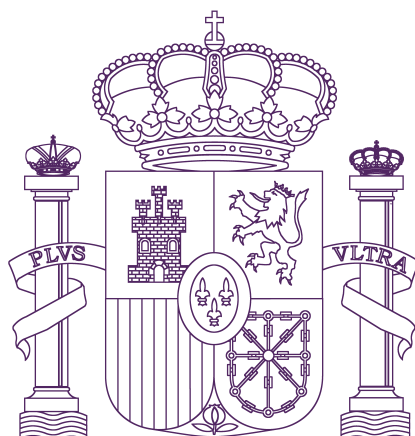
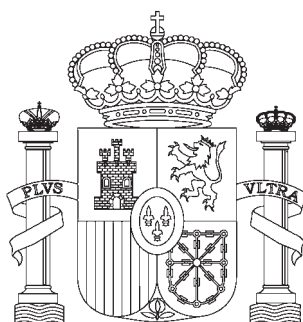




SPAIN

Convention on Nuclear Safety

Fifth National Report



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Fifth National Report

August 2010

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Introduction

Presentation of the Report

The present document constitutes the Fifth Spanish National Report to comply the obligations deriving from the Convention on Nuclear Safety, done in Vienna on September 20th 1994, in accordance with the provisions of articles 5, 20, 21 and 22 of the said Convention.

This Fifth Report is to be submitted before September 1st 2010, as approved during the preparatory meeting for the fifth review meeting. Consequently, its contents refer to the data and circumstances arising from January 2007 to December 2009 (both inclusive).

Drawing up of the Report

The report was drawn up by the Nuclear Safety Council (CSN), the organisation solely responsible for nuclear safety and radiological protection in the Spanish State, which is independent from the Government and reports exclusively to Parliament. In compliance with the commitments adopted during the second review meeting, the licensees of the Spanish Nuclear Power Plants, coordinated by the Spanish Electricity Industry Association (UNESA), and the Ministry of Industry, Tourism and Trade (MITYC), contributed to the preparation of the report.

The report has been drawn up following the same structure as that used for the articles of chapter 2 “Obligations” of the text of the Convention, starting from article 6. Each article includes relevant information on the content of each obligation, with the activities of the licensee being included in a separate section from those of the regulatory body, and a brief assessment of the degree of compliance in Spain with the requirements established therein.

A chapter on conclusions has been added, the aim being to summarise the commitments undertaken during the fourth review meeting, as requested in the Directives, and to point out the future challenges and the initiatives that are expected to be implemented in the near future.

The Report includes Appendices that extend upon and detail the information included in the articles.

The content and scope of this fifth report on the Convention are based on the recommendations established in INFCIRC/572/Rev 3 “Guidelines regarding national reports under the Convention on Nuclear Safety”, which was approved in an extraordinary meeting of the Contracting Parties held at Vienna in September 2009, and also including the conclusions for Spain resulting from the fourth review meeting.

General profile of national policy on activities relating to nuclear power plants

The objectives of Spanish energy policy are to guarantee supply and ensure a larger contribution by energy to increasing the competitiveness of the Spanish economy, the reduction of energy consumption and compliance with the environmental objectives.

Taking the above into account, the priority is established on progressing in the use of renewable energy sources and in technical developments possibly contributing to energy saving and efficiency.

Within this general framework, the policy of the current Government as regards nuclear energy contemplates the progressive reduction of the participation of this source in the energy mix, guaranteeing security in electricity supply and nuclear safety at all times.

As regards the fuel cycle, since the 1983 National Energy Plan, spent fuel has been considered a waste and the option of reprocessing is not contemplated, the only exception being the spent fuel from the Vandellós I plant, for technical reasons.

General view of the national nuclear programme

In Spain there are currently eight light water nuclear reactors in operation at six mainland sites, these representing an installed power of 7,728 MWe, equivalent to 7.85% of the total installed electricity generating capacity and to a contribution of around 18% of total national production. Six of these groups are pressurised water (PWR) reactors and the two remaining groups are boiling water (BWR) reactors. The average lifetime of the groups currently in operation amounts to 27 years.

In addition there are two reactors in the dismantling stage. The José Cabrera nuclear power plant ceased to operate in 2006 and on February 1st 2010 the ownership of the facility was transferred to the Spanish radioactive waste management agency, Empresa Nacional de Residuos Radiactivos, S.A. (ENRESA), by the Ministry of Industry, Tourism and Trade, the agency was authorised to undertake the dismantling of the plant. By other side the Vandellós I nuclear power plant is currently in the dormancy phase after having reached level 2 of dismantling.

Chapter 2. Obligations

a) General provisions

Article 6. Existing nuclear installations

This article describes the most relevant safety issues and improvement programmes that have arisen and have been carried out since the last national report in relation to the Spanish fleet of 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 Most significant nuclear safety issues undertaken in the light of Art.6 and their major results, along with events occurring since the last report and measures adopted to correct them.

José Cabrera

Throughout the period covered by this report, the José Cabrera nuclear power plant has been in the definitive shutdown situation pending the authorisation for dismantling and the transfer of ownership to ENRESA, which took place in February 2010.

The shutdown of the plant implied a significant reduction in the requirements applied during normal operation, due to the disappearance of all those relating exclusively to power operation. A review of practically all the licensing documents was performed on the basis of the new accident and risk analyses carried out by the licence for this new situation. This analysis revealed that the estimated frequency of fuel damage was 100 times lower than that existing during the operation of the plant.

From the point of view of the safety of the installation, the most relevant systems were the fuel pool cooling system and those making up its residual heat removal chain (essential services water system and component cooling water system), along with the electrical system. The remaining systems (protection, safeguards, systems associated with the secondary, chemical and volume control system, etc.) had no safety function during this stage of the installation, although in certain cases they were considered to be important for the shutdown situation.

The control over systems of importance during the shutdown condition was included in specific and obligatory programmes similar to the Operating Technical Specifications.

During this period activities oriented towards the dismantling of the plant have been carried out, such as the decontamination of the primary and auxiliary circuits and the radiological characterisation of the installation.

In 2008 the licence holder got authorisation for the commissioning of the on site spent fuel storage facility. This required the reinforcement of the spent fuel handling crane inside containment.

From January to September 2009, the spent fuel housed in the nuclear power plant pool (377 fuel assemblies) was loaded into 12 dry storage casks that were taken to the on site spent fuel storage facility.

Santa María de Garoña

During the period covered by this report, the plant operated until July 5th 2009 in accordance with the ten-year operating permit granted on July 5th 1999 and as from that date with the operating permit granted for the period July 3rd 2009 to July 6th 2013.

On July 3rd 2006 the licensee requested the renewal of the operating permit for 10 years. The MITYC requested the mandatory report from the CSN (which is binding in the event of its findings being negative) on the nuclear safety and radiation protection of the installation. The CSN issued a positive report on the renewal of the permit for the period requested. Subsequently the MITYC requested a complementary report from the CSN for an operational period of two, four or six years. The MITYC awarded the renewal of the operating permit until July 6th 2013, establishing this as the date of definitive shutdown of the plant. In renewing the permit the MITYC has taken into account aspects relating to energy planning or the socio-economic development of the region, among other things, and has not questioned safety issues.

The licensee has communicated 20 reportable events, the following being classified as level 1 on the International Nuclear Events Scale (INES): on 19/8/08 and in view of the result obtained during a test, the possibility of the batteries of the Uninterruptable Power Supply (UPS) for busses “B” and “A” of the 120V a.c. system simultaneously having a capacity lower than that required was contemplated. The tests performed subsequently confirmed that one of the trains had sufficient capacity and that the system would be able to perform its safety function, as a result of which the evaluation carried out subsequently by the CSN using the criteria of the integrated plant supervision system (SISC) classified the finding as “Green” or of very low safety significance.

The event had no consequences for either the plant personnel or the environment. The main corrective actions associated with the event include increasing the frequency of the capacity tests on the 120 V a.c. system UPS batteries, the performance of more frequent tracking of the parameters of these batteries, development by the manufacturer of an action plan to determine the cause of the premature degradation of the aforementioned batteries and replacement of the batteries every 24 months until the cause of their degradation has been determined.

Almaraz

The design modification of the greatest safety significance implemented by Almaraz plant during this period has been the installation of a fifth emergency diesel generator (EDG). The plant, which has two groups, had two EDG’s per group. The fifth EDG may replace any of the other four, cover all their services and absorb their loads in safety injection or loss of off-site power sequence.

Furthermore, in December 2009 a power upgrade was authorised for group I, and the plant has requested the same for group II. The new power level is 8% higher than previously and is based on a complete reanalysis of the plant design basis accidents using new LOCA analysis methodologies. The increase in power has implied a series of equipment changes, among them the replacement of the high pressure turbine, main transformer, heater drains and condensate pumps and a new alternator and associated equipment.

The most relevant events occurring during this period have been as follows:

- On October 16th 2007, with group II in mode 4 and in the process of reactor coolant system (RCS) cooldown to take the plant to cold shutdown conditions, the unexpected opening of a safety valve occurred on the suction side of train B of the residual heat removal system (RHRS), this discharging to the pressuriser relief tank for some 7 minutes.

It has been determined that the settings of the closing pressure (blowdown) regulating rings that were being performed on these valves were inadequate, due to inaccurate procedures

that did not adequately reflect the instructions of the manufacturers. This problem resulted to be generic and to affect the settings of all the safety valves, as a result of which the plant has had to revise the maintenance schedules and adjustments of all the valves of this type at the facility.

The CSN opened a generic issue and required an analysis of the applicability of this event to all the Spanish nuclear power plants.

- On December 4th 2008, during the process of replacing the seismic expansion gaskets separating the buildings of the two groups, it was observed that the original gaskets did not have the necessary fire barrier qualification. For this reason all the gaskets of this type were declared inoperable, the surveillance of the FFP barriers required by the performance technical specifications was established and the licensee replaced the gaskets with qualified items throughout 2009.

The CSN opened a generic issue and required an analysis of the applicability of this event to all the Spanish nuclear power plants.

Ascó

On April 4th 2008, Ascó plant notified the CSN of a release of radioactive particles in areas outside the controlled zone of group I of the plant. The origin of the particles had been an operating incident that occurred on November 26th 2007, during the 19th group I refuelling outage, when a release of contaminated water and sludges to the spent fuel pool led to the contamination of the ventilation system of the fuel building which, due to the specific characteristics of its design, allowed a part of this contamination to be released to the environment.

In view of the negative results of the internal contamination checks performed, the event did not imply any radiological effect for the plant personnel or public, and was classified at Level 2 on the International Nuclear Events Scale (INES).

In mid 2008 the licence initiated an organisational, cultural and technical reinforcement programme (the so-called PROCURA Plan), the aim of which is to address the root causes of the event. This programme will extend to the year 2012.

In October 2009 a 20-day non-scheduled outage was initiated at groups I and II for the replacement of diesel generator bearings, after receiving a letter from the manufacturer (Wärsilä) informing of the possibility of certain of the connecting rod bearings installed in the diesel generator motors being defective, this potentially leading to seizure of the motor shaft. The licensee decided to replace them as a preventive measure in order to guarantee their operability.

Cofrentes

During the refuelling outage at Cofrentes plant in 2007, a design modification was implemented consisting of changing the control rod drive housing (CRDH) hydraulic system inlet and outlet lines. Several problems arose during the performance of the mechanical tasks that this modification involved, fundamentally in the performance of the new welds that led to the need to disassemble all the CRDH's for a second time for re-machining and welding.

During this period a design modification has been implemented in the East spent fuel storage pool (PACE). This modification consisted of replacing the existing storage racks with others having a larger storage capacity and manufactured from material providing higher neutron absorption efficiency.

During 2008 there were two emergency prealerts as a result of the opening of relief and safety valves, although neither constituted a safety significant event. Finally, in September 2008 the plant was shut down as a result of increasing leakage across these same relief and

safety valves, the 16 valves being replaced. During the latest refuelling outage the original valves were reinstalled since it was determined that the cause of the leakage was an error in performance of the test, which caused a defect in the valve seats.

Vandellós II

During the 2007 scheduled refuelling outage, in addition to the activities typical of a conventional outage, design modifications were performed on the engineered safeguards cooling water systems, as established in the Safety Management Improvement Action Plan. The implementation of these modifications led to the scheduled outage lasting from May 5th to September 9th 2007, longer than is usual for this type of outages.

Through these design modifications a new heat sink has been implemented for the essential chilled water systems (which cool the safety-related building ventilation systems) and emergency diesel generator motor cooling system in replacement of the previous arrangement, these now having air coolers that dissipate the heat to the atmosphere. Prior to the modification, these systems discharged the thermal load removed from the safeguards equipment and support systems to the Mediterranean Sea via the essential services cooling water system.

The aforementioned Action Plan also established the implementation of a new engineered safeguards cooling water system to replace the essential services water system for accident conditions, as a way of avoiding the problems that this system presented (BONNA type pipes, buried for much of their length) and that finally led to the circumferential rupturing of a system access manway on August 25th 2004. The new system was implemented during the 2009 refuelling outage, which also lasted longer than usual for this reason, during the period running from March 13th to August 2nd 2009.

Trillo

During 2008 there was a problem with a control rod that prevented it from moving and that was detected during start-up process following a non-scheduled outage. It was determined that a rodlet had broken off of the control rod and had jammed in the corresponding fuel assembly, blocking the movement of the rod. The rodlet had broken off due to progressive corrosion resulting from chemical contamination during the manufacturing process. In view of the impossibility of ruling out the potential for similar problems in the short term in one or more of the 51 remaining control rods, the licensee decided to replace the 52 rods that had been in the core with the original control rods, which were in good conditions in the spent fuel pool. This is a generic issue that has affected the control rods of several KWU plants.

Neutron noise problems in the reactor. In October 2009 the licensee repeatedly detected the spurious actuation of the “dropped rod” limitation system signal. The cause is the existence of a neutron noise signal amplified by the temperature coefficient of the moderator. In January 2010, the CSN limited the operation of the plant to a maximum 94% of rated thermal power to the end of the cycle. During the refuelling outage in April 2010 the plant will implement a design modification in the limitation system that processes this signal and will perform an analysis of the cause of the phenomenon, among other requirements.

6.2 Measures and plans for the on-going improvement of safety, where appropriate, at installations belonging to different generations.

Santa María de Garoña

The previous reports have described the safety improvements carried out by the licensee as a result of the Periodic Safety Review performed in 1999 and deriving from its continuous plant updating policy.

As a result of the Periodic Safety Review the licensee will undertake improvements to several of the installation's procedures from now until 2013, and will continue the operational dose reduction programme, the human factors programme, the safety culture programme and the spent fuel management programme.

In compliance with the Complementary Technical Instruction on Standards of Conditioned Application, the licensee will carry out numerous improvements at the installation from now until 2013. These improvements are briefly described below:

- improvements to the instrumentation and control of the emergency core cooling systems (ECCS): the protection logic for the high pressure core injection (HPCI) system turbine-driven pump and the initiation logic for the automatic depressurisation system (ADS) have been optimised and manual initiation of the complete system of all the ECCS's has been installed.
- improvements to the containment isolation system: the manual initiation of the different isolation groups making up this system has been installed and a new isolation group has been generated.
- ventilation systems: the climate control systems for the emergency core cooling system rooms have been replaced with new units in keeping with the currently applicable standards.
- fire-fighting systems: detection systems and isolation dampers have been installed and will be installed in areas in which they did not previously exist, the physical separation between components operating with liquid fuels has been improved and the possibility of isolating by sectors in the fire-fighting water supply ring has been enhanced.
- electrical separation: improvements will be made in the separation of redundant components of safety systems, which will complement the separation of the components for safe shutdown in the event of a fire currently in place at the plant.
- containment isolation devices: new isolation devices will be installed and those currently existing, and their testing, will be improved.

Almaraz

The main improvements made during this period have been as follows:

- Installation of a new digital Reactor Control System using input signal validation techniques to increase the reliability of the system in the event of sensor failure.
- Installation of a new core supervision and monitoring and operational support system. The system determines the three-dimensional power distribution in the core on line and allows insight to be gained at all times into the thermal margins of the fuel, displaying this information on screen by means of an interactive graphic interface. The continuous monitoring of the core performed by the new system makes it possible to rapidly detect and diagnose any anomaly in core behaviour, and its predictive capacity makes it possible to rapidly evaluate the consequences and take appropriate actions. It also allows the power distribution in the reactor and the margins available to the peak factor limits to be monitored continuously and more accurately.

Ascó

As a result of the event involving the release of radioactive particles in areas outside the controlled zone of group I, the licensee initiated a series of diagnostic tasks to identify the deficiencies that had allowed the event to occur and subsequently drew up an organisational, cultural and technical reinforcement Plan known as PROCURA, which includes both corrective actions and actions aimed at improvement, prioritised in an attempt to resolve the causes

and factors contributing to the event, identifying the technical, cultural and organisational barriers to be implemented or reinforced to prevent recurrence.

This Plan, which was approved by the CSN, began to be applied in 2009 and will extend until 2012. It consists of six lines of improvement:

- Safety policies aimed at achieving a proactive culture at the plant facilities, reinforcing the commitment of all the personnel to the safety policies.
- Technical resources and training to strengthen the human resources in areas in which they show weaknesses.
- Decision-making process, for management to base its decisions on conservative assumptions based on the World Association of Nuclear Operators (WANO) methodology.
- Teamwork and inter-departmental communication.
- Troubleshooting.
- Cultural and behavioural reinforcement programme.

The CSN has established a tracking programme based on evaluation of the information generated by PROCURA and inspections, the objective of which is to check that this programme is adequately developed, that the actions deriving therefrom are implemented and that these actions are effective in correcting the deficiencies detected.

Cofrentes

In September 2008, as a result of the three prealerts that occurred (fire in a main transformer in 2007 and two relief and safety valve openings in 2008), the CSN requested that Cofrentes plant carried out a transverse analysis using the Management Oversight Risk Tree (MORT) methodology and including both these events and all those others occurred during the same period of time. As a result of this analysis a set of 35 recommendations has been put together which, along with those arising from other internal analyses carried out by the licensee, makes a total 133 recommendations that have been incorporated in the safety improvement programmes that are part of the Cofrentes Management Plan for the period 2008-2012.

Furthermore, as a priority action within the Cofrentes Management Plan for the period 2008-2012, the Iberdrola Nuclear Production Division decided to undertake a process of review of the performance of the relief and safety valves due to the increased leakage across these valves following the 2007 outage and the different undue opening events that had occurred. The review process was carried out by a multidisciplinary team and has led to improvement of the valve maintenance processes, the activities relating to root cause analysis of the opening events remaining open.

Vandellós II

Action Plan for Safety Management Improvement (PAMGS).

The PAMGS was issued in July 2005 as a result of the essential services cooling system pipe rupture that occurred in August 2004. This Plan evolved through different revisions.

In response to a request from the CSN, the licensee set up an External Advisory Group (EAG) made up of professionals from external companies, which carried out a series of diagnostic activities and provided a series of recommendations regarding the activities to be performed by Vandellós II plant to address all the root causes of and main contributing factors to the event.

The current revision of the PAMGS has incorporated the process to be adhered to for validation of the actions implemented, verification of the effectiveness of the results obtained and subsequent closure.

As of the end of 2009, the licensee was drawing up the final closure report of the PAMGS, incorporating evaluation of the results of applying this process for the verification of effectiveness. The licensee will also include in this report an evaluation of the results of the IAEA OSART mission carried out between September 21st and October 8th 2009 and of the results of the internal and external evaluations of the safety culture, carried out throughout the period of development of the PAMGS.

The PAMGS final closure report will be issued by the licensee and submitted to the CSN in early 2010.

As a result of the scope and application of the PAMGS, the plant currently has a new engineered safeguards cooling water system and modifications have been implemented in other safeguards cooling systems.

Trillo

The CSN has required Trillo plant to implement a design modification for the installation of a primary feed & bleed system allowing vessel failure to be prevented in certain accident scenarios beyond the plant design basis. This implementation is expected in 2012.

6.3 Identification of installations for which decisions on shutdown has been made.

During the period covered by this report it has not been necessary for the CSN to issue any formal (written) order for the plant to be shut down.

6.4 Position regarding the continued operation of the plants, including those that do not comply with the obligations as stated in articles 10-19, explaining how safety and other aspects were taken into account in decision-making

The Spanish nuclear power plants are subjected to a system of renewal of their operating permits after a set period. Likewise, every 10 years the plants carry out Periodic Safety Reviews (PSR's), updating the situation of their systematically performed on-going safety assessment programmes and analysing the applicability of the changes that have occurred in the standards during the ten-year period that has elapsed (Analysis of Conditioned Application Standards).

The position of the licensees of the operating plants is to request the renewal of their respective operating permits on expiry and, where appropriate, assess the technical-economic feasibility of the conditions imposed by the CSN for operation during the period requested.

This was what was done by Santa Maria de Garoña nuclear power plant during the previous three-year period, and what has been done by Almaraz and Vandellós II during the present such period. The rest of the plants aim to act accordingly when the moment arrives.

APPENDIX 6.A

Basic characteristics of the Spanish nuclear power plants

Table. Basic characteristics of the nuclear power plants

	Almaraz	Ascó	Vandellós II	Trillo	Santa María de Garoña	Cofrentes
Type	PWR	PWR	PWR	PWR	BWR	BWR
Number of groups	2	2	1	1	1	1
Thermal power	GI: 2729,0 (1) (2) GII: 2729,0 (1)	GI: 2940,6 (1) GII: 2940,6 (1)	2.940,6	3.010	1.381	3.237
Electrical power	GI: 977 GII: 980	GI: 1.032,5 GII: 1.027,2	1.087,1	1.066	466	1.092,02
Cooling	Open: Arrocampo reservoir	Mixed: River Ebro – cooling towers	Open: Mediterranean Sea	Closed: cooling towers, Tajo river make up	Open: Ebro river	Closed: cooling towers, Jucar river make-up
Preliminary authorisation	GI: 29-10-71 GII: 23-05-72	GI: 21-04-72 GII: 21-04-72	27-02-76	04-09-75	08-08-63	13-11-72
Construction permit	GI: 02-07-73 GII: 02-07-73	GI: 16-05-74 GII: 07-03-75	29-12-80	17-08-79	02-05-66	09-09-75
Start-up permit	GI: 10-13-80 GII: 15-06-83	GI: 22-07-82 GII: 22-04-85	17-08-87	04-12-87	30-10-70	23-07-84
Latest Operating permit	GI and GII: 08-06-00	GI: 01-10-01 GII: 01-10-01	14-07-00	16-11-04	03-07-09	19-03-01
Year of fuel pool saturation	GI: 2021 GII: 2022	GI: 2013 GII: 2015	2020	N/A (*)	2015	2021

(1) The nominal thermal power value is considered, i.e., that transferred by the core to the coolant in accordance with the definition included in the Operating Technical Specifications

(2) During the 20th refuelling outage performed at Group I of Almaraz plant, a design modification has been implemented to increase the thermal power of the facility to 2,947 MWt. This design modification was authorised by the MITYC on 18-12-09 and, following performance of the corresponding tests, the CSN authorised the continuous operation of Group I at this thermal power level on 14-4-10.

* The plant has a dry storage facility for casks containing spent fuel, which is expected to reach saturation in the year 2040.

b) Legislation and regulations

Article 7. Legislative and regulatory framework

7.1 Establishment and maintenance of the legal framework

7.1.1. General legislative framework

The following laws affecting nuclear safety were approved and officially published during the period from January 2007 to December 2009:

- Law 17/2007, of July 4th, modifying the Electricity Industry Act, Law 54/1997, of November 27th, to adapt it to the provisions of the European Parliament and Council Directive 2003/54/CE, of June 26th 2003, on common standards for the internal electricity market. The First Additional Provision of this Law modifies article 57 of the Nuclear Energy Act, Law 25/1964, of April 29th, setting the coverage for the risks that might arise in relation to responsibilities deriving from nuclear accidents at 700 million euros, although the MITYC may impose other limits of no less than 30 million euros in the case of the transport of nuclear substances or any other activity entailing a risk that, in the opinion of the CSN, does not require higher coverage. These figures may be modified by the Government in response to proposals by the MITYC in order to take into account the evolution of the international agreements subscribed to by the Spanish State and the passing of time or variations in the consumer price index in order to maintain the same level of coverage.

Likewise, the second additional Provision of this same Law 17/2007 introduces a new additional Provision to the aforementioned Nuclear Energy Act, referring to nuclear civil liability for environmental damage. This establishes that, without prejudice to what is set out in the Law in relation to civil liability for nuclear damage, the licensees of nuclear installations and of transport operations with nuclear substances shall be responsible for nuclear environmental damage occurring in the national territory and resulting from the accidental release to the environment of ionising radiations originating in such installations or transport operations, to the amounts and in accordance with the procedure established by the precept. In this respect it is established that the precepts require subsequent development by the Government.

- Law 33/2007, of November 7th, reforming Law 15/1980, of April 22nd, by which the Nuclear Safety Council was created. This not only revises the said Law 15/1980, of April 22nd, creating the Nuclear Safety Council in relation to the functions and responsibilities of the organisation but also partially revises the Nuclear Energy Act, Law 25/1964, of April 29th, as regards its objective, the principles of nuclear safety and safety in waste management, the definition of nuclear installations and updating of the system of infringements and penalties relating to nuclear safety, radiation protection and the physical protection of nuclear materials.
- Law 11/2009, of October 26th, regulating Quoted Limited Companies Investing on the real estate market. This law modifies the Nuclear Energy Act, Law 25/1964 of April 29th, adding a new article 38 b) on radioactive waste management. As established by this precept, the management of radioactive wastes, including spent nuclear fuel, and the dismantling and decommissioning of Nuclear Installations is an essential public service for which the

State is responsible, ENRESA, (overseen by the Ministry of Industry, Tourism and Trade through the Secretariat of State for Energy) being in charge of managing this public service, in accordance with the General Radioactive Waste Plan approved by the Government. It is also established that the State will undertake the ownership of the radioactive wastes once they have been definitively disposed of and will carry out whatever surveillance might be required following the decommissioning of a nuclear facility, after the period of time established in the corresponding decommissioning declaration has elapsed.

Law 11/2009 in turn modifies the sixth additional Provision of the Electricity Industry Act, Law 54/1997, of November 27th, regulating the management of the Fund for the financing of activities included in the General Radioactive Waste Plan, and annuls Additional Provision 6 b) of the said law.

7.1.2 Ratification of conventions and legal instruments relating to nuclear safety

This period has included the approval of Council Directive 2009/71/EURATOM, of June 25th 2009 (DOUE of July 2nd 2009), establishing a community framework for the nuclear safety of nuclear installations.

7.1.3 Implementation of the terms of reference of WENRA

In compliance with the action plan established for the implementation of the terms of reference of WENRA, from 2007 to December 2009 the CSN has issued seven of the fifteen instructions foreseen. Six new instructions are in an advanced stage of preparation (or in the external comments phase) and the other two are in the initial stage of preparation. One way or another the CSN expects to have issued all these instructions within the timeframe mapped out. The Regulation on Nuclear and Radioactive Installations was revised in 2008 and the issues foreseen were included.

7.2 National safety requirements and regulations

7.2.1 Secondary legislation framework (decrees, instructions, etc.)

In addition to the laws described in the previous section, several Royal Decrees affecting the field of nuclear safety have been approved during the period covering from 2007 to December 2009:

- Royal Decree 35/2008, of January 18th, Modifying the Regulation on Nuclear and Radioactive Installations. This Royal Decree partially modifies Royal Decree 1863/1999, of December 3rd, contemplates the modifications made to the legal system since its initial version and introduces improvements in the installations licensing process.

The drawing up of this Royal Decree was initiated as a result of a proposal by the CSN, in accordance with the provisions of article 2 a) of the law by which it was created, Law 15/1980, of April 22nd.

- Royal Decree 243/2009, of February 27th, regulating the surveillance and control of transfers of radioactive wastes and spent nuclear fuel between member states or from or to countries outside the Community. This provision transfers to our internal legal system Council Directive 2006/117/EURATOM, of March 5th, establishing the uniform document for the surveillance and control of radioactive waste and spent fuel transfer operations.
- Royal Decree 1428/2009, of September 11th, modifying the Basic Nuclear Emergency Plan approved by Royal Decree 1546/2004, of June 25th. This update is due to the need to contemplate the participation of the municipalities affected by nuclear power plants, which must be heard when drawing up the off-site emergency plans for the Spanish nuclear power plants.

7.2.2 Regulation and guidelines drawn up by the regulatory body

During this same period the CSN has approved several Instructions by virtue of the legal empowerment granted to this Organisation by article 2.a) of Law 15/1980, of April 22nd. These Instructions are binding technical standards, which are obligatory for the addressees, which are integrated into the legal system.

In this respect, the following CSN Instructions have been approved in relation to nuclear safety since the fourth national report:

- Nuclear Safety Council Instruction IS-14, of October 24th 2007, on the CSN Resident Inspectors at nuclear power plants (Official State Gazette of November 8th 2007).
- Nuclear Safety Council Instruction IS-15, of October 31st 2007, on requirements for the Monitoring of the Efficiency of Maintenance at nuclear power plants (Official State Gazette of November 23rd 2007).
- Nuclear Safety Council Instruction IS-16, of January 23rd 2008, regulating the periods of time during which the documents and records of radioactive facilities are to be kept filed (Official State Gazette of February 12th 2008).
- Nuclear Safety Council Instruction IS-17, of January 30th 2008, on the homologation of training courses or programmes for personnel directing the operation of or operating equipment at medical diagnosis X-ray facilities and accreditation of the personnel working at such facilities (Official State Gazette of February 19th 2008).
- Nuclear Safety Council Instruction IS-18, of April 2nd 2008, on the criteria applied by the CSN to require the licensees of radioactive facilities to report radiological events and incidents (Official State Gazette of April 16th 2008).
- Nuclear Safety Council Instruction IS-19, of October 22nd 2008, establishing the requirements of the nuclear installation management system (Official State Gazette of November 8th 2008).
- Nuclear Safety Council Instruction IS-20, of January 28th 2009, establishing the safety requirements relating to spent fuel storage casks (Official State Gazette of February 18th 2009).
- Nuclear Safety Council Instruction IS-21, of January 28th 2009, on the requirements applicable to modifications at nuclear power plants (Official State Gazette of February 19th 2009).
- Nuclear Safety Council Instruction IS-22, of July 1st 2009, on safety requirements for ageing management and the long-term operation of nuclear power plants (Official State Gazette of July 10th 2009).
- Nuclear Safety Council Instruction IS-23, of November 4th 2009, on the in-service inspection of nuclear power plants (Official State Gazette of November 24th 2009).

A complete list of all the Nuclear Safety Council Instructions may be found on the organisation's website (www.csn.es)

The Nuclear Safety Council Guides are recommendatory documents, unless some legal provision makes them mandatory in nature. Their objective is to achieve better compliance with the regulatory provisions and precepts, providing guidance for optimum decision-making by the administrated party rather than imposing such a requirement.

The new issues addressed by the CSN Guides published during the period corresponding to this report refer to activities relating to nuclear power plant operation and maintenance, the site emergency plans of radioactive facilities and the drawing up of waste management plans.

Section 1: Power reactors and nuclear power plants.-

- GS-1.16. Periodic testing of ventilation and air-conditioning systems at nuclear power plants. CSN, 2007.
- GS-1.17. Application of risk-informed techniques to the in-service inspection (ISI) of piping. CSN, 2007.
- GS-1.18. Measurement of the efficiency of nuclear power plant maintenance. CSN, 2007.

Section 7: Radiation protection.

- GS-7.10. Site Emergency Plan for radioactive facilities. CSN, 2009.

Section 9: Waste management.

- GS-9.3. Contents and criteria for the drawing up of radioactive waste management plans at nuclear installations. CSN, 2008.

A complete list of the CSN safety guides may be found on the organisation's website.

7.2.3 Processes for the establishment and revision of regulatory requirements, including the involvement of the stakeholders

The CSN has drawn up Management Procedure PG.III.03 on the Development of Standards, which describes the process for performance of the CSN's function of proposing necessary standards to the Government within its realm of competence, as well as whatever revisions it considers to be appropriate, and of issuing the Organisation's technical standards, such as the Council Instructions and Safety Guides, in accordance with article 2 a) of Law 15/1980, of April 22nd, creating the Nuclear Safety Council.

This document is applicable to the following processes:

- a) Drawing up of proposals for general standards (laws, regulations) on the initiative of the Organisation, for the development of new standards or the modification of existing standards on issues relating to its realm of competence.
- b) Participation in the commissions set up for the drawing up or modification of legal standards, in response to initiatives external to the Organisation or for the transposition to the Spanish legal system of Community Directives on issues within its realm of competence.
- c) Drawing up of CSN technical standards: Council Instructions (IS) and Safety Guides (GS)

As regards the CSN Instructions, which are standards of obligatory compliance, the procedure includes the need to submit a draft text to the stakeholders proposed by the responsible Technical Deputy, which shall then have 20 days in which to make whatever comments they consider to be appropriate. These comments shall be taken into account when approving the standard unless their inadmissibility is justified. This draft shall likewise be submitted to those Public Institutions that might be affected by the text, for them to issue their comments within 20 days.

In addition, procedure PG.III.03 contemplates the publication of the draft of the corresponding standard on the institutional website of the CSN.

Specifically, in the case of Instructions, the text is expected to be submitted to Congress in compliance with the provision contained in the third paragraph of art. 2 a) of Law 15/1980, which requires Instructions to be reported to Congress prior to their approval by the CSN.

7.3 Licensing system

7.3.1 Types of licences included in the licensing system

As set out in article 12 of Royal Decree 1836/1999, of December 3rd, approving the Regulation on Nuclear and Radioactive Installations, nuclear installations will require the following authorisations, depending on each individual case:

- a. **Preliminary or site authorisation:** this constitutes official recognition of the proposed objective and of the suitability of the site selected, and allows the licensee to request the construction permit for the installation and initiate the preliminary infrastructure works authorised.
- b. **Construction permit:** this empowers the licensee to initiate construction of the installation and to request the operating permit.
- c. **Operating permit:** this allows the licensee to load the nuclear fuel or introduce nuclear substances into the installation, to carry out the nuclear testing programme and to operate the installation in accordance with the conditions set out in the authorisation. It will initially be granted provisionally until nuclear testing has been satisfactorily completed. On completion of the operation for which the installations was conceived, this permit also allows the licensee to carry out the operations imposed by the Administration prior to obtaining the authorisation for dismantling.
- d. **Modification authorisation:** this allows the licensee to introduce modifications in the design of the installation or in its operating conditions whenever the criteria, standards and conditions on which the operating permit is based are altered.
- e. **Authorisation for performance and assembly of the modification:** this allows the licensee to initiate the performance, execution and assembly of those modifications that, in view of their major scope or because they imply significant works and assembly, need to be expressly authorised in the opinion of the Directorate General for Energy Policy and Mines or of the Nuclear Safety Council.
- f. **Dismantling permit:** once the operating permit has expired, this allows the licensee to initiate decontamination activities, the disassembly of equipment, the demolition of structures and the removal of materials to ultimately allow for the full or restricted release of the site. The dismantling process will conclude with the issuing of a declaration of decommissioning, which will release the licensee of the installations from his responsibility as operator and, in the case of restricted release of the site, define the applicable limitations on use and the party responsible for maintaining them and overseeing compliance.

In addition, the following will need to be authorised:

The storage of nuclear substances in installation in the construction phase and not having an operating permit.

The change of ownership of nuclear installations.

These authorisations are granted by the Ministry of Industry, Tourism and Trade following a report by the Nuclear Safety Council.

7.3.2 Involvement or commitment of the Stakeholders and public with the Contracting Party

It would be interesting to underline the specific public information process that is included within the arrangements for the request for the preliminary authorisation, as included in article 15 of the, in accordance with which the Ministry of Industry, Tourism and Trade will

send a copy to the respective regional Government Office for the latter to open a period of public information, this being initiated through the publication in the Official State Gazette and that of the corresponding Autonomous Community of an extract announcement setting out the objective and the main characteristics of the facility. This announcement shall establish that those persons and entities that consider themselves to be affected by the project may, within thirty days, present whatever written allegations they deem to be appropriate before the corresponding regional Government Office.

Once this period of public information has expired, the regional Government Office will issue its report on these allegations and the documentation submitted, sending the file to the Ministry of Industry, Tourism and Trade with a copy to the Nuclear Safety Council.

Likewise, the Regulation on Nuclear and Radioactive Installations provides that prior to the granting of the aforementioned authorisations (except those referred to in sections e) and g), the corresponding documentation will be transferred to the Autonomous Communities with responsibilities in relation to land planning and the environment whose territory houses the facility or the planning area contemplated in the basic standards on nuclear and radiological emergencies, for the latter to present their allegations within one month.

7.3.3 Legal provisions to prevent the operation of nuclear installations without a licence

It should finally be pointed out that the performance of activities without a licence will lead to application of the penalties contemplated in the system of sanctions set out in the Nuclear Energy Act, reformed as has been established above by Law 33/2007, of November 7th.

7.4 System of regulatory inspection and assessment

Since January 2007 the Integrated operating Plant Supervision System (SISC), inspired by the USNRC's Reactor Oversight Program (ROP), has been operating as designed, with the exception of the area relating to security.

In parallel to development of the SISC, the licensees set up an Integrated Safety Management system and other resources, particularly significant among which due to their impact on the activities of the CSN were the self-assessment programmes and the troubleshooting programmes (PAC). In this respect UNESA developed the guidelines CEN-13 "Guideline on corrective actions" and CEN-14 "Guideline on the self-assessment programme", which entered into force alongside the SISC.

Section 19.3 of the fourth national report (September 2007) on the Convention on Nuclear Safety describes the SISC with a significant level of detail.

It should be pointed out that the CSN did not simply carry out an automatic transfer of the ROP as it stood; rather the regulatory and organisational differences between the two countries and their respective regulatory bodies were taken into account and the decision was taken to conserve the good practices consolidated at the CSN over years of inspection and control of the plants.

The main objectives of the SISC are as follows:

- Concentrate inspection efforts in the areas with the highest potential risk.
- Pay greater attention to the worst performing plants.
- Use objective plant performance measures.
- Provide rapid, understandable and predictable assessments of plant operation.
- Reduce unnecessary regulatory burdens on the plants.

- Respond to deviations or cases of non-compliance in a predictable manner proportional to risk.
- Increase the transparency of the CSN supervision processes.

After 4 years of operation, it may be concluded that the SISC has more than lived up to the expectations of the licensees and the CSN. After the first two years of application a self-assessment exercise was performed, as foreseen in the programme itself, and it was concluded that the results were in general acceptable but that there were certain aspects to be improved, from which emerged the corresponding action plan.

Particularly significant among these areas for improvement was the need to speed up the process, significantly shortening the time used in each phase, the need for greater flexibility in the modifications and adaptations of the procedures and other documents describing the process and the need to improve the training of the inspectors. An inspector training plan was drawn up aimed especially at the process of assessing importance, with a view to making this process more predictable, objective and transparent.

At present, the SISC development activities are aimed mainly at incorporating actions relating to supervision of the security of the installations in the corresponding area or pillar of the system and incorporating elements of the safety culture within a substantial modification of the treatment of transverse aspects. Both these novelties were approved by the CSN in 2009.

An important conclusion is that in total the inspection activity of the CSN has increased quantitatively and that the function of supervising the installations has been deeply modified.

From 2006 to 2009 the CSN increased its technical staff through the creation of 31 new job posts, this meaning a significant increase in general inspection activities. In particular, and in relation to the inspection function, the new post of Coordinator and Assistant to the Resident Inspector was created, along with two new stand-in resident inspector posts.

It may also be pointed out that the human resources assigned to supervision of the plants have increased in the last four years and that the activities commissioned to the resident inspectors have been systematised in a highly satisfactory manner.

The coercive process, not understood exclusively in terms of sanctions proceedings, has been much more efficient, the identification of problems and the application of the most adequate corrective actions for their correction having been systematically and constantly pursued.

Most of the plants have been for most of the time in the licensee response and regulatory response columns, and only one has been for one year in the one degraded pillar column.

In the last two years, 10 supplementary inspections have been performed due to the existence of findings and indicators classified higher than green. In all these cases the analyses of the causes carried out by the licensees and the application of corrective actions were checked.

Although the corrective actions programme (PAC) involved a high degree of difficulty in the development of applications and their suitable management during its initial years, it is considered a fundamental tool for support for the SISC in as much as it refers to the activities to be performed by the licensees to correct deficiencies and to identify and solve problems before they imply an incident with more serious consequences.

7.5 Compliance with the regulations applicable to licences

In response to cases of non-compliance, the CSN may, pursuant to the provisions of Law 15/1980, of April 22nd, creating the Nuclear Safety Council, propose the initiation of whatever sanctions proceedings it considers to be appropriate within its realm of competence, in accordance with the legislation in force.

During the period covered by this report the CSN has initiated 8 sanctions proceedings against the nuclear power plants, the most significant of these being the one referring to Ascó as a result of the release of radioactive particles outside the controlled zone of group I, which implied four serious and two slight infringements.

Article 8. Regulatory body

In Spain the regulatory function regarding nuclear safety and radiation protection is undertaken by several different authorities.

The Government is in charge of energy policy and of issuing binding regulatory standards.

The Ministry of Industry, Tourism and Trade is the Department of the General State Administration responsible for nuclear energy, for granting the different authorisations for nuclear installations, subject to the mandatory and binding reports of the Nuclear Safety Council and, where appropriate, other ministerial departments, and for submitting standards proposals, adopting Provisions for the enactment of the standards in force and applying the system of sanctions in relation to nuclear energy.

The Nuclear Safety Council is the State body solely responsible for nuclear safety and radiation protection. It is an entity existing under Public Law independent from the General State Administration that reports on the performance of its activities to Parliament and is related to the Government through the Ministry of Industry, Tourism and Trade.

8.1 Functions and responsibilities of the MITYC

In accordance with Royal Decree 1182/2008, of July 11th, modified by Royal Decree 1038/2009, of June 29th, the Ministry of Industry, Tourism and Trade exercises the following functions within the framework of the Convention on Nuclear Safety:

- Granting of authorisations for nuclear and radioactive facilities¹, following a mandatory and binding report by the CSN.
- Drawing up of standards proposals and application of the sanctions system.
- Contribution to defining the R&D policy.
- Tracking of compliance with the international commitments subscribed to by Spain in the area of nuclear energy, in particular with regard to non-proliferation, the physical protection of nuclear materials and facilities and civil liability for nuclear damage.
- Relations with the International Organisations specialising in the field.

Pursuant to the provisions of Royal Decree 1182/2008, of July 11th, the CSN relates to the Government via the MITYC.

8.1.1 Organisational structure.

The structure of the MITYC was established by Royal Decree 438/2008 of April 14th, which approved the basic structure of ministerial departments, modified by Royal Decree 640/2009, of April 17th. Within the MITYC, the Secretariat of State for Energy is the top ranking organisation with regard to energy matters, and within the latter the Directorate General for Energy Policy and Mines, to which reports the Sub-directorate General for Nuclear Energy, is the management body carrying out the functions referred to in the previous section and specifically applicable to nuclear energy.

¹ Except for second and third category radioactive facilities located in Autonomous Communities to which administrative functions in this area have been transferred

8.1.2 Coordination of nuclear R&D&i activities

The MITYC, through the Sub-directorate General for Nuclear Energy, participates in coordinating certain research, development and innovation activities in the field of nuclear energy in Spain.

8.1.3 Participation in international organisations and activities

The MITYC, through the Sub-directorate General for Nuclear Energy, actively participates in nuclear energy-related activities promoted by the International Organisations to which Spain belongs.

The MITYC collaborates in concluding bilateral agreements with other countries in relation to the peaceful use of nuclear energy and represents the Spanish Government in the Meetings of Contributors to different international Funds to which Spain contributes.

Within the framework of the European Union, the MITYC provides advisory services to the Permanent Representation of Spain with a view to its participation in the working groups of the Council dealing with issues regulated by the EURATOM Treaty.

Within the framework of the International Atomic Energy Agency, the MITYC is part of the Spanish Delegation to the General Conference of the Organisation.

The MITYC is part of the Spanish Delegation before the Management Committee of the OECD Nuclear Energy Agency and participates in several of the Agency's technical committees.

8.2 Functions and responsibilities of the CSN

The main activities of the CSN in relation to nuclear and radioactive installations are as follows:

- Proposing to the Government the necessary regulations within its realm of competence and issuing technical Instructions, Guides and Circulars in this area.
- Issuing mandatory reports to the MITYC for the latter to take decisions regarding the granting of the legally established authorisations. These reports will be binding if negative in their findings and when imposing necessary safety conditions.
- Performance of the control and inspection of all the installations in all phases, especially during design, construction, commissioning and operation, as well as in transport and in the manufacturing and homologation of equipment incorporating radioactive sources or generating ionising radiations.

In this respect the CSN has the authority to suspend the operation of installations and activities for safety reasons.

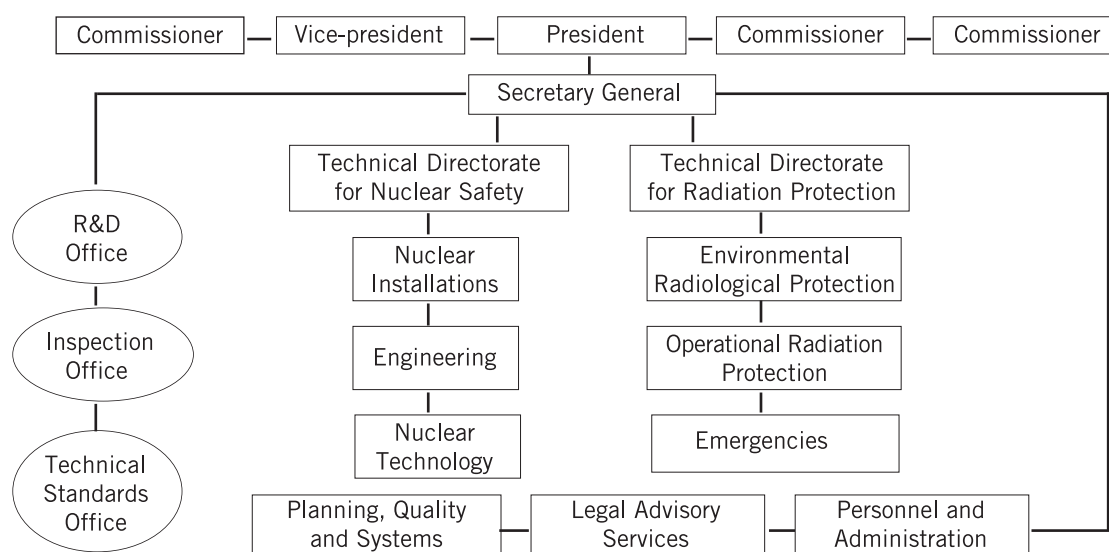
- Collaboration with the competent authorities in the drawing up of the criteria to be fulfilled by the site emergency plans and physical protection plans of the nuclear and radioactive installations and, following the development of these plans, participation in their approval and coordination of emergency response and support measures.
- Proposals regarding the initiation of sanctions proceedings in the event of infringements relating to nuclear safety and radiation protection, in accordance with the legislation in force, and the issuing of technical reports for the adequate classification of the events, in the terms set out in article 7, section 5.
- Control of measures for the radiation protection of exposed workers, the public and the environment. As regards the radiological protection of the environment, the CSN controls and oversees radiological quality throughout the Spanish territory and assesses the radio-

logical impact of nuclear and radioactive installations and activities involving the use of ionising radiations.

- Collaboration with the competent authorities in relation to programmes for the radiological protection of persons subjected to medical diagnosis or treatment procedures using ionising radiations.
- Issuing of favourable declarations regarding new designs, methodologies, simulation models or verification protocols relating to nuclear safety and radiation protection.
- Granting and renewal of nuclear and radioactive facility operator and supervisor licences, Head of Radiological Protection Service diplomas and radiodiagnostic accreditations.
- Performance of studies, assessments and inspections of plans, programmes and projects for all phases of radioactive waste management.
- In summary, the functions and responsibilities of the CSN have not been substantially modified with respect to the previous report, and work continues in accordance with the changes that have occurred in the legislation in recent years.

8.2.1 Structure of the CSN

The organisational structure of the CSN is currently as follows:



Units reporting directly to the Secretariat General

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

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

Technical Directorate for Nuclear Safety

This Technical Directorate brings together all the functions relating to the safety of nuclear installations, except those relating to the disposal of low and intermediate level radioactive wastes, which were transferred to the Technical Directorate for Radiation Protection. It is also in charge of safety in the transport of nuclear substances and radioactive materials.

This grouping of competences in a single highly specialised management centre allows for the optimisation of inspections, regulatory efficiency and the control of nuclear installations.

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

- Sub-directorate General for Nuclear Installations
- Sub-directorate General for Nuclear Technology
- Sub-directorate General for Engineering

Technical Directorate for Radiation Protection

In addition to the radiation protection of the workers and the management of low and intermediate level radioactive wastes, this Technical Directorate is in charge of the radiation protection of the public and the environment and of radiological emergencies.

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

- Sub-directorate General for Environmental Radiological Protection
- Sub-directorate General for Operational Radiation Protection
- Sub-directorate General for Emergencies

In accordance with the Law Creating the Nuclear Safety Council and its charter, in March 2007 the Secretary General was replaced, this occurring in March 2009 with respect to one of the CSN Commissioners

8.3 Development and maintenance of human resources over the last three years

As of December 31st 2009, the CSN headcount stood at 473, including the eight top posts (President, four Commissioners, Secretary General, Technical Directorate for Nuclear Safety and Technical Directorate for Radiation Protection), of which 218 are technical public officials belonging to the Nuclear Safety and Radiation Protection Corps and dedicated to the inspection, control and tracking of the operation of nuclear and radioactive installations, 137 are officials belonging to other public administrations, 26 are part-time office personnel and 84 are contracted workers.

Table 8.1 Distribution of Nuclear Safety Council personnel as of December 31st 2009.

	Council	Secretariat General	Technical Directorates	Total
General Staff	5	1	2	8
Public Officials of Technical NS Tand RP Corps	8	14	196	218
Public Officials of other Administrations	6	98	33	137
Part-time Workers	26	0	0	26
Contracted Workers	2	61	21	84
Totals	47	174	252	473

The following table shows the evolution of the number of technicians belonging to the nuclear safety and radiation protection technical corps and of the rest of the personnel making up the CSN (administration, contracted workers, computer systems maintenance personnel, etc.):

Table 8.2 Evolution of CSN human resources over the last four years.

	2007	2008	2009	2010
Technicians	206	209	210	218
Rest of personnel	236	244	258	255
TOTAL	442	453	468	473

The following table shows the number of new recruits that have joined the Organisation over the last four years, separating new public officials accessing the CSN via public offers of employment from civil servants coming from the State Administration and accessing the Organisation by competition and other workers accessing via competition:

Table 8.3 Evolution of personnel joining the CSN in the last four years.

	2007	2008	2009	2010
Public offer of employment	6	5	11	4
Civil servants via competition	8	20	6	2
Workers via competition	5	7	3	0

As of December 31st 2009, the degree of occupation of the workforce of civil servants stood at 93.61 % and that of contracted workers at 78.50%.

The average age of the personnel of the Organisation was 49 years. The percentage of women workers at the Organisation amounts to 51.84% (240 workers), compared to 48.16% in the case of the men (223 workers).

As regards academic qualifications, as of December 31st 2009 the workforce of the Organisation was made up as follows: 65.75% post-graduates, 5.70% graduates and 28.55% persons with other qualifications.

8.4 Measures to develop and maintain competence

In view of its specific characteristics, the CSN gives special importance to the training of its human resources. During the three-year period 2007 to 2009, the training plans have continued to be drawn up in such a way that their objectives were aligned with the CSN's Strategic Plan for 2005-2010, grouped into seven areas:

- Nuclear safety.
- Radiation protection.
- Development of management, organisation and communication skills.
- Standards, administration and management.
- Information systems.
- Languages.
- Training of public officials in work experience placement phase.

During 2009, the six areas that had previously made up the Training Plan were extended by way of a new area dedicated to the training of civil servants in the work experience placement

phase, which impacts the organisation and internal workings of the CSN in the areas of nuclear safety and radiation protection and as regards communication skills for the inspection personnel. The aim of this has been to achieve the adaptation of the employees to the job post from the very moment of their joining the Council.

In total 291 courses have been delivered, equivalent to some 97 courses per year. An annual average of 41,041 hours has been dedicated to training, this implying 5.41% of the working day. The spend on training tasks amounted to 1,860,955 euros (an annual average of 620,318 euros).

In 2009 a competence-based management model has been implemented for the first time, applied to training and designed in accordance with the needs of the CSN. The aim is to adapt the actual training received by each individual to the needs of the job post occupied, these needs having been defined previously for all the job posts in the organisation. During 2009 an individualised assessment has been carried out for the professional development of each person.

Likewise, the CSN has continued to be present in national and international forums (congresses, meetings, seminars,) relating to its functions and competences.

Year	Headcount	Number of training attendances	Average participation	Number of courses	Number of training hours	%training hours over working day	Total cost
2007	453	947	2.09	75	39,282	5.28	476,584.14
2008	452	1,181	2.60	88	46,331	6.00	682,448.06
2009	478	1,201	2.50	128	37,510	4.95	701,923.27
Totals	1,383	3,329	7.19	291	123,123	16.23	1,860,955.47
Averages							
2007- 2009	461	1,109	2.40	97	41,041	5.41	620,318.46

8.5 Review of CSN financing over the last three years. CSN resources and personnel

The expenses and income budgets are integrated into the General State Budget and their approval corresponds to Parliament.

The budget approved for the 2009 financial year amounted to 51,197.63 thousand euros.

Economic resources are obtained fundamentally through the collection of public prices and fees for the services rendered in compliance with the CSN's functions. The conditions are regulated by Law 14/1999, of May 4th, on Fees and Public Prices for services rendered by the Nuclear Safety Council. At present the financing routes are as follows:

a. *Financing by fees:*

- Performance of studies, reports and inspections prior to the granting of authorisations for the operation and decommissioning of nuclear and radioactive installations by the MITYC.
- Inspection and control of operating nuclear and radioactive installations and related activities.
- Granting of licences for nuclear and radioactive installations operating and operations supervision personnel.

b. *Financing by public prices:*

- Reports, tests or studies on new designs, methodologies, simulation models or verification protocols relating to nuclear safety or radiation protection.

In 2009 this source of financing amounted to 45,045.30 thousand euros, equivalent to 87.98 % of the total budget.

c. Transfers by the State

The Nuclear Safety Council carries out radiological protection measurement controls aimed at the general population and the environment. The performance of these functions is not covered by the fees and public prices regulated by Law 14/1999 but is funded by the General State Budget through the MITYC.

The financing obtained in this way amounted to 5,300.60 thousand euros and constituted 10.35 % of the total budget.

The remainder of the financing (1.67%) corresponded fundamentally to revenues from assets, deriving from bank account interests.

The evolution of the most important budget items in recent years is shown in the following table, in thousands of euros:

Nature of revenue	2007	2008	2009
Fees and Public Prices	38,199.60	39,334.34	45,045.30
Transfers by the State	5,333.38	5,389.23	5,300.60

Of the total financing, 55.76 % is set aside to cover personnel costs, which in 2009 amounted to 28,550.21 thousand euros, and 28.72 % for goods and services, to the sum of 14,707.65 thousand euros.

8.6 Statement of adequacy of resources.

During the period covered by this report, the technical workforce of the CSN has grown from 453 in December 2007 to 473 people in December 2009. This increase not only compensates for people leaving the CSN for different reasons, but also means 20 new technicians to attend to the functions of the organisation. At present the CSN is covering its personnel needs reasonably well, although the forecasts for growth in the coming years will depend on the general directives on public employment set out by the Government in each annual budget.

8.7 CSN management system

The CSN has implemented a process oriented Management System based on the requirements of the IAEA (GS-R-3) and the ISO 9001: 2008 standard. The processes, which cover all the activities of the Organisation, have been classified as follows:

- Strategic processes, including the operation of the Council, information and communication and standards development.
- Operating processes, including the authorisation, evaluation, supervision and control of installations and activities (including transport); personnel licensing; the radiation protection of exposed workers, the public and the environment; emergency management and security.
- Support processes, including institutional and international relations; research and development; economic and human resources management (including training); information systems; documentation and administration of the Management System.

The documents that describe the System are organised hierarchically: System Manual, Organisation Manual, descriptions of processes and procedures. All these documents, along with the information and documentation necessary for performance of the regulatory activity, are

available to all the personnel on the CSN Intranet, with certain exceptions for reasons of security or confidentiality.

The results, objectives and overall strategies of the Organisation are established by the CSN and included in the Strategic Plan, which also covers the Mission and the Vision of the Organisation. The Strategic Plan is deployed by way of annual plans that include numerical objectives (indicators) and are approved by the CSN. Detailed programming is undertaken by those responsible for each process. The compliance with the plans and objectives is assessed quarterly with a view to identifying possible deviations and taking the actions necessary to correct them.

The Management System is subject to on-going improvement. In addition to the assessments of compliance with the plans and objectives, the CSN has established an internal audits plan and is systematically subjected to external assessments by national and international organisations. In this respect the following may be underlined:

- The internal audits plan ensures that all the operating processes are audited every three years, and all others at least every four years.
- In addition to being subject to the economic-financial controls and audits required of all public organisations, the CSN is required to report systematically to the Spanish Parliament and to the Parliament of those Autonomous Communities housing nuclear installations. The Parliament is responsible for carrying out a continuous control of the activities of the CSN.
- In early 2008 the CSN hosted an IRRS mission. This mission identified 19 good practices, 26 suggestions and 7 recommendations. The mission was of unquestionable value, in as much as it involved the evaluation of the regulatory structure and practices of the CSN by a team of high level international experts. No less valuable were the self-assessment, systematisation and review efforts made by the CSN itself during the years prior to the mission, in preparation for the exercise, and the dynamic of on-going improvement that has been implemented at the Organisation as a result of the lessons learned and experience acquired during the process of preparing for, performing and analysing the IRRS mission. The CSN has requested a follow-up IRRS mission from the IAEA, which will be undertaken during early 2011.

The following are improvements made at the CSN and in the rest of the Spanish regulatory system in relation to the recommendations of the IRRS mission:

- Performance of an annual systematic compilation of the results of the inspections carried out at radioactive installations, identifying where appropriate deviations, good practices and other noteworthy aspects encountered and obtaining lessons learned in order to improve both the performance of the licensees of the installations in relation to safety and radiation protection and the inspection and control practices of the CSN itself.
- The MITYC has opened the public call for bids to determine those municipalities that would be interested in housing the centralised spent nuclear fuel and high-level waste temporary storage facility (CTS), and of its associated technology centre
- Formalisation and implementation of a programme of internal audits of management processes. The programme guarantees that the processes are audited every three or four years, depending on the type of process.
- Council Directive 2009/71/Euratom, of June 25th 2009, requires the European Union Member States to carry out self-assessments every ten years of their regulatory framework and authorities and to request an international *peer review*. The Management System implemented at the CSN and the experience in the performance of self-assessments and international peer reviews will facilitate compliance with this requirement.

8.8. Transparency of regulatory activities

The policy of transparency of the Nuclear Safety Council is defined by Law 15/1980 of April 22nd creating the CSN, reformed by Law 33/2007, of November 7th. This legislative reform incorporates guaranteed access to information on the environment, the participation of the public in decision-making and access to justice in relation to environmental issues, as included in the Aarhus Convention ratified by Spain in 2004 and materialised in the national legislation through Law 27/2006, of July 18th, regulating rights of access to information, public participation and access to justice in relation to environmental issues.

The reform of the Law Creating the CSN was very ambitious as regards public information, the objective clearly being to increase the transparency of the organisation and promote confidence among the members of the public regarding the activities of the Nuclear Safety Council.

The obligations of this law regarding information and communication are channelled along three routes:

- Policy on information for the State Institutions
- Policy on information in the neighbourhood of nuclear installations
- Policy on information for the general public

Institutional information policy

Every year the CSN submits to the Spanish Parliament and to the Regional Parliaments of the Autonomous Communities housing nuclear installations a report presenting details of the activities performed by the Organisation throughout the year. This report is submitted annually to Parliament through the appearance of the President of the CSN before the Commission for Industry, Tourism and Trade. Likewise, and as part of its relations with Parliament, the CSN replies to the requirements of the different political parties, presented by way of parliamentary questions, and of the resolutions issued in relation to the annual report.

In the last quarter of 2008 the CSN started up the first edition of the programme of institutional visits to the CSN as part of its transparency policy. The aim of the project is to promote institutional collaboration and it is aimed at the representatives of organisations, entities and groups related to the work of the CSN.

Policy on information in the neighbourhood of nuclear installations

The legislation requires of the CSN that it promotes and participates in information forums in the areas surrounding these installations, to deal with aspects relating to the operation of nuclear and radioactive installations and also aspects relating to emergency preparedness.

Furthermore, the Regulation on Nuclear and Radioactive Installations contemplates the operation of the Information Committees. The Information Committees are forums for information and public participation presided over by the MITYC and made up of the representatives mentioned in art. 13 of the Regulation on Nuclear and Radioactive Installations and have the clear objective of providing information and education for the local population on nuclear safety and radiation protection, in which respect a programme of annual meetings is held.

Public information policy

Article 14 of the Law Creating the CSN establishes the need to provide access to information and to facilitate the participation of the individual citizen and civil society. This implies the

obligation to report on all relevant events relating to the operation of the facilities, with special emphasis on safety and the possible radiological impact that might arise for people and the environment, but also on the events and incidents occurring at these facilities and on the corrective measures that might be implemented.

In 2009 the CSN renovated its website (www.csn.es), including interactive and multimedia elements making the access to information more dynamic and user friendly.

With the support of these new information and communication technologies, and as required by law, the CSN reports on the following via its website:

- Inspection reports.
- The minutes of Council meetings.
- Technical reports supporting the agreements of the Council.
- All relevant events relating to the operation of nuclear and radioactive facilities, through:
 - Plant operating states.
 - Information on environmental quality (ASN and ERSN)
 - News items, summaries and press releases on events occurring at nuclear power plants and radioactive installations.
 - SISC information.

However, the legal requirement for transparency also obliges the CSN to submit its instructions and safety guides to public comment during their phase of preparation. For this purpose the CSN has also provided an on-line space for comments. Also established is the procedure to be adhered to for the communications made by physical or legal persons in application of article 13 of Law 15/1980.

Through its institutional website the CSN has made a form available to the workers at nuclear and radioactive installations for them to be able to communicate any event affecting the safety of the installations, guaranteeing confidentiality.

As regards information for the media and stakeholder groups, in addition to what is provided on its institutional website the CSN responds to direct requests from the media, applying criteria of transparency and agility to the extent allowed by technical rigour.

As regards the communication activities carried out during the period from January 2007 to December 2009, special mention might be made of those associated with the off-site release of radioactive particles at Ascó nuclear power plant and the performance of the IRRS mission to Spain and its results, as well as of those designed for renewal of the operating permit for Santa María de Garoña nuclear power plant.

Other channels of communication

Organisation of conferences, seminars and training activities:

The CSN participates or collaborates with other institutions in the organisation of different events aimed at promoting understanding of issues relating directly or indirectly to its functions. During the period covered by this report, special mention might be made of the organisation of a workshop on the lessons learned from the IRRS missions performed in collaboration with the IAEA, held in Seville in November 2008, and the organisation, in cooperation with the IAEA, of an International Conference on the control and management of radioactive materials accidentally present in scrap metal, held in Tarragona in February 2009.

Information centre:

The CSN has an interactive exhibition facility on all activities relating to the mission of the Organization. This centre, which is open to the public free of charge, receives mainly visits

from education centres (schools, colleges, universities) and national and international institutional delegations.

Publications

The CSN publishes a magazine, which was revised, updated and enhanced in 2008, that aims to serve as a means of communication with the public in order to facilitate understanding of matters relating to nuclear safety and radiation protection. In addition to maintaining the objective of disseminating knowledge in relation to radiation protection and nuclear safety, the new CSN magazine: *Alpha. Magazine on nuclear safety and radiation protection*, includes a section with information on the activities of the CSN and the decisions of the Plenary.

In addition to this magazine, the CSN is involved in a far-reaching programme of technical and informative publications within the framework of its annual publications plan. These publications are free and are also available via the CSN website.

Finally, the Law Creating the CSN includes the need to establish an Advisory Committee for public information and participation on nuclear safety and radiological protection. The objective of this committee will be to issue recommendations to the Council with a view to improving transparency, access to information and public participation in those areas for which it is responsible.

8.9 Advisory committees

8.9.1 Advisory committee for public information and participation

One of the modifications to Law 15/1980, of April 22nd, Creating the Nuclear Safety Council introduced by Law 33/2007, of November 7th, is the setting up of an Advisory Committee for public information and participation. As contemplated by Law 33/2007, this committee will be responsible for issuing recommendations to guarantee and improve transparency and for proposing measures promoting access to information and public participation in areas for which the CSN is responsible.

During its meeting of September 11th 2008, the Plenary of the CSN approved the proposed draft of the new Charter, in accordance with the first final provision of Law 33/2007. This draft CSN Charter deals with the regulation of the Advisory Committee for public information and participation.

8.9.2 Technical Advisory Commissions

Pursuant to the provisions of article 4.5 of Law 15/1980, of April 22nd, Creating the CSN, the Plenary of the Council may be assisted by internal or external technical bodies in the performance of its functions.

The operating regime of these bodies is dealt with in the draft of the new CSN Charter, as Technical Advisory Commissions.

8.10 Status of the Regulatory Body

Thirty years have passed since the Nuclear Safety Council was created. During this period all the competences and functions of the organisation have been successively developed, such that today it has available to it all the regulatory capacities and legal instruments required to carry out its functions with full guarantees of the regulated entities and activities being performed in accordance with the most demanding international standards, criteria and guidelines.

The Law by which the CSN was created establishes mechanisms to guarantee its independence, among others the procedure of appointing the members of the Plenary of the CSN, who shall

be persons of recognised solvency in the subject matters commissioned to the CSN, with special value attached to their independence and the objectiveness of their criteria.

The members of the Plenary of the CSN are appointed by the Government in response to proposals by the MITYC, following the appearance of the candidates before the corresponding Congressional Commission. The Congress, by way of the competent Commission and with the vote of three fifths of its members, manifests its acceptance or justified rejection within one calendar month as from reception of the corresponding communication. If there is no express manifestation by the Congress in this respect, the candidates are understood to have been accepted.

The posts of President, Commissioner and other high-ranking CSN officials are incompatible with any other post or function. During the two years following resignation from such a post the incumbent may not be involved in any professional activities relating to nuclear safety and radiation protection.

The CSN's decisions in relation to nuclear safety and radiation protection are mandatory in all cases and, furthermore, are binding when negative in their findings or when denying the granting of a licence; they are also binding as regards the conditions set out when positive.

The CSN is responsible for proposing to the Government the necessary regulations on nuclear safety and radiation protection. It may also draw up and approve technical instructions, circulars and guidelines.

In drawing up instructions and standards of a binding nature for the affected entities, the CSN shall promote the participation of the stakeholders and the public, and these instructions and standards shall be communicated to Congress prior to being approved by the CSN

The independence of the CSN is also reinforced by the fact that its financing comes from fees and public prices, with only 10% or less of its funding being provided by the State budget, and this amount only to cover the cost of maintaining the national environmental radiological surveillance networks.

Article 9. Responsibility of the licence holder

Law 17/2007, of July 4th, requires that the coverage of the risks that might arise in relation to the liability deriving from nuclear accidents be increased. For further details refer to Article 7.1.1 of this report.

9.1 Legislation assigning prime responsibility for safety to the licence holder

The Nuclear Energy Act, Law 25/1964, modified by Article 36 of Law 33/2007 of November 7th, explicitly provides that “the licensee of the nuclear or radioactive installations or of the activities relating to ionising radiations shall be responsible for their safety”.

Article 8 of the Regulation on nuclear and radioactive installations (Royal Decree 1836/1999, modified by Royal Decree 35/2008) establishes that “The licensee of each authorisation shall be responsible for the safe operation of the installation or activity, in all cases in accordance with the requirements of the official documents under which the corresponding authorisation is granted”.

9.2 Description of main means by which the licence holder discharges the prime responsibility for safety

The licensee fulfils these obligations by operating the installation in accordance with the limits and conditions established in the operating permit granted by the MITYC following the mandatory and binding report by the CSN.

These limits and conditions include the official and binding operating documents: Safety Analysis Report, Operating Technical Specifications, Operating Regulation, Site Emergency Plan, Quality Assurance Manual, Radiation Protection Manual, Radioactive Waste and Spent Fuel Management Plan and Physical Protection (Security) Plan.

In addition, the operation of the plant must fulfil the Instructions issued by the CSN in accordance with Article 2.a of Law 15/1980 Creating the CSN, modified by Law 33/2007 of November 7th, according to which the CSN “may draw up and approve technical instructions, circulars and guidelines relating to nuclear and radioactive installations and to nuclear safety and radiation protection activities”. “The instructions are technical standards on nuclear safety and radiation protection that shall be binding for those affected by their scope of application, once notified or, where appropriate, published in the Official State Gazette”.

One of the obligations of the licensee is to submit a series of reports to the CSN, some periodic and others relating to specific activities, such as outage activities or the reporting of events complying notification criteria set up.

In addition, and as explained in article 14.3.4., the licensees have in-house procedures, guidelines (occasionally of a sector-specific nature) and organisational formats that facilitate and guarantee compliance with the requirements and establish internal control mechanisms.

9.3 Description of mechanisms by which the regulatory body ensures that the licence holder discharges its prime responsibility for safety compliance with its obligations.

The CSN possesses a variety of instruments to verify that the licensee is fulfilling his obligations. The first and most powerful is the annual inspection plan, which is made up of the following:

- The Basic Inspection Plan, by means of which the CSN carries out specific checks at the plant on samples of all safety significant activities.
- The generic issues inspection plan, on concerns that have arisen, generally as a result of Spanish or international operating experiences.
- Reactive inspections, which are organised whenever a safety significant event occurs, as a result of its causes or consequences.
- Licensing inspections, which are organised within the framework of an authorisation, be it a design modification, a change in an Operating Technical Specifications or an Operating Permit renewal.

An essential part of the inspection programme is carried out by the CSN's resident inspectors, two at each plant site. They also review and assess the daily operating events at the plant with the help, where appropriate, of a support structure at the CSN Headquarters, which manages technical collaboration with the rest of the CSN organisation when the circumstances so require.

The CSN also receives the operating indicators from each plant. In accordance with the procedures of the SISC in force, whenever these indicators exceed certain thresholds they imply a series of actions by both the licensee and the CSN.

The CSN analyses the periodic reports and the reports on specific activities or reportable events issued by the plants, sometimes in a subject-specific manner and at other times as part of the documentation that serves to prepare its inspections.

Regardless of whether it is as a result of inspections or of assessment of the information provided by the licensees, whenever the CSN detects any non-compliance with any of the internal standards of the plant (operating procedure, maintenance error, etc.), it identifies an "inspection finding" and categorises it depending on its importance, from where are derived the actions to be performed by the licensee and, where appropriate, the scope of the tracking to be performed by the CSN, in accordance with the methodology of the SISC.

If the non-compliance in question is of a legal or regulatory requirement, the CSN proposes the initiation of sanctions proceedings against the plant to the MITYC, the latter having the authority to undertake such proceedings.

If, on the other hand, the non-compliance constitutes a slight infringement with a series of attenuating circumstances, the Law allows the CSN to issue a direct warning to the licensee of the facility in order to point out the non-compliance identified and the corrective measures to be adopted.

c) General considerations relating to nuclear safety

Article 10. Priority to safety

10.1 Regulatory requirements regarding policies and programmes used by the licence holder to prioritise safety in activities for design, construction and operation of nuclear installations

In 2008 the CSN published Instruction IS-19 on the “Requirements of the Nuclear Installation Management System” in the Official State Gazette, this being applicable as from January 2010 and defining the requirements for a management system based on the IAEA document GS-R-3. In addition, Instruction IS-19 requires compliance with UNE standard 73.401:1995 “Quality assurance at nuclear installations”.

During 2009 each of the Spanish nuclear power plants drew up an Action Plan for the adaptation of its management system to the requirements of IS-19, the aim being to comply with all these requirements by early 2010. Safety is the fundamental principle upon which this management system is based.

One of the objectives of integrated management systems is the establishment of a strong safety culture. In this respect, work has continued on development of the safety culture programmes at the nuclear power plants. See Article 12 of this report.

The Integrated Management System (IMS) establishes the principle of on-going improvement, for which measures are put into place for the monitoring of safety and the evaluation of the results obtained. These activities serve to identify non-conformities and areas for improvement. Different mechanisms are established for the performance of these evaluations, such as surveillance tests, supervisions, self-assessments, independent assessments or external assessments.

10.2 Measures taken by the licence holders to prioritise safety, such as those above and any other voluntary activities or good practices

The Action Plans submitted to the CSN by the Spanish nuclear power plants analyse the situation of each plant and establish complementary improvement programmes to reinforce resources and investments in those areas in which this is considered necessary, including maintenance, personnel training, the analysis of operating experience, the renewal of equipment and staffing.

Work has continued on the implementation and improvement of the corrective action programmes (CAP), in order to make it an efficient means of identifying and solving problems potentially affecting nuclear safety, radiological protection and the reliability of the installations. The categorisation of entries in the CAP and the prioritisation of the actions have been revised, such that the programme serves for the monitoring of operational safety and the implementation of the necessary actions within an adequate timeframe and allows weaknesses to be detected and corrected before the operating safety margins are reduced.

Work continues also on the self-assessment programmes, driving the identification of the expectations that serve for the performance of these evaluations. The Self-Assessment Programme of each plant will be a vehicle for the on-going identification of deficiencies, their

assessment and the implementation of improvements through the direct involvement of the personnel in the critical examination and improvement of their own work and results.

The external assessments allow the work practices of the plants to be compared to the defined standards. External assessments are carried out on many of the activities performed at the plants: evaluation of the quality and environmental protection systems, evaluation of the occupational risk prevention systems, evaluations by insurance companies, accounts auditing, etc.

Table 10.1 presents the External Assessments performed during the period by the IAEA (OSART or PROSPER missions) and the peer reviews carried out by WANO

Table 10.1: External assessments at the Spanish nuclear power plants

Plant	Assessment	Date
Cofrentes	Peer Review Follow Up (WANO)	2005
Trillo	Peer Review (WANO)	2007
Ascó	Peer Review Follow Up (WANO)	2008
Almaraz	Peer Review (WANO)	2008
Santa.María de Garoña	PROSPER Follow Up (OIEA)	2008
Vandellós II	OSART (OIEA)	2009
Cofrentes	Peer Review (WANO)	2009

10.3 Regulatory processes for monitoring and oversight of arrangements used by the licence holders to prioritize safety

During 2009 the CSN carried out a plant by plant supervision to verify the adaptation of the current Management systems to the requirements of IS-19 and their implementation within the required schedule.

The supervision performed by the CSN is encompassed within the following activities:

- The nuclear power plant Management Systems establish the long-term Strategic Planning processes, the analysis and prioritisation of the projects that define the medium-term Investments Plan (5 years) and the Operating Plan or annual budget. The CSN is informed periodically of the planning of the nuclear power plant investments and supervises the improvement plans to maintain and reinforce safety-related aspects.
- Within the SISC, the supervision of the safety culture is accomplished by means of the tools provided by this programme, in particular:
 - a) Supervision via programmes by means of inspection procedure PT.IV.224 “*Organisation and Human Factors (O&HF) Programmes*”, one of the current objectives of which is the inspection of the process established at each nuclear power plant in its programmes of safety culture (specialists, resources, evaluations, on-going actions, etc.).
 - b) Supervision based on results, currently in the implementation phase. A conceptual document was drawn up in 2009 defining the way in which this will be carried out.

10.4 Means used by the regulatory body to prioritise safety in its own activities

Within the section on Safety Policy, the CSN’s Management System Manual first establishes the need to give priority to aspects essential for safety, optimising efficiency in the use of the resources of the CSN and the Licensees.

The Organisation’s results, objectives and overall strategies are established by the CSN and included in the CSN’s Strategic Plan, which represents the commitment of the entire Organ-

isation as regards the results expected. These objectives are set out in annual plans, which are approved by the CSN Plenary.

Set out below is the general scheme for the prioritisation of the CSN's activities within the framework of its operating processes relating to the nuclear power plants.

Standards development process:

One of the CSN's strategic objectives is the development of the standards pyramid in collaboration with other State Institutions, adapting the legislation to current needs and taking into account the legal developments at international level and the activities for the harmonisation of European standards.

Supervision and control process:

Another of the CSN's strategic objectives is to make available a *regulatory system* and a set of practices in line with those of the most advanced countries, adapted to the changing demands, guaranteeing a high level of safety of the facilities and activities throughout their life cycle and:

- focussing on aspects essential for safety, reinforcing the responsibility of the licensees;
- harmoniously integrating deterministic and probabilistic methodologies, maintaining sufficient safety margins and the principle of defence in depth;
- progressively oriented towards a performance-based process, aimed at the surveillance of safety significant processes and making the CSN's interventions systematic, integral, predictable and risk informed.

The SISC, has been set up with a view to achieving this strategic objective. This process is subjected to independent audits carried out by persons not participating in the process, and the results of the SISC are published on the CSN's external website.

Authorisation process:

With the objective of developing the specific integrated model for the licensing of nuclear installations, including the end of their service lifetime, dismantling, decommissioning and the management of wastes and irradiated fuel, the CSN has developed procedures for the evaluation of requests (PG-IV-01 "Mandatory CSN reports for the administration on fuel cycle nuclear and radioactive facilities" and PG-IV-08 "Evaluation of nuclear facilities"), which systematise the scope and content of the evaluations performed by the CSN. This process is subjected to independent audits by persons not participating in the process. Furthermore, the CSN publishes the reports on which its authorisation-related decisions are based on its external website.

Article 11. Financial and human resources

11.1 Financial resources

As regards investments in safety by the operators, the Integrated management system includes a series of procedures for the planning of safety-related investments. This system aims to ensure that all potential investment needs are detected and given adequate attention, with any unit of the organisation being able to propose actions implying new investments. As regards prioritisation, these requirements are classified as follows: 1) Requirements of the Regulatory Authorities, 2) Improvements in nuclear safety, radiation protection, the prevention of risk and environmental protection, 3) Technology updating or plant improvement and 4) Profitability.

In Spain the management of radioactive waste is considered to constitute an essential public service for which the State is solely responsible, this service being rendered by the national radioactive waste management agency ENRESA, which is a resource and a technical service of the Administration. The Government establishes the policy on radioactive waste management through its approval of the General Radioactive Waste Plan.

The management of radioactive waste, including spent nuclear fuel and the dismantling and decommissioning of nuclear installations, is charged to the Fund for the financing of activities included in the General Radioactive Waste Plan. This Fund is fed through the sums arising from the collection of regulated fees and the yield on the corresponding transitory financial investments.

11.2 Human resources

In 2007 Nuclear Safety Council Instructions IS-11 and IS-12 were published in the Official State Gazette. Instruction IS-11 refers to nuclear power plant operating personnel licences and IS-12 defines the qualification and training requirements for nuclear power plant non-licensed personnel with functions relating to the safe operation of the plant, through the efficient and safe performance of the tasks assigned to each job post. The term qualification includes academic qualifications, experience and initial and on-going training.

The licensee of a nuclear power plant has to ensure that all the members of the personnel are suitably qualified for the functions to be assigned to them.

The entry into force of the aforementioned Instruction IS-12 has meant the need to adapt the procedures and practices of the NPP's to this new requirement, including permanent and sporadic contractors, defining type profiles and carrying out suitability and training requirements analyses for all the workers.

In 2008 the Spanish nuclear industry, through UNESA, decided to undertake an analysis of the quality of the training delivered at the Spanish nuclear power plants. In this respect the decision was taken to take the practices of the Institute for Nuclear Power Operation (INPO) as a reference, and contacts were initiated between the two entities, these concluding in 2009 with an agreement between INPO and the Spanish nuclear industry, represented by UNESA, for the performance of this work.

The objective of the analysis, (known as Gap-Assessment), was to evaluate the implementation status of the training for the operating personnel of the Spanish nuclear power plants, including the training provided by Tecnatom.

The Spanish nuclear power plants are currently deciding on the steps to be taken following study of the results of this first stage, although some have already expressed their interest in continuing with the process up to the implementation of a model inspired by INPO practices.

With a view to assessing the efficiency of the personnel of the Spanish nuclear power plants, several benchmarking exercises have been performed with respect to the nuclear plants of other countries, the aim being to bring the workforces into line with international standards. New recruiting is planned in such a way that, in the case of replacements for retiring personnel, there is sufficient time to consider the necessary training and also an overlap suitable for the handover to be carried out with the maximum transfer of know-how. In the case of organisational reinforcement, the necessary training is provided before the newcomer occupies his job post.

Furthermore, training on the simulator has once again become an effective tool for far-reaching design modifications for which it is important that the operator have an understanding and training prior to operating in the control room, for example power upgrades, changes to the control systems referred to above or the incorporation of new systems.

11.3 Regulatory review and control activities

The CSN is carrying out supervision and control activities in relation to the human resources of the nuclear power plants, as set out below:

- Each plant is required to have analysed and documented its needs regarding technical capacity and the minimum human resources required for each department, in order to ensure the safe operation of the plant.
- Any organisational and human resources changes relating to Nuclear Safety or Radiological Protection functions shall be analysed and documented in order to guarantee that these functions continue to be suitably performed.
- Every year the nuclear power plants submit a report to the CSN with the modifications or updates relating to the optimisation of their human resources. The CSN carries out an annual supervision of the organisational changes occurring at the nuclear power plants, reviewing the most significant at each installation in greater detail.

In view of the various incidents that occurred at the Spanish NPP's in 2007 and 2008, in September 2008 the CSN called a meeting with representatives of the licensees. After analysing these incidents, the licensees undertook to perform an overall analysis of the situation at each plant in order to identify possible improvements and strengthen the deployment of resources in the necessary areas, including maintenance, personnel training, the analysis of operating experience, the renewal of equipment and staffing.

The analyses were submitted to CSN in December 2008 and during the months of January and February 2009 the Plenary of the CSN held meetings with each of the licensees of the Spanish nuclear power plants to analyse their conclusions, the improvements proposed and the forecasts regarding the investments and resources required for their implementation. The CSN considered that the investment plans presented represented a commitment by the licensees to the safety of the facilities and decided to undertake a detailed tracking of their implementation. Likewise, it was agreed that this type of meetings should be held annually, in order for the improvement plans to be continuously updated and for the commitment to dedicating investments and resources to safety-related issues to be continuously maintained.

The CSN plans to continue with this practice of annual reports by the licensees and holding individual meetings with each licensee of Spanish nuclear power plants.

Article 12. Human Factors

12.1 Contracting Party arrangements and regulatory requirements to take human factors and organisational issues into account for the safety of nuclear installations

Each of the Spanish nuclear power plants set up an organisation and human factors (O&HF) Programme in keeping with the provisions of the letter sent by the Nuclear Safety Council in 1999 on “Considerations for the development of a safety assessment and improvement programme on Organisation and Human Factors at Nuclear Power Plants”.

The O&HF Programmes are based on the setting up of a management and evaluation system allowing “organisational” and “human” issues to be identified, controlled and corrected before they can have a negative impact on plant safety and availability.

The objectives of the O&HF Programmes are as follows:

- Minimise or prevent to the extent possible that issues relating to organisation and human factors have a negative influence of plant safety and availability, analysing problems arising and identifying and carrying out the corrective actions required to prevent their repetition.
- That the design of equipment and systems is carried out taking into account human capacities and limitations and in accordance with recognised Human Factors principles and practices.
- That man-machine interfaces, the qualification and initial and on-going training of the personnel, procedures and organisational and management support allow for, promote and provide a high degree of personnel understanding of and attention to their tasks and activities.
- That the design of the plant and assignment of functions (manual, automatic or mixed) maintain a vigilant attitude by the operator and provide adequate work load levels.
- That the design of the interfaces minimises the possibility of error and provides the capacity to detect errors and recover from them.
- That design modifications do not have a negative influence on human behaviour leading to a reduction of the plant safety levels.

12.2 Consideration of human factors in the design and modification of nuclear installations

In the process of generating design modifications, consideration is given to the possible influence of human factors, both to reduce possible human errors and prevent the reduction of plant safety levels.

The activities relating to human factors in design modifications are the review of the control room panels, improvement of the man-machine interface, evaluation of changes in the location of items, variations in the working conditions, changes in systematic approaches, the use of new tools, work on simulators, etc.

12.3 Licensee methods and programmes for analysing, preventing, detecting and correcting human errors in nuclear plants operation and maintenance

The nuclear power plants have set up programmes for the strengthening of the safety culture and organisation and human factors programmes. All the activities have been coordinated within the framework of the UNESA working groups.

An UNESA guideline has been developed for the internal evaluation of the safety culture: UNESA CEN-23 “Document for the in-house evaluation of the safety culture at Spanish nuclear power plants”, September 2007.

The following table identifies the external evaluations that have been performed on the safety culture.

Table 12.1 External evaluations of the safety culture at Spanish nuclear power plants

Plant	Evaluation	Date
Trillo	Safety culture (HPA)	2005
Vandellós II	Safety culture (HPA)	2006
Almaraz	Safety culture (HPA)	2006
Santa María de Garoña	SCART mission (IAEA)	2007
Vandellós II	Safety culture (HPA)	2008
Ascó	Safety culture (HPA)	2008
Cofrentes	Safety culture (HPA)	2009
Santa María de Garoña	SCART Follow up (IAEA)	2009

A systematic approach has been established for the alternative reporting of deficiencies in safety in accordance with the requirements of the Regulation on Nuclear and Radioactive Installations. This systematic approach has been included in UNESA procedure CEN-28 “Guideline for the development of a procedure for the alternative reporting of deficiencies in safety (CADS)”, July 2008.

There has been participation in international congresses and groups relating to safety culture and organisation and human factors issues.

12.4 Self-assessment of managerial and organizational issues by the operator

The nuclear power plants have established a methodology for the evaluation of organisational changes. The objective of this evaluation is to provide a reasonable guarantee of the adequate identification and assessment of the possible impacts on safe operation of the plant that the change will have prior to its implementation.

Self-assessment programmes have been set up with a view to pursuing the on-going improvement of the activities and processes carried out by the Organisation, by identifying and assessing deficiencies and opportunities for improvement through the direct involvement of the personnel in the critical examination and improvement of their work and results.

12.5 Arrangements for the feedback of experience in relation to human factors and organisational issues

The corrective actions and operating experience assessment programmes allow for feedback to the organisations of experiences relating to human factors and organisational aspects.

12.6 Regulatory review and control activities

The CSN monitors the requirements and standards relating to human factors and organisational aspects issued in the country of origin of the projects and international practices, adapting its regulatory standards and practices. The operator is responsible for carrying out the actions required to respond to the applicable requirements and to establish processes of

on-going safety improvement in this area, the CSN being responsible for overseeing the suitability of these actions. In this respect, the CSN has continued its assessment and inspection activities throughout this period.

Furthermore, in these disciplines the CSN continues promoting the organisation, empowerment and initiative of the licensees themselves to undertake safety improvement projects. Support is being given from the CSN for the essential initiative of the licensee to identify improvement projects in these disciplines within the framework of a systematic programme, be they improvements in organisational efficiency, in human behaviour, in self-assessment and knowledge management, in the management of work and tasks, etc.

Throughout the present period the CSN has continued to carry out two-yearly inspections of the degree of implementation of the safety assessment and improvement programmes in Organisation and Human Factors of each of the nuclear power plants, in accordance with inspection procedure PT.IV.224. These proactive inspections, which are part of the CSN's basic inspection plan, are included within the framework of the SISC.

In the case of the Ascó and Vandellós II nuclear power plants, these inspections have been assumed in recent years in the special supervision programmes established by the CSN for tracking of the implementation of the Safety Management Improvement Plan of the Ascó – Vandellós II Nuclear Association (ANAV) and in the special supervision programme of the ANAV diagnostic actions plan performed during 2008, which in 2009 led to an ANAV organisational, cultural and technical reinforcement plan.

In addition, all the Spanish nuclear power plants have organisational changes management procedures that establish the process for the proposal, design, planning, implementation and revision of organisational changes at the installation, such that they do not have a negative impact on functions relating to the safety and radiation protection of the installation. Among other cases these procedures have been applied in the proposals for changes to the operating regulations of the Spanish nuclear power plants.

As regards the operating regulations, the process of incorporating the governing bodies of the nuclear installation operators and their functions to the extent that they have a relevant influence on safety is worthy of special mention.

Article 13. Quality assurance

13.1 Regulatory requirements for quality assurance programmes and quality management systems of the licence holders

CSN Instruction IS-19 on “Requirements of the Management System of nuclear installations” provides that quality requirements shall be managed together with the other elements of the management system and shall comply with the provisions of standard UNE 73,401, June 1995, «Quality assurance at nuclear installations» in order to achieve the highest standards of quality in the nuclear field.

For this reason the nuclear power plants have established quality systems that meet the requirements of the before mentioned standard UNE 73,401.

13.2 Implementation of integrated management systems at nuclear intallations

In 2009 the plants have revised their integrated management systems to adapt them to the requirements established in IS-19.

13.3 Main elements of quality assurance, quality management and management system programme, covering all aspects of safety throughout the lifetime of the nuclear installation

The objective of implementing a quality system at nuclear power plants is to provide reasonable assurance that the structures, systems and components, and the use made of them, are adequate to achieve their safe, reliable and documented operation.

The requirements established by the quality system are applicable to all activities affecting the safety functions of the structures, systems and components relating to nuclear safety.

13.4 Audit programmes of licence holders

The quality systems in place at the nuclear power plants define internal and external auditing programmes aimed at verifying the degree of compliance and the efficiency of the quality systems, these programmes being carried out by qualified personnel.

Work has been carried out within the framework of UNESA on the establishment of check-lists common to all the plants for the performance of audits in different areas, based on the best standards of the nuclear industry defined by INPO and WANO.

13.5 Audit of vendors and suppliers by licence holders

The nuclear power plants’ audits programme includes external audits performed with respect to the suppliers of materials and services in order to check the capacity of the supplier to provide materials and services in keeping with the demands of the plants.

The supplier evaluation procedures have been revised in order to bring them into line with the latest CSN instructions on the training of nuclear power plant personnel.

A common suppliers database has been created in accordance with the UNESA document CEN-16 “Document on operation of the KNEXT Platform for UNESA Placement Communities”, June 2006.

13.6 Regulatory review and control activities

During 2008 meetings were held between the CSN and the licensees of the nuclear installations to deal with the scope of the requirements to be implemented and draw up a reference document for the preparation of the Management System Manuals in accordance with IS-19. Likewise, the licensees of the installations identified their situation regarding the requirements of IS-19 and determined the additional activities to be carried out and the periods for their implementation during 2009. In 2009 the CSN has held two follow-up meetings with each licensee to track the additional activities identified.

The quality assurance assessment activities have consisted of reviewing the changes to the plant Quality Assurance Manuals and evaluating the Quality Plans established for the implementation of design modifications requiring authorisation, in accordance with chapter V of the Regulation on Nuclear and Radioactive installations. Examples of these modifications are as follows: implementation of the essential chilled water system for the cooling of the emergency diesel generators and engineered safeguards at the Vandellós II plant, power upgrade at the Almaraz plant, increase of the storage capacity of the spent fuel pools at the Cofrentes plant, temporary storage facility for spent fuel at José Cabrera plant and quality assurance programme for the dismantling of José Cabrera plant. .

The inspection activities performed have been as follows:

- Two-yearly inspections of the nuclear power plant corrective actions programmes: PA.IV.201 “Troubleshooting programme”
- Participation in two-yearly inspections of the implementation of design modifications at nuclear power plants: PT-IV-215: «Permanent design modifications”
- Inspection of application of the quality plans for certain design modifications implemented during the period.
- Two annual inspections of activities carried out by the licensees for the control of work performed by contractor companies during the refuelling outage.
- Inspections of aspects relating to the quality assurance of the Action Plans to improve safety at the Vandellós II (PAMS) and Ascó (PROCURA) nuclear power plants

Article 14. Assessment and verification of safety

14.1 Introduction

Each operating permit establishes the reports (periodic and non-periodic) that the licensees have to submit to the CSN. These reports are assessed or supervised, as the case may be, by the CSN, giving rise to meetings, inspections and audits with the licensee of the installation, as appropriate. A condition included in each permit refers to the faculty bestowed by law upon the CSN to issue complementary technical instructions directly to the licensee in order to guarantee the maintenance of the safety requirements and conditions of the facility and better compliance with the requirements established in each permit.

Design modifications or modifications to the operating conditions affecting nuclear safety or radiation protection may require specific authorisation.

14.2 Assessment of safety

14.2.1 Contracting Party measures and regulatory criteria for the performance of comprehensible and systematic safety assessments

The CSN procedure for the appraisal of the applications submitted by the licensees incorporates not only the assessment as such but also the categorisation of whatever deficiencies may be identified in the assessment process, in order for the licensees to make good these deficiencies and adopt adequate corrective measures in their own analysis and assessment processes to avoid their future repetition. The objective of this assessment procedure is to establish a systematic approach for the development of the process of assessing different issues relating to nuclear installations, from the reception of the assessment documentation to the issuing of the corresponding assessment technical report. It is applicable to all issues relating to nuclear power plants and subject to evaluation that require a decision by the Nuclear Safety Council, such as design modifications, changes in the official operating documents, etc., as well as the closure of the conditions associated with the operating permits or authorisations, CSN initiatives and whatever other issues it might occasionally be considered should be evaluated.

In 2009 the CSN published the technical Instruction IS-21, applicable to design modifications at nuclear power plants, which deals with the requirements regarding design modifications at installations described in the Regulation on Nuclear and Radioactive Installations. The application of this Instruction makes it possible to determine when a licensee have to apply for an authorisation for a design modification prior to its being implemented. This Instruction establishes the need to perform a preliminary analysis in order to identify whether, once the modification has been incorporated, the criteria, standards and conditions on which the original authorisation was based continue to be fulfilled. If these requirements are affected by the design modification, the licensee must apply for authorisation prior to their entry into service. If, on the other hand, they are not affected, the modification may be carried out by the licensee with the sole condition that information must be provided on the status of their performance.

Furthermore, and as described below (see article 14.3 of the report), the nuclear power plants are required to carry out a Periodic Safety Review (PSR) every ten years, this being associated with the renewal of each authorisation.

During the period covered by this report the Santa Maria de Garoña, Almaraz and Vandellós II plants have performed their Periodic Safety Reviews (PSR), as required in their respective operating permits. However, during this period the assessment has been completed only in the case of Santa Maria de Garoña, the most noteworthy results being included in the following sections.

14.2.2 Safety assessments within the licensing processes and safety analysis reports for different stages in the lifetime of the nuclear installations (siting, design, construction and operation)

During the period considered the operating permits for the plants in operation and the dismantling permit for the José Cabrera nuclear power plant are of special interest for the Spanish nuclear fleet.

The operating permits are currently granted for a maximum period of 10 years, with the possibility of renewal, although this period is not legally stipulated. These permits are all of the same format and include the applicable binding conditions. As part of the permit renewal process, the licensee has to demonstrate that all these conditions have been complied with.

Each authorisation indicates the revision in force of the official operating documents on the basis of which it is granted. These documents are the Safety Analysis Report, the Operating Regulation, the Operating Technical Specifications, the Emergency Plan, the Quality Assurance Manual, the Radiation Protection Manual and the Radioactive Waste Management Plan¹. Any changes to the Safety Analysis will require approval only if they are associated with design modifications requiring authorisation.

During the previous period considered (2004-2006), the Santa María de Garoña nuclear power plant had issued a request for renewal of its operating permit for 10 years (from 2009 to 2019), this being the first time in Spain that such a permit had been requested for an accumulated operating period of more than 40 years (from 38 to 48 years of operating lifetime). The possibility of requesting renewal for operation beyond 40 years was contemplated in the plant's operating permit in force, which set out the conditions for such a request. During the present period, the plant has submitted all the documentation, including the additional documentation required by the CSN in this case. The final result of the evaluation performed by this regulatory body was favourable for the granting of the permit for 10 years, and identified a series of conditions to be met, as is habitual. Despite this, the MITYC granted its authorisation to operate only 4 more years (to July 6th 2013).

During the period the Almaraz, Vandellós II, Cofrentes and Ascó nuclear power plants have had operating permits in force that will expire between 2010 and 2012, for which reason during the three-year period 2007-2009 they have prepared or submitted the necessary documentation.

Almaraz

In accordance with the Operating Permit in force, which expires on June 8th 2010, the Licensee submitted a request for renewal of the Plant Operating Permit in June 2008, accompanied by a Periodic Safety Review (PSR) pursuant to the requirements and scope defined in CSN Safety Guide GS-1.10 (Nuclear Power Plant Periodic Safety Reviews). Subsequently, the analysis period has been extended until December 31st 2008 on request by the CSN.

In addition the CSN required a conditional application standards applicability analysis, which was submitted in September 2009. The CSN is currently completing its evaluation of the information provided with a view to issuing the corresponding mandatory report to the MITYC.

¹ Recently also the Physical Protection Plan, although this is not yet included in the authorisations in force.

It should be pointed out that during this three-year period the plant has installed a fifth emergency diesel generator and has revised its accident analysis programme and implemented the modifications required for a power upgrade. Both modifications have required specific authorisations by the MITYC. Also worthy of mention are the safety assessments carried out within the context of the modification of the setpoints of the cold overpressure mitigation system (COMS) and the licensing of the residual heat removal (RHR) system for the performance of this function, or the new methodology for the calculation of the dose to the control room operators in the event of an accident.

Vandellós II

The Licensee submitted a request for renewal of the Operating Permit in July 2009, expecting to renew the authorisation in July 2010, the date on which the current permit expires. The CSN is currently evaluating the information submitted with a view to presenting the mandatory report to the MITYC. During this three-year period the plant has designed and put into operation a new safeguards cooling system for use in emergency situations, with a fresh water reservoir and cooling towers. This has changed the final emergency heat sink from the sea to a closed fresh water system. This modification has not only required a specific permit for start-up, granted by the MITYC following a favourable report by the CSN, but also, and in view of its scope, has required a request for a performance and assembly authorisation.

Also worthy of mention are the safety assessments undertaken within the context of the cold overpressure mitigation system (COMS) setpoints modification, the reduction of the temperature of the fuel pools cooling water and the assessment of the emergency ventilation systems.

Cofrentes

The Operating Permit currently in force expires on March 20th 2011. During the period covered by this report the Licensee has prepared the documentation required to request the renewal of this Permit, submitting it on March 17th 2010 accompanied by a Periodic Safety Review (PSR) in accordance with the requirements and scope defined in CSN Safety Guide GS-1.10.

In addition, via the complementary technical Instruction issued on July 30th 2009, the CSN required an analysis of the conditional application standards. This analysis will be submitted to the CSN, along with action proposals, before April 30th 2010.

Ascó

During the period covered by this report, the Ascó nuclear power plant has begun to prepare the documentation required to request the renewal of its Operating Permit with a view to presenting it before October 2010, since the current permit expires in October 2011. During these three years the plant has not implemented any design modifications of any special scope and has initiated the proceedings to request a design modification allowing for the storage of spent fuel in casks. This decision has been adopted in view of the dates foreseen for saturation of the fuel pools of both plant groups and pending the construction and start-up in Spain of a centralized spent nuclear fuel and high-level waste temporary storage facility .

José Cabrera

Since its definitive shutdown on April 30th 2006, and over the last three years, the José Cabrera nuclear power plant has carried out several safety assessments relating to the suitability of the facility for definitive dismantling. Particularly significant among these assessments have been those relating to the conditioning of all the operating wastes and the management of the spent fuel (loading, transfer and storage of 12 casks with 377 spent fuel assemblies in the storage facility at the José Cabrera nuclear power plant).

The new licensee for the dismantling phase (ENRESA) has requested the Dismantling Permit from the MITYC. This request has been evaluated by the CSN, which has issued its mandatory report, this being favourable.

14.2.3 Periodic safety assessments of nuclear installations using deterministic and probabilistic methods

One of the objectives of the Periodic Safety Reviews is to analyse the performance of the installation with respect to the different aspects of nuclear safety over a sufficiently long period of time to be able to identify trends, analyse the situation of the installation with respect to international standards and those of the country of origin of the project and assess the nuclear safety of the installation on the basis of the results obtained and in relation to the different aspects contemplated within the scope of the Periodic Safety Review. At those installations for which a long-term operating permit (beyond the design lifetime) is requested, the PSR should also include an Integrated Ageing Assessment and Management Plan containing the Ageing Management Reviews (AMR) and Time Limited Aging Analyses (TLAA). One of the products of the PSR is the preparation of on-going Safety Improvement Programmes or new programmes if they are necessary in view of the results of the different analyses.

One of the most noteworthy activities of the PSR, which focuses on comparison with the standards, is known as “conditional application standards” and is described below. The use of the standards in force in the country of origin of the project has been defined since the beginning of nuclear power plant licensing. Thus, the preliminary authorisations established that installation projects should be carried out in accordance with the applicable national criteria, codes, standards and provisions and that, were they not to exist, those applicable in the country of origin of the project should be adhered to.

This criterion has been continued in the different Operating Permits and Authorisations, which provide that during the first six months of each calendar year the licensee is to submit a report on the measures taken to adapt the operation of the plant to any new national requirements on nuclear safety and radiation protection and to the standards of the country of origin of the project, including in this last case an analysis of the applicability to the plant of the requirements issued by the regulatory authority of the said country of origin of the project.

The basic parameters of applicability of these new standards (design or operation, type of plant and date of construction or start-up) expressed in their publication will not generally coincide with those of the Spanish plant being considered, as a result of which their eventual application, complete or partial, is conditioned to the performance of a preliminary selection process and to the study of the improvements that their application might imply. The term “*new conditional application standards*” has been proposed for these circumstances, and it is considered that the CSN should be responsible for performing this preliminary analysis and selecting the most adequate standards to improve safety.

The PSR’s should also include an update of the Probabilistic Safety Assessment (PSA), evaluating the risk-informed design modifications and incorporating the operating experience acquired since the last update.

The scope of the PSA updates should include level 1 internal events at power and during shutdown, level 2 internal events at power and level 1 fires and internal flooding, in addition to other events arising outside the installation, although this scope will be progressively extended when the CSN Instruction on PSA and its applications is issued, which will require a full-scope level 1 and level 2 at power and in other operating modes for both internal and off-site events.

The PSA's for each nuclear power plant are kept updated by the licensees following each refuelling outage, such that they reflect the reality of the facility at all times. Furthermore, the maintenance and updating of the PSA's are inspected by the CSN during each refuelling cycle as part of its basic inspection Plan the result being an evaluation aimed at gaining insight into the methodological and plant modifications incorporated in the PSA since the previous inspection.

In addition, as part of the process of evaluating authorisation requests presented by the nuclear power plants for which the licensee has included only reasoning of a deterministic nature, the CSN may require that the licensee analyse the impact on risk of the proposals included in his request by means of PSA.

14.2.4 Safety assessments performed and main results for existing nuclear installations

The evaluation carried out by the CSN on the request submitted by the licensee of the Santa María de Garoña nuclear power plant for the renewal of the operating permit for a period of ten years, as from July 2009, which implied operation beyond the lifetime contemplated in the initial design (long-term operation), has focussed on the one hand on assessing compliance with the conditions set out in the operating permit in force and with the complementary technical Instructions associated with the granting of this permit and, on the other, on the documents submitted by the licensee in relation to the Periodic Safety Review, the Integrated Ageing Assessment and Management Plan, the updating of the Radioactive Waste Management Plan, the updating of the Environmental Radiological Impact Study and the analyses required in the CSN complementary technical Instruction establishing the conditional application standards (standards beyond the Licensing Basis whose compliance was to be analysed in association with the new authorisation requested). In view of the fact that the 40-year lifetime was to be exceeded, special attention was given to the integrated ageing assessment and management Plan, which has provided an assessment of the state of conservation of the plant and the establishment of ageing control programmes beyond the foreseen design lifetime.

The analyses submitted by the licensee in compliance with the CSN complementary technical Instruction would have resulted in the performance by the licensee of numerous safety improvements up to the year 2013, focussing on the instrumentation and control of the emergency core cooling systems and the containment isolation system, the ventilation systems, the fire-fighting systems, electrical separations and containment isolation devices. The CSN reported favourably on the granting of the authorisation requested, for which it is solely responsible, but the MITYC granted the operating permit only until July 6th 2013.

14.2.5 Regulatory review and control activities

The SISC implemented by the CSN incorporates the need to carry out self-assessments with regard to its operation. The first SISC self-assessment was completed in May 2008 and was performed in accordance with the Self-Assessment Programme in place.

The SISC self-assessment report underlined the fact that in general the objectives mapped out are being met and that there are no important deficiencies in the integrated supervision system.

Nevertheless, certain aspects were identified that required short and medium-term improvement measures, the most noteworthy being the need to maintain the inspector training ongoing improvement process, the advisability of revising and optimising the inspection procedures and operations indicators and the need to improve communications between the CSN and the licensees of the plants in order to reduce the response times in the interactions between the two organisations.

In June 2008 the CSN established an action plan by means of which:

- Certain procedures of the SISC have been revised and modified to incorporate the experience acquired over two years of use at the Spanish nuclear power plants and undertake improvements, modifying the efforts dedicated to inspection. The procedures revised include two of the main documents established for control: the basic management procedure describing the overall operation of the SISC and the self-assessment procedure itself.
- The scope of the basic inspection programme (BIP) has been revised, including a two-yearly inspection of the management of the in-house operating experience, and certain operations indicators have been modified and improved.
- The arrangements for the reporting of relevant findings to the licensees of the installations have been streamlined; improving the process of applying the necessary corrective actions, and the periods for the performance of supplementary inspections associated with safety significant findings and indicators has been modified.
- A training plan was drawn up and implemented during the last quarter of 2009 in order to reinforce those aspects that had proven to be most complex for the CSN inspectors, such as probabilistic assessments of the safety significance of the findings, the generalised supervision of the licensees' corrective actions Programmes, the treatment of transverse aspects and the safety culture in the SISC and greater emphasis on inspections in the field, supervising specific actions by the licensees of the facilities, than on documentary checks.

14.3 Verification of safety

14.3.1 Contracting Party arrangements and regulatory requirements for the verification of safety

Since it was first set up, the CSN has supervised the on-going assessment of the nuclear safety of the nuclear power plants carried out by the licensees through the inspection and control of these activities and through the review of the periodic reports that the licensees are required to submit in compliance with the conditions of the Operating Permit or Authorisation. These periodic reports refer to the in-house and industry operating experience, design modifications, new standards issued, personnel training, the Environmental Radiological Surveillance Programme, the dosimetry of the personnel, Waste Management Plan activities, compliance with the Maintenance Rule and the activities of the Plant Service Lifetime Management Plan.

The basic inspection programme is an instrument of continuous supervision that is applied equally to all the facilities every two years. The inspections included in this programme are performed by both specialists from the head offices and the CSN resident on-site inspectors (two inspectors per site), the latter also undertaking a daily tracking of the operation of the plant and of any operating incidents, overseeing the resolution of such incidents and compliance with the Operating Technical Specifications and other CSN requirements. The basic inspection programme includes a series of inspections in which specialists in various disciplines participate (effectiveness of maintenance, design of components, surveillance requirements, etc.) and in which the selection of the components to be inspected is accomplished on the basis of their significance for the risk of the installation.

During this period the CSN has invested significant efforts in this programme, both in inspection and in the evaluation of the results and categorisation of the findings of these inspections on the basis of their impact on risk. In this respect and during the period corresponding to this report, efforts have continued in the adaptation of an overall systematic supervision programme similar to that applied by the US NRC, as described in Article 19 of this report.

14.3.2 Main elements for continued verification of safety (in-service inspection, surveillance)

The licensees have been updating the design basis and the basis of the licensing documents of each installation. The objective of this activity has been the compilation of the design basis and the licensing basis for each safety-related system. The updating of the design basis requires verification of the hypotheses, the data and the results of accident analyses included in the Safety Analysis Report, the identification of the design basis of the support components necessary for the performance of safety functions and the design modifications incorporated in safety systems. Also included is the review of the current physical reality of each of the systems and the operating procedures, with a view to reconciling the operating practices with the design of the systems. The final product obtained from this process has been a Safety Analysis Report whose content is updated, sufficiently contrasted and in line with the design basis documents.

The set of periodic examinations and tests carried out on the plant structures, systems and components throughout the operating lifetime of the facility is what is known as *in-service inspection*, its objective being to verify structural integrity and the functional capacity of the said structures, systems and components.

Up until the publishing of the CSN Instruction on in-service inspection, IS-23, and in view of the absence of Spanish national standards on these activities, the nuclear power plants carried out their in-service inspection programmes in accordance with the standards defined in the regulations of the country of origin of the technology and accepted in the operating permits, the basic standards applied being section XI of the code of the American Society of Mechanical Engineers (ASME) and the Operation and Maintenance code of this Association (ASME-OM)), as required by the Operating Technical Specifications. Consequently, this code is considered to be an acceptable reference for the drawing up of the in-service inspection and testing programmes defined for these installations, these being included in the document known as the In-Service Inspection Manual (ISIM). The aforementioned CSN Instruction endorses and consolidates this practice.

The systems used for in-service inspections must be qualified in accordance with the methodology accepted by the CSN and have the scope defined in this methodology. The non-destructive testing (NDT) methods and techniques used should be selected with consideration given to the different characteristics and the nature of the structures, systems and components, the typology of the defects, the conditions of accessibility and different levels of radiation and the degree of automation of the equipment used to perform the examinations. These methods and techniques are adequately described in the procedures.

The evaluation of the results of these inspections and their comparison with the applicable acceptance criteria allow the objectives of the in-service inspection programmes to be verified. The comparison of these results with those obtained from the basic reference (pre-service) inspection and the previous in-service inspections performed make it possible to analyse any trends observed, justify changes and adopt the actions appropriate in each case.

In addition, in early 2006 a mixed working group was set up, comprising representatives of the electricity industry and the CSN, to draw up a guideline allowing for the homogeneous treatment of whatever anomalous conditions (degraded conditions and non-conformities) might arise during operation of the plant. This guideline was endorsed by the CSN in 2007.

In general it may be stated that the experience of relating the performance of a Periodic Safety Review at a nuclear facility and its presentation prior to the granting of the renewal of the operating permit has positive aspects of undeniable value for the safety of the facility. The overall review of a facility over prolonged periods of time allows operation to be evaluated from a perspective complementary to that of daily tracking. The results of the Periodic Safety Review may be used to improve operation during the following period.

This same systematic approach is considered to be equally valid for those cases in which the renewal of the Operating Permit exceeds the service lifetime originally considered in the initial design of the facility. It is understood that in this case special conditions should be included – both administrative and relating to management of the ageing of the facility – such that the operation of the plant may be extended beyond the initial design lifetime.

14.3.3 Elements for ageing management programmes

The control of the ageing of the structures, systems and components is a fundamental part of nuclear power plant lifetime management. In compliance with the limits and conditions of the operating permits, the licensees draw up an annual report identifying new inspection, surveillance and maintenance activities for the detection and control of ageing processes. The methodology used is that that described in the *LWR nuclear power plants remaining lifetime Assessment System*, developed jointly by the plants associated under UNESA.

In July 2009, CSN published its Instruction IS-22 on “Safety requirements for the management of ageing and long-term operation of nuclear power plants”, which establishes the terminology and criteria for the management of nuclear plants component ageing and determines the scope of the activities to be performed during both the design lifetime of the facility and long-term operation. The aforementioned Instruction IS-22 establishes that the nuclear installations should incorporate the conclusions of their analyses in a lifetime management Plan (LMP)

This Plan is limited to the scope required by IS-22, identifies the ageing mechanisms for this scope and evaluates current maintenance practices, determining whether they should be extended or modified. In addition, when the period covered by the analyses partially or completely exceeds the initially considered design lifetime, the analyses performed (studies, calculations) are re-assessed using defined design lifetime hypotheses Time-Based Ageing Analysis (TBAA).

During the first six months of every year, beginning in 2010, the plants will report to the CSN on the activities carried out within the scope of the LMP, specifying their proposals for improvement. During the design lifetime of the facilities the scope of the LMP's coincides with that described in articles 54.3, 54.4 and 54.21 of the US standard 10CFR54 “Requirements for the renewal of the operating permit”. Beyond this period, the requirements of this standard associated with the applicable TBAA's must also be complied with. Furthermore, the plants are required to submit a revision of the LMP within the framework of the Periodic Safety Reviews.

In view of the proximity of the dates of entry into force of IS-22 and of the submittal of the Periodic Safety Reviews corresponding to the period covered by this report, the provisions relating to ageing management were not initially contemplated in the requests for Renewal of the Operating Permit presented, except in the case of Santa María de Garoña plant, whose request included an integrated ageing assessment and management Plan for long-term operation, in accordance with the aforementioned US standards. In the case of Vandellós II plant, an extension of the period for submittal of the PSR was requested for the incorporation of the LMP. In the case of Almaraz plant, the complete implementation of the methodology required in IS-22 is being contemplated as part of the process of renewal of the Operating Permit, especially as regards aspects relating to the systematic analysis of the industry operating experience, the study of degradation phenomena and the control and mitigation of ageing.

14.3.4 Measures for internal review by the licence holder of safety cases to be submitted to the regulatory body

The control of requests is regulated by CSN Instruction IS-21 on “Requirements applicable to modifications at nuclear power plants”, of January 28th 2009. This instruction establishes

the requirements to be applied to decide whether or not authorisation is required. The nuclear power plants have procedures for the implementation of the different stages of development of this regulation, including those that require authorisation. In addition to the processes for the preparation and technical supervision of modifications and subsequent Quality Assurance review and approval processes, the Nuclear Safety Committees of the Plant (PNSC) and Operator (ONSC) provide an independent review of the technical and safety-related analyses to be submitted in support of the request. Occasionally, and either systematically or depending on the importance and magnitude of the changes requested, an independent review is carried out by organisations other than those responsible for the change. This independent review may be performed by internal licensee organisations or by entities outside the licensee's organisation.

The application of probabilistic techniques to assess the impact on safety of the requests issued is a valuable procedure that is used occasionally. The NPP's have updated Probabilistic Safety Assessment (PSA) models that are regularly inspected by the CSN. Recently a joint initiative has been deployed between the nuclear plants and the CSN for the setting up of a common database for generic components in PSA.

14.4 Regulatory review and control activities

The licensees of the facilities carry out routine assessments of new technologies and analyses of operating experiences or the applicability of new standards, all with a view to improving the installations. Some of these reviews are not specifically required by the regulations but are incorporated voluntarily by the licensees. Examples of these improvements are the replacement of analogue instrumentation with digital technology. The regulatory structure included in the aforementioned Regulation on Nuclear and Radioactive Installations and in the different Instructions published by the CSN requires the licensees of nuclear power plants to maintain an integrated management system, and within it a quality assurance programme guaranteeing the systematic performance of the actions required to reasonably ensure that the structures, systems and components will be capable of performing their functions.

Finally it should be pointed out that important efforts have been made to clarify the licensing process that will govern the renewal of operating permits when the granting of such permits leads to operation beyond the period contemplated in the original design. In Spain there is no legal or administrative limitation as regards establishing the service lifetime of the nuclear power plants, and no fixed period is currently set. The period of validity of the Operating Permits is periodically renewed through on-going assessment and Periodic Safety Reviews. The operation of the Spanish nuclear power plants beyond the period contemplated in their design is compatible with the Spanish nuclear legislation in force.

Article 15. Radiological protection

15.1 Arrangements and regulatory requirements concerning radiation protection at nuclear installations

15.1.1 Regulation on the Protection of Health against Ionising Radiations

The basic standards for the radiological protection of exposed workers and the members of the public against the risks of exposure to ionising radiations are established in Royal Decree 783/2001 approving the Regulation on the protection of health against ionising radiations, which transposes Directive 96/29 EURATOM to the national legislation.

15.1.2 Other provisions

Aspects relating to the radiation protection of the exposed workers of contracted companies (outside workers) at nuclear power plants receive special attention by the CSN, since experience shows that more than 80% of the occupational doses registered at these installations correspond to these workers.

The radiation protection of outside workers running the risk of exposure is specifically regulated by Royal Decree 413/1997 of March 21st 1997, which transposes the content of Directive 90/641/EURATOM

As an additional development, the Safety Council has published various Instructions on the procedures to be adhered to in order to comply with certain requirements established in the national legislation.

15.2 Regulatory expectations for the licence holder's processes to optimize radiation doses and to implement ALARA principle

The three basic principles of justification, optimisation and limitation of individual dose on which the radiological protection system is based are incorporated in the Spanish legislation by means of the Regulation on the protection of health against ionising radiations.

In the nuclear electricity sector the practical application of the principle of optimisation (or ALARA principle) constitutes the basic objective to be attained and is accomplished through the implementation in the different organisations of the nuclear power plants of the criteria and the systematic approach defined in CSN Safety Guide GS-1.12 Practical application of the optimisation of radiological protection in nuclear power plant operation.

This guide establishes the general framework to be considered by the nuclear power plant organisations in order to comply with the ALARA principle, contemplating the following criteria, among others:

- Compliance with the ALARA principle should be an objective during operation of the plant and in the planning of all activities, and should be a part of the plant modification and modernisation plans, including the processes of dismantling and decommissioning.
- The plant Management should be committed to implementation of the ALARA principle in all phases, from design to decommissioning, as part of the plant safety culture.

- The commitment of the management should extend to all levels of the organisation of the plant, as well as to external companies involved in the performance of the most significant tasks from the radiological point of view.
- Adequate means should be established to inform, train and motivate all the plant workers in compliance with the ALARA principle.

The aforementioned Safety Guide establishes that the commitment of the plant organisation to the ALARA principle should materialise through the implementation of an ALARA programme that:

- Defines radiological indicators to verify the degree of effectiveness in the implementation of the ALARA principle.
- Establishes a systematic approach for the ALARA review of the most significant tasks from the radiological point of view.
- Defines the plant policy in all aspects relating to reduction of the source term.
- Establishes a systematic approach for the ALARA review of design modifications.
- Establishes initial and on-going training programmes for implementation of the ALARA principle.
- Defines the content and scope of the programme of internal audits to be established to verify the degree of implementation of the ALARA Programme.

Since the beginning of the 1990's the implementation of this doctrine has led to important modifications in the operating organisations of the Spanish nuclear power plants, the aim being to ensure that all the members of these organisations are formally and seriously committed to compliance with the ALARA principle.

These premises are reflected in the official operations documents, specifically the Operating Regulation and Radiation Protection Manual.

15.3 Implementation of radiation protection programmes by the licence holders

The following dose limits are established in the Regulation on the protection of health against ionising radiations:

Exposed workers:

Effective dose limit: 100 mSv in five consecutive official years, subject to a maximum effective dose of 50 mSv in any one official year.

- Dose limit to skin (averaged over 1 cm²): 500 mSv per official year.
- Dose limit to lens: 150 mSv per official year.
- Dose limit to hands, forearms, skin and ankles: 500 mSv per official year

Members of the public

- Effective dose limit: 1 mSv per official year. Under special circumstances the CSN may authorise a higher effective dose value in a single official year, as long as the average over five consecutive official years does not exceed 1 mSv per official year.
- Dose limit to skin (averaged over 1 cm²): 50 mSv per official year.
- Dose limit to lens: 15 mSv per official year.

Appendix 15.A includes information on the dosimetry of exposed workers in 2009.

Alara Exposures

The implementation of the ALARA principle in the different operating organisations is in all cases accomplished in accordance with one same structure:

1. A management level that drives and approves the Alara culture and dose objectives, providing the necessary resources.
2. An executive level that proposes the Alara policy and dose objectives, analyses the results and takes corrective actions.
3. A technical level that performs the analysis, planning and tracking of the works, reviews the results and proposes actions for improvement.

An operational tool helping the implementation of the radiological protection programme by the licensee is the radiation work permit (RWP), which is a work order that establishes the task to be performed, the estimated duration of the work, the radiological conditions in the work area and the dosimetry and radiation protection requirements.

The regulatory control of the radiation protection of the population is accomplished through the programmes for the limitation, surveillance and control of nuclear power plant effluents and the environmental radiological surveillance programmes in the area of influence of these plants.

Compliance with conditions for the emission of radioactive substances

The nuclear power plant release limitation, surveillance and control system has led to actual release values that are far below the authorised limits and in keeping with those registered at international level.

Table 15.B.1 shows the activity released by the nuclear power plants in 2008. The radiological impact associated with the releases is insignificant, the activities released representing only a minor fraction of the authorised limits.

The effective doses, which have been calculated for the most exposed individual and considering highly conservative hypotheses, have in no case exceeded the limit of 100 microSievert authorised for radioactive effluents, and have in all cases been below 7 microSievert/year.

Environmental radiological surveillance

Each nuclear power plant has an environmental radiological surveillance programme for its surrounding area, in keeping with the directives of the CSN, the annual schedule and results of which are evaluated by the CSN. Appendix 15.C describes the content of the environmental radiological surveillance programmes and their most significant results during 2008.

From the evaluation of these results it may be deduced that the radiological impact of the Spanish nuclear power plants on their surroundings continues to be far below the established limits and that the quality of the environment around the facilities continues to be acceptable from the radiological point of view, with no risk for persons as a result of their operation.

15.4 Epidemiological study

The epidemiological study was completed in 2009, in keeping with the requirements of the collaboration agreement signed in April 2006 between the CSN and the Carlos III Institute of Health (ISCIII), although in February 2009 a modification to this collaboration agreement was signed extending the period for completion of the work and submittal of the final report to October 2010.

The study, requested from the health authorities by the Spanish Congress, has required the collaboration of the CSN for the performance of artificial and natural dose estimates.

Furthermore, and in accordance with the Commission from the Congress, an independent consultancy Committee was set up, with the participation of the institutions and independent experts, environmental groups and stakeholders, for tracking of the performance of the study and analysis of the results obtained on completion of the study.

The basis for the study consists of the municipalities in two areas of high and low natural radiation, in an area measuring 30 km in radius, and those located in the vicinity of nuclear and radioactive facilities belonging to the Spanish nuclear fuel cycle (within a radius of 30 kilometres around these installations), regardless of whether they are in operation or in the dismantling phase. Other municipalities having similar characteristics but located at a sufficient distance from the facilities were taken as control elements.

As of the date of drawing up of this report, the final report was being prepared for its formal presentation to the Congress.

15.5 Regulatory review and control activities

Since 2007 the CSN has been using a SISC that includes the following:

- Inspection of the occupational radiological inspection of the public and the environment.
- Application of the methodology established to categorise findings.
- Supervision of the indicators defined by the programme.

Furthermore, the aspects of Occupational RP and application of the ALARA principle during refuelling outages are evaluated through the supervision of the final refuelling reports issued by the licensees in accordance with the requirements of CSN Instruction IS-02

Likewise, the CSN has defined the scope and content of the effluent surveillance and control programmes and the environmental surveillance programme for each nuclear power plant, inspects their application and evaluates their results. In addition it carries out an environmental radiological surveillance programme independent from that performed by the licensee in the area surrounding each nuclear power plant, this allowing the results to be contrasted.

Appendix 15.C extends the description of these programmes.

APPENDIX 15.A

**Information relating to personal
dosimetry included in the CSN 2009
report to Congress and the Senate**

External exposure

The statistical results regarding accumulated doses in 2009 for the overall nuclear power plant workers are as follows:

Joint operation (normal and refuelling)

A.1 Company personnel:

A total 1,977 workers have been controlled.

1. 100% of the workers controlled received doses lower than the annual limit.
2. 0.66% of the workers controlled received doses of between 6 mSv and 20 mSv.
3. 99.34% of the workers controlled received doses lower than 6 mSv.
4. 91.60 % of the workers controlled received doses lower than 1 mSv.
5. 69.80% of the workers controlled did not receive any measurable dose.

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 amounts to 1.20 mSv.

A.2 Contracted personnel:

A total 7,516 workers have been controlled.

1. 100% of the workers controlled received doses lower than the annual limit.
2. 2.99% of the workers controlled received doses of between 6 mSv and 20 mSv.
3. 97.01% of the workers controlled received doses lower than 6 mSv.
4. 97.45 % of the workers controlled received doses lower than 1 mSv.
5. 59.34% of the workers controlled did not receive any measurable dose.

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 during this six-month period amounts to 2.02 mSv.

A.3 Collective doses

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

Santa María de Garoña	1726	mSv.person (*)
Almaraz I and II	1511	mSv.person (*)
Ascó I and II	849	mSv.person (* Ascó I)
Cofrentes	2899	mSv.person (*)
Vandellós II	1211	mSv.person(*)
Trillo	777	mSv.person (*)

(*) Refuelling outage in 2009

These data mean that the average collective dose per reactor throughout 2009 was 996.96 mSv.person. By reactor type, this parameter stands at a value of 2312.45 mSv.person for BWR's and 621.11 mSv.person for PWR's.

Figures 15.A.1. and 15.A.2 show comparative graphs of the evolution of the average three-yearly collective dose in Spain, Europe, Asia and the USA by reactor type, as reference data. The international data were taken from the database published by the Information System on Occupational Exposure (ISOE).

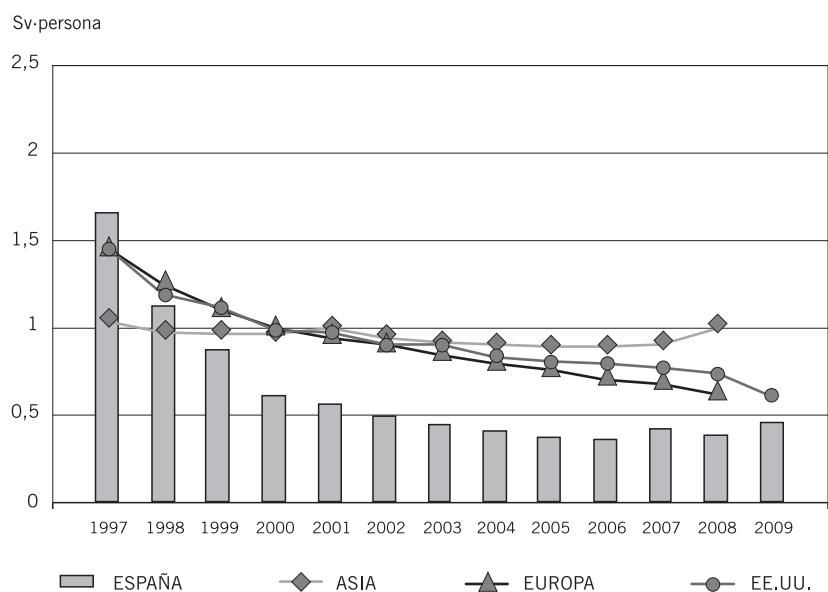


Figure 15.A.1 Average three-yearly collective dose (Sv.person) for PWR reactors. International comparison

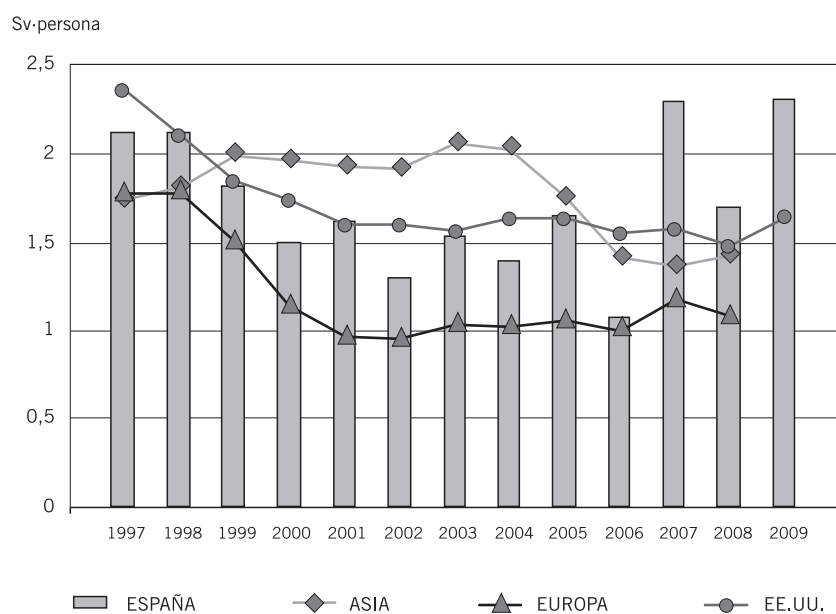


Figure 15.A.2. Average three-yearly collective dose (Sv.person) for BWR reactors. International comparison.

B. Internal contamination

Direct whole body radioactivity measurements were performed on 12,765 workers. In no case was internal contamination higher than the registration level (1 mSv/year) detected.

APPENDIX 15.B

**Limitation, monitoring and control
of the releases of radioactive
substances by the Spanish nuclear
power plants**

The release limits for the nuclear power plants, set at an effective dose of 0.1 mSv/year for liquid and gaseous effluents overall, guarantee with a very wide safety margin that the doses that may be received by the members of the public as a result of the emission of these releases during the normal operation of the nuclear power plants will not be significant and, in any case, will be clearly below the dose limits established for the public.

As a result of the application of this release limitation system, the actual release values continue to be much lower than the authorised limits and perfectly comparable to those found at international level. Table 15.B.1 shows the effluents released from the Spanish nuclear power plants in 2008. The doses received by the members of the public as a result of these releases are lower than 2% of the integrated limit authorised for radioactive effluents.

Table 15.B.1 Radioactive effluents from the nuclear power plants. Activity released in 2008 (Bq)

	PWR PLANTS					
	José Cabrera ⁽²⁾	Almaraz I & II	Ascó I	Ascó II	Vandellós II	Trillo
Liquid Effluents						
Total except						
Tritium and	1,64 10 ⁸	6,24 10 ⁹	3,49 10 ⁹	8,24 10 ⁹	8,27 10 ⁹	9,20 10 ⁸
Dissolved Gases	1,28 10 ¹¹	2,58 10 ¹³	2,60 10 ¹³	2,60 10 ¹³	1,99 10	1,59 10 ¹³
Tritium	- -	LDL ⁽¹⁾	1,96 10 ⁷	7,81 10 ⁸	LDL ⁽¹⁾	⁽³⁾
Gaseous Effluents						
Noble Gases	LDL ⁽¹⁾	3,87 10 ¹³	2,67 10 ¹²	3,36 10 ¹²	9,61 10 ¹²	3,77 10 ¹¹
Halogens	1,22 10 ²	5,55 10 ⁷	LDL ⁽¹⁾	1,92 10 ⁶	1,11 10 ⁷	LDL ⁽¹⁾
Particles	4,80 10 ⁶	9,28 10 ⁶	7,80 10 ⁶	7,27 10 ⁶	7,13 10 ⁶	3,83 10 ⁶
Tritium	1,43 10 ¹⁰	2,95 10 ¹²	1,25 10 ¹²	1,08 10 ¹²	1,80 10 ¹¹	8,77 10 ¹¹
Carbon-14	- -	1,42 10 ¹¹	7,42 10 ¹¹	9,15 10 ¹¹	1,49 10 ¹¹	3,03 10 ¹⁰

(1) LDL: Lower Detection Limit

(2) Effluents generated as a result of activities prior to dismantling.

(3) The liquid releases do not carry dissolved gases since these are eliminated during the treatment process.

BWR PLANTS

	Santa María de Garoña	Cofrentes
Liquid Effluents		
Total except Tritium and Dissolved Gases	1,65 10 ⁸	1,32 10 ⁸
Tritium	4,87 10 ¹¹	3,93 10 ¹¹
Dissolved Gases	LDL ⁽¹⁾	LDL ⁽¹⁾
Gaseous Effluents		
Noble Gases	1,87 10 ¹³	2,74 10 ¹³
Halogens	5,56 10 ⁹	5,20 10 ⁹
Particles	9,22 10 ⁷	2,40 10 ⁸
Tritium	1,31 10 ¹²	5,01 10 ¹¹
Carbon-14	2,43 10 ¹¹	3,09 10 ¹¹

(1) LDL: Lower Detection Limit

APPENDIX 15.C

**Environmental radiological surveillance
programmes in the areas of influence
of the Spanish nuclear power plants**

The radiological surveillance in the neighbourhood of the Spanish nuclear power plants is undertaken by means of two independent programmes.

The first is carried out by the licensee in accordance with the requirements of the Nuclear Safety Council and is subject to the regulatory control of the CSN.

The second is carried out by the CSN itself, in certain cases through the assignment of functions to the governments of the Autonomous Communities, in collaboration with national laboratories or universities in the region in which the facility is located. This programme is completely independent from that performed by the licensee as regards the collection of samples and the laboratories performing the analytical determinations. The sampling points, samples types and analyses performed coincide with those corresponding to the licensees. The scope is around 5% of the programme performed at each facility.

At present eight environmental radiological surveillance programmes continue to be implemented in the vicinity of the respective nuclear power plants, six in operation, one definitively shut down and one in the dormancy phase, these including the collection of around 8,200 samples a year and the performance of some 12,300 analytical determinations.

Table 15. C. 1 includes a summary of these programmes.

For illustrative purposes, table 15. C. 2 includes the average values of the results obtained from the analyses of air samples within the environmental radiological surveillance programmes carried out in the vicinity of the operating plants during 2008.

Table 15.C.1 ERSP of operating nuclear power plant licensees

TSample type	Sampling frequency	Analyses performed
Air	Continuous sampling with weekly filter change	Total beta activity, Sr-90 γ spectrometry, I-131
Direct radiation	Change of dosimeters after a maximum exposure period of one quarter	Integrated dose rate
Drinking water	Sampling every fortnight or more frequently	Total beta activity, remaining beta Sr-90, Tritium, γ spectrometry
Rainwater	Continuous sampling with monthly collection	Sr-90, γ spectrometry
Surface and ground waters	Sampling of surface water monthly or more frequently and of groundwater quarterly or more frequently	Total beta activity, remaining beta, Tritium, γ spectrometry
Soil, sediments and indicator organisms	Soil sampling annual and sampling of sediments and indicator organisms every six months	Sr-90, γ spectrometry
Milk and crops	Milk sampling every fortnight during grazing period and every month for the rest of the year. Crop sampling during harvesting period	Sr-90, γ spectrometry I-131
Meat, eggs, fish, shellfish and honey	Six-monthly sampling	γ spectrometry

Table 15.C.2 Nuclear power plant ERSP. 2008

Nuclear power plant	Air Bq/m ³			
	Total β	I-131	Sr-90	Cs-137
José Cabrera	5,79E-04	<LDL	1,65E-05	<LDL
Santa María de Garoña	4,36E-04	<LDL	<LDL	<LDL
Almaraz	8,74E-04	<LDL	<LDL	<LDL
Ascó	7,21E-04	<LDL	<LDL	<LDL
Cofrentes	8,20E-04	<LDL	<LDL	<LDL
Vandellós II	6,42E-04	<LDL	<LDL	<LDL
Trillo	574E-04	<LDL	<LDL	<LDL

LDL: Lower Detection Limit

Article 16. Emergency preparedness

16.1 Arrangements and regulatory requirements for emergency planning and preparedness

Emergency planning and preparedness are governed in the Spanish State by the Basic Nuclear Emergency Plan (PLABEN) and the Regulation on Nuclear and Radioactive Installations. In addition, general provisions on nuclear emergencies are included in the Law Creating the CSN, the Regulation on the Protection of Health against Ionising Radiations, the Agreement of the Cabinet of Ministers regarding public information on applicable health protection measures and the procedure to be adhered to in the event of a radiological emergency, and the basic civil defence standards.

The most noteworthy aspects of the modifications made during the period to the legal and regulatory framework regarding nuclear emergencies are summarised below.

16.1.1 Basic Nuclear Emergency Plan (Plaben)

The Basic Nuclear Emergency Plan approved by Royal Decree 1546/2004 was modified by Royal Decree 1428/2009. The international standards and recommendations on the management of nuclear emergencies were maintained, among them Directive 96/29/EURATOM, along with those issued by organisations such as the IAEA and the ICRP, and criteria of emergency organisation flexibility were introduced to reinforce the representation of local and autonomous entities.

Objectives

The Basic Nuclear Emergency Plan establishes organisational and operative criteria for the planning and preparation of an off-site response to emergencies caused by accidents at nuclear power plants. Three basic criteria are taken into account. The first of these consists of taking advantage of the experience acquired and developed through the public information programmes, the training of those required to intervene in the event of an emergency and exercises and drills, in addition to the incidents that have occurred.

Furthermore, the PLABEN introduces the participation of the Autonomous Communities and Town Councils concerned through the effective incorporation of their services, means and resources in the Nuclear Emergency Plans. Also, consideration has been given to their competences in areas such as health care, fire-fighting and rescue services, logistics and even the intervention of the autonomous police force in certain cases.

Thirdly, the PLABEN is very much a master plan, this meaning that it is being developed and implemented materially on the ground through the off-site Nuclear Emergency Plans.

Legal development of the PLABEN

The development of the PLABEN materialised through the approval of the following legal documents:

- Directive on preliminary information for the population in the off-site Nuclear Emergency Plans, which also develops what, was established by the Agreement of the Cabinet of October 1st 1999.

- Directive on training and preparation of those required to intervene in the off-site Nuclear Emergency Plans.
- Directive on exercises and drills programmes in the off-site Nuclear Emergency Plans.
- Central Response and Support Level Nuclear Emergency Plan.

In addition the nuclear emergency master plans for the areas surrounding each nuclear power plant have been adapted to the latest modification of the PLABEN for 2009

16.1.2 Law Creating the CSN

Law 33/2007, of November 7th, partially modified the nuclear emergency functions assigned to the organisation by Law 15/1980, these now being worded as follows:

- Collaboration with the competent authorities in the drawing up of the criteria to be met by the off-site emergency plans and physical protection plans of nuclear and radioactive installations and subsequent participation in their approval. Coordination, as regards all aspects relating to nuclear safety and radiological protection, of emergency support and response measures, integrating and coordinating the different organisations and public or private companies required to intervene for compliance with the functions attributed to this Body. Likewise, performance of any other emergency-related activities assigned to it by the applicable regulations.
- Inspection, assessment, proposal and adoption, where necessary and informing the competent authority, of whatever prevention and correction measures might be necessary in response to exceptional or emergency situations arising and potentially affecting nuclear safety and radiological protection, whenever these arise in facilities, equipment, companies or activities not subject to the system of authorisation contemplated in the nuclear legislation.

Likewise, the regulatory body, in compliance with the functions assigned to it by law, has a plan establishing its activities in response to nuclear and radiological emergencies (EAP).

16.1.3 CSN Emergency Action Plan (EAP)

The CSN has an emergency action Plan (EAP) that includes the emergency response Organisation (ERO) and brings together all the functions, specific resources and basic action procedures of the organisation's management and technical divisions, the interactions between them and general directives on their initial and on-going training.

The ERO, which is complementary to the normal working organisation, has an operating structure with a single line of command that carries out the management function and is responsible for decision-making and in which the technical and logistics units participate in accordance with an action plan established specifically for such cases and that is activated depending on the level of severity of the accident underlying the emergency.

In the event of an emergency, the ERO intervenes in accordance with the EAP and independently from the regulatory and control function of the CSN. It has the following functions:

- Collaboration in taking the emergency to safe conditions.
- Contributing to mitigating the radiological consequences of the accident that caused the emergency for persons, property and the environment.
- Informing and advising the authorities in charge of directing the applicable emergency plan on the adoption of measures to protect the population.
- Informing the population of the risks associated with the emergency situation.

- Compliance with the international commitments regarding prompt notification and mutual assistance and affecting the CSN.

The Plan includes the processes of incorporating members of the basic organisational structure of the CSN into the emergency response organisation and the critical emergency tasks to be performed in each situation in order to adequately cover the responsibilities assigned to the organisation within the national emergency response system.

In addition the Plan considers the activation and activities of a series of services for “in situ” intervention in affected areas, as regards the level of off-site response.

The ERO operates basically from an emergency centre (Salem) that is on permanent alert and that is aided by an emergency stand-by team capable of responding to an emergency situation in less than one hour.

The CSN Emergency Action Plan includes a plan for the training of the personnel. Likewise, the EAP includes a programme of exercises and drills of internal, national and international scope that allows the operability of the plan to be periodically checked and the appropriate improvements to be made.

16.1.4 Regulation on Nuclear and Radioactive Installations

The Regulation on Nuclear and Radioactive Installations requires the licensees of nuclear installations to draw up a site emergency plan in order to obtain the corresponding Operating Permit.

All the nuclear facilities propose a site emergency plan, which is subject to approval by the Ministry of Industry, Tourism and Trade following a report by the CSN.

As set out in the Regulation, the site emergency plan of the facilities will describe the measures contemplated by the licensee to address accident conditions, with a view to mitigating their consequences and protecting the personnel, and to notify the competent authorities their occurrence, including the initial assessment of the circumstances and the consequences of the situation. Furthermore, the licensee is explicitly required to collaborate with the competent authorities in protection activities off site.

16.1.5 Implementation of emergency preparedness measures by the licensees and off-site nuclear emergency plans.

Level of Site Response

The emergency preparedness and response actions at this level are established in the Site Emergency Plans (SEP-Self-protection) of the nuclear facilities.

The objective of these plans is to set out the actions contemplated by the licensee of the nuclear installation to reduce the risk of a radiological emergency and, if one occurs, to limit the release of radioactive material to the environment.

The classification and categorisation of emergencies are carried out on the basis of a dual criterion: degradation of the level of safety of the facility and potential or actual uncontrolled emissions of radioactivity to the environment in the event of the unfavourable evolution of the underlying incident.

- This classification is accomplished by way of mutually exclusive groups for the categorisation of the emergency on the basis of its level of severity, such that the complete spectrum of possible events is covered, along with the levels of intervention or specific actions to be taken at the facility immediately after the emergency is declared.
- Each class of emergency is given a brief name allowing it to be easily identified and describing with sufficient accuracy the nature and scope of the emergency in question.

This classification is as follows, in increasing order of severity:

Prealert

Type of emergency that is declared in response to any event of limited scope and severity that involves a potential degradation of the level of safety of the facility and that may or may not have a direct effect on its operation. These events, which do not cause any type of radioactive release, are known as **“Category I”**.

Emergency alert

Type of emergency that is declared in response to any event that causes or may cause a substantial degradation of the level of safety of the plant. These events, which in the case of unfavourable evolution cause or may cause a release of radioactive material in quantities such that levels of exposure lower than 5 mSv in 48 hours of effective dose or 50 mSv in 48 hours of equivalent dose to the thyroid are caused or may be caused off site, are known as **“Category II”**.

Site emergency

Type of emergency that is declared in response to any event whose foreseeable evolution may cause the loss or important failure of the safety functions of the facility necessary for the protection of the workers or the public. These events are known as **“Category III”** and are those that in the event of unfavourable evolution cause or may cause a release of radioactive material in quantities such that levels of exposure higher than those established for category II and lower than 10 mSv in 48 hours of effective dose or 100 mSv in 48 hours of equivalent dose to the thyroid are caused or may be caused off site. These dose values are lower than or close to those that would imply exceeding the intervention levels specified in the PLABEN for the adoption of urgent measures for the off-site protection of the public.

General emergency

Type of emergency declared in response to any event that has caused or may cause substantial damage to the core of the reactor, with the possible loss of containment integrity. These events are known as **“Category IV”** and are those in the event of their most unfavourable evolution may give rise to the release of radioactive material in quantities such that levels of exposure higher than those established for category III are caused or may be caused off site. These dose values would exceed the intervention levels specified in the PLABEN, as a result of which it is necessary to consider the adoption of urgent measures to protect the public off site.

In 2007, CSN Safety Guide 1.3, “Nuclear power plant emergency plan”, was revised. This Guide defines the structure and content of the nuclear power plant Site Emergency Plans that the CSN considers to be most adequate to fulfil the principles and criteria set out in the PLABEN and the Regulation on Nuclear and Radioactive Installations.

Level of Off-Site Response

The emergency preparedness and response actions at this level are established in the off-site nuclear emergency Plans (NEP) of the nuclear power plants, which in turn include the municipal nuclear emergency action Plans (PAMEN), and in the central response and support nuclear emergency Plan (PENCRA).

As regards the NEP's and the PAMEN's, there have been no significant changes other than those deriving from the approval of RD 1428/2009 on agreement by the Cabinet on September 11th 2009, this modifying the PLABEN approved by RD 1546/2004.

These changes refer basically to the incorporation of a Mayor representing the municipalities of Zone I affected by the NEP (10 Km.) in the executive body of the NEP and to the inclusion of a certain flexibility in the composition of the operating groups forming part of this executive body, with a view to reinforcing the presence of the corresponding autonomous community administrations.

Since 2007 the CSN has been driving the materialisation of collaboration Agreements between the CSN itself, the Directorate General for Civil Defence and Emergencies and the licensees of the nuclear power plants, for the latter to significantly strengthen their collaboration in the implementation of the NEP's in compliance with the responsibility assigned to them in the PLABEN.

The management of the national resources to support the off-site NEP's is accomplished through the Directorate General for Civil Defence and Emergencies (DGPCE), which belongs to the Ministry of the Interior, as the body coordinating all the necessary elements of support provided by the different organisations of the Central Administration, other Public Administrations and private entities.

These national resources were increased in 2005 through the creation of the military emergency response Unit (UME), which reports to the Ministry of Defence, since one of the responsibilities of this unit is to respond to emergencies arising as a result of technological risks, among them nuclear risks. The CSN has recently signed a collaboration agreement with the UME, which is currently being developed in the areas of telecommunications, training, the coordination of emergency operations and the joint procurement of equipment.

16.1.6 Regulatory review and control activities

The CSN verifies and inspects the implementation of the SEP's by the licensees and checks that these plans are updated and revised in accordance with CSN directives. It also controls and supervises both the emergency preparedness training programme of the licensees and the annual mandatory emergency drills performed by the licensees.

As regards the capacity of the nuclear power plant licensees to respond to and address emergencies, the annual programme of emergency drills is drawn up on the basis of the CSN criteria relating to lack of previous knowledge by those required to intervene of the scenario of events and date of performance of the drill and the scope of the emergencies to be simulated.

In early 2007 a technical working group was set up at the CSN to assess the scheduling and performance of the nuclear power plant emergency drills. The objective was to analyse the interventions of the personnel of the CSN's emergency response Organisation (ERO) in the preparation and performance of emergency drills, in particular the activities undertaken in the CSN Emergencies Room (SALEM), and to analyse the actions taken by the personnel of the Emergency Organisations of the different nuclear power plants in order to gain insight into possible deviations and propose appropriate corrective actions.

16.2 Information for the public and neighbouring States

16.2.1 Public information on measures to protect health and on procedures to be followed to in the case of a radiological emergency

The programmes for the provision of information to the population in the vicinity of nuclear power plants and for the training of those required to intervene in situations of nuclear emergency have been developed and strengthened through the approval of the Directive on information for the population on off-site nuclear emergency Plans and the Directive on the training and preparation of those required to intervene in off-site Nuclear Emergency Plans.

The public information programmes included in the different nuclear emergency plans are led by the Directorate General for Civil Defence and Emergencies; in addition to participating in their delivery, the CSN makes recommendations allowing the different information programmes of the respective nuclear emergency plans to be homogenised.

In October 2007 a framework Agreement was signed between the CSN and the Ministry of the Interior, along with another specific agreement with the DGPCCE, establishing activities relating to public information and the training of those required to intervene, among other collaborations.

16.2.2 Information exchange with neighbouring States

Spain is a signatory to the IAEA Conventions on Prompt Notification and Mutual Assistance and as a European Union Member State meets the requirements of Council Decision 87/600 EURATOM on Prompt Notification and Information Exchange.

Through its Emergencies Room (Salem) the CSN is the Spanish national warning point within the system implementing the content of the IAEA Convention on prompt notification (EMERCON/ ENAC). Exercises of different scope are carried out periodically to check the suitable operation of the system.

As regards the IAEA Convention on Mutual Assistance, the Spanish National Warning Points are the DGPCCE, through its Operations Coordination Room (SACOP), and the CSN through the Salem.

The EU system that implements the content of Decision 87/600 EURATOM on prompt notification is known as ECURIE (European Community Urgent Radiological Information Exchange). The Spanish National Warning Point with the ECURIE management Centre is the CSN, through the Salem. The messages sent to ECURIE may be alerts, for the notification of emergencies, or informative messages, voluntary notifications of events and incidents of minor importance that may be of use to the competent Authorities of other member countries.

Council Decision 87/600/Euratom. Art. 5 (2) requires that the ECURIE system be regularly checked by means of exercises of different scope and classified from 0 to 3.

In the event of a nuclear or radiological emergency, the European Union provides other support systems, such as EURDEP (European Union Radiological Data Exchange Platform) and ENSEMBLE (Atmospheric dispersion forecast model results).

As regards the EURDEP programme, the CSN provides the data from its network of automatic environmental radiological surveillance stations and from the stations of the Autonomous Communities daily and in accordance with the commitment made by the countries participating in EURDEP. In the event of an emergency and during the performance of drills the data are sent with a frequency of less than one hour.

Additionally, on November 20th 2009 the CSN signed a specific collaboration agreement with the French Nuclear Safety Authority (ASN) on notification and mutual assistance in the event of an emergency, the basic objectives being as follows:

- To establish bilateral mechanisms for the prompt notification of nuclear or radiological accidents occurring anywhere in either of the two countries and potentially affecting the national territory, the population or the environment of the other country or giving rise to concerns among the population.
- To establish mechanisms facilitating mutual assistance in the event of an accident between the respective nuclear or radiological emergency response organisations, within their respective realms of competence.

As of the date of drawing up of this report, a similar agreement is being drawn up with the Portuguese authorities.

d) Safety of facilities

Article 17. Siting

17.1 Significant licence holders activities relating to the safety of nuclear power plant installations

The criteria applicable to the acceptability of site studies are those contained in the Spanish standards mentioned in article 7 of this report.

In the case of those technical aspects that are not contemplated in detail in the Spanish regulations, the criteria of the international organisations to which the Spanish State belongs (IAEA standards) are applied, and compliance with the standards of the country of origin of the project is also required (fundamentally the standards of the USNRC).

The main factors of the site that will have an impact on nuclear safety or radiation protection are as follows:

- Demography: Distribution of the population; population density; population pyramid; demographic perspectives; distance to population centres.
- Geography: Land and water uses; human activities; topographic or morphological characteristics of the terrain (physical geography relating to geology); channels for communication and infrastructures.
- Geology: Materials making up the geological substrate and their spatial distribution; geological history; foreseeable evolution over time; neotectonics of the area; potentially active faults and capable faults.
- Seismology: Palaeoseismicity; historic earthquakes; instrumental earthquakes; seismic hazard; safe shutdown earthquake and operating basis earthquake.
- Geotechnics: Static and dynamic stability of the land; analysis of foundations; parameters of mechanical resistance of the soil necessary for analysis of soil-structure interaction; local soil effects in seismic response.
- Meteorology: Local climatology; distribution of rainfall; maximum probable rainfall; distribution of winds; humidity; extreme temperatures; frequency of extreme natural phenomena.
- Surface hydrology: Hydrological characteristics of the river basin; analysis of maximum foreseeable flow (natural or induced, for example, by upstream dam rupture); maximum flooding; temperature and composition of waters.
- Hydrogeology: Chemical and radiological characteristics of groundwaters; hydrogeological formations; spatial and chronological distribution of groundwater levels; definition of the pattern of groundwater flow and mass transport, supported by mathematical flow and transport models.
- Oceanography: Marine currents; coastal temperatures, erosion and sedimentation.
- Ecology: Description of ecosystems potentially affected.
- Evaluation of other external events: Transport of toxic and hazardous products and associated risks; nearby industries; explosions and fires; aircraft impact, etc.

The acquisition of the design parameters associated with the site (seismological, hydrological, meteorological, etc.) should be accomplished by means of an adequate combination of deterministic studies (maximum foreseeable values) and probabilistic studies (allowing uncertainties to be bound) and expert judgement. The identification and evaluation of the design parameters should be included in the site safety assessment.

17.2 Impact of the facility on individual, society and the environment

In order to assess the impact of the facility on individuals, society and the environment it is necessary to continuously oversee a series of different variables (seismology, meteorology, hydrology, etc.) that should be set out in the corresponding surveillance plans, especially adapted to each site and facility, and appropriate revisions. Likewise, appropriate periodic reports should be issued with the results obtained.

As regards the hydrogeology of the site, it is necessary to establish Hydrogeological Surveillance and Control Programmes (HVCP) covering the entire lifetime of the facility, addressing both water tables and the chemical and radiological quality of the groundwaters and being closely related to the Environmental Radiological Surveillance Plans. The integration of the information will be accomplished via mathematical groundwater flow and transport models.

The basic objectives of the specific surface and groundwater surveillance and control programmes are as follows:

- tracking of the radiochemical (chemical and radiological) quality of the surface and groundwaters, with respect to possible accidental emissions of radioactive effluents, among them tritium;
- detection of anomalous concentrations and possible radioactive contamination in waters on the site, for this to serve as an early indicator of the degradation of structures, systems or components and of the need to perform possible mitigation actions (repairs, cleaning operations, etc.);
- detailed understanding of the hydrogeological behaviour of each site and of the possible effect of the groundwaters on the structures of the nuclear power plant.

The Spanish nuclear facilities have operative seismic surveillance programmes with high precision instrumentation installed in outdoor areas and inside the buildings whose main purpose is to register any significant seismic movement detected on the site and compare it to the design earthquakes. In addition, once the seismic monitoring systems have determined the occurrence of an earthquake larger than the operating basis earthquake on a site, in accordance with the corresponding procedures, one of the categories of the Site Emergency Plan of the affected facility will be activated, depending on the category of the severity of the earthquake and on the safety-related damage caused.

Likewise, monitoring programmes have been set up for the meteorological parameters of the site, with suitable meteorological instrumentation and transmission of the information registered to the control room of each plant and to the CSN's Salem. At certain facilities ground movement monitoring programmes have also been established to detect overall and differential movements in the process of stabilisation, since the evolution over time is clearly one of damping.

The CSN periodically inspects the surveillance programmes of the nuclear installations (at least every four years) in order to verify their adequate operation throughout the operating lifetime of each facility.

Furthermore, a specific plan has been implemented for periodic inspections at each nuclear power plant relating to the parameters of the site and forming part of the SISC. Basically,

the plan consists of two types of inspections: one general in scope (every two years) and the other of limited scope (every six months). The general scope includes all the risks relating to the meteorological and flooding events identified for the site of each nuclear power plant, along with a revision of the licensee's studies and supporting documents, the results of the applicable surveillance programmes, the incidents occurring in the operating experience and the licensee's corrective actions programme. Furthermore, the six-monthly specific scope inspections are performed on structures, systems, items of equipment or components previously selected because of their relationship with plant safety and that may be significantly affected by severe meteorological conditions or off-site flooding.

The objective, scope and frequency of the site parameter-related inspections are set out in procedure PT.IV.201, "Protection against severe meteorological conditions and flooding", and in procedure PT.IV.206, "Operation of heat exchangers and the final heat sink".

17.3 Re-assessment of site-related factors

It is necessary to carry out a series of activities within the framework of the PSR for the reassessment of factors relating to the site, in order to ensure the on-going acceptability of the safety of nuclear facilities. The aspects reviewed are as follows:

- New requirements relating to site factors, required by the national standards, international recommendations and prescriptions of the country of origin of the project and whose national application has been established by the CSN.
- Design modifications performed at the facility and relating to site parameters.
- Probabilistic safety assessment (PSA) of other off-site events.
- Safety improvement programmes relating to site parameters.

In accordance with their programmes, all the plants have been carrying out the revision and/or maintenance of the PSA-off-site events studies performed pursuant to the "Integrated Programme for the performance and use of probabilistic safety assessments in Spain" and in accordance with the methodology described in the USNRC document NUREG-1407.

In reviewing the PSA-off-site events studies and their maintenance, particular consideration has been given to the risks deriving from earthquakes, flooding, strong winds, transmission lines and nearby industries. These studies have included a review of the occurrence of events and the performance of safety significant elements in response to events beyond the design basis (ruling out those with an annual frequency of occurrence of less than 10^{-6}), in order to detect specific vulnerabilities at each nuclear power plant that might be effectively eliminated at a reasonable cost, i.e., by applying improvements with a good cost-benefit ratio.

The implementation of the new nuclear power plant seismic surveillance systems with digital technology accelerometers installed in the open air and inside buildings has been reviewed and inspected, along with the modifications to the operating specifications and the implementation of specific procedures relating to the operating basis earthquake being exceeded and the plant walk-throughs to identify post-earthquake damage.

In general, the activities of the licensees in monitoring the site parameters and in performing studies and analyses relating to the safety of the site, in accordance with the previously established and scheduled plans, are in keeping with the forecasts and fulfil satisfactorily the principle of on-going site surveillance and of progress in the reasonable improvement of nuclear power plant safety.

17.4 Consultations with other contracting parties probable affected by the facility

Spain participates through its experts in various international nuclear safety development initiatives in relation to site factors, collaborating in R&D projects and in the working groups of international organisations. The most significant activities currently under way are as follows:

- IAEA extrabudgetary Project (EBP) on seismic safety of existing nuclear power plants, in which 21 countries participate through 45 institutions from Europe, America and Asia. The objective of this project is to research methods and practices to resolve current seismic safety issues relating to the design and operation of existing nuclear power plants.
- Participation, through the IAEA seismic-EBP, in the International Seismic Safety Centre (ISSC), the aim of which is to contribute to strengthening seismic safety and the safety of all off-site events at nuclear facilities across the world.

Article 18. Design and construction

18.1 Application for all nuclear installations of the defence in depth concept

The principle of defence in depth or safety at all costs is already incorporated in the design and maintenance of nuclear power plants, and is applied both to the physical barriers and to the engineered safeguards whose function it is to protect them.

Defence in depth is guaranteed through the application of the following levels of protection:

- Minimisation of deviations from normal operation and of system failures.
- Detection and control of such deviations.
- Availability of structures, systems and components (SSC) and procedures capable of taking the plant to safe conditions following a design basis accident, maintaining at least one barrier for the confinement of radioactive material.
- Reduction to the minimum of the probability of accidents outside the design basis and of the uncontrolled release of radioactive material, making available procedures or guidelines capable of managing such events.
- Attenuation of the radiological consequences of releases of radioactive material as a result of whatever accident might occur.

All the plants incorporate these levels of protection on both their physical design and their action guidelines and procedures.

The severe accidents Programme already implemented provides adequate protection for the plants against accidents beyond the design basis. In addition, during this period the Cofrentes, Santa María de Garoña, Trillo, Ascó and Vandellós II plants have planned or implemented physical modifications to prevent or mitigate this type of accidents. In the case of Cofrentes and Santa María de Garoña nuclear power plants, primary containment vent lines have been installed. In the case of Trillo plant, work has been performed on the implementation of a design modification to allow for primary circuit feed & bleed. At Vandellós II plant the containment pressure transmitters have been recalibrated to allow for the monitoring of possible negative pressure values. In the case of Ascó and Vandellós II nuclear power plants, the current containment hydrogen analysers are being replaced with others allowing for continuous monitoring. Santa María de Garoña plant is modifying the measuring range of these analysers to cover severe accident conditions.

Work has also continued on the emergency drills, which in certain cases has required the use of the severe accident Guidelines. Furthermore, training has been delivered on the application of these guidelines at all the nuclear power plants.

As regards Probabilistic Safety Assessment, (PSA) the nuclear power plants have continued to perform different applications of these analyses in support of licensing and safety improvement processes. These have consisted of the performance and presentation of several risk-informed modifications. An example of the above are the Cofrentes and Trillo nuclear power plants: Cofrentes plant has used its PSA during shutdown (PSAOM: PSA in other modes) to realign the planning and performance of outages, reducing the level of risk during such periods. In the case of Trillo plant, the same application has been carried out, in addition to the development of improvements to both the shutdown operation Manual (with consideration of failures during such operating states) and in fire-fighting (taking into account the results of the PSA for fires).

Mention may be made also of the Santa María de Garoña plant, which has implemented the following safety improvements as a result of probabilistic assessments:

- Elimination of the Low Pressure Coolant Injection (LPCI) loop selection logic.
- Installation of the Safety Monitor to comply with section a4 of 10 CFR 50.65.
- Replacement of the vital and instrumentation busses with essential busses based on a Uninterruptible Power Supply (UPS).
- Various modifications in instrumentation systems to minimise the risk of plant trips.

In addition, during the period dealt with in the present report the nuclear power plants have planned, designed or implemented the following design modifications (DM) not mentioned in the previous categories:

In the case of Almaraz plant the following are worthy of mention:

- Installation of the 5th emergency diesel generator.
- Installation of multi-nozzle venturis in the safety injection lines.
- Replacement of insulations inside containment and the reinforcement of the sump grilles.
- Execution of the weld overlay on the pressuriser nozzles.

In the case of Cofrentes plant:

- Replacement of the main turbine control system with a General Electric MARK VI digital control system.
- Increase of the capacity of the East spent fuel storage pool.
- Partial replacement of the containment electrical penetrations.
- Replacement of the material of certain sections of the piping and valves of the essential services water system with stainless steel and improvement of the layout, line sections, vents and spray nozzles.
- Installation of permanent shielding to reduce dose and eliminate hot spots.

In the case of Santa María de Garoña plant:

- Replacement of buried piping.
- Modification of the cooling system of the pump rooms of the emergency core cooling system (ECCS)
- Replacement of battery chargers.
- Installation of a new fire-fighting (FF) diesel pump with seismic requirements and seismic qualification of the FF network associated with safe shutdown systems.
- Installation of a new containment isolation Group 7.
- Modifications to protection systems as a result of analysis of standard IEEE-279.
- Replacement of atmospheric control system valve actuators to guarantee containment isolation.
- Change of containment vacuum breaker failure mode.
- Installation of a new battery room ventilation system in accordance with standard ASME-AG.

In the case of Trillo plant:

- Change of vessel vent valve position.
- Updating of motor-operated valves.
- Replacement of isolations inside containment and modifications to sump grilles.
- Renewal o electric batteries.
- Modifications to main pump bearings.

In the case of Vandellós II plant:

- Execution of weld overlay on pressuriser nozzles.
- Increase of containment sump filtering surface.
- New safeguards cooling system, changing the final emergency heat sink from the sea to a closed fresh water system.
- Replacement of seawater cooling for emergency diesel generators and essential chilled water units with aerocoolers.
- Replacement of fire-fighting ring material.

In the case of Ascó plant :

- Execution of weld overlay on pressuriser nozzles.
- Increase of containment sump filtering surface.
- System for zinc injection to primary.
- Modification of containment handling crane.

This process of incorporating improvements is not new since the nuclear power plants have been implementing design modifications to improve safety since they first started operating.

The following table shows the most significant historic improvements.

Cofrentes	Trillo	Almaraz	Santa María de Garoña	Ascó	Vandellós II
Replacement of internals of both recirculation pumps and modernisation of these units.	Third off-site electricity supply.	Installation of 4 th emergency diesel generator.	Replacement of piping susceptible to Intergranular Stress Corrosion Cracking (IGSCC, repair of core shroud and replacement of core spray piping inside reactor vessel.	Steam generator replacement.	New spent fuel pool racks.
Improvements deriving from power upgrade to 110% (neutron instrumentation, turbine, generator...).	Autocatalytic passive recombiners for control of H ₂ in containment in the event of severe accidents.	Increased capacity of spent fuel pools.	Increased capacity of spent fuel pool (1987 and 1998).	Power upgrade.	Power upgrade.
Installation of power breaker allowing for feed from external 400kV system with generator decoupled.	Development of Severe Accidents Manual (SAM) with new assumptions (steam generator tube rupture).	Direct vessel level indication (RVLIS, Reactor vessel level indication System).	Installation of new 1E MCC's (motor control Centres).	Modification of radiation monitoring system.	Mini power upgrade.
Replacement of generation transformer (the three phases).	Linked to Operating Experience and Systems Analysis (OESA) and redesign (1994-2000 approx.): Changes to essential cooling water system, redesign of site electrical system, sequencing of loads under accident conditions (reactor protection and safeguards system).	Upflow conversion in vessel.	Replacement of protection systems initiation instrumentation. Installation of analogue trip system.	Mini power upgrade and conversion to cold head.	New recirculation of residual heat removal system.

Cofrentes	Trillo	Almaraz	Santa María de Garoña	Ascó	Vandellós II
Replacement of control rod drive hydraulic system piping.	Change of low pressure turbine. Power upgrade.	Replacement of steam generators and reactor vessel heads.	Remodelling of primary containment isolation groups logic.	Change of vessel heads.	
Installation of new distributed control system.	Increased capacity of spent fuel storage pool.	Installation of 4th start-up transformer.	Replacement of APRM neutron flux instrumentation with digital PRNM-NUMAC.		
Replacement of condenser.	Temporary storage facility for spent fuel assemblies.	Increased SW (service water)/CC (component cooling) cooling capacity (replacement of pump impellers and installation of a SW pool cooling system.	Installation of a remote shutdown panel independent from the control room and new routing of a safe shutdown electrical division.		

18.2 Incorporation of proven technologies

Whenever a new design is to be incorporated, there is a previous process of homologation aimed at demonstrating by means of analysis, testing programmes, previous experience or a combination of these that the design is adequate. Furthermore, as the Spanish nuclear power plants are of US or German design, in most cases there is previous experience of application of the technologies incorporated.

During the period covered by this analysis, a new fuel assembly design has been licensed for loading in boiling water reactors. As regards the approval of this fuel and in accordance with the applicable national standards, especially section 4.6, “New fuel types”, of IS-02, which regulates the documentation on refuelling activities at light water reactor nuclear power plants, it is necessary to submit an analysis of the results of the demonstration programmes in which this fuel has been involved, in addition to information on the design of the fuel assembly. Likewise, the internal assessment procedure PG-IV-08 requires that “The assessment should confirm that the technical solutions, and in particular any novelty or unconventional solutions, have been tested or qualified through tests or experience and are capable of attaining the required level of safety”.

Also during this period assemblies have been introduced demonstrating the use of new alloys in PWR reactors. In this case the acceptance process requires approval by the regulatory body of the demonstration programme, which must demonstrate the safety of operating with these assemblies.

During this period the use of realistic deterministic methodologies has been accepted for the analysis of operating transients in BWR reactors and for the analysis of large primary breaks in PWR reactors. A noteworthy aspect of these methodologies is that they incorporate the concept of the probabilistic safety margin. The value accepted by the regulatory body is set at a probability of 95% with a 95% level of confidence that the applicable acceptance criterion will not be infringed. The acceptability of using these methodologies has been subjected to a detailed process of assessment in which consideration has been given to the experience of application in other countries, as well as their validation with respect to data obtained from separate and integral effects experimental facilities.

18.2.1 Measures taken by the licensees to implement these technologies. Analysis, testing and experimental methods for the qualification of new technologies such as digital instrumentation and equipment control.

The components of safety systems are subject to a process of environmental and seismic qualification that takes into account the environmental conditions in which they are required to carry out their function. The results of the environmental qualification are included in the appropriate equipment environmental qualification manual, which specifies the environmental conditions that the equipment in question is required to withstand. The inspections contemplated in the Basic Inspection Programme include verification of the conditions established in this manual.

At present, a project is being jointly configured by the regulatory body and the electricity industry for the analysis and optimisation of the methodologies applied in the process of implementation of simple software-based instrumentation and control equipment.

In addition, the power upgrades carried out recently by certain of the nuclear power plants have included the application of the latest methodologies for the revision of accident analyses. In particular, the new methodology known as ASTRUM-BLOCA has been applied as the most realistic method of calculation (best-estimate) to contemplate the uncertainties associated with the operating variables while maintaining safety margins with increased nuclear power.

Likewise, the GOTHIC code has been used as the most advanced tool for the calculation of loads and of the integrity of the plant containment building.

18.3 Design for reliable, stable and manageable operation with specifications relating to human factors and man-machine interfaces

18.3.1 Contracting Party measures and regulatory criteria for reliable, stable and manageable operation with specific considerations relating to human factors and man-machine interfaces

The structures, systems and components must be designed, manufactured, installed and operated in accordance with their safety classification and taking into account the capacity of their maintenance, inspection and testing to guarantee their functional capacity throughout the lifetime of the facility. Whenever the intervention of a system is required in the event of foreseen operating events or rapidly evolving accidents, its actuation should be automatic, the aim being to maintain the facility in a safe situation without the need for the operating personnel to intervene manually for a sufficient period of time for the subsequent actions required to be considered and implemented. Likewise, the structures, systems and components of the installation should be designed such that there be a guarantee of compliance with their safety functions under the environmental and seismic conditions included in the foreseen operating events and design basis accidents, incorporating adequate protections against on and off-site events and fires.

The CSN urged the licensees of nuclear installations to formally include requirements relating to human factors in their design modifications management procedures, with the participation of specialists in this discipline. During the period covered by this report these criteria have been taken into account in various modification projects at the Spanish nuclear power plants, using the methodology of NUREG-0711 and the criteria of NUREG-0700 to a greater or lesser extent depending on the scope of the project.

18.3.2 Implementation of measures taken by the licensee

Included within the scope of the periodic tracking of changes in the standards of the country of origin of the technology are the standards issued by the USNRC. Particularly significant are the generic letters relating to management of the accumulation of gases in the lines of the ECCS, DHR and CCS systems (GL 2008-01) and the performance and possible clogging of the filters in the recirculation sumps from which the emergency cooling systems would take suction (GL 2004-02), this last issue continuing to be the focus of attention during the period covered by this report. In each of these cases the licensees have carried out the actions considered in these generic letters and the corresponding evaluations are currently under way.

In addition, mention may be made of the complementary technical instruction issued by the CSN on internal flooding, with the objective of clarifying the standards applicable to the design bases for this question and other conditions deriving from probabilistic safety assessment, and the implementation by the licensees of a Manual on protection against internal flooding, the aim being to maintain the levels of risk within values similar to those assumed in the analyses.

18.4 Regulatory review and control activities

Each licensee is required to provide a set of periodic or non-periodic reports, contemplated in each authorisation. The practice described in article 14 of this report has been maintained, in accordance with which these reports are classified and a distinction is made between those

that are to be evaluated and those that, being subject to a process of supervision, are elements to be taken into account in the inspection programme of each plant.

In order to verify that the nuclear power plants are operating in accordance with the established conditions and standards, and that the actions required in the different authorisations and approvals are being adequately implemented, the CSN undertakes a basic inspection programme, such that each of the plants receives at least one two-yearly inspection in each of the areas subject to inspection.

Maintenance Rule

The CSN receives a report from each plant on the application of the maintenance rule in each cycle, and inspections are carried out in relation to this issue every two years within the basic inspection programme. In 2009 the CSN published Instruction IS-15 on requirements for monitoring of the efficiency of nuclear power plant maintenance and Safety Guide 1.18, which further develops this instruction, on measurement of the efficiency of nuclear power plant maintenance.

In-service Inspection

Prior to the initiation of each inspection interval, which covers a 10-year period during which all the inspection areas are to be completed, the licensees are required to submit to the CSN a general review of the «In-service Inspection Manual», including the areas to be inspected and the non-destructive testing method to be applied in each inspection area, in accordance with the requirements of the applicable edition of ASME Code Section XI.

In addition, prior to each refuelling outage, and as contemplated in CSN Instruction IS-02, which regulates the documentation on refuelling activities at light water reactor plants, each plant is required to submit its inspection programme, including the percentages of inspection, the areas to be inspected, the non-destructive testing techniques to be used, the programme for the inspection of supports and snubbers, forecasts regarding the personnel, equipment and resources to be used, the scope of steam generator tube inspections (in the case of PWR's), including the methods and techniques to be used, special inspections and tests and the functional tests of valves and pumps or pressure tests to be performed and complying with specific surveillance requirements.

On the completion of each refuelling outage, each plant is required to submit a final report with the results and the degree of compliance with the inspection programme initially foreseen, clearly identifying the deviations occurring, areas with interferences in excess of 10 percent of the inspection volume, each inspection or testing programme individually and the participating personnel and equipment used. This report should explicitly reflect the areas in which reportable anomalies or indications have been detected.

All this information is subject to a process of supervision by the CSN, by way of the inspections carried out by the CSN within the framework of the Basic Inspection Programme for each plant. Wherever the licensees have proposed a modification to the In-Service Inspection programme using risk-informed criteria, this change in the methodology has been evaluated by the CSN.

Lifetime Management

The operating permit for each plant includes a condition that requires the issuing of an annual report on plant lifetime management activities. This includes the surveillance of the ageing and degradation mechanisms affecting safety-related structures, systems and components. The implementation of lifetime management at each plant has been tracked through specific inspections included in the basic inspection programme for each plant.

Furthermore, Safety Guide 1.10, which indicates the activities to be taken into account in each periodic safety review (PSR), includes the overall revision of the ageing processes and the corrective measures adopted during the period contemplated in each periodic safety review. Like other issues relating to PSR, the information applicable to lifetime management is subject to a process of evaluation.

Refuelling safety report (RSR)

The objective of the RSR is to include the refuelling safety assessments required to demonstrate that the core resulting from replacement of the fuel fulfils the safety criteria established in the plant safety analysis report (SAR) and, therefore, that the operation of this core is safe according to the provisions of this document and within the operating limits and conditions required in the official operating documents and the operating permit in force. These analyses are revised by the CSN, even though they do not require explicit approval; however, in those cases in which they imply changes to the operating technical Specifications or modifications requiring authorisation (such as changes to analysis methodologies, fuel assembly types, plant operating conditions, etc.) , they are subject to CSN approval.

Article 19. Operation

19.1 Operational limits and conditions

19.1.1 Contracting Party's arrangements and regulatory requirements for the definition of safe boundaries of operation and the setting of operational limits and conditions.

The Regulation on Nuclear and Radioactive Installations establishes the content of the documentation that specifies the requirements to be included in the operating Permit (OP) of each plant.

The list of "Official operating documents" (OOD) established by the Regulation on Nuclear and Radioactive installations is as follows:

- a) Safety Analysis Report
- b) Operating Regulation
- c) Operating Technical Specifications
- d) Site Emergency Plan
- e) Quality Assurance Manual
- f) Radiation Protection Manual
- g) Radioactive Waste and Spent Fuel Management Plan
- h) Physical Protection Plan

The OP on the one hand and the OOD on the other contain a set of requirements defining the operational limits and whose compliance guarantees the safe operation of the plant.

19.1.2 Implementation of operational limits and conditions, their documentation, training in them and their availability to plant personnel engaged in safety-related work

At the Spanish nuclear power plants, the limits and conditions applicable to their operation constitute the "Operating Technical Specifications" (OTS).

The OTS are documents adapted to each nuclear power plant from standard documents generated in the country of origin of the technology of the installation, such as for example NUREG-0452 and NUREG-1431, and constitute the real technical regulation governing the operation of the Spanish nuclear power plants.

The OTS have a clearly defined structure that typically includes the following chapters:

- Definitions.
- Safety limits and safety system limiting setpoints and their basis.
- Limiting conditions for operation (LCO) and surveillance requirements (SR).
- Basis for LCO and SR.

The OTS are developed for use and documentation in a surveillance plan and a set of surveillance procedures, which establish the frequencies for performance applicable to each

requirement, the way in which the tests covered by the requirement are to be carried out and the corresponding acceptance criteria.

The OTS are an essential part of the initial and on-going training of the personnel engaged in safety-related tasks and especially the control room operating personnel. Knowledge of and the ability to use these specifications constitute one of the milestones in the examinations set by the CSN to obtain an operating licence.

Like other official documents, the OTS are part of the system for the filing and distribution of what are known as “controlled copies”, this meaning that in each location at which they are to be used there are “controlled” copies (latest updated revision), this being the case for example for the control room.

19.1.3 Review and revision of operational limits and conditions as necessary

Given the importance of the OTS for the operation of the Spanish nuclear power plants, their revision process is very complex and detailed, the objective being to guarantee that the revisions are carried out adequately, with the requirement in all cases that they be submitted to the CSN for technical analysis and evaluation.

Subsequently, and in accordance with the CSN evaluation, the MITYC formally approves the revisions of the OTS where applicable.

In certain cases of major design modifications implying the important modification of the OTS specific start-up permits are required from the MITYC, following a favourable assessment by the CSN and in all cases conditioned to the approval of the corresponding OTS.

The normal OTS revision process may be initiated as a result of a proposal by the licensee of the facility or a proposal by the CSN, which directly requests the Spanish nuclear power plants to revise or adapt the OTS for reasons of operating experience, new standards, etc.

The modification proposal drawn up by the licensee is subject to revision by the plant nuclear safety Committee (PNSC), the internal body with maximum responsibility in relation to nuclear safety and radiation protection. Following a favourable report by the CSN, it is subjected to review by the Operator’s nuclear safety Committee (ONSC), the maximum advisory body of the Directorate General for the nuclear safety of the plant.

Once favourably appraised by the ONSC, OTS revision proposals are sent for analysis and evaluation to the CSN, which after its favourable appraisal submits them to the MITYC for final approval.

The MITYC is responsible for finally notifying the nuclear power plants of its approval of OTS revisions by means of an official letter.

19.1.4 Regulatory review and control activities

As compliance with the OP and the OOD guarantees the safe operation of the plant, the CSN’s supervisory work centres on checking such compliance. Chapter 7.4 of this Report describes the SISC Programme and chapter 9.3 the mechanisms used by the regulatory body to ensure that the licensee fulfils his obligations, which consists basically of complying with the OP and the OOD.

In addition to the OP and the OOD, the CSN issues the following requirements:

- Complementary Technical Instructions (CTI), which address highly specific issues relating to activities or installations and have a simplified mechanism for preparation and revision. Ten of such instructions have been issued during the period covered by this Fifth National Report.

The CSN's supervision and control programme also checks for compliance with these CTI's, although the CSN is currently developing mechanisms to improve the traceability and control of the results of these checks, for which it will implement corporate tools similar to those already used for this control in relation to other activities.

19.2 Operation, maintenance, inspection and testing procedures

19.2.1 Contracting Party's arrangements and regulatory requirements on procedures for operation, maintenance, inspection and testing of a nuclear installation.

Operation, maintenance, inspection and testing activities should be carried out in accordance with approved procedures. Their use constitutes an element of defence in depth through the establishment of written and approved instructions, the aim to minimise the appearance of human errors in the performance of activities.

The procedures basically reflect the dynamics and development of the processes, cover the activities that need to be carried out on the equipment of the installation in any plant operating mode and ensure that the requirements contained in the official operating documents are adhered to. They may also reflect the information flows and the responsibilities of each of the intervening individuals, thus constituting the basic coordination system.

19.2.2 Establishing of operational procedures their implementation, periodic review, modification, approval and documentation

The Spanish nuclear power plants have permanently updated written procedures that cover all the activities relating to nuclear safety and radiation protection.

As regards the nuclear power plants, the operating procedures are especially relevant and are grouped into the following types:

- General operating procedures: these establish the conditions and the manoeuvres to be performed to operate the plant in the different operating modes and to migrate from one to another.
- Auxiliary operating procedures: these establish in detail the manoeuvres for the placing in service of the specific systems or items of equipment required by the general procedures.
- Off-normal condition operating procedures: these address systems or equipment transients or problems not included in the accident category.
- Emergency operating procedures: the mission of these procedures is to manage incidents/accidents, including the design basis.

The operating procedures have been implemented since the very beginning of the operation of the Spanish nuclear power plants and are in general adaptations of the procedures drawn up by the main vendor of the technology of the plant.

They are periodically reviewed in accordance with certain administrative procedures and, depending on their type and importance, obligatory review periods are established.

The operating procedures have been reviewed and updated throughout the lifetime of the Spanish nuclear power plants in accordance with the in-house and industry operating experience gleaned over the years, and consequently, constitute a true historic compendium of existing knowledge of nuclear power plant operation.

Operating procedures affected by major changes or modifications are tested, validated and trained prior to their use at the nuclear power plants on full-scope simulators.

Operating procedures that affect nuclear safety are subjected to obligatory review by the plant nuclear safety Committee(PNSC).

19.2.3 Availability of procedures for nuclear facility staff

The Spanish nuclear power plants have a system for the filing and distribution of official documents, including all the procedures, that guarantees the availability of these documents for the personnel required to use them.

Exhaustive knowledge of the operating procedures is another of the key milestones of the operating licence examinations set by the CSN for candidates to posts at the Spanish nuclear power plants.

19.2.4 Involvement of relevant nuclear staff in the development of procedures

At the Spanish nuclear power plants the procedures are drawn up by the personnel of the installation, specifically by the specialists in each area, structure, system or component. They are subsequently revised by the managers of the persons responsible for their development and approved by the top management of the plant.

As has been pointed out above, procedures affecting nuclear safety or radiation protection must be revised by the PNSC prior to their approval.

19.2.5 Regulatory review and control activities

The request for the operating permit of each nuclear power plant must be accompanied, among other documents, by a quality assurance Manual and an operating Regulation. The first of these documents establishes the scope and content of the quality programme applicable to the testing and operation of safety-related systems, structures and components. This quality assurance Manual is described in greater detail in article 13. The second document establishes the organisation and the functions of the personnel of the facility and the basic initial and on-going training programmes for these personnel, as well as the standards for operation under normal and accident conditions. These standards and the procedures through which they are enacted refer to the facility overall and to the different systems of which it is composed.

19.3 Procedure for responding to operational occurrences and accidents

19.3.1 Contracting Party's arrangements and regulatory requirements on procedures for responding to anticipated operational occurrences and accidents

In developing the emergency operating procedures for each of the facilities, and as in the case of the severe accidents management Guidelines, consideration was given to the generic guidelines drawn up by the BWR and PWR owners groups, with adaptations to each specific case. This process of adapting and developing the emergency operating procedures included both the written generic guidelines and specific studies for their implementation. They were also subjected to an internal process of verification and validation to guarantee both technical accuracy and possibilities for use.

The electricity industry adopted the commitment to implement the severe accident management Guidelines specifically at each nuclear power plant before 2001, in accordance with a joint strategic plan that included the validation of these guidelines and the adaptation of the site emergency plans of each plant. The incorporation of these severe accident guidelines meant providing the nuclear power plants with sufficient capacity to address severe accidents, i.e., beyond the design basis, in keeping with the programmes existing in the reference countries.

19.3.2 Establishment of events-based and/or symptom based emergency operating procedures

The first emergency operating procedures used by the nuclear power plants were based on events.

The main characteristics of this type of procedures were as follows: they covered a single scenario, they assumed the most unfavourable conditions, they assumed the operability of the instrumentation and they did not consider the failure of equipment or systems subsequent to initiation of the event. The technical bases of these procedures were based on the design and licensing criteria of the systems and did not always adequately cover the scope of the conditions subsequent to the event.

Following the Three Mile Island accident, it was considered necessary to revise a series of aspects relating to the emergency operating procedures, this leading to the development of a «symptomatic emergency response approach».

The emergency operating Procedures developed using this new approach are symptomatic input procedures since they consider only the evolutions of certain plant parameters and indicate the action to be performed based on these evolutions.

Specific emergency operating procedures were developed for the establishment of this new approach. These procedures are executed in accordance with curves, tables and values calculated using best estimate methods, depending on the specific design of each plant.

In addition, technical bases were drawn up in most cases, allowing the fundamentals of the procedural steps to be identified.

For the development and implementation of the procedures a basic programme was adhered to that included the definition of the criteria for their preparation in accordance with the owners group's guidelines, writing in keeping with technical and administrative criteria and criteria for integration of the management of emergency procedures in the training programmes, including the simulator to maintain the necessary qualification of the control room personnel and the development of a procedure updating and validation plan.

19.3.3 Establishing of procedures and guidance to prevent severe accidents or mitigate their consequences

A severe accident is one that might lead to the catastrophic failure of the fuel, degradation of the core and the release of radioactive products. In general a severe accident is considered to begin at the onset of core damage due to lack of cooling.

Preventing the accident from progressing and leading to core damage is part of the scope of the actions contemplated in the emergency operating procedures, aimed at preventing a severe accident. Maintaining containment capacity, putting an end to core damage and reducing the release of radioactive material are all included within the scope of the severe accident management Guidelines, aimed at mitigating severe accidents.

Consequently, the severe accident management Guidelines developed are specific action guidelines for flooding of the vessel and containment and control of containment and the release of radioactive products.

For the development and implementation of the severe accident management Guidelines a programme was undertaken that was similar in all aspects to that described for the emergency operating procedures (writing criteria, initial and on-going training programmes, validation plan, etc.).

Finally, the conditions for transition from the emergency operating Procedures to the severe accident management Guidelines were established, along with the systematic approach for

the revision of the site emergency Plan in order for it to have an organisation adapted to the management of severe accidents and the training programmes required to ensure the effective implementation of these actions.

19.3.4 Regulatory review and control activities

The Emergency Operating Procedures were implemented at the nuclear power plants at the end of the 1980's, while the implementation of the severe accident management Guidelines took place at the end of the 1990's. It should be pointed out that in the past important modifications were made, aimed more towards the prevention of core damage than towards the mitigation of its consequences. Modifications were incorporated in BWR and PWR reactors to address anticipated transients without scram (reflected in 10 CFR 50.62, or the ATWS Rule), by means of which additional systems were implemented to guarantee the reliability of the reactor scram function, such as AMSAC or ARI-RPT. Likewise, the modifications to address the complete loss of off-site power (Station Blackout, reflected in 10 CFR 50.63, SBO rule), which consist of making available an alternative electrical feed source, along with the possibility of using the hydrostatic test pump to provide water to the main pump seals or the FF diesel pump to provide an alternative reactor injection capacity, are prevention measures to address this situation of loss of electricity supply.

In general, the licensees have not been required to perform design modifications to implement severe accident management measures, except when they are relevant from the point of view of safety and are, therefore, justified.

Periodic inspection schedules not included in the basic inspection Plan have been set up, such that at least one inspection per year is scheduled, aimed at the implementation, updating and training of the personnel on the EOP and SAMG. In this way over a period of six years this issue is inspected at all the nuclear power plants.

19.4 Engineering and technical support

19.4.1 General availability of necessary engineering and technical support in all related fields for all nuclear installations, under construction, in operation or under decommissioning

The engineering companies and equipment suppliers who participated in the construction and start-up of the second generation of nuclear power plants in Spain, which are currently in operation, have maintained part of their capacities since that time thanks to the following:

- Participation in the maintenance and permanent updating of the design to improve the installations.
- Participation in new investment projects to improve the current installations (replacement of steam generators, turbines, cooling towers, etc.).
- Participation in national and international R&D projects relating to new problems deriving from the operating experience and lifetime management programmes.
- Participation in the design phase of generation III projects.
- Participation in European projects for support for the nuclear power plants and organisations of Eastern Europe.

The international projection of the electricity utilities, especially when this has been oriented in part towards participation in nuclear projects, has allowed for the maintenance and development of engineering capacities and the suppliers of goods and services, with benefits for the national market.

As regards fuel, with the capacities developed by the companies and with the leadership of ENUSA in manufacturing, it has been possible to undertake internationally recognised development and improvement programmes.

With respect to dismantling, the exercise and work carried out for the Vandellós I nuclear power plant, led by ENRESA, have provided the Spanish companies with the opportunity to develop technical and management capacities in this area, which are expected to continue through the work to be performed in the near future at the José Cabrera nuclear power plant.

19.4.2 General Availability of necessary technical support on the site also at the licence holder or utility headquarters, and procedures for making central resources available for nuclear installations

The technical support capacities required by a nuclear power plant may be said to be far-reaching in their scope and, depending on the organisation of the owner company or companies, may be configured in different ways; as a result, establishing a single philosophy would not appear to be practical.

Generally speaking, there should be a series of strategic investment and R&D approaches associated with the management of assets, with a knowledge and decision-making basis supported by the corporate organisation but also by essential understanding of the situation of the structures, systems and components by the plant engineering and maintenance sections.

Likewise, it would appear to be logical for the radioactive waste and fuel management strategy to have an important corporate component. The same might be said of the necessary agreements with the technical staff responsible for the NSSS, the turbine-generator set and other important items of plant equipment.

Other key aspects of technological competence are licensing and operating experience, which may be supported indistinctly by corporate organisations or the plants, although if the first of these options were chosen, certain minimum decentralised capacities should in all cases be maintained.

A corporate structure would be justified to guarantee independent supervision and monitoring of the operation and the improvement of processes of the nuclear power plant.

The procedures to make corporate resources available to the nuclear power plant are associated with the tracking of the strategic plans by the governing body of the facility and of the directives springing therefrom.

19.4.3 General situation regarding dependence on consultants and contractors for technical support to nuclear installations

The availability of contractors with duly qualified and motivated technical personnel and resources is of key importance for the safe and efficient operation of the installation.

In general there are three categories of contractor companies as regards the level of dependence upon them for support for the organisation.

A first level would be made up of the technologists, among which special mention might be made of the suppliers of the NSSS, the turbine-generator set, the emergency diesel generators, the main transformers and the design engineering of the facility.

In relation to these suppliers there is a high level of dependence, especially as regards the NSSS vendor, which makes it necessary to establish long-term agreements with them, throughout the entire operating lifetime of the plant.

Another category of contractor is that of the specialist services and/or equipment supply companies. These are of key importance for inspections, diagnosis, maintenance, quality

control, relevant repairs and equipment supply. Although different options are available on the market, the knowledge of the facility that springs from the continuity of the personnel and the unique characteristics associated with work with radiations makes it advisable to maintain medium-term links with these contractors.

The third level of contracting consists of companies requiring less highly qualified personnel, such as those providing cleaning services, scaffolding, surveillance, etc., which normally employ a high percentage of workers residing in the area. There is no technical dependence, although for political reasons relating to support for the area and due to historic contractual clauses there are important conditions as regards changing individuals, even though the contractor company is changed.

19.4.4 Regulatory review and control activities

The process of supervision and control established by the CSN with respect to the licensees of nuclear installations contemplates different mechanisms that allow the different aspects of the engineering and technical support-related processes of the licensee to be addressed.

The organisations of the licensees have other external support organisations in charge of developing projects and providing the necessary technical support. In general the processes subcontracted with external organisations should be controlled by the organisation of the licensee, which should verify the quality of the service with respect to the standards. The CSN in turn oversees compliance with these standards by means of inspections. For the direct supervision of the organisational aspects of the licensees, the CSN has, among other things, established inspections relating to the organisation, training and the supervision of contractor work during refuelling outages.

Furthermore, the CSN has established mechanisms for the control and supervision of the engineering work performed by the nuclear installations in relation to design modifications, maintenance, etc. These mechanisms take shape both through the direct supervision of modifications to the facility affecting nuclear safety or radiological protection – which are to be subject to the process of CSN authorisation – and through supervision and control by means of inspections focussing on the design basis of components, component surveillance requirements, design modifications, operating experience, etc.

19.5 Reporting of incidents significant to safety

19.5.1 Contracting Party arrangements and regulatory requirements to report incidents significant to safety to the regulatory body

In July 2006 the CSN published the Instruction IS-10, establishing the criteria to be applied to require the licensees of nuclear power plants to report on events occurring at their installations and possibly affecting nuclear safety or radiation protection. The events are reported to the CSN's emergencies room by way of a reportable event Report. In addition, these reports are distributed among the Spanish nuclear power plants and are communicated by the CSN to the public by way of press releases and published on the CSN website.

This Instruction allowed the CSN to be kept updated with a high degree of detail on especially relevant events such as the one that occurred at Ascó I nuclear power plant in April 2008, when radioactive particles were detected in areas outside the plant, and the dropping of a fuel sub-assembly at Cofrentes plant in September 2009.

In view of the above, the current CSN Instruction establishes an adequate framework for the reporting of significant incidents to the regulatory body, facilitates the transfer of information on operating experiences among the plants and allows for clear communications on relevant events to the public.

On the basis of the experience acquired in applying the aforementioned Instruction, a review process has been set up with a view to clarifying certain reporting criteria and achieving a higher degree of *Criteria* homogeneity as regards the safety significance of the events reported.

19.5.2 Established reporting criteria and reporting procedures for incidents significant to safety and other events such as near misses and accidents

CSN Instruction IS-10 on reporting criteria for events occurring at nuclear power plants establishes the terms for the reporting of each type of event depending on its safety significance (1 hour or 24 hours), the means of notification, the criteria for the provision of additional information and the review of the reports issued and reporting formats.

In accordance with the instruction, the information to be transmitted in the initial report should include, among other things, the date and time of occurrence or detection, thermal power prior to and following the event, the applicable reporting criteria, a brief description of the event, the situation as of the moment of notification, releases of radioactive material (were they to occur) and the measures adopted or foreseen.

Subsequent to the initial notification, and within 30 days, a more detailed report should be submitted to the CSN including the following additional information:

- Background and associated operating experience.
- Initial conditions.
- Chronological description of the event.
- Detailed description of the event and anomalies taking place.
- Direct causes.
- Description and conclusions of root cause analysis.
- Immediate corrective actions.
- Deferred corrective actions.
- Licensee's conclusions.

The Instruction describes 36 types of events that should be reported, included in eight reporting categories:

- Registers.
- Occupational health and safety.
- Releases.
- Operating specifications.
- Operation.
- Safety-related systems.
- Other situations of risk not contemplated in the licensing documents.
- Off-site events.

Certain of these types have been defined on the basis of the provisions of the North American standards. In these cases the document used as a reference to decide on the need to report an event is NUREG 1022 "Event Reporting Guidelines", which includes a detailed description of the types of events to be reported and examples to clarify its applicability.

19.5.3. Statistics of reported incidents significant to safety for the past three years

During the period 2007-2009, all the events reported to the Spanish regulatory body, the Nuclear Safety Council by the Spanish nuclear power plants have been classified as Level 0 on the IAEA's International nuclear event scale (INES), with the exception of the three cases described below:

On May 27th 2007 a motor-driven pump and the turbine-driven auxiliary feedwater pump were declared inoperable at Ascó II plant due to lower than design flows having been recorded during the three automatic reactor scrams that had occurred on previous days. As required by the operating technical Specifications under such circumstances, the plant was shut down. The cause of the lower than expected flows was the fact that a metallic washer from the internals of a valve that had come loose during the previous refuelling outage was obstructing the flow, this situation persisting until the valve was removed and repaired. The event was classified as Level 1 on the INES scale.

The most relevant event occurring during the period was the release of radioactive particles at Ascó I plant, reported to the CSN on April 4th 2008. The event consisted of the uncontrolled release of radioactive particles from the fuel building ventilation stack, these being dispersed across the plant site. Checks were performed on all the plant personnel and persons who had visited the facility in recent months to determine possible internal or external contamination, without any such contamination being detected. It was determined that all the particles had remained on site except for five, this meaning that the radiological impact of the event was very small. Nevertheless, the potential impact was not negligible, for which reason it was classified as a yellow Finding in the SISC. Deficiencies were also detected in the licensee's safety culture, due fundamentally to the deficient response once the event was identified, as a result of which the event was classified at Level 2 on the INES scale. The plant licensee has initiated a far-reaching action plan to analyse in detail all the deficiencies in the working practices underlined by this event and to apply the corrective actions deriving therefrom.

Finally, on August 19th 2008 a loss of essential electrical bus battery capacity greater than that permitted by design was detected at Santa Maria de Garoña plant. The event was classified at Level 1 on the INES scale, although the subsequent assessment performed by the CSN using the criteria of the SISC classified the finding as green, since it was considered relevant that one of the two trains of batteries had sufficient capacity and the system was capable of performing its safety function over the time required for recovery actions to be implemented, as a result of which it was concluded that the finding was of very low safety significance.

19.5.4 Documentation and publications of reported events and incidents by both the licence holders and the regulatory body

The reportable events reports issued by the Spanish nuclear power plants on the basis of IS-10 are sent to the CSN's Emergencies Room. From here they are distributed among the specialist areas.

A preliminary assessment is performed on the report received and is incorporated in the operating incident file database (OIF). This database, which may be consulted by all the personnel of the CSN, includes the following:

- Basic information on the event (plant, date, title, mode, power, etc.).
- Specific information (cause, applicable reporting criteria, etc.).
- Classification of the significance of the event by the Incident Review Panel.
- Associated findings or non-compliances.

- Documents attached (RER, Resident Inspector Notes).
- Follow-up summarising the content of the reports received and including additional information associated with the event.

In addition to this internal dissemination, the CSN procedures establish the way in which information on specific and current affairs is transferred to the media (press, radio and television) and to the public by means of press releases, the CSN website.

On the basis of this procedure the following types of events are communicated via press releases:

- RER on events with operational consequences and repercussions off site:
 - Automatic scrams
 - Non-scheduled outages
 - Load reductions
 - Releases
 - Activation of the site emergency plan
 - Activation of the off-site emergency plan, depending on the characteristics of the event
- Other events or incidents open or otherwise to becoming RER and ordinary or extraordinary in nature, depending on their characteristics and the degree of confidentiality.
- Any incident occurring at a nuclear power plant that the CSN has categorised at level 1 or higher on the INES scale.
- Occupational incidents (not radiological) or other events occurring at the plant as long as they are considered significant, either due to the event as such or the alarm that it might generate.

In addition, the following events are highlighted on the website:

- Events reported by means of RER and relating to the OTS Limiting Conditions for Operation (LCO's) and safety system actuations.
- Situations in which design, construction, etc. deficiencies have been detected.
- Automatic actuations of safety-related equipment or systems (incidents deriving from personnel errors).

19.5.5 Policy for use of the INES scale

The Nuclear Safety Council has a procedure for the classification of events using the INES scale, applicable to events occurring at the Spanish nuclear power plants. However, unless the importance of the event were so to require, events without a precursor and discovered through application of the following systematic review programmes are excluded from the classification:

- Operating specification surveillance procedures.
- Preventive or predictive maintenance schedules.
- Design reviews, including the findings of probabilistic safety assessments.

The process of classifying an event on the INES scale begins with communication of its occurrence to the Operating Experience and Training Area, which analyses the event and carries out a preliminary assessment of its classification.

If it is estimated that the classification of an event relating to nuclear facilities is higher than 0, the INES scale Coordinator should contact the licensee of the facility to discuss the basis of the classification.

If after the meeting with the nuclear power plant licensee the proposal to classify the event above 0 is maintained, the area involved draws up a report on the event justifying the proposed classification. This report is reviewed by the Sub-director of nuclear installations and approved by the Technical Directorate for Nuclear Safety.

If the classification approved by this Technical Directorate is 1, the report is submitted to the Technical Office of the Presidency for communication to the authorities and the public, and is sent at the same time to the Secretariat General and the members of the CSN.

If the classification approved by the Technical Directorate is 2 or higher, the report is submitted to the secretariat General, which in turn calls a meeting of the members of the Council to discuss the classification. Once debated the event is communicated to the public.

In addition, the area involved prepares a format for notification to the IAEA INES scale Secretariat of any event classified above level 1 by the CSN.

19.5.6 Regulatory review and control activities

In addition to the RER that the licensees are required to issue within 1 and 24 hours, the Resident Inspectors of the CSN carry out a review of these reports, checking that the information they contain is accurate and understandable, using for this purpose both the information provided by the licensee and their own independent observations. In this respect, after receiving the notification of an event, the inspectors gather information on the situation of the plant and the performance of the equipment, components and personnel involved in the event.

Subsequently, all the RER received by the CSN are re-analysed by the incident review Panel, made up of representatives of different areas specialising in nuclear safety and radiological protection. During its monthly meetings the information provided is reviewed, the corrective actions proposed are analysed and the need to perform or request additional actions to prevent the repetition of the event is debated. Finally, the event is classified depending on its importance as significant, of interest or irrelevant.

An event is classified as “significant” if it generates an important degradation of safety, if it produces an unexpected plant response to a transient, if it causes an instantaneous reactor scram with complications, if it causes a non-scheduled release of radioactivity, if it involves operation beyond the limits of the operating specifications, if from the probabilistic point of view the event implies important increases in the frequency of core damage or early releases or if the event is recurrent and, if considered collectively, may give rise to ineffective corrective actions or deficiencies in the plant or its management programmes. An event will be classified as being “of interest” if any of these requirements are approached and as “irrelevant” if none of these requirements are approached and there is no threat for the safety of the facility.

Events classified as significant are the subject of special tracking both by the specialist areas and during the two-yearly inspections of the operating experience, in which special attention is paid to the effectiveness of the corrective actions.

In addition, an event may be classified as “generic” if it may potentially affect other plants, which may imply the sending of letters to the licensees for them to analyse the applicability of the event to their facility. The quality and scope of these analyses and the suitability of the actions proposed are evaluated by the CSN personnel specialising in the corresponding area.

19.6 Operational experience feedback

19.6.1 Contracting Party arrangements and regulatory requirements on the licence holders to collect and analyse and share operating experience

The CSN has developed a methodology in relation to operating experience that is based on two elements: verification of the systematic approach developed by the licensees for the analysis of events and analysis and tracking of incidents occurring at Spanish and overseas plants.

For the verification of the systematic approach of the licensees, the CSN carries out two-yearly operating experience inspections at the plants. As regards the tracking and analysis of events, the CSN has two fundamental tools: the periodic meetings of the Incident Review Panel and the analysis of overseas events based on the use of international databases and participation in communication forums. All these elements are dealt with in the present section.

The above has served to establish a framework allowing national and international generic events potentially affecting the Spanish nuclear power plants to be identified and measures to prevent the repetition of such events to be performed or requested.

19.6.2 Programmes of licence holders for the feedback of information on operating experience from their own installation, from other domestic installations and from installations abroad

In its day the CSN issued complementary technical Instructions relating to the Operating Permits of the Spanish nuclear power plants specifying the industry operating experience to be analysed. This information is also included in Safety Guide 1.7 “Information to be submitted to the CSN by the licenses on nuclear power plant operation”, revision 3 of October 3rd 2003.

The following is considered to be industry operating experience:

- Reportable events occurring at other Spanish nuclear power plants.
- Experiences reported by the competent organisations, i.e.:
 - a) For US design nuclear power plants, the Significant Operating Experience Reports (SOER) and Significant Event Reports (SER) issued by the Institute for Nuclear Power Operations (INPO) or equivalent documents issued by the World Association of Nuclear Operators (WANO).
 - b) For German design plants, the operating experience reports (Weiterleitungsnachricht) issued by the Nuclear Safety Society (GRS).
- Written recommendations from the suppliers, these being understood to be the supplier technical bulletins (SAL, SIL, RICSIL, Technical Bulletin, etc.), along with communications on deficiencies affecting safety-related equipment: all notifications relating to 10CFR21 for American design plants and the KWU service and experiences reports for plants of German origin.
- Operating experience analyses expressly required by the CSN.

The industry operating experience programmes of the Spanish nuclear power plants cover these requirements but are not limited to them. Any other document considered to be of special interest for the improvement of the different processes of each plant is analysed.

The analysis of industry operating experience begins with an applicability study followed, after the results of the analysis are received, by proposals for corrective or improvement actions.

In addition to the above, mechanisms have been set up for the transfer of industry operating experience within the organisations, for informative purposes.

Every year a report has to be sent to the CSN, this having a defined content and covering the evolution of the analyses of in-house and industry operating experience performed by the Spanish nuclear power plants. This report is used by the CSN in the tracking of the Operating Experience programmes.

19.6.3 Procedures to analyse domestic and international events

Approximately once a month there is a meeting of the Incident Review Panel, which is made up of representatives of the necessary specialist areas.

During these meetings the reportable events that have taken place since the previous meeting are presented one by one. This is followed by an analysis of the quality of the information supplied, and the specialist areas analyse the suitability of the scope of the corrective actions proposed by the licensee to prevent the repetition of the event. If these actions are considered to be insufficient, additional actions are proposed which may include the request for additional information, the request that a root cause analysis be performed to gain insight into the ultimate causes of the event, the performance of a subject-specific inspection at the site or the performance of a more detailed evaluation of the incident by the specialist areas involved.

On completion of the analysis, the Panel agrees on a classification of the incident depending on its importance for safety. In addition, an event may be classified as generic if it might affect other plants. In these cases the additional action may consist of writing to the potentially affected plants for them to analyse the applicability of the event and propose actions to prevent its occurrence.

At international level the CSN analyses the events communicated via its databases: the Incident Reporting System (IRS) and the Nuclear Events Web Based System (NEWS). The specialists analyse those events that may have generic implications and, where appropriate, propose the corrective actions that they consider to be opportune, including the possibility of requesting the licensees to carry out an applicability analysis or performing subject-specific inspections.

Furthermore, the information transmitted via these databases is used in the two-yearly operating experience inspections as a tool to check the scope of the industry operating experience analyses performed by the Spanish nuclear power plants.

19.6.4 Procedures to draw conclusions and to implement any necessary modification to the installation and to personnel training programmes and simulators

The management of the operating experience is contained in various procedures at each Spanish nuclear power plant. A fundamental tool for the treatment of operating experience is the corrective actions programme (CAP). Once an incident enters the CAP, it is categorised and the required level of analysis is established.

All the plants have procedures or guidelines dealing with the methodology to be used to analyse operating experience. These procedures establish whether an incident requires the performance of a root cause analysis or whether it is necessary only to investigate the direct or apparent cause. The methodology preferentially used at the Spanish plants for the performance of root cause analysis is the Human Performance Enhancement System (HPES). In addition to studying each incident individually, trend analyses are performed to detect latent weaknesses and areas for improvement in the organisations.

The result of all these analyses is a series of actions that are incorporated into the corrective actions programme. Each action is assigned a priority, period for performance and person responsible for performance. The actions may be of various types: design modifications, procedural changes, training actions, etc.

CSN Instruction IS-12, of February 28th 2007, requires that the training programmes necessarily include the operating experience relative to incidents that have occurred at the plant, plus those occurring at other plants and being applicable and of relevance. Likewise, the training on operating experience shall be oriented towards clarifying the root causes of the incidents and the corrective actions required to prevent them from being repeated.

The Training Departments of the nuclear power plants take into account the training actions incorporated in the corrective actions programme when preparing the annual training programme. The corrective actions programme is an important source of information for the design of classroom and simulator training sessions. Occasionally advantage is taken of the internal communications sessions of each department to transmit the lessons learned from the operating experience study.

19.6.5 Mechanisms to share important experience with other operating organizations

Both the CSN and the Spanish nuclear power plants have established mechanisms for the exchange of operating experiences at national and international level.

The CSN and UNESA, as the representative of the Spanish plants, participate in the Working Group on operating experience (WGOE) of the Nuclear Energy Agency (NEA), the objective of which is to improve nuclear safety. This is achieved by sharing operating experience and know-how, analysing and providing the perspective of a group of experts in order to reach conclusions regarding trends and lessons learned and, in this way, be able to implement corrective actions in the short and medium term. In the longer term the WGOE contributes with proposals regarding safety assessment, identifies areas for which additional investigation is required, determines or proposes new inspection practices for the regulators and shares improvements in plant operations management.

Within the framework of UNESA the plants have set up a permanent working group on operating experience. This group is made up of the operating experience coordinators of the Spanish plants and has as its fundamental objective the sharing of experience regarding both the events occurring at the different sites and the very process of managing operating experience. The group's meetings are held at least quarterly. An important part of these meetings is given over to sharing information on events to be reported to the CSN and that have occurred or been analysed during the last quarter. A series of initiatives have been undertaken by the group, the following being particularly significant:

- During 2009 the industry incident analysis Group (GSAI) was set up. A systematic approach has been established whereby a Spanish nuclear power plant may activate a group of experts from the other Spanish plants to undertake the root cause analysis of an incident occurring at the requesting plant. The operation of this group has been dealt with in UNESA guideline CEN-29 "Guideline on the operation of the Industry Incident Analysis Group (GSAI)", revision 0 of June 2009.
- UNESA has drawn up the guideline CEN-31 "Establishment of criteria for the exchange of information on operating experience among the Spanish nuclear power plants", revision 0 of November 2009. This guideline recognises that the fundamental objective of the transmission and exchange of operating experience between nuclear power plants is to improve plant operation and prevent the repetition of operating incidents and problems, with a view to achieving excellence in operation. The plants accept a series of commitments as regards the minimum information to be exchanged and the mechanisms for this exchange, all with the objective of enhancing and facilitating understanding of the events and improving the analysis of their applicability.

The following activities are carried out for the exchange of operating experience at international level:

- The Spanish nuclear power plants regularly report on events to WANO) for publication as Significant Event Reports (SER), Event Notification Reports (ENR), Event Analysis Reports (EAR) o Miscellaneous Event Reports (MER).
- Participation in international seminars.
- Sending of experts for WANO missions (Peer Reviews) or IAEA OSART missions.
- Hosting at the Spanish plants of WANO Peer Reviews and OSART missions.

These national and international operating experience exchange activities are complementary to the industry operating experience evaluation programmes established at each plant.

In view of what has been set out above it might be concluded that both the CSN and UNESA and the Spanish nuclear power plants as a whole actively promote the exchange of experience as a way of establishing corrective actions leading to operational excellence.

19.6.6 Use of international information databases on operating experience

As has been pointed out in previous sections, the databases relating to operating experience that are most widely used at the CSN are as follows:

- Incident Reporting System (IRS), depending on the International Atomic Energy Agency and the OECD Nuclear Energy Agency.
- Nuclear Events Web Based System (NEWS), depending on the International Atomic Energy Agency.

As regards the NEWS database, the coordinator of the INES scale is responsible for the loading of information associated with events classified as level 1 or higher. The process for the classification of these events has been summarised in section 19.5.5.

The NEWS database may be consulted by all the CSN staff and is a tool that, among other applications, is used to check the scope of the analyses performed by the licensees in relation to industry operating experience events.

19.6.7 Regulatory review and control activities for licence holder procedures and programmes

Every two years the CSN carries out operating experience inspections with a view to checking the systematic approach established at the nuclear power plants for the analysis of in-house events, events occurring at other Spanish nuclear power plants and overseas events. During these inspections the organisational structure of the licensee is analysed, resources are assessed, the quality of the procedures is analysed and the scope and quality of the event analyses are checked. These checks include an analysis of the quality and the completeness of the corrective actions proposed and verification of their compliance within the foreseen term.

Furthermore, every year the licensees of the nuclear installations submit an operating experience report, the minimum content of this report being described in the Complementary Technical Instructions issued by the CSN to each facility.

19.6.8 Regulatory body programmes for feedback of operational experience and the use of existing mechanisms to share important experience with international organisations and with other regulatory bodies

The CSN basically has four tools for the dissemination of information relating to operating experience: the actions deriving from the monthly meetings of the Incident Review Panel, the use of the generic issues database (TEMGE), the use of international databases and participation in international working groups.

Events are classified depending on their significance in one of three categories: significant event, event of interest and irrelevant event. In addition to this classification, events may be described as being generic if they might affect or have generic implications for other Spanish plants for any of the following reasons:

- Because their direct or root causes might be reproduced.
- Because the systems or components affected are analogous.
- Because they represent common good and services suppliers problems.
- Because by analysing their lessons learned they are events that might contribute to significantly improving the safety of other nuclear power plants.

When an event is classified as generic, the IRP proposes that a letter be sent to the affected licensee or licensees for them to analyse the applicability of the event and, where appropriate, undertake the actions required to prevent its occurrence.

These events classified as generic are incorporated in the TEMGE database for their tracking. In addition all those events that, in the opinion of the specialists, might have generic implications are incorporated in this database.

At international level, and as has been described in section 19.6.6, the CSN incorporates information on the most safety significant events at the Spanish nuclear and fuel cycle installations in three databases.

In addition, the CSN participates in the of the OECD NEA.

19.7 Management of spent fuel and radioactive waste on the site

19.7.1 Contracting Party arrangements and regulatory requirements for on-site handling of spent fuel and radioactive waste

In accordance with article 20 of the Regulation on Nuclear and Radioactive Installations, all the Spanish nuclear facilities are required to have a radioactive waste and spent fuel management plan (WMP).

In 2008 the CSN approved Safety Guide 9.3 on the criteria and technical basis for the drawing up of the WMP by the licensees of nuclear installations.

The objective of the WMP is to set out criteria and instructions ensuring that the management of the radioactive wastes and spent fuel generated at these facilities is safe and optimised, taking into account the progress in the standards and technology and with due consideration of the following:

- The situation existing at each facility as regards the production, management and, where appropriate, disposal of wastes.
- Identification of the origin of the wastes and the history of the spent fuel.
- Study of management systems and processes alternatives and improvements.
- Justification of the suitability of current management or of the need to implement improvements.
- Planning of studies for the implementation of the improvements identified.

The WMP is the reference document for the management of the radioactive wastes generated at the nuclear installations, both during operation and during the dismantling and decommissioning phase, and must contain the information required to allow for analysis of the current management.

The radioactive waste and spent fuel management plan is applicable to the management of all radioactive wastes, regardless of their level of radioactivity, and to waste materials having a radioactive content that might allow them to be declassified or cleared, as well as to the so-called special wastes and spent fuel.

The radioactive waste and spent fuel management plan is part of the objective of improving the management of this type of materials at each facility. In particular, the licensee of the facility is required to keep the inventory of his wastes updated, minimise their production, recycle and give value to the wastes produced to the extent that this is technically and economically possible and condition the final waste materials for their disposal. The radioactive waste management plan will also serve to guarantee that no radioactive wastes are eliminated via conventional routes.

From the point of view of the usefulness of the Radioactive Waste Management Plan for the licenses of the producing facilities, the following contributions have been identified, among others:

- It constitutes a tool for reflection and progress for waste management.
- It constitutes a tool for internal and, where appropriate, external communication regarding radioactive waste management.
- It constitutes a reference document for the competent administration(s), since it commits the licensee to managing radioactive wastes in a particular fashion, in accordance with the general standards governing the operation of his facilities.

In 2009, following the approval of Safety Guide 9.3 on the criteria and technical basis for the drawing up of the WMP, the CSN required the licensees to adapt the Waste and Spent Fuel Management Plan to the contents of the said Safety Guide, by way of Technical Instructions sent to all the nuclear power plants.

19.7.2. On-site storage of spent fuel

To date the light water reactor spent fuel generated by the Spanish nuclear fleet has been stored on site in the pools of the corresponding plant. Throughout the 1990's the original storage racks in these pools were replaced with other more compact units in view of the foreseeable saturation of these pools, this having made it possible in most cases to defer the need to provide the plants with a storage capacity additional to that of the pools. Despite this increased capacity and as a result of saturation it has been necessary to construct a storage (ITS) facility for the dry storage of spent fuel casks at Trillo plant and another is expected to be built at the Ascó plant in the near future. An ITS facility has also been licensed and constructed at the José Cabrera nuclear power plant for the dismantling of this installation following its definitive shutdown in 2006. During 2009 this plant completed the transfer of all its spent fuel (around 100tU) from the pool to the ITS facility.

In all cases the process of licensing these storage facilities on the plant sites has consisted, in accordance with the legislation in force, of approving the design of the storage cask and later granting authorisation for the construction, completion and start-up of the facility on the plant site.

Furthermore, the current 6th General Radioactive Waste Plan, approved in 2006, sets out as a strategic course of action the construction of a centralised spent nuclear fuel and high-level waste temporary storage facility, (CTS) for the storage over a period of some 60 years of all the spent fuel and high level radioactive waste, along with certain intermediate level wastes that in view of their radiological characteristics cannot be disposed of at the El Cabril facility. The generic conceptual design of this vault type installation (which does not have a defined site to date) was favourably appraised by the CSN on June 29th 2006.

The designation of the site for the CTS facility and associated technology centre is based on a process of proposals by volunteer Municipalities, supervised by the Inter-ministerial Commission set up by Royal Decree 775/2006, in response to a proposal launched by the Congressional Commission for Industry, Tourism and Trade by way of a white paper approved during the session of April 27th 2006. During the period covered by this report a process of information for possibly interested municipalities and of the opening of candidatures was initiated. The process of final selection by this Commission will take place throughout 2010.

19.7.3 Implementation of on-site treatment, conditioning and storage of radioactive waste

The low and intermediate level wastes (LILW) produced at the nuclear power plants belong to one of the following types:

- Process wastes: chemical reagents and materials intervening in one of the phases of the production process of the plant. This group includes, for example, evaporator concentrates, ion exchange resins and filter sludges.
- Technological wastes: these are made up fundamentally of laboratory materials, materials used in the maintenance of equipment, gloves or clothing.
- Special wastes: these are solid process or technological wastes that may pose specific problems due to their nature, volume or activity.

Taking into account the conditioning performed, the waste packages generated will correspond to solidified wastes (resins, concentrates, sludges), compacted and non-compacted solid wastes and immobilised wastes (filters).

The production of LILW waste packages as a result of the operation of the Spanish nuclear power plants during the three-year period 2007-2009 amounted to 3,200 per year on average. These amounts are around the average generation value for recent years. With these values, eleven consecutive years have now passed with an annual production of less than 3,000 packages (with the exception of 2007, when this value was exceeded due to the conditioning of historic wastes). These production values are the direct result of the activities and projects undertaken to reduce the volume of LILW production in nuclear power plant operation.

19.7.4 Activities to minimise waste generation in each process, in terms of both volume and activity

Since the mid 1990's there has been a volume reduction action Plan in place between UNESA and ENRESA, aimed at reducing the generation of low and intermediate level radioactive wastes.

Since that time volume reduction projects have been implemented and the development and performance of new proposals has continued, with the objective of optimising radioactive waste management in order to reduce their volume.

19.7.5 Established procedures for clearance of radioactive wastes

In the Spanish regulations, the authorisation for declassification or clearance is typified as an administrative process that allows certain waste materials with radioactive contents generated at nuclear facilities to be managed via conventional routes without the need for subsequent regulatory controls in relation to safety and radiological protection.

Through the approval of action procedures common to all the nuclear power plants (common projects), the CSN has determined the criteria and technical basis for the clearance of the following waste streams:

- metallic scrap (October 11th 2001)
- activated carbon (June 20th 2002)
- spent ion exchange resins (June 20th 2002)
- used oils (February 19th 2003), updated on February 25th 2009
- wood (April 27th 2006)

In response to requests from the licensees of the facilities, and following the corresponding mandatory report from the CSN, the Ministry of Industry, Tourism and Trade has to date granted the following authorisations for the declassification of waste materials:

Nuclear Power Plant	Stream	Resolution
Almaraz	Oil	DGPEM 10/11/2000 *
	Activated carbon	DGPEM 12/06/2003
Ascó	Oil	DGPEM 15/08/2009
Cofrentes	Oil	DGPEM 7/06/2000
	Sludges	DGPEM 12/02/2001
José Cabrera	Oil	DGPEM 16/01/2004*
	Scrap	DGPEM 08/05/2003
	Wood	DGPEM 19/09/2007
Santa María de Garoña	Oil	DGPEM 04/06/2001*
Trillo	Oil	DGE 23/12/1999. *
	Activated carbon	DGPEM 08/05/2003
	Resins	DGPEM 08/05/2003
Vandellós II	Oil	DGPEM 31/07/2009

* Authorisation updated in 2009

The clearance authorisations establish the limits and conditions that the licensees of the installations are required to fulfil to carry out these processes. Specifically, the limits and conditions of the clearance authorisations determine the following aspects: the scope of the authorisation, the applicable clearance levels and verification of their compliance, the destination of the declassified waste materials, the records and traceability of the process and the periodic information to be submitted by the licensees to the CSN.

19.7.6 Regulatory review and control activities

During 2009 the operating nuclear power plants have adapted their radioactive waste and spent fuel management Plans to the new revision of CSN Safety Guide 9.3, Contents and criteria for the drawing up of nuclear facility radioactive waste management plans, published in 2008.

As regards the low and intermediate level radioactive waste management control activities carried out at the nuclear power plants, the inspection activities included in the SISC have been performed, in accordance with the Basic Inspection Plan.

During the period the CSN has drawn up an Instruction on the radiological control of waste materials generated at nuclear facilities, the aim being to establish criteria for such control

prior to the waste materials exiting radioactive waste areas for conventional management. In addition, this IS includes the technical documentation supporting requests for authorisation for the clearance of waste materials. The Instruction will shortly be submitted for public comment.

As regards spent fuel, during the period contemplated in this report two CSN Instructions have been drawn up on safety requirements applicable to the management of spent fuel and high level wastes. The first of these, which refers to spent fuel and high level waste storage facilities, is in the draft phase and was submitted for public comment in late 2009. This instruction regulates the basic safety requirements to be met in design, manufacturing, construction, testing and operation. The second instruction, published in 2009, includes safety requirements in the design of spent fuel casks and defines the contents of the Safety Analysis Report and the interfaces between the intervening parties. Both instructions include the international standards of the IAEA and of the countries exporting the technology and the WENRA reference levels for storage.

Furthermore, as part of the CSN's SISC, the first round of inspections carried out in accordance with the procedure for the control of the spent fuel and high level waste inventory and storage situation was completed in 2007. During 2008 the results were evaluated and gave rise to a technical instruction aimed at improving the mechanisms for determination of the inventory of high activity materials stored in the nuclear power plant pools. Also during this period the manufacturing of spent fuel casks was controlled by means of inspections and audits.

This entire set of regulatory review and control activities has been aimed at improving the management of radioactive wastes and spent fuel at the Spanish nuclear power plants, ensuring that this management meets the international safety standards.

Conclusions

Nuclear Safety Council

With a view to underling the most noteworthy aspects of the period in question, providing an overall view of CSN efforts in relation to safety and fulfilling the objective of the present report as regards self-assessment, in this section CSN highlights its conclusions for the period January 2007 to December 2009 and future challenges.

The Spanish nuclear fleet has not varied since the last review meeting of the fourth national report on the Convention on Nuclear Safety.

As regards the *development of the regulatory framework*, work has been performed in several areas:

During the period covered by this report, the following laws impacting nuclear safety have been approved and officially published:

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

Through its second additional provision, this Law 17/2007 introduces a new additional provision in the Nuclear Energy Act, dedicated to civil nuclear liability for environmental damages.

- Law 33/2007, of November 7th, reforming the law creating the Nuclear Safety Council, Law 15/1980, of April 22nd.
- Law 11/2009, of October 26th, regulating Limited Companies quoted on the real estate market, the ninth final provision of which modifies the Nuclear Energy Act, Law 25/1964, of April 29th, as regards radioactive wastes, and the Electricity Industry Act, Law 54/1997, of November 27th, as regards the financing of radioactive waste management.

Likewise, during the period covered by the fifth national report a series of Royal Decrees affecting nuclear safety have been approved:

- Royal Decree 35/2008, of January 18th, modifying the 1999 Regulation on nuclear and radioactive facilities.
- Royal Decree 243/2009, of February 27th, regulating the surveillance and control of transfers of radioactive waste and spent fuel between member states or to or from countries outside the Community.
- Royal Decree 1428/2009, of September 11th, modifying the basic nuclear emergency Plan approved by Royal Decree 1546/2004, of June 25th.

Furthermore, 10 CSN instructions relating to nuclear safety have been published. It should be pointed out that 7 of these instructions correspond to the action Plan set up by the CSN to fulfil the commitment made with WENRA regarding harmonisation by the year 2010.

Finally, mention should be made of the fact that during the period a set of Nuclear Safety Council Guides have been published, dealing with the subjects included in the following list:

- Section 1: Power reactors and nuclear power plants.- 3 Guides have been published
- Section 7: Radiation protection.- 1 Guide has been published

- Section 9. Waste management.- 1 Guide has been published

Furthermore, during the fourth review meeting of the Convention on Nuclear Safety, Spain took on board the opinions of the other contracting parties regarding the fourth Spanish report, with the commitment to report on this fifth occasion on the actions taken by the regulatory body in relation to these issues.

The progress made in these areas has been dealt with throughout the report, along with the response to the commitments acquired during the last review meeting of the Convention. This section summarises the initiatives and activities implemented and carried out as a result of the commitments made:

Safety improvement programmes relating to human resources and strengthening of NPP inspection activities.

One of the tasks identified in the regulatory efficiency improvement programmes was the implementation of an integrated system for the supervision of operating plants (SISC). The operation of this system began in 2007. After 4 years of operation it may be concluded that the SISC has lived up to the expectations of the licensees and the CSN in a very adequate manner. A self-assessment exercise was carried out after the first two years of application. This exercise measured the degree of effectiveness achieved by each of the elements of the SISC and in addition a series of surveys were carried out among the plant licensees and the technical personnel of the CSN involved in the SISC. The analysis of the results of these actions concluded that in general the results were acceptable, although there were areas for improvement, such as the need to homogenise and speed up the process, shortening the time periods used in each phase by introducing greater flexibility in the modifications and adaptations of the procedures of the process, and improving communications with the licensees and the training of the inspectors. In this respect the CSN carried out a specific inspector training plan.

At present, the SISC development activities are aimed mainly at incorporating actions relating to the security of the facilities in the corresponding area or pillar of the SISC and incorporating elements of the safety culture within a substantial modification of the treatment of transverse issues.

An important conclusion is that the inspection activities of the CSN have increased in quantitative terms and that the facility supervision function has been deeply modified.

Likewise, in the last four years the CSN has increased the human resources assigned to the supervision of the plants and has satisfactorily systematised the activities commissioned to the resident inspectors. From 2006 to 2009, the CSN increased its technical resources by 31 new job posts, this implying a significant increase in general inspection activities.

Implementation of recommendations and improvements arising from the IRRS mission

During the period that has elapsed since the last revision of the Convention, the regulatory body has been subjected to a full-scope mission by the integrated regulatory review service (IRRS), carried out between January 28th and February 8th 2008. For the CSN the preparation of this IRRS mission meant a self-assessment of all its processes. The results of the mission identified 7 recommendations, 26 suggestions and 19 good practices. These recommendations led the Organisation to revise its action Plan with a view to adapting the results of the IRRS mission, this leading in turn to improvements such as the following in the Spanish regulatory system:

- Every year the CSN performs a systematic compilation of the results of the inspections carried out at the radioactive facilities, identifying the deviations, good practices and other noteworthy aspects encountered and obtaining lessons learned with a view to improving both the performance of the licensees of the facilities in relation to safety and radiological protection and the inspection and control activities of the CSN itself.

- The CSN has formalised and implemented a programme of internal audits of the management processes.

Finally, it should be pointed out that an IRRS follow-up mission is scheduled in early 2011.

Implementation of the modification of Law 15/1980 relating to information and communication to society.

The obligations of this Law as regards information and communication are channelled along three routes:

- Policy on information for the State Institutions

Every year the CSN submits a report to the national Parliament and to the respective Parliaments of those Autonomous Communities that house nuclear facilities describing the activities performed by the Organisation throughout the year.

This report is also presented to Parliament through the appearance of the President of the CSN before the Commission for Industry, Tourism and Trade.

As part of its policy on transparency, during the last quarter of 2008 the Council initiated the first round of institutional visits to the CSN. The objective of this programme is to promote institutional collaboration and it is aimed at organisations, entities and other groups related in some way to the work of the CSN.

- Policy on information in the vicinity of nuclear installations.

Public information and participation are promoted through annual meetings organised by the Information Committees, presided over by the MITYC

- Policy on information for the general public

In 2009 the CSN renovated its website, including information on the following:

- Inspection reports.
- Minutes of Council Plenary meetings.
- Technical reports in support of Council Plenary agreements.
- All relevant events relating to the operation of the nuclear and radioactive installations, through:
 - Plant operational status reports.
 - Information on environmental quality (ASN and ERSN).
 - News items, communiqués and press releases on events occurring at nuclear and radioactive facilities.
 - Information from the SISC

Implementation of an integrated management system at the nuclear power plants.

In 2008 the CSN published its instruction IS-19, identifying the applicable requirements for the establishment, implementation, evaluation and on-going improvement of a Management System integrating nuclear safety and radiation protection, the prevention of occupational risk, environmental protection, physical protection, quality and the economic aspects of the nuclear facilities. The objective of these Management System requirements is to guarantee that safety is given priority attention, above any other consideration, and that it is not compromised, considering the implications of all actions not within the framework of the different management systems separately but via an integrated approach to safety.

During 2009 the CSN has performed plant by plant supervisions to verify the adaptation of the plant management systems in force to the requirements of IS-19 and their implementation within the required period.

At present the nuclear power plant management system manuals establish that safety is an essential requirement in plant operation and that it has maximum priority over any other consideration.

The supervision of compliance with IS-19 will constitute a fundamental tool to verify that priority consideration is given to safety in all the activities of the licensees.

Evaluation of NPP lifetime extension:

In July 2009 the Nuclear Safety Council published its Instruction IS-22 on safety requirements for the management of nuclear power plant ageing and long-term operation, which establishes the terminology and criteria for the management of NPP component ageing and determines the scope of the activities to be performed during both the design lifetime of the facility and long-term operation. This Instruction establishes that the nuclear power plants must incorporate the conclusions of their analyses in a Lifetime Management Plan (LMP).

During the first half of each year, beginning in 2010, the nuclear power plants shall report to the CSN on the activities performed within their LMP's, specifying the proposals for improvement.

Epidemiological study requested of the health authorities by Congress, investigating the possible effect of exposure to radiations deriving from the operation of Spanish nuclear and radioactive facilities belonging to the nuclear fuel cycle for the health of the population residing in the vicinity of such facilities.

The epidemiological study concluded in 2009, as contemplated in the collaboration agreement signed in April 2006 between the CSN and the Carlos III Institute of Health (ISCIII). The corresponding report was drawn up and presented in May 2010.

The study, requested of the health authorities by Congress, required the collaboration of the CSN for estimates of artificial and natural doses. Furthermore, and in accordance with the Congressional mandate, a consultation committee was set up, including the institutions involved in performance of the study and independent experts, environmentalist organisations and other stakeholders, for the tracking of the study and analysis of the results obtained on its completion.

The basis of the study consisted of municipalities in two zones, with high and low natural radiation levels, located within an area having a radius of 30 km, and those located in the vicinity of the nuclear and radioactive installations belonging to the Spanish nuclear fuel cycle (within a radius of 30 km of such installations), regardless of whether these were in operation or in the dismantling phase. Other municipalities having similar characteristics and located at a sufficient distance from the facilities were selected as controls.

Final implementation of the new Basic Nuclear Emergencies Plan and the CSN emergency response plan.

The basic nuclear emergency plan was modified by Royal Decree 1428/2009, of September 11th, the international standards for the management of nuclear emergencies being maintained and criteria of flexibility being introduced in the emergency organisation, basically to reinforce the representation of local and autonomous community entities, this having given rise to the adaptation of the nuclear emergency master plans of the areas surrounding each nuclear power plant.

Furthermore, the CSN has an emergency action Plan (EAP) that includes the emergency response organisation (ERO) and sets out the functions, specific resources and basic action procedures for its management and technical governing bodies, the interactions between the latter and general directives on initial and on-going training. The EAP is currently being developed by way of detailed instructions and procedures, which are expected to be approved in the immediate future.

Throughout its 30 years the CSN has guaranteed the safe operation of the Spanish nuclear fleet, as is demonstrated by the satisfactory operation and high rates of availability of the facilities. Likewise, the CSN has given priority to international presence in all the forums, actively collaborating in issues relating to technical cooperation and assistance with other regulatory bodies.

With respect to the future, the aim is to consolidate and strengthen what has been achieved to date while preparing for new challenges and new energy-related and geopolitical scenarios. Consequently, the CSN plans to maintain its top level technical and professional know-how while also acquiring the new competences required by new technological developments. In more detail, the following issues will need to be addressed in the near future:

- In early 2011, the follow-up to the IRRS mission carried out in Spain in 2008. The CSN will submit the Action Plan drawn up for the practical implementation of the recommendations issued after the IRRS mission performed in 2008.
- Completion in 2011 of the programme for the revision and development of the procedures and instructions included in the emergency action Plan.
- Final development of the collaboration with the military emergency response Unit in the areas of telecommunications, training, operational coordination in emergency situations and the joint provision of equipment.
- Implementation of the integrated supervision system relating to security Area.
- Final transposition of the European Directive on the establishment of a community framework regarding the nuclear safety of nuclear facilities. Practical implementation of detailed activities for compliance with art.9
- Establishment of the Advisory Committee for public information

By way of a final conclusion, it may be stated that the nuclear installations have operated correctly from the point of view of safety, as indicated in the annual reports submitted by the CSN to the Spanish Parliament during this period.

Licensees

The licensees of the Spanish nuclear power plants are responsible for producing electricity safely, reliably, economically and in an environmentally friendly manner. Throughout this report the extent to which the activities performed and the measures implemented by the licensees in compliance with this responsibility also comply with the obligations set out by the Convention has been described, following the layout of the articles of the latter. The most relevant aspects of the period are described below:

- There have been two particularly significant events as regards the Spanish nuclear fleet: the transfer of ownership of the José Cabrera nuclear power plant, the first to be built in Spain, which was definitively shut down in 2006, from the owner utility Gas Natural Fenosa to ENRESA, the company in charge of its dismantling; and the authorisation for a further four years of operation issued by the MITYC in 2009 following a favourable report by the CSN for the Santa María de Garoña nuclear power plant, in response to the request for a lifetime extension of ten years submitted by the licensee.
- In compliance with the requirements, in 2009 each of the Spanish nuclear power plant has drawn up and submitted to the CSN an Action Plan containing an analysis of the situation of the installation and the complementary improvement programmes supporting the deployment of resources and investments in those areas in which this has been considered necessary, including maintenance, personnel training, the analysis of operating experience, the renewal of items of equipment and staffing.
- The Spanish NPP's have adapted their respective Management Systems to the requirements of Instruction IS-19, issued by the CSN in 2008, which transcribes and extends upon IAEA requirement GS-R-3.
- Work has continued on the improvement of the corrective actions programmes (CAP), which are considered to be an efficient tool for the identification, prioritisation and resolution of issues potentially affecting the nuclear safety, radiological protection or reliability of the facilities. The self-assessment programmes have also continued, as have the external assessments of the Spanish nuclear power plants by both the IAEA (OSART or PROSPER missions) and WANO (Peer Reviews).
- In 2007 the Council approved Instructions IS-11, on operating personnel licences, and IS-12, on the qualification and training of non-licensed personnel, which have implied the adaptation of the training programmes and of the procedures and practices of the Spanish nuclear power plants for compliance therewith. Furthermore, in 2008 the Spanish nuclear power plants, through UNESA, decided on their own initiative to undertake an assessment of their operating personnel plans, contrasting them with the INPO standards. This gap Assessment was performed in 2009 and as a result INPO issued a set of recommendations, for which the plants have developed their respective action Plans in the area of training. In addition, the Spanish nuclear installations have performed various comparative analyses with respect to the nuclear power plants of other countries, with a view to contrasting their organisations with those of these plants. Also, training on plant-specific simulators continues to be an important tool, in particular as regards significant design modifications.
- The Spanish nuclear power plants have continued their Organisation and Human Factors Programmes and have set up programmes to strengthen the safety culture. In 2007, the UNESA guideline CEN-23 was issued for the internal assessment of the safety culture at the Spanish nuclear plants; external safety culture assessments have also been performed and an alternative systematic approach for the communication of safety deficiencies has been set up in accordance with UNESA guideline CEN-28, which each plant has incorporated in its own procedures.

- In the area of operating experience, and in addition to the permanent working group that carries out its activities within the framework of UNESA, in 2009 the Spanish nuclear power plants established a systematic approach whereby any of the them could activate a group of experts from the other plants, Industry Incident Analysis Group, (GSAI) for it to analyse the root cause of any incident occurring at their plant. The operation of this group is described in UNESA guideline CEN-29. In addition, UNESA guideline CEN-31 has been drawn up, through which the nuclear power plants adopt a series of commitments regarding the minimum operating experience information to be exchanged and mechanisms for such exchange, the aim being to improve the knowledge of events and the analysis of their applicability.
- In relation to emergencies, since 2004 a project has been under way for the modernisation of the system for emergency communications between the nuclear power plants and the CSN emergencies room. Likewise, since 2008 work has been on-going on the drawing up of a protocol for collaboration by the nuclear plants licensees with the off-site nuclear emergency plans directed and coordinated by the Spanish Civil Defence authorities.

The licensees of the Spanish nuclear power plants fully agree that compliance with the obligations set out in the Convention on Nuclear Safety is a basic requirement to guarantee the highest levels of nuclear safety, allowing nuclear energy to play its part in electricity generation. Consequently, they intend to follow the path of on-going improvement in order to be able to demonstrate compliance with these obligations at all times.

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