NEXTera ENERGY POINT BEACH

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10 CFR 50.46(a)(3)(ii)

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

Large Break Loss-of-Coolant Accident
Margin Summary Sheet – 30-Day Report

In accordance with 10CFR50.46(a)(3)(ii), NextEra Energy Point Beach (NextEra), LLC, is submitting this 30-day report for the Point Beach Nuclear Plant (PBNP) Units 1 and 2 for the emergency core cooling system (ECCS) analysis performed by Westinghouse Electric Company, LLC. The following 30-day report pertaining to the application of the Westinghouse large break loss of coolant accident (LBLOCA) evaluation model.

The Enclosure describes the ECCS evaluation model changes and errors to the large break loss of coolant accident (LOCA). The Table provides the large break LOCA peak cladding temperatures margin summary.

This submittal contains no new commitments or revisions to existing commitments.

Very truly yours,

NextEra Energy Point Beach, LLC

Michael Millen
Licensing Manager
Point Beach Nuclear Plant

Enclosure

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

ENCLOSURE

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

Emergency core cooling system (ECCS) analyses for Point Beach Units 1 and 2 are performed by Westinghouse Electric Company, LLC. The following 30-day report pertaining to the application of the Westinghouse large break loss of coolant accident (LBLOCA) evaluation model is provided pursuant to 10 CFR 50.46(a)(3)(ii). A summary of the calculated peak cladding temperature (PCT) changes for LBLOCA is provided in the Table.

LARGE BREAK LOCA ECCS EVALUATION MODEL CHANGES AND ERRORS

Initial Fuel Pellet Average Temperature Uncertainty Calculation

In the Automated Statistical Treatment of Uncertainty Method (ASTRUM) Best-Estimate (BE) Large-Break Loss-of-Coolant Accident (LBLOCA) Evaluation Model (EM), uncertainties are applied to the gap heat transfer coefficient and pellet thermal conductivity to capture the uncertainty in the initial fuel pellet average temperature. This approach was compared to the initial fuel pellet average temperature uncertainties predicted by the PAD code at beginning-of-life conditions and found to be conservative. However, the initial fuel pellet average temperature uncertainty range analyzed at higher burnups in the ASTRUM EM is much wider than the uncertainty range predicted by the PAD code, which may result in excessively low or high analyzed initial fuel pellet average temperatures.

- This results in an estimated impact of 0 °F for Unit 1 and -46 °F for Unit 2.

Heat Transfer Model Error Corrections

Several related changes were made to WCOBRA/TRAC to correct errors discovered which affected the heat transfer models. These errors included calculation of the entrained liquid fraction used in calculation of the drop wall heat flux, application of the grid enhancement factor for grid temperature calculation, calculation of the Reynold's number used in the Wong-Hochrieter correlation for the heat transfer coefficient from fuel rods to vapor, fuel rod initialization and calculation of cladding inner radius with creep, application of grid and two phase enhancement factors and radiation component in single phase vapor heat transfer, and reset of the critical heat flux temperature under certain conditions.

- This results in an estimated impact of 0 °F for Units 1 and 2.

Correction to Heat Transfer Node Initialization

An error was discovered in the heat transfer node initialization logic in WCOBRA/TRAC whereby the heat transfer node center locations could be inconsistent with the geometric node center elevations. The primary effects of this issue are on the interpolated fluid properties and grid turbulent mixing enhancement at the heat transfer node.

- This results in an estimated impact of 0 °F for Units 1 and 2

Mass Conservation Error Fix

It was identified that mass was not conserved in WCOBRA/TRAC one-dimensional component cells when void fraction values were calculated to be slightly out of the physical range (greater than 1.0 or smaller than 0.0). This was observed to result in artificial mass generation on the secondary side of steam generator components.

- This results in an estimated impact of 0 °F for Units 1 and 2.

Correction to Split Channel Momentum Equation

An error was discovered in the momentum equation calculations for split channels in WCOBRA/TRAC. This error impacts the (1) continuity area of the phantom/boundary bottom cell; (2) bottom and top continuity area correction factors for the channel inlet at the bottom of a section and for the channel outlet at the top of a section; and (3) drop entrainment mass rate per unit volume and drop de-entrainment mass rate per unit volume contributions to the momentum calculations for split channels.

- This results in an estimated impact of 0 °F for Units 1 and 2.

Changes to Vessel Superheated Steam Properties

Several related changes were made to the WCOBRA/TRAC coding for the vessel super-heated water properties, including updating the HGAS subroutine coding, updating the approximation of the enthalpy in the TGAS subroutine to be consistent with the HGAS subroutine coding, and updating the temperature iteration method and convergence criteria in the TGAS subroutine.

- This results in an estimated impact of 0 °F for Units 1 and 2.

Update to Metal Density Reference Temperatures

It was identified that for one-dimensional components in which heat transfer to stainless steel 304 or 316 is modeled, the reference temperature for the metal density calculation was allowed to vary; as a result the total metal mass was not preserved.

- This results in an estimated impact of 0 °F for Units 1 and 2.

Decay Heat Model Error Corrections

The decay heat model in the WCOBRA/TRAC code was updated to correct the erroneously coded value of the yield fraction directly from fission for Group 19 of Pu-239, and to include the term for uncertainty in the prompt energy per fission in the calculation of the decay heat power uncertainty.

- This results in an estimated impact of 0 °F for Units 1 and 2.

Correction to the Pipe Exit Pressure Drop Error

An error was discovered in WCOBRA/TRAC whereby the frictional pressure drop at the split break TEE connection to the BREAK component was incorrectly calculated using the TEE hydraulic diameter instead of the BREAK component length input.

- This results in an estimated impact of 0 °F for Units 1 and 2.

Revised Heat Transfer Multiplier Distributions

Several changes and error corrections were made to WCOBRA/TRAC and the impacts of these changes on the heat transfer multiplier uncertainty distributions were investigated. During this investigation, errors were discovered in the development of the original multiplier distributions, including errors in the grid locations specified in the WCOBRA/TRAC models for the G2 Refill and G2 Reflood tests, and errors in processing test data used to develop the reflood heat transfer multiplier distribution. Therefore, the blowdown heatup, blowdown cooling, refill, and reflood heat transfer multiplier distributions were redeveloped. For the reflood heat transfer multiplier development, the evaluation time windows for each set of test experimental data and each test simulation were separately defined based on the time at which the test or simulation exhibited dispersed flow film boiling heat transfer conditions characteristic of the reflood time period.

- This results in an estimated impact of +9 °F for Unit 1 and +7 °F for Unit 2.

Previous LBLOCA PCT changes are documented in the Reference below. The Table below summarizes the estimated impact of the changes/errors on the Point Beach Units 1 and 2 LBLOCA PCT. The cumulative PCT change for LBLOCA becomes 160 °F and 338 °F for Units 1 and 2, respectively. The limiting LBLOCA PCT with the estimated effect of all the changes/errors is 2135 °F and 2056 °F for Units 1 and 2, respectively. With the impact of all changes/errors, Point Beach Units 1 and Unit 2 continue to comply with the 10 CFR 50.46 acceptance criterion for PCT of $\leq$ 2200 °F.

Reference

NRC 2013-0043, NextEra Energy to US NRC Document Control Desk, "Point Beach Nuclear Plant, Units 1 and 2, Dockets 50-266 and 50-301, Renewed License Nos. DPR-24 and DPR-27, 10 CFR 50.46 Annual Report," June 18, 2013.

TABLE
LARGE BREAK LOCA MARGIN SUMMARY SHEET – 30-DAY REPORT

Plant Name: Point Beach Units 1 and 2

Utility Name: NextEra Energy

Evaluation Model: Westinghouse Realistic Large Break LOCA Evaluation Model using ASTRUM.

Evaluation Model PCT (Unit 1/Unit 2): **1975°F/1810 °F**

			Net PCT Effect Unit 1/Unit 2	**Absolute PCT Effect** Unit 1/Unit 2
A	Prior 10 CFR 50.46 Changes or Error Corrections – up to Year 2012	ΔPCT	+151 °F / +285 °F	151 °F / 285 °F
B	Prior 10 CFR 50.46 Changes or Errors Corrections – Year 2013	ΔPCT	0°F / 0°F	0°F / 0°F
C	10 CFR 50.46 Changes in Year 2013 Since Item B	ΔPCT		
	Initial Fuel Pellet Average Temperature Uncertainty Calculation		0 °F / -46 °F	0 °F / 46 °F
	Heat Transfer Model Error Corrections		0 °F / 0 °F	0 °F / 0 °F
	Correction to Heat Transfer Node Initialization		0 °F / 0 °F	0 °F / 0 °F
	Mass Conservation Error Fix		0 °F / 0 °F	0 °F / 0 °F
	Correction to Split Channel Momentum Equation		0 °F / 0 °F	0 °F / 0 °F
	Changes to Vessel Superheated Steam Properties		0 °F / 0 °F	0 °F / 0 °F
	Update to Metal Density Reference Temperatures		0 °F / 0 °F	0 °F / 0 °F
	Decay Heat Model Error Corrections		0 °F / 0 °F	0 °F / 0 °F
	Correction to the Pipe Exit Pressure Drop Error		0 °F / 0 °F	0 °F / 0 °F
	Revised Heat Transfer Multiplier Distributions		+9 °F / +7 °F	9 °F / 7 °F
D	Absolute Sum of 10 CFR 50.46 Changes	ΔPCT		160 °F / 338 °F

The sum of *the PCT from the most recent analysis using an acceptable evaluation model* and *the estimates of PCT impact for changes and errors identified since this analysis*	**2135 °F / 2056 °F <** 2200°F