SOUTH CAROLINA ELECTRIC & GAS COMPANY

VIRGIL C. SUMMER NUCLEAR STATION

CORE OPERATING LIMITS REPORT

FOR

CYCLE 9

REVISION 1

FEBRUARY 3, 1995

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1.0 Core Operating Limits Report

This Core Operating Limits Report (COLR) for V. C. Summer Station Cycle 9 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 Limit
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

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) and Moderator Density Coefficient (MDC) limits are:

The BOL/ARO-MTC shall be less positive than the limits shown in Figure 1.
The EOL/ARO/RTP-MDC shall be less positive than -40 $\Delta k/gm/cc$.

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The shutdown rods shall be withdrawn to at least 225 steps.

2.3 Control Rod Insertion Limits (Specification 3.1.3.6):

The Control Bank Insertion Limits are specified by Figure 2.

Figure 1
Moderator Temperature Coefficient vs. Power Level
V. C. Summer - Cycle 9

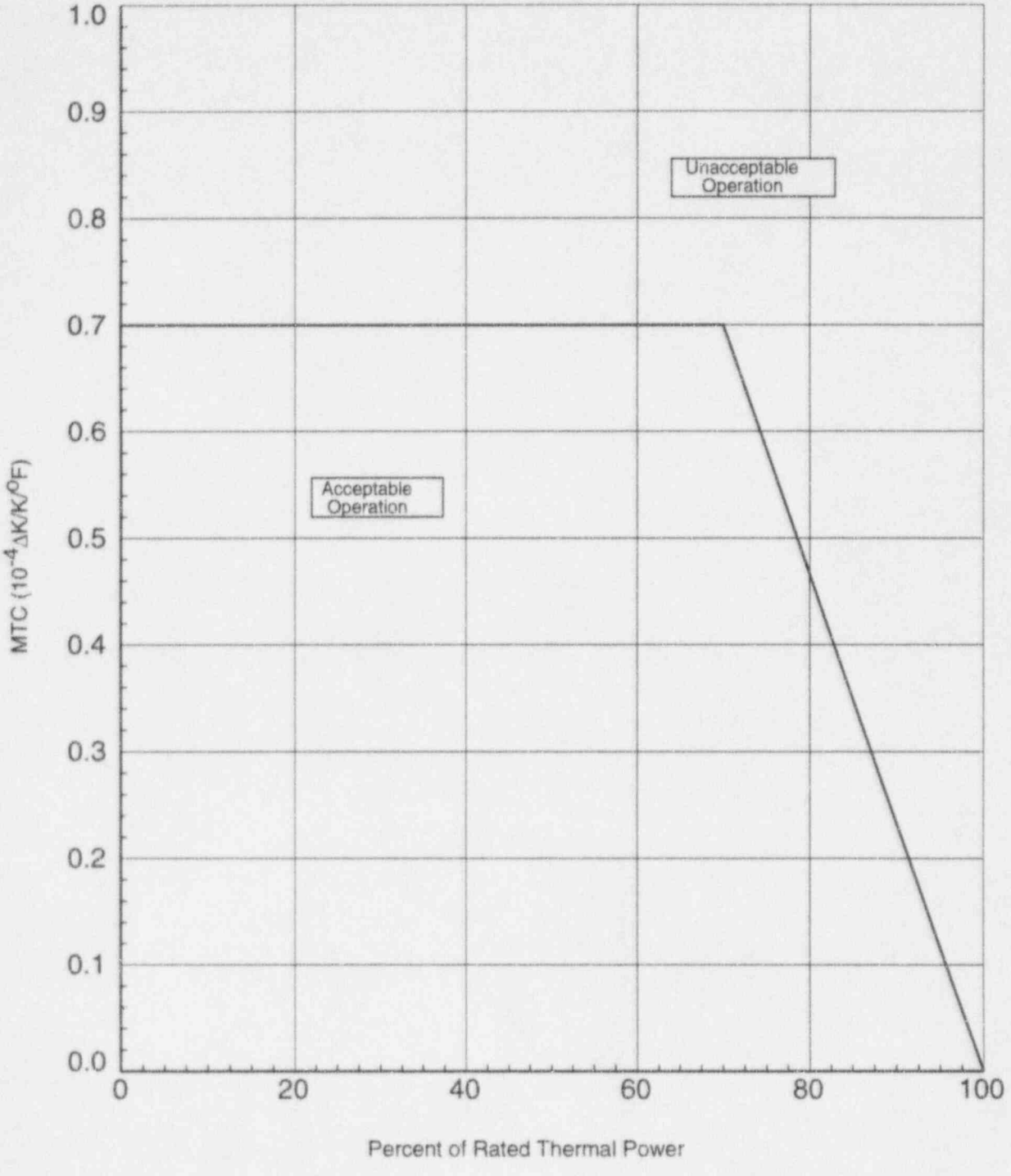
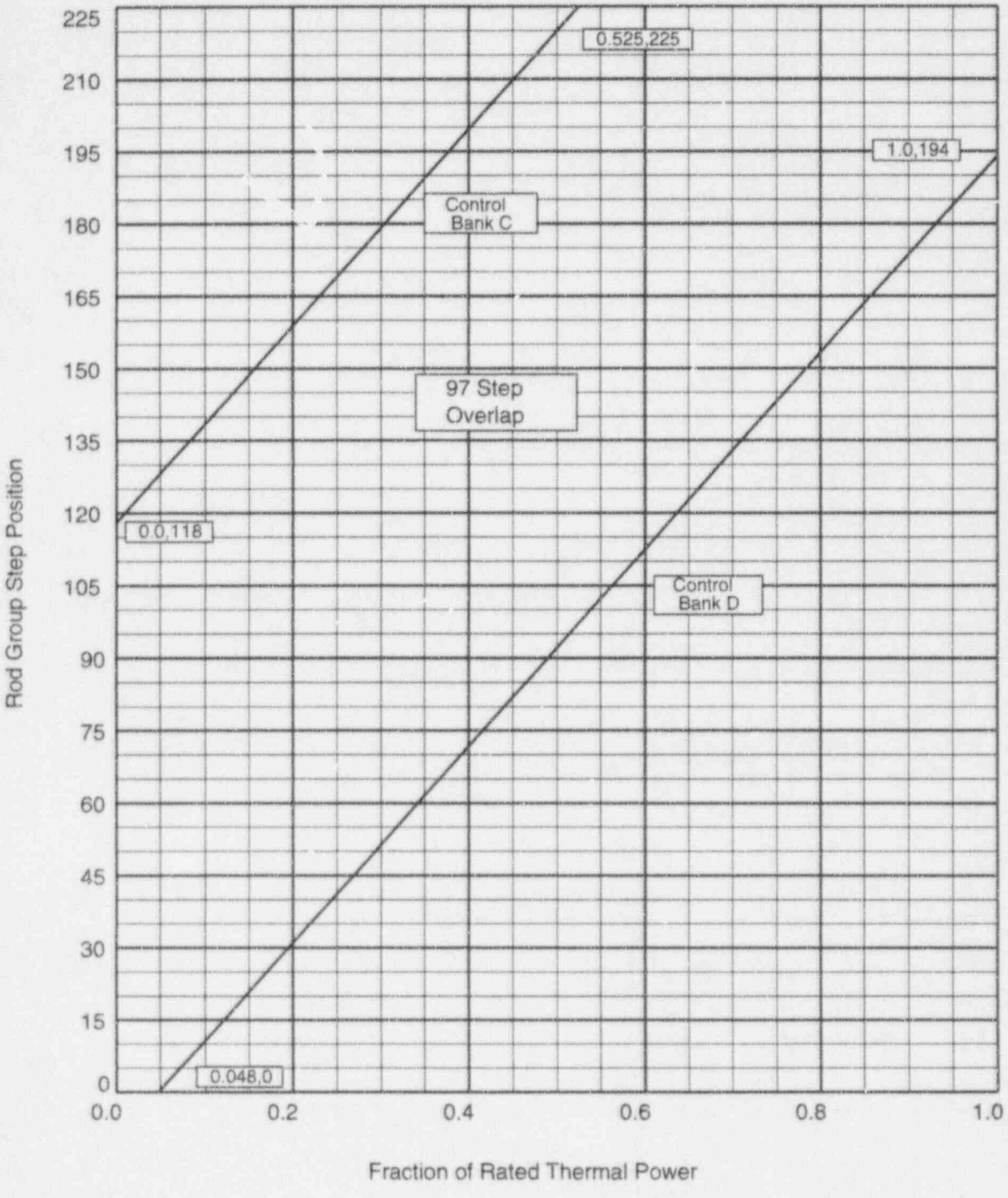


Figure 2
Rod Group Insertion Limits vs. Thermal Power
for Three Loop Operation
V. C. Summer - Cycle 9



2.4 Axial Flux Difference (Specification 3.2.1):

2.4.1 The Axial Flux Difference (AFD) Limits for RAOC operation for Cycle 9 are shown in Figure 3.

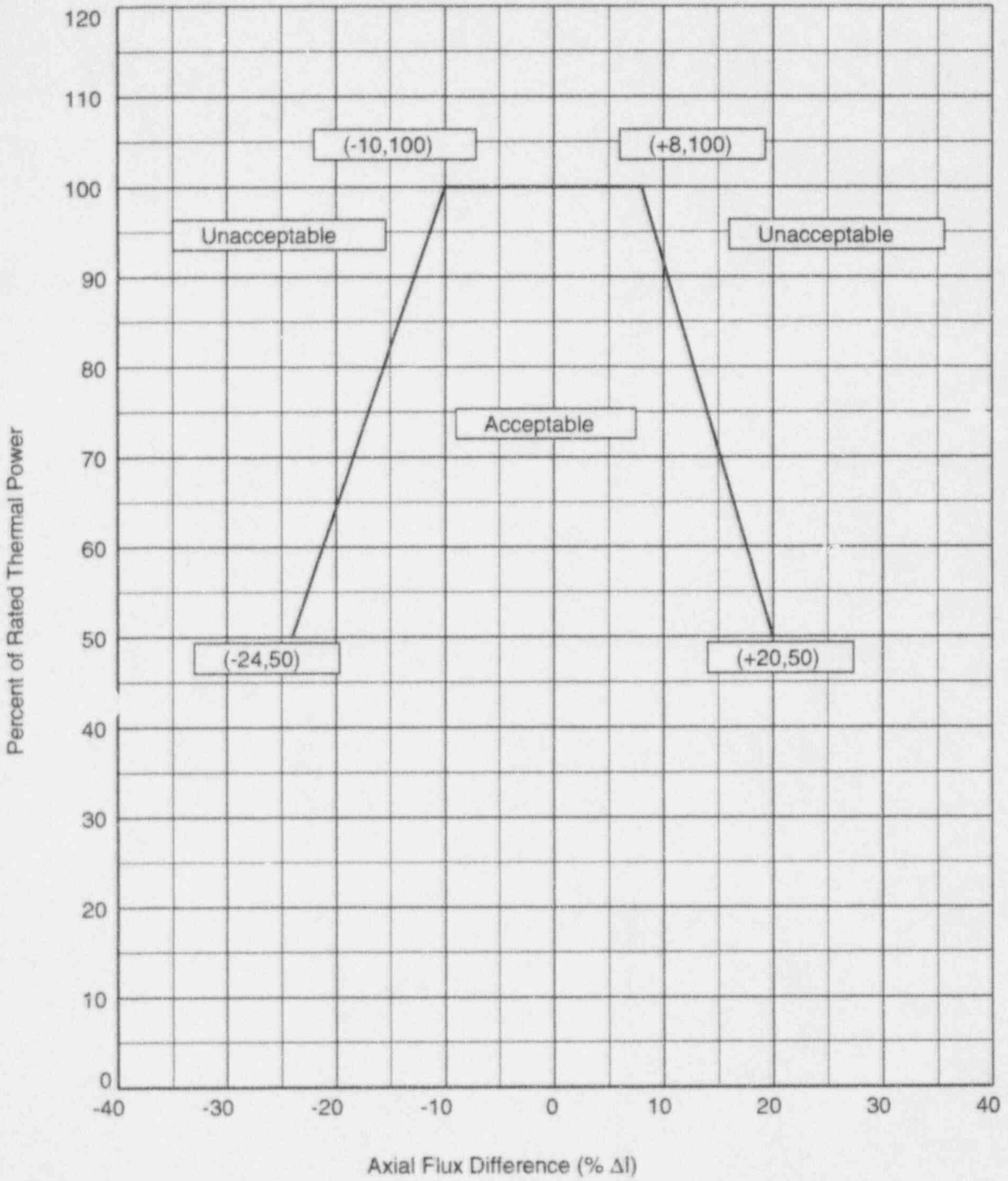
2.4.2 The Axial Flux Difference (AFD) target band during base load operations for Cycle 9 is:

BOL - EOL (0 - 20,000 MWD/MTU): + or - 5% about a measured target value.

2.4.2 The minimum allowable power level for base load operation, APL^{ND}, is 85% of RATED THERMAL POWER.

Figure 3

Axial Flux Difference Limits as a Function of Rated Thermal Power
V. C. Summer - Cycle 9



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

$$F_Q(Z) \leq \frac{F_Q^{RTP}}{P} * K(Z) \quad for\ P > 0.5$$

$$F_Q(Z) \leq \frac{F_Q^{RTP}}{0.5} * K(Z) \quad for:\ P \leq 0.5$$

$$where:\ P = \frac{Thermal\ Power}{Rated\ Thermal\ Power}$$

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, 1,100, 4,000, 10,000, 16,000 and 20,000 MWD/MTU are shown in Figures 5 through 10, respectively. This information is sufficient to determine W(Z) versus core height in the range of 0 MWD/MTU to EOL burnup. Three point interpolation of the data in Figures 5 through 7 is sufficient to determine RAOC W(Z) versus core height between a Cycle burnup of 0 to 1,100 MWD/MTU. For Cycle burnups between 1,100 MWD/MTU and 4,000 MWD/MTU, W(Z) versus core height may be obtained through three point interpolation of the data in Figures 6 through 8. For Cycle burnups between 4,000 MWD/MTU and 10,000 MWD/MTU, W(Z) versus core height may be obtained through three point interpolation of the data in Figures 7 through 9. For Cycle burnups between 10,000 MWD/MTU and EOL burnup, W(Z) versus core height may be obtained through three point interpolation of the data in Figures 8 through 10.

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, 800, 4,000, 10,000, 16,000 and 18,000 MWD/MTU are shown in Figures 11 through 16, 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.

Figure 4

K(z) - Normalized $F_Q(z)$ as a Function of Core Height
V. C. Summer - Cycle 9

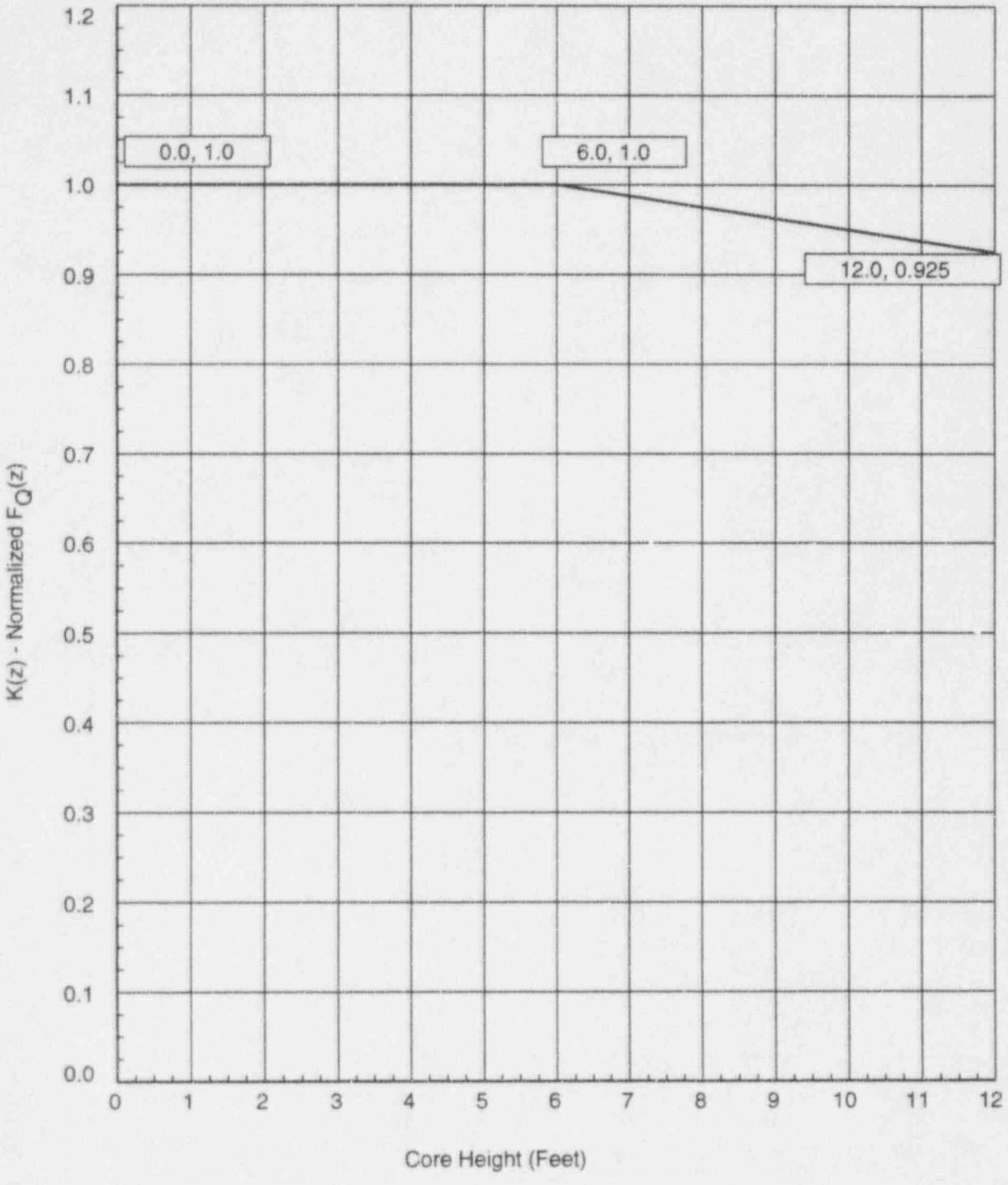


Figure 5

RAOC W(z) at 150 MWD/MTU

V. C. Summer - Cycle 9

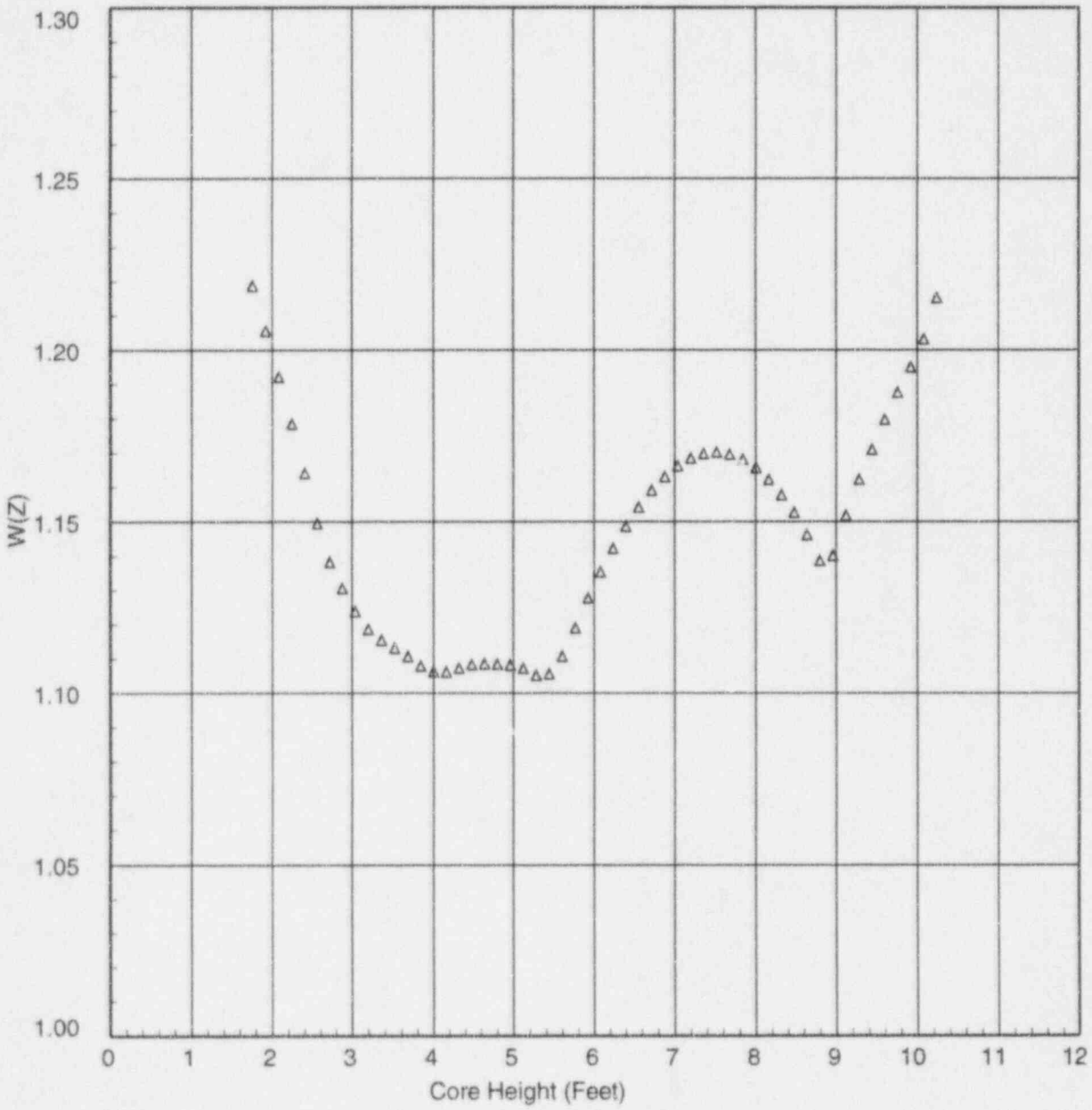


Table 1

RAOC W(z) at 150 MWD/MTU

V. C. Summer - Cycle 9

Core Height (ft)	W(Z)	Core Height (ft)	W(Z)
0.0000	1.0000	6.0800	1.1354
0.1600	1.0000	6.2400	1.1423
0.3200	1.0000	6.4000	1.1487
0.4800	1.0000	6.5600	1.1542
0.6400	1.0000	6.7200	1.1590
0.8000	1.0000	6.8800	1.1630
0.9600	1.0000	7.0400	1.1661
1.1200	1.0000	7.2000	1.1684
1.2800	1.0000	7.3600	1.1697
1.4400	1.0000	7.5200	1.1701
1.6000	1.0000	7.6800	1.1695
1.7600	1.2187	7.8400	1.1680
1.9200	1.2056	8.0000	1.1656
2.0800	1.1921	8.1600	1.1621
2.2400	1.1784	8.3200	1.1577
2.4000	1.1641	8.4800	1.1527
2.5600	1.1495	8.6400	1.1462
2.7200	1.1383	8.8000	1.1387
2.8800	1.1306	8.9600	1.1402
3.0400	1.1238	9.1200	1.1518
3.2000	1.1186	9.2800	1.1621
3.3600	1.1154	9.4400	1.1709
3.5200	1.1131	9.6000	1.1797
3.6800	1.1107	9.7600	1.1875
3.8400	1.1079	9.9200	1.1949
4.0000	1.1063	10.0800	1.2032
4.1600	1.1062	10.2400	1.2151
4.3200	1.1073	10.4000	1.0000
4.4800	1.1083	10.5600	1.0000
4.6400	1.1086	10.7200	1.0000
4.8000	1.1085	10.8800	1.0000
4.9600	1.1082	11.0400	1.0000
5.1200	1.1073	11.2000	1.0000
5.2800	1.1052	11.3600	1.0000
5.4400	1.1056	11.5200	1.0000
5.6000	1.1108	11.6800	1.0000
5.7600	1.1190	11.8400	1.0000
5.9200	1.1277	12.0000	1.0000

Figure 6
RAOC W(z) at 1,100 MWD/MTU
V. C. Summer - Cycle 9

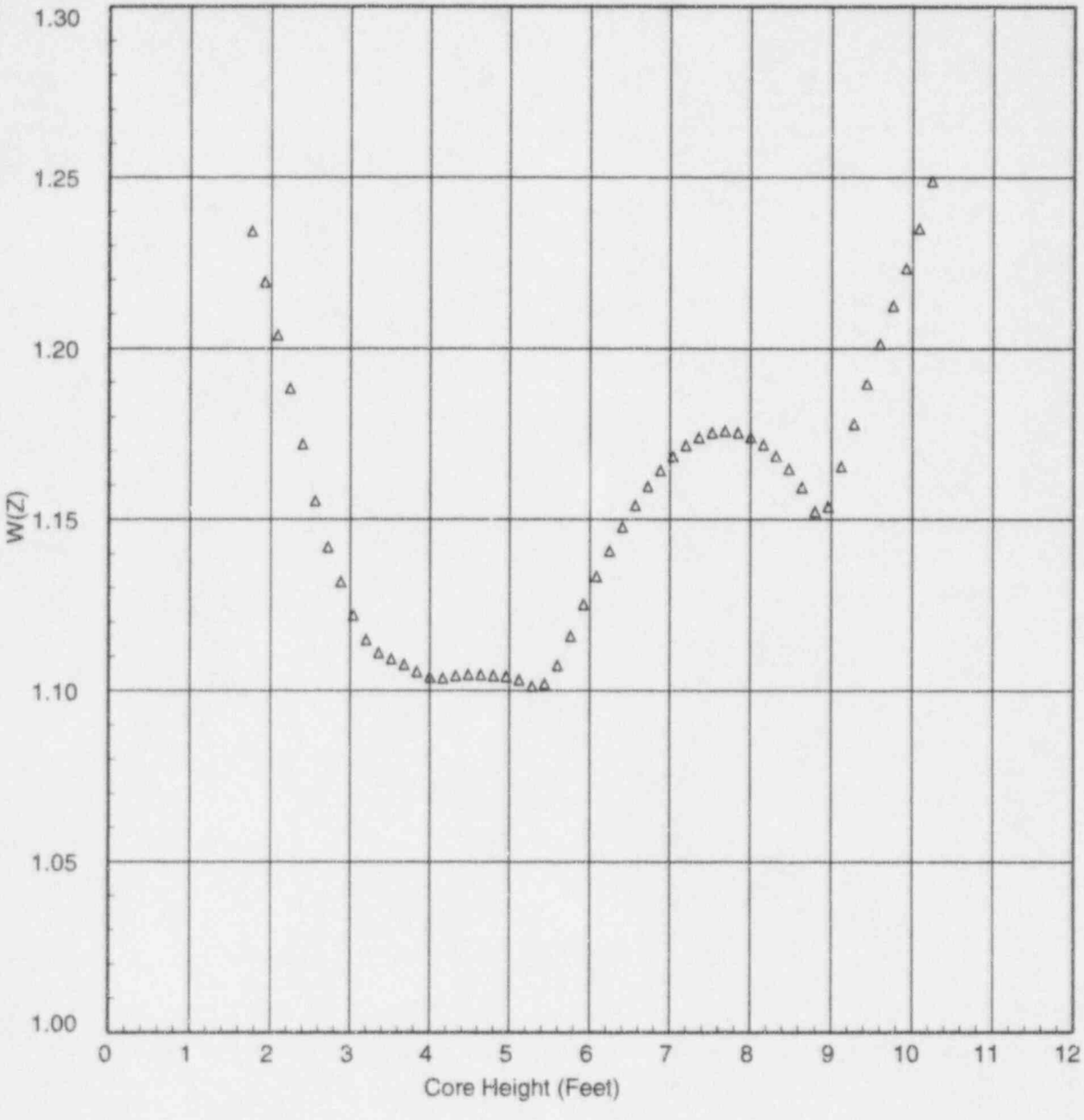


Table 2
RAOC W(z) at 1,100 MWD/MTU
V. C. Summer - Cycle 9

Core Height (ft)	W(Z)	Core Height (ft)	W(Z)
0.0000	1.0000	6.0800	1.1333
0.1600	1.0000	6.2400	1.1408
0.3200	1.0000	6.4000	1.1478
0.4800	1.0000	6.5600	1.1540
0.6400	1.0000	6.7200	1.1596
0.8000	1.0000	6.8800	1.1644
0.9600	1.0000	7.0400	1.1684
1.1200	1.0000	7.2000	1.1716
1.2800	1.0000	7.3600	1.1739
1.4400	1.0000	7.5200	1.1753
1.6000	1.0000	7.6800	1.1758
1.7600	1.2342	7.8400	1.1754
1.9200	1.2193	8.0000	1.1741
2.0800	1.2038	8.1600	1.1718
2.2400	1.1883	8.3200	1.1685
2.4000	1.1721	8.4800	1.1647
2.5600	1.1554	8.6400	1.1594
2.7200	1.1419	8.8000	1.1522
2.8800	1.1318	8.9600	1.1537
3.0400	1.1220	9.1200	1.1655
3.2000	1.1148	9.2800	1.1779
3.3600	1.1111	9.4400	1.1896
3.5200	1.1093	9.6000	1.2013
3.6800	1.1076	9.7600	1.2124
3.8400	1.1055	9.9200	1.2233
4.0000	1.1040	10.0800	1.2350
4.1600	1.1037	10.2400	1.2489
4.3200	1.1043	10.4000	1.0000
4.4800	1.1047	10.5600	1.0000
4.6400	1.1047	10.7200	1.0000
4.8000	1.1044	10.8800	1.0000
4.9600	1.1041	11.0400	1.0000
5.1200	1.1032	11.2000	1.0000
5.2800	1.1013	11.3600	1.0000
5.4400	1.1020	11.5200	1.0000
5.6000	1.1074	11.6800	1.0000
5.7600	1.1159	11.8400	1.0000
5.9200	1.1251	12.0000	1.0000

Figure 7

RAOC W(z) at 4,000 MWD/MTU

V. C. Summer - Cycle 9

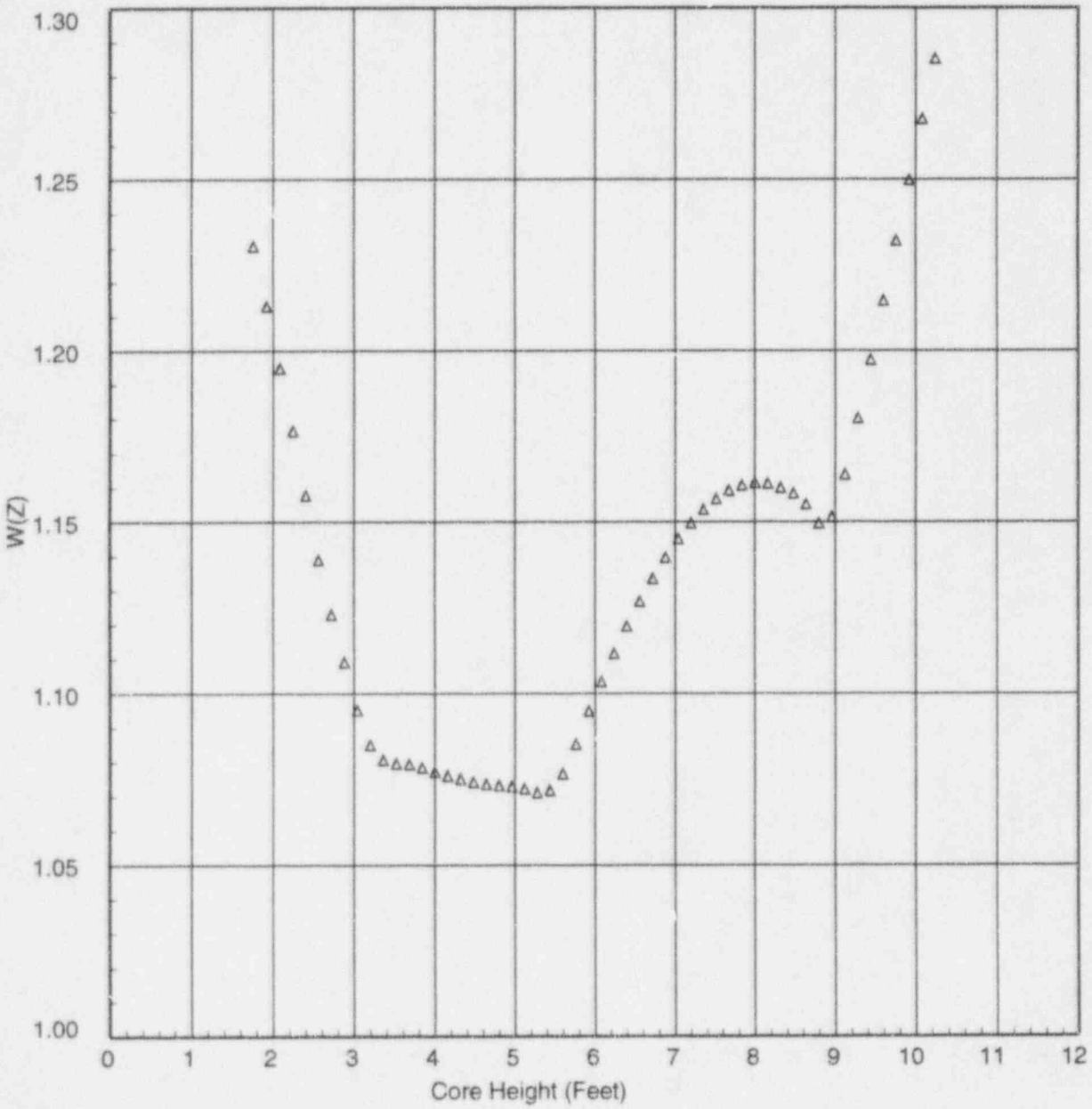


Table 3

RAOC W(z) at 4,000 MWD/MTU

V. C. Summer - Cycle 9

Core Height (ft)	W(Z)	Core Height (ft)	W(Z)
0.0000	1.0000	6.0800	1.1035
0.1600	1.0000	6.2400	1.1117
0.3200	1.0000	6.4000	1.1196
0.4800	1.0000	6.5600	1.1268
0.6400	1.0000	6.7200	1.1335
0.8000	1.0000	6.8800	1.1396
0.9600	1.0000	7.0400	1.1450
1.1200	1.0000	7.2000	1.1497
1.2800	1.0000	7.3600	1.1537
1.4400	1.0000	7.5200	1.1568
1.6000	1.0000	7.6800	1.1592
1.7600	1.2306	7.8400	1.1607
1.9200	1.2130	8.0000	1.1614
2.0800	1.1948	8.1600	1.1612
2.2400	1.1765	8.3200	1.1600
2.4000	1.1578	8.4800	1.1584
2.5600	1.1389	8.6400	1.1552
2.7200	1.1230	8.8000	1.1496
2.8800	1.1092	8.9600	1.1515
3.0400	1.0951	9.1200	1.1639
3.2000	1.0849	9.2800	1.1801
3.3600	1.0806	9.4400	1.1973
3.5200	1.0796	9.6000	1.2146
3.6800	1.0793	9.7600	1.2321
3.8400	1.0784	9.9200	1.2498
4.0000	1.0772	10.0800	1.2676
4.1600	1.0760	10.2400	1.2851
4.3200	1.0751	10.4000	1.0000
4.4800	1.0742	10.5600	1.0000
4.6400	1.0736	10.7200	1.0000
4.8000	1.0732	10.8800	1.0000
4.9600	1.0729	11.0400	1.0000
5.1200	1.0723	11.2000	1.0000
5.2800	1.0711	11.3600	1.0000
5.4400	1.0718	11.5200	1.0000
5.6000	1.0766	11.6800	1.0000
5.7600	1.0851	11.8400	1.0000
5.9200	1.0948	12.0000	1.0000

Figure 8

RAOC W(z) at 10,000 MWD/MTU

V. C. Summer - Cycle 9

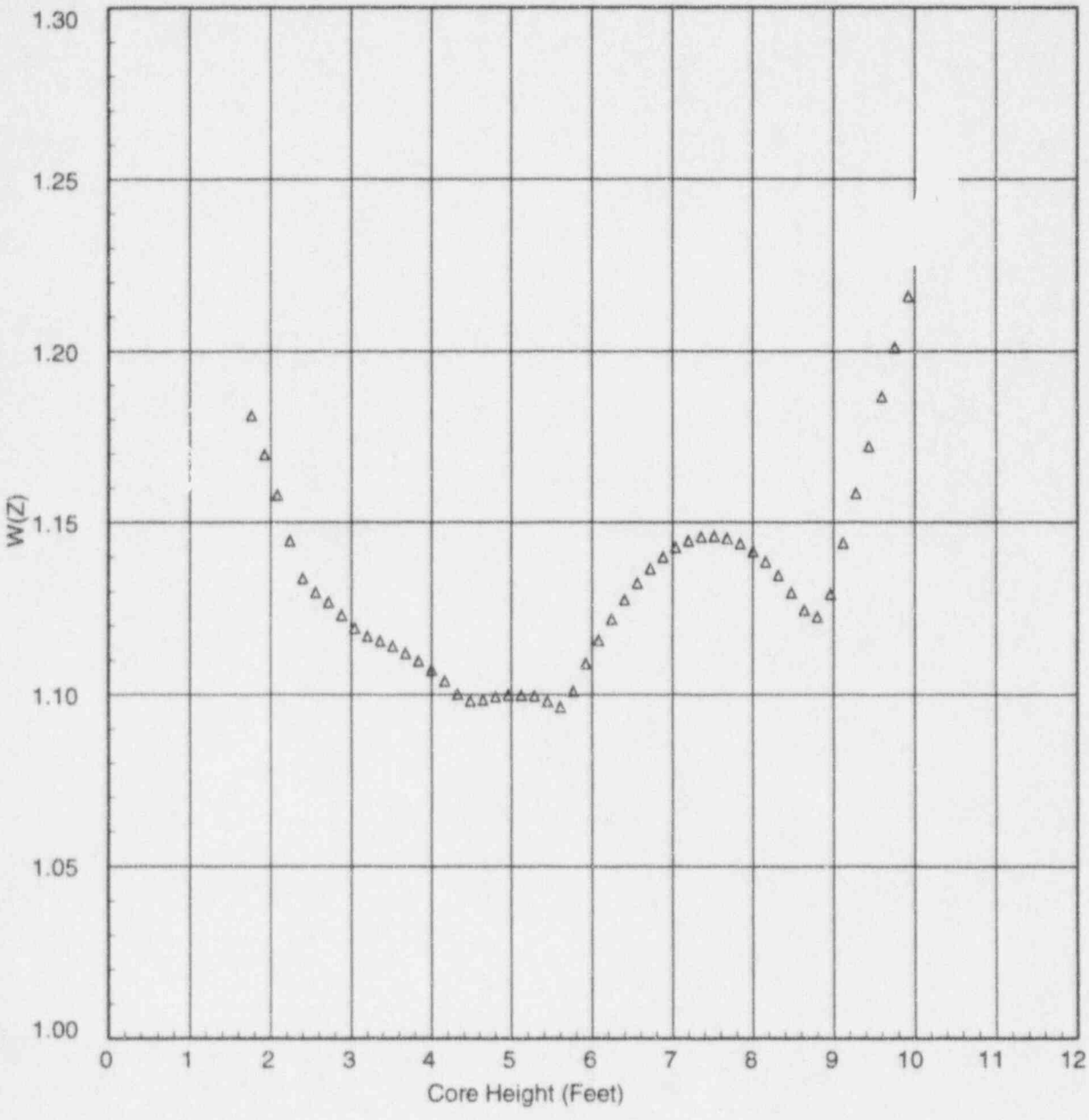


Table 4

P.A.OC W(z) at 10,000 MWD/MTU

V. C. Summer - Cycle 9

Core Height (ft)	W(Z)	Core Height (ft)	W(Z)
0.0000	1.0000	6.0800	1.1158
0.1600	1.0000	6.2400	1.1219
0.3200	1.0000	6.4000	1.1275
0.4800	1.0000	6.5600	1.1324
0.6400	1.0000	6.7200	1.1366
0.8000	1.0000	6.8800	1.1400
0.9600	1.0000	7.0400	1.1427
1.1200	1.0000	7.2000	1.1446
1.2800	1.0000	7.3600	1.1457
1.4400	1.0000	7.5200	1.1459
1.6000	1.0000	7.6800	1.1453
1.7600	1.1811	7.8400	1.1438
1.9200	1.1697	8.0000	1.1415
2.0800	1.1579	8.1600	1.1385
2.2400	1.1446	8.3200	1.1346
2.4000	1.1338	8.4800	1.1296
2.5600	1.1296	8.6400	1.1245
2.7200	1.1268	8.8000	1.1225
2.8800	1.1230	8.9600	1.1292
3.0400	1.1193	9.1200	1.1440
3.2000	1.1169	9.2800	1.1584
3.3600	1.1156	9.4400	1.1721
3.5200	1.1141	9.6000	1.1866
3.6800	1.1120	9.7600	1.2011
3.8400	1.1097	9.9200	1.2158
4.0000	1.1071	10.0800	1.2305
4.1600	1.1039	10.2400	1.2448
4.3200	1.1000	10.4000	1.0000
4.4800	1.0981	10.5600	1.0000
4.6400	1.0984	10.7200	1.0000
4.8000	1.0993	10.8800	1.0000
4.9600	1.0998	11.0400	1.0000
5.1200	1.0998	11.2000	1.0000
5.2800	1.0996	11.3600	1.0000
5.4400	1.0980	11.5200	1.0000
5.6000	1.0964	11.6800	1.0000
5.7600	1.1010	11.8400	1.0000
5.9200	1.1090	12.0000	1.0000

Figure 9

RAOC W(z) at 16,000 MWD/MTU

V. C. Summer - Cycle 9

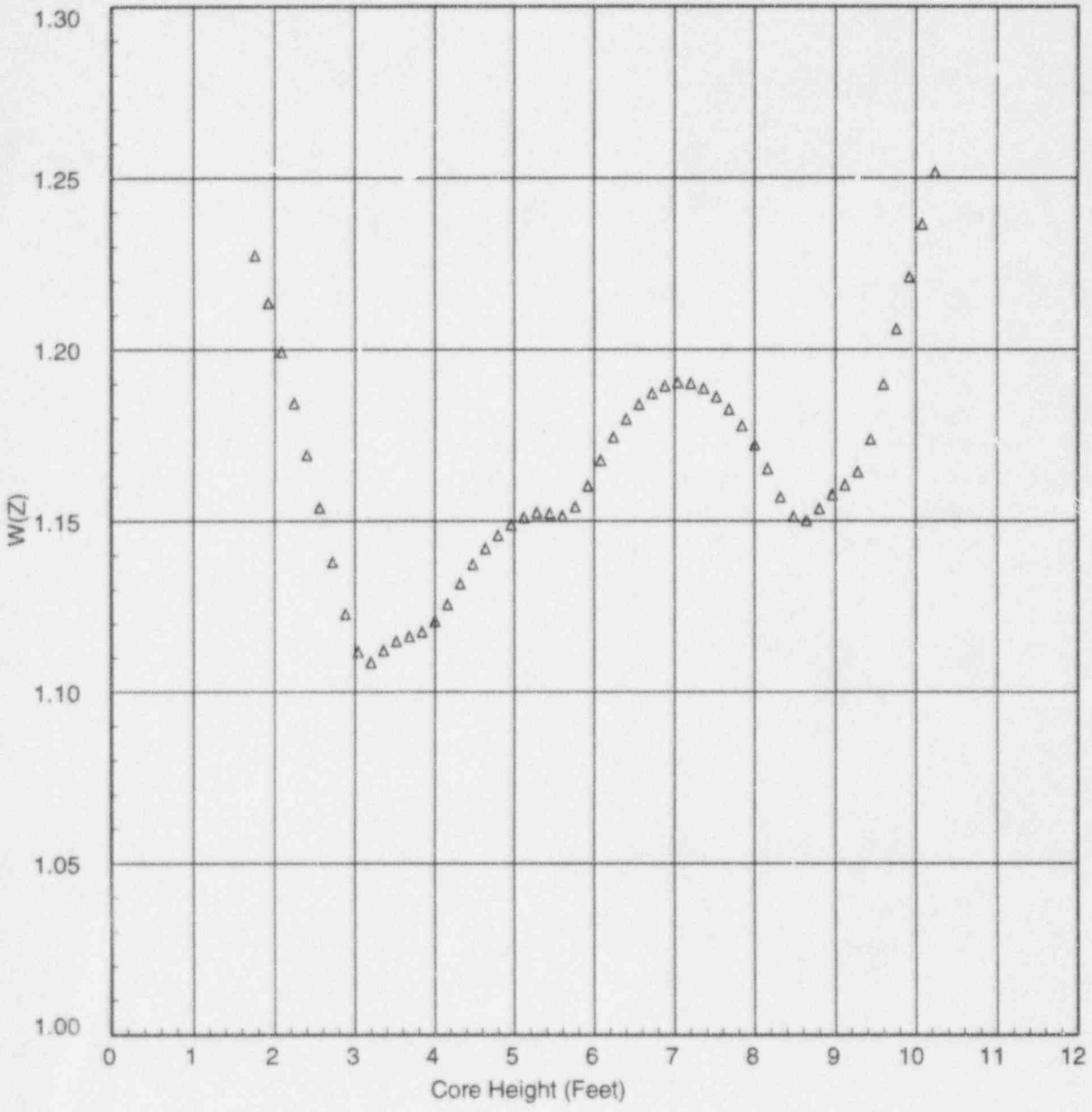


Table 5

RAOC W(z) at 16,000 MWD/MTU

V. C. Summer - Cycle 9

Core Height (ft)	W(Z)	Core Height (ft)	W(Z)
0.0000	1.0000	6.0800	1.1677
0.1600	1.0000	6.2400	1.1744
0.3200	1.0000	6.4000	1.1797
0.4800	1.0000	6.5600	1.1840
0.6400	1.0000	6.7200	1.1872
0.8000	1.0000	6.8800	1.1893
0.9600	1.0000	7.0400	1.1903
1.1200	1.0000	7.2000	1.1901
1.2800	1.0000	7.3600	1.1887
1.4400	1.0000	7.5200	1.1862
1.6000	1.0000	7.6800	1.1826
1.7600	1.2274	7.8400	1.1778
1.9200	1.2136	8.0000	1.1722
2.0800	1.1992	8.1600	1.1652
2.2400	1.1843	8.3200	1.1570
2.4000	1.1692	8.4800	1.1512
2.5600	1.1539	8.6400	1.1501
2.7200	1.1380	8.8000	1.1536
2.8800	1.1228	8.9600	1.1577
3.0400	1.1117	9.1200	1.1605
3.2000	1.1086	9.2800	1.1643
3.3600	1.1121	9.4400	1.1738
3.5200	1.1148	9.6000	1.1898
3.6800	1.1162	9.7600	1.2059
3.8400	1.1176	9.9200	1.2211
4.0000	1.1207	10.0800	1.2365
4.1600	1.1257	10.2400	1.2517
4.3200	1.1318	10.4000	1.0000
4.4800	1.1374	10.5600	1.0000
4.6400	1.1420	10.7200	1.0000
4.8000	1.1458	10.8800	1.0000
4.9600	1.1488	11.0400	1.0000
5.1200	1.1510	11.2000	1.0000
5.2800	1.1524	11.3600	1.0000
5.4400	1.1522	11.5200	1.0000
5.6000	1.1515	11.6800	1.0000
5.7600	1.1542	11.8400	1.0000
5.9200	1.1602	12.0000	1.0000

Figure 10

RAOC W(z) at 20,000 MWD/MTU

V. C. Summer - Cycle 9

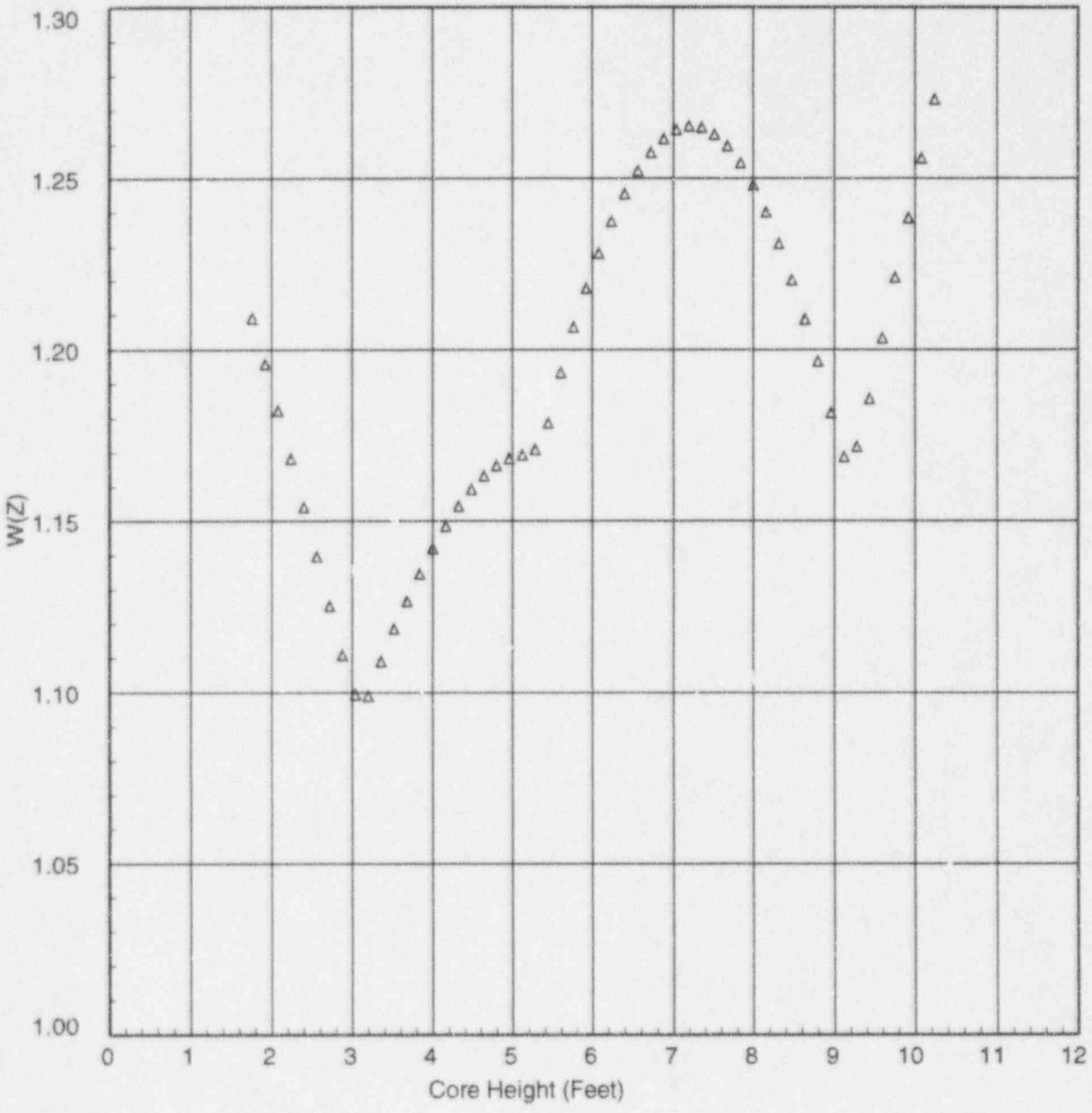


Table 6

RAOC W(z) at 20,000 MWD/MTU

V. C. Summer - Cycle 9

Core Height (ft)	W(Z)	Core Height (ft)	W(Z)
0.0000	1.0000	6.0800	1.2281
0.1600	1.0000	6.2400	1.2374
0.3200	1.0000	6.4000	1.2454
0.4800	1.0000	6.5600	1.2522
0.6400	1.0000	6.7200	1.2576
0.8000	1.0000	6.8800	1.2616
0.9600	1.0000	7.0400	1.2642
1.1200	1.0000	7.2000	1.2653
1.2800	1.0000	7.3600	1.2649
1.4400	1.0000	7.5200	1.2629
1.6000	1.0000	7.6800	1.2595
1.7600	1.2091	7.8400	1.2545
1.9200	1.1958	8.0000	1.2480
2.0800	1.1822	8.1600	1.2401
2.2400	1.1682	8.3200	1.2309
2.4000	1.1540	8.4800	1.2202
2.5600	1.1397	8.6400	1.2087
2.7200	1.1252	8.8000	1.1966
2.8800	1.1109	8.9600	1.1815
3.0400	1.0994	9.1200	1.1687
3.2000	1.0990	9.2800	1.1717
3.3600	1.1091	9.4400	1.1857
3.5200	1.1186	9.6000	1.2033
3.6800	1.1266	9.7600	1.2210
3.8400	1.1346	9.9200	1.2383
4.0000	1.1420	10.0800	1.2559
4.1600	1.1485	10.2400	1.2732
4.3200	1.1543	10.4000	1.0000
4.4800	1.1592	10.5600	1.0000
4.6400	1.1632	10.7200	1.0000
4.8000	1.1662	10.8800	1.0000
4.9600	1.1682	11.0400	1.0000
5.1200	1.1693	11.2000	1.0000
5.2800	1.1709	11.3600	1.0000
5.4400	1.1786	11.5200	1.0000
5.6000	1.1932	11.6800	1.0000
5.7600	1.2065	11.8400	1.0000
5.9200	1.2177	12.0000	1.0000

Figure 11

Baseload W(z) at 150 MWD/MTU

V. C. Summer - Cycle 9

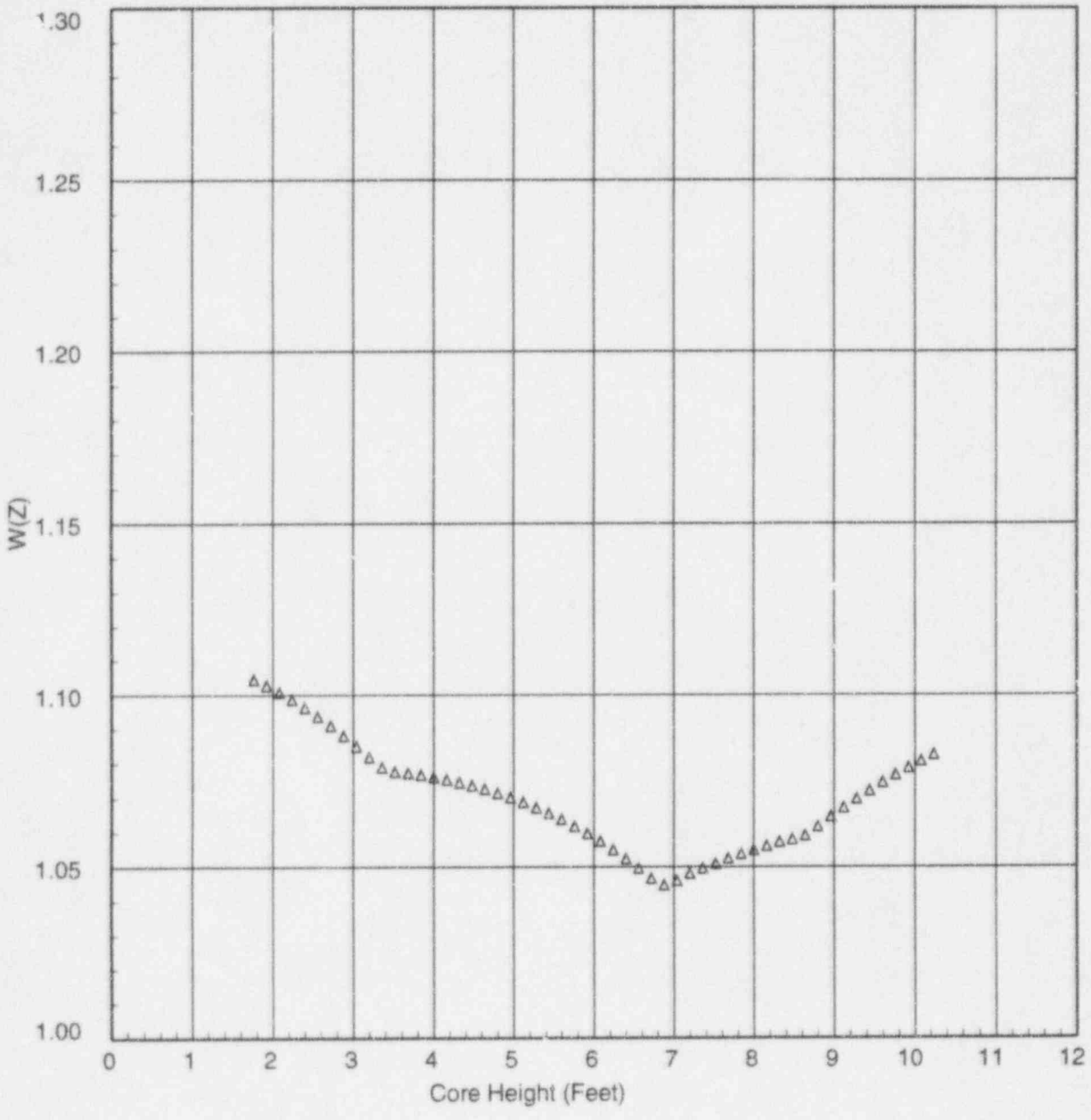


Table 7

Baseload W(z) at 150 MWD/MTU

V. C. Summer - Cycle 9

Core Height (ft)	W(Z)	Core Height (ft)	W(Z)
0.0000	1.0000	6.0800	1.0574
0.1600	1.0000	6.2400	1.0549
0.3200	1.0000	6.4000	1.0523
0.4800	1.0000	6.5600	1.0495
0.6400	1.0000	6.7200	1.0465
0.8000	1.0000	6.8800	1.0446
0.9600	1.0000	7.0400	1.0459
1.1200	1.0000	7.2000	1.0480
1.2800	1.0000	7.3600	1.0495
1.4400	1.0000	7.5200	1.0509
1.6000	1.0000	7.6800	1.0524
1.7600	1.1045	7.8400	1.0537
1.9200	1.1028	8.0000	1.0549
2.0800	1.1008	8.1600	1.0561
2.2400	1.0987	8.3200	1.0572
2.4000	1.0963	8.4800	1.0580
2.5600	1.0937	8.6400	1.0591
2.7200	1.0910	8.8000	1.0617
2.8800	1.0881	8.9600	1.0646
3.0400	1.0850	9.1200	1.0672
3.2000	1.0818	9.2800	1.0697
3.3600	1.0789	9.4400	1.0721
3.5200	1.0776	9.6000	1.0745
3.6800	1.0772	9.7600	1.0767
3.8400	1.0767	9.9200	1.0788
4.0000	1.0760	10.0800	1.0808
4.1600	1.0753	10.2400	1.0826
4.3200	1.0745	10.4000	1.0000
4.4800	1.0736	10.5600	1.0000
4.6400	1.0726	10.7200	1.0000
4.8000	1.0714	10.8800	1.0000
4.9600	1.0702	11.0400	1.0000
5.1200	1.0688	11.2000	1.0000
5.2800	1.0672	11.3600	1.0000
5.4400	1.0656	11.5200	1.0000
5.6000	1.0638	11.6800	1.0000
5.7600	1.0618	11.8400	1.0000
5.9200	1.0597	12.0000	1.0000

Figure 12

Baseload W(z) at 800 MWD/MTU

V. C. Summer - Cycle 9

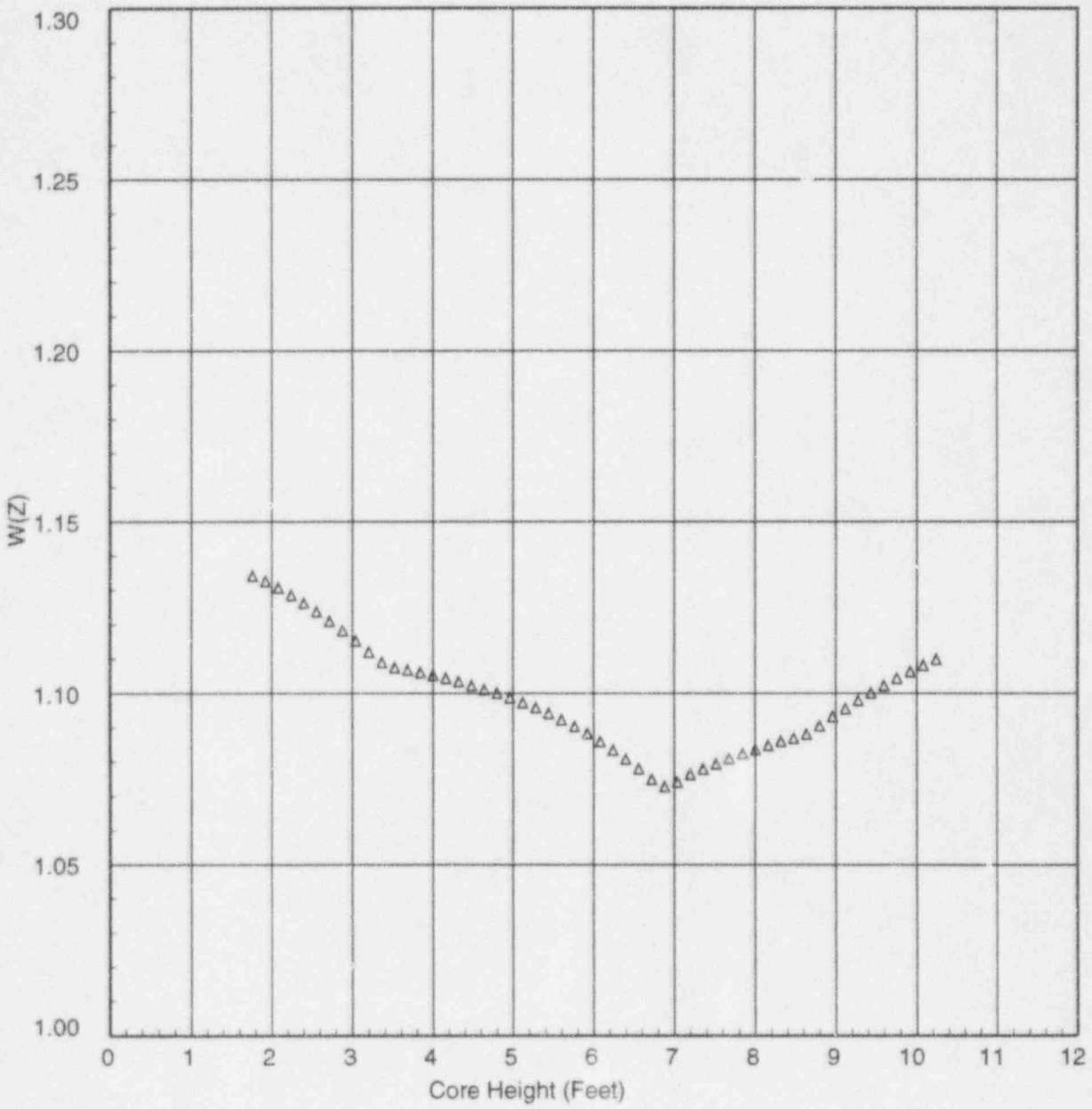


Table 8

Baseload W(z) at 800 MWD/MTU

V. C. Summer - Cycle 9

Core Height (ft)	W(Z)	Core Height (ft)	W(Z)
0.0000	1.0000	6.0800	1.0859
0.1600	1.0000	6.2400	1.0834
0.3200	1.0000	6.4000	1.0807
0.4800	1.0000	6.5600	1.0779
0.6400	1.0000	6.7200	1.0748
0.8000	1.0000	6.8800	1.0727
0.9600	1.0000	7.0400	1.0740
1.1200	1.0000	7.2000	1.0763
1.2800	1.0000	7.3600	1.0778
1.4400	1.0000	7.5200	1.0793
1.6000	1.0000	7.6800	1.0809
1.7600	1.1341	7.8400	1.0823
1.9200	1.1325	8.0000	1.0835
2.0800	1.1306	8.1600	1.0848
2.2400	1.1285	8.3200	1.0860
2.4000	1.1262	8.4800	1.0869
2.5600	1.1237	8.6400	1.0881
2.7200	1.1210	8.8000	1.0902
2.8800	1.1182	8.9600	1.0932
3.0400	1.1152	9.1200	1.0955
3.2000	1.1120	9.2800	1.0979
3.3600	1.1090	9.4400	1.1002
3.5200	1.1075	9.6000	1.1023
3.6800	1.1068	9.7600	1.1044
3.8400	1.1061	9.9200	1.1063
4.0000	1.1053	10.0800	1.1082
4.1600	1.1044	10.2400	1.1099
4.3200	1.1034	10.4000	1.0000
4.4800	1.1023	10.5600	1.0000
4.6400	1.1011	10.7200	1.0000
4.8000	1.1000	10.8800	1.0000
4.9600	1.0987	11.0400	1.0000
5.1200	1.0973	11.2000	1.0000
5.2800	1.0958	11.3600	1.0000
5.4400	1.0941	11.5200	1.0000
5.6000	1.0923	11.6800	1.0000
5.7600	1.0903	11.8400	1.0000
5.9200	1.0882	12.0000	1.0000

Figure 13

Baseload W(z) at 4,000 MWD/MTU

V. C. Summer - Cycle 9

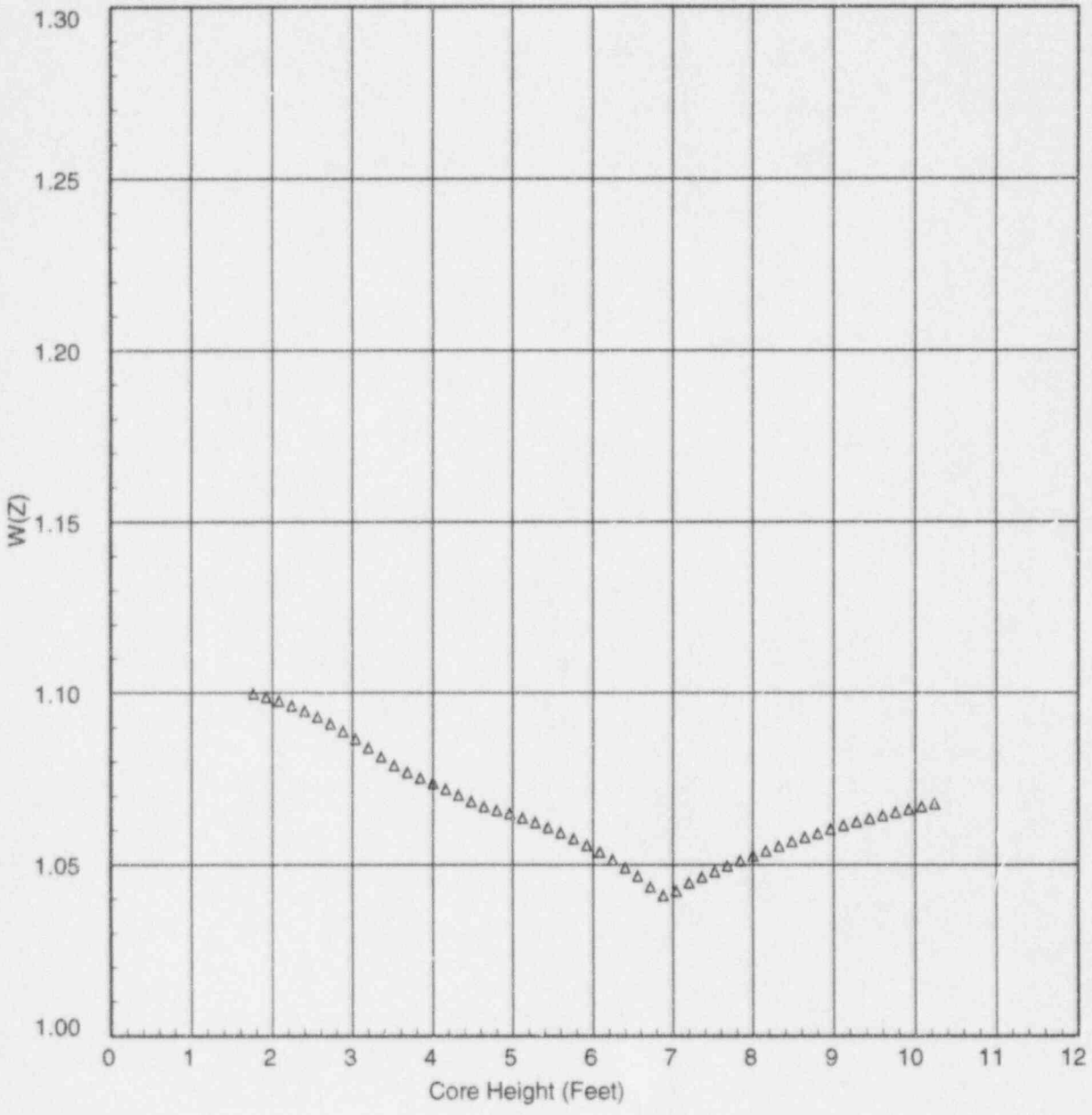


Table 9

Baseload W(z) at 4,000 MWD/MTU

V. C. Summer - Cycle 9

Core Height (ft)	W(Z)	Core Height (ft)	W(Z)
0.0000	1.0000	6.0800	1.0536
0.1600	1.0000	6.2400	1.0514
0.3200	1.0000	6.4000	1.0490
0.4800	1.0000	6.5600	1.0466
0.6400	1.0000	6.7200	1.0434
0.8000	1.0000	6.8800	1.0409
0.9600	1.0000	7.0400	1.0422
1.1200	1.0000	7.2000	1.0446
1.2800	1.0000	7.3600	1.0463
1.4400	1.0000	7.5200	1.0479
1.6000	1.0000	7.6800	1.0496
1.7600	1.0997	7.8400	1.0511
1.9200	1.0987	8.0000	1.0526
2.0800	1.0976	8.1600	1.0540
2.2400	1.0962	8.3200	1.0554
2.4000	1.0947	8.4800	1.0567
2.5600	1.0929	8.6400	1.0580
2.7200	1.0910	8.8000	1.0591
2.8800	1.0888	8.9600	1.0603
3.0400	1.0865	9.1200	1.0614
3.2000	1.0840	9.2800	1.0624
3.3600	1.0814	9.4400	1.0634
3.5200	1.0789	9.6000	1.0643
3.6800	1.0768	9.7600	1.0652
3.8400	1.0752	9.9200	1.0661
4.0000	1.0737	10.0800	1.0669
4.1600	1.0720	10.2400	1.0677
4.3200	1.0703	10.4000	1.0000
4.4800	1.0684	10.5600	1.0000
4.6400	1.0669	10.7200	1.0000
4.8000	1.0658	10.8800	1.0000
4.9600	1.0649	11.0400	1.0000
5.1200	1.0636	11.2000	1.0000
5.2800	1.0623	11.3600	1.0000
5.4400	1.0608	11.5200	1.0000
5.6000	1.0593	11.6800	1.0000
5.7600	1.0575	11.8400	1.0000
5.9200	1.0556	12.0000	1.0000

Figure 14

Baseload W(z) at 10,000 MWD/MTU

V. C. Summer - Cycle 9

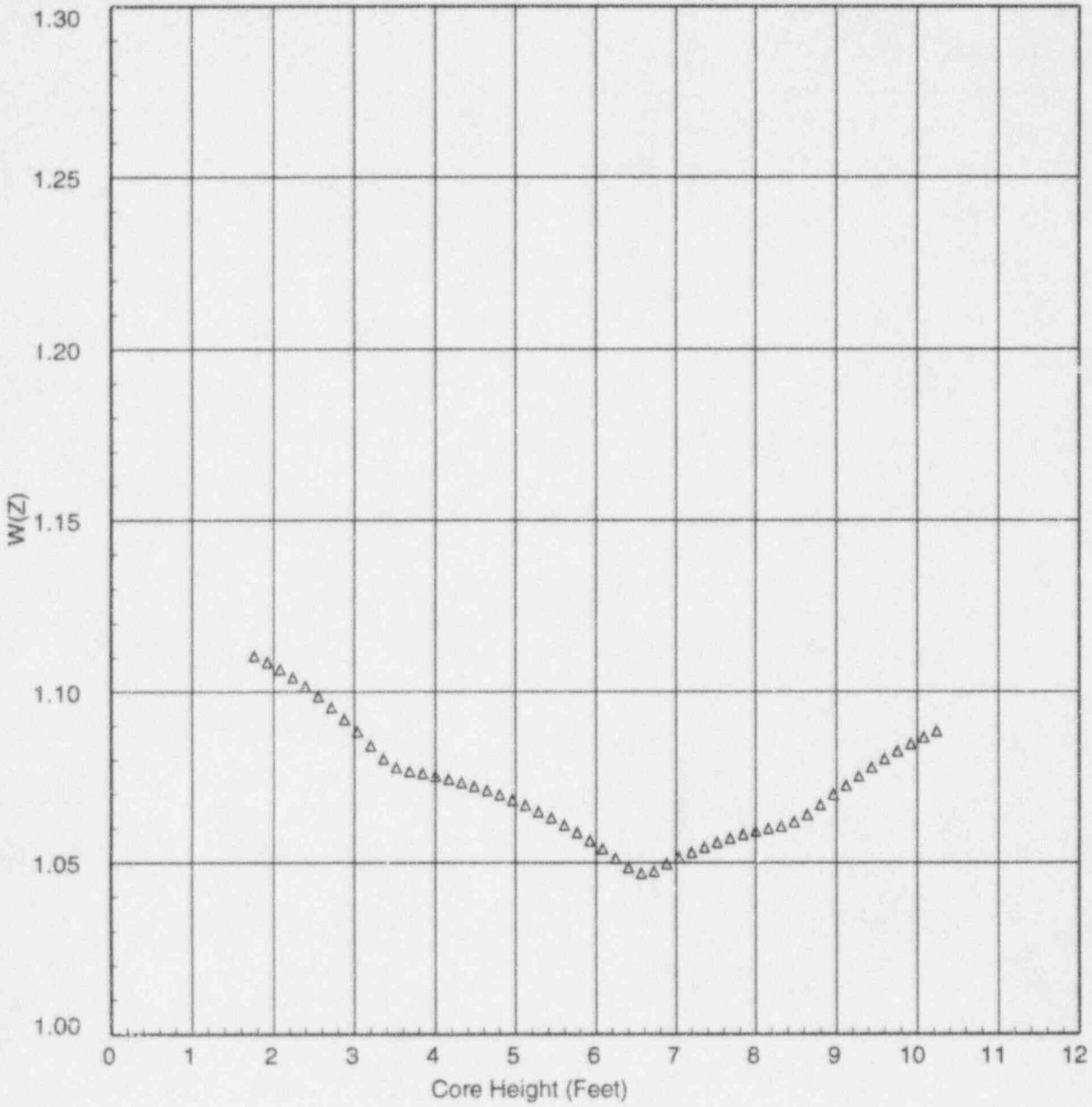


Table 10

Baseload W(z) at 10,000 MWD/MTU

V. C. Summer - Cycle 9

Core Height (ft)	W(Z)	Core Height (ft)	W(Z)
0.0000	1.0000	6.0800	1.0540
0.1600	1.0000	6.2400	1.0512
0.3200	1.0000	6.4000	1.0485
0.4800	1.0000	6.5600	1.0468
0.6400	1.0000	6.7200	1.0474
0.8000	1.0000	6.8800	1.0496
0.9600	1.0000	7.0400	1.0514
1.1200	1.0000	7.2000	1.0529
1.2800	1.0000	7.3600	1.0544
1.4400	1.0000	7.5200	1.0558
1.6000	1.0000	7.6800	1.0570
1.7600	1.1105	7.8400	1.0581
1.9200	1.1087	8.0000	1.0591
2.0800	1.1066	8.1600	1.0599
2.2400	1.1042	8.3200	1.0605
2.4000	1.1015	8.4800	1.0618
2.5600	1.0986	8.6400	1.0639
2.7200	1.0954	8.8000	1.0668
2.8800	1.0919	8.9600	1.0698
3.0400	1.0883	9.1200	1.0725
3.2000	1.0842	9.2800	1.0752
3.3600	1.0803	9.4400	1.0778
3.5200	1.0778	9.6000	1.0803
3.6800	1.0766	9.7600	1.0826
3.8400	1.0760	9.9200	1.0847
4.0000	1.0752	10.0800	1.0867
4.1600	1.0743	10.2400	1.0885
4.3200	1.0733	10.4000	1.0000
4.4800	1.0722	10.5600	1.0000
4.6400	1.0710	10.7200	1.0000
4.8000	1.0697	10.8800	1.0000
4.9600	1.0682	11.0400	1.0000
5.1200	1.0666	11.2000	1.0000
5.2800	1.0648	11.3600	1.0000
5.4400	1.0630	11.5200	1.0000
5.6000	1.0609	11.6800	1.0000
5.7600	1.0587	11.8400	1.0000
5.9200	1.0564	12.0000	1.0000

Figure 15

Baseload W(z) at 16,000 MWD/MTU

V. C. Summer - Cycle 9

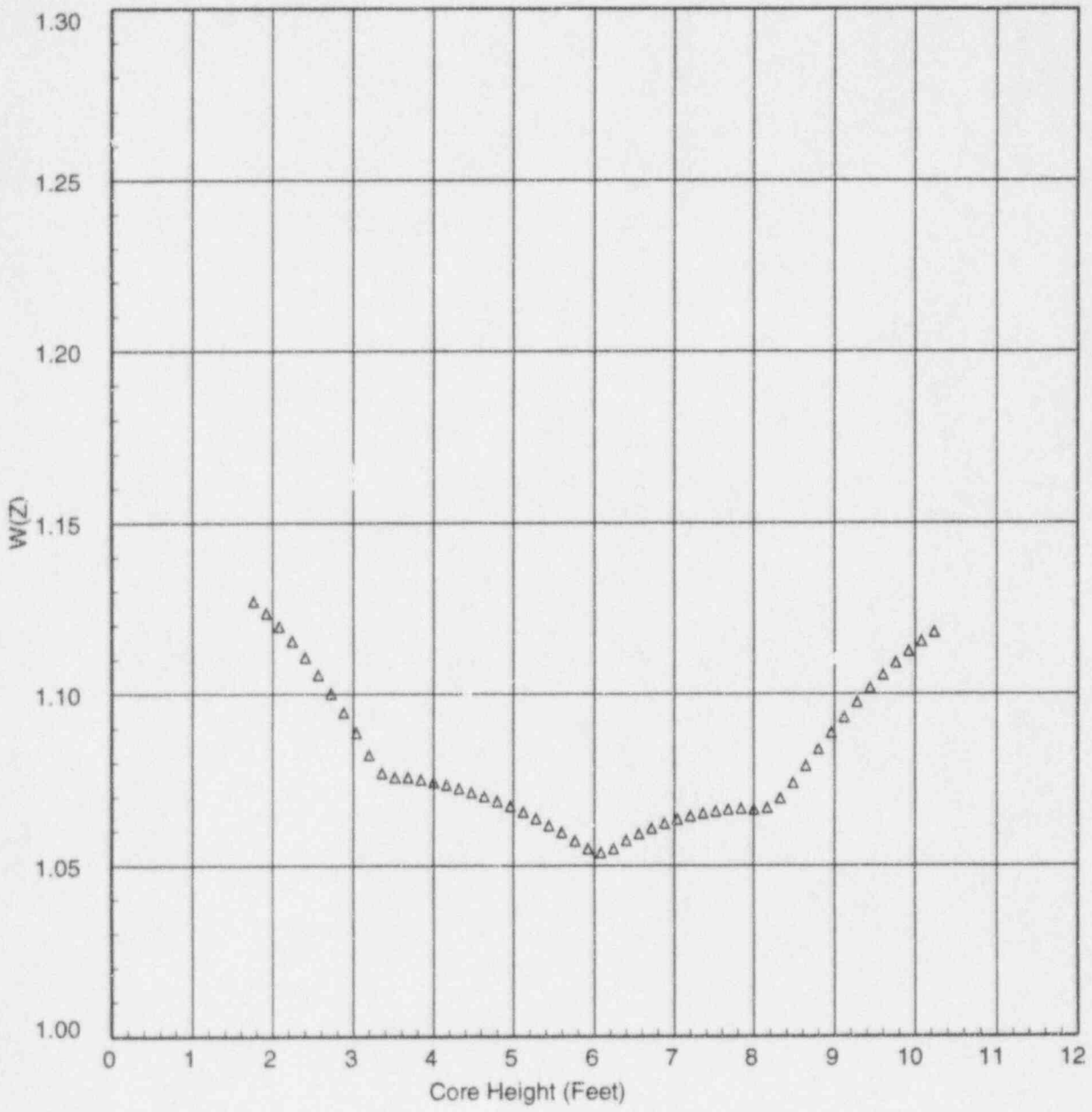


Table 11

Baseload W(z) at 16,000 MWD/MTU

V. C. Summer - Cycle 9

Core Height (ft)	W(Z)	Core Height (ft)	W(Z)
0.0000	1.0000	6.0800	1.0537
0.1600	1.0000	6.2400	1.0548
0.3200	1.0000	6.4000	1.0573
0.4800	1.0000	6.5600	1.0592
0.6400	1.0000	6.7200	1.0607
0.8000	1.0000	6.8800	1.0621
0.9600	1.0000	7.0400	1.0633
1.1200	1.0000	7.2000	1.0643
1.2800	1.0000	7.3600	1.0651
1.4400	1.0000	7.5200	1.0657
1.6000	1.0000	7.6800	1.0662
1.7600	1.1270	7.8400	1.0665
1.9200	1.1236	8.0000	1.0662
2.0800	1.1197	8.1600	1.0667
2.2400	1.1154	8.3200	1.0695
2.4000	1.1107	8.4800	1.0740
2.5600	1.1056	8.6400	1.0791
2.7200	1.1002	8.8000	1.0840
2.8800	1.0946	8.9600	1.0887
3.0400	1.0887	9.1200	1.0932
3.2000	1.0823	9.2800	1.0976
3.3600	1.0770	9.4400	1.1017
3.5200	1.0757	9.6000	1.1056
3.6800	1.0758	9.7600	1.1092
3.8400	1.0751	9.9200	1.1125
4.0000	1.0743	10.0800	1.1154
4.1600	1.0735	10.2400	1.1180
4.3200	1.0725	10.4000	1.0000
4.4800	1.0713	10.5600	1.0000
4.6400	1.0701	10.7200	1.0000
4.8000	1.0687	10.8800	1.0000
4.9600	1.0672	11.0400	1.0000
5.1200	1.0655	11.2000	1.0000
5.2800	1.0636	11.3600	1.0000
5.4400	1.0616	11.5200	1.0000
5.6000	1.0595	11.6800	1.0000
5.7600	1.0571	11.8400	1.0000
5.9200	1.0548	12.0000	1.0000

Figure 16

Baseload W(z) at 18,000 MWD/MTU

V. C. Summer - Cycle 9

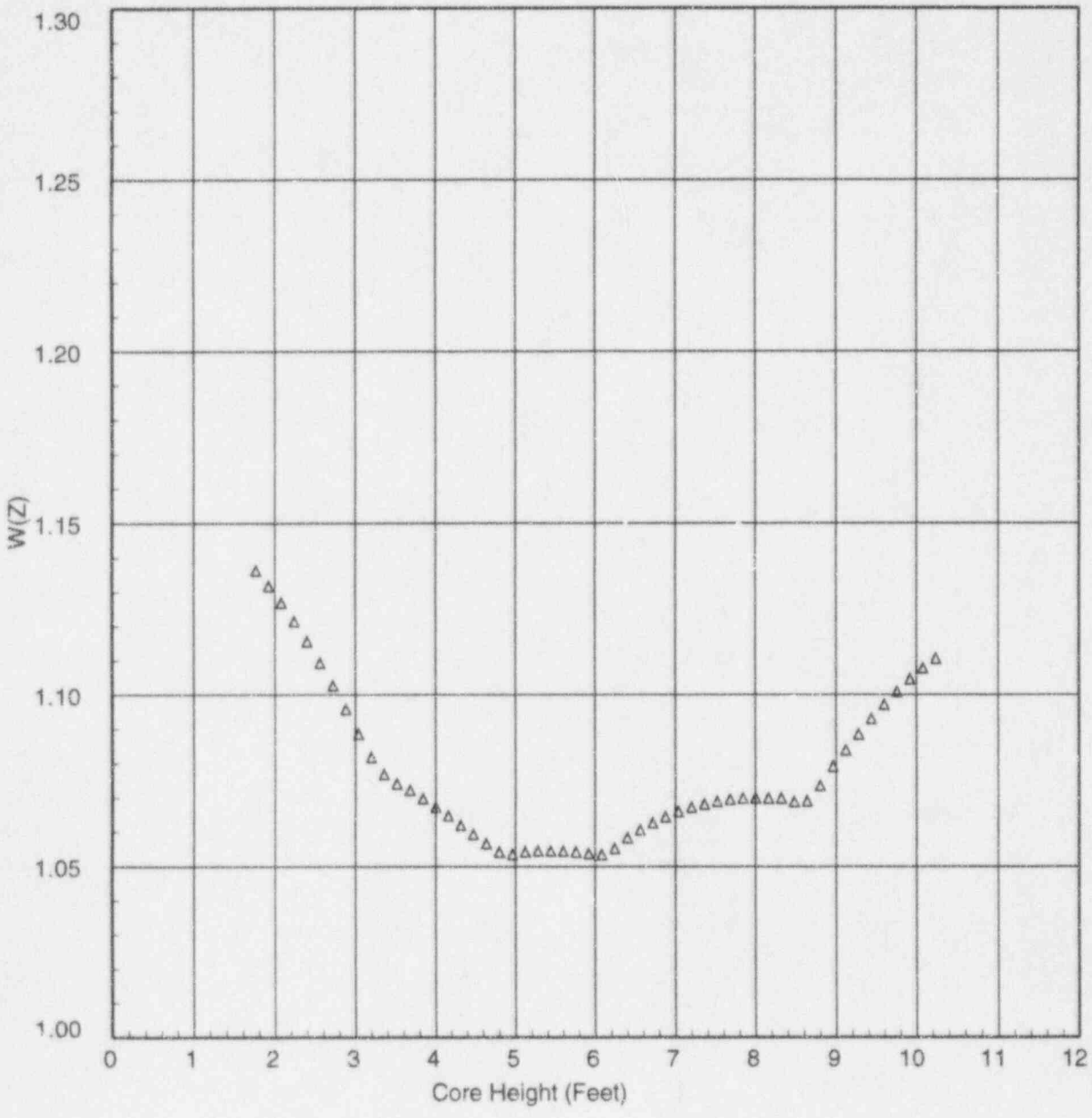


Table 12

Baseload W(z) at 18,000 MWD/MTU

V. C. Summer - Cycle 9

Core Height (ft)	W(Z)	Core Height (ft)	W(Z)
0.0000	1.0000	6.0800	1.0534
0.1600	1.0000	6.2400	1.0552
0.3200	1.0000	6.4000	1.0583
0.4800	1.0000	6.5600	1.0606
0.6400	1.0000	6.7200	1.0626
0.8000	1.0000	6.8800	1.0644
0.9600	1.0000	7.0400	1.0659
1.1200	1.0000	7.2000	1.0671
1.2800	1.0000	7.3600	1.0681
1.4400	1.0000	7.5200	1.0689
1.6000	1.0000	7.6800	1.0695
1.7600	1.1363	7.8400	1.0698
1.9200	1.1318	8.0000	1.0699
2.0800	1.1269	8.1600	1.0699
2.2400	1.1215	8.3200	1.0699
2.4000	1.1156	8.4800	1.0688
2.5600	1.1093	8.6400	1.0690
2.7200	1.1026	8.8000	1.0735
2.8800	1.0957	8.9600	1.0791
3.0400	1.0885	9.1200	1.0838
3.2000	1.0818	9.2800	1.0884
3.3600	1.0768	9.4400	1.0929
3.5200	1.0741	9.6000	1.0971
3.6800	1.0722	9.7600	1.1009
3.8400	1.0697	9.9200	1.1045
4.0000	1.0672	10.0800	1.1077
4.1600	1.0647	10.2400	1.1105
4.3200	1.0620	10.4000	1.0000
4.4800	1.0593	10.5600	1.0000
4.6400	1.0566	10.7200	1.0000
4.8000	1.0542	10.8800	1.0000
4.9600	1.0535	11.0400	1.0000
5.1200	1.0542	11.2000	1.0000
5.2800	1.0545	11.3600	1.0000
5.4400	1.0545	11.5200	1.0000
5.6000	1.0544	11.6800	1.0000
5.7600	1.0542	11.8400	1.0000
5.9200	1.0537	12.0000	1.0000

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

$$R = \frac{F^N_{\Delta H}}{F^{RTP}_{\Delta H} * (1 + PF_{\Delta H} * (1-P))}$$

$$\text{Where: } P = \frac{\text{Thermal Power}}{\text{Rated Thermal Power}}$$

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 17.

Figure 17

RCS Total Flow Rate vs. Three Loop Operation

V. C. Summer - Cycle 9

Measurement Uncertainties of 2.1% for Flow (includes 0.1% for feedwater venturi fouling) and 4.0% for Incore Measurement of $F^N_{\Delta H}$ are included in this figure.