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

8th NATIONAL REPORT OF SPAIN

July 2024

GOBIERNO DE ESPAÑA
VICEPRESIDENCIA TERCERA DEL GOBIERNO
MINISTERIO PARA LA TRANSICIÓN ECOLÓGICA Y EL RETO DEMOGRÁFICO

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Section A. Introduction

A.1. Presentation of the report

This document comprises the **Eighth** National Report by Spain to comply with the provisions of Article 32 of the *Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management*, held in Vienna on 5 September 1997.

This report will be examined at the Eighth Review Meeting of the Contracting Parties established in Article 30 of said Convention, which will begin on **17 March 2025**. Its preparation involved the Spanish Ministry for Ecological Transition and Demographic Challenge (MITERD), the Nuclear Safety Council (CSN), Empresa Nacional de Residuos Radiactivos, S.A., S.M.E. (Enresa) and the Nuclear Energy Committee (CEN) of the electrical companies. This report summarises the main actions implemented from **1 January 2020 to 31 December 2023.**

The baseline for authoring the report takes into account the International Atomic Energy Agency (IAEA) document INFCIRC/604 "Guidelines regarding the Form and Structure of National Reports," **in its fourth revision**, adopted by the Contracting Parties under the provisions of Article 29 of the Convention.

By way of introduction, Section A.2 contains an executive summary of the progress seen since the Seventh National Report, including pending actions indicated in Section K of said report and those others resulting from the commitments given by Spain at the **Seventh Review Meeting**, with reference to the article of the report under which they are developed. Section A.3 sets out some of the measures adopted in Spain in connection with those shared issues that were to be addressed in this national report, as agreed by the Contracting Parties at the **Seventh Review Meeting**.

In general, Sections A, B, C and D aim to be self-explanatory, while the remaining sections simply set out the developments occurring or the actions performed in order to fulfil the articles of the Convention, referring to previous national reports or the annexes in order to avoid repetition. The latter includes additional information on the applicable regulations within the sphere of the Convention, the process for licensing nuclear facilities, the management of nuclear and radiological emergencies in Spain, the funding of activities under the General Radioactive Waste Plan (GRWP), and the synoptic matrix.

Section K of this report presents an account of the continuous safety improvement process, based on the explicit identification of areas for improvement in progress and planned. This section also indicates several of the main strengths and developments undertaken by Spain within the Convention, which could serve as a reference for other Contracting Parties. The same section corroborates Spain's and its institutions' commitment to the international community and the principles of openness and transparency in the sphere of regulations and safety.

The analysis conducted during the preparation of this report allows us to assert that while there is always room for improvement, Spain complies with the objectives, requirements and measures set out in the Joint Convention and has in place the necessary infrastructure and experience for the safe management of spent fuel and radioactive waste, from the institutional, administrative, technical and economic/financial perspectives.

A.2. Executive summary: developments within the context of spent fuel management and radioactive waste management subsequent to the SEVENTH National Report

This executive summary highlights the key developments and actions taken since the last national report on spent fuel and radioactive waste management in Spain.

The spent fuel managed in Spain comes from seven nuclear reactors in operation at five sites, along with **Santa María de Garoña Nuclear Power Plant** and José Cabrera Nuclear Power Plant, which are currently in the process of being decommissioned. The Vandellós I reactor has been in the latent phase since January 2005. According to the Convention, these power plants are also radioactive waste management facilities.

Overview of Cofrentes Nuclear Power Plant (Valencia).

There are also other nuclear facilities in operation: the Juzbado Fuel Element Factory in Salamanca, El Cabril radioactive waste disposal facility (El Cabril Disposal Facility) in the province of Cordoba and the Centre for Energy-related, Environmental and Technological Research (Ciemat) in Madrid, which is currently in the process of decommissioning a number of its obsolete facilities. Radioactive waste is also produced at around a thousand hospitals, industrial facilities and research centres. Lastly, radioactive waste may be generated due to the presence of sources and other radioactive materials at facilities or in activities not covered by the regulatory system (radioactive material detected in metallic materials, at seaports or from practices that predate the existence of nuclear regulation).

Section B.3 describes in detail the origin of spent fuel and radioactive waste in Spain.

View of Juzbado Fuel Element Factory in Salamanca.

Section K of the **Seventh** National Report indicated the following areas for improvement and planned actions in Spain to improve safety in the management of radioactive waste and spent fuel:

- **Complete the transposition into the Spanish legal system of Council Directive 2013/59/Euratom of 5 December 2013, mainly providing the basic safety standards for protection against the dangers arising from exposure to ionising radiation through the *approval of a new Regulation on Health Protection against the Dangers arising from Exposure to Ionising Radiation* and of a new Regulation on Nuclear and Radioactive Facilities;**
- The approval of a Seventh General Radioactive Waste Plan (GRWP);
- **Expansion of the capacity of El Cabril Disposal Facility;**
- **Implementation of the Action Plans resulting from the combined IRRS-ARTEMIS mission.**

The developmental status of these initiatives was updated and debated during the presentation of the report at the **Seventh** Convention Review Meeting, following which a request was also made for the **Eighth** National Report to present an account of progress under the various challenges indicated:

- **Maintain existing staff skills in the short and medium term in the face of increasing average age;**
- **Develop a long-term solution for spent fuel and high-level waste management.**

Although various sections of this report address these matters in depth, the key advances achieved regarding these topics are highlighted below, along with other developments seen in the management of radioactive waste and spent fuel, or in connection with this.

A.2.1. Complete the transposition into national law of *Council Directive 2013/59/Euratom of 5 December 2013, laying down basic safety standards, mainly for protection against the dangers arising from exposure to ionising radiation, by adopting a new Regulation on Health Protection against the Dangers from Exposure to Ionising Radiation* and a new Regulation on Nuclear and Radioactive Installations

Council Directive 2013/59/Euratom of 5 December 2013, laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation, is the result of the modification and consolidation of five previous directives, which it repeals, establishing uniform basic safety standards applicable to the protection of the health of persons subjected to occupational, medical and population exposure to risks arising from ionising radiation. The Directive applies to any situation of planned, existing or emergency exposure that would entail a risk of exposure to ionising radiation that cannot be considered negligible from the perspective of radiation protection or in relation to the environment.

Given its complexity, the Directive is being transposed into Spanish law by means of various regulatory provisions, the scope of application of which is attributed to different Ministries and the Nuclear Safety Council, with an indication being given below only of those that are of the greatest significance within the scope of this Convention.

With regard to the Seventh National Report, two important steps have been taken to complete the transposition of this Directive:

- **Firstly, the amendment of the Law 25/1964, of 29th of April, on Nuclear Energy (LNE), in relation to radiologically contaminated sites, by *Royal Decree-Law 6/2022, of 29 March, adopting urgent measures in the framework of the National Plan in response to the economic and social consequences of the war in Ukraine*;**
- **Secondly, the approval of the Regulation on Health Protection against the Dangers from Exposure to Ionising Radiation, approved by Royal Decree 1029/2022 of 20 December.**

The modifications introduced by this new regulation and by the Regulation on Nuclear Safety at Nuclear Installations make it necessary to revise the Regulation on Nuclear and Radioactive Facilities (RINR), approved by Royal Decree 1836/1999, of 3 December, in order to coherently complete the regulatory framework relating to nuclear energy, transposing those aspects of Directive 2013/59/Euratom that affect its scope of application and harmonising its content with the provisions of the aforementioned regulations.

Additional information as to the provisions being processed may be found in Article 19.2 of this report.

A.2.2. The approval of a Seventh General Radioactive Waste Plan (GRWP)

On 27 December 2023, the Council of Ministers, at the proposal of MITERD, approved the 7th GRWP, a document establishing the Government's policy on the management of radioactive waste, including spent fuel, and the dismantling and closure of nuclear facilities.

This 7th GRWP has undergone a long process, which began in March 2020 with the dissemination of the draft plan. This is the first GRWP to be subject to a strategic environmental impact assessment—which also includes a consultation and public information phase—and to a report by the Nuclear Safety Council and the Regional Governments to ensure broad participation, consensus and social support.

The 7th GRWP is in line with the National Integrated Energy and Climate Plan 2021-2030 (PNIEC), which sets the roadmap for Spain to meet the European climate and energy targets, and with the Protocol for the orderly shutdown of nuclear power plants, signed in March 2019 between Enresa and the owners of the nuclear power plants.

The approved plan provides a reference scenario that includes:

- Cessation of nuclear power plant operations between 2027 and 2035;
- The dismantling of nuclear power plants starts three years after their definitive cessation of operation, except for Vandellós I, the last phase of which will be implemented in 2030;
- Continued operation of El Cabril Disposal Facility for low-, intermediate- and very low-level waste until the dismantling of the plants has been completed;
- Continuation of actions to increase the capacity of Individualised Temporary Storage (ITS) facilities for spent fuel at nuclear power plants, allowing for their operation and decommissioning;
- Start-up of seven Decentralised Temporary Storage facilities (DTSs) at the nuclear power plant sites for spent fuel and high-level waste until their transfer for final disposal. The DTS at each plant will consist of its ITS plus a new complementary facility or additional measures allowing for the maintenance of the casks in which the spent fuel is stored when the plant ceases to be operational;
- As regards the Centralised Temporary Storage (CTS) project provided for in the Sixth GRWP, the 7th GRWP, in view of the lack of a social, political and institutional consensus required to designate a site for the CTS, has opted for the aforementioned DTS, a decision that has meant the definitive abandonment of the project;
- Final storage of spent fuel and high-level waste in a Deep Geological Repository

(DGR), which is the solution chosen by the most advanced countries in this field. The 7th GRWP establishes a roadmap for a DGR in Spain, ensuring a prior process of public information and participation along the lines of those developed in European countries that have already decided on the location of their DGRs, such as Finland, Sweden, Switzerland and France.

Further information on the latter issue can be found in Section B.1.

A.2.3. Expansion of the capacity of El Cabril Disposal Facility

Spain manages low- and intermediate-level radioactive waste (LILW), as well as very low-level waste (VLLW) at El Cabril Disposal Facility. This facility has the authorised capacity to manage VLLW, allowing it to manage the waste expected to be generated, while in the case of LILW, in the timeframe of this report, more specifically in 2022, Enresa submitted the documentation to the competent authorities to request the expansion of capacity through the construction of the Southeast Platform, which will double the current physical capacity and cover the estimates associated with the 7th GRWP. The project is still in the pipeline, in order to obtain the necessary authorisations for the start of the material execution of the works.

Further details are provided under Section B.5 and in Article 13.

A.2.4. Implementation of the Action Plans resulting from the combined IRRS-ARTEMIS mission

In October 2018, Spain received a combined IRRS-ARTEMIS peer review mission (the first of its type) under the auspices of the International Atomic Energy Agency.

The final report resulting from the mission identified certain recommendations and suggestions that need to be addressed, to which end an Action Plan was established, with the corresponding actions, owners and milestones.

This final report is available on the MITERD and CSN websites, along with a summary and developments in relation to the request for the follow-up mission, which can be found in Section K.4 of this report.

A.2.5. Maintain existing staff skills in the short and medium term in the face of increasing average age

The CSN is continuing to develop a knowledge management model specifically adapted to its needs, based on the recommendations of the IAEA. This model will be fully incorporated into its Management System and employ the characteristic elements of knowledge management already in place.

The knowledge management process for the CSN should address the four basic pillars of the model recommended by the IAEA. It is structured as a cross-cutting process of a cyclical nature, the stages of which are as follows:

- Identification of the capabilities required by the CSN to perform its mission.
- Periodic assessment of the resources available at the CSN.
- Permanent assessment of the gaps, deficiencies and losses of information, documentation and knowledge of the CSN.
- Programme for the preservation of critical knowledge and the continuous improvement of capabilities.
- Internal communication plan to ensure the dissemination and accessibility of knowledge and information.
- Programme for independent assessment and periodic review of the process.

Furthermore, in relation to knowledge management at Enresa, a General Training Plan was adopted in 2018 designed to meet the specific needs of each department. In addition, Enresa's R&D+I Plan also contains a series of activities on knowledge management, return on experience and knowledge transfer in its infrastructure and coordination area. These include an induction plan for new recruits every six months, conceived as a form of mentoring, training plans in force, etc.

In this regard, Enresa is participating in different activities at a national and international level on the analysis and preservation of knowledge, competence and skills.

As regards nuclear facility operators, knowledge management is carried out taking into account the implementation of the Strategic Plan. New hirings are planned sufficiently in advance in order to schedule the necessary training of the staff replacing those retiring with sufficient time and with the appropriate overlap for the transfer of as much knowledge as possible to the replacement. In the case of organisational strengthening, the required training is given before taking up the job.

In addition, several educational programmes in Spain provide their students with in-depth knowledge of the theoretical and practical basics of nuclear engineering and the technology associated with energy production by means of nuclear fission. These educational programmes enjoy the collaboration of the CSN, the Licensees and national and international organisations.

More information on this subject may be found in Article 20 and Article 22.1 of this report.

A.2.6. Development of a long-term solution for the management of spent fuel and high-level waste

For the purposes of the 7th GRWP, temporary storage, followed by a final disposal facility, is considered the preferred and basic option for the management of spent fuel (SF) and high-level waste (HLW).

The activities previously performed in relation to definitive management have been fundamentally limited to consolidating and updating the knowledge acquired in in-house projects and international developments in this area.

The 7th GRWP establishes the strategic lines of action for the definitive management of SF and HLW, which are designed, on the one hand, towards maintaining and updating the information previously developed and, on the other, towards the analysis and formulation of legislative proposals that establish the decision-making process and the definition of the most appropriate framework for participation.

As a new development in this area since the previous report, it should be mentioned that Spain hosted an international seminar on the DGR organised by the CSN and Enresa in November 2022.

Further information can be found in Article 10.

A.2.7. Current status of ITS and actions for their extension

In its reference scenario, the 7th GRWP provides for the continuity of actions to increase the capacity of the ITS for spent fuel at nuclear power plants, allowing for their full operation and subsequent decommissioning.

In this regard, in the period covered by this report, following the authorisation for the start-up of the modification on 25 May 2021, the ITS at Cofrentes Nuclear Power Plant came into operation. Furthermore, during this period, the licensing procedure for an ITS at Vandellós Nuclear Power Plant, the only plant that does not have dry storage capacity, has been initiated. In addition, given that, in accordance with the useful capacity of the pools and the ITSs at Ascó, Almaraz and Cofrentes, and with the forecasts for spent fuel generation at these plants, there is insufficient storage capacity to allow their continued operation until the date of definitive cessation of operations provided for in the National Integrated Energy and Climate Plan 2021-2030 (PNIEC) and subsequent decommissioning, design modification authorisations have been requested for the construction of new ITS facilities to complement the current ones.

More information on this can be found in Section B.4.1 and Article 6.

A.2.8. Current situation regarding the decommissioning of José Cabrera and Santa María de Garoña Nuclear Power Plants

José Cabrera Nuclear Power Plant and Santa María de Garoña Nuclear Power Plant are shut down and in different administrative situations.

The former ceased operations in April 2006. The decommissioning and restoration of José Cabrera NPP is currently being carried out by Enresa, in accordance with the authorisation granted by Ministerial Order ITC/204/2010 of 1 February 2010, which includes the nuclear safety and radiation protection limits and conditions to which the performance of this activity must conform, along with the complementary technical instructions issued by the CSN. On 31 December 2023, it is estimated that the activities of the dismantling and closure plan established have been executed at approximately 99.2%, and site restoration activities have now commenced.

Santa María de Garoña NPP is at the beginning of phase 1 of dismantling, following receipt of the authorisation for the transfer of ownership and phase 1 of dismantling of this plant under Ministerial Order TED/796/2023 of 13 July.

More information on this subject may be found in Section D.5 and Article 26.

Picture of the decommissioning of José Cabrera Nuclear Power Plant.

A.3. Overarching common issues: Developments within the context of spent fuel management and radioactive waste management subsequent to the seventh National Report

The Contracting Parties gathered at the **Seventh** Review Meeting agreed, where applicable, to address the actual measures adopted in the implementation of the following matters in the national reports for the **Eighth** Review Meeting:

A.3.1. Competence and staffing in relation to the schedule of the spent fuel management and radioactive waste management programmes

In accordance with a suggestion resulting from the IRRS mission received within the framework of the combined IRRS-ARTEMIS, the CSN has performed an analysis of the essential knowledge and skills required for the correct performance of its functions, following the Systematic Approach to Training (SAT) methodology, the objective of which is to determine: the learning objectives in accordance with the results obtained from a previous job analysis; the design of the training programme and its implementation, based on these learning objectives; the tools and human resources required for their satisfactory achievement; the assessment of the degree of personal compliance with the learning objectives established; and finally, the evaluation and revision of the training programme, based on the performance of staff in their job positions. The CSN training plan and the results of the analysis performed using SAT methodology guide a quantitative strategic reflection on the human resources of the CSN.

In this regard, the limited coverage of the positions offered for the selection of technicians, along with the planned retirements, determine that the attraction of professionals is one of the organisational challenges facing the entity, in a scenario in which the CSN should at least maintain staff numbers required to effectively and efficiently meet the challenges it will face in the short and medium term. In order to address this challenge, a talent attraction programme has been drawn up, allowing, among other measures, the CSN (and its functions) to be advertised as an attractive place for the development of a professional career.

In parallel, the CSN should continue to develop measures for the retention of existing talent. The recently adopted professional career model and the improvements in remuneration that have been introduced contribute to this end. The SAT project, knowledge management and the CSN training plan are key elements for human resources management in the short and medium term.

Competence and staffing are challenges facing Enresa, as are many organisations in the nuclear field that were established in the 1980s and 1990s. This problem was detected a long time ago; thus, in the combined IRRS-ARTEMIS mission, one of the suggestions resulting from ARTEMIS included addressing it.

Enresa is aware of this challenge and has an employment plan in place to address it. While 20 employees will retire in 2023, out of a total workforce of 361 employees on 31 December 2023, 32 people have joined Enresa in the same year, 20 of whom are graduates. In the short and medium term, Enresa's managers need to envisage the human resources required in their areas so that they can be taken into account in the budget. The most recent staff planning is being introduced for the period 2024-27. Enresa's staff recruitment process must follow the channels envisaged for all public enterprises, which implies, among other things, that the Directorate-General for the Civil Service of the Ministry for Digital Transformation and the Civil Service approves the recruitment requests brought before it each year, based on the employees that have left in the previous year.

In parallel to this, and as described in Section A.2.5, Enresa applies a knowledge management plan to guarantee the technical skills of its employees. This includes a welcome plan for new recruits every six months, conceived as a form of mentoring, training plans in place, etc.

This is particularly important in the context of the current policy of abandoning nuclear electricity production and planned decommissioning. This schedule results in the performance of several decommissioning operations simultaneously, with the consequent need for Enresa to hire and train its personnel in a timely manner. The current decommissioning of Santa María de Garoña NPP has made it necessary to hire 30 people. Developing a specific staff needs plan for subsequent years will also be necessary. The preliminary phases of the decommissioning operations will be dealt with using the existing authorisations and the human teams will be increased in accordance with the established hiring channels.

Furthermore, the process of finding a site for the DGR entails the need to reinforce the human resources assigned to this activity. This will materialise as the process of implementing regulations progresses.

As regards nuclear facility operators, workforce planning takes into account the implementation of the Strategic Plan, retirement plans, and the time dedicated to qualification activities. A systematic design inspired by the SAT methodology referred to above has been adopted to analyse the skills required and training needs in relation to nuclear safety-related activities performed at nuclear facilities.

More information on this subject can be found in Article 20 and Article 22.1 of this report.

A.3.2. Inclusive public participation in radioactive waste management and spent fuel management programmes

Public participation is fully integrated into national legislation in relation to radioactive waste management. On the one hand, the contents of the Aarhus Convention have been transposed into domestic law, most notably by *Law 27/2006, of 18 July, regulating the rights of access to information, public participation and access to justice in environmental matters*. On the other hand, nuclear legislation specifically includes rules guaranteeing public information and participation. The criteria of transparency and public participation with respect to the management of spent nuclear fuel and radioactive waste are regulated under the GRWP, in accordance with Royal Decree 102/2014 of 21 February, on the responsible and safe management of spent nuclear fuel and radioactive waste.

The most recent experience of public participation took place during the approval process of the 7th GRWP. The draft GRWP was subject to a strategic assessment in compliance with the Law on Environmental impact assessment 21/2013 of 9 December. Throughout this assessment, a large number of contributions (a total of 588) were received from institutions interested in radioactive waste management and from the public. These 588 contributions are distributed as follows: 48 reports were received as a result of the specific consultation of 181 organisations, and 540 pleas from individuals and groups representing the public were received during the public information period. After detailed analysis, all contributions received a reasoned response, which was incorporated into the dossier.

Public participation has its greatest impact when it is accompanied by information campaigns and a proactive movement to bring these issues closer to the public. Both Enresa and the CSN are making significant efforts in this regard.

At Enresa, it is essential to publicise the facilities and activities carried out, paying special attention to the local communities in the areas surrounding the waste management facilities. In 2023, around 3,500 people visited El Cabril Disposal Facility, which has had a new museum space since the end of 2022, and 2,100 visitors were received at the nuclear power plants being decommissioned. Within the general communication policy, it is especially important to address young people, and in this regard, mention should be made of the visits aimed at schools and secondary education centres or collaboration with university centres.

The regulatory body's Strategic Plan for 2020-2025 includes Strategic Objective 5.8, which aims to reinforce the CSN's Advisory Committee for information and public participation and promote an increase in stakeholders' participation in regulatory decisions.

Furthermore, on 4 April 2022, an agreement was signed between the CSN and the Association of Municipalities of Areas with Nuclear Power Plants and Radioactive Waste Disposal Sites (AMAC) to reinforce communication with the populations in areas with

nuclear facilities in Spain and to assess their perception of the information supplied. This agreement aimed to implement initiatives to improve the public's perception of the CSN's mission to guarantee nuclear safety and radiation protection and provide better access to the different areas of knowledge, improving the organisation's communication and transparency.

Within the framework of the aforementioned CSN-AMAC agreement, the following activities have been carried out: i) workshops in areas with nuclear power plants and at El Cabril Disposal Facility with mayors, representatives of civil society, associations, etc.; ii) workshop with members of local information committees (CLI) to identify ways of improving the operation of the CLI, attended by numerous mayors of the municipalities affected, as well as staff from Enresa, the nuclear power plants, the Ministry, etc.; iii) workshops aimed at members of the local information committees (CLI) to identify ways to improve the operation of the CLI; iii) workshops aimed at students in the second year of advanced secondary education and vocational training; iv) drawing up of a report by a sociological research company (CERES) to determine the level of public interest and satisfaction with the issues dealt with, and to identify opportunities for improvement in the information and communication provided.

The first three activities have made it possible to strengthen the lines of communication with the municipalities affected by nuclear facilities and to make the CSN an institution that is approachable to the public, conveying information that is understandable, appropriate and accessible to the entire public, bearing in mind that many of the people present were neither specialists nor had any training in the issues addressed.

By addressing nuclear safety, radiation protection and radioactive waste management in this way, the public has gained a better understanding of the functions of the regulatory body, and also gained a better understanding of how these functions are carried out, what resources are available, how nuclear facilities are supervised and controlled by the CSN, and what the results of this supervision and control are.

Furthermore, the activities performed under this agreement have served to make society aware that the CSN is responsible for the safety and protection of the population and the environment with respect to the harmful effects of ionising radiation, and that Spain has a complete and consolidated environmental radiological monitoring system that is periodically verified by the European Commission, which instils even greater confidence.

The final report prepared by CERES indicates that the attributes associated with the CSN are, above all, responsible, useful and efficient, followed by active, transparent and independent. This is consistent with the CSN's level of credibility, which is clearly greater than that of other institutions.

Thus, it may be concluded that the Agreement signed between the CSN and AMAC has largely achieved its aims, stressing that a very high percentage (more than 50%) of those attending the different workshops state that their opinion of the CSN has changed in a positive way.

A.3.3. Management of the ageing of radioactive waste and spent fuel packages and facilities, taking into account extended storage periods

The Nuclear Safety Regulation, which transposes Directive 2014/87/Euratom into Spanish law as regards basic nuclear safety requirements, which includes the ITSs within its scope of application, requires the safety evaluation of the facility in order to determine that an adequate level of nuclear safety has been achieved and that the facility meets the safety objective. The aforementioned Regulation also requires that subsequent periodic safety evaluations be carried out in order to obtain an overall assessment of the performance of the facility and allow improvements to be made to the nuclear safety of the facility, taking into consideration, among other things, aspects relating to ageing.

The CSN has established the requirements for the management of ageing during the design period and long-term operating life of nuclear power plants, including spent fuel temporary storage facilities located at their sites, as well as for dry storage systems or casks planned for use at such facilities, by means of the instruments provided for in the law under which they were created.

In accordance with applicable regulations, the use of casks for the dry storage of spent fuel requires obtaining design approval for these systems, the validity of which is granted for a maximum period of twenty (20) years.

The strategic lines established in the 7th GRWP lead to an increase in the period of dry storage of spent fuel in licensed storage casks, thus implying the need to renew the respective approvals granted by the Directorate-General of Energy Policy and Mines for the different cask designs currently in service at the temporary storage facilities located at the nuclear power plant sites.

The applicable regulations establish that requests for renewal are supported by a justification that the storage period provided for in the original design approval, or in subsequent renewals, has not adversely affected the structures, systems and components of the cask considered to be important for safety, and that these, therefore, maintain the functions defined in the design during a new period of operation.

In practice, this justification is supported by the cask Life Management Plan (Spanish acronym: PGV), which is defined as the programme of ageing management actions specifically established for each cask design. The plan aims to achieve the cask's service life without affecting safety and maintain compliance with the licensing terms and conditions in force.

Furthermore, although the time for the transportation of spent nuclear fuel for intermediate or final management in Spain may be delayed by several years, this transportation is considered to be one more stage in the management of spent fuel and is regulated by a series of requirements imposed on the transportation packages, which are based on the

IAEA Regulations for the safe transportation of radioactive materials. Specifically, the incorporation of the requirements of the IAEA standard SSR-6 on the Transport of Radioactive Waste into the national legal system requires that in adapting the package designs to this standard, consideration be given to prior disposal of the waste, if applicable, in the life management of the transportation packages.

As the owner of the ITSs, Enresa has to carry out the LMPs for the spent fuel disposal systems mentioned above. In this regard, when drawing up these plans for the ITSs at José Cabrera, Ascó, and Cofrentes NPPs, different technical requirements will have to be applied to the HI-STORM 100Z (José Cabrera NPP fuel), HI-STORM 100 (Ascó NPP fuel), and HI-STAR 150 (Cofrentes NPP fuel) spent fuel storage systems, respectively.

The national standards of reference in this regard are included in two CSN Safety Instruction: IS-20, which establishes the safety requirements relating to spent fuel storage casks which include consideration of ageing, and IS-29 on *safety criteria at spent fuel and high-level waste disposal facilities*, which includes in Section 4.4 the following provision: "During the period of planned disposal, the Licensee shall implement a life management programme for the systems, structures and components defined as important for safety and define the intervals for preventive or corrective maintenance, periodic testing and inspection necessary to maintain the safety of the temporary storage facility by means of the necessary reliability and classification".

In addition to these safety instructions, the methodology for performing LMP preparation activities is used by US nuclear power plants to prepare their licence renewal applications for dry storage systems, in accordance with 10 CFR 72 and NEI 14-03. This methodology is based on documents of the US National Regulatory Commission and others, such as the *"Standard Review Plan for Renewal of Specific Licenses and Certificates of Compliance for Dry Storage of Spent Nuclear Fuel"* (NUREG-1927, Rev. 1 Ref. 8), Standard Review Plan for Spent Fuel Dry Storage Systems and Facilities (NUREG-2215, Ref. 9), Managing Aging Processes in Storage (MAPS) Report (NUREG-2214, Ref. 10), and Implementation of Aging Management Requirements for Spent Fuel Storage Renewals (R.G. 3.76, Ref. 12). It also takes into account the safety-related classification according to NUREG/CR 6407 (Ref. 13), Classification of Transportation Packaging and Dry Spent Fuel Storage System Components According to Importance of Safety.

In general, the ITS LMPs include the following phases:

- Evaluation of scope and selection;
- Development of the Ageing Management Review and identification of Ageing Analyses over time;
- Development of Ageing Management Programmes;
- Review and update of the safety study;

- Prepare the manual for the implementation of the Ageing Management Programmes;
- Drawing up the plan for monitoring the operational experience of the Life Management Plan.

A.3.4. Long-term management of disused sealed sources, including sustainable options for regional and multinational solutions

The management of sources in Spain has developed thanks to the regulatory framework, which has given Enresa the power to conduct a range of actions in this regard since 1986, such as removing sources or temporarily storing and disposing of them.

The preferred operational approach regarding radioactive sources is to return to the original supplier, or if this is not possible, temporary storage and disposal, both at El Cabril Disposal Facility. From time to time, Enresa has participated in initiatives and activities to reuse and recycle these sources abroad, resulting in exporting these materials to countries with the type of facilities required for this purpose.

Regarding temporary storage, disused sources removed by Enresa have been held in temporary storage at El Cabril Disposal Facility since 1993.

With regard to the disposal of disused sources, this takes place at El Cabril Disposal Facility, the near-surface centralised disposal facility for LILW, as Spain does not have any DGRs. A distinction may be made between separate periods during which different management models were applied, with the experience being presented below:

- From 1993 to 2000: disused sealed sources temporarily stored at El Cabril Disposal Facility, irrespective of the life of the isotope in question, were managed in accordance with compliance with the waste acceptance criteria for disposal in low- and intermediate-level vaults as established in the provisional operational permits granted to El Cabril Disposal Facility;
- From 2000 to 2014: disused sealed sources temporarily stored at El Cabril Disposal Facility with a half-life less than or equal to that of Co-60 were managed in accordance with compliance with the acceptance criteria for storage units, at either level 1 or level 2 for disposal in the low- and intermediate-level vaults as established in the operational authorisation;
- Since 2014: In addition to the above, sources with isotopes with a half-life greater than that of Co-60 and equal to or less than that of Cs-137 are also managed in accordance with the fulfilment of level I storage unit acceptance criteria.

Disused sealed sources temporarily stored at El Cabril Disposal Facility with a half-life greater than that of Cs-137 cannot be definitively disposed of. Those disused sealed sources that could not be definitively disposed of at El Cabril Disposal Facility would be added to the inventory of radioactive waste to be disposed of at the future disposal facility for high-level waste.

Detailed information on this framework can be found in Section J of this report.

B

Section B. Policies and practices

This section covers the obligations set out in Article 32, paragraph 1 of the Convention.

Article 32. Reporting

1. In accordance with the provisions of Article 30, each Contracting Party shall submit a national report to each review meeting of Contracting Parties. This report shall address the measures taken to implement each of the obligations of the Convention. For each Contracting Party, the report shall also address its:

   i. Spent fuel management policy;

   ii. Spent fuel management practices;

   iii. Radioactive waste management policy;

   iv. Radioactive waste management practices;

   v. Criteria used to define and categorise radioactive waste..

B.1. General policy and strategy for the management of radioactive waste and spent fuel

According to the provisions of Article 38 bis of the Law 25/1964, of 29th of April, on Nuclear Energy (LNE), regarding the management of radioactive waste, including spent nuclear fuel, and the dismantling and decommissioning of nuclear facilities, this constitutes an essential public service reserved for State ownership, entrusted to the public corporation Empresa Nacional de Residuos Radiactivos, S. A., S.M.E. (Enresa) in accordance with the terms of the General Radioactive Waste Plan (GRWP) approved by the Government. For these purposes, Enresa is established as an internal resource and technical service of the State Administration, performing the functions entrusted to it by the Government.

The Government is responsible for establishing the national policy and programme for radioactive waste management, including spent nuclear fuel and the dismantling and decommissioning of nuclear facilities, through approval of the GRWP.

According to Royal Decree 102/2014, of 21 February 2014, this Plan must make provision for the responsible and safe management of spent nuclear fuel and radioactive waste, the required actions, strategies and technical solutions to be undertaken in Spain in the short, medium and long term for the purpose of the responsible and safe management of spent nuclear fuel and radioactive waste, the dismantling and decommissioning of nuclear facilities and all other activities connected with the foregoing, including economic and financial provisions and the measures and instruments required for implementation.

The Plan is drawn up by Enresa and approved by the Government, at the proposal of the Spanish Ministry for Ecological Transition and Demographic Challenge (MITERD), following a report from the Nuclear Safety Council (CSN), and consideration of the opinions of the Spanish Regional Governments with regard to land-use planning and the environment. Furthermore, industry and social stakeholders are consulted during its processing, and a public information procedure is carried out via the MITERD website. Subsequently, the Spanish Parliament is informed of the approved plan.

In accordance with the regulations in force, the Plan is periodically reviewed, taking into account scientific and technical advances, the experience acquired, and the recommendations, lessons learnt and good practices derived from peer review processes, and establishes the reference framework for national spent fuel and radioactive waste management strategies.

For the purposes of verification of compliance with the GRWP, Enresa shall prepare and submit the following to the MITERD, responsible for strategic management and monitoring and control of Enresa's actions and plans, both technical and economic:

- During the first half of each year, an account including technical and economic aspects regarding activities in the previous year and the degree of compliance with the corresponding budget, in addition to an updated economic/financial study as to the cost of the activities set out in the GRWP, and the alignment of said cost with the financial mechanisms in force;

- By 30 November each year, a technical/economic justification of the annual budget corresponding to the next year and the forecast for the four following years;
- During the month following each calendar quarter, a budgetary monitoring report corresponding to said quarter.

Meanwhile, during the first quarter of each year, Enresa shall submit to the CSN, which is responsible for the control of safety in the management of spent nuclear fuel and radioactive waste and the execution of studies, assessments and inspections of the plans, programmes and projects required for all phases of such management, information as to the activities undertaken during the previous year and the forecasts for the year in progress with regard to the provisions of the GRWP.

The 7th GRWP was recently approved by the Council of Ministers on 27 December 2023, reflecting the technical solutions and updated economic forecasts on the basis of which Enresa performs its tasks and of which the competent authorities are informed in the various reports, accounts and justifications referred to above.

The content of the 7th GRWP is adapted to the regulatory framework derived from *Council Directive 2011/70/Euratom*, establishing an EU framework for responsible and safe management of spent nuclear fuel and radioactive waste, incorporated into Spanish law by Royal Decree 102/2014, of 21 February, on the responsible and safe management of spent nuclear fuel and radioactive waste. This Directive establishes that the Plan must be subject to periodic review in accordance with scientific and technical advances, the experience acquired, recommendations, lessons learned and good practices derived from the international peer review processes covered thereby.

In addition, approval of the 7th GRWP was necessary to align the Plan's reference scenario with the provisions of the Integrated National Energy and Climate Plan 2021-2030 (PNIEC) of 16 March 2021, which provides for the orderly closure of Spanish nuclear power plants over the period 2027-2035, in line with the provisions of the Protocol signed between the owners of these plants and Enresa in March 2019.

Furthermore, by means of this approval, the recommendation made by the international team of experts of the combined IRRS-ARTEMIS peer review mission that took place in Spain in October 2018, in relation to the regulatory infrastructure and its radioactive waste and spent fuel management programme, has been complied with.

Its processing procedure, the outline of which is shown in Figure 1, began on 10 March 2020, with Enresa submitting a proposal for the GRWP to the State Secretariat for Energy of MITERD in accordance with the provisions of *Royal Decree 102/2014, of 21 February*, on the responsible and safe management of spent nuclear fuel and radioactive waste. This proposal was made available to the public via the MITERD website. This procedure complied with both nuclear-specific and environmental regulations.

- Pursuant to the provisions of the LNE, the Government has approved the Plan at the MITERD's proposal, following a report by the CSN on nuclear safety and radiation protection and consultation with the Regional Governments on land-use planning and the environment.

- Furthermore, the 7th GRWP has been subjected to a strategic environmental assessment in accordance with the Law on Environmental impact assessment 21/2013, of 9 December, which consisted of the following actions:
  - At the request of the State Secretariat for Energy, the State Secretariat for the Environment sent the draft GRWP and an initial strategic document (DIE) to the affected public authorities and interested parties to carry out preliminary consultations to determine the scope of the strategic environmental study (EAE). Once these consultations were completed, on 29 October 2020, the EAE scope document was approved.
  - Once the scope had been determined, Enresa prepared a new revision of the draft, as well as the strategic environmental study and a non-technical summary thereof, which were submitted by the State Secretariat for Energy for public information and consultation with the public authorities, affected and interested parties between 11 April 2022 and 16 June 2022.
  - Taking into account the pleas received during these procedures, Enresa drew up a new revision of the GRWP, which was submitted to the aforementioned report by the CSN and the Regional Governments.
  - Taking into account the CSN report and the contributions of the Autonomous Communities, the GRWP was revised and, along with a new version of the EAE and the results of the consultations, was submitted to the State Secretariat for the Environment for technical analysis. Following the aforementioned analysis, on 14 July 2023, the State Secretariat for the Environment formulated the Strategic Environmental Statement (SEA) of the GRWP, the environmental conditions of which have been taken into account in the final version of the GRWP.

- Competent Authority and developer (OS): DG of Energy Policy and Mines (Secretary of State for Energy).
- Environmental authority (OA): DG of Quality and Environmental Assessment Secretariat.

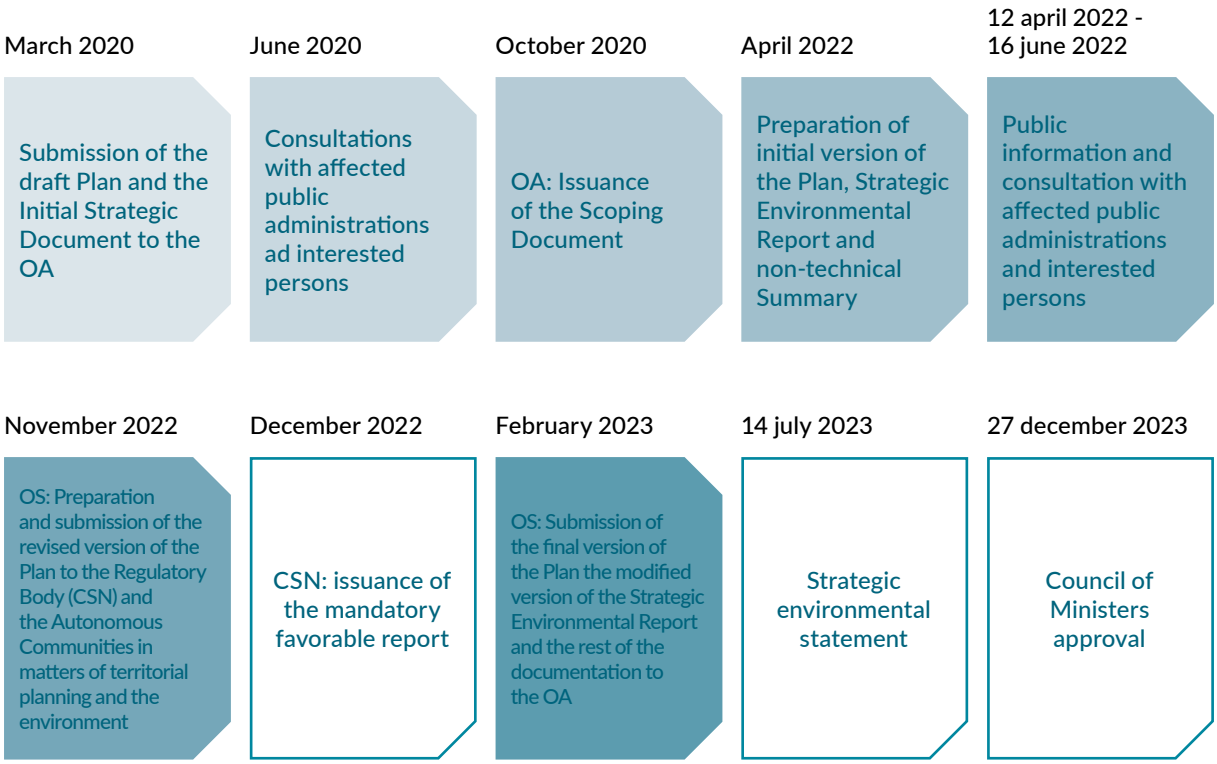


Figure 1. Structure of the procedure for the approval of the 7th GRWP.

B.2. Classification of radioactive waste

The concept of radioactive waste is defined in Article 2 of the LNE:

> *"Radioactive waste is any discarded material or product with no planned use, and which contains or is contaminated with radionuclides of concentrations or activity levels higher than those established by the Ministry of Energy, following a report by the Nuclear Safety Council"*

Waste is categorised in Spain in accordance with the management facilities authorised for a certain volume, radiological inventory and certain specific activity concentration limits in accordance with the nature of the different radioactive elements present. In practice, **as shown in Table 1**, the different categories of facility correspond to the radioactive waste classification criteria adopted by the IAEA and the European Commission:

- What is known as low- and intermediate-level waste (LILW) comprises waste with an activity level essentially caused by the presence of beta- or gamma-emitting radionuclides, with a short or intermediate half-life (less than 30 years) and with a very low, limited content of long-lived radionuclides. This group comprises waste which may be temporarily stored, treated, conditioned and disposed of at El Cabril Disposal Facility in the province of Cordoba. This includes very low-level waste (VLLW), comprising a

subset of low- and intermediate-level waste, and in general, revealing specific activity levels of between one and 100 Bq per gramme, potentially rising as high as several thousand in the case of certain radionuclides with low radio-toxicity or in the case of small amounts.

- High-level waste (HLW) contains long-lived alpha-emitters with a half-life of more than 30 years in appreciable concentrations, which generate heat because of the effect of radioactive disintegration, as they have a high specific activity. The main exponent in this group is spent fuel (SF) discharged from nuclear reactors, which, in accordance with Spanish policy, is considered waste. This is currently stored in the pools of nuclear power plants and the Individualised Temporary Storage (ITS) facilities in place at some plants. Further disposal in the Deep Geological Repository (DGR) is planned for the future.
- Furthermore, special waste (SW) refers to additions for nuclear fuel, neutron sources, used in-core instrumentation, or replaced components derived from the reactor cooling system and the internal reactor components, generally of metallic nature, which, because of their radiological characteristics cannot be managed at the installations of El Cabril Disposal Facility. As long-lived waste has a significant activity level, temporary storage and disposal of such materials are handled similarly to HLW.

National system classification		GSG-1 classification IAEA
RBBA	Very low-level waste	VLLW
RBMA	Low- and intermediate-level waste	LILW
RE	Special waste	ILW
RAA	High-level waste	HLW

Table 1. Classification of radioactive waste in Spain.

B.3. Generation of spent fuel and radioactive waste

Spain generates and has generated radioactive waste at nuclear facilities and radioactive facilities distributed nationwide, as may be seen in Figure 2.

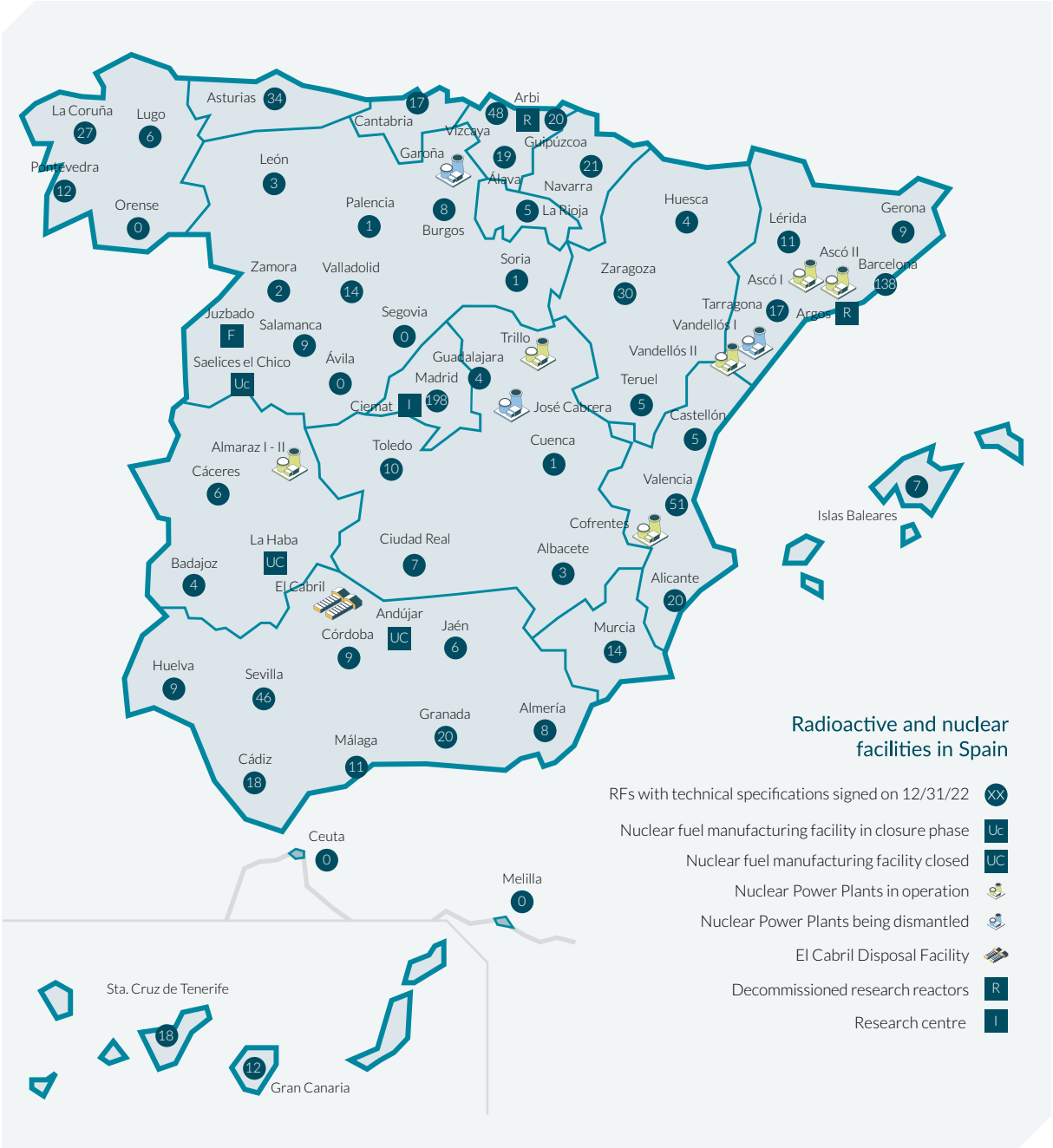


Figure 2: Location of nuclear reactors and other radioactive waste-generating facilities.

The inventories generated to date have been produced by the regular operation of nuclear and radioactive facilities and the implementation of decommissioning projects at various facilities, including Vandellós I and José Cabrera Nuclear Power Plants, and installations in disuse covered by the PIMIC-D project undertaken at the Centre for Energy-Related, Environmental and Technological Research (Ciemat), as well as radiological incidents which have occasionally occurred at conventional facilities, associated with the processing and recycling of scrap metal.

The waste currently produced is derived from:

- Operation of nuclear power plants (seven reactors);
- Operation of the Juzbado Fuel Element Factory in Salamanca;
- The Ciemat facility improvement project (PIMIC);
- Operation of radioactive facilities for industrial, medical, agricultural and research purposes;
- Operation of El Cabril Disposal Facility;
- Decommissioning of José Cabrera Nuclear Power Plant and **Santa María de Garoña Nuclear Power Plant**;
- Waste may occasionally be generated due to other specific activities (incidents).

In order to estimate the volumes of waste expected to be generated as a consequence of the operation of the current portfolio of nuclear facilities, the 7th GRWP adopts the following reference scenario:

- Cessation of nuclear power plant operations in line with the PNIEC, which takes as a reference the Protocol signed between the owners of nuclear power plants and Enresa in March 2019. This protocol provides for the orderly cessation of operations of Spanish nuclear power plants in the period 2027-2035;.
- Open fuel cycle, i.e. the option of spent fuel reprocessing is not provided for.
- **Maintenance of the operating capacities of El Cabril Disposal Facility for LILW and VLLW during the operation and decommissioning of all the nuclear facilities;**
- **Maintenance of SF, HLW and SW management capacity at the nuclear power plants by means of ITS;**
- **Start-up of a Decentralised Temporary Storage facility (DTS) for SF, HLW and SW at each nuclear power plant with spent fuel (Almaraz, Ascó, Cofrentes, Santa María de Garoña, José Cabrera, Trillo and Vandellós II). The DTS at each plant will comprise its ITS or, where appropriate, its ITSs, plus a new complementary facility or additional measures that allow maintenance and repair operations to be performed on casks, thus guaranteeing the cask level recoverability function. The DTSs, including their**

complementary facilities or additional measures, will be operational prior to the start of the dismantling of the plant's fuel pool and will have all the safety and auxiliary systems required to be able to operate as an independent nuclear facility once the plant has been declared decommissioned. At José Cabrera NPP, in the final dismantling phase, the measures provided for cask level recoverability in the CSN information circular will be implemented between 2024 and 2029. The DTSs will remain operational until the transfer of all the SF, HLW and SW to the DGR;

- As stated in art. 3.2.1.e of CSN Instruction IS-29 and in accordance with the Safety Reference Level S-32 of WENRA WGWD, for the safety of spent fuel storage, according to the 7th PGRR by 2031 the necessary means will be in place at the site of one of the nuclear power plants to ensure the fuel assembly level recoverability function throughout the lifetime of the DTSs. This facility will have a hot vault for handling spent fuel and radioactive waste and the capacity to store casks to deal with potential contingencies at the DTSs throughout their operating life. It will also have a laboratory equipped with the necessary means to verify and inspect the state of the fuel and waste;
- Start-up in 2027 of a temporary storage facility at the Vandellós I NPP site to house the radioactive waste from the reprocessing of spent fuel and, where appropriate, the SW from the decommissioning of the plant. It will remain operational until all the radioactive waste has been transferred to the DGR;
- Start-up of the SF, HLW and SW DGR in 2073;
- Immediate total dismantling of the light water nuclear power plants. Site preparatory work will begin between three and preferably five years before the date of definitive shutdown, so that the transfer of ownership and start of the dismantling work can be carried out no later than three years after the definitive shutdown. During these years, work will be performed to empty the pools, as well as preparatory tasks for dismantling and issuance of decommissioning authorisation and transfer of ownership to Enresa. Once this authorisation is obtained, decommissioning works will begin, with an estimated duration of ten years. In the case of Vandellós I Nuclear Power Plant, the final phase of decommissioning will take place from 2030 onwards, and will last 15 years. The monitoring period established for the sites following completion of the work will be ten years, prior to the declaration of final decommissioning.

In accordance with the estimates on 31 December 2023, the total volume of radioactive waste generated to date in Spain is 84,200 m^3, of which 33,800 m^3 are VLLW, 41,100 m^3 are LILW, 200 m^3 are SW, and 9,100 m^3 are SF and HLW. In accordance with the above, the quantities of spent fuel and radioactive waste generated and managed in Spain to date, and the quantities planned for the future, are set out in Table 2.

Type of waste	Approximate volume (m^3)		
	Inventory at 31/12/23	Forecast generation	Total Inventory
VLLW	33,800	91,200	**125,000**
LILW	41,100	53,100	**94,200**
SW	200	3,700	**3,900**
SF and HLW	9,100	2,300	**11,400**
Total	**84,200**	**150,300**	**234,500**

Table 2. Spent fuel and radioactive waste generated and forecast in Spain.

Figure 3 below shows the distribution in percentage terms of the volume of spent fuel and radioactive waste generated and planned to be generated in Spain.

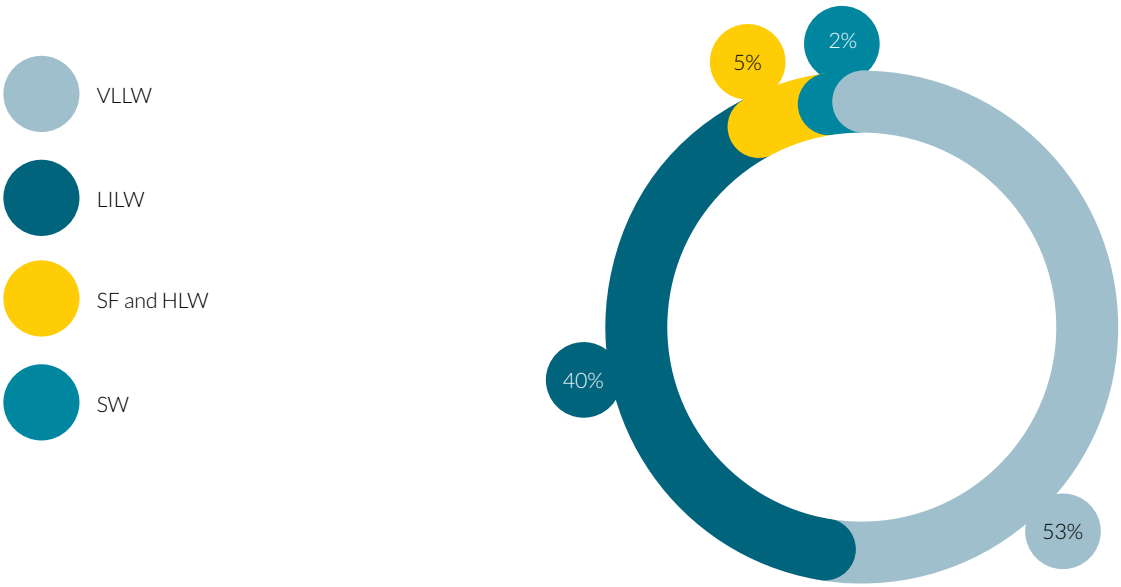


Figure 3. National inventory by type of radioactive waste.

In addition, significant quantities of tailings have been produced in Spain as a result of uranium mining and the manufacturing of concentrates (of the order of 77 million tonnes of mine tailings and some 14 million tonnes of process tailings on 31 December 2023), with low radioactive content and which, depending on their concentration, require specific management action. In most cases, "on-site" stabilisation has, to date, been the preferred management method.

B.4. Policies and practices for spent fuel management

The ongoing spent fuel management policy remains a once-through cycle, with provision made for the necessary strategies for temporary storage until a definitive solution is available, as set out in the **7th GRWP**.

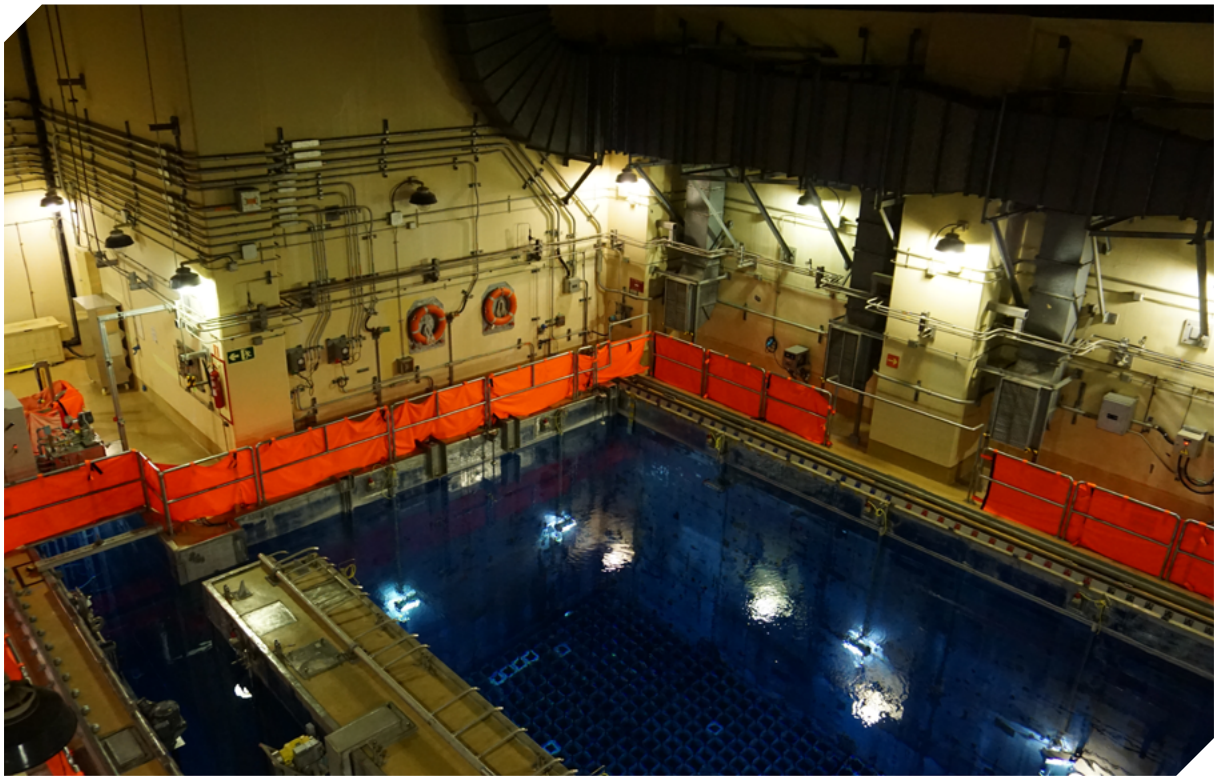
B.4.1. Temporary storage

The purpose of temporary storage is to provide sufficient capacity to accommodate SF generated by Spanish nuclear power plants until such time as a definitive solution is available. In line with this objective, the **7th GRWP contains the following strategies**:

- **Maintenance of SF, HLW and SW management capacity at nuclear power plants by means of ITS;**
- **Start-up of a DTS for SF, HLW, and SW at each nuclear power plant with spent fuel (Almaraz, Ascó, Cofrentes, Santa María de Garoña, José Cabrera, Trillo and Vandellós II). Each plant's DTS will consist of its ITS or, where appropriate, its ITSs, plus a new complementary facility or additional measures allowing maintenance and repair operations to be carried out on its casks to guarantee the cask-level recoverability function;**

The spent fuel of light water power plants generated within the Spanish nuclear portfolio has been stored in the pools of the power plants in question, as may be seen in Section D.1 of this report. As an initial measure adopted in response to the expected saturation of their capacity, over the course of the 1990s, the original pool frames were progressively replaced with other more compact designs, which in most cases significantly postponed the need to establish additional storage capacity facilities beyond the pools themselves.

The updated inventory of pools may be consulted in Section D.2, while matters regarding their operation are addressed in Article 9.



View of the pool at Vandellós II Nuclear Power Plant.

However, six Spanish nuclear power plants (Trillo, José Cabrera, Ascó, Almaraz, Santa María de Garoña and Cofrentes) already have ITS authorised at the sites themselves for the dry storage of spent fuel to supplement pool storage at the plants or as an alternative with a view to decommissioning. The details of these facilities may be found in Sections D.1 and D.2 and in Article 9.

During the period covered by this report, the ITS has entered into operation at Cofrentes Nuclear Power Plant following its licensing, in accordance with the Regulation on Nuclear and Radioactive Installations, approved by Royal Decree 1836/1999, of 3 December, as a design modification thereof. Other issues relating to its siting are described in Article 6, its design and construction in Article 7 and the assessment of its safety prior to construction and operation in Articles 8 and 9.1 of this report.

Furthermore, authorisation has been requested for the construction of an ITS at Vandellós II Nuclear Power Plant, which is the only plant that does not currently have dry storage.

Furthermore, given that, in view of the useful capacity of the pools and ITSs at Ascó, Almaraz and Cofrentes and the forecasts for the generation of spent fuel at these plants, there is not sufficient storage capacity to allow their continued operation until the date of final shutdown provided for in the PNIEC and subsequent decommissioning, design modification authorisations have been requested for the construction of new ITSs that are complementary to the current ones.

In addition, given that the ITS at Santa María de Garoña Nuclear Power Plant was designed and constructed at the time under the hypothesis of continued operation of the plant, following the granting of the authorisation for the transfer of ownership from Nuclenor, S.A. to Enresa and of phase 1 of the dismantling of this plant, Enresa has requested a design modification of the ITS in order to increase its capacity to allow for the temporary storage of all the fuel currently stored in the pool to be able to undertake the plant decommissioning work.

B.4.2. Disposal

Following a period of temporary storage, the 7th GRWP makes provision for the option of a DGR as a final management strategy for nuclear power plant spent fuel and high-level waste, in accordance with the indications given in the preamble to Directive 2011/70/Euratom, which acknowledges that the idea generally accepted by technical personnel is that at present the DGR represents the most sustainable and safest option as a waste management endpoint. In this regard, the main initiatives are intended to develop the technological capacities and social acceptance required in order to steer and implement the future disposal solution for SF, HLW and SW in a DGR.

Further details as to this management process may be found in Article 10 of this report.

B.5. Policies and practices for the management of radioactive waste

As indicated in the introduction to this report, the Government is responsible for establishing the policy for the management of radioactive waste, including spent nuclear fuel, and the dismantling and decommissioning of nuclear facilities, through the approval of the GRWP. This function of the Government is established by law, in Article 38 bis of the LNE.

As the management of high-level waste and special waste is associated with spent fuel management, discussed under previous headings, this subsection refers only to the policy for the management of LILW.

As previously stated in earlier national reports, LILW is produced in Spain as a result of the operation and decommissioning of regulated nuclear and radioactive facilities using radioactive substances or materials. It may also prove necessary to manage waste resulting from incidents at facilities that do not require authorisation within the regulatory framework for nuclear energy (such as steelworks, metal recycling plants, etc.). In order to address these latter cases, provision has been made for appropriate mechanisms for prevention and, where applicable, recovery of control over radioactive materials, ensuring safe management thereof as waste should the circumstances arise.

At present, Spain may be stated to have achieved an overall solution for the management of LILW, as it has an integrated system in place equipped with the necessary capacities, established on the basis of assigning responsibilities to a set of clearly identified agents operating in a structured manner.

As previously stated in earlier national reports, LILW is produced in Spain as a result of the operation and decommissioning of regulated nuclear and radioactive facilities using radioactive substances or materials. It may also prove necessary to manage waste resulting from incidents at facilities that do not require authorisation within the regulatory framework for nuclear energy (such as steelworks, metal recycling plants, etc.). In order to address these latter cases, provision has been made for appropriate mechanisms for prevention and, where applicable, recovery of control over radioactive materials, ensuring safe management thereof as waste should the circumstances arise.

It may at present be stated that Spain has achieved an overall solution for the management of LILW, as it has in place an integrated system equipped with the necessary capacities and established on the basis of assignment of responsibilities to a set of clearly identified agents, operating in a structured manner.

Within this system, nuclear facilities have their own capacities for the treatment and conditioning of LILW in accordance with the waste acceptance specifications applied by Enresa for El Cabril Disposal Facility. In all other cases, producers hand over their waste to Enresa in accordance with the agreed technical specifications, and the latter performs the required tasks of treatment and conditioning at its installations at El Cabril Disposal Facility, as detailed in Article 16.2 of this report.

The El Cabril Disposal Facility in the province of Cordoba represents the backbone of the national LILW waste management system. The fundamental aim is the disposal of this type of waste in solid form, and the facility also has treatment and conditioning installations to process waste derived from radioactive facilities and any resulting from collection from non-regulated facilities. Conditioning of all types of LILW waste is likewise performed at the storage units before the waste is placed in the disposal vaults. El Cabril Disposal Facility also has laboratories for the characterisation and verification of waste to conduct tests so as to improve knowledge and acceptance methodology for the different streams of waste and to verify their characteristics, along with workshops, laboratories and other ancillary systems required for the facility to function.

Image of the LILW disposal vaults at El Cabril Disposal Facility.

In December 2023, 22 of the 28 LILW vaults were full, accounting for 82.95% of the approved LILW storage capacity. The need for additional storage capacity has been identified on the basis of the estimates of the current inventory. Accordingly, Enresa has requested authorisation for a design modification to increase its capacity through the construction of new vaults, which, in view of the fact that El Cabril Disposal Facility is fundamental for the management of all LILW in Spain, is considered a key objective and is recognised as such in the 7th GRWP.

Furthermore, since 2008 VLLW has been stored in a specific vault for the disposal of this category of waste. Two of the four planned vaults have been built and are in operation, with authorisation having been granted for an overall volume in all four vaults of 130,000 m^3. The estimation is that the available storage capacity for VLLW is sufficient in order to cover all the foreseen needs..

Image of the VLLW disposal vaults at El Cabril Disposal Facility.

Efforts continue to be made to optimise vault occupancy by applying technologies and volume reduction, declassification and decontamination equipment.

The approaches to be promoted with regard to volume reduction include in particular the drying of waste, treatment by means of smelting large-scale equipment and components, and waste declassification projects.

Meanwhile, concerning activities involving disposal, waste categorisation, methods and techniques to understand the behaviour of the storage system and safety assessment, particular mention should be made of the following operational approaches:

- Analysis of forecast inventories and available capacities;
- Improvements in radioactive waste characterisation and package measurement techniques;
- Definition of management pathways for waste currently not accepted for disposal at El Cabril Disposal Facility;
- Acquisition of information and development of methodological and instrumental improvements to optimise the safety assessment of these facilities;
- Continuation of studies on the durability of the engineering barriers of the storage system;
- Continuation of data gathering and analysis on the test covers implemented to support the definitive design of the disposal covers;

- **Study of new configurations of storage units for the management of large nuclear facility equipment and components or other needs;**
- Design and test new transportation containers that are better suited to the new needs of decommissioning operations;
- **Continuation of work on radiological disposal capacity for low- and intermediate-level waste;**
- **Storage of memory and transfer of knowledge records at El Cabril Disposal Facility in all its processes.**

With regard to the adaptation and improvement of the functionality offered by El Cabril Disposal Facility, and with the resources available for future situations, the main initiatives being undertaken are:

- **Provision of new handling resources to increase the operational capacity of LILW and VLLW disposal;**
- **Assessment of the design of the new LILW vaults, taking into account the results of decommissioning operations and the preparation of support documentation for their construction;**
- Continuation of radioactive facility support actions to optimise "on-site" management of the waste they generate.

C

Section C. Scope of application

This section covers the requirements set out in Article 3 of the Convention regarding the scope of application.

Article 3. Scope of application

1. This Convention shall apply to the safety of spent fuel management when the spent fuel results from the operation of civilian nuclear reactors. Spent fuel held at reprocessing facilities as part of a reprocessing activity is not covered in the scope of this Convention unless the Contracting Party declares reprocessing to be part of spent fuel management.

2. This Convention shall also apply to the safety of radioactive waste management when the radioactive waste results from civilian applications. However, this Convention shall not apply to waste that contains only naturally occurring radioactive materials and that does not originate from the nuclear fuel cycle, unless it constitutes a disused sealed source or it is declared as radioactive waste for the purposes of this Convention by the Contracting Party.

3. This Convention shall not apply to the safety of management of spent fuel or radioactive waste within military or defence programmes, unless declared as spent fuel or radioactive waste for the purposes of this Convention by the Contracting Party. However, this Convention shall apply to the safety of management of spent fuel and radioactive waste from military or defence programmes if and when such materials are transferred permanently to and managed exclusively within civilian programmes.

4. This Convention also applies to discharges as provided for in Articles 4, 7, 11, 14, 24 and 26.

The scope of application of the Convention in Spain extends to the following:

- Spent nuclear fuel derived from the operation of nuclear power plants for electricity generation;
- Radioactive waste is derived from the nuclear fuel cycle and from the application of radioisotopes in industry, agriculture, research, and medicine or originates as a consequence of past activities, incidents, and accidents involving radioactive materials;
- Discharges from nuclear and radioactive facilities.

D

Section D. Inventories and lists

This section covers the requirements of Article 32(2) of the Convention.

Article 32. Reporting

2. This report shall also include:

   i. A list of the spent fuel management facilities subject to this Convention, their location, main purpose and essential features;

   ii. An inventory of spent fuel that is subject to this Convention and that is being held in storage and of that which has been disposed of. This inventory shall contain a description of the material and, if available, give information on its mass and its total activity;

   iii. A list of the radioactive waste management facilities subject to this Convention, their location, main purpose and essential features;

   iv. An inventory of radioactive waste that is subject to this Convention that:

      a. is being held in storage at radioactive waste management and nuclear fuel cycle facilities;

      b. has been disposed of; or

      c. has resulted from past practices.

This inventory shall contain a description of the material and other appropriate information available, such as volume or mass, activity and specific radionuclides;

   v. A list of nuclear facilities in the process of being decommissioned and the status of decommissioning activities at those facilities.

D.1. Spent fuel management facilities

The spent nuclear fuel from those power plants in operation, in addition to Santa María de Garoña NPP in phase 1 of decommissioning, is stored in the pools at the plants themselves. Meanwhile, Trillo, José Cabrera, Ascó, Santa María de Garoña, Almaraz and Cofrentes Nuclear Power Plants have dry Individualised Temporary Storage (ITS) facilities. These dry temporary storage facilities are located within the nuclear power plant site itself and are licensed as a modification to the plant's design. Table 3 shows the existing facilities.

Name of the facility	Location (Province)	Type of storage
Almaraz I NPP	Cáceres	Pool Dry storage
Almaraz II NPP	Cáceres	Pool Dry storage
Vandellós II NPP	Tarragona	Pool
Ascó I NPP	Tarragona	Pool Dry storage
Ascó II NPP	Tarragona	Pool Dry storage
Cofrentes NPP	Valencia	Pool Dry storage
Sta. M. Garoña NPP	Burgos	Pool Dry storage
Trillo NPP	Guadalajara	Pool Dry storage
José Cabrera NPP	Guadalajara	Dry storage

Table 3. Existing spent fuel storage facilities.

D.1.1. Pools

The storage pools at Trillo and Santa María de Garoña Nuclear Power Plants are located in the reactor building. At the other power plants in operation, the pools are located in a building adjacent to the containment building, with the two buildings connected by the transfer channel. Where there are two reactors on the same site, as in the cases of Almaraz and Ascó, each unit of the power plant has its own pool. In the case of Cofrentes Nuclear Power Plant there is also a pool in the reactor building used for temporary storage of fuel during reloading periods.

The spent fuel storage pools, with an initial capacity that was increased at most power plants in the 1990s by replacing the racks with other high-density models, have a reserve capacity to store a complete reactor core, if necessary. This is a requirement for the operation of nuclear power plants.

D.1.2. Individualised Temporary Storage (ITS) facilities for dry spent fuel storage (Trillo, José Cabrera, Ascó, Santa María de Garoña, Almaraz and Cofrentes Nuclear Power Plants)

- Trillo Nuclear Power Plant

The cask storage at Trillo Nuclear Power Plant has been in operation since mid-2002. This is a surface-level rectangular building with a pre-authorised capacity to hold up to 32 casks of the ENSA-DPT type, each loaded with 21 SIEMENS/KWU type I, type II and type III spent fuel assemblies, authorised during the previous reporting period up to a total of 80, using type ENUN 32P casks.

Image of the interior of the Trillo Nuclear Power Plant ITS.

The ENSA-DPT metal cask was designed for the safe transportation and storage of 21 PWR 16 x 16-20 fuel assemblies from a light water reactor of the Kraftwerk Union (KWU) type. The design complies with the requirements of 10 CFR 72 of the IAEA Regulations for the Safe Transport of Radioactive Materials, as well as the Spanish transport regulations.

The ENUN 32P can safely transport and store 32 fuel assemblies with a maximum of 58 GWd/tHM, 4.75% initial enrichment, and a minimum of 7.6 years of cooling.

The facility currently stores 32 ENSA-DPT-type casks and 8 ENUN 32P-type casks.

- José Cabrera Nuclear Power Plant

The José Cabrera Nuclear Power Plant definitively ceased operation in April 2006. The alternative selected in accordance with the strategy established in **the then-current General Radioactive Waste Plan (GRWP) was for complete and immediate dismantling, and as a result**, once this process has been completed, the site can be released in full for unrestricted usage. As a prior step, the spent fuel stored in the pool was transferred to the dry temporary storage constructed at the power plant site itself, a description thereof being given in the Fifth National Report.

Since it began operating in 2008, the power plant ITS, which stores all the spent fuel (SF) generated during the facility's operation (377 fuel assemblies, in 12 HI-STORM 100Z systems, based on welded capsules with a concrete casing), has been operated routinely.

Overview of the José Cabrera Nuclear Power Plant ITS.

In addition, the decommissioning of the power plant caused the cutting of some of the reactor's internal elements to produce a series of special waste elements. This waste, which cannot be disposed of at El Cabril Waste Disposal Facility, is currently stored in four HI-SAFE 100Z casks located in the power plant ITS, alongside those housing the spent fuel.

- Ascó Nuclear Power Plant

In order to avoid reaching saturation level in the pools of the two units at Ascó Nuclear Power Plant, it proved necessary to construct and commission a dry ITS facility to provide additional storage capacity at the power plant site.

View of the Ascó Nuclear Power Plant ITS.

The ITS comprises two storage slabs with seismic resistance, one for each unit. 16 storage systems were initially authorised for each slab, with a total combined capacity of up to 1,024 fuel assemblies. This outdoor facility was licensed in April 2013 and has been in operation since May of that year.

In this case the chosen storage system was HI–STORM 100, similar to that used at the José Cabrera ITS, but adapted for the fuel used by the power plant.

A change in the ITS design was implemented in 2022, allowing for the storage of 18 systems per slab.

In December 2023, 31 HI–STORM modules were loaded with 32 fuel assemblies each, and these are now in the ITS. The storage licence allows spent fuel of up to 55 GWd/tHM, with a maximum initial enrichment of 5%.

- Santa María de Garoña Nuclear Power Plant

This dry storage facility, **the licensing of which was described in the Seventh National Report**, has two seismic slabs, each of which is authorised to carry 16 dual-purpose ENSA-ENUN 52B type metal casks with capacity to store up to 52 BWR type fuel assemblies with a relatively low degree of burnup and higher cooling times. 5 casks were manufactured at the time with a view to the continuation of operations at the power plant. However, since the power plant definitively ceased activity in 2017, most of the fuel currently remains in the pool. A reassessment of the dry storage facility in order to house the complete inventory from the pool will, therefore, be required.

As shown in the picture below, one cask was already loaded in December 2023.

General view of the Santa María de Garoña Nuclear Power Plant ITS.

- Almaraz Nuclear Power Plant

This ITS, **the licensing of which was described in the Seventh National Report**, has an authorised capacity of 20 ENUN 32P casks capable of storing 32 pressurised water reactor fuel assemblies. This cask is similar to the model chosen to expand the capacity of the ITS at Trillo Nuclear Power Plant, with a different rack to house Westinghouse 17x17 fuel assemblies.

The authorised burnup limit for storage is 65 GWd/tHM, but only 45 GWd/tHM for transportation. Accordingly, only low burnup fuel will be stored for the time being. **The ITS currently has 12 casks in storage**.

General view of the Almaraz Nuclear Power Plant ITS.

- Cofrentes Nuclear Power Plant

During the period covered by the previous and current reports, the Licensee of Cofrentes Nuclear Power Plant has built and started up an Individualised Temporary Storage (ITS) dry storage facility at its site.

The ITS is a structure designed for the dry storage of spent fuel, with a total capacity of 24 casks of the HI-STAR 150 model, manufactured by the supplier HOLTEC, and located outdoors on the plant site.

Authorisation for the execution and assembly of this ITS was granted by resolution of the Directorate-General of Energy Policy and Mines (DGPEM) on 18 June 2019, following a favourable report from the Nuclear Safety Council (CSN) and with a favourable environmental impact statement from the Directorate-General of Biodiversity and Environmental Quality. This resolution establishes the limits and conditions of the authorisation in terms of nuclear safety and radiation protection, as is the case with any other authorisation granted in relation to nuclear and radioactive facilities, as provided for in Article 7(j) of the Regulation on Nuclear and Radioactive Facilities (RINR).

General view of the Cofrentes Nuclear Power Plant ITS.

Finally, the DGPEM authorised its start-up by means of a resolution dated 25 May 2021, following a report by the CSN and, as has been mentioned above, after the corresponding environmental impact assessment.

On 31 December 2023, the ITS had 9 casks loaded.

D.2. Spent fuel inventory (Assemblies and U mass)

The total amounts of spent fuel in existence on **31 December 2023** are shown in Table 4.

Name of the facility	Characteristics of the fuel assemblies	Total capacity/reserve core (number of assemblies)	Spent fuel stored (number of assemblies)	Spent fuel stored (tU)
Almaraz I Nuclear Power Plant	PWR 17x17	1,804/157	1,600	738
		ITS with a capacity for 20 casks of 32 fuel assemblies each	160	75
Almaraz II Nuclear Power Plant	PWR 17x17	1,804/157	1,468	678
		ITS with a capacity for 20 casks of 32 fuel assemblies each	224	105
Vandellós II Nuclear Power Plant	PWR 17x17	1,802/157	1,452	661
Ascó I Nuclear Power Plant	PWR 17x17	1,421/157	1,156	531
		ITS with a capacity for 18 casks of 32 fuel assemblies each	512	231
Ascó II Nuclear Power Plant	PWR 17x17	1,421/157	1,160	534
		ITS with a capacity for 18 casks of 32 fuel assemblies each	480	218
Cofrentes Nuclear Power Plant	BWR 8x8, 9x9, 10x10	5,404/624	4,708	846
		ITS with a capacity for 24 casks of 52 fuel assemblies each	468	85
Sta. M. Garoña Nuclear Power Plant	BWR 8x8, 9x9	2,609/400	2,453	431
		ITS with a capacity for 49 casks with up to 52 fuel assemblies per cask	52	9
José Cabrera Nuclear Power Plant	PWR 14x14	ITS with a capacity for 12 casks of 32 fuel assemblies each	377 (12 casks)	100
Central Nuclear Trillo	PWR 16x16	805/177	516	245
		ITS with a capacity for 80 casks, 32 casks of 21 fuel assemblies each and up to 48 casks of 32 fuel assemblies each	928	437

Table 4. Spent nuclear fuel in existence in Spain (31 December 2023).

D.3. List of radioactive waste management facilities

Article 2 of the Joint Convention defines a "Radioactive waste management facility" as follows: "Radioactive waste management facility" means any facility or installation the primary purpose of which is radioactive waste management, including a nuclear facility in the process of being decommissioned only if it is designated by the Contracting Party as a radioactive waste management facility.

The scope of this definition does not include "small-scale producers", since their radioactive waste is collected and processed by Empresa Nacional de Residuos Radiactivos, S.A., S.M.E. (Enresa) at El Cabril Disposal Facility. The radioactive waste management facilities are therefore the following:

- Nuclear power plants in operation

All the nuclear power plants have treatment facilities for their liquid waste and conditioning of solid waste (pre-compaction and immobilisation). There are also temporary storage facilities at each power plant to house waste prior to transportation to El Cabril Disposal Facility.

Overview of the Trillo Nuclear Power Plant.

- Vandellós I Nuclear Power Plant in decommissioning phase

This facility has been established in the pit of the reactor building as a specific intermediate solution for the temporary storage of graphite waste derived from the fuel assembly sleeves.

View of the facility protecting the casing of the Vandellós I Nuclear Power Plant reactor.

- José Cabrera Nuclear Power Plant in the decommissioning phase

The power plant has its own liquid and solid waste treatment facilities which have remained in use following cessation of operations at the plant. The waste resulting from some decontamination tasks currently in progress is treated in these facilities and temporarily stored at the plant prior to dispatch to El Cabril Disposal Facility.

Evolution of decommissioning of José Cabrera Nuclear Power Plant.

- **Santa María de Garoña Nuclear Power Plant in the decommissioning phase**

Like all the operating nuclear power plants, it has facilities for the treatment of its liquid waste and the conditioning of solid waste (pre-compaction and immobilisation). There are also temporary storage facilities to house the waste prior to its transportation to El Cabril Disposal Facility.

- Ciemat (temporary storage and processing facilities)

The Centre for Energy-Related, Environmental and Technological Research (Ciemat) holds authorisation to perform conditioning activities for low- and intermediate-level solid waste generated at the centre, and provisionally to store sources or other radioactive material within transportation containers where they comply with the requirements established in the national regulations for the carriage of hazardous goods by road.

Ciemat treats and conditions waste derived from research activities at the centre, essentially connected with developments for radioactive waste management, monitoring of materials and other activities involving the use of radioactive materials and tracers.

During the period covered by the Sixth National Report, Ciemat expanded its temporary storage capacities to store very low-level or de-classifiable waste derived from the execution of the PIMIC Project (see subsection D.5) through authorisation for the use of pre-existing buildings that were conditioned for this purpose.

- Juzbado Fuel Element Factory

As with nuclear power plants, it has a treatment plan for its liquid waste, which is dried and immobilised in cement. Precompaction is performed for the preconditioning of the facility's solid waste, with cement immobilisation being used for final conditioning. The existing temporary storage facility serves as the intermediate stage prior to the transportation of waste to El Cabril Disposal Facility.

- El Cabril Disposal Facility for the final disposal of radioactive waste

El Cabril Disposal Facility has treatment and conditioning systems in place for solid and liquid waste. These systems are intended to treat and condition all waste required prior to disposal at the facility. In accordance with the system of responsibilities derived from the GRWPs, most waste treated and conditioned at El Cabril Disposal Facility is derived from radioactive facilities generated at the site itself, although the facility also has the systems required for the final conditioning of waste derived from nuclear facilities prior to disposal in the disposal vaults.

Aerial view of the North and South disposal platforms for LILW.

- Low and intermediate-level waste (LILW).
  - Treatment and conditioning of radioactive facility waste.

    Waste produced by small-scale producers (radioactive facilities with industrial, medical, agricultural and research functions) is segregated by such sites on their own premises and subsequently transported to El Cabril Disposal Facility. The waste is transferred in accordance with a collection agreement signed between the producer and Enresa, which follows the waste categorisation system established by the Spanish Ministry for Ecological Transition and Demographic Challenge (MITERD).

    The different types of waste at El Cabril Disposal Facility are treated to minimise the production of secondary waste and generate conditioned packages that comply with the conditions required for subsequent inclusion in storage units.

    The conditioning building at El Cabril Disposal Facility has a specific area for the treatment and conditioning of small-scale producer waste, as described in the Fourth National Report.

- Final conditioning of major producer waste.

  Major producers (nuclear power plants and fuel assembly plants) must condition their LILW in packages that comply with the Enresa acceptance criteria for transportation as far as El Cabril Disposal Facility. Thus, they do not require subsequent treatment processes. A second category comprises packages pre-compacted at source because of their physical characteristics. El Cabril Disposal Facility has a drum compactor with a 1200 t capacity.

  In both cases, the packages are conditioned in storage units.

- Temporary storage at El Cabril Disposal Facility.

  The El Cabril Disposal Facility has access to three sets of installations used for the temporary storage of solid waste: the "modules", the transitional reception building, and the radioactive material and resources storage facility.

  The first comprises three buildings built in the 1980s for the temporary storage of long-term waste. Each has a nominal capacity for 5,000 drums holding 220 L. The process of characterising units produced prior to 1992 is still ongoing so that they can be transferred to the disposal vaults once compliance with the acceptance criteria has been verified. In addition, these facilities are used to accommodate heterogeneous and special waste pending subsequent treatment for disposal.

  The transitional reception building located at El Cabril site itself has a buffer storage area for LILW packages.

  The storage facility for radioactive material and sources has provided the capacity for integration and safekeeping of the material, requiring individualised management in one single physical enclosure.

- Disposal at El Cabril Disposal Facility.

  In operation since 1992, the low- and intermediate-level waste disposal system at El Cabril disposal facility is of the near-surface type and has 28 vaults, each with a capacity of 320 positions, for disposal units of the CE-2A type. The vaults are grouped on two platforms. The reconditioned waste packages are transferred to the storage units, which, once filled, are transported to the disposal platform and placed inside the vault.

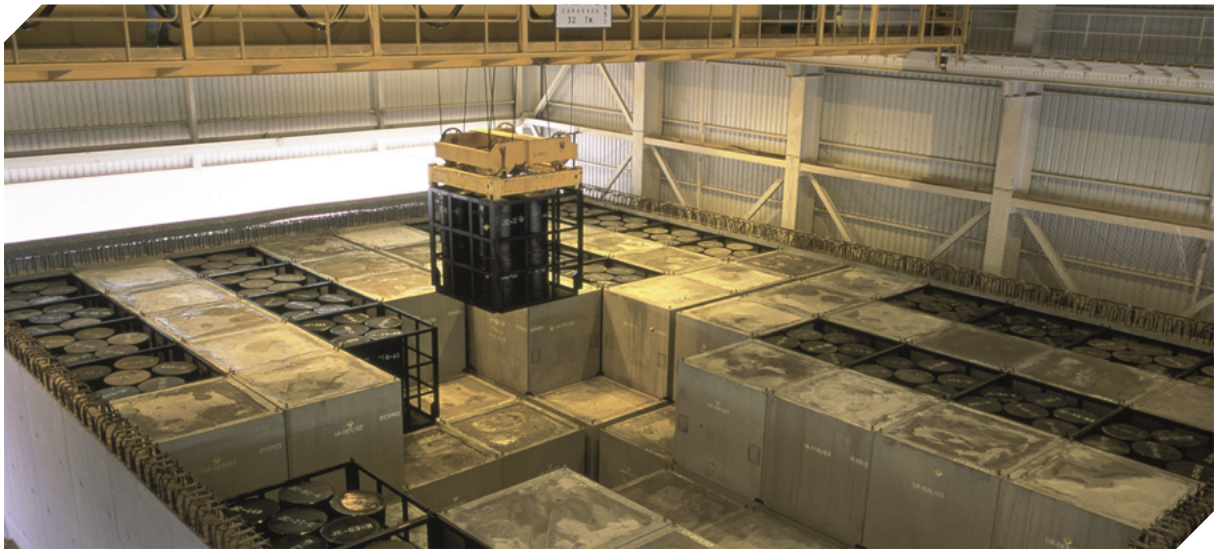


Image of the filling of a LILW disposal vault.

- Very low-level waste (VLLW)

  Since 2008, El Cabril Disposal Facility has had a specific disposal area for very low-level waste (VLLW), with provision for four vaults and a total authorised volume of 130,000 m^3. Two vaults have so far been constructed, with a total storage capacity of approximately 90,000 m^3. Each vault comprises a vessel excavated into the ground with a series of drainage and waterproofing materials laid on top to prevent the dispersal of any possible leachates into the environment. This allows for the disposal of this type of contaminated material, derived above all from the dismantling of installations, the specific activity of which is hundreds of times lower than the LILW currently disposed of in the other area of El Cabril Disposal Facility.

Image of the interior of the VLLW disposal vault at El Cabril.

The VLLW arrives at El Cabril Disposal Facility in drums, bags or metal containers and is sent directly to the vault or temporarily received in the Technology Building. This has systems in place for stabilisation by means of inerting and cavity filling.

Table 5 contains the radioactive waste management facilities list, indicating their location, purpose and key characteristics.

Name of the facility	Location (Province)	Main purpose	Other characteristics
Almaraz I Nuclear Power Plant	Cáceres	Treatment, prior conditioning and temporary storage	Facilities for the management of waste caused by the operation of each of the nuclear power plants themselves
Almaraz II Nuclear Power Plant	Cáceres	Treatment, prior conditioning and temporary storage	
Vandellós II Nuclear Power Plant	Tarragona	Treatment, prior conditioning and temporary storage	
Ascó I Nuclear Power Plant	Tarragona	Treatment, prior conditioning and temporary storage	
Ascó II Nuclear Power Plant	Tarragona	Treatment, prior conditioning and temporary storage	
Cofrentes Nuclear Power Plant	Valencia	Treatment, prior conditioning and temporary storage	
Sta. M. Garoña Nuclear Power Plant	Burgos	Treatment, prior conditioning and temporary storage	
Trillo Nuclear Power Plant	Guadalajara	Treatment, prior conditioning and temporary storage	
José Cabrera Nuclear Power Plant	Guadalajara	Treatment, prior conditioning and temporary storage	
Vandellós I Nuclear Power Plant	Tarragona	Temporary storage	Facilities to store some of the waste derived from the decommissioning of the plant **and operation during the latency phase**
Juzbado Plant	Salamanca	Treatment, prior conditioning and temporary storage	Facilities to manage technological waste from the operation of the plant
Ciemat	Madrid	Prior conditioning and temporary storage	Facilities within the nuclear research centre
El Cabril Disposal Facility.	Cordoba	Temporary storage	3 concrete modules + transitional reception building + storage facility for nuclear material and sources
		Disposal	28 near-surface reinforced concrete vaults for LILW
			2 vaults in a trench for VLLW

Table 5. Radioactive waste management facilities.

D.4. Inventory of temporary storage or disposal

Table 6 shows the inventory of radioactive waste on **31 December 2023**.

Name of the facility	Installation type	Type of waste	Volume (m^3)
Almaraz I-II Nuclear Power Plant	Nuclear Power Plant	VLLW	1,056
		LILW	983
Vandellós II Nuclear Power Plant	Nuclear Power Plant	VLLW	324
		LILW	180
Ascó I-II Nuclear Power Plant	Nuclear Power Plant	VLLW	937
		LILW	374
Cofrentes Nuclear Power Plant	Nuclear Power Plant	VLLW	977
		LILW	1,542
Sta. M. Garoña Nuclear Power Plant	Nuclear Power Plant	VLLW	175
		LILW	49
Trillo Nuclear Power Plant	Nuclear Power Plant	VLLW	19
		LILW	56
José Cabrera Nuclear Power Plant	Nuclear Power Plant	VLLW	3,001
		LILW	0
		Special waste (SW)	31
Vandellós I Nuclear Power Plant	Nuclear Power Plant	VLLW	757
		LILW	1,576
		SW	154
Juzbado Fuel Element Factory	Fuel assembly factory	VLLW	227
		LILW	71
Ciemat	Research centre	VLLW	0
		LILW	3
El Cabril Disposal Facility	Temporary storage	VLLW	616
		LILW	151
	Disposal	VLLW	25,670
		LILW	36,157

Table 6. Inventory of radioactive waste.

D.5. Installations in decommissioning phase

- Vandellós I Nuclear Power Plant

Vandellós I Nuclear Power Plant was in operation from 1972 until October 1989, when it suffered an accident in its conventional zone. This power plant, using French technology, is the only graphite-gas-type plant built in Spain. Following the definitive suspension of its operating licence, the then Ministry of Industry and Energy in 1992 accepted the decommissioning option proposed by Enresa for complete decommissioning of the plant in two phases. The Plan comprised the partial decommissioning of the facility (IAEA Level 2), followed by a latent period of some 25 years until complete decommissioning (IAEA Level 3).

Image of the Vandellós I Nuclear Power Plant under decommissioning, currently in latent period.

Although the level 2 decommissioning project ended in June 2003, the latent phase formally began on 17 January 2005, following the issuance of the Ministerial Decision. During this period, surveillance and control activities were undertaken to properly embark on the full decommissioning of the facility and its site once the established waiting period had passed.

- José Cabrera Nuclear Power Plant

The José Cabrera Nuclear Power Plant ceased operations in April 2006 following the authorities' decision not to renew its operating permit. The plant is of the pressurised water reactor (PWR) type, with a limited power rating (160 MW). It was the first nuclear power plant in operation in Spain, starting in 1968.

As previously indicated in the Fifth National Report, the facility was licensed to Enresa for decommissioning as a result of the Ministerial Order of 1 February 2010.

According to the strategy established by the Sixth GRWP, the power plant is being decommissioned under the immediate and complete dismantling strategy of the IAEA to free the site for other uses.

As indicated in previous subsections, the fuel spent is currently stored in an ITS at the power plant site.

In 2022, the plenary session of the CSN favourably assessed an updated revision of the Site Restoration Plan (PRE) of José Cabrera Nuclear Power Plant. This plan was submitted by the facility's Licensee, Enresa, and envisages maintaining the part of the site where the ITS is located under regulatory control and releasing the rest of the land from nuclear regulatory control.

This submission to the CSN was made by the Licensee in compliance with condition 12 of the decommissioning permit, which establishes that at least one year prior to the date scheduled for completion of the restoration activities at the site to be released from regulatory control, the Licensee should submit an updated revision of the aforementioned Site Restoration Plan to the CSN for its approval.

This new revision of the PRE includes, as the most relevant aspects, those deriving from the site radiological characterisation campaigns carried out during the performance of decommissioning activities, the release levels to be applied in the final verification of the radiological status of the site, the justification of the release scenario with final restrictions on use, the updating of the physical status of the site and a description of all the groundwater monitoring programmes currently being carried out.

Following the implementation of this Plan, the Licensee is required to draw up and submit to the CSN a final radiological status verification report that will document compliance with the radiological criteria applicable to the release of part or all of the site.

- Santa María de Garoña Nuclear Power Plant

Santa María de Garoña Nuclear Power Plant ceased operations in December 2012. The plant is a BWR (boiling water reactor) medium power plant (460 MW). It was the second nuclear power plant in operation in Spain after its start-up in 1971.

Enresa assumed, by the Ministerial Order of 17 July 2023, the ownership of the facility for its decommissioning. Since then, and in accordance with the strategy established by the GRWP in force, the plant has been decommissioned, following the IAEA's strategy

of immediate and complete dismantling, with a view to freeing the site up for other uses. Uniquely, this strategy recognises two phases:

- Phase 1: includes the unloading of spent fuel from the pool, its subsequent safe storage in the ITS facility located on the site itself, modification of the turbine building, initial radiological characterisation campaigns, decontamination of systems and dismantling of conventional facilities.

- Phase 2: final dismantling of the radiological buildings, decontamination, declassification and demolition of buildings and, finally, restoration of the site.

The first phase will be carried out between 2023 and 2027, while the second will foreseeably take place between 2027 and 2033. It will also require authorisation from the MITERD following a report by the CSN and be subject to an environmental impact assessment.

As indicated above, most of the spent fuel is currently stored in the pool. At the date of this report's closure, a loaded cask was in the ITS located on the plant site.

As a conclusion to the decommissioning of nuclear power plants, it should be pointed out that the partial dismantling carried out at Vandellós I NPP and the total dismantling of José Cabrera NPP, underway since 2010, have placed Spain among the group of countries with comprehensive experience in this area. The performance of the Cabrera NPP decommissioning project has been made possible by the existence of sufficient technical, administrative, institutional and business infrastructure in the country to guarantee the financing of the costs, the application of the technologies required and suitable management of the radioactive waste generated, including their final disposal.

The experience described above has allowed for the development of a set of different types of capabilities that are currently fully available. Linked to the above, generic and specific tools have been developed and are available for the planning, organisation, management and optimisation of decommissioning activities. Likewise, the decommissioning costs established for nuclear power plants have been updated, taking as a reference the lessons learned from the analysis of the real costs of the decommissioning of José Cabrera NPP.

The experience acquired in the Vandellós I and José Cabrera NPP projects, both in organisational and documentary aspects and in interactions with the CSN and other authorities involved, will be key for the planning and performance of the rest of the decommissioning projects and, particularly, for the decommissioning of Santa María de Garoña NPP, which has been in definitive shutdown since August 2017 and in the decommissioning process since July 2023.

Furthermore, the experience acquired in the integration of decommissioning activities and waste management, in the technologies applied for the dismantling of the main components and in the volume reduction practices implemented will be highly relevant in the planning and performance of future decommissioning projects.

- Ciemat facilities

The Integrated Plan for the Improvement of the Ciemat Installations (PIMIC) comprises the dismantling of certain obsolete installations for which no future use is foreseen, to make use of the spaces released so as to undertake other activities. The Plan is controlled and supervised by the CSN and the MITERD. Over the course of the process, most of the activities have been undertaken by Enresa, although Ciemat retains responsibility as the Licensee of the facility and provides the necessary support.

Enresa has collaborated with Ciemat in the dismantling of certain obsolete installations, including the management and dispatch of waste to El Cabril Disposal Facility. **During the period 2020-2023, work continued on the declassification and restoration of the different facilities and land. Among other activities, progress has been made in the declassification of materials from the PIMIC area**.

Enresa will continue to support Ciemat in the final phase of this project, including the management of the remaining waste, including processes of characterisation, decontamination, declassification and removal of contaminated land.

- Quercus uranium concentrate manufacturing plant in Saelices el Chico, Salamanca

The Quercus uranium concentrate manufacturing plant is located at the Saelices del Chico mining site in the province of Salamanca. It has been in a state of definitive shutdown since 2003, following the Order of the Ministry of Economy of 14 July 2003 declaring the cessation of operations.

Currently, activities at the facility focus on the treatment of the liquid effluent collected at the different drainage points on the existing mining site in the area (open pit water) and supernatant liquid from the tailings dike for conditioning and discharge.

Enusa Industrias Avanzadas S.A., S.M.E. (ENUSA), as the plant Licensee, applied for authorisation for dismantling and closure on 14 September 2015, in accordance with the modifications made as a result of the entry into force of Royal Decree 102/2014, for the responsible and safe management of spent nuclear fuel and radioactive waste. The application is currently being assessed by the CSN and dealt with in-depth in the Seventh National Report.

- Other facilities and sites

Surveillance and maintenance activities have continued with the scope and duration required by the CSN at all those restored mining/uranium concentrate manufacturing sites that are in the Compliance phase (Elefante Plant and restored mining sites in Saelices El Chico, and the Andújar Uranium Plant) or in the long-term surveillance phase following the Declaration of Decommissioning (Lobo-G Plant), the main purpose being to verify compliance with the environmental and radiological objectives of the Restoration Project.

D.6. Decommissioned facilities

No declarations of decommissioning were issued for any facility during the period between the generation of the Fifth National Report and this report, and the situation as regards decommissioned facilities is, therefore, the same as in the Fifth National Report.

Section E. Legislative and regulatory system

This section covers the requirements of Articles 18, 19 and 20 of the Convention on the legislative and regulatory system.

Article 18. Implementing measures

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

Spain has an appropriate legislative, regulatory and administrative framework in order to comply with the obligations derived from this Convention. The Spanish Ministry for Ecological Transition and Demographic Challenge (MITERD) and the Nuclear Safety Council (CSN) continue to work, each within its remit, on continuously improving the regulatory development of aspects connected with waste and spent fuel management.

This development takes into account the applicable national regulations, international experience and regulations, in particular analysis of the applicability of the IAEA programme of standards for safe waste management, and all those elements which, although not included in the regulations, have served successfully to address aspects arising in the authorisations granted to date for the management of radioactive waste.

Article 19. Legislative and regulatory framework

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

The legislative and regulatory framework governing the safe management of radioactive waste and spent fuel is integrated within a broader context, namely that governing nuclear energy, and comprises a legislative corpus made up of laws, regulations and Safety Instructions (the last of these issued by the Nuclear Safety Council (CSN)), compiled in detail in Annex A, with the main developments being as set out in Articles 19.2 and 19.3. The regime for authorisations (detailed in Annex B) has undergone no significant developments, nor have the inspection or disciplinary regime or the assignment of responsibilities (all summarised in Article 19.1).

19.1. General aspects of the regulatory framework

It is the task of the Government to approve the regulatory developments of the laws passed by Parliament, with the (MITERD) currently being the ministerial Department responsible for processing and submitting regulatory proposals in the field of nuclear energy. The generation of proposed regulatory developments in the field of nuclear energy is duly coordinated by the MITERD and the CSN. In any event, where proposals refer to matters that could affect nuclear safety or radiation protection, the initiative lies with the CSN, which passes proposals on to the MITERD to be processed by the Government.

The CSN is responsible for issuing its own regulations through the approval of Instructions, which are technical standards in the field of nuclear safety, radiation protection, emergencies and physical protection, incorporated within the domestic legal structure on a binding basis for those parties affected by the scope of application, once they have been notified or published in the Official State Gazette. It may likewise issue Supplementary Technical Instructions and Technical Instructions, which are administrative acts with binding status for those parties addressed by them, their purpose being to ensure the maintenance of safe requirements and conditions at facilities and in activities, along with optimal compliance with the requirements established in each authorisation, or they may otherwise be issued by the CSN in discharging its responsibilities. Lastly, the CSN issues Circulars and Guides which are, respectively, technical information documents and technical recommendations, which do not have binding status.

A compendium of the main binding provisions with the status of a Law, Regulation or Instruction of the CSN which are applicable to the scope of this Convention may be found in Annex A.

- Authorisation procedure

The Law 25/1964, of 29th of April, on Nuclear Energy (LNE) establishes the regime for granting authorisations for nuclear and radioactive facilities, explicitly prohibiting the usage and storage of nuclear fuel and radioactive waste without having obtained the corresponding authorisation. This regime, which has been subjected to successive amendments since it was first approved, was developed by the Regulation on Nuclear and Radioactive Facilities (RINR), approved by Royal Decree 1836/1999.

Under said regime, the MITERD is responsible for granting the corresponding authorisations for nuclear and radioactive installations, except for category 2 and 3 radioactive installations[1] where this responsibility has been transferred to the Autonomous Regional Government[2]. Prior to the granting of any authorisation for a nuclear or radioactive facility, the MITERD must request reports from all authorities with responsibilities for the matter in question. In terms of nuclear safety and radiation protection, a report must also be issued by the CSN, with binding status if it constitutes a refusal, or with regard to the limits and conditions imposed in the event of approval. Meanwhile, the State Secretariat for the Environment at the MITERD is responsible for issuing the Environmental Impact Statement for those projects that so require. The Autonomous Regions are likewise consulted in the field of territorial and environmental regulations. More detailed information with regard to the procedure for the authorisation of nuclear and radioactive facilities may be found in Annex B.

Meanwhile, the CSN is responsible for granting and revoking the licensing and accreditation of personnel operating nuclear and radioactive facilities, as well as the diplomas of personnel of technical radiation protection units or services, as required. The CSN likewise has the task

1 According to the classification of said facilities in the Regulation on Nuclear and Radioactive Facilities (RINR), approved by Royal Decree 1836/1999, of 3 December 1999.

2 The Spanish State comprises seventeen Autonomous Regions, plus the Autonomous Cities of Ceuta and Melilla. The authorisation of category 2 and 3 radioactive installations has been transferred to the Regional Governments of Aragon, Asturias, Cantabria, Castile-Leon, Catalonia, Ceuta, Extremadura, Galicia, Madrid, Murcia, Balearic Islands, Canary Islands, La Rioja, Navarre, Basque Country and Valencia

of granting and revoking authorisations of the Personal Dosimetry Services, the Radiation Protection Services, and the Technical Radiation Protection Units.

- System of inspection and assessment of facilities

In accordance with the functions attributed to the CSN by Law 15/1980, of 22 April 1980, creating the Nuclear Safety Council, said the body will perform inspection and control of nuclear and radioactive facilities in each phase of their life, in order to confirm implementation in accordance with the regulations in force and the limits and conditions of the authorisations granted. CSN inspection notices are published on its website, following redaction of any details that could affect confidentiality, or that cannot be disclosed because they are legally protected, because they affect personal privacy, national defence and public security, commercial or industrial secrecy, intellectual property rights, or the existence of punitive or disciplinary proceedings in progress, among other factors.

With regard to other matters, such as physical safety, emergency preparedness and environmental impacts, the application of inspection and evaluation actions is exercised in coordination with the bodies of other ministerial departments which also enjoy powers in accordance with the subject matter.

- Disciplinary regime

The disciplinary regime regarding nuclear energy is established in Chapter XIV (Articles 85 to 93) of the LNE. The Third National Report described the main aspects of the disciplinary regime in depth.

The Nuclear Safety Council will, where applicable, propose the initiation of the corresponding disciplinary investigation with regard to any events that could constitute an infringement in the field of nuclear safety, radiation protection or physical protection, informing the Directorate-General for Energy Policy and Mines at the MITERD, this being the body responsible for instigating the investigation both of the events constituting the infringement noted and any relevant circumstances that might be required in order properly to categorise the events.

Likewise, once a disciplinary investigation has been initiated in the field of nuclear safety, radiation protection or physical protection, the Nuclear Safety Council will, as a mandatory requirement, issue a report for the due categorisation of the events involved in the proceedings. This report will be issued if the investigation was not initiated at the proposal of the Nuclear Safety Council or in the event that, although it was, the proceedings cover other details beyond those communicated by the Council itself.

In addition to the above, the LNE empowers the CSN to adopt coercive measures directly, such as disciplinary notices, with the corresponding fines associated with them and warnings.

The Directorate-General for Energy Policy and Mines of the MITERD will handle disciplinary investigations of nuclear and radioactive facilities, except for Category 2 and 3, for which responsibility has been transferred to the Autonomous Regional Governments. It will likewise submit proposed penalties before the disciplinary authority determined in law in accordance with the seriousness of the infringement, which within the scope of Central Government is

the Council of Ministers, the Minister of Energy Transition and Demographic Challenge, or the Directorate-General for Energy Policy and Mines.

- Allocation of responsibilities

The allocation of functions and responsibilities within the legal system in the field of nuclear energy remains essentially the same as in place previously. The legal and regulatory framework for the management of spent fuel and the management of radioactive waste, lying within the general framework governing nuclear energy in Spain, clearly establishes the responsibilities of the different actors. A description is given below only of the responsibility lying with producers of radioactive waste and Empresa Nacional de Residuos Radiactivos, S. A., S.M.E. (Enresa), since the distribution of functions among the competent authorities is described at length in Article 20.

Royal Decree 102/2014, on the safe and responsible management of spent nuclear fuel and radioactive waste, establishes that the main responsibility with regard to spent nuclear fuel and radioactive waste will lie with those that produced it or, where applicable, the Licensee of the authorisation to which this responsibility has been entrusted. Those responsible will instigate and apply integrated management systems, including quality assurance, giving due priority to safety and the overall management of spent nuclear fuel and radioactive waste, which may be subject to periodic verification.

In accordance with Article 38 bis of LNE, the management of radioactive waste, including spent nuclear fuel, and the dismantling and decommissioning of nuclear facilities, constitute an essential public service reserved for State ownership. Enresa is entrusted with management of this public service in accordance with the provisions of the General Radioactive Waste Plan approved by the Government. This applies without prejudice to any liabilities that might be attached to those producing such materials or the licensees of authorisations to which such responsibility is entrusted, in accordance with the terms set out in the above paragraph. The functions of Enresa are currently governed by Royal Decree 102/2014.

Enresa, a 100% public enterprise, was created by Royal Decree in 1984 and is owned by Ciemat, a national research centre attached to the **Ministry of Science, Innovation and Universities**, and SEPI (Sociedad Española de Participaciones Industriales), a public law agency which serves as the holding corporation for state-owned industrial ventures, attached to the **Ministry of Finance**. Supervision of Enresa is the responsibility of the MITERD, through its State Secretariat for Energy, who conducts strategic management and monitoring and control of its actions and plans, both technical and economic.

The tasks entrusted to Enresa, aside from the performance of its inherent activities comprising the management of spent fuel and radioactive waste and the decommissioning of nuclear facilities, include the generation of proposals for the General Radioactive Waste Plans, which it subsequently submits to the MITERD for review and to be processed by the Government, along with administrative and financial administration of the Fund for the financing of GRWP activities, under the supervision of a Fund Monitoring Committee, as well as scrutiny of the responsible economic and financial authorities of National Government.

In order to allow Enresa to perform its activities regarding the management of radioactive waste and spent fuel, the Licensees of nuclear and radioactive facilities, and the Licensees of

facilities or activities not subject to the regime of authorisations under nuclear legislation, are obliged to sign certain technical and administrative specifications with Enresa, approved by the MITERD and with a prior report by the Nuclear Safety Council, defining the conditions for the receipt of such materials by Enresa, some of which have already been approved, replacing the previous "standard contracts" which had previously governed these obligations.

19.2. Developments in the main legislative and regulatory provisions governing the management of spent fuel and radioactive waste

This subsection describes developments that have occurred or are in progress in the regulatory provisions regarding the status of legislation or regulation in the field of spent fuel and radioactive waste managements.

- Amendment of the LNE, in relation to radiologically contaminated soils, by *Royal Decree-Law 6/2022, of 29 March, adopting urgent measures within the framework of the National Plan in response to the economic and social consequences of the war in Ukraine.*

To address the problems posed by the existence of radiologically contaminated soils as a result of past industrial activities or incidents, it was concluded that it was necessary to modify the LNE to provide a legal basis for some of the provisions considered necessary to include in a standard declaring soil to be radiologically contaminated and establishing the measures for its remediation.

This legal amendment was carried out by means of the First Final Provision of *Royal Decree-Law 6/2022, of 29 March, adopting urgent measures within the framework of the National Plan in response to the economic and social consequences of the war in Ukraine*, which, among other things, includes the definitions of "Radiologically contaminated soil or land" and "Soil or land with use restrictions" and establishes a series of obligations, both for the Licensees of activities potentially contaminating the soil with radionuclides and the owners of such soils and for the Government.

The obligations established for the Government include regulation of the declaration of these soils as radiologically contaminated or with restrictions on their use, their inventory, the parties responsible for decontamination and restoration, and the mechanisms for both voluntary execution and execution after the declaration has been issued.

Finally, it should be noted that this Royal Decree-Law partially transposes into Spanish law *Council Directive 2013/59/Euratom* of 5 December 2013, establishing basic safety standards for protection against the dangers arising from exposure to ionising radiation, and repealing *Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom.*

- *Law 11/2023, of 8 May, on the transposition of European Union Directives on the accessibility of certain products and services, the migration of highly qualified persons, taxation and the digitalisation of notarial and registry proceedings; and amending Law 12/2011, of 27 May, on civil liability for nuclear damage or damage caused by radioactive materials.*

By means of the law that is the object of this section, our existing legal system on civil liability for nuclear damage is adapted to applicable international standards, following the entry into force of the 2004 Protocols amending the Paris Convention of 29 July 1960 on Civil Liability in the Field of Nuclear Energy and its Brussels Supplementary Convention of 31 January 1963, by introducing the necessary amendments to *Law 12/2011, of 27 May, on civil liability for nuclear damage or damage caused by radioactive materials.*

An exhaustive development of this issue can be found in Article 21.2 below.

- *Royal Decree 451/2020, of 10 March, on the control and recovery of orphan radioactive sources.*

For decades, Spain has had a strict regulatory control system for the use and possession of radioactive sources, based on the Regulation on Nuclear and Radioactive Facilities (RINR) and the Regulation on Protection against Ionising Radiations. Nevertheless, the existence of radioactive sources that are outside the scope of this control system (orphan sources) cannot be ruled out, either because they were used prior to the implementation of the aforementioned control system or because they come from other countries mixed with other goods, as might be the case of metallic materials for recycling.

Based on the above, in 2016, a working group was set up between representatives of the then Ministry of Energy, Tourism and the Digital Agenda (currently MITERD) and the CSN, to transpose *Council Directive 2013/59/Euratom of 5 December 2013, laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation, and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom; as regards metallic materials. Finally, in 2020, and in order to make progress in this transposition, Royal Decree 451/2020 of 10 March was published on the control and recovery of orphan radioactive sources.*

Royal Decree 451/2020, of 10 March, on the control and recovery of orphan radioactive sources establishes the measures, monitoring and control requirements and procedures to be adopted in the event of the detection or processing of sources at facilities for the recovery, storage or handling of metallic materials for recycling.

The Royal Decree aims to adopt measures to reinforce the radiation protection of workers and members of the public, in addition to the safety of the orphan radioactive sources themselves. These measures include the establishment of radiological monitoring and control requirements at facilities where orphan sources are most likely to appear, such as facilities for the recovery, storage or handling of metallic materials for recycling and places with significant transit of people or goods. In addition, clear and structured procedures are established for action to be taken at facilities in the event of the detec-

tion or processing of sources, with priority being given to the protection of workers and members of the public, as well as to the safety of the source itself.

In detail, one of the main new features of this Royal Decree is the creation of a register at the MITERD, in which facilities for the recovery, storage or handling of metallic materials for recycling must be registered.

In addition, certain instrumentation requirements are established that must be met at these facilities, which depend on the type of activity carried out there and the quantity of metallic materials processed annually.

Furthermore, the existence of other voluntary agreements is envisaged, such as the Protocol of Collaboration for the Radiological Monitoring of Metallic Materials and the Spanish Protocol of Action in the event of the Inadvertent Movement or Illicit Trafficking of Nuclear and Radioactive Material in Ports of General Interest.

In relation to the above, it may be said that Spain had already adopted many of the aims pursued by Directive 2013/59/Euratom with the adoption of the aforementioned protocols, although, with the approval of this Royal Decree, some of the commitments assumed voluntarily by the signatory parties acquired the status of obligatory.

As has been commented above, the new Royal Decree explicitly introduces all the actions to be performed when orphan radioactive sources are detected, whether at a facility in possession of a Licensee or in a seaport of general interest, important places of transit for persons or goods, or in the case of the appearance of orphan sources in public places.

Furthermore, a system of inspections is defined, the jurisdiction for which corresponds to the CSN, to verify that the facilities comply with the contents of the Royal Decree; and a set of articles is included on infringements and penalties in accordance with the provisions of the LNE.

Last but not least, an important aspect introduced by the new Royal Decree is the scope of the training and information to be provided to the workers of the facilities involved. This training must be provided by the Licensee's own accredited radiation protection technicians or by the Radiation Protection Technical Units authorised by the CSN to provide advisory services in relation to the recovery of orphan sources.

- *Regulation on health protection against the risks derived from exposure to ionising radiation, approved by Royal Decree 1029/2022, of 20 December.*

The purpose of Royal Decree 1029/2022, of 20 December, approving the Regulation on health protection against the risks derived from exposure to ionising radiation is to partially transpose Directive 2013/59/Euratom, with regard to health protection against the risks derived from exposure to ionising radiation, thus repealing the previous Regulation approved by Royal Decree 783/2001.

The new regulation also incorporates the rules of *Royal Decree 413/1997, of 21 March, on the operational protection of external workers at risk of exposure to ionising radiation due to*

intervention in a controlled area, which is also repealed. This ensures that external workers receive the same protection as exposed workers employed by a company that undertakes practices with radiation sources.

The main new features introduced by this new Regulation include, in relation to external exposure, the incorporation of the methodology set out in Publication 116 of the International Commission on Radiation Protection. In relation to internal exposure, the provisions of Publication 103 of the aforementioned Commission are also taken into consideration.

Furthermore, the current effective dose limits are maintained for trainees and members of the public, but not for exposed workers, where averaging over five years is no longer permitted to ensure compliance with the limits, except in the special circumstances specified. On the other hand, the equivalent dose limit for the lens of the eye for occupational exposure is reduced.

Protection against exposure to natural radiation is integrated into the overall requirements instead of being dealt with separately under a specific heading. In particular:

- It establishes the Government's obligation to promote and approve a National Plan against Radon, with the aim of reducing the risk that long-term exposure to this gas poses to public health.
- It establishes the reference level for radon concentration in enclosed areas and specifies the obligations regarding compliance with this level.
- It establishes, for occupational exposure to radon, the annual dose level above which workers' exposure is to be managed as a planned exposure situation.
- A reference level is established for indoor exposure to gamma radiation emitted by building materials, including a list of the types of materials that require monitoring to ensure compliance with this level.
- Exposure of aircraft and spacecraft crew personnel to cosmic radiation is considered an existing exposure situation managed as a planned exposure situation.

In addition, the prohibition of deliberately adding radioactive substances to certain categories of consumer products is maintained.

It also prohibits the deliberate exposure of individuals to non-medical imaging, except in cases where such practices have been expressly justified and authorised.

The general principles relating to interventions are also established, and new reference levels associated with emergency exposure situations are introduced, both for emergency intervention personnel and members of the public, in the interests of enhancing the principle of optimisation. Other aspects relating to these situations are regulated in the regulations derived from Law 17/2015, of 9 July, on the National Civil Protection System.

Lastly, it clarifies the tasks and responsibilities of the radiation protection experts and services that provide specific advice on radiation protection and perform the functions that fall to them in this area.

- *Resolution of 21 March 2023, of the Undersecretariat, publishing the Agreement establishing basic safety standards for protection against the dangers arising from exposure to ionising radiation in the field of civil protection.*

In the area of civil protection and emergencies, although most of the transposition of Directive 2013/59/Euratom has been accomplished through Royal Decree 586/2020, of 23 June, on obligatory information in the event of a nuclear or radiological emergency, it is still necessary to incorporate and adapt issues such as radiological criteria for the protection of the population and personnel intervening in the event of an emergency, as well as certain other complementary aspects to be taken into account in the civil protection plans drawn up in response to possible nuclear and radiological emergencies.

In this regard, the Resolution of 21 March 2023 of the Undersecretariat publishes an important Agreement, approved by the Council of Ministers at its meeting of 7 March 2023, which establishes basic safety standards for protection against the dangers arising from exposure to ionising radiation in the field of civil protection.

This Agreement establishes the Strategy for protecting the public and responders in the event of a nuclear or radiological emergency by the general public, which translates into actions related to planning, preparedness, response and recovery from radiological emergencies, as well as preventive measures to minimise the associated risks.

Fundamental principles and criteria for radiation protection based on international recommendations and best practices in the field of radiation protection lie at the heart of this Agreement. These principles include the justification of practices involving radiation exposure, the optimisation of radiation protection and the limitation of exposure doses.

Lastly, the Agreement defines the responsibilities and roles of the competent authorities, the professionals involved and other relevant parties in the management of protection against radiological dangers in the field of civil protection. Clear procedures are established for coordination and collaboration between the different stakeholders.

19.3. New features in the regulatory provisions of the nuclear safety council

Article 2 of Law 15/1980, of 22 April 1980, on the creation of the Nuclear Safety Council, establishes the CSN's regulatory capacity, empowering this Council to propose to the Government the regulations required in relation to nuclear safety and radiation protection, as well as whatever revisions it deems to be appropriate. It attributes to the CSN the power to draw up and approve technical instructions, circulars and guides relating to nuclear and radioactive facilities and to activities relating to nuclear safety and radiation protection, in addition to the physical protection of nuclear and radioactive facilities and materials. These functions are de-

veloped more extensively in the Statute of the CSN, approved by Royal Decree 1440/2010, of 5 November.

The instructions are mandatory standards, the safety guides are technical documents containing recommendations for their intended audience, and the circulars are technical documents of an informative nature.

Two new CSN instructions have been approved from 2020 to 31 December 2023:

- *Nuclear Safety Council Instruction IS-44, of 26 February 2020, on emergency planning, preparedness and response requirements for nuclear facilities.*

This Instruction establishes the requirements to be met by Licensees of nuclear facilities to manage nuclear emergencies at the site response level (included in the Site Emergency Plan). The main means of preventing and mitigating the consequences of accidents at nuclear power plants is the principle of " in-depth defence", which consists of the establishment of a series of consecutive and independent levels of protection referring both to the design and construction and the operation of the plants, guaranteeing that no single technical, human or organisational failure may give rise to harmful effects on the health of the population and the environment, and that combinations of failures that might cause significant harmful effects are highly improbable.

- Nuclear Safety Council Instruction IS-45 of 17 November 2021, on safety requirements during the design, construction and operation phases of nuclear and radioactive facilities of the nuclear fuel cycle, to provide for their decommissioning and, where appropriate, their dismantling and closure.

It develops the common requirements or reference levels established by WENRA (Western European Nuclear Regulators Associations) to harmonise regulation in this area. It establishes the design criteria and requirements for the safe decommissioning of the facilities, which are applicable during the life of the preliminary, construction and operating permits, including the period of cessation of operation. To comply with these requirements, the Licensee must establish, jointly with the party responsible for future decommissioning, a strategy compatible with the GRWP and draw up a Preliminary Decommissioning Plan.

Furthermore, the modification of a CSN Instruction already in force has been approved.

- *Nuclear Safety Council Instruction IS-10, revision 2, of 7 September 2023, establishing the criteria for reporting events to the Council by nuclear power plants.*

Following the publication of Revision 1 of this Instruction IS-10, dated 30 July 2014, and taking into account the experience acquired since its publication, the CSN has approved a new revision in order to facilitate and clarify the reporting of events occurring at nuclear power plants, modifying both the general reporting conditions and the types of events to be reported.

The revision has also been influenced by regulatory changes such as *Royal Decree 1400/2018, of 23 November, approving the Regulation on Nuclear Safety at Nuclear Facilities*, the preamble of which refers to the "emphasis on early reporting of events", Article

32 of which indicates that the Licensee must "notify the competent authority of events with a potential impact on the safety of the facility" and, finally, its Fifth Additional Provision 1. g) indicates that IS-10 is applicable.

Article 20. Regulatory body

1. Each Contracting Party shall establish or designate a regulatory body entrusted with the implementation of the legislative and regulatory framework referred to in Article 19, and provided with adequate authority, competence and financial and human resources to fulfil its assigned responsibilities.

2. Each Contracting Party, in accordance with its legislative and regulatory framework, shall take the appropriate steps to ensure the effective independence of the regulatory functions from other functions where organisations are involved in both spent fuel or radioactive waste management and in their regulation.

The regulatory function within the context of nuclear energy in Spain corresponds to the following authorities, which act in accordance with their powers within the scope of application of the Convention, subject to the context established by the legislation in force:

- The Government is responsible for defining energy policy, including nuclear policy and radioactive waste management, as well as issuing regulatory standards at the proposal of those ministerial departments with powers in these areas.

Therefore, the Government will issue regulations with the status of a Royal Decree and will approve the regulatory developments of laws passed by the Spanish Parliament. MITERD is currently the ministerial Department responsible for issuing and processing regulatory proposals in the field of nuclear energy. Where these proposals refer specifically to nuclear safety or radiation protection, this responsibility lies with the CSN.

With regard to radioactive waste, according to Article 38 bis of the LNE, the Government is responsible for defining policy for the management of radioactive waste, including spent fuel, and the dismantling and decommissioning of nuclear facilities, through approval of the GRWP.

The Government is likewise responsible for reviewing the tariffs of the Fund used to finance GRWP activities, on the basis of the updated economic/financial report on the cost of the corresponding activities, as established in the Sixth Additional Provision of Electrical Sector Act 54/1997, of 27 November 1997, declared to remain valid by Law on Electricity Sector 24/2013, of 26 December 2013.

- The Spanish Ministry for Ecological Transition and Demographic Challenge

Is the ministerial department of the General State Administration responsible for granting, modifying, suspending or revoking the authorisations of nuclear and radioactive facilities[3],

3 In the case of Category 2 and 3 radioactive facilities, the Autonomous Regions are responsible for exercising the executive functions of the MITERD if they have been transferred these powers by legal provision.

subject to the mandatory and, where applicable, binding reports[4] of the with regard to nuclear safety and radiation protection, in addition to any reports that must be issued by other departments or bodies of the General State Administration in other matters in accordance with the provisions of the specific regulations. The Government likewise has the task of issuing regulatory proposals in furtherance of the legislation in force, adopting provisions in furtherance of governmental regulations, and applying the disciplinary regime in the field of nuclear energy.

- The Governments of those Autonomous Regions which have by legal provision[5], been transferred executive functions attributed to the MITERD.
- The CSN which, in accordance with the provisions of Law 15/1980, of 22 April 1980, on the creation of the CSN, is the only competent State body in the field of nuclear safety and radiation protection, as a public law agency independent of Central Government, with its own legal personality and assets, independent of those of the State.

In order to exercise the powers and functions established by law, the CSN must cooperate with the Spanish Parliament (Congress and Senate), the Government, its responsible ministerial departments, and the Autonomous Governments.

With regard to the relationship with Parliament, the corresponding Committee of the Lower House of Parliament monitors the activities of the CSN, by means of the report that the CSN presents to it each year, through periodic appearances and at the request of the Lower House or its own request, to provide information on significant matters. The Committee may likewise call on other public authorities or entities connected with nuclear energy to appear before it. As a result of such appearances, the Lower House of Parliament may, at the proposal of the Committee, call on the Government, the MITERD or the CSN, depending on the matter in question, to establish certain measures or initiate regulatory procedures. Similarly, the CSN appears before the responsible Upper House Committee, at the behest of said institution or at its own request in order to report on matters lying within its purview.

Meanwhile, the CSN deals with the Government essentially via the State Secretariat for Energy at the MITERD for all aspects concerning the processing of authorisations in all phases of site selection, construction, running, operation and decommissioning of nuclear and radioactive facilities. The MITERD is responsible for requesting that the CSN issue the mandatory and, where applicable, binding reports, with regard to nuclear safety and radiation protection, prior to the granting of any type of authorisation for facilities. The CSN will issue the Government with proposals for new regulations and the revision of the existing regulations in the field of nuclear safety, radiation protection and also the physical protection of nuclear and radioactive material and facilities, in collaboration with the competent authorities, and as required in accordance with international obligations entered into in this field. The CSN may likewise propose the instigation of disciplinary investigations where applicable.

4 The CSN reports are binding, whether they are negative or if they are positive, with regard to any stipulations they might impose.

5 Specifically, authorisation of category 2 and 3 radioactive installations has been transferred to the Autonomous Governments of Aragon, Asturias, Cantabria, Castile-Leon, Catalonia, Ceuta, Extremadura, Galicia, Madrid, Murcia, Balearic Islands, Canary Islands, La Rioja, Navarre, Basque Country and Valencia.

The CSN likewise has dealings with the State Secretariat for the Environment (SEMA) at the MITERD, essentially through participation in environmental impact assessment procedures with regard to the assessment of the environmental radiological impact of facilities that could cause such an impact.

The CSN also deals with other ministerial departments both in order to more effectively perform its functions and to cooperate in areas of shared interest. Aside from the MITERD, the main ministerial departments with which the CSN has dealings are:

- Ministry of Interior and Ministry of Defence, with regard to the handling of emergencies, physical protection and civil protection in response to radiation risk.
- Ministry of Education, Vocational Training and Sport and the Ministry of Science, Innovation and Universities, with regard to the training of secondary education teachers.
- Ministry of Health: The CSN collaborates with this Ministry in matters connected with radiation protection (protecting patients, workers, the public and the environment).
- Ministry of Foreign Affairs, European Union and Cooperation.

It should also be emphasised that both the MITERD and the CSN maintain relationships in their respective spheres of responsibility with the Parliaments and Governments of the Autonomous Regions.

With regard to the MITERD, Spanish law allows for the possibility that some of the powers corresponding to Central Government may be transferred to the Autonomous Regions. As previously mentioned, various Autonomous Regions exercise executive functions originally attributed to the MITERD by the RINR in connection with Category 2 and 3 radioactive facilities.

The MITERD is also obliged to convey the information presented in requests for authorisation to those Autonomous Regions which house facilities, or whose territory is included within the operational zone of the Nuclear Emergency Plan of facilities, in order to allow them to raise the relevant arguments with regard to territorial or environmental regulation.

Meanwhile, with regard to the CSN, in accordance with the provisions of Law 15/1980 it may delegate the Autonomous Regions to exercise functions attributed to said body, pursuant to the general criteria agreed by the CSN itself for the implementation thereof. Delegation agreements are signed for this purpose, under the terms of which the powers attributed to the CSN by law remain subject to its responsibility. The CSN currently has delegation agreements in place with nine Autonomous Regions: Principality of Asturias, Catalonia, Galicia, Balearic Islands, Canary Islands, Murcia, Navarre, Basque Country and Valencia. A representative of those Autonomous Regions with nuclear facilities within their territory or delegation agreements in place with the CSN will belong to the Advisory Committee for information on public participation regarding nuclear safety and radiation protection.

Lastly, according to the CSN's Articles of Association, the Government, Upper and Lower Houses of Parliament, Regional Governments and Parliaments, and Local Authorities concerned must be provided with timely information as to any circumstance or event affecting the safety of nuclear and radioactive facilities or the radiological quality of the environment

anywhere within national territory. Furthermore, each year, the CSN must send a report on its activities to the Regional Parliaments of Autonomous Regions whose territory contains nuclear facilities.

20.1. Structure, responsibilities and functions of the Ministry for Ecological Transition and Demographic Challenge

20.1.1. Organisational structure

Currently, ***Royal Decree 1009/2023, of 5 December, establishes the basic organisational structure of the ministerial departments and the organisational model of the General State Administration***, which includes the MITERD and its senior and executive bodies.

Within the MITERD, the State Secretariat for Energy is the senior authority in the field of energy, and within said secretarial department, the Directorate-General for Energy Policy and Mines (DGPEM) is the executive body which performs the functions detailed in the following subsection within the specific field of nuclear energy.

Within the DGPEM, the Sub-Directorate-General for Nuclear Energy (SGEN) is the executive body responsible for the practical execution of these functions. The SGEN also has dealings with other executive bodies and general services of the MITERD integrated within and outside the Department of the State Secretariat for Energy in order to exercise its functions, such as the Technical Secretariat-General for the processing of regulatory proposals, or the State Attorney's Office for legal consultations and support, among other aspects.

Annex F.1 of this report includes an organisational chart of the MITERD, highlighting those bodies that are attributed functions regarding the Convention, together with a block diagram indicating the structure of the functional areas and services of the SGEN.

20.1.2. Powers and functions

According to the legal structure in force, the MITERD is one of the authorities with powers and functions within the Spanish regulatory system in the field of energy, and in particular nuclear energy. It should be clarified that the generation of electrical energy in Spain is fully liberalised, and as a result, the actions of the Government via the MITERD are confined to the definition of guideline energy planning and the regulation of the different energy sectors. The MITERD, therefore, plays no role in either the development or the promotion of nuclear energy.

Those powers in the field of nuclear energy attributed to the different bodies remain substantially unchanged with regard to the **Seventh** National Report. The MITERD exercises the following powers and functions lying within the scope of the Joint Convention:

- It grants authorisations for nuclear and radioactive facilities, except for those second and third-category radioactive facilities located in Autonomous Regions that have had executive functions corresponding to the General State Administration, following a favourable report by the CSN;
- It draws up regulatory proposals and applies the disciplinary regime established in the LNE. Where regulatory developments refer to nuclear safety or radiation protection, the CSN is responsible for drawing up proposals;
- It manages administrative records (with regard to the transportation of nuclear and radioactive materials, radioactive facilities, activities involving the sale of radioactive devices and materials, etc.);
- It defines the radioactive waste management policy;
- It contributes to the definition of R&D policy in coordination with the **Ministry of Science, Innovation and Universities**. On the initiative of the MITERD, a Strategic Nuclear Energy R&D Committee (CEIDEN) was set up for this purpose in 1999[6], the predecessor of the current Nuclear Fission Energy R&D Technological Platform of the same name, its purpose being to bring together all actors connected with the nuclear energy sector, including not only the MITERD itself, but also the CSN, universities and research centres, operators and industry associations, in order to identify synergies and shared points of interest in the research activities and programmes undertaken by the former, and to take part in international programmes. Within the context of radiation protection, the National Radiation Protection R&D Platform (PEPRI) was set up in 2014, with the overall objective of promoting R&D&I and innovation activities focused on protection against radiation;
- It monitors compliance with the international commitments signed by Spain in the field of nuclear energy, in particular with regard to safeguards, non-proliferation and civil liability for nuclear damage;
- It has dealings with the international bodies specialising in nuclear energy within the context of the Eurotunnel Treaty and its related committees and working parties, within the framework of the IAEA and the OECD Nuclear Energy Agency (NEA) with regard to the European Reconstruction and Development Bank, and the European Nuclear Energy Forum, etc.

20.1.3. Human resources and training

The SGEN, which is the Sub-Directorate-General responsible for implementing the functions of the MITERD in the field of nuclear energy, is fully staffed by public officials belonging to the different General State Administration bodies. The normal system for recruitment to positions at the various units of the MITERD, including the SGEN, is by competitive examination

6 The CEIDEN currently has 110 members and 120 partner bodies, with the CSN holding the position of Chair, renewable every two years.

for those covered by a public job offer, followed by a selective training course. Meanwhile, such jobs are open within the SGEN to those applying through the competitive transfer process for public officials from other fields of Central Government Administration, provided that the bodies from which they are transferred are compatible with the demands applicable to the jobs at the MITERD for which they are applying.

The SGEN currently has 15 employees. 77% of the public officials who belong to the SGEN at present have a university education, most of them industrial engineers belonging to the State Industrial Engineers Body, although there are also public officials belonging to other engineering bodies. There is a balanced distribution of the workforce in terms of knowledge and experience in the fields of administration and nuclear technology, in accordance with service requirements.

The budget of the Directorate-General for Energy Policy and Mines, which is the executive body to which the SGEN belongs, is covered by the General State Budget, in the same way as any other organisational unit of the ministerial departments of the General State Administration.

The training programme for SGEN personnel forms a part of the general MITERD training programme, which covers training in technical energy-related matters and administrative, legal and economic fields.

20.2. Structure, powers and functions of the Nuclear Safety Council (CSN)

20.2.1. Organisational structure of the CSN

Law 15/1980, of 22 April 1980, creating the Nuclear Safety Council, and the Articles of Association of the Nuclear Safety Council, approved by Royal Decree 1440/2010, of 5 November 2010, establish, respectively, in Article 4 and Title II, Chapters IV and V, the following structure for the CSN:

- **The plenary session, one of the two highest management bodies of the Nuclear Safety Council, comprises the Chairperson and four Directors.**
- **The Chairperson's Office, which, in addition to its competences as a member of the plenary session, has its own competences as the highest management body.**
- **The Secretariat General, to which two Technical Directorates (Nuclear Safety and Radiation Protection) and the following Sub-Directorates and Units report directly:**
  - **Sub-Directorate for Personnel and Administration**
  - **Sub-Directorate for Information Technologies**
  - **Sub-Directorate for Legal Consultancy**

  - Planning, Assessment and Quality Unit
  - Inspection Unit
  - Research and Knowledge Management Unit

- The Technical Directorate for Nuclear Safety is responsible for the following Sub-Directorates:
  - Sub-Directorate for Nuclear Power Plants
  - Sub-Directorate for Nuclear Engineering
  - Sub-Directorate for Nuclear Technology
- The Technical Directorate for Radiation Protection is responsible for the following Sub-Directorates:
  - Sub-Directorate for Operational Radiation Protection
  - Sub-Directorate for Emergencies and Physical Protection
  - Sub-Directorate for Environmental Radiation Protection

Annex F.2 of this report includes an organisational chart of the CSN.

As mentioned above, the CSN's highest management bodies are the plenary session and the Chairperson's Office. They act in the exercise of their respective competences in accordance with the principle of competence, with no hierarchical subordination between them. Relations between the two governing bodies are governed by the principles of cooperation, balance, and respect for the legitimate exercise of the other body's powers.

The plenary session is made up of the **Chairperson and four Directors**, appointed from among persons of renowned competence in the areas commissioned to the CSN, whereby their independence and objective criteria are particularly valued.

The Chairperson and the Directors will be appointed by the Government at the proposal of the MITERD, following an appearance by the individual proposed for the position before the corresponding Committee of the Lower House of Parliament, on the terms provided by the Regulation of the Lower House. The Lower House will, by means of a resolution passed by three-fifths of the members of the responsible Committee, register its acceptance or reasoned veto within a period of one (1) calendar month of receipt of the corresponding notification. Once this deadline has passed, if no explicit opinion has been issued by the Lower House of Parliament, the corresponding appointments will be deemed to have been accepted.

The Council shall be assisted by a General Secretariat, **which is defined as the management body of the CSN**, to which the administrative and legal working bodies shall report for the fulfilment of its objectives, as well as those internal or external technical bodies provided for in its Articles of Association. The Secretary-General also acts as Secretary of the plenary session of the CSN, attending its sessions with the right to speak but not to vote.

Other CSN management bodies include the Technical Directorates, the Directorate of the Technical Office of the Chairperson's Office **and the sub-directorates listed above. In relation to the first three of these, the following should be stressed**:

- The Technical Directorate for Nuclear Safety group all functions involving the safety of nuclear facilities together, except for the storage of low- and intermediate-level radioactive waste, which is the responsibility of the Technical Directorate for Radiation Protection. It likewise handles matters regarding the safe transportation of nuclear waste and radioactive materials. It is responsible for three Sub-Directorates: Nuclear Facilities, Engineering and Nuclear Technology;
- The Technical Directorate for Radiation Protection is responsible not only for the inspection and control of radioactive facilities, radiation protection of workers and low- and intermediate-level radioactive waste management, but also the field of radiation protection of the general public and the environment, and radiation emergencies. This Directorate is responsible for three Sub-Directorates: Environmental Radiation Protection, Operational Radiation Protection, and Emergencies and Physical Protection.
- The Technical Office assists the Chairperson of the CSN, who is responsible for performing specific tasks entrusted to it by **the Chairperson**, in addition to those connected with the activities of the Plenary as a collegiate body.

20.2.2. Powers and functions of the CSN

The CSN is a public law entity, independent of the Central Government and with its own distinct legal personality and its own assets, independent of those of the State, as the sole body responsible for nuclear safety and radiation protection at the national level.

The functions of the CSN are essentially listed in Article 2 of Law 15/1980 and Title I of its Articles of Association, without prejudice to responsibilities shared with other national bodies as set out in other standards or legislation in force. With regard to the scope of the Convention, the functions of the CSN are, in summary, as follows:

- It issues mandatory reports to the MITERD with regard to authorisations for nuclear and radioactive facilities, and for all activities connected with the manipulation, processing, storage and transportation of nuclear and radioactive substances; it issues reports prior to the decisions issued in exceptional circumstances and cases by the MITERD in connection with the removal and safe management of radioactive materials;
- It issues reports prior to the decisions issued in exceptional circumstances and cases by the MITERD concerning the removal and safe management of radioactive materials;
- With regard to radioactive waste, it informs the MITERD of concentrations of levels of activity for consideration in materials containing or incorporating radioactive substances for which no use is planned;

- It presents the Government with proposals as to the regulations required within its purview. It likewise draws up and approves Instructions, Guides and Circulars of a technical nature with regard to nuclear safety and radiation protection;
- It proposes the initiation of disciplinary investigations within the sphere of its responsibilities. The Council will also, as a mandatory requirement, issue a report within a period of three (3) months for the appropriate classification of events if disciplinary proceedings in the field of nuclear safety, radiation protection or physical protection have been initiated by another body, or at the reasoned request of the CSN itself, and in the event that the proceedings involve details other than those notified by the CSN. Penalties will be imposed by the executive body of the Central Government or the Autonomous Regional Governments.

  The CSN is likewise empowered to serve disciplinary notices on Licensees, propose corrective measures, and, where applicable, impose coercive fines **in the case of minor infringements**.
- It performs surveillance and control of nuclear and radioactive facilities, conducting inspection and control of nuclear and radioactive facilities throughout all phases, and inspects the transportation, manufacture and approval of equipment with radioactive sources or that generate ionising radiation, and the approval or ratification of packages intended for the transportation of radioactive substances.

  It oversees and controls the doses of radiation received by operational personnel and discharges of radioactive materials outside nuclear and radioactive facilities, together with their individual or cumulative impact on the surroundings of such facilities.
- It conducts studies, assessments and inspections of the plans, programmes and projects required for all phases of radioactive waste management and new designs.

  It will likewise issue a prior report on the GRWP that the MITERD submits to the Government for approval.
- It maintains official relations with similar bodies abroad and takes part in international bodies with responsibilities for nuclear safety or radiation protection, and advises the Government as to commitments with such bodies or with other countries.
- It informs public opinion as to the matters within its purview without prejudice to the publication of its administrative actions on the legally established terms.

  The CSN is obliged to inform the general public of all significant events concerning nuclear and radioactive facilities; the reports that it issues are made public, as are the notices resulting from the inspections performed; a public information procedure is established during the preparatory stage of CSN Instructions and technical guides.
- It collaborates with the competent authorities in preparing the criteria applicable to external emergency plans and physical protection plans for nuclear and radioactive facilities.

It coordinates support and response measures to address emergency situations in all aspects connected with nuclear safety and radiation protection.

It inspects, evaluates, controls, proposes and adopts any preventive and corrective measures that might be required in response to exceptional or nuclear or radiological emergency situations, where these originate in facilities, equipment, companies or activities not subject to the nuclear legislation authorisations regime.

- It establishes and monitors research plans in the field of nuclear safety and radiation protection.
- It archives and stores the documentation received from the Licensees of the nuclear facility operating permits, when the definitive cessation of the practices occurs and prior to the transfer of ownership and the granting of the decommissioning authorisation for these facilities.

20.2.3. International relations of the CSN

In October 2022, the CSN approved, for the first time, a document containing the organisation's International Relations Strategy. This document describes and details the specific activities and actions to be carried out at an international level by the workers and the plenary session of the CSN during the period 2020-2025. Furthermore, it defines international strategic objectives that frame international activity in line with the functions attributed to the CSN, such as the promotion of international activity, representation of the CSN, relations with counterparts and returns on activity.

The CSN's international policy and activity revolves around five fundamental elements:

- The development of standards, criteria and procedures for action in the fields of nuclear safety, radiation protection and safety through participation in groups of experts and committees set up to this end in international organisations, as well as the promotion of good practices and recommendations;
- The exchange of information and experience at an international level contributing to the best possible performance of regulatory activities;
- The establishment of bilateral agreements, memorandums of understanding or other commitments between counterpart bodies that allow for the speedy and flexible exchange of experiences, information, working practices, personnel and participation in joint working groups or inspections;
- Participation in international research and development projects to keep knowledge up-to-date and contribute to advances made in technology, nuclear safety and radiation protection;
- Participation at an international level in assistance projects whose mission is to improve the regulatory capacity of the countries requesting them.

The CSN's intense international activity constitutes a strength of the institution since it allows for the constant updating and development of knowledge in accordance with the highest regulatory standards. This translates into a set of activities of a technical and institutional nature centred on four areas:

- The international conventions that have been ratified by Spain and in which the CSN participates, in its area of competence, through the application of the commitments acquired;
- The European Union, in which Spain, as a Member State, participates in international meetings on nuclear safety and radiation protection under the auspices of the Euratom Treaty;
- Multilateral relations within international organisations such as the IAEA, the NEA and the associations of regulators of which the CSN is a member by its own decision (INRA, WENRA, ENSREG, FORO, HERCA, ENSRA);
- Bilateral relations are normally carried out under technical cooperation agreements with counterpart organisations;

From the national point of view, the CSN collaborates with the competent Spanish organisations and entities in order to ensure the coordination of international activities in the areas of nuclear safety, radiation protection and nuclear security. Particularly significant among these organisations are MITERD, the Ministry of Foreign Affairs, European Union and Cooperation (MAEUEC) and its Permanent Representations, and the Ministry of the Interior, and in relation to the collaborating organisations, Ciemat and Enresa.

In the period since the previous national report, the CSN took part in activities concerning compliance with the commitments given by Spain as a contracting party under the following international Conventions:

- Convention on Nuclear Safety: The CSN acts as a national liaison and coordinates the preparation of the national reports;
- Joint Convention, collaborating with the MITERD in the preparation of the national reports;
- Convention on the Physical Protection of Nuclear Material;
- OSPAR Convention for the Protection of the Marine Environment of the North-East Atlantic.

Also significant during this period was the CSN's intense activity in Spain's rotating Chairmanship of the Atomic Questions Group of the Council of the European Union during the second half of 2023. Furthermore, in the European Nuclear Safety Regulators Group (ENSREG), the CSN was elected to head up the group as of January 2024.

The CSN has continued to collaborate in the different working groups and activities of the organisations and associations to which it belongs. In relation to the IAEA, it attended the annual General Conference, the Standards Committees and Commission, inter-

national conferences and participated in international missions. Furthermore, the CSN took part, as is customary, in the numerous activities of the NEA technical programme. As regards FORO, HERCA, INRA and WENRA, the CSN was present at the corresponding annual meetings. Furthermore, the CSN is currently the Vice-President of the HERCA Association.

The CSN plays an active role in the IAEA technical cooperation programme, contributing experts for participation in seminars, hosting placements and scientific visits by foreign experts, and organising activities in Spain in the field of safe radioactive waste management.

20.2.4. Human resources, training and funding of the CSN

- Human resources:

As the body responsible for nuclear safety and radiation protection, the CSN requires specialist technical personnel in this field. These technical personnel comprise public officials belonging to the Nuclear Safety and Radiation Protection Body, as established in Article 8 of Law 15/1980, establishing the CSN, appointed by means of a competitive examination organised by the CSN itself. In addition to such personnel, the organisation also includes public officials from other public authorities, temporary staff, and employees without public official status.

On 31 December 2023, the CSN had a workforce of 432 employees, 210 of them public officials of the Nuclear Safety and Radiation Protection Body, engaged in the inspection, control and monitoring of the functioning of nuclear and radioactive facilities, a further 127 public officials belonging to the bodies and hierarchies of other public authorities, 34 temporary employees, 8 Senior Officials, and 53 regular employees. Women account for 51.39% of the total CSN workforce, and men the remaining 48.61%. The average age of the organisation's personnel is 53 years of age. As for staff qualifications, 71.93% have a higher education qualification, 6.37% have intermediate qualifications and 21.7% have other qualifications.

A priority objective of the CSN in this area is to have adequate human resources in terms of a sufficiently large workforce (technical and from other administrative bodies) made up of people with a high degree of qualification, experience, competence and knowledge, allowing them to efficiently and effectively perform the functions and competences attributed to them.

In relation to the size of its workforce and in view of its distribution by age, the CSN needs to incorporate new civil servants to compensate for the loss of personnel caused by retirements, both in the field of nuclear safety and radiation protection and from other bodies. Along with attracting talent, the management and retention of existing talent is another of the organisation's objectives. From 2020 to December 2023, 45 new civil servants have been incorporated into the Nuclear Safety and Radiation Protection Corps by means of the competitive examination system, although not all the vacancies

offered have been filled. Accordingly, the CSN has developed a programme to attract talent that allows the CSN to be viewed as an attractive place for the development of a professional career. The retention of existing talent is also considered important, and to this end a new standardised professional career model has been approved (a horizontal model linked to performance assessment) and the improvement of staff remuneration.

- CSN Personnel Training Plan:

Since it was first set up, the Nuclear Safety Council has placed particular emphasis on training all its personnel. This emphasis has taken the specific form of annual training plans establishing the annual provision for training activities, organised internally or in partnership with external specialist bodies. Training activities have focused on scientific and technical training, legal and administrative training, the development of managerial, organisational and communication skills, and the use of working tools and procedures.

The 2020, 2021, 2022 and 2023 Training Plans were drawn up in accordance with the needs raised by the Technical Directorates and the remaining Sub-Directorates and Units involved, with the contents being clustered around seven training programmes:

- Nuclear Safety and Radiation Protection Technician:
  - Nuclear Safety sub-programme
  - Radiation Protection sub-programme
  - Cross-cutting Support Areas sub-programme
  - Initial Technical Training sub-programme (nuclear safety and radiation protection) (since 2015)
  - CSN ERO Training sub-programme (since 2021).
- Managerial Development
- Administrative and Legal Management
- Occupational Risk Prevention
- IT
- Languages
- Skills

The training plans for 2022 and 2023 have been developed taking into account the information obtained from the analysis and design phases of the SAT (*Systematic Approach to Training*) methodology developed in 2020 and 2021 based on the IAEA's SRS 79, thus responding to the recommendations of the IRRS-ARTEMIS Mission received in 2018.

The Agency's training budget amounted to 609,780 euros for each year from 2020 to 2023.

- Financing:

The budgets for the expenditure and income of the CSN are incorporated within the General State Budget, and as such, approval for these budgets lies with Parliament. The two most significant items under the income budget are, first of all, the fees, public levies and other income that the CSN obtains in consideration for its services and, to a lesser extent, State transfers, which have gradually been reduced through the application of budgetary containment and fiscal consolidation policies. The funding of the CSN is, therefore, at present derived almost entirely from its own resources.

- Fees, public levies and other income are governed by Fees and Public Levies Law 14/1999, of 4 May 1999, for services provided by the Nuclear Safety Council. The most significant fees in terms of their amount are those obtained through:
  - Execution of studies, reports and inspections prior to operational and decommissioning authorisations for nuclear and radioactive facilities granted by the MITERD;
  - Inspection and control of nuclear and radioactive facilities in operation, as well as related activities;
  - Granting of licences for personnel intended to operate or supervise the functioning of nuclear and radioactive facilities.

Public levies finance reports, trials, or studies into new designs, methodologies, simulation models, or verification protocols related to nuclear safety or radiation protection.

This funding financing heading accounted for 98.85% of the total budget in 2023.

- **State transfers. The CSN conducts controls of radiation protection measures intended for the general public and the environment. In addition, a new function has been assigned to it within the framework of nuclear liability claim proceedings, where it must draw up a mandatory technical report in the framework of such proceedings. These functions are not subject to public price and tariff levies, and are instead financed under the General State Budget, via the MITERD. The funding budgeted in this regard comprised 0.82% of the total in 2023.**

20.2.5. CSN management system

The CSN has implemented a process-focused Management System based on the IAEA (GS-R3) requirements and standard ISO 9001: 2008. The processes covering all the body's activities have been classified as follows:

- **Strategic processes: These determine the focus and deployment of the management system, encompassing the functions of the organisation's management, internal and external information and communication, and the management system itself.**

- **Operational processes: These comprise the organisation's know-how or value chain for the provision of services to regulated parties, society and other stakeholders. Basically, they correspond to the functions of the CSN.**
- **Support processes: These provide support for the operating processes and carry out certain strategic activities.**

The documents describing the system are organised in a hierarchical structure: System Manual, Organisation Manual and Procedures. All these documents, in addition to the information and documentation required in order to perform regulatory activities, are available to all personnel via the CSN intranet, with certain exceptions justified on grounds of security or confidentiality.

The Management System is subject to continuous improvement. In addition to assessments of the fulfilment of plans and objectives, the CSN has an established audit plan and is subject to external assessments by national and international bodies.

- The internal audit plan makes provision for all processes to be audited with the established frequency, ranging from 2 to 5 years depending on the importance of the process and the legal requirements applicable to it. There is a specific audit programme for activities entrusted to Autonomous Regions;
- Aside from being subject to the economic/financial checks and audits required of all public bodies, the CSN must also systematically report to the Spanish Parliament and the parliaments of those Autonomous Regions containing nuclear facilities. Parliament is responsible for continuously monitoring the actions of the CSN.

20.2.6. Knowledge management at the CSN

To properly perform its mission, the CSN's technical personnel must have the necessary qualifications and skills. Therefore, the CSN has developed and is implementing a knowledge management model specifically tailored to its needs, based on the recommendations of the IAEA and incorporated within the organisation's integrated management system.

The process of knowledge management at the CSN must address the four basic cornerstones of the model recommended by the IAEA. The structure is based on a horizontal and cyclical process, with the following stages:

- Knowledge from the CSN (shortcomings and lacks);
- Programme for preserving critical knowledge and continuously improving capabilities (acquisition and preservation);
- Internal communication plan to guarantee distribution and accessibility of knowledge and information (accessibility and availability);
- Independent evaluation programme and periodic process review (evaluation and review).

In the years 2020 to 2023 activities focused on the programme for the preservation of critical knowledge and the continuous improvement of capabilities, with an action plan being developed in this field, focused on the preservation/recovery of the knowledge and experience of CSN technicians born before 1955.

The methodology employed in this critical knowledge preservation programme comprises the following phases:

- Preparatory Phase: identification of holders of critical knowledge;
- Extraction Phase and systematisation of knowledge;
- Exploitation Phase: deployment of an agenda to use the systematised knowledge.

In this regard, the CSN has a computerised tool, KITE, to support the RECOR process (transparent extraction of critical knowledge), which is ongoing.

Furthermore, the CSN has initiated a process for creating knowledge communities. Several knowledge communities have been set up, the first on the subject of Findings, considered to be of interest since it is a cross-cutting activity involving the two Technical Directorates and of great importance for the organisation's activities; another on uncertainties; and a third on the NEA/OECD databases.

20.2.7. Safety culture of the regulatory body

The CSN recognises the importance of a safety culture not only at the facilities it regulates but also in its own organisation. The CSN Safety Culture Policy, approved by the plenary session at its meeting on 12 January 2017, establishes the attributes that this organisation considers fundamental for the establishment and maintenance of a safety-oriented organisational culture.

To implement the aforementioned Safety Culture Policy, the CSN drew up an action plan that included among its milestones, and as one of the plan's cornerstones, the performance of an assessment of the organisation's safety culture. The organisation's commitment to the development of this initiative was expressly included in the CSN Strategic Plan for the period 2020-2025 (Strategic Objective 2.3).

The self-assessment of the organisation's safety culture was carried out between September 2020 and September 2021, with the aid of an external contract, publicly tendered and awarded to the Sociotechnical Research Centre (CISOT) - Ciemat. The methodology used was an adaptation of NOMAC (Nuclear Organization and Management Analysis Concept) to the case of the CSN as a regulatory body. This methodology makes it possible to evaluate the most important operating processes of an organisation and analyse the perceptions of its personnel in relation to the principles of the organisation's safety culture. It uses quantitative (surveys and questionnaires) and qualitative (observations, individual and group interviews) sociological analysis tools.

The results of the self-assessment were received in two stages: a first final report in December 2021 and a summary report in 2022, the conclusions of which were presented to

the CSN personnel in a monographic session. The recommendations included in the final report of the self-assessment are to be implemented gradually over the coming years, for which the CSN will be assisted by organisations with expertise in organisational change.

In order to initiate the contracting process for the aforementioned external assistance, the CSN devoted different efforts to ensuring the maximum technical and administrative quality of the documentation associated with the contracting process itself (technical justification report and technical specifications), as well as of the criteria for assessing the experience of the entity to be contracted.

Following a public tender process, in July 2023, a contract was signed with the company INDRA BUSINESS CONSULTING S.L.U. to provide a support service to the CSN in the definition of an action plan and its subsequent implementation to improve the Nuclear Safety Council's safety and organisational culture. The scope of this contract is to identify precise indicators and joint working methods, as well as the definition and implementation of an action plan aimed at cultural improvements and transformation. The collaboration project with this company is currently being developed.

20.2.8. Independence of the regulatory body

The independence of the CSN is explicitly provided for in the law which created the body: "The Nuclear Safety Council is created as a public law entity, independent of Central Government Administration, with its own legal personality and assets, independent of those of the State, and as the sole body responsible for the field of nuclear safety and radiation protection. It shall be governed by its own Articles of Association drawn up by the Council and approved by the Government, the text of which shall be conveyed to the competent Committees of the Upper and Lower Houses of Parliament prior to publication, and through any specific provisions addressed thereto, without prejudice to the supplementary application of the principles of standard or special legislation."

This same declaration of independence is set out in Article 2.4 of the Articles of Association of the CSN, which states that "The Nuclear Safety Council acts in the pursuit of its activities and for the fulfilment of its purposes with organisational and functional autonomy, fully independent of public authorities and stakeholders. It is likewise subject to parliamentary and judicial control. Any decisions adopted by the Plenary and the Chairperson of the Nuclear Safety Council in performing the public functions attributed to them shall mark the end of the corresponding administrative channel".

Meanwhile, Article 8.2 of the Law establishing the CSN empowers the Council "in accordance with any standards established in the Articles of Association to hire the services of personnel, companies and national or foreign organisations solely in order to perform work or to draw up specific studies, provided that it can be confirmed that there is no connection with those affected by the services contracted. Under no circumstances may personnel from outside the CSN directly participate in decision-making as to administrative proceedings in progress. The CSN shall establish the necessary resources to ensure that any personnel, companies and organisations hired externally abide at all times by the obligations of independence required while providing their services".

Likewise, according to the lawestablishing the CSN itself, any reports issued by the CSN to the MITERD regarding nuclear safety, radiation protection and physical protection prior to any decisions that the MITERD might adopt in the field of the granting of authorisations will in all cases be mandatory, and furthermore binding if they constitute negative opinions or the refusal to grant authorisation, and likewise with regard to any conditions that they might impose if the decision is positive.

From an administrative point of view, its configuration as an independent administrative authority reinforces its independence as a regulatory body.

20.2.9. Transparency in regulatory and public information activities

In its Strategic Plan for the period 2020-2025, the CSN recognises as one of its fundamental values the principle of transparency, based on the capacity to provide the general public with relevant, valid and verifiable information in all matters connected with nuclear safety and radiation protection. **Specifically, it includes Strategic Objective 5.6, which establishes the "reinforcement of the independence, transparency, credibility and confidence of the public in the CSN through the quality of the information transmitted, the response to requests for information from interest groups, the public, etc., with a view to obtaining their respect and acceptance of regulatory decisions, backed by the best technical knowledge available and the results of R&D"**.

This policy of transparency is rooted in the law establishing the CSN **and in what is developed in the CSN Articles of Association, Article 15, which includes the functions of publicising actions, informing public opinion and public participation. Likewise, the CSN transparency policy** incorporates aspects that are governed by the Aarhus Convention, ratified by Spain in 2004 and expressed in national legislation in the form of Law 27/2006, of 18 July 2006, governing the rights of access to information, public participation and access to justice in the field of the environment.

Meanwhile, the 2007 amendment to the Law establishing the CSN extended the requirements with regard to public information, so as to increase the organisation's transparency and achieve greater public trust in the actions of the CSN. The law establishes three channels for this demand:

- The transfer of information to State institutions:

Each year, the CSN sends the Spanish Parliament and the regional parliaments of autonomous regions with nuclear facilities within their territory a detailed report on its activities. Likewise, as part of its relationship with Parliament, the CSN responds to parliamentary initiatives (oral and written questions, non-legislative proposals, etc.) and complies with the decisions issued on its annual reports.

- Information committees in the vicinities of nuclear facilities:

The law establishes that the CSN must promote and participate in information forums in the vicinities of such facilities, presided by the MITERD in order to address aspects connected

with the control and monitoring of nuclear and radioactive facilities and emergency preparedness. The functioning of these Information Committees is governed by the RINR.

- Public information policy:

Article 14 of the Law establishing the CSN establishes the need to facilitate access to information and participation by individual citizens and civil society. This entails an obligation to inform the media and stakeholders of significant events connected with the functioning of facilities, placing particular emphasis on the communication of any events and incidents that might affect safety, their possible radiological impact on people and the environment, and the corrective measures to be applied.

In this regard, the CSN website publishes facilities inspection notices, information on the operational statuses of nuclear power plants and information on environmental quality measured by the Network of Automatic Stations and the Environmental Radiological Surveillance Network. Meanwhile, the minutes of the Council meetings and technical reports that provide the basis for the decisions reached are also published. Likewise, the CSN website is updated with the results of the systematic evaluation programme applied to the functioning of power plants, known as the Integrated Power Plant Supervision System (SISC), which incorporates novel supervisory methods focused on observation of the performance of nuclear power plants in operation, through functional indicators and the evaluation of the findings of inspections conducted by the CSN.

In the event of any significant occurrence or incident at nuclear and radioactive facilities, the website publishes the associated news items, summaries and press releases.

During the period that has elapsed since the previous report, the CSN has paid special attention to information and communication, focusing its communication efforts on newsworthy events likely to generate interest among the public and other interested parties. Bearing in mind that it is increasingly necessary to find a new model of communication from the public authorities that allows a response to the growing demand for rigorous information by the public, the CSN is continuously searching for effective new channels. Thus, during this period, the CSN has increased its presence on social media and has set up an external newsletter through which the organisation disseminates information on its activities to more than 1,200 people.

In parallel, the CSN addresses direct requests for information from the media with all the flexibility that technical demands allow.

With regard to citizen participation:

- The CSN is obliged to subject its safety guides and instructions to public comment during the preparation process, to which end it provides an online platform on its corporate website which can be used to submit comments. The MITERD likewise reports on the regulations in force in the field of nuclear energy, and submits proposals for royal decrees and regulations to the mandatory public consultation procedure via its website;
- **The CSN has a "Mailbox" for public enquiries available on its website, through which requests are received for information on the safety of the facilities, aspects**

relating to the radiation protection of persons and the environment and criteria on the application of national standards.

The CSN has updated the complaints channel on its website for communications received by the regulatory body on non-compliance in relation to nuclear safety, radiation protection and safety within the scope of its competences. The update is an adaptation of *Law 2/2023, of 20 February, regulating the protection of persons who report regulatory infringements and the fight against corruption, which transposes European Directive 2019/1937 on the protection of persons who report breaches of Union law to Spanish law.*

- Advisory Committee for information on public participation.

The law establishing the CSN establishes the constitution of an Advisory Committee for public participation and information, which began its operations on 23 February 2011. The purpose of this committee is to issue recommendations to the CSN to improve transparency, access to information and public participation in the fields for which it is responsible.

The Advisory Committee comprises representatives of the main national stakeholders, including ministries, universities, professional associations, electricity industry bodies, mayors of municipalities in the vicinity of nuclear power stations, and charitable organisations. The CSN Strategic Plan for the period 2020-2025 includes Strategic Objective 5.8, which aims to "reinforce the activity of the CSN Advisory Committee for public information and participation, and thereby promote an increase in the participation of stakeholders in regulatory decisions".

- Grouping of Municipalities of Areas with Nuclear Power Plants and Radioactive Waste Storage (AMAC).

On 4 April 2022 an agreement was signed between the CSN and AMAC to reinforce communication with populations of the areas with nuclear facilities in Spain and to assess their perception of the information supplied. The purpose of this agreement was to carry out initiatives aimed at improving the public's perception of the CSN's mission to guarantee nuclear safety and radiation protection and to provide better access to the different areas of knowledge, leading to an improvement in the organisation's communication and transparency.

The results of the activities performed during this period (see in more detail in Section A.3) may be concluded that the Agreement signed between the CSN and AMAC has largely achieved its aims. A very high percentage (more than 50%) of those attending the different workshops state that their opinion of the CSN has changed positively.

Other channels of communication:

- Communication on the international stage

One of the CSN's strategic lines of action for the period 2020-2025 is maintaining and reinforcing Spain's representation on the international stage. In addition, the CSN will ensure compliance with international obligations and commitments, in line with other national organisations and institutions, in defence of a common position.

- Educational activities and interactive information centre

The CSN undertakes a broad spectrum of technical and educational activities, addressing topics connected with its work. These activities include, in particular, the organisation of conferences, seminars and training events, as well as an extensive publishing schedule, which includes the publication of the nuclear safety and radiation protection journal Alfa.

Furthermore, the CSN has an information centre of a museum and interactive nature, which celebrated its 25th anniversary in 2023 and receives a very significant number of visits (at the date of writing of this report it had already exceeded 150,000 visitors), most of which come from institutes, training schools, universities and cultural associations throughout Spain, but also from national and international institutional delegations.

Of the 29 modules that comprise the Information Centre, some are adapted for people with sensory disabilities. The description of the contents and themes included in the exhibition tour is provided in detail by CSN technicians and revolves around the world of ionising radiation and the risks associated with it, with an express description of the technical and institutional mechanisms guaranteeing the safety of people and the environment in each and every one of the processes in which this safety might be put to the test.

- Response to requests for access to information

Without prejudice to all the aforementioned channels, the CSN responds to requests for access to public information and environmental information addressed to it by members of the public through its transparency portal. It also keeps its website updated on personnel, budgetary and procurement matters, in compliance with the requirements of active disclosure set out in *Law 19/2013, of 9 December, on transparency, access to public information and good governance*.

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Section F. Other safety-related provisions

This section covers the requirements of Articles 21, 22, 23, 24, 24 and 26 of the Convention relating to other security-related provisions.

Article 21. Responsibility of the licensee

1. Each Contracting Party shall ensure that prime responsibility for the safety of spent fuel or radioactive waste management rests with the holder of the relevant licence and shall take the appropriate steps to ensure that each such licence holder meets its responsibility

2. If there is no such licence holder or other responsible party, the responsibility rests with the Contracting Party, which has jurisdiction over the spent fuel or radioactive waste.

21.1. Responsibility of the licensee concerning safety

Spanish legislation establishes as a basic principle that the overarching responsibility for the safety of waste management facilities lies with the Licensee.

The legal principles assigning responsibility to the Licensee of the facilities are set out in the Law 25/1964, of 29th of April, on Nuclear Energy (LNE), the Regulation on Nuclear Safety at Nuclear Facilities (RNSNF), approved by Royal Decree 1400/2018, of 23 November 2018, *Royal Decree 102/2014, of 21 February 2014, on the responsible and safe management of spent nuclear fuel and radioactive waste, and the Regulation on Nuclear and Radioactive Facilities (RINR)*, approved by Royal Decree 1836/1999, of 3 December 1999. From the perspective of civil liability for nuclear damage, the facility's Licensee is likewise designated as liable for compensation for damages up to the limit set out in law.

The LNE establishes that the Licensee of nuclear or radioactive facilities or activities connected with ionising radiation will be responsible for their safety, defining said figure as the natural or legal person responsible for the entirety of a nuclear or radioactive facility, as specified in the corresponding authorisation, while furthermore emphasising that this responsibility cannot be delegated. Furthermore, the RNSNF clarifies that this responsibility includes control of the activities of any contractors and subcontractors that could affect the nuclear safety of such facilities.

To this end, the RNSNF indicates that the Licensee of a nuclear facility authorisation must, throughout the life-cycle of the facility, have in place the necessary technical, economic and human resources, with appropriate qualifications and skills, and an appropriate organisational structure in order to maintain nuclear safety and to ensure an adequate emergency response capacity.

Meanwhile, Royal Decree 102/2014 establishes that the holders of authorisations shall instigate and apply integrated management systems, including quality management, affording due priority to safety in the overall management of spent nuclear fuel and radioactive waste, which may be subject to periodic verification.

The RINR establishes that in order to obtain the different authorisations, the applicant must present the organisation intended as the supervisor of the project and guarantee quality during the successive phases of the facility. A detailed description of each of the positions at the operator's organisation and the responsibilities assigned to them with regard to nuclear safety and radiation protection is likewise required, along with the presentation of the organisation planned for future operation of the facility, and the preliminary operational staff training structure.

The RINR furthermore indicates that the facility's Licensee is responsible for ensuring that all natural or legal persons involved there as contractors or subcontractors perform their activities under safe conditions and at all times within the provisions of official documents.

According to the LNE, the State will be the designated owner of radioactive waste once it has entered disposal. It will likewise handle any surveillance that might be required following the final decommissioning of a nuclear or radioactive facility once the time period established in the corresponding decommissioning declaration has passed.

21.2. Liability for nuclear damage

During the period covered by the report, there have been significant changes in the civil liability regime for nuclear damage.

In Spain, the legal regime governing the compensation for damage caused by a nuclear accident derives from the Paris Convention on Third Party Liability in the field of Nuclear Energy and the Brussels Convention complementary to the former, both developed under the auspices of the NEA, which acts as a depository of the Paris Convention, just as the Belgian Government acts as a depository of the Brussels Convention.

Both Conventions establish the internationally recognised principles in this field, such as the strict liability of the operator (regardless of the existence of negligence or wilful misconduct), the channelling of liability to the operator, the obligation to establish a guarantee for a minimum amount; the establishment of a minimum amount of liability for the operator; or the limitation, in time, of this liability, among others. Until December 2021, its provisions have been implemented in Spain by means of the LNE, as well as in Decree 2177/1967, of 22 July, approving the Regulation on Nuclear Risk Coverage.

The aforementioned Conventions have been revised on several occasions, the latest of which was carried out by means of the 2004 Protocols amending the aforementioned Conventions. Despite the substantial improvement that the entry into force of the Protocols would have for the protection of victims, this was delayed until 1 January 2022 due to the need to adapt the different national laws of the Contracting Parties to the Conventions to the new requirements, which are much more demanding for the operators of nuclear facilities than the unamended Conventions. In addition, Council Decision 2004/294/EC of 8 March 2004, authorising the EU Member States that are Contracting Parties to the Paris Convention to ratify the Protocol, required them to take "the necessary steps to simultaneously deposit their instruments for the ratification of the Protocol", as a result of which, in practice, it has been necessary for all the Member States Party to the Convention to complete the necessary parliamentary procedures to be able to proceed to the joint deposit of the ratification instrument of the Protocol, which occurred on 17 December 2021.

In Spain, the need to incorporate the changes resulting from the entry into force of the aforementioned 2004 Protocols into the legal system led to a substantial modification of national law in this field, which was carried out through the approval of *Law 12/2011, of 27 May, on civil liability for nuclear damage or damage caused by radioactive materials*, the entry into force of which was subject to that of the said Protocols, thus entering into force on 1 January 2022.

This law considers the rules contained in the amended Paris and Brussels Conventions to be directly applicable since having been published in the Official State Gazette, they form part of the internal legal system as higher-ranking laws. Therefore, this law develops those rules in which the Paris Convention gives the States leeway to specify certain aspects. Its main new features are summarised below.

Law 12/2011 incorporates new categories of damage that did not appear in the previous regime, such as environmental damage, certain loss of profit, or reparation and preventive measures.

The quantitative limits established in Law 12/2011 are determined by the application of the Conventions:

- The Paris Convention establishes a minimum of 700 million euros, which could be reduced to a minimum of 70 million euros for facilities that, due to their low risk, are not likely to cause major damage, and 80 million euros for nuclear material transportation. Based on the above, the Law establishes that the Spanish Ministry for Ecological Transition and Demographic Challenge, following a report from the Nuclear Safety Council, may determine a reduced amount appropriate to each situation, in consideration of the nature of the activity or facility;
- Furthermore, the Brussels Convention establishes three tranches for financing compensation for nuclear accidents. The first tranche, either up to a minimum of 700 million euros established by the Paris Convention or up to the amount indicated as the operator's liability by the State. The second tranche ranges from the amount set in the first tranche up to 1.2 billion euros (this tranche would be borne by the State Party of the facility). The third tranche (which would be the joint responsibility of all States Parties to the Brussels Convention), up to a total amount of 1.5 billion euros.

Law 12/2011 establishes a limit on liability for the operator of 1.2 billion euros, which covers the first and second liability tranches of the Brussels Convention, leaving only the State responsible for its share of the third tranche of the Convention.

As regards the regulation of liability in the event of accidents during the transportation of nuclear material, Law 12/2011 refers directly to the rules of the amended Paris Convention, which includes all the casuistry relating to liability for damage occurring during such transportation. Law 12/2011 only deals with the case of transportation to or from third countries that are not signatories to the Convention, in which case the operator of the facility located in Spain is liable. The law also offers the possibility that the carrier may be held liable for the substitution of the installation operator, provided that the competent authority authorises this and the Licensee agrees to it. Likewise, the carrier must prove that he has the financial guarantee required by the aforementioned law.

As regards the claims period, Law 12/2011 is in line with the amended Paris Convention, which provides for a general claims period of 30 years from the time of the accident in the case of death or personal injury, and 10 years for other categories of damage. Within

the general time limit, the Convention provides for the possibility of establishing a limitation or prescription period of at least three years for victims to bring a claim, starting from the time when the injured party knew or ought reasonably to have known of the damage and the person responsible for it. In accordance with the above, Law 12/2011 sets this period at three years.

Furthermore, Law 12/2011 has established a priority regime for a period of three years from the time of the accident, during which it is estimated that the claims presented will be the most important part in number, which will operate in the following order: first, claims relating to personal injuries will be dealt with, referring to their quantification by means of the scales used by the legislation for traffic accidents, as it is considered that their valuation is the most adapted to the purposes of the law. Second, compensation will be paid for claims due to environmental damage, including the costs of repair measures, those caused by preventive measures, or possible damage caused by these measures. Finally, compensation will be paid for damage to property, loss of profit due to damage to property and persons, and loss of profit directly related to a degraded use or enjoyment of the environment. After this initial period of three years, claims shall be dealt with without distinction between them.

In the event that claims exceed the 1.5 billion euro limit established in the law, the State must provide the legal means to pay compensation for death, personal injury and economic losses derived from such damage caused to persons within Spain.

Law 12/2011 provides several options for the Licensee to guarantee the liability granted, of which the only one used in practice is the insurance policy. In relation to this type of guarantee, the law provides an amendment to the Statute of the Insurance Compensation Consortium so that it can provide coverage for those categories of damage where this does not reach the limits established in the law, whether monetary or in terms of the limitation period.

As regards the claims procedure, Law 12/2011 establishes that claims shall be submitted following the usual general procedure for this type of claim, which is that established in the Civil Procedure Act 1/2000, of 7 January. In accordance with its functions, the Nuclear Safety Council shall be responsible for drawing up a mandatory technical report on the nuclear accident and its causes and effects, which shall be requested ex officio by the competent court as part of its proceedings.

In addition, Title II of Law 12/2011 regulates the civil liability regime for damage caused by radioactive materials other than nuclear substances (mainly radioactive sources for medical, agricultural and industrial use, etc.), which does not derive from these Conventions or from any other international standard, and which has also been regulated in the LNE and the aforementioned regulation. For such materials, an objective, exclusive and unlimited liability is established for the Licensee of the installation. Likewise, in order to respond to personal and economic damage, a minimum guarantee, depending on the activity of the authorised source, must be established.

Article 22. Human and financial resources

Each Contracting Party shall take appropriate measures to ensure that:

1. Qualified personnel are available for safety-related activities during the operational lifetime of a spent fuel and radioactive waste management facility;
2. Sufficient financial resources are available to maintain the safety of spent fuel and radioactive waste management facilities during their operational lifetime and for decommissioning;
3. Financial arrangements are in place to allow for the continuation of appropriate institutional controls and monitoring activities/measures for as long as deemed necessary after the closure of a radioactive waste disposal facility.

22.1. Availability and qualification of human resources

22.1.1. Legal framework

In Spain, Article 37 of the LNE establishes an obligation as to availability and aptitude regarding the personnel of nuclear and radioactive facilities, while the RINR, approved by Royal Decree 1836/1999, of 3 December 1999, governing the regime of administrative authorisations, lists the requirements for the organisation that must be presented by the Licensee in the various authorisations for the licensing of a facility, in addition to personnel accreditations and licences.

Said national provisions serve to fulfil *Directive 2011/70/Euratom, establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste*, which was adopted subsequently. Article 7 of said Directive requires national regulatory frameworks to require licence holders to provide for and maintain adequate financial and human resources to fulfil their obligations with respect to the safety of spent fuel and radioactive waste management. Aside from this obligation, with reference to licence holders, Article 8 extends the obligation to have knowledge and skills in place to all parties involved in radioactive waste management.

In any event, the provisions regarding personnel qualifications have been further reinforced following the adoption of said Directive, through the inclusion of a subsection in the RINR in September 2011, according to which personnel working at nuclear and radioactive facilities and whose functions are connected with nuclear safety, radiation protection or physical protection, or whose activity could in any way interfere in the functioning of the installation, must fulfil the conditions of appropriate physical and psychological suitability, and may be subjected to preventive analyses and controls to detect the consumption of intoxicating or narcotic substances. In accordance with this article, said controls have been applied both to direct employees of nuclear facilities and to their contractors.

In the case of nuclear facilities, the RNSNF, approved by Royal Decree 1400/2018, establishes that the holder of an authorisation for a nuclear facility must, throughout the life-cycle of the facility, have the necessary human resources in place, with appropriate qualifications and skills, in addition to a suitable organisational structure to maintain nuclear safety and to ensure an adequate emergency response capacity. To this end, the Licensee must:

- Establish an overall personnel training policy in accordance with the importance of this aspect, and that acknowledges the significance of nuclear safety;
- Guarantee appropriate qualifications on the part of personnel performing functions with an impact on the nuclear safety of the facility;
- Implement and update initial and ongoing training programmes for the facility's personnel, taking into account a systematic training design.

In addition, the Nuclear Safety Council (CSN) has issued different instructions defining the qualification requirements for staff working at nuclear power plants.

CSN Instruction IS-11, on the licensing of operational personnel at nuclear facilities, and IS-12, on the qualifications and training of unlicensed personnel at nuclear facilities with functions connected with the safe operation of the plant, define the efficient and safe performance of the tasks assigned to each job. The term "qualifications" includes academic qualifications, experience, and initial and ongoing training.

In addition, CSN Instruction IS-03, on qualifications to obtain recognition as an expert in protection against ionising radiation, details the training and experience requirements that the CSN deems necessary for such expert status, which therefore applies both to the Radiation Protection Service supervisors and the technical staff working under them.

Meanwhile, CSN Instruction IS-06 defines the scope and content of radiation protection training programmes for workers outside the sphere of nuclear facilities, applying to external companies, facilities, and workers.

The procedures and practices of nuclear power plants are established in accordance with the requirements defined by the CSN in the aforementioned instructions, including both personnel in their workforce and permanent or occasional contractors within the scope of the definition of standard profiles and the analyses of suitability in order to fulfil these training requirements.

22.1.2. Internal organisation of the personnel of facilities

Each nuclear facility has a Head of Operations or Technical Supervisor who supervises all employment and commercial operations, with the power to suspend the functioning of the facility. The figures of the Head of Radiation Protection Service, Supervisor and Operator of nuclear or radioactive facilities are likewise defined, requiring specific licences to be held. Each of these licences is assigned personally, empowers the holder to perform work at a specific

facility, and is granted by the CSN following an examination of the candidates' competence by a panel designated by the CSN, in order to allow them to take responsibility for the corresponding service or technical unit, or to serve as the Head of a Radiation Protection Service.

In the operational application granted in accordance with the procedure indicated in the RINR, the Functional Regulation for the facility contains the organisational structure of the Licensee, including the functions and responsibilities of all positions connected with nuclear safety and radiation protection, the basic training and skills development programmes for personnel, with or without a licence, the technical skills required for each specific task, and any re-training programmes that might be deemed appropriate. Modifications to this Regulation must be approved by the Directorate-General for Energy Policy and Mines at the MITERD, following a mandatory report by the CSN.

Meanwhile, the Internal Emergency Plan defines the responsibilities and human resources required in order to address emergency situations.

Once the facilities begin operations, the CSN conducts periodic inspections, focused above all on ascertaining the academic qualifications, experience and training required for each type of job, the basic radiation protection training of all operatives, the scope of the re-training programmes, and confirmation that they cover changes in regulations, design modifications, and relevant operational experience. In this regard, the Licensees must send the CSN an annual report summarising their personnel's main training and re-training activities connected with nuclear safety or radiation protection.

22.1.3. Methods employed to analyse the skills required and the training needs with regard to all safety-related activities undertaken at nuclear power plants

In order to analyse the skills required and training needs with regard to nuclear safety-related activities undertaken at nuclear facilities, the chosen option is a systematic design inspired by the SAT (*Systematic Approach to Training*) methodology, with the following aims: learning objectives in accordance with the results obtained from a prior analysis of the position; the design and implementation of the training and skills development programme, based on the aforementioned learning objectives; the tools and human resources required for satisfactory achievement; evaluation of the degree of personal fulfilment of the established learning objectives; and lastly, the evaluation and review of the training and skills development programme, based on the on-the-job performance of personnel.

This systematic process derived both initial and ongoing training programmes. The degree of complexity has been established in accordance with the various positions of employment, being more complete for personnel holding an operating licence.

Training committees have been set up to manage training programmes effectively. The involvement of line managers is essential to ensure that training focuses on improving staff performance.

The nuclear power plant Licensee must ensure that all personnel hold appropriate qualifications for the functions assigned to them.

New personnel and those reassigned to a different position are qualified in accordance with the regulations and the application of the aforementioned SAT methodology, requiring:

- Initial training completed by new personnel in accordance with the training plan defined for each position;
- Required training performed by personnel changing positions following the corresponding analysis of the additional training that they would require to hold the new position;
- On-the-job training under the supervision of experienced personnel;
- Overlap where necessary.

The renewal of qualifications takes place on average every five years.

22.1.4. Provisions for the initial skills development and re-training of operational personnel, including simulator training

The initial qualification process for power plant control room operators lasts 36 months and is divided between classroom hours, tutored study, simulator practice, and on-the-job training. Simulator practice must last at least 240 hours, and on-the-job training 1,200 hours.

The initial qualifications required for control room supervisors include a minimum of three years of experience as an operator and completion of a minimum 12-month training programme, including at least 100 hours of simulator practice and 500 hours of on-the-job training.

Once the operator or control room supervisor licence is issued, an annual ongoing training programme comprising 100 hours of tuition and a minimum of 20 hours in the simulator is required. In current practice, the latter comprises between 40 and 50 hours per year.

For personnel with a control room operations licence, the regulations require that this be renewed every six years.

The complete process is documented and is regularly inspected.

In the past, a joint working group was set up between the Spanish nuclear power plants, the CSN and the leading national company in operator and supervisor training, the objective of which was to improve the process of obtaining new licences geared towards optimisation of the content and time devoted to initial training programmes and improvement of the documentation that develops the syllabus.

22.1.5. Simulator capacities of nuclear power plants used for skills development with regard to faithful reproduction of the power plant and scope of simulation

Each nuclear power plant has its own simulator comprising a complete replica of the control room.

In the past, simulator capacity has been improved, extending the operational range to normal, abnormal and emergency operational manoeuvres, including operations with reduced primary inventory and operations under fuel reloading conditions. The simulators have incorporated the improvements made to the digital control systems of the plants with the utmost physical and functional accuracy, employing cutting-edge simulation solutions. The most significant design modifications have been installed on the simulators in advance, allowing them to serve as validation platforms from both the functional perspective and in aspects connected with Human Factor Engineering.

22.1.6. Provisions for the skills development of maintenance and technical support personnel

As mentioned previously, the procedures and practices of nuclear power plants are aligned with fulfilling the requirements defined by the CSN in the aforementioned instructions, in addition to the requirements indicated by Article 8 of the RNSNF.

22.1.7. Improvements to skills development programmes as a result of new knowledge derived from the analysis of safety, operational experience, development of methods and skills development practices

As has been done in the past, the initial and ongoing training programmes have incorporated training and qualifications requirements stemming from new tasks performed by personnel as a result of the implementation of improvements at nuclear power plants following the Fukushima accident, generally involving a significant practical training component. It has likewise proved necessary to undertake the development of exercises with an integrated emergency scope involving all members of the organisation with a role in emergency management, both those covered by the design specifications and those giving rise to severe accidents beyond the design specifications of the facility.

22.1.8. Methods employed to evaluate the sufficiency of personnel at nuclear power plants

Workforce planning is conducted by taking into account the implementation of the Strategic Plan, retirement plans and the time dedicated to the qualification activities described. One distinctive feature is that control room vacancies are planned eight years in advance.

Calculation of the dimensions required for a qualified and experienced workforce is based on:

- Fulfilment of the applicable regulations;
- Experience with the workload associated with the different processes for the operational management of power plants;
- Benchmarking was performed with power plants using the same technology and similar regulations.

22.1.9 Policy principles governing the use of personnel contracted to support or supplement the in-company personnel of the licence holder

The principles applicable to personnel contracted to support or supplement the in-company personnel of the licence holder in order to achieve a high functional level include the following:

- The ultimate responsibility for guaranteeing nuclear safety lies with the managers of the Licensee organisation and cannot be delegated to support personnel;
- The standards and expectations for the performance of support personnel activities are the same and of the same level as required for in-company personnel;
- Support personnel are familiar with and employ the same processes as the Licensee organisation to perform their activities;
- Support personnel working independently (in other words, under their own supervision) are duly qualified with appropriate criteria set at the same level as required for in-company personnel;
- Occupational safety expectations are clearly communicated to support personnel working at the plant;
- The supervisor's roles and responsibilities, regardless of whether this figure belongs to the internal workforce or support personnel, are clearly defined and robustly implemented in the supervision of support personnel activities.

22.1.10. Methods employed to evaluate the qualifications and skills of contractor personnel

In order to evaluate the qualifications and skills of contractor personnel, the Licensee must adopt the necessary measures to guarantee that the selection of the external company is appropriate, as defined in CSN Instruction IS-12:

- Confirmation that the quality system of the external company provides for adequate measures to ensure the skills of its personnel, including training and skills development programmes and the necessary records to demonstrate qualifications;
- Confirmation prior to commencement of the work that the personnel assigned by the external company to perform the contracted jobs have the required qualifications;
- Satisfactory completion of the basic training programme segments (except for tasks performed under escort) and the specific training for the nuclear plant (except where there is permanent supervision by nuclear power plant personnel) as applicable to perform the tasks assigned to the personnel designated by the external company, before commencement of the work.

In addition, the Licensee must demand that permanent contractors comply with an ongoing training programme designed in accordance with the criteria defined in the aforementioned IS-12, allowing workers to maintain qualifications in order to perform the contracted jobs in a proper fashion.

22.1.11. Description of national supply and demand for experts in the field of nuclear science and technology

New hirings are planned sufficiently in advance in order to allow enough time to schedule the training required for personnel replacing those who are retiring, with an adequate overlap to transfer the greatest possible amount of knowledge to the replacement. In the case of organisational reinforcement, the required training is given before on-the-job work begins.

In Spain, various educational programmes provide students with an in-depth knowledge of the theoretical and practical fundamentals of nuclear engineering and the technology associated with nuclear fission's generation of energy. These educational programmes draw on the collaboration of the CSN, the Licensees and national and international bodies. Notable examples include:

- Master's Degree in Nuclear Science and Technology (Technical University of Madrid);
- Master's Degree in Nuclear Engineering and Applications (Centre for Energy-related, Environmental and Technological Research (Ciemat) and the Autonomous University of Madrid);

- Master's Degree in Radiation Protection at Radioactive and Nuclear Facilities (Technical University of Valencia);
- Master's Degree in Nuclear Engineering (Technical University of Catalonia);
- European Master's Degree in Nuclear Energy-EMINE (Technical University of Catalonia).

Currently, there are very few Spanish students studying for a master's degree qualification in Spain in disciplines associated with nuclear technology, and the risk, therefore, exists that some programmes might fold because of a lack of students. In the case of international master's courses delivered in Spain in these disciplines, they may be maintained as they have a significant proportion of students from other countries.

Meanwhile, the demand for employees on the part of nuclear power plants is not always satisfied with the supply provided by the aforementioned master's courses. Power plants, therefore, have specific training programmes in place for vacancies in various posts, which are typically filled with other technical and engineering profiles, as well as individuals with specific training in these disciplines, so as to cover all the knowledge, abilities and expectations required in order safely to fulfil these functions.

The Nuclear Safety Council **collaborates with three** Chairs in Nuclear Safety and Radiation Protection to promote training and skills, as well as R&D development, in nuclear safety and radiation protection. The goal is to encourage young professionals with training in these fields to join the sector. The IRRS-ARTEMIS peer review mission conducted in Spain in 2018 considered this a high-performing area.

22.1.12. Methods employed for the analysis of skills, availability and sufficiency of additional personnel required for the management of very serious accidents, comprising contracted personnel or personnel from other nuclear facilities

An Emergency Response Organisation comprises the operating personnel, collaborating companies and External Support organisations as established in the Internal Emergency Plan. The baseline for establishing the Emergency Response Organisation, if an accident occurs, comprises the personnel present on the shift at the power plant when the emergency begins, along with staff on call who are sent to the power plant in accordance with the terms of the Internal Emergency Plan. Depending on the seriousness and characteristics of the event, the organisation progressively expands until it reaches its maximum level so as to be in a position to address all the planned mitigation measures.

An Emergency Response Organisation must be of appropriate dimensions to be able to take the actions required to address design specification accidents and implement mitigation stra-

tegies derived from analyses of situations that go beyond the design specifications, as well as the procedures developing the facility's internal emergency plan.

In order ultimately to define the provision and human resources required at any given moment for an Emergency Response Organisation at a nuclear power plant, the Licensees have devised a specific methodology to guarantee the capacity to address and mitigate events caused by extreme occurrences that would constitute a condition going beyond the design specifications established for the power plant, alongside potential events causing extensive damage across the entire site.

This methodology has been developed on the basis of the nuclear industry standards of the USA (NEI 06-12 rev. 2, NEI 12-06 rev. 1, NEI 12-01 rev. 0, NEI 10-5 rev. 0), and also the various post-Fukushima Supplementary Technical Instructions issued by the CSN, and the associated Safety Guides.

A common methodology has been developed with the aim of creating a process that is dynamic and sustainable over time, such that all Spanish nuclear power plants can at all times confirm and review how changes made to the facility or the organisation, operational experiences arising, or improvements implemented at the facilities, could affect the provisions required to mitigate emergencies. A sequential process, which serves periodically to evaluate the impact of the various requirements arising at the Emergency Response Organisation of the power plant and to modify it appropriately in accordance with any changes that might be identified.

All actions and provisions are established with internal resources. In other words, any possible support and external resources, such as the Emergency Support Centre, the Military Emergencies Unit (UME), external organisations, or personnel from other nuclear power plants, are established as additional assistance but are not taken into account in calculating the dimensions of the internal resources.

22.1.13. Regulatory control and examination activities

The CSN performs supervisory and control activities with regard to the human resources of nuclear power plants as follows:

- Each plant is required to analyse and document the technical capacity requirements and minimum provision of human resources at each organisational department for the safe operation of the plant;
- Each plant is required to analyse and document organisational and human resource changes connected with nuclear safety or radiation protection functions so as to ensure that they continue to perform their functions in a proper fashion and that the change and change management have no negative impact on safety;
- Each year, the nuclear power plants send the CSN a report with modifications or updates on their organisation's optimisation of human resources.

As already indicated, the CSN has Instruction IS-11 for licensed operational personnel and IS-12 for all other personnel regarding the qualifications of personnel performing safety-related functions at nuclear power plants.

With regard to licensed operational personnel, the granting of the licence by the CSN requires appropriate prior qualifications on the part of the candidates, who must also pass the examination tests (written, control room simulator and plant) established by the CSN Operational Licences Panel. The renewal of operational licences is granted by the CSN every six years upon application and confirmation of fulfilment of the requirements established in IS-11.

The CSN conducts biennial inspections of personnel training programmes for nuclear facilities for both the internal workforce and permanent and occasional contractors. These inspections cover both licensed operational personnel and all other personnel performing safety-related functions. These inspections include aspects connected with supervision of the policy, organisation, human and material resources, processes and procedures of the Licensee for the systematic design of personnel training, the resulting training programmes and their implementation, along with checks as to the fulfilment of personnel qualifications requirements (academic qualification, experience, initial and ongoing training). Likewise, the scope of these inspections includes aspects connected with maintaining the physical and functional accuracy of simulators, providing a replica of the entire scope of the plant.

22.1.14. Human resources available at Enresa

The Empresa Nacional de Residuos Radiactivos, S.A., S.M.E. (Enresa) is entrusted with the management of radioactive waste and spent nuclear fuel and the dismantling and decommissioning of nuclear facilities (Article 38 bis of the LNE; Article 9 of *Royal Decree 102/2014, for the safe and responsible management of spent nuclear fuel and radioactive waste*). By virtue of these regulations, Enresa is considered to be the Licensee of its facilities for the management of spent nuclear fuel and radioactive waste and acts as the Licensee of those other activities that it undertakes for which this status is determined. As a result, Enresa is the operator responsible for El Cabril Disposal Facility and for the decommissioning processes at the Vandellós I, José Cabrera and Santa María de Garoña Nuclear Power Plants.

On 31 December 2023, Enresa had a workforce of 361 people, of which 202 were employed at the Madrid headquarters, 111 at El Cabril Disposal Facility, 10 at the Vandellós I Nuclear Power Plant dismantling and closure project, 7 at the José Cabrera Nuclear Power Plant decommissioning project and 31 at Santa María de Garoña Nuclear Power Plant.

The average age of Enresa employees is 52. The ageing of personnel, a circumstance shared with other organisations in the sector, entails, on the one hand, the need to hire new employees and, on the other hand, the need to guarantee the appropriate transfer of knowledge between more experienced employees and new hires.

In this regard, the legal nature of Enresa as a public company does not provide the desired flexibility for hiring staff. In relation to knowledge management, in 2018, Enresa adopted a General Training Plan designed to meet the specific needs of each Directorate. On the one hand, this Plan introduced a criterion of flexibility since the first factor in determining which training actions are to take place is the criterion indicated by each Directorate; on the other, it emphasised corporate training in matters of interest to the entire workforce, such as IT or legislation. Certain positions or areas at Enresa's facilities require specific training in accordance with regulatory requirements, and such training must be provided.

In the area of safety culture, certain measures have been introduced in response to the requirements imposed by the CSN (in particular, CSN Instruction IS-19, on the requirements of the management system of nuclear facilities). This is the case of the integrated management committees at El Cabril Disposal Facility and at José Cabrera, and the creation of a safety culture team at headquarters in Madrid, with employees from the other workplaces, alongside the plans which are regularly issued with regard to continuous improvements to the safety culture.

In terms of training as an integral element of R&D, the infrastructure and coordination area of the Enresa R&D plan includes a series of initiatives regarding knowledge management, feedback and knowledge transfer. In this regard, Enresa is involved in various national and international initiatives addressing the analysis and preservation of knowledge, skills and aptitudes.

22.2. Availability of financial resources

Spain has been making allocations to a Fund for financing activities set out in the GRWP since Enresa was first set up in 1984. The Fund is independent of waste producers and draws almost exclusively on their contributions and, to a lesser extent, the financial returns on the funds. This Fund is used for the imputation of costs involved in the management of radioactive waste and spent fuel, the dismantling of nuclear facilities, structural costs and R&D projects, assignments to municipalities affected by nuclear power plants or radioactive waste or spent nuclear fuel storage facilities, and taxes derived from activities connected with said storage.

The Fund is currently regulated by the Sixth Additional Provision of Law on Electricity Sector 54/1997, of 27 November 1997, and Royal Decree 102/2014, of 21 February 2014, for the safe and responsible management of spent nuclear fuel and radioactive waste. During the period covered by this report, there were no significant developments in the financing system, which is summarised in Annex D of this report.

In accordance with the provisions of the aforementioned Sixth Additional Provision of Law 54/1997, the Government is responsible, by Royal Decree, for revising the tax rates and tax elements for determining the quotas of non-tax public economic contributions. This serves to guarantee the availability of sufficient financial resources in the Fund to safely undertake the activities set out in the GRWP.

As for radioactive facilities in the nuclear fuel cycle, their dismantling and decommissioning or closure are not covered by the Fund. In this case, the RINR establishes the obligation on their

Licensees to provide a financial guarantee or bond before they begin operations so as to guarantee their future decommissioning and the management of the resulting radioactive waste. This guarantee must be lodged before the operational authorisation is granted, and must be proportionate, so as to cover any costs and contingencies that might arise in the processes of dismantling and decommissioning or closure of the facility, even in the event of insolvency, cessation of operations or any other contingency. The Directorate-General for Energy Policy and Mines of the MITERD may authorise the updating of this guarantee in the event of circumstances or modifications at the facility that could have a significant impact on its dismantling and decommissioning or closure, or in accordance with work already performed in connection with such activities.

Article 23. Quality assurance

Each Contracting Party shall take the necessary steps to establish and implement appropriate quality assurance programmes concerning the safety of spent fuel and radioactive waste management.

Article 4.2 of *Royal Decree 102/2014, of 21 February 2014, for the safe and responsible management of spent nuclear fuel and radioactive waste*, completing the transposition of Directive 2011/70/Euratom, establishes that producers of radioactive waste and spent nuclear fuel shall instigate and apply integrated management systems, including quality management, affording due priority to safe management, which may be subject to periodic verification.

All activities connected with spent fuel and radioactive waste management in Spain are subject to a quality guarantee programme (PGC). The party responsible for establishing and implementing this Programme is the authorisation holder for the facility or regulated activity. The PGC must comply with standard UNE 73-401 of 1995, *"Quality assurance at nuclear facilities"*, the requirements of which are equivalent to those in Appendix B of 10 CFR 50 of the US NRC, and the IAEA code and guides 50-C/SG-Q, on quality assurance in nuclear power plants and other nuclear facilities.

In 2008, the Nuclear Safety Council issued IS-19, on the requirements of the management system at nuclear facilities, the origins of which lie in IAEA *Safety Requirement NO. GS-R-3 "The Management System for Facilities and Activities"*. This Instruction, applicable since 1 January 2010, affects all nuclear facilities throughout their life-cycle, in other words, from selection of the site up until dismantling and decommissioning. The main change is the need to integrate requirements within nuclear and radioactive safety aspects, occupational risk prevention, environment, physical protection, quality and economic aspects, in order to guarantee the protection of people and the environment.

Lastly, the RNSNF, approved by Royal Decree 1400/2018, incorporates content from Directive 2014/87/Euratom with regard to the establishment of basic nuclear safety requirements applicable to nuclear facilities throughout their entire life cycle. Among other aspects, the holders of authorisations for nuclear facilities must establish and continuously improve an integrated management system covering nuclear safety, occupational risk prevention, environ-

mental protection, physical protection, quality and economic aspects, so as to guarantee that nuclear safety is properly taken into account in all the organisation's activities.

23.1. Quality assurance in spent fuel and radioactive waste management

The Enresa Quality System is described in the document entitled "Quality Manual". This includes the mandatory quality regulations requirements (UNE 73.401, CSN Instructions and Safety Guides, including, among others, the aforementioned IS-19); in addition to other voluntary standards, as in the case of standard UNE-IN ISO 9001. This manual also summarises how said requirements are to be fulfilled, with references to procedures that establish the corresponding regulations.

For each facility, project or relevant activity, Enresa draws up a Quality Assurance Programme, which is an adaptation of the Corporate Quality Manual in accordance with the specific features of each facility, project and activity. It is this document, among others, which is presented for approval when authorisation is required by the MITERD. **In total, there are 10 Quality Assurance Programmes, among which those for the three Enresa facilities are particularly significant: El Cabril Disposal Facility, the decommissioning of José Cabrera and Vandellós I Nuclear Power Plants and the specific programme for the design and manufacturing of casks for spent fuel and high-level waste.**

A third level of documentation includes over 1,000 procedures governing Enresa's activities, some general and others specific to facilities, projects, or activities.

In order to ensure that quality assurance programmes and the development thereof are properly established, the Quality and Environmental Management department reviews all documentation in the system, along with the various documents and records generated within the context of the Quality System, to guarantee that they include and comply with the quality requirements defined in both external and internal regulations.

Verification of the proper application of the quality programmes is implemented by means of various tools: the first barrier is the generation of procedures defining mature systems equipped with self-control mechanisms applied by those performing the activities, and supervision by their managers, along with the generation of records providing evidence of the actions taken. The second barrier comprises internal independent assessment activities, specifically all the audits, inspections, supervisions and documentation reviews carried out by the Quality and Environmental Management department. **There is a third barrier, carried out by the different organisational units at the facilities, called self-assessment, which focuses on analysing the fulfilment of expectations and proposing actions for improvement**. Finally, there is a fourth barrier, based on external assessments, such as the CSN inspections themselves and third-party audits of those companies accredited by the ENAC (National Accreditation Agency), providing independent certification of quality systems.

It is important to stress that the quality of Enresa's activities is also defined by all those suppliers providing products or services for Enresa, and the relevant measures are therefore also applied to such parties to ensure the quality of what they supply. In particular, these actions include a review of purchase documentation before calling for offers, so as to ensure that quality requirements are included; prior and periodic assessment of Enresa suppliers; audits; inspections of the purchases made upon delivery, or the services provided during the course of performance, and even inspections at the suppliers' own factories during the manufacturing of elements. **Furthermore, the documents describing the specific systems proposed by the supplier, within the scope of its quality system, undergo a review and acceptance process by Enresa in order to ensure that they meet the previously defined requirements**.

Furthermore, Enresa has maintained the Integrated Management Systems at El Cabril Disposal Facility and the one implemented under the José Cabrera Nuclear Power Plant decommissioning and closure plan, both of which prioritise nuclear safety above all other aspects.

Under CSN Instruction IS-19 and Integrated Management, work continues on the implementation of a strong safety culture based on eight principles defined by Enresa. **The 2nd External Safety Culture Assessment was carried out in 2020, as a result of which an Improvement Plan was drawn up covering the period from 2021 to 2024. Once the implementation of the actions has been completed, their effectiveness will be checked by means of an Internal Self-Assessment of Safety Culture, an intermediate tool for analysing the evolution between External Assessments**.

After planning, execution and control, the last phase of management is improvement. To address this phase, Enresa implemented a corporate and integrated safety improvement system, called SIM, which enables all personnel to participate in the identification and management of non-conformities, corrective actions and improvement actions identified at the facilities and in corporate activities. This tool collects an average of 300 incidents per year, which allows Enresa's processes and activities, and therefore nuclear safety, to be improved.

23.2. Quality assurance programme evaluation and inspection system

Over the period corresponding to the **Eighth National Report**, assessment and inspection activities continue with regard to quality assurance programmes and quality plans with reference to spent fuel and radioactive waste management. These activities are connected with:

- Licensing of new Individualised Temporary Storage (ITS) facilities as design modifications;
- Licensing and design modifications of spent fuel transportation and storage casks;
- Design modifications of previously licensed facilities;
- Transportation of radioactive material.

Assessment activities:

- Cofrentes Nuclear Power Plant ITS quality plan;
- Quality assurance aspects of Almaraz and Vandellós II Nuclear Power Plants within the framework of the periodic safety reviews in 2020 (Almaraz I and II and Vandellós II) and 2021 (Cofrentes and Ascó I and II);
- Modifications introduced in the Safety Studies for the ENUN 32P and ENUN 52B casks, as regards quality assurance aspects (Chapter 14), as well as the changes made to the corresponding quality plan for the design, licensing, manufacturing and testing of the casks;
- Quality assurance aspects relating to the application for renewal of the design approval of the ENSA-DPT spent fuel storage cask ;
- Approval of the design of the HI-STAR 150 cask for use as a storage cask at Cofrentes Nuclear Power Plant (Article 80 of the RINR) in the quality assurance aspects;
- A satisfactory appraisal of the design of the HI-STAR 150 dual-purpose (storage and transportation) cask in terms of quality assurance;
- Re-racking of Vandellós II NPP.

Inspection activities:

- Two inspections are performed each year of the Corrective Actions Programme of nuclear power plants, along with an inspection every two years of the Juzbado Fuel Element Factory;
- In 2022, an inspection was carried out at Enresa on the Corrective Action Programme (known as the Integrated Improvement System) for high-level waste;
- In 2023, an inspection was carried out at Enresa on aspects of the design of the ENUN 32P cask.

Transportation of radioactive materials:

- Aside from specific checks performed by the CSN Transport Area as to particular aspects of carriers' quality assurance programmes, the regulatory body's Quality Management Area carries out an inspection every two years of a selected carrier to analyse overall compliance with its quality assurance programme. **During the period considered in this report, the Quality Management Area has carried out an inspection of a transportation operator (shipper, carrier or manufacturer), in this case Enresa, on quality assurance in the HISTAR150 cask project.**

Meanwhile, Article 7 of the RNSNF outlines specific changes regarding the Integrated System and quality requirements. CSN Instruction IS-19 on the requirements of the management system for nuclear facilities fulfils this Regulation, the purposes of this technical standard being as follows:

- Improve the safety performance of organisations by means of planning, control and supervision of activities connected with nuclear safety under normal, transitory and emergency situations;
- Foster and promote a strong safety culture by developing and underpinning appropriate attitudes and behaviours regarding nuclear safety among individuals and groups to ensure that they perform their tasks safely.

IS-19 also makes provision for nuclear facilities on the terms set out in the aforementioned Article 7 of the regulation:

- Technical, economic and human resources with appropriate skills and qualifications;
- Safety policy focused on continuous improvement;
- Establishment of an integrated management system (including the promotion and enhancement of an organisational culture);
- The influence of human and organisational factors throughout the life-cycle of the facility;
- The guarantee that quality requirements are defined and applied appropriately throughout the life-cycle of the facility;
- Assurance by the facility that contractors and subcontractors for which it is responsible and whose activities could affect the safety objective of Article 6 of the RNSNF have human, technical and economic resources.

Article 24. Operational radiation protection

1. Each Contracting Party shall take the appropriate steps to ensure that during the operating lifetime of a spent fuel or radioactive waste management facility:
   i. The radiation exposure of the workers and the public caused by the facility shall be kept as low as reasonably achievable, with economic and social factors being taken into account;
   ii. No individual shall be exposed, in normal situations, to radiation doses which exceed national prescriptions for dose limitation which have due regard to internationally endorsed standards on radiation protection; and;
   iii. Measures are taken to prevent unplanned and uncontrolled releases of radioactive materials into the environment.
2. Each Contracting Party shall take appropriate steps to ensure that discharges shall be limited:
   i. To keep exposure to radiation as low as reasonably achievable, with economic and social factors being taken into account, and;

ii. So that no individual shall be exposed, in normal situations, to radiation doses which exceed national prescriptions for dose limitation, which have due regard to internationally endorsed standards on radiation protection.

3. Each Contracting Party shall take appropriate steps to ensure that during the operating lifetime of a regulated nuclear facility, in the event that an unplanned or uncontrolled release of radioactive materials into the environment occurs, appropriate corrective measures are implemented to control the release and mitigate its effects.

The provisions in the field of radiation protection under Spanish regulations are essentially set out in Law 15/1980, of 22 April 1980, establishing the CSN and in **the Regulation on Health Protection against the Dangers arising from Exposure to Ionising Radiation (RPSRI), approved by Royal Decree 1029/2022, of 20 December.**

The lawcreating the Nuclear Safety Council assigns the function of supervision and control of levels of radioactivity to said body, both in the interior and exterior of nuclear facilities and in the Spanish fuel cycle, along with any individual or cumulative impact on the surrounding area, control of the doses received by operational personnel and reports and advice for the Government with regard to commitments given to other countries or international bodies in the field of nuclear safety and radiation protection.

The basic standards for the radiation protection of exposed workers and members of the public against the dangers from exposure to ionising radiation are established in the RPSRI. This Regulation transposes the provisions of European Union Directive 2013/59/Euratom into Spanish law.

The basic standards of radiation protection of exposed workers and members of the public against risks resulting from exposure to ionising radiation likewise apply to those facilities where spent fuel and radioactive waste are stored.

Article 9 of the RNSNF also states that the siting, design, construction, commissioning, operation and decommissioning of a nuclear facility must ensure that the doses received by exposed workers and by the public in the event of any operational situation are justified, are as low as reasonably possible, and below the values established in the specific standards and applicable requirements.

24.1. Worker protection

24.1.1. Measures adopted in order to ensure that radiation exposure is kept as low as reasonably achievable

The basic principles of justifying, optimising and limiting individual doses are incorporated within Spanish law in the aforementioned RPSRI.

In the scope of application of the RPSRI, the principle of justification states that "decisions introducing a practice shall be justified by an analysis that ensures that the individual or social benefit resulting from the practice outweighs the detriment to health that it may cause".

The principle of optimisation forms the fundamental basis of current radiation protection doctrine and is formulated in the following terms: the magnitude of individual doses, the number of persons exposed and the probability of exposure shall be kept as low as reasonably achievable, taking into account the current state of technical knowledge and economic and social factors.

Application of the principle of optimisation demands that a particular emphasis be placed on all radiation protection measures intended to prevent radiation exposure, essentially based on:

- **The prior assessment of working conditions to determine the nature and magnitude of the radiation risk and to ensure the application of the principle of optimisation;**
- **The classification of workplaces into different zones, taking into account the assessment of the expected annual doses, the risk of dispersion of contamination and the likelihood and magnitude of potential exposure;**
- **The classification of exposed workers into different categories according to their working conditions;**
- **The application of monitoring and control rules and measures relating to the different areas and to the different categories of exposed workers, including, where appropriate, individual monitoring.**

These measures are set out in radiation protection manuals, which must receive a favourable verdict from the Nuclear Safety Council.

24.1.2. Measures adopted to ensure that no worker is, under normal circumstances, exposed to doses of radiation greater than the national dose limitation provisions, duly taking into account internationally approved radiation protection standards

The RPSRI establishes the following dose limits for exposed workers:

- Effective dose limit: 20 mSv per official year;
- Dose equivalent limit for skin (measured over any 1 cm2 skin surface): 500 mSv per official year;
- Dose equivalent limit for the lens of the eye: 100 mSv over five consecutive official years, and a maximum dose of 50 mSv in a single official year;
- Equivalent dose limit for each extremity (hands, forearms, skin and ankles): 500 mSv per official year.

Control of the radiation doses received by exposed workers is usually conducted by means of individual monitoring, using passive physical dosimeters. However, there are cases in which radiation monitoring of the working area may be sufficient if the radiation risk is sufficiently low, **provided that such radiation monitoring makes it possible to demonstrate that the workers are suitably classified as Category B exposed workers.**

The aforementioned regulation governs the dosimetric monitoring of workers exposed to ionising radiation in Spain. It establishes that individual dosimetry must be performed by Personal Dosimetry Services explicitly authorised by the CSN.

The regulatory provisions established in the RPSRI determine that all exposed workers **classified as Category A and Category B with an assigned individual dosimeter** must have a dosimetric record opened for them, registering all doses received by them over the course of their professional activity. Said provisions assign responsibility to the practice licensee for archiving these records until the employee has reached the age of 65 and, in all cases, for a period of at least 30 years from the date when the worker leaves employment.

In 1985, the CSN agreed to implement a National Dosimetric Bank (BDN) in Spain, which would centralise the dosimetric records of all exposed workers at nuclear facilities and in the fuel cycle in Spain.

The BDN is managed by the CSN. At the close of the 2023 dosimetry exercise, there were records of more than 31.5 million dosimetry measurements, corresponding to more than 455,000 workers and more than 96,000 facilities. Each of these measurements is associated with information as to the type of facility and the type of work performed by the worker.

The number of people exposed to ionising radiation subject to dosimetry control in Spain in 2023 amounts to 127,394.

It should be pointed out that the overall values presented above corresponding to contents existing in the BDN include exposed workers rendering their services in the field of nuclear facilities, radioactive fuel cycle facilities and radioactive installations.

24.1.3. Personal dosimetry

With regard to the dosimetric results corresponding to 2023 for nuclear power plants as a whole, it should be stressed that 8,125 exposed workers engaged in their activities in this field of activity and that they were dosimetrically monitored. These dosimetric readings implied a collective dose of 3,202 mSv/person, the value of the overall average individual dose of this group being 1.18 mSv/year, considering only workers with significant doses in the calculation of this parameter. These data are broken down between the workforce and contractors in Table 7.

	Overall	Workforce	Contractors
No. of exposed workers	8,125	1,870	6,320
Collective dose (mSv/person)	3,202	416	2,786
Mean individual dose (mSv/year)	1.18	1.11	1.19

Table 7. Dosimetric results corresponding to 2023 for nuclear power plants as a whole (data from Santa María de Garoña are included until 31.07.2023. After that date, it is considered to be in cessation of operations).

In 2023, there were 504 exposed employees working at the Juzbado Factory. Dosimetric readings represented a collective dose of 40.75 mSv/person. Only taking into account workers with significant doses, the mean individual dose for this group is 0.47 mSv/year.

In 2023, there were 241 exposed employees working at El Cabril Disposal Facility. The dosimetric readings represented a collective dose of 6.28 mSv/person. Only taking into account workers with significant doses, the mean individual dose for this group was 0.48 mSv/year.

In 2023, the exposed workers who carried out their activity in the decommissioning activities at José Cabrera Nuclear Power Plant totalled 14. The dosimetric readings represented a collective dose of 0.30 mSv.p, and the average individual dose in this group was 0.10 mSv/year.

24.2. Protection of the public

The RPSRI explicitly requires the application of the ALARA philosophy to the radiation protection of members of the public. This philosophy applies to all stages of licensing Spanish nuclear facilities, as set out in the official operational documentation for each such site.

With regard to the limitation of doses, the RPSRI establishes the following dosage limits for members of the public:

- **An effective dose limit for members of the public of 1 mSv per official year;**
- Without prejudice to the above, an equivalent dose limit per official year of 15 mSv is established for the crystalline lens and 50 mSv for the skin.

24.2.1. Limitation of discharges at nuclear facilities

The operational permits of all Spanish nuclear facilities establish the system of limitation, surveillance, and control of radioactive effluent as part of the Technical Functional Specifications (ETF).

At nuclear power plants, the detailed development of this system for limitation, surveillance, and control of radioactive effluent is included in the External Dose Calculation Manual, while at El Cabril Disposal Facility and the Juzbado fuel Element Factory, it is developed in the Specifications document itself.

At nuclear power plants, both during operation and during the shutdown and decommissioning stage, an effective dose limit of 0.1 mSv/year is applied for each unit within the site. This limit, which refers to periods of twelve (12) consecutive months, applies to radioactive liquid and gas effluent emissions as a whole. Said limit likewise applies to radioactive effluent emissions from the Juzbado fuel Element Factory.

El Cabril Disposal Facility was licensed on the basis of a zero-discharge criterion for liquid radioactive effluent. Only gaseous radioactive effluent is emitted into the environment, and the discharge limit is an effective dose of 0.01 mSv over 12 consecutive months.

One aspect of interest is that at Spanish nuclear power plants, the water from the irradiated fuel storage pools does not constitute an input into liquid radioactive effluent treatment systems.

24.2.2. Verification of compliance with the discharge limits

The Licensees of Spanish nuclear facilities must make monthly estimates of the doses to the critical individual of the public, accumulated over 12 consecutive months, with the aim of verifying compliance with the established limits. This calculation is performed on the basis of the results of the sampling programmes and analyses of radioactive effluent in accordance with the methodology described in the External Dose Calculation Manual.

In order to determine activity released into the environment, liquid and gaseous radioactive effluents are always sampled prior to (batch discharge) or at (continuous discharge) the discharge point.

Since 2008, activity levels obtained through the application of these sampling and analysis programmes have been recorded in accordance with the criteria of Recommendation 2004/2/Euratom regarding standardised information on gaseous and liquid radioactive effluent discharged into the environment by nuclear power plants and reconditioning plants under normal operating conditions.

The results of the sampling and analysis programmes, as well as dose estimations and other relevant effluent data, are sent to the CSN each month.

In addition, in accordance with Article **64** of the RPSRI, the Licensees estimate the reference group dose each year, taking into account the most realistic criteria. The reference groups considered are equivalent to critical groups as described in the publication ICRP-60.

In addition, in accordance with Article 64 of the RPSRI, Licensees shall carry out an annual estimate of the doses received by the public, identifying representatives of the members of the public, taking into account more realistic criteria.

In the case of nuclear facilities and radioactive facilities in the nuclear fuel cycle, this estimate shall be made at least annually, taking into account:

- **The information available to identify representatives of the members of the public taking into account the actual transmission pathways of radioactive substances;**
- **The assessment of external exposure, indicating, as appropriate, the type and quality of radiation involved;**
- **The assessment of the intake of radionuclides, indicating the nature and the physical and chemical states of the radionuclides, as well as the determination of the activity concentrations of such radionuclides in foodstuffs and in drinking water or other relevant environmental components.**

In accordance with the Technical Functional Specifications, the Licensees implement Environmental Radiological Surveillance Programmes (PVRA) in the area of influence of nuclear facilities. The results of the PVRA, which are sent to the CSN each year, serve to ascertain the real impact of discharges into the environment.

24.2.3. Control of discharges

In accordance with regulatory requirements, Spanish nuclear facilities have liquid and gaseous effluent treatment systems that allow for the collection, storage and processing of the different types of liquid and gaseous radioactive waste generated during the normal operation of facilities, as well as during planned operational incidents.

The release of radioactive effluents into the environment must comply with the established limits, while furthermore aiming to be as low as possible in accordance with economic and social factors, and the best available techniques (Instruction IS-26).

According to the RINR, Licensees must implement a continuous improvement programme in accordance with the evolution of the applicable regulations, technological advances and operational experience. Specifically, Article 8.3 of said regulation establishes that the Licensees must continuously oversee improvements to radiation protection conditions at their facility, to which end they will be required to analyse the best techniques and practices available in accordance with the requirements established by the Nuclear Safety Council and to implement those that prove suitable in the judgment of said body.

Likewise, the Licensees of nuclear power plants must conduct a Periodic Safety Review serving as the basis every 10 years for:

- Analysis of the overall performance of the facility;
- Demonstration that the lessons learned from the analysis of operational experience have been properly implemented;
- Assessment of whether relevant changes made at new generation plants apply to the facility.

As a result, the Spanish regulatory system in the field of radioactive effluent control provides the appropriate framework for the effective application of a clearly established policy requiring the implementation of the applicable technological advances, fulfilling the requirements and recommendations of the competent international bodies, and incorporating the necessary measures to ensure that discharges are limited and the impact on the public and the environment is minimised.

Tables 8 and 9 summarise discharges from Spain's nuclear power plants, the Juzbado Fuel Element Factory, and El Cabril Disposal Facility during the years 2020, 2021 and 2022.

	PWR Nuclear Power Plant (1)						BWR Nuclear Power Plant (1)	
	José Cabrera NPP (2)	Almaraz I & II NPP	Ascó I NPP	Ascó II NPP	Vandellós II NPP	Trillo NPP	Santa María de Garoña NPP (3)	Cofrentes NPP
Liquid effluents								
Year 2020								
Total except tritium and dissolved gases	2,72 10^{7}	1,32 10^{10}	1,97 10^{9}	5,58 10^{9}	2,31 10^{9}	4,42 10^{8}	3,57 10^{7}	1,11 10^{8}
Tritium	3,64 10^{7}	2,53 10^{13}	1,82 10^{13}	2,39 10^{13}	2,03 10^{13}	1,59 10^{13}	3,95 10^{10}	3,63 10^{11}
Dissolved gases	--	ND	4,32 10^{7}	2,44 10^{7}	ND	ND	--	5,52 10^{6}
Year 2021								
Total except tritium and dissolved gases	7,06 10^{7}	1,57 10^{10}	6,38 10^{9}	1,94 10^{9}	1,04 10^{10}	2,63 10^{8}	2,57 10^{7}	1,05 10^{8}
Tritium	6,82 10^{7}	4,08 10^{13}	2,50 10^{13}	9,63 10^{12}	2,23 10^{13}	1,56 10^{13}	5,97 10^{10}	5,63 10^{11}
Dissolved gases	--	6,28 10^{9}	1,02 10^{8}	3,47 10^{7}	ND	(4)	ND	1,27 10^{8}
Year 2022								
Total except tritium and dissolved gases	2,76 10^{7}	1,61 10^{10}	2,78 10^{9}	6,06 10^{9}	6,02 10^{9}	1,46 10^{8}	3,36 10^{7}	1,22 10^{8}
Tritium	9,22 10^{7}	1,55 10^{13}	2,12 10^{13}	2,12 10^{13}	3,84 10^{13}	1,44 10^{13}	3,39 10^{11}	5,63 10^{11}
Dissolved gases	--	7,13 10^{7}	3,62 10^{8}	1,25 10^{7}	1,30 10^{7}	(4)	--	1,27 10^{8}
Gaseous effluents								
Year 2020								
Noble gases	--	2,00 10^{12}	3,33 10^{10}	2,19 10^{10}	3,31 10^{10}	2,14 10^{11}	ND	1,53 10^{12}
Halogen	--	ND	ND	ND	4,14 10^{6}	ND	--	4,15 10^{7}
Particles	--	7,64 10^{4}	1,29 10^{6}	1,52 10^{6}	1,57 10^{6}	ND	5,01 10^{5}	1,50 10^{6}
Tritium	--	4,40 10^{12}	3,40 10^{11}	5,11 10^{11}	8,42 10^{11}	1,02 10^{12}	9,43 10^{12}	3,06 10^{11}
Carbon-14	--	2,26 10^{11}	2,77 10^{10}	3,43 10^{11}	2,51 10^{11}	1,56 10^{11}	--	1,07 10^{11}
Year 2021								
Noble gases	--	1,00 10^{11}	2,69 10^{10}	9,00 10^{10}	1,45 10^{11}	9,94 10^{10}	--	1,40 10^{12}
Halogen	--	ND	ND	ND	5,21 10^{7}	ND	--	8,50 10^{7}
Particles	--	5,10 10^{3}	2,12 10^{6}	2,82 10^{6}	3,23 10^{6}	3,46 10^{5}	1,06 10^{4}	1,09 10^{7}
Tritium	--	5,73 10^{12}	8,26 10^{11}	6,88 10^{11}	9,26 10^{11}	7,97 10^{11}	6,13 10^{10}	4,60 10^{11}
Carbon-14	--	3,54 10^{11}	1,51 10^{11}	9,60 10^{10}	3,44 10^{11}	2,65 10^{11}	--	1,13 10^{11}
Year 2022								
Noble gases	--	1,01 10^{11}	1,09 10^{11}	8,01 10^{10}	1,26 10^{13}	7,64 10^{10}	--	1,17 10^{12}
Halogen	--	ND	ND	ND	1,55 10^{8}	ND	--	2,45 10^{7}
Particles	--	6,20 10^{5}	2,21 10^{6}	3,18 10^{6}	3,43 10^{7}	6,21 10^{5}	1,32 10^{5}	1,49 10^{7}
Tritium	--	3,18 10^{12}	4,00 10^{11}	2,68 10^{11}	8,47 10^{11}	7,46 10^{11}	6,47 10^{10}	5,30 10^{11}
Carbon-14	--	2,20 10^{11}	1,35 10^{11}	9,78 10^{10}	1,92 10^{11}	2,60 10^{11}	--	2,22 10^{11}

(1) ND = Not Detected

(2) Plant under dismantling since February 1, 2010

(3) Plant in definitive cessation of operation since July 6, 2013

(4) Liquid discharges do not carry dissolved gases because they are eliminated in the treatment process

Table 8. Activity of radioactive effluent from nuclear power plants (Bq).

El Cabril disposal Facility					
Gaseous effluents	Total alpha	Total beta	Gamma (1)	Tritium	Carbon-14
Year 2020	1,67 10^4	8,03 10^4	ND	2,66 10^9	2,53 10^8
Year 2021	1,83 10^4	8,61 10^4	ND	1,92 10^9	1,66 10^7
Year 2022	1,48 10^4	9,25 10^4	ND	3,92 10^7	ND
Juzbado fuel element Factory					
Liquid effluents	Total alpha				
Year 2020	2,22 10^7				
Year 2021	2,33 10^7				
Year 2022	2,02 10^7				
Gaseous effluents	Total alpha				
Year 2020	4,05 10^4				
Year 2021	5,38 10^4				
Year 2022	4,88 10^4				

(1) ND = Non Detected

Table 9: Activity of gaseous radioactive effluent from El Cabril Disposal Facility and the Juzbado Fuel Element Factory (Bq).

In the case of José Cabrera Nuclear Power Plant, effluent discharged into the environment was generated as a consequence of the tasks being performed during the decommissioning phase, while in the case of Santa María de Garoña Nuclear Power Plant, which is currently in a state of definitive cessation of operations, discharges occurred as a result of the tasks performed prior to decommissioning. **As explained above, the nuclear power plant is owned by Enresa and has been in the first phase of decommissioning since 17 July 2023**.

Furthermore, during the years under consideration, radioactive effluent discharges into the environment have been discharged from Vandellós I Nuclear Power Plant, which is in the latent phase, **in order to depressurise the Caisson following the leak test**.

These discharges represent a minimal risk to members of the public and the population as a whole, as revealed by the doses resulting from discharges in the three years under consideration, which did not exceed 1.1% in the case of Spanish nuclear power plants and 8.8% in the case of El Cabril Disposal Facility of the discharge limit authorised in each case.

24.2.4. Unplanned or uncontrolled discharges

In order to prevent unplanned or uncontrolled discharges of radioactive material into the environment, Spanish nuclear facilities have the following in place:

- Surveillance instrumentation serving to detect such discharges;
- Discharge isolation devices, in the event that the preset values are exceeded;
- Activation of alarms if abnormal conditions are detected;
- Administrative checks.

Nonetheless, if, despite these measures, there is an uncontrolled or unplanned discharge, the Licensees of nuclear facilities must adopt the necessary measures to arrest or control the discharge (if possible) and to minimise its impact on the exterior. They must likewise identify the cause or causes that led to it, and define the actions to be adopted in order to avoid any recurrence. All of these aspects must be notified to the CSN for analysis and approval.

The PVRA implemented by nuclear facility Licensees identified increases in environmental activity as a result of such discharges and confirmed the efficacy of the measures adopted to mitigate their effects.

Article 25. Emergency preparedness

1. Each Contracting Party shall ensure that before and during operation of a spent fuel or radioactive waste management facility there are appropriate on-site and, if necessary, off-site emergency plans. Such emergency plans should be tested at an appropriate frequency.

2. Each Contracting Party shall take the appropriate steps for the preparation and testing of emergency plans for its territory insofar as it is likely to be affected in the event of a radiological emergency at a spent fuel or radioactive waste management facility in the vicinity of its territory.

Annex C to this report describes the legislative and regulatory framework, the national emergency structure, the assignment of responsibilities, the emergency preparedness measures, the role of the regulatory body, etc.

This subsection aims to reflect only the main developments or actions taking place during the reporting period.

25.1. Developments in the legislative and regulatory framework to address emergency situations

The framework of regulatory standards to deal with emergency situations has been reinforced through a series of provisions summarised below:

- *Nuclear Safety Council Instruction IS-44, of 26 February 2020, on emergency planning, preparedness and response requirements for nuclear facilities*. **Its purpose is to establish the requirements regarding planning, preparedness and response to nuclear and radiological emergencies that are applicable to the on-site response level of nuclear facilities in Spain. The entry into force was altered due to the declaration of the State of Emergency by Royal Decree 463/2020 in regard to COVID-19, and accordingly finally entered into force on 2 December 2020. This applies to all nuclear facilities in each of their life phases;**

- *Royal Decree 586/2020, of 23 June, on mandatory information in the event of a nuclear or radiological emergency.* Its purpose is to establish standards and procedures for the provision of information on prevention and protection measures applicable, along with other relevant information, to the potentially affected population and to the population actually affected in the event of a nuclear or radiological emergency, to the intervention personnel of the external response level nuclear emergency plans and the special civil protection plans for radiation risk, and to the European Union, its Member States, third countries and other international organisations. This information shall be communicated without the need to be requested, and shall be provided in appropriate formats, supports and mediums, so that it is fully accessible and understandable to persons with disabilities of any kind;
- *Resolution of 16 December 2020, of the Undersecretariat of the Ministry of the Interior, publishing the Resolution of the Council of Ministers of 15 December 2020, approving the General State Plan for Civil Protection Emergencies;*
- *Royal Decree 1029/2022, of 20 December, approving the Regulation on Health Protection against the Dangers from Exposure to Ionising Radiation;*
- *Resolution of 21 March 2023, of the Undersecretariat of the Ministry of the Interior, publishing the Resolution of the Council of Ministers, which establishes basic safety standards for protection against the dangers arising from exposure to ionising radiation in the field of civil protection.* This Resolution transposes, in emergency matters, Council Directive 2013/59/Euratom of 5 December 2013, laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation, and aims to establish basic and uniform safety standards to ensure the protection of the health of persons subjected to occupational, medical and public exposure to the risks arising from ionising radiation. In the area of civil protection, although most of the transposition has been accomplished through the aforementioned Royal Decree 586/2020, it was still necessary to incorporate and adapt issues such as the radiological criteria for the protection of the public and the personnel intervening in the emergency, or certain other complementary aspects to be taken into account in the civil protection plans drawn up in response to possible nuclear and radiological emergencies;
- Royal Decree 524/2023, of 20 June, approving the Basic Civil Protection Standard, which follows the drawing up of the PLEGEM. The National Civil Protection System fully updates its regulatory framework, in line with the promotion of this public safety policy, which has recently become a fundamental instrument of territorial and social cohesion due to its focus on guaranteeing the safety of all people in situations of vulnerability as a result of emergencies and disasters. It is worth noting that this Royal Decree repeals several Basic Planning Guidelines and State Civil Protection Plans; however, it indicates that those in force will continue to be applied until the new planning instruments that replace them are approved, in accordance with the provisions of Articles 5 and 14.1 of the Basic Regulation, respectively;

- *Order TED/796/2023, of 13th July, authorising the transfer of ownership of Santa María de Garoña Nuclear Power Plant from the company Nuclenor, SA to Empresa Nacional de Residuos Radiactivos, SA, S.M.E., and authorising Phase 1 of the dismiantling of this plant.*

25.2. Application of emergency preparedness measures, including the role of the regulatory body and other agencies

25.2.1. Internal Response Level

The requirements established in IS 44 are graded according to the risks inherent to each type of nuclear facility in each operating phase. Its entry into force consolidated emergency management at nuclear facilities and required all Licensees to analyse compliance with its requirements or to make the appropriate modifications, which were reflected in the proposals for modification of the Site Emergency Plans (PEI) at all nuclear facilities, which were approved during this period.

During the period covered by this report and for the nuclear power plants, as a result of the improvements implemented following the stress tests, the operability of all the resources available to the Licensees in their External Emergency Plans for dealing with an emergency situation continued to be checked in the External Emergency Plan simulations. During this period, in addition to the review of the External Emergency Plans due to the entry into force of IS 44, the Licensees have requested conventional revisions of the External Emergency Plans and, in certain cases and for those Licensees whose operating permits include them, have carried out modifications to the External Emergency Plans by means of so-called minor modifications, provided that the proposed changes do not modify aspects of nuclear safety and radiation protection.

During this period, and on the basis of the experience derived from the licensing tribunals and from the performance of External Emergency Plan simulations, a working group has been set up with the participation of CSN technicians and Licensee emergency management technicians to revise the text of certain events that have given rise to discrepancies in interpretation. This group is expected to conclude its work in the first half of 2024.

It has also been proven that extensive damage mitigation teams can be moved by road or air transportation to any affected nuclear power plant from the Alternative Emergency Management Centre located in the Region of Madrid.

25.2.2. External Response Level

During the period covered by this report, for emergencies managed under the Basic Directive on Civil Protection against Radiological Risk, the CSN has reported favourably on Revision 2 of the Special Plan against Radiological Risk of **Castile la Mancha, Revision 2 of the Special Plan against Radiological Risk of the Region of Madrid, as well as the Special Plans against Radiological Risk of Murcia, the Balearic Islands and Asturias.**

25.3. Emergency preparedness and response

There has been an increase in resources and one-hour call-out personnel groups to fulfil the missions entrusted to the CSN under the Emergencies Law and those set out in the CSN Emergency Action Plan itself.

All nuclear facilities, nuclear power plants in operation or decommissioning, and all other nuclear facilities continue to stage their required internal emergency drills, covering complex accident scenarios serving to ascertain the operability of the External Emergency Plans in response to any hypothetical accident postulated for each facility. In addition, at those sites with two units, scenarios have, over recent years, been designed involving a simultaneous and different impact on the two units. Likewise, in accordance with the criteria established by the CSN, these drills may be used to activate the CSN Emergency Response Organisation and may be subject to specific inspection. **Some of the exercises are managed by the so-called CSN back-up Salem.**

25.4. Arrangements at the international level, including with neighbouring countries, where necessary

The bilateral agreement that the CSN has signed with the ASM (Autorité de Sûreté Nucléaire, French regulatory body) in the field of emergencies includes, among other objectives, the aim for both organisations swiftly to inform one another of any nuclear or radiological accident occurring anywhere within their territory that could affect any part of national territory or generate concern among their citizens. It also includes the exchange of the annual planning of emergency simulations so that experts from each regulator may participate as observers in the emergency simulations carried out by the other organisation.

During this period, a CSN technician attended the emergency simulation at the ASN headquarters for the French nuclear power plant of Flamanville, carried out on 13 December 2022.

The CSN continues to participate in the HERCA Working Group Emergencies (WGE) meetings.

Work continues on the fact that, although at the earliest phase of an accident, there are substantial uncertainties as to the accident and its potential radiological impact, those managing the emergency are required to adopt protection decisions. This demands considerable flexibility in decision-making. In this regard, the HERCA WGE has, for those countries affected by a nuclear accident, proposed the coordination of decisions and the response mechanism for the early stage of the accident, referred to as the HERAC-WENRA group: the Common Situation Report or Common Approach based on the following principles:

- Mutual trust and understanding
- Coordination of activities
- Alignment of recommendations between neighbouring countries

The objective is to develop mechanisms to implement protective measures during an emergency consistently along shared borders between countries, without the need to change each country's procedures.

Article 26. Decommissioning

Each Contracting Party shall take the appropriate steps to ensure the safety of a nuclear facility when decommissioned. Such steps shall ensure that:

i. Qualified staff and adequate financial resources are available;

ii. The provisions of Article 24 with respect to operational radiation protection, discharges and unplanned and uncontrolled releases are applied;

iii. The provisions of Article 25 with respect to emergencies;

iv. Records of information important to decommissioning are kept.

According to the RINR, decommissioning is understood to mean:

"The process under which the Licensee of a facility, having obtained the corresponding authorisation, performs activities for decontamination, disassembly of equipment, demolition of structures and removal of materials, ultimately allowing the site to undergo full or restricted release. The process of decommissioning ends with a final decommissioning declaration, which releases the Licensee of a facility from its liability as the operator thereof and, in the case of restricted release of the site, defines the applicable usage limitations and the party responsible for maintaining these and overseeing compliance".

Annex B to this report provides information on the licensing process for the decommissioning of nuclear facilities.

26.1. Decommissioning organisation and responsibilities

The decommissioning and closure of nuclear facilities in Spain constitute an essential public service, the management of which is entrusted in Article 38 bis of the LNE; Enresa is entrusted with acting as a Licensee in operations involved in the decommissioning and closure of nuclear facilities and, where applicable, radioactive facilities. The object and functions of Enresa in connection with dismantling/decommissioning are referred to in Article 9 of *Royal Decree 102/2014, of 21 February 2014, for the safe and responsible management of spent fuel and radioactive waste.*

In accordance with the RINR, when authorisation to operate a nuclear facility ends, responsibility for decommissioning initially lies with the Licensee of the facility itself, which, following the granting of the corresponding authorisation, is responsible for what is known as preliminary dismantling activities. Before the dismantling authorisation is granted, the Licensee of the operating permit must have conditioned the radioactive waste from operations generated during the operation thereof in accordance with the acceptance criteria of the storage facility to which it will be transferred. The Licensee of the facility must secondly have offloaded the fuel from the reactor and the irradiated fuel storage pools or, in default of the latter action, have in place a spent fuel management plan approved by the MITERD.

Once the operational Licensee of the facility has concluded the aforementioned preliminary dismantling activities, the facility must be temporarily transferred to Enresa in order for dismantling to proceed. The obligations and requirements resulting from this transfer of Licensee status are specified and established in the technical and administrative acceptance specifications between Enresa and the owners of the nuclear facilities, as referred to in Article 11 of Royal Decree 102/2014, and must first be approved by the MITERD.

The RINR itself legally defines Enresa's organisation and responsibility as the Licensee of facilities in the decommissioning process.

An obvious lesson from experience to date is the need to have an anticipated and planned strategy for the future decommissioning of the nuclear power plant during its operating period, demonstrating the viability and safety with which such decommissioning can be undertaken. This planning includes not only technological or economic-financial aspects of the activities to be carried out but also the planning of organisational aspects, the management of waste materials and even the planning of the political and social aspects that might be affected by decommissioning.

Planning must start in the design and construction phase of the nuclear power plant, continue throughout its operating lifetime, and be implemented immediately after the definitive cessation of its operations.

The recent Council Instruction IS-45 on safety requirements during the design, construction and operation phases of nuclear facilities in order to plan their future decommissioning includes the need to plan for the decommissioning of nuclear power plants sufficiently in advance at the end of their operating life in Spanish regulations.

26.2. Financing of decommissioning

In general, the decommissioning and closure of nuclear facilities are financed in the same manner as reported in the previous national report. For further details as to the financing system, please consult Annex D.

26.3. Radiation protection and emergencies during decommissioning

As described in the previous national report, nuclear facilities in the decommissioning phase continue to be considered nuclear facilities until the declaration of decommissioning is granted and are subject to the rules of the RINR. In this regard, the regulations indicated in the subsection referring to compliance with the provisions of Articles 24 "Operational radiation protection" and 25 "Emergency preparedness" of this Convention continue to apply in full.

26.4. Document archive for dismantling and decommissioning

The RINR **and the recent Council Instruction IS-45, which implements Article 36 of the RNSNF**, establish the obligation of the Licensees of nuclear facilities to compile and suitably conserve all the relevant information on the operating stage. **Both the RNSNF and the aforementioned Instruction** also require that all authorised nuclear facilities have a **Preliminary Decommissioning Plan** in place during their operation, describing the plans for decommissioning and closure provisions in place for the facility, describing, among other aspects, the disposal of radioactive waste generated and a study of the cost and economic and financial provisions to guarantee decommissioning (Article 20(j) of the RINR).

The agreements for the transfer of licensee status establish contractually the mechanisms and procedures allowing Enresa to access all operational archives of the facility. Therefore, Enresa can draw on all information available deemed relevant for the design and execution of the corresponding decommissioning and closure plan.

G

Section G. Safe management of spent nuclear fuel

This section covers the requirements of Articles 4 to 10 of the Convention on the Safety of Spent Fuel Management.

Article 4. General safety requirements

Each Contracting Party shall take the appropriate steps to ensure that individuals, society, and the environment are adequately protected against radiological hazards at all stages of spent fuel management.

In so doing, each Contracting Party shall take the appropriate steps to:

i. Ensure that criticality and removal of residual heat generated during spent fuel management are adequately addressed;

ii. Ensure that the generation of radioactive waste associated with spent fuel management is kept to the minimum practicable, consistent with the type of fuel cycle policy adopted;

iii. Take into account interdependencies among the different steps in spent fuel management;

iv. Provide for effective protection of individuals, society and the environment, by applying at the national level suitable protective methods as approved by the regulatory body, in the framework of its national legislation which has due regard to internationally endorsed criteria and standards;

v. Take into account the biological, chemical and other hazards that may be associated with spent fuel management;

vi. Strive to avoid actions that impose reasonably predictable impacts on future generations greater than those permitted for the current generation;

vii. Aim to avoid imposing undue burdens on future generations.

Spent fuel produced at Spanish nuclear power plants is first stored in the reactor pools. Once they no longer offer sufficient capacity or, where necessary, with a view to decommissioning, the fuel is transferred to Individualised Temporary Storage (ITS) facilities built on the sites of the plants themselves.

At the date of this report, there are operational ITSs at Trillo, José Cabrera, Ascó, Santa María de Garoña, Almaraz and Cofrentes Nuclear Power Plants. Given that the ITS at Ascó, Almaraz and Cofrentes do not have sufficient capacity, Empresa Nacional de Residuos Radiactivos, S.A., S.M.E. (Enresa) has scheduled the construction of new ITSs to complement the existing ones at these plants, with operation scheduled to begin in 2026. The construction of a new ITS is also scheduled to begin operation in 2026 at Vandellós II, which is the only plant that does not currently have a dry storage facility.

The ITSs in operation use dry storage casks: dual-purpose metal casks approved for storage and transportation in the case of Trillo, Almaraz and Cofrentes NPPs and concrete and metal storage systems in the case of José Cabrera and Ascó NPPs. **As explained throughout the report, Santa María de Garoña Nuclear Power Plant was shut down in 2012 and has been in definitive shutdown since August 2017, its decommissioning beginning in July 2023 following the transfer of ownership to Enresa. Despite this and under the assumption of the plant's continued operation, an ITS was licensed and built, which obtained authorisation for its start-up in 2018. The storage system selected for this plant consists of dual-purpose metal casks.**

Spent fuel storage facilities are nuclear facilities or form part of nuclear facilities governed by the general applicable legal and regulatory framework (see Annex A), essentially comprising the Law 25/1964, of 29th of April, on Nuclear Energy (LNE), *Royal Decree 102/2014, on safe and responsible management of spent nuclear fuel and radioactive waste*, the Regulation on Nuclear and Radioactive Facilities (RINR), approved by Royal Decree 1836/1999, the Regulation on Nuclear Safety in Nuclear Installations (RNSNF), approved by Royal Decree 1400/2018, the Regulation on Health Protection against Ionising Radiation (RPSRI), approved by Royal Decree 783/2001, and environmental legislation, in addition to the following Safety Instructions (SI) issued by the Nuclear Safety Council (CSN):

- *CSN Instruction IS-20 on safety requirements concerning spent fuel storage casks.*
- *CSN Instruction IS-26 on basic nuclear safety requirements applicable to nuclear facilities.*
- *CSN Instruction IS-29 on safety criteria at temporary spent fuel and high-level waste storage facilities.*

These Instructions incorporate the requirements of the IAEA and the WENRA reference levels, and in the case of Instruction IS-26, the safety requirements of Nuclear Safety Directive 2009/71/Euratom.

4.1. Measures to guarantee the maintenance of subcritical conditions and heat dissipation

Maintenance of subcritical conditions and adequate heat dissipation in temporary spent fuel storage facilities and systems constitute safety requirements incorporated by means of the application of technical and administrative or control systems, subject to analysis, assessment and surveillance.

The measures adopted by the Licensees of facilities to comply with these requirements are described in the Safety Studies, an official document presented with the application for authorisation for the different phases of the facility, and in the Technical Functional Specifications, likewise a mandatory document for the operation of nuclear facilities.

These measures take into account the criteria established in the IAEA technical standards and the regulations in the country of origin of the technology (US NRC 10 CFR 50, in the case of the power plant pools, and US NRC 10 CFR 72, in the case of dry storage facilities and systems). These criteria and requirements have been incorporated within national regulations by means of the aforementioned Nuclear Safety Council Instructions, particularly IS-20 and IS-29.

4.1.1. Measures to guarantee the maintenance of subcritical conditions

There has been no change since the last national report in the criteria and methods employed for the maintenance of subcritical conditions in spent fuel storage facilities. The design criterion adopted for the maintenance of subcritical conditions (both in the pools and in the dry storage casks) is that the neutron multiplication factor (Keff), including all biases and uncertainties with a level of confidence of 95%, should be below 0.95 under normal, abnormal or accident operating conditions.

The methods employed for this purpose are as follows:

- in nuclear reactor pools, a safe geometrical configuration is organised and maintained, with the use of fixed or dissolved neutron poisons (except in BWR reactors); initial enrichment is limited, and credit is given to the degree of burnup of the fuels;
- in dry storage casks, maintenance of subcritical conditions is based on the geometry of the rack, the presence of neutron-absorbing materials as an inherent or fixed part thereof, and the administrative limits as to the U-235 enrichment of the fuel and the degree of burnup attained for storable fuels.

4.1.2. Measures to guarantee adequate heat dissipation

The cooling system of fuel storage pools at nuclear power plants dissipates the heat generated and maintains a minimum level of water above the fuel assemblies to guarantee adequate buffering against any situation.

The dry storage casks of nuclear power plants have been designed to dissipate the heat generated by the fuel assemblies into the atmosphere by means of passive convection, conduction and radiation mechanisms.

The structure of the dual-purpose metal casks facilitates the dissipation of heat. The cask's structure assists in the conduction of heat to the exterior and evacuation by convection and radiation.

In the case of metal and concrete casks, the structure is ventilated by natural convection, cooling the capsule housed within. The capsule itself also has an internal structure that assists in the conduction of heat to the exterior and the convection of the inert gas within.

4.2. Measures to ensure that the generation of radioactive waste as a result of spent fuel management is kept as low as possible

The minimisation of waste generation is a principle established in the LNE (Article 38). It has also been included in Royal Decree 102/2014 (Article 3(a)), transposing into Spanish law *Directive 2011/70/Euratom (Article 4)* on the safe and responsible management of radioactive waste.

In wet spent fuel storage systems or pools, the minimisation of waste focuses on reducing as far as possible any secondary waste produced in the purification of the water and the air cleaning and ventilation system filters of the buildings where the systems are located. The criterion of minimising waste established as a general requirement for nuclear facilities likewise applies to the design and systems for temporary dry spent fuel storage facilities and the processes associated with the loading of fuel.

4.3. Measures to take into account interdependencies among the different steps in spent fuel management

The consideration given to the interdependencies between the different stages of radioactive waste and spent fuel management has been an intrinsic element of the legal and regulatory framework in Spain for decades. The consideration given to interdependencies is included among the general management principles listed in *Royal Decree 102/2014 for the safe and responsible management of spent nuclear fuel and radioactive waste*.

CSN instruction IS-26, on basic nuclear safety requirements applicable to nuclear facilities, requires that the Licensee identify and acknowledge in advance the interactions and relationships with other stages when making decisions in each radioactive waste management stage so as to achieve a balanced equilibrium of safety and overall effectiveness.

In practice, the Radioactive Waste and Spent Fuel Management Plan (PLAGERR) is an essential document for the application of this principle. The PLAGERR, an official document for the operation of nuclear facilities, is approved by the MITERD following a report from the CSN, as part of the facility licensing process. The objectives, criteria and content of the PLAGERR are governed by CSN Safety Guide 9.03, which dates from 2008. The respective PLAGERR plans of the nuclear power plants in operation have been aligned with this guide.

Consideration must also be given to the general strategy included in the General Radioactive Waste Plan (GRWP) as indicated in Royal Decree 102/2014: *"The Plan shall set out the strategies, required actions and technical solutions to be developed in Spain in the short, medium and long terms, for the purpose of safe and responsible management of spent nuclear fuel and radioactive waste, the decommissioning and closure of nuclear facilities, and all other activities connected with the foregoing, including the economic and financial provisions and measures and instruments necessary in order to undertake these actions"*.

The consideration given to interdependencies is directly reflected in the adoption of criteria for the acceptance of radioactive waste and spent fuel, which must be signed by the Licensees of nuclear facilities for subsequent management by Enresa, as indicated in Article 11 of Royal Decree 102/2014, regarding technical or administrative specifications. These specifications will be valid until the end of the life of the facilities, including decommissioning and closure, and must have been approved by the MITERD, with a prior report from the Nuclear Safety Council.

The standard contracts that have been established over time with regard to spent fuel and radioactive waste between Enresa, as the waste manager under Spanish regulations, and the Licensees of nuclear facilities have the status of technical administrative acceptance specifications.

It should lastly be pointed out that Enresa's reporting obligations regarding the CSN brought in by Royal Decree 102/2014 include the requirement to submit information during the first

quarter of each year regarding interdependencies, agreements, and interfaces of responsibilities with the Licensees of other spent nuclear fuel and radioactive waste management facilities (Article 12.2 of the aforementioned Royal Decree).

4.4. Measures for the protection of people, society and the environment

The provisions for the protection of people and the environment against risks derived from nuclear and radioactive facilities are set out in the existing legal framework in Spain, as explained in Sections E and F of this report. These provisions apply both to spent fuel storage facilities associated with nuclear power plants and to independent spent fuel storage facilities.

In the sphere of spent fuel management, and specifically the temporary spent fuel and high-level waste storage facilities, the basic criteria for worker protection are set out in Article 38 of **the LNE, developed in the RPSRI, approved by Royal Decree 1029/2022, during the period covered by this report**.

In addition, the Regulation on Nuclear Safety at Nuclear Facilities, approved by Royal Decree 1400/2018, establishes the basic nuclear safety requirements applicable to nuclear facilities throughout their lifecycle, guaranteeing a high level of nuclear safety and protecting workers and the general public against the risks resulting from ionising radiation derived from nuclear facilities [...].

Article 24 of this report sets out the aforementioned general measures adopted in connection with worker protection, as well as those regarding the control and surveillance of effluents and the optimisation of radiation protection at nuclear facilities.

As for radiation protection measures for people and society in the case of spent fuel storage and management facilities, these are developed in Articles 6, 7, 8 and 9 of this report and Article 25 for emergency management.

In terms of environmental protection measures, these are governed by the national environmental impact assessment regulations. Specifically, Environmental impact assessment Law 21/2013, of 9 December 2013, incorporating *Directive 2001/42/EC, of 27 June 2001, on the assessment of the effects of certain plans and programmes on the environment, and Directive 2011/92/EU, of 13 December 2011, on the assessment of the effects of certain public and private projects on the environment.*

In Spain, the ITS located at Trillo, José Cabrera, Ascó, Almaraz, **Cofrentes and Garoña** Nuclear Power Plants have been subjected to an environmental impact assessment (EIA) and obtained the corresponding environmental impact statement (EIS).

4.5. Measures for the consideration of biological, chemical and other hazards that could be associated with spent fuel management

The prevention of biological, chemical, and other non-radiological risks associated with spent fuel management is, first of all, governed by the standard regulations applicable to other industrial activities entailing such risk, which essentially comprise environmental impact assessment legislation. Meanwhile, the limitations established for this purpose in the corresponding requirements corresponding to the authorisation of the facilities in question take into account such risks in the operation thereof. The authorisation of spent fuel management facilities requires an environmental impact assessment and an operating permit.

Meanwhile, the prevention of non-radiological risks faced by operational personnel at such facilities is governed by Occupational Risk Prevention Law 31/1995.

Also of importance in this regard are the provisions of CSN Safety Guide 1.6 on "Notifiable events at Nuclear Power Plants," which requires that events that, in the judgement of the Licensee thereof, could have significant public repercussions (including environmental variations and occupational accidents) be reported to said body.

4.6. Measures to avoid repercussions for future generations that are greater than those permitted for present generations

Temporary storage of spent fuel in dry systems is expected to last for several decades. The robustness and safety of the storage facilities and systems is achieved through strict compliance with the regulations during siting, design, construction and operation, subject to a regulatory framework of licensing and supervision by the regulatory body established in the **RINR in IS-20, Instruction establishing the safety requirements relating to spent fuel storage casks, and in Law 15/1980, creating the Nuclear Safety Council**. National policy in the field of spent fuel management covers the various stages required for temporary storage up until disposal in a Deep Geological Repository, along with the necessary financial, technical and research provisions. This long-term management policy ensures that the fuel and waste remain isolated from the environment, protecting present and future generations.

Nonetheless, as mentioned in the previous paragraph, bearing in mind that fuel and waste management activities may involve various responsible figures and cover longer periods, the LNE indicates in Article 38 that, with regard to the measures to be adopted by organisations responsible for nuclear facilities, they must adopt appropriate measures in all stages of the management of spent nuclear fuel and radioactive waste, so as properly to protect people, property and the environment, in both the present and the future.

4.7. Measures to avoid imposing undue burdens on future generations

The Spanish regulatory framework establishes, by means of the LNE, the Sixth Additional Provision of Electrical Sector Law 54/1997 and Royal Decree 102/2014, *on the safe and responsible management of spent nuclear fuel and radioactive waste*, the specific measures for this purpose connected with the assignment of responsibilities, provision of funds to finance the activities set out in the GRWP, and provisions with regard to requirements for institutional control.

The legislation establishes the responsibilities of the different agents involved in spent fuel management: the Spanish Ministry for Ecological Transition and Demographic Challenge (MITERD), the regulatory body (CSN), producers and Enresa, as detailed, among others, in Articles 20 and 21 of this report.

With regard to this subsection, the legal framework provides for the creation, endowment, and management and guarantee mechanisms of the economic Fund established to finance GRWP activities, including spent fuel management, the details of which may be found in Annex D. Through the provisions allocated to said Fund, generating facilities benefiting from the production of electricity of nuclear origin pay the costs associated with the fuel generated up until disposal thereof.

The LNE establishes that the State will assume ownership of spent fuel once disposal takes place and will likewise handle any surveillance that might be required following the decommissioning of a nuclear facility, once the time period established in the corresponding authorisation has passed.

In this regard, Directive 2011/70/Euratom highlighted the ethical obligation of each Member State to avoid any undue burden on future generations with regard to spent nuclear fuel, and establish the Community framework to guarantee this principle.

In line with the Directive, Royal Decree 102/2014, which completed the transposition thereof into Spanish law, has the following aim: "the regulation of safe and responsible management of spent fuel and radioactive waste derived from civil activities in all stages, from generation up until disposal, so as to avoid imposing undue burdens on future generations, in addition to the regulation of certain aspects regarding the financing of such activities, thereby fulfilling the Community framework".

As a result of the above, and in accordance with Royal Decree 102/2014, the **7th GRWP includes, among its contents, "concepts or plans for the period after the operational phase of a disposal facility, indicating the period of time during which the relevant controls would be maintained, alongside the resources to be employed in order to preserve knowledge as to said facility in the long term"**.

Likewise, Article 9.2 of the RNSNF, approved by Royal Decree 1400/2018, establishes that the siting, design, construction, commissioning, operation and decommissioning of a nuclear

facility must ensure that reasonably foreseeable radiological consequences for future generations are no greater than those permitted for the present generation.

Lastly, authorisation for the decommissioning and closure of facilities for the disposal of spent nuclear fuel and radioactive waste, incorporated in the regulation for the licensing of facilities as a consequence of Directive 2011/70/Euratom, seeks to guarantee the long-term safety of the storage system, which will, where applicable, determine the site areas to be subject to radiological and other surveillance and control procedures, for a specified time period.

Article 5. Existing facilities

Each Contracting Party shall take the appropriate steps to review the safety of any spent fuel management facility existing when the Convention enters into force for that Contracting Party and to ensure that, if necessary, all reasonably practicable improvements are made to upgrade the safety of such a facility.

5.1. Measures adopted for the revision of the safety of existing facilities

This article refers only to those facilities that were in existence at the moment of entry into force of the Convention in Spain. At that time, the only spent fuel management facilities were the pools of the nuclear power plants. At present, the review of the safety of these pools is performed by means of Periodic Safety Reviews of the nuclear power plants, an issue essentially addressed in Articles 8 and 9 of this report, in addition to the application of certain measures of the Post-Fukushima National Action Plan (NAcP), described in depth in previous reports.

Article 6. Siting of proposed facilities

1. Each Contracting Party shall take the appropriate steps to ensure that procedures are established and implemented for a proposed spent fuel management facility:
   - i. To evaluate all relevant site-related factors likely to affect the safety of such a facility during its operating lifetime;
   - ii. To evaluate the likely safety impact of such a facility on individuals, society and the environment;
   - iii. To make information on the safety of such a facility available to members of the public;
   - iv. To consult Contracting Parties in the vicinity of such a facility, insofar as they are likely to be affected by that facility, and provide them, upon their request, with general data relating to the facility to enable them to evaluate the likely safety impact of the facility upon their territory.

2. In so doing, each Contracting Party shall take the appropriate steps to ensure that such facilities shall not have unacceptable effects on other Contracting Parties by being sited in accordance with the general safety requirements of Article 4.

The basic Spanish strategy for the management of spent fuel, as set out in the 7th GRWP currently in force, provides for the temporary storage of spent fuel and high-level waste on the basis of a dry storage system guaranteeing safety and the protection of people and the environment, for as long as required in order to proceed to disposal.

The facilities planned for the management of spent fuel will be assigned to temporary storage on a case-by-case basis.

6.1. Provision for new spent fuel management facilities

In line with the strategy provided for in the 7th GRWP, the objective for the coming years is to maintain the management capacity for spent fuel (SF), high-level waste (HLW) and special waste (SW) at the nuclear power plants by means of ITSs, along with the start-up of a Decentralised Temporary Storage (DTS) facility for SF, HLW and SW at each SF nuclear power plant (Almaraz, Ascó, Cofrentes, Santa María de Garoña, José Cabrera, Trillo and Vandellós II), consisting of its or, where appropriate, its ITSs, plus a new complementary facility or additional measures allowing maintenance and repair operations to be performed on its casks, in order to guarantee the function of recoverability at cask level.

In view of the above, during the period covered by the report, following the authorisation for the start-up of the modification obtained on 25 May 2021, the ITS at Cofrentes Nuclear Power Plant came into operation. Similarly, during this period, the licensing procedure for an ITS at Vandellós Nuclear Power Plant, the only plant that does not have dry storage capacity, has commenced; furthermore, given that, in accordance with the useful capacity of the pools and the ITS at Ascó, Almaraz and Cofrentes NPPs, and with the forecasts for spent fuel generation at these plants, there is insufficient storage capacity to allow their continued operation until the date of definitive cessation of operation provided for in the National Integrated Energy and Climate Plan 2021-2030 (PNIEC) and subsequent decommissioning, design modification authorisations have been requested for the construction of new complementary ITSs. To this end, the licensing of the Vandellós ITS and the new full-capacity ITSs at Ascó, Almaraz and Cofrentes NPPs requires the following authorisations in accordance with nuclear and environmental standards:

- Authorisation for the execution and assembly of the plant design modification for the implementation of an ITS, in accordance with Article 25.2 of the RINR, approved by Royal Decree 1836/1999. In all four cases, this authorisation is pending a report from the CSN;
- Authorisation of the plant design modification for its start-up, in accordance with the procedure established in Article 25.1 of the RINR. This authorisation shall be

requested once the previous performance and assembly authorisation has been obtained;

- Licensing of the HI-STORM FW cask for the dry storage of spent fuel, for which Enresa will have to request the CSN's favourable assessment in accordance with Article 82 of the RINR;
- Regarding the facility's impact on the environment, the projects are being subjected to environmental impact assessment in accordance with the procedure established in Law 21/2013, of 9 December. These processes will culminate in obtaining the project's environmental impact statement (EIS).

Likewise, given that the ITS at Santa María de Garoña Nuclear Power Plant was designed and built at the time under the assumption of continued operation of the plant, following the granting of the authorisation for the transfer of ownership from Nuclenor, S.A. to Enresa and of Phase 1 of the decommissioning of this plant, Enresa has requested a modification of the ITS in order to increase its capacity to allow for the temporary storage of all the fuel currently stored in the pool to be able to undertake the plant's decommissioning tasks. Its licensing will require the corresponding authorisation for modification of the plant design in accordance with Article 25.1 of the RINR.

Lastly, it should be pointed out that, in relation to the Centralised Temporary Storage (CTS) project provided for in the 6th GRWP, the 7th GRWP, in view of the lack of the social, political and institutional consensus required to designate a site for the CTS, has opted for the aforementioned start-up of the DTS. This decision has led to the abandonment of the CTS project and has led to the approval, on 27 December 2023, of the Agreement adopting the necessary instructions to abandon the project to house a Centralised Temporary Storage (CTS) facility and urging Empresa Nacional de Residuos Radiactivos, S. A., S.M.E. (Enresa) to carry out the appropriate actions for the orderly completion of the procedures initiated for its start-up.

Articles 6.2, 6.3, 6.4, 7, and 8 of this report further develop the matters processed during this period in connection with the site, the criteria for assessment of radiological repercussions, public information, and the construction and safety of these facilities.

6.2. Measures to assess all factors connected with the site and influencing safety

The analysis of factors connected with the siting of nuclear facilities must be included in the documentation to be presented in order to obtain the corresponding authorisations, as established in the RINR (set out in Annex B to this report), on the terms established in CSN Instruction IS-26.

Consideration must likewise be given to the terms of Article 14, *"Initial site assessment"*, of the RNSNF, approved by Royal Decree 1400/2018. In other words, an assessment of the potential siting of a nuclear facility to determine the effects that this could have from the nuclear safety perspective on the surrounding population and environment, and also the possible

conditional factors that the site might impose on the design of the facility, including aspects regarding transportation routes and emergency management.

Specifically, the application presented for prior authorisation encloses the study of site characterisation and the surrounding area, which must include sufficient information as to the corresponding parameters which could impact nuclear safety or radiation protection, including demographic and ecological factors and activities connected with land use regulations. This documentation is assessed by the CSN, which issues a report in order for the Ministry to grant authorisation.

Said information is completed in the documentation to be presented with the application for the construction permit and, subsequently, the operational application authorisation, which, in addition to updated information on the site parameters, including aspects regarding soil and water use and any data that could contribute to a better understanding of the site, must also include surveillance and verification plans for the basic representative parameters.

Site factors are also assessed in the Periodic Safety Reviews to which nuclear facilities are subjected, conducted every 10 years, as well as applications for modifications to the facilities if such modifications impact any factor concerning soil usage or the conditions initially planned for the site. Lastly, the application for decommissioning and closure requires presenting a radiological study of the site and its surrounding area.

In the case of the ITSs, both the existing ones at the Trillo, José Cabrera, Ascó, Almaraz, Cofrentes and Santa María de Garoña plants, and the one planned at the Vandellós II plant and the extensions planned at the Ascó, Almaraz, Cofrentes and Santa María de Garoña plants, the safety assessment takes into account the inherent characteristics of the site in each case, ascertained by means of the successive authorisations of these power plants, and their interfaces with the corresponding storage system, with the following result:

- First of all, it is confirmed that the site factors lie within the margins contained in the Safety Study (ES) for the approval of the storage casks to be used, as required by CSN Instruction IS-20, on design requirements and usage of casks;
- Meanwhile, an analysis is conducted of any site factors that could impact the design and settlement of the ITS concrete slab.

6.3. Criteria to assess radiological repercussions on the environment and surrounding population

In accordance with Article 3.1 of *Nuclear Safety Council Instruction IS-29 on safety criteria at temporary storage facilities for spent fuel and high-level radioactive waste*, the Licensee of the temporary spent fuel and high-level waste storage facility must, as a general safety objective, protect people and the environment from the harmful effects of ionising radiation. The Safety Study for the site must, to this end, demonstrate fulfilment of this objective both in normal operations and foreseeable operational events, as well as in the event of accidents.

During normal operations and foreseeable operational events, the effective annual dose for any member of the public located beyond the controlled area must be below 250 μSv. The controlled area is to be understood as the area surrounding the temporary storage facility where the Licensee exercises authority over usage and where the operations are performed. There must be a distance of at least 100 metres between the spent fuel or high-level waste stored at the facility and the boundary of the controlled area. To guarantee that the population's exposure is kept at a value as low as reasonably possible, operational restrictions may be established for the doses derived from radioactive effluent and levels of external irradiation caused at the facility.

For design specification accidents, the acceptance criteria are established in terms of an effective dose of less than 50 mSv, an equivalent skin dose of less than 500 mSv and an equivalent crystalline lens dose of less than 150 mSv, the same applying for any member of the public located beyond the controlled area. Verification of these limits in the event of postulated triggering events is covered by the analysis of accidents and radiological consequences incorporated in the Safety Study for the facility. The acceptable estimated frequency threshold for an event is once in a million years in order to conduct a detailed analysis of the effects of events of this type, and possible measures to mitigate them. In any event, the threshold cut-off value in order to consider an event as corresponding to the design specification must be established in the design specifications themselves. As a result, internal or external events with a lower exceedance frequency may be considered as being beyond the design specification.

In the case of the existing ITSs at the sites of Ascó, Almaraz, Trillo and Cofrentes Nuclear Power Plants and at the Santa María de Garoña and José Cabrera plants in the decommissioning phase, the assessment takes into account the inherent characteristics of the site, ascertained by means of the licensing and review of the plant itself, and the interface with the storage system. At these facilities, during normal operations and forecast operational events, compliance with the radiological acceptance criterion referred to above takes into account external or internal irradiation caused by the contribution made by the existing nuclear power plants on the site.

6.4. Public information as to the safety of planned spent fuel management facilities

General issues regarding information and public participation (the role of the regulatory body and other authorities, the duty to inform citizens, local information committees for nuclear power plants, website, SISC supervisory system, publication in planned standards, Law 21/2013, etc.) have already been addressed in Article 20.2.8 and subsection 3 of Annex B of this report, and we therefore below highlight only those aspects specifically tied to information for the public with regard to the safety of spent fuel management facilities conducted for facilities planned during this period, in other words, the **full capacity ITSs at Vandellós II, Ascó, Cofrentes and Almaraz Nuclear Power Plants**.

The MITERD is submitting the design modifications for the construction of the aforementioned full-capacity ITSs to the environmental impact assessment procedure provided for in Law 21/2013, which includes a public information and consultation process with the public authorities and interested parties affected for a period of thirty (30) working days, **with these procedures being in different stages of processing at the end of the period covered by this report. In any event, the observations received during these procedures will be sent to the Licensees so that, once they have been taken into consideration, they will have the opportunity to introduce the relevant modifications in new versions of the project and the Environmental Impact Study**.

Meanwhile, the revision of the RINR makes provision for the information committees, which had previously been held only in those municipalities where nuclear power plants are located in order to inform the surrounding population during the construction, operation and decommissioning of such plants to be extended to spent nuclear fuel and radioactive waste storage facilities, in line with the suggestion made to Spain in this regard at the sixth review meeting.

Article 7. Design and construction of the facilities

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

i. The design and construction of a spent fuel management facility provide for suitable measures to limit possible radiological impacts on individuals, society and the environment, including those from discharges or uncontrolled releases;

ii. At the design stage, conceptual plans and, as necessary, technical provisions for the decommissioning of a spent fuel management facility are taken into account;

iii. The technologies incorporated in the design and construction of a spent fuel management facility are supported by experience, testing or analysis.

7.1. Measures in design and construction to limit the radiological impact of facilities

Article 38 of the LNE establishes the objective of radiation protection of spent fuel management facilities in general.

This objective is developed in the RNSNF with regard to the prevention of accidents and avoidance of radioactive emissions (Article 6), the limitation of doses for workers and the public (Article 9), defence in depth of the facility (Article 11) by means of intrinsic safety mechanisms and multiple barriers (Article 16) ensuring compliance with safety functions, including the recoverability of spent fuel and radioactive waste (Article 17).

This objective is specifically developed in the *CSN Safety Instruction (IS) IS-26, "General safety requirements applicable to nuclear facilities," and IS-29, "Safety criteria at temporary spent fuel and high-level waste storage facilities."*

The latter Instruction IS-29, demands that the objective of radiation protection be taken into account in the design, construction and operation of the facility, requiring that measures be adopted in order to:

- Limit, minimise and control exposure to radiation on the part of people, the release of radioactive materials and the environment;
- Limit the likelihood of events that could cause a loss of control over any source of radiation;
- Mitigate the consequences of such events should they occur;
- Minimise the generation of radioactive waste.

In accordance with the RINR, the Safety Study to be presented with the application of the authorisation of this type of facility must demonstrate compliance with these objectives, both in normal operations and in abnormal conditions in the event of an accident.

In the specific case of ITSs located on the site of nuclear power plants, the request for their authorisation is addressed as a plant design modification. In accordance with Article 25 of the RINR, and due to the large scope of the works involved, it is necessary to obtain authorisation for the execution and assembly of the ITSs, the request for which must be accompanied by the documentation indicated in Article 27. The CSN evaluates the changes made in the Safety Studies and the Technical Functional Specifications prior to the MITERD granting the corresponding authorisation.

In a complementary manner, in accordance with the requirements of Article 80 of the RINR, the design of the casks or storage systems used at the ITSs must be approved by the MITERD, **following a mandatory and binding report from the CSN**, to which end consideration is given to the provisions of this Organisation's Instruction IS-20 Safety requirements relating to spent fuel storage casks. **Article 3.3 of this Instruction establishes the radiation protection criteria for designing spent fuel casks for use at authorised temporary storage facilities.**

It also requires that any modification to the design, testing, assessment methods, procedures or manuals of the cask that might affect radiation protection should be evaluated by the Licensee, who, in the event of the circumstances described in Article 6.1, should request authorisation for modification of the design approval.

In practice, as has been commented in previous national reports, the processes of design approval of the casks and authorisations of the ITSs existing at Trillo, José Cabrera, Ascó, Almaraz and Santa María de Garoña NPPs have taken these objectives and requirements into account. Since the process covered by the Seventh National Report, the start-up of an ITS has been authorised at Cofrentes NPP, the licensing of which has followed the same procedure as the previous ITSs. The casks used in this ITS have been designed and constructed in accordance with the same procedure as the previous ones. The casks used in this ITS, designed and manufactured by the US company Holtec International, are of the HI-STAR 150 model, also licensed during the period covered by this report.

7.2. Provisions with a view to decommissioning

As may be seen in Annex B with reference to the process for licensing facilities, Article 17 of the RINR requires that the documentation to be presented with the application for authorisation to construct nuclear facilities should include the technological, economic and financing provisions for decommissioning and closure. These provisions will likewise be developed to a greater extent in the operating permit application, in accordance with the specifications of Article 20 of the RINR.

Likewise, Article 36 of the RNSNF requires that during the phases of design, construction and operation, the Licensee must make provision for needs and take into account the activities required for the safe decommissioning of the facility. The Licensee must establish and maintain a decommissioning plan for the facility in accordance with the provisions required by the RINR.

Similarly, licensing for construction and commissioning of ITS facilities on the site of power plants themselves, considered to be a modification to the power plant design, follows the provisions set out in Articles 25, 26 and 27 of the RINR. During the period covered by the report, the following activities should be highlighted:

- Cofrentes Nuclear Power Plant has licensed and implemented an ITS to complement the capacity of its pool;
- Ascó Nuclear Power Plant has increased its storage capacity from 16 to 18 casks per slab, for a total of 36 casks;
- Santa María de Garoña Nuclear Power Plant is in the process of licensing an increase in the capacity of its ITS to allow the storage of all its fuel with a view to its total decommissioning;
- Ascó, Almaraz and Cofrentes Nuclear Power Plants are in the process of licensing ITS expansions at their sites, and Vandellós II Nuclear Power Plant, a newly created ITS, in order to be able to undertake the process of emptying the fuel pools within the deadlines required in the GRWP.

7.3. Technologies employed for the storage of spent fuel

All power plants in operation or in a situation of definitive cessation of operations have a pool for the storage of spent fuel, and this technology provides the greatest capacity for this purpose.

Furthermore, the Trillo, Ascó, Almaraz and Cofrentes plants (in operation), José Cabrera and Santa María de Garoña (in decommissioning) store spent fuel in different dry storage systems located at the ITSs authorised for this purpose:

- In the cases of Trillo, Almaraz, Cofrentes and Santa María de Garoña, the technology employed comprises dual-purpose metal casks (storage and transportation);
- The storage system employed at José Cabrera and Ascó comprises three separate components: a multi-purpose metal capsule comprising a hermetic confinement barrier, a hybrid concrete-steel storage module, which houses the capsule for long-term storage, and the transfer casks used for capsule transfer, loading and offloading operations. The system is completed with a common transportation cask planned for the future transportation of the loaded capsule to the facility, where the next management stage is performed;
- The expansion of the disposal facilities at Ascó, Almaraz and Cofrentes NPPs and the new facility at Vandellós II NPP will use a system similar to that of José Cabrera and Ascó NPPs, with a larger capacity.

Article 8. Assessment of safety of facilities

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

i. Before the construction of a spent fuel management facility, a systematic safety assessment and an environmental impact assessment appropriate to the hazard presented by the facility and covering its operating lifetime shall be carried out;

ii. Before the operation of a spent fuel management facility, updated and detailed versions of the safety assessment and of the environmental impact assessment shall be prepared when deemed necessary to complement the assessments referred to in paragraph (i).

8.1. Legal and regulatory requirements

The system of authorisations for nuclear facilities, including spent fuel storage facilities, is developed in the RINR, which includes the need to submit a Preliminary Safety Study with the construction permit (Article 17) and a Safety Study with the request for operation (Article 20). In the case of the construction of an ITS on the site of the plants themselves, these are considered to be modifications to their design and likewise require

the execution of the corresponding safety analysis, identifying changes with regard to the Safety Study for the facility, and requiring authorisation for execution and assembly, and further authorisation for the commissioning of the modification (Articles 25 and 27).

The contents of each of these safety studies, the Preliminary Safety Study and the Safety Study, are likewise detailed in the RINR, as indicated in Annex B to this report. These studies must include not only the description of the site and of the facility, but also an analysis of the foreseeable accidents and their consequences, and a radiological analytical study estimating the potential radiological impact on the population and the environment.

On a complementary basis, in accordance with the requirements of Article 80 of the RINR, the design of the storage casks used at the ITSs must be approved by the MITERD, following a mandatory and binding report from the CSN, to which end account is taken of the provisions of this Organisation's Instruction IS-20 Safety requirements relating to spent fuel storage casks. This instruction establishes the scope and content of the cask safety study and the criteria for its revision. In addition, when the cask itself or some of the components of the storage system fulfil transportation functions (as is the case of the dual-purpose cask at Trillo, Santa María de Garoña, Almaraz and Cofrentes Nuclear Power Plants, and of the casks for transportation of the MPC capsule of the storage systems at the José Cabrera and Ascó plants, respectively), the design is approved as a type B(U) transportation package model, in accordance with the international carriage regulations, following submittal of the corresponding Safety Study.

The RNSNF approved during the period covered by the previous report incorporates into Spanish law the aspects of Directive 2014/87/Euratom concerning basic nuclear safety requirements. Article 12 of said regulation requires a safety assessment of the facility (site, design and operation) in order to determine that an adequate level of nuclear safety has been attained and that the facility complies with the safety objective.

These requirements are developed in CSN Instruction IS-26 *on basic safety requirements applicable to nuclear facilities and in more detail in CSN Instruction IS-29 on safety criteria at spent fuel and high-level waste temporary storage facilities*, emphasising the principles of defence in depth, protection by multiple barriers, and passive safety, and also specifying that the objective of the safety analysis to be conducted by the Licensee is to verify the capacity of the safety-critical elements and barriers to prevent accidents and to mitigate their consequences.

According to Article 13 of the RNSNF and the aforementioned IS Instructions, nuclear power plants and spent fuel storage facilities are obliged to conduct a Periodic Safety Review at least every 10 years, to be supervised by the CSN. The objective of this Periodic Safety Review is to verify the nuclear safety of the facility and to obtain an overall assessment of its performance during the period considered, by means of a systematic analysis of all nuclear safety and radiation protection aspects. The Periodic Safety Review must:

a. Confirm that the facility continues to comply with its design specifications or establish the necessary corrective measures if it does not comply in any regard;

b. Verify the availability and validity of measures for preventing accidents and mitigating their consequences, as well as the in-depth application of the principle of defence;

c. Guarantee that nuclear safety remains at a high level during the following period;

d. Implement "reasonably feasible measures" to comply with the safety objectives of the RNSNF and the corresponding Nuclear Safety Directive 2014/87/Euratom.

Safety Guide 1.10 (Rev. 2) Periodic safety reviews of nuclear facilities includes the experience of the most recent safety reviews conducted at Spanish power plants and in other countries, IAEA safety guide SSG-25 "Periodic Safety Review for Nuclear Power Plants", the lessons learned from the Fukushima nuclear power plant accident which occurred in March 2011, the nuclear safety directives of the European Union (Council Directive 2009/71/Euratom, of 25 June 2009, and Council Directive 2014/87/Euratom, of 8 July 2014), the WENRA reference levels and the challenges associated with the ageing and obsolescence of equipment and the possible long-term operation of facilities beyond their initially planned lifespan.

In addition, the CSN has established the requirements for the management of ageing during the lifespan of design and long-term operation by means of Instruction IS-22, Revision 1, of 15 November 2017. **For the particular case of casks for the dry storage of spent fuel, Instruction IS-20 establishes as a requirement the consideration of ageing in those structures, systems and components classified as important for safety. Once the validity period provided for by IS-20 for cask design approvals has expired, this Instruction establishes the requirement to justify that the storage of spent fuel has not adversely affected the structures, systems and components of the cask. This justification is established in practice on the basis of an ageing management programme.**

Lastly, Article 15 of the RNSNF establishes the monitoring of the site conditions of facilities by means of surveillance and monitoring programmes throughout the life-cycle of the facility, the characteristics of the site and external events that could affect its nuclear safety, contextual conditions that could be affected by the potential impact of the nuclear facility and the assessment of the potential impact on the site of modifications to the facility during operation.

8.2. Application to the licensing of existing and planned facilities

The licensing of the pools associated with the design of nuclear power plants, as well as their ITSs, are integrated in the licensing of the plants themselves and are subject to the Periodic Safety Review process.

During the period covered by this national report, the Periodic Safety Reviews of Ascó and Cofrentes Nuclear Power Plants have been evaluated, with the scope indicated above, and the evaluation of the Trillo NPP Periodic Safety Review is underway. The following aspects should be stressed in relation to the safety improvements implemented at the facilities:

- **In the case of Cofrentes NPP, digitalisation of the fuel movement process, the existence of a Spent Fuel Master Plan, improvements in spent fuel storage capacity and improvements in the design of the fuel assemblies (in the channel material**

to reduce deformation during irradiation and minimise friction problems between the control rod and channel, in the inlet filters and in the design of the spacers to reduce fuel failure due to debris);

- In the case of Ascó NPP, improvements in the spent fuel storage capacity (re-densification of the ITS and plans for the construction of a full-capacity ITS);
- Improved distribution of spent fuel in the pools;
- Characterisation of fuel to dry storage;
- Optimisation of the positions occupied by waste in the pool;
- Operational experience in the management of spent fuel

During the period considered in this report, the ITS at Cofrentes NPP has been authorised to operate and the design of the storage and transportation cask for the spent fuel to be disposed of in this cask, the HI-STAR 150, has been approved. In the case of Santa María de Garoña NPP, currently, in the process of decommissioning, the assessment of the request for modification of the ITS authorisation is underway, with a view to increasing its storage capacity and allowing for the complete emptying of its fuel pool, with the operation of the ITS having begun in 2022. Likewise, Vandellós II NPP has been authorised for a design modification consisting of replacing the Boraflex racks of the spent fuel pool with compact borated steel racks (re-racking), increasing its storage capacity. Thanks to this modification, the operation is guaranteed until 2027.

Furthermore, the design approval of the ENSA-DPT cask, which is used in the ITS at Trillo NPP, has been renewed. This renewal has been issued for an additional period of 20 years in accordance with the provisions of CSN Instruction IS-20.

In addition, in keeping with the schedule for the orderly shutdown of Spanish nuclear power plants established in the PNIEC, work has been initiated during the period considered in this report to provide operating nuclear power plants with a full capacity ITS, allowing for the complete unloading of the spent fuel pools prior to the initiation of the decommissioning of the facilities. Of the nuclear power plants currently in operation, only Trillo has a full-capacity ITS, and it is necessary to complement the capacity of the existing ITSs at the Almaraz, Ascó and Cofrentes plants and to provide the Vandellós II plant with a new ITS. The corresponding requests for construction and assembly authorisations were submitted in 2023 and are currently being evaluated by the CSN.

For these new full-capacity ITSs, Enresa plans to use a single design of disposal cask corresponding to the HI-STORM FW model by Holtec International, a design that has already been licensed for use at various facilities in the United States and for which the licensing process in Spain will be initiated shortly.

In all cases, the corresponding safety studies are assessed by the CSN prior to the granting of authorisation by the MITERD, in accordance with the functions attributed to the CSN by the law creating this body, as well as the provisions of the RINR.

Subsection 9.1 contains additional details of the assessments providing the basis for the authorisations of spent fuel management facilities.

Article 9. Operation of facilities

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

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

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

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

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

v. Incidents significant to safety are reported promptly by the holder of the licence to the regulatory body;

vi. Programmes to collect and analyse relevant operating experience are established, and the results are acted upon, where appropriate;

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

9.1. Operational authorisation: limits and conditions. Operational experience

9.1.1. Introduction

The spent fuel storage pools of all power plants currently in operation were assessed and authorised within the power plants' licensing process. As a result, the design requirements and operational limits and conditions set out in the safety assessments and environmental assessments form part of the operating permits granted to the Licensees following the conclusion of the commissioning programme (pre-nuclear testing and nuclear testing programme), demonstrating that the facility as built complies with the design and safety requirements.

Aside from the pools, and as indicated in previous articles, **six individualised temporary storage facilities** (Trillo, José Cabrera, Ascó, Almaraz, Santa María de Garoña, and Cofrentes) are authorised for dry storage of spent fuel. In all cases, the authorisations have been based on the completion of a series of safety assessments. **In all of them**, a programme of pre-operational tests was carried out prior to the granting of the authorisation for their start-up.

Meanwhile, the procedures of nuclear power plants provide for analyses of internal and external operational experience, which could prompt the execution of improvement actions in terms of both design aspects and operational procedures. The reports analysed include those issued by INPO/WANO, US-NRC and suppliers.

The spent fuel operations at nuclear power plants are performed in accordance with the Technical Functional Specifications and the Radioactive Waste and Spent Fuel Management Plan (PGRRCG), both of which are mandatory documents.

The Technical Functional Specifications establish the Operational Limit Conditions, the applicability, the necessary actions and the surveillance requirements needed in order to comply with the limit conditions. They also contain the limit values for those variables that affect safety, the actuation limits of the automatic protection systems, the minimum functional conditions, the programme of revisions, calibration and inspections or periodic testing of various systems and components, and their operational control. To develop and detail the surveillance requirements of the Technical Functional Specifications, surveillance procedures are drawn up to be implemented by the various departments involved in the operation of the power plant.

The PGRRCG of a facility is intended to set out the criteria and methods ensuring that the management of radioactive waste and spent fuel generated at the facilities is safe and is optimised, taking into consideration advances in regulations and technology and bearing in mind the following:

- The origin of radioactive waste and the spent fuel record;
- The current situation at the facility, in terms of the generation, management and, where applicable, transfer of radioactive waste and spent fuel to other subsequent management stages;
- Interdependencies between the different radioactive waste and spent fuel management stages;
- The study of alternative management processes and systems, and possible improvements to them;
- Justification of the suitability of the management conducted or the desirability of implementing improvements;
- Planning of the implementation of the improvements identified. The PGRRCG is the reference document for the management of waste and spent fuel generated at nuclear facilities, both during operation and in the decommissioning and closure phase.

In particular, the Licensee of the facility will need to keep the inventory of waste and spent fuel updated, minimise generation, recycle and re-purpose the waste generated as far as technically and economically possible, and condition the final waste for handover to the authorised manager, in other words, any waste that cannot be treated in any other way under the technical or economic conditions at the time, and where reusable parts cannot be recovered.

The PGRRCG for each facility must consider the set of radiological and other hazards associated with radioactive waste and spent fuel to define comprehensive solutions. It must also take into account the functioning of liquid and gaseous radioactive waste treatment systems.

9.1.2. Periodic Safety Reviews of the Ascó and Cofrentes Pools

At the Ascó NPP Periodic Safety Review, safety factor 1, "Plant design", was reviewed in relation to aspects relating to the storage of spent fuel, and no weaknesses relating to pool storage were found. Proposals for improvement were identified regarding the need to complete the characterisation of spent fuel to address cask loading and the need to extend ITS storage in view of the pools' saturation.

Cofrentes NPP carried out a Periodic Safety Review following the methodology in accordance with CSN Safety Guide (GS) 1.10 revision 2. To this end, a systematic analysis was performed of the different aspects of nuclear safety and radiation protection at the plant, evaluating 15 Safety Factors and taking into account the standards, codes and practices applicable to the plant. Within these factors, the design of the plant was evaluated, sub-factor 6 of which is dedicated to the analysis of spent fuel management to ensure that Cofrentes NPP has an adequate strategy for the storage of spent fuel, confirming that it is stored safely and that consideration is given to the long-term operation of the plant.

On 26 March 2020, a letter was sent to the Directorate-General of Energy Policy and Mines requesting renewal of the operating permit, which was granted in March 2021 until 2030.

9.1.3. Operating experience of the ITSs in the operation of nuclear power plants

The Licensees of nuclear power plants share within the sector the experiences derived from the operation of their respective ITSs, by means of the completion and exchange of an information sheet model for each experience.

Furthermore, the terms of a future joint group between the Licensees and Enresa are being defined to track and exchange operating experience related to ITS and cask management.

9.2. Procedures for operations, maintenance, radiological surveillance, inspection and tests

Nuclear power plants have procedures in place governing the execution of the various activities connected with the operation, maintenance, radiological monitoring, and inspection of the structures, systems, and equipment comprising the spent fuel storage facilities.

The facilities have detailed inventories in place as to the fuel assemblies arranged in the spent fuel pool, with the following information regarding each of the assemblies stored:

- Identification and technical characteristics (manufacturer, model and type);
- History of burnup and burnup value attained;
- Isotopic balance of the element;
- Storage position;
- Physical status of the element, the existence of rod faults and inspections applied to the element;
- Defective rods extracted from fuel assemblies.

This information is updated at the end of each operational cycle, with the requirements of the relevant Technical Functional Specifications and the PGRRCG annual report being fulfilled.

The monthly operational report sent to the CSN contains information as to the status of pool storage and spent fuel casks and any possible changes with regard to the previous report, indicating the list of existing elements, the cumulative burnup, and the reactor discharge date.

The spent fuel storage systems are also subject to surveillance, ensuring that:

- The spent fuel temporarily held in wet or dry storage remains at all times in sub-critical conditions according to the Technical Functional Specifications;
- The storage systems in question have an appropriate residual heat extraction rate, that exposure to radiation and radioactive substances during spent fuel handling operations and during the corresponding temporary storage phase (pool or cask) remains as low as reasonably achievable (ALARA) and at all times below the regulatory limits (MPR);
- The radiation surveillance systems fulfil their design specification function.

The ITS facilities for the dry storage of spent fuel assemblies derived from spent fuel pools are designed to house fuel assemblies once they have suffered a period of decay and cooling in the pools. In order for them to function correctly, the plants in question have developed various operational, surveillance, maintenance and testing procedures, including, in particular, the procedure for the loading and handling of the casks, the sealing of the casks, transfer and offloading, along with procedures dealing with abnormal events, failures and/or malfunctions in the handling systems or equipment and the storage system.

9.3. Engineering and technical support services

Nuclear power plants have engineering and technical support services available to facilitate the fulfilment and verification of safety criteria in the spent fuel storage areas within the scope described in their Functional Regulations.

The contracts established with the suppliers and/or manufacturers of nuclear fuel provide for technical support in connection with the fuel assemblies supplied, including conveyance of the characteristics and design of the elements, their operational limits for the fuel warranty and the drawings and data that the nuclear power plant, in turn, requires as a consequence of the contract established between the plant and the companies responsible for irradiated fuel services (Enresa, irradiated fuel transportation, storage, etc.).

9.4. Notification of incident

The Technical Functional Specifications of nuclear power plants establish the conditions under which special reports must be drawn up whenever safety-relevant incidents occur in the spent fuel storage facilities.

Notifiable events are notified to the CSN and the competent governmental authorities by means of the formats set out in *CSN IS-10, establishing the criteria for the notification of events to the Council on the part of nuclear power plants*, ***revision 2***. The Special Reports will be sent to the CSN, as established in the Technical Functional Specifications.

Meanwhile, the CSN is entrusted with the inspection and control of the functioning of nuclear power plants, being entitled to conduct inspections with regard to nuclear safety and radiation protection.

9.5. Programmes to compile operational experience

Since 2008, following various incidents/events occurring at Spanish nuclear power plants in 2007 and 2008, the corresponding Licensees have committed to conducting an overall analysis of the situation at each plant to identify possible improvements and reinforce the dedication of resources in the required areas, including analysis of operational experience.

Likewise, as indicated in Article 9.1 of this report on licensing for the operation of a spent fuel management facility, nuclear power plants conduct procedural analyses of internal and external operational experience, which in some cases prompts the execution of improvement actions which could affect operational procedures or design. The documentation under analysis includes, without being confined to:

- Experiences communicated by the competent bodies in the field, namely:

  - For nuclear power plants originally designed in the USA, reports on significant events: INPO Event Report (IER) issued by the INPO (Institute for Nuclear Power Operations) and the equivalent reports issued by WANO (World Association of Nuclear Operators);
  - For the German-designed nuclear power plants, the operational experience notifications (Weiterleitungsnachricht) issued by the Nuclear Safety Society (GRS).

- Written recommendations from the suppliers, to be understood as the supplier technical bulletins (SAL, SR, RICS-IL, Technical Bulletin, etc.), as well as notifications of deficiencies in safety equipment: all notifications regarding 10 CFR 21 of the US NRC for American-designed power plants, and service and experience reports of the KWU for power plants of German origin.

Lastly, the owners of nuclear power plants conduct continuous assessments of the nuclear safety of the facility by issuing periodic reports, which must be sent to the CSN in fulfilment of the conditions of the operating permit. These periodic reports refer to a wide range of disciplines, and include both internal and external operational experience, periodically supervised by the CSN through the inspection and control of these actions on a biennial basis.

9.6. Decommissioning

As established in the RINR, approved by Royal Decree 1836/1999, Licensees must prepare and where necessary update the decommissioning plans for a radioactive facility or a nuclear facility with regard to the management of radioactive waste, using information obtained during the operational life of the facility. These plans are examined by the regulatory body.

Article 10. Disposal of spent fuel

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

As stated in the preamble of Council Directive 2011/70/Euratom of 19 July 2011, establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste, there is a broad consensus at the international level as to the option of disposal of spent fuel and high-level waste in Deep Geological Repositories (DGRs). Spain has since 1985 been working on the study into different deep disposal options, pursuing four basic operational approaches:

- The Site Search Plan (PBE) was undertaken between 1986 and 1996. This Plan concluded that the subsoil of Spanish territory contains abundant granite, clay, and, to a lesser extent, saline formations that could potentially accommodate a disposal facility. It verified the existence of a wide range of geographical locations that could, in principle, be valid. This work resulted in the Inventory of Favourable Formations to house the DGR;

- The generation of conceptual designs for a disposal facility in each of the lithological formations indicated aims for maximum convergence among the designs;
- Development of exercises to assess the safety of these conceptual designs, integrating the knowledge obtained in the work and projects undertaken on the basis of successive Enresa R&D plans, highlighting that geological storage is capable of fulfilling the safety and quality criteria applicable to this type of facility;
- The generic design and associated safety assessments for the aforementioned facility's basic and conceptual designs were also produced, adapted to a granite-type and clay-type host medium.

The knowledge acquired through these experiences is actively maintained at Enresa by means of a multidisciplinary group that reviews and updates all this documentation. These advances are held to constitute a sound basis for the launch of the forthcoming stages for the selection of the site and the implementation of the DGR. For its part, in order to harness lessons learned by other regulators in the licensing of this type of facility, the CSN maintains very close communication with the French regulatory body (ASN) on the CIGÉO project (Deep Geological Repository for high-level waste in Bure, France). Within the framework of this collaboration, a CSN expert took part in 2023 in the various communication events for the public and other stakeholders that took place in France.

It is in this spirit that Enresa has fulfilled the request set out in the Sixth GRWP to use these results to produce the following reports for consideration by the MITERD as part of the information process for the authorities:

- Irradiated fuel and high-level waste management options;
- Feasibility of new technologies: separation and transmutation;
- Generic basic projects:
  - Storage in granite formations
  - Storage in clay formations
- Experience in decision-making regarding spent fuel and high-level waste management in certain countries of the OECD.

These four documents complete the collection of knowledge, technologies and experience related to the ultimate management of spent fuel. They also form the basis for establishing the long-term management strategy.

As a new development in this area since the previous report, it should be mentioned that Spain hosted an international seminar on the Deep Geological Repository (DGR) organised by the CSN and Enresa in November 2022. The objective of the three-day meeting was to analyse the current situation in Spain in relation to radioactive waste disposal, to learn about the programmes and projects developed for deep geological disposal in Europe and to serve as a forum for technical debate and social participation. It also

served to publicise the R&D+I activities relating to this type of facility and the technical progress being made within the national programme.

In this regard, for the purposes of the 7th GRWP, the preferred and basic option is temporary storage, followed by a final storage facility that, for the purposes of economic and planning calculations, would come into operation in 2073.

The Action Plan developed on the basis of the ARTEMIS mission identifies the main actions, milestones and owners required in response to the recommendations made by the team of experts. This Plan, reflected in the 7th GRWP, includes the development of a planned roadmap, policy and action proposals and the technical programme for the DGR:

- Stage 1: Knowledge update (up to 2025)

During this stage, planned until 2025, the available technologies will be compiled and analysed on the basis of the documents indicated above, also taking into account the developments of the European Union's international R&D programmes, as well as the most advanced programmes, both in technical and sociological aspects.

At the end of this stage, Enresa will present a detailed report, including the status of the information developed and the available capacities. It will also provide the background information for the development of a legislative and procedural framework to support the DGR programme, including the site designation and licensing process.

- Stage 2: Adoption of the legislative and procedural framework (2026-2028)

In this stage, estimated to take three years, the Government will analyse the information submitted and guide the next steps based on the assessment made, particularly with regard to the site designation process. The necessary legal text regulating the site selection process and identifying the parties will be adopted in order to move forward with the following stages of the programme.

The generic technical documentation will also be submitted to the CSN for its evaluation and the establishment of limits and conditions. The operator-regulator dialogue will be initiated to define, establish and consolidate the design basis of the DGR facility, thus improving the efficiency of the licensing process.

- Stage 3: Site selection process (2029-2032)

Based on the established legislative and procedural framework, the process established will be implemented and, in light of the results, decisions on the following steps will be taken.

The results of this stage are not predictable a priori, so the process must be sufficiently flexible and reversible to allow for reformulation, according to the situation, if necessary, as set out in the established standard and/or procedure.

Where appropriate, an inventory of potential sites will be available at the end of this step and will be analysed in detail in the next step.

- Stage 4: Site analysis and selection of the final candidate (2033-2039)

This stage, estimated to take seven years, will require preliminary work to characterise the various sites, mainly using surface technologies (geophysics, boreholes, geology, geochemistry, etc.).

The evaluation of the results will make it possible to analyse the feasibility of these sites and to propose the final site. Furthermore, the detailed site characterisation plan and the underground laboratory and surface support facilities project will be submitted to the CSN for evaluation, and the processing of the environmental assessment of this project will be initiated.

- Stage 5: Site characterisation, verification of site suitability and initiation of licensing (2040-2059)

Following the designation of the selected site, detailed characterisation will be carried out during this stage, including the construction of an underground laboratory where the in-depth testing devices required to verify its suitability will be installed.

The documentation corresponding to the request for the preliminary or site authorisation, to be awarded by the MITERD following a report from the CSN, will be drawn up. The environmental impact assessment will also be carried out during this stage. Once the preliminary authorisation has been obtained, the request for the construction permit, to be granted by the MITERD following a report from the CSN, will be processed in accordance with the provisions of the standards in force on the authorisation of nuclear facilities. The total estimated duration of this stage is 20 years.

- Stage 6: Construction and operating permit (2060-2071)

Once the construction permit has been obtained, this stage will begin with the construction of the facility and procurement of the equipment. The corresponding documentation will be drawn up and submitted for application for the operating permit, to be awarded by the MITERD following a report from the CSN.

The total estimated timeframe for this phase is 12 years.

- Stage 7: Initial operation or testing (2072-2073)

With the operating permit granted, during this phase, SF and HLW will begin to be disposed of at the facility, considering a first stage of nuclear testing. It is estimated that operation will begin in 2073.

- Stage 8: Normal operation (2074-2100)

Once the initial or test operation stage has been completed, the plant will enter a phase of normal operation, until it is filled, which will be carried out taking into account reversibility criteria until the definitive sealing of the facility, which will take place as from 2100. During this period, the storage conditions will be controlled and monitored. After final sealing, the facility will be kept in a passive state under long-term institutional monitoring.

Section H. Safe management of radioactive waste

This section covers the requirements of Articles 11 to 17 of the Convention on the Safety of Radioactive Waste Management.

Article 11. General safety requirements

Each Contracting Party shall take the appropriate steps to ensure that at all stages of radioactive waste management, individuals, society and the environment are adequately protected against radiological and other hazards. In so doing, each Contracting Party shall take the appropriate steps to:

i. Ensure that criticality and removal of residual heat generated during radioactive waste management are adequately addressed;

ii. Ensure that the generation of radioactive waste is kept to the minimum practicable;

iii. Take into account interdependencies among the different steps in radioactive waste management;

iv. Provide for effective protection of individuals, society and the environment by applying at the national level suitable protective methods as approved by the regulatory body in the framework of its national legislation, which has due regard to internationally endorsed criteria and standards;

v. Take into account the biological, chemical and other hazards that may be associated with radioactive waste management;

vi. Strive to avoid actions that impose reasonably predictable impacts on future generations greater than those permitted for the current generation;

vii. Aim to avoid imposing undue burdens on future generations.

11.1. Measures to ensure maintenance of subcritical conditions and heat dissipation

The regulations governing waste management in Spain include various measures to maintain subcritical conditions and heat dissipation. *CSN Instruction IS-26, on basic nuclear safety requirements applicable to nuclear facilities*, establishes that the Licensee of the nuclear facility must analyse at least whether a series of fundamental safety functions are applicable to it: control of reactivity, extraction of the residual heat, and confinement and shielding of the radioactive material. More specifically, for temporary spent fuel (SF) and high-level waste (HLW) storage facilities, Nuclear Safety Council (CSN) Instruction IS-29 likewise lists the safety functions that such facilities must incorporate during their life cycle, both in normal operation and under abnormal or accident conditions. These are as follows: control of sub-criticality, confinement, extraction of residual heat, protection against radiation by using appropriate shielding thicknesses and materials, and recovery capacity.

At El Cabril Disposal Facility, provision has likewise been made for limitations on the content of fissionable materials as part of the acceptance criteria that waste packages must fulfill for disposal.

11.2. Measures adopted to ensure that the generation of radioactive waste is kept as low as possible

The principle of minimisation of waste production is established in Spanish law, in Article 38 of the Law 25/1964, of 29th of April, on Nuclear Energy (LNE), which requires producers to adopt appropriate measures so that the quantity and activity of waste produced is as low as possible, in accordance with the scientific practice in existence at the time in question. Waste minimisation is also, according to *Directive 2011/70/Euratom, establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste*, one of the principles which must govern waste management, and as such, this general principle is reproduced in Article 3 of Royal Decree 102/2014, completing the transposition of the Directive.

The CSN has promoted the implementation of this principle, requiring that Empresa Nacional de Residuos Radiactivos, S.A., S.M.E. (Enresa) make optimal use of its disposal capacities at El Cabril Disposal Facility. Among other measures, Enresa has worked with the nuclear power plants to determine and implement a project to reduce volume at such facilities. There has been a successful reduction in annual operating waste production figures from 1,430 m^3 registered in 1990 to approximately **576 m^3 currently generated** at all the nuclear power plants in operation. These figures are very close to the minimum levels that could technically be expected, and no notable reductions are expected in the future.

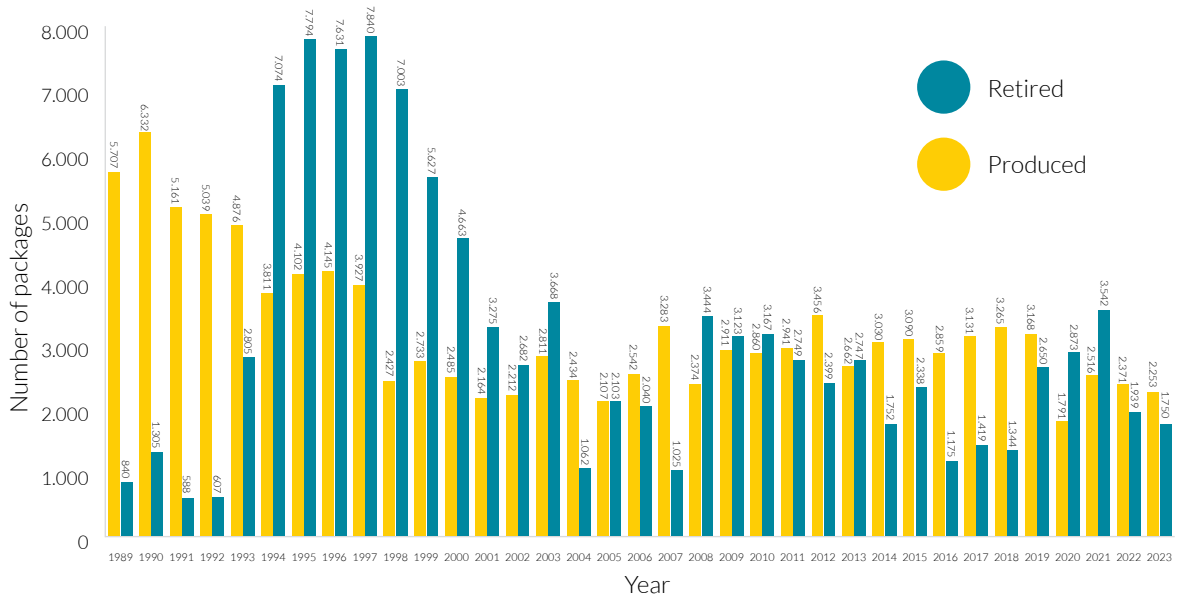

Figure 4. Packages produced at operating nuclear power plants retired annually in the period 1989-2023.

During the review of this report, several nuclear power plants renewed their operating permits for periods of time, implying entry into long-term operation (OLP). In this licensing process, the CSN has required the Licensee to demonstrate that it has the capacity for the safe and optimised management of the radioactive waste generated in the operations required for the new operating period. In order to demonstrate the safe operation of the plant during the long-term operating period, various documents are required to be submitted, including a proposal for revision of the Radioactive Waste and Spent Fuel Management Plan (PGRRCG) corresponding to the long-term operation of the plant (PGRRCG-OLP).

The PGRRCG-OLP incorporates the Licensee's actions and commitments for the ongoing improvement of radioactive waste management, with the aim of reducing its volume and radioactive content, fostering recovery and recycling, and minimising the amount of waste to be disposed of in disposal facilities such as the one at El Cabril Disposal Facility for low- and intermediate-level waste (LILW).

For the OLP of the nuclear power plants, the regulatory objective has been established of extending the current control and tracking of safety requirements relating to the reduction of the quantities of LILW to be generated by the nuclear power plants during this period and to the possibility of recovering and recycling residual materials.

To this end and within what is reasonably possible, considering the economic and technological factors involved, the Licensees of the facilities have been required by the CSN to analyse the possibilities of reducing each type of waste and incorporating all active

reduction and recovery projects into a Waste Minimisation Plan that will adopt the most appropriate periodic tracking indicators and will be associated with the PGRRCG for the OLP.

Furthermore, the Waste Minimisation Plan should incorporate an analysis of the disposal capacity available at the temporary LILW disposal facilities authorised at the facility, considering the forecasts for additional generation during the OLP and the LILW management routes during this period.

The CSN will maintain the mechanisms for the inspection and control of the activities associated with the GRWP for the OLP, based on the requirement that the Licensee submit an annual report on these activities, which should include a balance sheet on the total quantity of radioactive waste generated and conditioned for the LILW, a comparative analysis of the data with those of previous periods and an analysis of the operating experience during the year covered by the information.

The same circumstance applies to radioactive facilities as a whole, where joint efforts have similarly been made by Enresa and the owners to reduce the quantities of radioactive waste generated. Over the period 1992 to 2003, the annual volume of waste collected was reduced by half, from 140 m^3 to approximately 70 m^3. From mid-2003 onwards, as a result of the publication of ***Ministerial Order ECO/1449/2003, of 21 May, on the management of solid waste materials with radioactive content generated at Category 2 and 3 radioactive facilities in which non-sealed radioactive isotopes are handled or stored***, there was a notable reduction in the generation of waste at this category of producer. The current generation values are of the order of 15 m^3 per annum.

Meanwhile, the Licensees of nuclear facilities undertake declassification projects implementing the requirements of **CSN Instruction IS-31, and criteria for the radiological control of waste materials generated at nuclear facilities**.

In the case of power plants in operation, the Nuclear Industry Forum and the CSN have developed a methodology which applies to the declassification of four streams of materials: scrap metal, resins, activated carbon, and timber. Enresa applies the same methodology to its decommissioning projects underway, with the amounts of declassified materials generated by **31 December 2023 - 93,023 tonnes (35% earth and 65% other streams, mainly rubble and scrap) in the project for the decommissioning of José Cabrera NPP.**

11.3. Measures adopted to take into account interdependencies among the different stages of radioactive waste management

Article 4.7 of this report refers to the consideration given to interdependencies among the different stages of radioactive waste and spent fuel management as a fundamental element in Spain's legal and regulatory framework, referring to the status given to this principle under Spanish law.

The consideration given to interdependencies shapes the process of licensing nuclear facilities. For nuclear power plants, the Licensee is required to draw up and apply what is known as the Process Control Programme (PCP) and the operation of waste conditioning and treatment systems for the generation of packages compatible with the existing management channels for disposal.

With regard to Category 2 and 3 radioactive facilities for medical, industrial or research purposes, Ministerial Order ECO/1449/2003 specifies the different aspects that must be taken into account in the management of radioactive waste from such facilities.

The CSN has called on Enresa to draw up an acceptance methodology for waste at El Cabril Disposal Facility, along with a set of technical and administrative procedures. These will be required to develop practical implementation both as to the aspect of the relationship between Enresa and waste producers, and also regarding those activities that are the sole responsibility of Enresa in the acceptance of the different types of waste.

The LILW acceptance criteria were established in accordance with the ***Order of 9 October 1992 granting "Empresa Nacional de Residuos Radiactivos, Sociedad Anónima" (Enresa) the provisional operating permit for the extension of the Sierra Albarrana solid radioactive waste disposal nuclear facility***. The operating permit in force at El Cabril Disposal Facility, awarded by ***Order of 5 October 2001 granting the operating permit for the Sierra Albarrana solid radioactive waste disposal facility***, establishes that the waste acceptance criteria for this facility form part of the official operating documents. These acceptance criteria have been subsequently developed.

Enresa has established a methodology for the acceptance of LILW and VLLW (Very low-level waste) at El Cabril Disposal Facility that considers the different stages and interrelationships for their final disposal.

Radioactive waste producers at nuclear facilities are responsible for the conditioning of the packages so as to comply with the acceptance criteria. Enresa is required to verify that the packages comply with the aforementioned requirements, by means of a prior process. A surveillance system has also been established, based on documented and field controls of waste production, inspections upon handover to Enresa, together with scheduled verification tests applied to the actual packages received.

In relation to the CSN's request to Enresa to draw up specific acceptance processes contemplating the generation by the producers of final disposal units for direct disposal in the vaults

at El Cabril Disposal Facility, during the period covered by this **Eighth National Report** Enresa has continued to produce these units for a set of LILW - **high density metallic waste** - generated at José Cabrera Nuclear Power Plant decommissioning project. Until then, these processes were carried out exclusively at the Enresa facilities at El Cabril Disposal Facility.

11.4. Measures to provide for effective protection of individuals, society and the environment, by applying at the national level suitable protective methods as approved by the regulatory body, in the framework of its national legislation, which has due regard to internationally endorsed criteria and standards

Article 38 of the LGN demands that the Licensees of nuclear and radioactive facilities take appropriate steps in all stages of spent nuclear fuel and radioactive waste management to properly protect people, property and the environment against radiological risks in the present and the future.

Furthermore, *Royal Decree 102/2014, on the safe and responsible management of spent fuel and radioactive waste*, completes the legislative, regulatory and organisational framework in accordance with Council Directive 2011/70/Euratom. Article 12.3 of the aforementioned legal provision indicates that during the process of granting authorisations for radioactive waste management facilities, a demonstration or Safety Study is required for the different phases of the life-cycle of the facility, as established in the RINR. It is further indicated that the safety demonstration will be proportional to the complexity of the operations and the magnitude of the associated risks in accordance with the Instructions, circulars and guides of the Nuclear Safety Council.

At present, the regulatory framework highlights the importance of mechanisms for the direct protection of people and the environment and those regarding deferred safety since in radioactive waste management, the remaining radiological risk for people and the environment will require monitoring for lengthy periods.

During the licensing and control of El Cabril Disposal Facility, the safety criteria and principles issued in this regard by such international bodies as the International Commission on Radiation Protection and the International Atomic Energy Agency were deemed directly applicable, with the specific safety requirements established in the original regulations of the countries housing the facilities taken as a reference were also incorporated.

11.5. Measures for the consideration of biological, chemical and other hazards that could be associated with radioactive waste management

Biological, chemical and other hazards associated with radioactive waste management are governed by means of limitations on the content of substances present in radioactive waste disposed at El Cabril Disposal Facility.

In this regard, one fundamental element in the prevention of such risks corresponds to the acceptance criteria at said storage facility, including, among other restrictions, those regarding the limitation on the presence of substances the main potential risk from which is not derived from radioactivity, and those liable to generate exothermic chemical reactions. Responsibility for a declaration of the presence of toxic, chemical or biological substances in radioactive waste lies with the producers, who must minimise the generation thereof and identify such elements in order to allow Enresa to inventory the amount at the facility. Enresa works in cooperation with waste producers in order to address specific aspects of this issue.

The environmental impact statement process to which nuclear facilities are subject as part of the authorisation and licensing process is another preventive measure addressing the issue of biological and chemical risk.

11.6. Measures to avoid repercussions on future generations greater than those permitted for the present generation

Since 1985, the CSN has stipulated that the basic objective of radioactive waste disposal facilities, from the perspective of nuclear safety and radiation protection, is to ensure that radioactive waste is isolated from humanity and the environment, such that potential releases of nuclides do not give rise to unacceptable exposure by people to radiation, both for present and future generations.

The radiological criteria established by the CSN determine that the doses that individuals may receive in the future as a result of the disposal of radioactive waste will be less than or equal to those that currently guarantee an acceptable radiological impact for members of the public as a result of the operation of the licensed facilities.

Royal Decree 102/2014, on the safe and responsible management of spent fuel and radioactive waste, establishes that the object of said legislation is to regulate the safe and responsible management of radioactive waste and spent fuel so as to avoid imposing undue burdens on future generations.

The need to use passive safety systems with components whose functionality is guaranteed by physical processes not dependent on external energy sources is likewise stipulated.

Passive safety characteristics provide the basis for the design of El Cabril Disposal Facility, which is the only radioactive waste disposal facility in Spain. The disposal system, which is of the near-surface type in concrete vaults or directly on the ground, is based on interposed engineering and natural barriers providing safe containment and isolation of LILW and VLLW. Other containment technologies are also applied, including chemical barriers, by immobilising the waste within a solid, stable and long-lasting matrix, to slow down the migration of radionuclides without preventing water movement. The El Cabril Disposal Facility has a seepage control network which is required to verify the functioning of these barriers for a minimum of three hundred years after the closure of the facility.

11.7. Measures to avoid imposing undue burdens on future generations

The Spanish regulatory framework establishes, by means of the LNE, the Sixth Additional Provision of Law on Electricity Sector 54/1997 and *Royal Decree 102/2014, on the responsible and safe management of spent nuclear fuel and radioactive waste*, the specific measures for this purpose connected with the assignment of responsibilities, provision of funds to finance the activities set out in the General Radioactive Waste Plan (GRWP) and provisions with regard to requirements for institutional control.

The legislation establishes the responsibilities of the different agents involved in spent fuel management: the Spanish Ministry for Ecological Transition and Demographic Challenge (MITERD), the regulatory body (CSN), producers and Enresa, as detailed, among others, in Articles 20 and 21 of this report.

Specifically, Royal Decree 102/2014 also requires that the cost of radioactive waste management be borne by those who generated said materials so as not to impose an inappropriate burden on future generations.

With regard to this subsection, the legal framework provides for the creation, application and management and guarantee mechanisms of the economic Fund established to finance the activities of the GRWP, including spent fuel management, the details of which may be found in the Annex D. By means of the provisions of this Fund, the generator benefiting from those applications giving rise to radioactive waste pays the associated costs up until disposal.

The LNE also establishes that the State will assume ownership of spent fuel once disposal takes place, and will likewise handle any surveillance that might be required following the decommissioning of a nuclear facility, once the time period established in the corresponding authorisation has passed.

The El Cabril Disposal Facility is designed in accordance with a passive safety concept, which functions throughout its operational life and during its closure phase. Passive safety refers to the fact that after decommissioning, the facility will not depend on continuous, large-scale ac-

tive measures. Instead, it will be subject to active and passive institutional checks to underpin its safety and ensure compliance with the safety criteria specified by the regulatory authorities.

In this regard, Directive 2011/70/Euratom highlighted the ethical obligation on each Member State to avoid any undue burden on future generations with regard to radioactive waste, establishing the Community framework for this purpose in order to ensure safe and responsible management of such waste.

In line with the Directive, Royal Decree 102/2014, which completed the transposition thereof into Spanish law, has the following aim: "the regulation of safe and responsible management of spent fuel and radioactive waste derived civil activities in all stages, from generation up until disposal, so as to avoid imposing undue burdens on future generations, in addition to the regulation of certain aspects regarding the financing of such activities, thereby fulfilling the Community framework".

As a result of the above, and in accordance with Royal Decree 102/2014, the 7th GRWP must include "concepts or plans for the period after the operational phase of a disposal facility, indicating the period of time during which the relevant controls would be maintained, alongside the resources to be employed in order to preserve knowledge as to said facility in the long term".

With regard to nuclear fuel cycle radioactive facilities, the decommissioning and closure of which would not be covered by the Fund for the financing of GRWP activities, before they begin operations a financial surety or bond must be provided to guarantee their future decommissioning and the management of the resulting radioactive waste.

Likewise, authorisation for the decommissioning and closure of facilities for the disposal of spent nuclear fuel and radioactive waste, incorporated in the regulation for the licensing of facilities as a consequence of Directive 2011/70/Euratom, seeks to guarantee the long-term safety of the storage system, which will, where applicable, determine the site areas to be subject to radiological and other surveillance and control procedures, for a specified time period.

Article 12. Existing facilities and past practices

Each Contracting Party shall, in due course, take the appropriate steps to review:

i. The safety of any radioactive waste management facility existing at the time the Convention enters into force for that Contracting Party and to ensure that, if necessary, all reasonably practicable improvements are made to upgrade the safety of such a facility;

ii. The results of past practices in order to determine whether any intervention is needed for reasons of radiation protection, bearing in mind that the reduction in detriment resulting from the dose reduction should be sufficient to justify the harm and the costs, including the social costs, of the intervention.

12.1. Measures adopted to examine the safety of El Cabril Disposal Facility

Upon the Joint Convention's entry into force, the only specific facility for waste management was El Cabril Disposal Facility. Its safety is in line with all provisions of the Convention for facilities subsequent to its entry into force, with the mechanisms adopted to examine the facility's safety described in previous Convention reports remaining in force.

Article 13. Siting of proposed facilities

1. Each Contracting Party shall take the appropriate steps to ensure that procedures are established and implemented for a proposed radioactive waste management facility:

   i. To evaluate all relevant site-related factors likely to affect the safety of such a facility during its operating lifetime as well as that of a disposal facility after closure;

   ii. To evaluate the likely safety impact of such a facility on individuals, society and the environment, taking into account possible evolution of the site conditions of disposal facilities after closure;

   iii. To make information on the safety of such a facility available to members of the public;

   iv. To consult Contracting Parties in the vicinity of such a facility, insofar as they are likely to be affected by that facility, and provide them, upon their request, with general data relating to the facility to enable them to evaluate the likely safety impact of the facility upon their territory.

2. In so doing, each Contracting Party shall take the appropriate steps to ensure that such facilities shall not have unacceptable effects on other Contracting Parties by being sited in accordance with the general safety requirements of Article 11.

13.1. Forecast of new RW facilities

The final management of LILW in Spain is carried out at El Cabril Disposal Facility. The main disposal facility has been in operation since 1992, following its corresponding licensing by the authorities. **In this regard, the 7th GRWP provides for the extension of LILW disposal capacities at El Cabril Disposal Facility as the preferred scenario, in order to be able to house all the waste of this type to be generated in Spain as a result of the operation and decommissioning of existing nuclear and radioactive facilities**.

In the middle of the first decade of the millennium, new forecasts as to waste requiring management because of the decommissioning of certain nuclear power plants and possible incidents at others prompted the planning of a supplementary facility for the disposal of VLLW on the same site as El Cabril, which has been in operation since 2008.

Meanwhile, the decommissioning of José Cabrera Nuclear Power Plant gave rise to a further series of special waste elements as a consequence of the cutting of the internal reactor elements. This waste, which cannot be disposed of at El Cabril Disposal Facility, is currently held in four casks located in the ITS of the power plant, together with those housing the spent fuel. This management model is expected to be replicated at each of the nuclear power plant sites as the corresponding decommissioning projects are implemented.

Lastly, the long-term management strategy for high-level waste (HLW) and special waste (SW), in combination with the plans for spent fuel, remains in place.

13.1.1. Low-and intermediate-level waste (LILW)

The current and forecast inventory of radioactive waste generated in accordance with the scenario covered by the 7th GRWP will require an increase to low- and intermediate-level waste management capacity, currently estimated at **53,100 m^3** of conditioned waste.

The only plans made for such an increase in LILW storage capacity are at El Cabril Disposal Facility, bearing in mind that it has in place treatment and conditioning, temporary storage, waste quality verification and other ancillary systems. Meanwhile, since the installations available there for very low-level waste would continue to operate during this period, the increase in capacity at the site itself will avoid the duplication of operating costs.

To avoid any impact on operational plans and to continue the normal disposal of such waste, Enresa's analysis of the capacity of the vaults currently in place has concluded that new vaults will need to be constructed in 2028. Bearing in mind the timeframes required for design, construction, and licensing, Enresa initiated the engineering work associated with said activities in 2018.

On 14 July 2023, the CSN received a letter from the Directorate-General of Energy Policy and Mines requesting a mandatory report on the request submitted by Enresa for modification of the design of El Cabril Disposal Facility for the expansion of low- and intermediate-level waste disposal capacity through the construction of 27 new disposal vaults at the so-called Southeast Platform.

Enresa's request includes the authorisation for performance and assembly of the new Southeast LILW Disposal Platform, as well as the request for authorisation of the modification.

The administrative process to be followed will consist of first informing MITERD of the request for authorisation for execution and assembly of the modification, in accordance with Article 25.2 of the RINR. This authorisation does not modify the licensing docu-

ments. Subsequently, the application for the modification will be reported in compliance with Article 25.1 of the RINR.

As for VLLW, the supplementary installation for disposal of such waste has been authorised for four vaults (numbered as Vaults 29, 30, 31 and 32). These vaults will be progressively constructed per need, with an overall authorised capacity of around 130,000 m^3, which is deemed sufficient. Section II of Vault 29, located in above Section I (complete and closed), is currently operational.

- From 2020-2023, Section I of Vault 30 was completed and preparatory work was carried out for the construction of Vault 31.

In this regard, on 29 October 2021, Enresa submitted a request for a favourable assessment of the Construction Plan applicable to the construction of Vault 31 for very low-level radioactive waste. This request was submitted in compliance with Condition 6.4 of the Resolution of 22 July 2008 on the modification of the facility, which establishes that:

"The construction of the new vaults, already authorised for the definitive disposal of very low-level waste, must have the prior favourable appraisal of the Nuclear Safety Council. To this end, the documentation specified in the complementary technical instructions issued in this respect by the Nuclear Safety Council shall be submitted".

Complementary *Technical Instruction V of reference ADES1/CABRIL/08/03*, associated with Condition 6.4 establishes:

"At least one year in advance of the start of construction of each of the three new vaults authorised for the disposal of very low-level waste, Enresa shall submit a "Construction Plan" for the vault for favourable appreciation by the CSN including, among other aspects:

a. The operating experience of the very low-level waste disposal vaults that are or have been in operation, along with the modifications to the original design that might be deduced from this experience;

b. The Stability Study of each new vault, especially considering the design parameters relating to the risk of flooding, subsidence or landslides;

c. The Construction Programme and the Quality Control Programme to be applied during the construction of the vault".

- In July 2016, Enresa began operating Vault 30, with an estimated capacity of 50,000 m^3.

As indicated in previous reports, disposal Vault 30 was built on a natural depression in the terrain located immediately to the north of the previous VLLW disposal vault (Vault 29). Vault 30 comprises two operational sections (I and II) to house waste, one arranged on top of the other and with a downstream containment dike for each. These sections will be surrounded by berms to allow vehicles to travel around them.

During the operation of the vaults, the waste will be protected from rainwater at all times by means of a removable roof. Each section has its own leachate evacuation network, which joins at the riprap dike via the combined outflow into the control deposit located downstream of the vault. Once each disposal vault is filled, it will be closed with a final cover comprising various layers of earth, clay and gravel, along with other components and a final layer of soil.

It should be recalled that, as has been commented above, the authorisation for the construction of the vaults for very low-level waste included the construction and operation of four storage vaults numbered 29 to 32, with a storage capacity of up to 130,000 m^3 and a total surface area of approximately 10 ha. The execution and assembly were authorised by the Resolution of the Directorate-General for Policy and Mines of 14 February 2006, and the design modification by the Resolution of the Directorate-General for Policy and Mines of 21 July 2008.

13.1.2. High-level waste (HLW) and special waste (SW)

As indicated in Section B, the 7th GRWP includes an estimate of the radioactive waste in these categories that will be generated both during operation and the decommissioning of the nuclear facilities in Spain.

In this regard, the need for new facilities for the management of high-level waste is developed under Article 6.1, spent fuel being the dominant stream within this class of waste.

As regards special waste, as indicated in the introduction, consideration is given to the provision of the installations required at the nuclear power plant sites to meet the temporary disposal needs of the special waste resulting from the schedule for the orderly shutdown and subsequent future decommissioning of the plants.

In addition, the 7th GRWP includes the start-up in 2027 of a temporary storage facility at the Vandellós I NPP site to house the radioactive waste from the SF reprocessing and, where appropriate, the special waste arising from the decommissioning of the plant. This will remain operational until all the radioactive waste has been transferred to the DGR.

13.2. Criteria to assess all factors connected with the site and influencing safety

The Safety Study of El Cabril Disposal Facility took into account, among other aspects, those factors defining the acceptability of the radiological consequences of potential releases of radionuclides into the environment. These include, among others, those connected with the action of natural barriers or site characteristics that could delay or mitigate the migration of the radioisotopes.

At the time, the fundamental rule adopted established the concept of intrinsic safety, which, in terms of the site, required safety in the free usage phase to be based on the limitation of the inventory and the characteristics of the geological barrier. As a supplementary aspect, consideration was given to criteria for isolation against groundwater and surface water and the control of potential discharges in the event of the release of activity in supposed failures that such a site would be required to reveal for this type of disposal facility.

The VLLW disposal facility, operational since 2008, constitutes a modification to the initial design plans for the installation. In compliance with the Regulation on Nuclear and Radioactive Facilities, approved by Royal Decree 1836/1999, of 3 December (RINR), its construction required authorisation for modification of the existing facility. This disposal facility has, as its reference installation, the French facility, for the final disposal of very low-level radioactive waste from the Morvilliers activities, operated by ANDRA, the French national agency for radioactive waste management.

The weighting of the site characteristics takes into account the following suitability criteria, which are periodically reviewed within the context of the facility review conducted at least every ten years:

- Adequate lithological characteristics;
- Low and technically stable seismic activity;
- Known hydrogeology, which can be modelled;
- Known hydro-geochemistry;
- Topography that is gently sloping or can be flattened and is not susceptible to flooding;
- Appropriate geotechnical properties;
- Conservation of areas that could potentially be used to expand the facilities;
- Availability of sufficient information regarding the site;
- Accessibility and communication;
- Proximity to current facilities.

13.3. Criteria to assess radiological repercussions on the environment and the surrounding population

As indicated above, the El Cabril Disposal Facility received its operating licence in 1992. The Safety Study (ES) of the site conducted at the time took into account an analysis of present and future situations, events associated with the normal evolution of the storage facility, along with more improbable occurrences, such as intrusion.

The methodology for drawing up the Safety Study is based on the terms established on international forums such as the projects ISAM[7] and ASAM[8] promoted by the IAEA, the main elements being:

- The context of the study, identifying the timeframe, objectives, radiation and safety protection criteria, etc.
- The description of the system or description of the characteristics of its components: waste, operational practices, design of facilities, etc.
- The development and justification of the scenarios and the assessment thereof. These scenarios fulfil the two aforementioned objectives.
- Analysis of results.

When ministerial authorisation was granted to Enresa in 2006 for the construction and assembly of the specific VLLW disposal facility, the VLLW storage was considered to be a modification of the existing facility, and so the part concerning VLLW was incorporated within the Safety Study for the storage site, using the same criteria and methodology, with no change to the maximum radioactivity inventory authorised for the site. With a similar focus to the Safety Study conducted previously for LILW, the Safety Study for VLLW storage has two purposes:

- Formulate acceptance criteria for disposal of VLLW;
- Confirm that an acceptable level of protection for human health and the environment is achieved, both now and in the future.

13.4. Public information as to the safety of planned radioactive waste management facilities

General matters regarding public information (role of the regulatory body and other authorities, duty to inform citizens, local information committees for nuclear power plants, website, SISC, publication of planned regulations Law on Environmental impact assessment 21/2013, of 9 December, etc.) have already been addressed in Article 20.2.8 of this report, in addition to aspects regarding public participation in the decision-making process, as described in Annex B, subsection 3.

This describes the CSN's obligation to provide public access to information about nuclear and radioactive facilities. It, therefore, covers the radioactive waste generated at all such sites, including nuclear power plants, other nuclear facilities, such as El Cabril Disposal Facility, fuel

7 Improvement of Safety Assessment Methodologies for Near Surface Disposal Facilities

8 Application of Safety Assessment Methodologies for Near Surface Waste Disposal Facilities

cycle facilities, and facilities employed for the use of radioisotopes in medicine, industry, research, and teaching.

Article 14. Design and construction of facilities

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

i. The design and construction of a radioactive waste management facility provide for suitable measures to limit possible radiological impacts on individuals, society and the environment, including those from discharges or uncontrolled releases;

ii. At the design stage, conceptual plans and, as necessary, technical provisions for the decommissioning of a radioactive waste management facility other than a disposal facility are taken into account;

iii. At the design stage, technical provisions for the closure of a disposal facility are prepared;

iv. Experience, testing, or analysis support the technologies incorporated in the design and construction of a radioactive waste management facility.

VILW management facilities are located at the nuclear facilities that generate such waste themselves or at El Cabril Disposal Facility, where disposal takes place. The former were assessed and authorised as a part of the licensing process of the facilities themselves, and this article, therefore, refers only to El Cabril Disposal Facility.

14.1. Limitation of the possible radiological consequences on people, the environment and society

As indicated in Annex B to this report, with regard to licensing, the construction permit entitles the Licensee to begin construction of a facility and to apply for the operating permit. At new facilities, the application for this authorisation must be submitted to the competent authorities, enclosing a series of documents which include, in particular, the Preliminary Safety Study. The RINR establishes that this documentation must also be sent to the Autonomous Region, which is responsible for the field of territorial and environmental regulations within its territory housing the facility, as it is entitled to submit arguments regarding such matters.

According to Article 12 of the RINR, El Cabril Disposal Facility obtained its construction permit by Ministerial Order on 31 October 1989. The construction of the new supplementary facility for VLLW at El Cabril Disposal Facility, which began operations in 2008, was addressed

as a design modification (MD) of the existing facility and was executed under the aegis of the same safety criteria.

The general safety objectives defined in the design and construction of El Cabril Disposal Facility were as follows:

- Immediate protection during the operational phase, with deferred protection during the surveillance and control and free usage phases for both people and the environment;
- Allow free usage of the site within a reasonable timeframe, in other words, allow the land to be used for any purpose without limitations caused by the storage facility.

Fulfilment of these objectives requires the application of the following basic criteria:

- Isolation of the stored radioactivity from the environment (or biosphere) throughout the operational and the surveillance and control phases, thanks to the suitability of the site and the elements of the facility;
- Limitation of the activity of the radionuclides present in the storage units, such that the radiological impact would be acceptable under any foreseeable circumstances, and the residual activity would be compatible with free usage of the site.

The operating permit in force at El Cabril Disposal Facility, including that for modification of the design of the VLLW disposal facility, authorises Enresa to dispose of the disposal units meeting the acceptance criteria inside their corresponding disposal vaults, with no intention of subsequent retrieval, and to close these vaults with definitive covers. Prior to the implementation of closure, this must be favourably assessed by the CSN.

14.2. Technical provisions for the commissioning of radioactive waste management facilities

According to the regulations in force, an application for authorisation to construct any nuclear or radioactive facility must include the technological, economic and funding provisions for the corresponding process of decommissioning and closure within the documentation to be submitted. All the aforementioned aspects are defined in the RIRN, which assigns to the CSN the capacity to define the scope, content and development of the required documentation.

In the specific case of nuclear power plants, when operations end, the owners are obliged to perform preparatory activities allowing transfer of Licensee status to Enresa, so that it can begin dismantling activities.

14.3. Technical provisions for the closure of the radioactive waste disposal facility

As stated in the Fifth National Report, the RINR establishes that the authorisation for dismantling and closure will, at the time in question, be the document entitling Enresa as the Licensee of the facilities for the disposal of spent nuclear fuel and radioactive waste to begin the final engineering and other tasks required to guarantee the long-term safety of the storage system. Activities to dismantle any ancillary installations thus determined are likewise covered, ultimately allowing the limitation of those areas that must be subject to control and radiological monitoring, or any other monitoring, for a specified duration, along with releasing the remaining areas of the site from such control. The process of dismantling and closure will end with a closure declaration issued by the MITERD following a report from the CSN.

The preliminary safety study submitted to obtain the construction permit includes the systems for closing El Cabril Disposal Facility and those required to remain operational during the facility's surveillance and control phase.

At the end of the operational phase of the site, decommissioning activities will be performed in order to prepare the site for the next phase. Works will need to be completed on the storage facility and annexes (covering and water networks), evacuation and disassembly of operational installations (constructions and equipment) that are not required, along with the installation of all elements needed for the surveillance and control phase and that had not been installed.

The seepage control network, which operates during the operational phase and will remain in service during the surveillance and control phase with minimal maintenance, is designed to identify and easily locate any possible anomaly in any of the disposal vaults. To this end, the network pipelines have been installed in underground reinforced concrete galleries, which can be visited and run longitudinally beneath the vaults. They have been designed with sufficient dimensions and incline to ensure gravity drainage as far as the final control tank is concerned. Enresa will retain ownership of the land, thereby avoiding any deterioration due to uncontrolled human action and ensuring surveillance and maintenance of the covering, the water seepage control network and surveillance devices.

Prior to commencement of the surveillance and control period a specific Environmental Radiological Surveillance Programme will be drawn up, and must be approved by the authorities before closure is then performed. This Programme will be based on the experience acquired, the examinations performed and the resources employed during the operational period.

14.4. Technologies used for radioactive waste management

14.4.1. Nuclear power plants

The incorporation and development within Spanish regulations of the concept of "reference power plant" guarantees the incorporation of consolidated and proven technology without precluding the inclusion of innovations. The existing radioactive waste management facilities at nuclear power plants in Spain were designed and built as part of the plant in accordance with the standards applied at the reference power plants, originating in the United States and Germany.

The same applies to the dry storage of special waste at the José Cabrera Nuclear Power Plant in metal-concrete casks, the safety and reliability of which has been proven by international experience.

14.4.2. El Cabril Disposal Facility

At the time, the conceptual design of the disposal site was based on the experience acquired in those countries that had this type of facility in place and on the basis of establishing objectives and basic technical safety options. Following these considerations, the surface disposal model was selected, with the adoption of engineering barriers, developing a concept modelled on the French storage sites.

The auxiliary facility for VLLW, Vault 30, commissioned in 2016, takes its design reference from the prior facility built and operated by Enresa since 2008, Vault 29. The latter took into account, at the time, those facilities in operation in other countries, mainly the TFA facility in Movilliers, operated by ANDRA, the French radioactive waste management agency. **The design of Vault 31, currently in the licensing phase, is based on the design of the previous vaults (29 and 30) and incorporates certain improvements as a result of the operating experience acquired by Enresa in VLLW disposal from 2008 to the present day**.

Article 15. Assessment of safety of facilities

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

i. Before construction of a radioactive waste management facility, a systematic safety assessment and an environmental impact assessment appropriate to the hazard presented by the facility and covering its operating lifetime shall be carried out;

ii. In addition, before the construction of a disposal facility, a systematic safety assessment and an environmental impact assessment for the period following

closure shall be carried out, and the results evaluated against the criteria established by the regulatory body;

iii. When necessary to complement the assessments referred to in paragraph (i), updated and detailed versions of the safety assessment and the environmental impact assessment shall be prepared before the operation of a radioactive waste management facility.

15.1. Measures adopted prior to the construction of low and intermediate level waste management facilities

Low and intermediate waste management facilities in Spain are the temporary storage and treatment plants located at nuclear power plants, at the Juzbado Fuel Element Factory, and at the nuclear facility of the Centre for Energy-Related, Environmental and Technological Research (Ciemat). There are also systems for the treatment, conditioning, and temporary storage of waste at El Cabril Disposal Facility, both for the management of the waste produced at the site and any waste received from other external producers.

Radioactive facilities where ionising radiation applications are performed for medical, industrial and research purposes, also have appropriate infrastructure in place for the temporary storage of the waste they generate until this is handed over to Enresa.

The documents that the holder of the prior authorisation must present in support of the construction permit include a Preliminary Safety Study (Article 17(e) of the RINR).

The Preliminary Safety Study contains a description of the site and its surrounding area, with current data as to those parameters with an impact on radiation protection and safety, including demographic, ecological, land and water use factors, along with any additional data that could help establish a better understanding of the site and potentially impact on surveillance and verification plans for the aforementioned representative parameters.

The Preliminary Safety Study also contains a description of the proposed facility, which will include the criteria followed in the design of those components or systems on which the safety of the facility would depend, together with an analysis of foreseeable accidents and their consequences. The systems available for the low- and intermediate-level waste management expected to be generated form part of the aforementioned documentation.

In addition, prior to authorisation for the construction of the facility, an analytical radiological study will be conducted, along with a theoretical estimate of its potential radiological impact on the population and the environment. The results of this study will be included in the Preliminary Safety Study documentation and serve as the basis for preparation of the Pre-operational Radiological Environmental Surveillance Programme (PVRAP), which will establish the reference or radiological background level for the area under surveillance.

Annex B to this report includes detailed information as to the process of authorising facilities, including a systematic safety assessment and environmental impact assessment, in accordance with the risk raised by the facility and covering its operational life.

It should be pointed out that the CSN is in the process of revising the RINR, one of the aims pursued being the development of a process for the authorisation of nuclear radioactive waste management facilities, to compile the experience acquired with the existing regulations and specifically to incorporate those safety and radiation protection aspects deemed necessary, and for which regulations have not yet been established. In addition, with regard to facilities for the processing (treatment and conditioning) of radioactive waste, the CSN is drawing up an *Action Plan for the standardisation of safety criteria in member countries of the WENRA*.

15.2. Measures adopted prior to the construction of facilities for the disposal of low and intermediate level radioactive waste

In Spain, a facility for the disposal of low- and intermediate-level radioactive waste has been in operation since 1992, and another for the disposal of very low-level radioactive waste has been in operation since 2008, both located at El Cabril Disposal Facility. This is a nuclear facility, and so before it was constructed, it was subject to the regime of authorisations and safety assessments indicated in Section E of this report.

The information regarding the measures adopted prior to the construction of facilities for the disposal of waste remains unchanged and, therefore, corresponds to that included in the successive national reports regarding this Joint Convention, with a systematic safety assessment and environmental impact assessment being conducted for the post-closure period, the results being evaluated in accordance with the criteria established by the regulatory body.

Furthermore, *Royal Decree 102/2014*, on the safe and responsible management of spent nuclear fuel and radioactive waste, modified the RINR by establishing that, once operations have ended at the radioactive waste disposal facilities, the Licensee must apply for a decommissioning and closure authorisation, to be followed by a closure declaration by the regulatory authorities. The authorisation for dismantling and closure entitles the Licensee to perform the final engineering and other works required to guarantee the long-term safety of the storage system and any established activities to dismantle auxiliary facilities, serving to define those areas that need to remain under radiological monitoring and control or some other control for a specified time period, and the release of the remaining areas of the site from control.

As established in Royal Decree 102/2014, a CSN Instruction will serve to regulate all safety and protection aspects during closure and the subsequent control and surveillance stage, which must include the scope and content of the safety study or demonstration at each stage.

As already mentioned, the RINR is being revised. One of the aims pursued is developing the process of authorisation for nuclear facilities for the disposal of radioactive waste. This will

compile the experience acquired with the existing regulations and specifically incorporate those radiation protection and safety aspects deemed necessary for which regulations have not yet been established.

In general, and in connection with Article 15 of the Joint Convention, Article 12.3 of the aforementioned Royal Decree indicates that during the process of granting authorisations for radioactive management facilities, a Safety Study (ES) or demonstration is required for the different phases of the life-cycle of the facility, as established in the RINR. It is furthermore indicated that the safety demonstration will be proportional to the complexity of the operations and the magnitude of the associated risks, in accordance with the Instructions, circulars and guides of the Nuclear Safety Council.

As part of the regulatory documentation in the process of authorisation to obtain the construction permit for operations at El Cabril, the Licensee presented the competent authorities with the Preliminary Safety Study and the Safety Study, with the corresponding analyses and safety demonstration, taking into account the possible future evolution of the disposal system, bearing in mind mechanisms for the release and migration of radioactivity, channels for exposure by members of the public, and an analysis of radiological consequences on the human intrusion scenarios which were postulated. With regard to long-term safety assessment studies, consideration was given from the outset of the licensing process to international references as to the methodological approach to be adopted in such assessments. In particular, prior to the authorisation for construction of the facility, the safety analyses of the post-closure phase of the disposal system were conducted and progressively consolidated and fine-tuned during the licensing process associated with authorisation for operation. The study considered the safety objectives and criteria of the French standard RFS-I.2 applicable to the safety demonstration in surface radioactive waste disposal facilities.

The CSN safety guide designated as GSG-09.04: Long-term safety assessment of surface disposal facilities for low- and intermediate-level radioactive waste, likewise establishes the concept of defence in depth through a system of multiple barriers for the confinement of radioactive waste: waste conditioning matrix, disposal vaults and geological medium. The events and scenarios analysed in the safety demonstration must be based on the current situation of the disposal system and consider potential future developments, to which end an initial list must be drawn up of the Features, Events and Processes (FEP) that could affect performance and long-term safety of the facility. The safety demonstration must include criteria for the screening of FEP and must document and justify the process for the selection or exclusion of each of them.

15.3. Measures adopted prior to the operation of low and intermediate level radioactive waste management facilities

The information regarding the measures adopted prior to the operation of waste management facilities remains unchanged and was reflected in greater detail in previous national reports regarding this Joint Convention.

Royal Decree 102/201, on the safe and responsible management of spent fuel and radioactive waste, completed the legislative, regulatory and organisational framework in accordance with Council Directive 2011/70/Euratom.

In the case of radioactive waste management facilities associated with radioactive facilities other than those involved in the nuclear fuel cycle, functional authorisation is required, and the application for this must enclose a Descriptive Report, including, among other aspects, the solid, liquid and gaseous radioactive waste management systems. In this case, the application will also include a Safety Study comprising an analysis and evaluation of any risks that might result from the normal functioning of the facility or could be caused by any incident. Sufficient data will be included to allow the competent authorities to conduct an analysis of the risks of the facility, independently of the presentation made by the applicant.

Article 16. Operation of facilities

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

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

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

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

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

v. Procedures for characterisation and segregation of radioactive waste are applied;

vi. Incidents significant to safety are reported promptly by the holder of the licence to the regulatory body;

vii. Programmes to collect and analyse relevant operating experience are established, and that the results are acted upon, where appropriate;

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

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

16.1. Waste management at nuclear and radioactive facilities other than El Cabril

16.1.1. Operational authorisation: limits and conditions

The RINR, approved by Royal Decree 1836/1999, establishes the documentation that is to accompany the application for the operating permit, distinguishing between radioactive facilities and nuclear facilities, as explained in previous reports and as detailed in Annex B.

The Licensee must submit a series of reports and documentation for the regulatory control of its activities as established by the RINR and by the limits and conditions defined in the Annex to the operating permit. These reports are different in the case of nuclear and other radioactive facilities.

The management of radioactive waste at nuclear power plants is performed in accordance with the Technical Functional Specifications and the PGRRCG, both of which are mandatory documents.

Article 20 of the RINR states that all Spanish nuclear facilities must have a PGRRCG in place. In this regard, the Nuclear Safety Council (CSN) established its *Safety Guide 9.3 regarding the content and criteria for the generation of the radioactive waste management plans of nuclear facilities by the Licensees of nuclear facilities*. In its technical instructions, the CSN demanded in 2009 that all nuclear power plants adopt the radioactive waste and spent fuel management plan in accordance with the contents of the aforementioned guide.

The Technical Functional Specifications meanwhile establish the Operational Limit Conditions, applicability, the necessary actions and surveillance requirements needed in order to comply with the limit conditions. They also contain the limit values for those variables that affect safety, the actuation limits of the automatic protection systems, the minimum functional conditions, the programme of revisions, calibration and inspections or periodic testing of various systems and components, and their operational control.

In order to develop and detail the surveillance requirements of the Technical Functional Specifications, surveillance procedures are drawn up, to be implemented by the various departments involved in the operation of the power plant.

The procedures of nuclear power plants include provision for analyses of internal and external operational experience, which could give rise to the execution of improvement actions with regard to both design aspects and operational procedures. The reports analysed include those issued by INPO/WANO, US-NRC and suppliers.

16.1.2. Procedures for operations, maintenance, radiological monitoring, inspection and tests

Nuclear power plants have procedures in place to govern the execution of the various activities connected with the operation, maintenance, radiological monitoring and inspections of the structures, systems and equipment comprising the management of waste at nuclear and radioactive facilities.

The PGRRCG is intended to set out the criteria and methods ensuring that the management of radioactive waste and spent fuel generated at the facilities is safe and is optimised, taking into consideration advances in regulations and technology and bearing in mind the following:

- The existing situation at each facility in terms of the production, management and, where applicable, evacuation of waste;
- Identification of the source of the waste and the spent fuel record;
- The study of alternative management processes and systems and improvements to them;
- Justification of the suitability of current management or the need to implement improvements;
- Planning of studies for the implementation of the improvements identified.

The PGRRCG is the reference document for the management of radioactive waste generated at nuclear facilities, in both the operational and the decommissioning and closure phases, and must contain the required information to allow an analysis of existing management processes. It applies to the management of radioactive waste of whatever level of radioactivity, as well as waste materials with a radioactive content, making them eligible for declassification, which is known as special waste and spent fuel. This likewise corresponds to the objective of improving the management of waste and spent fuel generated at each facility.

The monthly operational report sent to the CSN provides information on the storage status of solid low- and intermediate-level radioactive waste, and any possible changes with regard to the previous report, indicating the list of packages generated and removed from storage.

16.1.3. Engineering and technical support services

All nuclear facilities are organised in a similar manner, with a support organisation not located at the plant and performing support functions, and the operational personnel per se, performing functions directly connected with activities at the plant. This support organisation in many cases includes sections with responsibilities associated with fuel and radioactive waste management.

Nuclear power plants also have engineering and technical support services available to fulfil and verify safety criteria in the spent fuel storage areas within the scope described in their Functional Regulations.

The context of the Periodic Safety Reviews includes a programme for the assessment and improvement of safety in terms of organisation and human factors.

The CSN has been conducting actions to verify that the processes employed by the Licensees to maintain the allocation, skills, and motivation of in-house and contractor human resources guarantee the maintenance and improvement of safety at nuclear facilities in all cases.

16.1.4. Notification of incidents

Previous reports indicated the demands of the RINR with regard to the information to be provided by the Licensee to the responsible authorities, concerning any event that might constitute an alteration in the normal functioning of the facility, or could affect nuclear safety or radiation protection.

Meanwhile, Law 15/1980, creating the Nuclear Safety Council, and the RINR itself establish the obligation for workers at nuclear and radioactive facilities to notify any event that could affect their safe functioning, protecting them against possible reprisals.

In order to provide guidance to the Licensees of nuclear power plants as to the events requiring notification in this regard, **the CSN revised its Safety Instruction IS-10 on 7 September 2023, establishing the criteria for notification of events to be provided by nuclear power plants to the Council**. Said Instruction establishes the notification criteria and sets out the notifiable events, establishing a deadline for notification of each of these to be served on the regulatory body.

On a supplementary basis, and in accordance with the RINR, nuclear facilities have an established Internal Emergency Plan, developing on the measures established by the Licensee and the assignment of responsibilities in order to deal with accident conditions so as to mitigate consequences, protect personnel at the facility, and serve immediate notice of the event on the competent bodies, including the initial assessment of the circumstances and consequences of the situation.

16.1.5. Programmes to compile operational experience

Since 2008, following various incidents/events occurring at Spanish nuclear power plants in 2007 and 2008, the Licensees have a commitment to conduct an overall analysis of the situation at each plant so as to identify possible improvements and to reinforce the dedication of resources in the required areas, including analysis of operational experience.

Furthermore, as indicated in Article 9.1 of this report on licensing for the operation of a spent fuel management facility, nuclear power plants conduct procedural analyses of internal and external operational experience, which in some cases prompts the execution of improvement actions which could affect operational procedures or design. The documentation under analysis includes, without being confined to:

- Experiences communicated by the competent bodies in the field, namely:
  - For nuclear power plants originally designed in the USA, the reports of significant events, INPO Event Report (IER) issued by the INPO (Institute for Nuclear Power Operations) or their equivalents issued by the WANO, (World Association of Nuclear Operators);
  - For the German-designed nuclear power plants, the operational experience notifications (Weiterleitungsnachricht) issued by the Nuclear Safety Society (GRS).
- Written recommendations from the suppliers, to be understood as the supplier technical bulletins (SAL, SR, RICS-IL, Technical Bulletin, etc.), in addition to notifications of defects in safety equipment: all notifications regarding 10 CFR 21 of the US NRC for American-designed power plants, and service and experience reports of the KWU for power plants of German origin.

Lastly, the owners of nuclear power plants conduct continuous assessments of the nuclear safety of the facility by issuing periodic reports, which must be sent to the CSN in fulfilment of the conditions of the operating permit. These periodic reports refer to a wide range of disciplines, and include both internal and external operational experience, periodically supervised by the CSN through the inspection and control of these actions on a biennial basis.

16.2. Management of radioactive waste at El Cabril Disposal Facility

16.2.1. Operational authorisation: limits and conditions

El Cabril Disposal Facility obtained its first provisional operating permit by ***Order of 9 October 1992, granting "Empresa Nacional de Residuos Radiactivos, Sociedad Anónima" (Enresa) the provisional operating permit for the extension of the Sierra Albarrana solid radioactive waste disposal facility***. The current operating permit, approved by ***Order of 5 October 2001, which***

grants the operating permit for the Sierra Albarrana solid radioactive waste disposal facility, is valid until the volume available for disposal in the existing vaults is completed. Furthermore, by ***Resolution of 21 July 2008, of the Directorate-General of Energy Policy and Mines, authorising Enresa to modify the design of the Sierra Albarrana (El Cabril) solid radioactive waste disposal facility for the disposal of very low-level radioactive waste***, authorised a design modification of the facility, whereby the 28 original vaults are designed to house LILW, and the four subsequent vaults, from 29 to 32, would be designed to receive VLLW, two of which are already in operation.

For the on-going safety assessment of El Cabril Disposal Facility, Enresa carries out the so-called Periodic Safety Reviews regularly every ten years. The first of these reviews was submitted in December 2003, corresponding to the operating period 1992 to 2001, and the second was submitted in November 2012, covering the following ten years for the period 2002-2011. **The third was submitted in December 2022, covering the period 2012-2022**.

The scope and content of the Periodic Safety Review correspond to the requirements of the Supplementary Technical Instruction for the authorisation of operations, including the thematic areas indicated below:

- Experience in the operation of the facility;
- Experience regarding radiation protection aspects;
- Experience regarding the methodology for the acceptance and quality of waste packages;
- Experience in the study of parameters impacting the long-term safety of the facility;
- Experience in the assessment of the long-term safety of the facility;
- Changes in regulations and standards;
- Programmes for assessment and improvements at the facility.

As indicated in greater detail in previous reports, the operating permit is granted in accordance with the mandatory updated documents listed in the RINR in force at the time in question (Safety Study, Functional Specifications, etc.), alongside the acceptance criteria for the storage units. The limits and conditions regarding nuclear safety and radiation protection established that operation of the facility will be performed in accordance with the corresponding review of these documents.

The Functional Specifications describe the general functional conditions of El Cabril Disposal Facility. One part of these conditions correspond to the limit values for certain parameters referring to the radiological capacity of disposal, permissible characteristics for waste at the facility for inclusion in the disposal units, the properties of these units and the conditions imposed on effluent discharges during the operational phase. The following are likewise indicated:

- The actions to be taken in any circumstances that are in breach of any limit conditions or value;
- The functional conditions and surveillance requirements (reviews, inspections, calibrations, etc.) to which those systems, equipment and components that are vital for safety and radiation protection are subjected.

Each of the individual treatment and conditioning activities is described in several documents referred to as Operational Instructions, which set out all activities within the scope of the Instruction, initial conditions and conditions during the operation of the system, operational requirements and limits, actions in response to anomalies, alarms and actuation modes for each of the systems at the facility, connected both with waste management and with ancillary systems.

The data obtained from operational and maintenance experience provide the basis for the organisations involved in the design of the facility and in these activities to stage periodic meetings at which improvement plans are established. These activities are governed by a procedure entitled "Design modifications procedure", establishing each of the aspects involved in this process.

16.2.2. Procedures for operations, maintenance, radiological monitoring, inspection and tests

The operating permit for El Cabril Disposal Facility from October 2001 allows the MITERD to demand the adoption of the relevant corrective actions in the light of the experience acquired in the operation of the facility, the results of other assessments and analyses in progress, and the outcome of inspections and audits. **Between 1 January 2020 and 31 December 2023, the CSN conducted 31 inspections of El Cabril Disposal Facility**.

Meanwhile, this authorisation and the aforementioned design modification authorisation establish the obligation to send the CSN reports during the first quarter of each calendar year concerning the following aspects, among others: design modifications implemented or in the process of implementation, results of the environmental radiological monitoring programme and dosimetric controls of personnel, and measures taken to analyse the applicability of new national nuclear safety and radiation protection requirements and any standards issued in this regard in countries with storage facilities that have a similar design. In this last case, aspects connected with testing and trials helping to improve knowledge of the long-term behaviour of radioactive waste are considered to be relevant.

The design modifications undertaken during the period 2020-23 include, in particular, the following:

- **Technological upgrade of the SCADA control and supervision system at El Cabril Disposal Facility;**
- **Modification of the leachate collection network in Vault 29. Adaptation of the volumetric cubing system in Section I;**
- **Adaptation of access for storage and Equipment and Components in the East Platform and improvement of VLLW, LILW and module area operation;**
- **Remote control of the bridge crane at Temporary Storage Module No. 2;**
- **Dismantling of the rail beam of Vault 25 and the mobile roof of Vault 28;**
- **Improvements to the Pump House Transformer Substation;**

- **Modification of the Active Laboratory extractions and display cabinets;**
- **Migration of the fire-fighting system in the Auxiliary Conditioning Building, Technology Building and RMTA.**

16.2.3. Engineering and technical support services

In accordance with the provisions of the RINR, the Functional Regulation contains information with regard to the list of jobs with nuclear responsibility, the organisation and functions of the personnel assigned to the facility, defining the basic training and skills development programmes.

The operational organisation is based on various organisational units dependent on Site Management, with the Manager currently answering to the Technical Division of Enresa, as indicated in the organisational chart included in Annex F.3 to this report. In turn, head office provides general technical support for the facility, via the Safety and Licensing Departments of the Technical and Engineering Directorate for LILW at the Engineering Directorate and the Logistics Department of the Operations Directorate. Furthermore, the Project Engineering Practice contracted by the LILW Engineering Department provides support for the execution and review of both the design and the technical validity of the modifications in accordance with the requirements established by the Enresa Project Manager.

16.2.4. Characterisation and segregation of waste

Enresa has a methodology in place for the acceptance of primary packages from nuclear facilities, compliance with which forms part of the Technical Functional Specifications of El Cabril Disposal Facility.

The initial operational permit for El Cabril Disposal Facility, issued in October 1992, established that the criteria for the acceptance of waste at the facility must, given their status as an official operational document, be approved by the regulatory authorities. These criteria, with minor modifications made over time, remained in force up until December 2004 and were applied to primary packages.

As indicated in previous national reports, in December 2004, the regulatory authorities approved the design modification allowing cask CE-2a to be used for the management of certain historical and non-conforming primary packages (in breach of quality objectives in terms of mechanical strength, confinement, or resistance of thermal cycles). This serves to:

- Increase the activity limit per primary package;
- Increase the acceptable dose rate limit per primary package;
- Optimise certain conditioning lines in walled packages.

Enresa was subsequently authorised to use other formats of disposal unit specifically proposed for the more efficient resolution of operational issues, requiring reference to the authorisation for 400 and 480-litre storage units of distinctive characteristics, the arrangement of

which in the vaults employees' metal racks with an identical geometry to the aforementioned CE-2a cask, later, the design and licensing of a disposal unit CE-2b, specifically designed in order better to fulfil the needs associated with solid waste management, essentially metal and heavy waste, generated in dismantling activities.

Waste management at El Cabril Disposal Facility is designed to allow the identification, monitoring and control of all waste packages at the facility, and to constantly update the inventory of activity disposed of in the vaults, allowing this to be checked at all times against the currently authorised inventory or the reference inventory.

Enresa is authorised to conduct the necessary tests and trials on LILW intended for characterisation and acceptance. The acceptance process controls are essentially process audits, production controls alongside technical verification trials, destructive and non-destructive tests, performed essentially at the laboratory of El Cabril Disposal Facility. These trials have the following purposes:

- Check the activity values against those declared by the producer and monitor scale factors for radionuclides that are difficult to measure;
- Confirm fulfilment of the package properties associated with the generation methodology;
- Ascertain significant chemical aspects for storage safety (compatibility with the cask, corrosion, etc.);
- Examine compliance with regard to the quality objectives for conditioned waste.

Meanwhile, since October 2008, Enresa has operated a specific installation at El Cabril Disposal Facility for the disposal of very low-level radioactive waste, which may be defined as solid or solidified material, mainly chemically inert or previously stabilised, and which is contaminated and/or activated, with a radioactive content of an average activity that is below certain authorised limits. As previously indicated, this waste forms a subset of low- and intermediate-level waste.

16.2.5. Notification of incidents

El Cabril Disposal Facility has a regulatory Internal Emergency Plan in place. Emergency situations are classified into three categories, none of which include the release of radioactive material in a quantity that would require the adoption of protective measures outside the site. Therefore, there is no defined Emergency level more serious than the site emergency level.

In addition to organisation under normal conditions, the Internal Emergency Plan also covers activities and organisation for the operation of the facility in emergency situations requiring special action. The baseline for emergency organisation is the operational organisation itself, although the necessary mechanisms have been established to ensure the location of these individuals at all times in accordance with an internal procedure. In all cases, a provision is made for communication with the CSN.

Meanwhile, as with other nuclear facilities, El Cabril Disposal Facility is subject to notification of events through the application of the regulations in force.

16.2.6. Programmes to compile operational experience

Periodic meetings are held in order to compile the operational experience of El Cabril Disposal Facility, at which the organisations involved in the design of the facility and in operational and maintenance activities establish the improvement plans.

The data obtained from operational and maintenance experience feed into this activity. Enresa also regularly participates in various international forums with the aim of gathering operational experience at other analogous and similarly designed facilities.

The implementation of improvements and modifications is governed by the procedure entitled "Design modifications procedure", establishing each of the aspects involved in this process.

16.2.7. Closure plans

Technical aspects for the future closure and decommissioning of El Cabril facility are developed in Articles 14.3 and 17.2.

As indicated in Article 16.2.1, the operational permit granted to El Cabril Disposal Facility by Ministerial Order on 5 October 2001 establishes that this covers its operations up until the moment when the physical capacity of the vaults authorised for LILW and VLLW has been filled, and at **31 December 2023, the facility reached 83% and 20% of its total gross authorised capacity, 100,000 m^3 and 130,000 m^3 respectively**.

With regard to the estimated date of closure, the successive reviews of the GRWP have progressively updated the estimates in terms of use of the existing remaining capacity, which is expected to be dependent on technical and technological factors associated with the amounts and characteristics of the waste to be generated, as well as external factors, essentially decisions with regard to the operational life of nuclear power plants and their decommissioning.

Article 17. Institutional measures after closure

Each Contracting Party shall take the appropriate steps to ensure that after the closure of a disposal facility:

i. Records of the location, design and inventory of that facility required by the regulatory body are preserved;

ii. Active or passive institutional controls such as monitoring or access restrictions are carried out if required;

iii. If an unplanned release of radioactive materials into the environment is detected during any period of active institutional control, intervention measures are implemented, if necessary.

According to Article 38 bis of the LNE, the management of radioactive waste, including spent nuclear fuel, is considered an essential public service owned exclusively by the State. Management thereof is entrusted to Enresa in accordance with the GRWP approved by the Government.

The State will ultimately also be transferred ownership of the spent fuel and radioactive waste once disposal has occurred, along with responsibility for any surveillance that might be required following the decommissioning of a nuclear facility, once the time period established in the corresponding decommissioning declaration has expired.

17.1. Safekeeping of documents

As Licensee of the facilities for the disposal of radioactive waste, Enresa is, according to Royal Decree 102/2014, responsible for permanent maintenance of the archive of the inventory of waste held at the radioactive waste disposal facilities. Article 9.3(e) specifies, among the functions entrusted to Enresa, the task of compiling and managing the National Inventory of Spent Nuclear Fuel and Radioactive Waste. This Inventory will include spent nuclear fuel and radioactive waste disposed of following the closure of the facility where it is held.

17.2. Closure of the radioactive waste disposal facilities

Article 12 of the RINR establishes the need for authorisation to be held for the dismantling and closure of spent nuclear fuel and radioactive waste disposal facilities.

The process of dismantling and the closure of disposal facilities will end with a closure declaration, which will ultimately define any areas that must be subject to subsequent control and radiological or other surveillance for a specified time period and the release from control of all other areas of the site.

In Spain, all facilities where radioactive waste has been stabilised and conditioned to remain on the same site correspond to radioactive facilities involved in the first part of the nuclear fuel cycle (mining tailings and process tailings from former uranium concentrate factories). The current situation of these facilities is the same as declared in the previous national report.

17.3. Institutional controls and future provisions

According to the RINR, the process of dismantling and the closure of facilities for the disposal of spent nuclear fuel and radioactive waste ends with the closure declaration. This declaration is required to define those areas that must following closure remain subject to control and radiological or other surveillance, as well as the time period during which they must remain under such control.

The GRWP also provides for, once it is approved and as established in the aforementioned Royal Decree 102/2014, the conceptual structure and planning schedule for the post-operational period of a disposal facility, indicating the estimated time period during which the relevant controls must be maintained, alongside the resources to be employed in order to preserve long-term knowledge of the facility in question.

17.4. Provisions for possible remedial intervention

Possible remedial intervention at definitive spent nuclear fuel or radioactive waste storage facilities must be provided for in any closure declarations granted. For the reasons set out above, it would seem foreseeable that the practical execution of such remedial actions or measures would be assigned in the closure declarations to those bodies or organisations given responsibility for the long-term control of said disposal facilities.

Section I. Cross-border movements

This section covers the obligations contained in Article 27 of the Convention.

Article 27. Cross-border movements

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

   i. A Contracting Party, which is a State of Origin, shall take the appropriate steps to ensure that cross-border movement is authorised and takes place only with the prior notification and consent of the State of destination;

   ii. Cross-border movement through States of transit shall be subject to those international obligations which are relevant to the particular modes of transport utilised;

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

   iv. A Contracting Party, which is a State of Origin, shall authorise a cross-border movement only if it can satisfy itself in accordance with the consent of the State of destination that the requirements of subparagraph (iii) are met prior to cross-border movement;

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

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

3. Nothing in this Convention prejudices or affects:

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

   ii. Rights of a Contracting Party to which radioactive waste is exported for processing to return, or provide for the return of, the radioactive waste and other products after treatment to the State of Origin;

   iii. The right of a Contracting Party to export its spent fuel for reprocessing;

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

27.1. Regulatory development

As already described in previous national reports, Council Directive 2006/117/Euratom, of 20 November 2006, on the supervision and control of shipments of radioactive waste and nuclear fuel, established the Community framework for the supervision and control of cross-border shipments of radioactive waste and spent fuel. Said Directive was transposed into the Spanish legal system by means of *Royal Decree 243/2009, of 27 February 2009, governing the supervision and control of transfers of radioactive waste and spent nuclear fuel between Member States, or from or to outside the Community.*

The Royal Decree likewise establishes the format for the uniform document defined in Commission Decision 2008/312/Euratom of 5 March 2008, which must be completed for a transfer request.

Royal Decree 243/2009 does not apply to transfers of disused sources to a manufacturer or supplier of radioactive sources or a recognised facility, to transfers of radioactive material recovered through reprocessing in order to be used, or to cross-border transfers of waste containing only natural radioactive material and not resulting from operational practices.

The authorisations covered by this Royal Decree do not replace any of the specific national requirements applicable to such transfers, for example, those regarding specific authorisations for transportation, physical protection, civil protection, etc. Royal Decree 243/2009 was partially modified by the second final provision of *Royal Decree 102/2014, of 21 February 2014, for the safe and responsible management of spent nuclear fuel and radioactive waste.*

Meanwhile, Royal Decree 102/2014 establishes that radioactive waste generated in Spain will be disposed of in the country unless, at the time of transfer, an agreement taking into account the criteria established by the Commission in accordance with Article 16.2 of Directive 2006/117/Euratom has taken effect between the Spanish State and another Member State or a third country, and where the object is the use of a disposal facility in one of the countries.

This requirement will not apply to the repatriation of disused sealed sources sent to a supplier or manufacturer and the transfer of spent nuclear fuel from research reactors to a country supplying or manufacturing research reactor fuel, taking into account the applicable international agreements.

If this case arises, prior to the definitive transfer for disposal of radioactive waste to a country that is not a Member State of the European Union, the natural or legal person responsible for the waste shall serve notice of the circumstance on the Directorate-General for Energy Policy and Mines of the Spanish Ministry for Ecological Transition and Demographic Challenge (MITERD), in order for it to inform the European Commission of the contents of said agreement, and to adopt reasonable measures in order to ensure that:

- The destination country has an agreement in force with the European Atomic Energy Committee covering the management of spent nuclear fuel and radioactive waste or is party to the Joint Convention on the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management;
- The destination country has disposal and management programmes in place for radioactive waste the objectives of which represent a high level of safety and are equivalent to those established by Directive 2011/70/Euratom, establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste;
- The disposal facility in the destination country has been authorised to receive the transfer of radioactive waste, is operational prior to the transfer, and is managed in accordance with the requirements established in the radioactive waste disposal and management programme of said destination country.

27.2. Experience in Spain

From January 2020 to 31 December 2023, the following procedures have been conducted with regard to cross-border shipments within the scope of the application of Directive 2006/117/Euratom:

- **2020. Shipment from France to a Spanish nuclear power plant of radioactive waste derived from the decontamination of primary circuit pump motors;**
- **2021. Shipment from Sweden of waste resulting from the treatment of liquid waste generated in the chemical cleaning of the secondary steam generator of a Spanish nuclear power plant;**
- **2021. Shipment from Sweden of ingots and secondary waste resulting from the melting of a Spanish nuclear power plant heater;**
- **2021. Shipment from Belgium to a Spanish nuclear power plant of radioactive waste resulting from the cleaning operations of the primary circuit pump motor. Four separate dossiers with the same characteristics have been processed;**

- 2023. Shipment from Sweden of ingots and secondary waste resulting from the melting of a Spanish nuclear power plant heater.

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Section J. Disused sealed sources

This section covers the obligations contained in Article 28 of the Convention.

Article 28. Disused sealed sources

1. Each Contracting Party shall, in the framework of its national law, take the appropriate steps to ensure that the possession, remanufacturing or disposal of disused sealed sources takes place in a safe manner;

2. A Contracting Party shall allow for re-entry into its territory of disused sealed sources if, in the framework of its national law, it has accepted that they be returned to a manufacturer qualified to receive and possess the disused sealed sources.

28.1. Steps to ensure that possession, remanufacturing or disposal take place in a safe manner

28.1.1. Obligation of administrative authorisation for the possession or remanufacturing of radioactive sources

The Law 25/1964, of 29th of April, on Nuclear Energy (LNE) establishes in Article 31 that radioactive materials may not be used or stored within national territory by persons who are not explicitly authorised for this, and indicates that the same requirements will be imposed for the transfer or resale thereof.

This legal requirement is developed in the Regulation on Nuclear and Radioactive Facilities (RINR), approved by Royal Decree 1836/1999, of 3 December 1999. Article 36 of this standard establishes that radioactive facilities for scientific, medical, agricultural, commercial or industrial purposes will require functional authorisation, a decommissioning declaration and, where applicable, authorisation for any modification or change of Licensee.

Article 34 of the aforementioned Regulation establishes that radioactive facilities will be understood as facilities of any class containing a source of ionising radiation, in addition to premises, laboratories, factories and installations that produce, use, possess, process, handle or store radioactive materials.

These requirements apply irrespective of whether the radioactive sources or materials are new or are spent or in disuse.

As a result, possession or remanufacturing of any radioactive source or material in Spain requires administrative authorisation. In the licensing process that the Licensee must follow to obtain this authorisation, the Licensee is required to issue a mandatory report on nuclear safety and radiation protection, following verification that the Licensee will design and operate the radioactive facility in compliance with the applicable safety and radiation protection standards and requirements. The corresponding authorisations, which are issued by the Spanish Ministry for Ecological Transition and Demographic Challenge (MITERD) or by the competent bodies of the Autonomous Regions in those cases in which these competences have been transferred, are accompanied by the operating technical specifications on safety and radiation protection established for this purpose by the CSN.

The documentation that they are required to submit in order to obtain these authorisations includes a document on the forecasts for decommissioning of the facility, in which they are required to report on agreements with suppliers for the safe management of disused sources, including the economic coverage established for this purpose.

28.1.2. Importing of radioactive sources

In Spain, there are no facilities for the manufacturing or production of sealed radioactive sources. Therefore, all sources of this type are imported from other countries. Article 74 of the RINR establishes that the import, export and intra-Community movement of radioactive materials shall be carried out in compliance with the international commitments assumed by Spain in this field.

In the case of sources originating in a Member State of the European Union, a system of notification of transfers of sources to the authorities of the recipient country and acceptance by the latter is applied, in accordance with the provisions of Regulation 1493/1993/Euratom, on the transfer of radioactive substances between Member States.

In the case of sources originating in or destined for countries outside the European Union, the Code of Conduct on the Safety and Security of Radiation Sources and, more specifically, the Supplementary Guidance on the Import and Export of Radioactive Sources apply. This Guidance provides for a regime of prior consent by the Regulatory Authority of the importing country for the shipment of any Category 1 source, as well as prior notification of the effective date of shipment. For Category 2 sources, only a notification prior to the effective date of shipment is required. In Spain, the CSN has been designated as the point of contact for communications deriving from the application of the aforementioned Regulation and its supplementary guide.

28.1.3. Marketing of radioactive sources

In accordance with the aforementioned Article 74 of the RINR, the commercialisation of radioactive sources requires authorisation by the Directorate-General of Energy Policy and Mines (DGPEM), following a report from the CSN. In any event, those commercialisation companies that, due to their activities, need an authorised radioactive facility may request a single authorisation. CSN Instruction IS-28, of 22 September 2010, on the operating technical specifications to be met by Category 2 and 3 radioactive facilities, establishes the obligation for supply companies to have the appropriate agreements in place with the original manufacturer or supplier for the return of disused radioactive sources collected from their clients. When this is not possible, they shall transfer the sources to an authorised company for their management as radioactive waste.

28.1.4. Control and inspection function of the CSN at authorised facilities

As the sole body with responsibility in Spain for the field of nuclear safety and radiation protection, in accordance with Law 15/1980, of 22 April 1980, establishing the CSN, it is responsible for the control and inspection of authorised nuclear and radioactive facilities.

In the exercise of these functions, when it encounters situations involving radioactive sources or equipment in disuse, the CSN urges the Licensees of the facilities to remove them in accor-

dance with the channels provided for in the regulations, and supervises the performance of these actions.

In 2014, the CSN established a Protocol that systematically groups together all the means and tools available to the CSN and Spanish regulations to detect facilities with viability problems, whether due to economic problems or any other cause, to identify the risk of each specific situation and to act in a timely and appropriate manner. Previously, in 2013, the CSN issued an Instruction to all Licensees of radioactive facilities housing sealed radioactive sources to require action in the event of viability problems and, if they were not capable of adequately maintaining safe control of the radioactive sources, the requirement to transfer them to a reliable entity: another authorised Licensee, the supplier or Empresa Nacional de Residuos Radiactivos, S.A., S.M.E. (Enresa). The Protocol was applied in a pilot phase in 2015 and 2016, to be formally implemented in 2017.

28.1.5. Particularities regarding the management of high-activity sealed sources

In December 2003, the Council of the European Union approved Directive 122/2003/Euratom on the control of high-activity sealed radioactive sources and orphan sources. This Directive, repealed by *Directive 2013/59/Euratom of 5 December 2013 laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation, and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom*, was transposed into Spanish national regulations by means of Royal Decree 229/2006, of 24 February 2006, on the control of high-activity sealed radioactive sources and orphan sources, the provisions of which regarding orphan sources were repealed by Royal Decree 451/2020, of 10 March 2006, on the control and recovery of orphan sources, while those provisions relating to high-activity sealed sources will remain in force.

The aforementioned Royal Decree 229/2006 includes specific requirements regarding the control of high-activity sealed sources and the management of disused sources. Article 5 of said Royal Decree indicates that before the authorisation procedure is completed prior to the commissioning of the radioactive facility, the authorisation of which includes a high-activity source, the possessing parties must arrange with the supplier the relevant agreements for the return thereof once it is disused, and establish a financial guarantee to cover its safe management at that time, even in the event of insolvency, cessation of operations, or any other contingency that might arise.

Article 7 of the same Royal Decree establishes the obligation of the holders of radioactive sources to keep an inventory sheet for each of the sources under their responsibility, indicating their location and transfers, and to submit a copy of these records to the CSN and MITERD. They must also submit a copy of this sheet specifically in the event of any change in the location or, where appropriate, in the habitual storage of the source; they must also communicate immediately and when the inventory sheet of a given source is closed, the identification of the new holder or the recognised installation to which it has been transferred.

As an additional measure, this article requires the Nuclear Safety Council to maintain an updated national inventory of authorised holders and the sources they possess. To this end, a computer application is available at the CSN virtual office in which the Licensees of the facilities upload the inventory sheets of high-activity sealed sources, thus facilitating the task of reporting data and allowing the CSN to keep the national inventory of radioactive sources and authorised holders up-to-date.

Article 8 of the aforementioned Royal Decree establishes that the possessor shall return all disused sources to the supplier and must, to this end, arrange the relevant agreements with said party in advance or transfer the source to another authorised possessor or a recognised facility without unjustified delay once it is no longer in use. Lastly, this standard includes requirements regarding the identification and marking of sources and personnel training.

28.1.6. Disposal planned for disused radioactive sources

The provisions adopted in Spain regarding the disposal of disused radioactive sources vary depending on the different situations that might arise.

In the case of radioactive sources for which the Licensee has authorisation as a radioactive facility, *CSN Instruction IS-28, on the technical functional specifications to be fulfilled by radioactive facilities*, establishes that the Licensee will return all disused sources to the supplier, to which end, it must arrange the relevant agreements with said party in advance, or transfer possession thereof to another authorised Licensee. If the above alternatives are not possible, the sources shall be transferred to an authorised entity for management as radioactive waste.

Likewise, the aforementioned *Royal Decree 229/2006, on the control of high-activity sealed radioactive sources and orphan sources*, requires that before the authorisation procedure is completed prior to the commissioning of the radioactive facility, the authorisation for which includes a high-activity sealed source, the possessor must:

a. Arrange the relevant agreements with the supplier for the return of the disused source;

b. Establish a financial guarantee to cover the safe management of the source once it becomes disused, even in the event of insolvency, cessation of operations, or any other contingency that the supplier of this type of source might undergo.

As has been pointed out above, there are situations in which the Licensee of a facility authorised for the possession and use of radioactive sources is unable to return them to the supplier at the end of their service lifetime (for example, due to the latter having entered into insolvency proceedings or bankruptcy). In these cases, the technical operating specifications associated with the authorisations establish that the Licensee should contact Enresa for removal and management of radioactive waste. In this case, it is Enresa that, on the basis of the rules governing its activity, is responsible for the management of radioactive sources and for providing a final destination for them in accordance with the applicable regulations.

28.1.7. Management of orphan sources

In the case of orphan radioactive sources, i.e. sources that are outside the regulatory control system, either because they have never been or because they have been abandoned, lost, misplaced, stolen or otherwise transferred without due authorisation, the actions to be taken are those established in Royal Decree 451/2020, of 10 March, on the control and recovery of orphan radioactive sources. The purpose of these actions will be the removal of the radioactive material by Enresa. This removal will require specific authorisation by the MITERD, following a report from the CSN, in accordance with the provisions of Article 74 of the RINR and Article 13 of the aforementioned Royal Decree 451/2020.

A special case within the group of orphan sources is that of those detected at facilities used for the recovery, storage or handling of metallic materials for recycling. The actions for the safe management of these sources are established in Royal Decree 451/2020 and in the Protocol for Collaboration on the Radiological Monitoring of Metallic Materials, signed by companies in the iron and steel industry, the MITERD, the CSN, Enresa and the social stakeholders. Adherence to the aforementioned Protocol is voluntary, but many of the commitments acquired by adhering to it have become obligatory following the approval of Royal Decree 451/2020. At any event, this Royal Decree establishes that the actions to be carried out by facilities adhering to the Protocol will continue to be carried out within the framework of the Protocol.

Both the Protocol and Royal Decree 451/2020 establish an obligation on the Licensees of the aforementioned facilities to have in place a radiological monitoring and control system. In the event of the detection of radioactive material, authorised radiation protection technicians must be notified, to identify the radioactive isotope and its activity, and maintain the material in a safe situation until it is collected by Enresa.

As regards the assumption of the management costs of these orphan sources, the Protocol establishes that when the radioactive source is of national origin, it will be managed as radioactive waste by Enresa, which will assume the costs. In the event that the source detected among the metallic materials is not of national origin, the costs deriving from its management will be borne by the affiliated companies, without prejudice to their passing them on, where appropriate, to the supplier or shipper of the metallic materials to be recycled.

For companies not adhering to the Protocol, the costs of management of orphan sources will be borne as established in Royal Decree 451/2020. This establishes that the costs will be borne by the last possessor of the source if this party can be identified, and if not, the costs will be borne by the operator or, in default thereof, the Licensee of the facility where the source was detected, without prejudice to those circumstances in which the costs may be charged to the Fund for the financing of the activities of the General Radioactive Waste Plan (such as for example, the management of radioactive lightning conductor heads).

Another special case is that of Ra-226 needles for medical use that were used in Spain prior to the development of the current regulations governing authorisations for the possession and use of radioactive sources and materials. These sources ceased to be used many years ago and have been the subject of specific campaigns aimed at their recovery, removal and management by Enresa. The costs of this management have been borne by the Enresa fund at

no cost to the holders. The collection and removal campaign is now considered to have been completed after several years without any new waste appearing.

28.1.8. Management in safe conditions in all cases

The possession, usage, transfer and disposal of radioactive sources in safe conditions in all cases referred to in the above paragraphs is guaranteed since the various entities involved in these processes are obliged to comply with the provisions of ***Regulation on health protection against the dangers from exposure to ionising radiation, approved by Royal Decree 1029/2022, of 20 December***. This Spanish regulation includes requirements on safety and radiation protection equivalent to those included in the international rules on radiation protection and on the safety of radiation sources, of the IAEA, and of Directive 2013/59/Euratom, **part of the set of national regulations transposing the aforementioned directive**.

In April 2004, Spain informed the Director General of the IAEA of its commitment to apply the Code of Conduct for Technological Safety and Physical Safety of Sources of Radiation, which in fact, constitutes a reinforcement of the measures to maintain effective control over sources of radiation from manufacture up until disposal at an authorised facility. These measures are set out in the national regulations governing safety, radiation protection, management of radioactive waste, transportation and control of radioactive sources.

Spain likewise informed the Director General of the IAEA in 2017 of its commitment to apply the Guidance on the import and export of radioactive sources published by said Agency as a development of the aforementioned Code of Conduct, having designated a national point of contact for the exchange of applications for consent for transfers of sources, and notifications of shipments thereof.

Lastly, Spain notified the Agency in June 2019 of its support for the Guidance on the management of disused radioactive sources, registering its intention to continue acting in accordance with this Guidance, and to use it as supplementary information in the application of the aforementioned IAEA Code of Conduct.

Lastly, Spain informed the Agency in June 2019 of its adherence to the Guidance on the management of disused radioactive sources, registering its intention to continue acting in accordance with this Guidance, and to use it as supplementary information in the application of the aforementioned IAEA Code of Conduct.

It should likewise be noted that, by virtue of ***Royal Decree 1308/2011, on the physical protection of nuclear facilities and materials and radioactive sources***, a system of physical protection has been established, which: a) provides protection against robbery, theft or other unlawful appropriation of nuclear materials with radioactive sources during their usage, storage and transportation; b) guarantees the application of appropriate measures to locate and, where applicable, to recover lost or stolen nuclear material or radioactive sources; c) protects against sabotage or any other unlawful action that may have radiological consequences or threaten or alter the normal functioning of facilities; and d) mitigates the radiological consequences of an act of sabotage...

With regard to radioactive sources, said Royal Decree establishes a classification based on the activity and hazardousness of a series of radionuclides, and for those attaining a certain Category (1, 2 and 3) and imposes a series of requirements; basically, whoever uses them must have a Physical Protection Plan authorised by the MITERD, following a favourable report from both the CSN and the Ministry of the Interior. This Physical Protection Plan will be based on verifying that the applicant has an adequate security system in place, regarding both material resources and the organisation and protocols for the operation, monitoring and custody of radioactive material.

Lastly, CSN Instruction IS-41, *approving the requirements for the physical protection of radioactive sources*, develops the requirements of the aforementioned Royal Decree 1308/2011, aligning Spanish regulations in this field with Nuclear Security Series No. 11 Security of Radioactive Sources of the IAEA. The standard establishes the basic functions of the radioactive source physical protection system (dissuasion, detection, delay and response), the organisation and management of safety.

28.2. Readmission of disused sealed sources into spanish territory

As previously mentioned, Spain currently does not have any facilities for the manufacture or production of sealed radioactive sources.

Section K. General efforts to improve safety

K.1. Measures adopted in connection with the challenges and suggestions identified at the SEVENTH joint convention review meeting

During the period covered by this report, Spain continued to work on those challenges and suggestions identified at the Seventh Convention Review meeting, as summarised in Section A.2.

K.2. Possible areas for improvement and planned activities to improve safety

This Eighth National Report sets out the situation in Spain with regard to the management of spent fuel and radioactive waste within the context of the safety requirements established in the Joint Convention. In light of the information provided in the treatment of each article and the appraisal of compliance, it may be asserted that, in general, the Spanish system continues to comply with the requirements of the Convention.

Nonetheless, bearing in mind the inherent nature of safe management of radioactive waste and spent fuel, efforts continue to improve the legal and regulatory framework, along with other areas that have been identified, as indicated below, where progress is expected to be achieved in the short and medium term:

K.2.1. Regulatory development regarding the safe management of spent fuel and radioactive waste

As indicated throughout this report, those aspects where efforts will be maintained in order to continue completing the legal and regulatory framework regarding the long-term management of spent fuel and radioactive waste are:

- Complete the transposition into national legislation of *Council Directive 2013/59/Euratom, of 5 December 2013*, laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation, and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom; mainly through the approval of the new Regulation on Nuclear and Radioactive Facilities (RINR);
- Development by Royal Decree of the amendment to Law 25/1964, of 29th of April, on Nuclear Energy, (LNE) in relation to radiologically contaminated soils.

K.2.2. Expansion of capacity at El Cabril Disposal Facility

As indicated in Section B.5 and in Article 13, the licensing of a capacity extension of El Cabril Disposal Facility for radioactive waste is planned for the coming years.

K.2.3. Progress in the implementation of the main strategies defined in the Seventh General Radioactive Waste Plan

As has been set out in this report, in Article 6.1 and Section B.4, the Seventh General Radioactive Waste Plan (GRWP) establishes that Decentralised Temporary Storage (DTS) facilities provide an adequate timeframe for the development of the final disposal solution, allowing sufficient time for the design, licensing, construction and start-up of the future Deep Geological Repository (DGR).

In this regard, the GRWP provides that the seven sites with spent fuel (SF) - Almaraz, Ascó, Cofrentes, Santa María de Garoña, José Cabrera, Trillo and Vandellós II - will have a DTS with sufficient storage capacity to house all the SF, high-level waste (HLW) and special waste (SW) generated during the operation and decommissioning of each plant, along with the resources required for their operation until their transfer to the DGR.

As has been explained above, the DTS of each plant will be made up of its Individualised Temporary Storage (ITS) or, where appropriate, its ITSs, plus a new complementary facility or additional measures allowing maintenance and repair operations to be performed on its casks, guaranteeing the safety function of recoverability at cask level.

In order to ensure full capacity, Empresa Nacional de Residuos Radiactivos, S.A., S.M.E. (Enresa) has programmed the construction of new ITSs complementary to the current ones at Ascó, Almaraz and Cofrentes Nuclear Power Plants, with operation scheduled to begin in 2026. A new ITS is also scheduled to start operating in 2026 at Vandellós II, the only plant without dry storage.

In the meantime, it is expected that, as can be seen in Article 10, progress will be made on the first stage of the DGR roadmap, "Updating knowledge", and will continue towards the second stage "Adoption of the legislative and procedural framework".

K.2.4. Financing of the Fund for the financing of the activities of the Seventh General Radioactive Waste Plan

Article 38 *bis* of the LNE establishes that the management of radioactive waste, including spent fuel, and the dismantling and closure of nuclear facilities constitutes an essential public service reserved for the State, in accordance with Article 128.2 of the Spanish Constitution. This same article commissions Enresa with the management of this public service, in accordance with the GRWP approved by the Government.

In addition, the same article provides that "The State shall assume ownership of radioactive waste once it has been disposed of. Likewise, it shall assume whatever monitoring might be required following the decommissioning of a nuclear facility, once the period of time established in the corresponding declaration of decommissioning has elapsed".

For the financing of these activities, the Sixth Additional Provision of the Law on Electricity Sector 54/1997, of 27 November, relating to the Fund for the financing of the activities of the GRWP, declared in force by the Law on Electricity Sector 24/2013, of 26 December, establishes, in the wording given by *Act 11/2009, of 26 October, regulating Listed Property Market Investment Companies*, a system of four non-tax public economic contributions for the services rendered by Enresa. In application of the foregoing, since 1 January 2010, the date from which this amendment came into effect, the aforementioned Fund for financing the activities of the GRWP has been fed by these four non-tax public economic contributions.

The calculations of the collection required to finance the services provided by Enresa have varied due to real inflation in 2021, 2022 and 2023, which is clearly higher than the rates considered in the calculations that, in 2019, served as the basis for the modification of the fixed unitary tariff by *Royal Decree 750/2019, of 27 December, which amends the fixed unitary tariff relating to the non-tax public economic contributions through which the service of Empresa Nacional de Residuos Radiactivos S.A., S.M.E., (Enresa) is financed to operate nuclear power plants*.

It is, therefore, appropriate to revise the fixed unitary tariff, as the main element determining the calculation of the fee for this economic benefit, in order to take into account the variations in the estimates of future costs mainly deriving from the approval of the

7th GRWP. Taking into account the foregoing, and in compliance with section 9/5) of the Sixth Additional Provision of Law 54/1997, of 27 November, Enresa has submitted to the State Secretariat for Energy an updated economic-financial report on the cost of the activities provided for in the GRWP.

In order to carry out the aforementioned review, the Government plans to process a draft of a new Royal Decree in the near future, modifying the fixed unitary tariff relating to the non-tax public economic contributions through which the service provided by Empresa Nacional de Residuos Radiactivos, S.A., S.M.E. (Enresa) to operate nuclear power plants is financed.

K.3. Information on the strengths of the national radioactive waste and spent fuel management system in Spain within the context of the joint convention

K.3.1. Experience acquired in nuclear power plant decommissioning projects

The partial decommissioning carried out at Vandellós I NPP and the full decommissioning of José Cabrera NPP, which has been underway since 2010, have made it possible to place Spain among the group of countries with comprehensive experience in this area. The performance of the José Cabrera NPP decommissioning project has been made possible due to the existence of the technical, administrative, institutional and business infrastructure in the country, to guarantee the financing of the costs, the application of the technologies required and the suitable management of the radioactive waste generated, including its final disposal.

An obvious lesson from experience to date is the need for an anticipated and planned strategy for the future decommissioning of the nuclear power plant during its operating period, demonstrating the feasibility and safety with which such decommissioning can be undertaken. This planning includes not only technological and economic-financial aspects of the activities to be carried out, but also the planning of organisational aspects, the management of waste materials and even the planning of the political and social aspects that might be affected by decommissioning.

Planning must start in the design and construction phase of the nuclear power plant, continue throughout its operating lifetime and be in a position to be implemented immediately after the definitive cessation of operations.

The recent Council Instruction IS-45, on safety requirements during the design, construction and operation phases of nuclear facilities in order to plan their future decommissioning, includes in the Spanish regulations the need to plan the decommissioning of nuclear power plants sufficiently in advance of the end of their operating life.

In addition, the experience described in Section D.5 and Article 26 has allowed for the development of a set of different types of capacities that are now fully available. This accumulated experience, both in organisational and documentary aspects and in interactions with the Nuclear Safety Council (CSN) and other authorities involved, will be key for the planning and performance of the rest of the decommissioning activities and, particularly, for the decommissioning of Santa María de Garoña NPP, in definitive shutdown since August 2017 and in the decommissioning process since July 2023.

The experience acquired in the integration of decommissioning activities and waste management, in the technologies applied for the dismantling of the major components and in the volume reduction practices implemented will be highly relevant in the planning and performance of future decommissioning projects.

K.3.2. Management of radioactive waste in the long-term operation of nuclear power plants

As has been explained in Articles 9.1.2 and 11.2, during the period of review of this report, several nuclear power plants have renewed their operating permits for periods of time implying entry into long-term operation (OLP). In this licensing process, the CSN has required the Licensee to demonstrate that it has the capacity for the safe and optimal management of the radioactive waste generated in the operations required for the new operating period. In order to demonstrate the safe operation of the plant during the long-term operating period, various documents are required to be submitted, including a proposal for revision of the Radioactive Waste and Spent Fuel Management Plan (PGRRCG) corresponding to the long-term operation of the plant (PGRRCG-OLP).

The PGRRCG-OLP incorporates the Licensee's actions and commitments for the ongoing improvement of radioactive waste management, with a view to reducing its volume and radioactive content, fostering recovery and recycling and minimising the quantity of waste to be disposed of at disposal facilities such as the one at El Cabril Disposal Facility for low- and intermediate-level waste (LILW).

In this regard, considering the economic and technological factors involved, the CSN has required the Licensees of the facilities to analyse the possibilities of reduction for each type of waste and to incorporate all active reduction and recovery projects into a Waste Minimisation Plan that will adopt the most appropriate periodic tracking indicators and will be associated with the PGRRCG for the long-term operation.

K.3.3 Public participation in processes related to safe spent fuel and radioactive waste management

As explained in Sections A.2.2, A.3.2 and B.1, public participation is fully integrated into national legislation on the safe management of spent fuel and radioactive waste. The most recent experience of public participation in this area was during the approval process of the 7th GRWP.

The draft GRWP was subject to a strategic assessment in compliance with the Law on Environmental impact assessment 21/2013 of 9 December. Throughout this assessment, a large number of contributions (a total of 588) were received from institutions interested in radioactive waste management and from the public. These 588 contributions are distributed as follows: 48 reports received as a result of the specific consultation of 181 organisations; and 540 allegations from individuals and groups representing the public received during the public information period. After analysing them in detail, all the contributions received a reasoned response, which has been included in the file.

In relation to the above, given the lack of social, political, technical and institutional consensus necessary to designate a site for the Centralised Temporary Storage (CTS) project, the 7th GRWP has opted for the aforementioned implementation of DTS, a decision which has led to the definitive abandonment of the CTS project.

Public participation has its greatest impact when it is accompanied by information campaigns and a proactive movement to bring these issues closer to the public. Both Enresa and the CSN are making a significant effort in this regard.

It is also worth mentioning that in November 2022, Spain hosted an international seminar on Deep Geological Repository (DGR), organised by the CSN and Enresa, with the participation of national and international experts. The three-day meeting, which brought together 200 people, was aimed at analysing the situation of the DGR programme within the Spanish strategic and regulatory framework, and at providing information on the developments achieved in the main peer countries, from both a technical and socio-political perspective, with the participation of national and international participants. In particular, an important aspect of the seminar was the need to encourage technical debate and social participation, through a specific session on information and public participation.

Further details can be found in Article 10.

In the framework of the bilateral agreement with the French regulatory body Autorité de Sûreté Nucléaire (ASN), it was already agreed in 2019 that one of the areas in which the two organisations could strengthen their cooperation was by collaborating on transparency and public information and participation in the field of nuclear safety and radiation protection. Specifically, to learn about the French national legal framework that includes bodies with functional independence to ensure public participation and transparency in ASN processes.

As a result, in February 2020, the CSN made a high-level visit to the ASN, where meetings were held with different institutions related to public participation. This first visit led to a second, more technical visit in May 2022 to the French DGR laboratory known as CIGEO, where the CSN participated as an observer in one of the local information committees (in the town of Bure) that guarantee transparency and public participation, among others, in projects relating to radioactive waste management. Finally, in recognition of the need to make progress in this area, and thanks to the collaboration with the ASN, specific visits by a CSN technician were organised during 2023 so that, in addition

to gaining insight into the technical aspects of the French project, a general overview may be obtained of the role of the regulator in processes involving different stakeholders and including public participation.

Furthermore, on 4 April 2022, an agreement was signed between the CSN and the Association of Municipalities of Areas with Nuclear Power Plants and Radioactive Waste Storage Facilities (AMAC) to reinforce communication with the population of areas with nuclear facilities in Spain and to assess their perception of the information supplied. The objective of this agreement was to carry out initiatives aimed at improving the public's perception of the CSN's mission to guarantee nuclear safety and radiation protection and to provide better access to the different areas of knowledge, leading to an improvement in the organisation's communication and transparency.

Within the framework of the aforementioned CSN-AMAC agreement, numerous activities have been carried out aimed at reinforcing the lines of communication with the municipalities affected by nuclear facilities, as well as at making the CSN an approachable institution to the public, conveying information that is understandable, appropriate and accessible to the entire public, bearing in mind that many of the people present were neither specialists nor had any training in the issues addressed.

More information in this respect may be found in Article 20.2.9 and Section A.3.2.

K.4. Plans and timeframe of peer review missions or their follow-up missions, and measures adopted by spain to publish the results reports

At the request of the Spanish Government, an international team made up of high-level safety experts held meetings with representatives of the Nuclear Safety Council (CSN), the regulatory body in Spain, representatives of the former Spanish Ministry for Ecological Transition and Demographic Challenge (MITERD) and representatives of Enresa between 15 and 26 October 2018, in order to conduct a combined mission of the Integrated Regulatory Review Service (IRS) and the Integrated Review Service for Radioactive Waste and Spent Fuel Management, Decommissioning and Remediation (ARTEMIS).

This combined peer review mission was intended to review the Spanish regulatory framework in the field of nuclear and radiological safety (IRRS), and to offer the opinions and advice of independent experts in the field of radioactive waste and spent fuel management, decommissioning and remediation (ARTEMIS).

With regard to the latter, the ARTEMIS team of experts reviewed the following areas: Framework and national policy for the management of radioactive waste and spent fuel; National strategy for the management of radioactive waste and spent fuel; inventory of spent fuel and radioactive waste; concepts, plans and technical solutions for the management of radioactive waste and spent fuel; safety cases and evaluation of the safety of radioactive waste and spent

fuel management facilities and activities; estimates of the cost and financing of the management of radioactive waste and spent fuel; skills for the management of radioactive waste and spent fuel - experience, training and abilities.

The mission's results were set out in the resulting report, which is available to the public on the websites of the MITERD, CSN, and IAEA.

In summary, the resulting report on the ARTEMIS mission formulated five recommendations and two suggestions, as well as one good practice and one well-functioning area.

With regard to the recommendations, the first of these refers to the need to update the GRWP. The second calls on the Government to ensure that the delay in Centralised Temporary Storage (CTS) has no negative impact on the safe management of SF. The third recommendation refers to embarking on the actions required to advance the implementation of the DGR programme, addressing the three organisations involved (MITERD, CSN and Enresa). The fourth recommendation calls on the Government to periodically review the funding mechanisms for radioactive waste management and the decommissioning of nuclear facilities. Lastly, the fifth recommendation calls on Enresa to assess the adequacy of the funds dedicated to R&D in order to support the development of the DGR programme.

Meanwhile, the suggestions addressing Enresa are connected with ensuring sufficient capacity for the disposal of radioactive waste, and access to mechanisms ensuring the transfer of knowledge within its professional context.

These suggestions and recommendations have been taken into account to embark on improvement actions in the field of radioactive waste management, as set out in the Action Plan drawn up as a result of the mission. This plan includes and develops the aspects detailed below, alongside other content.

With regard to the first recommendation, the need to update the GRWP had already been identified in the process of self-assessment conducted by Spain before receiving the review mission. **This has materialised in the approval of the 7th GRWP by the Council of Ministers on 27 December 2023**.

As regards the assurance of sufficient capacity for the disposal of radioactive waste, specifically low- and intermediate-level radioactive waste (LILW), the need to increase the capacity of El Cabril Disposal Facility has already been identified. **In this regard, in 2022, Enresa submitted the documentation for the request for the expansion of capacity through the construction of the Southeast Platform to the competent authorities, which will allow the current physical capacity to be doubled and cover the estimates associated with the 7th GRWP. The project continues to be processed in order to obtain the necessary authorisations for the commencement of the physical execution of the works**.

In relation to the CTS project provided for in the 6th GRWP, the 7th GRWP, in the absence of the social, political and institutional consensus necessary to designate a site for the CTS, has opted for the aforementioned implementation of a DTS, a decision that has led to the abandonment of the CTS project. More information in this regard can be found in Section 6.1**.**

Three further recommendations referred to the completion of the actions required to make progress in making the DGR a reality. A working party was set up for this purpose, comprising representatives of the three organisations concerned, so as to review existing legislation, identify shortcomings and draw up legislative proposals and initiatives to be implemented.

In addition, the Action Plan, reflected in the 7th GRWP, includes the design of a planned roadmap, policy and action proposals and the technical programme for the DGR.

The recommendation to review the funding mechanism is addressed in Section K.2.4 of this report.

Likewise, the suggestions resulting from the mission commissioned to Enresa have been taken into account in order to design strategies for the maintenance of knowledge and to ensure the appropriate budget allocation for the R&D projects of the DGR programme.

Furthermore, in accordance with the IAEA *Services Series No. 37 guide for the preparation and development of IRRS missions*, a Follow-up Mission should be carried out between two and four years after the end of the initial mission, with the aim of continuing the work of improving regulatory efficiency by reviewing the progress made by the requesting country in response to the recommendations or suggestions of the initial mission. The development and organisation of peer review missions will be initiated through a formal governmental request addressed to the IAEA.

To this end, the Nuclear Safety Council addressed the Government of Spain, requesting that the appropriate procedures be initiated to host the follow-up mission to the IRRS mission held in October 2018 in Spain, a request that was transferred and confirmed by the IAEA Secretariat in March 2023, which established that this follow-up mission will take place from 27 January to 3 February 2025. At the same time, in March 2024, the Government requested the IAEA that, in addition to the aforementioned follow-up mission to the IRRS mission, a follow-up mission to the ARTEMIS mission should also be carried out. When writing this report, the IAEA has already confirmed that the ARTEMIS mission will take place in 2025. Furthermore, during the period covered by this report, various WANO (World Association of Nuclear Operators) technical support missions have taken place, peer-to-peer at operator level, at Ascó (2019), Almaraz (2020), Trillo (2022) and Vandellós II (2023), monitoring missions at Cofrentes (2020), Vandellós II (2020 and 2022), Ascó (2021) and Almaraz (2022), as well as corporate missions at CNAT-Centrales Nucleares Almaraz Trillo (2021) and Iberdrola/Cofrentes (2022), and monitoring missions at ANAV-Ascó Vandellós Nuclear Association (2020). Likewise, the IAEA SALTO mission has taken place at Ascó (2021) and its follow-up (2023).

K.5. Information on improving openness and transparency in the implementation of the convention obligations

In order to achieve greater transparency and openness vis-à-vis the public regarding the implementation of the obligations of the Joint Convention, the Spanish Ministry for Ecological Transition and Demographic Challenge has been publishing all the national reports prepared in compliance with Article 32 of the Convention on its website, as well as the questions and comments received in the review process. The national report is also accessible to the public through the CSN and IAEA websites.

Section L. Annexes

Annex A: Internal legislative regulations in the field of nuclear energy and radioactive waste

A.1. Provisions with the rank of legislation

- The Law on Nuclear Energy (Law 25/1964, of 29 April 1964; LNE; Official State Gazette of 04/05/1964). This law has been amended by:
  - Law 25/1968, of 20 June 1968, amending Articles 9 and 16 of Law 25/1964.
  - Law 15/1980, of 22 April 1980, on the creation of the Nuclear Safety Council.
  - Law on Electricity Sector 54/1997, of 27 November 1997 (Article 2.9).
  - Law 62/2003, of 30 December 2003, on taxation, administrative and social measures (addition of Article 2.12 bis and First Additional Provision).
  - Law 24/2005, of 18 November 2005, on reforms for the promotion of productivity (Articles 28-30, 84).
  - Law 33/2007, of 7 November 2007, reforming Law 15/1980 (Articles 1, 2.12 bis, 36-38 43, 44 bis and Chapter XIV).
  - Law 11/2009, of 26 October 2009, regulating Listed Public Limited Liability Real Estate Investment Companies (Article 38 bis).

  - Law 12/2011, of 27 May 2011, on civil liability from nuclear damage or damage caused by radioactive materials (Articles 2 and 28) (repealing Chapter VII (except Article 45) and Chapters VIII, IX and X once it takes effect).
  - **Law 7/2021, of 20 May, on climate change and energy transition (Ref. Official State Gazette-A-2021-8447). Article 38. bis 1 is amended**.
  - **Royal Decree-Law 6/2022, of 29 March, adopting urgent measures within the framework of the National Plan in response to the economic and social consequences of the war in Ukraine (Articles 2, 86a and 38b are amended)**.

- Law creating the Nuclear Safety Council (Law 15/1980, of 22 April 1980; Official State Gazette of 25/04/1980). This law has been amended by:
  - Hydrocarbons Sector Act 34/1998, of 7 October 1998.
  - Law 14/1999, of 4 May 1999, on public prices and levies for services provided by the CSN.
  - Law 62/2003, of 30 December 2003, on taxation, administrative and social measures.
  - Law 24/2005, of 18 November 2005, on reforms to promote productivity.
  - Law 33/2007, 7 November 2007, reforming Law 15/1980.
- Law on public prices and levies for services provided by the Nuclear Safety Council (Law 14/1999, of 4 May 1999; Official State Gazette of 05/05/1999). Amended by:
  - Law 30/2005, of 29 December 2005, on the General State Budget for the year 2006 (Official State Gazette of 30/12/2005).
- Law on Electricity Sector (Law 54/1997, of 27 November 1997; Official State Gazette of 28/11/1997 and 31/12/2001). This law has been amended with regard to nuclear energy by:
  - Law 24/2005, of 18 November 2005, on reforms to promote productivity (Seventh Additional Provision).
  - Law 11/2009, of 26 October 2009, regulating Listed Public Limited Liability Real Estate Investment Companies (Sixth Additional Provision, and repeal of Sixth Additional Provision bis).
  - Sustainable Economy Act 2/2011, of 4 March 2011, amending subsection 9.4 of the Sixth Additional Provision of Law 54/1997, governing the levy for the provision of services to manage radioactive waste generated by radioactive facilities and other facilities.
  - Law on Electricity Sector 24/2013, of 26 December 2013, repealing Law 54/1997, except for the Sixth and Seven Additional Provisions (Official State Gazette of 27/12/2013).

- **Law on Electricity Sector 24/2013, of 26 December, repealing Law 54/1997 except for the Sixth and Seventh Additional Provisions (Official State Gazette 27/12/2013). This law has been amended, among others, by Law 1/2018, Law 6/2018, Royal Decree-Law 23/2021, Royal Decree-Law 29/2021, and Royal Decree-Law 18/2022.**
- Law on Environmental impact assessment 21/2013, of 9 December 2013 (Official State Gazette of 11/12/2013). This law has been amended by:
  - Law 9/2018, 5 December 2018, amending the Law on Environmental impact assessment 21/2013 (Official State Gazette of 06/12/2018).
  - **Royal Decree-Law 23/2020, of 23 June, approving measures in the field of energy and in other areas for economic reactivation (Articles 34, 43 and 47 are amended).**
  - **Royal Decree-Law 36/2020, of 30 December, approving urgent measures for the modernisation of the General Government and for the implementation of the Recovery, Transformation and Resilience Plan.**
  - **Royal Decree-Law 6/2022 of 29 March adopting urgent measures within the framework of the National Plan in response to the economic and social consequences of the war in Ukraine (Nineteenth Additional Provision is added).**
- Law 27/2006 (Aarhus Law), of 18 July 2006, regulating rights of access to information for public participation and access to justice regarding the environment (Official State Gazette of 19/07/2006). This law has been amended by:
  - Royal Legislative Decree 1/2008, of 11 January 2008, approving the recast text of the Law on the environmental impact assessment of projects.
- Law 12/2006, of 27 December 2006, on supplementary taxation measures of the Budget of the Autonomous Region of Andalusia (Official State Gazette of 16/01/2007).
- Law 12/2011, of 27 May 2011, on civil liability from nuclear damage or damage caused by radioactive materials (Official State Gazette of 28/05/2011). Not yet in force.
  - **Law 11/2023, of 8 May, on the transposition of European Union Directives on the accessibility of certain products and services, migration of highly qualified persons, taxation and digitalisation of notarial and registry actions; and amending Law 12/2011, of 27 May, on civil liability for nuclear damage or damage caused by radioactive materials (Certain rules are amended and the Fourth additional provision is added).**
- Law 15/2012, of 27 December 2012, on taxation measures for energy sustainability (Official State Gazette of 28/12/2012), amended by:
  - Law 16/2013, of 29 October 2013, establishing certain measures with regard to environmental taxation and adopting other taxation and financial measures (Official State Gazette of 30/10/2013).

  - **Law 7/2021, of 20 May, on climate change and energy transition (the Second Additional Provision is amended).**
  - **Law 7/2022, of 8 April, on waste and contaminated soils for a circular economy (First Transitory Provision is repealed).**
  - **Royal Decree-Law 11/2022, of 25 June, adopting and extending certain measures in response to the economic and social consequences of the war in Ukraine, to address situations of social and economic vulnerability, and for the economic and social recovery of the island of La Palma (Article 6 is amended).**

A.2. Laws with the rank of regulation

- Regulation on nuclear and radioactive facilities (Royal Decree 1836/1999, of 3 December 1999; Official State Gazette of 31/12/1999). This Regulation has been amended by:
  - Royal Decree 35/2008, of 18 January 2008, modifying the Regulation on nuclear and radioactive facilities.
  - Royal Decree 1308/2011, of 26 September 2011, on the physical protection of nuclear materials and facilities, and of radioactive sources (Official State Gazette of 07/10/2011).
  - Royal Decree 102/2014, of 21 February 2014, for the responsible and safe management of spent nuclear fuel and radioactive waste.
- **Royal Decree 1029/2022 of 20 December, approving the Regulation on health protection against the dangers from exposure to ionising radiation.**
- Royal Decree 102/2014, of 21 February 2014, for the responsible and safe management of spent nuclear fuel and radioactive waste (Official State Gazette of 08/03/2014).
- Royal Decree 1440/2010, of 5 November 2010, approving the Articles of Association of the Nuclear Safety Council (Official State Gazette of 22/11/2010).
- Royal Decree 229/2006, of 24 February 2006, on the control of high-activity sealed radioactive sources and orphan sources (Official State Gazette of 28/02/2006). This Royal Decree has been amended by:
  - Royal Decree 1308/2011, of 26 September 2011, on the physical protection of nuclear materials and facilities, and of radioactive sources (Official State Gazette of 07/10/2011).
  - **Royal Decree 451/2020, of 10 March, on the control and recovery of orphan radioactive sources.**
- Royal Decree 775/2006, of 23 June 2006, creating the Interministerial Committee for the establishment of the criteria to be fulfilled by the site of the centralised temporary storage facility for spent nuclear fuel and high-level waste, and the associated technology centre (Official State Gazette of 05/07/2006).

- Royal Decree 601/2019, of 18 October, on justification and optimisation of the use of ionising radiation for the radiation protection of persons during medical exposures.
- Royal Decree 1085/2009, of 3 July, approving the Regulation on the installation and use of X-ray apparatus for medical diagnostic purposes (Official State Gazette 18/07/2009). This Royal Decree is partially amended by:
  - **Royal Decree 1029/2022, of 20 December, approving the Regulation on health protection against dangers from exposure to ionising radiation.**
- Royal Decree 1308/2011, of 26 September 2011, on the physical protection of nuclear materials and facilities, and of radioactive sources (Official State Gazette of 07/10/2011). This Royal Decree has been amended by:
  - Royal Decree 1086/2015, of 4 December 2015, amending Royal Decree 1308/2011, of 26 September 2011, on the physical protection of nuclear facilities and materials and radioactive sources (Official State Gazette of 18/12/2015).
- Royal Decree 1464/1999, of 17 September 1999, on activities in the first part of the nuclear fuel cycle (Official State Gazette of 05/10/1999).
- **Royal Decree 524/2023 of 20 June, approving the Basic Civil Protection Regulations.**
- Regulation of cover for nuclear risks. (Decree 2177/1967, of 22 July 1967; Official State Gazette of 18/09/1967). This Regulation has been amended by:
  - Decree 742/1968, of 28 March 1968, amending Article 66 of the Regulation.
  - And this will be partially repealed following the entry into force of Law 12/2011, of 27 May 2011, on civil liability from nuclear damage or damage caused by radioactive materials (Official State Gazette of 28/05/2011).
- Royal Decree 110/2015, of 20 February 2015, on waste electrical and electronic equipment. (Official State Gazette of 21/02/2015). Amended by:
  - Royal Decree 27/2021, of 19 January, amending Royal Decree 106/2008, of 1 February, on batteries and accumulators and the environmental management of their waste, and Royal Decree 110/2015, of 20 February, on waste electrical and electronic equipment.
  - Royal Decree 208/2022, of 22 March, on financial guarantees for waste.
- Royal Decree 1428/1986, of 13 June 1986, on radioactive lightning conductors (Official State Gazette of 11/07/1986). This Royal Decree has been amended by:
  - Royal Decree 903/1987, of 10 July 1987 (Official State Gazette of 11/07/1987).
- Royal Decree 243/2009, of 27 February 2009, regulating the surveillance and control of transfers of radioactive waste and spent nuclear fuel between Member States or from or to outside the Community (Official State Gazette of 02/04/2009). This Royal Decree has been amended by:

  - Royal Decree 102/2014, of 21 February 2014, for the responsible and safe management of spent nuclear fuel and radioactive waste.

- Royal Decree 97/2014, of 14 February 2014, governing operations for the carriage of dangerous goods by road within Spanish territory (Official State Gazette of 27/02/2014). Amended by:

  - **Royal Decree 70/2019, of 15 February, amending the Regulation of the Land Transport Organisation Act and other regulations on the training of drivers of road transport vehicles, on control documents in relation to road transport, on health road transport, on the carriage of dangerous goods and the National Road Transport Committee.**

  - **Order TMA/1078/2022, of 28 October, amending Order FOM/606/2018, of 25 May, on the content of the annual report for the carriage of dangerous goods by road, and the model of Annex 3 of Royal Decree 97/2014, of 14 February, regulating the carriage of dangerous goods by road in Spanish territory.**

- Royal Decree 412/2001, of 20 April 2001, governing various aspects connected with the carriage of dangerous goods by rail (Official State Gazette of 08/05/2001), amended by Ministerial Order of 01/02/2007.

- Royal Decree 145/1989, of 20 January 1989, approving the National Regulation on the admission, handling and storage of dangerous goods at ports (Official State Gazette of 13/02/1989).

A.3. CSN instructions

- Nuclear Safety Council Instruction IS-01, of 31 May 2001, defining the format and content of the individual radiological monitoring document (radiological ID card) governed by Royal Decree 413/1997 (Official State Gazette of 06/08/2001).

- Nuclear Safety Council Instruction IS-02, Revision 1, on the documentation of reloading activities at light water nuclear power plants (Official State Gazette of 16/09/2004).

- Nuclear Safety Council Instruction IS-03, of 06 November 2002, on qualifications to obtain recognition as an expert in protection against ionising radiation (Official State Gazette of 12/12/2002).

- Nuclear Safety Council Instruction IS-04, of 05 February 2003, governing the transfers, archiving and safekeeping of documents corresponding to the radiation protection of workers, the public and the environment, prior to the transfer of licensing of practices at nuclear power plants conducted for the purpose of decommissioning and closure (Official State Gazette of 28/02/2003).

- Nuclear Safety Council Instruction IS-05, of 26 February 2003, defining the exemption values for nuclides as established in Tables A and B of Annex I to Royal Decree 1836/1999 (Official State Gazette of 10/04/2003).
- Nuclear Safety Council Instruction IS-06, of 09 April 2003, defining basic and specific training programmes in the field of radiation protection governed by Royal Decree 443/1997, of 21 March 1997, within the scope of nuclear facilities and radioactive facilities of the fuel cycle (Official State Gazette of 03/06/2003). On 28 October 2004, the CSN sent an information circular to all external companies to clarify certain aspects of the practical application of this Instruction.
- Nuclear Safety Council Instruction IS-07, of 22 June 2005, on fields of application of radioactive facility personnel licences (Official State Gazette of 20/07/2005).
- Nuclear Safety Council Instruction IS-08, of 27 July 2005, on the criteria applied by the Nuclear Safety Council to demand that Licensees of nuclear and radioactive facilities provide specific consultancy regarding radiation protection (Official State Gazette of 05/10/2005).
- Nuclear Safety Council Instruction IS-09, of 14 June 2006, establishing the criteria with which physical protection systems, services and procedures must comply for nuclear facilities and materials (Official State Gazette of 07/07/2006).
- **Nuclear Safety Council Instruction IS-10, Revision 2, of 7 September 2023, on criteria for reporting events at nuclear power plants (Official State Gazette 03/10/2023).**
- Nuclear Safety Council Instruction IS-11, Revision 1, of 30 January 2019, on licensing of nuclear power plant operational personnel (Official State Gazette of 15/02/2019).
- Nuclear Safety Council Instruction IS-12, of 28 February 2007, defining the qualifications and training requirements for non-licensed in-company and external personnel within the context of nuclear power plants (Official State Gazette of 11/05/2007).
- Nuclear Safety Council Instruction IS-13, of 21 March 2007, on radiological criteria for the release of nuclear facility sites (Official State Gazette of 07/05/2007).
- Nuclear Safety Council Instruction IS-14, of 24 October 2007, on the CSN Resident Inspection at nuclear power plant (Official State Gazette of 08/11/2007).
- Nuclear Safety Council Instruction IS-15, Revision 1 of 5 May 2016, on requirements for the supervision of the efficacy of maintenance at nuclear power plants (Official State Gazette of 16/06/2016).
- Nuclear Safety Council Instruction IS-16, of 23 January 2008, governing the time periods required for the archiving of documents and records of radioactive facilities (Official State Gazette of 12/02/2008).

- Nuclear Safety Council Instruction IS-17, of 30 January 2008, on the approval of training courses or programmes for personnel managing the functioning of or operating equipment at x-ray facilities for medical diagnosis purposes, and accreditation of personnel of such facilities (Official State Gazette of 19/02/2008).
- Nuclear Safety Council Instruction IS-18, of 2 April 2008, on the criteria applied by the Nuclear Safety Council to demand that Licensees of radioactive facilities notify radiological incidents and events (Official State Gazette of 16/04/2008).
- Nuclear Safety Council Instruction IS-19, of 22 October 2008, on the requirements of the management system of nuclear facilities (Official State Gazette of 08/11/2008).
- Nuclear Safety Council Instruction IS-20, of 28 January 2009, establishing safety requirements regarding spent fuel storage casks (Official State Gazette of 18/02/2009).
- Nuclear Safety Council Instruction IS-21, of 28 January 2009, on requirements applicable to modifications at nuclear power plants (Official State Gazette of 19/02/2009).
- Nuclear Safety Council Instruction IS-22, Revision 1, of 15 November 2017, on safety requirements for the management of ageing and long-term operation of nuclear power plants (Official State Gazette of 30/11/2017).
- Nuclear Safety Council Instruction IS-23, of 4 November 2009, on the in-service inspection of nuclear power plants (Official State Gazette of 24/11/2009).
- Nuclear Safety Council Instruction IS-24, of 19 May 2010, governing the archiving and storage periods of documents and records of nuclear facilities (Official State Gazette of 01/06/2010).
- Nuclear Safety Council Instruction IS-25, of 9 June 2010, on the criteria and requirements for the execution of probabilistic safety analyses and their applications at nuclear power plants (Official State Gazette of 24/06/2010).
- Nuclear Safety Council Instruction IS-26, of 16 June 2010, on basic nuclear safety requirements applicable to nuclear facilities (Official State Gazette of 08/07/2010).
- Nuclear Safety Council Instruction IS-27, Revision 1, of 14 June 2017, on general nuclear power plant design criteria (Official State Gazette of 03/07/2017).
- Nuclear Safety Council Instruction IS-28, of 22 September 2010, on Technical Functional Specifications to be fulfilled by Category 2 and 3 radioactive facilities (Official State Gazette of 11/10/2010).
- Nuclear Safety Council Instruction IS-29, of 13 October 2010, on safety criteria at temporary spent fuel and high-level radioactive waste storage facilities (Official State Gazette of 02/11/2010).
- Nuclear Safety Council Instruction IS-30, Revision 2, of 16 November 2016, on requirements of the fire protection programme at nuclear power plants (Official State Gazette of 30/11/2016).

- Nuclear Safety Council Instruction IS-31, of 26 July 2011, on criteria for the radiological control of waste matter generated at nuclear facilities (Official State Gazette of 17/09/2011).
- Nuclear Safety Council Instruction IS-32, of 16 November 2011, on Technical Functional Specifications of nuclear power plants (Official State Gazette of 05/12/2011).
- Nuclear Safety Council Instruction IS-33, of 21 December 2011, on radiological criteria for protection against exposure to natural radiation (Official State Gazette of 26/01/2012).
- Nuclear Safety Council Instruction IS-34, of 18 January 2012, on criteria with regard to radiation protection measures, communication of non-conformities, availability of personnel and resources for emergencies and supervision of loading in the transportation of radioactive material (Official State Gazette of 04/02/2012).
- Nuclear Safety Council Instruction IS-35, of 4 December 2013, with regard to the handling of design modifications for radioactive material transportation packages with an approval certificate of Spanish origin, and physical or operational modifications made by the sender of a package with regard to the packaging used (Official State Gazette of 04/01/2014).
- Nuclear Safety Council Instruction IS-36, of 21 January 2015, on operational emergency procedures and management of severe accidents at nuclear power plants (Official State Gazette of 17/02/2015).
- Nuclear Safety Council Instruction IS-37, of 21 January 2015, on the analysis of design specification accidents at nuclear power plants (Official State Gazette of 26/02/2015).
- Nuclear Safety Council Instruction IS-38, of 10 June 2015, on training for persons involved in the transportation of radioactive material by road (Official State Gazette of 06/07/2015).
- Nuclear Safety Council Instruction IS-39, of 10 June 2015, with regard to the control and monitoring of the manufacturing of packaging for the transportation of radioactive material (Official State Gazette of 06/07/2015).
- Nuclear Safety Council Instruction IS-40, of 26 April 2016, on documentation that must be submitted in support of the application for authorisation for the marketing or servicing of apparatus, equipment and accessories incorporating radioactive material or generating ionising radiation (Official State Gazette of 13/05/2016).
- Nuclear Safety Council Instruction IS-41, of 26 July 2016, approving physical protection requirements for radioactive sources (Official State Gazette of 16/09/2016).
- Nuclear Safety Council Instruction IS-43, of 20 March 2019, establishing criteria for notification of events concerning physical safety on the part of nuclear power plants (Official State Gazette of 04/04/2019). Correction of errata (Official State Gazette of 01/07/2019).

- Nuclear Safety Council Instruction IS-44 of 26 February 2020, on emergency planning, preparedness and response requirements for nuclear facilities (Official State Gazette of 12/02/2020).
- Nuclear Safety Council Instruction IS-45 of 17 November 2021, on safety requirements during the design, construction and operation phases of nuclear and radioactive facilities of the nuclear fuel cycle, in order to provide for their dismantling and, where appropriate, their decommissioning and closure (Official State Gazette of 19/01/2022).

Annex B: Process for the licensing of nuclear and radioactive facilities

In accordance with Article 28 of the Law 25/1964, of 29th of April, on Nuclear Energy, nuclear and radioactive facilities will be subject to a regime of authorisations issued by the Spanish Ministry for Ecological Transition and Demographic Challenge (MITERD), following a mandatory report from the Nuclear Safety Council (CSN).

The licensing process for nuclear and Radioactive facilities is governed by the Regulation on Nuclear and Radioactive Facilities (RINR), approved by Royal Decree 1836/1999, of 3 December 1999.

According to the RINR, such authorisations will be granted by the MITERD, to which applications must be submitted together with the documentation required in each case. The MITERD will send a copy of each application and the corresponding documentation to the Nuclear Safety Council, for it to issue the mandatory report.

The CSN reports are mandatory, and also binding if they are negative or refuse the granting of authorisation, and also with regard to any conditions they might impose, in the event of a positive decision.

The MITERD will also, and where applicable, send a copy of all the documentation to those Autonomous Regions with responsibilities in the field of regulation of territory and the environment and the territory of which contains the facility or the planning zone established in the basic regulations for nuclear and radiological emergency planning, in order to allow them to raise any arguments within a period of one month.

Once it has received the CSN report, and following any opinions, reports and arguments that might apply, the MITERD will issue the corresponding decision.

The RINR furthermore clarifies that the executive functions attributed in the Regulation to the MITERD with regard to Category 2 and 3 radioactive facilities will be understood to be attributed to the Autonomous Regions, if said functions have been transferred to them.

B.1. System for licensing of nuclear facilities

Según define el RINR son instalaciones nucleares:

1. Nuclear power plants
2. Nuclear reactors
3. Factories using nuclear fuel to produce nuclear substances and those where nuclear substances are treated

4. Facilities storing nuclear substances
5. Devices and facilities using nuclear fusion or fission reactions to generate energy or for the purpose of the production or development of new sources of energy.

According to the RINR, nuclear facilities require various administrative authorisations in order to function, namely the following, depending on the case in question: prior or site authorisation, construction permit, operating permit, modification authorisation and decommissioning authorisation, ending in a decommissioning declaration or dismantling and closure authorisation, ending in a closure declaration. The procedure for the granting of each of these authorisations is governed by the Regulation itself, and is set out in the summary below.

The granting of authorisations set out below is the responsibility of the head of the MITERD, although these powers have been delegated to the State Secretariat for Energy, except for modification authorisation, which may be granted by the Directorate-General for Energy Policy and Mines.

B.1.1. Prior authorisation

Prior or site authorisation is the official recognition of the intended purpose and the suitability of the chosen site. Once it is obtained, the Licensee may begin work on the preliminary infrastructure authorised and apply for the construction permit for the facility.

The prior authorisation application must be accompanied by the following documents:

a. Declaration of the needs intended to be fulfilled, justification of the facility and of the chosen site;
b. Descriptive memorandum of the fundamental elements comprising the facility, together with the corresponding basic information;
c. Preliminary construction project, including the phases and deadlines for execution and the prior economic study as to the financial investments and forecast cost;
d. Characterisation study of the site and the area of influence of the facility;
e. Planned organisation to supervise the project and guarantee quality during construction;
f. Description of preliminary works and activities for the infrastructure that is to be implemented.

In the process of examining this application, an information and public participation period is opened, as described in detail in item 3 of this Annex.

B.1.2. Construction authorisation

This empowers the Licensee to begin construction of the facility and to apply for the operating permit.

This application will be accompanied by the following documentation:

a. General project for the facility;

b. Acquisitions programme;

c. Budget, funding, execution deadline and technical collaboration regime;

d. Economic study, updating that presented with the prior application;

e. Preliminary Safety Study, which must, in turn, include:

   1. Description of the site and surrounding area
   2. Description of the facility
   3. Analysis of foreseeable accidents and their consequences
   4. Analytical radiological study
   5. Update of the organisation planned by the applicant to supervise the development of the project and guarantee quality during construction
   6. Planned organisation for the future operation of the facility and preliminary operational personnel training programme
   7. Pre-operational environmental radiological monitoring programme
   8. Construction quality assurance programme

f. Technological, economic and financing provisions for decommissioning and closure

g. Administrative concessions and authorisations to be granted by other Ministries and public authorities, or accredited documentation that the applications have been filed, with all necessary requirements.

During the construction and assembly of a nuclear facility, and before the fuel is loaded or nuclear substances are admitted at the facility, the holder of the authorisation is obliged to draw up a pre-nuclear testing programme in accreditation of the proper performance of the equipment or elements comprising the facility, with regard to nuclear safety and radiation protection, and also the applicable industrial and technical standards.

The pre-nuclear testing programme will be proposed by the holder of the authorisation, and must be approved by the Directorate-General for Energy Policy and Mines, following a report from the CSN.

The results of the pre-nuclear testing will be presented to the Directorate-General for Energy Policy and Mines and to the CSN for analysis before the operating permit may be granted.

B.1.3. Operational authorisation

This authorisation empowers the holder to load the nuclear fuel or to introduce nuclear substances into the facility, to conduct the nuclear testing programme, and to operate the facility under the conditions established in the authorisation. This will first be granted on a provisional basis up until the satisfactory completion of the nuclear tests.

In order to obtain the operating permit, the Licensee must present the following documents:

a. Safety Study: this must contain sufficient information in order to conduct an analysis of the facility from the perspective of nuclear safety and radiation protection, in addition to a risk analysis based on the functioning of the facility, both under its normal regime and under accident conditions. This must refer to the following issues:

    1. Supplementary data obtained during construction as to the site and its characteristics
    2. Description of the facility and the processes that will take place there
    3. Analysis of foreseeable accidents and their consequences
    4. Analytical radiological study of the facility
    5. Operational environmental radiological monitoring programme

b. Functional Regulation: This must contain the following information:

    1. List of jobs with nuclear responsibility
    2. Organisation and functioning of personnel and description of the implemented safety management system
    3. Operational standards under normal regime and other accident conditions.

c. Technical Functional Specifications: these will contain the limit values of those variables affecting safety and the minimal functional conditions.

d. Internal emergency plan: This plan details the measures established by the Licensee and assigns responsibilities to deal with accident conditions.

e. Nuclear testing programme: describing these tests, their purpose, the specific techniques and the expected results.

f. Quality assurance manual: establishing the scope and content of the quality programme applicable to safety-related systems, structures and components.

g. The radiation protection manual: includes the radiation protection standards of the facility.

h. Radioactive waste and spent fuel management plan: including a system for the possible declassification of waste materials with radioactive content.

i. Final economic study: analysing fulfilment of the economic and financial provisions and stating the total and actual cost of the facility.

j. Provisions for decommissioning and closure: setting out the disposal planned for the waste generated, and including the cost study and economic and financial provisions to guarantee decommissioning.

Once the nuclear testing programme has been completed, the Licensee of the authorisation must send the Directorate-General for Energy Policy and Mines and the CSN the results of the programme and the proposal for modifications to the Technical Functional Specifications, if in light of the tasks performed this would be advisable.

The CSN will send a report to the MITERD as to the outcome of the tests and any modifications that might need to be incorporated, in addition to the conditions for the operating permit for the established period. The MITERD will then issue the operating permit for the corresponding period.

B.1.4. Modification authorisation

The RINR establishes that modifications to the design of the operational conditions affecting nuclear safety or radiation protection of a facility, and any tests applied to it, must first be analysed by the Licensee in order to verify whether the criteria, standards and conditions providing the basis for the authorisation are still fulfilled. If the conclusion reached by the Licensee is that the aforementioned requirements are still guaranteed, it may implement the modifications, providing the competent regulatory authorities with periodic information. If, meanwhile, the modification to the design represents a change in the criteria, standards and conditions serving as the basis for the operating permit, the Licensee will be required to apply for a modification authorisation, which it must obtain before the modification becomes operational, or the tests are performed. Irrespective of the aforementioned authorisation, if in the judgment of the regulatory authorities, the modification is a large-scale change or entails significant construction or assembly works, the Licensee must apply for authorisation to execute and assemble the modification, said authorisation necessarily being obtained before assembly or construction activities begin this type of modification.

The modification authorisation application must be accompanied by the following documentation:

a. Technical description of the modification;

b. Safety analysis;

c. Identification of the documents that would be affected by the modification;

d. Identify any tests required prior to restarting operations.

An application for authorisation for execution and assembly of the modification must, where this is required, be accompanied by the following documentation:

a. Provide a general description of the modification and identify the reasons behind it;

b. Regulations to be applied in the design, construction, assembly and testing of the modification;

c. Basic design of the modification;

d. Planned organisation and quality assurance programme for execution of the project;

e. Identification of the scope and content of the analyses required in order to demonstrate the compatibility of the modification with the remainder of the facility and to ensure that it maintains its safety levels;

f. Destination of the equipment to be replaced;

g. Acquisition plan and budget in the case of major modifications.

B.1.5. Decommissioning authorisation

Once the operating permit has expired, this authorisation entitles the Licensee to begin activities for decontamination, disassembly of equipment, demolition of structures, and removal of materials. The ultimate goal is to allow the site to be released in full or with restrictions. The dismantling process will end with the decommissioning declaration.

The decommissioning authorisation application will be accompanied by the following documentation:

a. Safety Study;

b. Functional Regulation;

c. Technical specifications applicable during the dismantling phase;

d. Quality assurance manual;

e. Radiation protection manual;

f. Internal emergency plan;

g. Radioactive waste and spent fuel management plan;

h. Site remediation plan;

i. Economic study of the decommissioning process and financial provisions to address this;

j. Declassifiable materials control plan.

The decommissioning authorisation will include the general approach to this process and, if it is conducted in different phases, will govern only those activities planned for the phase to be immediately executed.

Once the decommissioning activities have been completed and compliance with the site remediation plan provisions has been verified, along with all other technical conditions established in the decommissioning programme, the MITERD will issue the decommissioning declaration, following a report from the CSN. This declaration will release the Licensee of a facility from responsibility as the operator thereof and will, in the case of the restricted release of the site, define any usage limitations that would apply, and the party responsible for maintaining these and overseeing compliance.

Said Ministry will inform the corresponding Autonomous Regions with powers regarding the regulation of territory and the environment within whose territory the facility is located prior to the decommissioning declaration to allow them to formulate arguments within one month.

B.1.6. Authorisation for dismantling and closure (for spent nuclear fuel and radioactive waste disposal facilities)

At facilities for the disposal of spent nuclear fuel and radioactive waste, this entitles the Licensee to begin the final engineering and other works required so as to guarantee the long-term safety of the storage system, and activities to dismantle any ancillary installations so determined, ultimately allowing definition of those areas that might, where applicable, need to remain subject to control and radiological or other types of surveillance for a specified time period, and the release of the remaining areas of the site from control. The process of dismantling the enclosure will end with a closure declaration issued by the MITERD following a report from the Nuclear Safety Council.

B.2. System for licensing of radioactive facilities

In accordance with the RINR, radioactive facilities are understood as:

- Facilities of any class containing the source of ionising radiation;
- Devices producing ionising radiation and functioning at a voltage of more than 5 kV;
- Premises, laboratories, factories and facilities producing, using, possessing, treating, handling or storing radioactive materials, except for incidental storage during transportation.

Radioactive facilities are divided into 3 categories.

- Category 1 radioactive facilities are those involved in the nuclear fuel cycle, industrial irradiation facilities, and other complex facilities handling very considerable inventories of radioactive substances with a significant potential radiological impact. Nuclear fuel cycle radioactive facilities, in other words, factories producing uranium, thorium and compounds thereof, or otherwise factories producing natural uranium fuel assemblies, will require the same authorisations as nuclear facilities. The application, processing and granting of these authorisations are conducted in accordance with the terms of

subsection 1 above, with the applicable documents being adapted for the specific characteristics of these facilities.

- Category 2 and 3 radioactive facilities are those for scientific, medical, commercial or industrial purposes which cannot be considered as Category 1, and are classified in the appropriate category essentially in accordance with their radiological characteristics. This type of facility will require functional authorisation, a decommissioning declaration and, where applicable, authorisation for modification or change of Licensee.

The application for the functional authorisation for such radioactive facilities with scientific, medical, commercial or industrial purposes must at least be accompanied by the following documents:

a. Descriptive memorandum of the facility;

b. Safety Study: analysis and assessment of any risks that might result from the normal functioning of the facility or as a consequence of any accident;

c. Verification of the facility: containing a description of the tests to which the facility is subjected;

d. Functional Regulation: practical measures guaranteeing the safe operation of the facility;

e. List of planned personnel, organisation, and responsibilities of each job;

f. Internal emergency plan: planned measures and assignment of responsibilities in order to deal with accident conditions;

g. Provisions for decommissioning and economic provisions to guarantee this;

h. Economic budget for the investment to be made.

For Category 1 installations, the following documentation must also be enclosed:

a. Information as to the site and surrounding land;

b. As part of the Functional Regulation:

- Quality Assurance Manual
- Radiation Protection Manual
- Technical Functional Specifications

c. Physical Protection Plan

The head of the MITERD is responsible for granting functional authorisations, changes of Licensee and decommissioning declarations of Category 1 radioactive facilities, although these powers are delegated to the State Secretary for Energy. These authorisations will include presentation of the corresponding documentation to the Autonomous Region, in order to allow it to raise any arguments within a period of one month.

The Directorate-General for Energy Policy and Mines is responsible for granting all other authorisations for radioactive facilities governed by this chapter.

When the Licensee is in a position to begin operations at the facility, it will inform the CSN, allowing it to conduct an inspection. Once the CSN has deemed that the facility can function under safe conditions, it will inform the MITERD in order for it to issue a "commissioning notification", entitling the Licensee to commence operations at the facility.

Any changes affecting the identity of the Licensee of the facility, its location, the activities enabled by the authorisation granted, the category of the facility, or the inclusion of particle accelerators or additional radioactive material not previously authorised will require authorisation under the same procedure as used to grant the functional authorisation.

Any changes and modifications affecting other aspects of the design or the authorised operating conditions of the facility will require only the explicit acceptance of the Nuclear Safety Council prior to implementation, with said body informing the MITERD.

The application for a decommissioning declaration must enclose the following documentation:

a. Technical decommissioning study;

b. Economic study, including the cost of decommissioning and the financial provisions

Once the CSN has confirmed the absence of radioactive substances or equipment producing ionising radiation and the results of the analysis of contamination of the facility, it will issue a report addressed to the MITERD, which will issue the decommissioning declaration for the facility.

In accordance with the provisions of the Spanish Constitution, the various Statutes of Autonomy and the corresponding regulations, the services and functions of the MITERD with regard to Category 2 and 3 radioactive facilities have been transferred to various Autonomous Regions. The following Autonomous Regions or Cities have had these powers transferred: Aragon, Asturias, Cantabria, Castile-Leon, Catalonia, Ceuta, Extremadura, Galicia, Madrid, Murcia, Balearic Islands, Canary Islands, La Rioja, Navarre, Basque Country and Valencia[9].

B.3. Public information and participation in the process of authorising facilities

Both the RINR, approved by Royal Decree 1836/1999, of 3 December 1999, and the Law on Environmental impact assessment 21/2013, of 9 December 2013, require public information processes, the most significant of which is performed in the handling of the prior authorisation for a nuclear or fuel cycle radioactive facility. Likewise, dismantling or definitive decommissio-

9 The Third Additional Provision of Law 15/1980, establishing the CSN, entitles the body to entrust the Autonomous Regions with performing certain functions attributed to it. However, these delegations do not have the status of a transfer of powers, since according to the law establishing the CSN, it enjoys exclusive responsibility for nuclear safety nationwide.

ning of nuclear power plants and reactors is also subject to an ordinary environmental impact assessment.

The process of public participation in decision-making with regard to the prior (or site) authorisation of a nuclear facility is conducted by means of two public information procedures performed within the context of two administrative procedures, for the prior authorisation under the terms of the RINR, and the project environmental impact assessment, in accordance with Law 21/2013, as described below.

With regard to the procedure established under nuclear regulations, once the application has been received for prior authorisation of a nuclear facility, Article 15 of the RINR makes provision for the initiation of a public information period lasting thirty (30) days, which will begin with publication in the "Official State Gazette" and an announcement in the official gazette of the corresponding Autonomous Region featuring an excerpt highlighting the object and main characteristics of the facility. During said period, in order to allow any arguments and observations deemed relevant to be formulated, the public will be provided with access to the documentation that must be enclosed with the authorisation application, as provided in Article 14 of the aforementioned RINR. Said documentation comprises the following documents:

a. Declaration of the needs intended to be fulfilled, justification of the facility and of the chosen site;

b. Descriptive memorandum. This memorandum will describe the facility's fundamental constituent elements and must generally include basic information about it, the technology to be employed, the preliminary supply plan, and provisions for decommissioning;

c. Preliminary construction project. Execution phases and deadlines. Prior economic study regarding financial investments and planned costs;

d. Characterisation study of the site and the facility's area of influence, including sufficient data as to site parameters that could impact nuclear safety or radiation protection, including those of a demographic and ecological nature and activities connected with territorial regulations;

e. Organisation planned by the applicant to supervise the project and for quality assurance during construction;

f. Provide a description of the preliminary infrastructure works and activities that are to be performed once the prior authorisation has been granted and before the application for the construction permit.

Once the deadline has passed for arguments to be made, these are passed on to the applicants in order to allow them to be taken into consideration in the project. The appraisal of the arguments and the response by the applicant, the responsibility of the Nuclear Safety Council, established as the sole body with responsibility for nuclear safety and radiation protection matters under the terms of Law 15/1980, of 22 April 1980, creating the Nuclear Safety Council, where the arguments in question correspond to those matters within its purview, and the

corresponding Ministerial Department in all other cases, mainly the Directorate-General for Energy Policy and Mines of the MITERD.

With regard to the public information procedure established under environmental legislation, Law 21/2013 governs the procedure for the environmental impact assessment of certain projects, including those involving nuclear facilities, during both their prior authorisation and their decommissioning authorisation. As part of this procedure, Article 33 of the aforementioned law establishes a procedure under which the public is, for a period of at least thirty (30) business days, given access to the project, the corresponding environmental impact study, and a summary of its fundamental characteristics. Although Law 21/2013 has horizontal status, for those projects subject to the RINR, certain specifically nuclear contents are required, and these must be included as part of the contents of the environmental impact study:

Subsection 1(d) of Part A of Annex VI thus establishes that with regard to the project description, this shall include:

"A forecast of the types, quantities and composition of the waste to be produced during the phases of construction, operation and decommissioning, and any radioactive emissions and discharges that could occur during normal operation, operational incidents, and accidents, in addition to a declaration of compliance with the principle of ALARA (As Low As Reasonably Achievable) under the terms of the basic radiation protection standards for such situations".

Subsection 7 of Part A of Annex VI likewise establishes that the following must be included in connection with the vulnerability of the project:

"A description of any significant adverse effects of the project on the environment as a consequence of its vulnerability to the risk of serious accident and/or major catastrophe in connection with the project in question. To this end, the available relevant information and any obtained by means of risk assessments conducted in accordance with [...] the regulations governing the nuclear safety of nuclear facilities may be employed. Where applicable, the description must include the measures established to prevent and mitigate a significant adverse effect of such occurrences on the environment, and details as to the preparation and response proposed for such emergencies".

Following the expiry of the duration of said procedure, the substantive body will send the developer reports and arguments received for consideration by it in authoring a new version of the project and of the environmental impact study, where applicable. Subsequently, should the environmental body note that the developer has not properly taken into account the arguments received during the public information and consultation procedures, it will call on the developer to complete the necessary information. Nonetheless, as in the case of the specifically nuclear procedure, the appraisal of those arguments that might have been raised with regard to nuclear safety or radiation protection is the responsibility of the Nuclear Safety Council, as the sole authority responsible for this matter, pursuant to Law 15/1980.

In any event, the regulations that govern the course of both public participation procedures ensure coordination between the two. First, as Article 15.2 of the RINR indicates, "the public information procedure shall be performed jointly with that established for the environmental

impact study in the corresponding specific regulations". Likewise, the Fourth Additional Revision of the RINR establishes that "the environmental impact assessment procedure established in Law 21/2013 shall be incorporated within the context of the substantive authorisation procedures governed by this Regulation". As the final outcome of said incorporation, Law 21/2013 itself establishes that the contents of the environmental impact statement must be included within the project authorisation by the substantive body.

Meanwhile, the RINR also requires that an Information Committee operate as a collegiate body during the construction, operation and decommissioning of nuclear power plants. This Committee has the function of informing the various bodies represented as to the course of the activities regulated by the corresponding authorisations and of jointly addressing those relevant matters to said bodies. It is chaired by a representative of the MITERD and made up of a representative of the Licensee of the facility, the CSN, the Government Delegation, the Autonomous Region, the Directorate-General for Civil Protection and Emergencies and those municipalities included within Zone 1 as defined in the corresponding External Emergency Plans for the nuclear power plants. This Committee may also include other representatives of public authorities if the nature of the matters to be discussed should be required.

At the municipal level, the Association of Municipalities in Areas of Nuclear Power Plants (AMAC) operates as a public authority interlocutor for various aspects of nuclear power plants.

At a separate information level and in general, the CSN is attributed to functions that include informing public opinion about matters within its purview, without prejudice to the publication of its administrative actions on the legally established terms. Particular mention should also be made of the CSN Advisory Committee, created by Law 33/2007, of 7 November 2007 (reforming Law 15/1980, of 22 April 1980, creating the Nuclear Safety Council), the object of which is the issuance of recommendations to said Council in the sphere of transparency and the proposal of measures to strengthen public access to information and citizen participation in those matters within its purview. It comprises representatives of the CSN, various Ministries, Autonomous Regions, Licensees of nuclear facilities, trade unions, experts, charities, municipalities and other entities.

Lastly, Spain approved and ratified the Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters made at Aarhus, Denmark. Law 27/2006, of 18 July 2006, governing rights of access to information, public participation and access to justice in environmental matters, acknowledges the right of any natural or legal person to access information about the environment held by public authorities and the obligation on such authorities to disseminate this information.

Annex C.
Emergency response organisation

C.1. Management of nuclear and radioactive emergencies

The management of nuclear and radioactive emergencies in Spain is governed by the national civil protection system and the requirements for the use of nuclear energy and ionising radiation.

From the perspective of Civil Protection, the general organisational principles, responsibilities, rights and duties of citizens, public authorities and Licensees of practices are established with regard to emergency planning, preparedness and response. Emergency plans are likewise established for actions outside facilities if accidents occurring on-site have an impact on third parties.

From the perspective of nuclear regulations, internal emergency plans must be in place at every radiological practice, with specific criteria being established with regard to levels and techniques for intervention, as well as the protection measures on which the plans are based.

In this regard, the Regulation on Nuclear and Radioactive Facilities (RINR), approved by Royal Decree 1836/1999, of 3 December, requires that applicants for any nuclear or radioactive facility draw up and submit a site emergency plan in line with the existing risks prior to obtaining the operating permit, which will be approved when said permit is awarded.

In accordance with the RINR, both El Cabril Disposal Facility and the Juzbado Fuel Element Factory are classified as nuclear facilities. Consequently, they must have a Site Emergency Plan approved by the Spanish Ministry for Ecological Transition and Demographic Challenge (MITERD), following a mandatory report from the Nuclear Safety Council (CSN).

In addition, the Basic Nuclear Emergency Plan (PLABEN), approved by Royal Decree 1546/2004, first of all, establishes planning and preparation for any emergency situations that could result from accidents at nuclear power plants in operation or shut down while spent fuel is stored in their pools.

Secondly, the Basic Civil Protection Guidance to address Radiological Risk (DBRR), approved by Royal Decree 1564/2010, contains the minimum criteria that must be followed by the various public authorities and, to the applicable extent, the Licensees of regulated nuclear and radioactive facilities, as well as the Licensees of any other facilities or activities where a radiological risk might exceptionally exist. These would include facilities dedicated to the disposal of low- and intermediate-level radioactive waste (El Cabril) and temporary spent fuel and high-level radioactive waste storage facilities. This includes both ITS facilities, currently still covered by the PLABEN regulations, and which at some specific point will be covered by the DBRR, **as in the case of the ITS at José Cabrera NPP, whose external emergency management**

has gone from depending on the PLABEN/PENGUA to depending on the DBRR/RADIOCAM, as the Special Plan for Radiological Risk in Castile la Mancha is called.

Likewise, the aforementioned Guidance establishes the minimum requirements that must be fulfilled by the corresponding plans in terms of fundamental principles, structure, organisation and operational and response criteria in order to set out a minimum national model or design that would, where applicable, enable coordination and joint action by the various services and public authorities involved. It makes provision for a general civil protection planning structure comprising the National Plan and the Autonomous Regional Plans, including the Local Action Plans.

In accordance with all the above, Royal Decree 1054/2015 approved the National Civil Protection Plan in response to Radiological Risk. The various Special Civil Protection Plans to address Radiological Risk of the Autonomous Regions should also be included.

In the last year, two milestones have taken place at a regulatory level that impact the organisation of the National Civil Protection System.

On the one hand, Royal Decree 524/2023, of 20 June, approving the Basic Civil Protection Regulations. This instrument fully updates the regulatory framework of the National Civil Protection System. This Royal Decree repeals several basic planning guidelines and civil protection plans against certain risks; however, it indicates that these documents will continue to be applied until the new planning instruments that replace them are approved.

On the other hand, the publication in the Official State Gazette of the *Resolution of 21 March 2023 of the Undersecretariat of the Interior, which publishes the Agreement of the Council of Ministers, establishing basic safety standards for protection against the dangers arising from exposure to ionising radiation in the field of civil protection*. This Agreement transposes, on emergency matters, pending issues of Council Directive 2013/59/Euratom of 5 December 2013.

C.2. Organisation of the CSN for emergency situations

Given the specific nature of nuclear and radiological emergencies, the CSN covers a series of functions in this sphere that go beyond the powers inherently vested in it as a nuclear regulatory body.

To fulfil these functions with an appropriate level of efficacy and efficiency, the CSN has an Emergency Response Organisation in place, supplementing its ordinary operational structure. It is headed by the Chairperson of the CSN and involves the technical and logistical units of the body in accordance with an Emergency Action Plan (Spanish acronym: PAE), which is activated according to the level of seriousness of the accident triggering the nuclear or radiological emergency.

The CSN Emergency Response Organisation operates from an Emergency Room (SALEM) which is permanently staffed and has an emergency callout team capable of responding to an emergency situation in under an hour. The SALEM has communications and assessment tools in place to advise the directors of emergency plans as to the level of external response activated based on the most conservative evolution of the accident, the potential consequences and the population protection measures that would need to be implemented in accordance with the expected impact.

The internal capacities of the CSN to respond to an emergency are supplemented by means of agreements and collaboration contracts with public and private entities, and external human and material resource support will therefore provide emergency services under the supervision of the CSN.

The PAE del CSN has its own training plan and is independent of the training plans of those acting in the external nuclear emergency plans of the nuclear power stations, but is coordinated with them. Furthermore, the PAE of the CSN has in place a programme of exercises and drills operating internally, nationally, and internationally, periodically serving to ascertain the operability of its technical capacities and to apply the relevant improvements.

The Emergency Response Organisation has a hierarchical structure operating under the principle of one single command, which supplements the ordinary structure of the CSN.

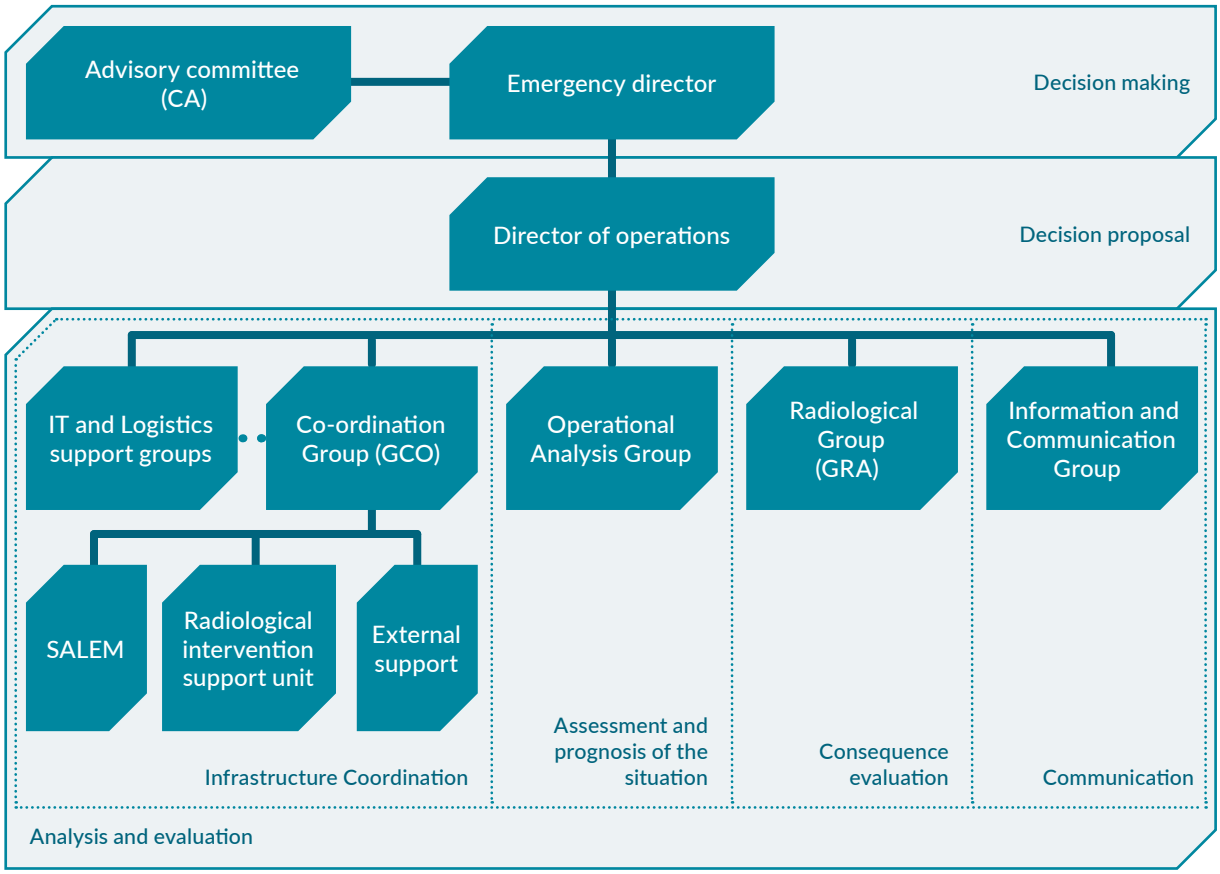


Figure 5. Hierarchical structure of the Emergency Response Organisation.

The Emergency Response Organisation structure has three hierarchical levels, as follows.

- Decision-making regarding recommendations for directors of external emergency plans;
- Proposal of decisions and protection measures for the population;
- Analysis and assessment of events by the Operational Groups:
    - The Emergency Director, advised by a committee including the members of the CSN Plenary who will not fulfil the role of Emergency Director, is responsible for directing the Emergency Response Organisation, reaching decisions and conveying CSN recommendations to those responsible for the management of the applicable emergency plan, and for cooperating with the competent authorities in information for the population. The function of the Emergency Director lies with the Chairperson of the CSN.
    - The Emergency Operations Director is responsible for coordinating all actions of the Emergency Response Organisation and drawing up proposed recommendations that the DE must send to those responsible for the management of the applicable emergency plan. The role of Emergency Operations Director is taken on by one of the two technical directors of the body or one of the sub-directors.
    - The Operational Groups are responsible for performing any technical actions that might be required in order to prepare recommendations. These will be passed on to the DOE and to the Emergency Director, and once the recommendations have been adopted by the SALEM, they will be passed on to those responsible for the management of the applicable external emergency plan, who will activate and coordinate the intervention teams and prepare information to be conveyed to the population affected.

The missions of the Operational Groups of the Emergency Response Organisation are specifically as follows:

- The mission of the Operational Analysis Group is to analyse the causes of the accident and to forecast its possible evolution, informing the Emergency Operations Director as to the measures that should be taken so as to restore the emergency situation to a safe condition, bearing in mind that the responsibility for reaching decisions and adopting the relevant measures for this to occur lies with the facility;
- The mission of the Radiological Group is to analyse the radiological situation caused by the accident, propose appropriate protection measures to the Emergency Operations Director in order to alleviate the radiological consequences for the population, property and the environment, and to cooperate in the practical implementation thereof;
- The mission of the Information and Communication Group is to provide the other members of the Emergency Response Organisation and the bodies with which the CSN has an early notification commitment with information as to the facility or location of the accident as required in order for them to undertake their functions. The GIC is also

responsible for preparing information about the emergency, which must be conveyed to the national and international media and the population in fulfilment of the functions assigned to the CSN under international commitments;

- The mission of the Coordination Group is to keep the infrastructure of the Emergency Response Organisation fully operational and to ensure the flow of information between all its members and the exterior. This group coordinates the IT Support and Logistics Support Group and manages external support and the emergency callout teams;

- The IT Support Group ensures the operability of the corporate IT systems at the CSN in the event of an emergency, providing viable alternatives where applicable to guarantee the fulfilment of the Emergency Response Organisation's basic functions. It also provides technical support for the proper operability of IT and communications systems and equipment for specific use by the different operational groups of SALEM;

- The Logistics Support Group ensures the availability of the logistical resources required for the functionality of the Emergency Response Organisation or provides viable alternatives to guarantee the fulfilment of its basic functions, and also ensures the safety of the Emergency Response Organisation;

- The Sub-Directorate for Emergencies and Physical Protection is assigned functions within the CSN, including maintenance and operation of the SALEM, management of external support, and management of the emergency callout team. Therefore, the actions and responsibilities of the Coordination Group are closely connected with the functioning of said Sub-Directorate.

Within the SALEM, the Emergency Response Organisation may operate in four Response Modes (from 0 to 3), with its structure varying in accordance with the seriousness, complexity, duration of the emergency and the level of decision-making responsibility, adapting to different response levels in terms of the composition of resources: permanent or mode 0 (permanent response technicians); limited or mode 1 (the aforementioned + DOE); basic or mode 2 (the aforementioned + callout teams); and extended or mode 3 (which could involve all CSN personnel).

The CSN ensures that its Emergency Response Organisation is trained and updated, allowing it to reliably and effectively handle all functions assigned by law to the CSN in the event of an emergency by updating and acquiring new material resources and signing contracts and protocols provided with access to new equipment.

C.3. Skills development and training of the emergency response organisation: drills and exercises

The Emergency Response Organisation of the CSN is permanently involved in conducting exercises and drills to guarantee its efficacy in the event of an emergency. Each year it supervises skills development and training activities for emergency response personnel at nuclear facilities, and in particular with reference to the low- and intermediate-level waste management facility and the Fuel assembly Factory.

The CSN monitors the development of annual emergency drills at all nuclear facilities through the activation and actuation of the Emergency Response Organisation at the Emergency Room (SALEM). The agreements between the Military Emergency Unit (UME) and the CSN include the provision of material resources serving promptly to allow the deployment of CSN staff to establish a backup SALEM at the facilities of the Emergency Military Unit General Staff Headquarters in Torrejón de Ardoz, Madrid. This would occur if SALEM activities were activated and the circumstances were to force an evacuation.

Actions in these drills are taken under conditions of the utmost realism, applying the existing procedures for the activation and actuation of the Emergency Response Organisation operational groups. These drills also practice coordination between the CSN and the corresponding Provincial and National Authorities, in order to verify the general efficacy of the existing procedures.

In addition, and as a result of the staging of the CSN drill, inspection personnel normally attend the facilities in order to ascertain the operability of the Internal Emergency Plan and to monitor the drill on-site so that they can call on the facility to implement any corrective actions which might result from the observations made.

Empresa Nacional de Residuos Radiactivos, S.A., S.M.E. (Enresa) plays an active role both in the urgent phase of the drills, with simulated or real activation, in the management of hypothetical radioactive waste generated and during the recovery phase tasks. It takes part in the debates on the efficacy of decontamination techniques for urban and rural areas, and the CSN supervises the management of radioactive waste generated in these processes.

C.4. Participation by the CSN on the international stage

The Spanish State is a contracting party to the international conventions on Early Notification of a Nuclear Accident or Radiological Emergency and is subject to obligations for the exchange of information in the event of a nuclear accident or radiological emergency. It has signed agreements and collaboration protocols both at the governmental level and between regulators.

Among other arrangements, the CSN has bilateral agreements in place for exchanging information in nuclear and radiological emergencies with the ASN in France, the Portuguese Envi-

ronmental Agency, the National Civil Protection Authority and the Higher Technical Institute of Lisbon University in Portugal.

C.5. Participation by the military emergency unit in nuclear and radiological emergencies

On the basis of National Defence Law 5/2005 and the Resolution of the Council of Ministers of 17 October 2005, the Emergency Military Unit was set up to provide an immediate response in situations of serious emergency. Royal Decree 1097/2011 approved the protocol for intervention by the Emergency Military Unit in order to specify the circumstances in which its involvement could be ordered. Said protocol indicates that the Ministry of Defence shall, by delegation of the President of the Government, order the intervention of the Emergency Military Unit, whose actions must comply with the provisions of the legislation in force regarding civil protection, and in particular with regard to the distribution of powers between the State and the Autonomous Regions. The conclusion of its actions must be agreed upon by the Ministry of Defence at the proposal of the Ministry of the Interior, having granted an audience to the authorities that requested its intervention. The commencement and conclusion of its actions will be notified to the National Security Department of the President of the Government.

C.6. Royal Decree for the regulation of the activities of Empresa Nacional de Residuos Radiactivos S.A., S.M.E. (ENRESA)

Royal Decree 102/2014, for the safe and responsible management of spent nuclear fuel and radioactive waste, assigns functions to Enresa, including cooperation with the competent authorities in the event of nuclear or radiological emergencies. Both the PLABEN and the DBRR make Enresa responsible for the management of radioactive waste required during the emergency phase under the coordination of the CSN.

Annex D.
Fund for the financing of the activities of the General Radioactive Waste Plan

The Fund for the financing of the General Radioactive Waste Plan (GRWP) covers the activities carried out by Empresa Nacional de Residuos Radiactivos, S.A., S.M.E. (Enresa) for the management of radioactive waste and spent fuel and the dismantling and closure of nuclear facilities, including all the associated costs.

The revenue required to finance these costs is calculated in accordance with the current legal framework developed by Law 11/2009, of 26 October, which regulates Listed Real Estate Investment Companies (Sociedades Anónimas Cotizadas de Inversión en el Mercado Inmobiliario) and amended the Law on Electricity Sector 54/1997. This law, which came into force on 1 January 2010, established a new financing system based on the collection of four fees depending on the type of producers or services provided.

The Law on Public Sector Contracts 9/2017, of 8 November, in its Eleventh Final Provision, amended the First Additional Provision of the General Law on Taxation 58/2003, of 17 December, so that the fees for the financing of the activities of the GRWP enjoyed the legal nature of non-tax public economic contributions.

D.1. Non-tax public economic percentage on network tariffs

This represents the funding channel both for the costs corresponding to the management of radioactive waste and spent fuel generated at nuclear power plants which definitively ceased operations prior to 1 January 2010, and also the decommissioning and closure thereof, as well as those future costs corresponding to nuclear power plants or fuel assembly factories which, having definitively ceased operations, had not made provision during their operations, as well as any that might result from the premature cessation of operations at a facility for reasons outside the control of the Licensee.

Also included in this benefit are the amounts intended to endow the part of the Fund for the financing of the costs of the management of radioactive waste from those research activities that the Spanish Ministry for Ecological Transition and Demographic Challenge (MITERD) deems to be directly connected with the generation of nuclear electrical energy, decommissioning and closure operations required as a consequence of mining and the production of uranium concentrate prior to 4 July 1984, the costs derived from the reprocessing of spent fuel sent abroad prior to the entry into force of the law establishing this, and any other costs specified by Royal Decree.

The amount to be paid is determined by the tax base, comprised of the total revenue derived from the application of the tolls relating to the electricity tariff and a tax rate fixed in the **Sixth Additional Provision of Law 54/1997.**

D.2. Non-tax public economic contribution relating to operating nuclear power plants

This represents the channel by means of which all costs incurred from 1 January 2010 onwards and corresponding to the management of radioactive waste and spent fuel generated at nuclear power plants in operation will be financed by the Licensees of the nuclear power plants during such operations, irrespective of the date when they were generated, as well as costs corresponding to decommissioning and closure.

The Licensees of nuclear power plants will likewise finance the allocations assigned to municipalities affected by nuclear power plants or spent fuel or radioactive waste storage facilities on the terms established by the MITERD, as well as the amounts corresponding to taxes levied in connection with radioactive waste and spent fuel storage activities, irrespective of the date when they are generated.

The fee payable by each nuclear power plant during the operation of the facility is the result of multiplying the gross nuclear electricity generated, measured in kWh and rounded down to the nearest whole number, by the fixed unitary tariff and the applicable corrective coefficient in accordance with the scale defined in the Sixth Additional Provision of Law 54/1997.

This fee was modified in 2019 by Royal Decree 750/2019, of 27 December, which updated the amounts by which nuclear power plants contribute to the Enresa Fund. This is in line with the policy of orderly and staggered closure of Spanish nuclear power plants reflected in the Integrated National Energy and Climate Plan (PNIEC) 2021-2030.

D.3. Non-tax public economic contribution relating to the juzbado fuel element factory

This covers the provision of radioactive waste management services deriving from the manufacturing of fuel assemblies, including the decommissioning of the manufacturing facilities. The Sixth Additional Provision of Law 54/1997 establishes the tax rate on the quantity of nuclear fuel manufactured yearly.

D.4. Non-tax public economic contribution relating to other facilities

This covers the provision of radioactive waste management services generated at facilities other than those indicated above, such as radioactive facilities (medicine, industry, agriculture and research), the Centre for Energy-related, Environmental and Technological Research (Ciemat) or other companies. All of them are directly charged for the costs when the services are provided. **The tax payable by the facilities is the result of multiplying the quantity or unit of waste delivered for management by the tax rates defined in the Sixth Additional Provision of Law 54/1997.**

D.5. Control of the fund

Enresa is responsible for management of the Fund, the prevailing principles being security, cost-effectiveness and liquidity. As repeatedly stated in successive national reports, the endowments of the Fund may only be assigned to cover the cost of actions set out in the GRWP. At the end of the radioactive waste management and facility decommissioning period covered by the GRWP, the total figure deposited in the Fund via the various funding channels will be required to cover the costs incurred, resulting in a final balance of zero.

Supervision, control and rating of transitional investments made by the Fund are the responsibility of a Committee for Tracking and Control attached to the MITERD through the State Secretariat for Energy and governed by Royal Decree 102/2014. This Committee must draw up biannual reports covering the status of the Fund and the investments corresponding to its financial management, along with the rating attributed to fund management, setting out any observations it might deem appropriate. These reports are submitted to the MITERD, **the Ministry of Science, Innovation and Universities and the Ministry of Finance**.

In addition, Royal Decree 102/2014 establishes the obligation on Enresa to present the following reports to the MITERD (which is responsible for strategic management and monitoring and control of Enresa's actions and plans, both technical and economic, via the State Secretariat for Energy):

- During the first half of each year:
  - A memorandum including technical and economic aspects regarding activities in the previous financial year.
  - An updated economic/financial study on the cost of the activities covered by the GRWP, including remuneration for plan management activities.
- By 30 November each year, a technical/economic justification of the annual budget corresponding to the next year and the forecast for the three following years. In the event that, on an exceptional basis, it should prove necessary to cover costs not provided for in the aforementioned economic/financial study, Enresa would first be required to submit the corresponding justification.

- The month following each calendar quarter, a budgetary monitoring report.

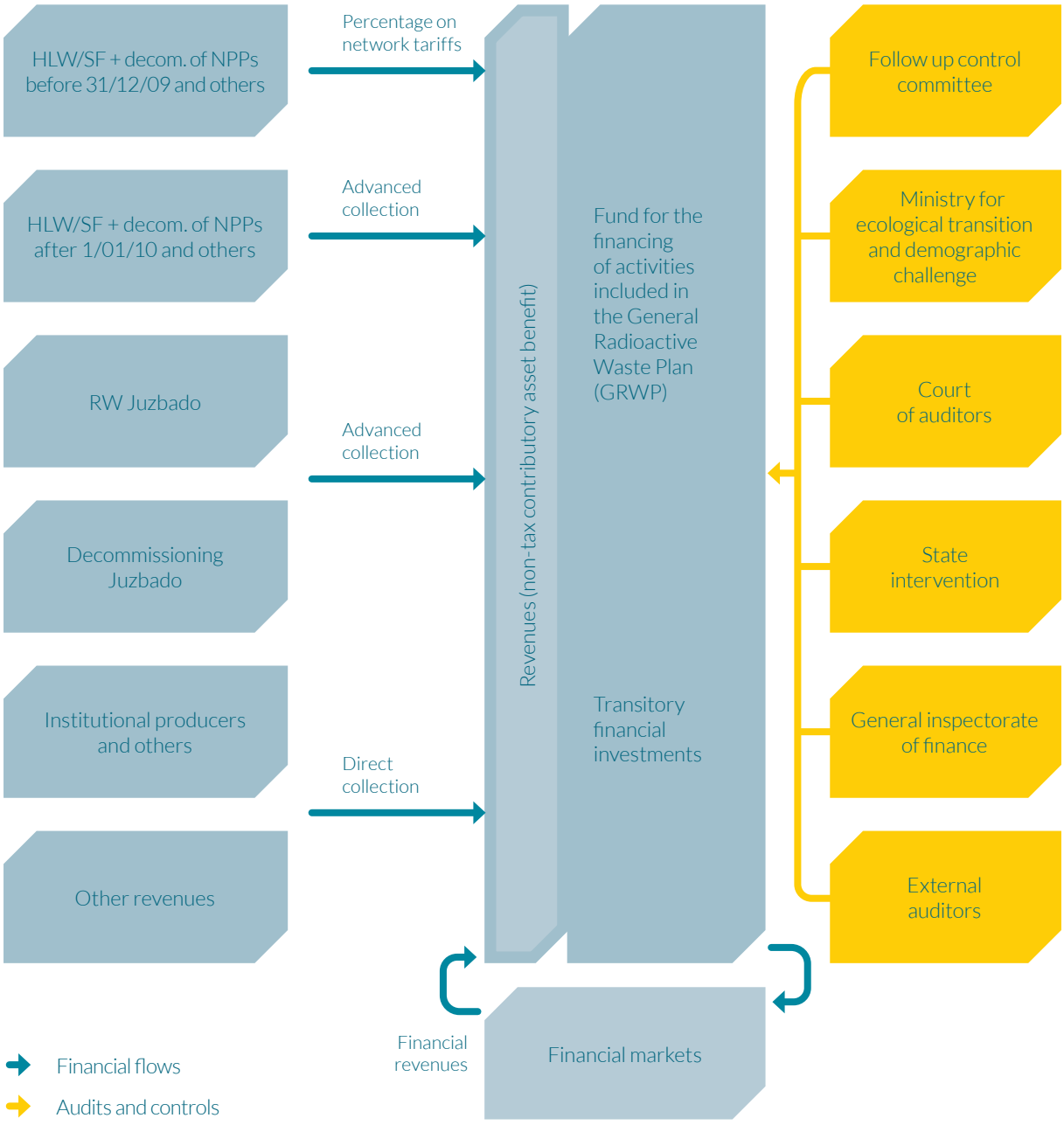


Figure 6. Overview of the funding system for GRWP activities and the mechanisms for its control.

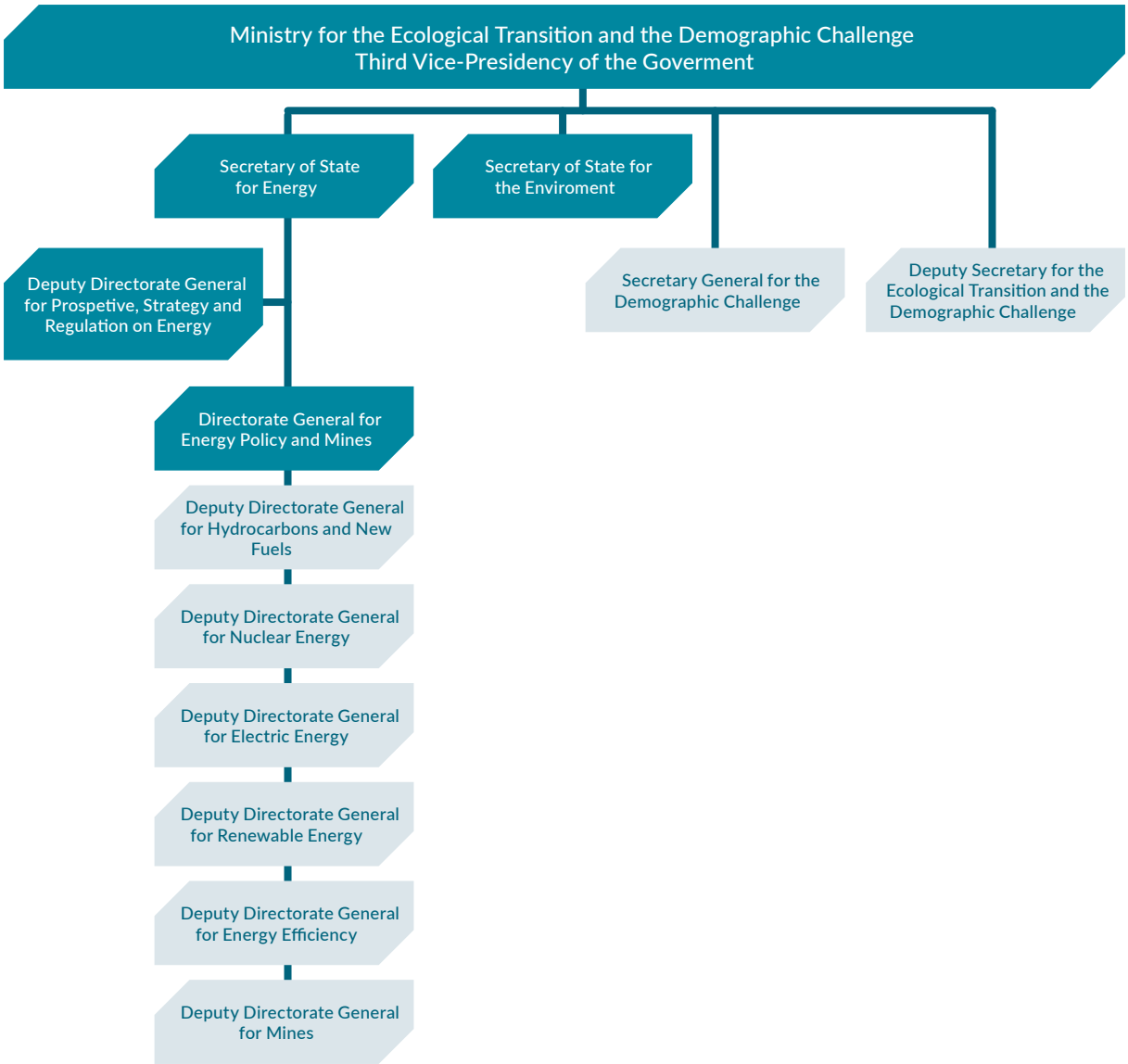
Annex E.
Synoptic matrix

Type of liability		Long-term management policy	Financing	Current practices/ facilities	Planned facilities
Spent fuel		**Temporary storage in the Decentralised Temporary Storage (DTS) facilities of the plants that generate them, until their transfer to the Deep Geological Repository (DGR).**	"Polluter pays" principle. Fund for financing the activities of the General Radioactive Waste Plan (GRWP). Revenue from the operation of nuclear power plants that have remained in operation in 2010, through the payment of the "non-tax public economic contribution (**PPCPNT**) 2". The financing of the management of spent fuel (SF) from nuclear power plants closed prior to 2010 is covered by the "**PPCPNT 1**".	In the pools of the nuclear power plants themselves. In Individualised Temporary Storage (ITS).	**DTS at each plant. Future final storage facility or DGR.**
Nuclear fuel cycle waste	**Uranium mining tailings**	Facilities under monitoring programmes	Financed by the Licensee of the facility or, in the case of historical legacies, is charged to the "**PPCPNT 1**".	On-site conditioning and remediation.	N/A
	Waste from Juzbado	Definitive disposal at El Cabril radioactive waste disposal facility (El Cabril Disposal Facility).	"Polluter pays" principle. Fund for the financing of GRWP activities. Revenue from Juzbado through payment of the "**PPCPNT 3**".	Pre-conditioning and temporary storage at Juzbado. Transportation, conditioning and definitive storage at El Cabril Disposal Facility.	N/A
	Operational waste from nuclear facilities	Definitive disposal at El Cabril Disposal Facility.	"Polluter pays" principle. Fund for the financing of GRWP activities. Revenue from the operation of operating nuclear power plants that remained operational in 2010, through the "**PPCPNT 2**".	Pre-conditioning and temporary storage at the facilities. Transportation, conditioning and final storage at El Cabril Disposal Facility.	N/A
	Waste from off-site reprocessing of fuel from Vandellós I fuel	**Start-up in 2027 of a temporary storage facility on the site. It will remain operational until transfer to the DGR**	Fund for the financing of GRWP activities. Revenue from "**PPCPNT 1**".	**Return to Spain once the temporary storage facility is available.**	**Temporary on-site storage.** Future disposal facility (DGR).
Waste external to the fuel cycle		Final disposal at C.A. El Cabril	"Polluter pays" principle. Fund for the financing of GRWP activities. Revenue from nuclear facility holders through the payment of "**PPCPNT 4**".	Temporary storage at radioactive facilities. Pre-conditioning on site. Transportation, storage and disposal at El Cabril Disposal Facility.	N/A

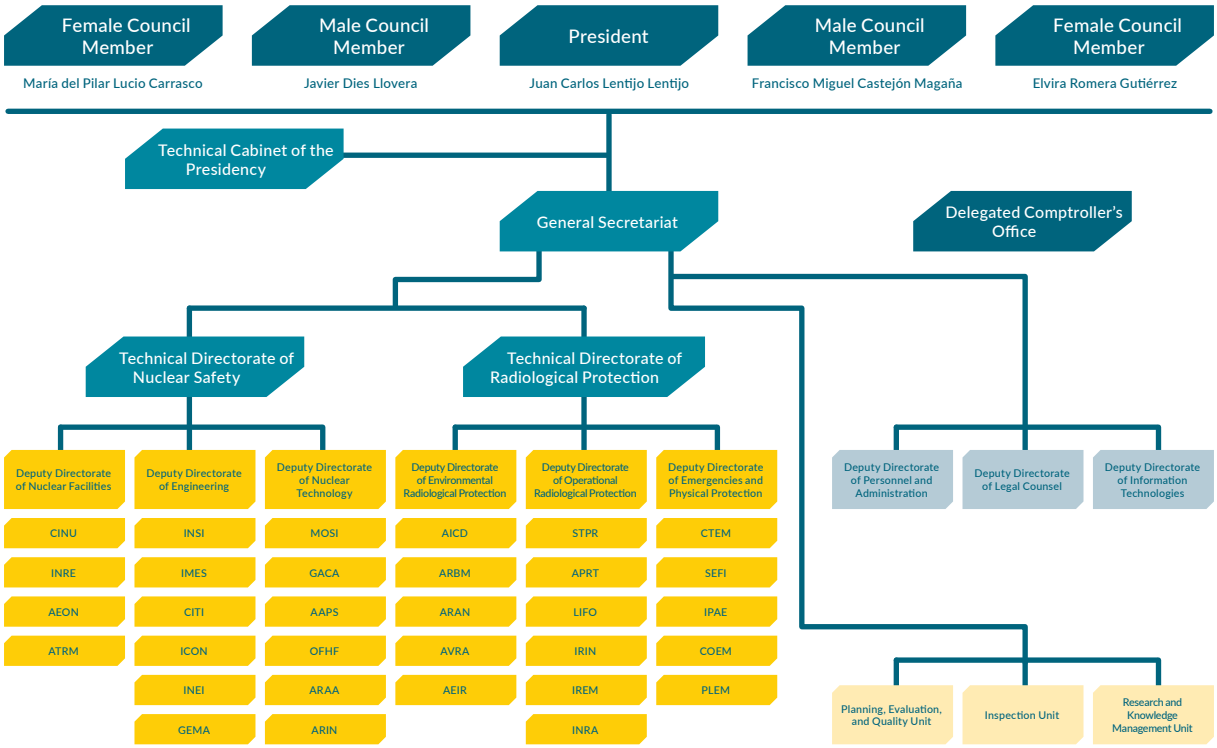
Type of liability	Long-term management policy	Financing	Current practices/ facilities	Planned facilities
Closure	**Total and immediate dismantling. Resulting in VLLW and LILW definitively disposed of at El Cabril Disposal Facility. High-level waste (HLW) and special waste (SW) are to be disposed of at the DTSs at the sites of the plants generating them until their transfer to the DGR.**	"Polluter pays" principle. Fund for the financing of GRWP activities. Revenue from the operation of operating nuclear power plants that have remained operational in 2010, through the payment of the "**PPCPNT 2**". The financing of the decommissioning and closure of nuclear power plants prior to 2010 is covered by the **"PPCPNT 1**".	The strategy established consists of the total and immediate decommissioning of light water-type nuclear power plants, all existing ones except Vandellós I NPP.	N/A
Sealed disused sources	Return to the supplier. If this is not possible, final disposal at El Cabril Disposal Facility. If it does not meet the acceptance criteria, temporary storage at El Cabril **until final storage once the DGR is available**.	Cost is borne by the Licensee of the facility.	Return to the supplier. If this is not possible, final disposal at El Cabril. If it does not meet the acceptance criteria, temporary storage at El Cabril Disposal Facility **until final disposal once the DGR is available.**	Future Deep Geological Repository (DGR).

Annex F.
Organisational charts of the bodies and institutions involved in radioactive waste and spent fuel management

F.1. The spanish Ministry for Ecological Transition and Demographic Challenge (MITERD)



F.2. Nuclear Safety Council



Deputy Directorate of Nuclear Facilities
CINU: Nuclear Facilities Coordinator
INRE: Coordinator and Support of Resident Inspection
AEON: Operational and Regulatory Experience Area
ATMR: Radioactive Material Transportation Area

Deputy Directorate of Engineering
NSI: Systems Engineering Area
IMES: Mechanical and Structural Engineering Area
CITI: Earth Sciences Area
ICON: Nuclear Fuel Engineering Area
INEI: Electrical Systems, Instrumentation, and Control Area
GEMA: Life Management and Maintenance Area

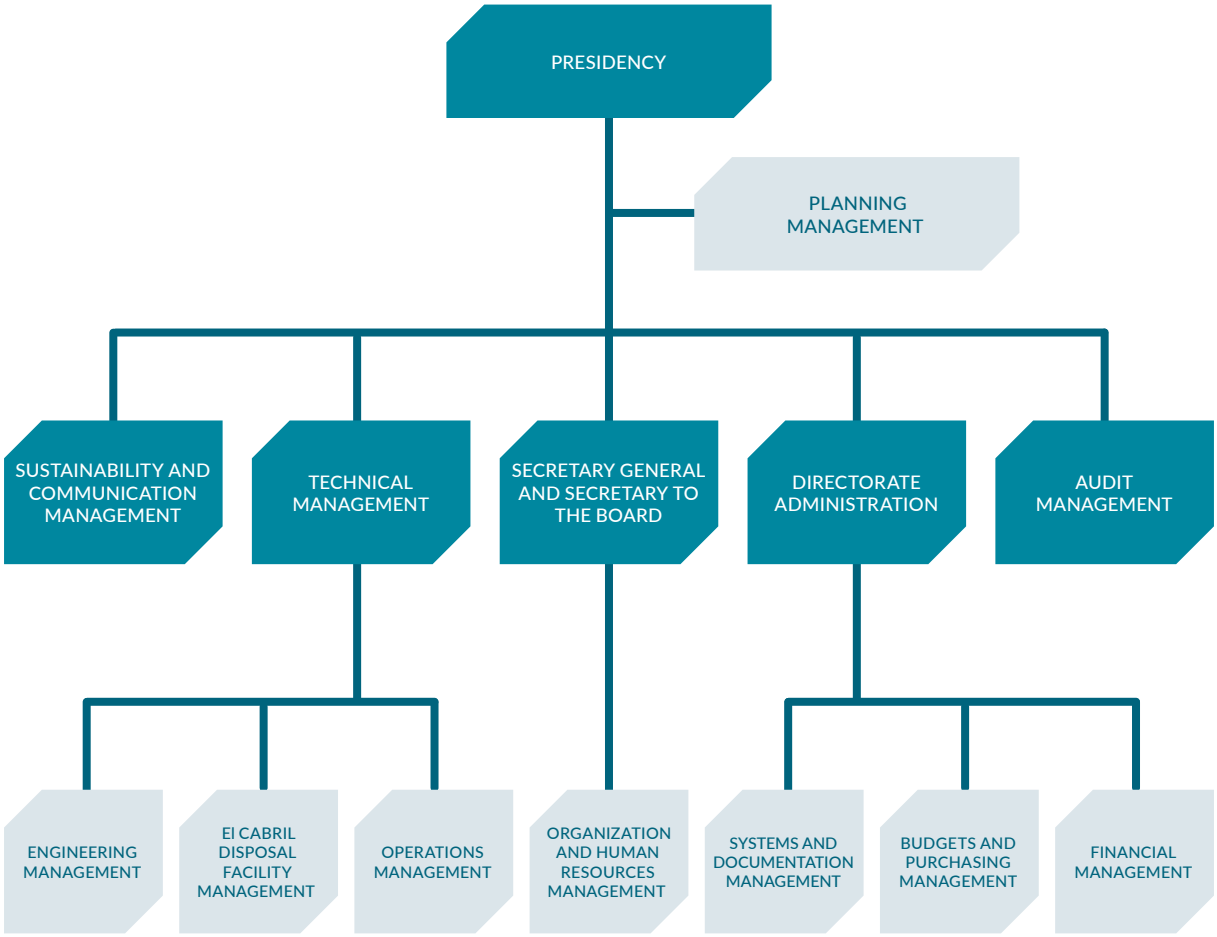
Deputy Directorate of Nuclear Technology
MOSI: Modeling and Simulation Area
GACA: Quality Assurance Area
AAPS: Probabilistic Safety Analysis Area
OFHF: Organization, Human Factors, and Training Area
ARAA: High-Level Waste Area
ARIN: Internal Events Protection Area

Deputy Directorate of Environmental Radiological Protection
AICD: Cycle and Decommissioning Facilities Area
ARBM: Low and Intermediate-Level Waste Area
ARAN: Natural Radiation Area
AVRA: Environmental Radiological Surveillance Area
AEIR: Radiological Impact Assessment Area

Deputy Directorate of Operational Radiological Protection
STPR: Technical Services of Radiological Protection Area
APTR: Workers' Radiological Protection Area
LIFO: Licensing and Training Area
IRIN: Industrial Radioactive Facilities Area
IREM: Medical Radioactive Facilities and Exposures Area
INRA: Radioactive Facilities Inspection Area

Deputy Directorate of Emergencies and Physical Protection
CTEM: Technical Emergency Coordinator (Deputy Directorate of Emergencies)
SEFI: Physical Security Area
IPAE: Emergency Responders Intervention and Preparedness Area
COEM: Emergency Operations Coordination Area
PLEM: Emergency Planning Area

F.3. ENRESA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DIRECTORATE ADMINISTRATION
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SYSTEMS AND DOCUMENTATION MANAGEMENT
BUDGETS AND PURCHASING MANAGEMENT
FINANCIAL MANAGEMENT

Annex G.
Acronyms and abbreviations used

DGR	Deep Geological Repository
ITS	**Individualised Temporary Storage**
DTS	**Decentralised Temporary Storage**
CTS	Centralised Temporary Storage
ALARA	As Low As Reasonably Achievable
OSG	Official State Gazette (Boletín Oficial del Estado)
BWR	Boiling Water Reactor
CAE	Emergency Support Centre (Centro de Apoyo a Emergencias)
CAGE	Alternative Emergency Management Centre (Centro Alternativo de Gestión de Emergencias)
EC	European Commission
CEN	Nuclear Energy Committee (Comité de Energía Nuclear)
CFR	US Code of Federal Regulations
SF	Spent Fuel
Ciemat	Centre for Energy-Related, Environmental and Technological Research (Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas)
CSN	Nuclear Safety Council (Consejo de Seguridad Nuclear)
DBRR	Basic Civil Protection Guidance to address Radiological Risk (Directriz Básica de Protección Civil frente al Riesgo Radiológico)
DGPC	Directorate-General for Civil Protection (Dirección General de Protección Civil)
DGPEM	Directorate-General for Energy Policy and Mines (Dirección General de Política Energética y Minas)
ECURIE	European Community Urgent Radiological Information Exchange
USA	United States of America
EIA	Environmental Impact Assessment
Enresa	Empresa Nacional de Residuos Radiactivos, S.A.

ENUSA	ENUSA Industrias Avanzadas, S.A.
EPS	Preliminary Safety Study (Estudio Preliminar de Seguridad)
ES	Safety Study (Estudio de Seguridad)
ETF	Technical Functional Specifications (Especificaciones Técnicas de Funcionamiento)
EURATOM	European Atomic Energy Community
FUA	Andujar Uranium Plant (Fábrica de Uranio de Andujar)
GS	Safety Guide (Guía de Seguridad)
HERCA	Heads of the European Radiation Protection Competent Authorities
R&D	Research and Development
ICRP	International Commission on Radiation Protection
IR	Radioactive Facility (Instalación Radiactiva)
INEX	International Nuclear Emergency Exercise
INPO	Institute of Nuclear Operations (Instituto de Operaciones Nucleares)
IOP	Operational Instructions (Instrucciones de Operación)
IRRS	Integrated Regulatory Review Service
ISO	International Organization for Standardization
KWU	Kraftwerk Union A.G.
LNE	Law on Nuclear Energy (Ley de Energía Nuclear)
MCDE	External Dose Calculation Manual (Manual de Cálculo de Dosis al Exterior)
MAPAMA	Spanish Ministry of Agriculture and Fisheries, Food and the Environment
MITYC/MINETUR/MINETAD/MITECO/MITERD	now the Spanish Ministry for Ecological Transition and Demographic Challenge
NEA	Nuclear Energy Agency of the OECD
NRC	United States Nuclear Regulatory Commission
NUREG	NRC technical publication
O.M.	Ministerial Order (Orden Ministerial)
OECD	Organisation for Economic Co-operation and Development
IAEA	International Atomic Energy Agency
ORE	Emergency Response Organisation (Organización de Respuesta a Emergencias)

OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic
PCP	Process Control Programme
PEI	External Emergency Plan (Plan de Emergencia Exterior)
PEN	National Energy Plan (Plan Energético Nacional)
GRWP	General Radioactive Waste Programme
PGRRCG	Radioactive Waste and Spent Fuel Management Plan (Plan de Gestión de Residuos Radiactivos y del Combustible Gastado)
PIMIC	Integrated Ciemat Installations Improvement Plan (Plan Integrado para la Mejora de las Instalaciones del Ciemat)
PLABEN	Basic Nuclear Emergency Plan (Plan Básico de Emergencia Nuclear)
PLAGERR	Radioactive Waste Management Plan (Plan de Gestión de Residuos Radiactivos)
PNIEC	2021-2030 National Integrated Energy and Climate Plan (Plan Nacional Integrado de Energía y Clima)
PPCPNT	**Non-tax public economic contribution**
PVRA	Environmental Radiological Surveillance Programme (Programa de Vigilancia Radiológica Ambiental)
PWR	Pressurised Water Reactor
R.D.	Royal Decree (Real Decreto)
R.G.	NRC Regulatory Guide
HLW	High-level waste
VLLW	Very low-level waste
LILW	Low- and intermediate-level waste
SW	Special Waste
RINR	Regulation on Nuclear and Radioactive Facilities (Reglamento sobre instalaciones nucleares y radiactivas)
RPS	Periodic Safety Review (Revisión Periódica de Seguridad)
RPSRIbre	Regulation on Health Protection Against Ionising Radiation (Reglamento so-Protección Sanitaria contra Radiaciones Ionizantes)
RW	Radioactive Waste
SACOP	Operational Coordination Room (Sala de Coordinación Operativa)

SALEM	CSN Emergencies Room (Sala de Emergencias)
SEMA	State Secretariat for the Environment (Secretaría de Estado de Medioambiente)
SEPI	Sociedad Española de Participaciones Industriales [Spanish state-owned industrial holding company]
SGEN	Sub-Directorate-General for Nuclear Energy (Subdirección General de Energía Nuclear)
UKAEA	United Kingdom Atomic Energy Authority
WANO	World Association of Nuclear Operators
WENRA	Western European Nuclear Regulators Association

GOBIERNO
DE ESPAÑA

VICEPRESIDENCIA
TERCERA DEL GOBIERNO

MINISTERIO
PARA LA TRANSICIÓN ECOLÓGICA
Y EL RETO DEMOGRÁFICO