

Attachment 1

Summary of Risk-Informed Alternatives

	BASELINE ALTERNATIVE (Current Approach): Retain Current SFC	ALTERNATIVE 1: Risk-Inform Application of SFC to DBA Analysis	ALTERNATIVE 2: Risk-Inform Application of SFC Based on Safety Significance	ALTERNATIVE 3: Replace SFC with Risk and Safety Function Reliability Guidelines
Rationale for the Alternative	The intent of the SFC, in part, is to promote high reliability of safety-related systems, and provide adequate safety margin in the event of a single failure of the safety system in response to a design-basis event. Specific licensing issues relating to the SFC arise periodically, providing the opportunity to reconsider application of the SFC from a risk-informed point of view.	Safety-insignificant single-failure event sequences are sometimes included in a plant's design basis, while some safety-significant multiple-failure sequences are not included. Alternative would risk-inform the selection of single-failure event sequences used in DBA analysis.	The intent of the SFC, in part, is to promote high safety-related system reliability. However, the SFC is sometimes not applied in a manner that is commensurate with the safety significance of the system. This alternative would risk-inform application of the SFC based on the safety significance of the system.	The intent of the SFC, in part, is to promote high safety-related system reliability. However, the SFC is sometimes not applied in a manner that is commensurate with the safety significance of the system. This alternative would replace the current SFC with functional reliability targets that relate to top-level risk targets.
Risk-Informed Approach	<p>This alternative would risk-inform the regulatory framework by refining the scope of application of the SFC in selected areas. While the current regulatory structure for implementation of the SFC would not be altered, the staff will consider risk-informing the current SFC in the context of specific licensing issues as they arise (e.g., LBLOCA redefinition). The staff could also consider aspects of Alternatives 1–3 for application to a particular issue.</p> <p>The staff would also develop a position on single passive failures in fluid systems to replace the footnote that currently appears in the definitions in Appendix A to 10 CFR Part 50.</p>	<p>This alternative would risk-inform the event sequences postulated in DBA analysis:</p> <ol style="list-style-type: none"> (1) Permit removal of sufficiently unlikely, non-risk-significant single-failure sequences from the design basis. (2) Require addition of multiple failure event sequences to the design basis when the frequency of multiple failure event sequences exceeds that of any single-failure sequence postulated for the same initiating event. <p>The staff would also establish quantitative frequency criteria for addition and removal of event sequences to/from the design basis.</p>	<p>This alternative would risk-inform SFC application, such that system reliability would be commensurate with safety significance. System categorization would be consistent with 10 CFR 50.69. Approaches are identified for relaxing the level of defense-in-depth required for systems of low safety significance:</p> <ol style="list-style-type: none"> (1) Alternative 2a proposes that redundant safety-related trains may be removed from service. The system would then comprise a single train. (2) Alternative 2b proposes that one train would remain safety-related, but the redundant trains could be reclassified as non-safety-related. (3) Alternative 2c proposes that all trains would remain safety-related, and the regulatory requirements for one would remain the same, but operational flexibility could be provided for redundant trains. 	<p>This alternative would replace the current SFC with a combination of quantitative targets and guidance:</p> <ol style="list-style-type: none"> (1) top-level risk targets for CDF and LERF (2) lower-level functional reliability targets commensurate with challenge frequency (3) guidance for redundancy, diversity, and CCF <p>Licenseses would determine which plant features to credit to address the targets, and how much credit to take for those features.</p>

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Implementation Approach	<p><u>Initial Licensing Changes:</u> The staff would identify a regulatory issue that could involve some aspect of the SFC (e.g., system reliability or DBA analysis margins). Licensees would submit appropriate information in accordance with the revised requirements. The staff would develop a position on passive failures in fluid systems (considering industry standards), and work that position through the rulemaking process.</p> <p><u>Performance Monitoring:</u> The staff would consider performance monitoring requirements, as appropriate, for changes in SFC requirements. These requirements could include approaches that are currently being used or developed in the ROP, or augmented approaches for the particular issue if new targets or goals are developed.</p>	<p><u>Initial Licensing Changes:</u> The staff would issue new guidance for modifying the DBA analysis. Licensees would delineate all possible single- and multiple-event sequences and, on the basis of event sequence frequency, would propose which single-failure paths are to be removed and which multiple-failure paths are to be added to the current design basis. Plant changes proposed on the basis of Alternative 1, if any, would be reviewed based on the guidance in RG 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis."</p> <p><u>Performance Monitoring:</u> This alternative would require monitoring of industry data related to the frequency of rare initiating events (such as large pipe breaks), as well as periodic revision of expert judgment regarding these frequencies. Plant-specific monitoring programs would be adapted as appropriate to verify PRA models and data used for DBA selection.</p>	<p><u>Initial Licensing Changes:</u> The staff would develop a new regulation, which could take the form of an expanded version of 10 CFR 50.69 and would include an approach to risk-inform the SFC. The GDCs that relate to the SFC may also have to be modified. Licensees would use a high-quality PRA of their plants, and could make physical or operational changes to the plants' systems as long as the changes meet the guidelines specified in RG 1.174.</p> <p><u>Performance Monitoring:</u> This alternative would require monitoring of system reliability for safety-significant systems (RISC-1 and RISC-2). Systems of low safety significance (RISC-3) would require monitoring, implemented appropriately for the three approaches for relaxing the level of defense-in-depth.</p>	<p><u>Initial Licensing Changes:</u> The staff would replace or alter the current regulations., and define the top-level CDF and LERF measures. Licensees would develop functional unreliability targets to meet the top-level targets, and would establish train-level reliability targets. Licensees would also establish redundancy and diversity targets, along with heightened treatment for SSCs performing those functions without benefit of the target redundancy. Licensee changes proposed on the basis of Alternative 3 would be reviewed based on the guidance in RG 1.174.</p> <p><u>Performance Monitoring:</u> Monitoring would confirm that assigned performance targets are actually met.</p>