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PLUNKETT, T.F. Florida Power & Light Co.
RECIP. NAME RECIPIENT AFFILIATION

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SUBJECT: Provides 10CFR50.46, "Acceptance Criteria for ECCS in Light
Water Nuclear Power Reactors" annual rept for CY93.

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OCT 29 1993

L-93-267
10 CFR 50.46

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

Re: Turkey Point Units 3 and 4
Docket Nos. 50-250 and 50-251
10 CFR 50.46, "Acceptance Criteria for
Emergency Core Cooling Systems In Light Water
Nuclear Power Reactors" - Annual Report

Gentlemen:

10 CFR 50.46 (a) (3) (ii) requires that licensees report to the Commission at least annually the nature of changes to, or errors discovered in, the emergency core cooling system (ECCS) evaluation models, or in the application of such models that affect the peak clad temperature calculation and their effect on the limiting ECCS analysis. This letter provides Florida Power and Light Company's report for Turkey Point Units 3 and 4 for calendar year 1993.

Should there be any questions, please contact us.

Very truly yours,

T. F. Plunkett
Vice President
Turkey Point Nuclear

Attachment

TFP/RJT/rjt

cc: Stewart D. Ebnetter, Regional Administrator, Region II, USNRC
Senior Resident Inspector, USNRC, Turkey Point Plant

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ATTACHMENT

Re: Turkey Point Units 3 and 4
Docket Nos. 50-250 and 50-251
10 CFR 50.46, "Acceptance Criteria for Emergency Core
Cooling Systems In Light Water Nuclear Power Reactors"
Annual Report

Large Break LOCA (LBLOCA)

By letter L-92-338 dated December 18, 1992, Florida Power and Light Company (FPL) reported a peak clad temperature (PCT) of 2129°F in the event of a worst case large break loss of coolant accident (LBLOCA) transient. This value included a calculated peak temperature of 2082°F plus 47°F increment due to containment purge coincident with a LBLOCA, increased steady-state pressurizer pressure uncertainty band, transition fuel core penalty, implementation of debris resistant fuel assemblies and stainless steel rods in fuel assemblies, steam generator tube collapse during an earthquake, and revised grid loss coefficients resulting in an increased core pressure drop.

Recent corrections to the WREFLOOD-INTERIM Structural Metal Heat Model in the BART computer model have resulted in a decrease in the peak clad temperature for the worst case LBLOCA of 25°F for a total PCT of 2104°F. This 25°F benefit is a result of a revision in the WREFLOOD-INTERIM Structural Metal Heat Model to allow for a more detailed specification of structural materials.

The LBLOCA analysis as described in the Updated Final Safety Analysis Report (UFSAR) was performed by Westinghouse in 1991 using the BART computer model with fuel assembly spacer grids.

Small Break LOCA (SBLOCA)

By letter L-92-338, Florida Power and Light Company reported a peak clad temperature of 1716°F in the event of a worst case small break loss of coolant accident (SBLOCA) transient. This value was based upon a new Turkey Point SBLOCA analysis performed by Westinghouse in 1991 using the NOTRUMP digital computer code. This value included a calculated peak clad temperature of 1749°F plus a 2°F increase due to the presence of stainless steel rods in fuel assemblies, and a 35°F benefit due to a NOTRUMP Bessel function correction.

Westinghouse recently completed an evaluation of a potential issue concerning the modeling of Safety Injection (SI) flow into the broken reactor coolant system (RCS) loop for SBLOCA.

Small Break LOCA (SBLOCA) - (Continue)

Westinghouse previously assumed that SI to the broken RCS loop would result in a lower calculated PCT and, therefore, modeled the Emergency Core Cooling System (ECCS) broken loop branch line to spill the SI to the containment sump. The basis for this assumption maximizes the SI spill, minimizes SI delivered to the core through the intact loops and maximizes the predicted PCT during a small break LOCA.

However, when SI is modeled to enter into the broken loop, a significant PCT penalty of 150°F was calculated. The analysis by Westinghouse indicate that the penalty occurs as a result of competition between the steam venting out the break and the SI to the broken loop, which also exits through the break. The competition between the steam and the SI results in higher RCS pressure for the identical core steaming rates.

In addition, Westinghouse has developed a modeling enhancement in the NOTRUMP computer code which increases condensation of steam in the RCS cold legs. This improved condensation model is based on data obtained from Westinghouse's COSI test facility. The results from the model reveal a reduction in the RCS pressure and an increase in the SI flow. The net effect is a reduction of 150°F in the peak clad temperature.

FPL is continuing to review with Westinghouse, the issue of safety injection in the broken loop and the impact on the NOTRUMP evaluation model. FPL will provide to the NRC by February 1, 1994, a schedule for resolution of this issue.

Westinghouse also discovered errors in the NOTRUMP Subroutine DFCORRS where the improved TRAC-P1 vertical flow regime map is evaluated. In the evaluation model applications, this model is only used during counter-current flow conditions in vertical flow links. The result of this error was a discontinuity in the flow regime map, which when corrected results in a PCT benefit of 13°F.

Summary

The revised peak clad temperatures of 2104°F for the worst case LBLOCA and 1703°F for the worst case SBLOCA, correcting for the effects discussed herein and summarized in the enclosed Tables 1 and 2, are below the 10 CFR 50.46 acceptance limit of 2200°F.

TABLE 1
TURKEY POINT UNITS 3 AND 4
PREDICTED PEAK CLAD TEMPERATURES
CURRENT LBLOCA EVALUATIONS
THAT HAVE ASSESSED PCT PENALTIES

Analysis of Record 2082°F

Evaluations specified in FPL letter L-92-338

Effect of Containment Purging	9°F
Pressurizer Pressure Uncertainty	8°F
Implementation of Debris Resistant FA	3°F
Transition Core Penalty	10°F
Stainless Steel Rods in Fuel Assemblies	2°F
Steam Generator Tube Collapse During an Earthquake	18°F
Revised Grid Loss Coefficients	-3°F

Total LBLOCA PCT specified
in FPL Letter L-92-238 2129°F

Evaluations since issuance of FPL letter L-92-338

WREFLOOD Structural Metal Heat Modeling -25°F

Total Estimated LBLOCA PCT 2104°F

TABLE 2
TURKEY POINT UNITS 3 AND 4
PREDICTED PEAK CLAD TEMPERATURES
CURRENT SBLOCA EVALUATIONS
THAT HAVE ASSESSED PCT PENALTIES

Analysis of Record		1749°F
<u>Evaluations specified in FPL letter L-92-338</u>		
Stainless Steel Rods in Fuel Assemblies	2°F	
NOTRUMP Bessel Function Correction	-35°F	
Total SBLOCA PCT specified in FPL Letter L-92-338		1716°F
<u>Evaluations since issuance of FPL letter L-92-338</u>		
Effect of Safety Injection in Broken Loop	150°F	
Effect of Improved Condensation Model	-150°F	
Drift Flux Flow Regime Errors	-13°F	
Total Estimated SBLOCA PCT		1703°F

