February 23, 2006

MEMORANDUM TO: Darrell J. Roberts, Chief
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

FROM: G. Edward Miller, Project Manager ***/RA/***
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

SUBJECT: SEABROOK STATION, UNIT NO. 1 - FACSIMILE TRANSMISSION, DRAFT REQUEST FOR ADDITIONAL INFORMATION (RAI) TO BE DISCUSSED IN AN UPCOMING CONFERENCE CALL (TAC NO. MC8554)

The enclosed draft RAI was transmitted by facsimile on February 23, 2006, to Mr. Mike O'Keefe, FPL Energy Seabrook, LLC (FPLE). This draft RAI was transmitted to facilitate the technical review being conducted by the Nuclear Regulatory Commission (NRC) staff, and to support a conference call with FPLE in order to clarify certain items in the licensee's submittal. The draft RAI is related to FPLE's submittal dated September 29, 2005, regarding requested changes to Technical Specification 4.4.5, "Steam Generators." This memorandum and the attachment do not convey a formal request for information or represent an NRC staff position.

Docket No. 50-443

Enclosure: Draft RAI

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DRAFT REQUEST FOR ADDITIONAL INFORMATION

LICENSE AMENDMENT REQUEST 05-08

LIMITED INSPECTION OF THE STEAM GENERATOR

TUBE PORTION WITHIN THE TUBESHEET

SEABROOK STATION, UNIT NO. 1 (TAC NO. MC8554)

By letter dated September 29, 2005, FPL Energy Seabrook, LLC (the licensee) submitted License Amendment Request (LAR) 05-08 requesting changes to the Seabrook Station, Unit No. 1 (Seabrook) Technical Specification (TS) 4.4.5, "Steam Generators." The Nuclear Regulatory Commission (NRC) staff has developed the following draft questions necessary in order to complete the review of the LAR. The following questions do not convey a formal NRC position.

1. LAR 05-08 proposes to add a new requirement "d." under TS 4.4.5.2, "Steam Generator Tube Sample Selection and Inspection". This proposed new requirement would define minimum sampling requirements to be performed with a rotating probe in the tubesheet region. The TSs are normally non-specific with respect to the types of eddy current test probes to be used. As stated in NRC Generic Letter (GL) 2004-01, once licensees determine that specific degradation mechanisms may be present at various locations along the tube (as part of the degradation assessment), it is the staff's position that they should use probes capable of detecting these forms of degradation. The GL states that, to not do so raises questions about whether the tube inspection practices ensure compliance with the TSs in conjunction with Title 10 of the *Code of Federal Regulations* Part 50, Appendix B. Please justify the need to specifically define the type of probe to be used.

2. LAR 05-08 proposes to add items 10) and 11) under TS 4.4.5.4, "Acceptance Criteria." These new items would define the words "bulge" and "overexpansion," respectively. These new definitions support the use of these terms in the proposed new requirement "d." under TS 4.4.5.2. In connection with question 1, if there is no need to specifically define the type of probe to be used, please describe the need for the proposed definitions.

3. Please justify why TS 4.4.5.5, "Reports," item "b.", pertaining to the 12-month Special Report does not have a proposed addition of informational requirements for the reports. Specifically, the NRC staff notes other amendment requests proposing similar changes as LAR 05-088 also included a proposed revision to the requirements for the 12-month report, expanding it to include:

    a. The number of indications and location, size, orientation, and whether initiated on primary or secondary side of each indication detected in the upper 17-inches of the tubesheet thickness.

b. The operational primary-to-secondary leakage rate observed in each steam generator (SG) during the cycle preceding the inspection which is the subject of the report, and the corresponding, calculated accident leakage rate from the lower-most 4 inches of tubing for the most limiting accident, in the most limiting SG. In addition, if the calculated accident leakage rate from the most limiting accident is less than two times the maximum operational primary-to-secondary leakage rate, the 12-month report should describe how it was determined.

4. Provide a copy of WCAP-16053, which is listed as a reference in the technical attachment to Reference 2, below.

5. Under the proposed 17-inch tubesheet inspection zone, LAR 05-08 contends that the accident leakage integrity of the tubing below the 17-inch inspection zone is ensured by the bell-weather principle. The NRC staff requests that the licensee submit a leakage sensitivity study to support the conservatism of the bell-weather approach. That is, leakage during accidents will not exceed two times that observed during normal operating conditions. It is requested that this study consider axial and circumferential flaws located at the bottom of the tubesheet at three tubesheet radial locations (i.e., at the zero radius, mid-radius, and peripheral locations). For each crack type at each location, leakage under normal operating and accident conditions should be evaluated considering only the crack leakage resistance, considering only the tube-to-tubesheet annulus resistance and, lastly, considering the total resistance of the crack and annulus to leakage. Please note that the staff is not so much interested in the absolute values of the leakage predictions as it is in the relative values of the predictions between normal operating and accident conditions. As LAR 05-08 has not requested that the staff review the leakage prediction models, the NRC staff would not be in a position to approve these models until the accuracy of these models has been validated by test for prototypic situations. Notwithstanding that, the NRC staff believes that these models, which are based on standard engineering principles, should at least be capable of providing a qualitative demonstration supporting the bell-weather approach.

6. The bell-weather principle maintains that the increase in primary-to-secondary leakage, when going from normal operating to accident conditions, is bounded by a factor of two. This is based, in part, on an assumed main steamline break (MSLB) and main feed line break (MFLB) pressure differential of 2560 and 2650 psi, respectively, and a temperature of 600 degrees F. Provide the rationale which supports the conservatism of the 600-degree F assumption. This rationale should consider the time history of primary and secondary pressure and temperature during the accident. The NRC staff's purpose in asking this question is ensure the time integrated leak rate is bounded by the bell-weather principle factor of two increase relative to normal operating leakage. Provide the primary pressure and temperature curves as a function of time for the MSLB and MFLB accidents under consideration. Also, provide the rationale supporting the conservatism of the bell-weather principle for a large break loss-of-coolant accident.

7. It is stated on page 20 of the attachment to Reference 2 that if the leak rate during normal operation was 0.1 gallons per minute (gpm) (150 gallons per day (gpd)), the postulated accident condition leak rate would be 0.2 gpm (using the D'Arcy equation), versus the allowable limit of 0.347 gpm when only considering the change in differential pressure. In accordance with the Electric Power Research Institute primary-to-secondary leak guidelines, operating leakage versus the TS limit is evaluated under

room temperature conditions. Presumably, this adjustment is based on water density at room temperature versus operating temperature, which means that if the operational leakage measurement is 0.1 gpm, then actual leakage under hot operating conditions is about 0.15 gpm. Assuming a factor of two increase in leak rate during postulated accidents, the actual leak rate under hot accident conditions is 0.3 gpm, which is still less than the "allowable limit" of 0.347 gpm. Please clarify what is the appropriate comparison to make here; 0.2 gpm (accident leakage adjusted for room temperature conditions) versus the 0.347 gpm "allowable limit," or 0.3 gpm (accident leakage for actual accident temperature) versus the 0.347 "allowable limit." In other words, does the accident analysis consider the 0.347 gpm "allowable limit" to be an adjusted value for room temperature conditions or does it treat it as a hot value?

8. The TS primary-to-secondary leakage limit is 500 gpd per SG, and 1 gpm for all SGs. These limits appear inappropriate since the 500 gpd limit is equal to the amount assumed in the accident analyses. If operational leakage is just below 500 gpd, the expected leakage during a postulated accident may significantly exceed the amount assumed in the MSLB accident analysis. Please justify how this TS limit is supported by the accident analyses given the previously-discussed possibility of an increase in leakage following the onset of an event.

9. WCAP-15932-P, Revision 1, Section 6.5 (submitted on the Callaway docket, NRC Agencywide Documents Access and Management System (ADAMS) Accession No. ML022910436) provides a justification for why ligament tearing of circumferential cracks is not a significant concern. Provide a justification for why ligament tearing of axial cracks at the bottom of the tubesheet at the periphery is similarly not a significant concern.

10. Are there any tubes in the Seabrook SGs which were not fully expanded (per nominal) within the tubesheet? If so, please describe the extent of this condition and justify why the amendment request is sufficient to ensure the structural and leakage integrity of the affected tube joints.

References:

1. FPL Energy Seabrook, LLC letter SBK-L-05185, "License Amendment Request 05-08, Limited Inspection of the Steam Generator Tube Portion Within the Tubesheet," dated September 29, 2005.

2. FPL Energy Seabrook, LLC letter SBK-L-05186, "Proprietary Information to Support License Amendment Request 05-08, Limited Inspection of the Steam Generator Tube Portion Within the Tubesheet," dated September 29, 2005.