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U. S. Nuclear Regulatory Commission
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Subject: VIRGIL C. SUMMER NUCLEAR STATION
DOCKET NO. 50-395
OPERATING LICENSE NO. NPF-12
CORE OPERATING LIMITS REPORT (COLR)
FOR CYCLE 13, REVISION 0

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 Revision 0 to the Cycle 13 Core Operating Limits Report (COLR).

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NUCLEAR EXCELLENCE - A SUMMER TRADITION!

SOUTH CAROLINA ELECTRIC & GAS COMPANY

VIRGIL C. SUMMER NUCLEAR STATION

CORE OPERATING LIMITS REPORT

FOR

CYCLE 13

REVISION 0

DECEMBER 2000

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1.0 Core Operating Limits Report

This Core Operating Limits Report (COLR) for V. C. Summer Station Cycle 13 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} $\Delta k/k/°F$.

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} $\Delta k/k/°F$
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The shutdown rods shall be withdrawn to at least 228 steps.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 13 are shown in Figure 3.

2.4.2 The Axial Flux Difference (AFD) target band during base load operations for Cycle 13 is:
BOL - EOL (0 - 21,000 MWD/MTU): ±5% about a measured target value.

2.4.3 The minimum allowable power level for base load operation, APL^{ND}, is 85% 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, 800, 3000, 10000, and 18000 MWD/MTU are shown in Figures 5 through 9 and Tables 1 through 5, 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.

2.5.4 Elevation dependent $W(z)_{BL}$ values for base load operation between 85 and 100% of rated thermal power with the item 2.4.2 specified target band about a measured target value at 150, 1000, 3000, 4700, 10000, and 18000 MWD/MTU are shown in Figures 10 through 15 and Tables 6 through 11, 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.

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

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

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

2.6.1 $PF_{\Delta H} = 0.3$

2.6.3 The Acceptable Operation Region from the combination of Reactor Coolant System total flow and R is provided in Figure 16.

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 13

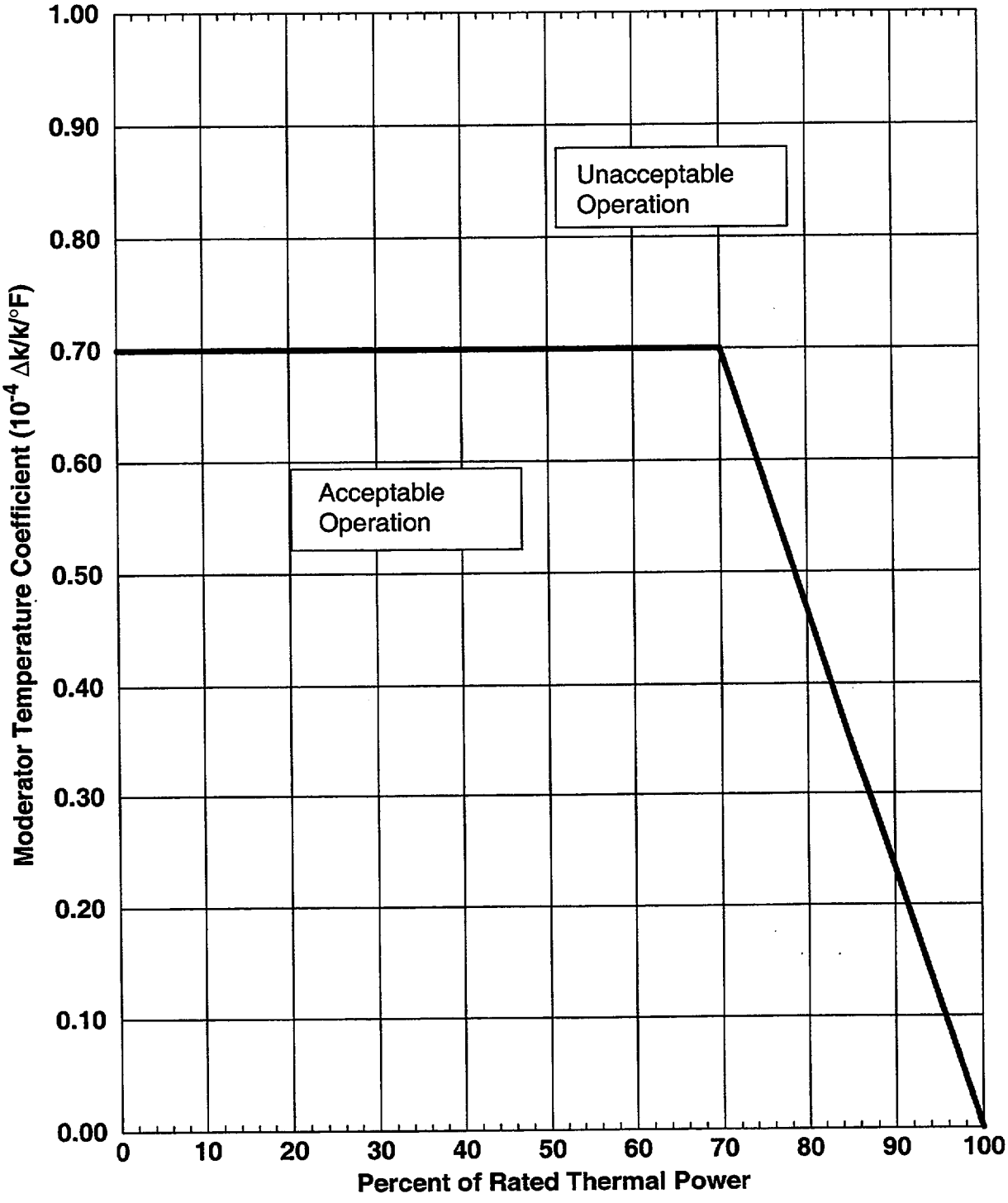


Figure 2. Rod Group Insertion Limits Versus Thermal Power for Three Loop Operation
V. C. Summer - Cycle 13

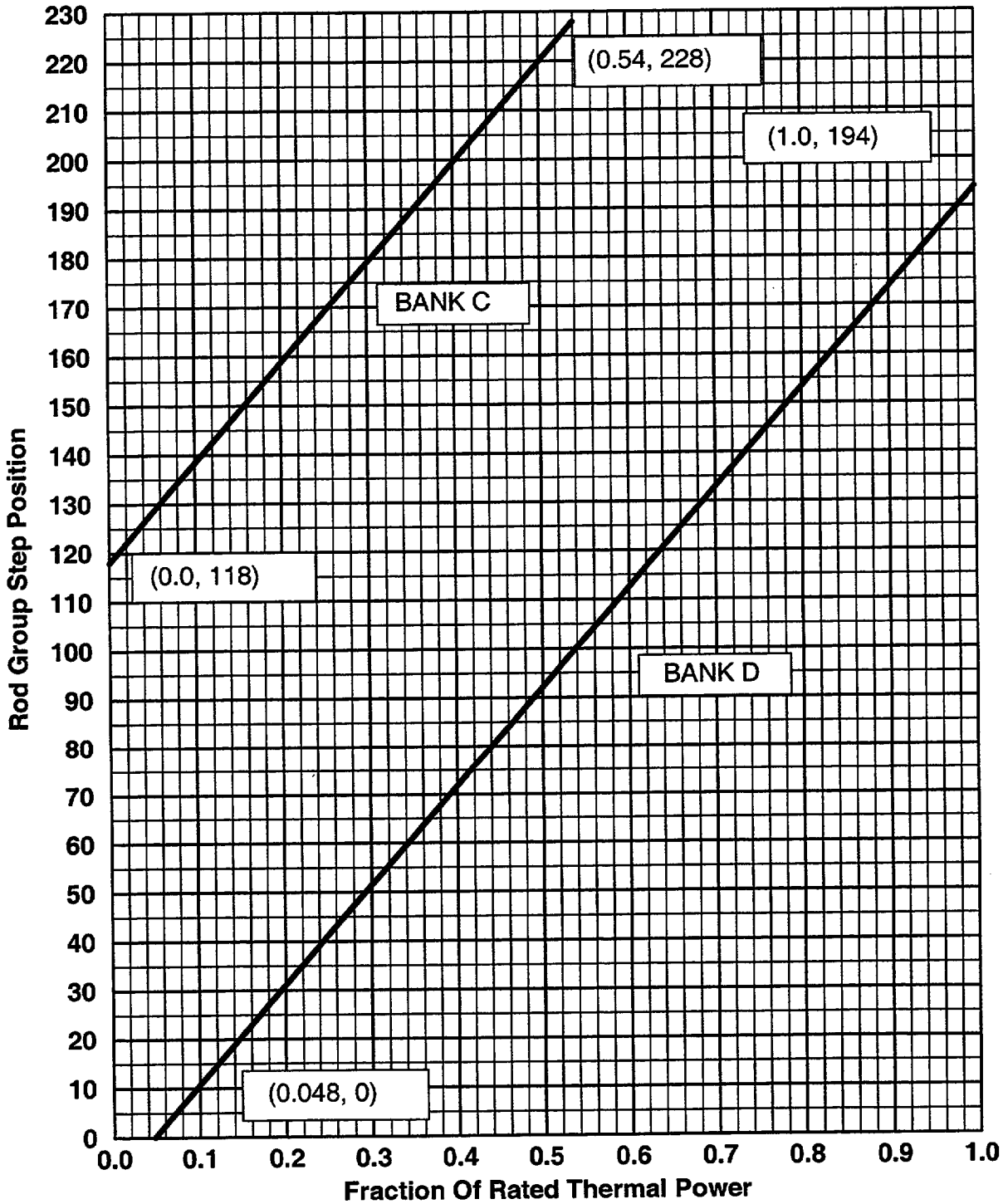


Figure 3. Axial Flux Difference Limits as a Function of Rated Thermal Power
V. C. Summer - Cycle 13

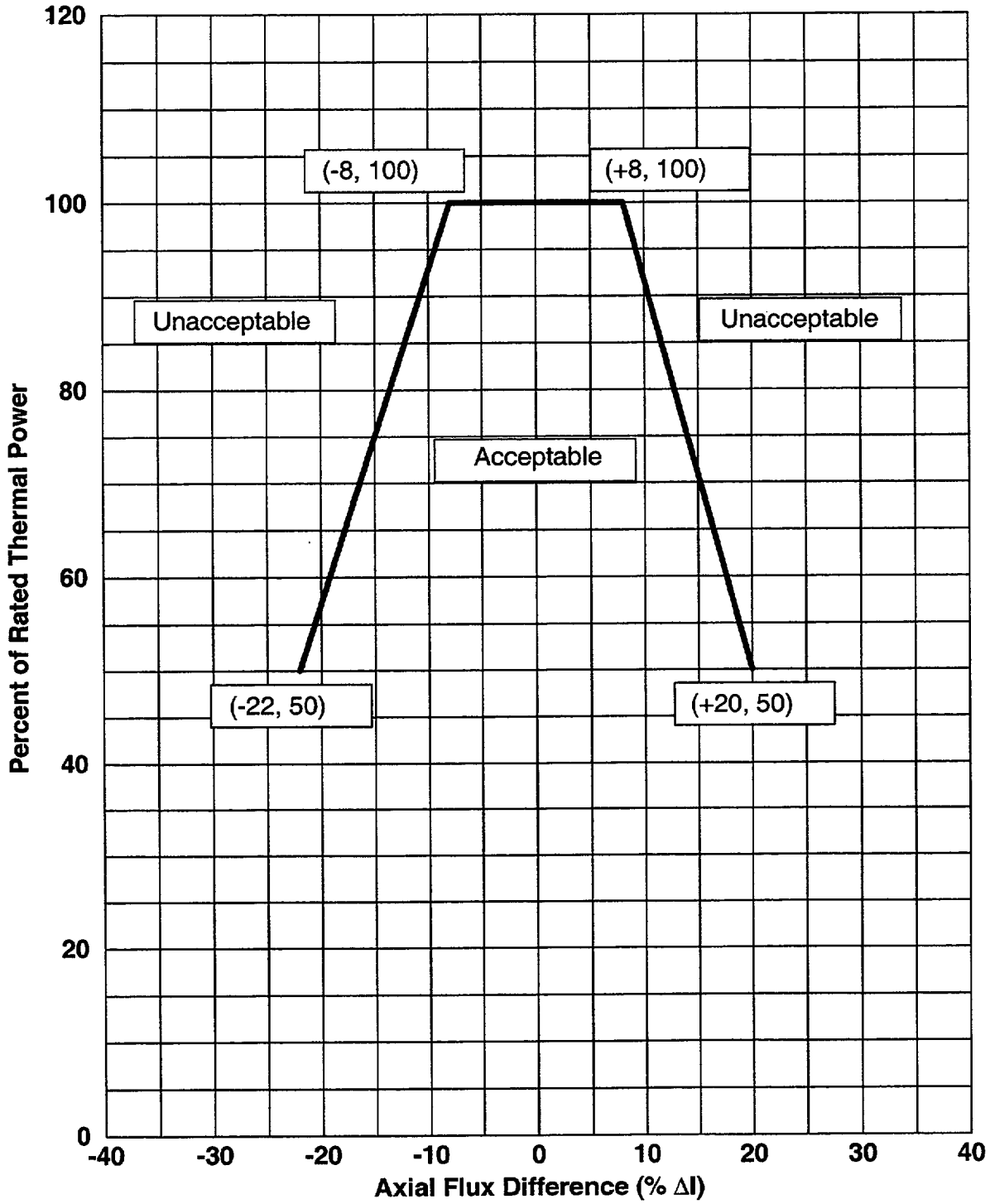


Figure 4. K(z) - Normalized $F_Q(z)$ as a Function of Core Height
V. C. Summer - Cycle 13

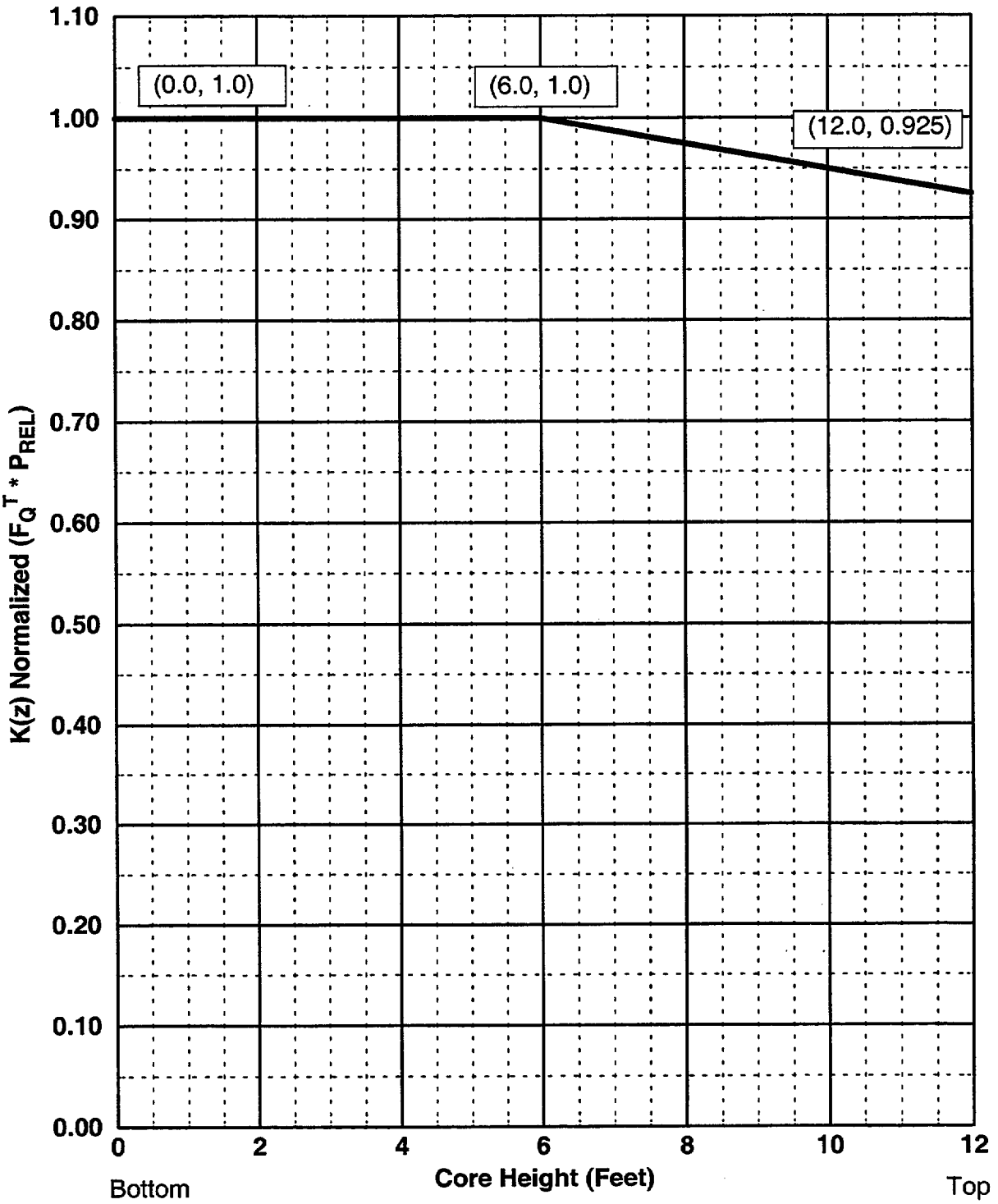


Figure 5. RAOC W(z) at 150 MWD/MTU
V. C. Summer - Cycle 13

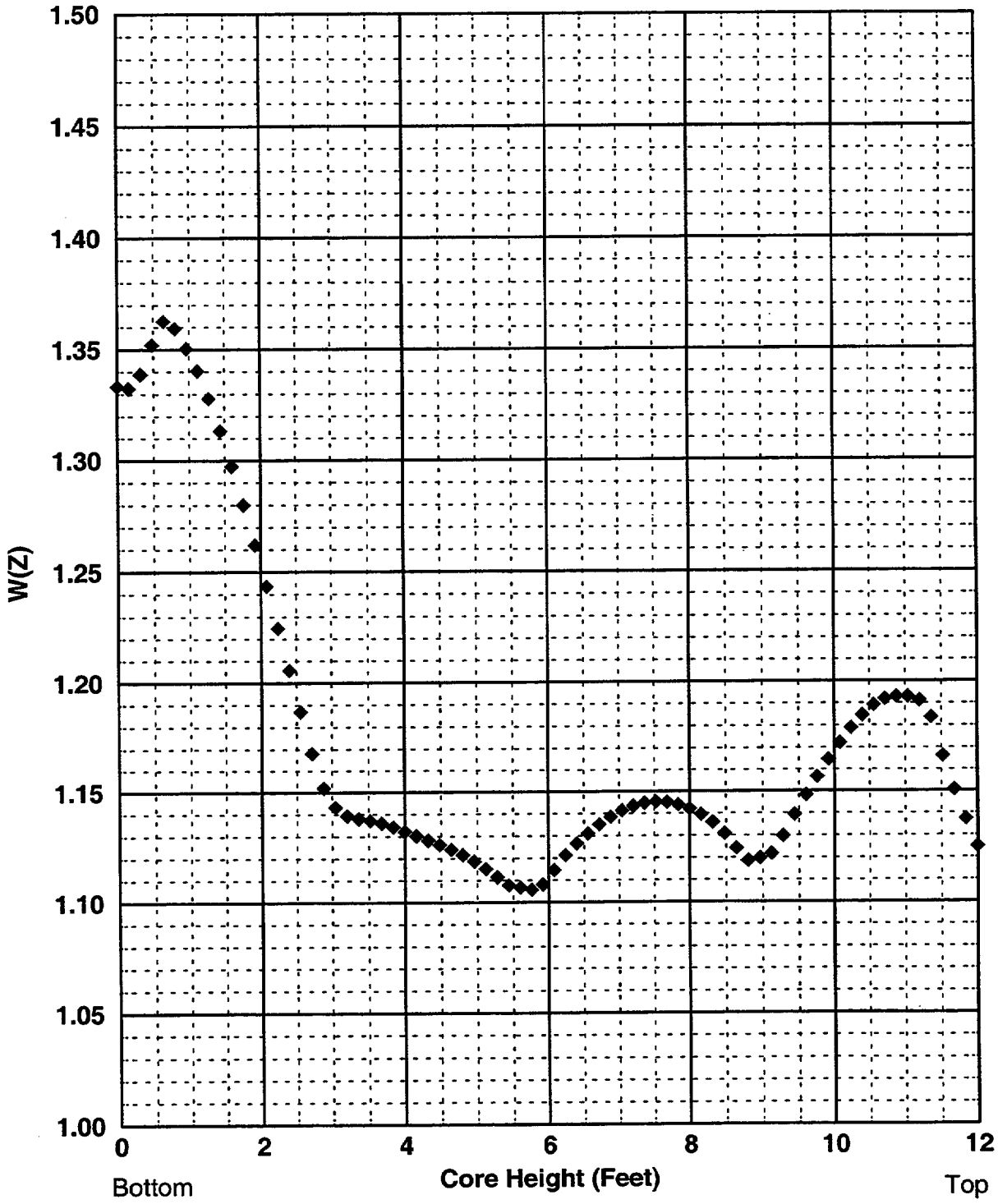


Table 1. RAOC W(z) at 150 MWD/MTU
V. C. Summer - Cycle 13

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.00	1.3334	6.08	1.1145
0.16	1.3325	6.24	1.1212
0.32	1.3388	6.40	1.1265
0.48	1.3520	6.56	1.1310
0.64	1.3626	6.72	1.1350
0.80	1.3593	6.88	1.1385
0.96	1.3504	7.04	1.1413
1.12	1.3403	7.20	1.1434
1.28	1.3279	7.36	1.1447
1.44	1.3133	7.52	1.1453
1.60	1.2973	7.68	1.1451
1.76	1.2800	7.84	1.1439
1.92	1.2620	8.00	1.1420
2.08	1.2435	8.16	1.1394
2.24	1.2247	8.32	1.1359
2.40	1.2057	8.48	1.1308
2.56	1.1869	8.64	1.1241
2.72	1.1680	8.80	1.1186
2.88	1.1519	8.96	1.1197
3.04	1.1432	9.12	1.1217
3.20	1.1393	9.28	1.1296
3.36	1.1379	9.44	1.1393
3.52	1.1371	9.60	1.1481
3.68	1.1359	9.76	1.1565
3.84	1.1341	9.92	1.1646
4.00	1.1321	10.08	1.1721
4.16	1.1301	10.24	1.1788
4.32	1.1281	10.40	1.1845
4.48	1.1261	10.56	1.1891
4.64	1.1239	10.72	1.1918
4.80	1.1215	10.88	1.1928
4.96	1.1186	11.04	1.1929
5.12	1.1152	11.20	1.1911
5.28	1.1114	11.36	1.1836
5.44	1.1077	11.52	1.1662
5.60	1.1067	11.68	1.1505
5.76	1.1057	11.84	1.1372
5.92	1.1080	12.00	1.1248

Figure 6. RAOC W(z) at 800 MWD/MTU
V. C. Summer - Cycle 13

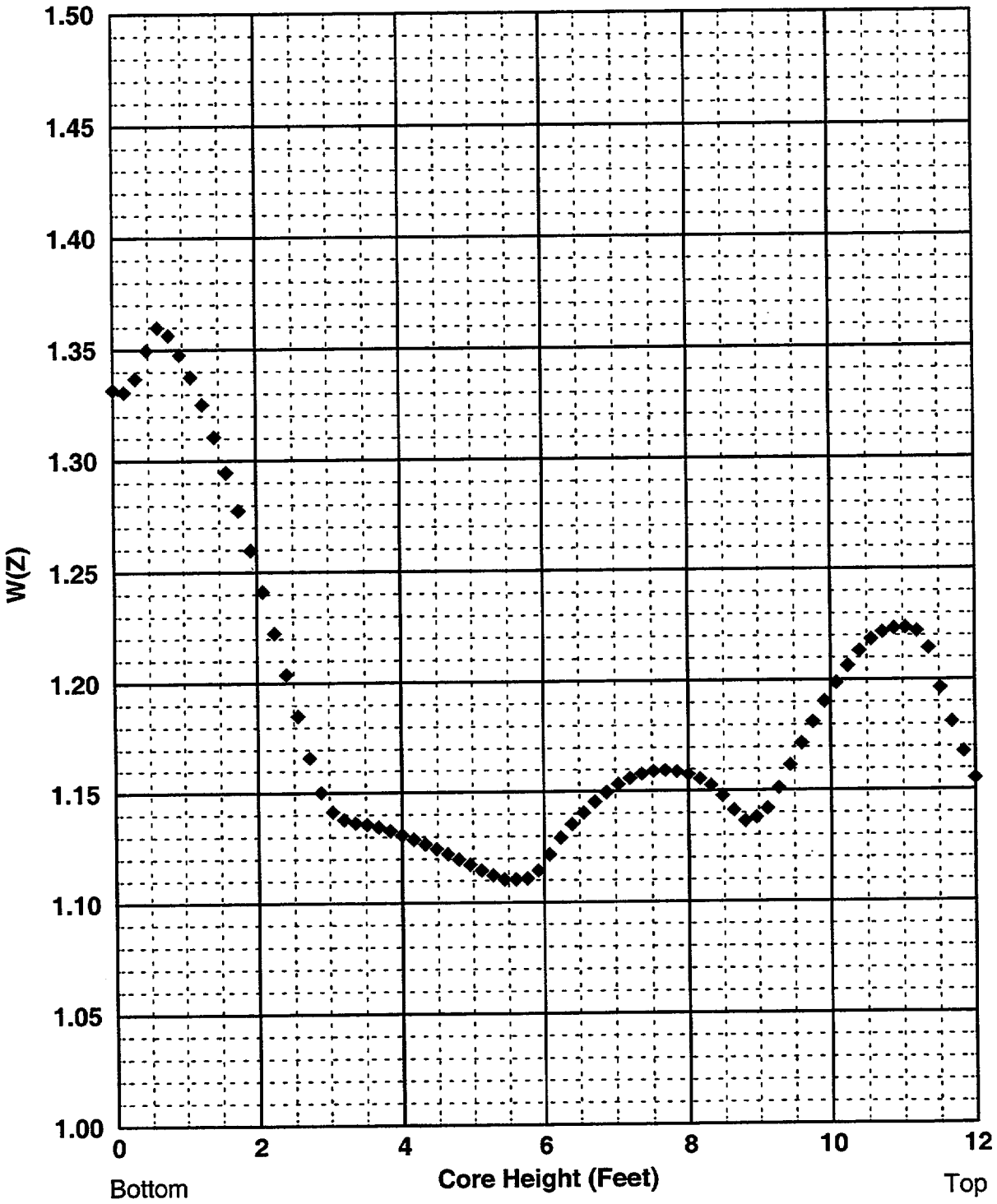


Table 2. RAOC W(z) at 800 MWD/MTU
V. C. Summer - Cycle 13

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.00	1.3318	6.08	1.1216
0.16	1.3308	6.24	1.1291
0.32	1.3369	6.40	1.1352
0.48	1.3496	6.56	1.1404
0.64	1.3599	6.72	1.1452
0.80	1.3564	6.88	1.1494
0.96	1.3476	7.04	1.1530
1.12	1.3376	7.20	1.1558
1.28	1.3252	7.36	1.1578
1.44	1.3106	7.52	1.1590
1.60	1.2946	7.68	1.1594
1.76	1.2775	7.84	1.1588
1.92	1.2596	8.00	1.1575
2.08	1.2412	8.16	1.1554
2.24	1.2225	8.32	1.1524
2.40	1.2037	8.48	1.1477
2.56	1.1851	8.64	1.1411
2.72	1.1662	8.80	1.1363
2.88	1.1501	8.96	1.1379
3.04	1.1414	9.12	1.1418
3.20	1.1378	9.28	1.1510
3.36	1.1363	9.44	1.1617
3.52	1.1356	9.60	1.1716
3.68	1.1344	9.76	1.1811
3.84	1.1326	9.92	1.1903
4.00	1.1307	10.08	1.1987
4.16	1.1287	10.24	1.2063
4.32	1.1266	10.40	1.2129
4.48	1.1244	10.56	1.2182
4.64	1.1221	10.72	1.2215
4.80	1.1196	10.88	1.2231
4.96	1.1172	11.04	1.2235
5.12	1.1145	11.20	1.2219
5.28	1.1122	11.36	1.2142
5.44	1.1104	11.52	1.1962
5.60	1.1104	11.68	1.1810
5.76	1.1107	11.84	1.1676
5.92	1.1143	12.00	1.1551

Figure 7. RAOC W(z) at 3000 MWD/MTU
V. C. Summer - Cycle 13

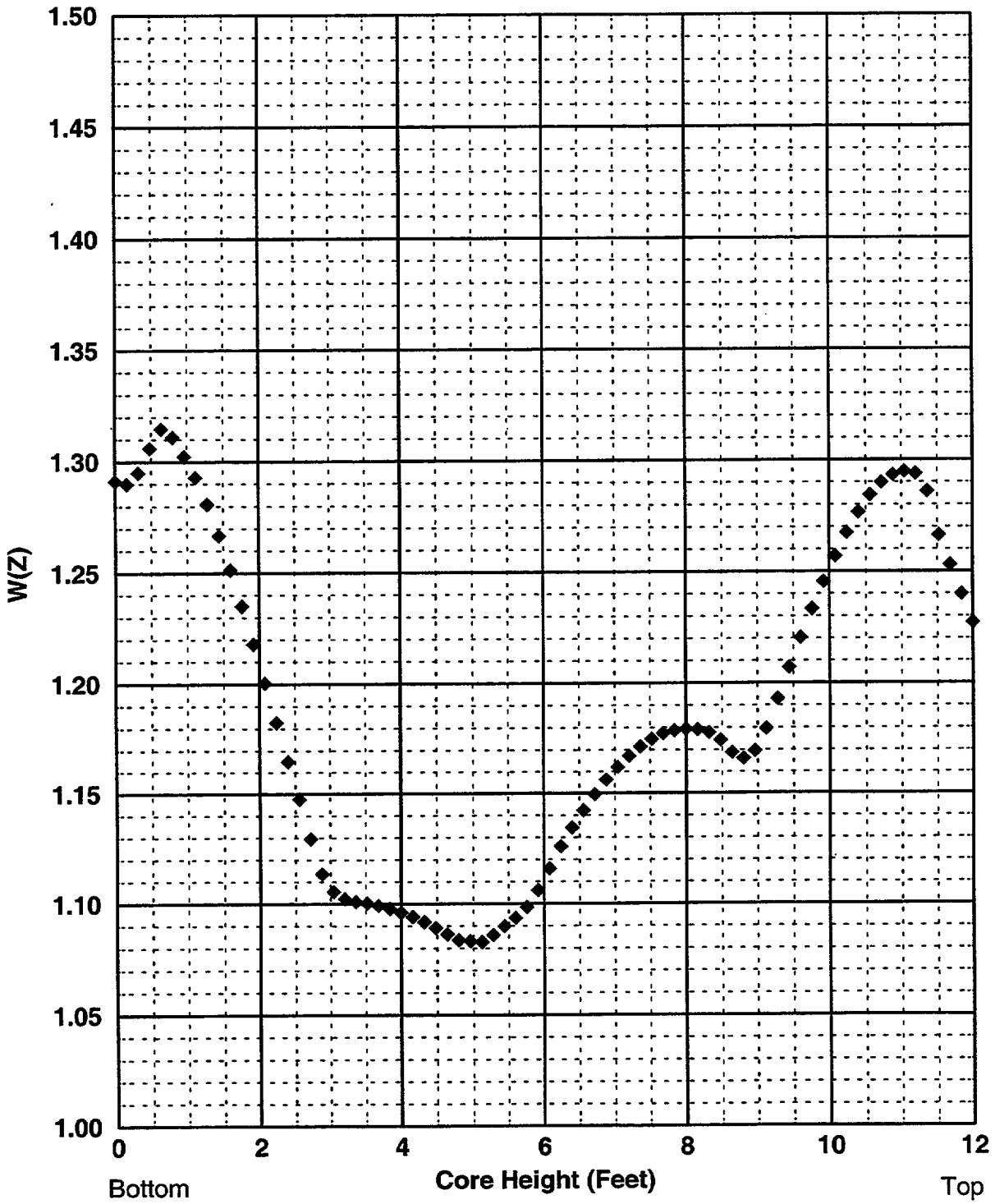


Table 3. RAOC W(z) at 3000 MWD/MTU
V. C. Summer - Cycle 13

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.00	1.2911	6.08	1.1159
0.16	1.2899	6.24	1.1258
0.32	1.2950	6.40	1.1344
0.48	1.3060	6.56	1.1422
0.64	1.3146	6.72	1.1494
0.80	1.3109	6.88	1.1561
0.96	1.3023	7.04	1.1620
1.12	1.2928	7.20	1.1671
1.28	1.2808	7.36	1.1714
1.44	1.2667	7.52	1.1748
1.60	1.2514	7.68	1.1773
1.76	1.2350	7.84	1.1786
1.92	1.2179	8.00	1.1792
2.08	1.2004	8.16	1.1790
2.24	1.1826	8.32	1.1778
2.40	1.1650	8.48	1.1744
2.56	1.1476	8.64	1.1687
2.72	1.1294	8.80	1.1661
2.88	1.1135	8.96	1.1695
3.04	1.1054	9.12	1.1795
3.20	1.1023	9.28	1.1929
3.36	1.1010	9.44	1.2069
3.52	1.1003	9.60	1.2203
3.68	1.0992	9.76	1.2332
3.84	1.0978	9.92	1.2455
4.00	1.0960	10.08	1.2569
4.16	1.0941	10.24	1.2674
4.32	1.0918	10.40	1.2766
4.48	1.0891	10.56	1.2842
4.64	1.0862	10.72	1.2898
4.80	1.0836	10.88	1.2932
4.96	1.0831	11.04	1.2947
5.12	1.0827	11.20	1.2938
5.28	1.0858	11.36	1.2858
5.44	1.0898	11.52	1.2662
5.60	1.0936	11.68	1.2529
5.76	1.0984	11.84	1.2398
5.92	1.1060	12.00	1.2270

Figure 8. RAOC W(z) at 10000 MWD/MTU
V. C. Summer - Cycle 13

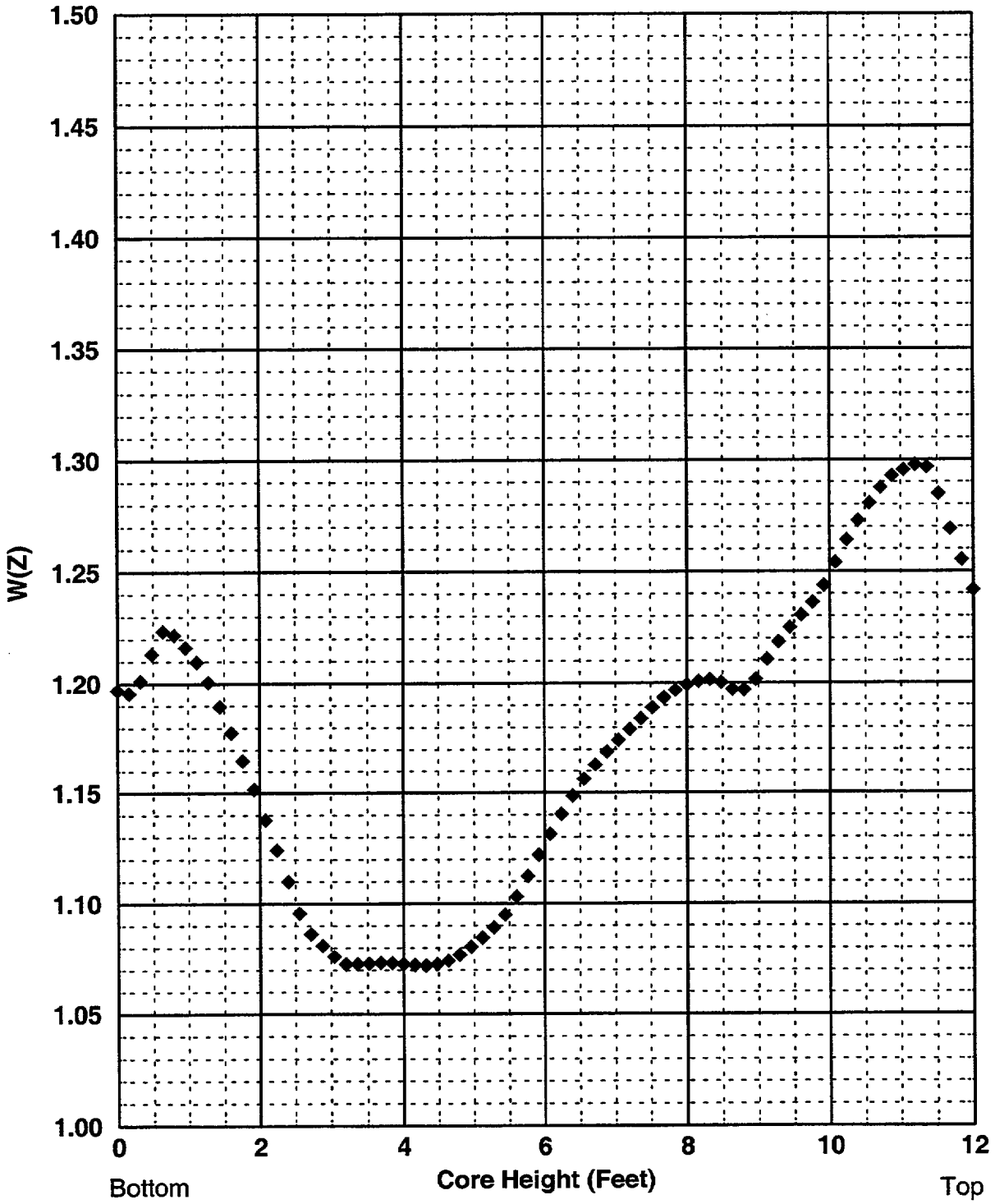


Table 4. RAOC W(z) at 10000 MWD/MTU
V. C. Summer - Cycle 13

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.00	1.1969	6.08	1.1313
0.16	1.1957	6.24	1.1403
0.32	1.2012	6.40	1.1485
0.48	1.2133	6.56	1.1561
0.64	1.2235	6.72	1.1628
0.80	1.2218	6.88	1.1689
0.96	1.2162	7.04	1.1742
1.12	1.2097	7.20	1.1790
1.28	1.2006	7.36	1.1839
1.44	1.1896	7.52	1.1889
1.60	1.1777	7.68	1.1934
1.76	1.1650	7.84	1.1967
1.92	1.1516	8.00	1.1991
2.08	1.1378	8.16	1.2007
2.24	1.1242	8.32	1.2015
2.40	1.1100	8.48	1.2002
2.56	1.0957	8.64	1.1971
2.72	1.0862	8.80	1.1969
2.88	1.0810	8.96	1.2016
3.04	1.0761	9.12	1.2106
3.20	1.0726	9.28	1.2184
3.36	1.0727	9.44	1.2248
3.52	1.0729	9.60	1.2304
3.68	1.0732	9.76	1.2361
3.84	1.0731	9.92	1.2437
4.00	1.0727	10.08	1.2540
4.16	1.0722	10.24	1.2640
4.32	1.0720	10.40	1.2727
4.48	1.0726	10.56	1.2805
4.64	1.0741	10.72	1.2874
4.80	1.0768	10.88	1.2927
4.96	1.0804	11.04	1.2955
5.12	1.0845	11.20	1.2977
5.28	1.0891	11.36	1.2967
5.44	1.0949	11.52	1.2847
5.60	1.1030	11.68	1.2689
5.76	1.1123	11.84	1.2551
5.92	1.1219	12.00	1.2416

Figure 9. RAOC W(z) at 18000 MWD/MTU
V. C. Summer - Cycle 13

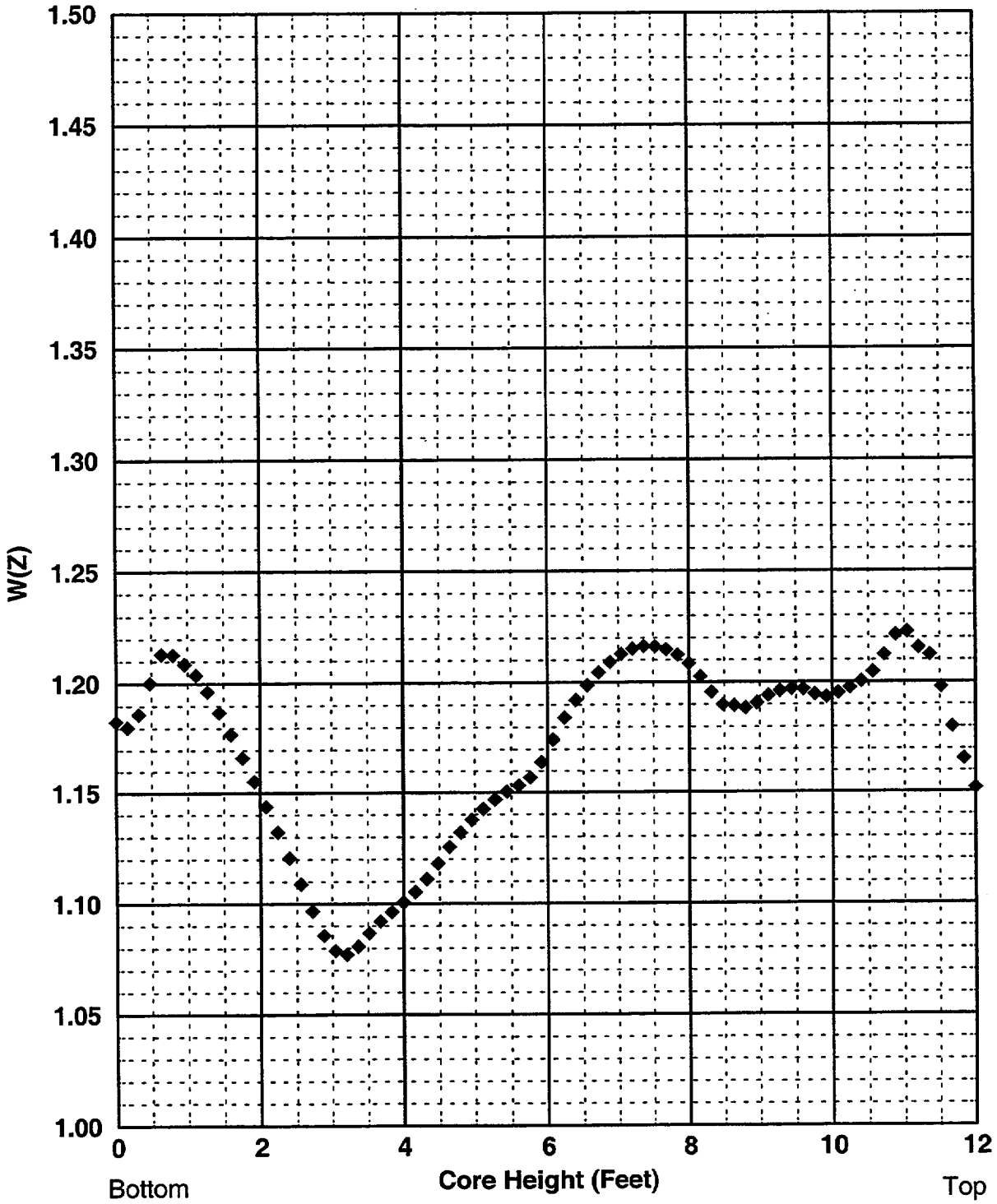


Table 5. RAOC W(z) at 18000 MWD/MTU
V. C. Summer - Cycle 13

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.00	1.1829	6.08	1.1743
0.16	1.1803	6.24	1.1842
0.32	1.1862	6.40	1.1921
0.48	1.2002	6.56	1.1987
0.64	1.2131	6.72	1.2044
0.80	1.2128	6.88	1.2091
0.96	1.2087	7.04	1.2127
1.12	1.2037	7.20	1.2150
1.28	1.1963	7.36	1.2162
1.44	1.1870	7.52	1.2160
1.60	1.1771	7.68	1.2147
1.76	1.1664	7.84	1.2122
1.92	1.1553	8.00	1.2084
2.08	1.1438	8.16	1.2025
2.24	1.1322	8.32	1.1955
2.40	1.1205	8.48	1.1899
2.56	1.1089	8.64	1.1895
2.72	1.0967	8.80	1.1884
2.88	1.0856	8.96	1.1907
3.04	1.0788	9.12	1.1940
3.20	1.0771	9.28	1.1961
3.36	1.0808	9.44	1.1970
3.52	1.0868	9.60	1.1968
3.68	1.0920	9.76	1.1945
3.84	1.0963	9.92	1.1933
4.00	1.1005	10.08	1.1952
4.16	1.1053	10.24	1.1975
4.32	1.1111	10.40	1.2003
4.48	1.1180	10.56	1.2046
4.64	1.1254	10.72	1.2122
4.80	1.1319	10.88	1.2212
4.96	1.1376	11.04	1.2226
5.12	1.1425	11.20	1.2155
5.28	1.1468	11.36	1.2122
5.44	1.1503	11.52	1.1977
5.60	1.1530	11.68	1.1799
5.76	1.1568	11.84	1.1654
5.92	1.1641	12.00	1.1517

Figure 10. Baseload W(z) at 150 MWD/MTU
V. C. Summer - Cycle 13

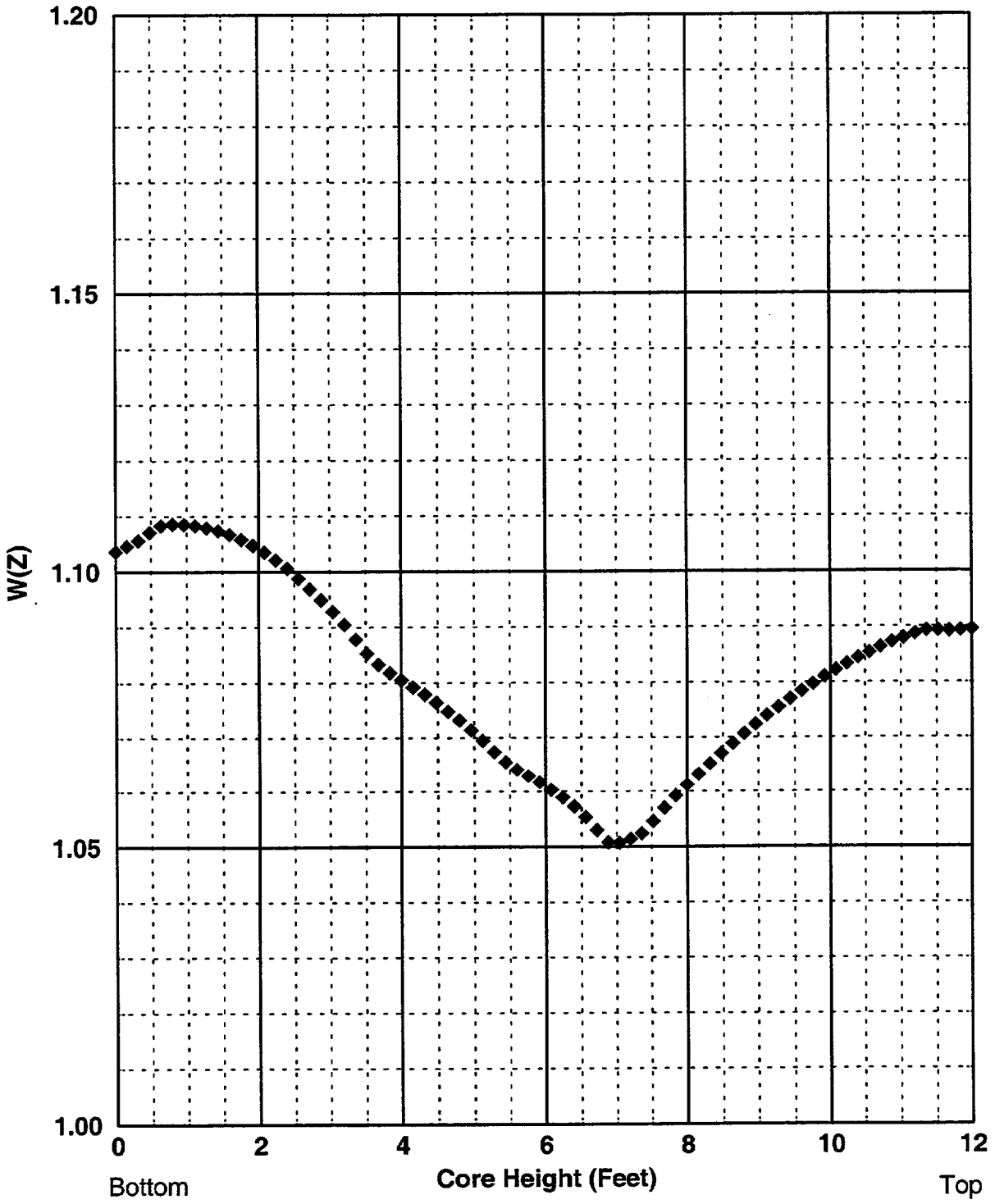


Table 6. Baseload W(z) at 150 MWD/MTU
V. C. Summer - Cycle 13

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.00	1.1036	6.08	1.0603
0.16	1.1046	6.24	1.0589
0.32	1.1056	6.40	1.0573
0.48	1.1071	6.56	1.0554
0.64	1.1083	6.72	1.0530
0.80	1.1086	6.88	1.0508
0.96	1.1085	7.04	1.0507
1.12	1.1083	7.20	1.0514
1.28	1.1079	7.36	1.0524
1.44	1.1074	7.52	1.0546
1.60	1.1067	7.68	1.0570
1.76	1.1058	7.84	1.0592
1.92	1.1047	8.00	1.0612
2.08	1.1035	8.16	1.0632
2.24	1.1021	8.32	1.0652
2.40	1.1006	8.48	1.0671
2.56	1.0988	8.64	1.0689
2.72	1.0969	8.80	1.0707
2.88	1.0949	8.96	1.0724
3.04	1.0928	9.12	1.0740
3.20	1.0905	9.28	1.0755
3.36	1.0878	9.44	1.0770
3.52	1.0853	9.60	1.0784
3.68	1.0833	9.76	1.0797
3.84	1.0818	9.92	1.0810
4.00	1.0805	10.08	1.0822
4.16	1.0792	10.24	1.0833
4.32	1.0779	10.40	1.0844
4.48	1.0764	10.56	1.0853
4.64	1.0748	10.72	1.0863
4.80	1.0732	10.88	1.0872
4.96	1.0714	11.04	1.0879
5.12	1.0695	11.20	1.0887
5.28	1.0674	11.36	1.0893
5.44	1.0655	11.52	1.0893
5.60	1.0641	11.68	1.0892
5.76	1.0629	11.84	1.0893
5.92	1.0617	12.00	1.0895

Figure 11. Baseload W(z) at 1000 MWD/MTU
V. C. Summer - Cycle 13

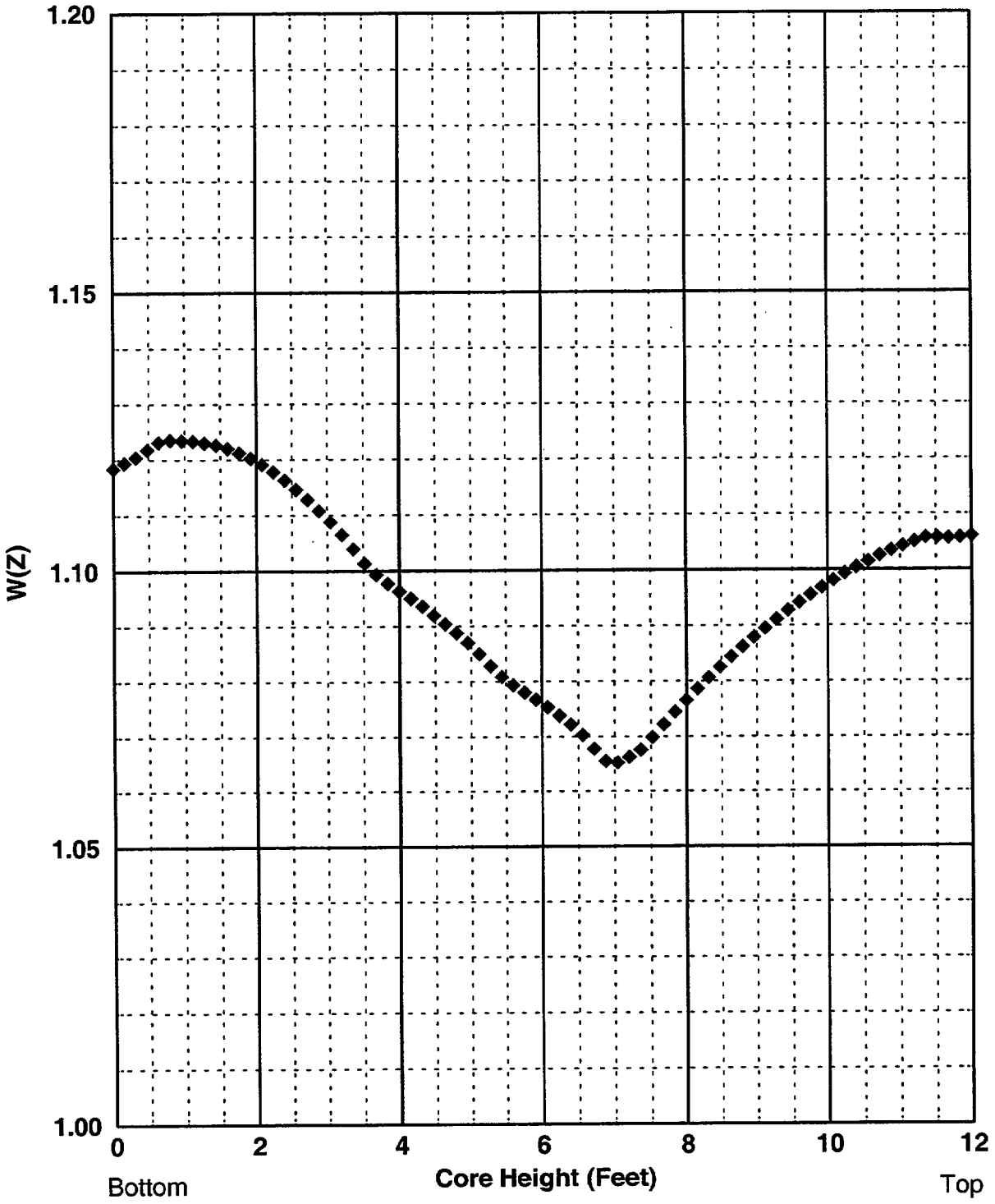


Table 7. Baseload W(z) at 1000 MWD/MTU
V. C. Summer - Cycle 13

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.00	1.1184	6.08	1.0753
0.16	1.1194	6.24	1.0738
0.32	1.1204	6.40	1.0722
0.48	1.1218	6.56	1.0703
0.64	1.1231	6.72	1.0678
0.80	1.1235	6.88	1.0656
0.96	1.1234	7.04	1.0653
1.12	1.1233	7.20	1.0663
1.28	1.1230	7.36	1.0676
1.44	1.1226	7.52	1.0699
1.60	1.1220	7.68	1.0722
1.76	1.1212	7.84	1.0744
1.92	1.1202	8.00	1.0765
2.08	1.1191	8.16	1.0786
2.24	1.1178	8.32	1.0806
2.40	1.1163	8.48	1.0825
2.56	1.1146	8.64	1.0844
2.72	1.1128	8.80	1.0862
2.88	1.1108	8.96	1.0879
3.04	1.1088	9.12	1.0895
3.20	1.1065	9.28	1.0911
3.36	1.1039	9.44	1.0927
3.52	1.1013	9.60	1.0941
3.68	1.0993	9.76	1.0955
3.84	1.0977	9.92	1.0968
4.00	1.0963	10.08	1.0981
4.16	1.0950	10.24	1.0993
4.32	1.0936	10.40	1.1004
4.48	1.0920	10.56	1.1014
4.64	1.0904	10.72	1.1025
4.80	1.0888	10.88	1.1034
4.96	1.0870	11.04	1.1042
5.12	1.0850	11.20	1.1050
5.28	1.0828	11.36	1.1057
5.44	1.0808	11.52	1.1057
5.60	1.0793	11.68	1.1056
5.76	1.0780	11.84	1.1057
5.92	1.0767	12.00	1.1060

Figure 12. Baseload W(z) at 3000 MWD/MTU
V. C. Summer - Cycle 13

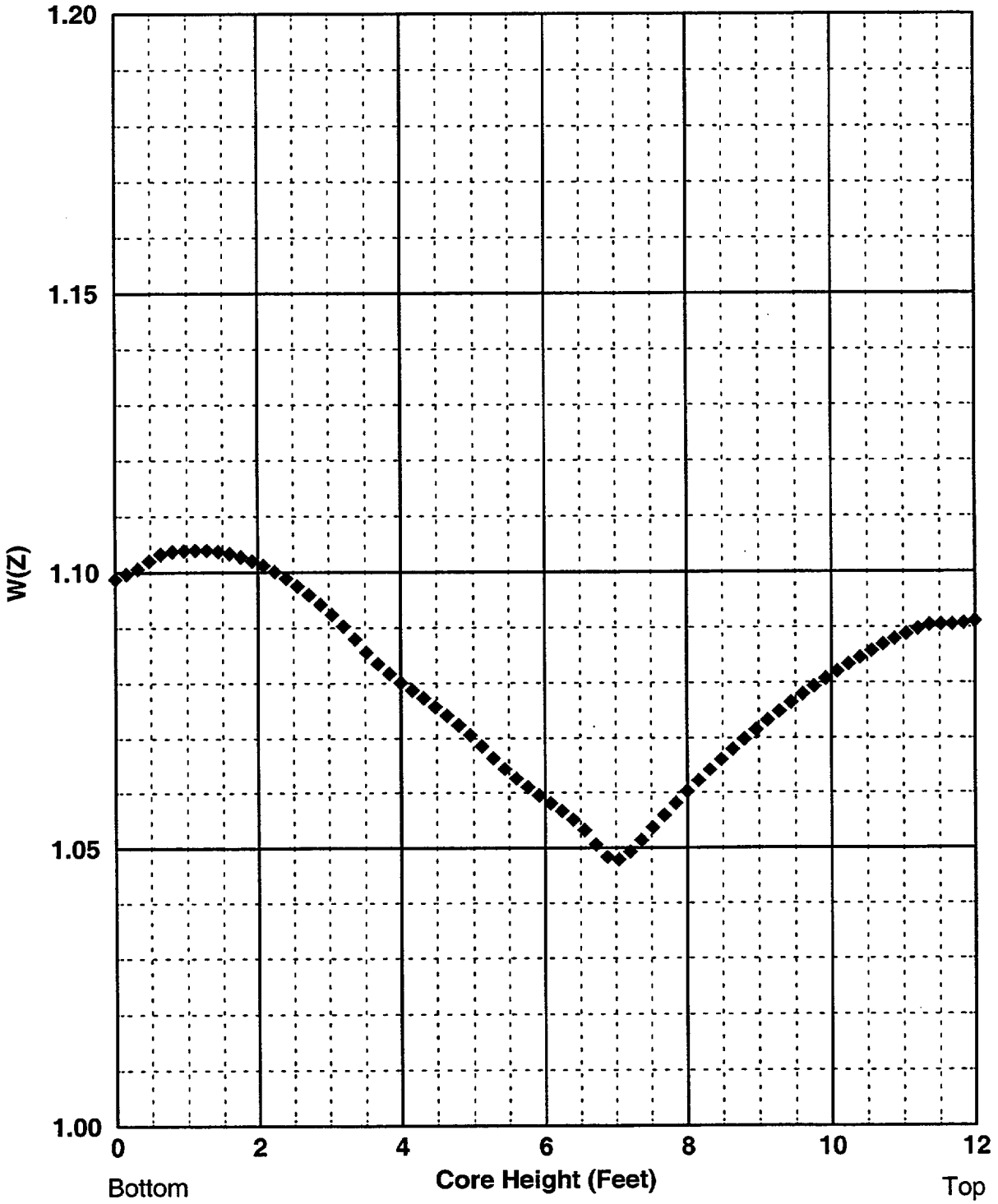


Table 8. Baseload W(z) at 3000 MWD/MTU
V. C. Summer - Cycle 13

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.00	1.0988	6.08	1.0581
0.16	1.0997	6.24	1.0567
0.32	1.1006	6.40	1.0551
0.48	1.1020	6.56	1.0532
0.64	1.1032	6.72	1.0506
0.80	1.1037	6.88	1.0484
0.96	1.1038	7.04	1.0479
1.12	1.1039	7.20	1.0493
1.28	1.1039	7.36	1.0514
1.44	1.1037	7.52	1.0537
1.60	1.1033	7.68	1.0559
1.76	1.1027	7.84	1.0581
1.92	1.1020	8.00	1.0602
2.08	1.1012	8.16	1.0622
2.24	1.1001	8.32	1.0642
2.40	1.0989	8.48	1.0661
2.56	1.0975	8.64	1.0680
2.72	1.0959	8.80	1.0698
2.88	1.0942	8.96	1.0715
3.04	1.0924	9.12	1.0732
3.20	1.0903	9.28	1.0748
3.36	1.0880	9.44	1.0764
3.52	1.0856	9.60	1.0779
3.68	1.0835	9.76	1.0793
3.84	1.0817	9.92	1.0807
4.00	1.0801	10.08	1.0820
4.16	1.0787	10.24	1.0833
4.32	1.0773	10.40	1.0845
4.48	1.0757	10.56	1.0857
4.64	1.0741	10.72	1.0869
4.80	1.0724	10.88	1.0879
4.96	1.0706	11.04	1.0888
5.12	1.0686	11.20	1.0897
5.28	1.0664	11.36	1.0904
5.44	1.0644	11.52	1.0905
5.60	1.0626	11.68	1.0905
5.76	1.0610	11.84	1.0907
5.92	1.0595	12.00	1.0911

Figure 13. Baseload W(z) at 4700 MWD/MTU
V. C. Summer - Cycle 13

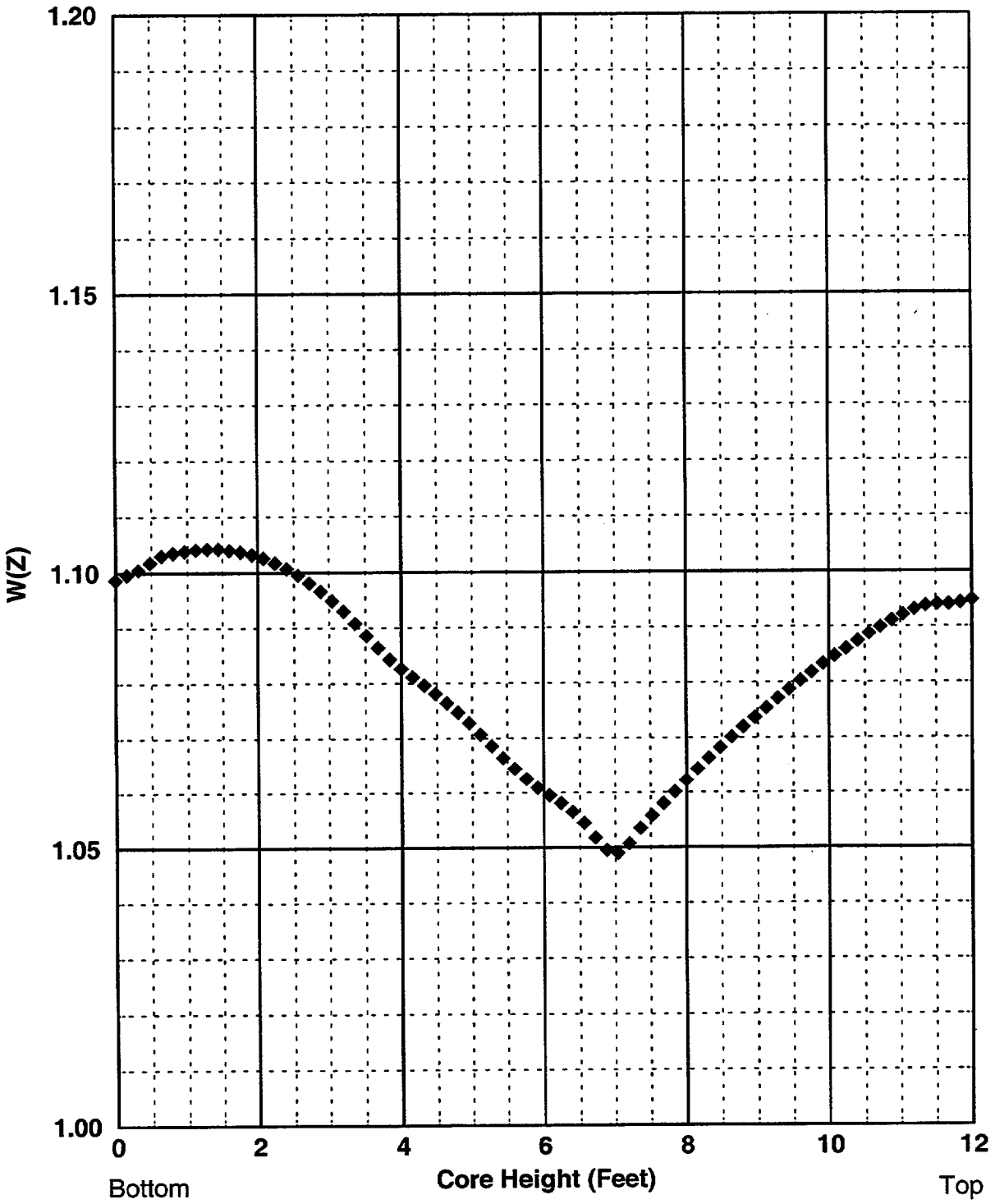


Table 9. Baseload W(z) at 4700 MWD/MTU
V. C. Summer - Cycle 13

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.00	1.0987	6.08	1.0595
0.16	1.0996	6.24	1.0581
0.32	1.1005	6.40	1.0565
0.48	1.1018	6.56	1.0545
0.64	1.1030	6.72	1.0518
0.80	1.1035	6.88	1.0495
0.96	1.1038	7.04	1.0490
1.12	1.1041	7.20	1.0507
1.28	1.1042	7.36	1.0535
1.44	1.1042	7.52	1.0558
1.60	1.1040	7.68	1.0580
1.76	1.1037	7.84	1.0601
1.92	1.1032	8.00	1.0622
2.08	1.1026	8.16	1.0643
2.24	1.1017	8.32	1.0663
2.40	1.1007	8.48	1.0682
2.56	1.0995	8.64	1.0701
2.72	1.0981	8.80	1.0720
2.88	1.0966	8.96	1.0737
3.04	1.0949	9.12	1.0754
3.20	1.0930	9.28	1.0771
3.36	1.0908	9.44	1.0787
3.52	1.0886	9.60	1.0803
3.68	1.0864	9.76	1.0818
3.84	1.0843	9.92	1.0833
4.00	1.0826	10.08	1.0847
4.16	1.0811	10.24	1.0860
4.32	1.0796	10.40	1.0874
4.48	1.0781	10.56	1.0887
4.64	1.0764	10.72	1.0899
4.80	1.0747	10.88	1.0911
4.96	1.0728	11.04	1.0921
5.12	1.0707	11.20	1.0931
5.28	1.0686	11.36	1.0938
5.44	1.0664	11.52	1.0940
5.60	1.0644	11.68	1.0940
5.76	1.0625	11.84	1.0943
5.92	1.0609	12.00	1.0948

Figure 14. Baseload W(z) at 10000 MWD/MTU
V. C. Summer - Cycle 13

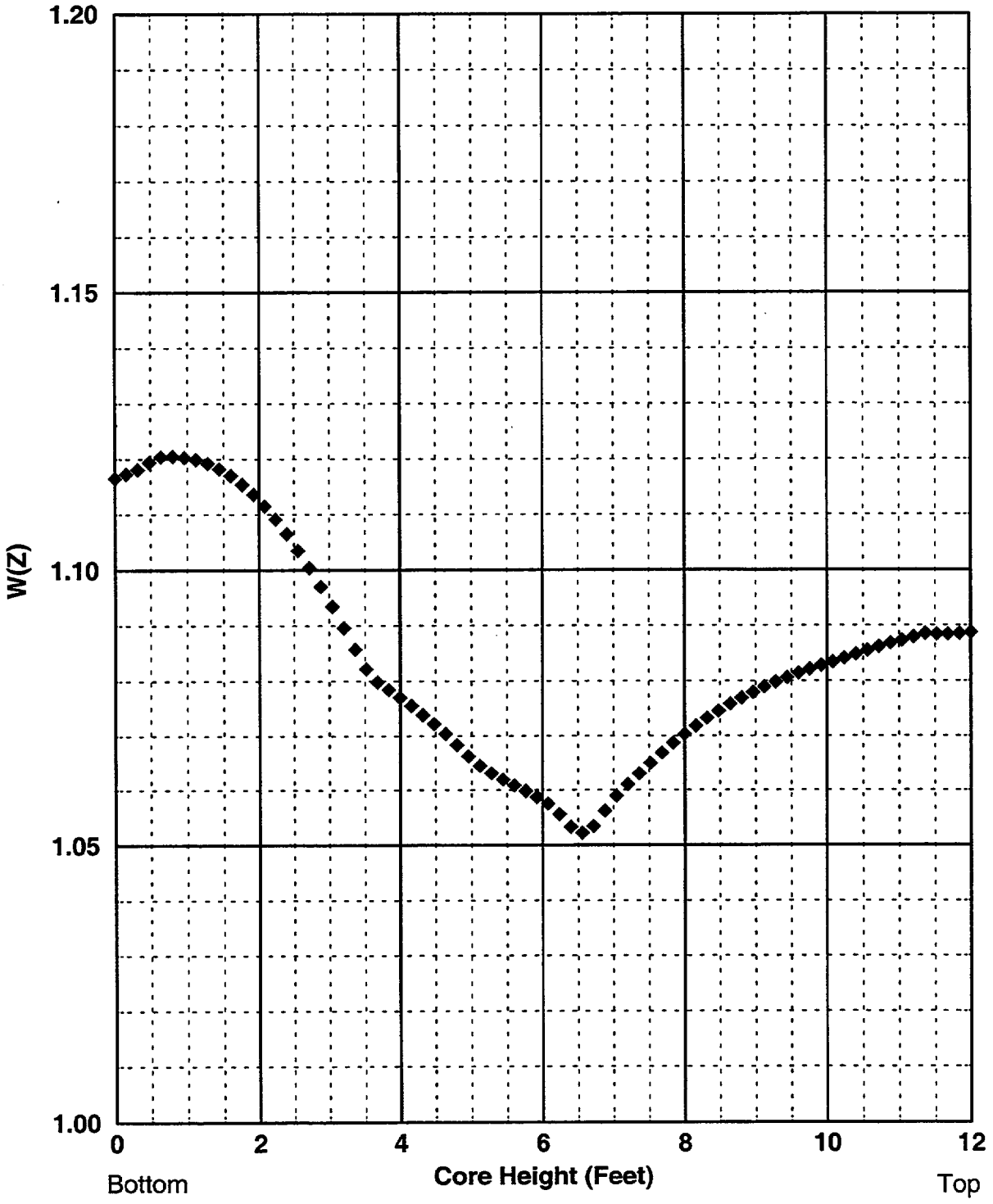


Table 10. Baseload W(z) at 10000 MWD/MTU
V. C. Summer - Cycle 13

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.00	1.1165	6.08	1.0575
0.16	1.1173	6.24	1.0556
0.32	1.1181	6.40	1.0533
0.48	1.1194	6.56	1.0522
0.64	1.1204	6.72	1.0534
0.80	1.1205	6.88	1.0562
0.96	1.1203	7.04	1.0589
1.12	1.1199	7.20	1.0610
1.28	1.1192	7.36	1.0630
1.44	1.1182	7.52	1.0650
1.60	1.1170	7.68	1.0669
1.76	1.1154	7.84	1.0687
1.92	1.1136	8.00	1.0703
2.08	1.1115	8.16	1.0718
2.24	1.1091	8.32	1.0732
2.40	1.1065	8.48	1.0745
2.56	1.1035	8.64	1.0758
2.72	1.1004	8.80	1.0769
2.88	1.0970	8.96	1.0779
3.04	1.0934	9.12	1.0789
3.20	1.0896	9.28	1.0798
3.36	1.0857	9.44	1.0806
3.52	1.0822	9.60	1.0814
3.68	1.0798	9.76	1.0821
3.84	1.0784	9.92	1.0828
4.00	1.0770	10.08	1.0834
4.16	1.0755	10.24	1.0841
4.32	1.0738	10.40	1.0848
4.48	1.0722	10.56	1.0855
4.64	1.0704	10.72	1.0862
4.80	1.0684	10.88	1.0868
4.96	1.0663	11.04	1.0873
5.12	1.0645	11.20	1.0879
5.28	1.0631	11.36	1.0885
5.44	1.0619	11.52	1.0884
5.60	1.0608	11.68	1.0884
5.76	1.0598	11.84	1.0885
5.92	1.0587	12.00	1.0887

Figure 15. Baseload W(z) at 18000 MWD/MTU
V. C. Summer - Cycle 13

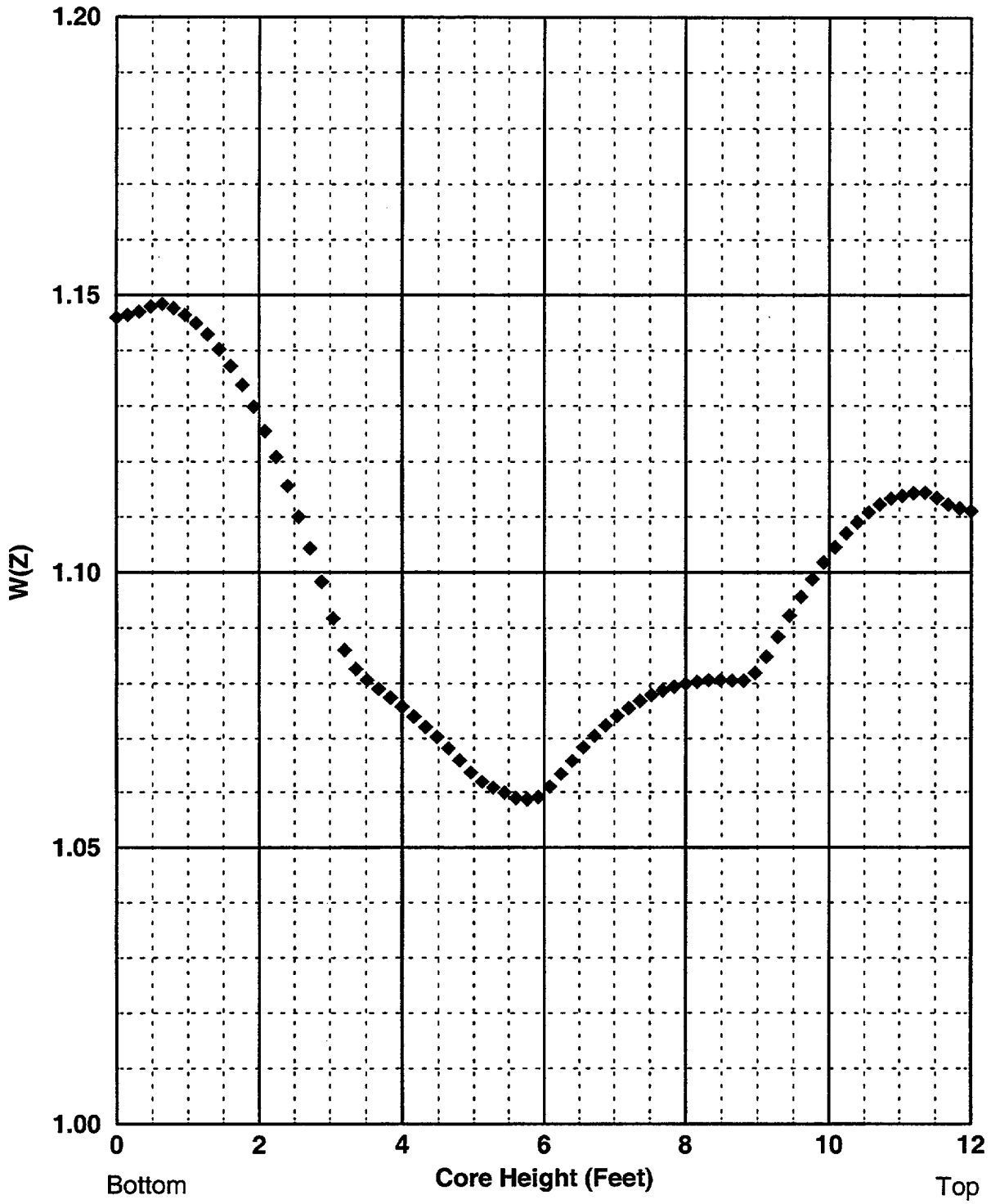
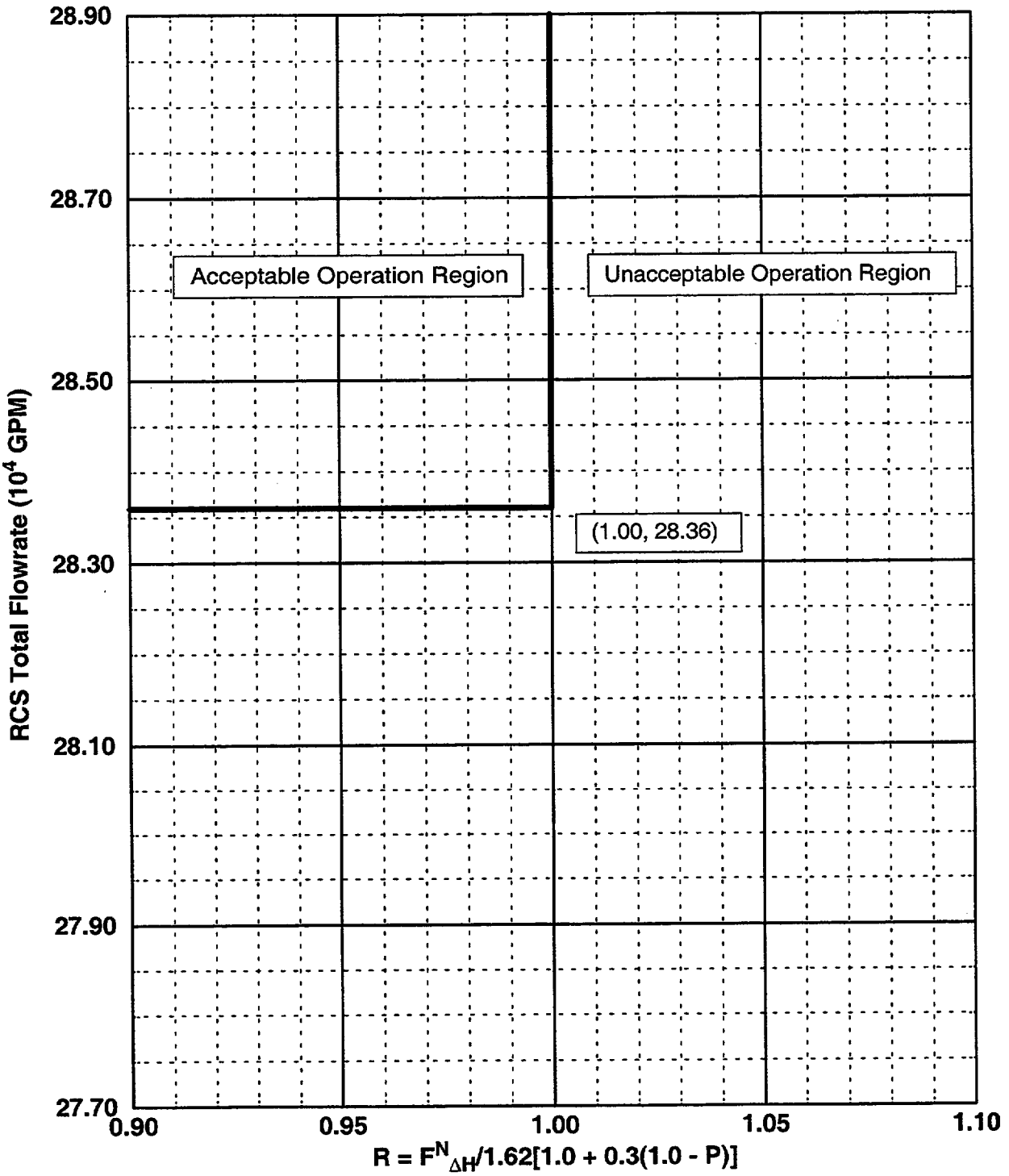


Table 11. Baseload W(z) at 18000 MWD/MTU
V. C. Summer - Cycle 13

Core Height (ft)	W(z)	Core Height (ft)	W(z)
0.00	1.1459	6.08	1.0610
0.16	1.1464	6.24	1.0634
0.32	1.1470	6.40	1.0659
0.48	1.1479	6.56	1.0684
0.64	1.1484	6.72	1.0705
0.80	1.1476	6.88	1.0724
0.96	1.1464	7.04	1.0741
1.12	1.1449	7.20	1.0755
1.28	1.1429	7.36	1.0768
1.44	1.1402	7.52	1.0779
1.60	1.1372	7.68	1.0787
1.76	1.1338	7.84	1.0794
1.92	1.1299	8.00	1.0799
2.08	1.1255	8.16	1.0803
2.24	1.1208	8.32	1.0806
2.40	1.1156	8.48	1.0806
2.56	1.1100	8.64	1.0805
2.72	1.1043	8.80	1.0805
2.88	1.0983	8.96	1.0819
3.04	1.0917	9.12	1.0848
3.20	1.0860	9.28	1.0884
3.36	1.0826	9.44	1.0922
3.52	1.0806	9.60	1.0956
3.68	1.0790	9.76	1.0988
3.84	1.0774	9.92	1.1018
4.00	1.0758	10.08	1.1045
4.16	1.0740	10.24	1.1070
4.32	1.0721	10.40	1.1090
4.48	1.0703	10.56	1.1108
4.64	1.0682	10.72	1.1122
4.80	1.0660	10.88	1.1133
4.96	1.0637	11.04	1.1138
5.12	1.0619	11.20	1.1143
5.28	1.0608	11.36	1.1144
5.44	1.0599	11.52	1.1134
5.60	1.0589	11.68	1.1122
5.76	1.0587	11.84	1.1115
5.92	1.0591	12.00	1.1110

Figure 16. RCS Total Flowrate Versus R for Three Loop Operation
V. C. Summer - Cycle 13



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