

Rulemaking to Make Risk-Informed Changes to Loss-of Coolant Accident Technical Requirements; 10 CFR 50.46a, "Alternative Acceptance Criteria for Emergency Core Cooling Systems for Light Water Nuclear Power Reactors"

Lead Office/Division: NRR/DPR
Supporting Offices/Divisions: RES/DFERR; NRR/DRA

Description

On July 29, 2005, in response to SECY-05-0052, "Proposed Rulemaking for 'Risk-Informed Changes to Loss-of-Coolant Accident Technical Requirements,'" the Commission directed the U.S. Nuclear Regulatory Commission (NRC) staff to publish for public comment a proposed rule adding a new Section 50.46a, "Alternative Acceptance Criteria for Emergency Core Cooling Systems for Light-Water Nuclear Power Reactors" to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities" to provide an alternative, risk-informed set of requirements for emergency core cooling systems (ECCS).

Current light-water reactor licensees could voluntarily adopt these requirements, which are intended to give licensees additional flexibility to change the designs of reactor ECCS. The proposed rule divides the current spectrum of LOCA break sizes into two regions. The division between the two regions is determined by a "transition" break size (TBS). The first region includes small breaks up to and including the TBS. The second region includes breaks larger than the TBS, up to and including the double-ended guillotine break of the largest reactor coolant system pipe. Pipe breaks in the smaller break size region are considered more likely than pipe breaks in the larger break size region. Consequently, each region is subject to ECCS requirements commensurate with the relative likelihood of breaks in that region. LOCAs in the smaller break size region will continue to be considered "design basis accidents" and will be analyzed by current design basis accident methods, assumptions, and acceptance criteria. LOCAs in the larger break size region must also be mitigated, but they may be analyzed with more realistic analytical methods and initial conditions without postulating the loss of offsite power or the worst case single failure.

The staff published the proposed rule in the Federal Register on November 7, 2005 (70 FR 67598). The public comment period ended on March 8, 2006. The staff held two public stakeholder meetings to provide for enhanced public participation on this rulemaking. As a result of these interactions, the staff made changes to the draft rule language with the objective of reducing burden on licensees while maintaining adequate protection of public health and safety.

On October 16, 2006, the staff sent draft final rule language for risk-informing 10 CFR 50.46 and the draft Federal Register notice for the final rule to the ACRS for review. The staff met to discuss the rule with the ACRS subcommittee on October 31 and with the full committee on November 1, 2006. After these meetings the ACRS issued its letter dated November 16, 2006. The ACRS letter recommended that the draft final 10 CFR 50.46a rule not be issued in its current form.

The staff issued SECY 07-0082 (<http://www.nrc.gov/reading-rm/doc-collections/commission/secys/2007/secy2007-0082/2007-0082scy.pdf>) on March 16, 2007. The SECY informed the Commission of the impacts of the ACRS recommendations on the draft final rule, sought Commission clarification on its direction regarding defense-in-depth considerations for beyond transition break size LOCAs, and sought a decision on the staff's recommended option for proceeding with the rule.

The Commission issued its SRM on SECY-07-0082 (<http://www.nrc.gov/reading-rm/doc-collections/commission/srm/2007/2007-0082srm.pdf>) on August 10, 2007. The SRM directed the staff to address the ACRS issues and provided additional Commission guidance. As the staff modified the rule in response to the ACRS recommendations and the Commission's direction, the staff made many substantive changes to the requirements. After considering the extent of these changes, the NRC decided to provide an additional opportunity for public stakeholders to review and submit comments on the revised rule language. The NRC published the supplemental proposed rule on August 10, 2009 (74 FR 40006). On August 18, 2009, NEI requested a 120-day extension to the public comment period, which the NRC granted extending the comment period for all stakeholders until January 22, 2010. The NRC evaluated public comments received on the supplemental proposed rule and prepared a draft final rule which was made publicly available on May 12, 2010, and posted on www.regulations.gov. The NRC held a public meeting on June 4, 2010, to discuss resolution of public comments and the draft final rule language with stakeholders. The NRC then prepared the final rule.

The staff met to discuss the draft final rule with the ACRS subcommittee on September 22, 2010, and the ACRS full committee on October 7, 2010. After these meetings the ACRS issued its letter dated October 20, 2010. The ACRS letter concluded that the draft final rule provides an acceptable risk-informed alternative to the current 10 CFR 50.46a for operating reactors but that it is premature to extend the proposed Rule to new reactors. The ACRS recommended that, if the NRC staff decided to include new reactors in the final rule, provisions to preclude a significant decrease in the level of safety provided by the new design be included. The staff issued SECY-10-0161, "Final Rule: Risk-Informed Changes to Loss-of-Coolant Accident Technical Requirements (10 CFR 50.46a)," on December 10, 2010 which included the requirement that new reactors justify the allowable time for operating in configurations without a demonstrated capability to mitigate beyond-TBS pipe breaks to preclude a significant decrease in the level of safety provided by the new design. The SECY further clarified that if, in response to the staff's policy paper, SECY-10-0121, "Modifying the Risk-Informed Regulatory Guidance for New Reactors," dated September 14, 2010, the Commission directs the staff to promulgate guidance that describes new metrics to be used for new reactors, the staff will also make appropriate conforming changes to § 50.46a by rulemaking. The SRM on SECY-10-0121 was issued on March 2, 2011, and directed the staff to engage with external stakeholders and test the applicability of current risk-informed guidance to new reactors. This engagement is ongoing and no changes to the draft final § 50.46a rule have been proposed.

Completed Milestones

- Complete expert elicitation for new LOCA frequencies (12/2004)
- Issue SECY 05-0052 forwarding proposed rule defining alternative risk-informed option ECCS evaluation criteria and risk-informed acceptance criteria for associated plant design and operational changes (03/2005)
- Issue draft NUREG report on expert elicitation results for LOCA frequencies for comment (06/2005)
- Issue proposed rule on risk-informing 50.46 for public comment (11/2005)
- Provide draft final rule to ACRS for review (10/16/2006)
- Meet with ARCS (11/2006)
- ACRS letter recommending changes be made to the Rule (11/16/2006)
- Issue SECY 07-0082 forwarding proposed resolution of ACRS recommendations to the Commission (5/16/2007)
- SRM on SECY 07-0082 (8/10/2007)
- Note to the Commission providing Plans And Schedule For The Rulemaking On Risk-informed Changes To Loss-Of-Coolant Accident Technical Requirements (04/01/2008)

- NUREG-1829, Estimating Loss-of-Coolant Accident (LOCA) Frequencies Through the Elicitation Process published (04/2008)
- ACRS letter concluding that draft final rule provides an acceptable risk-informed alternative to the current 10CFR50.46(a) for operating reactors (10/2010)
- Issue SECY-10-0161, forwarding proposed final rule: Risk-Informed Changes to Loss-of-Coolant Accident Technical Requirements (10 CFR 50.46a) (12/10/2010).

Future Milestones

Selected Major Milestones and Schedules				
Major Milestones	Original Target Date	Revised Date	Completion Date	NRC Responsibility
Provide final rule on 50.46a to Commission for approval	October 2006	December 2010	December 2010	NRR/DPR
Provide a regulatory guide on 50.46a implementation	December 2006	TBD		NRR/DSS