[7590-01-P]

NUCLEAR REGULATORY COMMISSION

NRC-2018-0066

Dry Storage and Transportation of High Burnup Spent Nuclear Fuel

AGENCY: Nuclear Regulatory Commission.

ACTION: Draft NUREG; request for comment.

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC) is issuing for public comment a draft NUREG, NUREG-2224, "Dry Storage and Transportation of High Burnup Spent Nuclear Fuel." The draft NUREG provides technical background information applicable to high burnup spent nuclear fuel (HBU SNF), provides an engineering assessment of recent NRC-sponsored mechanical testing of HBU SNF, and proposes example approaches for licensing and certification of HBU SNF in transportation and dry storage.

DATES: Submit comments on the draft NUREG-2224 by September 24, 2018. 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:

- **Federal Rulemaking Web Site:** Go to http://www.regulations.gov and search for Docket ID NRC-2018-0066. Address questions about NRC dockets to Jennifer Borges; telephone: 301-287-9127; e-mail: Jennifer.Borges@nrc.gov. For technical questions,

contact the individual listed in the FOR FURTHER INFORMATION CONTACT section of this document.

- **Mail comments to:** Cindy Bladey, Office of Nuclear Material Safety and Safeguards, Mail Stop: TWFN-4-B72, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

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: Wendy Reed, Office of Nuclear Material Safety and Safeguards, telephone: 301-415-7213; e-mail: Wendy.Reed@nrc.gov; 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-2018-0066 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 Web Site:** Go to http://www.regulations.gov and search for Docket ID NRC-2018-0066.

- **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. Draft NUREG-2224, ""Dry Storage and Transportation of High Burnup Spent Nuclear Fuel" is available in ADAMS under Accession No. ML18214A132.

- **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-2018-0066 in your comment submission.

The NRC cautions you not to include identifying or contact information in comment submissions that you do not want to be publicly disclosed in your comment submission. All comment submissions are posted at http://www.regulations.gov and entered into ADAMS. Comment submissions are not routinely edited to remove identifying or contact information.

If you are requesting or aggregating comments from other persons for submission to the OMB, 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 comment submissions are not routinely edited to remove such information before making the comment submissions available to the public or entering the comment into ADAMS.

II. Discussion

Historically, the potential for changes in the cladding performance of HBU SNF to compromise the analyzed fuel configuration in transportation packages and dry storage systems has been addressed through safety review guidance (Interim Staff Guidance (ISG) – 11,

Revision 3, Cladding Considerations for the Transportation and Storage of Spent Fuel (ADAMS Accession No. ML033230335); NUREG-1536, Revision 1, Standard Review Plan for Spent Fuel Dry Storage Systems at a General License Facility (ADAMS Accession No. ML101040620)). Time-dependent changes on the cladding performance of HBU SNF are primarily driven by the fuel's temperature, rod internal pressure (and corresponding pressure-induced cladding hoop stresses), and the environment during dry storage or transport operations. ISG-11, Revision 3 and NUREG-1536,Revision 1 defines adequate fuel conditions, including peak cladding temperatures during short-term loading operations to prevent and mitigate degradation of the cladding.

Draft NUREG-2224, "Dry Storage and Transportation of High Burnup Spent Nuclear Fuel," (ADAMS Accession No. ML18214A132) is a technical basis document which expands on the aspects of ISG-11, rev. 3 and NUREG-1536, rev. 1 that pertain to hydride reorientation in HBU SNF cladding. Hydride reorientation is a process in which the orientation of hydrides precipitated in HBU SNF cladding during reactor operation changes from the circumferential-axial to the radial-axial direction. Draft NUREG-2224 provides an engineering assessment of the results of NRC-sponsored research (NUREG/CR-7198, Rev. 1, "Mechanical Fatigue Testing of High-Burnup Fuel for Transportation Application," ADAMS Accession No. ML17292B057) on the mechanical performance of HBU SNF following hydride reorientation; and per the conclusions of that assessment, presents example approaches for licensing and certification of HBU SNF for transportation (under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 71, "Packaging and Transportation of Radioactive Material") and dry storage (under 10 CFR Part 72, "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste, and Reactor-Related Greater Than Class C Waste").

The staff will review and consider public comments received on draft NUREG-2224 as it finalizes the guidance. The NRC is particularly seeking public comment on the following:

1. Are NRC's assumptions regarding the performance of other cladding alloys based on data obtained from HBU SNF with Zircaloy-4 cladding for evaluating design basis drop accidents reasonable? If not, please explain why not.
2. Are the described licensing and certification approaches easy to follow and practical? If not, please explain why not.
3. Is the proposed approach for evaluation of vibration normally incident to transport clear? If not, please explain why not.
4. Are the discussions on consequence analyses due to hypothetical fuel reconfiguration clear and meaningful? If not, please explain why not.
5. Are there any potential conflicts between NUREG-2215, Standard Review Plan for Spent Fuel Dry Storage Systems and Facilities, Draft for Comment (ADAMS Accession No. ML17310A693) and this document? If so, please describe any conflicts.
6. Is the NRC's reassessment of the ductility transition temperature as measured by ring compression testing of defueled HBU SNF specimens reasonable? If not, please explain why not.

In answering the questions, please fully explain your answers. In addition, comments are invited on any areas of the draft report.

III. Public Meeting

The NRC will conduct a public meeting for the purpose of describing the draft NUREG and answering questions from the public. The NRC will publish a notice of the location, time, and agenda of the meeting on the NRC's public meeting web site at least 10 calendar days before the meeting. Stakeholders should monitor the NRC's public meeting web site for information about the public meeting at: http://www.nrc.gov/public-involve/public-meetings/index.cfm.

Dated at Rockville, Maryland, this 3rd day of August 2018.

For the Nuclear Regulatory Commission.

/RA/

Michael C. Layton, Director,
Division of Spent Fuel Management,
Office of Nuclear Material Safety and Safeguards.