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May 17, 2018

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U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Donald C. Cook Nuclear Plant Unit 2
CORE OPERATING LIMITS REPORT

Indiana Michigan Power Company, the licensee for Donald C. Cook Nuclear Plant Unit 2, is submitting the Core Operating Limits Report (COLR) for Unit 2 Cycle 24 in accordance with Technical Specification 5.6.5. Revision 0 of the Unit 2 Cycle 24 COLR is provided as an enclosure to this letter.

There are no new or revised commitments in this letter. Should you have any questions, please contact me at (269) 466-2649.

Sincerely,

M.K. Scarpello

Michael K. Scarpello
Regulatory Affairs Director

MDS/mll

Enclosure: Donald C. Cook Nuclear Plant Unit 2 Cycle 24 Core Operating Limits Report, Revision 0

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A001
NRR

ENCLOSURE to AEP-NRC-2018-41

Donald C. Cook Nuclear Plant Unit 2 Cycle 24

Core Operating Limits Report
Revision 0

Donald C. Cook Nuclear Plant
Unit 2 Cycle 24
Core Operating Limits Report
Revision 0

1.0 CORE OPERATING LIMITS REPORT

This Core Operating Limits Report for the Donald C. Cook Nuclear Plant Unit 2 Cycle 24 has been prepared in accordance with the requirements of Technical Specification 5.6.5.

The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the Nuclear Regulatory Commission (NRC) in:

a. WCAP-9272-P-A, Westinghouse Reload Safety Evaluation Methodology, July 1985

b. WCAP-8385, Power Distribution Control and Load Following Procedures – Topical Report, September 1974

c. WCAP-10216-P-A, Rev. 1A, Relaxation of Constant Axial Offset Control/F_Q Surveillance Technical Specification, February 1994

d. Plant-specific adaptation (approved by Amendment 297, dated March 31, 2011) of WCAP-16009-P-A, "Realistic Large Break LOCA Evaluation Methodology Using the Automated Statistical Treatment of Uncertainty Method (ASTRUM)," Revision 0 (Westinghouse Proprietary), approved by letter from H. N. Berkow, NRC, to J. A. Gresham, Westinghouse Electric Company, dated November 5, 2004

e. WCAP-12610-P-A, VANTAGE+ Fuel Assembly Reference Core Report, April 1995

f. WCAP-8745-P-A, Design Bases for the Thermal Overpower ΔT and Thermal Overtemperature ΔT Trip Functions, September 1986

g. WCAP-13749-P-A, Safety Evaluation Supporting the Conditional Exemption of the Most Negative EOL Moderator Temperature Coefficient Measurement, March 1997

h. WCAP-12610-P-A & CENPD-404-P-A, Addendum 1-A, Optimized ZIRLO™, July 2006

The Technical Specifications affected by this report are listed below:

2.1.1	Reactor Core SLs [Safety Limits]
3.1.1	SHUTDOWN MARGIN (SDM)
3.1.3	Moderator Temperature Coefficient (MTC)
3.1.5	Shutdown Bank Insertion Limits
3.1.6	Control Bank Insertion Limits
3.2.1	Heat Flux Hot Channel Factor (**$F_Q(Z)$**)
3.2.2	Nuclear Enthalpy Rise Hot Channel Factor (**$F^N_{\Delta H}$**)
3.2.3	AXIAL FLUX DIFFERENCE (AFD)
3.3.1	Reactor Trip System (RTS) Instrumentation
3.4.1	RCS [Reactor Coolant System] Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits
3.9.1	Boron Concentration

2.0 OPERATING LIMITS

The cycle-specific parameter limits listed in Section 1.0 are presented in the following subsections. These limits have been developed using the NRC-approved methodologies specified in Technical Specification 5.6.5.

2.1 SAFETY LIMITS

2.1.1 Reactor Core SLs (Specification 2.1.1)

In Modes 1 and 2, the combination of thermal power, pressurizer pressure, and the highest loop average temperature (**T_{avg}**) shall not exceed the limits as shown in Figure 6 for 4 loop operation.

2.2 REACTIVITY CONTROL

2.2.1 SHUTDOWN MARGIN (SDM) (Specification 3.1.1)

Shutdown margin shall be greater than or equal to 1.3% Δk/k for $T_{avg} > 200°F$
Shutdown margin shall be greater than or equal to 1.0% Δk/k for $T_{avg} \leq 200°F$

2.2.2 Moderator Temperature Coefficient (MTC) (Specification 3.1.3)

a. The MTC limits are:

The BOL/ARO-MTC shall be less positive or equal to the value given in Figure 1.

The EOL/ARO/RTP-MTC shall be less negative or equal to -4.10E-4 **Δk/k/°F**.

This limit is based on a **T_{avg}** program with HFP vessel **T_{avg}** of 571.0 to 576.0 °F

Where: ARO stands for All Rods Out
BOL stands for Beginning of Cycle Life
EOL stands for End of Cycle Life
RTP stands for Rated Thermal Power
HFP stands for Hot Full Thermal Power

b. The MTC Surveillance limit is:
The 300 ppm/ARO/RTP-MTC should be less negative or equal to -3.20E-4 **Δk/k/°F** at a HFP vessel $\mathbf{T_{avg}}$ of 571.0 to 576.0 °F

c. The Revised Predicted near-EOL 300 ppm MTC shall be calculated using Figure 7 and the following algorithm:

Revised Predicted MTC = Predicted MTC + AFD Correction + Predicted Correction*

* Predicted Correction is -0.30E-4 **Δk/k/°F**.

If the Revised Predicted MTC is less negative than the Surveillance Requirement (SR) 3.1.3.2 limit (COLR 2.2.2.b) and all of the benchmark data contained in the surveillance procedure are met, then a MTC measurement in accordance with SR 3.1.3.2 is not required.

d. The MTC Surveillance limit is:
The 60 ppm/ARO/RTP-MTC should be less negative or equal to -3.90E-4 **Δk/k/°F** at a HFP vessel $\mathbf{T_{avg}}$ of 571.0 to 576.0 °F

2.2.3 Shutdown Bank Insertion Limits (Specification 3.1.5)

The shutdown rods shall be withdrawn to at least 228 steps.

2.2.4 Control Bank Insertion Limits (Specifications 3.1.6)

a. The control rod banks shall be limited in physical insertion as shown in Figure 2.

b. Successive Control Banks shall overlap by 100 steps. The sequence for Control Bank withdrawal shall be Control Bank A, Control Bank B, Control Bank C, and Control Bank D.

2.3 POWER DISTRIBUTION LIMITS

2.3.1 AXIAL FLUX DIFFERENCE (AFD) (Specification 3.2.3)

a. The Allowable Operation Limits are provided in Figure 3.

b. The AFD target band is $\pm$5% for a cycle average accumulated burnup ≥0.0 MWD/MTU [Megawatt Days/Metric Ton Uranium].

2.3.2 Heat Flux Hot Channel Factor ($F_Q(Z)$) (Specification 3.2.1)

$$F_Q^C(Z) \le \frac{CF_Q}{P} * K(Z) \qquad for\ P > 0.5$$

$$F_Q^C(Z) \le 2 * CF_Q * K(Z) \qquad for\ P \le 0.5$$

$$F_Q^W(Z) \le \frac{CF_Q}{P} * K(Z) \qquad for\ P > 0.5$$

$$F_Q^W(Z) \le 2 * CF_Q * K(Z) \qquad for\ P \le 0.5$$

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

a. $\mathbf{CF_Q}$ = 2.335

b. **K(Z)** is provided in Figure 4

c. $\mathbf{F_Q^C(Z)}$ is the measured hot channel factor including a 3% manufacturing tolerance uncertainty and a 5% measurement uncertainty.

d. **W(Z)** is provided in Table 1 for ±5% AFD target band.

e. $\mathbf{F_Q^W(Z) = F_Q^C(Z) \times W(Z) \times F_P}$

The W(z) values are generated assuming that they will be used for a full power surveillance. When a part power surveillance is performed, the W(z) values should be multiplied by the factor 1/P, when P is > 0.5. When P is ≤ 0.5, the W(z) values should be multiplied by the factor 1/(0.5), or 2.0. This is consistent with the adjustment in the $F_Q(z)$ limit at part power conditions.

f. For Cycle 24, $\mathbf{F_P}$ = 1.02 for all burnups associated with Note 2a of SR 3.2.1.2, except as shown in the table below. When no penalty is required, $\mathbf{F_P}$ = 1.00.

Cycle Burnup (MWD/MTU)	F_P Penalty Multiplier
0	1.046
150	1.046
317	1.047
484	1.048
651	1.048
818	1.048
985	1.046
1152	1.044
1319	1.042
1487	1.038
1654	1.035
1821	1.033
1988	1.030
2155	1.026
2322	1.022
2489	1.020

The burnup range covers where F_P exceeds 1.02. Linear interpolation is adequate for intermediate cycle burnups.

2.3.3 Nuclear Enthalpy Rise Hot Channel Factor ($F^N_{\Delta H}$) (Specification 3.2.2)

$$\mathbf{F^N_{\Delta H} \leq CF_{\Delta H} * (1 + PF_{\Delta H} * (1\text{-}P))}$$

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

a. $\mathbf{CF_{\Delta H}}$ = 1.61

b. $\mathbf{PF_{\Delta H}}$ = 0.3

c. $\mathbf{F^N_{\Delta H}}$ is the measured Enthalpy Rise Hot Channel Factor including a 4% measurement uncertainty.

2.4 INSTRUMENTATION

2.4.1 Reactor Trip System (RTS) Instrumentation (Specification 3.3.1)

The Overtemperature **ΔT** and Overpower **ΔT** setpoints are as shown in Figure 5.

2.5 REACTOR COOLANT SYSTEM

2.5.1 RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits (Specification 3.4.1)

a. Pressurizer Pressure shall be ≥ 2172.4 psig +

b. RCS $\mathbf{T}_{avg}$ shall be ≤ 580.1 °F +

c. RCS Total Flow Rate shall be ≥ 366,400 gpm

2.6 REFUELING OPERATIONS

2.6.1 Boron Concentration (Specification 3.9.1)

The boron concentration of all filled portions of the Reactor Coolant System, the refueling canal and the refueling cavity shall be greater than or equal to 2400 ppm++.

+ These are Safety Analysis values. With readability allowance, the corresponding values are 577.8°F for $\mathbf{T}_{avg}$, and 2200 psig for Pressurizer Pressure.

++ This concentration bounds the condition of $K_{eff} \leq 0.95$ which includes a 1% Δk/k conservative allowance for uncertainties. The boron concentration of 2400 ppm includes a 50 ppm conservative allowance for uncertainties.

FIGURE 1
MODERATOR TEMPERATURE COEFFICIENT (MTC) LIMITS

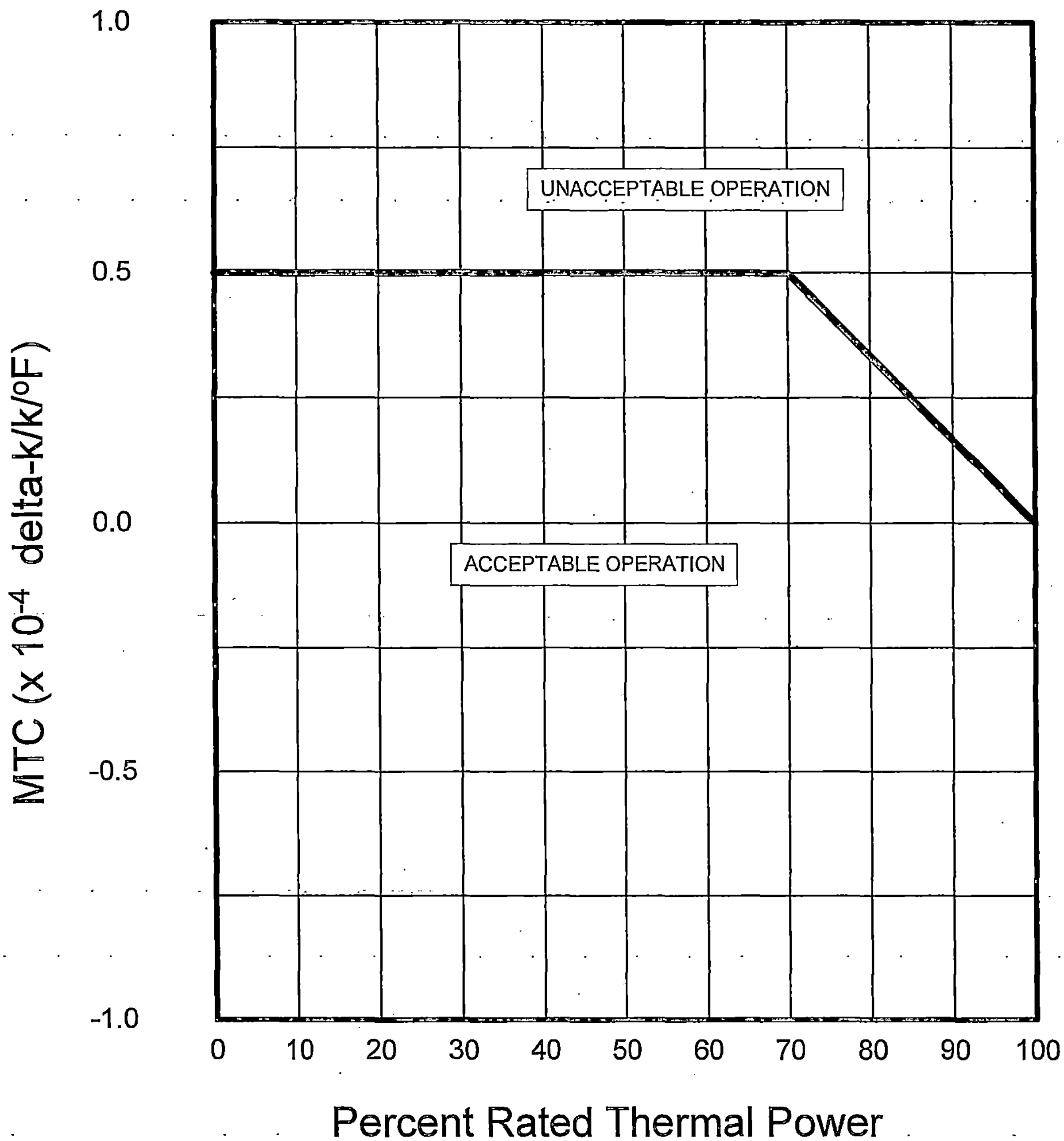


FIGURE 2

ROD BANK INSERTION LIMITS VERSUS THERMAL POWER

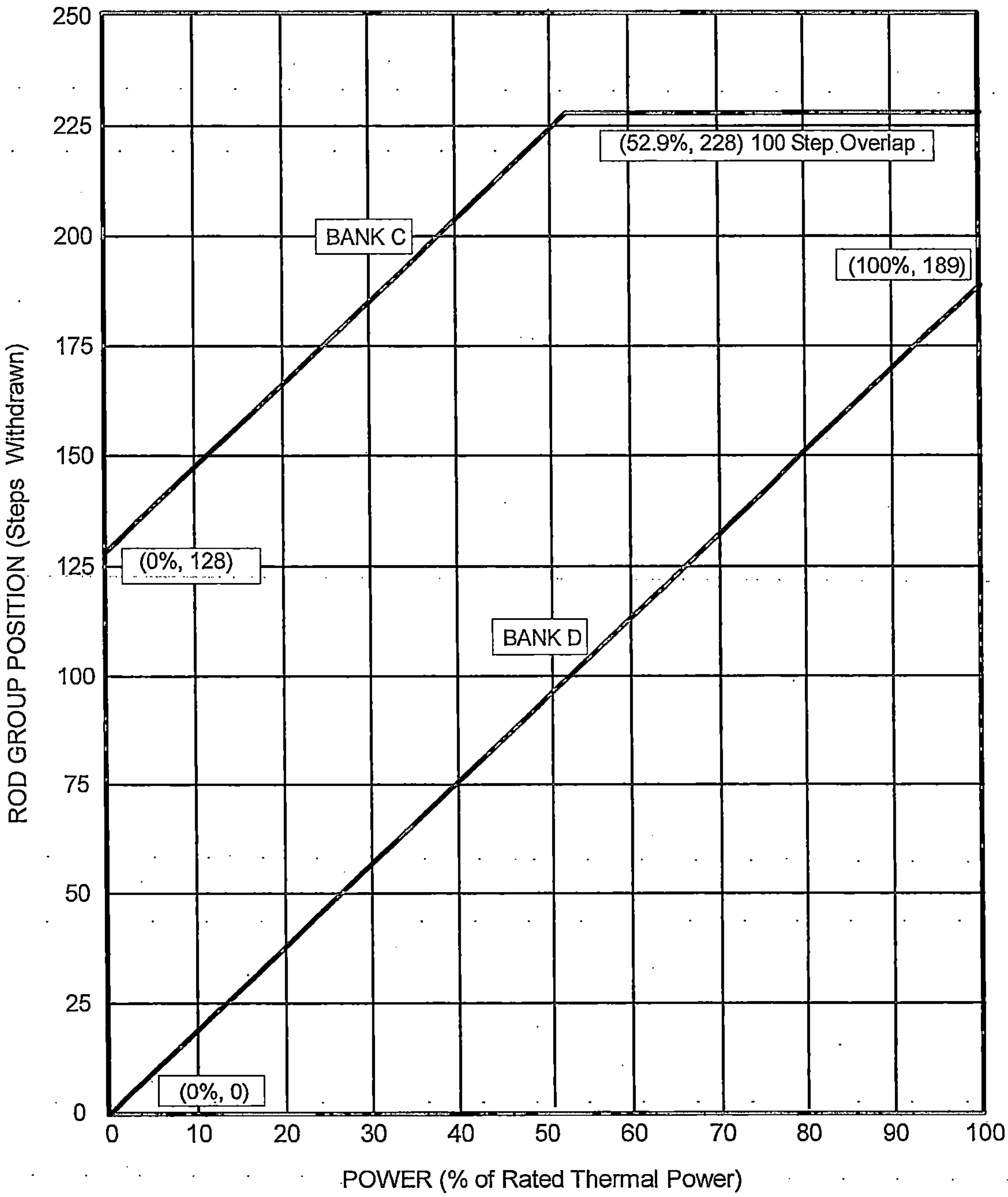


FIGURE 3

AXIAL FLUX DIFFERENCE LIMITS AS A FUNCTION OF RATED THERMAL POWER (RTP)

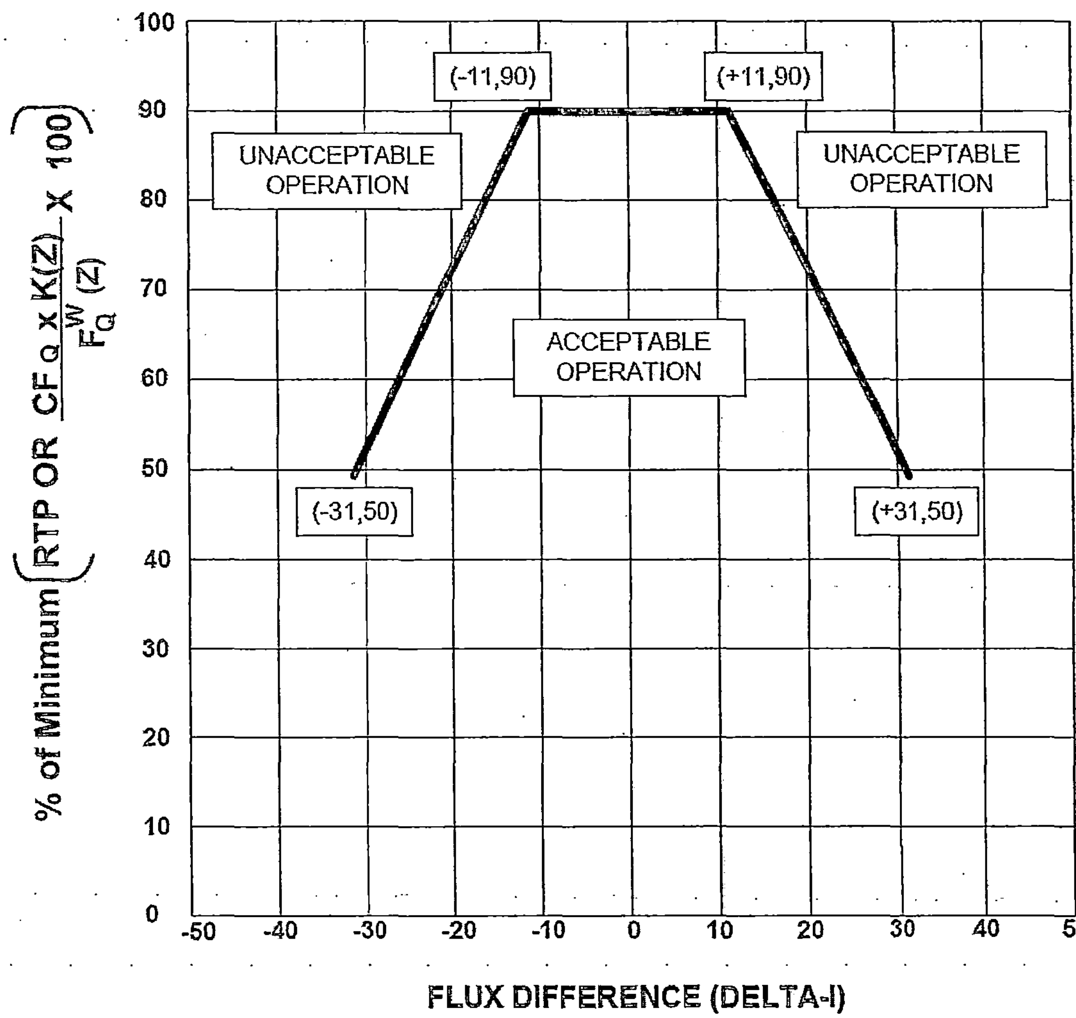


FIGURE 4

K(Z) - NORMALIZED $F_Q(Z)$ AS A FUNCTION OF CORE HEIGHT

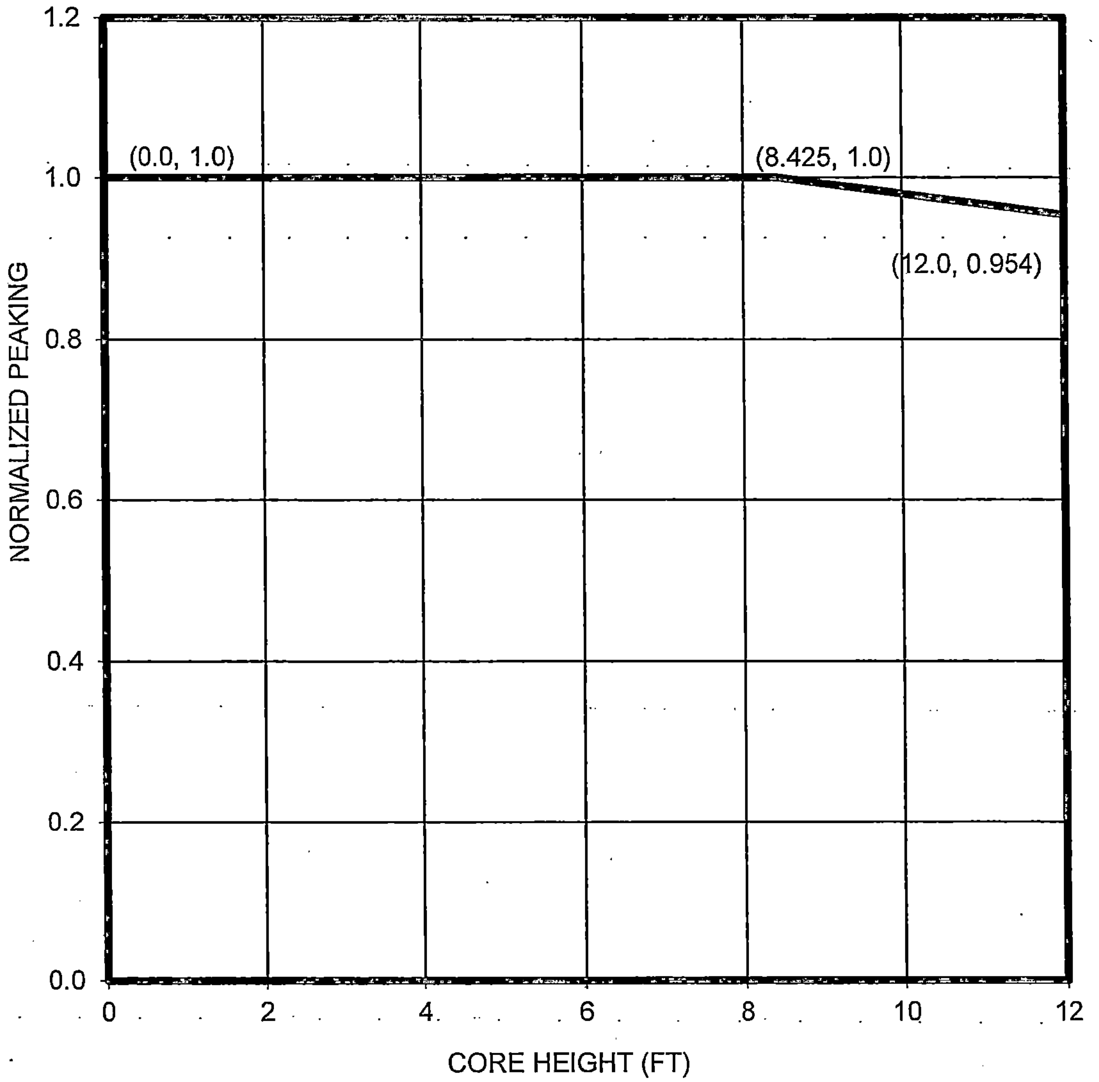


FIGURE 5

(Page 1 of 2)

Reactor Trip System Instrumentation Trip Setpoints

Overtemperature ΔT Trip Setpoint

$$\text{Overtemperature } \Delta T \leq \Delta T_0 \left[K_1 - K_2 \left[\frac{1+\tau_1 S}{1+\tau_2 S}\right] (T-T') + K_3 (P-P') - f_1(\Delta I)\right]$$

Where:

ΔT	=	Measured RCS ΔT, °F
ΔT_0	=	Indicated ΔT at RATED THERMAL POWER, °F
T	=	Average temperature, °F
T'	=	Nominal T_{avg} at RATED THERMAL POWER, (≤ 576.0°F)
P	=	Pressurizer Pressure, psig
P'	=	Nominal RCS operating pressure (2235 psig)
$\left[\frac{1+\tau_1 S}{1+\tau_2 S}\right]$	=	The function generated by the lead-lag controller for T_{avg} dynamic compensation
τ_1, τ_2	=	Time constants utilized in the lead-lag controller for T_{avg}. $\tau_1 \geq 28$ secs. $\tau_2 \leq 4$ secs.
S	=	Laplace transform operator, sec^{-1}
K_1	≤	1.19 *
K_2	≥	0.01331/°F
K_3	≥	0.00058/psig
$f_1(\Delta I)$	=	$-3.5\{33\% + (q_t - q_b)\}$ when $q_t - q_b \leq -33\%$ RTP 0% of RTP when -33% RTP $< q_t - q_b \leq 6\%$ RTP $+1.0\{(q_t - q_b) - 6\%\}$ when $q_t - q_b > 6\%$ RTP

where q_t and q_b are percent RATED THERMAL POWER in the upper and lower halves of the core respectively, and $q_t + q_b$ is total THERMAL POWER in percent RATED THERMAL POWER.

* This is a Safety Analysis value. Refer to Technical Requirements Manual for nominal value of this coefficient used in programming the trip setpoint.

FIGURE 5

(Page 2 of 2)

Overpower ΔT Trip Setpoint

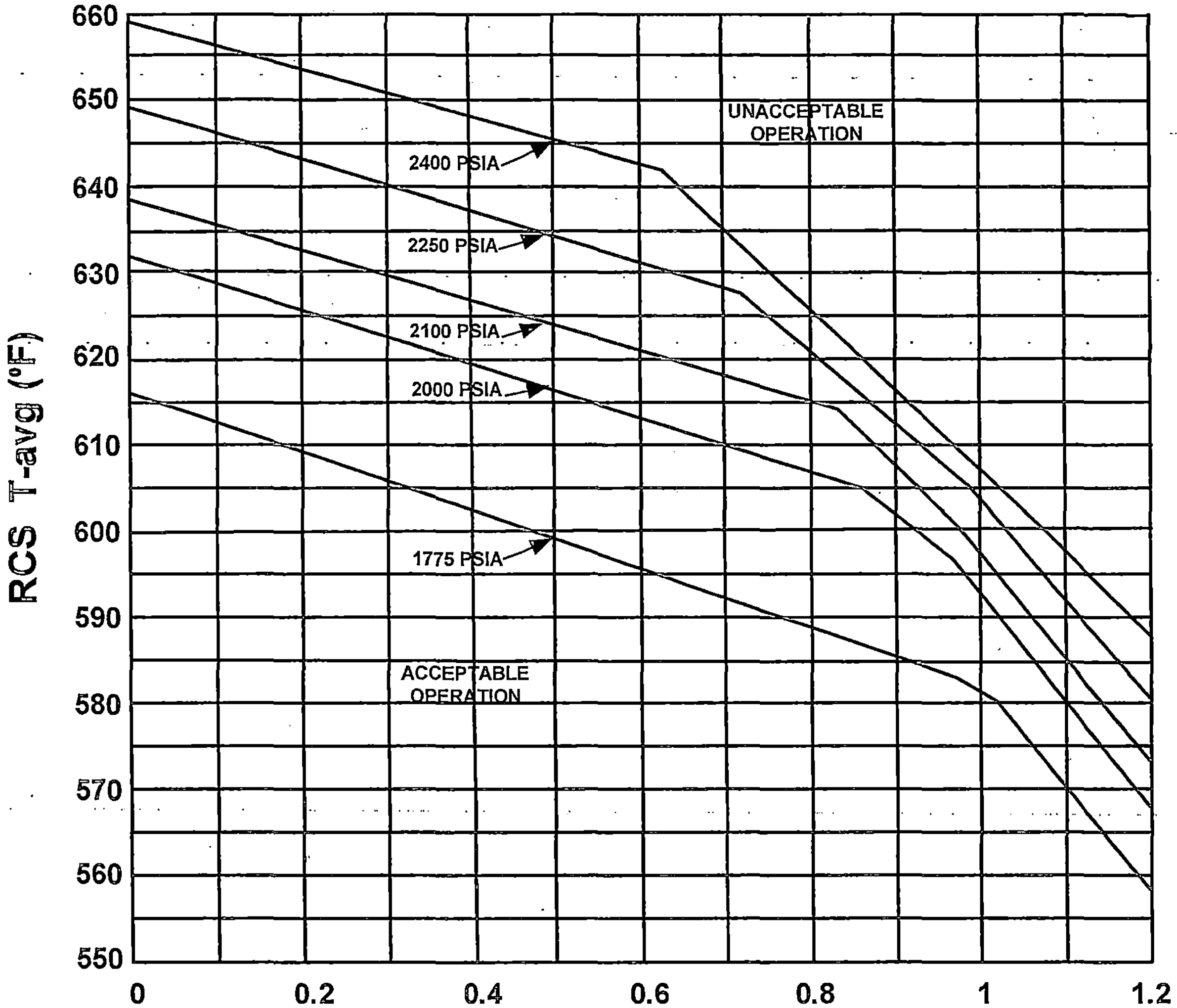
Overpower $\Delta T \leq \Delta T_0 \left[K_4 - K_5 \left[\frac{\tau_3 S}{1+\tau_3 S}\right] T - K_6 (T - T'') - f_2(\Delta I)\right]$

Where:	ΔT	=	Measured RCS **ΔT**, °F
	ΔT_0	=	Indicated **ΔT** at RATED THERMAL POWER, °F
	T	=	Average temperature, °F
	T''	=	Nominal T_{avg} at RATED THERMAL POWER, (≤ 576.0 °F)
	K_4	≤	1.16 *
	K_5	≥	0.02/°F for increasing average temperature; $K_5 = 0$ for decreasing average temperature
	K_6	≥	0.00197/°F for **T** greater than **T''** ; K_6=0 for **T** less than or equal to **T''**
	$\frac{\tau_3 S}{1+\tau_3 S}$	=	The function generated by the rate lag controller for T_{avg} dynamic compensation
	τ_3	=	Time constant utilized in the rate lag controller for T_{avg}; $\tau_3 \geq 10$ secs.
	S	=	Laplace transform operator, sec^{-1}
	$f_2(\Delta I)$	=	0.0

* This is a Safety Analysis value. Refer to Technical Requirements Manual for nominal value of this coefficient used in programming the trip setpoint.

FIGURE 6

Reactor Core Safety Limits



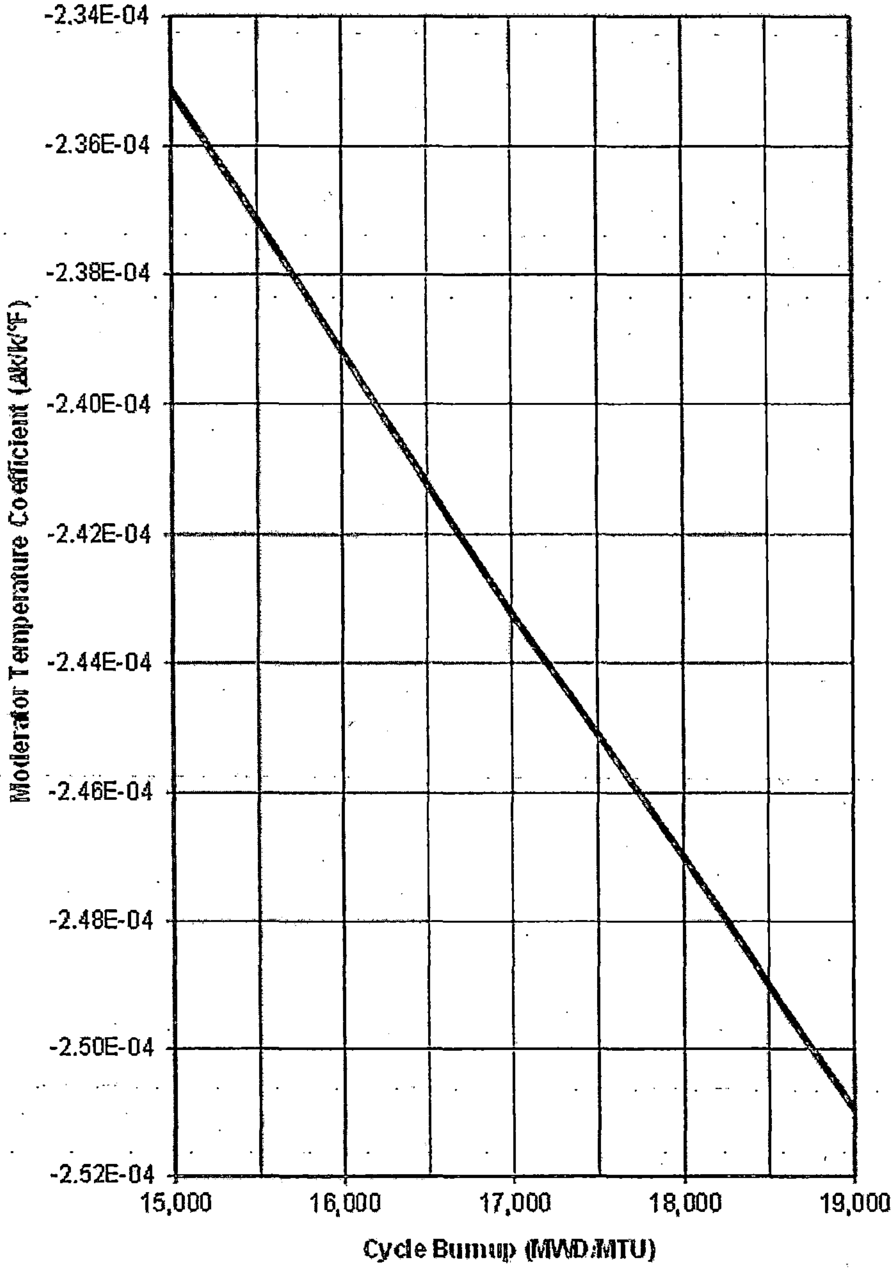
Power (fraction of rated thermal power)

DESCRIPTION OF SAFETY LIMITS

PRESSURE (psia)	Power (frac)	Tavg (°F)	Power (frac)	Tavg (°F)	Power (frac)	Tavg (°F)	Power (frac)	Tavg (°F)
1775	0.00	615.4	0.98	583.8	1.02	580.9	1.2	558.1
2000	0.00	631.8	0.86	605.8	0.96	597.5	1.2	568.5
2100	0.00	639.1	0.82	614.0	0.96	601.6	1.2	573.1
2250	0.00	649.2	0.72	628.6	0.98	605.2	1.2	580.4
2400	0.00	659.0	0.62	642.0	1.1	599.0	1.2	588.1

FIGURE 7

Unit 2 Cycle 24 Predicted HFP ARO 300 PPM MTC Versus Burnup



Burnup (MWD/MTU)	MTC (pcm/°F)	MTC (Δk/k/°F)
15000	-23.514	-2.3514E-04
16000	-23.917	-2.3917E-04
17000	-24.325	-2.4325E-04
18000	-24.699	-2.4699E-04
19000	-25.098	-2.5098E-04

Table 1

D. C. Cook Unit 2 Cycle 24

W(Z) Function

Node #	Height (ft)	Burnup (MWD/MTU) 150	1000	2000	4000	6000	8000	9000
1	0.0	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
2	0.2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
3	0.4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
4	0.6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
5	0.8	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6	1.0	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
7	1.2	1.1113	1.1140	1.1167	1.1201	1.1197	1.1168	1.1154
8	1.4	1.1105	1.1124	1.1143	1.1168	1.1168	1.1151	1.1144
9	1.6	1.1094	1.1105	1.1117	1.1133	1.1137	1.1131	1.1131
10	1.8	1.1080	1.1084	1.1089	1.1098	1.1104	1.1109	1.1114
11	2.0	1.1062	1.1060	1.1058	1.1061	1.1069	1.1083	1.1092
12	2.2	1.1041	1.1034	1.1029	1.1026	1.1036	1.1056	1.1069
13	2.4	1.1017	1.1010	1.1005	1.1003	1.1013	1.1032	1.1044
14	2.6	1.0989	1.0989	1.0989	1.0993	1.1001	1.1012	1.1019
15	2.8	1.0959	1.0965	1.0971	1.0981	1.0987	1.0990	1.0991
16	3.0	1.0925	1.0937	1.0949	1.0965	1.0969	1.0963	1.0959
17	3.2	1.0893	1.0910	1.0927	1.0947	1.0948	1.0933	1.0923
18	3.4	1.0872	1.0891	1.0908	1.0929	1.0925	1.0902	1.0889
19	3.6	1.0860	1.0879	1.0897	1.0918	1.0911	1.0884	1.0869
20	3.8	1.0851	1.0872	1.0891	1.0914	1.0907	1.0879	1.0863
21	4.0	1.0852	1.0871	1.0890	1.0911	1.0906	1.0881	1.0867
22	4.2	1.0861	1.0875	1.0889	1.0906	1.0907	1.0894	1.0887
23	4.4	1.0865	1.0875	1.0885	1.0901	1.0907	1.0908	1.0907
24	4.6	1.0869	1.0874	1.0880	1.0892	1.0905	1.0919	1.0926
25	4.8	1.0871	1.0871	1.0872	1.0881	1.0900	1.0927	1.0942
26	5.0	1.0872	1.0867	1.0863	1.0867	1.0892	1.0933	1.0954
27	5.2	1.0871	1.0860	1.0851	1.0851	1.0881	1.0935	1.0962
28	5.4	1.0867	1.0850	1.0837	1.0832	1.0867	1.0932	1.0966
29	5.6	1.0860	1.0838	1.0819	1.0810	1.0849	1.0925	1.0965
30	5.8	1.0850	1.0823	1.0800	1.0786	1.0828	1.0912	1.0957

Top and bottom 10% of core excluded.

Table 1 (Continued)

D. C. Cook Unit 2 Cycle 24

W(Z) Function

Node #	Height (ft)	Burnup (MWD/MTU) 150	1000	2000	4000	6000	8000	9000
31	6.0	1.0839	1.0806	1.0778	1.0758	1.0801	1.0893	1.0943
32	6.2	1.0824	1.0788	1.0755	1.0731	1.0774	1.0869	1.0922
33	6.4	1.0805	1.0769	1.0736	1.0711	1.0753	1.0846	1.0898
34	6.6	1.0782	1.0747	1.0715	1.0690	1.0729	1.0818	1.0868
35	6.8	1.0750	1.0717	1.0688	1.0664	1.0698	1.0778	1.0825
36	7.0	1.0723	1.0690	1.0659	1.0636	1.0670	1.0752	1.0799
37	7.2	1.0724	1.0685	1.0649	1.0619	1.0655	1.0744	1.0796
38	7.4	1.0758	1.0710	1.0666	1.0625	1.0661	1.0759	1.0816
39	7.6	1.0788	1.0740	1.0697	1.0655	1.0689	1.0782	1.0836
40	7.8	1.0813	1.0769	1.0728	1.0689	1.0720	1.0804	1.0853
41	8.0	1.0835	1.0794	1.0756	1.0718	1.0744	1.0821	1.0865
42	8.2	1.0853	1.0815	1.0780	1.0744	1.0766	1.0834	1.0872
43	8.4	1.0867	1.0833	1.0801	1.0768	1.0785	1.0841	1.0874
44	8.6	1.0878	1.0848	1.0820	1.0789	1.0799	1.0842	1.0868
45	8.8	1.0880	1.0854	1.0830	1.0803	1.0814	1.0855	1.0880
46	9.0	1.0892	1.0864	1.0839	1.0814	1.0833	1.0886	1.0916
47	9.2	1.0928	1.0895	1.0864	1.0835	1.0859	1.0925	1.0962
48	9.4	1.0978	1.0942	1.0908	1.0875	1.0900	1.0969	1.1008
49	9.6	1.1026	1.0987	1.0951	1.0915	1.0939	1.1010	1.1049
50	9.8	1.1071	1.1030	1.0991	1.0951	1.0975	1.1047	1.1087
51	10.0	1.1114	1.1071	1.1030	1.0986	1.1008	1.1080	1.1121
52	10.2	1.1154	1.1108	1.1065	1.1018	1.1038	1.1109	1.1150
53	10.4	1.1189	1.1142	1.1097	1.1047	1.1064	1.1134	1.1174
54	10.6	1.1219	1.1170	1.1123	1.1070	1.1085	1.1152	1.1190
55	10.8	1.1243	1.1192	1.1143	1.1088	1.1103	1.1172	1.1212
56	11.0	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
57	11.2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
58	11.4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
59	11.6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
60	11.8	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
61	12.0	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Top and bottom 10% of core excluded.

Table 1 (Continued)

D. C. Cook Unit 2 Cycle 24

W(Z) Function

Node #	Height (ft)	Burnup (MWD/MTU) 10000	12000	14000	16000	18000	20000	21470
1	0.0	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
2	0.2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
3	0.4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
4	0.6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
5	0.8	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6	1.0	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
7	1.2	1.1147	1.1162	1.1212	1.1289	1.1391	1.1472	1.1520
8	1.4	1.1142	1.1163	1.1210	1.1280	1.1369	1.1442	1.1486
9	1.6	1.1134	1.1159	1.1203	1.1265	1.1342	1.1406	1.1446
10	1.8	1.1121	1.1149	1.1190	1.1242	1.1306	1.1361	1.1396
11	2.0	1.1104	1.1133	1.1169	1.1212	1.1263	1.1308	1.1338
12	2.2	1.1082	1.1111	1.1142	1.1176	1.1213	1.1248	1.1273
13	2.4	1.1056	1.1080	1.1104	1.1129	1.1155	1.1181	1.1200
14	2.6	1.1026	1.1041	1.1056	1.1073	1.1091	1.1108	1.1120
15	2.8	1.0992	1.0997	1.1004	1.1013	1.1023	1.1031	1.1037
16	3.0	1.0954	1.0948	1.0945	1.0944	1.0944	1.0942	1.0940
17	3.2	1.0913	1.0899	1.0890	1.0883	1.0879	1.0872	1.0865
18	3.4	1.0877	1.0861	1.0855	1.0856	1.0862	1.0862	1.0860
19	3.6	1.0857	1.0844	1.0846	1.0859	1.0881	1.0895	1.0901
20	3.8	1.0851	1.0841	1.0850	1.0872	1.0905	1.0927	1.0938
21	4.0	1.0857	1.0851	1.0863	1.0889	1.0925	1.0952	1.0965
22	4.2	1.0882	1.0883	1.0896	1.0918	1.0948	1.0971	1.0985
23	4.4	1.0908	1.0916	1.0929	1.0947	1.0970	1.0988	1.1000
24	4.6	1.0933	1.0947	1.0960	1.0974	1.0988	1.1001	1.1011
25	4.8	1.0955	1.0975	1.0989	1.0997	1.1002	1.1011	1.1019
26	5.0	1.0973	1.0999	1.1013	1.1017	1.1013	1.1016	1.1022
27	5.2	1.0987	1.1020	1.1033	1.1032	1.1019	1.1017	1.1021
28	5.4	1.0996	1.1034	1.1048	1.1042	1.1020	1.1013	1.1015
29	5.6	1.1000	1.1044	1.1058	1.1050	1.1022	1.1013	1.1014
30	5.8	1.0997	1.1050	1.1071	1.1068	1.1046	1.1042	1.1049

Top and bottom 10% of core excluded.

Table 1 (Continued)

D. C. Cook Unit 2 Cycle 24

W(Z) Function

Node #	Height (ft)	Burnup (MWD/MTU) 10000	12000	14000	16000	18000	20000	21470
31	6.0	1.0988	1.1051	1.1082	1.1090	1.1080	1.1089	1.1103
32	6.2	1.0971	1.1041	1.1081	1.1099	1.1100	1.1119	1.1141
33	6.4	1.0947	1.1021	1.1069	1.1097	1.1113	1.1142	1.1171
34	6.6	1.0916	1.0993	1.1047	1.1087	1.1116	1.1157	1.1193
35	6.8	1.0871	1.0948	1.1010	1.1062	1.1110	1.1165	1.1208
36	7.0	1.0846	1.0926	1.0991	1.1047	1.1099	1.1158	1.1204
37	7.2	1.0846	1.0928	1.0992	1.1043	1.1087	1.1140	1.1184
38	7.4	1.0869	1.0953	1.1010	1.1050	1.1078	1.1120	1.1156
39	7.6	1.0887	1.0964	1.1015	1.1046	1.1065	1.1099	1.1130
40	7.8	1.0899	1.0967	1.1010	1.1034	1.1047	1.1073	1.1099
41	8.0	1.0906	1.0965	1.1000	1.1016	1.1020	1.1038	1.1057
42	8.2	1.0908	1.0957	1.0984	1.0993	1.0990	1.1000	1.1014
43	8.4	1.0904	1.0946	1.0968	1.0975	1.0972	1.0980	1.0991
44	8.6	1.0892	1.0929	1.0953	1.0967	1.0977	1.0993	1.1008
45	8.8	1.0903	1.0938	1.0961	1.0976	1.0986	1.1003	1.1017
46	9.0	1.0943	1.0981	1.1000	1.1005	1.1000	1.1005	1.1014
47	9.2	1.0994	1.1036	1.1049	1.1043	1.1021	1.1015	1.1017
48	9.4	1.1041	1.1080	1.1088	1.1072	1.1038	1.1022	1.1019
49	9.6	1.1083	1.1122	1.1129	1.1110	1.1071	1.1052	1.1047
50	9.8	1.1122	1.1163	1.1170	1.1151	1.1113	1.1095	1.1091
51	10.0	1.1156	1.1197	1.1205	1.1189	1.1153	1.1136	1.1133
52	10.2	1.1185	1.1226	1.1235	1.1220	1.1186	1.1170	1.1168
53	10.4	1.1209	1.1250	1.1260	1.1245	1.1213	1.1199	1.1197
54	10.6	1.1224	1.1265	1.1275	1.1263	1.1233	1.1220	1.1220
55	10.8	1.1248	1.1289	1.1298	1.1283	1.1250	1.1235	1.1233
56	11.0	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
57	11.2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
58	11.4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
59	11.6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
60	11.8	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
61	12.0	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Top and bottom 10% of core excluded.