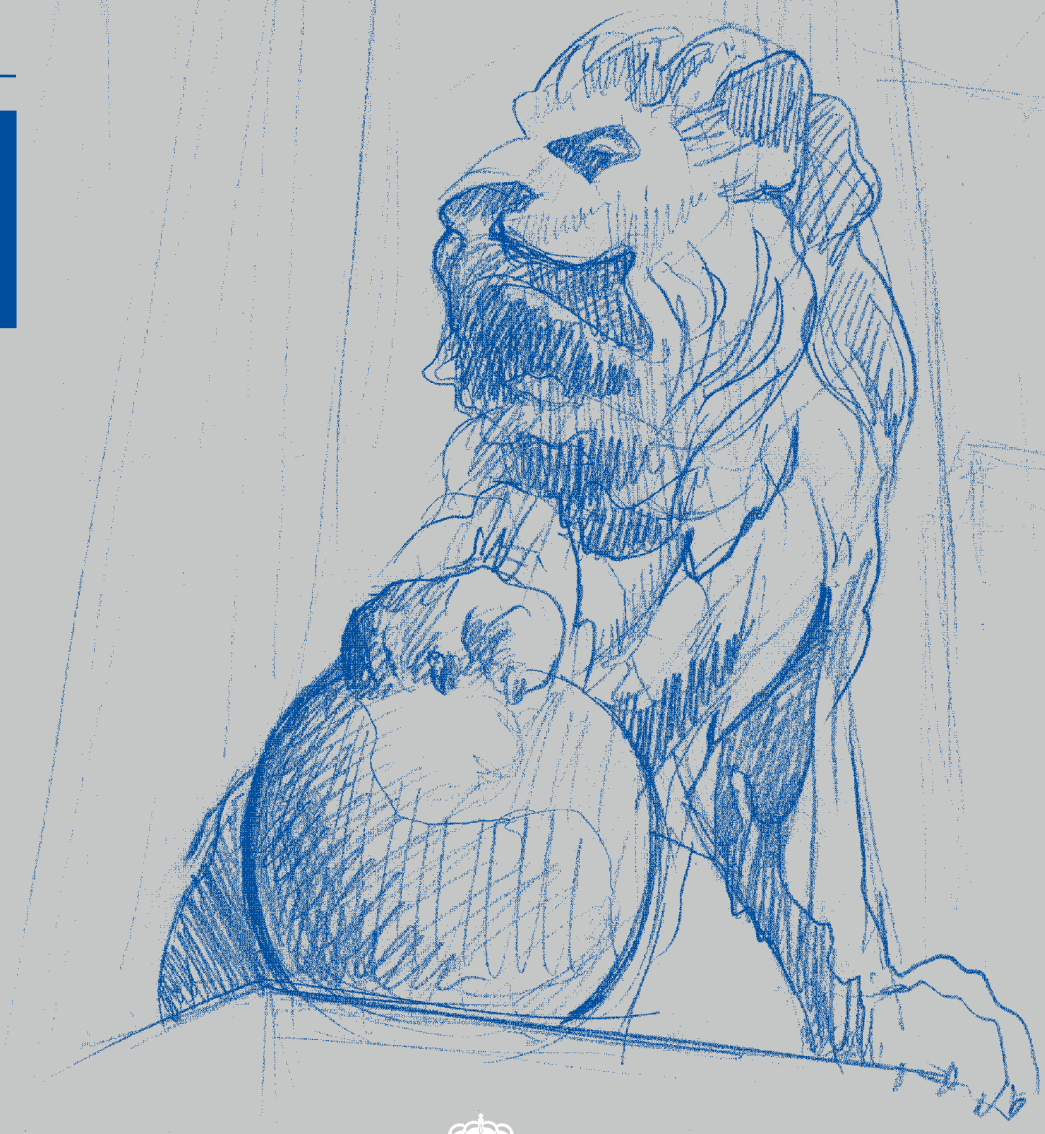
Nuclear Safety Council Report to Parliament

2019

Summary Report

CSN



CSN CONSEJO DE SEGURIDAD NUCLEAR

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2019

Summary Report

This report complies with article 11 of Law 15/1980, which requires the Nuclear Safety Council to submit an annual report on its activities to both chambers of the Spanish Parliament, and to the local parliaments of those autonomous communities in which nuclear facilities are located.

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ABBREVIATIONS

AGE	Central Government Administration.
AMAC	Association of Municipalities in Areas with Nuclear Power Plants.
ASN	French Nuclear Safety Authority (Autorité de Sûreté Nucléaire).
ATC	Temporary centralised storage.
ATI	Temporary individualised storage.
BDN	National Dosimetry Bank.
BOE	Official State Gazette.
BWR	Boiling water reactor.
CA	Advisory Committee.
CCAA	Autonomous communities.
CCNN	Nuclear power plant.
EC	European Community.
CEIDEN	Nuclear Fission Energy Technology Platform.
CIEMAT	Research Centre for Energy, Environment and Technology.
CN	Nuclear power plant.
CRES	Disciplinary Proceedings Review Board.
CSN	Nuclear Safety Council.
DGPCE	General Directorate for Civil Defence and Emergencies.
EMERCON	Emergency Reporting and Help Request System.
ENSA	Equipos Nucleares Sociedad Anónima.
ENRESA	Empresa Nacional de Residuos Radiactivos, SA.
ENSREG	European Nuclear Safety Regulator Group.
ENUSA	Empresa Nacional del Uranio, SA.
Euratom	European Atomic Energy Community.
FELO	Spanish Federation of Nuclear Power Plant Operating Licenses.
FORO	Ibero-American Forum of Radiological and Nuclear Regulatory Agencies.
FUA	Andújar Uranium Mill.
GBq	Gigabecquerel.
GDE	Emergency diesel generator.
GS	CSN Safety Handbook.
GSR	General Safety Requirements.
HERCA	Heads of European Radiation Control Authorities. IAEA International Atomic Energy Agency.
IINN	Nuclear facilities.
IIRR	Radioactive facilities.
INES	International Nuclear Event Scale.
IRRS-ARTEMIS	Integrated Regulatory Review Service
IS	CNS Instruction.
Miteco	(now Miterd) Ministry of Industry, Energy and Tourism.
MW	Megawatt.
NEA/OCDE	Nuclear Energy Agency (OCDE).
NORM	Naturally occurring radioactive materials.
NRC	U.S. Nuclear Regulatory Commission.
OLP	Long-term operation.
ORE	CSN Emergency Response Organisation.
OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic.
PAENS	National Security System Adaptation Plan.
PAT	CSN Annual Work Plan.
PEI	Onsite Emergency Plan.
PENBU	Offsite Nuclear Emergency Plan of the Santa María de Garoña (Burgos) Nuclear Plant.
PENCA	Offsite Nuclear Emergency Plan of the Almaraz (Cáceres) Nuclear Plant.
PENVA	Offsite Nuclear Emergency Plan of the Cofrentes (Valencia) Nuclear Plant.
PENTA	Offsite Nuclear Emergency Plan of the Ascó and Vandellós (Tarragona) Nuclear Plants.
PENGUA	Offsite Nuclear Emergency Plan of the José Cabrera and Trillo (Guadalajara) Nuclear Plants.
PEPRI	National Platform of R+D in Radiation Protection.
PGRR	Radioactive Waste and Spent Fuel Management Plan.
PIMIC	Integrated Plan for the Upgrade of CIEMAT Facilities.
PNIEC	National Integrated Energy and Climate Plan.
PR	Radiation protection.
PROCER	Radioactive Effluent Control Programme.
PVRA	Environmental Radiation Monitoring Programme.
PVRAIN	Independent Environmental Radiation Monitoring Programme.
PWR	Pressurised water reactor.
RD	Royal Decree
REA	Network of Automatic Sampling Stations.
REM	Network of Sampling Stations.
RINR	Regulation on Nuclear and Radioactive Facilities.
RPSRI	Regulation on Health Protection against Ionising Radiation.
SALEM	CSN (Nuclear) Emergency Room.
SEPR	Spanish Society for Radiological Protection.
SEFM	Spanish Medical Physics Society.
SG	General Secretary.
SISC	CSN Integrated Plant Supervision System.
SPR	Radiation Protection Service
TPR	Topical peer review.
UME	Military Emergencies Unit.
USNRC	United States Nuclear Regulatory Commission.
UTPR	Technical Radiation Protection Unit.
WENRA	Western European Nuclear Regulators Association.

INTRODUCTION

As every year, in accordance with Article 11 of Law 15/1980 on the Creation of the Nuclear Safety Council (CSN), this summary of the 2019 annual report is submitted to Parliament. It covers the main activities carried out during the year by the Council, the sole nuclear and radiation protection regulatory body in Spain.

The Council's functions, which are a public service, concern many groups, including the companies whose activities involve the use of ionising radiation (owners of facilities and undertakings, manufacturers and suppliers), workers exposed to radiation in regulated facilities and undertakings, other parties involved (residents around plants, union organisations, the media, professional colleagues, scientific and professional societies, research centres, universities, international agencies and political parties), as well as the public institutions of central, regional and local Government Administration, and society in general.

It is remarkable that the Board was renewed in 2019 with the appointment of the President (Josep María Serena i Sender) and three new Commissioners (Francisco Miguel Castejón Magaña, María del Pilar Lucio Carrasco and Elvira Romera Gutiérrez), who sit on the CSN Board along with councillor Javier Díes Llovera, who was appointed earlier.

The CSN's main mission is to ensure the safety of nuclear power plants and their fuel cycle, radioactive facilities, and other activities in Spanish territory, with the ultimate aim of protecting workers, the population and the environment from radiation. And this is no simple task, since Spain is the fourth largest producer of nuclear energy of the 27 countries of the European Union (we are 13th in the number of plants in operation, and 12th when installed power is taken into account). In addition to the nuclear power plants, we have 40,000 radioactive facilities in the medical, industrial, research and teaching fields.

Regarding the national scope of CSN's activities in 2019, we would highlight the approval of the National Action Plan on the management of aging nuclear power plants, after the first topical peer review (TPR, the results of which were published in October 2018) was conducted by regulators in compliance with Directive 2014/87/EU). Also noteworthy is the progress made on the future National Plan against Radon, with CSN issuing a favourable report on the proposed actions that will be taken by this body. In addition, licensing, supervision and control of facilities and activities were carried out within the purview of the CSN. As regulator, the Board approved the first review of Council Instruction number IS-11 on the licencing of operations personnel in nuclear power plants during 2019.

As regards international activity, CSN collaborates with peer regulatory bodies and with international agencies in various forums and working groups, most notably during the visit in 2019 of the European Commission to Palomares within the framework of a verification mission under the terms of Article 35 of the Euratom Treaty. Furthermore, in alignment with the international commitment to collaborate on improving worldwide safety standards, the CSN continues to lead a project to aid the regulatory agency of Morocco as part of EC cooperation. The CSN also continued to contribute to peer review missions by providing experts, and has coordinated at the national level the preparation of Spain's eighth report in compliance with the obligations of the Convention on Nuclear Safety. Finally, it should be noted that Madrid hosted the annual meeting of the Radioactive Substances Committee of the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) in 2019.

Furthermore, the CSN continues to carry out its duties with the utmost technical rigour, independence, transparency, neutrality, effectiveness and efficiency, reinforcing institutional, national and international cooperation and, of course, strengthening the relationship with civil society, to whom it provides a quality public service.

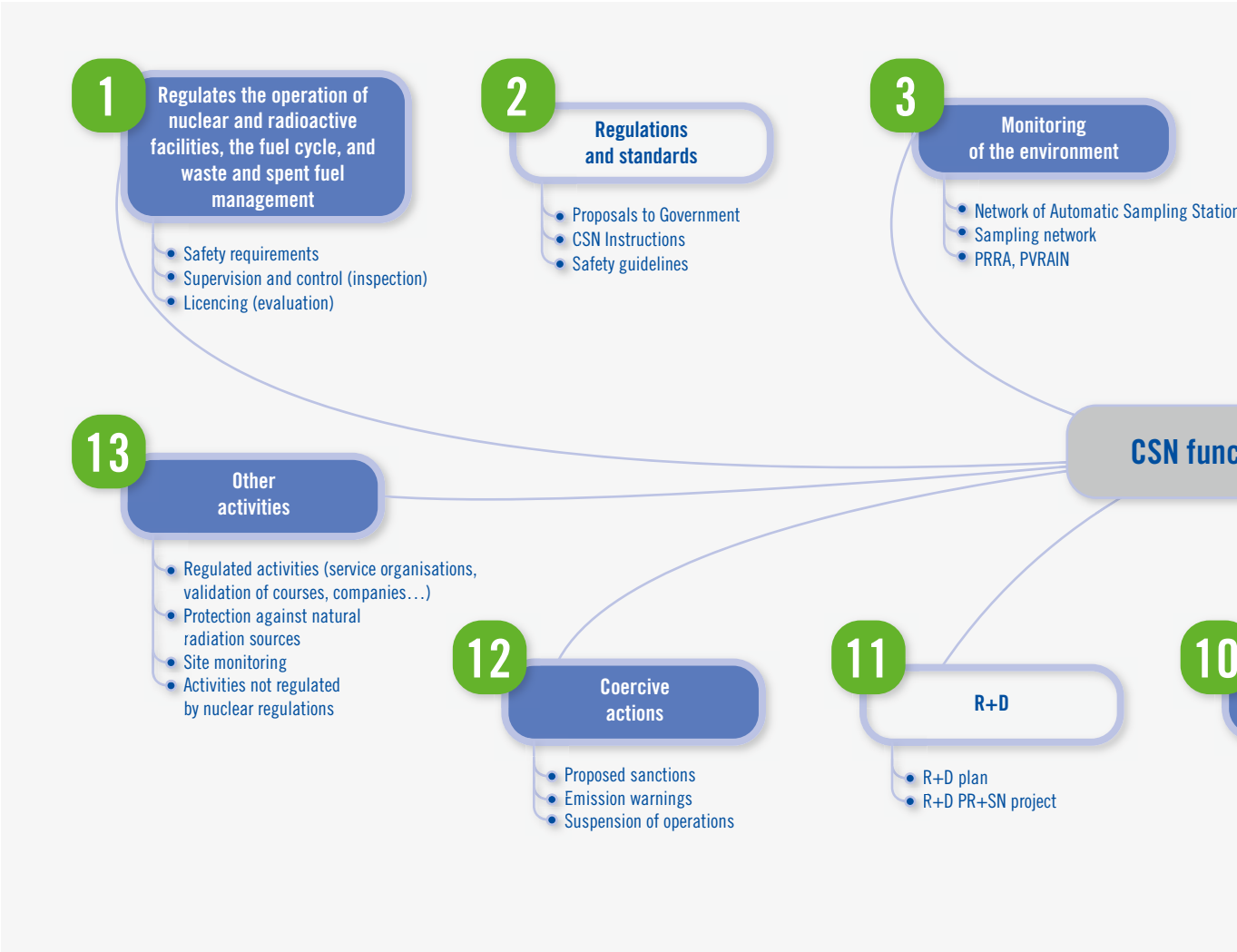
The President

CHAPTER 1

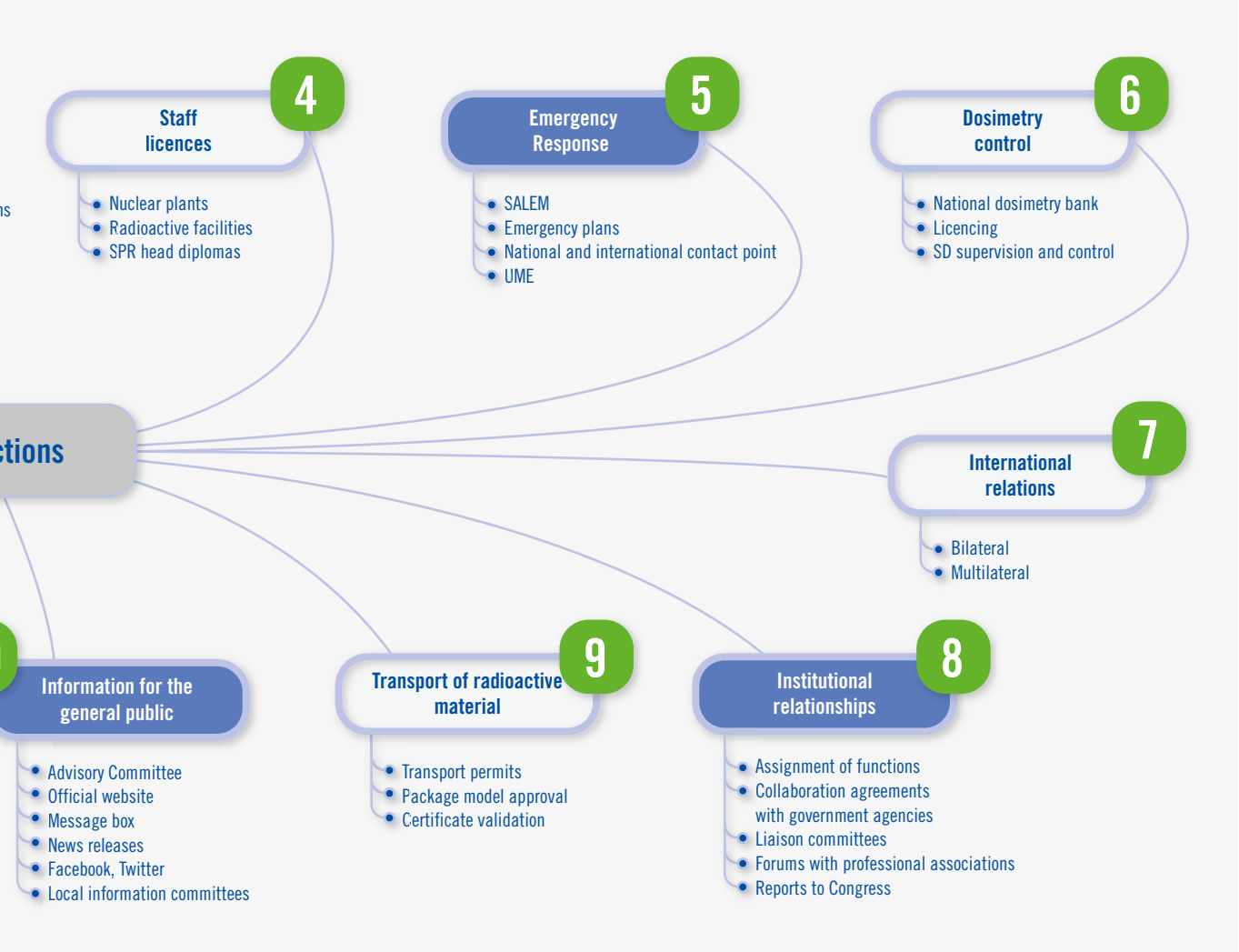
THE NUCLEAR SAFETY COUNCIL

Law 15/1980 of 22 Abril 1980 on the Creation of the Nuclear Safety Council, and Royal Decree 1440/2010 of 5 November 2010, which enacts the CSN Statute, confer on this regulatory body the corresponding authority on matters of nuclear safety and radiation protection, with its own legal personality and assets, independent from those of the State, notwithstanding its subjection to parliamentary and judicial control.

Functions of the CSN



The CSN is responsible for performing the functions established in Article 2 of Law 15/1980, and in Title I of the Statute, as well as others in the field of nuclear safety, radiation protection and physical protection that are assigned to it under legally binding rules, regulations, or under international treaties, as shown in the figure below.



1.1. The Board

The CSN's highest governing bodies are the Board and the Presidency, which were made up of the following members from 1 January to 30 March 2019:

Fernando Marti Scharfhausen (President) *Royal Decree 1732/2012, of 28 December 2012*	**Rosario Velasco García** (Vice-President) *Royal Decree 138/2013, of 22 February 2013*	**Fernando Castelló Boronat** (Commissioner) *Royal Decree 139/2013, of 22 February 2013*	**Javier Dies Llovera** (Commissioner) *Royal Decree 934/2015, of16 October 2015*	**Jorge Fabra Utray** (Commissioner) *(appointment Royal Decree 1028/2017 of 7 December. Royal Decree 75/2019 of 15 February, by which Mr Jorge Fabra Utray was retired, effective 2 February 2019), having turned 70*

Since 30 March 2019, the members of the highest governing bodies have been:

Josep Maria Serena i Sender (President) *29 March 2019*

Javier Dies Llovera (Commissioner) *16 October 2015*

Francisco Miguel Castejón Magaña (Commissioner) *29 March 2019*

Elvira Romera Gutiérrez (Commissioner) *29 March 2019*

María del Pilar Lucio Carrasco (Commissioner) *29 March 2019*

In 2019, the Nuclear Safety Council held 38 plenary sessions and adopted 460 resolutions. The minutes of the meetings and the opinions issued are available on the CSN's official website at www.csn.es. The table below shows the number of plenary sessions held by the board from 2015-2019:

Number of plenary sessions of the Nuclear Safety Council from 2015-2019

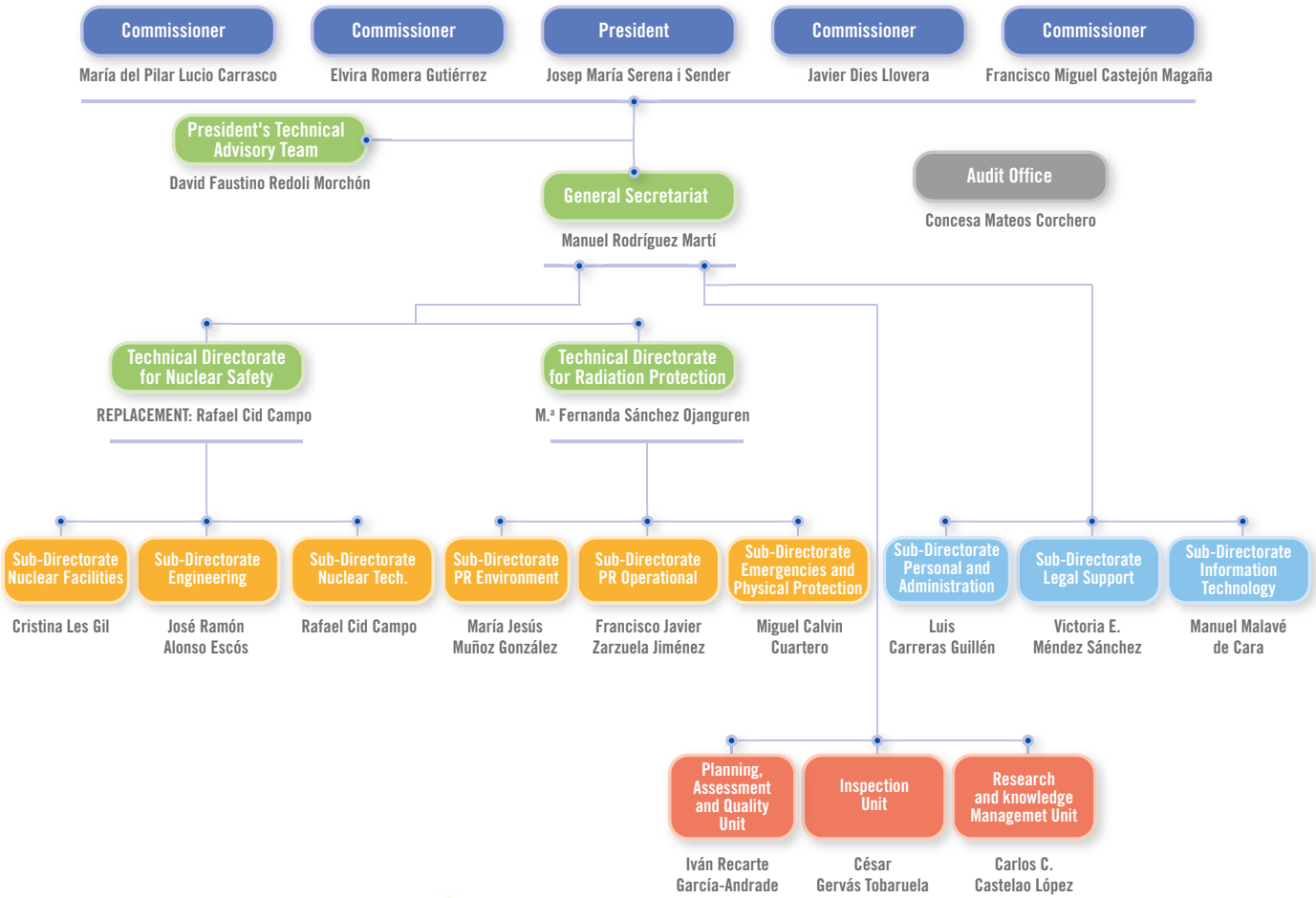
Number of meetings	2015	2016	2017	2018	2019
Ordinary	34	29	34	30	37
Extraordinary			2		
Constituent					1
Informational					
Total	**34**	**29**	**36**	**30**	**38**

1.2. Organisational Structure of the CSN

The Board is assisted by a General Secretariat, which is headed by Manuel Rodríguez Martí, appointed by Royal Decree 280/2017 of 17 March 2017.

The governing bodies of the Nuclear Safety Council, under the direction of the Presidency and the Board, are the General Secretariat of the Nuclear Safety Council, the Technical Directorate for Nuclear Safety, the Technical Directorate for Radiation Protection, the Technical Office of the Presidency, and the Sub-Directorates.

The chart below shows the organisational structure of the CSN:



1.3. Advisory Committee for Public Information and Participation

The Council has an Advisory Committee for public information and participation with the mission of issuing recommendations to promote transparency, access to information, as well as public participation in matters that are decided by the CSN. It is made up of representatives of civil society, business, unions, as well as public administrations at the state, regional and local levels.

Information about the Advisory Committee's activities may be consulted on its official website (www.csn.es). https://www.csn.es/comite-asesor.

The following meetings were held in 2019:

CA	Main topics of discussion	Date
Meeting No. 17	Renewal of operating licences for nuclear power plants. Licensing of two proton therapy facilities.	20 June 2019
Meeting No. 18	New Nuclear Safety Regulation. Incorporation of Directive 2014/87/Euratom. Decommissioning works at nuclear power plants.	26 November 2019

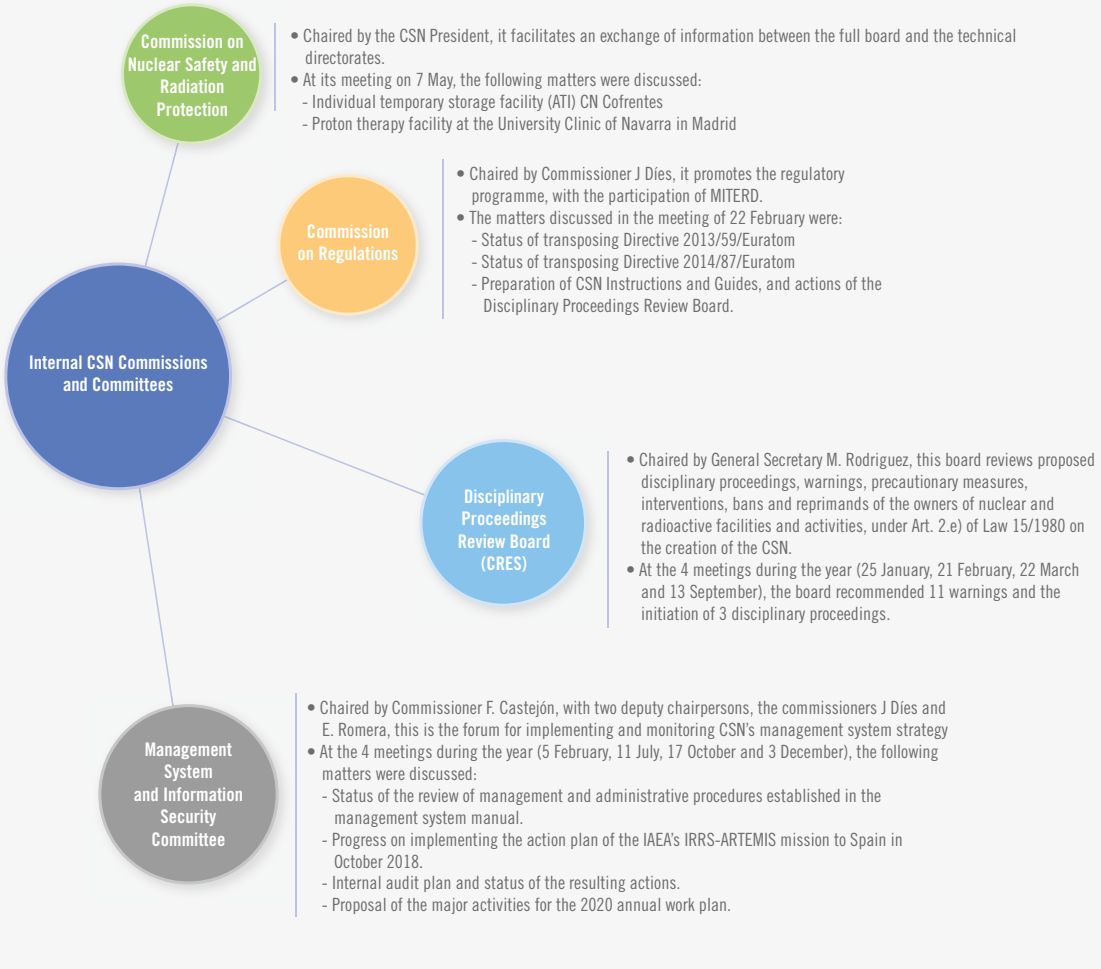
New recommendations of the CA during this period:

Nº	Content
Recommendation No.11	To hold an informational seminar on Council Instruction IS-10, the INES scale manual, and CSN's procedure (PG.II.06) in reporting events.
Recommendation No.12	The CSN will prepare an informational document on the Post-Fukushima National Action Plan, incorporating links to related documents of interest.

1.4. Internal CSN Commissions and Committees

Under Article 24.4 of the Statute, "The Board may resolve to create internal working commissions to carry out specific tasks assigned to them according to their purpose, and with respect to which the final decision corresponds to the Board."

The following chart shows the current CSN commissions and committees, and their most important activities in 2019.



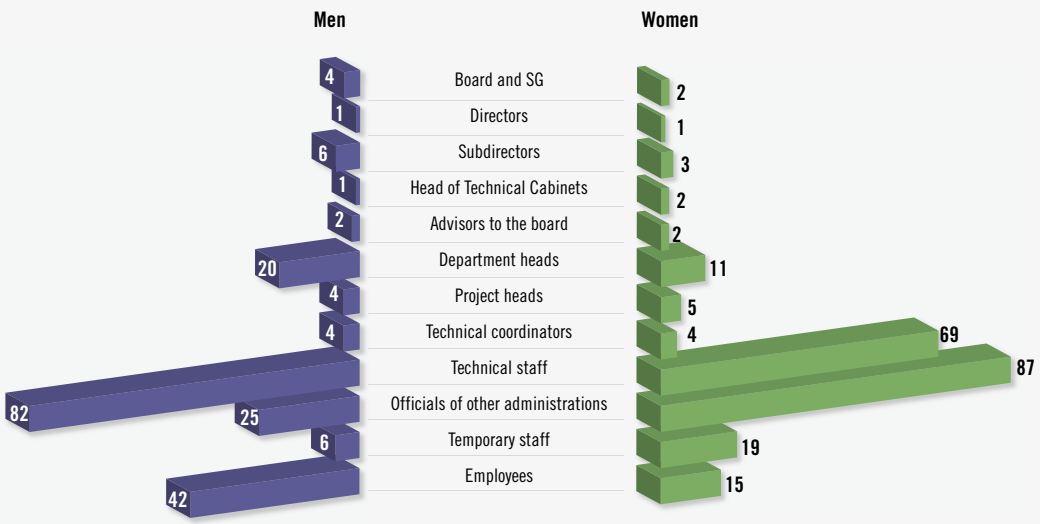
CHAPTER 2

HUMAN AND FINANCIAL RESOURCES

2.1. Human Resources

At 31 December 2019, the total staff numbered 417, as shown in the following tables. The number of women represent 52.76% of the total, while men represent 47.24%. The average age of CSN staff is 53, of which 71% hold postgraduate degrees, 6.23% graduate degrees, and 22.55% other degrees.

Breakdown of CSN staff at 31 December 2019



Total men: **197**

Total women: **220**

Breakdown of Nuclear Safety Council Staff as of December 31, 2019

	Council	General Secretariat	Technical directorates	Total
Senior Officials	5	1	1	7
Officials of the Nuclear Safety and Radiation Protection Technical Staff	7	14	190	211
Officials from other Public Administrations	3	83	31	117
Temporary staff	25	–	–	25
Employees	2	38	17	57
Totales	**42**	**136**	**239**	**417**

Simplified CSN Staff Data

Members of the staff
417

of which
211
are inspectors

8%
Senior officials

2.2. Financial Resources

Concerning economic and financial matters, the CSN is governed by the provisions of General Budgetary Law 47/2003 of 26 November 2003, as a government body subject to the public accounting system and the Accounting Regulations and Rules for the State Administration (Order EHA/1037/2010 of 13 April 2010). The table below shows the balance sheet for 2019.

Summary of 2019 financial year balance sheet

BUDGET 46.93 million *

EXPENSES		INCOME	
ITEM	PERCENTAGE	ITEM	PERCENTAGE
STAFF salaries, social security, other benefits	63 %	Fees for services rendered	98.65%
Supplies and outsourced services, company jobs, consumables and communications	35 %	Current transfers and subsidies, financial income and other operating income	1.35%
Others (depreciation, subsidies, grants, transfers, etc)	2 %		

POSITIVE RESULT 5.01 million

(*) The budget is unchanged with reference to 2018.

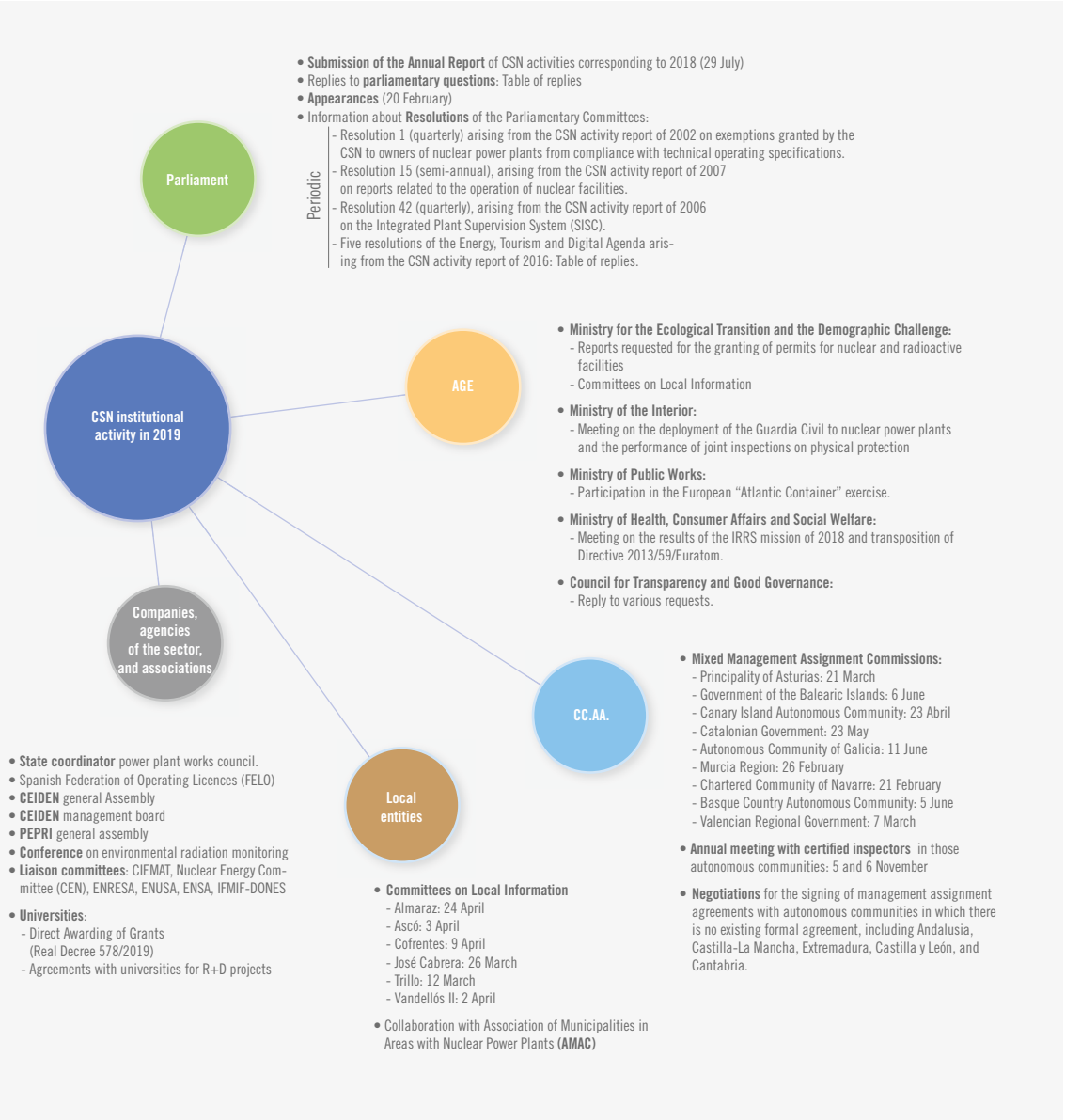
CHAPTER 3

INTERACTION OF CSN WITH OTHER BODIES

3.1. Institutional Relationships

To carry out its duties, the CSN, must interact with state institutions at the national, regional and local level, and with non-governmental professional organisations and associations, and particularly, due to their special relevance, the Congress of Deputies and the Senate. The chart below provides a summary of the CSN's institutional relationships, as well as the most relevant activities during 2019.

CSN institutional relationships in 2019



3.2. International Relationships

CSN participation in international forums in the field of nuclear safety and radiological protection, as well as bilateral relations with peer organisations in neighbouring countries, is necessary to maintain a harmonised regulatory framework with valid and internationally accepted benchmarks, and to ensure that regulated practices and activities are consistent and convey the knowledge and advances promoted in these international forums.

The CSN's international activity is shown on the chart below.

International Activity of the CSN in 2019

Bilateral activities of the CSN in 2019

BILATERAL RELATIONS WITH PEER AGENCIES. In 2019, bilateral relationships were initiated with countries of geostrategic interest in the regions of Latin America, North Africa and the Middle East, Australia, Japan, United Arab Emirates, Portugal and Morocco.

3.3. Information and Public Disclosure

The CSN informs the general public about matters within its purview, and guarantees the right of access to information in accordance with the principle of transparency. The institutional schedule of senior officials has been published on the website since November of 2019.

The main informational activities of the CSN in 2019 are summarised below:

Informational activities of the CSN in 2019

CHAPTER 4

STRATEGY AND RESOURCE MANAGEMENT

4.1. Strategic Plan

In 2019, CSN's board began preparing the Strategic Plan for the 2020-2025 period. The Strategic Plan is based on plans and schedules, including the Annual Work Plan. The 2019 Annual Work Plan was approved at the 20 February board meeting.

4.2. Management System

The CSN has introduced a management system subject to a continuous improvement process, based on the IAEA general safety requirement GSR Part 3 *Management System for Facilities and Activities* and ISO standard 9001:2008 *Quality Management Systems – Requirements*. The Manual is currently being revised to adapt it to GSR Part 2 *Leadership and Management for Safety* and ISO 9001-2015. The following activities were carried out in 2019:

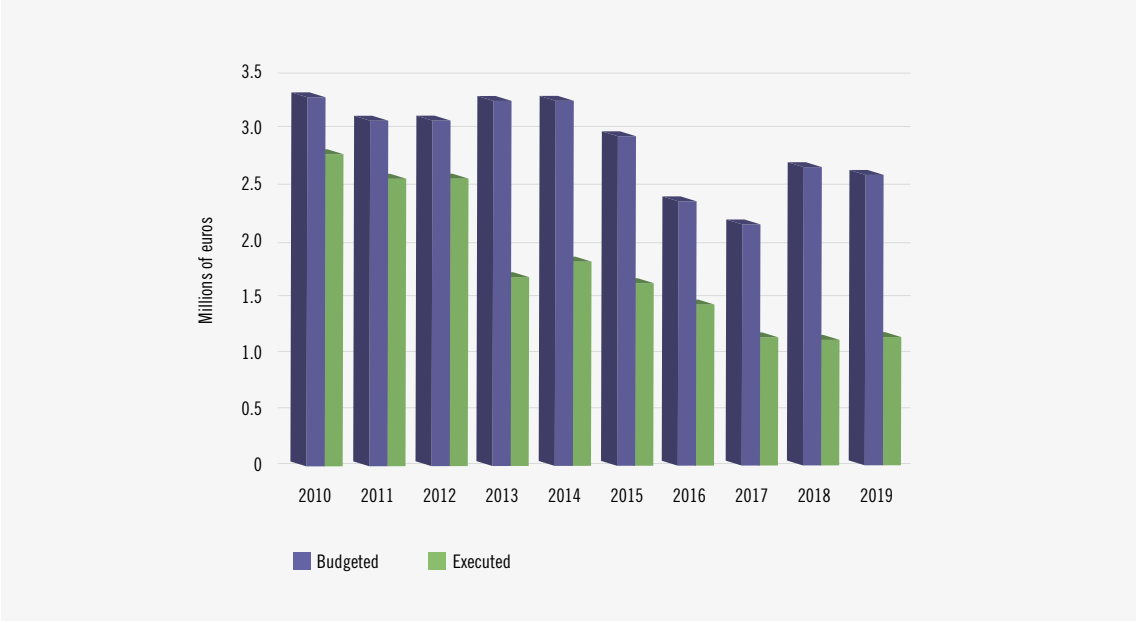
- The publishing or revision of 22 procedures.
- Update of the action plan of the IRRS-ARTEMIS mission of the IAEA of October 2018.
- Five processes audited and two audits of the assignment agreements with Catalonia and the Murcia Region.
- Restructuring of the Training Plan, with a total of 97 training activities completed, an average attendance of 3.42 activities per person, and 21,723 training hours. The portion of the Training Plan Budget of EUR 609,780 that has been spent is 53.8%.
- There has been progress on the knowledge management plan that the CSN has been developing since 2016, which is focused on preserving the knowledge and experience of technicians approaching retirement age. The CSN took part in the two annual meetings of the IAEA's *Steering Committee on Regulatory Capacity Building and Knowledge Management.*

4.3. Research and Development

The CSN uses its R+D Plan 2016-2020 to perform its duties of establishing and monitoring research plans for nuclear safety and radiation protection.

Due to the situation of extensions, which has prevented the authorisation of R+D+I agreements and grants, the amount of the 2019 R+D budget of €2,605,000 that has been executed is 44.52%. The graph below shows the evolution of the CSN's R+D budget in recent years:

Evolution of the CSN's R+D budget (2010-2019)



The following are the most important milestones of the R+D activities in 2019:

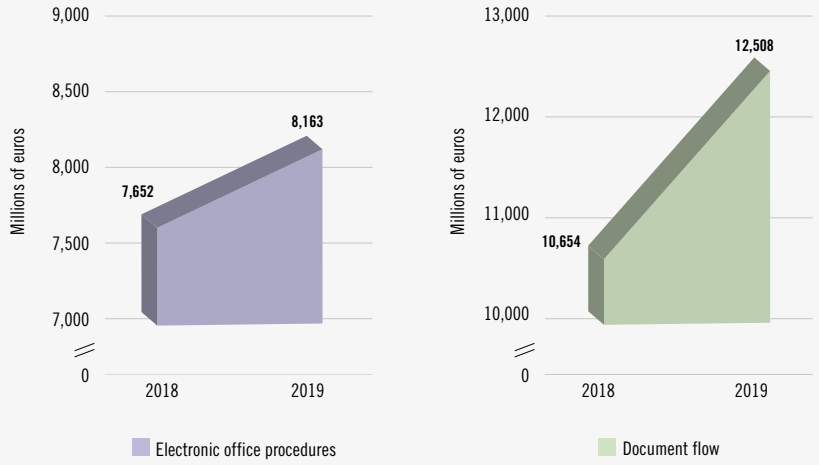
- Eleven R+D projects have been approved, and 8 of them have taken effect.
- Six projects have been completed that include collaboration agreements with institutions at the national level (universities, research centres, companies) and international level (NEA/OCDE and USNRC).
- Participation in the Nuclear Fission Energy Technology Platform (CEIDEN).
- Participation in the National Platform of R+D in Radiation Protection (PEPRI).
- Annual R+D seminar at CSN headquarters, in which the guest speaker (Mr Raymond Furstenau, Director of Nuclear Regulatory Research at the NRC) discussed the methods used by the NRC when applying R+D+I in its role as a regulator.

4.4. Information and Communication Technology Resources

The CSN is finalizing the adaptation of its Information and Communication Technology (ICT) to Law 39/2015 on General Administrative Procedure. In 2019:

- 22 corporate applications related to electronic files, electronic records, virtual office, mediation platforms with the central government administration, notifications, etc. have been modified.

Number of procedures in CSN's electronic office



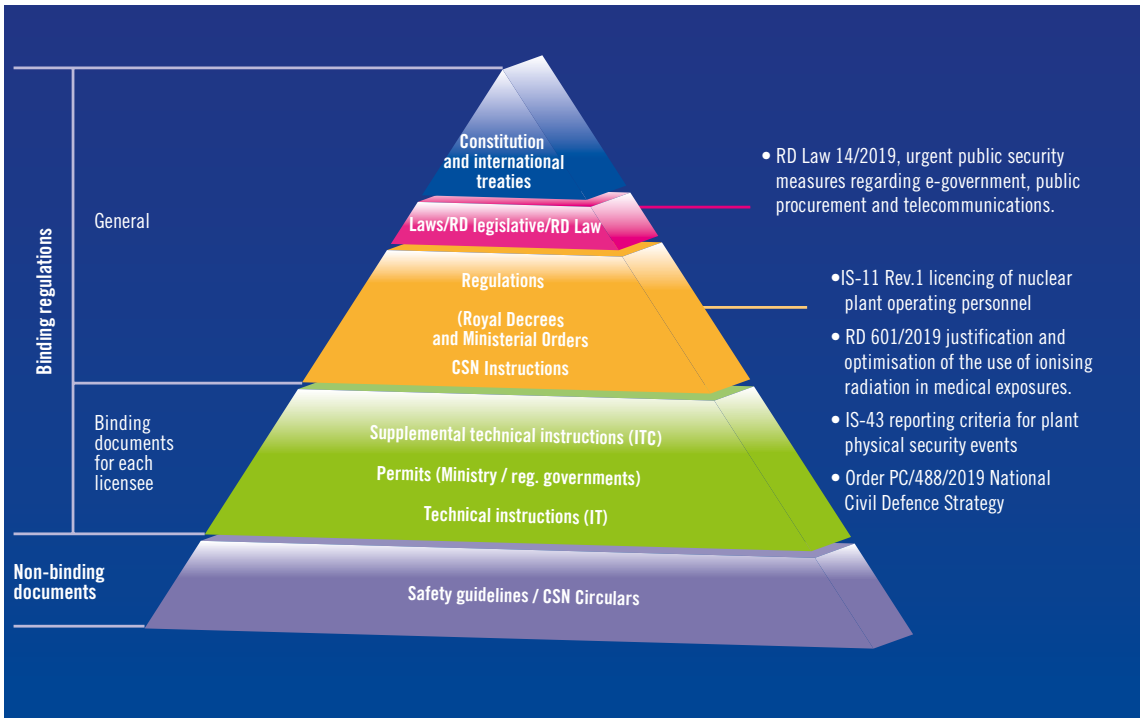
- The electronic offices procedures were carried out via 56 different web services, most frequently the Register of High Activity Source Inventory Sheets, with 2,353 procedures, followed by the Register of Documents, with 1,888 procedures.

- Many improvements have been made. Among the most important is the plan to adapt to the national technological security system (PAENS), enacted by RD 3/2010 and RD 951/2015.

4.5. Regulatory Activity

The CSN has the power to propose new regulations to the Government, and to review existing ones, in matters that are within its purview. Likewise, it issues Instructions, Circulars, Guidelines and other instruments of regulation, supervision and control that are part of the applicable legal framework, as the graph below illustrates:

Legal framework applicable to the CSN and the main developments in 2019



CHAPTER 5

GLOBAL VISION OF NUCLEAR SAFETY AND RADIATION PROTECTION AT SPANISH FACILITIES AND IN OTHER ACTIVITIES

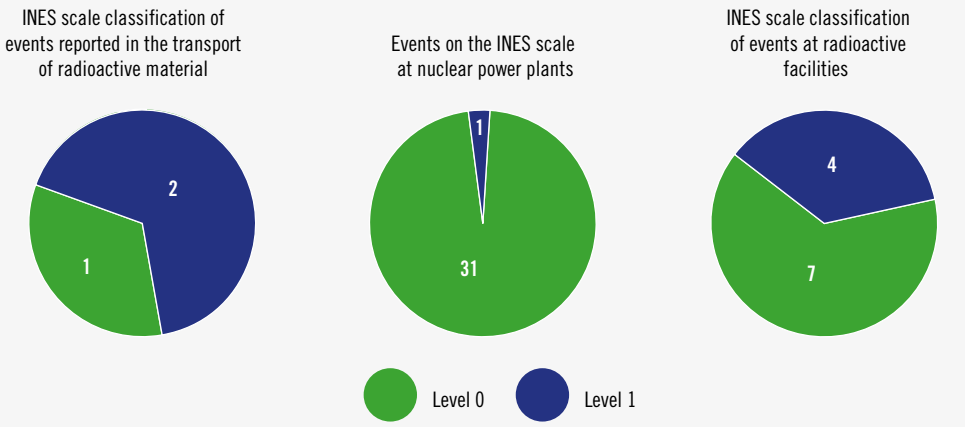
All of the nuclear and radioactive facilities have operated safely throughout the year and within established safety margins. The overall evaluation of the authorised facilities is based primarily on the results of the Integrated Plant Supervisions System (SISC); the inspection, supervision and control of radioactive facilities; reported events, especially those classified at a level above zero on the International Nuclear Event Scale (INES Scale); the radiation impact; the dosimetry of the workers; proposed modifications; warnings and sanctions, and operating incidents.

The environmental quality around the nuclear facilities is maintained in acceptable conditions from a radiological perspective, without any risk to people as a consequence of their operation or decommissioning or closure activities.

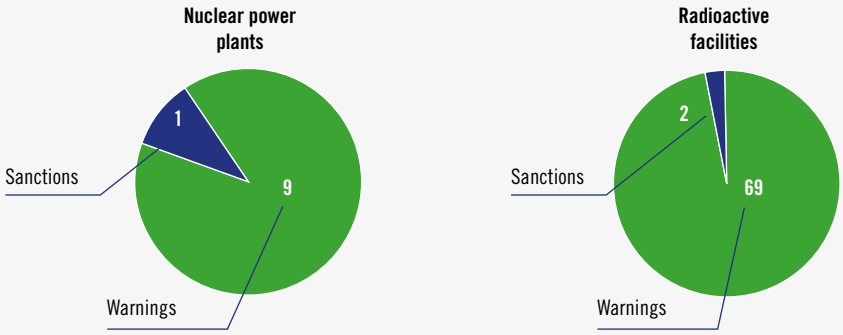
One of the most notable actions was the approval of the National Action Plan for the management of aging nuclear power plants, as a result of the first topical peer review (TPR) carried out in compliance with Directive 2014/87/EU.

Also in 2019, the CSN reported on the planned activities to move forward on developing the future National Plan against Radon.

Events reported on the INES scale at nuclear facilities, radioactive facilities, transports and orphan sources in 2019



Warnings and sanctions for nuclear facilities, radioactive facilities and transports in 2019



5.1. Safety of the Nuclear Facilities and the Fuel Cycle

The map below shows the geographical location of the nuclear and fuel cycle facilities:

5.1.1. Nuclear power plants

The CSN has a resident inspection team at each power plant, consisting of 2 inspectors at the sites of one unit and 3 inspectors at the sites of two units, and their main mission is the inspection and direct observation of the operating activities at the plants, and reporting this information to the CSN.

The tables below show the principal characteristics of the nuclear plant operations and the data corresponding to 2019:

Basic characteristics of the nuclear power plants

	Almaraz	Ascó	Vandellós II	Trillo	Garoña (down)	Cofrentes
Type	PWR	PWR	PWR	PWR	BWR	BWR
Thermal power (MW)	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
Electric power (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 Arrocampo reservoir	Mixed Ebro River Torres	Open Mediterranean Sea	Closed Contribution towers Tagus River	Open Río Ebro	Closed Contribution towers Júcar River
Number of units	2	2	1	1	1	1
Prior authorisation unit 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 unit 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
Commissioning permit unit 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

Summary of nuclear power plant operating data corresponding to 2019

	Almaraz I/II	Ascó I/II	Vandellós II	Trillo	Garoña	Cofrentes
Permit in force	07-06-10 07-06-10	02-10-11 02-10-11	26-07-10	03-11-14	Shut down since 06-07-13	20-03-11
Validity period (years)	10 10	10 10	10	10	N/A	10
Net production (GWh)	8662.815 7662.804	8671.571 7540.506	7379.156	7,905.283	–	8063.292
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 connected to grid	8760 7824	8760 7782.78	7293.31	8,048	–	7854.733
Refuelling outages	NO 05-10/13-11	NO 26-04/04-06	09-11/23-12	10-05/09-06	N/A	03-11/05-12

The following CSN activities in 2019 may be highlighted:

- In March 2019, the owners of Almaraz I and II and Vandellós II submitted their respective applications to renew their operating permits. Among the accompanying documents is the Periodic Safety Review (RPS), which is one of the most important systematic safety improvement programmes. It is conducted according to the CSN GS-1.10 Rev. 2 safety guide, which is based on the IAEA SSG-25 safety guide.

- A total of 123 inspections were conducted at the nuclear power plants, including Santa María de Garoña, 116 of them scheduled and 7 unscheduled.

- The following were the results of using the SISC:

  — At the end of 2019, all of the operating indicators were green.

  — All of the inspection findings were green, except for one white at the Trillo power plant, due to deficiencies in the protection measures during an exercise.

  — The owner of Ascó II sent the CSN an improvement action plan after reaching the threshold of 8 incidents in the cross-cutting component of *work practices and supervision* in the third quarter.

  — The situation at the power plants was normal, except for periods in which specific guidance from the CSN was necessary, such as:
  · The first quarter at the Ascó II power plant, due to a white finding in 2018: "Inoperability of Emergency Diesel Generator B because a flexible sleeve that had exceeded its useful life had failed and this anomalous condition had not been reported."
  · The second quarter, and for the rest of the year, at the Trillo power plant, due to a white finding related to deficient measures taken during an exercise.
  · The third quarter at the Vandellós II power plant, due to the indicator *Emergency and exercise response.*

- Thirty-two events were reported in 2019 in accordance with the reporting criteria of Instruction IS-10. All were classified as Level 0 on the International Nuclear and Radiological Event Scale (INES) except one, classified as Level 1, in relation to a pressure barrier leak in the Steam Generator B drain line at the Vandellós II nuclear power plant.

- The CSN recommended to the Ministry for the Ecological Transition that a disciplinary proceeding be initiated against the owner of the Almaraz nuclear power plant for a breach of Instruction IS-30 in relation to the inadequate water supply to the containment fire protection system.

- The CSN issued 9 warnings to nuclear power plants in 2019 (2 to the Ascó plant, 2 to Cofrentes, 2 to Vandellós II, 2 to Almaraz and 1 to Santa Mª Garoña).

5.1.2. Fuel cycle and waste storage facilities, and uranium mining

The table below provides a summary of the status and activities of the various facilities in 2019:

Status of the fuel cycle and radioactive waste facilities in 2019

FACILITY	STATUS	DESCRIPTION 2019
Juzbado factory	In operation (fuel assembly manufacturing facility)	Proper functioning overall 480 fuel assemblies (PWR) and 106 BWR were issued 13 inspection were conducted in 2019 There were no reportable incidents On 15 January, the estimated dose was confirmed in an internal case of contamination of a worker in 2018. 1 warning for non-compliance with section 4.1.2 of the Safety Analysis for improper placement of potentially declassifiable radioactive waste.
El Cabril power plant	Operational (low waste and very low level activity)	Proper functioning overall There were no reportable incidents Monitoring the collection of water of Cell 29 (exceeds the limit of 61 litres, although this does not entail risks). No waste was stored in this cell in 2019.
CIEMAT Nuclear + radioactive facilities	Upgrade plans under development: PIMIC-D (management of decommissioning waste) PIMIC-R (declassification)	There were no reportable incidents Shipments to El Cabril, monitoring and control of decommissioning waste and declassification of materials There were no reportable incidents In 2019, 7 inspections were conducted (1 in Palomares) 2 disciplinary proceedings recommended: Loss of traceability unrecorded Am-Be source Breach of physical safety regulations
Central storage facility	Suspended	No activities related to the central storage facility have been carried out
VANDELLÓS I	Latency	Proper compliance with safety requirements There were no reportable incidents Inspections: Vandellos I power plant (2); Jose Cabrera power plant (16) Diverse programs operational for environmental radiation monitoring, worker radiation protection, physical protection, discharge controls and waste management.
José Cabrera power plant	Decommissioning	

Evolution of the decommissioning of the José Cabrera Power Plant.

FACILITY	STATUS	DESCRIPTION 2019
MINING, URANIUM CONCENTRATE MANUFACTURING PLANTS AND ENVIRONMENTAL RADIATION MONITORING SITES (PVRA)		
ELEFANTE PLANT	Decommissioned and restored (compliance period)	Proper compliance with safety requirements There were no reportable incidents Diverse programs operational for environmental radiation monitoring, worker radiation protection, physical protection, discharge controls and waste management. Inspections: Quercus (2), FUA (2), Saelices (1) In 2019, CSN completed its evaluation of the application submitted by Enusa in 2017 to the Junta de Castilla y León for the definitive abandonment of the works, concluding that the Monitoring and Maintenance Plan should be renewed.
PLANTA QUERCUS	Shut down (decommissioning and closure requested)	
SAELICES	In restoration	
FUA (Andújar uranium concentrate plant)	Decommissioned and restored (compliance period)	
Valdemascaño y Casillas de Flores (Salamanca)	Decommissioned and restored (compliance period)	
LOBO-G (uranium ore plant, La Haba, Badajoz)	Closed (tailings stabilised in monitored enclosure)	Specific monitoring programme 1 Inspection of the facility's Environmental Radiological Monitoring Programme (PVRA)
Retortillo (category 1 radioactive facility of the fuel cycle for manufacturing uranium concentrates)	Site authorisation (September 2015)	The construction permit application submitted in 2016 is being evaluated. The environmental radiation monitoring, ground water, mining site characterization programmes, and the operational radiation monitoring programme are operational.

Evolution of the Quercus plant from 1993 to 2016

5.2. Safety of the Radioactive Facilities

CSN is responsible for controlling the operation and inspection of radioactive facilities, including medical diagnostic X-ray facilities, whose regulation specifically provides for a system of declaration and registration regulated by the autonomous communities.

By 31 December 2019, executive powers over category 1 and 2 radioactive facilities have been transferred to the Autonomous Communities of Aragon, Asturias, the Balearic Islands, the Canary Islands, Cantabria, Catalonia, Castilla y León, Ceuta, Extremadura, Galicia, La Rioja, Madrid, Murcia, Navarra, the Basque Country and Valencia.

By 31 December 2019, a total of 1,285 radioactive facilities had operating permits (2 in category 1, 941 in category 2, and 342 in category 3). In addition, the CSN is aware of the registration of 38,714 radiology facilities in the corresponding records of the autonomous communities. The following is a breakdown:

Breakdown of the Radioactive Facilities by Autonomous Community

Autonomous Community	Category 2 radioactive facilities					Category 3 radioactive facilities					Total Community facilities	X-Ray Facilities per Community
Field of application	C	D	I	M	Total C2	C	D	I	M	Total C3		
Andalusia	3	13	64	57	137	1	15	22	4	42	179	6,798
Aragón	4	2	23	9	38	-	2	8	1	11	49	979
Asturias	-	2	18	10	30	-	1	6	1	8	38	980
Balearic Islands	-	1	5	8	14	-	-	-	-	-	14	871
Canary Islands	-	2	9	10	21	-	1	3	-	4	25	1,336
Cantabria	-	2	12	4	18	-	1	5	-	6	24	496
Castilla-La Mancha	1	2	14	11	28	-	1	5	-	6	34	1,665
Castilla y León	-	8	25	13	46	-	3	14	1	18	64	1,974
Catalonia	12	22	77	55	166	3	14	40	9	66	*234	6,307
Extremadura	-	1	8	7	16	-	-	4	1	5	21	887
Galicia	2	6	28	14	50	-	-	9	-	9	59	2,533
Madrid	39	25	49	67	180	10	15	34	8	67	247	5,912
Murcia	2	1	18	9	30	1	-	4	-	5	35	1,107
Navarre	-	1	16	5	22	-	1	5	1	7	29	426
Basque Country	3	1	52	12	68	2	8	60	1	71	139	1,756
Rioja	-	-	1	3	4	-	-	-	-	-	4	286
Comunidad Valenciana	3	9	30	31	73	-	5	11	1	17	90	4,309
Ceuta	–	–	–	–	–	–	–	–	–	–	–	55
Melilla	–	–	–	–	–	–	–	–	–	–	–	37

C: Commercial radioactive facilities.
D: Radioactive facilities for research and teaching.
I: Industrial radioactive facilities.
M: Medical radioactive facilities.
** Includes two category 1 facilities: one industrial and one for research.*

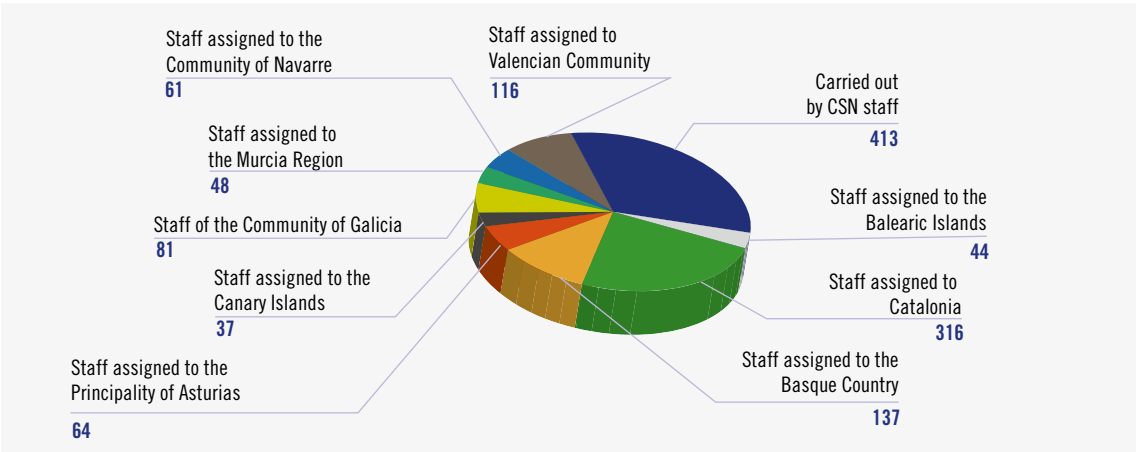
The radioactive facilities were operated in accordance with the established safety requirements in 2019, with no undue risks arising.

In 2019, a radioactive installation was authorised for the marketing of new proton therapy systems manufactured by HITACHI, which supplied the radioactive facility of the University of Navarra in Madrid and will provide technical support. This equipment is the first of this technology to be supplied by Hitachi in Europe.

CSN's most important activities of 2019 are summarised below:

- Licencing: 351 opinions on radioactive facility permits, 248 evaluated by the CSN and the rest by Catalonia (54) the Basque Country (47) and the Balearic Islands (2).
- Handling of 44 complaints, all resolved at the end of the year except 4 that are still ongoing.
- 11 radiological events reported in accordance with the criteria of Instruction IS-18.
- Inspection, follow-up and control: 1,321 inspections and 1,280 annual reports evaluated.

Breakdown of inspections conducted at radioactive facilities in 2019



- The CSN has issued or recommended the following warnings and sanctions:
  - 69 warnings to radioactive facilities and related activities.
  - 2 coercive fines against owners of radioactive facilities for failing to take the required corrective actions stipulated in the respective warnings.
  - Proposal to MITECO to initiate disciplinary proceedings against the owner of a Technical Radiation Protection Unit (UTPR) for a minor non-compliance.
  - Proposal to the regional government of the Junta de Castilla y León to initiate disciplinary proceedings against the owner of a radioactive facility for a minor non-compliance.
  - Proposal to the regional government of Catalonia to revoke the permit of a radioactive facility and seize its radioactive material.

5.3. Other Activities

5.3.1. Service organisations and other regulated activities

Activities related to service organisations and other activities in 2019

ACTIVITY/FACILITY	DESCRIPTIONS 2019
Radiation protection services and units (SPRs and UTPRs)	Proper functioning overall 4 SPRs authorised (total SPRs authorised 91) 24 SPR control inspections (11 by CSN-assigned autonomous communities; Catalonia (4), Navarra (4) and Valencia (3)); 7 SPR licencing inspections (associated with applications) 2 UTPR licences authorised and 2 revoked (total UTPRs authorised 40) 10 UTPR control inspections (2 by Catalonia authorities) 2 UTPR licencing inspections (associated with applications)
Personal dosimetry services	Proper functioning overall No new external dosimetry services have been authorised (total 21) No new internal dosimetry services have been authorised (total 9) 7 control inspections of external dosimetry services 2 control inspections of internal dosimetry services
External companies (contractors that carry out activities in a controlled area)	Proper functioning overall The CSN keeps a record of external companies: total 2,096 Verification of the radiation passbook, training, etc., during operational radiation protection inspections when refuelling of nuclear power plants.
Medical X-ray sales and technical support companies	Proper functioning overall The CSN issued a report for the authorisation of 9 companies (total authorised 365) The CSN issued a report for the modification of 3 authorised companies CSN evaluation of 50 annual reports of authorised companies
Certification of courses for training of radiation facility and diagnostic radiology personnel	1 new organisation approved for the training of radioactive facility personnel 7 approvals associated with courses for radioactive facilities modified 4 new organisations approved for certification courses to manage or operate diagnostic radiology facilities 11 approvals modified for certification courses to manage or operate diagnostic radiology facilities 62 inspections associated with the evaluation of 85 radioactive facility courses 24 in-house inspections of autonomous communities (7 Basque Country and 17 Catalonia) 5 inspections certification course diagnostic radiology facilities Update and approval of the informative material available on the CSN website
Other regulated activities	24 reports on the modification of licenses for marketing devices that generate ionising radiation and providing technical support 1 report for the filing of a manufacturing record of radioactive equipment for the quality control of raw materials 37 favourable reports for the approval of 55 radioactive equipment models

5.3.2. Personnel Licensing

Regarding licensed personnel, the tables below show CSN's activities in 2019 both at nuclear power plants and fuel cycle facilities, as well as radioactive facilities:

Granting and renewal of nuclear power plant licenses in 2019

Facility	New licenses and renewals							
	Granted			Renewed		In force 31/12/2019		
	SUP	OP	JSP	SUP	OP	SUP	OP	JSP
Sta. Mª Garoña plant	-	-	-	-	4	11	6	2
Almaraz I and II plants	2	6	-	1	4	23	36	4
Ascó I and II plants	3	3	-	1	8	32	36	4
Trillo plant	-	-	-	4	2	13	23	3
Cofrentes plant	2	5	-	3	-	17	24	4
Vandellós II plant	2	4	-	-	1	18	19	4
TOTAL	**9**	**18**	**-**	**9**	**19**	**114**	**144**	**21**

Granting and renewal of licenses at fuel cycle and decommissioning facilities in 2019

Facility	New license and extensions							
	Granted			Renewed		In force 31/12/2019		
	SUP	OP	JSP	SUP	OP	SUP	OP	JSP
Juzbado factory	-	-	-	-	-	12	35	3
Saelices								
Quercus/Elefante	2	2	-	-	1	9	4	1
CIEMAT Nuclear	-	-	-	-	1	1	1	
CIEMAT Radioactive	4	3	-	9	11	56	55	2[(1)]
Cabril	-	-	-	2	4	5	7	2
Vandellós I	1	-	-	1	-	4	-	1
José Cabrera	1	-	-	-	-	1	2	1

(1) Also for nuclear power plants

Granting and renewal of radioactive facility licenses in 2019

Facility	New licenses and extensions							
	Granted			Extended		In force 31/12/2019		
	SUP	OP	JSP	SUP	OP	SUP	OP	JSP
Radioactive facilities category 1 (except fuel cycle)	–	–	–	–				
Radioactive facilities categories 2 and 3 (except CIEMAT)	488	1,725	26	470	1,065	4,444	12,553	221
Total	**488**	**1,725**	**26**	**470**	**1,065**	**4,444**	**12,553**	**222**

** Head of Radiation Protection Service (includes Head of UTPR Service).*

By 31/12/19, the total number of certifications for medical radiology facilities was 160,666, of which 63,432 are for managers and 97,234 for operators.

5.3.3. Transport of nuclear and radioactive materials

The transport of radioactive materials is regulated in Spain by a set of regulations on the transport of hazardous waste by road, rail, air and sea, which refer to international regulatory agreements based on the International Atomic Energy Agency rules for the safe transport of radioactive materials.

The transport safety measures depend on the classification of the package according to type and model, as the table below shows.

Approval and reporting requirements for the transport of radioactive materials

Package models	Package design approval	Approval of shipment	Prior notification of the shipment
Exempt	No	No	No
Type: industrial	No	No	No
Type A	No	No	No
Type B(U)	Unilateral (1)	No	Yes (3)
Type B(M)	Multilateral (2)	Yes (3)	Yes
Type C	Unilateral	No	Yes (3)
Packages with fissile materials	Multilateral	Yes (3)	Yes

(1) Unilateral: It is only necessary for the country of origin of the package design to grant it.
(2) Multilateral: The approval of all countries of origin, transit and destination of the transport is necessary.
(3) Only under certain conditions.

The main milestones of CSN's activity in 2019 in relation to transport are summarised in the table below:

The following are the main milestones of CSN's activity in 2019 in relation to transport:

ACTIVITY/INSTALLATION	DESCRIPTION 2019
1 approval for review of package design of Spanish origin	ENRESA-B-02a. (E/0105/B(U)-96)
7 approval certificates for validated foreign designs	ANF-10 (E/0101/IF-96) EMBRACE (E/102/IF-96) TNF-XI(E/165/AF-96) 3516A (E/092/AF-96) BU-D (E/145/AF-96) RAJ-II (E-125/B(U)F-96) 3516C (E/164/AF-96)
5 reports about specific authorisations of physical protection	5 Express Truck (ETSA)
1 report on a radioactive waste shipment authorisation	Transport to return radioactive waste from Westinghouse Electric Belgium to the Ascó power plant
64 Transport inspections	45 were carried out by the autonomous communities 19 conducted by CSN staff
59 shipments of fissile material	41 from Juzbado 12 from United Kingdom 4 from Germany 2 from USA
ENRESA has made shipments of waste to El Cabril	256 from nuclear facilities 39 radioactive facilities
3 events in the transport of radioactive materials	2 classified as Level 1 (anomaly on the IAEA's INES scale) 1 classified as 0 on the INES scale

5.3.4. Other non-regulated activities

CSN's activities in 2019 in this regard are summarised in the table below:

Non-regulated activities carried out by CSN in 2019

ACTIVITY/FACILITY	DESCRIPTION 2019
Removal of unauthorised radioactive material	Requires ministerial approval 20 reports on permits to transfer various unauthorised materials and sources to ENRESA (7 by autonomous communities: Basque Country (1), Catalonia (5) and Balearic Islands (1)) 12 of the applicants were not owners of radioactive facilities.
Removal of radioactive material detected in metallic materials	Collaboration protocol for radiation monitoring of metallic materials 70 reports to the CSN regarding the detection of activity (total number historically 1,975) Material detected: isolated sources, radioluminescent paint, ionic smoke detectors, lightning rods, uranium parts, products with radium and thorium and parts with radioactive contamination of artificial or natural origin.
Radioactive material detected in seaports	Action protocol for inadvertent movement or illegal trafficking of radioactive material in ports of general interest 6 reports to the al CSN regarding the detection of activity in merchandise in the ports in Valencia and Algeciras Detected material exempt or transferred to ENRESA
CRI-9 ACERINOX Inert Recovery Centre in Marismas Mendaña (Huelva)	Monitoring of residual contamination (melting of Cs-137 source in 1998) Analysis and evaluation of PVRA results 1 inspection related to the implementation of the PVRA
Palomares (Almería)	Monitoring of residual pollution aircraft accident 1966 Analysis and evaluation PVRA results 1 verification mission under Article 35 Euratom 1 transport inspection

Lands in Spain where there is a presence of radioactive contamination are shown on the map below.

Location of lands with a presence of radioactivity not associated with mining

5.3.5. Protection against natural sources of radiation

The CSN carried out the following related activities in 2019:

- Inspections of lands affected by NORM waste were conducted at the following sites:
  - — El Hondón
  - — The works to eliminate chemical contamination in the Flix reservoir
  - — The phosphogypsum pools of Huelva

- The CSN took part in the first course in Spain for training UTPR heads in the field of natural radiation, conducted in CIEMAT.

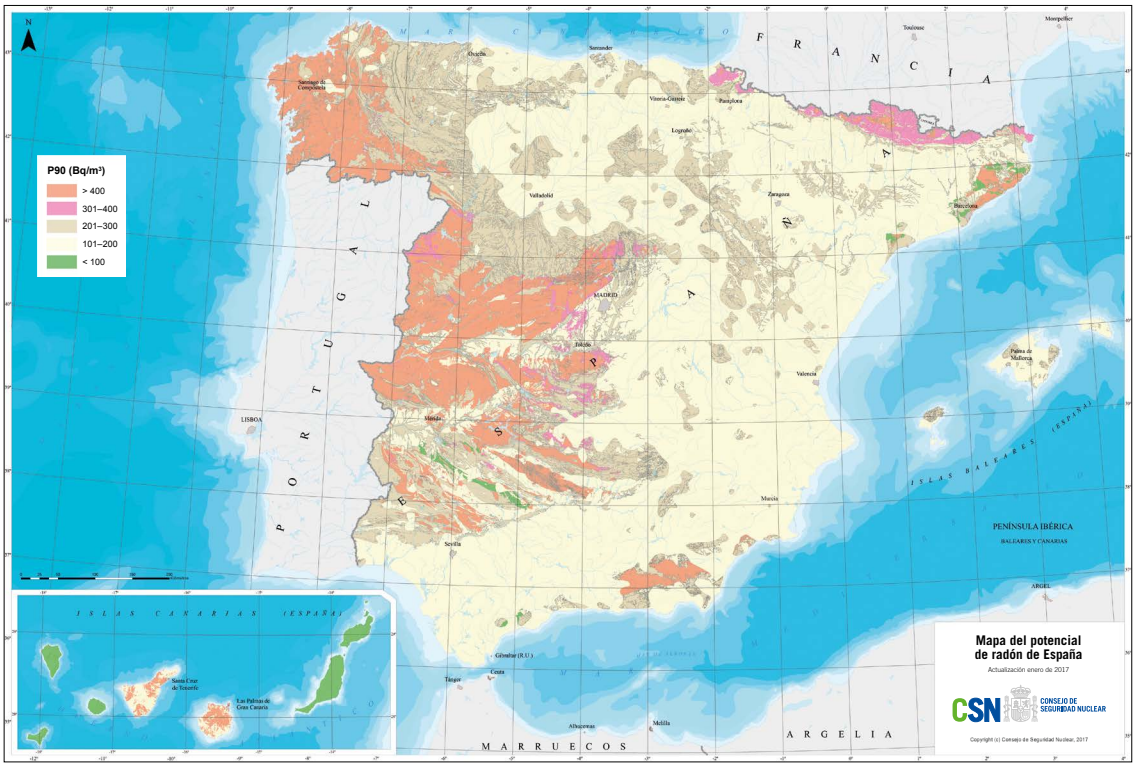
- 4 requests for UTPR authorisation were received to carry out activities in the field of natural radiation, and the corresponding evaluations were started.

- 16 inspections, 7 in industries that process naturally occurring radioactive material (NORM) or at sites contaminated by NORM, and 9 workplaces with radon exposure.

- Regarding the preparation of the future National Plan against radon, in December 2019 the CSN Board approved the proposed actions to be taken by the agency, and progress has been made in the classification of municipalities to define priority areas for action.

- In collaboration with the Ministry of Transport, Mobility and Urban Agenda, a new Core Document on protection against radon in buildings (DB-HS6) of the Technical Building Code was approved in 2019.

Map of radon in Spain



5.4. Global Radiation Protection System

5.4.1. Radiation Protection for exposed workers. Dosimetry

In most cases, the doses received by exposed workers are monitored individually using passive dosimeters. At the close of 2019, the National Dosimetry Bank (BDN) contained 26,809,717 records corresponding to 395,959 exposed workers and 82,217 facilities.

The table below provides a summary of the doses received by the exposed workers for each sector:

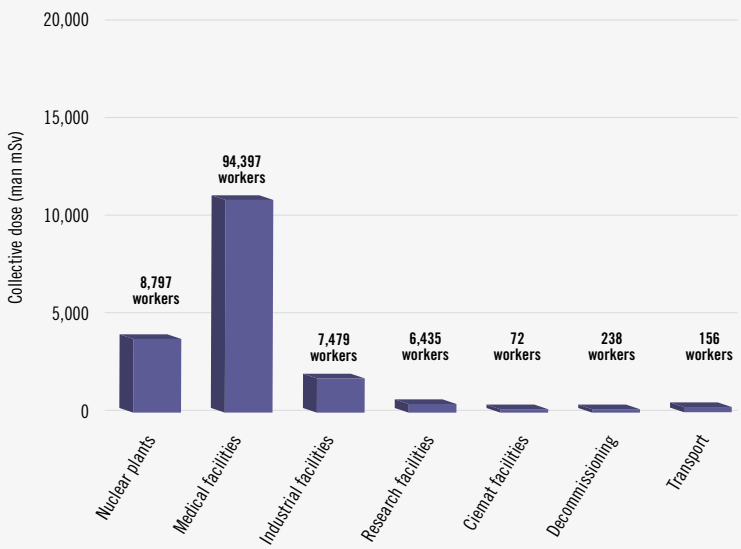
Doses received by the exposed workers for each sector

Facilities	Number of workers	Collective dose	Average individual dose
		(man mSv)	(mSv/year)
Nuclear power plants	8,797	3,688	1.15
Fuel cycle facilities, waste storage, and research centres (CIEMAT)	1,108	72	0.47
Radioactive facilities			
Medical	94,397	10,998	0.60
Industrial	7,479	1,679	0.93
Research	6,435	251	0.36
Facilities in decommissioning and closure phase	238	20	0.49
Transport	156	162	1.82
TOTAL	**117,771**	**16,870**	**0.69(*)**

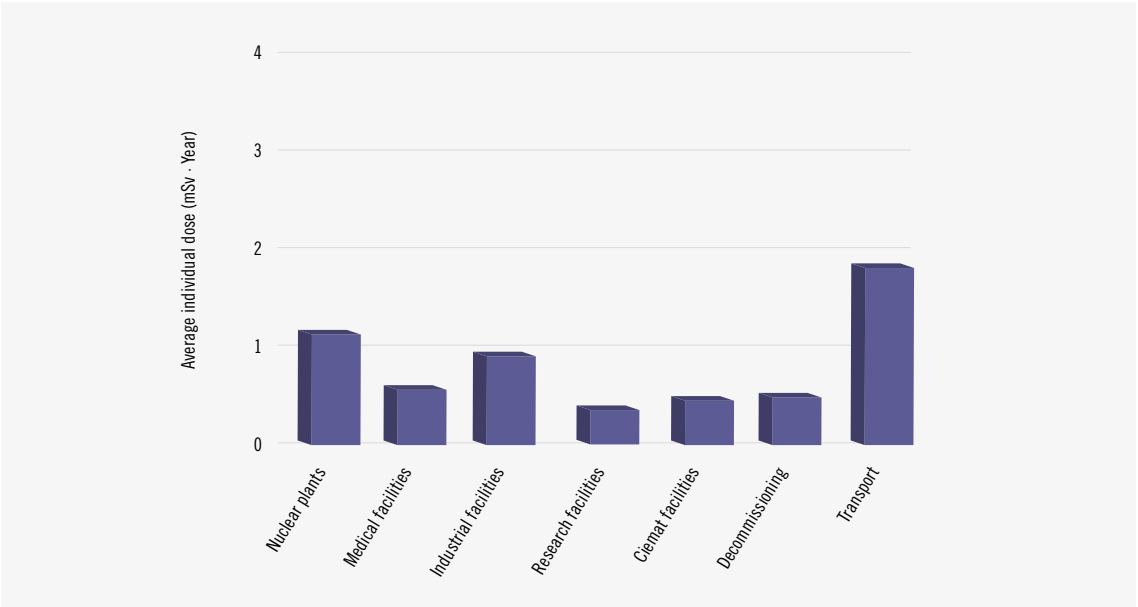
(*) Taking into account significant doses (>0) and excluding cases potentially exceeding the annual dose limit.

The graphs below chart these data:

Collective dose and number of exposed workers per sector in 2019



Average individual dose by sector in 2019



The assessment of the dosimetry data and their historical evolution is summarised as follows:

- There have been 6 cases in which the annual limit of the regulatory dose was potentially exceeded, all at radioactive facilities. A subsequent investigation confirmed overexposure in 2 cases in industrial gammagraphy facilities on which the CSN maintains open case files. In 3 cases, there was no overexposure, and in 1 case the investigation is ongoing.

- The high percentage of workers who did not receive doses (79.4%) or received doses of under 1 mSv/year (96.5%) reveals a positive trend that is in compliance with the dose limit established in the Radiation Protection Regulation on dose limits to ionising radiation (100 mSv/5 years).

- The medical radioactive facilities recorded the highest collective dose (10,998 man mSv.), since they have the highest number of exposed workers (94,397).

- Transport activities recorded a higher median individual dose, although it is virtually unchanged from the previous year (1.82 mSv/year versus 1.80 mSv/year in 2018); however, the collective dose rose slightly (162 man mSv versus 149.78 man mSv in 2018), although still below the regulatory dose limits.

- With respect to the plants in operation, outside exposed workers represent the largest share of the collective dose (3,244 man mSv versus 444 man mSv for permanent staff), as well as the average individual dose (1.18 mSv/year versus 0.94 mSv/year for permanent staff).

- 7,253 workers have the assigned administrative doses, mostly in medical radioactive facilities.

- With respect to internal dosimetry, in the direct measurement of the whole body radioactivity of exposed workers with significant risk of internal contamination, no values higher than the established record level were detected (1 mSv/year).

5.4.2. Discharge control from nuclear and radioactive facilities

Controlling and monitoring radiation throughout Spanish territory allows the CSN to assess the impact of releases from the facilities into the atmosphere and determine the radiation protection measures to be taken to safeguard the public and the environment. Regulations require facilities that may produce radioactive waste to implement a programme to control radioactive effluents (PROCER in the case of nuclear power plants). Furthermore, the CSN also fulfils the obligations of the Euratom Treaty (articles 35 and 36) that each Member State must assume regarding the control of environmental radioactivity, such as regularly reporting radioactive releases to the EC, the IAEA, and under the OSPAR Convention.

The most important milestones in 2019 are summarised below:

- In May 2019, in accordance with the aforementioned Treaty, the EC published report of the verification mission conducted by a team of inspectors from 17th to 19th July 2018 in the area of the Almaraz power plant. The report concludes with the fulfilment of the terms of the Euratom Treaty

- From 18 to 20 June 2019, two EC inspectors conducted a new verification mission in Palomares, which included the resources available in the area and the CIEMAT laboratories.

- Actual doses due to the radioactive effluents based on estimates for the most exposed individual in the critical group in no case exceeded 1.2% of the authorised limit (0.1 mSv/year for nuclear power plants).

5.4.3. Environmental radiological monitoring in the surroundings of the facilities

The establishment of an environmental radiological surveillance programme (PVRA) at nuclear and radioactive fuel cycle facilities is required to provide data on radioactivity levels in the most significant routes of exposure for the individuals at each site, and to facilitate verification, where appropriate, of the suitability of the effluent monitoring programmes and models for the transfer of radionuclides in the environment. The PVRA results refer to 2018, due to the delay in availability of the data from 2019, which depends on processing and prior analysis of the samples.

To check the results of the PVRA, the CSN overlays its own radiological sampling and analysis programmes. These are called independent environmental radiological monitoring programmes (PVRA-IN) and are conducted by means of collaboration agreements with university environmental radioactivity measurement laboratories.

In 2018, 10,223 samples were collected by the facilities that are required to have a PVRA. The following table provides a breakdown of the samples collected:

Environmental radiological surveillance programme: number of samples taken in 2018

ENVIRONMENTAL RADIOLOGICAL SURVEILLANCE PROGRAMMES: NUMBER OF SAMPLES				
NUCLEAR POWER PLANTS				
FACILITY	**AIR**	**WATER**	**FOOD**	**TOTAL**
Sta Mª Garoña power plant	618	176	118	912
Almaraz power plant	785	188	291	1264
Ascó power plant	839	127	119	1085
Cofrentes power plant	777	142	103	1022
Vandellós II power plant	828	90	106	1024
Trillo power plant	778	159	131	1068

FUEL CYCLE FACILITIES, SHUTDOWN, DECOMMISSIONING AND CLOSURES IN 2018		
Facility	**Number of samples taken**	**TOTAL**
Juzbado	585	585
Cabril	726	726
Ciemat	722	722
Quercus/Elefante	623	623
José Cabrera power plant	769	769
Vandellós I power plant	334	334
FUA	50	50
Lobo G	38	38
Valdemascaño	14	14

The following can be concluded from the 2018 PVRAs:

- They are similar to those of previous years and show that the operation of the facilities and associated activities do not impact the radiological quality of the environment or pose a risk.

- The results of the PVRAIN confirm those obtained in the corresponding PVRA for the different facilities, with no significant deviations.

The CSN application, available at the following link, allows you to view a map showing the sampling stations for environmental radiological surveillance.

https://www.csn.es/kprGisWeb/consultaMapaPuntos2.htm

5.4.4. Environmental radiological monitoring in the national territory

The CSN monitors the environment at the national level using what is known as the Revira Network of Automatic Stations (REAs) that continuously measure radioactivity in the atmosphere to analyse air, soil, water and food samples. The CSN collaborates with other institutions, which provide it with technical and logistic support.

Network of Sampling Stations (REM)

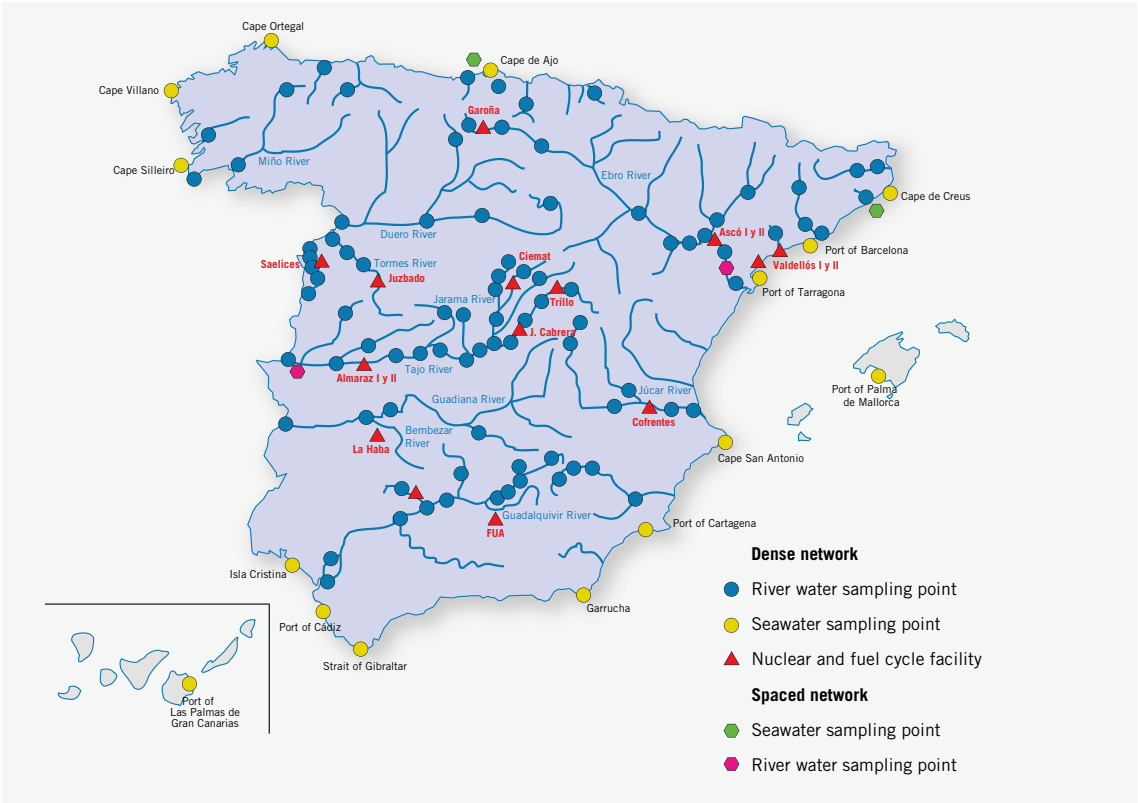
Programme to monitor the atmosphere and terrestrial environment

The CSN maintains specific agreements with 20 laboratories of various universities and CIEMAT for the monitoring programme, with diverse and representative samples.

Radiation monitoring programmes for inland and coastal waters

The CSN maintains specific agreements with Cedex for continuous radiation monitoring of inland and coastal waters, including sampling at port inlets in this case, and at a distance from the coast of 10 miles, as shown on the map below:

CSN network of sampling stations for inland and coastal waters



The main activities and results of the REM in 2019 are summarised below:

- The 2018 results confirm the pattern observed in prior years, consistent with radioactive background levels and revealing normal isotopic indications of land use, urban effluents, etc., as well as the usual recordings of the nearby nuclear power plants. In any case, the values are not significant, and in the specific case of Cs-137, they are among the lowest activity concentration values detected in the European Union.

- CSN completed the intercomparison exercise started in 2018, and organised with the participation of CIEMAT and 40 laboratories, with samples containing natural and anthropogenic radionuclides prepared in in collaboration with the Mat Control Laboratory of the University of Barcelona. In addition to the usual results, those for Iodine-131 were requested for the first time in this exercise.

- An intercomparison of environmental radiation measurements with thermoluminescence dosimeters (TLD) was carried out, with the participation of 11 laboratories and CIEMAT.

- A new exercise was started in which water samples (inland and marine) with natural and artificial radionuclides were the object of the study.

- In December, the CSN headquarters hosted the 26th Seminar on Environmental Radiological Surveillance, which confirmed the suitability and satisfactory level of quality of the participating laboratories.

Network of Automatic Sampling Stations (REA)

The Network of Automatic Sampling Stations (REA) consists of 25 stations that continuously measure radiation and concentrations of activity in the air. The data are received and analysed at the supervision and control centre of the CSN's nuclear emergency room (SALEM), and enables fulfilment of the data-sharing commitments CSN has in the EU's European Union Radiological Data Exchange Platform (EURDEP).

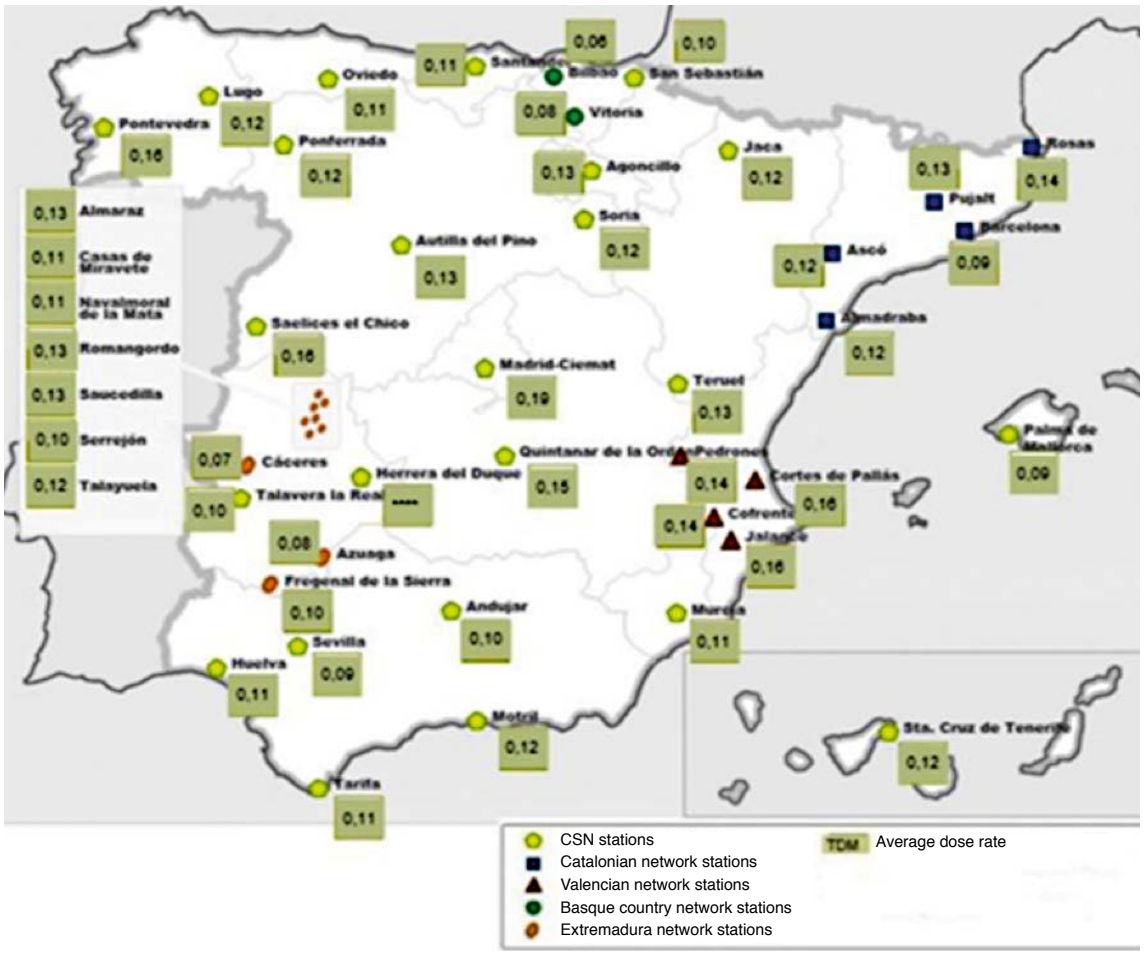
The CSN maintains agreements with AEMET (the state meteorological agency) and CIEMAT for the placement and shared use of data from certain stations, just as the agreements with the autonomous communities of Valencia, Catalonia, the Basque Country and the Junta de Extremadura enable the shared use of regional and CSN networks. In addition, the CSN maintains an agreement with Portugal's General Directorate for the Environment (DGA) that permits each country to place a monitoring station in the other and exchange data.

The following were the most significant of the CSN's activities in relation to REA in 2019:

- The start of work on the REA modernisation plan, to be completed by 2021. The new network will have 185 automatic stations, 44 of which were installed in 2019.

- The results of the measurements taken in 2018 were characteristic of environmental radiation background and indicate the absence of radiation risks to the population and the environment.

(REA). Average annual gamma dose rates (μsievert/hour). 2019



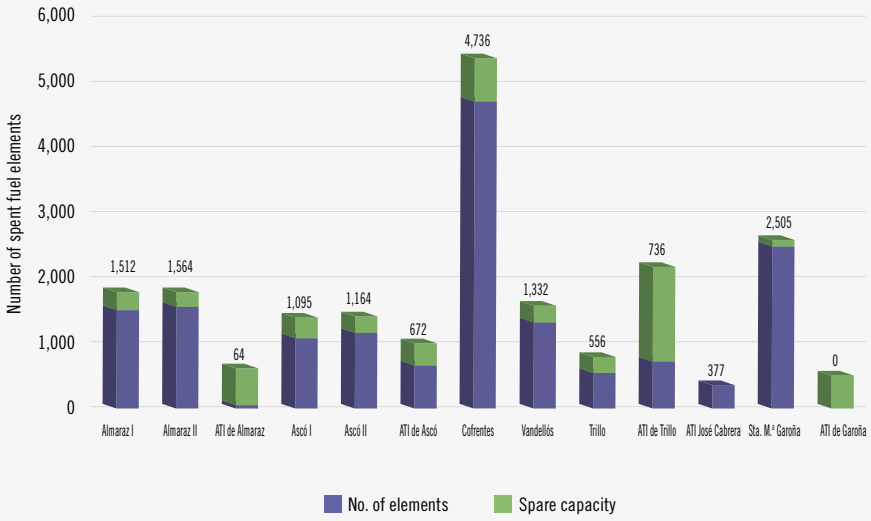
CHAPTER 6

SPENT FUEL AND RADIOACTIVE WASTE MANAGEMENT

6.1. Irradiated Fuel and High-Level Waste

The graph and table below show the amount of fuel stored in the spent fuel pools of the nuclear power plants (14,465 fuel elements) and at temporary individualised storage sites (In Spanish: ATIs) existing at 31st December 2019 (1,849 elements in the ATIs of Trillo, José Cabrera, Ascó and Almaraz):

Spent fuel storage at 31 December 2019



Spent fuel inventory stored at the nuclear power plants

Name of facility	Characteristics of the fuel elements	Total capacity/main reserve (No. elements)	Spent fuel stored (No. elements)	Spent fuel stored (tU)
Almaraz I Nuclear Power Plant	PWR 17x17	1,804/157	1,512	697
		ATI with capacity for 20 containers of 32 elements each	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
		ATI with capacity for 16 containers of 32 elements each	384	174
Ascó II Nuclear Power Plant	PWR 17x17	1,421/157	1,164	534
		ATI with capacity for 16 containers of 32 elements each	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	ATI with capacity for 12 containers of 32 elements each	377 (12 containers)	100
Trillo Nuclear Power Plant	PWR 16x16	805/177	556	263
		ATI with capacity for 80 containers, 32 containers of 21 elements each, and 48 containers of 32 elements each	736	347

Image of Trillo Nuclear Power Plant ATI.

Image of the Ascó Nuclear Power Plant ATI.

Spent fuel and radioactive waste generated and projected in Spain

TYPE OF WASTE	APPROXIMATE VOLUME (m^3)		
	INVENTORY AT 31/12/19	PROJECTED GENERATION	TOTAL INVENTORY
Very low level waste	24,600	98,900	123,500
Low and medium level waste	41,300	55,200	96,500
Special waste	200	5,900	6,100
Spent fuel and high-level waste	7,450	2,950	10,400
TOTAL	73,550	162,950	236,500

The following are some of the most significant data from CSN's activities in 2019 in relation to managing spent fuel:

- 12m^3 of fuel-reprocessing waste from Vandellós I continues stored in France.
- 2 inspections of containers at the ENSA factory in Maliaño, Santander.
- 2 inspections to verify spent fuel management at Garoña and Almaraz.

6.2. Management of Low and Medium Level Radwaste at Operating and Permanently Shut-Down Nuclear Power Plants

In 2019, operating and permanently shut-down nuclear power plants generated 3,184 packages of low- and medium-level and very-low-level solid radioactive waste, with a radioactive content of an estimated 30,773 GBq, packed in metal drums and containers. The following table provides a breakdown:

Packages generated and sent to El Cabril, and the status of the temporary storage facilities of operating and permanently shut-down nuclear power plants at 31st December 2019

Nuclear Plant	Packages generated	Packages sent to El Cabril	Packages stored	Storage space used (%)
Santa María de Garoña	871	701	2.534	47.7
Almaraz	490	460	8.768	38.9
Ascó	346	283	5.668	74.9
Cofrentes	947	549	9960	50.0
Vandellós II	252	179	1.725	22.1
Trillo	278	418	832	7.2
Total	**3,184**	**2,590**	**29,487**	**35.9**

6.3. Very Low Level Waste

In addition to the very low-level radwaste generated at nuclear power plants, wastes of this category are also generated during uranium mine restoration activities. Specifically, the Quercus Plant generates waste from the treatment of acidic and non-releasable water from rainwater runoff and seepage. As a consequence of these processes, about 1,107,896 tons of depleted mineral with a granulometry of less than 15 mm accumulates in the static leaching bed of the Quercus Plant, and about 853,242 tons of tailings from the dynamic leaching process also accumulate in the plant's tailing dam.

6.4. Clearance of Radioactive Waste

Nuclear facilities can be authorised for clearance of waste materials with low radioactive content, which allows them to be managed by conventional means, and such materials are not subject to radiological regulatory controls, notwithstanding laws that may be apply to them due to their particular characteristics and nature.

No clearance authorisation was issued in 2019.

6.5. End-of-Life consumables

Since 1993, ENRESA has managed radioactive lightning rod headers. The lightning rods are removed and the Am-241 sources are disassembled at CIEMAT before being shipped to the United Kingdom.

In 2019, 2 lightning rods were removed, with no sources shipped. At 31st December, the total number of lightning rods removed was 22,870, and the total number of sources shipped to the United Kingdom was 59,796.

CHAPTER 7

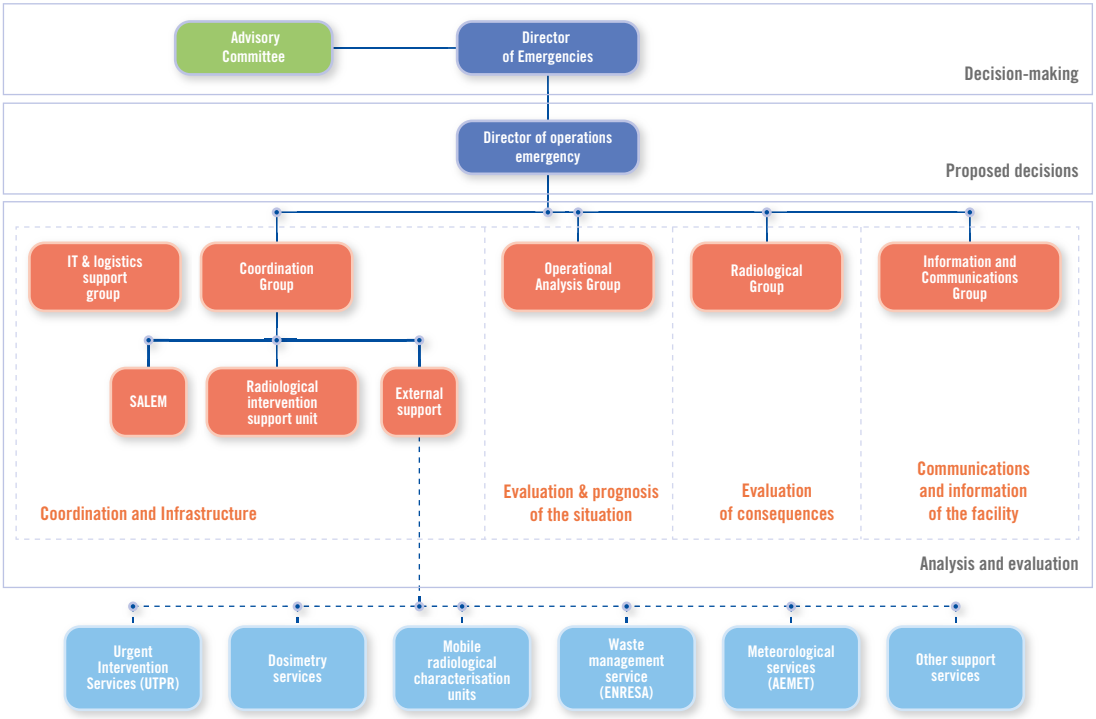
NUCLEAR AND RADIOLOGICAL EMERGENCIES. SECURITY

7.1. Authority and Actions of the Nuclear Safety Council in Emergencies

The CSN participates in the National Civil Defence System through different agreements with the General Directorate of Civil Defence and Emergencies, with the UME of the Ministry of Defence, with the autonomous communities and other institutions. The activities to maintain the effectiveness and coordination of the different groups include training, coordination meetings, and drills of varying scope.

The CSN Emergency Response Organisation is illustrated in the following diagram:

Structure of the emergency response organisation



The CSN has an emergency centre (SALEM) that has the necessary resources to respond to an emergency and can be used and mobilised. The ORE ensures that SALEM services are available 24 hours a day, 365 days a year, with a checkpoint consisting of up of 12 technicians who, once mobilised, arrive at SALEM as soon as possible, and always in less than one hour.

There is also a contingency emergency room (SALEM 2) located at the headquarters of the Military Emergency Unit at the Torrejón de Ardoz base (Madrid). At least once a year, this facility is mobilised to verify the proper functioning of its systems.

The CSN participates in the official emergency communications systems of the IAEA (EMERCON) and the EC (ECURIE for radiological emergencies in the countries of the European Union). Likewise, the CSN participates in the associated international work groups.

The following were the most important activities of the CSN in relation to emergencies in 2019:

- Participation in four IAEA exercises: ConvEx-1a (21 January), ConvEx-2a (12 June), ConvEx-1b (15 July) and ConvEx-2d (23 and 24 October).
- On 2 April and 27 November, the EC conducted communications tests with SALEM.
- On 21 November, the EC conducted an ECURIE accident exercise at the Dokovany plant in the Czech Republic.
- Eleven Radiological Group exercises were conducted under the different off-site nuclear emergency plans (PENBU, PENCA, PENVA, PENTA and PENGUA). In the PENCA exercise, the protocol established between the UME and the CSN for sending dosimetry data to SALEM was implemented.
- Two other radiological emergency exercises were conducted: one table-top exercise on transporting radioactive material by road, and another on nuclear medicine services.
- The annual emergency drills were conducted under the onsite emergency plans of the nuclear power plants.
- Emergency pre-alerts were declared at two facilities (Ascó NPP, due to an offsite power outage, and Quercus, due to a fire outside of the facility), without activing the ORE.
- SALEM received 3 ECURIE communiqués and 35 communiqués from IAEA USIE (Unified System for Information Exchange in Incidents and Emergencies).
- Communications were received during restoration works in the areas around Fukushima.
- The CSN organised a course for UME commanders and officers on the supervision of response teams in nuclear and radiological emergencies, with the participation of CIEMAT.
- Training activities for the Radiological Groups on the offsite emergency plans.
- An emergency course was given with the logistical support of the National Civil Defence School of the Directorate General of Civil Defence and Emergencies (DGPCE), with 40 officers belonging to the defence forces, search and rescue services, representatives of autonomous communities and municipalities, as well as other organisations with jurisdiction in matters of civil defence.
- CSN took part in the Integrated Regulatory Review Service (IRRS) mission of the IAEA to Norway from 17 to 28 June 2019.

7.2. Security of Nuclear Materials and Facilities

- In April 2019, CSN Instruction IS-43 of 20 March, on the criteria for reporting events related to the physical security of nuclear power plants, was published in the BOE (State Gazette).
- In 2019, implementation of CSN Instruction IS-41 on security requirements of radioactive sources was completed.
- Ten physical security inspections were carried out: nuclear power plants (7), El Cabril (1), ATI José Cabrera (1) and the Juzbado factory (1).
- In April, the annual meeting of the Technical Commission for Monitoring the Specific Agreement between the Secretary of State for Security and the CSN on security took place.
- The CSN collaborated in establishing the Civil Guard Response Units at the nuclear power plants within the deadlines established in RD 1086/2015, which amends RD 1308/2011 on the security of nuclear facilities and materials and radioactive sources.

CHAPTER 8

HIGHLIGHTED ACTIVITIES OF 2019

Institutional and international activities

- Answers to the 2018 resolutions issued by the Congress on the 2016 CSN activity report. Analysis and improvement of the process.

- Participation in the annual meeting in Madrid in 2019 of the Radioactive Substances Committee of the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR).

Regulations

- Issue of CSN Instruction IS-43 on the criteria for reporting security events at nuclear power plants, supplementing CSN Instruction IS10, which is applicable to other events.

- Issue of CSN Instruction IS-11 Rev.1 on operator licences at nuclear power plants.

Nuclear facilities

- Approval of the National Action Plan on the management of aging nuclear power plants (first Topical Peer Review required by Directive 2014/87/EU).

- Applications for the renewal of nuclear power plant operations in accordance with the National Integrated Energy and Climate Plan (PNIEC). Long-term operation will begin in all cases.
  — Almaraz I and II nuclear power plants for 7.4 years for Unit I and 8.3 years for Unit II
  — Vandellós II nuclear power plant for 10 years
  — Ascó I and II nuclear power plant for 9 years for Unit I and 10 years for Unit II
  — Cofrentes nuclear power plant for 9.6 years

- Favourable report on the assembly and completion of the temporary individualised storage (ATI) facility at the Cofrentes nuclear power plant.

Physical security

- Favourable report on the physical protection plans for 42 radioactive facilities, in compliance with IS-41 and RD-1308/2011.

D ACTIVITIES
2019

Radioactive medical facilities

- Favourable report on the operating license for the second proton radiotherapy facility in Spain on the Madrid campus of the University of Navarra.

Natural radiation sources

- Approval of proposed CSN action on the future National Plan against Radon in Collaboration with 6 universities, the Ministry of Health and the Autonomous Community of Madrid.

- Approval of the core document on protection against radon in buildings (DBHS6), in collaboration with Minister of Transport, Mobility and Urban Agenda.

- Inspection of lands affected by NORM wastes:
  — Grounds of "El Hondón" Cartagena.
  — Works to eliminate chemical contamination in the Flix reservoir (Tarragona).
  — Phosphogypsum pools of Huelva.

Sites with specific monitoring programmes

- European Commission verification mission in Palomares under Art. 35 Euratom Treaty. https://ec.europa.eu/energy/sites/ener/files/art_35_main_conclusions_es_19-01.pdf

Environmental radiation monitoring

- Start of 2019-2021 project to modernise and expand the REA. The current 25 stations are being expanded to 200 fixed stations and 15 additional mobile stations. In 2019, 44 stations were installed.

Collaboration with stakeholders

- Update and improvement of the material for radioactive facility and radiology certification courses.(www.csn.es)

Nuclear Safety Council Report to Parliament

2019

Summary Report

CSN CONSEJO DE SEGURIDAD NUCLEAR