Updating WENRA Reference Levels for existing reactors in the light of TEPCO Fukushima Daiichi accident lessons learned

International Experts’ Meeting on Severe Accident Management in the Light of the Accident at the Fukushima Daiichi Nuclear Power Plant
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Content

WENRA

01 WENRA
02 WENRA Safety Reference Levels
03 Post-Fukushima Review of Reference Levels
04 Conclusions
WENRA

Basic facts

- Association of the Heads of nuclear regulatory authorities of the EU countries with NPP and Switzerland
- Original Terms of Reference signed on 4 February 1999
  - Revised on 14 March 2003
  - Revised on 26 March 2010
- Independent from politics
- European centre of competence for Nuclear Safety
- Common approach and commitment to continuous improvement of nuclear safety

www.wenra.org
Basic facts

- 17 Members
- 9 Observers
Working Groups

RHWG  Reactor Harmonization Working Group

WGWD  Working Group on Waste and Decommissioning

Ad-hoc Working Groups established for post-Fukushima activities (sub-groups of RHWG) :

- Natural hazards
- Containment integrity
- Accident management
- Periodic safety review
- Mutual assistance
WENRA Safety Reference Levels for Existing Nuclear Power Plants
02 WENRA Safety Reference Levels
Development of Safety Reference Levels

OBJECTIVE

to increase harmonisation within WENRA countries on safety requirements issued by the regulatory bodies and their implementation in existing NPPs.

PROCESS

• Initiated in 2000
• Set of Reference Levels (RLs) available in 2006
• Adapted version in 2008 taking into account the stakeholder comments
02 WENRA Safety Reference Levels

Content of Safety Reference Levels

Sets of RLs in 18 areas where harmonisation was considered as necessary

Issue A : Safety Policy
Issue B : Operating Organisation
Issue C : Management System
Issue D : Training and Authorization of NPP Staff
Issue E : Design Basis Envelop for Existing Reactors
Issue F : Design Extension of Existing Reactors
Issue G : Safety Classification of Structures, Systems and Components
Issue H : Operational Limits and Conditions
Issue I : Ageing Management
Issue J : Systems for Investigation of Events and Operational Experience Feedback
02 WENRA Safety Reference Levels
Content of Safety Reference Levels

Sets of RLs in 18 areas where harmonisation was considered as necessary (con’t)

Issue K : Maintenance, In-service Inspection and Functional Testing
Issue LM : Emergency Operating Procedures and Severe Accident Management Guidelines
Issue N : Contents and Updating of Safety Analysis Report
Issue O : Probabilistic Safety Analysis
Issue P : Periodic Safety Review
Issue Q : Plant Modifications
Issue R : Onsite Emergency Preparedness
Issue S : Protection against Internal Fires
WENRA Countries agreed upon

- The incorporation of the RLs within their national requirements
- The implementation of the RLs in all NPPs

Action plans within countries to harmonise at both levels
Review of the WENRA Safety Reference Levels for existing plants after the Fukushima Dai-ichi accident
03 Post-Fukushima review

WENRA’s commitment

March 2012 : WENRA Statement - WENRA Conclusions arising from the Consideration of the Lessons from the TEPCO Fukushima Dai-ichi Nuclear Accident

WENRA Emphasizes institutional (roles and responsibilities of governments, regulators and utilities) and cultural (continuous improvement) aspects of nuclear safety in addition to technical issues. WENRA is ready to tackle further issues as necessary on the basis of the lessons learned from the Fukushima accident. WENRA’s commitment is to proceed along the path of defining or revising existing Reference Levels as well as developing guidance documents for practical use by regulators.
03 Post-Fukushima review

RHWG Task

To review and revise the existing RLs (2008) or to develop additional RLs

3 Sub-groups

• T.1 Natural hazards
• T.2 Containment integrity
• T.3 Accident management

Goals:

• Include the lessons learned from Fukushima
• Maintain consistency and balance within RLs
Post-Fukushima review
Main areas of changes

Design Extension for existing plants – Issue F

• In accordance to IAEA SSR 2/1, “Design Extension Conditions“ (DEC) where introduced (instead of Beyond DBA)
• Clear differentiation between DEC without core melt (DEC A) and DEC with core melt (DEC B)
• More prescriptive on the identification and selection of DEC to be analysed
• Expressing more detailed the goals of the safety analysis for DEC
03 Post-Fukushima review
Main areas of changes

Design Extension for existing plants – Issue F

- Addressing safety in the spent fuel pools
- Addressing ‘multi-unit’ sites
- Requiring effective means after natural hazards more severe than design basis
- No preferences expressed on the use of mobile or fixed equipment
- Requirements on the use if relied upon in the safety assessment:
  - Capacity and capability
  - Availability and accessibility
  - Connection points
- NPP autonomy for a justified time

A guidance document will be issued to explain and support the RLs in Issue F
03 Post-Fukushima review
Main areas of changes

Additional RLs on natural hazards – Issue T

- Screening of hazards relevant to the site
- Identification of the design basis events
  - Target value $10^{-4}$/year
  - 0.1 g minimum PGA for seismic events
- Requirements on the development of a protection concept to minimize the threats
- Considerations on events exceeding the design basis events
  - To ensure that the chosen design basis is sound
  - To ensure that sufficient margins exist before cliff edge effects

A guidance document will be issued to explain and support the RLs in Issue T
03 Post-Fukushima review
Main areas of changes

Emergency Operating Procedures and Severe Accident Management Guidelines – Issue LM

- Addressing spent fuel storage safety
- Addressing multi-unit sites with common resources
  - All reactors challenged by the same event
  - Possibility of mutual support
- Qualification of equipment relied on in SAMGs
- Stress the need to carefully consider whether measures from accident procedures can be implemented taken into account deterioration of site conditions
- Extend training needs to all emergency response personnel, reflecting realistic conditions
03 Post-Fukushima review
Main areas of changes

On-site emergency preparadness – Issue R

Enhancing the emergency preparedness
• Improving the consideration on accidents affecting several installation on site
• Addressing consideration on long lasting accidents and disrupted regional infrastructure
• Enhancing requirements on staff in the above situations (number, training)
• Appropriate procedures to manage the emergency, including for the use of mobile equipment
03 Post-Fukushima review

Other changes

- Addressing Safety Culture – Issue C (Management System)
- Clarifications and aligning of Issue E (Design Basis Envelope) to Issue T en F
- Treatment of natural hazards and spent fuel storage in PSA – Issue O
- Consequential changes for
  - Contents and Updating of the SAR – Issue N
  - Periodic safety review – Issue P
Conclusions
04 Conclusions

Thorough review of the RLs for existing plants
• Adding an issue on natural hazards
• Taking into account the Fukushima lessons learned and European Stress Test Actions
  • multi-unit site, mobile equipment, natural hazard, enhanced emergency preparedness and training,...
• Resulting in a coherent and well balanced set of new RLs for existing plants

Available on http://www.wenra.org/publications/
Public consultation has been held (01/12/2013 – 28/02/2014). RHWG is considering the received comments.

Final version expected in the middle of 2014
Thank you.

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