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Proposed Revisions to Branch Technical Position 5-3; Fracture Toughness Requirements

Comment On: NRC-2018-0145-0001

Proposed Revisions to Branch Technical Position 5-3; Fracture Toughness Requirements

Document: NRC-2018-0145-DRAFT-0001

Comment on FR Doc # 2018-15035

Submitter Information

Name: Tim Hardin

General Comment

Comments are provided in EPRI Letter MRP 2018-032, attached.

Attachments

MRP 2018-032

MRP Materials Reliability Program_____MRP 2018-032

Date: September 10, 2018

To: May Ma
Office of Administration
Mail Stop; TWFN-7-A60M
U.S. Nuclear Regulatory Commission
Washington DC, 20555-0001

From: Brian Burgos, MRP Program Manager, Electric Power Research Institute (EPRI)

Subject: Submission of EPRI MRP Comments on the Proposed Revisions to NUREG 0800
Branch Technical Position 5-3, "Fracture Toughness Requirements"

In response to the NRC's solicitation of public comments [1], the EPRI Materials Reliability Program (MRP) provides the following comments on the proposed NUREG-0800, Branch Technical Position 5-3, DRAFT Revision 3 [2].

1. Section A, Background, final paragraph, last sentence: "Based on the change-in-risk analyses documented in the memorandum, the NRC determined that the methodologies in B1.1 and B1.2 can be used in pressure-temperature limits and PTS evaluations for up to 72 effective full power years of operation."
 - a. Comment: EPRI recommends that the sentence be revised as follows:

"Based on the change-in-risk analyses documented in the memorandum, the NRC determined that the methodologies in B1.1 and B1.2 can be used in pressure-temperature limits and PTS evaluations for up to **80** years of operation."
 - b. Justification: The justification for this recommended change is based on the information presented in the NRC Closure Memorandum [3], Enclosure 5, "Technical Assessment by Division of Engineering and Division of Risk Assessment on Risk Assessment of Pressurized Thermal Shock Event for 72 EFPYs Considering Non-conservatism in BTP 5-3." The data in Table 1 in Section 3.1.3 documents the NRC staff's change in through-wall cracking frequency (TWCF) values for the four limiting BTP plants at 72 EFPYs. Section 3.2.2.2.4 states,

The results of the NRC staff's change-in-risk analyses were summarized in Table 1 in Section 3.1.3 where the bounding increases in risk were

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reported as 2.14E-8/year, 2.31E-9/year, 7.70E-11, and 7.81E-11/year for IP-2, Palisades, WB-1, and NA-1, respectively, considering the extremely conservative case that the adjustment for the BTP 5-3 non-conservatism is 200 % of the required (i.e., increased by 37 °F) for plates and non-Rotterdam forgings and 150 % of the required (i.e., increased by 136 °F) for Rotterdam forgings. These change-in-risk increases are well below the guideline for a plant-specific backfit as described in NUREG/BR-0058 and discussed in Section 3.2.2.2.1 of this document.

First, it is noted that the two plants cited above which have the highest increases have announced plans to shut down within the next four years, before 60 years of plant operation are reached. Second, referring to Table 1 in Section 3.1.3, it is noted that the remaining two limiting plants have substantially lower through-wall cracking frequency (TWCF) and change in TWCF values (e.g., one or two orders of magnitude lower) than the two plants shutting down.

Incorporating the change recommended above to extend the allowable use of BTP 5-3 from 72 EFPY to 80 years of operation would result in a small increase in adjusted reference temperature of the beltline ring forgings (about a 4°F increase according to the shift prediction equations of 10CFR50.61a, at a conservative assumption of 80 EFPY). Such an increase would have negligible impact on the conclusions of the technical assessment documented in [3]. Therefore, it is reasonable to remove the unnecessary limitation of “72 EFPY” and permit plants to use BTP 5-3 through a full 80 year license period which may exceed 72 EFPY by a small amount.

2. Section B, paragraph 1.2, “Estimation of Charpy V-Notch Upper Shelf Energies,” third sentence: “Beltline materials are defined to be those materials directly surrounding the effective height of the active core and adjacent materials estimated to receive a neutron fluence of 1×10^{17} n/cm² (E > 1.0 MeV) or higher.”
 - a. Comment: Industry recommends that the NRC revise the beginning of this sentence to read, “**Consistent with RIS 2014-011**, beltline materials are **considered** to be those materials...”
 - b. Justification: The reactor vessel beltline is officially *defined* in 10 CFR 50, Appendix G, Section II, Definition F [4]. NRC RIS 2014-011 [5] provides the current NRC staff *interpretation* of the definition given in Appendix G; thus, the recommended phraseology is more accurate.

Thank you for your consideration of these comments. Please direct any questions regarding this letter to Tim Hardin, Technical Executive.

Best Regards,

A handwritten signature in dark ink, appearing to read 'B. Burgos', with a long horizontal stroke extending to the right.

Brian Burgos
MRP Program Manager
EPRI

cc: Timothy Hardin (thardin@epri.com)
Elliot J. Long (elong@epri.com)
Gary Stevens (gstevens@epri.com)

References:

1. U.S. Nuclear Regulatory Commission, NRC-2018-0145, "Proposed Revisions to Branch Technical Position 5-3; Fracture Toughness Requirements," Federal Register / Vol. 83, No. 135 / Friday, July 13, 2018 / Notices.
2. NUREG-0800, Standard Review Plan, Branch Technical Position 5-3, "Fracture Toughness Requirements," DRAFT Revision 3, July 2018. (ADAMS Accession No. ML18071A066)
3. U.S. NRC Memorandum to John W. Lubinski from David L. Rudland, SUBJECT: Closure Memorandum Supporting the Limited Revision of NUREG-0800 Branch Technical Position 5-3, "Fracture Toughness Requirements," dated April 11, 2017. (ADAMS Accession No. ML16364A285)
4. 10 CFR 50, Appendix G, "Fracture Toughness Requirements," U.S. Nuclear Regulatory Commission, 78 FR 75450, Dec. 12, 2013.
5. U.S. NRC Regulatory Issue Summary (RIS) 2014-11, "Information on Licensing Applications for Fracture Toughness Requirements for Ferritic Reactor Coolant Pressure Boundary Components," U.S. Nuclear Regulatory Commission, October 14, 2014.