

SPAIN

National Report on the implementation of the Council Directive 2014/87/Euratom

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I. Introduction

a) Basis and purpose of the report

The present document is the Second Spanish National Report drawn up in compliance with the requirement set out in article 9.1 of Council Directive 2009/71/Euratom, of July 25th 2009, which establishes a community framework for the nuclear safety of nuclear installations, amended by Council Directive 2014/87/Euratom, of July 8th 2014, according to which the member States shall submit to the European Commission (EC) a report on the application of the aforementioned Directive, initially by July 22nd 2014 and subsequently by July 22nd 2020 at the latest.

The Report covers Spain's compliance with the obligations set out in the Directive and also provides the EC with a follow-up on the report, which in accordance with article 9.2 of the said Directive is to be submitted to the European Council and Parliament to report on the progress made by the member States in its application. In drawing up the report, the recommendations proposed in the guideline produced for this purpose by the European Nuclear Safety Regulators Group (ENSREG) have been adhered to in content and form.

The structure of the Report is made up of the present introduction, an executive summary, a breakdown into articles and sub-sections and those appendices that have been considered appropriate. The body of the Report aims to be self-explanatory, with references in certain cases to other articles, the appendices or other reports in order to provide more detailed information. This Report summarises events and actions implemented from May 1st 2014 to July 22nd 2020, although the data it contains are those available as of December 31st 2019, unless some other date is specified.

The Spanish Nuclear Safety Council (CSN), the Ministry for Environmental Transition and Demographic Challenge (Miterd), the Spanish national radioactive waste management company Empresa Nacional de Residuos Radiactivos, S.A., S.M.E., (Enresa), the licensees of the Spanish nuclear power plants, coordinated by the Nuclear Energy Committee (CEN) and the licensee of the Juzbado fuel assembly manufacturing installation, Enusa Industrias Avanzadas, S.A., S.M.E. (Enusa), participated in drawing up this Report.

b) General outline of the national policy regarding activities relating to nuclear power plants

The Government will realign the national energy policy with the European environmental commitments assumed in the so-called "*Clean Energy Package*" by approving a National Integrated Energy and Climate Plan (PNIEC) 2021-2030, the first draft of which was submitted to the EC by the Government in February 2019. This Plan will establish the contribution to be made to the energy mix by each energy source, including that of nuclear energy, in order to guarantee supply, the competitiveness of the economy, economic growth, the creation of jobs and environmental sustainability. The PNIEC contemplates a stepwise and orderly shutdown of the Spanish nuclear fleet during the period from 2027 to 2035, in keeping with what was agreed to in the Protocol signed in March 2019 by the electricity utilities and Enresa. Likewise, during such time as Spain keeps its nuclear power plants in operation, it will be necessary to maintain and continuously reinforce their safety.

As regards the nuclear fuel cycle, since the 1983 National Energy Plan, spent fuel has been considered a radioactive waste and is to be managed as such. The option of reprocessing is not contemplated, the only exception being that carried out in its day with fuel from Vandellós I nuclear power plant, for technical reasons.

c) General outline of the national nuclear programme

Spain currently has seven light water reactors in operation at five sites. Together they provide a gross installed power of 7,394 MWe, which represents 6.5% of the total installed electricity generation and a contribution of round 21% to total national production¹. Six of the seven groups are pressurised water reactors (PWR), the other being a boiling water reactor (BWR) unit. The average lifetime of the currently operating groups amounts to 36.5 years.

Finally, there are two reactors that are in the process of dismantling and one that is in the definitive shutdown situation. The José Cabrera nuclear power plant was definitively shut down in 2006, and in 2010 its ownership was transferred to Enresa, which at the same time was authorised to undertake its dismantling. This is currently under way and is scheduled to be completed in 2021. For its part, Vandellós I nuclear power plant was definitively shut down in 1989, reached level 2 dismantling in 2003 and is currently in the latency phase under Enresa ownership. Finally, Santa María de Garoña nuclear power plant (BWR) is currently in the definitive shutdown situation and has been since July 6th 2013. In May 2014 the renewal of its operating permit was requested, but this was turned down by a Ministerial Order issued on August 1st 2017, published in the Official State Gazette (BOE) on August 3rd 2017. Since then the plant has been in definitive shutdown pending a request for the authorisation of its dismantling.

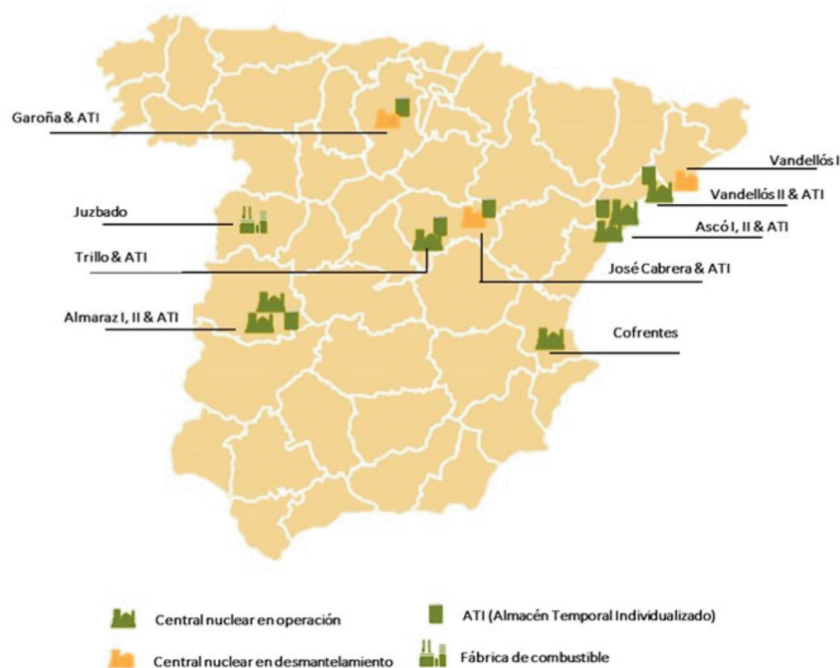


Figure 1. Installations included within the scope of application of the Directive

¹ Data as of December 31st 2019

There is also a installation in charge of designing, manufacturing and supplying nuclear fuel for Spanish and overseas plants, operated by the company Enusa Industrias Avanzadas, S.A., S.M.E.

Furthermore, the Trillo, José Cabrera, Ascó, Almaraz and Santa María de Garoña nuclear power plants have individual temporary storage (ITS) installations, authorised as a complement to storage in their plant pools or because of their dismantling.

d) Scope of the document

Figure 1 in the previous section and the tables included in Appendix I show the nuclear installations currently existing in Spain, as defined in article 3.1 of the Directive, and provide information on the operating nuclear power plants (table 1), the plants in the dismantling phase (table 2), nuclear fuel manufacturing installations (table 3) and spent fuel storage installations (table 4). All of these operate in accordance with one of the licences contemplated in article 3.4 and are consequently included within the scope of application of this Directive.

As regards the plan mapped out for the construction of a Centralised Temporary Storage (CTS) installation for spent nuclear fuel and high-level radioactive waste, the preliminary or site and construction permits for which were requested by ENRESA in 2014, the CSN reported favourably on the preliminary permit in July 2015. However, on July 5th 2018 the Secretary of State for Energy of the Miterd asked the CSN to suspend the issuing of its mandatory report on the request for a construction permit in order to be able to analyse the current circumstances and forecasts and draw up a plan in keeping with them, these to be specified following approval by the Spanish Government of the seventh General Radioactive Waste Plan. Furthermore, certain Spanish nuclear power plants have individual temporary storage (ITS) installations as an alternative or complement to their spent fuel pools. This document reports on these storage installations, including the ITS's of the Santa María de Garoña, José Cabrera, Ascó, Trillo and Almaraz plants. The ITS of Cofrentes nuclear power plant has been in the process of licensing since July 2017.

II. Executive summary

In summary and as a conclusion of this Report, Spain may be stated to fulfil all the obligations and provisions included in the Directive and whose application is covered in this Report.

Summarised below are the most relevant or significant aspects covered by each of the articles included in the Directive:

Article 4. Legislative, regulatory and organisational framework

Spain has a basic framework regulating nuclear installations that more than meets all the obligations included in the Euratom Directive. In addition, the Spanish regulatory body in charge of nuclear safety and radiological protection, the CSN, is empowered to adopt technical provisions complementing this basic framework by means of so-called Council Instructions, which are legally binding upon all installations or activities to which they are addressed. These Instructions are published in the Official State Gazette.

The Spanish regulatory framework is extensive in its coverage of the contents of the Directive and is updated with a view to improving regulation, as may be appreciated from the information contained in section 4 of this report.

Article 5. Competent regulatory authority

Spain considers the effective independence of the regulatory body to be a fundamental issue for the development of an effective regulation of nuclear safety. In this respect, since 1980 Spain has had an independent regulatory body, whose capacities are described in article 5. Particularly significant during this period has been the process carried out by the regulatory body to renew its personnel, addressing the question of retirement, and the drawing up of different safety instructions in the field of nuclear safety.

Article 6. Licence holders

The Spanish regulation that requires the operating nuclear power plants and Juzbado fuel assembly manufacturing installation to carry out a periodic safety review every 10 years, associated with the renewal of their respective operating permits, has been updated during the period covered by this report. Furthermore, the Spanish nuclear power plants have completed the implementation of the post-Fukushima measures that were required by the Nuclear Safety Council. Also worthy of mention in relation to emergencies are new emergency planning, preparedness and response requirements applicable to nuclear installations.

Article 7. Expertise and skills in nuclear safety

In compliance with the established regulatory requirements, the licensees have programmes for the qualification and initial and on-going training of their licensed and non-licensed personnel, these also including the analysis of and lessons learned from in-house and industry operating experience and specific requirements relating to the safety culture.

Article 8. *Transparency*

Transparency in the area of nuclear safety is accomplished through effective communication with the workers and the public and with member States close to the Spanish nuclear installations.

This article underlines the standards in force that require the establishment of appropriate channels for communication with the workers and the public, such as the Reports to Parliament issued by the Nuclear Safety Council, the Local Information Committees in the vicinity of nuclear power plant sites or the CSN Advisory Committee for Public Information and Participation. Likewise, there are regulations that promote the participation of the public during nuclear installation licensing processes.

Within the framework of its areas of competence the Nuclear Safety Council also has bilateral technical collaboration and cooperation agreements relating to nuclear safety with its counterpart bodies in neighbouring countries such as France, Portugal and Morocco.

Article 8a. Nuclear safety objective for nuclear installations

Royal Decree 1400/2018, of November 23rd, which approves the Regulation on the nuclear safety of nuclear installations (RSN), in compliance with the transposition of the 2014/87/Euratom Directive, establishes specific regulatory provisions on nuclear safety for the Spanish nuclear installations.

Article 8b. Implementation of the nuclear safety objective for nuclear installations

The Nuclear Safety Council has in place a structured set of technical standards relating to the design and construction of nuclear installations which contemplates the principles of defence in depth. The regulatory framework of the CSN has been completed by way of the RSN.

Likewise, the CSN promotes the effective implementation of a safety culture and of management systems, at both the nuclear installations and at the regulatory body itself.

In keeping with other applicable standards, the new RSN also provides that the licensees of nuclear installations shall have programmes for the compilation and analysis of in-house and industry operating experience, and also requires that events implying a possible impact on the nuclear safety of nuclear installations be reported to the regulatory body.

As regards the personnel of nuclear installations, the regulatory body has issued various Nuclear Safety Council instructions defining their qualification requirements.

Article 8c. Initial assessment and periodic safety reviews

The requirements and criteria applicable to site studies and relating to the safety of nuclear installations are expressly contained in the new RSN, as well as being developed in CSN Instructions IS-26 and IS-27, which bring together the practices habitual in the national environment.

The provisions relating to the periodic safety review (PSR) that were established in the previous CSN standards dealing with this issue are reinforced in the new RSN, including transfer of the provisions contemplated in the Directive. The PSR's submitted by the Spanish nuclear power plants during the period covered by this report, and the evaluations of these reviews that are being carried out by the regulatory body, have been based on a new review of safety guide GS-01.10 Rev. 2. "*Periodic safety reviews at nuclear power plants*".

Article 8d. On site emergency preparedness and response

The regulatory requirements relating to emergency planning, preparedness and response to be met by the licensees of nuclear installations are basically included in Nuclear Safety Council Instruction IS-44, which deals with the response to emergencies at nuclear installations.

As regards the level of preparedness and off-site response, the Government Delegations and Sub-delegations belonging to the Ministry of the Interior and corresponding to the provinces in which the nuclear power plants are located take charge of emergency management. The regulatory body provides advisory services and recommends protection measures for the public and intervening personnel.

As regards the level of site response to emergency situations, the preparedness and response actions are set out in the nuclear power plant Site Emergency Plans (SEP). The objective of these plans is to map out the actions foreseen and the resources required for their performance by the licensee of the nuclear installation in order to reduce the risk of a radiological emergency and, if such an emergency should occur, to limit the release of radioactive material to the environment.

Article 8e. Peer reviews

Spain was subjected to the first combined IRRS-ARTEMIS mission performed in the world in October 2018. The mission was requested with a view to fulfilling the obligations of European directives 2014/87/Euratom and 2011/70/Euratom.

Likewise, in compliance with the Directive, a detailed evaluation of “aging management at nuclear installations” was carried out at the Spanish nuclear power plants (*Topical Peer Review*). The results were published in October 2018, and in 2019 the Plenary of the CSN approved an action plan for the implementation of the actions resulting from the European peer review.

III. Compliance with articles

Article 4. Legislative, regulatory and organisational framework

4.1. Legislative, regulatory and organisational framework

1. The member States shall establish and maintain a national legislative, regulatory and organisational framework (from here on referred to as «the national framework») for the nuclear safety of nuclear installations, which shall assign responsibilities and contemplate coordination between the relevant state bodies. The national framework shall establish responsibilities for:

- a) the adoption of national requirements in relation to nuclear safety. The determination of the way in which they are adopted and the instrument by means of which they are applied fall within the realm of competence of the member States;*
- b) the availability of a system for the granting of licences and the prohibition on operating nuclear installations without a licence;*
- c) the availability of a nuclear safety supervision system;*
- d) measures to ensure compliance, including the suspension of operation and the modification or revocation of licences.*

The basic *framework regulating* nuclear installations and activities in Spain is made up of the following standards:

- Nuclear Energy Act (LEN) (Law 25/1964, of April 29th and subsequent modifications), the objective of which is to “*Establish the legal framework for the development and implementation of peaceful applications of nuclear energy and ionising radiations in Spain, in such a way as to suitably protect people, property and the environment*”. The reasoning behind the Act also includes the will to “*regulate the application of the international commitments undertaken by the State in relation to nuclear energy and ionising radiations*” (article 1).
- Law Creating the Nuclear Safety Council (Law 15/1980, of April 22nd and subsequent modifications). This is the Law that constituted the regulatory Body for nuclear safety and radiological protection in Spain. The said Law created this organisation as a “*body existing under public Law, independent from the General State Administration, of legal standing and having its own assets independent from those of the State, as the organisation solely responsible for nuclear safety and radiological protection*”. It also provides that it shall be governed by its own Charter, which shall establish its organisation and operation. The version of the CSN Charter currently in force was approved by Royal Decree 1440/2010, of November 5th.
- Regulation governing Nuclear and Radioactive Installations (Royal Decree 1836/1999, of December 3rd, see section 4.2.): this regulates the system for administrative authorisations for nuclear installations, the obligations of their licensees and the corresponding inspection and control activities.
- Regulation governing nuclear safety at nuclear installations (Royal Decree 1400/2018, of November 23rd, see section 4.2): this regulates the nuclear safety of nuclear installations and completes the transposition to the national legal framework of the basic safety requirements established in Directive 2014/87/Euratom.

- Regulation on the Protection of Health against Ionising Radiations (RPSRI) (Royal Decree 783/2001, of July 8th): this establishes the basic standards relating to the protection of the health of the public and workers against the risks deriving from ionising radiations.
- Royal Decree 1308/2011, of September 26th, on the physical protection of nuclear installations and materials and of radioactive sources, as established by the system for the physical protection of the nuclear installations, nuclear materials and radioactive sources specified therein, located within the territory of Spain or under Spanish jurisdiction.
- Royal Decree 1546/2004, approving the Basic Nuclear Emergency Plan, modified by Royal Decree 1428/2009, which contains standards and criteria essential for the drawing up, effective material implementation and continued effectiveness of the civil defence nuclear emergency plans, responsibility for which falls to the General State Administration with the participation of the other public administrations.
- Royal Decree 1564/2010, of November 19th, approving the basic civil defence Directive on planning for radiological risks.
- Royal Decree 102/2014, of February 21st, for the responsible and safe management of spent nuclear fuel and radioactive waste.

The regulatory framework is complemented by the technical provisions adopted by the CSN within its realm of competence. These are known as Council Instructions and are binding upon all the installations and activities to which they are addressed. An article will be included below to identify the most significant of these instructions issued during the period covered by this Report.

Furthermore, as regards the ratification of international conventions and legal instruments relating to nuclear safety, Spain is a signatory to the following conventions affecting the scope of the Directive:

- *Convention on Nuclear Safety* (Vienna, September 20th 1994). Signed by Spain on November 15th 1994; deposit of the instrument of ratification on July 4th 1995; publication of the instrument of ratification in the Official State Gazette on September 30th 1996. Entry into force generally and for Spain on October 24th 1996.

The CSN acts as the national point of contact and coordinates the drawing up of the national reports. The CSN, the Miterd and CEN-Foro Nuclear participated in the drawing up of this report.

- *Joint convention on Safety in the Management of Spent Fuel and Safety in the Management of Radioactive Waste* (Vienna, September 29th 1997). Signed by Spain on April 30th 1999. Publication of the instrument of ratification in the Official State Gazette on April 23rd 2001. Entry into force for Spain on June 18th 2001.

The Miterd acts as the national point of contact and coordinates the drawing up of the national reports. The Ministry, the CSN, Enresa and the CEN (Nuclear Energy Committee) participated in the drawing up of this report.

- *Convention on the Early Notification of a Nuclear Accident* (Vienna, September 26th 1986). Signed by Spain on September 26th 1986; deposit of the instrument of ratification on September 13th 1989; publication of the instrument of ratification in the Official State Gazette on October 31st 1989.

The objectives of this Convention refer to the exchange of information, establishing a system for international notification and cooperation allowing States potentially affected by an accident to take the necessary protective measures in the shortest possible time. The CSN is the competent authority appointed as the point of contact and alert in Spain, these functions being carried out via the Council's emergency response centre.

- *Convention on Mutual Assistance in the event of a Nuclear Accident or Radiological Emergency* (Vienna, September 26th). Signed by Spain on September 26th 1986; deposit of the instrument of ratification on September 13th 1989; publication of the instrument of ratification in the Official State Gazette on October 31st 1989.

The articles of this Convention establish mechanisms for international cooperation aimed at preventing nuclear accidents and mitigating their consequences, thereby completing the system established in the Convention on the Early Notification of a Nuclear Accident. The CSN collaborates with the Directorate General for Civil Defence and Emergencies of the Ministry of the Interior in the development of the mandatory commitments of this Convention.

- Paris Agreement of July 29th 1960 on *Civil Liability in Relation to Nuclear Energy* and the Brussels Agreement of January 31st 1963, complementary to the former. (Paris and Brussels agreement review protocols of 2004).

These agreements establish a compulsory legal framework for the contracting States that brings into harmony the application of concepts of civil liability for nuclear damages. Certain of their provisions provide something of a margin of discretion that the States are required to specify in their national legislations, such as the establishment of priorities in the order of payment of indemnities.

Established as a fundamental principle in these agreements is the objective responsibility of the operator for nuclear damage produced as a result of an accident at a nuclear installation, regardless of its root cause, pursuant to the limitations and conditions set out therein.

The revised Paris Agreement determines the minimum obligatory liability to be met by the operator, while the Brussels Agreement establishes complementary compensations, up to a given limit, to indemnify victims or make good damages in the event of their exceeding the liability set out for the first.

4.1.a. Allocation of responsibilities and coordination between relevant state bodies

In Spain the regulatory function relating to nuclear safety and radiological protection is undertaken by different authorities: the CSN, the Government and the Autonomous Communities.

Pursuant to the provisions of Royal Decree RD 864/2018, of July 13th, the CSN deals with the Government via the Ministry for Environmental Transition and Demographic Challenge (Miterd).

While the CSN is the only State body responsible for nuclear safety and radiological protection, the Miterd is the Department of the General State Administration in charge of proposing and carrying out Government policy in relation to energy, and within this to nuclear energy.

The Miterd is responsible for setting compulsory regulatory standards, granting different authorisations relating to nuclear installations, subject to mandatory and binding reports by the Nuclear Safety Council, and where appropriate other ministerial departments, submitting standards-related proposals and applying the system of penalties in relation to nuclear energy.

The Nuclear Safety Council is a body existing under Public Law and independent from the General State Administration that reports on its activities to Parliament.

Its main functions as regards nuclear and radioactive installations and associated actions are as follows:

- To propose necessary regulations to the Government and issue technical instructions, guidelines and circulars on nuclear safety and radiological protection within its realm of competence.
- To issue mandatory reports to the Miterd in order for the latter to take decisions regarding the granting of the legally established authorisations. These reports shall be binding if negative and subject to the necessary safety conditions if positive.
- Control and inspection of all installations throughout all the different phases, and especially during design, construction, start-up, operation and dismantling, up to decommissioning.
- Suspension of activities and the operation of installations for safety reasons.
- Collaboration with the competent authorities in the establishment of the criteria to be met by the off-site emergency plans and plans for the physical protection of nuclear and radioactive installations and, following the drawing up of these plans, participation in their approval and coordination of emergency support and response measures.
- Proposals for the initiation of sanctions proceedings in the event of nuclear safety and radiological protection-related infringements, in accordance with the legislation in force, and the issuing of technical reports for the suitable appraisal of events, in the terms set out in article 7, section 5 of the Law by which the CSN was created.
- Control of measures for the radiological protection of professionally exposed workers, members of the public and the environment. As regards the radiological protection of the environment, the CSN assesses the environmental radiological impact of the nuclear installations and issues declarations of approval of new designs, methodologies, simulation models or verification protocols relating to nuclear safety and radiological protection.
- Granting and renewal of nuclear installation operator and supervisor licences and of Head of Radiological Protection Service diplomas.
- Performance of studies, assessments and inspections of plans, programmes and projects for all phases of radioactive waste management.

The CSN also collaborates with the Miterd in the transposition of European directives and in coordination for the implementation of new Council instructions.

The CSN collaborates with other Ministries, such as those of the Interior, Defence, Transport, Mobility and the Urban Agenda and Health, Consumption and Social Welfare.

Pursuant to the third additional provision of the Law by which it was created, the CSN may assign to the Autonomous Communities the performance of functions attributed to it in accordance with the general criteria agreed to for such performance by the Council itself and by way of a bilateral Agreement. There are currently nine Autonomous Communities that have Delegation Agreements with the Nuclear Safety Council for the performance, on behalf of the latter, of inspections and, in certain cases, assessments of radioactive installations: Asturias, the Balearic Islands, the Canary Islands, Catalonia, Galicia, Murcia, Navarre, the Basque Country and Valencia. For each of these Communities there is a Mixed follow-up Commission made up of representatives of the Community in question and the CSN, presided over by the secretary general of the Council, that meets at least once a year.

As regards the Delegation Agreements, it should be stressed that for their performance the Autonomous Communities must have the number of inspectors required for them to be carried out correctly, these to be trained and accredited by the CSN. Furthermore, the CSN has Agreements with the Autonomous Communities on planning, preparedness and response to situations of radiological emergency.

As regards sanctions, all the Autonomous Communities except Castilla la Mancha, Andalusia, Ceuta and Melilla have competences transferred in relation to 2nd and 3rd category radioactive installations and are the authorities responsible for the launching of sanctions proceedings.

4.1.b. National nuclear safety requirements covering all stages of the life cycle of nuclear installations

a) The adoption of national nuclear safety requirements. Determination of the way these requirements are adopted and of the instrument by means of which they are applied are the responsibility of the member States.

As has been pointed out in section 4.1a, in Spain the regulatory function in relation to nuclear safety is undertaken by different competent authorities: the Government, the CSN and the Autonomous Communities.

The national safety requirements are included fundamentally in the Regulation governing Nuclear Safety at Nuclear Installations (RSN), but also in the RINR and the different instructions (IS) issued by the CSN. As regards basic safety standards, the Regulation governing Nuclear Safety at Nuclear Installations (RSN) (approved by Royal Decree 1400/2018, of November 23rd), incorporates Directive 2014/87/Euratom of July 8th 2014 into the Spanish legal framework, this establishing a community framework for the nuclear safety of nuclear installations.

Although the Spanish legal framework already contemplated the different requirements of this directive to a large extent, it did not include any specific regulatory standard on the nuclear safety of nuclear installations, for which reason the decision was taken to draw up a standard of this type.

Along with those aspects of the Directive that were not covered by the Spanish legal framework and that it was considered necessary to transpose and incorporate in this regulation, others from different CSN Instructions (such as IS-26 of June 16th 2010 on the basic nuclear safety requirements applicable to nuclear installations) were identified. The decision was taken to include these also in this same regulation, thereby giving rise to a unified text having the rank of a royal decree.

4.1.c. System of licensing and prohibition of operation of nuclear installations without a licence

b) provision of a system for the granting of licences and prohibition to operate nuclear installations without a licence. In its article 28 the LEN establishes that nuclear installations shall be subject to a system of authorisations to be issued by the Miterd, following a mandatory report by the CSN and with the autonomous communities housing the installation in question or included in the planning area contemplated in the basic standards on planning for nuclear emergencies having been heard in relation to land planning and the environment. The legal framework of authorisations is established by way of regulations, with a definition of the permits applicable to each of the phases of the lifetime of the said installations.

In accordance with the Law by which it was created, the CSN is obliged to issue reports to the Miterd on nuclear safety, radiological protection and physical protection prior to the resolutions to be adopted by the latter in relation to the granting of authorisations for nuclear installations and for all activities associated with the handling, processing and storage of nuclear substances. These reports are mandatory in all cases and are binding if negative in nature or rejecting the application and also as regards whatever conditions might be established if positive.

On reception of the CSN report and whatever other decisions and reports might be applicable, the Miterd shall take the appropriate decision regarding preliminary or site, construction, operation, modification, dismantling and decommissioning or dismantling and shutdown permits for nuclear installations.

The system of authorisations to which the Spanish nuclear installations are subject within the scope of the 2014/87 Euratom Nuclear Safety Directive is set out in the RINR. In turn this regulation enlarges upon the provisions regarding authorisations of chapter 5 of the LEN.

The RINR establishes that the application of its precepts corresponds to the Miterd and the CSN, (without prejudice to other departments) and assigns the corresponding executive functions to the said Ministry.

The RINR requires that the renewal of permits shall be carried out using the same procedure as was applied to their initial awarding, attaching updates of the documents on which such awarding was based. In the case of renewal, the CSN report shall be submitted to the Miterd one month prior to expiry of the permit in force. The limits and conditions established by the CSN are incorporated in the operating permit and compliance with them is compulsory.

The RINR also empowers the CSN to shut down activities in the event of anomalies affecting nuclear safety, until such anomalies are corrected, and may propose cancellation of the permit if the objective mapped out is not achieved. Likewise, this Body is empowered to suspend the operation of installations for reasons relating to nuclear safety or radiological protection.

Pursuant to article 12 of the RINR, nuclear installations shall require the following permits, as appropriate:

- **Preliminary or site permit**

This is an official recognition of the suitability of the site selected and entitles the licensee to request the construction permit for the installation and initiate the authorised preliminary infrastructural works. The arrangements for the preliminary authorisation include a specific process of public information that, as established in article 15 of the RINR, is carried out jointly with that contemplated in the standards relating to the Environmental Impact Assessment, which also requires public participation.

- **Construction permit**

This entitles the licensee to initiate the construction of the installation and to request the operating permit.

- **Operating permit**

This entitles the licensee to load the nuclear fuel or take nuclear substances into the installation, to carry out the nuclear testing programme and to operate the installation within the set of conditions established in the permit. It shall first be issued provisionally, pending the satisfactory completion of nuclear testing. Likewise, and notwithstanding the possibility of its being renewed in accordance with the provisions of section 1 of article 28 of the RINR, this permit entitles the licensee – on completion of the activity for which the installation was designed and in the terms set out in the declaration of shutdown – to carry out the operations imposed by the Administration prior to obtaining the permit for dismantling or dismantling and shutdown in the case of disposal installations for spent nuclear fuel or radioactive waste.

Article 28. 1 of the RINR (following its modification by Royal Decree 102/2014) establishes that the aforementioned shutdown or ceasing of activity shall be considered definitive when caused by nuclear safety or radiological protection issues. If this ceasing of activity is due to other reasons, the licensee may request the renewal of the operating permit within one year of the date on which the shutdown declaration enters into force. The procedure to be adhered to in this case shall be that established for

requests for the renewal of the operating permit, to which shall be added the additional documentation or requirements determined in each case, taking into account the specific situation of the installation, scientific and technological progress, the applicable standards and the in-house and industry operating experience accumulated over the operating period of the installation, along with other safety significant aspects. If after the aforementioned one-year period no such request has been made, the shutdown declaration shall be considered definitive.

- **Modification permit**

This entitles the licensee to introduce modifications in the design of the installation or its operating conditions, or in those cases in which the criteria, standards and conditions on which the operating permit is based are altered.

- **Modification execution and assembly permit**

This entitles the licensee to initiate the performance, execution and assembly of those modifications which, in view of their wide scope or because they imply significant works and assembly operations, are considered to require express authorisation.

- **Dismantling permit**

On expiry of the operating permit, the licensee shall be entitled to initiate decontamination activities, the disassembly of equipment, the demolition of structures and the removal of materials in order, ultimately, to allow for the complete or restricted release of the site. The dismantling process shall end with a **decommissioning declaration** that will release the licensee of the installation from his responsibility as the operator thereof and define, in the case of restricted release of the site, the applicable limitations on use and the party responsible for maintaining them and supervising compliance with them.

- **Dismantling and shutdown permit**

In the case of installations for the definitive disposal of spent nuclear fuel and radioactive waste, this entitles the licensee to initiate the work required to guarantee the long-term safety of the disposal system, as well as activities for the dismantling of those auxiliary installations identified for such treatment, ultimately allowing for the identification of areas to be subjected where appropriate to control and surveillance, radiological or of some other type, over a given period of time, and the release from control of the other areas of the site. The dismantling and shutdown process will conclude with the issuing of a shutdown declaration by the Miterd, following a report by the CSN.

In addition, the following shall also require authorisation:

- The temporary storage of nuclear substances at a installation in the construction phase and not having an operating permit.
- Any change in the ownership of nuclear installations. The new licensee shall accredit sufficient legal, technical and economic-financial capacity for the performance of the activities authorised.

The performance of activities without the necessary permit shall lead to application of the penalties contemplated in the system of sanctions established in the LEN.

In accordance with the said Law, the exercising of any activity regulated by it or by its standards of enactment without having obtained the corresponding authorisation, or with the latter expired, suspended or revoked, is considered to constitute a highly serious infringement, as long as it implies a serious threat for the safety or health of persons or serious damage to property or the environment. Otherwise, it shall

be considered a serious infringement. The commission of such infringements carries sanctions of an amount proportional to the seriousness of the offense.

4.1.d. System of regulatory control of nuclear safety performed by the competent regulatory authority

c) provision of a nuclear safety supervision system

The Law by which the CSN was created assigns to this Body the function of inspecting and controlling nuclear and radioactive installations, its scope covering the installations included within the area of application of the 2009/71 Euratom Nuclear Safety Directive.

Nuclear power plants

In 2007, the CSN started up the systematic operating nuclear reactor supervision programme, SISC (Integrated Plant Supervision System), inspired by the U.S. NRC's Reactor Oversight Process (ROP). In 2012, after a pilot experience lasting one year, the results of inspections relating to physical protection were incorporated in the SISC, although for confidentiality reasons the results of these inspection have not been made public.

The implementation of the SISC meant an increase in the inspection activities of the CSN, through what is known as the Basic Inspection Plan (PBI) and has profoundly modified the supervision of the operating nuclear power plants.

Most of the SISC inspections are scheduled inspections integrated in the so-called Basic Inspection Plan, which is biennial in nature. The SISC also includes non-scheduled inspections, such as the reactive and supplementary inspections.

In addition to the inspections that form part of the SISC, the CSN carries out inspections at nuclear installations relating to the granting of authorisations (licensing inspections) and other specific or generic scheduled or non-scheduled inspections outside the scope of the SISC.

The supervision of the operation of nuclear power plants by way of the SISC is undertaken by identifying and categorising inspection deviations or findings and tracking the performance indicators defined. The categorisation of both on the basis of their safety significance determines the position of each plant in one of the four columns of the so-called "action matrix" and the needs for their supervision by the CSN are established accordingly.

Furthermore, as from 2016 supervision of the safety culture was incorporated in the SISC through the tracking of the so called "crosscutting components" associated with inspection findings. These components are grouped in three areas: human and organizational performance, problem identification and resolution, and safety conscious work environment, and provide information on the possible existence of plant organisational and cultural weaknesses. Likewise, the position of a plant in this action matrix may give rise to the implementation of safety culture-related actions by the CSN.

Complete information on the SISC, and individual details of each inspection finding or performance indicator, are available on the CSN's public website and are updated quarterly.

Furthermore, the nuclear power plants in the dismantling phase are the subject of an annual inspection plan, adapted in each case to a specific supervision system in keeping with the phase of the process in which they are to be found.

Juzbado fuel manufacturing installation

The CSN has implemented a supervision and control system for the Juzbado fuel manufacturing installation (SSJ), also inspired by the U.S. NRC's model, which makes it possible to ensure that supervision of the operation of the installation is carried out efficiently and at a given frequency.

4.1.e. Effective and proportioned enforcement actions, including where appropriate corrective actions or the suspension of operation and modification or revocation of a licence

d) Measures to ensure compliance, including the suspension of operation and the modification or revocation of a licence

The CSN continuously supervises compliance by the licensees with the safety conditions of the installations. The licensees issue annual reports on certain activities regulated in the authorisations, which are subject to assessment by the regulator. In addition, the CSN has resident inspectors at the nuclear power plants.

In order to ensure compliance with the national framework for the safety of nuclear installations, the Spanish legislation determines what conditions constitute infringements susceptible to the application of sanctions and what these sanctions should be.

The Spanish Constitution establishes that nobody can be condemned or penalised for actions or omissions that at the moment of their occurring did not constitute a crime, offense or administrative infringement, as set out in the legislation in force at the time. In this respect, in its chapter on infringements and sanctions in relation to nuclear matters, the LEN determines which infringements are subject to sanctions and the significance of the latter.

Further to the above, the administrative procedure governing sanctions is regulated in Spain by Law 39/2015, of October 1st, on the Common Administrative Procedure of the Public Administrations, as a speciality of the said procedure.

Assignment of responsibilities

The national framework clearly sets out and establishes the responsibilities assigned to the different organisations and authorities that intervene in sanctions proceedings:

- The CSN is responsible for proposing the launching of sanctions proceedings.
- The Miterd is responsible for their initiation and investigation.
- The Miterd or the Cabinet of Ministers is responsible for their resolution, depending on the seriousness of the infringement.

Sanctions proceedings

The CSN proposes the initiation of sanctions proceedings to the Miterd, informing the latter of both the events that constitute the infringement appreciated and of whatever relevant circumstances might be required for their suitable qualification. The Ministry initiates the proceedings and, having received the corresponding allegations and evidence and heard the stakeholders, submits a proposal for resolution to the decision-making body, including the proven facts, the infringement committed, the responsibilities and the sanction proposed.

The body competent for imposing the sanction may, in response to a proposal by the CSN, agree to the following precautionary measures, among others, which may be adopted prior to the initiation of the administrative sanctions procedure or during the said procedure:

- Corrective, safety or control measures preventing the continuity of the infringement or of the production of risk or damage.
- Temporary, partial or full suspension of the operation of the installations or of the performance of the activities.

One way or another, and as set out in the RINR, in the event of manifest danger, the CSN or its accredited inspectors may require the immediate stoppage of works, functions or operations, reporting to the Miterd and explaining the causes for shutdown underlying such action.

Furthermore, the CSN is legally authorised to issue warnings directly to the licensees under certain circumstances contemplated in the LEN, establishing the corrective measures to be applied by the licensee, as an alternative to proposals for the launching of sanctions proceedings. In the event of the licensees failing to respond to the warning, the CSN may impose coercive fines.

Description of sanctions

In terms of seriousness, infringements are classified as very serious, serious and slight, in keeping with the assumptions contemplated in the LEN, which also typifies the economic penalties to which they may give rise, as shown in table 5 in appendix III.

Very serious infringements may, in addition to the economic penalties foreseen, give rise to the revocation, withdrawal or temporary suspension of permits, licences or entries on registers. They may also give rise to the temporary or definitive disqualification from the condition required for access to any type of permit or licence regulated by the nuclear legislation.

4.2. Maintenance and improvement of the national framework

2. The member States shall guarantee that the national framework is maintained and improved where necessary, taking into account the operating experience, the knowledge acquired from the safety assessments of operating nuclear installations, the evolution of the technology and the results of safety investigations, where available and appropriate.

The Spanish legal framework relating to nuclear energy has been updated and adapted in order to take into account, among other things, the modifications that have taken place in the structure of the institutional framework governing this area, the experience gleaned from the operation of the nuclear installations and the evolution of the technology.

As regards the regulatory issue, the most significant novelty that has occurred during the period considered has been the approval by Royal Decree 1400/2018, of November 23rd, of the Regulation governing nuclear safety at nuclear installations (RSN), which completes the incorporation into the Spanish legal framework of the 2014/87/Euratom Directive regarding the establishment of the basic nuclear safety requirements applicable to nuclear installations. The objective is the establishment of such requirements for the said installations “*throughout their entire lifecycle, in order to: a) guarantee a high level of nuclear safety in order to protect the workers and the general public against the risks posed by ionising radiations from nuclear installations; b) maintain nuclear safety and promote its improvement*”.

As a result, the national framework is provided with a specific regulatory standard on the nuclear safety of nuclear installations, as was previously the case for other subject areas such as radiological protection (Regulation on the protection of health against ionising radiations, approved by Royal Decree 783/2001), the management of radioactive waste (Royal Decree 102/2014, on the responsible and safe management of spent nuclear fuel and radioactive waste), physical protection (Royal Decree 1308/2011, on the physical protection of nuclear installations and materials and radioactive sources) and the processes of

licensing such installations (Regulation governing nuclear and radioactive installations, approved by Royal Decree 1836/1999).

In addition, during the period covered by this report, the CSN has approved a number of Instructions, summarised in section 5.3.a of the present report, pursuant to the legal authority granted to this Body by article 2.a) of Law 15/1980, of April 22nd, by which the CSN was created. These Instructions are technical standards that are binding upon the addressees and are integrated into the legal framework.

Furthermore, the process of transposing to the Spanish national legal system the 2013/59/Euratom Directive of December 5th 2013, on basic safety standards for protection against the risks associated with exposure to ionising radiations is being completed through the adoption of different legal provisions of royal decree rank and the revision of certain existing Safety Instructions.

Current situation

In the Spanish legal framework, the Law creating the CSN contemplates both the objective of updating and improving the regulations and the tools necessary for this to be implemented, assigning to the CSN the function of proposing to the Government the necessary regulations on nuclear safety and radiological protection, as well as whatever revisions it might deem to be appropriate.

Likewise, this Law empowers the CSN to draw up and approve technical Instructions, Circulars and Guidelines relating to nuclear and radioactive installations and to nuclear safety and radiological protection-related activities. This CSN faculty is addressed in greater detail in section 5.3.

In addition, the CSN may submit complementary technical instructions (CTI's) directly to the licensees of nuclear and radioactive installations in order to guarantee the maintenance of safety conditions and requirements.

The CSN has as its strategic objective the creation and continuous updating of a solid set of standards covering the requirements set out in the European directives, taking into account the standards of the International Atomic Energy Agency (IAEA) and the reference levels agreed to in the harmonisation plan of the Western European Nuclear Regulators Association (WENRA).

Furthermore, as a Contracting Party to the Conventions described in section 4.1, Spain periodically assesses the legislative and regulatory framework governing the safety of its installations and participates in the peer review meetings contemplated in this respect by the said conventions, deriving from them challenges, suggestions and best practices for the on-going improvement of the national framework.

Likewise, the standards framework has been subjected to –and will continue in the future to be subjected to– peer review assessments carried out by way of the IAEA's IRRS (*Integrated Regulatory Review Service*) missions, the last of which took place in October 2018 and was performed jointly with the IAEA's ARTEMIS (Integrated Review Service for Radioactive Waste and Spent Fuel Management, Decommissioning and Remediation) mission, *the first of its type*. The report on the results of both missions are available to the public on the CSN and Miterd websites.

Measures aimed at improving the national framework: use of operating experience

The CSN verifies the operating experience programmes developed by the licensees and also analyses and monitors events occurring at Spanish and overseas nuclear power plants.

For the verification of the licensees' operating experience programmes, the CSN carries out on-site operating experience inspections every two years. As regards the monitoring and analysis of events, the CSN has available the following tools: periodic meetings of the Spanish nuclear power plant Incident

Review Panel (PRI) and International Incident Review Panel (PRIN), use of the operating experience databases and participation in international forums and working groups for the exchange and analysis of operating experience.

Through the above, a framework has been established that allows for the identification at national and international level of events of a generic nature that might affect the Spanish plants and for the performance or requests for implementation of measures preventing the repetition of such events.

Article 5. Competent regulatory authority

5.1. Competent regulatory authority

The member States shall establish and maintain a competent regulatory authority responsible in the field of nuclear safety of nuclear installations.

In Spain, the Nuclear Safety Council was set up in accordance with Law 15/1980, of April 22nd, as a body existing under Public Law and independent from the General State Administration, with its own legal standing and assets, independent from those of the State, as the body solely responsible for nuclear safety and radiological protection.

The CSN is governed by its own Charter, drawn up by the Council and approved by the Government, which is developed in Royal Decree 1440/2010, of November 5th, and which describes the organisation and deals with the competences and functions established in the Law creating the CSN.

Both standards determine that the CSN shall be responsible for informing nuclear installation authorisations in relation to nuclear safety and radiological protection, undertaking the inspection and control of such installations and dictating CSN instructions, which are technical standards drawn up by the body and dealing with nuclear safety, radiological protection and physical protection. These are binding upon those affected by their scope of application once published in the Official State Gazette.

As has been described in section 4.1., in Spain the regulatory function relating to nuclear safety and radiological protection is undertaken by a number of different authorities, in addition to the CSN: the Government, the Miterd and, where appropriate, the governments of the autonomous communities.

In order to undertake the competences and functions established in the legislation, the CSN needs to communicate with the Parliament and the Government, as well as with the competent ministerial departments and regional governments. In keeping with the provisions of article 11 of Law 15/1980, of April 22nd, and article 14 of the CSN Charter, the Nuclear Safety Council shall submit annually to both Houses of the Spanish Parliament and to the regional Parliaments of Autonomous Communities housing nuclear installations within their territory a report on its activities. Likewise, the Nuclear Safety Council shall keep the Government, the Congress and the Senate, the regional Governments and Parliaments and the City Councils concerned punctually informed of any circumstance or event that might affect the safety of nuclear and radioactive installations or the radiological quality of the environment at any location within the national territory.

To this effect, information shall be supplied on all incidents having a significant impact on safety, in accordance with the criteria established by the Nuclear Safety Council.

Likewise, information shall be supplied on the detection of anomalous levels of radioactivity in the environment at any location within the national territory, once confirmed, and on whatever exceptional situations might arise and have an impact on nuclear safety or radiological protection, when originating

in installations, items of equipment, companies or activities not covered by the system of authorisations of the nuclear legislation.

5.2. Independence

Member States shall ensure the effective independence from undue influence of the competent regulatory authority in its regulatory decision-making. For this purpose, Member States shall ensure that the national framework requires that the competent regulatory authority.

The independence of the CSN is expressly regulated in article 1 of the Law by which it was created:

The Nuclear Safety Council is created as a body existing under Public Law, independent from the General State Administration, of legal standing and having its own assets independent from those of the State, as the organisation solely responsible for nuclear safety and radiological protection. It shall be governed by a Charter drawn up by the Council and approved by the Government, the text of which shall be submitted to the competent Commissions of the Congress and Senate prior to its publication, and by whatever specific provisions might be applied to it, without prejudice to the additional application of precepts of the common or special legislation.

This same declaration of independence is included in article 1 of the CSN Charter. Likewise, article 2.4 of the said Charter, which defines the legal system of the organisation, establishes that *the Nuclear Safety Council acts in the performance of its activity and for compliance with its objectives with organisational and functional autonomy and complete independence from the Public Administrations and stakeholder groups. It is furthermore subject to parliamentary and judicial control. Resolutions adopted by the Plenary and the Chairman of the Nuclear Safety Council in exercising the public functions attributed to them shall imply the termination of administrative proceedings.*

Furthermore, article 2 of the Law creating the CSN establishes the following as functions of the body:

The issuing of reports to the Ministry of Industry, Tourism and Trade (now the Miterd) in relation to nuclear safety, radiological protection and physical protection prior to the adoption of resolutions for the granting of authorisations for nuclear and radioactive installations, the transport of nuclear substances or radioactive materials, the manufacturing and homologation of equipment incorporating radioactive sources or generating ionising radiations, the operation, restoration or decommissioning of uranium mines and, in general, all activities relating to the handling, processing, storage and transport of nuclear and radioactive substances.

The issuing of reports prior to the resolutions of the Ministry of Industry, Tourism and Trade (now the Miterd) in relation to the authorisation of companies selling and providing technical assistance for X-ray equipment and installations for medical diagnosis purposes and other equipment for radioactive installations and the performance of their inspection and control.

These reports shall be mandatory in all cases and in addition binding when negative or rejecting a request for authorisation, and as regards the conditions established when positive.

In view of what is stated above, it may be concluded that both the Law creating the CSN and its Charter establish the mechanisms required to guarantee that the actions of the Council warrant the credibility and trust of the society that it is responsible for protecting, as well as to guarantee its independence in the exercising of the functions assigned to it.

5.2.a. Functionally separate from any other body or organisation

CSN organisational structure

The organisational structure of the CSN, which was modified by the approval of Royal Decree 1440/2010, of November 5th, is currently as follows:

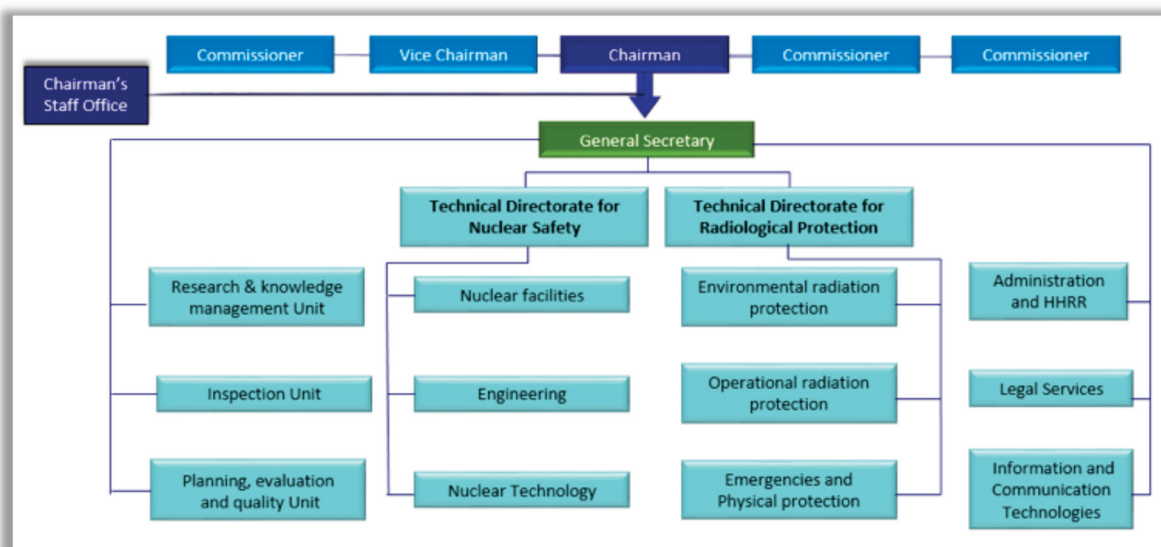


Figure 2. CSN organisational structure

Article 22 of the Charter defines the top management of the CSN which, as set out in Law 15/1980, of April 22nd, is made up of the Plenary and the Chairman.

The Plenary is made up of a Chairman and four Commissioners.

The Chairman and Commissioners of the CSN are appointed by the Government, with the agreement of Congress and in response to a proposal by the Miterd, in keeping with the requirements and conditions defined in article 5 of the Law creating the CSN, which provides as follows:

The Chairman and Commissioners of the Nuclear Safety Council shall be appointed from among persons of known ability in the subject areas assigned to the Council, such as the specialities of nuclear safety, technology, radiological protection and the environment, medicine, legislation or any other relating to the above, or energy in general or industrial safety, with special importance attached to independence and the objectiveness of criteria.

The period of occupancy of the post shall be six years, with the possibility of being appointed for at most one other six-year term. The posts of Chairman and Commissioner may not be occupied by persons of more than seventy years of age.

Article 23.1. of the CSN Charter identifies the following as the management bodies of the Nuclear Safety Council, under the direction of the Chair and the Plenary: the Secretariat General of the Nuclear Safety Council, the Technical Directorate for Nuclear Safety, the Technical Directorate for Radiological Protection, the Chairman's Technical Staff and the Sub-directorates.

Article 23.2 identifies the Advisory Committee and the Technical Advisory Commissions as the advisory bodies of the Nuclear Safety Council.

The functions and competences of the upper and management bodies are defined in RD 1440/2010, which approves the Charter of the CSN. Thus, chapter II, section 1 of the said Charter establishes the competences and composition of the Plenary of the Council, chapter II sets out the functions of the Chairman and the Secretary General and chapter IV establishes the functions of the Technical Directorates for Nuclear Safety and Radiological Protection.

Guarantee of the CSN maintaining effective independence in decision-making in relation to nuclear and radiological safety and being able to perform its functions without pressure or limitation by the government

As has been pointed out above, the CSN is a body existing under Public Law and independent from the General State Administration, with its own legal standing and assets, independent from those of the State, and is the body solely responsible for nuclear safety and radiological protection.

The CSN has its own Charter, which is drawn up by the Council itself and approved by the Government, the text being submitted to the competent Commissions of the Congress and Senate before application. This CSN Charter also includes a declaration of independence in its article 2.4, which provides that the body acts for the performance of its activity and compliance with its objectives with organisational and functional autonomy, fully independent from the Public Administrations and stakeholder groups but subject to parliamentary and judicial control.

Additionally, article 8.2 of the Law by which it was created provides that the Council may, in accordance with the standards established in the Charter, contract the services of national or overseas personnel, companies and organisations exclusively for the performance of specific tasks or the drawing up of specific studies, as long as no link is seen with those affected by the services to be contracted. In no case may personnel not belonging to the Nuclear Safety Council participate directly in decision-making regarding on-going administrative proceedings. The Nuclear Safety Council shall put in place the resources required to ensure that personnel, companies and organisations contracted from outside respect at all times the obligation to maintain the independence required during the rendering of their services.

The promotion of nuclear or radiological technology is excluded from the functions of the CSN, this maintaining the effective independence of the organisations responsible for the installations and corresponding activities or practices. It reports annually on its activities to the two Houses of the Spanish Parliament and to the regional Parliaments of those Autonomous Communities that house nuclear installations in their territory through the submittal of a report on the performance of its activities and the appearance of the management of the CSN before an ad-hoc parliamentary address or commission.

Furthermore, the CSN has identified independence as one of its fundamental objectives in its Strategic Plan for 2017-2022, defining it as the capacity to take decisions autonomously with respect to third parties and as the basis of all regulatory bodies.

Thus, in order to preserve independence from the Government, from the licensees of installations and activities in general and from all those having a stake in the matter, the CSN has determined that its way of working and processes should:

- Maintain the degree of autonomy and freedom in the exercising of its activities that is conferred by law and prevent both the imposition of and request for guidelines regarding the regulatory activity for which it is responsible.

- Avoid the influence of the regulated party on the regulator and implement the internal control mechanisms required to eliminate conflicts of interest.
- Avoid the influence of any other players (the media and other stakeholder groups) in the way in which regulation and supervision are carried out.

5.2.b. Regulatory decisions based on solid requirements and transparent in relation to nuclear safety

As is established in article 24 of the Charter of the Nuclear Safety Council, the Plenary of the Council is responsible, as its collegiate management body, for the exercising of all settlement, advisory, supervision and regulation functions relating to nuclear safety and radiological protection and set out in article 2 of Law 15/1980, of April 22nd. It is also responsible for any other functions attributed to the Nuclear Safety Council as the body solely responsible for nuclear safety and radiological protection. The Plenary shall adopt whatever agreements might be necessary for the suitable performance of such functions.

In this respect, all settlement decisions are taken by the Plenary of the CSN by way of a plenary session. This minimises subjectivity in decision-making, since no member of the staff takes decisions individually but rather within the framework of a collegiate management body.

Furthermore, it should be taken into account that the will of the collegiate body (the Plenary of the CSN), as expressed through agreement or an administrative act, is legally binding, since this body has the power to decide according to the legal system of the Spanish public sector.

All the decisions and agreements of the Plenary are registered in a database known as *Plenadoc*. This database is available via the internal web of the CSN, in order for all the personnel of the body to remain aware of the agreements or decisions reached or taken.

Furthermore, article 8.2. of the Law by which the CSN was created establishes that in no case may personnel not belonging to the Nuclear Safety Council participate directly in decision-making regarding on-going administrative proceedings.

In compliance with the provisions of articles 2.ñ) and 14 of Law 15/1980, of April 22nd, and article 15 of the Charter of the Nuclear Safety Council, in its activities the organisation abides by the principle of transparency and informs the members of the public of all relevant events relating to the operation of nuclear and radioactive installations, especially as regards their safe operation, the radiological impact for people and the environment, events and incidents occurring at these installations and the corrective measures adopted to prevent their repetition. The information is made public by the Nuclear Safety Council using data-processing and telematic resources ensuring maximum diffusion.

In this respect, the CSN publishes the minutes of its sessions on its institutional website. The minutes of the sessions of the Plenary include the decisions or agreements taken or reached and the technical documentation on which such decisions are based.

Management procedures PG.IV.01 rev.3 on the mandatory reports of the CSN to the Administration in relation to nuclear and radioactive fuel cycle installations, and PG.IV.02, rev.3 on the mandatory reports of the CSN to the Administration in relation to radioactive installations require that when the CSN does not approve a request, the technical reasons and justification for the issuing of a negative decision to the requester shall be included.

In addition, the CSN explains the bases for its decisions with authorised parties via periodic or specific meetings.

5.2.c. Dedicated and appropriate budget allocations

As regards the economic resources of the CSN, article 62.1 of the Council's Charter provides that: the Nuclear Safety Council shall have its own resources, independent from those of the General State Administration, which shall consist of the set of assets and rights of which it is the owner.

Article 62.3. of the CSN Charter provides as follows:

The economic resources that the Nuclear Safety Council shall possess for compliance with its functions comprise the following assets, rights and revenues:

- a) The assets and rights that make up its equity and corresponding income and interest.*
- b) Revenues arising from the public fees and prices regulated by Law 14/1999, of May 4th.*
- c) The allocations established annually and charged to the General State Budget.*
- d) Any others that might legally be attributed to it.*

By way of Law 14/1999, of May 4th, on public Fees and Prices for services rendered by the CSN, the latter may require the payment of fees for services rendered and the performance of its activities. In 2019 these constituted the main source of CSN funding, the revenues obtained in this way amounting to 98.65% of the total, the remaining 1.35% coming from current transfers and subsidies, financial revenues and other management revenues.

The budget of the CSN is audited annually by the Ministry of Finance and the Court of Auditors. The results of this audit are published in the Official State Gazette.

The CSN is responsible for its economic budget. Thus, article 1.2 of the Law by which it was created establishes that the Council shall draw up a draft of its annual budget, in accordance with the provisions of the General Budgeting Law, and submit it to the Government for it to be integrated in the General State Budget, this guaranteeing the assignment of a specific budget for the CSN.

In accordance with article 24. 2 c) of the Charter, the Plenary of the Nuclear Safety Council is also responsible for approving the draft budget, establishing policies for its execution and undertaking control and monitoring of compliance with it, without prejudice to the internal control to be performed by the General Intervention Board of the State Administration, in the terms set out in the General Budgeting Act, Law 47/2003, of November 26th.

5.2.d. Employs an appropriate number of staff with qualifications, experience and expertise necessary to fulfil its obligations

As has been pointed out above, in accordance with the provisions of article 8 of the Law creating the CSN, the Council's technical staff shall be made up of civil servants belonging to the Nuclear Safety and Radiological Protection Corps, which is a special body, this guaranteeing the existence of personnel for the organisation with the qualifications, experience and expertise required to fulfil the obligations falling within the realm of competence of the CSN. Article 57 of the Charter establishes the selection process to be applied to those aspiring to join the Nuclear Safety and Radiological Protection Corps. This process is accomplished by way of a competition-competitive examination, governed by the bases for application approved by the Plenary.

The following table shows the general distribution of the CSN personnel as of December 31st 2019, with the total number of employees amounting to 417 as of that date:

	Council	Secretariat General	Technical directorates	Total
Top management	5	1	1	7
Members of the Nuclear Safety and 7 Radiological Protection Technical Corps		14	190	211
Civil Servants belonging to other Public 3 Administrations		83	31	117
Temporary personnel	25	–	–	25
Non-career personnel	2	38	17	57
Totals	42	136	239	417

As of December 31st 2019, the qualifications of the workforce were distributed as follows: 71.22% post-graduates, 6.23% graduates and 22.5% with other qualifications.

The number of women at the CSN represents 52.76% of the total workforce, the male employees making up the remaining 48.24%. The average age of the Organisation's personnel is 53.

The number of persons belonging to the CSN Nuclear Safety and Radiological Protection Corp amounts to 211.

As regards the needs for human resources, according to article 24 of the CSN Charter the Plenary of the Council is responsible for the following:

- i) *Approval of the bases for invitations to participate in the selection procedures for access to the Nuclear Safety and Radiological Protection Corps.*
- ii) *Approval of the list of civil servants at the service of the Nuclear Safety Council and of whatever modifications might be made in this respect by the Plenary, and approval of proposals for modification of the list of non-career personnel at the service of the Nuclear Safety Council, in accordance with the provisions of the standards in force.*

Consequently, the recruiting of new technical personnel for the CSN must be in line with the general State policy set out in the General State Budget and the annual public employment Offer. Given the significance of the mission of the regulatory body, the CSN enjoys special treatment as regards staffing with human resources ensuring the availability of qualified personnel guaranteeing the performance of the mission of the organisation.

The organisation of the CSN is currently oriented towards the different types of installations and activities it deals with and performs. It has a matrix organisation with organisational units in charge of the different installations, manned by experts specialising in the different technology areas.

The CSN Strategic Plan for the period 2017-2022 contemplates human resources as an instrument necessary for the strategic objectives mapped out in the said Plan to be achieved, as follows:

III.3.2. Human resources. Planning of human resources in such a way as to maintain the competence and capacity required for the performance of their mission, preserving critical know-how both among persons close to retirement and to facilitate mobility, periodically and permanently evaluating the resources available and the needs of the Organisation in different areas of expertise. Likewise, this planning shall be aimed at improving the conciliation of professional and family life.

The objectives and instruments of the Strategic Plan will be used as a basis for the creation of policies defining guidelines for generic action in each relevant area, the relationships between them and the framework for their development.

The Policy governing human resources and provision of means included in the Strategic Plan contemplates the following:

- Response to the demands regarding the quantitative and qualitative sufficiency of human resources recommended by the international organisations.
- Complement and review the professional career model of the personnel of the organisation in force, with special attention paid to leadership capacities within the organisation and defining and applying a knowledge management model.
- Provide the workers with the resources required for the performance of their work, promoting the application of new technologies.
- Protection of information as a fundamental asset for the performance of the organisation's mission and functions, guaranteeing its confidentiality, integrity and availability and the continuity of the information systems and technologies in all circumstances, minimising the risks of damage.

As regards the qualification and competence of the CSN's technical staff for the suitable performance of its mission, the Council has developed and is implementing a knowledge management model adapted specifically to its needs, based on the recommendations of the IAEA and incorporated in the organisation's management system.

The CSN knowledge management process is required to address the four basic pillars of the model recommended by the IAEA. It is structured as a cyclic transversal process comprising the following stages:

- Identification of the capacities required by the CSN to perform its mission (necessary capacities).
- Periodic evaluation of the resources available at the CSN (available resources).
- On-going evaluation of gaps, shortcomings and losses of CSN information, documentation and know-how (gaps and shortcomings).
- Programme for the preservation of critical know-how and continuous improvement of capacities (acquisition and preservation).
- Internal communication plan to ensure the spreading and accessibility of know-how and information (accessibility and availability).
- Programme for the independent evaluation and periodic review of the process (evaluation and review).

During the period 2016 to 2018, activities have focussed on the programme for the preservation of critical know-how and on-going improvement of capacities and an action plan has been developed in this area aimed at preserving/recovering the expertise and experience of CSN technicians born before 1952.

The methodology used in this critical know-how preservation programme is made up of the following phases:

- Preparation phase: identification of those possessing critical expertise.
- Expertise extraction and systematisation phase.
- Exploitation phase: application of an agenda for the exploitation of systematised expertise.

In this respect the CSN has a computer tool, KITE, which supports the RECOR process (transfer and extraction of critical expertise). This is a continuous process.

Furthermore, the CSN has initiated a process of setting up know-how communities, and in 2019 constituted the first such community dedicated to Findings, this considered as being of interest due to its being a transversal activity involving the two Technical Directorates.

In addition, every year the CSN approves a Training Plan that guarantees the on-going training of the personnel in their respective areas of competence. In 2019 the training of the technical personnel took 71.91% of the training budget, with training on nuclear safety taking 35.4%.

In October 2018, Spain hosted a joint IRRS-ARTEMIS mission, and one of the recommendations issued by the review team was that the CSN should improve its training activities through the setting up of a more systematic training method, considering the formal qualifications for each specific post. In this respect, during its meeting number 1505, held on January 22nd 2020, the Council Plenary approved the contracting of external services to provide support for the CSN in the phases of analysis and design of a systematic methodology for the training of the Nuclear Safety Council personnel (“*Systematic Approach to training*”, SAT, methodology developed by the IAEA). This activity will be carried out in 2020 and 2021.

5.2.e. Procedures for the prevention and resolution of conflicts of interest

Articles 5.1 and 5.2 of Law 15/1980, of April 22nd, creating the Nuclear Safety Council provide as follows:

1. The Chairman and Commissioners of the Nuclear Safety Council shall be appointed from among persons of known ability in the subject areas assigned to the Council, such as the specialities of nuclear safety, technology, radiological protection and the environment, medicine, legislation or any other relating to the above, or energy in general or industrial safety, with special importance attached to independence and the objectiveness of criteria.

They shall be appointed by the Government in response to a proposal by the Minister of Industry, Tourism and Trade and following the appearance of the person proposed for the post before the corresponding Congressional Commission, in the terms contemplated by the Regulations of the Congress. The Congress, through the competent Commission and with the agreement of three fifths of its members, shall manifest its acceptance or veto and the underlying reasons within one calendar month of reception of the corresponding communication. If the Congress has not expressly issued any manifestation before the end of this period, the corresponding appointments shall be understood as having been accepted. The period of occupancy of the post shall be six years, with the possibility of being appointed for at most one other six-year term. The posts of Chairman and Commissioner may not be occupied by persons of more than seventy years of age.

Article 27 of the Charter of the Nuclear Safety Council, approved by R.D. 1440/2010, establishes a system of Incompatibilities for the top management of the CSN:

Article 27. Incompatibilities

1. The posts of chairman and commissioner shall be subject to the system of incompatibilities affecting high-ranking officers of the General State Administration established in Law 5/2006, of April 10th, regulating conflicts of interest affecting members of the Government and high-ranking officers of the General State Administration, and in its provisions of enactment, as well as in the Agreement of the Cabinet of Ministers of February 18th 2005, approving the Code of Good Governance of members of the Government and high-ranking officers of the General State Administration.

2. The standards associated with the functioning of the CSN do not establish any other legal provision preventing executive personnel from the nuclear sector from being appointed by the Government, in response to a proposal by the Miterd, to posts in the regulatory sector, although such personnel shall be required to meet the criteria established by Law: *persons of known ability in the subject areas assigned to the Council, such as the specialities of nuclear safety, technology, radiological protection and the environment, medicine, legislation or any other relating to the above, or energy in general or industrial safety, with special importance attached to independence and the objectiveness of criteria.*

However, high-ranking officers appointed to the Nuclear Safety Council shall be subject to compliance with Law 3/2015 of March 30th regulating the exercising of top management posts in the General State Administration.

Title II of the said Law is dedicated to the system of conflicts of interest and incompatibilities. Article 11 of this Law defines conflicts of interest and article 12 establishes a system of alerts for the prompt detection of conflicts of interest.

In addition to what is indicated above, article 23 of Law 40/2015, of October 1st, on the Legal System of the Public Sector, establishes the reasons and circumstances in which Public Administration authorities (executive staff) and personnel should abstain within a process of decision-making.

For its part, article 55.2 of the Charter of the Nuclear Safety Council establishes that the personnel of the nuclear safety and radiological protection technical corps shall be subject to the same system of incompatibilities and other rights and obligations as civil servants belonging to the General State Administration, governed by its generally applicable provisions.

Consequently, the members of the CSN technical corps are required to fulfil the provisions of Royal Legislative Decree 5/2015, of October 30th, which approves the reworded text of the Basic Public Employee Statute Law. Article 52 of this Law establishes a code of conduct that provides that *public employees shall diligently perform the tasks assigned to them and protect general interests, adhering to and abiding by the Constitution and the rest of the legal code, and shall act in accordance with the following principles: objectiveness, integrity, neutrality, responsibility, impartiality, confidentiality, dedication to public service, transparency, exemplary behaviour, austerity, accessibility, effectiveness, honesty, promotion of the cultural and environmental surroundings and respect for equality between men and women, which inspire the Code of Conduct of public employees comprising the ethical principles and conduct regulated in the following articles.*

Furthermore, article 53 of the Charter establishes as an ethical principle, in article 53.5, that *public employees shall abstain from participating in matters in which they have a personal interest, as well as in all private activities or interests that might constitute a risk of creating conflicts of interest with their public post.*

Finally, it should be pointed out that the CSN has a Code of Ethics approved by the Plenary during its meeting of June 1st 2016, that defines as values independence, integrity and neutrality in professional practice and in decision-making. The value of integrity includes the need to avoid conflicts of interest between professional duties and private interests.

With regard to external companies contracted by the CSN to provide support in the performance of its functions, article 8.2 of the Law by which the CSN was created establishes that *in accordance with the standards established in the Charter, the Council may contract the services of national or overseas persons, companies and organisations exclusively for the performance of work or the drawing up of specific studies, as long as there is proof of there not being any link to those affected by the services contracted. In no case may personnel not belonging to the Nuclear Safety Council participate directly in decision-making in relation to on-going administrative proceedings. The Nuclear Safety Council shall establish the resources required to ensure that externally contracted persons, companies and organisations abide at all times with the independence-related obligations during the rendering of their services.*

5.2.f. Provision of safety-related information without clearance from any other body or organisation, provided that this does not jeopardise other overriding interests, such as security, recognised in relevant legislation or international instruments

In accordance with the provisions of article 2 ñ) of the Law by which it was created, the CSN is responsible for *informing the members of the public on matters falling within its realm of competence to the extent and at the frequency determined by the Council, without prejudice to the publishing of its administrative activities in the legally established terms.*

Article 14 of the Law creating the CSN deals with the functions of the latter in relation to access to information and the participation of the members of the public and civil society in its operations.

In this respect, the CSN shall:

- 1. Inform the members of the public of all relevant events relating to the operation of nuclear and radioactive installations, especially as regards their safe operation, their radiological impact for persons and the environment, events and incidents occurring at them and corrective measures implemented to prevent the repetition of such events. In order to facilitate access to this information, the Nuclear Safety Council shall make use of information and communication technologies.*
- 2. Report on all Council agreements, setting out clearly the matters covered, the reasons for the agreement and the results of any voting.*
- 3. Submit technical instructions and guidelines to public comment during the preparation phase, making extensive use of the corporate website of the Nuclear Safety Council to facilitate access for the members of the public.*
- 4. Promote and participate in information forums, in areas surrounding nuclear installations, dealing with aspects relating to the operation of such installations and especially emergency preparedness and analysis of events occurring.*

For performance of the informative tasks conferred by Law, the Plenary of the CSN approved a Communications Plan during its meeting of April 5th 2017. The objective of this Plan is to guide the CSN's internal and external communications and in the event of an emergency, with a view to improving the management of information and communications within the organisation and determining the most efficient channels for communications with public institutions, society and stakeholder groups.

The CSN possesses an institutional website (www.csn.es) through which it issues press releases or news items in relation to events occurring at nuclear power plants. Information is also provided on the minutes

of Plenary meetings and the technical reports supporting Plenary decision-making, inspection reports, on the operating status of nuclear power plants and on the environmental radiological situation as measured by the Automatic Stations Network and the Environmental Radiological Surveillance Network. The results of the Integrated Nuclear Power Plant Supervision System (SISC) are also presented.

5.3. Legal faculties

Member States shall ensure that the competent regulatory authority is given the legal powers necessary to fulfil its obligations in connection with the national framework described in Article 4(1).. This will imply competences and resources for the following:

- a) requirement that the licensee meets the national nuclear safety requirements and the terms of the licence in question;*
- b) requirement for such compliance to be demonstrated, including that of the requirements established pursuant to sections 2 to 5 of article 6;*
- c) verification of such compliance by means of regulatory assessments and inspections;*
- d) and the application of regulatory measures to ensure compliance, including suspension of the operation of nuclear installations, in accordance with the conditions defined in the national framework mentioned in article 4, section 1.*

Legal faculties

The Law by which the CSN was created empowers it to draw up and approve technical Instructions, Circulars and Guidelines relating to nuclear installations and nuclear safety-related activities. This is expressed in article 2.a as follows: instructions are technical standards that are binding upon those affected by their scope of application and are published in the Official State Gazette.

To date the CSN has issued 33 instructions applicable to nuclear installations, which remain in force. A complete list of these instructions is included in appendix IV.

The circulars and safety guides are also defined in article 2.a of the Law, as follows:

Circulars are technical documents of an informative nature that the Council may address to one or more subjects affected by their scope of application to inform them of events or circumstances relating to nuclear safety or radiological protection. For their part, safety guides are technical documents of a recommendatory nature via which the Council may provide orientations to those affected in relation to nuclear safety and radiological protection standards in force.

In addition, the CSN may issue complementary technical instructions directly to permit holders in order to guarantee the maintenance of safety conditions and requirements. These reinforce, develop or complement the limits and conditions established in the permits.

5.3.a. Propose, define or participate in the definition

During the period covered by this report, the CSN has approved several Instructions by virtue of the legal authorisation granted to this Body by article 2.a) of Law Ley 15/1980, of April 22nd, by which the CSN was created. These instructions are binding technical standards, compliance with which is compulsory for the addressees, which are integrated into the legal system.

Thus, the following CSN Instructions have been approved since May 1st 2014:

- CSN Instruction IS-10 (Revision 1), of July 30th 2014, establishing criteria for the reporting of events to the Council by the nuclear power plants (BOE of September 19th 2014). This is revised

taking into account the experience acquired since the previous edition of 2006, with a view to facilitating and clarifying the notification of events occurring at nuclear power plants.

- CSN Instruction IS-36, of January 21st 2015, on emergency operating procedures and the management of severe accidents at nuclear power plants. (BOE of February 17th 2015). This Instruction establishes the requirements to be met by the Spanish nuclear power plants in the operating procedures necessary to guarantee that they are operated safely and without undesirable consequences for safety, indicating how to interact with the plant systems in response to possible operating situations, up to severe accidents. These procedures are to be subjected to processes of verification and validation in order to guarantee the suitability of the transient and accident management strategies they contain. The users of these documents shall receive suitable periodic initial and on-going training. Consideration has been given to the revision of reference levels by the Western European Nuclear Regulators Association (WENRA), which has incorporated new requirements associated with the lessons learned from the Fukushima accident.
- CSN Instruction IS-37, of January 21st 2015, on the analysis of design basis accidents at nuclear power plants (BOE of February 26th 2015). Following the Fukushima accident, the transcendental importance of aspects relating to the capacities and resources required to manage accidents exceeding the design basis of the installation became apparent. The regulatory practice applied to date in this area has consisted of verifying compliance with the technical standards required in the country of origin of the technology, with the specific adaptations deemed to be necessary.

This Instruction deals with the contents of nuclear power plant accident analysis, thereby contributing to compliance with Council Directive 2014/87/Euratom, of July 8th 2014, article 6 of which requires the national legal framework to demand the following of the licensees: “periodic evaluation and verification, and continuous improvement, to the extent reasonably feasible, of the nuclear safety of nuclear installations in a systematic and verifiable manner”.

- CSN Instruction IS-15, Revision 1, of May 5th 2016, on the requirements for monitoring the effectiveness of maintenance at the nuclear power plant (BOE of June 16th 2016) This instruction is revised as a result of the experience acquired since its appearance in 2007 and the evolution of the international standards, which has underlined certain areas for improvement that should be included in the regulations, although they were already being applied as complementary Technical Instructions by the nuclear power plants.
- CSN Instruction IS-41, of July 16th 2016, requirements on physical protection of radioactive sources are approved (BOE of September 16th 2016).

This Instruction is a direct mandate of the single transitory provision of Royal Decree 1308/2011, of September 26th, on the physical protection of nuclear installations and materials and of radioactive sources.

Its objective is for the security of radioactive sources to include physical protection, in order to avoid, prevent, detect, delay and respond to whatever malicious acts might intentionally be performed in relation to these sources.

- CSN Instruction IS-42, of July 26th 2016, criteria on notification of certain events to the Council of the transport of radioactive material are established (BOE of September 22nd 2016). The aim of this instruction is to identify the different types of events in the transport of radioactive material that are to be reported to the CSN and the timeframe established for such reporting. This is applicable to transport events occurring or detected in the Spanish territory or outside this territory when the transport operation had its origin in Spain. Excluded are events in transport by sea or air that occur or are detected outside the area of the port or airport, respectively.

- CSN Instruction IS-30 (Rev. 2), of November 16th 2016, on the requirements of the fire protection programme at nuclear power plants (BOE of November 30th 2016). In drawing up the first version of this Council instruction on January 19th 2011, consideration was given to the work performed by WENRA, with a view to bringing the regulations of the different countries into harmony. As a result of this effort, a set of common requirements known as «reference levels» that were to be reflected in the national standards was established, among them the requirements applicable to what is known as «Protection against fires at nuclear power plants».

Subsequently, and as a result of the experience gleaned from its application, revision 1 of Instruction IS-30, of February 21st 2013 was approved.

At the present time it has been considered necessary to update it in order to clarify and facilitate the practical application of the term «exemption», splitting the term coined in Revision 1 into two new terms: «exemption», and «equivalent measures», which fit suitably with the regulatory framework relating to nuclear safety and radiological protection.

- CSN Instruction IS-27, Revision 1, of June 14th 2017, on general nuclear power plant design criteria (BOE of July 3rd 2017). In the first edition of this instruction, and with a view to establishing design criteria, consideration was given not only to the standards in force in the country of origin of the technology of the nuclear power plants (Appendix A of 10CFR50 for Spanish plants of American design) but also to the work performed by WENRA, in order to bring the regulations of the different countries into harmony.

In view of the experience gleaned from the application of this Instruction since 2010, it has been considered necessary to revise certain aspects in order to suitably establish its scope, which will now cover only “safety related” Structures, Systems and Components (SSC) and not those which are “safety significant”.

This restriction of the scope of this IS to safety-related SSC’s does not imply that safety significant SSC’s should cease to have legal requirements associated with them but rather that those applicable would be IS-26 (on Basic Nuclear Safety Requirements Applicable to Nuclear Installations) and IS-30, revision 1 (on the Requirements of the Nuclear Power Plant Fire Protection Programme).

- CSN Instruction IS-22, Revision 1, of November 15th 2017, on safety requirements for the management of the ageing and long term operation of nuclear power plants (BOE of November 30th 2017).

This is revised in order to update and clarify the CSN requirements for the development of a process for management of the aging of nuclear power plant structures, systems and components (SSC), including the long-term operating period case, on the basis of the experience gleaned by the different plants from its application since 2009, which has pointed to certain areas for improvement.

The “reference levels” regulatory requirements agreed to by the Western European Nuclear Regulators Association, WENRA, have been taken into account to bring the regulations of the different countries into harmony.

- CSN Instruction IS-11, Revision 1, of January 30th 2019, on nuclear power plant operating personnel licences (BOE of February 15th 2019).

This is revised, with greater coherence and accuracy attached to all aspects applicable to operating licences. One of the more significant aspects is the express requirement for a Systematic Training Design in keeping with the internationally recognised standards, in order to guarantee the

qualification of the plant personnel, this already being required by Nuclear Safety Council instruction IS-12, of February 28th 2007, for all non-licensed personnel working at a nuclear power plant, along with the improvements made to the definition of conditions for active continuance in the post and measures for recovery in the event of loss thereof.

- CSN Instruction IS-44, of February 26th 2020, on nuclear installation emergency planning, preparedness and response requirements (BOE of March 12th 2020).

This establishes the requirements regarding planning and preparedness for and response to nuclear and radiological emergencies that are applicable at on-site response level at the Spanish nuclear installations.

A complete list of all the Nuclear Safety Council Instructions (IS) may be found on the CSN website www.csn.es.

Also worthy of mention among the technical standards approved by the CSN are the Nuclear Safety Council Safety Guides (GS), which are recommendatory documents unless made compulsory by the provisions of a standard.

The following may be singled out from among the new subjects or reviews addressed by the Nuclear Safety Council Safety Guides published during the period corresponding to this report and relating to matters covered by the Convention:

- GS-07.06 (Rev.1) «Contents of Manuals on the radiological protection of nuclear fuel cycle nuclear and radioactive installations». Approved by the Plenary on April 15th 2016

This revision extends the contents of the previous Guide, updating areas that had become obsolete and briefly dealing with the contents of each of the chapters of the manual, in addition to establishing guidelines for their development.

The text of this Guide is based on the generic radiological protection manual for the Spanish nuclear power plants, which has been used as a basis for the drawing up of the radiological protection manuals of all the operating plants, as well as for nuclear and radioactive installations belonging to the fuel cycle.

- GS-01.18 (Rev.1) «Measurement of the effectiveness of nuclear power plant maintenance». Approved by the Plenary on June 22nd 2016. This Guide was first published in 2007.

This revision allows for the adoption of the most recent changes made in the American standards, i.e. the *country of origin of the technology* most frequently used for the licensing of Spanish nuclear power plants; the modifications do not imply any substantial changes to the contents of the standard.

The only point that clearly constitutes a new requirement is the one relating to the inclusion of *guidelines for the consideration of the risk* due to fire events in the risk assessments required by section (a)(4) of the American Maintenance Rule.

In addition, certain modifications are introduced in safety structures, systems and components (SSC) for protection against flooding, in SSC's during the period from definitive shutdown of the installation to the initiation of dismantling and in specific aspects of the monitoring programme, among others.

- GS-01.15 (Rev.1) «Updating and maintenance of Probabilistic Safety Assessments». Approved by the Plenary of the Council on January 25th 2017. The purpose of the revision of this Guide is the development of minimum criteria to be adhered to by the nuclear power plants in order to have available quality updated PSA's, as established in Council Instruction IS-25, of June 9th 2010, on criteria and requirements for the performance of probabilistic safety assessments and their applications to nuclear power plants.

The existing process is adapted to new needs and the new methodologies developed at the national and international levels are included in the PSA's.

The timeframes in which PSA maintenance and updating are to be performed are now specified and the documentation to be submitted by the plants is defined.

- GS-01.10 (Rev.2) «Periodic safety reviews at nuclear power plants». Approved by the Plenary of the Council on May 30th 2017.

This revision is based on international experience of periodic safety reviews (PSR's) in neighbouring countries and on documents drawn up by the IAEA.

The regulatory strategy now changes from a more prescriptive approach based on the CSN's CTI's to self-assessment by the licensee, who is responsible for analysing and proposing changes and improvements in the standards applicable to his installation. The Periodic Safety Reviews (PSR's) are disassociated from renewals of Operating Permits, the Guide referring only to Council Instruction IS-26, of June 16th 2010, on basic nuclear safety requirements applicable to nuclear installations, which requires the performance of a PSR every ten years.

- GS-06.06 «Drawing up of Safety Studies on transport packages not subject to approval». Approved by the Plenary of the Council on June 14th 2017.

This Guide determines the requirements applicable to the contents of regulatory compliance documentation and facilitates the drawing up of Safety Studies on packages not subject to design approval, enacting the provisions of Council Instruction IS-39, of June 10th 2015, in relation to the control and monitoring of the manufacturing of packaging for the transport of radioactive material.

It channels the user directly to the sections of the European Agreement on the transport by road of dangerous goods (ADR) and of the IAEA Regulation on the transport of radioactive material relating to the requirements established for packages not subject to approval.

5.3.b. Require that the licence holder complies and demonstrates compliance with national nuclear safety requirements

The holders of permits for nuclear installations are subject to the legislation in force and to the provisions of the corresponding permits issued by the Miterd and the requirements issued directly by the CSN. The Nuclear Energy Act (LEN), Law/1964, of April 29th, provides that the responsibility for the safety of nuclear installations shall be to the licensees thereof, who shall undertake their activities in such a way as to maintain the conditions of safety required and adopt the measures necessary to prevent nuclear and radioactive accidents and mitigate their consequences should they occur.

The LEN provides that the organisations responsible for the management of nuclear installations shall possess human, technical and economic resources adequate for the maintenance of conditions of safety and shall have incorporated the basic principles of safety management.

Royal Decree 1836/1999, of December 3rd, approving the Regulation governing Nuclear and Radioactive Installations (RINR), establishes that *the holder of each permit shall be responsible for the operation of the installation or activity under safe conditions and in all cases in accordance with the provisions of the official documents pursuant to which the corresponding permit is granted.*

The Law by which the CSN was created and the RINR determine that the CSN may issue Complementary Technical Instructions (CTI's) directly to permit holders in order to guarantee the continuity of the safety requirements and conditions of the installations and for better compliance with the requirements set out in the corresponding permits.

Likewise, the LEN and the Law by which the CSN was created empower the latter to undertake the surveillance, inspection and control of nuclear installations throughout each phase of their lifetime, during operation and up to decommissioning, in order for the operation of such installations not to pose any undue risk for persons or the environment.

The competences of the CSN are established in the Law by which it was created; its functions in relation to nuclear installations within the scope of Directive 2014/87 have been set out in article 8b of this document.

5.3.c Verify such compliance through regulatory assessments and inspections

Verification of compliance by means of assessments

The Regulation governing Nuclear and Radioactive Installations (RINR), approved by Royal Decree 1836/1999 of December 3rd, establishes the requirements to be fulfilled by the licensees in the different processes of authorisation (preliminary or site, construction, operation, modification, dismantling and declaration of decommissioning) throughout the different phases of the lifetime of the installation.

Included among the requirements established in the RINR is the performance of accident analyses and the assessment of risks arising from the operation of the installation. Specifically, CSN Instruction IS-37 establishes the requirements for the performance of accident analyses at nuclear power plants.

As regards design modifications, the RINR requires that they be analysed in order to determine whether or not ministerial authorisation is necessary prior to their being put into service, and also establishes what types of modifications require authorisation for construction and assembly. These requirements are dealt with in CSN Instruction IS-21del CSN, applicable to:

1. Modifications to plant structures, systems and components.
2. The performance of tests not described in the Safety Study or the Technical Specifications.
3. Modifications to the operating conditions, including evaluation methods, practices, procedures, manuals and other documents.
4. Temporary modifications.
5. Degraded or non-conforming conditions.

Council Instruction IS-21 makes a distinction between different types of modification evaluations (preliminary analysis and/or safety assessments), depending on their safety significance and on whether they require favourable reporting by the CSN or ministerial authorisation prior to assembly or start-up. When a modification requires authorisation, the safety assessment shall demonstrate that, following implementation of the modification, there continues to be compliance with the applicable safety criteria, standards and requirements.

As is established in Council Instruction IS-21, during the first three months of the year the licensees are required to submit a report on the modifications foreseen, implemented or in the process of

implementation to the Miterd and the CSN, this to include the preliminary analyses and safety assessments performed.

In the case of the Juzbado installation, design modifications are regulated by CSN Guide 3.1 on Modifications at nuclear fuel manufacturing installations, which includes criteria equivalent to those established for nuclear power plants.

Article 13 of the Regulation governing Nuclear Safety at Nuclear Installations, approved by Royal Decree 1400/2018, of November 23rd, and Council Instruction IS-26 on basic nuclear safety requirements applicable to nuclear installations provide as follows:

The licensee, under the supervision of the Nuclear Safety Council, shall systematically and periodically reassess the nuclear safety of the installation, at least once every ten years. The objective of this periodic safety review is to verify the nuclear safety of the installation and obtain an overall assessment of its performance throughout the period considered, by systematically analysing all aspects of nuclear safety and radiological protection.

CSN Safety Guide GS 1.10 Rev. 2., which regulates the performance of Periodic Safety Reviews (PSR's), contemplates a new methodology that adds weight to the self-assessment and safety enhancement proposals of the licensees, in keeping with IAEA guideline SSG-25, and complies with the WENRA reference levels.

Likewise, revision 2 of GS-1.10 contemplates analysis and comparison with the most advanced standards and best practices as a fundamental part of the PSR. The new standards to be analysed during the PSR are reflected in the baseline document for PSR performance, which requires the favourable judgement of the CSN. This practice replaces the process applied during the previous PSR period in Spain, known as the conditioned application standards (NAC) approach.

In addition to the PSR, compliance with the 2014/87/Euratom Directive implies the performance every six years of a specific nuclear power plant safety exercise (Topical Peer Review), the results of which will be included in a national report subject to a peer review by all the member countries of the European Union. The results of this process are published. The first review was initiated in 2017 on the subject of nuclear installation aging management. The results of the national self-assessment, based on the Technical Specifications defined by WENRA, were published in October 2018 as the National Report on the first Topical Peer Review.

Finally, section a of the second article of Law 15/1980, by which the CSN was created, empowers this regulatory body to establish requirements with which compliance is compulsory.

In the wake of the Fukushima accident, the CSN issued CTI's requiring the performance of the stress tests and assessments necessary to identify and implement measures for improvement. The Spanish nuclear power plants completed the implementation of these measures during the period 2016-2017, except for the updating of the seismic characterisation of the sites, which is on-going within the terms established by the CSN. The first phase of this seismic characterisation (data acquisition) has now been completed and completion of the second is scheduled for 2021. In December 2017 the CSN submitted revision 2 of the National post-Fukushima measures Action Plan (NAcP) to ENSREG, as agreed to during the plenary meeting of that organisation, held in June 2017, the main conclusion being that the actions and commitments acquired by Spain following the European stress tests have now been completed or are in a very advanced stage.

Although the report entitled National post-Fukushima measures Action Plan submitted to ENSREG did not include information on the Juzbado fuel manufacturing installation, this installation being outside the scope agreed to by ENSREG, which covered only nuclear power plants, on July 4th 2011 the CSN

requested the performance of stress tests adapted to the specific characteristics and risks of the said installation as a complement to the framework established specifically at European level.

During its meeting of July 21st 2011, the CSN agreed to approve the final Report on the stress tests for the Juzbado fuel manufacturing installation, which concluded that the installation in question had margins ensuring the maintenance of conditions of safety beyond the assumptions considered in design and that the licensee of the installation has proposed the implementation of improvements and the study of available resources in order to increase even further the capacity to respond to extreme situations. On July 12th 2012 the CSN issued a Complementary Technical Instruction (CSN/ITC/SG/JUZ/12/01) requiring the implementation of all the proposals for improvement identified by the licensee.

Verification of compliance by inspection

In keeping with the functions and competences established in the Law by which it was created and in its Charter, the CSN carries out inspections allowing it to obtain the information required to verify compliance with the applicable legislation in force, the CSN instructions and the specific conditions imposed in regulatory authorisations, licences or permits, as detailed in the CSN's systematic inspection and control programme, as well as through the review of the periodic reports that the licensees are obliged to submit in compliance with the conditions of the authorisations.

The CSN carries out the Basic Inspection Programme (PBI) as an instrument for continuous supervision, this being applied every two years to the operating nuclear power plants and the Juzbado fuel manufacturing installation and included within the framework of the Integrated Plant Supervision and Control System and the Juzbado Supervision and Control System (SISC and SSJ), respectively.

The Integrated Plant Supervision and Control System (SISC) is a basic tool that has been in use for more than ten years for supervision of the operation of the Spanish nuclear power plants and establishes the corrective and other actions applicable, depending on the results. The IRRS-ARTEMIS mission carried out in Spain in 2018 considered the performance of the SISC crosscutting components programme and the systematic inspections of the safety culture of the organisations operating the nuclear power plants to be an area of good performance. Likewise, the availability of a procedure for the identification of cases of non-compliance with safety requirements, used to reinforce supervision was also considered to be an area of good performance by this mission.

The inspections carried out by the CSN technical personnel may be of the following types:

- **Licensing:** these ensure that the installation authorisation processes are carried out in accordance with the requirements of the regulations on nuclear safety and radiological protection.
- **Control:** these guarantee that the installations operate in accordance with the requirements supporting the corresponding authorisation. They may be systematic (periodic) control inspections aimed at checking the operating conditions of the installation or occasional control inspections without any particular frequency set out.
- **Special:** these provide coverage for inspection functions attributed to the CSN and different from the above, arising as a result of incidents, exceptional situations of intervention in the event of radiological emergencies, complaints, etc.

The set of systematic control inspections is structured in the PBI of the nuclear power plants, which is completed every two years and whose performance is planned in the Annual Work Plan (PAT).

In the case of the operating nuclear power plants, the performance of PBI inspections includes the intervention of both specialists from the head office and the CSN inspectors resident on the sites (two inspectors per site), who also carry out daily monitoring of the operation of the plant and any incidents, overseeing the solutions applied to operational incidents, compliance with the Technical Specifications and

other CSN requirements. Within the PBI there are inspections in which specialists from various disciplines participate, this giving them a transversal nature that is considered to be of high added value (effectiveness of maintenance, design modifications, component design basis, surveillance requirements, etc.).

The CSN dedicates significant efforts to the inspection plans of operating nuclear power plants and the Juzbado installation, as regards both the inspection itself and evaluation of its results and, where appropriate, the categorisation of findings, which is accomplished depending on their impact on risk.

The SISC has its own self-assessment process aimed at identifying deficiencies in the process and areas for improvement.

In addition to the periodic inspection of the PBI, the CSN also performs non-scheduled inspections within the scope of the SISC, such as reactive and supplementary inspections to glean information on incidents occurring at the installations and track the actions carried out by the licensees for the correction and identification of the reason underlying the findings, both when required in application of the system procedures.

Apart from the SISC inspections, the CSN also carries out other scheduled and non-scheduled inspections. Particularly significant recently have been the scheduled inspections associated with compliance with the National Action Plan in the wake of the accident that occurred at the Fukushima nuclear power plant, to which the CSN has dedicated great effort. Also included among the scheduled activities are the so-called generic inspections (contractors, spares management, management system, seismic surveillance system, site characterisation for ITS installations, etc.). The non-scheduled inspections include those associated with licensing processes.

In the case of nuclear power plants in the dismantling phase, specific annual inspection programmes are set up adapted to the current phase of the process. Furthermore, during active periods of dismantling there is also a resident inspector on site for the daily monitoring of activities and of compliance with the established requirements.

5.3.d. Proposals for or carry out effective and proportionate enforcement actions

The section of this report relating to article 4.1.e) dealt with the legal framework and the distribution of areas of competence between the CSN and the Miterd regarding the exercising of sanctions powers.

One of the functions assigned to the CSN by the Law by which it was created is the proposal of launching whatever sanctions proceedings might be deemed appropriate within its realm of competence, in accordance with the legislation in force. The LEN empowers the Miterd to initiate and conduct sanctions proceedings in relation to nuclear safety and radiological protection and grants the Miterd or Cabinet of Ministers authority to settle them depending on the seriousness of the infringement.

For this purpose, the RINR confers upon the CSN and Miterd personnel appointed to carry out the inspection and verification of nuclear and radioactive installations the condition of agents of the authority. Furthermore, for the correct performance of their mission, such personnel may be accompanied by whatever accredited experts might be considered necessary, with powers to access the installations without prior notice and after identifying themselves. Events verified by staff members recognised as agents of the authority shall carry evidential value during the conduct of sanctions proceedings.

To date there have been no events constituting very serious infringements in Spain, although there have been infringements classified as slight and serious.

As regards the former, during the period 2015-2019 there have been 4 slight infringements relating to nuclear safety or radiological protection, and 24 warnings.

Likewise, since 2014 there have been only 2 infringements classified as serious, one caused by the loss of information associated with hourly walkthroughs within the framework of the fire protection system of a plant, and the other by non-compliance with the Technical Specifications (ETF) and Council Instruction IS-10. Rev. 1, of July 30th 2014, establishing criteria for the reporting of events to the Council by the nuclear power plants.

In accordance with the standards described above in relation to sanctions proceedings, this was settled by Ministerial Order.

Article 6. Licence holders

6.1. Licence holders

6.1.a. Responsibility of licence holder

The Spanish regulations establish as a basic principle that the fundamental responsibility for the nuclear safety of nuclear installations shall be to the licensee.

The legal precepts by which the responsibility of the licensee of the installation is assigned are set out in the LEN and the RINR. From the standpoint of civil liability for nuclear damage, the licensee is also identified as being responsible for the compensation of damages up to the limit established in the legislation.

Article 8 of the RINR provides that *the licensee of each authorisation shall be responsible for the operation of the installation or activity under conditions of safety and in all cases within the provisions of the official documents pursuant to which the corresponding authorisation was granted.*

In keeping with the above, article 5 of the Regulation governing nuclear safety at nuclear installations (RSN), approved by RD 1400/2018, of November 23rd, establishes that “the fundamental and non-transferrable responsibility for nuclear safety falls upon the licensee of the authorisation. This responsibility includes the control of contractor and sub-contractor activities that might affect the nuclear safety of nuclear installations”.

In the Nuclear Energy Act:

- The concept of the “licensee or operator” of a nuclear or radioactive installation is defined as being the physical or legal person entirely responsible for the said installation, whose responsibility cannot be delegated.
- Article 38bis establishes that in Spain the management of radioactive waste, including spent fuel, and the dismantling and decommissioning of nuclear installations is an essential public service governed by the State, commissioned to Enresa, which constitutes a resource and technical service of the Administration, without prejudice to the responsibilities corresponding to the generators of such materials or to the holders of permits to whom such responsibility has been entrusted. The responsibilities attributed to Enresa are set out in Royal Decree 102/2014, of February 21st, for the responsible and safe management of spent fuel and radioactive waste included within the scope of management of radioactive waste in all its forms, the dismantling and decommissioning of nuclear and radioactive installations and other activities associated with them, such as management of the fund for the financing of activities defined in the General Radioactive Waste Management Plan (PGRR) approved by the Government and other activities included within its realm of responsibility. For the performance of its activities, Enresa takes ownership of the corresponding nuclear installations.

In accordance with the Spanish legislation, dismantling is the process by which the licensee of a installation, having obtained the corresponding authorisation, undertakes the decontamination, disassembly of equipment, demolition of structures and removal of materials in order to allow, ultimately, for the full or restricted liberation of the site. The dismantling process concludes with a declaration of decommissioning that frees the licensee from his responsibility as operator and defines, in the case of restricted liberation of the site, the applicable limitations on use and the party responsible for their maintenance and for overseeing compliance therewith.

The organisation and responsibilities in the dismantling of nuclear and radioactive installations are legally defined by Royal Decree 1836/1999, of December 3rd, which approves the RINR, subject to successive amendments, and by Royal Decree 102/2014, of February 21st.

In addition, article 36 of the Regulation governing Nuclear Safety at nuclear installations (RD 1400/2018) indicates arrangements for dismantling during the design, construction and operating phases.

For its part, the RINR indicates that when the operating permit of a nuclear installation expires, the responsibility for its decommissioning falls initially upon the licensee who, prior to the granting of the corresponding authorisation, undertakes the so-called pre-dismantling activities. For the granting of the dismantling permit, the holder of the operating permit must first condition the operational radioactive waste generated during the operation of the installation (article 28), in accordance with the acceptance criteria of the storage or disposal installation to which they are to be transferred. Secondly, the licensee must have unloaded the fuel from the reactor and irradiated fuel storage pools or, in the absence of the latter, have a spent fuel management plan approved by the Miterd, following a report by the CSN (article 28). The obligations of and relationships between the two parties are established in detail in the so-called technical-administrative specifications, previously type contracts, between Enresa and the owners of the nuclear power plants having Miterd approval.

6.1.b. Demonstration of nuclear safety by the licence requester

The member States shall guarantee that the national framework in force requires the licensees to periodically assess and verify and continuously improve, to the extent reasonably possible, the safety of their nuclear installations in a systematic and verifiable manner; this to be accomplished under the supervision of the competent regulatory authority.

Regulatory requirements

The RINR establishes the requirements to be met by the licensees in the different processes of authorisation (preliminary or site, construction, operation, modification, dismantling and declaration of decommissioning) throughout the different phases of the lifetime of the installation.

Article 8.3 of the RINR establishes that *the licensee shall continuously strive to improve the nuclear safety and radiological protection conditions of the installation. In this respect, he shall analyse the best techniques and practices existing, in accordance with the requirements established by the CSN, and implement those deemed to be ideal by the said Body.*

Furthermore, in the operation of nuclear installations the provisions established in the authorisations granted for them and in the different mandatory documents approved in the latter must be fulfilled. Likewise, the Council instructions issued by the CSN pursuant to article 2.a of the Law by which it was created must be adhered to, as explained in detail in section 5.3. The CSN has issued a large number of instructions, which are included in Appendix IV.

Technical requirements aimed at maintaining and improving the safety of nuclear installations are derived from these instructions.

Specifically, CSN Instruction IS-37 establishes the requirements for the performance of nuclear power plant accident analyses. Also with regard to nuclear power plants, CSN Instruction IS-21 refers to the different requirements governing the modifications of the installation described in the RINR, replacing the Complementary Technical Instructions associated with the Operating Permits regulating design modifications and incorporating the WENRA reference levels on design modifications that are not yet incorporated in the Spanish standards.

The individual temporary storage (ITS) installations of the Trillo, José Cabrera, Ascó, Almaraz and Santa María de Garoña nuclear power plants have been considered installation design modifications and, as such, their licensing has been carried out in accordance with the provisions of articles 25, 26 and 27 of the RINR. This same consideration and treatment are given to the Cofrentes ITS installation, which is still in the licensing process.

For the Juzbado fuel manufacturing installation, design modifications are regulated by CSN Guide 3.1 on Modifications at nuclear fuel manufacturing installations.

Additionally, and as has been already pointed out, all nuclear installations are required to perform a Periodic Safety Review (PSR) every ten years, as established in the RSN and CSN Instruction IS-26 on basic safety criteria applicable to nuclear installations. CSN safety guide GS-01.10 Rev.2. “Periodic safety reviews at nuclear power plants”, of May 30th 2017, incorporated in the NPP Operating Permits, has established new directives for PSR performance.

Article 13 of the Regulation governing Nuclear Safety at nuclear installations reinforces the provisions relating to PSR established by instruction IS-26, including the transfer of the provisions of the Directive.

Furthermore, articles 12 and 31 of this new regulation reinforce the requirements previously existing in the regulatory framework in relation to safety assessment and modifications of the installation.

In March 2019, Enresa submitted a PSR of the José Cabrera ITS installation, as 2018 marked ten years of operation of this nuclear installation. This review was performed in accordance with IS-26 and its contents were determined pursuant to Guide S 1.10. The fundamental objective of the ITS PSR was an overall analysis of the maintenance programme and the improvements implemented by Enresa and of the performance of the installation and the storage systems during the period analysed, in relation to nuclear safety and radiological protection.

In accordance with the third additional provision of the RSN, every six years the CSN is required to carry out a detailed analysis of a specific nuclear installation safety issue or a Topical Peer Review (see section 8e.2.), the results of which are to be included in a national report subject to a process of peer review among all the member countries of the European Union. The results of this process are public. The first review was initiated in 2017, prior to publication of the RSN, and dealt with nuclear installation aging management. The results of the national self-assessment, based on the Technical Specifications defined by WENRA, were published in October 2018 as the National Report on the first topical review.

The licensees are required to submit the following reports annually to the CSN, associated with the authorisation of operating nuclear power plants and the Juzbado fuel manufacturing installation:

- In-house and industry operating experience applicable to the installation, describing the actions taken to improve the performance of the installation or to prevent similar events.
- Measures adopted to adapt the operation of the installation to the new national requirements on nuclear safety and radiological protection and to the standards of the country of origin of the project, if applicable. In this last case, an analysis of the applicability of the new requirements issued by the regulatory authority of the said country of origin of the project to plants of a similar design shall be included. In the case of the Juzbado fuel manufacturing installation, and as the

country of origin of the project is not established, the CSN has issued a Complementary Technical Instruction associated with the Operating and Manufacturing Permits requiring the review of requirements drawn up by the US regulatory body applicable to installations licensed in accordance with standard 10 CFR70.

- Results of the environmental radiological surveillance programme.
- Results of operating personnel dosimetry controls, including an analysis of the individual and collective doses received by the personnel during the course of the previous year.
- Activities of the Radioactive Waste and Spent Fuel Management Plan (applicable only to operating plants), including activities relating to very low-level waste open to management as conventional waste, to low and intermediate level waste, to high level waste and to irradiated fuel.
- Activities of the initial and on-going training programme for all the plant personnel whose work might have an impact on nuclear safety or radiological protection.
- Design modifications contemplated, in the process of implementation or implemented (annually in the case of the Juzbado installation and linked to the refuelling outage in the case of operating nuclear power plants).

The licensees of nuclear installations in the dismantling phase shall submit the following reports annually to the CSN:

- Modifications to the design or to the conditions for the performance of activities executed or implemented, which are foreseen or are in the process of execution or implementation.
- Relevant in-house and industry operating experience relating to dismantling and site restoration activities and to radioactive waste management and spent nuclear fuel storage at similar installations, describing the events and incidents that have occurred and establishing lessons learned to prevent them.
- Measures taken to adapt dismantling and restoration activities to whatever new national requirements on nuclear safety and radiological performance might be applicable.
- The results of environmental radiological surveillance, with information discriminating where possible increases in activity over the radiological background due to the dismantling or restoration activities performed.
- The results of the surveillance and control of groundwaters, with information on the possible radiological impact on the aquifer of the installation site.
- The results of the dosimetry controls applied to the personnel participating in dismantling of the installation and the restoration of its site.
- Activities relating to the management of radioactive materials and waste, including information on the management of the declassified materials generated.
- Updated list of reviews in force of procedures for the enactment of regulatory documents, with their date of approval.

In addition, every month Enresa shall submit information on the dismantling and restoration activities carried out during the previous month, as well as on those foreseen for the next two months.

This regulatory channel is used whenever it is considered necessary to review or assess safety issues. Following the accident at Fukushima nuclear power plant, the CSN issued a CTI requiring performance of the stress tests agreed to in the European context at the operating nuclear power plants, the Juzbado fuel manufacturing installation and José Cabrera NPP (in the dismantling phase), with a scope adjusted to the characteristics of each. The results of these tests and their subsequent appraisal have given rise to new CTI's issued to each licensee, including proposals for improvement, additional analyses and other improvements deemed necessary by the CSN, with their associated terms for implementation.

The Juzbado installation has also completed all the actions deriving from the post Fukushima stress tests in 2019, with the start-up of the earthquake-resistant fire-fighting water tank

Compliance by the licensees

The licensee adheres to these obligations by operating the installation in accordance with the limits and conditions established in the authorisation granted by the Miterd, in response to a mandatory and binding report by the CSN.

These limits and conditions include the official binding documents: Safety Study, Technical Specifications, Operating Regulation, Site Emergency Plan, Quality Assurance Manual, Radiological Protection Manual, Radioactive Waste and Spent Fuel Management Plan and Physical Protection Plan. These documents are complemented in the case of installations in the dismantling phase by the Declassifiable Materials Control Plan, the Site Restoration Plan and the Dismantling Process Economic Study.

One of the obligations of the licensee is the issuing of a series of reports to the CSN, both periodic and non-periodic, as established in the aforementioned authorisations. Likewise, the licensees have their own procedures, guidelines (occasionally pertaining the sector in general) and organisational bodies that facilitate and guarantee compliance with the requirements and establish in-house control and supervision mechanisms.

Article 13 of the RSN reinforces the provisions of instruction IS-26 in relation to the PSR and establishes that “as a result of the PSR, the licensee shall introduce at the installation whatever nuclear safety enhancements might be reasonably feasible within a time period in keeping with their safety significance, taking as a reference the safety objective established in article 6 of this regulation”. The safety objective referred to in article 6 of the RSN covers the safety objective of the Directive dealt with in this report and, therefore, principle 2 of the Vienna Declaration on nuclear safety.

The aforementioned GS-01.10 was revised in 2017 with the following dual purpose:

- improve the effectiveness of PSR's, taking into account the experience of the latest PSR's at the Spanish nuclear power plants and those of other countries, the lessons learned from the Fukushima accident that occurred in March of 2011, the community Directives 2009/71/Euratom, of June 25th 2009, and 2014/87/Euratom, of July 8th 2014, and the challenges associated with the aging and obsolescence of equipment and the possible long-term operation of the installations beyond their initially foreseen lifetime, and
- adapt to the WENRA reference levels and the contents of IAEA guideline SSG- 25 “*Periodic Safety Review for Nuclear Power Plants*”, which provides recommendations and guidelines for PSR performance.

One of the objectives of the PSR is to analyse the performance of the installation in different areas of nuclear safety over a sufficiently long period of time to identify trends, analyse the situation of the installation with respect to the international standards and those of the country of origin of the project and assess the nuclear safety of the installation, verifying compliance with its design basis and the validity of the measures for the prevention of accidents and the mitigation of their consequences, and application

of the principle of defence in depth. The PSR also aims to guarantee that nuclear safety remains at a high level throughout the following period.

The safety assessment associated with PSR must also include updating of the Probabilistic Safety Assessment.

6.1.c. Assessment of nuclear safety

Assessment by the regulatory authority

The assessments of the requests submitted by the licensees are carried out in accordance with the CSN's internal assessment procedures and guidelines, which embody the regulatory requirements established in the RINR and the CSN instructions. The systematic approach established is applied to all subjects requiring a CSN decision, such as design modifications, changes in official operating documents, etc., as well as compliance with the conditions associated with authorisations, CSN initiatives and whatever other subjects might occasionally be considered appropriate for assessment.

The CSN performs inspection plans adapted to the characteristics of each type of installation. In the case of the operating nuclear power plants and the Juzbado fuel installation, the results of the PBI inspections are included in the SISC and SSJ, described above. In addition, the CSN performs inspections outside the PBI at nuclear power plants in the dismantling phase, adjusted to the activities specific to each phase of dismantling.

An important part of the process of assessment associated with requests for the renewal of the Operating Permits (OP's) for nuclear installations is assessment of the results of the PSR's, from which are derived limits and conditions for safety enhancement applicable to the new OP.

6.1.d. Management system

Licence holders establish and implement management systems which give due priority to nuclear safety

Regulatory requirements

As has been pointed out in section 5.3.b, the nuclear installations establish their management systems in accordance with the requirements of Council Instruction IS-19, thereby achieving the two major objectives of a management system:

- Improve the safety performance of the organisations through the planning, control and supervision of activities relating to nuclear safety under normal, transient, off-normal and emergency situations.
- Drive and promote a solid safety culture through the development and strengthening of appropriate attitudes and behaviours among individuals and groups of persons in relation to nuclear safety, in order for them to carry out their tasks safely.

Furthermore, in addition to establishing the prevention of accidents and the attenuation of their consequences as a safety objective, the new RSN reinforces particularly relevant aspects such as human and financial resources, transparency and the safety culture, which were insufficiently explicit in other standards.

Licensee compliance

The licensees have in place management systems in accordance with CSN Instruction IS-19 and carry out their activities via an organisation and a series of procedures included in the different mandatory documents in force at the installations.

The management system is the expression of the commitment of the licensees of the installations to plant safety, and its application guarantees that nuclear safety and radiological protection are the fundamental building block, such that any decision taken in any area is informed firstly by its impact on nuclear safety and radiological protection.

The management systems establish measures for the safe management of the installations, beginning by establishing a good planning of activities and the availability of economic and duly qualified human resources. During the performance of activities, supervision, assessment and auditing mechanisms are established, along with indicators allowing for the identification of negative trends in the results obtained. In the case of the operating nuclear power plants, the action plans are reviewed annually on the basis of the results obtained from the previous year's assessment and of the new needs identified. These action plans identify the most important activities to be undertaken within a period of five years.

Likewise, article 12, *Safety assessment*, of the new RSN requires the licensees to carry out an evaluation of the installation during the site selection, design and operating phases in order to determine that an adequate level of safety has been achieved and that the installation meets the safety objective set out in the regulations.

These self-assessment programmes allow those responsible for activities or processes to undertake a critical assessment of the results obtained, with respect to the expectations defined, in order to identify non-conformities or proposals for improvement allowing progress to be made in terms of the quality of the process.

The management system also establishes the performance of in-house assessments independent from safety-related activities and processes. These assessments are carried out by persons not directly intervening in the activity in question.

The licensees set up programmes for the systematic assessment of in-house and industry operating experience with a view to identifying the root causes of events and implementing actions to correct them, such that their repetition is prevented. Management of the corrective actions and improvements programme implemented at the nuclear installations makes it possible to prioritise the actions to be performed depending on their safety significance.

In the case of the operating nuclear power plants, the external assessments, carried out by the World Association of Nuclear Operators (WANO) through peer reviews and those undertaken by the IAEA by way of OSART missions (Operational Safety Examination Groups) provide information for the organisation through comparisons with the best practices in the sector and the identification of areas for improvement. Also, and although in general they are not involved in external assessments, mention may be made of other organisations and forums that are a source of information and lessons learned for the plants, in addition to WANO and the IAEA. For example, the entire Spanish nuclear industry participates in the BWR reactors owners group (BWROG), the Westinghouse PWR reactors owners group (WOG), the Power Research Institute (EPRI), the Nuclear Energy Institute (NEI), etc.

Regulatory review

The supervision carried out by the CSN is embodied in the following two activities:

- The nuclear installation management systems establish the processes for long-term strategic planning, the analysis and prioritisation of projects defining the medium-term investments plan (5 years) and the operating plan or annual budget. The CSN is informed annually of the planning of investments by the operating nuclear power plants and supervises plans for improvement with a view to maintaining and reinforcing safety issues. Furthermore, the PBI contemplates the performance of Management System inspections.

- The integrated supervision systems for the operating plants and the Juzbado installation include the supervision of the safety culture, carried out using the tools provided by this programme, which establishes the systematic approach to be adopted in inspections to verify the performance of the safety assessment and enhancement programmes in the area of Organisation and Human Factors (O&HF) at these installations. In addition, within the scope of the SISC the CSN carries out a supervision of the NPP safety culture via the crosscutting components. At other installations, the CSN applies whatever specific inspection and supervision systems it deems to be suitable, in view of experience and the results of the action programmes and supervision systems applied by the licensee.

6.1.e. Emergency response measures

3. Licence holders provide for appropriate on-site emergency procedures and arrangements, including severe accident management guidelines or equivalent arrangements, for responding effectively to accidents in order to prevent or mitigate their consequences

Regulatory requirements

The CSN has drawn up and edited specific safety instructions of a technical nature, these being included in appendix IV.

The planning and preparedness for nuclear emergency situations are governed, for emergencies deriving from accidents at nuclear power plants, by the Basic Nuclear Emergency Plan (PLABEN) and by the Directives deriving from it. In addition, general provisions on nuclear emergencies are included in the Law by which the CSN was created, the RINR, the Regulation on the Protection of Health against Ionising Radiations, the Agreement of the Cabinet of Ministers on public information on applicable health protection measures and how to respond in the event of a radiological emergency, and the basic standards on civil defence.

For their part, actions in situations of radiological emergency at other installations and in other activities that might give rise to emergency situations entailing radiological risk are regulated in the Royal Decree approving the Basic Civil Defence Directive on Planning for Radiological Risk and in the Royal Decree approving the State Civil Defence Plan for Radiological Risk, which are the standards that contain the minimum criteria to be adhered to by the different public administrations and, to the extent appropriate, by the licensees of nuclear installations.

The most noteworthy aspects of the modifications made to the legal and regulatory framework governing nuclear emergencies during the period covered by this report are as follows:

- Issuing of post-Fukushima Complementary Technical Instructions within the framework of the “stress tests” promoted by the European Union, requiring the licensees to carry out analyses, measures and actions aimed at the re-dimensioning of their organisations in order to suitably manage emergency situations taking into account new scenarios, and the adoption of mitigation measures to respond to beyond design basis events relating to the potential loss of large areas of the installation.
- In compliance with the Directive, article 29 of the RSN for nuclear installations establishes the need to have available site emergency plans in keeping with the RINR; to ensure the availability of suitable resources for the management of emergencies, and mechanisms for the reception of external assistance; and to be prepared to collaborate with the authorities in the implementation of off-site emergency plans, in providing information for the public and in the expected response.
- Deriving from the self-assessment report drawn up by the CSN on the subject of emergency preparedness, prior to the IAEA’s IRRS-ARTEMIS mission carried out in relation to the Spanish

regulatory system in October 2018, CSN instruction IS-44, of February 26th 2020, has been drawn up on emergency planning, preparedness and response at nuclear installations, with a view to including in a single document all the demands made of the licensees by means of other regulatory instruments.

Licensee compliance

The licensees of nuclear installations carry out their activities within the framework of the standards described above and in accordance with the provisions of the corresponding authorisations and the different mandatory operations documents and the procedures by which they are enacted.

Generally speaking, the design defines the different safety functions to be maintained at each nuclear installation, the different operating or dismantling situations to be assumed (normal, incidents or accidents), the scenarios to be contemplated (both “within” the design basis and “beyond” it), and the safety criteria and requirements of the different structures, systems and components (SSC) to be ensured. The mandatory documents included in the authorisations cover in great detail the actions required to guarantee compliance with the requirements, and the licensees establish and organisation and apply the detailed procedures and instructions necessary to carry them out.

Also generally speaking, nuclear installations have site emergency plans (SEP) to address exceptional situations for which they may be required, these being consistent and coordinated with the corresponding off-site plans, established by the competent authorities for those cases and situations in which the regulations determine that they are necessary. These SEP’s are commensurate with the risks of the operational situation of each installation and establish and document the response expected of the licensee to possible emergency situations.

As a result of the post-Fukushima CTI’s issued by the CSN, all the Spanish nuclear power plants have performed organisational improvements and design modifications in the areas of emergency preparedness and response and accident management.

The improvements made are as follows:

- Adaptation of the human and material resources assigned to the emergency response organisation for severe accidents and prolonged emergencies.
- Setting up of a single Emergency Support Centre (CAE) close to Madrid, with portable equipment for electricity generation and medium and low pressure pumping of water that may be transported to the affected installation in less than 24 hours following activation.
- Construction of Alternative Emergency Management Centres (CAGE) for each site in order to protect the personnel of the emergency response organisation against adverse radiological conditions, among other things.
- Identification at each nuclear power plant of safe areas for the storage of portable equipment for the mitigation of extensive damage and electricity generation and medium and low pressure pumping of water, complementary to those items of equipment in place at the CAE and subject to a programme of periodic testing.
- Installation of passive hydrogen recombiners (PHR).
- Installation of filtered containment venting systems (FCVS). The SEP’s include the need to coordinate the actuation of this system with the management of the off-site emergency plan.
- Improvement of on and off-site emergency communication systems, extending their redundancy and autonomy.
- Improvement or construction, as appropriate, of heliports at each of the sites.
- Drawing up of the corresponding documents, procedures and instructions containing the new human and material resources available and establishing the operational approach for emergency response.

- Additional support for all the requirements established in the CTI's issued by the CSN. The CSN has led the licensees of nuclear power plants and the Military Emergency Response Unit (UME) to sign a collaboration agreement for the possible intervention of UME resources on site in tasks for transport, the removal of rubble, pumping, etc. The signing of this type of agreements for the reinforcement of emergency response capabilities was considered an area of good performance in the results of the IRRS-ARTEMIS mission performed in Spain in 2018.

All these modifications affecting the management of on-site emergencies have been included in the SEP's of all the nuclear power plants, in accordance with the requirements set out by the CSN in the corresponding CTI's.

For its part, during this period and associated with the Post-Fukushima actions, the Juzbado fuel installation has started up a new emergency management centre and a new emergency response organisation. These activities have been included in the Site Emergency Plan in force.

Regulatory review

As has been pointed out above, in order to verify that the nuclear installations are operating or being dismantled in accordance with the applicable standards and the requirements of the regulator, and that the actions required in the different permits are being carried out suitably, the CSN establishes inspection plans. The scope and extent of the CSN inspection plan varies depending on the results of the supervision systems implemented at the different installations or of the different phases and activities of the dismantling process.

As regards the implementation of the SEP's by the licensees, the CSN checks and inspects this and verifies that the plans are updated and revised in accordance with the guidelines issued by the CSN. Control and supervision activities are performed with respect both to the licensees' emergency preparedness training programme and performance of the mandatory emergency drills. As regards the emergency response capacity of the licensees of nuclear installations, an annual emergency drills programme is drawn up, this incorporating the criteria of the CSN in relation to unawareness by those participating of the scenario and date of performance of the drill and the scope of the emergencies to be simulated.

The CSN has a Drill Assessment Technical Group (GTES) that every year evaluates the proposals made by the licensees regarding the minimum scope of the SEP emergency drills to be performed at the Spanish nuclear installations. The considerations derived from this analysis are reported to the licensees in order for them to be taken into account in performing the drills.

Also, once the drills have been completed, the GTES analyses their performance, taking into consideration the actions carried out by the CSN personnel and the rest of the participants and issues proposals for improvement on the basis of this analysis.

For their part, the licensees evaluate the results of these drills and establish measures to improve the emergency response actions developed by the SEP's and associated procedures.

6.1.f. Human and financial resources

4. The member States shall guarantee that the national framework in force requires the licensees to provide and maintain financial and human resources suitable to ensure compliance with their obligations in relation to the nuclear safety of nuclear installations, as set out in sections 1 to 4.

Regulatory requirements

Several of the mandatory documents (Operating Regulation, Radiological Protection Manual, Physical Protection Permit, Quality Assurance Manual and Site Emergency Plan) included in the corresponding

nuclear installation authorisations define specific regulatory requirements relating to the organisation and human resources, with their corresponding qualifications, required by the licensee for the performance of his responsibilities. Likewise, the authorisations include regulatory requirements regarding financial coverage in the event of an accident.

In addition to establishing as a safety objective the prevention of accidents and the attenuation of their consequences, the RSN reinforces highly relevant aspects such as human and financial resources, transparency and the safety culture, which were not sufficiently explicit in other standards. The management systems establish measures for the safe management of the plants, beginning by establishing a good planning of activities and the availability of economic and duly qualified human resources. Article 7 of the RSN, *Organisation and management system*, reinforces these aspects.

The management of radioactive waste, including spent nuclear fuel, and the dismantling and decommissioning of nuclear installations, is charged to the fund for the financing of activities included in the General Radioactive Waste Plan (PGRR). This fund is made up of amounts from the collection of regulated fees and the yield from its transitory financial investments.

As has been indicated in section 6.1.a, article 38 bis of the Nuclear Energy Act, relating to “Radioactive waste management”, defines the management of radioactive waste (including spent fuel) and the dismantling and decommissioning of nuclear installations as an essential public service, and assigns these activities to Enresa within the framework of the corresponding PGRR. In general, the financing of these activities is defined and regulated by the sixth additional provision of the Electricity Industry Act, Law 54/1997. This sixth additional provision, the most relevant modification of which was by Law 11/2009, establishes two different financing channels depending on the operational status of the plants referred to as of January 1st 2010. The financing channel contemplated for the management of radioactive wastes from nuclear power plants that ceased their operation prior to that date, and for their dismantling, is a small percentage of the tolls associated with the electricity tariff, and is, therefore, ultimately provided by the end consumer. As regards the management of the radioactive waste generated by nuclear power plants that were in operation as of that date, and their dismantling, charges are established to be paid to Enresa by the waste generators in strict compliance with the principle he who contaminates pays, and that are collected only during operation of the plants. The charge to be paid by the nuclear power plant licensees was updated in December 2019 through Royal Decree 750/2019, with an increase of almost 20%. As regards the Juzbado fuel installation, a specific charge is established that covers the integrated cost of the radioactive waste management and dismantling and decommissioning services.

Licensee compliance

The licensees of nuclear installations must meet the requirements of the corresponding authorisations and the mandatory documents included therein and maintain the necessary levels of staffing, with the qualifications and financial capacities defined and required by the authorisations.

Any organisational change requires an in-house assessment process ensuring that they do not imply any negative impact on nuclear safety and radiological protection.

As regards financial resources for radioactive waste management and nuclear installation dismantling and decommissioning activities, Enresa is responsible for management of the fund set up for this purpose, under the supervision and guardianship of the control bodies established by the corresponding national authorities.

In relation to investments in safety by the operators of nuclear power plants, the Integrated Management System includes a series of safety-related investment planning procedures. This system aims to guarantee that all potential needs for investment are detected and receive suitable attention, and any unit of the organisation may propose actions implying new investments. For prioritisation, they are classified in accordance with the following criteria, in the order in which they appear:

- 1) Requirements of the regulatory authorities.
- 2) Enhancement of nuclear safety, radiological protection, prevention of risks and environmental protection.
- 3) Technology updating or plant improvement.
- 4) Profitability.

As regards the availability of the financial resources necessary in the event of nuclear damage, the Spanish nuclear power plants have ensured coverage for both the potential radiological impact outside the installations and the possible costs of decontamination.

These cases of coverage are regulated by the Nuclear Energy Act, Law 25/1964.

As has been indicated above in section 9.5, the RSN explicitly reinforces aspects relating to human and financial resources, transparency and the safety culture.

Regulatory review

The CSN holds annual meetings with the top management of the operating nuclear power plants during which the forecast investments in safety of each of the installations are analysed.

The CSN carries out inspections at nuclear installations, as detailed in previous sections, and covers all technical areas.

Within the framework of these inspections, the suitability of the human and economic resources available to the organisations of the installations are indirectly evaluated.

The management of organisational changes is reviewed in detail within the framework of the O&HF inspections, in which the changes and actions taken to avoid their having a negative impact on nuclear safety and radiological protection are examined in detail.

At the nuclear installations, the CSN carries out supervision and control activities relating to human resources, in the following fashion:

- All the nuclear power plants are required to have analysed and documented their needs for technical capacity and minimum staffing with human resources in each organisational department for safe operation.
- Every year the nuclear power plants submit a report to the CSN dealing with the modifications or updates relating to the optimisation of the organisation's human resources.
- Each installation is required to analyse and document any organisational and human resources changes relating to nuclear safety or radiological protection functions, in order to guarantee that the functions continue to be performed adequately and that the change and its management do not have a negative impact on safety.
- The CSN carries out inspections every two years on each licensee.

Article 7. Expertise and skills in nuclear safety

7. Member States shall ensure that the national framework requires all parties to make arrangements for the education and training for their staff having responsibilities related to the nuclear safety of nuclear installations so as to obtain, maintain and to further develop expertise and skills in nuclear safety and on-site emergency preparedness

Competent regulatory authority

In accordance with the CSN Charter, the technical staff of the organisation is made up of civil servants belonging to the Nuclear Safety and Radiological Protection Corps. The Charter also sets out the system for recruiting and joining this body. Selection is accomplished by competition-examination, the bases of which establish the requirements regarding the academic qualifications of the candidates and the selection tests to be passed. These tests consist of a series of examinations covering, among other things, nuclear physics and technology, radiation physics, nuclear safety, radiological protection, legislation (general and in the radiological and nuclear area) and administration, as well as the solving of practical problems and a demonstration of mastery of the English language. This guarantees a homogeneous level of knowledge and skills sufficient entry to the CSN.

Furthermore, in accordance with the general standards applicable to the Spanish administration, an initial period is established after the entry of newcomers, or trial period, which in the case of the CSN is used for the delivery of a training programme for new staff members, where, through a combination of introductory sessions, in-house and external training courses, technical visits and brief stays at a nuclear power plant, the degree of preparation of the new technical personnel is strengthened in all aspects within the realm of competence of the CSN. This initial training must be completed with a specialist programme that each new technician will receive in his or her final organisational unit.

Likewise, the CSN Charter establishes the obligation to promote the mechanisms and instruments required for the permanent training, improvement and technical specialisation of the staff members belonging to the Nuclear Safety and Radiological Protection Corps. Included among the functions of the Plenary of the CSN established in the Charter is the approval of the Annual Training Plan, which must be submitted to the Plenary by the Secretariat General of the CSN.

The Council pays special attention to the training of its human resources. The annual training plans are drawn up in such a way that their objectives are aligned with those of the Strategic Plan of the Organisation, grouped into the following programmes:

- Nuclear safety
- Radiological protection
- Support areas
- Management development
- Administrative management
- Prevention
- Computer systems
- Languages
- Skills

Technical training is accomplished through the delivery of courses by the CSN personnel and, in the majority of cases by specialists from national or overseas outside organisations. The programme is completed with attendance at national or international meetings, seminars, congresses, etc. There is a stable budget allocation for the annual Training Plan that guarantees the availability of economic resources adequate for its development.

Given the diversity of subjects and the individual nature of different people's careers, training is dealt with from a perspective of areas of know-how, establishing short, medium and long-term objectives. In addition, specific training activities are contemplated, aimed at experts in different subject areas. The three pillars on which the CSN is working in an integrated manner are as follows:

1. *R&D strategy*, maintaining contacts with organisations of the highest scientific and technical level and allowing excellence to be addressed as a method for the achievement of better results.

2. *Knowledge management*, which given the difficulty involved in acquiring and maintaining knowledge and skills is based on a medium to long-term approach.
3. *Initial and on-going training and preparation*, both individual and collective, for the exchange of knowledge, mutual enrichment, recycling and improvement of performance in the workplace.

Licence holder *Regulatory requirements*

The set of Spanish standards regarding qualification and training, in accordance with the requirements of the RINR, is supported by several CSN instructions.

The qualification and training of licensed operations and supervision personnel at operating nuclear power plants are regulated by Council Instruction IS-11 *on nuclear power plant operating personnel licenses* and in the case of non-licensed personnel with functions relating to safe operation of the plant, by Council Instruction IS-12 *defining the qualification and training requirements of non-licensed staff and non-licensed off-site personnel of nuclear power plants* – belonging to the workforce and external – in the area of nuclear power plants. Both instructions define the efficient and safe performance of the tasks assigned to each job post. The term “qualification” includes academic titles, experience and initial and on-going training. These two instructions, although not binding upon other nuclear installations as regards compliance, are also used at such installations with the necessary adaptations.

Complementary to the above, the Spanish regulatory framework establishes particularly specific and demanding requirements in relation to qualification, and requires a specific accreditation, issued by the CSN, for persons occupying posts of great responsibility in radiological protection at nuclear installations. These requirements are included in Council Instruction IS-03, on qualifications for recognition as an expert in protection against ionising radiations. In addition, Council Instruction IS-06 defines the scope and content of the training programmes for external workers at nuclear installations, applicable to external companies, installations and external workers.

Likewise, CSN Instruction IS-19, mentioned above, contains specific requirements relating to the safety culture of nuclear installation licensees.

Finally, article 8 of the RSN sets out the obligations of the licensees in relation to training, and specifically the obligation to implement and update the initial and on-going training programmes for the personnel of the installations, taking into account a systematic approach to training (SAT).

Licensee compliance

Generally speaking, the licensees of nuclear installations ensure compliance with the provisions of the aforementioned standards through their own programmes for the selection, training, accreditation and refresher training of the personnel of their organisations, which are carried out in accordance with the in-house procedures implemented by each installation and with the applicable safety culture enhancement plans.

In 2009, the Spanish nuclear industry, through Unesa and, more recently the Nuclear Energy Committee of the Nuclear Industry Forum, carried out a joint analysis of the quality of the training applied at the Spanish operating nuclear power plants, taking as a reference the practices of the Institute for Nuclear Power Operations (INPO).

As a result of the previous analysis, action plans were set up at the Spanish nuclear power plants based on the recommendations made by INPO. Since then, the SAT (Systematic Approach to Training) methodology has been implemented, graduated to a greater or lesser extent, for the design of the initial and on-going training programmes for personnel with operating licences and others, ahead of what has subsequently been determined in the regulation governing Nuclear Safety at nuclear installations.

In the case of the Juzbado installation, work is currently on-going for implementation of the SAT methodology.

This methodology allows for analysis of the necessary competences and training needs associated with activities relating to nuclear safety and performed at nuclear installations, the objective of which is to determine learning objectives, in keeping with the results of a preliminary job post analysis, the design of the initial and on-going training programme and its implementation based on the aforementioned learning objectives, the tools and human resources required for satisfactory performance, assessment of the degree of personal compliance with the foreseen learning objectives and, finally, assessment and review of the initial and on-going training programme, based on the actions of the personnel in their job posts. The initial and on-going training programmes are the result of this systematic process. Their degree of complexity has been established on the basis of the different job posts, the most complete being the one for operating licence personnel. Training committees have been set up for the effective management of the training programmes, in which the participation of the line management is essential for the training to focus on improving personnel performance.

Nuclear power plant licensees must ensure that all the personnel possess qualifications adequate for the functions that are to be assigned to them. Newcomers and personnel changing their job posts are qualified in accordance with the regulation and application of the aforementioned SAT methodology, which requires the following:

- Performance of initial training by newcomers in accordance with the training plan defined for each job post.
- Performance of the necessary training by personnel changing their job posts following analysis of the training that they would require to occupy the new post.
- On-the-job training, under the supervision of experienced personnel.
- Overlapping where necessary.

The renewal of the qualification is carried out on average every five years.

The aforementioned initial training includes a part made up of aspects that are basic and common to all the workers and a specific part relating to each job post, following review and acceptance thereof by the organisational units responsible for the tasks assigned.

For its part, the on-going training is applied to all the workers in order to maintain or improve competences in their job post.

In the case of the Juzbado fuel assembly manufacturing installation, the events dealt with in Operating Experience are those established in a Complementary Technical Instruction (CTI) associated with the Operating and Manufacturing Authorisations and the in-house operating experience.

In designing and improving the training programmes, consideration is given to Operating Experience and to the results of assessments performed subsequent to training by the line management and the workers themselves, such as supervisions, indicator trends and feedback from trainees and instructors.

Consideration is given also to changes, such as those relating to the tasks associated with the job post, modifications in design, equipment or procedures and the changes made by the regulatory authority. At present, all the Spanish nuclear power plants are equipped with a full-scope simulator, which is used by the licensed operating personnel for both initial and on-going training.

Likewise, at the nuclear power plants new contracting activities are planned with sufficient notice to allow for scheduling of the training required for personnel replacing people who are retiring and with

suitable overlapping for the maximum amount of know-how to be passed on during the handover process, without any negative impact on the safety of the installations. In the event of organisational reinforcements, the necessary training is delivered prior to the worker occupying the work post.

In addition, scheduled activities are carried out in the field of human factors and the safety culture, including measures to reinforce expectations regarding performance and leadership at all levels, aimed at stressing that safety is the most important issue. One of these activities is the putting in place of an initial training programme common to all the nuclear power plants for specialists in organisation and human factors.

Regulatory review

For each nuclear installation the CSN carries out a biennial inspection relating exclusively to personnel qualification and training.

Likewise, as part of the radiological protection and SEP inspections, checks are carried out on training in these areas.

Article 8. Transparency

Member States shall ensure that necessary information in relation to the nuclear safety of nuclear installations and its regulation is made available to workers and the general public, with specific consideration to local authorities, population and stakeholders in the vicinity of a nuclear installation. That obligation includes ensuring that the competent regulatory authority and the licence holders, within their fields of responsibility, provide in the framework of their communication policy.

8.1. Information for the workers and the public. Communications policy of the competent regulatory authority and the licensees

Regulatory authority

On April 5th 2017 the Nuclear Safety Council approved its Communications Plan in order to improve the management of information and communications both within the organisation and with public institutions, society and stakeholder groups, with the ultimate objective of strengthening credibility and trust regarding the Council's decisions and activities.

The aforementioned communications plan is applicable to the entire organisation and responds to three types of scenarios:

- External communications
- Internal communications
- Emergency communications

External communications refer to the communication actions aimed at public opinion, directly or via the media, and stakeholder groups with which the CSN has relations in different areas, for example local, provincial, regional, national or international.

Internal communications are those taking place within the organisation, such that the members participating in the process identify with a common project. The information is characterised by being two-way, this meaning that both parties respond, participate and are involved in dialogue.

Emergency communications focus on coordination with all the authorities involved in order for the messages issued to the public to be coherent. The structure of the response to a given emergency, including the responsibilities and functions of the different participating organisations, is set out in the

institutional and national plans. This ensures that the messages transmitted are first agreed to and coordinated.

Licensees

As regards the communications policy / plans of the licensees, the Spanish nuclear installations have in place organisations, equipment and persons in charge of ensuring that the information reaches the workers, by means of periodic communiques or the sending of notes in response to relevant situations or events. They have access to different channels, such as intranets, journals and in-house publications, as well as institutional videos, posters and screens installed at the installations for the broadcasting of messages.

Particularly significant has been the boost received by the websites of each plant as an increasingly consolidated communication tool, with systematically updated and increasingly reliable information accessible at all times. Also increasingly frequent are initiatives for the use of other direct and interactive communication tools with the public via the social media (for example YouTube videos), in order to inform a wider and more diverse public of certain activities or processes carried out at the installations.

Communications and relations with the media, and through them with society in general, are channelled via the sending of notes, communiques and direct information, including SMS messages, press conferences and meetings with the media, specific information dispatches, etc. Certain installations also collaborate periodically with the media by way of specific articles or reports. These activities are more frequent and relevant in the areas surrounding each installation.

As regards the José Cabrera plant, which is in the process of dismantling, Enresa has a specific communications plan to inform on the characteristics of the process and its economic impact on the region. This plan is based on a policy of open days, with visits being one of the most significant elements. These visits are normally made by professional and technical groups from the sector, although university students and the media also show interest in learning about the details of the project. In this respect, the national and provincial press is periodically informed of the progress of the work. Also, informative material has been printed and computer and virtual reality tools have been developed to spread information on the characteristics of the process.

8.1.a. Information on normal operating conditions of nuclear installations to workers and the general public

The obligation to inform the workers and the general public on the normal operating conditions of nuclear installations is incorporated in the legal system by way of legal provisions of different rank, as set out in the fifth additional provision of the Regulation governing nuclear safety at nuclear installations, approved by Royal Decree 1400/2018.

In this respect, article 2 of Law 15/1980, of April 22nd, by which the Nuclear Safety Council was created, contemplates as a function of the said regulatory authority that of informing the public of matters within its realm of competence, which may be done ex officio, on request by the general public or through participation by the latter in decision-making processes.

As regards the first of these, the Law creating the CSN and the Charter of the Nuclear Safety Council, approved by Royal Decree 1440/2010, establish the obligation of the organisation to submit a report on the performance of its activities to both Houses of the Spanish Parliament and to the regional Parliaments of those Autonomous Communities in which nuclear installations are located.

Article 14 of the aforementioned Law establishes the CSN's obligation to inform of all relevant events relating to the operation of nuclear and radioactive installations, especially as regards safe operation and the radiological impact for persons and the environment.

Likewise, by virtue of the said article and the part of the Charter enacting it, the CSN is obliged to inform of all agreements reached by the Council, the reasons for them and the results of any voting processes, of the minutes of meetings of the Plenary, of the minutes of inspections and of the Safety Instructions and Guides approved by the Council, among others. To accomplish the above, the CSN Charter contemplates the use of computer and telematic resources ensuring maximum spreading of the information.

Another of the mechanisms contemplated for the diffusion of information to the general public are the so-called information committees. The main mission of these committees, established as provided for in article 13 of the Regulation governing nuclear and radioactive installations, approved by Royal Decree 1836/1999, is to inform the different bodies represented and the general public of the performance of the activities regulated in the corresponding authorisations, and jointly deal with other questions of interest. One Committee is established per nuclear power plant and will function throughout its construction, operation and dismantling. The Committees will be made up of representatives of the General State Administration, the nuclear installation, the CSN and the local Administration of the area housing the said installation and will be open to participation by those members of the public who so desire.

As regards the possibility of accessing information on request, the Spanish legal system, through Law 27/2006, of July 18th, regulating rights of access to information, public participation and access to justice in relation to the environment, contemplates the public's right to access environmental information in the power of the authorities or of others holding it in their name.

In the area of interest to us here, the environmental information referred to by this law includes those measures, including administrative measures, such as policies, standards, plans, programmes, agreements in relation to the environment and activities, that affect or might affect environmental elements and factors having an impact on the environment, such as radiations or radioactive waste.

In certain cases, the right to access environmental information might be denied if revealing such information might negatively affect certain aspects such as national security, intellectual and industrial property rights or the protection of personal data.

Without prejudice to the above, Law 27/2006 also guarantees ex officio the spreading and public availability of the environmental information previously referred to.

Finally, the participation of the general public in processes of decision-making on the normal operating conditions of nuclear installations is formulated generically in provisions governing legislative and administrative procedures, and more specifically in the aforementioned Law 27/2006, which dedicates a complete chapter to this question. Likewise, article 14.3 of the Law creating the CSN contemplates mechanisms similar to those referred to above to ensure public participation in the drawing up of technical instructions and guidelines.

8.1.b. Prompt information in case of incidents and accidents to workers and the general public and to the competent regulatory authorities of other Member States in the vicinity of a nuclear installation

In addition to what is set out in the previous heading, Spain has different legal provisions that ensure the obligation of the licensees and regulatory authorities to make the relevant information available to the public and the workers in the event of incidents and accidents.

Firstly, mention might be made of article 11 of Law 15/1980, of April 22nd, by which the CSN was created, further developed through article 14 of the Council's Charter. These establish the obligation of the Nuclear Safety Council to keep the Government, the Congress and the Senate punctually informed of any circumstance or event that might affect the safety of nuclear and radioactive installations or the radiological quality of the environment, this including also the regional governments and parliaments

concerned. This obligation may materialise by way of a presentation by the competent regulatory authority or its appearance before an ad-hoc parliamentary commission.

Also, in its article 14, the Law by which the CSN was created contemplates the availability for the general public of complete information relating to events and incidents occurring at nuclear installations, as well as to the corrective measures implemented at these installations to prevent their repetition. In this respect, the said Law establishes that the CSN shall make use of the electronic resources necessary to ensure maximum diffusion of the information.

Furthermore, article 29.3 of the Regulation governing nuclear safety, approved by Royal Decree 1400/2018, provides that the licensees of nuclear installations shall establish the channels and procedures necessary for collaboration with the authorities in the spreading of information and the protection of the population in the event of an accident.

Additionally, by way of Instruction IS-19 on the requirements of the nuclear installation management system the CSN imposes upon the licensees of nuclear installations the obligation to report to persons belonging to the organisation, and where necessary other stakeholder groups, all information of relevance for the objectives of safety, the prevention of occupational risk, environmental protection, physical protection and quality, among others, thereby reinforcing the protection of the workers.

Finally, one of the most relevant mechanisms that incorporates provisions regarding the diffusion of information in response to emergencies is the Basic Nuclear Emergency Plan (PLABEN), approved by Royal Decree 1546/2004, of June 25th. This Plan stands as the guideline that contains the standards and criteria essential for the drawing up, effective material implementation and continuous efficiency of the different off-site Nuclear Emergency Plans (PEN).

As regards the PEN's, article 7 of the PLABEN establishes the basis for the off-site planning of nuclear emergencies, introducing requirements such as the guarantee of information in emergencies, in which respect the nuclear energy plans shall set up the procedures and channels required to guarantee the rapid and appropriate availability of information for the population effectively impacted, for the public Administrations involved and for the rest of the population, or the establishment of prior public information programmes with a view to maintaining an adequate threshold of operability of these plans.

Likewise, Title III of the PLABEN, oriented towards the definition of the basic hierarchical and organisational structure of the PEN', such that the orderly intervention and effective application of the measures to protect the population are facilitated, establishes the setting up of an information and communications Bureau, reporting to the Director of each PEN, and aimed at undertaking all activities relating to information for the population effectively impacted by the emergency, for the public Administration organisations involved and for the social media. As regards the diffusion of information to the international organisations and to neighbouring countries that might be affected by the emergency, the PLABEN assigns this task to the State coordination committee, which is the executive body of the Plan at the central level of response and support (PENCRA).

Complementary to the above, the Resolution of October 20th 1999 of the Sub-secretariat of the Ministry of the Presidency, which provides for the publication of the Agreement of the Cabinet of Ministers of October 1st 1999 in relation to applicable measures for the protection of health and to how to respond in the event of a radiological emergency, incorporating into our legal system Council Directive 89/618/Euratom, of November 27th 1989, in relation to information for the population on applicable measures and the way to respond in the event of a Radiological Emergency, establishes the basis for the diffusion of information to those potentially and actually affected by a radiological emergency. In this respect, the said Agreement sets out competences among the different authorities, establishes mechanisms for the prior diffusion of information, of information on the emergency, of information for the members of the emergency response services or of information for the European Union.

As regards the last point in the previous paragraph, Spain, as a member State of the European Union and the Euratom Community is directly affected by Council Decision 87/600/Euratom, of December 14th 1987, on community arrangements for the rapid exchange of information in the event of a radiological emergency. This Decision regulates the supply of information to both the European Commission and to those member States that might be affected if another member State decided to take far-reaching measures in order to protect the population in the event of a radiological emergency.

The system that implements the contents of Directive 87/600 Euratom on early notification to the EU is known as Ecurie (European Community Urgent Radiological Information Exchange). The point of contact with the web-Ecurie Management Centre in Spain is the CSN through its Emergency Response Centre (Salem). The messages issued to this web-Ecurie may be alert messages, emergency notifications or informative messages, these being voluntary notifications of events and incidents of lower importance that might be of use to the competent authorities of other member countries. Spain regularly participates in Ecurie exercises that test information exchange capacities.

In the event of a nuclear or radiological emergency, the EU provides other support systems such as EURDEP (European Union Radiological Data Exchange Platform) and Ensemble (Atmospheric dispersion forecast model results).

As regards the EURDEP programme, the CSN submits data from the network of automatic environmental radiological surveillance stations and the stations of the autonomous communities daily and in accordance with the commitment acquired by the countries participating in EURDEP. In the event of an emergency and during drills, the data are sent at a frequency of less than one hour.

The CSN has international agreements with neighbouring countries such as France, Portugal and Morocco establishing bilateral mechanisms for the prompt notification of nuclear or radiological accidents occurring anywhere in either of the countries and potentially affecting the national territory, the population or the environment of the other country or causing concern among its population.

8.2. Information available to the public

Regulatory authority

Law 15/1980, by which the CSN was created, following its modification by Law 33/2007, incorporates aspects included in the Aarhus Agreement, ratified by Spain in 2004⁵ and materialised in the national legislation through Law 27/2006, of July 18th, which regulates the rights to access to information, public participation and access to justice in legal matters, extending the requirements relating to public information with a view to increasing the transparency of the organisation and achieving greater trust among the members of the public in the activities of the CSN. The Law establishes three routes for this to be accomplished:

- *Transmission of information to the State institutions:*

Every year the CSN submits to the Parliament and to the regional parliaments of the autonomous communities having nuclear installations in their territories a detailed report on its activities. Likewise, and within the framework of its relations with the Parliament, the CSN responds to parliamentary initiatives (verbal and written questions, non-legislative motions, etc.) and abides by the resolutions issued in the annual reports.

- *Information forums in the areas surrounding nuclear installations:*

The legislation establishes that the CSN shall promote and participate in information forums in the areas surrounding these installations, presided over by the Miterd, to deal with issues relating

to the control and supervision of nuclear and radioactive installations and with emergency preparedness. The functioning of these information committees is regulated by the RINR.

- *Public information policy:*

Law 15/1980, by which the CSN was created, establishes the need to facilitate access to information and allow for the participation of the members of the public and civil society. This implies the obligation to inform the media and stakeholder groups of relevant events relating to the operation of the installations, with special emphasis on the communication of events and incidents potentially affecting safety, their possible radiological impact for persons and the environment and the corrective measures to be applied.

The *Advisory Committee for Public Information and Participation*, which began its operations in 2011, was set up under the aegis of this Law. The objective of this Committee is to issue recommendations to the CSN with a view to improving transparency, access to information and public participation in areas for which it is responsible. This Advisory Committee is made up of representatives of the main national stakeholder groups, including ministries, universities, professional associations, electricity industry bodies, mayors of towns close to nuclear power plants and NGO's.

In this context, the CSN publishes on its website information arising from the SISC, the minutes of inspections at the installations, information on the operational status of the nuclear power plants and information on environmental quality acquired by the Network of Automatic Stations and the Environmental Radiological Surveillance Network. Also published are the minutes of Council meetings and the technical reports supporting CSN decision-making.

In the event of any significant event or incident occurring at a nuclear or radioactive installation, news items, stories and press releases on it are published on the website. In parallel to this, the CSN responds to direct requests for information from the media.

Another strategic CSN course of action is the promotion of policies for institutional relations and communication with other organisations in international circles.

In this respect, the CSN participates actively in different international forums for the exchange of experience and technical and regulatory know-how in relation to nuclear safety and radiological protection, to gain insight into good practices allowing the safety of the country's installations to be strengthened and to reinforce the international coordination of emergency response plans.

The CSN also performs a wide range of technical or educational activities in areas relating to its activities. Particularly significant among these activities are the organisation of conferences, seminars and training activities and a far-reaching editorial activity that includes the publishing of the magazine Alfa, Journal on Nuclear Safety and Radiological Protection.

Furthermore, the CSN has in place an interactive Information Centre that hosts a significant number of visits (the figure of 100,000 visitors was recently reached), most from education centres and national and international institutional delegations.

With regard to the participation of the members of the public, the CSN is obliged to submit its instructions and safety guides for public comment during their preparation, for which an online space is provided in the corporate website for comments. Likewise, the Miterd informs on the standards in force on nuclear energy matters and subjects royal decree and regulation development projects to a mandatory public hearing process via its website.

Also subjected to environmental impact assessment, and consequently to the process of public hearings contemplated in Law 21/2013, of December 9th, on environmental assessment, are construction and dismantling projects for nuclear power plants and installations designed for the production of nuclear fuel.

Licensees

From the standpoint of the licensees, all the Spanish nuclear power plants are equipped with an information centre. These are installations at which the operation of the plant and the measures applied to guarantee its safety, the quality of the environment and the management of radioactive waste are explained in a didactic and practical manner. These centres are mainly visited by school children, university students and members of the public from the areas surrounding the plants.

In addition, most of the nuclear power plants have their own periodic publications (company magazines) that include the most important items of news affecting each installation and its surroundings, as well as the nuclear sector overall. There are also specific publications, such as general information on the installation for visitors, subject-specific brochures, papers, technical videos and reports, etc. In recent years there has been a greater increase in the digital versions of these items, these being more accessible and having a greater potential for diffusion through both corporate websites and the social media. In this respect, the digital publication of the annual reports put out by certain installations are increasingly widespread as external/internal information tools.

As regards the information supplied by other collective organisations within the nuclear sector, special mention may be made of the role of the Spanish Nuclear Industry Forum, which carries out important informative and educational work. Particularly significant within its organisation is the Communications Committee, of which the nuclear power plants are also members, which meets periodically for the exchange of experiences and the promotion and coordination of joint initiatives. There is also a Training Committee that coordinates and channels activities for collaboration with the teaching world, and a Documentation Committee that provides support for other activities of the Forum and its members.

The Spanish Nuclear Society (SNE), which brings together professionals in the sector, also performs a significant communication task through its Communication and Publications commissions and the initiatives of the Nuclear Youth and WIN (Women in Nuclear) groups, which are part of the SNE.

In short, both the nuclear installations and the Spanish nuclear sector overall carry out a series of activities that guarantee public information, communication and access to information by society, such that there be a complete guarantee of the transparency of its activity. The ultimate objective of this effort is to achieve the trust of the public in electricity generation by nuclear means.

8.3. Participation by the competent regulatory authority in activities for cooperation in nuclear safety at nuclear installations

For the Nuclear Safety Council, relations with its counterpart regulatory bodies in countries located close to the Spanish nuclear installations are especially important. In this respect, the regulatory body has entered into a series of bilateral cooperation agreements aimed mainly at creating a basis for collaboration and the exchange of technical information and regulatory experience.

Significant examples of the above are the agreements in place with France, Portugal and Morocco. In the case of France, the CSN collaborates actively with the French Nuclear Safety Authority (ASN), this including the holding of annual meetings for the exchange of work practices and information and/or the exchange of technical personnel between the two regulators, as contemplated in the Memorandum of Understanding (MoU) signed. Likewise, in 2018 the Council signed a MoU with the Moroccan Nuclear and Radiological Safety Agency (AMSSNuR) for cooperation in nuclear safety. Finally, a Cooperation

agreement was signed with Portugal in 2015, between the Portuguese Environmental Agency, the National Civil Defence Authority, the University of Lisbon Technical Institute and the CSN, in the fields of nuclear and radiological emergencies and environmental radiological protection.

8.4. Public participation in the process of decision-making in relation to the granting of licences for nuclear installations

Both the Regulation governing nuclear and radioactive installations (RINR), approved by Royal Decree 1836/1999, of December 3rd, and Law 21/2013, of December 9th, on environmental assessment, require processes of public information, the most significant of which is the one performed as part of the preliminary authorisation process for a nuclear or radioactive fuel cycle installations. Likewise, the dismantling or decommissioning of nuclear plants and reactors is subject to a normal environmental impact assessment.

The process of public participation in decision-making relative to the preliminary (or site) authorisation of a nuclear installation is carried out by way of two public information procedures that are performed within the framework of administrative procedures: the one for preliminary authorisation, in accordance with the RINR, and the one for the environmental assessment of projects, in keeping with Law 21/2013, these being described below.

As regards the arrangement contemplated by the nuclear standards, once the request for the preliminary authorisation of a nuclear installation has been received, article 15 of the RINR contemplates the opening of a thirty-day period for public information, which will begin with its publication in the "Official State Gazette", and the publication in the gazette of the corresponding Autonomous Community of an announcement describing the objective and main characteristics of the installation. In order to allow for the presentation of as many allegations and observations as are deemed to be appropriate during this period, the documentation that is to accompany the request for preliminary authorisation pursuant to article 14 of the aforementioned RINR shall be made available to the public.

On completion of the period for allegations, these shall be submitted to the requester in order for them to be taken into account in the project. The assessment of these allegations and of the replies by the requester corresponds to the Nuclear Safety Council, set up as the only body responsible for nuclear safety and radiological protection in accordance with Law 15/1980, of April 22nd, by which the Council was created, when such allegations refer to matters relating to its realm of competence, and to the corresponding ministerial department in other cases, mainly the Directorate General for Energy Policy and Mines of the Miterd.

As regards the process of public information contemplated by the environmental legislation, Law 21/2013 regulates the environmental impact assessment procedure of certain projects, among them those relating to nuclear installations, both for preliminary authorisation and dismantling. As part of this procedure, article 33 of the aforementioned law establishes a process by which for a period of no less than thirty working days the project, its environmental impact study and a summary of its fundamental characteristics are made available to the public. Although Law 21/2013 is transversal in nature, in the case of projects subject to the RINR certain specifically nuclear contents are required, which must be included as part of the contents of the environmental impact study:

Thus, section 1.d) of Part A of Appendix VI provides that, in relation to the description of the project, the following shall be included:

“A forecast of the types, quantities and composition of the waste to be produced during the phases of construction, operation and dismantling, and of the radioactive releases and emissions that might occur during normal operation, operational incidents and accidents; as well as a declaration of compliance with the ALARA (As Low As Reasonably Achievable) criterion, in accordance with the basic radiological protection standards for these situations”.

Also, section 7 of Part A of Appendix VI provides that, in relation to the vulnerability of the project, the following shall be included:

“A description of the significant adverse environmental effects of the project as a result of the vulnerability of the project to the risk of serious accidents and/or relevant catastrophes in relation to the project in question. For this objective, use may be made of the relevant information available obtained through risk assessments performed in compliance with [...], the standard regulating the nuclear safety of nuclear installations. Where appropriate, the description shall include the measures foreseen to prevent and mitigate the significant adverse effect of such events on the environment, and details of the preparedness and response proposed for such emergencies”.

On expiry of the period for this arrangement, the substantive body shall submit to the promoter the reports and allegations received for them to be considered in the drawing up, where appropriate, of a new version of the project and of the environmental impact study. Subsequently, if the environmental body were to determine that the promoter has not given due consideration to the allegations received during the procedures for public information and consultation, it shall require the promoter to complete the necessary information. However, as in the case of the specifically nuclear arrangement, the evaluation of whatever allegations might have been formulated in relation to nuclear safety or radiological protection shall correspond to the Nuclear Safety Council, as the authority solely responsible for such matters pursuant to Law 5/1980.

In any case, the very standards that regulate the development of both arrangements for public participation ensure coordination between them. Firstly, as pointed out in article 15.2 of the RINR, *“the procedure for public information shall be carried out jointly with that contemplated for the study of environmental impact in its specific regulation”*. Likewise, the fourth additional provision of the RINR establishes that *“the environmental impact assessment procedure contemplated in Law 21/2013 shall be incorporated in the substantive authorisation procedures governed by this Regulation”*. As a final result of this incorporation, Law 21/2013 itself establishes that the contents of the declaration of environmental impact shall be integrated in the authorisation of the project by the substantive body.

Furthermore, as has been described above, the RINR also requires that during the construction, operation and dismantling of nuclear power plants there be an information Committee, operating as a collegiate body. The function of this Committee shall be to inform the different bodies represented and the public in general of the performance of the activities regulated in the corresponding authorisations and to jointly deal with matters of interest. It shall be presided over by a representative of the Miterd and made up of representatives of the licensee of the installation, the CSN, the Government Delegation, the Autonomous Community, the Directorate General for Civil Defence and Emergencies and the municipal areas included in the zone 1 defined in the corresponding nuclear power plant off-site emergency plans. Other representatives of the Public Administrations may be part of this Committee when the nature of the matters to be dealt with so requires.

The Association of Municipalities in Areas housing Nuclear Power Plants (AMAC) operates at municipal level, acting as a go-between with the Administration for various aspects relating to nuclear power plants. At another level of information, and in general, the CSN is assigned, among others, the function of informing the general public on matters within its realm of competence, without prejudice to the announcement of its administrative activities in the legally established terms. Also worthy of mention is the CSN Advisory Committee referred to previously.

Finally, mention should be made of the fact that in 2004 Spain approved and ratified the Convention on access to information, public participation in decision-making and access to justice in relation to the environment, done in Aarhus (Denmark). Law 27/2006, of July 18th, regulating rights to access to information, public participation and access to justice in relation to the environment recognises the right of any physical or legal person to access information on the environment in the power of the public Administrations and the obligation of the latter to provide such information.

Article 8a. Nuclear safety objective for nuclear installations

8a.1. Guarantee of nuclear installations compliance with the objective of accident prevention

Article 6 of the Regulation governing Nuclear Safety at nuclear installations (RSN) includes the requirements corresponding to the objective of accident prevention, in keeping with the Directive:

“General requirements. Article 6. Safety objective for nuclear installations. The site selection, design, construction, start-up, operation and dismantling shall have the following objectives:

- a) the prevention of accidents and, if they occur, the attenuation of their consequences;
- b) avoidance of the following, either because of physical impossibility or extreme improbability with a high degree of confidence:
 - i) early radioactive emissions requiring emergency measures off site without sufficient time for application
 - ii) major radioactive emissions requiring measures for the protection of the population that cannot be limited in time or space”

As regards section b, indications have been included also in relation to compliance with this section in the case of installations constructed prior to the entry into force of Directive 2014/87/Euratom, requesting the licensees to adopt whatever safety enhancements might be reasonably feasible taking this section as a reference.

- First additional provision. Application of the safety objective to nuclear installations that have obtained their construction permit before August 14th 2014.
- Section b of article 6 shall be interpreted as a reference for the timely implementation of whatever nuclear safety enhancements might be reasonably feasible at nuclear installations that have obtained their construction permit before August 14th 2014.

Consequently, although in Spain the construction of new nuclear power plants is not foreseen, the principle of accident prevention is understood to be fully applicable, as regards design and operation, to the existing plants. In fact, many of the activities implemented as a result of the Fukushima accident are in alignment with this principle.

These principles and their transposition to the Spanish standards would be fully applicable in the case of whatever other nuclear installations (not nuclear power plants) might be built in Spain in the future (such as spent fuel storage installations).

In addition, article 13 of the RSN, relating to periodic safety reviews (PSR's) establishes that “as a result of the PSR, the licensee shall incorporate at the installation whatever nuclear safety enhancements might be reasonably feasible within a timeframe in keeping with their safety significance, taking as a reference the safety objective set out in article 6 of this regulation”, thereby transferring compliance with the safety objective referred to in article 6 of the RINR and the safety objective of the Directive to existing reactors.

8a.2. Guarantee of compliance with section 8.a.1 for the initial granting of construction permits for nuclear installations

As has been pointed out in the previous section, article 6 of the RSN included the requirements corresponding to the objective of preventing accidents, in keeping with the Directive. This article and

all its requirements are fully applicable to new installations, understood as being those that have obtained their construction permit after August 14th 2014.

Article 8b. Implementation of the nuclear safety objective for nuclear installations

8b.1. Application of the principle of defence in depth for nuclear safety

The CSN has in place a structured set of technical standards relating to the design and construction of nuclear installations that contemplate the principles of defence in depth, in accordance with the applicable international standards, such as those of the IAEA, the WENRA reference levels and the technical standards of the countries of origin of the technology used for the Spanish nuclear power plants. The CSN's regulatory framework has been completed through the RSN, in force since November 2018, which completes the transposition of Directive 014/87/Euratom as regards basic nuclear safety requirements and, as a result, principle 1 of the nuclear safety Declaration of Vienna on the prevention of accidents during start-up and operation and, in the event of their occurring, on the mitigation of emissions of radionuclides that might cause long-term contamination off site. These objectives are applicable to all the stages of the lifetime of the installation.

The principle of defence in depth (DiD) is fully implemented in the Spanish regulatory framework. The new RSN reinforces the application of this principle and contemplates it explicitly in article 11, applicable to the design and operation of nuclear installations. Specifically, it provides as follows: “... *including on-site and off-site events and serious conditions, the doses received by the workers and off-site releases must be minimised to the extent possible*”, and then goes on to deal with the levels of defence that are to be maintained through the design and construction of suitable physical barriers and engineered safeguards.

Article 16 of this same regulation deals with the application of the principle of defence in depth in design, and articles 18 (accident analysis) and 19 (off-site events) its application in these specific cases.

Furthermore, the section on *defence in depth* of CSN Instruction IS-26 requires the incorporation of multiple barriers to prevent and mitigate off-site releases of radioactive material beyond the authorised limits during design, construction, operation, dismantling and the transport and management of the radioactive waste generated.

All of the Spanish nuclear installations incorporate these levels of protection, both in their physical design and in their procedures and actuation guidelines. This was confirmed during the European stress tests carried out at the nuclear power plants following the accident at Fukushima NPP, the associated peer reviews and the implementation of the National Action Plan resulting from analysis of the response to extreme natural events and all their realistically conceivable combinations. Likewise, in the case of the Juzbado fuel manufacturing installation, a process analogous to the stress tests was carried out, providing analogous conclusions, as indicated in section 5.3.c.

8b.2. Promotion and enhancement of an effective nuclear safety culture

Licensees' safety culture

Article 7, Organisation and management system, of the new RSN, which completes the transposition of Directive 2014/87, establishes provisions aimed at ensuring that the licensees have available technical, economic and human resources, as well as safety policies, all these integrated in a management system taking into account organisational, human factors and safety culture aspects, including the contracting of external organisations.

It is specifically stipulated that the integrated management system shall incorporate the measures required to promote and enhance a nuclear safety culture that, among other things, strengthens at all organisational levels the capacity to question safety principles and practices and inform on safety issues.

In the area of the safety culture, the plants have set up an improvement programme based on a common sector guideline, organised from another further-reaching programme known as the “Human and organisational factors enhancement programme”. These safety culture programmes are periodically assessed by the CSN.

The safety culture enhancement programme establishes training requirements for specialists in this area, delivery being common to all the plants in order to homogenise criteria. Also identified are joint areas of work and projects between plants, such as leadership improvement, the safety culture at collaborating companies, etc.

The results of the safety culture enhancement programmes, like those of other processes, contribute through the annual review of the action plans of the licensees, in which are identified the most important short and medium-term activities for the enhancement of the safety of the plants.

Management of the corrective actions programme (CAP) allows the priority of the actions to be performed at the plants to be identified on the basis of their safety significance. Categorisation of the actions is accomplished by means of a classification (A, B, C and D) of the impact of the problems identified on the nuclear and radiological safety of the plant. Identification of the root cause and compliance with the terms of the corrective actions allow the causes of incidents to be eliminated and, therefore, their repetition avoided.

The commitment to perform in-house and external safety culture assessments at a frequency of 2 and 6 years respectively has been established. It is recommended that these assessments combine different techniques, such as surveys, interviews, observations of behaviour, working group discussions, etc.

Also worthy of mention is the information and the lessons learned obtained from other organisations, additional to WANO, thanks to the contacts maintained by the licensees with the BWROG and PWROG owners groups, the Electric Power Research Institute (EPRI) and the Nuclear Energy Institute (NEI), institutions to which they belong either as direct members or through the Nuclear Energy Committee (CEN) of the Nuclear Forum (Foro Nuclear). These forums make it possible to apply measures reinforcing performance and leadership expectations at all levels, using the different documents issued by these organisations.

Participation in technical missions at both Spanish and overseas plants is considered to be a source of experience of great relevance for safety. In addition to the missions hosted directly by the licensees of the Spanish installations, several experts from these plants have participated in missions carried out plants abroad. By way of an example, during 2016, 2017 and 2018, national representatives participated in 43 WANO peer reviews and 31 WANO technical missions.

Enresa has established a similar line of safety culture assessment and on-going improvement and has implemented a management system known as the Integrated Improvement System (SIM) for the organisation overall and for its installations.

For its part, the Juzbado fuel manufacturing installation also has an Organisation and Human Factors safety assessment and enhancement programme that is also subject to periodic assessment by the CSN and contemplates specific safety culture projects or activities.

Safety culture at the regulatory body

The CSN recognises the importance of the safety culture and has taken measures to promote and support a culture of this type within its organisation. In this respect, the Plenary of the CSN approved a Safety Culture Policy during its session of January 12th 2017.

The CSN's safety culture Policy establishes the attributes that this organisation considers to be fundamental to set up and maintain an organisational culture oriented towards safety.

This policy is based on the establishment of the basic principles for the organisation, which are in turn developed through the systematic application of certain attributes. Each of the principles and attributes is a necessary element for the achievement of a safety-oriented organisational culture: in isolation they are insufficient and consequently need to be grouped together.

The basic principles adopted by the CSN are as follows:

Principle 1.- Leadership for safety must be manifested at all levels of the CSN hierarchy

Principle 2.- All members of the CSN personnel are individually responsible for behaving at all times in a manner oriented towards safety

Principle 3.- A CSN culture that promotes safety facilitates cooperation and communication

Principle 4.- The application of an overall safety approach is ensured by working systematically

Principle 5.- Stimulus for on-going improvement, learning and self-assessment at all levels of the organisation

The Plenary of the CSN has approved an action plan for the implementation of the culture policy that includes self-assessments of the safety culture of the organisation. In this respect, during its meeting held on January 29th 2020, the Plenary of the CSN approved the contracting of an external service providing support for the safety culture self-assessment to be carried out by the CSN in 2020-2021.

8b.2.a. Management systems

Licensees' management system

The nuclear installations establish management systems in accordance with the requirements of CSN Instruction IS-19 on the requirements applicable to such systems. These requirements define how to establish, implement, assess and continuously improve a management system integrating nuclear safety, the prevention of occupational risk, environmental protection, physical protection, quality and economic aspects, in order to guarantee that nuclear safety is duly taken into account in all the organisation's activities.

Furthermore, in addition to establishing as a safety objective the prevention of accidents and attenuation of their consequences, the new RSN reinforces highly significant aspects such as human and financial resources, transparency and the safety culture, which were not sufficiently explicit in the previously existing standards.

The management systems establish measures for the safe management of the installations, beginning by establishing a good planning of activities and the availability of duly qualified human and economic resources. Article 7 of the new RSN, *Organisation and management systems*, reinforces these aspects. Specifically, the following is required:

1. Availability, throughout the entire life cycle of the installation, of the technical and economic and duly qualified and competent human resources required, along with an organisational structure appropriate for the maintenance of nuclear safety and assurance of an adequate response capacity in emergency situations.

2. Availability of a nuclear safety policy promoting on-going improvement by means of the following:

- a. The identification of new information and analysis of that deemed to be significant within a timeframe in keeping with its safety significance.
- b. Systematic review of nuclear safety, taking into account in-house and industry operating experience and breakthroughs in nuclear safety and science and technology.
- c. The implementation within an adequate timeframe of whatever nuclear safety enhancements are identified and reasonably feasible.

3. Establishment, implementation, assessment and on-going improvement of an integrated management system covering nuclear safety, the prevention of occupational risk, environmental protection, physical protection, quality and economic aspects, in order to guarantee that nuclear safety is duly taken into account in all the organisation's activities. This management system shall grant due priority to nuclear safety above any other consideration, guaranteeing its maintenance and promoting its on-going improvement.

4. Incorporation in the integrated management system of the measures required to promote and enhance a nuclear safety culture that, among other things, strengthens at all levels of the organisation the capacity to challenge safety-related principles and practices and inform on safety matters.

5. Take into account the influence of human and organisational factors on nuclear safety throughout the entire life cycle of the installation.

6. Guarantee throughout the entire life cycle of the installation that quality requirements are defined and applied suitably in order to achieve the safety objective established in article 6 of the Regulation and that these requirements are integrated in its management system.

7. Assurance that the contractors and sub-contractors under their responsibility and whose activity might impact the safety objective established in article 6 of the Regulation have available human, technical and economic resources suitable for the efficient and safe performance of the tasks assigned.

As these provisions apply to the entire life cycle of the installation, which according to the definition included in the Regulation covers "*the stages of planning, site selection, design, construction, operation and dismantling*", the scope includes all the management resources for the different operating situations that might arise during the cycle, including accidents. The licensees have a non-transferable responsibility to abide by the RSN, such compliance including requirements relating to the control of contractor and sub-contractor activities potentially affecting the safety of the installations, in keeping with article 5, *Licensee's responsibility*, of the aforementioned Regulation.

Regulatory body management system

The CSN has established and implemented a management system based on processes integrating all the functions and activities carried out at the CSN. The system was developed in accordance with the previous IAEA safety guide GS-R-3 "The management system of installations and activities". However, the CSN has initiated the review of its management system in order to meet the requirements of the new IAEA Safety Guide GSR Part 2 "Leadership and management for safety".

The organisational structure of the CSN, its responsibilities and accountability at its different levels are specified in the manual of the management system and the organisation and operation manual, as appropriate. The management system manual also describes the organisation processes and their interfaces, as well as relations with external organisations.

The management system manual clearly specifies that the Plenary of the CSN is responsible for establishing, applying, maintaining and continuously improving the management system in order to guarantee safety. For effective compliance with these responsibilities, the CSN has set up a «Management System and Information Security Committee». This committee is made up of following CSN staff members:

- Three commissioners, one the chairman of the committee and the other two vice-chairmen
- Secretary general
- Technical director for nuclear safety
- Technical director for radiological protection
- Sub-director of administration and personnel
- Sub-director of information technologies
- Director of the technical office of the presidency
- Head of the planning assessment and quality unit, responsible for coordination of the management system

The Committee is responsible for the following, among other things:

- Proposing the strategy of the CSN management system, developing it and supervising its implementation.
- Reviewing the drafts of management system documentation prior to their approval.
- Analysing process and activity assessments.
- Proposing and follow-up of improvement actions.

The CSN has developed two administrative procedures to deal with whatever conflicts might arise during the process of decision-making, in which the right of any member of the CSN personnel to question the corresponding safety principles and practices and report appropriately on safety issues is guaranteed. These two procedures are: PG.IV.8 “Assessment of fuel cycle nuclear and radioactive installations”, for conflicts arising before the final decision, and PA.XI.33 “Treatment of different technical options”, for conflicts arising once the final decision has been taken.

The CSN also has a Code of Ethics in place, the objectives of which are as follows:

- Identification of the values of the organisation and of how they are formulated in professional practice, both individually and collectively.
- Promotion among all the CSN workers of attitudes best adapting to achievement of the fundamental objective of the Council, nuclear safety and radiological protection, serving also as a reference for stakeholder groups.
- Consolidation of a climate of trust within the CSN, serving also as a vehicle for socialisation and the cohesion of all the organisation’s groups.
- Reinforcing the trust of stakeholder groups in the CSN.

8b.2.b. Operating experience

The requirement for the licensees of nuclear installations to have in place programmes for the gathering and analysis of in-house and industry operating experience is included in article 32 of the RSN, which provides as follows:

Article 32. Operating experience. The licensee shall:

1. Establish and implement a systematic programme for the gathering, screening, analysis, documentation and internal communication of in-house and industry operating experience with a view to identifying, selecting and diligently implementing safety significant lessons learned, as

well as notifying the competent authority of events potentially impacting the safety of the installation.

2. Establish agreements with the organisations in charge of the design, manufacturing, construction, maintenance and supply of safety significant structures, systems, components and services, in order for them to keep the operating experience updated and promptly notify of the detection of faults and deviations that might impact conditions of safety, this serving as a support for analysis and resolution.

Furthermore, CSN Instruction IS-26 establishes requirements in relation to programmes for the treatment of in-house and industry operating experience at nuclear installations.

The CSN analyses operating experience by supervising the processes of the licensees for the analysis of events and, also, by analysing and tracking the reports issued by Spanish and overseas plants and the Juzbado fuel manufacturing installation on reportable events. Likewise, the operating permits establish a generic condition applicable to the treatment of operating experience, developed by means of a CTI, on the contents of the report on in-house and industry operating experience that the licensees of nuclear installations are required to submit annually to the CSN.

The tools available to the CSN for the monitoring and analysis of events at nuclear installations are the national and international Incident Review Panels (PRI and PRIN, respectively), the use of databases and participation in operating experience exchange forums, with a view to identifying events that might affect the Spanish nuclear power plants and analysing the possible application of measures to prevent their repetition, as well as to finding common solutions to generic problems identified.

Both the Spanish nuclear power plants and the Juzbado installation have deep-rooted processes for the analysis of national and overseas events, oriented towards the integration of lessons learned in the practices of each plant. These processes are based on the requirements imposed by the CSN via its specific standards and on the conditions imposed by the operating permits, and may include not only the analysis of the sources of information required by the CSN but also the analysis of any other document considered to be relevant to the plant in question.

The in-house operating experience is analysed using the internationally accepted methodologies (HPES, MORT, etc.) appropriate for each type of event depending on its complexity and safety significance and in accordance with the methodological procedures or guidelines developed at each installation.

In addition to studying each incident individually, trend analyses are performed to detect weaknesses and areas for improvement in the organisations, the methods used being agreed to between the Spanish nuclear power plants, such as common cause analysis.

A fundamental tool for the treatment of operating experience is the PAC, which allows the actions identified to be categorised and prioritised. The results of the in-house and industry operating experience analyses are used in the preparation of the annual training programme, as required by CSN instructions IS-11 and IS-12 in the case of the plants, and as is the case also at the Juzbado installation.

As regards external or industry events, the most significant for safety and included in IER Level 1 type documents (INPO) are analysed by way of the Nuclear Forum CEN Operating Experience Sector Group.

The CSN carries out biennial operating experience inspections on the nuclear power plants and Juzbado installation within the framework of the PBI, the scope of which includes the review of the treatment given to in-house and industry operating experience, including at international level. These inspections deal with organisational aspects and resources, procedures and the process of analysis and implementation of the results.

For their part, the annual operating experience reports submitted to the CSN by each installation are subjected to a preliminary evaluation to select a sample of events for analysis in greater detail and to analyse the indicators and trend analyses prepared by the licensee.

8b.2.c. Information on events impacting nuclear safety

The requirement relating to the notification to the regulatory authority of events potentially impacting the nuclear safety of nuclear installations is included at all levels of the Spanish nuclear standards, from the LEN (articles 40 and 86.a), the RINR (in articles 8.1. 20 and 73) and the RSN (article 32).

Article 7.17 of CSN Instruction IS-26 includes the requirement that in-house operating events be reported for all nuclear installations and, in the case of nuclear power plants, IS-10 rev.1 develops the specific criteria to be taken into account for decisions regarding the notification of events occurring. This instruction typifies reportable events at Spanish nuclear power plants and the terms, resources and formats for their notification and establishes criteria for the submittal of additional information on the events reported and review of the reports submitted.

In the case of the Juzbado installation, both the criteria for the reporting of an event and the terms for notification are detailed in the Operating Specifications.

Events at nuclear installations are communicated to the CSN emergency response centre (Salem) by means of a reportable event communique (ISN). They are also reported by the CSN to the public via press releases and the organisation's website, and in the case of nuclear power plants these reports are distributed to the rest of the Spanish plants, in accordance with the internal procedures of the CSN.

The Spanish nuclear installations have procedures for the reporting of events, in the drawing up of which consideration is given to valid references for the adequate use and interpretation of reporting criteria. Complementary to the above, there are procedures for the performance of cause analyses in compliance with internationally accepted methodologies that apply the concepts of condition and cause extension to check whether the causes of the event point to vulnerabilities that might be present, active or latent, in other processes or SSC's of the installation.

The consistency of the administrative procedures of the Spanish nuclear power plants with respect to the requirements of CSN instruction IS-10 is subject to independent supervision by the CSN within the scope of the PBI inspections dedicated to the nuclear power plant operating experience programmes, among others.

The CSN carries out a follow-up of reported events, which begins with the review performed by the CSN resident inspectors to verify their suitability and provide additional information to the CSN, this being transmitted by way of a preliminary assessment that is distributed internally at the CSN.

Events reported by nuclear installations are analysed during monthly meetings of the CSN's Incident Review Panel (PRI), made up of representatives of different areas specialising in nuclear safety and radiological protection. In addition to reviewing the information submitted, analysing the corrective actions proposed and determining whether additional actions are required, in the case of the nuclear power plants the event is classified on the basis of its safety significance as significant, of interest or irrelevant. The events are tracked by specialist areas and are subjected to the biennial operating experience inspections within the PBI.

Among the CSN's most significant actions are decisions relating to events considered as being generic, due to their potential impact on other plants. Analysis of the applicability of these events may be required of the licensees and subjected to CSN supervision in order to establish the corresponding actions.

8b.2.d. Education and training

In accordance with the provisions of article 7, the CSN has in place several instructions defining the qualification requirements applicable to persons working at nuclear installations.

CSN Instructions IS-11 (Operating personnel licences) and IS-12 (Non-licensed personnel) are applicable only to nuclear power plants and define the efficient and safe performance of the tasks assigned to each job post. In addition, the CSN Instruction is applicable to all installations since it refers to qualification for recognition as an expert in protection against ionising radiations, applicable to all the installations, and details the training and experience required by the CSN for such recognition to be granted, this being applicable to both those in charge of the Radiological Protection Service and the technicians reporting to them. The CSN also has in place Instruction IS-06, which defines the scope and content of the training programmes on radiological protection for external workers in the area of nuclear installations, this being applicable to external companies, installations and external workers.

For analysis of the required competences and training needs for nuclear safety-related activities carried out at nuclear installations, the decision has been taken to use a systematic design inspired by the SAT (*Systematic Approach to Training*) methodology. Both the initial and on-going training programmes are the result of this systematic process. The complexity of the design depends on the different job posts.

For the effective management of the training programmes at nuclear power plants, training committees have been set up, in which the participation of the line management is essential for training to be focussed on improving the performance of the personnel.

As has already been pointed out, the procedures and practices of nuclear installations are adapted for compliance with the requirements defined by the CSN through the corresponding legal instruments. In addition to these standards, article 8, Training, of the new RSN provides that the licensee shall:

1. Establish an overall personnel training policy in keeping with their importance, recognising the significance of nuclear safety.
2. Guarantee the suitable qualification of personnel performing functions with an impact on the nuclear safety of the installation.
3. Implement and update the initial and on-going training programmes for the personnel of the installation, taking into account a systematic training design.

As has been the case in recent years, the training and qualification requirements deriving from the new tasks that have arisen with the implementation of improvements at nuclear power plants following the Fukushima accident have been incorporated in the initial and on-going training programmes. These have generally implied a high degree of practical training. Likewise, it has been necessary to address the development of integrated scope emergency exercises, with the participation of all the members of the organisation involved in the management of emergencies, both those contemplated within the design basis and those giving rise to severe accidents beyond the design basis of the installation.

In Spain there are several educational programmes that provide students with a profound understanding of the theoretical and practical fundamentals of nuclear engineering and the technology associated with the production of power by nuclear fission. These programmes include the collaboration of the CSN, the licensees and national and international organisations.

The following are examples:

- Master in Nuclear Science and Technology (Polytechnic University of Madrid).
- Master in Nuclear Engineering and Applications (Ciemat and the Autonomous University of Madrid).
- Master in Radiological Protection at Radioactive and Nuclear Installations (Polytechnic University of Valencia).
- Master in Nuclear Engineering (Polytechnic University of Catalonia).
- European Master in Nuclear Energy-EMINE (Polytechnic University of Catalonia).

Furthermore, the demand for job posts by the nuclear installations is not always covered by the offer of the aforementioned masters' degrees. Consequently, the plants have specific training programmes to cover different vacant posts, which are usually filled by other technical and engineering profiles, as well as by persons specifically trained in these disciplines, who must cover all the know-how, skills and expectations required to perform their functions safely.

The Nuclear, Safety Council provides economic subsidies for four university Nuclear Safety and Radiological Protection departments with a view to promoting education and training and the performance of R&D in the field of nuclear safety and radiological protection, the aim being to support the entry into the sector of young professionals trained in these areas. This was considered an area of good performance as a result of the IRRS- ARTEMIS mission to Spain in 2018.

Article 8c. Initial assessment and periodic safety reviews

8c.a. Site and installation assessment

The requirements and criteria applicable to site studies in relation to the safety of nuclear installations are expressly included in the new RSN, and are also developed in CSN Instructions IS-26 on basic nuclear safety requirements applicable to nuclear installations and IS-27 on general nuclear power plant design criteria, which set out the practices habitual in the national environment, in keeping with the IAEA standards in force and those of the country of origin of the technology used at each installation (United States and Germany), as well as the WENRA reference levels. Furthermore, the CSN plans to issue a specific instruction setting out the requirements relative to nuclear installation sites, which will incorporate the seismic reference levels of issue T "External events".

The RSN dedicates a chapter to site requirements, specifying what should be done during the initial assessment and the obligation to set up surveillance programmes throughout the life cycle of the installation for suitable monitoring of the site conditions. Article 13 of the RSN reinforces the requirement that a PSR be carried out every ten years, including within its scope and objectives aspects relating to the site, in particular within the programmes for the on-going assessment of safety and of the changes that have taken place in the standards over the corresponding ten-year period.

The site safety analysis shall include the identification and evaluation of the site design parameters, resulting from an adequate combination of deterministic (maximum foreseeable) studies and probabilistic (allowing uncertainties to be bound) studies, validated through the judgement of experts.

During the period covered by this report no construction permits have been granted to new nuclear installations.

8c.b. 10-year periodic safety reviews

Article 13 of the new RSN reinforces the provisions relating to the periodic safety review (PSR) established in the previous CSN standards in this area, transposing the provisions contemplated in the Directive.

Article 13, *Periodic safety review*, of the aforementioned RSN provides as follows:

1. The licensee, under the supervision of the Nuclear Safety Council, shall systematically and periodically, at least once every ten years, reassess the nuclear safety of the installation. The objective of this periodic safety review is to verify the nuclear safety of the installation and obtain an overall evaluation of its performance over the period considered, through the systematic analysis of all aspects of nuclear safety and radiological protection.

The periodic safety review shall:

- a) Confirm that the installation continues to fulfil its design basis, or establish the necessary corrective measures if, in certain cases, this requirement is not met.
 - b) Verify the availability and validity of the measures for the prevention of accidents and mitigation of their consequences, and application of the principle of defence in depth.
 - c) Guarantee that nuclear safety remains at a high level during the following period.
2. As a result of the periodic safety review, the licensee shall introduce at the installation whatever nuclear safety enhancements might be reasonably feasible within a timeframe in keeping with their safety significance, taking as a reference the safety objective established in article 6 of this Regulation for the installation.

For this purpose, consideration shall be given to the best practices and the evolution of the international nuclear safety and radiological protection standards. Furthermore, aspects relating to aging, operating experience, the results of the most recent investigations and scientific and technological breakthroughs compatible with the existing design shall be taken into account.

In accordance with the provisions of this article, *“as a result of the PSR the licensee shall introduce at the installation whatever nuclear safety enhancements might be reasonably feasible within a timeframe in keeping with their safety significance, taking as a reference the safety objective established in article 6 of this Regulation”*, which, as indicated in relation to article 8.a.1, transposes to the national system the provision relating to the safety objective of the Directive for existing reactors.

CSN Instruction IS-26, on basic safety criteria applicable to nuclear installations establishes that the licensees shall carry out a PSR at least once every 10 years, the objectives being described in section 14.2.3.

One of the objectives of the PSR is analysis of the performance of the installation in relation to the different aspects of nuclear safety over a sufficiently long period of time to allow for the identification of trends, analysis of the situation of the installation with respect to international standards and those of the country of origin of the project and assessment of the nuclear safety of the installation, verifying compliance with the design basis and the validity of the measures for the prevention of accidents and mitigation of their consequences, and application of the principle of defence in depth.

Another objective of the PSR is to guarantee that nuclear safety remains at a high level throughout the period that would elapse prior to the next PSR or, where appropriate, the end of commercial operation.

- In the case of nuclear power plants, CSN safety guide GS-01.10 Rev. 2. “Periodic safety reviews at nuclear power plants” establishes directives for PSR performance. This guide was revised in 2017, with the publication of revision 2.

The PSR's submitted by the Spanish nuclear power plants during the period covered by this report, and the evaluations of them carried out by the CSN, have been based on this version of the guide.

In the case of installations requesting authorisation for long-term operation (beyond the design lifetime), the licensee shall include in the documentation supporting the request an *integrated aging assessment and management plan*, which shall contain the Aging Management Reviews (AMR) and Time Limited Aging Analyses (TLAA), as established in CSN Instruction IS-22 on aging management at nuclear power plants.

One of the results of PSR's is the revision of current safety enhancement programmes or the incorporation of new programmes if necessary, depending on the results of the different analyses.

As a fundamental part of PSR, GS-1.10 contemplates analysis and comparison with the most advanced standards and best practices. The new standards to be analysed during the PSR are reflected in the basic document for PSR performance, which requires the favourable appreciation of the CSN. This practice replaces the process applied during the previous PSR period in Spain, known as the conditioned application standards (NAC) process.

Consideration has been given to the standards of the country of origin of the project since the beginning of Spanish nuclear power plant licensing, by means of requirements relating to their consideration in both the preliminary authorisations and the operating permits. At present, these permits include the condition that during the first quarter of each calendar year the licensee shall issue a report on the measures taken to adapt operation of the plant to the new national requirements on nuclear safety and radiological protection and to the standards of the country of origin of the project. In this latter case, an analysis of the applicability to the plant of the new requirements issued by the regulatory body of the country of origin of the project is included.

Likewise, in the area of PSR, the licensees are required to perform an overall analysis of the applicability of the new standards issued in the country of origin of the project or other reference countries and international organisations (IAEA). The standards to be analysed are specified in the basic documents of the corresponding PSR's of each plant.

The safety assessment associated with the PSR's are required to include an update of the Probabilistic Safety Assessment, evaluating risk-informed design modifications and incorporating the operating experience gleaned since the last update.

The plant operating permits require the submittal of a PSR along with the request for renewal of the permit. The PSR results may be used to enhance the operation of the plant during the next period, as it is an overall review of the installation over prolonged periods of time. In those cases in which the renewal of the operating permit exceeds the lifetime originally considered in the initial design of the installation, the PSR's include special conditions, both administrative and relating to installation aging management, such that the operation of the plant may be extended beyond the initial design lifetime with suitable guarantees of safety.

In the case of the Juzbado fuel manufacturing installation, the operating permit specifies that the licensee may request renewal, accompanying the request with a periodic safety review of the installation, an analysis of the accumulated operating experience and a revision of the official operating documents. For performance of the PSR, GS-01.10 Rev. 2 shall be complied with to the extent applicable.

Article 8d. On site emergency preparedness and response

8d.1. On site emergency preparedness

The regulatory requirements regarding emergency planning, preparedness and response to be met by the licensees of nuclear installations are included basically in Instruction *IS-44 of the Nuclear Safety Council (CSN) on the response to emergencies at nuclear installations*, of February 26th 2020.

CSN Instruction IS-44 incorporates the obligation that the licensees draw up a Site Emergency Plan (SEP) for emergency management at the site level of response. Likewise, the SEP must specify the obligation of the licensees to have available mechanisms for coordination between those responsible for the site and off-site levels of response. As compliance with IS-44 is compulsory, it contains among other things the requirements to be met by the nuclear power plants that arose as a result of the stress tests and lessons learned following the Fukushima accident.

In addition, CSN Instruction IS-44 develops another series of requirements relating to radiological protection in emergency situations and established in the Regulation governing Nuclear and Radioactive Installations (RINR), The Regulation on the Protection of Health against Ionising Radiations (RPSRI), the Basic Nuclear, Emergency Plan (PLABEN) and the Basic Guideline for the Planning of Civil Defence in response to Radiological Risk (DBRR).

Distribution of responsibilities on and off site

In Spain, the management of a nuclear emergency contemplates an on-site response, the responsibility of the licensee and included in the SEP and its corresponding procedures, and an off-site response, the responsibility of the competent authorities and of the organisations concerned in emergency management and included in the off-site emergency plans.

In relation to the SEP's, section 8d.2 of the present report deals in greater depth with emergency preparedness and response measures.

Particularly significant among the competent authorities at the off-site preparedness and response level are the Delegations and Sub-Delegations of the Government, belonging to the Ministry of the Interior, in provinces housing nuclear power plants, which are responsible for emergency management, and the CSN as the technical regulatory body providing them with advisory support and recommending protective measures for the public and the intervening personnel.

The national standards relating to emergencies, PLABEN, DBRR and CSN Instruction IS-44, incorporate the licensee's obligation to respond to nuclear emergencies in coordination with the off-site response plans, such that the radiological consequences for the workers, the general public and the intervening personnel of accidents occurring at the installation are mitigated.

The aforementioned standards establish mechanisms for the coordination and control of the interfaces between the two levels of response, especially establishing the collaboration to be provided by the holder of the installation's operating permit to the competent organisations and public administration bodies concerned in implementing and maintaining the effectiveness of the off-site emergency plans, as well as in the implementation of protective measures and other emergency actions.

In this respect, the CSN as the regulatory body and part of the National Civil Defence System is assigned a series of functions that facilitate coordination between the on and off-site levels of the emergency during the preparation and response phases.

For this purpose, the CSN has put in place a specific emergency response plan, procedures for its enactment, a suitable organisational structure and a series of resources, infrastructures and tools, particularly significant among which is the Emergency Response Centre (Salem).

Coordination between the on and off-site levels of response will be established depending on the type of accident and the emergency situation, defined by the urgent protective measures that need to be adopted.

Coordination between the licensee and the competent authorities (Off-site emergency Management)

Operational actions and requests for support by the installations.

The SEP's and corresponding procedures incorporate the following:

- The necessary coordination with the responsible authorities of the off-site emergency management, whenever the activation of the filtered containment venting system is foreseen, in the case of operating nuclear power plants. In this case, the SEP Director shall report as soon as possible to the Director of the off-site plan and to the CSN Salem.
- Mechanisms for warning the Military Emergency Response Unit (UME), a unit specialising in response to emergencies, including those of a radiological nature, and requesting the activation and reception of external support from the said unit, on the basis of the provisions of the agreements between the UME and the nuclear sector. This warning procedure respects at all times the instructions established for these cases by the Directorate General for Civil Defence and Emergencies (DGPCyE) of the Ministry of the Interior.
- Systems for requests for support to off-site emergency management for the evacuation of non-essential personnel from the installations in the event of serious emergency situations.

Dose estimate on and off site:

The licensee has available the installations, resources and equipment required for the estimation of doses on and off site.

The emergency management centres are equipped with tools making it possible to estimate the off-site radiological consequences from known data on the accident and its probable evolution. For each centre the licensee has radiation measurement equipment capable of measuring over the ranges expected during the emergency, as well as procedures for the use of such equipment. This equipment is maintained and checked in order to guarantee its operability at all times.

In the event of extensive damage, the licensee has available the means and equipment required for the estimation of radioactive emissions under the existing environmental conditions and with the infrastructures and resources expected in these scenarios.

In the case of operating nuclear power plants, there is a laboratory for the measurement of active samples at the Alternative Emergency Management Centre (CAGE).

The CSN's Emergency Response Organisation at the Salem is equipped with calculation codes for the estimation of consequences and has access to the data obtained by the Automatic Stations Network (REA), the Sampling Stations Network (REM) and the Radioactivity Alert Network (RAR) for the

characterisation of the radiological situation generated by the accident, the aim being to facilitate coordination between the licensee and the competent off-site emergency authorities, with a view to implementing the off-site protective measures recommended on the basis of the dose estimate performed by the CSN.

Emergency Radiological Surveillance:

The licensee possesses and maintains the equipment and means of transport necessary for performance of the Emergency Radiological Surveillance Programme (PVRE) off the site but close to it.

With the data obtained from the PVRE, the aforementioned networks of stations and mobile radiation measurement units, the CSN is capable of radiologically characterising the affected area in order to be able to recommend to the off-site emergency management the protective measures best suited to each situation.

Means of communication:

The licensee shall report the occurrence of any initiating event to the competent authorities, using the voice and data transmission resources established by the CSN.

The licensee possesses resources for voice and data communications between his emergency management centre, the CSN's Salem and the off-site management's Operations Coordination Centres (CECOP), with levels of independence and redundancy sufficient to ensure the reliability and transmission capacity of the information required in the most severe accident and off-site event scenarios that might also have repercussions off site.

In the case of nuclear power plants with fuel on site, the licensees have available a highly reliable alternative communications system using satellite technology, as well as alternative non-automatic means for the transmission of data to the CSN's Salem, if the automatic resources have been lost or there is evidence that they are not receiving data.

For its part, the CSN's Salem has redundant systems for the reliable transmission of voice, data and video to the CECOP and the DGPCyE Emergency Centre of the Ministry of the Interior, a system for connection to the process computers of each nuclear power plant, digital and satellite telephony, an encrypted information transmission system and basic and mobile communications resources (Tetra).

Decision-making by the off-site emergency management:

The off-site emergency plans are applicable during the emergency phase and take into account whatever decision-making might affect the recovery phase.

The CSN provides technical support and advisory assistance on issues within its realm of competence to the off-site emergency management organisations which, as has been pointed out above, focus essentially on the recommendation of measures to protect the general public and the intervening personnel.

Although nuclear emergencies in all cases require a national level of response, they will also imply a hierarchical response at regional and municipal level; in other words, there is an organisational and decision-making structure in which the regional and local authorities are coordinated under a single authority at state level.

The off-site emergency management may request whatever extraordinary state, regional or private resources might be required. Likewise, the state authorities may request international assistance from the European Union via the European Mechanism for Collaboration.

8d.2. On site emergency response

As regards the on-site level of response to emergency situations, the preparedness and response actions at this level are established in the SEP's of the nuclear installations.

The objective of these plans is to set out the foreseen actions and the resources required for their performance by the licensee of the nuclear installation in order to reduce the risk of a radiological emergency and, if one were to occur, limit the release of radioactive material to the environment.

The following particularly significant modifications have been incorporated in the SEP's of the nuclear power plants in order to take into account the results of the European stress tests:

- A new SEP initiating event relating exclusively to variations in the level or temperature of the water in the spent fuel pool.
- New initiating events relating to the transfer of spent fuel from the storage pools to the individual temporary storage (ITS) installations at nuclear power plants possessing such installations.
- Reinforcement of the staffing and functions of the Emergency Response Organisation to address extremely serious emergency situations.

Also incorporated has been the treatment to be given to SEP initiating events relating to security, in accordance with what is published in the SEP guideline on emergency actions in response to security-related events (CEN-49), drawn up between the CSN and the CEN of the Nuclear Forum.

Furthermore, the nuclear power plant licensees have included the following in the procedures corresponding to their SEP's.

- One on the treatment of SEP initiating events related to security initiating events.
- Severe accident action procedures, for which the Extensive Damage Emergency Guidelines (GEDE) and Extensive Damage Mitigation Guidelines (GMDE) have been published.
- CAGE activation procedures for operating nuclear power plants.
- Procedures for coordination of the emergency response organisation with the CAE teams.
- The Nuclear Emergency Reporting Form has been revised for sites having more than one group. The new Form includes information on the status of the site, combining those aspects of reporting that show the emergency status of each group.

At the Juzbado installation, the emergency response procedures have been updated in accordance with the new emergency management centre and the new organisation implemented in the wake of the Fukushima accident.

Article 8e. Peer reviews

8e.1. IRRS Mission

In the area of peer review missions, it is relevant to point out that Spain underwent a combined IRRS-ARTEMIS (Integrated Regulatory Review Service - Integrated Review Service for Radioactive Waste and Spent Fuel Management, Decommissioning and Re-mediation) mission in October 2018, the first of its type at world level. The mission was requested in order to fulfil the obligations of the European directives 2014/87/Euratom and 2011/70/Euratom.

The results of the mission may be summarised as follows:

- IRRS part: 13 recommendations / 20 suggestions / 1 good practice / 10 good performance areas.
- ARTEMIS part: 5 recommendations / 2 suggestions / 1 good practice / 1 good performance area.

Particularly significant among the recommendations, oriented towards reinforcing nuclear safety and radiological protection in the country, are those relating to: ensuring that the delay in starting up the Centralised Temporary Storage installation does not have a negative impact on the safe management of high level waste and spent fuel; updating of the General Radioactive Waste Plan; the regulatory framework applicable to Deep Geological Disposal; communications with the public and between organisations in the event of an emergency; improvement of the process for the establishment and review of regulations and guidelines in accordance with international standards; and cooperation agreements in relation to the management of contaminated soils.

The good practices resulting from the mission, which may be exported internationally, are related to the tool for the management of nuclear and radioactive transport data developed by the CSN, and to the excellence of the design of the CTS installation.

Currently under development is the performance of the interventions identified in the Action Plan resulting from the IRRS part of the mission, the aim being to complete the vast majority of the activities and achieve a satisfactory degree of progress in the rest, with a view to the follow-up mission initially scheduled for the Autumn of 2021. Furthermore, subsequent to completion of the mission, the Action Plan resulting from the ARTEMIS part has been drawn up, its main short-term activities having already begun.

The report on the combined IRRS-ARTEMIS mission was published in May 2019 (<https://www.csn.es/en/misiones-internacionales>).

8e.2. Topical Peer Review (TPR)

In compliance with the Directive on the nuclear safety of nuclear installations, the EU Member States are required to carry out Topical Peer Reviews every six years, the results of which are to be included in a national report subject to a peer review process among all these States. The results of this process are public. The first review started in 2017, on the subject of “aging management at nuclear installations”. The results of the national self-assessment were published in October 2018 through the National Report on the first Topical Peer Review. In September 2019, the Plenary of the CSN approved an action plan for the implementation of the results of this self-assessment.

APPENDIX I

Nuclear installations existing in Spain

Table 1. Basic characteristics of Spanish nuclear power plants

Type	Almaraz	Ascó	Vandellós II	Trillo	Garoña	Cofrentes
Thermal output (MW)	PWR	PWR	PWR	PWR	BWR	BWR
	U-I: 2,947.0 U-II: 2,947.0	U-I: 2,940.6 U-II: 2,940.6	2,940.6	3,010	1,381	3,237
Electrical output (MW)	U-I: 1,044.55 U-II: 1,043.98	U-I: 1,032.5 U-II: 1,027.2	1,087.1	1,066	465.6	1,092.02
Cooling	Open	Mixed	Open	Closed	Open	Closed
Number of groups	Arrocampo	River Ebro	Mediterranean	Make-up Towers	River Ebro	Make-up Towers
	Reservoir	Towers	Sea	River Tagus	River Júcar	
Preliminary authorisation group I/II	29-10-71 23-05-72	21-04-72 21-04-72	27-02-76	04-09-75	08-08-63	13-11-72
Construction permit group I/II	02-07-73 02-07-73	16-05-74 07-03-75	29-12-80	17-08-79	02-05-66	09-09-75
Start-up permit group I/II	13-10-80 15-06-83	22-07-82 22-04-85	17-08-87	04-12-87	30-10-70	23-07-84

Table 2. Summary of nuclear power plant data for 2019

	Almaraz VII	Ascó VII	Vandellós II	Trillo	Garroña	Cofrentes
Authorisation in force	07-06-10 07-06-10	02-10-11 02-10-11	26-07-10	03-11-14	As from 06-07-13 Defin. shutdown	20-03-11
Period of validity (years)	10 10	10 10	10	10	N/A	10
Net production (GWh)	8,662.815 7,662.804	8,671.571 7,540.506	7,379.156	7,905.283	–	8,063.292
Load factor (%)	97.73 87.24	99.81 87.49	80.71	90.56	–	87.67
Operating factor (%)	100 89.66	100.00 88.84	83.26	91.87		89.67
Hours coupled to grid	8,760	8,760	7,293.31	8,048	–	7,854.733
Refuelling outages	7,824 NO	7,782.78 NO	09-11/23-12	10-05/09-06	N/A	03-11/05-12
	05-10/13-11	26-04/04-06				

Table 3. Nuclear power plant fuel assembly storage situation

Plant name	Fuel assembly characteristics	Total capacity/ Reserve core (No. assemblies)	SF stored (No. assemblies)	SF stored (tU)
Almaraz I Nuclear Power Plant	PWR 17x17	1,804/157	1,512	697
		ITS with capacity for 20 casks, each containing 32 assemblies	64	30
Almaraz II Nuclear Power Plant	PWR 17x17	1,804/157	1,564	722
Vandellós II Nuclear Power Plant	PWR 17x17	1,594/157	1,332	606
Ascó I Nuclear Power Plant	PWR 17x17	1,421/157	1,096	502
		ITS with capacity for 16 casks, each containing 32 assemblies	384	174
Ascó II Nuclear Power Plant	PWR 17x17	1,421/157	1,164	534
		ITS with capacity for 16 casks, each containing 32 assemblies	288	131
Cofrentes Nuclear Power Plant	BWR 8x8, 9x9	5,404/624	4,736	851
Sta. M. Garoña Nuclear Power Plant	BWR 8x8, 9x9	2,609/400	2,505	440
José Cabrera Nuclear Power Plant	PWR 14x14	ITS with capacity for 12 casks, each containing 32 assemblies	377 (12 casks)	100
Trillo Nuclear Power Plant	PWR 16x16	805/177	556	263
		ITS with capacity for 80 casks, 32 casks containing 21 assemblies each and 48 casks containing 32 assemblies each	736	347

Table 4. Basic characteristics of Juzbado fuel assembly manufacturing installation

Fuel assembly manufacturing installation	Preliminary authorisation	Construction permit	Start-up permit	Operation and manufacturing permit
Juzbado	17/08/1979	12/12/1980	14/01/1985	30/06/2016

Status	Annual authorised capacity (ton U/year)	Fuel assembly type	Directly related radwaste storage installations on site
Operating	500	PWR, BWR,	Yes *

APPENDIX II

**Integrated Operating Nuclear Power Plant
Supervision System (SISC) and Juzbado
Supervision System (SSJ)**

The Integrated Plant Supervision System (SISC) is a set of activities that the CSN and the nuclear power plant licensees use as a tool for the supervision of plant operation and to establish the necessary corrective actions depending on the results. The SISC incorporates supervision methods focusing on observation of the performance of the operating plants by way of performance indicators and appraisal of the findings of inspections carried out by the CSN.

Among the objectives of the SISC are the optimisation and systematisation of nuclear power plant supervision, focusing efforts on the areas of greatest importance from the point of view of risk. The SISC also seeks to increase the transparency of the nuclear power plant operations and safety supervision process. The evaluation of the performance of the plants and the actions to be undertaken are set out in the so-called “Action Matrix”.

The SISC uses information provided by the following:

- A set of 16 operating nuclear power plant Performance Indicators, designed to address overall all safety significant aspects.

Performance Indicators are defined in order to characterise the operation of the plant by means of numerical data and are applied to all areas of safety that may reasonably be quantified, with a view to achieving maximum objectivity. The results of the indicators are classified in accordance with previously established ranges of importance.

- Information from the findings of the CSN’s Basic Inspection Plan, known as the PBI.

The Basic Inspection Plan consists of direct observations, measurements, examinations or tests and is aimed at assessing the status of structures, systems, components and materials, as well as of the operating activities, processes, procedures and skills of the personnel, and serves to check for compliance with documented standards, good practices or commitments and, in short, that the plant is operated safely. Non-compliances are categorised on the basis of their safety significance, in accordance with the applicable procedures for the determination of the importance of findings.

Supervision of the operation of the nuclear power plants through the SISC is accomplished by identifying and categorising deviations or inspection findings and monitoring the performance indicators defined. The categorisation of both on the basis of their safety significance determines the position of each plant in one of the four columns of the so-called “action matrix”, and the needs for their supervision by the CSN are established accordingly, these needs growing as from the supervision established in the Basic Inspection Plan depending on the safety significance of the findings and inspections.

In addition to the Performance Indicators and the Basic Inspection Plan, consideration is given also to other sources of information, generated either by the licensees, such as reports on reportable events or non-conforming conditions, or by the CSN itself within the context of its general plant monitoring, assessment, control and inspection work, or any relevant type of information relating to the operation and safety of nuclear power plants.

Furthermore, as from 2016, the SISC incorporated supervision of the safety culture through the monitoring of crosscutting components associated with inspection findings (on completion of a pilot period with the results analysed and improvements and lessons learned derived). The crosscutting components are grouped into three areas: human and organizational performance, problem identification and resolution, and safety conscious work environment, and provide information on the possible

existence of plant weaknesses in relation to organisational and cultural aspects. Likewise, the position of a nuclear power plant in the action matrix may give rise to the CSN's taking action in relation to the safety culture.

After thirteen years of operation, the SISC may be concluded to have responded in a highly satisfactory manner to the expectations of the licensees and the CSN. During this period the CSN has carried out two SISC self-assessment exercises with positive results. These self-assessment exercises are contemplated in the programme itself and involved surveys among the licensees and the technical personnel of the CSN.

The enforcement process is also more efficient now, since the identification of problems and the application of the most suitable corrective actions to resolve them are systematically and constantly undertaken by the licensees themselves, where possible, without the need for CSN intervention. Furthermore, in certain cases the SISC has helped to objectify the sanctions process, when the findings of inspections have constituted an infringement.

The deviations identified in inspections are categorised as *findings* when a potential safety impact is identified; in turn findings are categorised as significant when the criteria established for this purpose are met, these being oriented towards the performance of a qualitative assessment of the impact on safety.

Indicated below are the findings identified between 2014 and 2019, distributed on the basis of their importance, along with the number of indicators that have entered the white band, on the basis of safety significance.

Findings/Indicators Findings/Indicators Findings/Indicators Findings/Indicators

		green (*)	white (*)	yellow (*)	red (*)
2014	Findings 155		0	0	0
2015	Findings 134		0	0	0
2016	Findings 107		2 indicators	0	0
2017	Findings 138		1 indicator	0	0
2018	Findings 115		1 finding	0	0
2019	Findings 117		1 indicator	0	0

(*) Green finding and indicator, with a very low level of safety significance; white finding and indicator, with a level of safety significance between low and moderate; yellow finding and indicator, with a level of safety significance that is substantial; and red finding and indicator, with a level of safety significance that is high.

In addition to the Basic Inspection Plan (PBI) inspections, the SISC includes reactive and supplementary inspections. Reactive inspections are those performed as a CSN response to events occurring at operating nuclear power plants, as long as the criteria established in the regulating procedure are met. Supplementary inspections are performed in response to findings of significant risk, either through the results of inspections included in the PBI or due to the thresholds of the SISC performance indicators having been exceeded, in all cases in accordance with the criteria established in the regulating procedure. In the last four years, up to December 31st 2013, 10 supplementary inspections have been performed, arising from the existence of findings or indicators classified above green, in order to verify the performance of root cause analyses by the licensees and the application of corrective actions.

Deviations encountered during inspections are categorised as findings when a potential impact for safety is identified; in turn, findings are categorised as significant when the criteria established for this purpose are met, these being oriented towards the performance of a qualitative assessment of the impact on safety.

The CSN plans to carry out a complete review of the SISC in 2021, in order to adapt it to the situation of the Spanish nuclear power plants with a limited and agreed to operating horizon.

Juzbado fuel manufacturing installation supervision and control system (SSJ)

The supervision and control system of the Juzbado fuel manufacturing installation is a set of activities used by the CSN and the licensee of the installation as a tool for the supervision of its performance and the establishment of the necessary corrective actions, in view of the results.

The functional areas subject to the SSJ are as follows:

- Safety-related areas: plant operations, safety with respect to criticality and protection against fire.
- Physical protection.
- Radiological protection (RP): operational R, environmental RP, waste management and transport.
- Protection against severe meteorological conditions and flooding.
- Support areas: maintenance and surveillance, training, emergency preparedness, management organisation and controls, operating experience and quality assurance.

This supervision system covers two-year cycles. On completion of the second year of the monitoring period, a supervision system assessment report is drawn up. A period of two months is established for the licensee to submit a report explaining the actions contemplated to address any deficiencies identified. The appraisal report drawn up by the CSN is published on the Organisation's website.

Since the SSJ was put into operation, three appraisal reports have been produced, the first as a pilot application of the system and covering the period 2009-2010, the second for the period 2011-2012 and the third corresponding to the period 2017-2018, which was undertaken in 2019. These reports conclude that the Juzbado installation has operated suitably overall from the point of view of safety.

APPENDIX III

Economic sanctions contemplated in the Nuclear Energy Act

Table 5. Economic sanctions contemplated in the Nuclear Energy Act

	Slight	Serious	Very serious
Nuclear power plants	15,000-300,000	0.3-9M	9-30M
Other nuclear installations	12,000-100,000	0.1-3M	3-10M

APPENDIX IV

Council Instructions (IS)
(Published up to 2020 relating
to nuclear safety)

- IS-01, defining the format and content of the individual radiological monitoring document (radiological licence) regulated in Royal Decree 413/1997.

Plenary approval: May 31st 2001

Publication: BOE N° 187, August 6th 2001

(Correction of errors published in BOE N° 16 on January 18th 2002)

- IS-02 (Rev. 1), on the documentation of refuelling activities at light water nuclear power plants

Plenary approval: July 21st 2004.

Publication: BOE N° 224, September 16th 2004.

(Correction of errors published in BOE N° 245 on October 11th 2004) in the Summary.

(Correction of errors published in BOE N° 177 on July 26th 2005) in first and second sections.

- IS-03, on the qualifications required to obtain recognition as an expert in protection against ionising radiations.

Plenary approval: November 6th 2002.

Publication: BOE N° 297, December 2002.

- IS-04, regulating transfers, filing and custody of documents relating to the radiation protection of the workers, the general public and the environment prior to the transfer of the licence ownership of the nuclear power plant activities for dismantling and decommissioning.

Plenary approval: February 5th 2003.

Publication: BOE N° 51, February 28th 2003.

- IS-05, defining the values of exemption for nuclides as established in tables A and B of Annex I of Royal Decree 1836/1999.

Plenary approval: February 26th 2003.

Publication: BOE N° 86, April 10th 2003.

- IS-06, defining training programmes on basic and specific radiation protection matters, regulated in Royal Decree 413/1997, of March 21st, in relation to nuclear and radioactive facilities of fuel cycle.

Plenary approval: April 9th 2003.

Publication: BOE N° 132, June 3rd 2003.

- IS-08, on the criteria applied by the Nuclear Safety Council to request specific advice on radiation protection from the owners of nuclear and radioactive facilities.

Plenary approval: July 27th 2005.

Publication: BOE N° 132, October 5th 2005.

- IS-09, establishing criteria to be applied for the systems, services and procedures of physical protection for nuclear facilities and materials.

Plenary approval: June 14th 2006.

Publication: BOE N° 161, July 7th 2006.

- IS-10, Revision 1, establishing criteria for the reporting of events to the Council by nuclear power plants.

Plenary approval: July 30th 2014.

Publication: BOE N° 228, September 19th 2014.

- IS-11, Revision 1, on nuclear power plant operating personnel licences.

Plenary approval: January 30th 2019.

Publication: BOE N° 40, February 15th 2019.

- IS-12, defining qualification and training requirements of non-licensed staff and non-licensed off-site personnel of nuclear power plants

Plenary approval: February 28th 2007.

Publication: BOE N° 113, May 11th 2007.

- IS-13, on radiological criteria for the release of nuclear facilities sites.

Plenary approval: March 21st 2007.

Publication: BOE N° 109, May 7th 2007.

- IS-14, on CSN Resident Inspection at nuclear power plants.

Plenary approval: October 24th 2007.

Publication: BOE N° 268, November 8th 2007.

- IS-15, Revision 1, on the requirements for monitoring the effectiveness of maintenance at the nuclear power plants.

Plenary approval: May 5th 2016.

Publication: BOE N° 145, June 16th 2016.

- IS-19, on the requirements of the nuclear facilities management system.

Plenary approval: October 22nd 2008.

Publication: BOE N° 270, November 8th 2008.

- IS-20, establishing safety requirements relating to spent fuel storage casks.

Plenary approval: January 28th 2009.

Publication: BOE N° 42, February 18th 2009.

- IS-21, on the requirements applicable to modifications at nuclear power plants.

Plenary approval: January 28th 2009.

Publication: BOE N° 43, February 19th 2009.

- IS-22, Revision 1, on safety requirements for the management of the ageing and long-term operation of nuclear power plants.

Plenary approval: November 15th 2017.

Publication: BOE N° 291, November 30th 2017.

- IS-23, on in-service inspection at nuclear power plants.

Plenary approval: November 4th 2009.

Publication: BOE N° 283, November 24th 2009.

- IS-24, regulating the filing and periods of retention of the documents and records of nuclear facilities.

Plenary approval: May 19th 2010.

Publication: BOE N° 133, June 1st 2010.

- IS-25, on criteria and requirements on the performance of probabilistic safety assessments and their applications to nuclear power plants.

Plenary approval: June 9th 2010.

Publication: BOE N° 153, June 24th 2010.

- IS-26, on basic nuclear safety requirements applicable to nuclear installations.

Plenary approval: June 16th 2010.

Publication: BOE N° 165, July 8th 2010.

- IS-27, Revision 1, on general nuclear power plant design criteria.

Plenary approval: June 14th 2017.

Publication: BOE N° 157, July 3rd 2017.

- IS-28, on the technical specifications that second and third category radioactive facilities must observe.

Plenary approval: September 22nd 2010.

Publication: BOE N° 246, October 11th 2010.

- IS-29, on safety criteria at spent fuel and high-level radioactive waste storage facilities.

Plenary approval: October 13th 2010.

Publication: BOE N° 265, November 2nd 2010.

- IS-30 (Rev. 2), on the requirements of the fire protection programme at nuclear power plants.

Plenary approval: November 16th 2016.

Publication: BOE N° 289, November 30th 2016.

- IS-31, on the criteria for the radiological control of waste materials generated in nuclear facilities.

Plenary approval: July 26th 2011.

Publication: BOE N° 224, September 17th 2011.

- IS-32, on plant Technical Specifications of nuclear power plants.

Plenary approval: November 16th 2011.

Publication: BOE N° 292, December 5th 2011.

- IS-35, relating to the treatment of design modifications of radioactive material transport packages accompanied by certificates demonstrating their Spanish origin and of the physical or operational modifications performed by the consignor of a package on the packaging used.

Plenary approval: December 4th 2013.

Publication: BOE N° 4, January 4th 2014.

- IS-36, on emergency operating procedures and the management of severe accidents at nuclear power plants.

Plenary approval: January 21st 2015.

Publication: BOE N° 41, February 17th 2015.

- IS-37, on the analysis of design basis accidents at nuclear power plant.

Plenary approval: January 21st 2015.

Publication: BOE N° 49, February 26th 2015.

- IS-41, on requirements on physical protection of radioactive sources are approved.

Plenary approval: July 26th 2016.

Publication: BOE N° 224, September 16th 2016.

- IS-44, on nuclear installation emergency planning, preparedness and response requirements.

Plenary approval: February 26th 2020.

Publication: BOE N° 63, March 12th 2020.

APPENDIX V

CSN revenues

Table 6. Evolution of CSN revenues (euros)

Revenue type	2015	2016	2017	2018	2019
Public prices, fees	45,948,510	45,812,130	46,042,130	46,042,130	46,042,130
State transfers	400,000	400,000	400,000	400,000	400,000
Equity revenues	230,000	230,000	0	0	0

APPENDIX VI

Abbreviations and Acronyms

AE	Autorización de Explotación (Operating Permit)
ALARA	As low as reasonably achievable
CTS	Centralised Temporary Storage installation for Spent Nuclear Fuel and High-Level Radioactive Waste
ITS	Individual Temporary Storage installation
BOE	Boletín Oficial del Estado (Official State Gazette)
BWR	Boiling Water Reactor
EC	European Commission
CSN	Consejo de Seguridad Nuclear (Nuclear Safety Council)
ENRESA	Empresa Nacional de Residuos Radiactivos S.A.
ENSREG	European Nuclear Safety Regulators Group
ENUSA	Empresa Nacional del Uranio S.A. Industrias Avanzadas
SSC	Structures, systems and components
INPO	Institute for Nuclear Power Operations
IRRS	Integrated Regulatory Review Services
IS	Instrucción del Consejo (Council Instruction)
CTI	Complementary Technical Instruction
MITERD	Ministerio para la Transición Ecológica y Reto Demográfico (Ministry for Environmental Transition and Demographic Challenge)
NAC	Normativa de Aplicación Condicionada (Conditioned application standards)
IAEA	International Atomic Energy Agency
O%HF	Organisation and Human Factors
CAP	Corrective Actions Programme
PBI	Plan Base de Inspección (Basic Inspection Plan)
SEP	Site Emergency Plan
PGRR	Plan Nacional de Gestión de los Residuos Radiactivos (National Radioactive Waste Management Plan)
PLABEN	Plan Básico de Emergencia Nuclear (Basic Nuclear Emergency Plan)
PWR	Pressurized Water Reactor
RP	Radiological Protection
RINR	Reglamento sobre Instalaciones Nucleares y Radiactivas (Regulation governing Nuclear and Radioactive Installations)
ROP	Reactor Oversight Programme
PSR	Periodic Safety Review
RPSRI	Reglamento sobre Protección Sanitaria contra Radiaciones Ionizantes (Regulation on the Protection of Health against Ionising Radiations)
RSN	Reglamento sobre Seguridad Nuclear en Instalaciones Nucleares (Regulation governing Nuclear Safety at Nuclear Installations)
SISC	Sistema Integrado de Supervisión de Centrales (Integrated Plant Supervision System)
SSJ	Juzbado fuel manufacturing installation supervision and control system
EU	European Union
UNESA	Asociación Española de la Industria Eléctrica
U.S. NRC	United States Nuclear Regulatory Commission
WANO	World Association of Nuclear Operators
WENRA	Western European Nuclear Regulators Association

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SPAIN
