Nuclear Safety Standards Committee
41st Meeting (21st to 23rd June 2016)

Agenda item 2.3

Design of Reactor Containment Systems for Nuclear Power Plant (DS482)

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Outline

• Background Information
• Fukushima implications
• Status of the document
• Overview of the document
• NUSSC Member comments
• Requested action
Background Information

• The document (NS-G 1.10) was published in 2004

• The current revision (DS 482) was initiated to provide design recommendations and guidance to fulfil SSR-2/1 requirements and the latest IAEA requirements (SSR-2/1, Rev.1):
  • Extension of the plant design envelope (either DBAs and design extensions conditions w/wo core melting)
  • Prevention and minimization of radiological releases in accident conditions
  • Avoiding early radioactive releases or radioactive releases large enough to require long term protective measures and actions
  • Practical implementation of defence in depth strategy
Fukushima Implications

• Fukushima IAEA Draft Action Plan
  • IAEA Secretariat is requested to review and revise as necessary the relevant Safety Standards in a prioritised sequence
    • Revision of Safety Guide NS-G-1.10 was considered of high priority once SSR-2/1 requirements updated

• 2015 Vienna Declaration

• CNS 6th Review meeting (Recommended action n0 35/6)
Status of the Document (1/2)

- Review of Safety Guide NS-G-1.10 and decision to revise recommendations → DS482
- Draft DPP approved at 36th NUSSC and NSCG meetings (2013/11)
- Draft DPP approved at 35th CSS meeting (2014/04)
- Internal Review of draft DS482 by Coordination Committee (2016/04)
Status of the Document (2/2)

• 1st Review of draft DS482 by Review Committees (41th NUSSC/Step 7)

This draft has been prepared with the support of experts from Finland, France, Germany, Japan, USA.
Overview of the Document (1/4)

• The scope of remains essentially unchanged

• Section 3: Design Basis of Structures, Systems and Components provides more detailed

  • Guidance to identify additional needs in the event of DECs
  • Recommendations with regard to protection of systems against the effects of hazards and required operability
  • Recommendations to achieve required reliability
  • Guidance for independence between systems
  • Guidance for safety classification
Overview of the Document (2/4)

- **Section 4: Design of Containment Structure and Associated Systems**
  - Recommendations for instrumentation is more detailed and the former Appendix of NS-G-1.10 is no longer useful

- **Annex 1: Examples of Containment Systems**
- **Annex 2: Illustrations of Categories of Isolation Features**
  - Deleted: Obsolescence or schematic information not always appropriate
Overview of the Document (3/4)

- Annex 3: Severe Accident Phenomena
  - Content merged within the body of the text

- Appendix 1: Plants Designed with Earlier Standards
  - CNS 6th Review meeting Report/ Article 2 of Vienna Declaration
  - General guidance to conduct an evaluation of the existing capabilities of the containment structure and systems to perform their intended function under conditions not postulated in the licensing basis
• General recommendations to identify room for further improvement
  • Control of energy released from containment
  • Management of combustible gases released inside containment
  • Control of radionuclides released inside containment
  • Use of mobile equipment
NUSSC Comments: Summary

- Comments from Belgium, Canada, Egypt, Federation of Russia, Finland, France, Germany, Hungary, Japan, Pakistan, Slovaquia, Sweeden, Switzerland, United States of America, ENISS, European Commission.

- A few comments on scope and details of recommendations

- A few comments to change specific recommendations

- Other comments are for better clarity of the recommendation, clarification, consistent use of terminology, additional references.
NUSSC Comments: Highlighting resolutions

• All comments were analysed and for each of them a resolution is proposed

• Scope and details:
  – For completeness of the guide recommendations should be provided for all relevant requirements (generic or specific plant systems)
  – References to IAEA Safety guides, if any
  – Application of design concepts to the scope of the guide
  – Primarily to provide “should” recommendations
  – Appendix 1: International practices for improving nuclear safety of nuclear power plants in operation will be discussed in a specific TECDOC
NUSSC Comments: Highlighting resolutions

• Specific recommendations:
  
  – *External hazards*: List of typical EH has been replaced by a reference to NS- R 3
  
  – *Containment venting*: No need for DBAs, should be used as the last resort mean for DECs if necessary
  
  – Selection of boundary conditions for core melting accident: Boundary conditions for a set of the more likely representatives sequences ( PSA level 2 + engineering judgement)
  
  – *Failure of In Vessel Retention*: No recommendation (pending)
  
  – *Risk of hydrogen detonation/fast deflagration*: Leaks from the Primary containment should also be considered (see clause 4.124)
Requested Action

Approval by NUSSC to submission to Member States
Thank you!