[7590-01-P]

NUCLEAR REGULATORY COMMISSION

[NRC-2025-0149]

Draft Interim Staff Guidance: Treatment of Certain Loss-of-Coolant Accident Locations as Beyond-Design-Basis Accidents

AGENCY: Nuclear Regulatory Commission.

ACTION: Draft guidance; request for comment.

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC) is soliciting public comment on its draft Interim Staff Guidance (ISG), DSS-ISG-XX, "Treatment of Certain Loss-of-Coolant Accident Locations as Beyond-Design-Basis Accidents." The purpose of the ISG is to communicate the key safety principles that would enable the NRC staff to determine that certain break locations that would normally be analyzed as design-basis loss-of-coolant accidents (LOCAs) for light-water reactors can be treated as beyond-design-basis accidents.

DATES: Submit comments by **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]**. Comments received after this date will be considered if it is practical to do so, but the Commission is able to ensure consideration only for comments received before this date.

ADDRESSES: You may submit comments by any of the following methods; however, the NRC encourages electronic comment submission through the **Federal rulemaking website**:

- **Federal rulemaking website:** Go to https://www.regulations.gov and search for Docket ID **NRC-2025-0149**. Address questions about Docket IDs in Regulations.gov to Bridget Curran; telephone: 301-415-1003; email: Bridget.Curran@nrc.gov. For technical questions, contact the individuals listed in the "For Further Information Contact" section of this document.

- **Mail comments to:** Office of Administration, Mail Stop: TWFN-7-A60M, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, ATTN: Program Management, Announcements and Editing Staff.

For additional direction on obtaining information and submitting comments, see "Obtaining Information and Submitting Comments" in the SUPPLEMENTARY INFORMATION section of this document.

FOR FURTHER INFORMATION CONTACT: Carolyn Lauron, telephone: 301-415-2736; email: Carolyn.Lauron@nrc.gov or Vic Cusumano, telephone: 301-415-4011; email: Victor.Cusumano@nrc.gov, both in the Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

SUPPLEMENTARY INFORMATION:

I. Obtaining Information and Submitting Comments

A. Obtaining Information

Please refer to Docket ID **NRC-2025-0149** when contacting the NRC about the availability of information for this action. You may obtain publicly available information related to this action by any of the following methods:

- **Federal Rulemaking Website:** Go to https://www.regulations.gov and search for Docket ID **NRC-2025-0149.**
- **NRC's Agencywide Documents Access and Management System (ADAMS):** You may obtain publicly available documents online in the ADAMS Public Documents collection at https://www.nrc.gov/reading-rm/adams.html. To begin the search, select "Begin Web-based ADAMS Search." For problems with ADAMS, please contact the NRC's Public Document Room (PDR) reference staff at 1-800-397-4209, at 301-415-4737, or by email to PDR.Resource@nrc.gov. The draft ISG for the "Treatment of Certain Loss-of-Coolant Accident Locations as Beyond-Design-Basis Accidents" is available in ADAMS under Accession No. ML25043A335.
- **NRC's PDR:** The PDR, where you may examine and order copies of publicly available documents, is open by appointment. To make an appointment to visit the PDR,

please send an email to PDR.Resource@nrc.gov or call 1-800-397-4209 or 301-415-4737, between 8 a.m. and 4 p.m. eastern time (ET), Monday through Friday, except Federal holidays.

B. Submitting Comments

The NRC encourages electronic comment submission through the **Federal rulemaking website** (https://www.regulations.gov). Please include Docket ID **NRC-2025-0149** in your comment submission.

The NRC cautions you not to include identifying or contact information that you do not want to be publicly disclosed in your comment submission. The NRC will post all comment submissions at https://www.regulations.gov as well as enter the comment submissions into ADAMS. The NRC does not routinely edit comment submissions to remove identifying or contact information.

If you are requesting or aggregating comments from other persons for submission to the NRC, then you should inform those persons not to include identifying or contact information that they do not want to be publicly disclosed in their comment submission. Your request should state that the NRC does not routinely edit comment submissions to remove such information before making the comment submissions available to the public or entering the comment into ADAMS.

II. Background

The emergency core cooling system (ECCS) performance requirements in section 50.46 of title 10 of the *Code of Federal Regulations* (10 CFR), "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors," assume as their starting point that a LOCA has occurred. Such an approach is called "non-mechanistic" and presumes reactor coolant pressure boundary rupture without regard to cause. Mechanistic (i.e., based on physical processes or phenomena)

rationales for determining that certain LOCAs are unlikely to occur have generally not been accepted.

The NRC, however, has accepted mechanistic rationales for dispositioning certain phenomena for limited purposes. For example, the dynamic effects of pipe ruptures can be excluded from consideration in the design bases under 10 CFR part 50, Appendix A, “General Design Criteria [(GDC)] for Nuclear Power Plants,” GDC 4 if certain conditions are met. Specifically, the NRC needs to review and approve analyses that demonstrate that the probability of fluid system piping rupture is “extremely low” under conditions consistent with the design basis for the piping. The determination that the probability of pipe ruptures is extremely low under GDC 4 is only for the analysis of dynamic effects and does not apply to the design-basis LOCA spectrum usually used to calculate ECCS or containment performance, among other aspects of system, structure, or component design. The NRC has nonetheless begun considering other aspects of reactor design for which engineering analysis methods have developed to a point that mechanistic considerations may be employed to exclude some LOCAs from the design basis while continuing to maintain high level of probability that the emergency core cooling function will be accomplished. Other design-basis analyses that depend on the results of ECCS analyses may also be affected by this approach. Further, the NRC has begun rulemaking efforts to apply relaxed analytical methods to certain classes of LOCAs.

The NRC is currently considering circumstances under which an alternative interpretation of the design-basis LOCA spectrum may be found to be acceptable. For some applications now under review and anticipated to be submitted in the near to medium term, designers have sought to holistically reduce LOCA risks (e.g., reduced numbers of penetrations, larger volumes of water above the core, extended coping times, passive cooling systems). In consideration of design-specific information, the

NRC can review justifications that design-basis LOCAs need not be postulated at all conceivable locations.

This draft guidance describes the mechanistic considerations that the NRC staff may consider in determining whether an applicant has proposed an adequately protective design-basis LOCA spectrum.

Dated: November 19, 2025.

For the Nuclear Regulatory Commission.

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