June 16, 1986

Docket Nos. 50-348
and 50-364

DISTRIBUTION

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Mr. R. P. McDonald
Senior Vice President
Alabama Power Company
Post Office Box 2641
Birmingham, Alabama 35291

Dear Mr. McDonald:

The Commission has issued the enclosed Amendment No. 64 to Facility Operating License No. NPF-2 and Amendment No. 57 to NPF-8 for the Joseph M. Farley Nuclear Plant, Unit Nos. 1 and 2, respectively. The amendments consist of changes to the Technical Specifications in response to your application transmitted by letter dated November 27, 1985, as supplemented April 11, 1986.

The amendments modify Technical Specification (TS) 3.2.3 to delete the rod bow penalty from the equation shown. Also, TS Figure 3.2-3 which had shown values of the rod bow penalty versus core region average burnup is deleted.

A copy of the related Safety Evaluation is enclosed. A Notice of Issuance will be included in the Commission's next regular bi-weekly Federal Register notice.

Sincerely,

/s/

Edward A. Reeves, Project Manager
PWR Project Directorate #2
Division of PWR Licensing-A
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No. 64 to NPF-2
2. Amendment No. 57 to NPF-8
3. Safety Evaluation

cc: w/enclosures
See next page

LA:PAD#2	PM:PAD#2	D:PAD#2	OELD
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5/29/86	6/2/86	6/3/86	6/6/86

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

ALABAMA POWER COMPANY

DOCKET NO. 50-348

JOSEPH M. FARLEY NUCLEAR PLANT, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 64
License No. NPF-2

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Alabama Power Company (the licensee) dated November 27, 1985, as supplemented April 11, 1986, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, as amended, the provisions of the Act, and the regulations of the Commission;

   C. There is reasonable assurance: (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this license amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-2 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 64 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Acting for Lester S. Rubenstein, Director
PWR Project Directorate #2
Division of PWR Licensing-A
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical Specifications

Date of Issuance: June 16, 1986

ATTACHMENT TO LICENSE AMENDMENT NO. 64

TO FACILITY OPERATING LICENSE NO. NPF-2

DOCKET NO. 50-348

Replace the following pages of the Appendix "A" Technical Specifications with the enclosed pages as indicated. The revised pages are identified by amendment number and contain vertical lines indicating the area of change. The corresponding overleaf pages are also provided to maintain document completeness.

Remove Pages	Insert Pages
3/4 2-8	3/4 2-8
3/4 2-10	3/4 2-10
B3/4 2-4	B3/4 2-4

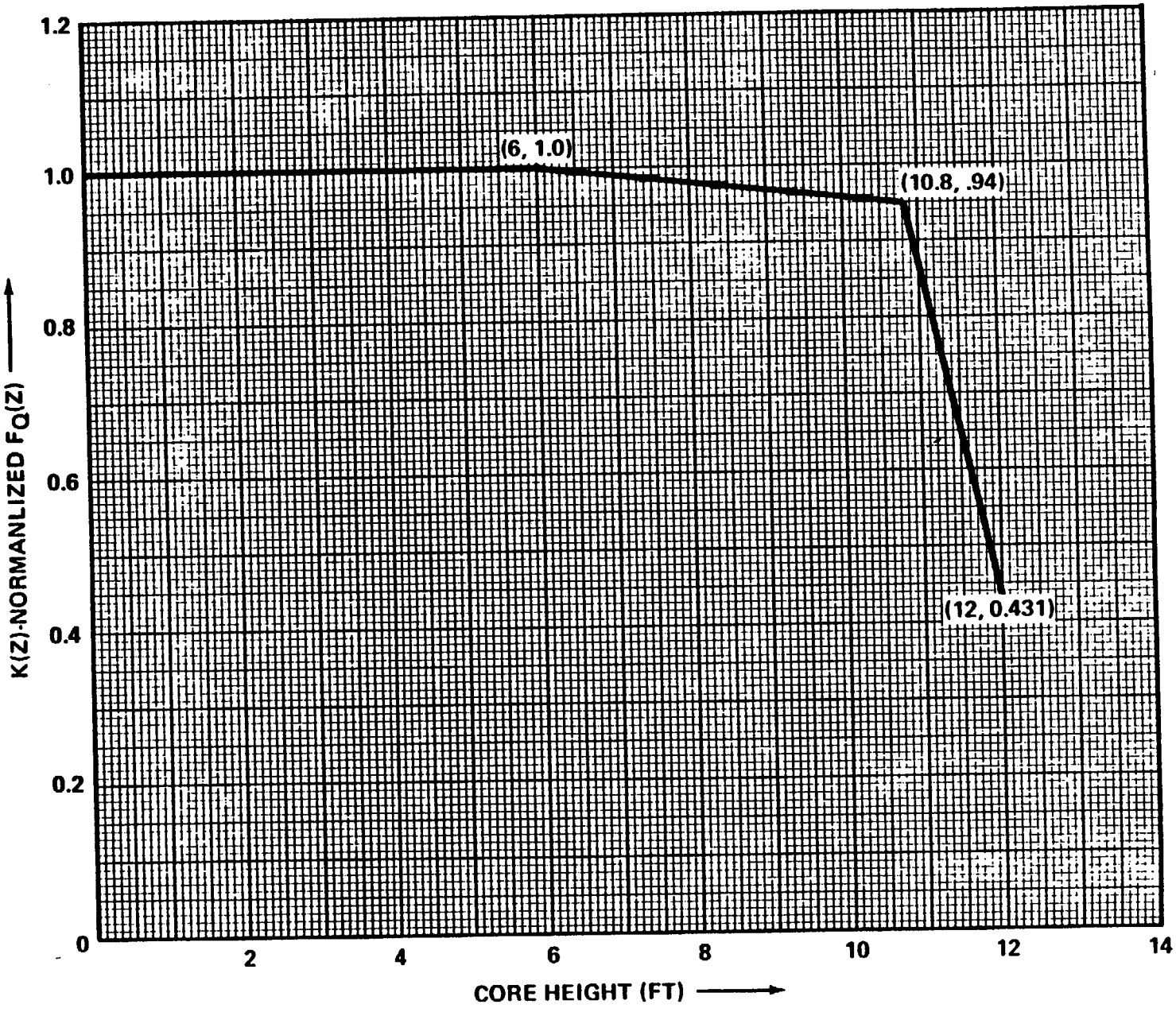

Figure 3.2-2 K(Z) Normalized $F_Q(Z)$ as a Function of Core Height

POWER DISTRIBUTION LIMITS

3/4.2.3 NUCLEAR ENTHALPY HOT CHANNEL FACTOR - $F^N_{\Delta H}$

LIMITING CONDITION FOR OPERATION

3.2.3 $F^N_{\Delta H}$ shall be limited by the following relationship:

$$F^N_{\Delta H} \leq 1.55 [1 + 0.3 (1-P)]$$

where $P = \frac{\text{THERMAL POWER}}{\text{RATED THERMAL POWER}}$

APPLICABILITY: MODE 1

ACTION:

With $F^N_{\Delta H}$ exceeding its limit:

a. Reduce THERMAL POWER to less than 50% of RATED THERMAL POWER within 2 hours and reduce the Power Range Neutron Flux-High Trip Setpoints to ≤ 55% of RATED THERMAL POWER within the next 4 hours,

b. Demonstrate through in-core mapping that $F^N_{\Delta H}$ is within its limit within 24 hours after exceeding the limit or reduce THERMAL POWER to less than 5% of RATED THERMAL POWER within the next 2 hours, and

c. Identify and correct the cause of the out of limit condition prior to increasing THERMAL POWER above the reduced limit required by a or b, above; subsequent POWER OPERATION may proceed provided that $F^N_{\Delta H}$ is demonstrated through in-core mapping to be within its limit at a nominal 50% of RATED THERMAL POWER prior to exceeding this THERMAL POWER, at a nominal 75% of RATED THERMAL POWER prior to exceeding this THERMAL POWER and within 24 hours after attaining 95% or greater RATED THERMAL POWER.

SURVEILLANCE REQUIREMENTS

4.2.3.1 $F^N_{\Delta H}$ shall be determined to be within its limit by using the movable incore detectors to obtain a power distribution map:

a. Prior to operation above 75% of RATED THERMAL POWER after each fuel loading, and

b. At least once per 31 Effective Full Power Days.

c. The provisions of Specification 4.0.4 are not applicable.

4.2.3.2 The measured $F^N_{\Delta H}$ of 4.2.3.1 above, shall be increased by 4% for measurement uncertainty.

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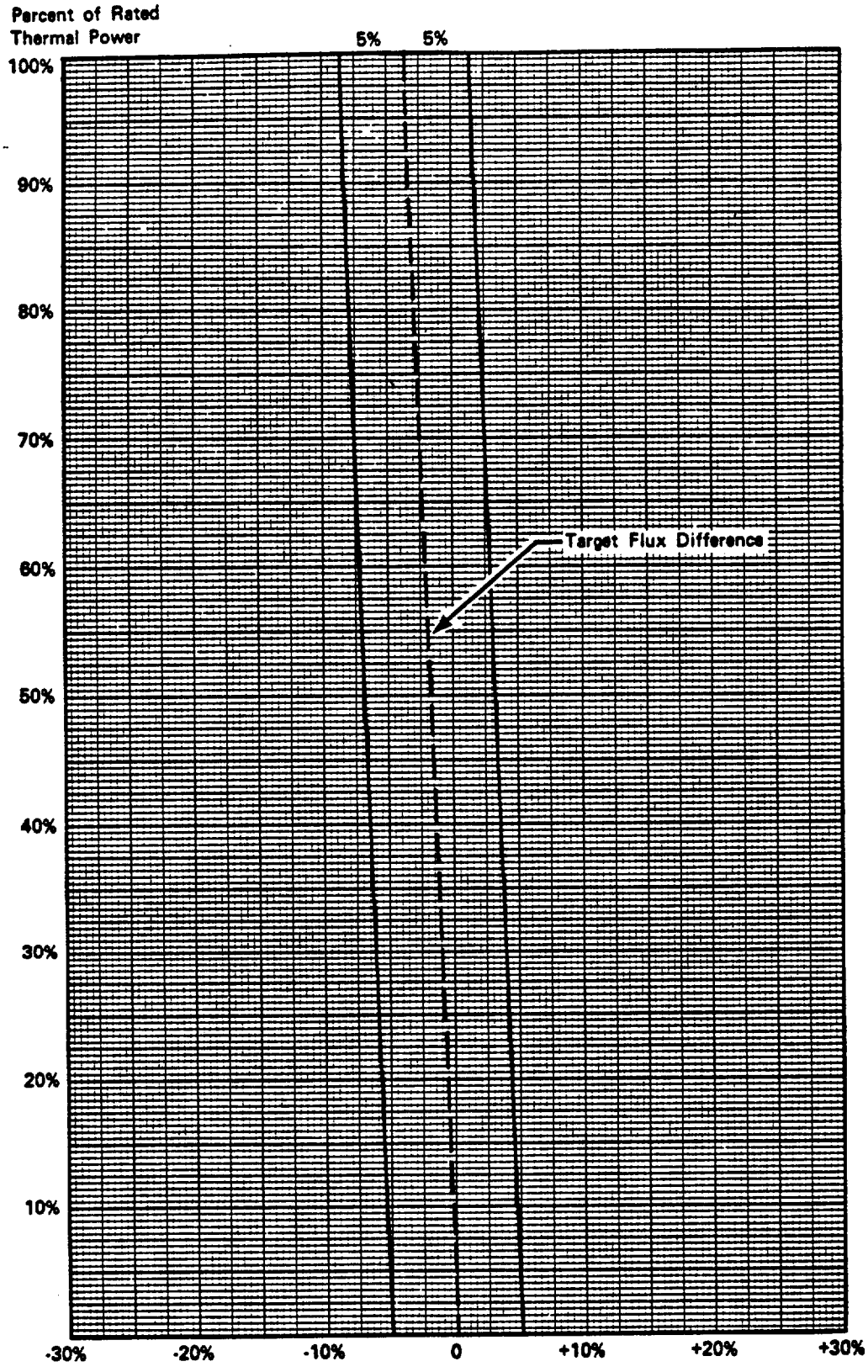

Figure B 3/4 2-1 TYPICAL INDICATED AXIAL FLUX DIFFERENCE VERSUS THERMAL POWER

BASES

$F^N_{\Delta H}$ will be maintained within its limits provided conditions a. through d. above are maintained. The relaxation of $F^N_{\Delta H}$ as a function of THERMAL POWER allows changes in the radial power shape for all permissible rod insertion limits.

When an F_Q measurement is taken, an allowance for both experimental error and manufacturing tolerance must be made. An allowance of 5% is appropriate for a full core map taken with the incore detector flux mapping system and a 3% allowance is appropriate for manufacturing tolerance.

When $F^N_{\Delta H}$ is measured, experimental error must be allowed for and 4% is the appropriate allowance for a full core map taken with the incore detection system. The specified limit for $F^N_{\Delta H}$ also contains an 8% allowance for uncertainties which means that normal operation will result in $F^N_{\Delta H} \leq 1.55/1.08$. The 8% allowance is based on the following considerations:

a. Abnormal perturbations in the radial power shape, such as from rod misalignment, affect $F^N_{\Delta H}$ more directly than F_Q,

b. Although rod movement has a direct influence upon limiting F_Q to within its limit, such control is not readily available to limit $F^N_{\Delta H}$, and

c. Errors in prediction for control power shape detected during startup physics tests can be compensated for in F_Q by restricting axial flux distribution. This compensation for $F^N_{\Delta H}$ is less readily available.

Fuel rod bowing reduces the value of DNB ratio. Credit is available to offset this reduction in the generic margin. The generic design margins, totaling 9.1% DNBR, completely offset any rod bow penalties (less than 3% for the worst case which occurs at a burnup of 33,000 MWD/MTU). This margin includes the following:

1) Design limit DNBR of 1.30 vs. 1.28
2) Axial Grid Spacing Coefficient (k_s) of 0.046 vs. 0.059
3) Thermal Diffusion Coefficient of 0.038 vs. 0.059
4) DNBR Multiplier of 0.865 vs. 0.88
5) Pitch reduction

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

ALABAMA POWER COMPANY

DOCKET NO. 50-364

JOSEPH M. FARLEY NUCLEAR PLANT, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 57
License No. NPF-8

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Alabama Power Company (the licensee) dated November 27, 1985, as supplemented April 11, 1986, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, as amended, the provisions of the Act, and the regulations of the Commission;

   C. There is reasonable assurance: (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this license amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-8 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 57 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Acting for Lester S. Rubenstein, Director
PWR Project Directorate #2
Division of PWR Licensing-A
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: June 16, 1986

ATTACHMENT TO LICENSE AMENDMENT NO. 57

TO FACILITY OPERATING LICENSE NO. NPF-8

DOCKET NO. 50-364

Replace the following pages of the Appendix "A" Technical Specifications with the enclosed pages as indicated. The revised pages are identified by amendment number and contain vertical lines indicating the area of change. The corresponding overleaf pages are also provided to maintain document completeness.

Remove Pages	Insert Pages
3/4 2-8	3/4 2-8
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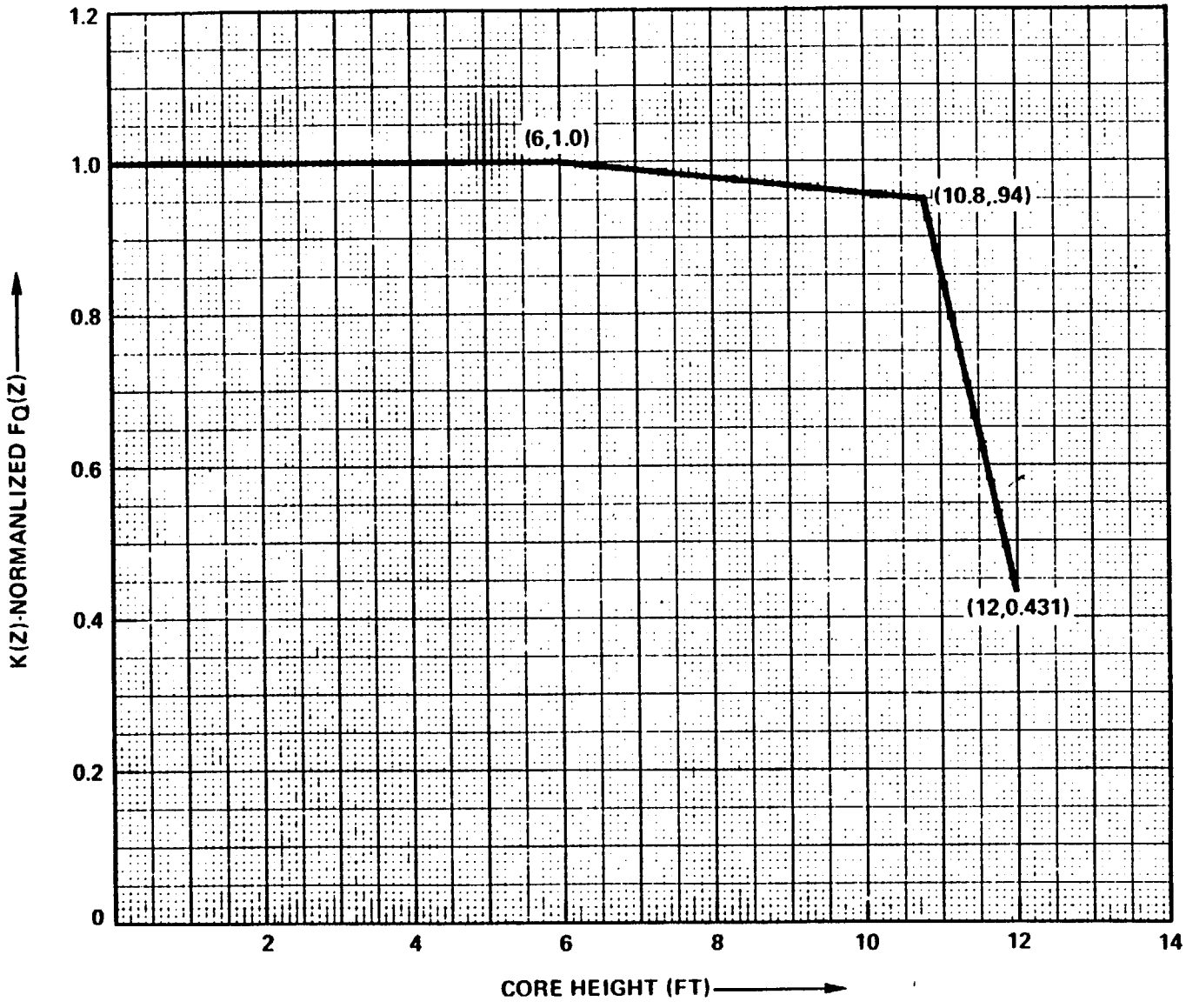

Figure 3.2-2 K(Z) Normalized $F_Q(Z)$ as a Function of Core Height

POWER DISTRIBUTION LIMITS

3/4.2.3 NUCLEAR ENTHALPY HOT CHANNEL FACTOR - $F^N_{\Delta H}$

LIMITING CONDITION FOR OPERATION

3.2.3 $F^N_{\Delta H}$ shall be limited by the following relationship:

$$F^N_{\Delta H} \leq 1.55 [1 + 0.3 (1-P)]$$

where $P = \frac{\text{THERMAL POWER}}{\text{RATED THERMAL POWER}}$

APPLICABILITY: MODE 1

ACTION:

With $F^N_{\Delta H}$ exceeding its limit:

a. Reduce THERMAL POWER to less than 50% of RATED THERMAL POWER within 2 hours and reduce the Power Range Neutron Flux-High Trip Setpoints to $\leq$ 55% of RATED THERMAL POWER within the next 4 hours,

b. Demonstrate through in-core mapping that $F^N_{\Delta H}$ is within its limit within 24 hours after exceeding the limit or reduce THERMAL POWER to less than 5% of RATED THERMAL POWER within the next 2 hours, and

c. Identify and correct the cause of the out of limit condition prior to increasing THERMAL POWER above the reduced limit required by a or b, above; subsequent POWER OPERATION may proceed provided that $F^N_{\Delta H}$ is demonstrated through in-core mapping to be within its limit at a nominal 50% of RATED THERMAL POWER prior to exceeding this THERMAL POWER, at a nominal 75% of RATED THERMAL POWER prior to exceeding this THERMAL POWER and within 24 hours after attaining 95% or greater RATED THERMAL POWER.

SURVEILLANCE REQUIREMENTS

4.2.3.1 $F^N_{\Delta H}$ shall be determined to be within its limit by using the movable incore detectors to obtain a power distribution map:

a. Prior to operation above 75% of RATED THERMAL POWER after each fuel loading, and

b. At least once per 31 Effective Full Power Days.

c. The provisions of Specification 4.0.4 are not applicable.

4.2.3.2 The measured $F^N_{\Delta H}$ of 4.2.3.1 above, shall be increased by 4% for measurement uncertainty.

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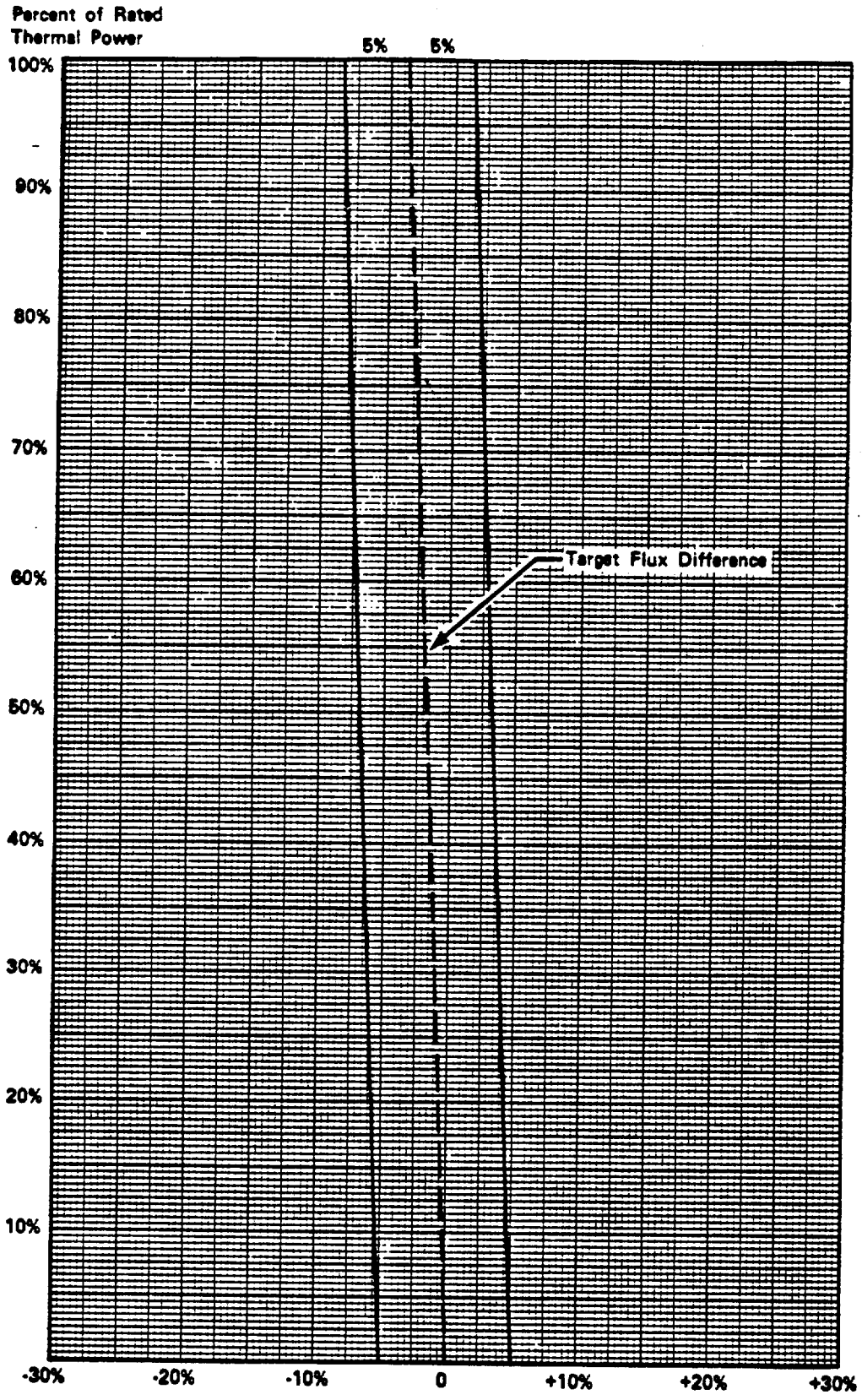

Figure B 3/4 2-1 TYPICAL INDICATED AXIAL FLUX DIFFERENCE VERSUS THERMAL POWER

BASES

$F^N_{\Delta H}$ will be maintained within its limits provided conditions a. through d. above are maintained. The relaxation of $F^N_{\Delta H}$ as a function of THERMAL POWER allows changes in the radial power shape for all permissible rod insertion limits.

When an F_Q measurement is taken, an allowance for both experimental error and manufacturing tolerance must be made. An allowance of 5% is appropriate for a full core map taken with the incore detector flux mapping system and a 3% allowance is appropriate for manufacturing tolerance.

When $F^N_{\Delta H}$ is measured, experimental error must be allowed for and 4% is the appropriate allowance for a full core map taken with the incore detection system. The specified limit for $F^N_{\Delta H}$ also contains an 8% allowance for uncertainties which means that normal operation will result in $F^N_{\Delta H} \leq 1.55/1.08$. The 8% allowance is based on the following considerations:

a. Abnormal perturbations in the radial power shape, such as from rod misalignment, affect $F^N_{\Delta H}$ more directly than F_Q.

b. Although rod movement has a direct influence upon limiting F_Q to within its limit, such control is not readily available to limit $F^N_{\Delta H}$, and

c. Errors in prediction for control power shape detected during startup physics tests can be compensated for in F_Q by restricting axial flux distribution. This compensation for $F^N_{\Delta H}$ is less readily available.

Fuel rod bowing reduces the value of DNB ratio. Credit is available to offset this reduction in the generic margin. The generic design margins, totaling 9.1% DNBR, completely offset any rod bow penalties (less than 3% for the worst case which occurs at a burnup of 33,000 MWD/MTU). This margin includes the following:

1) Design limit DNBR of 1.30 vs. 1.28
2) Axial Grid Spacing Coefficient (k_s) of 0.046 vs. 0.059
3) Thermal Diffusion Coefficient of 0.038 vs. 0.059
4) DNBR Multiplier of 0.865 vs. 0.88
5) Pitch reduction

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 64 TO FACILITY OPERATING LICENSE NO. NPF-2

AND AMENDMENT NO. 57 TO FACILITY OPERATING LICENSE NO. NPF-8

ALABAMA POWER COMPANY

JOSEPH M. FARLEY NUCLEAR PLANT, UNIT NOS. 1 AND 2

DOCKET NOS. 50-348 AND 50-364

INTRODUCTION

By letter dated November 27, 1985, as supplemented April 11, 1986, (References 1 and 6), Alabama Power Company, the licensee, proposed deleting the rod bow penalty (RBP) currently included in the Technical Specifications (TSs) for Farley Nuclear Plant Units 1 and 2. An analysis was provided to support the removal of the RBP which was used in calculations of the nuclear enthalpy hot channel factor, $F^N_{\Delta H}$. The April 11, 1986, licensee letter provided additional information and clarification to the TS Bases section for completeness. Our evaluation follows:

EVALUATION

The rod bow penalty is currently addressed in the TSs by a modifier to the equation for calculating the limiting value of $F^N_{\Delta H}$. The modifier, [1-RBP(BU)], has a term for rod bow penalty which is obtained from TS Figure 3.2-3 showing the rod bow penalty as a function of core region average burnup.

The DNBR effects due to rod bow were studied by the Westinghouse Electric Corporation and the effects of predicted rod bowing on power peaking and DNBR analyses were presented for NRC review in a report, "Fuel Rod Bow Evaluation" (WCAP-8691), in January 1976. Revision 1 of WCAP-8691 (Reference 2) and References 3 and 4 document subsequent NRC inquiries and Westinghouse responses. The Westinghouse methods for predicting the effects of rod bow on DNB as described in the above documents were approved by the NRC staff in a letter to E. P. Rahe dated December 29, 1982 (Reference 5).

The licensee used the approved methods of Reference 4 for calculating the rod bow penalty and stated that the rod bow penalty is less than 3% at 33,000 MWD/MTU. The licensee has also identified margins totaling 9.1% DNBR to accommodate full and low flow DNBR penalties associated with rod bow. The 9.1% DNBR margin has been previously accepted for other similar Westinghouse plants (e.g. Summer) and is shown in the tabulation below:

		DNB Margin %
a.	Design limit DNBR of [1.30 vs. 1.28],	1.6
b.	Axial Grid Spacing Coefficient (K_s) of [0.046 vs 0.059],	2.9
c.	Thermal Diffusion Coefficient of [0.038 vs. 0.059],	1.2
d.	DNBR Multiplier of [0.865 vs. 0.88] and	1.7
e.	Pitch reduction	1.7
	Total	9.1%

This margin is adequate to offset all rod bow penalties for assembly average burnups of up to 33,000 MWD/MTU. The maximum rod bow penalty accounted for in the design safety analysis is less than 3% and is based on an assembly average burnup of 33,000 MWD/MTU. At burnups greater than 33,000 MWD/MTU, credit is taken for the effect of $F^N_{\Delta H}$ burndown. This is due to the decrease in fissionable isotopes and the buildup of fission product inventory and therefore no additional rod bow penalty is required. The staff finds the rod bow penalty of less than 3% acceptable as it is obtained using the approved methods of Reference 3. Also, the generic DNBR margin of 9.1% which offsets the <3% rod bow penalty is acceptable.

The licensee's proposed changes to the Technical Specifications for Farley Units 1 and 2 as a result of eliminating the rod bow penalty involve three pages: 3/4 2-8, 3/4 2-10 and B 3/4 2-4. These changes are discussed as follows:

On page 3/4 2-8, Limiting Condition for Operation, TS 3.2.3, as currently exists reflects the equation for the limit of the nuclear enthalpy hot channel factor:

$$F^N_{\Delta H} \leq 1.55\,[1 + 0.3(1-P)][1-RBP(BU)]$$

where $P = \frac{\text{THERMAL POWER}}{\text{RATED THERMAL POWER}}$ and

RBP(BU) = Rod Bow Penalty as a function of region average burnup as shown in Figure 3.2-3, where a region is defined as those assemblies with the same loading date (reloads) or enrichment (first cores).

The licensee has proposed that the multiplier [1-RBP(BU)] be deleted as well as the definition for RBP(BU). These changes are acceptable as the rod bow penalty is no longer required as discussed above.

Page 3/4 2-10 currently contains Figure 3.2-3 (RBP) as a function of region average burnup. The licensee has proposed that this figure be deleted. This change is acceptable because the deletion of the rod bow penalty in the TS 3.2.3 equation makes the figure of no further use.

Page B 3/4 2-4 is the Bases discussion of Power Distribution Limits. The proposal modifies the previous TS Bases for the RBP by listing the five items from which generic design margins totaling 9.1% DNBR were obtained to offset the <3% rod bow penalty. After NRC staff discussions, the licensee, in Reference 6, provided clarifying information to satisfy our concerns. The 9.1% DNBR margin has previously been approved and the <3% rod bow penalty has been obtained by approved methods.

SAFETY SUMMARY

We conclude that the proposed Technical Specification changes are acceptable and that the licensee may continue to operate the Joseph M. Farley Nuclear Plant, Units 1 and 2, at the rated power of 2652 thermal megawatts with the rod bow penalty removed. This conclusion is based on the following: 1) acceptable methods were used for calculating the rod bow penalty and, 2) approved DNBR margin is available to offset the rod bow penalty.

ENVIRONMENTAL CONSIDERATION

These amendments involve a change in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously published a proposed finding that these amendments involve no significant hazards consideration and there has been no public comment on such finding. Accordingly, these amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR §51.22(c)(9). Pursuant to 10 CFR §51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of these amendments.

CONCLUSION

We have concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations and the issuance of these amendments will not be inimical to the common defense and security or to the health and safety of the public.

Dated: June 16, 1986

Principal Contributors:

H. Balukjian
E. A. Reeves

References

(1) Letter from R. P. McDonald, Alabama Power Company, to Director, NRR, NRC, Attention: L. S. Rubenstein, dated November 27, 1985.

(2) Skarita, J., (Ed), "Fuel Rod Bow Evaluation," WCAP-8691, Revision 1, July 1979, (Proprietary).

(3) "Partial Response to Request Number 1 for Additional Information on WCAP-8691, Revision 1" letter to E. P. Rahe, Jr., (Westinghouse) to J. R. Miller (NRC), NS-EPR-2515, dated October 9, 1981 (Proprietary).

(4) "Remaining Response to Request Number 1 for Additional Information on WCAP-8691, Revision 1" letter, E. P. Rahe, Jr., (Westinghouse) to J. R. Miller (NRC), NS-EPR-2572, dated March 16, 1982 (Proprietary).

(5) NRC letter from C. Thomas, NRC, to E. P. Rahe, Westinghouse dated December 29, 1982.

(6) Letter from R. P. McDonald, Alabama Power Company, to Director, NRR, NRC, Attention: L. S. Rubenstein, dated April 11, 1986.