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SERIAL: HNP-08-058  
10 CFR 50.46

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

SHEARON HARRIS NUCLEAR POWER PLANT  
DOCKET NO. 50-400/LICENSE NO. NPF-63  
EMERGENCY CORE COOLING SYSTEM EVALUATION CHANGES

Ladies and Gentlemen:

In accordance with the Code of Federal Regulations, Title 10, Part 50.46, "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors," paragraph (a)(3)(ii), the Harris Nuclear Plant (HNP), of Carolina Power & Light Company doing business as Progress Energy Carolinas, Inc., submits its annual report regarding the effect of changes or errors in the application of the Emergency Core Cooling System (ECCS) evaluation models.

The HNP ECCS performance following a large break loss of coolant accident (LBLOCA) is calculated for HNP by AREVA NP using the SEM/PWR-98 ECCS Evaluation Model for PWR LBLOCA Applications. The ECCS performance following a small break loss of coolant accident (SBLOCA) is calculated for HNP by AREVA NP using the EXEM PWR Small Break Model.

The previous HNP annual report to the NRC was provided by letter dated June 1, 2007, which documented a SBLOCA peak clad temperature (PCT) of 1658°F and a LBLOCA PCT of 2102°F. Since that report, no errors or changes in the LOCA models or results have been made that would require a 30-day report under 10 CFR 50.46. The new value for the SBLOCA PCT is 1650°F, and the new value for the LBLOCA PCT is 2081°F.

Attachment 1 provides a summary of the impact of changes and errors on PCT since the June 2007 report.

Attachment 2 provides a summary of the errors associated with the SBLOCA model since the June 2007 report.

Attachment 3 provides a summary of the changes associated with the LBLOCA model since the June 2007 report.

Progress Energy Carolinas, Inc.  
Harris Nuclear Plant  
P. O. Box 165  
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LRR

This letter contains no new regulatory commitments. Please contact me if you have any questions regarding this submittal at (919) 362-3137.

Sincerely,



D. H. Corlett  
Supervisor, Licensing - Regulatory Programs  
Harris Nuclear Plant

DHC/mgw

Attachments:

1. Summary of the Impact of Changes and Errors on Peak Clad Temperature
  2. Summary of the Errors Associated with the Small Break LOCA Model
  3. Summary of the Changes Associated with the Large Break LOCA Model
- c: Mr. P. B. O'Bryan (NRC Sr. Resident Inspector, HNP)  
Mr. L. A. Reyes (NRC Regional Administrator, Region II)  
Ms. M. G. Vaaler (NRC Project Manager, HNP)

**Summary of the Impact of Changes and Errors on Peak Clad Temperature**

**Harris Nuclear Plant Small Break LOCA  
Peak Clad Temperature Summary**

	<u>Peak Clad Temperature (°F)</u>
Value Reported 6/1/2007	1658
Reported Error Impact	-8
New SBLOCA PCT Value	1650

**Harris Nuclear Plant Large Break LOCA  
Peak Clad Temperature Summary**

	<u>Peak Clad Temperature (°F)</u>
Value Reported 6/1/2007	2102
Reported Change Impact	-21
New LBLOCA PCT Value	2081

## **Summary of the Errors Associated With the Small Break LOCA Model**

### Small Break LOCA Reactor Kinetic Model Programming Error

AREVA NP (the HNP nuclear fuel and safety analysis vendor) was informed that the programming for the point kinetics equation in RELAP5 has an error that results in the over prediction of reactor power. RELAP5 is used in the EXEM Small Break Model (topical report XN-NF-82-49). The original error occurred in the development of the RELAP5 software at Idaho National Laboratory. The impact of the error is an estimated 8 °F reduction of the Peak Clad Temperature (PCT). The current PCT is now estimated at 1650 °F and includes several downward adjustments previously reported to the NRC. There are no immediate plans to re-analyze the Small Break Loss of Coolant Accident (SBLOCA) due to the large margin between the result and the 10CFR 50.46 limit and because the individual errors have been assessed in the downward direction.

## **Summary of the Changes Associated with the Large Break LOCA Model**

### Large Break LOCA Re-analysis

The Large Break Loss of Coolant Accident (LBLOCA) analysis was re-performed to support changing the limiting axial power shape and  $k(z)$  curve. The re-analysis also included incorporation of previously identified errors reported against LBLOCA. The revised analysis was put into place with the startup of Cycle 15 (Fall of 2007). The revised LBLOCA analysis decreased the peak clad temperature (PCT) to 2081 °F. The previous value for PCT was 2102 °F and included several estimated errors. The impact of the change is an estimated 21 °F reduction of the Peak Clad Temperature (PCT).