VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

W. L. STEWART
VICE PRESIDENT
NUCLEAR OPERATIONS

June 4, 1986

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
Attn: Mr. Lester S. Rubenstein, Director
PWR Project Directorate No. 2
Division of PWR Licensing-A
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Serial No. 86-356
E&C/KLB/ap
Docket Nos. 50-338
50-339
License Nos. NPF-4
NPF-7

Gentlemen:

VIRGINIA ELECTRIC AND POWER COMPANY
NORTH ANNA POWER STATION UNIT NOS. 1 AND 2
CORE SURVEILLANCE REPORTS FOR 2893 MWt OPERATION

By letter dated May 2, 1985, Virginia Electric and Power Company requested an amendment to the North Anna Unit 1 and 2 Technical Specifications to allow operation with a core rated thermal power of 2893 MWt. This submittal was supplemented with additional information by letters dated February 6, 1986 and April 30, 1986. This letter transmits the Core Surveillance Reports associated with 2893 MWt operation for North Anna 1, Cycle 6 and North Anna 2, Cycle 5.

The North Anna 1, Cycle 6 and North Anna 2, Cycle 5 reload cores were reanalyzed in accordance with the methodology documented in topical report VEP-FRD-42 Rev. 1, "Reload Nuclear Design Methodology," using NRC approved codes as referenced in the topical. These analyses were performed and reviewed by our technical staff. The results of these analyses indicated that no key analysis parameters would become more limiting than the values assumed in the safety analyses applicable to a core rated thermal power of 2893 MWt. Further the analyses demonstrated that the current Technical Specifications, as modified by the changes included in the references above, are appropriate and require no additional changes.

A review has been performed by both the Station Nuclear Safety and Operating Committee and the Safety Evaluation and Control Staff. It has been determined that no unreviewed safety question as defined in 10CFR50.59 will exist as a result of operation of the North Anna 1, Cycle 6 and North Anna 2, Cycle 5 reload cores at core rated thermal power levels of 2893 MWt.

A001
1/1

Attachment 1 provides the North Anna 1 Cycle 6 Core Surveillance Report containing the cycle specific values for Fxy limits and the axial power distribution surveillance limit, Pm. Attachment 2 provides the North Anna 2,Cycle 5 Core Surveillance Report containing the cycle specific values for N(z) and the Axial Flux Difference limits. Both Core Surveillance Reports are based on a total peaking factor (FQ) limit of 2.15. In accordance with Section 6.9.1.7 of the Unit 1 and 2 Technical Specifications, we will need written authorization from you in order to implement the information contained in these reports within the next sixty days should the core uprate Technical Specifications amendments become effective during that time period.

Please contact us if you have any questions or require any additional information.

Very truly yours,

W. L. Stewart

Attachments

1. North Anna Unit 1, Cycle 6 CAOC Core Surveillance Report for FQ=2.15 and Power Uprate to 2893 MWt.

2. North Anna Unit 2, Cycle 5 RPDC Core Surveillance Report for FQ=2.15 and Pcwer Uprate to 2893 MWt.

cc: Dr. J. Nelson Grace
Regional Administrator
NRC Region II

NRC Senior Resident Inspector
North Anna Power Station

Mr. Leon B. Engle
NRC North Anna Project Manager
PWR Project Directorate No. 2
Division of PWR Licensing-A

Director, Office of Nuclear Reactor Regulation
Attention: Chief, Reactor Systems Branch
Division of PWR Licensing-A
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

ATTACHMENT 1

NORTH ANNA UNIT 1, CYCLE 6

CAOC CORE SURVEILLANCE REPORT FOR FQ=2.15

AND POWER UPRATE TO 2893 MWt

TABLE 1

NORTH ANNA UNIT 1, CYCLE 6 UPRATED CORE SURVEILLANCE LIMITS, FQ = 2.15

I. The F-xy limits for RATED THERMAL POWER within specific core planes shall be:

   1. Fxy-RTP $\leq$ 1.71 for all core planes containing bank "D" control rods, and

   2. Fxy-RTP $\leq$ 1.66 for all unrodded core planes.

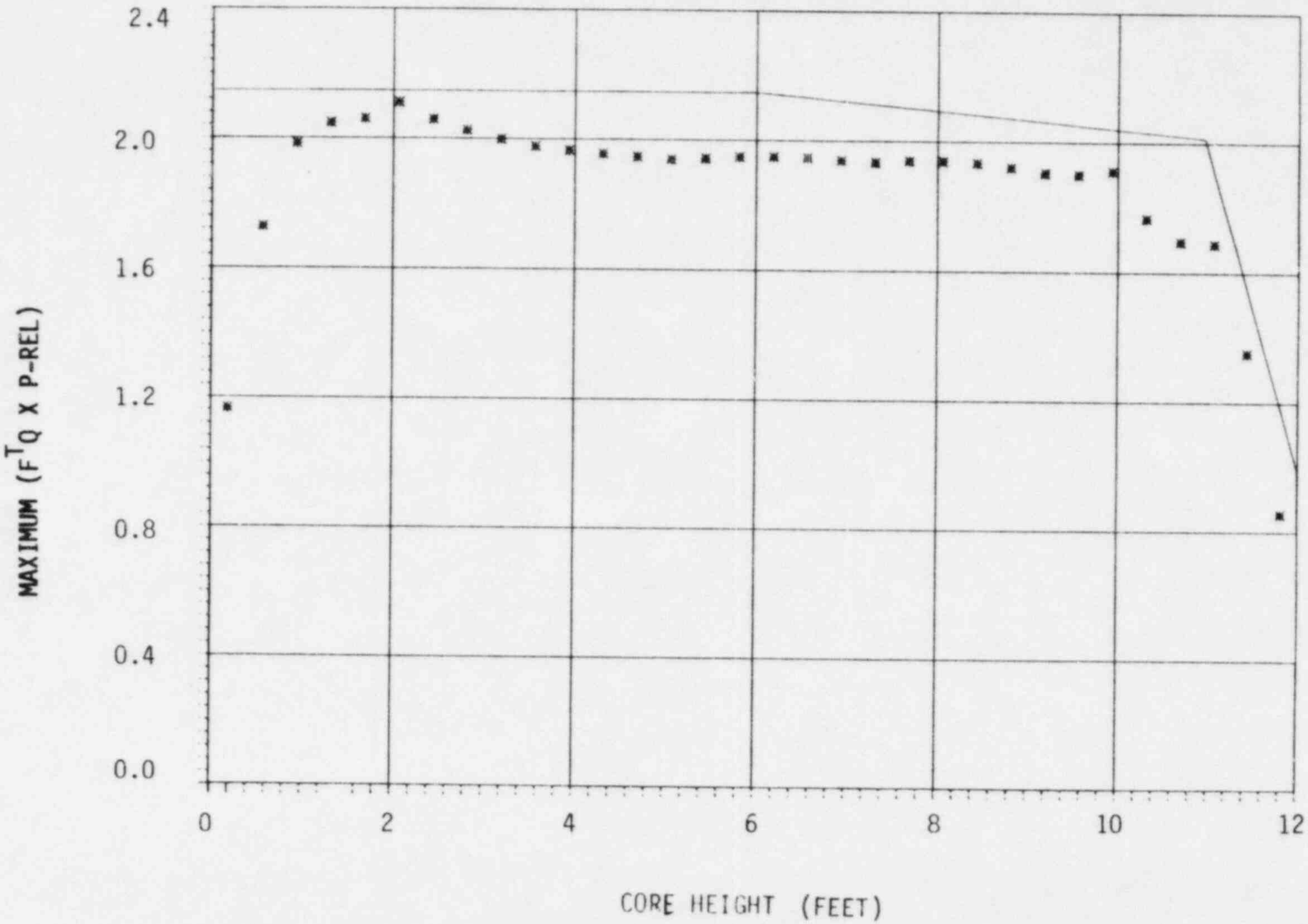
II. The axial power distribution surveillance threshold power level shall be:

   1. Pm = 100% of RATED THERMAL POWER.

NORTH ANNA UNIT 1, CYCLE 6

MAXIMUM ($F^T Q$ X P-REL) V S. AXIAL CORE HEIGHT

DURING NORMAL OPERATION



LINE - TECH. SPEC. LIMIT

STAR - CALCULATED FQ

FIGURE 2

N1C6 Power Uprated to 2893 MW

ATTACHMENT 2

NORTH ANNA UNIT 2, CYCLE 5

RPDC CORE SURVEILLANCE REPORT

FOR FQ=2.15 AND POWER UPRATE TO 2893 MWt

NORTH ANNA UNIT 2 CYCLE 5 RPDC CORE SURVEILLANCE REPORT FOR FQ=2.15 AND POWER UPRATE TO 2893 MWt

This Core Surveillance Report is provided in accordance with Section 6.9.1.7 of the North Anna Unit 2 Technical Specifications.

The Burnup-dependent Cycle 5 N(z) function for Technical Specification 4.2.2.2 is shown in Figures 1-5. N(z) was calculated according to the procedure of VEP-NE-1A.

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

$$FQ(z) \leq \frac{2.15}{P} K(z), \quad P > 0.5 \text{ and}$$

$$FQ(z) \leq 4.30 \ K(z), \quad P \leq 0.5.$$

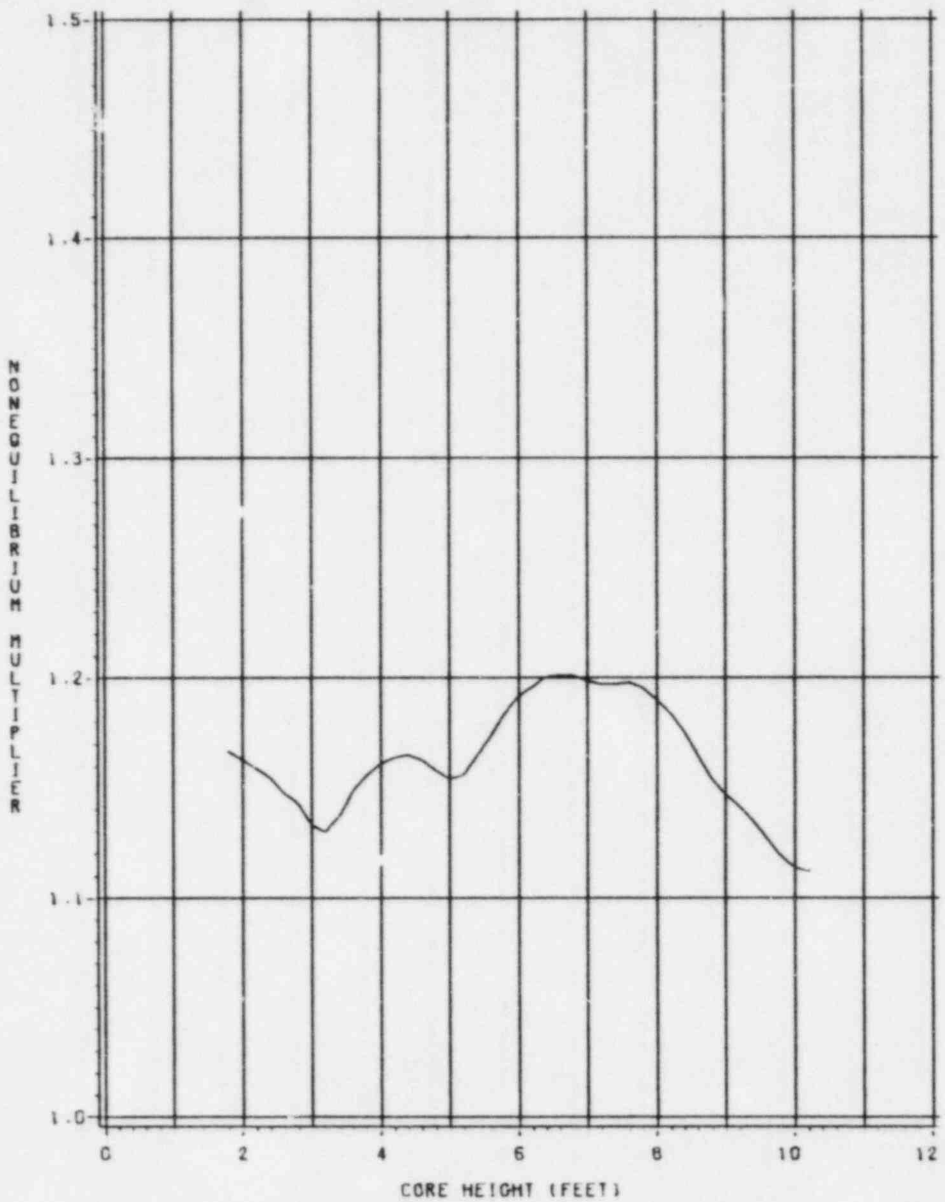
The Cycle 5 Axial Flux Difference (AFD) limits for Technical Specification 3.2.1 are shown in Figure 6. These limits were calculated according to the methods of VEP-NE-1A and are slightly more restrictive than the limits at non-uprated conditions.

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.

---

*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.

TOP AND BOTTOM 15% EXCLUDED
AS PER TECHNICAL SPECIFICATION 4.2.2.2.G

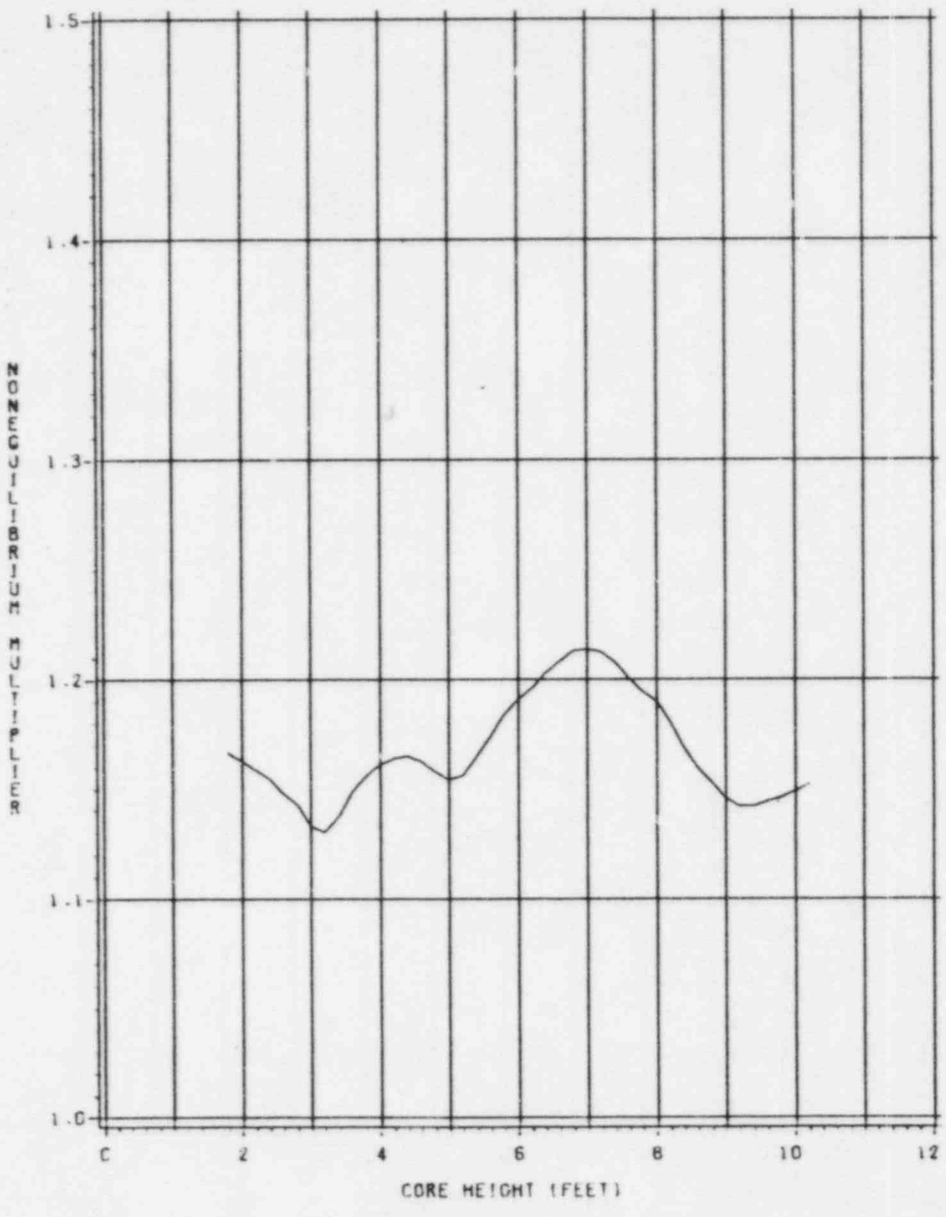


N(Z) FUNCTION
NORTH ANNA UNIT 2 CYCLE 5 AT 2893 MW
BURNUPS 2,000 to 3,000 MWD/MTU

HEIGHT (FEET)	N(Z)	HEIGHT (FEET)	N(Z)
0.0	.	6.2	1.196
0.2	.	6.4	1.200
0.4	.	6.6	1.201
0.6	.	6.8	1.201
0.8	.	7.0	1.199
1.0	.	7.2	1.197
1.2	.	7.4	1.197
1.4	.	7.6	1.198
1.6	.	7.8	1.196
1.8	1.167	8.0	1.190
2.0	1.163	8.2	1.184
2.2	1.159	8.4	1.176
2.4	1.155	8.6	1.165
2.6	1.148	8.8	1.154
2.8	1.143	9.0	1.147
3.0	1.133	9.2	1.142
3.2	1.130	9.4	1.135
3.4	1.137	9.6	1.127
3.6	1.149	9.8	1.119
3.8	1.156	10.0	1.114
4.0	1.161	10.2	1.112
4.2	1.164	10.4	.
4.4	1.165	10.6	.
4.6	1.163	10.8	.
4.8	1.158	11.0	.
5.0	1.154	11.2	.
5.2	1.156	11.4	.
5.4	1.165	11.6	.
5.6	1.174	11.8	.
5.8	1.184	12.0	.
6.0	1.192		

Figure 1 - N(Z) Function for N2C5 at 2893
from 2,000 to 3,000 MWD/MTU Burnup

TOP AND BOTTOM 15% EXCLUDED
AS PER TECHNICAL SPECIFICATION 4.2.2.2.G

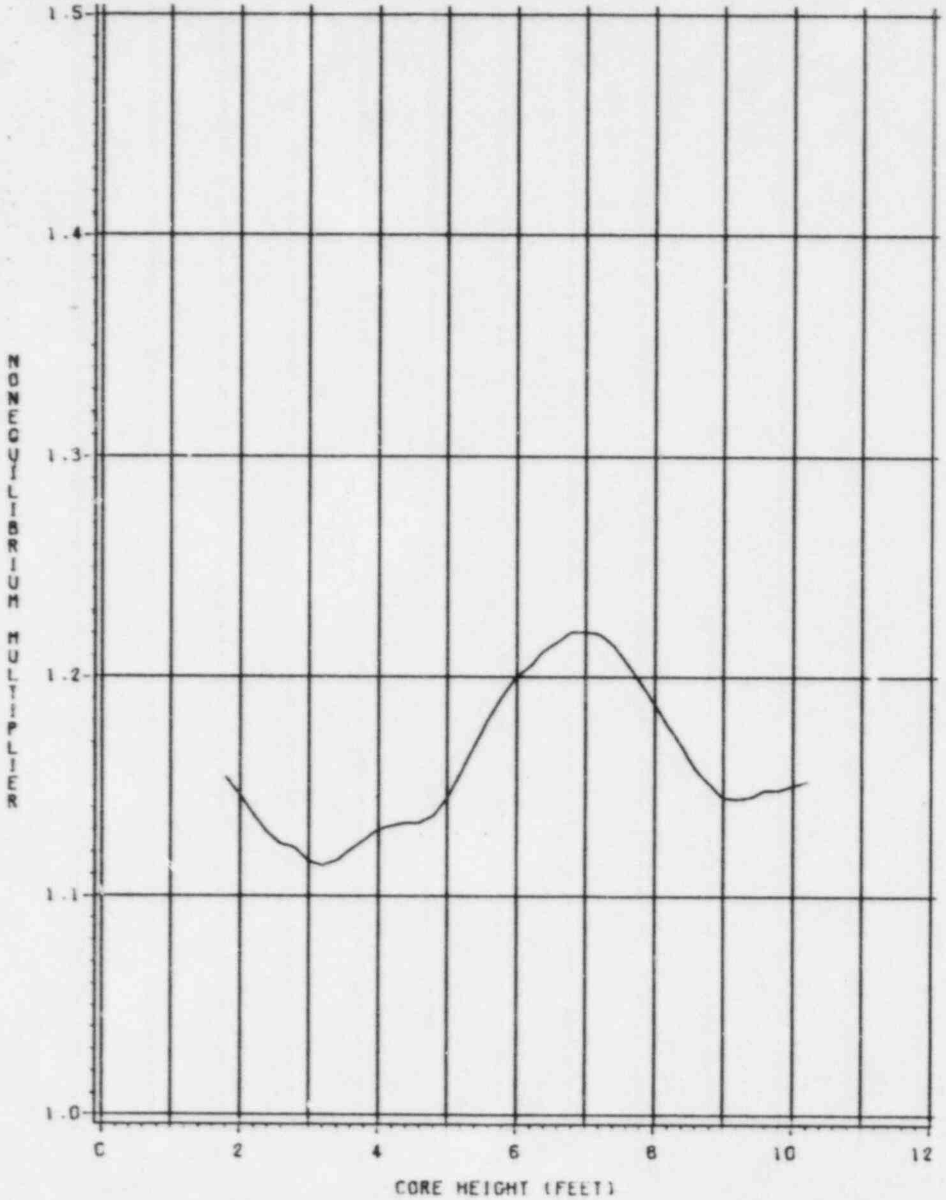


N(Z) FUNCTION
NORTH ANNA UNIT 2 CYCLE 5 AT 2893 MW
BURNUPS 3,000 TO 5,000 MWD/MTU

HEIGHT (FEET)	N(Z)	HEIGHT (FEET)	N(Z)
0.0	.	6.2	1.196
0.2	.	6.4	1.203
0.4	.	6.6	1.208
0.6	.	6.8	1.213
0.8	.	7.0	1.214
1.0	.	7.2	1.213
1.2	.	7.4	1.208
1.4	.	7.6	1.201
1.6	.	7.8	1.195
1.8	1.167	8.0	1.190
2.0	1.163	8.2	1.181
2.2	1.159	8.4	1.169
2.4	1.155	8.6	1.160
2.6	1.148	8.8	1.153
2.8	1.143	9.0	1.146
3.0	1.133	9.2	1.142
3.2	1.130	9.4	1.142
3.4	1.137	9.6	1.144
3.6	1.149	9.8	1.146
3.8	1.156	10.0	1.149
4.0	1.161	10.2	1.152
4.2	1.164	10.4	.
4.4	1.165	10.6	.
4.6	1.163	10.8	.
4.8	1.158	11.0	.
5.0	1.154	11.2	.
5.2	1.156	11.4	.
5.4	1.165	11.6	.
5.6	1.174	11.8	.
5.8	1.184	12.0	.
6.0	1.191		

Figure 2 - N(Z) Function for N2C5 at 2893 MW from 3,000 to 5,000 MWD/MTU Burnup

TOP AND BOTTOM 15% EXCLUDED
AS PER TECHNICAL SPECIFICATION 4.2.2.2.G

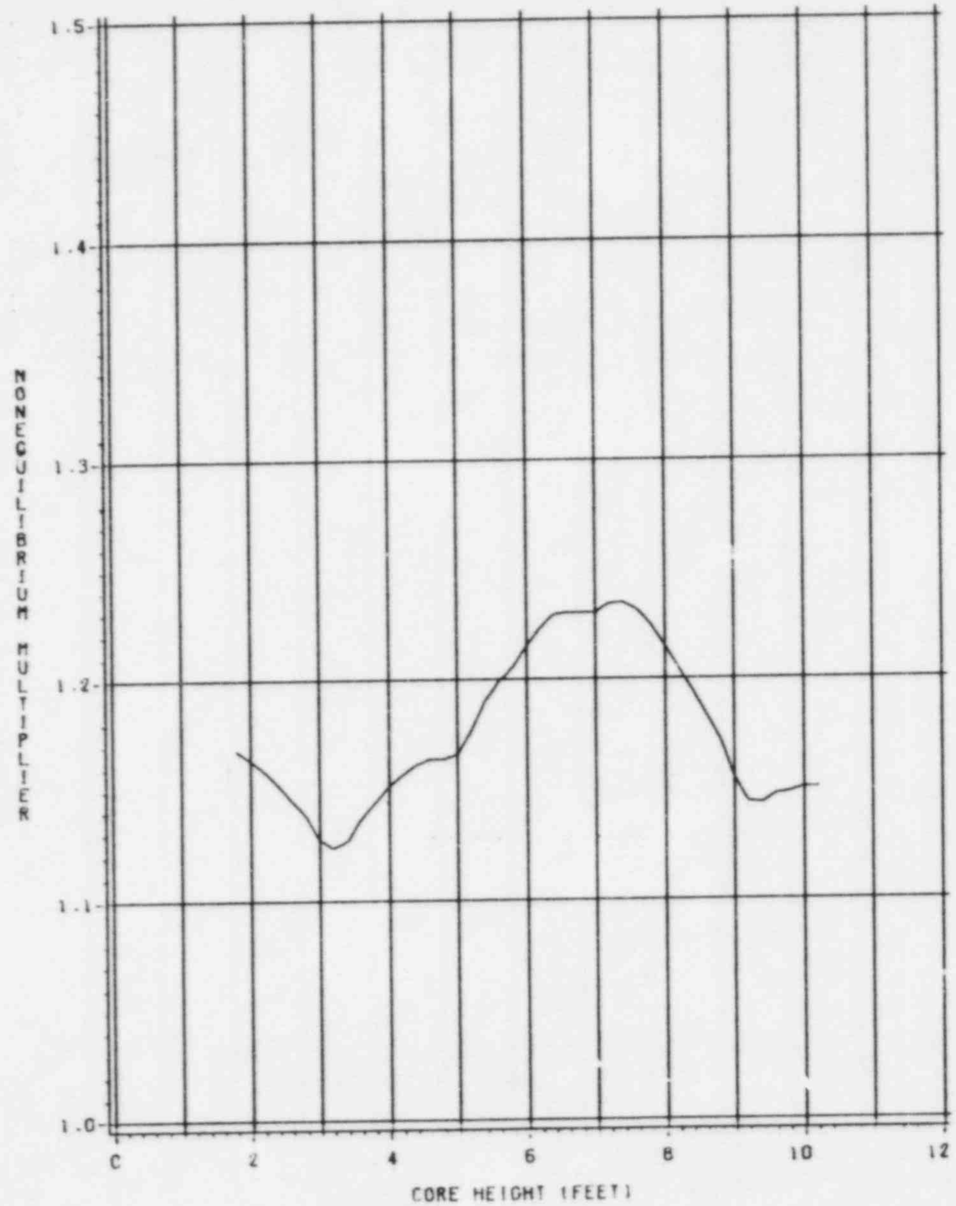


N(Z) FUNCTION
NORTH ANNA UNIT 2 CYCLE 5 at 2893 MW
BURNUPS BETWEEN 5,000 AND 7,000 MWD/MTU

HEIGHT (FEET)	N(Z)	HEIGHT (FEET)	N(Z)
0.0	.	6.2	1.205
0.2	.	6.4	1.212
0.4	.	6.6	1.216
0.6	.	6.8	1.221
0.8	.	7.0	1.221
1.0	.	7.2	1.220
1.2	.	7.4	1.215
1.4	.	7.6	1.207
1.6	.	7.8	1.198
1.8	1.154	8.0	1.188
2.0	1.146	8.2	1.178
2.2	1.137	8.4	1.169
2.4	1.129	8.6	1.158
2.6	1.124	8.8	1.151
2.8	1.122	9.0	1.145
3.0	1.116	9.2	1.144
3.2	1.114	9.4	1.145
3.4	1.116	9.6	1.148
3.6	1.121	9.8	1.148
3.8	1.125	10.0	1.150
4.0	1.130	10.2	1.152
4.2	1.132	10.4	.
4.4	1.133	10.6	.
4.6	1.133	10.8	.
4.8	1.136	11.0	.
5.0	1.144	11.2	.
5.2	1.156	11.4	.
5.4	1.169	11.6	.
5.6	1.181	11.8	.
5.8	1.191	12.0	.
6.0	1.200		

Figure 3 - N(Z) Function for N2C5 at 2893 MW from 5,000 to 7,000 MWD/MTU Burnup

TOP AND BOTTOM 15% EXCLUDED
AS PER TECHNICAL SPECIFICATION 4.2.2.2.G

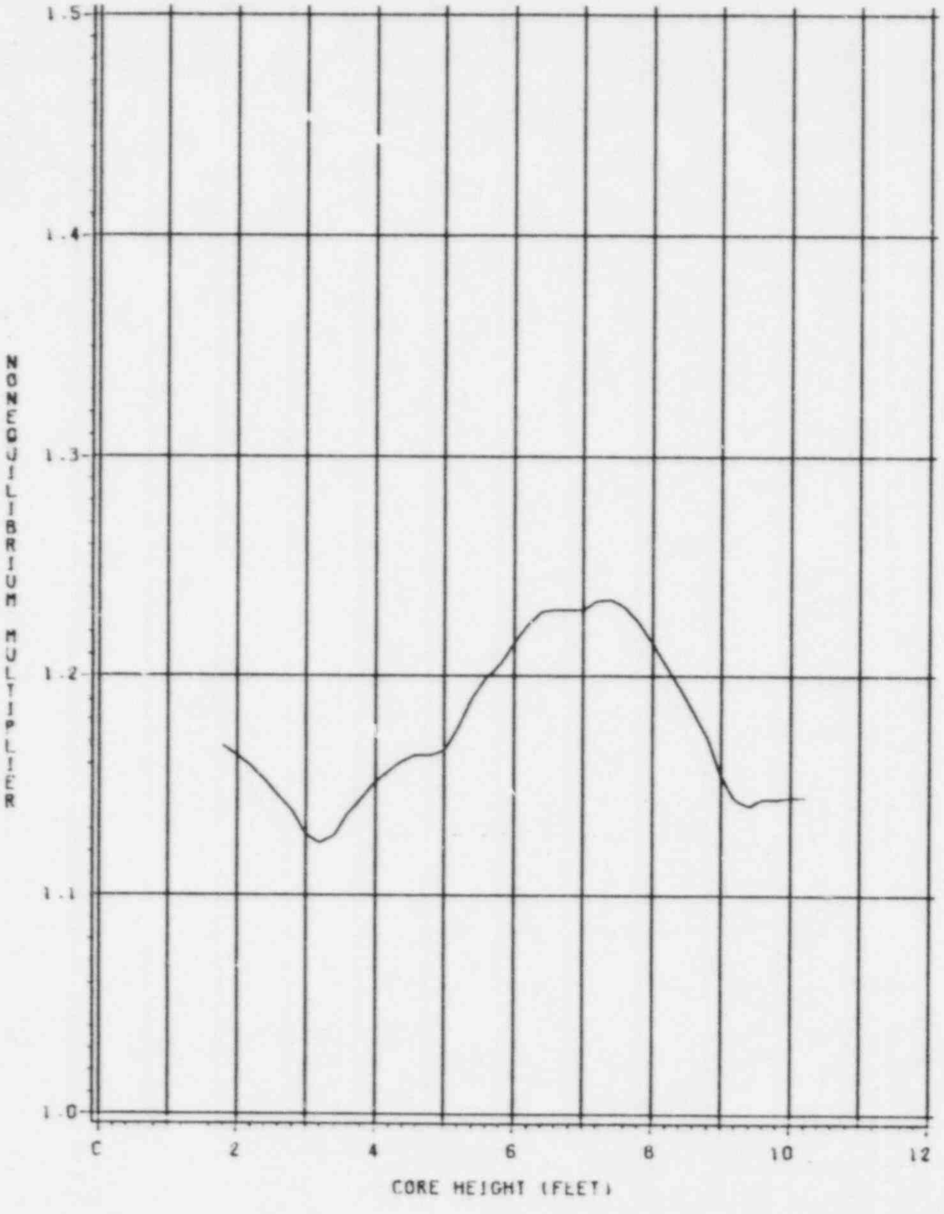


N(Z) FUNCTION
NORTH ANNA UNIT 2 CYCLE 5 AT 2893 MW
BURNUPS 7,000 TO 14,500 MWD/MTU

HEIGHT (FEET)	N(Z)	HEIGHT (FEET)	N(Z)
0.0	.	6.2	1.223
0.2	.	6.4	1.229
0.4	.	6.6	1.230
0.6	.	6.8	1.230
0.8	.	7.0	1.230
1.0	.	7.2	1.234
1.2	.	7.4	1.235
1.4	.	7.6	1.232
1.6	.	7.8	1.225
1.8	1.168	8.0	1.215
2.0	1.164	8.2	1.205
2.2	1.159	8.4	1.195
2.4	1.153	8.6	1.184
2.6	1.146	8.8	1.172
2.8	1.139	9.0	1.155
3.0	1.128	9.2	1.144
3.2	1.124	9.4	1.143
3.4	1.127	9.6	1.147
3.6	1.137	9.8	1.148
3.8	1.144	10.0	1.150
4.0	1.152	10.2	1.150
4.2	1.157	10.4	.
4.4	1.161	10.6	.
4.6	1.164	10.8	.
4.8	1.164	11.0	.
5.0	1.166	11.2	.
5.2	1.176	11.4	.
5.4	1.190	11.6	.
5.6	1.199	11.8	.
5.8	1.205	12.0	.
6.0	1.215		

Figure 4 - N(Z) Function for N2C5 at 2893 MW from 7,000 to 14,500 MWD/MTU Burnup

TOP AND BOTTOM 15% EXCLUDED
AS PER TECHNICAL SPECIFICATION 4.2.2.2.G



N(Z) FUNCTION
NORTH ANNA UNIT 2 CYCLE 5 AT 2893 MW
BURNUPS GREATER THAN 14,500 MWD/MTU

HEIGHT (FEET)	N(Z)	HEIGHT (FEET)	N(Z)
0.0	.	6.2	1.223
0.2	.	6.4	1.229
0.4	.	6.6	1.230
0.6	.	6.8	1.230
0.8	.	7.0	1.230
1.0	.	7.2	1.234
1.2	.	7.4	1.235
1.4	.	7.6	1.232
1.6	.	7.8	1.225
1.8	1.168	8.0	1.215
2.0	1.164	8.2	1.205
2.2	1.159	8.4	1.195
2.4	1.153	8.6	1.184
2.6	1.146	8.8	1.172
2.8	1.139	9.0	1.153
3.0	1.128	9.2	1.144
3.2	1.124	9.4	1.141
3.4	1.127	9.6	1.144
3.6	1.137	9.8	1.144
3.8	1.144	10.0	1.145
4.0	1.152	10.2	1.145
4.2	1.157	10.4	.
4.4	1.161	10.6	.
4.6	1.164	10.8	.
4.8	1.164	11.0	.
5.0	1.166	11.2	.
5.2	1.176	11.4	.
5.4	1.190	11.6	.
5.6	1.199	11.8	.
5.8	1.205	12.0	.
6.0	1.215		

Figure 5 - N(Z) Function for N2C5 at 2893 MW greater than 14,500 MWD/MTU Burnup

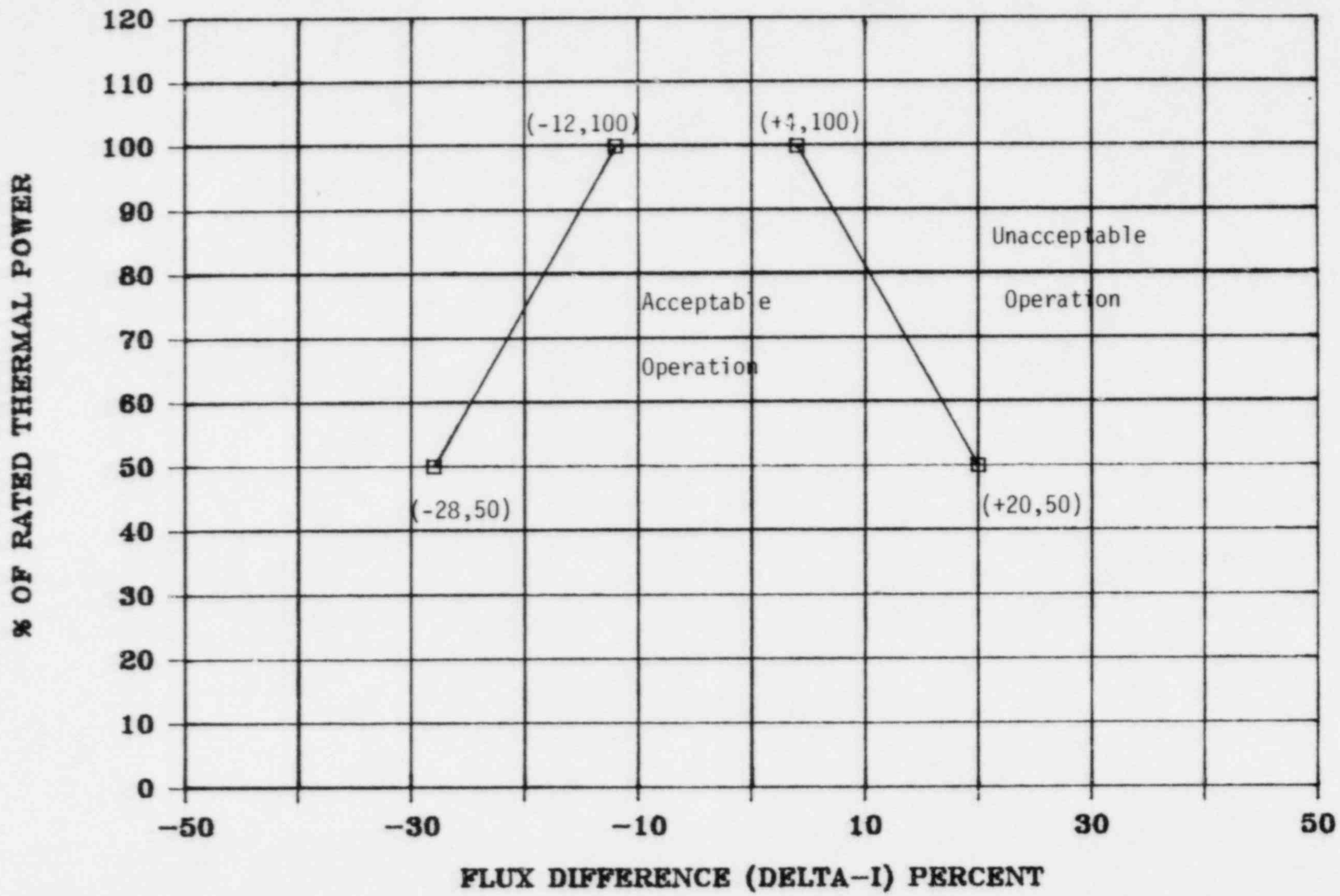


Figure 6 - Axial Flux Difference Limits as a Function of Rated Thermal Power for North Anna Unit 2 Cycle 5 at Uprated Conditions (2893 MW)