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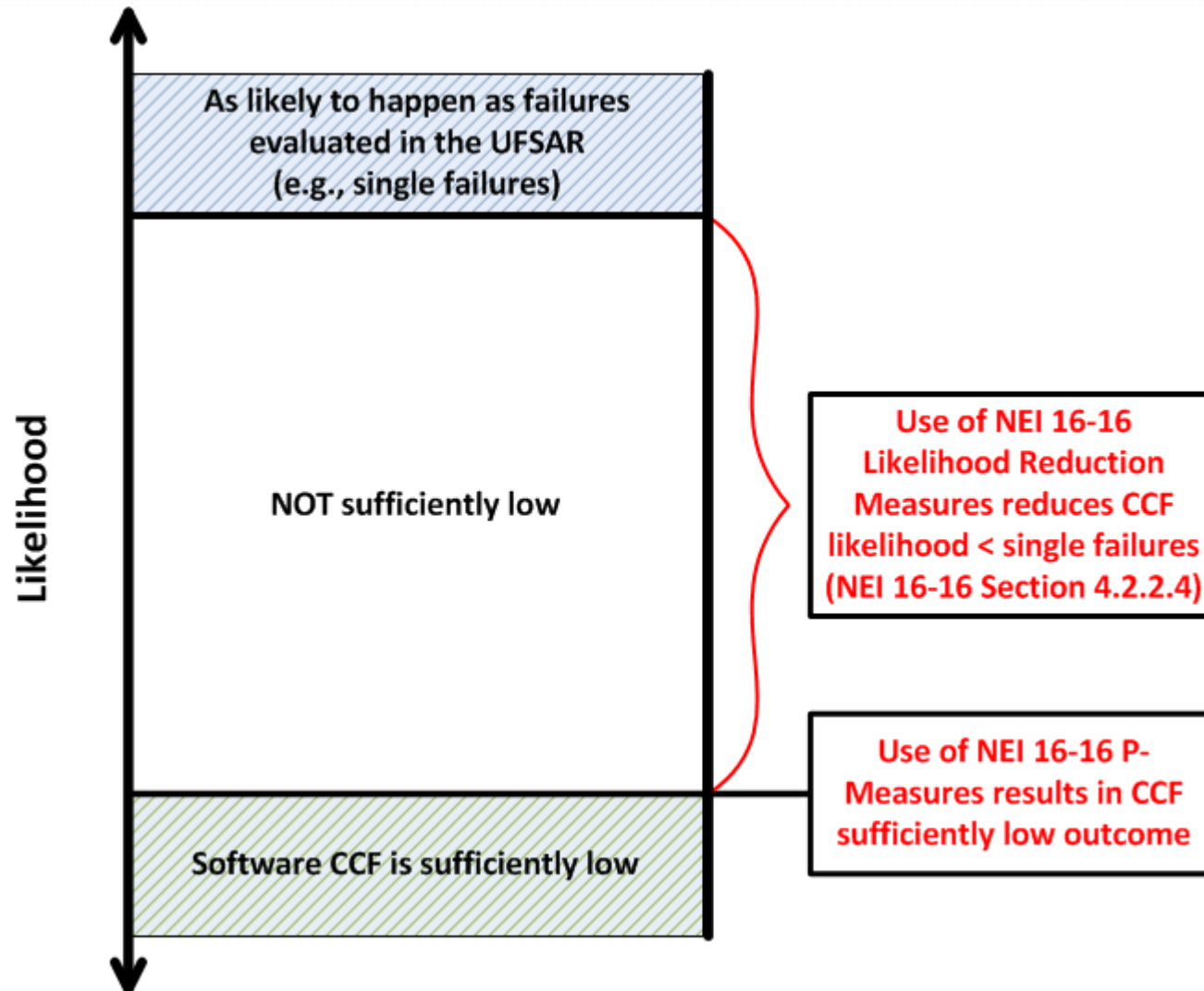
**MEETING BETWEEN THE U.S. NUCLEAR
REGULATORY COMMISSION STAFF AND
THE NUCLEAR ENERGY INSTITUTE TO PREVIEW
NEI 16-16, "GUIDANCE FOR ADDRESSING
DIGITAL COMMON CAUSE FAILURE"**

Topics for Discussion

- Discussion of “Sufficiently Low”
- Use of Best Estimate Safety Analysis Techniques In NEI 16-16
- Common Cause Failure Definition
- NEI 96-07 Appendix D, Section 4.3.6
- Relationship Between NEI 16-16 and Appendix D
- NEI 16-16 Guidance Versus RIS 2017-XX Guidance
- NEI 16-16 Staff Comments
- Path Forward
- Summary/Wrap Up



Software CCF Likelihood



Use of Best Estimate Techniques In NEI 16-16

- NEI 16-16, Draft 2, proposes the use of best estimate safety analysis methods to address CCF **not sufficiently low** outcomes (white space area) when addressing 50.59 Evaluation Questions 5 and 6
- Based on discussions with industry licensing SMEs, it has been determined that best estimate methods cannot be used to address 50.59 questions
- NEI 16-16 Revision 3 will eliminate guidance for using best estimate safety analysis techniques for addressing 50.59 questions
- NEI 16-16 will continue to provide technical guidance on use of best estimate safety analysis techniques as appropriate (i.e., when licensee pursues a LAR)



Common Cause Failure Definition

NEI Proposed Definition of CCF:

*“Loss of function to multiple structures, systems or components due to a shared root cause” (IEEE Std. 603-2009). For this guideline, the following notes apply: 1) Loss of function means ~~a malfunction~~ **failure** of multiple SSCs caused by a specific I&C failure source. 2) Shared root cause is limited to I&C failure sources, including single random hardware component failure, an environmental disturbance, a software design defect, and a human error.*

NRC Staff Proposal for Note 1:

“Loss of function means undesirable behaviors (e.g., spurious actuations, failure to perform on demand, failure to maintain normal operating conditions, etc.) of multiple SSCs caused by an I&C failure source considered in this guideline.”



NEI 96-07 Appendix D, Section 4.3.6

- Appendix D, Section 4.3.6, provides guidance on addressing 10 CFR 50.59 Criterion 6 – the possible creation of a malfunction with a different result
- Section 4.3.6 discussions center on what malfunction results are to be evaluated – safety analysis results
- The Appendix D team (MP2) has lead for industry
- NEI 16-16 will be revised to remove any implied 50.59 guidance
- Note that Revision 3 of NEI 16-16 will use terminology consistent with Appendix D, as needed



Relationship Between Appendix D and NEI 16-16

- Recall that one of the goals of the DI&C initiative is the separation of NEI 01-01 technical and licensing guidance
- Although NEI 16-16 (as currently drafted) calls out a relationship to licensing (50.59 and LARs), this is unnecessary
- NEI 16-16 provides technical guidance for determination of CCF susceptibility
- Appendix D provides licensing guidance specific to digital changes
- A 50.59 practitioner may exploit a number of different technical products to support arguments and conclusions, such as:
 - Seismic Calculations
 - Heat Load Calculations
 - Power System Analysis Calculations
 - Instrument Uncertainty/Setpoint Calculations
 - PRA Outcomes
 - Radiation Dose Calculations
 - Failure Modes and Effects Analysis (FMEA)



Relationship Between Appendix D and NEI 16-16

- None of the guidance associated with the above listed technical products make reference to their use in 50.59
- A CCF susceptibility analysis is simply another technical product the 50.59 practitioner will use in supporting licensing arguments and conclusions
- Appendix D does not reference any specific technical guidance – Appendix D simply states an “engineering evaluation” was performed
- Technical evaluations are developed to support the design – the 50.59 practitioner will use technical evaluation outcomes as needed to support the 50.59 conclusions
- NEI 16-16 should only determine if CCF is sufficiently low or not sufficiently low



NEI 16-16 Guidance Versus RIS 2017-XX Guidance

- RIS 2017-XX provides a qualitative analysis framework that can be used to determine overall SSC reliability
- The RIS 2017-XX qualitative assessment can be used to address 50.59 Questions 1, 2, 5, & 6
- NEI 16-16 provides design attributes for accessing CCF likelihood
- As currently drafted, NEI 16-16 provides useful technical basis for addressing 50.59 Questions 5 & 6, but is of no use for addressing 50.59 Questions 1 & 2
- When Appendix D and NEI 16-16 are endorsed, RIS 2017-XX may be retired along with NEI 01-01
- NEI 16-16 should incorporate the qualitative analysis elements in RIS 2017-XX to ensure NEI 16-16 provides suitable technical basis for addressing 50.59 Evaluation Questions 1, 2, 5, and 6



Discussion on NEI 16-16 Staff Comments

- Comments 1,13, 16, 17, 26, 39, 47, 48, and 49 are associated with use of BDBE and best estimate safety analysis methods – NEI 16-16 will limit use of best estimate analysis for LAR submittals
- Comments 2,15, 18, 28, 38, and 40 are related to terminology – NEI 16-16 will use terminology that is specifically technical or consistent with Appendix D, as appropriate
- Comments 8, 14, 15, 18 and 28 are associated with the relationship between Appendix D and NEI 16-16 – slides 7 and 8 address this issue
- NEI has reviewed notes and actions from the last public meeting and provided a tabulation of the proposed resolution for the staff comments on the body of NEI 16-16 (provided in a separate document to support today's meeting)



Path Forward

- Draft 3 of NEI 16-16 will:
 - Incorporate staff comments and proposed resolutions discussed to date
 - Eliminate use of best estimate safety analysis methods for addressing 50.59 questions (will retain for LAR submittals)
 - Include technical information to support answering 50.59 Questions 1 & 2 (incorporate relevant guidance from RIS 2017-XX)
 - Adopt Appendix D terminology as appropriate
- NEI will continue to update NRC staff on the comment status in subsequent public meetings
- Review of staff comments on NEI 16-16 Appendix A
- Next public meetings – February and March



Meeting Summary

- Discussed software CCF sufficiently low
- Dispositioned the use of best estimate safety analysis methods to address 50.59 questions
- Discussed Common Cause Failure definition
- NEI 16-16 will adopt Appendix D terminology, as appropriate
- Discussed relationship between Appendix D and NEI 16-16
- Provided comparison between NEI 16-16 and RIS 2017-XX
- Dispositioned a number of NEI 16-16 staff comments

