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BOUNDLESS ENERGY

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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 27 in accordance with Technical Specification 5.6.5. Revision 1 of the Unit 2 Cycle 27 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,

Michael K. Scarpello
Regulatory Affairs Director

JMT/sjh

Enclosure: Donald C. Cook Nuclear Plant Unit 2 Cycle 27 Core Operating Limits Report, Revision 1

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ENCLOSURE TO AEP-NRC-2023-29

Donald C. Cook Nuclear Plant Unit 2 Cycle 27

Core Operating Limits Report
Revision 1

Donald C. Cook Nuclear Plant
Unit 2 Cycle 27
Core Operating Limits Report

1.0 CORE OPERATING LIMITS REPORT

This Core Operating Limits Report for the Donald C. Cook Nuclear Plant Unit 2 Cycle 27 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% $\Delta k/k$ for $T_{avg} > 200°F$
Shutdown margin shall be greater than or equal to 1.0% $\Delta k/k$ 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 **$\Delta k/k/°F$**.

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 ±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)

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

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

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

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

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 27, $\mathbf{F_P}$ = 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	1.080
150	1.080
359	1.083
568	1.083
777	1.080
986	1.075
1195	1.067
1404	1.058
1613	1.049
1822	1.041
2031	1.034
2240	1.029
2449	1.026
2658	1.023
2867	1.022
3076	1.020

The burnup range only 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)

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

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 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 T_{avg}, and 2200 psig for Pressurizer Pressure.

++This concentration bounds the condition of Keff ≤ 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

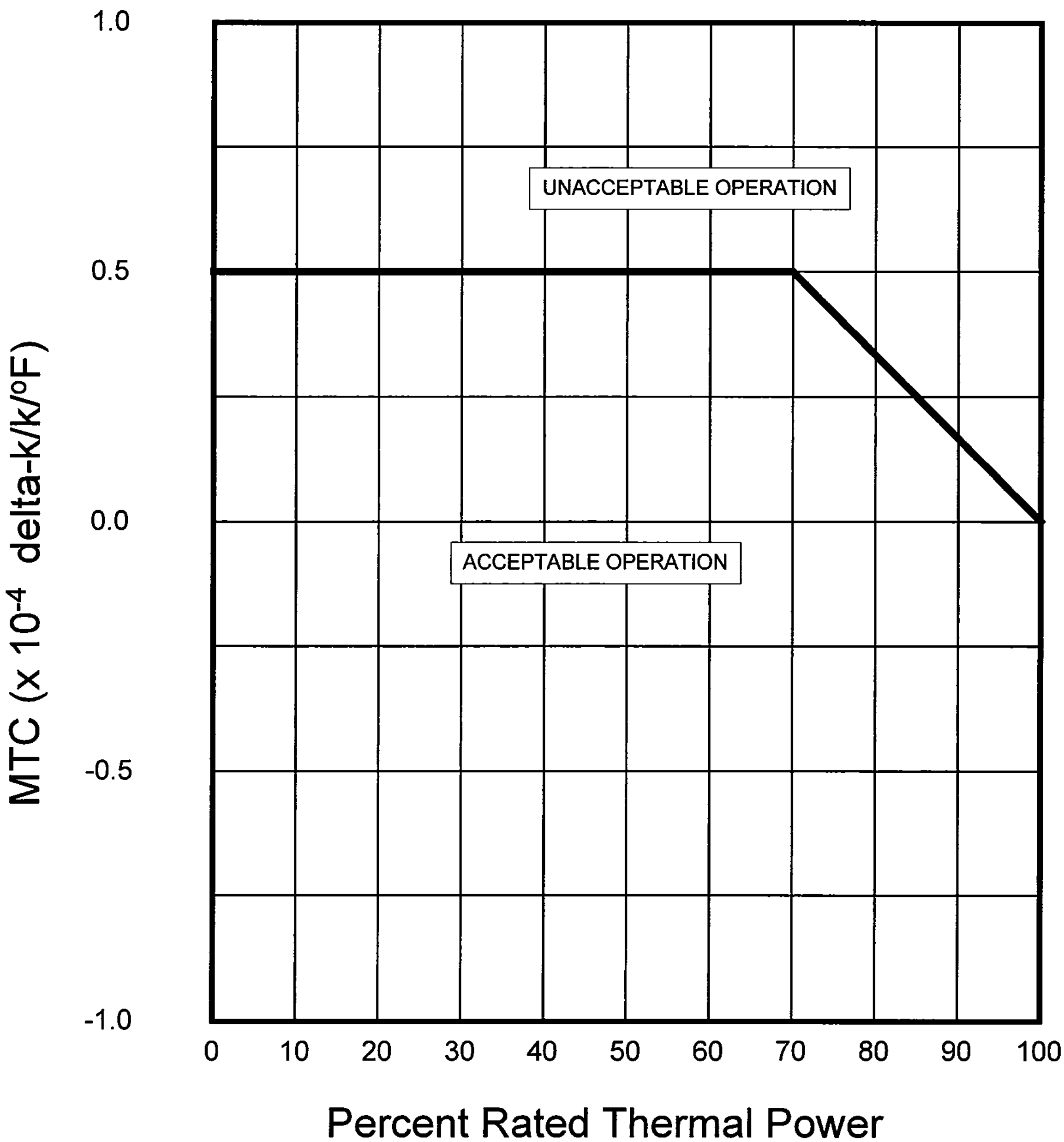


FIGURE 2
ROD BANK INSERTION LIMITS VERSUS THERMAL POWER

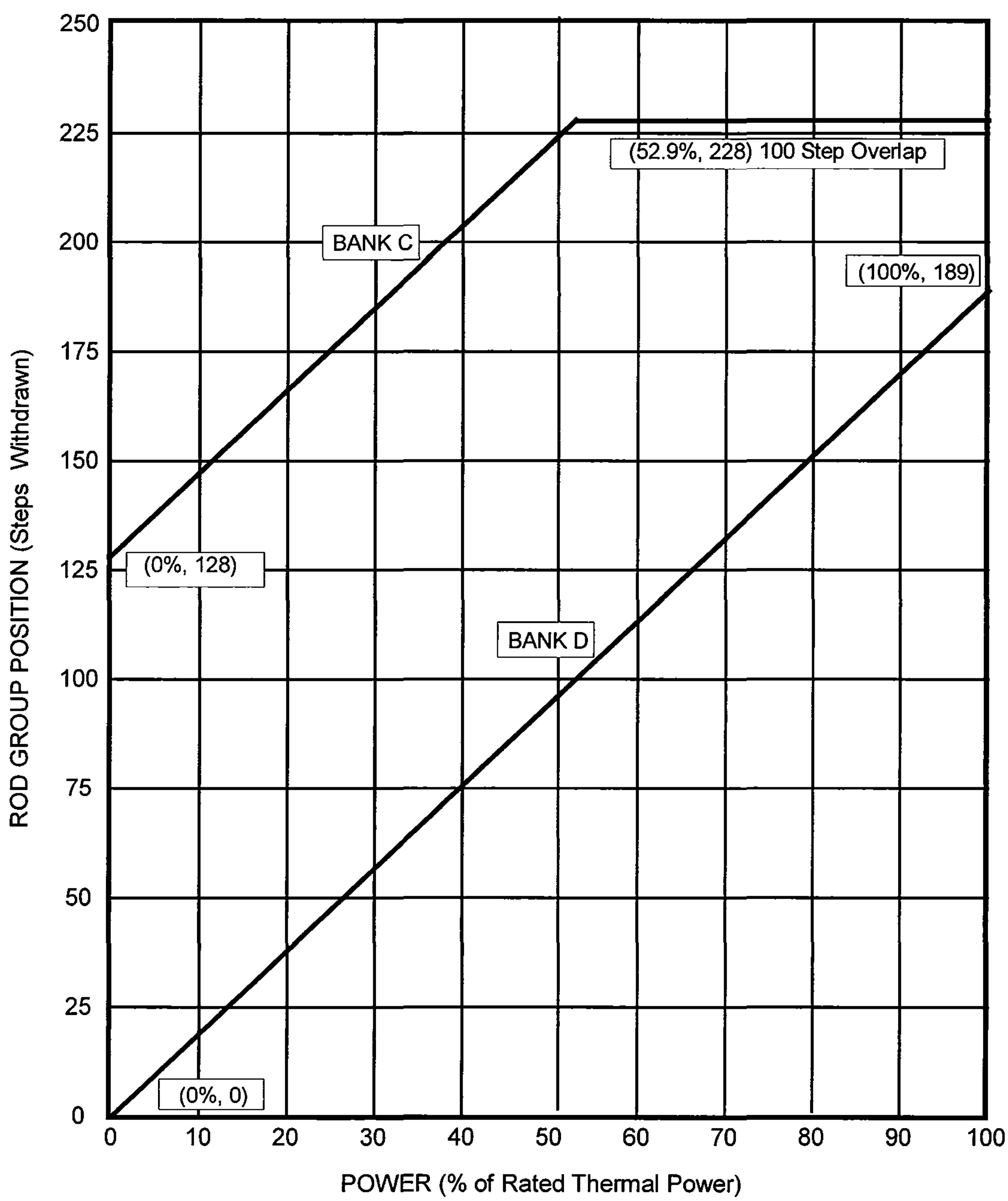


FIGURE 3

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

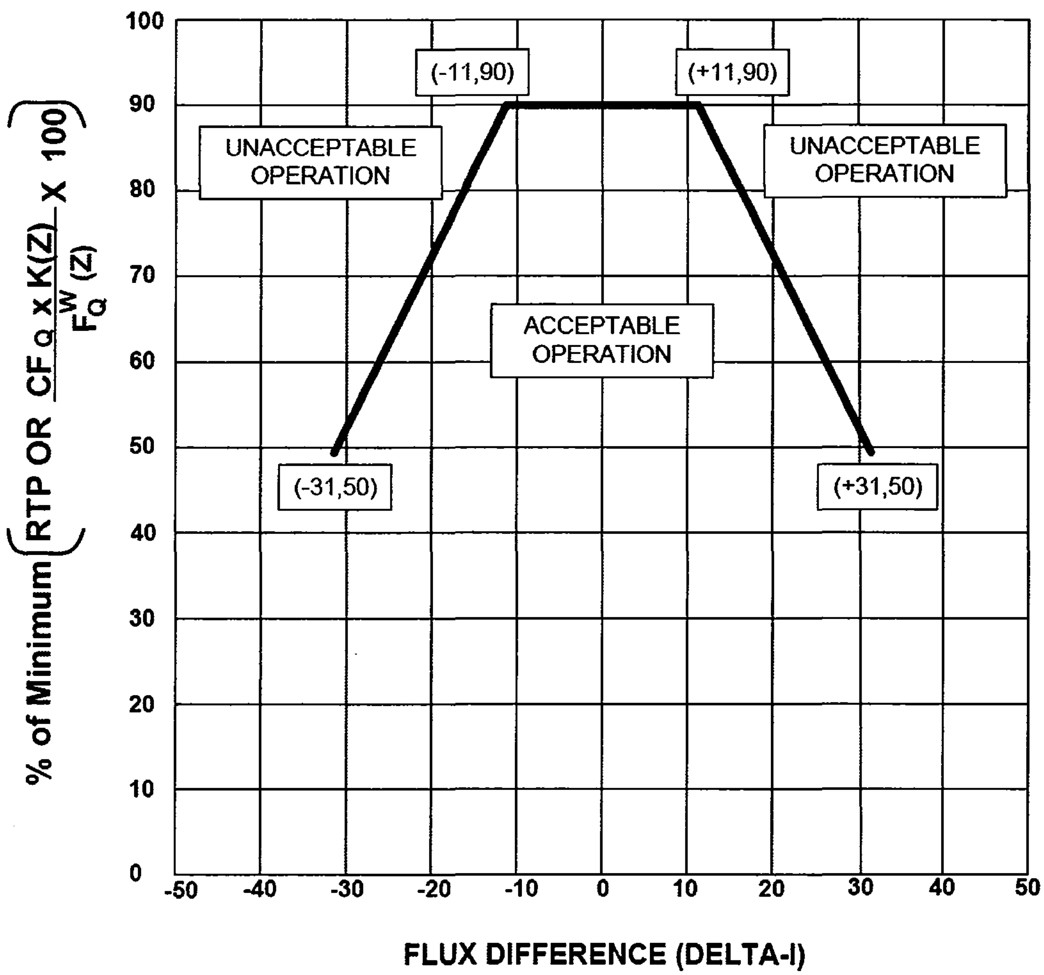


FIGURE 4

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

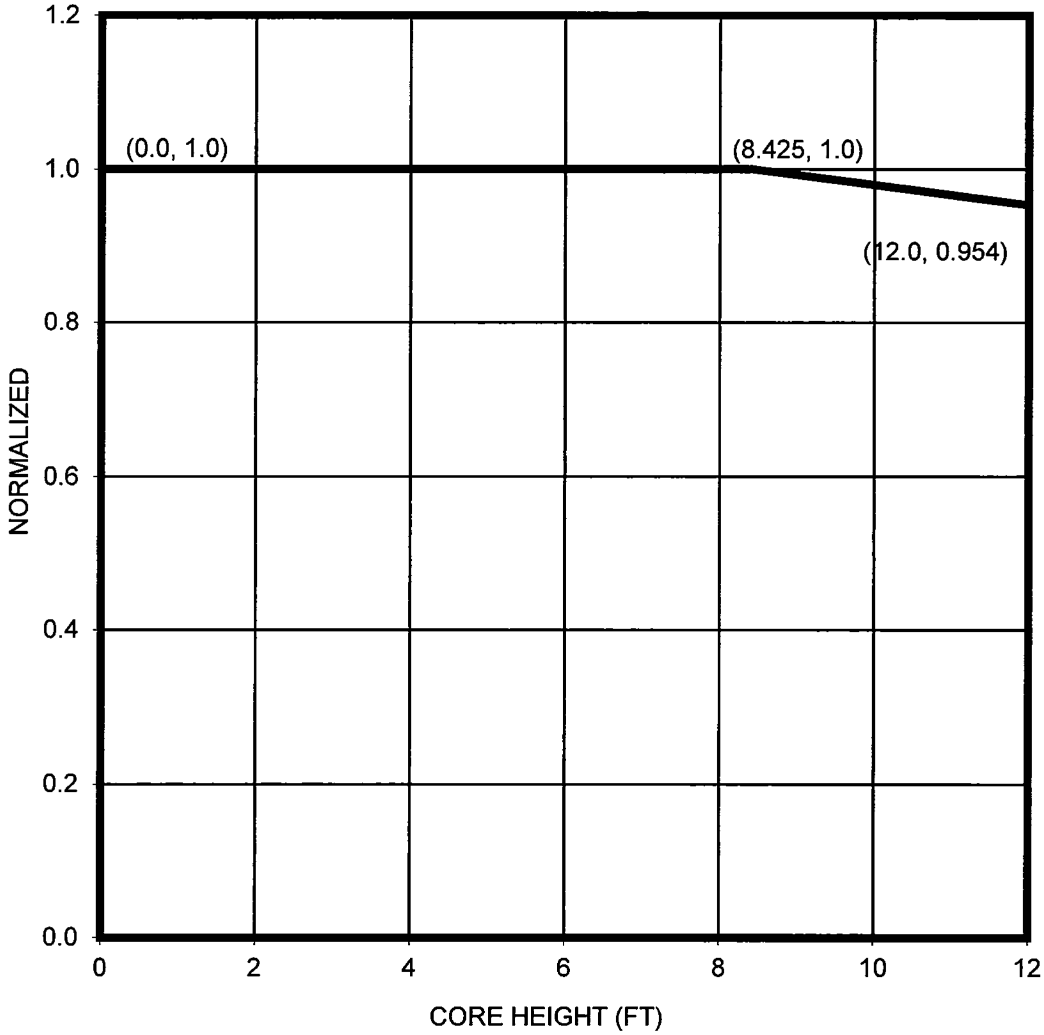


FIGURE 5
(Page 1 of 2)
Reactor Trip System Instrumentation Trip Setpoints
Overtemperature ΔT Trip Setpoint

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

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

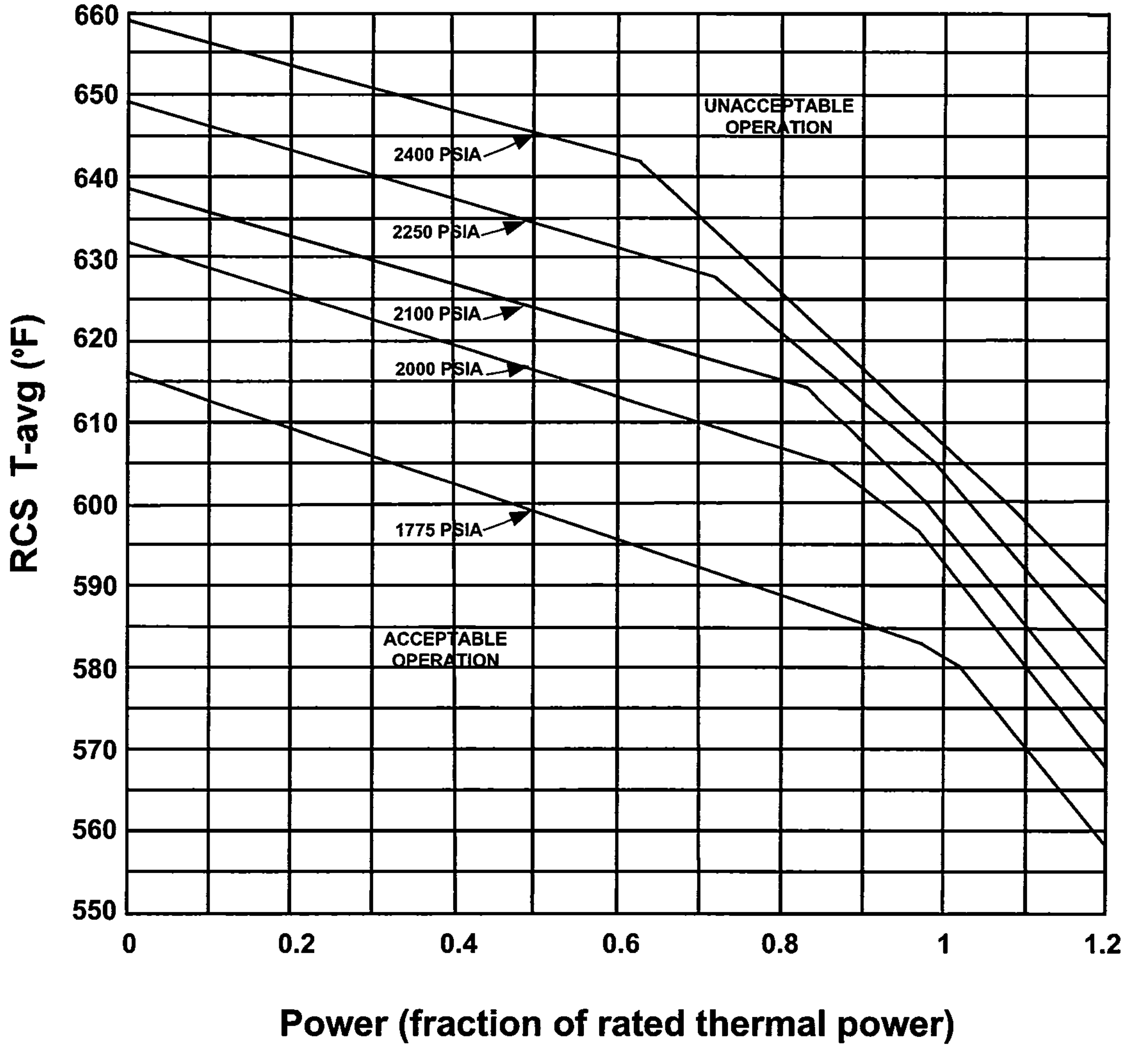
Overpower $\Delta T \leq \Delta T_o \left[K_4 - K_5 \left[\frac{\tau_3 S}{1+\tau_3 S}\right] T - K_6 (T - T'') - f_2 (\Delta I)\right]$

Where:

ΔT	=	Measured RCS **ΔT**, °F
ΔT_o	=	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

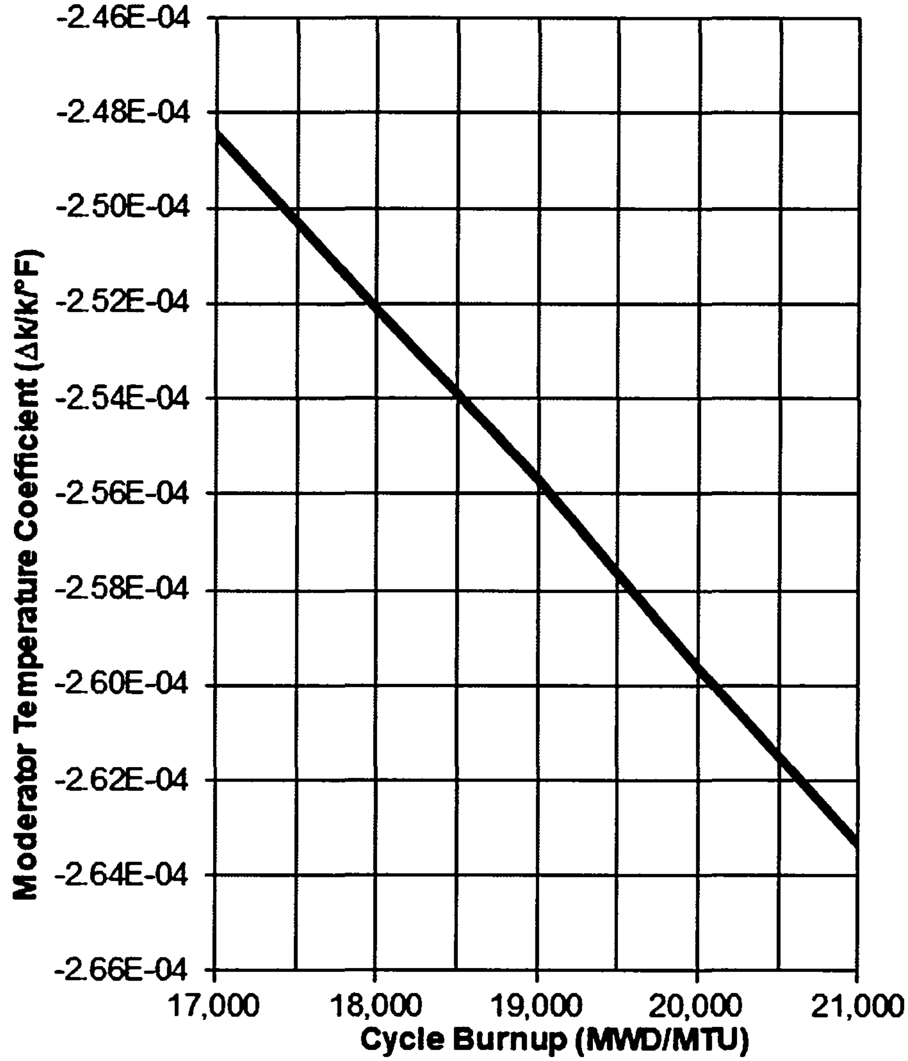


DESCRIPTION OF SAFETY LIMITS

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 27 Predicted HFP ARO 300 PPM MTC Versus Burnup



Burnup (MWD/MTU)	MTC (pcm/°F)	MTC (Δk/k/°F)
17000	-24.845	-2.4845E-04
18000	-25.212	-2.5212E-04
19000	-25.567	-2.5567E-04
20000	-25.963	-2.5963E-04
21000	-26.333	-2.6333E-04

Table 1

D. C. Cook Unit 2 Cycle 27

W(Z) Function

Node	Height	Burnup (MWD/MTU)						
#	(ft)	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	1.1133	1.1123	1.1113	1.1102	1.1099	1.1106	1.1114
8	1.4	1.1123	1.1105	1.1088	1.1068	1.1069	1.1089	1.1105
9	1.6	1.1110	1.1085	1.1061	1.1033	1.1038	1.1070	1.1092
10	1.8	1.1093	1.1066	1.1040	1.1011	1.1017	1.1054	1.1078
11	2.0	1.1073	1.1049	1.1026	1.1002	1.1009	1.1043	1.1065
12	2.2	1.1049	1.1031	1.1015	1.0997	1.1004	1.1031	1.1049
13	2.4	1.1022	1.1011	1.1000	1.0989	1.0995	1.1016	1.1029
14	2.6	1.0993	1.0987	1.0982	1.0978	1.0984	1.0998	1.1006
15	2.8	1.0961	1.0961	1.0962	1.0964	1.0969	1.0976	1.0980
16	3.0	1.0926	1.0932	1.0939	1.0948	1.0952	1.0951	1.0950
17	3.2	1.0890	1.0902	1.0914	1.0930	1.0932	1.0924	1.0918
18	3.4	1.0861	1.0878	1.0894	1.0914	1.0914	1.0898	1.0888
19	3.6	1.0846	1.0867	1.0887	1.0911	1.0907	1.0882	1.0868
20	3.8	1.0847	1.0868	1.0889	1.0912	1.0903	1.0871	1.0855
21	4.0	1.0855	1.0873	1.0890	1.0908	1.0897	1.0866	1.0850
22	4.2	1.0861	1.0876	1.0889	1.0904	1.0894	1.0867	1.0855
23	4.4	1.0867	1.0878	1.0889	1.0901	1.0893	1.0873	1.0865
24	4.6	1.0871	1.0878	1.0885	1.0895	1.0892	1.0883	1.0881
25	4.8	1.0873	1.0876	1.0879	1.0886	1.0888	1.0891	1.0896
26	5.0	1.0873	1.0871	1.0871	1.0875	1.0882	1.0896	1.0907
27	5.2	1.0871	1.0864	1.0860	1.0861	1.0873	1.0898	1.0916
28	5.4	1.0866	1.0855	1.0847	1.0844	1.0861	1.0897	1.0921
29	5.6	1.0862	1.0846	1.0833	1.0825	1.0846	1.0892	1.0921
30	5.8	1.0856	1.0835	1.0816	1.0804	1.0827	1.0882	1.0916

Top and bottom 10% of core excluded.

Table 1 (Continued)

D. C. Cook Unit 2 Cycle 27

W(Z) Function

Node #	Height (ft)	Burnup (MWD/MTU) 150	1000	2000	4000	6000	8000	9000
31	6.0	1.0845	1.0819	1.0797	1.0779	1.0805	1.0868	1.0907
32	6.2	1.0831	1.0800	1.0774	1.0752	1.0779	1.0849	1.0891
33	6.4	1.0812	1.0778	1.0747	1.0721	1.0750	1.0825	1.0870
34	6.6	1.0788	1.0752	1.0720	1.0692	1.0721	1.0797	1.0843
35	6.8	1.0759	1.0722	1.0689	1.0660	1.0689	1.0765	1.0811
36	7.0	1.0725	1.0690	1.0659	1.0630	1.0656	1.0728	1.0771
37	7.2	1.0714	1.0675	1.0639	1.0604	1.0629	1.0702	1.0747
38	7.4	1.0754	1.0699	1.0647	1.0594	1.0622	1.0716	1.0773
39	7.6	1.0792	1.0736	1.0685	1.0632	1.0660	1.0753	1.0809
40	7.8	1.0823	1.0774	1.0729	1.0682	1.0708	1.0792	1.0842
41	8.0	1.0854	1.0809	1.0767	1.0724	1.0749	1.0826	1.0872
42	8.2	1.0880	1.0841	1.0804	1.0767	1.0789	1.0858	1.0898
43	8.4	1.0904	1.0870	1.0839	1.0807	1.0826	1.0886	1.0921
44	8.6	1.0924	1.0897	1.0871	1.0844	1.0861	1.0910	1.0939
45	8.8	1.0941	1.0920	1.0900	1.0881	1.0894	1.0932	1.0954
46	9.0	1.0957	1.0943	1.0931	1.0918	1.0927	1.0953	1.0967
47	9.2	1.0974	1.0967	1.0961	1.0954	1.0957	1.0968	1.0974
48	9.4	1.0986	1.0987	1.0987	1.0987	1.0984	1.0981	1.0980
49	9.6	1.1002	1.1005	1.1008	1.1012	1.1013	1.1012	1.1013
50	9.8	1.1037	1.1035	1.1034	1.1035	1.1040	1.1049	1.1054
51	10.0	1.1082	1.1074	1.1066	1.1059	1.1064	1.1079	1.1089
52	10.2	1.1120	1.1105	1.1090	1.1074	1.1080	1.1105	1.1119
53	10.4	1.1156	1.1132	1.1110	1.1085	1.1092	1.1126	1.1145
54	10.6	1.1185	1.1177	1.1169	1.1160	1.1162	1.1173	1.1180
55	10.8	1.1210	1.1186	1.1162	1.1136	1.1141	1.1171	1.1190
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 27

W(Z) Function

Node #	Height (ft)	Burnup (MWD/MTU) 10000	12000	14000	16000	18000	20000	22000	22871
1	0.0	1.0000	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	1.0000
3	0.4	1.0000	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	1.0000
5	0.8	1.0000	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	1.0000
7	1.2	1.1126	1.1164	1.1216	1.1282	1.1362	1.1456	1.1523	1.1551
8	1.4	1.1123	1.1166	1.1218	1.1278	1.1347	1.1427	1.1488	1.1515
9	1.6	1.1116	1.1164	1.1214	1.1268	1.1326	1.1391	1.1446	1.1470
10	1.8	1.1104	1.1152	1.1199	1.1245	1.1293	1.1346	1.1395	1.1416
11	2.0	1.1087	1.1130	1.1170	1.1210	1.1250	1.1294	1.1335	1.1353
12	2.2	1.1067	1.1101	1.1134	1.1166	1.1199	1.1235	1.1269	1.1283
13	2.4	1.1042	1.1068	1.1093	1.1117	1.1142	1.1169	1.1195	1.1206
14	2.6	1.1015	1.1032	1.1048	1.1064	1.1080	1.1097	1.1114	1.1121
15	2.8	1.0984	1.0992	1.1000	1.1008	1.1016	1.1025	1.1033	1.1037
16	3.0	1.0949	1.0947	1.0946	1.0945	1.0944	1.0942	1.0941	1.0940
17	3.2	1.0912	1.0903	1.0897	1.0893	1.0890	1.0887	1.0882	1.0880
18	3.4	1.0879	1.0868	1.0864	1.0865	1.0871	1.0880	1.0880	1.0880
19	3.6	1.0857	1.0848	1.0855	1.0876	1.0907	1.0948	1.0966	1.0974
20	3.8	1.0842	1.0838	1.0857	1.0895	1.0950	1.1020	1.1055	1.1071
21	4.0	1.0840	1.0842	1.0871	1.0923	1.0994	1.1084	1.1133	1.1154
22	4.2	1.0848	1.0859	1.0898	1.0960	1.1043	1.1145	1.1205	1.1231
23	4.4	1.0863	1.0882	1.0928	1.0998	1.1090	1.1202	1.1270	1.1299
24	4.6	1.0885	1.0913	1.0967	1.1042	1.1137	1.1252	1.1325	1.1357
25	4.8	1.0906	1.0944	1.1004	1.1082	1.1179	1.1294	1.1372	1.1406
26	5.0	1.0923	1.0970	1.1035	1.1117	1.1215	1.1329	1.1410	1.1446
27	5.2	1.0937	1.0993	1.1062	1.1146	1.1243	1.1355	1.1438	1.1475
28	5.4	1.0948	1.1010	1.1084	1.1168	1.1263	1.1371	1.1456	1.1493
29	5.6	1.0953	1.1022	1.1099	1.1182	1.1274	1.1377	1.1462	1.1498
30	5.8	1.0953	1.1028	1.1106	1.1187	1.1275	1.1371	1.1455	1.1492

Top and bottom 10% of core excluded.

Table 1 (Continued)

D. C. Cook Unit 2 Cycle 27

W(Z) Function

Node #	Height (ft)	Burnup (MWD/MTU) 10000	12000	14000	16000	18000	20000	22000	22871
31	6.0	1.0947	1.1026	1.1104	1.1183	1.1266	1.1355	1.1436	1.1472
32	6.2	1.0935	1.1017	1.1094	1.1170	1.1246	1.1327	1.1405	1.1440
33	6.4	1.0916	1.1000	1.1075	1.1147	1.1216	1.1289	1.1363	1.1396
34	6.6	1.0890	1.0973	1.1045	1.1112	1.1176	1.1241	1.1311	1.1341
35	6.8	1.0856	1.0936	1.1004	1.1064	1.1119	1.1173	1.1237	1.1264
36	7.0	1.0814	1.0890	1.0955	1.1014	1.1069	1.1124	1.1186	1.1213
37	7.2	1.0791	1.0870	1.0937	1.0997	1.1054	1.1110	1.1174	1.1202
38	7.4	1.0827	1.0916	1.0982	1.1032	1.1071	1.1103	1.1158	1.1182
39	7.6	1.0862	1.0947	1.1007	1.1049	1.1079	1.1101	1.1149	1.1170
40	7.8	1.0890	1.0966	1.1018	1.1054	1.1079	1.1095	1.1136	1.1154
41	8.0	1.0916	1.0983	1.1028	1.1057	1.1074	1.1082	1.1115	1.1130
42	8.2	1.0936	1.0994	1.1031	1.1052	1.1062	1.1064	1.1089	1.1100
43	8.4	1.0953	1.1001	1.1029	1.1043	1.1046	1.1040	1.1058	1.1065
44	8.6	1.0965	1.1002	1.1022	1.1028	1.1024	1.1011	1.1021	1.1025
45	8.8	1.0973	1.0999	1.1010	1.1009	1.1000	1.0982	1.0984	1.0984
46	9.0	1.0980	1.0997	1.1005	1.1004	1.0998	1.0986	1.0988	1.0988
47	9.2	1.0981	1.0993	1.1003	1.1013	1.1022	1.1031	1.1041	1.1045
48	9.4	1.0981	1.0987	1.0999	1.1016	1.1038	1.1065	1.1082	1.1089
49	9.6	1.1014	1.1022	1.1036	1.1055	1.1078	1.1106	1.1125	1.1133
50	9.8	1.1061	1.1074	1.1089	1.1106	1.1124	1.1145	1.1162	1.1169
51	10.0	1.1098	1.1116	1.1132	1.1147	1.1162	1.1178	1.1194	1.1201
52	10.2	1.1134	1.1157	1.1173	1.1186	1.1195	1.1203	1.1216	1.1222
53	10.4	1.1164	1.1192	1.1208	1.1217	1.1219	1.1217	1.1228	1.1233
54	10.6	1.1188	1.1205	1.1222	1.1241	1.1261	1.1283	1.1303	1.1311
55	10.8	1.1207	1.1233	1.1249	1.1257	1.1259	1.1258	1.1268	1.1273
56	11.0	1.0000	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	1.0000
58	11.4	1.0000	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	1.0000
60	11.8	1.0000	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	1.0000

Top and bottom 10% of core excluded.