



April 18, 2001

L-2001-081  
10 CFR 50.90

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

RE: St. Lucie Unit 2  
Docket No. 50-389  
Proposed License Amendment  
Add COLR Methodology - Improved Heat Flux Correlation

Pursuant to 10 CFR 50.90, Florida Power and Light Company (FPL) proposes to amend the St. Lucie Unit 2 Facility Operating License NPF-16 to implement the improved heat flux correlation (ABB-NV) previously approved by the NRC for Westinghouse-Combustion Engineering (W-CE), as documented in the topical report CENPD-387-P-A, Revision 000. The proposed change is to update the COLR methodology listed in the Technical Specification (TS) 6.9.1.11 to include the topical report CENPD-387-P-A. Additionally, TS Bases for TS 2.1.1, including the Bases Figure B2.1-1, is modified to reflect the use of the ABB-NV critical heat flux correlation in satisfying the departure from nucleate boiling (DNB) reactor core safety limit. In addition, a conforming amendment is requested to the TS Index.

Attachment 1 is the Safety Analysis in support of the proposed amendment. Attachment 2 is the "Determination of No Significant Hazards Consideration." Attachment 3 is a marked-up copy of the proposed Technical Specification changes.

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.

Abol

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Approval of this proposed license amendment is requested by November 19, 2001 to support the fall 2001 Unit 2 refueling outage (SL2-13) and the Cycle 13 reload analysis. Please contact us if there are any questions about this submittal.

Very truly yours,



Rajiv S. Kundalkar  
Vice President  
St. Lucie Plant

RSK/GRM

Attachments

cc: Regional Administrator, Region II, USNRC  
Senior Resident Inspector, USNRC, St. Lucie Plant  
Mr. William A. Passetti, Florida Department of Health

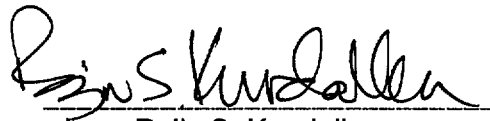
STATE OF FLORIDA     )  
                                  )  
COUNTY OF ST. LUCIE   )

                                  ss.

Rajiv S. Kundalkar being first duly sworn, deposes and says:

That he is Vice President, St. Lucie Plant, for the Nuclear Division of Florida Power & Light Company, the Licensee herein;

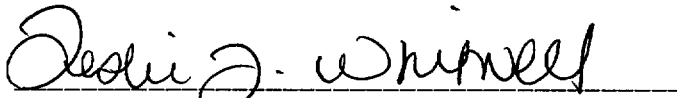
That he has executed the foregoing document; that the statements made in this document are true and correct to the best of his knowledge, information and belief, and that he is authorized to execute the document on behalf of said Licensee.

  
Rajiv S. Kundalkar

STATE OF FLORIDA  
COUNTY OF ST. LUCIE

Sworn to and subscribed before me

this 18 day of April, 2001  
by Rajiv S. Kundalkar, who is personally known to me.

  
Name of Notary Public - State of Florida



Leslie J. Whitwell  
MY COMMISSION # CC646183 EXPIRES  
May 12, 2001  
BONDED THRU TROY FAIN INSURANCE, INC.

\_\_\_\_\_  
(Print, type or stamp Commissioned Name of Notary Public)

## **ATTACHMENT 1**

### **SAFETY ANALYSIS**

#### **Introduction/Background**

Florida Power and Light Company (FPL) proposes to amend the St. Lucie Unit 2 license to implement the improved heat flux correlation (ABB-NV) previously approved by the NRC for Westinghouse-Combustion Engineering (W-CE), as documented in the topical report CENPD-387-P-A, Revision 000. The proposed change is to update the COLR methodology listed in the Technical Specification 6.9.1.11 to include the topical report CENPD-387-P-A. Additionally, TS Bases for TS 2.1.1, including the Bases Figure B2.1-1, is modified to reflect the use of the ABB-NV critical heat flux correlation in satisfying the departure from nucleate boiling (DNB) reactor core safety limit.

The evaluation of the proposed changes has demonstrated that the proposed changes would not have any adverse impact on the plant safety or on the operation of the plant at any power level. The proposed changes do not impact the current cycle (Cycle 12) operation of St. Lucie Unit 2. The proposed methodology update is planned to support the Cycle 13 reload analysis.

#### **Description of Proposed Changes**

The proposed changes are described below:

1. TS Index page XIX, Section 6.9.2, SPECIAL REPORTS

For Section 6.9.2, SPECIAL REPORTS, change the page reference from 6-20d to 6-20e.

2. TS 6.9.1.11: CORE OPERATING LIMITS REPORT (COLR)

The methodology listed in TS 6.9.1.11.b is updated to include the following additional fuel vendor (W-CE) methodology approved by the NRC:

CENPD-387-P-A, Revision 000, "ABB Critical Heat Flux Correlation for PWR Fuel," May 2000.

3. Bases for TS 2.1.1 (REACTOR CORE)

The Bases for TS 2.1.1 are clarified with respect to the application of ABB-NV DNB correlation and the Bases Figure B2.1-1, supporting the curves of thermal margin safety limit lines Figure 2.1-1, is revised to reflect the application of ABB-NV critical heat flux correlation.

Basis for Proposed Changes/Analysis of Impact on Safety

1. This is a conforming amendment. Section 6.9.2 was moved to page 6-20e due to the text addition on page 6-20d.
2. TS 6.9.1.11: CORE OPERATING LIMITS REPORT (COLR)

TS 6.9.1.11.a lists the specifications whose limits are defined in the COLR, and the methodologies supporting the determination of the COLR limits are included in TS 6.9.1.11.b. The proposed addition of methodology to the current list in TS is described below:

CENPD-387-P-A, Revision 000, "ABB Critical Heat Flux Correlation for PWR Fuel," May 2000

This methodology has been previously approved by the NRC for licensing applications for ABB-CE plants subject to the limitations specified in the NRC Safety Evaluation Report. FPL will use this methodology consistent with the application guidelines and limitations.

3. Bases for TS 2.1.1 (REACTOR CORE)

The text in the Bases for TS 2.1.1 is modified to reflect the application of ABB-NV DNB correlation. Accordingly, references to CE-1 critical heat flux (CHF) correlation are modified to quote both CE-1 and ABB-NV correlation. Also, the TS Bases Figure 2.1-1 is modified to reflect the implementation of ABB-NV CHF correlation. The use of appropriate NRC approved DNB correlation is stipulated by TS 6.9.1.11. Specific analysis will use the appropriate DNB correlation and the corresponding DNBR limit to ensure that the thermal margin DNBR limit is not violated for the combination of transient conditions initiated within the limiting conditions of operation in combination with the reactor protection systems.

Reference

1. Letter F2-2001-011, G. Singh (W-CE) to M. Jimenez (FPL), "Revised Information for Implementation of the Improved Heat Flux Correlation (ABB-NV) on St. Lucie Unit 2," March 9, 2001.

## ATTACHMENT 2

### DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATION

Florida Power and Light Company (FPL) proposes to amend the St. Lucie Unit 2 license to implement the improved heat flux correlation (ABB-NV) previously approved by the NRC for Westinghouse-Combustion Engineering (W-CE), as documented in the topical report CENPD-387-P-A, Revision 000. The proposed change is to update the COLR methodology listed in the Technical Specification 6.9.1.11 to include the topical report CENPD-387-P-A. Additionally, TS Bases for TS 2.1.1, including the Bases Figure B2.1-1, is modified to reflect the use of the ABB-NV critical heat flux correlation in satisfying the departure from nucleate boiling (DNB) reactor core safety limit.

The evaluation of the proposed changes has demonstrated that the proposed changes would not have any adverse impact on the plant safety or on the operation of the plant at any power level. The proposed changes do not impact the current cycle (Cycle 12) operation of St. Lucie Unit 2. The proposed methodology update is planned to support the Cycle 13 reload analysis.

The standards used to arrive at a determination that a request for amendment involves a 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 proposed amendment would allow the implementation of ABB-NV critical heat flux correlation to St. Lucie Unit 2 core. The proposed changes have no adverse impact on the operation of the plant and have no relevance to the accident initiators. There are no changes to the plant configuration, and thus the frequency of occurrence of previously analyzed accidents is not affected by the proposed changes.

With the application of the added methodology (the approved ABB-NV DNB correlation), the safety analysis would continue to remain consistent with the design basis requirements. The proposed changes, including changes to the TS Bases, have no adverse effect on the safety analysis and thus would not involve a significant increase in the consequences of design basis accidents. Changes to the

COLR limits will continue to be controlled per Generic Letter 88-16 under the provisions of 10 CFR 50.59 and the requirements of TS 6.9.1.11.c.

Therefore, 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.

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

The proposed amendment updates the list of approved methodology in TS 6.9.1.11 and makes corresponding changes to the TS Bases for TS 2.1.1. These changes would not create the possibility of a new kind of accident since there is no change to plant configuration, systems, or components, which would create new failure modes. The modes of operation of the plant would remain unchanged.

Therefore, operation of the facility in accordance with the proposed amendment would not create the possibility of a new or different kind of accident from any accident previously evaluated.

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

The proposed changes have no significant adverse impact on the safety analysis. As such, these changes would continue to provide margin to the acceptance criteria for Specified Acceptable Fuel Design Limits (SAFDL), 10CFR50.46(b) requirements, primary and secondary overpressurization, peak containment pressure, potential radioactive releases, and existing limiting conditions for operation. The future use of updated approved methodology will follow all design basis requirements to ensure that a safety margin to the acceptance criteria would continue to remain available at all power levels for operation of St. Lucie Unit 2.

Therefore, operation of the facility in accordance with the proposed amendment would not involve a significant reduction in a margin of safety.

Based on the above, we have 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.

**Environmental Impact Consideration Determination**

The proposed license amendment changes requirements with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The proposed amendment involves no significant increase in the amounts and no significant change in the types of any effluents that may be released offsite, and no significant increase in individual or cumulative occupational radiation exposure. FPL has concluded that the proposed amendment involves no significant hazards consideration and therefore meets the criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), an environmental impact statement or environmental assessment need not be prepared in connection with issuance of the amendment.



ATTACHMENT 3

St. Lucie Unit 2 Marked-up Technical Specification Pages

INDEX XIX

6-20d

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ADMINISTRATIVE CONTROLS (continued)

CORE OPERATING LIMITS REPORT (COLR) (continued)

b. (continued)

*Add*  
55. CENPD-387-P-A, Revision 000, "ABB Critical Heat Flux Correlations for PWR Fuel," May 2000.

- 46. CENPD-199-P, Rev. 1-P-A, Supplement 2-P-A, "CE Setpoint Methodology," June 1998.
- 47. CENPD-382-P-A, "Methodology for Core Designs Containing Erbium Burnable Absorbers," August 1993.
- 48. CEN-396(L)-P, "Verification of the Acceptability of a 1-Pin Burnup Limit of 60 MWD/KG for St. Lucie Unit 2," November 1989 (NRC SER dated October 18, 1991, Letter J.A. Norris (NRC) to J.H. Goldberg (FPL), TAC No. 75947).
- 49. CENPD-269-P, Rev. 1-P, "Extended Burnup Operation of Combustion Engineering PWR Fuel," July 1984.
- 50. CEN-289(A)-P, "Revised Rod Bow Penalties for Arkansas Nuclear One Unit 2," December 1984 (NRC SER dated December 21, 1999, Letter K. N. Jabbour (NRC) to T.F. Plunkett (FPL), TAC No. MA4523).
- 51. CENPD-137, Supplement 2-P-A, "Calculative Methods for the ABB CE Small Break LOCA Evaluation Model," April 1998.
- 52. CENPD-140-A, "Description of the CONTRANS Digital Computer Code for Containment Pressure and Temperature Transient Analysis," June 1976.
- 53. CEN-365(L), "Boric Acid Concentration Reduction Effort, Technical Bases and Operational Analysis," June 1988 (NRC SER dated March 13, 1989, Letter J.A. Norris (NRC) to W.F. Conway (FPL), TAC No. 69325).
- 54. DP-456, F.M. Stern (CE) to E. Case (NRC), dated August 19, 1974, Appendix 6B to CESSAR System 80 PSAR (NRC SER, NUREG-75/112, Docket No. STN 50-470, "NRC SER - Standard Reference System, CESSAR System 80," December 1975).

c. The core operating limits shall be determined such that all applicable limits (e.g., fuel thermal mechanical limits, core thermal hydraulic limits, Emergency Core Cooling Systems (ECCS) limits, nuclear limits such as SHUTDOWN MARGIN, transient analysis limits, and accident analysis limits) of the safety analysis are met.

d. The COLR, including any mid cycle revisions or supplements, shall be provided upon issuance for each reload cycle to the NRC.

*Page Break*

SPECIAL REPORTS

6.9.2 Special reports shall be submitted to the NRC within the time period specified for each report.

*move to page 6-20e*

2.1 SAFETY LIMITS

BASES

2.1.1 REACTOR CORE

The restrictions of this safety limit prevent overheating of the fuel cladding and possible cladding perforation which would result in the release of fission products to the reactor coolant. Overheating of the fuel is prevented by maintaining the steady-state peak linear heat rate below the level at which centerline fuel melting will occur. Overheating of the fuel cladding is prevented by restricting fuel operation to within the nucleate boiling regime where the heat transfer coefficient is large and the cladding surface temperature is slightly above the coolant saturation temperature.

Operation above the upper boundary of the nucleate boiling regime could result in excessive cladding temperatures because of the onset of departure from nucleate boiling (DNB) and the resultant sharp reduction in heat transfer coefficient. DNB is not a directly measurable parameter during operation and therefore THERMAL POWER and Reactor Coolant Temperature and Pressure have been related to DNB through the CE-1 correlation. The CE-1 ~~DNB correlation has~~ been developed to predict the DNB heat flux and the location of DNB for axially uniform and non-uniform heat flux distributions. The local DNB heat flux ratio, DNBR, defined as the ratio of the heat flux that would cause DNB at a particular core location to the local heat flux, is indicative of the margin to DNB.

The minimum value of the DNBR during steady state operation, normal operational transients, and anticipated transients is limited to the DNB-SAFDL of 1.28 in conjunction with the Extended Statistical Combination of Uncertainties (ESCU). This value is derived through a statistical combination of the system parameter probability distribution functions with the CE-1 DNB correlation uncertainty. This value corresponds to a 95% probability at a 95% confidence level that DNB will not occur and is chosen as an appropriate margin to DNB for all operating conditions.

The curves of Figure 2.1-1 show conservative loci of points of THERMAL POWER, Reactor Coolant System pressure and maximum cold leg temperature with four Reactor Coolant Pumps operating for which the DNB-SAFDL is not violated for the family of axial shapes and corresponding radial peaks shown Figure B 2.1-1. The limits in Figure 2.1-1 were calculated for reactor coolant inlet temperatures less than or equal to 580°F. The dashed line at 580°F coolant inlet temperature is not a safety limit; however, operation above 580°F is not possible because of the actuation of the main steam line safety valves which limit the maximum value of reactor inlet temperature. Reactor operation at THERMAL POWER levels higher than 107% of RATED THERMAL POWER is prohibited by the high power level trip setpoint specified in Table 2.2-1. The area of safe operation is below and to the left of these lines.

The conditions for the Thermal Margin Safety Limit curves in Figure 2.1-1 to be valid are shown on the figure.

The Thermal Margin/Low Pressure and Local Power Density Trip Systems, in conjunction with Limiting Conditions for Operation, the Variable Overpower Trip and the Power Dependent Insertion Limits, assure that the Specified Acceptable Fuel Design Limits on DNB and Fuel Centerline Melt are not exceeded during normal operation and design basis Anticipated Operational Occurrences.

*Specific verification of the DNB-SAFDL limit using an appropriate DNB correlation ensures that the reactor core safety limits satisfied.*

ST. LUCIE - UNIT 2

Amendment No. 3, 45, 89, 100  
Revised by NRC Letter dated 3/4/04

*either or ABB-NV*

*and ABB-NV DNB correlations have*

*yes*

*based on ABB-NV CHF correlation*

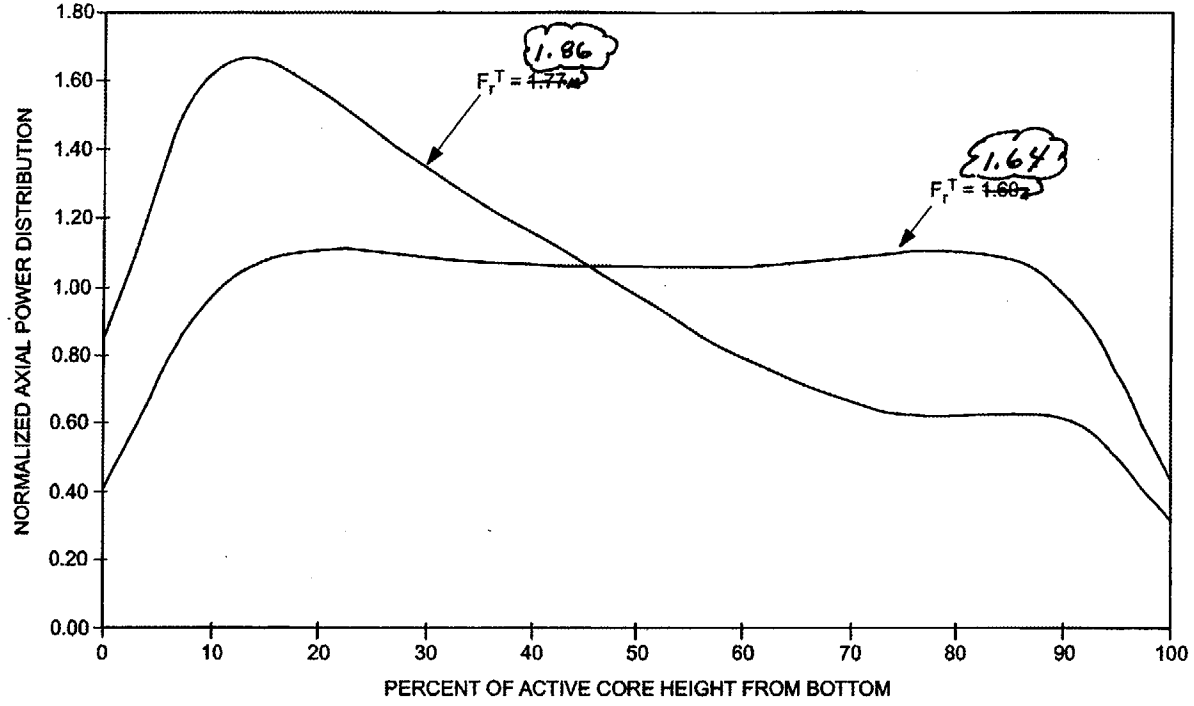


FIGURE B 2.1-1  
Axial Power Distributions For Thermal Margin Safety Limits