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10 CFR 50.4
L-2010-173
August 5, 2010

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington D.C. 20555-0001

Re: Turkey Point Unit 4
Docket No. 50-251
BADGER Test Results – License Condition 3.H(b)

References:

1. USNRC letter dated November 13, 2009 forwarding Unit 4 License Amendment 237, “Turkey Point Unit 4 - Issuance of Amendment Regarding Implementation Date Change for License Amendment 229 (TAC No. ME2161)”
2. Florida Power and Light Company letter L-2009-270 to the USNRC dated November 13, 2009, “Issuance of Amendment Regarding Spent Fuel Boraflex Remedy, Supplement 7 to Request for a Change in Implementation Date”

The United States Nuclear Regulatory Commission issued Unit 4 License Amendment 237 by Reference 1 in response to Florida Power and Light Company’s (FPL) license amendment application supplement (Reference 2). Unit 4 License Amendment 237 added requirements pertaining to fuel storage in the Unit 4 Spent Fuel Pool (SFP) as Section 3.H of the Unit 4 Renewed Facility Operating License and revised the implementation date of License Amendment 229 to February 28, 2011.

License Condition 3.H(b) requires Boron-10 Areal Density Gauge for Evaluating Racks (BADGER) neutron attenuation testing be performed to assess the condition of the neutron absorber Boraflex in the Unit 4 SFP by May 30, 2010, and the submission of the BADGER test results and a license amendment application to update the Unit 4 SPF licensing basis. The BADGER testing was completed on May 7, 2010. License Condition 3.H(b) requires that the results of the BADGER testing be submitted to the NRC no later than 90 days from the completion of the BADGER testing, which is August 5, 2010. This letter provides the BADGER test results of Boraflex in the Unit 4 SFP.

BADGER testing was performed in Region II of the Unit 4 SFP. Sixty nine Boraflex panels in the Region II racks measured in this test were selected to provide a sample of Boraflex panels representative of the population of panels in the SFP. These panels included some with the greatest gamma exposure in the pool. Panels were selected to include the range of %B₄C loss,

A001
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the range of panel dose and variations in cell service history. The sample size was selected to support a 95/95 statistical analysis; however, the positive testing results obviated the need for this statistical analysis because no test results came close to the licensing basis limit. In addition, FPL has configured Region I of the Unit 4 SFP to comply with the requirements of License Amendment 229 and Region I no longer relies upon Boraflex as a neutron absorber.

Boraflex panel dissolution and gaps/shrinkage are independent physical phenomenon and are treated as separate effects. Dissolution represents a permanent loss of Boron-10 (B-10) from the panel whereas gaps/shrinkage represents an axial redistribution of B-10 within the panel. Additionally, these phenomena are treated separately in the licensing basis criticality analysis. Accordingly, the measurements of these two processes are compared against their separate licensing basis criticality analysis assumptions.

As expected, the minimum amount of B-10 areal density and the maximum gaps/shrinkage measured for all Boraflex panels were both well within licensing basis criticality analysis assumptions.

Measured Boraflex Panel B-10 Areal Density

The measured data from the 69 panels is shown in Table 4-1 of the Attachment. The non-gap areal density as a function of panel dose as shown in Figure 4-8 of the Attachment indicates that the remaining areal density of all measured panels is well above the licensing basis criticality analysis assumption of 0.006 g B-10/cm².

The North panel of storage cell R36, as indicated in Table 4-1 of the Attachment, had the lowest measured non-gap areal density of 0.0109 gm B-10/cm². Accounting for measurement uncertainty would place the true measured value in the range of 0.010 to 0.012 gm B-10/cm². This is well above the licensing basis value of 0.006 gm B-10/cm².

Measured Boraflex Panel Gaps and Shrinkage

The licensing basis criticality analysis assumes five 1.5 inch gaps near the center of the Boraflex panel and another 4.18 inch gap at the top of the panel to account for top shrinkage. Furthermore, no credit is taken in the analysis for densification of the Boraflex due to gaps. The percent shrinkage measured is the ratio of the cumulative gap size to the total Boraflex panel length. The cumulative gap size assumed in the criticality analysis is 11.68 inches for all Boraflex panels which translates to an assumed shrinkage of 8.4%. This value provides a conservative upper limit for Unit 4 since the panel length is 141.4 inches vs. 139.4 inches assumed in the criticality analysis.

A review of the gap size data in Table 4-1 of the Attachment shows that the cumulative gap size for any panel was no greater than 6.32 inches and corresponds to shrinkage of 4.5 %. This information in combination with the distribution of axial gaps in Figure 4-10 of the Attachment

demonstrates that the gap/shrinkage is conservatively bounded by the licensing basis criticality analysis assumptions since the gaps are not coplanar.

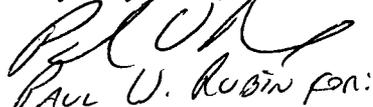
BADGER Test Conclusion

The BADGER test of the Boraflex panels in the Unit 4 SFP demonstrated that the panel dissolution and gap characteristics are conservatively bounded by the design basis assumptions in the criticality analysis.

At the time License Condition 3.H was issued, FPL had no faith in its vendor's capability to deliver Metamic™ inserts to specification in a timely manner and had requested an extension of time to implement License Amendment 229, until September 30, 2012. At that time, no BADGER testing had been performed in the Unit 4 SFP. The NRC approved an extension until February 28, 2011, a requirement for a BADGER test to validate the status of Boraflex and the submission of a basis for a further extension of time beyond February 28, 2011. Because the purpose of the license amendment application was to request further extension of time to implement License Amendment 229, the NRC required that the application be submitted within 90 days of the BADGER test. The deadline for the BADGER test is to provide sufficient time for NRC staff review before the current deadline for implementation of License Amendment 229. Since then, our supplier has been able to deliver sufficient Metamic™ inserts and the current schedule is to complete installation in both the Unit 3 and 4 SFPs by the end of September 2010, at which point Turkey Point Unit 4 will be in compliance with License Amendment 229. Therefore, FPL has determined that a license amendment application is not required because License Condition 3.H can be satisfied by completing the implementation of License Amendment 229 by the currently required date and the condition of Boraflex in the Unit 4 SFP has been verified to comply with its licensing basis requirements as described herein.

If you have any questions or require additional information, please contact Robert Tomonto at 305-246-7327.

Very truly yours,



Paul U. Rubin for:

Michael Kiley
Vice President
Turkey Point Nuclear Plant

Attachment: NETCO Report NET-346-01: BADGER Test Campaign at Turkey Point Unit 4

cc: Regional Administrator, Region II, USNRC
Senior Resident Inspector, USNRC, Turkey Point Nuclear Plant