

DRAFT – UNCERTIFIED INFORMATION

Question

RAI 4.6-2a

Background

Section 4.6 of the SRP LR states that if a plant's code of record requires a fatigue parameter evaluation (fatigue analysis or fatigue waiver), then this analysis may be a time limited aging analyses (TLAA) and must be evaluated in accordance with 10 CFR 54.21(c) (1) to ensure that the effects of aging on the intended functions are adequately managed for the period of extended operation.

The current licensing basis may include fatigue waiver evaluations that preclude the need for performing CUF analyses of structural components. The ASME Code Section III rules for performing fatigue waiver evaluations for structural components are analogous to those in the Code for performing fatigue waiver evaluations of mechanical components. ASME Code NE-3222.4(d) "Analysis for Cyclic Operations, Vessels Not Requiring Analysis for Cyclic Operation," provides for a waiver from fatigue analysis when certain cyclic loading criteria are met.

In its response to RAI 4.6 2, dated February 6, 2018, the applicant stated, in part, the following:

- For the personnel airlock, drywell airlock, drywell combination door/hatch assembly components: "The evaluation concluded that analysis for cyclic operation was not necessary. No cumulative usage factors were calculated. The evaluation assumed 120 plant startup cycles. LRA Table 4.3-1 has a limiting value of 168 for plant startups, but because the allowable number of cycles for this ASME Section NE 3222.4(d) criterion was 2,800 cycles, the increase in cycles shown in LRA Table 4.3-1 does not impact the conclusion that a fatigue analysis is unnecessary."
- For the equipment hatch component: "The equipment hatch calculation determined a fatigue analysis was not necessary after considering loads from OBE, SSE, LOCA, SRV lifts and heatups because the loads were very low. Cumulative usage factors were not calculated," and
- For the drywell head component: "The drywell head calculation determined the alternating stresses from earthquakes and SRV loads were so low that the allowable number of cycles were infinite (CUF- 0)."

Issue

It is not clear if the evaluation performed under ASME Section NE 3222.4(d) criterion for the personnel airlock, drywell airlock, and the drywell combination door/hatch assembly constitutes a fatigue waiver that relies on time dependent cycles, and whether they were evaluated and dispositioned in accordance with 10 CFR 54.21(c) (1). The staff notes that the current licensing basis may include fatigue waiver evaluations that preclude the need for performing CUF analyses of structural components which may be a TLAA and must be evaluated.

Additionally, it is not clear if the equipment hatch and the drywell head were evaluated in accordance with the requirements of ASME Code Section III, Division I, Subsection NE-3222.4(d) to waive the requirements of a fatigue analysis, and what the disposition is in accordance with 10 CFR 54.21(c) (1) for the evaluations.

Request

1. State the disposition, in accordance with 10 CFR 54.21(c) (1), for the personnel airlock, drywell airlock, and the drywell combination door/hatch assembly evaluations.

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2. Clarify if an evaluation was performed in accordance with ASME Code, Section III, Subsection NE 3222.4(d) to evaluate the fatigue analysis requirements for the equipment hatch and the drywell head.
 - A. If an evaluation was performed state the assumed number of cycles and limits. Otherwise, clarify what requirements of the ASME Code were followed to evaluate the fatigue analysis requirements for the equipment hatch and the drywell head, and clarify whether these evaluations are based on time dependent cycles.
 - B. State the disposition, in accordance with 10 CFR 54.21(c) (1), for the equipment hatch and drywell head evaluations.

Response

1. The personnel airlock, drywell airlock, and drywell combination door/hatch assembly fatigue waiver evaluations are considered time-limited aging analyses due to the cycle assumptions in the evaluations.

The Fatigue Monitoring Program in accordance with 10 CFR 54.21(c)(1)(iii) will ensure the numbers of cycles remain within the values allowed in the fatigue waiver criteria of ASME Code, Section III, Subsection NE 3222.4(d).

2. A. The equipment hatch calculation includes a fatigue waiver evaluation for the hatch cover and a fatigue calculation specific to the hatch bolting. The calculation evaluates the hatch bolting for 50,000 cycles of SRV lifts.

The drywell head calculation determined the alternating stresses were low and that the allowable number of cycles is infinite. The fatigue usage factor was zero. The cycles specified were 120 heatups, 5 operating basis earthquakes of 30 cycles each, 1 safe shutdown earthquake of 20 cycles, 50,000 SRV cycles and 350 loss-of-coolant induced cycles.

B. The Fatigue Monitoring Program in accordance with 10 CFR 54.21(c)(1)(iii) will ensure that the numbers of transient cycles remain within the values assumed for the fatigue analyses and fatigue waiver evaluations.

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