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Environmental Evaluation of Accident Tolerant Fuels with Increased Enrichment and Higher Burnup Levels

Comment On: NRC-2023-0113-0001

Draft NUREG: Environmental Evaluation of Accident Tolerant Fuels With Increased Enrichment and Higher Burnup Levels

Document: NRC-2023-0113-DRAFT-0003

Comment on FR Doc # 2023-18966

Submitter Information

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General Comment

NEI Comments on Draft NUREG–2266, “Environmental Evaluation of Accident Tolerant Fuels with Increased Enrichment and Higher Burnup Levels.” (Docket ID: NRC–2023–0113) (Federal Register Notice 88FR60507)

Attachments

10-31-23_NRC_Draft NUREG-2266 Industry Comments Letter

October 31, 2023

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

Subject: Comments on Draft NUREG-2266, “Environmental Evaluation of Accident Tolerant Fuels with Increased Enrichment and Higher Burnup Levels.” (Docket ID: NRC-2023-0113) (Federal Register Notice 88FR60507)

Project Number: 689

Submitted via Regulations.gov

Dear Program Management, Announcements and Editing Staff:

The Nuclear Energy Institute (NEI)¹, on behalf of its members, submits the following comments on Draft NUREG-2266, “Environmental Evaluation of Accident Tolerant Fuels with Increased Enrichment and Higher Burnup Levels” published in the Federal Register on September 1, 2023, for public comment by October 31, 2023.

We appreciate the U.S. Nuclear Regulatory Commission (NRC) staff’s thorough evaluation of the impacts of near-term accident tolerant fuel (ATF) technologies with increased enrichment and higher burnup levels on the uranium fuel cycle, transportation of fuel and waste, and decommissioning of LWRs. This work will support efficient and effective licensing reviews of ATF and reduce the need for a complex site-specific environmental review for each ATF license amendment request (LAR).

Based on the NRC staff’s evaluations documented in Draft NUREG-2266, Table S-3 and Table S-4 in the Continued Storage Generic Environmental Impact Statement and the Decommissioning Generic

¹ The Nuclear Energy Institute (NEI) is responsible for establishing unified policy on behalf of its members relating to matters affecting the nuclear energy industry, including the regulatory aspects of generic operational and technical issues. NEI’s members include entities licensed to operate commercial nuclear power plants in the United States, nuclear plant designers, major architect and engineering firms, fuel cycle facilities, nuclear materials licensees, and other organizations involved in the nuclear energy industry.

Environmental Impact Statement would bound the deployment of conventional and near-term ATF for up to 8 wt% U-235 and up to 80 GWd/MTU. The evaluation also indicated there would be no significant adverse environmental impacts for the uranium fuel cycle, transportation of fuel and wastes, and decommissioning associated with deploying conventional fuel and near-term ATF with enrichments up to 8 wt% U-235 and peak-rod burnups up to 80 GWd/MTU.

As discussed in the first comment of Attachment 1, the industry is considering deployment of conventional fuel and near-term ATF with enrichments up to 10 wt% U-235 and peak-rod burnups up to 80 GWd/MTU. Industry would prefer that NUREG-2266 be revised to accommodate enrichments up to 10 wt% U-235; however, if this change will significantly extend its issuance, then use of 8 wt% U-235 as the bounding value is acceptable.

Attachment 1 also includes several additional recommendations for your consideration to enhance the document and improve clarity when finalizing this guidance.

The FRN included a specific request for comment on the use of release fractions developed in Appendix B of the draft NUREG for higher burnup levels than previously considered under postulated transportation accident conditions. We did not identify any additional comments pertaining to the use of the release fractions developed in Appendix B of the draft NUREG.

We appreciate the NRC's effort in developing this draft guidance and encourage your consideration of all stakeholder comments. The comments provided in this letter were aggregated from contributions by several member utilities, Framatome, GE-Hitachi, and Westinghouse, among others. We trust that you will find these collective comments useful and informative.

We would be pleased to answer any comments or questions you might have on the contents of this letter. I may be contacted at fap@nei.org or (202) 340-7491 with any questions.

Sincerely,



Frances A. Pimentel
Sr. Project Manager, Engineering & Risk

Attachment 1: Draft NUREG-2266 Industry Comments

c: Joseph Donoghue, NRR, NRC
Andrea Kock, NRR, NRC
Donald Palmrose, NMSS, NRC
Andrea Veil, NRR, NRC
NRC Document Control Desk

Attachment 1
Comments on Draft NUREG–2266, “Environmental Evaluation of Accident Tolerant Fuels with Increased Enrichment and Higher Burnup Levels”

	Section	Comment/Basis	Recommendation
1.	1.3 Scope of this Study (Page 1-3)	Section 1.2 discusses how NRC staff anticipates that applicants may seek to use fuels with enrichments up to approximately 10 weight percent (wt%) uranium-235 (U-235) and higher burnup levels up to approximately 75 to 80 gigawatt days per metric ton of uranium (GWd/MTU). Then, in Section 1.3, Lines 24 thru 27 state that, “the NRC staff also assesses these impacts in this study, with increased enrichment and higher burnup levels up to 8 wt% U-235 and up to 80 GWd/MTU, respectively, on the uranium fuel cycle, transportation of fuel and waste, and decommissioning for LWRs (i.e., a bounding analysis).” There are several other instances in the document where increased enrichment is discussed as 8wt%.	For consistency, the definition the industry uses for LEU+ is between 5-10 wt% U-235. This NUREG discusses enrichments up to 8 wt% and 10 wt% and burnups up to 75 GWd/MTU and 80 GWd/MTU. If possible, industry would prefer that increased enrichment and higher burnup levels be indicated up to 10 wt% U-235 and up to 80 GWd/MTU, respectively, throughout the document as the bounds for the impacts that were assessed in this study. However, if revising this document to include enrichments up to 10 wt% U-235 will significantly the extend the issuance of this document, then 8 wt% U-235 as a bounding value is acceptable.
2.	3.3 Table S-4 on the Transportation of Fuel and Waste (Page 3-3)	This section discusses the environmental data provided in Table S-4 and the applicability criteria for its use.	When discussing burnup, specify if bundle average or pin average burnup was considered in the criteria.
3.	3.6.3 Number of Annual Unirradiated and Spent Accident Tolerant Fuel Shipments (Page 3-18)	Line 7 discusses how many fuel assemblies are removed from a core during an outage. For longer cycles, this will be more than one-third, therefore, recommend saying “During a typical refueling outage, between one-third to one-half of the fuel assemblies...”	Recommend changing lines 7 to 8 to read, “During a typical refueling outage, between one-third to one-half of the fuel assemblies...”
4.	5.0 Conclusion (Page 5-2)	Line 31-32 states, “In particular, applicants must discuss whether: ...”	Change the word “must” to “should”
5.	5.0 Conclusion (Page 5-2)	This section includes items that must be discussed as part of a generic evaluation. Lines 40-42, indicate the applicant discuss “the number of annual unirradiated and spent ATF shipments over the refueling cycle time being requested in the LAR application based on the expected transport package fall within the	Add the word “generally” before “based on the expected transport package fall within the number of shipments discussed in this study.” The bullet in final form would be: “The number of annual unirradiated and spent ATF shipments over the refueling cycle time being requested in the LAR application generally based on the

	Section	Comment/Basis	Recommendation
		number of shipments discussed in this study.” Since the number of shipments has a lot of variability, it is suggested to add the word “generally” before “based on the expected transport package fall within the number of shipments discussed in this study.”	expected transport package fall within the number of shipments discussed in this study.”
6.	Appendix B, Section B.2 Cases (Page B-2)	This section references 18 events (cases) examined in NUREG/CR-6672. It would be helpful to have the description of each of these cases provided in this document for ease of reference.	Add a table with the description of the 18 events (cases) examined in NUREG/CR-6672.
7.	Appendix B, Section B.6 Particulate Release (Page B-7)	This section discusses the changes to particulate release fractions due to impact and temperature and due to fire only. The discussion does not explain why the NUREG/CR-6672 methodology assumes that for the fire-only scenario the cladding rupture could be large, and that fines in up to 1 foot (ft) of the rod could escape without filtering and that for the impact and temperature scenario, the cladding rupture opening is expected to be smaller and fines in up to 0.25 inches (in.) of the rod could escape without filtering.	Include a discussion as to why the cladding rupture is expected to be larger in the fire only scenario than the expected rupture opening for the impact and temperature scenario.
8.	B.9 Crud Release (Page B-8)	Change modern PWRs to say modern LWRs in Line 12.	Change modern PWRs to say modern LWRs in Line 12.
9.	D.4 Population Density Adjustments (Page D-9)	This section provides examples of the data sources used by WebTRAGIS when developing the population datasets. One is called Census TIGER road data. Please define “TIGER” as it is not obvious as what this refers to.	Define “TIGER” in context of “Census TIGER road data.”