

# JCNRM Comments

## Pre-decisional Trial Use RG 1.247

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This presentation summarizes a letter from the JCNRM to the NRC regarding a *preliminary* review of pre-decisional trial use RG 1.247\*

\*Letter from the ASME/ANS JCNRM (Rick Grantom, Dennis Henneke, and Oliver Martinez) to Ms. Lund, October 28, 2021.

# RG 1.247

- JCNRM and NLWR Working Group are appreciative of NRC efforts as...
  - Members of the JCNRM working groups
  - Commenters on JCNRM standard ballots
  - Developers of RG 1.247
- RG 1.247 is an affirmation of the quality of the NLWR standard
  - No significant gaps or concerns identified by the NRC.
  - 147 NRC staff positions (33 qualifications, 114 clarifications) for a standard with 247 high level requirements and 1,233 supporting requirements.

# NLWR Standard History

- Trial Use Version
  - Issued in 2013
  - Piloted by a significant number of vendors representing the spectrum of advanced reactor designs
  - Valuable experience and feedback that greatly improved the quality and functionality of the standard
- Formal Release
  - A new version of the standard was developed based on pilot user feedback and efforts to retain consistency with the next edition of the L1 LWR PRA standard and other LWR PRA standards under development (L2 and L3).
  - **First JCNRM ballot:** Fell just short of approval, 1,319 comments (489 from NRC)
  - **Second JCNRM ballot:** Unanimous approval, 86 comments (70 from NRC)
  - Formal ASME/ANS/ANSI approval and release in February 2021

# JCNRM Comments

- **Motivation for Regulatory Positions:**

- Additional insight regarding the motivation for specific regulatory positions would be beneficial (such as RG 1.200 consistency, etc.).
- The vast majority of NRC clarifications concern requirements that are derived from LWR PRA standards and that do not have NLWR-specific attributes. The source main LWR PRA standard has undergone NRC review in 2021, with some updates to the LWR standard provided as NRC clarification in the RG (JCNRM took no exception to these). Other source standards such as the LPSD standard are undergoing final review in 2022.
- Those elements that are generally unique to the NLWR standard (Initiating Event Analysis, Event Sequence Quantification, Mechanistic Source Term, and Risk Integration) have minimal clarifications.

# JCNRM Comments

- **PRA Application and Characteristics (1/2):**
  - As stated by the NRC, the purpose of RG 1.247 is to support all NLWR risk-informed applications under Part 50, Part 52, and likely future Part 53.
  - However, RG 1.247 makes specific statements regarding the scope (and other characteristics) of PRAs.
  - For example, RG 1.247 states:
    - A PRA and its results used to support an application should generally address all radiological sources, all internal and external hazards, and all plant operating states.
    - Regarding POS-N-2: All stages of the licensing process should address low power and shutdown-type evolutions

# JCNRM Comments

- **PRA Application and Characteristics (2/2):**
  - The NLWR standard uses an “applications process” to determine the necessary PRA characteristics (scope, level of detail, etc.) and applicable standard requirements to support a specific application.
  - While it is appropriate for the NRC to dictate PRA characteristics for specific risk-informed applications, these statements would be better placed within application-specific guidance, rather than in RG 1.247.
    - As RG 1.247 supports all NLWR risk-informed applications, the inclusion of statements regarding PRA characteristics can result in the unintentional expansion of standard requirements.
    - Including statements regarding PRA characteristics in application-specific guidance is consistent with RG 1.200, where such info is provided in RG. 1.201, 1.205, etc.
    - Such an approach would also be consistent with the NLWR standard application process.

# JCNRM Comments

- **Methods:**

- All JCNRM standards, including the NLWR standard, list requirements for what must be done but not how to do it (a performance-based approach).
- While it is appropriate for the NRC to dictate PRA methods, care must be taken not to unduly limit flexibility, especially for the diverse range of advanced reactor systems and risk-informed applications.
  - Such statements, if appropriate, may be better placed in application-specific guidance, unless they are applicable to all possible risk-informed applications.

# JCNRM Comments

- **Absolute Risk Significance:**

- RG 1.247 states that “unless justified, relative risk significance criteria...should be used to develop the PRA.”
- The NLWR standard supports both relative and absolute risk significance criteria and does not require *additional* justification for the use of absolute risk.

- **CDF/LERF:**

- RG 1.247 notes the potential use of CDF/LERF.
- While the NLWR standard permits the use of intermediate metrics, the standard elements (Risk Integration, etc.) are designed to utilize event sequence frequency and consequence.

# JCNRM Comments

- **Improvements:**

- The NRC staff identified several areas where the NLWR standard could be improved (errors, inconsistencies, etc.).
- Such suggested changes should be transmitted to the JCNRM for review.
- Before adopting a change, it is important to consider internal consistency and consistency/impact on other JCNRM PRA standards.

# JCNRM Comments on SR Clarifications

- NRC clarification adds a “feasibility assessment” to several Supporting requirements (SRs) involving human reliability analysis (HRA), and “setting the Human Error Probability (HEP) to 1.0 if not feasible.”
  - HRA already includes the determination of whether an event is feasible through the assignment of the HEP probability. However, a separate feasibility study is not performed outside of the HRA.
  - The change provides wording that extends the SR to “how to” perform analysis, which is against the guidance of the standard development.

# JCNRM Comments on SR Clarifications

- NRC Clarification on SR POS-A10 expands the definition of Plant Operating State (POS) to including changes that may “impair or change the effectiveness of radionuclide transport barriers, affect propagation pathways, or modify fragilities of SSCs...”
  - The LPSD PRA includes these factors in the PRA modeling through the system modeling or plant configuration modeling.
  - However, including these factors in the POS definition conflict with the long-standing definition of POS used both in the PRA and deterministic analysis (See NUREG-1150 or NUREG/CR-6143).
- NRC Clarification to POS-A1 and Note POS-N-3 requires LPSD at all stages of the licensing process.
  - This is in conflict with the discussion throughout the standard and the consensus wording of POS-A1.
  - Clarification is centered on licensing application and should not be included in the NLWR standard SRs or related notes.

# JCNRM Comments on SR Clarifications

- NRC Clarification on SR HLR-HR-E and SR SR-E4 add to the scope of a PRA the systematic review of “well intended post-initiator operator responses that result in adverse safety.”
  - This adds scope to the PRA for errors of commission, which is not currently required by any PRA standard.
- NRC Clarification on SR HR-D4 references NUREG-0700 and requires the quality of human-machine interface consider “results from any quantitative evaluations of performance per functional requirements.”
  - Reference to a specific document is not appropriate for a PRA standard as it indicates only one acceptable approach to meet the SR.
  - Overall, the wording adds too much “how to” in the requirement of ensuring HMI quality.
- Many other examples of NRC clarifications are noted as “how to” and commented on by the JCNRM.

# NRC Clarifications on SR Clarifications

- NRC Clarification adds wording on screening of SSCs based on inherent ruggedness to “justify the applicability to the plant or site or range of sites identified in SHA-A1.”
  - Similar requirement on SFR-E3 for SSC fragilities.
- A number of NRC clarifications were provided on the release category requirements (RCRE-A2, A3, RCPA-A10, RCAD-A5, etc.) that provide additional detailed requirements.
  - These should be submitted to the JCNRM to be evaluated for the Level 3 and NLWR standards.
- A number of requirements in the release category requirements provide additional detailed requirements that provide too much how to in the details.
  - Also uses the term “results of interest” in RCQ-B3, which is inconsistent with the standard and an inaccurate term.

# NRC Clarifications on SR Clarifications

- NRC Clarification on configuration control requirement CC-E1 adds the requirement to provide a “record of the process and results used to evaluate changes on previously implemented risk-informed decisions.”
  - The PRA standard does not require documentation for risk-informed decisions or for analysis/calculations for risk-informed applications.
  - The additional requirement is inappropriate for the standard and would be addressed in the specific guidance and NRC endorsement documents for each specific risk informed application.

# Conclusions

- The JCNRM appreciates the NRC support for the NLWR standard, including the proposed endorsement with clarification in the pre-decisional trial-use RG 1.247
  - The NRC participation in the standard is a key component to the overall development of a consensus PRA standard.
- We also appreciate the opportunity to have this conversation as to how to improve clarifications.
- We look forward to future discussions