



EC Stress Tests Conclusions and Follow up Regulatory Activities

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Content of Presentation

Stress tests and peer review process

NAcPs

NAcP conclusions for WWER

Following Regulatory Activities

Enforcement of NAcP conclusions

New legislation

Implementation of the national measures

Conclusion



Stress Tests – EC Response on Fukushima Accident

Stress Tests – comprehensive and transparent risk reassessment of operated NPPs

Basic principles

- Targeted reassessment of the safety margins of NPPs in the light of Fukushima accident

Goals

- To find the potential weak points and implement any necessary measures to increase safety of NPPs in case of severe accidents
- To restore public confidence in safety of nuclear energy

Goal was not to search for answers if operated NPPs in EU are safe

Content of the Stress Tests

3 main parts of reassessment:

- Initiating events

earthquake

flooding

other extreme external conditions in location

- Loss of safety functions

electrical power

ultimate heat sink

combination of both

- Severe accident management issues

organization and arrangements SAM (licensee and national level)

accident management measures after loss of the core cooling and

spent fuel pool cooling

maintaining the containment integrity

accident management measures to mitigate radioactive releases



STs Reassessment Methodology

Safety reassessment based on:

- existing and available documents / walk downs
- engineering judgement to evaluate the adequacy of the available margins and means

Three steps approach to identify potential improvements:

- review the current design basis
- review the existing preventive and mitigation protection measures
- review the vulnerability of the plant with respect to hazards beyond the design basis



Way from Stress Tests to NAcP

- 25.3.2011 Declaration of the Stress Tests**
- NPP assessment by licensee
 - NPP independent assessment by national RBs
- 31.12.2011 National Reports (submitted to EC by RB)**
- May 2012 Final report of ENSREG - submitted to EC**
results of international peer review
- Follow up Activity**
- July 2012 Declaration of the Action Plans**
- 31.12.2012 Submission of National Action Plans -**
- proposed measures for improving safety and robustness of NPPs
 - time shedule of implementation



Scope of the National Action Plans

- **The NAcP structure - in accordance with the structure suggested by ENSREG**
- **Part I**
issues of external hazards (earthquakes, floods, extreme weather)
the loss of ultimate heat sink and complete loss
of electrical power and their combination
- **Part II**
the organization of emergency preparedness and emergency response
international cooperation (evaluated by the CoNS)
- **Part III**
cross/cutting issues
- **Part IV**
list of corrective actions and recommendations contained in parts I - III.



National Action Plans

Proposed measures are generally compilation of all the major conclusions and recommendations from:

National reports on ST

International peer review recommendations

ENSREG recommendations

Conclusions of the 2nd Extraordinary meeting of the Convention on NS

National Action Plan (NAcP) on Strengthening Nuclear Safety in the Czech Republic

- **Dukovany NPP and the Temelín NPP developed so called Safety Increasing Program (SIP) based on conclusions from (core of measures in NAcP)**
 - periodic safety review findings
 - PSR Dukovany NPP after 20 years of operation (2006)
 - PSR Temelín NPP after 10 years of operation (2010)
 - safety findings of the IAEA and WANO missions
 - findings identified within the project LTO Dukovany NPP

National Action Plan

supplemented

- conclusions of the National Stress Tests Report
- lessons learned from EC stress tests peer reviews
- general recommendations of ENSREG
- 2.extraordinary meeting of the CoNS IAEA

National Action Plan (NAcP) on Strengthening Nuclear Safety in the Czech Republic (www.sujb.cz)



Po fukušimský

Národní Akční Plán (NAcP)

na
posílení jaderné bezpečnosti jaderných zařízení v
České republice



Státní úřad pro jadernou bezpečnost
Červenec 2013



Post Fukushima

National Action Plan (NAcP)

on
Strengthening Nuclear Safety of Nuclear Facilities
in the Czech Republic



State Office for Nuclear Safety
July 2013



Responsibility for Implementation of NAcP CR

ČEZ - measures relating NPP - 66 HW and SW provisions

SUJB (+ ministries)

Measures of general nature - 11 SW provisions

All proposed corrective measures must be implemented in scheduled time (dead line 2015)

National Action Plan - living document - new knowledge, stage of implementation, results of required analyses

NACP CR – Enforcement of NACP implementation

§17 of Atomic Act

- to assess systematic and comprehensive manner the fulfilment of conditions determined under § 4 of this Act, from the viewpoint of current science and technology achievements and to ensure the assessment results to be implemented in practice

Licensing condition - Temelin NPP

(permission for further operation of Unit 2
Temelin NPP issued 2012)

- To implement all measures listed in Safety Increasing Program (SIP) for Temelin NPP in prescribed deadline
- To submit PSR after 10 years of operation with assessment of implementation of Fukushima accident conclusions

Dukovany NPP

Basic condition for possible issue of LTO EDU permission (2015-2017)



NAcP CR – Enforcement of NAcP implementation

The most important corrective measures from NAcP must be approved by SUJB (in compliance with AA)

- **Ventilator cooling towers – independent UHS EDU**
- **SBO DG EDU**
- **SBO DG ETE**
- **3.emergency SG feedwater system EDU**
- **3. pump for SFP cooling system EDU**
- **Diversion PC make up system ETE**
- **Hydrogen control and combustion EDU, ETE**
- **Severe accidents management guidelines**
- **Supplement PAMS**

NAcP CR – Measures for National Organizations

SUJB is responsible implement administrative SW measures following from 2.extraordinary meeting CoNS conclusions

- to prepare new legislation in the field of nuclear energy
- to perform regularly assessment of safety - PSR
- to ensure independent assessment of RB activities
- to ensure regular updating of emergency plans
- to keep transparent and open communication with the public/stakeholders
- to ensure International cooperation on the nuclear safety field

NACP CR – Measures for National Organizations

New legislation in the field of nuclear energy - process started before STs

Goal:

- **To implement all relevant recommendations and requirements into legislative – IAEA, WENRA RLs, EC Directives**
- **To have new legislation in time of licensing process of NNS construction**

Examples of new requirements: PSR, PSA, supplemented DiD,DEC

Present state:

New Atomic Act in official comment process –end of process 2013

Relevant STs requirements are incorporated into proposal

NAcP CR – Measures for National Organizations

Regular assessment of safety – continuous process using all legislative means – basic tool of supervision

- results of inspection activities
- results of safety analyses (deterministic and probabilistic)
- **Periodic Safety Review** – 10 years cycles
- implementation of research results (state-of-art)
- assessment of experience feedback mechanisms
(implementation of all relevant lessons-learned from events and findings)

Conclusions of safety assessment must be (and are) used towards achievement of the highest reasonably achievable level of safety

NACP CR – Measures for National Organizations

Regular independent assessment of RB activities

IRRS - mission organized by IAEA

- **Period 10 years – mission invited (18.11.2013)**
- **Assess all competencies of RB**
- **Conclusions – recommendations**
 - suggestions**
 - good practices**

Follow up mission (after 2 years) – assessment of progress in implementation of recommendations and suggestions



General conclusions of STs for WWER Units

WWER 440 design offers large time margins to severe accident

Proposed measures for safety improvement of WWER 440 units are feasible

In case of WWER 1000 is necessary perform analyses and propose appropriate strategy to maintain long-term containment integrity (filtered venting, IVR)

Consider a common center for WWER 440 operators in EU for mutual assistance in case of severe accidents (Dukovany, Bohunice, Mochovce, Paks)

Weak Points and Benefits of the STs - Backwards View

Stress tests and their peer review was a challenge

Weak Points

Immediate forced political decision EK

Unrealistic schedule and the resulting stress

Excess burden as operators and supervisory authorities

Missing acceptance criteria

Benefits

integrated responses of European countries

Mutual comparison

Objectification of the conclusions in the peer review process

Number of recommendation for enhancement of NPP

robustness against extreme hazards, loss of power supply or ultimate heat sink, and severe accident management – the most positive results



Conclusion

- **European stress tests despite initial fears of political abuse yielded positive technical solutions to improve the safety and robustness of NPPs against severe accidents**
- **All countries committed to enhance safety/increase safety margins beyond the design basis including revision of national legislative framework**
- **European stress tests confirmed - assessment of nuclear safety performed by RB is continuous independent process in high quality – see results of PSR and others independently on STs**
- **Stress tests should be considered as an exceptional exercise, not to be repeated regularly**