

Attachment 1

North Anna 1 Cycle 9, Pattern R8

Core Surveillance Report

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## NORTH ANNA UNIT 1 CYCLE 9 CORE SURVEILLANCE REPORT

This Core Surveillance Report is provided in accordance with Section 6.9.1.7 of the North Anna Unit 1 Technical Specifications.

The burnup-dependent Cycle 9  $N(z)$  function for Technical Specification 4.2.2.2.C is shown in Figures 1-7.  $N(z)$  was calculated according to the procedure of VEP-NE-1-A.

The  $N(z)$  function\* will be used to confirm that the heat flux hot channel factor,  $FQ(z)$ , will be limited to the Technical Specifications values of

$$FQ(z) \leq \frac{2.19 K(z)}{p}, \quad P > 0.5 \text{ and}$$

$$FQ(z) \leq 4.38 K(z), \quad P \leq 0.5.$$

The Cycle 9 Axial Flux Difference (AFD) limits for Technical Specification 3.2.1 are shown in Figures 8 and 9. These limits were calculated according to the methods of VEP-NE-1-A and are comparable to the previous Cycle 8 limits.

The limits on Axial Flux Difference assure that the  $FQ(z)$  upper bound envelope is not exceeded during either normal operation or in the event of xenon redistribution following power changes.

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\*The  $N(z)$  function, when applied to a power distribution measured under equilibrium conditions, demonstrates that the initial conditions assumed in the LOCA analysis are met, along with the ECCS acceptance criteria of 10CFR50.46.

FIGURE 1 - N(Z) FUNCTION FOR N1C9 AT 2893 MW  
 FROM 0 to 1000 MWD/MTU BURDEN  
 TOP AND BOTTOM 15 PERCENT EXCLUDED  
 AS PER TECH SPEC 4.2.2.2.G

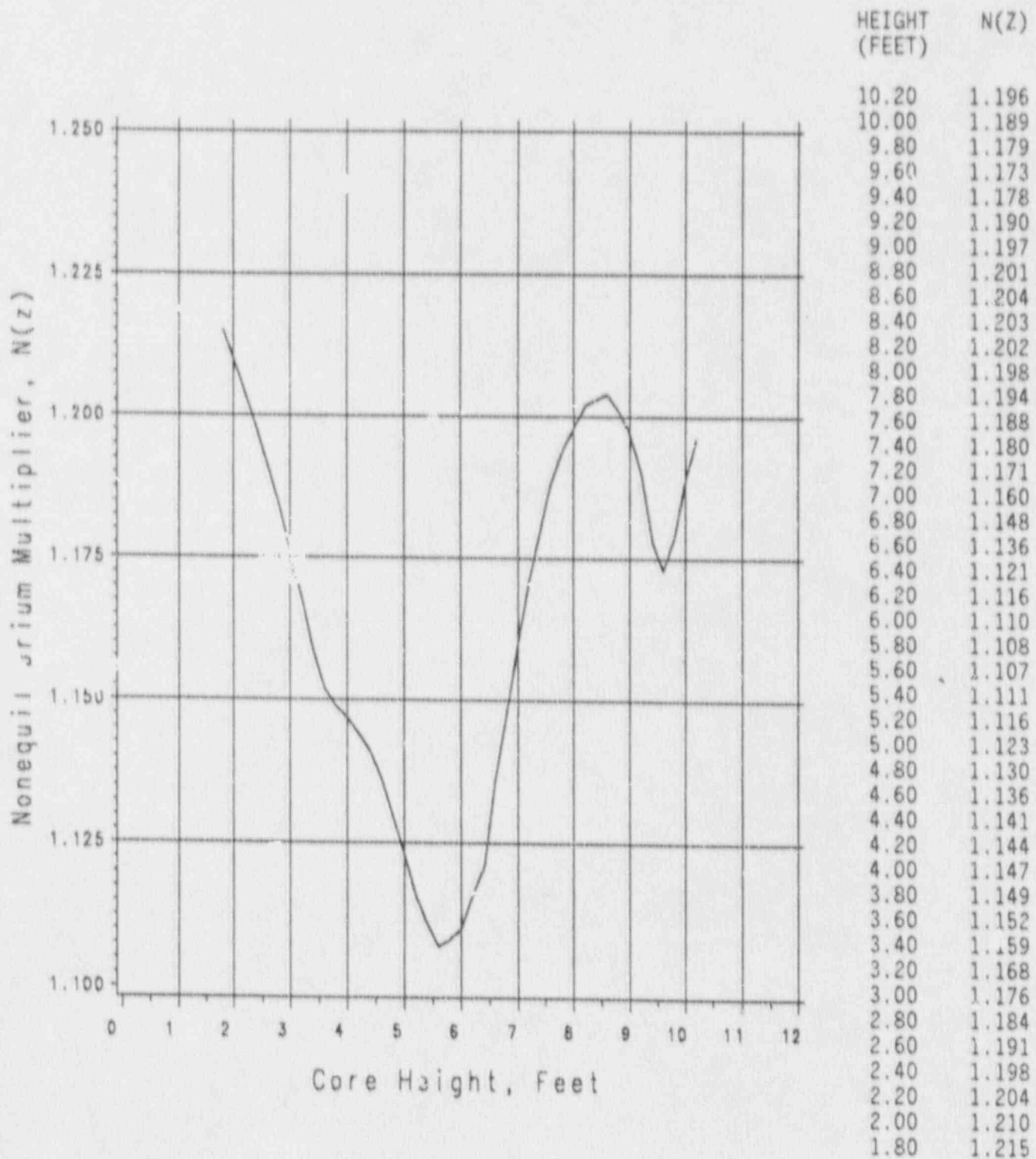


FIGURE 2 - N(Z) FUNCTION FOR N1C9 AT 2893 MW  
 FROM 1000 to 3000 MWD/MTU BURNUP  
 TOP AND BOTTOM 15 PERCENT EXCLUDED  
 AS PER TECH SPEC 4.2.2.2.G

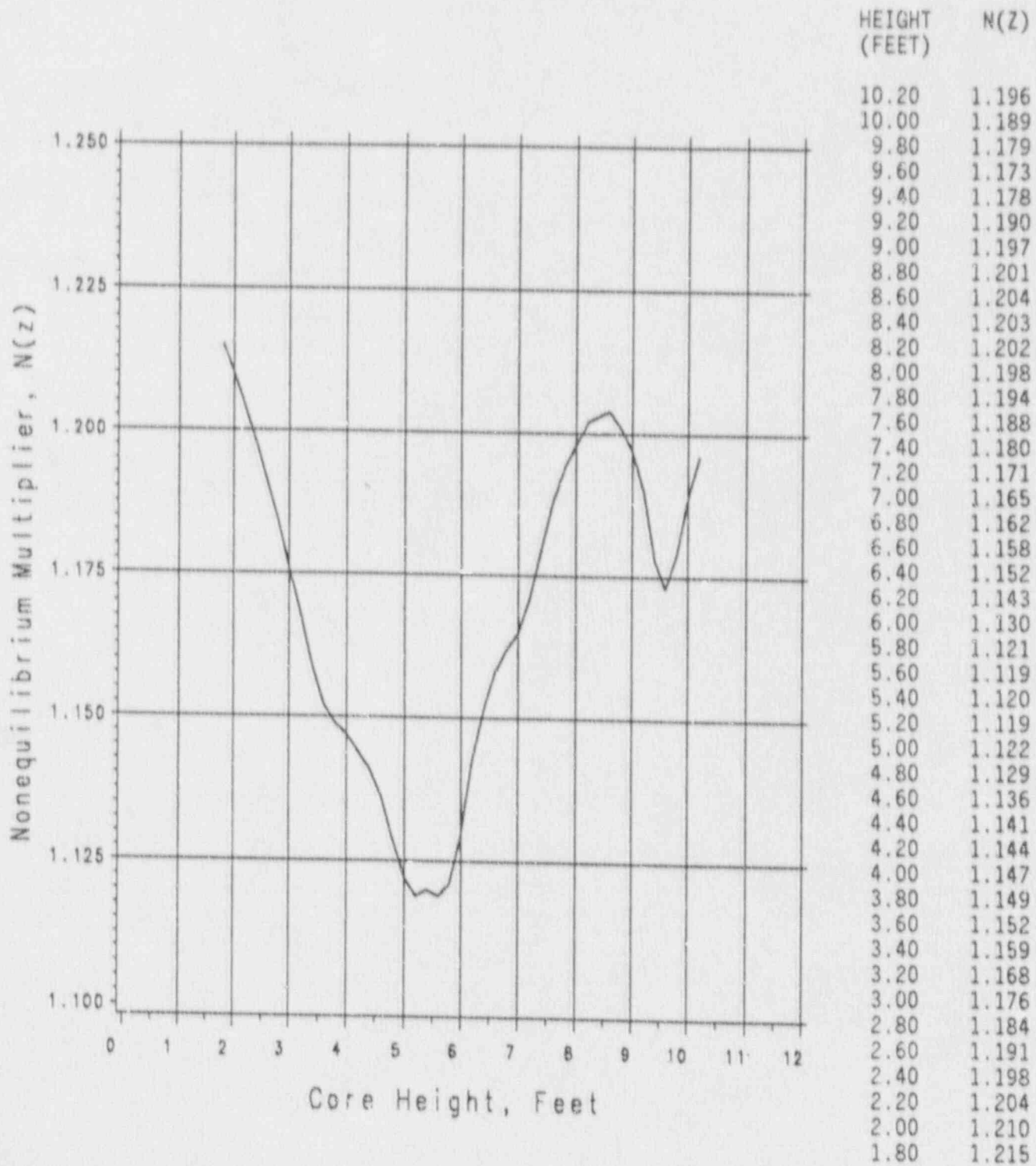


FIGURE 3 - N(Z) FUNCTION FOR NIC9 AT 2893 MW  
 FROM 3000 to 5000 MWD/MTU BURNUP  
 TOP AND BOTTOM 15 PERCENT EXCLUDED  
 AS PER TECH SPEC 4.2.2.2.G

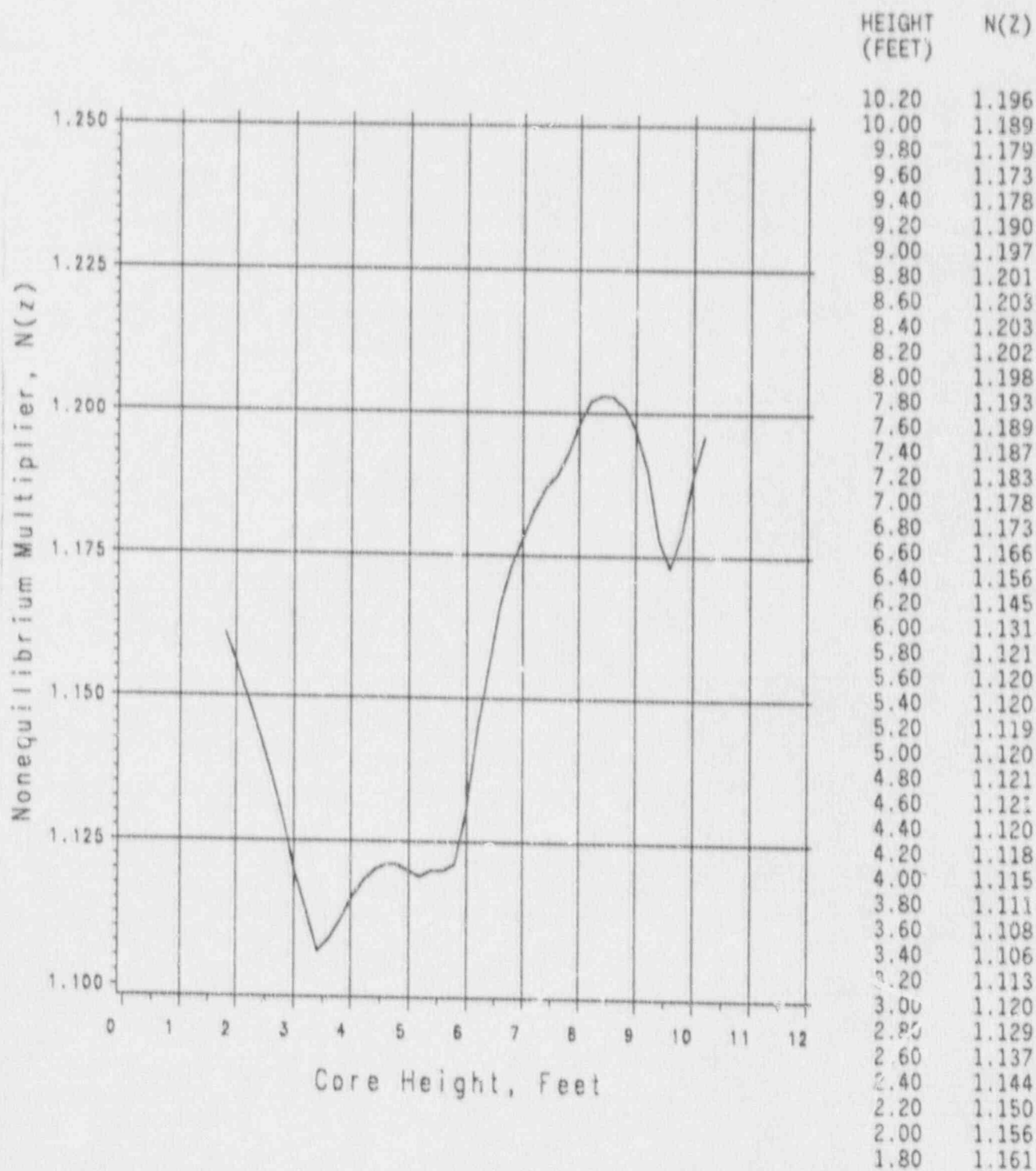


FIGURE 4 - N(Z) FUNCTION FOR N1C9 AT 2893 MW  
 FROM 5000 to 7000 MWD/MTU BURNUP  
 TOP AND BOTTOM 15 PERCENT EXCLUDED  
 AS PER TECH SPEC 4.2.2.2.G

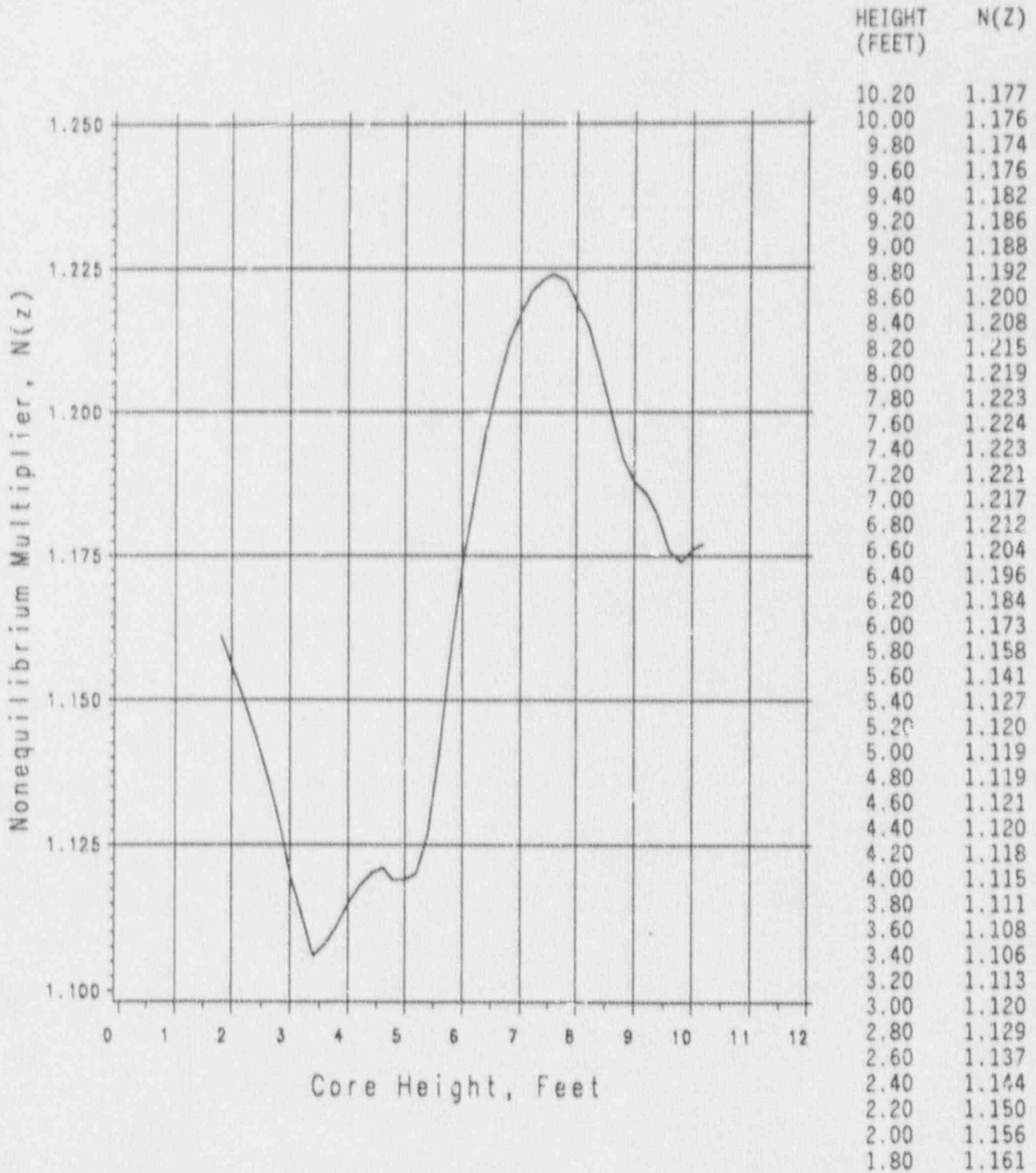


FIGURE 5 - N(Z) FUNCTION FOR N1C9 AT 2893 MW  
 FROM 7000 TO 9000 MWD/MTU BURNUP  
 TOP AND BOTTOM 15 PERCENT EXCLUDED  
 AS PER TECH SPEC 4.2.2.2.G

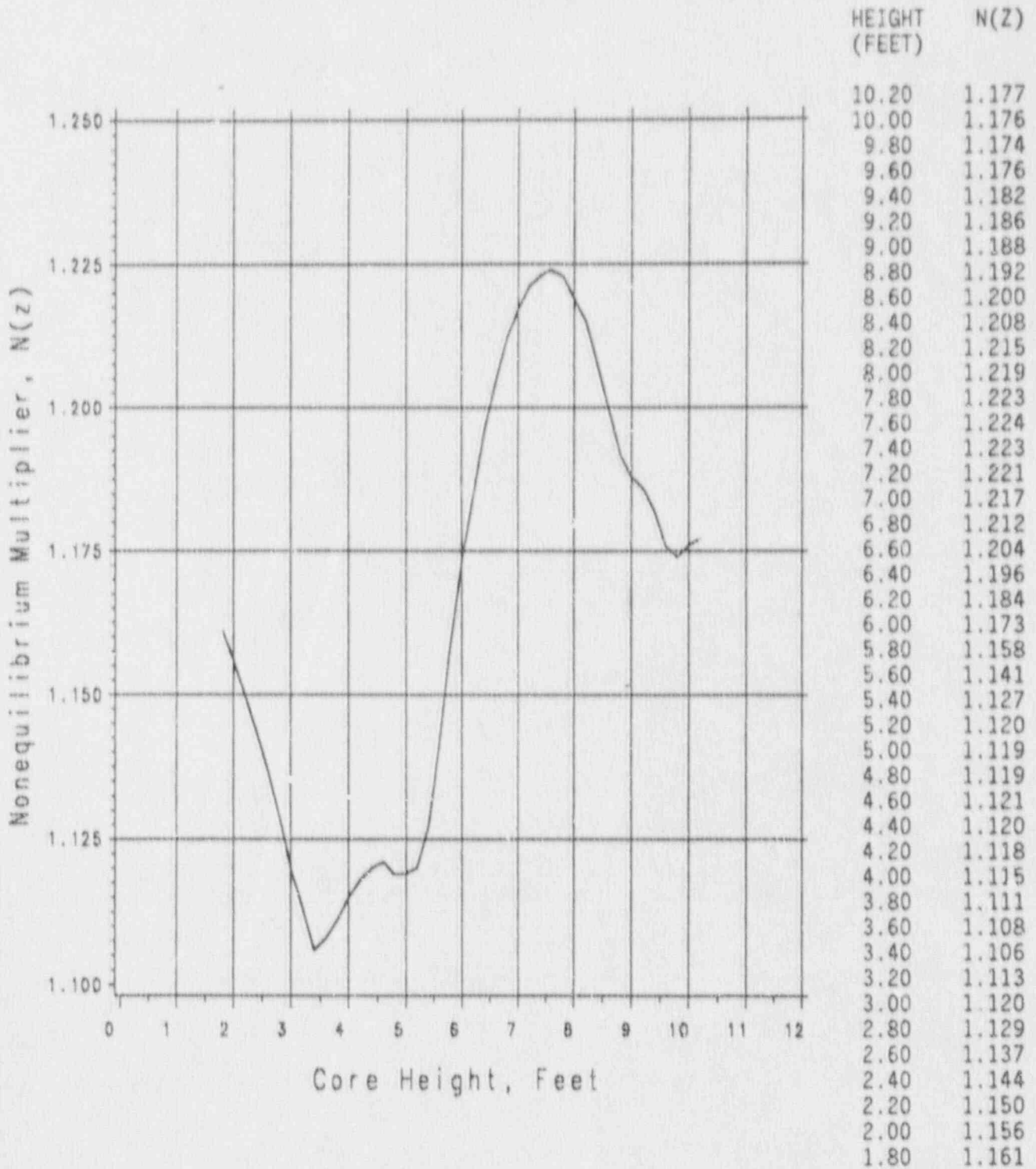


FIGURE 6 - N(Z) FUNCTION FOR NIC9 AT 2893 MW  
 FROM 9000 TO 17000 MWD/MTU BURNUP  
 TOP AND BOTTOM 15 PERCENT EXCLUDED  
 AS PER TECH SPEC 4.2.2.2.G

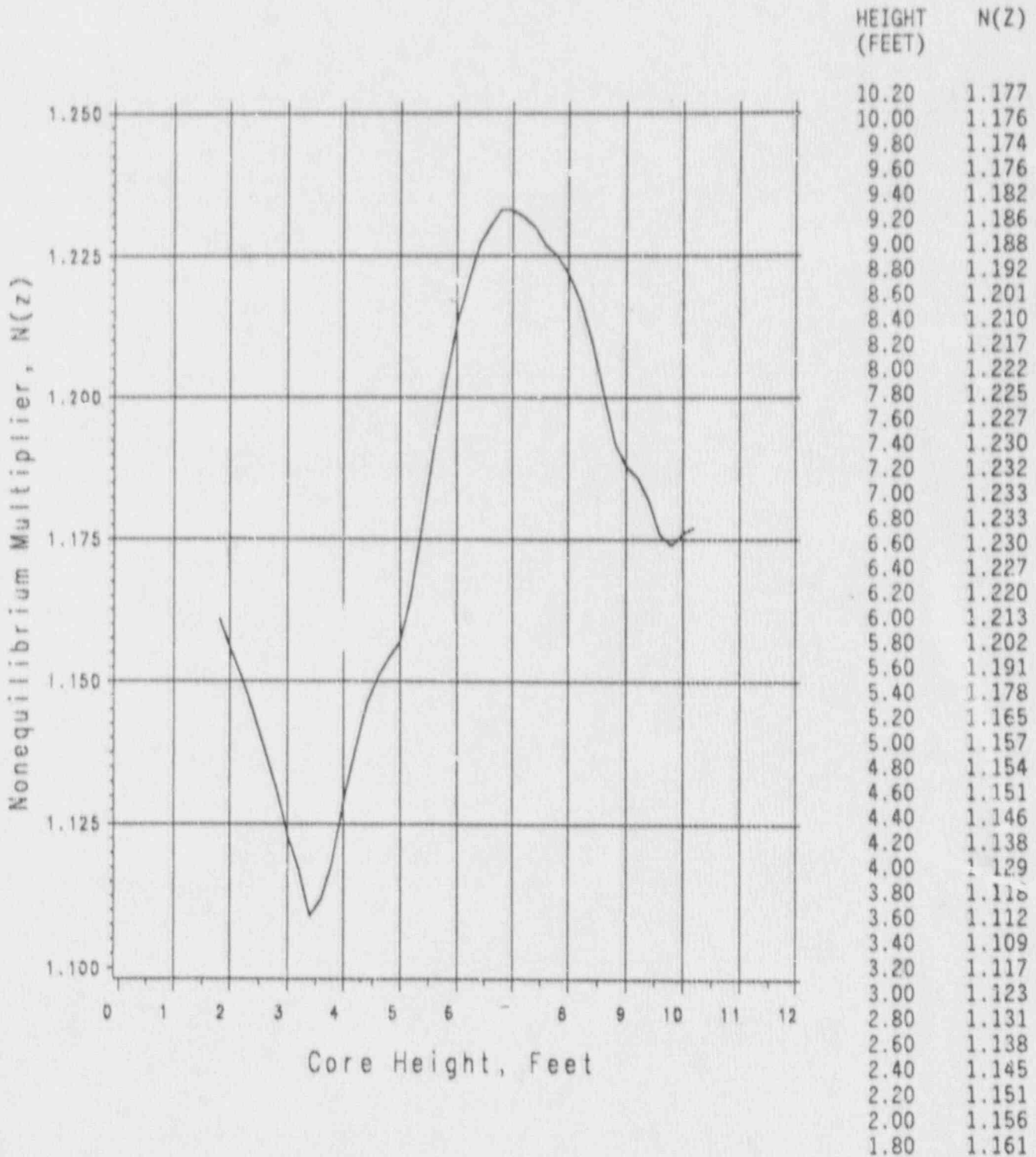




FIGURE 7 -  $N(z)$  FUNCTION FOR N1C9 AT 2893 MW  
 FROM 17000 MWD/MTU BURNUP TO EOL  
 TOP AND BOTTOM 15 PERCENT EXCLUDED  
 AS PER TECH SPEC 4.2.2.2.G

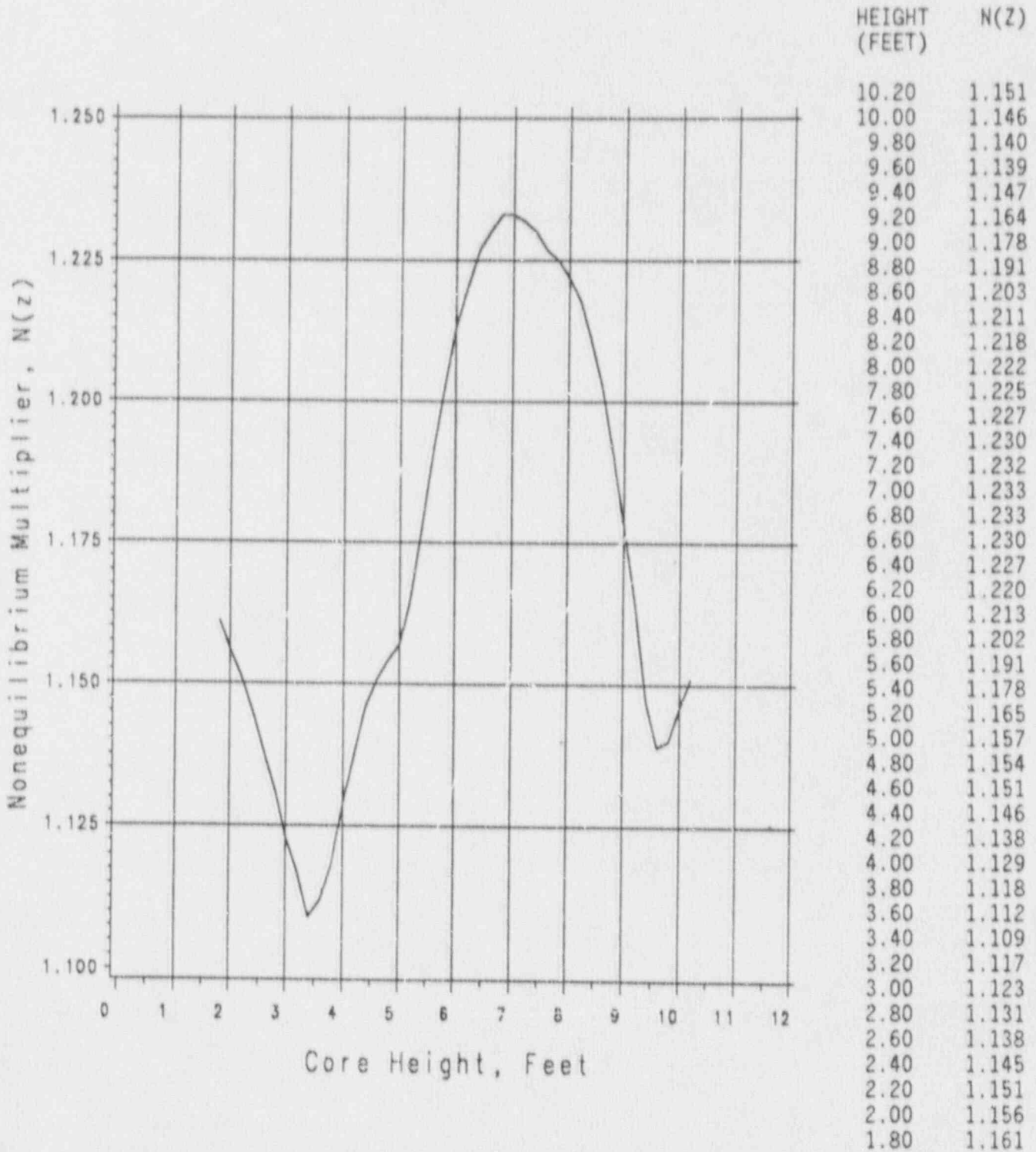


FIGURE 8 - AXIAL FLUX DIFFERENCE LIMITS  
AS A FUNCTION OF RATED THERMAL POWER  
FROM 0 MWD/MTU BURNUP TO 5000 MWD/MTU  
FOR NORTH ANNA UNIT 1 CYCLE 9

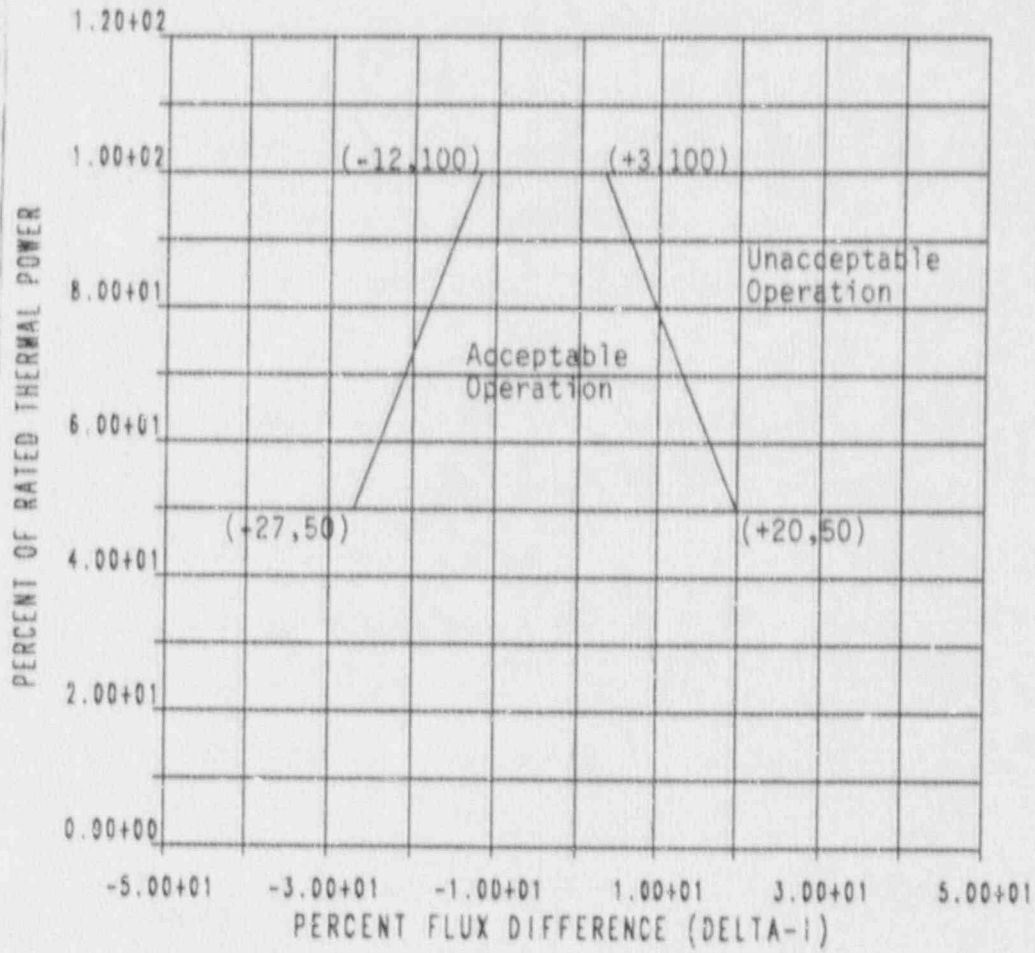


FIGURE 9 - AXIAL FLUX DIFFERENCE LIMITS  
AS A FUNCTION OF RATED THERMAL POWER  
FROM 5000 MWD/MTU BURNUP TO EOL  
FOR NORTH ANNA UNIT 1 CYCLE 9

