

SPAIN

Convention on Nuclear Safety

Second National Report

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Second National Report

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Introduction

Submittal of the report

The present document is the second Spanish national report prepared in order to comply with the obligations deriving from the Convention on Nuclear Safety, made in Vienna on 20th September 1994. This Convention was signed by Spain on 15th October 1994 and ratified by way of an instrument issued by the Ministry of Foreign Affairs, signed by H.M. the King on 19th June 1995.

The Convention, which entered into force on 24th October 1996, following ratification by a minimum number of countries, as set out in articles 20, 21 and 22, includes 51 countries and Euratom, in addition to Spain.

The first review meeting, organised in accordance with chapter 3 of the Convention, was held in Vienna in April 1999. Spain was represented by the CSN, the State organisation solely responsible for nuclear safety, both for the drawing up of the national report and for participation in the meetings held between the parties. In accordance with article 21, the second review meeting has been scheduled for April 2002, also in Vienna.

At the review meetings, the countries party to the Convention review the national reports required by article 5. Spain submitted its first national report in September 1998. The present document is an update of that first report, and is to be submitted by 15th October 2001, as agreed on during the first review meeting. This report will be reviewed by the interested countries, which will forward their comments and questions. In April 2002, the Spanish report and the questions received will be subjected to the review process contemplated by the Convention, along with the reports submitted by the other countries.

Development of the second national report for the Convention on Nuclear Safety

The development of the report has once again been coordinated by the Nuclear Safety Council, an organisation independent from the Government that reports to both Parliament Chambers, and that is solely responsible for Nuclear Safety and Radiation Protection in Spain. Other departments of the Spanish Administration and the operators of Spain's nuclear power plants have provided their comments on the present report.

The content and scope of the second national report are based mainly on the Convention on Nuclear Safety itself, the text used as a basis being the first national report and the guidelines relating to national reports. In addition, the scope includes the most significant findings contained in the different reports of the first review meeting (Summary report and the verbal report on Spain by the review group), and consideration has been given to the questions received from other countries in relation to the first national report, along with the most important comments regarding the content of the second national report, resulting from bilateral and multilateral contacts.

In accordance with the requirements of the guidelines relating to national reports, the objective of the second national report is allowing Spain's compliance with the Convention to be efficiently assessed. It is understood that the first national report submitted by Spain

in 1998 continues to be valid as general information on regulatory practices, and that this second report is an update that incorporates the changes that have occurred during these last three years, the previous report being used as a reference in those areas in which there have been no changes. Consequently, the second national report includes all the obligations of the Convention and is organised by articles, in keeping with the structure of the latter.

In this respect, the report provides the data and analyses required, updated to 1st September 2001, to show the evolution of nuclear safety in Spain and takes into account the general issues dealt with in the summary report on the first review meeting, avoiding the repetition of generic information already included in the first national report.

During the review carried out by the corresponding group at the first review meeting, Spain was requested to provide specific information on the revision of the legislation and regulations in relation to the licensing process, radiation protection standards, the funding of the regulatory authority and radiological criteria in emergency situations; the evolution of national policy on severe accidents and the modifications made at the plants; and the results of the Periodic Safety Reviews. These indications have also been taken into account in drawing up this second report.

The preparation of this report has been based on a process similar to that applied for the first report, with attempts made to optimise it in the light of the experience gained. An initial draft was first drawn up and submitted for comments to other bodies external to the CSN (Ministry of Economy, Ministry of Foreign Affairs and nuclear power plant operators). Once the pertinent comments had been included, the Council published the final edition, following definitive approval. The two versions (Spanish and English) of the document approved by the Council was submitted to the IAEA, as depository for the Convention, and was incorporated into the CSN's external web, along with the two versions of the first national report and the related questions and answers (www.csn.es).

Chapter 2. OBLIGATIONS

II INFORME NACIONAL SOBRE CUMPLIMIENTO DE LA CONVENCIÓN SOBRE SEGURIDAD NUCLEAR.

a) General provisions

Article 6. Existing nuclear installations

This article describes the most relevant safety issues and improvement developed since the last national report at the operating nuclear power plants. Appendix 6.A contains updated data on the nuclear installations existing in Spain and included within the scope of the Convention.

6.1 *Significant nuclear safety-related issues occurring at each plant during the period*

The most significant safety-related issues that have occurred at each of the Spanish nuclear power plants during the period considered are presented below.

José Cabrera NPP

When the plant Operating Permit was renewed for a period of 3 years in 1999, the operator was requested to apply a Safety Improvement Programme over the period of its Permit, the satisfactory implementation of this programme being a prerequisite for subsequent extension of the Permit.

The improvement programme includes those measures that, according to the results of the plant PSA, implied a significant reduction in risk, along with other aspects for which the probabilistic methodology shows large uncertainties. Among the most outstanding improvements, mention may be made of a new layout for the instrumentation and controls on the control room panels, significantly improving the reliability of operator actuation in the event of an accident, and the motor operation of valves switching the alignment of the emergency core cooling system from the injection phase to recirculation.

A more detailed description of the improvement programme may be found in section 14.4 of this report.

No significant events have occurred at this plant during the last three years.

Sta. M^a de Garoña NPP

When the plant Operating Permit was renewed for a period of 10 years, in 1999, the operator was requested to apply a Safety Improvement Programme, which was to be completed before the end of the year 2003.

The main improvements made refer to various ventilation systems (control room, electrical systems building, etc.) and to the control room operating personnel training simulator.

A more detailed description of the improvement programme may be found in section 14.4 of this report.

It must be pointed that the lifetime management programme included the replacement of the core spray piping inside the reactor vessel during year 2001 refuelling outage, since very few of the areas of this pipe were accessible for inspection and it contained several welds and a material susceptible to stress corrosion. The new pipe has flanged joints instead of welds and is made of a more corrosion-resistant material.

No significant events have occurred at this plant during the last three years.

Almaraz NPP

The Operating Permit was renewed during the year 2000 for a period of ten years. The most relevant events that have occurred at this plant during the period are as follows:

- Detection of a possible common mode failure of both trains of the component cooling water system due to failure of the surge tank level instrumentation, discovered during an incident involving misalignment of the hydraulic cooler of the pump common to both Units.
- Detection of a design deficiency in the ultimate heat sink, during the design basis review programme carried out by the licensee.

In both cases design modifications were implemented to correct the situation, although in the case of the ultimate heat sink an additional modification is foreseen to re-establish the system design margins.

Ascó NPP

The Operating Permit was renewed for a period of ten years in 2001. The two units of the Ascó plant increased their thermal power by 8% each following the 1999 and 2000 refuelling outages. The main modifications carried out at the plant were the replacement of the steam generators, performed in 1995 at Unit I and in 1997 at Unit II, replacement of the turbine-alternator set and the replacement of various items of equipment in the secondary circuit.

No significant events have occurred at this plant during the last three years.

Cofrentes NPP

The Operating Permit for ten years was renewed in 2001. One of the most relevant events that have occurred during the period has been the detection of a common mode failure in the condenser pressure measuring instrumentation. This caused failure of the automatic main steamline isolation during a loss of condenser vacuum incident, due to rupturing of the turbine and condenser neck union gasket. The failure of the instrumentation was due to the presence of water in long sections of the piping connecting the pressure transmitters to

the condenser, which has a low degree of inclination. As a result of the incident various instrumentation lines on different systems have been reviewed and redesigned.

In 1999, the CSN approved a new refuelling safety design and analysis methodology, developed by the licensee. The last two operating cycles have been designed and licensed through application of this new methodology.

In addition to the power upgrades authorised for this plant in 1988 and 1998, Cofrentes NPP has requested authorisation for a new increase in thermal power to 110%. The objective is to carry out the design modifications associated with this power increase during the forthcoming refuelling outage, which will take place in March 2002, with a view to initiating the next cycle at the increased power level, once the modifications have been authorised by the regulatory body.

Vandellós II NPP

The ten-year Operating Permit was renewed in 2000. In 1999 the plant increased its thermal power by 4.5% and replaced the turbine-alternator set in order to achieve a higher electrical power level.

No significant events have occurred at this plant during the last three years.

Trillo NPP

The Operating Permit was renewed in 1999 for a period of 5 years. During the 1999 refuelling outage the design modifications deriving from the Operating Experience and Systems Analysis programme (OESA) were completed, these including a completely new design for the electrical safeguards system, the essential services cooling water system and the emergency building ventilation system.

In November 2000, a new edition of the Operating Specifications entered into force, which was required by the CSN due to difficulties in applying those initially approved. The reference used has been the improved technical specifications of NUREG 1431.

A design deficiency was discovered during the 2001 refuelling outage in the seal of the gate separating the fuel pool from the refuelling cavity, which would not guarantee the leaktightness of this gate in the event of an accident. Compensatory measures have been adopted pending replacement of the seal during the 2002 refuelling outage.

6.2 Generic nuclear safety-related issues and regulatory practices initiated or completed during the period

6.2.1 Regulatory activities

The most significant novelties in regulatory practices arising since September 1998 are as follows:

a) Periodic Safety Review (PSR)

The PSR had been requested from all the Spanish plants, with the exception of Trillo NPP, during the last renewal of operating permits prior to 1998. As a result, all the plants except

Trillo NPP have submitted their PSRs since 1998, these having been evaluated by the CSN and used as a basis for the granting of operating permits. Except in the case of José Cabrera and Trillo plants, these permits have been awarded for a period of 10 years.

Trillo NPP will initiate its PSR in the year 2003, since it has carried out a complete review of its design basis and operating experience within the framework of the OESA Programme.

The operator of the José Cabrera NPP requested an operating permit for 9 years (1999 to 2008), the end of this period marking 40 years of plant operation. On evaluating the PSR, the CSN concluded that it was necessary to implement a series of improvements before awarding the permit for the period of time requested, for which reason it was awarded for three years only.

Point 14.4 includes more details of the results obtained from the periodic safety reviews.

b) Maintenance Rule (MR)

In January 1999, the CSN agreed to request that all the Spanish plants, with the exception of Trillo NPP, establish a process to measure the efficiency of their maintenance practices with respect to previously established objectives, such that there be a guarantee that all the structures, systems and components be capable of performing their design safety function. This requirement was the result of several years of work by both the CSN and the licensees. Previously a pilot programme had been carried out at two plants, the conclusion drawn being that application of the MR would imply an improvement in the reliability of systems classified as being safety-related or of those which, not being safety-related, have a significant impact on plant risk.

c) Application of Safety Guide 1.11 relating to design modifications

During the inspections performed by the CSN on the analyses of design modifications carried out by the licensees, deficiencies had been detected that made it advisable to prepare a safety guide on this issue. The CSN approved the preliminary version of this guide in November 1998, this being submitted to the licensees in December of that year for implementation. The requirement was that a report on the lessons learned be submitted to the CSN one year later, on the basis of which the final version of the guide would be drawn up. At present the preliminary edition is still being applied and the definitive version is in the review phase, with completion expected during the year 2001.

6.2.2 Operator activities

The generic issues that have given rise to actions by the Spanish plant owners during the period have been as follows:

a) Y2K effect

All the plants analysed the susceptibility of their equipment, applications and systems to the Y2K effect. This activity, which began formally in 1998, implied the drawing up of a master plan at each plant, the preparation of an inventory of susceptible products (some 300 per

plant), the certification and validation of each, the development of a test programme and contingency plans. As a reference the Spanish plants used the NRC generic letter 98-01, which indicated an analytical methodology, reference to industrial guidelines, etc. The transition into the year 2000 took place at all the plants without incident. With a view to addressing any possible grid supply problems, the power of the nuclear plants was reduced to 60% during the transition, in accordance with an instruction from the Ministry of Industry.

b) Containment sump blockage

In the event of a loss of coolant accident, there is the possibility of sump blockage if the high pressure coolant entrains insulating material from the piping and the sump filters get blocked. The generic issue consisted of analysing all the possible combinations of breaks, the most unfavourable cases and the most likely, to subsequently take the measures required to prevent this blockage in the event of an accident. In the case of PWR plants, this subject was analysed and no need to introduce design modifications was identified, while for BWR plants important modifications were carried out. Among the measures adopted special mention might be made of the replacement of the filters in the suppression pool at the Cofrentes and Santa María de Garoña plants for others with a much larger surface area and, therefore, preventing blockage even in the worst scenarios. This solution required important economic and engineering resources.

c) Erroneous measurement of steam pressure due to condensation in the sensing lines

As a result of an incident that occurred at Cofrentes on 28th October 1998 it was discovered that the condenser vacuum measurement was erroneous, this preventing correct actuation of the automatic closing of the main steam isolation valves. Analysis of the cause showed that it was due to the layout of the pressure sensing lines, which had excessively long horizontal sections with little inclination. The corrective action implemented by the plant consisted of replacing these lines with others having a more adequate configuration: shorter horizontal sections and with greater inclination.

In response to a request by the CSN, the rest of the Spanish plants reviewed the layout of their pressure measuring lines to check whether or not they were susceptible to experiencing similar problems. As a result of this review, several plants modified sections and layouts in order to guarantee reliability.

d) Ageing of air supply tubing to air-operated valves

On 4th May 2000, unit II of Ascó NPP reached an automatic plant shutdown condition following the rupturing of a flexible tube supplying air to the positioner of a main feedwater control valve. The rupturing of this tube was caused by ageing of the elastomer from which it was made. As a result of this event, Ascó replaced all the unit feedwater control valve tubing, and plans to do the same at the other unit during the next refuelling outage. In addition, Ascó has included the periodic replacement of these tubes as a procedural practice, in order to avoid repetition of the problem.

In response to a request by the CSN, all the Spanish plants have analysed the applicability of this event to their plants. In those cases in which the same problem was detected, the tubing was replaced, following an analogous procedure to that applied at Ascó.

e) Incorrect interpretation of Operating Technical Specifications.

As a result of shutdown due to increasing drywell leakage at Garoña NPP, on 8th February 2000, a generic letter was issued to all the Spanish plants clarifying the concepts of non-identified primary circuit leaks and pressure boundary leaks, included in the Operating Technical Specifications of each plant, and establishing the periods allowed for correction of the problem prior to having to go to shutdown conditions. Furthermore, due to the identification by the resident inspector at the Almaraz nuclear power plant of an illuminated alarm relating to a failure in the neutron absorbent control rod system, in July 1999, a generic problem was identified regarding the incorrect application of the technical specification relating to the control rod system. A generic letter was issued with appropriate clarifications and the procedure to be applied whenever similar alarm indications appear.

f) Clearance of very low level wastes

During the year 2000, the Spanish nuclear power plants have submitted the programme for the radioactive clearance of very low level wastes, for the following waste streams: activated carbon, fabrics, plastics, metallic scrap, sludges, civil works materials, resins and oils for regeneration. This programme is currently being evaluated by the CSN, and has been approved in some plants for specific materials like oils.

The common project, for all the plants, for the clearance of streams of metallic scrap has already been received, and the project for resins, activated carbon and oils for regeneration is expected to be submitted for CSN evaluation during the course of the year 2001.

6.3 Safety improvement programmes at Spanish nuclear power plants, in response to regulator and/or operator initiatives

6.3.1 Integrated PSA programme

During the period considered, work has continued on development of the Integrated Programme for the performance of PSA's level 1 and 2 for all the Spanish plants. This programme was set up in 1986 and revised in 1998, this being the latest revision. At present, the PSA's level 1 and 2 have been completed for all the plants. Santa María de Garoña NPP had already performed a PSA level 1 in 1984, but in 1996 the CSN requested the performance of a new PSA using an updated methodology and data and with the scope established in the Integrated Programme for all the Spanish plants. This report should be submitted to CSN by the end of 2001. Moreover, Vandellós II, Ascó I and II and Santa María de Garoña plants have performed PSA in other operating conditions. The CSN has evaluated all the PSA's submitted with the exception of the one for Trillo NPP, which is expected to be completed before the end of 2001, and has requested the plants to implement the corresponding actions deriving therefrom.

New benefits continue to be derived from the PSA's through the use of applications in various areas of operation, this being developed specifically in the 1998 revision of the Integrated PSA Programme. CSN has recently produced GS-1.14 Safety Guide on criteria to perform Probabilistic Safety Analysis applications.

The most important activities currently been performed in relation to PSA's are those carried out by the working group set up to establish uniform PSA maintenance and updating criteria.

6.3.2 Design basis review programme

Another important programme carried out during the period, on the initiative of the licensees and with CSN agreement, is the design basis review, aimed at correcting whatever inconsistencies might exist between the different bases, the Safety Report, the Operating Technical Specifications and the usual practices and procedures of the installation. This review stemmed from concern following detection at the American Millstone plant of practices not in accordance with the analyses contained in the Safety Report.

In 1998, the Spanish plants drew up and submitted to the CSN a document on the criteria to be adhered to for maintenance of the Final Safety Report and safety design basis, this serving as a basis for the performance of a detailed design basis review process. Since that time, the licensees have carried out this review work, completed at all the plants in year 2000, and the CSN has performed inspections and evaluations. The final result of the review has led to documents identifying the discrepancies encountered, to proposals for modification of the Operating Technical Specifications, as a result of modification of the design basis, and to the revision of the Safety Report.

6.3.3 Severe accident management guidelines

Within the framework of a programme requested by the CSN, Severe Accident Management Guidelines have been implemented at all the plants except Trillo, where they will be implemented as from the end of 2001. The measures include the management guidelines developed specifically for each plant, the initial training programme and the annual retraining of the personnel required to apply these guidelines (members of the emergency Technical Support Centre and operations personnel). The technical bases of these measures are detailed in section Otros programas en curso a destacar son:

- Mejora de la formación y el entrenamiento del personal de operación.
- Actividades de protección contra incendios
- Revisiones de diseño de sala de control.
- Programas de reducción de dosis.
- Limitación de vertidos.
- Gestión de residuos.
- Definición y aplicación de Programas de Gestión de vida útil para todas las centrales nucleares

18.3 of this report.

6.3.4 Human factors improvement programme

In December 1999, the CSN requested all the licensees to establish a Human Factors Improvement Programme, which would have to identify the licensee department responsible for its application, the projects to be included in the programme, the resources assigned to performance, actuation procedures, etc.

At present, all the plants have established the responsibilities and have assigned resources, as well as completing the preliminary design of the Programme, although at most it is not yet fully operational. The technical bases for these measures are detailed in Article 12 of this report.

6.3.5 Other generic nuclear safety improvement programmes

The following are other nuclear safety improvement programmes currently under way and warranting special mention:

- Operations personnel initial and on-going training improvement
- Activities relating to fire protection.
- Control room design reviews.
- Dose reduction programmes.
- Release limitation programmes.
- Activities relating to radioactive waste management.
- Definition and application of service lifetime Management Programmes for all the nuclear power plants.

6.3.6 Plant-specific improvement programmes

In addition to those mentioned above, which is applicable to all the plants, there are certain improvement programmes and activities that are specific to each. In some cases the initiative to improve issues has emanated from the plant owner, although in most cases the improvement itself, or its scope, has been requested by the CSN. Most of these initiatives emerged from the framework of the Periodic Safety Review and the design basis review programmes. The specific improvements are described in point 14.4, in relation to the results obtained from the Periodic Safety Reviews.

6.4 *Generic assessment of continued operation, based on the level of safety of Spanish nuclear power plants*

The Spanish nuclear power plants are permanently subjected to an on-going safety review process, which leads to the establishment of specific safety improvement programmes in various areas. In addition, a Periodic Safety Review is performed every ten years.

The generic assessment of the level of safety of the Spanish plants is based on the following aspects:

- Compliance with the standards and regulations. The Spanish plants meet both the design standard of the country of origin of the technology in force as of their date of construction and the current Spanish regulations.
- The first generation plants, José Cabrera and Sta. M^a de Garoña, were subjected during the 1980's to a Systematic Assessment Programme, as a result of which they underwent a series of safety improvements, as detailed in section 1 of Article 6 of the First Spanish National Report for the Convention on Nuclear Safety.
- Both these plants and all the others are required to analyse the new standards emerging in the country of origin of the project, the USA for most of the plants and Germany in the case of Trillo, and to take whatever actions might be applicable to them.
- The Periodic Safety Reviews constitute a new revision of safety and have led to the application of new improvement programmes, as indicated in section 6.3.
- Probabilistic Safety Assessment (PSA). All the Spanish plants have carried out specific PSA's that have been evaluated by the CSN. Chapter 14.3 indicates the status of the PSA studies specific to each plant, Level 1 for on-site events, off-site events, fires, Level 2, etc.

6.5 Degree of compliance with the obligations of the Convention

In view of the levels of safety achieved as a result of the analyses and modifications performed, along with the continuous safety review process to which the Spanish plants are subjected, these plants are considered to adequately comply with the requirements of this article. Consequently, it is not considered necessary to carry out new safety reviews or urgent modifications, nor to establish plans for plant decommissioning for safety reasons.

Appendix 6.A: Basic nuclear power plant characteristics

	José Cabrera	Almaraz	Ascó	Vandellós II	Trillo	Garroña	Cofrentes
Type	PWR	PWR	PWR	PWR	PWR	BWR	BWR
Thermal power (MW)	510	2 x 2,696	2 x 2,912	2,913	3,010	1,381	3,015
Electrical power (MW)	160	U-1: 974 U-2: 983	U-1: 1,028 U-2: 1,027	1,087	1,066	466	1,025,4
Vendor	Westinghouse	Westinghouse	Westinghouse	Westinghouse	Siemens-KWU	General Electric	General Electric
Cooling	Mixed river Tajo and towers	Open, Arrocampo reservoir	Mixed river Ebro and towers	Open, Mediterranean	Closed, towers at river Tajo	Open, river Ebro	Closed, towers at river Júcar
Number of units	1	2	2	1	1	1	1
Site authorisation. Units 1/2	27-03-63	U-1: 29-10-71 U-2: 23-05-72	U-1: 21-04-72 U-2: 21-04-72	27-02-76	04-09-75	08-08-63	13-11-72
Construction permit Units 1/2	24-06-64	U-1: 02-07-73 U-2: 02-07-73	U-1: 16-05-74 U-2: 07-03-75	29-12-80	17-08-79	02-05-66	09-09-75
Start-up authorisation. Units 1/2	11-10-68	U-1: 10-13-80 U-2: 15-06-83	U-1: 22-07-82 U-2: 22-04-85	17-08-87	04-12-87	30-10-70	23-07-84
Year of fuel pool saturation. Units 1/2	2015	U-1: 2021 U-2: 2022	U-1: 2013 U-2: 2015	2020	2003*	2015	2009**
Last Operating Permit	15-10-99	08-06-2000	02-10-1996	14-07-2000	17-11-1999	05-07-1999	19-03-2001

* On its site, a dry storage is being built to solve this problem

** If at this point a final repository was not in place, the storing capacity of the second pool could be enhanced

b) Legislation and regulation

II INFORME NACIONAL SOBRE CUMPLIMIENTO DE LA CONVENCIÓN SOBRE SEGURIDAD NUCLEAR

Article 7. Legislative and regulatory framework

7.1 Main modifications to legal framework

This section includes references to the legal and regulatory documents that have been issued since the preparation of the first National Report for the Convention on Nuclear Safety. The documents included in the first Report continue to be in force unless otherwise indicated in this second National Report.

7.1.1 Legal documents

Law on Public Fees and Prices for services rendered by the Nuclear Safety Council (Law 14/1999, of 4th May)

The objective of this Law is to update the fees and prices for the services rendered by the Nuclear Safety Council in compliance with its nuclear safety and radiation protection functions.

The fee initially being regulated by article 10 of Law 15/1980, enacted by Royal Decree 3229/1982, of 12th November, and now annulled, experience of management had underlined certain problems regarding adaptation to reality that made a new regulation necessary. Likewise, the Nuclear Safety Council has had to undertake a series of functions that were not specifically contemplated in the Law by which the organisation was neither established nor configured as events subject to payment. Furthermore, the modification to the standards was required by both Law 8/1989, of 13th April, governing Public Fees and Prices, and by Law 54/1997, of 17th November, regulating the Electricity Industry, which made the introduction of new criteria a necessity, both for quantification of each fee and for adequate modification of the tax basis of the rate applied to the inspection and control of nuclear power plant operation.

In addition, the entry into force of the Regulation on Protection against Ionising Radiations, which has assigned a series of new functions to the Nuclear Safety Council in the area of radiation protection, required that the corresponding new payable events be established.

In view of the above, this Law establishes a new catalogue of functions that more accurately reflects the current activity of the Nuclear Safety Council and regulates payment in exchange for all the services provided. To these effects, certain rates are updated, the

range of payable activities is extended and brought into line with reality, and the wording of the agreement is improved in the light of the experience acquired, taking into account criteria of equivalence and the economic capacity of the paying party.

Finally, it should be pointed out that, through this Law, the dismantling operations for the decommissioning of nuclear installations are detailed for tax purposes; the performance of studies and drawing up of reports relating to the management of high level radioactive wastes are contemplated; and a series of services that the Nuclear Safety Council has been performing in response to requests from private institutions, and which it was not specifically obliged to perform according to its legal statutes, are now incorporated as a public price.

7.1.2 Regulatory documents

Modification of the Law establishing the Nuclear Safety Council 14/1999 of 4th May

CSN functions are modified by conferring on it the control and surveillance of the environment radiological quality of the whole territory and the production of instructions, circulars and guides related to nuclear safety and radiation protection of the installations.

Moreover, CSN will co-ordinate support and response measures in emergency situations.

It must as well inspect, evaluate, control, inform the competent authority and adopt the preventing and corrective measures, in case of exceptional or emergency situations in installations, equipment, enterprises and activities not subject to the authorisation regime of the nuclear legislation.

Finally, CSN is responsible for the achievement of studies, evaluations and inspections of plans, projects and programmes foreseen at all the waste management phases.

Royal Decree 1836/1999, of 3rd December, approving the Regulation on Nuclear and Radioactive Installations

This replaces the previous Regulation approved by Royal Decree 2869/1972, which had been left out of date. The Decree introduces important modifications in relation to nuclear installations, such as the adaptation of the documentation required during the different phases of authorisation, the replacement of successive extensions to the provisional operating permit with authorisations subject to given time periods or regulation of the arrangements required for decommissioning and dismantling authorisations. The new Regulation contemplates the following authorisations for nuclear installations:

- Preliminary or site authorisation
- Construction permit
- Operating permit
- Authorisation for modifications to the installation
- Authorisation for decommissioning and dismantling
- Authorisation for the change of ownership.

It also establishes the need to obtain a preliminary authorisation for waste storage/disposal installations and for nuclear reactors and critical assemblies used for research purposes, which were not previously subject to this permit like other nuclear installations.

All the aforementioned authorisations are awarded by the competent Ministry (at present the Ministry of Economy), following a mandatory and binding report from the CSN in relation to nuclear safety and radiation protection issues, as explained in detail in the first national report.

As regards radioactive installations, two important modifications are introduced. The first derives from application of the European Union standards, specifically Directive 96/29/EURATOM, of 13th March, which establishes the basic standards governing health protection for the workers and the public against the risks arising from ionising radiations. This modification affects the classification of installations into different categories and the declaration of exempt installations and activities. The second modification refers to the different graduation of such installations for the purposes of administrative arrangements, compared to that included in the previous Regulation. Thus, for radioactive installations involved in the nuclear fuel cycle, the same arrangements and documentation as applied to nuclear installations are considered. For the rest of the radioactive installations, however, the arrangements are significantly simplified, and now consist of a single request that leads to the operating permit and to the switch on notification, after CSN inspection.

The need to obtain a manufacturing permit is limited to equipment incorporating radioactive materials or emitting ionising radiations.

The approval of types of apparatus producing ionising radiations is also updated, with the regulations adapted to the Directive of the European Union, in order for the use of such apparatus to be exempt from authorisation as a radioactive installation.

The arrangements for authorisations for companies selling products and providing technical assistance in relation to radioactive installations are incorporated into the text of this regulation, as is the need for companies transporting nuclear substances and radioactive materials to be entered on a Register.

Finally, the Nuclear Safety Council is authorised to issue guidelines or technical standards to facilitate application of this regulation, which is assigned the standing of the basic rule in accordance with article 149 of the Spanish Constitution.

Royal Decree 783/2001, of 6th July, approving the Regulation on Protection against Ionising Radiations

This regulation, which replaces the one issued in 1992, establishes standards relating to the protection of workers and the members of the public against the risks resulting from ionising radiations, and constitutes the transposition to the Spanish regulatory system of EU Directive 96/29 EURATOM.

It introduces the concept of the practice, maintains the principles of justification, optimisation and dose limitation for such practices and goes on to establish the fundamental principles governing the operational protection of exposed workers,

individuals undergoing training and students during the performance of practices, and aspects relating to the radiation protection of the population under normal circumstances.

With a view to preventing the exposure of the workers, these are classified depending on their conditions of work; work places are also classified into different zones depending on the annual doses that may be received in them, and the standards and measures for control to be applied in the different zones and to the different categories of workers are established. Likewise, requirements are established for the determination of doses and for their recording, for the training and medical monitoring of the workers.

As regards the radiation protection of the public, general standards are established to avoid or reduce the emission of radioactive substances to the environment. Likewise, the regulation establishes the obligation to carry out, regularly and as realistically as possible, estimates of the doses received by the population overall and by the reference groups in all places in which such groups might exist.

It must be highlighted the introduction of new dose limits for professionally exposed workers, training and public in agreement with EURATOM Directive, that include ICRP-60 recommendations.

Also introduced are the concept of intervention, and the general principles and requirements applicable to such intervention in the event of radiological emergency or long-lasting exposure are established.

Finally, radiation protection requirements are required to be identified and applied for those activities in which there is a significant increase in exposure due to natural radiation sources.

As regards the radiation protection of the population, and in addition to the requirements described in the first national report, it is established that realistic estimates are to be made of the doses received by the population as a result of operation of the nuclear power plants.

Royal Decree 469/2000, of 7th April, modifying the basic organisational structure of the Nuclear Safety Council

As has been pointed out above, Law 14/1999, on Public Fees and Prices for the services rendered by the Nuclear Safety Council, attributes new functions in relation to the radiation protection of the public and the environment.

This strengthening of the Nuclear Safety Council's areas of activity and the need to address its new functions made it necessary to introduce certain changes in the organisational structure of the Body, in order to better adapt the existing resources to the new requirements, organisationally separating issues relating to the safety of nuclear installations from those relating to radiation protection. To this effect, article 41 of the Statutes of the Nuclear Safety Council is reworded through the present Royal Decree, the former Technical Directorate disappearing and two new Technical Directorates: Nuclear Safety and Radiation Protection, being created, accompanied by modification of the former structure of General Sub-Directorates and other Areas and job posts.

Royal Decree 689/2000, of 12th May, establishing the basic organisational structure of the Ministry of Economy

This Royal Decree assigns the responsibilities formerly attributed to the Ministry of Industry and Energy (suppressed by Royal Decree 557/2000) in the area of nuclear safety and radiation protection to the new Ministry of Economy, the said responsibilities being exercised via the new Directorate General for Energy Policy and Mining.

7.1.3 Main issues addressed by the CSN guidelines published during the period

Three Guidelines have been published in Section 1: Power reactors and nuclear power plants: GS-1.7, which establishes the documentation to be submitted to the CSN by the licensees on nuclear power plant operation; GS-1.12, on the optimisation of radiation protection at nuclear power plants, GS-1.13, which establishes the regulations governing the operation of nuclear power plants, and GS-1.14 on criteria for the performance of Probabilistic Safety Assessment applications.

Three Guidelines have also been published in Section 5: Radioactive installations and apparatus: GS-5.09, which establishes the documentation required to request authorisation for and registration of companies selling X-ray equipment and providing technical assistance in this area; GS-5.12, which establishes the criteria for the homologation of training courses for the supervisors and operators of radioactive installations; and GS-5.14, which refers to the safety and radiation protection of radioactive industrial gammagraphy installations.

In Section 8: Physical protection, regulation is by way of Guideline GS-8.01 on nuclear materials at nuclear and radioactive installations.

Two Guidelines have been published in Section 10, Miscellaneous: GS-10.09, on the guarantee of computer applications relating to the safety of nuclear installations, and GS-10.10, on the qualification and certification of personnel performing non-destructive tests.

Appendix 7.A includes a list of all the CSN safety guides that have been published or are under elaboration.

7.2 Significant modifications to the licensing system introduced during the period

The new Regulation on Nuclear and Radioactive Installations has established that nuclear power plant operating permits are awarded for a fixed period, established in the permit itself. In accordance with the directives established in the CSN Strategic Plan, the permits are being issued for a period of ten years, coinciding with the performance of the Periodic Safety Reviews.

In the new authorisations the need for revisions to the Safety Assessment Report, performed following each refuelling outage in order to incorporate the modifications implemented at the installation and update its content, to be approved by the Ministry of Economy following a favourable report by the CSN has been removed. Only revisions deriving from design modifications requiring authorisation prior to implementation must now be approved. In these cases, the revision of the Safety Assessment Report is approved

simultaneously with the design modification and with the other official operating documents affected, such as the Operating Technical Specifications.

The new Regulation on Nuclear and Radioactive Installations has also developed the licensing system for design modifications, establishing the obligation that the licensee analyse modifications prior to their implementation and specifying the need for approval of those that imply alteration of the criteria, standards or conditions on which the authorisation of the installation is based. These concepts are developed in a CSN safety guide (GS-1.11). In addition, an authorisation for construction and assembly is contemplated for large-scale modifications or those implying significant construction and assembly work.

7.3 Significant modifications to the inspection and assessment system introduced during the period

In December 1999 a revision of the Regulation on Nuclear and Radioactive Installations was approved, although Section IV, which refers to inspection activities, remains practically as it was in the previous revision.

During the period concerned in this report, a new CSN Inspection Model has been drawn up. Along with the procedures through which it is enacted, this Model establishes the systematic approach for the performance of the supervisory function assigned to the CSN by Law.

In accordance with the Inspection Model, the CSN carries out three types of inspections:

- Systematic control inspections,
- Licensing inspections,
- Special inspections.

For the systematic control inspections a basic inspection programme has been set up, such that a set of 25 significant areas is inspected every two years, in order to guarantee the safe operation of the installation. These areas or processes of importance from the point of view of safety are inspected systematically regardless of the results obtained. The operational philosophy is that if the processes are performed adequately and in accordance with the legal requirements established, it is possible to guarantee that the functioning of the installation is as expected and that it is being operated safely and in compliance with the established standards. The annual inspection programme details which of these inspections will be carried out each year.

In addition, control inspections are performed with respect to specific operational issues or activities undertaken at the installation, such as refuelling outages, design modifications, etc. Inspections may also be performed to check specific aspects related with licensee requests to perform modifications in the official operations documents; design modifications, etc.

Finally, special or reactive inspections are undertaken in the event of anomalous situations, such as incidents, the investigation of certain events, denouncements and other similar situations. This type of inspections habitually amounts to less than 10% of the CSN's inspection activities.

Furthermore, as from 1998 the CSN has been applying a systematic programme for the control of plant operations (ESFUC Programme), based on the results obtained from the inspection programmes performed over a given period of time. These programmes, initially carried out every 18 months, allow plant operations to be evaluated in five functional areas: operation, maintenance and surveillance, engineering and technical support, radiological controls and emergency preparedness and fires and sabotage.

Depending on the results of the inspections and on the deviations encountered, the performance of the plants is assessed in each of the functional areas. These assessments allow the CSN to detect worsening trends in plant performance, identify areas in which performance is most deficient and detect possible operational problems before the event. Likewise, these programmes allow the CSN to systematically and objectively optimise the resources deployed for inspections and to focus efforts on those areas and plants showing the worst performance, thus reducing inspection activities in areas in which performance is excellent.

7.4 Degree of compliance with the obligations of the Convention

In view of the legal and regulatory modifications and the adaptation of the organisational structure of the regulatory authority carried out during the period, Spain may be said to have improved its degree of compliance with the requirements established in this article, relating to the establishment and maintenance of a legal framework applicable to nuclear installations.

Appendix 7.A: Collection of CSN safety guides

Appendix 7.A: Collection of CSN safety guides

(List updated as of 1/09/2001 and including documents published and in draft form)

Section 1. Power Reactors and Nuclear Power Plants:

- GS-1.1 Qualifications for the awarding and use of nuclear power plant operating personnel licences. *Revision 1* ^(*)
- GS-1.2 Nuclear emergency dosimetry model.
- GS-1.3 Nuclear power plant emergency plan. *Revision 1* ^(*)
- GS-1.4 Radiological control and surveillance of liquid and gaseous radioactive effluents released by nuclear power plants.
- GS-1.5 Documentation on refuelling activities at light water nuclear power plants. *Revision 1* ^(*)
- GS-1.6 Reportable events at operating nuclear power plants.
- GS-1.7 Information to be submitted to the CSN by licensees on nuclear power plant operation.
- GS-1.9 Emergency simulations and drills at nuclear power plants.
- GS-1.10 Periodic nuclear power plant safety reviews.
- GS-1.11 Design modifications at nuclear power plants (preliminary publication). *Definitive version* ^(*)
- GS-1.12 Practical application of the optimisation of radiation protection in nuclear power plant operation.
- GS-1.13 Content of nuclear power plant operating regulations.
- GS-1.14 Criteria for the performance of Probabilistic Safety Assessment applications. ^(**)

Section 4. Environmental Radiological Surveillance:

- GS-4.1 Design and development of the Environmental Radiological Surveillance programme for nuclear power plants.

Section 5. Radioactive Installations and Apparatus:

- GS-5.1 Technical documentation for authorisation requests for the construction and start-up of installations handling and storing non-encapsulated radioactive isotopes (2nd and 3rd category).
- GS-5.2 Technical documentation for authorisation requests for the construction and start-up of installations handling and storing encapsulated sources (2nd and 3rd category).
- GS-5.3 Control of the leaktightness of encapsulated radioactive sources.

- GS-5.5 Technical documentation for authorisation requests for the construction and start-up of radiotherapy installations.
- GS-5.6 Qualifications for the awarding and use of radioactive installation operating personnel licences.
- GS-5.7 Technical documentation for authorisation requests for the construction and start-up of installations using X-rays for radiodiagnosis purposes (Replaced by R. D. 1891/1991).
- GS-5.8 Bases for the preparation of information relating to the operation of radioactive installations.
- GS-5.9 Documentation for authorisation requests for the registration of companies selling and providing technical assistance for X-ray equipment.
- GS-5.10 Technical documentation for authorisation requests for installations using X-rays for industrial purposes.
- GS-5.11 Technical safety and radiation protection aspects of medical installations using X-rays for diagnosis.
- GS-5.12 Homologation of training courses for the supervisors and operators of radioactive installations.
- GS-5.13 Homologation of training courses for the personnel managing or operating X-ray installations for diagnostic purposes (This will be a CSN Instruction). ^(*)
- GS-5.14 Safety and radiation protection at industrial gammagraphy radioactive installations.
- GS-5.15 Technical documentation for requests for the approval of radioactive apparatus types. ^(*)
- GS-5.16 Technical documentation for authorisation requests for the operation of radioactive installations constituted by equipment for the control of industrial processes. ^(**)

Section 7. Radiation Protection:

- GS-7.1 Technical-administrative requirements for Individual Personal Dosimetry Service. *Revision 1* ^(*)
- GS-7.2 Qualifications for recognition as expert in protection against ionising radiations for managerial positions at RP Services or Technical Units. *Revision 1* ^(*)
- GS-7.3 Bases for the establishment of Services or Technical Units for Protection against Ionising Radiations. *Revision 1*
- GS-7.4 Bases for the medical surveillance of workers exposed to ionising radiations. *Revision 2*

- GS-7.5 Actions to be taken in relation to persons affected by radiological accident.
- GS-7.6 Content of radiation protection manuals for nuclear installations and radioactive nuclear fuel cycle installations.
- GS-7.7 Radiological control of drinking water. *Revision 1*

Section 8. Physical Protection:

- GS-8.1 Physical protection of nuclear materials at nuclear and radioactive installations.

Section 9. Waste Management:

- GS-9.1 Control of the process of solidifying low and intermediate level radioactive wastes.
- GS-9.2 Management of solid waste materials with radioactive contents generated at radioactive installations. ^(*)

Section 10. Miscellaneous:

- GS-10.1 Basic quality assurance guideline for nuclear installations. *Revision 2*
- GS-10.2 System for documentation subject to quality assurance programmes at nuclear installations. *Revision 1* ^(*)
- GS-10.3 Quality assurance audits. *Revision 1* ^(*)
- GS-10.4 Quality assurance for the start-up of nuclear installations.
- GS-10.5 Quality assurance of processes, tests and inspections at nuclear installations. *Revision 1*
- GS-10.6 Quality assurance in the design of nuclear power plants. *Revision 1* ^(*)
- GS-10.7 Quality assurance at operating nuclear installations. *Revision 1*
- GS-10.8 Quality assurance for the management of items and services for nuclear installations. *Revision 1* ^(**)
- GS-10.9 Quality assurance for computer applications related to the safety of nuclear installations.
- GS-10.10 Qualification and certification of personnel performing non-destructive tests.
- GS-10.11 Quality assurance at first category radioactive installations.
- GS-10.12 Radiological control of scrap recovery and recycling operations. ^(*)

^(*) Under development

^(**) In print

Article 8. Regulatory body

8.1 *New CSN functions and responsibilities*

The legislative changes that have occurred in recent years, described in points 7.1 and 7.2, have significantly altered the responsibilities and functions of the CSN. As regards environmental radiation protection, the CSN is responsible for control and surveillance of radiological quality throughout Spain, and not only, therefore, in the vicinity of the installations. In relation to radioactive wastes, the CSN intervenes in the control of management, and may even in very specific circumstances propose the clearance of middle and low level waste. In emergency situations the CSN coordinates whatever resources are required for compliance with the functions under its responsibility. In addition, the CSN approves technical standards and has the power to issue favourable reports on new designs and methodologies, and is empowered also to issue penalties to the licensees and propose corrective measures, applying coercive sanctions where applicable. Finally, the CSN undertakes the regulation of companies in relation to radiation protection.

The new Regulation on Nuclear and Radioactive Installations unify the general content of authorisations and bring the aforementioned Regulation into line with other general standards. The Regulation provide new functions for the CSN, consisting of participation on the Information Committees, consisting of representatives from the Government, regional governments, town councils of the NPP sites and plants operators. Those committees are responsible to inform to some organisations on the development of regulator activities.

Other noteworthy questions that affect the missions and responsibilities of the CSN refer to the creation of a register of companies transporting nuclear substances and radioactive materials and the regulation of new designs and methodologies. Furthermore, the CSN is assigned new missions relating to public information and the public behaviour measures to be taken in emergency cases.

The strengthening of certain of the CSN's areas of action and the need to address its new responsibilities, especially in relation to environmental radiological surveillance and to coordination and response in the event of radiological emergencies, implies the need to make certain changes to the organisational structure. The objective of these changes is to achieve greater adaptation of the existing resources to the new needs, this requiring specific attention and separation of the organisational aspects relating to the safety of nuclear installations from those relating to radiation protection.

8.1.1 New structure of the CSN

The modifications introduced by the new organisational structure are as follows (figure 8.1):

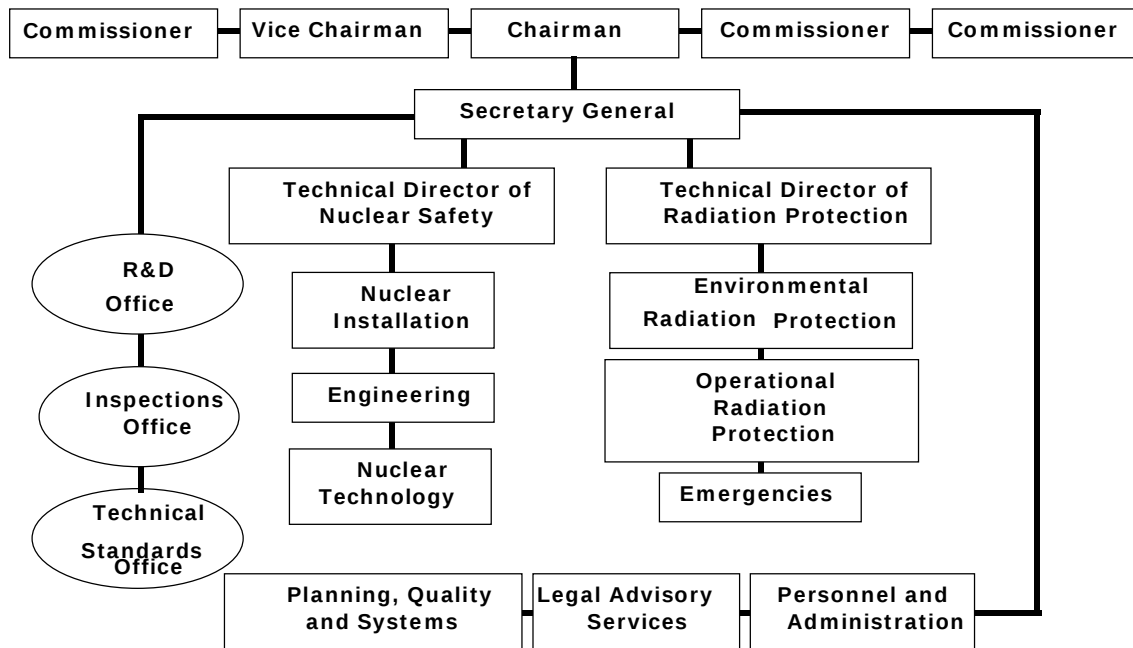


Figure 8.1: Organisational chart of the CSN

Units reporting directly to the Secretariat General

In addition to the two technical directorates, three General Sub-Directorates and three Offices report to the Secretariat General:

- Sub-Directorate General of Planning, Information Systems and Quality
- Sub-Directorate General of Personnel and Administration
- Sub-Directorate General of Legal Advisory Services
- Inspection Office
- R&D Office
- Technical Standards Office

Technical Directorate for Nuclear Safety

Under this Technical Directorate are grouped all functions relating to the safety of nuclear installations, except for the disposal of low and intermediate level radioactive wastes, which depends on the Technical Directorate for Radiation Protection. The Technical Directorate for Nuclear Safety also undertakes responsibility for the transport of nuclear substances and radioactive materials.

This grouping of responsibilities under a single, highly specialised management centre will make it possible to optimise the inspection, regulatory efficiency and control of nuclear installations.

Three Sub-Directorates General report to the Technical Directorate for Nuclear Safety:

- Sub-Directorate General of Nuclear Installations
- Sub-Directorate General of Nuclear Technology

- Sub-Directorate General of Engineering.

Technical Directorate for Radiation Protection

In addition to the inspection and control of radioactive installations, the radiation protection of the workers and the management of low and intermediate level radioactive wastes, this Technical Directorate assumes responsibility for the new missions relating to the radiation protection of the public and the environment and radiological emergencies.

Three Sub-Directorates General report to the Technical Directorate for Radiation Protection:

- Sub-Directorate General of Environmental Radiation Protection
- Sub-Directorate General of Operational Radiation Protection
- Sub-Directorate General for Emergencies.

In addition, and in accordance with the Law establishing the Nuclear Safety Council and with its Statutes, two of the members of the Council were replaced in February 2000, followed by a further two members and the Chairman in July 2001.

8.1.2 Revision of the CSN Strategic Plan (SP)

The Plan relating to has been revised at the beginning of the year 2001.

Until that time, the objective established was to promote the participation of Spanish companies and organisations in the CSN research programmes and also to develop the CSN/Unesa (Spanish Union of Electrical Industry) agreement while undertaking the development of support laboratories. In February 2001, the decision was taken to orient research such that the results obtained be of use to the organisation in its regulatory activities, taking into account the medium and long-term objectives, and to optimise the assignment of resources while promoting the integration of the main research centres and groups and participating in international projects providing the highest possible return on investment.

Moreover, the Strategic Plan is expected to be revised in its entirety. Work has been achieved on a document dealing with the degree of compliance with the objectives established in the current SP.

8.1.3 CSN internal Quality Plan

The Nuclear Safety Council has implemented a Quality System based on the ISO 9000 standards and on the model of the European Foundation for Quality Management (EFQM). This implementation began in 1996, when the Council approved the Internal Quality Plan, establishing the reference models and the activities, objectives and responsibilities for system implementation.

The objectives of the Internal Quality Plan are as follows:

- To consolidate the quality of service and the spirit of on-going improvement within the scheme of values shared by the members of the Organisation, identifying what society,

the public authorities and the users require from it and responding rapidly and adequately to these requirements without causing unjustified cost or delay.

- To bring about a situation in which all the actions of the CSN warrant the maximum credibility, based on the competence and motivation of the people working at the Organisation, transparency and the orientation of the entire Organisation towards the improvement of Nuclear Safety and Radiation Protection.
- To optimise use of the resources made available to the CSN, adopting a systematic approach to processes, strengthening the planning and control systems and reducing performance times.

In adherence with the ISO directives, the Nuclear Safety Council has identified its basic processes and the relationships between them. These processes are systematised and documented in management procedures covering the functions assigned by law to the CSN, the internal management activities of the Organisation involving various Organisational Units and those referring to CSN relationships with external bodies. The technical work of the Technical Directorates is regulated by technical procedures. Activities not strictly of a technical nature are regulated by administrative procedures. A large part of the personnel participates in drawing up the procedures.

The Nuclear Safety Council's quality policy and the general outline of its quality system are described in the Quality Manual. The Organisation and Operations Manual describes the functions of the different organisational elements, mapping out the relations and interfaces between them and specifying what is laid out in the Statutes of the Council.

The Quality System of the Nuclear Safety Council incorporates on-going improvement methodologies. Improvement groups have been set up to promote the participation of those working for the organisation in activities aimed at achieving improvement. The activities of this group serve as a basis for the identification and implementation of important improvement opportunities, such as the following, regarding nuclear power plants:

- Criteria for the annual planning of inspections.
- New systematic approach to the preparation, administration and evaluation of inspection reports.
- New system for the Tracking of issues pending evaluation.
- Formal delivery of proposals emanating from technical judgements to the owners of nuclear installations.
- Publication of the agreements reached by the Council on the INTRANET and the external web.
- Creation of an improvement group establishing a system for the prioritisation of assessment findings.
- Definition and implementation of a scorecard.
- Creation of a working group with Unesa to deal with the quality of documents supporting regulatory requests.

- Simplification of limits and conditions in the granted authorisations.
- Delegation of various CSN responsibilities to the Chairman, Secretary General and Technical Directors.

During the year 2000 a survey was held among the users of the CSN's services, with a view to achieving better understanding of their needs and identify and implement opportunities for improvement. From the results of this survey the Council learned that the licensees of nuclear power plants and radioactive installations valued especially highly the technical expertise of the CSN personnel and their capacity to adapt to exceptional circumstances. Analysis of these results led to a series of actions, one of the more noteworthy of which was the setting up of a system allowing the safety significance of the technical requirements imposed on the nuclear installations to be graduated, including the formal delivery to these installations of the technical reports supporting the Council's decisions.

Two self-assessment exercises have been carried out in accordance with the EFQM model, these having been completed in 1999 and 2001. These self-assessments have made it possible to identify the strong and weak points of the organisation and to assign priorities to improvement actions, integrating them within strategic planning.

A set of internal and external indicators is being established, allowing the achievement of objectives to be evaluated and providing support for management of the Organisation in the monitoring of the most important activities.

Appendix 8.A includes a complete list of the procedures currently being carried out at the CSN.

8.1.4 Revision of CSN funding/CSN resources and personnel

The Nuclear Safety Council has its own equity and budget, independent from those of the Government. These are integrated into the General State Budget and are approved by Parliament.

Until the beginning of the 2000 financial year, the organisation was entirely self-financing, through the revenues coming from the fees applied to services rendered.

Law 14/1999, on Public Fees and Prices for services rendered by the CSN, attributes new functions to the Council, as described in point 8.1. The performance of some of these functions does not attract any fee, for which reason the Parliamentary Commission for Industry, Energy and Tourism requested, through Resolutions to the Government both in 1999, that the CSN be provided with funding for the Radiological Surveillance of the Environment (RSE) in the whole territory, charged to the General State Budget.

In the year 2000, this funding, which is complementary to that received by the CSN through its fees, amounted to 307.4 million pesetas, and for 2001 stands at 288.4 millions, representing 5.1% of the total budget.

The current functions of the CSN, differentiated by sources of financing, are as follows:

Financed by fee:

- Inspection and control of nuclear and radioactive installations and related activities.

- Performance of studies and reports prior to the authorisation awarded to the aforementioned installations by the Ministry of Economy.
- Issuing of licences for the personnel operating and supervising the operation of the installations in question and homologation of courses.

Financed in part via the General State Budget:

- Control of protection measures for the general public and the environment.

Financed via public prices:

- Approval of methodologies, simulation models or protocols
- Performance of reports, tests or studies related with the radiation protection to the public or the environment.

The total CSN budget for the year 2001 amounts to 5,631.96 Million Pesetas¹. As regards expenses, somewhat more than half corresponds to the personnel and a quarter to current operating costs.

As of 31st December 2000, and without counting the eight members of top management (Chairman, four Board Members, the Secretary General and two Technical Directors), the staff of the CSN was made up of 414 persons. Of these, 191 are civil servants belonging to the Nuclear Safety and Radiation Protection Technical Division, dedicated to the inspection, control and monitoring of the operation of nuclear and radioactive installations, 109 are civil servants belonging to other public administrations, 6 are temporary office staff and 108 are contracted. (See table 8.1)

	Council	Secretariat General	Technical Directorates	Total
Top Management	5	1	2	8
Civil Servants from NS and RP Technical Division.	4	14	173	191
Civil Servants from other Public Administrations	12	78	19	109
Temporary Personnel	6	-	-	6
Contracted Personnel	8	68	32	108
Total	35	161	226	422

Table 8.1: Distribution of Nuclear Safety Council personnel as of 31st December 2000.

¹ 1 Euro = 166.386 Pesetas

8.1.5 CSN personnel training plan

The CSN Strategic Plan included a Training Plan for the period 1997-2000, the objective being to heighten the qualification of the personnel and respond to the need to adapt to the new working methods demanded.

All the training activities were grouped into five areas, which have been developed over this four-year period (table 8.2):

- Nuclear Safety and Radiation Protection
- Development of management, organisational and communications skills.
- Administration and management
- Information systems
- Languages.

The objectives mapped out were oriented towards training at three major levels: general, specialist and informative.

The Strategic Plan established the way in which training would be financed and who would be responsible for its management. The Plan has been assessed annually and different measures have been adopted to adapt it to the specific needs of the units, as demanded.

The overall balance for the four-year period 1997-2000 may be considered as being positive. The investment in training tasks amounted to more than 290 million pesetas, representing an annual average of some 73 millions. Furthermore, the training programme for the personnel of the CSN, which has remained practically unchanged in number, has allowed most of the general and specialist training objectives to be met.

Likewise, the presence of the Council in national and international forums (congresses, meetings, seminars, etc.) continues to be promoted within the realm of its functions and responsibilities.

Table 8.2 shows the evolution of the number of trainees, hours of class attendance and budget deployed in the different areas of the Training Plan. It may be appreciated that in the technical area of nuclear safety and radiation protection, the budget has seen few major oscillations over the four years. The time dedicated to training in management skills and in information systems and languages has decreased, since the number of people that have received this specialist training in the short term has remained constant.

Area	Year	Number of trainees	Total hours	Budget deployed
Nuclear safety and Radiation protection	1998	648	14,129	47,773,695
	1999	483	11,457	51,396,852
	2000	280	6,770	42,164,258
Development of management skills: Organisation and communication	1998	62	1,37	3,436,016
	1999	105	1,09	5,845,774
	2000	34	440	1,785,984
Administration and management	1998	161	2,896	2,827,700
	1999	126	2,000	2,393,320
	2000	112	1,739	2,010,889
Information systems	1998	942	4,756	8,148,878
	1999	343	3,378	8,650,624
	2000	166	897	2,836,852
Languages	1998	95	-	12,187,145
	1999	80	-	8,195,364
	2000	67	-	8,504,696

Table 8.2: Evolution of training course attendance

8.1.6 Evolution of CSN international relations

The international relations maintained by the CSN, through direct contacts with other countries and attendance at multinational forums and conferences, help the Council to continuously update its working practices, while maintaining its fundamental role within the international framework of regulatory bodies.

The CSN continues to participate actively in international working groups belonging to the United Nations International Atomic Energy Agency (IAEA), the European Union and the Nuclear Energy Agency of the Organisation for Economic Cooperation and Development (NEA/OECD).

In addition, the CSN has signed agreements, protocols or conventions with 22 counterpart organisations from 19 countries, as shown in table 8.3.

Since the publication of the First National Report for the Convention on Nuclear Safety, agreements have been signed with the CSN's counterparts in Brazil, Canada, Cuba, Peru, Great Britain and Sweden.

In parallel with its multilateral and bilateral relations, the CSN has actively participated in setting up three associations with similar regulatory organisations outside the multilateral framework. New initiatives are studied by these associations and regulatory practices and policies are exchanged. The CSN is a member of the three regulatory associations: the International Nuclear Regulators Association (INRA), the Western European Nuclear Regulators Association (WENRA) and the Forum of Ibero American Nuclear Regulators (FORO).

Country	Organisation
Germany	Ministry of the Environment, BMU
Argentina	Nuclear Regulatory Authority, ARN
Brazil	National Nuclear Energy Commission, CNEN
Canada	Canadian Nuclear Safety Commission, CNSC
Colombia	Colombian Institute of Nuclear Sciences, ICN
Korea	Korean Institute of Nuclear Safety, KINS
Cuba	National Centre for Nuclear Safety, CNSN
China	National Nuclear Safety Administration, NNSA
United States	Nuclear Regulatory Commission, NRC
France	Nuclear Installations Safety Directorate, DSIN
	Institute for Nuclear Safety and Protection, IPSN
Italy	National Agency for Environmental Protection, ANPA
Mexico	National Nuclear Safety and Safeguards Commission, CNSNS
Paraguay	National Atomic Energy Commission, CNEA
Peru	Peruvian Nuclear Energy Institute, IPEN
Portugal	Directorate General for the Environment, DGMA
Great Britain	Nuclear Installations Inspectorate, HSE/NII
	National Radiation Protection Board, NRPB
Russia	Russian Federal Organisation for Nuclear and Radiation Safety, GAN
Sweden	Swedish Nuclear Power Plant Inspectorate, SKI
	Swedish Radiation Protection Inspectorate, SSI
Ukraine	State Nuclear Regulatory Committee of Ukraine, SNRCU

Table 8.3: International Bilateral Relations

The most important international activities during the period have been the celebration of the International conference on safety in radioactive waste management in Córdoba (May 2000), sponsored by the IAEA, the NEA and the European Commission, and the publication by WENRA of the second report on the nuclear safety of countries aspiring to membership of the European Union (November 2000). The CSN made an outstanding contribution to both activities.

8.1.7 Evolution of R&D activities and results obtained

In 1999, R&D activities included 61 projects and the management of an in-house budget of 376,550,000 pesetas, 19 of the projects being completed. In 2000, there were 55 projects and budget of 439,237,000 pesetas, with 16 projects being completed that year.

In accordance with the pattern established in the CSN research plan, many of the research projects were carried out in collaboration with other institutions, outstanding among which was the collaboration with Unesa (Coordinated research plan) and with Ciemat, Enresa and Enusa. Also relevant was the CSN's participation on the Strategic Nuclear R&D Committee (Ceiden), set up by the Ministry of Economy for the establishment of plans of national scope.

The research projects carried out contributed to improving the know-how, methods and tools used by the CSN personnel in the performance of their functions, helping to make the actions taken more effective and efficient. They also made it possible to increase the level of competence of the organisations owning the regulated installations or activities, and of those, such as research centres and universities, that provide support for the CSN or for the licensees.

It is important to point out that during the year 2000 it was considered advisable to revise the strategic orientations of the research plan in force, for which purpose the CSN set up an internal team to draw up a document including these new strategies and serving as a basis for the preparation of a new research plan providing an orientation for future R&D activities and projects.

In the last organic restructuring on 2000, the CSN has created a new administrative unit, the Research and Development Office (OFID), which has been given the task of managing and coordinating all the CSN's R&D activities, from the reception of proposals for research projects from the Technical Directorates to the dissemination of their results and promotion of their application.

Finally, mention may be made of the fact that the CSN has created and periodically publishes three basic documents: the Report on nuclear safety and radiation protection, the first revision of which was published in 1999 to serve as a basis for the different revisions of the CSN Research Plan (1996-2000), which was updated in 1999, and the Report on the products and benefits of completed research projects, which is published annually.

Through its publications and working sessions the CSN reports on the progress and results of its research projects, and holds a special session at its headquarters at the end of each year, during which the most relevant on-going projects are presented.

8.1.8 CSN public information policy

The second article of the Law by which the CSN was created establishes that one of the functions of the organisation shall be "to inform the public on issues within its realm of competence". In order to fulfil this function, the CSN has implemented a proactive public information and communication programme over the years, consisting of various different activities.

These activities, which in general are aimed at bringing the CSN closer to the public, focus on the following:

- Information on the activities of the institution.
- Promotion of CSN presence in forums close to the public.
- Increasing the credibility of the institution as a point of reference for questions relating to nuclear safety and radiation protection.
- Making the CSN accessible to society in order to provide the information required by the latter.
- Contribute to the education of the public on matters within its realm of competence.

With a view to achieving these objectives, the CSN has an information and communication department that reports to the Chairman's Technical Office. This department, aware of the interest shown by the public in the use of ionising radiations, performs work in the following areas:

- Relations with the media. The department maintains permanent and direct contact with the media, organisations related to environmental protection and professional associations, and responds to specific requests received. It issues press releases and information on the situation of the country's installations or on whatever safety-related events might occur.
- Publications. The CSN establishes an annual publications plan that includes works of both a technical and informative nature. In order to provide information for the two Houses of Parliament, the CSN is obliged by law to draw up an annual technical report summarising the activities of the organisation and the nuclear and radiation situation of the country. In 1996 it initiated the publication of a quarterly journal, *Seguridad nuclear*, which contains technical articles on nuclear safety and radiation protection and news relating to the activities of the CSN.
- Public information centre. A permanent information centre on radiation and its uses was inaugurated in 1998. This centre is open to the public and is aimed mainly to schoolchildren. Designed and built around interactive techniques, the centre has 9 modules, distributed over an area of 350 square metres and covering four areas: the history of radiations, the use of radiations, the problems and burdens of radiations and the work of the organisation.
- Internet information service. The CSN maintains a direct line of information for the public by way of a website (www.csn.es). The structure of the site includes general information on the Nuclear Safety Council and last agreements, the daily status of the nuclear power plants and values obtained by the environmental radiological surveillance stations, research and development projects, legislation, publications, press releases and, in general, whatever other information might be of interest.

8.2 *Effective separation between the functions of the regulatory authority and those relating to the promotion of nuclear energy*

With respect to the previous report, the first national report, it should be pointed out that the CSN reports on its activities the Parliament (Congress and Senate), and is obliged to issue an annual report on these activities. Since the law by which it was established, the CSN had been providing this information every six months; however, the fourth additional provision of Law 14/1999, of 4th May, on Public Fees and Prices for services rendered by the CSN, has modified this frequency, which is now annual.

Furthermore, as a result of the ministerial restructuring that took place in the year 2000, the mandatory reports for the awarding of permits or regulatory proposals that the CSN previously issued to the Ministry of Industry and Energy are now submitted to the Ministry of Economy.

The Nuclear Safety Council has Collaboration Agreements with the Ministry of Education, Culture and Sport, the Ministry of the Interior (in relation to emergency situations) and the Ministry of Health and Consumption. It also participates in ad hoc working Commissions of the Ministries of Defence, Civil Works and Health and Consumption.

8.3 *Regulatory efficiency improvement programmes*

The objective of these programmes is to ensure that the CSN's activities are performed with increasing efficiency, optimising the requirements made of the regulated bodies and persons, the consumption of resources and performance dates, and guaranteeing that the required levels of safety are maintained. Improvement of the regulatory process requires actions relating to the updating of standards, described in another section of the report, identification of the essential aspects of safety and of the operating indicators described in the section on new working methods, the planning and systematisation of CSN actions, improvement to assessment and inspection activities, on-going training of the personnel, the updating of information systems and others described in different chapters of the report.

Development of the inspection model

In September 1998 the CSN approved a new model for the nuclear and radioactive installation inspection system. The aim of the model is to optimise and systematise inspection activities relating to all the installations and activities under CSN supervision. This inspection model was revised in 2000, and the lessons learned in recent years were incorporated.

The objective with the new model is to increase the efficiency of the resources assigned to inspection activities through the implementation of a single system introducing concepts such as inspection based on the risk implied by the installations and activities. This allows specific scopes to be identified for the different types of inspections, along with the frequency of the activities and, in short, greater systematisation of inspection activities.

A basic inspection programme was set up systematically and periodically covering a series of basic activities involved in nuclear power plant operation, 50% of the inspection resources being set aside for this purpose.

Planning and control

The planning model implemented at the CSN aims to integrate the strategic actions established in the Strategic Plan (SP) with day-to-day activities. For this purpose three levels of planning are established: Strategic, Annual work plan and task scheduling. The planning model includes integration with the budget, such that budgeting indicators and objectives are also contemplated in planning.

The CSN has under way a project for the implementation of a scorecard for the Organisation's activities, constituted initially by a series of indicators associated with inspection processes and reports for the Administration. This will allow the degree of compliance with the approved planning to be assessed and the efficiency of the Organisation to be measured more accurately. As this project progresses, new indicators will be incorporated into the scorecard.

Information systems plan

This includes the actions to be taken by the organisation to keep its information systems updated, improving their availability and simplifying the working processes

It contemplates activities relating to networks and communications, documentary management, planning and monitoring systems, analytical accounting, personnel administration and management, technical management systems and information for the management team.

8.4 Degree of compliance with the obligation of the Convention

As indicated in the first national report, Spain already met the requirements of the Convention as regards resources and the independence of the regulatory organisation. With the changes mentioned in this article, an important improvement has been achieved in the degree of compliance.

Appendix 8.A: Procedures

Appendix 8.A: Procedures

A.1 Management procedures

Procedure	Date of approval*
PG.II.01. Institutional relations	28.04.98
PG.II.02. International relations	23.07.99
PG.II.03. Public information	28.04.98
PG.II.04. Commission agreements	07.05.01
PG.II.05. Relations with the Administration and interested persons and bodies	07.05.01
PG.III.01. Regulatory proposals	
PG.III.02. Technical standards	
PG.IV.01. Mandatory CSN reports to the Administration (Nuclear Installations)	03.01.01
PG.IV.02.. Mandatory CSN reports to the Administration (Radioactive Installations)	24.03.98
PG.IV.03. Inspection and control of nuclear installations	03.01.01
PG.IV.04. Inspection of radioactive installations, transport and other regulated activities	18.04.00
PG.IV.05. CSN actions in sanction procedures relating to Nuclear Safety and Radiation Protection	07.05.01
PG.IV.06. Control of radioactive installations and other related regulated activities	07.05.01
PG.V.01. Planning, scheduling, tracking and control of activities	24.09.97
PG.V.02. Project management	16.06.98
PG.V.03. Management of external supplies and services	24.09.97
PG.V.04. Annual budget	24.03.98
PG.V.05. Fees and other revenue	03.01.01
PG.VI.01. Collaboration with the Administration in Emergency Plans	16.04.99
PG.VII.01. Control and surveillance of radiation levels. Professionally exposed workers	17.12.99
PG.VII.02. Control and surveillance of radiation levels. The public and the environment	05.10.98
PG.VIII.01. Nuclear installation personnel licences	01.12.98
PG.VIII.02. Radioactive installation personnel licences	16.04.99
PG.IX.01. Research activities	05.11.99
PG.XI.01. Documentary management	13.04.00

Procedure	Date of approval*
PG.XI.02. Quality management	13.06.00
PG.XI.03. Information systems	05.10.98

* Procedures not having a date of approval are in the phase of development.

A.2 Administrative procedures

Procedure	Date of approval*
PA.II.01. Classification of events using the INES scale	06.03.00
PA.II.02. Communication to the institutions and the public of events at nuclear installations	09.03.00
PA.II.03. Treatment, control and access to confidential documentation relating to the physical protection of nuclear installations and materials	
PA.II.04. Updating and maintenance of the corporate website	13.06.01
PA.IV.01. Basic nuclear installation inspection programme	18.06.01
PA.IV.02. Systematic evaluation of nuclear power plant operations. ESFUC Programme	15.03.01
PA.X.01. Personnel training	
PA.XI.01. Internal audits	10.11.99
PA.XI.02. On-going improvement	
PA.XI.03. Computer support media	
PA.XI.04. Development of information systems	
PA.XI.05. Maintenance of information systems	
PA.XI.06. Documentary archive	

* Procedures not having a date of approval are in the phase of development

A.3 Technical procedures

Procedure	Date of approval*
PT.IV.01. Evaluation of periodic safety reviews	
PT.IV.02. Evaluation of revisions of final safety analysis reports for operating NPP's	16.06.99
PT.IV.03. Monitoring of NPP design modification management	16.06.99
PT.IV.04. Inspection of surveillance requirements by resident inspector	28.05.01
PT.IV.05. Inspection of maintenance activities by resident inspector	28.05.01

Procedure		Date of approval*
PT.IV.06.	Evaluation and inspection of quality assurance programmes of nuclear and radioactive installations	03.11.00
PT.IV.07.	Evaluation and inspection of quality assurance programmes of suppliers of equipment and services for nuclear installations	03.11.00
PT.IV.08.	Evaluation of Q lists	03.11.00
PT.IV.09.	Resident inspector's manual	25.06.01
PT.IV.10.	Systematic evaluation of NPP operations. ESFUC Programme	10.05.00
PT.IV.11.	Evaluation of periodic dismantling reports on nuclear and fuel cycle radioactive installations	15.01.00
PT.IV.13.	Inspection of the control of temporary storage of spent fuel at NPP's	
PT.IV.15.	Inspection of control of the interface between Enresa and radioactive waste producers	
PT.IV.16.	Evaluation of the integrity of post-stressed containments	
PT.IV.17.	Evaluation of chemical parameters	
PT.IV.18.	Evaluation and inspection of In-Service Inspection manuals and reports	
PT.IV.19.	Evaluation and inspection of the structural integrity of post-stressed containments	
PT.IV.20.	Revision of periodic testing of class 1E batteries	
PT.IV.21.	Revision of reliability maintenance of emergency diesel generators	
PT.IV.22.	Evaluation and inspection of auxiliary cooling water systems	30.10.00
PT.IV.23.	Evaluation and inspection of ventilation systems	20.04.01
PT.IV.24.	Inspection of compliance with the maintenance rule	
PT.IV.25.	Revision of containment leak tests (ILRT and LLRT)	
PT.IV.26.	Evaluation and tracking of periodic controls of earth movements at nuclear installations	
PT.IV.27.	Evaluation of the groundwater surveillance and control programme at nuclear sites	
PT.IV.28.	Evaluation for the approval and validation of transport packages	05.04.01
PT.IV.29.	Control of supplies of sources	02.03.01
PT.IV.30.	Inspection of the transport of radioactive materials	
PT.IV.31.	Inspection of radioactive installations	26.09.00
PT.IV.32.	Evaluation of radioactive installations for deferred and manual brachytherapy	
PT.IV.33.	Evaluation of RP services and technical units	15.11.00
PT.IV.34.	Evaluation of companies selling X-ray equipment for purposes of medical diagnosis and providing technical assistance in this area	

Procedure		Date of approval*
PT.IV.35.	Evaluation of installations for the commercialisation of radioactive sources or equipment	
PT.IV.36.	Performance and evaluation of audits and inspections at RPTU's rendering services to X-ray installations for medical diagnosis	
PT.IV.37.	Evaluation of precursors by PSA	
PT.IV.38.	Evaluation of new safety assessment methodologies	
PT.IV.39.	Evaluation of new fuel designs	
PT.IV.40.	Evaluation of proposals for PSA applications	
PT.IV.41.	Use of PSA in inspection	
PT.IV.42.	Inspection of radioactive installation site emergency plans	05.10.00
PT.IV.43.	Preparation, arrangements and dealing with nuclear installation inspection reports	16.02.00
PT.IV.44.	Treatment of deviations deriving from CSN inspections of nuclear installations	03.02.00
PT.IV.45.	Preparation and performance of inspections at nuclear installations	16.02.00
PT.IV.46.	Basic NPP inspection programme	20.03.00
PT.IV.47.	Inspection of in-service inspections	
PT.IV.48.	Evaluation and inspection of the NPP equipment environmental qualification programme	12.02.01
PT.IV.49.	Evaluation of stress and fatigue analysis in components and piping	
PT.IV.50.	Evaluation of stress analysis in piping through application of the LBB criterion	
PT.IV.50.	Classification of events using the INES scale (This has become PA.II.01)	
PT.IV.51.	Criteria for opening and closure of SITES.	
PT.IV.52.	Use of NPP project database	
PT.IV.53.	Evaluation of teletherapy radioactive installations	
PT.IV.54.	Evaluation of radiography and industrial gammagraphy installations	
PT.IV.55.	Evaluation for the control and tracking of X-ray installations used for medical diagnosis	
PT.IV.56.	Evaluation of requests for the homologation of radioactive apparatus	
PT.IV.57.	Evaluation of radioactive installations for nuclear medicine	09.03.01
PT.IV.58.	Evaluation of radioactive installations for metabolic radiotherapy, with patient hospitalisation	
PT.IV.59.	Evaluation of radioactive installations of medical and research laboratories	09.03.01
PT.IV.60.	Evaluation of soil density and humidity measurement installations	

Procedure	Date of approval*
PT.IV.61. Evaluation of radioactive installations for process control	
PT.IV.62. Evaluation of Level 2 PSA's and their application to severe accident management	
PT.IV.63. Evaluation of seismic instrumentation and records	
PT.IV.64. Evaluation of analyses of containment ultimate capacity and structural reliability	
PT.IV.65. Evaluation of plant probabilistic assessment of off-site seismic events	
PT.VI.02. SALEM Technical Manual	
PT.VI.03. REVIRA network Operating Manual	
PT.VI.04. Action of the Operations Analysis Group in NPP emergency situations	31.01.01
PT.VI.05. Coordination of actions for the control and removal of stray radioactive sources or materials	
PT.VI.06. CSN response to the detection of radioactive material in metals for recycling	
PT.VII.01. Evaluation of Radiation Protection Manuals	
PT.VII.02. Evaluation of ALARA criterion application	
PT.VII.03. Inspection and control of NPP liquid and gaseous effluent treatment systems	
PT.VII.04. Evaluation of ERSP results	
PT.VIII.01. Evaluation and inspection of NPP personnel training programmes	25.06.01

* Procedures not having a date of approval are in the phase of development

Article 9. Responsibility of the licence holder

9.1 *Legal and organisational changes occurring during the period*

As was pointed out in section 7.1.2, during the period considered in the present report new Regulation on Nuclear and Radioactive Installations (Royal Decree 1836/1999) has been approved replacing the previous regulations approved in 1972. However, this new Regulation do not introduce any changes as regards the assignment of responsibilities to licensees in relation to the safety of their installations or to the requirements made of the licensee's organisation, which are to be set out in the Organisational Manual of the Installation (see section 9.2). In this respect, what was presented in the first national report continues to be in force.

The nuclear power plant operating permits renewed between 1999 and 2001 continue to identify these responsibilities, establishing that the licensees are responsible for the safety of their installations. Any change in the ownership of the installations must previously be approved by the Ministry of Economy, following a favourable report by the CSN. As has been pointed out, the Organisational Manual of the Installations continue to be considered official operating documents, as a result of which any changes to them require official approval.

As regards the situation of the electricity market, a new regulatory framework has been introduced for the electricity industry with the approval of Law 54/1997. Within this new framework, the recognition of generating costs has disappeared and the price of the electricity produced is established on the basis of the offer and demand. Owing, to a large extent, to the above, there have already been two cases of mergers between plant operators (Ascó - Vandellós II and Almaraz – Trillo), and the possibility of others occurring in the future cannot be ruled out. In each of these cases a single organisation has been set up for the management and operation of the affected plants, composed of personnel from what were originally two different operators. In parallel to these mergers there have been processes of early retirement of the personnel. The fundamental changes arising as a result of the mergers have been felt at the head offices of the companies, although there has also been some impact on the plant personnel and on the policies of contracting external services. This matter is dealt with in the chapter corresponding to Article 11.

9.2 *CSN regulatory strategy regarding the organisation of the licensee*

The Organisational Manual of the Installations constitute a legally required official operating document. This document contains the definition of the job posts and associated responsibilities, the organisation of the personnel at the installation, the licensed and non-licensed personnel training programmes and the operating and radiation protection standards for normal and accident conditions. The fact that any changes to this document are subject to a formal process of approval facilitates the tracking and control by the CSN of any changes occurring in the organisation and management of the installation that might negatively affect its safety.

In this context, the period considered in the report has seen issuing by the CSN of safety guide GS-1.13, “Content of nuclear power plant organisational manual”. Its main objective is to define a set of criteria bringing uniformity to the content of the Organisational Manual of the Installations that were in operation. This was so because, firstly, there were significant differences in the content of the regulations of the different installations and, secondly, because the effects associated with liberalisation of the economic framework of the electricity industry reinforced the importance of tracking and control of organisational changes occurring at nuclear installations.

Furthermore, in order to strengthen the tracking of the mergers between nuclear power plant operators, mentioned in section 9.1, the CSN, aware of the impact that these processes might have on safe operation, initiated a programme of inspections of those merger processes that had already taken place, this serving as a basis for a study of the effects and consequences for safety. Within this programme, studies have already been carried out at the Almaraz and Trillo plants, in May 2000, and at Ascó and Vandellós II, in April 2001.

Taking advantage of the lessons learned from this process, the aforementioned inspection programme was later extended to include other plant-operating organisations that, although not affected by merger operations, foresaw reductions in their personnel or significant changes to their organisational framework.

One of the most relevant consequences of this inspection programme was the request issued to all the nuclear power plants for the preparation and submittal to the CSN of a document analysing the minimum requirements, in terms of technical capacity and staffing, to be met by each department in the organisation in order to guarantee the safe operation of the installation.

Once these documents were received from the plants, a working group was set up at the CSN to undertake their evaluation. The objectives of this group are to establish criteria and assess the documents submitted by the licensees. The conclusions of this work are expected to be available by December 2001, and will serve as a basis for future standards development in this area.

In addition, the CSN has established that the plant owners must analyse, justify and document all reductions in the personnel performing safety-related functions at their installations. This is applicable even in those cases in which such reductions do not require previous authorisation due to their not implying changes to the Organisational Manual in force at the corresponding installation.

9.3 Licensee responsibilities for nuclear damages

The economical responsibility of the licensees for nuclear damages of their installations was modified by the Electricity Industry Act of 1997. Thus, in Article 57 of the Nuclear Energy Act the amount of coverage required of the nuclear installations is modified, increasing to a minimum 25 thousand million pesetas, and empowers the Ministry of Economy the impose a coverage of no less than one thousand million pesetas for the transport of material or other activities relating to the use of nuclear energy.

9.4 Degree of compliance with the obligation of the Convention

As was indicated in the first national report, Spain meets the requirements of the Convention as regards the regulations and practices applied in relation to the responsibility of the licensees for the nuclear safety of their installations. In fact, with the improvements introduced during the period and described in the previous paragraphs, Spain may be said to have improved the degree of compliance with the requirements established in this article in relation to licensee responsibilities.

c) General safety considerations

Article 10. Priority to safety

10.1 Main activities performed by the licensee during the period in relation to the safety culture

During the period covered by this report, the licensees have undertaken on-going improvement programmes of varying scope, at their own initiative, with special emphasis on any matter relating to safety issues and on training, through diffusion of the concept and the strengths and weaknesses of the safety culture and of human errors management.

The on-going improvement processes require mechanisms for the critical comparison of activities and results with the previously established goals, the aim being to determine at all times the degree of progress made with respect to the objectives of the organisation.

In this respect, the different licensees have carried out all or some of the following activities:

- Establishment and diffusion of the mission and vision of the organisation, as maximum long-term objectives, and definition of the policies applicable to issues such as nuclear safety, radiation protection, human factors, quality and the environment.
- Drawing up, diffusion and periodic review of the organisation's Strategic Plan, establishing specific medium-term courses of action, with the objective of complying with the mission and the vision and adhering to the policies defined.
- Establishment and tracking, at the different levels of the organisation, of short-term improvement objectives, in accordance with the Strategic Plan.
- Establishment of an overall assessment scheme with the pyramid structure shown in figure 10.1. The examples of external assessments shown in this figure refer to activities such as the OSART missions, WANO Peer Reviews (table 10.1), certification of quality management systems, environmental systems or systems for the prevention of occupational risk in accordance with the ISO standards, etc. The independent internal assessments refer to the activities carried out by Quality Assurance organisations and others such as the Operator's Nuclear Safety Committees.
- Establishment of formal self-assessment programmes based on the following basic elements:
 - Performance indicator programmes covering the general processes at general and specific level and allowing problems to be anticipated.
 - Individual, service and department improvement objectives.
 - Self-assessment activities matrix, constituted by the different activities performed continuously or periodically by each organisational level.
 - Periodic self-assessment reports evaluating the evolution of the indicators and the degree of compliance with the improvement objectives, along with the most

significant results of the activities contemplated in the self-assessment matrix or other elements such as the implementation of past or future corrective actions.

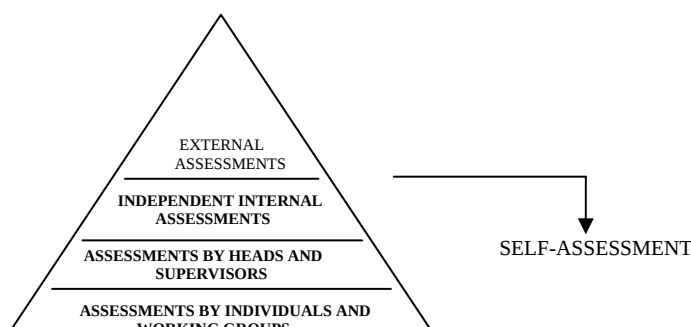


Figure 10.1

Plant	Assessment	Date
Almaraz	OSART (OIEA)	1987
Cofrentes	OSART (OIEA)	1990
Garoña	Peer Review (WANO)	1996
Ascó	OSART (OIEA)	1998
Vandellós II	Peer Review (WANO)	2001
Trillo	Peer Review (WANO)	2001
Almaraz	Peer Review (WANO)	2002
Garoña	OSART (OIEA)	Scheduled for February 2002

Table 10.1: External safety reviews of Spanish nuclear power plants:

The five courses of action described in the previous sections make up a typical PDCA (Planification, Development, Control and Adjustment) scheme for self-assessment and on-going improvement, which should allow for the prompt detection and correction of adverse trends in the operation of the organisation. The scheme applied in these processes is represented in figure 10.2.

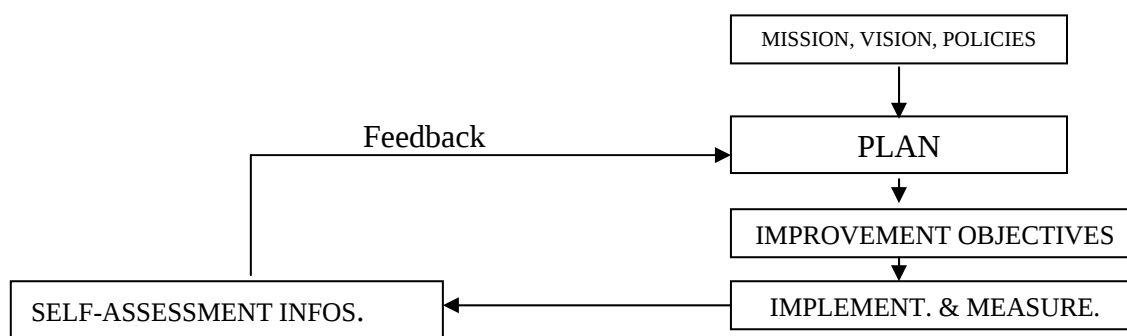


Figure 10.2

10.2 Regulatory control of licensee activities

The CSN is kept informed at all times of the initiatives taken by the licensees in relation to the maintenance and improvement of the safety culture within their organisations, as well as of the self-assessment activities carried out. Nevertheless, for the time being the CSN has not established any specific requirements in this area, which will need to be developed in view of the experience and results of the programmes implemented at the installations.

Furthermore, it is important to bear in mind that the ESFUC programme (systematic evaluation of plant operations) described in detail in section 19.3, does contemplate a detailed assessment of the performance of the operator's organisation from the results of the inspections, and evaluation of the way in which the safety culture concept is applied to all operating activities carried out at the installations. This programme includes assessment, for each of the five functional areas around which it is structured, of aspects such as the management commitment to improving quality and safety, the self-assessment capacity of the operator, the human resources of the organisation, and personnel training and qualification programmes. This allows the CSN to continuously monitor the application of the safety culture concept by the operator. Assessments of the programme are based on inspection reports and on reports drawn up by the inspectors themselves, in which they provide information on the performance of the licensee in relation to the issue inspected, including an analysis of the human resources available, the technical preparation of the personnel covered by the inspection, the quality and level of the documentation revised, the willingness and capability of the licensee to detect deficiencies, the corrective measures adopted and the diligence shown in their implementation. The results of the overall evaluations corresponding to each ESFUC assessment period are sent to the licensees for the implementation of corrective measures.

10.3 Degree of compliance with the obligation of the Convention

As indicated in the first national report, Spain meets the requirements of the Convention as regards all the activities of the licensees complying with the principle of priority for nuclear

safety. Furthermore, the CSN carries out a continuous and systematic analysis of the activities of the licensees, this allowing it to verify adherence to the aforementioned principle. With the modifications made during the period and described in the previous paragraphs, Spain may be said to have improved the degree of compliance with the requirements established in this article.

Article 11. Financial and human resources

11.1 Significant changes during the period to the financial and human resources of the licensee. The effect of deregulation of the electricity market on licensee policy

The deregulation of the electricity market is bringing greater competitive pressure on the plant operators. The mergers between plant operators already mentioned in section 9.1, among other consequences, have occurred as a result of this.

The generic objectives of these mergers have been to improve the management of assets through greater economies of scale. A worrying result of these mergers, however, has been a reduction in personnel resources. Although these reductions have mainly affected the personnel working at the corporate head offices: administration, support services, configuration control, etc., it is no less true that there have been reductions in the technical personnel, or such reductions are planned, this especially affecting those of lower qualification, such as auxiliary maintenance personnel, etc. It should also be pointed out that similar personnel reductions have occurred in certain cases at plants that have not undergone merger processes.

As a general practice, the practice applied in reducing the personnel as a result of mergers has been not to replace job post incumbents lost through the system of early retirement when the functions performed by such personnel may easily be contracted externally and there is a guarantee of the availability of specialists on the market. On the other hand, in all cases the installations have maintained the personnel considered essential for the organisation to retain basic technological know-how, from the point of view of safety and general plant knowledge, with the dual objective of not depending on third parties for planning, assessment, decision-making, etc. in relation to key operational issues and, at the same time, of being able to act as an intelligent customer when contracting external products or services.

As regards the investments made in safety by the operators, until the end of 1997 the funding of safety improvements introduced at the installations during their operation was covered by the system regulating the electricity industry, this being recognised as constituting an extraordinary investment with costs included in establishing the electricity price. This system disappeared at the beginning of 1998 as a result of liberalisation of the electricity market and has posed a serious challenge for the utilities, since they are responsible for guaranteeing the maintenance and updating of safety conditions within a competitive framework, in which the nuclear installations are required to operate safely but also profitably. It should be pointed out, however, that to date the CSN has not observed any significant reduction in safety-related investments during the period corresponding to this report.

11.2 Significant changes during the period in licensee personnel training programmes

Various modifications have been introduced in training of the personnel of the installations during this period, some due to the entry into force of the new Regulation on Nuclear and

Radioactive Installations and others as a result of CSN decisions and agreements reached with the licensees. As a result of the modifications made to the regulations, the licences for nuclear power plant operators, which used to be awarded for a two-year period, are now issued for three years, on the condition that the candidate has occupied the job post for which the license is granted for at least half the period of validity without continuous interruption of more than one year. In addition, a mechanism has been agreed on with the nuclear sector for the so-called turbine operators also to have an operating licence restricted to their job post, such that the requirements regarding qualification and initial and on-going training applicable to them be regulated also by Safety Guide GS-1.1 on “Qualifications for the granting and use of nuclear power plant operating personnel licences”.

As regards the training programmes for licensed personnel, Safety Guide GS-1.1 is being revised to adapt it to the aforementioned changes introduced by the new regulations, such as the inclusion of requirements for turbine operators and the updating of the set of cognitive aspects to be covered in both initial and on-going training, with an increase in the number of hours dedicated to training on full-scope simulators, due to the demonstrated importance of such training tools from the point of view of safety. At present, the revision of GS-1.1 is in the phase of comments from outside the CSN, and it is expected to enter into force during the year 2002.

Following evaluation of the operator policy in relation to training simulators, the CSN took the decision to require that each plant have a specific full-scope simulator replicating its control room. In this respect it is expected that all the Spanish nuclear power plants will have such training tools by the year 2004, which will guarantee an adequate operator response to off-normal and emergency situations and reduce the probability of human errors associated with training on simulators not replicating the specific plant. As a special case, and in view of the expectations for the remaining service lifetime, the José Cabrera plant has been authorised to use a virtual simulator with touch screens instead of a full-scope unit.

As regards personnel training programmes, some licenses have, on their own initiative, undertaken the performance of systematic analyses based on the methodology described in 10 CFR 50.120, and also adopted by the IAEA. These analyses have initially been restricted to personnel holding an operating licence. With respect to the rest of the personnel, the nuclear sector has drawn up a guideline generally setting out the minimum training requirements for the typical job posts of an installation. The contents of this guideline have been revised by the CSN and considered acceptable.

At present, a mixed group including CSN and industry representatives is drawing up a document which will establish the minimum qualification requirements for external contracted personnel to work at nuclear power plants, which is of fundamental importance in the current context. This document will serve as a basis for a new industry guideline similar to that mentioned above. The principles governing its contents may be summarised as follows:

- The qualifications demanded of contracted personnel should be similar to those of the plant personnel carrying out the same functions at the nuclear installation.

- The degree of supervision required for contracted work will be lower the higher the qualification for its performance accredited by the contracted workers.

11.3 Regulatory control of licensee activities

With regard to the human resources of the licensee and the technical capabilities of such personnel, the following requirements were established by the CSN in July 2000, as mentioned in section 9.2:

- Requirement of a report to be issued by the licensees of each plant analysing technical capabilities and the minimum resources required for safe plant operation.
- Establishment of any reduction in the human resources dedicated to tasks relating to nuclear safety or radiation protection must be analysed and documented by the operator prior to implementation.

The need for these requirements stems from the need to analyse the effects of personnel reduction processes on plant operation, especially in the case of those operating companies that have recently merged. The CSN is currently evaluating the documents submitted by the licensees. In addition, inspections continue to be performed with respect to the plant operating organisations, in line with those already carried out on the merged organisations of the Almaraz-Trillo and Ascó-Vandellós II plants.

As regards financial resources, no specific regulatory action has been taken to date. However, as pointed out in Article 9 in relation to possible changes in ownership of the installations, any modification to the structure of plant ownership and whatever conditions are deemed to be necessary to guarantee the safe operation of the installations may be imposed, including economic conditions.

In relation to personnel training, improvements are being made in the definition of training requirements through the guidelines described in the previous section, and compliance with the requirements established by each plant is continuously verified through specific inspections, which are performed every two years. Likewise, detailed inspections have been carried out on the status of training simulators and on the training sessions performed on them, the objective being to establish the specific requirements to be made of each plant in order to ensure that they each have by the year 2004 a specific control room simulator, excepting José Cabrera plant that will have a virtual simulator.

11.4 Degree of compliance with the obligations of the Convention

As was indicated in the first national report, there are no measures of legal standing in Spain that oblige operators to maintain previously established financial resources during plant operation in order to guarantee safety. Nevertheless, the activities of the licensees themselves under the principle of the responsibility of the operator and the CSN's actions within its surveillance and control function ensure the permanent availability of the funds and resources required to guarantee the safe operation of the installations.

With the modifications made during this period, Spain may be said to have improved the degree of compliance with the requirements established in this article in relation to the financial and human resources applicable to nuclear installations.

Article 12. Human factors

12.1 Significant licensee activities during the period in relation to human and organisational factors

The Periodic Safety Review process, associated with the renewal of Operating Permits for each Spanish nuclear power plant, includes a safety assessment and improvement programme relating to organisation and human factors. With a view to facilitating the development of such programmes, the CSN issued a detailed document to the licensees listing the considerations to be taken into account in drawing up the programmes.

During this period the licensees of the Spanish nuclear power plants have responded to this requirement by way of a series of basic actions. These actions may be summarised as follows, generically and for each plant (albeit with certain specific characteristics in some cases):

- 1) setting up of an organisational unit responsible for organisational and human factors issues, its functions being formalised in a new revision of the Organisational Manual,
- 2) minimum initial staffing of this unit with in-house personnel,
- 3) attendance at training courses on these disciplines.
- 4) design of a safety assessment and improvement programme in relation to organisation and human factors,
- 5) setting up of a plant management committee on these disciplines,
- 6) identification of on-going and new projects to be addressed in this area, in relation both to regulation in the strictest sense and to improvement through new developments and R&D,
- 7) drawing up of internal procedures governing the operation of this organisational unit and its relations with other departments,
- 8) coordination of activities at sector level.

Likewise, a mixed working group has been set up during the period, including CSN technicians and the technicians responsible for organisation and human factors services at the Spanish nuclear power plants, the objectives being to facilitate the coordinated and progressive development of organisation and human factors programmes at these installations and to maintain a forum for the exchange of experience among specialists in these disciplines.

The objective of these programmes is to guarantee that adequate measures are adopted for evaluation of the capabilities and limitations in human performance throughout the lifetime of the nuclear installation, the person being considered both as an individual and as a member of working groups and of a complex organisation and system.

The implementation of these programmes is considered to be an adequate way of achieving the ultimate objective, inasmuch as the responsibility of the licensee in this area is made more tangible, the continuity of actions sponsored by management is promoted and

knowledge of the disciplines is made to reside in the licensee himself (intelligent customer concept), this being an essential characteristic to achieve the proactive attitude required for suitable treatment of these matters.

In addition, and as pointed out in Article 9, there has been a process of nuclear power plants integration, initiated by the licensees of certain utilities as a result of deregulation of the Spanish electricity industry. These are lengthy processes, lasting some five years, with significant implications as regards organisational aspects: the establishment of common policies and strategies, the modification of organisational structures, the exchange of experience and standardisation of practices and procedures, staff reductions through early retirement, the contracting of new personnel, knowledge management and the optimisation of contracting resources, etc.

12.2 Regulatory control of licensee activities

As regards organisational aspects, since 1990 the CSN has had a specific group of technicians in charge of issues relating to human factors. The role of the regulatory authority in this area is similar to that it has in other specialities. The CSN undertakes tracking of the human factors-related requirements and standards issued in the country of origin of the projects, as well as of international practices. The operator is responsible for performance of the necessary actions and the CSN's function is to assess whether these actions are adequate.

In this respect, throughout this period the CSN has continued its assessment tasks in relation to human reliability analysis, the design of control rooms and SPDS's (safety parameter display systems), human factors in operating events, etc., and has initiated the evaluation of organisational design changes at nuclear power plants by means of multidisciplinary teams of specialists.

In addition, and as may be deduced from section 12.1, within these disciplines the CSN is promoting the organisation, capacities and initiative of the licensees in order for safety improvement projects to be addressed. Regulatory control oriented towards the processes of the licensee is becoming an additional or complementary approach in the field of human and organisational factors.

The requirements applied to human factors aspects have evolved along with the practices established in the countries of origin of the technology and at international level. In those areas in which clearly defined requirements were in place, these have been implemented, the CSN evaluation has been completed practically in its entirety and the phase of resolving pending items is now under way. In other more complex and novelty areas, work continues on research projects, which are providing satisfactory results and will facilitate new improvements. Thus, for example, a technical procedure for the analysis of human commission errors in PSA's is expected to be finished by November 2001, and during this period a methodology has been adapted to the national environment for analysis of the impact of organisation on safety and a pilot experience has been successfully applied at a Spanish plant, etc. Having said this, the systematic review of internal and external operating experience has made it possible to identify and correct situations in which human factors had not been adequately taken into account in the design and operation of the installations.

During the period, and in collaboration with the licensees of the Spanish nuclear power plant, the CSN has continued to sponsor and direct R&D projects in areas of common

interest to both, such as human commission errors and the identification of methodologies for analysis of the impact on safety of organisational factors.

12.3 Degree of compliance with the obligations of the Convention

With the modifications made during this period, Spain may be said to have improved the degree of compliance with the requirements established in this article, in relation to human factors applicable to nuclear installations.

Article 13. Quality assurance

13.1 Significant licensee activities during the period in relation to quality systems

As has been pointed out above, during the last two years there have been two cases of business integration that have affected the management of four of the seven nuclear power plants existing in Spain. As regards the quality assurance organisations, the consequence of these phenomena of integration has been a modification of their organisational structures, the optimisation of their functions and, as a result, and in certain cases, a reduction in human resources.

In the new companies the quality assurance organisation has a Quality Director who, in most cases, reports directly to the General Manager. Under the responsibility of the Quality Director is a quality assurance unit performing functions common to the plants managed, such as supplier evaluation and auditing of the activities performed by the common units, and a quality assurance unit for each plant.

As regards functions, it should be pointed out that the direct supervision of safety-related activities has always been, and continues to be, one of the main functions of the quality assurance organisation, although there is a downward trend in this activity and an increase in auditing activities, especially process audits. By increasing their auditing activities and with the performance of direct sampling-based supervision and root cause analysis of deviations detected, these quality assurance organisations consider that they are capable of evaluating the degree of implementation and the effectiveness of the quality systems.

Furthermore, and as in other industrial sectors, the nuclear power plants are implementing total quality practices, incorporating on-going improvement and self-assessment. These new practices are occasionally implemented by organisations different from those dedicated to assuring the level of quality required to guarantee the safety of the installation.

13.2 Regulatory control of licensee activities

13.2.1 Changes in regulatory provisions

With the entry into force of the new Regulation on Nuclear and Radioactive Installations (RNRI), changes have occurred in relation to quality assurance requirements, the most important being as follows:

- **Construction permit:** the previous edition required that the request be accompanied by a description of the organisation foreseen by the requesting party to supervise the project and guarantee quality during construction. The current edition explicitly requires that a construction quality assurance programme be submitted.
- **Operating permit:** in the previous edition this was known as the start-up permit and did not explicitly establish quality assurance requirements, although in practice these were applied to all the installations. The current edition, however, explicitly requires the submittal of a quality assurance manual establishing the scope and content of the quality programme applicable to testing and operation of safety-related systems,

structures and components and of the design, manufacturing, construction, testing and operation of modifications thereto.

- **Modification permit:** this authorisation was contemplated not in detail in the previous edition of the RNRI. In the current edition it authorises the licensee to introduce modifications in the design of the installation or in the operating conditions, in those cases in which the criteria, standards and conditions on which the operating permit is based are altered. The RNRI does not establish any quality assurance requirements for the awarding of this permit, since the changes are considered to be carried out within the scope of the quality assurance programme of the installation. The practice is, however, to require the submittal of a specific quality plan for those modifications for which this is considered necessary, in view of their scope or complexity.
- **Modification performance permit:** the previous edition of the RNRI did not contemplate in detail this type of authorisation. In the current edition, this authorisation allows the licensee to initiate the performance and erection of those modifications which, because of their wide scope or because they imply significant works and erection activities, are considered to require express authorisation in the opinion of the Directorate General for Energy Policy and Mining from the Ministry of Economy or of the CSN. Requests for such authorisation are required to be accompanied by a document describing the foreseen organisation and the quality assurance programme for performance of the modification.
- **Dismantling permit and declaration of decommissioning:** the previous edition of the RNRI did not contemplate this type of authorisation. The current edition requires the submittal of a request for authorisation for dismantling and another for decommissioning. The documentation to be submitted with the request includes a quality assurance manual for the activities involved.
- **Authorisations for equipment for radioactive purposes:** the previous edition of the RNRI required authorisation by the Ministry of Industry and Energy for the manufacturing of apparatus, equipment or accessories to be used specifically for nuclear or radioactive purposes, following a mandatory report from the CSN. In preparing such reports, the CSN evaluated and inspected the manufacturers' quality assurance programmes.

The current edition of the RNRI does not require this authorisation, and contemplates only the inspection of the work centres of suppliers of equipment and services relating to the safety of the installation. Access for the inspectors to the suppliers' facilities is to be facilitated by the nuclear installations to which the safety-related equipment or services are supplied.

The manufacturing of apparatus, equipment or accessories containing radioactive substances or generating ionising radiations, including the manufacturing of nuclear fuel elements, does require a mandatory authorisation.

Likewise, authorisation is required for the importing, exporting, movement within the European Community, commercialisation and any type of transfer of radioactive materials.

13.2.2 Changes to operating permits

In recent years the Operating Permits of the nuclear power plants have been renewed, in accordance with the RNRI currently in force. In the new Operating Permits, the quality assurance manuals continue to be official operating documents whose requirements have to be met, although the licensee may, under his own responsibility, make modifications to these manuals, as long as the changes do not reduce the commitments contained in the quality assurance programme in force. Any changes reducing such commitments must be favourably evaluated by the Nuclear Safety Council prior to the entry into force.

In this respect, the commitments are understood to be those contained in the quality assurance Manual in force, in the form of applicable standards and guidelines, and the very description of the programme reflected in the contents of the Manual, as specified in the complementary technical instructions issued by the Nuclear Safety Council for this purpose.

Revisions to the quality assurance Manual must be submitted to the Nuclear Safety Council within one month of their entry into force.

13.2.3 Regulatory control activities

The assessment and inspection activities carried out by the CSN follow the same systematic approach and have the same objectives as in previous years, although special emphasis is being placed on tracking of the results of changes in the quality assurance organisations of companies involved in integration processes.

The review of CSN safety guides in relation to Quality Assurance continues, with a view to adapting them to new international trends in this area.

13.3 Degree of compliance with the obligations of the Convention

Spain is considered to have improved the degree of compliance with the requirements of Article 13 of the Convention for the following reasons:

- The Spanish legislation, through the new Regulation on Nuclear and Radioactive Installations, currently requires that, throughout the lifetime of the nuclear installations and for any modification to them, quality assurance programmes applicable to all activities of importance to the nuclear safety of these installations be set up.
- Through its assessment and inspection activities, the CSN verifies compliance by these programmes with the applicable standards and checks their degree of implementation and efficiency.
- In order to facilitate the implementation of the quality assurance programmes, the CSN draws up safety guides and keeps them updated in accordance with new international trends in this area.
- The CSN monitors new trends in quality assurance, in order to assess and control their application at the Spanish nuclear installations.

Article 14. Assessment and verification of safety

As is indicated in point 7.2, the granting of an Operating Permit is subject to a process of licensing with several stages. This process has been revised and updated in the new Regulation on Nuclear and Radioactive Installations.

The operating permits include both the applicable limits and conditions and the period of validity. Current practice is to extend the validity of the permits for a period of ten years when they are renewed, coinciding with the PSR, as detailed in Article 8. Furthermore, these operating permits indicate that new requests are to be accompanied by a periodic safety review of the plant, a revision of the probabilistic safety assessment, an analysis of the ageing of the safety-related components, systems and structures and an analysis of the operating experience accumulated.

The operating permits granted to the plants are all similar in their structure and contain as appendices the limits and conditions that are necessarily to be fulfilled (see Appendix 19.A). Some of these conditions are to be fulfilled immediately while others are associated with a fixed time period. The permits also define the revisions in force of the official documents to be adhered to in performing operations activities (Safety Report, Organisational Manual, Operating Technical Specifications, Site Emergency Plan, Quality Assurance Manual, Radiation Protection Manual and Radioactive Waste Management Plan). Modifications to the Safety Report require approval only if associated with design modifications requiring such approval. Any modification or change to the Organisational Manual, Operating Technical Specifications or Site Emergency Plan must be approved by the Ministry of Economy, following a report from the CSN, prior to entry into force. In addition, each permit establishes the reports (periodic or otherwise) to be submitted to the CSN. These reports are evaluated by the CSN and may lead to meetings with or inspections or audits on the licensee, as applicable. One of the conditions contained in each permit refers to the powers assigned by law to the CSN to directly issue complementary instructions to the licensee in order to guarantee adherence to the safety conditions or technical requirements of the installation and better compliance with the requirements established in each authorisation.

Prior to each renewal, the licensee is required to demonstrate compliance with all the conditions. For its part, the CSN carries out a detailed assessment of the state of the plant and of compliance with the conditions, the results being reflected in the technical evaluation proposal that serves as a basis for granting the corresponding permit.

According to the new Regulation, design modifications may require express authorisation when they affect nuclear safety or radiation protection. The new Regulation include the need to perform an analysis in order to demonstrate that, following the change, the criteria, standards and conditions on which the original permit was based continue to be met. If these requirements are not affected by the design modification, the latter may be carried out by the licensee, who is obliged to report periodically on the status of their performance. Otherwise, authorisation must be sought for the modification prior to its entry into service.

14.1 Licensee modifications to the safety assessment and supervision system during the period. Updating of licensing basis and documents

As was indicated in the first national report, the CSN issued the draft Safety Guide GS-1.11, with recommendations regarding the performance of safety assessments for design modifications at the plants. As a result of this, and prior to the entry into force of the new Regulation, each licensee had already initiated a process of adaptation of the internal procedures for the administration and management of design modifications, in keeping with the aforementioned safety guide. This process was subsequently completed with adaptation of the procedures in use for the performance of safety assessments in response to changes in operating conditions affecting nuclear safety or radiation protection, including the performance of tests, with respect to the requirements of the new Regulation.

During the period corresponding to this report, the nuclear power plant operators have initiated different Probabilistic Safety Assessment (PSA) applications in support of their licensing processes. These have consisted of the performance and submittal of various risk-informed modifications, among them valve testing, the verification of check valves, extension of the inoperability periods for certain components required by the Operating Specifications or In-Service Inspection practices. These requests were initiated during 2000 and 2001 following adaptation to each particular case of an assessment and application methodology deriving from the one used by the NRC. The preliminary validation of this methodology has been accomplished through a pilot experience.

As has been described in point 6.2 of this report, one activity initiated at each of the plants, promoted by the CSN, has consisted of updating the design basis and licensing documents of each licensee. The objective of this activity is to compile design and licensing bases for each safety-related system. In this context, licensing bases are understood to be licensing requirements applicable to design, such as codes and design standards, and requirements deriving from the new regulations and those requested by the CSN.

Updating of the design bases requires verification of the hypotheses, data and results of accident analysis included in the Safety Report, the identification of the design bases for support components necessary for safety functions to be performed and the design modifications incorporated in safety-related systems. Also included is the revision of the current physical reality of each of the systems and of the operating procedures, in order to reconcile operating practices and systems design. The final product of this process is an updated content of the Safety Report that is sufficiently verified and consistent with the design basis documents. Furthermore, the design modifications affecting the systems, and their repercussions, are identified, as are the licensing requirements demanded of each system.

14.2 Most significant results of these programmes. Results obtained from the Trillo NPP Operating Experience and Systems Analysis (OESA)

As a result of the publication of the GS-1.11 Safety Guide with recommendations to in the safety assessment of design modifications, the overall management of and documentation

associated with such modifications have become a much more complete issue involving each of the departments affected.

As regards PSA applications in risk-informed modifications, a methodology has been drawn up along with guidelines for performance. The corresponding assessment has been subjected to process of validation through pilot experiences. The personnel of the CSN have intervened actively in these activities, which will foreseeably facilitate the assessment of future applications. At present, the experience available is insufficient, as regards the number of such applications, to draw any definitive conclusions, but these applications are expected to increase in number in the near future.

As a result of updating of the safety-related systems design bases, a performance programme has been set up at each plant for resolution of the most significant discrepancies encountered, with specific schedules. The nuclear power plant owners have already completed this updating process, which is currently being revised by the CSN. The final result will culminate with the publishing of a revision of the Final Safety Analysis Report (FSAR) in which these Design Bases will be reflected. Furthermore, a compilation of the Licensing Bases applicable to each system will be made available.

As was pointed out in the previous report, an operating experience and systems analysis programme (OESA) was carried out at Trillo NPP between 1996 and 1999, due to the discovery of certain deficiencies in design implementation for certain components. This has meant the complete revision of the safety-related systems, in order to check for compliance with the project design criteria. Revision of the six major areas led to the identification and documentation of almost 400 discrepancies. Although most of these were documentary in nature, design modifications of limited scope were performed to resolve a large number of them.

In certain systems, in which it was necessary to incorporate a design change of some significance in order to guarantee functional compliance, the redesign of the whole system was considered from the start, instead of detailed analysis. The most important modifications are described below:

- Redesign of the essential cooling water system to adapt it to plant needs, this consisting of establishing new flows in the heat exchanger interfacing with the component cooling water system. In addition, design improvements were carried out, such as the replacement of valves, the establishment of automatic control for the fourth redundancy level recirculation pump, temperature control for the cooling tower fans, protection against frost, etc.
- Redesign of the air-conditioning system in the emergency building to adapt it to the new standards, consisting of the incorporation of new chillers, improvements to the instrumentation cabinet ventilation, improvements to the fire doors and fan motor replacements.
- Redesign of the alternating current safeguards system, incorporating new transformers and a.c. distribution busses (660 V and 380 V), new load distribution, improvements to wiring and increased capacity for the emergency system distribution busses.

All of these redesigns were subjected to a process of approval through the corresponding request and assessment by the CSN. All of the deficiencies detected within the OESA

programme were definitively solved during the refuelling outage in February 1999, with the exception of certain minor modifications that were resolved at a later date.

Following the completion of the OESA programme, when renewing the Operating Permit for Trillo NPP in 1999, the plant was required to submit a Periodic Safety Review and a revision of the probabilistic safety assessment study one year before any further renewal.

Also required was the implementation of design modifications deriving from the Severe Accidents Programme and the development of a Severe Accidents Manual, along with the availability of a plant replica simulator for the training of operations personnel, which would have to be operable by the year 2004.

14.3 CSN supervision activities and results obtained. Probabilistic studies completed during the period

As was indicated in the first national report, in view of the characteristics of the system for granting permits and authorisations applied in Spain since the beginning of plant operations, the regulatory body has carried out direct monitoring and on-going assessment of the operation of the plants.

The Spanish nuclear power plants are subject in practice to continuous and permanent assessment in two different ways: one through the granting of operating permits, which in the new regulation are known as authorisations, and the other through an Inspections programme described in Article 7. In the case of Trillo NPP, the direct monitoring of the OESA programme by the CSN was accomplished by the resident inspector as a standard verification activity. In parallel to this, the plant kept the CSN periodically informed through a monthly report, the notification of events detected and numerous meetings. During this period the CSN made significant efforts in relation to the programme, as regards both inspection and the evaluation of activities.

Probabilistic Safety Assessments completed during the period

The Integrated Probabilistic Safety Assessment Plan was described in the first national report, and contemplates the use and the applications expected from the PSA models once developed. The foreseen applications were to be based on the large capacity of these risk assessments to discriminate the importance, or contribution, for risk of different design and operating aspects of the installation.

Table 14.1 shows the overall quantitative results obtained from the PSA Level 1, expressed in terms of core damage frequency, following CSN assessment and revision.

The new revision of the Integrated Plan, issued in 1996, places emphasis on the applications. As regards the performance of PSA's, it establishes a common scope to be applied in the medium term in the PSA's of all the plants. The PSA's are to be level 1 and level 2 assessments for all reactor operating modes, not only full power, and with consideration given to all possible risks arising from off-site events and all other sources of radioactive products in the plant.

The PSA's, as detailed tools for the assessment of the design and operation of each plant, must be updated with some frequency, in order to incorporate design and procedural

modifications. The application of PSA's to different fields requires an on-going process of maintenance and updating, known as the "Living PSA".

José Cabrera NPP	8.76 E-5
Sta. M ^a de Garoña NPP	3.23 E-6 *
Almaraz NPP	3.78 E-5
Ascó NPP	5.51 E-5
Cofrentes NPP	2.13 E-6
Vandellós II NPP	3.66 E-5
Trillo NPP	4.34 E-5 **

* 1998 version, under revision by the plant following the CSN assessment

** Pending conclusion of the CSN assessment

Table 14.1: Core damage frequency (reactor/year)

In accordance with the scope established in the second edition of the integrated plan, the PSA's level 2 have been performed at all the Spanish plant and evaluated by the CSN, the only evaluation pending completion being the one for Trillo, due in part, as occurred with the level 1 assessment, to the termination of the OESA programme. The PSA level 2 evaluations have concluded that it is not necessary to implement relevant design modifications at the plants, such as containment vents, hydrogen burners, etc., in addition to those already performed.

All the Spanish PWR plants are currently planning the performance of PSA's level 1 for operating modes other than full power (APSOM). This situation has been reached following a joint analysis by a mixed CSN and plant working group and following the performance of a pilot project at the Ascó plant. This project was evaluated by the CSN and its technical procedures, once revised in the wake of the evaluation will be used for the APSOM's of the other PWR plants. Initially, performance of the APSOM for Almaraz will begin in the year 2001, the one for José Cabrera in 2002 and the Trillo assessment in 2003. The date of the assessment for Vandellós, the revision of a previous and incomplete APSOM, remains to be decided.

As regards the BWR plants, a pilot project has also been performed at Santa María de Garoña, evaluation of which has just begun at the CSN. Following this process, a decision will be taken regarding the performance of the APSOM at the only other plant remaining in this respect, i.e., the BWR GE Mark III of Cofrentes.

Pilot projects are also being launched within this mixed working group for other aspects included in the scope established in the integrated plan, with a view to verifying methodologies. Thus, analysis of other radioactive sources at Cofrentes NPP is currently

being performed, for decisions to be taken subsequently regarding performance at the other plants. In the future, this approach is expected to be used to verify the methodology of the level 2 assessments, off-site events and APSOM's, along with analysis of off-site events in other operating modes.

In evaluation of the level 2 studies, certain aspects of the progression of the severe accident for which the current level of knowledge is still somewhat limited are highlighted, this constraint not invalidating the implementation of the management guidelines for these accidents. These limitations in the understanding of certain aspects of the phenomena involved are not exclusive to any given plant, but are in general the same as those identified in other countries. This does not imply that the vulnerabilities are the same, since the specific characteristics of each plant might give rise to different responses to severe accident phenomena.

As regards PSA applications, methodologies have been tested in the pilot projects and these tests have already given rise to official requests for use of PSA's in changes to the Operating Technical Specifications, the piping In-Service Inspection Manual or the In-Service Inspection Manual for the testing of valves and pumps at various plants. These applications are currently being evaluated by the CSN.

14.4 Results obtained from Periodic Safety Reviews

In accordance with the contents of CSN Safety Guide 1.10, the periodic safety reviews of the nuclear power plants are drawn up every ten years. These periodic reviews do not aim to replace the practices of analysis, control and surveillance that are continuously performed at the plants, but are designed to undertake an overall assessment of the safety of each plant and of the possible improvements to be introduced in view of their current status.

As indicated in Article 6, during the period of this second report the evaluations of the first Periodic Safety Review, in accordance with GS-1.10, have been completed at all the plants except Trillo NPP, submittal of which is expected during the year 2003. In all cases documentation has been submitted to the CSN covering all the aspects contemplated in the applicable Safety Guide. The time period considered in most cases has been longer than ten years, since this covers from one year prior to completion of the term of the authorisation to initiation of commercial plant operation or the moment of performance of a systematic evaluation process (SEP) at the older plants. In all cases it has been necessary to compile a great deal of documentation, especially on the design modifications made at the plant.

Evaluation of the PSR's has been carried out in accordance with the corresponding programme and the results have been taken into account in renewing each operating authorisation. In none of the safety reviews performed have any anomalies or discrepancies sufficiently significant so as to prevent continued operation of the plant been identified. In general, the PSR's of plants with older commercial operation dates have shown a larger number of deficiencies. Whenever any deficiency having a repercussion on safety was detected, CSN assessed its impact in order to identify the advisability of including any improvement, or to determine whether instructions complementary to those included in the authorisation were required. This review process also underlined positive aspects, as

was the case with the safety improvement programme and the upgrading of design modifications management.

The results of these evaluations also pointed to issues affecting all the nuclear power plants to a greater or lesser extent, among them the revision of in-house and industry operating experience, revision of the adaptation to the changes in the new regulations and standards, equipment performance analysis, progressive adaptation of design modification management practices to the new recommendations in the applicable Safety Guide and the overall revision of these design modifications, updating of the PSA's and the establishment of safety improvement programmes. As regards the last, various commitments and implementation programmes have arisen, including aspects relating to human factors and organisation and the incorporation of severe accident management guidelines. Given the characteristics of each plant, specific results have also been obtained, which have been the subject of specific evaluations. Whenever the results were significant, complementary instructions to the operating authorisation were developed. The improvement programmes for each plant, derived fundamentally from the Periodic Safety Reviews (PSR's) are described below.

José Cabrera NPP

In the case of José Cabrera, a PWR plant that started commercial operation in 1968, the PSR period was 25-10-86 to 31-12-97. In this case the review process identified the need to perform specific tracking of certain issues that at other plants were addressed generically, such as the cracking of the core barrel deflector plate bolts, the performance of tests for the qualification of certain electrical containment penetrations, improvements to certain of the emergency operating procedures and improvements to the simulator used for operations personnel training. The following improvements were particularly significant:

- a new layout for the controls and other modifications, on the control panels, significantly improving the reliability of operator action in the event of an accident;
- the motor operation of valves switching the emergency core cooling system alignment from the injection phase to recirculation;
- fire protection for components supplying information to the control room and necessary for following the emergency operating procedures;
- installation of a temporary control room evacuation panel from which the plant may be maintained in safe shutdown conditions from outside the control room;
- reinforcement of fire detection and extinguishing resources on the control room panels;
- installation of a qualified full range steam generator level measuring device, to improve the reliability of operations in the event of a steam generator tube rupture accident;
- improvement to the emergency operating procedures in the light of the results of the thermohydraulic analysis of certain steam generator tube rupture sequences, the availability of the new full-range steam generator level measuring device and other specific considerations;

- construction of an interactive graphics simulator of the control room for operations personnel training. The simulator physically represents the layout of the control room panels and of the controls located on them.

The plant operator was given a period of 3 years to design, evaluate and implement these improvements, this expiring in October 2002. The successful completion of this programme will be a prerequisite for granting of the Operating Permit until 2008.

All these improvements should be accomplished by the end of year 2002.

Sta. M^a de Garoña NPP

In the case of the Sta. M^a de Garoña plant, the period contemplated in the PSR is from 31-12-86, the date of the ESP (Evaluation Systematic Programme), to 31-12-97. The results of the evaluation have underlined the advisability of completing the root cause analyses of all relevant events from the point of view of their importance to safety. A series of improvements programmes has also been contemplated, with the following being especially significant:

- the installation of seismic instrumentation on the site and completion of the existing structures, as well as the development of procedures for action in the event of a seismic phenomenon exceeding the operating basis earthquake;
- the installation of a qualified ventilation and air-conditioning system for the medium and low voltage electrical equipment rooms;
- the installation of improvement to the training simulator;
- separation of the safety and non-safety load electrical feeds, in certain specific cases in which the two were mixed, assigning the first to divisional busses and the second to normal busses;
- the installation of a new qualified ventilation and air-conditioning system for the control room, cooled by a new essential chilled water system, also safety-related;
- the establishment of a waste conditioning programme;
- implementation of the severe accident management guidelines;
- the establishment of improvements in operations personnel training.

All these improvements should be accomplished by the end of year 2003.

Almaraz NPP

In the case of Almaraz NPP, which has two units on site, the review period covered from 13-10-81 for unit I and 15-06-83 for unit II, to 31-12-97. In this case the most significant issues have arisen during the safety systems design basis review process, which identified that the temperature conditions of the ultimate heat sink were not consistent with the assumptions of the most limiting scenario. This made it necessary to establish restrictions on the maximum temperature and to set up an action programme for resolution, this

impacting the ventilation and air-conditioning systems of certain buildings. Other significant improvements were as follows:

- the implementation of seismic instrumentation on site and an action procedure in the event of the operating basis earthquake (OBE) being exceeded;
- improvement to the physical separation between the feed circuits from the off-site transmission grid to the on-site electricity distribution system;
- the installation of improvements in the fuel building ventilation system, to make available a double filtration, heaters and HEPA pre-filters train and ensure effective continuous control of the negative pressure in the building;
- modification of the final heat sink in order to fulfil the design basis for ventilation of certain safeguards systems;
- the installation of improvements to the control room ventilation system.

All these improvements should be accomplished by the end of year 2004.

Ascó NPP

In the case of Ascó, a plant that has two units, the period contemplated in the PSR covered from 22-07-82, for unit I, and 22-04-85 for unit II, to 31-12-99. The CSN evaluation of the PSR of this plant, which finished during 2001, demonstrated the advisability of making the following improvements:

- a complementary instruction for the owner to construct and validate a plant replica simulator for operations personnel training, by July 2002;
- the incorporation of an improvement programme relating to organisation and human factors.

Cofrentes NPP

As regards Cofrentes NPP, the period contemplated in the review covered from 1-03-85 to 31-12-98. The most significant improvements in this safety review were as follows:

- the installation of on-site seismic instrumentation;
- improvements to the design modifications analysis and management procedures;
- the incorporation of an improvement programme relating to organisation and human factors.

Vandellós II NPP

At Vandellós II NPP, the review period was from 8-03-88 to 31-12-98. In this case, the advisability of setting up a radioactive waste management programme arose, along with the closure of certain conditions deriving from the initial plant operating permit. The most significant points of the improvement programmes were as follows:

- the installation of seismic instrumentation on the site and completion of the existing structures surveillance instrumentation, for the detection of the operating basis earthquake;
- the installation of a new safety parameter surveillance system for the monitoring of essential variables in the event of an accident;
- by January 2003, the construction and validation of a simulator replica of the plant, for the initial and on-going training of the operations personnel.

14.5 Degree of compliance with the obligation of the Convention

The first report considered the systematic approach adopted for the assessment and verification of safety at the Spanish nuclear power plants to be highly positive, from the point of view both of the licensing and inspection systems in force and of their effectiveness, since they have allowed the different types of problems that have arisen to be detected. With regard to those points that the previous report identified as being open to improvement in order to achieve greater efficiency, mention may be made of the following:

- The experience accumulated has led to the progressive implementation in the CSN of a policy of granting operating authorisations for periods of ten years, preceded by a systematic review of the safety and radiation protection of the plant. This review has been carried out taking into account the operating experience, analysis of the performance of the equipment, structures and systems, the impact of changes in the standards applicable to the technology of the project, the results of the probabilistic safety assessments performed and the requirements that might be established in the national regulations during the period. The results of this periodic review have been taken into account, when considered appropriate, in the conditions of the new authorisation.
- The strengthening of the Integrated Probabilistic Safety Assessment Programme and the use of its results imply an improvement in plant safety. The revision and updating of the probabilistic safety studies and their application as a support for risk-informed design modifications constitutes a method for the identification and improvement of management and deployment of resources in areas of significance for the safety of the installation. The importance of human factors in plant design has been re-evaluated in the wake of the probabilistic safety assessments, and the issue is receiving considerable attention.
- Monitoring of the ageing of the installations and remaining lifetime management, along with the establishment of detailed programmes, will allow insight to be gained into the degradation mechanisms of safety-related systems and also make it possible to identify critical components and establish equipment maintenance and replacement programmes. The aim of the above is to guarantee that it is possible to reach the design lifetime and keep open the option to extend plant operation beyond the service lifetime established in the initial design.

In summary, Spain is considered to have improved compliance with the requirements of this article, since it has adopted adequate measures for the performance of detailed and systematic safety assessments both prior to construction and start-up and throughout plant lifetime. At each plant there is a mechanism for revision of the operating experience and of new and significant information relating to safety. All these activities are evaluated by the regulator.

Article 15. Radiation protection

15.1 Legal modifications introduced during the period

Of the legal provisions governing radiation protection in the Spanish regulations, two have been modified substantially during this period: Law 15/1980, of 22nd April, by which the CSN was established, regarding the functions on this matter of the regulatory authority, and the Regulation on Protection against Ionising Radiations, approved on 6th July 2001. Furthermore, Royal Decree 469/2000, of 7th April, modifying the organisational structure of the Nuclear Safety Council, has had a clear impact of the management of radiation protection.

15.1.1 Law establishing the Nuclear Safety Council

As has been described in Article 7, Law 14/1999 on the Public Fees and Prices for services rendered by the Nuclear Safety Council was approved in May 1999, modifying the Law by which the CSN was established and assigning new functions to it, particularly in relation to radiological surveillance throughout the national territory.

15.1.2 Royal Decree 469/2000, of 7th April, modifying the organisational structure of the Nuclear Safety Council

As is commented in greater detail in chapter 7, the reinforcement of the CSN's areas of action and the need to respond to its new responsibilities, by virtue of the Law mentioned in the previous section, made it necessary to introduce certain changes in the organisational structure of the body. The fundamental objective was to achieve better adaptation of the existing resources to the new needs requiring specific attention, such as environmental radiological surveillance and coordination of the response to emergency situations. To these effects, the aforementioned Royal Decree sets up two Technical Directorates, separating nuclear safety issues from those relating to radiation protection.

15.1.3 Royal Decree 783/2001, approving Regulation on Protection against Ionising Radiations

As has been described in Article 7, this regulation, which replaces that issued in 1992, establish standards relating to the protection of the workers and the members of the public against the risks arising from ionising radiations, and constitutes the transposition to the Spanish regulatory framework of EU Directive 96/29 EURATOM.

The regulation introduces the concept of the practice, maintains the principles of justification, optimisation and limitation of doses for practices and goes on to establish the fundamental principles of operational protection of professionally exposed workers, people undergoing training and students during the performance of practices, as well as aspects relating to the radiation protection of the population under normal circumstances. For each of these groups permissible dose limits are established, in accordance with the recommendations of the International Commission on Radiation Protection in its publication number 60 (ICRP-60).

For the prevention of worker exposure, these workers are classified according to their working conditions; work places are also classified into different zones, depending on the annual doses it is possible to receive in each, and the standards and control measures to be applied in the different zones and to the different categories of workers are established. Likewise, requirements are established for the determination of doses and their recording, for training and for the medical surveillance of the workers.

As regards the radiological protection of the public, general standards are updated to prevent or minimise the emission of radioactive substances to the environment. Also established is the obligation to carry out estimates, regularly and as realistic as possible, of the doses received by the population and by the reference groups in those places where such groups might exist.

The concept of intervention is introduced, and the general principles and requirements applicable to intervention in the event of a radiological emergency and in the case of long exposure are established.

Finally, the identification and application of radiation protection requirements in professional activities in which there is a significant increase in exposure due to natural radiation sources are required.

In relation to the radiation protection of the population, and in addition to the requirements described in the first national report, the obligation to make realistic estimates of the doses received by the population as a result of nuclear power plant operations is established.

With a view to ensuring compliance with this new regulatory requirement, the CSN has set up a programme of national activities and is participating in analogous activities at Community level, the objective being to establish an appropriate methodology for realistic dose estimates. In particular, a detailed study has been carried out on the actual diets of the population living around the plants and the dose estimate models contained in the Off-Site Dose Calculation Manuals, described below, are being revised.

15.2 Control activities in radiological protection of workers

15.2.1 Compliance with dose limits

The dose limits for nuclear power plant workers, established in the new Regulation on Protection against Ionising Radiations, are based on the recommendations contained in ICRP- 60 and are as follows:

1. Effective dose limit (5 consecutive calendar years)

100 mSv, with a maximum effective dose of 50 mSv in any calendar year.

2. Annual equivalent dose limits (calendar year)

Skin (averaged over 1 cm ²)	Lens	Hands, forearms, feet and ankles
500 mSv	150 mSv	500 mSv

During the period covered by this report, the former dose limits (50 mSv in one year) were in force, and no cases of exceeding these doses were recorded among the nuclear power plant workers. Furthermore, the gradual reduction in individual doses in recent years means that the number of workers systematically receiving doses in excess of 20 mSv is practically zero, for which reason no situations in which the new five-year limit might be compromised are foreseen.

As regards internal dosimetry, as from January of this year the recording level established by the CSN has been modified, changing from 1% of the Annual Intake Limit to an annual value of 1 mSv.

Appendix 15.C summarises the information relating to personal dosimetry included in the CSN report to Parliament for the year 2000.

15.2.2 Measures adopted to guarantee that radiation exposures are kept as low as reasonably achievable (ALARA)

The process of adapting the organisations of the nuclear power plant licensees to the latest trends in efficient management of the principle of optimisation (ALARA) – referred to in the previous report and initiated at the beginning of the 1990's – may now be considered consolidated. Indeed, the appearance in 1999 of CSN Safety Guide GS-1.12 "Practical application of the optimisation of radiation protection in nuclear power plant operation" simply reflects what was already a reality in the licensee organisations as of the date of publishing. This guide contains general criteria, the administrative system and the assignment of responsibilities to be considered by the organisation with respect to those participating in activities relating to nuclear power plant operation.

The following are especially significant among the general criteria established in this guide in relation to compliance with the principle of optimisation:

- The commitment and motivation of the Organisation should extend to all the workers and off-site organisations involved.
- It should be one of the objectives to be achieved during the operation, planning of activities, modification and modernisation of the installation.
- The assignment of responsibilities should be governed by the principle of the responsibility of all, depending on the area of competence of each individual.

The administrative system includes a definition of the specific responsibilities of the entire organisation and a description of the structure, along with the development of a programme for the optimisation of documents and procedures, subject to a system of audits by the Nuclear Safety Council.

Generally speaking, a distinction is made between three levels in the basic structure existing:

- Direction or Management level, that promotes the ALARA culture, approves the policy and dose objectives and undertakes responsibility for providing the necessary economic resources, technicians and administrative personnel.

- Executive level, formed by an interdisciplinary Committee (Management, Heads of operations, engineering, etc.) in charge of proposing ALARA policies and programmes and dose objectives, coordinating the actions of the different groups involved and periodically reviewing their effectiveness, the lessons learned and corrective actions. The Management of the different areas completes this level of responsibility, undertaking management of the development of the ALARA policy and programmes.
- Technical level, made up of small interdisciplinary groups including an ALARA technician and several people responsible for the performance of refuelling, modification or operation activities contemplated by the ALARA programme. These people analyse and plan tasks and undertake detailed tracking of their performance.

The off-site organisations are required to assume the commitment of backing and participating in the ALARA programmes in place at the installation and, where applicable, of having their own ALARA programme for the activities they perform.

Figures 15.C.1 and 15.C.2 in Appendix 15.C reflect the significant decrease in collective average dose per reactor that has occurred over the last three years, for both pressurised water reactors (PWR) and boiling water reactors (BWR). The comparison of this parameter within the Information System on Occupational Exposure (ISOE) – managed jointly by the NEA and the IAEA and providing the most complete nuclear power plant data available at world level – allows insight to be gained into the relative situation of our plants compared to those of similar design in Asia, Europe and the USA. This comparison shows that the situation at the Spanish plants is very much in line with that of plants of similar design in other countries. Furthermore, active participation of the regulatory authority in the activities promoted by this international forum provides insight into the state of the art as regards the radiological protection of the workers and management of the optimisation of their exposures.

15.3 Control activities in radiological protection of the population

The regulatory control of the radiological protection of the public is put into effect through the release limitation, surveillance and control programmes of the plants and the programmes for environmental radiological surveillance in their areas of influence. The Nuclear Safety Council systematically inspects the implementation of the release surveillance and control and environmental radiological surveillance programmes of each plant, evaluates the results and informs the Parliament and the European Commission through annual reports.

15.3.1 Compliance with radiological substance release conditions

The dose limits established in the new regulations for the members of the public are as follows:

1.- Effective annual dose limit (calendar year)

1 mSv

In special circumstances, the Nuclear Safety Council may authorise a higher effective dose value in a single calendar year, as long as the average over five consecutive years does not exceed 1 mSv per year.

2.- Annual equivalent dose limits (calendar year)

	Lens	Skin (averaged over 1 cm ²)
Dose	15 mSv	50 mSv

The system for the limitation, surveillance and control of radioactive releases from nuclear power plants is based on the same principles, criteria and practices as were described in the previous report, although the limits and the procedures for their practical application have been slightly modified in order to adapt them to the new Regulation on Protection against Ionising Radiations. Table 15.A.1 summarises the new release limits.

The combination of the instantaneous limits and operational restrictions guarantees, with a very wide margin of safety, that no member of the public will receive a significant dose as a result of the release of radioactive effluents during the normal operation of nuclear power plants.

The release limitation system described above has led to actual release values far below those authorised and perfectly comparable to those recorded at international level. The data included in table 15.A.2 and figure 15.A.1 show that the releases are below 10% of the operating limit conditions and 1% of the annual regulatory dose limits. Table 15.A.3 shows a comparison between the releases, standardised to unit of power, from the Spanish plants and those of their North American and European counterparts.

The release limits, their surveillance and the control measures at each installation are established in the Release Technical Specifications and further developed in the Radioactive Effluent Control Programme (PROCER). Practical implementation of the programme is by way of the Manual for the Calculation of Off-Site Doses during normal operation (MCOSD). The contents of the PROCER and the MCOSD were described in appendix 15.A. of the previous report.

15.3.2 Environmental Radiological Monitoring

Each plant has an Environmental Radiological Surveillance Programme (ERSP) applied to the surrounding area, whose annual schedule and results are evaluated by the Nuclear Safety Council. In addition, the CSN carries out an annual sampling and analysis campaign in the area surrounding each nuclear power plant, allowing the licensee's programme to be compared with the results obtained. Appendix 15 B describes the content of the environmental radiological surveillance programmes and the most significant results obtained in 1999. Evaluation of these results shows that the impact of the nuclear power plants on the environment is far below the foreseen limits.

The environmental radiological surveillance programmes include a system for immediate information whenever certain previously determined levels are exceeded.

15.4 Degree of compliance with the obligations of the Convention

The following on-going and scheduled actions currently exist in Spain, the objective being to improve radiation protection at the nuclear power plants:

- Adaptation to the requirements of the new Regulation on Protection against Ionising Radiations.
- Establishment of a new format and requirements for use of the individual radiological monitoring document (radiological licence), in accordance with what is established in the Royal Decree 413/1997, of 21st May, on protection of external workers exposed to ionising radiation during their activities in the controlled area, and adapted to the new regulation governing Radiation Protection.
- Definition of training requirements in relation to radiation protection for off-site company workers.
- With a view to establishing an appropriate methodology for realistic estimates of the doses received by the population, a detailed study has been made of the actual diet of the population around the nuclear power plants, and the dose estimate models of the Manuals for Calculation of Off-Site Dose are being revised.
- Optimisation of CSN control over the ERSP's carried out by the plant licensees and establishment of new reporting levels in keeping with the release limits established, in terms of effective equivalent dose.

The legal provisions adopted during the period, along with the change in the organisation of the CSN, have led to an important improvement in the radiation protection measures applied to the workers, the programmes for the surveillance, limitation and control of effluents and the environmental radiological surveillance programmes described above, along with application of the ALARA criterion. As a result, the Spanish plants are considered to have improved their degree of compliance with this Article.

Appendix 15.A: Limitation, monitoring and control of the release of radioactive substances at Spanish nuclear power plants

Appendix 15.B: Environmental radiological surveillance programmes in the areas of influence of Spanish nuclear power plants

Appendix 15.C: Information relating to personal dosimetry included in the CSN report to Parliament for the year 2000

Appendix 15.A: Limitation, monitoring and control of the release of radioactive substances at Spanish nuclear power plants

The system for the limitation, surveillance and control of radioactive releases from the nuclear power plants is based on the same principles, criteria and practices as were described in the previous report, although the limits and the procedures for their practical application have been slightly modified to adapt them to the new Regulation on Protection against Ionising Radiations. Table 15.A.1 summarises the new release limits.

Instantaneous limits (RPSRI)

Releases	Variable	Value
Gaseous mSv/y	Effective equivalent dose rate	5
Liquid	Concentration non-restricted zones	5 mSv/y

Operational restrictions

(Integrated doses established by the CSN)

Releases	Variable	Value
Total	Effective equivalent dose	0.1 mSv/a

Table 15.A.1 New release limits

The combination of the instantaneous limits and operational restrictions guarantees, with a very wide margin of safety, that no member of the public will receive a significant dose as a result of the release of radioactive effluents during the normal operation of nuclear power plants.

The release limitation system described has led to actual release values far below those authorised and perfectly comparable to those obtained at international level. Table 15.A.2 and figure 15.A.1 show the releases made from Spanish nuclear power plants during the year 2000. In both cases it may be seen that the releases are below 10% of the operating limiting conditions and below 1% of the annual regulatory dose limits.

Table 15.A.3 shows a comparison between the releases, standardised to the unit of power, from the Spanish nuclear power plants and from their North American and European counterparts.

PWR PLANTS						
	J. Cabrera	Almaraz I & II	Ascó I	Ascó II	Vandellós II	Trillo
Total Liquid						
Effluents except						
Tritium & Dis. Gases	$3.22 \cdot 10^8$	$1.20 \cdot 10^{10}$	$6.13 \cdot 10^9$	$1.88 \cdot 10^9$	$2.66 \cdot 10^{10}$	$6.58 \cdot 10^8$
Tritium	$4.02 \cdot 10^{12}$	$6.74 \cdot 10^{13}$	$3.32 \cdot 10^{13}$	$4.49 \cdot 10^{13}$	$3.57 \cdot 10^{13}$	$1.57 \cdot 10^{13}$
Dissolved Gases	$5.67 \cdot 10^8$	$1.55 \cdot 10^9$	$3.20 \cdot 10^6$	$1.38 \cdot 10^8$	$2.03 \cdot 10^9$	(1)
Gaseous Effluents						
Noble Gases	$1.71 \cdot 10^{13}$	$5.67 \cdot 10^{11}$	$1.11 \cdot 10^{12}$	$1.48 \cdot 10^{12}$	$1.54 \cdot 10^{13}$	$3.79 \cdot 10^{11}$
Halogens	$2.55 \cdot 10^7$	$1.51 \cdot 10^7$	LDL ₂	LDL ₂	$2.80 \cdot 10^8$	$1.65 \cdot 10^5$
Particles	$2.28 \cdot 10^6$	$5.31 \cdot 10^6$	$4.00 \cdot 10^6$	$1.15 \cdot 10^6$	$4.24 \cdot 10^7$	$7.80 \cdot 10^5$
Tritium	$4.11 \cdot 10^{10}$	$8.10 \cdot 10^{12}$	$9.24 \cdot 10^{11}$	$6.72 \cdot 10^{11}$	$3.54 \cdot 10^{11}$	$9.85 \cdot 10^{11}$
BWR PLANTS						
	S.M. Garoña		Cofrentes			
Liquid effluents						
Total except Tritium and Dis. Gases			$1.33 \cdot 10^8$			$1.69 \cdot 10^8$
Tritium			$6.69 \cdot 10^{10}$			$1.71 \cdot 10^{12}$
Dissolved Gases			LDL ₂			$1.55 \cdot 10^9$
Gaseous effluents						
Noble Gases			$1.09 \cdot 10^{11}$			$8.10 \cdot 10^{12}$
Halogens			$8.24 \cdot 10^7$			$2.24 \cdot 10^9$
Particles			$9.89 \cdot 10^6$			$1.97 \cdot 10^8$
Tritium			$4.74 \cdot 10^{11}$			$1.49 \cdot 10^{12}$
(1) The liquid releases do not entrain dissolved gases because these are removed during the treatment processes						
(2) LDL: Lower Detection Limit						

**Table 15.A.2 Releases of radioactive effluents from nuclear power plants.
Activity released during the year 2000 (GBq).**

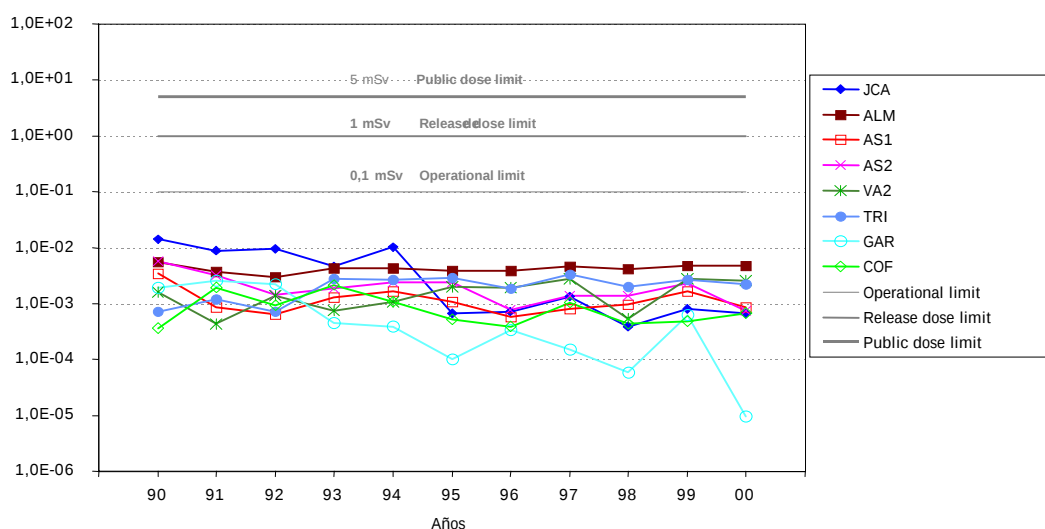


Figure 15.A.1 Total Effective Equivalent Dose (mSv/y)

GASEOUS EFFLUENTS

Radionuclides	Spain		EU Countries		USA	
	PWR	BWR	PWR	BWR	PWR	BWR
Noble Gases	$1.68 \cdot 10^1$	$3.13 \cdot 10^1$	$6.16 \cdot 10^0$	$7.07 \cdot 10^1$	$2.13 \cdot 10^1$	$2.14 \cdot 10^2$
I-131	$2.57 \cdot 10^{-5}$	$6.37 \cdot 10^{-5}$	$3.17 \cdot 10^{-5}$	$2.89 \cdot 10^{-4}$	$1.29 \cdot 10^{-4}$	$8.48 \cdot 10^{-4}$
Particles	$3.52 \cdot 10^{-5}$	$8.48 \cdot 10^{-5}$	$5.48 \cdot 10^{-5}$	$1.66 \cdot 10^{-4}$	$5.08 \cdot 10^{-4}$	$2.03 \cdot 10^{-3}$
Tritium	$2.05 \cdot 10^{-1}$	$9.03 \cdot 10^{-2}$	$3.25 \cdot 10^{-2}$	$5.15 \cdot 10^{-2}$	$5.61 \cdot 10^{-1}$	$3.64 \cdot 10^{-1}$

LIQUID EFFLUENTS

Radionuclides	Spain		EU Countries		USA	
	PWR	BWR	PWR	BWR	PWR	BWR
Total exc. Tritium	$4.75 \cdot 10^{-3}$	$1.62 \cdot 10^{-3}$	$4.92 \cdot 10^{-3}$	$5.63 \cdot 10^{-3}$	$9.90 \cdot 10^{-3}$	$1.05 \cdot 10^{-2}$
Tritium	$3.14 \cdot 10^0$	$6.13 \cdot 10^{-2}$	$3.42 \cdot 10^0$	$2.70 \cdot 10^{-1}$	$3.27 \cdot 10^0$	$1.14 \cdot 10^{-1}$

(*) Average values: Spain: 1980-2000, EU: 1980-1994 and USA: 1980-1993

Table 15.A.3 Releases of radioactive effluents (GBq/GWh)*

Appendix 15.B: Environmental Radiological Surveillance Programmes in the areas of influence of Spanish nuclear power plants

The radiological surveillance of the areas surrounding the Spanish nuclear power plants is carried out by way of two independent programmes.

The first is performed by the licensee in application of the regulatory provisions and the conditions of the plant authorisation, and is subject to regulatory control by the Nuclear Safety Council.

The second is carried out by the Nuclear Safety Council itself, in certain cases through the commission of functions from the Governments of the Autonomous Communities, in collaboration with national laboratories or the universities of the area in which the plant is located. This programme is completely independent from that performed by the licensee and aims to complement control over the latter.

The development of both programmes has continued since publication of the previous report. At present, eight environmental radiological surveillance programmes (ERSP's) are being implemented around the respective nuclear power plants, seven of which are in operation and one in the decommissioning and dismantling phase. These programmes include the collection of some 10,000 samples per year and the performance of some 12,000 analytical determinations. Table 15. B. 1 includes a summary of the ERSP's.

In addition to the environmental radiological surveillance carried out by the licensees in the areas of influence of their installations, the CSN performs its own independent control programmes (sampling and radiological analysis), which are carried out either directly or through programmes commissioned by the autonomous communities of Catalonia and Valencia. The sampling points, type of samples and analyses performed coincide with those covered and performed by the licensees. The scope is around 5% of the ERSP performed at each installation. These programmes are undertaken through collaboration agreements with the environmental radioactivity measurement laboratories of Universities belonging to the autonomous communities in which the plants are located.

Table 15. B. 2 shows, for illustrative purposes, the average values of the results obtained from air sample analysis in the ERSP's during 1999.

Type of sample	Sampling frequency	Analyses performed
Air	Continuous sampling with weekly filter change	Total beta activity Sr-90 γ Spectrometry I-131
Direct radiation	Quarterly dosimeter change	Integrated dose rate
Drinking water	Fortnightly or more frequent sampling	Total beta activity Beta activity rest Sr-90 Tritium γ Spectrometry
Rainwater	Continuous sampling with monthly sample collection	Sr-90 γ Spectrometry
Surface and groundwaters	Monthly or more frequent sampling of surface water and quarterly or more frequent sampling of groundwaters	Total beta activity Beta activity rest Tritium γ Spectrometry
Soil, sediments and indicator organisms	Annual soil sampling and six-monthly sampling of sediments and indicator organisms	Sr-90 γ Spectrometry
Milk and crops	Fortnightly sampling of milk during pasture period and monthly for the rest of the year, and crops during harvesting period	Sr-90 γ Spectrometry I-131
Meat, eggs, fish, shellfish and honey	Six-monthly sampling	γ Spectrometry

Table 15.B.1 Nuclear power plant licensee ERSP's

Nuclear power plant	Air Bq/m ³			
	β -Total	I-131	Sr-90	Cs-137
José Cabrera	4.07E-04	LDL	LDL	LDL
Sta. M ^a de Garoña	4.33E-04	LDL	LDL	LDL
Vandellós I (dismantling)	6.24E-04	NA	LDL	LDL
Almaraz	6.24E-04	LDL	LDL	LDL
Ascó	7.29E-04	LDL	LDL	LDL
Cofrentes	8.59E-04	LDL	LDL	LDL
Vandellós II	6.28E-04	LDL	LDL	LDL
Trillo	5.46E-04	LDL	LDL	LDL

LDL: Lower Detection Limit

Table 15. B.2 Nuclear power plant ERSP's. 1999

Appendix 15.C: Information relating to personnel dosimetry included in the CSN report to Parliament for the year 2000

A *External exposure*

The statistical results for the doses accumulated during the six-monthly period for the nuclear power plants overall are as follows:

Overall operation (normal and refuelling)

A.1 Plant personnel:

A total 2,211 workers have been controlled.

- 1- 100% of the workers controlled have received doses lower than the annual limit.
- 2- 99.95% of the workers controlled have received doses lower than 3/10 of the annual limit.
- 3- 98.46 % of the workers controlled have received doses lower than 1/10 of the annual limit.
- 4- 62.91 % of the workers controlled have not received doses capable of being measured.

If only workers with readings higher than the background of the dosimetry system used are considered, the average individual dose for this group of workers is 1.17mSv.

A.2 Contracted personnel:

A total 5,146 workers have been controlled.

- 1- 100% of the workers controlled have received doses lower than the annual limit.
- 2- 99.14% of the workers controlled have received doses lower than 3/10 of the annual limit.
- 3- 93.51 % of the workers controlled have received doses lower than 1/10 of the annual limit.
- 4- 45.76 % of the workers controlled have not received doses capable of being measured.

If only workers with readings higher than the background of the dosimetry system used are considered, the average individual dose for this group of workers is 2.19 mSv.

A.3 Collective doses

The following table summarises the overall annual collective doses for each of the nuclear power plants:

José Cabrera NPP	863	mSv.person (*)
Sta. M ^a . de Garoña NPP	311	mSv.person
Almaraz I and II NPP	1,413	mSv.person (*)
Ascó I and II NPP	612	mSv.person (* Ascó I)
Cofrentes NPP	2,634	mSv.person (*)
Vandellós II NPP	958	mSv.person
Trillo NPP	274	mSv.person (*)

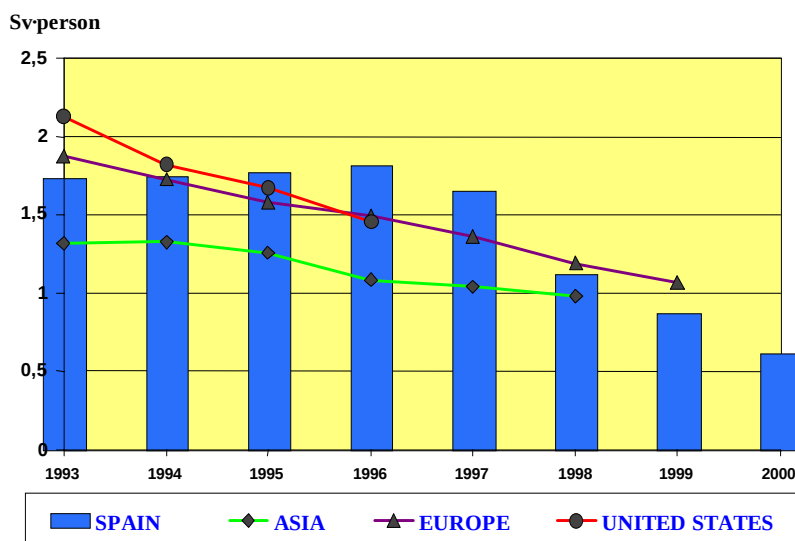
(*) Refuelling outage

These data mean that the average collective dose per reactor throughout the year amounts to 785 mSv.person. By reactor type, this parameter amounts to 1,472.5 mSv.person for the BWR plants and 588.5 mSv.person for the PWR's.

As reference data, figures 15.C.1.and 15.C.2. show comparative graphs of the evolution of the collective dose parameter in Spain, Europe, Asia and the USA, by reactor type.

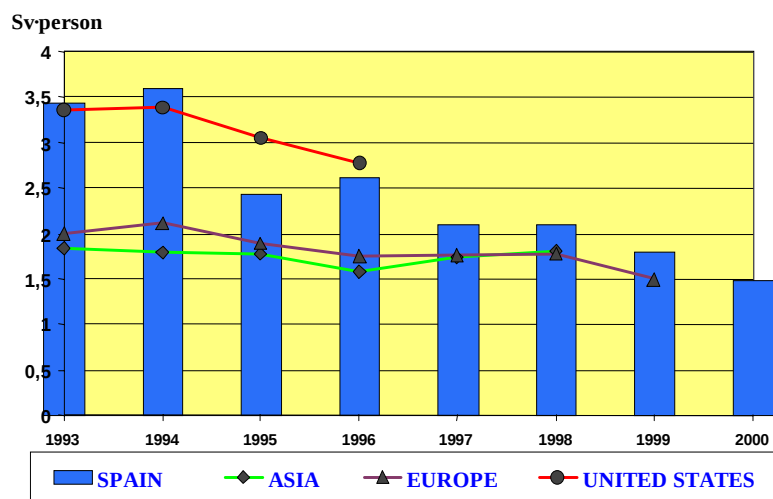
B Internal exposure

Direct corporal radioactivity measures were carried out on 8,637 people. In no case was internal contamination in excess of the recording level (1% of the annual intake limit) detected.



NOTE: EN THIS GRAPH WAS PREPARED WITH CONSIDERATION GIVEN TO AVERAGE COLLECTIVE THREE-YEAR DOSES FOR PWR REACTORS IN EACH REGION USED FOR COMPARISON

Figure 15.C.1 Average collective dose (Sv. Person) for PWR type reactors.
International comparison



NOTE: IN PREPARING THIS GRAPH CONSIDERATION HAS BEEN GIVEN TO AVERAGE COLLECTIVE THREE-YEAR DOSES FOR BWR REACTORS IN EACH REGION USED FOR COMPARISON

Figure 15.C.2 Average collective dose (Sv. Person) for BWR type reactors.
International comparison

Article 16. Emergency preparedness

16.1 Modification of laws, regulations and requirements relating to planning and preparation for emergency situations

The planning and preparation for nuclear emergency situations are governed in the Spanish State by the Basic nuclear emergency plan (Plaben) and by the Regulation on Nuclear and Radioactive Installations. Likewise, general provisions on nuclear emergencies are included in the Law establishing the CSN (modified by the Law on Public Fees and Prices for services rendered by the CSN) and the Regulation on Protection against Ionising Radiations, in the Agreement of the Cabinet of Ministers on public information on applicable health protection measures and response in the event of radiological emergency, and in the Basic Civil Defence Standards.

The most significant aspects of the modifications introduced in the legal and regulatory framework governing nuclear emergencies in this period are summarised below:

16.1.1 Basic Civil Defence Standards

These have not been modified.

16.1.2 Basic Nuclear Emergency Plan (PLABEN)

This has not been modified. However, a process of review of this document, whose version currently in force was approved by the Cabinet of Ministers in 1989, has been initiated.

The Plaben review project is addressed with the following objectives:

- Incorporation of current international standards and recommendations for the management of nuclear emergencies. Among them, the EU Directive 96/29/EURATOM and those emerging from organisations such as the IAEA and the ICRP. Among other aspects, the philosophy of levels of intervention based on avoided dose will be incorporated.
- Formal adaptation of the Plaben in accordance with the requirements of Law 6/1997, of 14th April, on the Organisation and Operation of the General State Administration (LOFAGE). Provisionally, a practical adaptation has been carried out with respect to the nuclear emergency response structures at provincial level, in which consideration was given to the general clauses of the LOFAGE.
- Incorporation of the experience acquired in applying the Plaben in force in the Provincial Nuclear Emergency Plans, with a view to increasing the operability of these plans and of the central response and support level.

The review tasks are being addressed through a technical group including the participation of the Directorate General for Civil Defence (DGPC) of the Ministry of the Interior and the CSN. It is expected that following completion of the first draft of the new Plaben,

other organisations and institutions with responsibilities for nuclear emergency management will join this group.

Within this working scheme, the CSN has already dealt with those issues that fall within its realm of competence, among which are the following:

- Definition of the new radiological principles and criteria, which constitute one of the main fundamentals of the bases for planning of the Plaben.
- Proposals regarding the organisational and operational aspects of the Provincial Plan Radiological Groups.
- Proposals regarding development of the central level of response for everything relating to nuclear safety and radiation protection, which is the responsibility of the CSN.

The process of drawing up the new version of the Plaben is expected to reach completion by the beginning of 2002.

In parallel, the CSN is working with the Directorate General for Civil Defence for the elaboration of a Directive for civil protection on general radiological damages that will take into account among others accidents in NPP of other countries. The CSN approved in June 2000 the basic elements of planning for this Directive.

16.1.3 Law establishing the CSN / Law on CSN Fees

Among other functions, Law 15/1980, of 22nd April 1980, governing the Creation of the CSN, assigned to the organisation the function of collaborating with the competent authorities in drawing up the criteria on which the emergency plans for nuclear installations would be based and, following preparation of these plans, of participating in their approval.

As indicated in point 7.1 of this report, Law 14/1999, of 4th May 1999, on Public Fees and Prices for services rendered by the CSN, partially modified the functions assigned to the organisation by Law 15/1980, including those relating to emergencies. The new functions assigned to the CSN in relation to nuclear emergencies include the following:

- Collaboration with the competent authorities in drawing up of the criteria serving as a basis for the nuclear and radioactive installation off-site emergency plans and emergency plans for transport and, following drawing up of the plans, participation in their approval.
- Coordination, in all aspects relating to nuclear safety and radiation protection, of the emergency support and response measures, integrating and coordinating the different public and private organisations and companies required to intervene for compliance with the functions attributed to the organisation.
- Likewise, the performance of any other emergency activities assigned to it in the applicable regulations.

The aforementioned functions refer to the participation of the CSN in the emergency response that might arise as a result of practices subject to regulatory control, such as those carried out at nuclear and radioactive installations and in transport. Furthermore, Law 14/1999 assigns to the organisation other emergency response-related functions that might arise from activities not subject to the system of authorisations included in the nuclear legislation.

16.1.4 Regulation on Nuclear and Radioactive Installations

As was indicated in point 7.1 of this report, a new version of the Regulation on Nuclear and Radioactive Installations was published in 1999. This Regulation requires the licensees of nuclear installations to draw up a Site emergency plan in order to obtain the Operating Permit of such facilities. All the nuclear installations propose a Site emergency plan, which is subject to approval by the Ministry of Economy, following a report from the CSN, which evaluates such proposals considering specific national and international standards.

As established by the aforementioned regulation, the Site emergency plan for the installations is required to detail the measures foreseen by the licensee to respond to accident conditions, in order to mitigate their consequences and protect the personnel of the installation and to notify the competent organisations of occurrence of the accident, including an initial assessment of the circumstances and the consequences of the situation. In addition, the licensee is explicitly required to collaborate with the competent organisations in protective interventions off-site.

16.1.5 Agreement of the Cabinet of Ministers in relation to public information on health protection measures and performance in the event of radiological emergencies

This Agreement of the Cabinet of Ministers was published in October 1999 and replaced the previous Agreement of 1993. The new version was drawn up in order to extend the scope of preliminary information in the areas surrounding installations other nuclear power plants, as established in EU Directive 89/618/Euratom. The extended scope of this Cabinet Agreement affects radioactive installations in relation to activities not subject to the system of authorisations included in the nuclear and radiological legislation, and does not modify what was established in the previous such Agreement with regard to programmes of information for the public in areas surrounding nuclear power plants, in relation to preliminary information, the information to be provided during an emergency and the training of those required to act in nuclear emergency situations. This agreement increases the responsibilities assigned to the CSN on public information matters during emergencies.

In addition to the above, the new Regulation on Protection against Ionising Radiations, approved on 6th July 2001, in adherence to Directive 96/29/Euratom, includes the general principles of radiation protection to be considered in interventions, including those relating to nuclear or radioactive emergencies in general.

16.2 Application of emergency preparedness measures, including the role of the regulatory authority and other bodies

16.2.1 Nuclear installation plans for on and off-site emergency situations, including support organisations and systems

Site Emergency Plans

The national authority that currently authorises the Site emergency plans of the nuclear power plants is the Directorate General for Energy Policy and Mining of the Ministry of Economy, following a mandatory and binding report by the CSN.

Certain other matters of interest that have occurred since the first national report are described below.

At the end of 1999 a working group was set up to review CSN Safety Guide GS-1.3. “Nuclear power plant emergency plan”. Among other things, this group will review the coherence between the criteria contained in that guide and those affecting the Site emergency plans and contained in the proposed revision of the Plaben.

Finally, it should be pointed out that at the end of the year 2000 all the nuclear power plant Site emergency plans were revised to include aspects relating to the application of the severe accident management guidelines. As part of the licensing process of these documents, the Council required all the licensees to include in their Site emergency plans the performance of drills with the severe accident management guidelines, at least once a year, and annual retraining on this issue.

Central Response and Support Level

Summarised below are certain of the actions performed in recent years by the CSN to reinforce its intervention capabilities in areas affected by an emergency.

The CSN, as the party responsible for the Provincial Radiological Groups, permanently pursues the objective of progressively improving the response capacity of these groups, for which it has incorporated the following resources:

- Contracting of an immediate response service for emergency cases, composed of technicians specialising in RP, for intervention at the classification and decontamination, access control and support stations at the Cecopales (municipal emergency coordination centres).
- Specific agreement with Ciemat (Research Centre on Energy, Environment and Transports), for the short-term availability of the Centre’s radiation control mobile unit for environmental radiation and contamination measurement.
- Contracting of an external company for the availability of a portable corporal radioactivity counter, for the in situ measurement of persons potentially contaminated as a result of an accident.

16.2.2 CSN response to and preparation for emergency situations

At the last organic restructuring in year 2000, the Office for Emergencies was replaced by the Sub-Directorate General of Emergencies, depending from the Technical Directorate for Nuclear Safety.

The essential responsibilities of the CSN in the event of a nuclear accident are set up in the Law establishing the CSN, modified by Law 14/1999, and are those indicted in section 16.1.3.

In complying with these responsibilities, the CSN is required to undertake essentially the following functions:

- gain insight into and estimate the evolution of the initiating event,
- measure and analyse the levels of radiation and contamination,
- estimate the radiological effects of the accident,
- determine the most adequate measures to protect the population.

In addition, the CSN appoints the Heads of the Provincial Radiological Groups, through which the management of such groups and the coordination of the radiological intervention teams are accomplished. As the organisation integrating the Central Response and Support Level, the CSN coordinates all the agents of the Spanish State required for the performance of its functions, including the interventions assigned to the Provincial Radiological Groups.

In order to fulfil all these functions, in keeping with the restructuring of its basic organisational structure, and to rationalise the response to the different types of radiological emergencies that might arise, the CSN has undertaken the revision of the document “Nuclear Safety Council Action Plan for Radiological Emergency situations”. In this new revision the Council’s Emergency Response Organisation has been modified and different response modes have been introduced allowing the response adopted to be proportional to the severity of each emergency situation and to the degree of uncertainty associated with its evolution.

The Plan includes the processes of incorporating personnel belonging to the CSN’s basic organisational structure into the emergency response organisation, and the critical emergency tasks to be performed in each situation to adequately cover the responsibilities assigned to the organisation in the national emergency response system. In addition, the Plan considers the activation and performance of a series of services intervening in the affected areas, as described in section 16.2.1. in relation to the Central response and support level.

The Emergency Room (SALEM) is the location from which the CSN carries out its function as the Emergency Organisation and where the tools required to fulfil these functions are to be found. This Room is permanently staffed by technical and support personnel.

Appendix 16.A includes a description of the CSN Action Plan for radiological emergency situations, including the Emergency Response Organisation and available facilities and resources.

The CSN is performing a plan for the modernisation of its Emergency Room, consisting in the modification and enlargement of its site and the technological updating of its computer and telecommunication systems, needed for the CSN's emergency services. The architectural modifications should improve the situation of the Emergencies Direction and of the Permanent Attention Service of the Room, as well as enhance the circulation of personnel and documents among the different halls. Concerning the technological renewal of the computer and telecommunication systems of the SALEM, a new Systems Plan described on Appendix 16.A has been developed.

16.2.3 Measures to inform the public of emergency preparedness in the vicinity of nuclear installations

The content of this section has not been modified with respect to the first national report, with the exception of the reference to the Agreement of the Cabinet of Ministers regulating the aspects of public information on nuclear and radiological emergencies, as commented in section 16.1.5.

The fundamental difference of the new Cabinet Agreement, of October 1999, with respect to the previous agreement is an increase in scope as regards the public receiving training and information on radiological emergencies. As regards nuclear emergencies, the publication of the new Agreement does not imply any significant changes, as a result of which the systematic approach established by the Directorate General for Civil Defence is maintained.

For its part the Nuclear Safety Council collaborates closely with the Directorate General for Civil Defence in informing the population in nuclear emergency planning zones, in relation to aspects such as the following: the drawing up of information plans and programmes, the design and publishing of informative leaflets on the emergency plans and the delivery of direct public information sessions.

At present work is under way on coordination of the contents of the training sessions for those intervening and of the information provided to the public.

16.3 Preparation and training: simulations and drills

Since the previous report, the programmes of Site emergency plan simulation and drills have been maintained, these including a simulation at each nuclear installation per year. These programmes are prepared and performed in accordance with CSN Safety Guide GS-01.09 Emergency simulations and drills at nuclear power plants. A large amount of experience has been acquired in the performance and tracking of the drills and simulations included in the nuclear power plant Site emergency plans, the following results being especially significant:

- Checks have been made on the correct preparation of the resources and procedures used for the Site emergency plans. The objective analysis of each drill has made it

possible to identify certain aspects open to improvement in relation to the procedures or provision of response resources at the plants, in all cases of minor importance.

- The CSN's participation in these simulations, for which the emergency organisation in the Salem is systematically activated, has allowed the organisation to identify certain aspects for the improvement of its analytical resources and systems for the acquisition of plant on and off-site data. This has led to the on-going improvement of the CSN's capacities to respond to nuclear emergencies, channelled along two complementary paths: the new CSN Action Plan for nuclear or radiological emergencies and the Salem computer and telecommunications systems plan.

An aspect additional to what was established in the first national report in relation to this issue refers to the systematisation of the drills and general simulations included in the Off-site emergency plans (Provincial plans) implemented in recent years by the Directorate General for Civil Defence (DGCD). In this respect, the most relevant aspect is that since 1999 a policy has been established whereby a general simulation of a Provincial plan will be performed every year. Thus, in 1999 the simulation for the province of Guadalajara was carried out, followed in 2000 by the one for Burgos, and the performance of the simulation for Cáceres is foreseen for the end of the year 2001.

The Off-site plan general simulations programme is complemented by a programme of partial drills for all the plans, including the local, provincial and national coordination centres, classification and decontamination stations and access controls.

In both the partial drills and the general simulations a team of observers is set up. This consists of technicians from the different organisations involved, and holds a meeting following each drill for analysis of and reporting on its performance. The conclusions of these reports are incorporated into the documentation of the plans, as proposals for improvement to the provision of response resources. The general conclusion as regards these drills and simulations is that what is being observed is an adequate degree of preparation of the off-site plans for nuclear emergency response, although aspects open to improvement are being identified in relation to the response processes and the availability of resources.

16.4 International agreements

The CSN and the Directorate General for Civil Defence, as the national authorities for the IAEA Conventions on prompt notification and mutual assistance in the event of nuclear accidents, respectively, have incorporated into their nuclear emergency management systems the provisions of the document EPR – ENATOM – 2000 “Notification and assistance in emergencies. Technical operations manual”.

The Nuclear Safety Council Emergency Room (Salem) is the Spanish contact and alert point, as established in the aforementioned manual.

16.5 Degree of compliance with the obligations of the Convention

Since the first national report on compliance with the Convention, complementary actions have been performed or initiated with a view to improving the general capacity to respond to nuclear emergencies in Spain. The most significant of these relate to the following issues:

- Revision of the Basic Nuclear Emergency Plan to introduce the new radiological criteria defined at international level.
- Plans for the improvement and updating of the resources and capacities of the Provincial Plans are maintained.
- Periodicity and systemisation of the performance of internal and external exercises.
- Within the legal framework, the functions and responsibilities assigned to the CSN for the management of nuclear emergencies and radiological emergencies in general have been widened.
- The regulatory framework governing public information on nuclear and radiological emergencies has been modified, its scope being increased.
- As regards the plans for action during the recovery phase of an emergency, the new Plan introduces certain general criteria that will allow for the performance of specific actions, especially in relation to the long-lasting protection measures to be initiated during the urgent and intermediate phases, depending on circumstances.

Consequently, the general conclusions presented in the previous report continue to be valid, this meaning that in Spain the planning for and response to situations of nuclear emergency meet the requirements of Article 16 of the Convention.

Appendix 16.A: CSN Emergency Response Organisation

Appendix 16.A: CSN Emergency Response Organisation

The Organisation foreseen by the CSN for emergency situations covers all the different levels of authority of the Council, and makes use of the persons involved in the performance of its functions as the Regulatory Body, following the due preparation and training of such persons for the performance of the functions specifically assigned to them in the event of a nuclear emergency (Figure 16.1).

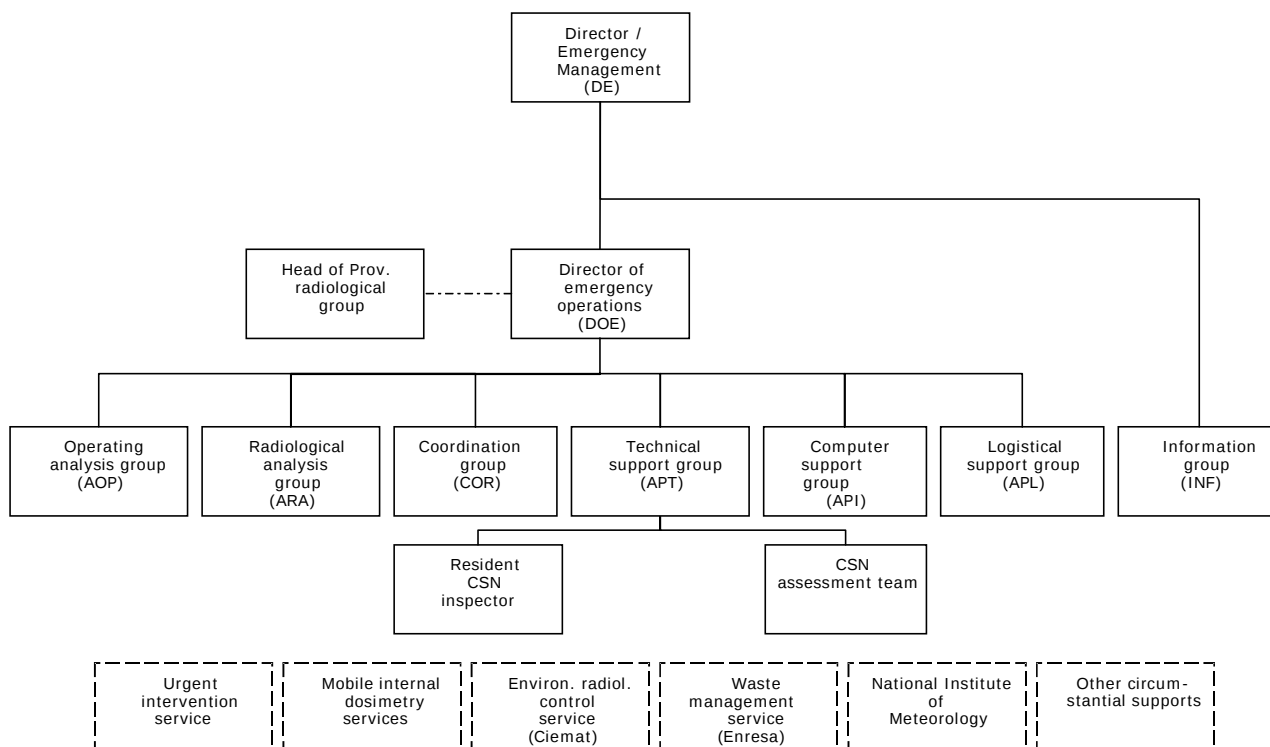


Figure 16.1

Emergency management:

The Chairman of the CSN is the emergency Director of the CSN Emergency response organisation during the immediate and urgent phases of an emergency, acting as the sole authority on behalf of the Nuclear Safety Council during the response to these phases.

The mechanisms required for the delegation and assumption of this function in the Vic-Chairman or the Commissioners are in place for cases of scheduled or non-scheduled unavailability of the Chairman in an emergency situation.

The Nuclear Safety Council, as the responsible body, undertakes Management of the emergency response organisation during the third phase of radiological emergencies.

Director of emergency operations:

One of the two Technical Directors of the Nuclear Safety Council undertakes the functions of Director of emergency operations, depending on the practice, activity or source from which the emergency arises. The Director of emergency operations directs the operations of the operating groups of the CSN emergency organisation.

Information Group:

This group is in charge of all activities relating to public information during emergency situations, and of organising and undertaking contacts with the representatives of the media during such situations, with support from whatever technical personnel is deemed to be appropriate in each particular case. The information group reports directly to the Emergency Director.

The Emergency Room (SALEM) is where the CSN emergency organisation mostly carries out its functions, centred on the activity of the personnel assigned to the different operating groups: management, coordination, radiological analysis, operating analysis, computer support and logistical support.

Co-ordination group

The co-ordination group is responsible for ensuring the correct application of all the CSN emergency planning instruments at local, national and international level; for the coordination and operational interface between the CSN emergency response organisation and the response organisations of other national and international agents and bodies, and for the coordination of the different operations of the different groups of the organisation, in accordance with the directives and priorities established by the Director of emergency operations. Likewise, this group is in charge of permanently manning the Emergency Room and of the maintenance and revision of the Action Plan and its procedures.

Radiological analysis group

The radiological analysis group is in charge of the tracking and evaluation of the radiological consequences of the emergency situation and for proposing the protection measures to be adopted to the CSN emergency Director. For these tasks this group is equipped with aid tools located in the Salem and received assistance from the National Institute of Meteorology.

Operating Analysis group

The operating analysis group is in charge of tracking and evaluating the emergency from the point of view of the nuclear safety of the installation and, therefore, of gaining insight into the initial cause of the event, its evolution, the systems and equipment affected, the emergency operating procedures used and, in general, the operating status of the installation and characterisation of the source term.

Support group

The support group is responsible for providing the support required by the different CSN Emergency Organisation operating groups and by the Information Office, especially as regards contacting those national and international organisations that might collaborate in the emergency and the off-site operating support agents. Reporting to this group are the resident inspectors and deputy resident inspectors at the Spanish nuclear power plants who are not the heads of the provincial radiological group and who remain at the plant throughout the emergency situation. The analysis, study and investigation teams made up of CSN personnel and sent to the location of the accident also report to this group.

There is a stand-by system for the personnel of the CSN emergency organisation that guarantees the presence of a sufficient number of people within less than one hour of activation. In addition, the CSN emergency centre, which is described below, is permanently manned by shift personnel included within the co-ordination group.

The CSN emergency response organisation is backed by a series of support and assistance services for extension of the response of the organisation to the site or place of the accident. These services are as follows:

Urgent Intervention Service.

Radiological Characterisation Service.

Waste Management Service.

Mobile internal contamination measuring service.

Emergency Room (Centre) of the Nuclear Safety Council (SALEM).

In order for the different elements of the CSN Emergency Organisation, described above, to be able to carry out in an efficient and coordinated manner the functions assigned to them, the CSN has an Emergency Centre known as the SALEM. SALEM is the abbreviation of “Sala de Emergencias”.

The SALEM is a nerve centre established at national level for the notification, information, tracking, analysis and assessment of whatever nuclear accident or radiological emergency situations might arise in the national territory of Spain or outside this territory but having real or potential repercussions on it.

A brief description of the Centre is included below, along with the information, calculation and estimation systems available at it.

The main core of the SALEM consists of four operating rooms of approximately the same size that together form a cube and that are separated by glass partitions. The centre is located in the basement of the headquarters of the Council, and constitutes a restricted access area.

The main room of the centre is known as the **emergency management room** and is the working area for the emergency Director, the Director of emergency operations and the co-ordination group. The three remaining rooms are the working areas for three of the operating groups defined in the CSN Action Plan: radiological analysis, operating analysis and technical support. The last of these rooms also houses the information group.

The SALEM is complemented by a communications room annexed to the emergency management room, and by a set of auxiliary rooms equipped for the extended presence of the emergency organisation personnel. This communications room houses the fax and telex terminals, the telephone concentrator, a device for recording telephone conversations, a photocopying machine, etc.

The SALEM is attended 24 hours a day, 365 days a year by a duty technician qualified in nuclear safety and radiation protection and by a communications officer.

The voice transmission systems at the SALEM are classified as direct telephony (head-tail), switched telephony (conventional) and radiotelephony. In addition to this criterion of diversification, the systems also meet the criterion of redundancy, inasmuch as the communications are designed with at least two different systems, to provide and ensure a permanent link between the SALEM and the different nuclear groups, relevant radioactive installations, civil defence operations co-ordination centres and the different national and international bodies involved in the management of nuclear emergencies.

At the SALEM there is a series of surveillance, calculation and estimation systems that constitute a set of specialist tools used by the experts of the emergency organisation for the performance of their functions.

Information on the electrical switchyards of the nuclear groups is received at the emergency management room. For each nuclear installation the system provides a single-line schematic of its sub-stations and a set of associated electrical parameters that allow any power reduction or non-scheduled trip at any of the nuclear groups to be detected.

The **radiological analysis group room** is equipped with the environmental radiological surveillance networks. These allow the CSN to fulfil its task of measuring and controlling the levels of radiation and contamination outside the nuclear and radioactive installations. The CSN has its own automatic network of environmental radiological surveillance stations, known as REA. This is made up of 25 stations distributed throughout the country, each of which consists of an automatic radiological station that measures levels of radiation and concentrations of radon, radioiodines and alpha and beta emitters in the air, and a meteorological station (belonging to the National Institute of Meteorology) that measures the main meteorological parameters. The REVIRA network control centre at the SALEM also receives data from the networks of automatic stations implemented by the Governments of certain of the Autonomous Communities of the Spanish State. A consultation terminal (associated centre) forming part of the radioactivity alert network, belonging to the Directorate General for Civil Defence of the Ministry of the Interior, is also installed in the SALEM. The aforementioned network is made up of 907 automatic radiation rate measuring stations distributed across the country.

The CSN currently has various calculation codes for dose estimation in emergency situations, these taking into account atmospheric dispersion, which is of fundamental importance for determination of the radiological risks associated with the possible release of radioactive materials that might take place in the event of a nuclear emergency. Most of these codes originated at the NRC and have been adapted to the Spanish nuclear power plants: IRDAM, RASCAL Y MESORAD. The SALEM is also equipped with the generic application of the RODOS decision-making aid system, which is currently being adapted to the conditions of the Spanish emergency plans via a specific CSN project.

In order to function, these emergency situation dose estimate calculation codes require the values of different meteorological parameters as input, which they use to estimate or calculate the prevailing atmospheric dispersion conditions. For this purpose, the CSN has a system linking the SALEM to the meteorological towers of the different nuclear sites. In addition, there is a direct connection to the National Institute of Meteorology via a data transmission line, for reception of the parameters required for wide range dose estimates and of weather forecasts.

The **operating analysis group room** is fitted with a safety parameters transmission system, required by the personnel of the CSN to gain insight into the operating situation of the plant and to reliably assess the degree of safety of the facility in the emergency situation. The main function of this system is to identify abnormal operating conditions, supplying a continuous indication of safety-related parameters or other variables representing the operating status of the plant.

This room also has a real-time plant analysis system that incorporates the MAAP code, specifically adapted for each nuclear power plant, this system being connected to the safety parameters reception system of each plant. The system allows the evolution of severe accidents to be assessed and predicted. It is also used as a training tool for the personnel of the CSN in relation to severe accidents, which are simulated using the system.

In order to be able to carry out the function of providing technical documentation on a given installation for the other operating groups, the **technical support group room** is equipped with an archive containing documentation on emergency situations for each of the nuclear power plants, general and emergency operating plans and procedures, radiological surveillance plans, technical specifications, etc.

At the end of 2000 and the beginning of 2001, the CSN drew up an emergency room computer and telecommunications systems plan, with the following objectives:

- To establish a clear guideline on integrated development of the computer and telecommunications systems deemed to be necessary to allow for and rationalise the orderly and efficient performance of all the activities relating to the CSN response to emergency situations and for maintenance of the organisation's response capacity.
- To identify and technically specify each of the systems proposed and integrate them with current or future systems, either directly at hardware and software level or through the definition and specification of a common integration standard, which will need to be present in all the proposed, current or future systems, taking into account the specific characteristics of each.
- To establish a service lifetime for each of the systems proposed, identifying in each case possible alternatives for updating and renewal.

The product of the systems plan is included in the corresponding projects plan, for which a total 19 projects have been identified and prioritised, including the renewal of the Salem hardware and software, the improvement and modernisation of the current telecommunications systems used for the transmission of voice, data, video and documentation, the modernisation and updating of the alert, surveillance, estimation and information systems and, finally, the integration of all these systems.

The implementation of these projects, within the framework of priorities mapped out for each, will be accomplished over a period of three years and with a foreseen budget amounting to some 2,000,000 Euros.

d) Safety of installations

Article 17. Siting

17. Significant licensee activities in relation to the safety of nuclear power plant sites

During the period since the first national report, the on-line actions taken in relation to site safety have progressed in accordance with the forecasts: progress in the preparation of Periodic Safety Review reports; progress in PSA-Off-Site Events studies, and continuation of the site parameters Surveillance Programmes already implemented at each plant.

As has been pointed out before in this report, with the exception of Trillo NPP, all the plants have carried out their Periodic Safety Reviews.

The PSA-Off-Site Events studies (levels 1 and 2), carried out in accordance with the “Integrated Programme for the Performance and Use of Probabilistic Safety Assessments in Spain” and with the methodology described in the document NUREG-1407, have been completed on schedule at all the plants except Trillo.

Also continuing at the Spanish nuclear power plants are the surveillance programmes relating to the site parameters required: seismology parameters (seismic instrumentation and transmission of the information recorded), meteorological parameters (meteorological instrumentation and transmission of the information recorded) and hydrogeological parameters (surveillance point and data acquisition networks). At the Ascó, Vandellós and Trillo plants, ground movements surveillance programmes also continue, for the auscultation of as yet non-stabilised differential movements.

The performance of the licensees in site parameter surveillance and in the performance of studies and assessments relating to site safety, in accordance with the previously established and scheduled plans, accurately meets the forecasts mapped out and satisfactorily fulfils the principle of continuous site surveillance and of progress in the reasonable improvement of nuclear power plant safety.

17.2 Regulatory control of licensee activities

All the studies and re-evaluations carried out by the licensees have been reviewed. The Periodic Safety Review studies have led to the updating of the seismic surveillance systems, with digital technology free-field accelerographs having been installed at all the plants.

In the PSA-Off-Site Events assessments, consideration has been given to earthquakes, floods, winds, transmission lines and nearby industries. The studies analyse the performance of the installations in response to events beyond the design basis (ruling out those with a frequency of occurrence of less than 10^{-6}), with a view to detecting specific vulnerabilities at each plant that might be resolved at low cost, through reasonable improvements offering a good cost-benefit ratio.

The periodic results of the “surveillance programmes” have also been evaluated, and continuous supervision has been accomplished by way of the appropriate inspections.

17.3 Degree of compliance with the obligations of the Convention

The site parameters surveillance programmes, which allow for the continuous evaluation of such parameters, are progressing satisfactorily, on the basis of the corresponding information needs and most appropriate frequency of data acquisition.

The progress made in the Periodic Safety Review studies and PSA-Off-Site Events assessments demonstrate the above. The review of these studies by the regulatory authority has led to various improvements to their content. From the practical point of view, the most relevant consequence has been the specific review of the free-field seismic surveillance systems in all the plants.

Consequently, Spain has improved its degree of compliance with the requirements established in this Article.

Article 18. Design and construction

18.1 Significant licensee activities in relation to safety of plant design reviews

As was mentioned in the first national report, the licensing standards and practices applied in Spain are incorporating the concept of safety in depth or defence in depth, as regards both the barriers (fuel cladding, pressure boundary and containment system) and the engineered safeguards protecting the integrity of these barriers. The administrative requirements relating to licensing, inspection and quality assurance attempt to ensure the proper design of the barriers and the correct operation of the engineered safeguards protecting them.

The designs and materials used to manufacture fuel have varied over time, in accordance with the state of the art. The performance of the fuel has been generally satisfactory, although certain excessive deformations and cases of corrosion and hydriding have occurred in zircaloy-4 cladding with degrees of burnup in excess of 45 Mwd/Kg in PWR plants, these being replaced with advanced alloys during the refuelling outages.

The pressure boundary is designed in accordance with the US ASME III code (at Trillo NPP, which is of German design, the requirements of AD Merkblätter and associated documents are adhered to). Also included are full requirements regarding controlled and uncontrolled coolant leakage. Criteria are established for surveillance of the neutron flux experienced by the pressure vessel and for the monitoring of displacement of the transition temperature.

The pressure boundary of the different reactors has performed reasonably well, although incidents have not been lacking. After twenty-five years of operation, certain blind penetrations in the closure head of the reactor vessel at the José Cabrera plant developed through-wall cracks as a result of the entry of resins in the primary circuit. The vessel head was repaired and subsequently replaced in 1997. At the Santa María de Garoña plant, intergranular stress corrosion cracking appeared, affecting different parts of the pressure boundary, especially the recirculation circuit, which was replaced in 1985.

At the second generation plants – that is to say Almaraz I and II and Ascó I and II – the main problems have been related to the Westinghouse model D-3 steam generators, these finally leading to the replacement of these components (Almaraz I in 1996, Almaraz II in 1997, Ascó I in 1995 and Ascó II in 1996). At both units of the Almaraz plant, the vessel heads were also replaced in order to prevent the corrosion affecting the control rod drive system tubes that had been observed at certain French plants.

The containment buildings of all the Spanish nuclear power plants have been re-evaluated using realistic criteria, with the objective of determining static breaking strain. In general, values of between two and five times the design values were obtained, this revealing the real capacity of these buildings. The licensees analysed the advisability of introducing filtered containment venting systems, concluding that this was not justified. The CSN conditioned the decision on the results of the probabilistic safety assessments. The BWR

plant owners, however, determined that the installation of wet well venting systems was justified, this being accepted by the CSN.

As regards the design of the plant systems, each periodic safety review includes a section for the analysis and documentation of design modifications corresponding to the review period. The overall analysis of all of these is carried out in order to verify that the overall operation of the plant has been in accordance with the design and that the design modifications incorporated have not altered the original design bases. The tracking and management of the design modifications carried out at the plants has undergone over time a process of progressive adaptation to the current requirements, the aim being to identify whether a modification does or does not constitute a non-revised safety issue, in which case it would require approval before being incorporated.

As regards the performance of the equipment during the period of this second report, the in-service inspection practices and performance of tests on components subject to surveillance requirements have continued, as has the updating of the pressure-temperature curves and revision of the reference values for nil ductility transition temperature, as a result of the neutron flux monitoring programmes and the extraction of capsules subjected to irradiation. Similarly, work has continued on the containment testing programme (local leak and integral leakage tests) in order to verify that containment integrity is maintained and that the limiting conditions for operation and accident analysis hypotheses are satisfied. Furthermore, the application of the maintenance rule at the plants has meant improved management of resources, for both preventive and corrective maintenance practices. At one plant, where the performance of preventive maintenance at power has been contemplated, this maintenance rule has made it possible to identify and analyse risk configurations, and to establish the applicable contingences.

The design basis review programme for the plant safety systems, the aim of which is to compile the design bases and licensing bases for each safety-related system, has already been indicated in Article 14.

As has been pointed out in Article 6, the period contemplated in this second report has included the performance of power upgrading activities at Vandellós II NPP and at the two groups of the Ascó plant. In all these cases it has been necessary to submit appropriate justifications, identifying the systems affected and providing the evaluations required to justify that the capacity of the systems was not compromised by these increases in power.

18.2 Regulatory control of licensee activities

In addition to the regulatory control of licensee activities performed directly by the CSN, by having resident inspectors at each site, each licensee is required to submit a series of reports. The issuing of these reports is a requisite for each authorisation, and they are drawn up periodically or otherwise. Once received, the reports are evaluated and constitute one of the inputs to the inspection programme for each plant.

The following are among the reports to be submitted:

- Reports specifically required by the authorisations on a yearly basis:
 - In-house or industry operating experience applicable to the installation, describing the actions taken to improve the performance of the installation.

- Design modifications foreseen, implemented or in the implementation phase.
- Measures taken to adapt plant operation to the new national requirements on nuclear safety and radiation protection, to the standards of the international organisations of which Spain is a member or to the standards of the country from which the project originates.
- Activities within the plant personnel initial and on-going training programme having an impact on nuclear safety or radiation protection.
- Results of the environmental radiological surveillance programme.
- Results of the personnel dosimetry controls.
- Activities within the radioactive waste management plan
- Activities relating to plant lifetime management, including monitoring of the mechanisms of ageing and degradation of safety-related structures, system and components.
- Periodic reports required by other official operations documents:
 - Daily, monthly, six-monthly and yearly operating reports, including data on annual operations activities, etc.
 - Reports deriving from other periodic activities, such as the results of In-Service Inspections, containment leak rate testing, environmental qualification and application of the Maintenance Rule.
- Non-periodic reports:
 - Such as those referenced in the authorisations themselves, for example the reports to be submitted as a result of the conditions of the authorisation or complementary instructions.
 - Reports deriving from application of the operating technical specifications: i.e., reports on reportable events or special reports.

In addition to the evaluations of these reports, the information contained in them is obviously used in the inspections and audits that the CSN carries out, as described in Article 19.

18.3 Evolution of severe accident policy and modifications made at the nuclear power plants

As regards severe accidents, the policy applied has been based on the following points:

- In accordance with the policy initially adopted in Spain, based on the country's technological circumstances, its industrial development and the dimensions of its nuclear programme, the licensing processes and requirements made of the nuclear installations are based fundamentally on the standards and references developed by the regulatory authority of the country of origin of the design, either the United States or Germany. Given that Trillo NPP is the only plant of German origin, the NRC standards are those most closely adhered to. With justified exceptions, this pattern has been

followed in Spain since the beginnings of the use of nuclear energy, and has been applied also in relation to severe accidents. Consequently, the CSN requirements as regards severe accidents have consisted of an argued adaptation of NRC actions.

- The most important requirement of the NRC in relation to severe accidents has been the performance of individual plant evaluations (IPE), which in practice have translated into the so-called level 2 Probabilistic Safety Assessments (PSA) for severe accidents. In this respect, the CSN requested the Spanish plants to undertake PSA level 2, as a basis allowing insight to be gained into the risks associated with different severe accident sequences and for application of adequate management measures, in order to prevent or mitigate the consequences of such accidents and, if necessary, carry out appropriate modifications on the plant systems. The methodology applied in performing these assessments is in line with that used in the United States.
- The CSN and the Spanish nuclear industry, universities and research organisations have participated in international research and development programmes with a view to achieving the necessary knowledge of the phenomena associated with severe accidents. This knowledge is essential for performance of the aforementioned assessments. Likewise, they have participated in the different working groups of the international organisations dedicated to this question. Under the auspices of the nuclear industry and the CSN, the Spanish universities have organised educational and training programmes on severe accidents.
- For the performance of the aforementioned assessments, the Spanish nuclear industry has used the main severe accident simulation codes, especially those from the country of origin of the design of the country's installations (USA). The CSN has also installed and used these codes in order to improve knowledge of them among its personnel. Furthermore, both the Spanish nuclear industry and the CSN and the different research organisations have participated in different ways in the processes of validating the most important codes on severe accidents.

In the past important modifications have been carried out, aimed at preventing core damage more than at mitigating its consequences. Modifications were incorporated in BWR and PWR reactors in order to respond to anticipated transients without scram. Likewise, the modifications made to address loss of off-site power, consisting of making available alternative electrical feeds from other sources, along with the possibility of using the hydrostatic test pump as to provide water make-up to the seals of the main pump, are prevention measures designed to address the loss of electricity supply.

In the BWR reactors, and in particular the Mark I and Mark III designs, containment vents were installed to reduce the environmental impact of a severe accident. The installation of this type of vents was accomplished in accordance with the recommendations of an NRC Generic Letter (GL-89-16). This measure has been estimated to constitute a significant safety improvement, since it reduces the risk of containment failure in situations in which the pressure, in the event of a loss of coolant, might jeopardise the integrity of the containment.

The implementation of containment design modifications for the mitigation of severe accidents, such as filtered vents for use as a mitigation measure to prevent potential containment failure, was conditioned on the results of the PSA's level 2.

The existence of hydrogen in containment, generated as a result of an accident, implies a threat to containment integrity. To address this possibility, the containments of certain plants have been equipped with hydrogen analysers, hydrogen mixing systems and hydrogen recombiners, and even burners (ignitors), on the basis of specific studies.

As regards the Trillo plant, a PWR-KWU design, although the objective is the same as in the previous cases, i.e., to undertake an improvement programme responding to accidents beyond the design basis, the measures have been based on the specific characteristics of the plant design, which is considerably more automated. This means that in order to be able to adopt measures to respond to accidents beyond the design basis, it is necessary to incorporate changes in the design itself, allowing the operator to perform manual actuations. Consequently, it is not possible to develop the corresponding instructions until such time as these changes have been incorporated. The CSN has required that the incorporation of the accident management strategies and the appropriate design modifications be completed before the end of 2001.

With regard to the emergency operating procedures, or symptom-based EOP's, these have been incorporated at the plants in accordance with the patterns developed by the owners' groups. The incorporation of these operating procedures has made it necessary to introduce significant improvements in the training programmes.

The implementation of the Severe Accident Management Guidelines has been generally and formally requested, as is reflected in the corresponding authorisations, this having meant a revision of organisational aspects, such as the activation time for the technical support centre (TSC), the information available at the TSC, the organisation for assessment and decision-making and communications between the TSC and the control room.

Recently, the CSN has issued a technical instruction relating to revision of the site emergency plans, such that in all cases these guideline drills be performed at least once a year.

The development and implementation of the symptoms-based Emergency Operating Procedures, including operational situations beyond the design basis, such as the severe accident management guidelines are based on references developed in the United States.

Severe accident management activities are understood to include those performed by the plant personnel during the evolution of an accident to avoid, or prevent, core damage, terminate the progression of core damage and ensure its maintenance inside the vessel, maintain containment integrity and minimise the off-site release of radioactive products.

The approach applied in Spain for implementation of the severe accident management guidelines is based fundamentally on references from the country of origin (USA), without the requirement that design modifications be undertaken to implement severe accident management measures except when justified from the point of view of safety.

18.4 Degree of compliance with the obligations of the Convention

The Spanish legislation has established a formal programme for the granting of authorisations to the nuclear power plants, this including design review, the surveillance of construction and verification of the suitability of performance by means of a testing programme.

The design of the Spanish nuclear power plants places special emphasis on application of the concept of defence in depth or safety in depth, as regards both the design of the physical barriers to the release of fission and activation products and the design, maintenance and verification of the engineered safeguards that maintain the integrity of these barriers in foreseeable operating situations and design basis accident circumstances.

The design pays special attention to the prevention of postulated accidents and to the mitigation of their consequences. The containments and associated engineered safeguards have been re-evaluated with respect to the strictest criteria.

Generally speaking, each plant has been formally required to implement severe accident management guidelines, this having meant a review of their systems and a review of the organisational and personnel training aspects of the plants. The CSN has recently issued a technical instruction relating to the revision of the site emergency plans, such that in all cases severe accident management guideline drills be carried out at least once a year.

In summary, mention might be made of the fact that adequate measures have been adopted for the design of the nuclear installations to incorporate various barriers and reliable protection methods to prevent accidents and attenuate their radiological consequences were they to occur.

In view of the above, it is considered that Spain adequately meets the requirements of this article of the Convention, in relation to the design and construction of nuclear power plants.

Article 19. Operation

19.1 Significant licensee activities in relation to safety of nuclear power plant operational reviews

As is explained in detail in Article 10, during this period the licensees of the installations have undertaken various on-going improvement programmes, which have focussed among other things on improved performance in relation to safety. Through these programmes, the licensees have carried out activities such as the establishment and diffusion of the mission and vision of the organisation, the preparation, diffusion and periodic revision of a Strategic Plan and the establishment and tracking of short-term improvement objectives. These objectives are aimed, among other things, at strengthening and enhancing the safety culture of the installation and at orienting the capabilities of the organisation towards on-going, systematic review of safety in the different areas of plant operation.

Furthermore, as regards changes in the standards affecting the activities of the licensees, and as indicated in section 9.1.1, the new Regulation on Nuclear and Radioactive Installations introduce adaptation measures in relation to the documentation required during the different phases of authorisation and replace the successive extension to the operating permits with authorisations issued for a fixed period.

The format and content of these authorisations is the same for all the plants, and they establish the requirements applicable to a number of different issues, among them the continuous safety review to be carried out by the licensees on the basis of operating experience, the new national standards and those in force in the country of origin of the technology, as well as the performance of a periodic safety review prior to requesting renewal of the authorisation (Appendix 19.A includes a standardised model of the Operating Authorisation). Specifically, the general requirements included in the new operating authorisations refer to the following aspects:

- Ownership of the plant and scope of the authorisation.
- Maximum authorised operating thermal power.
- Documents in accordance with which the installation is to be operated and revision in force of these documents: Safety Analysis Report, Operating Technical Specifications, Organisational Manual and Site Emergency Plan. The authorisation indicates that subsequent revisions of these documents, except the Safety Analysis Report, are to be approved by the Ministry of Economy, following a favourable report from the CSN. The Safety Analysis Report may be revised by the licensee without approval from the Ministry of Economy, except in cases of specific design modifications requiring authorisation. Another requirements is that operation of the plant be accomplished in conformity with what is established in the following documents: Radiation Protection Manual, Quality Assurance Plan and Waste Management Plan. These documents may be revised by the licensee without authorisation, although the different revisions made to them must be submitted to the CSN within one month for their supervision. In the event that the licensee plans to carry out modifications implying an important impact on the safety or operation of the installation, authorisation is required prior to their implementation.

- Annual reports on the following are to be submitted to the CSN:
 - Design modifications performed, under way or planned at the installation and safety assessment of such modifications.
 - New requirements established by the regulatory authority of the country of origin of the project and analysis of their applicability.
 - Analysis of in-house and industry experience.
 - Activities of the personnel initial and on-going training programme.
 - Results of the environmental radiological surveillance programme.
 - Results of personnel dosimetry controls.
- Transport of fissionable material and radioactive wastes.
- Lifetime management activities.
- Performance of periodic safety review.
- Information required to request new extensions to the operating authorisation.
- Power of the CSN to issue to the licensee appropriate complementary instructions for better compliance with and verification of the plant safety conditions.

At present, in order to be granted these authorisations, the licensee must provide with the request a periodic safety review, a revision of the probabilistic safety assessment and an analysis of the operating experience accumulated during the period of validity of the previous authorisation.

The following may be singled out as being among the more significant on-going licensee activities in relation to safe plant operation:

a) Maintenance

In addition to what has been commented in section 6.2, certain plants have initiated a reliability-based maintenance programme that has meant a systematic review of the maintenance carried out to date on the systems defined within the scope of the programme.

The objectives of the programme have been to improve the reliability/availability of systems of significance from the point of view of risk (Maintenance Rule criteria) and of production, to improve the coordination between the different sections involved in maintenance and to implement new technologies, with greater weight given to predictive maintenance tasks, in order to achieve greater safety in plant operation, a higher degree of reliability in equipment and systems operation and a reduction in overall maintenance costs.

b) In-service inspection applying risk-based criteria

Certain plants have submitted a new way of performing in-service inspection activities for CSN consideration, this consisting of applying risk-based criteria. The CSN is studying these criteria, which have not to date been applied at any plant.

c) Improved Operating Technical Specifications

Certain plants have modified their Operating Technical Specifications, adapting them to the standards for each plant type of the American regulatory authority, while others are in the modification phase.

The improved Operating Technical Specifications submitted by the plants have been evaluated by the CSN in an integrated manner, and have been approved for certain of these plants. Periods have been established for implementation, including the time required for adequate plant personnel training.

19.2 Regulatory control of licensee activities. Nuclear power plant operating experience feedback programme and results obtained

The regulatory control of the licensee's activities is accomplished through evaluation of the documentation that is required legally to be submitted to the CSN and through inspection activities, including resident inspections.

Especially relevant among the documentation issued by the licensees is that relating to operating experience, with respect to which the CSN continues to carry out the activities described in the first national report. In addition, during this period the periodic safety reviews have meant exhaustive revision, among other aspects, of the analyses of the in-house and industry operating experience. Although the revision period foreseen for future periodic reviews is ten years, the first reviews have uniquely included an analysis of the operating experience acquired since plant start-up. During these reviews a study has been made of the scope of the events analysed, their applicability to the plants, the set of corrective actions deduced from the analysis and, finally, their state of implementation.

Aside from its assessments programme and routine inspections for verification of correct analysis of the operating experience, the CSN has carried out a highly detailed revision of the documentation provided by the licensees in relation to their periodic safety reviews, this having in fact represented a second control by the regulator over these activities, since most had been contemplated within the scope of routine control.

The results obtained following this redundant review of the operating experience management programme have corroborated the goodness of the ordinary control system established by the CSN, since it has been necessary to correct only aspects of minor importance or to evaluate certain issues that were left outside the scope of the routine programme or that had not been treated with adequate depth and rigour. It may be pointed out that thanks to the periodic safety reviews the licensees have made the results of their systematic analyses uniform in all respects, and that the CSN has obtained a high degree of confidence in the work performed having been complete and consistent.

Changes have also been introduced during the period in the plant operating indicators programme designed by the CSN. The diverse improvements made to the definition of the indicators have also been aimed at making the programme consistent with the operating indicator programme used by the NRC in its new plant oversight process. In this way, the objective is to continue to use data from US plants as a direct reference for comparison, this being a valuable element when evaluating the results of the national programme. During the process of developing the new programme, the CSN has continued to apply the

indicators programme already in use, although by the end of the year 2000 agreement had already been reached regarding the new set of indicators, and development of the computer process for their implementation is under way. The pilot report on the new indicators is expected to be available during the first quarter of the year 2002.

19.3 Regulatory control of licensee activities. Nuclear power plant operation inspection and monitoring programme and results obtained

As regards the inspection programme, the CSN has approved the Inspection Model during the period, along with the basic programme of inspections of operating nuclear installations.

The programme of inspections is carried out in accordance with the Inspection Model established, which includes the methodological criteria to be used by those responsible for the inspection of the installations and the activities that fall within their realm of competence.

Inspections are classified into the following types, depending on their objective:

Licensing inspections

These are inspections aimed at ensuring that the authorisations that the CSN is required to report on, and its favourable recognitions or appreciations of any kind, are performed in compliance with the requirements and conditions established by the legislation in relation nuclear safety and radiation protection.

This type of inspection is applicable to the processes of construction, testing and start-up and to modifications requiring a process of licensing, including the declaration of decommissioning.

Control inspections

These are inspections aimed at ensuring that the installations comply with all the regulatory requirements.

This group includes systematic control inspections, i.e. those that are performed periodically or regularly to check the real operating conditions of the facility or to verify the normal performance of an activity, and occasional inspections in which such checks are made without any fixed frequency.

Special inspections

This type of inspection seeks to provide coverage for functions attributed to the CSN other than those relating to licensing and control processes.

They include the inspections performed as a result of incidents or accidents, denouncements, legal advice, special programmes or studies commissioned by the CSN and, in general, situations that the CSN considers it advisable to control by inspection.

Depending on their characteristics, the inspections may be as follows:

- Scheduled inspections. These are inspections that, because of their characteristics or in view of the experience acquired in previous years, may be planned and their performance scheduled with sufficient notice.
- Non-scheduled inspections. These are inspections that, because of their characteristics or type of impact, cannot be scheduled beforehand. Nevertheless, it is feasible to plan a given number of this type of inspections on the basis of the statistical data available.
- Generic inspections. These are inspections in which the scope includes certain of the functional areas, systems or components treated in an integral fashion. This type of inspections will normally be performed with the same scope for all the installations of one same type.
- Specific inspections. These are inspections in which the scope covers only specific or detailed aspects of a given functional area, component or system.
- Overall inspections. The scope of this type of inspection includes practically the entire installation.

The CSN has a basic inspection system for all the installations, in which the issues to be inspected are established along with the frequency with which the inspections are to be performed. For operating nuclear power plants, five functional areas are defined for inspection, within which the specific aspects to be revised are detailed, giving a complete programme made up of 25 inspections. These functional areas and specific aspects to be revised are as follows:

Operations functional area

- 1.1 Tracking of general operations activities
- 1.2 Operating personnel initial and on-going training

Radiological controls functional area

- 2.1 Operational Radiation Protection programme. ALARA Programme
- 2.2 Dosimetry service operation
- 2.3 Control of liquid and gaseous radioactive effluents
- 2.4 Environmental radiological surveillance programme
- 2.5 Tracking of reactor coolant chemistry. Radiochemistry
- 2.6 Radioactive waste management

Equipment maintenance and monitoring functional area

- 3.1 Integral maintenance management
- 3.2 Performance of corrective and preventive maintenance and surveillance requirements

- 3.3 In-service inspection programme
- 3.4 Equipment environmental qualification
- 3.5 Service lifetime management programme
- 3.6 Management of procurement and supplies

Engineering and technical support functional area

- 4.1 Checking of the design, assembly and testing of design modifications
- 4.2 Management of licensing and technical support by head office personnel
- 4.3 Performance of the Quality Assurance Programme
- 4.4 Operating experience
- 4.5 Design of core reloads, the operating cycle and fuel modifications
- 4.6 Human factors programmes
- 4.7 Tracking of safe shutdown programmes
- 4.8 Surveillance of characteristic site parameters

Preparation for emergencies, fire and sabotage

- 5.1 Emergency plans, drills and simulations
- 5.2 Security plan
- 5.3 Fire prevention and protection programme

The minimum frequency for the performance of each of these inspections is once every two years.

The results of the inspections are used to evaluate the operation of the plants by means of the ESFUC systematic plant operation assessment programme, which is used to evaluate the performance of the licensee's organisation in relation to five functional areas of the basic inspection programme: operation, radiological controls, maintenance and surveillance, engineering and technical support and emergency preparedness, security and fires. The evaluations are based on reports from the inspectors themselves, in which consideration is given within each functional area to aspects such as the management commitment to quality and safety improvement, the licensee's capacity for self-assessment, the human resources of the organisation and training and qualification programmes.

The set of ESFUC reports thus obtained during an operating cycle are used to draw up an overall report on each functional area. The results obtained allow conclusions to be reached regarding the degree of application of the concept of the safety culture within the licensee's organisation, and make it possible to direct the CSN control and inspection efforts more efficiently towards those areas in which they are most required.

Another important element of the CSN's inspection task is the resident inspector. The CSN has had resident inspectors at the Spanish plants since 1984, and since 1988 each

plant has two resident inspectors assigned to it, the inspector and the deputy inspector. The period during which these inspectors remain at one same plant is limited to between a minimum of three years and a maximum of five, with the possibility for this period to be extended once only by up to five years.

The Resident Inspector has two basic functions:

- The direct inspection and observation of the activities performed during nuclear power plant operation, fundamentally those relating to nuclear safety or radiation protection, and the evaluation of these activities and provision of information on them for the CSN. The systematic inspections and the activities of the resident inspectors are regulated by a CSN technical procedure.
- Participation in the Nuclear Emergency Plan of each province. This participation consists of undertaking leadership of the Provincial Radiological Group, which is the group that advises the Sub-delegate of the Government, when the latter acts as Emergency Director off site, in relation to nuclear safety and radiation protection. This requires preparation of the Radiological Group's action procedures, participation in emergency simulations, etc.

19.4 Activities relating to radioactive waste and spent fuel management at nuclear power plant sites

In July 1999, the Spanish Government approved the 5th General Radioactive Waste Plan. This plan does not introduce any substantial modifications in the national low and intermediate level radioactive waste management system with respect to what was described in the first national report.

Among the novelties introduced, mention should be made of the fact that the term radioactive waste, originally established in the Nuclear Energy Act of 1964, and subsequently modified by Law 54/97 and the recent Regulation on Nuclear and Radioactive Installations (Royal Decree 1836/1999), has consolidated the regulatory framework necessary for the establishment of a system of clearance allowing certain waste materials (metallic scrap, oils, rubble from demolition, etc.) with very low levels of radioactivity, generated during the operation and dismantling of nuclear power plants, to be managed as conventional waste.

The clearance system established for the Spanish nuclear power plants is based on the principles of the responsibility of the waste producer, the traceability of the management process for declassified materials and the intrinsic safety of all the processes carried out with such waste materials.

Furthermore, in 1999 the CSN started up an initiative aimed at establishing the derived levels of clearance for each of the waste streams generated at the nuclear power plants and potentially open to management as conventional waste. At present this initiative is in the development phase, and derived levels have been established for the clearance of active carbon and rubble.

Finally, since it is foreseen that capacity of the pool of Trillo plant will be completed in year 2002, as established in the fifth Plan for Radioactive Waste Management, a temporary storage is being built on its site to set the spent fuel on metallic containers.

19.5 Degree of compliance with the obligations of the Convention

As was indicated in the first national report, at that time Spain met the requirements of the Convention in relation to the operation of nuclear power plants. With the modifications carried out during the period and described in the previous paragraphs, it may now be stated that Spain has improved its degree of compliance with the requirements established in this article.

Appendix 19.A: Standard model of operating authorisation

A CSN Transmission Letter to the Minister of Economy

On _____ (date), the CSN received from the Directorate General for Energy Policy and Mining of the Ministry of Economy, along with a letter dated ... (registration entry number), the request for renewal for ten years of the operating authorisation for the _____ nuclear power plant, as referred to in chapter IV of the Regulation on Nuclear and Radioactive Installations. With one year's notice prior to expiry of the authorisation currently in force, and in compliance with condition ____ of Appendix I of the Ministerial Order of _____ of _____ of the year _____, the licensee submitted a re-evaluation of safety and radiation protection at the plant, known as the Periodic Safety Review.

The CSN has undertaken continuous tracking and supervision of the operation of the aforementioned plant throughout the period of validity of the current Authorisation and of compliance with the applicable conditions regarding nuclear safety and radiation protection. Likewise, it has evaluated the Periodic Safety Review corresponding to recent years, from _____ to _____, submitted by the licensee, which includes an analysis of the operating experience of the plant since the beginning of its operation, an analysis of equipment performance, analysis of the impact of the new applicable standards, the results of the probabilistic safety assessment and the plans for safety improvement implemented by the licensee.

The Nuclear Safety Council, during its meeting held on of of the year ..., has studied the request made by {Licensee} and the report drawn up by the Technical Directorate for Nuclear Safety as a result of the evaluations performed, and has agreed to issue its favourable judgment for renewal of the operating authorisation for a period of _____ years, as long as operation is carried out in accordance with the limits and conditions included in the Appendix. This agreement was reached in compliance with section b) of article 2 of Law 15/1980, modified by the first additional provision of Law 14/1999, and is submitted to that Ministry to all appropriate effects.

Madrid,

OFFICE OF THE CHAIRMAN

B Limits and conditions regarding nuclear safety and radiation protection associated with the operating authorisation

1. For the purposes contemplated by the current legislation, the company _____ is considered to be the licensee and holder of this authorisation and the operator responsible for the _____ nuclear power plant.
2. The present Operating Permit empowers the licensee for the following:
 - 2.1. To own and store fuel elements containing slightly enriched uranium, in accordance with the technical limits and conditions contained in the Refuelling Safety Study for each cycle and with the limits and conditions associated with the specific Authorisations for the storage of fresh and irradiated fuel.
 - 2.2. To operate the plant to a thermal power of _____ MWt.
 - 2.2. To own, store and use the radioactive materials, nuclear substances and radiation sources required for operation of the installation.
3. The authorisation is granted on the basis of the following documents:
 - a) Final Safety Analysis Report, Rev. _____.
 - b) Organisational Manual, Rev. _____.
 - c) Operating Technical Specifications, Rev. _____.
 - d) Site Emergency Plan, Rev. _____.
 - e) Quality Assurance Manual, Rev. _____.
 - f) Radiation Protection Manual, Rev. _____.
 - g) Radioactive Waste Management Plan, Rev. _____.

The operation of the plant shall be accomplished in accordance with the revision in force of the aforementioned documents and in adherence to the updating process indicated below.

- 3.1 Modifications or changes subsequent to the Organisational Manual, the Operating Technical Specifications and the Site Emergency Plan shall be subject to approval by the Directorate General for Energy Policy and Mines, following a report from the Nuclear Safety Council, prior to their entry into force.

The Nuclear Safety Council may temporarily exempt the licensee from complying with any section of the documents mentioned in the previous paragraph, informing the Directorate General for Energy Policy and Mines of the start and end dates of such exemption.

- 3.2 Six months before the start-up following each refuelling outage, the licensee shall carry out a revision of the Final Safety Analysis Report, incorporating the modifications included at the plant between the beginning of the previous cycle and the end of the said outage and not requiring authorisation according to the provisions of condition 4.1, and the new safety assessments performed. This new revision shall be submitted during the month prior to its entry into force to the Directorate General for Energy Policy and Mines and to the Nuclear Safety Council.

The revisions of the Final Safety Analysis Report corresponding to modifications requiring authorisation from the Directorate General for Energy Policy and Mines, in accordance with condition 4.1, shall be authorised simultaneously with the modifications.

- 3.3 Modifications to the Quality Assurance Manual may be carried out under the responsibility of the licensee, as long as the change does not reduce the commitments made in the quality assurance programme in force. Any changes reducing said commitment shall be subject to approval by the Nuclear Safety Council prior to their entry into force.

The commitments are understood to be those included in the Quality Assurance Manual in force, in the form of applicable standards and guidelines, and the description of the programme itself as reflected in the contents of the Manual, as specified in the complementary technical instructions issued in this respect by the Nuclear Safety Council.

Revisions of the Quality Assurance Manual must be submitted to the Directorate General for Energy Policy and Mines and to the Nuclear Safety Council within one month as from their entry into force.

- 3.4 Modifications to the Radiation Protection Manual may be carried out under the responsibility of the licensee, except in those cases, in which they affect basic radiation protection standards or criteria, as specified in the complementary technical instructions issued in this respect by the Nuclear Safety Council. In these cases, the modifications shall require the approval of the Nuclear Safety Council prior to their entry into force.

Revisions of the Radiation Protection Manual must be submitted to the Directorate General for Energy Policy and Mines and to the Nuclear Safety Council within one month as from their entry into force.

- 3.5. Modifications to the Radioactive Waste Management Plan may be carried out under the responsibility of the licensee, except in those cases identified in the complementary technical instructions issued by the Nuclear Safety Council. In these cases, the favourable judgment of the Nuclear Safety Council shall be required prior to their entry into force.
4. As regards modifications to the design or the operating conditions and the tests to be performed at the plant, the following shall be required:
 - 4.1. Modifications to the design or the operating conditions affecting the nuclear safety or radiation protection at the installation, as well as the performance of tests at the installation, shall be previously analysed by the licensee to verify that the criteria, standards and conditions on which the present authorisation is based continue to be fulfilled, as specified in the complementary technical instructions issued in this respect by the Nuclear Safety Council.

If the analysis performed by the licensee concludes that compliance with the requirements listed in the previous paragraph continues to be guaranteed, then the modification or test may be performed and the Directorate General for Energy Policy and Mines and the Nuclear Safety Council shall be notified, as established in condition 5.

If the design modifications, the operating conditions or the performance of tests were to imply modification of the criteria, standards and conditions on which the Operating authorisation is based, the licensee shall be required to request from the Ministry of Economy an authorisation for the said modification or test, which will need to be effective prior to the entry into service of the modification or the performance of the test. This request shall be accompanied by the documentation specified in the complementary technical instructions issued in this respect by the Nuclear Safety Council.

- 4.2. Design modifications whose implementation interferes significantly with the operation of the installation or whose associated work imply an estimated collective dose in excess of 1 Sv.person, shall be subject to approval by the Nuclear Safety Council prior to their performance; in this respect, documentation similar to that indicated in previous point 4.1 shall be submitted.

Significant interference with operation is understood to mean that the work required for the installation of verification of the modification may cause plant transients or damage to safety-related equipment, or may imply a reduction in the capacity of the personnel to operate the plant safely

5. During the first quarter of each year, the licensee shall submit reports to the Directorate General for Energy Policy and Mines and to the Nuclear Safety Council on

the following aspects, with the scope and content specified in the complementary technical instructions issued in this respect by the Nuclear Safety Council:

- 5.1. In-house and industry operating experience applicable to the installation, describing the actions taken to improve the performance of the plant or to prevent similar events.
- 5.2. Design modifications foreseen, implemented or in the implementation phase at the plant.

Whenever a design modification not included in the last annual modifications report is foreseen for implementation during the refuelling outage, three months prior to the initiation of the outage activities the licensee shall submit to the CSN a report including these modifications, with the same scope and content as the annual report.

- 5.3. Measures taken to adapt the operation of the plant to the new national requirements on nuclear safety and radiation protection and to the standards of the country of origin of the project. In this last case, an analysis of the applicability to the plant of the new requirements issued by the regulatory body of the said country of origin for plants of a similar design.
 - 5.4. Activities of the initial and on-going training programme for all plant personnel whose work might impact nuclear safety or radiation protection.
 - 5.5. Results of the environmental radiological surveillance programme. The information included shall be adequate to allow any possible increases in activity above the radiological background to be detected and to determine whether the possible additional activity is the result of plant operation.
 - 5.6. Results of the operations personnel dosimetry controls, including an analysis of trends in the individual and collective doses received by the personnel during the previous year.
 - 5.7. Activities of the radioactive waste management plan, including those referring to very low level wastes open to management as conventional wastes, low and intermediate level wastes and high level wastes and irradiated fuel.
6. Any dispatch of packages of radioactive waste or fissionable materials from the plant site shall be communicated to the Directorate General for Energy Policy and Mines and to the Nuclear Safety Council with at least seven days' notice prior to the date of dispatch. The dispatch of other radioactive packages shall be communicated within 24 hours of the decision to undertake transport, and in any case prior to the performance thereof. The dispatch of radioactive packages from the plant site shall be subject to the system of authorisations established by the standards in force.

When the licensee is responsible the transport of fissionable material to or from the plant, and no authorisation is required due to the sum of the transport indexes of all the dispatched packages being less than 50, the Directorate General for Energy Policy and Mines and the Nuclear Safety Council shall be additionally notified of the intention to undertake such transport three months prior to the scheduled date.

7. During the first six months of each calendar year, the licensee shall submit reports to the Directorate General for Energy Policy and Mines and to the Nuclear Safety Council on plant lifetime management activities, including the surveillance of the mechanisms of ageing and degradation of safety-related structures, systems and components and the condition of these structures, systems and components, and identifying the new inspection, surveillance and maintenance activities incorporated to detect the said mechanisms and control their effects.

The scope and content of the lifetime management activities shall be in accordance with what is specified in the complementary technical instructions issued in this respect by the Nuclear Safety Council.

8. At least _____ years prior to the expiry of the present operating authorisation, the licensee may request from the Ministry of Economy a new authorisation for a period of no more than ten years. This request shall be accompanied by: (a) the latest revision of the documents referred to by condition 3; (b) a Periodic Safety Review of the plant in accordance with the specifications of the complementary technical instructions established by the Nuclear Safety Council; (c) a revision of the probabilistic safety assessment; (d) an analysis of the ageing experienced by the plant safety-related components, systems and structures, and (e) an analysis of the operating experience accumulated during the period of validity of the authorisation to be renewed.
9. If during the period of validity of this authorisation the licensee decided to cease plant operation, the Directorate General for Energy Policy and Mines and the Nuclear Safety Council should be notified of such decision at least one year prior to the foreseen date for such action, unless it were due to unforeseen circumstances or to a resolution by the Ministry of Economy. The licensee shall justify the nuclear safety of the installation and the radiological protection of the personnel for the operations to be performed at the installation between the termination of its operation and granting of the dismantling authorisation, as specified in the complementary technical instructions issued in this respect by the Nuclear Safety Council.
10. The licensee shall measure the efficiency of the maintenance practices carried out at his plant with respect to previously established objectives, such that there be assurance that the plant structures, systems and components are capable of fulfilling their function, in accordance with the complementary technical instructions issued by the Nuclear Safety Council on 15th February 1999 (*Not valid for Trillo NPP*).

11. Prior to each shutdown for refuelling, the licensee shall submit to the Directorate General for Energy Policy and Mines and the Nuclear Safety Council a report on the activities to be performed during the outage, in accordance with the complementary technical instructions issued in this respect by the Nuclear Safety Council.
12. During the period of validity of this authorisation, the licensee shall put into effect the plant Safety Improvement Programmes identified in the Periodic Safety Review drawn up by the licensee in support of the request for the present authorisation, within the period defined for each in the report submitted and those specified in the complementary technical instructions issued in this respect by the Nuclear Safety Council.
13. The Nuclear Safety Council may issue complementary technical instructions directly to the licensee in order to guarantee that the safety conditions and requirements are maintained at the plant and for better compliance with the requirements established in the present authorisation.