NORTH ANNA 1 CYCLE 8 RPDC PATTERN AN CORE SURVEILLANCE REPORT

June 5th, 1989

NORTH ANNA UNIT 1 CYCLE 8 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 8 N(z) function for Technical Specification 4.2.2.2.C is shown in Figures 1-6. 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 8 Axial Flux Difference (AFD) limits for Technical Specification 3.2.1 are shown in Figure 7. These limits were calculated according to the methods of VEP-NE-1-A and are comparable to the Cycle 7 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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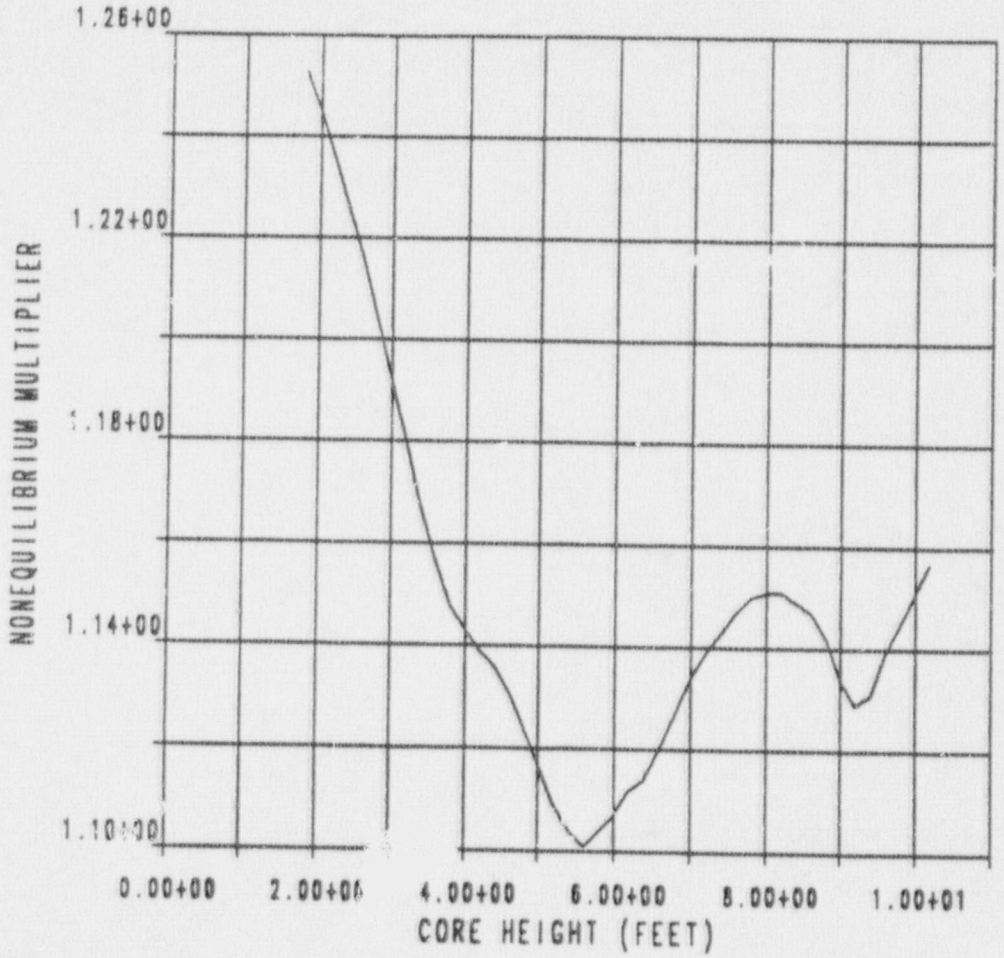
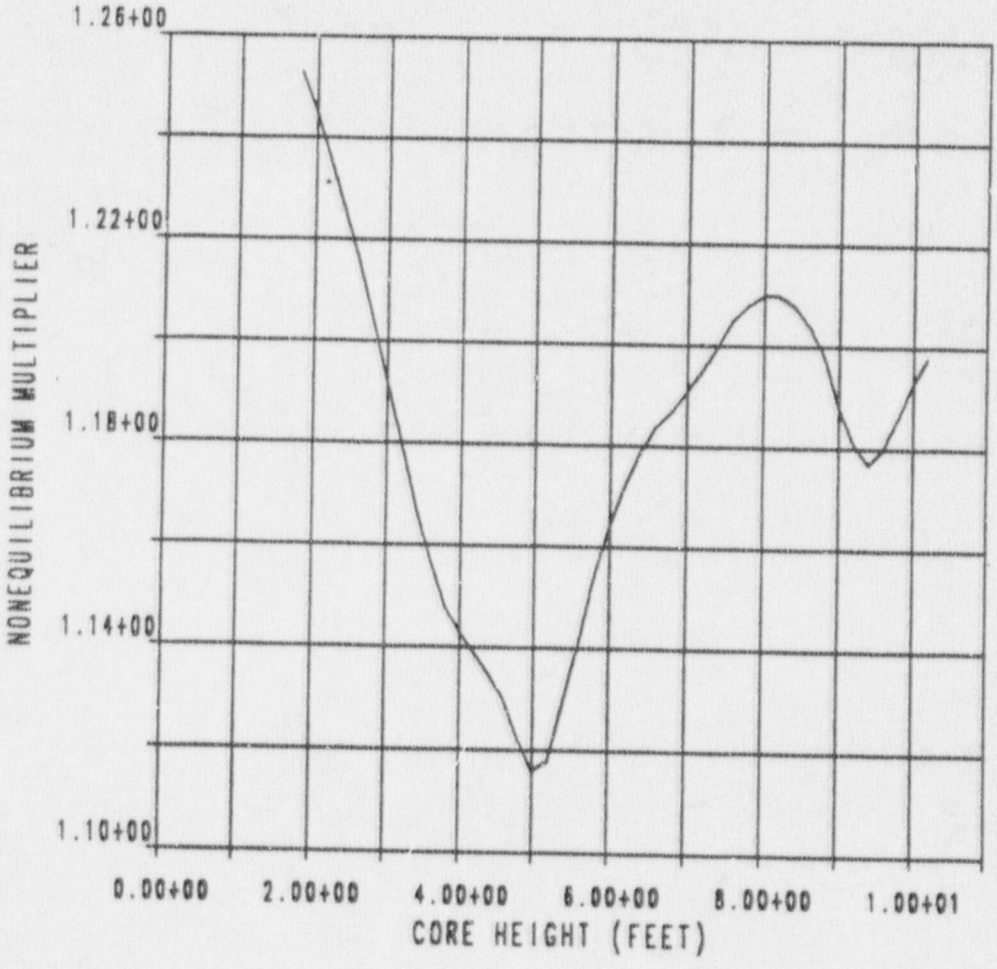
*The N(z) function, when applied to a power distribution measured under equilibrium conditions, demonstrates that the initial conditions assumed in the LOCA analysis are met, along with the ECCS acceptance criteria of 10CFR50.46.

FIGURE 1 - N(Z) FUNCTION FOR N1C8 AT 2893 MW
FROM 0 to 1000 MWD/MTU BURNUP
TOP AND BOTTOM 15 PERCENT EXCLUDED
AS PER TECH SPEC 4.2.2.2.G



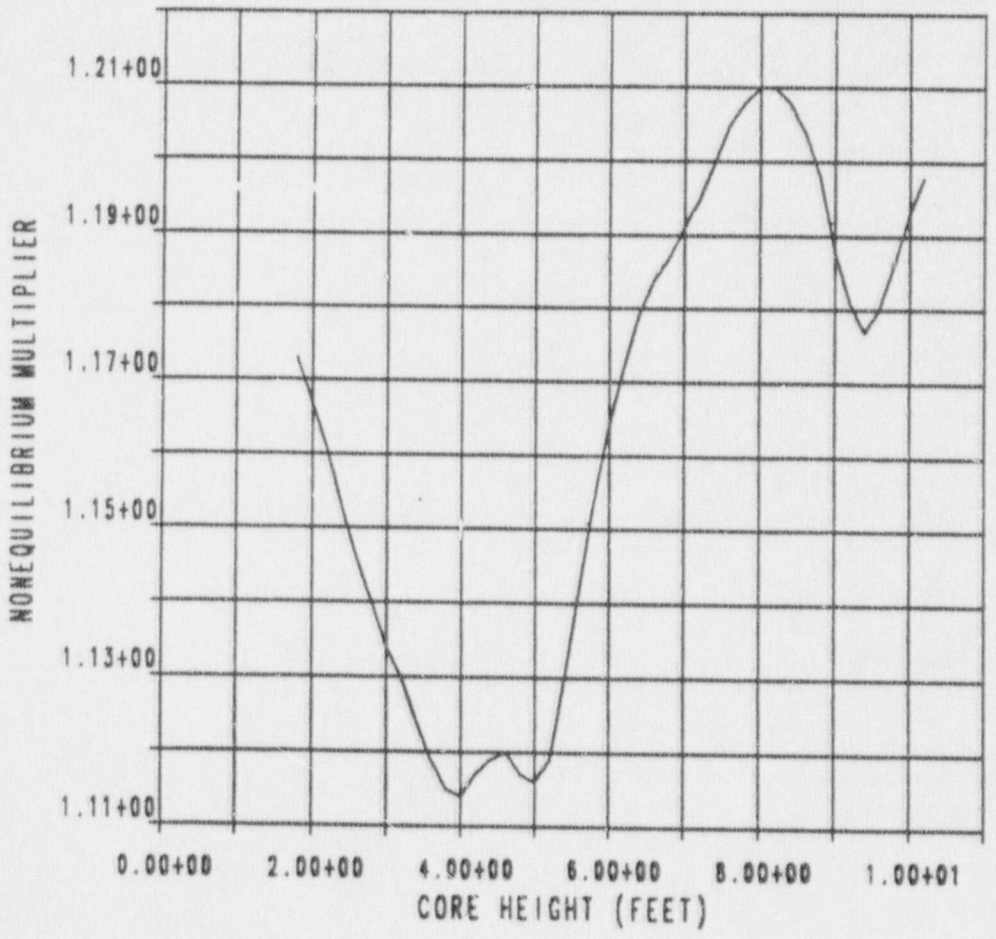
HEIGHT (FEET)	N(Z)
1.80	1.253
2.00	1.245
2.20	1.236
2.40	1.226
2.60	1.216
2.80	1.204
3.00	1.192
3.20	1.180
3.40	1.167
3.60	1.157
3.80	1.148
4.00	1.143
4.20	1.139
4.40	1.136
4.60	1.131
4.80	1.124
5.00	1.117
5.20	1.109
5.40	1.104
5.60	1.101
5.80	1.104
6.00	1.107
6.20	1.112
6.40	1.114
6.60	1.120
6.80	1.127
7.00	1.134
7.20	1.139
7.40	1.143
7.60	1.147
7.80	1.150
8.00	1.151
8.20	1.151
8.40	1 149
8.60	1.147
8.80	1.142
9.00	1.134
9.20	1.129
9.40	1.131
9.60	1.139
9.80	1.145
10.00	1.151
10.20	1.157

FIGURE 2 - N(Z) FUNCTION FOR N1C8 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



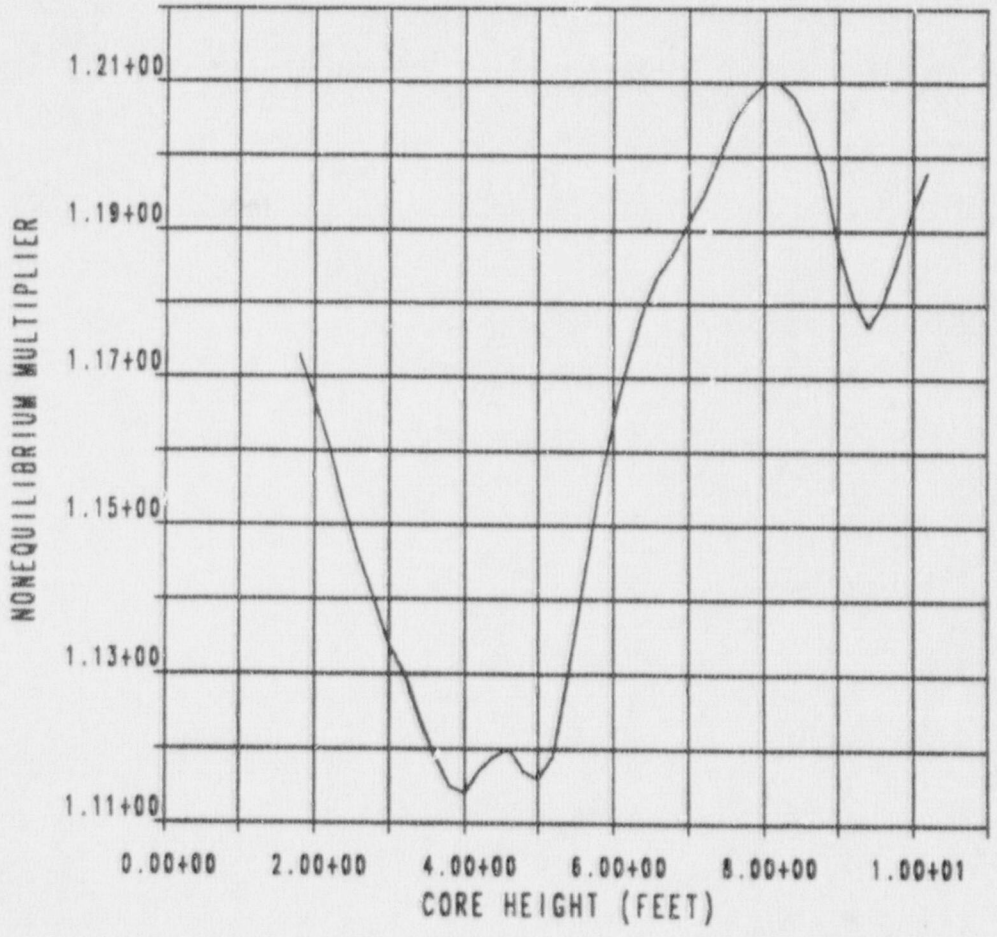
HEIGHT (FEET)	N(Z)
1.80	1.253
2.00	1.245
2.20	1.236
2.40	1.226
2.60	1.216
2.80	1.204
3.00	1.192
3.20	1.180
3.40	1.167
3.60	1.157
3.80	1.148
4.00	1.143
4.20	1.139
4.40	1.135
4.60	1.130
4.80	1.122
5.00	1.116
5.20	1.118
5.40	1.130
5.60	1.141
5.80	1.154
6.00	1.164
6.20	1.172
6.40	1.179
6.60	1.184
6.80	1.187
7.00	1.191
7.20	1.195
7.40	1.200
7.60	1.205
7.80	1.208
8.00	1.210
8.20	1.210
8.40	1.208
8.60	1.204
8.80	1.198
9.00	1.188
9.20	1.181
9.40	1.177
9.60	1.180
9.80	1.186
10.00	1.193
10.20	1.198

FIGURE 3 - N(Z) FUNCTION FOR N1C8 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



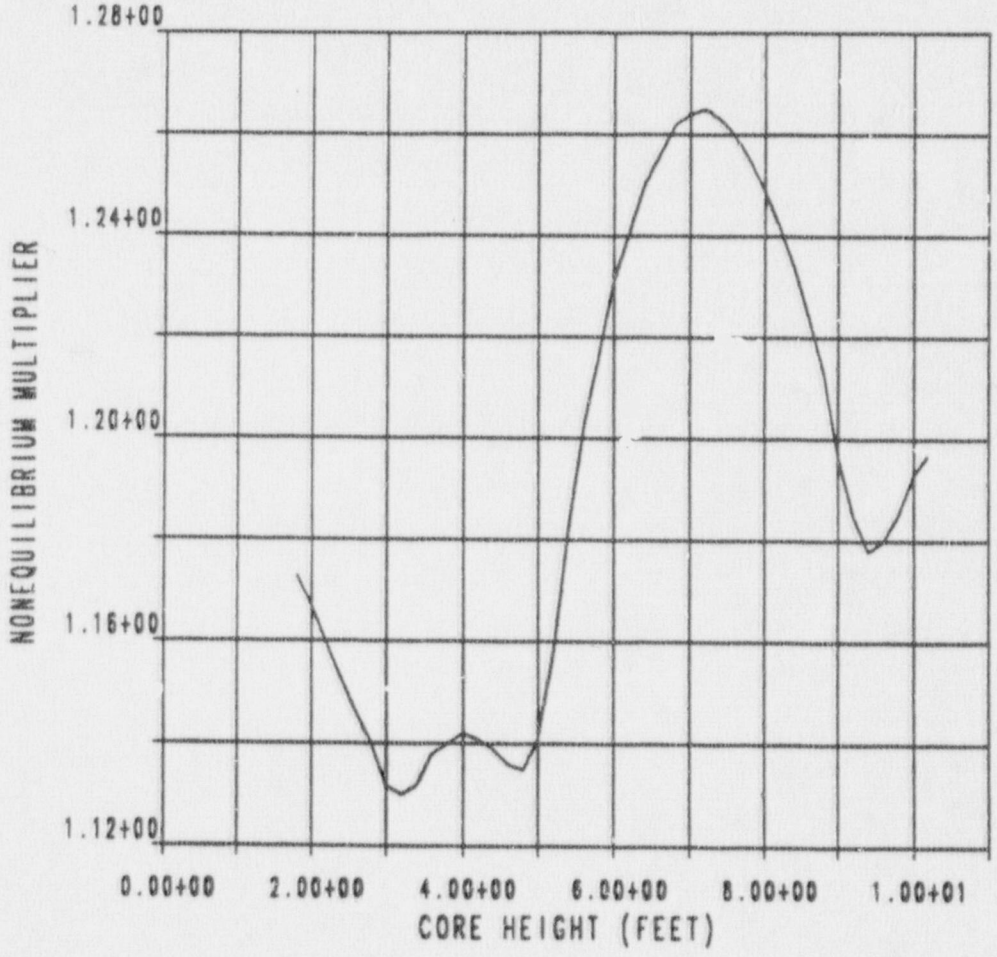
HEIGHT (FEET)	N(Z)
1.80	1.173
2.00	1.167
2.20	1.161
2.40	1.153
2.60	1.146
2.80	1.140
3.00	1.134
3.20	1.130
3.40	1.124
3.60	1.119
3.80	1.115
4.00	1.114
4.20	1.117
4.40	1.119
4.60	1.120
4.80	1.117
5.00	1.116
5.20	1.119
5.40	1.130
5.60	1.142
5.80	1.154
6.00	1.164
6.20	1.172
6.40	1.179
6.60	1.184
6.80	1.187
7.00	1.191
7.20	1.195
7.40	1.200
7.60	1.205
7.80	1.208
8.00	1.210
8.20	1.210
8.40	1.208
8.60	1.204
8.80	1.198
9.00	1.188
9.20	1.181
9.40	1.177
9.60	1.180
9.80	1.186
10.00	1.193
10.20	1.198

FIGURE 4 - N(Z) FUNCTION FOR N1C8 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



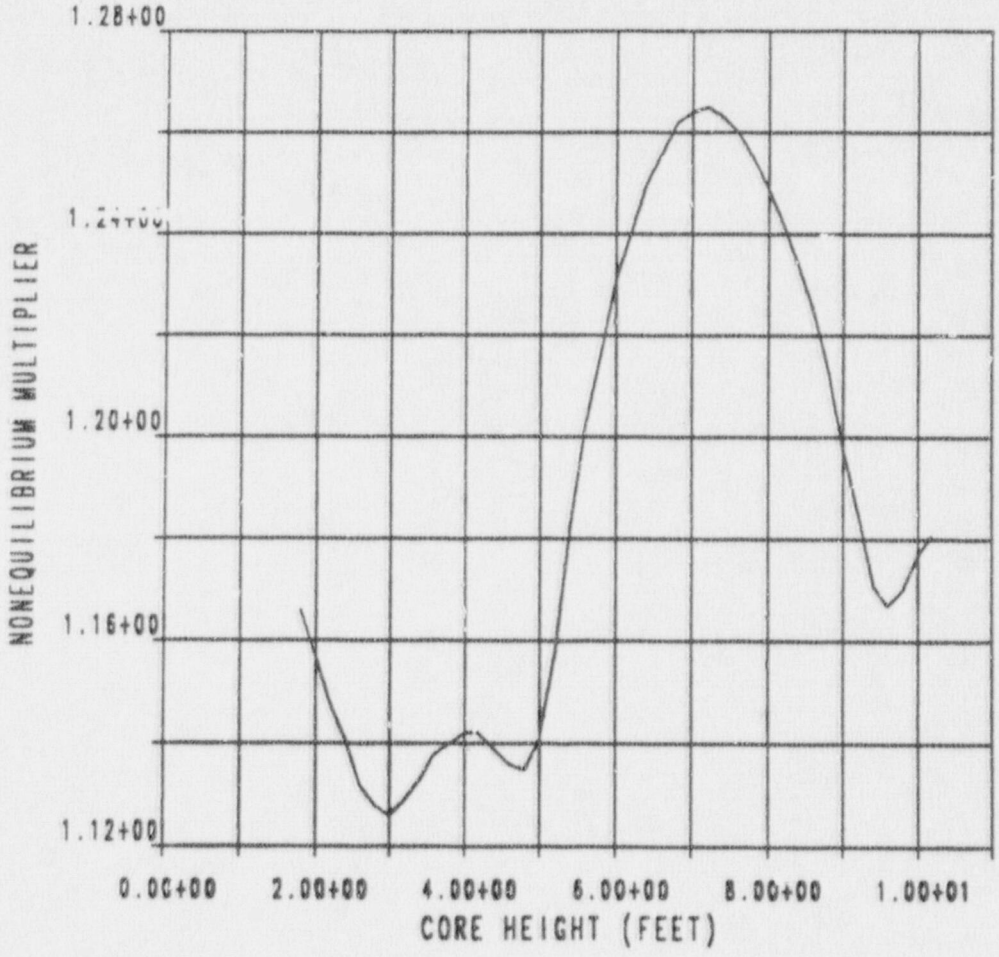
HEIGHT (FEET)	N(Z)
1.80	1.173
2.00	1.167
2.20	1.161
2.40	1.153
2.60	1.146
2.80	1.140
3.00	1.134
3.20	1.130
3.40	1.124
3.60	1.119
3.80	1.115
4.00	1.114
4.20	1.117
4.40	1.119
4.60	1.120
4.80	1.117
5.00	1.116
5.20	1.119
5.40	1.130
5.60	1.142
5.80	1.154
6.00	1.164
6.20	1.172
6.40	1.179
6.60	1.184
6.80	1.187
7.00	1.191
7.20	1.195
7.40	1.200
7.60	1.205
7.80	1.208
8.00	1.210
8.20	1.210
8.40	1.208
8.60	1.204
8.80	1.198
9.00	1.188
9.20	1.181
9.40	1.177
9.60	1.180
9.80	1.186
10.00	1.193
10.20	1.198

FIGURE 5 - N(Z) FUNCTION FOR N1C8 AT 2893 MW
FROM 7000 to 15600 MWD/MTU BURNUP
TOP AND BOTTOM 15 PERCENT EXCLUDED
AS PER TECH SPEC 4.2.2.2.G



HEIGHT (FEET)	N(Z)
1.80	1.173
2.00	1.167
2.20	1.160
2.40	1.153
2.60	1.146
2.80	1.140
3.00	1.132
3.20	1.130
3.40	1.132
3.60	1.138
3.80	1.140
4.00	1.142
4.20	1.141
4.40	1.139
4.60	1.136
4.80	1.135
5.00	1.141
5.20	1.158
5.40	1.183
5.60	1.202
5.80	1.216
6.00	1.231
6.20	1.240
6.40	1.250
6.60	1.256
6.80	1.262
7.00	1.264
7.20	1.265
7.40	1.263
7.60	1.260
7.80	1.255
8.00	1.249
8.20	1.242
8.40	1.234
8.60	1.224
8.80	1.213
9.00	1.197
9.20	1.185
9.40	1.178
9.60	1.180
9.80	1.185
10.00	1.193
10.20	1.197

FIGURE 6 - N(Z) FUNCTION FOR N1C8 AT 2893 MW
FROM 15600 MWD/MTU BURNUP TO EOL
TOP AND BOTTOM 15 PERCENT EXCLUDED
AS PER TECH SPEC 4.2.2.2.G



HEIGHT (FEET)	N(Z)
1.80	1.166
2.00	1.157
2.20	1.148
2.40	1.141
2.60	1.132
2.80	1.128
3.00	1.126
3.20	1.129
3.40	1.133
3.60	1.138
3.80	1.140
4.00	1.142
4.20	1.142
4.40	1.139
4.60	1.136
4.80	1.135
5.00	1.141
5.20	1.158
5.40	1.183
5.60	1.202
5.80	1.216
6.00	1.231
6.20	1.240
6.40	1.250
6.60	1.256
6.80	1.262
7.00	1.264
7.20	1.265
7.40	1.263
7.60	1.260
7.80	1.255
8.00	1.249
8.20	1.242
8.40	1.23(
8.60	1.225
8.80	1.213
9.00	1.198
9.20	1.185
9.40	1.171
9.60	1.167
9.80	1.170
10.00	1.177
10.20	1.181

FIGURE 7 - AXIAL FLUX DIFFERENCE LIMITS
AS A FUNCTION OF RATED THERMAL POWER
FROM 0 MWD/MTU BURNUP TO EOC
FOR NORTH ANNA UNIT 1 CYCLE 8