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NUCLEAR PRODUCTION

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February 21, 1986

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: B.J. Youngblood, Director
PWR Project Directorate #4

Subject: McGuire Nuclear Station, Unit 2
Docket No. 50-370
McGuire 2/Cycle 3 Reload-Peaking Factor Limit Report

Dear Mr. Denton:

The McGuire Unit 2 end of cycle 2 refueling outage is currently scheduled to begin March 14, 1986, with a cycle 3 startup (initial criticality) date of May 16, 1986. This reload is expected to be accomplished under the provisions of 10 CFR 50.59.

Pursuant to Technical Specification 6.9.1.9, attached is the Peaking Factor Limit Report for McGuire Unit 2/Cycle 3. This report provides the W(Z) functions that are to be used for RAOC and base load operation during Cycle 3, and the value for APL^{ND}. For both RAOC and base load operation, a set of data covering three specific burnup steps is provided which permits the determination of W(Z) at any cycle burnup through the use of three point interpolation. The information for base load operation has been obtained using a ± 5 percent AFD about a measured target in the power interval between 80% and 100% of rated thermal power. Figures 1-3 are the W(Z) functions appropriate for RAOC operation and Figures 4-6 are the W(Z) functions appropriate for base load operation. The appropriate W(Z) function is used to confirm that the heat flux hot channel factor, $F_Q(z)$, will be limited to the values specified in the Technical Specifications.

Very truly yours,

H.B. Tucker /BB

Hal B. Tucker

PBN/jgm

Attachment

A001
1/1

xc: Dr. J. Nelson Grace, Regional Administrator
U.S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

Mr. Dayne Brown, Chief
Radiation Protection Branch
Division of Facility Services
Department of Human Resources
P.O. Box 12200
Raleigh, North Carolina 27605

Mr. W.T. Orders
Senior Resident Inspector
McGuire Nuclear Station

PEAKING FACTOR LIMIT REPORT FOR McGUIRE UNIT 2 CYCLE 3

RAOC AND BASE LOAD OPERATION

This Peaking Factor Limit Report is provided in accordance with Paragraph 6.9.1.9 of the McGuire Unit 2 Technical Specifications.

The McGuire Unit 2 Cycle 3 elevation dependent W(z) values for RAOC operation at beginning, middle, and near end-of-life are shown in Figures 1 through 3 respectively. This information is sufficient to determine W(z) versus core height for Cycle 3 burnups in the range of 0 MWD/MTU to 11000 MWD/MTU through the use of three point interpolation.

The McGuire Unit 2 Cycle 3 elevation dependent W(z) values for base load operation between 80% and 100% of rated thermal power with a ± 5 percent AFD about a measured target value at 150, 6000, and 10000 MWD/MTU Cycle 3 burnups are shown in Figures 4 through 6 respectively. This information is sufficient to determine W(z) versus core height for Cycle 3 burnups in the range of 0 MWD/MTU to 11000 MWD/MTU through the use of three point interpolation.

W(z) values for RAOC and base load operation were calculated using the method described in Part B of Reference 1.

The minimum allowable power level for base load operation, APL^{ND}, for McGuire 2 Cycle 3 is 80 percent of rated thermal power.

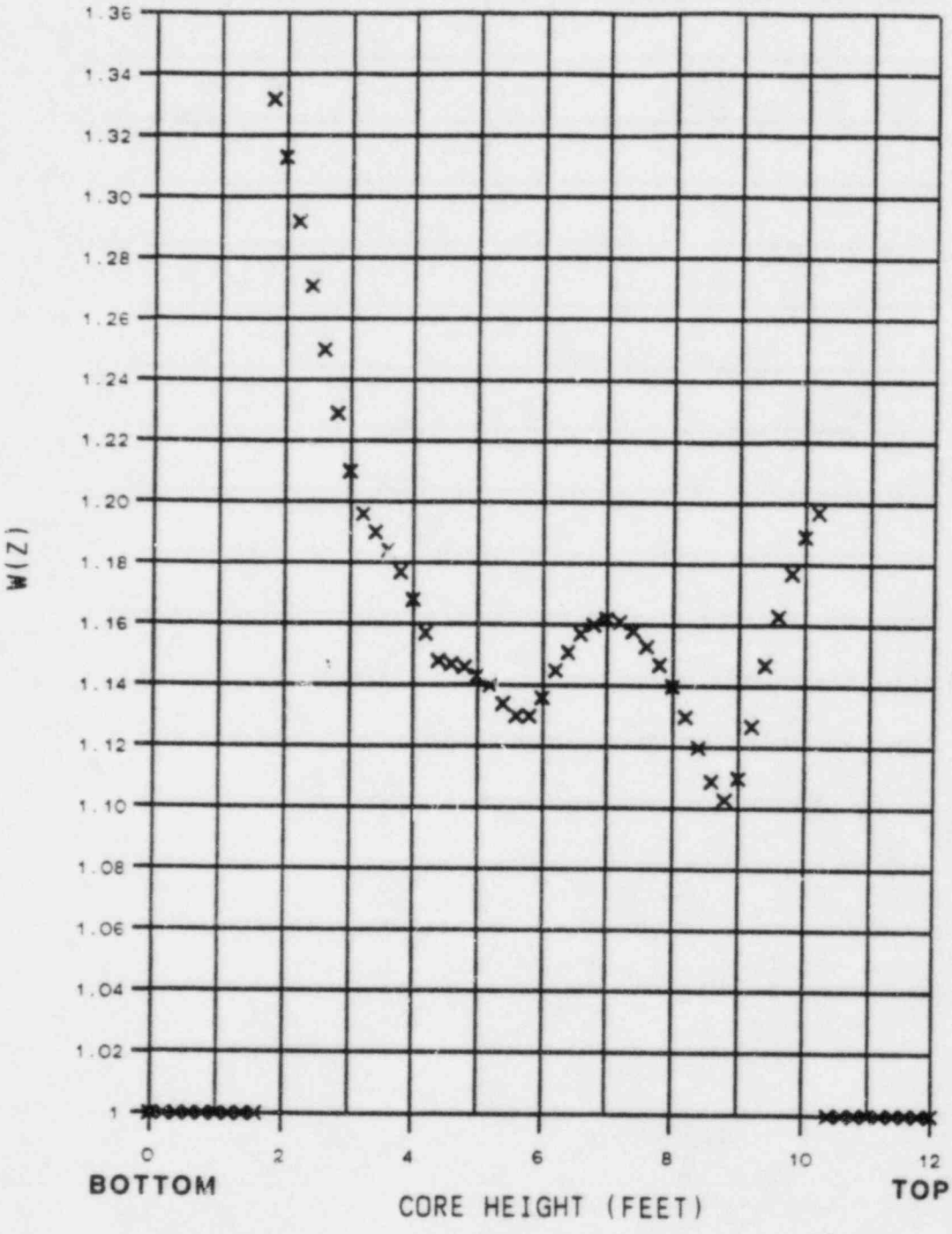
The appropriate W(z) function is used to confirm that the heat flux hot channel factor, Fq(z), will be limited to the Technical Specification values of:

$$Fq(z) \leq \frac{2.26}{P} [K(Z)] \text{ for } P > 0.50 \text{ and}$$

$$Fq(z) \leq 4.52 [K(Z)] \text{ for } P \leq 0.50$$

The appropriate elevation dependent W(z) values, when applied to a power distribution measured under equilibrium conditions, demonstrates that the initial conditions assumed in the LOCA are met, along with the ECCS acceptance criteria of 10CFR10.46.

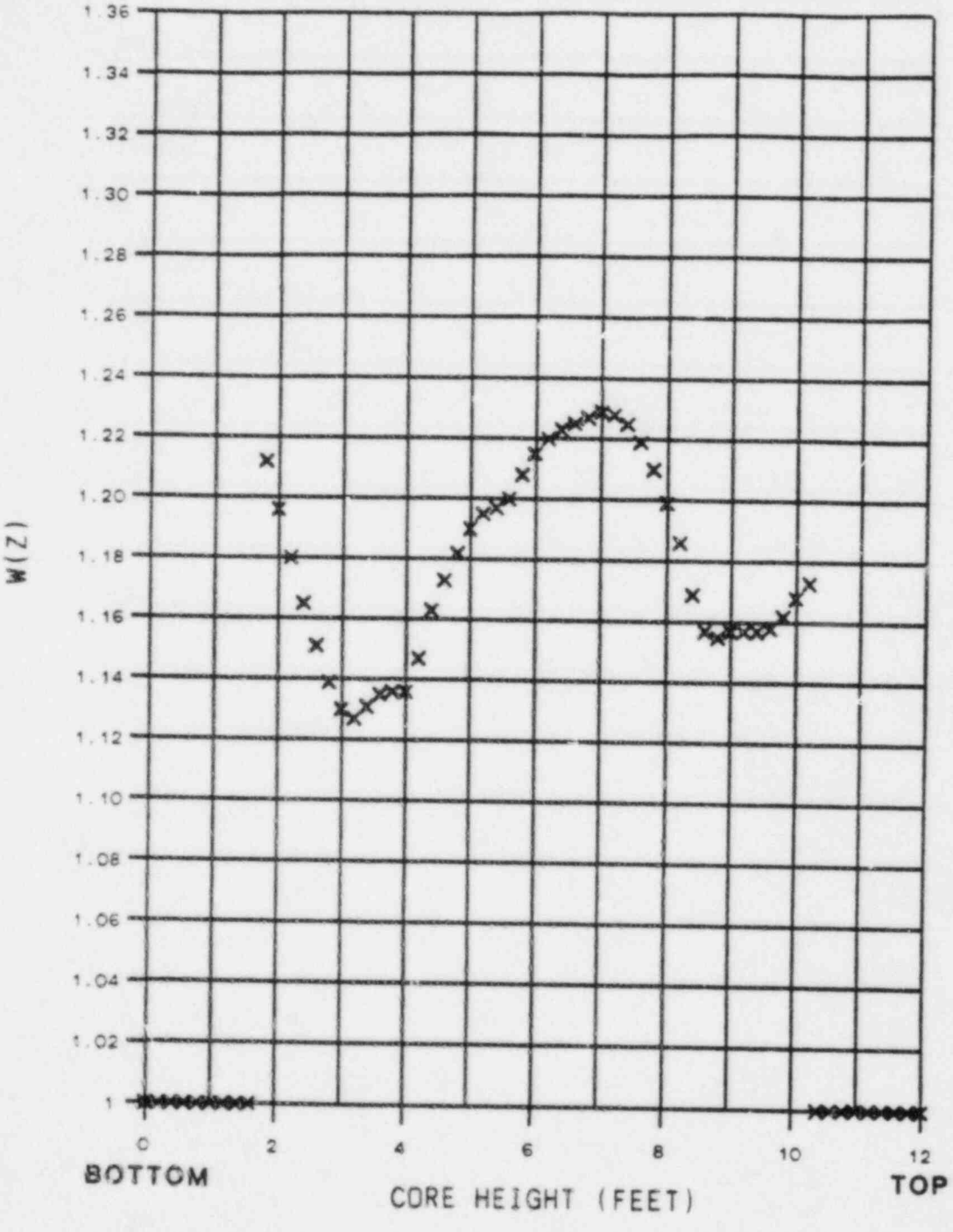
(1) WCAP-10216-P-A, Relaxation of Constant Axial Control - Fq Surveillance Technical Specification



	HEIGHT (FEET)	MAX W(Z)	
*	0.00	1.000	
*	0.20	1.000	
*	0.40	1.000	
*	0.60	1.000	
*	0.80	1.000	
*	1.00	1.000	
*	1.20	1.000	
*	1.40	1.000	
*	1.60	1.000	
	1.80	1.332	
	2.00	1.313	
	2.20	1.292	
	2.40	1.271	
	2.60	1.250	
	2.80	1.229	
	3.00	1.210	
	3.20	1.196	
	.40	1.190	
	.60	1.184	
	3.80	1.177	
	4.00	1.168	
	4.20	1.157	
	4.40	1.148	
	4.60	1.147	
	4.80	1.146	
	5.00	1.143	
	5.20	1.140	
	5.40	1.134	
	5.60	1.130	
	5.80	1.130	
	6.00	1.136	
	6.20	1.145	
	6.40	1.151	
	6.60	1.157	
	6.80	1.160	
	7.00	1.162	
	7.20	1.161	
	7.40	1.158	
	7.60	1.153	
	7.80	1.147	
	8.00	1.140	
	8.20	1.130	
	8.40	1.119	
	8.60	1.109	
	8.80	1.103	
	9.00	1.110	
	9.20	1.127	
	9.40	1.147	
	9.60	1.163	
	9.80	1.177	
	10.00	1.189	
	10.20	1.197	
*	10.40	1.000	
*	10.60	1.000	
*	10.80	1.000	
*	11.00	1.000	
*	11.20	1.000	
*	11.40	1.000	
*	11.60	1.000	
*	11.80	1.000	
*	12.00	1.000	TOP

Figure 1
McGuire Unit 2 Cycle 3
RAOC W(z) at 150 MWD/MTU

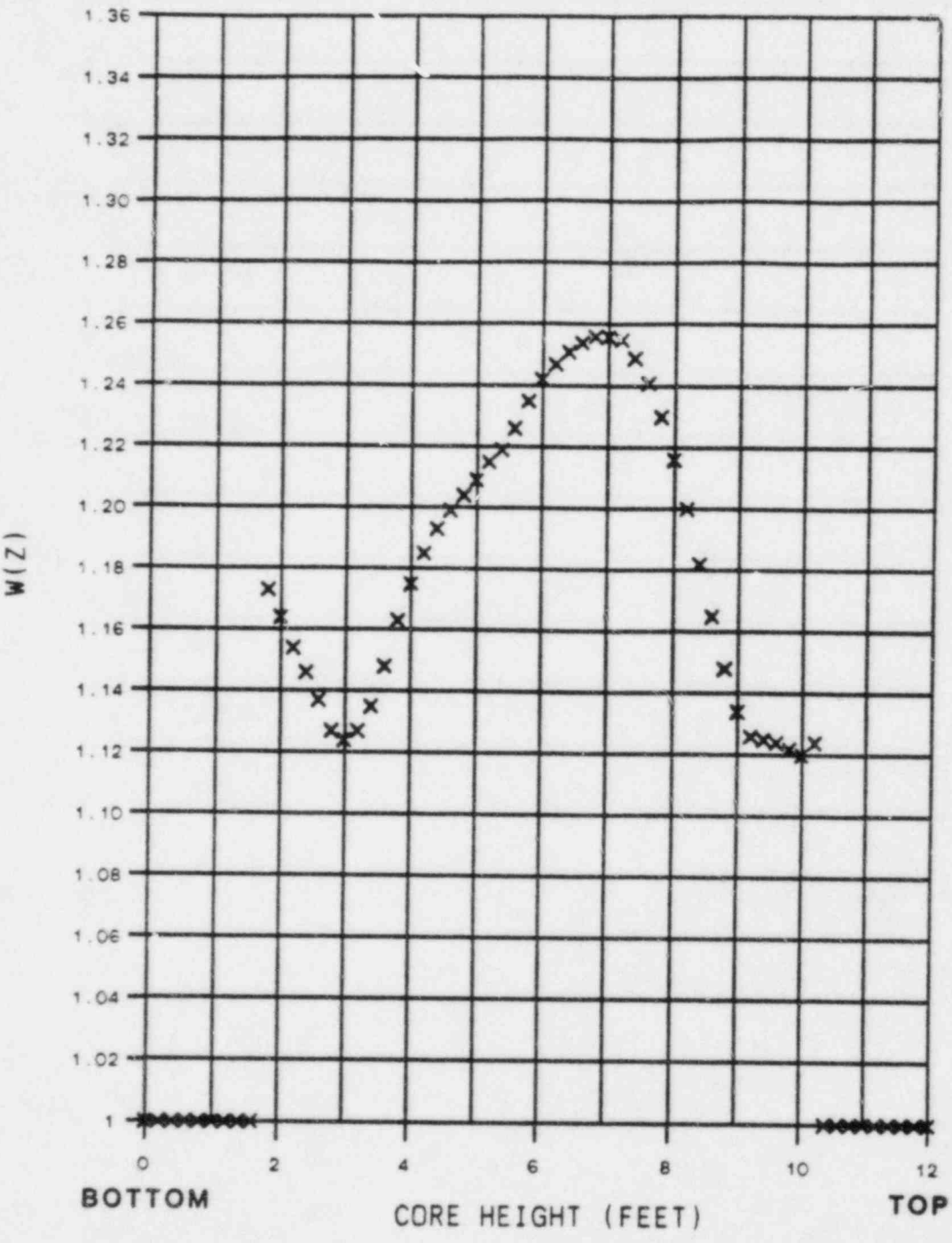
*Top and Bottom 15% excluded as per Tech Spec 4.2.2.2.G



	HEIGHT (FEET)	MAX W(Z)	
*	0.00	1.000	
*	0.20	1.000	
*	0.40	1.000	
*	0.60	1.000	
*	0.80	1.000	
*	1.00	1.000	
*	1.20	1.000	
*	1.40	1.000	
*	1.60	1.000	
	1.80	1.210	
	2.00	1.196	
	2.20	1.180	
	2.40	1.165	
	2.60	1.151	
	2.80	1.139	
	3.00	1.130	
	3.20	1.127	
	3.40	1.131	
	3.60	1.135	
	3.80	1.136	
	4.00	1.136	
	4.20	1.147	
	4.40	1.163	
	4.60	1.173	
	4.80	1.182	
	5.00	1.190	
	5.20	1.195	
	5.40	1.197	
	5.60	1.200	
	5.80	1.208	
	6.00	1.215	
	6.20	1.220	
	6.40	1.223	
	6.60	1.225	
	6.80	1.227	
	7.00	1.229	
	7.20	1.228	
	7.40	1.225	
	7.60	1.219	
	7.80	1.210	
	8.00	1.199	
	8.20	1.185	
	8.40	1.169	
	8.60	1.157	
	8.80	1.155	
	9.00	1.157	
	9.20	1.157	
	9.40	1.157	
	9.60	1.158	
	9.80	1.162	
	10.00	1.168	
	10.20	1.173	
*	10.40	1.000	
*	10.60	1.000	
*	10.80	1.000	
*	11.00	1.000	
*	11.20	1.000	
*	11.40	1.000	
*	11.60	1.000	
*	11.80	1.000	
*	12.00	1.000	TOP

Figure 2
McGuire Unit 2 Cycle 3
RAOC W(z) at 6000 MWD/MTU

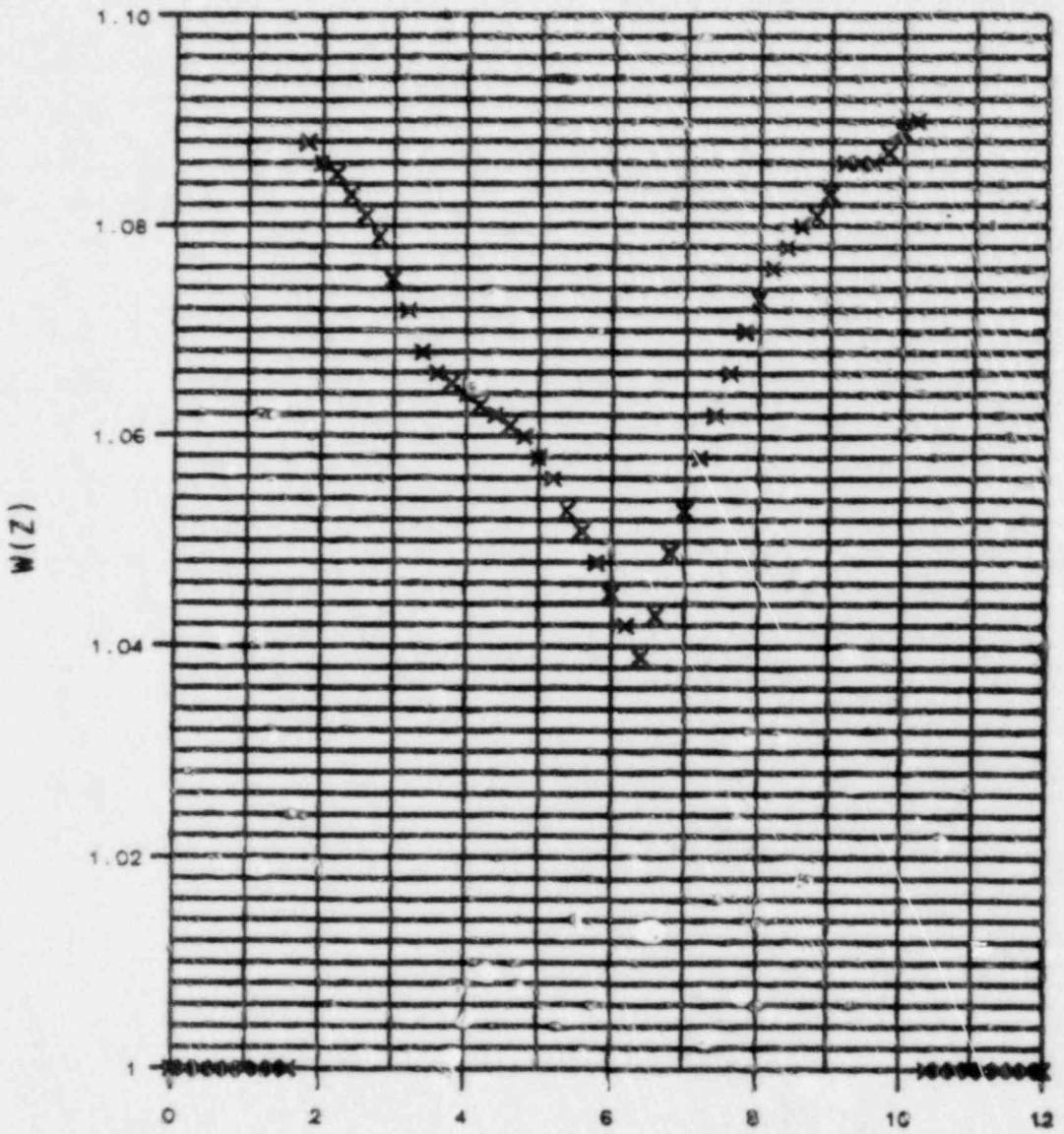
*Top and Bottom 15% excluded as per Tech Spec 4.2.2.2.G



	HEIGHT (FEET)	MAX W(Z)	
*	0.00	1.000	
*	0.20	1.000	
*	0.40	1.000	
*	0.60	1.000	
*	0.80	1.000	
*	1.00	1.000	
*	1.20	1.000	
*	1.40	1.000	
*	1.60	1.000	
	1.80	1.173	
	2.00	1.164	
	2.20	1.154	
	2.40	1.146	
	2.60	1.137	
	2.80	1.127	
	3.00	1.124	
	3.20	1.127	
	3.40	1.135	
	3.60	1.148	
	3.80	1.163	
	4.00	1.175	
	4.20	1.185	
	4.40	1.193	
	4.60	1.199	
	4.80	1.204	
	5.00	1.209	
	5.20	1.215	
	5.40	1.219	
	5.60	1.226	
	5.80	1.235	
	6.00	1.242	
	6.20	1.247	
	6.40	1.251	
	6.60	1.254	
	6.80	1.256	
	7.00	1.256	
	7.20	1.255	
	7.40	1.249	
	7.60	1.241	
	7.80	1.230	
	8.00	1.216	
	8.20	1.200	
	8.40	1.182	
	8.60	1.165	
	8.80	1.148	
	9.00	1.134	
	9.20	1.126	
	9.40	1.125	
	9.60	1.124	
	9.80	1.122	
	10.00	1.120	
	10.20	1.124	
*	10.40	1.000	
*	10.60	1.000	
*	10.80	1.000	
*	11.00	1.000	
*	11.20	1.000	
*	11.40	1.000	
*	11.60	1.000	
*	11.80	1.000	
*	12.00	1.000	TOP

Figure 3
McGuire Unit 2 Cycle 3
RAOC W(z) at 10000 MWD/MTU

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



	HEIGHT (FEET)	BOL W(Z)	
*	0.00	1.000	
*	0.20	1.000	
*	0.40	1.000	
*	0.60	1.000	
*	0.80	1.000	
*	1.00	1.000	
*	1.20	1.000	
*	1.40	1.000	
*	1.60	1.000	
	1.80	1.088	
	2.00	1.086	
	2.20	1.085	
	2.40	1.083	
	2.60	1.081	
	2.80	1.079	
	3.00	1.075	
	3.20	1.072	
	3.40	1.068	
	3.60	1.066	
	3.80	1.065	
	4.00	1.064	
	4.20	1.063	
	4.40	1.062	
	4.60	1.061	
	4.80	1.060	
	5.00	1.058	
	5.20	1.056	
	5.40	1.053	
	5.60	1.051	
	5.80	1.048	
	6.00	1.045	
	6.20	1.042	
	6.40	1.039	
	6.60	1.043	
	6.80	1.049	
	7.00	1.053	
	7.20	1.056	
	7.40	1.062	
	7.60	1.066	
	7.80	1.070	
	8.00	1.073	
	8.20	1.076	
	8.40	1.078	
	8.60	1.080	
	8.80	1.081	
	9.00	1.083	
	9.20	1.086	
	9.40	1.086	
	9.60	1.086	
	9.80	1.087	
	10.00	1.089	
	10.20	1.090	
*	10.40	1.000	
*	10.60	1.000	
*	10.80	1.000	
*	11.00	1.000	
*	11.20	1.000	
*	11.40	1.000	
*	11.60	1.000	
*	11.80	1.000	
*	12.00	1.000	TOP

FIGURE 4

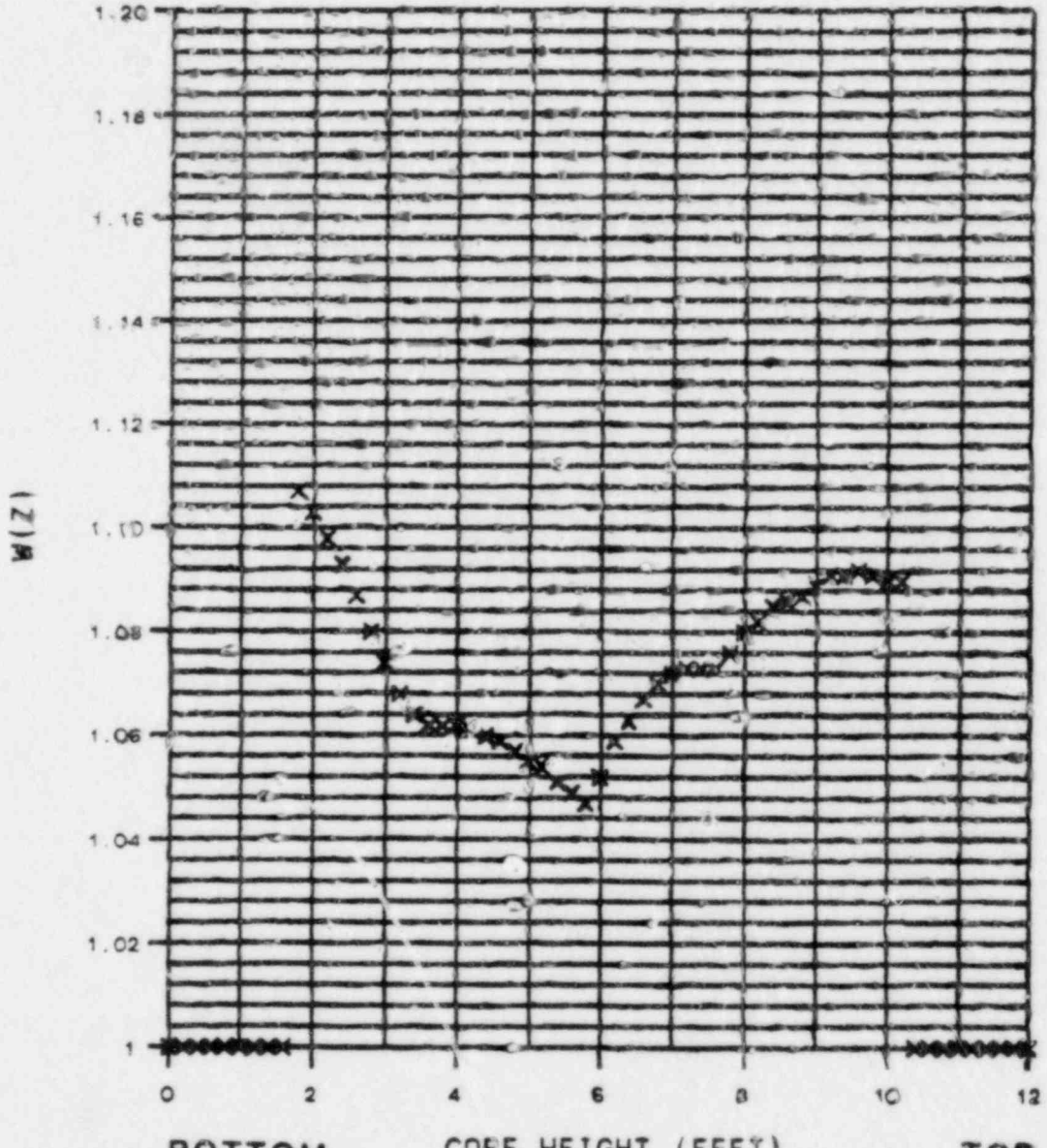
McGuire Unit 2 Cycle 3

Baseload W(z) for Powers Between 80% and 100% of Rated Thermal Power

Within +5% AFD of the Measured Target

150 MWD/MTU

* Top and Bottom 15% Excluded as per Tech Spec 4.2.2.2d



	HEIGHT (FEET)	MOL W(Z)	
●	0.00	1.000	
	0.20	1.000	
	0.40	1.000	
	0.60	1.000	
	0.80	1.000	
	1.00	1.000	
	1.20	1.000	
	1.40	1.000	
	1.60	1.000	
	1.80	1.107	
	2.00	1.103	
	2.20	1.098	
	2.40	1.093	
	2.60	1.087	
	2.80	1.080	
	3.00	1.074	
	3.20	1.068	
	3.40	1.064	
	3.60	1.062	
	3.80	1.062	
	4.00	1.062	
	4.20	1.061	
	4.40	1.060	
	4.60	1.059	
	4.80	1.057	
	5.00	1.055	
	5.20	1.054	
	5.40	1.051	
	5.60	1.049	
	5.80	1.047	
	6.00	1.052	
	6.20	1.059	
	6.40	1.063	
	6.60	1.067	
	6.80	1.070	
	7.00	1.072	
	7.20	1.073	
	7.40	1.073	
	7.60	1.073	
	7.80	1.076	
	8.00	1.080	
	8.20	1.082	
	8.40	1.085	
	8.60	1.086	
	8.80	1.087	
	9.00	1.089	
	9.20	1.091	
	9.40	1.091	
	9.60	1.092	
	9.80	1.091	
	10.00	1.090	
	10.20	1.090	
●	10.40	1.000	
	10.60	1.000	
	10.80	1.000	
	11.00	1.000	
	11.20	1.000	
	11.40	1.000	
	11.60	1.000	
	11.80	1.000	
●	12.00	1.000	TOP

FIGURE 5

McGuire Unit 2 Cycle 3

Baseload W(z) for Powers Between 80% and 100% of Rated Thermal Power

Within +5% AFD of the Measured Target

6000 MWD/MTU

● Top and Bottom 18% Excluded as per Tech Spec 4.2.2.3d

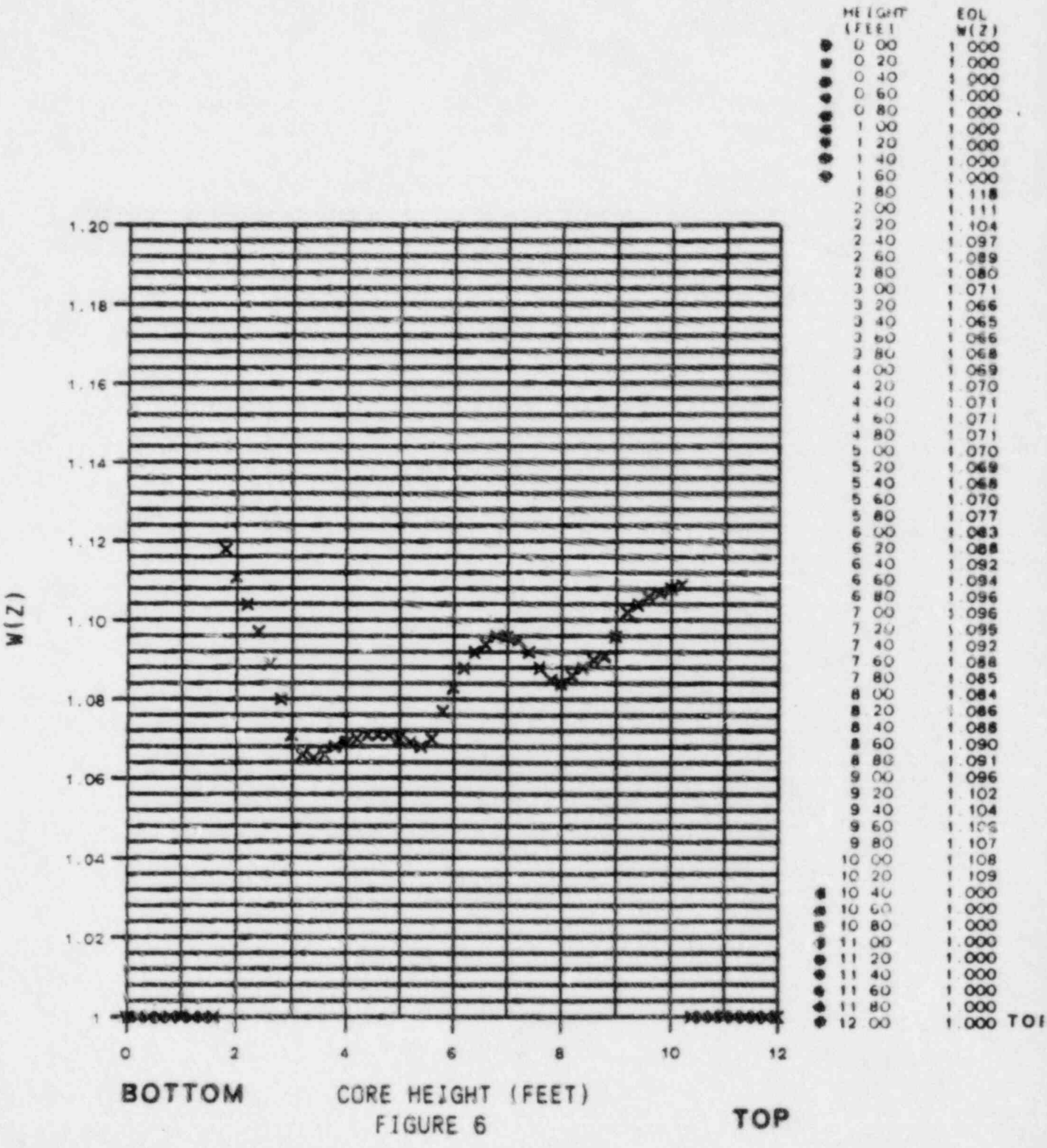


FIGURE 6

McGuire Unit 2 Cycle 3

Baseload W(z) for Powers Between 80% and 100% of Rated Thermal Power

Within +5% AFD of the Measured Target

10000 MWD/MTU

@ Top and Bottom 10% Excluded as per Tech Spec 4.2.2.2G