

NUCLEAR REGULATORY COMMISSION

[NRC-2021-0179]

**Alternative Radiological Source Terms for Evaluating Design Basis Accidents at
Nuclear Power Reactors**

AGENCY: Nuclear Regulatory Commission.

ACTION: Draft regulatory guide; request for comment.

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC) is issuing for public comment a draft regulatory guide (DG), DG-1389, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors." This DG is proposed Revision 1 to Regulatory Guide (RG) 1.183 which describes a method that the NRC staff considers acceptable in complying with regulations for design basis accident dose consequence analysis using an Alternative Source Term. This guidance for light-water reactor (LWR) designs includes the scope, and documentation of associated analyses and evaluations; consideration of impacts on analyzed risk; and content of submittals.

DATES: Submit comments by **June 21, 2022**. 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.

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-2021-0179**. Address questions about Docket IDs in Regulations.gov to Stacy Schumann; telephone: 301-415-0624; email: Stacy.Schumann@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: Michael Eudy, Office of Nuclear Regulatory Research, telephone: 301-415-3104, email: Michael.Eudy@nrc.gov; and Mark Blumberg, Office of Nuclear Reactor Regulation, telephone: 301-415-1083, email: Mark.Blumberg@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-2021-0179** 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-2021-0179**.

- **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, 301-415-4737, or by email to PDR.Resource@nrc.gov. The ADAMS accession number for each document referenced (if it is available in ADAMS) is provided the first time that it is mentioned in this document.

- **NRC's PDR:** You may examine and purchase copies of public documents, by appointment, at the NRC's PDR, Room P1 B35, One White Flint North, 11555 Rockville Pike, Rockville, Maryland 20852. 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 8:00 a.m. and 4:00 p.m. (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-2021-0179** 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. Additional Information

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

The DG, entitled "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors," (ADAMS Accession No. ML21204A065) is temporarily identified by its task number, DG-1389 which is proposed Revision 1 of RG 1.183 of the same name. This revision of the guide (Revision 1) addresses new issues identified since the guide was originally issued. These include (1) using the term maximum hypothetical accident (MHA) loss-of-coolant accident (LOCA) to define the accident described in regulation, (2) adding transient release fractions from empirical data from in-pile, prompt power pulse test programs and analyses from several international publications of fuel rod performance under prompt power excursion conditions, (3) revising steady-state release fractions for accidents other than the LOCA based on a revision to the American National Standards Institute/American Nuclear Society Standard 5.4, "Method for Calculating the Fractional Release of Volatile Fission Products from Oxide Fuel," (4) adding information to acknowledge the proposed Revision 1 may provide useful information for satisfying the radiological dose analysis requirements in part 50 of title 10 of the *Code of Federal Regulations* (10 CFR), "Domestic Licensing of Production and Utilization Facilities" and 10 CFR part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," for advanced LWR design and siting, (5) providing additional guidance for modeling boiling-water reactor (BWR) main steam isolation valve (MSIV) leakage, (6) adding guidance for accident

tolerant fuel, high-burnup fuel, and increased enrichment source term analyses, (7) revising transport and decontamination models for the fuel handling design basis accident, (8) adding guidance for crediting holdup and retention of MSIV leakage within the main steam lines and condenser for BWRs, and (9) providing additional meteorological assumption guidance.

On October 14, 2009, the NRC staff issued DG-1199, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors," (ADAMS Accession No. ML090960464), for public comment (74 FR 52822). DG-1199 was a proposed Revision 1 to RG 1.183. The NRC staff has elected not to finalize DG-1199 and is issuing DG-1389 as a replacement. The staff notes that DG-1389 addresses technical issues and considered public comments related to the issuance of DG-1199.

The staff is also issuing for public comment a draft regulatory analysis (ADAMS Accession No. ML21204A066). The staff developed a regulatory analysis to assess the value of issuing or revising a regulatory guide as well as alternative courses of action.

III. Backfitting, Forward Fitting, and Issue Finality

The NRC staff may use this RG, if finalized, as a reference in its regulatory processes, such as licensing, inspection, or enforcement. However, the NRC staff does not intend to use the guidance in this RG to support NRC staff actions in a manner that would constitute backfitting as that term is defined in 10 CFR 50.109, "Backfitting," and as described in NRC Management Directive (MD) 8.4, "Management of Backfitting, Forward Fitting, Issue Finality, and Information Requests" (ADAMS Accession No. ML18093B087), nor does the NRC staff intend to use the guidance to affect the issue finality of an approval under 10 CFR part 52. The staff also does not intend to use the guidance to support NRC staff actions in a manner that constitutes forward fitting as that

term is defined and described in MD 8.4. If a licensee believes that the NRC is using this RG in a manner inconsistent with the discussion in this Implementation section, then the licensee may file a backfitting or forward fitting appeal with the NRC in accordance with the process in MD 8.4.

IV. Specific Request for Comment

In addition to the general request for comments on DG-1389, the NRC is also seeking specific comments on a draft staff technical assessment titled, “Technical Assessment of Hold-up and Retention of Main Steam Isolation Valve Leakage within the Main Steam Lines and Main Condenser” (ADAMS Accession No. ML20085J042) that is referenced in the draft revised guidance. The technical assessment provides the proposed technical basis for the low risk of gross failure of the alternate pathway to the condenser at seismic accelerations at or below a plant’s design basis safe shutdown earthquake, as described in DG-1389. The technical assessment also supports a proposed streamlined approach in DG-1389 for demonstrating the seismic capacity of structures, systems, and components in the alternate pathway, compared to the approach in RG 1.183, Revision 0 (ADAMS Accession No. ML003716792).

V. Submitting Suggestions for Improvement of Regulatory Guides

A member of the public may, at any time, submit suggestions to the NRC for improvement of existing RGs or for the development of new RGs. Suggestions can be submitted on the NRC’s public website at <https://www.nrc.gov/reading-rm/doc->

[collections/reg-guides/contactus.html](#). Suggestions will be considered in future updates and enhancements to the “Regulatory Guide” series.

Dated: April 18, 2022.

For the Nuclear Regulatory Commission.

/RA/

Meraj Rahimi, Chief,
Regulatory Guide and Programs
Management Branch,
Division of Engineering,
Office of Nuclear Regulatory Research.