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50-251 Turkey Point Plant, Unit 4, Florida Power and Light C 05000251
AUTH.NAME AUTHOR AFFILIATION
HOVEY,R.J. Florida Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION
Document Control Branch (Document Control Desk)

SUBJECT: Application for amends to licenses DPR-31 & DPR-41,modifying TS sections 5.3.1 & 6.9.1.7 to allow implementation of ZIRLO fuel rod cladding.

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FPL

JAN 09 1998

L-97-317
10 CFR 50.36
10 CFR 50.90

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
Proposed License Amendments
Implementation of ZIRLO^{tm} Fuel Rod Cladding

In accordance with Title 10 Code of Federal Regulations 50.90 (10 CFR 50.90), Florida Power and Light Company (FPL) requests that Appendix A of Facility Operating Licenses DPR-31 and DPR-41 be amended to modify Turkey Point Units 3 and 4 Technical Specifications Section 5.3.1, Design Features, and Section 6.9.1.7, Core Operating Limits Report (COLR). These requested changes will allow implementation of ZIRLO^{tm} fuel rod cladding. FPL requests review and approval of the proposed amendments by May 1, 1998.

FPL has determined the proposed license amendments do not involve a significant hazard pursuant to 10 CFR 50.92. A description of this amendments request is provided in Attachment 1. The no significant hazards determination is provided in Attachment 2. The revised Technical Specifications are provided in Attachment 3.

In accordance with 10 CFR 50.91 (b) (1), a copy of these proposed license amendments are being forwarded to the State Designee for the State of Florida.

The proposed amendments have been reviewed by the Turkey Point Plant Nuclear Safety Committee and the FPL Company Nuclear Review Board.

Should there be any questions on this request, please contact us.

Very truly yours,

R. J. Hovey
Vice President
Turkey Point Plant

OIH

Attachments

cc: L. A. Reyes, Regional Administrator, Region II, USNRC
T. P. Johnson, Senior Resident Inspector, USNRC, Turkey Point
W. A. Passetti, Florida Department of Health and Rehabilitative Services

A001

L-97-317
Proposed License Amendments
Implementation of ZIRLO™ Fuel Rod Cladding

STATE OF FLORIDA)
) ss.
COUNTY OF DADE)

R. J. Hovey being first duly sworn, deposes and says:

That he is Vice President, Turkey Point Plant, of Florida Power and 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.

R. J. Hovey

Subscribed and sworn to before me this
9th day of January, 1998.

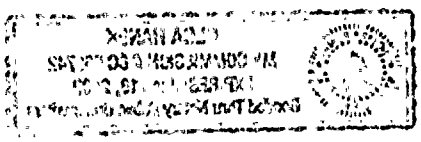
Olga Hanek

Olga Hanek
Name of Notary Public (Type or Print)

OLGA HANEK
MY COMMISSION # CC 562742
EXPIRES: June 18, 2000
Bonded Thru Notary Public Underwriters

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

R. J. Hovey is personally known to me.



DESCRIPTION OF PROPOSED AMENDMENTS REQUEST

Introduction

Florida Power & Light Company (FPL) proposes to amend the Turkey Point Units 3 and 4 Technical Specifications (TS) Section 5.3.1, Design Features, and Section 6.9.1.7, Administrative Controls - Core Operating Limits Report (COLR), to allow the use of ZIRLO^{tm} fuel rod clad material.

The proposed change to TS Section 5.3.1, Design Features, will add ZIRLO^{tm} to the permitted fuel rod clad material. In addition, a reference will be added to the Core Operating Limits Report (COLR) Section 6.9.1.7 of the TS in the paragraph describing the analytical methods used to determine the Heat Flux Hot Channel Factor, F_Q (Z); Nuclear Enthalpy Rise Hot Channel Factor, $F_{\Delta H}$; and the Normalized F_Q (Z) as a function of core height, K(Z) curve. This reference documents the changes in Westinghouse's analysis methodology required to use ZIRLO^{tm}.

Discussion

In order to gain margin to the fuel rod corrosion design limits, a change from Zircaloy-4 (Zr-4) to the ZIRLO^{tm} material has been proposed. ZIRLO^{tm} is an alloy of zirconium similar to Zr-4 which was developed to enhance corrosion resistance. ZIRLO^{tm} is a modification of Zr-4 that includes a reduction in the tin and iron content, elimination of the chromium content, and addition of niobium.

The thermophysical properties of ZIRLO^{tm} clad material are essentially identical to Zr-4, except for the effect of the phase change temperature shift on the specific heat versus temperature relationship. The ZIRLO^{tm} phase change occurs at a temperature of approximately 1380°F. Below this temperature, the specific heat of Zircaloy-4 and ZIRLO^{tm} clad are essentially identical. ZIRLO^{tm} has the following beneficial mechanical characteristics relative to Zr-4: 20% lower creep rate, 50% lower irradiation growth, and 65% lower waterside corrosion.

SAFETY ANALYSIS REVIEW

The current TS specifically refer to the fuel rod clad material as Zr-4. The analytical methods referenced in the COLR section of the TS used to determine the F_Q (Z), $F_{\Delta H}$ and K(Z) curve refer to Zr-4. This review of the safety analysis is with respect to the impact of changing from Zr-4 to ZIRLO^{tm} for fuel rod cladding.

Loss Of Coolant Accident (LOCA) and LOCA-Related Evaluations

The ZIRLO^{tm} and Zr-4 behavior, under high temperature conditions that are typical of a LOCA, has been studied. The effect of ZIRLO^{tm} is expected to have a relatively small effect, 20-30°F increase, on Peak Clad Temperature (PCT) because of small differences in material properties. A Turkey Point specific evaluation is required to evaluate the impact of ZIRLO^{tm} fuel rod cladding on Large Break LOCA. The current PCT margin using the Westinghouse Best Estimate LOCA methodology is 133°F.

Therefore, the calculated PCT for the Large Break LOCA will remain below the 2200°F acceptance criteria after implementation of ZIRLO™ fuel rod cladding.

The small break LOCA analysis results will not be significantly affected by the small differences in material properties due to changing from Zr-4 to ZIRLO™ for fuel rod cladding. The small increase in stored energy associated with ZIRLO™ fuel rod cladding does not significantly affect core uncovery time and therefore, PCT is not significantly affected. As such, the small break LOCA analysis results will continue to be bounded by the large break LOCA analysis results.

The LOCA-related accident analyses remain valid for implementation of ZIRLO™. ZIRLO™ fuel rod cladding will not affect the normal plant operating parameters, the safeguards system actuation, the accident mitigation capabilities important to a LOCA, nor the assumptions used in the LOCA-related accidents. ZIRLO™ fuel rod cladding will not create conditions more limiting than those assumed in these analyses.

Non-LOCA Related Evaluations

The thermophysical properties of ZIRLO™ clad material are essentially identical to Zr-4, except for the effect of the phase change temperature shift on the specific heat versus temperature relationship. The ZIRLO™ phase change occurs at a temperature of approximately 1380°F. Below this temperature, the specific heat of Zr-4 and ZIRLO™ clad are essentially identical. Therefore, for those non-LOCA accident analyses in which the clad temperature does not reach or exceed a value of 1380°F, the introduction of the ZIRLO™ clad will have no effect upon the analysis results. Only two events were predicted to reach a clad temperature of 1380°F: 1) Locked Rotor/Shaft Break PCT analysis, and 2) Rod Cluster Control Assembly (RCCA) Ejection.

Locked Rotor/Shaft Break

For this event, conservative analyses have determined that the ZIRLO™ clad results in a 2°F increase in the PCT when compared to Zr-4. The effect on the metal-water reaction rate is negligible. Specific heat differences do not affect the number of rods-in-DNB or the peak Reactor Coolant System (RCS) pressure.

RCCA Ejection

Sensitivity analyses of the hot full power and hot zero power rod ejection events were performed, accounting for the specific heat versus temperature relationship of the ZIRLO™ clad material. These analyses demonstrate that the ZIRLO™ clad results in a small reduction in both the fraction of fuel melted at the hot spot as well as the peak fuel stored energy when compared to the results for Zr-4. The peak RCS pressure analysis is unaffected by the ZIRLO™ clad.

It is concluded that the implementation of ZIRLO™ fuel rod cladding does not have a significant adverse affect on the results of the non-LOCA analyses and that the conclusions made in the Updated Final Safety Analysis Report (UFSAR) remain valid.

Containment Integrity Evaluations

The implementation of ZIRLO^{tm} fuel rod cladding does not have a significant adverse effect on short and long term LOCA mass and energy releases and/or the main steamline break mass and energy release containment analyses. ZIRLO^{tm} fuel rod cladding does not affect the normal plant operating parameters, system actuation, accident mitigating capabilities or assumptions important to the containment analyses, or create conditions more limiting than those assumed in these analyses. Therefore, the conclusions presented in the UFSAR remain valid with respect to containment integrity.

Radiological Evaluation

The implementation of ZIRLO^{tm} fuel rod cladding would not affect the radiological consequences or the post-LOCA hydrogen production. Since the inputs to the radiation dose analysis do not change, the doses remain within previously acceptable limits as defined by 10 CFR 100. Therefore, the consequences to the public resulting from any accident previously evaluated in the UFSAR have not increased.

Mechanical Components and System Evaluation

The implementation of ZIRLO^{tm} fuel rod cladding does not directly or indirectly involve mechanical component hardware considerations. Direct effects as well as indirect effects on equipment important to safety have been considered. Indirect effects include activities which involve non-safety related equipment which may affect equipment important to safety. Component hardware considerations may include overall component integrity, subcomponent integrity, and the adequacy of component supports during all plant conditions. ZIRLO^{tm} fuel rod cladding implementation does not alter the design, material, construction standards, function, or method of performance of equipment important to safety. Also, ZIRLO^{tm} fuel rod cladding implementation does not affect the integrity of a plant auxiliary fluid system, or the ability of any system to perform its intended safety function.

Conclusion

The proposed changes to the Technical Specifications, to implement a change from Zr-4 to ZIRLO^{tm} for fuel rod cladding, will not impact the existing plant safety analysis limits and margin to safety. Furthermore, the conclusions presented in the UFSAR will remain valid and the ability of plant systems to perform their intended safety function will not be affected.

Determination of No Significant Hazards Consideration

Description of the Proposed License Amendments

The Technical Specification Design Features section 5.3.1 will be revised to extend the permitted fuel rod clad material from Zircaloy-4, to Zircaloy-4 **or ZIRLO™**. The Technical Specification Administrative Controls Section 6.9.1.7, Core Operating Limits Report will be modified to reflect the use of ZIRLO™.

The following reference will be added to Section 6.9.1.7 of Turkey Point Units 3 and 4 Technical Specifications.

7. WCAP-12610-P-A, "VANTAGE+ Fuel Assembly Reference Core Report," S. L. Davidson and T. L. Ryan, April 1995.

Basis

The Nuclear Regulatory Commission has provided standards for determining whether a significant hazards consideration exists (10 CFR §50.92 (c)). A proposed amendment to an operating license for a facility involves no significant hazards consideration, if 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 below for the proposed amendments.

(1) Does the proposed license amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

Implementation of ZIRLO™ fuel rod cladding will have no impact on the probability or consequences of any Design Basis Event occurrences which were previously evaluated. The determination that fuel design limits are met will continue to be performed using NRC approved fuel performance analysis methodology. Changing to ZIRLO™ fuel rod cladding poses no significant increase in the probability or consequences of any accident previously evaluated.

No new performance requirements are being imposed on any system or component in order to support implementation of ZIRLO™ fuel rod cladding. Since the LOCA and Non-LOCA analysis results will remain within design limits, the inputs to the radiation dose analysis do not change. Therefore, the consequences to the public resulting from any accident previously evaluated in the Updated Final Safety Analysis Report (UFSAR) is not increased.

Fuel rod design criteria will be evaluated every cycle to ensure proper compliance with fuel rod design limits and therefore the UFSAR. The evaluation of the fuel design against fuel design

limits will be performed in accordance with 10 CFR 50.59, which ensures that the reload will not involve an increase in the probability or consequence of an accident previously evaluated.

(2) Does the proposed license amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

Implementation of ZIRLO^{tm} fuel rod cladding will have no impact, nor does it contribute in any way to the probability or consequences of an accident.

No new accident scenarios, failure mechanisms or limiting single failures are introduced as a result of using ZIRLO^{tm} fuel rod cladding. The institution of ZIRLO^{tm} fuel rod cladding will have no adverse effect on, and does not challenge the performance of, any safety related system.

The determination that the fuel rod design limits are met will be performed using NRC approved methodology. Therefore, the proposed amendment does not in any way create the possibility of a new or different kind of accident from any accident previously evaluated.

(3) Does the proposed amendment involve a significant reduction in the margin of safety?

The margin of safety is not affected by the implementation of ZIRLO^{tm} fuel rod cladding. Use of ZIRLO^{tm} fuel rod cladding has been approved by the NRC and does not constitute a significant reduction in the margin of safety.

The margin of safety provided in the fuel design limits is acceptable and will be maintained and not reduced.

In addition, each future reload will involve a 10 CFR 50.59 review to assure that operation of the units within the cycle specific limits will not involve a reduction in the margin of safety. Therefore, the proposed amendment does not significantly reduce the margin of safety.

Conclusion

Based on the above discussion, FPL has determined that the proposed amendment does not: (1) involve a significant increase in the probability or consequences of an accident previously evaluated, (2) create the probability of a new or different kind of accident from any previously evaluated, or (3) involve a significant reduction in a margin of safety; and therefore, does not involve a significant hazards consideration.