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AUTH. NAME AUTHOR AFFILIATION
WILLIAMS, J. W. Florida Power & Light Co.
RECIP. NAME RECIPIENT AFFILIATION
MIRAGLIA, F. J. Division of Pressurized Water Reactor Licensing - B (post 8

SUBJECT: Forwards addl info re 851017 application for amend to License DPR-67, modifying Tech Spec limit for linear heat generation rate to be in compliance w/10CFR50.46.

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FLORIDA POWER & LIGHT COMPANY

DEC 2 1985
L-85-447

Office of Nuclear Reactor Regulation
Attention: Mr. Frank J. Miraglia, Jr., Director
Division of PWR Licensing-B
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Miraglia:

Re: St. Lucie Unit No. 1
Docket No. 50-335
Proposed License Amendment
Linear Heat Generation Rate
Additional Information - NRC TAC No. 59920

Florida Power and Light Company (FPL) letter L-85-396, dated October 17, 1985, requested a license amendment to modify the Technical Specification limit for the linear heat generation rate to be in compliance with 10 CFR 50 Part 46. This change became necessary as a result of correcting an input error in the St. Lucie Unit 1 LOCA-ECCS analysis. The details of the input error were provided to NRC on August 27, 1985 (L-85-331).

NRC is reviewing the amendment request and has determined that additional information is needed. Attached is the information requested by Core Peformance Branch and Reactor Systems Branch, so that their reviews can be completed.

Very truly yours,

J. W. Williams, Jr.
Group Vice President
Nuclear Energy

JWW/RJS/gp

Attachment

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PROPOSED LICENSE AMENDMENT
LINEAR HEAT GENERATION RATE
ADDITIONAL INFORMATION
NRC TAC NO. 59920

CORE PEFORMANCE BRANCH

Question No. 1:

In your request to allow violation of the Linear Heat Generation Rate (LHGR) Limiting Condition for Operation (LCO) during performance of the Moderator Temperature Coefficient (MTC) testing, you state that the measured LHGR during the MTC testing may exceed the LHGR LCO. What is the axial linear heat rate expected during the MTC test?

FPL Response:

The highest axial linear heat rate is expected during the beginning of Cycle 7 MTC testing. Figure 1 presents the predicted axial linear heat rate for the nominal beginning of Cycle 7, and the rate that is expected to result from the MTC test. As shown in Figure 1, the predicted LHGR is not expected to exceed the limits of Technical Specification Figure 3.2-1. The shift in the axial power shape is due to the partial insertion of control rods during this test. As can be seen, the maximum increase is about 0.5 kw/ft, and this increase occurs towards the bottom of the core. The data presented in this figure represents LHR values calculated with standard Exxon Nuclear methodology. The Technical Specification uncertainty factors of 1.07 (measurement uncertainty), 1.03 (engineering factor) and 1.02 (power uncertainty) have been included. The 1.01 densification uncertainty factor has not been included. A 1.05 design allowance has also been included.

It should be noted that the expected change in linear heat rate predicted in Figure 1 does not represent the response of the incore detectors during the MTC test. The incore detectors, which are normally used to ensure compliance with the linear heat rate Technical Specification are subject to radial peaking as well as axial peaking effects during the MTC test. It is due to the change in incore detector response during the MTC test that the special test exception has been requested.

REACTOR SYSTEMS BRANCH

Question No. 1:

For reference, how many tubes are currently plugged in each generator? What fraction of tubes per generator is each value equivalent to?

FPL Response:

As of November 26, 1985, the following tubes have been plugged:

Steam Generator "A" - 336 plugged = 4.0%
Steam Generator "B" - 303 plugged = 3.6%

Steam Generator ISI is currently in progress and additional tube plugging will be required. While the extent of the additional tube plugging has not yet been determined, based on information to date, we anticipate being substantially below the limiting tube plugging analytical assumption of 11%.

Question No. 2:

The information provided indicates that the licensee is requesting allowed steam generator tube plugging based on uniform plugging not to exceed 15% in a generator. This would suggest that the maximum allowable asymmetric plugging could be as high as 15%. Define the maximum permissible asymmetric plugging permitted as proposed in the amendment.

FPL Response:

The large break LOCA-ECCS analysis was performed with 17% steam generator tube plugging in the broken loop steam generator and 13% tube plugging in the intact loop steam generator. This analysis bounds steam generator tube plugging up to an average of 15% tube plugging in both steam generators and an asymmetric plugging difference of up to 4% between the two steam generators.

NRC Question No. 3:

Provide justification that, for the steam generator plugging proposed, the plant meets all Commission regulations for both LOCA and non-LOCA transients and accidents. Address the effects of asymmetric tube plugging.

FPL Response:

To allow operation with steam generator tube plugging at levels higher than previously approved, both the LOCA and non-LOCA transients must be reviewed. The LOCA analysis reported in XN-NF-85-117 was performed at a 15% average plugging level with 4% asymmetry to bound possible future plugging without requiring an additional large break LOCA analysis. When operation with the higher plugging is required, the remaining transients must be evaluated. For example, for Cycle 7, the remaining transients were evaluated to an average plugging of 11%. The results of this evaluation were presented in XN-NF-85-73, Revision 2, "St. Lucie Unit 1 Cycle 7 Safety Analysis Report." This safety analysis report has been provided for information to the NRC.

NRC Question No. 4:

Provide the justification of the tube plugging assumptions in XN-NF-85-117. (17% in broken loop, 13% in intact loop).

FPL Response:

A LOCA-ECCS analysis supporting operation with up to an average of 15% steam generator tube plugging with as much as 4% more tubes plugged in one generator than in the other was performed. The configuration analyzed was chosen based on ENC's experience as being the worst case for these conditions.

NRC Question No. 5:

Provide the justification for using 15 kw/ft for the guillotine breaks but using only 14 kw/ft for the split breaks. How does this demonstrate compliance with 10 CFR 50 Appendix K Section A?

FPL Response:

As stated in XN-NF-85-117, identification of the limiting break LOCA was made from partial preliminary results. A supplement to XN-NF-85-117 containing the large break LOCA break spectrum results and exposure study results is in preparation. This supplement will contain final break spectrum results using the 15 kw/ft power profile peaked at 0.6 x/l as reported in XN-NF-85-117 and will show compliance to 10 CFR 50 Appendix K for all breaks.

NRC Question No. 6:

The request to allow violation of the LHGR LCO during MTC tests is based on the argument that the frequency of a LOCA during the test period is "very low". Estimate the frequency, and discuss why the increase in risk associated with this request is considered negligible. Should additional steps and/or precautions be included in the MTC test procedure to reduce the associated risk? For example, assure no ECCS sub-systems are being tested or out of service during the MTC tests.

FPL Response:

As indicated in the October 17, 1985 application, the MTC testing event frequency can be conservatively estimated to be less than 10^{-2}/year. This event frequency times the LOCA probability results in an acceptably low event frequency.

Furthermore, as indicated in the above response to Core Performance Branch Question No. 1, at no time is the predicted LHGR expected to exceed the Technical Specification limits. Therefore, there is no increase in risk, and additional steps and/or precautions are not necessary.

FIGURE 1

ST. LUCIE-1 Predicted BOC7 Maximum Axial LHR at ARO Equilibrium Conditions and MTC Test Conditions. (No 1.01 densification factor. Other Tech Spec Uncertainties Included. A 1.05 Design Allowance Is Included.)