

Convention on Nuclear Safety 7th Review Meeting – 2017



International Atomic Energy Agency IAEA, Vienna

Country Review Report for SPAIN

Drafted by Country Group No. 5

(Brazil, Cambodia, China, Finland, Iceland, Libya, Oman, Senegal,
Spain, United Arab Emirates, Viet Nam)

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Final Version

DISCLAIMER: Per INFCIRC 571, Revision 7, Para. 16-19 and Annex IV, Contracting Parties were invited to comment on the implementation of the CNS reporting guidance. Contracting Parties were also encouraged to submit proposed Good Practices, Challenges, and Suggestions prior to the Review Meeting. The draft Country Review Report documents the preliminary observations identified by the Contracting Parties. The Country Review Report is the result of the CNS Review Process and was agreed by consensus by the Country Group.

Glossary

The Glossary provides here the definitions of “Challenges”, “Suggestion” and “Good Practice” according to Annex IV of INFCIRC/571/Rev. 7. The definition of “Area of Good Performance” was agreed upon by the Officers of the 7th CNS Review Meeting at the CNS Officers’ Meeting on 3-4 October 2016.

A **Challenge** is “a difficult issue for the Contracting Party and may be a demanding undertaking (beyond the day-to-day activities); or a weakness that needs to be remediated.”

A **Suggestion** is “an area for improvement. It is an action needed to improve the implementation of the obligations of the CNS.”

A **Good Practice** is “a new or revised practice, policy or programme that makes a significant contribution to nuclear safety. A Good Practice is one that has been tried and proven by at least one Contracting Party but has not been widely implemented by other Contracting Parties; and is applicable to other Contracting Parties with similar programmes.”

An **Area of Good Performance** is “a practice, policy or programme that is worthwhile to commend and has been undertaken and implemented effectively. An Area of Good Performance is a significant accomplishment for the particular CP although it may have been implemented by other CPs.”

Executive Summary

Spain has eight light water nuclear reactors located on six sites, comprised of six PWRs and two BWRs. Seven NPPs are in operation. Since July 6th 2013, one of the BWR groups, Santa María de Garoña, has been in an administrative shutdown situation. Renewal of the operating permit was requested in May 2014. As of the date of submission of national report of Spain (2015), this renewal procedure was pending the mandatory report by the Nuclear Safety Council. Furthermore, there are two other reactors in the dismantling phase.

All the 5 Challenges and the only suggestion from the 6th Review Meeting have been closed.

The Country Group highlights the following measures to improve safety in Spain's national nuclear programme:

- Establishment: Law on Environmental Assessment, on Electricity Industry, and on the National Civil Defence System; Royal Decree-Law on adopting urgent measures in relation to the ownership of NPPs; Royal Decree for the responsible and safe management of spent nuclear fuel and radioactive waste, and amended Royal Decree on the physical protection; and, some CSN instructions related to fire protection, reporting of events at NPPs, emergency and severe accident management, and on DBA analysis;
- Spain implemented extensive improvements and modifications at several NPPs, and PSR was also conducted for the license extension; and,
- Several long-term actions resulting from Fukushima feedback in operating NPPs continued e.g., filtered containment venting system, severe accident management, containment combustible gas control system, CAGE, PAR, mobile equipment, EDMG, EDEG.

The Country Group highlights the following results of international peer review missions of Spain:

- Spain invited WANO peer review to Trillo, Cofrentes, Vandellós II, Almaraz, and Ascó NPPs, and a Follow-up peer review to Trillo. WANO corporate peer review mission also been done in Iberdrola G.N./Cofrentes and CNAT/Almaraz-Trillo; and,
- Spain received IRRS Mission in 2008 and the Follow-up Mission in 2011. Spain has invited a joint IRRS-ARTEMIS Mission in 2018, and is performing self-assessment in 2017.

The Country Group discussed the following topics after the Spain national presentation:

- Long-term operation (LTO) and associated licensing process;
- Public communication;
- Post Fukushima actions, including review of seismic hazards and plant improvements;
- CSN integrated oversight process;
- Safety culture at both the licensees and the regulator;
- Regulatory decision making process;
- Application of risk-informed regulation; and
- Knowledge management at the regulator.

The Country Group proposed the following topic to be discussed in the plenary session:

- Integrated NPP Oversight System, including recent development in Spain with a modified integrated plant supervision tool.

The Country Group identified the following Challenges for Spain:

- **Challenge 1:** Finalize preparatory work in effective and efficient way for the upcoming joint IRRS-ARTEMIS Mission, considering this is the first simultaneous IRRS-ARTEMIS mission;
- **Challenge 2:** To update legislation and regulations on radiation safety and emergency preparedness, considering there are many government institutions involved:
 - Transposition to the Spanish legislation of the Directive on basic safety standards for protection against the risks arising from exposure to ionising radiations, and
 - The requirements relating to emergencies contained in the new European standards and the incorporation of international trends and recommendations and the lessons learned in the wake of Fukushima constitute an important challenge, since they imply an ambitious process of review of the standards and criteria applicable to emergency management;
- **Challenge 3:** To implement and enhance Knowledge Management Plan within the regulatory body, considering significant number of experienced staff may retire soon; and,
- **Challenge 4:** To develop in the CSN a Safety Culture Programme in line with the CSN Safety Culture Policy.

In addition, the country group identified 4 Areas of Good Performance.

The Country Group acknowledges that the following significant achievements were made in relation with Spain Fukushima Response Action Plan:

- the development of regulatory evaluation criteria for deciding on post-Fukushima plant modifications; and,
- implementation of actions in response to regulatory requirements against an accident with loss of control of large areas.

The Country Group concluded that Spain:

- Submitted a National Report, and therefore complies with Article 5 and in time following Rule 39 of INFCIRC/573 Rev. 6;
- Attended the 7th CNS Review Meeting, and therefore complies with Article 24.1; and,
- Held a national presentation and answered questions, and therefore complies with Article 20.3.

1. Basic Information on Spain Nuclear Programme

According to Spain's Report:

- Spain has eight light water nuclear reactors located on six sites, comprised of six PWRs and two BWRs. Seven NPPs are in operation. Since July 6th 2013, one of the BWR groups, Santa María de Garoña, has been in an administrative situation of definitive shutdown. Renewal of the operating permit was requested in May 2014. As of the date of submission of national report of Spain (2015), this renewal procedure was pending the mandatory report by the Nuclear Safety Council; and
- Furthermore, there are currently two reactors in the dismantling phase in Spain. The José Cabrera nuclear power plant ceased to operate in 2006, and in 2010 ownership of the facility was transferred to ENRESA (Empresa Nacional de Residuos Radiactivos) and authorisation was granted for the performance of the dismantling process, which is scheduled for completion in 2018. Vandellós I nuclear power plant, which was shut down in 1989, reached dismantling level 2 in 2003 and is currently in the dormancy phase.

2. Follow-Up from previous CNS Review Meeting

2.1 Challenges

Spain provided the following updates on Challenges identified during the 6th CNS Review Meeting:

Challenge 1: to maintain and improve top level technical and professional know-how at CSN.

Spain addressed this Challenge by:

- enhancing the training plan with the objectives aligned with the CSN Strategic Plan, and implements it in many levels for both technical and administrative areas. During the reporting period a relevant number of courses have been delivered, with the investment of 1,264.324 Euros;
- promoting of the CSN presence at national and international forums (congresses, meetings, seminars) relating to its functions and competences has continued; and,
- developing a knowledge management model based on IAEA recommendations that will be fully incorporated into then CSN Management System. It is structured as a cyclic transversal process comprising many interactive stages from the competency identification, gap analysis, preservation, dissemination, to independent assessment and periodic review of the process.

Follow Up Status: Many relevant processes have been set in place, and Spain already identified knowledge management issue as Challenge No. 7 for this RM, hence this Challenge may be considered as **Closed**.

Challenge 2: to set up a working plan to incorporate into the Spanish legislation the new WENRA reference levels after Fukushima Daiichi accident.

Spain addressed this Challenge by carrying out the process of alignment with the reference levels revised after Fukushima in accordance with the programme and schedule established by the reactor harmonisation working group. Many of the new WENRA requirements had already been incorporated by the CSN in the Complementary Technical Instructions (legally binding) issued to all the nuclear installation following up the Fukushima accident. Furthermore, the two new CSN instructions issued during this reporting period report also incorporated many of the revised reference levels. As of

December 31st of 2015, 318 of the 330 WENRA reference levels in force (including those revised subsequent to Fukushima) were incorporated in the Spanish regulations. The remaining 12 reference levels are in the process of alignment.

Follow Up Status: Many relevant steps have been set in place, and the task is almost completed, therefore this challenge might be considered as **Closed**.

Challenge 3: to review the seismic characterization of the sites of Spanish nuclear power plants in accordance with the most advanced international standards.

Spain addressed this Challenge by issuing a Complementary Technical Instruction by the CSN in 2015 to all the nuclear power plant licensees requiring the performance of a reassessment of the seismic risk of each site, for which active or seismogenic faults. The process has already been initiated and is being carried out jointly for all the sites, in compliance with the most updated analytical criteria at international level (SSHAC methodology, level 3) and with widespread participation at national and international level.

Follow Up Status: Relevant action plan have been initiated and is in progress, hence this challenge might be considered as **Closed**.

Challenge 4: to finish revising and developing the procedures and instructions included in CSN Emergency Response Organization.

Spain addressed this Challenge by:

- implementing the CSN Emergency Action Plan (PAE), including the Emergency Response Organisation, which brings together the functions, resources and basic action procedures of its management and technical staff, their interactions and general guidelines for their initial and on-going training;
- completing Emergency Procedures Manual by the CSN with the issuing of new procedures, including the emergency radiological Measurement, Assessment and Control Plan; and,
- revising the PAE as part of the standards review process that is being carried out in Spain, and in relation to the management of emergencies. A series of aspects for improvement have already been identified and is in progress, especially as regards reinforcement of the organisation to respond suitably to the requirements for information in the event of an emergency from international organisations and neighbouring countries.

Follow Up Status: Many relevant efforts have been implemented, thus this challenge might be considered as **Closed**.

Challenge 5: Upgrade treatment of cross-cutting elements (human and organizational factors and safety culture) in Integrated Plant Oversight System (SISC).

Spain addressed this Challenge by:

- having the CSN completed the development of a systematic approach for incorporation into the SISC in 2014. Organisational and cultural aspects that might have an impact on nuclear safety were integrated into the inspection system;
- initiated a pilot application in July 2014, and began the official application of the supervision of these SISC transversal components in April 2016. Furthermore, the results of the supervision of these transversal components have been analysed as part of the quarterly assessment of the SISC and transmitted to the plant licensees; and,

- having the CSN monitors the implementation status of the organizational and human factors (O&HF) programmes and the projects and activities they include, through the evaluation of licensee requests, the meetings of the mixed CSN-UNESA working group on O&HF and, especially, the basic two-yearly CSN inspection plan relating to O&HF. Among the projects and activities supervised by the CSN, special mention may be made of the development of human factors simulators at the Spanish NPPs, the safety culture programmes, the analysis of human factors in operating experience, human factors engineering in design modifications, work supervision and behaviour observation activities, projects for analysis of the feasibility of human actions and the management of organisational changes.

Follow Up Status: Many relevant processes have been implemented, hence this challenge might be considered as **Closed**.

2.2 Suggestions

Suggestion 1: Describe progress of implementation of the CSN Knowledge Management Plan in Spanish National Report to 7th Review Meeting.

Spain addressed this Suggestion by having the CSN developing a knowledge management model adapted specifically to its needs and based on IAEA recommendations that will be fully incorporated in its Management System and will make use of the characteristic elements of knowledge management already available to it. The knowledge management process of the CSN is structured as a cyclic transversal process and addresses the four basic pillars of the model recommended by the IAEA.

Follow Up Status: The requested description of the CSN Knowledge Management Plan was provided in the Spain's National Report. Therefore, this suggestion might be considered as **Closed**.

3. Measures to improve safety

3.1 Changes to the regulatory framework and the national nuclear programme

Since the last Review Meeting, the Country Group took note of the following changes to the regulatory framework and the national nuclear programme:

- Establishment of new laws: Law on Environmental Assessment, on Electricity Industry, on the National Civil Defence System, and partial amendment of Law on the General Tax; and new Royal Decree-Law on adopting urgent measures in relation to the gas system and ownership of NPPs. A new Royal Decree on Nuclear Safety is under approval process to comply with the Euratom Directive on nuclear safety;
- Implementation of WENRA terms of reference. According to the latest harmonisation status report, as of December 31st 2015, of the 330 WENRA reference levels in force (including those revised following Fukushima), 12 remain to be incorporated into the national standards;
- Establishment of secondary legislation (Royal Decree) for the responsible and safe management of spent nuclear fuel and radioactive waste; amended Royal Decree on the physical protection of nuclear facilities and materials and radioactive sources; and,
- Establishment of CSN instruction (as legally binding technical standards): on the requirements of the NPP fire protection programme; on Criteria for the reporting of events at NPPs; on emergency operating and severe accident management procedures at NPPs; and, on design basis accident analysis at NPPs.

3.2 Safety improvements for existing nuclear power plants

The Country Group took note of the following implemented and planned safety measures for existing nuclear power plants in Spain:

- The implementation of measures to address extensive damage accident scenarios, including interfaces with existing plant facilities, resources and portable equipment, equipment storage areas, heliport, etc.;
- A common Emergency Support Centre (CAE) sharing resources among the different Spanish NPP and capable of providing support in the event of an emergency at any of the sites;
- Alternative Emergency Management Centres (CAGE);
- Acquisition of 380 V.a.c. portable diesel generators to provide feed for the minimum critical loads defined in the prolonged SBO scenario and for the installation of emergency connection systems for this equipment;
- Acquisition of portable diesel pumps for the extinguishing of a major fire in the absence of off-site power supply or in the event of damage to the plant's fixed fire-fighting systems, and for providing reactor or containment make-up water if necessary;
- Drawing up of Extensive Damage Mitigation Guidelines (EDMG) and the new Extensive Damage Emergency Guidelines (EDEG);
- Installation of Filtered Containment Venting Systems and Passive Autocatalytic hydrogen Recombiners (PAR); and,
- other technical improvements and modification were also made based on the result of deterministic and probabilistic safety analysis. Some NPPs have implemented specific improvements such as: Installation of alternative shutdown panels to guarantee safe shutdown following a fire in the cable room or control room; the filtering and ventilation systems of different plant buildings, including the installation of a new redundant train in each group for the spent fuel building; the systems for the protection of buildings against atmospheric discharges; and the physical separation and electrical insulation of nuclear class circuits, etc.

3.3 Response to international peer review missions

The Country Group took note of the following implemented or planned measures in response to the results of international peer review missions:

- In this reporting period, Spain invited WANO peer review to Trillo, Cofrentes, Vandellós II, Almaraz, and Ascó NPPs, and a Follow-up peer review to Trillo. WANO corporate peer review mission also been done in Iberdrola G.N./Cofrentes and CNAT/Almaraz-Trillo. Some important points from this missions are:
 - All the plants have established a safety culture improvement programme based on a common guideline. There is a commitment to perform assessments internally every two years and externally every six years. It is recommended that a combination of different techniques be used for these assessments, such as surveys, interviews, behaviour observations, working group discussions, documentary reviews, etc. The programmes are periodically evaluated by the CSN,
 - During 2013-2015, experts from the Spanish NPPs participated in 41 WANO peer reviews at other plants and in 26 WANO technical missions at such facilities; and,

- Spain received IRRS Mission in 2008 and the Follow-up Mission in 2011. Spain has invited a new IRRS Mission in 2018, and is performing self-assessment in 2017. Spain stated that it has also simultaneously invited ARTEMIS, the IAEA's integrated expert peer review service for radioactive waste and spent fuel management, decommissioning and remediation programmes, in 2018.

4. Implementation of the Vienna Declaration on Nuclear Safety (VDNS)

On 9 February 2015, the Contracting Parties adopted INFCIRC 872, "Vienna Declaration on Nuclear Safety", which is a commitment to certain principles to guide them in the implementation of the CNS' objective to prevent accidents and mitigate their radiological consequences, should they occur. The Contracting Parties agreed to discuss the principles of the Vienna Declaration on Nuclear Safety in their National Reports and in the subsequent Review Meetings.

4.1 Implementation of the VDNS's principle on new nuclear power plants

The first principle of the VDNS is:

"New nuclear power plants are to be designed, sited, and constructed, consistent with the objective of preventing accidents in the commissioning and operation and, should an accident occur, mitigating possible releases of radionuclides causing long-term off site contamination and avoiding early radioactive releases or radioactive releases large enough to require long-term protective measures and actions."

Spain National Report explains that in defining the "new" NPP, Spain as a member state of the European Union is obliged to abide by the provisions of Council Directive 2014/87/Euratom, of July 8th 2014, modifying Directive 2009/71/Euratom. In this Directive, "new" NPPs are those which a construction licence is granted for the first time after 14 August 2014. Anyway, there are no plans to build new NPPs in Spain, but the principle is understood to be fully applicable to existing plants as regards design modifications and operation.

Spain reports, that its national requirements and regulation incorporate appropriate technical criteria and standards to address the First principle of VDNS:

- applying Council Directive 2014/87/EURATOM, which establishing a community framework to implement improvements in nuclear safety following up the Fukushima nuclear accident;
- implementing CSN IS-36 2015 on emergency operating and severe accident management procedures at NPPs;
- implementing CSN IS-26, which establishes that the licensee shall incorporate "defence in depth" to prevent and mitigate off-site releases beyond the authorised limits in the phase of design, construction, operation, and dismantling;
- implementing CSN IS-11, on the NPP operating personnel licences, and CSN Instruction IS-12, which defines the qualification and training requirements of non-licensed NPP personnel, whose functions relate to the safe operation of the plant; and,
- applying Organizational and Human Factor (O&HF) Programme, and safety culture, by the Spanish NPP. These activities are then supervised by the CSN.

The Country Group made the following observations: Spain has implemented many relevant administrative and technical measures in accordance with the First Principle of VDNS. Most of the

regulation and requirements were enacted before the establishment of the VDNS.

4.2 Implementation of the VDNS's principle on existing nuclear power plants

The second principle of the VDNS is:

“Comprehensive and systematic safety assessments are to be carried out periodically and regularly for existing installations throughout their lifetime in order to identify safety improvements that are oriented to meet the above objective. Reasonably practicable or achievable safety improvements are to be implemented in a timely manner.”

Spain reports, that it's national requirements and regulation:

- address the application of the principles and safety objectives of the Vienna Declaration to existing NPPs in the following way:
 - implementing CSN IS-37 2015 on the DBA analysis at NPPs. This Instruction contributing to compliance with Council Directive 2014/87/EURATOM which requires that the national legal framework demand that the licensees “periodically assess and verify and permanently improve the nuclear safety of the nuclear facilities, to the extent that is reasonably possible and in a systematic and verifiable manner”,
 - applying many improvements as the result of the PSRs and the performance of the stress tests and analyses such as: protection against fires; the electrical separation of trains, containment isolation and the standby gas treatment system; the remote and alternative shutdown systems; the calculation methodologies used in accident analysis; address situations of loss of major areas, complete loss of power supply and loss of the ultimate heat sink as a result of the analyses performed within the stress tests and tests on loss of major areas,
 - implementing Royal Decree 1836/1999, which establishes that the licensee shall continuously strive to improve the conditions of nuclear safety and radiological protection of the facility; analyse the best existing techniques and practices in accordance with the requirements established by CSN and implement those considered by this body to be appropriate. The CSN may at any time require the licensee to perform analyses for the implementation of improvements in nuclear safety and radiological protection, pursuant to the provisions of Law 15/1980 creating the CSN;
- require the performance of periodic comprehensive and systematic safety assessments of existing NPPs; and,
- does address reasonably practicable/achievable safety improvements to be implemented in a timely manner.

The Country Group made the following observations: Spain has implemented many relevant administrative and technical measures in accordance with the Second Principle of VDNS. Most of the regulation and requirements were enacted before the establishment of the VDNS.

4.3 Taking into account IAEA Safety Standards and other international Good Practices in the national requirements and regulations addressing the VDNS principles

The third principle of the VDNS is:

“National requirements and regulations for addressing this objective throughout the lifetime of nuclear power plants are to take into account the relevant IAEA Safety Standards and, as appropriate, other good practices as identified inter alia in the Review Meetings of the CNS.”

- Spain reports that its national requirements and regulation take into account the relevant IAEA Safety Standards throughout the life-time of a nuclear power plant by the establishment of CSN IS-26 on basic nuclear safety requirements applicable to nuclear facilities and IS-27 on general NPP design criteria, which include both the Spanish practices previously applied, the IAEA standards, and the country of origin standards (USA and Germany), as well as the WENRA reference levels of 2008.

The Country Group made the following observations: Most parts of the third principle of VDNS were adopted in Spain national requirements and regulations.

4.4 Issues faced by Spain in the implementation of the VDNS

Spain has not reported any specific challenges in applying the Vienna Declaration principles and safety objectives to its existing fleet of nuclear power plants.

5. Results of the Review

5.1 General Quality of the National Report

With regards to the general quality of the National Report and transparency issues, the members of the Country Group made the following observations:

- The Report is qualified to be comprehensive and well structured. The 7th National Report of Spain addresses in due details all aspects of the obligations of the Convention;
- Spain does not use the voluntary template for Articles 17 and 18. Spain explains that this is due to the fact that ultimately it is for each Contracting Party to determine the form, length and structure of its National Report along with the steps taken for its preparation, as it was stated during the Organizational Meeting of the 7th RM; and,
- Spain reported in detail about the activity of international peer review missions, and Spain plans to receive a joint IRRS-ARTEMIS Mission in 2018.

With regards to the compliance with the requirements of the CNS and its Guidelines, the members of the Country Group made the following observations:

- The Spain's National Report was submitted before the deadline of 15 August 2016;
- The content and structure of Spain's National Report complies with the CNS guidance, even if a summary has not been included. Spain stated that it has considered as lesson learned for future drafting of national reports for the Convention on Nuclear Safety;
- The directions of the Summary Report of 6th Review Meeting were taken into consideration; and,
- The directions given by the President of the 7th Review Meeting were mostly followed.

5.2 Participation in the Review Process

With regards to Spain's participation in the Review process, the members of the Country Group made

the following observations. Spain:

- posted questions to Contracting Parties;
- delivered answers to the questions of Contracting Parties before the deadline; and,
- delivered its national presentation.

5.3 Challenges

The Country Group identified the following Challenges for Spain:

- **Challenge 1:** Finalize preparatory work in effective and efficient way for the upcoming joint IRRS-ARTEMIS Mission, considering this is the first simultaneous IRRS-ARTEMIS mission;
- **Challenge 2:** To update legislation and regulations on radiation safety and emergency preparedness, considering there are many government institutions involved:
 - Transposition to the Spanish legislation of the Directive on basic safety standards for protection against the risks arising from exposure to ionising radiations,
 - The requirements relating to emergencies contained in the new European standards and the incorporation of international trends and recommendations and the lessons learned in the wake of Fukushima constitute an important challenge, since they imply an ambitious process of review of the standards and criteria applicable to emergency management;
- **Challenge 3:** To implement and enhance Knowledge Management Plan within the regulatory body, considering significant number of experienced staff may retire soon; and,
- **Challenge 4:** To develop in the CSN a Safety Culture Programme in line with the CSN Safety Culture Policy.

5.4 Suggestions

There was no Suggestion identified by the Country Group.

5.5 Good Practices and Area of Good Performance

During the peer review of Spain's National Report, the Contracting Parties were invited to recommend Good Practices and to highlight Area of Good Performance.

There was no Good Practice identified by the Country Group.

The following Areas of Good Performance of Spain was commended by the Country Group:

- **Area of Good Performance 1:** Implementation of “cross-cutting elements”, including causes of findings, in the Integrated NPP Oversight System (SISC) to take into account the organizational and safety culture factors in the oversight process;
- **Area of Good Performance 2:** Establishment of University chairs sponsored by the regulatory body to promote E&T and R&D development in nuclear safety and radiological protection matters and to foster and support the entry of young professionals in the nuclear safety field;

- **Area of Good Performance 3:** Establishment of the CSN Safety Culture Policy; and,
- **Area of Good Performance 4:** Governmental commitment to maintain the CSN staff, despite economic constraints in Spain.

6 Fulfilment of CNS Review Requirements

The Country Group concluded that Spain:

- Submitted a National Report, and therefore complies with Article 5 and in time following Rule 39 of INFCIRC/573 Rev. 6;
- Attended the 7th CNS Review Meeting, and therefore complies with Article 24.1; and,
- Held a national presentation and answered questions, and therefore complies with Article 20.3.