NEXTera ENERGY
POINT BEACH

August 6, 2010

NRC 2010-0121
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)
(2) NRC electronic mail to NextEra Energy Point Beach, LLC, dated February 25, 2010, DRAFT - Request for Additional Information from Reactor Systems Branch RE: EPU (ML100560283)
(3) NextEra Energy Point Beach, LLC letter to NRC, dated May 20, 2010, License Amendment Request 261, Extended Power Uprate, Response to Request for Additional Information (ML101410093)

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.

Via Reference (2), the NRC staff determined that additional information is required to enable the staff's continued review of the request. Reference (3) provided NextEra's response to the NRC staff's request for additional information. Enclosure 1 provides additional information to clarify the responses provided in Reference (3).

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.

A001
NRR

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 August 6, 2010.

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

The NRC staff determined that additional information was required (Reference 1) to enable the Reactor Systems Branch to complete its review of License Amendment Request (LAR) 261, Extended Power Uprate (EPU) (Reference 2). By letter dated May 20, 2010 (Reference 3), NextEra Energy Point Beach, LLC (NextEra) provided its response to the NRC staff's request. The following information is provided to further clarify information submitted in Reference (3).

RAI Clarification

Per discussion with the NRC staff on June 30, 2010, the following clarification was requested:

Provide a description of the balance of plant (BOP) hydraulic analysis that would satisfy the design assumptions used in the nuclear steam supply system LOFTRAN (transient model) analysis. Include a comparision of the hydraulic analysis results versus the acceptance criteria necessary to meet the LOFTRAN design assumptions.

Describe the power ascension testing that will ensure that the results of the BOP hydraulic analysis can be achieved without dynamic or transient testing.

NextEra Response

Balance of Plant (BOP) Hydraulic Analysis and Acceptance Criteria

In order to evaluate the impact of the increased BOP feedwater (FW), condensate (CS), and heater drain (HD) systems demand and replacement components, a hydraulic computer model (Proto-Flo) was developed. The model was benchmarked against the existing plant configuration and operating data. The model was modified to reflect the replacement components and EPU operating conditions. Several design basis and operating cases were run to evaluate the modified system design against bounding acceptance criteria. The acceptance criteria identifies the bounding conditions that demonstrate that the plant design basis and expected plant transient conditions can be met at the EPU power level.

The hydraulic model is a static model and does not perform a transient time dependent analysis. However, based on the original plant design basis and experience with previous uprates, meeting these conservative acceptance criteria ensure the system and component design capacities will have sufficient margin to meet expected transient conditions. Most notably is the acceptance criterion for meeting a large load (50%) rejection. The acceptance criterion is based on providing sufficient FW flow to the steam generators (SG) with an elevated SG pressure. The bounding criterion allows the Westinghouse EPU plant transient operability analysis for a large load transient to assume that the SG level will be maintained. This acceptance criterion bounds the smaller step load changes expected.

The following case was evaluated for benchmarking the Point Beach Nuclear Plant (PBNP) model at current licensed power level:

Case 1 – Existing Plant Conditions Using Recorded Flows, Pressures, Temperatures (Benchmark)

This case demonstrates that the Proto-Flo model simulates the CS and FW system performance at the current power level based on field recorded parameters. Existing conditions (system flows, pressures, temperatures, etc.) for PBNP were documented.

The following cases were run with equipment changes based on necessary upgrades for EPU conditions:

Case 2 – Uprate Plant Conditions; Best Estimate – 100% Power

This case evaluates the capability of meeting the EPU conditions under normal operation at the EPU 100% power level best estimate heat balance.

Case 3 – Uprate Plant Conditions; Margin Case – 100% Power with 2% Flow Margin

This case evaluates the capability of meeting the EPU conditions under normal operation at the EPU 100% power level with an additional 2% flow for bounding purposes.

Case 4 – Uprate Plant Conditions; Large Load Transient Case

This case evaluates uprate performance under a 50% load rejection. During a 50% load rejection, complete loss of HD flow is assumed, and SG pressure is increased 100 psi greater than Case 3. Under these conditions, the low pressure FW heater bypass opens to reduce CS system pressure drop, resulting in increased FW pump suction pressure above that required to provide adequate available net positive suction head (NPSH). Required FW flow is reduced to 96% of full load maximum flow. Reduction in FW flow is a mass flow reduction.

Case 5 – Uprate Plant Conditions; Abnormal Case 50% Heater Drain Flow

This case evaluates station performance under EPU 100% power level conditions, but with HD system flow reduced 50%. Total FW flow is kept at 100%. Boundary conditions and heat loads were the same as Case 2. By design, if FW pump suction pressure is too low, the low pressure FW heaters are bypassed.

This case is conservatively developed to minimize FW pump suction pressure. When the HD pump trips, the HD tank level control valve will open fully in an attempt to maintain HD tank level. The remaining flow into the HD tank will be diverted to the condenser through the HD tank high level dump valve. The actual flow split between the HD pump and the condenser is not determined in the calculation. This calculation conservatively assumes the one remaining HD pump can handle 50% of the total EPU 100% power level HD flow. In reality, the HD pump will pump more, however, the assumed split will result in the largest increase in CS pump flow. This causes the CS pump to run out reducing its discharge pressure. The increased CS flow also increases the pressure drop from the CS pump to the FW pump. This combination results in a conservatively low FW pump suction pressure which this case is evaluating.

For conservatism, Cases 6 and 7 were run with 3% head added to the CS pump based on high total developed head (TDH) tolerance and 3% degraded head for the FW pumps based on age of the equipment.

<u>Case 6</u> – Uprate Plant Conditions; Start-Up 25% Power Ascension
<u>Case 7</u> – Uprate Plant Conditions; Start-Up 60% Power Ascension

These cases evaluate EPU performance under plant start-up conditions at 25% and 60% of EPU full power. At 25% power, two HD pumps and one CS pump are running. At 60% power, HD recirculation flow is isolated and then the second CS pump is started. The mass flow through the feedwater regulating valve (FRV) and HD level control valve (LCV) are scaled linearly for each power level. HD tank pressure was also scaled.

Cases 8 through 10 are developed to maximize FW flow through an in-service main FW heater with the opposite heater (or string) out of service. Although these cases are not necessarily accurate representations of the plant configuration or power level, they are bounding configurations for maximum flow.

<u>Case 8</u> – One String of the First through Third Point FW Heaters Out of Service

This case evaluates the CS flow through the in-service string of the first through third point low pressure FW heaters with the opposite string isolated and the manual bypass valve open.

<u>Case 9</u> – One Fourth Point FW Heater Out of Service

This case evaluates the CS flow through the in-service fourth point FW heater with the opposite string isolated. This case is used to support the EPU heat balance calculation. Preliminary input from the heat balance calculation showed that during this evolution the heater drain flow will be reduced to approximately two-thirds. Sensitivity runs of this case showed that due to low FW pump suction pressure the low pressure FW heater bypass valve will need to be opened to maintain FW pump suction pressure.

<u>Case 10</u> – One Fifth Point FW Heater Out of Service

This case evaluates the condensate flow through the in-service fifth point FW heater with the opposite string isolated and the manual bypass valve open.

Following is a comparison of the acceptance criteria necessary to satisfy the LOFTRAN design assumptions versus the results of the BOP hydraulic analysis performed:

Acceptance Criteria vs. Results		
	Results	**Requirement**
EPU 100% Power Operation		
Provide the total heat balance mass FW flow to the SGs at a maximum SG outlet pressure of 806 psia.	8.11 mlb/hr	8.11 mlb/hr
The FRV C_v is adequate to maintain the FRV less than 80% open.	63% Open	< 80% Open
The CS and HD pumps provide the total heat balance mass flows and provide adequate FW pump suction pressure margin for the required NPSH ($NPSH_R$). The FW pump recommended NPSH available ($NPSH_A$) to $NPSH_R$ ratio is greater than or equal to 2.0.	Ratio = 2.3	Ratio > 2
EPU 50% Load Rejection		
FW pumps must provide 96% of the 100% heat balance mass flow with SG pressure elevated by 100 psi.	7.72 / 8.11 = 0.95 (See Case 4 discussion below)	FW mass flow rate equals 96% of the 100% power mass flow rate
CS pumps must provide adequate flow and head to maintain the FW pump suction pressure such that the $NPSH_A$ exceeds $NPSH_R$.	$NPSH_R$ = 64 ft $NPSH_A$ = 270 ft	$NPSH_A > NPSH_R$
Plant Start Up / Power Ascension		
The HD pumps must have sufficient head to overcome the increased CS pump head for all power levels.	Existing HD pumps are sufficient for all cases	HD LCV required C_v less than 1,200 for all cases
Loss of a Single HD Pump		
The FW pump suction pressure remains above the trip setpoint.	FW pump suction pressure = 203 psia	Pressure remains above 153 psia

For EPU 100% power level, the replacement FRV is less than 80% open, the replacement CS pumps provide adequate $NPSH_A$ to the FW pumps, the replacement FW pumps require less than half the available NPSH, and the FW system provides the required mass flow rate to the SGs.

Case 4 demonstrated that the FW system will provide 95% of the EPU 100% power level mass flow with SG pressure elevated by 100 psi and a complete loss of HD pump flow. Westinghouse found the reduction in FW flow from the original design requirement of 96% to the actual obtained 95% acceptable for EPU. With Case 4 conditions, 96% of nominal FW flow with SG pressure elevated by 100 psi will ensure that the plant does not trip on low-low water level in the SGs. During a 50% load reduction, SG pressure increases while the steam dump valves trip open to maintain a thermal load on the reactor. The SG water level initially drops and then recovers by FW control system action. Although the Westinghouse standard design requirement is that a 96% of nominal FW flow at an elevated steam pressure of 100 psi will prevent an automatic reactor trip on low-low SG level, Westinghouse concluded that 95% of full power feedwater flow should continue to provide acceptable SG level response on a 50% load reduction for PBNP EPU conditions.

The HD pumps will support the plant startup. There will be sufficient head developed by the existing HD pumps to overcome the increase in FW pump suction pressure while at low power. The plant will require a procedure change and an addition of a control valve in the HD pump recirculation line. When the first through third point low pressure FW heaters are bypassed, there will be a low FW pump suction pressure alarm. The revised FW pump low suction pressure trip setpoint for the new pumps should not be reached, but caution will need to be used to ensure the trip point is not reached. When the fourth point FW heater is bypassed, the reduction in HD flow will require the low pressure FW heater bypass valve to open.

The above analysis results demonstrate that with EPU modifications, the BOP FW, CS and HD systems will have sufficient capacity and margin to meet the plant design basis and satisfy the design assumptions used in the LOFTRAN transient analysis.

Power Ascension Testing to Demonstrate Analyis Results Can Be Met

The power ascension and testing program is described in LAR 261, Attachment 5, Section 2.12, and was revised in Enclosure 3 to Reference (4).

The following testing will be performed to demonstrate that FW dynamic and transient testing is not required. Specifically, hydraulic interactions between the new CS and FW pumps, and modified FRVs, as well as the impact of the higher FW flow and the associated increased piping pressure loss will be evaluated. Individual control systems, such as SG level control, and main steam reheater and FW heater drain level control is optimized for the new conditions as required. The proposed tests will adequately identify unanticipated adverse system interactions and allow them to be corrected in a timely fashion prior to operation at EPU 100% power conditions. The following additional surveillance and monitoring will be performed during power ascension to ensure that plant response does not result in unanticipated transient conditions:

- A SG level swing test will be performed. At power escalation hold points, each FRV will have control loop and tuning performance validated by verifying steady-state and dynamic control. Manual and automatic modes of operation will be demonstrated, including applicable operational level deviations to demonstrate proper control loop response.

- HD level controls are tuned and calibrated based on the new FW heaters and new level controls installed for EPU. During power ascension, the level controls are tested by deviating the FW heater level and the placing the control system back in automatic control. Also during power ascension, the level controls are monitored during power increases and when major components are placed in service to demonstrate the automatic level control is operating satisfactory.

- The FW pumps, CS pumps, and HD pumps, along with associated system parameters, will be monitored to ensure the system interactions are performing as expected. The FW and HD minimum flow recirculation systems will be tested as part of the post-modification testing and monitored during the power ascension.

- The revised setpoints and instrument calibrations will be tested as part of the post-modification testing and monitored during power ascension. Any unexpected alarms on control response received during power ascension will be evaluated prior to proceeding to the next plateau.

The above EPU power ascension testing program has been used at several power uprates and has demonstrated that the expected values and plant response are within the design basis, unexpected transients were avoided, and response to plant transient conditions following the uprate continue to be as expected.

The post-modification testing and the above power ascension testing will demonstrate performance of plant controls and enhanced control upgrades will continue to operate reliably at EPU conditions. The changes primarily involve replacement of existing equipment with more reliable equipment with no significant changes to how the integrated controls systems respond to plant transients. Accordingly, subjecting the plant to additional transient or dynamic testing is not required based upon previous experience and experience obtained from the Ginna transient testing as discussed in the revised LAR 261, Attachment 5, Section 2.12, submitted by Reference (4), Enclosure 3.

References

(1) NRC electronic mail to NextEra Energy Point Beach, LLC, dated February 25, 2010, DRAFT - Request for Additional Information from Reactor Systems Branch RE: EPU (ML100560283)

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

(3) NextEra Energy Point Beach, LLC letter to NRC, dated May 20, 2010, License Amendment Request 261, Extended Power Uprate, Response to Request for Additional Information (ML101410093)

(4) NextEra Energy Point Beach, LLC letter to NRC, dated May 6, 2010, License Amendment Request 261, Extended Power Uprate, Response to Request for Additional Information (ML101270061)