St. Lucie SLRA: Breakout Questions

SLRA Section 4.3.4, "High Energy Line Break Analyses"

TRP: 143.4

Note: Breakout Questions are provided to the applicant and will be incorporated into the publicly-available audit report.

Technical Reviewer	Seung Min	11/30/2021
Technical Branch Chief	Matt Mitchell	12/21/2021
Breakout Session	*Date/Time*	*To be filled in by PM*

Applicant Staff	**NRC staff**
To be filled out by PM during breakout	

Question Number	**SLRA Section**	**SLRA Page**	**Background / Issue (As applicable/needed)**	**Discussion Question / Request**	**Outcome of Discussion**
1	4.3.4	4.3-22 4.3-23	SLRA Section 4.3.4 addresses the high energy line break (HELB) analyses. The section indicates that the existing HELB analysis for Class 1 reactor piping at St. Lucie Unit 2 uses the guidance in the Giambusso letter (December 1972), which is described in Branch Technical Position 3-3 (ADAMS Accesso No. ML070800027). In the guidance, the postulation of HELB locations is, in part, based on the cumulative usage factor (CUF) criterion (i.e., CUF greater than 0.1) for Class 1 piping. SLRA Section 4.3.4 also explains that, as discussed in SLRA Section 4.3.1 and	1. Clarify whether additional break locations and their effects will be evaluated in the Class 1 piping HELB analysis if new additional piping break locations are identified based on the CUF threshold of 0.1. If not, provide justification for why such additional HELB locations do not need to be evaluation in the HELB analysis.	

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			Table 4.3.1-1, the original Unit 2 design cycles (CLB cycles) bound the projected cycles for 80 years of operation. Based on this evaluation, the applicant determined that the fatigue analyses, corresponding cumulative usage factors (CUFs) and Class 1 piping postulated HELB locations remain valid for the subsequent period of extended operation. In comparison, Branch Technical Position (BTP) 3-3 specifies that, if intermediate Class 1 piping locations between terminal ends have a CUF value greater than 0.1, such locations are postulated as break locations in the HELB analysis. This CUF threshold for HELB postulation (0.1) is significantly lower than the CUF limit of 1.0 used in fatigue design analyses. However, the applicant did not clearly address whether the 80-year operation may increase the CUF values at Class 1 piping locations above the CUF threshold of 0.1 for HELB postulation such that additional break locations needs to be evaluated in the HELB analysis. Therefore, the staff found a need to confirm that, if new additional piping break locations are identified based on the CUF threshold of 0.1, the applicant will evaluate such new break locations in the HELB analysis.	2. The applicant proposed to use the Fatigue Monitoring program for managing the aging effect associated with the HELB TLAA. Given the proposed approach, clarify whether the Fatigue Monitoring program includes a relevant action to update the HELB analysis based on potentially new additional HELB locations discussed in request item 1.	

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2	4.3.4	4.3-22 4.3-23	SLRA Section 4.3.4 indicates that the existing HELB analysis for non-Class 1 piping at St. Lucie Unit 2 uses the guidance in the Giambusso letter (December 1972), which is described in Branch Technical Position 3-3 (ADAMS Accesso No. ML070800027). In the guidance, the postulation of HELB locations is, in part, based on the allowable stress range for expansion stress (S_a). S_a may need to be adjusted by a stress range reduction factor, which is, in turn, determined by the number of thermal cycles as addressed in the implicit fatigue analysis in SLRA Section 4.3.2. In SLRA Section 4.3.4, the applicant dispositioned the HELB analysis for non-Class 1 piping in accordance with 10 CFR 54.21(c)(1)(i), indicating that the HELB analysis remains valid for the subsequent period of extended operation. In comparison, SLRA Section 4.3.2 indicates that, except for the sampling line, the non-Class 1 piping systems involve a stress range reduction factor of 1.0 for 80 years of operation. However, the sampling line involves a 80-year projected stress range reduction factor of 0.7, which is less than 1.0. Therefore, the staff needs to clarify whether the stress range reduction factor for the sampling	1. Clarify whether the sampling line is included in the scope of the Unit 2 HELB analysis. 2. In addition, clarify whether the stress range reduction factor of the sampling line less than 1.0 may have an impact on HELB location postulation. If so, discuss how the applicant addresses new potentially additional break locations and their effects on the HELB analysis for the sampling line.	

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			line (less than 1.0) may have an impact on the break location postulation in the non-Class 1 HELB analysis.		
3					
4					