

# Nuclear Safety Council report to the Parliament

Summary of 2014

**CSN**



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## Introduction

In compliance with the Law by which it was created, the Nuclear Safety Council hereby presents the report on its most significant activities during 2014 in relation to nuclear safety and radiological protection.

For this regulatory body, the preparation and drawing up of the present report and its submittal to Parliament constitute a milestone in its annual activity that involves all its workers and organisational units.

Following a process of detailed review, the structure and index of the report were modified in 2013, this being consolidated in the present edition, such that the first chapter includes everything relating to the organisation, its resources and its three types of relations, international, institutional and with the general public, and the second deals with the CSN's inspection, control, supervision and authorisation functions and the drawing up of specific standards.

The year 2014 has seen an additional step forward in the consolidation of one of the main challenges facing the CSN in the medium to long term: the human resources policy and renewal of the technical staff. The year's public employment offer included posts for new entrants to the CSN's *Nuclear Safety and Radiological Protection* corps.

Mention should also be made of the fact that the CSN has continued to promote its international activities, through participation in different organisations and associations involved in nuclear safety and radiological protection. Likewise, our prime relationship with the Congress and Senate has continued to be strengthened.

Also included among the CSN's functions is informing the public on matters for which it is responsible, to the extent and with the frequency that the Council might determine, without prejudice to the publicising of its administrative actions in the legally established terms, all the above providing the highest levels of transparency and credibility in the exercising of its functions. The CSN has continued this public information and communication activity throughout 2014, its maximum expression being the project for the renewal of its institutional website.

From the point of view of safety, it may be concluded that all the nuclear and radioactive facilities operated safely throughout 2014. In this respect it should be pointed out that according to the results of the Integrated Supervision System (SISC), at the end of the year all the operational indicators and inspection findings of the action matrix were classified green. As regards the areas surrounding the Spanish nuclear power plants, the quality of the environment remained under acceptable radiological conditions, without any significant data of relevance.

As regards radiological protection, the Council has increased its supervision of the radiation doses received by the workers, and has carried out the mandatory monitoring and control of spent fuel and radioactive waste. In relation to emergencies, the CSN's Emergency Response Room (Salem) has continued to operate with absolute normality throughout 2014.

In short, for the Nuclear Safety Council the most noteworthy feature of 2014 has been the fact that throughout the year the nuclear and radioactive facilities have not implied any risk for either people or the environment and that the Council has performed the functions assigned to it with its characteristic efficiency, transparency, rigour and independence.

*Fernando Marti Scharfhausen*



# Chapter I. The Nuclear Safety Council



## 1. The Nuclear Safety Council

The Nuclear Safety Council is an entity existing under Public Law, independent from the General State Administration, with its own legal standing and equity independent from those of the State, set up in accordance with Law 15/1980, of April 22<sup>nd</sup>, creating the Nuclear Safety Council, as the organisation solely responsible for nuclear safety and radiological protection.

The legal framework to which it is to be subjected in its actions is based on the prevalence of its constitutional law and its Charter, and additionally on the organisational standards and legal system common to other public organisations linked to the General State Administration. It acts with organic and functional autonomy, fully independent from the Public Administrations and stakeholder groups, without prejudice to its being subject to parliamentary and judicial control.

The Charter of the Nuclear Safety Council, drawn up by the Council itself and approved by the Government pursuant to the provisions of Law 15/1980, was approved by Royal Decree 1440/2010, of November 5<sup>th</sup>.

The mission of the CSN is to protect the workers, the general population and the environment against the harmful effects of ionising radiations, ensuring that the nuclear and radioactive facilities are operated by the licensees safely and establishing prevention and correction measures with respect to radiological emergencies, regardless of their origin.

The CSN is responsible for exercising all the functions set out in article 2 of Law 15/1980, of April 22<sup>nd</sup>, and in title I of its Charter, particularly significant among which are the

drawing up and issuing of reports previous to resolutions by the Ministry of Industry, Energy and Tourism, inspection and control reports, standards proposals and the drawing up of proposals, advisory reports, etc., as well as those others that are assigned to it in the fields of nuclear safety, radiological protection and security by standards of legal or regulatory rank or by virtue of international treaties.

In addition, article 11 of Law 15/1980 establishes that every year the Nuclear Safety Council shall submit a report on its activities to the two houses of the Spanish Parliament and to the regional parliaments of autonomous communities housing nuclear facilities. The objective of the present report is to comply with this requirement.

The governing bodies of the CSN are the Plenary and the Presidency, the members of which are as follows as of December 31<sup>st</sup> 2014:

- President: Fernando Marti Scharfhausen (Royal Decree 1732/2012, of December 28<sup>th</sup>).
- Vice-president: Rosario Velasco García (Royal Decree 138/2013, of February 22<sup>nd</sup>).
- Commissioner: Antoni Gurguí i Ferrer (Royal Decree 307/2009, of March 6<sup>th</sup>).
- Commissioner: Fernando Castelló Boronat (Royal Decree 139/2013, of February 22<sup>nd</sup>).
- Commissioner: Cristina Narbona Ruiz (Royal Decree 1733/2012, of December 28<sup>th</sup>).

The Plenary is assisted by a Secretary General, a post held as of December 1<sup>st</sup> 2014 by María Luisa Rodríguez López (Royal Decree 268/2013, of April 12<sup>th</sup>).

Other management bodies are the Technical Directorates, the Technical Office of the President and the sub-Directorates.

The President and the members of the Council carry out activities in the exercising of the competences assigned to them by articles 26 and 36 of the Charter.

### 1.1. The Plenary

The Plenary of the Council is the upper management body responsible for adopting agreements for the exercising of all the functions contemplated in article 2 of Law 15/1980, as well as the exercising of whatever other functions might be attributed to the Nuclear Safety Council as the single competent authority for matters relating to nuclear safety and radiological protection.

In 2014 the Nuclear Safety Council held 38 plenary sessions.

In its role as upper management body, the Plenary of the Council adopted a total 394 agreements in 2014 within the context of the functions and competences assigned to it by the Charter currently in force, 98% of these having been adopted unanimously and without the need for them to be put to the vote.

The agreements adopted were distributed as follows: 46.70% corresponded to licensing and control issues, 1.77% to regulations and standards, 2.79% to coercive activities, 12.18% to agreements, contracts and conventions, 4.31% to administration and personnel and 32.25% to other matters.

Pursuant to article 14.2 of Law 15/1980, of April 22<sup>nd</sup>, creating the Nuclear Safety Council, the minutes of the Council's Plenary sessions and the decisions supporting the issuing of authorisations are available for general consultation on the CSN website ([www.csn.es](http://www.csn.es)).

## 1.2. Council Commissions

The Council commissions have provided impulse for the activities assigned to the organisation in the fields of nuclear safety and radiological protection and standards.

The Nuclear Safety and Radiological Protection Commission is presided over by the secretary general of the Council, María Luisa Rodríguez López, and constitutes a forum for the exchange of ideas between the Technical Directorates of the organisation and the members of the Council, the aim being to report on forecasts regarding issues to be submitted to the Plenary in the short term and to encourage open debate on proposals or matters of the greatest interest and technical complexity.

In 2014, this Commission met on three occasions, with 10 subject-specific presentations being made on issues of various types. Especially important was the report on the application for renewal of the operating license of Trillo nuclear power plant for a period of 10 years.

The role of the standards Commission, presided over by Commissioner Antoni Gurgu i Ferrer, is to drive, monitor and control the CSN's standards programme. The Ministry of Industry, Energy and Tourism participates in the activities of this Commission through a representative appointed for this purpose. During 2014 the standards Commission met on two occasions, on July 10<sup>th</sup> and December 2<sup>nd</sup>.

## 1.3. CSN relations

### 1.3.1. Institutional relations

One of the functions assigned to the Nuclear Safety Council is that of maintaining official collaboration and advisory relations with State institutions, at central, autonomous community and local level, with professional and trade union

organisations and with non-governmental associations and organisations involved in nuclear safety and radiological protection.

The report on the CSN's activities during 2013 was submitted to Congress and the Senate on June 30<sup>th</sup> 2014.

During the year there were no direct questions put to the Nuclear Safety Council by parliamentary groups, although answers were provided to eleven questions posed by different members of parliament and channelled through the Ministry of Industry, Energy and Tourism referring to matters relating to nuclear safety or radiological protection.

On March 12<sup>th</sup> 2014, the president of the CSN appeared before Parliament, at his own request, in order to present the report on activities during 2012, and again on December 3<sup>rd</sup> to present the report for 2013.

The technical directors for Nuclear Safety and Radiological Protection appeared before Congress twice in 2014, specifically before the board in charge of relations with the Nuclear Safety Council, on March 11<sup>th</sup> in relation to the annual report for 2012 and on December 2<sup>nd</sup> in relation to the report for 2013.

On December 3<sup>rd</sup> 2014, the president of the CSN also appeared, in response to a request from the socialist parliamentary group, to explain the decision taken by the Plenary of the Council to report favourably on the possibility of the Ministry of Industry, Energy and Tourism modifying Ministerial Order IET/1453/2012, of June 29<sup>th</sup>, establishing July 6<sup>th</sup> 2013 as the date for the definitive shutdown of Santa María de Garoña nuclear power plant and authorising its operation up until that date. He also appeared on request by the parliamentary group Izquierda Plural to explain the potential consequences for the physical

safety of people (the workers at the facility and neighbouring population) and for the environment of the increase in pressure inside the shroud at Vandellós I (Tarragona).

All resolutions corresponding to the reports for 2012-2013, and falling within the realm of competence of the Nuclear Safety Council were submitted to Congress and the Senate on time and in the appropriate form.

The Nuclear Safety Council may task the autonomous communities with the exercising of functions attributed to it in accordance with the general criteria agreed to by the Council itself for their performance. At present, nine autonomous communities have signed function assignment agreements with the Nuclear Safety Council: Asturias, the Balearic Islands, the Canary Islands, Catalonia, Galicia, Murcia, Navarre, the Basque Country and Valencia. During 2014, the CSN Inspection Unit performed a tracking of the assignment agreements established with the autonomous communities of the Basque Country and Murcia. The annual assignment inspectors meeting was held on November 4<sup>th</sup> and 5<sup>th</sup>.

Furthermore, 2014 saw a revision of the collaboration agreement between the CSN and the Regional Government of Catalonia regarding the handing over of data from the former's Automatic Environmental Radiological Surveillance Network, through the incorporation of a new addendum.

Especially significant as regards institutional relations between the Nuclear Safety Council and the local administrations has been the CSN's participation in the seven meetings of the Information Committees of the Spanish nuclear power plants, as well as its collaboration with the Association of Municipalities in Areas housing Nuclear Power Plants (AMAC).

Finally, with a view to promoting the training of technicians and specialists in areas relating to nuclear safety and radiological protection, in 2014 the Plenary of the Council approved an extension to the collaboration with the university departments for two six-month periods, with an economic contribution of 60,000 euros a year.

In addition, in 2014 the Plenary of the Council approved the setting up of the Vicente Serradell Chair of Nuclear Safety and Radiological Protection at the Polytechnic University of Valencia's College of Industrial Engineering, the corresponding agreement being signed in 2015.

### 1.3.2. International relations

As regards international relations, the CSN is responsible for collaborating with the Government in relation to international agreements dealing with nuclear safety and radiological protection, relations with international organisations involved in these areas and relations with the Council's counterparts, the overseas regulatory bodies. This implies a wide spectrum of activities that may be classified under the following headings: multilateral relations, international agreements and bilateral relations.

#### Multilateral relations

##### *European Union*

In 2014 the CSN participated in a number of Community initiatives deriving from the Euratom Treaty, as the organisation solely responsible for nuclear safety and radiological protection in Spain, and also participated alongside Minetur in the European Nuclear Safety Regulators Group.

##### *Atomic Questions Group (AQG)*

Throughout 2014, important legal projects were undertaken within the framework of the Council of the European Union. The CSN assisted the Government in the process of negotiation and

approval by the Atomic Questions Group of the 014/87/Euratom Directive, which establishes a Community framework for the safety of nuclear facilities. This Directive is an amendment of the 2009/71/Euratom Directive, incorporating new provisions for the improvement of the nuclear safety of nuclear facilities as a result of the lessons learned from the European stress tests carried out in the wake of the Fukushima accident.

##### *European Nuclear Safety Regulators Group (ENSREG)*

The main activities carried out by this group in 2014 related to compliance with nuclear safety and waste management directives. Proposals regarding the national reports and the coordination of the verification missions to be organised by the IAEA were approved.

In July 2014, the CSN submitted the first National Report to the European Commission, in compliance with the Directive on Nuclear Safety.

##### *Regulatory assistance activities*

The CSN continued to participate in projects aimed at providing assistance to regulatory authorities within the framework of the European Commission's Instrument for Nuclear Safety Cooperation (INSC). In 2014 it has also participated in cooperation projects aimed at developing and strengthening the nuclear regulation capacities of the Moroccan authority and in the INSC project to strengthen the regulatory capacities of the Chinese authority and its technical support organisation.

##### *International Atomic Energy Agency (IAEA)*

In addition to the technical contribution implied by the participation of members of the CSN technical staff in IAEA courses, seminars and missions, economic contributions are also made to support certain organisation's programmes and activities. On closure of the 2014 financial year,

the CSN completed a voluntary contribution of 276,000 Euros, most of which went to financing the activities of the Ibero-American Radiological and Nuclear Regulatory Bodies Forum.

As on previous occasions, the CSN participated in the General Conference of the IAEA, which took place in Vienna from September 22<sup>nd</sup> to 26<sup>th</sup> 2014.

In 2014 the CSN participated in the following IAEA missions:

- IRRS mission to France.
- IRRS follow-up mission to the United States.
- Mission for the safety assessment of radioactive waste management facilities in Cuba.
- IRRS preparatory missions to Chile and Croatia.

For the coordination and follow-up of all technical standards development and revision activities, the IAEA relies on the Commission on Safety Standards (CSS), in which counsellor Antoni Gurgu  participates as a national representative. For the detailed study of the technical issues on the basis of which the IAEA standards are developed, the CSS has four support committees, in which CSN experts actively participate: the Nuclear Safety Standards Committee (NUSSC), the Radiological Protection Safety Standards Committee (RASSC), the Transport Safety Standards Committee (TRANSSC) and the Waste Management Safety Standards Committee (WASSC). There is also a committee involved in the development and revision of nuclear security-related standards, the Nuclear Security Guidance Committee (NSGC).

#### *Other international organisations*

Two meetings of the International Nuclear Regulators Association (INRA) were organised in 2014, under the presidency of Germany, the

issues dealt with including for example the extension of INRA, interactions with other associations, spent fuel management and the use of international conventions to ensure that all countries operating nuclear facilities maintain the highest levels of safety.

In 2014, the Western European Nuclear Regulators Association (WENRA) named CSN counsellor Antoni Gurgu  as its vice-president. During the year the revision of the reference levels for the safety of operating nuclear power plants in the light of the lessons learned from the Fukushima accident was completed and several activities relating to the development and tracking of the Convention on Nuclear Safety and the Joint Convention on the safety of the spent fuel management and the safety of radioactive waste management were discussed and coordinated.

#### **International conventions of the International Atomic Energy Agency (IEA)**

The 6<sup>th</sup> review meeting of the Convention on Nuclear Safety was held at the IAEA headquarters from March 14<sup>th</sup> to April 4<sup>th</sup> 2014. On March 26<sup>th</sup>, Spain presented its report on the actions carried out at the Spanish nuclear power plants in the wake of the Fukushima accident, drawn up by the Nuclear Safety Council and UNESA.

In 2014 Spain drew up its fifth national report in compliance with the joint convention on the safety of the spent fuel management and the safety of radioactive waste management, coordinated by the Ministry of Industry, Energy and Tourism and with the CSN and Enresa participating in its preparation. The national report, submitted to the IAEA in September 2014, will be subjected to a peer review process that will conclude with the fifth review meeting, which is to take place in May 2015.

### **Bilateral relations**

In 2014 the CSN participated in the Regulatory Information Conference (RIC), an event organised annually by the US regulatory authority in order to report on its lines of work. In parallel with the different conference sessions, the CSN delegation participated in high-level meetings with leading representatives of the NRC and in other technical meetings.

From November 18<sup>th</sup> to 20<sup>th</sup> 2014, a bilateral meeting was held between the CSN and the regulatory authority of the United States, the Nuclear Regulatory Commission (NRC), this including several high-level meetings between leading representatives of the two bodies and technical visits to US nuclear facilities.

Likewise, the CSN continued to collaborate actively with the French Nuclear Safety Authority (ASN) throughout 2014.

In March 2014, an ASN expert was seconded to the CSN for one year. The objective of this exchange was to allow her to learn about Spanish regulatory practices in relation to the management of and preparation for nuclear and radiological emergencies.

In return, a CSN expert was seconded to the ASN in 2014, the objective being for her to learn about French regulatory practices in relation to the management of radioactive waste and NORM substances.

### **1.3.3. Public information and communication**

#### **Communication and the website**

Throughout 2013, a total of 114 informative notes were sent to the media and to institutions interested in the areas for which the Council is responsible, and 28 articles on reportable events were published on the CSN website.

Furthermore, appropriate answers were provided to 124 direct requests for information coming from the media.

The CSN's corporate website received 331,433 visits during 2014. The remodelling of the website and the continuous feedback of information, with 1,967 updates performed throughout last year, provides society with an insight into the work of the Council and access to information while also improving the mechanisms for interaction with the members of the public through its electronic office.

#### **Public information**

During 2014 a total 14 new works were published in hard copy format within the framework of the Publications Plan (books, the Alfa journal, brochures and posters), with a circulation of 17,985 copies; six publications were issued in electronic format (2,050 copies) and nine works were re-edited (with a circulation of 16,765 copies). Likewise, six informative publications were produced, with a circulation of 7,800 copies, most distributed at the Information Centre and different congresses.

For its part the Information Centre received 311 visits throughout the year, with a total 7,033 visitors; of these, 6,807 were from educational centres, 170 from different institutions and 56 were from private individuals.

During the month of November, the CSN collaborated with the Community of Madrid by organising its open day, held every year as part of the events celebrating Science Week, when visits by individuals and groups of people interested in learning of the activities of the Council are received.

#### **Other activities**

Among the activities carried out by the CSN to provide information for the general public is its attendance at congresses, seminars and exhibitions organised throughout the year. In this respect, in 2014 the Council participated in the 8<sup>th</sup>



Sessions on quality in the control of environmental radioactivity, the national congress on the environment (CONAMA 12) and the 40<sup>th</sup> Annual Meeting of the Spanish Nuclear Society. The CSN participates with a view to promoting and disseminating nuclear science and technology.

#### **1.4. Advisory Committee for Public Information and Participation**

The Advisory Committee for Public Information and Participation in relation to nuclear safety and radiological protection was set up in accordance with article 15 of Law 15/1980, of April 22<sup>nd</sup>, creating the Nuclear Safety Council, with the mission of issuing recommendations to the CSN with a view to favouring and improving transparency, access to information and public participation in areas included within the realm of competence of the CSN. The Advisory Committee is made up of representatives of civil society, the business world, trade unions and state, autonomous communities and local public administrations.

The seventh meeting of the Advisory Committee was held on May 22<sup>nd</sup> 2014, chaired by the

president, Fernando Marti Scharfhausen, on behalf of the Nuclear Safety Council, and attended by the vice-president of the CSN, Rosario Velasco García. The president brought attention to the milestone achieved in the General State Budget Law for 2014, with the CSN being included in the group of sectors exempted from the so-called zero replacement rate, as a result of which the public employment offer for this year contemplated six new posts in the Nuclear Safety and Radiological Protection Technical Corps and two to be covered by means of the internal promotion system.

The eighth meeting of the Advisory Committee took place on November 27<sup>th</sup> 2014. During the meeting the representatives of the Nuclear Safety Council reported on the most relevant activities carried out by the CSN, with special attention to the renewal of the operating license for Trillo nuclear power plant, the situation and activities of Santa María de Garoña nuclear power plant and the centralised temporary storage (CTS) facility for spent fuel and high level waste.

For complete information on the activities of the Advisory Committee, refer to the CSN website ([www.csn.es](http://www.csn.es)).

## 2. Strategies and management of resources

### 2.1. Strategic Plan

In 2011 the Nuclear Safety Council approved its Strategic Plan for 2011-2016, this representing its commitment to society for the coming years in relation to the preservation of nuclear and radiological safety in Spain.

The Strategic Plan is enacted by way of Annual Work Plans (AWP's), which are approved by the Council and include the operational objectives and most significant activities to be performed each year, along with numerical objectives or indicators.

Among other things, the AWP for 2014 defined the objectives and activities to be performed by the CSN organisation throughout the year, the overall planning of employee deployment, details of activities by installations, inspection plans, the standards programme, the procedures programme, the programme of audits and R&D projects.

Among the activities performed throughout 2014, special mention might be made of the following:

- Evaluation of the application for renewal of the operating license for Trillo nuclear power plant.
- Activities relating to actions deriving from the Fukushima accident: the national action plan, response by licensees to complementary technical instructions (CTI's) and revision of the basic nuclear emergency response plan (Plaben), among others.
- Performance of evaluations associated with the application for renewal of the operating license for Santa María de Garoña nuclear power plant, submitted by the licensee on June 2<sup>nd</sup> 2014.

- Continued evaluation of the request for a site and construction license for the centralised temporary storage (CTS) facility.

The Annual Work Plan tracking mechanism consists of a control panel that collects numerical values for 18 indicators, selected for the monitoring of the most significant AWP activities. These values are then compared to previously established objectives. The control panel values for 2014 reflect a degree of compliance close to the annual target mapped out.

### 2.2. Management System

#### Internal procedures and audits

The CSN has implemented a process-oriented Management System based on the requirements of IAEA guideline GS-R-3 and the ISO 9001: 2008 standard. The system is described and developed in manuals and procedures. The *Management System Manual* contains an overall description of the system and the documentation through which it is enacted.

The management system implemented at the CSN requires the entire organisation to be subjected to a process of continuous improvement. In addition to evaluations of compliance with the plans and objectives, the CSN has established an internal audit plan and is systematically subjected to external evaluations by national and overseas bodies.

During 2014, thirty-seven procedures were published or revised; of these, eleven relate to management, twelve are administrative and fourteen are technical.

The basic internal audit plan continued throughout 2014, and was divided into two separate parts, one for CSN activities and the other for functions assigned to the autonomous communities. The following four internal

processes were audited: Evaluation of Nuclear and Fuel Cycle Facilities (carried over from the 2013 programme), Licensing of Nuclear and Fuel Cycle Facility personnel (also from the 2013 programme), Emergency Management (also from 2013) and Standards Development. Furthermore, performance of the functions assigned to the autonomous communities of Murcia and the Basque Country was audited.

The results of all the audits were adequately documented and a series of non-conformities were identified, these being reported to those responsible for resolution. None of these non-conformities may be considered to be relevant to safety.

### Training plan

In 2014 the training plan was structured around seven programmes, one sub-divided into three areas: technical, refresher courses and recycling (sub-programmes on nuclear safety, radiological protection and support areas, administrative management, prevention, computer systems, languages and skills). The plan was carried out in accordance with the training proposals of the different organisational units.

The average number of activities for each person involved in training amounted to 2.32.

The overall number of hours set aside for personnel training was 26,393, at a total cost of 305,508.49 Euros.

As is normally the case, the CSN's participation in national and overseas congresses, meetings, seminars, etc. was promoted.

## 2.3. Research and development

The four-year R&D Plan establishes the research and development objectives of the CSN and identifies the technical lines of work considered to be suitable for performance. Furthermore, the Plan

contains objectives relating to aspects necessary for its correct development.

A total 54 R&D projects were managed throughout 2014. This figure includes all the R&D projects carried out by way of conventions and collaboration agreements with other organisations and projects subsidised by the CSN.

In addition, the CSN initiated actions to respond to the requests of the 2<sup>nd</sup> Resolution of Congress in relation to the CSN's Annual Report for 2012, which urged that "through the CSN, R&D&i tests be encouraged between the plants and universities and technology centres in order to gain a better understanding of the behaviour of degradation phenomena not initially foreseen".

With a view to complying with this recommendation by Congress, the CSN promoted the setting up of a Working Group on Material Degradation within the framework of the CEIDEN R&D technology plateau on energy and nuclear safety-related issues. This group was tasked with analysing those degradation phenomena that might affect the Spanish nuclear power plants, the current understanding of such phenomena, whatever shortcomings might exist and, where appropriate, the R&D programmes under way in relation to these points, identifying and prioritising from the technical viewpoint the additional R&D activities required to reasonably cover these shortcomings in knowledge.

Eleven projects were completed in 2014, these including both collaboration agreements with national (universities and Ciemat) and overseas (OECD Nuclear Energy Agency) institutions and certain of the projects subsidised through the public call for proposals performed in 2009.

In 2014, the R&D budget amounted to 3.27 million Euros, an amount similar to that budgeted in 2013.

Changes were made to the CSN's R&D management in 2014, with a view to its optimisation. In summary, these changes consisted of redefining the responsibilities of the CSN organisational units for the performance of R&D projects, reinforcing the role of the Plenary, the optimization and verification of returns associated with R&D projects and the incorporation of an external assessment of the quality of the R&D projects performed by an independent agency. This external evaluation will be carried out by the National Assessment and Forecasting Agency (ANEP), which is part of the Ministry of Economy and Competitiveness. An initial assessment of a series of selected projects has been carried out by this agency, with generally satisfactory results.

## 2.4. Resources and means

### 2.4.1. Human resources

The General State Budget Act for 2014, Law 22/2013, of December 23rd, included the CSN in the sector exempted from the zero rate of replacement of employees, this having allowed the Council to begin to recover its technical staff after several years of freezing of the public offer of employment, specifically since 2010. Article 21.One.2.M) provides for a public announcement of nine available posts for public officials in the upper scale of the Nuclear Safety and Radiological Protection Corps to perform functions relating to the management, study and assessment, inspection and control of radioactive and nuclear facilities.

As a result, Royal Decree 228/2014, of April 4<sup>th</sup>, approving the offer of public employment for 2014, allowed the Nuclear Safety Council, by way of the resolution of July 16<sup>th</sup>, to announce two selection processes for entry into the upper scale of the Nuclear Safety and Radiological Protection Corps, one to cover six posts via the general free access system and another to cover two posts through internal promotion. The selection phase

got under way on November 26<sup>th</sup> 2014 with the first examination within this process.

As of December 31<sup>st</sup> 2014, the staff of the CSN amounted to 446 people, 52% women and 48% men, the average age being 52 years.

As regards academic qualifications, 69.07% of the people working for the CSN are post-graduates, 6.55% are graduates and 24.38% hold other qualifications.

### 2.4.2. Economic resources

As regards economic and financial matters, the CSN is governed by the provisions of the General Budgeting Act, Law 47/2003, of November 26<sup>th</sup>, inasmuch as it is an entity included in the state public administrative sector in the terms established in articles 2.1.g and 3.b)1, as a result of which it is subject to the public accountancy system and the Accounting Instruction for the State Institutional Administration.

The accounting of the body complies with the *General public accountancy plan*, the economic aspects being broken down into budgeting items (income and expenses) and financial items (profit and loss account and balance sheet).

#### Budgeting aspects

The initial CSN budget for 2014 amounted to 46,612 thousand Euros. This initial budget was increased by 119 thousand Euros to the definitive figure of 46,730 thousand Euros, a decrease of 1.23% with respect to the previous year.

As regards income, the net recognised rights amounted to 44,757 thousand Euros, this implying a 94.23% implementation of the definitive budget, with a variation of +1.12% with respect to the previous year. 99.42% of the income corresponded to public prices and rates.

As regards outgoings, the net recognised obligations amounted to 40,012 thousand Euros, an implementation of 85.62% of the definitive budget of 46,730 thousand Euros, with a variation of 0.5% with respect to 2013.

### Financial aspects

The profit and loss account showed a positive result of 4.49 million Euros for the 2014 financial year.

As regards income, the rates for services rendered constituted the main source of CSN funding, representing 97.27% of the total, the remaining 2.73% arising from current subsidies and transfers, financial revenues and other management income.

Outgoings were broken down as follows: 59.20% corresponding to personnel expenses, 32.86% to supplies and external services, 4.40% to provisions for amortisations, 2.82% to transfers and subsidies and the remainder to taxes, financial expenses, other ordinary management expenses and the loss of value of financial assets.

### 2.4.3. Computer resources

The risk assessment and risk management programmes were updated in 2014 in compliance

with the requirements defined in the National Security System.

Operation of the CSN contingencies centre continued throughout the year. This is an alternative and redundant external centre permanently replicating all the CSN's critical data, servers and applications, such that essential services may continue to be provided in the hypothetical case of the normal system being unavailable. Improvements also continued to be made to another of the CSN's contingency centres, in this case the emergency room at the installations of the Military Emergency Response Unit (UME) in Madrid.

From the point of view of information security, the CSN continues to apply the Plan for Adaptation of the CSN to the National Security System (PAENS), pursuant to Royal Decree 3/2010, of January 8<sup>th</sup>, which regulates the said system in the area of electronic administration.

In June 2014, the Plenary of the Council approved the document on information security policy in the area of electronic administration, in compliance with this PAENS. This document is made up of a series of basic principles and minimum requirements that allow for the adequate protection of information and of the systems by which it is managed.



# Chapter II. Report on Activities





### 3. Overall view of nuclear safety and radiological protection in 2014

#### Overall assessment of the Nuclear Safety and Radiological Protection of the Facilities in 2014

The overall assessment of the operation of nuclear and radioactive facilities is accomplished fundamentally by considering the results provided by the Integrated Nuclear Power Plant Supervision System (SISC) and the inspection, supervision and control of radioactive facilities; reported events, especially those classified at a level higher than zero on the IAEA's International Nuclear and Radiological Events Scale (INES Scale); radiological impact; the dosimetry of the workers and relevant modifications proposed; warnings and sanctions and operating events at the said facilities.

All the nuclear facilities have operated safely throughout 2014.

As of the end of 2014, all the operations indicators of the Integrated Nuclear Power Plant Supervision System (SISC) were *green*, and no inspection finding exceeded the *green* category. The plants have remained in a situation of normality, with the application of standard inspection and deficiency

correction programmes, the situation known as "licensee response" in the SISC action matrix.

For their part, the radioactive facilities operated within the established safety standards, with no situations of undue risk.

The quality of the environment around the facilities remained under acceptable conditions from the radiological point of view, without any risk for persons as a result of their operation or of the dismantling or decommissioning activities performed.

#### 3.1. Safety of the facilities

##### 3.1.1. Nuclear power plants

The SISC is currently the fundamental instrument for the assessment of the performance of the plants from the point of view of safety, the planning of the CSN's supervision and control efforts and the communication to the general public of both issues.

Table 3.1.1.1 shows the status of the action matrix for 2014, in which it may be appreciated that all the operating plants were in the licensee response mode. Table 3.1.1.2 describes the characteristics of the different action matrix modes.

**Table 3.1.1.1. Status of action matrix. SISC 2014**

	1 <sup>st</sup> quarter	2 <sup>nd</sup> quarter	3 <sup>rd</sup> quarter	4 <sup>th</sup> quarter
Almaraz I	LR	LR	LR	LR
Almaraz II	LR	LR	LR	LR
Ascó I	LR	LR	LR	LR
Ascó II	LR	LR	LR	LR
Cofrentes	LR	LR	LR	LR
Garoña	LR	LR	LR	LR
Trillo	LR	LR	LR	LR
Vandellós II	LR	LR	LR	LR

LR: licensee response.

**Table 3.1.1.2. Analysis of action matrix. SISC 2014**

<b>Modes</b>	<b>Basis</b>	<b>Derived actions</b>
Licensee response	A plant is in this column when all the results of the assessment are <i>green</i> .	The CSN will perform only the basic inspection programme and any deficiencies identified will be dealt with by the licensee as part of the latter's corrective actions programme.
Regulatory response	A plant is in this column when one or two results, either operation indicator or inspection finding, are <i>white</i> on different safety pillars and there are no more than two <i>whites</i> in any strategic area.	The licensee shall perform an analysis to determine the root cause and contributing factors and include the activities required to solve the deficiencies detected in his corrective actions programme. The assessment performed by the licensee shall be subjected to a supplementary inspection by the CSN. Following this inspection, the CSN will meet with the licensee to analyse the deficiency detected and the actions implemented to correct the situation.
One pillar degraded	A pillar is considered to be degraded when it contains two or more white results or one yellow. A plant is in this column when it has a degraded pillar or three white results in a strategic area.	The licensee shall perform an analysis to determine the root cause and contributing factors and include the activities required to solve the deficiencies detected in his corrective actions programme, as regards both the problems identified in each subject area and whatever overall collective deficiencies and problems might arise. The assessment performed by the licensee shall be subjected to a supplementary inspection by the CSN. Following this inspection, the CSN will meet with the licensee to analyse the deficiency detected and the actions implemented to correct the situation.
Multiple degradations	A plant is in this column when it has several degraded pillars, several yellow results or one red result, or when a pillar has been degraded for five or more consecutive quarters.	The licensee shall perform an analysis to determine the root cause and contributing factors and include the activities required to solve the deficiencies detected in his corrective actions programme, as regards both the problems identified in each subject area and whatever overall collective deficiencies and problems might arise. This assessment may be performed by a third party, independent from the licensee. The CSN shall perform a supplementary inspection to determine the amplitude and depth of the deficiencies. Following this inspection, the CSN will decide whether supplementary actions are required (supplementary inspections, request for additional information, issuing of instructions and/or shutdown of the plant).
Unacceptable operation	The Council declares a plant to be in this situation when there is insufficient guarantee that the licensee is capable of operating the facility without causing an unacceptable risk.	The CSN will meet with the management of the licensee to discuss the degradation observed in operation and the actions to be taken before the plant can restart. The CSN will draw up a specific supervision plan.

The CSN website has a specific link to the SISC ([www.csn.es/sisc/index.do](http://www.csn.es/sisc/index.do)), which includes the results of the system and supporting operational information for all the nuclear power plants updated every three months, along with descriptive documentation and corresponding procedures.

### Reported events, proposals for sanctions proceedings and warnings

In application of the contents of Council Instruction IS-10, which establishes the criteria for the reporting of events to the Council, the nuclear power plant licensees reported 46 events in total in 2014, all of which were classified on level 0 on the International Nuclear Events Scale (INES). In 2014, six more events were reported than in 2013.

Of the 46 events reported, the CSN Incident Review Panel (IRP) classified 15 as significant, and two of these as both significant and generic. An event is classified as significant if subsequent tracking of the corrective measures implemented is considered necessary or if it may lead to requests for the adoption of measures additional to those proposed by the licensee because of its safety significance. An event is considered generic when it is determined that its causes may be extrapolated to other nuclear facilities.

The CSN issued six warnings to the licensees of nuclear power plants in 2014 and one caution to a nuclear power plant licensee representative. The CSN has not proposed the opening of any sanctions proceedings.

### 3.1.2. Juzbado fuel assembly manufacturing facility

Overall, the Juzbado manufacturing facility operated suitably from the point of view of safety and managed the reportable events that occurred correctly, performing the appropriate analyses and applying the corrective actions arising therefrom. At no time was there any undue risk for the

workers, the members of the public or the environment.

During 2014 the facility reported a single event, classified at level 0 on the International Nuclear Events Scale (INES).

The CSN did not have to propose the opening of any sanctions proceedings or issue any warnings to this facility.

### 3.1.3. El Cabril waste disposal facility

The data available from the supervision and control system for 2014 indicate that this facility operated adequately from the point of view of safety, meeting the established requirements and without posing any undue risk for the workers, the members of the public or the environment.

No reportable events occurred at this facility during 2014.

The CSN did not have to propose the opening of any sanctions proceedings or issue any warnings to this facility.

### 3.1.4. Facilities in the dismantling and decommissioning phase

Throughout 2014, the activities carried out at each of the facilities currently in this phase, in keeping with their respective statuses, remained within the established safety limits and had no undue impact on either persons or the environment.

### 3.1.5. Radioactive facilities

Throughout 2014, the operation of the radioactive facilities for scientific, medical, agricultural, commercial and industrial purposes remained within the established safety standards; the measures in place to ensure the radiological

protection of persons and the environment were adhered to and, as a result, there were no situations of undue risk.

## 3.2. Application of the radiological protection system

### 3.2.1. Summary of dosimetry data

In 2014, the collective dose of dosimetrically monitored workers carrying out their activities at radioactive facilities and properly changing their dosimeters amounted to 12,642 mSv.person, with an average individual dose of 0.71 mSv/year, this representing 1.42% of the maximum annual dose established in the legislation.

During 2014, there were four cases in which the annual dose limit established in the legislation might have been exceeded, at all radioactive facilities. In all these cases a process of investigation was initiated, and in the two cases for which the investigation has been completed, it has been concluded that the potential overdose did not in fact occur.

The following may be underlined:

- The medical radioactive facilities are those that showed the highest collective dose (10,856 mSv.person), a logical outcome in view of the fact that these are the installations with the largest number of professionally exposed workers (82,218).
- The facilities in the dismantling phase registered the highest average individual dose (3.72 mSv/year), this corresponding to the doses registered during the dismantling of the José Cabrera nuclear power plant.
- The operating nuclear power plants had 9,053 dosimetrically monitored workers with a

collective dose of 2,750 mSv.person and an average individual dose of 0.97 mSv/year.

### 3.2.2. Control of releases and environmental radiological surveillance

The CSN controls and oversees measures for the radiological protection of the public and the environment, the off-site releases of radioactive materials from nuclear and radioactive facilities and their impact on the areas of influence of these installations, all with a view to estimating their radiological impact.

Furthermore, the CSN carries out an environmental radiological surveillance programme throughout the national territory, outside the areas of influence of the facilities, in order to watch over and maintain the radiological quality of the environment across the country, in keeping with the requirements of the Euratom Treaty.

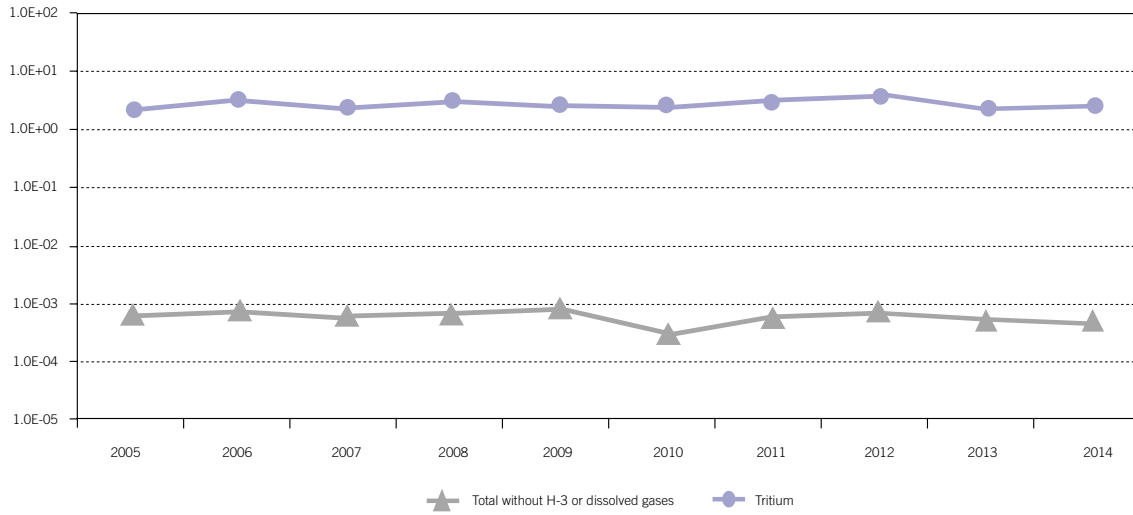
#### Control of releases and environmental radiological surveillance around the facilities

In response to a CSN requirement, the nuclear power plants have established a programme aimed at controlling radioactive effluents and keeping doses to the public as low as possible and in all cases below the values established by the Regulation on the Protection of Health against Ionising Radiations.

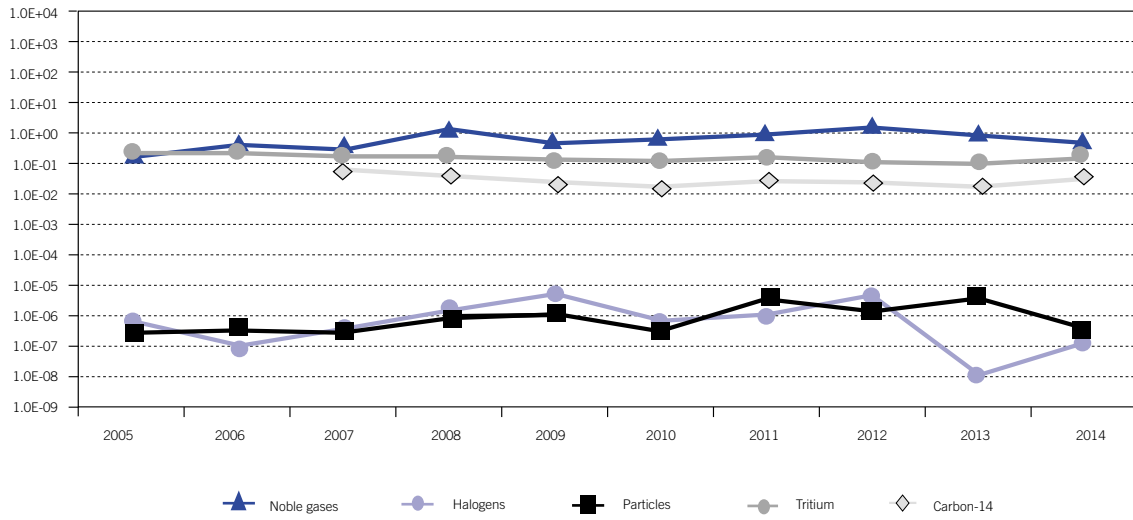
The radioactive effluents from the Spanish nuclear power plants have followed a stable trend in recent years, except in the case of halogens at PWR plants, which have experienced a reduction, as shown in figures 3.2.2.1 to 3.2.2.4.

The effective doses due to the emission of liquid and gaseous radioactive effluents, estimated using conservative criteria for the most exposed individual in the critical group, have not in any case exceeded 4% of the authorised limit (0.1 mSv in 12 consecutive months).

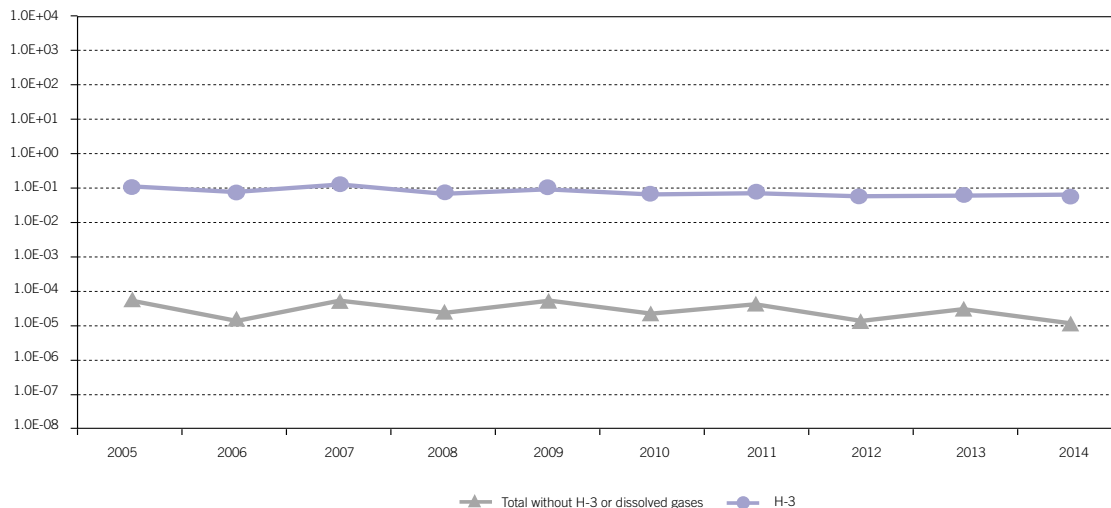
**Figure 3.2.2.1. Liquid radioactive effluents from PWR plants. Normalised activity (GBq/GWh)**



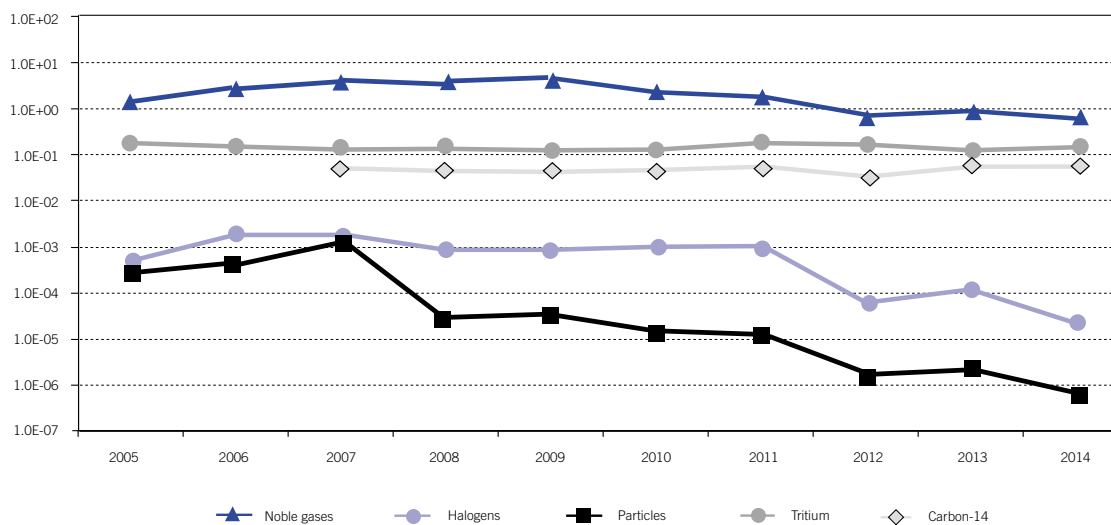
**Figure 3.2.2.2. Gaseous radioactive effluents from PWR plants. Normalised activity (GBq/GWh)**



**Figure 3.2.2.3. Liquid radioactive effluents from BWR plants. Normalised activity (GBq/GWh)**



**Figure 3.2.2.4. Gaseous radioactive effluents from BWR plants. Normalised activity (GBq/GWh)**



Environmental radiological surveillance programmes are set up around the operating nuclear power plants, fuel cycle facilities and installations currently in the dismantling or decommissioning phase in order to verify the suitability of the radioactive effluent surveillance

and control programmes and models of radionuclide transfer in the environment.

This report presents the results of the environmental radiological surveillance programmes (ERSP's) for the year 2013. This is due to the fact that the

processing and analysis of results prevents the results for the 2014 campaign from being available for inclusion in this report.

The licensees of the facilities are responsible for carrying out these surveillance programmes. During 2013, 6,353 samples were taken in the areas surrounding the nuclear power plants, 1,964 around the fuel cycle facilities (Juzbado fuel assembly manufacturing facility, El Cabril and the Quercus plant) and 1,938 at installations in the dismantling and decommissioning phase, including Ciemat, the José Cabrera and Vandellós I nuclear power plants, the Andújar uranium mill and the now decommissioned Lobo-G plant.

The results of the ERSP's belonging to the 2013 campaign were similar to those of previous years and made it possible to conclude that the quality of the environment around the facilities remained in acceptable conditions from the radiological point of view, without there being any risk for persons as a result of their operation or of the dismantling or decommissioning activities carried out.

In order to verify that the surveillance programmes carried out by the facilities are correct, the CSN implements independent environmental radiological surveillance programmes (INERSP's), the sample volume and determinations of which represent around 5% of those performed by the licensees.

The results of these programmes, corresponding to the 2013 campaign, did not show any significant deviations with respect to those obtained in the corresponding programmes of the licensees.

### **Environmental surveillance outside the area of the facilities**

The Nuclear Safety Council undertakes environmental surveillance at national level by means of a surveillance network known as Revira, in collaboration with other institutions. This network is made up of automatic stations for the

continuous measurement of atmospheric radioactivity and of stations where samples are taken for subsequent analysis.

- Automatic stations network (ASN)

Figure 3.2.2.5 (ASN) shows the average annual gamma dose rate values measured at each of the stations of the networks of the CSN and of the Regional Governments of Valencia, the Basque Country, Catalonia and Extremadura.

The results of the measures performed during 2014 were characteristic of the environmental radiological background and indicate the absence of any radiological risk for the population and the environment.

- Sampling stations network (SSN)

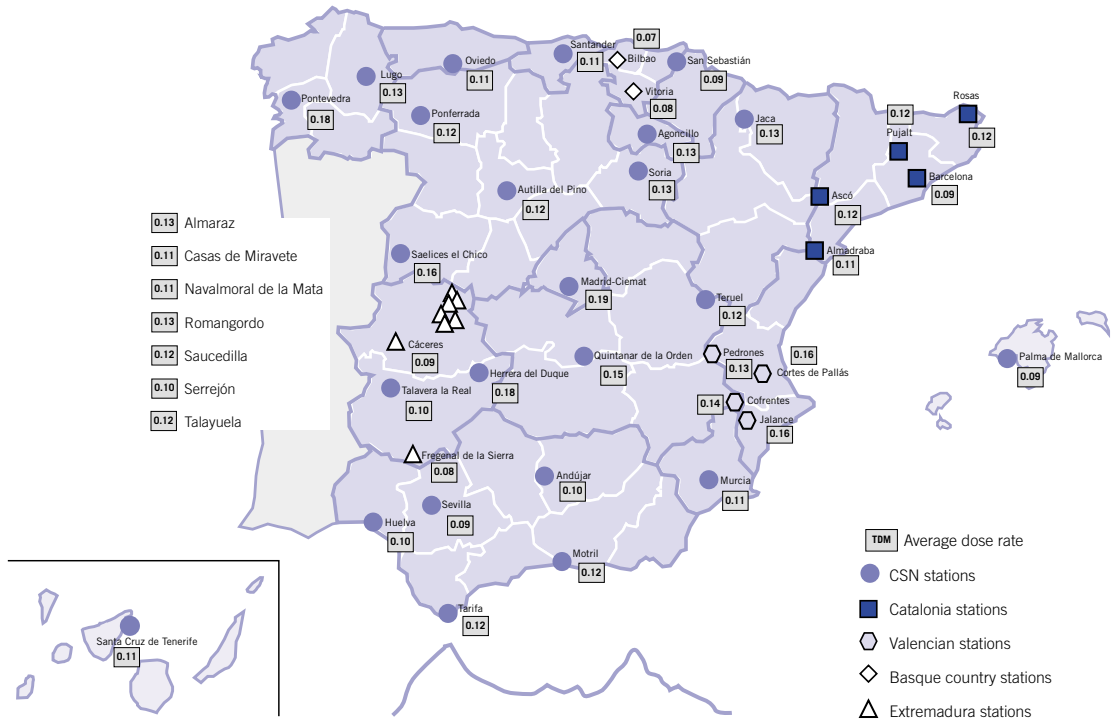
In this network samples are taken of the air, soil, drinking water, milk, type diet and continental and coastal waters. Within this whole, consideration is given to the following:

- *Dense network*, with numerous sampling points ensuring adequate surveillance of the entire territory.
- *Spaced network*, made up of a small number of sampling points, where highly sensitive measurements are required.

Overall assessment of the results obtained in 2013<sup>1</sup> indicates that the values are in keeping with the radioactive background levels and that in general they remain relatively stable throughout the different periods, with slight variations being observed between the different points that are attributable to the radiological characteristics of the different areas.

<sup>1</sup> This report presents the results of the environmental radiological surveillance programmes (ERSP) for the year 2013. This is because the processing and analysis of the samples do not make it possible for the results of the 2014 campaign to be available for inclusion therein.

Figure 3.2.2.5. ASN. Average gamma dose rate values. 2014 (microSievert/hour)





## 4. Tracking and control of facilities and activities

### 4.1. Regulations and standards

The exercising of the CSN's regulatory capacities gave rise in 2014 to the approval of Council Instruction IS-10 (rev. 1), of July 30<sup>th</sup> 2014, on Criteria for the reporting of events at nuclear power plants (Official State Gazette of September 19<sup>th</sup> 2014). This revision 1 replaces the Instruction issued in 2006, the objective being to incorporate the experience acquired since the publication of the latter.

As regards Safety Guides, GS 05.08 (rev. 1) "Bases for the drawing up of information on the operation of radioactive facilities" was approved by the Plenary on October 1<sup>st</sup> 2014.

The following provision affecting the regulatory framework of the CSN was approved and published in 2014:

Council Directive 2014/87/EURATOM, of July 8<sup>th</sup> 2014, in modification of Directive 2009/71/EURATOM, establishing a community framework for the nuclear safety of nuclear facilities. This Directive modifies the previous one on the same subject, published in 2009. European stress tests were performed at the nuclear power plants in the wake of the Fukushima accident, these highlighting a number of nuclear safety improvements to be undertaken by the member States. Member States not having nuclear facilities in their territory are not bound by the provisions of this Directive, which are related intrinsically to the existence of such installations. These Member States are, however, obliged to ensure that there are mechanisms in place guaranteeing cooperation in

relation to nuclear safety issues with cross-border impact.

The Directive includes high level Community nuclear safety-related objectives that covers all the different stages of the life cycle of nuclear facilities and also requires significant safety improvements in the design of new reactors. In this respect, the Directive obliges the Member States to guarantee that their respective national frameworks require the competent regulatory authority and licensees to adopt measures to promote and improve an effective culture of nuclear safety, this to be achieved specifically through nuclear safety assessments.

### 4.2. Operating nuclear power plants

#### 4.2.1. General and licensing issues

During 2014, the Plenary of the Council issued 43 resolutions for authorisations and 15 favourable reports, most relating to requests for the revision of official nuclear power plant operation documents.

On June 2<sup>nd</sup> 2014, the licensee of the Santa María de Garoña nuclear power plant requested renewal of the plant operating license, in accordance with the provisions of section 1 of article 28 of Royal Decree 1836/1999, of December 3<sup>rd</sup>, approving the Regulation on Nuclear and Radioactive Facilities. On July 30<sup>th</sup> 2014, the Plenary of the Council agreed to apply to the licensee a complementary technical instruction on additional requirements and documentation in relation to the request for renewal of the operating license.

On October 8<sup>th</sup> 2014, the Plenary of the Council reported favourably, with certain conditions, on renewal of the operating license for Trillo nuclear power plant for a period of ten years, from November 17<sup>th</sup> 2014 to the same day and month of the year 2024, as well as on extension of the security authorisation, also with conditions.

The licensees of the Ascó, Vandellós II and Cofrentes nuclear power plants requested postponements in relation to the planning of actions deriving from post-Fukushima Complementary Technical Instructions (CTI's), for activities scheduled for completion by December 31<sup>st</sup> 2014. For their part, the licensees of the Almaraz, Ascó, Vandellós II and Trillo nuclear power plants submitted requests for modification of the limit date for presentation of the analysis of the existing alternatives for filtered containment venting.

On April 9<sup>th</sup> 2014, the CSN issued a generic Complementary Technical Instruction (CTI) to the operating nuclear power plants in relation to the adaptation of the post-Fukushima Complementary Technical Instructions. The CTI in question is divided into general and specific requirements. As regards the former, the programme for the implementation of improvements is required to be completed prior to December 31<sup>st</sup> 2016, and it is further specified that the modifications to be incorporated at the facility, including the use of portable equipment, must comply with the indicated criteria, new mobile equipment fulfilling the philosophy of "plug and play". In addition, the licensee of the facility is required to submit a six-monthly report to the CSN on activities carried out during the period, expressly indicating whatever deviations might have occurred.

The specific requirements fall into seven areas for action:

1. Protection against the potential loss of major areas beyond the plant design basis.
2. Protection against extreme events.
3. Measures to address the prolonged loss of electrical or cooling systems.

4. Reinforcement of the capacity to manage severe accidents.
5. Reinforcement of the measures necessary for the prevention/mitigation of damage to the fuel.
6. Radiological protection of the personnel in the event of accidents involving fuel damage.
7. Improvement of the capacity to estimate and reduce radioactive emissions.

This CTI was not sent to Santa María de Garoña nuclear power plant as it was in the definitive shutdown situation.

Other especially significant agreements adopted by the Plenary in relation to licensing are those relating to the favourable reports on the vessel forged rings inspection programme, the vessel internals inspection programme and the programme for the inspection of the circumferential welds of the vessel at Santa María de Garoña nuclear power plant.

The overall assessment of the operation of the nuclear power plants is carried out by considering fundamentally the results of the Integrated Nuclear Power Plant Supervision System (SISC), reported events, especially those classified above level zero on the International Nuclear Events Scale (INES Scale), radiological impact, the dosimetry of the workers and other aspects such as relevant modifications proposed, warnings and sanctions and operating incidents.

Table 4.2.1.1 contains information on the design characteristics of the nuclear power plants, the dates of the site, construction and start-up licenses and the year in which the spent fuel pools are expected to become saturated.

Table 4.2.1.2 contains specific data on the plants for 2014, indicating whether or not they have undergone a refuelling outage.

**Table 4.2.1.1. Basic characteristics of the nuclear power plants**

	<b>Almaraz</b>	<b>Ascó</b>	<b>Vandellós II</b>	<b>Trillo</b>	<b>Garoña</b>	<b>Cofrentes</b>
Type	PWR	PWR	PWR	PWR	BWR	BWR
Thermal power (MW)	U-I: 2,947 U-II: 2,947	U-I: 2,940.6 U-II: 2,940.6	2,940.6	3,010	1,381	3,237
Electrical output (MW)	U-I: 1,049.43 U-II: 1,044.45	U-I: 1,032.5 U-II: 1,027.2	1,087.1	1,066	465.6	1,092.02
Cooling	Open Arrocampo Reservoir	Mixed, River Ebro + Towers	Open Mediterranean	Closed Towers, make-up from River Tajo	Open River Ebro	Closed Torres make-up River Júcar
Number of groups	2	2	1	1	1	1
Preliminary authorisation groups I/II	29-10-71 23-05-72	21-04-72 21-04-72	27-02-76	04-09-75	08-08-63	13-11-72
Construction license groups I/II	02-07-73 02-07-73	16-05-74 07-03-75	29-12-80	17-08-79	02-05-66	09-09-75
Start-up license groups I/II	13-10-80 15-06-83	22-07-82 22-04-85	17-08-87	04-12-87	30-10-70	23-07-84
Year of fuel pool saturation groups I/II	2020 2022	N/A <sup>(*)</sup> N/A <sup>(*)</sup>	2020	N/A <sup>(*)</sup>	2015	2021

(\*) Equipped with a store for the dry storage of irradiated fuel.

**Table 4.2.1.2. Summary of nuclear power plant data for 2014**

	<b>Almaraz I/II</b>	<b>Ascó I/II</b>	<b>Vandellós II</b>	<b>Trillo</b>	<b>Garoña</b>	<b>Cofrentes</b>
Permit in force	07-06-10 07-06-10	02-10-11 02-10-11	21-07-10	17-11-04	Definitive shutdown since 06-07-13	20-03-11
Period of validity (years)	10/10	10/10	10	10	Unlimited shutdown	10
Number of inspections in 2014	36	38	31	29	23	25
Production (GWh) I/II	7,510.873 7,948.998	7,394.000 7,143.840	9,194.079	7,785.49	–	9,468.968
Load factor (%) I/II	81.70 90.55	81.75 79.39	96.54	88.97	–	98.98
Operating factor (%) I/II	83.92 91.94	82.49 80.02	98.90	90.2	–	100.00
Hours coupled to the grid I/II	7,351.00 8,054.00	7,226.40 7,009.32	8,663.72	7,901	–	8,760.00
Refuelling outages I/II	23-06-14 20-08-14 (U-I) 24-11-13 25-01-14 (U-II)	03/05/14 05/07/14 (U-I) 01/11/14 16/12/14 (U-II)	No outage	23-05-14 28-06-14	N/A	No outage

## 4.2.2. Nuclear power plants inspection, supervision and control: SISC

The CSN's Integrated Nuclear Power Plant Supervision System (SISC) is a fundamental tool for supervision of the operation of the Spanish nuclear power plants and establishment of the necessary corrective actions, on the basis of the results. As part of the on-going review and improvement of the SISC, the system has been provided with new elements contributing to more detailed monitoring of the operation of the plants, especially as regards transversal issues.

The pilot phase of the process of supervising transversal components within the SISC began on July 1<sup>st</sup> 2014 and is scheduled to last one year. The objective of this new approach would be to make available some type of indicator or alert that would allow the CSN to identify possible degradations affecting organisational and cultural aspects and that might have an impact on nuclear safety, thereby making it possible to take appropriate actions. These indicators or alerts would be obtained from the findings of all CSN inspections, this involving all CSN inspection activities.

On completion of the pilot phase, the results will be evaluated and the Council will decide on the definitive implementation of transversal component supervision within the SISC.

These transversal components are 13 fundamental attributes of plant operation that extend to all the safety pillars of the SISC, i.e. to the following: initiating events, mitigation systems, barrier integrity, emergency preparedness, occupational radiological protection, the radiological protection of the public and security.

On January 8<sup>th</sup> 2014, the Plenary approved a new system for the supervision and monitoring of the Santa María de Garoña plant, adapted to the situation of definitive shutdown, as a result of

which this plant no longer appears in the SISC and has its own six-monthly evaluation reports.

As of closure of the 2014 year, all the operations indicators and inspection findings of the action matrix were *green*. Furthermore, all the plants have remained in the licensee response column throughout the four quarters of 2014.

The total number of inspections performed at the operating plants during 2014, including Santa María de Garoña, was 182, 64 more than those contemplated in the Basic Inspection Programme (BIP) and considered standard, which amounted to 118, including the quarterly inspections performed by the resident inspectors at the plants.

These 118 inspections do not include those performed in reaction to operating incidents, inspections of generic issues as a result of new standards and in-house and industry operating experience, inspections with respect to various licensing issues and other inspections planned as generic or scheduled prior to the plant action plans. In particular, this year 23 inspections were performed outside the Basic Inspection Plan and the rest of the scheduled inspections (182 carried out as opposed to 159 scheduled in the CSN's annual work plan).

### Sanctions proceedings and warnings

The CSN did not propose that the Ministry of Industry, Energy and Tourism initiate any sanctions proceedings against nuclear power plants in 2014.

In 2014, the CSN approved issuing of the following warnings to nuclear power plants:

- Almaraz nuclear power plant, groups I and II, deriving from non-compliance with instructions IS-21 and IS- 26, relating to requirements applicable to nuclear power plant design modifications and to basic nuclear safety

requirements applicable to nuclear facilities as a result of inspections in accordance with the components design basis, procedure PT.IV.218 revision 1.

- Ascó II nuclear power plant, deriving from non-compliance with the Technical Specifications relating to fire barriers, and CSN instruction IS-10 on event reporting criteria, as a result of such non-compliance not being reported.
- Cofrentes nuclear power plant, as a result of non-compliance with Council instruction IS-06, defining basic and specific training programmes on radiological protection, regulated by Royal Decree 413/97 in the area of nuclear and radioactive fuel cycle facilities, the period of validity of the specific training on radiological protection established therein having been exceeded.
- Cofrentes nuclear power plant as a result of inadequate behaviour by a representative of the licensee, who obstructed inspection activities during the CSN inspection visit carried out on February 26<sup>th</sup> and 27<sup>th</sup> 2014.
- Trillo nuclear power plant for non-compliance with Council instruction IS-32 on nuclear power plant Technical Specifications, section 2.5, as a result of the plant not adequately updating these specifications following the implementation of three design modifications during the 2013 refuelling outage.

#### 4.2.3. Monitoring of actions deriving from the Fukushima nuclear power plant accident

The CSN post-Fukushima requirements applied to the Spanish nuclear power plants were incorporated in four Complementary Technical Instructions (known as CTI-1/2/3/4), issued by the CSN during 2011 and 2012. In April 2014, the CSN issued a new CTI for adaptation of the post-

Fukushima CTI's, in order to consistently reflect the requirements of the previous instructions with completion dates after January 1<sup>st</sup> 2014.

In February 2013, the CSN required the licensees of the plants to provide a six-monthly tracking report on activities relating to these post-Fukushima CTI's, to be submitted within the month following the end of each calendar six-month period and with previously established contents allowing for identification of the progress made at each plant and explaining possible problems encountered in complying with the terms set out for the completion of these activities.

On the basis of the compliance reports for 2014, the CSN drew up reports assessing the degree of progress of the actions required of the licensees and of its own supervision activities.

During 2014 the CSN performed 35 inspections at nuclear power plants to check for compliance with the post-Fukushima CTI's. These inspections included checks on aspects relating to the stress tests carried out at each plant and with the loss of major areas and extensive damage scenarios. The following aspects specifically supervised during these inspections may be singled out:

- Electrical and instrumentation systems (only electrical systems at Vandellós II in 2014).
- Protection against major fires.
- Prolonged loss of off-site power.
- Stress tests and loss of major areas.
- Fuel damage.
- Capacity to respond to internal flooding in the event of an earthquake.
- Capacity to respond to external flooding and other extreme natural events.

- Determination of the seismic margins of structures, systems and components.
- Radiological protection equipment and human resources additional to those previously in place to address severe accidents (means to estimate radioactive emissions in scenarios analysed in the stress tests).
- Guidelines for controlled flooding and the transfer of contaminated water.
- Emergency Support Centre (ESC).
- Monitoring of post-Fukushima actions in relation to radioactive effluents.
- Emergency management.

The results of the aforementioned inspections are subject to the same treatment as the rest of the CSN inspections and are associated with the corresponding action in the programme for the identification and resolution of problems of each plant (PAC).

During the months of November and December, the licensees of all the plants requested extensions to the periods established for compliance with certain of the requirements of the post-Fukushima CTT's, the limit date for which had been set for December 31<sup>st</sup> 2014. The Plenary of the CSN examined these requests and in most instances reported favourably, except in certain cases where the delays were not considered to be justified.

#### 4.2.4. Safety improvement programmes

##### 4.2.4.1. Human and organisational factors

Since 1999, all the Spanish nuclear power plants have had safety assessment and improvement programmes relating to organisational and human factors. These programmes are aimed at implementing mechanisms for the supervision of

human performance and human error prevention tools, establishing the influence of human factors on design modifications, assimilating operating experience, defining safety culture evaluation and improvement processes and verifying the effectiveness of the improvement plans.

In 2014 these organisational and human factors programmes were inspected at the Almaraz, Trillo, Ascó and Vandellós II nuclear power plants.

##### 4.2.4.2. ANAV Organisational, Cultural and Technical Reinforcement Plan (Procura)

The Procura plan was approved by the Plenary of the Council in March 2010. The renewals for the operating licenses of the Ascó I, Ascó II and Vandellós II plants establish conditions relating to Procura that require that its implementation be completed prior to December 31<sup>st</sup> 2012 and that a final report be submitted to the CSN prior to June 30<sup>th</sup> 2013 assessing the effectiveness of the actions implemented.

The Procura plan has been developed as planned. ANAV has completed its implementation and assessed its effectiveness by the date required by the aforementioned condition.

The CSN has tracked the progress of the plan and its implementation and has evaluated the effectiveness of the actions put into place by way of inspections, and has finally reported favourably on the Procura closing report on October 1<sup>st</sup> 2014.

##### 4.2.4.3. Cofrentes nuclear power plant Dose Reduction Master Plan (DRMP)

An assessment of the overall evolution of operational doses during the period 1999-2009 was performed within the scope of the Cofrentes nuclear power plant Periodic Safety review. As a result of the different analyses and checks and of the evaluation process performed by the CSN in the context of renewal of the plant's operating

license, it was concluded that there was a need for the Safety Improvement Programme to be strengthened in relation to radiological impact, in terms of the occupational doses associated with the long-term operation of the facility. Thus, among the limits and conditions associated with the operating license, the requirement that the Dose Reduction Master Plan (DRMP) be revised was introduced.

The main objective of this plan is to describe the most important courses of action and the action plan developed as part of the plant's ALARA policy, with a view to reducing the individual and collective doses of the workers during both normal operation and outages.

During 2014 the CSN continued the process of tracking and control of this Improvement Programme, and has carried out a specific inspection to check the progress made in complying with the actions included in the 2013 action plan and with those scheduled for 2014, both the actions deriving from the licensee's annual self-evaluation report for 2013 and those required by the Nuclear Safety Council.

#### 4.2.5. Generic issues

A generic issue is understood as being any safety-related problem identified at any national or overseas nuclear power plant that might affect other plants. The CSN monitors these issues and promotes the analysis of their applicability to the Spanish plants and the adoption of the corrective actions identified as a result of such analysis.

Throughout 2014, the most relevant generic issues have been as follows:

##### **Ageing of active components**

This generic issue was opened as a result of ageing problems having been detected in recent years in

active components, causing the failure and unavailability of safety-related equipment.

The management of the ageing of passive components is regulated through the Lifetime Management Plans required in Council Instruction IS-22, on the management of ageing and long-term operation. In the case of active components, however, there is no specific standard regulating ageing management, although there are regulations that more or less implicitly require that problems of ageing and obsolescence be addressed.

The CSN has required the licensees to submit a report describing the processes and practices in place to identify, oversee and evaluate active equipment ageing and obsolescence problems.

From the evaluation of the responses provided by the nuclear power plants it is concluded that they all have processes and practices allowing for the control of the ageing and obsolescence of active components; nevertheless, the CSN will carry out inspections at all the plants within the next two years in order to verify the processes applied in the management of ageing and obsolescence.

##### **Monitoring of primary to secondary temperature difference before starting up the reactor coolant pumps**

This generic issue derives from a special report, issued by Ascó II nuclear power plant on September 4<sup>th</sup> 2014, on a pressure transient that caused a pressuriser relief valve to open due to the actuation of the cold overpressure protection system (COMS).

The pressure increase occurred following the start-up of the first reactor coolant pump, as a result of heating of the water in the reactor coolant system via the steam generators, due to the mass of water on the generator secondary side being at a higher temperature than that of the reactor coolant. This

was due to the reactor coolant system having been cooled for the performance of a surveillance procedure following a non-scheduled outage.

The CSN sent a letter to the other Spanish pressurised water reactor nuclear power plants with Westinghouse technology, requesting information on the way in which precautions relating to the variation in temperature between the primary and secondary prior to starting a reactor coolant pump were incorporated in procedures. Ascó nuclear power plant was requested to provide additional information on the transient. The replies from the Spanish plants are currently being evaluated by CSN specialists.

### 4.3. Nuclear fuel cycle and radioactive waste disposal and storage facilities and research centres

This heading includes the Juzbado fuel assembly manufacturing facility, the El Cabril radioactive waste disposal centre and the Centre for Energy-Related, Environmental and Technological Research (Ciemat). All of these installations operated within the established safety margins throughout 2014, without any situations of undue risk.

Also included are requests relating to the centralised temporary storage (CTS) facility.

#### 4.3.1. General and licensing issues

Throughout 2014, the CSN passed judgment on twenty-two applications for authorisation and reported favourably on five requests. The dossiers dealt with referred to the following installations:

- Juzbado fuel assembly manufacturing facility: eight favourable reports were issued in relation to design modifications or changes to official operation documents.
  - El Cabril disposal centre: three favourable reports were issued in relation to design modifications or changes to official operation documents and one favourable report for the construction of cell 30 for the disposal of very low level waste.
  - Ciemat: four authorisations for modifications, five favourable reports and one radioactive facility decommissioning declaration.
  - Centralised Temporary Storage (CTS) facility: On January 13<sup>th</sup> 2014, Enresa submitted to the Ministry of Industry, Energy and Tourism requests for the preliminary or site authorisation and construction license for the centralised temporary storage (CTS) facility for spent fuel and high level radioactive waste. These applications were accompanied by the documentation required by articles 14 and 17 of the RNRF. For its part, on January 14<sup>th</sup> 2014 the Ministry of Industry, Energy and Tourism requested from the CSN the mandatory report on the applications submitted.
- The CSN issued a report on the scope of the Environmental Impact Study on the CTS facility and associated technology centre, considering the content submitted by Enresa to be acceptable from the point of view of the former's realm of competence.
- A total number of nine CSN/Enresa technical meetings were held during 2014. The technical personnel of the CSN made two technical visits to the site and performed an inspection focussing on quality assurance issues.
- As regards the application for the preliminary or site evaluation and construction license, three requests for additional information were issued, two relating to the documentation associated with the construction license and one to the preliminary



authorisation; in all cases these focussed on quality assurance and the Site Characterisation Plan.

Likewise, the CSN issued a report to the Ministry of Industry, Energy and Tourism on the authorisation relating to the physical protection of the facility.

### Reported events

A reportable event occurred at the Juzbado fuel assembly manufacturing facility, this not posing any risk for the workers, the general public or the environment.

On November 4<sup>th</sup> 2014, the facility reported an event classified at level zero on the International Nuclear Events Scale (INES) and consisting of an incoherence detected in the “Hepa filter bank in situ leak testing procedure”, which supports the requirement for surveillance testing every 18 months of the efficiency of the secondary filter banks.

The following events occurred at Ciemat:

- A reported event relating to the notification levels of the Ciemat environmental radiological surveillance plan having been exceeded, specifically regarding iodine-131 activity in a sample of surface water. According to Ciemat indications, this iodine-131 came from releases performed by hospitals located upstream of the sampling point.
- There was an emergency pre-alert warning due to the malfunctioning of the pool water replenishment and purification system of the IR-33 “Neutron standards” facility. This did not have any radiological consequences.
- A reported event due to the rupturing of the piping connecting two of the PIMIC-Dismantling liquid waste control tanks. This did not have any radiological consequences.

### 4.3.2. Monitoring and control of the Juzbado fuel assembly manufacturing facility

Within the framework of its control programmes, the CSN performed a total 14 inspections at the Juzbado fuel assembly manufacturing facility.

The Juzbado manufacturing facility Supervision and Monitoring system (JSM) undertakes evaluation of the operation of the installation. The frequency of the supervision system is two-yearly, coinciding with extension of the facility’s Basic Inspection Plan, and begins with an analysis of the deviations or findings documented during the review period.

Although the supervision system report for the period 2013-2014 had not been completed as of the date of issuing of this document, from the evaluation performed it may be deduced that the Juzbado fuel manufacturing facility has in general operated adequately from the point of view of safety, i.e. in compliance with the established requirements and without undue risk for the workers, the general public or the environment.

The post-Fukushima requirements applied to the Juzbado facility by the CSN are incorporated in two Complementary Technical Instructions (CTI) issued by the Council in 2011 and 2012.

Various improvements have been implemented at the facility, or are in the process, in response to these instructions, and are being monitored by the CSN.

### Sanctions and warnings

The CSN has not had to propose the initiation of any sanctions proceedings or issue any warnings to this facility.

### 4.3.3. Monitoring and control of the El Cabril radioactive waste disposal centre

In the performance of their respective control programmes, the CSN performed a total 11 inspections at the El Cabril disposal facility.

The solid low and intermediate level radioactive wastes generated at the nuclear and radioactive facilities are managed at the El Cabril disposal centre, which is equipped with two storage cells for this purpose (north and south platforms). There are also cells for very low level wastes (east platform).

In 2014 a total 229 shipments were received at the facility, 112 of low and intermediate level wastes (82 from nuclear facilities and 30 from radioactive facilities), 112 of very low level wastes (101 from nuclear facilities and 11 from radioactive facilities) and five mixed shipments from nuclear facilities with:

- 3,518 waste packages, 244 containment units, 16 storage units and 28 samples from nuclear facilities.
- 1,010 packages or containment units from radioactive facilities.

In 2014, cell 24 on the south platform remained in operation, cell 18 was completed and closed and the storage of low and intermediate level wastes began in cell 19. Very low level wastes were stored in lines 2, 3 and 4 of section I of cell 29.

A pilot programme for the facility-specific supervision and control system was undertaken in 2013.

This supervision and control system has been definitively applied as from 2014. The frequency of the supervision and monitoring process is two-yearly. The system includes a process of periodic

review of the operation of the facility and constitutes the basis for adjustment of the inspection programme in points such as areas of attention, frequency and resources.

The supervision process starts with the gathering of information from the following sources: the operating indicators, communicated by the facility to the CSN, and the inspections and evaluations performed by the latter. The system is based on verifying the operation of the facility in accordance with the standards, the applicable authorisations and other requirements established.

#### Sanctions and warnings

The CSN has not had to propose the initiation of any sanctions proceedings or issue any warnings to this facility.

### 4.3.4. Monitoring and control of the Centre for Energy-Related, Environmental and Technological Research (Ciemat)

In the performance of their respective control programmes, the CSN performed a total of seven inspections at Ciemat.

The dismantling project (PIMIC-Dismantling) affects the area that previously housed the most representative nuclear installations of the former Nuclear Energy Board (JEN) and is being carried out by Enresa.

The rest of the site is covered by the so-called PIMIC-Rehabilitation project, and includes installations whose dismantling was initiated previously and activities for the restoration of radiologically affected areas of the centre.

#### Sanctions and warnings

The CSN has not had to propose the initiation of any sanctions proceedings or issue any warnings to this facility.

### 4.3.5. Monitoring and control of the Quercus uranium concentrates plant

The CSN performed three inspections in performing the programme for the supervision and control of the Quercus plant.

This facility has been in the definitive shutdown condition since 2003, and a new request for dismantling was submitted on November 5<sup>th</sup> 2013.

Licensing for the dismantling of the Quercus plant was reinitiated in November 2013. The preliminary evaluation of the new documentation submitted by Enusa showed that the request was presented as a continuation of the procedure initiated years before, although the strategy set out in the new application consists of dismantling by phases and is different from the one initially contemplated.

The activities performed during 2014 centred on treatment of the liquid effluents collected from the different drains of the mining site existing in the area (cutting waters) and of the liquids washing over the tailings dyke for conditioning and release, no transports of radioactive material having been performed due to the absence of stocks of uranium concentrates.

On August 18<sup>th</sup> 2014, the Salem and the Civil Defence Agency of Castilla y León were notified of an interruption in the normal power supply at certain of the Quercus uranium concentrates plant facilities, due to the performance of maintenance work at the main sub-station.

The CSN has not had to propose the initiation of any sanctions proceedings or issue any warnings to this facility.

No events were reported during 2014 and, judging by the information analysed, there were

no cases of non-compliance with the limiting conditions for operation.

### 4.3.6. Uranium mining

This heading includes activities relating to arrangements for authorisations for the exploitation of uranium ore resources and permits for the prospecting of such resources currently undertaken by the company Berkeley Minera España, SA (BME).

On April 9<sup>th</sup> 2014 the Directorate General for Energy and Mines of the Regional Government of Castilla y León awarded a licence for the “Retortillo-Santidad” mining works, No 6.605-10, Section D) resource, uranium ores, in the province of Salamanca.

On January 14<sup>th</sup> 2014, the CSN issued a mandatory report on the extension of the 4 fractions of the Pedreras investigation permit. On November 13<sup>th</sup> 2014, the CSN carried out an inspection of several boreholes performed by the company BME on land covered by the Pedreras investigation permit, the reason being the fact that a formal complaint had been made.

During 2014, investigation activities continued in relation to the mineral resources contemplated in the permits awarded previously in the Autonomous Community of Castilla y León, giving rise to the submittal to the CSN of a total 17 annual reports on compliance with radiological requirements during performance of the investigation tasks contemplated in these permits.

## 4.4. Facilities in the definitive shutdown, dismantling or decommissioning phase

The following nuclear or radioactive fuel cycle facilities have ceased to operate or are in the dismantling and decommissioning phase:

Vandellós I nuclear power plant (in the latency phase following completion of the first phase of dismantling), José Cabrera nuclear power plant (in the dismantling phase), the Elefante uranium concentrates plant (dismantled and in the period of compliance), the Quercus plant (in the definitive shutdown phase pending application for dismantling) and the Andújar uranium mill (AUM) (dismantled and in the period of compliance).

The environmental radiological surveillance, workers' radiological protection, security and, where applicable, effluent release control and waste management programmes remain in operation at all these facilities. There were no deviations in the performance of any of these programmes.

In 2014, the activities carried out at each of these facilities, in keeping with their respective status, were performed within the safety limits established and without any undue impact for persons or the environment.

#### 4.4.1. Licensing, inspection and control

The CSN issued two favourable reports and two favourable appreciations:

- José Cabrera: nuclear power plant: favourable report on revision 2 of the site emergency plan, within the dismantling and decommissioning plan.
- José Cabrera nuclear power plant: favourable report on the system for revision and approval of changes to the security plan.
- José Cabrera nuclear power plant: favourable appreciation of the proposal for revision 3 of the security plan, within the dismantling and decommissioning plan.

- José Cabrera nuclear power plant: favourable appreciation of test results in the overall process of declassifying surfaces and major parts within the dismantling and decommissioning plan.

Within the framework of its control programmes, the CSN performed a total 16 inspections: one at Vandellós I nuclear power plant and 15 at José Cabrera nuclear power plant.

## 4.5. Radioactive facilities

### 4.5.1. General aspects

In 2014, the operation of scientific, medical, agricultural, commercial and industrial radioactive facilities took place within the established safety standards and the measures required for the radiological protection of persons and the environment were fulfilled. Table 4.5.1 shows the evolution of the number of radioactive facilities.

### 4.5.2. Licensing

The CSN undertakes the licensing of these facilities in collaboration with the autonomous communities with which it has assignment agreements including the function of evaluation of requests for authorisation (Catalonia, the Balearic Islands and the Basque Country).

During 2014, 377 reports were issued regarding radioactive facilities. The personnel of the Nuclear Safety Council evaluated 280 of these requests, the remaining 97 being evaluated by the autonomous communities:

- 21 for operating licenses.
- 33 for declarations of decommissioning.
- 226 for authorisations for various modifications.

**Table 4.5.1. Evolution of the number of radioactive facilities**

Category	Field of application	2010	2011	2012	2013	2014
1 <sup>st</sup>	Irradiation	1	1	1	1	1
	Research			1	1	1
	<b>Subtotal</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>2</b>
2 <sup>nd</sup>	Commercialisation	58	57	58	67	68
	Research and teaching	98	102	97	98	101
	Industry	570	563	558	538	517
	Medicine	322	326	322	323	329
	<b>Subtotal</b>	<b>1,048</b>	<b>1,048</b>	<b>1,035</b>	<b>1,026</b>	<b>1,015</b>
3 <sup>rd</sup>	Commercialisation	16	14	14	17	17
	Research and teaching	97	90	89	89	83
	Industry	182	195	207	217	220
	Medicine	46	42	38	37	35
	<b>Subtotal</b>	<b>341</b>	<b>341</b>	<b>348</b>	<b>360</b>	<b>355</b>
	Medical X-rays	31,437	32,595	33,625	34,592	35,302
	<b>Total</b>	<b>32,827</b>	<b>33,985</b>	<b>35,010</b>	<b>35,980</b>	<b>36,674</b>

In the industrial field, 2014 saw the inspection prior to start-up and subsequent notification of the radioactive research facility of the Ultra-short and Ultra-intense Pulsed Lasers Centre (CLPU) for interaction between focussed coherent light and matter, for the production of ionising radiations, along with its industrial and medical applications. This facility is located in Salamanca and is the first of its type in Spain. The installation is in the first phase of operation and is equipped with a laser beam generator with a maximum energy per pulse of 3.5 millijoules, a pulse duration of 120 femtoseconds and a power of 30 gigawatts, capable of producing a Maxwell type X-ray energy distribution with a maximum of 25 keV when impinging on a solid target. The licensee has requested authorisation to extend the facility with two higher energy laser-plasma accelerators (VEGA-2 and VEGA-3), which are currently being evaluated by the CSN.

In the medical field, special attention was paid throughout 2014 to radioactive facilities that have

been abandoned, are in an economic crisis situation or are involved in bankruptcy proceedings, in order to ensure conditions of safety and radiological protection for equipment containing radioactive sources and adequate management of such items.

It should also be pointed out that in 2014 dismantling work was being performed on three of the 19 cyclotrons existing in Spain for the production of fluor-18 and other isotopes emitting very short-lived positrons, used for positron emission tomography (PET) at nuclear medicine facilities. As of the end of 2014 there were 95 PET diagnosis installations in Spain, two of them mobile units.

As regards external radiotherapy, in 2014 work continued on the replacement of a large number of linear accelerators, with older units being substituted. The overall number of such accelerators has hardly varied and remains at 256, these continuing to operate satisfactorily as regards safety and radiological protection.

### 4.5.3. Inspection, monitoring and control of facilities

The CSN performs the inspection of these facilities in collaboration with the autonomous communities with which it has function assignment agreements (see section 1.3.1).

Throughout 2014, 1,777 inspections were performed at radioactive facilities, 751 by the personnel of the CSN and the remaining 1,026 by the autonomous communities with function assignment agreements. By types, these inspections were distributed as follows:

- 1,459 radioactive facility control and licensing inspections.
- 290 radiodiagnostic facility control inspections.
- 28 inspections relating to incidents, complaints or irregularities.

Control by the CSN rests also on the review of periodic reports. During 2014, the CSN received 1,240 annual reports from radioactive facilities, around 5,000 from diagnostic X-ray installations and 348 quarterly commercialisation reports.

The results of the inspections, along with analysis of the annual reports from the facilities, the information on radioactive materials and equipment supplied by the commercialisation installations and the data on waste management provided by Enresa, gave rise to the issuing of 632 written control notes.

Also significant among the control activities has been the attention given to complaints. In 2014, there were 21 of these. In almost all cases, an inspection visit was made, with those placing the complaint being informed of the result and appropriate measures being taken.

### Reported events

Sixteen events were reported at radioactive facilities, seven at industrial installations and the other nine at medical centres. As regards their causes, nine were attributable to operating faults and nine to equipment failures.

### Sanctions proceedings and warnings

The CSN proposed that the competent authority initiate three sanctions proceedings due to non-compliance with the technical requirements imposed.

Likewise, as a result of the facility evaluation and inspection and control activities performed, 42 warnings were issued, the deviations being identified and their correction required within two months. In three cases coercive fines were imposed due to the licensee of a radioactive facility not implementing the corrective actions required by the corresponding warning.

As regards administrative doses, in May 2014 the CSN issued a warning to the radiological protection services of all medical centres at which the administrative doses revealed non-compliance, in more than 5% of cases, with the obligation to change dosimeters monthly, this affecting 66 centres in total. The warning issued required the adoption of corrective measures to make good the deficiency.

Furthermore, the CSN issued an informative circular to those centres at which the level of non-compliance was below 5%, requiring the adoption of measures to lower the percentage to zero.

## 4.6. Service entities, personnel licences and other activities

This section encompasses those companies or entities that are subject to nuclear regulation and provide services to third parties in the field of radiological protection. It includes radiological

protection services (RPS), radiological protection technical units (RPTU), companies selling medical X-ray equipment and providing technical assistance in relation to it, personal dosimetry services (PDS) and registered external companies.

Also indicated are the personnel licences currently existing in Spain for all nuclear and radioactive facilities.

- As regards radiological protection services and units:

- In 2014 the CSN authorised a new RPS, as a result of which the number of such services authorised by the Council on closure of the year amounted to 84.

- In 2014 the CSN authorised a new RPTU and modified the authorisations previously granted to two others. In addition, the authorisations of two RPTU's were revoked and the operation of three others was temporarily suspended, as a result of which the number of RPTU's authorised by the CSN at the end of the year amounted to 41.

- Twenty-three RPS control inspections were performed, three of which were carried out by personnel accredited by the CSN and attached to the autonomous community of Catalonia, four to the autonomous community of Valencia and one to the autonomous community of the Principality of Asturias.

- During 2014, diplomas were awarded to six heads of radiological protection services at hospitals and six heads of radiological protection services at RPTUs.

- As regards personal dosimetry services:

- No new external dosimetry services were authorised in 2014, as a result of which there

were 21 such services authorised at the end of the year.

- Neither were any new internal personal dosimetry services authorised, although the authorisation previously granted to one was modified (due to a change in ownership), as a result of which there were 9 such services authorised at the end of the year.

- Thirteen control inspections were performed, nine at external dosimetry services and four at internal dosimetry services.

- In January 2014, the CSN issued a circular to all the authorised external dosimetry services in relation to the systematic approach to the characterisation and calibration of systems used to calculate extremity doses. In response to this circular, two personal dosimetry services requested CSN authorisation to perform this type of dosimetry.

- As regards registered external companies:

- Throughout 2014, a total 113 companies were entered on the Register of External Companies, the vast majority of these carrying out their activities in relation to nuclear power plants.

- As regards companies selling medical radiodiagnosis equipment and providing technical assistance in relation to it:

- In 2014, the CSN reported on the authorisation of 11 new sales and technical assistance companies and the modification of the authorisation previously granted to two others, as a result of which at the end of the year there were 334 authorised sales and technical assistance companies.

- The control of these companies is accomplished by examining their annual

reports and contrasting them with other information and records, inspections not being necessary other than in exceptional cases. In 2014, 300 annual reports were reviewed and additional information was requested in those cases in which the contents of these reports were incomplete.

- Personnel licences:

- This section provides information on the licences of the personnel of nuclear and radioactive facilities, grouped by type.

- a) Nuclear power plant personnel licences

As of December 31<sup>st</sup> 2014, the number of licensed workers at the nuclear power plants amounted to 306: 131 holders of a supervisor licence, 158 operators and 17 with a head of radiological protection service diploma.

In 2014, the CSN granted six nuclear power plant supervisor licences, eight for operators and one for a radiological protection service head, and 17 supervisor and nine operator licences were renewed.

- b) Licences for the personnel of fuel cycle facilities and facilities in the dismantling phase

As of December 31<sup>st</sup> 2014, the number of licensed workers at these facilities amounted to 207: 78 holders of a supervisor licence, 117 operators and 12 with a head of radiological protection service diploma.

In addition, two supervisor licences and one operator licence were granted for these facilities, and 16 supervisor licences and 15 operator licences were extended.

- c) Radioactive facility personnel licences

As of December 31<sup>st</sup> 2014, the number of licensed workers at the radioactive facilities amounted to 11,903: 3,314 supervisors, 8,406 operators and 183 holders of a head of radiological protection service diploma.

As of the end of 2014, the total number of persons accredited to direct or operate radiodiagnosis installations amounted to 127,646: 52,425 for the management of such facilities and 75,221 for their operation.

The CSN granted the following licences and accreditations throughout the year:

- At radioactive facilities: 322 new supervisor licences, 925 operator licences and 12 for heads of radiological protection services, as well as the extension of 309 supervisor licences and 830 for operators.
- At radiodiagnostic facilities: 84 accreditations for the management of such installations and 1,580 for their operation.

Furthermore, 1,563 accreditations were registered for the management of X-ray facilities for medical diagnosis purposes and 2,627 for their operation, according to reports submitted by entities approved for the delivery of training courses homologated by the CSN.

As regards courses for the training of the personnel of radioactive facilities, two new entities were homologated in 2014 and in nine cases previously granted homologations were modified. In the case of courses for accreditation to direct or operate radiodiagnostic facilities, seven new entities were homologated and the homologation granted to another thirteen was modified. In both cases, all the possible combinations of levels and modes



occurred. That same year the CSN performed 52 inspections to attend a total 81 examinations on courses corresponding to radioactive facilities.

In addition, in accordance with the assignment of functions to the Basque Country, eight inspections of this type were performed. The CSN also carried out 13 inspections of courses for the accreditation of the personnel of medical radiodiagnostic facilities.

- Other regulated activities: radioactive materials, equipment, apparatus and accessories

In 2014 the CSN issued three reports on the manufacturing of radioactive equipment, one in relation to equipment for the inspection of packaged products and two on package inspection equipment.

Likewise, in 2014 the CSN issued 31 favourable reports, 24 for modifications and seven on new authorisations for the approval of 48 models of radioactive equipments. The largest number of models approved, 19, were for the inspection of products, packaged or otherwise, on the process line (G/CP IE/INE), 13 corresponded to X-ray equipment for instrumental analysis (G/AI), three models were for other radiographic techniques (G TC), nine systems for the inspection of packages (G/IB), for the identification of explosives, weapons, drugs, etc., three for the inspection of cabin products (electronic circuits and others) (G/IP) and one for a model of an electron capture cell with a radioactive source of Ni-63.

As regards the commercialisation and technical assistance regulated by article 74 of the Regulation on Nuclear and Radioactive Facilities, in 2014 the CSN reported on the authorisation of 11 new sales and technical assistance companies and the modification of the authorisations granted previously to another two, as a result of which at the end of the year

the number of authorised sales and technical assistance companies amounted to 334.

#### 4.7. Transport of nuclear and radioactive materials

In the area of licensing of transport activities, the CSN dealt with 17 proceedings throughout 2014:

- Seven reports on the validation of certificates of approval for packages from abroad.
- Two reports on authorisations under special conditions for the transport of disused cobalt therapy headers to the Enresa radioactive waste disposal facility at El Cabril (Córdoba).
- A report on authorisations under special conditions for the transport of solid wastes containing natural uranium or uranium enriched to less than 5% from Enusa (Juzbado) to the Enresa radioactive waste disposal facility at El Cabril (Córdoba).
- Four authorisations relating to security in the transport of nuclear materials between Enusa and the United States and requiring physical protection measures.
- A report on authorisations under special conditions for the transport of nuclear material from Almaraz nuclear power plant to Sweden.
- A report for authorisation of the transfer of spent fuel from Almaraz nuclear power plant to Sweden in accordance with Royal Decree 243/2009 on surveillance and control.
- A report for authorisation of the transfer of radioactive waste from France to Vandellós II nuclear power plant, in accordance with Royal Decree 243/2009 on surveillance and control.

Throughout 2014, 74 inspections specifically relating to transport were performed: 22 by the CSN and the remaining 52 by autonomous communities with function assignment agreements.

This control is completed with an analysis of the prior notifications and performance reports required by the CSN for the transport of fissile materials, high activity radioactive sources and waste. During the year, 67 shipments of fissile material were analysed and Enresa carried out 229 shipments of radioactive wastes to its El Cabril facility, 188 from nuclear facilities and 41 from other installations.

The CSN did not issue any warnings or propose the initiation of any sanctions proceedings in relation to the licensees of radioactive material transport companies.

Five reportable events occurred in the transport of radioactive material in 2014. None of these events gave rise to radiological consequences for persons or the environment and all were classified on the International Nuclear Events Scale (INES) at level 0 (off scale, of no safety significance).

#### **4.8. Activities at facilities not regulated by the nuclear legislation**

##### **Removal of unauthorised radioactive material**

Throughout the year, the CSN reported on 31 proceedings authorising the transfer to Enresa of

unauthorised radioactive sources and various other materials. In 19 of these cases the applicant was not authorised as a radioactive facility and the other twelve were the licensees of facilities. Seven of these reports were drawn up within the framework of the functions assignment agreement with Catalonia and another two within the agreement with the Basque Country.

##### **Removal of radioactive material detected in metallic materials**

As of December 31<sup>st</sup> 2014, the number of metallic materials treatment and management companies adhering to the *Protocol for collaboration in the radiological surveillance of metallic materials* amounted to 166.

Within the framework of this protocol, 103 cases of detection of radioactivity in metallic materials were reported to the CSN during the year. The radioactive sources detected (indicators with radioluminescent paint, ion smoke detectors, radioactive lightning rods, pieces of uranium, products containing radium and thorium and artificially contaminated parts), were transferred to Enresa for management as radioactive waste, or are pending the completion of their characterisation for such transfer.

##### **Facilities affected by the smelting of radioactive sources**

During 2014 there were no incidents relating to the smelting of radioactive sources.

## 5. Radiological protection of professionally exposed workers, the public and the environment

### 5.1. Radiological protection of workers

The control of the radiation doses received by professionally exposed workers is mainly accomplished through individual monitoring by means of passive physical dosimeters. There are cases, however, in which, if the radiological risk is sufficiently low, the doses are determined on the basis of the results of the radiological surveillance of the areas in which these workers perform their professional activities.

In Spain the dosimetry of workers exposed to ionising radiations is regulated by the Regulation on the Protection of Health against Ionising Radiations, which establishes that individual dosimetry is to be undertaken by personal dosimetry services expressly authorised by the CSN.

In 2014, the number of workers exposed to ionising radiations and dosimetrically controlled in Spain amounted to 105,360, with an average individual dose of 0.71 mSv/year and a collective dose of 16.250 mSv.person. These data take into consideration only significant doses and do not include potential cases of the annual dose limit being exceeded and the administrative doses assigned due to dosimeters not being changed.

99.73% of the dosimetrically controlled workers received doses lower than 6 mSv/year, and 99.99% received doses lower than 20 mSv/year

This distribution makes evident the positive trend of the doses at the Spanish nuclear and radioactive facilities as regards compliance with the regulatory

dose limits for professionally exposed workers (100 mSv in five years).

As of closure of the 2014 dosimetry year, the National Dosimetry Bank contained registers of a total 21,062,299 dosimetry measures, corresponding to 335,562 workers and 66,310 installations.

Table 5.1.1 summarises the dosimetry information (number of workers, collective dose and average individual dose) for each of the occupational sectors considered in this report, while figures 5.1.1 and 5.1.2 show the collective dose and average individual dose values in these sectors.

Analysis of the aforementioned data underlines the following:

- The medical radioactive facilities are those registering the highest collective dose (10,856 mSv.person), this being logical since they are the installations with the largest number of professionally exposed workers (82,218). The largest contribution to the collective dose of the country's professionally exposed workers overall is made by the medical radioactive facilities, with 67% of the overall figure, since the number of professionally exposed workers in this sector represents 77% of the total.
- The facilities in the dismantling phase are those registering the highest average individual dose (3.72 mSv/year), this being explained by the doses registered during the dismantling of the José Cabrera nuclear power plant.
- As regards doses at the operating plants, it should be pointed out that the number of dosimetrically controlled workers amounted to 9.053<sup>2</sup>, with a collective dose of

<sup>2</sup> The data are obtained from the National Data Bank; consequently, consideration is given to the fact that some contractor workers carry out work at more than one nuclear power plant. This means that the total number of workers in the sector does not coincide with the sum of the workers at each plant.

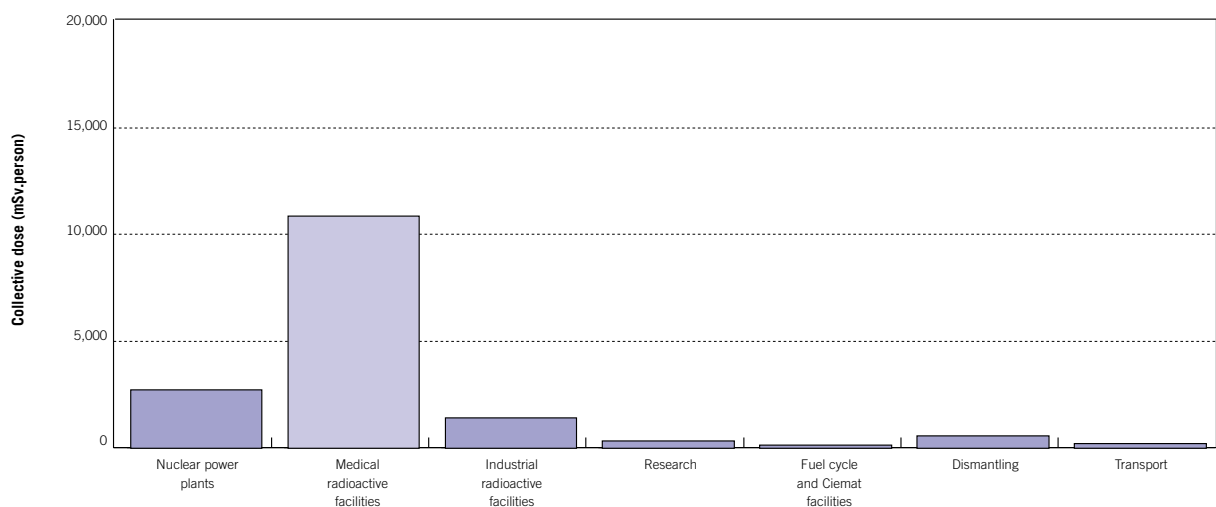
2,750 mSv.person and an average individual dose of 0.97 mSv/year. For the permanent staff members (2,167 workers) the collective dose was 265 mSv.person and the average individual

dose 0.69 mSv/year, while for contracted personnel (6,930 workers) the collective dose was 2,486 mSv.person and the average individual dose 1.02 mSv/year.

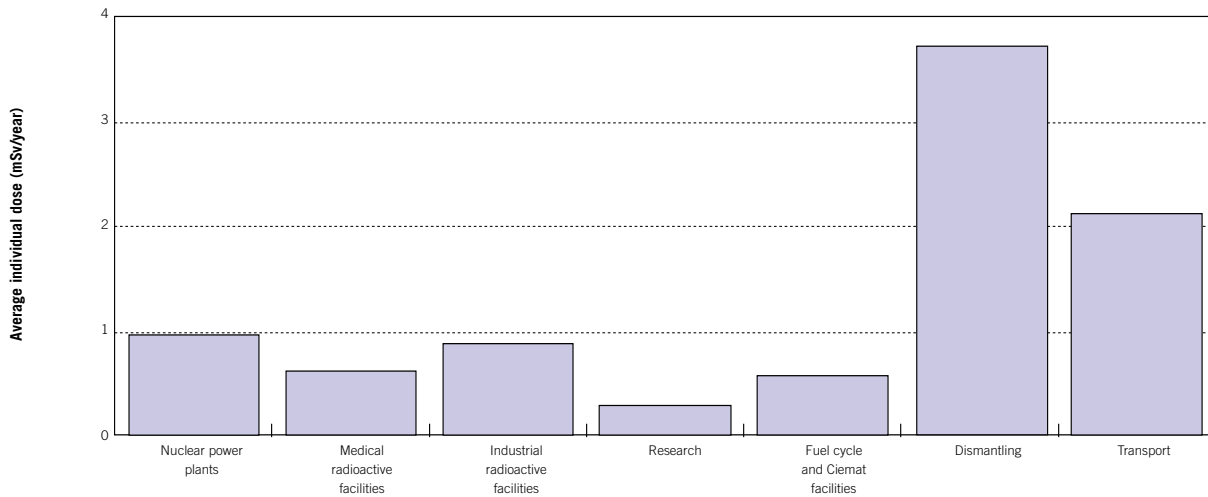
**Table 5.1.1. Doses received by the workers in each of the sectors considered in the Annual Report**

Facilities	Number of workers	Collective doses (mSv.person)	Average individual dose (mSv/year)
Nuclear power plants	9,053	2,750	0.97
Fuel cycle and waste storage and disposal facilities and research centres (Ciemat)	1,141	92	0.57
Radioactive facilities			
Medical	82,218	10,856	0.63
Industrial	7,110	1,453	0.89
Research	5,881	332	0.30
Facilities in dismantling and decommissioning phase	335	591	3.72
Transport	155	175	2.14

**Figure 5.1.1. Collective dose and number of professionally exposed workers by sectors. 2014**



**Figure 5.1.2. Average individual dose by sectors. 2014**



As regards internal dosimetry, controls were carried out by directly measuring whole body radioactivity in all workers with a significant risk of radionuclide intake and in no case were values higher than the established recording level (1 mSv/year) detected.

During 2014, four potential cases of the annual dose limit established by the legislation being exceeded were registered, all at radioactive facilities. In all these cases a process of investigation was initiated. In two cases it was concluded that the

dose was not real, while in the other two the investigation has not yet been completed.

Table 5.1.2 shows the operational collective dose at nuclear power plants at which there has been a refuelling outage in 2014.

Figures 5.1.3 and 5.1.4 show the evolution over time of the three-year average collective dose by reactor type at the Spanish nuclear power plants, compared to the values registered at international level.

**Table 5.1.2. Operational collective dose per refuelling outage. 2014**

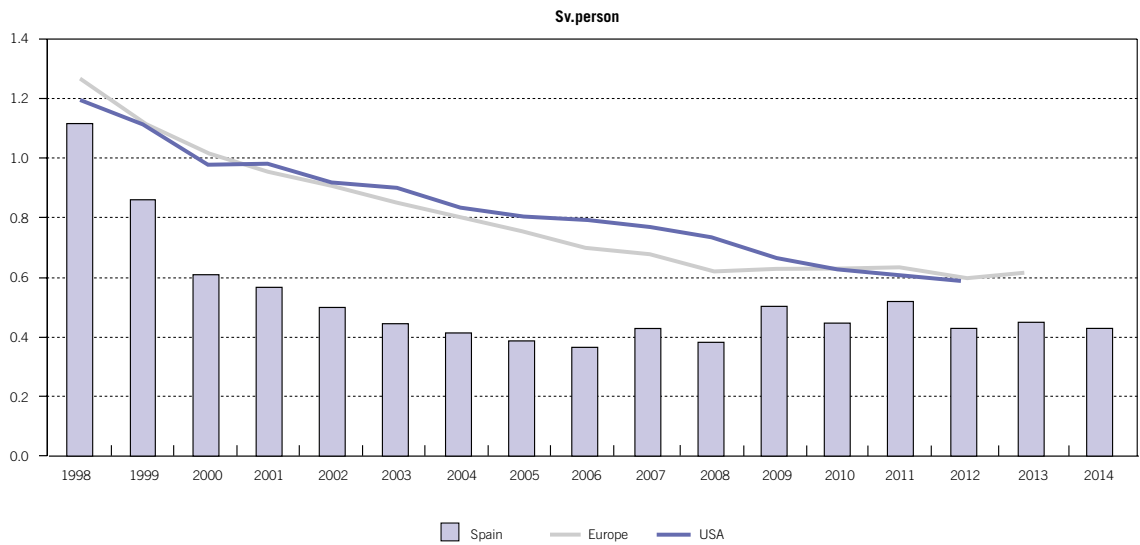
Nuclear power plants	Average collective dose 2004-2013	Collective dose 2014	Average collective dose, percentage 2014 vs. 2003-2014
	(mSv.p) <sup>(1)</sup>	(mSv.p) <sup>(2)</sup>	% <sup>(3)</sup>
Almaraz II	473.76	436.44	92
Ascó I	607.64	663.35	109
Ascó II	615.61	632.42	103
Trillo	326.93	284.76	87

(1) Average figure for collective dose in the refuelling outages during the period 2004-2013.

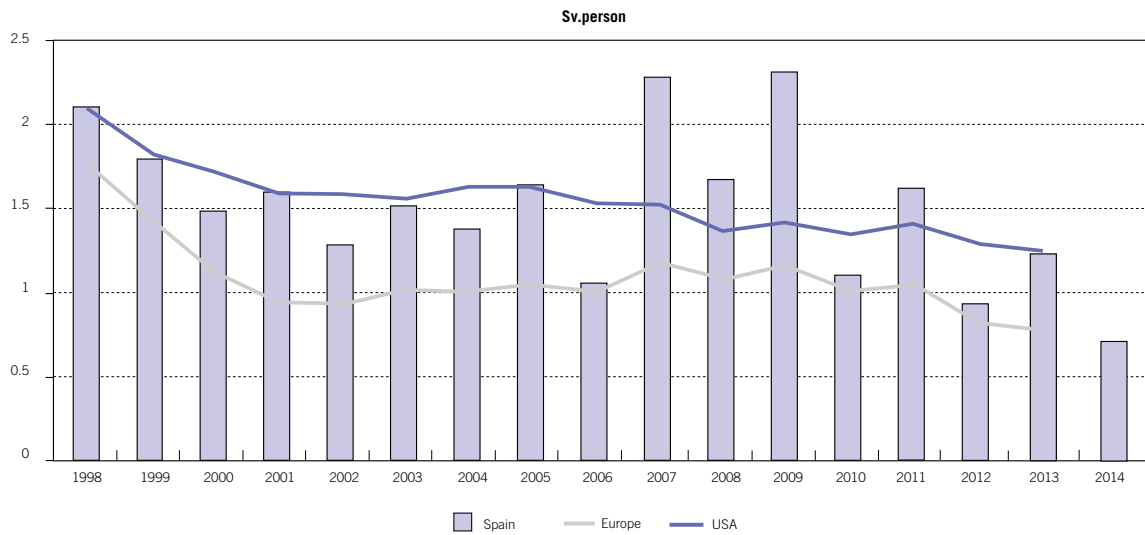
(2) Operational collective dose during the 2014 refuelling outage.

(3) The value represents the percentage of operational collective dose during the 2014 refuelling outage compared to the average for the period 2004-2013.

**Figure 5.1.3. Three-year average collective dose for PWR reactors. International comparison**



**Figure 5.1.4. Three-year average collective dose for BWR reactors. International comparison**



In order to evaluate the results obtained, consideration should be given to the following:

a) Pressurised water reactors (PWR):

During the three-year period 2012-2014, a stabilisation of the three-year average collective dose per reactor may be observed at the Spanish nuclear power plants. There were four refuelling outages during 2014, at the Almaraz I, Ascó I and II and Trillo nuclear power plants.

The situation of the occupational doses at the Spanish nuclear power plants of this type of technology continues to reflect values lower than the European plants of the same type for the three-year period 2011-2013 (latest data available). There are no updated data for the US PWR plants for 2013, as a result of which no data are shown for the period 2011-2013.

b) Boiling water reactors (BWR):

The value of the three-year average collective dose for BWR reactors for the period 2012-2014 is lower than that registered during previous three-year periods. This reduction is due fundamentally to two circumstances. In 2014 there were no refuelling outages at the nuclear power plants based on this technology since the last such outage at Cofrentes was in 2013 and the Santa María de Garoña nuclear power plant has been shutdown since December 2012. During this three-year period there has been a single refuelling outage at Cofrentes.

The average collective dose at the Spanish BWR plants has been slightly lower during the period 2012-2014 than the average for the US plants, while no definitive data are available for the European plants.

## 5.2. Control of releases and environmental radiological surveillance

### Control of effluents

In 2014, the liquid and gaseous radioactive releases from the facilities remained within the usual values and are comparable to those experienced at the European and US installations, as is shown by the monitoring performed and the records kept. As in previous years, the calculated doses attributable to these releases were far below the regulatory dose limits for the public and represent only a minor fraction of the release limits. In the specific case of the nuclear power plants, this fraction does not exceed 4% of the authorised limit (0.1 mSv in 12 consecutive months).

### Radiological surveillance around the facilities

In 2013<sup>3</sup>, 6,353 samples were taken from the areas surrounding the operating nuclear power plants within the framework of the environmental radiological surveillance programmes of these facilities, 1,964 at the fuel cycle facilities and 1,943 at the installations in the dismantling and decommissioning phase, including Ciemat, the José Cabrera and Vandellós I nuclear power plants and the now decommissioned Lobo-G plant, as indicated in tables 5.2.1 and 5.2.2.

The results of the ERSP's of the 2013 campaign are similar to those obtained in previous years and show that the quality of the environment around the facilities is correct from the radiological point of view. With a view to verifying that the surveillance programmes carried out by the facilities are correct, the CSN performs independent environmental radiological surveillance programmes (INERSP's), the sample volumes and determinations of which represent

<sup>3</sup> This report presents the results of the environmental radiological surveillance programmes (ERSP) for 2013. This is due to the fact that the processing and analysis of the samples do not make it possible to have the results of the 2014 campaign available for their inclusion herein.

approximately 5% of those performed by the licensees. In 2013 the performance of these programmes was undertaken by seven university environmental radioactivity laboratories contracted by the CSN and by those contracted by the autonomous communities with function

assignment agreements for the facilities in their respective territories, two in Catalonia and two in Valencia. The results of the CSN's independent programmes did not show any significant deviations with respect to those obtained by the licensees' programmes.

**Table 5.2.1. Environmental radiological surveillance programmes: number of samples per operating plant in 2013**

Sample type	Garroña	Almaraz	Ascó	Cofrentes	Vandellós II	Trillo
Atmosphere	556	783	849	777	845	768
Water	192	212	126	142	130	148
Total foodstuffs	125	276	121	103	81	119
<b>Total</b>	<b>873</b>	<b>1,271</b>	<b>1,096</b>	<b>1,022</b>	<b>1,056</b>	<b>1,035</b>

**Table 5.2.2. Environmental radiological surveillance programmes: number of samples at fuel cycle facilities and installations in the definitive shutdown, dismantling and decommissioning phase in 2013**

Facility	Juzbado	Cabrill	Ciemat	Quercus/Elefante	José Cabrera	Vandellós I	AUM	LoboG
<b>No samples</b>	596	698	743	670	778	326	51	45

#### Radiological surveillance of the national territory

The Nuclear Safety Council undertakes the surveillance of the environment at national level by means of a surveillance network, known as Revira, in collaboration with other institutions. This network is made up of automatic stations for continuous measurement of the radioactivity in the atmosphere and of sampling stations, where samples of the air, soil, water and foodstuffs are taken for subsequent analysis.

There are two networks:

- The Sampling Station Network (SSN) is made up of a total 20 laboratories that analyse samples of river and coastal waters, the atmosphere, the terrestrial medium and foodstuffs. This network

operates in two modes: the so-called dense network, which analyses a large number of samples from many different locations across the country, and the spaced network, which analyses few samples but to a high level of precision, this requiring very low limits of detection such that values above them are obtained, in order to be able to monitor the evolution of the concentrations of activity over time.

Overall evaluation of the results shows that the values are coherent with radioactive background levels and generally remain relatively stable throughout the different periods, the slight variations between different points observed being attributable to the radiological characteristics of the different areas.



- The Automatic Stations Network (ASN), which consists of the CSN network, with 25 stations spread across the country, and the networks of the autonomous communities of Catalonia, Valencia, Extremadura and the Basque Country, with a further 21 stations located in their respective territories. The objective of these is to continuously measure the gamma dose rate, radon concentration, radioiodines and alpha and beta emitters in the air.

In 2014, data began to be received from three new gamma dose measuring stations belonging to the Catalonian network and located in Barcelona, Pujalt and Roses.

#### **Cross-comparison and procedures standardisation campaigns**

The CSN carries out an annual programme of analytical cross-comparisons, with technical support from Ciemat, in which some 30 laboratories participate, performing low activity measurements with a view to guaranteeing the quality of the results obtained from the environmental radiological surveillance programmes. These campaigns have proven to be effective in improving the results obtained from these programmes.

The campaign initiated in 2013 was completed in 2014, the study matrix, distributed among the participants, consisting of filters marked with natural and man-made radionuclides. In addition, the twenty-first session on environmental radiological surveillance was held at the CSN headquarters, the evaluation of the results performed by Ciemat being presented to the participants. As regards these results, it was concluded that in general the participating laboratories are capable of performing determinations of airborne artificial radionuclides with low levels of concentration with a satisfactory level of quality.

Also in 2014, a new campaign was initiated in which the matrix under study and distributed among the participants was a vegetable ash containing natural and artificial radionuclides. Thirty-nine laboratories participated, with 37 providing results. The results obtained by the participants are currently being evaluated.

#### **Surveillance at the site of the former Lobo-G plant**

The former Lobo-G uranium ore treatment plant was decommissioned by the Order of the Ministry of Industry, Trade and Tourism of August 2<sup>nd</sup> 2004. The mining and process tailings generated during operation of the plant have remained duly stabilised in a fenced off and signposted enclosure, under institutional surveillance, temporarily assigned to Enusa as the organisation formerly responsible for the facility.

Within the environmental radiological surveillance programme carried out by the facility in 2013<sup>4</sup>, approximately 45 samples were taken and some 69 analyses were performed, underlining the absence of any significant radiological impact to the population.

During 2014 an inspection was performed to verify compliance with the general conditions imposed upon the site of the former plant.

#### **Radiological surveillance in the Palomares area**

Since the military aircraft accident that occurred in 1966, which gave rise to the dispersal of metallic plutonium from nuclear artefacts in the area around Palomares (Almería), a radiological surveillance programme has been carried out in the area.

<sup>4</sup> This report presents the results of the environmental radiological surveillance programmes (ERSP's) for 2013. This is due to the fact that the processing and analysis of the samples do not make it possible to have the results of the 2014 campaign available for their inclusion herein.

Ciemat has been responsible for the performance of this programme, which includes overseeing the possible internal contamination of persons and measurement of the levels of contamination in the environment, and reports the results to the CSN. These results show that the accident has had no effect on the health of the inhabitants of the Palomares area, although there is residual contamination in the environment.

The CSN analysed the final report on the radiological characterisation of the Palomares area submitted by Ciemat in 2009 and subsequently requested Ciemat to draw up a specific plan for the restoration of the affected areas, including the final decontamination objectives. In 2010, Ciemat submitted a preliminary rehabilitation plan, which was judged favourably by the CSN.

### 5.3. Protection against natural radiation sources

Title VII of the Regulation on the Protection of Health against Ionising Radiations imposes upon

the licensees of occupational activities involving natural radiation sources the obligation to declare these to the competent authority in order for them to be included on a register, and for the performance of a study of their radiological impact.

Throughout 2014, a new guideline was drawn up with a view to guaranteeing the reliability of the measurements of Rn-222 concentrations in air inside workplaces and dwellings. This guideline is currently in the phase of resolution of external comments and will bear the title *Measurement of concentrations of radon in the air* using passive detectors: electrets, nuclear tracers and active carbon.

The industrial activities carried out in the past by the company Ercros in Cartagena (Murcia), generated NORM wastes that were deposited on a plot in the area known as El Hondón. The CSN is carrying out an evaluation of the project on the restoration of this plot from the point of view of radiological impact.

## 6. Monitoring and control of the management of irradiated fuel and radioactive waste

### 6.1. Irradiated fuel and high level radioactive waste

The spent nuclear fuel generated in Spain (with the exception of that generated during the operation of Vandellós I nuclear power plant, and at Santa María de Garoña up to 1982), is currently held in the fuel storage pools associated with the reactors and in dry storage casks at the Individual Temporary Storage (ITS) facilities at the sites of the Trillo, Jose Cabrera and Ascó plants.

In addition to the wastes arising as a result of the reprocessing in France of the fuel from Vandellós I, the category of high level wastes includes those produced during the operation and

decommissioning of nuclear power plants and that, in view of their activity, do not meet the criteria for disposal at the El Cabril facility, these being grouped under the class of “special wastes”.

#### Inventory of irradiated fuel and high level waste stored at the nuclear power plants

As of December 31<sup>st</sup> 2014, the number of fuel assemblies stored at the nuclear power plants amounted to 14,306, of which 7,821 were from pressurised water reactor (PWR) plants and 6,485 were from boiling water reactor (BWR) plants. Of these, 13,181 are stored in the pools at the respective plants and the remainder as follows: 1,125 assemblies are in dry storage casks at the ITS facilities at Trillo (588 assemblies in 28 ENSA-DPT type casks), José Cabrera (377 assemblies in 12 HI-STORM type casks) and Ascó (160 assemblies in five HI-STORM type casks).

Table 6.1.1 shows in detail the inventory of irradiated fuel and its location.

**Table 6.1.1. Inventory of irradiated fuel at the end of 2014**

	José Cabrera	Garoña	Almaraz I	Almaraz II	Ascó I	Ascó II <sup>(2)</sup>	Ascó <sup>(2)</sup>	Cofrentes	Vandellós II	Trillo <sup>(2)</sup>	
	ATI	<sup>(1)</sup>			Pool	Pool	ITS			Pool	ITS
Assemblies in storage	377	2,505	1,392	1,316	1,228	1,168	160	3,980	1,084	508	588
Degree of occupation (%)	100	96.01	84.52	79.90	97.15	92.41	15.63	83.26	75.43	80.89	35
Year saturation of pool	–	NA	2020 <sup>(3)</sup>	2021 <sup>(3)</sup>	–	–	–	2019 <sup>(3)</sup>	2021 <sup>(3)</sup>	–	–

(1) At the Santa María de Garoña nuclear power plant, which unloaded the complete core into the pool in December 2012, thereby occupying the positions reserved for this purpose, the percentage of occupation of the pool is the result of subtracting from its total capacity the number of fuel assemblies stored, including the 400 in the core, the items labelled NA not applying in this situation.

(2) At the Ascó and Trillo plants, the date of pool saturation is not included since an ITS facility is available. As fuel assemblies are unloaded into the pool during refuelling outages, they are also loaded into dry storage casks and transferred to the ITS facility.

(3) Data obtained from the nuclear power plant Monthly Operating Reports IMEX 2014.

During 2014, the CSN performed three inspections at the Ascó I and II, Trillo and Vandellós II nuclear power plants to control the

management of spent fuel and high level wastes or special wastes, no deviations having been identified.

It should also be pointed out that in 2014 the CSN performed an inspection of the manufacturing of the ENSA-DPT cask at that company's workshops.

## 6.2. Low and intermediate level radioactive waste

### Nuclear power plants

In 2014, the operating nuclear power plants generated solid low and intermediate level radioactive wastes with an estimated activity of

27,584.19 GBq, conditioned in 3,030 packages, as described in table 6.2.1.

Figure 6.2.1 shows the percentage per facility of the total generation of radioactive waste packages in 2014 at the operating Spanish nuclear power plants.

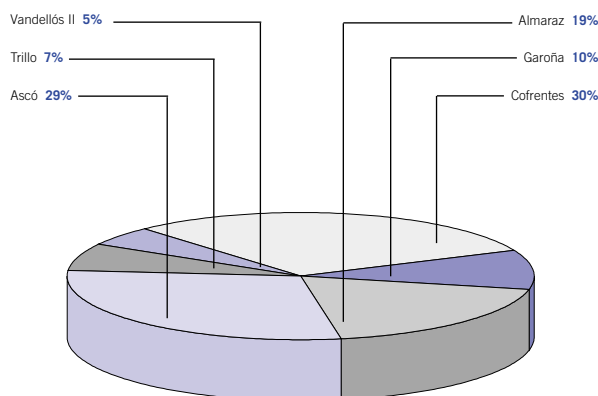
Figure 6.2.2 shows the percentage of distribution by facilities of the activity content of the wastes generated in 2014.

**Table 6.2.1. Nuclear power plants: low and intermediate level radioactive waste packages. 2014 (\*)**

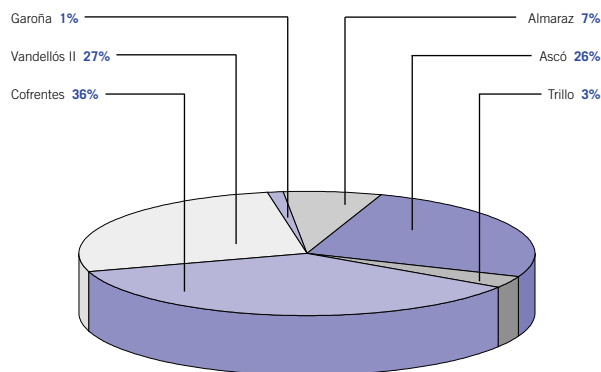
Facility	Conditioned packages	Packages sent to El Cabril	Packages (*) stored at the plant	Plant store occupation (%)
Santa María de Garoña	299	0	4,126	43.08
Almaraz I and II	580	251	7,446	42.44
Ascó I and II	874	240	5,047	61.13
Cofrentes	896	965	8,129	40.44
Vandellós II	154	96	1,640	15.13
Trillo	227	200	674	5.86
<b>Totals</b>	<b>3,030</b>	<b>1,752</b>	<b>27,062</b>	<b>34.78</b>

(\*) Packages equivalent to 220-litre drums.

**Figure 6.2.1. Distribution of the 3,030 packages of conditioned radioactive wastes at the operating nuclear power plants in 2014**



**Figure 6.2.2. Distribution of the activity contained in the packages of radioactive wastes generated at the operating nuclear power plants in 2014**



### 6.3. Very low level wastes

Very low level wastes were stored in *lines 2, 3 and 4 of section I* of cell 29 at the El Cabril waste disposal centre.

As of December 31<sup>st</sup> 2014, the number of very low level waste storage units stored on the east platform amounted to 11,692, 21.71% of the capacity of cell 29.

Likewise, 97 ISO casks containing wastes from incidents at steelyards were in temporary storage in cells 26, 27 and 28 on the south platform; three other casks of this type are located on the esplanade in front of the transitory reception building.

#### Quercus plant waste

##### Process waste

Some 1,107,896 t of depleted ore with sizes of less than 15 mm are accumulated on the static leaching bed of the Quercus plant. Likewise, there are some 941,338 t of neutralisation sludges accumulated in the plant's tailings dyke.

##### Water treatment wastes

Wastes are currently generated as a result of the treatment of non-releasable acid waters generated on the site. The treatment and conditioning of

liquid effluents continued in 2014. In 2014, 291,149 m<sup>3</sup> of water were released.

In the process a total 4,933 t of waste were generated in the form of precipitate *cakes*, these being deposited in the crown of the *static leaching bed*. The total waste of this type accumulated at the end of 2014, resulting from water treatment and deposited on the *leaching bed* amounted to 44.241 t.

### 6.4. Clearance of wastes

The Spanish nuclear facilities are authorised for the clearance of waste materials with low radioactivity contents, in order to be able to manage them along conventional routes, these being understood as those routes that are not subject to radiological regulatory control, without prejudice to the legal framework applicable to them in view of their specific characteristics and nature.

No new authorisation for clearance was issued by the competent authority in 2014.

### 6.5. Disused consumer goods

The headers of radioactive lightning rods are included among disused consumer goods. Enresa

was authorised to undertake the management of these headers by the Resolution of the Directorate General for Energy of June 7<sup>th</sup> 1993. The lightning rods removed are sent to Ciemat for extraction of the radioactive sources, which are subsequently sent to the United Kingdom.

Nine lightning rods were removed in 2014, the total number removed now amounting to 22,728. No sources of Americium-241 were sent to the United Kingdom this year. The total number of sources sent to that country to date stands at 59,796.

## 7. Nuclear and radiological emergencies. Physical protection

### 7.1. Nuclear Safety Council emergency response capacities and actions

#### 7.1.1. Emergency room

The CSN has an Emergency Response Organisation (ERO) that guarantees the manning of the emergency room (Salem) 24 hours a day, 365 days a year, with a stand-by emergency team made up of 14 technicians who would report to the Salem in less than one hour when activated.

The Salem is equipped with special tools that are used by the ERO experts in the performance of their functions. Additionally, there is a back-up emergency response room (Salem-2) at the facilities of the Military Emergency Response Unit (UME).

The CSN has in place agreements and contracts allowing it to have available a team of specialists belonging to an authorised RPTU, distributed across the country to address possible radiological emergencies, two mobile units for environmental radiological characterisation, a mobile unit for internal dosimetry and a laboratory at Ciemat for the measurement of contaminated samples.

The CSN manages and keeps operable all the radiometric instrumentation assigned to the five provincial nuclear emergency plans, as well as that in place to address radiological emergencies.

#### 7.1.2. National and international exercises and drills

In 2014, the CSN participated in five IAEA exercises: ConvE-2a (April 29<sup>th</sup>), ConvEx-1b (May 28<sup>th</sup>), ConvEx-1c (October 1<sup>st</sup>), ConvEx-1a (October 31<sup>st</sup>) and ConvEx-2d (November 25<sup>th</sup>).

During 2014 the European Commission performed five communications tests with the Salem to check its availability as the national point of contact for the Ecurie system.

In 2014 all the nuclear power plants and facilities carried out emergency drills within the framework of their respective Site Emergency Plans, under the supervision of the CSN and with the necessary participation of the CSN's ERO.

#### 7.1.3. Tracking of incidents

During 2014 the CSN Emergency Response Organisation was activated on two occasions as a result of activation of the Site Emergency Plans (SEP's) of the Centre for Energy-Related, Environmental and Technological Research (Ciemat) and Vandellós II nuclear power plant.

At 13:23 hours on May 5<sup>th</sup>, Ciemat declared an emergency pre-alert, in accordance with its SEP, due to a failure in the encapsulated sources storage pool make-up water system that caused the pool to be left without water, this implying loss of the primary shielding of the sources. The emergency was deactivated at 14:41 hours, once the water level in the pool had been recovered by manual make-up and the measurements in the area were verified to be at normal values.

At 17:21 hours on October 10<sup>th</sup>, Vandellós II nuclear power plant activated its SEP in the emergency pre-alert mode due to a complete loss of off-site power caused by a heavy storm in the area. A reactor scram occurred and all the safety systems of the facility operated correctly, the diesel generators starting up and supplying electricity to the emergency equipment. The pre-alert situation was deactivated at 18:48 hours, following the recovery of off-site power.

Throughout the year, several reports were received at the Salem in relation to accidental overexposures

or cases of external contamination of workers, the deterioration of equipment containing radioactive sources, accidents or incidents during the transport of radioactive packages or incidents at radioactive facilities. In no case were there any noteworthy radiological consequences.

During 2014, four European Union ECURIE information messages were received at the Salem, referring to the detection in customs of a container with high radiation levels (Co-60), the disappearance or theft of radioactive sources or equipment containing such sources and the intrusion of Greenpeace activists in the restricted area of Oskarshamn nuclear power plant (Sweden).

## 7.2. Nuclear Safety Council participation in the National Emergencies System

Included among the functions of the CSN is participation in a series of activities in compliance with the document CSN participation in the National Civil Defence System, which includes the Services Charter of the organisation in relation to its collaboration in the preparation for, planning of and response to nuclear and radiological emergencies.

The most significant of the CSN's activities during 2014 were as follows:

- The CSN and the Directorate General for Civil Defence and Emergencies (DGPCE) set up a working group for the development of the State Radiological Risk Plan (SRRP), which emanates from the Basic Directive on the Planning of Civil Defence in response to Radiological Risks and which, along with the special plans of the autonomous communities, will configure the structure of the external response to radiological emergencies in Spain.
- Joint efforts were reinitiated with the DGPCE for the revision of the PLABEN in the light of the lessons learned from the Fukushima accident.

- The CSN kept updated the National Catalogue of Facilities and Activities entailing Radiological Risks.
- Furthermore, the CSN continued to facilitate collaboration between the UME and the licensees of the nuclear power plants in relation to logistics and initial and on-going training for the possible intervention of the former in the event of extremely severe accidents, postulated as a result of the lessons learned from the Fukushima accident.
- The CSN participated in the organisation, collaboration and delivery of training courses for those required to act in the event of an emergency, the UME and the State Security Forces and Corps.
- The CSN now has radiological emergency collaboration agreements signed with the following regional governments: Extremadura, Catalonia, Castilla y León, Galicia, Madrid, Castilla-La Mancha, the Balearic Islands, Navarre, Valencia, the Basque Country and Murcia.

## 7.3. On-site emergency plans

In addition to participating in and supervising the drills included in the site emergency plans of the nuclear power plants, in 2014 the CSN continued its evaluation of the revision of the nuclear power plant SEP's as a result of the lessons learned from the Fukushima accident, the instructions issued and the results of the stress tests.

## 7.4. International collaboration in emergencies and other collaboration activities

During 2014, work continued on the final document of the working sub-group on mutual



assistance within the framework of WENRA and in the working group on emergencies of HERCA.

Collaboration continued with the competent international authorities in accordance with article 7 of the IAEA's Convention on prompt notification (Group of Competent Authorities of the Convention on Prompt Notification and Assistance).

The CSN has developed the protocol for communications in the event of an emergency with the French nuclear safety authority (ASN). This protocol will be tested during certain of the emergency drills planned between the two countries.

The CSN participated in the two-yearly meeting of the competent authorities of the conventions on prompt notification and mutual assistance in the event of nuclear accidents and radiological emergencies, which took place at the IAEA headquarters in Vienna.

## 7.5. Physical protection of nuclear materials and facilities

In 2014 the CSN evaluated the request submitted by Trillo nuclear power plant for authorisation in relation to physical protection, associated with the request for extension of the plant operating license and the request for evaluation of the physical protection authorisation associated with the application for a construction license for the centralised temporary storage facility for spent nuclear fuel.

Likewise, the year saw the completion of the basic inspection programme (BIP) established for the physical protection systems of the nuclear power plants and nuclear facilities, within the strategic area of the Security of the CSN's Integrated Nuclear Power Plant Supervision System (SISC).

This programme consists of the performance of six technical procedures, grouped into two security inspections, type 1 and type 2, which must be performed within a period of 18 months at all the operating nuclear power plants. The performance of the type 1 inspection consists of applying two of the technical procedures, and that of the type 2 inspection of applying the four remaining technical procedures.

The cycle of inspections corresponding to the BIP initiated in 2013 was completed in 2014, as scheduled.

Furthermore, in 2014 inspections were performed on the security systems of the El Cabril waste disposal centre and the individual storage facility for spent fuel of the José Cabrera nuclear power plant, within the framework of their respective supervision systems.

In 2014, the CSN evaluated the revisions of the physical protection plans of the nuclear facilities, issued to adapt the format and content to CSN Safety Guide 8.2 on the "Preparation, content and format of physical protection plans for nuclear facilities and materials".

In addition, in 2014 the CSN carried out the evaluations in relation to two requests for specific authorisation for physical protection in the transport of category III nuclear material (uranium oxide) from the United States to the Juzbado fuel manufacturing facility, and vice versa, and between Almaraz nuclear power plant and the Studsvik research centre in Sweden.

In 2014 the CSN continued to participate with the National Centre for the Protection of Critical Infrastructures (CNPIC) of the Ministry of the Interior in the following collaboration projects:

- Participation in and technical advisory services for the working group coordinated by the CNPIC, for

the drawing up of Strategic Sector Plans (SSP's) for the protection of critical infrastructures, which in 2014 completed the Strategic Sector Plan document for the nuclear industry.

- Nuclear Safety Council participation in the Inter-departmental Group for the Protection of Critical Infrastructures and the National Commission for the Protection of Critical Infrastructures, with approval of the Strategic Sector Plan for the nuclear industry and the appointment of critical operators in this sector.

Meetings were held within the Inter-ministerial contact group for nuclear matters of the Global

Initiative to Combat Nuclear Terrorism (GICNT) at the Ministry of Foreign Affairs and Cooperation. The following were particularly significant among the issues dealt with:

- Preparation of the Nuclear Security Summit and drawing up of a document setting out the Spanish position for the plenary meeting of the summit, in which the president of the Government will participate.
- Analysis of the cooperation agreement between the IAEA and the Ministry of Foreign Affairs and Cooperation in relation to physical protection.

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