

# November 7, 2017, Draft of Appendix D: Section 4.3.6 Key Areas

NRC Staff - Modernization Plan #2

November 30, 2017

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# KEY MESSAGES

- Still misalignment on some critical concepts in Section 4.3.6
- Alignment should be reached prior to detailed comments/edits are provided
- Upcoming staff suggested edits on Section 4.3.6 will reflect staff positions on critical concepts

# Difference in Position

**NRC Position** – All malfunctions of an SSC important to safety must be evaluated to determine whether there is a different result than any previously evaluated in the final safety analysis report (as updated).

**NEI Position** – Narrower scope of malfunctions and analyses that are considered (Also understood as plant level effects.). **Notes:** (1) It is not clear what malfunctions are excluded by the narrower scope, and why that is consistent with the intent of the regulations . (2) The examples do not include sufficient variety of SSCs to understand how the methodology proposed would be applied.

# Explanation of Differences

- Section 4.3.6 provides partial quotations of defined terms that fall within Criterion 6, which provides an incomplete set of considerations for identifying possible *“malfunction of an SSC important to safety”*  
**NRC Position:** 10 CFR 50.59, Criterion 6, specifies “a malfunction of an SSC important to safety.”
- Section 4.3.6 provides partial quotations of definitions, effectively narrowing what is considered “previously evaluated.”  
**NRC Position:** 10 CFR 50.59, Criterion 6, specifies “*a different result than any previously evaluated in the final safety analysis report (as updated).*”
- **Summary:** The partial definitions result in guidance based on partial considerations. As a result, the examples do not provide the minimum information necessary to provide an adequate basis for 10 CFR 50.59 conclusions. Specifically, the NEI examples should describe two sets of results necessary to conclude whether there is a “different result.” This is specifically described in NEI 96-07, Rev. 1, Section 4.3.6, which states:  
  
“Once the malfunctions previously evaluated in the UFSAR and the results of these malfunctions have been determined, then the types and results of failure modes that the proposed activity could create are identified. Comparing the two lists can provide the answer to the criterion question.”

# Proposed Global Changes

- Changes to Address Global Concerns
  - Complete Quotations or No Quotations (preferred)
  - Safety Analysis vs. UFSAR
  - Design Basis Function vs. Design Functions
  - Using GDCs to Identify Design Basis Functions Vs. UFSAR to Identify Design Functions
- Other Global Changes
  - Redefinition of Credible vs. Using Likelihood Levels
  - FMEA, or similar analysis

## Complete Quotations or No Quotations (preferred)

- Partial Quotations Provide a Partial Understanding
- NRC will propose to include more of the quotations than is currently in Section 4.3.6 or preferably to delete them (i.e., simply state position, not justify it).
- **Specific Concern:** The partial quotations related to “safety analysis” imply only part of the safety analysis should be used.

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# “Safety Analysis” versus “any previously evaluated in the FSAR (as updated)”

## Key Concept –

- Section 4.3.6 appears to use incomplete quotations related to “safety analysis” that could lead the reader to a narrower consideration of applicable analysis in the FSAR for 10 CFR 50.59 evaluations.
- Section 4.3.6 also appears to exclude “supporting analyses that demonstrate that SSC design functions will be accomplished as credited in the accident analysis” as defined in Section 3.12 of NEI 96-07 revision 1.
- Taken together with other items not mentioned here, it appears that the position of Section 4.3.6 is that the applicable analysis in the FSAR for consideration under 10 CFR 50.59 is the accident analysis only.

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# Continued

## Staff Comment –

- 10 CFR 50.59(c)(2)(vi) states, “Create the possibility for a malfunction of an SSC important to safety with a different result than ***any previously evaluated in the final safety analysis report (as updated)***;”
- 10 CFR 50.59 uses “safety analysis” **only** in Criterion (viii), but excludes the phrase “final safety analysis report (as updated)”

## Staff Comment Resolution –

- Section 4.3.6 should be revised to include complete quotations or none at all
- Upcoming edits will align with staff position that applicable analysis for consideration under 10 CFR 50.59 evaluations is not limited to the accident analysis, which aligns with rule language of “evaluated in the FSAR”.

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# “Design Functions” versus “Design Basis Function”

**Key Concept** – Section 4.3.6 appears to focus on malfunctions that affect: (1) “design bases functions” not continuing to be performed and (2) “design functions” that if not performed would initiate a transient or accident that the plant is required to withstand.

**Staff Comment** –

- Appears to exclude design functions that would support or impact the mitigation of a transient or accident.
  - 10 CFR 50.59 is focused on design functions
  - NEI 96-07 revision 1 states that design bases function is a subset of design functions
  - Guidance on 10 CFR 50.59(c)(2)(vi) is based on design functions
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# Continued

## **Staff Comment –**

- Use of safety analysis is potentially non-conservative
- NEI provides definitions of terms that fall within 10 CFR 50.59 Criterion 6, but through specific quotes which may provide an incomplete set of considerations for identifying possible “malfunction of an SSC important to safety”

## **Staff Comment Resolution –**

- Use “design bases functions” to help identify “design functions” or eliminate “design bases functions” from Section 4.3.6. Compare all changes to malfunction results against the results previously evaluated.

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# General Design Criteria (GDCs) versus Final Safety Analysis Report (FSAR)

**Key Concept** – Section 4.3.6 appears to direct the reader that GDCs are the source of design bases functions

**Staff Comment** –

- GDCs are not the only source of design functions or design bases functions
- Focus on GDCs appears non-conservative
- 10 CFR 50.59 requires evaluations against the UFSAR

**Staff Comment Resolution** –

- Upcoming Section 4.3.6 edits will reflect a focus on design functions in the UFSAR and not design basis functions in GDCs

# Redefinition of Credible vs. Using Likelihood Levels

**Key Concept** – Section 4.3.6 expands the definition of credible from “as likely to happen as those described in the UFSAR” to (1) for software CCF, not sufficiently low, and (2) for all other malfunction to “as likely to happen as those described in the UFSAR.”

**Staff Comment** –

- NRC has reservations about redefining terms because it may introduce confusion

**Staff Comment Resolution** –

- It is better to use likelihood level and have two different thresholds for likelihood: (1) credible, and (2) sufficiently low.

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# Use of failure modes and effects analysis (FMEA)s or similar analysis

**Key Concept** – Section 4.3.6 could be understood to focus on the results of certain failures as described in FMEAs only.

**Staff Comment** –

- FMEAs are not the only source of information for descriptions of malfunctions in UFSARs.

**Staff Comment Resolution** –

- Upcoming Section 4.3.6 edits will reflect a focus on inclusion of other types of analysis.
  - Example edit: “FMEA or similar type of analysis” rather than “FMEA”

# Backup Slides

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# Overview of 10 CFR(c)(2)(vi)

10 CFR 59.59 Criterion 6 contains two terms with specific definitions, which in turn contain other terms with specific definitions as follows:

- “*malfunction of an SSC important to safety*” [NEI 96-07, Rev. 1, Definition 3.9]
  - *Design functions* [Defined in the discussion under NEI 96-07, Rev. 1, Definition 3.3]
  - *Design basis function* [Defined in the discussion under NEI 96-07, Rev. 1, Definition 3.3]
  - “support or impact *design bases functions*” [Defined in the discussion under NEI 96-07, Rev. 1, Definition 3.3]
  - *Safety Analyses* [NEI 96-07, Rev. 1, Definition 3.3]
  - “credited in the *safety analyses*” [Defined in discussion under NEI 96-07, Rev. 1, Definition 3.3]
- “*final safety analysis report (as updated)*” [NEI 96-07, Rev. 1, Definition 3.7, and 10 CFR 50.59(a)(4)]

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# Overview of 10 CFR(c)(2)(vi) continued

Based on the 10 CFR 50.59, Criterion 6, regulation wording “a different result” involves the comparison of two sets of results:

- The regulation describes the first set of results as, “Create a possibility for a *malfunction of an SSC important to safety*”
  - Are compared to determine whether there is a “different result than”
- The second set of results described as “any previously evaluated in the *final safety analysis report (as updated)*.”

Key to compliance with 10 CFR 50.59, Criterion 6 is applying all considerations in the entire definition of all defined terms.