



# FRANCE

## SAFETY ASSESSMENT OF NUCLEAR FACILITIES IN FRANCE

### AGEING MANAGEMENT

### CLOSURE REPORT OF THE NATIONAL ACTION PLAN

PRODUCED PURSUANT TO ARTICLE 8e  
OF COUNCIL DIRECTIVE 2014/87/EURATOM  
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## 1. INTRODUCTION

In 2014, the European Union (EU) Council adopted directive 2014/87/EURATOM and, recognizing the importance of peer review in delivering continuous improvement to nuclear safety, introduced a European system of Topical Peer Review (TPR) commencing in 2017 and every six years thereafter.

The first peer review focused on the Ageing Management Programmes (AMPs) at Nuclear Power Plants (NPPs) and Research Reactors (RRs) above 1 MWth. [The national report for France](#) was issued in December 2017.

France defined a [national action plan](#) published in September 2019. In this document, the findings of the self-assessment and peer review were indicated, as well as the actions planned as a result of this review.

This report presents the updated status of these actions, in the same order as the summary table in the September 2019 national action plan. That table is also updated in the annex to this report.

## **2. UPDATE OF THE STATUS OF THE ACTIONS PLANNED IN THE SEPTEMBER 2019 NATIONAL ACTION PLAN**

### **2.1. Overall Ageing Management Programmes (OAMPs)**

#### **2.1.1. OAMP for the Cabri and RJH research reactors**

##### **Finding**

*“A systematic and comprehensive OAMP is implemented for research reactors, in accordance with the graded approach to risk, the applicable national requirements, international safety standards and best practices.”*

##### **Actions planned**

Cabri: Application of the new methodology for AMP based on IAEA guide SSG10 to all EIPs.

RJH: AMP addressed in the commissioning file as requested in ASN resolution.

##### **Actions implemented**

Cabri: Following the peer review, the CEA made a commitment in 2019 to implement a new methodology for ageing management of EIPs based on IAEA Guide SSG-10 by mid-2020, to apply it to certain EIPs and then to apply it to all EIPs by the end of 2022.

The CEA has first applied this methodology to the reactor block and reactor building, and then extended it to other EIPs (fuel elements, cooling system, and elements of the first barrier of the pressurized water loop).

RJH: The CEA is keeping in operational conditions the structures, systems and components (SSCs) that have been accepted and are already in service (polar crane, high-voltage substation) by means of a maintenance programme and regulatory verifications implemented by the future operating teams. The maintenance programme is built by integrating the provisions defined by the vendor and the regulatory verifications. In addition, for SSCs that have been accepted (or partially accepted) and not put into service, the CEA implements conservation provisions defined with the vendor.

SSCs stored on the site, awaiting assembly, are subject to conservation provisions by the CEA: these include verification of certain parameters (temperature, humidity, etc.) and specific operations (regular inerting, etc.). Finally, SSCs that have not been accepted are kept at the vendors premises.

In addition, the CEA also carries out special monitoring of certain SSCs in connection with requests and prescriptions of ASN. A programme for monitoring reactor containment is also in place. It includes, in particular, seismic supports, pre-stressing cables, and the retaining wall.

##### **ASN position**

Cabri: ASN considers that the definition of the new methodology developed by the CEA for ageing management constitutes progress. Its application to all the facility's EIPs will improve ageing management.

RJH: In its assessment of the CEA's request for an extension of the commissioning deadline for the RJH, ASN considered acceptable the provisions implemented by the CEA for the conservation of SSCs already manufactured.

Commissioning tests will confirm the condition of the SSCs and their potential ageing. Finally, as indicated in the national action plan, ASN will examine the ageing management programme in the frame of the commissioning licensing.

**Status: completed**

### **2.1.2. OAMP for the EDF nuclear power plants**

#### **Finding**

*“The specific aspects of the site and of each reactor could be better taken into account in the local ageing management programme (PLMV) and the unit ageing analysis report (UAAR).”*

#### **Actions planned**

Action plan to improve the quality and usability of PLMV and UAAR (guide issued by national and support to the site).

#### **Actions implemented**

EDF has set up an action plan to improve the quality of the UAARs and PLMVs, as well as their usability. This action plan includes an update of the UAAR format (by updating the EDF national drafting guide) in order to better take site-specific aspects into account.

Ageing management is now the subject of an elementary process in the "Industrial Asset Management" sub-process, which is applied at national and local levels. This reorganization of the processes should enable the sites to take greater ownership of the objective of the UAAR, which is to demonstrate the ability of the reactor to continue operation, taking into account its specific features, and of the local ageing management programme.

In particular, EDF has raised awareness of the sites on the continuous nature of ageing management, which must go beyond the simple drafting of the UAAR every ten years, notably by asking the sites to designate a local "ageing" correspondent in liaison with the network managed at national level. In addition, a new guide for drafting UAARs was recently issued to the sites, as a test, to integrate, during the fourth ten-yearly outages, all the elements important for protection (excluding equipment that is regularly replaced), as well as the SSCs taken into account in the probabilistic safety assessments on hazards.

#### **ASN position**

ASN considers these changes satisfactory in principle. ASN is checking that the sites have effectively implemented them and that they are effective over time during its inspections dedicated to ageing management.

**Status: completed**

### **2.1.3. TPR expected level of performance: Delayed NPP projects and extended shutdown**

#### **Finding**

*“During long construction periods or extended shutdown of NPPs, relevant ageing mechanisms are identified and appropriate measures are implemented to control any incipient ageing or other effects.”*

#### **Actions planned**

1. For outages with a significantly extended duration, update of the national doctrine for the preservation of equipment.
2. For EPR FA3, proportionate means are already implemented.

#### **Actions implemented**

1. For reactors in operation, the national doctrine on conditioning for reactor outage was updated in 2020 by EDF. This revision includes a paragraph dedicated to unusually long outages. This doctrine is currently being applied at the sites.

To date, this doctrine concerns only the conditioning of circuits. As a result, EDF has planned to include a specific section in the next review of the ageing analysis sheets (AAS)<sup>1</sup> in order to review each item of equipment covered by a AAS and to define whether additional measures are necessary to take account of an extended outage (these measures may be part of preventive maintenance, requalification of equipment or periodic tests).

2. For the EPR, EDF is implementing provisions for the preservation of equipment.

#### **ASN position**

1. ASN considers these changes satisfactory. ASN notes that the changes proposed by EDF are consistent with the IAEA document, drawn up in the framework of IGALL (international generic ageing lessons learned).

2. In view of the extension of the commissioning deadline for the Flamanville EPR, ASN has initiated a review of the effectiveness of EDF's organization and of the provisions of the programme for equipment preservation. The practical implementation of this programme is also regularly inspected.

**Status: completed**

## **2.2. Concealed pipework**

### **2.2.1. Definition of a generic programme of verification of concealed pipework**

#### **Finding**

*“With a view to continued reactor operation beyond 40 years, EDF has undertaken an ageing management programme for buried or poorly accessible pipes in addition to its monitoring provisions. Under this programme EDF has performed inspections on the Tricastin, Fessenheim and Bugey sites, with the aim of defining a generic programme of verifications and being able to decide during the fourth ten-yearly outage inspections (VD4) whether the buried pipes are fit for continued service or need to be renovated. The examination is in progress and the conclusions are expected in 2018.”*

#### **Actions planned**

Application of the programme to 3 sites is completed which confirms the adequacy of the approach. Supplementary inspections are planned for pipework with environmental implications on Tricastin 1.

#### **Actions implemented**

EDF has implemented a programme of specific inspections of buried pipework or pipework that is difficult to access in order to conclude on its condition. These inspections showed that these pipes did not present any unexpected degradation. They did not therefore require any specific work. This programme is deployed during the fourth ten-yearly inspection of each 900 MWe reactor.

#### **ASN position**

ASN considers the programmes underway for fire system pipework and buried pipework to be satisfactory. It is closely monitoring the feedback from their implementation in each reactor.

**Status: completed**

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<sup>1</sup> The ageing analysis sheets are reviewed annually

## **2.2.2. TPR expected level of performance: Opportunistic inspection**

### **Finding**

*“Opportunistic inspection of concealed pipework is undertaken whenever the pipework becomes accessible for other purposes.”*

### **Actions planned**

New organization between national level and NPP level.

### **Actions implemented**

Within the framework of the national "buried pipework" programme, the pipe sections to be inspected are defined in an expertise programme, following the risk analysis phase which uses the BP-Works software. During the presentation or kick-off meetings of the programme at the sites, people in charge are asked to identify any current or future projects that would allow access to pipe sections that are usually difficult to access.

Feedback shows that this organization allows inspections to be carried out on systems that were not initially planned in the expertise programme.

### **ASN position**

ASN considers these changes to be satisfactory. In addition, ASN has noted the effectiveness of this new organization at several sites in recent years.

**Status: completed**



### **3. CONCLUSION**

In September 2019, France defined a [national action plan](#) following the first Topical Peer Review on Ageing Management. In this document, the findings of the self-assessment and the peer review were indicated, as well as the actions planned following this review.

This report presents the provisions defined by the licensees. These provisions allow to close the actions of the action plan defined following this topical review.

This report is the final report from France.

**ANNEX: SUMMARY AS OF JUNE 2021 OF THE STATUS OF THE ACTIONS PLANNED IN THE SEPTEMBER 2019 NATIONAL ACTION PLAN**

This table recalls the planned actions resulting from the self-assessment and the peer review, the associated deadlines and the monitoring process by the regulator, as extracted from the 2019 national action plan. The last column indicates the current status of the actions.

| Installation                | Thematics | Finding   | Planned action   | Deadline          | Regulator's Approach to Monitoring   | Status as of June 2019 |
|-----------------------------|-----------|---|--|-------------------|--|------------------------|
| Cabri<br>(research reactor) | OAMP      | <i>A systematic and comprehensive OAMP is implemented for research reactors, in accordance with the graded approach to risk, the applicable national requirements, international safety standards and best practices. A systematic and comprehensive OAMP is implemented for research reactors, in accordance with the graded approach to risk, the applicable national requirements, international safety standards and best practices.</i><br><br>Finding in the self-assessment and from the peer review | Application of the new methodology for AMP based on IAEA guide SSG10 to all EIPs                                     | Mid 2020          | Examination of the application of this methodology to the reactor block and the containment in the frame of the periodic safety review | completed              |
| RJH<br>(research reactor)   |           |   | AMP addressed in the commissioning file as requested in ASN resolution   | RJH commissioning | Examination of the AMP in the frame of the commissioning licensing   | completed              |
| NPP fleet                   | OAMP      | <i>The specific aspects of the site and of each reactor could be better taken into account in the local ageing management programme (PLMV) and the unit ageing analysis report (UAAR).</i><br><br>Finding from the self-assessment  | Action plan to improve the quality and usability of PLMV and UAAR (guide issued by national and support to the site) | Start early 2020  | Inspections on site to assess the effectiveness  | completed              |

| Installation                  | Thematics          | Finding   | Planned action  | Deadline                        | Regulator's Approach to Monitoring  | Status as of June 2019 |
|-------------------------------|--------------------|---|---|---------------------------------|---|------------------------|
| NPP fleet (including EPR FA3) | OAMP               | <i>During long construction periods or extended shutdown of NPPs, relevant ageing mechanisms are identified and appropriate measures are implemented to control any incipient ageing or other effects.</i>  | For outages with a significantly extended duration, update of the national doctrine for the preservation of equipment   | End of 2020                     | Evaluation of the doctrine with regard to IAEA future guidance and OEF  | completed              |
|                               |                    | Finding from the peer review  | For EPR FA3, proportionate means are already implemented  |                                 | Evaluation of the means to preserve the equipment in the frame of the commissioning delay (more than mentioned in the authorisation decree) | completed              |
| 900 MWe series                | Concealed pipework | <i>With a view to continued reactor operation beyond 40 years, EDF has undertaken an ageing management programme for buried or poorly accessible pipes in addition to its monitoring provisions. Under this programme EDF has performed inspections on the Tricastin, Fessenheim and Bugey sites, with the aim of defining a generic programme of verifications and being able to decide during VD4 whether the buried pipes are fit for continued service or need to be renovated. The examination is in progress and the conclusions are expected in 2018</i><br>Finding from the self-assessment | Application of the programme to 3 sites is completed which confirms the adequacy of the approach<br><br>Supplementary inspections are planned for pipework with environmental implications on Tricastin 1 | Post-VD4 start-up (end of 2019) | Examination of the results of the buried pipework programme   | completed              |

| Installation   | Thematics          | Finding   | Planned action  | Deadline    | Regulator's Approach to Monitoring                | Status as of June 2019 |
|----------------|--------------------|---|---|-------------|---|------------------------|
| 900 MWe series | Concealed pipework | <i>Opportunistic inspection of concealed pipework is undertaken whenever the pipework becomes accessible for other purposes</i><br>Finding from the peer review | New organization between national level and NPP level | End of 2020 | Assess its effectiveness with inspections on site | completed              |