Report of the Spanish Nuclear Safety Council to the Congress of Deputies and the Senate

Year 2023

Summary Report

CSN

CSN CONSEJO DE SEGURIDAD NUCLEAR

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Year 2023

Summary Report

This report complies with article 11 of Law 15/1980 which establishes that on a yearly basis, the Nuclear Safety Council shall submit to both Chambers of the Spanish Parliament, as well as to the local parliaments of any region where there is a nuclear facility, a report describing the activities carried out.

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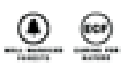

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PRESENTATION

As every year, we are pleased to present to both Congress and Senate, the Annual Report of the Nuclear Safety Council (CSN) for the year 2023.

As a main summary, it should be noted that all nuclear and radioactive facilities and activities operated safely throughout 2023. In addition, the environmental radiation quality, both around the facilities and throughout the rest of the territory, remained in acceptable conditions, with no risk for people.

In terms of nuclear safety, the most significant action related to the decommissioning of Santa María de Garoña Nuclear Power Plant (Burgos). In that sense, the requests to authorize the change of ownership from Nuclenor to Enresa, the first phase of plant decommissioning and its Security Plan, were all reported favorably, establishing the corresponding limits and conditions. The CSN also authorized the Radiation Protection Service for the new plant condition. The supervision of decommissioning activities in this nuclear power plant will constitute a new major regulatory challenge for the CSN over the coming years.

As regards radiation protection, 2023 marks the end of the High-Tech Healthcare Equipment Investment Plan within the National Health System (INVEAT Plan). This plan posed a challenge for the CSN, which had to evaluate installation requests for over 200 pieces of medical equipment, corresponding to renewals, extensions or authorization of new medical radioactive facilities. Work has also begun to implement the Regulation on health protection against the risks derived from exposure to ionizing radiation, following Regulation approval in December 2022 and issuance of a favorable report on the draft Royal Decree approving the new Regulation on nuclear and radioactive facilities and other activities related to exposure to ionizing radiation (RINR), arising from the transposition of Directive 2013/59/Euratom, which establishes the basic safety standards for protection against the dangers of exposure to ionizing radiation.

It is also worth mentioning the start of restoration activities at the José Cabrera nuclear power plant site after the near completion of decommissioning works at the end of 2023. Moreover, the Spanish Ministry for Ecological Transition and the Demographic Challenge (MITERD) approved the 7th Radioactive Waste Plan (PGRR), which defines the national strategy to manage radioactive waste and spent nuclear fuel, following issuance of the required report by the Council. This plan implies the CSN must undertake various activities, mainly in relation to expansion of the El Cabril low- and mid-level radioactive waste repository, the Interim Storage Facilities for spent nuclear fuel in each nuclear power plant, and the development of a future Deep Geological Repository (DGR).

As for the CSN's institutional activity, the Council maintained close relations with other institutions, industry organizations and associations. With the aim of bringing the CSN closer to the public and honoring the agreement signed with the Association of Municipalities in Areas with Nuclear Power Plants and radioactive waste Storage Facilities (AMAC), the Nuclear Safety Council did not only participate in the Local Information Committees of areas where nuclear facilities are located, but also organized several activities to

inform about nuclear safety and radiation protection aspects in those facilities.

As for the Autonomous Communities, the mixed commissions for entrustment agreements signed between the CSN and some of them, continued to operate. Furthermore, the Nuclear Safety Council visited Catalonia, in an effort to further strengthen the institutional visit program to Communities where nuclear facilities are located. In both cases, the goal is to inform the highest institutional authorities of the Autonomous Communities about the work carried out by the Nuclear Safety Council. Similarly, 17 new agreements and 5 extension addenda were signed with the Home Office, the Health Ministry and various universities and scientific societies. The Advisory Committee for Information and Public Participation - comprising 35 representatives of the civil society, nuclear industry, trade unions, public administrations and experts in the field of public communication - continues to meet every six months.

As regards the international activity of the CSN, in the first year after approval of the International Relations Strategy 2020-2025, a total of 301 meetings were held, 258 of them face-to-face. Mention should be made to the intense activity of the CSN in Spain's rotating presidency of the Atomic Questions Group of the European Union Council during the second half of 2023 and its participation in the 8th and 9th Review Meetings of the Convention on Nuclear Safety. On the other hand, the CSN has signed a Memorandum of Understanding with Saudi Arabia and a Letter of Intent with the Peruvian Regulatory Agency, and our country has hosted a bilateral meeting with the French Nuclear Safety Agency (ASN).

In terms of access to information, communication and transparency, up to 173 news items were published on our website in 2023 and a total of 1147 requests received in the CSN's consultation mailbox, 24 requests in the transparency portal and 54 requests from the media, were addressed. This year, a new whistleblower channel was launched to report potential non-compliance in application of Law 2/2023, dated February 20, regulating the protection of persons who report regulatory violations and the fight against corruption. Furthermore, 26 new publications were issued, increasing the distribution of technical and informative CSN documentation to 44,000 copies. In addition, last year we celebrated the 25th anniversary of the Information Center, which has received more than 160,000 visits since its inauguration.

As regards the drafting of regulations last year, the second revision of Safety Instruction IS-10 was approved, establishing the criteria to be applied by nuclear power plants to report events to the CSN, and work began to prepare three other safety instructions, which are expected to be approved throughout this year. I would also like to highlight the subsidy program for the implementation of 15 R&D&I projects related to nuclear safety and radiation protection.

To conclude, I wish to mention two actions of great importance in the area of organizational management in 2023. On the one hand, the approval of a new standardized professional career model for CSN civil servants; and on the other, the approval of the 1st Equality Plan at the Council. Both actions aim to improve personnel motivation and the working environment at the CSN.

In short, we close another year full of actions, convinced that our society faces unprecedented and rapid changes, which is why the adaptability of teams, people and technologies will be essential to fulfill the CSN's mission of guaranteeing the nuclear safety and radiation protection of workers, the population and the environment in an ever-challenging world.

Juan Carlos Lentijo Lentijo
President of the CSN

2023 HIGHLIGHTS

HIGH-TECH HEALTHCARE EQUIPMENT INVESTMENT PLAN (*INVEAT*)

The Government of Spain approved the Recovery, Transformation and Resilience Plan on April 27, 2021. Among the ten driving policies included within this plan, component 18 of policy number 6 focuses on renewing and expanding National Health System capabilities.

This component seeks to reinforce system capacities in coordination with the Spanish Autonomous Communities, address the structural weaknesses detected and adapt the National Health System to the current challenges, with the aim of preparing it to prevent and face possible global health threats, and to have a public, universal, excellent health system which cares for and promotes individual and collective health throughout life.

This Plan involved the expansion, replacement or new installation of high technology equipment such as:

- Linear Particle Accelerator (LINAC)
- High Dose Rate (HDR) Brachytherapy Equipment
- Hybrid Gamma-Optical Camera Systems SPECT and Computerized Tomography (equipment SPECT-TC)
- Hybrid Positron Emission Tomography and Computerized Tomography (equipment SPECT-TC)

The role played by the CSN during development of the INVEAT Plan involved the issuance of reports prior to authorization resolutions granted by the competent executive bodies for new facilities, as well as modifications to already authorized medical radioactive facilities, along with the performance of inspections prior to issuing start-up notifications.

Graph 1 provides an overview of the number of INVEAT Plan equipment located in National Health System hospitals. The authorization process for this equipment was carried out by internal CSN evaluation personnel, from mid-2022 to December 31, 2023.

Graph 1. *INVEAT* Equipment Evaluated by the CSN until December 31, 2023

Linear Particle Accelerator (LINAC)	High Dose Rate Brachytherapy (HDR)	Positron Emission Tomography (PET)	Single Photon Emission Computed Tomography (SPECT CT)	Total
73	24	40	79	216

Furthermore, the CSN signed assessment and inspection entrustments with the Autonomous Communities of Catalonia, Basque Country and Balearic Islands, which evaluated the facilities located in their territories, as shown in graph 2:

Graph 2. INVEAT Equipment Managed through by Function Entrustments with Autonomous Communities

	Linear Particle Accelerator (LINAC)	High Dose Rate Brachytherapy (HDR)	Positron Emission Tomography (PET)	Single Photon Emission Computed	Total
Catalonia	11	4	6	12	33
Basque Country	3	1	1	3	8
Balearic (Islands)	4	0	1	1	6

Graph 2B provides an overview of the pieces of equipment evaluated and processed prior to the CSN Plenary decision-making process.

Graph 2B. *INVEAT* Equipment Managed prior to Decision-Making by the CSN Plenary Board

Linear Particle Accelerator (LINAC)	High Dose Rate Brachytherapy (HDR)	Positron Emission Tomography (PET)	Single Photon Emission Computed Tomography (SPECT CT)	Total
91	29	48	95	263

The following is a summary of results from the lessons learned analysis carried out by the CSN after INVEAT Plan implementation and development in each administrative processing phase of radioactive facility authorization.

a) Evaluation phase

A key element during this phase was the support provided by the Nuclear Safety Council to radioactive facility licensees to ensure that documentation supporting authorization requests was complete, clear and precise, thus avoiding the need to request additional information. This has optimized the evaluation process time, a critical element in the implementation of this project.

The CSN standardized the format and content of authorization request support documentation for the different equipment within the INVEAT Plan, sending it out to licensees, radiological protection services and technical units, professional societies and competent authorities by means of the following circulars available on the CSN website.

- Information Circular No. 02/2022 on standard format and content of the application for medical linear electron accelerators.
- Information Circular No. 03/2022 on documentation to be submitted by licensees for authorization of medical facilities with high dose rate brachytherapy equipment.
- Information Circular No. 4/2022 on documentation to be submitted by licensees for authorization of medical facilities with hybrid PET-CT equipment.
- Information Circular No. 7/2022 on documentation to be submitted by licensees for authorization of medical facilities with hybrid SPECT-CT equipment.

In addition, the CSN drew up an authorization protocol for requests relating to the *INVEAT* Plan, to serve as a guide on the systematics to be followed by CSN evaluation personnel. This document directed evaluations to focus on the application subject matter by applying a graded approach consistent with requirement 3 paragraph 2.3.1 of the IAEA GSR part 3, on "Radiation Protection and Safety of Radiation Sources. International Basic Safety Standards". Graph 3 shows this favored a significant reduction of evaluation times.

Graph 3. Average and Minimum Evaluation Times

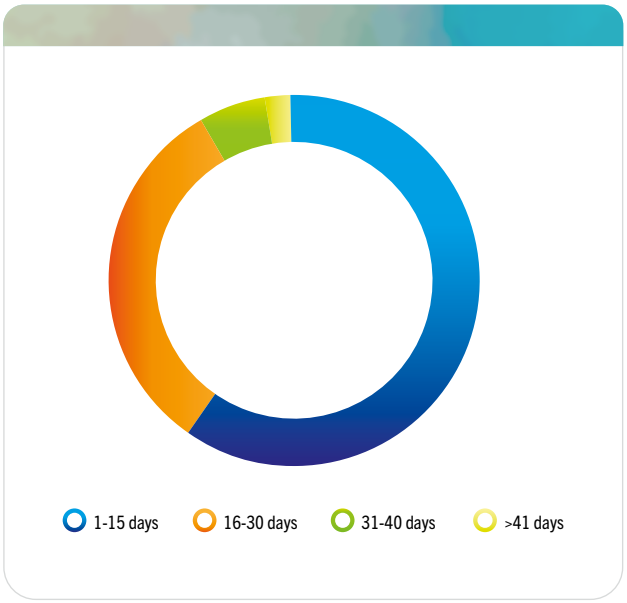
Linear Particle Accelerator (LINAC)	High Dose Rate Brachytherapy (HDR)	Positron Emission Tomography (PET)	Single Photon Emission Computed Tomography (SPECT CT)
Average Evaluation Times			
146 days	150 days	134 days	122 days
Minimum Evaluation Times			
36 days	63 days	26 days	24 days

b) Inspection Phase

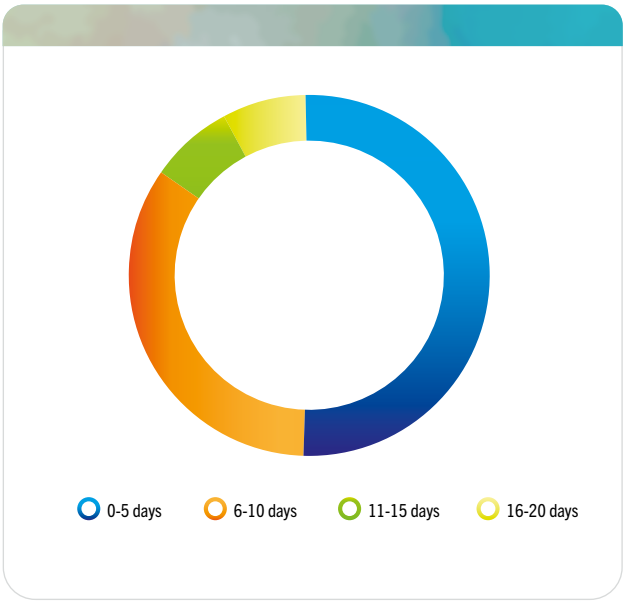
In order to plan pre-start-up onsite inspection visits in a phased, gradual and agile manner, the CSN informed radioactive facility licensees, the Health Ministry and representatives from Regional Health Departments of the Autonomous Communities, that they should make the corresponding request to the CSN following the availability of equipment acceptance tests.

From January to December 2023, the CSN carried out a total of 79 start-up notification inspections within the framework of the INVEAT Plan. Graph 4 shows that more than 60 % of inspection requests were dealt with within 15 days of receipt.

Graph 4. Time Elapsed Between Inspection Request and Inspection Completion



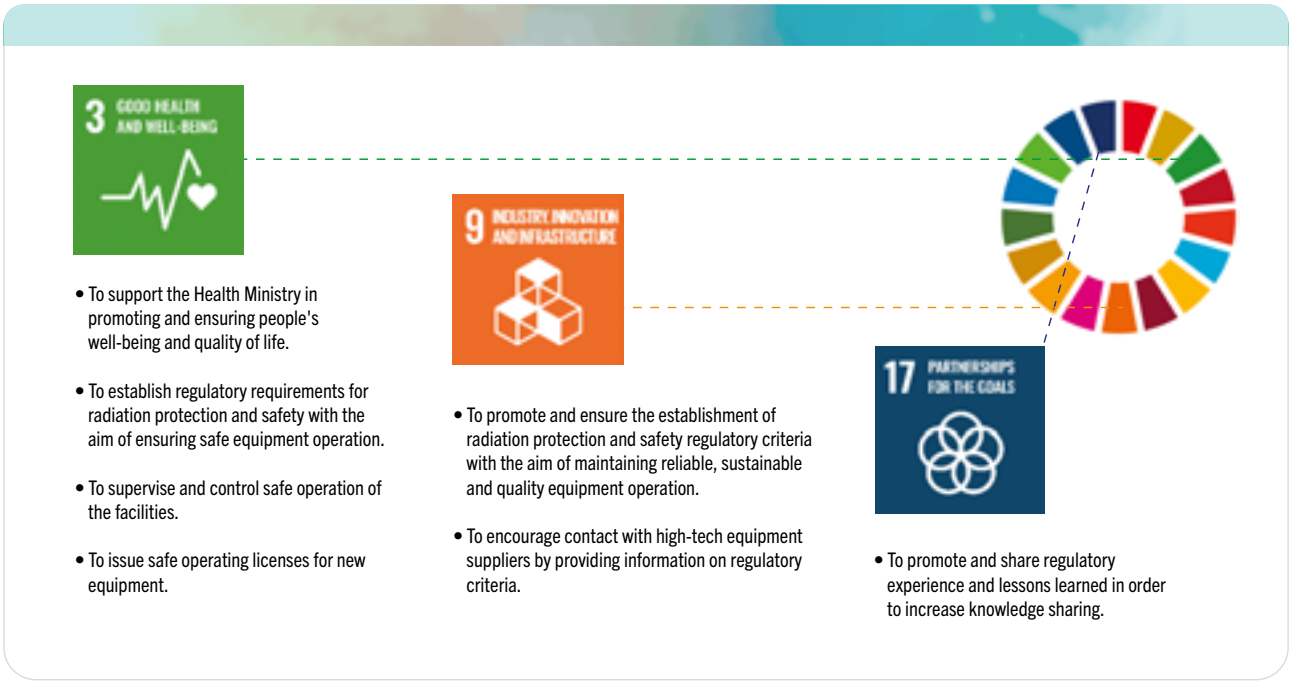
Graph 5. Time Elapsed Between Inspection Completion and Inspection Report Submittal



The time spent in sending inspection reports was optimized. Graph 5 shows that over 50 % of inspection reports were sent within 5 days following inspection completion.

The analysis of lessons learned from the implementation of the demanding, challenging INVEAT Plan, revealed the great value of strategy planning by the CSN at the start of the project with the aim to enhance the planning and implementation phases, resulting in a significant optimization of both the assessment and inspection processes. This ambitious plan also proved to be a tool for learning and evaluating the capabilities of the regulatory agency itself, leading to a satisfactory, enriching experience which encouraged reflection and a search for better regulatory practices, as well as optimization of work processes. All of this while maintaining adherence to the SDGs (Sustainable Development Goals) of the 2030 Agenda, as shown in the following graph:

Graph 6. Adherence of Work Carried Out by CSN Within the *INVEAT* Plan to the Agenda 2030 SDGs



DECOMMISSIONING OF SANTA MARÍA DE GAROÑA NUCLEAR POWER PLANT

The Nuclear Safety Council Plenary, at its meeting held on May 17, 2023, reported favorably, with limits and conditions, on the authorization requests to change ownership from Nuclenor to Enresa (Spain's National Radioactive waste Company), to launch decommissioning phase 1 of the Santa María de Garoña nuclear power plant (Burgos) and to the corresponding Security Plan, submitted by Enresa to the Ministry for Ecological Transition and the Demographic Challenge (MITERD). The Plenary also authorized Enresa to request the creation of a new Radiation Protection Service specific to the plant. On July 26, 2023, the Plenary approved the Complementary Technical Instructions for the aforementioned decommissioning permit.

Consequently, on July 13, 2023, the MITERD, by means of Order TED/796/2023, authorized the facility ownership transfer from Nuclenor to Enresa, which will be the company in charge of decommissioning Spanish nuclear power plants, authorizing Enresa to roll out decommissioning phase one.

This plant, located in the Tobalina Valley, in the province of Burgos, came into operation in May 1970 under the ownership of the company Nuclenor. With a BWR type-3 boiling water reactor and a power output of 466 MW, the station remained in operation for 43 years. In July 2013, the permanent plant shutdown was declared by Order IET/1302/2013, issued by the Ministry of Industry, Energy and Tourism.

Figure 1. Service Life of Santa María de Garoña Nuclear Power Plant

The selected decommissioning strategy, in line with national and international recommendations, involved a total, immediate decommissioning in two phases.

In the first phase, which Enresa estimates will last three years (2023-2026), fuel stored in the spent fuel pool will be taken out and transferred to an onsite Interim Storage Facility (ISF) for dry storage in casks, where it will remain safely in the mid and long term.

Figure 2. Fuel Casks

As for the Turbine Building, its systems, structures and components will be disassembled, transforming it into the new Auxiliary Decommissioning Building, which shall play a key role in the next dismantling phase.

In the second phase, for which Enresa anticipates a 7-year duration (2026-2033), a new permit will be necessary to undertake the final decommissioning of radiological buildings, followed by decontamination, declassification and demolition tasks which ultimately will conclude with site restoration.

In the first half of 2023, the Nuclear Safety Council made an important regulatory effort to license this decommissioning project, technically evaluating the extensive documentation submitted and required by the Regulation on Nuclear and Radioactive Facilities.

Seventeen specialist areas participated in this evaluation, which thoroughly analyzed and studied documentation within the scope of their specialties. After this, more than 125 reports were issued on different aspects related to nuclear safety and radiation protection, such as the determination of the radiological impact on the public and the environment, the maintenance of safe fuel pool conditions, the transfer of spent fuel to the ISF, emergency planning and the management of generated radioactive waste, among others.

This exhaustive work concluded with the issuance of a favorable report by the CSN Plenary Board, with limits and conditions, and 32 Complementary Technical Instructions which specify and detail the requirements developing the decommissioning permit as regards the facility's nuclear safety and radiation protection, so as to guarantee decommissioning is both safe and effective.

Figure 3. Santa María de Garoña Nuclear Power Plant (current and future forecast)

In the second half of 2023, Enresa began to carry out decommissioning phase 1 which, during this period involved mainly the preparation of activities to load into the casks the spent fuel currently in the pool. Loaded casks will be transported to the ISF. Enresa also reviewed documentation supporting the decommissioning authorization in order to comply with key requirements.

In short, licensing the phased decommissioning of Santa María de Garoña nuclear power plant meant an important, new regulatory challenge for the CSN in 2023, just as will be the supervision and control of nuclear safety and radiation protection during implementation of this project.

Limits and Conditions on Nuclear Safety and Radiation Protection included in CSN reports

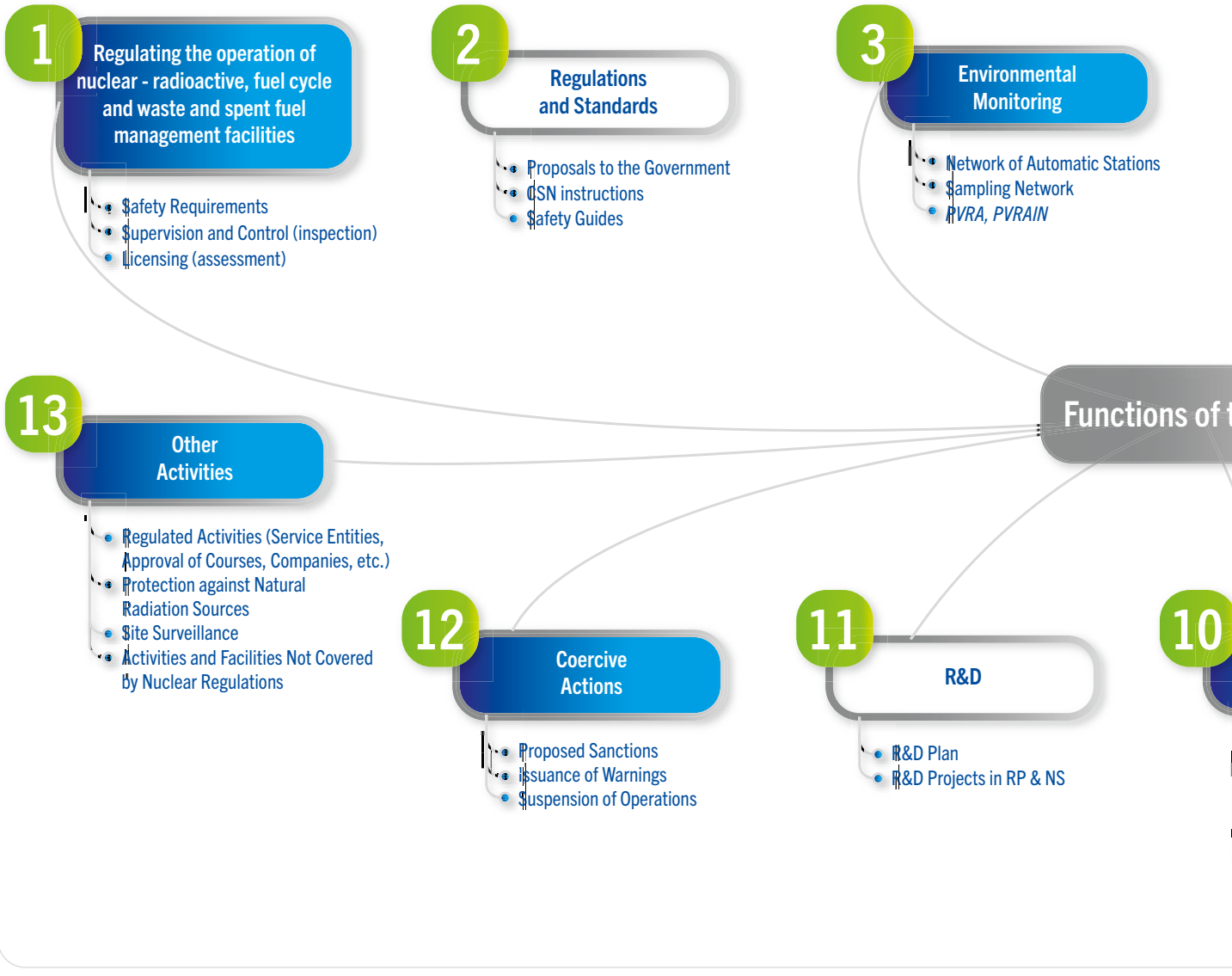
	Ownership of permit and authorized activities.
	Documentation supporting the permit and regime for revisions, permit or revision approvals.
	Modifications to design, programs to discharge systems and availability of a Radiation Protection service.
	Status of implementation of decommissioning and restoration activities.
	Information to be submitted by Enresa to the CSN on a yearly basis.
	Transport of radioactive material, and dispatchment and traceability of declassified materials to be treated as conventional waste.

1. THE NUCLEAR SAFETY COUNCIL. LEGAL FRAMEWORK AND FUNCTIONS

The Nuclear Safety Council (CSN) is a Public Law Body, independent from the National Government Administration, with full legal personality and independent assets, and created by Law 15/1980, dated April 22, as the only competent organism in matters of nuclear safety and radiation protection. The current CSN Statute which develops the abovementioned law, was approved by the Government via Royal Decree 1440/2010, dated November 5, 2010.

It is the responsibility of the CSN to exercise all functions established in Article 2 of Law 15/1980, and in Title 1 of the Statute.

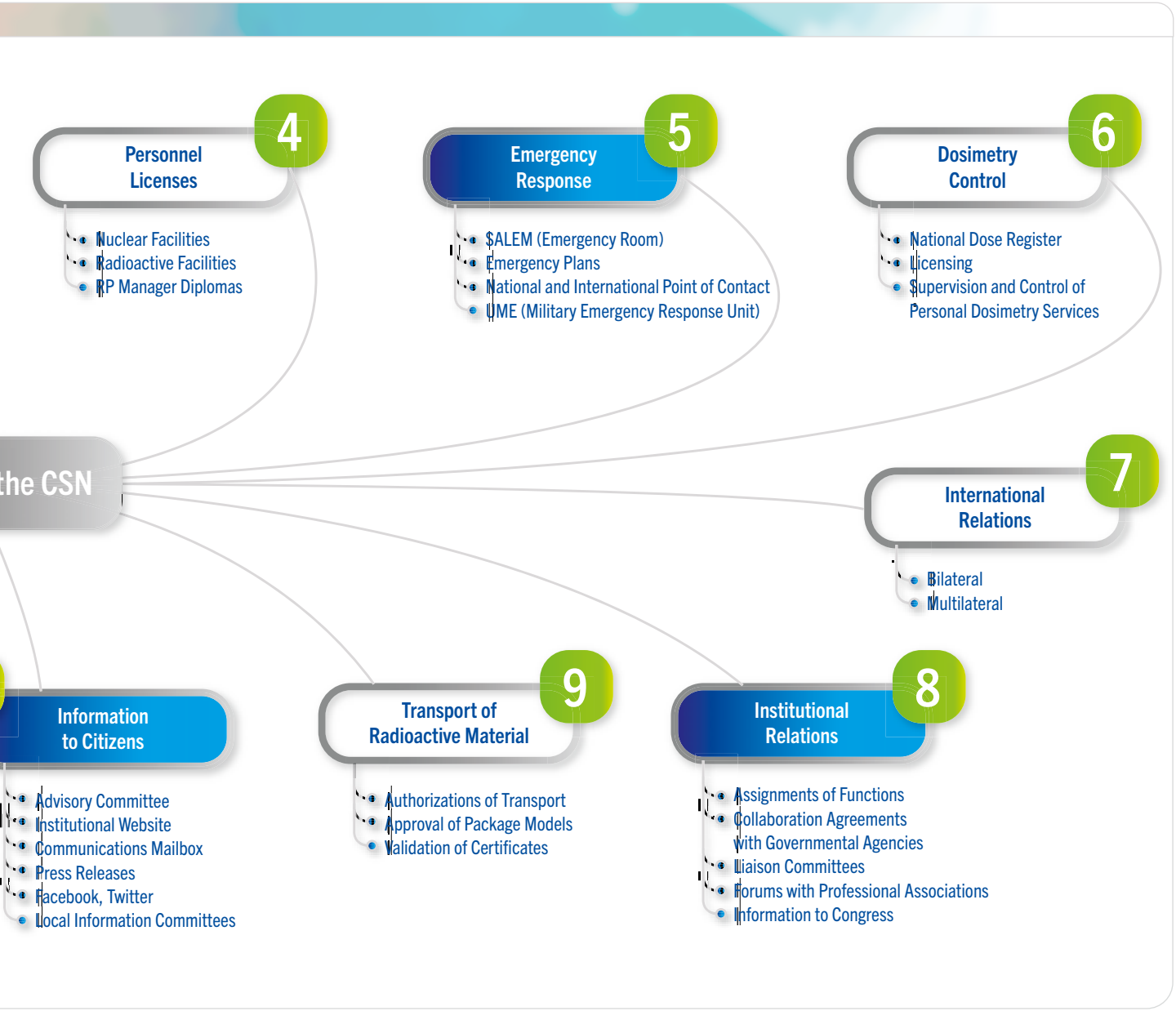
Figure 1.1. Summary of *CSN* functions



The CSN should also exercise any other function which, within the framework of nuclear safety, radiation protection and security, is attributed by norms equivalent to laws, regulations or in accordance with International Treaties.

Nuclear safety and radiation protection are core goals of the CSN. Although there are other goals, they are all subordinate to these: credibility and trust, effectiveness and efficiency, transparency and neutrality, and independence.

In accordance with this legal and competence framework, the CSN undertakes the following functions:



Article 11 of Law 15/1980 establishes that on a yearly basis, the Nuclear Safety Council shall submit to both Spanish Parliament Chambers and to the Regional Parliaments of Autonomous Communities where there are nuclear facilities, a report describing the activities carried out. This report complies with such requirement.

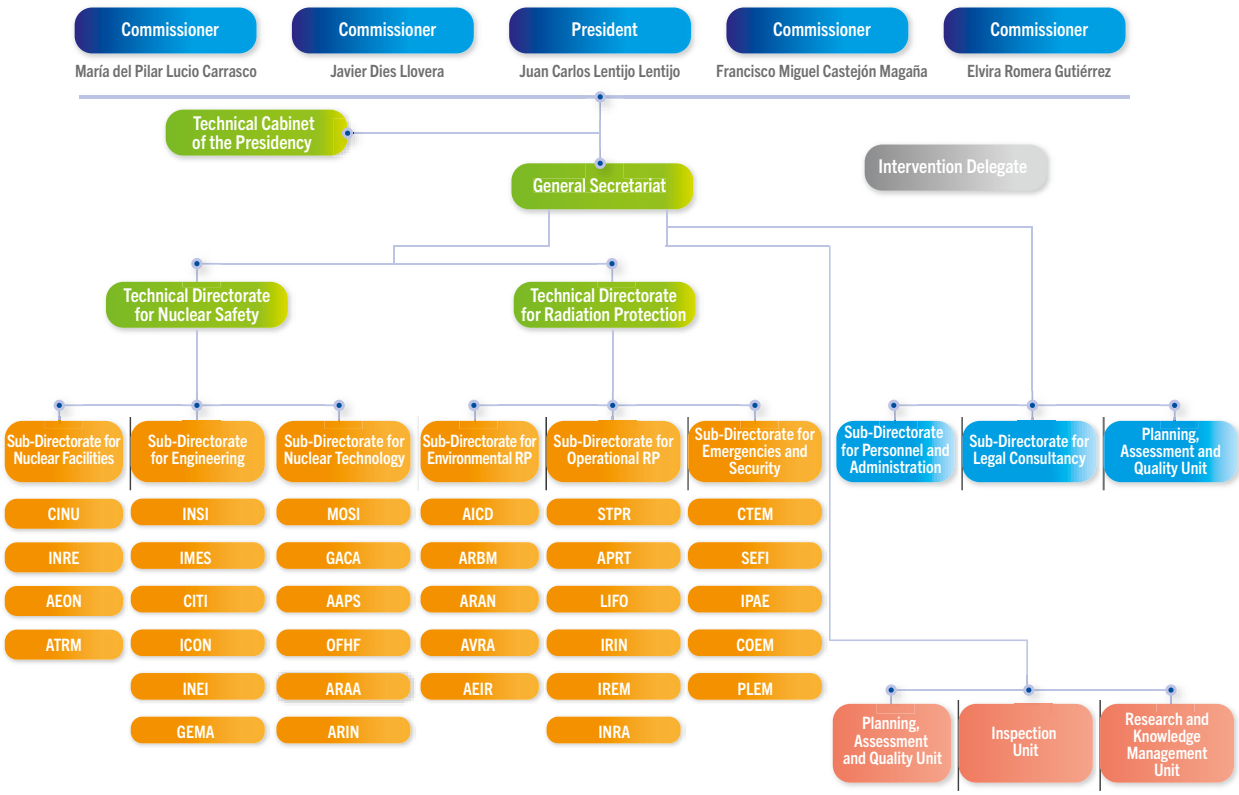
1.1. Organizational structure of the CSN

Pursuant to the CSN regulatory framework, the highest governing bodies are the Plenary Board and the Presidency.

The management bodies are the Secretariat General, the Technical Directorate for Nuclear Safety, the Technical Directorate for Radiation Protection, the Technical Cabinet of the Presidency and the Sub-Directorates.

The following figure illustrates the organizational structure of the CSN, effective as of December 31, 2023.

Figure 1.1.1. CSN Organization Chart



Sub-Directorate for Nuclear Facilities
CINU: Coordinator of Nuclear Facilities
INRE: Coordinator and Support of Resident Inspectors
AEON: Regulatory and Operating Experience Area
ATMR: Radioactive Material Transport Area

Sub-Directorate for Engineering
NSI: System Engineering Area
IMES: Mechanical and Structural Engineering Area
CITI: Earth Sciences Area
ICON: Nuclear Fuel Engineering Area
INEI: Electrical Systems, Instrumentation and Control Area
GEMA: Life Management & Maintenance Area

Sub-Directorate for Nuclear Technology
MOSI: Modeling and Simulation Area
GACA: Quality Assurance Area
AAPS: Probabilistic Safety Assessment Area
OFHF: Organization, Human Performance and Training Area
ARAA: High Activity Radioactive Waste Area
ARIN: Internal Event Protection Area

Sub-Directorate for Environmental RP
AICD: Decommissioning and Cycle Facilities Area
ARBM: Low- and Mid-Activity Radioactive Waste Area
ARAN: Natural Radiation Area
AVRA: Environmental and Radiological Surveillance Area
AEIR: Radiological Impact Assessment Area

Sub-Directorate for Operational RP
STPR: Technical Radiation Protection Service Area
APRT: Radiological Workforce Protection Area
LIFO: Licensing and Training Area
IRIN: Industrial Radioactive Facilities Area
IREM: Radioactive Facilities and Medical Exposure Area
INRA: Radioactive Facilities Inspection Area

Sub-Directorate for Emergencies and Security
CTEM: Emergency Technical Coordinator (Sub-Directorate for Emergencies)
SEFI: Security Area
IPAE: Emergency Responders Intervention and Preparation Area
COEM: Emergency Operations Coordination Area
PLEM: Emergency Planning Area

1.2. The CSN Plenary Board

The Plenary Board of the Nuclear Safety Council, as governing management body, has the responsibility of exercising all functions relating to nuclear safety and radiation protection, as foreseen in Article 2 of Law 15/1980. It is also entrusted with the exercise of any other functions attributed to the Nuclear Safety Council, as the sole competent body in the area of nuclear safety and radiation protection. The Plenary Board members are as follows:

- President: Juan Carlos Lentijo Lentijo
- Commissioner: Javier Dies Llovera
- Commissioner: Francisco Miguel Castejón Magaña
- Commissioner: María del Pilar Lucio CarrAscó
- Commissioner: Elvira Romera Gutiérrez

In 2023, the Plenary held 36 meetings in which 329 resolutions were adopted, 320 of them unanimously.

Pursuant to Article 14 of Law 15/1980 on Creation of the CSN, concerning access to information, all Plenary session reports and opinions underlying Plenary agreements are available for general consultation on the CSN website (www.csn.es).

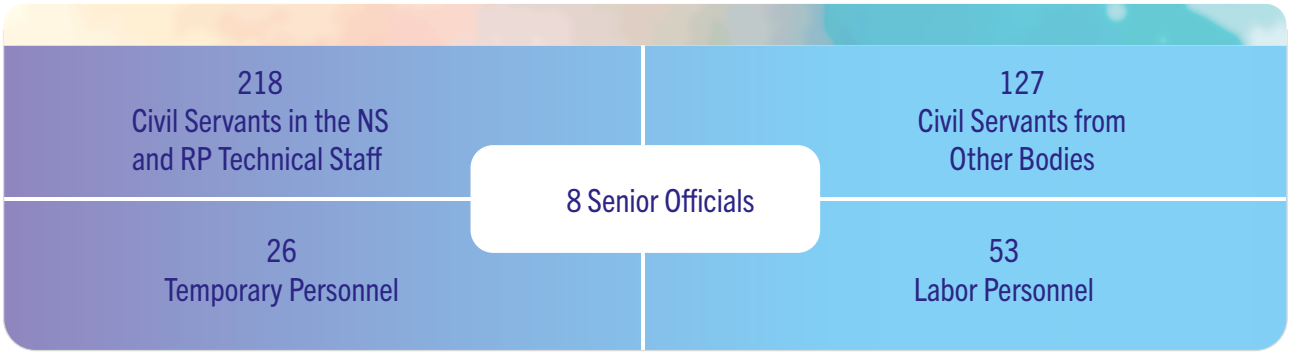
1.3. Resources and means

1.3.1. Human Resources

As of 31 December 2023, the total headcount at the CSN amounted to 436, as detailed in figure 1.3.1.1.

51.39 % of Nuclear Safety Council staff are women compared to 48.61% men, with the average age of staff being 53 years.

Figure 1.3.1.1. CSN Staff as of December 31, 2023



Graph 1.3.1.1. Workforce Distribution by Job Position over the 2014-2023 Period

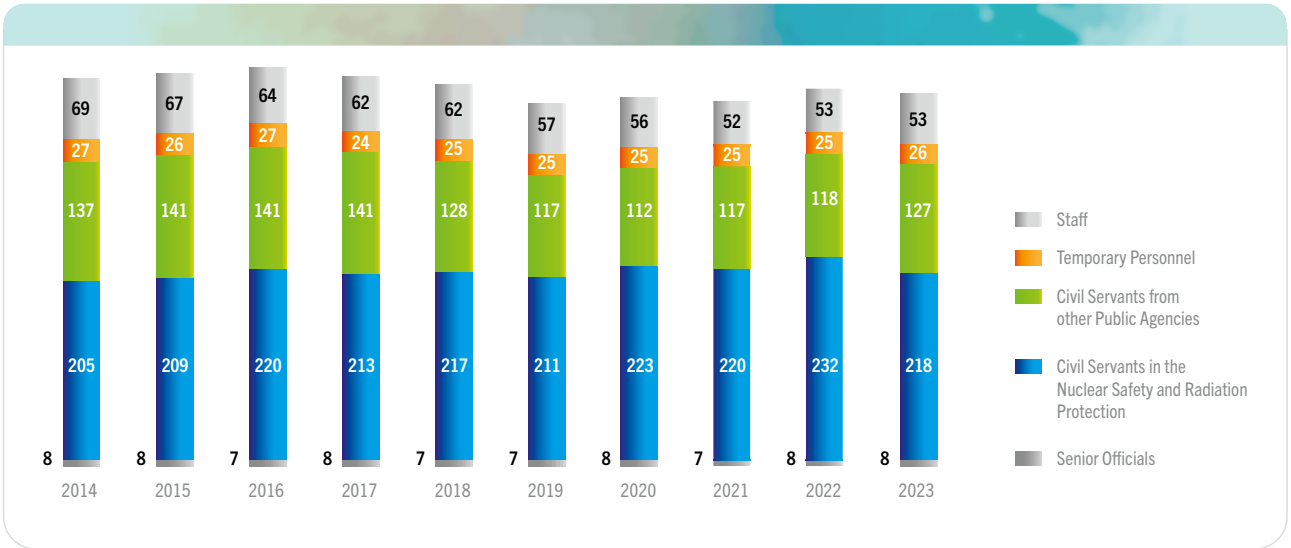
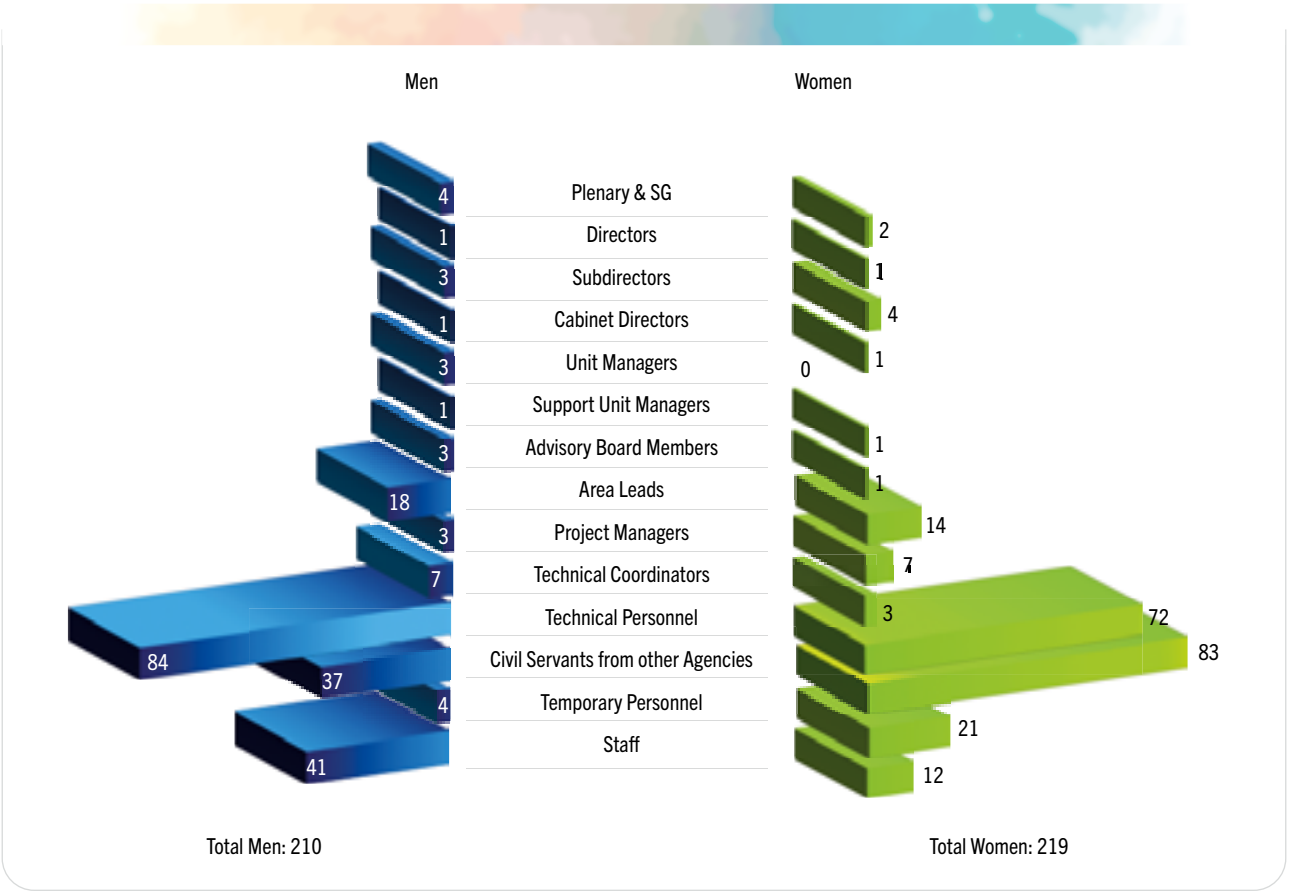


Figure 1.3.1.2. CSN Staff Distribution based on Job Position and Gender



Graphs 1.3.1.2 and 1.3.1.3 show the qualifications of CSN personnel.

Graph 1.3.1.2. Qualification of Nuclear Safety Council Personnel in 2023

Graph 1.3.1.3. Qualification of Technical CSN Staff in 2023

The main milestone reached in 2023 was the approval by the CSN Plenary of a new professional career model for all Council civil servants.

1.3.2. Financial resources

As regards economic-financial management, the CSN is governed by the provisions of General Budgetary Law 47/2003, dated November 26, as a state administrative public sector entity subject to the Public Accounting system and the Accounting Instruction for State Institutional Administration.

This fiscal year 2023 shows a positive result of 12.886 million euros, due to a State transfer of eleven million euros outstanding corresponding to recognized obligations from previous fiscal years.

Table 1.3.2.1 below summarizes the expenses and revenues for the year 2023.

Table 1.3.2.1. Summary Income Statement for 2023

SUMMARY INCOME STATEMENT FOR 2023 INITIAL BUDGET OF 48.9 MILLION EUROS			
COSTS		REVENUE	
CONCEPT	PERCENTAGE	CONCEPT	PERCENTAGE
PERSONNEL: Wages, Social Security, Social Expenditure	59.57 %	Fees and Revenues for Services Rendered	76.16 %
External Services and Supplies: Corporate Work, Consumable Supplies and Communications	31.05 %	Current Transfers and Subsidies, Financial Revenues and Other Management Income.	4.67 %
Other: Depreciations, Subsidies, Scholarships, Transfers, etc.	9.38 %	Excess and Application of Provisions	19.17 %
POSITIVE RESULT OF 12.886 Million Euros			

In relation to subsidizing activities, the following table shows the amounts invested by the CSN in the four lines of action for the year 2023.

Table 1.3.2.2. Amounts Invested (thousand EUR) by the CSN in Subsidies in 2023

SCHOLARSHIPS	2023
Scholarships	8,641.58
Research and Training Fellowships in NS and RP	346,250.00
Grants for Training, Information and Dissemination Activities	0.00
Subsidies for R&D&I Projects	1,064,767.06

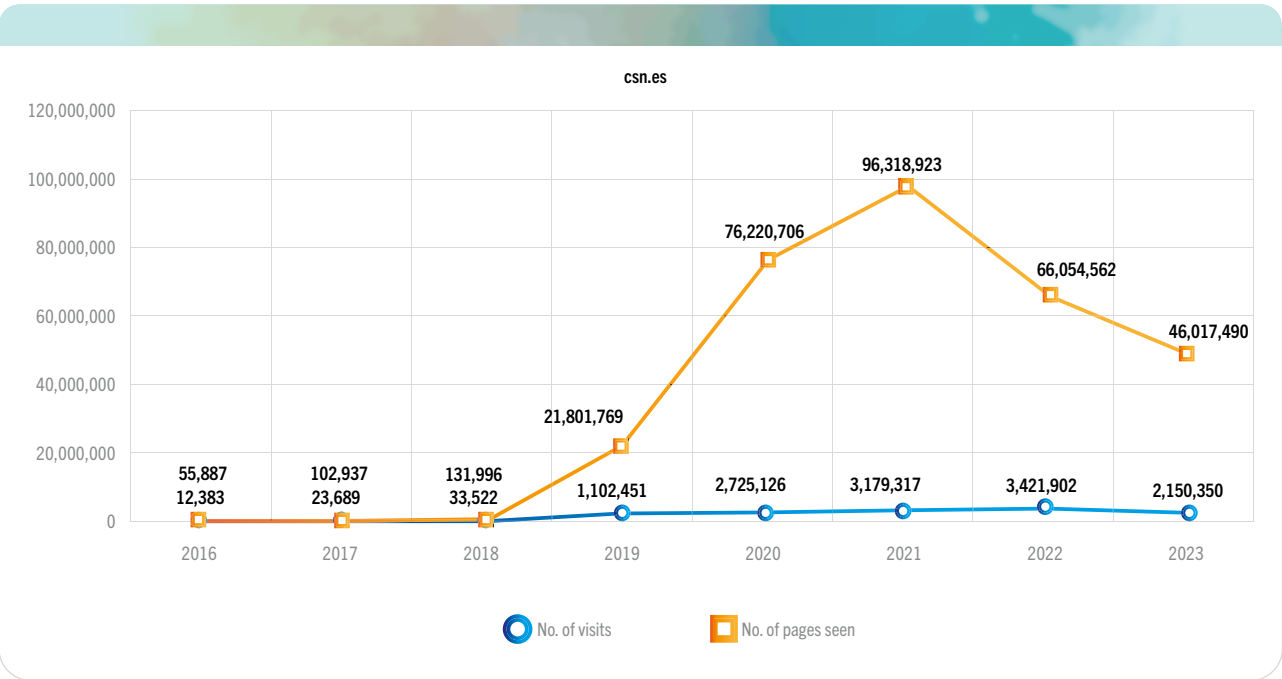
1.3.3. IT Means

Graph 1.3.3.1 shows the increasing implementation of e-government with data for the 2020-2023 period corresponding to the number of registration entries at the CSN.

Graph 1.3.3.1 CSN Registry Entries

Graph 1.3.3.2 shows the number of pages visited on the corporate website, which reached 46 million pages.

Graph 1.3.3.2. Number of Visits and Pages Visited on the Corporate Website



1.4. CSN Commissions

Figure 1.4.1 shows the active committees and activities they carried out in 2023.

Figure 1.4.1. Active Committees in 2023

1.5. CSN relations and institutional activity

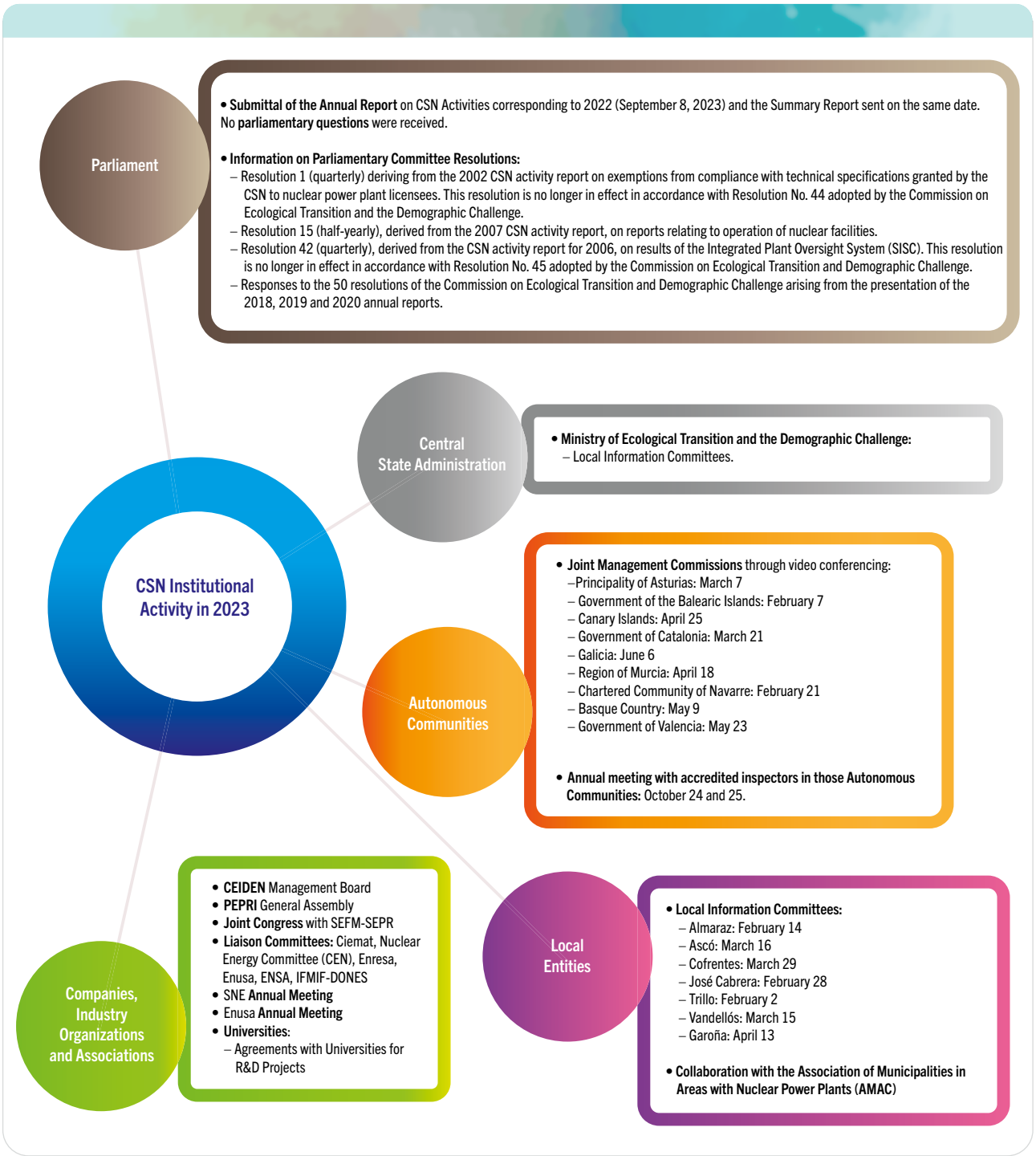
1.5.1. Institutional Relations

One of the roles of the Nuclear Safety Council is to maintain formal relationships with State institutions at a local, regional and national level, as well as with professional associations and non-governmental agencies, some of them international.

Due to its special relevance and uniqueness, the CSN's institutional relationship with the Congress and Senate is particularly noteworthy.

Figure 1.5.1.1 Summarizes CSN Institutional Activities in the Area of Institutional Relations in 2023.

Figure 1.5.1.1. Institutional Relations. Activities in 2023



Due to the parliamentary activity that comes with an election year, no parliamentary questions or requests for information were received by the Council in 2023. Nonetheless, information from previous years is available on the CSN website.

1.5.2. International relations

The international policy and strategies of the CSN are translated into a set of technical and institutional activities carried out in four areas, as shown in figure 1.5.2.1.

Figure 1.5.2.1. International Relations of the CSN with Peer Agencies and Other Organizations in 2023

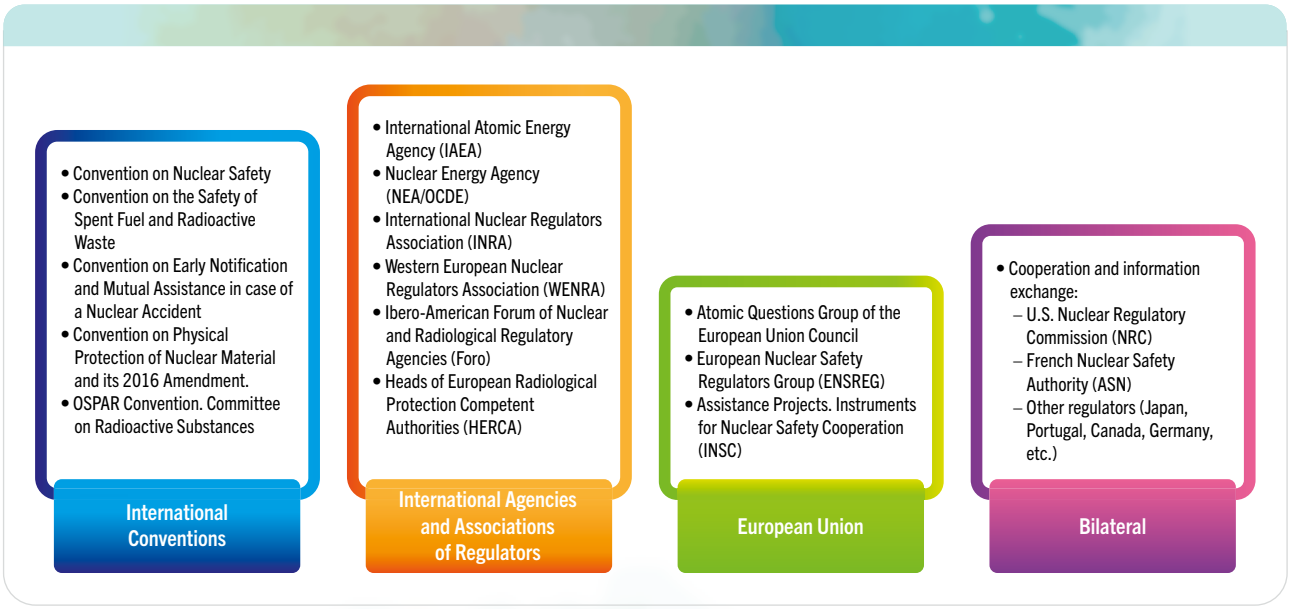


Figure 1.5.2.2 shows the activities carried out by the CSN in 2023 at an international level.

Figure 1.5.2.2. CSN International Activities in 2023

In 2023, nearly 300 international meetings were held, 258 of them face-to-face, with the main destinations not-surprisingly being Vienna, Paris and Brussels as these cities are home to the headquarters of the International Atomic Energy Agency (IAEA), the Nuclear Energy Agency (NEA) and the institutions of the European Union, respectively.

1.5.3. Public Information and Communication

Article 2, section ñ) of Law 15/1980, dated April 22, establishes the CSN obligation to inform the public on matters within its competence to the extent and periodicity determined by the Council, without prejudice to the

Figure 1.5.3.1. Relevant Communication Activities in 2023

publication of its administrative actions under the terms established by law.

The CSN continues striving to improve and strengthen internal and external communication, as evidenced by the inclusion of a strategic line in the current CSN

Strategic Plan for the period 2020-2025 which goes hand in hand with transparency. Figure 1.5.3.1 illustrates the most relevant actions in this regard.

All publications are available for download free of charge at the documentation center of the CSN institutional website.

1.6. Advisory committee for public information and participation

The Advisory Committee for Public Information and Participation on nuclear safety and radiation protection was created, under article 15 of Law 15/1980, with the aim of issuing recommendations that favor and improve transparency, access to information and public participation in fields of competence of the CSN.

All the information on Advisory Committee activities are available on the CSN institutional website.

Two meetings were held in 2023, numbers twenty five and twenty six, on June 29 and November 16, respectively. The former was held electronically and the second onsite, being the first face-to-face meeting since November 2019.

Table 1.6.1. Summary of Monographic Subjects Presented at each Advisory Committee meeting held in 2023

NUMBER	ATTENDEES	PRESENTATIONS ON SPECIFIC SUBJECTS			
		TECHNICAL DIRECTORATE FOR NUCLEAR SAFETY	TECHNICAL DIRECTORATE FOR RADIATION PROTECTION	TECHNICAL CABINET OF PRESIDENCY	CABINET OF THE SECRETARIAT GENERAL
Meeting 25	26		Dismantling of Santa María de Garoña Nuclear Power Plant.		CSN Information System in application of Law 2/2023
Meeting 26	25		30 years of environmental radiological surveillance	Progress of Advisory Committee performance review work	

At the 26th meeting, it was reported that the Advisory Committee had made 14 recommendations since its creation.

As of December 31, 2023, there is only one open recommendation, referring to revision of CSN publications containing the tables of effective imaging scan doses.

2. STRATEGY AND MANAGEMENT OF RESOURCES

2.1. Strategic Plan

The current strategic plan covers the 2020-2025 period and presents the mission and vision of the Council, establishing two goals: one aimed at ensuring nuclear and radiological safety and the other at achieving sustainable development goals.

Figure 2.1.1. Logo of the CSN Strategic Plan

The plan includes five strategic goals. Table 2.1.1 shows the progress made in 2023 in relation to these goals.

Table 2.1.1. CSN Strategic Goals and their Implementation Level in 2023

GOAL	ACTIVITY	FORECASTING AND COMPLIANCE	
Strategic Goal 1	Effectively supervising actions and activities carried out by nuclear facility licensees, with a special focus on key safety aspects.	Renewal of Trillo NPP's operating license	Goal: To start evaluating the Trillo NPP operating license renewal request. Action: evaluated as planned for 2023.
		Monitoring of SSC aging management programs	Goal: To analyze the lessons learned from pilot inspections carried out in 2022. Action: Participation in NRC inspection. A meeting was held to discuss lessons learned from the 2022 inspections and to develop an action plan which was implemented in 2023 and shall continue in 2024.
		Licensing the Santa María de Garoña NPP decommissioning process	Goal: Informing on the decommissioning license (phase 1) and change in ownership. Action: On May 17, 2023, the Physical Protection Plan authorization requests for the Radiation Protection Service, were reported favorably. On July 13, 2023, ownership transfer of Santa María de Garoña NPP from the company Nuclenor to Spain's National Radioactive Waste Management Company (ENRESA) and Decommissioning Phase 1, were both approved. On July 26, 2023, the Complementary Technical Instructions were approved.
		SISC (Integrated Plant Oversight System) self-assessment	Goal: To carry out the SISC self-assessment. Action: 75% completed
		Regulatory development	Goal: To transpose Directive 59/2013/ Euratom and regulatory development, contaminated land, PLABEN, Basic guideline for civil protection planning in case of radiological risk, National Radon Plan, Regulation on Nuclear and Radioactive Facilities (RINR). Action: To move forward in the regulatory development associated with the transposition of Directive 59/2013 Euratom. CSN Safety Instruction (IS) on priority municipalities for action against radon. It is still being processed. Draft Royal Decree approving the Regulation on radioactive nuclear facilities, and other activities related to exposure to ionizing radiation. Reported by the CSN Plenary Board on December 20, 2023.
Strategic Goal 2	Increasing the efficiency and efficacy of CSN roles and competences	Implementation of safety culture evaluation results at the CSN	Goal: To roll out improvement actions aimed at reinforcing organizational safety culture. Action: formalizing a contract with an external company. Completed.
		Improvement of the coercive process	Goal: To initiate the analysis of actions aimed at improving the coercive process. To establish an action plan for improving the process. Action: Activity 50% completed.

Table 2.1.1. CSN strategic goals and their implementation level in 2023 (continued)

GOAL	ACTIVITY	FORECASTING AND COMPLIANCE	
Strategic Goal 3	Ensuring the CSN maintains and improves its emergency response capabilities and strengthens security-related competences.	Organizational and methodological development of the emergency response structure at the CSN	Goal: To develop a comprehensive CSN model for nuclear and radiological emergency response which incorporates the requirements of Directive 2013/59/Euratom, the new Regulation on health protection against the risks derived from exposure to ionizing radiation and the most recent international recommendations. Action: Activities could not start because there are still no new emergency regulations, which are expected to be approved in 2024.
Strategic Goal 4	Fostering amongst CSN employees an increased sense of ownership and commitment to the organization	Approval of the new professional career model by the CSN Plenary Board.	Goal: To continue with actions to regulate professional career implementation. Action: Approved by Plenary Resolution of July 19, 2023
		Update of the training program.	Goal: To carry out the first pilot SAT implementation project targeting CSN technical staff. Action: The goal was met as planned.
		Drafting the CSN's Equality Plan.	Goal: Approval by the Plenary of an Equality Plan for the CSN. Action: Approved on January 11, 2023.
Strategic Goal 5	Improving the perception of regulatory activities amongst society and stakeholders through rigor, truthfulness and reliability.	Compliance with Advisory Committee recommendations	Goal: Compliance with Advisory Committee recommendations. Pending response to a recommendation associated to Health Forum activities. Action: The goal was met as planned.

2.1.1. Equality Plan

As mentioned above, Goal 4 of the current Strategic Plan establishes the obligation to draft a specific CSN Plan for equality between women and men considering the organization's specificities so as to ensure effectiveness and achievement of the best results possible. This milestone illustrates the CSN's commitment to equal opportunity and supports its development and actual implementation.

The First Equality Plan was approved by the Plenary Board on January 11, 2023, in accordance with the provisions of Article 24.2d of its Bylaws, for a period of 4 years. The organization's social partners were involved in Plan preparation.

The main targets to be achieved with the implementation of the First Equality Plan, are as follows:

- To visualize and consolidate the organization's commitment to equal opportunities between women and men.
- To put into effect the development of this plan and its implementation in a real and effective manner, placing it as a central, cross-functional element of organizational management.

The specific targets are related to the intervention areas or axes, whereas the specific measures are aimed at meeting these targets.

The First Equality Plan is structured around five main lines or areas of action:

- Axis 1. Instrumental measures for organizational transformation.
- Axis 2. Awareness, education and training.
- Axis 3. Working conditions and professional development.
- Axis 4. Co-responsibility and reconciliation of personal, family and working life.
- Axis 5. Gender violence.

Different goals and action measures are established within each main action line. The measures included within this plan were defined based on the specific characteristics of the Council and will be applied systematically and progressively, so that they can be modified or supplemented if new needs are detected.

Some of the actions carried out internationally in 2023 are the participation of the CSN in activities of the NEA/OECD "Retain" and "Atract" working group, which at the end of the year became a high level group. The CSN also participates in the IAEA's International Gender Champions Impact Group (IGC-IG), which is conducting a pilot project to collect data on gender equality in the nuclear safety and radiation protection regulator sector.

2.2. Management System

The management system is analyzed at the Management System and Information Security Committee.

During the five meetings held by the Committee in 2023, presentations were made on the revisions to management and administrative procedures developing the management system manual, the internal audit plan, the status of non-conformities and improvement opportunities arising from such audits, as well as modifications to be made to the annual activity planning and follow-up.

The proposal for proposed key activities included within the Annual Work Plan (AWP) in 2024 and the draft Annual Work Plan for that year, were also analyzed.

Every year the CSN draws up an annual work plan compliance report which is published on the CSN corporate website and on the transparency portal.

On the other hand, the implementation status of the 2018 IAEA IRRS-ARTEMIS mission action plan was reviewed throughout the year. On March 1, the CSN formally requested the opening of procedures to host the follow-up visit of the aforementioned IRRS mission in Spain, to be held from January 27 to February 3, 2025, in accordance with the IAEA's proposal.

With regards to the monitoring of CSN management, the following tables show the scorecard indicators in 2023, comparing them to set targets.

Table 2.2.1. Scorecard for Nuclear and Radioactive Fuel Cycle Facilities

INDICATOR	DESIGNATION	ANNUAL TARGET	VALUES	DSN	DPR
NI 1	Number and percentage (in relation to forecasted annual total) of inspections carried out throughout the period under review	175 DSN 139 / DPR 36	168 (95 %)	137 (99 %)	31 (86 %)
NI 2	Number and percentage of all scheduled yearly inspections actually carried out throughout the period under review	175 DSN 139 / DPR 36	161 (91 %)	133 (96 %)	28 (78 %)
NI 3	Number and percentage of all scheduled yearly inspections included within the base inspection program which were carried out throughout the period under review	142 DSN 132 / DPR 10	133 (94 %)	126 (95 %)	7 (70 %)
NI 4	Number of hours charged to the inspection of nuclear facilities, casks and manufacture of components for nuclear facilities, expressed in thousands.	≥ 50,000 hours per year	64862 (130 %)	56006 (112 %)	8856 (18 %)
NE 2	Number and percentage of total requests reviewed throughout the period under review, which complied with the timelines agreed with the Administration.	100 %	47 (68 %)	33 (69 %)	14 (67 %)
NE 3	Number and percentage of total requests yet to be reviewed throughout the period under review which exceeded the timelines agreed with the Administration.	0%	16 (26 %)	11 (24 %)	5 (33 %)

DSN: Nuclear Safety Directorate
DPR: Radiation Protection Directorate

Table 2.2.2. Scorecard of Radioactive Facilities, Service Entities, Related Activities and Transport

INDICATOR	DESIGNATION	ANNUAL TARGET	VALUES	CSN VALUES	REGIONAL VALUES
RI1	Number and percentage (in relation to forecasted annual total) of control inspections carried out throughout the period under review	980 CSN 467 / Aut. Com. 513	990 (101 %)	291 (62 %)	699 (136 %)
RI4	Level of dedication for inspection of nuclear facilities, service entities, standardized, radioactive transports, NORM industries and places of exposure to radon throughout the period under review, defined as the weighted number of inspections of each type.	Annual Value	4451 (50 %)	3510 (40 %)	942 (11 %)
RE3	Number and percentage of total requests left pending throughout the period under review which exceeded the timelines agreed with the Administration, as established by procedure PG.II.05	≥ 8,850	514 (89 %)	492 (89 %)	22 (85 %)
NE 3	Number and percentage of total requests yet to be reviewed throughout the period under review which exceeded the timelines agreed with the Administration.	100%	2 (8 %)	2 (11 %)	0 (0 %)

able 2.2.3. Emergency Scorecard

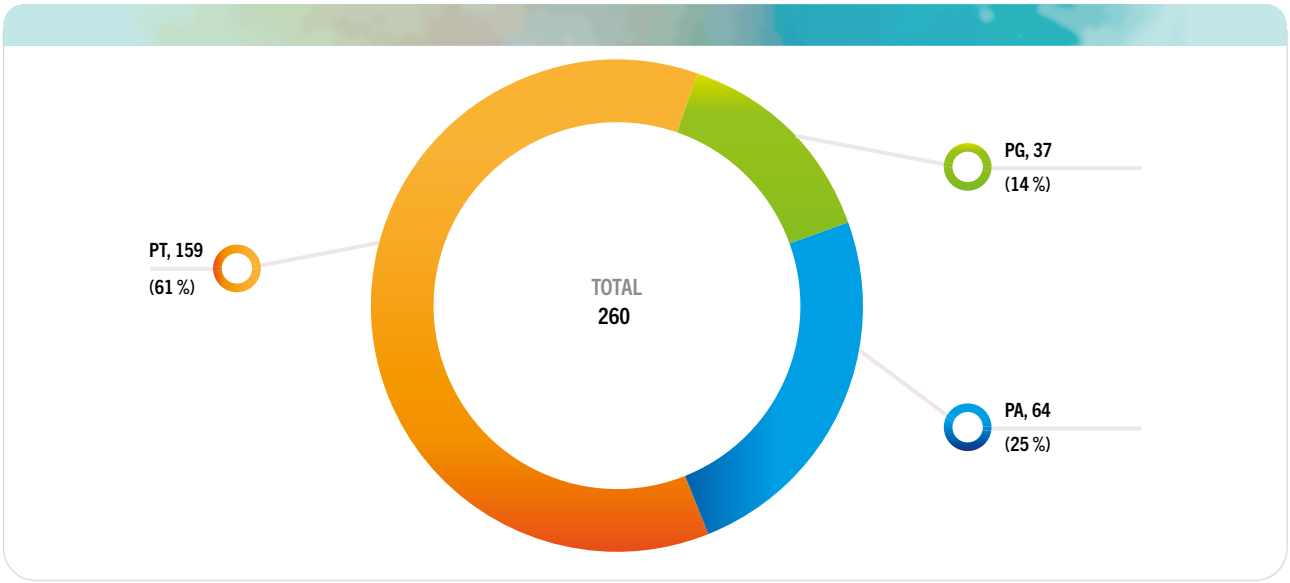
INDICATOR	DESIGNATION	GLOBAL VALUES	GOAL
ETS	Average time for activation of all emergency drill on-call team members	Annual average value ≤ 30 min	10
ETR	Average time for activation of all on-call team members in real emergencies	Annual average value ≤ 30 min	8
ECS	Emergency drill response quality throughout the period under review	Annual value ≥ 36	186
ECR	Real emergency response quality throughout the period under review	Annual value ≥ 105	500

2.2.1.Procedures and internal audits

Management system documentation is composed of a series of high-level documents and three different types of procedures: managerial (PG), administrative (PA) and technical (PT).

The CSN currently has 260 procedures, the breakdown of which is shown in the following graph, indicating in parenthesis the percentage for each type:

Graph 2.2.1.1. Graph 2.2.1.1. Total Number of Procedures and Breakdown by Type



In 2023, seven CSN management system processes were audited, 36 procedures were reviewed and audits were carried out in the autonomous communities of Galicia and Valencia. Table 2.2.1.2 shows the audits carried out.

Table 2.2.1.2. Audits carried out in 2023

PROCESS
Internal and External Information and Communication
Transports
Emergency Management
Radiation Protection of Workers
Function management entrustment to the Autonomous Community of Catalonia
Function management entrustment to the Autonomous Community of the Canary Islands
Function management entrustment to the Chartered Community of Navarre

2.2.2. Training Plan

In 2022, the Training Plan was structured into the seven programs and subprograms, as illustrated in figure 2.2.2.1.

Figure 2.2.2.1 Type of Courses and Hours Spent

• Nuclear Safety and Radiation Protection Technical Program • Nuclear Safety • Radiation Protection • Management of Cross-Functional Areas • Induction Technical Training • Qualification of Emergency Response Organization	24 courses - 3,352 hours 25 courses - 4,862 hours 9 courses - 309 hours 3 courses - 529 hours 10 courses - 1,405 hours
• Management Development Program	6 courses - 351 hours
• Administrative and Legal Management Program	3 courses - 1,058 hours
• Industrial Safety and Occupational Health Program	8 courses - 1,969 hours
• IT Program	11 courses - 954 hours
• Language Program	4 courses - 7,240 hours
• Skills Program	2 courses - 300 hours

In 2020, a project was launched to develop and implement the Systematic Approach to Training (SAT) with the aim of optimizing CSN training processes.

The development and implementation of annual training plans following the SAT methodology began in 2023 with a pilot project which should enable preparation of the Training Plan for 2025 in accordance with the SAT methodology.

2.2.3. Knowledge Management

The aim of the CSN in recent years has been to develop and apply a knowledge management model adapted to its real needs, based on IAEA recommendations, and to incorporate such model into the management system. To this end, in 2023 the CSN focused on analyzing the "Creation and Development of Competencies" process, which is intended to ensure that the personnel assigned to the Nuclear Safety Council have all the necessary attributes (skills) to carry out their functions.

On the other hand, as part of the CSN knowledge transfer strategy, webinars were held allowing internal CSN experts to share their knowledge, in a total of six online sessions. The following presentations were made:

Table 2.2.3.1. Webinars Held in 2023 at the CSN

DATE	TITLE
Jan. 20, 2023	"European Research Project DISCO. (Modern Spent Fuel Dissolution and Chemistry in Failed Container Conditions)"
Feb. 17, 2023	"New Network of Automtic Stations (REA) for environmental radiological surveillance"
Jun. 22, 2023	"Deep Geological Repository (DGR) and the situation in Spain"
Jul. 14, 2023	"Calibration and Verification Guide"
Oct. 27, 2023	"Document of the health forum on treatment of deceased people with radioactive material"
Nov. 17, 2023	"Dismantling of Santa María de Garoña Nuclear Power Plant"

2.3. Research & Development & Innovation

The CSN R&D&I Plan serves as an instrument to define the strategic lines and goals of the CSN in relation to this function, establishing the conditions applicable to the activities to be performed. In 2023, implementation of the current R&D&I Plan for the period 2021-2025 continued.

2.3.1. R&D&I Plan of the CSN in 2023

A total of 27 R&D&I projects were initiated in 2023.

Eight agreements were approved for implementation and execution of R&D&I projects with Spanish institutions. In addition, two agreements were signed with NEA/OECD, one with the NRC and the other with Studsvik Lab (Sweden), both within the scope of participation in international projects. Lastly, 15 R&D&I projects were subsidized through an open call for proposals. In addition, research lines previously launched with several national and international institutions, were maintained. Investments made in R&D agreements and conventions amounted to €1,378,460, with €545,200 of them being allocated to international organizations.

2. 4. Policy and regulatory activity

In accordance with its legal framework and functions, the CSN proposes regulations to the Government in the area of nuclear safety and radiation protection. This includes both new regulations and revisions of existing ones. Similarly, the CSN prepares and approves its own technical standards, such as instructions, circulars and guides relating to facilities and activities within its area of competence. Figure 2.4.1 shows the regulatory activity in 2023.

Figure 2.4.1. Regulatory Pyramid. Regulatory Activity in 2023

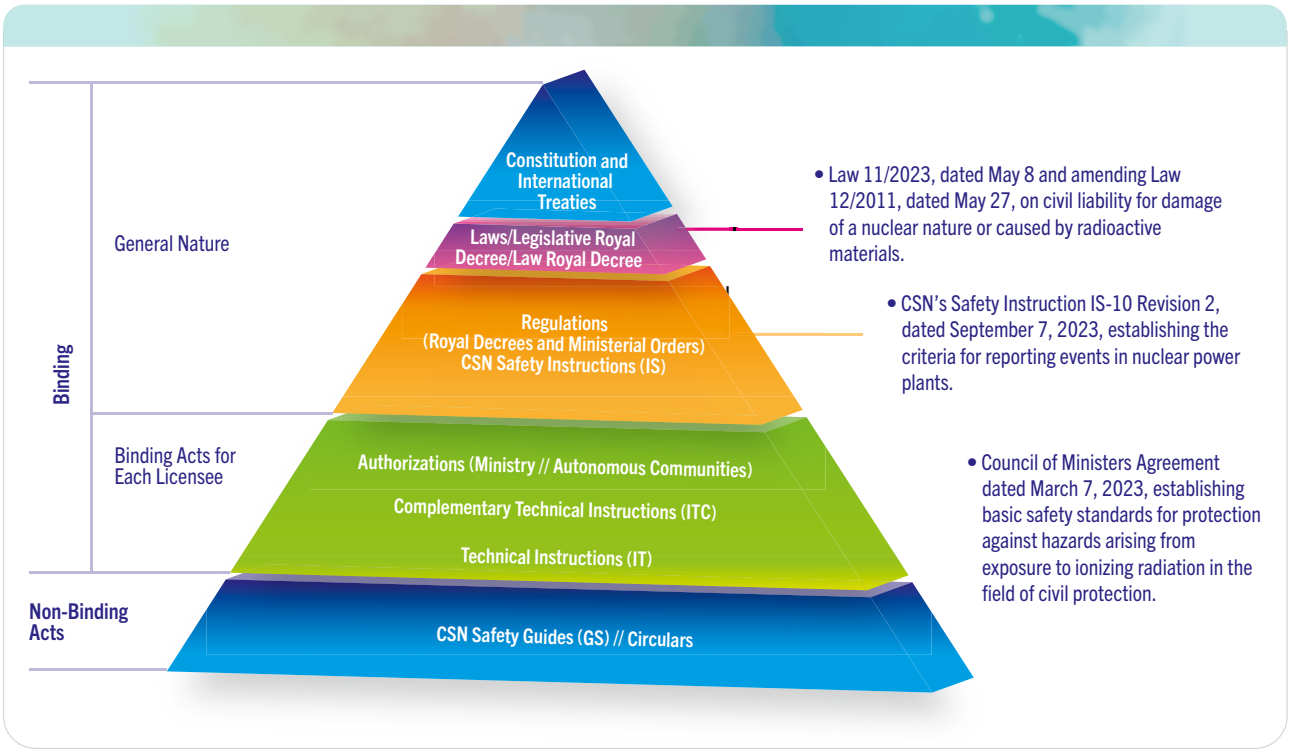


Table 2.4.1 lists the Complementary Technical Instructions issued by the CSN in 2023 as part of its regulatory activity.

Table 2.4.1. ITC issued by the CSN

SUBJECT	ISSUANCE DATE	FACILITY
Complementary Technical Instruction on operational resumption of cell 29 of the east platform of the Sierra Albarrana solid radioactive waste repository.	Apr. 04, 2023	Enresa
Complementary Technical Instruction on the quality of documentation to be submitted to the CSN	May 18, 2023	Trillo NPP Garoña NPP Ascó NPP Cofrentes NPP Vandellós NPP Almaraz NPP Juzbado Fuel Factory

Table 2.4.1. ITC issued by the CSN (cont'd)

SUBJECT	ISSUANCE DATE	FACILITY
Complementary Technical Instruction on Tech Specs	May 23, 2023	*Juzbado* Fuel Factory
Complementary Technical Instruction on reactor coolant leaks and follow-up of unidentified leak increases	Aug. 03, 2023	Trillo NPP
Complementary technical instructions for authorization of decommissioning phase 1 and Santa María de Garoña nuclear power plant ownership transfer	Jul. 28, 2023	Garoña NPP
Complementary Technical Instruction on revisions to the Radioactive Waste Management Plan for the El Cabril nuclear waste repository.	Nov. 28, 2023	*El Cabril* radioactive waste disposal facility (Enresa)
Complementary Technical Instruction on extension of the deadline to complete the relocatable cover on lines 1 and 2, section II of cell 29, for very low level radioactive waste established in point I on April 3, 2023.	Dec. 19, 2023	Enresa

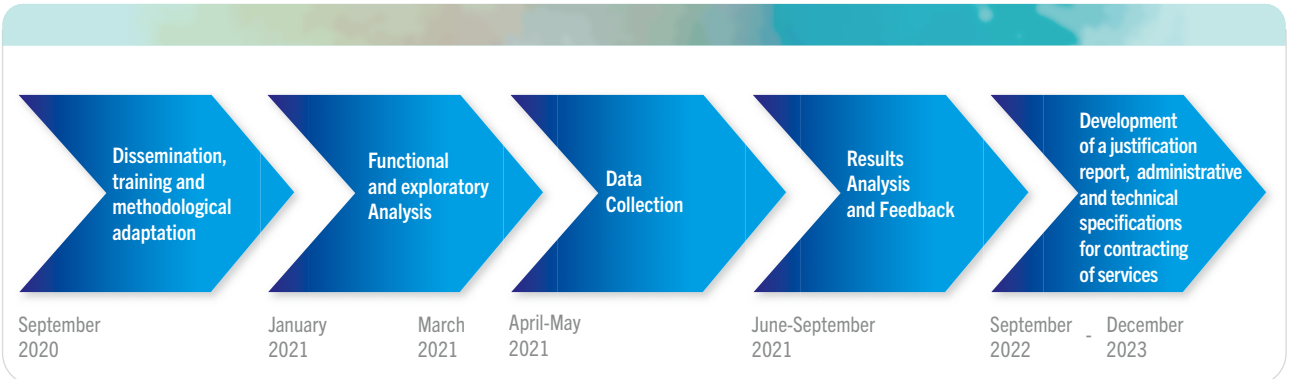
2.5. Organizational Safety Culture

The CSN recognizes the importance of safety culture, not only in the facilities it regulates but also in its own organization, as proven by the inclusion in the 2020-2025 Strategic Plan of a Strategic Goal (reference: OE.2.3.) which states the following:

Completion of a safety culture assessment during the 2020-2021 period. Results should then be analyzed to integrate lessons learned from the safety culture assessment into the organization.

On April 12, 2023, the CSN Plenary Meeting agreed to approve an executive report containing the results of the CSN safety culture assessment, continuing work with an external support company in order to identify precise indicators and joint working methods, as well as to define and implement an action plan aimed at improving and transforming culture at the CSN.

Figure 2.5.1: Phases of the Safety Culture Assessment Project



3. OVERVIEW OF NUCLEAR SAFETY AND RADIATION PROTECTION IN 2023

Generally speaking, it can be said that all nuclear and radioactive facilities operated safely throughout 2023. Likewise, radioactive material transports were carried out safely and activities were conducted within regulatory requirements, without any risk situations arising.

The environmental quality around the facilities remained within acceptable radiological conditions, without any risk for people resulting from facility operation or dismantling or decommissioning activities.

The overall performance of authorized facilities is assessed considering mainly the results of a number of supervision systems, namely the Integrated Plant Oversight System (SISC), as well as the remaining supervision and control processes established for nuclear and radioactive facilities and for the transport of radioactive material.

Two aspects used for this assessment are the operational issues and licensee events, especially those classified above zero on the IAEA's International Nuclear and Radiological Event Scale (INES), the radiological impact, the dosimetry of workers, the relevant modifications proposed and the coercive regime.

The table below summarizes the main data on licensing, supervision and control activities carried out by the CSN in 2023, whereas those activities are detailed in the following sections.

Figure 3.1. Summary of Licensing and Control Activities in 2023

	LICENSING REPORTS	INSPECTIONS	EVENTS	WARNINGS	PROPOSED SANCTIONS
NPPs in operation & Garoña NPP in permanent shutdown	41	122	39	8	0
NPP undergoing decommissioning	2	17	0	0	0
Juzbado	4	14	4	0	1
Transport	17	57	9	7	0
Radioactive Facilities	612	1,151	14	19	0
SPR/UTPR/SDP/ERX	12	17	0	2	0
Other Inspections	13	39	0	0	0

Figure 3.2. Licenses Issued in 2023 for Personnel in Nuclear Power Plants, Fuel Cycle Facilities and Radioactive Facilities

TYPE OF LICENSE		PERSONNEL LICENSES		
		NPPS	FUEL CYCLE FACILITIES	RADIOACTIVE FACILITIES
SUPERVISOR	GRANTING	6	4	315
	RENEWAL	12	19	313
OPERATOR	GRANTING	15	6	1,483
	RENEWAL	16	21	825

Figure 3.3. Dosimetry of exposed workers in Nuclear Power Plants, Fuel Cycle Facilities and Radioactive Facilities in 2023

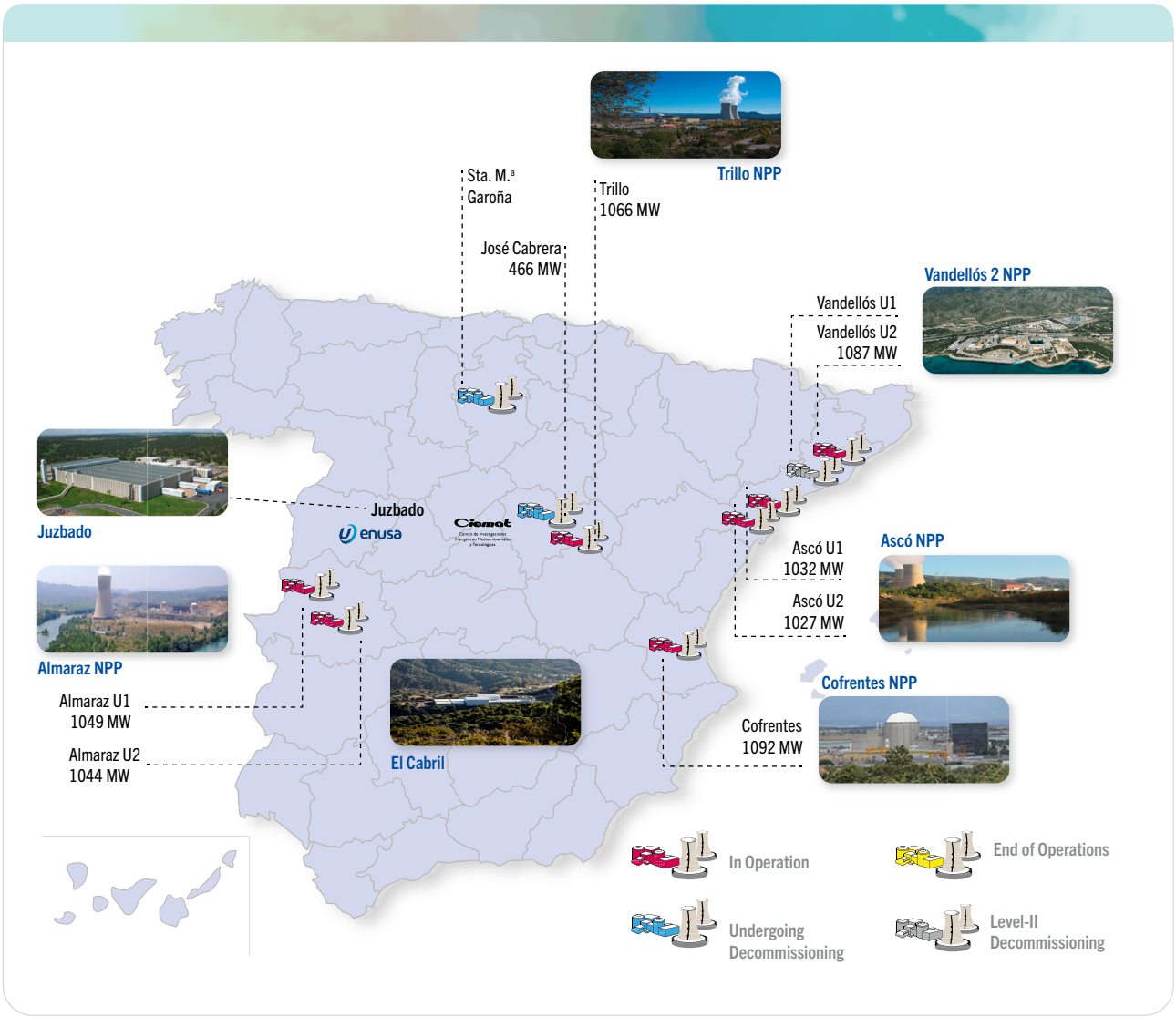
FACILITY/ACTIVITY		No. OF PEOPLE	COLLECTIVE DOSE mSv·PERSON	AVERAGE INDIVIDUAL DOSE mSv/YEAR
NPPs		8,125	3,202	1.28
Nuclear Fuel Cycle fac./Waste Fac./Ciemat		1,113	50	0.45
Radioactive Facilities	Medical	100,284	11,344	0.65
	Industrial	8,267	1,626	0.96
	Other	10,053	353	0.44
Facilities Being Dismantled/Decommissioning		516	1	0.15
Transport		220	229	1.80

4. MONITORING AND CONTROL OF FACILITIES AND ACTIVITIES

4.1. Nuclear power plants in operation

Figure 4.1.1 shows the location of existing nuclear facilities in Spain: Nuclear power plants in operation, undergoing decommissioning and other nuclear facilities. The following sections summarize the characteristics and activities of each of them in 2023.

Figure 3.1.1. Nuclear Facilities in Spain



4.1.1. Operating licenses for nuclear power plants

Table 4.1.1.1 summarizes the operating data of nuclear power plants in 2023.

Table 4.1.1.1. Summary of nuclear power plant operating data in 2023

	ALMARAZ U1/U2	ASCÓ U1/U2	VANDELLÓS U2	TRILLO	GAROÑA	COFRENTES
Existing License	Jul. 23, 2020 Jul. 23, 2020	Sep. 27, 2021 Sep. 27, 2021	July 27, 2020	Nov. 03, 2014	Since Jul. 13, 2023 Decommissio-ning Phase 1	Mar. 20, 2021
Validity period (years)	Nov. 01, 2027 Oct. 31, 2028	Oct. 01, 2030 Oct. 01, 2031	10	10	N/A	Nov. 30, 2030
Net Generation (GWh)	7735.090 8517.287	6610.03 7196.066	8565.10	7734.717	–	7948.343
Load Factor (%)	87.29 97.31	76.69 83.64	93.70	88.83	–	86.39
Operational Factor (%)	90.72 99.77	51.29 85.76	96.39	91.72		88.86
Hours Coupled to the Grid	7947.5 8739.5	7,103.93 7512.88	8443.83	8,035	–	7784.283
Refueling Outages	U1: Apr. 16/May 20 U2: N/A	U1 Apr.29/Jun.15 U2 Oct.23/ Dec.10	-	May 24/Jun. 23	N/A	Oct. 06/Nov. 12

Table 4.1.1.2 End-of-Life and End-of-Operation Dates

END-OF-LIFE AND END-OF-OPERATION DATES (PLENARY MONOGRAPH 1565)		
REACTOR	DESIGNED END-OF-LIFE DATE	END-OF-OPERATION DATE*
ALMARAZ 1	May 1, 2021	November 1, 2027
ALMARAZ 2	October 8, 2023	October 31, 2028
ASCÓ 1	August 29, 2023	October 2, 2030
ASCÓ 2	October 23, 2025	October 2, 2031
COFRENTES	October 14, 2024	November 30, 2030
VANDELLÓS U2	December 12, 2027	February 2035
TRILLO	May 23, 2028	May 2035

(*) According to the National Integrated Energy and Climate Plan (PNIEC)

It should be noted that all Spanish nuclear power plants in operation have reached (Almaraz NPP U1 in 2021) or are about to reach their 40-year design life period (Almaraz NPP U2 in 2023; Ascó NPP U1 in 2023 and Ascó NPP U2 in 2025; Cofrentes NPP in 2024; Vandellós U2 NPP in 2027 and Trillo NPP in 2028). That means all of them have considered or should consider entering Long-Term Operation (LTO) as part of the renewal processes completed in the years 2020 (Almaraz NPP U1&U2, Vandellós NPP U2) and 2021 (Cofrentes NPP and Ascó NPP U1&U2) or foreseen in the near future (Trillo NPP in 2024).

In accordance with this timeline, Almaraz NPP U1&U2 and Vandellós NPP U2 in 2020, and Cofrentes NPP and Ascó NPP U1&U2 in 2021 were granted an operating license renewal for the requested period, in accordance with the PNIEC.

In December 2021, CNAT submitted the base document for the Trillo NPP PSR, which was favorably assessed by the CSN Plenary Session June 29, 2022. The licensee filed with MITERD at the end of March 2023 an application for operating license renewal.

4.1.2. General Aspects of CSN supervision and Control. Operating Experience

The CSN assesses the overall operation of nuclear power plants on an annual basis, based mainly on SISC results, licensee events, radiological impact assessment, workforce dosimetry, licensing requests and relevant modification requests, as well as warnings, sanctions and operational issues.

4.1.2.1. Integrated Plant Oversight System (SISC)

SISC is based on the continuous monitoring of a set of performance indicators and on an inspection program called Basic Inspection Plan, with the aim to focus supervision efforts on key safety aspects, in accordance with the Probabilistic Safety Assessments (PSA).

SISC supervision is structured around three "strategic areas" (Nuclear Safety, Radiation Protection and Security) and seven "safety pillars", as shown in figure 4.1.2.1.1.

The following SISC results on the performance of operating nuclear power plants in 2023, can be highlighted:

- A total of 114 inspections were carried out in 2023, when the number of inspections carried out within existing inspection programs was similar to the years before the pandemic. The same thing applies to the number of inspection findings, also within similar values.

- In 2023, 158 findings were categorized as green and two findings as white.

- During 2023 all performance indicators were green.

- Power plants were within the normal condition known as "Licensee Response" within the SISC action matrix, with the application of standard inspection and deficiency correction programs, except in the case of both units at Almaraz NPP, which were put in the "Regulatory Response" column in the second quarter of 2023, due to a common finding categorized as white, remaining in that column in both the third and fourth quarters.

In 2014, the CSN Plenary approved a new specific oversight and monitoring system for Santa María de Garoña nuclear power plant (Garoña Oversight System (SSG)), adapted to the end-of-life situation declared in 2013.

The SSG focuses on nuclear safety, radiation protection and security of the spent fuel pool onsite.

In relation to the SISC, the SSG has the same strategic areas, which are based on the same safety pillars. However, the Basic Inspection Plan was adjusted to the plant's operating situation, making use only of SISC performance indicators related to radiation protection of workers and the public and to emergency preparedness.

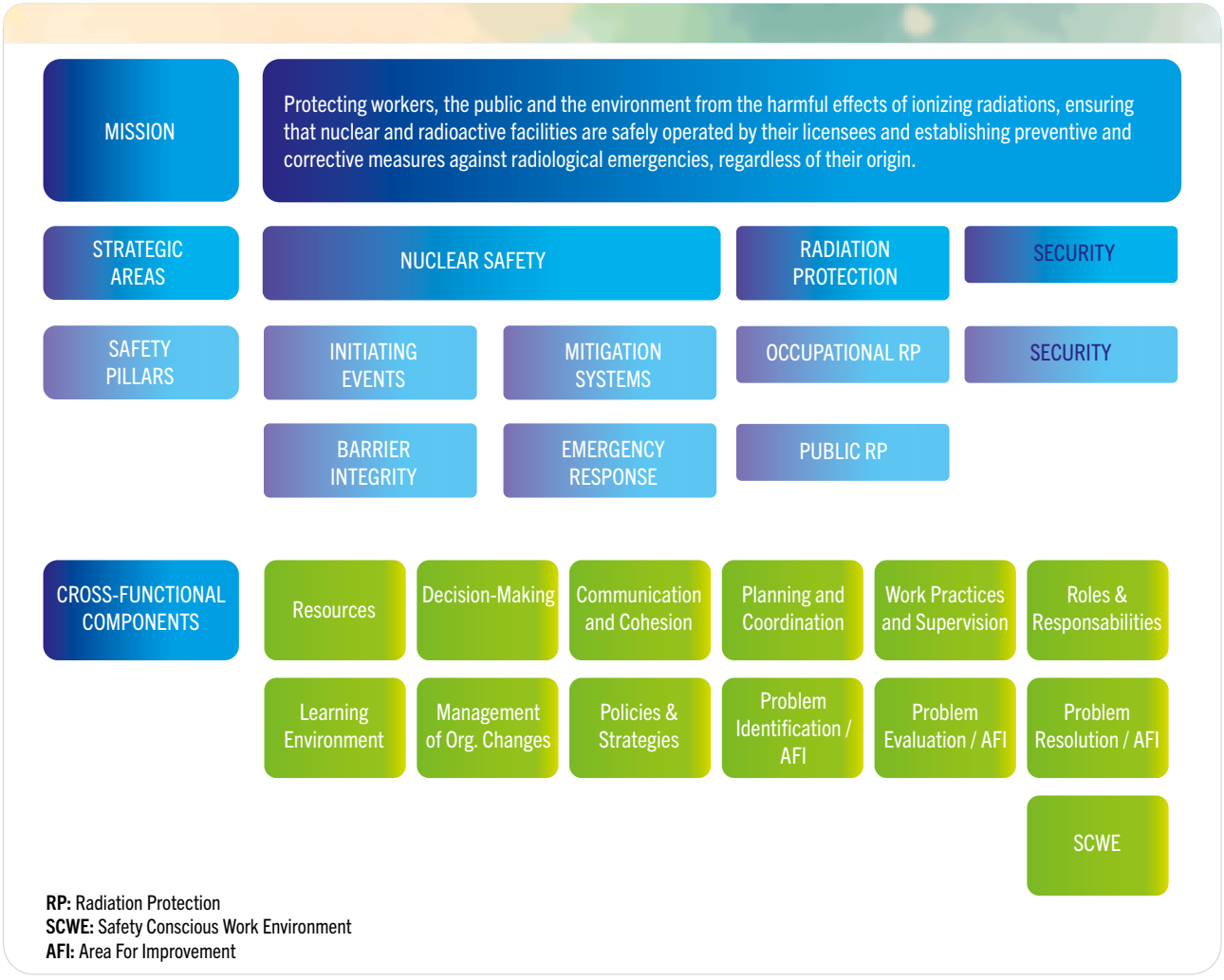
The Basic Inspection Plan is complemented with other scheduled inspections and with the results of any potential reactive inspection.

Unlike the SISC, SSG findings are not coded. Instead, the process is simplified by referring to "minor deviations", "findings" and "significant findings", given the lower complexity of spent fuel pool-related phenomena.

In 2023, the CSN continued to supervise Santa María de Garoña power plant using the SSG and considering it an operating plant until the publication of Order TED/796/2023 in Spain's Official Gazette, dated July 13, authorizing both the Santa María de Garoña nuclear power plant ownership transfer from the company Nuclenor to the company Enresa, as well as the commencement of plant dismantling phase one. During the eight inspections carried out in the period from January to July 2023, plant operation was rendered as normal, identifying and categorizing six findings, none of them significant.

In summary, a total of 122 inspections were carried out in 2023 within the scope of SISC in the seven operating nuclear reactors and of SSG in the Santa María de Garoña nuclear power plant, in permanent shutdown.

Figure 4.1.2.1.1. SISC Performance Scheme



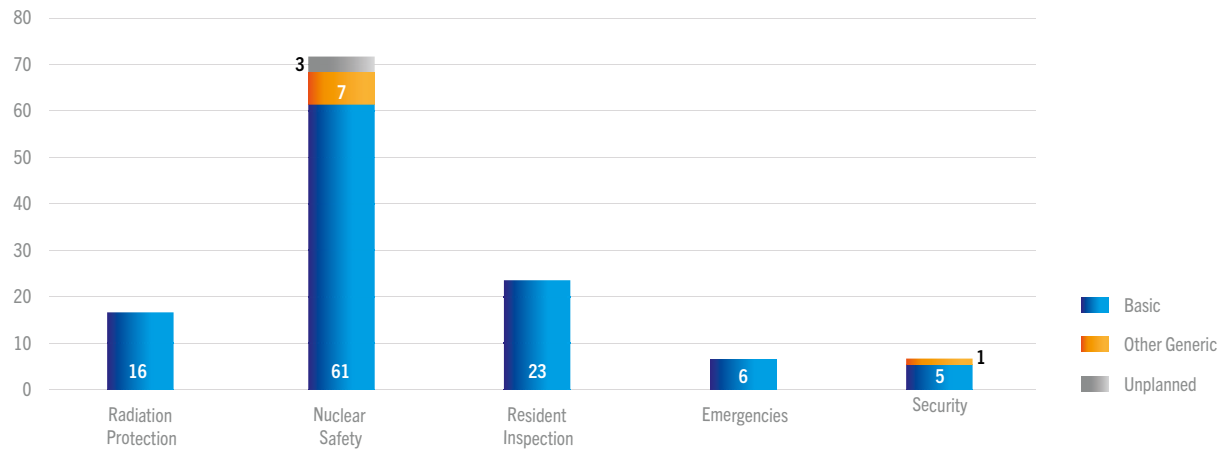
RP: Radiation Protection
SCWE: Safety Conscious Work Environment
AFI: Area For Improvement

Table 4.1.2.1.1. Breakdown of Inspections Carried Out by CSN units (2023)

	BASIC INSPECTION PLAN	OTHER PLANNED & GENERIC	UNPLANNED	TOTAL
Radiation Protection	16	0	0	16
Nuclear safety	61	7	3	71
Resident Inspection	23	0	0	23
Emergencies	6	0	0	6
Security	5	0	1	6
Total	111	7	4	122*

*This includes operating plants and the Santa María de Garoña nuclear power plant until publication in the Official Gazette of Order TED/796/2023, dated July 13, 2007.

Graph 4.1.2.1.1 Inspections at Operating Nuclear Power Plants, including Sta. María de Garoña in 2023



The following table shows SISC performance indicators for the four quarters of 2023.

Table 4.1.2.1.2. Performance Indicators. SISC 2023

	1ST QUARTER	2ND QUARTER	3RD QUARTER	4TH QUARTER
Almaraz Unit 1	green	green	green	green
Almaraz Unit 2	green	green	green	green
Ascó Unit 1	green	green	green	green
Ascó Unit 2	green	green	green	green
Cofrentes	green	green	green	green
Trillo	green	green	green	green
Vandellós 2	green	green	green	green

Plant position (status and analysis) in the action matrix is determined together with the performance indicators and findings in each station, as shown in the following table:

Table 4.1.2.1.3. Action Matrix Status. SISC 2023

	1ST QUARTER	2ND QUARTER	3RD QUARTER	4TH QUARTER
Almaraz Unit 1	RT	RR[1]	RR	RR
Almaraz Unit 2	RT	RR[1]	RR	RR
Ascó Unit 1	RT	RT	RT	RT
Ascó Unit 2	RT	RT	RT	RT
Cofrentes	RT	RT	RT	RT
Trillo	RT	RT	RT	RT
Vandellós 2	RT	RT	RT	RT

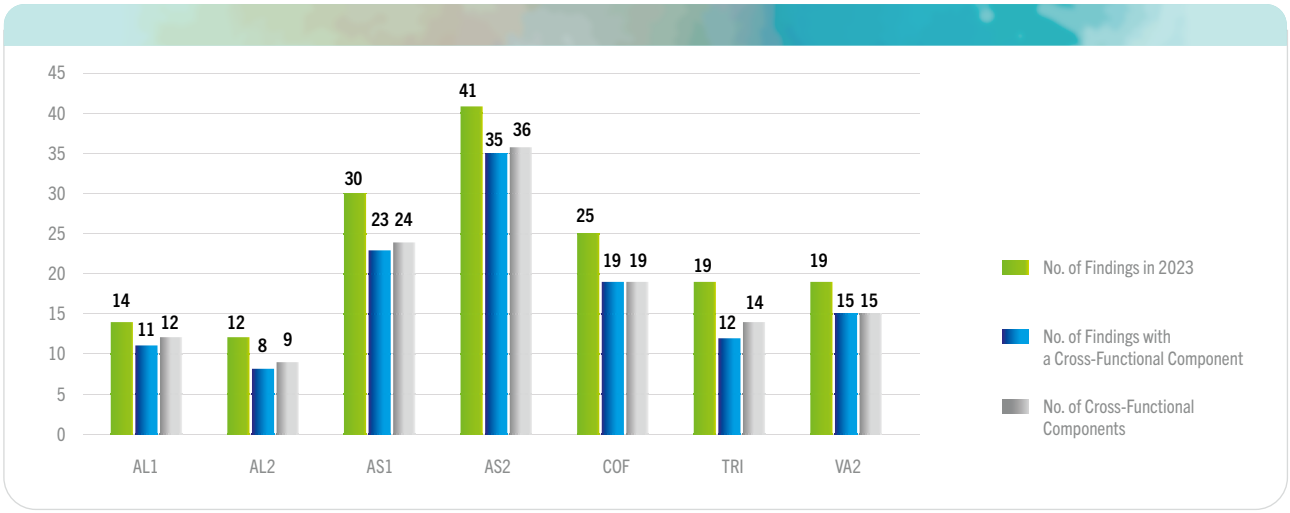
RT: Licensee Response.
RR: Regulatory Response

[1] Both Almaraz NPP units are placed in the "REGULATORY RESPONSE" column of the action matrix, due to definitive categorization of a white finding common to both units in the second quarter (2Q2023).

SISC results are published quarterly on the CSN institutional website, where additional information on this oversight and control system is also available.

Since 2017, the SISC is completed with nuclear power plant monitoring in the area of Safety Culture, which includes two parts: cross-functional components and action matrix. The graph below shows the results of cross-functional components in 2023.

Graph 4.1.2.1.2. Total Number of Findings and Cross-Functional Components in 2023 for each Nuclear Reactor

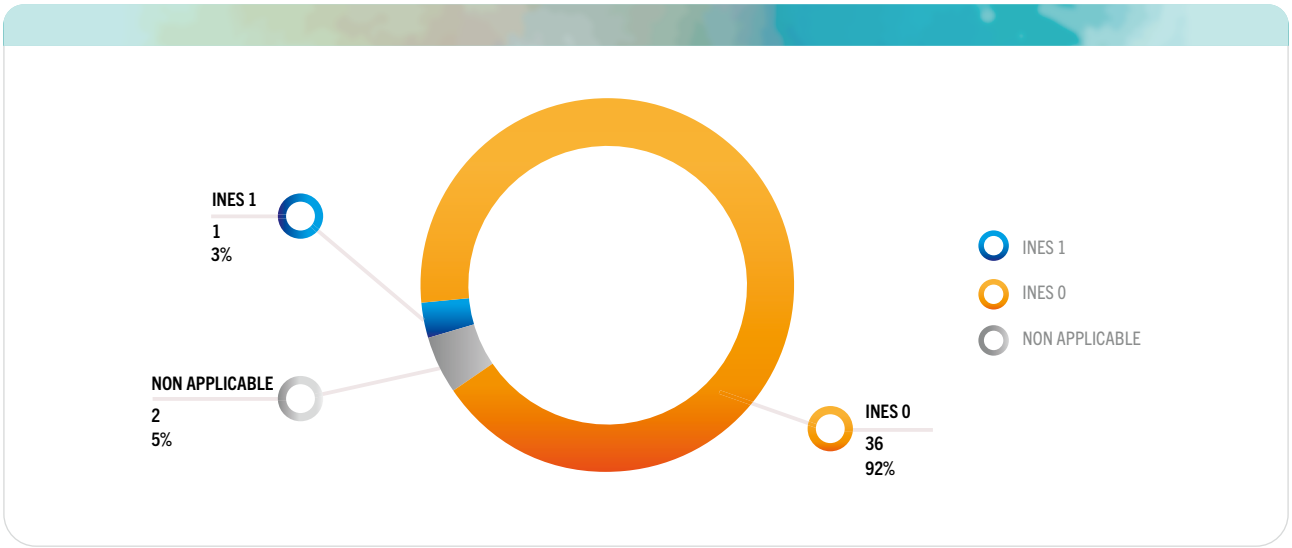


4.1.2.2. Reported Events, Proposals For Disciplinary Proceedings And Warnings

In 2023, the licensees of operating nuclear power plants reported a total of 39 events, in accordance with the provisions of CSN Safety Instruction IS-10 on event reporting criteria.

Of these, 36 notifications were classified as level 0 on the International Nuclear Event Scale (INES), and only one was classified as INES level 1. In addition, two reported events not covered by the INES scale were accounted for.

Graph 4.1.2.1.2. INES Classification of Events Reported to the CSN in 2023



In 2023, the CSN issued eight warnings and proposed no sanctioning proceeding to the Ministry for Ecological Transition and the Demographic Challenge (MITERD) regarding operating nuclear power plants and Santa María de Garoña, until the publication of the latter in the Official Gazette of Order TED/796/2023, dated July 13.

Table 4.1.2.2.1 summarizes key information on the causes giving rise to these coercive actions.

Table 4.1.2.2.1 Information on Warnings and Proposed Sanction to NPPs

WARNINGS	
NUCLEAR POWER PLANT	
Almaraz NPP	Non-compliance with the Surveillance Requirement (SR) for Delta-P measurement in Fuel Building ventilation filters, a task which was carried out without the pre-filters in place" (Tech Specs SR 4.9.13.d.1).
Ascó NPP	Non-compliance with Article 7.4 of Regulatory Safety Instruction IS-26 regarding the implementation of the manual of performance requirements for extensive damage management equipment.
Trillo NPP	Non-compliance with Tech Specs 7.1.1 and 7.2.1.3 relating to the spent fuel storage cask ENSA-DPT. Non-compliance with section 4.2.1.9 of the Onsite Emergency Plan.
Cofrentes NPP	Non-compliance with Article 5.15 of CSN Instruction IS-20, Article 4.3 of CSN Instruction IS-29, and Section 15.4.3 of the Quality Assurance Manual (QAM) in relation to spent fuel casks. Non-compliance with Improved Tech Specs 4.4.2.1.b regarding the minimum thickness of spent fuel storage HI-STAR 150 cask.
Santa María de Garoña NPP	Non-compliance with Section 5.7 of Regulatory Instruction IS-20 and Section 3.4.16 of Regulatory Instruction IS-29, during evolutions to load the first spent fuel cask (model ENUN52B).
Vandellós 2 NPP	Non-compliance with section 3.4.1 of Regulatory Instruction IS-30, on fire protection requirements in nuclear power plants, due to unavailability of a fire detection system in the fire area of tank BN-T01, without having requested a favorable assessment.

4.1.3. Generic Topics and Operating Experience Monitoring and Analysis

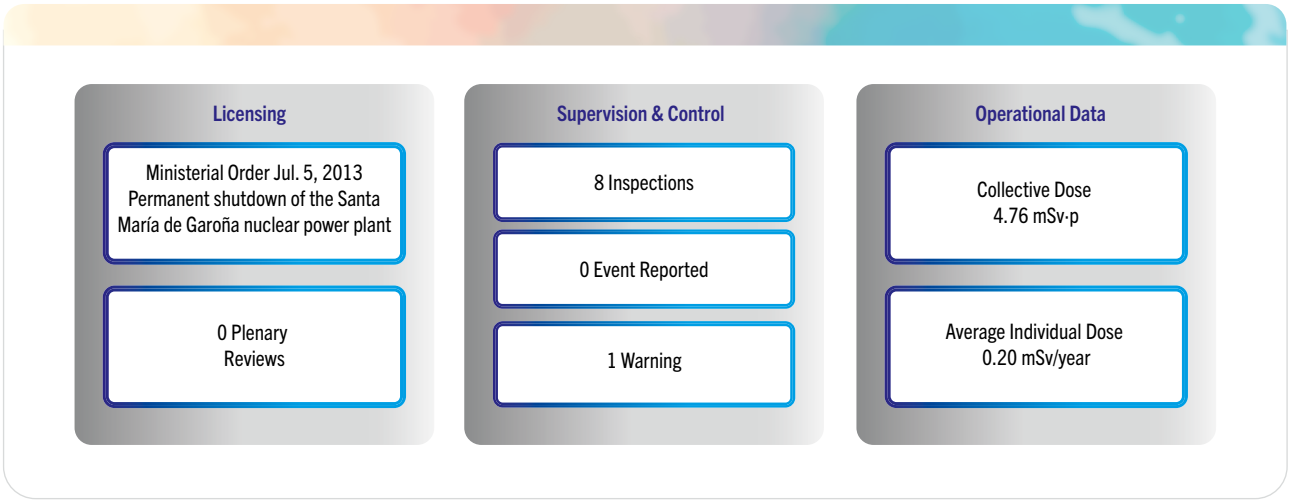
A Generic Topic is any safety-related matter which could affect more than one plant and implies special monitoring by the CSN. CSN monitoring may include the submittal of generic instructions or letters to the plants, requesting analysis of the applicability of new requirements, the performance of inspections, the assessment of specialized areas and the inclusion of analyses in the Operating Experience (OE) reports of the plants, among other possible actions.

No new generic topic was opened in 2023. It is worth mentioning that the CSN is further developing the pilot project for implementation of the continuous monitoring system in line with the new standards issued by the country of origin of the facilities, and based on information obtained through a series of inspections carried out by the CSN in 2018 on these processes at all the nuclear facilities. In 2024, it is planned to conduct a joint evaluation of new regulations analysis reports from 2022 and 2023, as well as to issue a report including a proposal for updating the process and consequently revising CSN procedure PT.IV.103 "Treatment of new regulations issued in the country of origin of the project".

The following is a graphic summary of major milestones regarding the status of operating nuclear power plants in 2023, including Sta. María de Garoña while the plant remained in a situation of permanent shutdown until Official Gazette publication of Order TED/796/2023, dated July 13, granting site ownership to Enresa and authorizing decommissioning phase 1.

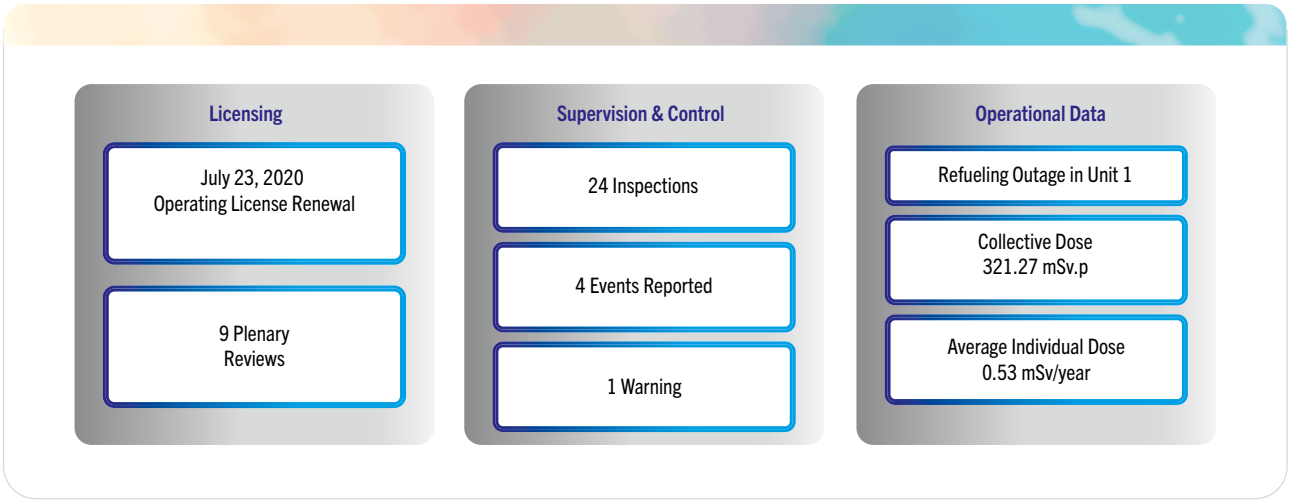
4.1.3.1. Santa María de Garoña Nuclear Power Plant

Figure 4.1.3.1.1. Key Activities at Santa María de Garoña (2023)



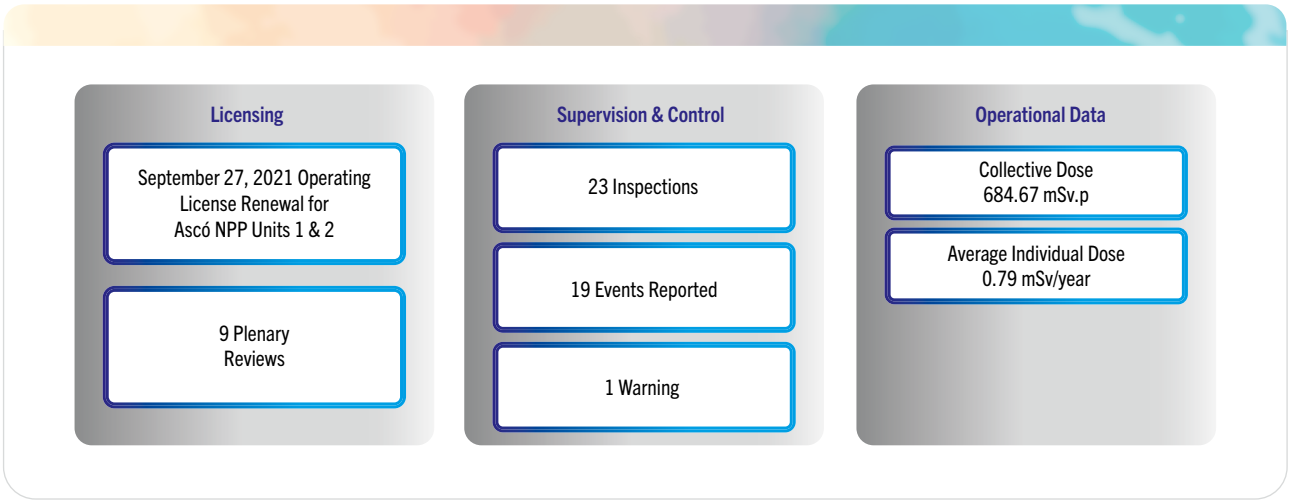
4.1.3.2. Almaraz Nuclear Power Plant

Figure 4.1.3.2.1. Key Activities at Almaraz NPP (2023)



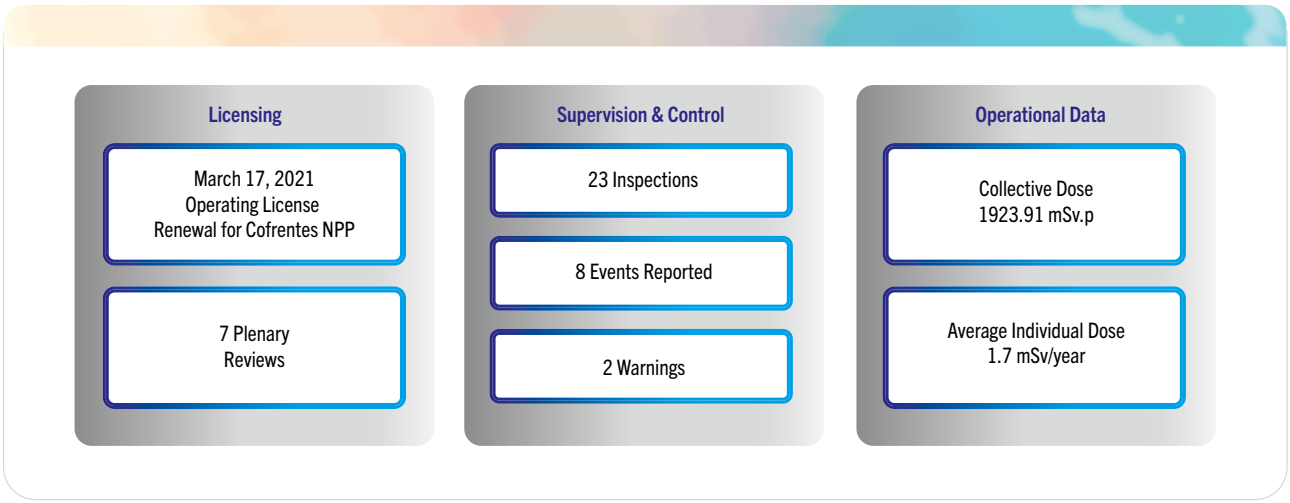
4.1.3.3. Ascó Nuclear Power Plant

Figure 4.1.3.3.1. Key Activities at Ascó NPP (2023)



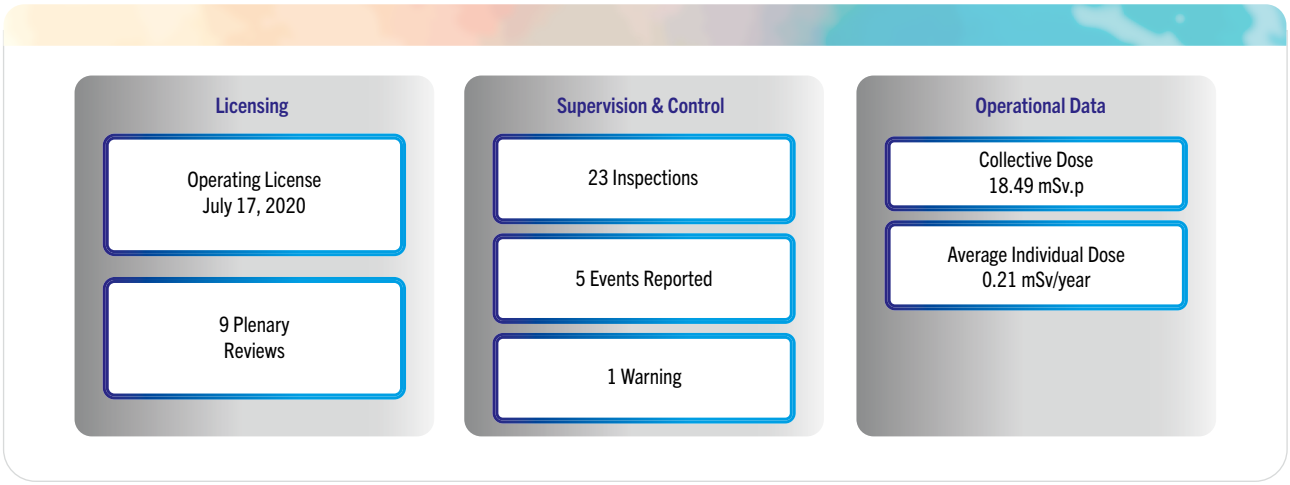
4.1.3.4. Cofrentes Nuclear Power Plant

Figure 4.1.3.4.1. Key Activities at Cofrentes NPP (2023)



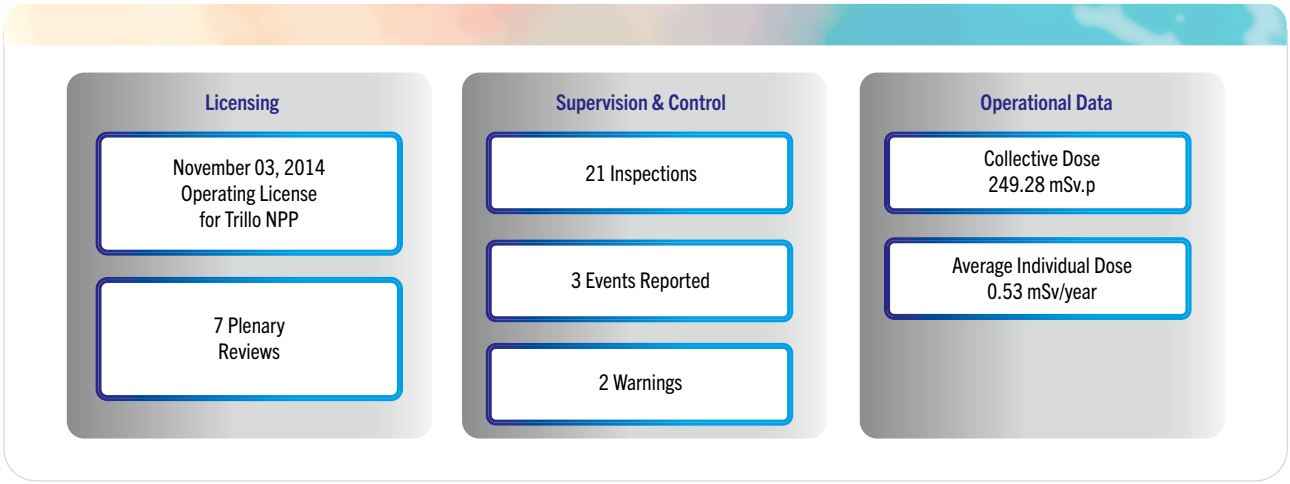
4.1.3.5. Vandellós 2 Nuclear Power Plant

Figure 4.1.3.5.1. Key Activities at Vandellós 2 NPP (2023)



4.1.3.6. Trillo Nuclear Power Plant

Figure 4.1.3.6.1. Key Activities at Trillo NPP (2023)



4.2. Nuclear power plants in decommissioning

There are currently three nuclear power plants in Spain under decommissioning, with varying degrees of progress: Vandellós 1 NPP, located in Tarragona and in a latency phase since 2005, José Cabrera NPP in Guadalajara, and Santa María de Garoña NPP in the province of Burgos. Regarding the latter, in May 2020 Enresa filed a request for authorization with the Ministry (MITERD) to undertake decommissioning phase 1 at Santa María de Garoña nuclear power plant, which permanently ceased operations in 2013.

The CSN completed the evaluation of this request in 2023 and since July 20, 2023 (date when facility ownership changed from Nuclenor to Enresa), the Santa María de Garoña nuclear power plant has been in phase 1 of decommissioning under the responsibility of Enresa.

Table 4.2.1 shows a summary of nuclear power plants undergoing decommissioning, their location, licensing milestones, etc.

Table 4.2.1. Overview of Characteristics of Nuclear Power Plants in Decommissioning Phase

PROGRAM	FACILITY (LOCATION)	LICENSING MILESTONES	STATUS	IMPLEMENTATION
Vandellós 1 Nuclear Power Plant Decommissioning Project	Vandellós 1 (town of Vandellós, Tarragona)	Start of Operations: Feb. 1972 End of Operations: Jul. 1990 Decommissioning: Jan. 1998 Latency: Jan. 2005	Latency (dismantled to level 2)	1998-2004
José Cabrera NPP Nuclear Power Plant Decommissioning Project	José Cabrera (town of Zorita de los Canes, Guadalajara)	Start of Operations: Oct. 1968 End of Operations: Apr. 2006 Decommissioning: Feb. 2010	Implementation of Decommissioning and Permanent Shutdown Plan	As of December 31, 2023, 99.2% completion of Decommissioning Plan
Santa María de Garoña Nuclear Power Plant Decommissioning Project	Santa María de Garoña (Burgos)	Start of Operations: Oct. 1970 End of Operations: Dec. 2013 Decommissioning: Jul. 2023	Decommissioning phase 1	In progress

Activities carried out at each of these facilities in 2023 were performed within the required safety limits and conditions, without any radiological impact on the public or the environment.

The most significant milestones regarding the status of nuclear power plants in different phases of decommissioning in 2023, are summarized graphically below.

4.2.1. Vandellós 1 Nuclear Power Plant

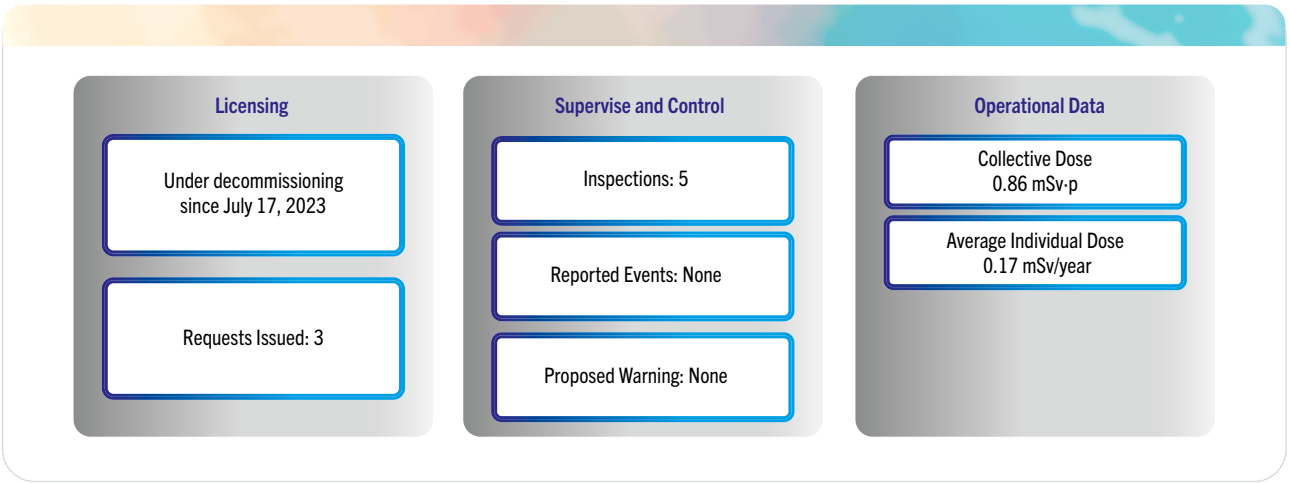
Figure 4.2.1.1. Key Activities at Vandellós 1 NPP (2023)

4.2.2. José Cabrera Nuclear Power Plant

Figure 4.2.2.1 Information Summary on José Cabrera NPP (2023)

4.2.3. Santa María de Garoña Nuclear Power Plant

Figure 4.2.3.1. Key Activities at Santa María de Garoña NPP after July 2023



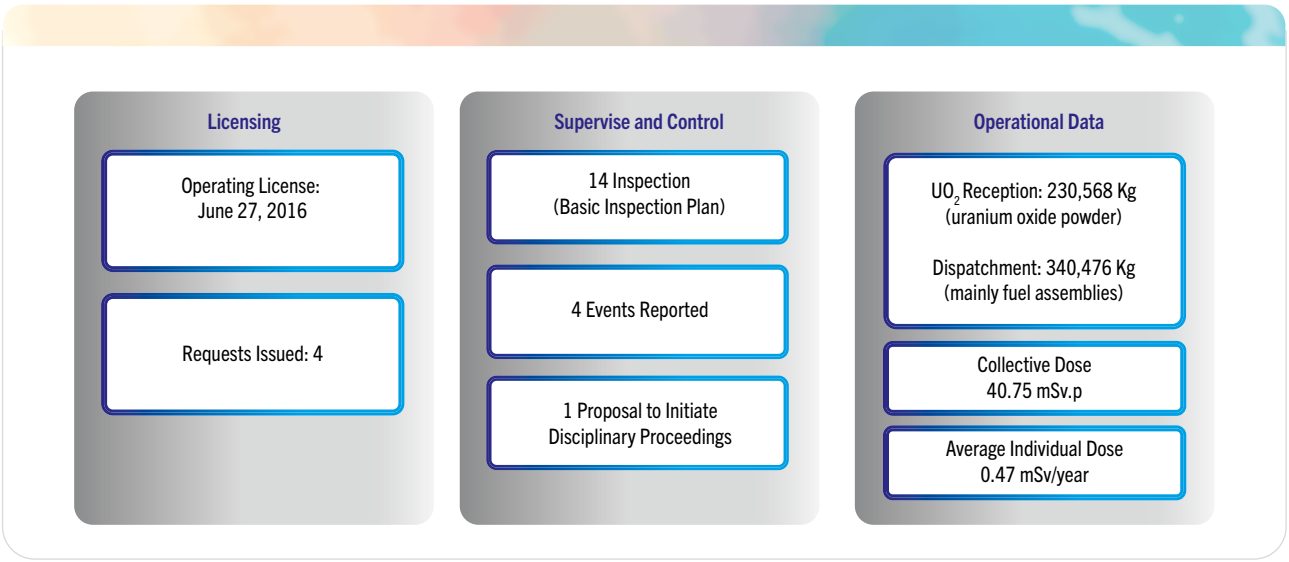
4.3. Fuel cycle facilities, radioactive waste storage and Ciemat

4.3.1. Juzbado Nuclear Fuel Assembly Factory

The Juzbado nuclear facility manufactures fuel assemblies of uranium oxide and a mixture of uranium oxide and gadolinium oxide, with a maximum U-235 enrichment of 5% by weight, for use in pressurized light water and boiling light water nuclear reactors.

The Plenary Board session held on January 18, 2023, agreed to propose the opening of a disciplinary proceeding against Enusa, licensee of the Juzbado Factory, due to non-compliance with sections 8.3.2.1.1.1.a) "Entry and Exit Controls" and 8.3.2.1.1.1.b) "Routine Controls" of the facility's Radiation Protection Manual (RPM). This non-compliance was identified in 2022.

Figure 4.3.1.1 Key Activities at the Juzbado Fuel Assembly Factory (2023)



4.3.2. El Cabril Radioactive Waste Disposal Facility

The El Cabril Disposal Facility is a nuclear site used to dispose of Low and Intermediate Level Waste (LILW) and Very Low Level Waste (VLLW). The site, commissioned in 1992, has a valid operating license since October 5, 2001.

Figure 4.3.2.1 shows the most relevant activities related to the El Cabril Radioactive Waste Disposal Facility in 2023.

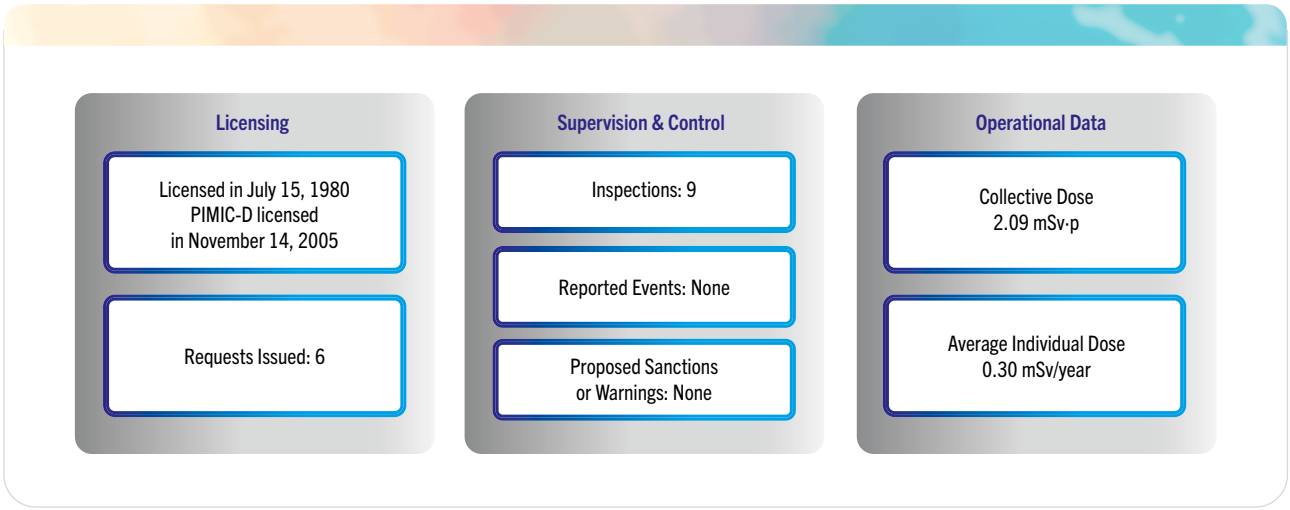
Figure 4.3.2.1. Key Activities at El Cabril (2023)

Enresa submitted to the CSN in June 2022 a request to resume the operation of cell 29, after considering that it had completed all Comprehensive Plan actions, namely the repairs and splitting of lines and tanks of the cell's leachate collection network, as well as the enhancement of quality assurance standards within the project and the guarantee of compliance with Tech Specs at all times.

In April 2023 the CSN approved the continued operation of cell 29, requiring Enresa to observe a series of conditions and increase surveillance so as to ensure that cell operation remained within the cell 29 operation safety envelope.

4.3.3. Public Research Centre for Energy, Technology and Environment (Ciemat)

Figure 4.3.3.1 Key Activities at Ciemat (2023)



4.3.4. Uranium Mining and Uranium Concentrate Manufacturing Plants

Table 4.3.4.1 summarizes the complete descriptive overview of all facilities under this section.

Table 4.3.4.1 Descriptive Overview of Uranium Mining and Concentrate Manufacturing Plants

FACILITY		SITUATION	DESCRIPTION 2023
Saelices Mining Center	Elefante Plant	Dismantled and Restored (under surveillance and control since 2006)	• Decommissioning and restoration plan including different programs for environmental radiological surveillance, radiation protection of the workers, release control and waste management. • Inspections: One to Quercus Plant. • Mining sites are restored and a groundwater and structural stability monitoring plan is being carried out.
	Quercus Plant	Permanent Shutdown (dismantling and closure license requested in 2015. Phase 1)	
	Mining facilities	Restored in 2008	
FUA Andújar Uranium Concentrate Factory		Dismantled and Restored (in compliance period since 2015)	• Different programs are operational in the areas of environmental radiological surveillance, radiation protection of the workers, security, release control and waste management.
Old Mines of Valdemascaño and Casillas de Flores (Salamanca)		Dismantled and Restored (compliance period since 2008)	• The surveillance and maintenance programs, approved by the CSN in 2010 and 2012, are operational.
LOBO-G (Mineral U Plant, La Haba, Badajoz)		Closed in 2004 (sterile stabilized in enclosure)	• Long-term surveillance program compliant with ORDER ITC/2942/2004, dated August 2, 2004, declaring the closure of the restored Lobo-G plant site.

4.3.4.1. Quercus Plant

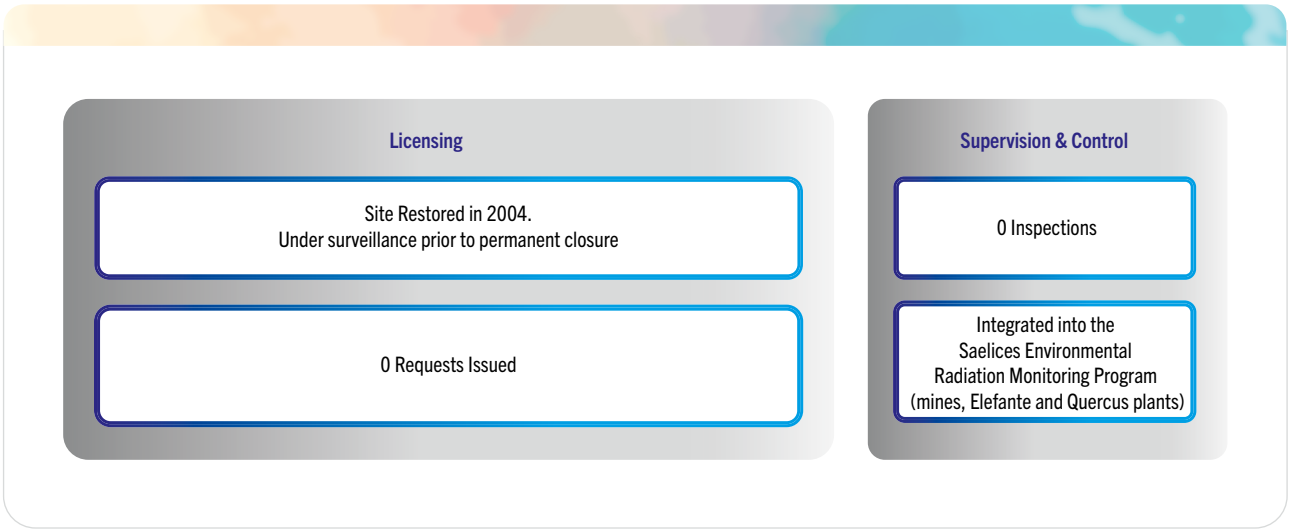
Figure 4.3.4.1.1 summarizes the main activities carried out at the Quercus plant in 2023.

Figure 4.3.4.1.1. Key Activities at the Quercus Plant (2023)

4.3.4.2. Elefante Plant

Figure 4.3.4.2.1 summarizes the main activities carried out at Elefante plant in 2023.

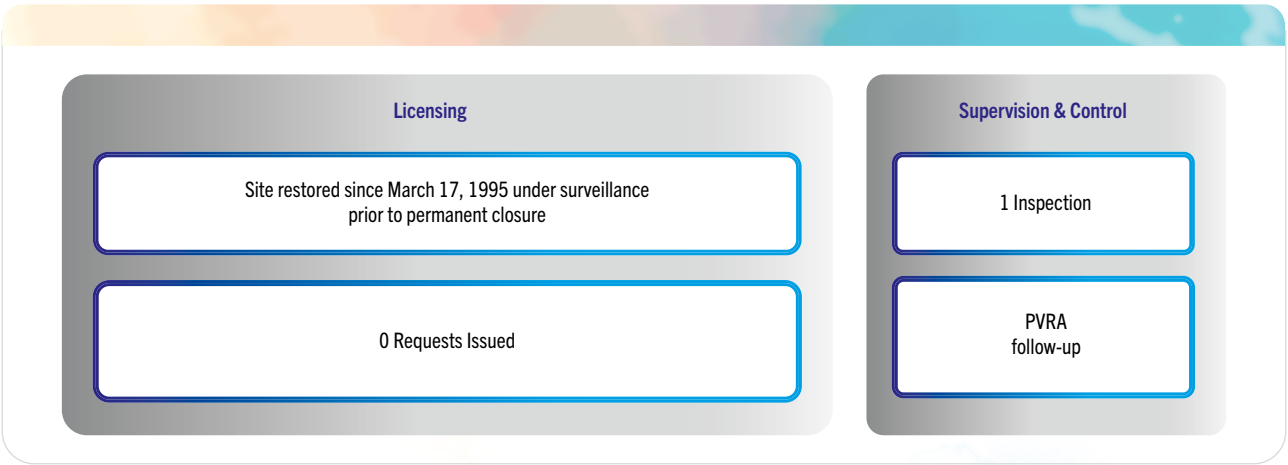
Figure 4.3.4.1.1. Key Activities at the Elefante Plant (2023)



4.3.4.3. Andújar Uranium Factory (FUA)

Figure 4.3.4.3.1 summarizes the main activities carried out at the Andújar uranium factory in 2023.

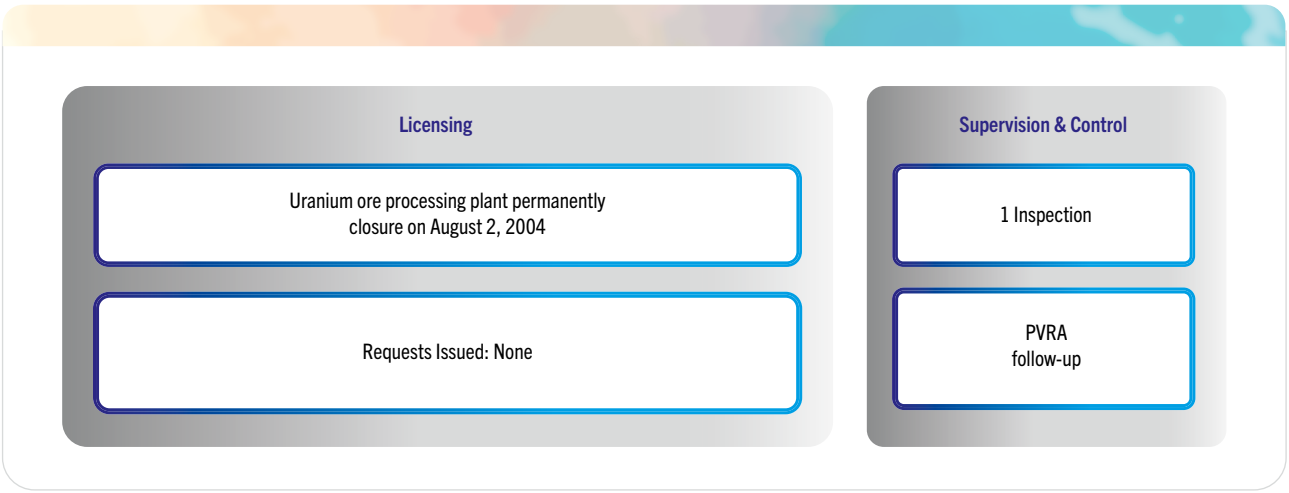
Figure 4.3.4.3.1. Key Activities at the Andújar Uranium Factory (FUA)



4.3.4.4. Lobo-G Plant

Figure 4.3.4.4.1 summarizes the main activities carried out at Lobo-G Plant in 2023.

Figure 4.3.4.4.1. Key Activities at Lobo-G Plant (2023)



4.3.4.5. Saelices el Chico Site

Enusa's project to restore the Saelices el Chico mining site (Salamanca) was approved on September 13, 2004, by the Territorial Service of Industry, Commerce and Tourism of the Regional Government of Castile and Leon.

In 2023, Enusa continued with the groundwater and structure stability monitoring program prior to initiating the post-mining restoration phase, which was favorably assessed by the CSN on March 19, 2014.

4.3.4.6. Valdemascaño and Casillas de Flores Sites

Restoration of these sites ended in 2007 and is currently in the compliance period, with the aim of verifying that restoration works progress as planned. During this period, the Monitoring and Maintenance Program approved by the CSN on September 8, 2010 for the Valdemascaño mine and on April 11, 2012 for the Casillas de Flores mine, is applied.

The Monitoring and Maintenance Programs rolled out by Enusa during the compliance period were initially established with a minimum duration of three years. Upon request by the licensee to cease their activity, the CSN has been extending the validity of these Monitoring and Maintenance Programs in both cases.

4.4. Radioactive facilities

Figure 4.4.1 shows the distribution of radioactive facilities by category and Autonomous Community at the end of 2023.

Figure 4.4.1. Distribution of Radioactive Facilities in Spain

4.4.1. General aspects

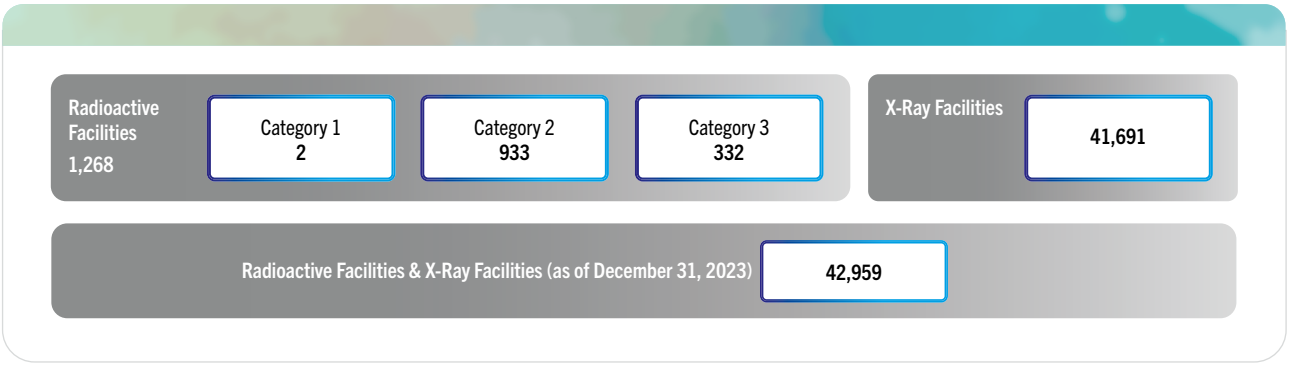
As of 31 December 2022, executive powers over 2nd- and 3rd-category radioactive facilities were transferred to the Autonomous Communities of Aragon, Asturias, Balearic Islands, Canary Islands, Cantabria, Catalonia,

Castile and Leon, Ceuta, Extremadura, Galicia, La Rioja, Madrid, Murcia, Navarre, Basque Country and Valencia. However, in terms of occupational, public and environmental Radiation Protection, the CSN still holds the responsibility of ensuring the correct operation of those facilities authorized by the corresponding executive body, including X-ray facilities for medical diagnostics.

In this respect, it is important to mention that the CSN currently has entrustment agreements with nine Autonomous Communities which perform inspection functions. Three of those agreements also include functions relating to evaluation of radioactive facilities. The Autonomous Communities with an entrustment agreement are Asturias, the Balearic Islands, the Canary Islands, Catalonia, Galicia, Murcia, Navarre, the Basque Country and Valencia.

Figure 4.4.1.1 shows a schematic representation of the number of radioactive facilities nationwide at the end of 2023.

Figure 4.4.1.1. Global Data on Number of Radioactive Facilities



In 2023, radioactive facilities for scientific, research, medical, agricultural, commercial and industrial purposes were operated in line with applicable safety and radiation protection requirements, without any undue risk situations.

4.4.2. Generic issues

A generic issue is defined as any problem relating to radiation protection or safety which may affect more than one facility and implies special monitoring by the CSN, such as the issuance of instructions or circulars to all radioactive facilities or to specific sectors in order to require actions, make requests or provide information on relevant developments.

Generic issues can also arise from the analysis of experience in Spanish or foreign nuclear facilities, as well as from the assessment of standards issued by international agencies or Regulatory Bodies from other countries. The CSN has a Panel for Review of Regulatory and Operating Experience in associated to Radioactive Facility and Incidents (PIRA), as well as an Incident Review Panel (PRI) and an International Incident Review Panel (PRIN), made up of sectoral CSN specialists who meet periodically to examine such experiences, determine their applicability in the Spanish context and assess the corresponding actions to be taken.

Table 4.4.2.1 below summarizes the generic actions carried out by the CSN in 2023.

Table 4.4.2.1. Generic Actions Carried Out by the CSN in 2023

GENERIC ISSUES	SITUATION IN 2023	ACTIONS
Radioactive facilities with economic viability issues.	27 facilities under special supervision	
	131 facilities which solved their situation	
Application of standards on the security of radioactive sources (Instruction IS-41, approving the requirements on the radioactive source protection)	Favorable report on the physical protection plans of 45 facilities. An additional 36 physical protection plans under evaluation.	

Table 4.4.2.1. Generic Actions Carried Out by the CSN in 2023 (cont'd)

GENERIC ISSUES	SITUATION IN 2023	ACTIONS
Patient Protection	The year 2023 marked the end of the third phase of the MARRTA project, which aims to develop a risk model, advanced radiotherapy practices and a MARRTA software tool for risk analysis in radiotherapy services.	Implementation of radiotherapy accident prevention requirements included in Directive 2013/59/Euratom and Royal Decree 601/2019 on justification and optimization of ionizing radiation usage for radiological protection of people under medical exposures. The Spanish Society of Radiation Oncology (SEOR) and the Spanish Society of Radiology, Radiotherapy and Nuclear Medicine Technicians (AETR), with the support of the Spanish Ministry of Health, participate in the project together with the members of the Forum for Radiation Protection in the Healthcare Environment.

4.4.3. Licensing, Inspection, Monitoring and Control of Radioactive Facilities

Table 4.4.3.1 summarizes the most relevant CSN activities regarding the licensing and control of radioactive facilities in 2023.

Table 4.4.3.1 Key Licensing and Control Activities in Radioactive Facilities

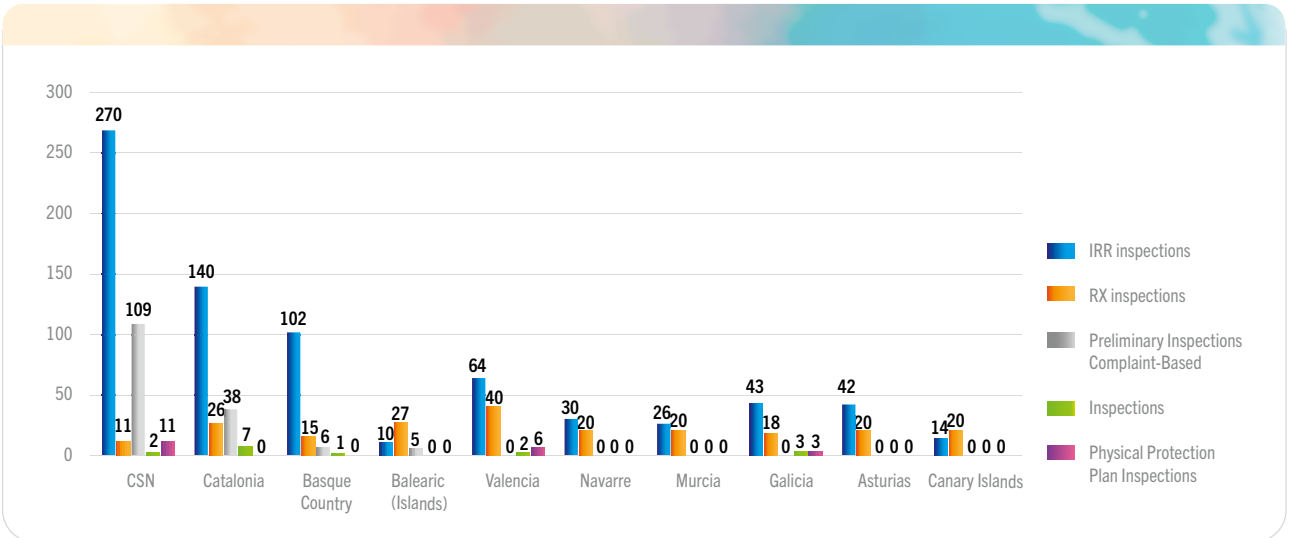
In 2023, a total of 626 approvals were made in relation to radioactive facility licenses. CSN personnel drafted 525 evaluation reports prior to issuing a technical report. with the remaining 101 being drawn up and evaluated by technical personnel from the Autonomous Communities entrusted with evaluation functions.
1151 inspections of radioactive facilities and evaluation of 1268 annual facility reports.
43 complaints about radioactive and medical radio diagnosis facilities. By the end of the year, 13 had been resolved and the remaining 30 were underway.
14 events reported to the CSN, in accordance with Regulatory Safety Instruction IS-18, on criteria to report radiological events and incidents at radioactive facilities (2 classified as INES 1).
Thirty-five warnings were issued to radioactive facilities.

Table 4.4.3.2. Key Licensing Processes in Main Radioactive Facilities according to their Scope of Application. 2023

LICENCIAMIENTOS DESTACADOS 2023, POR ÁMBITO DE ACTUACIÓN	
APPLICATION	**PROCESSES**
INDUSTRIAL FACILITIES	• The high number of delegation registrations and de-registrations in gammagraphy facilities implied the need to report physical protection plan revisions, as well as new installations. • In 2023, the implementation of safety measures in industrial gammagraphy operation bunkers was evaluated as per the requirements of Complementary Technical Instruction referenced CSN/SRO/ IRIN/IRA/000/ITC-bunker operation-01/2021.
COMMERCIAL FACILITIES	• Evaluation of permits for vehicle and container inspection systems used mainly in ports and incorporating drive-through or portable scanning features.
MEDICAL FACILITIES	• More than 140 modification requests for medical radioactive facilities included within the INVEAT Plan led by the Ministry of Health, were reported. The technical equipment covered by these requests involves the renewal of high-tech medical equipment for application in the field of radiotherapy and nuclear medicine. • In December 2023, a total of 263 high-tech pieces of equipment included in the INVEAT plan were successfully licensed. The CSN evaluated a total of 216 pieces of equipment directly: 79 single photon emission tomography (SPECT-CT) devices; 73 linear electron accelerators (LINAC), 40 positron emission tomography (PET) machines and 24 high rate brachytherapy (HDR) machines. Through the entrustments of the Balearic Islands, Catalonia and the Basque Country, a total of 6, 33 and 8 units were evaluated, respectively, for a total of 263 units evaluated and processed prior to the decision-making process by the CSN Plenary Board. • The CSN role in this ambitious project contributed to successfully achieving the strategic objectives set by the Ministry of Health for this Plan, as stated in the INVEAT Plan compliance evaluation agreement approved by the Inter-territorial Council of the National Health System on December 22, 2023. This agreement recognizes *the relevant role played by the CSN in achieving this plan through the publication of guides which simplified licensing procedures, strengthening work teams to shorten times and planning visits during vacation periods.*

In 2023, a total of 1,151 inspections to radioactive facility were made. Graph 4.4.3.1 shows the inspections performed by the CSN and the Autonomous Communities with an entrustment agreement in 2023, distributed by type of inspection and radioactive facility.

Graph 4.4.3.1. Inspections performed by the CSN and the Autonomous Communities with an entrustment agreement in 2023 distributed by type of inspection and radioactive facility.



4.4.4. Coercive actions

Table 4.4.4.4.1 summarizes supervision and control activities carried out by the CSN and Autonomous Communities with entrusted functions, which eventually led to coercive actions in 2023.

Table 4.4.4.1. Coercive actions carried out at radioactive and X-ray facilities in 2023

Warnings	CSN	35
Warnings	Basque Government	9
Warnings	Catalonia Government	5
Proposed Sanction Proceeding	CSN	0

4.5. Service organizations, licensed personnel and other activities

Table 4.5.1 shows a summary of CSN activities in this area throughout 2023.

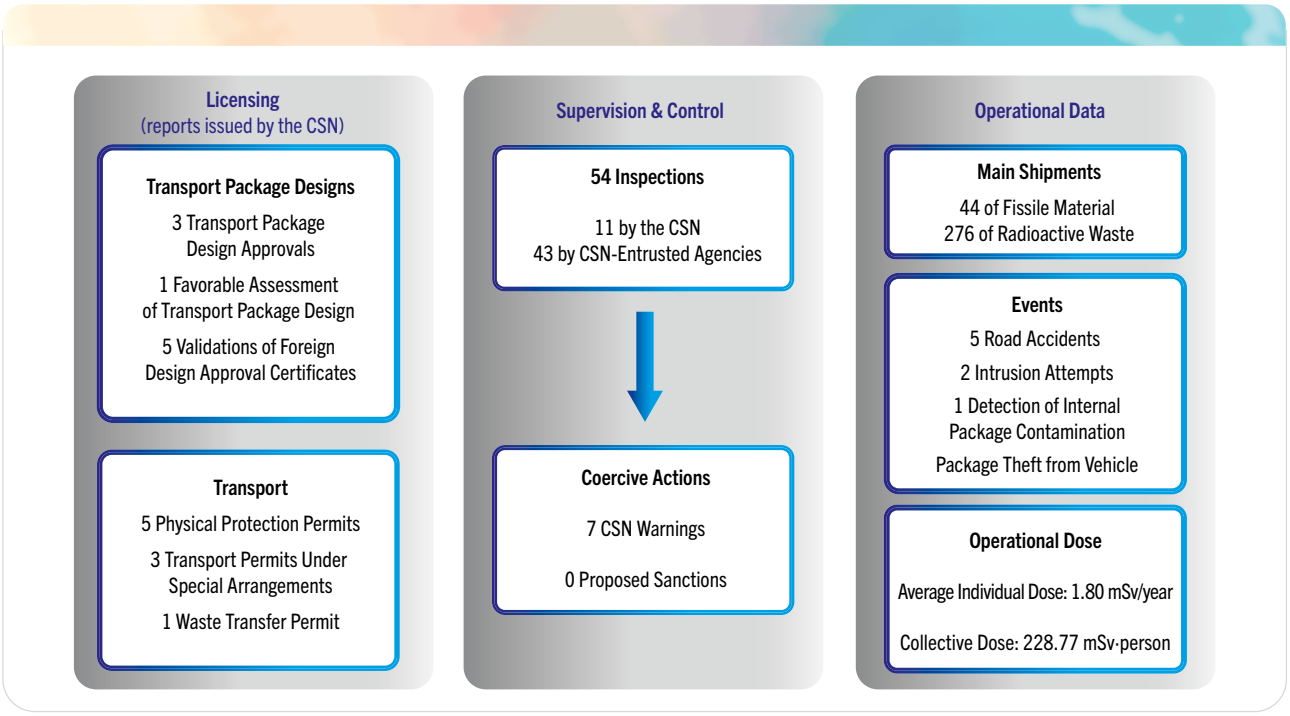
Table 4.5.1. CSN Activity for Service Entities in 2023

SERVICE	IN FORCE	ACTIVITY
Radiation Protection Services	96	• 1 Permit Modification • 2 Licensing Inspection • 9 Control Inspections
Technical Radiation Protection Units	44	• 1 Permit Modification • 1 Permit Request File • 1 Licensing Inspection • 3 Control Inspections
Personal Dosimetry Services	21 (external) 8 (internal)	• 2 Permit Modifications • 2 Control Inspections
External Companies (Contractors)	2265	• Control Through Operational RP Inspections in Refueling Outages
Sale and Support of Medical X-Rays	371	• 8 Reports of New Permits • 5 Reports of Application File
Other Regulated Activities	139	• 8 New Entities Reported • 17 Reports of Permit Modifications
Licenses and Accreditations	13,638 Radioactive Facilities 203,350 R-Ray Facilities 254 NPPs 247 Cycle Facilities	• Radioactive Facilities (1,798 Concessions and 1,138 Extensions) • R-Ray Facilities (4,674 Accreditations Issued and 4,857 Certificates of Accredited Courses). • NPPs (21 Concessions and 28 Renewals) • Cycle Facilities (10 Concessions and 40 Renewals)
Approved Course Entities Radioactive & X-Ray Facilities	38 Course Entities Radioactive Facilities 66 Course Entities R-Ray Facilities	• 5 New Accredited Entities • 27 Accreditation Modifications • 116 Inspections of Training Courses
Device-Type Approval	268	• 7 Reports of New Approvals • 26 Reports of Approval Modifications

4.6. Transport of radioactive material

Figure 4.6.1 summarizes CSN transportation milestones in 2023, which are detailed in the sections below.

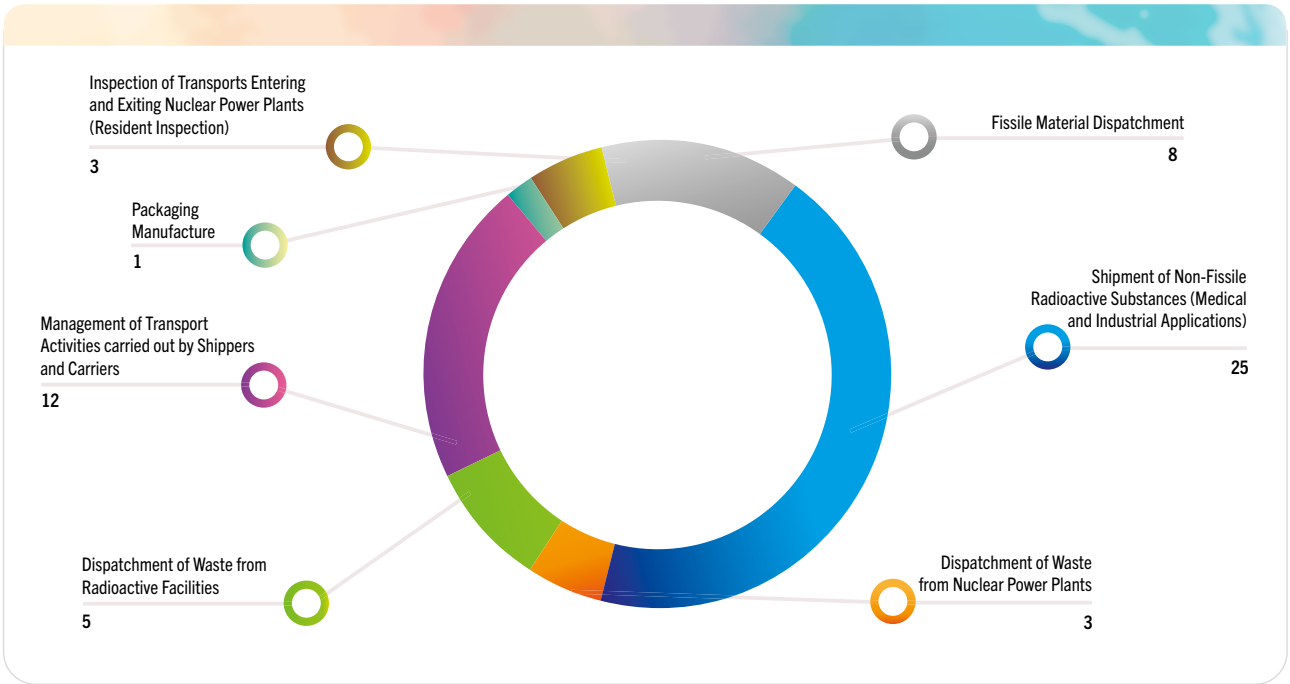
Figure 4.6.1. CSN Transportation Milestones in 2023



In 2023, a total of 54 transport-related inspections were performed, 11 by the CSN and 43 by entrusted Autonomous Community agencies (one of them in collaboration with the CSN).

Graph 4.6.1 shows the total number of inspections carried out in 2023 by type of inspection.

Graph 4.6.1. Types of Radioactive Material Transport Inspections in 2023



4.7. Activities and Facilities Not Covered by Nuclear Regulations

Radioactive Material Detected in Seaports

In June 2010, the CSN, the Ministries of Home Affairs, former Ministry of Public Works and *MITECO*, the State Agency of Tax Administration (AEAT) and Enresa jointly signed the *Action Protocol for cases of illegal trafficking or inadvertent movement of radioactive material in ports of general interest* (Algeciras, Valencia, Barcelona, Bilbao, Vigo, Tarragona and Santa Cruz de Tenerife), being a reference framework for radiological monitoring of merchandise entering Spain by sea. This protocol is often referred to as "Megaport Protocol".

This year there was only one detection, a decrease compared to the previous year, when there were a total of five detections.

Control of Radioactive Material detected in Metallic Materials

In 2023, application of the *Collaboration Protocol on the Radiological Surveillance of Metallic Materials* signed in 1999 resulted in the CSN being notified on 69 occasions of the detection of radioactivity in metallic materials. A total of 2,286 detections have been reported since 1998.

A list of all facilities adhered to the collaboration protocol on the radiological surveillance of metallic materials can be found in the following e-mail address.

In 2023, the CSN reported favorably on the normalization, from a radiological standpoint, of *Aluminio La Estrella*, following the Am-241 radioactive source melting incident occurred at their facilities in February 2022.

During 2023, two incidents involving the melting of radioactive sources in steel mills occurred.

On June 8, 2023, *Megasa Siderúrgica S.L.* informed the CSN about the accidental melting of a Cs-137 source in the electric arc furnace of its facilities in Narón (A Coruña). This facility is ascribed to the Collaboration Protocol on the Radiological Surveillance of Metallic Materials.

On September 12, 2023, *Corrugados Getafe, S.L.U.* informed *UTPR Proinsa* about an incident involving the melting of a radioactive Cs-137 source at its corrugated steel production plant in Getafe (Madrid), requesting their prompt intervention. On September 13, 2023, the CSN was informed about the furnace incident and shutdown the previous day, as well as on the implementation of preliminary self-protection measures.

Removal of unauthorized radioactive material

In 2023, the CSN reported 20 transfer permits to Enresa for various radioactive materials and sources, one of them issued by the entrusted agency in the Basque Country. In 16 of these transfers, the requesting entity was not authorized as a radioactive facility.

Figure 4.7.1 summarizes CSN work in 2023 in relation to these non-regulated activities.

Figure 4.7.1. Summary of activities carried out at facilities not regulated by nuclear regulations

5. RADIATION PROTECTION OF EXPOSED WORKERS, THE PUBLIC AND THE ENVIRONMENT

5.1. Radiation Protection of Workers

In 1985, the CSN created the National Dose Register as a database centralizing the dosimetry records of exposed workers at nuclear and radioactive facilities.

Figure 5.1.1 summarizes information on the types of records available in the National Dose Register at the end of 2023.

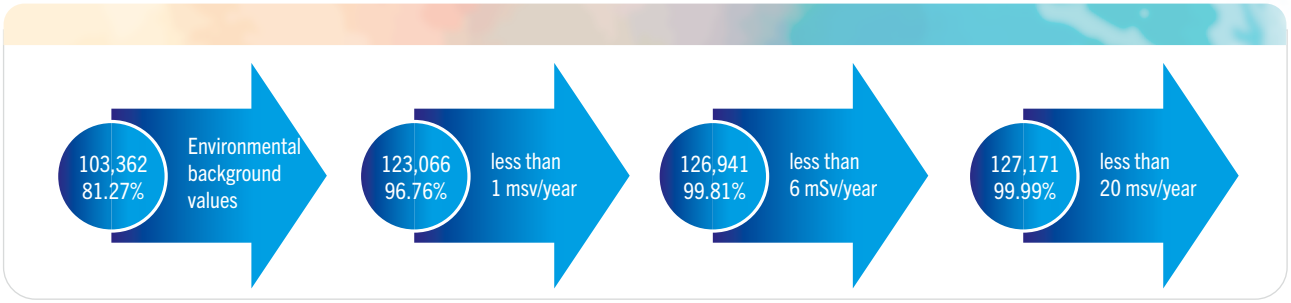
Figure 5.1.1. National Dose Register Data 2023

The number of workers dosimetrically controlled this year was 127,394, who are assigned a collective dose of 16,747.04 mSv per person.

If only workers with significant doses are considered and the cases of potential annual dose limit excess are excluded, the average individual dose in this group of workers amounted to 0.70 mSv/year.

Figure 5.1.2 shows the number of workers and their percentage, indicating those with dose values similar to environmental background values, as well as those receiving doses lower than 1 mSv, 6 mSv and 20 mSv.

Figure 5.1.2. Number of Workers and Percentage Depending on the Received Dose



In 2023, there were 5 cases in which the legal annual dose limit was potentially exceeded, all of them at medical radioactive facilities.

In all cases, the CSN undertook an analysis and investigation which are yet to be completed as of the date of writing of this report.

Graph 5.1.1 shows the average individual dose per sector. It is worth noting that transport activities account for the highest average individual dose (1.8 mSv/year).

Table 5.1.1 shows the doses received by workers in each of the sectors under review.

Graph 5.1.2.2. Average individual dose per sector. Year 2023

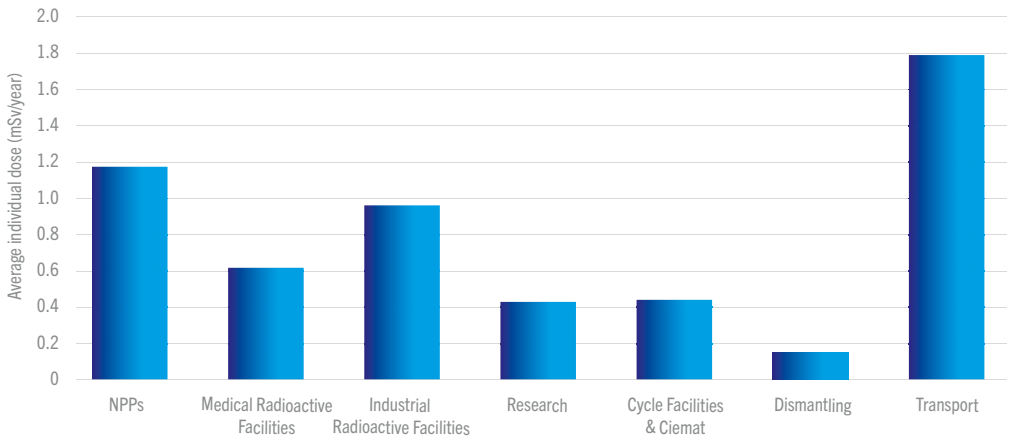


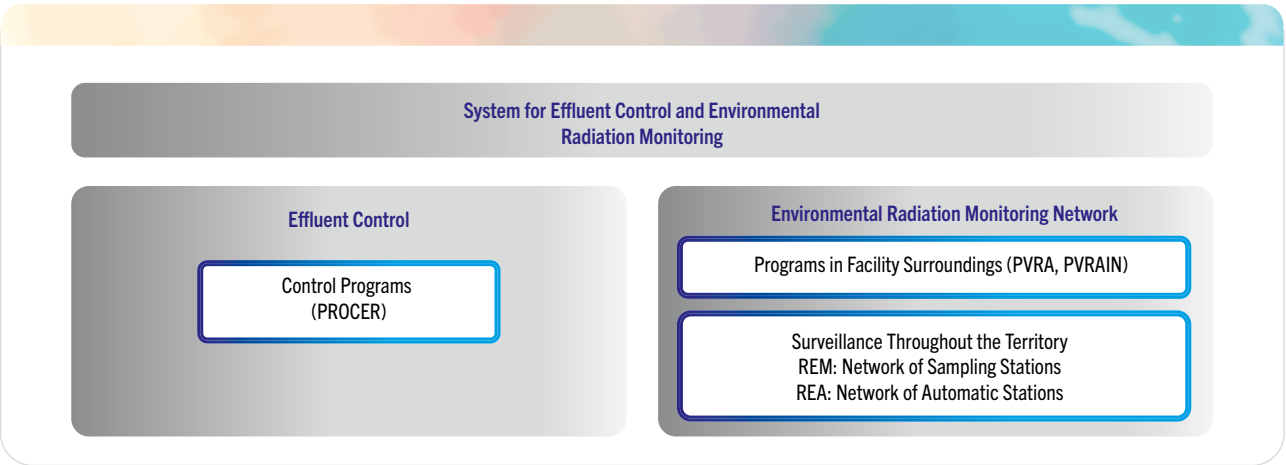
Table 5.1.1. Doses received by workers in each sector under review

FACILITIES	NUMBER OF WORKERS	COLLECTIVE DOSE mSv· person	AVERAGE INDIVIDUAL DOSE mSv/year
Nuclear Power Plants	8,125	3,202	1.18
Fuel cycle facilities, radioactive waste storage facilities and research centers (Ciemat)	1,113	50	0.45
Radioactive Facilities Medical Industrial Other	100,284 8,267 10,053	11,344 1,626 353	0.62 0.96 0.44
Facilities under Decommissioning and Permanent Closure	516	1	0.15
Transport	220	229	1.80

5.2. Discharge control and environmental radiation monitoring

Figure 5.2.1 outlines key activities related to effluent control and environmental radiation monitoring.

Figure 5.2.1. Key activities related to effluent control and environmental radiation monitoring



In 2023, effective doses resulting from liquid and gaseous radioactive effluents from nuclear facilities, estimated for members of the public using realistic criteria, never exceeded 1.1% of the authorized limit (0.1 mSv in 12 consecutive months).

Regarding Environmental Radiation Monitoring Plans (Spanish acronym, PVRA), the results for 2022 are presented below because the results for 2023 remain unavailable at the time of issuing this report due to the time required for sample processing and analysis.

The results of the 2022 PVRA campaign are similar to those obtained in previous years and lead to the conclusion that the environmental quality around the facilities remains within acceptable radiological conditions, without any risk for people due to facility operation or dismantling or decommissioning activities.

The CSN implements independent environmental radiation monitoring programs (Spanish acronym: PVRAIN). The number of samples and determinations of these independent programs represents around 5% of those implemented by licensees.

The results of 2022 campaign programs did not show any significant deviation compared to those obtained from licensee programs.

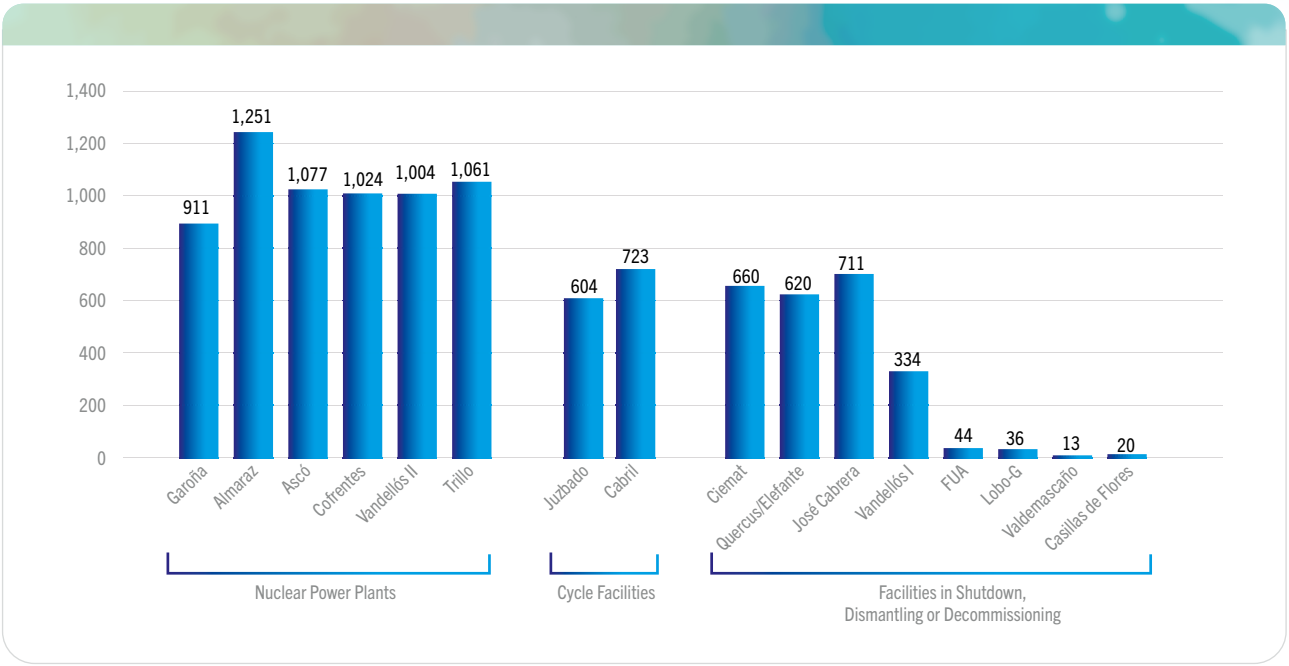
the CSN website, it is possible to access environmental monitoring data in Spain by clicking on the link "Environmental values. REM and PVRA".

Figure 5.2.1 summarizes PVRA data for the 2022 campaign.

In addition to surveilling the areas around the facilities, the CSN monitors the environment at a national level by means of a surveillance network known as Revira, in collaboration with other institutions. This network is made up of automatic stations measuring atmospheric radioactivity online (Spanish acronym: REA) and stations collecting samples for subsequent analysis (Spanish acronym: REM).

Measurements recorded in 2022, both in the surveillance network managed by the CSN and in the regional networks, were compliant with environmental radiation background values, indicating there are no radiological risks for people or the environment.

Graph 5.2.1. Number of PVRA Samples in the 2022 Campaign



In 2022, neither in Spain or abroad did any radioactive contamination event occur that required the specific monitoring of the national network of sampling stations. As also noted in 2021, it is only worth mentioning some meteorological phenomena that in the months of February and March 2022 caused the arrival of dust clouds from the Sahara. Such clouds were closely monitored mainly through the results obtained in the online sampling equipment of dust particles using high flow equipment of the spaced network, where an increase in the detection rate of cesium-137 traces was detected, but always within the regular values which are sporadically detected. Otherwise, the sampling and analysis programs remained within their normal scope, with no operational incidents.

Euratom Article 35 Verification Missions

The European Commission checks radiological monitoring systems in the air, water, soil and food of all European Union Member States in accordance with Article 35 of the Euratom Treaty, which states that:

Each Member State shall establish facilities necessary to carry out continuous monitoring of the levels of radioactivity in air, water and soil and to ensure compliance with the basic safety standards. The Commission shall have the right of access to such facilities in order that it may verify their operation and efficiency.

The table below shows the history of Euratom Treaty verification missions carried out in Spain by the EC.

Table 5.2.1. History of Euratom Article 35 Verification Missions to Spain

YEAR	FACILITY	LABORATORY	OTHER
2004	Trillo NPP (Guadalajara)	Environmental Measurements (Burgos) Ciemat URAyVR (Madrid)	SALEM-CSN (Madrid)
2007	Cofrentes NPP (Valencia)	University of Valencia Valencia Polytechnic University	REM Stations (Cedex & CSN) REA Stations (CSN) RAR Stations (Civil Protection)
2008	Ascó NPP		
2009	Fosfoyesos (Huelva) CRI-9 (Huelva)	University of Huelva University of Seville Citius (Seville) Ciemat URAyVR (Madrid) Geocisa (Madrid)	
2010	Palomares (Almería)	Ciemat (Almería)	
2012	Quercus & Elefante (Salamanca) Valdemascaño Mining Site (Salamanca) Andújar Uranium Factory (Jaén) La Virgen Mining Site (Jaén)	University of Salamanca Enusa Juzbado (Salamanca) Enusa Saelices (Salamanca) University of Granada University of Seville	REM Stations (CSN) REA Stations (CSN) RAR Stations (Civil Protection)
2018	Almaraz NPP (Caceres)	University of Caceres	Alert Center (Extremadura) RAE & RARE Stations (Extremadura) REM Stations (CSN) REA Stations (CSN)
2019	Palomares (Almería)	Ciemat-RARE (Madrid) Ciemat URAyVR (Madrid)	
2021	Santa María de Garoña NPP (Burgos)	Environmental Measurements (Burgos)	RAR Stations (Civil Protection) REA Stations (CSN)
2021	Marine environment of the Cantabrian Sea and Galician Coastline	Cedex (Madrid)	

5.2.1 Site-specific surveillance

Although this type of sites is dealt with in section 5.3 of this report, here we single out the Palomares and CRI-9 sites, which were contaminated as a result of accidents and for which the CSN established specific surveillance programs in the areas indicated in figure 5.2.1.1.1, where there is residual contamination due to reasons described below.

Figure 5.2.1.1. Areas with Specific Surveillance Programs

Environmental Radiation Monitoring in the Area of Palomares

In 1986 the CSN was assigned the task of monitoring surveillance plans for the Palomares area, whereas Ciemat was given the responsibility for technical execution of the Environmental Radiation Monitoring Program (PVRA), with the obligation to report periodically to the CSN on the results obtained. The existing Palomares PVRA was approved in 2012 and includes the collection and analysis of samples of air, rainwater or dry deposition, soils, animal food, crops, and different types of water, indicator organisms and sediments.

In 2023 Ciemat submitted to the CSN the annual report corresponding to the 2022 results, which show that residual contamination values at Palomares remains within the range of previous years.

In 2023, the CSN continued to supervise and control Palomares PVRA results.

An inspection of PVRA development was also carried out. The program includes the measurement of americium-241 by gamma spectrometry and plutonium-239+240 by alpha spectrometry. These plutonium analyses which could not be performed during the 2018 and 2019 campaigns due to equipment unavailability as a result of laboratory refurbishment works, have therefore been reinstated. This technique achieves increased detection levels which enabled the detection of plutonium activity in many of samples in which gamma spectrometry did not detect americium-241. During the 2022 campaign, plutonium-239+240 activity above the lower detection limit was found in all air samples and in most rainwater, dry tank and indicator organism samples. It was also detected in four crop samples out of 24 measured, although this time, no activity was found in either of the two bottom sediment samples measured. In no case the reference levels considered by international organizations, derived from an annual dose value of 0.1 mSv/year, were exceeded.

Inert Waste Recovery Center at the Mendaña Marshes, CRI-9

The melting in 1998 of a cesium-137 source in an ACERINOX steel plant furnace in Los Barrios (Algeciras-Cadiz) resulted in the contamination at the Mendaña Marshes (Huelva) of Inert Recovery Center pond No. 9 (CRI-9), with an approximate surface area of 1,600 m2. This center receives the NORM waste generated by the activity of the Fertiberia company, which was closed in 2010. As part of the area restoration process, EGMASA (Public Environmental Company of the Regional Government of Andalusia) manufactured filler materials using inert waste (slag and fumes) from the steel mill.

By Resolution of the Directorate General of Energy Policy and Mines of January 15, 2001, radioactive material was authorized to remain in the area, applying a layer of clay over the contaminated spill fronts and establishing a PVRA to ensure a limited radiological impact on the environment.

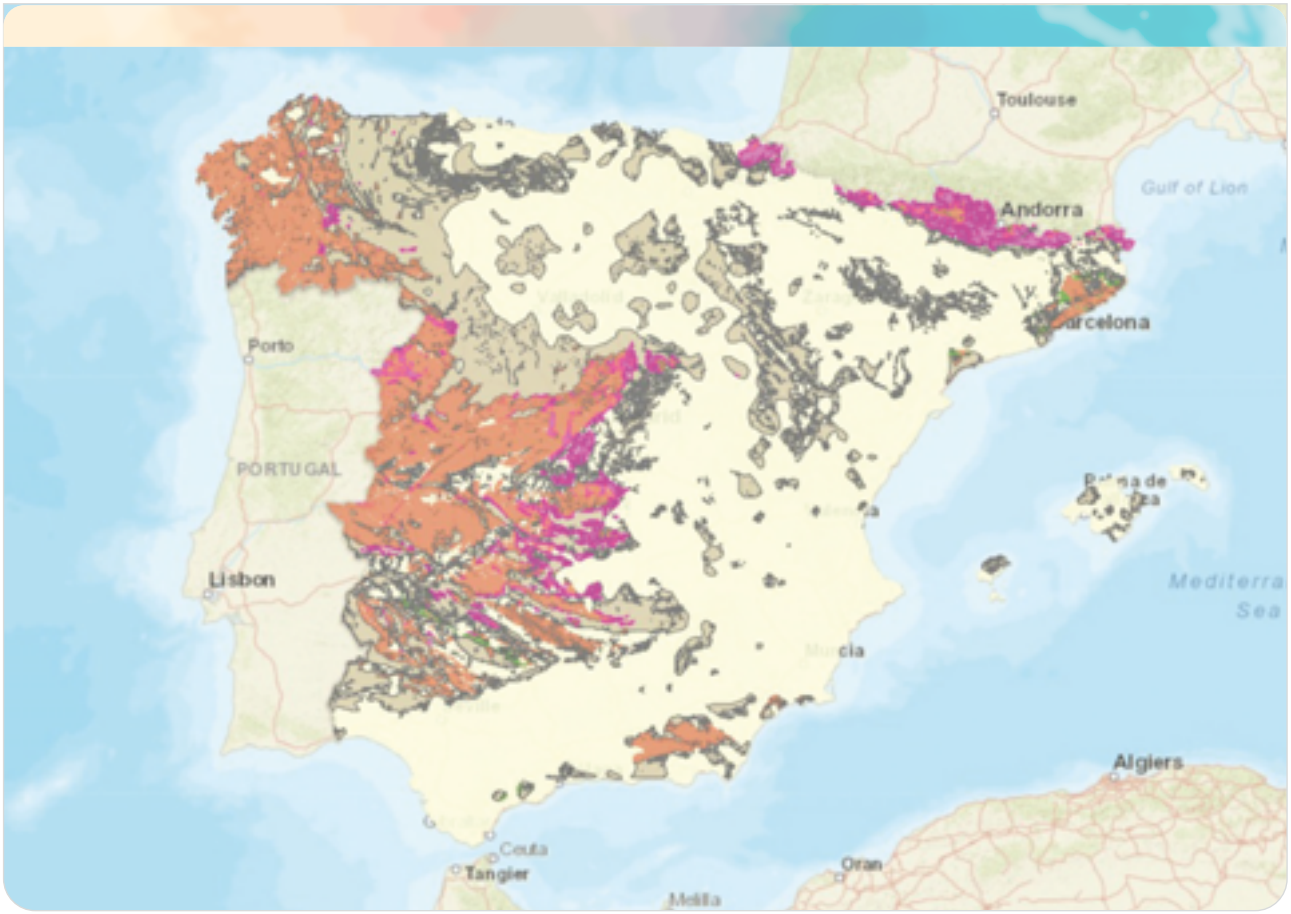
The PVRA of the affected area began in November 2002, with the monitoring of surface and groundwater for Cs-137 control, as well as in the vicinity of the affected area. Later on, given the results obtained, this plan was extended to other types of samples (sediments and shore plants), changing the monthly sampling frequency to quarterly as of 2004 and, as of 2015, to half-yearly.

The CSN analyzes and evaluates the report on PVRA results every year, in addition to supervising and controlling its implementation. Within the scope of supervision and control processes, the CSN inspects PVRA development annually, without any significant data being reported.

Protection against Natural Radiation Sources

CSN-developed natural gamma radiation maps (MARNA) and radon potential maps, make it possible to visualize in Spain current exposure levels to gamma radiation emitted by the Earth's crust and to radon gas, respectively (see figure 5.2.1.2).

Figure 5.2.1.2. Radon Potential Map for Spain



This last map is the basis for municipality zoning established by the Technical Building Code (Basic Document HS, section HS 6 "Protection against Radon Exposure") to determine which types of construction solutions against radon should be incorporated in buildings.

In addition to these natural radiation sources, certain industrial activities treat materials containing naturally occurring radionuclides and alter their initial concentrations. Such materials are referred to as NORM and may have a radiological impact on human health or the environment.

The following table summarizes the most relevant activities carried out in 2023.

Table 5.2.1.1. CSN Actions related to NORM Industries in 2023

In 2023, the CSN carried out eight inspections in the area of natural radiation exposure control. Three of these inspections related to the control of industries processing Naturally Occurring Radioactive Material (NORM) or affected by these industries, and five to workplaces exposed to radon.
In relation to other exposure situations, and regarding the management of land affected by naturally occurring radioactivity (NORM) due to past activities, in March 2023, the CSN Plenary Board favorably reported the Basic Remediation Project for the "El Hondón" site (Cartagena), within the scope of its competences, subject to compliance with a radiological protection condition.
In May 2023, the request for a favorable assessment was received to partially dismantle the Casablanca oil platform, which includes the work of sealing and abandoning the platform underwater wells, owned by the company Repsol Investigaciones Petrolíferas S.A., which was favorably approved in early 2024.
As part of the ordinary environmental impact assessment procedure related to the permit for sealing and final abandonment of hydrocarbon wells, the CSN issued reports on the radiological aspects of Repsol's assets in Tarragona (Casablanca), Huelva (Poseidón) and Albatros (Vizcaya).
Within the scope of radon exposure, and as regards to public protection, Directive 2013/59/Euratom, on basic safety standards for protection against the dangers arising from exposure to ionizing radiation, urges Member States to develop action plans ultimately aimed at reducing the risk of radon-attributable lung cancer. The Health, Consumption and Social Welfare Ministry is coordinating the preparation of the future National Plan against Radon. While awaiting Plan approval, the CSN is already working on several of action lines which will be carried out by means of R&D&I projects.

Other Locations Affected by Long-Term Exposure

Figure 5.2.1.3 shows the Spanish sites with radioactivity caused by human activities. Those sites are briefly described below (Palomares and CRI-9 are excluded, as they were described in section 5.2 above). To date, all checks carried out by the CSN indicate these sites do not pose a significant radiological risk.

- In the Mendaña Marshes, located in the Tinto River estuary in Huelva, before joining the Odiel River, is home to the Inert Waste Recovery Center, which includes phosphogypsum waste ponds containing radium-226 from the former Fertiberia fertilizer factory, closed in 2010. It has a surface area of approximately 1,200 hectares.

- The El Hondón area in Cartagena (Murcia), with a surface area of approximately 108 hectares, contains phosphate sludge deposits with the presence of uranium-238, also from an old fertilizer factory.

- In locations located in several municipalities of Madrid and Toledo, on the banks of the Canal Real del Jarama, there are eight trenches of variable length and depth, known as the Banquetas del Jarama, with the presence of fission products from a spill accident in 1970, namely the artificial isotopes cesium-137 and strontium-90.
- The Ebro river reservoir located in Flix, Tarragona, contained phosphate sludge containing uranium-238 from the fertilizer industry. Sludge removal was completed in 2020.

Figure 5.2.1.3.3 Location of Sites Containing Soils Affected by Radioactivity Not Related to Mining

6. MONITORING AND CONTROL OF SPENT FUEL AND RADIOACTIVE WASTE MANAGEMENT

In Spain, radioactive waste is generated by nuclear and radioactive facilities throughout the country, as shown in Figure 6.1.

The origin of the inventory of waste generated to date is shown in Table 6.1.

Figure 6.1. Facilities generating radioactive waste in Spain

Table 6.1. Activities generating radioactive waste

Operation of nuclear power plants (7 reactors in 5 sites) plus Santa María de Garoña NPP, which remained in a situation of permanent shutdown until Official Gazette publication of Order TED/796/2023, dated July 13, granting site ownership to Enresa and authorizing decommissioning Phase I
Operation of the Juzbado Nuclear Fuel Assembly Plant (Salamanca, Spain)
Project to upgrade Ciemat's facilities in Madrid (PIMIC-D and PIMIC-R)
Operation of industrial, medical, agricultural and research radioactive facilities
Operation of the El Cabril low- and intermediate-level radioactive waste disposal facility (Sierra Albarrana, Cordoba)
José Cabrera NPP decommissioning
Reprocessed fuel from Vandellós 1 NPP (generated during its operation) currently stored in France and pending its return to Spain
Radiological incidents in conventional facilities, such as scrap metal recycling and remediation of affected sites
Radioactive waste can also be generated by the presence of radioactive sources and other radioactive materials in facilities or activities not included in the regulatory system

6.1. High-Activity radioactive waste and Spent Fuel

Spent fuel generated in Spain (except Vandellós 1 NPP reprocessed fuel, currently stored in France) is temporarily stored in the nuclear reactor building pools and in casks placed in the Interim Storage Facilities (ISF) at the NPPs of Trillo, José Cabrera, Ascó, Almaraz and Cofrentes.

In 2023 the CSN controlled and supervised the management of spent fuel, the evaluations of cask licensing both in terms of design permit modifications and their renewal for existing casks, the supervision of pre-operational testing, the loading of fuel into ISFs and the management of pools. The main tasks in 2023 are detailed in later sections of this report.

It should also be noted that in 2023 the multidisciplinary team (MITERD, CSN and ENRESA) created in 2020, continued working to further develop a roadmap for the Deep Geological Repository (DGR) project, thus addressing the recommendations and suggestions provided by the ARTEMIS component of the combined IRRS-ARTEMIS mission to Spain carried out by the IAEA in 2018.

As of December 31, 2023, the total number of fuel assemblies stored in nuclear power plants was 17,714 (10,033 of PWR type and 7,681 of BWR type). Out of this total number of fuel assemblies:

- 14,513 (4,403 tons of uranium) are stored in pools.
- 3,201 (1,195 tons of uranium) are stored in ISF casks.

The total number of casks stored in the NPP ISFs is 109.

Figure 6.1.1 shows the inventory of fuel stored in the spent fuel pools of Spanish nuclear power plants and, where appropriate, at existing ISFs as of December 31, 2023.

Graph 6.1.1. Inventory of spent fuel storage facilities at Spanish nuclear power plants as of December 31, 2023 (in number of fuel assemblies).

Figure 6.1.1 below summarizes the main licensing, supervision and control activities performed by the CSN in 2023 in the area of spent fuel management.

Graph 6.1.1.1 Inventory of spent fuel storage facilities at Spanish nuclear power plants as of December 31, 2023 (in number of fuel assemblies).

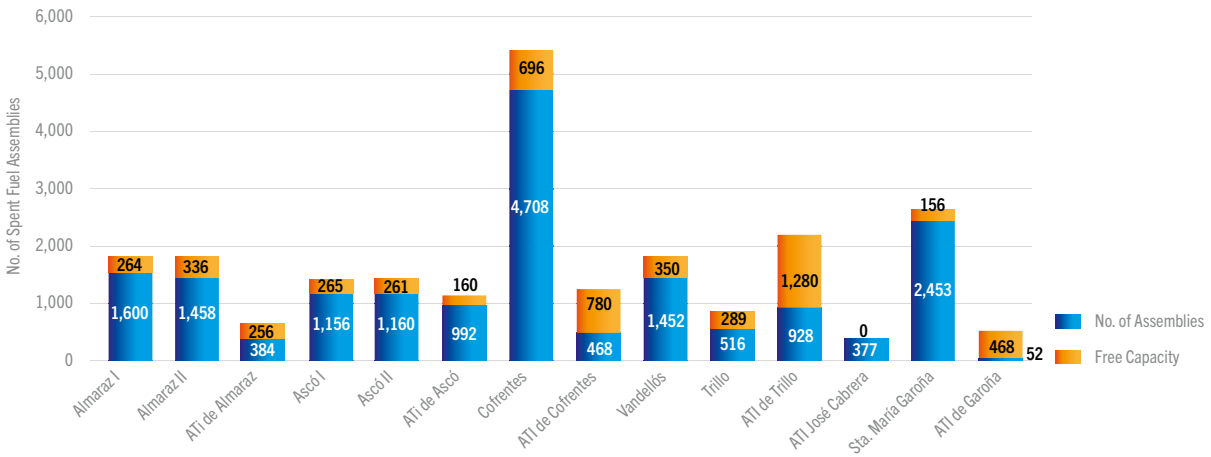


Figure 6.1.1. Main licensing, supervision and control activities performed by the CSN in 2023 in the area of spent fuel management

Licensing and Evaluation

In 2023, no request for the granting, modification or renewal of design approval for spent fuel casks was reported favorably. The modification of the ENUN 52B cask design approval for BWR fuel storage at Sta. María de Garoña NPP is currently under evaluation, with approval expected in 2024.

In 2023, Enresa's request for ownership transfer of the Sta. Mª de Garoña NPP, as well as the authorization of plant decommissioning phase 1, was reported favorably, which means that activities to empty the spent fuel pool will be carried out under the ownership of Enresa.

Inspection (6)

Within the Basic Inspection Plan, 3 inspections were made in Trillo, Ascó and Vandellós 2.

1 inspection on manufacturing processes and design modifications of the ENUN 52B cask design approval licensee (ENSA).

1 inspection of ENUN 32P cask loading evolutions at Trillo NPP.

1 inspection not scheduled with the Annual Work Plan, to the supplier of neutron absorbing material used in ENSA's ENUN 32P casks.

6.2. Low and Intermediate Level radioactive waste

In 2023, the CSN supervised and controlled the different management phases of Low- and Intermediate Level Waste (LILW) generated in Spanish nuclear facilities, as described below.

6.2.1. Nuclear Power Plants in Operation (including Garoña, until the start of decommissioning phase 1)

In 2023, operating nuclear power plants generated 2,252 solid radioactive waste packages of low and intermediate, and very low activity (VLLW), with an estimated activity of 16.622 GBq. These packages were conditioned in 220-liter metallic drums and in other types of metal containers. Table 6.2.1.1 breaks down package generation by site and transports to El Cabril in 2023.

Table 6.2.1.1 Radioactive waste Packages (LILW & VLLW) Generated by Nuclear Power Plants in Operation and Permanent Shutdown, and transferred to El Cabril in 2023

FACILITY	GENERATED PACKAGES	PACKAGES SENT TO EL CABRIL
Santa María de Garoña	23	0
Almaraz 1 & 2	399	422
Ascó 1 & 2	355	417
Cofrentes	1,135	606
Vandellós 2	162	94
Trillo	178	211
Total	**2,252**	**1,750**

Table 6.2.1.2 shows the waste stored, the capacity of interim storage facilities and their percentage of occupancy in each facility as of December 31, 2023.

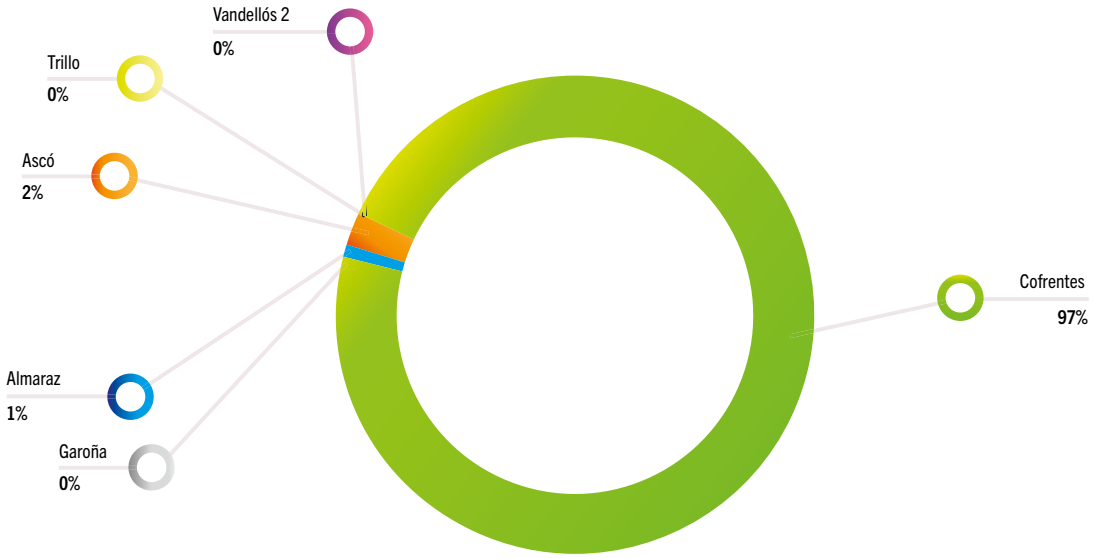
Table 6.2.1.2. Situation of interim waste storage facilities in nuclear power plants in operation and permanent shutdown as of December 31, 2023

PLANT	PACKAGES STORED (EQUIVALENT TO 220-LITER DRUMS)	STORAGE FACILITY CAPACITY (EQUIVALENT TO 220-LITER DRUMS)	STORAGE FACILITY OCCUPATION (%)
Santa María de Garoña	4,038	10,080	40.1
Almaraz	14,140	23,544	60.1
Ascó	6,506	8,256	78.8
Cofrentes	11,792	20,100	58.7
Vandellós 2	2,870	9,432	30.4
Trillo	3,319	11,500	28.9
Total	**42,665**	**82,912**	**51.5**

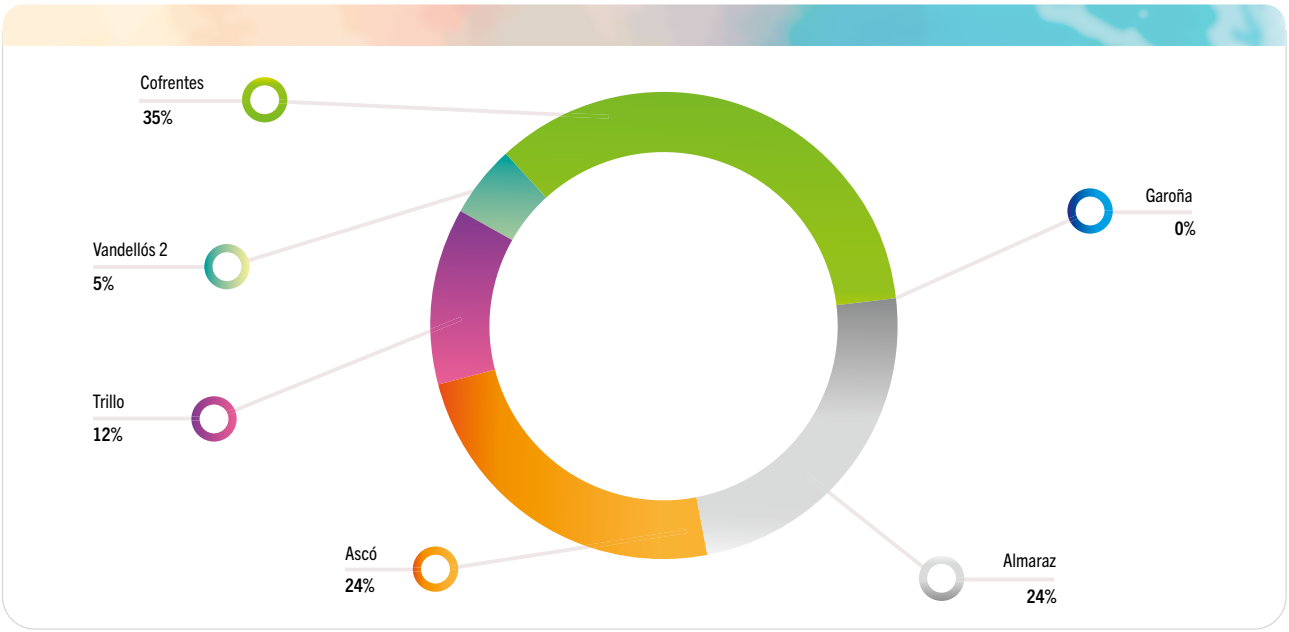
Graphs 6.2.1.1 and 6.2.1.2 show the percentage contribution of each plant to the total generation of radioactive waste packages and to the total activity content of these packages in 2023.

Graph 6.2.1.1. Distribution of 2,252 radioactive waste packages (LILW & VLLW) conditioned by nuclear power plants in operation and permanent shutdown in 2023

Graph 6.2.1.2 Distribution of activity contained in radioactive waste packages (LILW and VLLW) generated in 2023 by nuclear power plants in operation and permanent shutdown



Graph 6.2.1.3 Distribution by facility of radioactive waste packages transferred by Enresa to the El Cabril repository in 2023



6.2.2. Nuclear power plant under decommissioning: Vandellós 1 NPP and José Cabrera NPP

Table 6.2.2.1 shows the radioactive waste stored in available Vandellós NPP facilities (in latency phase), as of December 31, 2023. In 2023, the compactable waste generated was stored in "CMD" type containers in the "ATOC" warehouse. No packages were shipped to El Cabril in 2023.

Table 6.2.2.1. Radioactive waste storage at Vandellós 1 as of December 31, 2023

STORAGE FACILITY	STORED WASTE
Temporary container storage (ATOC)	31 220-liter packages of debris 8 packages of non-compactable material 37 220-liter packages and 2 CMD-type container of compactable material 289 CMD-type containers of non-compactable heterogeneous solids 303 220-liter drums with concrete scarifying powder 27 400-liter drums with concrete scarifying powder 26 CMD-type containers with thermal insulation
Temporary graphite tank	230 CME-1 type containers with crushed graphite 93 CBE-1 type containers with stirrups and absorbers 5 CBE-1 type containers with waste from pool drainage 11 CE-2a type containers containing 25 220-liter drums with non-compactable waste and 166 220-liter drums with graphite

CBE-1: Enresa shielding container. CME-1: Enresa metallic container. CE-2a: Enresa container.
CMT: Metallic transport container. CMD: Declassifiable residual material container.

Table 6.2.2.2 summarizes waste management at José Cabrera NPP in 2023.

Table 6.2.2.2. Management of radioactive waste conditioned at the José Cabrera nuclear power plant in 2023

	GENERATED		TRANSPORTED TO EL CABRIL	
	PACKAGES(1)	STORAGE UNITS(2)	PACKAGES(1)	STORAGE UNITS(2)
Year 2023	1,996	0	2,048	0

(1) Waste conditioned in containers of different volumes (220, 400, 480, 750, 750, 1,000 and 1,300 liters).

(2) Storage Units in Containers of the CE-2a and Ce-2b types.

As of December 31, 2023, José Cabrera NPP has the temporary radioactive waste storage facility (Warehouse 4) and the storage facilities called "Declassifiable Tent" and "DESCLA" where very low level waste and potentially declassifiable waste, can be placed. In 2023, decommissioning activities generated different waste volumes which are grouped in Authorized Management Units, initially classified in one of two categories: very low activity or potentially declassifiable. These units are stored in plant warehouses as they await their permanent management.

6.2.3. Juzbado Nuclear Fuel Factory

Table 6.2.3.1 summarizes waste management at the Juzbado factory in 2023, indicating packages generated, packages transferred to the El Cabril facility and occupancy of the factory's temporary radioactive waste storage facility as of December 31, 2023. Data on VLLW generation are detailed in section 6.3 of this report.

Table 6.2.3.1. Activities related to LILW and VLLW management at the Juzbado Factory in 2023 and occupation of the factory's radioactive waste storage facility

RADIOACTIVE WASTE MANAGEMENT ACTIVITIES (LILW & VLLW)	
Waste packages generated	137 220-liter packages
Packages containing recyclable waste materials generated	26 220-liter packages
Packages sent to El Cabril	134 220-liter packages
Packages dispatched for external recycling	26 220-liter packages
RADIOACTIVE WASTE STORAGE OCCUPANCY LEVEL	
Temporary radioactive waste storage	55 %
Temporary declassifiable waste storage	5 %

6.2.4. Ciemat

Table 6.2.4.1 shows the level of occupancy of temporary radioactive waste storage facilities associated to the PIMIC-Decommissioning project, as of December 31, 2023.

Table 6.2.4.1. Occupancy level of temporary radioactive waste storage facilities associated to PIMIC-Decommissioning, as of December 31, 2023

WAREHOUSE	CONTAINER TYPE	NUMBER OF CONTAINERS	CAPACITY (1M³ BIG BAG)	OCCUPANCY
E11-REACTOR	0.5m³ Big Bag	0	2,249	0.2%
E11-ANEXO	CMD (2m³) 0.5m³ Big Bag	2 186	483	19.3%
CAZE EXPANSION	CMD (2m³)	36	504	14.3%

6.2.5. Radioactive Facilities

In the case of radioactive facilities, waste segregation and classification is done at the facilities themselves, while waste collection, treatment and conditioning is done by Enresa at the El Cabril disposal facility. Waste generated at radioactive facilities is later treated by incineration, compaction, immobilization in a hydraulic conglomerate matrix and manufacture of backfill mortar.

In general, Enresa treats the waste generated at radioactive facilities as follows:

- Incineration of biological waste, organic liquids and mixed waste (composed of organic liquids and vials).
- Compaction of solids such as clothes, gloves and lab material.
- Immobilization of hypodermic needles, non-compactable solids and radioactive sources.
- Mortar manufacturing: aqueous liquids.

6.3. Very Low-Activity radioactive waste

6.3.1. Nuclear facility waste

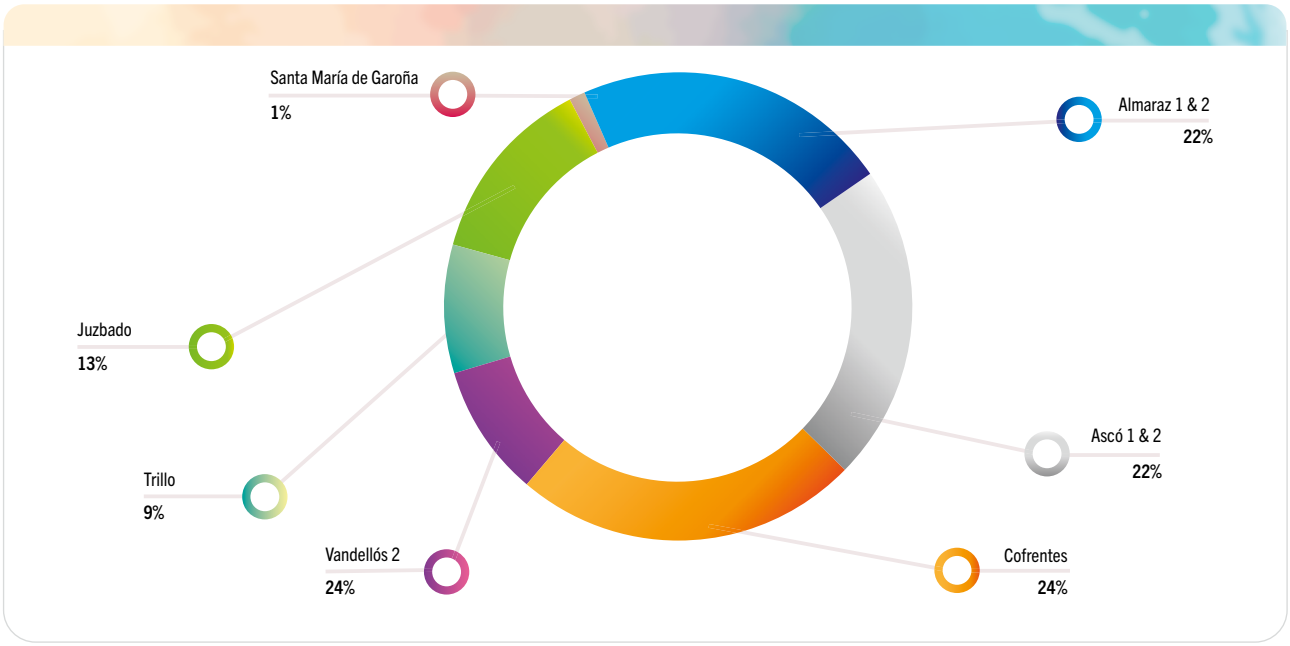
Table 6.3.1.1 details the generation of VLLW packages in 2023 at nuclear power plants in operation and under decommissioning, as well as at the Juzbado fuel manufacturing facility.

Table 6.3.1.1. Very Low-Level Radioactive Waste (VLLW) Packages Generated in 2023 at Nuclear Power Plants in Operation and Under Decommissioning, and at the Juzbado Fuel Manufacturing Facility

FACILITY	GENERATED PACKAGES
Santa María de Garoña	15
Almaraz 1 & 2	244
Ascó 1 & 2	242
Cofrentes	256
Vandellós 2	96
Trillo	97
Juzbado Factory	144
Total	**1,094**

Graph 6.3.1.1 shows the percentage contribution of each nuclear power plant and the Juzbado plant to the generation of VLLW packages in 2023.

Graph 6.3.1.1. Percentage distribution of radioactive waste packages (VLLW) conditioned by nuclear power plants and the Juzbado Fuel Factory in 2023



6.3.2.Waste generated in other activities

Quercus Plant Waste. Water treatment and process waste

At the static leaching bed of the Quercus plant, some 1,107,896 metric tons of depleted ore with a granulometry of less than 15 mm, are accumulated. In addition, approximately 853,242 metric tons of tailings from the dynamic leaching process accumulate in the tailings dam of this plant.

During these activities, 379,864 m3 of previously treated water was discharged in 2023, generating waste in the form of precipitate cakes which were subsequently repulped and sent back to the tailings dam.

6.4. Declassified radioactive waste

Table 6.4.1 lists the main milestones in 2023 concerning waste declassification at nuclear facilities.

Table 6.4.1. Main milestones in 2023 concerning waste declassification at nuclear facilities

- Vandellós 2 NUCLEAR POWER PLANT
  - In April 2023 the CSN received from the Ministry (MITECO) a request to authorize the declassification of spent ion exchange resins with very low levels of activity generated during Vandellós 2 NPP operation and maintenance.
  - On December 20, 2023, the CSN issued a favorable report on the request, with limits and conditions, which was authorized by Resolution of the Directorate General for Energy Policy and Mines on January 8, 2024.
- Ascó NUCLEAR POWER PLANT (U1 & U2)
  - The CSN inspected the declassification test plan implementation. In June 2023, Ascó NPP submitted to the CSN for its favorable assessment the test plan results corresponding to declassification of non-sampleable materials from Ascó NPP, introduced in CMT containers and measured by gamma spectrometry.
- CIEMAT
  - In July 2023, the CSN inspected the test plan corresponding to declassification of residual materials with processed uranium isotope, measured by gamma spectrometry. In November 2023, the CSN received plan results.

6.5. Disused consumer products

In 2023, 8 lightning rods were removed, although no sources were shipped to the UK that year. As of December 31, 2023, the total number of lightning rods removed is 22,950 units, with 59,796 sources shipped to the United Kingdom.

Table 6.5.1. Disused Consumer Products

ACCUMULATED LIGHTNING RODS AS OF DECEMBER 31, 2022	ACCUMULATED LIGHTNING RODS AS OF DECEMBER 31, 2023	LIGHTNING RODS REMOVED IN 2023	ACCUMULATED DISASSEMBLED CONDUCTORS AS OF DECEMBER 31, 2023	AM-241 CONDUCTORS STORED AT CIEMAT AS OF DECEMBER 31, 2023	NUMBER OF SOURCES SENT TO UNITED KINGDOM AS OF DECEMBER 31, 2022	NUMBER OF SOURCES SENT TO UNITED KINGDOM AS OF DECEMBER 31, 2023
22,942	22,950	8	19,224	0	59,796	59,796

7. NUCLEAR AND RADIOLOGICAL EMERGENCIES

The Nuclear Safety Council has an emergency center called Salem, which is where CSN emergency response is coordinated at an operational level. The CSN also has an Emergency Communications System (SICOEM) which ensures communication between various agencies in charge of managing nuclear and radiological emergencies and nuclear facilities.

In addition, the CSN has a contingency emergency room (Salem 2) at the headquarters of the Military Emergency Response Unit in the airbase of Torrejon de Ardoz (Madrid).

Activities carried out in 2023 are summarized in Table 7.1.

Table 7.1. Summary of International Emergency Activities

TYPE OF ACTIVITY	DEVELOPMENT	DATES
Participation in TWO EXERCISES organized by the IAEA	ConvEx-1A ConvEx-2C	March 28 October 3
European Commission	Communications test as national point of contact for Ecurie	February 8 April 17 October 4

Table 7.2 shows a summary of exercises and drills held in Spain in 2023.

Table 7.2. Implementation of Exercises and Drills in 2023

EXERCISES OF RADIOLOGICAL TEAMS WITHIN EXTERNAL NUCLEAR EMERGENCY PLANS		
PLAN	**TYPE OF EXERCISE**	**DATE**
PENBU	Control of accesses and routing of Municipal Operational Coordination Centers	October 2023
	Classification and decontamination station (Medina de Pomar)	October 2023
PENCA	Control of accesses and routing of Municipal Operational Coordination Centers	June 2023
	Classification and decontamination station (Trujillo)	October 2023
PENGUA	Control of accesses and routing of Municipal Operational Coordination Centers (2 exercises)	October and November 2023
	Classification and decontamination station (Sacedon)	May 2023
PENTA	Control of accesses and routing of Municipal Operational Coordination Centers (Ascó area)	November 2023
	Control of accesses and routing of Municipal Operational Coordination Centers (Vandellós area)	November 2023
	Classification and decontamination station (Falset)	June 2023
PENVA	Control of accesses and routing of Municipal Operational Coordination Centers	September 2023
	Control of accesses and routing of Municipal Operational Coordination Centers	October 2023
	Classification and decontamination station (Requena)	June 2023
Nuclear accident drill NURIEX		June 2023

RADIOLOGICAL EMERGENCY EXERCISES	
TYPE OF EXERCISE	**DATE**
Management of an air transport accident involving radioactive materials	November 2023
Drill of a process control facility accident	December 2023

No onsite emergency plan was activated in any Spanish nuclear facilities in 2023.

The notifications on events occurring at nuclear facilities described in Section 3 of Chapter 1 of this report were received at SALEM in 2023. Notifications were also received regarding radiological incidents at radioactive facilities, involving failures to retract gammagraph sources, on-site damages to soil density and humidity measuring equipment, a fire due to sterilization line blockage, flooding at radioactive facilities, accidental irradiations of workers in medical treatment facilities, as well as surface contamination incidents caused by broken radiopharmaceutical vials and radioactive waste management incidents. Several notifications of incidents, accidents and thefts during radioactive material transportation were also received, in addition to notifications related to improperly conditioned packages.

None of these situations had radiological consequences.

Some incidents reported to the Salem were not considered as licensee events, as they did not fall under any of the reporting criteria established in CSN Safety Instructions IS-18 and IS-42.

Excluding nuclear facilities, a total of 24 licensee events were received at the Salem; 15 related to radioactive facilities and 9 related to radioactive material transport.

The 15 events in radioactive facilities were analyzed by the Technical Directorate for Radiation Protection, classifying 13 of them as INES 0 and two as INES 1; With respect to the 9 transport events, all were classified as INES 0.

In addition, pursuant to Royal Decree 451/2020, dated March 10, on the control and recovery of orphan radioactive sources, two communications were received reporting the appearance of orphan sources or detections of anomalous radiation levels in containers at seaports of national interest where the MEGAPORT protocol is applicable.

Graph 7.1. Notifications of radiological incidents received at SALEM in 2023.

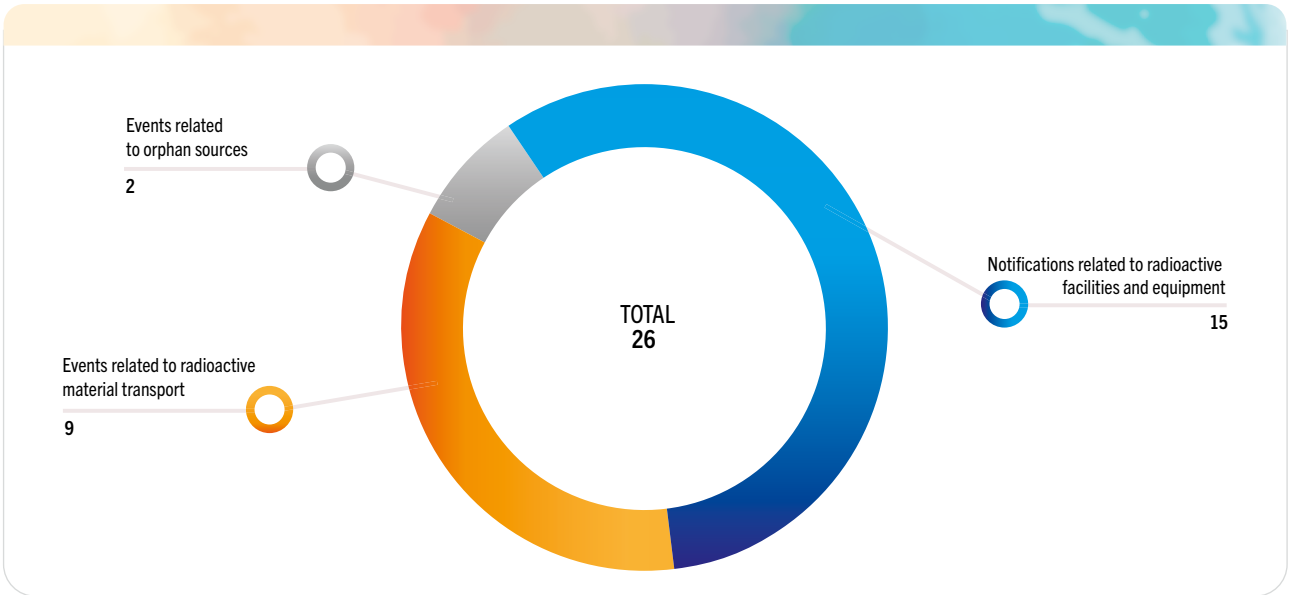
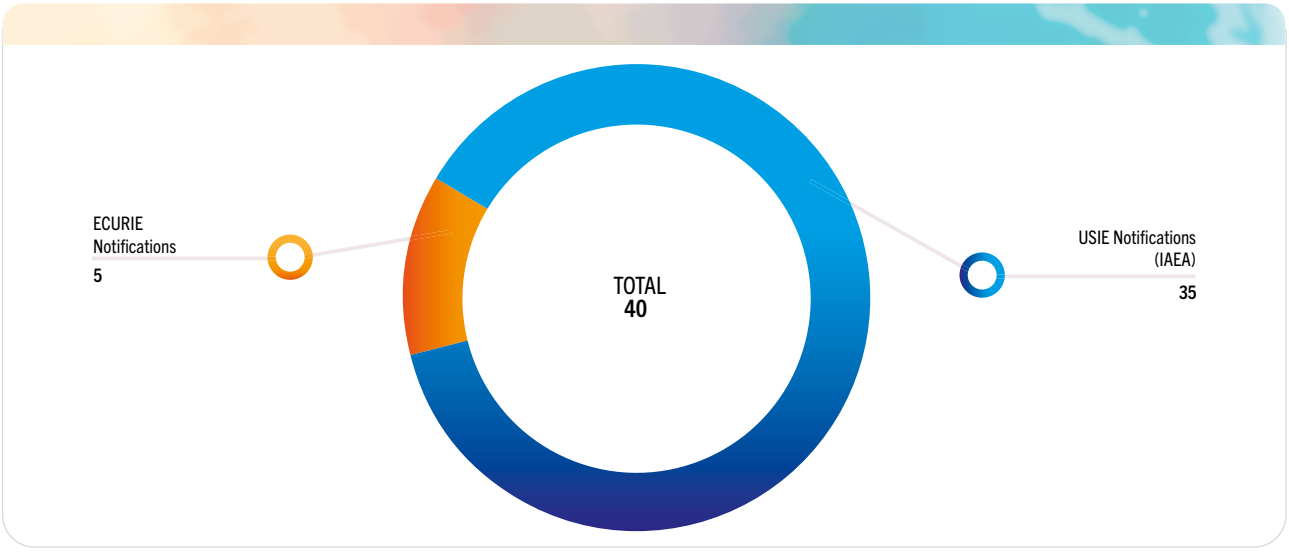


Figure 7.2 shows the 30 international notifications received in 2023.

Graph 7. 2. International notifications



ECURIE notifications generally refer to events occurring within the European Union, in the Community area, while USIE notifications cover relevant events worldwide.

Table 7.3 includes a list of the 9 drills carried out by Spanish nuclear facilities in 2023. All Onsite Emergency Plan (OEP) drills at these facilities were subject to onsite inspections by CSN technicians, in compliance with existing health recommendations and restrictions at all times.

Table 7.3. Schedule and Minimum Scope of OEP Emergency Drills at Nuclear Facilities in 2023

NUCLEAR FACILITY	DRILL DATE	BRIEF SCENARIO DESCRIPTION
El Cabril	April 13	Rapidly evolving fire in compactable waste unloading warehouse. A person injured during firefighting operations. Onsite Emergency Plan category 3 is reached.
NPP in shutdown Santa María de Garoña	April 20	Earthquake resulting in prolonged loss of offsite power and emergency diesel generators, leading to extensive damage coincident with a fire near a safety busbar.
Juzbado FA Factory	May 05	Uranium oxide spillage in ceramic zone evolving to a criticality-related accident. Partial relief of the Emergency Management Center personnel.
Vandellós 2 NPP	May 11	Operational event evolving to the point where Severe Accident Guidelines must be entered, thus leading to declaration of a General Emergency. During the emergency it was necessary to extinguish a fire and care for at least one injured person and contaminated personnel, as well as the loss of a muster center.

Table 7.3. Schedule and minimum scope of OEP emergency drills at Nuclear Facilities in 2023 (cont'd)

NUCLEAR FACILITY	DRILL DATE	BRIEF SCENARIO DESCRIPTION
Cofrentes NPP	June 22	ATWS-type event leading to declaration of an Onsite Emergency Plan Category III with radiological impact on the site. Plant trip caused by an external event which involves strong winds and affects plant systems, leading to the use of Extensive Damage Management Guidelines / Extensive Damage Mitigation Guideline. It is assumed that some workers are injured or contaminated and that some of them require transfer to a Level II medical facility. Simulated relief of some Technical Support Center personnel.
Ascó NPP	September 21	Impact of an aircraft causing extensive damage to one of the units. In this situation, the use of Extensive Damage Mitigation Guidelines and Extensive Damage Management Guidelines, is considered.
Almaraz NPP	October 17	Loss of offsite AC power supply coinciding with failure of the emergency diesel electrical generators in Unit 2 due to torrential rains. A fire occurs involving the loss of the AF turbine-driven pump and several injuries. Implementation of EDMG strategies required, hampered by flood management onsite.
Ciemat	November 2	Event at a radioactive facility evolving to an OEP Category II (highest level in this Onsite Emergency Plan).
Trillo NPP	November 23	Rapidly evolving accident involving SAMG entry and declaration of an OEP Category 4. Due to a communications failure, it is necessary to use satellite telephones until communications are re-established. Activation of the Emergency Support Center and Military Emergency Response Unit (UME) is required.

8. SECURITY OF NUCLEAR MATERIALS AND FACILITIES, RADIOACTIVE SOURCES AND TRANSPORT

Table 8.1 summarizes the activities carried out in 2023 in relation to the security of nuclear materials and facilities, radioactive sources and transport, in accordance with Royal Decree 1308/2011 on physical protection of nuclear facilities and materials and radioactive sources.

Table 8.1. Evaluations on the security of nuclear materials and facilities and protection of radioactive sources

FACILITY / LICENSEE	REQUEST
SECURITY PLANS AND SECURITY PERMITS FOR FACILITIES AND TRANSPORTS	
Almaraz Nuclear Power Plant (CNAT)	Proposal for revision 9 of Almaraz Nuclear Power Plant Security Plan, units 1 & 2.
Cofrentes Nuclear Power Plant (Iberdrola)	Proposed changes PC-01-22 Rev.1 and PC-01-23 Rev.0 to the Cofrentes Nuclear Power Plant Security Plan.
Santa María de Garoña Nuclear Power Plant (Nuclenor, before ownership transfer to Enresa)	Request for security approval associated to the permit for decommissioning phase 1 (FASE 1) and ownership transfer of Santa María de Garoña nuclear power plant.
Trillo Nuclear Power Plant (CNAT)	Request to renew the Trillo Nuclear Power Plant Security permit.
El Cabril Repository (Enresa)	Proposed text nº1 of revision 7 of the Security Plan for the Sierra Albarrana solid radioactive waste disposal nuclear facility (El Cabril Repository)
TRANSPORT SECURITY PERMITS	
ETSA	Four ETSA requests for specific security transport permits of category-3 nuclear material across the borders: – From the Juzbado Factory to Springfields Fuel Limited (United Kingdom) – From Global Nuclear Fuels (United States) to the Juzbado Plant – From the Juzbado Factory to Ulba Metallurgical Plant (Kazakhstan) – From Springfields Fuel Limited (United Kingdom) to the Juzbado Factory.

Report of the Spanish Nuclear Safety Council to the Congress of Deputies and the Senate

Year 2023

Summary Report

CSN CONSEJO DE SEGURIDAD NUCLEAR