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Guidelines for Evaluating the Effects of Light-Water Reactor Coolant Environments in Fatigue Analyses of Metal Components; Draft Regulatory Guide for Comment

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Submitter Information

11/24/2014
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Submitter's Representative: Westinghouse Electric Company

General Comment

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Please see LTR-NRC-15-1 attached.

Attachments

LTR-NRC-15-1

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LTR-NRC-15-1

January 12, 2015

Subject: Transmittal of Westinghouse Electric Company Comments on Draft Regulatory Guide DG-1309 [Docket ID NRC-2014-0244]

Dear Ms. Bladey,

Thank you for the opportunity to provide comments on the proposed Revision 1 of Regulatory Guide 1.207, "Guidelines for Evaluating the Effects of Light-Water Reactor Coolant Environments in Fatigue Analyses of Metal Components."

Please find enclosed the Westinghouse Electric Company (Westinghouse) comments on the draft Regulatory Guide.

For technical questions regarding the enclosed comments, please contact Mark Gray at 412-374-4602 or David Roarty, P.E. at 412-374-6253.

Very truly yours,

James A. Gresham, Manager
Regulatory Compliance

Attachment

Comments on Draft Regulatory Guide DG-1309

(Proposed Revision 1 of Regulatory Guide 1.207)

1. Page 5, paragraph 1, states: "The NRC staff deems this criterion acceptable because the NRC staff bases the fatigue design curves on crack initiation, rather than component failure or through-wall crack leakage, and, therefore, additional margin exists between crack initiation and actual component failure or leakage."

Comment: Specifying crack initiation vs. through-wall growth as a basis for margin is not consistent with the science of fatigue crack failures, where one case could have significant margin and another case essentially no margin. Other margins exist in the ASME Code design process which can be more consistently identified as applicable to all cases. We suggest that this sentence be deleted, or reworded similar to the following: "The NRC staff deems this criterion acceptable because the staff recognizes the conservatism in the ASME Code design process."

2. Page 5, paragraph 3, states: "Fen calculations for carbon, low-alloy, austenitic stainless, and Ni-Cr-Fe alloy steels need only consider the types of stress cycles or load set pairs that exceed the strain threshold criteria."

Comment: As stated here in the draft Regulatory Guide, it is understood that the strain amplitude threshold may be used to exclude ASME fatigue pairs from Fen penalty (Fen = 1.0), regardless of the strain rate method applied in the evaluation (modified rate or average strain rate). A cursory reading of Appendix A of Draft NUREG/CR-6909 Revision 1 could lead one to conclude that use of the strain amplitude threshold is not permissible when the modified rate approach will be employed. Section 4.1.14 of draft NUREG/CR-6909 Revision 1 seems to indicate that application of the modified rate approach to the remaining fatigue pairs should employ no further use of the strain amplitude threshold in the detailed integration method. Please clarify and make consistent in both documents which applications of the strain amplitude threshold are permitted and not permitted with respect to the application of the modified rate approach.

A possible rewording of the first two sentences of the current paragraph of the draft Regulatory Guide would be: "Fen calculations for carbon, low-alloy, austenitic stainless, and Ni-Cr-Fe alloy steels need only consider the types of stress cycles or load set pairs that exceed the strain threshold criteria, *regardless of the strain rate method applied in the F_{en} evaluation. For pairs that exceed the strain amplitude threshold criteria,* the evaluation options *to determine F_{en}* depend on the complexity of the analyzed transient conditions and the details of the evaluation."

Another possibility is to remove this detail from the Regulatory Guide and include it with the suggested clarifications in Appendix A of NUREG/CR-6909 Revision 1.

With regard to this comment, please also see our comments that were provided in Westinghouse letter LTR-NRC-14-26 on draft NUREG/CR-6909 Revision 1, Section 4.1.14, related to application of the strain amplitude threshold.

3. Page 6, paragraph 2, states: "These methods apply to those components exposed to reactor coolant that are required by regulation to have a fatigue CUF evaluation or have an existing CLB fatigue CUF evaluation."

Comment: The Fen factors have been developed for simulated primary reactor coolant environments. In some cases there are components that "have an existing CLB fatigue CUF evaluation" that are not exposed to reactor coolant, but are in secondary systems (e.g., PWR steam generator feedwater nozzles) exposed to secondary fluid. They are not required by regulation to have a fatigue CUF. If this statement is meant to apply to such components, then the applicability of the Fen factors to such components should be clearly stated. Otherwise, such components should be excluded from this requirement.