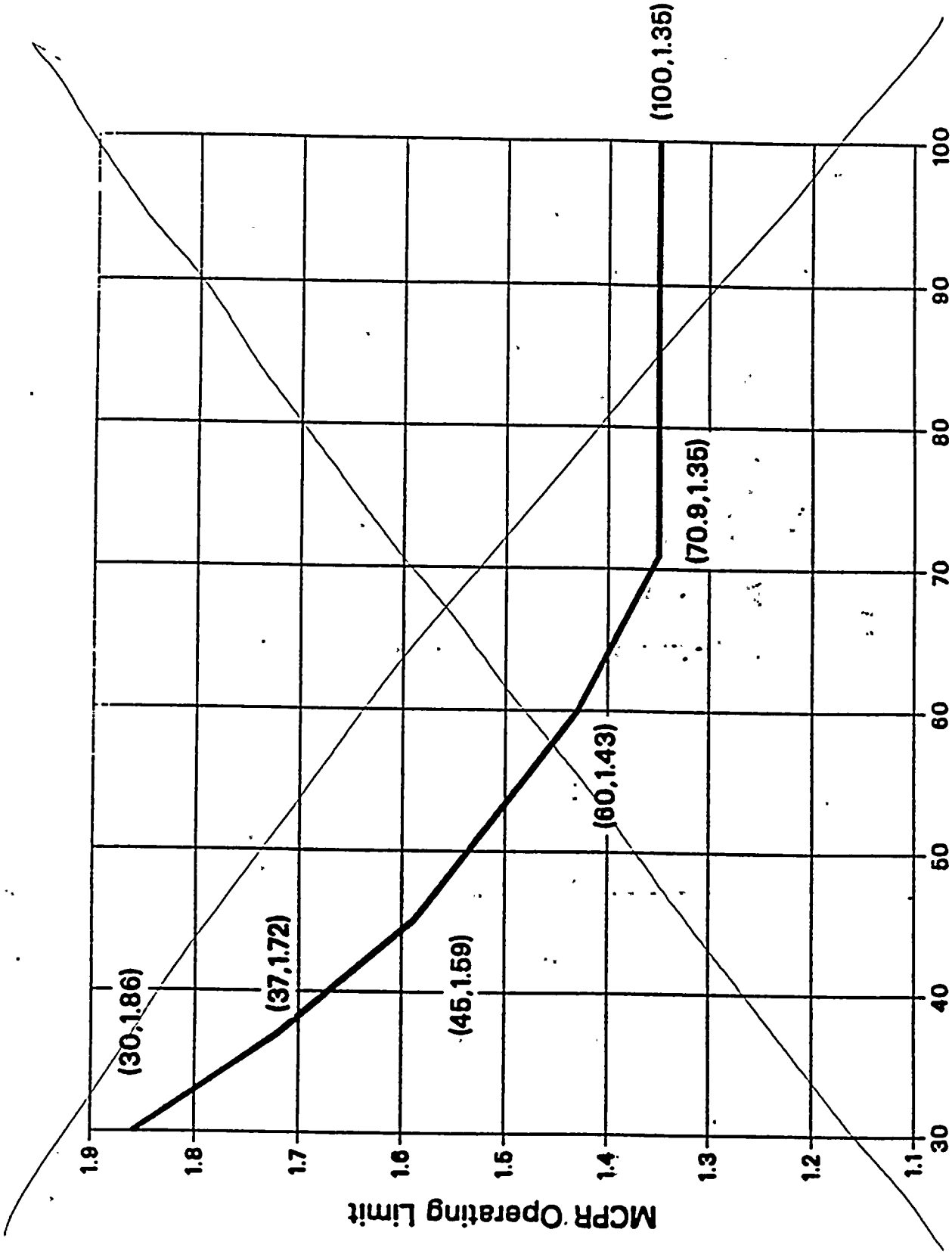
REPLACE WITH CORRECTED FIGURE ON NEXT PAGE



FLOW DEPENDENT MCPR OPERATING LIMIT
FIGURE 3.2.3-1

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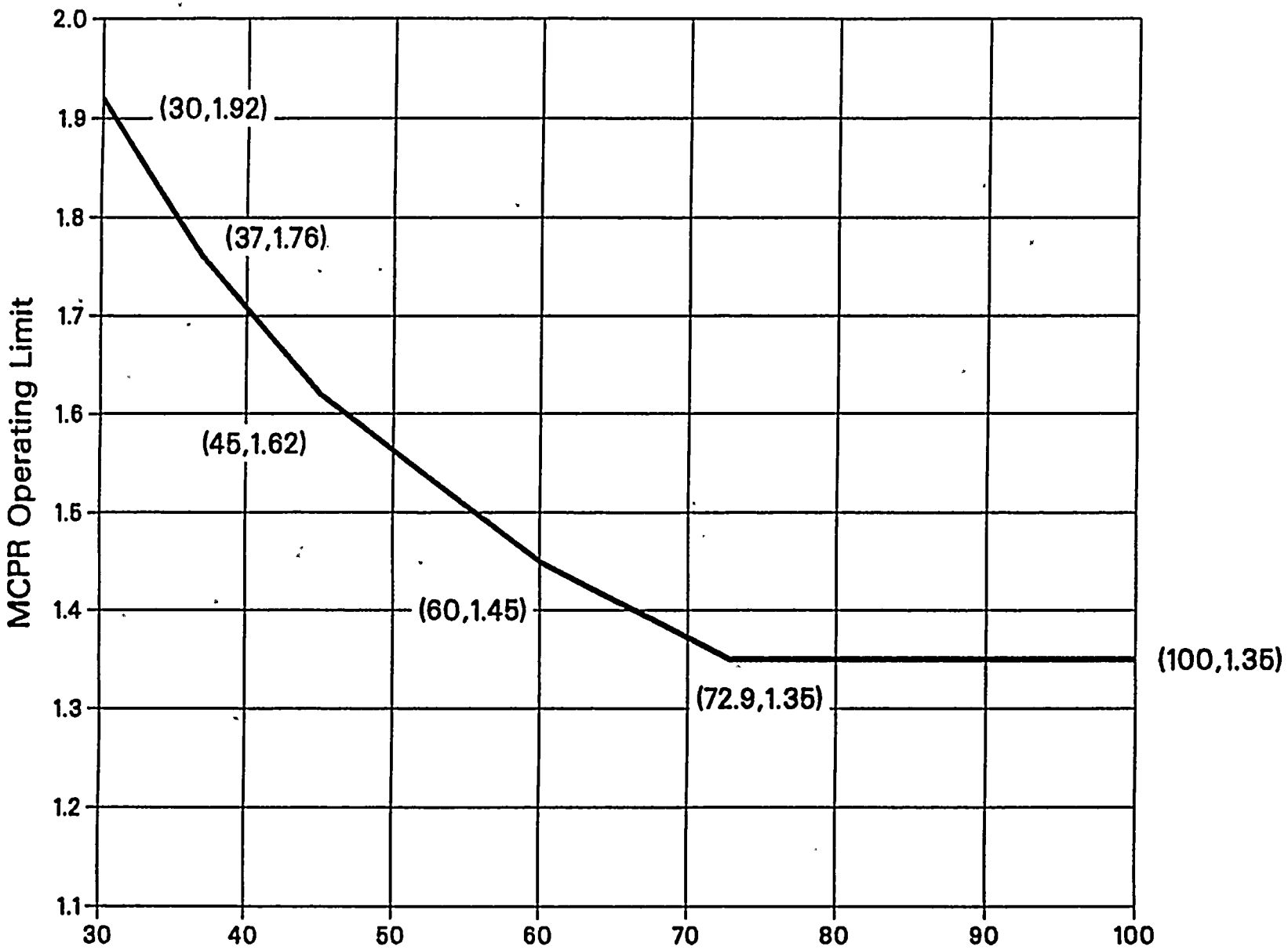
CORRECTED FIGURE



FLOW DEPENDENT MCPR OPERATING LIMIT
FIGURE 3.2.3-1

ORIGINAL CALCULATION

To account for the RETRAN code uncertainty, the RCPR is multiplied by 1.04 (Reference 2) as follows;

$$RCPR_f = 1.04 * RCPR$$

where: $RCPR_f$ = the final RCPR for the event adjusted for code uncertainty,
$RCPR$ = the RCPR for the event based on the values calculated by the DELTACPR runs.

To determine the corrected delta-CPR (delta-CPR_f) for the event, the equation for $RCPR_f$ can be rearranged as follows;

$$RCPR_f = \frac{\text{delta-}CPR_f}{1 + \text{delta-}CPR_f}$$

$$RCPR_f*(1 + \text{delta-}CPR_f) = \text{delta-}CPR_f$$

Therefore,

$$\text{delta-}CPR_f = \frac{RCPR_f}{1 - RCPR_f}$$

Once the delta-CPR_f is determined, the estimated MCPR operating limit (MCPROL) for each power/flow condition is determined as follows;

$$MCPROL = \text{Safety Limit} + \text{delta-}CPR_f$$

$$MCPROL = 1.06^* + \text{delta-}CPR_f.$$

* assuming a 1.06 Safety Limit

Table 3.4 presents the RCPR, $RCPR_f$, delta-CPR_f, MCPROL values for the three explicit U1C7 RFCF calculations. The information in Table 3.4 will be used to develop detailed values for the Core Flow dependent MCPR operating limits.

The following curve fit was used to determine the MCPR operating limit value for the 30% core flow case;

initial guess on bundle power which was then iterated upon until the calculated CPR is within 0.0005 of 1.0. The 54/37 condition required a 60 second null transient to be run because of instabilities in the Hot Bundle Model while trying to reach a steady state at these power/flow conditions. The 54/37 case still was not capable of reaching a steady state even after 60 seconds. Therefore CPR calculations were performed at 0.5 second intervals over the last 1 second of the 60 second null and the maximum CPR was used as the initial CPR.

Tables D.3.2 and D.3.3 present the results of the CPRITER runs including the RCPRs. These RCPRs are defined below and are not corrected for code uncertainty. Section D.3.3 will provide the adjusted RCPRs and the estimated MCPR operating limits.

$$RCPR = \frac{(\text{Initial CPR} - 1.0)}{\text{Initial CPR}}$$

(Initial CPR = 1.0 + delta-CPR for the RFCF event)

D.3.3 MCPR Operating Limits

To determine the MCPR vs Core Flow operating limits that the new analyses produce, the RCPR values must first be corrected for the RETRAN code uncertainty and then a MCPR operating limit can be 'back-calculated'. This MCPR operating limit will be based on a MCPR safety limit of 1.06 for this calculation. The original U1C7 RFCF analysis did not correctly calculate the MCPR operating limits. Revision 1 of this package shows that the safety limit must be used when back calculating a delta-CPR or MCPR operating limit from the value of RCPR with the code uncertainty applied to it. The procedure that follows correctly accounts for the safety limit when calculating the MCPR operating limit and is used to calculate operating limits for the new U1C7 RFCF analysis.

REVISED CALCULATION

To account for the RETRAN code uncertainty, the RCPR defined in Section D.3.2 is multiplied by 1.04 (Reference 2) as follows;

$$RCPR_f = 1.04 * RCPR$$

where: $RCPR_f$ = the final RCPR for the event adjusted for code uncertainty,
RCPR = the RCPR for the event based on the values calculated by the CPRITER runs.

To determine the MCPR operating limit (MCPROL) for the event, the equation for $RCPR_f$ can be rearranged as follows;

$$RCPR_f = \frac{MCPROL - SL}{MCPROL} \quad ;(SL = \text{Safety Limit})$$

$$MCPROL*(1 - RCPR_f) = SL$$

Therefore,

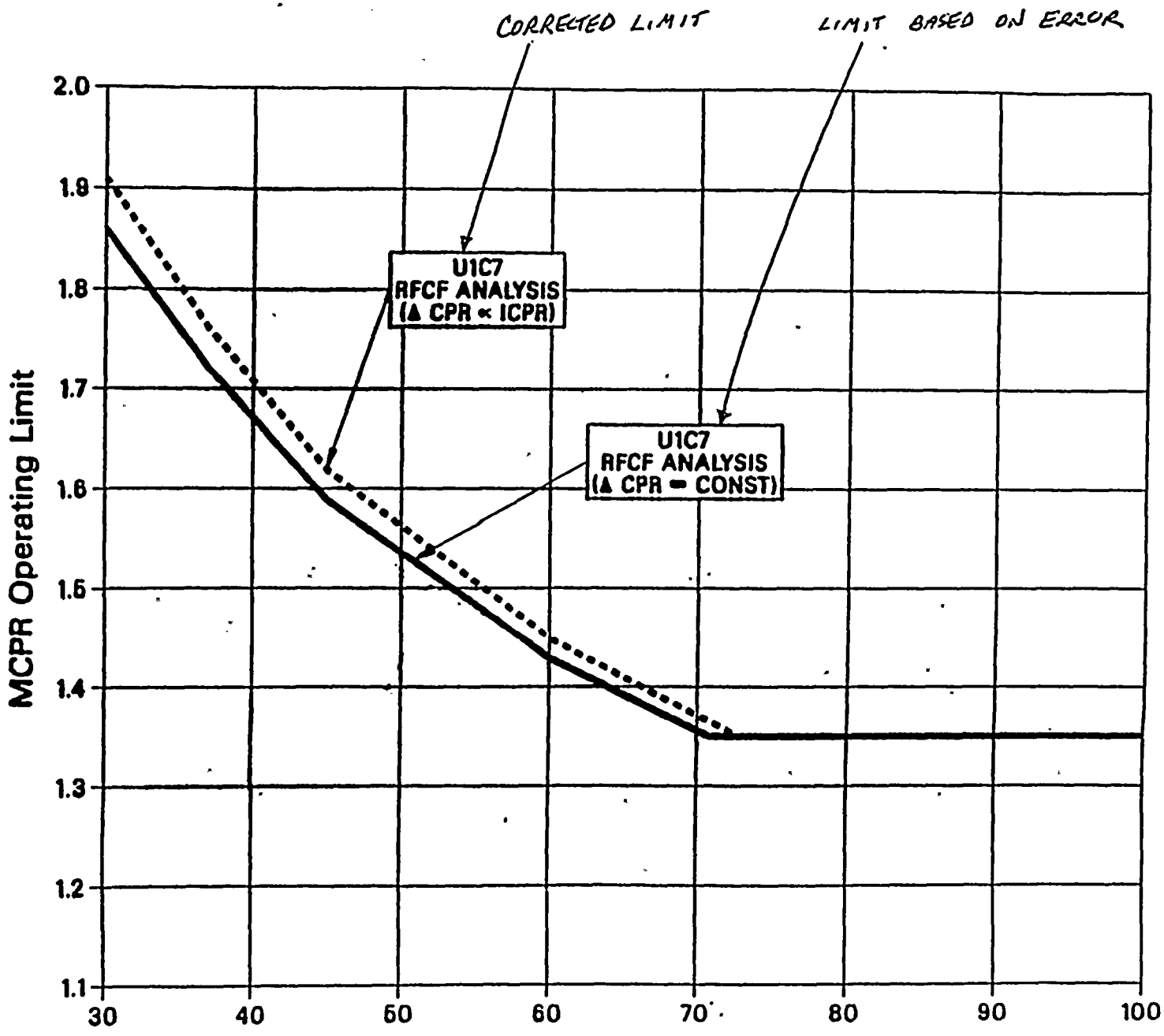
$$MCPROL = \frac{SL}{1 - RCPR_f}$$

Assuming a 1.06 Safety Limit

$$MCPROL = \frac{1.06}{1 - RCPR_f}$$

Table D.3.4 presents the RCPR, $RCPR_f$, MCPROL values for the three explicit U1C7 RFCF calculations. The information in Table D.3.4 will be used to develop detailed values for the Core Flow dependent MCPR operating limits.

The following curve fit was used to determine the MCPR operating limit value for the 30% core flow case;



FLOW DEPENDENT MCPR OPERATING LIMIT

DATA BASED ON CALCULATIONAL ERROR

Table 3.1

U1C7 Core Flow Dependent MCPR Operating Limits Based on the U1C7 Recirculation Flow Controller Failure Analysis

Core Flow (% Rated)	delta-CPR	MCPROL
30.0	0.80	1.86
37.0	0.66	1.72
45.0	0.53	1.59
60.0	0.37	1.43
70.9	0.29	1.35*
100.0	0.29	1.35*

* MCPROL value for 100% Power/100% Flow operation based on the U1C7 Licensing Analyses.

CORRECTED DATA

Table 3.1A

U1C7 Core Flow Dependent MCPR Operating Limits Based on the U1C7 Recirculation Flow Controller Failure Analysis

Core Flow (% Rated)	delta-CPR	MCPROL
30.0	0.86	1.92
37.0	0.70	1.76
45.0	0.56	1.62
60.0	0.39	1.45
72.9	0.29	1.35*
100.0	0.29	1.35*

* MCPROL value for 100% Power/100% Flow operation based on the U1C7 Licensing Analyses.