

Key Areas of Focus to be Resolved

CCF Unlikely and CCF Not Unlikely Approach

A primary approach in Section 2.0 of Appendix D is to determine whether a potential CCF in a digital replacement is credible, by qualitative considerations of whether CCF is “Unlikely” or “Not Unlikely” with a CCF Susceptibility Analysis. The process appears to qualitatively address whether a potential CCF malfunction is as likely to happen as other type of malfunctions previously addressed in the FSAR. Current guidance in 96-07, Revision 1 states that qualitative engineering judgment and/or industry precedent can be used to address the likelihood of malfunctions. However, the staff does not consider a precedent for the over-arching CCF unlikely approach has yet been established, and has periodically raised concerns with the existing technical guidance that could be used by licensees to support such qualitative judgments. The approach as discussed in Appendix D does not provide the necessary and sufficient evaluation criteria that different qualified parties could apply with consistent results. In addition, this proposed approach overlaps significantly with the staff’s efforts to re-examine and modernize the NRC positions on CCF.

The NRC staff believes that 50.59 modifications using digital technology can be implemented under 50.59. The staff seeks to work with industry to identify a practical approach for evaluating the criteria in 50.59(c)(2) that does not singularly rely upon the common cause failure susceptibility approach defined in Appendix D. In the bi-weekly meetings, the staff would like to work with NEI to develop a set of evaluation and acceptance criteria that licensees can apply with consistent results. The staff would prefer to start with key examples listed in Appendix D that are of highest priority to industry for near-term 50.59 implementation. Such an approach should include consideration of analyses that have already been performed, and which have been shown to be within a bounding safety analysis of such SSC failures, regardless of the cause of the failure, as well as adherence to limiting conditions for operation as administered in the NRC-approved plant technical specifications. It is important to note that NEI 96-07 requires the level of the analysis to be identical to the level documented in the FSAR.

New Digital I&C Evaluation Approaches

The draft guidance introduces new (or modified) evaluation approaches in Section 2.0 of Appendix D for CCF susceptibility analysis, dependability analysis, coping analysis, and consideration of layers of design and variety and how they will be used as tools for addressing CCF. These are foundational approaches in proposed Appendix D to the success of adequately and consistently screening digital changes for 50.59 evaluation, and answering the eight 50.59 criteria, such as the likelihood and consequences of potential new malfunctions or accidents. Discussion is needed to achieve consistency with the NRC policies and guidance. NEI requests approval of these approaches, primarily at a conceptual process level, without further evaluation of the specific technical methodologies and detailed technical criteria that licensees would need

to rely upon to use these new or enhanced approaches. These approaches need to be sufficiently defined interface appropriately with existing or future technical methodologies that may be developed.

Early in the bi-weekly meetings, the staff would like to systematically discuss each significant issue to achieve agreement on how it specifically relates to current NRC positions and methods that may be available to licensees at this time. In addition, these issues may involve new terminology that may not be consistent with definitions in current industry consensus standards or NEI 01-01. The staff would like to achieve mutual agreement on the definitions in consideration of current industry definitions, to avoid ambiguity when implemented by licensees in 50.59 evaluations. If there are issues to be evaluated outside Appendix D or in a future forum (e.g., proposed NEI 16-xx guidance) then their effects on the path forward of Appendix D should be clearly defined as well.

Departures and Differences from Process Criteria in NEI 96-07 and NEI-01-01

NEI 96-07 Appendix D is meant to replace NEI 01-01 and used in conjunction with the base criteria in NEI 96-07. In its review the staff has identified examples of beneficial guidance in NEI-01-01 which were not transferred over to Appendix D of NEI 96-07 and other cases where the new guidance in Appendix D is potentially inconsistent. For example, the draft guidance appears to indicate a digital I&C AOO (in which fuel design limits must be maintained) can be bounded by FSAR Accidents (in which minimal fuel damage is allowed). The staff would like to continue the discussion from the June 15, 2016 meeting (ADAMS Accession Nos.ML16166A339, & ML16165A166), regarding the cross-walk between Appendix D, NEI 96-07, NEI 01-01, and other guidance. The staff would like to work with NEI to understand and justify such differences in Appendix D and ensure the positive attributes of NEI 01-01 are maintained.

Appendix D Examples

Draft Appendix D provides a good range of examples for auxiliary and support systems. However, there are some conclusions in addressing the eight 50.59 criteria that appear to be achieved within the examples, without a clear nexus to the criteria provided in the document. In addition, NEI has requested that NRC approve new approaches at a process guidance level, and not review or endorse specific technical methodologies for this effort. However, the governing examples in Appendix D, used to articulate the implementation of the process guidance, include specific technical discussions and findings, without any nexus to approved technical guidance. Endorsement of the current examples as-is would appear to constitute endorsement of specific technical guidance. Finally, there is a lack of examples illustrating potentially more complex and safety-significant modifications such as modifications to RPS and ESFAS.

In conjunction with bi-weekly discussions regarding new approaches, the staff would like to work through key examples to understand underlying design assumptions and how conclusions are

made in conjunction with the governing process criteria. The staff and NEI should agree upon which examples require modification and/or which process criteria need to be enhanced, consistent with resolution of the issues described above. Given the safety significance and complexity of potential digital I&C systems ranging from reactor protection systems to chiller digital controls, the staff would like to endorse examples that clearly highlight when a LAR would or would not be required.

Progress on other NRC Staff Issues in NEI 01-01

At the June 15 public meeting with the NRC staff, NEI presented the status of 12 of the issues the NRC staff raised in 2014 with NEI 01-01. Appendix D addresses some of these issues. The NRC and NEI need to continue discussions to resolve some of the following issues.

- Guidance to supplement NEI 01-01 Section 4.3.2 “Software Considerations”
- Guidance for addressing Increase in Interactions in non-safety systems or Decrease in Independence
- Guidance for Characterizing Failures (Worst Case, Worst Time, etc.)