

European Nuclear Safety Regulator's Group

ENSREG

1st Topical Peer Review

"Ageing Management"

Country specific findings

October 2018

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1. INTRODUCTION

The objective of this document is to compile the country specific findings resulting from the Topical peer review on ageing management.

The Topical Peer Review as set out in Article 8e of Directive 2014/87/EURATOM has been carried out. The first Topical Peer Review focused on the Overall Ageing Management Programmes and four thematic areas: electrical cables, concealed pipework, reactor pressure vessels and Calandria, and concrete containment structures and Pre-stressed Concrete Pressure Vessels. The scope of the first Topical Peer Review covered Nuclear Power Plants in operation and under construction, and Research Reactors with thermal power of 1 MW or above.

All participating countries made a self-assessment and reported results in their National Assessment Reports. Most countries identified a number of areas for improvement, good practices and challenges.

In the course of the Topical Peer Review, national results have been evaluated through the peer review process, complementing the national assessments. The review identified generic findings, namely good practices and expectations to enhance ageing management. The definitions for these categories are provided below:

- **Good Practice**

A good practice is an aspect of ageing management which is considered to go beyond what is required in meeting the appropriate international standard.

- **TPR expected level of performance**

A "TPR expected level of performance" for ageing management is the level of performance that should be reached to ensure consistent and acceptable management of ageing throughout Europe.

These findings were allocated to participating countries (the country specific findings). The "TPR expected levels of performance" are considered as a good performance for those countries which already meet this expectation and as an area for improvement for the others.

Due to the large variation of cables and their use at Nuclear Power Plants and lack of details provided in the National Assessment Reports and during the workshop, the findings related to cables were not allocated to the countries and therefore country specific findings related to cables are not included in this report. As discussed and decided in July ENSREG meeting, countries are requested to address findings in their national action plans.

All generic and country-specific findings are documented in the Topical Peer Review report and in this document. Both documents once approved by ENSREG will be published on the European Nuclear Safety Regulators website.

The presentation of the country specific findings adopted in the table has been kept short and succinct.

It is important to keep in minds that not all TPR Expected levels of performance are applicable to all types of reactors and that the potential safety significance of each finding can be very different. Therefore careful use of the table below is recommended to avoid misleading conclusions. The tables should not be used to compare countries with each another.

It should be recognised that in certain cases the specific context of the required improvement for some countries has been omitted. The detailed context will need to be provided in the national action plans developed by each country; along with the required actions, which could vary from providing a detailed explanation in response to the finding to the need for improvements.

2. Overall Ageing Management Programmes (OAMPs)

Findings	Belgium	Bulgaria	Czech Re	Finland	France	Germany	Hungary	Italy	NL	Poland	Romania	Slovakia	Slovenia	Spain	Sweden	UK	Norway	Switzerla	Ukraine
Good practice																			
External peer review services: External peer review services (e.g. SALTO, OSART-LTO, INSARR-Ageing) are used to provide independent advice and assessment of licensees' ageing management programmes.	GP (for NPP and RR)	GP	GP	GP	GP (for NPP)		GP		GP			GP	GP	GP	GP		GP	GP	
Expected level of Performance																			
International cooperation: Participation in international projects, experience exchange within groups of common reactor design and the use of existing international databases are used to improve the effectiveness of the OAMP.	GPerf	GPerf	GPerf	GPerf	GPerf	GPerf	GPerf	NC	GPerf	NC	GPerf	GPerf	GPerf	GPerf	GPerf	GPerf	NC	GPerf	GPerf
Methodology for scoping the SSCs subject to ageing management: The scope of the OAMP is reviewed and, if necessary, updated, in line with the new IAEA Safety Standard after its publication.	GPerf	Afl	GPerf	GPerf	GPerf	Afl	GPerf	NC	GPerf	NC	Afl	GPerf	Afl	GPerf	Afl	Afl	NC	Afl	Afl
Delayed NPP projects and extended shutdown: 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.	GPerf	Afl	Afl	Afl	Afl	Afl	Afl	NC	Afl	NC	Afl	Afl	Afl	GPerf	Afl	Afl	NC	GPerf	Afl
Overall Ageing Management Programmes of research reactors: 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.	GPerf	NC	Afl	NC	Afl	Afl	GPerf	Afl	Afl	Afl	Afl	NC	NC	NC	NC	NC	Afl	NC	NC

GP: Good practice

GPerf: Good performance

Afl: Area for improvement

NC: Not Concerned

3. Concealed pipework

Findings	Belgium	Bulgaria	Czech Rep	Finland	France	Germany	Hungary	Italy	NL	Poland	Romania	Slovakia	Slovenia	Spain	Sweden	UK	Norway	Switzerland	Ukraine	
Good Practice																				
<i>Use of results from regular monitoring of the condition of civil structures</i> : In addition to providing information on soil and building settlement, the results from regular monitoring of the condition of civil structures are used as input to the ageing management programme for concealed pipework.	GP	GP			GP	GP														
<i>Performance checks for new or novel materials</i> : In order to establish the integrity of new or novel materials, sections of pipework are removed after a period of operation and inspected to confirm the properties are as expected.						NC										GP		GP		
Expected level of Performance																				
<i>Inspection of safety-related pipework penetrations</i> : Inspection of safety-related pipework penetrations through concrete structures are part of ageing management programmes, unless it can be demonstrated that there is no active degradation mechanism.	GPerf	Afi	GPerf	Afi	GPerf	GPerf	Afi	NC	Afi	Afi	Afi	GPerf	Afi	GPerf	GPerf	Afi	NC	GPerf	Afi	
<i>Scope of concealed pipework included in AMPs</i> : The scope of concealed pipework included in ageing management includes those performing safety functions, and also non-safety-related pipework whose failure may impact SSCs performing safety functions.	GPerf	GPerf	GPerf	GPerf	GPerf	NC	GPerf	NC	GPerf	NC	GPerf	GPerf	GPerf	GPerf	GPerf	GPerf	NC	Afi	Afi	
<i>Opportunistic inspections</i> : Opportunistic inspection of concealed pipework is undertaken whenever the pipework becomes accessible for other purposes	GPerf	Afi	GPerf	Afi	Afi	GPerf	GPerf	NC	Afi	NC	NC	GPerf	GPerf	GPerf	GPerf	GPerf	NC	Afi	Afi	

GP: Good practice

GPerf: Good performance

Afi: Area for improvement

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4. Reactor pressure vessel

Findings	Belgium	Bulgaria	Czech Rep	Finland	France	Germany	Hungary	Italy	NL	Poland	Romania	Slovakia	Slovenia	Spain	Sweden	UK	Norway	Switzerla	Ukraine
Good practice																			
Hydrogen water chemistry: Hydrogen Water Chemistry (HWC) is used in BWRs which may be sensitive to Intergranular Stress Corrosion Cracking	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	GP	GP	NC	NC	GP	NC
Implementation of a shield: Shielding in the core of PWRs with relatively high fluence is implemented to preventively reduce neutron flux on the RPV wall.					GP	GP	NC	NC		NC		NC			GP	GP	NC		
Expected level of Performance																			
Volumetric inspection for nickel base alloy penetration: Periodic volumetric inspection is performed for nickel base alloy penetrations which are susceptible to PWSCC for PWRs to detect cracking at as early a stage as possible.	GPerf	NC	NC	GPerf	GPerf	NC	NC	NC	GPerf	NC	NC	NC	GPerf	Afl	GPerf	GPerf	NC	GPerf	NC
Non-destructive examination in the base material of beltline region: Comprehensive NDE is performed in the base material of the beltline region in order to detect defects	GPerf	Afl	GPerf	Afl	GPerf	Afl	Afl	NC	GPerf	NC	NC	GPerf	Afl	Afl	Afl	Afl	NC	GPerf	Afl
Environmental effect of the coolant: Fatigue analyses have to take into account the environmental effect of the coolant.	GPerf	Afl	GPerf	GPerf	GPerf	GPerf	GPerf	NC	GPerf	NC	NC	GPerf	GPerf	GPerf	GPerf	GPerf	NC	GPerf	Afl
Suitable and sufficient irradiation specimens: For new reactors, suitable and sufficient irradiation specimens and archive materials are provided to support the reactor through its full operational life.	NC	NC	NC	GPerf	GPerf	NC	Afl	NC	NC	NC	NC	GPerf	NC	NC	NC	Afl	NC	NC	NC

GP: Good practice

GPerf: Good performance

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NC: Not Concerned

5. Concrete containment structure and pre-stressed concrete pressure vessel

Findings	Belgium	Bulgaria	Czech Rep	Finland	France	Germany	Hungary	Italy	NL	Poland	Romania	Slovakia	Slovenia	Spain	Sweden	UK	Norway	Switzerland	Ukraine
Good practice																			
Monitoring of concrete structures : Complementary instrumentation is used to better predict the mechanical behaviour of the containment and to compensate for loss of sensors throughout the life of the plant.			GP		GP			NC		NC		GP					NC		
Assessment of inaccessible and/or limited access structures : A proactive and comprehensive methodology is implemented to inspect, monitor and assess inaccessible structures or structures with limited access					GP		GP	NC		NC				GP			NC	GP	
Expected level of Performance																			
Monitoring of pre-stressing forces : Pre-stressing forces are monitored on a periodic basis to ensure the containment fulfils its safety function.	GPerf	GPerf	GPerf	GPerf	GPerf	NC	NC	NC	NC	NC	GPerf	NC	NC	GPerf	GPerf	GPerf	NC	NC	GPerf

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