

**STANDING ADVISORY GROUP  
FOR NUCLEAR REACTORS**

**OPINION ON THE GUIDELINES FOR THE FIFTH PERIODIC  
REVIEW OF 900 MWE REACTORS**

Meeting held in Montrouge and by videoconference on 25 June 2024

## I

In accordance with the referral from the French Nuclear Safety Authority (ASN), notified by letter CODEP-DCN- 2024-013370 of 12 April 2024, the standing advisory group of experts for nuclear reactors met on 25 June 2024, with the participation of members of the standing advisory group of experts for nuclear pressure equipment, to examine the guidelines planned by EDF for the fifth periodic review of 900 MWe reactors.

The ASN wished to obtain the opinion of the standing group on the objectives adopted by EDF with regard to aspects related to radiological incidents and accidents; it indicated that the opinion should concern more specifically:

- the general objectives of the review ;
- the reinforcement proposed during this review to check that reactors comply with their current standards;
- safety reassessment focused on changes in external risk factors, particularly those linked to climate change;
- the state of knowledge to be included in this periodic review, in the light of experience feedback and to changes in reference systems and knowledge;
- the topics to be studied as part of this review.

During this meeting, the standing group was informed of the conclusions of the review by ASN and IRSN of the guidance documents sent by EDF in July and September 2023 and of the additional information gathered as part of this review. It also heard the explanations and comments presented by EDF at the meeting.

## II

### **General guidelines for the fifth periodic review**

In view of the major safety improvement actions implemented as part of the fourth periodic review, EDF decided to focus the fifth review on verifying compliance of the units with their applicable requirements, maintaining equipment qualification, controlling ageing for up to 60 years and reassessing certain stresses associated with the sites where the plants are located, particularly in relation to climate change. The standing advisory group notes that the safety demonstration studies corresponding to the other topics would remain those of the fourth review, including the responses to the requests made in that context.

The standing advisory group notes that this fifth periodic review follows a major improvement in the safety of 900 MWe reactors, carried out as part of their fourth review and involving a large number of modifications in progress, and in parallel with an approach to the operating life of these reactors, which will be implemented as part of the sixth review.

In this context, it considers that the aim of the fifth review should be to have a stabilised and verified state of the installations, corresponding to the deployment of all the modifications from the fourth review, with a view in particular to constituting a consolidated basis for studies into the possible continuation of their operation beyond 60 years.

### III

#### **General safety objectives**

The standing advisory group examined the measures planned by EDF to check that installations comply with their standards and to reassess safety for the fifth periodic review of 900 MWe reactors.

#### **Compliance**

The standing advisory group points out that compliance of installations with their design and operating standards is essential to their safety. It is based on control actions implemented during the construction and operation of reactors and is verified during periodic reviews, for which it is a major objective. Controlling ageing and obsolescence also contributes to maintaining compliance.

The standing group was informed of the new compliance management approach defined by EDF, comprising multiannual compliance management programmes (PPMC) and field visits (VT CONF). In particular, this approach should make it possible to check the effectiveness of the operational measures in force to ensure compliance (quality, general operating rules, maintenance, modification processes, etc.). EDF explained at the meeting that this approach does not modify the deviation handling process.

The standing advisory group considers that these new provisions are likely to strengthen the control of equipment compliance with their requirements as well as the "compliance culture" within nuclear power plants. However, as the new approach is in the process of being rolled out, it considers that EDF should present an assessment of the first few years of implementation, as well as any improvements that may be necessary to enhance its effectiveness.

Site visits consist of checking that installations comply with the standards in force at the start of the review. As modifications are made during a review, the standing advisory group reiterates the importance of checks carried out as part of the modification process to ensure compliance.

Finally, the standing advisory group notes that the site visits do not include checks on compliance with the plans; EDF indicated at the meeting that these checks will be carried out as part of the multi-year compliance management programmes.

### Safety reassessment

In view of the scale and importance of the safety improvements made during the fourth periodic review of 900 MWe reactors, the standing advisory group considers it acceptable that the safety reassessment carried out under the fifth periodic review should focus mainly on hazards related to climate change, the lessons learned from the Le Teil earthquake and possible changes in the industrial environment and communication routes at nuclear sites.

The standing group notes, however, that some work under the fourth periodic review remains to be carried out; it considers that EDF must ensure that this work is completed, irrespective of the objectives of the fifth review.

In view of the guidelines adopted by EDF, the standing group considers it necessary for EDF to include in the safety reassessment :

- justification for the list of attacks reassessed in the fifth review periodically as a result of climate change ;
- the updating of all thermal studies on heatwave aggression following the reassessment of the "extreme heat" hazard, taking into account the lessons learnt from the 2024 climate watch;
- carrying out thermal studies of the complementary domain covering situations involving the total loss of electrical power supplies and the total loss of the heat sink, according to a timetable that allows the modifications they would entail to be implemented at the time of the fifth periodic review;
- updating the internal flood and high-energy pipe rupture studies by applying the commitments made as part of the fourth review of the 1300 MWe reactors, in accordance with a timetable that allows the implementation of the changes they would entail at the time of the fifth periodic review;
- the search for specific safety improvements for the Bugey reactors, given the design differences with the other 900 MWe reactors.

### **State of knowledge**

The standing advisory group has no comments on the state of knowledge adopted by EDF for the generic phase of this fifth review. However, it considers that EDF should complete its five-yearly climate watch to cover the consequences of climate change. In this respect, it stresses the interest that EDF :

- reassesses the reference levels for hazards identified as being sensitive to climate change and for which changes can be projected;
- monitor and analyse "major climatic events" specific to hazards sensitive to climate change, taking account of regional rainfall monitoring;
- carries out an analysis of the annual balances of hydrometeorological data observed over the sites and measurement stations used to define hazard levels.

### **Work to be undertaken or continued for subsequent periodic reviews**

The standing group considers it important for EDF to continue its research and development work on subjects of interest to safety with a view to identifying safety improvements that could be deployed during the sixth periodic review.

In addition, the standing group notes that EDF plans to define, in 2026, a study reference system to assess the robustness of installations in situations in the complementary field during periods of extreme heat, which it considers satisfactory.

Lastly, the standing group notes that a number of technical study guidelines are still being developed or consolidated and that EDF has made a number of commitments in this regard. It considers that these various guidelines should be stabilised by the start of the sixth periodic review.

### **Topics to be discussed**

The topics selected by EDF in its programme associated with the fifth periodic review of 900 MWe reactors concerning compliance verification and safety reassessment do not call for any additional comment from the standing group.

## IV

In view of the commitments made by EDF as part of the appraisal of the guidance dossier, the standing advisory group considers that the guidelines adopted by EDF for the fifth periodic review of 900 MWe reactors are relevant and consistent with the current state of knowledge.

The standing advisory group notes that this fifth review should make it possible to consolidate the safety improvements made to the reactors during their fourth review and considers that, in parallel with this fifth review, discussions should be held on the safety objectives to be adopted for the sixth review of 900 MWe reactors.

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