5th Meeting of the Emergency Preparedness and Response Standards Committee

7-9 November 2017

Agenda Item 2.5
Draft Safety Guide (DS494) on Protection against Internal Hazards in the Design of Nuclear Power Plants

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• **Background**
  
  – NS-G-1.7, “Protection against Internal Fires and Explosions in the Design of Nuclear Power Plants”, and NS-G-1.11, “Protection against Internal Hazards other than Fires and Explosions in the Design of Nuclear Power Plants” were published in 2004 to provide recommendations to fulfill the requirements of NS-R-1, “Safety Requirements on the Safety of Nuclear Power Plants”, published in 2001;
  – NS-R-1 was superseded in 2012 by SSR-2/1 which was recently revised to incorporate lessons learned from the Fukushima Daiichi accident;
  – In particular, the requirements for protection against internal and external hazards have been reinforced with respect to those of NS-R-1;
  – The inclusion of Design Extension Conditions (DECs) in the nuclear power plant design envelope also requires that safety features for DEC are protected against the impact of internal and external hazards as appropriate;
  – Adoption, in February 2015, of the Vienna Declaration on Nuclear Safety by the Diplomatic Conference on the Convention on Nuclear Safety.
Background and objectives (2/3)

• **Justification and objectives of the Safety Guide**
  
  – Revision of the Safety Guides, previously subordinated to NS-R-1, after publication of SSR-2/1;
  – The discussion of planning the transition to the long-term structure of the Safety Standards led to the agreement to merge, in a single Safety Guide, the four existing Safety Guides on internal and external hazards;
  – Meanwhile, it was found impracticable to merge the Safety Guides related to internal hazards with those relevant for external hazards;
  – Separate revision of Safety Guides for external hazards underway.
The present Draft Safety Guide (DS494):

- Addresses all the internal hazards contained in NS-G-1.7 and NS-G-1.11;
- Coalesces the recommendations for protection against internal hazards under a common approach consistent with the new requirements;
- Reflects the changes in the safety requirements for NPP design and advances in relevant knowledge, technology and regulation in Member States;
- Considers the implication of the Vienna Declaration on Nuclear Safety;
- Provides basis for the preparation and review of the sections of the Safety Analysis Report related to the protection against internal hazards.
Overview of the Document

- The document is a revision and combination of Safety Standards Series No. NS-G-1.7 and Safety Standards No. NS-G-1.11
- The information in DS494 is based on SSR-2/1 (Rev.1) and some safety guides, in particular NS-G-1.7 and NS-G-1.11, and includes:
  - General considerations relevant to internal hazards (Section 2)
  - General recommendations applicable to internal hazards (Section 3)
  - Specific recommendations relevant for the protection against the following internal hazards (Section 4):
    - Internal fires;
    - Internal explosions;
    - Missiles;
    - Pipe breaks (pipe whip, jet effect and flooding);
    - Internal floods;
    - Collapse of structures/ falling objects/ heavy load drops;
    - Electromagnetic interference;
    - Release of hazardous substances inside the plant.
  - Appendix I: Hazard combinations
  - Appendix II: Detailed guidance on internal fires
Status of the Document

• The DPP was approved by the Committees and endorsed by the CSS in April 2016 with NUSSC and NSGC as the only Review Committees

• DS494 was developed in three Consultancy Meetings between 2015 and 2017
  – First draft of DS494 submitted to NUSSC and NSGC on 24 April 2017 for comments up to 3 November 2017;
  – DS494 submitted also to EPReSC Members on for comments by 13 October;
  – Only one comment came from one EPReSC Member (Iran) and was resolved;
  – At the time of preparation of the presentation, comments came from the following NUSSC Members: Czechia, Finland, France, Germany, Hungary, Korea, Pakistan, Switzerland, UK;
  – Those comments and the comments that will be sent by 3 November have been or will be resolved for the NUSSC and NSGC meetings of 27 Nov.- 1st Dec.
  – EPReSC Chair will be informed about subsequent comments so to decide on whether the resulting changes are relevant to the field of review of EPReSC:
    ✓ If they are not relevant, previous EPReSC decision is maintained;
    ✓ If they are relevant, EPReSC Chair and NUSSC Chair should decide on what to do with the participation of the Technical Officer.

• Submission to EPReSC for clearance to submit DS494 for Member States’ comments.
EPReSC Member Comments: Summary

• One comment from one EPReSC Member (Iran)
  – “long term” is used in para. 4.54, 4.55, 4.56 and 4.171 but it seems that something in these sentences has been missed because “long term” is an adjective. For example it should be written, “long term operation”;
  – The comment was resolved and the resolution was discussed with, and finally accepted by the EPReSC Member who raised it;
  – Paragraph 4.54 was modified as: “4.54. The safety feature for DEC necessary in the long term of the accident should be protected against the effects of a fire, as it is a rather frequent event”;
  – No modification in paragraphs 4.55, 4.56 and 4.71;
  – The use of “long term” is consistent with its use in GSR Part 7, Requirement 21, para. 6.10, and in the IAEA Safety Glossary (2007), page 36;
  – In para. 4.54, 4.55, 4.56 and 4.171, “long term” is used with reference to the context of the recommendation, i.e. long term phase of the accident;
  – It is important to note that the duration of the long term phase of severe accidents is quite long thus rendering frequent the occurrence of internal hazards during that period of time.

• There are no unresolved EPReSC comments.
Requested Action

Clearance by EPReSC to submit DS494 for Member States’ comments
Thank you!