Spanish Nuclear Safety Council report to the Parliament

Year 2004 Summary

CSN

CSN CONSEJO DE SEGURIDAD NUCLEAR

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Summary

Presentation

The Nuclear Safety Council, in compliance with article 11 of the Law by which it was created (Law 15/1980), hereby submits its annual report to the Upper and Lower Houses of the Spanish Parliament, this report corresponding to the performance of the Council's activities during 2004. The fourth additional provision of Law 14/1999 on the Public Fees and Prices for services rendered by the CSN changed the frequency of this document from every six months to every year, as a result of which the present document is the sixth annual report submitted to Parliament.

One of the most significant aspects this year has been the approval and publication of the Strategic Plan for 2005-2010, which presents the mission, the vision, the strategic objectives and the activities of the CSN for the period in question, these being based on three strategic lines: the Safety of the facilities and activities, Management and organisation and Social credibility. The first chapter includes an ample description of the Plan, the development and degree of compliance of which will be presented annually in the corresponding reports.

With the exception of the event that affected the Essential Services Water System of Vandellós II nuclear power plant, which is enlarged upon below, the Spanish plants operated correctly throughout 2004, as is underlined by the results obtained from the CSN's supervision and control activities, and confirmed by the indicators used to assess the operation of these facilities. These indicators include parameters such as automatic scrams with the reactor critical, forced outages, significant events, safety system failures, the actuation of these systems and collective exposure to radiation.

Throughout the year the nuclear power plants reported 39 events, 13 fewer than in 2003. The most significant of these was the detection of generalised corrosion in the Essential Services Water System at Vandellós II Nuclear Power Plant. This event, provisionally classified at level 1 on the International Nuclear Events Scale (INES) had no radiological impact but did imply a significant reduction in the required safety margins. The evaluation of the event and its definitive classification on the INES scale, which in view of the data being analysed throughout the repair and operation period might reach level 2, will be carried out during 2005. Both the technical and organisational causes of the degradation of the system are being analysed, since important deficiencies were detected in the licensee's management that led to problems that had been identified over the years through internal inspections going uncorrected. Likewise, during the early months of next year the licensee is required to submit and action plan for approval by the CSN. Of the remaining events, five were classified at level 1 on the aforementioned scale and the rest at level 0, with no significance for safety.

Two sanctions proceedings were initiated during the year, affecting the licensees of the Santa María de Garoña and Ascó I nuclear power plants, respectively, although the

non-compliance with the manuals or limiting conditions for operation to which they referred did not imply any direct damage or harm to persons or the environment. No warning was issued during this same period.

During 2004, the control of the safety of the nine reactors at Spain's seven nuclear power plants by the Nuclear Safety Council led to 172 inspections, 34 decisions regarding authorisations, 13 favourable appreciations, three technical instructions and one temporary exemption.

During 2004, the Almaraz II, Ascó I and II and Trillo nuclear power plants underwent refuelling outages.

The safety improvement programmes in which significant progress was made were carried out in four major groups: Periodic safety review (PSR) programmes, problem identification and resolution programme, human and organisational factors at nuclear facilities and specific inspections at Santa María de Garoña nuclear power plant of the control rod drive mechanism (CRD) penetration bushings.

In May 2004, the Council approved the replacement of the ESFUC programme with the new systematic plant operation evaluation programme known as the Integrated Plant Supervision System (SISC), an adaptation of the USNRC's Reactor Oversight Process (ROP). This new programme will enter into force during 2006.

As regards the dismantling and decommissioning of facilities, mention should be made of the fact that during the year the dismantling of the Elefante plant was completed and that the dormancy period of the Vandellós I installation was authorised. On completion of this period, which will last 25 years, the reactor shroud will be disassembled and dismantled and the site will be fully released.

Throughout 2004 the operation of the radioactive facilities operating for scientific, medical, agricultural and commercial purposes proceeded within the established safety standards, with the measures for the radiological protection of persons and the environment being adhered to and, therefore, without situations of undue risk occurring.

As of the end of 2004 there were 25,399 radioactive facilities in Spain, 1,330 radioactive installations (one first category, 994 second category and 335 third category) and 24,069 radiodiagnosis installations entered on the different registers of the Autonomous Communities.

The CSN undertakes the control of these installations both directly and through the Autonomous Communities with which it has agreements for the assignment of functions. During 2004 the entry into force of the assignment agreement with the Autonomous Community of the Canary Islands was signed, along with that corresponding to the Principality of Asturias.

During 2004 358 decisions regarding operating, modification and decommissioning permits were issued; of these 81 were by the Autonomous Community of Catalonia, 5 by the Balearic Islands and 33 by the Basque Country, communities that have evaluation and control functions assigned to them, in addition to inspection.

The following may be singled out among the control activities carried out:

- 1,634 inspections, of which 794 were performed by the CSN and 840 by the corresponding services of the Autonomous Communities having assignment agreements covering the function of inspection (327 in Catalonia, 188 in the Community of Valencia, 71 in Galicia, 143 in the Basque Country, 90 in Navarre and 21 in the Balearic Islands).

- The review of 1,188 operating reports (172 annual reports on radioactive facilities, 800 annual reports on X-ray facilities for medical diagnosis and 216 reports on commercialisation installations).

There were 19 event reports from second and third category facilities, all referring to incidents having no significant radiological consequences.

The CSN proposed the initiation of 21 sanctions proceedings to the competent industrial authority, nine of which were in response to proposals from the Regional Government of Catalonia and one from the Basque Country, as well as 93 warnings (six by the Regional Government of Catalonia and seventeen by the Basque Country).

As regards the transport of nuclear and radioactive materials, the CSN reported on four authorisations, 47 specific inspections were carried out and two events were detected at the Juzbado facility, along with two radioactive package dropping incidents at airports.

During 2004, and as a result of application of the *Protocol on collaboration in the surveillance of metallic materials*, the CSN received 146 communications of radioactive material having been detected in metallic materials. Two of these were especially relevant because of the radioactive contamination of equipment, these occurring at the installations of Arcelor Alambrón Zumárraga, S.A. and Sidenor Industrial, S.L.

On June 25th 2004 the Government approved the Basic Nuclear Emergency Plan (Plaben). This Plan constitutes the basic directive for preparedness and planning of the response to nuclear emergencies in the national territory and contains the radiological criteria defined by the CSN for the planning of nuclear emergency response. The objective of the Plan is to protect the population against the adverse effects of the ionising radiations that might be produced by the uncontrolled release of radioactive material resulting from a nuclear accident.

In 2004 work began at the CSN headquarters on the remodelling of the Emergency Room *(Salem)*, the aim being to enhance the physical distribution and modernise the support systems. Improvement of the communication systems between the Salem and the points involved in the Plaben (nuclear power plants, Government delegations and sub-delegations, etc.) has also been addressed.

Complementary to the drawing up of this report, the CSN has undertaken a meticulous task of informing and communicating. During 2004, 87 press releases and 17 informative notices were issued, 328 consultations were replied to, 6,211 visits were received at the Information Centre, 33 publications were issued and the contents of the institutional website, **www.csn.es**, were updated, this site receiving more than 90,000 visits a year. Among the specific projects targeted at stakeholders, special mention might be made of the public information campaign on the use of ionising radiation for therapeutic purposes, *Radiotherapy, a fundamental treatment against cancer*, carried out in collaboration with the Spanish Radiotherapy and Oncology Association (AERO), and of the programme of communication and education in areas housing nuclear power plants, performed in collaboration with the Association of Municipal Areas housing Nuclear Power Plants (AMAC)

Continuing with the work carried out in previous years, there has been intensive effort at international level throughout the year, in the activities of WENRA (Western European Nuclear Regulators Association); INRA (International Nuclear Regulators Association) and the South American Forum of Regulatory Bodies, as well as periodic work within the framework of the European Union, OECD/NEA and the IAEA (International Atomic Energy Agency). Mention should be made of the drawing up of the Third National Report for the Convention on Nuclear Safety, the technical support provided by the CSN to the Spanish presidency of the IAEA Board of Governors and the promotion and development by the South American Forum of Regulators of a nuclear safety and radiological protection Knowledge Network, with support from the IAEA.

The *Training plan* was executed in accordance with the activities mapped out and approval was given for the creation of a training commission to prepare criteria and a methodology for training plan tracking, undertake the monitoring and evaluation of the results and develop criteria for the design of future training plans.

The CSN invested an in-house budget of 3,905,077 euros in the Research plan, which materialised in 67 projects, largely undertaken in collaboration with other institutions.

Finally, and as regards technical standards, during 2004 the CSN has approved a *Technical instruction* and six *Safety guides*.

1. Strategic plan

During 2004, with a view to complying with the increasingly far-reaching obligations attributed to it by law and responding efficiently to the legitimate expectations of society and other groups having a stakeholding in its activities, the CSN has drawn up its Strategic Plan for 2005-2010, in which, with consideration given to the current environment and to the conditions expected in the future, the Council establishes the results it seeks to obtain and its strategies and objectives for the coming five years.

The Strategic Plan represents the commitment of the entire organisation in relation to the results expected, the objectives mapped out and the methods and resources to be used in achieving them. This is the result of a process directed by the Council in which consideration has been given to the expectations of society and of different stakeholder groups (the Central and Autonomous Community Administrations, the licensees of the facilities and the staff of the CSN).

The Plan sets out the Mission and Vision of the Organisation, summarises the analyses of the social environment carried out in preparing the Plan and establishes the results expected of the organisation. Also described are the strategies established (*safety and protection, management and organisation and social credibility*) and the objectives associated with them. Finally, the most significant activities to be carried out in order to achieve the objectives are included.

1.1. Mission and vision

The mission of an organisation is its raison d'*être*, the reason for which it was set up. In the case of the CSN, the mission may be deduced from the law by which it was created. The Strategic Plan defines this mission in the following terms:

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

In this definition a distinction is made between three basic elements. The first implies the unequivocal commitment of the institution to society, as the primary recipient of its services, assuming its underlying purpose, which is to protect the workers, the population at large and the environment.

The second element refers explicitly to the direct responsibility of the licensees of the facilities and activities in relation to safety and radiological protection, and to the role of the CSN in controlling these issues.

Finally, the third element contemplates the participation of the Council in the management of radiological emergencies, including those that might arise outside the scope of regulated activities and installations, in coordination with the public administrations and the licensees of the practices.

The Vision of the Council as regards the type of organisation that it seeks to be is also defined in the Strategic Plan, and is as follows: *An organisation independent of the public administrations and of the licensees of the facilities, reporting to the Parliament of the Nation. An organisation technically qualified for its proposals and decisions to be rigorous and for its activities to be performed in an effective, efficient and transparent manner, such that it warrant the trust of the Spanish society and constitute a point of reference at international level.*

1.2. The environment of the CSN

In addition to the Mission and Vision of the CSN, the starting point for the Strategic Plan was analysis

of the current situation and the possible evolution of the environment in which the Council carries out its activities. Some of the more significant conclusions of this analysis are summarised below:

- Society is increasingly sensitive to issues relating to ionising radiations, and very especially to their impact on the public and the environment. It is also more demanding as regards the safety of the facilities and the availability of transparent information. As a result, the CSN must pay attention not only to safety but also, and especially, to the transparency of its activities and to its very credibility.

- Most of the activities carried out by the CSN are considered to constitute a public service, as a result of which all of the efforts of the Organisation should be seeped in the concept of service to the man in the street. The demands of the public are for optimum levels of quality and efficiency.

- The liberalisation of electricity production, the evolution of electricity tariffs and other factors may lead the licensees of nuclear facilities to adopt cost reduction policies. This obliges both the CSN and the licensees to intensify their efforts to guarantee that economic pressures do not compromise the safe management of the installations.

- The regulatory systems are evolving continuously, becoming increasingly oriented towards greater consideration of aspects relating to risk, a less prescriptive approach and a higher degree of concentration on processes and results. The CSN has carried out an in-depth analysis of the regulatory system implemented in Spain and should promote and implement where appropriate the necessary improvements.

- The activities of the CSN are influenced by the obligations deriving from Spain's adhesion to international conventions, by European Union standards and by the multilateral or bilateral commitments entered into by the Organisation itself. The activities of the CSN must be in keeping with the international context.

- The Spanish nuclear standards are based on the Nuclear Energy Act approved in 1964. The system of standards has certain shortcomings in areas such as the licensing and control of the dismantling of facilities, the unification and systematisation of technical criteria for the management of wastes, including very low level wastes (generated in large quantities in dismantling) and their possible declassification. Consequently, there is a need for the standards to be updated, based on rigorous analysis of the existing shortcomings.

- There is a series of issues relating to nuclear facilities that require, and will continue to require, increasing attention from the CSN and the licensees, such as the following:

  – The ageing of certain plants, which are coming closer to the limit of their design lifetime.

  – Approach to the saturation limits of the irradiated fuel storage pools.

  – The contribution made by human and organisational factors to the risk of the facilities.

  – The updating of the technology of certain elements and systems of the facilities.

  – Initiation of the dismantling of the José Cabrera nuclear power plant, which will definitively cease its operations on April 30th 2006, and continuation of the dismantling and decommissioning activities at Vandellós I and various radioactive and fuel cycle installations.

  – Determination of the criteria applicable to interventions to reduce the level of radiological

risk in areas affected by accidents, natural events and industrial processes.

- The national emergency system and the CSN's participation in it must be adapted to the changes arising from events such as the approval of the new Basic Nuclear Emergency Plan *(Plaben)* in July 2004, or the future approval of the civil defence Directive on radiological risk. At the same time, the Council should maintain the continuous technological updating of its intervention resources and systems. Furthermore, the participation of the different social classes in decision-making on the planning and preparedness for and response to emergency situations is increasing. This implies the need to reinforce programmes on public information and the training of those intervening.

- The basic assumptions regarding security systems have undergone profound modification affecting not only nuclear facilities but also radioactive sources and their transport. As a result, multiple activities are being developed at both national and international level, activities in which the CSN must necessarily be involved.

- Growth is expected in the number of radioactive facilities (or the extension of those already in existence), especially as regards security inspection equipment, radiotherapy, positron emission tomography (PET), nuclear medicine and immunotherapy. Novelty technologies are increasingly being used in both traditional installations and others that until recently did not exist in Spain, such as centres for the production of radioisotopes by means of cyclotrons. The Council is required to keep the knowledge and the regulatory system applicable to all these facilities updated.

- There is international consensus regarding the need to extend the scope of the current radiological protection system, which is anthropocentric in nature, to include protection of the environment among its objectives. These new trends will require some re-orientation of the concept and scope of environmental radiological surveillance programmes.

- Within the function defined in section VII of the *Regulation on protection against ionising radiations,* the CSN has established an action plan to assess the risks associated with natural radiation. The application of this plan will require additional activities in the coming years.

- As occurs in other countries, the *Alara* principle (principle of optimisation of protection through which the doses received by those exposed to ionising radiations are kept as low as is reasonably achievable) is not implemented at radioactive installations and transport companies as solidly as it is at nuclear facilities. The activities already initiated by the CSN and the licensees to achieve such implementation must continue in the future.

- The strict healthcare requirements applicable to radiopharmaceuticals are giving rise to a situation in which their production is increasingly focussed on large centralised radiopharmacy units, with distribution to the different installations being by way of single doses, this causing an increase in radioactive material transport activities. The increasing use of equipment with radioactive sources in other industrial applications will also lead to an increase in such transport operations. All this implies a dual challenge: the implementation of a real dose reduction culture among the personnel involved and the availability of an adequate infrastructure to respond to whatever emergencies might arise.

- It is to be expected that stray sources will continue to be detected at installations relating to the processing of metallic materials, at a time when concerns about this issue are increasing at international level and certain actions are being

initiated for their control, such as the one included in the *European Directive* on high activity sources and stray sources. As a result, it will be necessary to drive initiatives aimed at improving the practical application of the Protocol on collaboration in the *Radiological surveillance of metallic materials* in areas such as personnel training, intervention and instrumental procedures and procedures relating to the management of events and the analysis of acquired experience.

- The technical infrastructure and the national training systems relating to nuclear safety and radiological protection should be kept updated and the corresponding structures and human and technological resources should be constantly renewed, avoiding loss of the know-how generated, a situation that might occur under circumstances already detected, such as:

  – Limitations affecting laboratories accredited for instrument calibration, internal dosimetry services and biological dosimetry.

  – Possible mergers between companies operating in the nuclear area or reduction of the capacity of Spanish organisations involved in engineering, services, manufacturing, training and research.

- The administrations of all the advanced nations are implementing electronic administration systems in order to modernise their services, bringing them closer to the members of the public and the organisations demanding them and making them more accessible, flexible and streamlined. The CSN has already initiated the implementation of these systems and should continue to promote them.

- There is general consensus in that in order to be efficient and effective the regulatory authorities should, among other things, achieve and maintain an adequate level of competence, carry out their functions within adequate cost and time frameworks an strive for continuous improvement in their operations. The Council should continue to implement actions deriving from improvement programmes already initiated and undertake other new such programmes.

- At both national and international levels, the relationships between the institutions, organisations and administrations are undergoing profound modification. Approaches based on good relations and occasional collaboration are being reinforced and giving way to networks of stable relationships in which those intervening provide each other with mutual support, working in a coordinated manner and complementing their respective capacities in order to provide a better service to the community. The Council should strengthen its relations with other organisations and institutions participating in the coordination strategies.

- The achievement of excellent management of the organisation makes it increasingly necessary to suitably bring together different aspects of the professional development of the personnel, such as training, the development of technical capacities, teamwork and knowledge management, and those relating to their personal and social development. The activities of the Council are based on knowledge, as a result of which it is necessary to maximise the contribution of everybody working for the Organisation to optimum compliance with the Mission.

1.3. Strategies, objectives and activities

Based on the mission and the vision, considering analysis of the environment and with a view to achieving the strategic results contemplated in the plan itself, three strategies are established as a basis for future CSN activities. These three strategies are as follows:

Safety of the facilities and activities

Ensure that the licensees operate the facilities safely, this implying continuous evolution of the regulatory system to reinforce the responsibility of the licensees and their safety culture. In all the sectors and agents involved, strengthen activities oriented towards the protection of people and the environment.

Management and organisation

Ensure that the use of the resources of the CSN, the Public Administrations and the licensees be as close as possible to optimum, maintaining the levels of safety and protection demanded.

Social credibility

Ensure that the general public, the institutions and the licensees trust that the CSN is fulfilling its Mission properly. In order to achieve this, the CSN must be perceived as being an independent, efficient, rigorous and reliable Organisation, providing the stakeholders with clear and accurate information on its action programmes, facilitating participation and demonstrating that its actions are independent and objective.

2. Tracking and control of facilities and activities

2.1. Nuclear power plants

Operation

The Spanish nuclear power plants operated correctly throughout 2004, as is demonstrated by the results obtained from the CSN supervision and control activities and confirmed by the indicators used to assess the operation of these installations. These indicators include parameters such as: automatic scrams with the reactor critical, forced outages, significant events, safety system failures, safety system actuations and collective exposure to radiations, as indicated in figure 1.

The following may be singled out as being especially significant findings within the programme in 2004:

- In the long term all the indicators, with the exception of *Average number of automatic scrams with the reactor critical* and *Average number of significant events*, show a downward trend over the ten years analysed. In the short term also, almost all the indicators have decreased, with an increase having been observed over the last three years for only one: *Average rate of forced outages:*

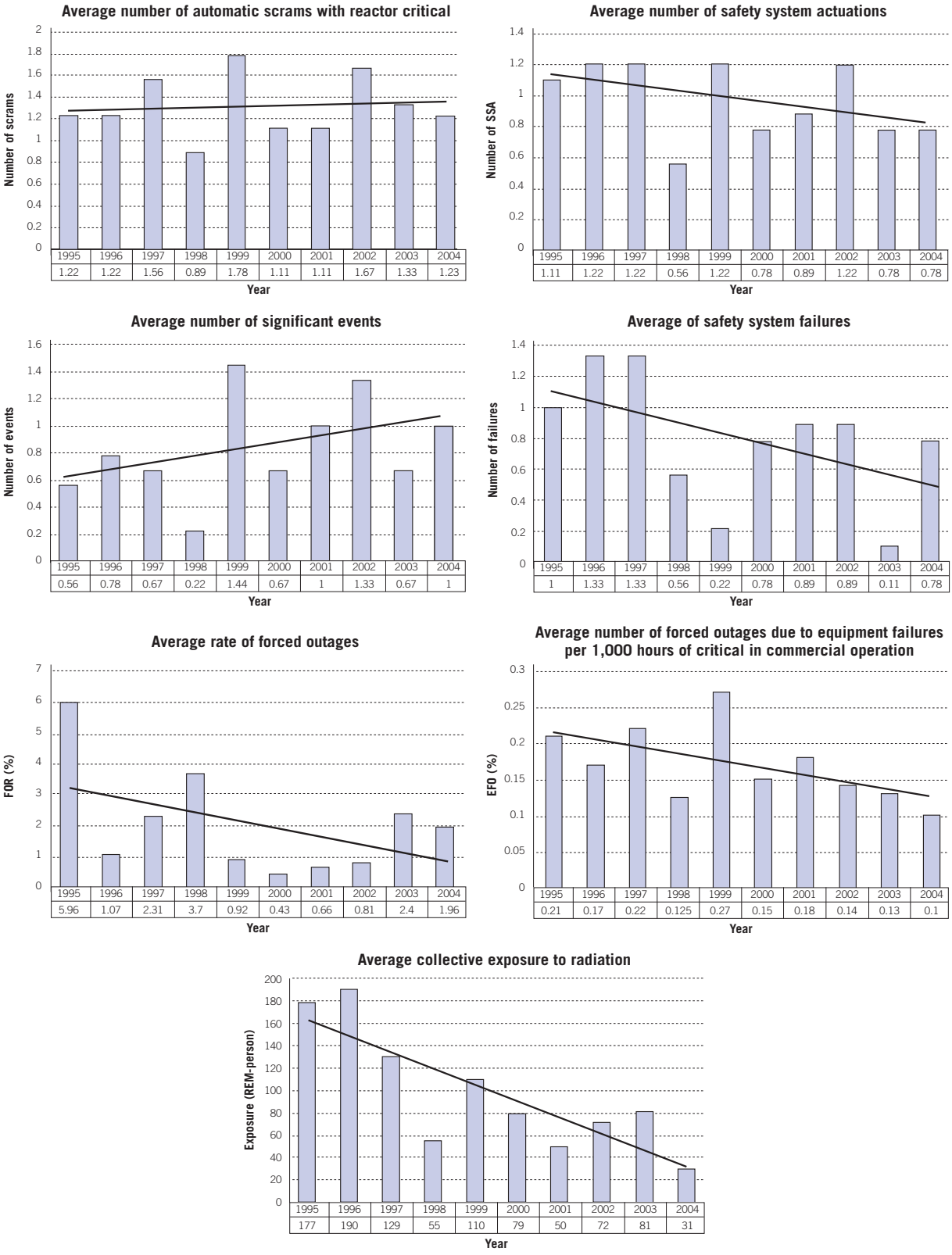
  – *Average number of automatic scrams with the reactor critical*: This indicator has increased slightly in the long term, although very moderately with respect to the results for last year, which were caused jointly by elimination of the figure for 1993, which was very high, and the 1999 and 2002 values, which determine the upwards slope of the graph as from that year. Nevertheless, in the last three years the changing trend for this indicator, already detected last year, has become accentuated and it is now clearly on the decrease, a favourable situation that allows us to consider its recent evolution as being fairly satisfactory.

  – *Average number of safety system actuations*: This indicator continues its favourable long-term decrease; the change in trend observed in the short term is maintained, this now being slightly downward. This is a favourable situation and allows us to consider the short and long-term evolution of this indicator to be satisfactory. Nevertheless, the increasing trend seen over the last three years as regards the contribution of this indicator at power is maintained, contrasting strongly with the decreasing trend in shutdown conditions. Although surveillance of this trend at power is maintained, the evolution allows us to predict a certain stabilisation next year, as long as values analogous to those for 2004 are obtained.

  – *Average number of significant events*: The long-term change in the trend of this indicator is maintained, although it continues to increase as a result of the unfavourable contribution made in the years 1999 and 2002; however, there is a clear evolution towards stabilisation, which is expected to materialise by the forthcoming cycle. A symptom of this is the short-term behaviour of the indicator, which continues along its decreasing path. The contributions of this indicator at power and in shutdown conditions are also on the decrease, for which reason its overall evolution may be considered satisfactory.

  – *Average number of safety system failures*: In the long term this indicator shows a clear decreasing trend, which may be observed also, albeit to a lesser extent, over the last three years. These trends continue to be reflected in the contribution at power and in shutdown. Consequently, it is concluded that the evolution of this indicator is favourable in the short and long term.

Figure 1. Nuclear power plant performing indicators



– *Average rate of forced outages*: Despite this indicator maintaining its decreasing trend in the long term, it continues to evolve upward in the short term. The reason for this, in addition to the considerations referred to last year in relation to its behaviour in 2003 due to extension of the refuelling outages, has been marked by the forced outages that occurred at Ascó II on October 16th 2004 and November 23rd 2004 as a result of electrical faults in the phases of the plant's main transformer, the second of which led to a prolonged wait for the damaged phase to be replaced, due to the lack of a reserve unit. The evolution of this indicator is not considered to require specific tracking.

– *Average number of forced outages due to equipment failures per 1,000 hours of critical in commercial operation:* This indicator maintains its decreasing trend in both the long and short term. The tendency is considered to be favourable and ratifies the evaluation of the causes for the increase of the previous indicator in the short term.

– *Average collective exposure to radiation*: This indicator continues to decrease in the long term; a favourable change in trend has been observed over the last three years, a clear downward trend having been recovered. The cause for this is to be found in the favourable values reported by all the Spanish nuclear power plants in 2004.

As regards the causal factors contributing to the events reported to the CSN during the last three years, broken down by nuclear plant operating modes, the following may be underlined:

- *Administrative causes* maintain their favourable downward trend, both at power and under shutdown conditions.
- The indicator *licensed personnel errors* has stabilised strongly, showing a slightly decreasing trend at power and during shutdowns.
- The indicator de *other personnel errors* maintains its favourable downward trend, both at power and under shutdown conditions.
- The *maintenance causes* indicator continues to decrease favourably, both at power and under shutdown conditions.
- The favourable trend of the indicator *design causes* continues, which is decreasing at power. However, a slight increase may be observed in its behaviour during shutdowns.
- The indicator *miscellaneous causes* stabilised in 2004, its trend being slightly downward at power and insignificant during shutdowns.

In application of what is established in the operating technical specifications of each plant, the licensees reported 39 events 13 fewer than in the year 2003. Five of these were classified at level 1 on the International Nuclear Events Scale (INES), the remainder being classified at level 0. However, in 2005 one of the events classified provisionally at level 1 in 2004 is in a process of study and analysis.

The events classified at level 1 are the result of anomalies in the authorised operating regime; although not having a significant impact on safety, these events reveal the existence of deficiencies in safety-related aspects that exceed the authorised operating regime and consequently require correction. They had no significant radiological impact on or off the plant site. The events classified at level 2 are incidents that either cause doses to the workers in excess of the annual doses and/or lead to the presence of significant quantities of radiation in areas where this is not expected, requiring corrective actions, or imply the significant failure of

safety devices but with sufficient defence in depth to be able to respond to additional failures.

The events classified as level 1 on the INES scale during 2004 occurred at the Santa María de Garoña, José Cabrera, Almaraz I, Almaraz II and Vandellós II plants.

The Santa María de Garoña event implied the uncontrolled exit from the plant of material contaminated with non-detachable *Cobalt 60*. The event occurred on February 3rd 2004, when a transport vehicle left the plant for the installations of an offsite steelyard loaded with 15 tons of recyclable materials from the general storage area for freely circulating material of Santa María de Garoña. When the vehicle passed through the steelyard radiological metering gate, an alarm was activated, indicating the possible presence of radioactive material in its load. The vehicle was unloaded and the parts showing non-detachable surface contamination, which totalled 1,480 kg in weight, were metered and segregated in a metallic container. Certain parts presented a contact dose rate of 40 μSv/h, with a dose rate in contact with the outside of the container of 1.2 μSv/h, the latter value being considered of no significant importance from the radiological point of view. On February 6th 2004, the segregated material returned to the plant by qualified transport, 1,000 kg being sent to the decontamination shop and the rest being classified as freely circulating material. The exit from the plant of material contaminated with Co-60 was due to an error in supervision, the material having been stored in freely circulating materials area when it should have been confined and controlled. As part of the corrective measures, the licensee is drawing up a procedure for the radiological control of materials leaving the plant and is installing a radiological metering gate to control such materials.

The three following events classified at level 1 on the INES scale were due to a systematic error in calibration of the steam generator (SG) level instrumentation. This error, which had a common cause based on deficient information provided by the supplying manufacturer, simultaneously affected the José Cabrera plant (July 29th 2004) and both groups of Almaraz (August 5th 2004), the problem having initially detected at the first. Following consultations as a result of the possible generic implications of the event, the problem was also detected at the two last installations, this explaining the delay in the identification dates. In all these cases, the transmitters involved measured differential pressure and the error was due to a static pressure calibration in the opposite direction to that required by the assembly of the transmitter, this causing the non-conservative effect of slightly delaying reactor trip on low steam generator (SG) level. The licensees have demonstrated by means of thermohydraulic calculations that plant safety was at no time compromised, due to the availability of reasonable safety margins, and consider that the cause of the error was the calibration reports provided by the manufacturer, which contained incorrect input data not corresponding to the assembly of the transmitters at the plants and not detected during the periodic calibrations performed.

Finally, the event originally classified at level 1 on the INES scale occurred at the Vandellós II plant on August 25th 2004 and consisted of the rupturing of a manhole in the essential services water system (from hereon the EF system), train B. The definitive classification on the INES scale, with the data being analysed throughout the repairs and operation period, might reach level 2.

In this event, important deficiencies were detected in the licensee's management, which led to problems of generalised corrosion affecting both system trains and identified during internal inspections over the years not being corrected, to due importance not being given to leakage identified in May in the same manhole that would later break, on August 25th, during a system pump B

start-up manoeuvre, to the event not being managed with adequate transparency and to an acceptable resolution plan not being submitted for recovery of the plant safety levels.

The technical causes of the degradation of the system are being analysed and might be design weaknesses in the piping, inadequate surveillance –in 1999 the periodic hydrostatic test to detect possible piping leakage was cancelled and subsequent thickness measurements in certain manholes, as recommended during the inspection performed in 2000 were not performed– and inefficient maintenance of the surfaces of the system piping.

The organisational causes will be analysed along with the technical issues.

In view of all the above, the licensee is required to submit an action plan for CSN approval during the early part of 2005. This incident is described below in summary(1).

- On August 25th 2004, with the plant at 100% power, the circumferential rupturing of a manhole occurred on train B of the essential services water system. During the visual inspections performed by the licensee, the cause of the breakage was discovered to be generalised corrosion affecting the entire neck of the manhole, especially on the lower part. The licensee took the plant to operating *Mode 3* and initiated repairs on the manhole that had failed. Subsequently, the manhole on train A of the system was repaired, this also being affected by the corrosion phenomenon.

- On August 27th, during the repairs on the train A manhole, and due to the common cause failure of several relays, a loss of off-site power occurred that affected the electrical feed to train A. Given that the train was not operable, this loss of power had no effect on its availability.

- Likewise, on August 28th, the licensee detected seepage from a manhole on train B different from the one that had failed and undertook its repair by installing a reinforced concrete collar around its neck.

- On August 29th the licensee proceeded to start up the plant following the performance of calculations of the minimum thicknesses of the steel piping of the manholes, the aim being to justify their structural integrity.

- From September 20th to 23rd and on October 6th and 7th, a multidisciplinary systems inspection was carried out by the CSN, during which the licensee was required to provide the reports containing the aforementioned thickness calculations and thickness measurements performed on all the manholes. Following an initial revision of these reports, the inspectors manifested their disagreement with the conclusions reached. In response, between 10th and 20th October 2004 the licensee installed an additional reinforced concrete collar on all the manholes as a temporary measure pending the March 2005 refuelling outage.

- On October 26th 2004, the licensee submitted to the CSN an *Action plan*, based on root cause analysis of the degradation that had occurred in the EF system, this including a plan for the definitive repairs of the manholes, which would be carried out during the next refuelling outage, as well as actions aimed at correcting deficiencies in the working methods that had contributed in some way to the degradation of the system due to external corrosion.

- The CSN considered that the temporary concrete reinforcement installed should be in-

[1] Given the relevance of this event, the CSN has published several detailed reports on it in its external website. The tracking of the derived actions will be included in the annual report for 2005.

creased at the 800 mm manholes located on the impulsion lines of both EF trains and that the root cause analysis had not been performed using a methodology in keeping with the importance of the degradation detected, as a result of which the action plan did not have the scope or contents required to suitably correct the situation or the organisational management deficiencies that had led to it. Consequently, a CSN letter dated November 17th 2004 established a series of requirements for the correction of the aforementioned deficiencies.

- The definitive repair of the system was scheduled for performance during the refuelling outage set for March 2005.

The function of the essential services water system (EF) is to transfer the heat loads from other systems or components required for plant safety, both during normal operating conditions and in the event of an accident, transferring this thermal load to the Mediterranean Sea for its final dispersal.

The system supplies cooling water (seawater) to the component cooling water (EG) heat exchangers, the condensers of the essential chilled water system (GJ), the heat exchangers of the emergency diesel generators system (KJ) and the grid washing system (DC), with the flow required meet the requirements for normal operation, start-up and shutdown and following a design basis accident.

The system is equipped with redundancies, that is to say that its consists of two sub-systems trains A and B), similar or mutually independent, each having a 100% capacity fully independent pump and a third stand-by pump, also with a 100% capacity, which may be connected to either of the trains. One of the two trains is normally shut down, in manual start-up. The stand-by pump is isolated hydraulically from the in-service train with its breaker racked out. Consequently, loss of the in-service EF train causes a plant trip in the medium term, due to the incapacity to cool the water in the component cooling water system (EG). Trains A and B operate in open circuit mode.

The water used by the EF system is seawater, for which reason it is not radioactively contaminated. Leakage or breakages in the system are important only because they reduce its cooling capacity.

In the event that occurred on August 25th 2004, train B was lost completely, as a result of which only train A was left. Although degraded, this train did not fail at any time. If train A had also failed, there was still the possibility of cooling the reactor via the secondary by means of the auxiliary feedwater turbine driven pump, preventing the failure of the reactor coolant pump seals by means of the hydrostatic test pump, since if this failure had occurred it would give rise to a loss of reactor coolant inventory in a situation which the safety injection would not be available. With the turbine driven pump and the hydrostatic test pump operating correctly the reactor could be stabilised and its cooling assured while other additional means cooling the reactor were established.

Given that the failure of train A did not occur, nor any other events that would have required the actuation of other plant safety systems, the failure of train B did not affect reactor cooling and consequently had no impact for the workers, the public or the environment. However, the maintenance of train redundancy such that there be ample safety margins is a safety requirement. In this case, the rupturing of train B and the degradation existing in train A meant a significant reduction of these necessary margins, which is unacceptable. For this reason actions have been taken at the plant to recover the margins, and their complete recovery is foreseen during the 2005 refuelling outage. It is also necessary to ensure that there are no other degradations of these margins and that lessons from the event be learned and applied in order to

prevent the occurrence of significant degradations in the future.

The final classification of this event on the INES scale is being analysed on the basis of the results of the inspections performed during the refuelling outage, and it is possible that it might reach level 2. The event had no radiological repercussion on or off site, for which reason the classification will be made in consideration of the criteria of *defence in depth*, with analysis of the conditions of system inoperability prior to and after the rupturing of the manhole. Likewise, consideration should be given to the additional factors included in the INES Manual: common cause failures, procedural deficiencies and deficiencies in the safety culture.

Of the 39 events reported, nine were considered provisionally as *potentially significant* and five as *potentially generic* by the CSN *Incident Review Panel* (PRI), with four being potentially generic and potentially significant at one and the same time. An event is classified as being potentially significant if subsequent tracking of the corrective measures implemented is considered necessary or if it might imply request for the adoption of measures additional to those proposed by the licensee. The classifications presented are still provisional because the PRI does not issue its definitive classification during such time as the subsequent tracking of the event, of the corrective actions or of the subsequent evolution of the nuclear power plant remains open. As regards events corresponding to previous years, definitively classified by the PRI during 2004, no deviation has been detected with respect to the provisional classification assigned.

During 2004, the CSN proposed to the Ministry of Industry, Tourism and Commerce the opening of two sanctions proceedings and no warning to the licensees of the following nuclear power plants:

- Sanctions proceedings with respect to the Santa María de Garoña nuclear power plant for non-compliance with the *Radiological Protection Manual* and the *Quality Assurance Manual*, in relation to the exit from the plant of contaminated metal scrap.

- Sanctions proceedings with respect to the Ascó I nuclear power plant for non-compliance with limiting condition for operation 3.7.12 *Fire resistant barriers of operating technical specification 3/4.7.12*, in relation to the hourly surveillance established under this condition.

In all these cases the CSN has required that corrective actions be taken and has established a timeframe for the performance of these measures. These cases of non-compliance have been considered by the CSN as relating to the requirements of article 92.4 of the Nuclear Energy Act, *Law 25/64*, in the wording of the Law on *CSN tariffs and public prices*, and did not imply any direct damage or harm to either persons or the environment.

Inspections and reports

During 2004, the control of the safety of Spain's seven nuclear power plants (nine reactors) by the Nuclear Safety Council gave rise to 172 inspections, 34 decisions regarding authorisations, 13 favourable reports, three technical instructions and one temporary exemption from the *Operating technical specifications* for the Ascó I plant.

The following were among the more important proceedings:

- Issuing of a complementary technical instruction requiring the José Cabrera nuclear power plant to submit to the CSN, prior to May 1st 2005, a proposal for modification of the official operating documents in keeping with the activities to be performed during the period from the end of plant operation (April 30th 2006) and the transfer of the spent fuel casks to the Individual Temporary Storage Facility (approximately 2009).

- Issuing of a modification of complementary technical instruction (CTI) number 25 relating to the *Operating permit* of the Santa María de Garoña nuclear power plant, regarding the inspection programme for welds on stainless steel piping.

- Issuing of complementary technical instructions regarding the *Operating permit* of the Trillo nuclear power plant.

- Authorisation of the revisions of the Site Emergency Plan (SEP) of the José Cabrera, Santa María de Garoña, Almaraz, Cofrentes, Vandellós II and Trillo nuclear power plants.

- Approval of the revisions of the *Operating regulations* of the José Cabrera and Santa María de Garoña nuclear power plants.

- Authorisation for the *Radiological protection service* of the Santa María de Garoña, José Cabrera, Almaraz, Ascó and Cofrentes plants, in keeping with article 24 of *Royal Decree* 783/2001, approving the new *Regulation on protection against ionising radiations.*

- Approval of the revisions of the operating technical specifications of the José Cabrera, Santa María de Garoña, Almaraz, Ascó I y II, Vandellós II and Trillo nuclear power plants.

- Authorisation of the safety study revisions for the Trillo, Ascó II and Vandellós II nuclear power plants.

- Authorisation for an increase in thermal power to 2,952.3 MWt (1.4% of nuclear thermal power), conversion to cold head and replacement of the reactor vessel closure head at the Ascó II plant.

- Non-authorisation and rejection of the change proposal PC-216, revision 0 of the *Operating technical specifications* of the Ascó I plant in relation to the one-off extension of the Type A containment integrated leak rate test.

- Approval of the renewal of the *Operating permit* for the Trillo nuclear power plant for a period of 10 years.

- Favourable appreciation of the *Radioactive waste management plan* for the José Cabrera plant.

- Favourable appreciation for the application of a new core design and analysis methodology for use in replacing part of the *spent* fuel for *fresh* fuel during refuelling. *Modification of the framework specification*, HTP grid fuel assemblies for the Trillo nuclear power plant.

- Favourable appreciation for the non-implementation of *filtered containment venting* within the severe accident response programme and request for a plan for application of the draft Guideline for the performance of a *cost-benefit analysis* as part of the licensing prior to decision-making regarding final implementation, in relation to the design modification allowing for primary *bleed and feed* at Trillo nuclear power plant.

- Favourable appreciation of the proposal for revision 13 of the *Ascó II surveillance manual, volume II* regarding the effects of lifting of the terrain.

- Favourable appreciation for the granting of a temporary exemption from compliance with *Operating technical specifications* 3/4.5.2 and 3/4.5.3 at Ascó I nuclear power plant, until March 1st 2005, with the commitment by the licensee to submit a proposal regarding the changing of these Specifications prior to November 15th 2004.

During 2004 there were refuelling outages at the Almaraz II, Ascó I and II and Trillo nuclear power plants.

2.1.1. Safety improvement programmes

The safety improvement programmes in which significant progress was made during 2004 were undertaken in four major categories: Periodic safety review programmes, Problem identification and resolution programme: *Corrective actions programme*, Human and organisational factors at nuclear facilities and specific inspections at the Santa María de Garoña nuclear power plant of the control rod drive (CRD) penetration bushings.

2.1.1.1. Periodic safety review programmes

The periodic safety review (PSR) performed at the Trillo nuclear power plant covered the following aspects: Operating experience, Experience in relation to radiological impact, Changes to regulations and standards, Equipment performance, Modifications to the facility, Probabilistic safety assessment (PSA) and Updating of the safety assessment and improvement programmes.

Following evaluation of this review, it was concluded that complementary technical instructions relating to the following should be issued:

- Updating of the documentation affecting the PSR incorporating CSN comments, analysis of the US standards issued during the period covered by the PSR affecting the plant licensing basis and not previously analysed, including an analysis of its applicability, and where appropriate a corrective actions plan and its inclusion in the Safety Study.

- Likewise, complementary technical instructions were issued in relation to justification of the environmental qualification of certain items of equipment and to the performance of a programme of hydrogeological studies of the terrain.

2.1.1.2. Problem identification and resolution programme. Corrective actions programme

The programme of measures aimed at improving the regulatory process included identification of the task defined as: Acceptance by the licensee of a solid system for the identification of deficiencies and the establishment, control and tracking of corrective actions, the development and implementation of which was assigned to a working group made up of representatives of the nuclear power plants and the CSN. In order to establish the scope of this task, homogenise it and facilitate its implementation at the plants, the group drew up the documents: Guideline for the self-assessment programme, rev. G, July 2003, and Guideline for the corrective actions programme, rev. G, July 2003, based on documents by international organisations (IAEA and WANO) and by the USA. The self-assessment and corrective actions programmes are the basis for the problem identification and resolution systems of the plants.

At present the plants are involved in the process of implementing the self-assessment and corrective actions programmes, and it is expected that these will be fully operative by the end of 2005.

Implementation of the self-assessment and corrective actions programmes is being undertaken in two phases. The first took place between September 2003 and December 2004 and consisted fundamentally of each of the plants drawing up the corresponding procedures, on the basis of the guidelines developed, developing databases (DB) for the management of the corrective actions programme, delivering training on the programmes, preparing self-assessment programmes and initiating data loading in the DB for the corrective actions programme. The second phase will be carried out from December 2005 and will consist fundamentally of the application, running in and improvement of the programmes on the basis of the experience acquired during the implementation phase.

During 2004 the Nuclear Safety Council has evaluated the plants' procedures and has made visits to all the facilities in order to monitor the implementation of the programmes. In addition, in November 2004 an inspection was performed on the application of a corrective actions programme at the José Cabrera nuclear power plant. This plant had been required to implement the corrective actions programme since early 2003, within the overall set of measures aimed at improving its safety. The *Basic inspection programme* for 2005 includes specific inspections of the problem identification and resolution programmes of three plants, an inspection having been performed at Trillo in February.

2.1.1.3. Human and organisational factors at nuclear facilities

The CSN carries out actions aimed at verifying that the processes used by the licensees to maintain staffing levels and the competence and motivation of both in-house and contracted human resources in all cases guarantee the maintenance and improvement of the safety of their nuclear facilities.

Resolution 18 of the Commission for Economy and the Exchequer, of December 17th 2003, states as follows: *the Nuclear Safety Council is encouraged to continue to verify that the processes used by the licensees to maintain staffing levels and the competence and motivation of both in-house and contracted human resources in all cases guarantee the maintenance and improvement of the safety of their nuclear facilities, and the CSN shall furthermore report on these activities in its Annual Report.*

Resolution 28 of the Commission for Industry, Tourism and Commerce, of December 14th 2004, states as follows: *the CSN is recommended to encourage Unesa and the licensees of the nuclear power plants to promote the prompt implementation at all the plants of the Guideline on the Integrated Management System and to ensure its continuous updating, in which respect it shall periodically provide information in its annual report, giving priority to development of the modules relating to human and organisational factors and having an impact on safety.*

The main activities of the CSN in relation to the issues described in these two resolutions, with emphasis on human and organisational factors having an impact on safety, are dealt with in the following paragraphs.

Implementation of safety management systems and systems for the management of investments in nuclear facilities

As regards safety management systems, in 2003 the electricity industry submitted a proposal to the CSN for the implementation of this type of systems at nuclear power plants. The José Cabrera plant was already developing such a system as a result of the Condition established in its *Operating permit* issued in October 2002. During the early months of 2004 the CSN provided comments to the sector on this proposal through the mixed CSN-Unesa working groups. Finally, in July 2004, Unesa issued its document Unesa CEN-10 (Rev. 0): *Guideline on the Integrated Management System*.

The guideline establishes the necessary scope and content of an integrated management system, including five major elements: *Organisation, Planning, Performance, Assessment and Action*. The *Organisation* element establishes the need to determine the structure, functions and resources of the organisation, as well as its responsibilities, also paying attention to the human factors issue, to communications and to the interface with external organisations. Within the *Planning and Action* elements the guideline includes the investments management system, the guideline on which had been approved by the CSN in 2003. The development of the organisation's mission, vision, values and policies, the setting out of these in medium-term strategic plans and their specification in annual operating plans are commitments embodied in the *Planning* element of these systems. Within

the element *Performance* a process model developed by the NEI (US Nuclear Energy Institute) is taken as a reference, integrating strategic, operational, support and improvement processes. The element *Assessment* includes external assessments, independent internal assessments and self-assessments throughout the organisation. Within the assessment of the integrated management system itself, the guideline establishes the configuration of the system as a learning system that, depending on the consequences, allows action strategies to be adjusted (simple loop learning) or the variables of government, such as policies, objectives, rules, etc., to be adapted (double loop learning) on the basis of experience.

The publication of this guideline in 2004 represents an important qualitative leap in the Spanish nuclear industry, since although it includes many elements that existed previously, it integrates them in a single and harmonious system in which safety management is part of an integrated management system and where there is the possibility of especially developing human and organisational aspects having an impact on safety. This Unesa guideline is in line with international initiatives, both in the nuclear industry and in other industries with high reliability requirements, for the development of integrated management systems.

The next step taken by the sector in 2004 was to start the implementation of this guideline at each of the Spanish nuclear power plants, transposing the principles of the guideline to the specific procedures of each plant. The development programme contemplated the preliminary implementation of these procedures in September 2004, and definitive implementation in December 2005. Throughout 2004 the plants have developed these procedures, albeit it not in full, and the date foreseen for definitive implementation remains unchanged.

The CSN has requested these specific procedures, some of which are now being received, in order to undertake their assessment and design a strategy for tracking and supervision of the operation and results of the integrated management systems. At present this CSN strategy consists of incorporating this initiative in the CSN nuclear power plant supervision programme (IPSS), this consequently meaning the development of procedures for the inspection of this issue throughout 2005.

Given that the management of investments is one of the processes included in the integrated management systems, the CSN supervision in this area is expected to be embedded also in the inspection of these systems. In 2004 the licensees developed the investments management procedures for each nuclear power plant and this systematic approach has now begun to be applied to the budgets for 2005.

The situation of the José Cabrera nuclear power plant represents a specific case, inasmuch as it has moved ahead of the other plants in the implementation of its safety management systems. This situation is analysed below in the section *Specific actions at José Cabrera nuclear power plant.*

Programmes for the assessment and improvement of safety in organisational and human factors

The safety assessment and improvement programmes on organisational and human factors were required of the nuclear power plants by the CSN in association with the periodic safety reviews as of the end of 1999.

Although the nuclear power plants are improving the implementation of these organisational and human factors programmes, they do not yet have specialists in scientific disciplines other than the purely technical, specialists who might provide new points of view and strategies for the resolution of issues relating to the working environment, mo-

tivation of the personnel, etc. In 2004 some nuclear plants, such as Santa María de Garoña and Trillo-Almaraz have incorporated specialists in these disciplines.

Through its inspections of the status of implementation of these programmes, initiated in late 2002, the CSN is attempting to strengthen the improvement of these aspects. In 2004 the degree of implementation of the programme was inspected at the Trillo and Almaraz plants.

Integration process inspections

In 2000 the CSN carried out an inspection of the Almaraz-Trillo nuclear power plants association in order to check the process being applied by the licensee, its degree of implementation and future forecasts regarding the organisation for joint management. This same type of inspection was repeated in 2001 at the Ascó - Vandellós II plants. In both integration processes a reduction in human resources was foreseen, as a result of the optimisation achieved through joint operations. In the case of Ascó-Vandellós II, the initiation of integration brought with it a labour force adjustment plan affecting all the personnel reaching the age of 52 before the end of 2003. In the case of Trillo-Almaraz the labour force adjustment plan has been divided into two stages and was not initiated at the moment of integration. In both cases, and as a result of the inspections of the integration processes, the CSN transmitted to the licensee certain possibilities for the improvement of specific aspects.

In the case of Ascó-Vandellós II, where integration and the optimisation of human resources began earlier than at Trillo-Almaraz, the most significant phase of this period of resources reduction ended in 2004, this constituting an opportune moment to weigh things up and re-assess the management of the facility, reconsidering the suitability of the human resources for the current situation and the future needs for safe operation of the plants. The CSN is tracking the activities of the licensee through assessments and inspections.

Complementary Technical Instructions on the reduction of human resources and the organisational change management procedure

- In response to the first CTI, all the nuclear power plants submitted the study requested. This was reviewed by the CSN and, as a result, letters were sent to the licenses at the beginning of 2002 with the preliminary conclusions of the assessment, requesting certain additional analyses or justifications regarding specific aspects of the study. The plants responded to these requests.

  At the end of 2004, and as a result of the organisational changes that had affected their *Operating regulations*, the José Cabrera and Santa María de Garoña plants provided the CSN with a revision of their minimum staffing and technical capacity studies, adapting them to the new organisation.

- As regards the second CTI, the licensees implemented their change supervision and control mechanisms. All the nuclear power plants developed and implemented specific administrative procedures on this issue, establishing responsibilities, the scope and criteria of analysis and the documentation to be applied in assessing these changes.

  In addition to the CTI itself, since 2002 the CSN has been urging the licensees of the nuclear power plants to extend the scope of these procedures to include any organisational change taking place at the facility, and not just those implying a reduction in human resources. This situation in fact already exists at all the Spanish Plants, which have these larger scope procedures. An additional element is that all the nuclear facilities have explicitly incorporated in their nuclear safety and radiological protection functions, included in the *Operating regulations*,

those relating to the implementation of a safety management system contemplating the analysis, supervision and control of the impact on safety of organisational changes, regardless of their nature.

- Finally, in the third CTI the licensees submitted to the CSN, in the first quarter of 2002, 2003 and 2004 the annual reports corresponding to the previous years, where they specified and justified the changes that had occurred in those years in relation to the optimisation of human resources.

  In this respect it is considered that the licensees are responding to the requirements established by the CSN for supervision and control of the impact that staffing changes might have on safety.

Specific activities at the Vandellós II and Ascó nuclear power plants

A significant activity in this area relates to the analyses required of the Vandellós II nuclear power plant in the wake of the identification of management deficiencies that led to the rupturing of a manhole on a train B pipe of the essential services water system in August 2004, the equivalent components of train A also being degraded.

The CSN required the licensee to carry out significant in-house and external analyses to identify the causes, including the organisational and management causes that had allowed the system to degrade to unacceptable conditions. The CSN itself set up a working team in charge of performing its own independent analysis, for comparison with the analyses and action plan requested of the licensee for mid February 2005.

It is expected that action plan and additional actions to be adopted by the licensee during the 2005 refuelling outage will serve to satisfactorily resolve these deficiencies. The CSN will continue to supervise in detail the action plan developed by the licensee and its implementation.

Likewise, and in view of the large number of operating incidents relating to human actions that took place at the Ascó nuclear power plant in 2004, the licensee decided to undertake a collective analysis of the incidents of this type that had occurred over the last two years, submitting to the CSN a plan with actions for improvement. The CSN also set up an inspection team, which supervised and assessed the suitability of this plan.

Specific activities at the José Cabrera nuclear power plant

At the same time, in view of the special situation of the José Cabrera nuclear power plant, which already has a date announced for its end of operations, and considering the consequences for nuclear safety that might derive from this circumstance, the plant has a condition associated with its last operating permit that required that before April 14th 2003 it develop and submit for CSN approval an *Integrated Safety Management System* guaranteeing the availability of a sufficient number of duly qualified and motivated personnel for the safe operation of the facility up to the definitive interruption of its operations.

This proposal was submitted by the licensee and subjected to CSN assessment and supervision throughout 2003; one point remains to be resolved, in relation to independent external assessments of the strategic management. As has been indicated above, in describing the status of the integrated management systems, in 2004 Unión Fenosa Generación performed this external assessment of the strategic management of the plant. José Cabrera sent a note to the CSN informing of the satisfactory results and the lines for improvement on which it would continue to work.

Likewise, as an integral part of its safety management system, the José Cabrera nuclear power plant

has since October 14th 2002 had another condition associated with its operating permit, relating to the need to submit for CSN approval, and prior to January 14th 2003, a systematic approach for the management of safety-related investments.

The systematic approach to the management of safety investments at the José Cabrera plant, which consequently also had to cover investments in organisational aspects, was supervised, assessed and inspected by the CSN throughout 2003. This assessment was completed in 2004 and considered to be acceptable. This systematic approach is now implemented at the José Cabrera plant.

Another significant activity in this area also relates to the José Cabrera nuclear power plant and has to do with the organisational analysis required of the plant in the wake of the events that occurred at the beginning of 2002 in the essential services water system. In October 2002 a consulting company of recognised technical experience and independent from Unión Fenosa Generación performed an organisational analysis of the José Cabrera nuclear power plant. This analysis focussed on three fundamental aspects: personnel structure and staffing, the safety culture and the design basis review process. The analysis techniques used were a documentary review and, very especially, interviews with a significant sample of the personnel of the facility, around 50 plant and contracted personnel occupying different work posts in the organisational structure of the facility.

In January 2003, and as a result of this analysis, the José Cabrera plant submitted to the CSN an organisational action plan, which was approved by the Council in February of that year. This action plan addressed issues relating to the staffing of certain departments, the development of an internal communications plan, the development of a professional future plan, etc. Likewise, the CSN required the licensee to systematically repeat the previous organisational analysis (personnel interviews) in order for the Council to assess whether the interventions contemplated in the action plan designed by Unión Fenosa Generación were achieving the improvement objectives pursued at the plant. In 2003 two additional analyses were performed, in April and October, and the licensee developed specific indicators based on this approach. In 2004 the licensee repeated this analysis, with suitable results.

The CSN has performed, and plans to continue throughout the rest of the operating period of the plant, a meticulous tracking of the evolution of these aspects.

Specific activities at the Trillo nuclear power plant

Another significant activity in 2004 has been the decision taken by the Trillo nuclear power plant to voluntarily accept the performance of an organisational analysis via an independent external company. For this purpose a specific methodology has been used, this having its origins in the USA, subsequently developed fully in Canada and now adapted to the Spanish nuclear framework by way of an R&D project with the participation of Unesa, the CSN and Ciemat. This methodology was successfully applied for the performance of organisational analyses at the Santa María de Garoña nuclear power plant in 2001, at Ascó in 2002 and at Cofrentes in 2003.

This methodology was applied at Trillo in the autumn of 2004, and the presentation to the licensee of the final results report is foreseen for April 2005. The licensee will adopt the appropriate improvement measures depending on the results of the analysis.

Labour force adjustment plans at the Trillo-Almaraz and Cofrentes nuclear power plants

In 2003 labour force adjustment plans were approved at the Almaraz-Trillo and Cofrentes nuclear power plants. In the case of Almaraz-Trillo, the

plan is applicable to the personnel of departments at both plants (since in 2001 a plan was signed for the personnel of the corporate or common departments) reaching the age of 58 prior to the end of 2007. In the case of Cofrentes it is applicable to all the members of the personnel reaching the age of 58 before the end of 2006. In both cases presentations have been made to the CSN on the specific characteristics of the redundancy plans and of the management systems implemented and foreseen to guarantee that they will have no negative impact on safety. Since then technical assessment meetings have been held with the licensees. The supervision of each of these plans is scheduled to continue throughout 2005.

Contracted personnel

In February 2004 the CSN set up a multidisciplinary working group to undertake the preparation of an action plan relating to the use and supervision of contractor companies by the licensees of the nuclear power plants. Obviously, one of the issues to be addressed by this group was verification of the processes used by the licensees to ensure that the human resources contracted guarantee the maintenance and improvement of safety at all times.

This action plan was drawn up and, as part of it, two pilot inspections were performed in 2004 at the Trillo and Santa María de Garoña plants

CSN inspections programme

Finally, through its inspection programme the CSN verifies whether the activities of the licensees in relation to each of the issues involved in nuclear safety and radiological protection are adequate and, where appropriate, if they might be affected by staffing changes. Likewise, the CSN regularly monitors the nuclear power plant personnel training programmes and checks whether the reportable events occurring at the plants might spring from causes associated with human resources management.

During 2004, 176 inspections have been performed at the nine operating nuclear power plant groups.

These included five multidisciplinary risk-informed inspections aimed at verifying the capacity of certain systems to perform the function for which they were designed. These systems were selected from among the most important for safety at each plant, in accordance with the corresponding PSA. This type of inspection implies the intervention of some seven inspectors over two weeks, an effort equivalent to that of at least five traditional inspections. As a result, the inspection effort has been similar to that of the two previous years, when 203 and 209 inspections were carried out, respectively, at the nuclear power plants.

With a view to improving and reinforcing inspection, and taking into account resolution 23 of the Commission for Economy and the Exchequer of the Lower House of the Spanish Parliament, dated October 9th 2002, which urges that *the inspection of nuclear power plants be reinforced to achieve 100% compliance with the basic inspection programme and implement inspection techniques prioritising CSN and licensee staff efforts in areas of greatest safety significance*, since the beginning of 2002 the CSN has carried out –as the first step in a farther ranging project– weekly tracking of the planning and performance of the *Basic inspection programme*, with the objective of ensuring that this programme is performed fully.

The content of the *Basic inspection programme* has been fully covered during the period 2003-2004, this consisting of a set of inspections covering different significant plant operations areas having a frequency of at least once every two years. The inspections scheduled within the basic programme for the period 2003-2004 totalled 220, and 250 were effectively carried out, since certain of the areas are inspected once a year instead of once every two years. Among these mention may be made of the inspections of the annual emergency drills, the

inspections of the plant security systems and inspections relating to activities associated with plant refuelling outages, which are performed during each such outage (every 12 or 18 months).

As regards the human resources dedicated to inspection activities at nuclear power plants, such efforts have increased systematically in recent years, although it is now estimated to have reached a level such that no further increases will be required. The number of hours dedicated to these inspections in recent years has been as follows: 50,301 in 2004, 49,789 in 2003, 41,070 in 2002 and 31,389 in 2001. Prior to 2001, the effort was stable at around 30,000 hours. With the new risk-informed inspection system to be applied as from 2005, it is expected that around 50,000 hours will be sufficient to meet the safety objective mapped out.

Considerations regarding activities in this area

Approaches such as process-based regulation, which attempts to ensure that the processes established by the licensee for the performance of analyses are based on the best criteria available internationally and performed by experts, are increasingly being widely accepted by European regulators. It is this approach to assessment of the processes implemented by the licensees, and even the strengthening of the implementation of such process by the licensees where applicable, that the CSN is attempting to promote in this area. The integrated management systems that have begun to be implemented at the nuclear power plants during 2004 underline this course of action and should constitute a platform supporting the continuous improvement of human and organisational aspects.

The incorporation of this vision of supervision of these aspects in the framework of the CSN's *Integrated Plant Supervision System* (IPSS) will be one of the challenges for 2005.

2.1.1.4. Specific inspections of control rod drive (CRD) penetration bushings at Santa María de Garoña nuclear power plant

The inspections performed during the refuelling outages in 1999 and 2001, and more so that carried out during the refuelling outage (RO) in 2003, revealed new defects located in areas different from those considered normal (*areas below the J-weld root*) in bushings incorporating mechanical seals. According to the inspection results reports on inspections carried out during recent refuelling outages and the verifications performed in relation to the results of inspections carried out during RO-2003, on bushings that had been sealed –five in 1998 and one in 1994, during the inspection performed on March 11th– the new crack indications appear in areas above the root of the *J-weld*, confined within the mechanical seal, with others below the *J-weld* root at the lower end of the mechanical seal, coinciding with the graphite gasket of the seal and probably in contact with the reactor water.

In view of the circumstances, the CSN considered it necessary for Nuclenor to establish criteria to reorient future inspection plans towards more efficient approaches, such that by using the most modern ultrasonic techniques it might be possible to maximise knowledge of the condition of the bushings, in order to meet the requirements of preventing the appearance of leakage during the operating cycle and maintain the structural guarantees of the *Control rod drive* (CRD) penetration bushings, and to submit the contingency plan that would be applied in the event of the action criterion relating to structural integrity being exceeded.

During part of 2003 and throughout 2004 several meetings were held with Nuclenor with a view to drawing up the action plan for surveillance of the control rod penetration bushings, with consideration given to the new situation. During the meetings the following points were dealt with: a) establishment of different criteria to be applied in

defining the inspection programme to be carried out during the next refuelling outage in 2005; b) presentation of the process to be applied in the event of an action criterion relating to structural integrity being exceeded, consisting of repair by rolling; and c) submittal of an additional contingency proposal, consisting of weld repair of the vessel bottom housing. To date mechanical seals have been installed on 55 penetrations, of a total 97, this representing 55.7%. As regards the rest of the penetrations, 31 have been seen not to have defects and 11 have defects with remaining thicknesses in excess of the limit value established (11.3%). The status of the vessel has not varied as regards the number of penetrations sealed, with defects or healthy, since it has not been necessary to install any new seals on penetrations that were not previously sealed.

In relation to these issues, in 2004 Nuclenor submitted its control rod drive (CRD) penetration bushing inspection programme for the 2005 refuelling outage, which was assessed by the CSN.

During this same year different technical aspects relating to the objective and the criteria for application of the process of repairs by rolling were discussed.

2.2. Fuel cycle facilities, wastes disposal and research centres

In 2004 the CSN performed 45 inspections and issued 11 decisions, eight favourable appreciations, no temporary exemption, no sanctions proceeding, no technical instruction and no warning in relation to this type of facilities.

The following were among the most important proceedings:

- Authorisation of *revision 16 of the operating regulation* for the Juzbado fuel manufacturing facility.
- Authorisation of the modification due to the recent implementation of the PWR fuel rod store in the mechanical zone of the Juzbado fuel manufacturing facility, as well as of the changes arising therefrom in chapter 4 of the *Safety study* of the facility.
- Authorisation for the modification due to the implementation of the new continuous oxidisation furnace and of the modifications deriving from chapters 4 and 7 of the facility safety study and certain sections of the operating specifications.
- Authorisation for El Cabril for the use of reconditioned waste package disposal units of 400 and 480 litres for the José Cabrera and Almaraz nuclear power plants.
- Authorisation of revision 6 of the *Operating regulation*, of revision 5 of the *Safety study* and of revision 5 of the *Emergency Plan*, adapted to the new situation of definitive shutdown of the Quercus plant.
- Favourable appreciation of the modification of chapter 10 of the *Accident analysis*, in reference to radiological consequences following the incorporation of the new dose conversion factors of the new *Regulation on protection against ionising radiations*, leading to revision 19 of the *Safety study* of the Juzbado fuel manufacturing facility.
- Favourable appreciation of the design modification relating to the conditioning of aggregate wastes from the Acerinox incident and other similar materials at El Cabril.
- Favourable appreciation of the *Environmental impact study* for the complementary installation for very low level wastes at El Cabril.
- Favourable appreciation of the *Radiological protection manual* applicable to the definitive shutdown of the Quercus plant.

- Favourable appreciation for the implementation of the modification to the Ciemat IR-03 facility, *Radiological protection laboratory*.

At the Juzbado fuel assembly manufacturing facility, 293,697.503 kg of enriched UO_2 powder and 6,583.339 kg of powder of natural uranium were received during 2004, and the following fuel assemblies were dispatched to different Spanish and overseas nuclear power plants: 524 pressurised water (PWR) type containing 210,099 kg of uranium and 387 boiling water (BWR) type containing 68,366 kg of uranium, plus 828 gadolinium rods for Westinghouse (Columbia-USA) containing 1,588 kg of uranium and six rods for Paluel (EDF-France) containing 12 kg of uranium.

The total amount stored at the facility was in all cases below the authorised limit of 400.00 kg/year of uranium. Likewise, other minor amounts also left the facility: 25 kg of uranium for *Panreac* (Barcelona), 0.064 kg of uranium in samples to the IAEA, 0.021 kg of uranium for Ciemat, 0.077 kg of uranium for *British Nuclear Fuel Ltd* (BNFL) (England) as recoverable dirty wastes in the transport bags themselves, 0.162 kg of uranium as samples for BNFL (England) and 59 drums of non-recoverable wastes to Mississauga (Canada), containing five kg of uranium.

During 2004 the El Cabril facility received 2,468 packages or containment units, plus 17 samples, of low and intermediate level radioactive wastes:

- 1,373 from the nuclear facilities, plus 17 samples.
- 973 from radioactive facilities.
- Two arising from the incident that occurred at the scrap, iron and metal fragmentation facility belonging to Daniel González Riestra, S.L. (Gijón, Asturias) and 120 from the Sidenor Industrial installation (Reinosa, Cantabria).

During 2004 characterisation studies and tests were performed on real waste packages from nuclear power plants at the facility's quality verification laboratory. Different studies were also carried out on specimens manufactured with simulated wastes in order to determine the quality of the final product depending on the type of cement, dosing, presence of undesirable compounds, etc. Furthermore, radiochemical tests were undertaken using non-conditioned wastes to check the evolution of the scaling factors and associate the alpha emitter activity value of waste batches. The laboratory received 17 samples of non-conditioned wastes from nuclear facilities. In addition, characterisation tests were performed on samples of wastes generated at radioactive facilities, as well as the study of historic packages located in the disposal modules of the installation.

Also during this year the occupation of Cell N-2 was completed and disposal operations began in N-9. As of December 31st 2004, the number of completed cells amounted to 14, all of them having been closed, with the exception of N-2, which is the process of closure. The total number of waste packages disposed of in the cells is 94,127. Likewise, 108 ISO containers with wastes from the steelyard incidents have been temporarily stored in cells 26, 27 and 28 on the *south platform*. In the *north platform* there are 15 similar containers with wastes from the latest incidents.

Activities at the Quercus plant focussed throughout 2004 on the treatment of liquid effluents (short-lived waters and overflow liquids from the tailings dyke) for conditioning and release, as well as on the maintenance of these sections, and 5,939 tons of neutralisation sludges have been generated, these having been deposited in the tailings dyke, which now contains a total 895,163 tons of such sludges.

As regards the treatment of liquid effluents, a total 473,782 cubic metres of short-lived waters and

106,768 cubic metres of dyke waters were treated during 2004.

There has been no case of non-compliance with the limit conditions for operation throughout the year, nor any incident having radiological repercussions on the workers or the environment.

Ciemat has continued with the radiological characterisation of the areas of the centre pending rehabilitation. By the end of 2004, Ciemat had concluded rehabilitation activities in 14 of the 24 areas contemplated in the project and work continues on the rest.

During 2004 Ciemat has completed dismantling work on installation IN-03, the fuel assembly development plants for research reactors, within the framework of the dismantling plan favourably looked upon by the Nuclear Safety Council in 2002. Ciemat will shortly request the *Decommissioning statement* for this nuclear facility from the Ministry of Industry, Tourism and Commerce.

Ciemat has decided to apply for a decommissioning statement for installation IN-04, metallurgical hot cells, for unconditional release of the building for non-regulated uses. In this respect, 2004 has seen the restart of the activities contemplated in the decontamination and dismantling plan for the installation, approved by the Nuclear Safety Council in 1993.

For its part, throughout 2004 the CSN has continued with the assessment of the documentation submitted in support of the request for the Ciemat installations dismantling project, several written communications having been sent to the licensee requesting additional information in this respect.

As regards preparatory activities for the dismantling of the IN-01 installation, 2004 has seen the conclusion of the release of the water stored in the pool of the JEN-1 experimental reactor. This release was performed under constant supervision by the centre's *Radiological protection service* and has complied at all times with the safety and radiological protection requirements imposed by the Nuclear Safety Council, without there having been any risk for the population or the environment.

In relation to this installation, the CSN responded to the request issued by the delegate of the council for the environment and services of the City Council of Madrid in relation to releases of water from the pool of the Jen-1 nuclear reactor.

2.3. Facilities in the dismantling and decommissioning phase

In 2004 the Nuclear Safety Council performed 16 inspections and issued three decisions, one favourable appreciation, no exemptions, no technical instructions and no warnings or sanctions proceedings with respect to this type of facilities, which are subject to specific surveillance and control programmes.

The following may be singled out as being especially important:

- Authorisation for the dormancy phase at the Vandellós I facility.
- Authorisation for 2004 of revision 3 of the *Operating regulation* of the Elefante plant, adapting it to the new organisation of Enusa resulting from the definitive interruption of activities at the Quercus plant.
- Favourable appreciation for decommissioning of the restored site of the Lobo-G plant.

The strategy chosen for the dismantling and decommissioning of the facility within the framework of the *Dismantling and decommissioning plan for Vandellós I (DDP)* contemplates three period or phases of development. The completion of the first

of these phases has left the unloaded reactor with its internals and control systems in a period of waiting and decay known as the latency or dormancy phase.

Following the dormancy period, which is scheduled to last 25 years, the reactor shroud will be disassembled and dismantled in order to completely release the site.

The phase that has recently been completed began in January 1998 following authorisation for the transfer of ownership of the facility to Enresa. Various dismantling activities have been carried out during this phase in the active parts of the facility, simultaneously with the disassembly of other conventional components that also required the demolition of various non-active structures and buildings.

Other important activities that took place during this completed phase related to the confinement of the reactor shroud and the placing in service of new systems designed specifically for the latency of the installation, which will allow the reactor shroud to be kept controlled under suitable conditions of isolation throughout the entire dormancy period.

As of the end of 2004, the degree of progress made in dismantling of the active parts was 100%, and the facility is now pending only administrative authorisation for the new latency phase.

This first phase also initially contemplated release from regulatory control of a part of the site, the dormant facility being left located on a significantly reduced part of the site than was originally occupied. In 2004, and following various considerations, Enresa changed its licensing strategy for the installation, proposing that the partial release of the site be postponed for a stage subsequent to the authorisation of the dormancy period of the facility.

The most immediate activity to be performed once the latency period of the facility has begun is the release from regulatory control of the remaining part of the site. This release of the terrain, which is scheduled for performance during 2005 under the direct supervision of the CSN, will imply renewal of the ministerial authorisation.

In the case of the future dismantling of the José Cabrera nuclear power plant, the *General Radioactive Waste Plan* currently in force contemplates the transfer of ownership from Unión Fenosa Generación (UFG) to Enresa, which will act as licensee throughout the rest of the dismantling. This strategy contemplates the existence of two entities having different responsibilities, on which the regulatory control of the dismantling process will centre.

Certain key activities for efficient regulation of the process are among the responsibilities of both licensees, this requiring a clear differentiation of responsibilities and coordination from the regulatory point of view. Thus, the *Basic strategies study* for the dismantling of the José Cabrera nuclear power plant, of July 2003, includes the following action programme:

- Licensing of the spent fuel storage system (casks) in the period 2004-2006 (responsibility of Enresa).

- Construction, during the period 2004-2006, of the *Individual temporary storage* (ITS) facility for the irradiated fuel assemblies (responsibility of UFG).

- Submittal of the first documentation on the *Dismantling and decommissioning plan* (DDP) in 2005 (responsibility of Enresa).

- Shutdown of the plant in April 2006 and subsequent conditioning of the operating wastes (responsibility of UFG).

- Cooldown of the last core and removal of fuel assemblies from the pool by 2009 (responsibility of UFG).

- Transfer of ownership and authorisation for dismantling in 2009 (responsibility of Enresa).

- End of dismantling and restoration of the site scheduled for 2015 (responsibility of Enresa).

Taking into account the aforementioned considerations, the CSN decided to set up an interdisciplinary working group with the basic objective of proposing the most adequate licensing and control strategy, in keeping with the international and national standards, guaranteeing the safety of all the operations foreseen.

This working group was constituted in September 2003 and was made up of CSN technical experts in different speciality areas. Subsequently, technicians from Unión Fenosa Generación, Enresa and the Ministry of Economy (current Ministry of Industry, Tourism and Commerce) joined the group.

At present, with the plant still in the operating phase, numerous preparatory activities are being carried out with a view to future dismantling. As a result, the first of the mandates established for this group has been to coordinate regulatory activities relating to the preparation for and performance of the dismantling of the plant.

The most significant regulatory milestones to be achieved throughout the dismantling process are as follows: *Declaration of plant definitive shutdown*; *Authorisation for transfer of ownership and authorisation for dismantling* and the plant *Decommissioning declaration*. Given the aforementioned authorisation process, four successive stages have been mapped out as regards the scheduling of the group's tasks:

- *Final operating stage* (regulatory activities prior to the declaration of definitive plant shutdown)

- *Transition stage (*regulatory activities prior to the transfer of ownership to Enresa).

- *Dismantling stage* (regulatory activities prior to dismantling of the active or conventional parts of the facility).

- *Decommissioning stage* (regulatory activities relating directly to the plant decommissioning declaration).

Throughout 2004 the following activities relating to the future dismantling of the José Cabrera nuclear power plant have been carried out:

- Evaluation of the request for authorisation of the performance and assembly of the spent fuel storage system design modification. This modification consists of constructing an individual temporary storage facility for 12 casks containing the plant's spent fuel assemblies, a further six casks for storage of the reactor internals, etc.

- Throughout 2005, and in relation to the dismantling of José Cabrera, the fundamental activities will be the licensing of the individual temporary storage (ITS) facility and the preparation of the limits and conditions of the *Declaration of Definitive Shutdown.*

At the Elefante Plant, 2004 has seen the conclusion of the dismantling process, which has included the extension of 33 spent mineral beds previously occupying an area of 24 hectares. 3.9 million tons have been moved, forming a new configuration with a maximum slope of 20% and covering a surface area of 65 hectares.

The whole has been covered with a multiple layer measuring 2.3 metres in thickness, made up at the base by 0.90 metres of clay material covering the surface of the remodelled beds and acting as a protective layer against the emission of radon. Over this has been laid a layer of mining tailings

measuring 90 cm in thickness that acts as a protection against erosion. Finally, a 50-centimetre layer of topsoil has been laid, in which different native plant species have been planted.

In December 2004 the final dismantling works documentation was submitted, including a proposal for a surveillance and control programme for the period of compliance.

Three inspections were carried out at the *Andújar uranium mill* (AUM) in 2004, with a view to verifying the general, hydrological and geological conditions imposed by the surveillance and maintenance plan for the site period of compliance. No significant deviations with respect to the programme established were encountered. The programme aimed at determining the scope of the effects of burrowing animals and the plant life at the restored site was considered adequate.

At the Lobo-G plant at La Haba five site inspection were performed in 2004, three to verify the general, hydrological and geological conditions imposed by the surveillance and control plan for the period of compliance and two to verify compliance with the conditions imposed in the Ministerial Order for decommissioning. No significant deviations with respect to the programmes established were encountered.

2.4. Radioactive facilities

The Council estimates that the operation of the scientific, medical, agricultural, commercial and industrial radioactive facilities has been accomplished throughout 2004 within the safety standards established and that the measures required to ensure the radiological protection of people and the environment have been adhered to, no undue situations of risk having, therefore, arisen.

The activities of the CSN in relation to the radioactive facilities include a number of strategies, among which the following may be singled out:

- Simplification of the processes of authorisation and modifications.
- Progressive adoption of the elements of risk-informed regulation.
- Incorporation of the new requirements on the technological safety and security of radioactive sources and the control of high level radioactive sources and stray sources.
- Updating of the system of penalties.
- Updating of the requirements applicable to medical radiodiagnosis equipment and facilities.
- Facilitate compliance with the requirements for the licensees, avoiding unnecessary regulatory requirements and arrangements in all cases.
- Establishment of a system for the analysis and recording of operating experience at radioactive facilities. Application of a system for the classification of incidents depending on their safety significance.
- Increased inspection activities regarding practices implying the greatest risk, such as industrial gammagraphy, and promotion of the renewal of older equipment.
- Reinforcement and systematisation of the medical X-ray facility control process.
- Signing of new assignment agreements with Autonomous Communities interested in participating in the system and improvement of existing agreement through enhanced coordination and joint preparation of action programmes and

the development of support tools based on new information technologies.

The second article of the Law by which the CSN was created empowers the organisation to draw up and approve technical instructions and circulars applicable to radioactive facilities. The Regulation on nuclear and radioactive facilities empowers the CSN to issue complementary technical instructions directly to the licensees of authorisations in order to guarantee the maintenance of the safety conditions and requirements of the facilities and better compliance with the requirements included in the authorisations. The generic activities performed by the CSN during 2004 in application of these provisions are briefly described below:

- *Technical instruction* to all industrial gammagraphy facilities requiring that gammagraphy operations be performed by operators accompanied by at least one assistant. It is likewise established that during such operations a radiation monitor and a direct reading dosimeter should be available, the integration of these two devices in a single item of equipment not being considered a good practice.

- Circular to all authorised industrial gammagraphy facilities reminding them of the obligation to notify the CSN of all events in which the sources cannot be retracted to their safety position inside the gammagraphs. Given that these are events typically contemplated in the emergency procedures of such facilities, certain licensees interpreted that if the problem was resolved as laid out in the procedures, notification was not necessary.

- Circular to authorised industrial gammagraphy facilities informing them of an incident that occurred at one such facility due to the failure to use radiation detection and measuring equipment. It was pointed out to the licensees that, in order for events of this nature not to be repeated in the future, it is especially important that the responsible supervisors carry out their radiological protection planning tasks for mobile gammagraphy interventions in accordance with their operating regulations, and that the operators and assistants adhere strictly to the established operating procedures, which should explicitly state that the lack of any of the radiation detection and measuring resources (radiation meter, TLD or DLD) rules out performance of the work, since it implies a reduction of the safety and radiological protection conditions.

  Also indicated is the need to make additional efforts to improve the periodic training received by the operators and assistants on radiological protection, in order for them to understand and value the importance of adhering to the procedures, both for their own safety and that of the public.

- Circular to healthcare centres with nuclear medicine facilities, indicating the measures to be adopted to facilitate to the maximum extent the operations of unloading and delivering radioactive material, with a view to reducing the dose received by the personnel responsible for the movement of the packages and by the members of the public in the vicinity of unloading or transit areas.

  Throughout 2004 the application of the INES (international nuclear events scale) for the classification of events at Spanish radioactive facilities has continued as a test exercise. The objective of this scale is to establish a mechanism for quick and coherent communication to the public of the impact of events occurring at facilities and relating to safety. Application of the *Additional INES scale guideline on events in transport and at radioactive facilities of May 26th 2004*, has now begun, the preparation of this guideline having included the participation of CSN experts, as

part of the corresponding working group set up by the IAEA.

Described below are the main activities performed by the CSN during 2004 in relation to the 25,399 radioactive facilities, 1,330 authorised radioactive facilities (one 1st category, 994 2nd category and 335 3rd category) and 24,069 diagnosis X-ray installations registered in the different Autonomous Communities.

The CSN undertakes the control of these facilities directly and through the Autonomous Communities with which it has signed assignment agreements.

During 2004, 358 decisions were issued in reference to radioactive facilities, 239 of which were undertaken by the CSN staff itself, as detailed below:

- 31 for operating permits for 2nd category facilities.
- 12 for operating permits for 3rd category facilities.
- 38 for decommissioning declarations.
- 158 for the authorisation of different modifications.

The 119 remaining licences evaluated were dealt with by the technical personnel of the Autonomous Communities having function assignment agreements.

Catalonia

- 10 for operating permits.
- 11 for decommissioning declarations.
- 60 for the authorisation of different modifications.

Balearic Islands

- One for an operating permit.
- Two for different modifications.
- Two for decommissioning declarations.

Basque Country

- Four for operating permits.
- Five for decommissioning declarations
- 24 for authorisations for different modifications.

The following may be singled out from among the control activities undertaken:

- 1,634 inspections, of which 794 were carried out by the CSN and 840 by the corresponding services of the Autonomous Communities having inspection assignment agreements (327 in Catalonia, 188 in the Community of Valencia, 71 in Galicia, 143 in the Basque Country, 90 in Navarre and 21 in the Balearic Islands).
- Review of 1,188 operating reports (172 annual reports from radioactive facilities, 800 annual reports from medical diagnosis X-ray facilities and 216 quarterly reports from commercialisation installations).

It should be pointed out that the annual inspections performed with respect to hospital radiological protection services include the indirect control of the operation of the radioactive and X-ray facilities of the hospitals themselves and of the X-ray facilities of the healthcare centres covered by these services (healthcare centres, specialist centres and other hospitals).

Analysis of the minutes generated during the inspections, of the annual reports by the facilities, of the information on radioactive materials and equipment supplied by the commercialisation facilities and of the waste management data provided by Enresa, gave rise to the issuing of 167 control letters directly by the CSN and 173 by the service exercising functions by assignment in Catalonia and in the

Basque Country relating to various technical aspects of facility licensing and control.

Likewise, as a result of the facility assessment and control inspection activities described above, the CSN proposed to the competent industry authority the launching of 21 sanctions proceedings, of which nine were proposed by the Regional Government of Catalonia and one by the Basque Country. Also, 93 warnings were issued by the CSN, six by the Regional Government of Catalonia and 17 by the Basque Country, identifying the deviations encountered and requiring that the licensee correct them within two months.

The causes most frequently leading to sanctions proposals are the performance of activities requiring authorisation without such authorisation having been provided, operation of the facilities by unlicensed personnel and non-compliance with the instructions and requirements imposed.

Two operations suspension orders were imposed as a result of non-compliance with the corrective actions required by the CSN in the corresponding warnings. Likewise, five fines have been applied, one to an industrial facility, one to a commercialisation installation, two to radiodiagnosis facilities and one to an unauthorised installation.

Mention should be made also in relation to control of the response to denouncements, of which there were 21 during 2004, two in relation to industrial facilities, two to medical facilities, one to a RPS, 12 to radiodiagnosis installations and four miscellaneous reports. In all these cases, the denouncing party was informed of the condition of the facility in question or of the activities performed by the CSN in relation to the events denounced and corresponding results. In most cases an inspection visit was made and a control letter was sent to the licensee.

The CSN received 19 notifications of events at 2nd and 3rd category facilities during 2004, although none of these had any significant radiological consequences.

Industrial facilities

As in previous years, and in addition to the control and licensing of the facilities, the optimisation of dose at the different types of facilities has been the subject of special tracking, with particular attention having been paid to the mobile gammagraphy sector, since operating experience shows that this is the area most requiring improvement as regards radiological protection conditions.

Application of the action plan aimed at reducing the doses received by the personnel operating mobile industrial gammagraphy facilities, initiated in mid 2001, has continued throughout 2002, 2003 and 2004, and in this respect the following may be underlined:

- Tracking activities have been performed in order to ensure that the licensees have incorporated into the operating regulations for this type of facilities the procedures relating to task planning, the supervision of on-site works and personnel training required by way of a *complementary technical instruction*.

- The campaign initiated last year to reinforce the control activities applied to this type of facilities has continued, this consisting of increasing the number of inspections of on-site works and of delegations to which the facilities have dispatched operating personnel and equipment, in order to check that the procedures mentioned in the previous paragraph are being implemented suitably.

- The control of disused radioactive equipment and materials has continued. The prolonged storage of disused equipment is not justified, since this may imply the risk of losing control over radioactive material or equipment. For this reason, when the CSN detects equipment in this

situation, it encourages the companies to initiate arrangements for its removal through the regulatory channels and closely monitors the development of such arrangements.

Medical facilities

As a result of the development of new technologies, there were nine cyclotrons with operating permits in Spain as of the end of 2004, and a further two in an advanced stage of the licensing process, whose authorisations will be issued in March 2005. These cyclotrons are used for the production of very short-lived positron-emitting isotopes and subsequent synthesis of the corresponding radiopharmaceutical, mainly deoxyfluoroglucose marked with Fluorine-18 (FDG) for use in nuclear medicine diagnosis by means of positron emission tomography (PET).

There has been a significant increase in the number of applications for external radiotherapy facilities, specifically linear accelerators, due to the current trend of bringing healthcare closer to cancer patients and to the campaign initiated in 1996 for the progressive replacement of obsolete telegammatherapy units, which are being replaced with linear accelerators. There are currently 152 linear accelerators for external radiotherapy in Spain, of which 15 have been licensed in 2004.

As indicated in previous reports, a subject of great interest was the creation in January 2001 of a *Permanent forum on radiological protection in the healthcare environment,* which includes the participation of the CSN, the Spanish Radiological Protection Society and the Spanish Medical Physics Society. The objective of this forum is to define a framework for relations and a systematic approach for joint work on a series of previously identified subjects of common interest. Throughout the year the activities of the working groups set up during the previous year have moved ahead.

Likewise, procedures for the following activities are being prepared as part of the activities of the Forum:

- Management of radioactive liquid effluents at radioactive facilities, in accordance with the document approved by the Forum.

- Management of solid waste materials with radioactive contents generated at radioactive facilities, in accordance with the Ministerial Order issued on May 21st 2003 by the Ministry of Economy and the CSN Guide.

Diagnostic X-ray facilities

During 2004 some 17,000 annual reports were received from X-ray facilities, including among other things the quality controls performed on the equipment by the radiological protection services or technical units or by the companies selling such equipment or providing technical assistance. Around 5% of these reports were reviewed. The selection criteria applied for this review were: the continuation of those that had been reviewed in previous years and that had revealed deficiencies, those corresponding to medium-sized installations and major hospitals, private institutions with large numbers of equipment, centres possessing haemodynamic, vascular or scanning installations and veterinary clinics.

The pilot X-ray facility inspection programme was completed in 2004, the aim being to carry out a crossed control between these facilities and the Radiological Protection Technical Units (RPTU) servicing them. For this purpose the facilities were selected from among those general radiodiagnosis installations not attended by a Radiological Protection Service (RPS), since these are controlled through the surveillance of such services, and veterinary diagnosis installations. In relation to this inspection programme and in compliance with Resolution 24 of the Commission for Economy and the Exchequer of the Lower House of Parliament, of October 9th 2002, *Include healthcare X-ray facili-*

ties in the inspection programmes applicable to medical radioactive facilities, in order to achieve compliance with the inspection programmes, 189 inspections were performed in relation to X-ray installations used for medical diagnosis purposes in 2004. The corresponding results report has been drawn up and is being used as a basis for consolidated inspection programmes for 2005 and subsequent years. Inspections of dental radiodiagnosis facilities included on the register are being incorporated in these programmes, such that they include the RPTU's that provide services only to dental facilities.

Commercial facilities

The control and tracking of the activities of radioactive facilities commercialising capsulated and non-capsulated radioactive materials and ionising radiation generating sources have, as in previous years, been carried out through reports on sales and supplies submitted quarterly by these facilities, these being contrasted with the authorisations of the receiving radioactive facilities and with the declarations of transfer of radioactive substances between member States (Euratom regulation number 1493/93) and through control inspections performed at the installations and study of their annual operating reports.

This year has seen a significant increase in the sales of equipment for security controls in relation to courier services, buildings, containers, etc.

Also worthy of special mention is the increase in the number of requests for new facilities equipped with cyclotrons for the production of PET radiopharmaceuticals, as well as requests for the authorisation of new PET equipment models, specifically PET-CT equipment. These combine both CT and PET images, acquired from the same area of the patient, the PET images providing a functional image of radiopharmaceutical distribution in the patient and the CT images providing an image of the part of the body used to locate the uptake of the radiopharmaceutical product and to correct attenuation in PET reconstruction.

2.5. Transport of nuclear and radioactive materials

In keeping with the regulations in force, which require the authorisation or notification of transport operations depending on the risk implied by the contents and validation of the package model (suited to the technical characteristics of the material), in 2004 the CSN reported on four authorisation for transport, two of non-irradiated fuel assemblies from the Juzbado manufacturing facility to different Spanish and European nuclear power plants, another for the transport under special agreement of a maximum 16 non-irradiated fuel assemblies from this facility to France, and finally one relating to the operations for the transport of uranium oxide from BNFL in the United Kingdom to the Juzbado facility for 2005.

Likewise, and as part of control activities, in 2004 forty-seven inspections relating specifically to transport were carried out: 16 by the CSN itself, 28 by Autonomous Community services with function assignments and three through collaboration between the CSN and the aforementioned services, specifically one in Galicia and two in Catalonia. In addition to these specific inspections relating to transport, the requirements applicable to the transport of radioactive material have been controlled within the framework of the inspection performed at radioactive facilities having transport as one of their activities.

Control by way of inspections is completed with the reception and analysis of the notifications required by the CSN for the transport of fissionable materials, high level radioactive sources and wastes, along with the subsequent performance reports in the case of fissionable material.

Especially significant were the 53 dispatches of fissionable material that took place in 2004. Also noteworthy is the transport by Enresa of radioactive wastes to its El Cabril disposal facility, with 76 operations with wastes from nuclear facilities, 28 from radioactive facilities, six resulting from the incident that occurred at the Sidenor steelworks and one from the incident at the Daniel González Riestra works.

Furthermore, in 2004 the CSN reported on 10 requests for the validation of overseas certificates and two for the review of approvals for packages of Spanish origin.

As regards events occurring during the transport of radioactive material in 2004, special mention should be made of the two incidents involving the incorrect preparation of packages containing uranium oxide that were detected on arrival at the Enusa Industrias Avanzadas, S.A. fuel assembly manufacturing facility at Juzbado. Both incidents were entirely attributable to the sender of the packages, BNFL-Westinghouse of the United Kingdom. In the first case, which occurred on January 12th 2004, the inner cover of one of the packages was incorrectly bolted, although the outer cover of the cask was correctly positioned. Following the safety assessment required of the sender, it was concluded that safety was not compromised during transport since, although incorrectly bolted, the inner cover - the function of which is fundamentally thermal insulation - was in place. The second incident, which occurred on April 18th 2004, is similar, with the difference that in this case both the inner and outer covers were correctly positioned and bolted but the removable thermal insulation placed between them was missing. This case was more important than the first since, although there was no risk under the normal conditions in which the transport took place, the safety assessment performed by BNFL/Westinghouse concluded that since the thermal insulation was missing, safety would have been compromised in the event of an accident during transport.

The detection of both incidents was possible thanks to the package checking procedures in place at the Juzbado fuel manufacturing facility. In neither of these cases was the safety of the facility compromised, both incidents being considered as being within the safety limits for transport. In both cases the Juzbado facility not only reported the events to the CSN but also initiated the corresponding deviation reports with its supplier, BNFL/Westinghouse, in order for the latter to analyse the causes of the events and adopt appropriate improvement measures to prevent their repetition.

Given that the events arose at a UK facility, their control is within the realm of competence of the Department of Transport of that country, with which the CSN has maintained fluid communications and has received all the necessary information on the measures adopted by that competent authority. The final details on the improvement measures adopted by BNFL/Westinghouse have been submitted to the CSN by the Juzbado facility, following the audits performed by the latter with respect to its supplier. The measures adopted are very numerous and it is considered that following their implementation the process of preparing the packages has improved significantly.

Events involving the dropping of radioactive packages at airports are those that normally occur with the greatest frequency, given the large number of packages transported by air; however, there has been no increase in the number of such events compared to the previous year. The only two cases that have taken place affected two operators and in neither case was there any radiological risk. The CSN performed specific analyses in these cases and has required actions for improvement by both operators. Aside from these specific cases, the CSN continues its special tracking of the loading, unloading and handling of these

packages by the airlines and airport handling companies through the assessment of their radiological protection programmes and inspections to check their degree of implementation.

Finally, as regards the detection of contamination at the French Gravelines plant in two packages and the transport vehicle sent by Enusa- Enwesa A.I.E from the Ascó nuclear power plant, the values registered were slightly higher than the regulatory contamination limits, the results of the measurement not coinciding with those obtained at the exit from the Spanish facility. In view of these differing values, and in the wake of the analysis performed, it has not been possible to clearly conclude whether or not there was any contamination. A process has been initiated by the Spanish nuclear power plants to attempt to improve the procedures for radiological protection and for the control and measuring of contamination in transport operations.

2.6. Manufacturing of radioactive equipment and exemptions

As from the entry into force of the new *Regulations on nuclear and radioactive facilities*, authorisation is required for the manufacturing only of equipment containing radioactive material or producing ionising radiations.

The CSN has not issued any report relating to the manufacturing of radioactive equipment in 2004.

In 2004 the CSN issued 17 reports: two archive reports, one unfavourable report and 14 for the approval of radioactive equipment types.

The trend in recent years, confirmed in 2004, is towards more applications for approval of X-ray generating apparatus. As regards apparatus containing radioactive material, this consists of low risk radioisotopes in very small quantities.

2.7. Activities and facilities not regulated by nuclear legislation

Transfers to Enresa

The management of radioactive materials not having any authorisation, which fundamentally are the result of practices performed prior to the instauration of nuclear legislation in Spain, is usually accomplished through their removal by Enresa as radioactive waste.

During 2004 the CSN drew up reports for 27 transfers to Enresa of different materials and radioactive sources. In 15 of these cases the requesting company or entity had no radioactive facility, the remainder of the requesters being the licensees of installations. Nine were drawn up under the functions assignment agreement with Catalonia.

Radium sources

Another case of the same nature, but with special regulation, is the removal of the radium for medical purposes previously used in radiotherapy, the dispersion –it was previously used freely– and highly hazardous nature of which justified its being remove at no cost to the licensees. Ciemat undertakes to remove such material following a report from the CSN; in 2004 two removals were reported by the CSN and one by the responsible service in Catalonia.

Removal of radioactive material detected in metallic materials

Another case subject to special regulations is the removal of radioactive material detected in the area of application of the *Protocol on collaboration in the radiological surveillance of metallic materials*.

On November 2nd 1999, the Ministry of Energy and Industry, the Ministry of Public Works, the Nuclear Safety Council (CSN), the Spanish radioactive waste management agency (Enresa), the Union of Iron and Steel Companies (UNESID) and the Spanish Recovery Federation (FER) signed the *Protocol on collaboration in the radiological surveillance*

of metallic materials, these being joined subsequently, in 2000, by the Mining and Metallurgy Federation of the trade union Comisiones Obreras and the State Federation of Metal, Construction and Similar Works of the Unión General de Trabajadores, in 2002 by the Spanish Association of Aluminium Refiners, the National Copper Industries Union and the Union of Lead Industries and more recently, in November 2003, by the Spanish Federation of Smelting Associations.

As a result of the application of the *Protocol on collaboration in the radiological surveillance of metallic materials,* the CSN was informed 146 time of the detection of radioactivity in metallic materials during 2004. The radioactive sources detected, indicators with radioluminescent paint, ion smoke detectors, products containing thorium and artificially contaminated parts, were transferred to Enresa for management as radioactive wastes.

Particularly significant during 2004 were the events involving radioactive contamination that occurred at the Reinosa factory of Sidenor Industrial on March 24th 2004 and at the installations of Arcelor Alambrón Zumárraga on May 31st.

Installations affected by the smelting of a source of Cesium-137 at the Acerinox steel production plant

The actions taken as a result of the smelting of a source of Cesium-137 on May 30th 1998 have been described in detail in previous annual reports.

During 2004 there has been tracking of the radiological surveillance programme implemented at the Inert Materials Recovery Centre (CRI-9), located in the marshes of the Marismas de Mendaña, in the province of Huelva; and Egmasa has submitted the report on the hydrogeological characteristics of CRI-9 in response to the Resolution issued by the Directorate General for Energy Policy and Mines on January 15th 2001, ratified by the Resolution of June 8th of that year.

Fragmentation of a source of Cesium-137 at the metals recovery company Daniel González Riestra, S.L.

On August 11th 2003, the scrap fragmentation and recovery company Daniel González Riestra, S.L., located on the road to Serín in San Andrés de los Tacones (Gijón), notified the CSN that a truck loaded with light wastes from the scrap fragmentation process had activated the radiation alarms of the control gate monitor when leaving its facility.

The personnel of the facility determined that the cause of the alarm was not any specific part but the load overall, for which reason the fragmentation machine was shut down and an urgent notification sent to the CSN. Subsequently, with the help of the radiological protection technical unit, they determined that the fragmentation machine, the fragmented scrap and the light wastes arising from the fragmentation process were contaminated with cesium-137.

The event had no radiological consequences for the workers at the facility or for the environment.

The decontamination and cleaning works generated a mass of 51,978 kg of radioactive wastes, which were sent to the El Cabril disposal facility in five operations carried out in 2003 and one operation involving two packages in 2004.

Installations affected by the smelting of a source of Cesium-137 at the Reinosa Factory of Sidenor Industrial

On March 24th 2004, the integral iron and steel company Sidenor Industrial Fábrica de Reinosa, located in Reinosa (Cantabria), notified the CSN of the fact that a truck leaving the facility loaded with steel dust had activated the gate monitor.

The personnel of the facility isolated the truck and analysed a sample of the dust, concluding that it contained Cesium-137. This pointed to the possibility of a radioactive source having been smelted,

for which reason the plant was shut down and the CSN was urgently notified.

The CSN required the company to adopt measures to prevent the dispersion of radioactive contamination and to guarantee adequate radiological protection of the personnel and the environment and sent an inspector accompanied by Enresa personnel to perform a more detailed assessment.

The radiological controls performed by the CSN inspector identified the presence of radioactivity in one of the smoke dust storage silos, in the smoke extraction line leading to this silo and in the truck that had attempted to leave the steelworks, the values measured being slightly higher than those recorded during the ACB event that occurred in 2003.

In view of the information obtained in the inspection, the CSN required the facility to continue the radiological characterisation of the plant and to request a plan for the cleaning and recovery of the installation. The radiological criteria adopted in drawing up this Plan, which was supervised by the CSN, were those established for the events that had taken place previously at Acerinox, Siderúrgica Sevillana and ACB. The cleaning efforts focussed on two interventions:

- Cleaning of the areas of the facility affected by the smelting of the source of Cesium-137.
- Unloading of the truck tank and characterisation of the steel dust, with subsequent radiological control of the vehicle.

On March 31st, following performance of the tasks contemplated in the action plan, including the emptying and decontamination of the dust storage silo, Sidenor requested authorisation from the CSN to start-up the furnace for the smelting of four batches by way of a test phase. Following analysis of the results provided by the samples of dust, it was decided that additional tasks should be performed to clean the smoke piping and replace the sections showing the highest dose rates.

On April 2nd the furnace was restarted for a test phase, and on 5th, following evaluation of the results for dust activity concentration generated after 31 batches, the CSN authorised the facility to reinitiate normal production.

The event had no radiological consequences for the workers of the facility or the environment.

The decontamination and cleaning works generated 76,163 kg of radioactive wastes having an activity of 3.03 GBq, these being sent to the El Cabril disposal facility in six transport operations.

Smelting of a source of Cesium-137 at Arcelor Alambrón Zumárraga

On May 31st 2004, a truck loaded with steelyard dust entering the installations of the Compañía Industrial Asúa Erandio (ASER), located in Asúa-Erandio (Vizcaya), activated the radiation alarms of the gate monitor. Following this detection, ASER (a company dedicated to the extraction of zinc and lead from steelyard dust) returned the truck to the integral iron and steel company Arcelor Alambrón Zumárraga, located in Zumárraga (Guipúzcoa). On its return, the truck passed through the gate monitor at the entrance to the steelyard, where the alarm was confirmed.

The personnel of the facility isolated the truck and analysed a sample of the dust transported, concluding that it contained Cesium-137. This pointed to the possibility of a radioactive source having been smelted, for which reason the plant was shut down and the CSN was urgently notified.

The CSN required the company to adopt measures to prevent the dispersion of radioactive contamination and to guarantee adequate radiological protection of the personnel and the environment and sent an inspector accompanied by personnel from Enre-

sa and the Basque Government to perform a more detailed assessment.

The radiological controls performed during the CSN inspection identified the presence of radioactivity in the smoke dust storage silo, the smoke extraction line leading to this silo and two trucks loaded with steelyard dust, the values measured in the smoke dust line being lower than the acceptance criteria established for this type of incidents.

In view of the information provided by the inspection, the CSN concluded that there was no need for additional cleaning and decontamination tasks at the facility, as a result of which the activities contemplated in the action plan should centre on emptying of the silo and of the trucks loaded with steelyard dust.

On June 2nd, after emptying of the silo, the CSN granted the steelyard a permit for the provisional start-up of the furnace. Finally, on 3rd of that month, and having analysed the results of the steelyard dust generated in the batches, the CSN authorised the steelyard to re-initiate normal production.

The event had no radiological consequences for the workers of the facility or the environment.

It has not been necessary to transport radioactive material to the El Cabril disposal facility as a result of this event since the concentration of Cesium-137 in the samples of dust analysed following extraction from the silo and trucks was in all cases lower than 10 Bq/g.

2.8. Technical services

Listed below are the main activities carried out by the Radiological Protection Services (RPS), the Radiological Protection Technical Units (RPTU), the medical X-ray equipment sales and technical assistance companies, the External Personnel Dosimetry Service (EPDS) and external companies.

The CSN, which authorises, supervises and controls entities providing radiological protection services for the licensees of nuclear and radioactive facilities, undertook the following activities in 2004:

- Two authorisations were requested in 2004 for the constitution of new RPS's, along with one modification. Reports were issued on three new authorisations. Twenty-three inspections were carried out: 15 by the CSN, three by the responsible service in Catalonia, two by Navarre and three by the Basque Country.

- The main activity at the radiological protection technical units consists of the controls applied to them via periodic inspections and reports, since these serve for part of the controls applied to other facilities, in particular radiodiagnosis installations. Twenty inspection were carried out on the RPTU's: 17 by the CSN and three by the responsible service in Catalonia. There were no requests for new RPTU's and three were modified.

- There are currently 65 RPS's and 46 RPTU's authorised, 22 of the latter providing services only to radiodiagnosis facilities. A list of these may be found on the CSN website.

As from 1992, medical X-ray equipment sales and technical assistance became regulated activities, in accordance with *Royal Decree 1891/1991 on the installation and use of X-ray apparatus for the purposes of medical diagnosis.*

The *Regulation establishing quality criteria in radiodiagnosis, Royal Decree 1976/1999*, also regulates the activities of these companies as regards the clinical acceptance of medical diagnosis X-ray equipment and the tests to be performed for this purpose, as well as the implementation of maintenance programmes, when so determined by the health authorities.

- In 2004 there were 13 requests for authorisation and 13 for modification of companies involved in medical diagnosis X-ray equipment

sales and technical assistance. Favourable reports were issued for the authorisation of new companies, 14 for the modification of existing companies and 16 closures. As of December 31st 2004, 266 sales and technical assistance companies were authorised.

- There were 24 inspections of X-ray equipment sales and technical assistance companies (ERX): 10 by the CSN, one by the responsible service of the Balearic Islands, nine by the Regional Government of Catalonia, three by the Basque Country and one by the Regional Government of Valencia.

As regards the regulatory tracking and control of the personnel dosimetry services authorised by the CSN in 2004, the following may be mentioned:

- Eight control inspections were carried out on authorised personnel dosimetry services, complementary technical instructions being issued to the licensee in all cases for the better operation of these services.

- The first comparative campaign for the determination of iodine in the thyroid has been carried out at the internal personnel dosimetry services of the Spanish nuclear power plants and Tecnatom. Analysis of the results obtained remains pending and will be performed during the coming year.

- The Council has participated with the *Healthcare Forum on Radiological Protection* in drawing up a protocol on the criteria applicable to area dosimetry.

- An evaluation has been performed of the protocol drawn up by the Ciemat internal personal dosimetry service for validation of the technique used at the Juzbado fuel assembly manufacturing facility for the determination of Uranium in urine samples.

- The evaluations associated with review of the authorisations for internal personal dosimetry services have been carried out to adapt them to the new national legislative framework on radiological protection arising from the publication of Royal Decree 783/2001, of July 6th, approving the *Regulation on radiological protection against ionising radiations.*

As regards the control of external companies, as of December 31st 2004 there were a total 760 companies included on the register of external companies, the vast majority of which perform their activities in relation to the nuclear power plants.

- With a view to complying with Royal Decree 413/1997 on *Operational protection of off-site workers running the risk of exposure to ionising radiations due to interventions in the controlled zone*, this Organisation has verified the degree of compliance with the requirements applicable to such external companies (radiological permit, training, etc.) during the operational radiological protection inspections carried out during the nuclear power plant refuelling outages.

- During 2004 two informative circulars have been sent to the companies included on the Register of external companies with a view to clarifying aspects relating to basic training in radiological protection, which is the responsibility of the licensees of such entities.

- Likewise, a reply has been sent to the European Community questionnaire aimed at identifying the problems arising in each of the member States in implementing *Directive 90/641/Euratom on* external workers, with a view to a possible revision.

2.9. Personnel licences

In order to guarantee that the personnel of the facilities are sufficiently prepared, the CSN grants the obligatory licences (for the supervision and operation of nuclear and radioactive facilities) and diplomas (for the heads of radiological protection services) only to candidates successfully passing the necessary tests. As of December 31st 2004 there were 8,644 workers holding a licence or diploma.

Furthermore, 32,076 workers had the corresponding CSN accreditation for the management of medical radiodiagnosis installations and 45,547 the accreditation to operate such facilities.

In 2004, the CSN awarded the following:

- At the nuclear power plants: eight supervisor licences, 18 operator licences, no diplomas for the heads of radiological protection services, 29 extensions to operator licences and 48 to supervisor licences.

- At fuel cycle, disposal and dismantling installations (Juzbado, El Cabril, Ciemat, Vandellós I, Quercus and Elefante plants): seven supervisor licences and five operator licences and extensions to 28 operator licences and 14 supervisor licences.

- At radioactive facilities: 188 new supervisor licences, 701 operator licences and five for the heads of radiological protection services, along with the extension of one supervisor licence and one operator licence.

- At medical radiodiagnosis installations: 1,706 accreditations for management and 2,584 for the operation of such installations.

In order to obtain the necessary licences, the courses homologated by the CSN must be successfully attended and passed.

- In 2004 two proposals were issued regarding the homologation of courses for radioactive facilities, implying eight combinations of applications and levels, and a further six were modified.

- In the field of radiodiagnosis, six homologations were proposed, implying 15 combinations, and four others were modified.

The CSN proposed and qualified the final tests for the courses authorised for radioactive facilities held during 2004, this implying a total 51 such tests. Some of these included more than one speciality.

2.10. Other regulated activities

Section VII of the *Regulation on nuclear and radioactive* facilities establishes the need for authorisation of the following activities, with a previous report from the CSN:

- Deliberate addition of radioactive substances in the production of consumer goods.

- Import, export, commercialisation and transfer of radioactive materials, radiation-generating equipment and consumer goods incorporating radioactive substances.

- Technical assistance for radioactive apparatus and radiation-generating equipment, as long as these are not required to be authorised as radioactive facilities.

During 2004 the CSN has received three requests for new authorisations and three for modifications. In all cases these refer to the commercialisation or technical assistance of equipment exempt due to type approval having been granted. Favourable reports have been issued on two authorisations, two modifications and one closure during these activities.

The second additional provision of the *Regulation on nuclear and radioactive facilities* establishes that services authorised by the CSN and having radioactive sources incorporated in measuring equipment may be exempted from consideration as radioactive facilities.

Likewise, section 1.g of Annex I of the aforementioned regulation contemplates the possibility of exemption for activities in which doses are very low and below specified values.

During 2004 three requests for exemption from authorisation as radioactive facilities have been submitted, two of them meeting with a favourable response.

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

3.1. Radiological protection of the workers

Article 6 of *Royal Decree 783/01,* which approves the *Regulation on protection against ionising radiations*, includes the principle of optimisation of radiological protection (the Alara principle), according to which the doses received by workers professionally exposed to ionising radiations must be kept as low as is reasonable achievable, and in all cases below the dose limits established in the said legislation.

The evaluation of the radiological protection manuals that constitute one of the official operating documents of nuclear facilities and of radioactive facilities that, in view of their radiological relevance, are required to have a radiological protection service or technical unit, along with the inspections performed by the CSN, are the basic tools used by the Council to guarantee the protection of workers exposed to ionising radiations.

One of the functions assigned to the CSN is that of controlling the radiation doses received by the operating personnel of nuclear and radioactive facilities. In relation to this dosimetry surveillance, the legislation in force establishes that individual dosimetry is to be carried out by the personal dosimetry services expressly authorised by the CSN. These are periodically inspected by the CSN to verify that they are operated in accordance with the conditions established in their authorisations. As a result of these inspections, the appropriate complementary technical instructions are sent to the dosimetry services for the optimisation of their operations.

Additionally, approximately once every five years and in collaboration with laboratories having the recognised capacity to obtain standardised irradiation fields to the levels of quality determined in the ISO standards, the CSN carries out a comparative campaign in which the authorised external personal dosimetry services are required to read problem dosimeters with unknown irradiation conditions (dose and energy). These campaigns provide the CSN with an objective insight for the assessment of the level of reliability of each dosimetry service and for the application of the corrective actions appropriate to improve this reliability.

In this context, in 2004 a comparative exercise on I-131 in the thyroid has been performed with all the internal personal dosimetry services of the Spanish nuclear power plants and the company Tecnatom. The results obtained will be evaluated during the coming year.

The *National dosimetry bank* centralises the dosimetry histories of the professionally exposed workers of the Spanish nuclear and radioactive facilities. As of the end of 2004 there were records of a total of some 10,769,500 dosimetry measures performed, corresponding to some 228,600 workers and 38,100 installations.

In addition to the above, the CSN has two other instruments for the supervision and control of the radiological protection of workers: the radiological permit for external workers running the risk of exposure to ionising radiations due to their intervening in the controlled zone and the register of external companies, on which contractor companies are obliged to submit a declaration on their activities. Throughout 2004 the CSN has distributed a total 3,638 radiological permits for the workers of 157 companies.

The number of workers professionally exposed to ionising radiations and dosimetrically controlled

in Spain in 2004 amounted to 88,854[2], these having a collective dose of 43,809 mSv.person and an average individual dose of 1.32 mSv/year.

99.70% of the dosimetrically controlled workers (88,583) received doses lower than 20 mSv/year, and 97.53% of these workers (86,655) received doses lower than 5 mSv/year. This distribution underlines the favourable trend experienced at our country's nuclear and radioactive facilities in relation to compliance with the dose limits (100 mSv over five years) established in the *Regulation on protection against ionising radiations.*

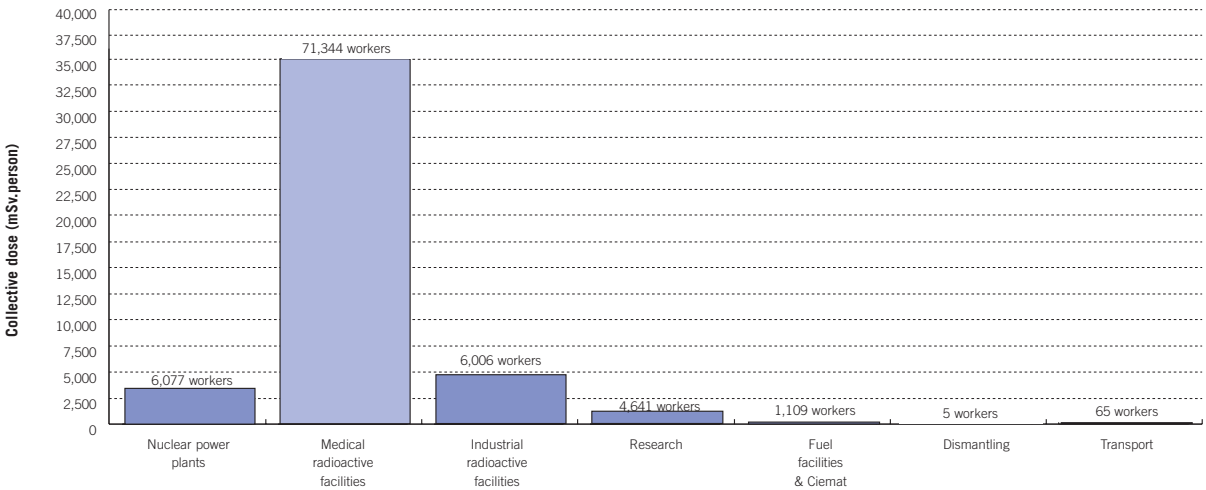
The results of the dosimetric controls are set out below by sectors (figures 2 and 3):

- At the nuclear power plants the CSN controls s total 6,077 workers with a collective dose of 3.07 Sv.person and an average individual dose of 1.31 mSv/year.

The collective dose per pressurised water reactor observed in previous years has been maintained in 2004, this consolidating the trend recorded in previous years. During 2004, refuelling outages were performed at the Ascó I and II, Almaraz II and Trillo nuclear power plants.

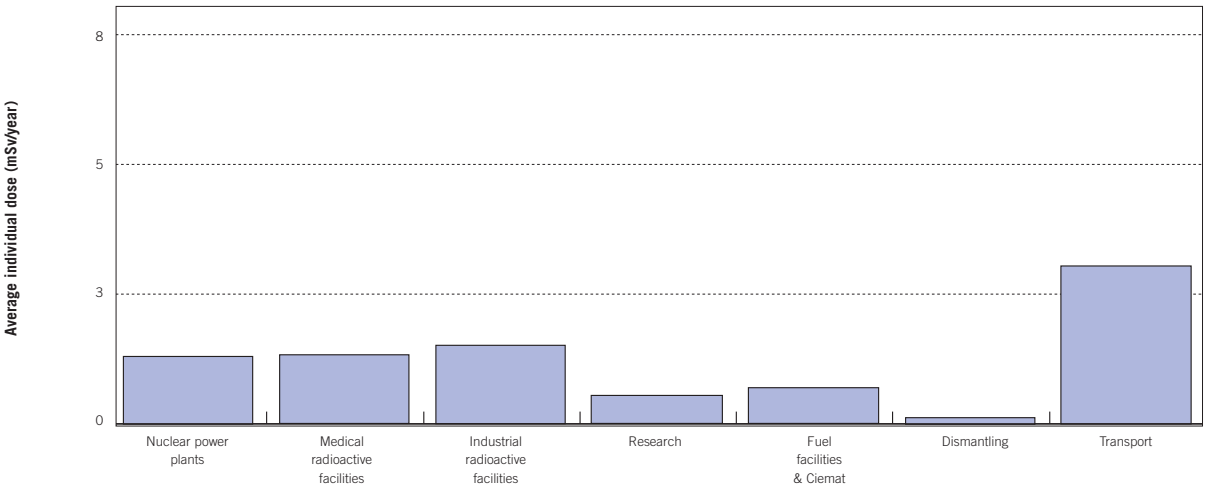
No refuelling outages were performed at Spain's two boiling water plants during 2004, this having meant a considerable decrease in collective dose with respect to the previous year, the values registered having been similar to those obtained in other years in which no refuelling outages occurred.

Figure 2. Collective dose and number of exposed workers by sectors. Year 2004



[2] Given that the dosimetry data have been extracted from the National Dosimetry Bank, the overall number of exposed workers in the country does not coincide with the sum of the workers in each of the sectors reported on, since there may be workers intervening in different sectors throughout the year.

Figure 3. Average individual dose, by sectors. Year 2004



Finally, as regards the average collective three-yearly doses per reactor/year, a slight increase may be observed, this resulting from the increase in the source term observed at Cofrentes nuclear power plant (figures 4 and 5).

- At the radioactive facilities the CSN controlled 81,991 workers, with a collective dose of 40.47 Sv.person and an average individual dose of 1.32 mSv/year.

  During 2004 a total 44 workers (0.05% of the total) exceeded the annual dose limit established in the *Regulation on protection against ionising radiations.* Of these, 15 cases were the result of readings from the dosimeters carried by the workers and the rest, i.e. 29 cases, correspond to workers who repeatedly and systematically have not changed any of the dosimeters assigned to each of the installations at which they perform services throughout the year. In view of these situations, the CSN has established the criterion of assigning an administrative dose equal to the corresponding fraction of the dose limit for the period of use of the dosimeters.

  – 71,344 (80.29% of the total controlled workers) at medical installations, with a collective dose of 34.75 Sv.person and an average individual dose of 1.34 mSv/year.

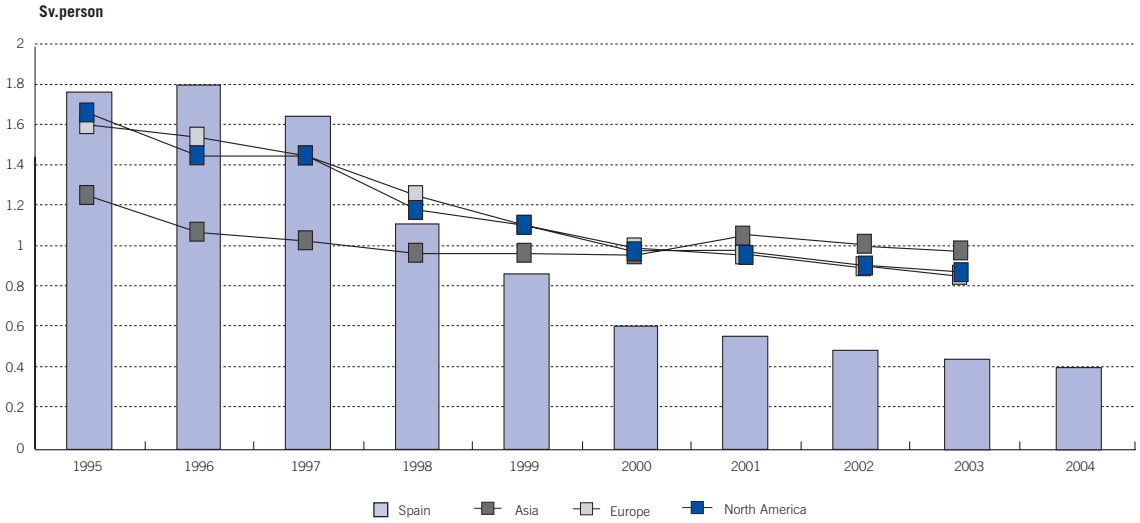
  – 6,606 (6.75% of the total controlled workers) at industrial facilities, with a collective dose of 4.69 Sv.person and an average individual dose of 1.53 mSv/year.

  – 4,641 (5.22% of the total controlled workers) at research centres, with a collective dose of 1.02 Sv.person and an average individual dose of 0.56 mSv/year.

- At facilities in the dismantling and decommissioning phase the CSN controlled a total of five workers (0.0056% of the total controlled workers) with a collective dose of 0.28 mSv.person and an average individual dose of 0.14 mSv/year.

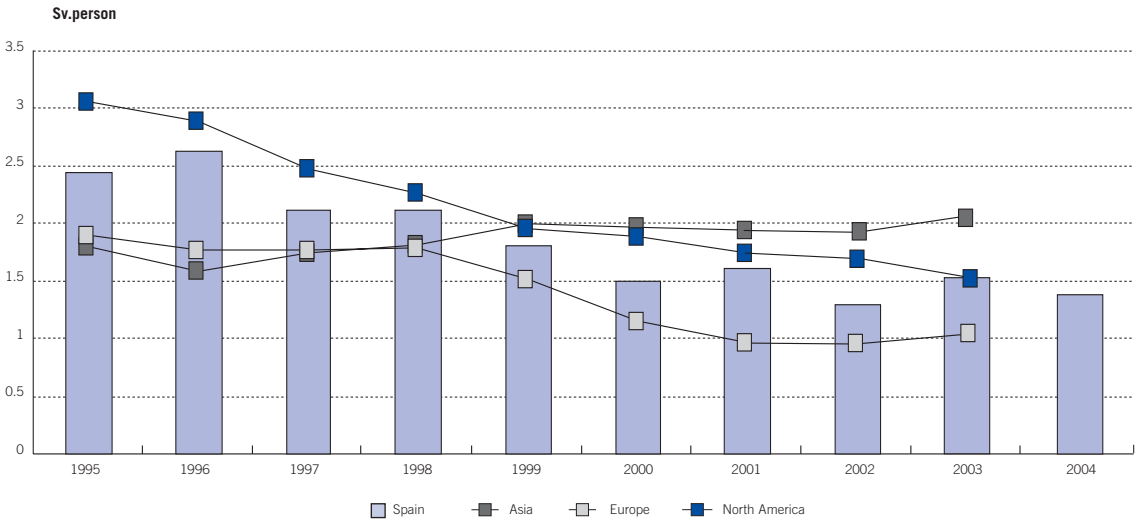
- At fuel cycle and waste disposal facilities and at research centres the CSN controlled 1,109 workers (1.25% of the total controlled workers)

Figure 4. Average collective dose (Sv.person) for PWR type reactors. International comparison



In preparing this graph consideration has been given to three year rolling average collective doses for PWR type reactors in each region compared

Figure 5. Average collective dose (Sv.person) for BWR type reactors. International comparison



In preparing this graph consideration has been given to three year rolling average collective doses for BWR type reactors in each region compared

with a collective dose of 0.106 Sv.person and an average individual dose of 0.71 mSv/year.

- In the transport sector the CSN controlled a total 65 workers (0.073% of the total controlled workers) with a collective dose of 0.157 Sv.person and an average individual dose of 3.08 mSv/year. The individual dose is higher than in the rest of the sectors indicated.

  In this sector the dose is concentrated in the transport of radiopharmaceutical material. Given

that these materials are transported in small packages that are loaded and unloaded manually, and that only a few companies perform such transport operations, the average individual dose for the sector will normally be higher, although the collective dose is very small compared to the others.

In 2004 there has been a clear reduction in the average individual dose in this sector with respect to 2003, as well as in the collective dose. In 2004 the CSN issued different instructions to all the companies involved in the transport of radioactive material, advising them of the measures to be implemented to reduce dose and, in certain cases, requiring the performance of specific dose analyses. Furthermore, the companies in which the workers receive the highest doses are being especially monitored.

3.2. Environmental radiological surveillance

Among the functions assigned to the CSN by article 2 section g) of the first additional provision of Law 14/1999, of May 4th, on *Tariffs and public prices for services rendered by the CSN*, may be found the following: control of the radiological protection measures applied to the public and the environment, controlling and monitoring off-site releases of radioactive materials from nuclear and radioactive facilities and their specific or cumulative effects in the areas of influence of such facilities, estimating their radiological impact; control and surveillance of the radiological quality of the environment throughout the country, in compliance with the international obligations of the Spanish State in this area, and collaboration with the competent authorities in the area of environmental radiological surveillance outside the area of influence of the facilities.

Furthermore, the Euratom Treaty establishes, in its articles 35 and 36, that each member state should possess the facilities required to control environmental radioactivity and regularly provide information on these controls to the European Union Commission.

This section describes the activities performed by the CSN during 2004 in compliance with these functions.

- The CSN controlled the releases from the nuclear power plants in order to check that the activity of the liquid and gaseous radioactive effluents from all the Spanish plants are kept at values far below the maximum values deriving from the limits established in the operating technical specifications of these facilities, the doses associated with these being a small fraction of the authorised limits.

  The activity issued in the form of both liquid and gaseous effluents was similar to that of other European and North American installations and confirmed the downward trend registered in the last twenty years (figures 6 and 7). Furthermore, the effective doses, which have been calculated for the most exposed individual using very conservative hypotheses, have in no case exceeded 3.5% of the limit of 100 microSievert authorised for radioactive effluents.

  The CSN analysed the results of the environmental radiological surveillance programmes that the licensees of the facilities are obliged to carry out, corresponding to 2003, which show values similar to those of previous years and far from implying any situation of radiological risk. The independent control performed by the CSN or assigned to the Autonomous Communities of Catalonia and Valencia gave results equivalent to those of the facilities.

  This section includes information on the activities carried out during 2004 and presents the results of the environmental radiological sur-

Figure 6. Radioactive liquid effluents from PWR plants. Total activity except for tritium (GBq/GWh)

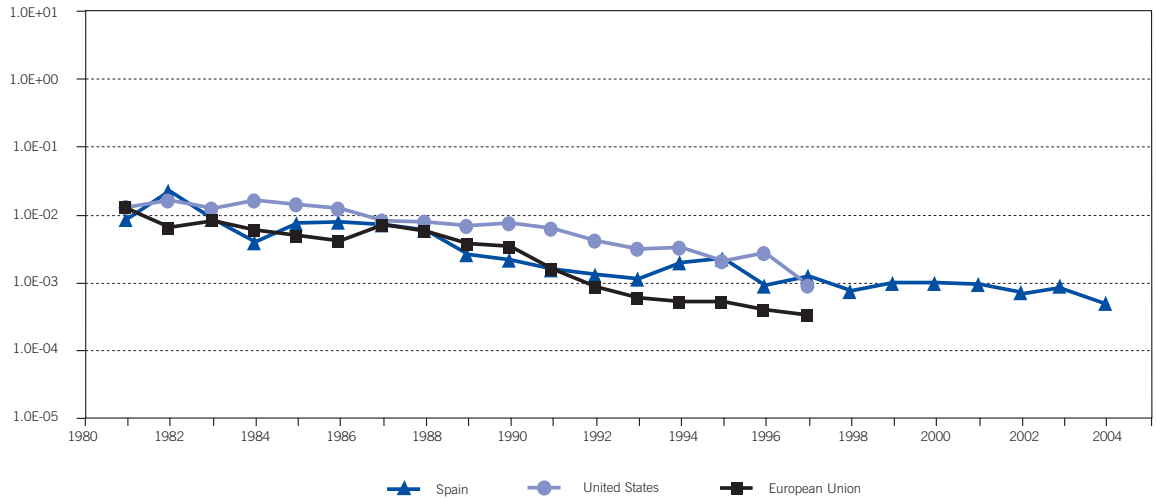
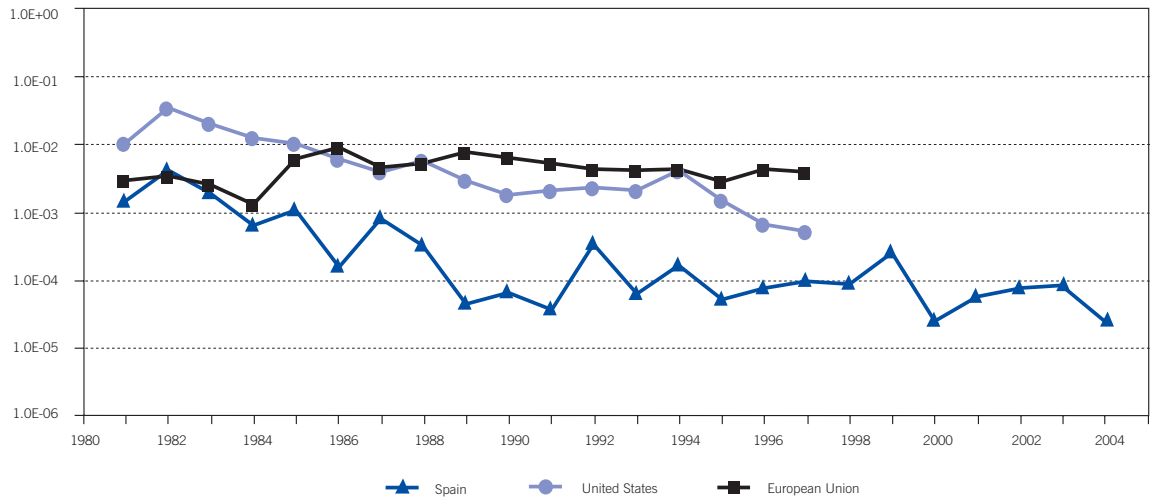


Figure 7. Radioactive liquid effluents from BWR plants. Total activity except for tritium (GBq/GWh)



veillance programmes for 2003. This lag is due to the fact that the processing and analysis of the samples do not allow the results of the annual campaigns to be made available until the second quarter of the following year.

- The CSN also controlled the environmental radiological quality of the entire national territory via its measuring networks: both the Network of Automatic Stations, which continuously measures the presence of radiation in the atmosphere, and the spaced and dense Networks of Sampling Stations, which is made up of various laboratories that analyse samples of river and coastal waters, the atmosphere and the terrestrial medium.

Sampling Station Network

Atmospheric and terrestrial surveillance programme

For the performance of this programme the CSN has subscribed specific agreements with the laboratories of different universities since 1992. During 2003, 20 laboratories participated in the dense and spaced networks, distributed as indicated in figure 8.

Spanish continental waters radiological surveillance programme

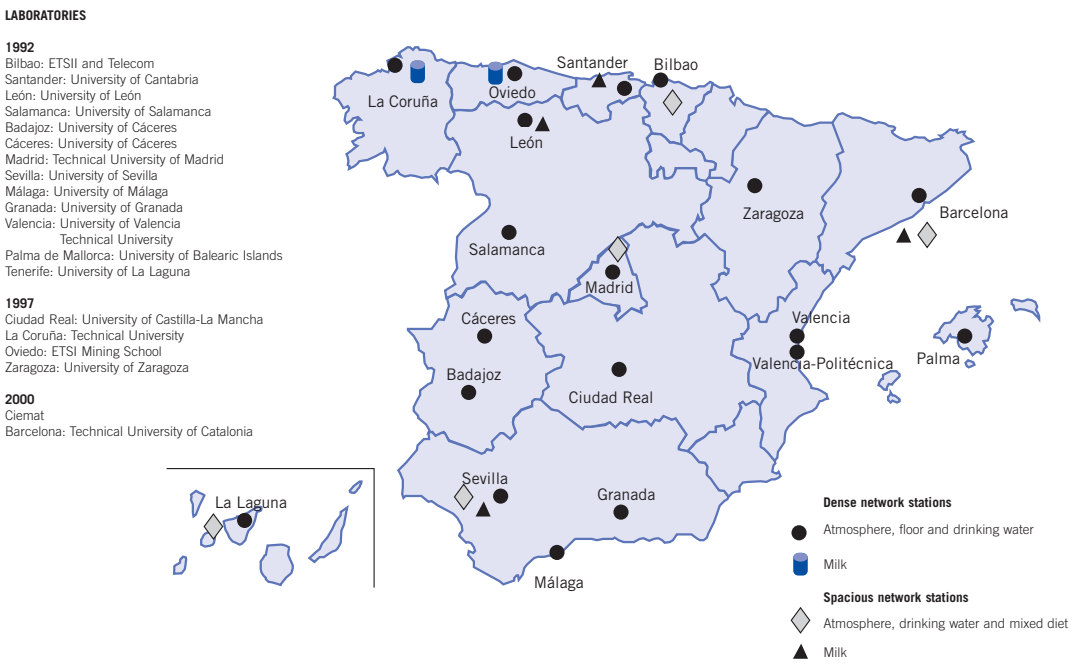
The results of the radiological measures performed during 2003 on these samples, which were analysed during 2004, confirmed the behaviour observed over the years in the different river basins, the most outstanding events being as follows:

- The values of the indices of total alpha, total beta and remaining beta activity reflect fundamentally the geographic and geological characteristics of the soils over which the different stretches of rivers run. Furthermore, the values may be affected by the impact of urban releases, which increase the content of organic material, as well as by the existence of crop areas on the banks, where fertilisers may be entrained into the river and, occasionally, give rise to the isotopes that accompany these materials, such as Potassium-40 and the offspring of the Uranium-238 series.

- As in previous years, the highest alpha activity corresponds to the river Águeda, a tributary of the Duero, due to its flowing through the uranium-bearing terrains of Saelices el Chico and the exploitations of the Quercus plant. In the river Tajo the values for this index are also rather high at the Aranjuez and downstream stations, reflecting the characteristics of the terrain and the agricultural activities mentioned above.

- As regards beta activity indices, the stations located downstream of major population areas are those that show the highest values, due to urban releases, and in many of the basins a slight en-

Figure 8. CSN's Sampling Stations Network for atmosphere and land: dense and spacious networks



richment may be observed from the head of the river to its outlet to the sea (Duero, Tajo, Guadalquivir, Segura and Ebro).

- In relation to other artificial isotopes, and as has habitually been the case in all the basins, during 2003 the gamma-emitting radionuclides of artificial origin remained below their corresponding detection limits.

- A regards the values for the concentration of tritium, the effects of the releases from the Trillo, José Cabrera and Almaraz nuclear power plants in the river Tajo, and of the first of these in the river Júcar via the Tajo-Segura transfer channel, may occasionally b detected, as is the case for the Ascó plant in the river Ebro. These values are continuously monitored by the CSN, are insignificant from the radiological point of view an do not pose any risk for the population or the environment due to their being below the acceptable reference values.

  One of these values was obtained from a sample taken in November 2003 in the river Tajo, at a station located downstream of the point of releases from the Trillo nuclear power plant, very close to the discharge channel.

  This situation was reported in its day (Annual Report for 2003). The increase was monitored and it was observed that the release of liquid effluents occurred practically simultaneously with the sampling at a short distance from this point, with hardly any dilution taking place.

Spanish coastal waters radiological surveillance programme

The sampling areas are located at a distance of ten miles from the coast, with the exception of the samples taken at the entrance to harbours. The samples are taken from the surface layer of the water and the indices of total alpha activity, total beta and remaining beta are analysed, along with gamma and tritium spectrometry.

During 2003, samples were taken from the 14 points indicated in figure 9. The values of each analytical determination are fairly homogeneous at all the sampling locations and similar to those obtained in previous campaigns. The greatest variability is encountered with tritium, where slightly higher values are obtained from certain of the points located in the Mediterranean. As regards the remaining beta activity index, no value in excess of the LID is obtained in any of the samples for 2003. As in previous years, no artificial gamma-emitting isotopes are found in any of the samples analysed.

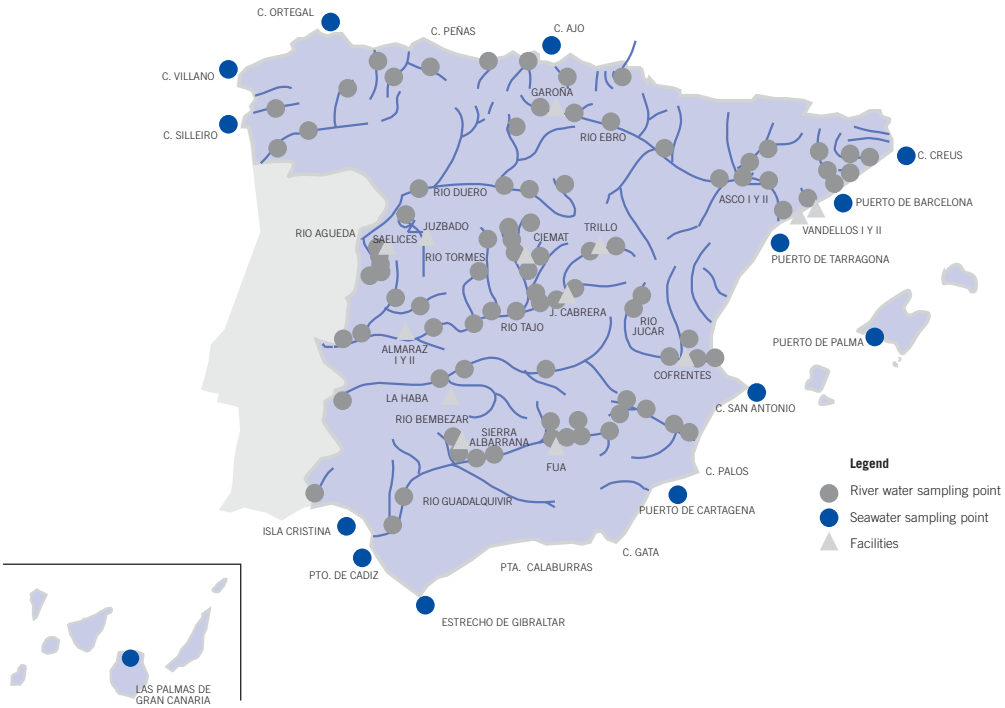
Cross-comparison campaigns of analytical results obtained at low activity measuring laboratories

A campaign was performed during 2004 in which the study matrix was water for human consumption with environmental levels of radioactivity close to the limits established in *Royal Decree* 140/2003, which establishes the healthcare criteria regarding the quality of water for human consumption, prepared at the Ciemat Ionising Radiations Metrology Laboratory. The analyses performed were the total alpha index, total beta index, remaining beta index, Tritium, Cesium-137, Strontium-90, Plutonium-(239+240) and Americium-241.

The campaign concluded with a meeting with the participants, held at the CSN headquarters in November 2004, during which the results and conclusions were presented. The main results and conclusions were as follows:

- A good response has been provided by the laboratories (with 97% having reported on some results) and in general they have adhered properly to the technical bases established, although it has been necessary to request missing informa-

Figure 9. CSN Sampling Station Network for continental and coastal waters



tion from a number of laboratories. The study has shown homogeneous performance by the laboratories: in all the analyses evaluated the statistical parameters have been close to the reference values established, this demonstrating that the results from the participating laboratories are comparable.

- As regards the performance by the laboratories of the analyses of the total alpha, total beta and remaining beta indices, the percentage of satisfactory performance has been high, at 85%, 97% and 87% respectively. For the rest of the analyses, the percentage of satisfactory performance has also been high, at between 65% for Tritium and 90% for Plutonium (239+240).

- In the analysis of remaining beta it has been observed that some of the laboratories do not calculate adequately the combined uncertainty, and that there is no homogeneous criterion as regards estimation of the detection limit.

Overall it may be concluded that the participating laboratories are capable of performing radiological determinations in environmental samples of water for human consumption to a satisfactory level of quality.

Network of Automatic Metering Stations

This Automatic Metering Network is made up of 25 stations.

Each of the stations in the network has instrumentation for the measurement of gamma dose rate and concentrations of radon, radio-iodines and alpha and beta emitters in the air. The stations measure continuously and the data obtained are

received and analysed at the Networks of Sampling Stations supervision and control centre, located in the CSN Emergency Room (Salem).

Throughout 2004 the specific agreements on connections between the CSN network and the automatic radiological surveillance networks of the Autonomous Communities of Valencia, Catalonia and the Basque Country operated satisfactorily.

The data exchange commitments embodied in the agreement with the Portuguese Directorate General for the Environment (DGA) and in CSN participation in the European Union's Eurdep project (*European Union Radiological Data Exchange Platform*) were complied with.

During 2003, an automatic continuous gamma spectrometry station was acquired, installed, started up and operated as a pilot project aimed at complementing the stations of the Network of Automatic Stations with this type of equipment. During 2004 operating and calibration procedures have been developed and production is scheduled to get under way during 2005.

The results of the measurements undertaken during 2004 were characteristic of the environmental radiological background and indicate the absence of any radiological risk for the population and the environment.

Specific surveillance programmes

Mention should be made of the radiological surveillance carried out in the area of Palomares, as a result of the air accident that occurred in 1966. Since that time a radiological surveillance programme has been performed without interruption in this area.

The programme is undertaken by Ciemat, which reports to the Nuclear Safety Council. The results of the surveillance programme indicate that the accident has not had any impact on the health of the inhabitants of the Palomares area.

On December 4th 2003, Ciemat submitted to the CSN the research plan to be performed by the former in the land around Palomares. The objective of this plan is to gain a more in-depth insight into the radiological situation of the area and improve the scientific knowledge supporting the correct selection of strategies for its environmental recovery, were this to be necessary, as well as proposals for action regarding the use and availability of the affected areas, in keeping with the CSN statement of February 2002. In its meeting of December 10th 2003, the CSN reported favourably on the Plan proposed by Ciemat.

On March 15th 2004, Ciemat submitted this research plan to the Secretary General for Scientific Policy of the Ministry of Science and Technology, for its approval by the Government, pursuant to Article 130 of *Law 62/2003*, of December 30th, *on fiscal, administrative and social measures*, for achievement of the objectives of the economic policy of the State Budget Law for the year 2004.

Subsequent to the issuing of the favourable information, Ciemat submitted to the CSN the document *Updating of knowledge of the radiological situation of the Palomares area,* which deals with the activities foreseen for the radiological characterisation of the area. The CSN evaluated this document and concluded that the Ciemat proposal included the aspects to be covered and was in keeping with the research plan favourably looked upon by the Council, albeit with a lesser scope, since the boreholes to be performed close to the points of impact of *bombs 2 and 3* cannot begin until such time as the process of expropriating the land has concluded.

In its meeting of December 17th 2004, the Cabinet agreed to approve the energy-related and environmental research plan on radiological surveillance to be carried out by Ciemat on the land at Palomares. Approval of the Plan implies the urgent expropriation of the land.

3.3. Protection against natural radiation sources

The basic health protection standards of the European Community were revised by means of Directive 96/29/Euratom, approved by the Cabinet on May 13th 1996. One of the most important modifications introduced in the new Directive relates to extension of the scope of application to include professional activities implying exposure to natural radiation sources. The *Regulation on the protection of health against ionising radiations*, revised in 2001, includes aspects relating to natural radiation in its section VII.

In accordance with this section, the competent authority, with advice from the CSN, shall require the licensees of activities not regulated by the requirements of the Regulation and involving the presence of natural radiation sources to carry out the studies required to determine whether or not there is any noteworthy increase in the exposure of the workers or the members of the public that cannot be considered insignificant from the point of view of radiological protection. The following are among the activities to be reviewed:

a) Occupational activities in which the workers and, where appropriate, the members of the public, are exposed to the inhalation of thoron or radon daughters, to gamma radiation or any other exposure in work places such as spas, caves, mines or underground or non-underground places of work in identified areas.

b) Occupational activities implying the storage or handling of materials not habitually considered to be radioactive but containing natural radionuclides causing a significant increase in the exposure of the workers and, where appropriate, of the members of the public.

c) Occupational activities generating wastes not habitually considered to be radioactive but containing natural radionuclides causing a significant increase in the exposure of the members of the public and, where appropriate, of the workers.

d) Occupational activities implying exposure to cosmic radiation during the operation of aircraft.

Following the publication of the Regulation, the Nuclear Safety Council implemented an action plan for the development of section VII. This Plan also included the development of specific standards for protection against exposures to radon inside buildings, in accordance with the Recommendation of the European Commission (90/143/Euratom, of February 21st 1990).

Within this plan, and in relation to protection against terrestrial sources of natural radiation, 2004 saw the continued performance of pilot studies in industries of interest identified therein, though the awarding of subsidies to the corresponding R&D projects, only one type of industry now pending study.

As regards protection against radon gas inside homes, measurement studies continued in homes and different places of work. Also initiated was study of the feasibility and effectiveness of different remedial actions for the presence of radon gas in buildings, through the awarding of a subsidy to this project. The initial phase of comparison of different continuous radon metering equipment with exposure and submittal of the results of the measures by the participants has now been completed.

3.4. Radioactive wastes

Management of spent fuel and high level wastes.

The irradiated fuel generated at the Spanish nuclear power plants is temporarily stored in the pools of the plants themselves, or in the case of Trillo NPP in the on-site temporary cask storage facility, with the exception of that generated prior to 1983 at José Cabrera and Santa María de Garoña

plants, which was sent to the United Kingdom for reprocessing, and that generated during the operation of the Vandellós I plant, which was sent to France for the same purpose.

In view of the above, throughout 2004 the CSN has continued to concentrate its efforts on activities relating to technical, standards-related, regulatory and R&D project progress, as well as on communications with the public and with the agents involved in decision-making through: 1) monitoring of and participation in international developments; 2) tracking of national plans and programmes; 3) the development of in-house tools and technical capacities; 4) the development of a framework for the assessment and licensing of the individual temporary storage facility (ATI) foreseen for the shutdown of the José Cabrera nuclear power plant, based on the use of ventilated steel-concrete casks known as HI-STORM 100Z, the request for which was received in August 2004; and 5) the performance of technical and administrative activities for establishment of the public price for the evaluation of the safety study for a generic centralised temporary storage (CTS) facility design, in accordance with the request submitted by Enresa pursuant to articles 81 of the RINR and 31 of the *Law on CSN tariffs and public prices.*

In addition, throughout 2004 the CSN has continued to control the inventory of irradiated fuels and high level wastes and of temporary storage installations existing in Spain, the current situation being summarised below:

As of December 31st 2004, the number of irradiated fuel assemblies in the storage pools of the Spanish operating nuclear power plants, and in the dry storage facility at Trillo NPP, was 9,704. Of these, 4,372 are assemblies from the boiling water reactor (BWR) plants of Santa María de Garoña and Cofrentes and 5,332 are from the pressurised water (PWR) plants, this last figure including the 168 fuel assemblies from Trillo NPP loaded in the eight casks currently in that plant's dry storage facility.

As regards saturation of the plant storage pools, the José Cabrera plant will not experience this situation before the date established for its definitive shutdown in April 2006. The pool of the Cofrentes nuclear power plant is expected to reach saturation in 2009 and groups I and II of the Ascó plant in 2013 and 2015 consecutively, while the Santa María de Garoña and Almaraz I and II plants will have sufficient storage capacity to take them to the end of their scheduled lifetime.

In the case of the Trillo plant, capacity has been provided in the pool with the loading of the aforementioned 168 fuel assemblies in the eight casks existing in the temporary spent fuel dry storage facility as of the end of 2004, these being of the Ensa-DPT (*Dual Purpose Trillo)* type. The loading process is performed in compliance with the limits and conditions established in the approval of the casks and in accordance with the cask specifications.

The CSN has performed inspections on the loading operation and on radiological protection aspects of the storage facility.

Four new casks are scheduled to be delivered to Trillo nuclear power plant in 2005.

During 2004 the CSN has concluded the evaluations required for approval of Revision 6 of the Generic Safety Study on the Ensa-DPT cask, for use in spent fuel storage facilities (ES-44.3-A). This was requested by Enresa and implies extending the use of the DPT cask to include the storage of irradiated fuel having higher degrees of burnup and longer cooling times than those initially specified in the approval, this in turn implying a change to the technical specifications. On November 12th 2004 the CSN issued its favourable report in this respect. According to the new specifications, the cask may be used for fuel of up to 40,000

MWd/tU (mewatt days per ton of uranium) and for a cooling period of five years, or for fuel of up to 45,000 MWd/tU and six years of cooling.

During 2004 the CSN carried out two inspections, one relating to *Quality assurance* in the manufacturing of the cask at the Ensa installations (Santander) and the other relating to revision of the calculations performed for extension of the authorisation to higher degrees of burnup.

The storage facility has a capacity for 80 casks, in principle sufficient for the spent fuel to be generated throughout the lifetime of the plant, and at present houses eight such casks, of which two were loaded and stored in 2002, four in 2003 and two in 2004.

The CSN has inspected the loading of two Ensa-DPT casks, performed in November and December 2004, the reports on which are referred to in the section of this report dedicated to the plant in question. During the cask loading operations the activities associated directly with them were monitored, as were radiological protection aspects associated with the operations and the control and surveillance of the facility and the casks stored in it.

In February 2004, Enresa requested from the CSN the *Evaluation of the public price for the Generic CTS facility Design Project*, in accordance with the GR-WP in force and articles 31 of Law 14/1999, on tariffs and public prices for services rendered by the Nuclear Safety Council, and 81 of the RINR on the *Appreciation of new designs and models.*

Along with this request, Enresa submitted the document entitled *Safety Study of the Generic CTS Facility Design*. The generic design proposed corresponds to the concept of a modular vault type installation for the temporary storage, over 100 years, of the spent fuel from the Spanish nuclear power plants and the high level vitrified wastes from the reprocessing of the fuel from Vandellós I nuclear power plant, as well as other wastes that cannot be sent to El Cabril. The generic design of the facility has been contemplated in principle for development at any future site.

The evaluation requested having been carried out, and studied by the CSN, the results have been transmitted to Enresa for consideration within the framework of the aforementioned legislation. In the event of acceptance, the generic design would be evaluated in 2005 with a view to its being approved by the CSN.

Management of low and intermediate level wastes

During 2004 the CSN undertook the control of radioactive wastes management in each of the operational activities involved: handling, treatment, conditioning, temporary storage, transport and definitive disposal.

The following may be singled out among the radioactive wastes management control actions performed by the CSN at the nuclear power plants:

- The control of the systems for the treatment and conditioning of the wastes generated and of their temporary storage.

  During the process of licensing prior to operation, the licensees are required to draw up the corresponding control procedures for their systems, in order to reasonably guarantee their operation within the limits and conditions established in the authorisation.

  During the operation of the systems the processes are monitored continuously, this allowing the CSN to require the improvements considered to be appropriate in each case and in accordance with the new technological developments.

- The control and tracking of the inventory of solid radioactive wastes stored at the facilities. This control is accomplished through evalua-

tion of the obligatory information submitted in the monthly operating reports and through the performance where applicable of complementary inspections.

One of the activities involved in the management of radioactive wastes corresponds to the monthly control of their generation and updating of the total inventory of wastes stored at the production facilities and the El Cabril waste disposal centre.

- Control of the processes of accepting each type package carried out by Enresa, such that there be guaranteed compliance with the acceptance criteria for their disposal at the El Cabril facility.

In 2004, 2,468 waste packages or containment units were received at the El Cabril disposal facility, plus 17 samples of low and intermediate radioactive wastes: 1,373 from nuclear facilities, plus 17 samples, two from the incident at the Daniel González Riestra, S.L. scrap, iron and metal fragmentation facility in Gijón and 20 from the incident that took place at Sidenor Industrial (Reinosa, Cantabria).

During 2004 the operating nuclear power plants generated low and intermediate level solid radioactive wastes with an estimated activity of 47,891.95 GBq, conditioned in 2,729 220-litre drums.

Figure 10 shows the distribution of the activity of the radioactive wastes conditioned during 2004 by the Spanish operating nuclear power plants.

In 2004, Enresa removed a total 1,368 packages of conditioned radioactive wastes from the nuclear power plants, these being transferred to the El Cabril waste disposal facility.

Very low level radioactive wastes

On June 10th 2004 the Nuclear Safety Council reported favourably on the request issued by Enresa for modification of the El Cabril disposal centre's solid wastes disposal facility for the complementary installation of a very low level radioactive waste storage facility, and consequently the construction and assembly of cells for this purpose.

The most important activities performed in relation to very low level radioactive wastes were the following:

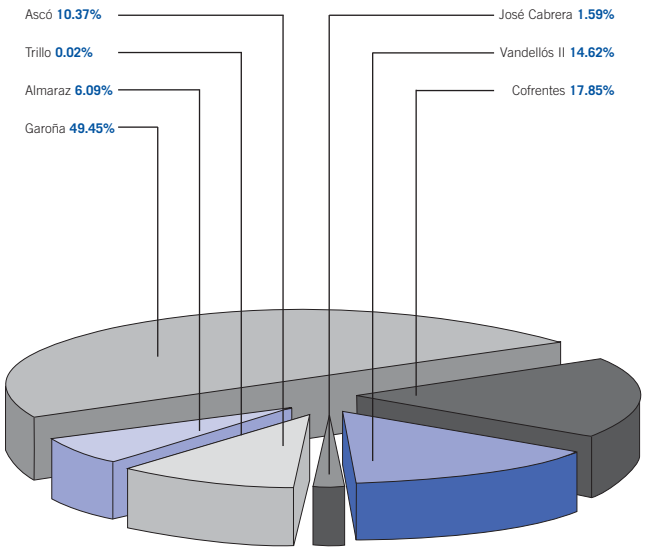
- Enresa removed 236 radioactive lightning rods, bringing the total removed to 22,101.

- The CSN received 146 notifications of the detection of radioactivity in metallic materials, as a result of application of the Protocol on collaboration in the radiological surveillance of metallic materials, the majority being metallic parts or sections of piping contaminated with natural radionuclides from non-nuclear industries, radioactive sources from industrial uses, indicators with radioluminescent paint and ion smoke detectors. All the radioactive sources detected were transferred to Enresa. This year there have been no sources of Americium-241 from the disassembly of lightning rods sent to the United Kingdom, as a result of which the total number of sources sent stands at 59,796. Enresa estimates that there may be other lightning rods for which no request for removal has been received, and which have not, therefore, been located.

- Particularly significant this year have been the events with radioactive contamination that occurred at the installations of Sidenor Industrial Fábrica in Reinosa and Arcelor Alambrón Zumárraga.

  On March 24th 2004, a truck loaded with steelyard dust activated the alarms of the gate monitor at the installations of the Sidenor Industrial steelyard in Reinosa. The analysis performed on a sample of this dust and the subsequent radiological characterisation of the installation led to

Figure 10. Distribution of conditioned radioactive wastes activity (47,891.95 GBq) generated in 2004 by the operating Spanish nuclear power plants



the conclusion that a source of Cesium-137 had been smelted. The recovery actions made it possible for the installation to re-initiate operations on April 5th. As a result of this incident, 76,163 kg of radioactive wastes were generated, these being sent to the El Cabril disposal facility in six transport operations.

On May 31st, a truck loaded with steelyard dust activated the alarms of the gate monitor at the entry to the installations of Compañía Industrial Asúa Erandio S.A. (ASER), a company dedicated to the extraction of zinc and lead from steelyard dust. Following this detection, ASER returned the truck to the Arcelor Alambrón Zumárraga steelyard. The analysis performed on a sample of this dust and the subsequent radiological characterisation of the installation led to the conclusion that a source of Cesium-137 had been smelted. The recovery actions made it possible for the installation to re-initiate operations on June 3rd. There was no need for radioactive waste to be transported to the El Cabril disposal facility as a result of this event, since the concentrations of Cesium-137 measured in all the samples analysed following the extraction of the dust were below 10 Bq/g.

The application of the Protocol on the radiological surveillance of metallic materials allowed the consequences of these incidents to be lessened by reducing the volume of wastes generated and the time required for the installations to be re-started.

Management of declassified materials

Depending on the analysis of potential radiological risk it is possible to determine, as regards very low level waste materials, which may be managed using the conventional routes already implemented by society for similar wastes (declassification) and which require a specific controlled management in keeping with their radiological risk.

Waste materials from nuclear facilities may be managed via conventional routes when they fulfil the following conditions:

- It must have been demonstrated that conventional management implies a trivial radiological risk and that it is justified.
- The management routes selected comply with the legislation applicable to the management of conventional waste materials.
- Management is accomplished in keeping with an adequate programme for the radiological control of the materials and is subject to the application of a suitable quality control programme.

In 2001 the nuclear power plants, through Unesa, requested CSN approval for common projects for the declassification of used active carbon, spent ion exchange resins and the regeneration of used oils. In June 2002, the Plenary Session of the CSN approved the first two of these projects, and in February 2003 the CSN gave its approval for the declassification of the third type of waste.

Throughout 2004 the CSN, in exercising its competences and responsibilities regarding nuclear safety and radiological protection, continued to develop this system for the declassification of very low level wastes, initiated in 1999, through complementary instructions requiring the licensees of the nuclear facilities to draw up a specific programme of actions, technical studies and forecasts for applications for authorisation to be submitted to the Ministry for the management of such wastes by conventional routes.

In 2004 the CSN reported favourably to the Directorate General for Energy Policy and Mines in relation to the request submitted by the José Cabrera nuclear power plant for the declassification of used oils.

Likewise, in its meeting held on December 15th 2004 the CSN approved the methodology for the declassification of metallic scrap of complex geometry submitted by the José Cabrera nuclear power plant.

3.5. Radiological emergencies and physical protection

3.5.1. Activities performed by the CSN and the Directorate General for Civil Defence and Emergencies

The Plaben

The *Basic nuclear emergency plan* (Plaben) was approved by the Government, in response to a proposal by the Ministry of the Interior, during the Cabinet Meeting held on June 25th 2004, following reports by the Nuclear Safety Council and the National Civil Defence Commission, and published in the Official State Gazette (BOE) by means of Royal Decree 1546/2004, of July 14th 2004.

This new Plaben replaces the one approved in March 1989, adapting it to the new international standards on emergencies, introducing the lessons learned in its application through the former provincial nuclear emergency plans and reflecting the assumption of different areas of competence by the Autonomous Communities.

The Plaben constitutes the basic directive for the preparation for and planning of the response to nuclear emergencies in the national territory. Its objective is to protect the population against the adverse effects of ionising radiations that might be caused by the uncontrolled release of radioactive material as a result of a nuclear accident, and to define the actions foreseen to implement this protection. Fundamentally, the Plaben contains the radiological criteria defined by the CSN for planning of the response to nuclear emergencies.

The scope of the Plaben covers the preparation for and planning of actions in the event of an emergency produced by a nuclear accident and during the emergency phase (from the declaration of an emergency situation to the declaration that the situation is under control), although it also includes certain of the action criteria for the recovery phase, due to the consideration that during the emergency phase decisions might be taken or actions initiated that condition the response during the former.

As regards the practical effects of application, the Plaben is developed on two different and complementary levels for response to emergency situations:

- On-site or self-protection level of response:

  – The actions for emergency preparedness and response are contained in the *Site Emergency Plan* (SEP) for each nuclear power plant, regulated specifically by the Regulation on nuclear and radioactive facilities.

- Off-site level of response, the actions for emergency preparedness and response for which are established in the following:

  – The nuclear emergency plans external to the nuclear power plants, which in turn include the action plans for the operating groups and the municipal action plans for nuclear emergencies (Pamen).

  – The nuclear emergency plan at plant level designed to respond and rovide support to the previous plans (Pencra) includes requests for assistance at international level. This plant response and support level is integrated by the Directorate General for Civil Defence and Emergencies (DGPCE) of the Ministry of the Interior, as the body coordinating all the support required from the different organisations of the central administration and other administrations, and the Nuclear Safety Council for all aspects relating to nuclear safety and radiological protection, the latter also coordinating in turn all the different public or private organisations and companies whose intervention is required with respect to the functions attributed to this organisation.

During 2004 the systematic approach associated with the management and maintenance of the radiological teams for all the off-site emergency plans has been started up, developed and completed, culminating with the design and operability of the *Géminis* database, which reflects the situation of these teams in real time, as regards location, operability, etc.

In this respect progress has been made also in preparing a proposal for the acquisition of automatic direct reading dosimeters with their corresponding management software, to replace the current pen dosimeters assigned to these plans. The call for bids for their acquisition is scheduled to take place during the first quarter of 2005.

Mutual collaboration has continued between the DGPCE, the provincial Civil Defence units and the CSN, with the participation of the heads of the radiological groups. Within this framework, systematic collaboration continued during 2004 between the two organisations in relation to the joint planning of exercises and drills, the training of those required to intervene and public information.

The CSN carried out the activities included in its programme aimed at providing information for the population. Work has been performed to date on the design of informative publications, the extension of the contents of the Council's website http://**www.csn.es**. and the organisation of seminars for the population of areas around certain nuclear power plants.

Parallel to the above, the CSN participated, through the heads of the radiological groups of the off-site nuclear emergency plans, in the sessions for public information and training of participants programmed by the provincial Civil Defence units.

Within the framework of development of the Plaben work has been performed on evaluation of the Pencra and on the joint preparation by the DGPCE and the CSN of the Directives on the training and preparation of participants, on preliminary information for the population and on the preparation, performance and evaluation of exercises and drills.

In accordance with the agreement signed to this effect between the *Association of municipal areas housing nuclear power plants* (Amac) and the CSN, technicians from the emergencies sub-division have participated during 2004 in the population education sessions organised by the Association in the areas surrounding the Cofrentes, José Cabrera, Garoña and Ascó plants.

Radioactivity Alert Network

The new framework agreement subscribed by the Ministry of the Interior and the Nuclear Safety Council includes collaboration in the joint use of data provided by the *Radioactivity Alert Network*, through the development of a joint protocol on action for data transmission and analysis, and the initial and on-going training of the personnel related to this network. This collaboration existed previously through a collaboration agreement associated specifically with the Radioactivity Alert Network, which has been left without effect with the signing of the new agreement, although the protocol for action developed in its day on the basis of the initial agreement continues to be applied. The CSN is fundamentally responsible for actions relating to analysis of the data provided by the stations.

The computer systems supporting the Radioactivity Alert Network have been replaced during 2004. This has meant an improvement in operation of the network, despite which the system will be optimised throughout the coming year.

3.5.2. CSN emergency response

Salem

The CSN emergency room (Salem) was not activated on any occasion during 2004.

Throughout the year the CSN continued to provide technical assistance from the *Emergency room* continuously (24 hours a day, every day of the year). This assistance materialised through the presence in the room of shifts consisting of one technician and one telecommunications officer.

On June 6th 2004, an *Emergency pre-alert,* category I event, occurred at the Ascó II nuclear power plant, the situation remaining under control.

Furthermore, during 2004 the CSN managed several cases of radioactive sources or traces of radioactive contamination being detected in scrap at the entry to steelyards or metallic waste recovery industries. In all these cases the management consisted of immobilisation of the material, its radiological characterisation by a radiological protection technical unit duly authorised for such interventions and, where appropriate, the immobilisation and removal of the material discovered by Enresa.

Several notifications were received by the emergency room in relation to the deterioration of radioactive packages due to their falling or being dropped in transport. In all these cases the CSN sent an inspector to the scene and in no case were any breakages or loss of integrity detected in the transport containers, the packages being subsequently removed safely by the personnel of the respective issuing organisations.

The programmes established for the corrective and preventive maintenance of all the material re-

sources of the emergency room were carried out, the objective being to maintain the organisation's capacity to respond to emergency situations. Also, an initial phase of updating of the systems and communications integrating the CSN emergency response system was addressed.

During this year the physical remodelling of the Salem has been addressed. This has been by way of an open call for bids and will be undertaken during 2005. The works were awarded in December. The basic criteria for this remodelling have been the separation of the *Emergency Management Room* and the *Coordination Group Room* and improvement of the support systems, which were in need of modernisation. In this respect display screens will be installed in all the rooms and in general will allow for complete integration of the new data-processing and communications systems on which their operation is based.

Also addressed during 2004 have been the emergency communication systems linking the Salem to the different locations involved in the Plaben (nuclear power plants, sub-delegations and delegation of the government, etc.). In this respect a public call for bids was issued for the implementation of an emergency communications network providing for the exchange of voice, data and videoconferencing communications between these different points. This has now been awarded and the network is scheduled to be placed in service during the first quarter of 2005.

Emergency drills

In 2004 the nuclear power plants and facilities carried out the obligatory annual site emergency drills contemplated in the PEI.

These site emergency drills were performed at the seven operating nuclear power plants, at the Juzbado fuel assembly manufacturing facility (Salamanca) and at the El Cabril disposal facility (Córdoba).

It was concluded from assessment of the emergency drills performed and from the results of the inspections carried out at the installations on the implementation status of the respective site emergency plans and emergency drills that the activities performed by the licensees to maintain their capacity and coordination with the national authorities in responding to possible emergencies were adequate.

The scenarios prepared for 2004 simulated the occurrence of initiating events that, in the worst case, would have led to an off-site release of radioactive material such that the application of urgent measures would have been required to protect the public.

International exercises

In 2004, within the framework of the European Union's programme of activities for maintenance of the system of urgent exchange of radiological information in emergency situations *(Ecurie*), the CSN participated in four *Ecurie* international exercises*;* two at level I, which served to evaluate the communications of countries that might be affected by a hypothetical accident, and a further two at level III, which included the active participation of several states and their respective organisations responsible for nuclear safety and the radiological protection of the population. The CSN participated from the Salem, sending data from the radiological surveillance network (Revira) via the *Eurdep* programme.

Two *Emercom* exercises on communications with the International Atomic Energy Agency have been carried out in 2004, with the CSN being notified via the Provincial Delegation for Civil Defence.

3.5.3. Security of nuclear facilities and materials

In accordance with the *Programme of security inspections,* the CSN performed inspections at the Ascó, Trillo, Almaraz and José Cabrera nuclear

power plants and at the Enusa nuclear fuel manufacturing facility at Juzbado throughout 2004. These inspections were carried out by a team made up of inspectors from the Nuclear Safety Council, the *Central Private Security Unit of the Directorate General of the Police* and the *Protection and Security Service* (Seprose) of the Guardia Civil and were aimed at verifying the degree of implementation of the integrated security model at the aforementioned facilities.

This model rests fundamentally on the convergence of three courses of action: the internal security of the installations, the support of the State Security Forces and a preventive information plan.

The nuclear power plant and facilities security organisations have been required to reinforce their security systems, in keeping with their specific characteristics, in response to the threat posed by the latest Islamic terrorist attacks of 2001 and 2002.

The CSN participated in the preparation, organisation and implementation of a pilot training course on technology, nuclear safety, radiological protection and the security of nuclear facilities at Cofrentes nuclear power plant, aimed at the specific training of the members of the State Security Forces who would act in the event of any physical protection contingency at the plant. Following the validation of the course and its objectives, other similar courses are planned to be held at other sites during 2005.

In relation to international agreements, standards and recommendations, in 2004 the 10th Meeting of the European Nuclear Security Regulators Association (ENSRA) was held at the CSN headquarters in Madrid, the charter of this association being signed during the event. The meeting was complemented by a visit by the ENSRA representatives to the Trillo nuclear power plant.

In addition, two representatives of the Nuclear Safety Council attended the meeting of the Parties to the global initiative for the reduction of threats, which took place at the Vienna International Centre on 17th and 18th September 2004.

Likewise, the CSN participated in the US *Megaport* project, a part of the second line of defence initiated by the Department of Energy (US DOE) with the objective of addressing, detecting and preventing the illicit trafficking of nuclear or radioactive materials at certain ports handling major movements of materials and merchandise.

4. Public information, relations with the institutions and research plans

4.1. Public information and communication

Contacts with the media were constant throughout the year. The following are some of the activities that required the greatest flow of information in 2004:

Nuclear power plants

Most of the items of information issued by the CSN (50.57%) referred to reportable events at nuclear power plants. The reportable incidents and events that occurred at the Spanish nuclear power plants constituted the largest percentage of coverage by the media, representing 63% of the total published on the CSN. The issues that generated most information in the media were incidents at the José Cabrera, Ascó, Cofrentes and Trillo plants, the most controversial subject having been a programme televised by Tele 5 on the impact of nuclear power plants on human health and the environment.

The incident that attracted the greatest attention in the media in 2004 was the reportable event that occurred at the Vandellós II plant during the month of August.

Drills

The Spanish nuclear power plants carried out their obligatory emergency drills during 2004, which have been reported on punctually. These represented 10.34% of the total information published at the CSN.

Radioactive facilities

The greatest increase in the demand for information occurred in relation to the radioactive facilities, and the general understanding of the different situations by the media also reached high levels. The press releases issued by the CSN in this field represented 16.09%. The subjects generating the most information in the media have been the detection of radioactive material at the Sidenor factory in Reinosa, the theft of a briefcase containing a radioactive source in Zaragoza and the radiological incident that occurred in October at the company Sidmed- Arcelor in Sagunto.

Radiological protection

The CSN appeared in the media in 2004 in relation to issues in which it plays a technical and institutional advisory role, for example in the case of the Erkimia tip on the Flix reservoir on the river Ebro, where materials containing radioactive elements were detected. A considerable amount of information has been generated also in relation to the radiological situation of the Palomares area.

The CSN makes great efforts to keep society informed. During this period 3,957 telephone calls have been received from the media and 87 press releases and 17 informative bulletins have been issued. These communiqués are sent by fax and e-mail to all the press and to the personnel of the institutions established in the action procedures. At the same time this information is included in a visible place on the website.

In the area of communications, the number of external queries attended to by e-mail during the last year amounted to 328, representing an increase of 200% over the previous year.

Judging by the number of queries received, the questions that have aroused most interest among the population relate to the authorisation of radioactive facilities, operator and supervisor licences and denouncements on radioactive facilities, radiological protection, training and information on administrative matters. An analysis of the most frequently asked questions is currently being undertaken with a view to optimising the replies.

On July 8th 2004 the *Working sessions for teachers on the functions of the Nuclear Safety Council* were organised by the CSN in collaboration with the Ministry of Education and Science and within the framework of the agreement in place with the latter. The objectives of these sessions are to bring the teaching staff into closer contact with the Nuclear Safety Council, inform on the functions of the CSN in relation to nuclear safety and radiological protection, fulfil the obligations attributed to the CSN by the Agreement of the Cabinet of October 1st 1999 regarding public information on protective measures in the event of a radiological emergency, and the recommendation established in European Directive 89/618/Euratom that such information be provided to education centres, and provide an insight into the teaching materials developed by the CSN.

In collaboration with the Ministry of Education and Science the CSN has drawn up the *Guideline for Teachers. The CSN and Radiations*, the objective of which is to provide secondary school teachers with a working tool facilitating the preparation of teaching materials complementing the little information on ionising radiations and their applications that has been included to date in the school programmes.

Various activities have taken ploace within the framework of the specific collaboration agreement in place between the CSN and the Association of Municipal Areas housing Nuclear Power Plants (Amac) for the performance of a communications and educational programme in areas with nuclear power plants and an analysis of their direct impact on public opinion, including visits by the local authorities to the affected municipal areas.

Educational seminars have been carried out for the population on nuclear safety and radiological protection in the management of nuclear energy, radioactive wastes and the dismantling of nuclear power plants.

The campaign *Radiotherapy, a fundamental treatment against cancer* has been carried out within the framework of the specific collaboration agreement between the CSN and the Spanish Radiotherapy and Oncoloy Association (AERO) as part of the project for public information on the use of ionising radiations for therapeutic purposes.

The CSN participated in *PIME,* the annual meeting of communicators in the nuclear field at European level, which is attended by communications professionals from across the world.

In 2004 this meeting took place in Spain for the first time, specifically in Barcelona, and a complete panel of the plenary sessions was given over to explaining the situation of nuclear communications in Spain from the point of view of all the agents involved (producers, regulator, waste vmanagement agency, associations, etc.).

During 2004 a training course was organised for CSN spokespersons, which included the participation of those members of the management staff who are most frequently called upon to undertake responsibilities for providing information to the media.

The CSN has a space dedicated exclusively to providing public information. This is the Information Centre, which is located at the headquarters of the organisation and which uses interactive museum techniques. From its inauguration in October 1998 to December 31st 2004, the Information Centre has received a total 37,177 visits from different school, university, institutional and private groups. During 2004 there were 310 visits involving 6,211 people.

Among the institutional visits to the Information Centre there have been representatives of the Councils for Industry and Commerce of the Autonomous Communities of the Canary Islands, Madrid and Navarre; representatives of the Madrid

Fire Brigade and emergency medical service Samur; representatives of the NRBQ groups of the Ministry of Defence; representatives of the Polytechnic University of Catalonia; representatives of Ciemat; representatives of companies associated with the nuclear sector; representatives of the different Town Councils belonging to Amac and representatives of Spanish organisation for the blind, ONCE. At international level, visits have been received from representatives of the IAEA, the American Embassy and the regulatory authorities of Ukraine, Sweden, France and Germany.

During 2004 the CSN published 33 works, in addition to the catalogue of publications, these including technical reports, R&D documents, safety guides, periodic publications, the CSN journal and informative and audiovisual publications.

The CSN website, in operation since April 1997, has become consolidated as an information service for the population. The number of visits to the institutional website during 2004 amounted to 90,353, an increase of 50% over the previous year.

Among the CSN's activities is also the organisation of conferences relating to science and technology in general, and ionising radiations and their regulation in particular, these representing an important contribution of great current interest.

The CSN participated in several trade fairs, congresses and exhibitions during 2004: Expodidáctica 2004, Madrid por la Ciencia, Heliatom, etc.

4.2. Institutional relations

Following the approval by the plenary session of the Council of the Strategic Plan for 2005-2010, on February 17th 2005, which is built around the Mission and Vision of the CSN and results from a process of participation by the entire organisation led by the Council, in which consideration has been given to the expectations of Spanish society, the central, autonomous community and municipal Administrations, the licensees of the facilities and the CSN personnel as stakeholder groups, it would now be of interest to underline the strategies and objectives for the immediate future as regards institutional relations: To develop and maintain frameworks for collaboration adding value to relations with other administrations, organisations and institutions. Likewise, to consolidate, extend and improve the system of assignments of functions to the Autonomous Communities for the joint management of the regulatory programmes applicable to radioactive facilities and related activities and to transport.

Furthermore, and very specifically, the Annual Work Plan for 2005 establishes the following as the priority lines of activity:

- Strengthening of relations with Parliament.
- Promotion of agreements with the Ministries, especially Interior, Defence and Health.
- Signing of new function assignment agreements.
- Strengthening of relations with the Delegates and Sub-Delegates of the Government, as those responsible for the emergency plans.
- Promotion of agreements signed with the universities and institutions.

Relations with Parliament

Before Congress

In the 8th legislature, constituted following the general elections held in March 2004, and throughout this year, matters relating to the Nuclear Safety Council have been dealt with by the Commission on Industry, Tourism and Commerce, which replaces the Commission on Economy and the Exchequer that was in force during the 7th legislature, which includes the special panel in charge

of studying the reports submitted to the Houses by the CSN.

The CSN annual report containing the activities performed during 2003 was submitted to the two Houses of the Spanish Parliament on July 15th 2004.

Commission of Economy and the Exchequer and Commission on Industry, Tourism and Commerce:

The following appearances took place during 2004:

- On December 1st 2004 the Lady Chairman of the Nuclear Safety Council appeared before the Congress (Commission on Industry, Tourism and Commerce) to inform on the report submitted in relation to the annual report of this organisation corresponding to 2003.

- On November 24th 2004 the following members of the CSN staff appeared before the special panel in charge of studying the Annual Report on CSN activities for 2002: the Secretary General, the Technical Directors of Nuclear Safety and Radiological Protection and the Sub-Directors General for Nuclear Facilities, Operational Radiological Protection, Environmental Radiological Protection, Emergencies and Administration and Personnel.

Before the Senate

Commission on Economy, Commerce and Tourism (Legislature VII) and Commission on Industry, Tourism and Commerce (Legislature VIII)

There has been no request for the Lady Chairman or other members of the CSN staff to appear before the Senate in 2004.

Reports

21 reports were submitted to the Lower House of the Spanish Parliament, one of them double, requested by way of resolutions by the Commission on Economy and the Exchequer (CEH) on December 17th 2003 and corresponding to the Annual Report for 2002.

Additional documentation consisted of a total 13 reports in response to resolutions by the Commissions on Industry, Energy and Tourism or the Commission on Economy and the Exchequer.

Technical reports were drawn up also in response to written questions asked of the CSN by different parliamentary groups from both Houses.

Seven written requests for questions were submitted to the Government, these in fact corresponding to a much larger number of reports, since in many cases these requests covered two, three or more issues and questions.

In percentage terms, the parliamentary questions relating to nuclear power plants implied 50.0% of the total.

There has been no parliamentary question in relation to radioactive or fuel cycle facilities.

Relations with the Central Administration

A large number of functions are performed in collaboration with the ministries.

Ministry of Economy/Ministry of Industry, Tourism and Commerce

On February 25th 2004 the annual meeting was held at the Ministry of Economy with representatives of the Directorate General for Energy Policy and Mines, the CSN, Enresa and all the autonomous communities having functions and services assigned to them in relation to 2nd and 3rd category radioactive facilities.

Ministry of the Interior

The activities performed by the CSN and this Ministry are based on the collaboration agreement signed on May 3rd 1999 between the CSN and the Ministry of the Interior in relation to emergencies.

For the actions aimed at meeting the different objectives mapped out in this agreement, specific working groups have been set up, along with a mixed commission for tracking of this agreement. The meeting of this mixed commission was held at the Directorate General for Civil Defence on May 31st 2004.

Another common activity carried out with the Ministry of the Interior is the maintenance of the equipment of the radiological groups involved in the provincial emergency plans, an issue that was agreed on in May 2002 and according to which the CSN is in charge of the maintenance of all the equipment for the radiological groups of these plans.

The lengthy collaboration with this Ministry and equally lengthy process of preparation involved led to the approval of the Basic Nuclear Emergency Plan (Plaben), the revision of which was concluded in November 2003.

In addition, and also in coordination with the Directorate General for Civil Defence, work has continued throughout 2004 on different activities relating to compliance with the Agreement reached by the Cabinet on October 1st 1999 regarding public information on the health protection measures applicable in the event of a radiological emergency.

Another issue relating to the CSN and the Directorate General for Civil Defence (DGPC) is the collaboration with the Armed Forces in defining the basic equipment for their *NBC (Nuclear, Biological and Chemical*) units, where the CSN participates actively in defining the N specifications. Also worthy of mention are actions in relation to the use of the DGPC's *Radioactivity alert network*, to the criteria used for the preparation of scenarios and, especially important, the earliest possible publication of the basic directive on radiological risks.

Ministry of Education, Culture and Sport

The Council has a collaboration agreement in place with the Ministry of Education and Culture, which was extended in 2004. One result of the signing of this *Framework Agreement* in 2004 was the celebration at the CSN of the so-called *Working sessions with teachers on the functions of the Nuclear Safety Council* (July 8th 2004), aimed at secondary school teachers involved in the specialities of mathematics, physics and chemistry and natural history. Arrangements have been initiated for the renewal of this agreement for 2005.

Ministry of Public Health and Consumption

During 2004 the Ministry of Public Health did not call the Panel on radiological protection created in 1997 within the framework of the Inter-territorial Council of the National Health System on the initiative of the Nuclear Safety Council.

In view of the large number of activities and collaborations between the Ministry of Public Health and Consumption and the CSN, it is considered necessary to prepare and implement a Framework Agreement for collaboration between the two organisations serving as a basis for all the specific agreements and collaborations required to achieve optimum results in common issues relating to healthcare and radiological safety, many of which are under way. Consequently, a specific Agreement with the *Institute for Healthcare Management* for the dosimetric control by the National Dosimetry Centre of the personnel intervening in the off-site nuclear emergency plans.

Finally, the CSN participated in the Working Session on the *Action Plan for the Radiological Protection of Patients*, the result of collaboration between the CSN and the Ministry with the International Atomic Energy Agency in activities emanating from the international conference on the radiological protection of patients, held in Málaga in 2002.

Ministry of Defence

During 2004, the CSN continued its collaboration with the Ministry of Defence in the training of

NBC groups, for which meetings and visits to the CSN *Emergency Room* were organised, during which all the elements and interventions that would be deployed by the CSN in the hypothetical event of a nuclear emergency were explained in detail.

On September 14th 2004 a meeting took place between the General Inspectorate for Health of this Ministry and the CSN with a view to clarifying the status of reorganisation of the structures reporting to the Ministry in relation to radiological protection and dosimetry, the idea being to achieve more efficient coordination in the activities of the two organisations. This CSN initiative is the result of the willingness of the Council to initiate collaboration agreements once this reorganisation takes place, with a view to participating on the *Central radiological protection board for defence* in the terms set put in Ministerial Order 191/1999, of July 22nd, on radiological protection in the area of the Ministry of Defence.

Relations with the autonomous administrations

The CSN maintains institutional relations with the autonomous community administrations via two different routes: general relations and the assignment of functions.

As regards the Autonomous Communities, revision continues of the *General Criteria* document for the assignment of functions, which dates back to 1998. The overall objective of these assignments is to achieve an improvement in the performance of the functions corresponding to the CSN using the capacities of the Autonomous Communities, this making it possible to provide the licensees of the facilities and society overall with improved performance as regards activities and the licensing of the operating personnel of radioactive installations.

On January 15th 2004 the entry into force of the assignment to the Autonomous Community of the Canary Islands was signed, and on November 15th 2004 a similar assignment of functions was signed with the Autonomous Community of the Principality of Asturias, this meaning that to date the CSN has signed such assignment agreements with the following eight Autonomous Communities: Asturias, Catalonia, Galicia, the Balearic Islands, the Canary Islands, Navarre, Valencia and the Basque Country.

Also signed with the Autonomous Community of the Basque Country in 2004 was the second addendum, by which this community reaches the ceiling of its possible assignments. Analogously, at the end of 2004 the Autonomous Community of Valencia manifested its intention to reach its maximum level of assignments within the agreement with the CSN and sign in 2005.

In 2004, in developing the criteria approved, meetings were held with the different mixed Commissions for the tracking of the assignment agreements signed with the autonomous communities of the Balearic Islands, the Basque Country, Catalonia, Valencia, Navarre and Galicia.

During these meetings the degree of compliance with the activities assigned to each community by the CSN for the previous year is revised, the activities for the current year are planned, the situation is analysed economically and an assessment is made, overall and specifically for each assignment. In all cases it was seen in 2004 that the activities had been carried out to a large extent and that the assignment of functions was generally working well.

In this same area, on November 4th 2004 the annual meeting with the inspectors for the different Autonomous Communities with assignment agreements was held in the assembly hall of the CSN.

Relations with the local administrations

Different meetings have been held with the AMAC to deal with the contents of a *Framework*

Agreement and a *Specific Agreement* for information and the education of the member of the public and socio-economic sectors in the areas surrounding the Spanish nuclear power plants.

This framework collaboration agreement was signed on September 22nd 2003 and the specific agreement was signed and entered into force on February 12th 2004.

The following may be singled out among the requests for information from the town councils:

- City Council of Madrid: Report on releases of the water from the pool of the Jen-1 nuclear reactor.
- City Council of Madrid: Department for the Environment and City Services, on the initiative of a private individual, regarding application to the Ciemat issue of the agreement relating to public information on applicable health protection measures and behaviour in the event of a radiological emergency.
- Town Council of Merindad de Cuesta-Urria: on the road linking Cantabria with the plateau of Castilla-León (Burgos-Santander section)
- Town Council of Peñarroya-Pueblonuevo: on the agreement reached during the Plenary Session of January 28th 2004 regarding the extension of the El Cabril facilities.

Relations with Institutional Organisations

Five reports were drawn up for the provincial court of Guipúzcoa and the government delegations in the Autonomous Communities of La Rioja, Valencia and Cantabria. Reports were also prepared for the provincial government of Cádiz on incidents at steelyards, denouncements of X-ray facilities, incidents at nuclear power plants and the El Cabril disposal facility.

Relations with Sector Companies and Organisations

There has been an updating of the agreements between the CSN and Cedex for technical assistance for the CSN in relation to the environmental radiological surveillance plans for the aquatic medium and between the CSN and Ciemat for the performance of environmental radiological measurements in emergency situations, by means of the CSN and Ciemat fixed laboratories and mobile radiological control unit. Also, as occurs each year, the specific agreements with the 32 laboratories that work with the CSN in the environmental radiological surveillance plans, through the Network of Sampling Stations were updated.

Relation with Universities

In keeping with the CSN's interest in collaborating in maintaining knowledge of nuclear techniques, three agreements have been signed with Spanish public universities for the creation of CSN chairs at their faculties. These are as follows:

- Specific collaboration agreement with the Polytechnic University of Catalonia for the creation of the CSN Chair on Nuclear Safety *Argos* at the Barcelona University College of Industrial Engineering, on October 22nd 2004.
- Specific collaboration agreement with the Polytechnic University of Madrid, through the University College of Mining Engineers, for the creation of the CSN chair, on May 4th 2004.
- Collaboration agreement between the Nuclear Safety Council and the Polytechnic University of Madrid for the creation of the *Federico Goded Nuclear Safety Professorship,* on September 9th 2004.

Non-Governmental, Professional and Trade Union Organisations

During 2004 communications and reports were sent to Greenpeace, Ecologistas en Acción and other environmentalist groups, in relation, for example,

to their request that the operating permit for the Santa María de Garoña nuclear power plant (Burgos) be suspended, to the locations in the Autonomous Community of Castilla y León of the environmental radioactivity control and metering equipment for air and water and to the results of the measurements taken in 2001, 2002 and 2003, among other issues.

Also submitted were the reports requested by the state coordinator of the nuclear power plant Workers' Committees, with whom a meeting was held on June 3rd 2004.

The CSN participated in the annual meeting of the Radiological Protection Forum (health forum) on June 9th 2004, which integrates the Spanish Radiological Protection Society and the Spanish Medical Physics Society.

Management of Subsidies

Pursuant to *Law 38/2003, of December 17th, on General Subsidies* and to the CSN resolution of December 17th 2003, establishing the regulatory basis for the granting of economic assistance for the performance of R&D projects relating to nuclear safety and radiological protection, the conditions in force for the year 2004 were published in the Official State Gazette (BOE) number 25 on December 17th 2003.

The budget for subsidies during 2004 amounted to 172,690 euros.

This budget has been used to finance or co-finance projects with different national organisations and entities, collaborations with different universities, congresses and conferences, etc.

4.3. International relations

As regards bilateral arrangements, during 2004 the CSN has strengthened its relations fundamentally with the United States of America, France and Ukraine, holding high level bilateral meetings, setting up joint working groups and organising technical personnel exchanges. The CSN has also maintained an active relationship with all the member and candidate countries of the European Union, Brazil, Mexico, Cuba, Morocco and South Korea.

The CSN participates in the activities and institutional and technical working groups of international organisations having responsibilities in relation to the nuclear and radiological safety and security of nuclear and radiological materials and facilities: the European Union, the United Nations International Atomic Energy Agency (IAEA) and the Nuclear Energy Agency of the Organisation for Economic Cooperation and Development (OECD/NEA).

Furthermore, the CSN participates actively in international regulators associations such INRA (International Nuclear Regulators Association), WENRA (Western European Nuclear Regulators Association) and the Latin American Regulators Forum.

On the basis of the above, the priority lines of work performed in 2004 have been as follows:

- Optimisation of the bilateral relations with the United States of America, France and Ukraine.
- Consolidation of multi-lateral relations with the United Nations International Atomic Energy Agency (IAEA) and the Nuclear Energy Agency of the Organisation for Economic Cooperation and Development (OECD/NEA).
- Rationalisation of activities and relations with the European Union.
- Promotion and enhancement of the CSN's presence and influence in Latin America through the promotion of and participation in the Latin

American Regulators Forum for radiological and nuclear safety.

- To learn from and advise the Government on commitments with other countries and international organisations in relation to nuclear safety and radiological protection, especially within the framework of international treaties and conventions and in its participation in the control and governing bodies of the international institutions.

Multi-lateral relations

The CSN's participation in the international working groups of the United Nations International Atomic Energy Agency (IAEA), the European Union (E) and the Nuclear Energy Agency of the Organisation for Economic Cooperation and Development (OECD/NEA) is a leading institutional activity. The issues dealt with during such multi-lateral meetings allow insight to be gained, information to be exchanged and common strategic decisions to be taken to improve aspects of nuclear safety, radiological protection and waste management in the member countries.

Especially significant is the work performed in support of proposals for directives on the harmonisation of criteria in relation to nuclear safety and safe radioactive waste management of the Atomic Affairs Group (AAG) of the Council of the European Union, the drawing up of the Third National Report on the Convention on Nuclear Safety and the technical support provided by the CSN to the Spanish presidency of the Board of Governors of the IAEA, in response to an express request from the Ministry of Foreign Affairs.

These are dealt with in greater detail below:

Convention on Nuclear Safety

The *Third national report* was drawn up during 2004 and delivered to the IAEA on September 8th of that year, this being followed by the phase on questions on the reports submitted by other countries and replies to those posed by the parties with respect to the Spanish report.

In preparing this report, the CSN has received collaboration from both the Ministry of Industry, Tourism and Commerce and from the Spanish Electricity Industry Association (Unesa), in compliance with the commitment adopted in the second review meeting to involve the regulated sectors in the process.

Convention on the Security of Nuclear Materials

In 2003 a group of technical and legal experts was set up to prepare a project for amendment of the Convention on Security, the Spanish delegation including CSN experts.

Finally, Austria led an initiative proposing an amendment to the Convention and submitted this for the consideration of the different *Party States to the Convention and Members of the IAEA*, for them to declare their agreement with or opposition to the new text. Both the Nuclear Safety Council and the Ministry of Industry, Tourism and Commerce notified the Ministry of Foreign Affairs of their agreement to the amended text presented by Austria and, at the same time, confirmed to the said Ministry their backing for a diplomatic conference to be called to approve the amended text for the Convention. This conference is expected to be held at the beginning of the summer of 2005.

OSPAR Convention

The CSN has drawn up the reports presented by Spain with data for 2003 on releases from the Spanish nuclear facilities, which have been submitted to the Ministry for the Environment (MMA) since 1990.

The CSN regularly attends the annual meetings of the Radioactive Substances Committee and the periodic ministerial meetings and meetings of the official representatives when requested to do so by the MMA, these including discussion of the documentation prepared on application of the *OSPAR Strategy*. In October 2004 the CSN approved the organisation of the meeting of this Committee in Spain. This will take place in Valencia in January 2005.

European Union

In 2004 the nuclear safety area continued working towards its objective of meeting the technical and scientific needs of the European Union, maintaining a high level of European capability and contributing to the creation of the aforementioned European research space. For this purpose it undertakes activities such as the assessment of innovative concepts offering advantages in terms of costs, safety, environmental impact, in-house resources, non-proliferation, the sustainability of nuclear generation and the development of new safer operating processes. The CSN also promotes and participates through WENRA in projects for the harmonisation of criteria for the initial and on-going training of nuclear and radioactive facility operators in the EU and on the consolidation of a safety culture aimed at achieving the integration of national efforts to bring about an economy of scale and facilitate the mobility of resources, access to other infrastructures and coordination activities.

Atomic Affairs Group (AAG)

Throughout 2004 the Commission of the EU continued its efforts to ensure a common approach to nuclear safety, including common standards, criteria and practices aimed at reaching agreement with the States on the final content of the corresponding Directives on nuclear safety and wastes.

The CSN drew up the technical review of the proposals to be submitted in the AAG through the Permanent Representation (REPER), coordinating its tasks with the comments made by other institutions, especially with respect to the proposal for the directive on nuclear safety.

European Consensus Group (CONCERT)

During the two meetings held in 2004, discussions have centred mainly on the regulatory challenge of licensing improvements to nuclear power plants constructed in accordance with the standards in force at the time.

Another point to be underlined is the future of this group and of the Nuclear Regulators Working Group (NRWG). The European Commission is revisiting the idea of continuing to finance these two groups, since it is not habitual to have permanent assistance groups. However, the future of the CONCERT group would appear to be justified, since it is an exemplary framework for the regulators of the European Union to meet with their counterparts from the *New Independent States.*

Regulatory Assistance Management Group (RAMG)

The CSN participates in the meetings of the *Steering Committees* of the regulatory assistance management group (RAMG), where assistance projects are defined and their suitability is discussed, depending on the needs expressed by the beneficiaries. It participates also in several programmes for assistance to Ukraine.

During the meetings of the RAMG that took place throughout 2004, the actions performed and already coordinated for the candidate countries by the DG on extension were reviewed and the future activities of the group within the Phare Programme project for assistance to candidate countries were studied, bearing in mind that on May 1st 2004 these beneficiary countries would be part of the EU. Assistance to Bulgaria and Rumania will be continued in the coming years and the possibility of including Turkey in these funds will be studied.

Nuclear Regulators Working Group (NRWG) and other groups

The CSN participates in a wide range of European Union working groups, significant among which is the Nuclear Regulators Working Group (NRWG) of the Directorate General for Energy and Transport, DG-TREN, set up by the Resolution of Council of 22nd July 1975, the scope of which includes nuclear power plants and all types of nuclear facilities, as well as the criteria and methods applicable to advanced reactors.

IAEA

During 2004 the CSN contributed 300,000 US dollars to the budget of the Agency for Technical Cooperation activities in developing countries and 200,000 US dollars for the development and improvement of radiological safety in Latin America. These economic contributions are complementary to those made by the Spanish Government and other national institutions. The CSN also has a high degree of technical participation in this organisation. The CSN technical staff performs close monitoring of the IAEA working programme and participates actively in it. During 2004 this staff participated in more than 47 meetings of the different technical and advisory committees, in working groups and in training courses, attended three meetings of the board of governors and the 48th general conference and managed scientific visits from the developing nations.

General Conference

The forty-eighth General Conference of the IAEA took place in Vienna in mid September 2004, with the participation of delegates from the member countries, among them Spain.

During this meeting the activities performed during 2003 were reviewed and the projects for 2004 were approved, the member States being encouraged to provide their voluntary economic contributions as set out in the Charter. The Spanish delegation was made up of the Lady Chairman of the CSN, the Director General for Energy of the Ministry of Industry, Tourism and Commerce and the Director of the Centre for energy-related, environmental and technological research (Ciemat).

Board of Governors

The Ambassador and Permanent Representative of Spain before the International Organisations presided over the IAEA Board of Governors during 2004. For this reason and in compliance with the request from the Secretariat of State for Foreign Affairs, the CSN has provided extraordinary technical support in relation to nuclear safety, with a staff member attached to the Embassy in Vienna throughout the Spanish mandate.

International Nuclear Safety Advisory Group (INSAG)

A Spanish representative, whose participation is financed by the CSN, collaborates in all INSAG activities, especially in the coordination and development of all activities associated with communication and the democratic participation of the public in aspects relating to nuclear safety and protection against ionising radiations. The initial draft of the document *Stakeholder involvement* is now available.

During 2004 INSAG has placed great emphasis on four questions relating to safety, which will imply a challenge now and in the coming years for the regulators and nuclear companies:

- The continuous safety improvements undertaken at the nuclear power plants are underlined, these being reflected in the results for safety management shown by the plant operating indicators.
- INSAG insists on the need for the operators and regulators to pay increasing attention to the operation of the plants, avoiding the economic pressures that might affect the former.
- The importance of correct maintenance and care for the human factor now and in the future.
- Lack of interest among polytechnic university students in nuclear engineering.
- Finally, INSAG recalls the challenge implied by the management of radioactive wastes and underlines the fact that many opinions contrary to nuclear activities spring from the lack of solutions in this area.

The CSN participates actively in the following working groups: the Nuclear Safety Standards

Committee (NUSSC); the Radiological Protection Standards Committee (RASSC); the Transport Safety Standards Committee (TRANSSC) and the Waste Management Safety Standards Committee (WASSC).

The CSN collaborates by receiving scholars and scientific visits from other countries. In 2004, the CSN organised and received scientific visits from Brazil and Mexico, in keeping with the possibilities, needs and fields of work of its different areas.

NEA/OECD

The Nuclear Energy Agency is a semi-autonomous organisation within the OECD and has its headquarters in Paris. It assists its member countries in the maintenance and development, through international cooperation, of the scientific, technological and legal bases required for the peaceful, economic, safe and environmentally friendly use of nuclear energy. The Agency collaborates with the European Commission, the IAEA, non-member countries, the nuclear industry and civil organisations.

The CSN participates very actively in all the Agency's committees and is currently involved in technical and R&D projects relating to the Safety of Nuclear Energy.

The Steering Committee, which meets twice a year in Paris, is the governing body of the NEA.

During the 2004 meeting, the Committee approved the implementation and tracking of the strategic plan and recommended the introduction of processes measuring the results obtained and thus allowing the degree of compliance with the objectives mapped out in the Plan to be quantified.

The CSN continued to participate fully in the programmes and activities of the NEA through the Committee for the Safety of Nuclear Installations (CSNI), the Committee on Nuclear Regulatory Activities (CNRA), the Radioactive Waste Management Committee (RWMC), the Committee for Radiological Protection and Public Health (CRPPH) and the Nuclear Science Committee (NSC) and Nuclear Law Committee (NLC).

The CSN is part of international R&D projects, leading national entity groups set up for specific programmes.

Bilateral relations

The CSN has agreements, protocols and conventions signed with organisations carrying out similar functions in 19 countries. Four of these countries have specific agreements: USA, Sweden, France and the United Kingdom.

The most significant aspects are outlined below:

During this year contacts have been maintained with the Cuban regulatory authority, with a Spanish delegation making an institutional visit.

One of the most important agreements is with the United States of America, since many of the Spanish nuclear power plants are based on technology developed in the USA and relations are very fluid. In addition to the working groups contemplated in the bilateral agreement between the US Nuclear Regulatory Commission and the CSN in the area of nuclear safety and research, a high level bilateral meeting was institutionalised in 2004 and will take place every year.

The second bilateral meeting was held at the CSN on March 28th to April 2nd 2004, with the presence of the NRC Board Member Mr. Jeffrey S. Merrifield and of all the members of the Board of the CSN. Visits to the NRC by members of the CSN technical staff have been organised, as has attendance at the conferences and courses promoted by the American Commission, and American technicians have visited Spain. Furthermore, information has been provided to the NRC and the information received in exchange has been managed.

The CSN was represented at the NRC Annual Regulatory Information Conference (RIC), an event of great relevance in relation to regulatory information and communication at State level. Institutional contacts at the highest level are normally maintained within the context of the RIC between the CSN and the NRC.

There are two collaboration agreements in place with France, one with the *Directorate General for Nuclear Safety and Radiological Protection* (DGSNR) and the other with the Institute for Radiological Protection and Nuclear Safety, IRSN.

Within the framework of the bilateral agreement with the French regulatory authority (DGSNR) a high level bilateral meeting was held, as it is every year, on this occasion in Madrid. Among the issues dealt with, discussions focussed on risk-informed inspection, the problems of material ageing, the licensing of plant improvements and the management of low and intermediate level wastes and radioactive sources.

Cooperation with the Ukrainian regulatory authority goes back a long way at the CSN. Since the signing of the cooperation agreement in 1997, assistance has been provided to the Ukrainian authority on a number of issues, outstanding among which was the drawing up of the law by which it was created.

Furthermore, within the framework of the European Union, the CSN has participated in five projects for assistance to Ukraine, financed via TACIS Programme funds.

The Ukrainian representatives had repeatedly expressed their interest in receiving a visit from a delegation of the CSN. For this reason, and with a view to reviewing interests in launching new bilateral collaboration projects, the Lady Chairman of the CSN visited Ukraine in June 2004. Matters relating to the management of radioactive sources, plant dismantling and emergency preparedness were discussed with the regulatory authority.

Other regulatory groups

The CSN continuously promotes the exchange of practices with other similar organisations, even informally, outside the scope of multi-lateral and bilateral agreements. One result of this interest was the creation of three international associations: the International Nuclear Regulators Association (INRA), the Western European Nuclear Regulators Association (WENRA) and the Latin American Nuclear Regulators Forum (FORO).

INRA is a forum at which the high-ranking managers of the regulatory bodies of these countries are able to establish open and constructive dialogue on questions of common interest, present new challenges in order to learn of the opinion of their counterparts or share experiences for the implementation of improvements in their own organisations.

The terms of reference of the association, which were reviewed and grouped during the last meeting, held in December 2004, do not contemplate specific objectives but simply establish open dialogue and, in the event of unanimous agreement being reached, express the opinion of the association on specific issues to the international organisations. Until December 2004, the presidency of INRA had been for terms of one year. During the last meeting, held in Kyoto under the presidency of Japan, the decision was taken to reduce this period to six months, the presidency passing to Germany.

Another issue of interest that has been debated this year has been the possibility of widening the membership of the association, specifically by inviting the Republic of South Korea to join INRA.

WENRA (Western European Nuclear Regulators Association) is currently a forum for regulators limited exclusively to responsibilities relating to nuclear facilities, excluding actions on issues relat-

ing to radiological protection. The forum, of great current interest and importance, is present in all the countries of the European Union.

In May 2003, in view of the future entry of 12 new members of the Union, ten in 2004 and two more in 2006, WENRA modified its statutes and opened the door to those of the new Union countries that possessed nuclear facilities. The WENRA members are currently Germany, Belgium, Bulgaria, the Czech Republic, Slovakia, Slovenia, Spain, Finland, France, Holland, Hungary, Italy, Great Britain, Lithuania, Rumania, Sweden and Switzerland.

During this year the Atomic Affairs Group (AAG) has considered the inclusion of a reference to WENRA in the action plan for the development of proposals for Directives relating to nuclear safety, and a request for the association to regularly report to the group. WENRA agreed to suggest to the group (AAG) a new text faithfully expressing the objectives of WENRA. The original text refers to the bringing into harmony of standards at European level. WENRA does not see this as being correct and requests the Council to talk of harmonising nuclear safety through methods not necessarily implying a common set of standards.

At national level, the work performed by WENRA for the CSN will allow us to evaluate our facilities using an independent tool and help us to assess our level of safety compared to that of the other European nuclear countries.

During this period the Latin American Nuclear Regulators Forum, with technical and financial support from the CSN, has managed to promote and consolidate the development at international level of a NETWORK of know-how on nuclear and radiological safety that is perfectly integrated into the international community. This responds to national needs in this area and has a major impact on the entire Latin American region. Demonstration of this is the fact that in response to the efforts made by this institution, the *General Conference of the United Nations International Atomic Energy Agency* has decided to support these developments and to instruct its technical secretariat to develop action plans for their execution in the context of the United Nations.

4.4. Research plan

Article 2 of Law 15/1980, of April 22nd, attributes to the Nuclear Safety Council the mission of drawing up and implementing plans for research into nuclear safety and radiological protection.

In 2004, compliance with this mission materialised through 67 projects and the management of an in-house budget amounting to 3,905,077 euros, in accordance with the CSN research plan. Many of the research projects were carried out in collaboration with other institutions, noteworthy among which were the collaborations with Unesa (coordinated research plan), Ciemat (framework collaboration agreement) and Enresa. Subsidies through competitions allowed 30 of these to be performed.

The number of projects completed at year end was 13, with 54 still on-going: 23 in the field of radiological protection and 31 on nuclear safety.

The objective of the research projects carried out is to improve the knowledge, methods and tools used by the personnel of the CSN in performing their functions, thus cooperating in ensuring that their activities are more efficient and effective. The projects also helped to increase the levels of competence of the organisations owning regulated facilities or activities and of those, such as research centres or universities, that provide support to the CSN or to the licensees. The results of the completed projects will be described in a publication entitled *Products and benefits of research projects completed in 2004.*

5. Regulations and Standards

Along with its characteristic functions of advice, inspection and control, and others of an executive nature, the Nuclear Safety Council is legally and officially assigned competences relating to the capacity to propose general standards or to dictate technical provisions, some general in scope and obligatory and others specific and merely as recommendations.

In this respect, the following significant standards were published in 2004:

- Royal Decree 1546/2004, of June 25*th* (BOE of July 14th 2004), approving the Basic Nuclear Emergency Plan.

- Order ITC/2637/2004, of July 21st (BOE of August 4th 2004), relating to the application of certain provisions of Royal Decree 1206/2003, of September 19th, for the application of commitments undertaken by the Spanish State in the Protocol Additional to the Safeguards Agreement deriving from the *Treaty on the Non-Proliferation of nuclear weapons,* through the assignment to the *European Commission.*

- Instruction IS-02, revision 1, of July 21st 2004 (BOE of September 16th 2004), of the Nuclear Safety Council, on documentation relating to *Refuelling activities at light water nuclear power plants.*

- Nuclear Safety Council resolution of September 22nd 2004 (BOE of December 13th 2004), updating certain automated files containing personal data and regulating others in the area of management of the *Public entity.*

The policy of the CSN as regards national standards development is contained in the *CSN Strategic Plan*, approved by the Plenary Session of the Council during its meeting of January 13th 2005.

The objective pursued, apart from the on-going improvement of the regulatory process, is development of the standards pyramid in this area, identifying shortcomings in the legal standards and preparing the corresponding texts, monitoring the evolution of the regulatory systems in countries belonging to our environment and adopting and incorporating the international standards in the framework of the Spanish situation.

In compliance with these orientative principles, the CSN continued to promote and drive several projects on standards of different standing during 2004.

The *Regulation on Nuclear and Radioactive Facilities*, approved by *Royal Decree 1836/1999, of December 3rd,* (BOE of December 31st 1999), which replaced the Regulation of July 21st 1972, is being subjected to a profound internal revision in order to adapt it to the experience acquired from its application in recent years. Various tasks have been performed, through the efforts of different sub-directorates of the CSN, to study the possibility of improving certain of its headings, with representatives of the Ministry of Industry, Tourism and Commerce also having intervened. During the last third of the year a proposal was drawn up for the specific modification of different aspects of the Regulation, with the objective of their being published during the first half of 2005.

During 2004 the Nuclear Safety Council also performed other standards-related functions through its participation or integration in groups developing preliminary projects on issues relating directly or indirectly to nuclear safety and radiological protection. A proposal for legislative reform that would affect certain aspects of Laws 25/1964 (system for authorisation), 15/1980 (standards-related capacity of the CSN) and 14/1999 (partial modification of the system of fees) remains open, all of these to be included in a draft bill promoted by the Ministry of Industry, Tourism and Commerce.

Work continues on a proposal for the replacement of chapter XIV of the nuclear energy act, Law 25/1964, of April 29th, regulating the system of infringements and penalties in the nuclear area, technically improving its content and establishing more rational and proportional criteria in describing types and penalties.

During the year 2004 a draft text was prepared for a future Waste Law, incorporating the philosophy of the *Joint Convention on Safety in the Management of Spent Fuel and on Safety in the Management of Radioactive Waste*, of September 5th 1997.

With a view to undertaking the transposition of Council Directive 2003/122/Euratom of December 22nd 2003 on the control of high level sealed radioactive sources and stray sources, a Commission has been set up within the Organisation for the study and preparation of a Royal Decree text.

As regards technical standards developments in 2004, the following Safety Guides (SG) and Instructions (IS) have been approved and published by the Council:

- IS-02. *Revision 1. Documentation on refuelling activities at light water nuclear power plants. (BOE No 224, of September 16th 2004. (A correction of certain errors was published in the BOE of October 11th 2004).*
- GS - 10.13. *Quality assurance in the dismantling and decommissioning of nuclear power plants.*
- GS - 1.7. *Revision 1, Information to be submitted by licensees operating nuclear power plants.*
- GS - 1.15. *Updating and maintenance of PSA's.*
- GS - 6.3. *Instructions on emergencies in the transport of nuclear substances.*
- GS - 1.5. *Revision 1, Documentation on refuelling activities at light water nuclear power plants.*
- GS - 1.15. *Updating and maintenance of PSA's.*

Nine CSN Guides and ten CSN Instructions, either original versions or revisions, are in the final phase of development and of internal and external comments.

Another significant activity has been the preparation of a block of Technical Instructions (from the two technical divisions), general Complementary Technical Instructions (CTI's) and Circulars, which have been placed on the Intranet and on the CSN's external website. Mention should be made at international level of the continued participation of members of the CSN technical staff in the *standards harmnisation* groups promoted by WENRA (*Western European Nuclear Regulators Association*).

6. Management of resources

6.1. Organisational improvements

During 2004 the CSN completed the drawing up of its *Strategic Plan for 2005-2010*, which establishes the targeted results, the strategies and the objectives for the coming five years, taking into account the current and foreseeable conditions of the environment.

Another of the project contemplated in the *Action Plan* for modernisation of the operation of the Organisation is the re-engineering of processes, which was completed in 2004. The conclusions and recommendations were submitted to the Council in September and are currently in the phase of implementation.

A new planning model supported by a new computer application, has been designed and implemented. The main objectives of the new model are greater integration of the strategy of the organisation and its day-to-day activities and simplification of the planning documents (plans and tracking reports).

As a result of work relating to data protection, the resolution of the Council regulating automated files containing personal data has been updated.

Improvement of the regulatory process

Significant progress has been made throughout the year 2004 in activities aimed at improving the efficiency of the regulatory process, with the performance of activities approved within the improvement tasks identified. The draft improvement tasks are currently in the process of comments and approval. Especially significant are tasks such as *CSN Policies*, *standards pyramid and licensing basis*, *Adaptation of the Reactor oversight process (ROP) in the integrated plant supervision system (IPSS), Process of evaluation, document quality and Guideline on exemptions,* and other specific tasks such as the *Programme for problem identification and resolution. Corrective actions programme.*

Planning and tracking

A new planning model was deigned and implemented during 2004. The model considers planning to be a continuous process in which, on the basis of strategic objectives, operational objectives are mapped out and the fulfilment and validity of both are continuously evaluated.

Strategic planning is designed to satisfy the general goals of the Organisation (Mission and Vision) in the long term, their elements being looked upon as a whole.

Operational planning applies and develops the strategic plans within the framework of day-to-day activities, drawing up short-term plans.

The cycle is closed with measuring and evaluation, which makes it possible to identify possible deviations and take corrective measures.

The drawing up of the strategy and the definition of the strategic objectives are carried out for five-year periods. The strategies and associated objectives are included in the Strategic Plan approved by the Council. Action policies are established yearly by the Council (although they may be updated if changes in the environment so require). These policies are set out in a resolution by the Secretary General, which includes instructions for the preparation of the Annual Work Plan *(AWP).*

Finally, it is necessary to establish parameters and standards providing the data required to check whether the results obtained correspond to those mapped out, whether the timeframes established are met and whether the activities are performed to the necessary levels of quality.

The tool used for such measuring and evaluation is the integral command panel, to be implemented at the CSN extending upon the current command panel and using it as a reference.

Internal Quality Plan

During 2004, 6,515 hours have been dedicated to the question of internal quality, and 10,259 to planning, these figures meaning respectively 1.74% and 2.75% of the available hours.

As of December 31st 2004 there were 89 procedures approved, 27 relating to management, 13 administrative and 49 technical. Four procedures were approved during the year.

The nuclear safety technical division has submitted 11 procedures relating to the *Integrated Plant Supervision System* (IPSS) to the internal quality area for them to be adapted to the CSN documentary system.

The audit performed to verify compliance by personal data with the *Regulation on security measures* has concluded satisfactorily and the *Process re-engineering* project has also been completed.

Information systems plan

As part of the implementation of the new planning model, a new activities planning and management system has been developed and implemented. The system is based on the Microsoft EPM tool.

An *electronic administration* system has been developed, allowing radioactive facility rates to be paid remotely, along with another system that allows for the automated submittal (registration) of documentation by nuclear facilities.

As part of the work relating to the training plan, a new application operating on the CSN Intranet has been developed and implemented. The application allows course requests and evaluations to be performed on-line, using Web formats.

In order to allow the CSN offices to be extended, it has been necessary to install and configure the local network in the new annex and interconnect it with the CSN building. An optical link based on laser technology has been used for this interconnection.

Training plan

During 2004 the activities foreseen in the CSN Training Plan have been carried out. At the beginning of this year the Council approved the setting up of a *Training commission* with the following objectives: preparation of the criteria and tracking methodology for the training plans, monitoring and evaluation of the results of training activities for the current year and development of criteria for the design of the Training Plan for 2005 and subsequent years.

The Commission has undertaken the activities required to achieve these objectives, with special attention paid to the design of the Training Plan for 2005, given its particular relevance.

The design of the aforementioned plan has been undertaken for the first time in accordance with the strategic objectives, as defined in the *CSN Strategic Plan*, facilitating and strengthening compliance with the *Mission and Vision* of the CSN.

The training efforts made by the Council were oriented, on the one hand, towards ensuring and updating knowledge in the areas of nuclear safety and radiological protection and the development of management and administrative skills and, on the other, towards the development of specific language teaching programmes on English, French and German, as well as training processes on the use of computer tools and resources by the CSN personnel.

As of the end of the year the Council's training efforts included 1,114 trainees, with an average of 2.53 attendances per person.

The overall number of hours dedicated to personnel training was 44,733, the total cost amounting to 710,294.26 euros).

6.2. Management of human and economic resources

As of December 31st 2004, the total staff of the Organisation numbered 440. The number of women working at the Nuclear Safety Council represents 48.86% of the total workforce.

Throughout the year selective processes were initiated for the civil service personnel to cover eight job posts through the system of free appointment and 17 on merit. By Resolution of May 31st 2004, the seven candidates who successfully passed the selective examinations called via the resolution of May 27th 2003 were appointed to the Upper Level of the Nuclear Safety and Radiological Protection Technical Corps.

Finally, Isabel Mellado Jiménez, formerly Deputy Director General of Nuclear Facilities, was appointed to the post of Technical Director of Nuclear Safety by Royal Decree 1493/2004, of June 18th, replacing José Ignacio Villadóniga Tallón, and on September 8th 2004 the Council agreed to appoint Francisco Javier Zarzuela, civil servant belonging to the Upper Level of the Nuclear Safety and Radiological Protection Technical Corps, to the post of Deputy Director General of Nuclear Facilities.

The economic aspects are dealt with under budgeting and financial aspects, and the accounting of the Organisation is undertaken in compliance with the *General public accounting plan.*

The initial budget of the CSN for the 2004 financial year amounted to a total 48,267 thousand euros. This initial budget did not undergo any increase as a result of the budget modifications performed during the year. With respect to the previous year, the initial budget increased by 11.07%.

The variation in revenues with respect to the previous year amounted to 1.82%, the variation in execution of the expense budget compared to that year being 12.88%. As regards revenues, the fee for services rendered, which is the main source of financing, reached 92.8% of the total.

The commitments acquired, to the sum of 39,188 thousand euros, amounted to 81.1% of the definitive budget forecasts. It is to be noted that the total recognised obligations amounted to 37,976 thousand euros, 78.7% of the definitive budget application.

Personnel expenses are quantitatively the most important, representing 52.8% of the total. The personnel expenses include salaries, social security contributions to be paid by the employer and social welfare expenses.

External services appear in second place, at 32.4%, the fundamental components of this heading being the services of independent professionals, maintenance expenses and communications.

The financial year gave a negative result of 5,636 thousand euros.