

## Long Term Operation Regulatory Aspects



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## Outline

- **Background**
- **Regulatory Framework**
- **Periodic Safety Review**
- **Long Term Operation**
- **Conclusion**

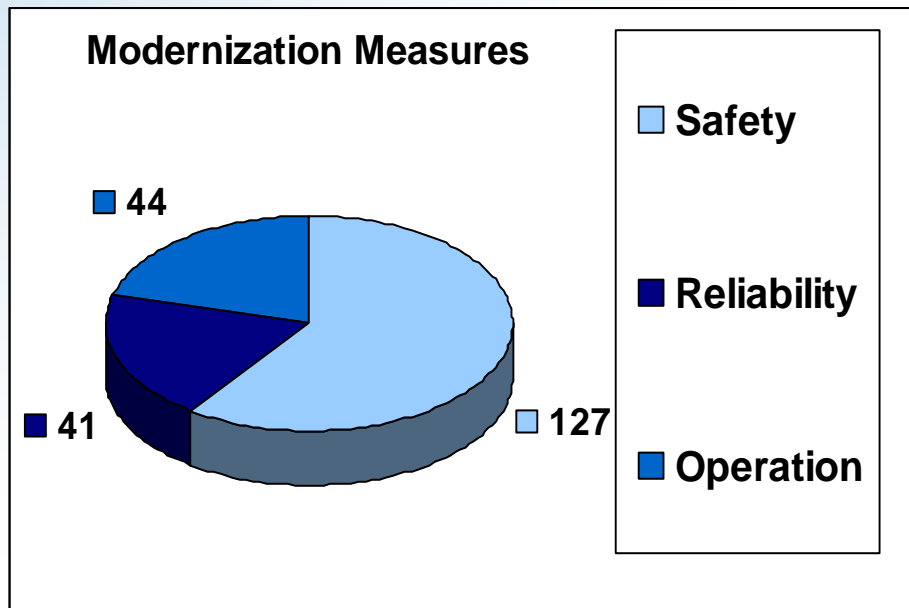
## Background



	Unit 5	Unit 6
Commercial operation since	Nov 1987	Sept 1991
Design lifetime expiration	Nov 2017	Aug 2021
License validity until	Nov 2017	Aug 2019

## Background

- Large-scale Modernization programme at units 5&6 performed in the period 1999-2008
- Totally 212 measures structured in 3 groups



- Seismic qualification
- Severe accident management
- Replacement of components with higher failure rate
- Optimization of systems
- Replacement of equipment
- Rest life time assessment

## Background

- Safety improvement measures implemented were taken into account in the PSR for license renewal in 2009
- PSR Initiated Safety Improvement Programme developed as license condition
- Stress Tests completed by the end of 2011 based on BNRA and EC-ENSREG requirements
- National Action Plan with 77 safety improvement measures

## Regulatory Framework

- Prime responsibility for safety lies with the operator
- License validity shall not exceed 10 years, and
- May be renewed on the basis of an assessment of the nuclear safety and radiation protection and of the actual plant status – PSR
- License renewal application shall be submitted to NRA 12-18 months prior to license expiration
- Continuous supervision by BNRA

## Periodic Safety review

### Scope of PSR shall include as minimum

- site characteristics considered in the design and their re-evaluation on the basis of new data or new methods
- plant design as built and actual condition of SSCs taking into account the modifications, ageing and other effects that impact safety and plant lifetime
- current safety analyses methods and applicable new safety requirements
- operating experience and effectiveness of the system for experience feedback
- safety performance indicators and effectiveness of the management of safety
- other factors, such as organizational arrangements, staffing, emergency preparedness, radiological impact



## Periodic Safety review

### Safety improvement program

- As a result of the PSR conclusions shall be drawn to justify practically achievable improvement measures, considering the links between the identified deviations
- The decisions for design modifications and improvements shall be made considering the safety significance of the identified deviations
- In the process of plant authorization for operation (license renewal) BNRA performs review and assessment of the PSR outcome and the efficiency of the resulting safety improvements



## **BNRA Approach to PSR for LTO**

### **Two key issues requiring special attention**

- Ageing management programme
- Enhancement of the safety level with the aim to reach, when reasonably practicable, a level similar to that for new reactors (no significant release in case of severe accident)

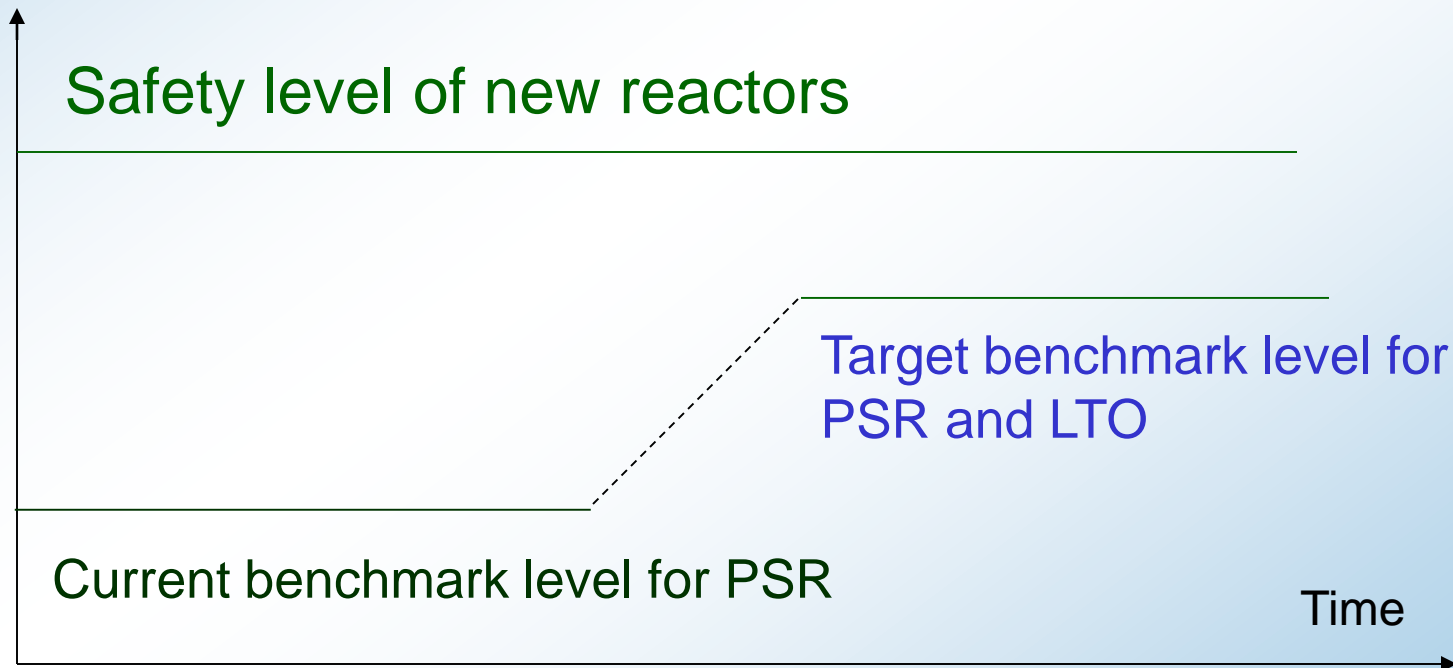
### **This approach is fully consistent and harmonized with the European and international practice**

- WENRA RHWG Pilot Study on LTO of NPPs, 2011
- CNS 2<sup>nd</sup> EOM Final Summary Report, 2012
- WENRA Position paper on PSR in the context of the Fukushima accident, 2013

## Benchmark Level for PSR

**Simplified representation of the transition of the benchmark level for PSR in the context of**

- safety concept of new reactors, and
- lessons learnt from the Fukushima accident



## Long Term Operation

### **BNRA specific LTO related License conditions**

- (1) Integrated Plant Assessment has been made in BNRA agreed scope and timeframe. The assessment is aimed at
- Identifying the SSC that will remain in operation and SSC to be replaced
  - Justification of the new plant operation lifetime
  - Development and implementation of a Long Term Operation Programme (LTO Programme)

The Programme shall be submitted to BNRA for agreement at least 4 years before the license expiration date

## Long Term Operation

### LTO related License conditions (cont.)

- 2) The licensee may apply for a license for extended operation provided that the following conditions are fulfilled in addition to the legal requirements:
- Implementation of the plant lifetime management requirements, set in the previous item (1)
  - Submission of a Safety Analysis Report (SAR) that demonstrates the possibility for safe operation of the plant for justified period of time
  - Implementation of an environmental impact assessment and approval by the competent authority

## Long Term Operation

### Integrated plant assessment

- Fully consistent approach with the related IAEA Safety Standards and supportive guidance publications
- Aimed at:
  - Identification of organizational, technical and methodological actions towards the development of LTO programme;
  - Justification of the equipment lifetime and the ageing management measures for LTO
- Performed by a Consortium of Rosenergoatom and EdF – experienced companies

## Long Term Operation

### Integrated plant assessment – Scope

- Analyses of the equipment list of SSC and heat sink facilities and identification of critical components to be assessed
- Development of procedures for specific investigations and lifetime assessment of the critical SSC
- Performance of the lifetime assessment
- Substantiation of the set of actions intended to ensure the SSC lifetime and maintain the equipment qualification, incorporated into the LTO Programme

## Long Term Operation

### Integrated plant assessment – Expected Outcomes

- Replacement of components with expired lifetime
- Additional analysis and justification of the residual lifetime of non-replaceable equipment
- Update of programmes and procedures for SSC operation, maintenance and repair and aging management



## Long Term Operation

### LTO Programme

- Scope - the improvement measures shall consider in synergy the results of:
  - Integrated plant assessment
  - Safety analyses
  - Operational experience feedback
  - IAEA recommendations and good practices
- The safety improvement measures shall be implemented and taken into account in the PSR and updated SAR
- IAEA SALTO peer review service is invited to review and confirm the adequacy and efficiency of LTO measures

## Long Term Operation

### Current status

- Comprehensive investigation of the physical status of main equipment initiated by the licensee in 2011
- Programme for comprehensive investigation of the physical status of equipment and assessment of the residual lifetime of SSC presented at BNRA at the end of 2012
- LTO Licensing programme developed
- Equipment List and Residual Lifetime Assessment Methodology agreed by BNRA
- SSC Summary Report submitted in Dec 2013
- LTO Programme submitted in Dec 2013
- LTO Programme agreed by BNRA in 2014
- LTO PSR Methodology agreed by BNRA in 2014

## Long Term Operation

### Further actions

- PSR resulting safety improvement program – to be submitted by the end of 2016
- Implementation of LTO Programme – Nov 2017
- Review of plant LTO justification lifetime – Nov 2017
- Review of updated SAR – Nov 2017
- National Action Plan measures completion – end 2017
- IAEA SALTO Mission invited for 2016

## Conclusions

- The decision to extend the lifetime of existing plants should be balanced by a significant enhancement of their safety features
- It is recognized that more comprehensive and systematic reviews will be performed on the following key issues:
  - Extended ageing management programme
  - Comprehensive safety reassessment including natural hazards and severe accident management features
- Significant modifications are implemented at Kozloduy NPP to minimize the radiological consequences in case of severe accidents. Additional actions are being taken in response to the Fukushima accident
- BNRA will take actions to make the process as transparent as possible to stakeholders and public and improve public confidence

**Thank You,  
for your attention!**