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

GEORGIA POWER COMPANY

OGLETHORPE POWER CORPORATION

MUNICIPAL ELECTRIC AUTHORITY OF GEORGIA

CITY OF DALTON, GEORGIA

DOCKET NO. 50-321

EDWIN I. HATCH NUCLEAR PLANT, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 157
License No. DPR-57

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

   A. The application for amendment to the Edwin I. Hatch Nuclear Plant, Unit 1 (the facility) Facility Operating License No. DPR-57 filed by Georgia Power Company, acting for itself, Oglethorpe Power Corporation, Municipal Electric Authority of Georgia, and City of Dalton, Georgia, (the licensee) dated June 20, 1988, 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 set forth in 10 CFR Chapter I;

   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.

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. DPR-57 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 157, 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 and shall be implemented within 60 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

David B. Matthews, Director
Project Directorate II-3
Division of Reactor Projects-I/II

Attachment:
Changes to the Technical
Specifications

Date of Issuance: September 12, 1988

OFFICIAL RECORD COPY

LA:PDII-3	PM:PDII-3	NRR:SRXB	OGC-WF	D:PDII-3
MRood	LCrocker:sw	WHodges		DMatthews
8/16/88	8/18/88	8/19/88	8/24/88	8/31/88

ATTACHMENT TO LICENSE AMENDMENT NO. 157

FACILITY OPERATING LICENSE NO. DPR-57

DOCKET NO. 50-321

Replace the following pages of the Appendix A Technical Specifications with the enclosed pages. The revised page is identified by amendment number and contains a vertical line indicating the area of change.

Remove Page	Insert Page
X	X
Xi	Xi
3.11-1a	3.11-1a
3.11-2	3.11-2
3.11-3	3.11-3
3.11-4	3.11-4
3.11-4a	3.11-4a
Figure 3.11-1 (Sheet 4)	Figure 3.11-1 (Sheet 4)
Figure 3.11-1 (Sheet 5)	Figure 3.11-1 (Sheet 5)
Figure 3.11-1 (Sheet 6)	Figure 3.11-1 (Sheet 6)
Figure 3.11-1 (Sheet 8)	Figure 3.11-1 (Sheet 8)
Figure 3.11-2	Figure 3.11-2
Figure 3.11-4	Figure 3.11-4
Figure 3.11-5	Figure 3.11-5

LIST OF FIGURES

LIST OF FIGURES

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.11.B. <u>Linear Heat Generation Rate (LHGR)</u>	4.11.B. <u>Linear Heat Generation Rate (LHGR)</u>
During power operation, the LHGR shall not exceed the limiting value of 14.4 kW/ft for GE8x8EB fuel or the limiting value of 13.4 kW/ft for any other 8 x 8 fuel. If at any time during	The LHGR shall be checked daily during reactor operation at ≥ 25% rated thermal power.

3.11.B. Linear Heat Generation Rate (LHGR) (Continued)

operation it is determined by normal surveillance that the limiting value for LHGR is being exceeded, action shall be initiated within 15 minutes to restore operation to within the prescribed limits. If the LHGR is not returned to within the prescribed limits within 2 hours, then reduce reactor power to less than 25 percent of rated thermal power within the next 4 hours. If the limiting condition for operation is restored prior to expiration of the specified time interval, then further progression to less than 25 percent of rated thermal power is not required.

C. Minimum Critical Power Ratio (MCPR)

The minimum critical power ratio (MCPR) for two-loop operation shall be equal to or greater than the operating limit MCPR (OLMCPR), which is a function of scram time, core power, and core flow. For 25 percent ≤ power < 30 percent, the OLMCPR is given in Figure 3.11-6. For power ≥ 30 percent, the OLMCPR is the greater of either:

1. The applicable limit determined from Figure 3.11-3, or

2. The applicable limit from Figure 3.11-4 multiplied by the K_p factor determined from Figure 3.11-6, where τ is the relative measured scram speed with respect to Option A and Option B scram speeds. If τ is determined to be less than zero, then the OLMCPR is evaluated at τ=0.

4.11.C.1. Minimum Critical Power Ratio (MCPR)

MCPR shall be determined to be equal to or greater than the applicable limit, daily during reactor power operation at ≥ 25-percent rated thermal power and following any change in power level or distribution that would cause operation with a limiting control rod pattern as described in the bases for Specification 3.3.F.

4.11.C.2. Minimum Critical Power Ratio Limit

The MCPR limit at rated flow and rated power shall be determined for each fuel type, as appropriate from Figure 3.11-4, using:

a. τ=1.0 prior to initial scram time measurements for the cycle, performed in accordance with Specification 4.3.C.2.a.

or

b. τ is determined from scram time measurements performed in accordance with Specification 4.3.C.2.

The determination of the limit must be completed within 72 hours of the conclusion of each scram time surveillance test required by Specification 4.3.C.2.

3.11. FUEL RODS

A. Average Planar Linear Heat Generation Rate (APLHGR)

This specification assures that the peak cladding temperature following the postulated design basis loss-of-coolant accident (LOCA) will not exceed the limit specified in 10 CFR 50.46 even considering the postulated effects of fuel pellet densification.

The peak cladding temperature 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 only dependent secondarily on the rod to rod power distribution within an assembly. Since expected local variations in power distribution within a fuel assembly affect the calculated peak clad temperature by less than ± 20°F relative to the peak temperature for a typical fuel design, the limit on the average linear heat generation rate is sufficient to assure that calculated temperatures conform to 10 CFR 50.46. The limiting value for APLHGR at rated conditions is shown in figures 3.11-1, sheets 1 thru 6.

For convenience, the APLHGR limits are reported in the units of kW/ft, which is the bundle planar power normalized to the number of fueled rods. Figure 3.11-1 (Sheet 4) shows that the 9x9 LFAs have the same planar power limits as the GE 8/P8DRB284H fuel; however, on a kW/ft basis, the APLHGR limits for the LFAs are 62/79 times the 8/P8DRB284H limits.

The actual APLHGR limits for GE8x8EB fuel are lattice-type dependent and are explicitly modeled in the process computer. At each exposure, the Technical Specifications APLHGR limit is defined as the most limiting value of all the enriched lattices. The Technical Specifications APLHGR limits will be used for manual calculations.

The calculational procedure used to establish the APLHGR shown in figures 3.11-1, sheets 1 thru 6, is based on a LOCA analysis. The analysis was performed using General Electric (GE) calculational models which are consistent with the requirements of Appendix K to 10 CFR 50. The LOCA analysis was performed utilizing the new improved calculational model, SAFER/GESTR-LOCA. The analysis demonstrated that loss-of-coolant concerns do not limit the operation of the fuel since margin to the 2200°F limit was demonstrated (Reference 9). Therefore, the APLHGR limits for the fuel types shown in figure 3.11-1 are derived to assure that the fuel thermal-mechanical design criteria are met.

A list of the significant plant input parameters to the LOCA analysis is presented in tables 4-1 and 4-2 of Reference 9. Further discussion of the APLHGR bases is found in NEDC-30474-P(*).

A flow dependent correction factor incorporated into figure 3.11-1 (sheet 8) is applied to the rated conditions APLHGR to assure that the 2200°F PCT limit is complied with during LOCA initiated from less than rated core flow. In addition, other power and flow dependent corrections given in figure 3.11-1 (sheets 7 and 8) are applied to the rated conditions APLHGR limits to assure that the fuel thermal-mechanical design criteria are met during abnormal transients initiated from off-rated conditions for two-loop and single-loop operations, References 2 and 8. For single-loop operation, a 0.75 multiplication factor to APLHGR limits for all fuel bundle types conservatively bounds that required by Reference 2. For single-loop operation (SLO), the most restrictive of the SLO and ARTS(*) MAPLHGRS will define the Limiting Conditon for Operation.

3.11.B. Linear Heat Generation Rate (LHGR)

This specification assures that the LHGR in any rod is less than the design linear heat generation if fuel pellet densification is postulated. For LHGR to be a limiting value below 25-percent rated thermal power, the ratio of peak LHGR to core average LHGR would have to be greater than 9.6, which is precluded by a considerable margin when employing any permissible control rod pattern.

C. Minimum Critical Power Ratio (MCPR)

The required operating limit MCPR as specified in Specification 3.11.C. is derived from the established fuel cladding integrity Safety Limit MCPR and an analysis of abnormal operational transients presented in References 1, 2, and 8.

Various transient events will reduce the MCPR below the operating MCPR. To assure that the fuel cladding integrity safety limit is not violated during anticipated abnormal operational transients, the most limiting transients have been analyzed to determine which one results in the largest reduction in critical power ratio (Δ MCPR). Addition of the largest Δ MCPR to the safety limit MCPR gives the minimum operating limit MCPR to avoid violation of the safety limit should the most limiting transient occur. The type of transients evaluated were loss of flow, increase in pressure and power, positive reactivity insertion, and coolant temperature decrease.

3.11.C. Minimum Critical Power Ratio (MCPR) (Continued)

According to Figure 3.11-4 the 100-percent power, 100-percent flow operating limit MCPR (OLMCPR) depends on the average scram time, τ, of the control rods, where:

$$t = 0 \text{ or } \frac{\tau_{ave} - \tau_B}{\tau_A - \tau_B}, \text{ whichever is greater}$$

where: τ_A = 1.096 sec (Specification 3.3.C.2.a, scram time limit to notch 36)

$$\tau_B = \mu + 1.65 \left[\frac{N_1}{\sum_{i=1}^{n} N_i}\right]^{1/2} \sigma \quad \text{[Reference 7]}$$

where: μ = 0.822 sec (mean scram time used in the transient analysis)

σ = .018 sec (standard deviation of μ)

$$\tau_{ave} = \left[\frac{\sum_{i=1}^{n} N_i \tau_i}{\sum_{i=1}^{n} N_i}\right]$$

where: n = number of surveillance tests performed to date in the cycle

N_i = number of active control rods measured in the ith surveillance test

τ_i = average scram time to notch 36 of all rods in the ith surveillance test

N_1 = total number of active rods measured in 4.3.C.2.a

The purpose of the $MCPR_f$, and the K_p of Figures 3.11-3 and 3.11-6, respectively, is to define operating limits at other than rated core flow and power conditions. At less than 100 percent of rated flow and power, the required MCPR is the larger value of the $MCPR_f$ and $MCPR_p$ at the existing core flow and power state. The $MCPR_f$s are established to protect the core from inadvertent core flow increases such that the 99.9-percent MCPR limit requirement can be assured.

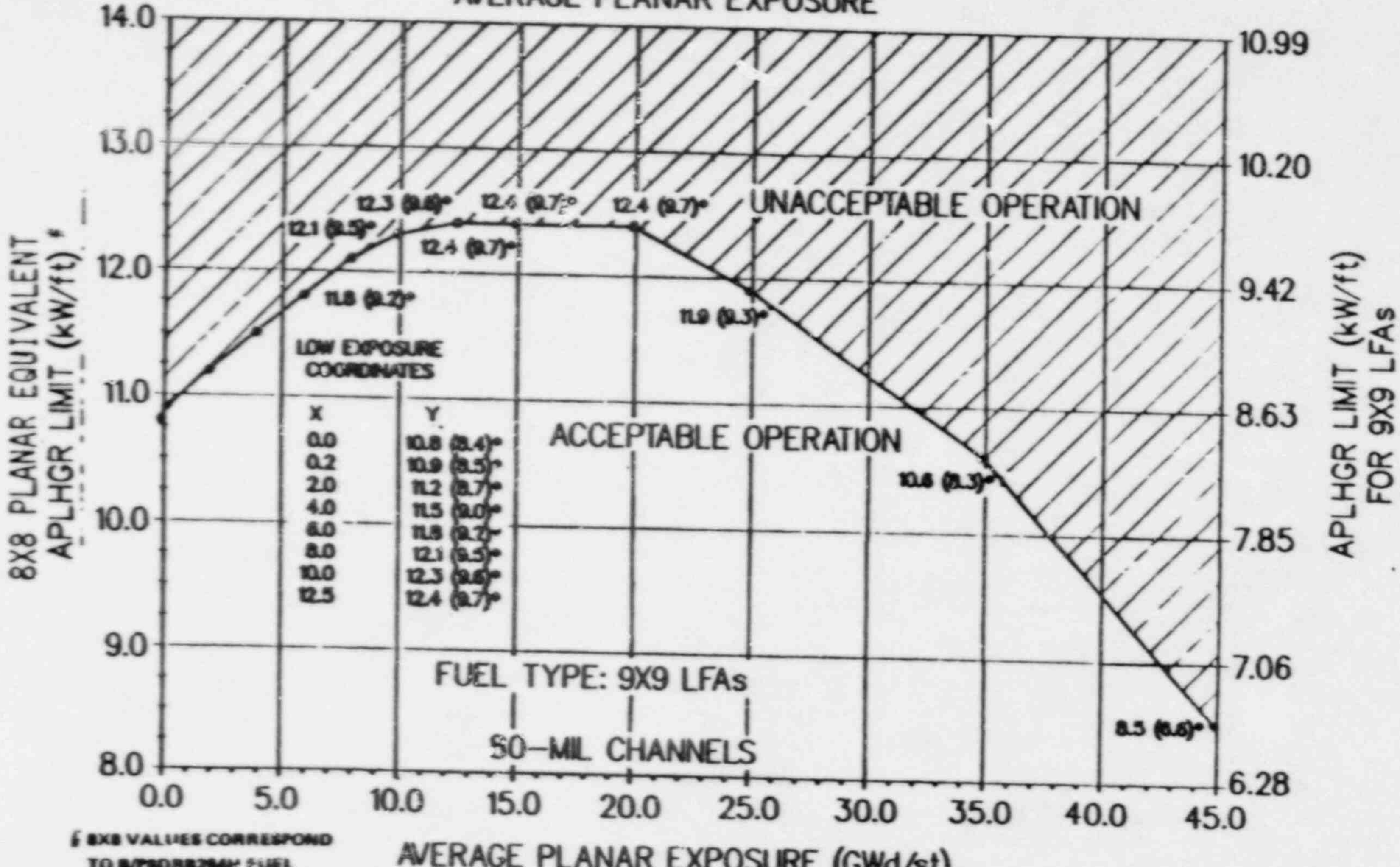
The $MCPR_f$s were calculated such that for the maximum core flow rate and the corresponding THERMAL POWER along the 105 percent of rated steam flow control line, the limiting bundle's relative power was adjusted until the MCPR was slightly above the Safety Limit. Using this relative bundle power, the MCPRs were calculated at different points along the 105 percent of rated steam flow control line corresponding to different core flows. The calculated MCPR at a given point of core flow is defined as $MCPR_f$.

The core power dependent MCPR operating limit $MCPR_p$ is the power rated flow MCPR operating limit multiplied by the K_p factor given in Figure 3.11-6.

The K_ps are established to protect the core from transients other than core flow increases, including the localized event such as rod withdrawal error. The K_ps were determined based upon the most limiting transient at the given core power level. (For further information on MCPR operating limits for off-rated conditions, reference NEDC-30474-P.(*))

When operating with a single-recirculation pump, the MCPR Safety and Operating Limits are increased by an amount of 0.01 over the comparable values for two-recirculation pump operation.(a)

AVERAGE PLANAR LINEAR HEAT GENERATION RATE vs AVERAGE PLANAR EXPOSURE



§ 8X8 VALUES CORRESPOND TO B/P8DRB284H FUEL

*( ) – APLHGR LIMITS FOR 9 X 9 LFAs

FIGURE 3.11-1 (SHEET 4)

AVERAGE PLANAR LINEAR HEAT GENERATION RATE LIMIT vs AVERAGE PLANAR EXPOSURE

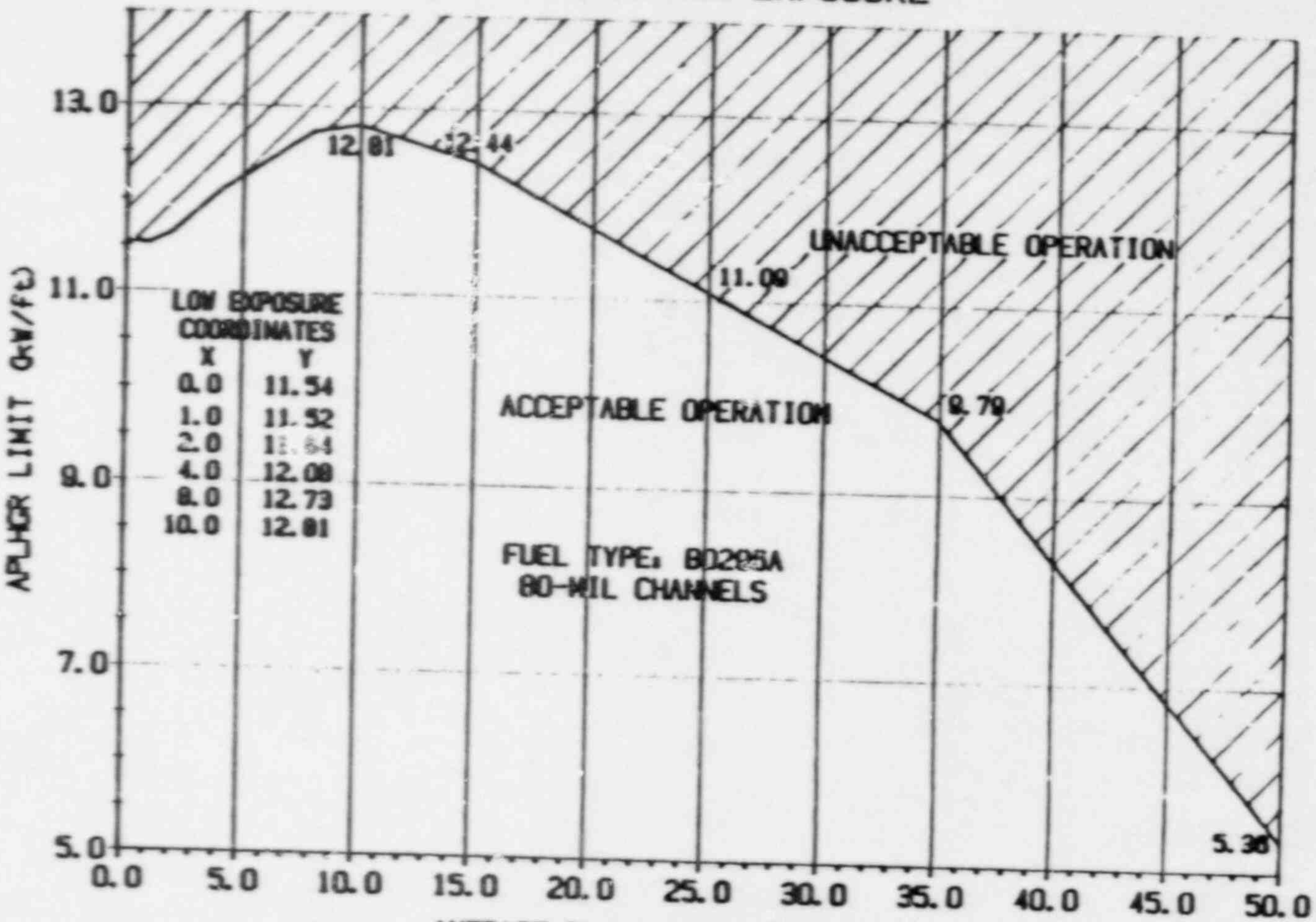
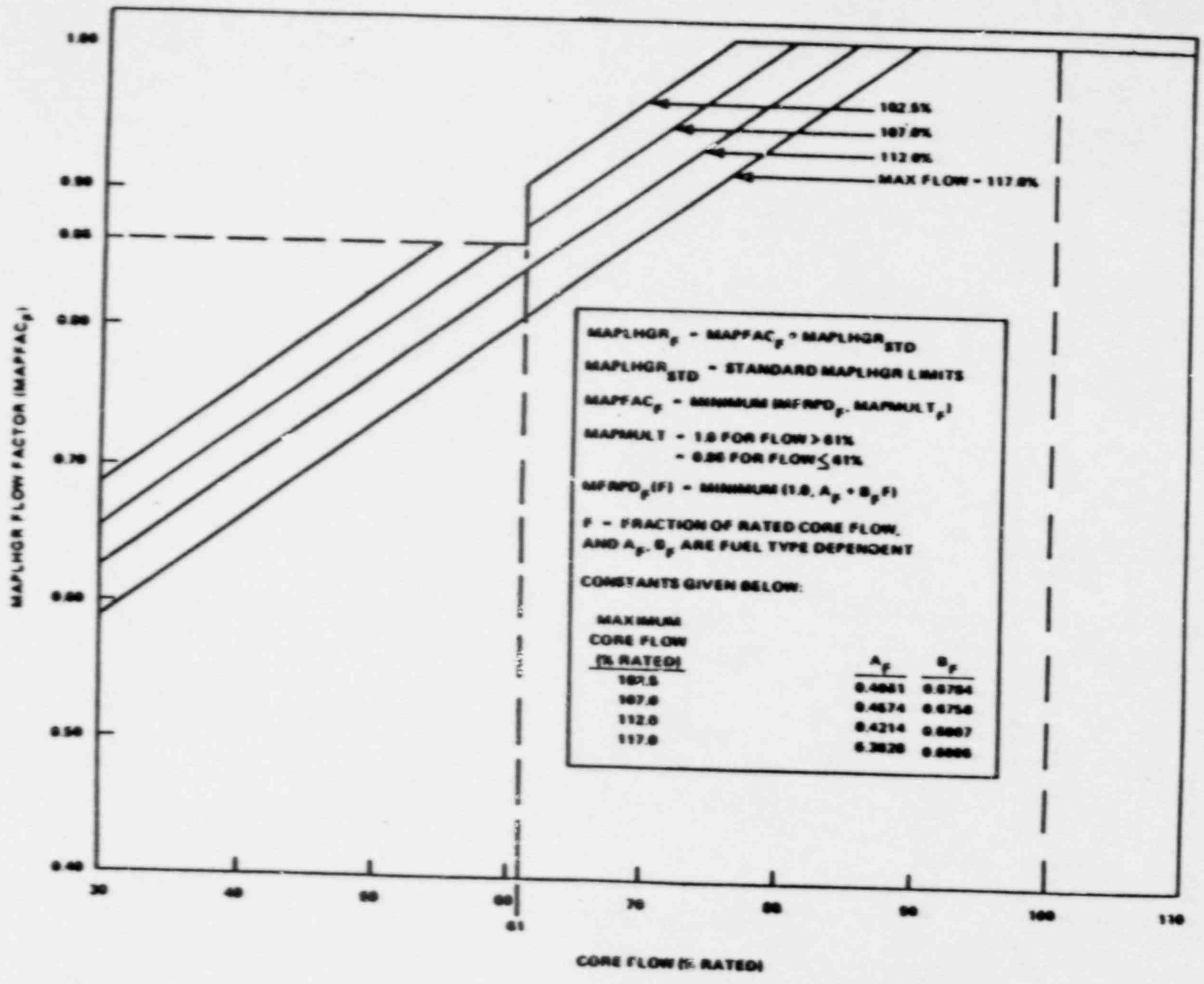


FIGURE 3.11-1 (SHEET 5)

NOTE: THIS IS THE APLHGR LIMIT FOR THE MOST LIMITING LATTICE AS A FUNCTION OF AVERAGE PLANAR EXPOSURE.

Figure 3.11-1 (Sheet 6) (Deleted)



1.00
0.90
0.86
0.80
0.70
0.60
0.50
0.40
MAPLHGR FLOW FACTOR (MAPFAC$_F$)
30
40
50
60
61
70
80
90
100
110
CORE FLOW (% RATED)
102.5%
107.0%
112.0%
MAX FLOW - 117.0%
MAPLHGR$_F$ = MAPFAC$_F$ * MAPLHGR$_{STD}$
MAPLHGR$_{STD}$ = STANDARD MAPLHGR LIMITS
MAPFAC$_F$ = MINIMUM (MFRPD$_F$, MAPMULT$_F$)
MAPMULT = 1.0 FOR FLOW > 61%
= 0.86 FOR FLOW ≤ 61%
MFRPD$_F$(F) = MINIMUM (1.0, A$_F$ + B$_F$F)
F = FRACTION OF RATED CORE FLOW,
AND A$_F$, B$_F$ ARE FUEL TYPE DEPENDENT
CONSTANTS GIVEN BELOW:
MAXIMUM
CORE FLOW
(% RATED)
A$_F$
B$_F$

FIGURE 3.11-2 (Deleted)

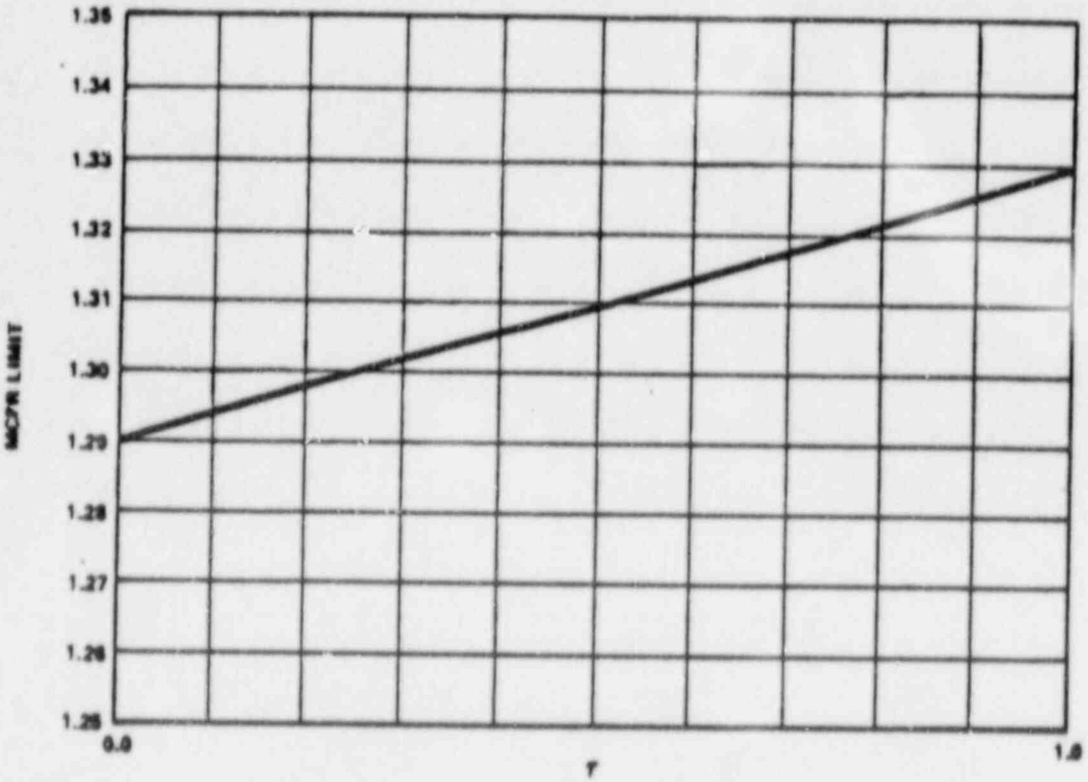


FIGURE 3.11-4
MCPR LIMIT ALL 8X8 AND 9X9 FUEL TYPES
FOR RATED POWER AND RATED FLOW

FIGURE 3.11-5 (Deleted)