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SCE&G®
A SCANA COMPANY

November 14, 2003

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

Gentlemen:

Subject: VIRGIL C. SUMMER NUCLEAR STATION
DOCKET NO. 50-395
OPERATING LICENSE NO. NPF-12
CORE OPERATING LIMITS REPORT (COLR)
FOR CYCLE 15

In accordance with Section 6.9.1.11 of the Virgil C. Summer Nuclear Station Technical Specifications, South Carolina Electric & Gas Company (SCE&G) hereby submits the Cycle 15 Core Operating Limits Report (COLR).

Should you have any questions, please call Mr. Jeffrey W. Pease at (803) 345-4124.

Very truly yours,

Stephen A. Byrne

JWP/SAB
Attachment

NOTE: Attachment is on file in NL&OE

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SOUTH CAROLINA ELECTRIC & GAS COMPANY

VIRGIL C. SUMMER NUCLEAR STATION

CORE OPERATING LIMITS REPORT
FOR
CYCLE 15

REVISION 0

OCTOBER 2003

LIST OF EFFECTIVE PAGES

PAGE	REVISION
i	0
ii	0
iii	0
iv	0
v	0
1	0
2	0
3	0
4	0
5	0
6	0
7	0
8	0
9	0
10	0
11	0
12	0
13	0
14	0
15	0
16	0
17	0
18	0
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21	0
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26	0
27	0
28	0
29	0
30	0
31	0
32	0
33	0
34	0
35	0
36	0
37	0
38	0
39	0
40	0
41	0
42	0
43	0
44	0

Table of Contents

List of Tables

List of Tables

List of Figures

List of Figures

1.0 Core Operating Limits Report

This Core Operating Limits Report (COLR) for V. C. Summer Station Cycle 15 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
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 -5×10^{-4} Δk/k/°F.

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

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

2.2 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):

The Control Bank Insertion Limits are specified by Figure 2.

2.4 Axial Flux Difference (Specification 3.2.1):

2.4.1 The Axial Flux Difference (AFD) Limits for RAOC operation for Cycle 15 are shown in Figure 3.

2.4.2 The Axial Flux Difference (AFD) target band during base load operations for Cycle 15 is:
BOL - EOL (0 – 22,800 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 $F_Q^{RTP} = 2.40$

2.5.2 K(z) is provided in Figure 4.

2.5.3 Elevation dependent W(z) values for RAOC operation at 150, 3000, 10000, and 20000 MWD/MTU are shown in Figures 5 through 8 and Tables 1 through 4, 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 at all burnups to increase $F_Q^M(z)$ as per Surveillance Requirement 4.2.2.2e.

2.5.4 Elevation dependent $W(z)_{BL}$ values for base load 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, 1300, 3000, 4700, 10000, and 20000 MWD/MTU are shown in Figures 9 through 14 and Tables 5 through 10, 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 11 shows F_Q 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 Requirement 4.2.2.4e. A 2% penalty factor shall be used at all burnups that are outside the range of Table 11.

2.5.5 Elevation dependent $W(z)_{BL}$ values to be used in the event that an axial offset deviation (AOD) condition exists (as defined by measured axial offset more negative than predicted by 3% or more at beginning of cycle) are shown in Figures 15 through 20 and Tables 12 through 17, respectively. These values apply to base load 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, 1300, 3000, 4700, 10000, and 20000 MWD/MTU. 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. A 2% penalty factor shall be used at all burnups to increase $F_Q^M(z)$ as per Surveillance Requirement 4.2.2.2e.

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

$$R = \frac{F^N_{\Delta H}}{F^{RTP}_{\Delta H} \times \left(1 + PF^N_{\Delta H} \times (1 - P)\right)} \qquad \text{where: } P = \frac{\text{Thermal Power}}{\text{Rated Thermal Power}}$$

2.6.1 $F^{RTP}_{\Delta H} = 1.62$

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 21.

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.

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 power peaking factor as defined in equation (5-19) in Reference 1.

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-12473-A (Non-Proprietary), "BEACON Core Monitoring and Operations Support System," August, 1994.

Figure 1. Moderator Temperature Coefficient Versus Power Level
V.C. Summer - Cycle 15

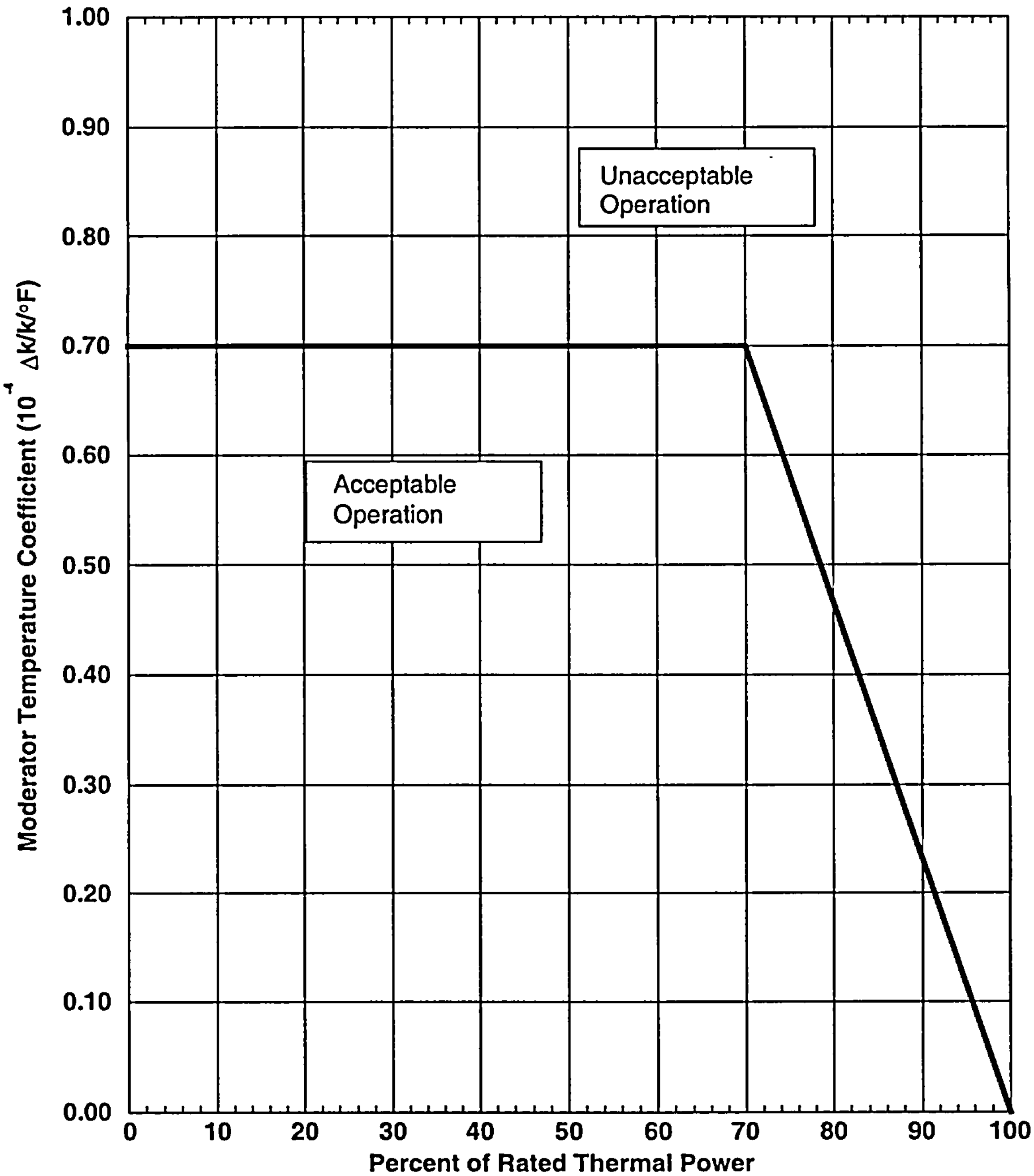


Figure 2. Rod Group Insertion Limits Versus Thermal Power for Three Loop Operation
V. C. Summer - Cycle 15

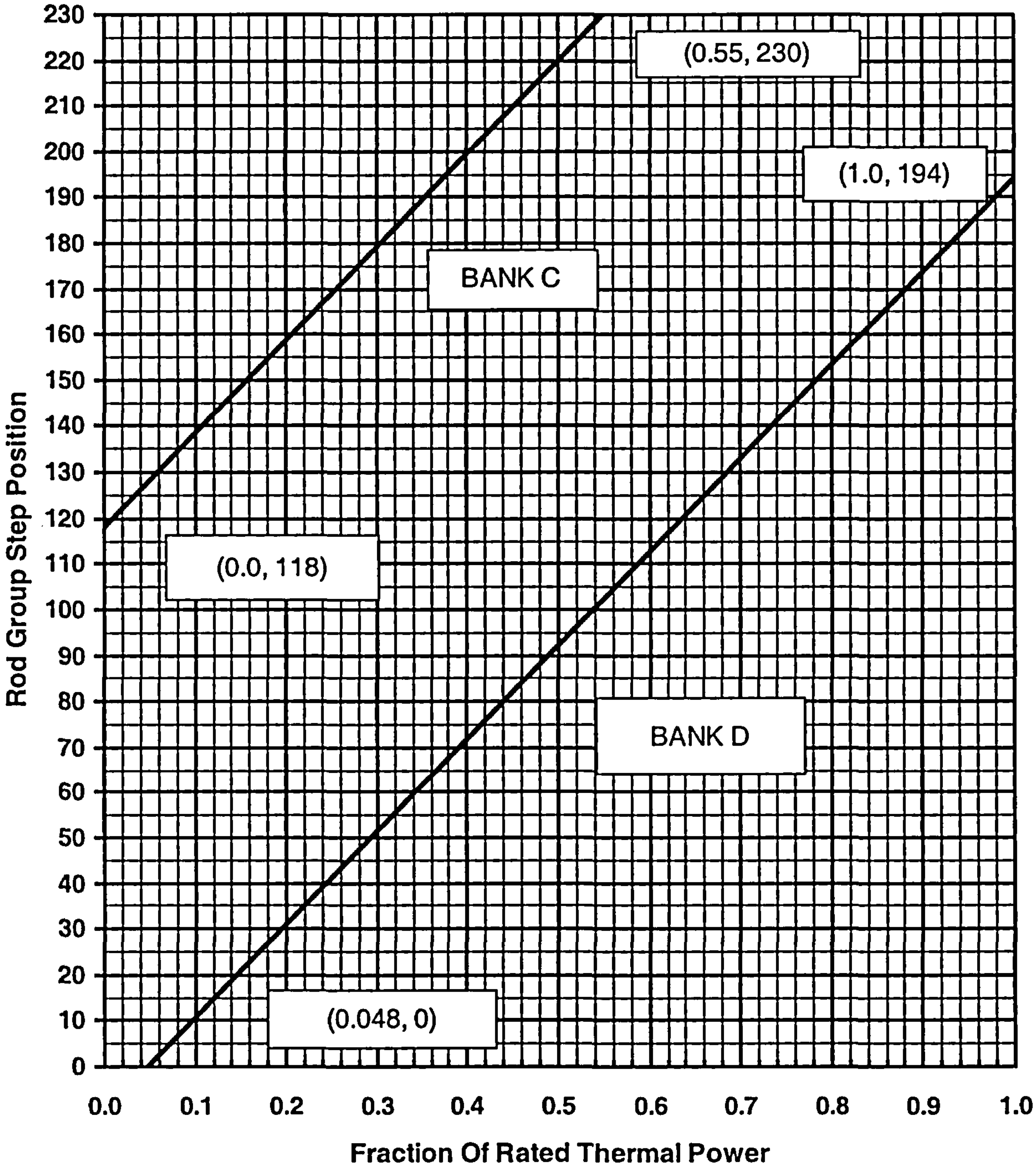


Figure 3. Axial Flux Difference Limits as a Function of Rated Thermal Power
V. C. Summer - Cycle 15

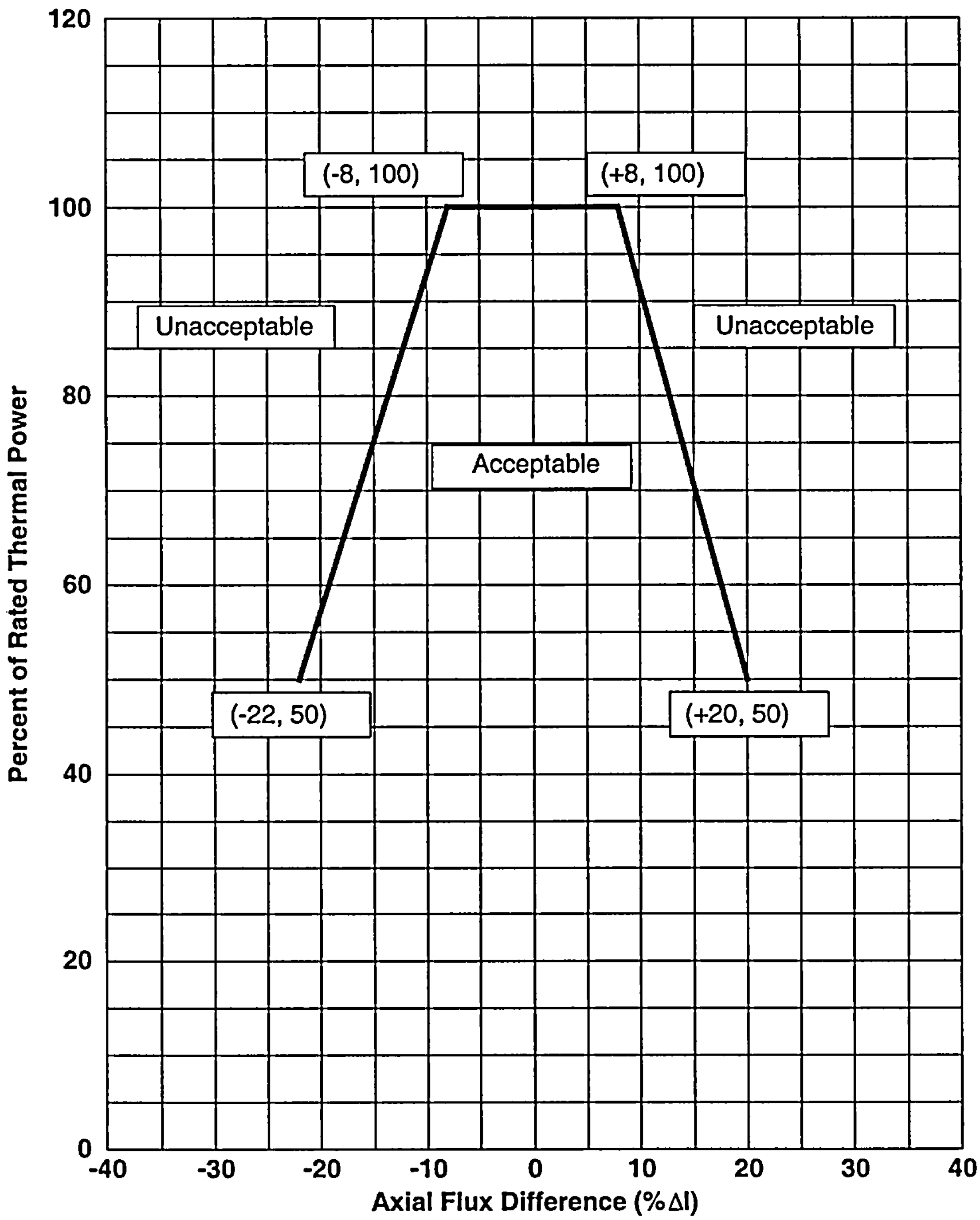


Figure 4. K(z) - Normalized $F_Q(z)$ as a Function of Core Height
V. C. Summer - Cycle 15

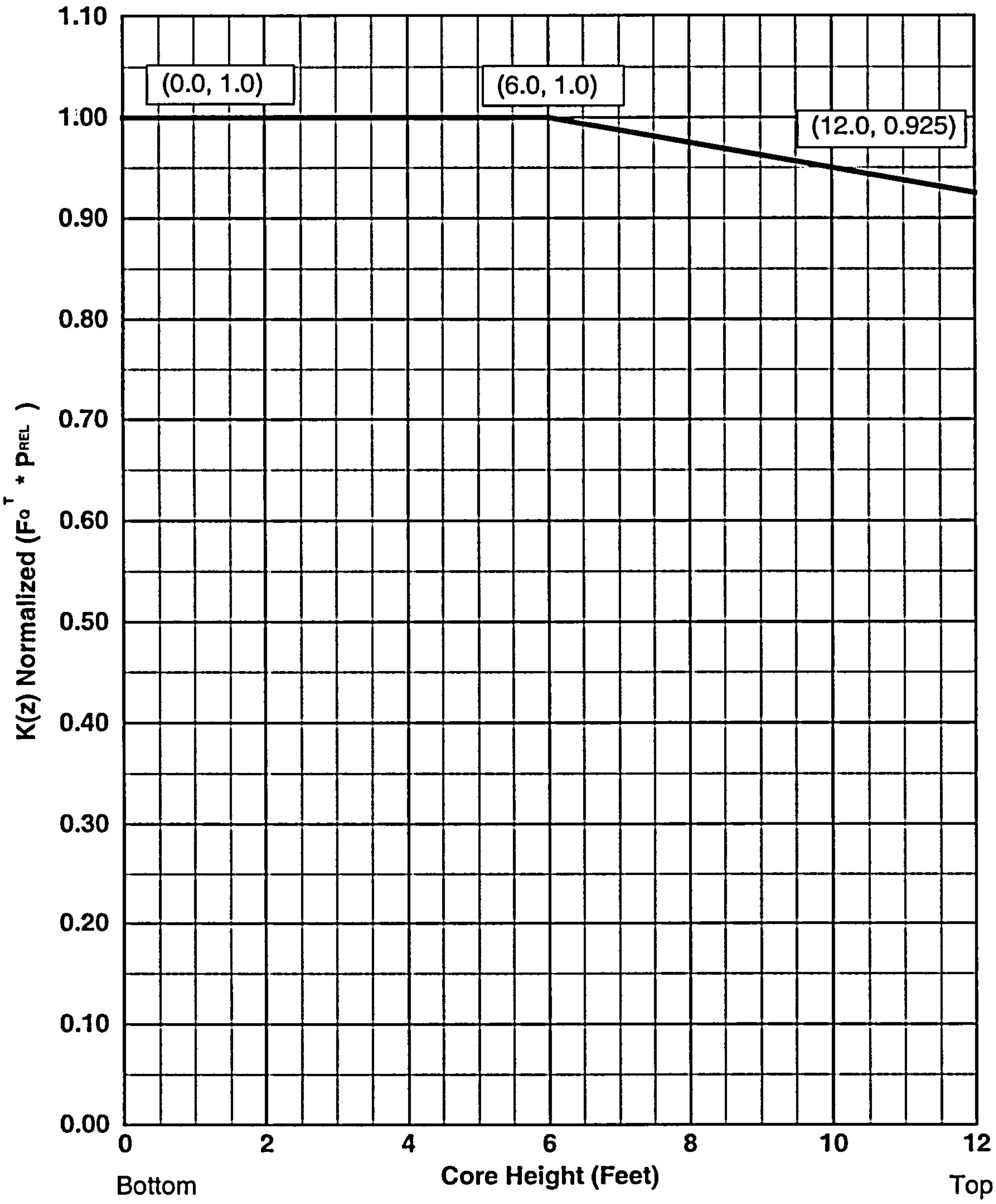


Figure 5. RAOC W(z) at 150 MWD/MTU
V. C. Summer - Cycle 15

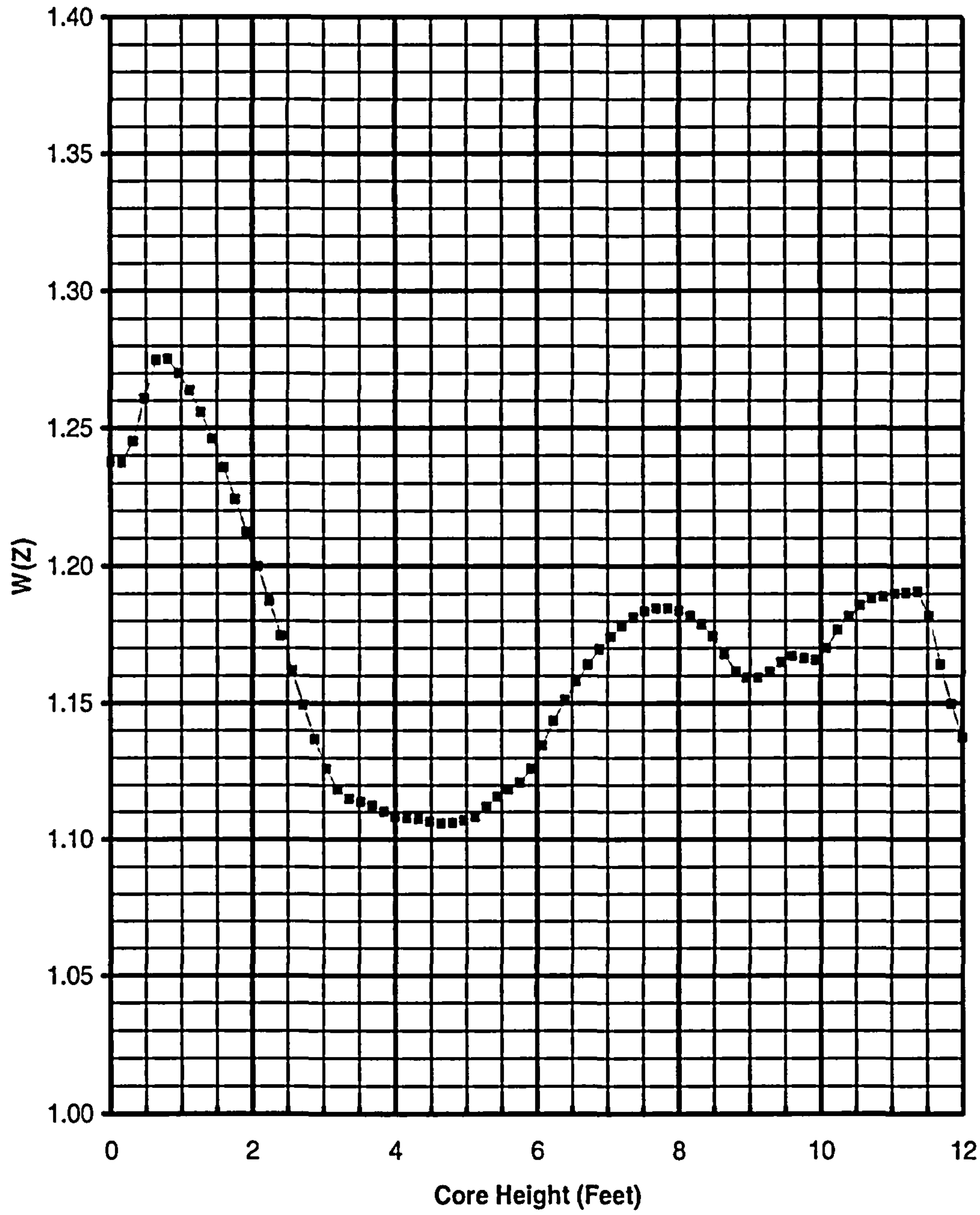


Table 1. RAOC W(z) at 150 MWD/MTU
V. C. Summer - Cycle 15

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.00	1.238	6.08	1.135
0.16	1.237	6.24	1.144
0.32	1.245	6.40	1.151
0.48	1.261	6.56	1.158
0.64	1.275	6.72	1.164
0.80	1.275	6.88	1.170
0.96	1.270	7.04	1.174
1.12	1.264	7.20	1.178
1.28	1.256	7.36	1.181
1.44	1.246	7.52	1.183
1.60	1.236	7.68	1.185
1.76	1.224	7.84	1.185
1.92	1.212	8.00	1.184
2.08	1.200	8.16	1.182
2.24	1.187	8.32	1.179
2.40	1.175	8.48	1.175
2.56	1.162	8.64	1.168
2.72	1.149	8.80	1.161
2.88	1.137	8.96	1.159
3.04	1.126	9.12	1.159
3.20	1.118	9.28	1.161
3.36	1.115	9.44	1.165
3.52	1.114	9.60	1.167
3.68	1.112	9.76	1.166
3.84	1.110	9.92	1.166
4.00	1.109	10.08	1.170
4.16	1.108	10.24	1.177
4.32	1.108	10.40	1.182
4.48	1.107	10.56	1.186
4.64	1.106	10.72	1.188
4.80	1.106	10.88	1.189
4.96	1.107	11.04	1.190
5.12	1.108	11.20	1.190
5.28	1.112	11.36	1.191
5.44	1.116	11.52	1.182
5.60	1.118	11.68	1.164
5.76	1.121	11.84	1.150
5.92	1.126	12.00	1.138

Figure 6. RAOC W(z) at 3000 MWD/MTU
V. C. Summer - Cycle 15

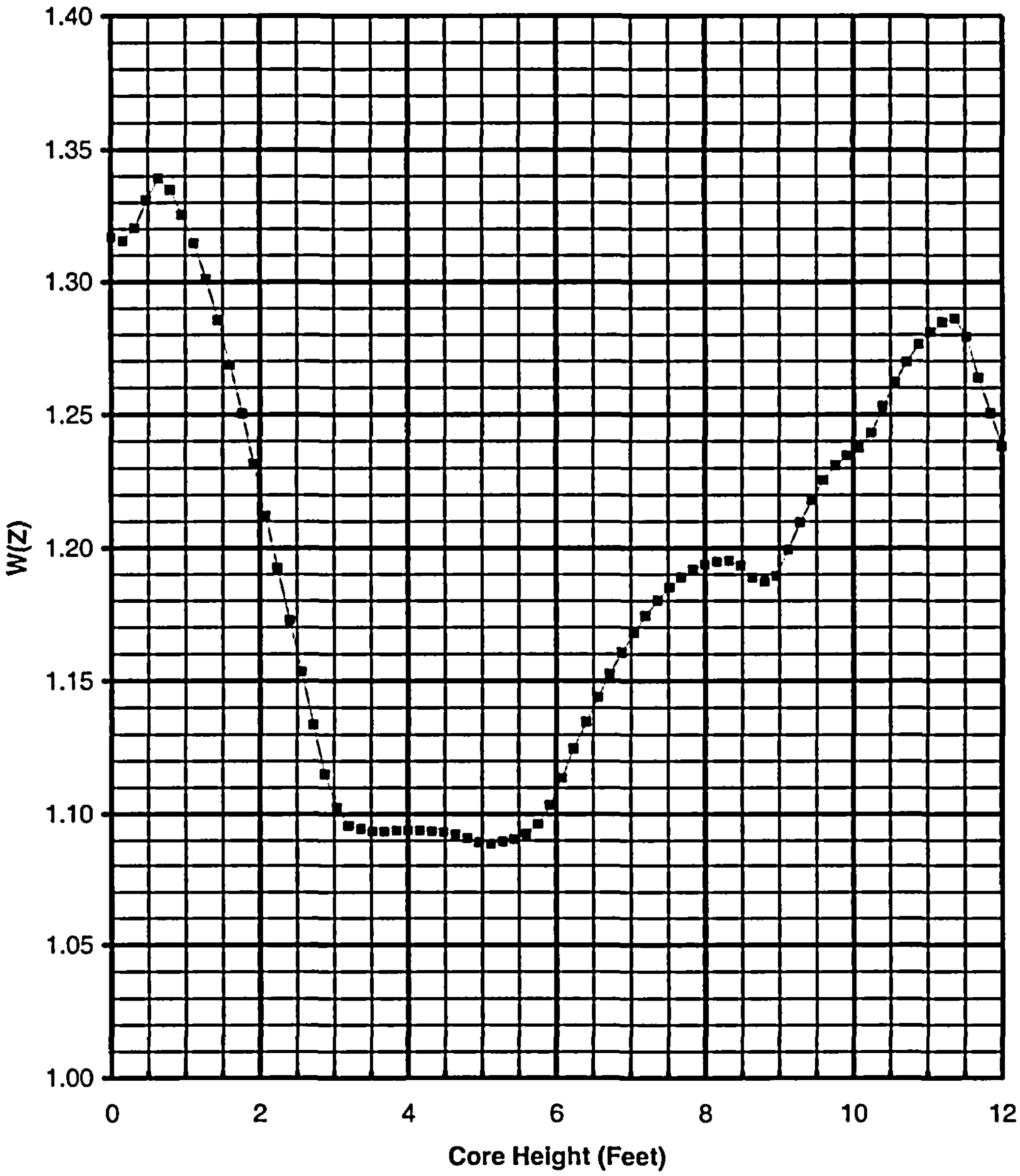


Table 2. RAOC W(z) at 3000 MWD/MTU
V. C. Summer - Cycle 15

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.00	1.317	6.08	1.114
0.16	1.316	6.24	1.125
0.32	1.320	6.40	1.135
0.48	1.331	6.56	1.144
0.64	1.339	6.72	1.153
0.80	1.335	6.88	1.161
0.96	1.325	7.04	1.168
1.12	1.315	7.20	1.174
1.28	1.301	7.36	1.180
1.44	1.285	7.52	1.185
1.60	1.269	7.68	1.189
1.76	1.250	7.84	1.192
1.92	1.232	8.00	1.194
2.08	1.212	8.16	1.195
2.24	1.192	8.32	1.195
2.40	1.173	8.48	1.193
2.56	1.153	8.64	1.189
2.72	1.134	8.80	1.187
2.88	1.115	8.96	1.189
3.04	1.103	9.12	1.199
3.20	1.096	9.28	1.210
3.36	1.094	9.44	1.218
3.52	1.093	9.60	1.226
3.68	1.093	9.76	1.231
3.84	1.094	9.92	1.235
4.00	1.094	10.08	1.237
4.16	1.094	10.24	1.243
4.32	1.093	10.40	1.253
4.48	1.093	10.56	1.262
4.64	1.092	10.72	1.270
4.80	1.091	10.88	1.276
4.96	1.089	11.04	1.281
5.12	1.089	11.20	1.285
5.28	1.090	11.36	1.286
5.44	1.090	11.52	1.279
5.60	1.092	11.68	1.264
5.76	1.096	11.84	1.251
5.92	1.103	12.00	1.238

Figure 7. RAOC W(z) at 10000 MWD/MTU
V. C. Summer - Cycle 15

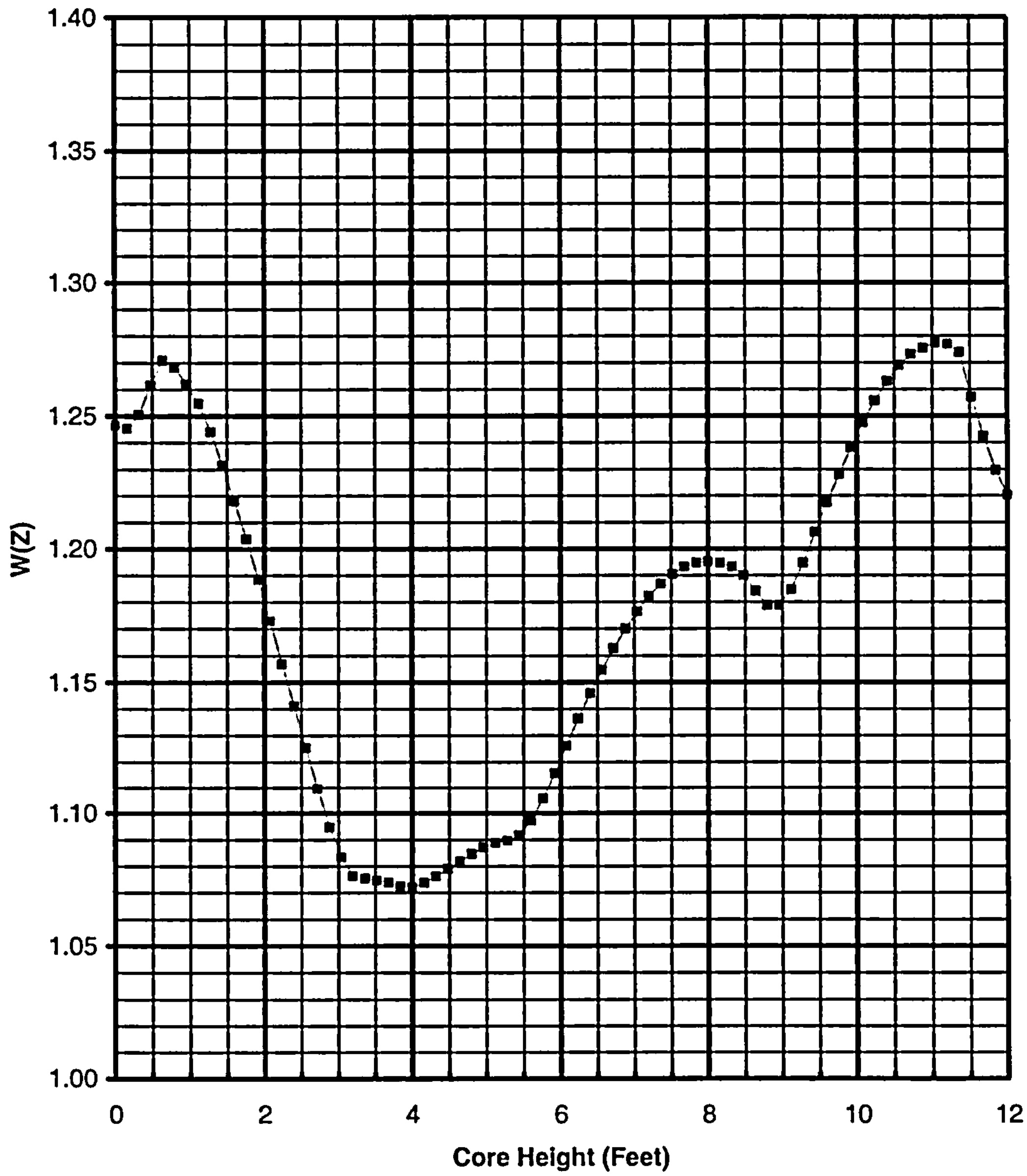


Table 3. RAOC W(z) at 10000 MWD/MTU
V. C. Summer - Cycle 15

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.00	1.247	6.08	1.126
0.16	1.245	6.24	1.137
0.32	1.251	6.40	1.146
0.48	1.262	6.56	1.155
0.64	1.271	6.72	1.163
0.80	1.268	6.88	1.170
0.96	1.262	7.04	1.177
1.12	1.255	7.20	1.182
1.28	1.244	7.36	1.187
1.44	1.231	7.52	1.191
1.60	1.218	7.68	1.193
1.76	1.204	7.84	1.195
1.92	1.189	8.00	1.195
2.08	1.173	8.16	1.195
2.24	1.157	8.32	1.193
2.40	1.141	8.48	1.190
2.56	1.126	8.64	1.184
2.72	1.110	8.80	1.179
2.88	1.095	8.96	1.179
3.04	1.083	9.12	1.185
3.20	1.076	9.28	1.195
3.36	1.075	9.44	1.206
3.52	1.075	9.60	1.218
3.68	1.074	9.76	1.228
3.84	1.073	9.92	1.238
4.00	1.072	10.08	1.247
4.16	1.074	10.24	1.256
4.32	1.076	10.40	1.263
4.48	1.079	10.56	1.269
4.64	1.082	10.72	1.273
4.80	1.085	10.88	1.275
4.96	1.087	11.04	1.277
5.12	1.089	11.20	1.277
5.28	1.090	11.36	1.274
5.44	1.092	11.52	1.257
5.60	1.097	11.68	1.242
5.76	1.106	11.84	1.230
5.92	1.116	12.00	1.220

Figure 8. RAOC W(z) at 20000 MWD/MTU
V. C. Summer - Cycle 15

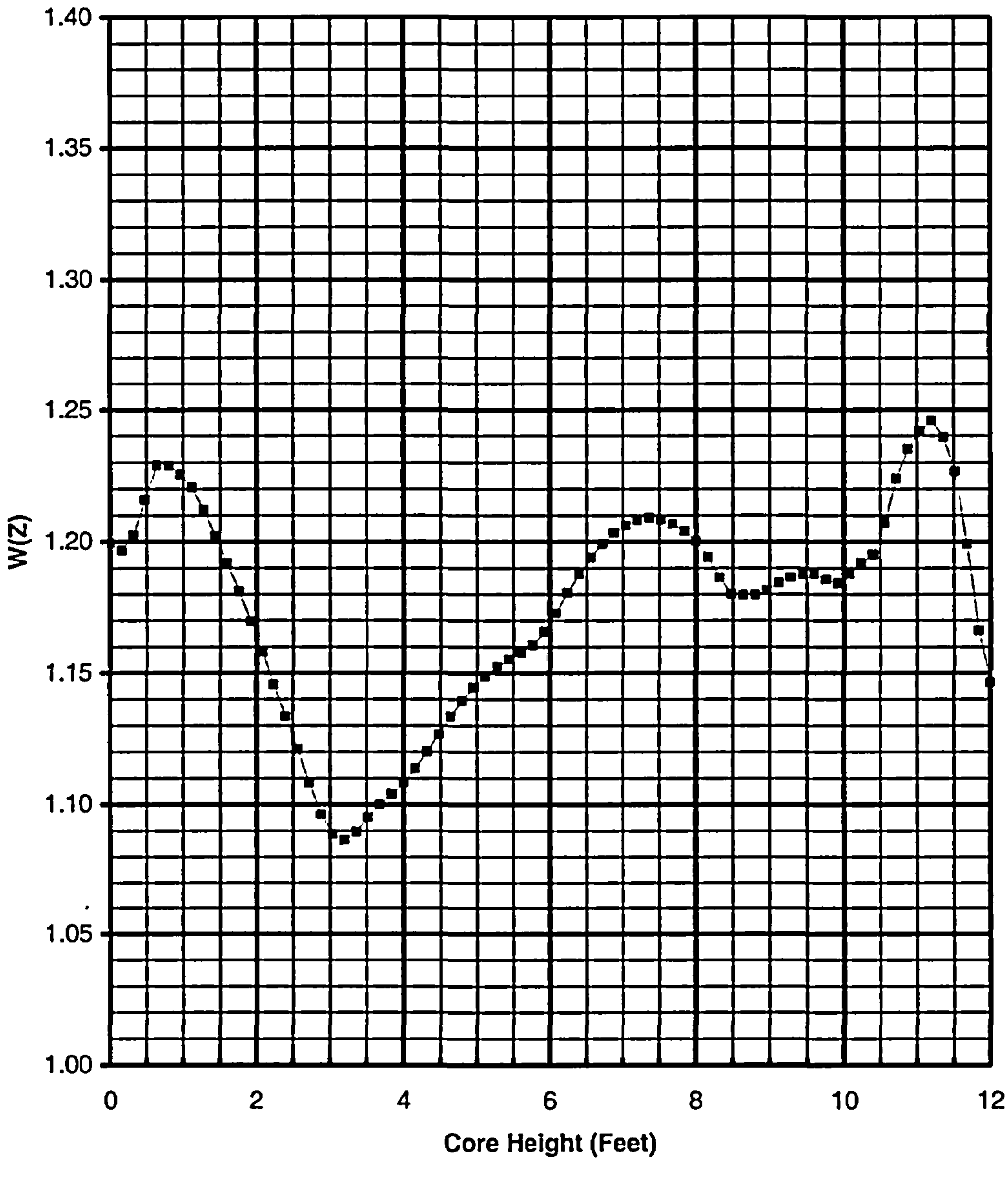


Table 4. RAOC W(z) at 20000 MWD/MTU
V. C. Summer - Cycle 15

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.00	1.199	6.08	1.173
0.16	1.197	6.24	1.181
0.32	1.202	6.40	1.188
0.48	1.216	6.56	1.194
0.64	1.229	6.72	1.199
0.80	1.229	6.88	1.203
0.96	1.225	7.04	1.206
1.12	1.221	7.20	1.208
1.28	1.212	7.36	1.209
1.44	1.202	7.52	1.209
1.60	1.192	7.68	1.207
1.76	1.181	7.84	1.204
1.92	1.170	8.00	1.200
2.08	1.158	8.16	1.194
2.24	1.146	8.32	1.187
2.40	1.133	8.48	1.180
2.56	1.121	8.64	1.180
2.72	1.108	8.80	1.180
2.88	1.096	8.96	1.182
3.04	1.089	9.12	1.185
3.20	1.087	9.28	1.187
3.36	1.090	9.44	1.188
3.52	1.095	9.60	1.188
3.68	1.100	9.76	1.186
3.84	1.104	9.92	1.184
4.00	1.108	10.08	1.188
4.16	1.114	10.24	1.192
4.32	1.120	10.40	1.195
4.48	1.127	10.56	1.207
4.64	1.133	10.72	1.224
4.80	1.139	10.88	1.235
4.96	1.144	11.04	1.242
5.12	1.149	11.20	1.246
5.28	1.152	11.36	1.240
5.44	1.155	11.52	1.227
5.60	1.158	11.68	1.199
5.76	1.161	11.84	1.166
5.92	1.166	12.00	1.146

Figure 9. Baseload W(z) at 150 MWD/MTU
V. C. Summer - Cycle 15

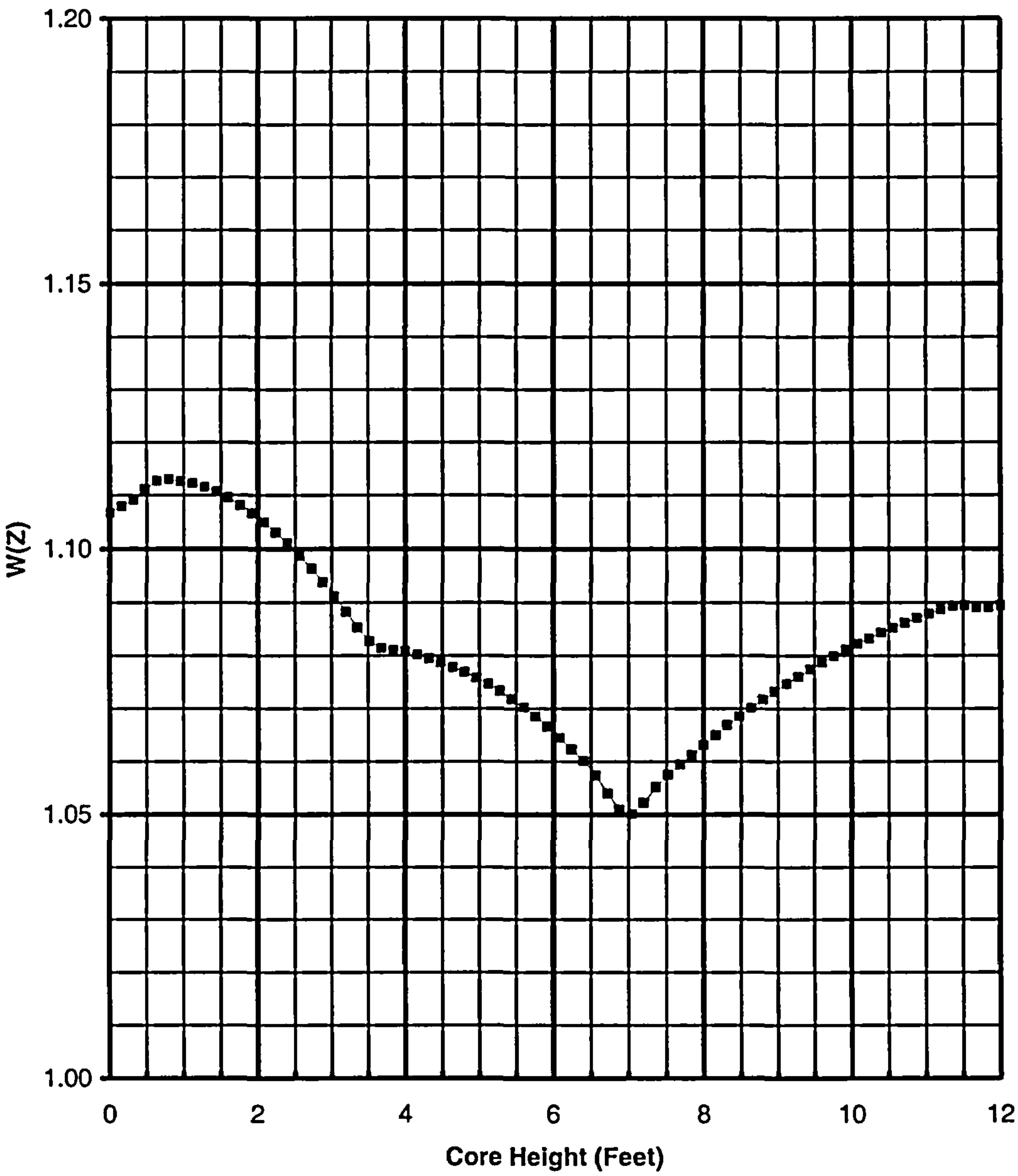


Table 5. Baseload W(z) at 150 MWD/MTU
V. C. Summer - Cycle 15

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.00	1.107	6.08	1.065
0.16	1.108	6.24	1.062
0.32	1.109	6.40	1.060
0.48	1.111	6.56	1.057
0.64	1.113	6.72	1.054
0.80	1.113	6.88	1.051
0.96	1.113	7.04	1.050
1.12	1.112	7.20	1.052
1.28	1.112	7.36	1.055
1.44	1.111	7.52	1.058
1.60	1.110	7.68	1.059
1.76	1.108	7.84	1.061
1.92	1.107	8.00	1.063
2.08	1.105	8.16	1.065
2.24	1.103	8.32	1.067
2.40	1.101	8.48	1.069
2.56	1.099	8.64	1.070
2.72	1.096	8.80	1.072
2.88	1.094	8.96	1.073
3.04	1.091	9.12	1.075
3.20	1.088	9.28	1.076
3.36	1.085	9.44	1.077
3.52	1.083	9.60	1.079
3.68	1.081	9.76	1.080
3.84	1.081	9.92	1.081
4.00	1.081	10.08	1.082
4.16	1.080	10.24	1.083
4.32	1.080	10.40	1.084
4.48	1.079	10.56	1.085
4.64	1.078	10.72	1.086
4.80	1.077	10.88	1.087
4.96	1.076	11.04	1.088
5.12	1.075	11.20	1.089
5.28	1.073	11.36	1.089
5.44	1.072	11.52	1.089
5.60	1.070	11.68	1.089
5.76	1.069	11.84	1.089
5.92	1.067	12.00	1.089

Figure 10. Baseload W(z) at 1300 MWD/MTU
V. C. Summer - Cycle 15

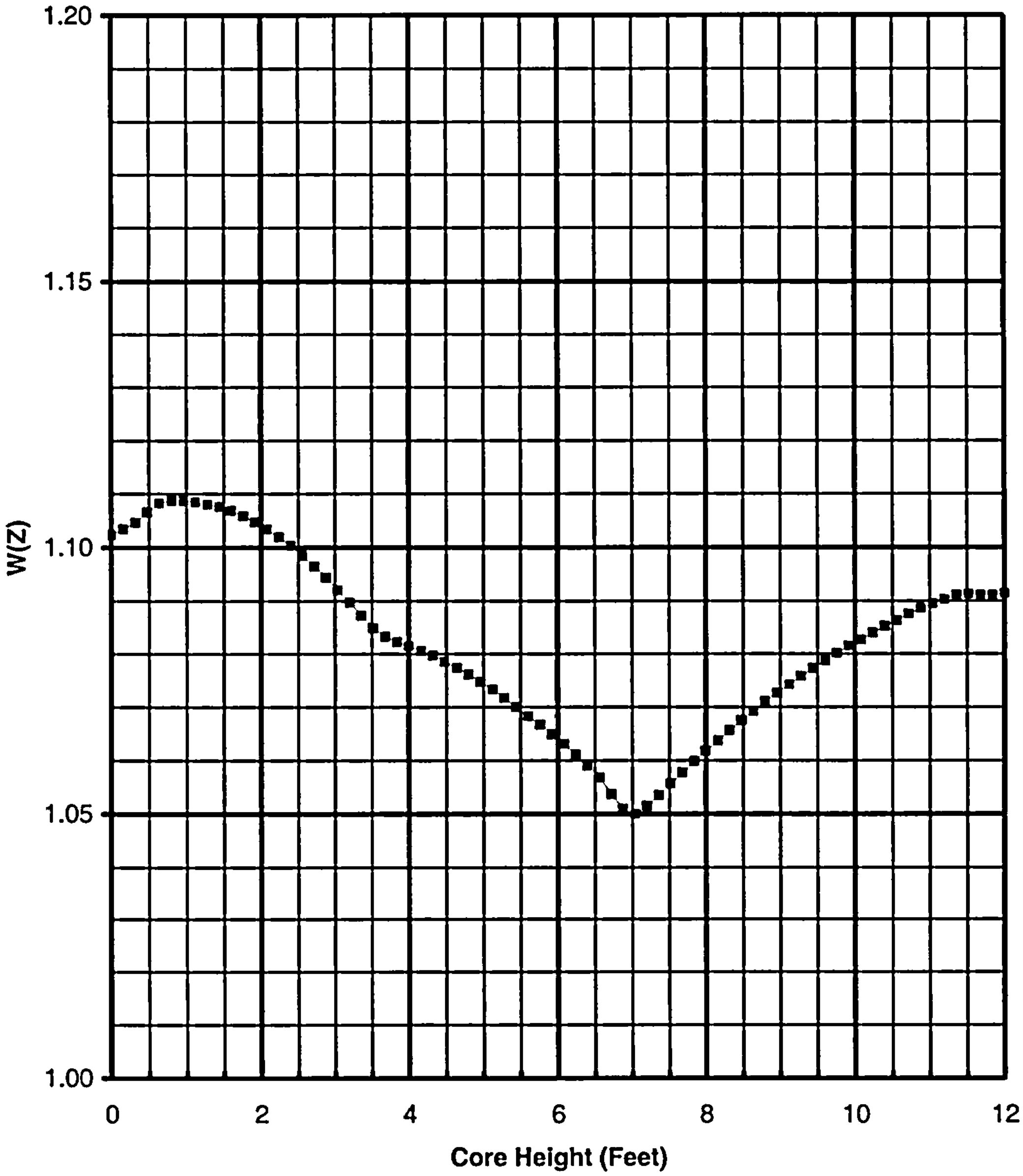


Table 6. Baseload W(z) at 1300 MWD/MTU
V. C. Summer - Cycle 15

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.00	1.102	6.08	1.063
0.16	1.104	6.24	1.061
0.32	1.105	6.40	1.059
0.48	1.107	6.56	1.057
0.64	1.108	6.72	1.054
0.80	1.109	6.88	1.051
0.96	1.109	7.04	1.050
1.12	1.109	7.20	1.052
1.28	1.108	7.36	1.054
1.44	1.108	7.52	1.056
1.60	1.107	7.68	1.058
1.76	1.106	7.84	1.060
1.92	1.105	8.00	1.062
2.08	1.104	8.16	1.064
2.24	1.102	8.32	1.066
2.40	1.100	8.48	1.068
2.56	1.099	8.64	1.069
2.72	1.097	8.80	1.071
2.88	1.094	8.96	1.073
3.04	1.092	9.12	1.074
3.20	1.090	9.28	1.076
3.36	1.087	9.44	1.077
3.52	1.085	9.60	1.079
3.68	1.083	9.76	1.080
3.84	1.082	9.92	1.082
4.00	1.082	10.08	1.083
4.16	1.081	10.24	1.084
4.32	1.080	10.40	1.085
4.48	1.079	10.56	1.086
4.64	1.077	10.72	1.088
4.80	1.076	10.88	1.089
4.96	1.075	11.04	1.090
5.12	1.073	11.20	1.090
5.28	1.072	11.36	1.091
5.44	1.070	11.52	1.091
5.60	1.068	11.68	1.091
5.76	1.067	11.84	1.091
5.92	1.065	12.00	1.091

Figure 11. Baseload W(z) at 3000 MWD/MTU
V. C. Summer - Cycle 15

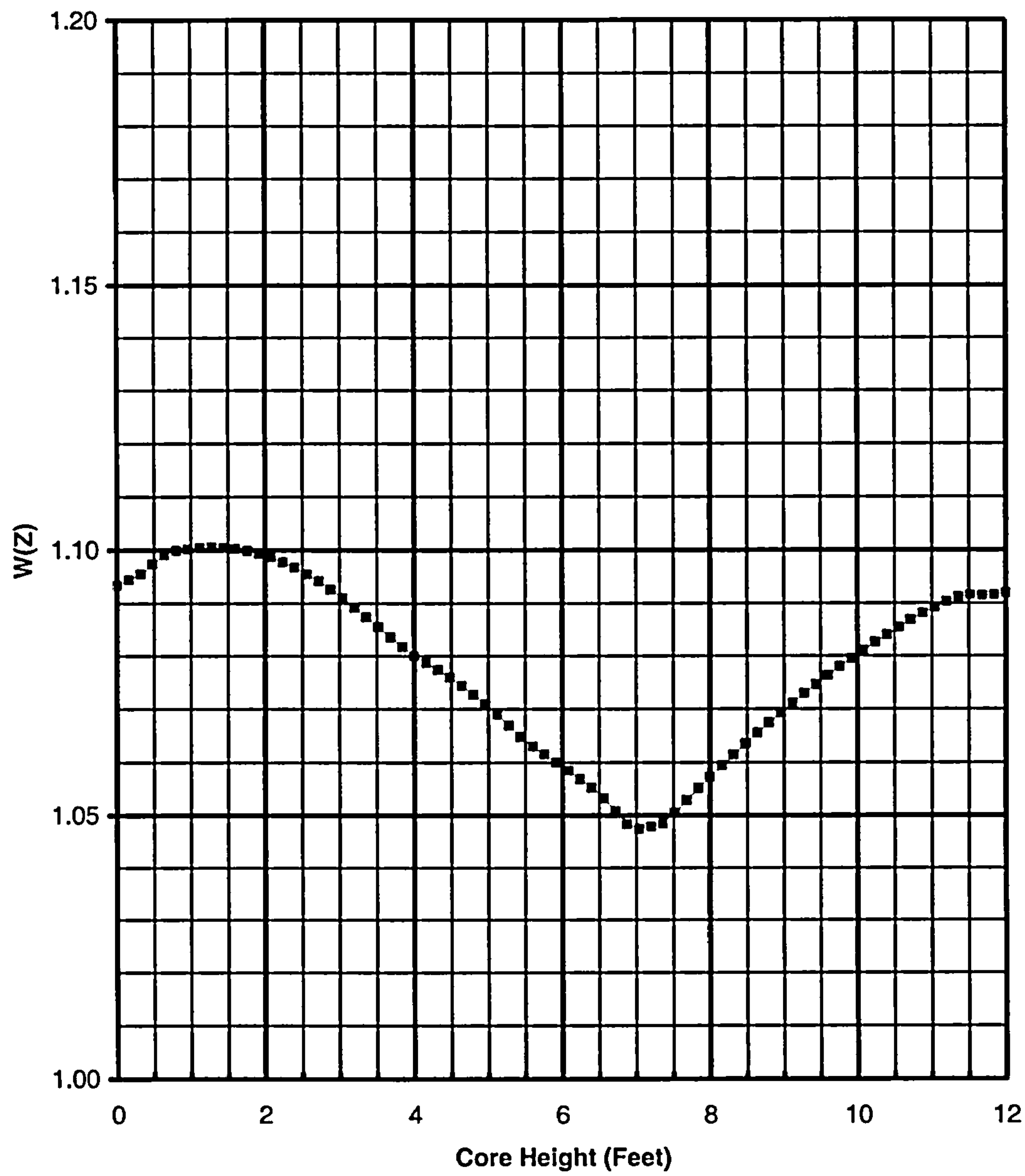


Table 7. Baseload W(z) at 3000 MWD/MTU
V. C. Summer - Cycle 15

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.00	1.093	6.08	1.059
0.16	1.094	6.24	1.057
0.32	1.096	6.40	1.055
0.48	1.097	6.56	1.053
0.64	1.099	6.72	1.051
0.80	1.100	6.88	1.048
0.96	1.100	7.04	1.048
1.12	1.101	7.20	1.048
1.28	1.101	7.36	1.049
1.44	1.101	7.52	1.051
1.60	1.100	7.68	1.053
1.76	1.100	7.84	1.055
1.92	1.099	8.00	1.057
2.08	1.099	8.16	1.059
2.24	1.098	8.32	1.061
2.40	1.097	8.48	1.064
2.56	1.096	8.64	1.066
2.72	1.094	8.80	1.067
2.88	1.093	8.96	1.069
3.04	1.091	9.12	1.071
3.20	1.089	9.28	1.073
3.36	1.087	9.44	1.075
3.52	1.086	9.60	1.076
3.68	1.084	9.76	1.078
3.84	1.082	9.92	1.080
4.00	1.080	10.08	1.081
4.16	1.079	10.24	1.083
4.32	1.077	10.40	1.084
4.48	1.076	10.56	1.085
4.64	1.074	10.72	1.087
4.80	1.073	10.88	1.088
4.96	1.071	11.04	1.089
5.12	1.069	11.20	1.090
5.28	1.067	11.36	1.091
5.44	1.065	11.52	1.092
5.60	1.063	11.68	1.091
5.76	1.062	11.84	1.092
5.92	1.060	12.00	1.092

Figure 12. Baseload W(z) at 4700 MWD/MTU
V. C. Summer - Cycle 15

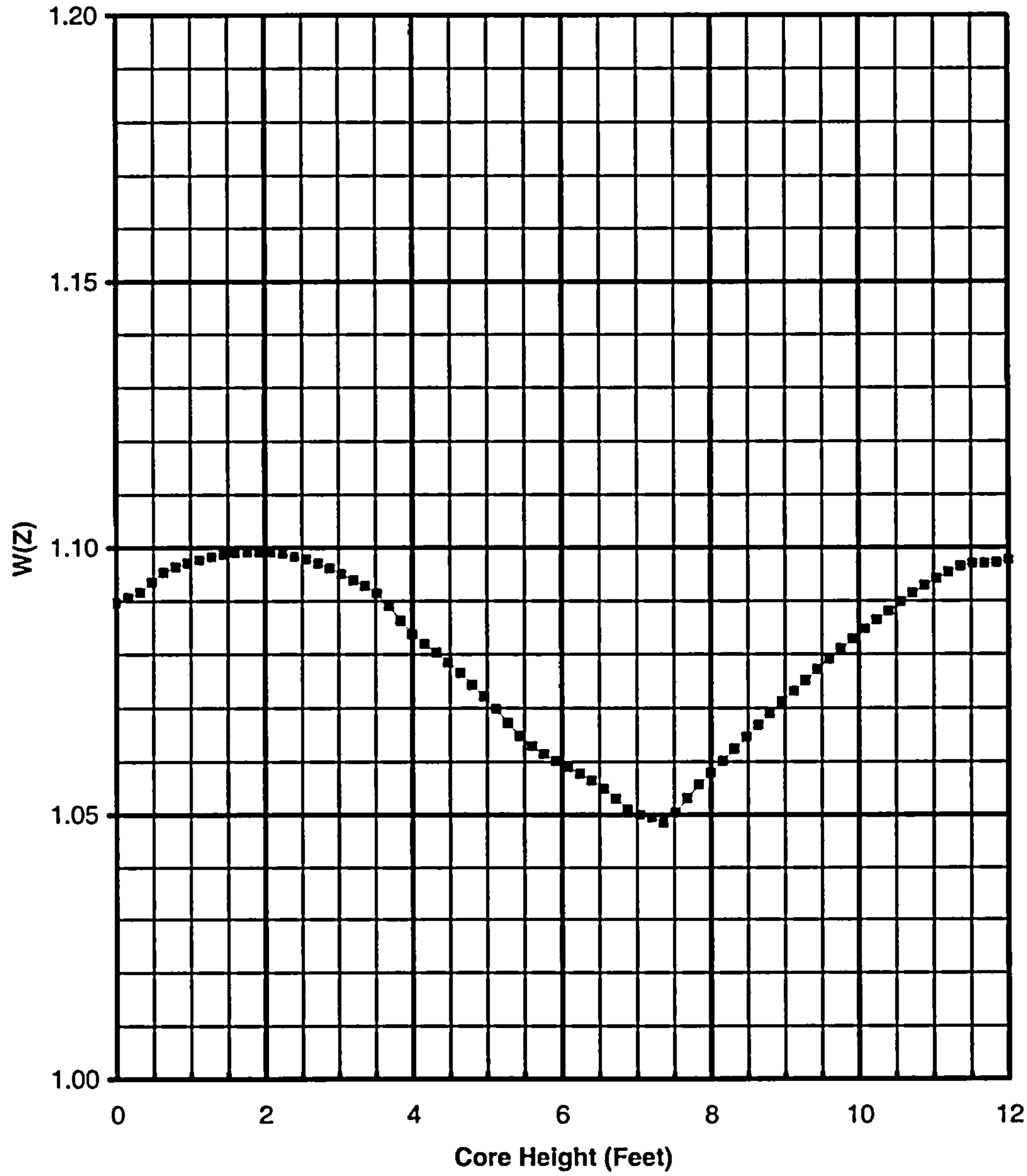


Table 8. Baseload W(z) at 4700 MWD/MTU
V. C. Summer - Cycle 15

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.00	1.090	6.08	1.059
0.16	1.091	6.24	1.058
0.32	1.092	6.40	1.057
0.48	1.094	6.56	1.055
0.64	1.095	6.72	1.053
0.80	1.096	6.88	1.051
0.96	1.097	7.04	1.050
1.12	1.098	7.20	1.050
1.28	1.098	7.36	1.049
1.44	1.099	7.52	1.050
1.60	1.099	7.68	1.053
1.76	1.099	7.84	1.056
1.92	1.099	8.00	1.058
2.08	1.099	8.16	1.060
2.24	1.099	8.32	1.062
2.40	1.098	8.48	1.065
2.56	1.098	8.64	1.067
2.72	1.097	8.80	1.069
2.88	1.096	8.96	1.071
3.04	1.095	9.12	1.073
3.20	1.094	9.28	1.075
3.36	1.093	9.44	1.077
3.52	1.091	9.60	1.079
3.68	1.089	9.76	1.081
3.84	1.086	9.92	1.083
4.00	1.084	10.08	1.085
4.16	1.082	10.24	1.086
4.32	1.080	10.40	1.088
4.48	1.079	10.56	1.090
4.64	1.077	10.72	1.091
4.80	1.074	10.88	1.093
4.96	1.072	11.04	1.094
5.12	1.070	11.20	1.095
5.28	1.067	11.36	1.097
5.44	1.065	11.52	1.097
5.60	1.063	11.68	1.097
5.76	1.061	11.84	1.097
5.92	1.060	12.00	1.098

Figure 13. Baseload W(z) at 10000 MWD/MTU
V. C. Summer - Cycle 15

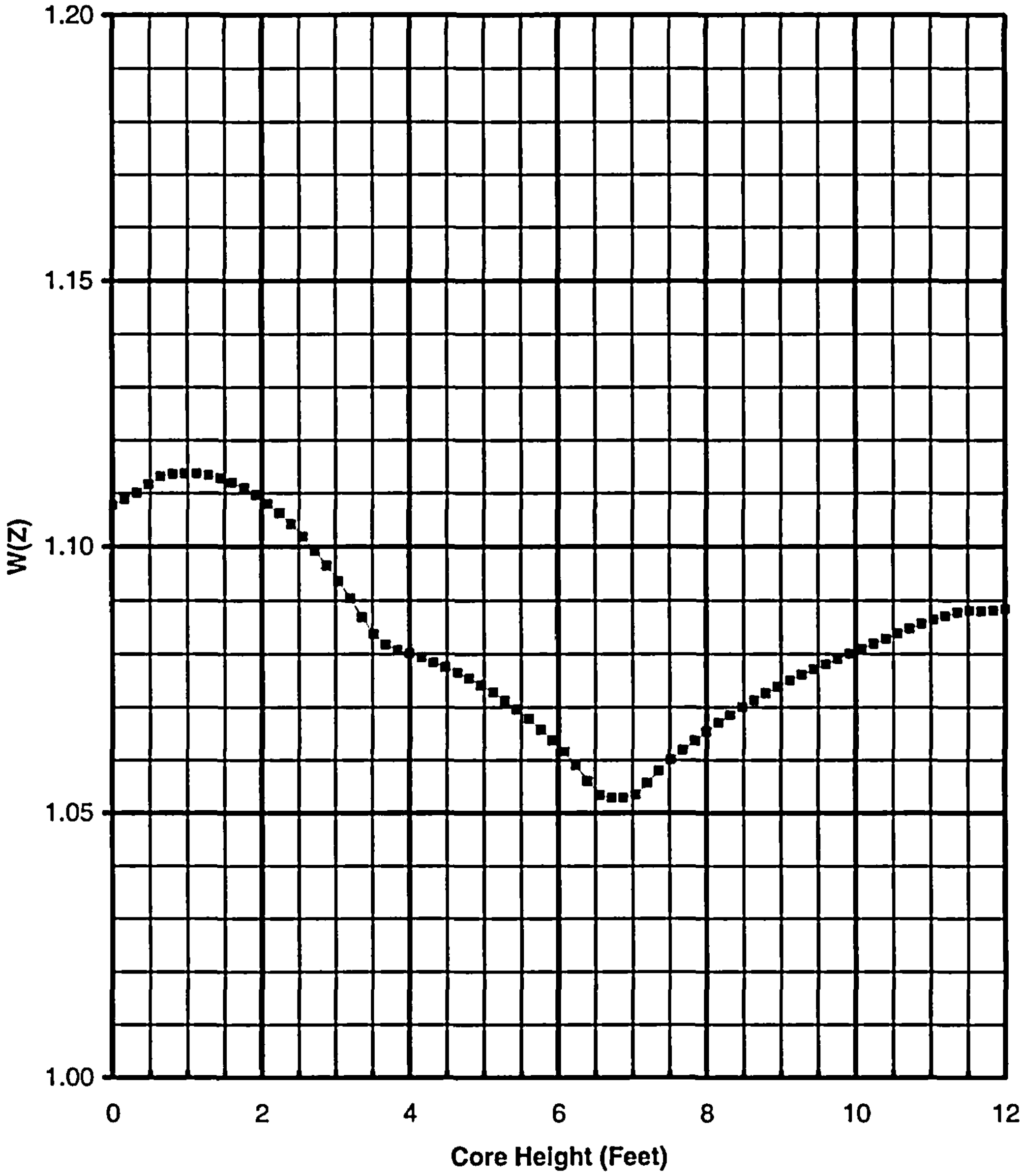


Table 9. Baseload W(z) at 10000 MWD/MTU
V. C. Summer - Cycle 15

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.00	1.108	6.08	1.062
0.16	1.109	6.24	1.059
0.32	1.110	6.40	1.056
0.48	1.112	6.56	1.053
0.64	1.113	6.72	1.053
0.80	1.114	6.88	1.053
0.96	1.114	7.04	1.054
1.12	1.114	7.20	1.056
1.28	1.113	7.36	1.058
1.44	1.113	7.52	1.060
1.60	1.112	7.68	1.062
1.76	1.111	7.84	1.064
1.92	1.110	8.00	1.065
2.08	1.108	8.16	1.067
2.24	1.106	8.32	1.069
2.40	1.104	8.48	1.070
2.56	1.102	8.64	1.071
2.72	1.099	8.80	1.073
2.88	1.097	8.96	1.074
3.04	1.094	9.12	1.075
3.20	1.090	9.28	1.076
3.36	1.087	9.44	1.077
3.52	1.084	9.60	1.078
3.68	1.082	9.76	1.079
3.84	1.081	9.92	1.080
4.00	1.080	10.08	1.081
4.16	1.079	10.24	1.082
4.32	1.079	10.40	1.083
4.48	1.078	10.56	1.084
4.64	1.077	10.72	1.085
4.80	1.075	10.88	1.086
4.96	1.074	11.04	1.086
5.12	1.073	11.20	1.087
5.28	1.071	11.36	1.088
5.44	1.070	11.52	1.088
5.60	1.068	11.68	1.088
5.76	1.066	11.84	1.088
5.92	1.064	12.00	1.088

Figure 14. Baseload W(z) at 20000 MWD/MTU
V. C. Summer - Cycle 15

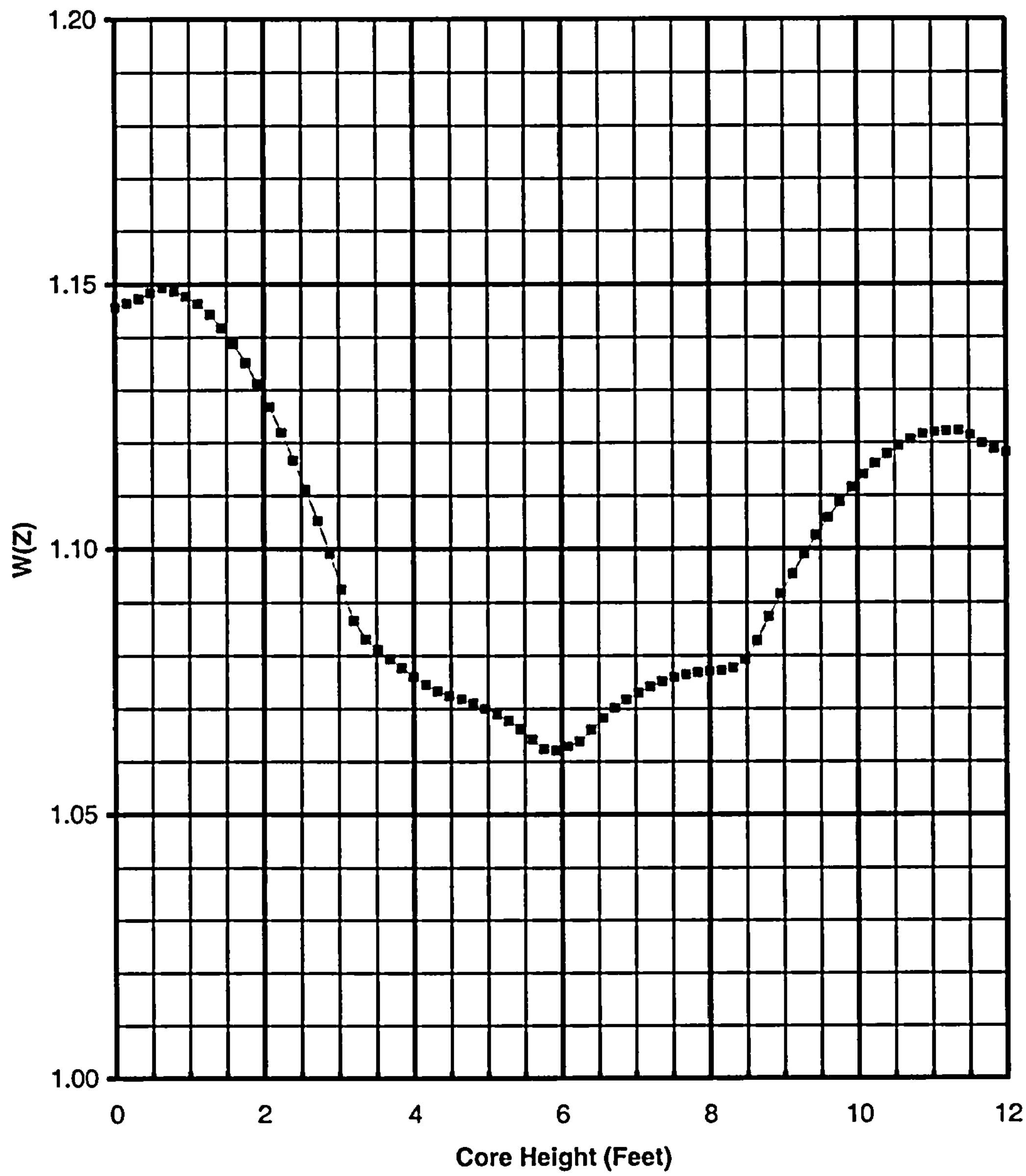


Table 10. Baseload W(z) at 20000 MWD/MTU
V. C. Summer - Cycle 15

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.00	1.146	6.08	1.063
0.16	1.146	6.24	1.064
0.32	1.147	6.40	1.066
0.48	1.148	6.56	1.068
0.64	1.149	6.72	1.070
0.80	1.149	6.88	1.072
0.96	1.148	7.04	1.073
1.12	1.146	7.20	1.074
1.28	1.144	7.36	1.075
1.44	1.142	7.52	1.076
1.60	1.139	7.68	1.076
1.76	1.135	7.84	1.077
1.92	1.131	8.00	1.077
2.08	1.127	8.16	1.077
2.24	1.122	8.32	1.078
2.40	1.117	8.48	1.079
2.56	1.111	8.64	1.083
2.72	1.105	8.80	1.087
2.88	1.099	8.96	1.092
3.04	1.093	9.12	1.095
3.20	1.087	9.28	1.099
3.36	1.083	9.44	1.103
3.52	1.081	9.60	1.106
3.68	1.079	9.76	1.109
3.84	1.078	9.92	1.112
4.00	1.076	10.08	1.114
4.16	1.075	10.24	1.116
4.32	1.073	10.40	1.118
4.48	1.072	10.56	1.119
4.64	1.072	10.72	1.121
4.80	1.071	10.88	1.122
4.96	1.070	11.04	1.122
5.12	1.069	11.20	1.122
5.28	1.068	11.36	1.122
5.44	1.066	11.52	1.121
5.60	1.064	11.68	1.120
5.76	1.062	11.84	1.119
5.92	1.062	12.00	1.118

Table 11. Baseload F_Q Margin Decreases in Excess of 2% Per 31 EFPD

Cycle Burnup (MWD/MTU)	Maximum Decrease in F_Q Margin
837	1.020
1008	1.021
1180	1.021
1352	1.021
1523	1.021
1695	1.020
4270	1.020
4442	1.022
4614	1.022
4785	1.023
4957	1.022
5129	1.020

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 15. Baseload AOD W(z) at 150 MWD/MTU
V. C. Summer - Cycle 15**

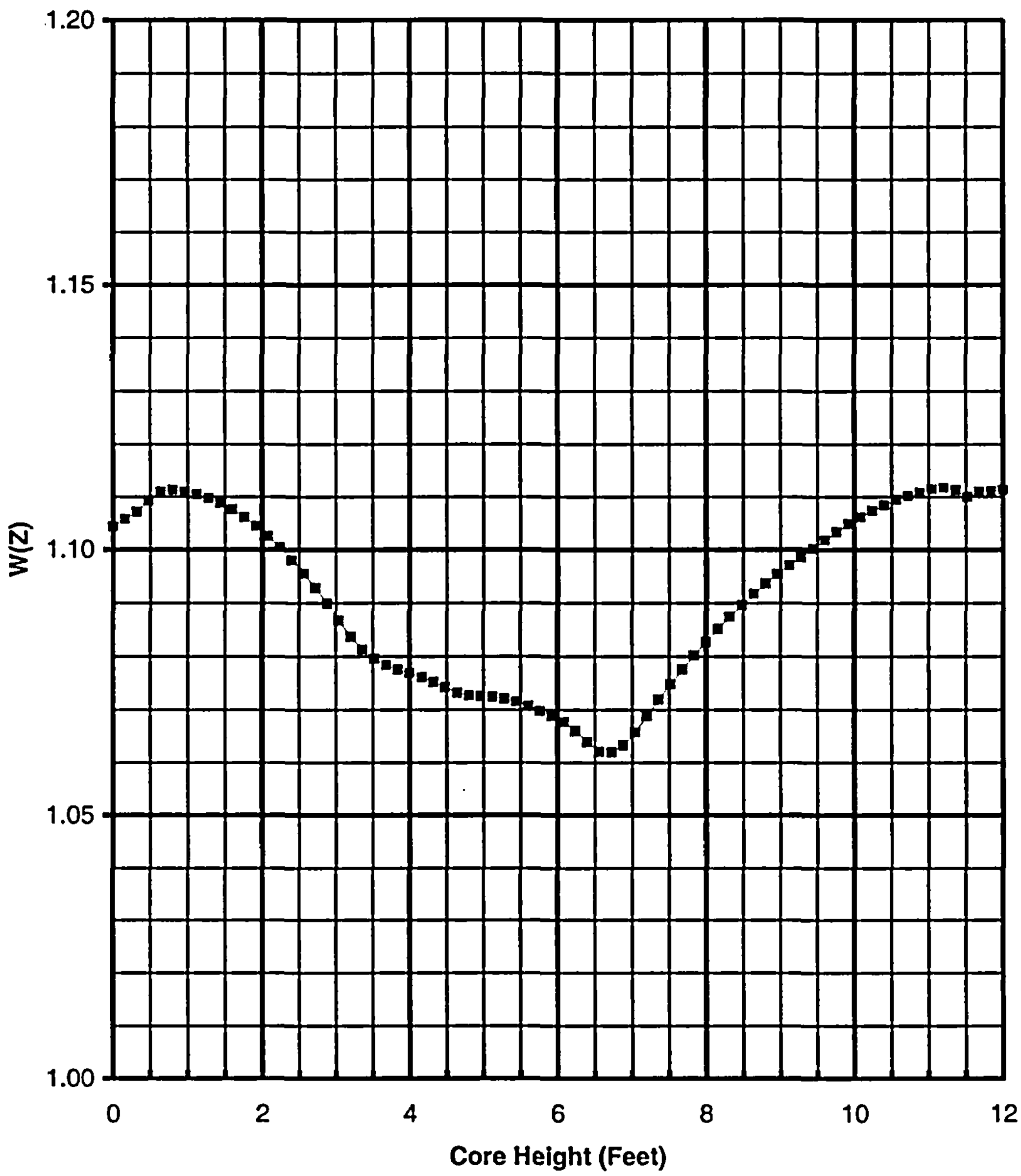


Table 12. Baseload AOD W(z) at 150 MWD/MTU
V. C. Summer - Cycle 15

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.00	1.104	6.08	1.068
0.16	1.106	6.24	1.066
0.32	1.107	6.40	1.064
0.48	1.109	6.56	1.062
0.64	1.111	6.72	1.062
0.80	1.111	6.88	1.063
0.96	1.111	7.04	1.066
1.12	1.111	7.20	1.069
1.28	1.110	7.36	1.072
1.44	1.109	7.52	1.075
1.60	1.108	7.68	1.078
1.76	1.106	7.84	1.080
1.92	1.105	8.00	1.083
2.08	1.103	8.16	1.085
2.24	1.100	8.32	1.087
2.40	1.098	8.48	1.090
2.56	1.096	8.64	1.092
2.72	1.093	8.80	1.094
2.88	1.090	8.96	1.095
3.04	1.087	9.12	1.097
3.20	1.084	9.28	1.099
3.36	1.081	9.44	1.100
3.52	1.080	9.60	1.102
3.68	1.078	9.76	1.103
3.84	1.078	9.92	1.105
4.00	1.077	10.08	1.106
4.16	1.076	10.24	1.107
4.32	1.075	10.40	1.109
4.48	1.074	10.56	1.110
4.64	1.073	10.72	1.110
4.80	1.073	10.88	1.111
4.96	1.073	11.04	1.111
5.12	1.072	11.20	1.112
5.28	1.072	11.36	1.111
5.44	1.072	11.52	1.110
5.60	1.071	11.68	1.111
5.76	1.070	11.84	1.111
5.92	1.069	12.00	1.111

Figure 16. Baseload AOD W(z) at 1300 MWD/MTU
V. C. Summer - Cycle 15

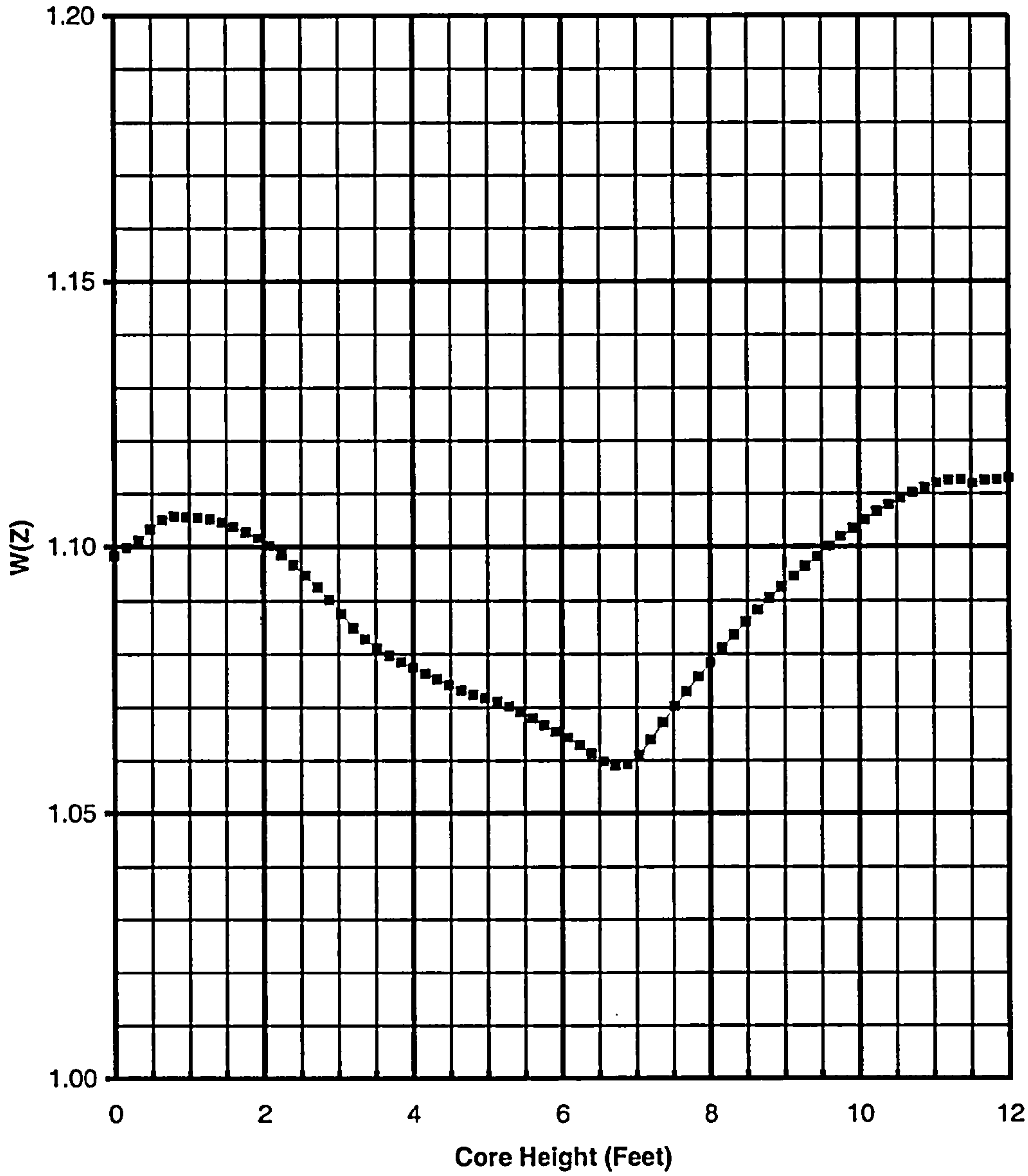


Table 13. Baseload AOD W(z) at 1300 MWD/MTU
V. C. Summer - Cycle 15

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.00	1.098	6.08	1.064
0.16	1.100	6.24	1.063
0.32	1.101	6.40	1.061
0.48	1.103	6.56	1.060
0.64	1.105	6.72	1.059
0.80	1.106	6.88	1.059
0.96	1.106	7.04	1.061
1.12	1.106	7.20	1.064
1.28	1.105	7.36	1.067
1.44	1.105	7.52	1.070
1.60	1.104	7.68	1.073
1.76	1.103	7.84	1.076
1.92	1.102	8.00	1.079
2.08	1.100	8.16	1.081
2.24	1.099	8.32	1.084
2.40	1.097	8.48	1.086
2.56	1.095	8.64	1.088
2.72	1.093	8.80	1.091
2.88	1.090	8.96	1.093
3.04	1.088	9.12	1.095
3.20	1.085	9.28	1.096
3.36	1.083	9.44	1.098
3.52	1.081	9.60	1.100
3.68	1.080	9.76	1.102
3.84	1.079	9.92	1.104
4.00	1.078	10.08	1.105
4.16	1.076	10.24	1.107
4.32	1.075	10.40	1.108
4.48	1.074	10.56	1.109
4.64	1.073	10.72	1.110
4.80	1.072	10.88	1.111
4.96	1.072	11.04	1.112
5.12	1.071	11.20	1.113
5.28	1.070	11.36	1.113
5.44	1.069	11.52	1.112
5.60	1.068	11.68	1.113
5.76	1.067	11.84	1.113
5.92	1.066	12.00	1.113

Figure 17. Baseload AOD W(z) at 3000 MWD/MTU
V. C. Summer - Cycle 15

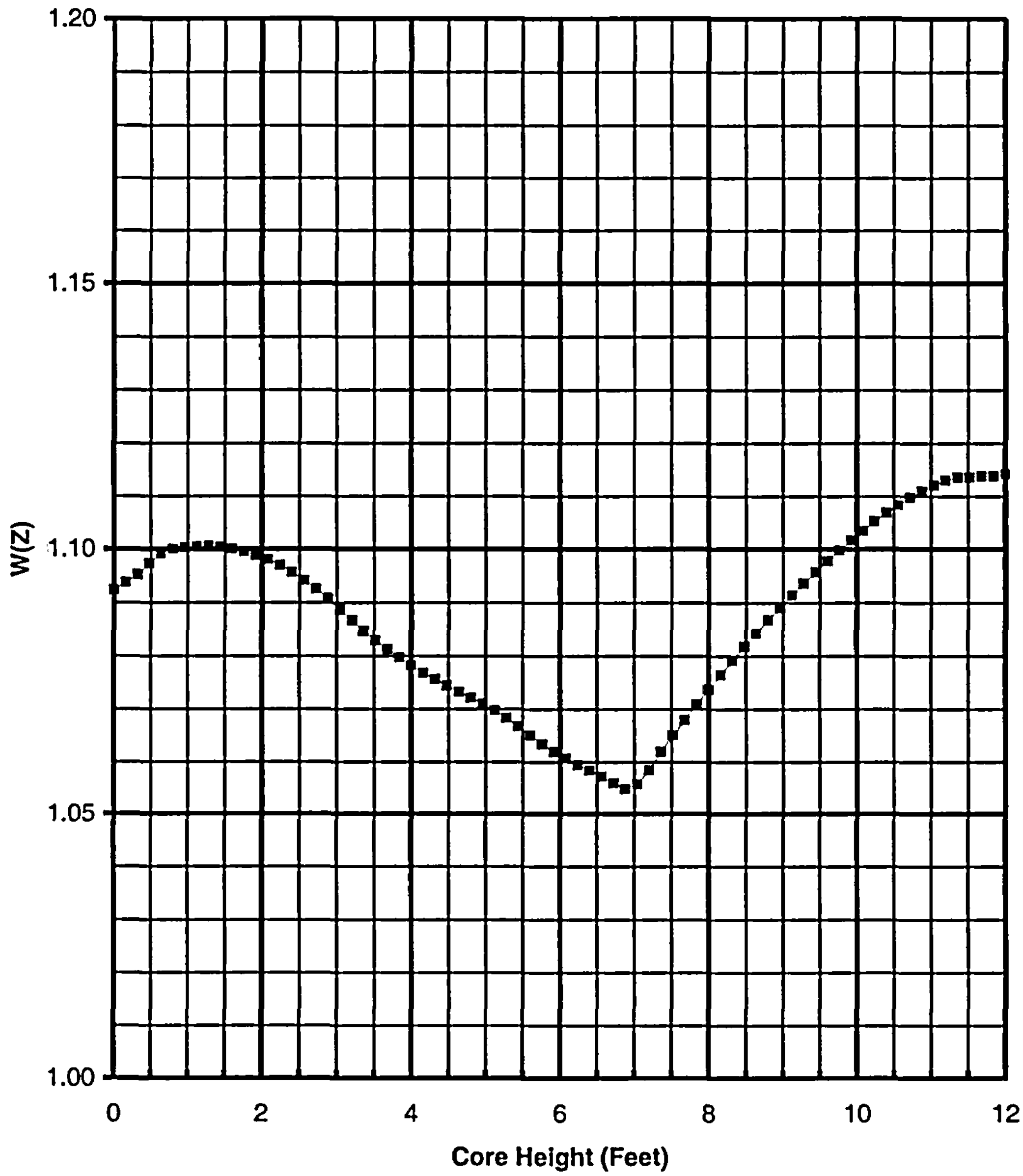


Table 14. Baseload AOD W(z) at 3000 MWD/MTU
V. C. Summer - Cycle 15

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.00	1.092	6.08	1.061
0.16	1.094	6.24	1.060
0.32	1.095	6.40	1.059
0.48	1.097	6.56	1.057
0.64	1.099	6.72	1.056
0.80	1.100	6.88	1.055
0.96	1.100	7.04	1.056
1.12	1.101	7.20	1.059
1.28	1.101	7.36	1.062
1.44	1.100	7.52	1.065
1.60	1.100	7.68	1.068
1.76	1.100	7.84	1.071
1.92	1.099	8.00	1.074
2.08	1.098	8.16	1.077
2.24	1.097	8.32	1.079
2.40	1.096	8.48	1.082
2.56	1.094	8.64	1.084
2.72	1.093	8.80	1.087
2.88	1.091	8.96	1.089
3.04	1.089	9.12	1.091
3.20	1.087	9.28	1.094
3.36	1.085	9.44	1.096
3.52	1.083	9.60	1.098
3.68	1.081	9.76	1.100
3.84	1.080	9.92	1.102
4.00	1.078	10.08	1.104
4.16	1.077	10.24	1.105
4.32	1.076	10.40	1.107
4.48	1.075	10.56	1.108
4.64	1.073	10.72	1.110
4.80	1.072	10.88	1.111
4.96	1.071	11.04	1.112
5.12	1.070	11.20	1.113
5.28	1.068	11.36	1.114
5.44	1.067	11.52	1.114
5.60	1.065	11.68	1.114
5.76	1.063	11.84	1.114
5.92	1.062	12.00	1.114

Figure 18. Baseload AOD W(z) at 4700 MWD/MTU
V. C. Summer - Cycle 15

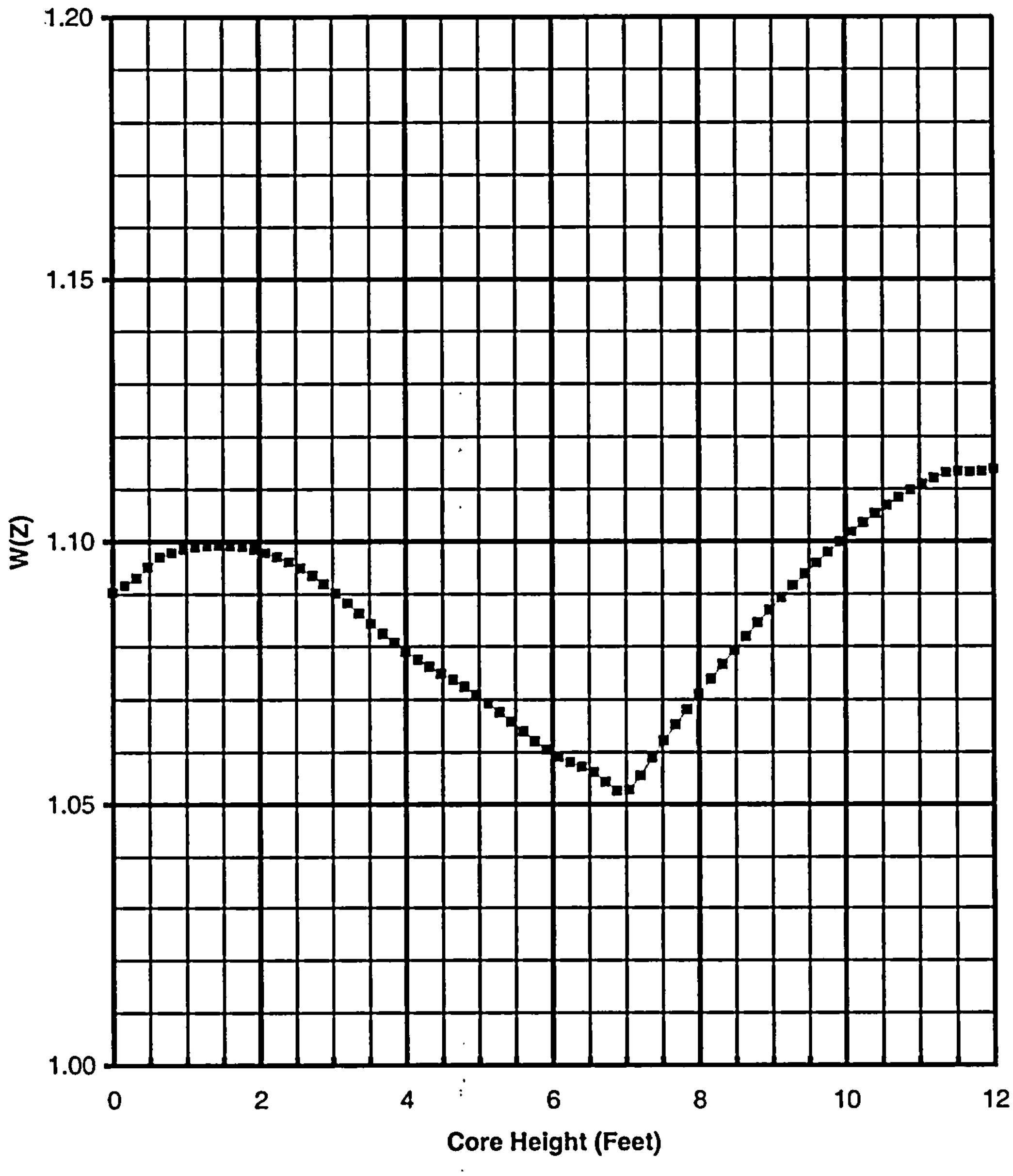


Table 15. Baseload AOD W(z) at 4700 MWD/MTU
V. C. Summer - Cycle 15

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.00	1.090	6.08	1.059
0.16	1.092	6.24	1.058
0.32	1.093	6.40	1.057
0.48	1.095	6.56	1.056
0.64	1.097	6.72	1.054
0.80	1.098	6.88	1.053
0.96	1.099	7.04	1.053
1.12	1.099	7.20	1.056
1.28	1.099	7.36	1.059
1.44	1.099	7.52	1.062
1.60	1.099	7.68	1.065
1.76	1.099	7.84	1.068
1.92	1.099	8.00	1.071
2.08	1.098	8.16	1.074
2.24	1.097	8.32	1.077
2.40	1.096	8.48	1.079
2.56	1.095	8.64	1.082
2.72	1.094	8.80	1.085
2.88	1.092	8.96	1.087
3.04	1.090	9.12	1.089
3.20	1.088	9.28	1.092
3.36	1.086	9.44	1.094
3.52	1.084	9.60	1.096
3.68	1.082	9.76	1.098
3.84	1.081	9.92	1.100
4.00	1.079	10.08	1.102
4.16	1.078	10.24	1.104
4.32	1.076	10.40	1.105
4.48	1.075	10.56	1.107
4.64	1.074	10.72	1.108
4.80	1.072	10.88	1.110
4.96	1.071	11.04	1.111
5.12	1.069	11.20	1.112
5.28	1.068	11.36	1.113
5.44	1.066	11.52	1.113
5.60	1.064	11.68	1.113
5.76	1.062	11.84	1.113
5.92	1.061	12.00	1.114

Figure 19. Baseload AOD W(z) at 10000 MWD/MTU
V. C. Summer - Cycle 15

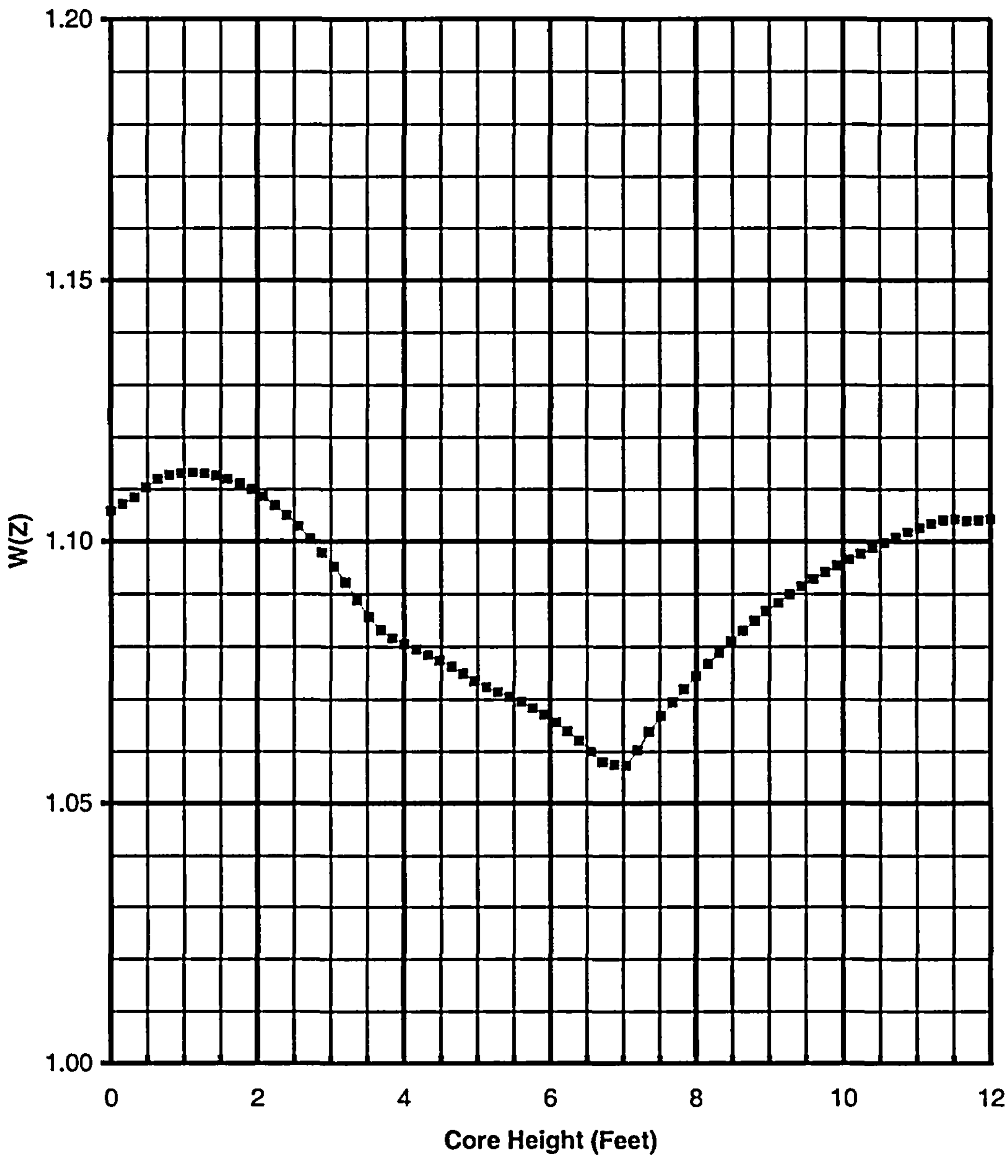


Table 16. Baseload AOD W(z) at 10000 MWD/MTU
V. C. Summer - Cycle 15

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.00	1.106	6.08	1.066
0.16	1.107	6.24	1.064
0.32	1.108	6.40	1.062
0.48	1.110	6.56	1.060
0.64	1.112	6.72	1.058
0.80	1.113	6.88	1.058
0.96	1.113	7.04	1.057
1.12	1.113	7.20	1.060
1.28	1.113	7.36	1.064
1.44	1.113	7.52	1.067
1.60	1.112	7.68	1.069
1.76	1.111	7.84	1.072
1.92	1.110	8.00	1.074
2.08	1.109	8.16	1.077
2.24	1.107	8.32	1.079
2.40	1.105	8.48	1.081
2.56	1.103	8.64	1.083
2.72	1.101	8.80	1.085
2.88	1.098	8.96	1.087
3.04	1.095	9.12	1.088
3.20	1.092	9.28	1.090
3.36	1.089	9.44	1.091
3.52	1.086	9.60	1.093
3.68	1.083	9.76	1.094
3.84	1.082	9.92	1.095
4.00	1.081	10.08	1.097
4.16	1.080	10.24	1.098
4.32	1.079	10.40	1.099
4.48	1.077	10.56	1.100
4.64	1.076	10.72	1.101
4.80	1.075	10.88	1.102
4.96	1.074	11.04	1.103
5.12	1.072	11.20	1.103
5.28	1.071	11.36	1.104
5.44	1.071	11.52	1.104
5.60	1.070	11.68	1.104
5.76	1.068	11.84	1.104
5.92	1.067	12.00	1.104

Figure 20. Baseload AOD W(z) at 20000 MWD/MTU
V. C. Summer - Cycle 15

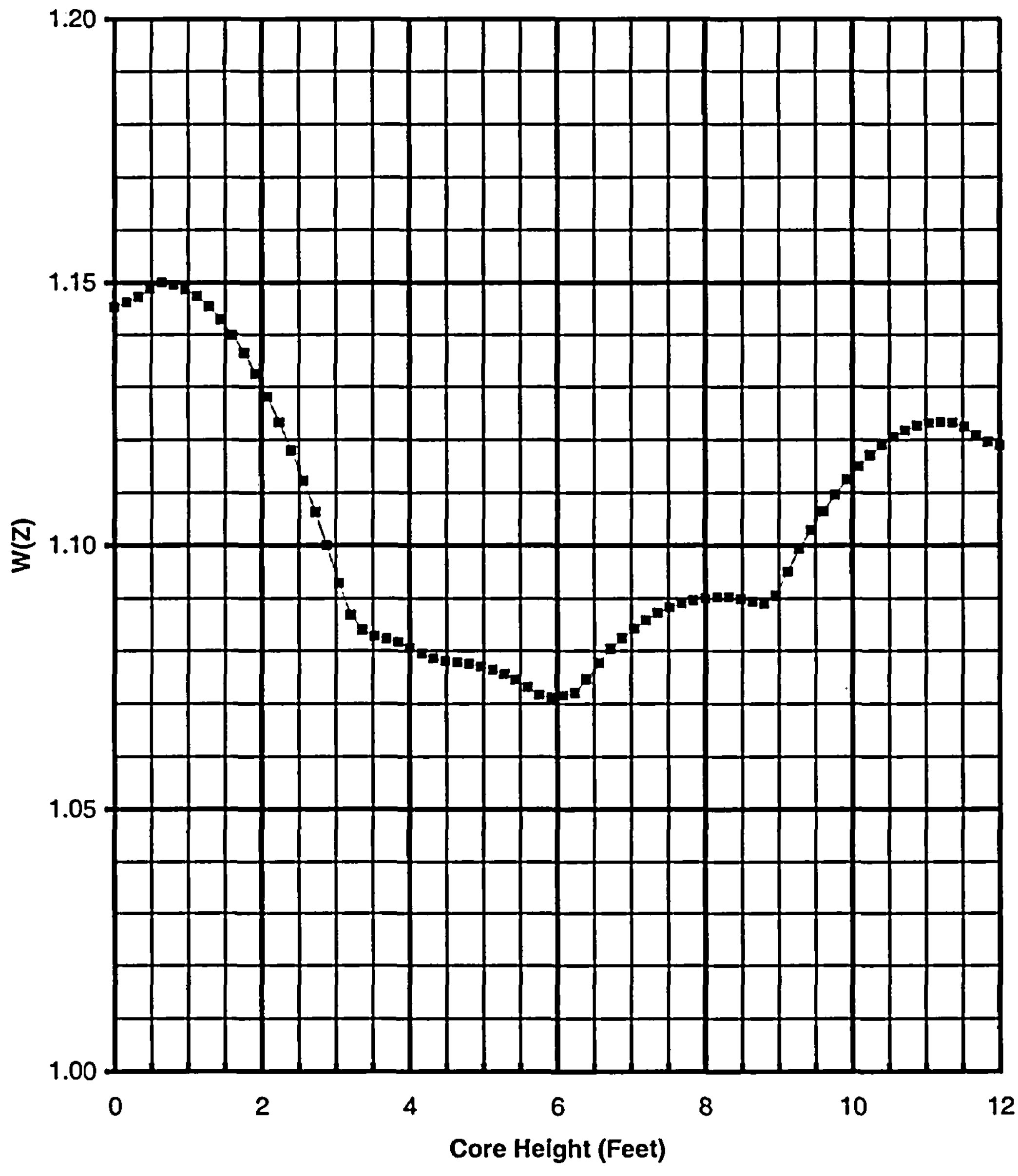
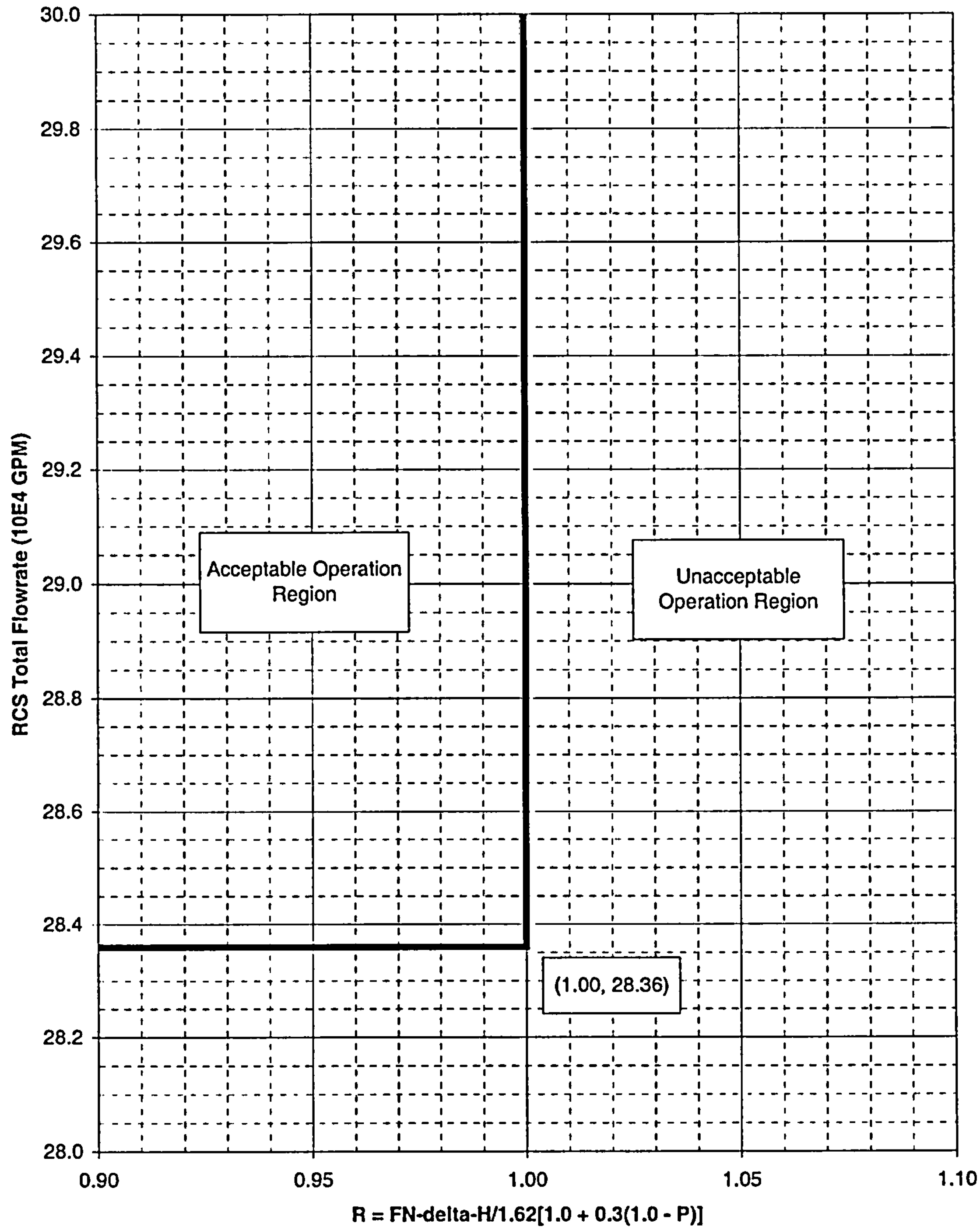


Table 17. Baseload AOD W(z) at 20000 MWD/MTU
V. C. Summer - Cycle 15

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.00	1.145	6.08	1.072
0.16	1.146	6.24	1.072
0.32	1.147	6.40	1.075
0.48	1.149	6.56	1.078
0.64	1.150	6.72	1.080
0.80	1.150	6.88	1.082
0.96	1.149	7.04	1.084
1.12	1.147	7.20	1.086
1.28	1.145	7.36	1.087
1.44	1.143	7.52	1.088
1.60	1.140	7.68	1.089
1.76	1.137	7.84	1.090
1.92	1.133	8.00	1.090
2.08	1.128	8.16	1.090
2.24	1.123	8.32	1.090
2.40	1.118	8.48	1.090
2.56	1.112	8.64	1.089
2.72	1.106	8.80	1.089
2.88	1.100	8.96	1.091
3.04	1.093	9.12	1.095
3.20	1.087	9.28	1.099
3.36	1.084	9.44	1.103
3.52	1.083	9.60	1.107
3.68	1.082	9.76	1.110
3.84	1.082	9.92	1.113
4.00	1.081	10.08	1.115
4.16	1.080	10.24	1.117
4.32	1.079	10.40	1.119
4.48	1.078	10.56	1.121
4.64	1.078	10.72	1.122
4.80	1.078	10.88	1.123
4.96	1.077	11.04	1.123
5.12	1.076	11.20	1.123
5.28	1.076	11.36	1.123
5.44	1.075	11.52	1.122
5.60	1.073	11.68	1.121
5.76	1.072	11.84	1.120
5.92	1.071	12.00	1.119

Figure 21. RCS Total Flowrate vs. R for Three Loop Operation
V. C. Summer - Cycle 15



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