Nuclear Safety Standards Committee

42nd Meeting, 29 November – 1 December, 2016

Agenda item 2.7

DS492 Human Factors Engineering in Nuclear Power Plants

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Background

- This is the new IAEA safety guide

- The DS 492 was initiated to:
  - Provide a structured approach and guidance on Human Factors Engineering (HFE) in the design and modification of human machine interface in order to minimize the risk of human errors, and optimize human performance to ensure safe operation of the nuclear power plant
  - Ensure coherency and consistency with the other relevant IAEA Safety Standards (GSR Part 2, GSR Part 4, GSR Part 7, SSR-2/2, GSG-3.1, GS-G-3.5, and SSG-39)
  - Incorporate experience on application of the documents, and the operating experience feedback from the IAEA Incident reporting systems, and the feedback from the accident at the Fukushima-Daiichi NPP
Overview of the Document

• The main topical areas for which this Safety Guide provides guidance are the following:
  – Considerations specific to HFE, including the human machine interface(s) for achieving compliance with the requirements established in SSR 2/1
  – Competences needed for integrating human factors engineering into the design of nuclear facilities throughout the plant lifecycle for achieving compliance with the requirements established in GSR Part 2
  – The HFE process to be considered in achieving human machine interface design across plant states
  – A consideration of HFE aspects for several important processes and applications linked to design
Fukushima Implications

• This Safety Guide considers relevant Fukushima accident lessons:
  – Availability of the information and displays giving to plant operators and other critical personnel during accidents
  – Optimal layout of displays and controls reducing possibility of erroneous operation
  – Human machine interface in the field (e.g. accessibility during accident states, equipment status, local controls and measurement devices)
  – Human and organizational factors related to HFE designing
Status of the Document

- The DPP was approved by the Committees in April 2015
- The first draft was developed in three Consultancy Meetings during 2015-2016
- Submission to the Committees for approval to MS comments
  - The first draft was submitted to the Committees (EPReSC and NUSSC) for comments in September 2016
  - Table of resolution of Committees comments including revised draft Safety Guide posted on the website November 2016
  - The 3dr EPReSC meeting cleared DS492 for submission to MS
NUSSC Member Comments: Summary

- 270 comments from Australia, Brazil, Canada, Czech Republic, EC, ENIS, Finland, Germany, Republic of Korea, Sweden, and USA.
  - The comments suggested to improve clarity of statement of recommendations, consistent use of terminology, additional references, and improved coherency with the other relevant IAEA Safety Standards
  - Most of the comments were addressed
  - Comments to include SF already covered in other safety guides rejected
  - Reason for rejection of comments was always provided
  - **There are no unresolved comments**
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• **Last moment comment resolution (FI):**
  
  – **New 2.25.** Through the design stages consideration should be made of constraints from the safety assessment and regulatory requirements that apply to the design of specific systems.
  
  – **New: 3.7.** Based on Member States experience, effective HFE design requires involvement of HFE at conceptual stage.
  
  – **4.4.** The human machine interaction should be designed through a structured methodology that permits from conceptual design the identification and selection of candidate HMI approaches, the definition of a detailed design, and the performance of HMI tests and evaluations, when needed.
Requested Action

Approval by NUSSC to submit draft Safety Guide for Member States comments
Thank you!