Callaway Cycle 8
Core Operating Limits Report
(Revision 1)

January, 1996

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1.0 CORE OPERATING LIMITS REPORT

This Core Operating Limits Report (COLR) for Callaway Plant Cycle 8 has been prepared in accordance with the requirements of Technical Specification 6.9.1.9

The Core Operating Limits affecting the following Technical Specifications are included in this report.

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	Nuclear Enthalpy Rise Hot Channel Factor
3.9.1	Refueling Boron Concentration

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 6.9.1.9.

2.1 Moderator Temperature Coefficient

(Specification 3.1.1.3)

2.1.1 The Moderator Temperature Coefficient shall be less positive than the limits shown in Figure 1. These limits shall be referred to as the Beginning of Cycle Life (BOL) Limit.

The Moderator Temperature Coefficient shall be less negative than -47.9 pcm/°F. This limit shall be referred to as the End of Cycle Life (EOL) Limit.

2.1.2 The MTC 300 ppm surveillance limit is -40.4 pcm/°F (all rods withdrawn, Rated Thermal Power condition).

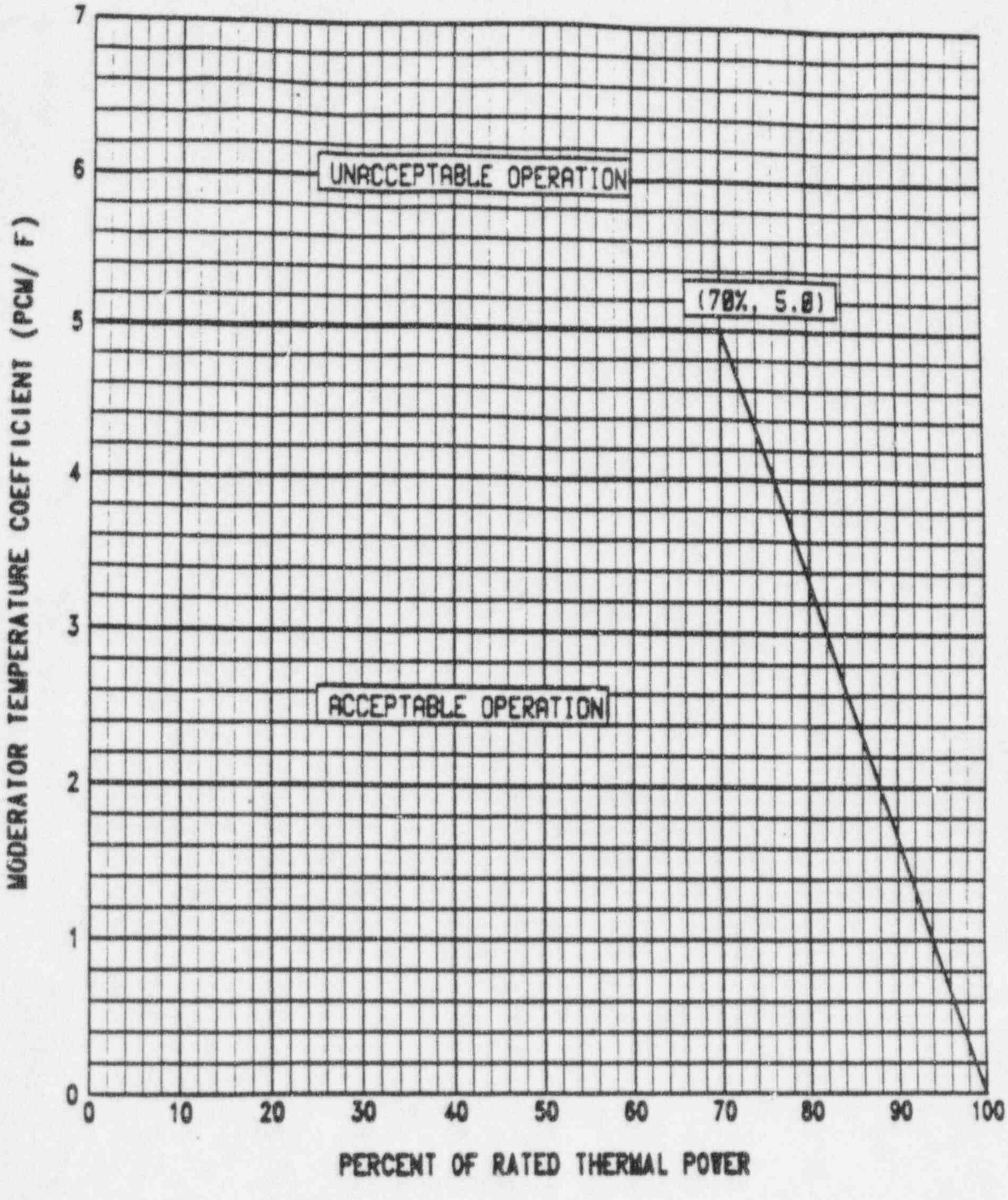


FIGURE 1

CALLAWAY UNIT 1 CYCLE 8
MODERATOR TEMPERATURE COEFFICIENT VS. POWER LEVEL

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The shutdown rods shall be withdrawn to at least 225 steps.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

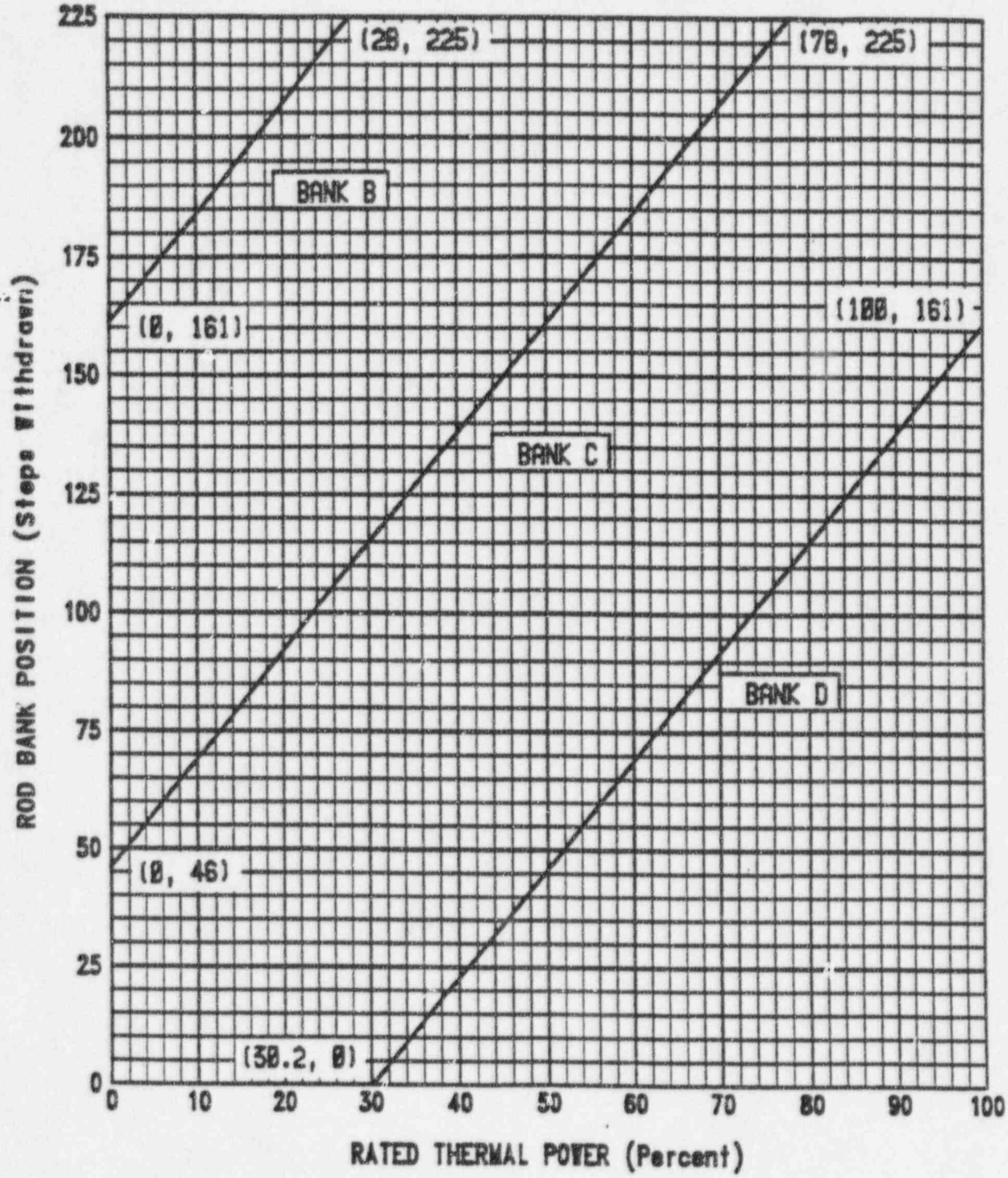


FIGURE 2

CALLAWAY UNIT 1 CYCLE 8
ROD BANK INSERTION LIMITS VS.
RATED THERMAL POWER - FOUR LOOP OPERATION

2.4 <u>Axial Flux Difference</u>
(Specification 3.2.1)

2.4.1 The Axial Flux Difference (AFD) Limits are provided in Figure 3.

2.4.2 The target band during Restricted AFD Operation is $\pm 3\%$. The AFD limits provided in Figure 3 also remain applicable during Restricted AFD Operation.

2.4.3 The minimum allowable power level for Restricted AFD Operation, APL^{ND}, is 90% of RATED THERMAL POWER.

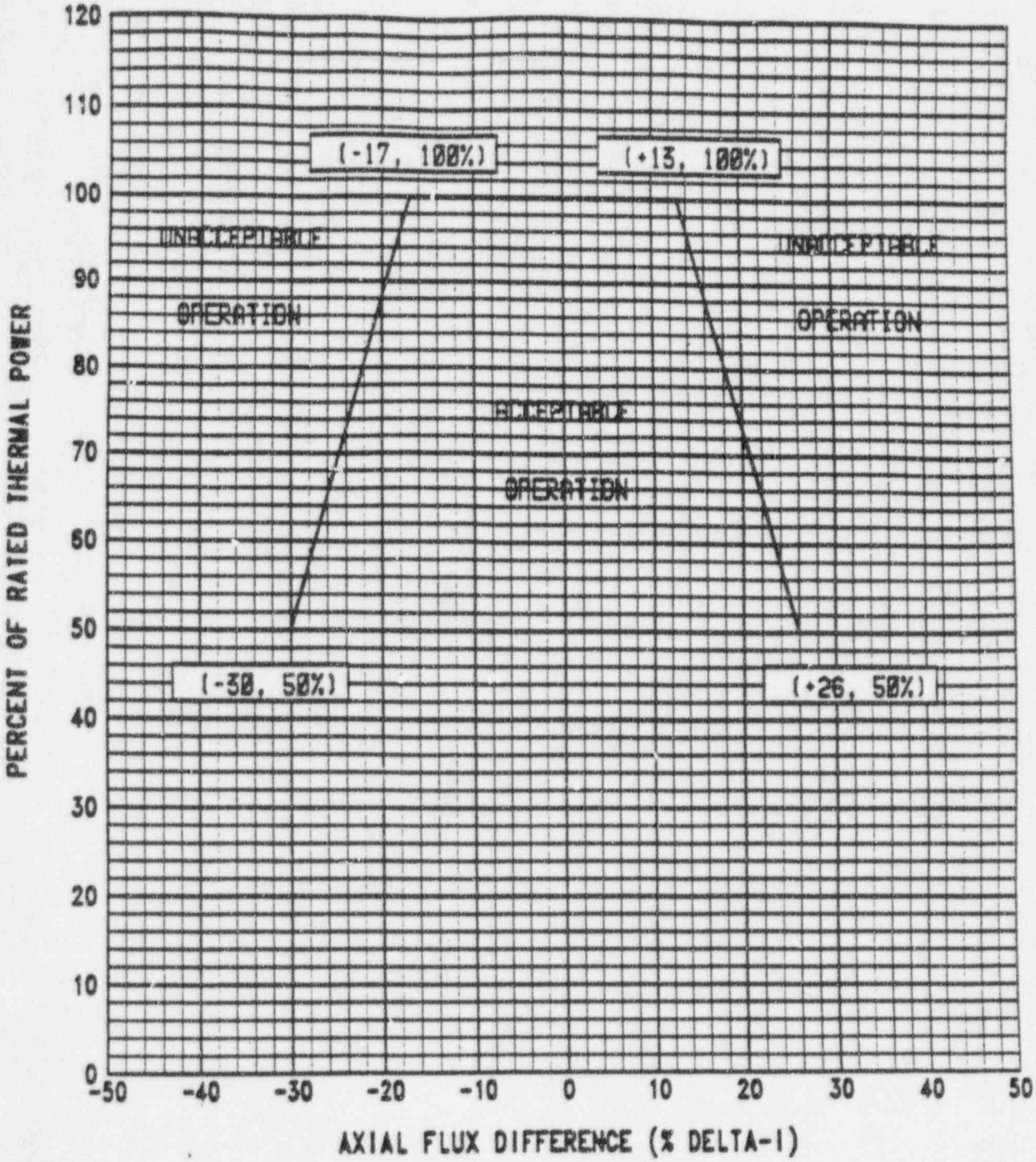


FIGURE 3

CALLAWAY UNIT 1 CYCLE 8
AXIAL FLUX DIFFERENCE LIMITS AS A FUNCTION
OF RATED THERMAL POWER FOR RAOC

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

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

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

where: $P = \dfrac{\text{THERMAL POWER}}{\text{RATED THERMAL POWER}}$

2.5.1 $F_Q^{RTP} = 2.50$

2.5.2 K(Z) is provided in Figure 4.

2.5.3 The W(z) functions that are to be used in Technical Specifications 4.2.2.2, 4.2.2.3, and 4.2.2.4 for F_Q surveillance are shown in Figures 5 through 18.

The Normal Operation W(z) values have been determined for several burnups up to 18000 MWD/MTU in Cycle 8. This permits determination of W(z) at any cycle burnup up to 18000 MWD/MTU through the use of three point interpolation. For cycle burnups greater than 18000 MWD/MTU, use of the 18000 MWD/MTU W(z) values without interpolation or extrapolation is conservative The $W(z)_{NO}$ values were determined assuming Cycle 8 operates with the RAOC strategy. Also included is a $W(z)_{NO}$ function that bounds the $W(z)_{NO}$ curve for all Cycle 8 burnups. Use of the bounding $W(z)_{NO}$ curve will be conservative for any Cycle 8 burnup; however, additional margin may be gained by using the burnup dependent $W(z)_{NO}$ values.

The Normal Operation W(z) values have also been determined for a range of measured axial offset values in Cycle 8. For measured axial offset values within $\pm$3% of the predicted axial offset value, Figures 5 through 9 are applicable. Additional W(z) values are provided in Figures 10 through 12 applicable to measured axial offsets within $\pm$3% of a measured-predicted axial offset difference of -3.2%. Figures 13 through 15 provide W(z) values applicable to measured axial offset within $\pm$3% of a measured-predicted axial offset difference of -6.4%. Figures 16 through 18 provide W(z) values applicable to measured axial offsets within $\pm$3% of a measured-predicted axial offset difference of -9.4%. For purposes of burnup interpolation, a consistent set of W(z) values should be used based on the difference between the measured and predicted axial offset. The W(z) set

selected should be the set closest to the actual measured-predicted axial offset difference. The bounding W(z) value provided in Figure 9 is only applicable for measured axial offset values within $\pm 3\%$ of predicted values.

Because significant margin exists between the analytically determined maximum $F_Q(z)*P_{rel}$ values and their limit, Restricted Axial Flux Difference (RAFDO) operation is not expected to be required for Cycle 8. For this reason, no $W(z)_{RAFDO}$ values are supplied for Cycle 8.

The W(z) values are provided for 73 axial points assuming the core height boundaries of 0 and 12 feet and intervals of .167 feet between the core boundaries.

Table A.1 shows the burnup dependent F_Q penalty factors for Cycle 8. These values shall be used to increase $F_Q^M(z)$ when required by Technical Specification Surveillance Requirement 4.2.2.2.e. A 2% penalty factor shall be used at all cycle burnups that are outside the range of Table A.1.

TABLE A.1

F_Q PENALTY FACTORS AS A FUNCTION OF CYCLE BURNUP

Cycle Burnup	$F_Q^M(z)$ Penalty Factor (%)
0	2.00
22500	2.00

Note: All cycle burnups outside the range of the above table shall use a 2% penalty factor for compliance with the 4.2.2.2.e Surveillance Requirement. Linear interpolation should be used for intermediate cycle burnups.

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

$F_{\Delta H}^{N} \leq F_{\Delta H}^{RTP} [1 + PF_{\Delta H}(1-P)]$

$$\text{where: } P = \frac{\text{THERMAL POWER}}{\text{RATED THERMAL POWER}}$$

2.6.1 $F_{\Delta H}^{RTP} = 1.59$

2.6.2 $PF_{\Delta H} = 0.3$

2.7 Refueling Boron Concentration
(Specification 3.9.1)

2.7.1 The refueling boron concentration to maintain $K_{eff} \leq 0.95$ shall be $\geq$ 2000 ppm.

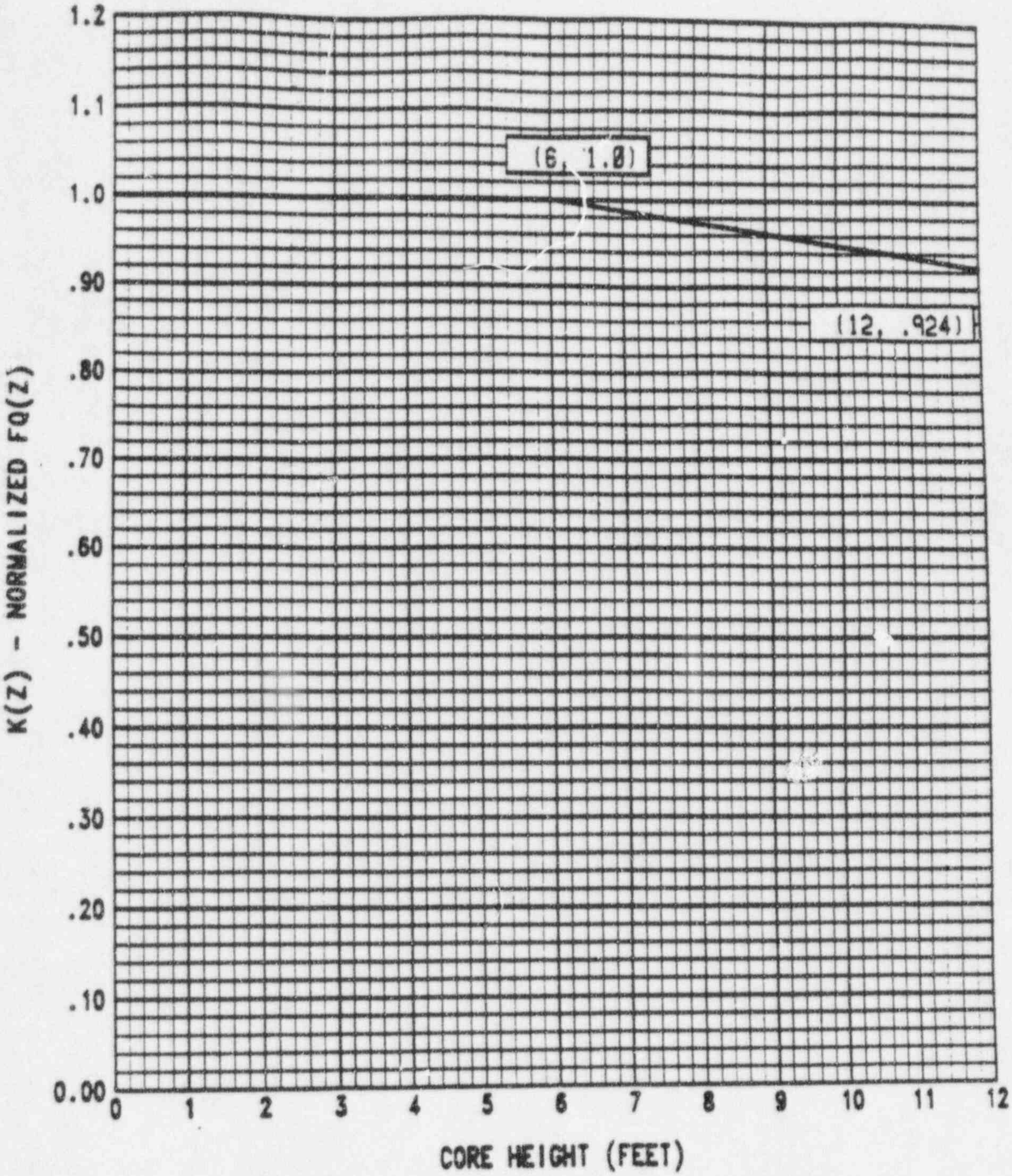
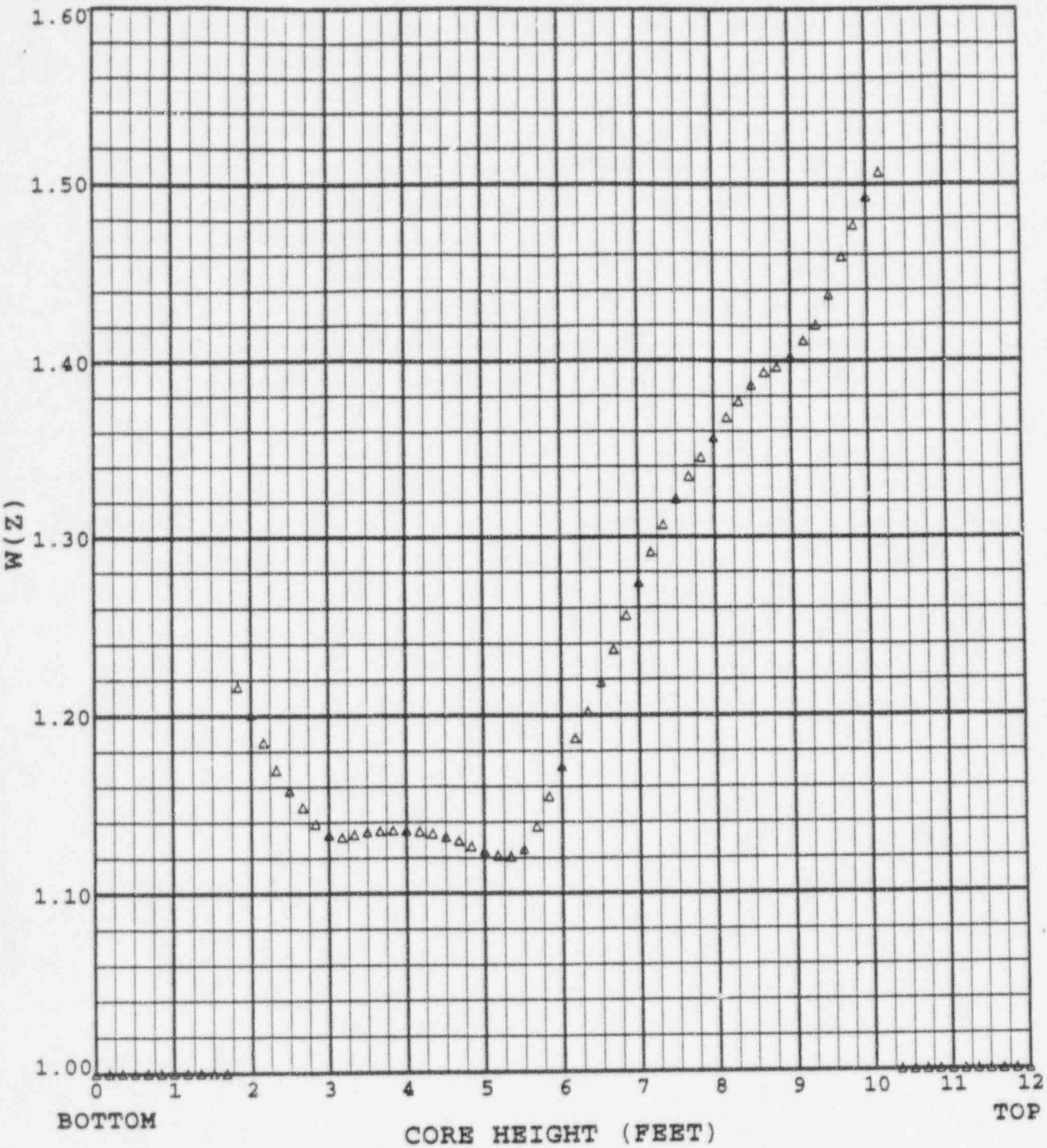


FIGURE 4

CALLAWAY UNIT 1 CYCLE 8
K(z) - NORMALIZED $F_Q(z)$
AS A FUNCTION OF CORE HEIGHT



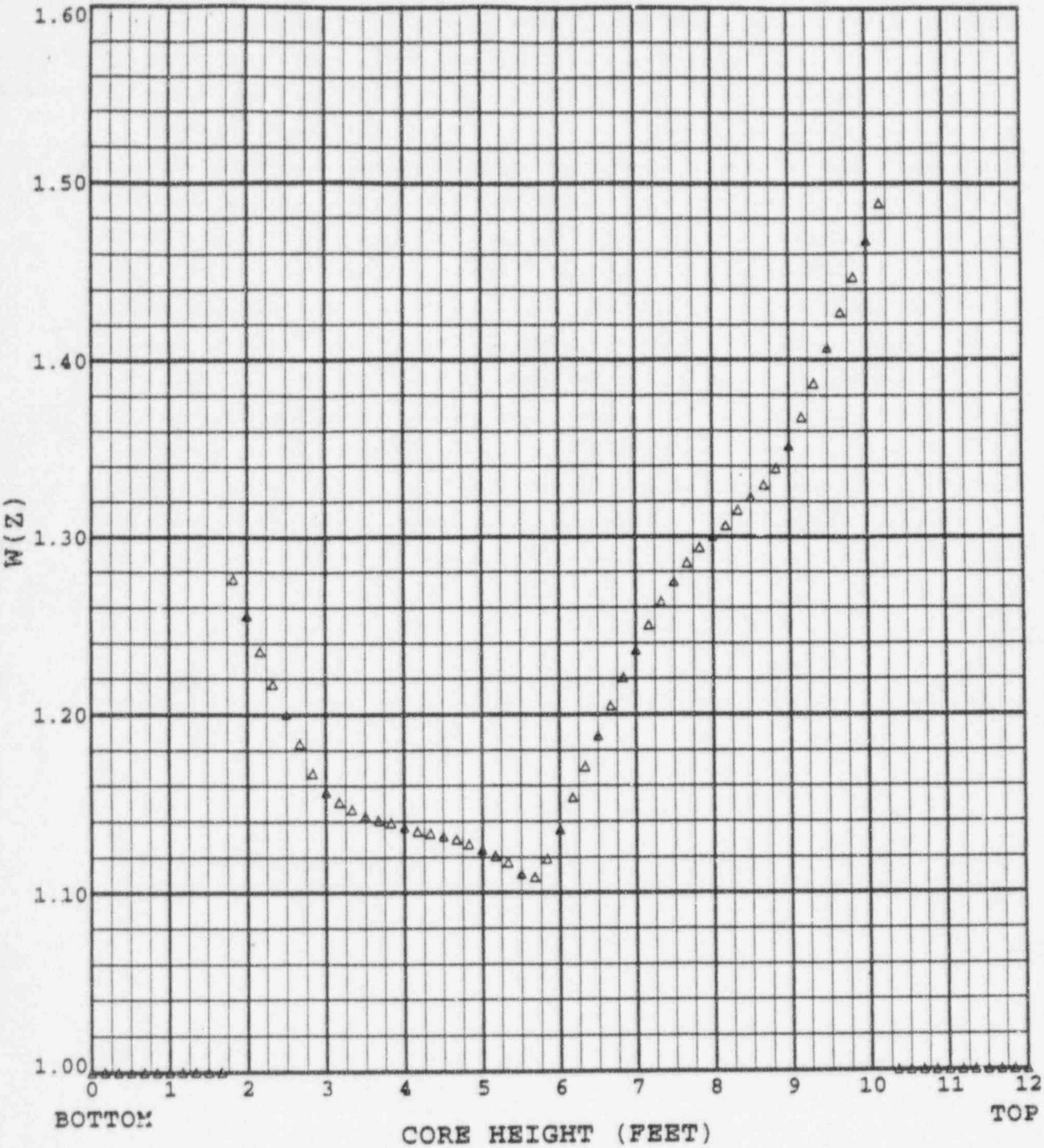
HEIGHT (FEET)	150. W(Z)
* 0.000	1.0000
* 0.167	1.0000
* 0.333	1.0000
* 0.500	1.0000
* 0.667	1.0000
* 0.833	1.0000
* 1.000	1.0000
* 1.167	1.0000
* 1.333	1.0000
* 1.500	1.0000
* 1.667	1.0000
1.833	1.2104
2.000	1.2012
2.167	1.1852
2.333	1.1695
2.500	1.1580
2.667	1.1486
2.833	1.1391
3.000	1.1331
3.167	1.1316
3.333	1.1332
3.500	1.1346
3.667	1.1352
3.833	1.1355
4.000	1.1354
4.167	1.1347
4.333	1.1335
4.500	1.1318
4.667	1.1295
4.833	1.1266
5.000	1.1240
5.167	1.1213
5.333	1.1207
5.500	1.1249
5.667	1.1375
5.833	1.1545
6.000	1.1715
6.167	1.1871
6.333	1.2021
6.500	1.2185
6.667	1.2366
6.833	1.2557
7.000	1.2742
7.167	1.2913
7.333	1.3071
7.500	1.3217
7.667	1.3343
7.833	1.3450
8.000	1.3566
8.167	1.3679
8.333	1.3770
8.500	1.3865
8.667	1.3938
8.833	1.3966
9.000	1.4027
9.167	1.4115
9.333	1.4204
9.500	1.4372
9.667	1.4584
9.833	1.4784
10.000	1.4928
10.167	1.5066
* 10.333	1.0000
* 10.500	1.0000
* 10.667	1.0000
* 10.833	1.0000
* 11.000	1.0000
* 11.167	1.0000
* 11.333	1.0000
* 11.500	1.0000
* 11.667	1.0000
* 11.833	1.0000
* 12.000	1.0000

Figure 5

Callaway Unit 1 Cycle 8

W(z)no at 150 MWD/MTU

*Top and bottom 15% excluded as per Tech Spec 4.2.2.2G



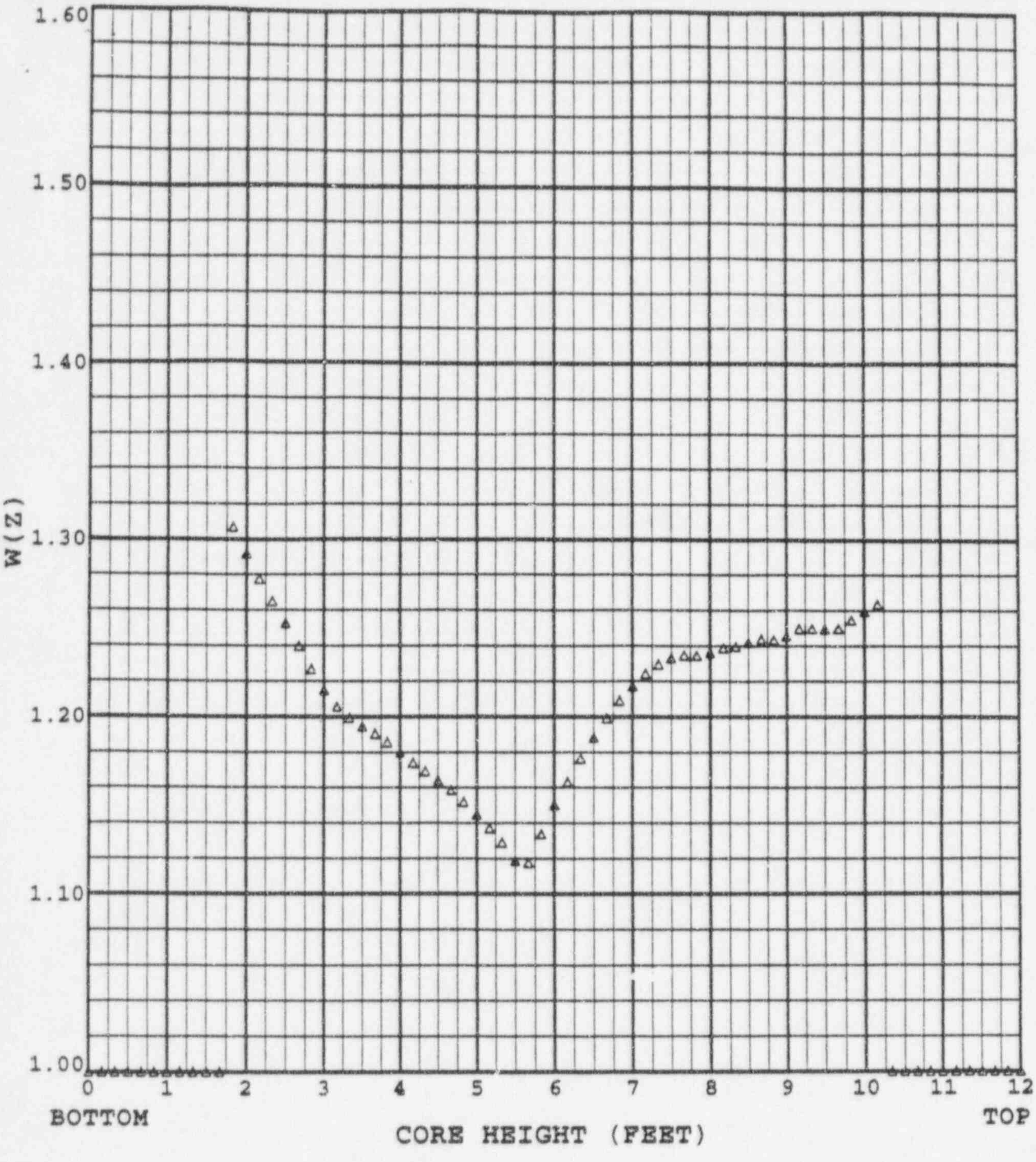
	HEIGHT (FEET)	2000. W(Z)
*	0.000	1.0000
*	0.167	1.0000
*	0.333	1.0000
*	0.500	1.0000
*	0.667	1.0000
*	0.833	1.0000
*	1.000	1.0000
*	1.167	1.0000
*	1.333	1.0000
*	1.500	1.0000
*	1.667	1.0000
	1.833	1.2761
	2.000	1.2557
	2.167	1.2356
	2.333	1.2171
	2.500	1.2004
	2.667	1.1836
	2.833	1.1671
	3.000	1.1566
	3.167	1.1510
	3.333	1.1467
	3.500	1.1431
	3.667	1.1407
	3.833	1.1392
	4.000	1.1368
	4.167	1.1345
	4.333	1.1333
	4.500	1.1319
	4.667	1.1299
	4.833	1.1273
	5.000	1.1241
	5.167	1.1208
	5.333	1.1170
	5.500	1.1106
	5.667	1.1089
	5.833	1.1192
	6.000	1.1356
	6.167	1.1535
	6.333	1.1708
	6.500	1.1881
	6.667	1.2049
	6.833	1.2208
	7.000	1.2360
	7.167	1.2502
	7.333	1.2631
	7.500	1.2747
	7.667	1.2851
	7.833	1.2938
	8.000	1.3000
	8.167	1.[illegible]63
	8.333	1.3152
	8.500	1.3227
	8.667	1.3296
	8.833	1.3389
	9.000	1.3515
	9.167	1.3676
	9.333	1.3868
	9.500	1.4068
	9.667	1.4266
	9.833	1.4466
	10.000	1.4673
	10.167	1.4886
*	10.333	1.0000
*	10.500	1.0000
*	10.667	1.0000
*	10.833	1.0000
*	11.000	1.0000
*	11.167	1.0000
*	11.333	1.0000
*	11.500	1.0000
*	11.667	1.0000
*	11.833	1.0000
*	12.000	1.0000

Figure 6

Callaway Unit 1 Cycle 8

W(z)no at 2000 MWD/MTU

*Top and bottom 15% excluded as per Tech Spec 4.2.2.2G



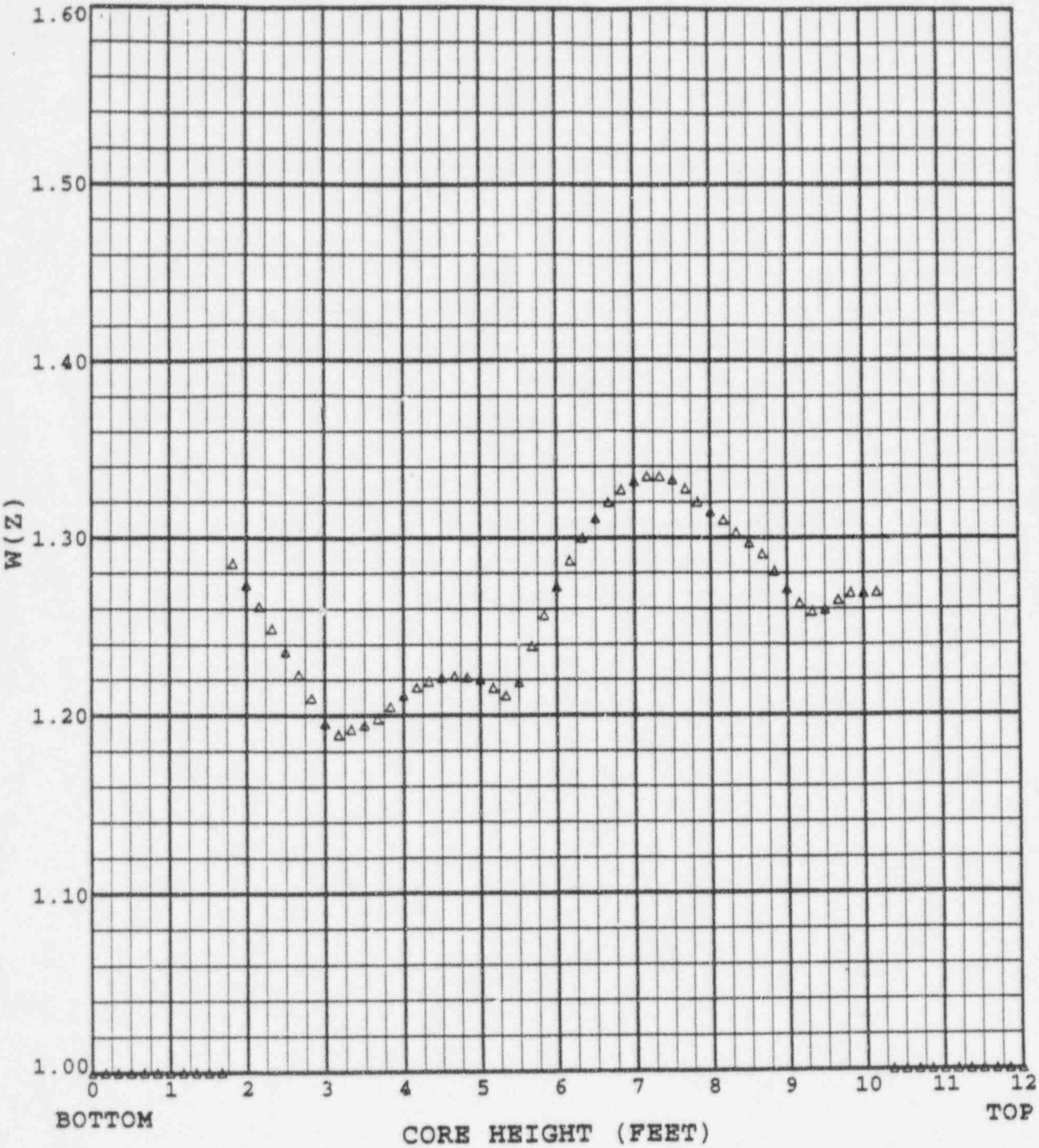
	HEIGHT (FEET)	10000. W(Z)
*	0.000	1.0000
*	0.167	1.0000
*	0.333	1.0000
*	0.500	1.0000
*	0.667	1.0000
*	0.833	1.0000
*	1.000	1.0000
*	1.167	1.0000
*	1.333	1.0000
*	1.500	1.0000
*	1.667	1.0000
	1.833	1.3070
	2.000	1.2919
	2.167	1.2775
	2.333	1.2650
	2.500	1.2527
	2.667	1.2398
	2.833	1.2269
	3.000	1.2151
	3.167	1.2058
	3.333	1.1996
	3.500	1.1948
	3.667	..1905
	3.833	1.1858
	4.000	1.1801
	4.167	1.1742
	4.333	1.1693
	4.500	1.1642
	4.667	1.1586
	4.833	1.1522
	5.000	1.1449
	5.167	1.1372
	5.333	1.1290
	5.500	1.1188
	5.667	1.1177
	5.833	1.1337
	6.000	1.1502
	6.167	1.1633
	6.333	1.1764
	6.500	1.1885
	6.667	1.1994
	6.833	1.2091
	7.000	1.2174
	7.167	1.2243
	7.333	1.2295
	7.500	1.2333
	7.667	1.2348
	7.833	1.2345
	8.000	1.2361
	8.167	1.2388
	8.333	1.2396
	8.500	1.2420
	8.667	1.2440
	8.833	1.2435
	9.000	1.2457
	9.167	1.2498
	9.333	1.2499
	9.500	1.2496
	9.667	1.2499
	9.833	1.2546
	10.000	1.2596
	10.167	1.2636
*	10.333	1.0000
*	10.500	1.0000
*	10.667	1.0000
*	10.833	1.0000
*	11.000	1.0000
*	11.167	1.0000
*	11.333	1.0000
*	11.500	1.0000
*	11.667	1.0000
*	11.833	1.0000
*	12.000	1.0000

Figure 7

Callaway Unit 1 Cycle 8

W(z)no at 10000 MWD/MTU

*Top and bottom 15% excluded as per Tech Spec 4.2.2.2G



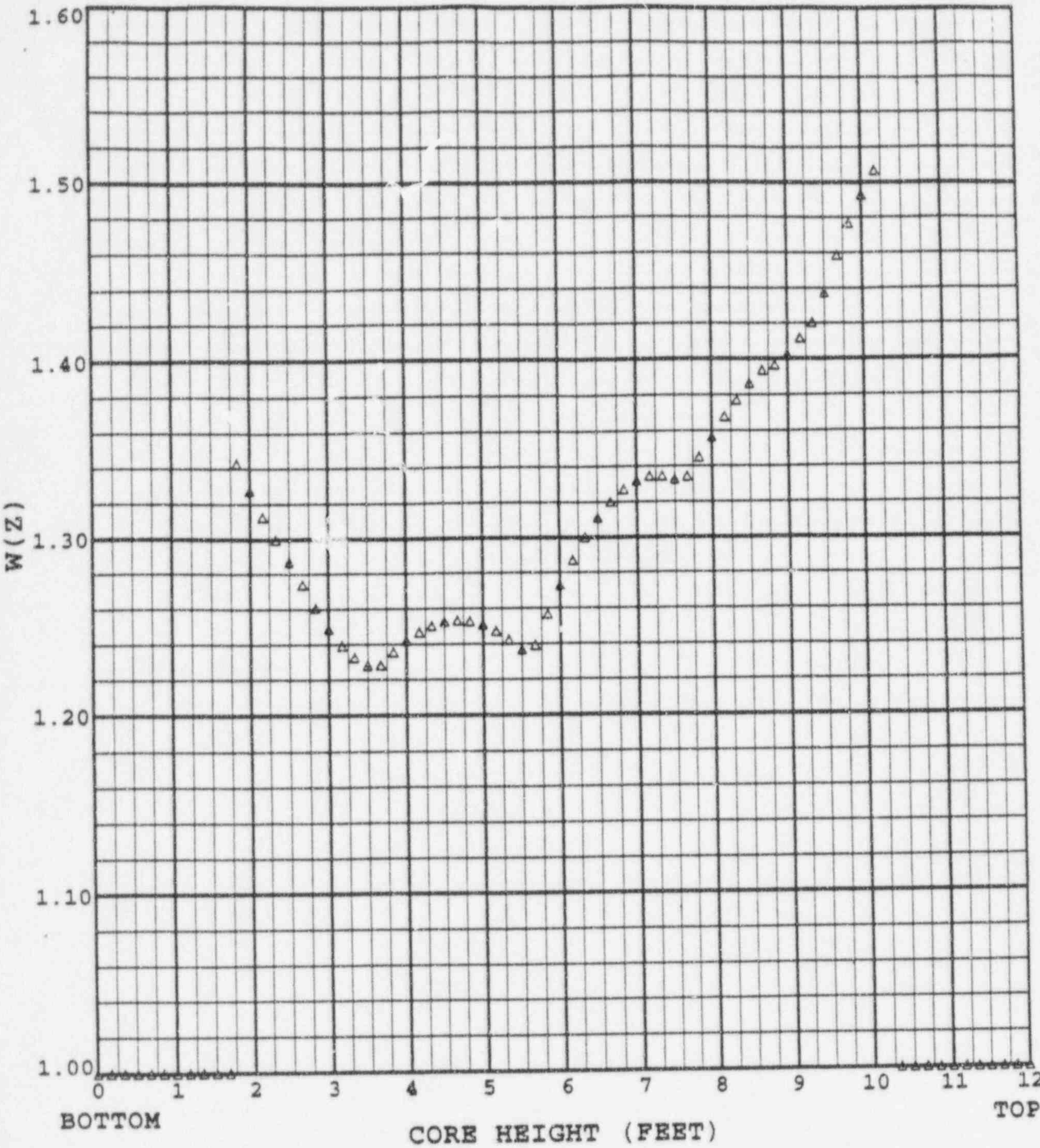
	HEIGHT (FEET)	18000. W(Z)
*	0.000	1.0000
*	0.167	1.0000
*	0.333	1.0000
*	0.500	1.0000
*	0.667	1.0000
*	0.833	1.0000
*	1.000	1.0000
*	1.167	1.0000
*	1.333	1.0000
*	1.500	1.0000
*	1.667	1.0000
	1.833	1.2856
	2.000	1.2737
	2.167	1.2615
	2.333	1.2490
	2.500	1.2361
	2.667	1.2230
	2.833	1.2096
	3.000	1.1956
	3.167	1.1894
	3.333	1.1924
	3.500	1.1949
	3.667	1.1980
	3.833	1.2049
	4.000	1.2111
	4.167	1.2156
	4.333	1.2190
	4.500	1.2213
	4.667	1.2220
	4.833	1.2214
	5.000	1.2202
	5.167	1.2155
	5.333	1.2112
	5.500	1.2188
	5.667	1.2392
	5.833	1.2567
	6.000	1.2726
	6.167	1.2873
	6.333	1.3001
	6.500	1.3111
	6.667	1.3201
	6.833	1.3271
	7.000	1.3319
	7.167	1.3345
	7.333	1.3347
	7.500	1.3328
	7.667	1.3278
	7.833	1.3203
	8.000	1.3148
	8.167	1.3099
	8.333	1.3028
	8.500	1.2970
	8.667	1.2908
	8.833	1.2813
	9.000	1.2714
	9.167	1.2631
	9.333	1.2584
	9.500	1.2597
	9.667	1.2649
	9.833	1.2689
	10.000	1.2689
	10.167	1.2691
*	10.333	1.0000
*	10.500	1.0000
*	10.667	1.0000
*	10.833	1.0000
*	11.000	1.0000
*	11.167	1.0000
*	11.333	1.0000
*	11.500	1.0000
*	11.667	1.0000
*	11.833	1.0000
*	12.000	1.0000

Figure 8

Callaway Unit 1 Cycle 8

W(z)no at 18000 MWD/MTU

*Top and bottom 15% excluded as per Tech Spec 4.2.2.2C



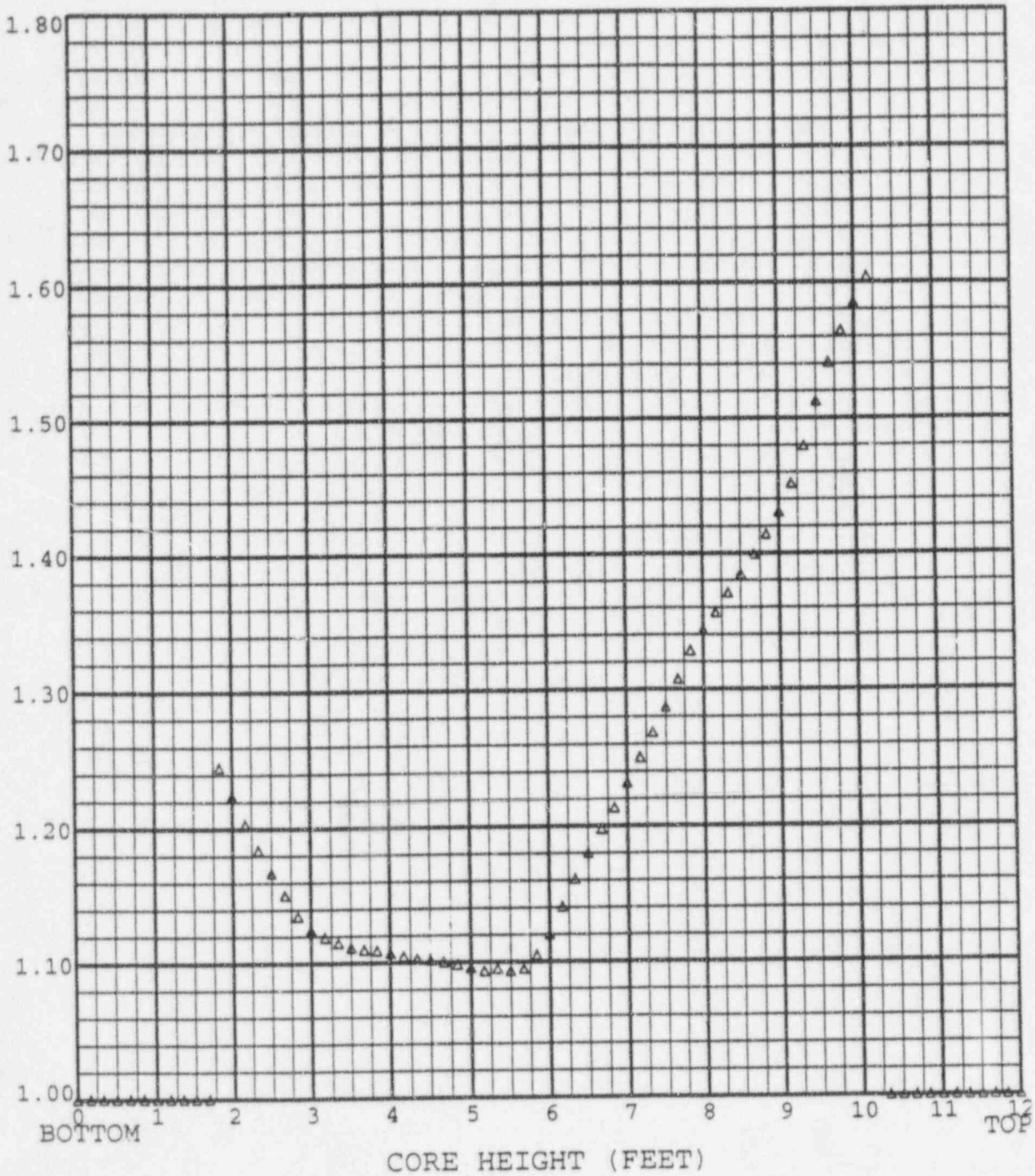
	HEIGHT (FEET)	MAX W(Z)
*	0.000	1.0000
*	0.167	1.0000
*	0.333	1.0000
*	0.500	1.0000
*	0.667	1.0000
*	0.833	1.0000
*	1.000	1.0000
*	1.167	1.0000
*	1.333	1.0000
*	1.500	1.0000
*	1.667	1.0000
	1.833	1.3430
	2.000	1.3275
	2.167	1.3127
	2.333	1.2999
	2.500	1.2870
	2.667	1.2740
	2.833	1.2607
	3.000	1.2486
	3.167	1.2391
	3.333	1.2327
	3.500	1.2280
	3.667	1.2283
	3.833	1.2355
	4.000	1.2421
	4.167	1.2466
	4.333	1.2502
	4.500	1.2525
	4.667	1.2533
	4.833	1.2528
	5.000	1.2508
	5.167	1.2472
	5.333	1.2423
	5.500	1.2369
	5.667	1.2392
	5.833	1.2567
	6.000	1.2726
	6.167	1.2873
	6.333	1.3001
	6.500	1.3111
	6.667	1.3201
	6.833	1.3271
	7.000	1.3319
	7.167	1.3345
	7.333	1.3347
	7.500	1.3328
	7.667	1.3343
	7.833	1.3450
	8.000	1.3566
	8.167	1.3679
	8.333	1.3770
	8.500	1.3865
	8.667	1.3938
	8.833	1.3966
	9.000	1.4027
	9.167	1.4115
	9.333	1.4204
	9.500	1.4372
	9.667	1.4584
	9.833	1.4764
	10.000	1.4928
	10.167	1.5066
*	10.333	1.0000
*	10.500	1.0000
*	10.667	1.0000
*	10.833	1.0000
*	11.000	1.0000
*	11.167	1.0000
*	11.333	1.0000
*	11.500	1.0000
*	11.667	1.0000
*	11.833	1.0000
*	12.000	1.0000

Figure 9

Callaway Unit 1 Cycle 8

Bounding W(z)no For Cycle 8

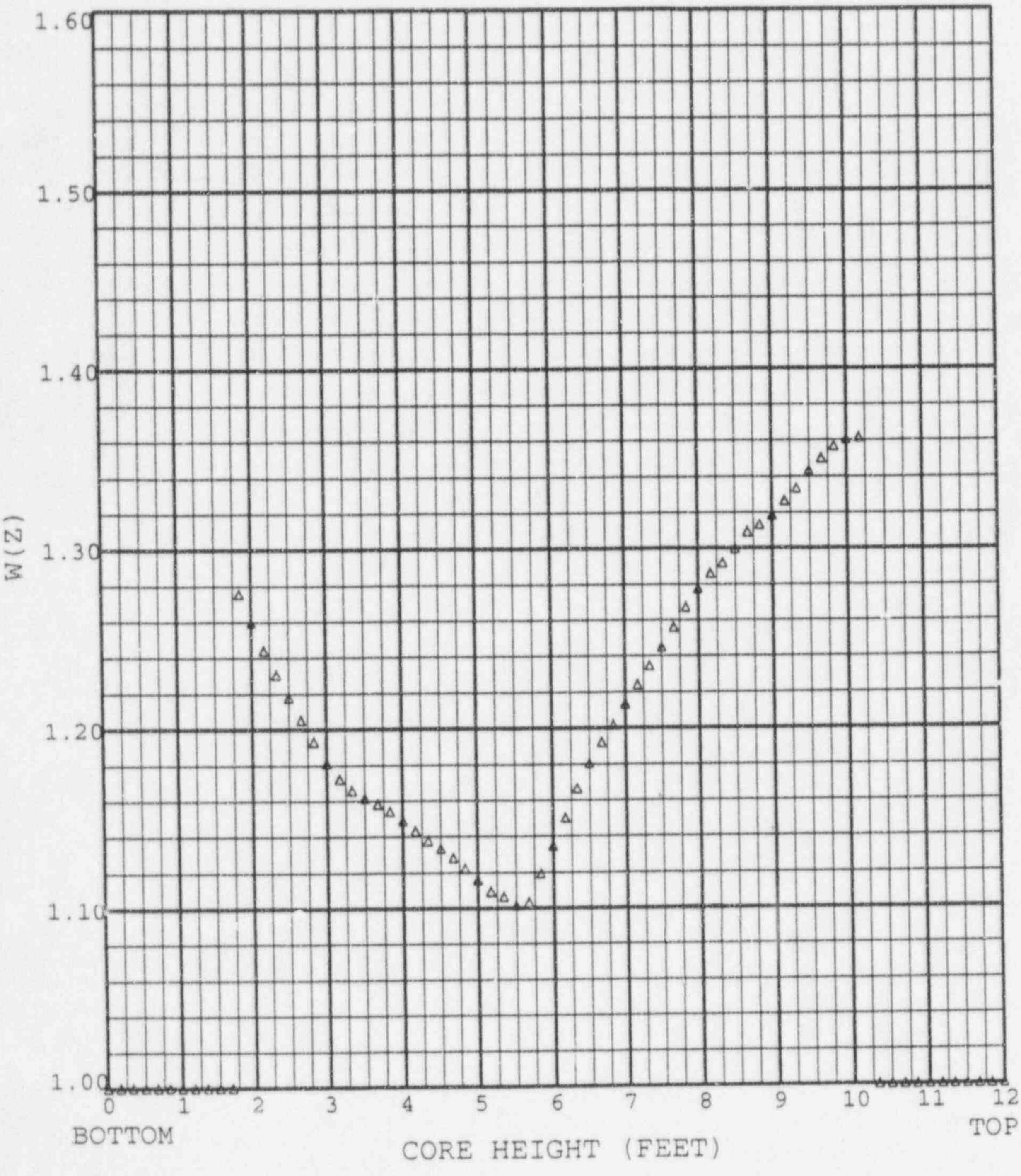
*Top and bottom 15% excluded as per Tech Spec 4.2.2.2G



	HEIGHT (FEET)	MEASURED-PREDICTED AO= -3.2
*	0.000	1.0000
*	0.167	1.0000
*	0.333	1.0000
*	0.500	1.0000
*	0.667	1.0000
*	0.833	1.0000
*	1.000	1.0000
*	1.167	1.0000
*	1.333	1.0000
*	1.500	1.0000
*	1.667	1.0000
	1.833	1.2454
	2.000	1.2244
	2.167	1.2033
	2.333	1.1841
	2.500	1.1671
	2.667	1.1506
	2.833	1.1349
	3.000	1.1244
	3.167	1.1190
	3.333	1.1146
	3.500	1.1113
	3.667	1.1096
	3.833	1.1089
	4.000	1.1070
	4.167	1.1045
	4.333	1.1027
	4.500	1.1019
	4.667	1.1002
	4.833	1.0980
	5.000	1.0957
	5.167	1.0934
	5.333	1.0948
	5.500	1.0934
	5.667	1.0946
	5.833	1.1050
	6.000	1.1201
	6.167	1.1405
	6.333	1.1609
	6.500	1.1802
	6.667	1.1976
	6.833	1.2134
	7.000	1.2319
	7.167	1.2500
	7.333	1.2684
	7.500	1.2870
	7.667	1.3072
	7.833	1.3282
	8.000	1.3436
	8.167	1.3563
	8.333	1.3707
	8.500	1.3845
	8.667	1.3993
	8.833	1.4141
	9.000	1.4306
	9.167	1.4516
	9.333	1.4796
	9.500	1.5125
	9.667	1.5409
	9.833	1.5644
	10.000	1.5851
	10.167	1.6040
*	10.333	1.0000
*	10.500	1.0000
*	10.667	1.0000
*	10.833	1.0000
*	11.000	1.0000
*	11.167	1.0000
*	11.333	1.0000
*	11.500	1.0000
*	11.667	1.0000
*	11.833	1.0000
*	12.000	1.0000

Figure 10
Callaway Unit 1 Cycle 8
$W(z)_{no}$ at 2000 MWD/MTU

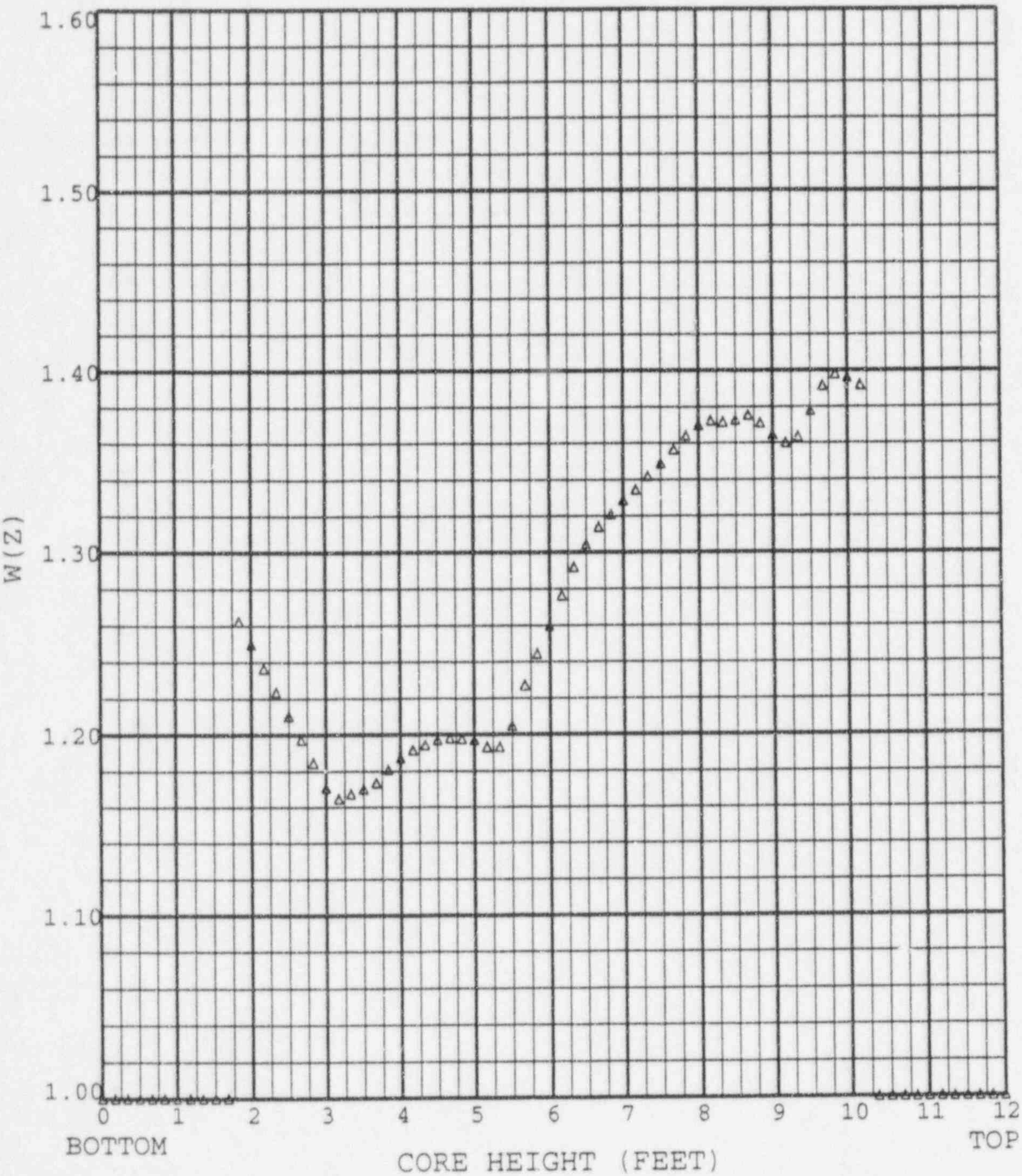
* Top and bottom 15% excluded as per Tech Spec 4.2.2.2G



HEIGHT (FEET)	MEASURED-PREDICTED AO= -32
*0.000	1.0000
*0.167	1.0000
*0.333	1.0000
*0.500	1.0000
*0.667	1.0000
*0.833	1.0000
*1.000	1.0000
*1.167	1.0000
*1.333	1.0000
*1.500	1.0000
*1.667	1.0000
1.833	1.2756
2.000	1.2597
2.167	1.2441
2.333	1.2307
2.500	1.2180
2.667	1.2053
2.833	1.1931
3.000	1.1812
3.167	1.1723
3.333	1.1660
3.500	1.1615
3.667	1.1581
3.833	1.1543
4.000	1.1491
4.167	1.1431
4.333	1.1377
4.500	1.1334
4.667	1.1281
4.833	1.1223
5.000	1.1159
5.167	1.1094
5.333	1.1065
5.500	1.1015
5.667	1.1032
5.833	1.1193
6.000	1.1345
6.167	1.1502
6.333	1.1664
6.500	1.1806
6.667	1.1921
6.833	1.2018
7.000	1.2134
7.167	1.2241
7.333	1.2347
7.500	1.2452
7.667	1.2561
7.833	1.2673
8.000	1.2776
8.167	1.2862
8.333	1.2919
8.500	1.3001
8.667	1.3092
8.833	1.3133
9.000	1.3186
9.167	1.3264
9.333	1.3336
9.500	1.3435
9.667	1.3501
9.833	1.3568
10.000	1.3607
10.167	1.3616
*10.333	1.0000
*10.500	1.0000
*10.667	1.0000
*10.833	1.0000
*11.000	1.0000
*11.167	1.0000
*11.333	1.0000
*11.500	1.0000
*11.667	1.0000
*11.833	1.0000
*12.000	1.0000

Figure 11
Callaway Unit 1 Cycle 8
$W(z)_{no}$ at 10000 MWD/MTU

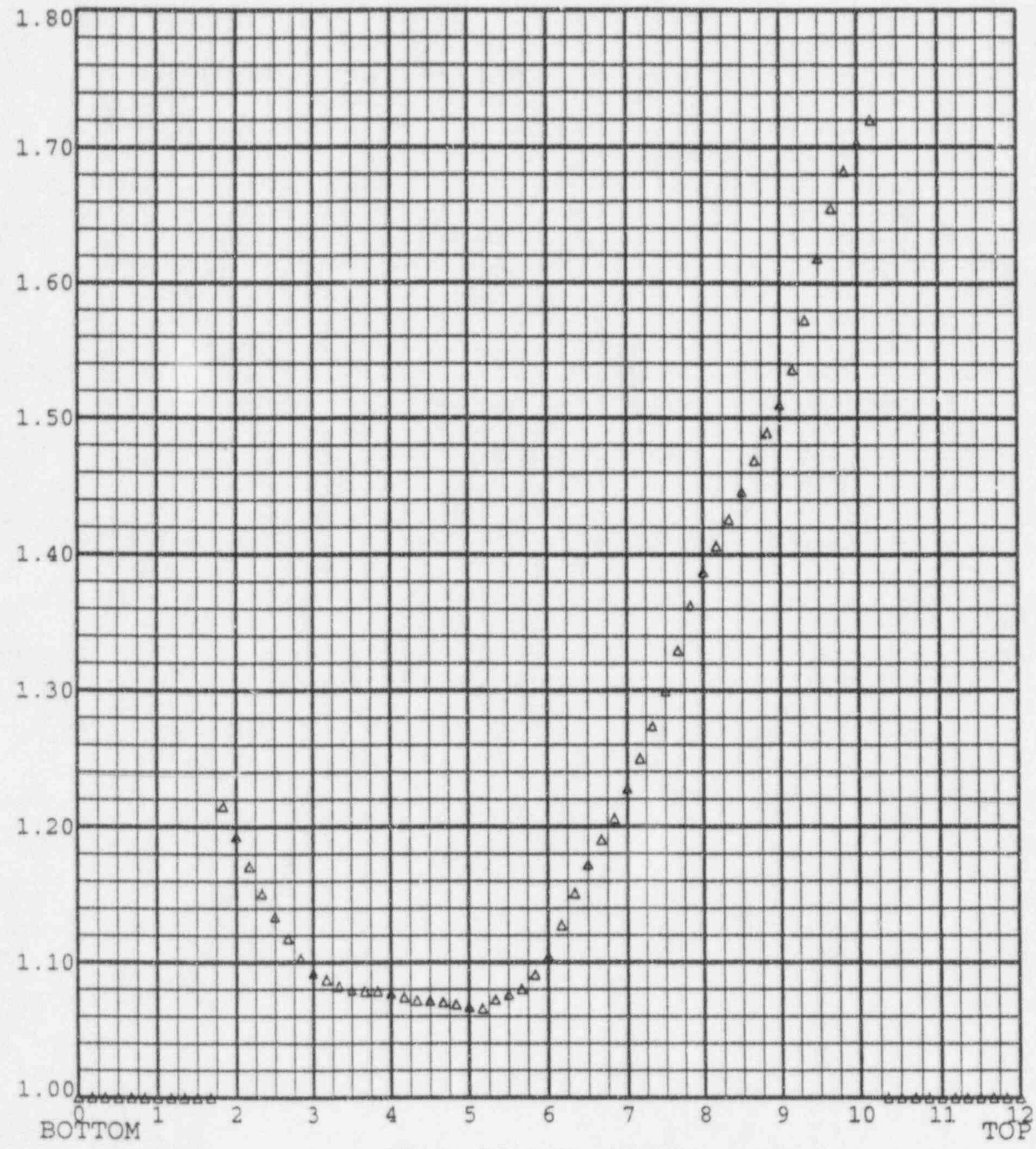
* Top and bottom 15% excluded as per Tech Spec 4.2.2.2G



HEIGHT (FEET)	MEASURED-PREDICTED AO= -3.2
* 0.000	1.0000
* 0.167	1.0000
* 0.333	1.0000
* 0.500	1.0000
* 0.667	1.0000
* 0.833	1.0000
* 1.000	1.0000
* 1.167	1.0000
* 1.333	1.0000
* 1.500	1.0000
* 1.667	1.0000
1.833	1.2624
2.000	1.2499
2.167	1.2367
2.333	1.2236
2.500	1.2104
2.667	1.1975
2.833	1.1846
3.000	1.1706
3.167	1.1646
3.333	1.1673
3.500	1.1700
3.667	1.1735
3.833	1.1809
4.000	1.1873
4.167	1.1915
4.333	1.1943
4.500	1.1970
4.667	1.1979
4.833	1.1976
5.000	1.1971
5.167	1.1932
5.333	1.1931
5.500	1.2046
5.667	1.2272
5.833	1.2447
6.000	1.2596
6.167	1.2764
6.333	1.2918
6.500	1.3046
6.667	1.3141
6.833	1.3211
7.000	1.3286
7.167	1.3344
7.333	1.3417
7.500	1.3489
7.667	1.3564
7.833	1.3641
8.000	1.3700
8.167	1.3726
8.333	1.3715
8.500	1.3728
8.667	1.3754
8.833	1.3712
9.000	1.3644
9.167	1.3601
9.[illegible]33	1.3637
9.500	1.3780
9.667	1.3916
9.833	1.3981
10.000	1.3962
10.167	1.3921
* 10.333	1.0000
* 10.500	1.0000
* 10.667	1.0000
* 10.833	1.0000
* 11.000	1.0000
* 11.167	1.0000
* 11.333	1.0000
* 11.500	1.0000
* 11.667	1.0000
* 11.833	1.0000
* 12.000	1.0000

Figure 12
Callaway Unit 1 Cycle 8
$W(z)_{no}$ at 18000 MWD/MTU

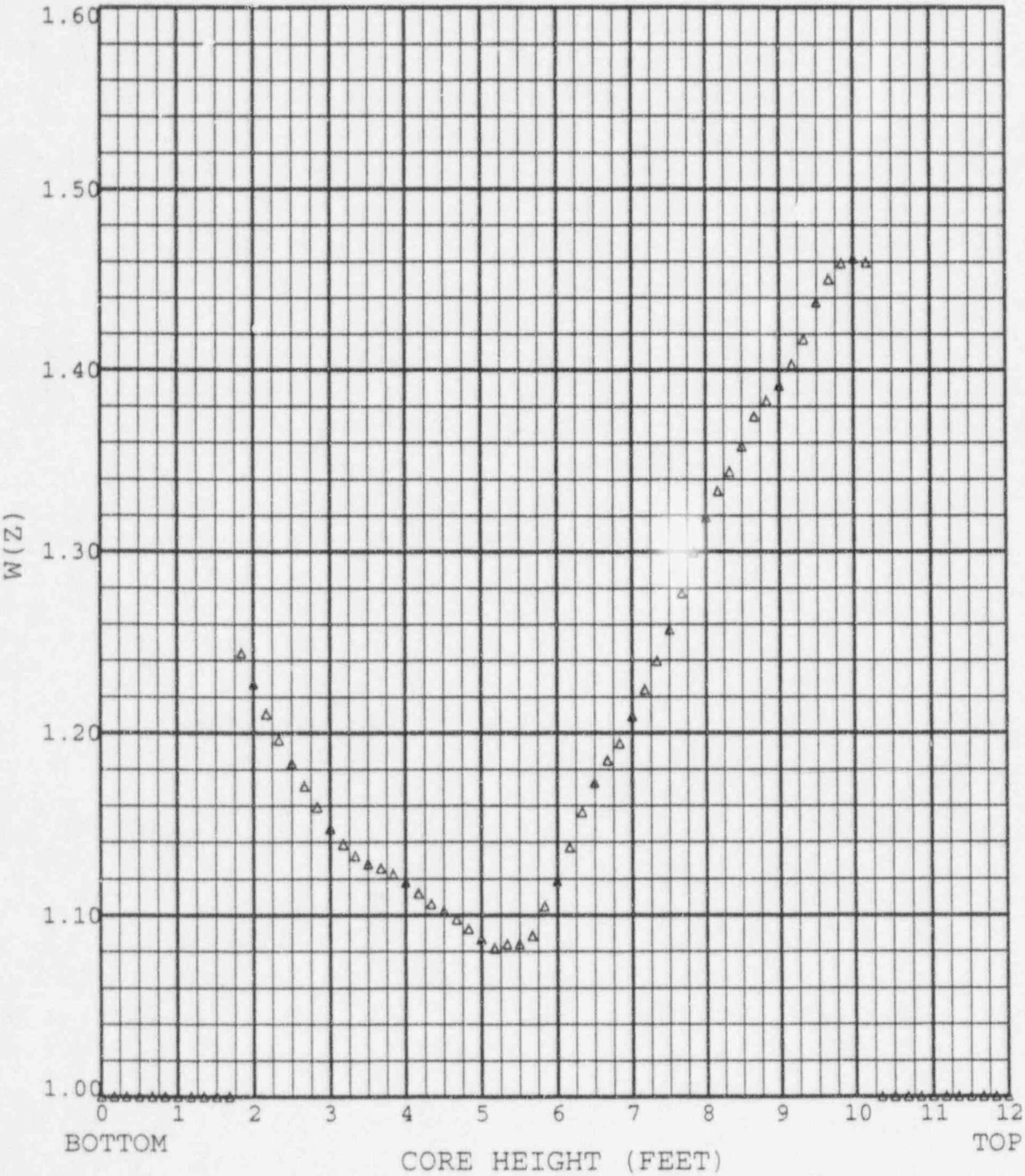
* Top and bottom 15% excluded as per Tech Spec 4.2.2.2G



HEIGHT (FEET)	MEASURED-PREDICTED AO= -4.4
* 0.000	1.0000
* 0.167	1.0000
* 0.333	1.0000
* 0.500	1.0000
* 0.667	1.0000
* 0.833	1.0000
* 1.000	1.0000
* 1.167	1.0000
* 1.333	1.0000
* 1.500	1.0000
* 1.667	1.0000
1.833	1.2148
2.000	1.1930
2.167	1.1709
2.333	1.1510
2.500	1.1339
2.667	1.1177
2.833	1.1028
3.000	1.0922
3.167	1.0871
3.333	1.0824
3.500	1.0795
3.667	1.0786
3.833	1.0786
4.000	1.0771
4.167	1.0744
4.333	1.0720
4.500	1.0719
4.667	1.0705
4.833	1.0688
5.000	1.0672
5.167	1.0660
5.333	1.0725
5.500	1.0762
5.667	1.0802
5.833	1.0908
6.000	1.1046
6.167	1.1275
6.333	1.1510
6.500	1.1723
6.667	1.1902
6.833	1.2060
7.000	1.2278
7.167	1.2498
7.333	1.2737
7.500	1.2994
7.667	1.[illegible]293
7.833	1.3625
8.000	1.3873
8.167	1.4063
8.333	1.4261
8.500	1.4464
8.667	1.4690
8.833	1.4893
9.000	1.5097
9.167	1.5357
9.333	1.5725
9.500	1.6182
9.667	1.6553
9.833	1.6823
10.000	1.7028
10.167	1.7195
* 10.333	1.0000
* 10.500	1.0000
* 10.667	1.0000
* 10.833	1.0000
* 11.000	1.0000
* 11.167	1.0000
* 11.333	1.0000
* 11.500	1.0000
* 11.667	1.0000
* 11.833	1.0000
* 12.000	1.0000

Figure 13
Callaway Unit 1 Cycle 8
$W(z)_{no}$ at 2000 MWD/MTU

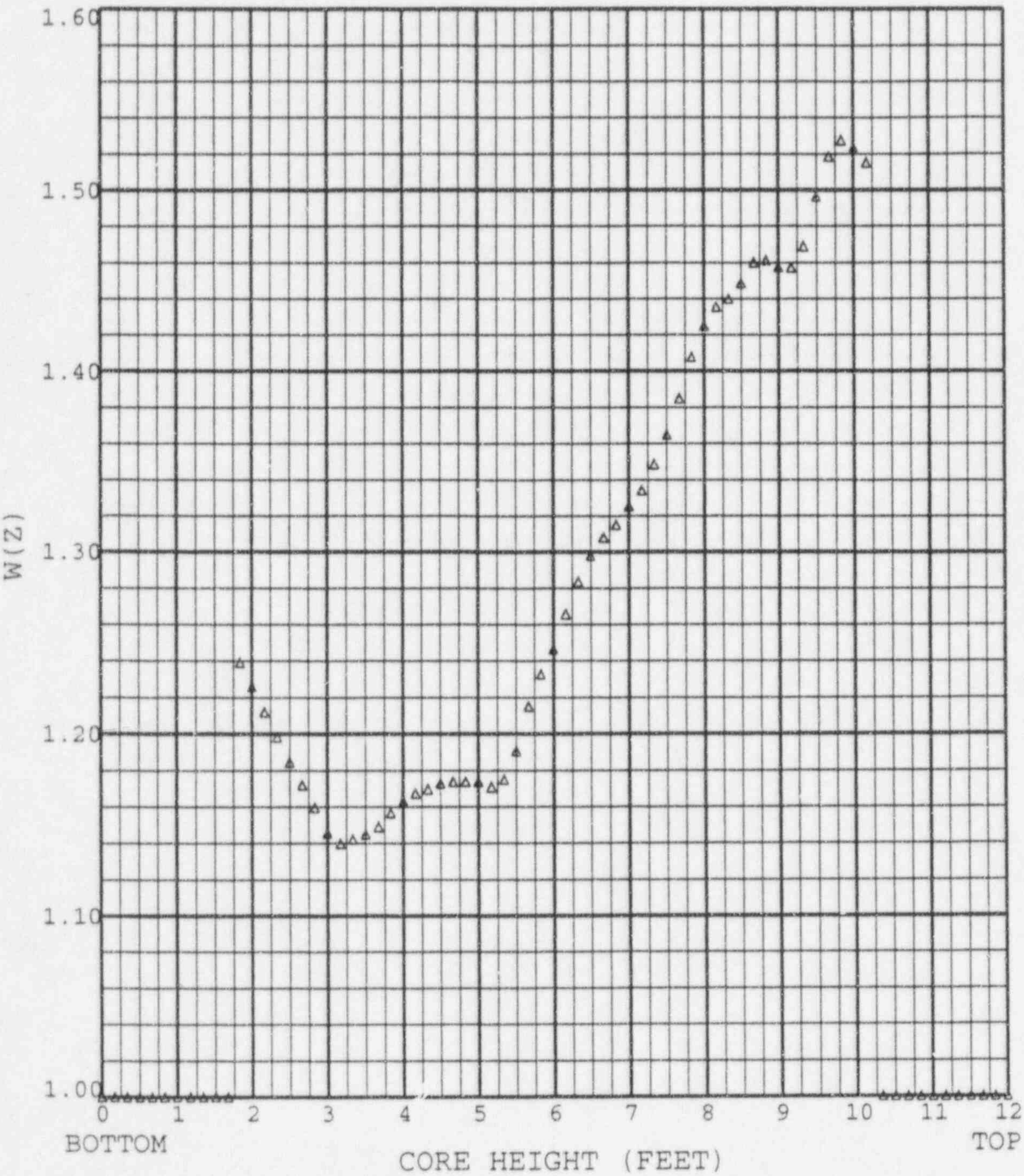
* Top and bottom 15% excluded as per Tech Spec 4.2.2.2G



HEIGHT (FEET)	MEASURED-PREDICTED AO= -4.4
* 0.000	1.0000
* 0.167	1.0000
* 0.333	1.0000
* 0.500	1.0000
* 0.667	1.0000
* 0.833	1.0000
* 1.000	1.0000
* 1.167	1.0000
* 1.333	1.0000
* 1.500	1.0000
* 1.667	1.0000
1.833	1.2442
2.000	1.2274
2.167	1.2106
2.333	1.1963
2.500	1.1833
2.667	1.1707
2.833	1.1593
3.000	1.1474
3.167	1.1388
3.333	1.1324
3.500	1.1283
3.667	1.1257
3.833	1.1227
4.000	1.1181
4.167	1.1120
4.333	1.1061
4.500	1.1025
4.667	1.0977
4.833	1.0924
5.000	1.0870
5.167	1.0816
5.333	1.0841
5.500	1.0841
5.667	1.0888
5.833	1.1049
6.000	1.1188
6.167	1.1371
6.333	1.1565
6.500	1.1727
6.667	1.1848
6.833	1.1944
7.000	1.2094
7.167	1.2239
7.333	1.2398
7.500	1.2572
7.667	1.2773
7.833	1.3000
8.000	1.3191
8.167	1.3336
8.333	1.3441
8.500	1.3582
8.667	1.3745
8.833	1.3832
9.000	1.3915
9.167	1.4032
9.333	1.4172
9.500	1.4374
9.667	1.4502
9.833	1.4590
10.000	1.4618
10.167	1.4596
* 10.333	1.0000
* 10.500	1.0000
* 10.667	1.0000
* 10.833	1.0000
* 11.000	1.0000
* 11.167	1.0000
* 11.333	1.0000
* 11.500	1.0000
* 11.667	1.0000
* 11.833	1.0000
* 12.000	1.0000

Figure 14
Callaway Unit 1 Cycle 8
$W(z)_{no}$ at 10000 MWD/MTU

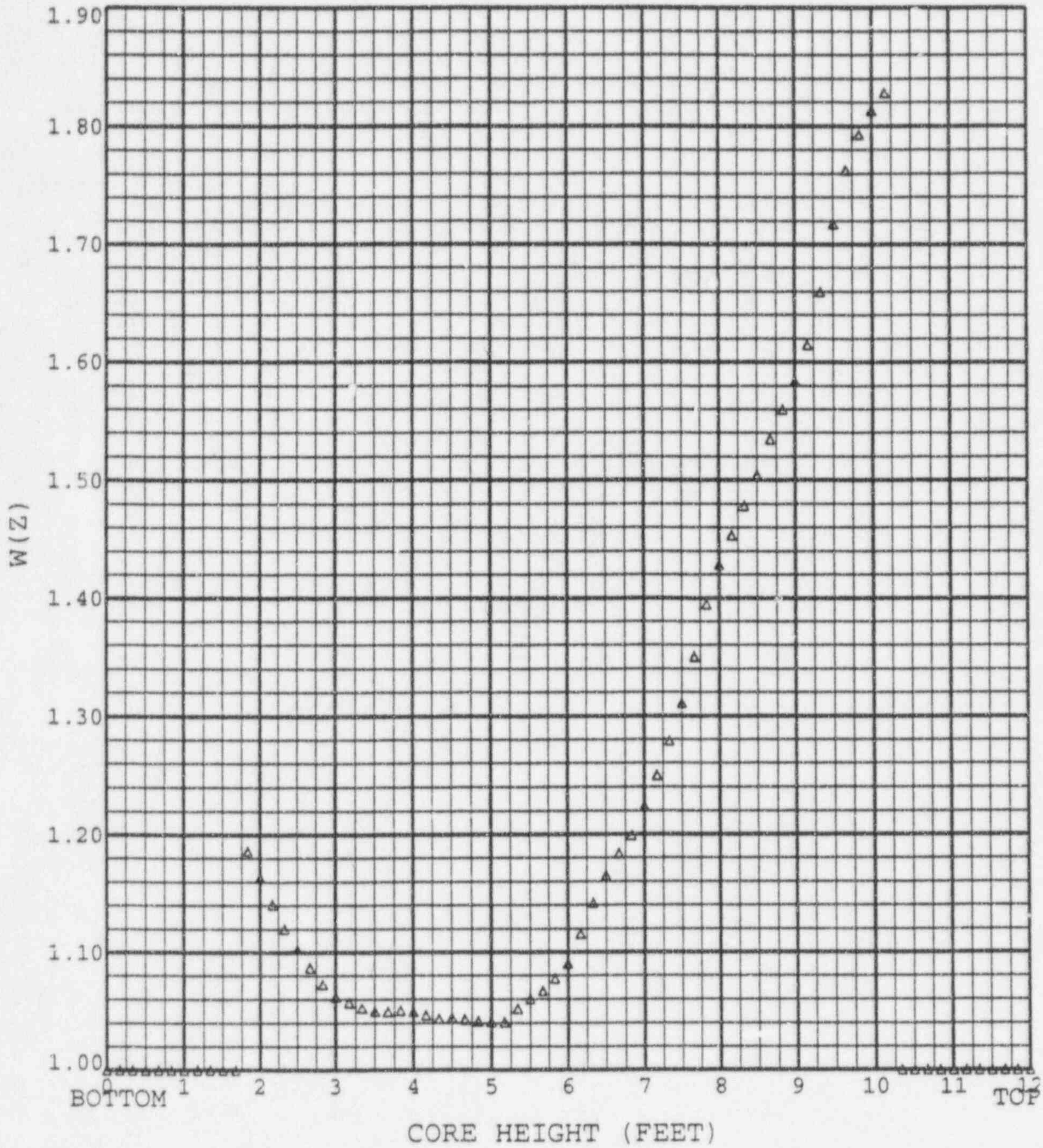
* Top and bottom 15% excluded as per Tech Spec 4.2.2.2G



HEIGHT (FEET)	MEASURED-PREDICTED AO= -4.4
* 0.000	1.0000
* 0.167	1.0000
* 0.333	1.0000
* 0.500	1.0000
* 0.667	1.0000
* 0.833	1.0000
* 1.000	1.0000
* 1.167	1.0000
* 1.333	1.0000
* 1.500	1.0000
* 1.667	1.0000
1.833	1.2393
2.000	1.2260
2.167	1.2120
2.333	1.1981
2.500	1.1847
2.667	1.1719
2.833	1.1596
3.000	1.1456
3.167	1.1399
3.333	1.1423
3.500	1.1450
3.667	1.1491
3.833	1.1568
4.000	1.1634
4.167	1.1673
4.333	1.1696
4.500	1.1728
4.667	1.1738
4.833	1.1738
5.000	1.1739
5.167	1.1709
5.333	1.1750
5.500	1.1905
5.667	1.2151
5.833	1.2328
6.000	1.2465
6.167	1.2655
6.333	1.2836
6.500	1.2981
6.667	1.3080
6.833	1.3150
7.000	1.3253
7.167	1.3342
7.333	1.3487
7.500	1.3651
7.667	1.3849
7.833	1.4079
8.000	1.4252
8.167	1.4353
8.333	1.4401
8.500	1.4486
8.667	1.4600
8.833	1.4612
9.000	1.4574
9.167	1.4572
9.333	1.4690
9.500	1.4963
9.667	1.5183
9.833	1.5273
10.000	1.5235
10.167	1.5151
* 10.333	1.0000
* 10.500	1.0000
* 10.667	1.0000
* 10.833	1.0000
* 11.000	1.0000
* 11.167	1.0000
* 11.333	1.0000
* 11.500	1.0000
* 11.667	1.0000
* 11.833	1.0000
* 12.000	1.0000

Figure 15
Callaway Unit 1 Cycle 8
$W(z)_{no}$ at 18000 MWD/MTU

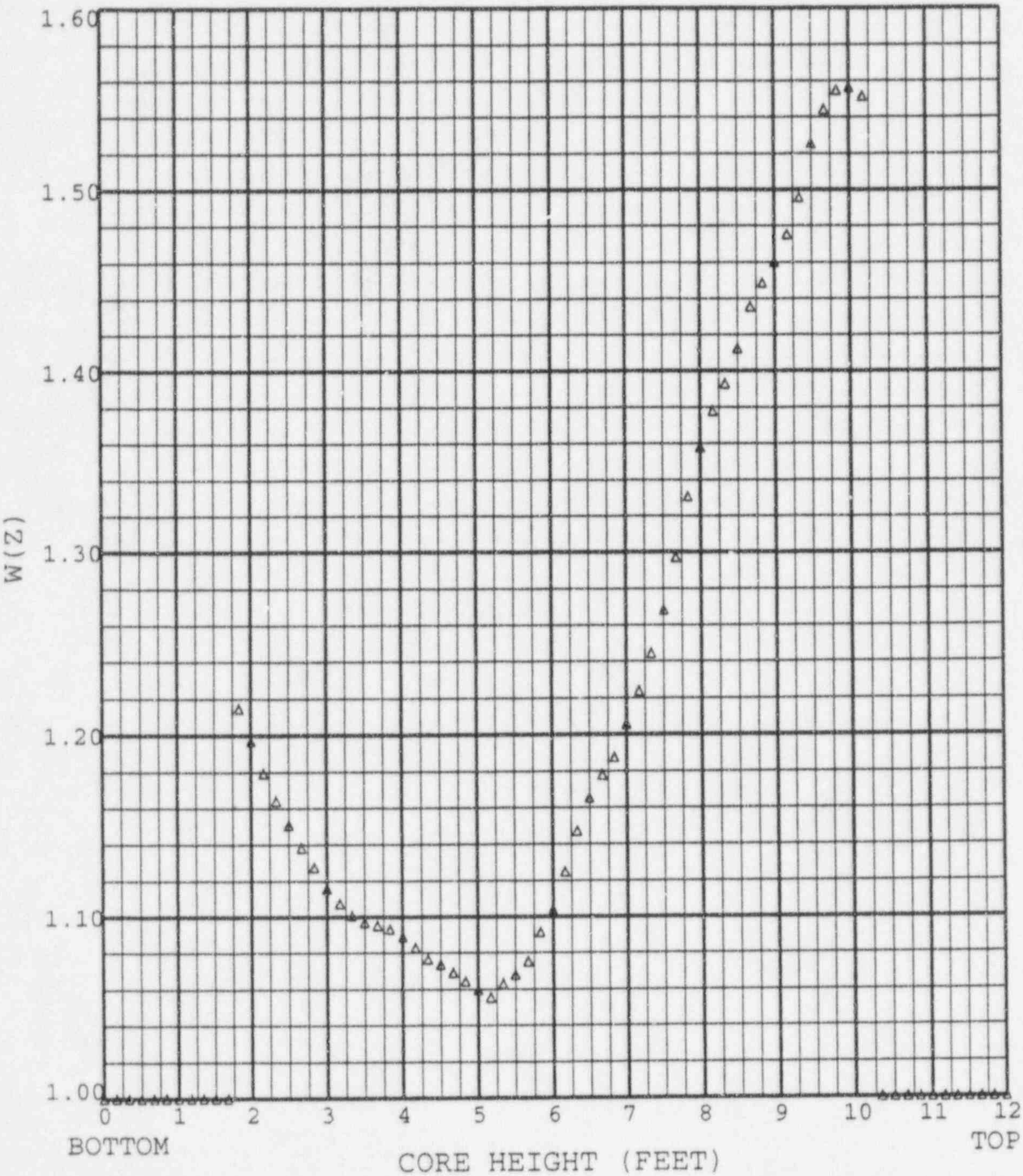
* Top and bottom 15% excluded as per Tech Spec 4.2.2.2G



HEIGHT (FEET)	MEASURED-PREDICTED AO= -9.4
* 0.000	1.0000
* 0.167	1.0000
* 0.333	1.0000
* 0.500	1.0000
* 0.667	1.0000
* 0.833	1.0000
* 1.000	1.0000
* 1.167	1.0000
* 1.333	1.0000
* 1.500	1.0000
* 1.667	1.0000
1.833	1.1861
2.000	1.1636
2.167	1.1406
2.333	1.1200
2.500	1.1027
2.667	1.0868
2.833	1.0726
3.000	1.0619
3.167	1.0571
3.333	1.0523
3.500	1.0497
3.667	1.0494
3.833	1.0502
4.000	1.0492
4.167	1.0463
4.333	1.0433
4.500	1.0438
4.667	1.0426
4.833	1.0413
5.000	1.0406
5.167	1.0402
5.333	1.0517
5.500	1.0601
5.667	1.0660
5.833	1.0775
6.000	1.0901
6.167	1.1153
6.333	1.1417
6.500	1.1650
6.667	1.1833
6.833	1.1990
7.000	1.2240
7.167	1.2496
7.333	1.2787
7.500	1.3110
7.667	1.3501
7.833	1.3947
8.000	1.4282
8.167	1.4532
8.333	1.4781
8.500	1.5044
8.667	1.5364
8.833	1.5598
9.000	1.5838
9.167	1.6145
9.333	1.6595
9.500	1.7173
9.667	1.7625
9.833	1.7927
10.000	1.8132
10.167	1.8277
* 10.333	1.0000
* 10.500	1.0000
* 10.667	1.0000
* 10.833	1.0000
* 11.000	1.0000
* 11.167	1.0000
* 11.333	1.0000
* 11.500	1.0000
* 11.667	1.0000
* 11.833	1.0000
* 12.000	1.0000

Figure 16
Callaway Unit 1 Cycle 8
$W(z)_{no}$ at 2000 MWD/MTU

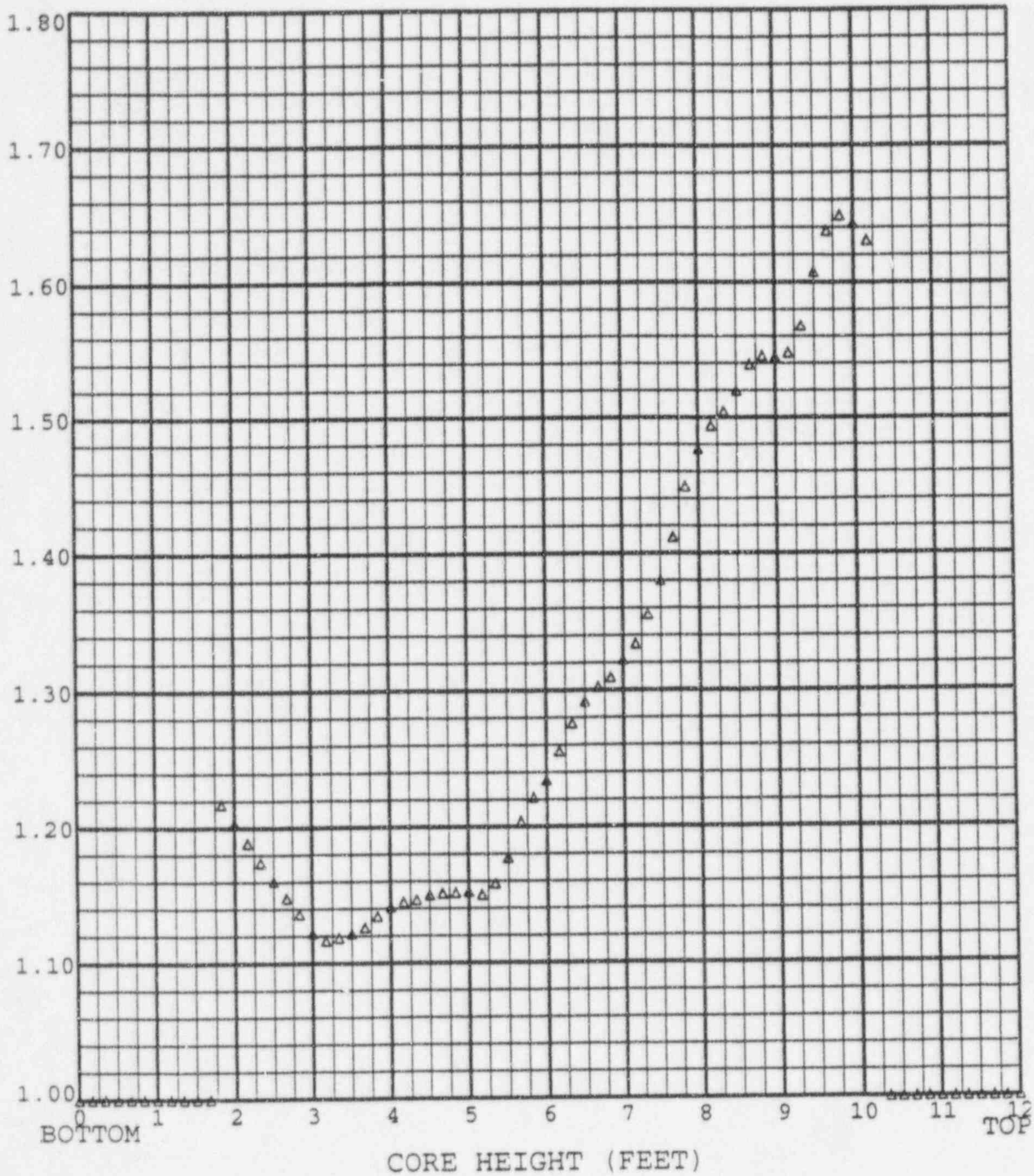
* Top and bottom 15% excluded as per Tech Spec 4.2.2.2G



HEIGHT (FEET)	MEASURED-PREDICTED AO= -8.4
* 0.000	1.0000
* 0.167	1.0000
* 0.333	1.0000
* 0.500	1.0000
* 0.667	1.0000
* 0.833	1.0000
* 1.000	1.0000
* 1.167	1.0000
* 1.333	1.0000
* 1.500	1.0000
* 1.667	1.0000
1.833	1.2148
2.000	1.1972
2.167	1.1793
2.333	1.1641
2.500	1.1507
2.667	1.1384
2.833	1.1276
3.000	1.1157
3.167	1.1074
3.333	1.1008
3.500	1.0971
3.667	1.0952
3.833	1.0932
4.000	1.0891
4.167	1.0829
4.333	1.0765
4.500	1.0736
4.667	1.0691
4.833	1.0643
5.000	1.0598
5.167	1.0555
5.333	1.0630
5.500	1.0679
5.667	1.0752
5.833	1.0914
6.000	1.1041
6.167	1.1248
6.333	1.1471
6.500	1.1653
6.667	1.1779
6.833	1.1875
7.000	1.2056
7.167	1.2238
7.333	1.2447
7.500	1.2684
7.667	1.2972
7.833	1.3308
8.000	1.3580
8.167	1.3781
8.333	1.3931
8.500	1.4126
8.667	1.4356
8.833	1.4486
9.000	1.4599
9.167	1.4752
9.333	1.4957
9.500	1.5254
9.667	1.5442
9.833	1.5548
10.000	1.5565
10.167	1.5514
* 10.333	1.0000
* 10.500	1.0000
* 10.667	1.0000
* 10.833	1.0000
* 11.000	1.0000
* 11.167	1.0000
* 11.333	1.0000
* 11.500	1.0000
* 11.667	1.0000
* 11.833	1.0000
* 12.000	1.0000

Figure 17
Callaway Unit 1 Cycle 8
$W(z)_{no}$ at 10000 MWD/MTU

* Top and bottom 15% excluded as per Tech Spec 4.2.2.2G



	HEIGHT (FEET)	MEASURED-PREDICTED AO= -9.4
*	0.000	1.0000
*	0.167	1.0000
*	0.333	1.0000
*	0.500	1.0000
*	0.667	1.0000
*	0.833	1.0000
*	1.000	1.0000
*	1.167	1.0000
*	1.333	1.0000
*	1.500	1.0000
*	1.667	1.0000
	1.833	1.2176
	2.000	1.2037
	2.167	1.1887
	2.333	1.1743
	2.500	1.1606
	2.667	1.1479
	2.833	1.1361
	3.000	1.1222
	3.167	1.1166
	3.333	1.1198
	3.500	1.1216
	3.667	1.1261
	3.833	1.1343
	4.000	1.1411
	4.167	1.1447
	4.333	1.1464
	4.500	1.1500
	4.667	1.1512
	4.833	1.1515
	5.000	1.1522
	5.167	1.1500
	5.333	1.1581
	5.500	1.1772
	5.667	1.2039
	5.833	1.2216
	6.000	1.2343
	6.167	1.2553
	6.333	1.2758
	6.500	1.2919
	6.667	1.3024
	6.833	1.3094
	7.000	1.3222
	7.167	1.3341
	7.333	1.3553
	7.500	1.3802
	7.667	1.4117
	7.833	1.4490
	8.000	1.4769
	8.167	1.4940
	8.333	1.5045
	8.500	1.5197
	8.667	1.5393
	8.833	1.5455
	9.000	1.5466
	9.167	1.5481
	9.333	1.5677
	9.500	1.6072
	9.667	1.6371
	9.833	1.6484
	10.000	1.6428
	10.167	1.6305
*	10.333	1.0000
*	10.500	1.0000
*	10.667	1.0000
*	10.833	1.0000
*	11.000	1.0000
*	11.167	1.0000
*	11.333	1.0000
*	11.500	1.0000
*	11.667	1.0000
*	11.833	1.0000
*	12.000	1.0000

Figure 18
Callaway Unit 1 Cycle 8
$W(z)_{no}$ at 18000 MWD/MTU

* Top and bottom 15% excluded as per Tech Spec 4.2.2.2G