

From: [Poole, Justin](#)
To: [Browne, Kenneth](#); [Mack, Jarrett](#)
Cc: [Danna, James](#)
Subject: Request for Additional Information Regarding Seabrook Heat Flux Hot Channel Requirement Amendment Request (L-2020-LLA-0187)
Date: Tuesday, February 23, 2021 9:01:00 AM
Attachments: [L-2020-LLA-0187 Final RAI.pdf](#)

Ken/Jarrett,

By letter dated August 17, 2020, (Agencywide Documents and Access Management System (ADAMS) Accession No. ML20230A425), NextEra Energy Seabrook, LLC (NextEra, the licensee), requested an amendment to Seabrook Station, Unit No. 1 (Seabrook) Technical Specifications (TS). The proposed license amendment request (LAR) revises the Seabrook TS to resolve non-conservative heat flux hot channel factor ($F_Q(Z)$) requirements. In reviewing the submitted information, the U.S. Nuclear Regulatory Commission (NRC) staff has determined that additional information is necessary to complete its review.

On February 11, 2021, the NRC staff sent NextEra the DRAFT RAI to ensure that the question is understandable, the regulatory basis is clear, there is no proprietary information contained in the RAI, and to determine if the information was previously docketed. On February 18, 2021, the NRC and NextEra held a clarifying call. During the call, NextEra requested a response date of 30 days from the date of this email. The NRC staff informed NextEra that this timeframe is acceptable. The attached is the final version of the RAIs. These RAIs will be put in ADAMS as a publicly available document.

Justin C. Poole
Project Manager
NRR/DORL/LPL I
U.S. Nuclear Regulatory Commission
(301)415-2048

REQUEST FOR ADDITIONAL INFORMATION REGARDING
TECHNICAL SPECIFICATION CHANGES TO RESOLVE NON-CONSERVATIVE
HEAT FLUX HOT CHANNEL FACTOR REQUIREMENTS
NEXTERA ENERGY SEABROOK, LLC
SEABROOK STATION, UNIT NO. 1
DOCKET NO. 50-443

By letter dated August 17, 2020 (Agencywide Documents Access and Management System (ADAMS) Accession number ML20230A425), NextEra Energy Seabrook, LLC (NextEra, the licensee), requested an amendment to Seabrook Station, Unit No. 1 (Seabrook) Technical Specifications (TS). The proposed license amendment request (LAR) revises the Seabrook TS to resolve non-conservative heat flux hot channel factor ($F_Q(Z)$) requirements.

Regulatory Basis

NRC Generic Letter (GL) 88-16, "Removal of Cycle-Specific Parameter Limits from Technical Specifications," provides the guidance necessary to relocate the cycle-specific values of parameter limits from the TSs to an administratively controlled, core operating limits, in accordance with the requirements of Title 10 of the Code of *Federal Regulations* (10 CFR), Section 50.36(c)(2), insofar as TSs include limiting conditions for operation (LCOs), and of 10 CFR 50.36(c)(5), insofar as it establishes the characteristics of Administrative Controls, such as those set forth in Section 6.8 of the Seabrook TS.

Among other things, 10 CFR 50.36(c)(2)(ii)(B) requires that LCOs include LCOs on "a process variable, design feature, or operating restriction that is an initial condition of a design basis accident or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier." Adherence to LCOs like the heat flux hot channel factor (i.e., F_Q) assures that the initial conditions of the emergency core cooling system (ECCS) performance evaluation, performed in accordance with the requirements of 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light-Water Nuclear Power Reactors," are met. Additional criteria applicable to accident and transient analyses are also identified in Section 4.1 of the enclosure to the licensee's LAR.

In accordance with GL 88-16, the Seabrook TS 6.8.1.6.b, states, "The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC in:", and TS 6.8.1.6.b.14 indicates that WCAP-10216-P-A, Revision 1A (Proprietary), "Relaxation of Constant Axial Offset Control FQ Surveillance Technical Specification," February 1994, shall be used, in part, to determine TS 3.2.1 "AXIAL FLUX DIFFERENCE," and TS 3.2.2 "Heat Flux Hot Channel Factor."

NRC Staff Issues 1 and 2: Application of R_j Factor

The LAR proposes to apply a burnup-dependent correction factor, R_j , to the formulation for the transient heat flux hot channel factor surveillance parameter (i.e., $F_Q^W(Z)$). The NRC staff notes the following, concerning this parameter:

- The formulation of the R_j factor is not described in WCAP-10216-P-A, Revision 1A.
- The R_j factor, as described in WCAP-17661-P-A, "Improved RAOC [Relaxed Axial Offset Control] and CAOC [Constant Axial Offset Control] F_Q Surveillance Technical Specifications," is applied to a $F_Q^W(Z)$ surveillance parameter that is based on a planar-radial (i.e., F_{XY}) surveillance, which the licensee has not proposed to adopt.

NRC Staff Issue 3: Implementation of RAOC Operating Spaces

Similar to the R_j parameter described above, the implementation of RAOC Operating Spaces is described in principle in WCAP-17661-P-A and does not appear to be consistent with the methods described in WCAP-10216-P-A, Revision 1A.

NRC Staff Issue 4: Required Actions in Table 3 of Attachment 4

The licensee proposes to adopt Required Actions that would be specified in a Table contained within the COLR. As described in the regulatory basis above, TS 6.8.1.6.b requires the use of NRC-approved analytical methods to specify core operating limits, and for those methods to be listed in the Seabrook TS. Therefore, the methods used to determine the parameter limits in Table 3 must be provided to the NRC for review, approved by the NRC staff, and referenced in the TS.

NRC Staff Issue 5: LIMITATION 2 Imposed in the NRC SE Approving WCAP-17661-P-A

LIMITATION 2 imposed in the NRC SE (ADAMS No. ML18298A320) requires final power decrease to 50 percent. This LIMITATION 2 appears applicable to Seabrook, since the first paragraph on page 7 of 35 of Enclosure 1 in the LAR states that "the THERMAL POWER is limited to less than 50% RTP, or as specified in cycle specific COLR, to assure additional margin to the transient F_Q ."

NRC Staff Issue 6: Adequacy of the Proposed Surveillance Formulations 2.10.4 and 2.10.5 in the COLR

The LAR proposes Surveillance Formulations 2.10.4 and 2.10.5 in the COLR to address the non-conservatisms identified in NSAL 15-1 regarding the $F_Q(Z)$ surveillance formulation. The proposed COLR surveillance formulations do not contain the terms such as $T(Z)$ -COLR and $A_{XY}(Z)$, and use $F_Q(Z)$ instead of $F_{XY}(Z)$ in the NRC-approved formulations (Equations 5-1 and 5-2) in WCAP-17661-P-A. The second paragraph on page 5 of 35 of Enclosure 1 in the LAR states that " $T(Z)$ -COLR and $A_{XY}(Z)$ are not being pursued due to low safety significant" without presenting technical basis supporting the quoted statement. The discussion of adequacy of using $F_Q(Z)$ instead of $F_{XY}(Z)$ is not presented in the LAR.

Request For Additional Information (RAI)

RAI – 1

Justify the validity of the adoption of the R_j factor in light of the fact that doing so will result in COLR specifications that do not adhere to the methods referenced in 6.8.1.6.b.14, as required by the Seabrook TS. As necessary, consider proposing a revised TS citation that specifies, with adequate accuracy, the Seabrook-specific methods that would be used.

RAI – 2

Justify the applicability of the R_j factor, in light of the fact that the Seabrook licensee does not intend to adopt the broader surveillance formulation described in WCAP-17661-P-A.

RAI – 3

Justify the implementation of RAOC Operating Spaces as consistent with WCAP-10216-P-A, Revision 1A, or provide additional information to describe how the RAOC Operating Spaces would be formulated. As necessary, consider proposing a revised TS citation that specifies, with adequate accuracy, the Seabrook-specific methods that would be used.

RAI – 4

Describe how the required margin improvements contained in Table 3 of the COLR were formulated, demonstrate that they provide the required, additional margin to justify continued operation in the event $F_Q^W(Z)$ exceeds its limit, and as necessary, consider proposing a revised TS citation that specifies, with adequate accuracy, the Seabrook-specific methods that would be used.

RAI – 5

Discuss the applicability of LIMITATION 2 imposed in the NRC safety evaluation approving WCAP-17661-P-A to Seabrook specific methods. If the licensee determines that LIMITATION 2 is not applicable, please provide rationale for the basis of the determination. If LIMITATION 2 is applicable, please justify a value, other than 50 percent, that would be “specified in cycle specific COLR,” as stated in the LAR.

RAI – 6

Discuss how the effect of terms, such as $[T(z)]COLR$ and $A_{xy}(z)$, on the proposed F_Q^W formulation in the COLR were determined to involve low safety significance, and justify the adequacy of the proposed surveillance formulations in COLR with use of $F_Q(Z)$ instead of $F_{xy}(Z)$ in the NRC-approved formulations (Equations 5-1 and 5-2) in WCAP-17661-P-A.