



NUCLEAR ENERGY INSTITUTE

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Ms. Annette L. Vietti-Cook
Secretary
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
Attn: Rulemaking and Adjudications Staff

OFFICE OF SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

Project Number: 689

Subject: Industry Comments on Supplemental Proposed Rule 10 CFR Part 50 RIN 3150-AH29, Risk-Informed Changes to Loss-of-Coolant Accident Technical Requirements.

Dear Ms. Vietti-Cook:

The Nuclear Energy Institute (NEI)¹ appreciates the opportunity to comment on the subject proposed rule. Over a decade of research and effort has been expended attempting to produce a revision to the design basis loss-of-coolant accident requirements. We continue to believe this concept provides safety benefits through more safety focused plant operation, and improved alignment with the risk-informed reactor oversight process. The proposed rule is an enabling rule, and NRC would review and approve the proposed implementation of the revised break size prior to granting the licensee the ability to make changes to the plant. While we believe some revisions to the proposed rule are necessary to achieve an implementable approach, we also believe it is important for NRC to codify the concept of a risk-informed break size. The promulgation of a final rule will demonstrate NRC's continuing commitment to risk-informed performance-based methods and provides a platform for enhanced regulatory stability in the future.

The most recent draft of the proposed rule includes some improvements that are responsive to industry's previous comments, and enhance the potential for beneficial implementation. Examples of improvements include:

¹ NEI is the organization responsible for establishing unified nuclear industry policy on matters affecting the nuclear energy industry, including the regulatory aspects of generic operational and technical issues. NEI's members include all utilities licensed to operate commercial nuclear power plants in the United States, nuclear plant designers, major architect/engineering firms, fuel fabrication facilities, materials licensees, and other organizations and individuals involved in the nuclear energy industry.

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- Treatment of mitigation capability for beyond transition break size (TBS) breaks has been made more practical and somewhat consistent with current regulatory treatment for unavailability of similar mitigation equipment
- Reduction of the scope of changes subject to the risk-informed evaluation process to those changes enabled by the rule.

However, many aspects of implementation of the rule as written remain unduly burdensome, and it is unlikely to be adopted at any plants unless further revisions are made. Specifically:

- The overly conservative transition break size (TBS) greatly reduces the potential benefits of implementation of the rule. This is particularly true for boiling water reactors.
- Potential future NRC redefinitions of the TBS are excluded from the provisions of 10 CFR 50.109 (Backfit Rule). It is not clear why this unique exception is made, and it does not support regulatory certainty for licensees who may otherwise consider implementing the rule.

Attachment 1 includes detailed comments on these and other aspects of the proposed rule that should be further revised to improve the usability of the rule once final. Additionally, Attachment 2 gives industry feedback on specific topics that the NRC identified for public comment. We also believe comments submitted by the Pressurized Water Reactor Owners Group should be given careful consideration, given their longstanding substantial commitment to this rulemaking effort.

We hope that these attachments include content that is helpful to the NRC in arriving at a beneficial and implementable final rule. If you have any questions or require any additional assistance, please feel free to contact me at 202.739.8083, reb@nei.org or Victoria Anderson at 202.739.8101; vka@nei.org.

Sincerely,



Biff Bradley

Attachments

c: Mr. Richard F. Dudley, NRR/DPR/PFPB, NRC
Mr. Robert L. Tregoning, RES/DE, NRC
NRC Document Control Desk

NEI Comments on Revised Proposed Rule 50.46a

Transition break size (TBS): The TBS as defined in paragraph (a)(5) of the draft proposed rule remains unchanged from the previous draft of the proposed rule, and remains overly conservative. Without revision to the definition of the TBS, it is unlikely that licensees will pursue this rule, which will preclude realization of the potential safety benefits that could be supported by implementation of this rule. The industry reiterates the suggestion that the TBS be redefined as follows:

- For boiling water reactors, the TBS should be equivalent to 16 inch schedule 80 piping in the shutdown cooling suction line inside containment.
- For pressurized water reactors (PWRs) with large piping connected to both the hot and cold legs, the TBS for the hot leg should be based on the largest connecting pipe on the hot leg, and the TBS for the cold leg should be based on the largest connecting pipe on the cold leg. For PWRs with no large piping connected to the cold legs, it should be acceptable to use the above TBS for the hot leg for both hot and cold legs.

Exclusion of changes to TBS from backfit evaluation: The industry maintains that the provision exempting changes to the TBS from backfit evaluation as currently written in draft proposed 50.109(b)(2) should be deleted, as the NRC has not sufficiently justified departure from this part of the regulatory process. The backfit rule should apply to all aspects of 50.46a, as it ensures that an appropriate safety focus is maintained and does not dilute licensee and NRC attention and resources unnecessarily. Any subsequent changes to the TBS should be accomplished by rulemaking, and 50.109 should apply as it does today.

Restrictions regarding capability for mitigation of breaks larger than TBS: In paragraph (d)(5), the revised proposed rule has been improved in that plants implementing 50.46a would be able to spend a limited amount time at-power while in a configuration in which the ability to mitigate breaks larger than the TBS has not been demonstrated. This provision would permit licensees to operate in such a configuration for no more than a total of 14 days in any 12-month period, and is a marked improvement over the previous draft of the proposed rule in which at-power operation in such a configuration was not permitted for any period of time. However, the prescriptive time restriction remains problematic for several reasons:

- Codification of such a restriction does not allow plants to take into account specific considerations regarding such an operating configuration in determining the amount of time for which such operations could reasonably be conducted. There is no technical reason to treat changes enabled by 50.46a differently from any other risk-informed technical specification change or allowed outage time.
- As the industry stated in comments on the previous draft of the proposed rule, existing technical specifications control the initial conditions for equipment credited in the safety analyses of design bases events. Breaks larger than the TBS are still considered large break loss-of-coolant accidents (LOCAs), and all of the mitigation equipment remains in the technical specifications. The allowed outage times for that equipment do not change as a

result of this rulemaking. This equipment will also continue to provide mitigation for breaks larger than the TBS. Thus, it follows that the existing operational restrictions on this equipment, which are based on the more conservative traditional emergency core cooling systems (ECCS) analyses, are more than sufficient to provide reasonable assurance that the same equipment can mitigate breaks larger than the TBS, as analyzed in the reasonably conservative mitigating analysis.

- The industry previously noted that such restrictions are redundant to 50.65(a)(4), which already requires licensees to assess and manage operating configuration risk when equipment is removed from service. This requirement covers beyond design basis/severe accident risk for all modes of plant operation.

Acceptance guidelines for changes in risk: It is not appropriate for a risk-informed rule to conflict with Regulatory Guide (RG) 1.174 guidance for the acceptability of changes in risk associated with risk-informed, performance-based regulatory changes. However, the language in paragraphs (f)(1)(ii) and (f)(2)(ii) of the draft proposed rule departs from RG 1.174 in stating that changes in core damage frequency (CDF) and large early release frequency (LERF) may not exceed the "very small" threshold regardless of the total plant CDF or LERF. This language should be revised to achieve consistency with RG 1.174, given that it is the umbrella guidance document for all risk-informed licensing basis changes. Additionally, paragraph (f)(1)(ii) uses the term "minimal" in reference to increases in estimated risk; however, the term "minimal" is not defined in the draft rule or RG 1.174. This term should be defined if it is to be used in the final version of the rule.

Reporting of changes resulting in no more than minimal risk increase: The revised proposed rule states that prior NRC review is not required for individual facility changes that cause no more than a minimal increase in risk. However, the revised proposed rule still states that every 24 months, the licensees implementing 50.46a must report all such changes made under 50.46a(f)(1) without prior NRC review. As noted in NEI's comments on the previous draft of the proposed rule, 10 CFR 50.59 already requires licensees to submit a report to the NRC at least every 24 months that summarizes the changes that were made that did not require a license amendment. The approach of 50.59 is sufficient for this purpose and is more resource effective for industry and NRC.

Expectations for Probabilistic risk assessment (PRA) scope: In commenting on the prior draft of the proposed rule, NEI noted that the rule appeared to require that the licensee justify sufficiency of use of a PRA that did not address all modes and all initiators. However, no changes were made in the draft revised proposed rule, and the industry reiterates that some initiators and modes of operation are not significant to the implementation of this rule, and could be identified in advance in paragraph (f)(4)(iv) of the draft proposed rule to enhance regulatory clarity.

PRA maintenance and upgrade: Paragraph (d)(4) states that the licensee shall complete maintenance and upgrade of the PRA in a timely manner, but not less often than once every two refueling cycles. While the industry agrees that a robust PRA maintenance and upgrade process is an integral component of implementation of this application, requiring a specific periodicity for maintenance and upgrade will not enhance PRA technical adequacy beyond the approach of the American Nuclear Society (ANS)/American Society of Mechanical Engineers (ASME) PRA Standard. In practice, utilities implement a maintenance and upgrade program that ensures that the PRA reflects the as-built, as-operated plant. Such programs are assessed as part of the peer review process associated with the ANS/ASME PRA Standard. The industry suggests that paragraph (d)(4) be revised to require that licensees implement a maintenance and upgrade process that is consistent with section 1-5, PRA Configuration Control, of the ANS/ASME PRA Standard and ensures that the PRA continues to reflect the as-built, as-operated plant.

Evaluation of cumulative effect on risk: In the draft proposed rule, the NRC has stated in paragraph (f)(2)(iv) that the cumulative change in risk be evaluated for each change enabled by 50.46a. Such an evaluation is unnecessary and is an inefficient use of NRC and licensee resources. The NRC's rationale for retaining this requirement is that it is necessary to ensure that risk increases greater than that intended to be allowed by the Commission are not made; however, many other risk-informed applications have been implemented with no such requirement, and experience has demonstrated that this issue has not arisen. As stated in NEI's comments on the previous draft of the proposed rule, an alternative, less burdensome, approach would be to rely on the routine maintenance and updates of the plant-specific PRA, which would demonstrate the effectiveness of the licensee's risk management of the plant configuration.

Plant-specific assessment of effect of seismically-induced breaks: In commenting on the previous draft of the revised proposed rule, NEI noted that plant-specific assessments should not be required to demonstrate that the seismically induced pipe breaks do not significantly affect the likelihood of pipe breaks larger than the TBS and cited EPRI studies that demonstrated the negligible contribution of the indirect seismically-induced LOCA risk. In paragraph (3)(c)(i), the draft proposed rule retains the requirement for such a plant specific assessment, and the industry reiterates that such an assessment is not necessary given the negligible contribution to the overall LOCA frequency.

ECCS analysis methods: In the revised proposed rule, the NRC has retained the requirement in paragraph (e)(2) that evaluations of ECCS cooling performance for LOCAs larger than the TBS must utilize comparisons to applicable experimental data. As stated in NEI's comments on the previous draft of the proposed rule, other approaches, such as comparison of results to accepted analysis techniques or to text book approaches, are also appropriate. The "sufficient justification" clause allows for a demonstration of the calculation approach that is appropriate to the importance of the phenomena without the specific requirement to benchmark data.

NEI Feedback on Specific Topics Identified for Public Comment

1. Although the revised proposed rule would permit licensees to make plant changes that result in very small risk increases, the NRC is requesting stakeholder comments on whether the rule should allow plant changes that increase risk at all. Instead of the risk acceptance criteria allowing very small risk increases, should the risk acceptance criteria in final rule require that the net effect of plant changes made under § 50.46a be risk neutral or risk beneficial?

NEI believes that the final rule should be consistent with other risk-informed regulatory applications; that is, plant changes that are consistent with the Commission's PRA policy statement, including those that result in very small calculated risk increases such that the safety goals are still met, should be permitted. A provision preventing any increase in calculated risk as a result of plant changes would be inconsistent with the PRA policy statement and should not be included in the final rule.

2. Because of the difference in the risk acceptance criteria metrics used for currently operating reactors (LERF) and new reactors (LRF), the NRC is seeking public comments on whether LRF should be the metric of concern in lieu of LERF for new reactor applicants (or licensees) implementing the § 50.46a alternative ECCS requirements. Because the LRF goal for new reactors is a decade lower than the 10^{-5} per reactor year LERF reference value above which a facility would be limited to very small increases, should the definition of what constitutes "very small increase" and "minimal increase" for LRF (for new reactors) be a full decade lower than those defined for LERF (for existing reactors) or should the definition be based on *relative* change in LRF?

NEI notes that extensive NRC and industry efforts regarding treatment of risk metrics for reactors licensed under 10 CFR Part 52 have been underway for over a year, and believes that such decisions as specific to 50.46a should be deferred until after the completion of these efforts.

3. In § 50.46a(e)(4)(i) of the revised proposed rule the NRC proposes coolable core geometry as a high level performance-based ECCS analysis acceptance criterion for beyond-TBS LOCAs. Applicants would be allowed to justify appropriate metrics to demonstrate coolable geometry or use the current metrics (2200 °F PCT and 17 percent MLO). However, the NRC acknowledges that it would be expensive and time-consuming for industry to develop the necessary experimental and analytical data to justify alternative acceptance criteria as a surrogate for demonstrating coolable geometry. Because of the difficulty in demonstrating alternative metrics, the NRC is requesting stakeholder comments on whether the final § 50.46a rule should retain the coolable geometry criterion for beyond-TBS breaks. Retaining coolable geometry would give licensees the option to demonstrate alternative coolable geometry metrics or use the current metric (2200 °F PCT and 17 percent MLO). If the NRC removed the coolable

geometry criterion, the beyond-TBS acceptance criteria would be the same as the acceptance criteria for TBS and smaller breaks (2200 °F PCT and 17 percent MLO).

NEI believes that the coolable geometry criterion for beyond-TBS breaks should be retained in the final rule, as this gives applicants additional flexibility and increases the chances that a licensee could find implementation of this rule to be beneficial. As the surrogate demonstration would be an option, not a requirement, NEI requests that the coolable geometry requirement be retained.

Rulemaking Comments

From: BELL, Denise [dxb@nei.org] on behalf of BRADLEY, Biff [reb@nei.org]
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Subject: Comments on Supplemental Proposed Rule 10 CFR Part 50 RIN 3150-AH29
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