March 4, 2011

NRC 2011-0028
10 CFR 50.90

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Point Beach Nuclear Plant, Units 1 and 2
Dockets 50-266 and 50-301
Renewed License Nos. DPR-24 and DPR-27

License Amendment Request 261
Extended Power Uprate
Response to Request for Additional Information

References: (1) FPL Energy Point Beach, LLC letter to NRC, dated April 7, 2009, License Amendment Request 261, Extended Power Uprate (ML091250564)

NextEra Energy Point Beach, LLC (NextEra) submitted License Amendment Request (LAR) 261 (Reference 1) to the NRC pursuant to 10 CFR 50.90. The proposed amendment would increase each unit's licensed thermal power level from 1540 megawatts thermal (MWt) to 1800 MWt, and revise the Technical Specifications to support operation at the increased thermal power level.

During a meeting with the NRC on February 24 and 25, 2011, NextEra was requested to provide additional information regarding Point Beach Nuclear Plant (PBNP) steam generator tube bundle fluid velocity to enable continued review of the request. Enclosure 1 provides the NextEra response to the request for additional information.

This letter contains no new Regulatory Commitments and no revisions to existing Regulatory Commitments.

The information contained in this letter does not alter the no significant hazards consideration contained in Reference (1) and continues to satisfy the criteria of 10 CFR 51.22 for categorical exclusion from the requirements of an environmental assessment.

In accordance with 10 CFR 50.91, a copy of this letter is being provided to the designated Wisconsin Official.

I declare under penalty of perjury that the foregoing is true and correct.
Executed on March 4, 2011.

Very truly yours,

NextEra Energy Point Beach, LLC

Larry Meyer
Site Vice President

Enclosure

cc: Administrator, Region III, USNRC
Project Manager, Point Beach Nuclear Plant, USNRC
Resident Inspector, Point Beach Nuclear Plant, USNRC
PSCW

ENCLOSURE 1

NEXTERA ENERGY POINT BEACH, LLC
POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

LICENSE AMENDMENT REQUEST 261
EXTENDED POWER UPRATE
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

NextEra Energy Point Beach, LLC (NextEra) submitted License Amendment Request (LAR) 261 (Reference 1) to the NRC pursuant to 10 CFR 50.90. The proposed amendment would increase each unit's licensed thermal power level from 1540 megawatts thermal (MWt) to 1800 MWt. During a meeting with the NRC on February 24 and 25, 2011, NextEra was requested to provide additional information regarding Point Beach Nuclear Plant (PBNP) steam generator (SG) tube bundle fluid velocity to enable the continued review of the request. The NextEra response to this request for additional information is provided below.

NextEra Response

This response addresses the PBNP extended power uprate (EPU) concerning the secondary side velocity and density of the fluid in the SG tube bundle, downcomer and U-bend region, and how these values compare to other plants with similar SGs. The comparison of the PBNP Unit 1 (Model 44F) SG data is made to the SG data for PBNP Unit 2 (Model Δ47), Kewaunee (Model 54F), Indian Point Units 2 and 3 and Turkey Point Units 3 and 4 (all Model 44F). The comparisons are provided in Table 1.

Fluid velocity entering the tube bundle calculated for five of the six plants shows that the velocity for the PBNP Unit 1 and 2 SGs is lower than for the compared plants. This is expected since the effect of an uprate typically shows little impact on the product of the density (ρ) and velocity (V) squared (ρV^2) entering the tube bundle. The calculated results typically show a reduction in the product calculated demonstrating a condition more favorable to tube stability.

The U-bend region typically shows an increase in the ρV^2 quantity. The assessment of this increase in comparison to other plants is summarized below. These values represent the fluid properties for the condition that produces the maximum impact on tube stability/wear based on bounding full power operation. The velocity for the SG models reviewed is based on converting the calculated volumetric flow rate into a velocity entering the U-bend region by dividing by the flow area outside of the tubes. The area is calculated based on the inner diameter (ID) of the SG wrapper (117.45 inches, 116.77 inches, and 124.26 inches for the Model 44F, Model Δ47, and Model 54F, respectively). All models have 0.875 inch outer diameter (OD) tubes with 3214, 3499, and 3592 tubes for the Model 44F, Model Δ47 and Model 54F, respectively. Results shown below in Table 1 show that the difference between the value of ρV^2 at the U-bend for PBNP Unit 1 SGs at EPU conditions is within approximately 3% of what is calculated for Kewaunee or Indian Point Unit 3 SGs. The value for the PBNP Unit 2 SGs is approximately 20% lower than for the PBNP Unit 1 SGs.

Table 1
Velocity/Density Comparisons

Plant	SG Model	Velocity (Downcomer Tube Entrance) [ft/sec]	Volumetric Flow Rate U-Bend [ft^3/sec]	Velocity (V) (U-Bend Entrance) [ft/sec]	Mixture Density (ρ) [lb/ft^3]	ρV^2 (U-bend) [$lb/ft\text{-}s^2$]
PBNP 1	44F	12.02	880	18.2	3.60	1190
PBNP 2	Δ47	9.68	728	13.4	4.27	995
Turkey Point 3 & 4	44F	12.26	731	15.1	4.52	1031
Kewaunee	54F	12.09	817	15.1	5.11	1160
Indian Point 2	44F	None Given	783	16.2	3.80	995
Indian Point 3	44F	12.12	818	16.9	4.06	1154

Analysis of the PBNP Units 1 and 2 SGs for the effects of EPU on flow-induced vibration is performed based on tube effect as a function of density and velocity. A thermal-hydraulic analysis of the SGs was performed over the range of full power operating parameters that envelope NSSS operation at EPU conditions. The equations that govern fluid-elastic instability, tube amplitude of vibration, and tube wear, show that each can be shown to be a function of ρV^2. Since these are the parameters that are affected by the uprate, a ratio of these parameters to those calculated for the analysis-of-record will provide a valid indication of the increase, or decrease, that will occur for each of the areas of interest. The original analysis is conservatively based on 1% damping rather than a higher damping factor which would result in lower results.

For the purpose of evaluating the EPU, the evaluation of the effects is based on first calculating the ratio of the product of ρV^2 for the EPU at each 100% power case postulated, to the product of these parameters for the original analysis. For the original analysis, a minimum product is calculated based on the full power conditions evaluated. The maximum ratio calculated is then used to evaluate the effect of the EPU for the effects of flow-induced vibration. As is typical for this type of evaluation, the maximum factor (ratio) calculated is for High T_{avg} and the maximum tube plugging level (10% for PBNP). All other conditions would produce a lower ratio. The current plugging level for Unit 1 is 11 tubes, three as a result of anti-vibration bar (AVB) wear, out of a total of 6428 tubes for both SGs, or 0.17%. For Unit 2, the plugging level is four tubes, no tubes plugged for AVB wear, out of a total of 6998 tubes for both SGs, or 0.06%.

The operating experience for the PBNP Unit 1 Model 44F SGs shows that the only degradation mode that is progressing with operating time is AVB wear. Only three tubes were plugged due to AVB wear and 11 tubes total have been plugged in both SGs since the SGs were placed in service in 1984. The absence of corrosion degradation, relatively slow AVB wear growth rate, and excellent industry experience with replacement SGs having thermally-treated Alloy 600 tubing, indicates that these SGs are showing excellent performance.

The PBNP Unit 2 Model Δ47 SGs have been in operation since 1997. These SGs have Alloy 690 tubing, an advanced AVB design utilizing three sets of AVBs. Recent eddy current testing showed that there were seven AVB indications in five tubes in SG A. The maximum wear depth reported is 11% through-wall, which when inspected with rotating pancake coil (RPC) revealed that the wear was actually two-sided wear with the maximum at 6% through-wall. The calculated 95 percentile wear rate was 1% through-wall per effective full power years, and the maximum indication was well below the repair limit. There is very little AVB wear, or

any other degradation mechanism, present in these SGs. This is indicative of the newer generation of Alloy 690 SGs with advanced AVB designs.

A review of SGs with comparable flow energy predicted in the U-bend region was performed. While these models of SGs are closer to the PBNP Unit 2 design, the results are indicative of Westinghouse replacement SGs related to flow-induced vibration effects.

- Kewaunee, with Model 54F replacement SGs installed in late 2001, was last inspected in 2008. Results show that there was no SG tube or secondary side component degradation observed and no tubes plugged as a result of AVB wear.

- Indian Point Unit 3, with Model 44F replacement SGs installed in 1989, was last inspected in 2007. Results show no degradation mechanism present. Currently, there are no tubes plugged as a result of AVB wear.

For both plants, there are a small number of tubes that are plugged. The tubes were plugged due to manufacturing defects, loose parts or non-degradation NDE signals, which are not concerns related to flow-induced vibration.

References

(1) FPL Energy Point Beach, LLC letter to NRC, dated April 7, 2009, License Amendment Request 261, Extended Power Uprate (ML091250564)