Spanish Nuclear Safety Council (CSN) Instruction IS-02, revision 1, of 1st September 2004, on documentation relating to Refuelling Activities at Light-water Nuclear Power Plants

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Article 2 a) of the Act 15/1980, of 22nd April, on the Creation of the Nuclear Safety Council, as amended by the 1st Additional Provision to the Act 14/1999, of 4th May, on the Public Prices and Fees for services rendered by the Nuclear Safety Council, grants this Public Body the authority 'to develop and approve all required Instructions, Memoranda, and Safety Guidelines with regard to nuclear and radioactive facilities and to any activities relating to nuclear safety and radiation protection' with the purpose of ensuring safe operation, i.e. without unnecessary risks to the people or the environment, of nuclear and radioactive installations.

In this sense, CSN has approved Instruction IS-02, on the 'Documentation relating to refuelling Activities at Light-water Nuclear Power Plants', with the purpose of defining the documentation that may be required by the Nuclear Safety Council in order to assess the safety and correct performance of nuclear refuelling processes. This Instruction, therefore, will identify the activities that shall be notified to CSN, will define the information to be included in such notifications, and establish the corresponding submission times.

Resolution Eight of the Commission on Economy and Finance of the Spanish Chamber of Deputies, dated 9th October 2002, urged CSN 'to issue –within a period of three months– an instruction to all operators of nuclear power plants ordering them to perform a detailed planning of their refuelling periods and to submit a report on that planning to the Nuclear Safety Council before its actual implementation in order to have it analysed and evaluated. The reason for this new requirement is that some operators tend to reduce shutdown time in their plants in order to perform refuelling activities, which is the probable origin of some incidents that may eventually affect the safety of the plants.'

The Nuclear Safety Council, in its meeting on 8th January 2003, after analysing the report prepared by the Technical Directorate on Nuclear Safety as a consequence of the aforementioned resolution, agreed to set forth additional technical guidelines for all the operators of nuclear power plants. It also agreed to prepare a new edition of Instruction IS-02 in order to include such additional technical guidelines.

Apart from including the new additional technical guidelines, the contents of this Instruction have been reduced to the minimum requirements established, i.e., a definition of the documentation to be submitted, a description of the minimum information to be provided, and the deadlines for submission. All remaining details, which had a recommendatory nature, have been included in a new revision of the Nuclear Safety

Council Guide 1.5, which is consistent with the amendment of this Instruction. As a consequence of the scope of the changes introduced, this edition of Instruction IS-02 repeals the former edition in force, dated 10th April 2002.

By virtue of all the foregoing, in accordance with the legal authorisation provided by Article 2 a) of the Law 15/1980, dated 22nd April, on the creation of the Spanish Nuclear Safety Council, as amended by the 1st Supplementary Provision to the Law 14/1999, dated 4th May, in consultation with all affected sectors, and after receiving all appropriate technical reports,

This Nuclear Safety Council, in its meeting on 21st July 2004, has agreed upon the following provisions:

One. Scope of Application

Unless a specific type of nuclear power plant is stated, this Instruction shall apply to all licensees of pressurised water reactor (PWR) and boiling water reactor (BWR) nuclear power plants.

Two. Definitions

'Refuelling' shall include, in a strict sense, all activities aimed at renewing the fuel of a nuclear power plant. In light-water nuclear power plants, however, this term shall also cover the activities performed during the plant's shutdown previous to the refuelling itself, namely:

a) Refuelling design and safety analysis

b) Fuel handling

c) Fuel inspection

d) Regular monitoring checks and special checks

e) Cycle start-up nuclear checks

f) Design modifications

g) Radiation control and monitoring during refuelling

h) In-service Inspection

i) Preventive and corrective maintenance

The definitions of the remaining terms and concepts used in this Instruction correspond to those set forth by the legislation below:

Law 25/1964, dated 29 April, on Nuclear Energy (Official State Gazette No. 107, dated 4 May), as amended by Law 54/1997, dated 27 November, on the Electricity Sector (Official State Gazette No. 285, dated 28 November).

Law 15/1980, dated 22 April, Establishing the Spanish Nuclear Safety Council (Official State Gazette No. 100, dated 25 April), as amended by Law 14/1999, dated 4 May, on Public Prices and Fees for Services Rendered by the Nuclear Safety Council (Official State Gazette No. 107, dated 5 May).

Royal Decree 1836/1999, dated 3 December, approving the Regulations on Nuclear and Radioactive Facilities (Official State Gazette No. 313, dated 31 December).

Royal Decree 783/2001, dated 6 July, approving the Regulation on Health Protection against Ionising Radiations (Official State Gazette No. 178, dated 26 July).

Three. Documentation on Refuelling activities

Documentation on refuelling activities, as referred to herein, shall be submitted to the Nuclear Safety Council according to the procedures and within the deadlines established by this Instruction. This documentation shall include the following reports:

- Refuelling Safety Report (RSR)
- Refuelling Planning Report
- General Schedule for the Refuelling Activities
- Details to be Submitted during Shutdown
- Final Report on the Refuelling

Four. Refuelling Safety Report (RSR)

4.1. Overview and Purpose of the RSR

4.1.1. The purpose of the RSR is providing the refuelling safety analyses required to prove that the conditions of the core after refuelling meet the safety criteria established by the plant's Safety Study (SS) and, therefore, that the operation of the refuelling core is safe according to such criteria and can be performed within the operating limits and conditions established both by the official operating documentation and by the operating permit in force. These analyses will not require to be expressly authorised unless they imply any changes to the Technical Specifications or any modifications requiring authorisation. Should this occur, approval will be obtained according to the procedure established.

4.1.2. Methodology used for the safety analyses included in the RSR shall have been approved by CSN previous to its actual application.

4.1.3. Should there be any modification in the methodology with respect to previous refuelling safety analyses in the same plant, this shall be clearly and precisely stated in the RSR.

4.2. General Information to be Included in the RSR

The RSR shall include at least the following general information on the refuelling analysis:

a) Core map used for the analysis, with specific reference to the fuel type, to the enrichment and burn-up of each component, to the position of neutronic poisons, and to the secondary neutron sources, if any.

b) Expected average burn-up for the end of the previous cycle, burn-up axial distribution (BWR), and expected design burn-up for the end of the new cycle. Burn-up window applicable to the analysis.

c) Nominal values for the corresponding cycle's design parameters.

d) Significant changes in the operating strategy with respect to previous cycles (control of power distribution and xenon transients, extension of the operation map, cycle extensions, refuelling monitoring, etc.).

e) Plant's operating conditions used both as a reference for the cycle safety analyses and to generate the information on the nuclear design. Any operating conditions different from nominal conditions not included in the RSR shall be specifically identified.

Some of the previously listed items may not be expressly stated in the RSR provided that they are included in other documentation specific to the refuelling, such as the Nuclear Design Report –NDR– or the Cycle Management Report –CMR–, among others), and that this documentation is submitted to CSN.

4.3. Specific Information to be Included in the RSR

The RSR shall include at least the following specific information:

- Nuclear design of the operating cycle
- Mechanical design of the fuelling component
- Cycle-specific safety analyses

4.4. Report on the Core Operating Limits (RCOL)

All plants having an approved report on the core operating limits shall submit the report corresponding to the new cycle together with the RSR. The new report shall include all safety analysis necessary to validate any changes introduced with respect to the previous RCOL.

4.5. Sample Fuelling Components

Any refuelling where sample components of a new type of fuel are introduced in the core for the first time are to be previously authorised by CSN, which shall provide approval of the corresponding sample component programme.

4.6. New Types of Fuel

The introduction of a new type of fuel into the core during the refuelling process shall be considered a modification of the Technical Specifications and, thus, shall be performed according to the established procedure, namely, submitting an analysis of the results of the fuel's sample programmes, together with a report on the design of the fuelling component stating the most relevant features of its nuclear, thermohydraulic, thermomechanical, and structural design.

Five. Revision of the Safety Documentation on Refuelling Activities

5.1. Documentation on the refuelling safety analyses, as described in Section Four hereof, shall be revised whenever any errors or any deviations on the design conditions are detected and this fact may lead to conclude that the contents of the refuelling documentation are not suitable for their intended purpose. CSN shall be immediately informed in the event that the contents involved are related with the core's refuelling map or are necessary for the fulfilment of any monitoring requirements or for the completion of any required tests.

5.2. Any revisions on the safety documentation on refuelling activities, as described in Section Four hereof, shall be submitted to CSN.

Six. Refuelling Planning Report

The Refuelling Planning Report shall contain all necessary information to prove that the refuelling will always be performed under adequate safety guarantees. In order to ensure this, the information shall include the following details:

• General criteria for the planning of refuelling activities and global objectives on nuclear safety and radiation protection in force.

• Refuelling objectives in terms of guaranteeing the operation of the key safety functions during shutdown.

• Evidence on the adequacy both of the organisation and resources established for monitoring the refuelling activities and the fulfilment of the refuelling programme and of the refuelling programme itself to meet the objectives stated in the paragraph above.

• Identification –and justification, where applicable– of any changes introduced in a refuelling process with respect to the record of previous processes.

• Established controls aimed at preventing any alterations of the refuelling activities lacking an adequate previous analysis, provided that such alterations may impact on the safety conditions.

• Description of the established procedures for ensuring both that planning will be revised under the occurrence of significant events and that operational experience available is properly assimilated.

• Description of the most significant events occurred during shutdown, stating –and justifying, when applicable– which activities (including maintenance and control activities, among others) have been shortened, reduced, or suppressed with respect to the record of previous refuelling processes.

• Description of the activities to be performed during shutdown by virtue either of the requirements of CSN or of the operator's own commitments. Also, description of any activities postponed for subsequent refuelling processes.

Seven. General Schedule for the Refuelling Activities

7.1. Overview

The general schedule for the refuelling activities shall contain a time sequence of the main activities planned for the shutdown (more precisely, this sequence shall always include all activities belonging to the critical process and those related with nuclear safety and with the plant's shutdown safety programme). The general schedule shall also include specific information on certain activities, as described below.

7.2. Specific Information

The general schedule shall also include specific information on the following issues:

• In-service Inspection work plan.

• Maintenance activities.

• List of safety-related design modifications to be performed during shutdown. The general schedule for refuelling activities shall state any exceptional design modifications related with safety during shutdown that, not being previously included in the reports required by CSN Guide 1.11, need to be implemented. Furthermore, all documentation associated with such exceptional modifications shall be attached.

• Inspection plan for irradiated fuel.

• Schedules for any activities related with the completion of special tests or the fulfilment of specific control requirements previously identified by CSN.

• Cycle start-up nuclear checks, justifying any possible modifications with respect to usual procedures.

• Expected dose on all works involving radiation (including information on radiation parameters and on dose-reduction techniques).

Eight. Details to be Submitted during Shutdown

During a plant's shutdown, CSN shall be informed weekly on the progress in the completion of all scheduled works, as well as on the most relevant works expected to be undertaken in the following week. Furthermore, CSN shall be immediately informed on any significant deviation found during checks, tests, or inspections, as well as on the status forecasts for the key safety functions associated with shutdown. On any works contributing with over 10 percent to the refuelling dose, notification shall be performed whenever the collective dose to be received exceeds –or is expected to probably exceed– the forecast dose by 50 percent.

Nine. Final Report

9.1. Overview

The final report shall include a general summary on all activities performed during the refuelling process, including specific details on those considered to be priority activities. Any deviations on the schedule or on the expected results, as well as any incidents occurred during the refuelling process shall be expressly stated. Additionally, certain issues shall be reported by providing specific information, as described below.

9.2. Specific Information

The general schedule shall also include specific information on the following issues:

- Final report on the findings of the In-service Inspection.

- Report on the monitoring of key safety functions in connection with the refuelling activities performed.

- Final assessment of all safety-related design modifications implemented during shutdown, stating any deviations on the expected results.

- Results of the inspection activities on irradiated fuel.

- Report on any special tests or specific control requirements implemented according to the provisions of section 7.2 above.

- Results of all start-up nuclear checks identified in the previously submitted programme.

- Report on the perceived doses, according to the provisions of the Commission of the European Communities, as set forth in the 3650/90/ES MC/ae questionnaire,

and to the NEA 1 format, as used by the NEA-OECD Information System on Occupational Exposure (ISOE).

Ten. Submission Periods for Refuelling-related Documentation

10.1. Refuelling Safety Report (RSR)

a) On refuelling processes where no new design or analysis methods have been implemented, where no changes have been made to the Technical Specifications, or where no modifications on the new core requiring authorisation have taken place, the RSR shall be submitted at least two months before the scheduled date for reaching Mode or Condition 3 in the new cycle start-up.

Should an approved base-document for the licensing of refuelling activities be available, the submission of the cycle values for the parameters identified in the base-document may take place up to fifteen days before the scheduled date for reaching Mode or Condition 3 in the new cycle start-up.

Nuclear Design Report (NDR) and Cycle Management Report (CMR) shall be submitted at least fifteen days before the scheduled date for reaching Mode or Condition 3 in the new cycle start-up.

b) In all other circumstances, the RSR shall be submitted at least three months before the scheduled date for reaching Mode or Condition 3 in the new cycle start-up. Furthermore, the requirements set forth below shall always be observed.

c) In refuelling processes where, as a consequence of the new cycle, changes are applied to the Technical Specifications, the submission of a complete list of both the Specifications involved and the changes expected shall take place at least two months before the submission of the RSR itself.

Any expected changes on the list of parameters included in the Report on the Core Operating Limits (RCOL) shall be considered changes on the Technical Specifications as far as submission times are concerned.

d) In refuelling processes where new design or analysis methods are to be implemented, the corresponding use authorisation for such methods –if any– shall always be obtained first. The intention to implement any change or modification with respect to the methods used for former refuelling processes shall be notified to CSN at least two months before the submission date of the RSR; when applicable, reference to the authorisation of the new methods shall be included.

e) In the event any of the fuelling components to be loaded in the core must be replaced and, thus, the refuelling design needs to be modified, CSN shall receive written notice of the situation before any change on the operation mode takes place. This written notice shall state that all analyses required for ensuring the plant’s safety in the new mode of operation

have already been completed. The same procedure shall apply when replacing fuelling components during shutdown at an operation cycle.

The new revision of the refuelling safety documentation (RSR, NDR, CMR…, as applicable) shall be submitted to CSN no later than one month after Mode or Condition 1 is achieved for the first time after the affected components have been replaced.

10.2. Refuelling Planning Report

The Refuelling Planning Report shall be submitted to CSN four months before the scheduled date of beginning of the refuelling activities.

10.3. General Schedule for the Refuelling Activities

The General Schedule for the Refuelling Activities shall be submitted to CSN at least one month before the scheduled date of beginning of the shutdown activities.

Any revisions on the General Schedule –in particular, any revisions on the specific schedules for the inspections associated with the In-service Inspection Manual (ISIM)– shall be submitted to CSN in good time to guarantee that, at least 24 before the beginning of the shutdown process, the information on the General Schedule is sufficiently up-to-date.

Both the final estimation on the collective refuelling dose and the estimated collective dose by activities, together with the estimate of hours per person expected for each of such doses, shall also be submitted at least 24 hours before the refuelling begins.

10.4. Final Report

The Final Report shall be submitted to CSN within the period of three months subsequent to the completion of the shutdown.

Eleven. Compliance of this Instruction

The licensees of nuclear power plants to whom this Instruction applies may also recourse to the Nuclear Safety Council Guide 1.5, on the ‘Documentation on Refuelling Activities in Light-water Nuclear Power Plants', as a supplement to the provisions herein, in order to make their understanding and compliance easier.

Twelve. Exemptions

Should any nuclear power plant licensee to whom this Instruction applies state their incapacity to meet any of the requirements herein, they shall provide the competent body of the Nuclear Safety Council with appropriate evidence of such incapacity by submitting the relevant documentation and safety analyses grounding their condition and by describing their alternatives to meet the corresponding nuclear safety and radiation protection criteria applicable.

Thirteen. Infractions and Sanctions

Any failure to meet this Instruction shall be considered an infringement of a regulatory requirement and, thus, shall be treated according to the provisions of Articles 91 to 95 inclusive of Law 25/1964 on Nuclear Energy, according to the wording given by the Fifth Additional Provision of Law 54/1997, of 27th November, on the Electricity Sector, as well as by the Fifth Additional Provision of the Law 14/1999, of 4th May, on Public Prices and Fees for Services Rendered by the Nuclear Safety Council (Official State Gazette No. 107, dated 5 May).

Single Repeal Provision

Nuclear Safety Council Instruction IS-02, dated 10 April 2002 (Official State Gazette dated 4 July), on the 'Documentation relating to Refuelling Activities in Light-water Nuclear Power Plants', is expressly repealed hereby.

Any rule of equal or inferior rank contradicting the provisions of this Instruction shall also be repealed hereby.

Single Final Provision. Entry in Force.

This present Instruction shall enter in force on the day following its publication in the Spanish Official Gazette.

This I communicate to you for your knowledge and pertinent effects

In Madrid, on this 1st September, 2004

Signed by the President, Ms. María-Teresa Estevan Bolea