Spanish Nuclear Safety Council report to the Parliament

Year 2007 Summary

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Summary

Introduction

In compliance with article 11 of the law by which it was created (Law 15/980, modified by Law 33/2007), the Nuclear Safety Council hereby submits its Annual Report to the Congress and Senate and to the parliaments of the autonomous communities of Andalusia, Castilla y León, Castilla-La Mancha, Catalonia, Extremadura, Madrid and Valencia, the said report corresponding to activities carried out during 2007.

The report includes the advisory, assessment and control activities performed by the organisation during 2007 in order to report on the authorisations required by the regulations, oversee the operation of nuclear and radioactive facilities and prevent and limit any radiological impact. The objective of the report is to provide an overall picture of the situation regarding safety and radiological protection, the aforementioned facilities and all activities subject to nuclear regulation.

It may be stated in general terms that the degree of safety of the regulated sector has been correct and that the protection of the workers, the public and the environment against ionising radiations has been adequate, as is demonstrated by the absence throughout the year of incidents of relevance for nuclear safety and of events having any significant radiological impact.

The CSN makes continuous efforts to increase the knowledge and experience of its workers, improve its working processes and increase its efficiency through the development of the *CSN's Strategic Plan for 2005-2010*, the ultimate objective of which is to increase the safety of the regulated facilities and activities and increase the social credibility of the organisation.

In order to contrast the effectiveness of the improvement efforts made by the CSN, the IAEA was invited to carry out an IRRS (Integrated Regulatory Review Service) Mission to look at the Spanish regulatory system, this culminating in a visit to Spain by a team of international specialists during the first quarter of 2008. Throughout 2007 the entire CSN organisation was involved in the preparatory tasks for this IRRS Mission, reviewing the preliminary self-assessment performed and updating and implementing the programme of improvement actions deriving from this self-assessment.

Furthermore, during the last few weeks of the year an intense task of analysis of the new obligations imposed and of the resources required for implementation of the provisions of Law 33/2007, reforming the Law Creating CSN, was carried out.

The process of implementing the Integrated Plant Supervision System (Sistema Integrado de Supervisión de Centrales - SISC) was completed in 2007 and the system

became fully operative during that year, in relation both to its supervision and action planning aspects and to public information, as may be appreciated on the Council's website.

Assessment of the results of the SISC programme, along with consideration of other aspects of the behaviour of the nuclear power plants (operating incidents, warnings and sanctions and radiological impact), make it possible to conclude that throughout 2007 the Spanish nuclear power plants operated correctly from the point of view of safety.

The licensing applications filed by the plants in 2007 led to the issuing by the CSN of 62 decisions and six favourable reports, the authorisations for the modification of the plant cooling systems at Vandellós II NPP and of the control rod drive system at Cofrentes NPP being particularly significant. All the plants, with the exception of Almaraz group I, shut down for refuelling during 2007.

The CSN performed 175 inspections, 112 of which corresponded to the basic inspection programme established, the remaining 63 relating to the requirements of the SISC, events follow-up, generic issues and licensing support. The information provided by the operating indicators and the findings of inspections is classified by means of a colour code depending on its safety significance: very low (*green*), low to moderate (*white*), substantial (*yellow*) and high (*red*).

Throughout the year the SISC has recorded 10 indicators of a category higher than *green* and one *white* during the first quarter, one *yellow* and two *whites* during the second, two *whites* during the third and one *yellow* and three *whites* during the fourth. There were also a single *white* and three transverse findings during the third quarter. These results have implied the action matrix underlining a regulatory response on nine occasions for the plants overall and the four quarters of the year, and a degraded pillar on two occasions. This represents a profile of performance very similar to that obtained by the identical system in the USA.

In 2007 the nuclear power plants reported on 96 events, all classified at level 0 on the International Nuclear Events Scale (INES), except one which was classified at level 1. The 50% increase in the number of events with respect to the previous year is generally the result of the greater demands regarding the notification of events included in the new CSN instruction.

On April 4th 2008, during the period in which the Annual Report to Congress for 2007 was being drawn up, the Ascó nuclear power plant issued reportable event ISN-AS1-127, communicating the discovery and collection on its site of radioactive particles. The plant indicated that the origin of these particles was an operating incident initiated on November 26th 2007, at the end of the nineteenth refuelling

outage of group I, due to an irregular release that contaminated the fuel building ventilation system.

The CSN issued three warnings to the Almaraz, Cofrentes and Vandellós II nuclear power plants for minor cases of non-compliance with their official operating documents, and proposed the initiation of sanctions proceedings against the Vandellós II plant for non-compliance with the Operating Regulations in relation to the licensed personnel training programme.

The fuel cycle facilities operated correctly. The CSN carried out 36 inspections and issued 13 decisions for authorisations and two favourable reports. There were five reportable events at the Juzbado facility, one classified at level 1 on the INES scale and resulting from the mislaying of radioactive material, leading to a proposal for sanctions proceedings. A warning was issued also to Ciemat for non-compliance with the official documentation governing the *Integrated plan for the improvement of Ciemat facilities* project (Pimic).

The supervision and control of facilities in the shutdown, dismantling and decommissioning phases continued, these being the Vandellós I and José Cabrera nuclear power plants and the Elefante, Quercus, in Andújar and Lobo-G uranium concentrates facilities. During this period eight decisions and two favourable reports were issued and 33 inspections were carried out. There was also a proposal for the initiation of sanctions proceedings against the José Cabrera nuclear power plant for non-compliance regarding the control of radioactive sources.

The radioactive facilities for scientific, medical, agricultural, commercial and industrial purposes operated normally throughout 2007. There were 402 decisions regarding authorisations and 1,636 inspections, and 22 incidents and 16 complaints were responded to, all in relation to the 1,361 authorised facilities and more than 28,000 X-ray diagnosis installations registered.

The control interventions at radioactive facilities gave rise to the issuing of 84 warnings and the initiation of three sanctions proceedings.

As regards the rendering of regulated services to installations, including radiological protection services and technical units, companies selling and providing technical assistance for medical X-ray equipment and personal dosimetry services, the CSN issued 41 decisions regarding authorisations and performed 55 inspections.

In 2007 seven authorisations were issued in relation to the transport of nuclear and radioactive materials, one approving a national package, and reports were issued regarding the validation of eight overseas packages. Sixty-seven inspections were performed and three incidents were dealt with.

The activities undertaken to guarantee the training of the personal involved in operation of the facilities led in 2007 to the granting of 35 new licences for nuclear and fuel cycle facility operating personnel and 1,426 for radioactive facilities, as well as five head of radiological protection service licences, and a total 1,204 licences of various types were extended. Particularly significant has been the fact that training material for all fields of application in radioactive and radiodiagnosis facilities was made available to the public via the CSN website.

Control was maintained throughout 2007 over the inventory of spent fuel and the safety conditions of the systems for its storage at the plants. Radioactive waste treatment, conditioning and temporary storage activities carried out at the facilities were also supervised, along with the operation of the El Cabril disposal facility.

The CSN maintains strict control over the radiation doses received by persons exposed to ionising radiations, supervising the dosimetry control systems available in Spain and registering the results obtained. The number of workers controlled in 2007 amounted to 98,539, with a collective dose of 31,741 mSv.person. The average individual dose was 0.95 mSv/year. Of these persons, 99.09% received doses of less than 6 mSv/year and for 99.94 % the dose received was lower than 20 mSv/year.

In 2007 there were four cases of the annual dose limit established in the legislation being exceeded, and the measures contemplated in the corresponding procedure were applied.

The radioactive releases from the facilities during 2007 remained within the habitual values, comparable to those of other European and American installations, and the calculated doses attributable to them were – as in previous years – far below the dose limits for the public, representing only a minor fraction of the release limits.

The quality of the environment around the facilities continues to be acceptable from the radiological point of view, as determined by the results of the environmental radiological surveillance programmes of the facilities and the CSN, which are similar to those obtained in previous years. The CSN also controlled the environmental radiological quality of the entire national territory via its metering networks, obtaining normal values similar to those of previous years.

The CSN continued its contribution to the national emergencies system, based mainly on its emergency response organisation and its emergency room, which provides a permanently available infrastructure for advice and intervention in any nuclear or radiological emergency. It also collaborated with the Secretariat of State for Security in guaranteeing the security of nuclear and radioactive facilities, activities and materials.

Protection against natural sources of radiation has continued to occupy the CSN as part of its support function to the competent authorities. The year 2007 saw the completion of pilot studies on the radiological impact of phosphoric acid and fertiliser manufacturing activities, the manufacturing of titanium dioxide pigments and ceramics industries using zirconium sands. The advisory services provided to the Government of the Region of Murcia for the recovery of the area known as El Hondón, in Cartagena, were also significant.

The epidemiological study being carried out jointly by the CSN and the Instituto de Salud Carlos III also continued. In 2007 the estimate of doses to the population due to releases and the natural radiation in a radius of 30 km around the nuclear power plants was provided, along with the estimate of doses due to natural radiation in selected municipal areas located between 50 km and 100 km from the six operating plants.

In applying the R&D plan for 2004-2007, the CSN has completed 12 projects and initiated eight new ones, continuing the performance of a further 25 projects initiated in previous years. Also, a new research plan has been designed for the four-year period 2008-2011. The total cost of R&D activities in 2007 amounted to 1,737,909 €.

There have been intense efforts in the areas of information, coordination and collaboration with the different political institutions and administrations. In 2007 answers were provided to 11 parliamentary questions from the Congress and Senate and 12 reports were submitted in response to resolutions by the Commission for Industry, Tourism and Trade of the Congress. A framework collaboration agreement was signed with the Ministry of the Interior, along with two specific agreements regarding emergency management and security. The CSN has also collaborated actively with the Ministry of Industry, Tourism and Trade in reviewing the *Regulation on Nuclear and Radioactive Facilities* and the *Regulation on the Installation and Use of X-ray Apparatus for Medical Diagnosis.*

The agreements for the assignment of functions to the autonomous communities have continued to play an irreplaceable role as a way of bringing the control of radioactive facilities closer to their users.

The CSN used all the means available to it to respond objectively and transparently to all the demands for information from society. In addition to replying individually to all the requests received, more than 1,000, and issuing more than 200 informative notes and press releases, the Council provides full information on the regulated sector, the radiological situation in the country and its own activities via its institutional website. Particularly significant in this respect is the publishing of inspection reports and reports on Board of Commissioners' agreements, along with the associated technical decisions.

As advisor to the Government and appointed representative on nuclear safety and radiological protection in various international organisations, as well as the liaison with its counterpart organisation in numerous countries, the CSN has been very active on the international scene throughout 2007. Particularly significant has been its contribution to the International Atomic Energy Agency, including attendance at 57 events and the provision of almost 500,000 €, participation in the High Level Group set up by the European Union to promote the harmonisation of the practices of the Member States in relation to nuclear safety and radiological protection and participation in the meetings of the International Nuclear Regulators Association (INRA) and the Western European Nuclear Regulators Association (WENRA).

The CSN's efforts to provide technical standards for the regulated sectors in its areas of competence led to the publication of five Council instructions and six safety guides during 2007.

As of December 31st 2007, the staff of the organisation numbered 453 people, of which 65.12% are post-graduates and 49.88% are women.

Finally, the definitive budget of the CSN for the 2007 financial year amounted to 43.8 million Euros, an increase of 4.6% over the previous year.

1. The Nuclear Safety Council

In 2007 the Nuclear Safety Council was made up of the following members:

- President: Carmen Martínez Ten.
- Vice-president: Luis Gámir Casares.
- Commissioner: Julio Barceló Vernet.
- Commissioner: Francisco Fernández Moreno.
- Commissioner: Antonio Colino Martínez.

The General Secretary of the Council Antonio Luis Iglesias Martín vacated his post during 2007 and was replaced by Purificación Gutiérrez López, who took over on March 7th.

The entry into force of Law 33/2007, of November 7th, amending Law 15/1980, of 22nd April, Creating the Nuclear Safety Council introduced modifications in the regime applicable to the members of the Board of Commissioners in relation to the limitation of their terms, the mechanisms for termination or continuation in the exercising of their functions and the maximum age permissible for the post of General Secretary.

The Nuclear Safety Council held 38 plenary sessions, 35 of them ordinary, two extraordinary sessions and one following the appointment of the new General Secretary.

As the management body of the Council, the Board of Commissioners adopted 606 agreements during the year; of these 84 were commissions to the different working groups of the Organisation, 53 being resolved during the year.

The Board of Commissioners' decisions during the period were characterised by consensus among the members, practically all of the agreements being adopted unanimously.

The Board of Commissioners has delegated in the Presidency the issuing of reports prior to certain authorisations for radioactive facilities regulated by the Regulation on Nuclear and Radioactive Facilities.

Within the framework of the policy of increasing the transparency of the activities of the Council, since 2005 the minutes of all the plenary sessions are made public and are included on the CSN website (www.csn.es) for consultation by all interested parties, along with the technical reports underlying decisions regarding the licensing and control of nuclear and radioactive facilities.

With a view to promoting the activities for which the Organisation is responsible, it was agreed that five Council commissions should be established:

- Strategic Planning Commission.
- Standards Commission.
- External Relations Commission.
- Resources and Means Commission.
- Training and R&D Commission.

The Council commissions are non-executive in nature and the functions assigned to them include the establishment of strategic courses of action in their respective areas, the tracking and promotion of on-going activities and submittal to the Board of Commissioners of proposals for improvement. The leadership of the commissions corresponds in each case to a member of the Board of Commissioners.

Certain institutional activities have been organised, with specific responsibilities being assigned to the members of the Board of Commissioners in relation to institutional,

international and emergency response activities and to issues of a special nature or significance.

The liaison committees working with the main companies regulated have been reconfigured and the representation and leadership of the members of the Board of Commissioners on the different existing committees have been established.

It was also agreed that the members of the Board of Commissioners should participate in international relations, in order to ensure an adequate institutional representation in this type of activities.

The members of the Board of Commissioners continue to form part of the emergency stand-by team and lead the response of the Organisation to address emergency situations as efficiently as possible.

The Board of Commissioners agreed to assign the management of certain issues of a special nature or significance to certain of its members, in particular the coordination of the IRRS (International Regulatory Review Service) Mission and the project to improve cooperation with Ciemat.

2. Supervision and control of installations and activities

2.1. Nuclear power plants

2.1.1. Operation

The six nuclear power plants (eight reactors) shown in table 1 continued to operate during 2007.

The overall assessment of the operation of the nuclear power plants is carried out considering the following: the results of the Integrated Plant Supervision System (SISC), operating events (including incidents classified on the INES scale at a level higher than zero), reportable events (especially those declared as significant or generic), the dosimetry of the workers and the warnings or sanctions issued or applied.

Since 1994, the annual report of the CSN has included a set of indicators reflecting operation and its historic evolution, as a means of assessing the performance of the plants. The introduction of the Integrated Plant Supervision System (SISC) brings a new series of operations supervision parameters that play down the significance of these more intuitive indicators, constituting a set of full-scope, technically coherent parameters based on the quantification of risk.

Notwithstanding the above, and purely for informative purposes, the 2007 Annual Report

Table 1. General information on nuclear power plants and their operation in 2007

	Almaraz I	Almaraz II	Ascó I	Ascó II	Vandellós II	Trillo	Garoña	Cofrentes
Type	PWR	PWR	PWR	PWR	PWR	PWR	BWR	BWR
Thermal power (MW)	2,729	2,729	2,952.3	2,952.3	2,940.6	3,010	1,381	3,237
Electrical power (MW)	980	984	1,032.5	1,026.25	1,087.1	1,066	466	1,096
Authorisation for start-up	13-10-80	15-06-83	22-07-82	22-04-85	17-08-87	04-12-87	30-10-70	23-07-84
Authorisation in force	08-06-00	08-06-00	02-10-01	02-10-01	26-07-00	16-11-04	05-07-99	19-03-01
Period of validity (years)	10	10	10	10	10	10	10	10
Refuelling outage	N/A	14-10-07 to 29-11-07	27-10-07 to 01-12-07	24-03-07 to 02-05-07	05-05-07 to 09-09-07	25-05-07 to 24-06-07	18-02-07 to 25-03-07	29-04-07 to 02-08-07
Operating factor %	100	87.53	89.91	85.98	61.4	91.78	90.05	67.32
Load factor %	99.43	86.63	87.52	82.47	58.08	91.04	85.31	65.23
SISC indicators > green	1 White	1 Yellow	1 Yellow	1 White	4 White	1 White	–	1 White
SISC findings > green	–	–	–	1	–	–	–	–
Significant reportable events(1)	1	2	1	1(2)	2	1	–	1

(1) Significant events are those that require follow-up subsequent to the corrective measures implemented or require the request to implement measures additional to those proposed by the licensee.
(2) Classified at level 1 in the INES scale. The only event in 2007 with a level higher than 0.

quantifies these indicators and assesses their evolution, although this is not included in this summary.

Integrated Plant Supervision System (SISC)

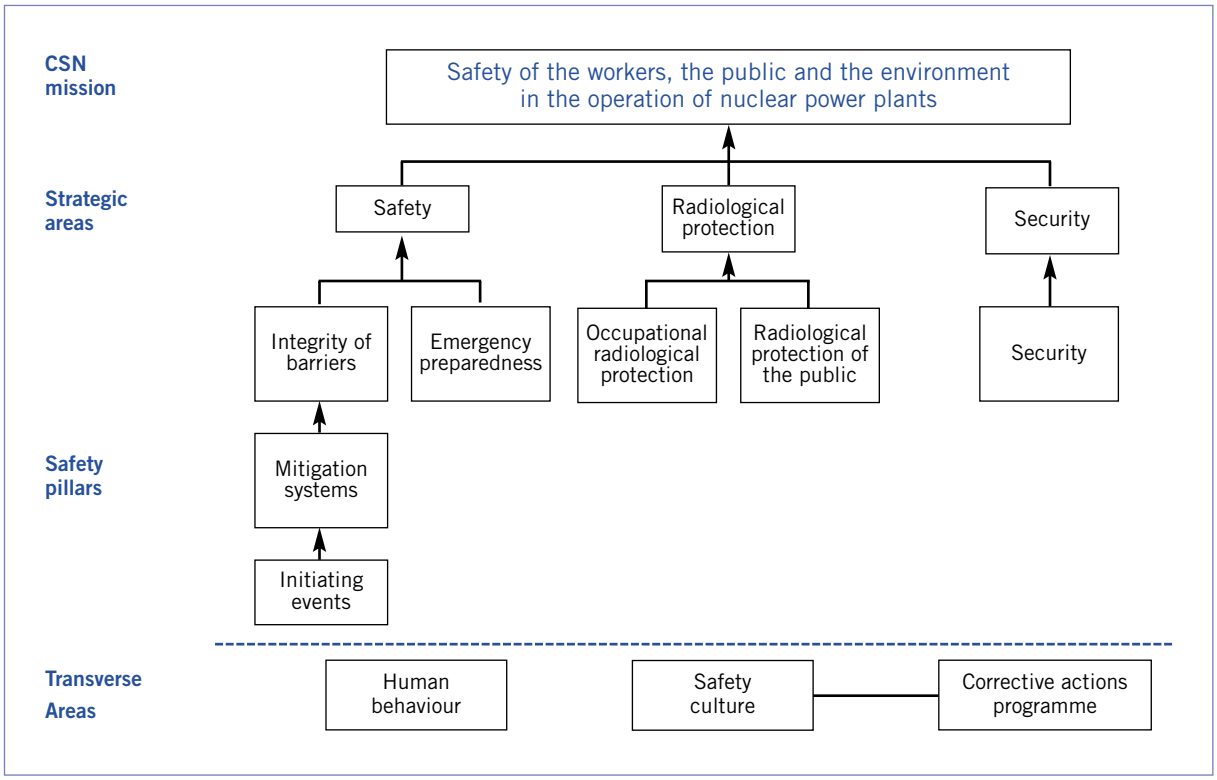
The Integrated Plant Supervision System has been in use since January 1st 2006, although one of its fundamental characteristics, communication to the public of its results, was not implemented until 2007. Since early 2007 the CSN website has included a link to a page dedicated specifically to the SISC, including the results of the system and the underlying operations information, quarterly and updated for all the nuclear power plants, in addition to the documentation describing the system and corresponding procedures.

The SISC is an objective mechanism for the assessment of nuclear power plant performance based on the analysis of certain operating parameters (indicators) and on the results of the inspection performed (findings). This analysis is carried out on the basis of rules and focuses on risk. The assessment obtained is converted, also in a previously established and rule-based manner, into a regulation and control plan specific to each plant. As a result, the intervention of the CSN is a response proportional to the increase in risk appreciated and may consist of increasing inspection pressure or requiring the application of corrective measures.

As shown schematically in figure 1, the SISC assesses plant safety from the point of view of three strategic areas: nuclear safety, radiological protection and security, based on seven priority areas or safety pillars. The system also considers three transversal areas common to all the pillars: human behaviour, the safety culture and the corrective actions programme.

Transparency is one of the fundamental elements of the SISC and for this reason, in order to

Figure 1. Schematic representation of the SISC



facilitate general understanding of the results, the information provided by the operations indicators and the findings of inspections are colour coded depending on their safety significance: very low (*green*), low to moderate (*white*), substantial (*yellow*) and high (*red*).

The programme contemplates quarterly, six-monthly and yearly assessments. The overall result is materialised through the so-called "action matrix", which integrates the information from the indicators and the inspection findings and establishes the actions to be performed by the licensees and the CSN depending on the relevance of the results of the supervision, providing an overall view the situation of the plants. The matrix contemplates the action modes shown in table 2.

Table 1 also lists the different *green* operating indicators during 2007, a total of 10, these being described below:

- During the first quarter there was a *white* indicator at Almaraz I as a result of four diesel generator failures in the last three years. The start-up of a fifth diesel generator, which may be connected to either of the plant groups, means that a diesel failure is less relevant from the point of view of safety, and as from the second quarter of 2007 the system reliability data improved.

- During the second quarter there was a *white* indicator at Vandellós II as a result of more than three reactor scrams in 7,000 hours critical, and another *white* at the same plant due to diesel generator failures, two during the second quarter of 2005 and the third during the first quarter of 2007. In addition, consideration should be given to a *yellow* indicator at Ascó I, as a result of reactor coolant leakage in excess of those indicated in the Operating Technical Specifications, a leak across the first seal of a pressuriser spray valve. Once this was identified, the line was isolated and the valve repaired.

- During the third quarter there was a *white* indicator at Cofrentes as a result of the number of reactor scrams in 7,000 hours critical, and the *white* indicator due to the number of diesel generator failures at the Vandellós II plant continued.

- During the fourth quarter there was a *white* indicator resulting from the accumulation of four reactor shutdowns at the Ascó II nuclear power plant (three during the second quarter of 2007 and one during the fourth). The *white* indicator at Vandellós II due to the number of diesel generator failures in three years was maintained, and there was a *white* indicator at the Trillo plant, also due to diesel generator failures (one on 2005, two in 2006 and two in 2007, during the first and third quarters). At Trillo, the failure of a single diesel generator is less critical than at other plants, as a result of which the indicator has entered the *white* band after five failures in three years. Consideration should be given also to the *yellow* indicator at Almaraz II, due to reactor coolant leakage in excess of those indicated in the Operating Technical Specifications. During the cooldown to initiate the refuelling outage, a residual heat removal system safety valve was opened, causing a letdown flow to the pressuriser relief tank. The valve did not close on reaching its setpoint and the discharge to the tank continued for approximately one minute, until the line was isolated.

As regards the inspection findings identified in 2007, there were 141, only one of which was higher than *green* (*white*). Two transverse findings were recorded, at Almaraz I and II and Vandellós II, the first relating to the area of human behaviour and the second to the area of corrective actions.

Table 2. Action matrix. Modes of response, fundamentals and actions contemplated

Modes	Basis	Derived actions
Licensee response	Plants with all assessment results in *green*.	The CSN will perform only the basic inspection programme and the deficiencies identified will be treated by the licensee within his corrective actions programme.
Regulatory response	Plants with one or two *white* results, either operating indicator or inspection finding, on different safety pillars and no more than two *whites* in a strategic area.	The licensee shall be required to carry out an analysis to determine the root cause and contributing factors and to include in his corrective actions programme the actions necessary to resolve the deficiencies detected. The assessment performed by the licensee shall be the subject of a supplementary inspection by the CSN. Following this inspection, the CSN will hold a meeting with the licensee to analyse the deficiency detected and the actions implemented to correct the situation.
Degrade pillar	Plants with two or more *white* results or one *yellow* on one same pillar, or three *white* results in a strategic area.	The licensee shall be required to carry out an analysis to determine the root cause and contributing factors and to include in his corrective actions programme the actions necessary to resolve the deficiencies detected, as regards both the problems identified in each issue or area and the overall set of deficiencies and collective problems that might arise. The assessment performed by the licensee shall be the subject of a supplementary inspection by the CSN. Following this inspection, the CSN will hold a meeting with the licensee to analyse the deficiency detected and the actions implemented to correct the situation.
Multiple degradations	Plants with 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 be required to carry out an analysis to determine the root cause and contributing factors and to include in his corrective actions programme the actions necessary to resolve the deficiencies detected, as regards both the problems identified in each issue or area and the overall set of deficiencies and collective problems that might arise. This assessment may be carried out by a third part independent from the licensee. The CSN will perform a supplementary inspection to determine the amplitude and depth of the deficiencies. Following this inspection, the CSN will decide whether supplementary CSN actions are required (supplementary inspections, request for additional information, issuing of instructions and/or shutdown of the plant).
Unacceptable operation	Plants not offering sufficient guarantee of the licensee's capacity to operate the facility without this implying unacceptable risk.	The CSN will meet with the licensee's management to discuss the degradation observed in operation and the actions to be taken before the plant may be restarted. The CSN will draw up a specific supervision plan.

The *white* finding affected the Ascó II plant and corresponded to the fact that the containment building equipment lock was left open for more than eight hours during a refuelling outage, this implying an increased risk of radioactive emissions in the event of a loss of coolant accident.

The transverse finding at the Almaraz I and II plant was related to the discovery that a series of

findings detected during the third quarter of 2007 had in common failures in the management of the plant procedures and inadequate working practices by the personnel. For this reason the CSN agreed to assign a transverse finding in the area of human factors, notifying the licensee for the latter to establish an action programme including adequate corrective factors.

The transverse finding at the Vandellós II plant related to the accumulation of *green* category findings in relation to application of the Maintenance Rule. These failures arose as a result of the same root causes and led to excessive delay in the implementation of corrective actions in anticipation of the failures, this meaning that the performance of the sections with problems continued to degrade. As a result, the CSN assigned a transverse finding in the area of corrective actions.

Table 3, included below, summarises the status of the "action matrix" in the four quarters of 2007.

Table 3. Summary of action matrix during the four quarters of 2007

	I quarter	II quarter	III quarter	IV quarter
Almaraz I	Regulatory response			
Almaraz II				One degraded pillar
Ascó I		One degraded pillar		
Ascó II	Regulatory response		Regulatory response	Regulatory response
Cofrentes			Regulatory response	
Garoña				
Trillo				Regulatory response
Vandellós II		Regulatory response	Regulatory response	Regulatory response

Reportable events

In applying the requirements of CSN Instruction IS-10 regarding event reporting criteria at nuclear power plants, the licensees of these facilities reported 96 events during 2007, all of them classified at level 0 on the International Nuclear Events Scale (INES), with the exception of one which was classified at level 1. Furthermore, following an inspection it was determined that an event that occurred in 2005 should be reclassified, changing from level 0 to level 1.

The larger number of events with respect to 2006 was due to the entry into force of the new CSN instruction on event reporting criteria for nuclear power plants (more demanding than those previously applied). Specifically, the inclusion of the new criterion regarding the reporting of automatic or manual safety system actuation led to 32 of the notifications performed, as a result of which it is not possible to make a direct comparison with the number of events in previous years.

The event classified at level 1 corresponded to a non-scheduled outage at Ascó II, imposed by the Operating Technical Specifications due to the declaration of a simultaneous inoperability of one motor-driven pump and the turbine-driven pump of the auxiliary feedwater system, with lower than design flows having been registered in three events in which its actuation was required.

On April 4th 2008, during the drawing up of the 2007 Annual Report to Congress, the Ascó nuclear power plant issued reportable event ISN-AS1-127, informing of the identification and collection of radioactive particles on the plant site. These particles originated from an operating incident that started on November 26th 2007, at the end of the nineteenth refuelling outage in Group I of the plant, due to an irregular release, this contaminating the ventilation system of the fuel building. Subsequently, on November 29th 2007, a part of this contamination was discharged to the exterior via the gaseous effluents stack.

According to the information transmitted by the licensee on April 4th 2008, the particles were collected on 2nd, 3rd and 4th of that month, this resulting, according to the licensee, from extension of the surveillance initiated after having detected a point of contamination outside the containment building, next to the equipment lock, on March 14th 2008.

From the very beginning, the actions taken by the CSN were aimed at determining the scope of the event and at ensuring the protection of persons and the environment. On a secondary plane, the actions were aimed at determining the causes of the event, from both the material point of view, investigating the physical phenomena that occurred and the behaviour of the safety systems and components, and in relation to the behaviour of the licensee and his possible responsibilities.

On the basis of the results of this inspection, on April 9th 2008 the CSN sent a technical instruction to the licensee requiring actions and requesting information on the radiological surveillance at the site, estimations of the source term and maximum potential dose, the operational status and process of decontaminating the ventilation systems, analysis of the performance of the process radiation monitors and, especially, a contamination surveillance programme relating to the workers and other persons that had had some relation with the plant.

On April 14th 2008, the plant responded to this request, submitting part of the information required. Along with the findings of the inspection, this led to the reclassification of the event on the INES scale, from the level 1 initially assigned to level 2. The level 1 was due to a radioactive release of little radiological impact, while the increase to level 2 was due to the deficiencies in the safety culture discovered by the CSN in relation to the plant's management of the event.

Sanctions and warnings

During 2007, the CSN proposed to the Ministry of Industry, Tourism and Trade that sanctions proceedings be initiated against Vandellós II nuclear power plant for non-compliance with the Operating Regulations, this consisting of the minimum number of hours of study scheduled for 2006 not having been covered, as established in the said regulations in relation to licensed personnel training.

The CSN also agreed on the following warnings throughout the year:

- Warning to Almaraz II for non-compliance with the Operating Technical Specifications in relation to fire barrier integrity, a door of the fire protection system having been chocked in

the open position without establishing the corresponding surveillance walkdown.

- Warning to Cofrentes for non-compliance with the Operating Technical Specifications in relation to the primary containment isolation and radiation surveillance instrumentation, all the main steam line radiation monitors having been left with incorrect alarm and insulation setpoints.

- Warning to Vandellós II for non-compliance with the Operating Technical Specifications on performing an operating mode change during start-up, following a refuelling outage, without complying with a charging pump surveillance requirement, and for exceeding the frequency of surveillance of the fire-fighting diesel pump direct current battery.

Conclusions

Assessment of the results of the SISC, along with the consideration of other aspects of the performance of the plants, as set out in this section and in subsequent sections on radiological impact, make it possible to state that during 2007 the Spanish nuclear power plants operated correctly and within the safety limits established, without any situations of undue risk.

It is also concluded that the maintenance of an adequate safety state does not require the adoption of actions additional to those set out in the SISC at this moment in time.

2.1.2. Licensing

During 2007 the Nuclear Safety Council issued 62 decisions regarding authorisations and six favourable reports. The following were among the most important licensing activities:

- Almaraz: favourable decision regarding the storage of fuel assemblies in region II of the spent fuel pools of both plant groups.

- Almaraz: revisions 84 and 79 of the Operating Technical Specifications regarding the surveillance of temperatures in safety-related equipment rooms.

- Ascó I: use of alternatives to ASME Code XI and to code cases N-504-2 and N-638-1 for the design and performance of weld overlays on the pressuriser nozzles of this group.

- Cofrentes: design modifications relating to intervention on the control rod drive hydraulic system, performed during the refuelling outage.

- Cofrentes: implementation of an in-service risk informed piping inspection programme.

- Santa María de Garoña: design modification of the speed control system for the recirculation motor-generators, for the incorporation of a digital control system.

- Santa María de Garoña: design modification for use of the TRACG methodology in transient analysis.

- Santa María de Garoña: revision 13 of the Operating Technical Specifications and revision 12 of their basis, increasing the maximum acceptable final heat sink temperature.

- Vandellós II: modification of the essential chilled water cooling systems (system GJ) and of the emergency diesel generator motors (system KJ). The cold source of these systems was changed, replacing cooling by seawater via the essential services water system (system EF) for atmospheric cooling via air coolers, in order to make the cooling of the thermal loads of these systems independent from the EF system (result of the event that occurred on August 24th 2004).

- Vandellós II: performance and assembly of the new essential services water system (system EJ) replacing system EF under accident conditions and potentially replacing it also under normal operating conditions, declassifying the EF system as safety class (result of the event that occurred on August 24th 2004).

- Extension for all the plants of the authorisation for activities relating to the import, export, handling, processing, storage and transport of nuclear materials.

- Extension of the term for compliance with Council Instruction IS-09, which establishes the criteria applicable to the security systems, services and procedures relating to nuclear facilities and materials, for the Cofrentes, Santa María de Garoña, Ascó and Vandellós II plants.

In addition, information has been provided for the revision of the site emergency plans, operating regulations, operating technical specifications and safety studies for various nuclear power plants.

2.1.3. Supervision and control

The CSN tasks aimed at the supervision and control of the nuclear power plants consists mainly of exercising its inspection function and that of developing the plant safety improvement programmes.

2.1.3.1. Inspection

The number of inspections carried out at the six operating plants during 2007 amounted to 175. Of these, 112 corresponded to the basic inspection programme contemplated in the SISC, which in 2007 included 88 inspections performed by the CSN specialists in different disciplines, plus the inspections carried out by the resident inspectors, which are documented by way of 24 quarterly inspection reports. This has meant the performance of 100% of the inspections scheduled in the aforementioned plan, which also includes the forecasts for 2006-2007 to cover different significant areas of plant operation with a frequency of at least once every two years.

The remaining 63 inspections include the supplementary inspections performed as a result of indicators or findings of more than *green* category, inspections carried out as a result of operating incidents, inspections of generic issues as a result of the new standards and in-house and external operating experience and inspections relating to licensing issues. In particular, a significant number of inspections were performed outside the basic inspection programme at the Vandellós II plant, to perform checks on the actions carried out as a result of the incident that occurred in 2004 and the tasks for replacement of the essential services water system that caused this incident, which is being completely modified.

2.1.3.2. Safety improvement programmes

The most important safety improvement programmes in force during 2007 were the following:

Periodic safety review programmes

During 2007 assessment tasks were carried out on the periodic safety reviews submitted by the Santa María de Garoña and Almaraz plants in relation to the renewal of their operating permits, which will expire in July 2009 and June 2010, respectively.

Likewise, assessment of the documentation submitted by these two plants in 2007, in compliance with the Complementary Technical Instruction on *standards of conditional application*, issued by the CSN in October 2006, was initiated, this also relating to the renewal of their operating permits.

Generic issues

Generic issues are understood to be all safety-related problems identified at any national or overseas nuclear power plant that might affect other plants. The CSN carries out tracking of these issues and promotes the analysis of the applicability, and adoption at the Spanish plants of the corrective actions arising from this analysis. The most relevant generic issues in 2007 were as follows:

- *Incident at Wolf Creek nuclear power plant (USA).* Detection in October 2006 of circumferential cracking in the pressuriser nozzle welds. This event was discovered during the materials reliability inspections carried out by the US NRC. The CSN issued a technical instruction for PWR plants, requesting the performance of an inspection plan and the application of corrective actions. The following has resulted from compliance with this instruction:

  – Ascó I nuclear power plant has already licensed the repair and has applied it in group I during the autumn 2007 refuelling outage, and plans to do the same in group II during the refuelling outage scheduled for the autumn of 2008.

  – Almaraz nuclear power plant has scheduled the repairs for the spring 2009 refuelling outage in group II and the autumn 2009 outage in group I.

  – Vandellós II nuclear power plant has scheduled the repair for the refuelling outage programmed for the beginning of 2009.

- *Scaffolding on safety structures*. During its inspections, and especially those performed during refuelling outages, the CSN has detected the positioning of scaffolding for maintenance and repair activities in the vicinity of safety-significant structures, systems and components or their access routes that might, in the event of objects being accidentally dropped or in the case of an earthquake, cause damage to these systems or block access to them. In order to prevent this possibility, a technical instruction was issued to all the plants requiring them to perform, by means of a written procedure, a safety assessment of the design, assembly, maintenance and removal of temporary structures, under normal and accident conditions. This generic issue is now closed, the licensees having introduced it in their corresponding procedures.

- *Incident at Almaraz II nuclear power plant: lowering of level in the pressuriser as a result of opening and delayed closure of a safety valve.* With group II of the Almaraz plant in mode 4, during the process of cooldown to take the plant to cold shutdown, the safety valve on the suction side of residual heat removal system train B was anomalously actuated, remaining open below closing pressure and discharging to the pressuriser relief tank for approximately four minutes, this causing the level of the pressuriser to decrease by 44%. The incident reoccurred subsequently with the group in mode 5. The CSN carried out a reactive inspection to clarify the causes of the event, discovering that the delayed closure of the safety valve was due to an incorrect setting, this error also affecting the rest of the safety valves of a given model in both groups of the Almaraz plant. The CSN decided to classify the event as significant and generic, since it might affect more than one plant, issuing a technical instruction to the rest of the nuclear power plants for them to analyse and revise the settings of their safety valves, with a view to ruling out the possibility of this setting error having been repeated. The replies to this instruction were required prior to April 25th 2008.

Safety management improvement plan at Vandellós II

On April 18th 2007, the Council approved revision No 4 of the *Safety management improvement action plan* (SMIAP) proposed by the licensee.

During 2007 the licensee implemented a total 30 actions of those required by the SMIAP, including all those relating to management and leadership, organisation, management systems and communication. Six of the actions included in the design, inspections and surveillance improvement programme are still pending, their performance being scheduled for 2008 and 2009.

Throughout 2007, the CSN has maintained in parallel a SMIAP supervision plan, performing the four inspections scheduled for the year plus two additional inspections, one of SMIAP progress indicators and the other on application of the Maintenance Rule. The most significant aspects identified by the CSN in its tracking plan were as follows:

As regards operation of the facility:

- Reduction of the number of anomalous conditions opened. Of the 20 pending closure at the beginning of 2007, the licensee solved 15 and suitably channelled the other five.

- It became evident that there was an excessive delay in drawing up the reports required by the Maintenance Rule and in the adoption of the corresponding corrective actions. The licensee has had to implement an improvement plan assigning more resources and modifying the responsible organisation.

As regards the design modifications to the plant systems, the first phase of the design modifications to the cooling water systems has been implemented, this including the change of the cold source of the essential chilled water and emergency diesel generator motor cooling systems and the removal of the 300 mm pipe from the essential services water system.

As regards actions relating to the re-establishment of safety and quality management:

- By means of inspections and meetings with the licensee, the CSN checked the conclusions regarding the safety culture of the *Second external assessment report* and the *Third internal assessment report*. Both coincide in concluding that the performance of the organisation in safety management has not made significant progress. On the other hand, the specialists in the area recognise that cultural and behavioural changes in this type of situations are not observable in the short term.

- During 2007 the licensee completed compliance with the CSN requirements regarding the operator's Nuclear Safety Committee (ONSC), with the incorporation in this committee's operating procedure of criteria for extraordinary meetings prior to plant start-up following non-scheduled outages.

- The licensee is preparing a new restructuring of his organisation, incorporating CSN requirements such as the inclusion in the Operating Regulation of a new structure for the Human Factors Group and Investments Committee. This restructuring is currently being assessed by the CSN.

- The CSN has reviewed the reports by the External Advisory Group (EAG) corresponding to the second and third assessments carried out in January and July 2007, along with their analysis and consideration by the licensee.

Lessons learned by the rest of the plants as a result of the Vandellós II nuclear power plant event

In September 2005, in the wake of the analysis of this event and the resolutions of the Commission for Industry, Tourism and of the Congress, Trade, the CSN issued five complementary technical instructions to the rest of the plants:

- ITC-1. Analysis of the applicability of the Vandellós II nuclear power plant event.

- ITC-2. Analysis of the safety culture.

- ITC-3. Review of structures, systems and components degradation mechanisms.

- ITC-4. Review of issues involving important design modifications.

- ITC-5 Review of applicable standards and comparison with the basic standard.

The licensees submitted their compliance reports within the required period. In 2006 the CSN completed the evaluation of ITC-1, ITC-2 and ITC-4. The evaluation schedule foreseen by the CSN for the responses to ITC-3 and ITC-5 covers the period 2007 and 2008.

ITC-3 refers to the identification of degradation mechanisms potentially affecting safety significant plant structures, systems and components, which constitutes the starting point for the plant lifetime management plans. In 2007 it completed the evaluation for the Santa María de Garoña plant, and the rest are expected to be completed during the first six months of 2008.

The CSN has concluded the evaluation of the responses to ITC-5. In general the analysis performed by the plants is considered to be adequate, and it is concluded that the majority of the safety significant systems comply with the basic standard. Those cases in which unique or doubtful standards have been used have been identified and, where appropriate, justified. Nevertheless, the CSN has requested the review of certain aspects through the following technical instructions:

- Ascó, for the plant to describe the methodology applied and the conclusions of the analysis performed, including deviations from the basic standard if applicable.

- Santa María de Garoña for the plant to increase its scope to include:

  a) In the case of safety systems, the standard applicable to operation.

  b) Analysis of the standard applicable to the design, in-service inspection, testing and operation of systems included in the maintenance rule.

  c) The conclusions of the aforementioned analyses and deviations where applicable.

- Cofrentes, for the plant to justify the use in the design of seismic category I structures of the MV standards of the Ministry of Housing, the UNE standards, the EM 62 standard of the Eduardo Torroja Institute and the DIN standards of the German Standards Institute and check that they do not contradict the basic design standards in those aspects for which they have been used.

Contractor control activities

Many of the tasks carried out at nuclear power plants, related or not with safety, are performed by external companies (contractors). The licensees of the facilities are responsible for guaranteeing the quality of such tasks. During refuelling outages a very important volume of correct and preventive maintenance tasks are concentrated in a short space of time, and in most cases are performed by the personnel of external companies, for which reason the selection of such companies, planning, control and supervision of the work require special efforts by the licensees.

Aware of the existing problems, in recent years the CSN has carried out specific inspections of the activities undertaken by the licensees to control safety-related tasks performed by external companies during refuelling outages.

In 2007 two inspections were performed during the refuelling outages at the Trillo and Santa María de Garoña nuclear power plants, with a scope similar to the inspections performed in previous years:

- Checking of the licensee's preliminary contractor selection and control activities.
- Checking of the systematic approach used to control, supervise and accept safety-related work.
- Checking of work control, supervision and acceptance activities by the plant personnel, with respect to a sample of tasks performed by external personnel.

As a result of the checks performed at these two plants, no significant deficiencies were observed in the control of refuelling tasks, the only findings being minor and corrected within the process of the Corrective Actions Programme (CAP).

2.2. Nuclear fuel cycle facilities, waste disposal facilities and research centres

The facilities referred to in this section are the Juzbado fuel assembly manufacturing facility, the El Cabril waste disposal facility and the Centre for Energy-Related, Environmental and Technological Research (Ciemat). Throughout 2007, all of these installations operated within the established safety margins and there were no situations of undue risk.

Licensing

As regards the licensing of these facilities, throughout the year the CSN issued 13 decisions on authorisations and two favourable reports. The following are particularly significant among the proceedings dealt with:

- Juzbado fuel assembly manufacturing facility: approval of different revisions of the following official operating documents: Safety Study, Operating Regulation, Operating Technical Specifications and Emergency Plan.
- Ciemat: approval of revisions of the Operating Technical Specifications and Operating Regulation of the Pimic-Dismantling project. Approval of modifications to the following radioactive facilities of the centre: IR-17 solid radioactive waste conditioning, IR-14 dosimetry standards laboratory and IR-08 radioisotopes laboratory. Declaration of decommissioning with restrictions of the IN-03 research reactor fuel assembly development plant.
- Juzbado fuel assembly manufacturing facility, El Cabril waste disposal facility and Ciemat: extension of the authorisation for nuclear material import, export, handling, processing, storage and transport activities.

Within the Pimic project performed by Ciemat activities continue on the dismantling and rehabilitation of areas and buildings. Particularly significant in 2007 have been the start-up of storage areas for clearable materials and the adaptation of measuring areas and performance of measuring equipment start-up tests for the clearance of such materials. The ventilation systems of buildings inside the protected area were also adapted and the reactor pool liquid effluents treatment system was modified.

Inspection and control

In performing its respective control programmes the CSN carried out a total 36 inspections, 11 at the Juzbado fuel assembly manufacturing facility, 11 at the El Cabril disposal facility and 14 at Ciemat.

Reportable events

There were five reportable events at Juzbado. Given its significance, special mention is warranted of the

discovery outside the manufacturing shed – but on the licensee's property – of a small jar containing fuel pellets. This event, which had no radiological significance, was classified at level 1 on the INES scale, since it implied a temporary loss of control over nuclear material.

Sanctions and warnings

In response to the aforementioned event, and in view of its inadequate reporting, the Council agreed to propose to the Ministry of Industry, Tourism and Trade that sanctions proceedings be initiated against the Juzbado facility.

Likewise, the Council issued a warning to Ciemat for non-compliance with the provisions of the Pimic project Quality Manual.

2.3. Facilities in the definitive shutdown, dismantling and decommissioning phases

The nuclear or radioactive fuel cycle facilities that have ceased to operate or are in the dismantling or decommissioning phase are the Vandellós I and José Cabrera nuclear power plants, the Elefante and Quercus uranium concentrates facilities, the Andújar uranium mill (AUM) and the Lobo-G plant at La Haba. The conservation, characterisation, dismantling and surveillance activities carried out at these installations during 2007, depending on the status of each, were performed within the established safety limits and without any undue impact for people and the environment.

Licensing

Throughout 2007 the CSN issued eight decisions regarding authorisations and two favourable reports.

The following are among the most important proceedings dealt with:

- Vandellós I: authorisation of the revision of the *Operating regulation for the dormancy phase* of the facility.

- José Cabrera: approval of revisions of the following official operating documents: *Regulation on shutdown operation*, shutdown Operating Technical Specifications. Clearance of very low level wooden materials. Establishment of new limits of coverage for civil liability depending on the risk analysis performed for the current situation of the plant. Minimum services required to guarantee the nuclear safety of the facility during the intermittent strike held between November 16th and December 16th 2007. Extension to the authorisation for nuclear materials import, export, handling, processing, storage and transport activities. The Council issued a favourable report on the request for the performance and assembly of the design modification of the irradiated fuel dry storage system, as well as of the content of the study on the environmental impact of this modification.

Inspection and control

During the performance of the respective control programmes of the facilities the CSN carried out a total 33 inspections, three at the Vandellós I nuclear power plant, 16 at José Cabrera, five at the Quercus plant, three at the Elefante plant, four at the Andújar uranium mill (AUM) and two at the Lobo-G plant.

The technical activities performed at the Vandellós I nuclear power plant in 2007 focussed on the maintenance of the different control systems in place for the checking and verification of safety during the dormancy phase of the facility.

Unión Fenosa Generación, which continues to be the licensee of the José Cabrera plant, continued with the preparatory activities for dismantling. The primary circuit decontamination control programme, which began at the end of November

2006, was completed in mid 2007. During the three phases of decontamination carried out more than 29.6 TBq of total activity were removed from the reactor coolant system, the residual heat removal system and the chemical and volume control system.

Work relating to the design modification of the individual spent fuel storage facility (ITS) began during the first quarter of 2007, and was completed by mid year. Authorisation for start-up of the design modification was requested in May 2007, and authorisation is expected during the first quarter of 2008.

As part of the José Cabrera plant site characterisation plan, two campaigns were carried out during 2007, these being additional to those performed in 2004 and 2005.

Although the Quercus plant ceased to operate in 2003 and requested dismantling in 2005, Enusa, confirming an interest already manifested in 2006, requested the indefinite suspension of the plant dismantling licensing process on October 23rd 2007, pending the completion of the feasibility analysis of the facility in view of the current uranium concentrates market. The CSN did not initially object to this request, as long as compliance with the conditions established in the authorisation in force was maintained; however, in view of the duration of this suspension, a process of technical analysis has been initiated regarding the validity and possible reinforcement of these limits and conditions.

The activities performed at the Elefante plant during 2007 have been aimed at performing the checks and verifications required by the surveillance programme approved.

At the Andújar uranium mill a series of activities submitted by the licensee was evaluated, these having as their objective the reduction of the presence of rodents in the upper parts of the dyke. These animals might cause a deterioration of the covering layers, with the subsequent risk of rainwater seeping into the internal layers.

During 2007 two inspections were performed at the site of the Lobo G plant to verify the general and hydrogeological conditions imposed in the decommissioning statement. No significant variations with respect to the programme established were encountered in either inspection.

At all the facilities in the shutdown, dismantling and decommissioning phases the environmental radiological surveillance programme, the programme for the radiological control of the workers, the security programme and, if necessary, the effluent release control and waste management programmes continue to be operative. None of these programmes presented deviations during 2007.

Sanctions and warnings

During its Plenary meeting of December 19th 2007, the Board of Commissioners agreed to propose the initiation of the sanctions proceedings against the José Cabrera nuclear power plant for non-compliance with its official operating documents, in relation to the loss of control over radioactive sources.

2.4. Radioactive facilities

Throughout 2007 the operation of the radioactive facilities for scientific, medical, agricultural, commercial and industrial purposes remained within the safety standards established, the measures required for the radiological protection of people and the environment being adhered to.

During 2007, 17 significant events were registered at radioactive facilities, particularly significant

being the over-exposure of a worker at the SGS Tecnos S.A facility, in the shielded zone of the company's branch in Zamudio (Vizcaya). This worker received a dose of 718 millisieverts, far above the regulatory limit.

In accordance with CSN Safety Guide 7.5, this worker was checked at an authorised medical centre for individuals wounded or contaminated by radioactive isotopes or ionising radiations, and the dose received was estimated by means of biological dosimetry techniques. The medical reports concluded that there were no significant clinical data, although further controls are foreseen in the future.

In 2007 the CSN proposed that the competent authority initiate three sanctions proceedings, one in relation to the event described above. The causes underlying the sanctions proposals were the performance of activities requiring authorisation without having such authorisation, the operation of facilities by non-licensed personnel and non-adherence to the instructions and requirements imposed.

Likewise, and as a result of its control assessment and inspection activities, the CSN issued 84 warnings, identifying the deviations encountered and requiring their correction.

The licensing and control of these facilities is undertaken by the CSN in collaboration with the autonomous communities with which function assignment agreements have been signed.

During 2007, 402 decisions were issued regarding radioactive facilities:

- 66 for operating permits.
- 49 for decommissioning statements.
- 287 for the authorisation of various modifications.

Table 4. Evolution of the number of radioactive facilities

Category	Field of application	2003	2004	2005	2006	2007
1ª	Irradiation	1	1	1	1	1
	Subtotal	**1**	**1**	**1**	**1**	**1**
2ª	Commercialisation	55	55	49	46	51
	Research and teaching	80	82	84	80	85
	Industry	572	587	600	582	597
	Medicine	262	270	276	287	309
	Subtotal	**969**	**994**	**1.009**	**995**	**1.042**
3ª	Commercialisation	24	16	12	13	14
	Research and teaching	94	88	90	89	95
	Industry	168	161	145	152	157
	Medicine	98	70	66	57	52
	Subtotal	**384**	**335**	**313**	**311**	**318**
		22,947	24,069	25,222	25,902	28,438
	Total	24,301	25,399	26,545	27,209	29,799

Throughout 2007, 1,636 inspections were performed at radioactive facilities. Their distribution by types was as follows:

- 161 licensing inspections.
- 1,235 radioactive facility control inspections.
- 218 radiodiagnosis facility control inspections.
- 22 inspections relating to incidents, complaints or irregularities.

In addition to the controls through inspection, the control of the facilities is based on the review of the periodic reports. In 2007 the CSN received 1,122 annual reports from radioactive facilities, some 20,000 from diagnostic X-ray installations and 253 quarterly commercialisation reports.

The analysis of the reports generated during inspections, of the annual reports from the facilities, of the information on radioactive materials and equipment supplied by the commercialisation installations and of the radioactive waste data provided by Enresa led to the sending of 213 control letters.

Mention should be made also, in the field of control, of the response to complaints, of which there were 16 in 2007. Thirteen of these complaints referred to radiodiagnosis facilities and three to miscellaneous issues. In these cases an inspection visit was made and the complaining parties were subsequently informed of the condition of the facility, a control letter being sent to the licensee where appropriate.

In 2007 several improvements were implemented to speed up the licensing process, and the CSN collaborated with the Ministry of Industry, Tourism and Trade in drawing up the modification to the *Regulation on Nuclear and Radioactive Facilities*, this including several changes aimed at simplifying the processes of authorising radioactive facilities.

The test application of the INES scale for the classification of events at radioactive facilities continued throughout 2007. Likewise, the CSN collaborated with the IAEA in revising the application manual for this scale, its official application in Spain being foreseen once completed.

The database that is to house the National Inventory of High Activity Encapsulated Radioactive Sources was implemented at the CSN, and the Council collaborated with the Ministry of Industry, Tourism and Trade in the definition and performance of an orphan source recovery campaign, which is scheduled for performance during 2007 and 2008.

Continuing with the practice of distributing operating experience and the lessons learned from significant incidents among the facilities, a circular has been sent to the radiological protection services of hospitals and radiotherapy installations dealing with the overexposure accident affecting radiotherapy patients that occurred between May 2004 and August 2005 at the Epinal Hospital in France. Attached to the circular was the report on the accident drawn up by the French authorities.

Furthermore, in 2007 the CSN promoted the creation of a radiological protection forum at industrial radioactive facilities, aimed at facilitating meetings between the professional and business organisations in the sector with a view to promoting improvements in safety and radiological protection at these installations, especially in the field of industrial radiology.

2.5. Transport of nuclear and radioactive materials

In 2007 the CSN issued decisions on two authorisations for transport *under special conditions* (transport approved by the competent authority and allowing for expeditions not fulfilling all the requirements established in the regulations) of sources of Cobalt-60 from the dismantling of medical radiotherapy units.

Furthermore, two security authorisations were issued for the transport of nuclear materials and two resolutions establishing the coverage of nuclear risk in the transport of nuclear substances.

Also issued was approval for a national package and the validation of eight approval certificates for packages from overseas.

The control of transport is accomplished by inspecting a significant sample of the highest risk transport operations. In performing this function the CSN is supported through collaboration by the autonomous communities that have function assignment agreements in place. Throughout 2007 a total 67 inspections were carried out on transport activities. Furthermore, the scope of the inspections performed at radioactive facilities includes specific checks relating to transport, such as the reception of radioactive material and the dispatching of wastes.

Control by inspection is completed with the reception and analysis of the notifications required by the CSN for the transport of fissile materials, high level radioactive sources and waste, as well as of the subsequent performance reports in the case of fissile materials. During 2007 the notifications and performance reports corresponding to 58 dispatches of fissile material were received and analysed, along with those corresponding to 152 radioactive waste transport operations carried out by Enresa, 100 from nuclear facilities and 52 from other installations.

There were two incidents in the transport of radioactive material in 2007, both being road accidents in the transport of radioactive material for medical applications. The emergency measures adopted were adequate; in neither case were there radiological consequences for people or the environment and the radioactive packages were finally transferred to the initially foreseen addressees.

A third incident was related to the detection of cracks in certain interior drums of several packages containing uranium oxide on reception at the Juzbado fuel assembly manufacturing facility. The transport was from FBFC (France) and the analysis of the event led to the adoption of corrective measures by the dispatching French installation. No damage was detected to the external packaging and there was no release of radioactive material, as a result of which the event did not imply any radiological risk during transport.

2.6. Manufacturing of radioactive equipment and exemptions

During 2007 the CSN issued one authorisation decision regarding the manufacturing of radioactive equipment and 29 for the type approval of radioactive apparatus.

2.7. Activities and facilities not regulated by the nuclear legislation

Transfers to Enresa

During 2007 the CSN drew up 34 reports for the authorisation of transfers to Enresa of various radioactive materials and sources. In 13 of these cases the requesting company or entity did not have radioactive facilities and in the rest the requesters were the licensees of facilities, the request referring to non-authorised materials.

Removals of radioactive material detected in metallic materials

During 2007, and as a result of the application of the *Protocol on collaboration in the radiological surveillance of metallic materials*, the CSN received 134 reports on the detection of radioactivity in metallic materials. The radioactive sources detected, which included indicators with radioluminescent paint, ion smoke detectors, radioactive lightning rods, pieces of uranium, products containing radium and thorium and contaminated parts, were transferred to Enresa for management as radioactive waste.

Particularly significant in 2007 was the detection of radioactive material at the installations of the Sidenor Industrial factory in Reinosa (Cantabria). The analysis of this event concluded that a source of Cesium-137 had been smelted. The recovery activities performed allowed the facility to return to normal operation in two days and 26,810 kg of radioactive waste was generated, these being sent to the El Cabril disposal facility in two transport operations. The incident had no radiological consequences for the workers, the public or the environment.

As of the end of 2007, 129 metallurgical facilities had subscribed to the protocol.

2.8. Service entities

This section encompasses those companies or entities that are subject to nuclear regulation and render services to third parties in the field of radiological protection. These include radiological protection services (RPS), radiological protection technical units (RPTU), companies selling and providing technical assistance for medical X-ray equipment, personal dosimetry services (PDS) and registered external companies.

The following activities were particularly significant during 2007:

- The CSN authorised two new radiological protection services and modified the authorisations of two others, in all cases at hospitals belonging to the public health service. The Council also authorised a new Radiological Protection Technical Unit and modified the authorisations of three others, filing one request.

  26 inspections were performed at radiological protection services and 23 at radiological protection technical units, in collaboration with the autonomous communities with functions assignment agreements.

  At present 68 radiological protection services and 47 radiological protection technical units are authorised; of the latter 26 render services exclusively in the field of radiodiagnosis facilities.

- The CSN issued authorisation reports for 13 new sales and technical assistance companies, the modification of authorisations for nine and the decommissioning of seven, and filed one request.

- The extension of two personal dosimetry services was authorised, one internal and the other external, and the set of conditions applicable to the 23 authorised external personal dosimetry services was updated. Likewise, six control inspections and one licensing inspection were performed.

  The results obtained from the 4th Personal Dosimetry Services Intercomparison Campaign were presented to the 21 participants and technical instructions requiring corrective actions were sent to those PDS that so required.

- As of December 31st 2007, a total 974 companies were included on the register of external companies, the vast majority carrying out their activities in relation to nuclear power plants. The scope of the inspections performed at

plants during refuelling outages included checking for compliance with the obligations of these companies.

2.9. Personnel licences

As of December 31st 2007, the number of licensed workers amounted to 8,763 and 167 workers held the diploma for heads of radiological protection services. Furthermore, 38,587 workers have CSN accreditation for the management of medical radiodiagnosis facilities and 53,453 for their operation.

During 2007 the CSN granted the following licences:

- At nuclear power plants: nine supervisor licences, 14 operator licences, two head of radiological protection service licences and the extension of 46 operator licences and 40 supervisor licences.
- At fuel cycle and storage facilities and installations in the dismantling phase: four supervisor licences, six operator licences and the extension of 14 supervisor licences and 24 operator licences.
- At radioactive facilities: 388 new supervisor licences, 1,038 operator licences and three for the heads of radiological protection services, along with the extension of 352 supervisor licences and 728 operator licences.
- At medical radiodiagnosis facilities: 1,598 management accreditations and 2,343 for operation.

As regards courses to obtain licences and accreditations, the CSN homologated two new courses and authorised the modification of ten others that were previously homologated for radioactive facilities, also granting the homologation of three new courses for X-ray facilities.

The control of course delivery and of the corresponding examinations gave rise to the performance of 136 inspections.

During 2007, with the purpose of facilitating the delivery of the aforementioned courses, and consequently the training of the workers, the CSN developed educational materials for all the fields of application at radioactive and radiodiagnosis facilities, making these materials available to any user via the organisation's website.

2.10. Other regulated activities

As of December 31st, 28 companies were authorised for the activities included under title VII of the Regulation on Nuclear and Radioactive Facilities, in relation to the following activities:

- Deliberate addition of radioactive substances in the production of consumer goods.
- Import, export, commercialisation and transfer of radioactive materials, radiation generating equipment and consumer goods incorporating radioactive substances.
- Technical assistance for radioactive apparatus and radiation generating equipment, as long as these are not required to be authorised as radioactive facilities.

During 2007 reports were issued regarding 10 new authorisations for the performance of these activities, along the modification of 11 previously granted authorisations.

3. Radiological protection of the workers, the public and the environment

3.1. Radiological protection of the workers

The number of workers professionally exposed to ionising radiations and dosimetrically controlled in Spain in 2007 amounted to 98,539. The collective dose of the workers overall was 31,741 mSv.person. This value does not include the administrative dose assigned in the event of the dosimeter not being changed monthly. Considering only significant doses and excluding cases of the annual limit potentially being exceeded, the average individual dose of these workers amounted to 0.95 mSv/year.

Of the dosimetrically controlled workers, 99.09% received doses lower than 6 mSv/year, and 99.94% doses lower than 20 mSv/year.

On closure of the 2007 dosimetry year, the National Dosimetry Bank registered a total of approximately 13,608,000 dosimetry measurements, corresponding to some 262,000 workers and 45,100 facilities. Each of these measurements includes associated information on the type of facility and the type of work performed by the worker.

Throughout 2007 the CSN distributed a total 4,302 radiological logs for the workers of 201 companies.

This year the nuclear electric sector presented the highest average individual dose values, with 2.80 mSv/year, the contractor personnel showing the highest values, 3.05 mSv/year.

In assessing these results, consideration should be given to the following:

Table 5. Doses received by professionally exposed workers in each of the sectors considered in the annual report for 2007

Facilities	Workers	Collective dose (mSv.person)	Average individual dose (mSv/year)*
Nuclear Power Plants	8,152	11,620	2.80
Fuel cycle facilities and waste storage facilities and research centres (Ciemat)	1,197	81	0.46
Radioactive facilities			
Medical	77,442	16,555	0.67
Industrial	7,259	2,700	0.94
Research	4,912	561	0.36
Facilities in dismantling and decommissioning phase	5	0	0
Transport	108	224	2.70

(*) The calculation of the average individual dose considers only those workers that have had dosimetry readings above the background.

a) Pressurised water reactor (PWR) plants:

During the three-year period 2005-2007, a slight increase may be observed in the average collective dose per reactor, this being due to the fact that most of the nuclear power plants using this technology had refuelling outages, this being the case for Ascó I and II, Almaraz II, Trillo and Vandellós II.

Despite this, the Spanish PWR plants continue to show occupational dose values below those of the plants in other countries in our technological environment.

b) Boiling water reactor (BWR) plants:

Considering the average collective doses per reactor for the three-year period 2005-2007, it may be observed that there was an increase with respect to the previous such period, this being due fundamentally to the repairs performed on the piping of the CRDH system performed during the refuelling outage at Cofrentes nuclear power plant (6,948.51 mSv.person).

The average individual dose for professionally exposed workers involved in transport activities (2.70 mSv/year) shows practically the value as that obtained the previous year. The collective dose has increased, but so has the number of workers classified as exposed in this sector of activity.

The increase in the collective dose is due to an increase in the road transport of radiopharmaceutical products, in particular the transport of products labelled with Fluor-18 for use at PET medical diagnosis centres, which have increased in recent years.

During 2007 there were four cases of the annual regulatory dose limits for workers being exceeded, one at an industrial facility and three at medical installations, these being indicated by the readings from the dosimeters carried. In addition there were 35 workers who were assigned administrative doses above one of the limits established in the legislation in force as a result of deficient dosimetry management. The CSN has required the facilities involved to take the actions necessary to ensure adequate dosimetry management.

3.2. Control of releases and environmental radiological surveillance

The radioactive releases from the facilities during 2007 remained within the habitual values and are comparable to those of other European and American installations. As in previous years, the doses calculated during 2007 are far below the 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 3.7%.

In the case of Ciemat, an effective dose limit of 0.1 mSv/year has been established, this being applicable to the overall liquid and gaseous radioactive effluents released to the environment as a result of the improvement tasks performed within the framework of the Pimic project. This limit is additional to that existing for liquid radioactive effluents, established in terms of activity concentration.

During 2007, 8,238 samples were taken from around the nuclear power plants within the framework of the environmental radiological surveillance programmes (PVRA), 1,900 from around fuel cycle facilities and 1,012 in the vicinity of installations in the shutdown, dismantling and decommissioning phases.

As regards the results of the PVRA's, this report refers to those corresponding to the year 2006. This delay is due to the fact that the processing and analysis of the samples do not allow the results of

Table 6. Radioactive effluent release limits. 2007

	Limits	Release	Variable	Value
Nuclear power plants	Operational restrictions	Total	Effective dose	0.1 mSv/y
		Gases	Effective dose	0.08 mSv/y (1)
		Liquids	Effective dose	0.02 mSv/y (1)
El Cabril	Dose limit	Gases (2)	Effective dose	0.01 mSv/y
Ciemat	Instantaneous limits	Liquids	Concentration of activity of each isotope	1/10 RPHIR (3)
			Concentration of activity of unknown mixture	1.1 kBq/m^3
	Dose limit (4)	Total	Effective dose	0.1 mSv/y
Juzbado	Dose limit	Total	Effective dose	0.1 mSv/y
Quercus	Increase at river bottom	Liquids	Concentration of activity of Ra-226	3.75 Bq/m^3
	Annual limit	Liquids	Activity of Ra-226	1.64 GBq/y
	Annual limit	Gases	Average concentration mineral powder	15 mg/m^3
	Annual limit	Gases	Average concentration concentrate powder	5 mg/m^3
	Dose limit	Total	Effective dose	0.3 mSv/y

(1) Generic values, the share between liquids and gases is different at some facilities
(2) Zero releases for liquids
(3) Concentration values deriving from the effective dose limit for the public of the regulation on the protection of health against ionising radiations (RPHIR)
(4) Appplicable to overall liquid and gaseous radioactive effluents generated by the improvement tasks performed within the framework of the PIMIC project

the annual campaigns to become available until the second quarter of the following year.

The results of the PVRA for 2006 are similar to those of previous years and the environmental quality in the vicinity of the facilities remains in acceptable conditions from the radiological point of view.

The independent environmental radiological surveillance programmes (PVRAIN's) performed by the CSN for contrasting with the PVRA did not show any significant variations with respect to the latter. The volume of determinations of the PVRAIN's represents 5% of those of the corresponding PVRA's and in the case of Catalonia and Valencia are performed by the autonomous community itself.

The CSN also controlled the environmental radiological quality of the entire national territory through its metering networks: the automatic stations network (REA), which continuously measures the presence of radiation in the atmosphere, and the sampling stations network (REM) (spaced network and dense network), made up of a series of laboratories, which analyses samples of water from rivers and coasts, the atmosphere and the terrestrial medium. The values are similar to those of previous years and reflect a correct radiological status.

Table 7. Exposure routes considered in the environmental radiological surveillance networks system

Types of routes	Types of samples		
	PVRA	REM	REA
Transient	Air:	Air:	Air:
	Powder particles	Powder particles	Powder particles
	Airborne iodine	Airborne iodine	Airborne iodine
	H-3 in water vapour		Radon
	C-14		
	Rainwater:		
	Wet and/or dry deposit		
	Surface water	Surface water	
	Drinking water (origin on surface)	Drinking water (origin on surface)	
	Direct radiation:		Direct radiation:
	Dose rate		Dose rate
Integrating	Soil	Soil	
	Bottom sediments and beach sand		
	Drinking water (underground origin)	Drinking water (underground origin)	
	Foodstuffs:	Foodstuffs:	
	Vegetables	Milk	
	Milk	Type diet	
	Meat		
Integrating and cumulative	Indicating organisms		
	Fish, shellfish		

Campaigns for the intercomparison of analytical results obtained in the laboratory from low activity measurements

With a view to guaranteeing the homogeneity and reliability of the results obtained from the different environmental radiological surveillance programmes, and given that some 30 different laboratories participate in their performance, the CSN carries out periodic intercomparison exercises and promotes the standardisation of the procedures applied during the different stages of the process of measuring environmental radioactivity.

During the two-year period 2007-2008 a campaign for the measurement of environmental radiation levels is being performed using thermoluminescent dosimeters, with the participation of eight national laboratories and one overseas laboratory.

Also in 2007, four procedures were published in the Environmental Radiological Surveillance Series of the CSN Technical Reports collection.

Specific radiological surveillance programme in the Palomares area

The organisation responsible for this programme is Ciemat, which reports to the Nuclear Safety Council. The results of the surveillance programme carried out on persons indicate that the accident has had no effects on the health of the inhabitants of the Palomares area.

In 2006 and 2007, within the framework of the Palomares Radiological Surveillance Plan

commissioned to Ciemat, the radiological characterisation of the extended surface area around Palomares was updated, this finally covering an area of approximately 660 Ha.

In view of the radiological information available and taking into account economic, social and urban planning factors, along with the Research Plan approved by the Ministers' Cabinet in 2004, Ciemat submitted to the CSN a proposal for the temporary occupation of areas bordering those expropriated in 2005. During its Plenary meeting of July 24th 2007, the Board of Commissioners reported favourably on this proposal.

During its meeting of September 28th 2007, the Ministers' Cabinet agreed to extend the *Energy-related and environmental research plan on the radiological surveillance of land in Palomares*, through the temporary occupation of 30 Ha of land residually affected by contamination with a view to undertaking the environmental recovery of this land.

Specific radiological surveillance programme at the Inert Materials Recovery Centre (CRI-9) located in the Marismas de Mendaña

A radiological surveillance programme is in place at the Inert Materials Recovery Centre (CRI-9) located in the Marismas de Mendaña in the province of Huelva as a result of the accidental contamination that occurred at the facility because of the smelting of a source of Cesium-137 at the Acerinox plant in 1998.

During 2007 it became evident that there was a lack of efficiency in confining the contaminated materials, for which reason the CSN proposed to the Directorate General for Energy Policy and Mines that a new resolution be issued requiring the licensee of the centre to undertake a series of actions aimed at ensuring a suitable level of long-term radiological protection for the population and the environment.

3.3. Protection against natural radiation sources

In application of the plan drawn up by the CSN for the development and application of the provisions of title VII of the *Regulation on the protection of health against ionising radiations*, criteria were proposed during 2007 with regard to the following aspects of work activities to be studied:

- Content of the studies to be performed.
- Workers dose values that if exceeded would require the establishment of exposure surveillance means or the application of corrective actions.
- Concentrations of radon in the work place and home that would require the adoption of corrective measures or means of surveillance.
- Criteria on the total or partial application of the titles of the RPHIR quoted in title VII, once the results of the studies demonstrated that the dose levels established had been exceeded.
- Actions relating to the control of waste management.

The pilot projects relating to the manufacturing of phosphoric acid and fertilisers, the manufacturing of titanium dioxide pigments and ceramic industries using zirconium sands were completed during 2007, while those relating to coal-fired thermal power plants continued.

The project on the measurement of radon gas in homes in Galicia continues, while the project for the study of the feasibility and effectiveness of different remedial actions in response to the presence of radon gas in already completed buildings has now been finished. Also in the province of Galicia, performance of the project on the content of natural isotopes, among them Radon-222, in waters for public use continues.

Furthermore, there have been talks with the Ministry of Housing and its advisory bodies with a view to including requirements on protection against radon in the Technical Building Code.

In addition to generic aspects of the control of exposures due to natural radiation, the CSN participates in specific activities in response to requests from various authorities. In 2007 various issues were assessed for the Regional Government of Catalonia in relation to the actions taken to remove deposits of sludges contaminated with natural radioisotopes from the Flix reservoir, these arising as a result of the manufacturing of bicalcium phosphate.

In relation to deposits originating in the phosphorite industry, the Government of the Region of Murcia was advised in relation to the recovery of the area known as El Hondón in Cartagena.

Finally, a study requested by the Ministry of Industry, Tourism and Trade on radiological protection measures in operation of the oil rig located off the coast of Tarragona is on-going and will be completed during 2008.

3.4. Epidemiological study

Work continues on the joint performance by the CSN and the Instituto de Salud Carlos III of the epidemiological study on the eventual impact of radiations emitted by nuclear facilities on the health of the population in surrounding areas, this having been requested by Congress through a bill issued on December 9th 2005.

During 2007 the CSN estimated the dose to the population due to releases and to natural radiation in areas located within 30 km of the Spanish nuclear power plants. In addition, it undertook estimation of the doses due to natural radiation in selected municipal areas located between 50 and 100 km from the Santa María de Garoña, Almaraz, Trillo, José Cabrera, Vandellós II, Ascó and Cofrentes nuclear power plants.

3.5. Radioactive waste

Management of irradiated fuel and high level waste

The number of irradiated fuel assemblies stored as of December 31st 2007 in the pools of the Spanish operating nuclear power plants, and in the dry storage cask facility at the Trillo plant, amounted to 11,249. Of these, 5,076 are assemblies from the Santa María de Garoña and Cofrentes boiling water reactor (BWR) plants and 6,173 are from pressurised water reactor (PWR) plants. This quantity includes 294 assemblies from the Trillo nuclear power plant stored in 14 Ensa-DPT casks located at the plant's individualised temporary storage (ATI) facility. The inventory of irradiated fuel and the situation of the storage facilities of the nuclear power plants are shown in table 8.

The following activities were particularly significant in 2007:

- Favourable report on the *Quality assurance system for the HI-STORM dry fuel storage system* of the José Cabrera nuclear power plant.
- Performance of three inspections on the process of manufacturing the HI-STORM-100Z system at the Ensa facilities (Santander), covering structural, thermal and quality assurance aspects. The CSN also attended a pre-operational test on the welding and sealing of the MPC-32Z multi-purpose fuel canister.
- Control of the inventory of spent fuel and other stored components and control of the operating conditions of the nuclear power plant fuel storage pools and the individual temporary storage (ATI) facility for casks at the Trillo plant.
- Tracking and control of the manufacturing of Ensa-DPT type metallic casks.

Table 8. Inventory of irradiated fuel stored in the pools and dry storage casks at the Spanish nuclear power plants and situation of the corresponding storage facilities as of the end of 2007

Nuclear Plant	Total capacity	Reserve in core	Effective capacity	Occupied capacity	Free capacity	Degree of occupation	Year of saturation
	Number of irradiated fuel assemblies					%[1]	
José Cabrera (p)	548	NA[3]	548	377	171	68.80	[3]
Sta. Mª de Garoña (p)	2,609	400	2,209	1,860	349	84.20	2015
Almaraz I (p)	1,804	157	1,647	1,076	571	65.33	2021
Almaraz II (p)	1,804	157	1,647	1,068	579	64.85	2022
Ascó I (p)	1,421	157	1,264	1,036	228	81.96	2013
Ascó II (p)	1,421	157	1,264	952	312	75.32	2015
Cofrentes (p)	4,186	624	3,562	3,216	346	90.29	2009[4]
Vandellós II (p)	1,594	157	1,437	840	597	58.46	2020
Trillo (p)	805	177	628	530	98	84.39	2040[5]
ATI[2] of Trillo (c)	1,680		1,680	294	1,386	17.50	
Total	17,872	2,055	15,817	11,249	4,568	71.12	

(p) piscina
(c) casks
1 The degree of occupation refers in all cases to effective capacity.
2 Individual Temporary Storage.
3 The plant has been definitively shut down since April 2006. The fuel from the last core has been unloaded to the pool. The hypothetical year of saturation of the fuel pool would have been 2015.
4 Year of saturation with respect to the current situation, bearing in mind that re-racking has been performed in the west pool but not in the east pool, which might provide an additional margin for a few years.
5 No pool saturation problem is posed since the plant has an ITS facility.

Low and intermediate level waste management

In 2007 the operating nuclear power plants generated solid low and intermediate level wastes with an estimated activity of 83,380.83 GBq, conditioned in 3,858 220-litre drums.

In 2007 the El Cabril facility received 3,581 waste packages or containment units, plus 29 samples of low and intermediate level radioactive wastes:

- 1,872 packages and 29 samples from nuclear facilities.
- 1,669 packages from radioactive facilities.
- 40 packages arising from incidents.

The CSN continued to perform the activities indicated below, which were supported by the performance of eight specific inspections:

- Suppervision and control of the treatment, conditioning and temporary storage systems for wastes generated at the nuclear power plants.
- Control and tracking of the inventory of solid radioactive wastes stored at the facilities.
- Control of the processes for the acceptance of each type package.

Finally, and in relation to very low level waste the CSN has maintained its surveillance over the management of uranium concentrate plant steriles, the restoration of disused uranium mines and the removal of contaminated metallic materials and lightning rods, of which 114 were removed in 2007.

3.6. Emergencies and security

3.6.1. Emergencies

In addition to its regulatory function, aimed at ensuring the capacity and preparedness of the licensees of nuclear and radioactive facilities to address emergencies, the CSN is part of the national emergency response system in all areas relating to nuclear safety and radiological protection.

Participation in the national emergency response system

The CSN coordinates and collaborates with the other participants in the national emergency response system, providing them with its available resources, specifically its Emergency Response Organisation (ERO) and emergencies room (Salem). The interaction with other administrations is especially intense in the case of the Directorate General for Civil Defence and Emergencies and of the delegations and sub-delegations of the Government, and also includes the Military Emergency Unit (UME) and the autonomous communities.

The following activities were particularly significant in this area during 2007:

- The signing on October 25th 2007 of a framework collaboration agreement between the CSN and the Ministry of the Interior and of two specific agreements, one on security and the other on planning, and preparation for and response to nuclear or radiological emergency situations. The scope of this latter agreement includes, among other things, the drawing up of standards, the implementation and maintenance of nuclear and radiological emergency plans, the provision, improvement and maintenance of equipment, public information, the initial and on-going training of those required to intervene, exercises and drills, the joint operation of the Radioactivity Alert Network (RAR) and compliance with international commitments.

- The CSN reported on the action plans of the radiological groups within the provincial nuclear emergency plans, the Penta (Tarragona), Penva (Valencia) and Pengua (Guadalajara).

- The agreement with Ciemat for the performance of environmental radiological measurements in the event of a nuclear emergency was renewed.

- The CSN has participated with the Guardia Civil in various exercises including the deployment of a mobile classification and decontamination station (CDS) in the areas surrounding the José Cabrera, Trillo, Almaraz, Garoña and Cofrentes nuclear power plants.

- Agreements were signed for the assignment of radiometric equipment use between the CSN and the directors of the Penta (Tarragona) and Penbu (Burgos) external nuclear emergency plans, this implying the technological modernisation of the dosimetry system of those involved in these two plans.

- During 2007 the CSN has collaborated with the UME, providing advisory services on the training of participants and on radiometric instrumentation and participating in the design and preparation of the CPX 08 exercise, which covers the territories of several autonomous communities and involved Cofrentes nuclear power plant.

CSN capabilities and actions

The CSN has maintained and improved its response capacity in the event of a nuclear or radiological emergency. During 2007 the following aspects were particularly significant in this field:

- The Salem was kept operative permanently (24 hours a day, every day of the year).

- The permanent intervention capacity by means of local emergency support technicians was maintained. This service is provided by a company specialising in radiological protection (authorised by the CSN), providing operative immediate response teams for action within the framework of the off-site nuclear emergency plans and for radiological emergencies throughout the entire country.

- Availability of the mobile environmental radiological surveillance units of Ciemat and the Regional Government of Extremadura, for the performance of environmental contamination and radiation measurements in areas potentially affected by a nuclear or radiological emergency at any point throughout the country.

- Availability of a mobile internal personal dosimetry service, including two whole-body counters for the measurement of internal doses in persons potentially contaminated as a result of a nuclear or radiological emergency at any point throughout the country.

- During 2007 the supply to the CSN, initiated in 2005, of 3,000 electronic direct reading dosimeters (DRD's), 20 reading units and the corresponding management software was completed. During the last quarter of 2007, 570 DRD's and five reading units were distributed within the framework of the Penta plan.

- During 2007 the nuclear power plants and facilities carried out the obligatory site emergency drills contemplated in their respective site emergency plans (SEP's) under the supervision of the CSN and with the subsequent activation of the Salem. The CSN also participated in three European Union Ecurie exercises, two at level 1 and one at level 3, and in three international exercises with the International Atomic Energy Agency.

Incidents

During 2007 the CSN's ERO was activated on two occasions as a result of the following events:

- On May 24th, as a result of a demonstration in the vicinity of Almaraz nuclear power plant, for tracking in coordination with the Operations Coordination Centre of the Government Sub-delegation in Cáceres. The event did not represent a risk for plant safety at any moment.

- On August 2nd, ERO response mode 1 was declared as a result of a fire in one of the phases of the main transformer at Cofrentes nuclear power plant. This fire led to the activation of the facility's site emergency plan in category I, emergency pre-alert.

Furthermore, given its operability and communications capacity, the Salem has been the entr4ance route for most of the reports on events and incidents, at both nuclear and radioactive facilities and in transport. Of the latter, 25 were received throughout 2007.

3.6.2. Security of nuclear materials and facilities

During 2007 the CSN carried out the following activities, among others:

- On October 25th 2007 a specific collaboration agreement was signed with the Secretary of State for Security on the security of nuclear and radioactive facilities, activities and materials, within a framework collaboration agreement between the CSN and the Ministry of the Interior on emergency management and security.

- The first *National course on the security of radioactive sources* was organised with the Security Office of the International Atomic Energy Agency. In addition to CSN staff, civil servants from the Ministry of the Interior and the Ministry of Industry, Tourism and Trade attended this course.

- The security systems of the Almaraz, Santa María de Garoña, José Cabrera, Ascó, Trillo, Cofrentes and Vandellós II nuclear power plants, the El Cabril disposal facility and the Juzbado fuel assembly manufacturing facility were inspected. The inspections were carried out by a team made up of inspectors from the CSN, the General Public Security Branch and Protection and Security Service (Seprose) of the General Directorate of the Police and the Guardia Civil.

4. Public information and external relations

4.1. Public information and communication

The CSN uses all means available to it to respond objectively and transparently to demands for information. The modifications introduced through the new Law 33/2007 have a very special impact on public information and communication, as an instrument to improve the credibility of the CSN and the trust placed in it by society.

The following activities were particularly significant in 2007:

- Minutes of the meetings of the Board of Commissioners: publication on the corporate website of the minutes of the 38 plenary sessions held during the year.
- Inspection reports: publication on the corporate website of the reports on inspections performed.
- Pubic information: replies to the 711 external queries received via the CSN website and to the 350 requests for publications made by e-mail via the address peticiones@csn.es.
- Regional and local information: revitalisation of the local information commissions (CLI's), promoted by the Association of Municipal Areas with Nuclear Power Plants (AMAC) in order to inform the public and interested groups in the vicinity of the Spanish nuclear power plants.
- Information for the media: issuing of 128 informative bulletins, publication of 76 reportable event bulletins on the website and replies to more than 300 requests for information.
- Information Centre: 297 visits, with a total number of 6,334 visitors during the year.
- Publications: publishing of a total 37 documents (34,000 copies), reissuing of 15 publications (47,400 copies). Distribution of 66,492 technical and informative publications and distribution of 20,304 copies among visitors to the Information Centre.
- Website: updating and reorganisation of the CSN website in order to facilitate access to the information. During the year the website received 271,000 visits.
- Conferences and working sessions: organisation of six subject-specific conferences on issues of special relevance and of the working session *The CSN and environmental radiological surveillance*, within the framework of the collaboration agreement with the Ministry of Education and Science.
- Participation in congresses, trade fairs and exhibitions: the CSN was present at the 8th Madrid for Science Fair, the 16th National Congress on Medical Physics, the 11th National Congress of the Spanish Radiological Protection Society and the fair Fisalud 2007 with a publications stand.

4.2. Institutional relations

The relations between the CSN and the State, Autonomous Communities and local political institutions are aimed both at collaboration and cooperation in shared or converging areas of competence and at facilitating knowledge and control of the activities performed.

The following activities were particularly significant in 2007:

Parliament

- Annual report: submittal to the Congress and the Senate of the CSN annual report for 2006.

- Appearances: the CSN technical directors of nuclear safety and radiological protection appeared before the Commission for Industry, Tourism and Trade on October 2nd 2007 and the President of the CSN appeared before this same commission on November 21st 2007, in both cases in relation to the Annual Report for 2006.

- Resolutions of Congress: 12 reports were submitted to Congress in response to resolutions by the Commission for Industry, Tourism and Trade.

- Parliamentary questions: replies to 11 parliamentary questions posed by political groups of the Congress and Senate.

- CSN Instructions: communication to Congress, prior to approval, of two projects for CSN instructions.

Central administration

- Ministry of Industry, Tourism and Trade: participation in the 6th and 7th meetings of the Interministerial Commission on the Centralised Temporary Storage (ATC) facility and Associated Technology Centre (January 22nd and February 26th), participation in the meetings of the Technology Panel for R&D on Nuclear Energy (Ceiden) and the annual meeting with representatives of autonomous communities with assigned functions and services in relation to 2nd and 3rd category radioactive facilities (March 21st).

- Ministry of the Interior: signing of a framework collaboration agreement and two specific agreements regarding emergency management and security (October 25th).

- Ministry of Education and Science: signing of an addenda to the agreement of April 23rd 2003 on the training of secondary school teachers (July 16th).

- Ministry of Health and Consumer Affairs: institutional meeting between the Minister of Health and Consumer and the President of the CSN (April 17th) and meetings between the Mixed Coordination Commission and the Instituto de Salud Carlos III on the Epidemiological Study (February 7th, June 12th and September 10th).

Autonomous community administrations

- Assignment agreements: signing of the entry into force of the functions assignment agreement with the Region of Murcia (September 13th) and subsequent agreement regarding the termination of the period of trusteeship in the exercising of the functions assigned (December 27th), meeting of the mixed commissions for follow-up of the assignment agreements with the autonomous communities of Asturias, the Balearic Islands, the Basque Country, Catalonia, Galicia, Navarra and Valencia, and holding of the annual coordination meeting with the accredited inspectors in autonomous communities having function assignment agreements (November 15th).

Local administrations

- Association of Municipal Areas with Nuclear Power Plants (AMAC): two meetings between the Council and the Management Board of AMAC, signing of a specific collaboration agreement (October 16th) on communication and training activities in areas housing nuclear power plants and drawing up of a study on the direct impact of public opinion in such areas.

- Local information commissions: participation in the meetings of the local information commissions of Santa María de Garoña (March 8th and December 11th), José Cabrera (March 26th), Ascó (September 18th) and Vandellós (September 18th and November 27th), meeting with the presidents of the local information commissions (December 10th) to draw up the schedule of activities for 2008.

Social entities, organisations and groups

- Unesa: restructuring of the liaison committee in order to provide a form for dialogue for the adequate exchange of information at the highest level, the coordination of initiatives and activities of mutual interest and the driving of generic improvements deriving from technological and legislative progress at international level.

- Enresa: constitution of the liaison committee with Enresa (March 1st), the work of which provides coverage for the CSN's collaboration in the national campaign for the recovery of orphan sources, organised by the Ministry of Industry, Tourism and Trade and Enresa, and holding of two meetings (June 26th and July 11th).

- Ciemat: updating of the specific agreement for the performance of environmental radiological measurements in the event of an emergency.

- Universities: co-organisation of the meeting *Electricity: guaranteed supply, sustainability and safety* (July 2nd to 4th) within the framework of the summer courses of the Menéndez Pelayo International University.

- Greenpeace: submittal of reports relating to the operating permit for the Santa María de Garoña nuclear power plant, to various issues regarding Cofrentes nuclear power plant, to the event that occurred at the Juzbado fuel manufacturing facility on October 3rd 2007 and to activities undertaken at the Inert Waste Centre (CRI-9) of Marismas de Mendaña. Likewise, a meeting was held with leaders of Greenpeace on January 31st.

- Ecologistas en Acción: submittal of reports on the cooling systems of Vandellós II nuclear power plant.

- Asociación Mesa de la Ría de Huelva: submittal of reports on the activities undertaken at the Inert Waste Centre (CRI-9) of Marismas de Mendaña.

- Spanish Radiological Protection Society: collaboration in the working session on *Radiological protection in 2006* (March 27th), the 11th Congress of the SRPS (September 18th to 23rd) and the meeting of the Permanent Forum on Radiological Protection in the hospital environment (April 14th).

Subsidies

Pursuant to the General Subsidies Act, Law 38/2003, of December 17th, and by means of a Resolution on April 13th 2007, the CSN launched an invitation for applications for assistance for the performance in 2007 of training, information and communication activities relating to nuclear safety and radiological protection. This initiative had a budget of 60,000 Euros, of which as total 53,000 were assigned.

4.3. International relations

International relations play a major role in compliance with the functions assigned to the CSN by the legal system, functions that have been extended with the approval of Law 33/2007 reforming Law 15/1980 by which the organisation was created.

The following activities warrant special mention among those performed in 2007:

European Union

- Participation of the President of the CSN in the High Level Group on nuclear safety and radioactive waste management, set up in 2007 to promote the harmonisation of activities relating to nuclear safety and waste management among the Member States.

- CSN participation in the project for assistance to the Ukrainian Regulatory Body for the

training of emergency response personnel and the development of standards.

- Attendance of a representation of the CSN at the first meeting of the European Nuclear Energy Forum.

International Atomic Energy Agency (IAEA)

- Contribution of 498,000 Euros for assistance projects relating to nuclear safety and radiological protection issues, especially in Latin America and North Africa.

- Attendance at 57 events relating to the IAEA and presence at the CSN of IAEA sponsored scientific and scholarship visits from other countries.

- Preparation, coordination and organisation of the Integrated Regulatory Review Service (IRRS) mission, scheduled for the beginning of 2008.

- CSN commitment at the 51st General Conference of the IAEA to organise an international conference on the control of scrap, an international workshop to present the results of the IRRS mission and proposal for the creation of a Mediterranean forum on safety, and to provide assistance to the countries of North Africa.

Nuclear Energy Agency (NEA-OECD)

- Participation in 14 research projects promoted by the NEA, financially and through attendance by CSN technicians, and promotion of an international project known as the *Zorita Internals Research Project (ZIRP*), for recovery of part of the materials of the reactor vessel internals from the José Cabrera nuclear power plant for assessment of the degradation of their characteristics as a result of the conditions to which they have been subjected.

- Participation in 49 committee and working group meetings.

- Attendance at the 50th anniversary of the Committee on Radiological Protection and Public Health (CRPPH).

Other regulatory groups

- International Nuclear Regulators Associations (INRA): in 2007 Spain exercised the presidency of INRA and the responsibles for the different regulatory bodies met in Madrid in May and in Córdoba in October. Among other issues, these meetings included debate on the new international nuclear industry scenario and associated problems, the need to improve the safety culture and the use of lessons learned, and issues relating to radioactive waste management and the importance of adopting a common approach with a view to best achieving objectives during the fourth review meeting of the Convention on Nuclear Safety.

- Western European Nuclear Regulators Association (WENRA): participation in the two plenary meetings held in 2007, which included a revision of the methodology for the harmonisation of safety at the nuclear facilities of the member countries and analysis of the evolution of the action plans of the different countries to achieve the reference levels established by WENRA for nuclear power plants, temporary irradiated fuel storage facilities and the dismantling of nuclear facilities. The CSN also participated in the activities of the different working groups.

- Latin American Forum of Radiological and Nuclear Regulators (FORO): during 2007 the President of the CSN attended the meeting of the Plenary, held in Cancún (Mexico) in the month of June; representation of the CSN at the meetings of the executive technical committee held during the year; and organisation of a technical workshop on nuclear safety at the CSN headquarters, this being the first activity of the FORO in this area.

International conventions

- Convention on Nuclear Safety: coordination of preparation of the 4th National Report, sent to Vienna in September 2007, and attendance at the organisation meetings for analysis of the conclusions of previous review meetings and the coordination of possible improvements in the development of the fourth review meeting, scheduled for April 2008.

- Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management: initiation of work on the drawing up of the 3rd National Report, preparatory meeting for the preparation of the next report, including debate on the usefulness of the IAEA standard as a reference for the preparation of national reports and the drawing up of a draft report possibly serving as a guideline for countries with little experience in this Convention.

Bilateral relations

- Nuclear Regulatory Commission – *NRC* (United States): renewal of the specific collaboration agreement on R&D for the period 2006-2011; visits by members of the CSN technical staff to their counterparts at the NRC, as part of the development and implementation of the new Integrated Plant Supervision system (SISC), based on the NRC's *Reactor Oversight Process (ROP);* attendance at the Annual Regulatory Information Conference (RIC-2007), within the context of which institutional contacts were held at the highest level between representatives of the CSN and the NRC; and several high level meetings and one bilateral meeting with the NRC at which, among other issues, there was agreement regarding the training of CSN personnel in the USA, collaboration is nuclear power plant lifetime management and the exchange of information on public communication.

- Nuclear Safety Authority – ASN (France): during 2007 several high level meetings were held, along with the annual bilateral meeting, at which among other things the collaboration in patient protection was strengthened and work was performed on a proposal for a collaboration agreement on nuclear and radiological emergency preparedness and response. During this bilateral meeting an extension to the current bilateral agreement existing between the ASN and the CSN was signed, in the presence of the presidents of both organisations. As a result of the activities approved at these bilateral meetings, CSN technicians participated in inspections at two French nuclear power plants, along with members of the ASN technical staff.

5. Research and Development

One of the functions of the Nuclear Safety Council is to establish and follow-up research plans on nuclear safety and radiological protection, the ultimate aim being to guarantee the maintenance of the technical independence attributed to it in its regulatory task.

The research projects carried out in 2007 were grouped on the basis of the programmes making up the Research Plan for 2004-2007, these being as follows:

- Behaviour of fuel under very high burnup conditions, including their storage and transport.
- Thermohydraulics and performance of the primary circuit pressure boundary, integrity maintenance and the ageing of materials.
- Integrity of the containment in the event of an accident.
- Probabilistic safety assessment and human factors.
- Exposure of of workers and relationship between dose and effects.
- Radiological impact due to nuclear and radioactive facilities and assessment of exposure to natural radiation.
- Reduction of radiological impact. Materials and waste management techniques.
- Long-term management of spent fuel and high level waste.
- Advanced nuclear reactors.

During 2007, 25 projects initiated in previous years were continued, eight new projects were launched and 12 were completed. The total cost of R&D activities in 2007 amounted to 1,737,909 Euros, most of this being set aside for the continuation of projects initiated previously. In general, the new projects initiated during 2007 relate to studies of spent nuclear fuel behaviour, severe accident phenomena, materials performance, reduction of the impact of natural radioactivity and extremities dosimetry techniques.

Of the 45 projects referred to, 13 correspond to international cooperation projects, fundamentally to projects coordinated by the OECD Nuclear Energy Agency.

During the last part of the year work began on a new approach to the technical and administrative management of the Council's R&D activities. The fundamental objective sought is to continue to increase and improve the use made of R&D activities from the technical point of view, as a source of knowledge supporting the facility safety assessments carried out by the Council and of on-going training for its technical staff. The measures and strategies adopted in this respect will also allow for increased efficiency in the Council's internal R&D management.

The R&D activities carried out by the Nuclear Safety Council are included within a four-year R&D Plan. The R&D Plan for 2008-2011 was drawn up during 2007, establishing the fundamental objectives to be met by the Council's R&D projects during that period and defining, in a justified manner, the Council's main technical lines of research.

One of the most significant novelties introduced in 2007 was the creation of the Training and R&D Commission, one of its objectives being to promote, track and control the organisation's R&D programme.

6. Regulations and standards

The Nuclear Safety Council is assigned competences relating to the capacity to propose general standards or to dictate technical provisions, these sometimes being general in their scope and entailing obligatory compliance and at other times being specific or merely recommendatory.

Efforts dedicated to drawing up Council instructions (IS) have continued throughout 2007 and five new instructions have been approved:

- Nuclear Safety Council Instruction IS-11, of February 21st 2007, on licences for operating personnel of nuclear power plant, the objective of which is to define the minimum requirements to be fulfilled in order to obtain and use nuclear power plant operating personnel licences.

- Nuclear Safety Council Instruction IS-12, of February 28th 2007, defining the qualification and training requirements for non-licensed staff and non-licensed external personal of nuclear power plants. The objective of this instruction is to define the training requirements for non-licensed personnel working at nuclear power plants and whose work is important from the point of view of safety and to establish the responsibilities of the licensees as regards ensuring the qualification of the personnel working at the plant.

- Nuclear Safety Council Instruction IS-13, of March 21st 2007, on radiological criteria for the release of nuclear facility sites, the objective of which is to establish the requirements to be met for the release of the sites of nuclear facilities authorised for dismantling. This instruction contemplates the possibility of partial site release, complete or partial release with restrictions on use and the need for the licensees of authorisations to demonstrate compliance with the radiological criteria.

- Nuclear Safety Council Instruction IS-14, of October 24th 2007, on the CSN Resident Inspectors at nuclear power plants, the objective of which is to establish the system for the actuation and operation of the resident CSN inspectors at nuclear power plants and the obligations of the licensees of operating permits for nuclear power plants in operation or in the situation of definitive shutdown prior to dismantling in relation to these inspectors.

- Nuclear Safety Council Instruction IS-15, of October 31st 2007, on the requirements for monitoring maintenance effectiveness at nuclear power plants, the objective of which is to establish the requirements to be demanded of nuclear power plant licensees in relation to monitoring of the efficiency of maintenance practices.

Likewise, the safety guide preparation process has continued and six guides have been approved:

- Safety Guide GS.-1.3. Revision 1. *Nuclear power plant emergency plan.* This was approved by the Board of Commissioners on January 10th 2007 and its objective is to define the structure and content of the nuclear power plant site emergency plans that the CSN considers to be most adequate for these documents to meet the requirements, principles and criteria established in the Regulation on Nuclear and Radioactive Facilities and in the Basic Nuclear Emergency Plan (Plaben).

- Safety Guide GS.-4.2. *Site restoration plan*. This was approved by the Board of Commissioners on March 21st 2007 and its objective is to define

the content of the official document required by article 30 of the Regulation on Nuclear and Radioactive Facilities to apply for dismantling authorisations and the decommissioning declaration for nuclear and radioactive facilities belonging to the fuel cycle.

- Safety Guide GS.-1.16 *Periodical testing of the ventilation and air-conditioning systems at the nuclear power plants.* This was approved on April 11th 2007 and its objective is to recommend the periodic tests to be performed on safety-related ventilation and air-conditioning systems at operating nuclear power plants, detailing the actions to be performed in relation to tests included in the operating technical specifications and unifying the test programmes and acceptance criteria at all the plants.

- Safety Guide GS.-1.14, revision 1. *Criteria for the performance of probabilistic safety assessments applications.* This was approved on July 12th 2007 and its objective is to develop the criteria to be met by risk-informed probabilistic safety assessments in relation to design modifications.

- Safety Guide GS.-1.17. *Application of risk-informed techniques to the in-service inspection (ISI) of piping.* This was approved on July 20th 2007 and its objective is to define the process for the performance of risk-informed in-service inspections on piping using the methodology developed by Westinghouse, and approved by the Nuclear Regulatory Commission (NRC), alternative to the traditional programmes of ASME Code Section XI.

- Safety Guide GS.-1.18. *Measurement of maintenance effectiveness in nuclear power plant.* This was approved on October 31st 2007 and its objective is to establish a methodology acceptable for compliance with the requirements on monitoring of the efficiency of nuclear power plant maintenance.

During 2007 several provisions affecting the regulatory framework of the CSN have been approved and officially published, the following being particularly significant:

- Law 17/2007, of July 4th, modifying the Electricity Industry Act, Law 54/1997, of November 27th, to adapt it to the requirements of European Parliament and Council Directive 2003/54/CE, of June 26th 2003, on common standards for the interior electricity market.

- Law 26/2007, of October 23rd, on environmental liability.

- Law 33/2007, of November 7th, amending, Law 15/1980, of April 22nd, creating the Nuclear Safety Council.

- Royal Decree 1767/2007, of December 28th, determining the values to be applied in 2008 for financing of the costs of radioactive waste and spent fuel management and the dismantling and decommissioning of facilities.

During 2007 the CSN participated in the promotion and driving of various projects for legal standards of different rank, of which mention may be made of the following:

- Proposal for modification of the Law on Nuclear Energy and amending the Law of creating the Nuclear Safety Council.

- Modification of the Regulation on Nuclear and Radioactive Facilities.

- Project for a Royal Decree on the Installation and Use of X-Ray Apparatus for Medical Diagnosis purposes.

As regards legal developments at international level, the CSN has continued to participate in the following processes:

- Drawing up of IAEA guidelines and continuation of the collaboration between the CSN and the IAEA with a view to making the aforementioned guidelines available to the Spanish-speaking community.

- Activities within the WENRA working groups in relation to the harmonisation of European standards in the field of nuclear safety. In 2007 the CSN has revised the national action plan to comply with the reference levels for nuclear power plants established by WENRA.

7. Management of resources

7.1. Improvement of the CSN organisation and plans

Improvements to the internal organisation of the CSN

The activities relating to preparation for the IAEA IRRS (International Regulatory Review Service) Mission have been particularly important during 2007.

At the end of February 2007 a preparatory meeting was held at the CSN headquarters; during the second half of the year the self-assessment questionnaires required for the mission, and subsequently the IRRS Action Plan, were updated, and during the last quarter the composition of the team and details of the activities to be performed during the mission were specified with the IAEA.

One of the activities addressed in preparing for the IRRS Mission was the updating of the CSN *management system* in order to adapt it to the IAEA requirements, this system encompassing the former *planning and quality* systems.

During 2007 the *Management system manual* was drawn up, this being a document that describes the said system and adjusts the requirements of the IAEA to the peculiarities and needs of the CSN. The analyses performed as part of the process of preparing this document concluded that many of these requirements were already implicitly or explicitly implemented in the CSN organisation. During the phase of preparing for the IRRS, priority was given to describing the practices developing these requirements and already present in the CSN organisation. Throughout the year 26 procedures were approved, seven relating to management, six administrative and thirteen technical.

In accordance with the IAEA requirements, the values of the organisation – i.e. the basic principles that should govern the behaviour of the CSN organisation: independence, transparency, competence and responsibility and commitment – were approved.

Quite apart from the benefits obtained from the IRRS Mission itself, the true added value is the drive to improve the Organisation that has taken place during the preparatory phase. This has been materialised not only through the implementation of the actions expressly identified from the self-assessments performed but also through the development of attitudes and methodologies contributing to on-going improvement of all aspects of the organisation.

Different improvements have been introduced as a result of the preparatory work for compliance with the *IRRS action plan*. In addition to those already referred to in relation to the management system, the most relevant are the following:

- Definition of a document on the policies of the Technical Cabinet of the President, including international relations, communication and information.
- Revision and updating of the CSN *organisation and operations manual*.
- Drawing up of a working plan for harmonisation with WENRA.
- Initiation of a process of the implementation of a competence-based management model: two posts of technical coordinator have been created, one in the Sub-division of Personnel and Administration in relation to training and the other in the Secretariat General for advice and coordination of technical issues. A consulting company has been contracted for development.

The following are other significant improvements incorporated during 2007:

- Reinforcement of the Resident Inspectorate: the figure of the Resident Inspectorate coordinator has been created and a CSN Instruction has been approved.

- Improvement of the terms for the assessment of licensing applications for radioactive facilities: implementation in 2007 of the improvements identified by the working group set up in 2006, this having led to the improvement of the results of the different indicators related to the terms for the assessment of licensing applications for this type of installations.

- Analytical accountancy of the organisation: a process has been initiated for the design and implementation of a new model allowing for the improvement of the management, control and quality of the information used in this process.

Strategic Plan and Annual Work Plan

The planning model implemented at the CSN contemplates the integration of the Annual Work Plan (AWP) in the *Strategic plan*. This integration is accomplished via the directives and objectives mapped out by the CSN for each year. The 2007 AWP, approved by the Board of Commissioners on January 3rd 2007, was drawn up in accordance with this model and includes the objectives approved by the Board of Commissioners for 2007.

As in the previous year, the annual work plan for 2007 incorporated the activities of the *IRRS action plan* foreseen for performance during the year.

Research Plan

A new CSN research plan was drawn up in 2007 for the four-year period 2008-2011, although the R&D projects in force during 2007 continue to be grouped in accordance with the programme structure of the plan for 2004-2007, as described in chapter 5 of this report.

Training Plan

The training plan for 2007 was grouped around the six traditional areas: nuclear safety; radiological protection; development of management skills, organisation and communication; standards, administration and management; information systems and quality; and languages. The total number of hours set aside for training by the CSN personnel amounted to 39,282, with a cost of 476,584.14 Euros, this implying an average cost per person of 1,050 Euros.

The training model was assessed during 2007 and it was agreed that a competence-based management model should be introduce, allowing for a better understanding of the training needs of the CSN employees. This is in keeping with the idea of on-going improvement encompassed in the management of the CSN.

Mention should be made also of the setting up of the Training and R&D Commission, one of whose objectives is the promotion, tracking and control of CSN personnel training.

Information systems plan

Efforts have continued throughout 2007 to improve and reinforce the CSN's information systems.

This year has seen the definitive implementation of the Integrated Nuclear Power Plant Supervision System (SISC), which is published quarterly on the institutional website. This system consists of a series of operating indicators and the findings of the inspections performed by the CSN.

As regards new developments, mention should be made of the new planning system and the new modules for management control by the technical divisions, of a new system for the assignment of

terms for proceedings affecting radioactive facilities that allows the time required for the issuing of reports on licensing applications to be reduced, and finally of the implementation of a documentary database supporting decision-making during meetings of the Board of Commissioners.

Also in 2007 there have been improvements to the internal network, external accesses and connections with the functions assignments and resident inspectors, and there has been a strong drive in developing a system for the notification of events, aimed at the licensees of metallurgical installations subscribing to the *Protocol on collaboration in the radiological surveillance of metallic materials.*

7.2. Human and economic resources

Human resources

As of December 31st 2007, the workforce of the organisation amounted to 453 people. The number of women working for the CSN has increased during the year, now amounting to 49.88% of the total, and 65.12% of the CSN personnel are post-graduates.

Throughout the year there were selective processes to cover seventeen vacancies by the system of free appointment and thirteen by competition. The five candidates that passed the selective tests were appointed as civil servants belonging to the Upper Scale of the Nuclear Safety and Radiological Protection Technical Corps. Likewise, a new officer was appointed to this scale through internal promotion.

The year 2007 saw the second application of the model for the recognition of professional experience among the civil servants belonging to the Organisation, as well as for correction of the malfunctions detected in the first application, this including a system for performance assessment that affected 83 officers.

Economic resources

The economic aspects are broken down into budgeting and financial items, the accountancy of the organisation being governed by the General Public Accounting Plan.

Budgeting aspects

The definitive budget amounted to 43.8 million Euros, an increase of 4.6% over the previous year.

Revenues amounted to 43.5 million Euros, reaching a degree of execution of 99.3% of the initial forecasts. Of this figure, 37.3 million Euros correspond to fees, public prices and other income and 5.1 million to transfers received.

Expenses amounted to 39.9 million Euros, reaching a degree of execution of 91% of the definitive budgeting credits. Of this figure, 22.7 million Euros correspond to personnel expenses and 11.9 million to working expenses for goods and services.

Financial aspects

Outgoings: working expenses amounted to 39.6 million Euros, of which 57.5% correspond to personnel expenses, 31.4% to external services, 5.9% to transfers and subsidies and 4.8% to transfers for depreciation. The rest of the expenses corresponded to transfers, provisions, levies, financial expenses and extraordinary expenses.

Income: the working income amounted to 43.5 million Euros, of which 85.5% corresponds to fees on services rendered, the main source of CSN financing, and the remaining 14.5% to transfers and subsidies, financial revenues and other management income.

Result for the year: the year 2007 saw a positive result of 3.9 million Euros.

Annex: list of abbreviations and acronyms

AMAC: Association of municipalities in areas housing nuclear power plants.

ASME: American Society of Mechanical Engineers.

ASN: French Nuclear Safety Authority: *Autorité de Sûreté Nucléaire*.

ASN: Automatic Stations Network.

AUM: Andújar Uranium Mill.

AWP: CSN Annual Work Plan.

BWR: Boiling Water Reactor.

C: Carbon.

C-14: Carbon 14.

Ci: Curie.

CAP: Corrective Actions Programme.

CDS: Classification and Decontamination Stations.

Ceiden: Nuclear Fission Energy Technology Platform (ex Strategic Nuclear R&D Committee).

Ciemat: Centre for Energy-Related, Environmental and Technological Research: *Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas.*

CPX: Command Post Exercise (NATO Nomenclature).

CRDH: Control rod drive housing.

CRPPH: NEA Committee on Radiation Protection and Public Health.

CSN: Nuclear Safety Council: *Consejo de Seguridad Nuclear.*

CTI: Complementary Technical Instruction.

CTS: Centralised Temporary Storage.

DIN: German Standards Institute: *Deutsches Institut für Normung*

DPT: Dual-purpose cask: transport and storage.

DRD: Direct Reading Dosimeter.

EC: European Commission.

ECURIE: European Community Urgent Radiological Information Exchange System

EF: Essential services water system at Vandellós II nuclear power plant.

EJ: New essential services water system at Vandellós II nuclear power plant.

EM: Standard of the Eduardo Torroja Institute.

Enresa: Spanish national radioactive waste management agency: *Empresa Nacional de Residuos Radiactivos S.A.*

Ensa: Equipos Nucleares S.A.

EPDS: External Personal Dosimetry Service.

ERO: CSN Emergency Response Organisation.

ERSP: Environmental Radiological Surveillance Programme.

EU: European Union.

EURATOM: European Atomic Energy Community.

F: Fluor.

F-18: Fluor 18.

FBFC: Nuclear fuel manufacturing facility: *Société Franco-Belge de Fabrication de Combustibles*

FISALUD: International Health Fair.

FORO: Latin American Radiological and Nuclear Regulators Forum.

GAE: External advisory group of Vandellós II nuclear power plant.

GJ: Essential chilled water system at Vandellós II nuclear power plant.

GS: CSN Safety Guide.

H: Hydrogen.

H-3: Tritium.

HI-STORM: Holtec International Storage and Transfer Operation Reinforced Module.

IAEA: International Atomic Energy Agency.

IERSP: Independent Environmental Radiological Surveillance Programme.

INES: International Nuclear Event Scale.

INRA: International Nuclear Regulators Association.

IRC: Inert waste recovery centre.

IRRS: International Regulatory Review Service.

IS: Nuclear Safety Council Instruction.

ISI: In-Service Inspection.

ATI: Individualised Temporary Storage

KJ: Emergency diesel generator motor cooling water system at Vandellós II nuclear power plant.

MPC: Multipurpose canister.

MV: Standard of the Ministry of Housing.

MW: Megawatt.

NEA: Nuclear Energy Agency of the Organisation for Economic Cooperation and Development.

NF: Nuclear Facility.

NPP: Nuclear Power Plant.

NRC: US Nuclear Regulatory Commission.

OECD: Organisation for Economic Cooperation and Development.

ONSC: Operator's Nuclear Safety Committee.

PDS: Personal Dosimetry Service.

PET: Positron Emission Tomography.

PIMIC: Integrated plan for the improvement of Ciemat facilities.

PLABEN: Basic Nuclear Emergency Plan.

PWR: Pressurised Water Reactor.

RAN: Radioactivity Alert Network of the Ministry of the Interior.

R&D: Research and Development.

RF: Radioactive Facility.

RIC: NRC Regulatory Information Conference.

Rn: Radon.

Rn-222: Radon 222.

ROP: NRC Reactor Oversight Process.

RPHIR: Regulation on the Protection of Health against Ionising Radiations.

RPS: Radiological Protection Service.

RPTU: Radiological Protection Technical Unit.

Salem: CSN Emergency Room.

SEP: Site Emergency Plan.

SEPR: Spanish Radiological Protection Society: *Sociedad Española de Protección Radiológica*.

SEPROSE: Protection and Security Service of the Directorate General of the Police and Guardia Civil.

SISC: Integrated Nuclear Power Plant Supervision System: *Sistema Integrado de Supervisión de Centrales nucleares*.

SMIAP: Safety management improvement action plan at Vandellós II nuclear power plant.

SSN: Sampling Stations Network.

TRACG: Transient Reactor Analysis Code

UME: Military Emergency Unit: *Unidad Militar de Emergencias*.

UNE: Spanish Standards Association (AENOR)

UNESA: Spanish electricity industry association.

USA: United States of America.

WENRA: Western European Nuclear Regulators´ Association.

ZIRP: Zorita Research Project.