

BENJAMIN HOLTZMAN

*Senior Project Manager,
Fuel and Radiation Safety*



1201 F Street, NW, Suite 1100
Washington, DC 20004
P: 202.739.8031
bah@nei.org
nei.org

SUNSI Review Complete
Template = ADM-013
E-RIDS=ADM-03
ADD: Jason Drake, Andrew Proffitt

September 27, 2019

Ms. Jane E. Marshall
Director, Division of Safety Systems (Acting)
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

COMMENT (12)
PUBLICATION DATE: 12/21/2017
CITATION 82 FR 60633

Subject: Comments on Draft NRC Project Plan Appendix on Fuel Burnup and Enrichment Extension Preparation Strategy

Project Number: 689

Dear Ms. Marshall:

On behalf of the nuclear energy industry, the Nuclear Energy Institute (NEI)¹ submits the attached comments on the draft NRC Project Plan Appendix on fuel burnup and enrichment extension preparation strategy. Industry recognizes and appreciates the NRC's commitment to develop the Accident Tolerant Fuel (ATF) Project Plan and continue the collaborative dialogue that has informed the NRC staff's efforts. The industry is committed to the pursuit and development of ATF with increased burnup and enrichment on a timeline that supports phased deployment in a commercial reactor in the early to mid-2020s.

This schedule is of key importance in the decisions our members will need to make when evaluating the ATF benefits against the costs of adopting this technology. As noted during the NRC Public Meeting on September 12th, industry is providing the attached comments on the draft NRC Project Plan Appendix. Industry requests an opportunity to review the revised draft NRC Project Plan Appendix to understand how our comments have been addressed and potentially another public meeting, if NRC resolution has not addressed key industry concerns regarding the current draft.

One such key concern is the need for experimental confirmation of whether unknown age-related phenomena impact the spent fuel during storage and transportation after storage. The current thermal and radiological dose limits are sufficient for the safe storage and transportation of fuel with increased burnup

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.

Ms. Jane E. Marshall
September 27, 2019
Page 2

and enrichment. Instead industry agrees with the NRC opinion expressed elsewhere in the draft appendix, which states there are no anticipated gaps or deficiencies in 10 CFR 71 and 10 CFR 72.

Another key industry concern is that the draft NRC Project Plan Appendix proposed changes to the criticality acceptance criteria. Industry believes that the criticality uncertainty can accommodate the uncertainty associated with the benchmark study size for enrichments above 5% by increasing the one-sided k-effective tolerance factor to account for the uncertainties in criticality code performance rather than reducing the allowable maximum k-effective as currently suggested in the draft appendix.

Thank you for your time and attention to this important matter. If you have any questions or require additional information, please contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "Ben Holtzman", with a stylized, flowing script.

Ben Holtzman

Attachment

c: Andrew Proffitt, NRR, NRC
Jason Drake, NRR, NRC
Josh Whitman, NRR, NRC
Dennis Morey, NRR, NRC
NRC Document Control Desk

Comment #	Location	Comment	Proposed Change
1	General	The timelines, activities, and impacts associated with increasing burnup and enrichment are different. The appendix sometimes discusses both topics and other times is only referring to one of the two, however, it is not perfectly clear at all times.	Please consider partitioning the various sections into burnup and enrichment portions of the appendix to more clearly identify the information relevant to each topic.
2	General	In numerous places it references UF6 as the only enriched product used to fabricate UO2.	Please revise the text to be more generic as there are possibilities to use other precursor forms that are not UF6.
3	General	The draft appendix discusses changes to the standard 'pellet/clad' fuel system. In a fuel system where uranium is the minority component, a uranium enrichment could be above 5% while the ratio of U235 to all atoms by volume may not be above 5%. Therefore the effective enrichment would be less than 5% despite the ratio of U235 atoms to U atoms being above 5%.	Please add text to indicate that this appendix is only applicable for current UO2 fuel or clarify how to treat all fuel types.
4	General	The appendix to the NRC Project Plan is prepared as Appendix A, however the NRC Project Plan Version 1.0 (ML18261A414) already contains an Appendix A "NRC Plans to Develop Analysis Capability." Having two appendices with the same letter creates an error likely situation.	Please revise the burnup and enrichment appendix or the current project plan appendix to be a different letter.
5	General	Where is table A.5? The appendix appears to skip this table.	Please revise text for consistency.
6	General, Line 25, Lines 228-292	<p>The text indicates NRC staff will participate in a coordinated PIRT on in-reactor performance of fuels with increased enrichment. Please provide more information on the timing, scope, and intent of this activity. Additional information such as the information presented during the Public Meeting on September 12th would be helpful.</p> <p>The text indicates that the PIRT would only be for increased enrichment. Is burnup excluded intentionally? Would these activities be NRR focused or more cross-cutting across multiple parts of NRC?</p> <p>The text indicates NRC staff will participate in a PIRT for transportation packages for unirradiated fuel transportation for material with higher burnup and enrichment. Please provide more information on the timing, scope, and intent of this activity. Please explain higher burnup unirradiated material.</p>	Please explain NRC's intentions regarding a PIRT for increased burnup and enrichment efforts.
7	Line 24	Please spell out PIRT as this is the first occurrence (Phenomena Identification & Ranking Table)	Please revise text as indicated
8	Lines 46-50	The Appendix states that "the staff does not anticipate identification of gaps or deficiencies in these regulations" with respect to Part 71 and 72. However, lines 243-244 discuss new transportation packages, modification of current packages, or exemptions from 10 CFR 71.55(g), especially subpart (g)(4) and its limit of 5.0 w/o. The latter statements appear to be contradictory with respect to gaps in Part 71.	Please ensure text is consistent with intent.
9	Lines 112-113	While updating the regulatory framework is important to ensure regulatory certainty, why would such changes that could include rulemaking, need to be made before either higher enrichments or burnups can be licensed? This text appears to indicate that the common regulatory practice of using exemptions first would not be acceptable. Additionally, it is inconsistent with the exemption pathway discussed in lines 180-182 and the discussion in lines 227-230.	Please revise text to remove indication that regulatory framework changes are anticipated to be complete before licensing can be approved.
10	Lines 118-123	<p>Two sentences appear to be inter-mixed and need to be corrected. We believe the sentences are supposed to read as follows:</p> <p>While higher burnups and increased enrichments may impact the way compliance with regulatory requirements is demonstrated, the actual principal design and performance requirements provided by the GDC remain applicable. The degree to which existing regulations and guidance need revision or new regulatory requirements and guidance need to be established, depends on the level of departure from existing burnup and enrichment limits.</p>	Please revise text.
11	Tables A.1 and A.2	Tables A.1 and A.2 do not appear to be in alignment. Industry believes that 10 CFR 51 and NUREG-1555 should have similar impacts. However 10 CFR 51 is noted as being impacted by both higher burnup and enrichment but NUREG-1555 is only noted as impacted by higher enrichment.	Please review regulatory impact tables for consistency.

Comment #	Location	Comment	Proposed Change
12	Lines 141-159	Industry performs a review of whether a LAR qualifies for a categorical exclusion from the National Environmental Policy Act (NEPA) as part of the standard LAR review process and NRC reviews that assessment during the approval of that LAR. As such, the text discussing whether NRC staff needs to reconsider the justification for the continued applicability of the existing Generic Environmental Impact Statement is unnecessary.	Please remove Section A.1.1 as it's redundant.
13	Line 170	The reference to ADAMS Accession Number ML18100A045 is incorrect. That was the draft LTA letter from the NRC to NEI which was posted on 5-31-18. The final LTA letter should be cited, ADAMS Accession Number ML18323A169 dated 6-24-19.	Please revise text.
14	Lines 171-173	The text states that for LTAs using increased enrichments and higher burnups, the guidance in the LTA letter may not be applicable. The guidance in the LTA letter should be applicable to all LTAs programs. The determination of whether a 50.59 or LAR is required is made by applying the guidance on a case-by-case basis depending on the scope of the LTA campaign and the licensing basis of the reactor.	Please revise the text to simply state that LTA programs for higher burnup and increased enrichment may require LARs and remove the text indicating that the LTA program may fall outside the guidance. The determination of whether a LAR or 50.59 is appropriate is made by applying the guidance in the LTA letter to the specifics of the LTA campaign and the reactor licensing basis.
15	Lines 241 – 244	The design of new UF6 packaging must continue to interface with the existing plant equipment process (receipt, storage, heating, discharge, cleaning, etc).	Please add text to indicate that as part of the consideration of new package designs, there should be a consideration for how a new packages would interface with existing facility equipment.
16	Lines 235-244	The Appendix contains two citations of 10 CFR 71.55(g) and one citation of 49 CFR 173.420 (line 322). There is no mention of 49 CFR 173.417 which sets a 5.0 w/o U235 enrichment limit for transport within 30-inch cylinders. Given the regulatory infrastructure changes discussed in lines 235-244 of the Appendix, the need to revise DOT's 49 CFR 173.417 should be captured in some fashion in this Appendix.	Please add mention of 49 CFR 173.417 in the appendix.
17	Table A.4	Why does table A.4 not have an opinion on NUREGs 1536, 1567 or 1927?	Please provide the NRC opinion of these fuel cycle NUREGs in table A.4.
18	Line 256	"safety related- issues" should be "safety-related issues"	Please revise text as indicated
19	Lines 266, 272, 321, 329	Please use subscripts consistently throughout the appendix.	Please revise text for consistency.
20	Lines 328 to 338	The International Handbook of Evaluated Criticality Safety Benchmark Experiments contain approximately 30 LWR benchmark cases between 5 and 10 w/o U-235 with the majority near 7 w/o. Pooling these benchmark experiments with the larger population of experiments below 5 w/o does present a challenge but general issue exists in all benchmark studies as discussed in DSS-ISG-2010-01 (ML110620086).	Please revise the last bullet (lines 336 and 337) to the following: "increase the one-sided k-effective tolerance factor to account for uncertainties in criticality code performance due to the number of applicable critical experiments for benchmarking."
21	Lines 332-337	Are each of the activities noted are potential methods for applicants to overcome the NRC's stated lack of criticality benchmark data? Or is the intent that a combination of the denoted activities would be needed? Given the predictive nature of first principle codes now available, has the NRC staff reviewed how these advanced codes could resolve the issue?	Please clarify text.
22	Lines 353-355	The text indicates that there is a need for experimental confirmation for whether an unknown age-related phenomena impact the spent fuel during storage and transport after storage. Why would this be the case?	Please remove this text. There is no reason an experimental confirmation for something that isn't known to exist is needed.
23	Line 372	"Near -term" should be "near-term"	Please revise text as indicated
24	Line 374	Please revise text to "...only one fuel cycle facility has shared plans..."	Please revise text as indicated
25	Line 394	Please revise "unrainum" to "uranium"	Please revise text as indicated
26	Lines 423 – 424	The text indicates that near-term increases in burnup and enrichment limits are expected to be only marginally greater than current limits. Is the 5 – 8 wt% range considered as "marginally greater than current limits"; or is a stepwise approach between 5 – 8% being envisioned? What burnup values are considered to be marginal increases?	Please clarify text.
27			