

EDWIN I. HATCH NUCLEAR PLANT  
UNIT 2

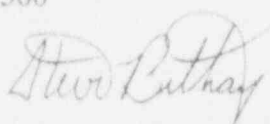
CORE OPERATING LIMITS REPORT  
*for*  
FUEL CYCLE 12

*Revision 0*

*April 1994*

DATE: April 19, 1994

RE: Hatch Project Support - Licensing  
Core Operating Limits Report for Hatch 2 Cycle 12  
Revision 0  
File: Fuel Cycle Technical  
Log: HL-3300

FROM: S. J. Bethay 

TO: ALL UNIT 2 TECHNICAL SPECIFICATIONS MANUAL HOLDERS

By amendment 106 to the Unit 2 Technical Specifications, the NRC authorized relocation of certain fuel-related limits from the Technical Specifications to the adjunct Core Operating Limits Report (COLR). This letter transmits to all Unit 2 Technical Specifications manual holders a copy of Revision 0 of the COLR for Hatch 2 Cycle 12. This document should be utilized in conjunction with the Unit 2 Technical Specifications, as referred to in the Specifications. Normally, the shift technical advisor or reactor engineer will use this report. Where necessary, the fuel limits from the COLR are included in plant procedures.

Please discard Revision 0 of the COLR for Hatch 2 Cycle 11, which was issued in November 1992, since it is no longer applicable. If you have questions regarding Revision 0 of the Unit 2 COLR for Cycle 12, please contact me at extension 8-821-7392 or telephone number (205) 877-7392.

SRP/sp  
colrwp

Enclosure

cc: NORMS

GEORGIA POWER COMPANY  
EDWIN I. HATCH NUCLEAR PLANT

UNIT 2 FUEL CYCLE 12  
CORE OPERATING LIMITS REPORT

REVISION 0

Southern Nuclear Operating Company  
Post Office Box 1295  
Birmingham, Alabama 35201

EDWIN I. HATCH NUCLEAR PLANT  
UNIT 2 FUEL CYCLE 12  
CORE OPERATING LIMITS REPORT

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EDWIN I. HATCH NUCLEAR PLANT  
UNIT 2 FUEL CYCLE 12  
CORE OPERATING LIMITS REPORT

1.0 INTRODUCTION

The Core Operating Limits Report (COLR) for Plant Hatch Unit 2 Cycle 12 is prepared in accordance with the requirements of Technical Specification 6.9.1.11. The core operating limits presented herein were developed using NRC-approved methods (References 1 and 2). Results from the reload analyses for the General Electric (GE) fuel in Unit 2 Cycle 12 are documented in References 3 and 4.

The following cycle-specific core operating limits are included in this report:

- a. Control Rod Program Controls - Technical Specification 3/4.1.4.3.
- b. Average Planar Linear Heat Generation Rate (APLHGR) - Technical Specification 3/4.2.1.
- c. Minimum Critical Power Ratio (MCPR) - Technical Specification 3/4.2.3.
- d. Linear Heat Generation Rate (LHGR) - Technical Specification 3/4.2.4.

2.0 ROD BLOCK MONITOR (Technical Specification 3/4.1.4.3)

Both Rod Block Monitor (RBM) channels shall be operable as specified in Technical Specification 3/4.1.4.3 and when:

- a. THERMAL POWER is  $< 90\%$  of RATED THERMAL POWER and the MCPR is  $< 1.70$
- or
- b. THERMAL POWER is  $\geq 90\%$  of RATED THERMAL POWER and the MCPR is  $< 1.40$ .



3.0 APLHGR LIMIT (Technical Specification 3/4.2.1)

The APLHGR limit is given by the applicable rated-power, rated-flow limit taken from Figures 3-3 through 3-8, multiplied by the smaller of either:

- a. The factor given by Figure 3-1

or

- b. The factor given by Figure 3-2.

For the fuel types whose APLHGR limits are shown in Figures 3-3 through 3-8, the APLHGR limit shall be applied to each axial location in the fuel assembly.

As required by GESTAR Amendment 19, the hand-calculated APLHGR values for a multi-lattice (i.e., GE8-296 and GE11-LUA) fuel must be less than or equal to the APLHGR limits shown in Figures 3-4 and 3-7, respectively. When APLHGR values are determined by the process computer, the lattice-dependent APLHGR limits are used. Under these conditions, some axial locations may have APLHGR values exceeding the values shown in Figures 3-4 and 3-7.

Plant Hatch Unit 2 Fuel Cycle 12  
Core Operating Limits Report

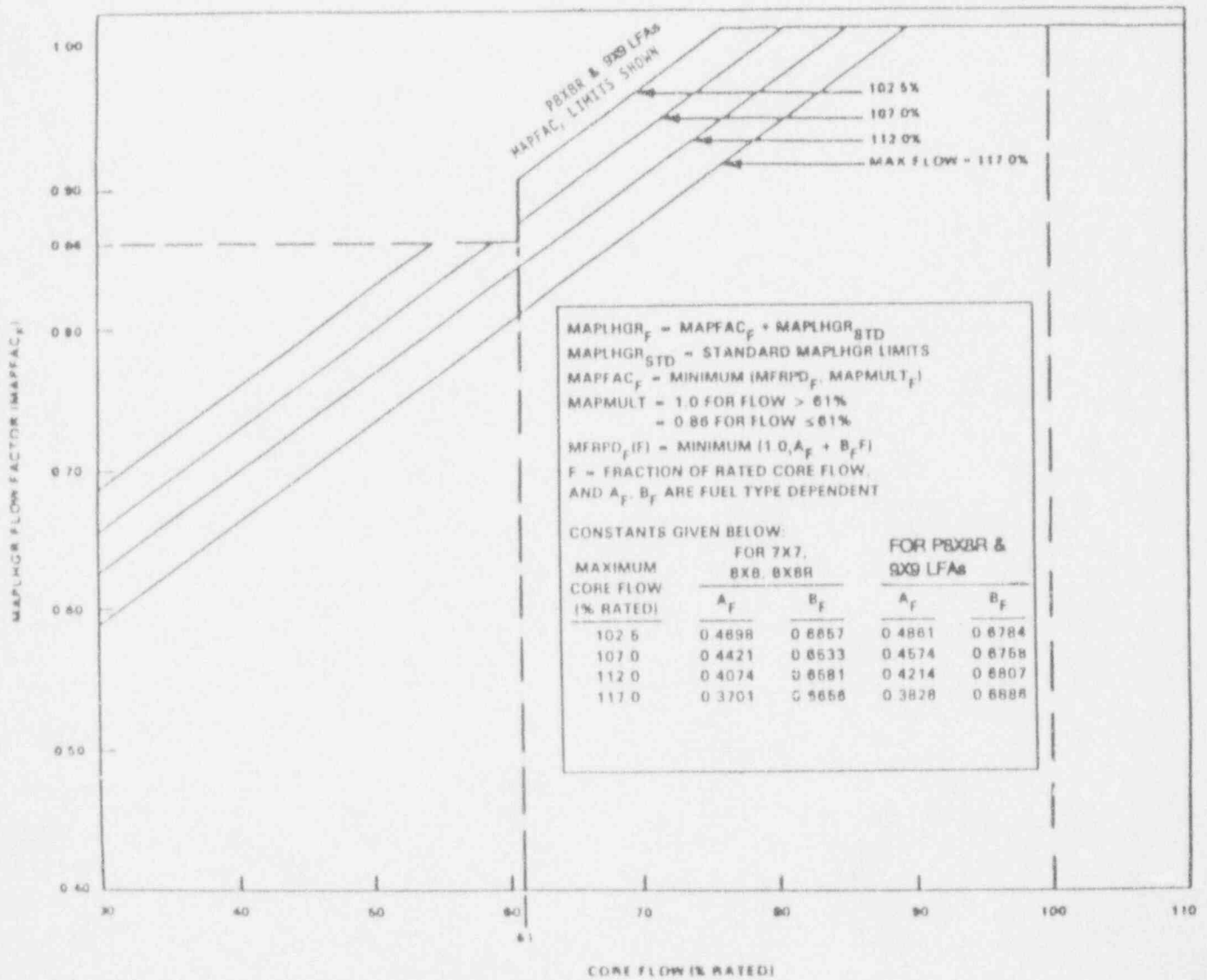


FIGURE 3-1  
MAPFAC<sub>F</sub>



Plant Hatch Unit 2 Fuel Cycle 12  
Core Operating Limits Report

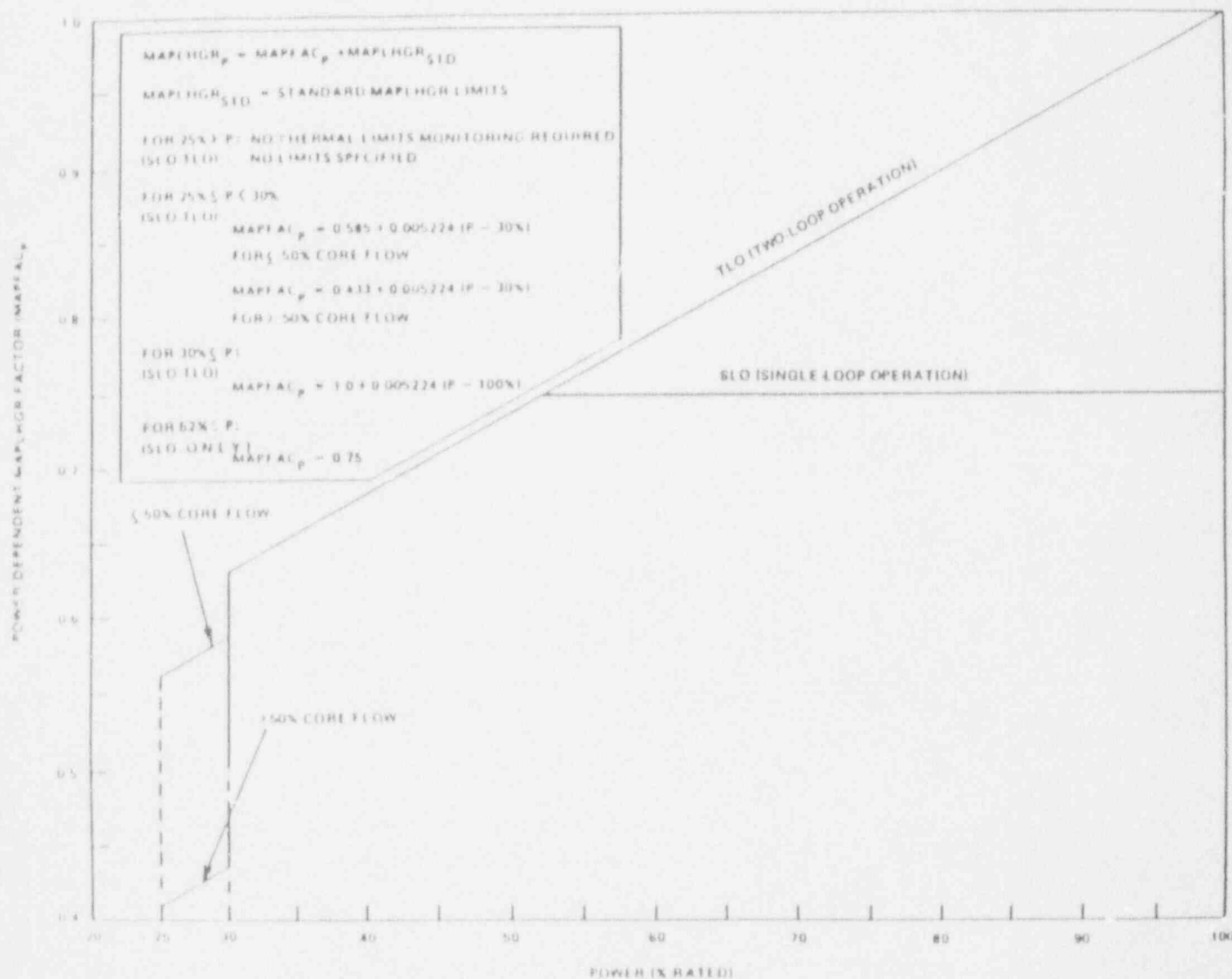


FIGURE 3-2  
MAPFAC<sub>p</sub>

Plant Hatch Unit 2 Fuel Cycle 12  
Core Operating Limits Report

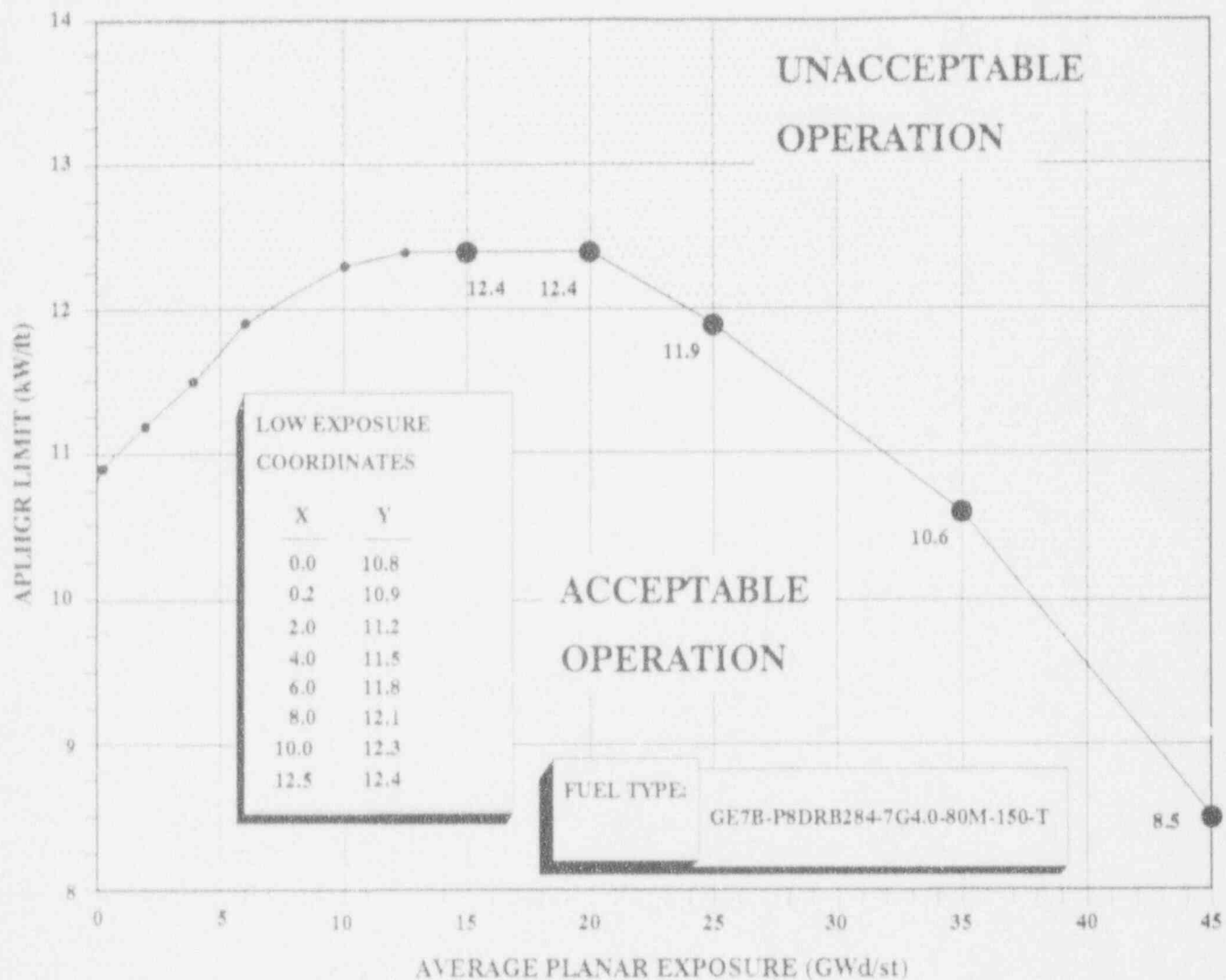
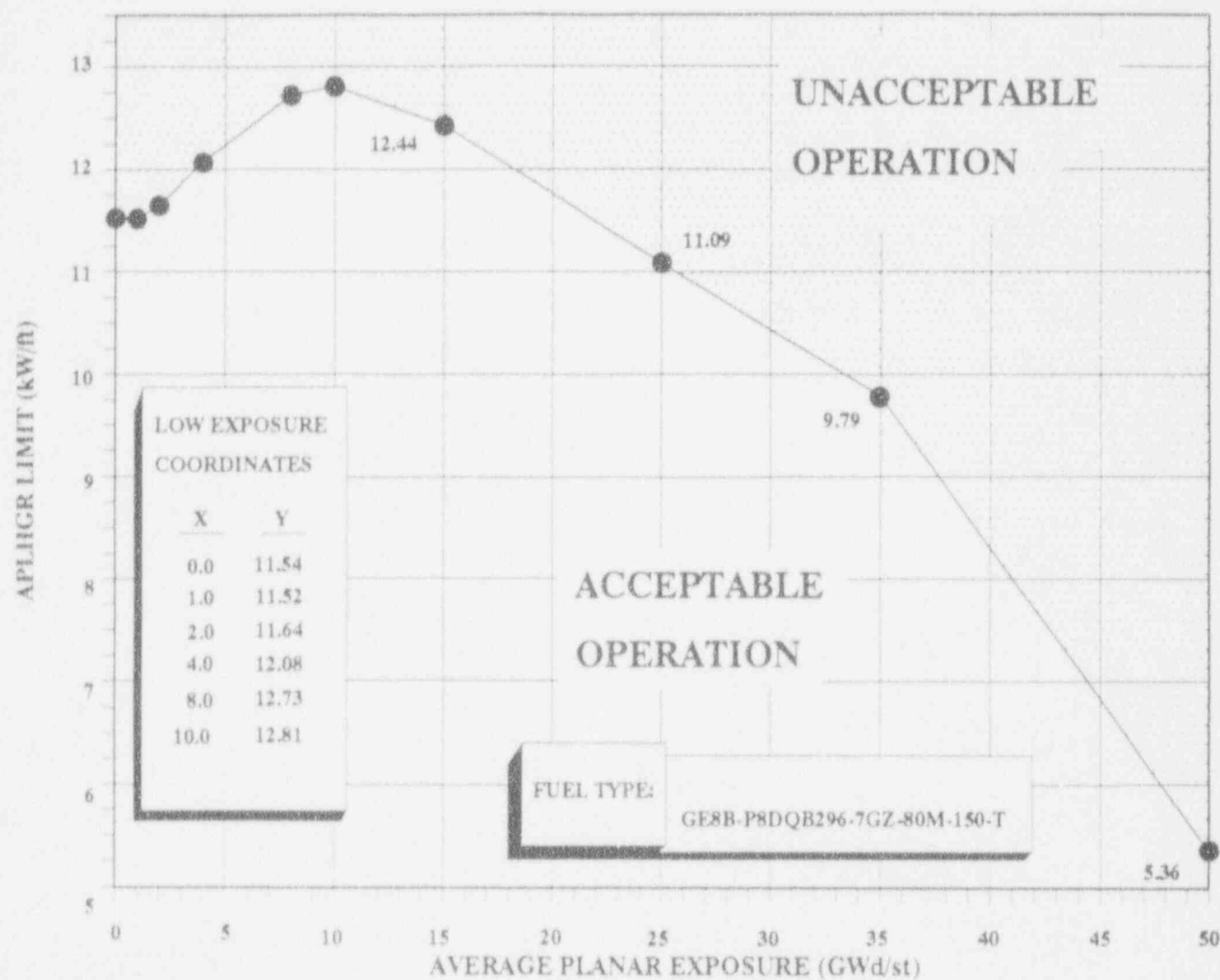


FIGURE 3-3  
AVERAGE PLANAR LINEAR HEAT GENERATION RATE  
VERSUS  
AVERAGE PLANAR EXPOSURE  
(Fuel Type: GE7B-P8DRB284-7G4.0-80M-150-T)

Plant Hatch Unit 2 Fuel Cycle 12  
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NOTE:  
APLHGR LIMIT FOR MOST LIMITING  
LATTICE AS FUNCTION OF AVERAGE  
PLANAR EXPOSURE

FIGURE 3-4  
AVERAGE PLANAR LINEAR HEAT GENERATION RATE  
VERSUS  
AVERAGE PLANAR EXPOSURE  
(Fuel Type: GE8B-P8DQB296-7GZ-80M-150-T)

Plant Hatch Unit 2 Fuel Cycle 12  
Core Operating Limits Report

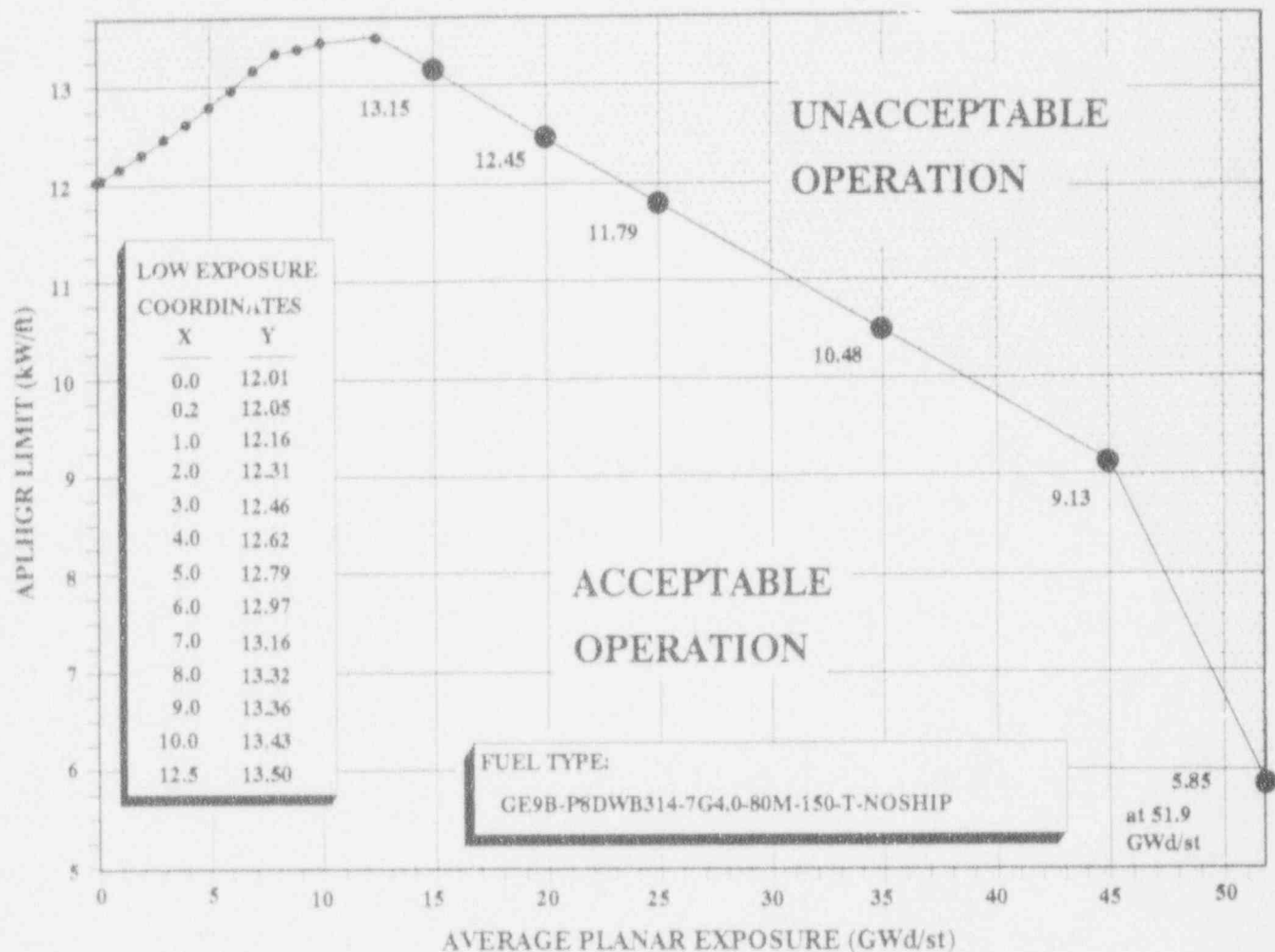


FIGURE 3-5  
AVERAGE PLANAR LINEAR HEAT GENERATION RATE  
VERSUS  
AVERAGE PLANAR EXPOSURE  
(Fuel Type: GE9B-P8DWB314-7G4.0-80M-150-T-NOSHIP)

Plant Hatch Unit 2 Fuel Cycle 12  
Core Operating Limits Report

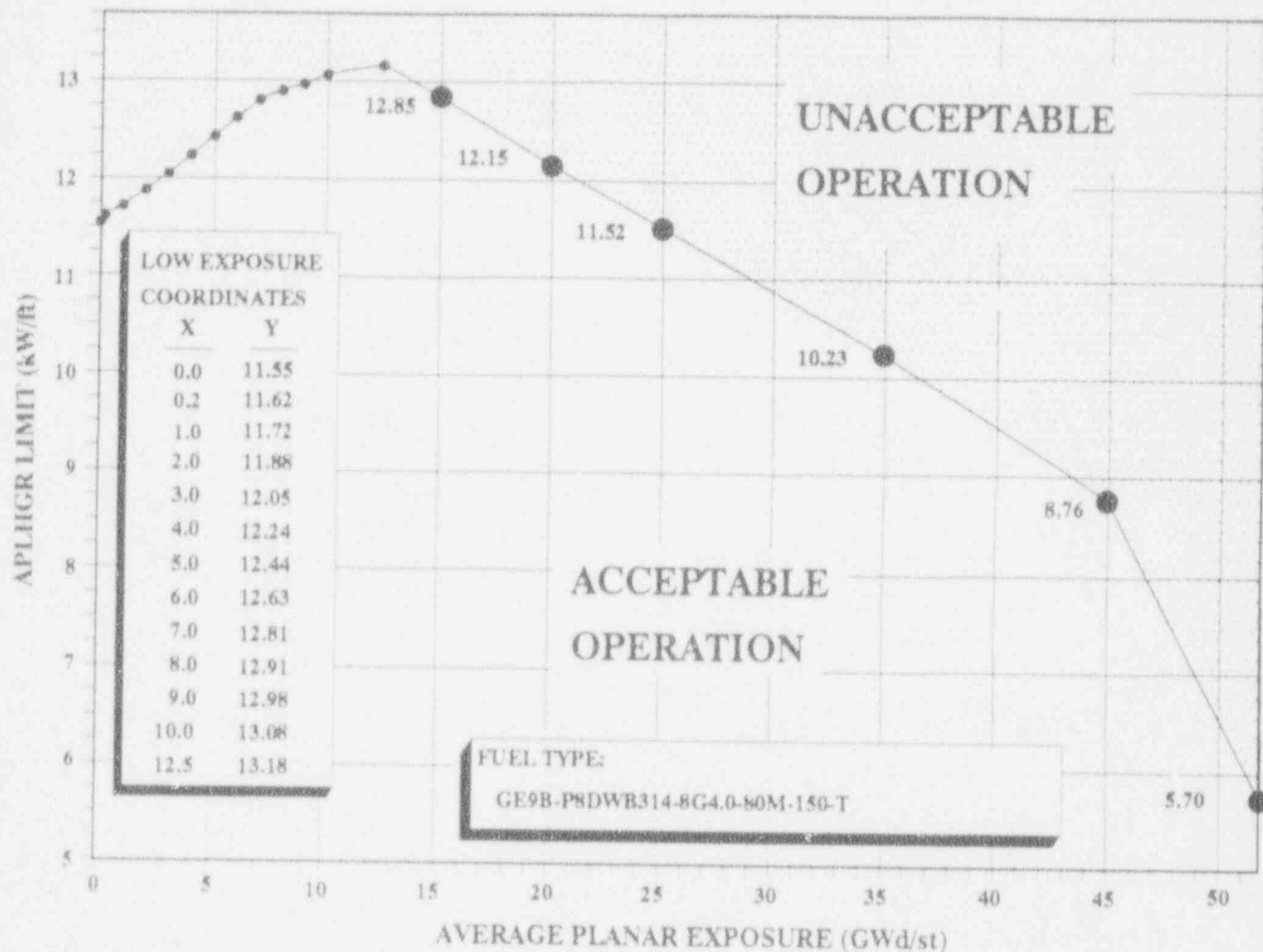
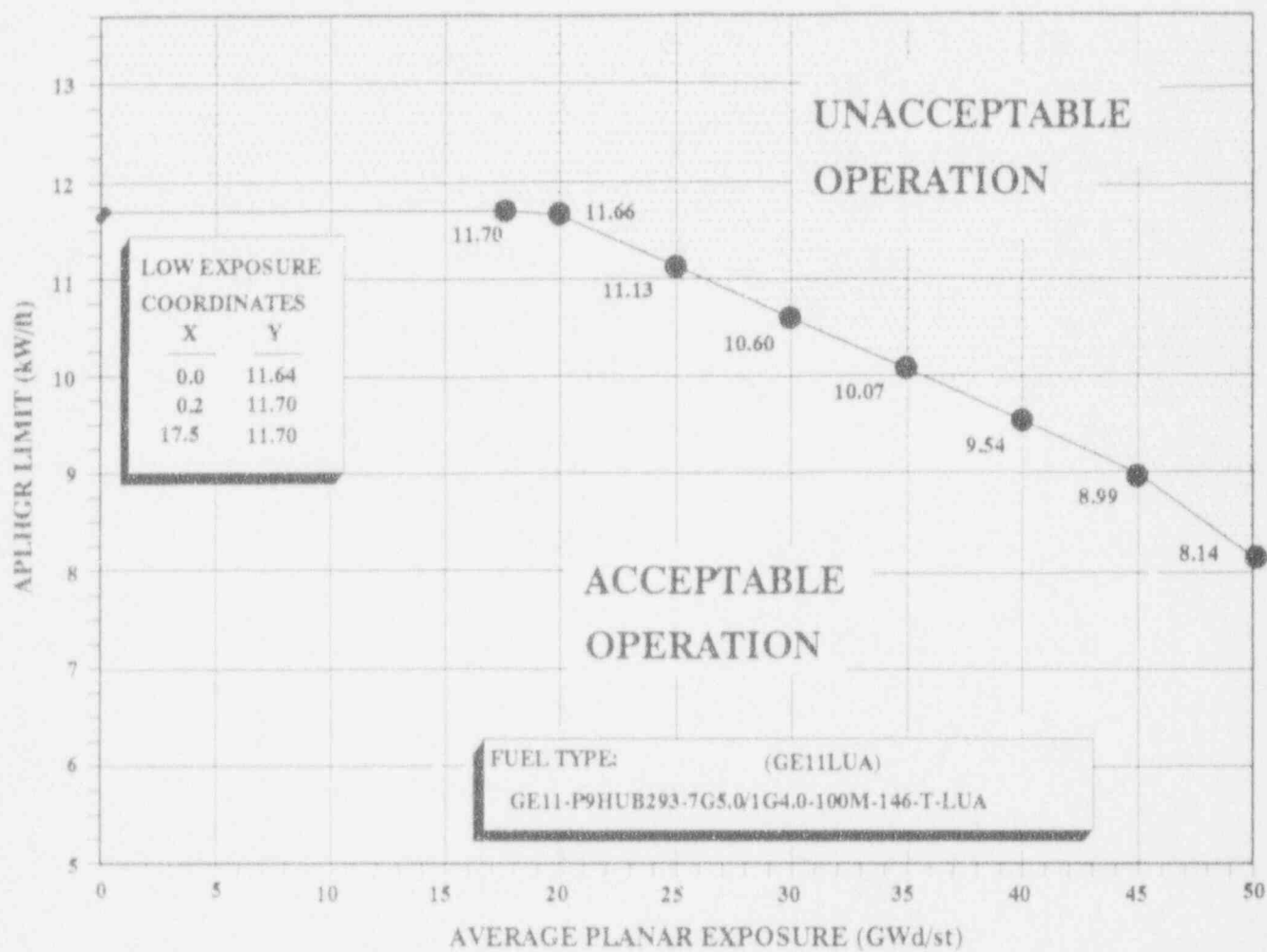


FIGURE 3-6  
AVERAGE PLANAR LINEAR HEAT GENERATION RATE  
VERSUS  
AVERAGE PLANAR EXPOSURE  
(Fuel Type: GE9B-P8DWB314-8G4.0-80M-150-T)



Plant Hatch Unit 2 Fuel Cycle 12  
Core Operating Limits Report



NOTE:  
APLHGR LIMIT FOR MOST LIMITING  
LATTICE AS FUNCTION OF AVERAGE  
PLANAR EXPOSURE

FIGURE 3-7  
AVERAGE PLANAR LINEAR HEAT GENERATION RATE  
VERSUS  
AVERAGE PLANAR EXPOSURE  
(Fuel Type: GE11-P9HUB293-7G5.0/1G4.0-100M-146-T-LUA)



Plant Hatch Unit 2 Fuel Cycle 12  
Core Operating Limits Report

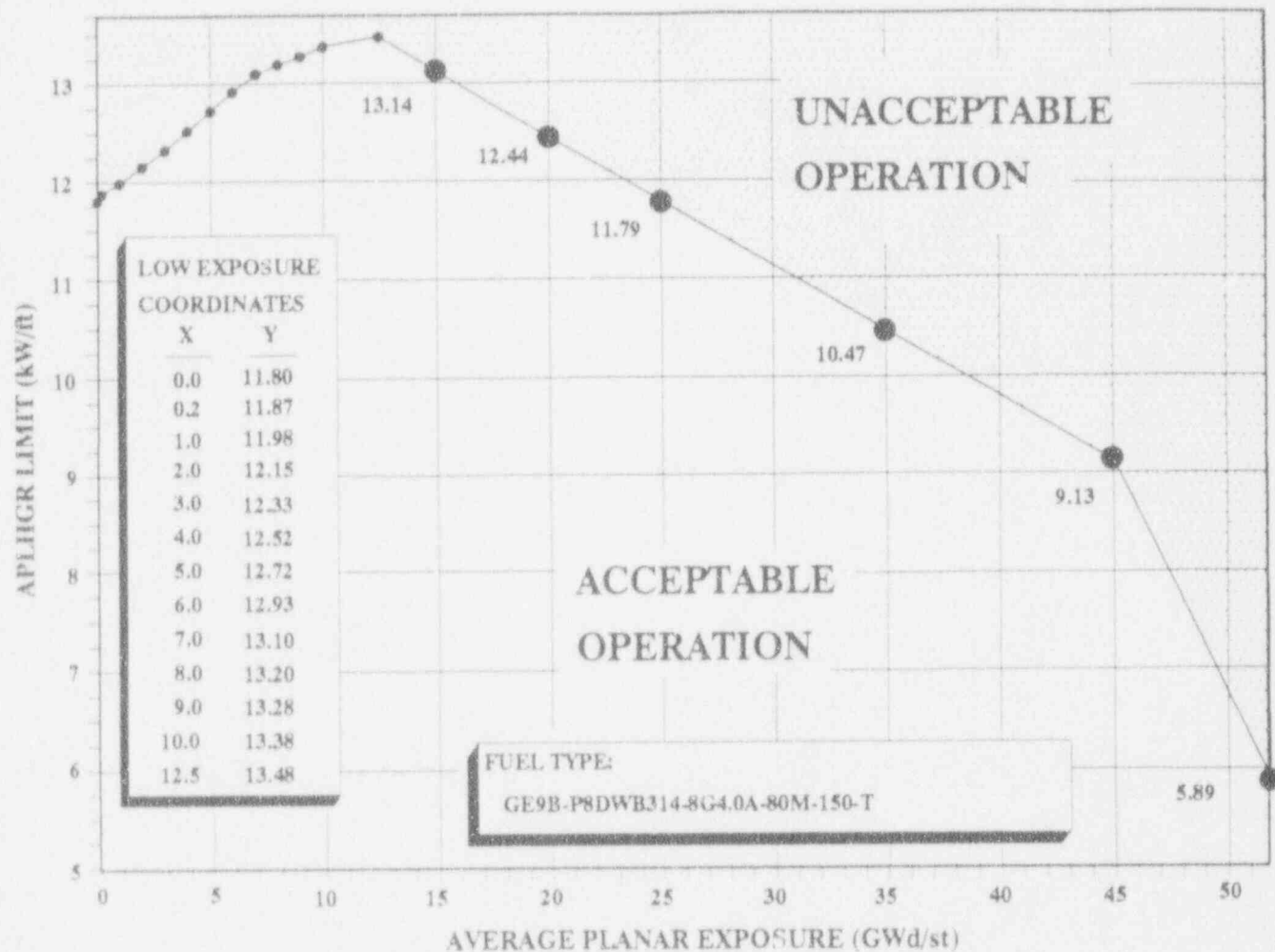


FIGURE 3-8  
AVERAGE PLANAR LINEAR HEAT GENERATION RATE  
VERSUS  
AVERAGE PLANAR EXPOSURE  
(FUEL TYPE: GE9B-P8DWB314-8G4.0A-80M-150-T)

#### 4.0 MCPR LIMIT (Technical Specification 3/4.2.3)

The MCPR operating limit (OLMCPR) is a function of fuel design, average scram time, core flow, number of operating recirculation loops, and core power. Note that in Figure 4-3, the rated-power and rated-flow OLMCPR is fuel-type dependent; e.g., the Option B limits are 1.22 for GE7B, GE8B, and GE9B fuels, and 1.28 for GE11 fuel.

#### 4.1 Two Recirculation Loop Operation

For  $25\% \leq \text{power} < 30\%$ , the OLMCPR is given in Figure 4-1. For  $\text{power} \geq 30\%$ , the OLMCPR is the greater of either:

- a. The applicable limit determined from Figure 4-2
- or
- b. The appropriate  $K_p$  given in Figure 4-1, multiplied by the appropriate limit shown in Figure 4-3. The scram time dependence is given in the Bases for Technical Specification 3/4.2.3.

#### 4.2 Single Recirculation Loop Operation

For single-loop operation, the OLMCPR shall be 0.01 greater than the two-loop value which is determined as specified in section 4.1.

Plant Hatch Unit 2 Fuel Cycle 12  
Core Operating Limits Report

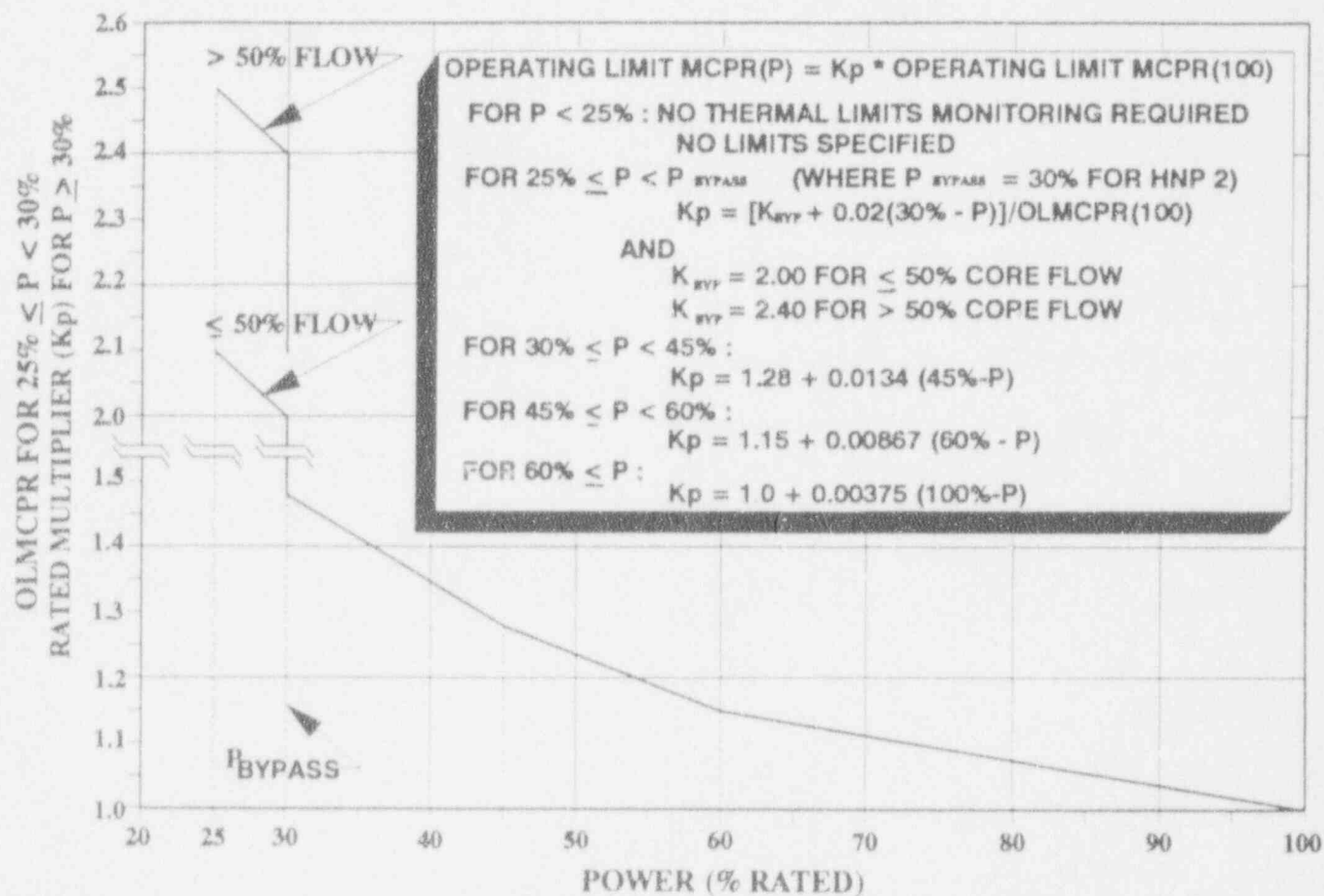


FIGURE 4-1  
POWER-DEPENDENT MCPR MULTIPLIER (K<sub>p</sub>)

Plant Hatch Unit 2 Fuel Cycle 12  
Core Operating Limits Report

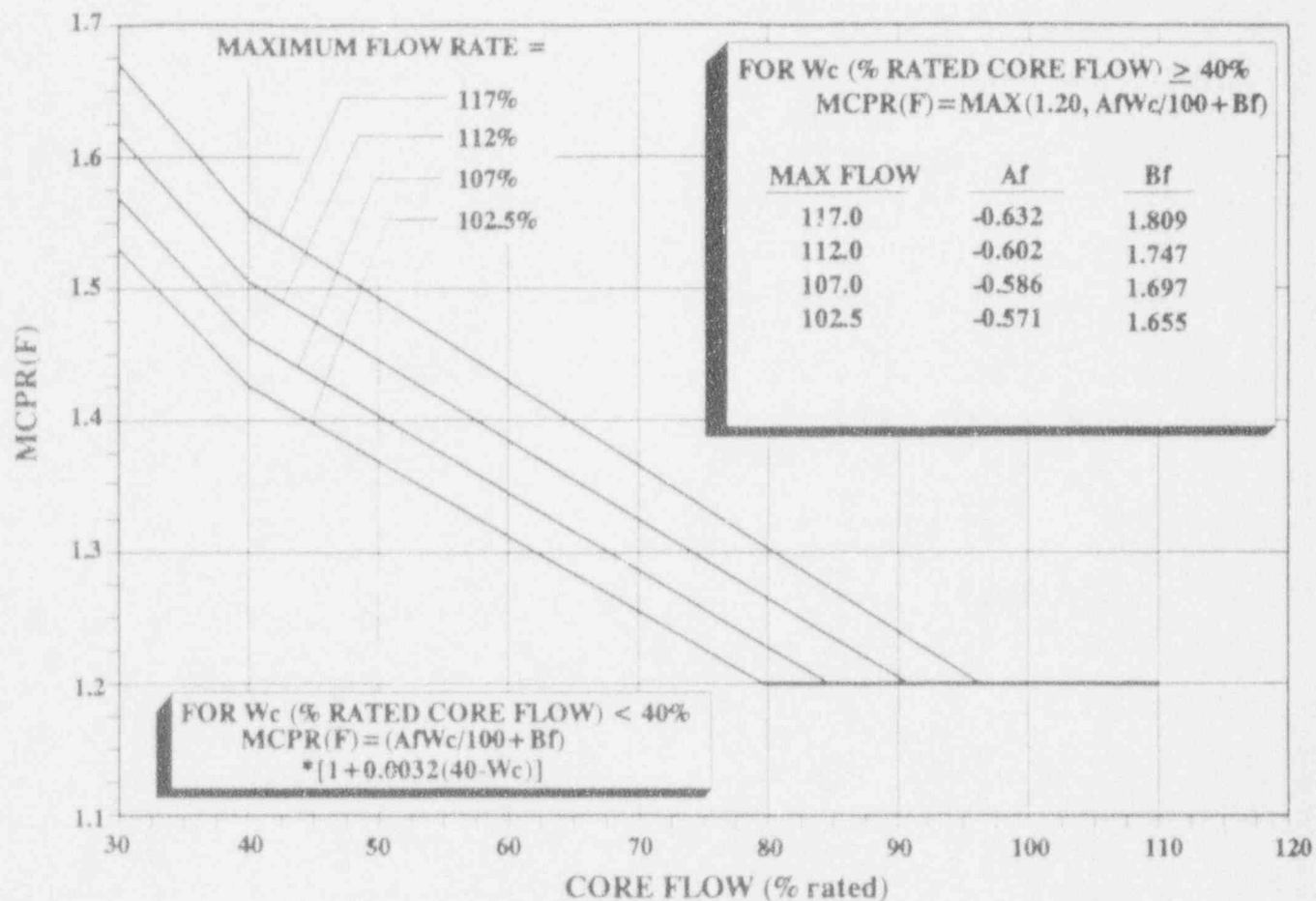


FIGURE 4-2  
FLOW-DEPENDENT MCPR LIMITS ( $MCPR_F$ )

Plant Hatch Unit 2 Fuel Cycle 12  
Core Operating Limits Report

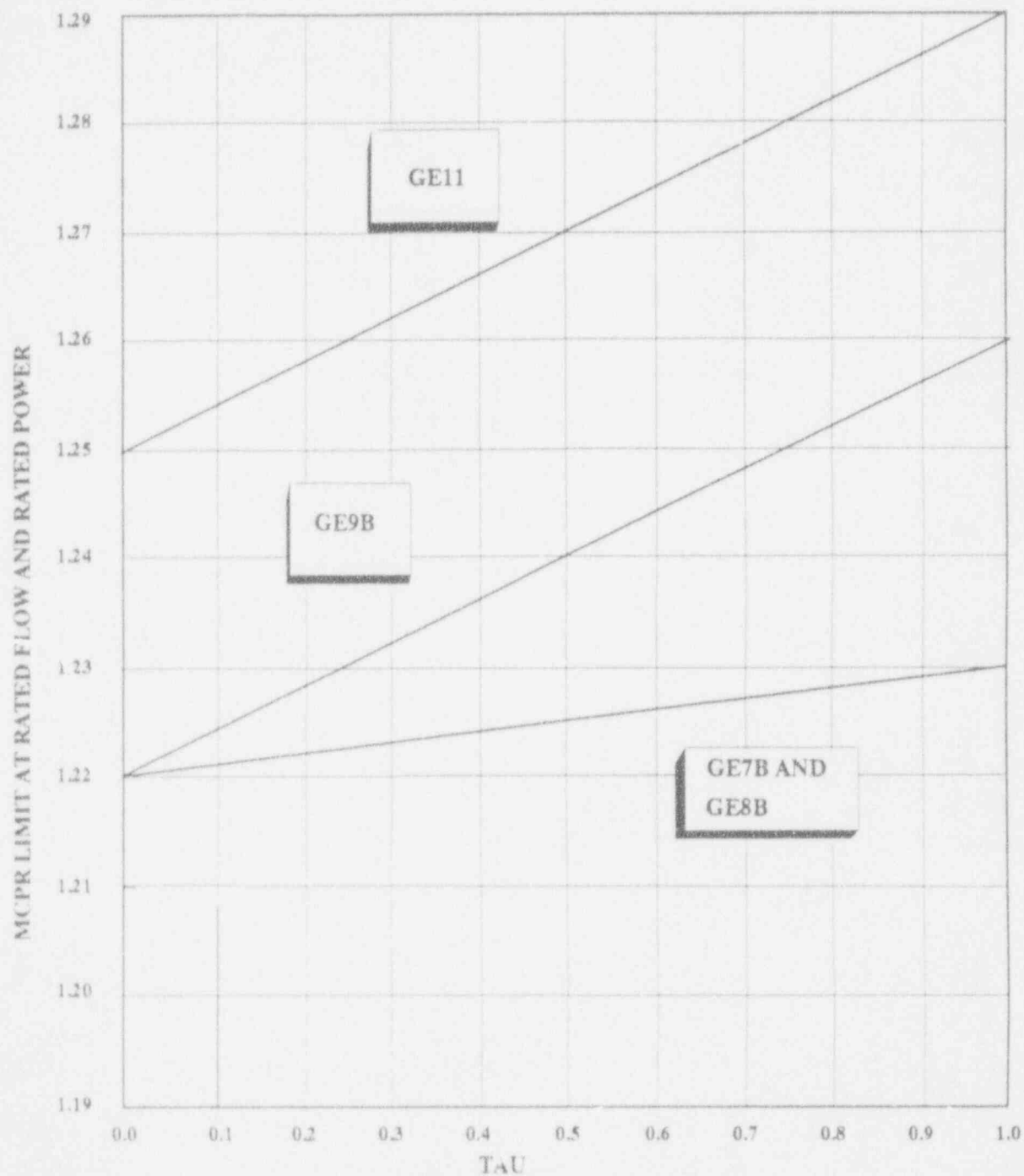


FIGURE 4-3  
MCPR LIMIT AS FUNCTION OF AVERAGE SCRAM TIME

## Plant Hatch Unit 2 Fuel Cycle 12 Core Operating Limits Report

### 5.0 LHGR LIMIT (Technical Specification 3/4.2.4)

The LHGR limit is 13.4 kW/ft for GE7B fuel. The LHGR limit for GE8B, GE9B, and GE11 fuels is 14.4 kW/ft.

### 6.0 REFERENCES

1. "General Electric Standard Application for Reactor Fuel," NEDE-24011-P-A-10-US, March 1991.
2. Letter, L. P. Crocker (NRC) to J. P. O'Reilly (GPC), "Issuance of Amendment Nos. 168 and 106 to Facility Operating Licenses DPR-57 and NPF-5 - Edwin I. Hatch Nuclear Plant Units 1 and 2 (TACS 66524/66525)," January 22, 1988.
3. "Supplemental Reload Licensing Submittal for Edwin I. Hatch Nuclear Plant Unit 2, Reload 11, Cycle 12," General Electric Document 23A7241, Revision 0, April 1994.
4. "Edwin I. Hatch Nuclear Plant Units 1 and 2 SAFER/GESTR-LOCA Loss-of-Coolant Accident Analysis," NEDC-31376-P, December 1986.
5. Edwin I. Hatch Nuclear Plant Unit 2 Technical Specifications, Bases 3/4.1.4.3, 3/4.2.1, 3/4.2.3, and 3/4.2.4.