UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

August 13, 2009

Mr. Gene F. St. Pierre
Site Vice President
Seabrook Station
NextEra Energy Seabrook, LLC
P.O. Box 300
Seabrook, NH 03874

SUBJECT: SEABROOK STATION, UNIT NO. 1 – REQUEST FOR ADDITIONAL INFORMATION REGARDING STEAM GENERATOR PROGRAM (TAC NO. ME1386)

Dear Mr. St. Pierre:

By letter dated May 28, 2009 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML091530539) the licensee (FPL Energy Seabrook, LLC) submitted a license amendment request to revise the technical specifications (TS) of Seabrook Station Unit No. 1. The request proposed changes to the inspection scope and repair requirements of TS section 6.7.6.k, "Steam Generator (SG) Programs," and to the reporting requirements of TS section 6.8.1.7, "Steam Generator Tube Inspection Report." The proposed changes would establish permanent alternate repair criteria for portions of the SG tubes within the tubesheet.

The NRC staff is reviewing your application and finds that additional information is needed, as discussed in the enclosure. Your earliest response will facilitate our continued review of the application.

The draft questions were previously sent to Mr. O'Keefe, of your staff with an opportunity to have a teleconference to ensure that the licensee understood the questions and their regulatory basis; as well as, to verify that the information was not on the docket. On July 29, 2009, Mr. Kilby, of your staff, declined the opportunity for a teleconference and requested that the final RAIs be issued.

Sincerely,

Dennis Egan, P.E., Senior Project Manager
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-443

Enclosure: RAIs

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REQUEST FOR ADDITIONAL INFORMATION

REGARDING PERMANENT H* ALTERNATE REPAIR CRITERIA

FOR STEAM GENERATOR INSPECTIONS

SEABROOK STATION UNIT NO. 1

DOCKET NO. 50-443

By letter dated May 28, 2009, (ADAMS Accession No. ML091530539) the licensee (FPL Energy Seabrook, LLC) submitted a license amendment request to revise the technical specifications (TS) of Seabrook Station No. Unit 1 (Seabrook). The request proposed changes to the inspection scope and repair requirements of TS section 6.7.6.k, "Steam Generator (SG) Program," and to the reporting requirements of TS section 6.8.1.7, "Steam Generator Tube Inspection Report." The proposed changes would establish permanent alternate repair criteria for portions of the SG tubes within the tubesheet. In order to complete its review, the staff needs the additional information requested below. The staff also notes that the review is still ongoing and there may be additional questions in the future.

The Westinghouse document, WCAP-17071-P, Rev. 0, "H*: Alternate Repair Criteria for the Tubesheet Expansion Region in Steam Generators with Hydraulically Expanded Tubes (Model F)" (Reference 1) was submitted with the May 28, 2009, letter, in support of the requested license amendment.

1. Reference 1, Page 6-21, Table 6-6. This table contains a number of undefined parameters and some apparent inconsistencies with Table 5-2 on page 5-6. Please define the input parameters in Table 6-6.

2. Reference 1, Section 6.2.2.2. Why was the Failure Effects Analysis run with the linear distribution and scaling of the results instead of being run directly with the modified temperature distribution?

3. Reference 1, Section 6.2.3. Why is radial displacement the "figure of merit" for determining the bounding segment? Does circumferential displacement not enter into this? Why is the change in tube hole diameter not the "figure of merit?"

4. Reference 1, Page 6-69. In Section 6.2.5.3, it is concluded that the tube outside diameter and the tubesheet tube bore inside diameter always maintain contact in the predicted range of tubesheet displacements. However, for tubes with through wall cracks at the H* distance, there may be little or no net pressure acting on the tube for some distance above H*. In Tables 6-18 and 6-19, the fourth increment in the step that occurs two steps prior to the last step suggests that there may be no contact between the tube and tubesheet, over a portion of the circumference, for a distance above H*. Is the conclusion in 6.2.5.3 valid for the entire H* distance, given the possibility that the tubes may contain through wall cracks at that location?

Enclosure

5. Reference 1, Section 6.3. Are the previously-calculated scale factors and delta D factors in Section 6.3 conservative for steam line break (SLB) and feed line break (FLB)? Are they conservative for an intact divider plate assumption? Are they conservative for all values of primary pressure minus crevice pressure that may exist along the H* distance for intact tubes and tubes with through wall cracks at the H* distance?

6. Reference 1, Page 6-87. How is tube temperature ($T_T$) on page 6-87 determined? For normal operating conditions, how is the $T_T$ assumed to vary as function of elevation?

7. Reference 1, Page 6-97, Figure 6-75. Contact pressures for nuclear plants with Model F steam generators are plotted in Figure 6-75, but it is not clear what operating conditions are represented in the plotted data; please clarify.

8. Reference 1, Page 6-112, Reference 6-5. This reference seems to be incomplete; please provide a complete reference.

9. Reference 1, Page 6-113, Reference 6-15. Table 6-3 in Reference 6-15 (SM-94-58, Rev 1) appears inconsistent with Table 6-2 in the same reference. Explain how the analysis progresses from Table 6-2 to Table 6-3.

10. Reference 1, Page 8-9, Figure 8-1. There is an apparent discontinuity in the plotted data of the adjustment to H* for distributed crevice pressure; please provide any insight you may have as to why this apparent discontinuity exists.

11. Reference 1, Page 8-6, Section 8.1.4. Clarify whether the "biased" H* distributions for each of the four input variables are sampled from both sides of the mean H* value during the Monte Carlo process, or only on the side of the mean H* value yielding an increased value of H*.

12. Reference 1, Page 8-14, Figure 8-6. The legend for one of the interactions shown between $\alpha_{TS}$ and $E_{TS}$ appears to have a typographical error in it; please review and verify that all values shown in the legend are correct.

13. Reference 1, Page 8-20, Case S-4. Why does the assumption of a 2-sigma value for the coefficient of thermal expansion of the tube ($\alpha$T) and the tubesheet ($\alpha$TS) to determine a "very conservative biased mean value of H*" conservatively bound the interaction effects between $\alpha$T and $\alpha$TS? Describe the specifics of how the "very conservative biased mean value of H*," as shown in Table 8-4, was determined.

14. Reference 1, Page 8-22, Case M-5. The description for this case seems to correspond to a single tube H* estimate rather than a whole bundle H* estimate. How is the analysis performed for a whole bundle H* estimate?

15. Reference 1, Page 8-22, Case M-5 states: "Interaction effects are included because the 4.285 sigma variations were used that already include the effective interactions among the variables." Case M-5 also states that the 4.285 sigma variations come from Table 8-2. However, Table 8-2 does not appear to include interactions among the variables.

Explain how the 4.285 sigma variations include the effect of interactions among the variables.

16. Reference 1, Page 8-22, Case M-6, first bullet. Should the words "divided by 4.285" appear at the end of the sentence?

17. Reference 1, Page 8-23, Case M-7. Was the "2 sigma variation of all variables" divided by a factor of 2?

18. Reference 1, Page 8-23, Case M-7. Explain how this case includes the interaction effects between the two principle variables, $\alpha$T and $\alpha$TS.

19. Reference 1, Page 8-25, Table 8-4. Explain why the mean H* calculated in the fifth case does not require the same adjustments, as noted by the footnotes, that all other cases in the table require.

20. Reference 1, Page 8-25, Table 8-4. Verify the mean H* shown in the last case in the table.

21. Section 8 of Reference 1. The variability of H* with all relevant parameters is shown in Figure 8-3. The interaction between $\alpha$T and $\alpha$TS are shown in Figure 8-5. Please explain why the direct relationships shown in these two figures were not sampled directly in the Monte Carlo analysis, instead of the sampling method that was chosen. Also, please explain why the sampling method chosen led to a more conservative analysis than directly sampling the relationships in Figures 8-3 and 8-5.

22. In the May 28, 2009, letter (ML091530539), Seabrook commits to monitor for tube slippage as part of the steam generator tube inspection program. The "due date/event" is prior to the start of Refueling Outage 1R13. It is not clear whether the planned monitoring will be performed only once. The commitment should be modified to indicate that the tube slippage will be monitored during every steam generator tube inspection outage.

23. In the May 28, 2009, letter, Seabrook commits to determine the position of the bottom of the expansion transition in relation to the top of the tubesheet and to enter "any significant deviation" into their corrective action program. This is a one-time verification prior to implementation of H*. The commitment should be modified to also include a requirement to notify the staff if significant deviations in the location of the bottom of the expansion transition relative to the top of the tubesheet are detected. The information provided (via the Steam Generator Tube Inspection Report or separate timely correspondence) will be evaluated against program assumptions and bases.

24. Reference 1, Page 9-6, Section 9.2.3.1. The feedwater line break heat-up transient is part of the plant design and licensing basis. Thus, it is the staff's position that H* and the "leakage factors," as discussed in Section 9.4, should include consideration of this transient. Explain why the proposed H* and leakage factor values are conservative, even with consideration of the feedwater line break heat-up transient.

References:

1. WCAP-17071-P, Rev. 0, "H*: Alternate Repair Criteria for the Tubesheet Expansion Region in Steam Generators with Hydraulically Expanded Tubes (Model F)," dated April 2009.

August 13, 2009

Mr. Gene F. St. Pierre
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Dennis Egan, P.E., Senior Project Manager
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

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Enclosure: RAIs

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