

NUCLEAR REGULATORY COMMISSION

[NRC-2019-0208]

**Supplemental Guidance Regarding the Chromium-Coated Zirconium Alloy Fuel Cladding
Accident Tolerant Fuel Concept**

AGENCY: Nuclear Regulatory Commission.

ACTION: Interim staff guidance; issuance.

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC) is issuing Interim Staff Guidance (ISG) ATF-ISG-2020-01, "Supplemental Guidance Regarding the Chromium-Coated Zirconium Alloy Fuel Cladding Accident Tolerant Fuel Concept." This ISG is intended to facilitate the NRC staff's understanding of the in-reactor phenomena important to safety for the chromium-coated zirconium alloy fuel cladding concepts, as well as to provide guidance for NRC staff reviewing vendor applications. Chromium-coated zirconium alloy fuel cladding concepts are being pursued by several U.S. fuel vendors as part of the U.S. Department of Energy's accident tolerant fuel program.

DATES: This guidance is effective on **February 10, 2020**.

ADDRESSES: Please refer to Docket ID **NRC-2019-0208** when contacting the NRC about the availability of information regarding this document. You may obtain publicly-available information related to this document using any of the following methods:

- **Federal Rulemaking Web Site:** Go to <https://www.regulations.gov> and search for Docket ID **NRC-2019-0208**. Address questions about NRC docket IDs in Regulations.gov to Jennifer Borges; telephone: 301-287-9127; e-mail: Jennifer.Borges@nrc.gov. For technical questions, contact the individual(s) listed in the FOR FURTHER INFORMATION CONTACT section of this document.

- **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 e-mail to pdr.resource@nrc.gov. The ISG, "Supplemental Guidance Regarding the Chromium-Coated Zirconium Alloy Fuel Cladding Accident Tolerant Fuel Concept," is available in ADAMS under Accession No. ML19343A121.

- **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.

FOR FURTHER INFORMATION CONTACT: Tekia Govan, Office of Nuclear Reactor Regulation, telephone: 301-415-6197 e-mail: Tekia.Govan@nrc.gov and Michael Orenak, Office of Nuclear Reactor, telephone: 301-415-3229, e-mail: Michael.Orenak@nrc.gov. Both are staff of the U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

SUPPLEMENTARY INFORMATION:

I. Background

On October 24, 2019, (84 FR 57058) the NRC requested public comments on draft ATF ISG–2019–01 (ADAMS Accession No. ML19276G621). The NRC received comments from the Nuclear Energy Institute by letter dated November 25, 2019 (ADAMS Accession No. ML19344C125). No other comments were submitted. The NRC staff considered those comments in developing the final ATF–ISG 2019-01. Detailed responses to the comments can be found in Appendix E of the final ATF–ISG 2019-01.

This ISG is intended to provide guidance for NRC staff reviewing applications involving fuel products with chromium-coated zirconium alloy cladding. For coated claddings of this type, a phenomena identification and ranking table (PIRT) was generated for the NRC by Pacific

Northwest National Laboratory; the guidance provided in this ISG extensively references the PIRT report, “Degradation and Failure Phenomena of Accident Tolerant Fuel Concepts: Chromium Coated Zirconium Alloy Cladding,” issued June 2019. The suggested cladding properties specified acceptable fuel design limits and new failure mechanisms sections from the PIRT are replicated in Appendices B and C. These appendices supersede Sections 5.1 and 5.2 of the PIRT report.

This ISG is not intended as stand-alone review guidance, but instead supplements NUREG-0800, “Standard Review Plan,” Section 4.2, “Fuel System Design,” and discusses the potential impact of coated claddings on reviews performed under Standard Review Plan (SRP), Section 4.3, “Nuclear Design,” Section 4.4, “Thermal and Hydraulic Design,” and Chapter 15, “Transient and Accident Analysis.” In addition to the guidance provided in this ISG, reviewers of coated cladding applications should familiarize themselves with the PIRT report and with the relevant sections of the SRP.

The PIRT report and this ISG focus primarily on metallic chromium coatings applied to a zirconium alloy base metal, with some additional discussion that is applicable to chromium-based ceramic coatings. Reviewers of submittals on ceramic chromium-coated zirconium alloy claddings should carefully read the PIRT to determine the applicability to the review. This ISG does not apply to reviews of fuel products other than metallic or ceramic chromium-based coatings on a zirconium alloy substrate.

II. Backfit Discussion

This ISG intends to provide guidance for the NRC staff reviewing applications involving fuel products with chromium-coated zirconium alloy cladding. Issuance of this ISG does not constitute a backfit as defined in section 50.109(a)(1) of title 10 of the *Code of Federal Regulations* (10 CFR) and is not otherwise inconsistent with the issue finality provisions in 10 CFR part 52. As discussed in the “Backfitting” section of the final ATF–ISG–2020–01, the ISG positions do not constitute backfitting, inasmuch as the ISG is guidance directed to the NRC

staff with respect to its regulatory responsibilities. Applicants and potential applicants are not, with certain exceptions, the subject of either the Backfit Rule or any issue finality provisions under 10 CFR part 52. The NRC staff has no intention to impose the ISG positions on existing nuclear power plant licensees either now or in the future (absent a voluntary request for a change from the licensee).

III. Congressional Review Act

This ISG is a rule as defined in the Congressional Review Act (5 U.S.C. 801-808). However, the Office of Management and Budget has not found it to be a major rule as defined in the Congressional Review Act.

Dated at Rockville, Maryland, this 3rd day of January 2020.

For the Nuclear Regulatory Commission.

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