

December 15, 1987

Docket No.: 50-416

DISTRIBUTION
See Attached List

Mr. Oliver D. Kingsley, Jr.
Vice President, Nuclear Operations
System Energy Resources, Inc.
Post Office Box 23054
Jackson, Mississippi 39205

Dear Mr. Kingsley:

SUBJECT: ISSUANCE OF AMENDMENT NO. 39 TO FACILITY OPERATING LICENSE
NO. NPF-29 - GRAND GULF NUCLEAR STATION, UNIT 1, REGARDING
CYCLE 3 FUEL RELOAD (TAC NO. 66376)

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 39 to Facility Operating License No. NPF-29 for the Grand Gulf Nuclear Station, Unit 1. This amendment consists of changes to the Technical Specifications (TS) in response to your application dated October 9, 1987.

The amendment adds two maximum average planar linear heat generation rate (MAPLHGR) curves for two new types of fuel assemblies being loaded into the core for fuel cycle 3 and removes one MAPLHGR curve for a type fuel assembly being unloaded. Also, the average planar exposure limit is increased from 25,000 megawatt days per short ton (MWD/ST) to 28,500 MWD/ST. In addition, administrative changes were made to reflect the new fuel types and to correct an error in Figure 3.2.1-2.

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


Sincerely,

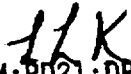
Lester L. Kintner, Project Manager
Project Directorate II-1
Division of Reactor Projects-I/II

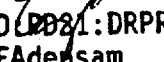
Enclosures:

1. Amendment No. 39 to NPF-29
2. Safety Evaluation

cc w/enclosures:
See next page


LA/PD21:DRPR
PAAnderson
12/9/87


PM:PD21:DRPR
LKintner
12/9/87


D/PD21:DRPR
EAdensam
12/9/87

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P PDR

Mr. Oliver D. Kingsley, Jr.
System Energy Resources, Inc.

Grand Gulf Nuclear Station (GGNS)

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Port Gibson, Mississippi 39150



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

MISSISSIPPI POWER & LIGHT COMPANY

SYSTEM ENERGY RESOURCES, INC.

SOUTH MISSISSIPPI ELECTRIC POWER ASSOCIATION

DOCKET NO. 50-416

GRAND GULF NUCLEAR STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 39
License No. NPF-29

1. The Nuclear Regulatory Commission (the Commission) has found that
 - A. The application for amendment by System Energy Resources, Inc. (the licensee), dated October 9, 1987, 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, the provisions of the Act, and the rules and 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 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.

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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-29 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 39, are hereby incorporated into this license. System Energy Resources, Inc. shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

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

FOR THE NUCLEAR REGULATORY COMMISSION


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Elinor G. Adensam, Director
Project Directorate II-1
Division of Reactor Projects-I/II

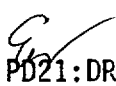
Attachment:
Changes to the Technical
Specifications

Date of Issuance: December 15, 1987


LA:PD21:DRPR
PAnderson
12/9/87


PM:PD21:DRPR
LKintner
12/9/87

*11/10/87 noted re: review
+ SEC. check sheet*
OGC-B
m. young
12/10/87


D:PD21:DRPR
EAdensam
12/14/87

ATTACHMENT TO LICENSE AMENDMENT NO. 39

FACILITY OPERATING LICENSE NO. NPF-29

DOCKET NO. 50-416

Replace the following pages of the Appendix A Technical Specifications with the enclosed pages. The revised areas are indicated by marginal lines. The corresponding overleaf page(s) have been provided to maintain document completeness.

<u>Remove</u>	<u>Insert</u>
3/4 2-1	3/4 2-1
3/4 2-2	3/4 2-2
3/4 2-2a	3/4 2-2a
3/4 2-2b	3/4 2-2b
--	3/4 2-2c
3/4 2-3	3/4 2-3 (overleaf)
--	3/4 2-3a
--	3/4 2-3b
3/4 2-4	3/4 2-4 (overleaf)
B 3/4 2-1	B 3/4 2-1
B 3/4 2-2	B 3/4 2-2 (overleaf)

3/4.2 POWER DISTRIBUTION LIMITS

3/4.2.1 AVERAGE PLANAR LINEAR HEAT GENERATION RATE

LIMITING CONDITION FOR OPERATION

3.2.1 During two loop operation all AVERAGE PLANAR LINEAR HEAT GENERATION RATES (APLHGRs) for each type of fuel as a function of AVERAGE PLANAR EXPOSURE shall not exceed the limits shown in Figures 3.2.1-1, 3.2.1-1a, 3.2.1-1b, or 3.2.1-1c as multiplied by the smaller of either the flow-dependent MAPLHGR factor ($MAPFAC_f$) of Figure 3.2.1-2, or the power-dependent MAPLHGR factor ($MAPFAC_p$) of Figure 3.2.1-3.

During single loop operation, the APLHGR for each type of fuel as a function of AVERAGE PLANAR EXPOSURE shall not exceed the limits as determined below:

- a) for fuel type 8CR210 - the limit shown in Figure 3.2.1-1 as multiplied by the smaller of either $MAPFAC_f$, $MAPFAC_p$ or 0.86; and
- b) for the ANF fuel types the limit determined in "a" above for fuel type 8CR210.

APPLICABILITY: OPERATIONAL CONDITION 1, when THERMAL POWER is greater than or equal to 25% of RATED THERMAL POWER.

ACTION:

During two loop operation or single loop operation, with an APLHGR exceeding the limits of Figures 3.2.1-1, 3.2.1-1a, 3.2.1-1b, or 3.2.1-1c as corrected by the appropriate multiplication factor for each type of fuel, initiate corrective action within 15 minutes and restore APLHGR to within the required limits within 2 hours or reduce THERMAL POWER to less than 25% of RATED THERMAL POWER within the next 4 hours.

SURVEILLANCE REQUIREMENTS

4.2.1 All APLHGRs shall be verified to be equal to or less than the required limits:

- a. At least once per 24 hours,
- b. Within 12 hours after completion of a THERMAL POWER increase of at least 15% of RATED THERMAL POWER, and
- c. Initially and at least once per 12 hours when the reactor is operating with a LIMITING CONTROL ROD PATTERN for APLHGR.
- d. The provisions of Specification 4.0.4 are not applicable.

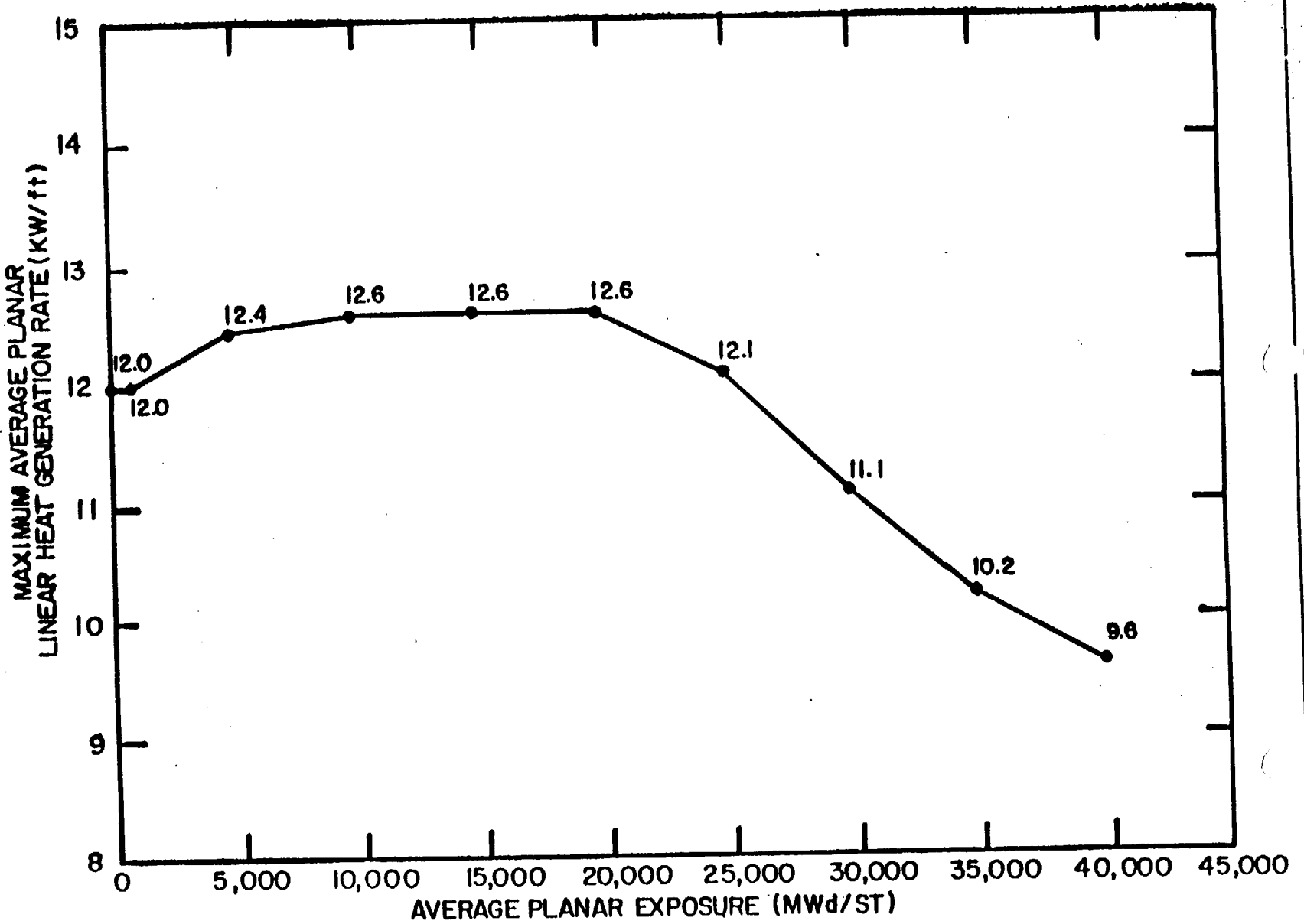


FIGURE 3.2.1-1 MAXIMUM AVERAGE PLANAR LINEAR HEAT GENERATION RATE (MAPLHGR) VERSUS AVERAGE PLANAR EXPOSURE FOR GE FUEL TYPE 8CR210

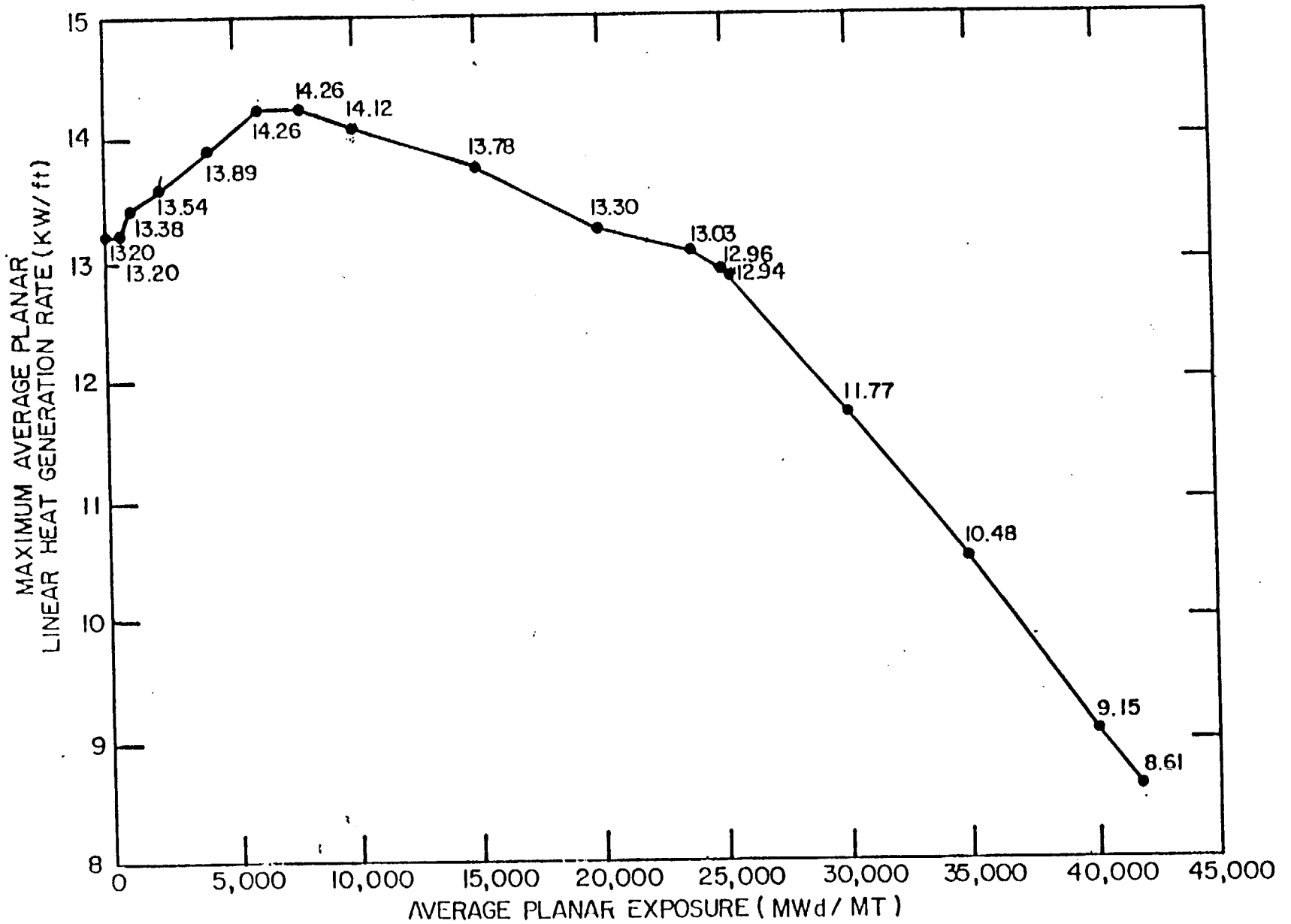


FIGURE 3.2.1-1a MAXIMUM AVERAGE PLANAR LINEAR HEAT GENERATION RATE (MAPLHGR) VERSUS AVERAGE PLANAR EXPOSURE FOR ANF FUEL TYPE ANF299E5G3S8

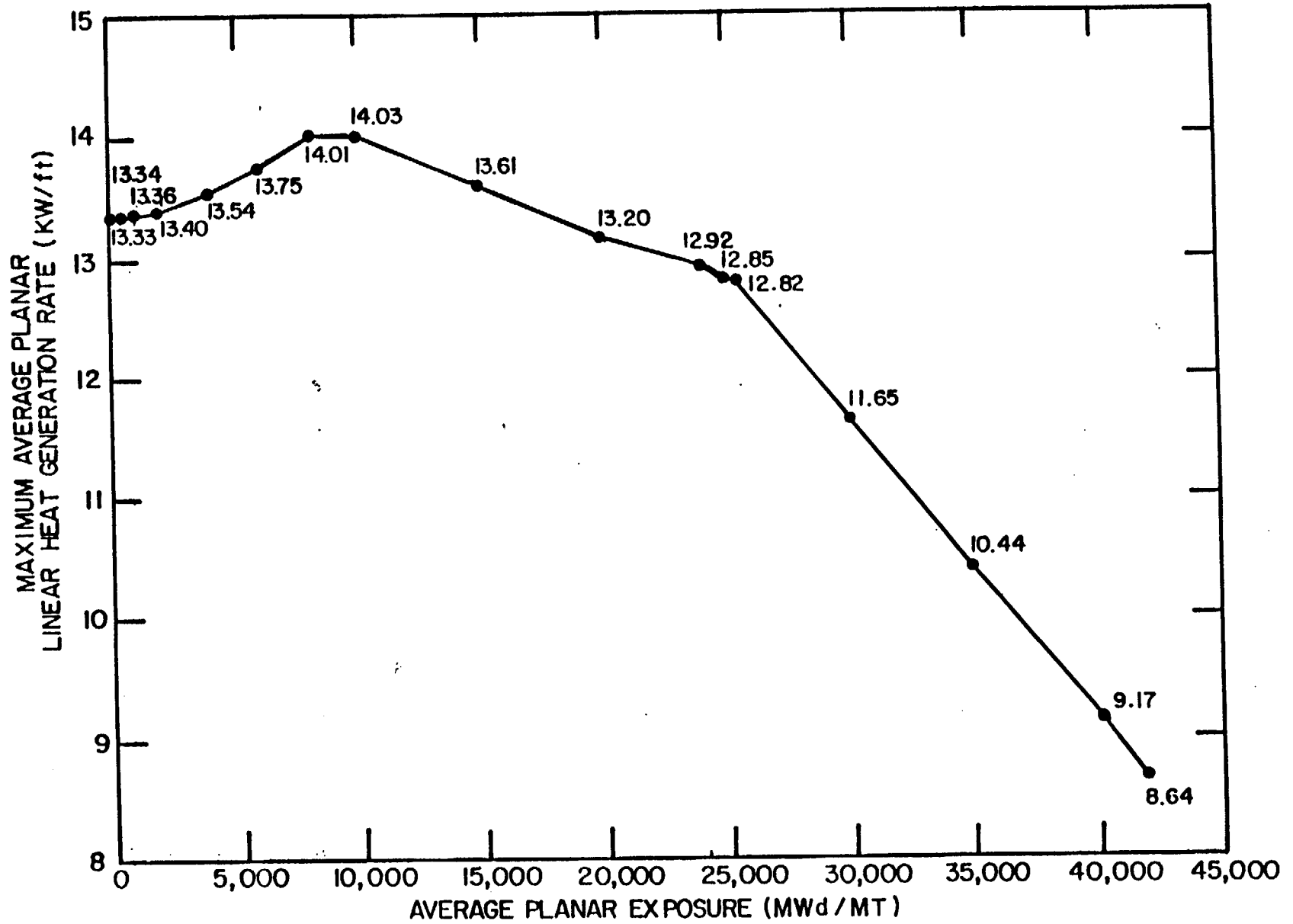


FIGURE 3.2.1-1b MAXIMUM AVERAGE PLANAR LINEAR HEAT GENERATION RATE (MAPLHGR) VERSUS AVERAGE PLANAR EXPOSURE FOR ANF FUEL TYPE ANF321E6G4S8

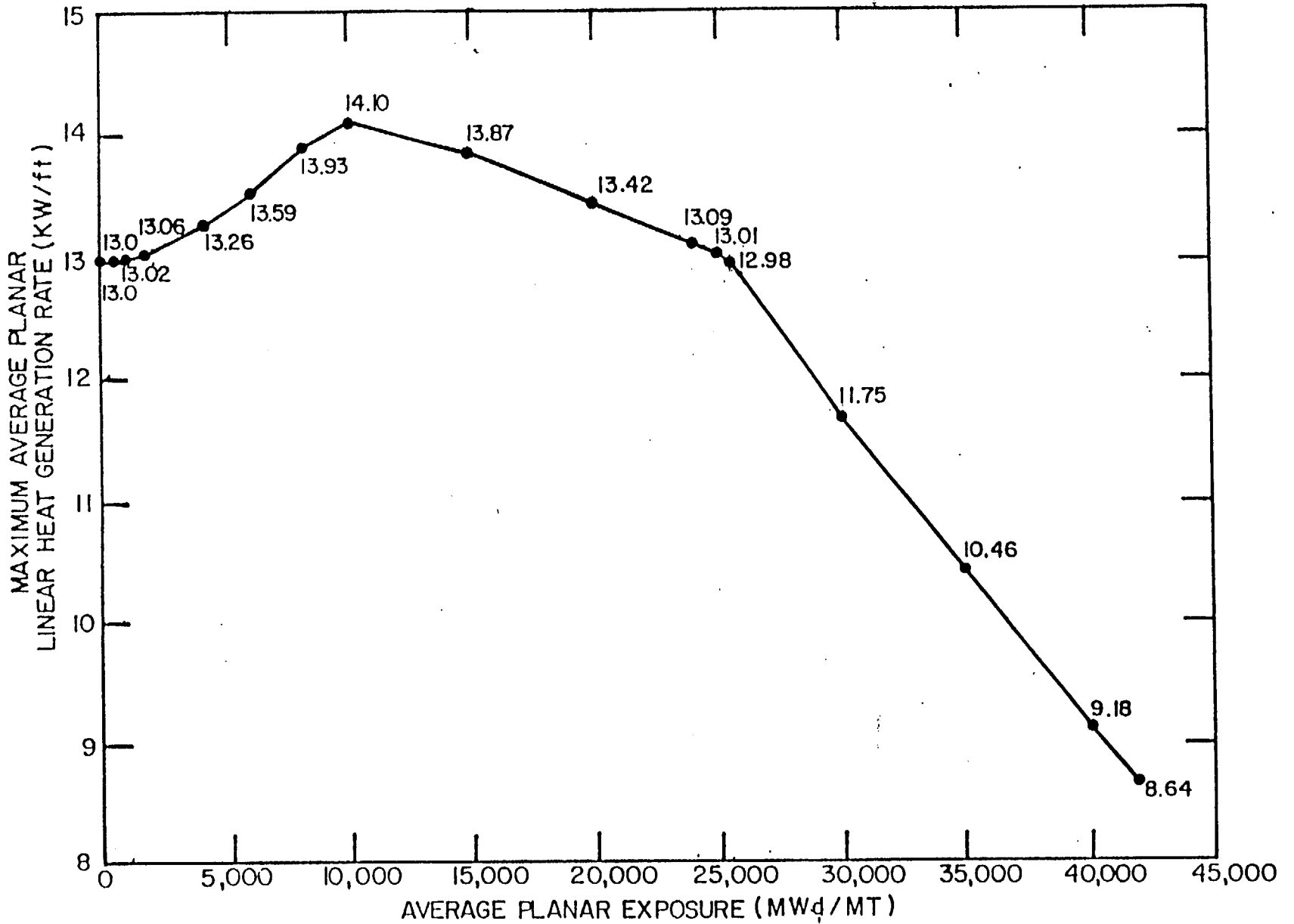


FIGURE 3.2.1-1c MAXIMUM AVERAGE PLANAR LINEAR HEAT GENERATION RATE (MAPLHGR) VERSUS AVERAGE PLANAR EXPOSURE FOR ANF FUEL TYPE ANF32IE8G4S8

POWER DISTRIBUTION LIMITS

3/4.2.2 [DELETED]

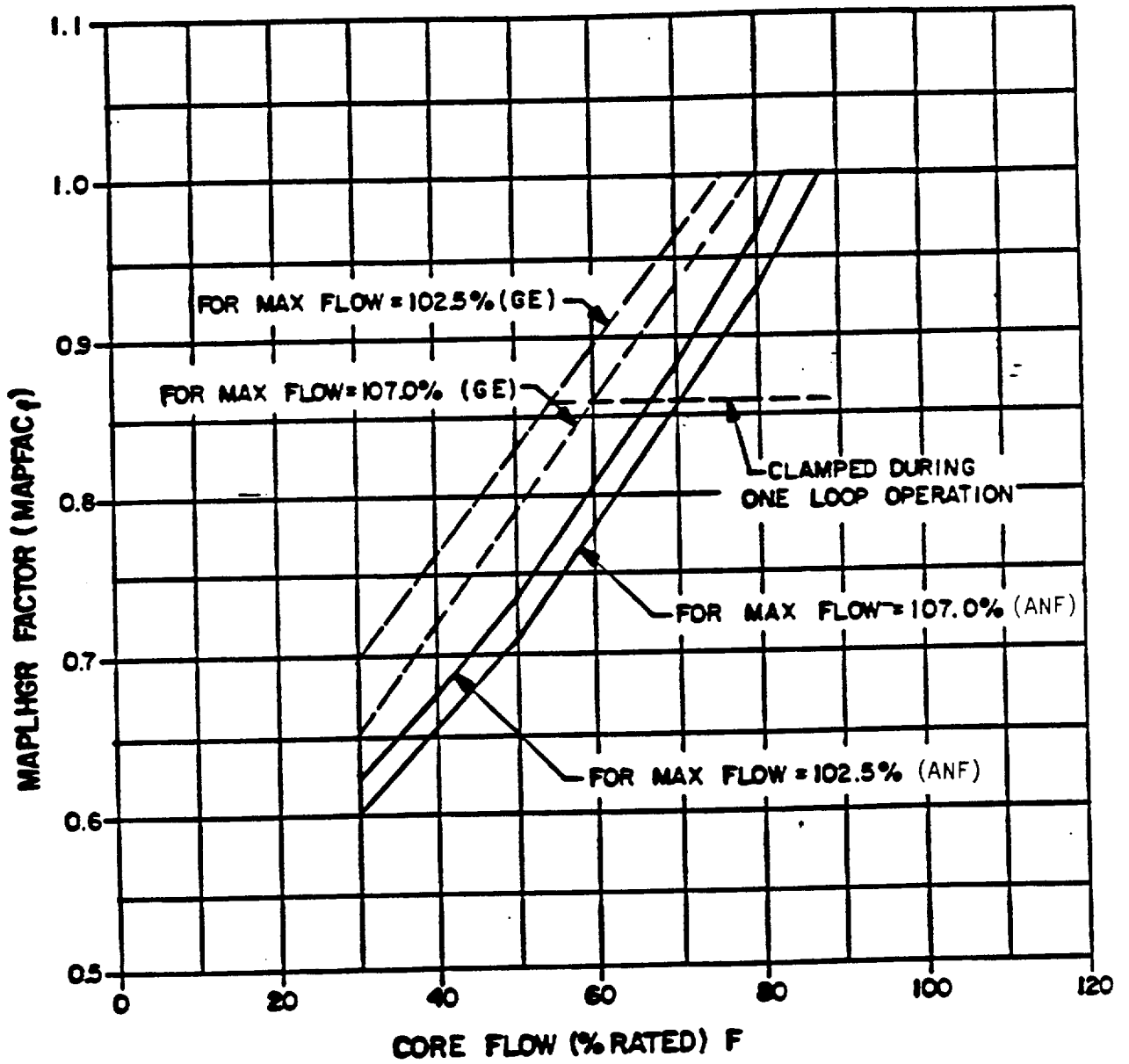


FIGURE 3.2.1-2 MAPFAC_f

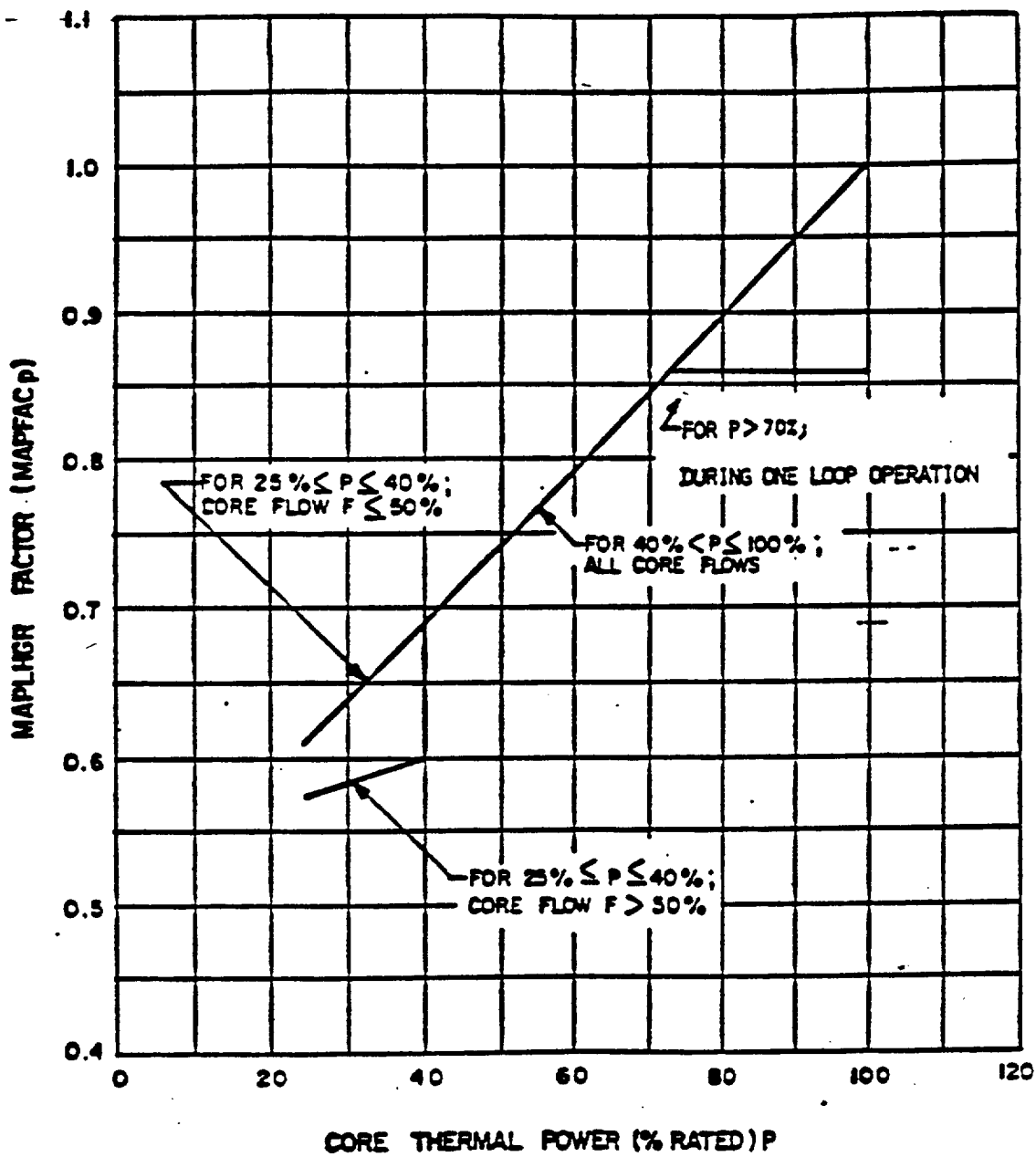


FIGURE 3.2.1-3 MAPFAC_p

POWER DISTRIBUTION LIMITS

3/4.2.3 MINIMUM CRITICAL POWER RATIO

LIMITING CONDITION FOR OPERATION

3.2.3 The MINIMUM CRITICAL POWER RATIO (MCPR) shall be equal to or greater than both MCPR_f and MCPR_P limits at indicated core flow and THERMAL POWER as shown in Figures 3.2.3-1^P and 3.2.3-2.

APPLICABILITY: OPERATIONAL CONDITION 1, when THERMAL POWER is greater than or equal to 25% of RATED THERMAL POWER.

ACTION:

With MCPR less than the applicable MCPR limits determined from Figures 3.2.3-1 and 3.2.3-2, initiate corrective action within 15 minutes and restore MCPR to within the required limits within 2 hours or reduce THERMAL POWER to less than 25% of RATED THERMAL POWER within the next 4 hours.

SURVEILLANCE REQUIREMENTS

4.2.3 MCPR shall be determined to be equal to or greater than the applicable MCPR limits determined from Figures 3.2.3-1 and 3.2.3-2:

- a. At least once per 24 hours,
- b. Within 12 hours after completion of a THERMAL POWER increase of at least 15% of RATED THERMAL POWER, and
- c. Initially and at least once per 12 hours when the reactor is operating with a LIMITING CONTROL ROD PATTERN for MCPR.
- d. The provisions of Specification 4.0.4 are not applicable.

3/4.2 POWER DISTRIBUTION LIMITS

BASES

The specifications of this section assure that the peak cladding temperature following the postulated design basis loss-of-coolant accident will not exceed the 2200°F limit specified in 10 CFR 50.46.

3/4.2.1 AVERAGE PLANAR LINEAR HEAT GENERATION RATE

This specification assures that the peak cladding temperature following the postulated design basis loss-of-coolant accident will not exceed the limit specified in 10 CFR 50.46.

The peak cladding temperature (PCT) following a postulated loss-of-coolant accident is primarily a function of the average heat generation rate of all the rods of a fuel assembly at any axial location and is dependent only secondarily on the rod to rod power distribution within an assembly. The peak clad temperature is calculated assuming a LHGR for the highest powered rod which is equal to or less than the design LHGR corrected for densification. This LHGR times 1.02 is used in the heatup code along with the exposure dependent steady state gap conductance and rod-to-rod local peaking factor. The Technical Specification AVERAGE PLANAR LINEAR HEAT GENERATION RATE (APLHGR) is this LHGR of the highest powered rod divided by its local peaking factor. The Maximum Average Planar Linear Heat Generation Rate (MAPLHGR) limits of Figures 3.2.1-1, 3.2.1-1a, 3.2.1-1b, or 3.2.1-1c are multiplied by the smaller of either the flow dependent MAPLHGR factor ($MAPFAC_f$) or the power dependent MAPLHGR factor ($MAPFAC_p$) corresponding to existing core flow and power state to assure the adherence to fuel mechanical design bases during the most limiting transient. The maximum factor ($MAPFAC$) for single loop operation is 0.86.

For single-loop operation with ANF 8x8 fuel, a MAPLHGR limit corresponding to the product of the highest enriched GE fuel MAPLHGR, and the appropriate $MAPFAC$, can be conservatively used, provided that the average planar exposure is limited to 28,500 MWD/ST.

$MAPFAC_f$'s are determined using the three-dimensional BWR simulator code to analyze slow flow runout transients. Two curves for each fuel vendor are provided for use based on the existing setting of the core flow limiter in the Recirculation Flow Control System. The curve representative of a maximum core flow limit of 107.0% is more restrictive due to the larger potential flow runout transient.

$MAPFAC_p$'s are generated using the same data base as the $MCPR_p$ to protect the core from plant transients other than core flow increases.

The daily requirement for calculating APLHGR when THERMAL POWER is greater than or equal to 25% of RATED THERMAL POWER is sufficient since power distribution shifts are very slow when there have not been significant power or control

3/4.2 POWER DISTRIBUTION LIMITS

BASES

AVERAGE PLANAR LINEAR HEAT GENERATION RATE (Continued)

rod changes. The requirement to calculate APLHGR within 12 hours after the completion of a THERMAL POWER increase of at least 15% of RATED THERMAL POWER ensures thermal limits are met after power distribution shifts while still allotting time for the power distribution to stabilize. The requirement for calculating APLHGR after initially determining a LIMITING CONTROL ROD PATTERN exists ensures that APLHGR will be known following a change in THERMAL POWER or power shape, that could place operation exceeding a thermal limit.

The calculational procedure used to establish the APLHGR limits is based on a loss-of-coolant accident analysis. The analysis was performed using calculational models which are consistent with the requirements of Appendix K to 10 CFR 50. These models are described in references 1, 6, and 8.

3/4.2.2 [DELETED]



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 39 TO FACILITY OPERATING LICENSE NO. NPF-29

MISSISSIPPI POWER & LIGHT COMPANY

SYSTEM ENERGY RESOURCES, INC.

SOUTH MISSISSIPPI ELECTRIC POWER ASSOCIATION

GRAND GULF NUCLEAR STATION, UNIT 1

DOCKET NO. 50-416

1.0 INTRODUCTION

By letter dated October 9, 1987, System Energy Resources, Inc., requested an amendment to Facility Operating License No. NPF-29 for the Grand Gulf Nuclear Station, Unit 1. The proposed amendment would change the Technical Specifications (TS) to reflect two new fuel types being added to the core and one fuel type being removed from the core during the fuel reload for Cycle 3. In addition, the average planar fuel exposure limit would be increased from 25,000 megawatt days per short ton (MWD/ST) to 28,500 MWD/ST. Administrative changes would be made to reflect the fuel reload and to correct an error in TS Figure 3.2.1-1. In support of the proposed amendment, the licensee enclosed a summary reload report (Reference 1) and two technical reports by Advanced Nuclear Fuels (ANF) (References 2 and 3). The NRC staff has reviewed these documents and prepared the following evaluation.

The reload fuel assemblies are supplied by the Advanced Nuclear Fuels (ANF) Corporation, previously known as the Exxon Nuclear Company (ENC). The fuel cycle 3 core would consist of 248 General Electric (GE) Company fuel assemblies from the initial core loading, 264 ANF fuel assemblies from the first refueling and 288 ANF fuel assemblies from this refueling. Of the 288 new fuel assemblies added in this reload, 204 assemblies would contain 6 Gadolinium oxide nuclear poison rods and 84 assemblies would contain 8 poison rods.

2.0 EVALUATION

For Cycle 3, the licensee plans to continue the process, that was begun for Cycle 2, of substituting ANF designed fuel assemblies for the GE designed fuel. The ANF fuel to be used for Cycle 3 is mechanically identical to that used for Cycle 2 and is similar to the remaining GE fuel. Compatibility of the fuels was addressed in the Cycle 2 reload analysis and the conclusion of that analysis is still valid.

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The fuel mechanical design analysis, core thermal hydraulic analysis and nuclear design analysis were performed by methods previously used and approved (especially for Cycle 2). The results of these analyses show that no change in the TS is required except that maximum average planar linear heat generation rate (MAPLHGR) curves must be provided for the two fuel assembly types introduced in Cycle 3. The POWERPLEX core monitoring system, which was approved for use in Cycle 2, will continue to be used in Cycle 3.

The limiting core-wide anticipated operational occurrences of Cycle 2 were reanalyzed to confirm that the plant operating minimum critical power ratio (MCPR) values of Cycle 2 were bounding. The control rod withdrawal error transient was examined to confirm that the results of the approved generic analysis were acceptable.

Reduced flow and power operations were examined to confirm that the Cycle 2 flow and power dependent multipliers for MCPR and MAPLHGR are still applicable for Cycle 3. For single loop operation, analysis supports the use of a maximum average planar exposure of 28,500 MWD/ST. The loss-of-coolant and rod ejection events were examined to confirm that applicable fuel limits are not exceeded. MAPLHGR values for the two new fuel types were obtained from the loss-of-coolant accident analysis. These evaluations were performed by previously approved methods and are acceptable.

In Figure 3.6.1-3, the limiting MAPLHGR factor for power greater than 70% is incorrectly drawn at 0.84 instead of 0.86. Redrawing the limiting line at 0.86 is, therefore, acceptable.

The staff has reviewed the proposed changes to the TS that are proposed for operation of Cycle 3 and concludes that they are consistent with the analyses and are acceptable.

3.0 ENVIRONMENTAL CONSIDERATION

This amendment changes a requirement with respect to 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 amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released off site; and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that this amendment involves no significant hazards consideration, and there has been no public comment on such finding. Accordingly, this amendment meets 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 this amendment.

4.0 CONCLUSION

The Commission made a proposed determination that this amendment involves no significant hazards consideration, which was published in the Federal Register (52 FR 42365) on November 4, 1987, and consulted with the State of Mississippi. No public comments or requests for hearing were received, and the State of Mississippi did not have any comments.

The staff has 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 the operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and the security, or to the health and safety of the public.

References:

1. Grand Gulf Nuclear Station, Unit 1 Cycle 3 Reload Summary Report, August 1987.
2. Report ANF-87-67, Rev. 1, Grand Gulf Unit 1 Cycle 3 Reload Analysis, August 1987.
3. Report ANF-87-66, Rev. 1, Grand Gulf Unit 1 Cycle 3 Plant Transient Analysis, August 1987.

Principal Contributor: W. Brooks

Dated: December 15, 1987

AMENDMENT NO. 39 TO FACILITY OPERATING LICENSE NO. NPF-29 - GRAND GULF, UNIT 1

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Docket No. 50-416
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