

Leveraging Risk Insights in 10 CFR 50.59 Evaluations

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PROPOSAL



- The evaluation approach developed for the Risk Informed Process for Evaluations (RIPE) could be used by licensees to independently evaluate 10 CFR 50.59 criteria (i) & (ii) (and potentially others) by applying risk insights to determine if a proposed change results in a “more than minimal” increase.

GENESIS



- NRC and Industry interests aligned on the expansion of the use of risk insights to modernize and optimize regulatory processes
- Two of these efforts included the development of RIPE and discussions on the use of risk insights in 10 CFR 50.59 (50.59, hereafter) evaluations



ACTIONS TAKEN

- NEI developed a focus team & NRC developed an agency-wide working group
- A series of public meeting occurred in 2020 to share ideas on how risk insights may be better employed during 50.59 evaluations.
- NRC agreed with NEI's assessment that opportunities exist to better apply risk insights as they relate to 50.59 (c)(2) criteria (i) & (ii).
 - (i) Result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the final safety analysis report (as updated)
 - (ii) Result in more than a minimal increase in the likelihood of occurrence of a malfunction of a structure, system, or component (SSC) important to safety previously evaluated in the final safety analysis report (as updated)



ACTIONS TAKEN

- NRC working group issued IMC-0335, Changes, Tests and Experiments effective February 2021
 - Considered comments from NEI & public stakeholders
 - Provides guidance for inspectors on how PRA & risk insights may be used during a 50.59 evaluation
 - Δ CDF and/or Δ LERF values in RG 1.174 should not be used as basis for 50.59 evaluations
 - Each criterion must be satisfied on its own
 - It is acceptable for licensees to use reasonable engineering practices, engineering judgement, and PRA techniques, as appropriate, to inform 10 CFR 50.59 evaluations with respect to “more than a minimal increase.”



ACTIONS TAKEN

- NEI focus team reinforced that NEI 96-07 Rev. 1 quantitative examples provided for criteria (i) & (ii) were for illustrative purposes only. Other criteria could be used to assist in determining the “more than minimal increase” threshold.
 - Criterion (i) - Example 3: The change in frequency of occurrence of an accident is calculated to support the evaluation of the proposed activity, and one of the following criteria are met:
 - The increase in the pre-change accident or transient frequency does not exceed 10 percent or;
 - The resultant frequency of occurrence remains below 1E-6 per year or applicable plant-specific threshold.
 - Criterion (ii) - Example 8: The change in likelihood of occurrence of a malfunction is calculated in support of the evaluation and increases by more than a factor of two. Note: The factor of two should be applied at the component level.

ACTIONS TAKEN

- During the December 1, 2020, public meeting, the industry presented information on the status of the initiative to incorporate risk insights into 50.59 evaluations

- In particular, this presentation included the desire and efforts to:
 - Clarify the use of “more than minimal” as it pertains to 50.59 evaluations (*Focus Area 1*)

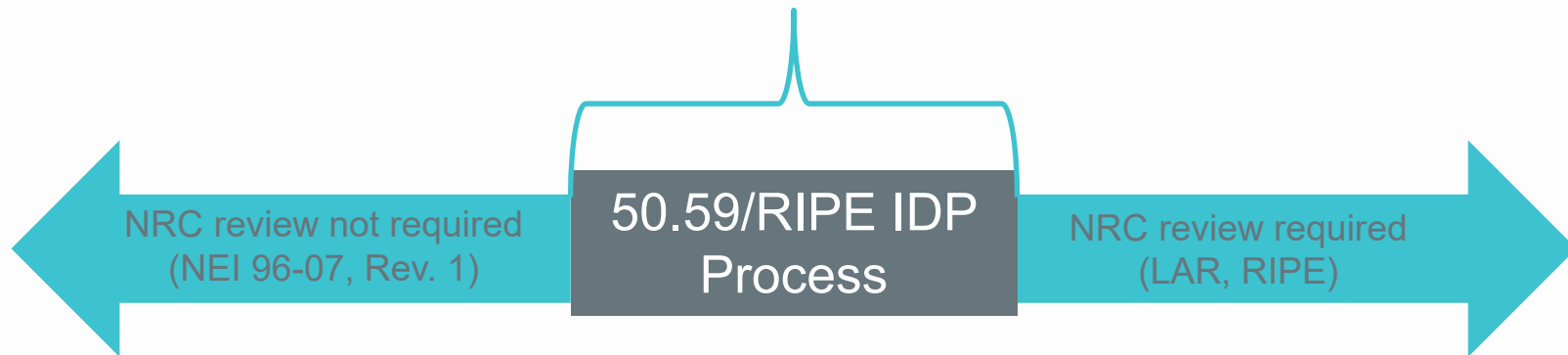
 - Provide other reasonable approaches to make this determination using available risk insights



PROPOSAL

- In January 2021, NRC issued the Risk-Informed Process for Evaluations (RIPE).
 - It provides general guidance on characterizing the safety impact of proposed changes in plant design and operation that have a minimal impact on safety.
 - Its use is limited to proposed changes for which the safety impact can be modeled using probabilistic risk assessment (PRA).
 - This process can be used by licensees that have a technically acceptable PRA and have established an integrated decision-making panel (IDP).
- As made evident by the RIPE screening questions, there is a strong correlation between 50.59 and RIPE.
- A similar approach could be utilized in 50.59 evaluations when determining if a proposed change has a “more than minimal” increase in the frequency of occurrence of an accident (criterion i) or increase in the likelihood of occurrence of a malfunction of an SSC important to safety (criterion ii).

CONTINUUM OF CHANGES





EXAMPLE 1

- A proposed change at the facility is being evaluated through the 50.59 process.
 - For criterion (i), it is determined that the accident frequency due to the proposed change increased from once per 90 years to 1.12 times per 90 years (remains within the infrequent incident accident category).
 - NEI 96-07 Rev. 1 would require criterion (i) to be answered “yes” as a more than minimal increase in the frequency of an accident based on a greater than 10% increase (12%) even though the assumptions in the licensing bases for this accident category was unchanged (infrequent incidents).
 - By applying criteria similar to RIPE, a plant that has an eligible IDP could assess the impact of the proposed change to determine if it has a minimal impact. This would be used as a factor into the determination if criterion (i) could be answered “no” with proper documentation.



EXAMPLE 2

- A proposed change at the facility is being evaluated through the 50.59 process.
 - For criterion (ii), it is determined that a proposed modification to replace an obsolete component has a higher failure rate (1 failure per 100,000 operating cycles) than the original component (1 failure per 250,000 operating cycles) but provides better overall predictive testing and monitoring and addresses observed age-related degradation.
 - NEI 96-07 Rev. 1 would require criterion (ii) to be answered “yes” as a more than minimal increase in the likelihood of occurrence of a malfunction of an SSC important to safety due to an increase in failure rate of greater than a factor of 2 (2.5 times) even though there are many other benefits to this modification.
 - By applying criteria similar to RIPE, a plant that has an eligible IDP could assess the impact of the proposed change to determine if it has a minimal impact. This would be factored into the determination if criterion (ii) could be answered “no” with proper documentation.



CONCLUSION

- The evaluation approach developed for RIPE could be used by licensees to independently evaluate 50.59 criteria (i) & (ii) by applying risk insights into the evaluation process when determining a “more than minimal” increase.
- This approach needs to be consistent with the NRC staff’s interpretation of the 1999 SOCs for the final 50.59 rule and not conflict with the guidance provide to inspectors in IMC-0335 on the use of PRA and risk insights.
- There may be room to expand this concept beyond criteria (i) & (ii) to evaluate facility changes made to address issues of low safety significance.



NEXT STEPS

- Receive feedback on the viability of the concept
- Continue dialogue with NRC staff on areas of key interest or concern
- Develop guidance document