



[7590-01-P]

NUCLEAR REGULATORY COMMISSION

[NRC-2016-0233]

**Pressurized Water Reactor Control Rod Ejection and Boiling Water Reactor
Control Rod Drop Accidents**

AGENCY: Nuclear Regulatory Commission.

ACTION: Draft regulatory guide; request for comment.

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC) is issuing for public comment draft regulatory guide (DG) DG-1327, "Pressurized Water Reactor Control Rod Ejection and Boiling Water Reactor Control Rod Drop Accidents." This DG proposes new guidance for analyzing accidents such as control rod ejection for pressurized water reactors and control rod drop for boiling-water reactors. It defines fuel cladding failure thresholds for ductile failure, brittle failure, and pellet-clad mechanical interaction and provides radionuclide release fractions for use in assessing radiological consequences. It also describes analytical limits and guidance for demonstrating compliance with regulations governing reactivity limits.

DATES: Submit comments by **[INSERT DATE 90 DAYS FROM THE DATE OF PUBLICATION IN THE FEDERAL REGISTER NOTICE]**. Comments received after this date will be considered if it is practical to do so, but the NRC is able to ensure consideration only for comments received on or before this date. Although a time limit is given, comments and

suggestions in connection with items for inclusion in guides currently being developed or improvements in all published guides are encouraged at any time.

ADDRESSES: You may submit comments by any of the following methods (unless this document describes a different method for submitting comments on a specified subject):

- **Federal Rulemaking Web Site:** Go to <http://www.regulations.gov> and search for Docket ID NRC-2016-0233. Address questions about NRC dockets to Carol Gallagher; telephone: 301-415-3463; e-mail: Carol.Gallagher@nrc.gov. For technical questions, contact the individuals listed in the FOR FURTHER INFORMATION CONTACT section of this document.

- **Mail comments to:** Cindy Bladey, Office of Administration, Mail Stop: OWFN-12H-08, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

For additional direction on accessing information and submitting comments, see “Obtaining Information and Submitting Comments” in the **SUPPLEMENTARY INFORMATION** section of this document.

FOR FURTHER INFORMATION CONTACT: Paul Clifford, Office of Nuclear Reactor Regulation, telephone: 301-415-4043, e-mail: Paul.Clifford@nrc.gov and Edward O’Donnell, Office of Nuclear Regulatory Research, telephone: 301-415-3317 e-mail: Edward.ODonnell@nrc.gov. Both are staff of the 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-2016-0233 when contacting the NRC about the availability of information regarding this action. You may obtain publically-available information related to this action, by any of the following methods:

- **Federal Rulemaking Web Site:** Go to <http://www.regulations.gov> and search for Docket ID NRC-2016-0233.

- **NRC's Agencywide Documents Access and Management System (ADAMS):** You may obtain publicly available documents online in the ADAMS Public Documents collection at <http://www.nrc.gov/reading-rm/adams.html>. To begin the search, select "[ADAMS Public Documents](#)" and then 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, 301-415-4737, or by e-mail to pdr.resource@nrc.gov. The DG is electronically available in ADAMS under Accession No. ML16124A200.

- **NRC's PDR:** You may examine and purchase copies of public documents at the NRC's PDR, Room O1-F21, One White Flint North, 11555 Rockville Pike, Rockville, Maryland 20852.

B. Submitting Comments

Please include Docket ID NRC-2016-0233 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 posts all comment submissions at <http://www.regulations.gov> as well as enters 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 submissions into ADAMS.

II. Additional Information

The NRC is issuing for public comment a DG in the NRC's "Regulatory Guide" series. This series was developed to describe and make available to the public information regarding methods that are acceptable to the NRC staff for implementing specific parts of the NRC's regulations, techniques that the staff uses in evaluating specific issues or postulated events, and data that the staff needs in its review of applications for permits and licenses.

The DG, entitled "Pressurized Water Reactor Control Rod Ejection and Boiling Water Reactor Control Rod Drop Accidents," is a proposed new guide temporarily identified by its task number, DG-1327. DG-1327 proposes new guidance for analyzing reactivity-initiated accidents such as control rod ejection for pressurized water reactors and control rod drop for boiling-water reactors. It defines fuel cladding failure thresholds for ductile failure, brittle failure, and pellet-clad mechanical interaction and provides radionuclide release reactions for use in assessing radiological consequences. It also describes analytical limits and guidance for demonstrating compliance with regulations governing reactivity limits.

The draft guide also incorporates new empirical data from in-pile, prompt power pulse test programs and analyses from several international publications on fuel rod performance

under reactivity initiated accident conditions to provide guidance on acceptable analytical methods, assumptions, and limits for evaluating a pressurized water reactor control rod ejection accident.

The draft guide expands the existing guidance for control rod ejection accidents in Regulatory Guide (RG) 1.77, “Assumptions Used for Evaluation a Control Rod Ejection Accident for Pressurized Water Reactors.” However, the NRC intends to maintain RG 1.77 for existing licensees who do not make any design changes within the scope of RG 1.77.

III. Backfitting and Issue Finality

Draft regulatory guide DG-1327 describes one acceptable method for demonstrating compliance with Appendix A of part 50 of title 10 of the Code of Federal Regulations (10 CFR), “General Design Criteria 28, *Reactivity Limit*,” with respect to control rod ejection (CRE) for pressurized-water reactors (PWRs) and a control rod drop (CRD) for boiling-water reactors (BWRs). It addresses fuel cladding failure thresholds for ductile failure, brittle failure, and pellet-clad mechanical interaction (PCMI), provides radionuclide release fractions for use in assessing radiological consequences, and describes analytical limits and guidance for demonstrating compliance with GDC 28 governing reactivity limits.

This draft regulatory guide, if finalized, would not constitute backfitting as defined in 10 CFR 50.109 (the Backfit Rule) and is not otherwise inconsistent with the issue finality provisions in 10 CFR part 52, “Licenses, Certifications and Approvals for Nuclear Power Plants.” Existing licensees and applicants of final design certification rules will not be required to comply with the positions set forth in this draft regulatory guide, unless the licensee or design certification rule applicant seeks a voluntary change to its licensing basis with respect to CRE for PWRs or CRD for BWRs, and where the NRC determines that the safety review must include consideration of

these events. Further information on the staff's use of the draft regulatory guide, if finalized, is contained in the draft regulatory guide under Section D. Implementation.

Applicants and potential applicants are not, with certain exceptions, protected by either the Backfit Rule or any issue finality provisions under part 52. Neither the Backfit Rule nor the issue finality provisions under part 52 – with certain exclusions discussed below – were intended to apply to every NRC action which substantially changes the expectations of current and future applicants. Therefore, the positions in any final draft regulatory guide, if imposed on applicants, would not represent backfitting (except as discussed below).

The exceptions to the general principle are applicable whenever a combined license applicant references a part 52 license (i.e., an early site permit or a manufacturing license) and/or part 52 regulatory approval (i.e., a design certification rule or design approval). The staff does not, at this time, intend to impose the positions represented in the draft regulatory guide in a manner that is inconsistent with any issue finality provisions in these part 52 licenses and regulatory approvals. If, in the future, the staff seeks to impose a position in this regulatory

guide in a manner which does not provide issue finality as described in the applicable issue finality provision, then the staff will address the criteria for avoiding issue finality as described in the applicable issue finality provision.

Dated at Rockville, Maryland, this 10th day of November, 2016.

For the Nuclear Regulatory Commission.

Thomas H. Boyce, Chief,
Regulatory Guidance and Generic Issues Branch,
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Office of Nuclear Regulatory Research.

[FR Doc. 2016-27903 Filed: 11/18/2016 8:45 am; Publication Date: 11/21/2016]