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A SCANA COMPANY

June 1, 2015

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Dear Sir / Madam:

Subject: VIRGIL C. SUMMER NUCLEAR STATION (UNIT 1)
DOCKET NO. 50-395
OPERATING LICENSE NO. NPF-12
CYCLE 22 CORE OPERATING LIMITS REPORT (COLR) REVISION 2

In accordance with Section 6.9.1.11 of the Virgil C. Summer Nuclear Station Technical Specifications, South Carolina Electric & Gas Company, acting for itself and as an agent for South Carolina Public Service Authority, hereby submits Revision 2 of the Core Operating Limits Report for Cycle 22. This revision corrects an error in the macroscopic cross section for neutron absorption (SIG-P) variable affecting analyzed shutdown margin. This report supersedes letter dated May 27th, 2014 (RC-14-0080, ML14149A388).

Should you have any questions, please call Bruce Thompson at (803) 931-5042.

Very truly yours,

[signature]

Thomas D. Gatlin

BJH/TDG/rp

Attachment: V. C. Summer Unit 1 Cycle 22 Core Operation Limits Report Revision 2
c: Without Attachment unless noted

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SOUTH CAROLINA ELECTRIC & GAS COMPANY

VIRGIL C. SUMMER NUCLEAR STATION

UNIT 1

CORE OPERATING LIMITS REPORT

FOR

CYCLE 22

REVISION 2

MAY 2015

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1.0 Core Operating Limits Report

This Core Operating Limits Report (COLR) for V. C. Summer Station Cycle 22 has been prepared in accordance with the requirements of Technical Specification 6.9.1.11.

The Technical Specifications affected by this report are listed below:

3.1.1.3	Moderator Temperature Coefficient
3.1.3.5	Shutdown Rod Insertion Limits
3.1.3.6	Control Rod Insertion Limits
3.2.1	Axial Flux Difference (AFD)
3.2.2	Heat Flux Hot Channel Factor
3.2.3	RCS Flow Rate and Nuclear Enthalpy Rise Hot Channel Factor
3.3.3.11	Power Distribution Measurement Uncertainty

2.0 Operating Limits

The cycle-specific parameter limits for the specifications listed in Section 1.0 are presented in the subsections which follow. These limits have been developed using the NRC-approved methodologies specified in Technical Specification 6.9.1.11.

2.1 Moderator Temperature Coefficient (Specification 3.1.1.3):

2.1.1 The Moderator Temperature Coefficient (MTC) limits are:
The BOL/ARO-MTC shall be less positive than the limits shown in Figure 1.
The EOL/ARO/RTP-MTC shall be less negative than -4.8×10^{-4} Δk/k/°F (-48 pcm/°F).
where: BOL stands for Beginning of Cycle Life
ARO stands for All Rods Out
RTP stands for RATED THERMAL POWER
EOL stands for End of Cycle Life

2.1.2 The MTC Surveillance limit is:
The 300 ppm/ARO/RTP-MTC should be less negative than or equal to -4.1×10^{-4} Δk/k/°F (-41 pcm/°F).

2.1.3 The Revised Predicted near-EOL 300 ppm MTC shall be calculated using the following algorithm from Reference 2:

Revised Predicted MTC = Predicted MTC + AFD Correction*+ Predictive Correction**

*AFD Correction is 0.05 pcm/°F/%ΔAFD.

**Predictive Correction is -3 pcm/°F.

If the Revised Predicted MTC is less negative than the SR 4.1.1.3b limit of -4.1×10^{-4} Δk/k/°F, and all of the benchmark data contained in the surveillance procedure are met, then an MTC measurement in accordance with SR 4.1.1.3b is not required.

2.2 Shutdown Rod Insertion Limits (Specification 3.1.3.5):

The shutdown rods shall be withdrawn to at least 230 steps.

2.3 Control Rod Insertion Limits (Specification 3.1.3.6):

Control Bank A and B rods shall be withdrawn to at least 230 steps. Control Bank C and D Rod Insertion Limits are specified by Figure 2. Control rod overlap is 102 steps.

2.4 Axial Flux Difference (Specification 3.2.1):

2.4.1 The Axial Flux Difference (AFD) Limits for Relaxed Axial Offset Control (RAOC) operation for Cycle 22 are shown in Figure 3.

2.4.2 The Axial Flux Difference (AFD) target band during base load operations for Cycle 22 is: BOL - EOL (0 – 23,000 MWD/MTU): ±5% about a measured target value.

2.4.3 The minimum allowable power level for base load operation, APL^{ND}, is 75% of RATED THERMAL POWER.

2.5 Heat Flux Hot Channel Factor - $F_Q(z)$ (Specification 3.2.2):

$$F_Q(Z) \le \frac{F_Q^{RTP}}{P} \times K(Z) \qquad \text{for } P > 0.5$$

$$F_Q(Z) \le \frac{F_Q^{RTP}}{0.5} \times K(Z) \qquad \text{for} P \le 0.5 \qquad \text{where: } P = \frac{\text{Thermal Power}}{\text{Rated Thermal Power}}$$

2.5.1 $F_Q^{RTP} = 2.45$

2.5.2 K(z) is provided in Figure 4.

2.5.3 Elevation dependent W(z) values for RAOC operation at 150, 3000, 5000, 8000, 10000, 14000, and 20000 MWD/MTU are shown in Tables 1 through 7, respectively. This information is sufficient to determine W(z) versus core height in the range of 0 MWD/MTU to EOL burnup through the use of three point interpolation. A 2% penalty factor shall be used for RAOC operation to increase $F_Q^M(z)$ as per Surveillance Requirement 4.2.2.4e. A 2% penalty factor shall be used at all burnups.

2.5.4 Elevation dependent $W(z)_{BL}$ values for Baseload operation between 75 and 100% of rated thermal power with the item 2.4.2 specified target band about a measured target value at 150, 3000, 5000, 8000, 10000, 14000, and 20000 MWD/MTU are shown in Tables 8 through 14, respectively. This information is sufficient to determine $W(z)_{BL}$ versus core height for burnups in the range of 0 MWD/MTU to EOL burnup through the use of three point interpolation. Table 15 shows FQ margin decreases for base load operation that are greater than 2% per 31 Effective Full Power Days (EFPD). These values shall be used to increase $F_Q^M(z)$ as per Surveillance.

2.6 RCS Flow Rate and Nuclear Enthalpy Rise Hot Channel Factor - $F_{\Delta H}^N$ (Specification 3.2.3):

$$R = \frac{F_{\Delta H}^N}{F_{\Delta H}^{RTP} \times \left(1 + PF_{\Delta H}^N \times (1 - P)\right)} \quad \text{where: } P = \frac{\text{Thermal Power}}{\text{Rated Thermal Power}}$$

2.6.1 $F_{\Delta H}^{RTP} = 1.62$

2.6.2 $PF_{\Delta H} = 0.3$

2.6.3 The Acceptable Operation Region from the combination of Reactor Coolant System total flow and R is provided in Figure 5.

2.7 Power Distribution Measurement Uncertainty (Specifications 3.2.2 and 3.2.3):

If the Power Distribution Monitoring System is OPERABLE, as defined in Technical Specification 3.3.3.11, the uncertainty, $U_{F\Delta H}$, to be applied to the Nuclear Enthalpy Rise Hot Channel Factor $F^N_{\Delta H}$ shall be calculated by the following formula:

$$U_{F\Delta H} = 1.0 + \frac{U_{\Delta H}}{100.0}$$

where: $U_{\Delta H}$ = Uncertainty for enthalpy rise as defined in equation (5-19) in Reference 1 or 4.0, whichever is larger.

If the Power Distribution Monitoring System is OPERABLE, as defined in Technical Specification 3.3.3.11, the uncertainty, U_{FQ}, to be applied to the Heat Flux Hot Channel Factor $F_Q(z)$ shall be calculated by the following formula:

$$U_{FQ} = \left(1.0 + \frac{U_Q}{100.0}\right) \cdot U_e$$

where: U_Q = Uncertainty for $F_Q(z)$ = 5.0 when confirming $F_Q(z)$ for RAOC or Base Load operation, or as defined in equation (5-19) in Reference 1 for all other purposes.

U_e = Engineering uncertainty factor.

= 1.03

If the Power Distribution Monitoring System is INOPERABLE, as defined in Technical Specification 3.3.3.11, the uncertainty, $U_{F\Delta H}$, to be applied to the Nuclear Enthalpy Rise Hot Channel Factor $F^N_{\Delta H}$ shall be calculated by the following formula:

$$U_{F\Delta H} = U_{F\Delta Hm}$$

where: $U_{F\Delta Hm}$ = Base $F_{\Delta H}$ measurement uncertainty.

= 1.04

If the Power Distribution Monitoring System is INOPERABLE, as defined in Technical Specification 3.3.3.11, the uncertainty, U_{FQ}, to be applied to the Heat Flux Hot Channel Factor $F_Q(z)$ shall be calculated by the following formula:

$$U_{FQ} = U_{qu} \cdot U_e$$

where: U_{qu} = Base F_Q measurement uncertainty.

= 1.05

U_e = Engineering uncertainty factor.

= 1.03

3.0 References

1) WCAP-12472-P-A, "BEACON Core Monitoring and Operations Support System," August, 1994, (W Proprietary)

WCAP-12472-P-A, Addendum 1-A, "BEACON Core Monitoring and Operations Support System," January 2000, (W Proprietary).

2) WCAP-13749-P-A, "Safety Evaluation Supporting the Conditional Exemption of the Most Negative EOL Moderator Temperature Coefficient," March 1997, (W Proprietary).

Figure 1. Moderator Temperature Coefficient Versus Power Level V.C. Summer – Cycle 22

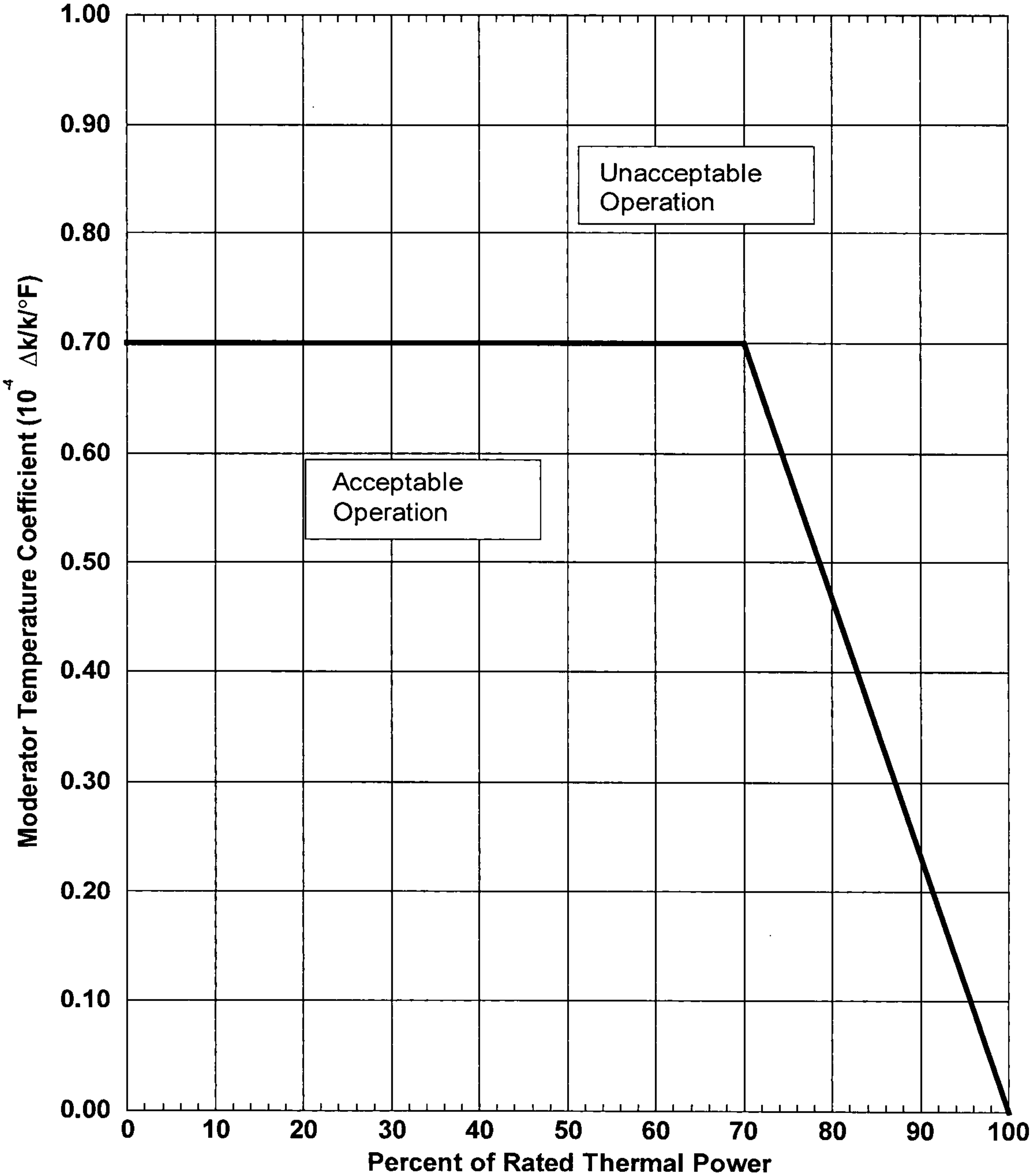


Figure 2. Rod Group Insertion Limits Versus Thermal Power for Three Loop Operation V. C. Summer - Cycle 22

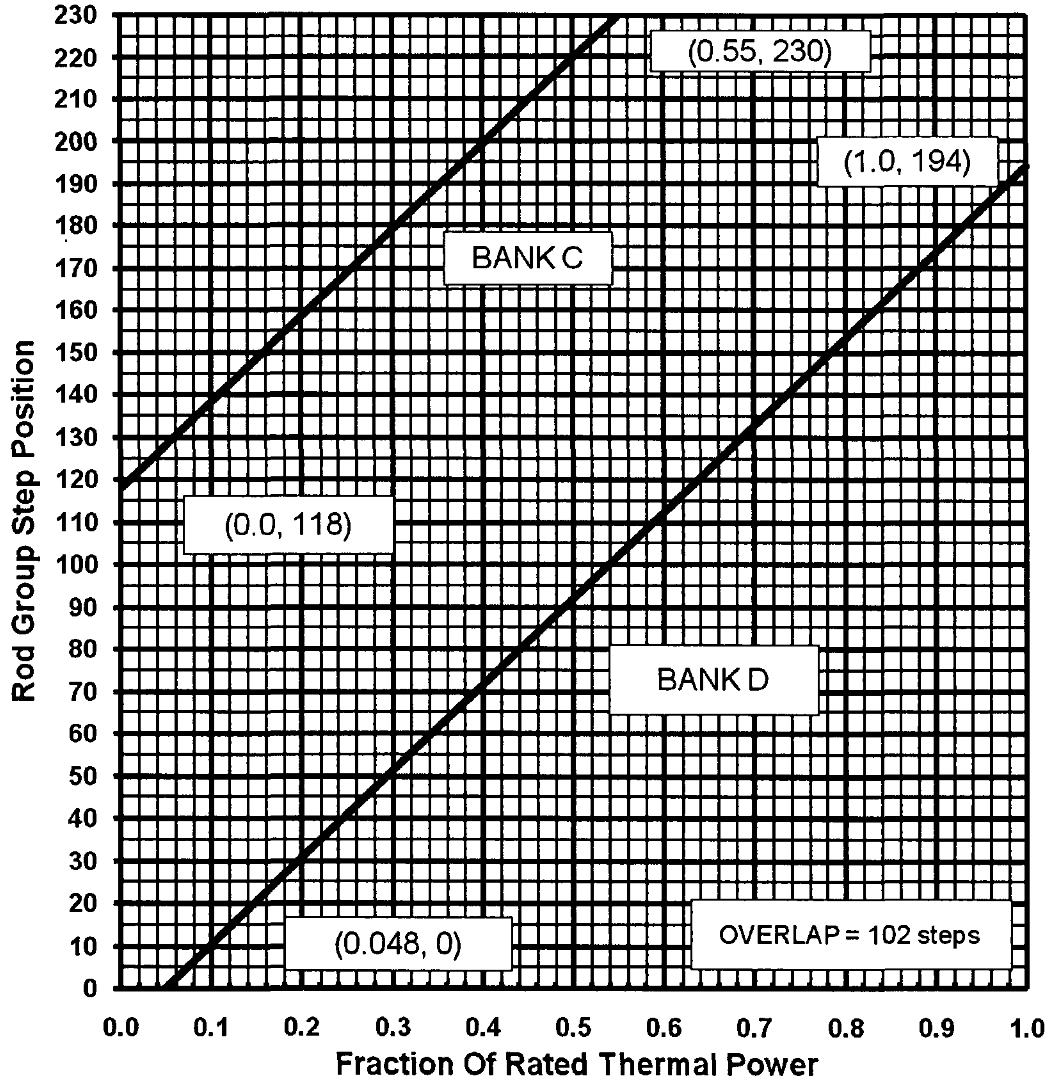


Figure 3. Axial Flux Difference Limits as a Function of Rated Thermal Power V. C. Summer – Cycle 22

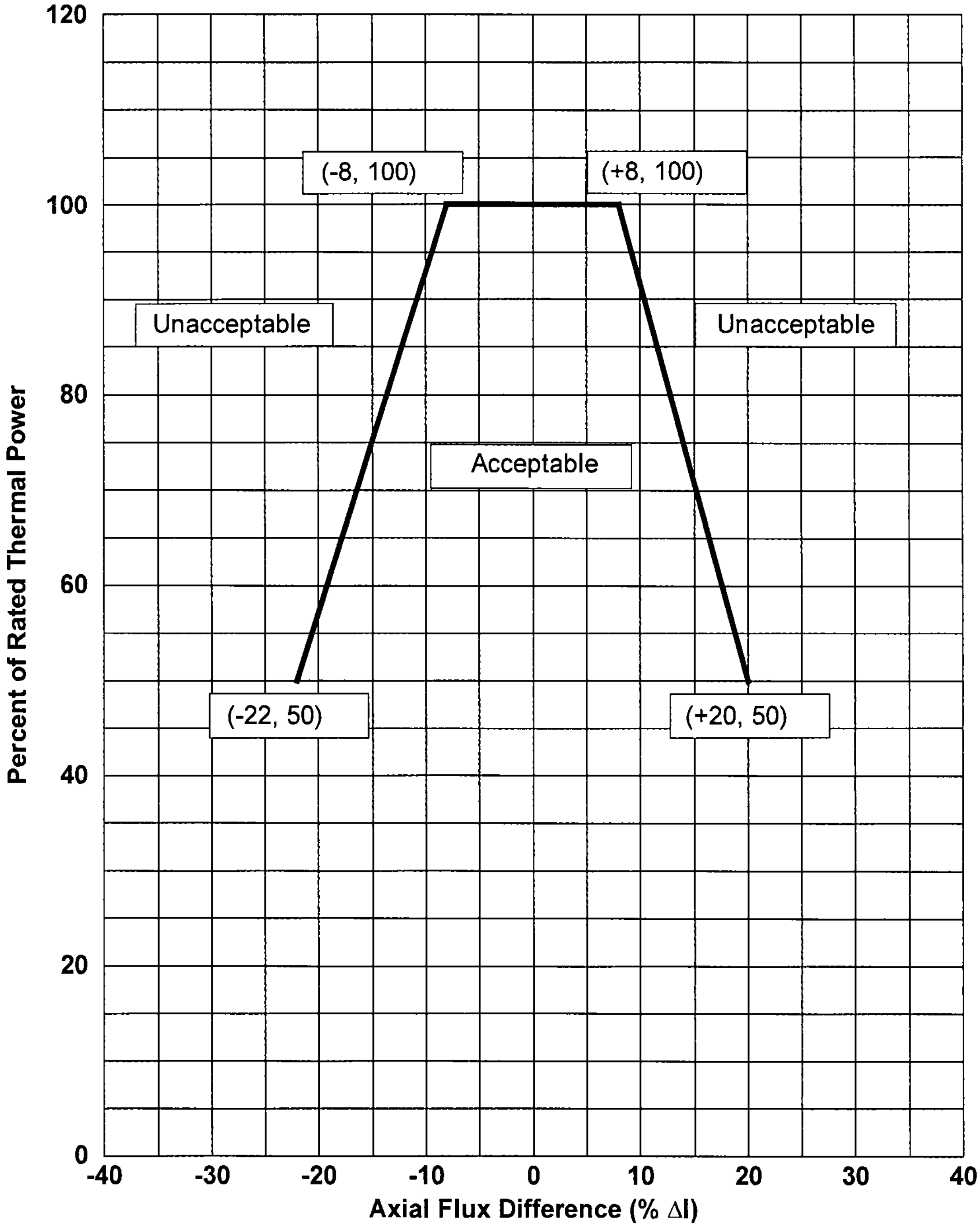


Figure 4. K(z) - Normalized $F_Q(z)$ as a Function of Core Height
V. C. Summer – Cycle 22

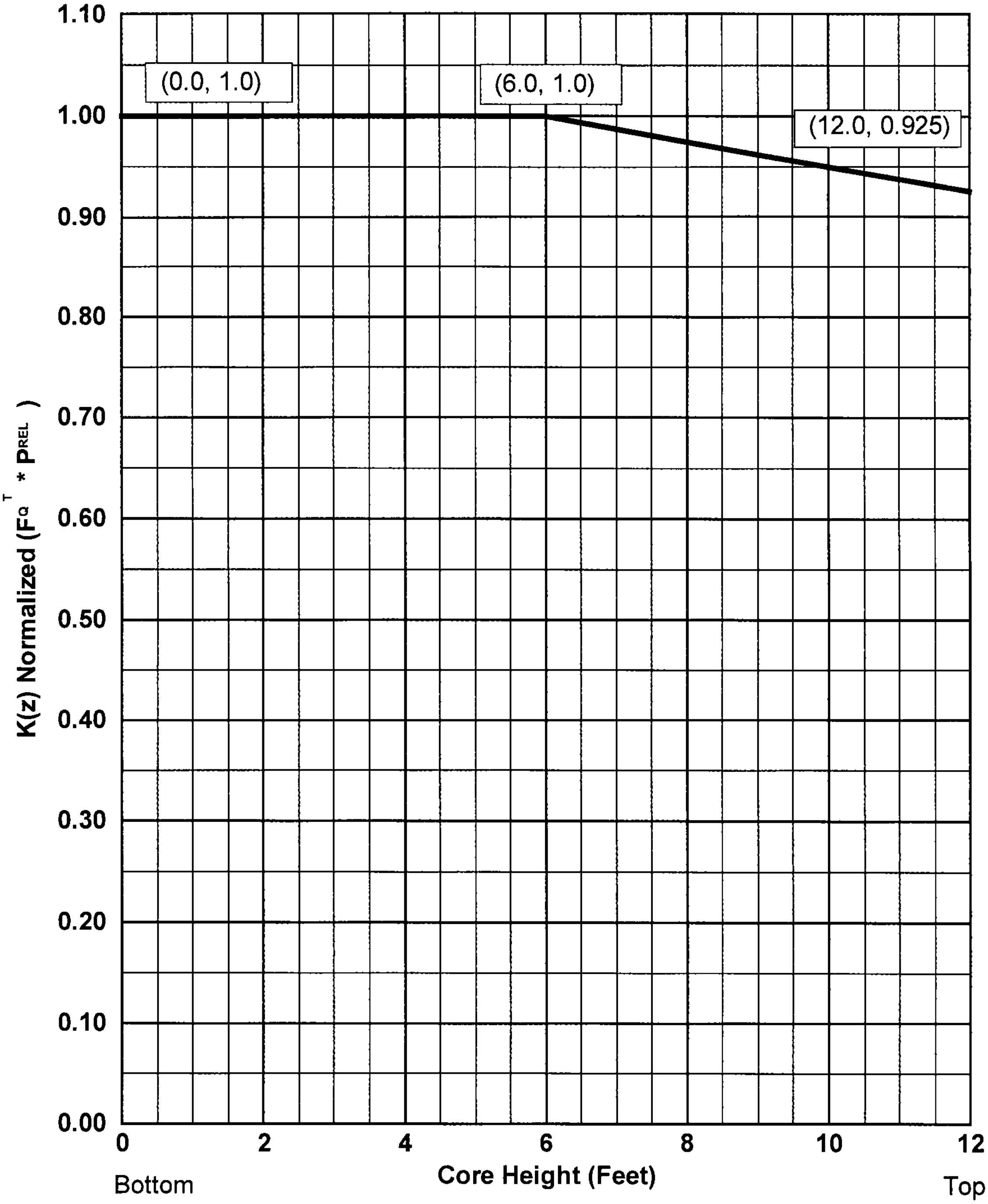


Table 1. RAOC W(z) at 150 MWD/MTU
V. C. Summer – Cycle 22

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.000	1.245	6.140	1.135
0.140	1.244	6.279	1.141
0.279	1.249	6.419	1.146
0.419	1.261	6.558	1.151
0.558	1.276	6.698	1.155
0.698	1.282	6.837	1.158
0.837	1.279	6.977	1.161
0.977	1.274	7.116	1.164
1.116	1.269	7.256	1.165
1.256	1.262	7.395	1.167
1.395	1.253	7.535	1.167
1.535	1.243	7.674	1.167
1.674	1.232	7.814	1.166
1.814	1.221	7.953	1.164
1.953	1.210	8.093	1.162
2.093	1.199	8.233	1.159
2.233	1.189	8.372	1.155
2.372	1.181	8.512	1.150
2.512	1.172	8.651	1.144
2.651	1.163	8.791	1.138
2.791	1.154	8.930	1.135
2.930	1.146	9.070	1.135
3.070	1.139	9.209	1.136
3.209	1.134	9.349	1.139
3.349	1.132	9.488	1.143
3.488	1.131	9.628	1.146
3.628	1.130	9.767	1.147
3.767	1.128	9.907	1.149
3.907	1.126	10.046	1.153
4.046	1.123	10.186	1.159
4.186	1.121	10.326	1.163
4.326	1.117	10.465	1.167
4.465	1.114	10.605	1.170
4.605	1.110	10.744	1.174
4.744	1.108	10.884	1.177
4.884	1.108	11.023	1.176
5.023	1.107	11.163	1.183
5.163	1.107	11.302	1.205
5.302	1.108	11.442	1.202
5.442	1.110	11.581	1.189
5.581	1.113	11.721	1.159
5.721	1.118	11.860	1.122
5.860	1.123	12.000	1.084
6.000	1.129		

Table 2. RAOC W(z) at 3000 MWD/MTU
V. C. Summer – Cycle 22

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.000	1.408	6.140	1.112
0.140	1.407	6.279	1.120
0.279	1.410	6.419	1.125
0.419	1.417	6.558	1.131
0.558	1.427	6.698	1.135
0.698	1.428	6.837	1.140
0.837	1.421	6.977	1.144
0.977	1.411	7.116	1.147
1.116	1.401	7.256	1.150
1.256	1.388	7.395	1.152
1.395	1.373	7.535	1.154
1.535	1.356	7.674	1.155
1.674	1.339	7.814	1.155
1.814	1.321	7.953	1.155
1.953	1.302	8.093	1.154
2.093	1.282	8.233	1.153
2.233	1.262	8.372	1.150
2.372	1.242	8.512	1.147
2.512	1.223	8.651	1.142
2.651	1.203	8.791	1.138
2.791	1.182	8.930	1.139
2.930	1.165	9.070	1.146
3.070	1.154	9.209	1.153
3.209	1.148	9.349	1.159
3.349	1.145	9.488	1.164
3.488	1.143	9.628	1.169
3.628	1.142	9.767	1.171
3.767	1.140	9.907	1.173
3.907	1.138	10.046	1.176
4.046	1.136	10.186	1.181
4.186	1.134	10.326	1.188
4.326	1.131	10.465	1.195
4.465	1.129	10.605	1.200
4.605	1.127	10.744	1.205
4.744	1.124	10.884	1.209
4.884	1.122	11.023	1.211
5.023	1.119	11.163	1.213
5.163	1.115	11.302	1.212
5.302	1.112	11.442	1.209
5.442	1.108	11.581	1.196
5.581	1.104	11.721	1.179
5.721	1.100	11.860	1.160
5.860	1.100	12.000	1.137
6.000	1.105		

Table 3. RAOC W(z) at 5000 MWD/MTU
V. C. Summer – Cycle 22

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.000	1.330	6.140	1.111
0.140	1.328	6.279	1.118
0.279	1.331	6.419	1.125
0.419	1.339	6.558	1.132
0.558	1.349	6.698	1.138
0.698	1.350	6.837	1.144
0.837	1.344	6.977	1.149
0.977	1.335	7.116	1.153
1.116	1.327	7.256	1.157
1.256	1.315	7.395	1.161
1.395	1.302	7.535	1.163
1.535	1.288	7.674	1.165
1.674	1.272	7.814	1.167
1.814	1.256	7.953	1.167
1.953	1.239	8.093	1.168
2.093	1.222	8.233	1.167
2.233	1.205	8.372	1.166
2.372	1.188	8.512	1.163
2.512	1.169	8.651	1.159
2.651	1.153	8.791	1.158
2.791	1.143	8.930	1.158
2.930	1.134	9.070	1.165
3.070	1.125	9.209	1.174
3.209	1.119	9.349	1.183
3.349	1.116	9.488	1.192
3.488	1.115	9.628	1.200
3.628	1.114	9.767	1.208
3.767	1.113	9.907	1.214
3.907	1.110	10.046	1.219
4.046	1.108	10.186	1.222
4.186	1.105	10.326	1.223
4.326	1.102	10.465	1.225
4.465	1.099	10.605	1.231
4.605	1.096	10.744	1.237
4.744	1.093	10.884	1.241
4.884	1.090	11.023	1.244
5.023	1.087	11.163	1.246
5.163	1.087	11.302	1.246
5.302	1.087	11.442	1.243
5.442	1.088	11.581	1.231
5.581	1.089	11.721	1.215
5.721	1.092	11.860	1.196
5.860	1.096	12.000	1.172
6.000	1.103		

Table 4. RAOC W(z) at 8000 MWD/MTU
V. C. Summer – Cycle 22

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.000	1.245	6.140	1.113
0.140	1.243	6.279	1.122
0.279	1.247	6.419	1.131
0.419	1.254	6.558	1.139
0.558	1.265	6.698	1.148
0.698	1.268	6.837	1.156
0.837	1.263	6.977	1.164
0.977	1.257	7.116	1.171
1.116	1.250	7.256	1.177
1.256	1.241	7.395	1.183
1.395	1.230	7.535	1.188
1.535	1.218	7.674	1.193
1.674	1.206	7.814	1.197
1.814	1.192	7.953	1.200
1.953	1.178	8.093	1.202
2.093	1.164	8.233	1.203
2.233	1.149	8.372	1.204
2.372	1.135	8.512	1.203
2.512	1.122	8.651	1.203
2.651	1.112	8.791	1.201
2.791	1.104	8.930	1.197
2.930	1.098	9.070	1.192
3.070	1.092	9.209	1.190
3.209	1.088	9.349	1.194
3.349	1.086	9.488	1.201
3.488	1.086	9.628	1.211
3.628	1.086	9.767	1.221
3.767	1.085	9.907	1.230
3.907	1.084	10.046	1.238
4.046	1.082	10.186	1.246
4.186	1.080	10.326	1.254
4.326	1.079	10.465	1.260
4.465	1.079	10.605	1.266
4.605	1.081	10.744	1.271
4.744	1.082	10.884	1.274
4.884	1.084	11.023	1.276
5.023	1.085	11.163	1.277
5.163	1.086	11.302	1.276
5.302	1.087	11.442	1.273
5.442	1.088	11.581	1.260
5.581	1.090	11.721	1.243
5.721	1.092	11.860	1.223
5.860	1.097	12.000	1.198
6.000	1.104		

Table 5. RAOC W(z) at 10000 MWD/MTU
V. C. Summer – Cycle 22

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.000	1.255	6.140	1.125
0.140	1.253	6.279	1.135
0.279	1.257	6.419	1.143
0.419	1.265	6.558	1.152
0.558	1.276	6.698	1.159
0.698	1.278	6.837	1.166
0.837	1.274	6.977	1.173
0.977	1.268	7.116	1.179
1.116	1.261	7.256	1.184
1.256	1.252	7.395	1.188
1.395	1.241	7.535	1.192
1.535	1.228	7.674	1.194
1.674	1.215	7.814	1.196
1.814	1.201	7.953	1.198
1.953	1.187	8.093	1.198
2.093	1.172	8.233	1.198
2.233	1.157	8.372	1.197
2.372	1.142	8.512	1.194
2.512	1.127	8.651	1.189
2.651	1.112	8.791	1.185
2.791	1.097	8.930	1.185
2.930	1.084	9.070	1.190
3.070	1.076	9.209	1.197
3.209	1.071	9.349	1.204
3.349	1.071	9.488	1.210
3.488	1.070	9.628	1.216
3.628	1.070	9.767	1.221
3.767	1.069	9.907	1.225
3.907	1.068	10.046	1.229
4.046	1.069	10.186	1.235
4.186	1.070	10.326	1.242
4.326	1.070	10.465	1.249
4.465	1.073	10.605	1.255
4.605	1.075	10.744	1.260
4.744	1.078	10.884	1.264
4.884	1.081	11.023	1.266
5.023	1.083	11.163	1.267
5.163	1.085	11.302	1.266
5.302	1.087	11.442	1.263
5.442	1.089	11.581	1.250
5.581	1.093	11.721	1.233
5.721	1.098	11.860	1.213
5.860	1.106	12.000	1.189
6.000	1.115		

Table 6. RAOC W(z) at 14000 MWD/MTU
V. C. Summer – Cycle 22

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.000	1.189	6.140	1.151
0.140	1.188	6.279	1.153
0.279	1.192	6.419	1.162
0.419	1.202	6.558	1.171
0.558	1.215	6.698	1.180
0.698	1.220	6.837	1.188
0.837	1.218	6.977	1.194
0.977	1.215	7.116	1.200
1.116	1.210	7.256	1.205
1.256	1.203	7.395	1.209
1.395	1.194	7.535	1.213
1.535	1.185	7.674	1.215
1.674	1.175	7.814	1.217
1.814	1.164	7.953	1.218
1.953	1.153	8.093	1.217
2.093	1.141	8.233	1.216
2.233	1.129	8.372	1.214
2.372	1.117	8.512	1.211
2.512	1.107	8.651	1.208
2.651	1.099	8.791	1.204
2.791	1.092	8.930	1.204
2.930	1.087	9.070	1.207
3.070	1.083	9.209	1.210
3.209	1.080	9.349	1.211
3.349	1.082	9.488	1.211
3.488	1.083	9.628	1.210
3.628	1.084	9.767	1.210
3.767	1.085	9.907	1.212
3.907	1.087	10.046	1.216
4.046	1.091	10.186	1.221
4.186	1.098	10.326	1.225
4.326	1.106	10.465	1.228
4.465	1.113	10.605	1.230
4.605	1.118	10.744	1.230
4.744	1.124	10.884	1.228
4.884	1.129	11.023	1.228
5.023	1.133	11.163	1.225
5.163	1.138	11.302	1.236
5.302	1.141	11.442	1.220
5.442	1.144	11.581	1.203
5.581	1.147	11.721	1.186
5.721	1.149	11.860	1.165
5.860	1.150	12.000	1.141
6.000	1.151		

Table 7. RAOC W(z) at 20000 MWD/MTU
V. C. Summer – Cycle 22

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.000	1.144	6.140	1.203
0.140	1.142	6.279	1.213
0.279	1.146	6.419	1.223
0.419	1.157	6.558	1.231
0.558	1.172	6.698	1.238
0.698	1.179	6.837	1.244
0.837	1.179	6.977	1.249
0.977	1.178	7.116	1.253
1.116	1.174	7.256	1.256
1.256	1.169	7.395	1.258
1.395	1.162	7.535	1.258
1.535	1.154	7.674	1.258
1.674	1.146	7.814	1.256
1.814	1.137	7.953	1.253
1.953	1.128	8.093	1.249
2.093	1.119	8.233	1.244
2.233	1.109	8.372	1.238
2.372	1.099	8.512	1.231
2.512	1.089	8.651	1.225
2.651	1.080	8.791	1.218
2.791	1.073	8.930	1.209
2.930	1.067	9.070	1.198
3.070	1.061	9.209	1.193
3.209	1.060	9.349	1.196
3.349	1.064	9.488	1.201
3.488	1.071	9.628	1.209
3.628	1.079	9.767	1.216
3.767	1.087	9.907	1.223
3.907	1.095	10.046	1.229
4.046	1.102	10.186	1.234
4.186	1.110	10.326	1.239
4.326	1.117	10.465	1.244
4.465	1.124	10.605	1.247
4.605	1.130	10.744	1.250
4.744	1.136	10.884	1.252
4.884	1.141	11.023	1.252
5.023	1.146	11.163	1.251
5.163	1.150	11.302	1.248
5.302	1.153	11.442	1.241
5.442	1.156	11.581	1.224
5.581	1.163	11.721	1.204
5.721	1.171	11.860	1.182
5.860	1.181	12.000	1.157
6.000	1.192		

Table 8. RAOC FQ Margin Decreases in Excess of 2% Per 31 EFPD – Cycle 22

Cycle Burnup (MWD/MTU)	Maximum Decrease in FQ Margin
665	1.0200
6155	1.0200
6326	1.0200
6498	1.0200
6669	1.0200
6841	1.0200
7012	1.0200
7184	1.0200
7356	1.0200
7527	1.0200
7699	1.0200
7870	1.0200
8042	1.0200
8213	1.0222
8385	1.0270
8556	1.0306
8728	1.0302
8900	1.0287
9071	1.0269
9243	1.0248
9414	1.0224
9586	1.0200
9757	1.0200
9929	1.0200

Note: All cycle burnups outside the range of this table shall use a 1.020 decrease in margin for compliance with Specification 4.2.2.2e. Linear interpolation is adequate for intermediate cycle burnups.

Table 9. BASELOAD W(z) at 150 MWD/MTU
V. C. Summer – Cycle 22

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.000	1.113	6.140	1.063
0.140	1.114	6.279	1.061
0.279	1.115	6.419	1.059
0.419	1.116	6.558	1.057
0.558	1.118	6.698	1.055
0.698	1.118	6.837	1.054
0.837	1.118	6.977	1.054
0.977	1.118	7.116	1.055
1.116	1.117	7.256	1.058
1.256	1.117	7.395	1.060
1.395	1.116	7.535	1.062
1.535	1.114	7.674	1.063
1.674	1.113	7.814	1.065
1.814	1.112	7.953	1.067
1.953	1.110	8.093	1.068
2.093	1.108	8.233	1.070
2.233	1.106	8.372	1.071
2.372	1.104	8.512	1.073
2.512	1.102	8.651	1.074
2.651	1.099	8.791	1.075
2.791	1.096	8.930	1.076
2.930	1.094	9.070	1.077
3.070	1.091	9.209	1.078
3.209	1.088	9.349	1.080
3.349	1.085	9.488	1.080
3.488	1.083	9.628	1.081
3.628	1.082	9.767	1.082
3.767	1.080	9.907	1.083
3.907	1.079	10.046	1.084
4.046	1.078	10.186	1.085
4.186	1.077	10.326	1.085
4.326	1.076	10.465	1.086
4.465	1.076	10.605	1.087
4.605	1.075	10.744	1.088
4.744	1.074	10.884	1.088
4.884	1.074	11.023	1.089
5.023	1.073	11.163	1.089
5.163	1.072	11.302	1.090
5.302	1.071	11.442	1.090
5.442	1.070	11.581	1.090
5.581	1.069	11.721	1.089
5.721	1.067	11.860	1.089
5.860	1.066	12.000	1.089
6.000	1.064		

Table 10. BASELOAD W(z) at 3000 MWD/MTU
V. C. Summer – Cycle 22

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.000	1.098	6.140	1.058
0.140	1.097	6.279	1.057
0.279	1.098	6.419	1.056
0.419	1.099	6.558	1.054
0.558	1.101	6.698	1.052
0.698	1.102	6.837	1.050
0.837	1.103	6.977	1.048
0.977	1.103	7.116	1.049
1.116	1.103	7.256	1.049
1.256	1.104	7.395	1.050
1.395	1.104	7.535	1.052
1.535	1.103	7.674	1.054
1.674	1.103	7.814	1.056
1.814	1.103	7.953	1.058
1.953	1.102	8.093	1.060
2.093	1.102	8.233	1.062
2.233	1.101	8.372	1.064
2.372	1.100	8.512	1.066
2.512	1.099	8.651	1.067
2.651	1.097	8.791	1.069
2.791	1.096	8.930	1.071
2.930	1.095	9.070	1.072
3.070	1.093	9.209	1.074
3.209	1.091	9.349	1.075
3.349	1.089	9.488	1.077
3.488	1.087	9.628	1.078
3.628	1.085	9.767	1.080
3.767	1.084	9.907	1.081
3.907	1.082	10.046	1.082
4.046	1.081	10.186	1.083
4.186	1.080	10.326	1.084
4.326	1.078	10.465	1.086
4.465	1.077	10.605	1.087
4.605	1.076	10.744	1.088
4.744	1.074	10.884	1.089
4.884	1.073	11.023	1.090
5.023	1.071	11.163	1.090
5.163	1.069	11.302	1.091
5.302	1.067	11.442	1.092
5.442	1.065	11.581	1.092
5.581	1.064	11.721	1.092
5.721	1.062	11.860	1.092
5.860	1.061	12.000	1.092
6.000	1.060		

Table 11. BASELOAD W(z) at 5000 MWD/MTU
V. C. Summer – Cycle 22

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.000	1.097	6.140	1.057
0.140	1.097	6.279	1.056
0.279	1.097	6.419	1.055
0.419	1.099	6.558	1.053
0.558	1.100	6.698	1.051
0.698	1.102	6.837	1.048
0.837	1.102	6.977	1.047
0.977	1.102	7.116	1.047
1.116	1.103	7.256	1.049
1.256	1.103	7.395	1.051
1.395	1.103	7.535	1.053
1.535	1.103	7.674	1.055
1.674	1.103	7.814	1.057
1.814	1.102	7.953	1.059
1.953	1.102	8.093	1.061
2.093	1.101	8.233	1.063
2.233	1.100	8.372	1.064
2.372	1.099	8.512	1.066
2.512	1.098	8.651	1.068
2.651	1.097	8.791	1.069
2.791	1.096	8.930	1.071
2.930	1.094	9.070	1.073
3.070	1.093	9.209	1.074
3.209	1.091	9.349	1.075
3.349	1.089	9.488	1.077
3.488	1.087	9.628	1.078
3.628	1.085	9.767	1.079
3.767	1.083	9.907	1.081
3.907	1.082	10.046	1.082
4.046	1.080	10.186	1.083
4.186	1.079	10.326	1.084
4.326	1.078	10.465	1.085
4.465	1.076	10.605	1.086
4.605	1.075	10.744	1.088
4.744	1.073	10.884	1.089
4.884	1.072	11.023	1.089
5.023	1.070	11.163	1.090
5.163	1.068	11.302	1.091
5.302	1.066	11.442	1.092
5.442	1.064	11.581	1.092
5.581	1.063	11.721	1.091
5.721	1.061	11.860	1.092
5.860	1.060	12.000	1.092
6.000	1.059		

Table 12. BASELOAD W(z) at 8000 MWD/MTU
V. C. Summer – Cycle 22

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.000	1.103	6.140	1.059
0.140	1.104	6.279	1.057
0.279	1.105	6.419	1.055
0.419	1.107	6.558	1.053
0.558	1.108	6.698	1.051
0.698	1.109	6.837	1.051
0.837	1.110	6.977	1.051
0.977	1.110	7.116	1.052
1.116	1.110	7.256	1.054
1.256	1.110	7.395	1.057
1.395	1.110	7.535	1.058
1.535	1.109	7.674	1.060
1.674	1.109	7.814	1.062
1.814	1.108	7.953	1.064
1.953	1.107	8.093	1.065
2.093	1.106	8.233	1.067
2.233	1.105	8.372	1.068
2.372	1.103	8.512	1.070
2.512	1.102	8.651	1.071
2.651	1.100	8.791	1.072
2.791	1.098	8.930	1.074
2.930	1.096	9.070	1.075
3.070	1.093	9.209	1.076
3.209	1.091	9.349	1.077
3.349	1.088	9.488	1.078
3.488	1.086	9.628	1.079
3.628	1.084	9.767	1.080
3.767	1.082	9.907	1.081
3.907	1.080	10.046	1.082
4.046	1.079	10.186	1.083
4.186	1.077	10.326	1.084
4.326	1.075	10.465	1.085
4.465	1.074	10.605	1.086
4.605	1.073	10.744	1.087
4.744	1.072	10.884	1.088
4.884	1.071	11.023	1.089
5.023	1.070	11.163	1.089
5.163	1.069	11.302	1.090
5.302	1.068	11.442	1.090
5.442	1.067	11.581	1.090
5.581	1.065	11.721	1.090
5.721	1.064	11.860	1.090
5.860	1.062	12.000	1.091
6.000	1.061		

Table 13. BASELOAD W(z) at 10000 MWD/MTU
V. C. Summer – Cycle 22

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.000	1.110	6.140	1.059
0.140	1.111	6.279	1.056
0.279	1.112	6.419	1.053
0.419	1.113	6.558	1.051
0.558	1.115	6.698	1.051
0.698	1.116	6.837	1.053
0.837	1.116	6.977	1.055
0.977	1.116	7.116	1.057
1.116	1.116	7.256	1.059
1.256	1.116	7.395	1.061
1.395	1.115	7.535	1.062
1.535	1.115	7.674	1.064
1.674	1.114	7.814	1.066
1.814	1.113	7.953	1.067
1.953	1.111	8.093	1.068
2.093	1.110	8.233	1.070
2.233	1.108	8.372	1.071
2.372	1.106	8.512	1.072
2.512	1.104	8.651	1.073
2.651	1.102	8.791	1.074
2.791	1.099	8.930	1.075
2.930	1.096	9.070	1.076
3.070	1.094	9.209	1.077
3.209	1.091	9.349	1.078
3.349	1.087	9.488	1.079
3.488	1.085	9.628	1.080
3.628	1.082	9.767	1.080
3.767	1.081	9.907	1.081
3.907	1.080	10.046	1.082
4.046	1.079	10.186	1.083
4.186	1.078	10.326	1.084
4.326	1.077	10.465	1.084
4.465	1.076	10.605	1.085
4.605	1.075	10.744	1.086
4.744	1.074	10.884	1.086
4.884	1.073	11.023	1.087
5.023	1.072	11.163	1.088
5.163	1.071	11.302	1.088
5.302	1.069	11.442	1.089
5.442	1.068	11.581	1.089
5.581	1.066	11.721	1.089
5.721	1.064	11.860	1.089
5.860	1.062	12.000	1.089
6.000	1.061		

**Table 14. BASELOAD W(z) at 14000 MWD/MTU
V. C. Summer – Cycle 22**

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.000	1.123	6.140	1.059
0.140	1.124	6.279	1.058
0.279	1.125	6.419	1.059
0.419	1.126	6.558	1.059
0.558	1.127	6.698	1.060
0.698	1.128	6.837	1.063
0.837	1.128	6.977	1.065
0.977	1.128	7.116	1.066
1.116	1.128	7.256	1.068
1.256	1.127	7.395	1.069
1.395	1.126	7.535	1.071
1.535	1.125	7.674	1.072
1.674	1.123	7.814	1.073
1.814	1.121	7.953	1.074
1.953	1.119	8.093	1.075
2.093	1.117	8.233	1.076
2.233	1.114	8.372	1.077
2.372	1.111	8.512	1.077
2.512	1.108	8.651	1.077
2.651	1.105	8.791	1.078
2.791	1.101	8.930	1.079
2.930	1.097	9.070	1.082
3.070	1.093	9.209	1.085
3.209	1.089	9.349	1.088
3.349	1.086	9.488	1.090
3.488	1.083	9.628	1.092
3.628	1.080	9.767	1.095
3.767	1.079	9.907	1.097
3.907	1.077	10.046	1.098
4.046	1.076	10.186	1.100
4.186	1.076	10.326	1.101
4.326	1.075	10.465	1.103
4.465	1.074	10.605	1.104
4.605	1.073	10.744	1.104
4.744	1.072	10.884	1.105
4.884	1.071	11.023	1.105
5.023	1.070	11.163	1.106
5.163	1.069	11.302	1.106
5.302	1.068	11.442	1.105
5.442	1.067	11.581	1.104
5.581	1.066	11.721	1.103
5.721	1.064	11.860	1.102
5.860	1.063	12.000	1.102
6.000	1.061		

Table 15. BASELOAD W(z) at 20000 MWD/MTU
V. C. Summer – Cycle 22

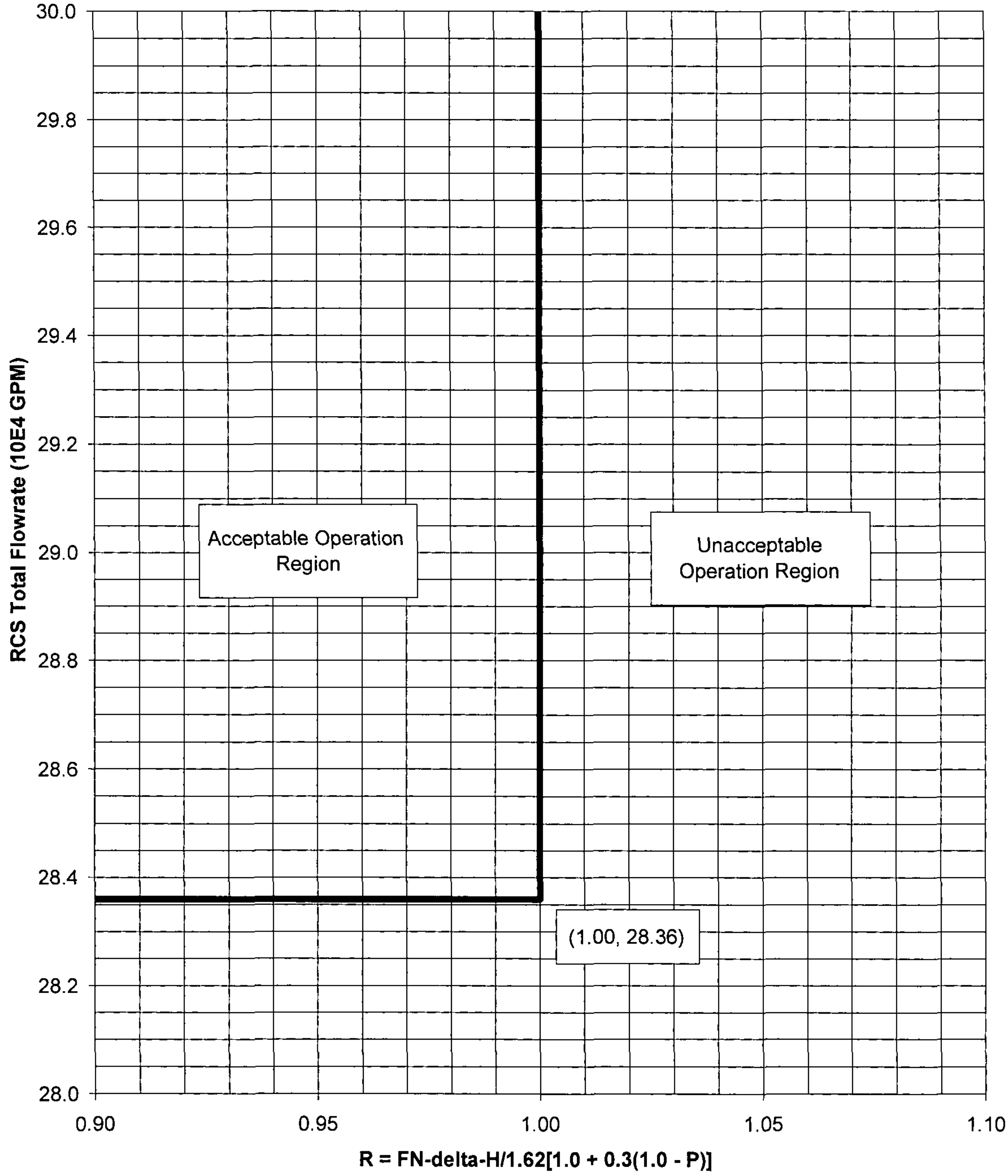
Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.000	1.151	6.140	1.068
0.140	1.151	6.279	1.071
0.279	1.152	6.419	1.073
0.419	1.153	6.558	1.074
0.558	1.154	6.698	1.076
0.698	1.154	6.837	1.077
0.837	1.154	6.977	1.078
0.977	1.153	7.116	1.079
1.116	1.151	7.256	1.080
1.256	1.149	7.395	1.081
1.395	1.147	7.535	1.081
1.535	1.144	7.674	1.081
1.674	1.141	7.814	1.081
1.814	1.138	7.953	1.082
1.953	1.134	8.093	1.081
2.093	1.129	8.233	1.081
2.233	1.125	8.372	1.081
2.372	1.120	8.512	1.080
2.512	1.114	8.651	1.082
2.651	1.109	8.791	1.084
2.791	1.103	8.930	1.087
2.930	1.097	9.070	1.091
3.070	1.091	9.209	1.095
3.209	1.085	9.349	1.098
3.349	1.082	9.488	1.102
3.488	1.081	9.628	1.105
3.628	1.080	9.767	1.108
3.767	1.078	9.907	1.110
3.907	1.077	10.046	1.113
4.046	1.075	10.186	1.115
4.186	1.074	10.326	1.116
4.326	1.072	10.465	1.118
4.465	1.072	10.605	1.119
4.605	1.071	10.744	1.120
4.744	1.071	10.884	1.121
4.884	1.070	11.023	1.121
5.023	1.069	11.163	1.121
5.163	1.069	11.302	1.121
5.302	1.068	11.442	1.121
5.442	1.066	11.581	1.119
5.581	1.065	11.721	1.118
5.721	1.063	11.860	1.117
5.860	1.063	12.000	1.116
6.000	1.065		

Table 16. BASE LOAD FQ Margin Decreases in Excess of 2% Per 31 EFPD – Cycle 22

Cycle Burnup (MWD/MTU)	Maximum Decrease in FQ Margin
1352	1.0200
1523	1.0200
1695	1.0243
1867	1.0286
2038	1.0321
2210	1.0347
2382	1.0333
2553	1.0317
2725	1.0301
2896	1.0286
3068	1.0273
3240	1.0262
3411	1.0255
3583	1.0250
3755	1.0248
3926	1.0249
4098	1.0253
4270	1.0254
4441	1.0254
4613	1.0252
4785	1.0245
4956	1.0234
5128	1.022
5300	1.0205
5471	1.0200

Note: All cycle burnups outside the range of this table shall use a 1.020 decrease in margin for compliance with Specification 4.2.2.4e. Linear interpolation is adequate for intermediate cycle burnups.

Figure 5. RCS Total Flowrate vs. R for Three Loop Operation
V. C. Summer – Cycle 22



Measurement Uncertainty of 2.1% for Flow (includes 0.1% for feedwater venturi fouling) is included in this figure.