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 FACIL: 50-389 St. Lucie Plant, Unit 2, Florida Power & Light Co.
 AUTH. NAME: WOODY, C. D. AUTHOR AFFILIATION: Florida Power & Light Co.
 RECIP. NAME: THADANI, A. C. RECIPIENT AFFILIATION: PWR Project Directorate 8

DOCKET # 05000389

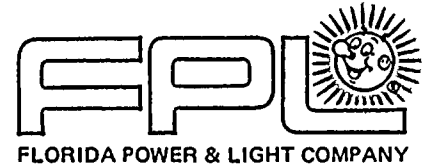
SUBJECT: Application for amend to License NPF-16, incorporating revised pressure/temp limits & results of low temp overpressure protection analysis into Tech Specs. Safety evaluation & NSHC encl. Fee paid.

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L-86-281

Office of Nuclear Reactor Regulation
Attention: Mr. Ashok C. Thadani, Director
PWR Project Directorate #8
Division of PWR Licensing - B
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Thadani:

Re: St. Lucie Unit 2
Docket No. 50-389
Proposed License Amendment
P/T Limits and LTOP Analysis

In accordance with 10 CFR 50.90, Florida Power & Light Company (FPL) submits herewith three signed originals and forty copies of a request to amend Facility Operating License NPF-16.

The purpose of the amendment is to incorporate revised Pressure/Temperature (P/T) limits and the results of a recent Low Temperature Overpressure Protection (LTOP) analysis into the Technical Specifications for St. Lucie Unit 2. P/T limit calculations and LTOP analyses were performed for 5, 10, 15, 20, 25, 30, and 32 Effective Full Power Years (EFPY). Heatup curves, cooldown curves, and alignment temperatures have been provided for each time interval. Your approval of the proposed amendment is requested prior to the plant reaching 2.6 EFPY (September 11, 1986), as the existing P/T curves expire at that time. We are prepared to meet with your staff as necessary to expedite the review process.

Attachment 1 is a Safety Evaluation of the proposed amendment. Attachment 2 is a determination of the "No Significant Hazards Consideration." Revised Technical Specification pages are provided in Attachment 3.

The proposed amendment has been reviewed by the St. Lucie Facility Review Group and the Florida Power & Light Company Nuclear Review Board.

In accordance with 10 CFR 50.91(b)(1), a copy of the proposed amendment is being forwarded to the state designee for the State of Florida.

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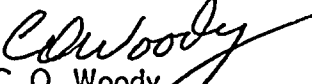


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Mr. Ashok C. Thandani, Director
L-86-281
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In accordance with 10 CFR 170.21, FPL Check No. 1802 is attached as remittance of the license amendment application fee.

Very truly yours,


C. O. Woody
Group Vice President
Nuclear Energy

COW/MAS/gp

Attachments

cc: Mr. Alan Schubert, Florida Dept. of Health and Rehabilitative Services
Dr. J. Nelson Grace, USNRC, Region II
Harold F. Reis, Esquire, Newman & Holtzinger

Faint, illegible text scattered across the page, possibly bleed-through from the reverse side. The text is too light to transcribe accurately.

STATE OF FLORIDA)
) ss.
COUNTY OF DADE)

C. O. Woody being first duly sworn, deposes and says:

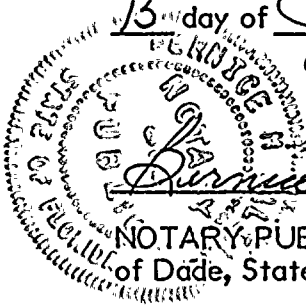
That he is a Group Vice President of Florida Power & Light Company, the Licensee herein;

That he has executed the foregoing document; that the statements made in this document are true and correct to the best of his knowledge, information, and belief, and that he is authorized to execute the document on behalf of said Licensee.

C. O. Woody
C. O. Woody

Subscribed and sworn to before me this

15 day of July, 1986.

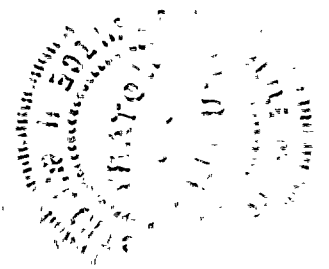


Bernice M. Salinas

NOTARY PUBLIC, in and for the County of Dade, State of Florida

NOTARY PUBLIC STATE OF FLORIDA
MY COMMISSION EXP SEPT 18, 1989
BONDED THRU GENERAL INS. UND.

.My Commission expires: _____



ATTACHMENT I

St. Lucie Unit 2 P/T Limits and LTOP Analysis Safety Evaluation

I. INTRODUCTION

New pressure/temperature (P/T) limit curves have been generated in intervals of five Effective Full Power Years (EFPY). There is a separate set of two curves, one for heatup/criticality and one for cooldown/in-service-testing, for each 5-year interval out to 32 EFPY (32 EFPY corresponds to 40 calendar years, which is the term of the Operating License).

A new Low Temperature Overpressure Protection (LTOP) analysis has also been performed to maximize heatup and cooldown rates (while leaving sufficient margin) for each new set of P/T limit curves.

II. METHODOLOGY

I. P/T Limits

New pressure/temperature (P/T) limits have been calculated for 5 to 32 EFPY in 5 EFPY increments. The P/T limits are intended to provide assurance that the Reactor Coolant Pressure Boundary (RCPB) behaves in a non-brittle manner and the probability of rapidly propagating fracture is minimized. These limits were developed using a conservative Linear Elastic Fracture Mechanics (LEFM) methodology in accordance with the fracture toughness requirements of 10 CFR Part 50 Appendix G as supplemented by the ASME Code Section III Appendix G, "Protection Against Nonductile Failure".

Seven critical locations of the reactor vessel were considered. At each location being analyzed, a maximum postulated flaw was assumed. At the same location, the mode I stress intensity factor K_I was calculated for the specified loadings (pressure and thermal stresses) and the sum of the K_I values is compared to a reference stress intensity value K_{IR} which is the highest critical value of K_I based upon the static, dynamic, and crack arrest fracture toughness values that can be ensured for the material and temperature involved.

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For the reactor vessel beltline region, a postulated semi-elliptical surface flaw oriented in the axial direction with a depth of 1/4 of the vessel thickness was analyzed. For the reactor vessel flange area, a postulated defect with a depth of .75" was analyzed as permitted by the ASME Code Section III Appendix G. Factors of safety utilized on the membrane and thermal stress intensities were 2.0 and 1.0 for normal operation and 1.5 on membrane stresses for hydrostatic tests.

The P/T limits were based on fast neutron fluence predictions for the ends of the respective operating periods. Reactor vessel material surveillance capsule #1 was used to establish baseline data. The shifts in the reference transition temperature of the controlling metal at the reactor vessel wall 1/4 t (for I.D.) and 3/4 t (for O.D.) locations were calculated using Regulatory Guide 1.99, Revision 02 (Draft) shift predictions and C-E's flux attenuation factors.

The P/T limits have been adjusted to indicated pressurizer pressure and indicated RCS temperature by correcting for instrument loop and hydrodynamic errors using actual startup test data. The pressure correction factors for core delta-P and RCS piping losses are based on actual flow velocities for specific RCP operating combinations.

An upward correction of 15 psi has been applied to the RCP curves to conservatively account for the current 18-month (as opposed to 6-month) calibration interval.

2. LTOP Analysis

The most limiting (worst case) RCS pressure transients were identified and analyzed with either PORVs or SDCS relief valves mitigating. Consistent with the single failure criterion, only one PORV or SDCS relief valve was assumed to be available to mitigate the transients.

The energy addition (RCP start) transient analysis was performed for a secondary-to-primary temperature differential of 40°F and was based on the existing SDCS relief valve setpoint and a number of PORV setpoints. Water-solid conditions in the pressurizer were assumed in the RCP start analysis.

The mass addition transient analysis was limited to two cases: (1) two charging pumps and (2) one HPSI and three charging pumps. Both transients were analyzed under water-solid conditions. Additionally, the latter was analyzed assuming a steam bubble in the pressurizer.



III. CONCLUSION

The revised P/T limit curves are shown in Attachment 3 (Proposed Technical Specification Changes).

Revised heatup/cooldown rates and operational limitations based on the LTOP analysis are shown on Tables I through 7. The LTOP analysis is based on maintaining the shutdown cooling system (SDCS) relief valves at the current setpoint of 350 psia. Both power operated relief valves are assumed to have a setpoint of 470 psia.

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ATTACHMENT 2

St. Lucie Unit 2 P/T Limits and LTOP Analysis No Significant Hazards Consideration

The standards used to arrive at a determination that a request for amendment involves no significant hazards consideration are included in the Commission's regulation, 10 CFR 50.92, which states that no significant hazards considerations are involved if the operation of the facility in accordance with the proposed amendment would not (1) involve a significant increase in the probability or consequences of an accident previously evaluated; or (2) create the possibility of a new or different kind of accident from any accident previously evaluated; or (3) involve a significant reduction in a margin of safety. Each standard is discussed as follows:

- (1) Operation of the facility in accordance with the proposed amendment would not involve a significant increase in the probability or consequences of an accident previously evaluated.

The pressure/temperature (P/T) limit curves in the Technical Specifications are conservatively generated in accordance with the fracture toughness requirements of 10 CFR 50 Appendix G as supplemented by the ASME Code Section III, Appendix G. The RT_{NDT} values for the revised curves are based on Regulatory Guide 1.99, Revision 02 (Draft) shift predictions and Combustion Engineering flux attenuation factors. The analysis of reactor vessel material irradiation surveillance specimens are used to verify the validity of the fluence predictions and the P/T limit curves. Use of the revised curves in conjunction with the surveillance specimen program ensures that the reactor coolant pressure boundary will behave in a non-brittle manner and that the possibility of rapidly propagating fracture is eliminated.

In conjunction with revising the P/T limit curves, a low temperature overpressure protection analysis has been performed to establish the configuration and PORV setpoints of the Unit 2 overpressure protection system.

To ensure compliance with the P/T limit curves, overpressure protection is provided to keep the RCS pressure below the P/T limits for any given temperature after the initiation of assumed pressure transients (energy-addition and mass-addition transients) while operating below the temperature at which the pressurizer safety valves provide overpressure protection during heatup and cooldown.

THE NATIONAL ARCHIVES
College Park, Maryland

Dear Sirs:

I have the honor to acknowledge the receipt of your letter of the 15th inst. and in reply to inform you that the records of the [illegible] are being reviewed and will be made available to you as soon as possible. The records of the [illegible] are being reviewed and will be made available to you as soon as possible.

Very respectfully,
[illegible]

It is to be noted that the records of the [illegible] are being reviewed and will be made available to you as soon as possible. The records of the [illegible] are being reviewed and will be made available to you as soon as possible.

Very truly yours,
[illegible]

Very truly yours,
[illegible]

The revised P/T curves and LTOP system do not represent a significant change in the configuration or operation of the plant. The results of the LTOP analysis show that the limiting pressures for a given temperature are not exceeded for the assumed transients and that reactor vessel integrity is maintained. Thus, the proposed amendment does not involve an increase in the probability or consequences of events previously evaluated.

- (2) Use of the modified specification would not create the possibility of a new or different kind of accident from any accident previously evaluated.

The evaluation performed by Combustion Engineering has resulted in revised P/T limits based on the fracture toughness requirements of 10 CFR 50 Appendix G, and in a revised low temperature overpressure protection system based on standard energy-addition and mass-addition transients. Use of the revised limits/setpoints will not create the possibility of a new or different kind of accident from any previously evaluated.

- (3) Use of the modified specification would not involve a significant reduction in a margin of safety.

The proposed amendment will not involve a significant reduction in a margin of safety, because the fracture toughness requirements of 10 CFR 50 Appendix G are satisfied and conservative operating restrictions are applied for the purpose of low temperature overpressure protection.

In conclusion, based on the analysis performed by Combustion Engineering, we have determined that the amendment request does not (1) involve a significant increase in the probability or consequences of an accident previously evaluated, (2) create the probability of a new and different kind of accident from any accident previously evaluated, or (3) involve a significant reduction in a margin of safety; and therefore does not involve a significant hazards consideration.

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