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Enclosure 3

AREVA Report ANP-2658(NP), Revision 0,
Brunswick Unit 1 Cycle 17 Fuel Cycle Design
dated July 2007

An AREVA and Siemens company

ANP-2658(NP)
Revision 0

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

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Nature of Changes

Item	Page	Description and Justification
1.	All	This is a new document.

Contents

1.0	Introduction	1-1
2.0	Summary	2-1
3.0	Cycle 17 Fuel Cycle Design	3-1
3.1	General Description.....	3-1
3.2	Control Rod Patterns and Thermal Limits	3-1
3.3	Hot Excess Reactivity and Cold Shutdown Margin	3-2
4.0	References	4-1
Appendix A	Brunswick Unit 1 Cycle 17 Step-through Depletion Summary, Control Rod Patterns and Core Average Axial Power and Exposure Distributions	A-1
Appendix B	Elevation Views of the Brunswick Unit 1 Cycle 17 Fresh Reload Batch Fuel Assemblies.....	B-1
Appendix C	Brunswick Unit 1 Cycle 17 Fresh Fuel Locations.....	C-1
Appendix D	Brunswick Unit 1 Cycle 17 Radial Exposure and Power Distributions	D-1

Tables

2.1	Brunswick Unit 1 Cycle 17 Energy and Key Results Summary.....	2-2
2.2	Brunswick Unit 1 Cycle 17 Fuel Cycle Design Assembly ID Range by Nuclear Fuel Type.....	2-3
3.1	Cycle 17 Core Composition and Design Parameters.....	3-3
3.2	Brunswick Unit 1 Cycle 17 Hot Operating Target k-eff Versus Cycle Exposure	3-4
3.3	Brunswick Unit 1 Cycle 17 Cold Critical Target k-eff Versus Cycle Exposure	3-4
3.4	Brunswick Unit 1 Cycle 17 Reactivity Margin Summary.....	3-5

Figures

2.1	Brunswick Unit 1 Cycle 17 Design Step-through k-eff versus Cycle Exposure	2-4
2.2	Brunswick Unit 1 Cycle 17 Design Margin to Thermal Limits versus Cycle Exposure	2-4
3.1	Brunswick Unit 1 Cycle 17 Reference Loading Pattern	3-6
3.2	Brunswick Unit 1 Cycle 17 Upper Left Quarter Core Layout by Fuel Type	3-7
3.3	Brunswick Unit 1 Cycle 17 Upper Right Quarter Core Layout by Fuel Type	3-8
3.4	Brunswick Unit 1 Cycle 17 Lower Left Quarter Core Layout by Fuel Type	3-9
3.5	Brunswick Unit 1 Cycle 17 Lower Right Quarter Core Layout by Fuel Type	3-10

This document contains a total of 113 pages.

Nomenclature

BOC	beginning of cycle
BOL	beginning of life
BWR	boiling water reactor
CSDM	cold shutdown margin
EOC	end of cycle
EOFP	end of full power capability
FFTR	final feedwater temperature reduction
GWd/MTU	gigawatt days per metric ton of initial uranium
HEXR	hot excess reactivity
LHGR	linear heat generation rate
MCPR	minimum critical power ratio
MICROBURN-B2	AREVA NP advanced BWR core simulator methodology with PPR capability
MWd/MTU	megawatt days per metric ton of initial uranium
NRC	Nuclear Regulatory Commission, U.S.
PPR	Pin Power Reconstruction. The PPR methodology accounts for variation in local rod power distributions due to neighboring assemblies and control state. The local rod power distributions are reconstructed based on the actual flux solution for each statepoint.
R Value	the larger of zero or the shutdown margin at BOC minus the minimum calculated shutdown margin in the cycle
SLC	standby liquid control
SPCB	AREVA NP (formerly Siemens Power Corporation) critical heat flux correlation

1.0 Introduction

AREVA NP Inc.* has performed fuel cycle design and fuel management calculations for the Cycle 17 operation of the Brunswick Unit 1 BWR. These analyses have been performed with the approved AREVA neutronics methodology (Reference 1). The CASMO-4 lattice depletion code was used to generate nuclear data including cross sections and local power peaking factors. The MICROBURN-B2 three dimensional core simulator code, combined with the application of the SPCB (Reference 2) critical power correlation, was used to model the core. The MICROBURN-B2 pin power reconstruction (PPR) model was used to determine the thermal margins presented in this report.

Design results for the Cycle 17 reactor core loading including projected control rod patterns and evaluations of thermal and reactivity margins are presented. The Cycle 17 results are based on Cycle 16 core operational history as summarized in Table 2.1

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2.0 Summary

The Cycle 17 fresh batch size (248 assemblies) and batch average enrichment [

] were determined to meet the energy requirements provided by Progress Energy. The loading of the Cycle 17 fuel as described in this report results in a projected Cycle 17 full power energy capability (including FFTR) of $1,918 \pm 30$ GWd ($19,155 \pm 300$ MWd/MTU). Beyond the full power capability, the cycle has been designed to achieve 20 GWd additional energy via power coastdown operation.

In order to obtain optimum operating flexibility, the projected control rod patterns for Cycle 17 were developed to be consistent with a conservative margin to thermal limits. The cycle design calculations also demonstrate adequate hot excess reactivity and cold shutdown margin throughout the cycle. Key results from the design analysis are summarized in Table 2.1. Table 2.2 summarizes the assembly identification range by nuclear fuel type batch for the Cycle 17 design. Figures 2.1 and 2.2 provide a summary of the cycle design step-through projection.

Table 2.1 Brunswick Unit 1 Cycle 17 Energy and Key Results Summary

Cycle Energy, GWd (Cycle Exposure, MWd/MTU)	
Cycle 16	
• Core follow through April 14, 2007	1,013 (10,086)
• Best estimate depletion to Nominal EOC 16	1,897 (18,893)
• Short window EOC 16	1,853 (18,457)
• Long window EOC 16	1,973 (19,650)
Cycle 17	
• EOFP Energy (including FFTR)	1,918±30 (19,155±300)
• power coastdown Energy	20 (204)
• EOC Energy	1,938±30 (19,360±300)
Key Results	
BOC CSDM, %Δk/k (based on short EOC 16)	1.14
Minimum CSDM, %Δk/k (based on short EOC 16)	0.95
Cycle Exposure of Minimum CSDM, MWd/MTU (short basis)	20,265
Cycle R Value, %Δk/k (short basis)	0.19
Minimum SLC SDM, %Δk/k (based on short EOC 16)	1.31
Cycle Exposure of Minimum SLC SDM, MWd/MTU (short basis)	0
BOC HEXR, %Δk/k (based on nominal EOC 16)	1.74
Maximum HEXR, %Δk/k (based on nominal EOC 16)	2.24
Cycle Exposure of Maximum HEXR, MWd/MTU (nominal basis)	12,000
Minimum MAPLHGR Margin, %	10.3
Exposure of Minimum MAPLHGR Margin, MWd/MTU	17,500
Minimum LHGR Margin, %	8.8
Exposure of Minimum LHGR Margin, MWd/MTU	17,500
Minimum CPR Margin, %	6.7
Exposure of Minimum CPR Margin, MWd/MTU	16,901

**Table 2.2 Brunswick Unit 1 Cycle 17 Fuel Cycle Design Assembly ID
Range by Nuclear Fuel Type**

Nuclear Fuel Type	Number of Assemblies	Assembly ID Range
10	11	JLK444-JLK513
11	10	JLK577-JLK598
12	38	JLK599-JLK636
14	150	JLW653-JLW802
15	60	JLW803-JLW862
16	40	JLW863-JLW902
22	3	JLB050-JLB108
30	152	A17001-A17152
31	96	A17153-A17248

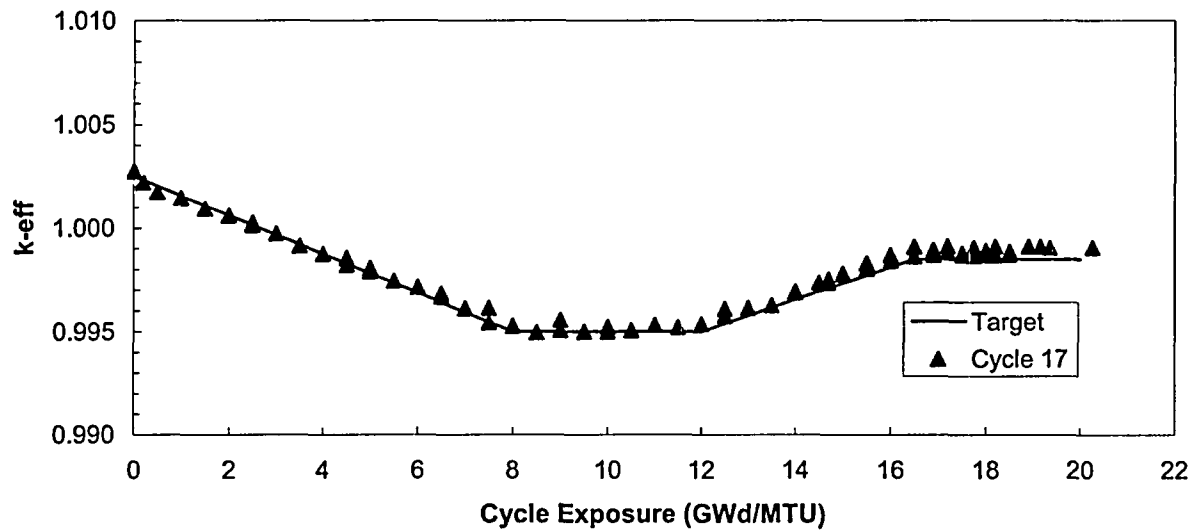


Figure 2.1 Brunswick Unit 1 Cycle 17 Design Step-through k_{eff} versus Cycle Exposure

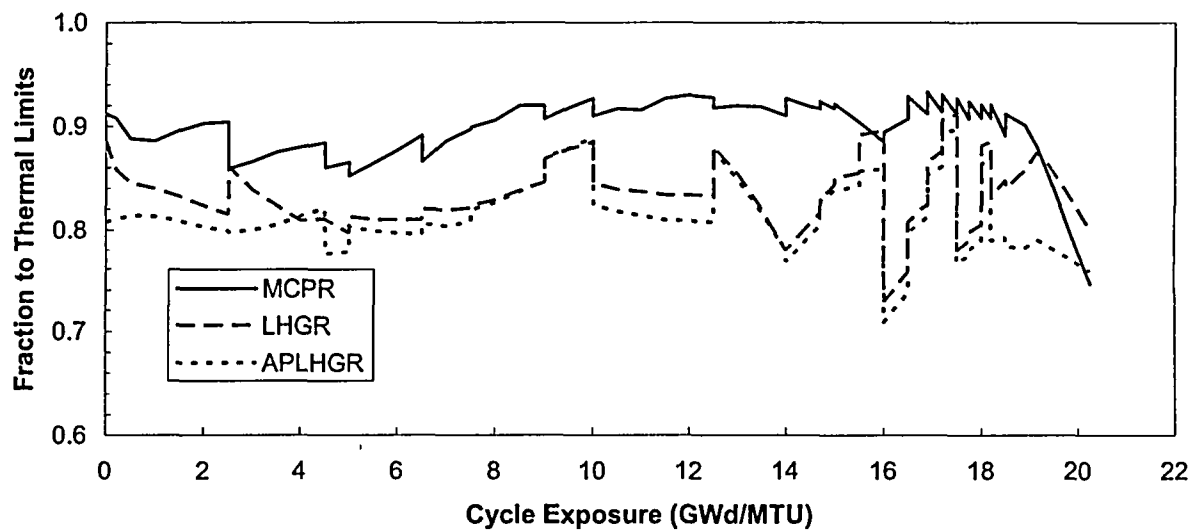


Figure 2.2 Brunswick Unit 1 Cycle 17 Design Margin to Thermal Limits versus Cycle Exposure

3.0 Cycle 17 Fuel Cycle Design

3.1 *General Description*

The ATRIUM™*-10 fuel assembly consists of a lower tie plate (LTP) and upper tie plate (UTP), 91 fuel rods, 8 spacer grids, a central water channel, and miscellaneous assembly hardware. Of the 91 fuel rods, 8 are part-length fuel rods (PLFRs). The structural members of the fuel assembly include the tie plates, spacer grids, water channel, and connecting hardware. The structural connection between the LTP and UTP is provided by the water channel. Seven spacers occupy the normal axial locations, while an eighth spacer is located just above the LTP to restrain the lower ends of the fuel rods.

The assembly design for the Cycle 17 BRK1-17 fresh reload fuel for Brunswick Unit 1 is described in Appendix B. Elevation views of the fresh reload fuel design axial enrichment and gadolinia distributions are shown in Appendix B, Figures B.1 and B.2. The fuel rod distribution and axial distributions are presented in Figures B.3 through B.5. The loading pattern maintains near quarter core mirror symmetry within a scatter load fuel management scheme. This loading in conjunction with the control rod patterns presented in Appendix A shows acceptable power peaking and associated margins to limits for projected Cycle 17 operation. The analyses supporting this fuel cycle design were based on the core parameters shown in Table 3.1. Figures 3.1 through 3.5, along with Table 3.1 define the reference loading pattern used in the fuel cycle design. The specific core location of the fresh assemblies in Cycle 17 is provided in Appendix C. Key results for the cycle are summarized in Table 2.1.

3.2 *Control Rod Patterns and Thermal Limits*

Projected control rod patterns for Cycle 17 and resultant key operating parameters including thermal margins are shown in Appendix A. The thermal margins presented in this report were determined using the MICROBURN-B2 3D core simulator PPR model to provide adequate margin to thermal limits. The MCPR margins presented in this report are based on assumed limits and are subject to change pending the completion of the safety analyses calculations. The final MCPR limit values will be reported in the Reload Safety Analysis Report. A detailed summary of the core parameters resulting from the step-through projection analysis is provided

* ATRIUM is a trademark of AREVA NP.

in Tables A.1 and A.2. Limiting results from the step-through are summarized in Table 2.1 and in Figure 2.2. The hot operating target k-eff versus cycle exposure which was determined to be appropriate for Cycle 17 is shown in Table 3.2. The k-eff and margin to limits results from the design cycle depletion are presented graphically in Figures 2.1 and 2.2. The k-eff values presented in Figure 2.1 and in Appendix A are not bias corrected. Selected exposure and radial power distributions from the design step-through are presented in Appendix D.

3.3 *Hot Excess Reactivity and Cold Shutdown Margin*

The cycle design calculations demonstrate adequate hot excess reactivity, SLC shutdown margin, and cold shutdown margin throughout the cycle. Key shutdown margin and R-Value results are presented in Table 2.1. The shutdown margin for Cycle 17 is in conformance with the Technical Specification limit of $R + 0.38\% \Delta k/k$ at BOC. The cold target k-eff versus exposure determined to be appropriate for calculation of cold shutdown margin in Cycle 17 is shown in Table 3.3. The core hot excess reactivity was calculated at full power with all rods out, 77.0 Mlb/hr core flow, with equilibrium xenon. Table 3.4 summarizes the Cycle 17 reactivity margins versus cycle exposure, including the SLC shutdown margin for the cycle.

Fuel Description*	Cycle Loaded	Nuclear Fuel Type	Number of Assemblies
GE-14 GE14-P10DNAB413-16GZ	15	10	11
GE-14 GE14-P10DNAB429-18GZ	15	11	10
GE-14 GE14-P10DNAB437-12G6	15	12	38
GE-14 GE14-P10DNAB407-16GZ	16	14	150
GE-14 GE14-P10DNAB425-18GZ	16	15	60
GE-14 GE14-P10DNAB437-12G6	16	16	40
GE-14 GE14-P10DNAB416-17GZ	14	22	3
ATRIUM™-10 []	17	30	152
ATRIUM-10 []	17	31	96

The fuel description for GE assemblies is similar, except that a “Z” at the end indicates axially zoned gadolinia.

Table 3.1 Cycle 17 Core Composition and Design Parameters (Continued)

Number of Fuel Assemblies in Core	560
Total Number of Fresh Assemblies	248
Total Core Mass, MTU	100.10
Rated Thermal Power Level, MW _t	2,923
Rated Core Flow, Mlb/hr	77.0
Reference Pressure, psia	1,045*
Reference Inlet Subcooling, Btu/lbm	20.29-21.56 [†]

Table 3.2 Brunswick Unit 1 Cycle 17 Hot Operating Target k-eff Versus Cycle Exposure

Cycle Exposure (MWd/MTU)	Hot Operating k-eff [‡]
0.0	1.0025
8,000.0	0.9950
12,000.0	0.9950
16,500.0	0.9985
20,000.0	0.9985

Table 3.3 Brunswick Unit 1 Cycle 17 Cold Critical Target k-eff Versus Cycle Exposure

Cycle Exposure (MWd/MTU)	Cold Critical k-eff [‡]
0.0	0.9935
4,000.0	0.9875
20,000.0	0.9875

* Value is representative of MICROBURN-B2 input for dome pressure at rated conditions and varies depending on core state point.

[†] Value is typically determined by MICROBURN-B2 using a heat balance method based on nominal feedwater temperature and other parameters identified in the cycle specific plant parameters document.

[‡] Values are linearly interpolated between cycle exposure points.

Table 3.4 Brunswick Unit 1 Cycle 17 Reactivity Margin Summary

Cycle Exposure (MWd/MTU)	Cold Shutdown Margin* (% $\Delta k/k$)	SLC Cold Shutdown Margin† (% $\Delta k/k$)	Hot Excess Reactivity‡ (% $\Delta k/k$)
0	1.14	1.31	1.74
200	1.31	1.51	1.67
500	1.58	1.79	1.49
1,000	1.48	1.66	1.51
2,000	1.53	1.74	1.56
3,000	1.63	1.81	1.58
4,000	1.82	1.90	1.58
5,000	2.00	2.14	1.61
6,000	2.19	2.35	1.66
7,000	2.34	2.52	1.76
8,000	2.43	2.64	1.90
9,000	2.32	2.69	2.00
10,000	2.16	2.69	2.12
11,000	1.99	2.70	2.21
12,000	1.87	2.73	2.24
13,000	1.83	2.81	2.11
14,000	1.80	2.95	1.92
15,000	1.62	3.17	1.63
16,000	1.53	3.53	1.22
16,900	1.52	3.94	0.82
17,750	1.34	4.39	0.34
18,500	1.18	4.70	--
19,155	1.07	4.91	--
19,360	1.04	4.98	--
20,265	0.95	--	--

* Based on short window EOC 16.

† Based on short window EOC 16, calculated at 360.0 °F ARO conditions.

‡ Based on nominal EOC 16.

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

	1	3	5	7	9	11	13	15	17	19	21	23	25
52									JLK607	JLW659	JLK631	JLK615	JLK619
50								JLK587	JLW881	A17001	JLW863	A17002	JLW816
48					JLK627	JLW870	JLW815	JLW831	A17153	A17154	A17005	JLW714	A17155
46				JLK595	JLW873	A17007	A17008	A17009	JLW865	A17159	JLW809	A17010	JLW655
44			JLK623	JLW869	A17161	JLW803	A17162	JLW696	A17163	JLW686	A17015	JLW677	A17016
42			JLW875	A17019	JLW823	A17167	JLW811	A17020	JLW654	A17021	JLW810	A17168	JLW668
40			JLK503	A17025	A17171	JLW713	A17026	JLW660	A17172	JLW669	A17173	JLW670	A17174
38		JLK603	JLW864	A17029	JLW829	A17030	JLW675	A17031	JLW695	A17032	JLW721	A17033	JLW678
36	JLK579	JLW880	A17179	JLW819	A17180	JLW701	A17181	JLW676	A17039	JLW711	A17182	JLW804	A17040
34	JLW723	A17043	A17187	A17188	JLW703	A17044	JLW702	A17045	JLW662	A17046	JLW705	A17047	JLW693
32	JLK635	JLW827	A17053	JLW821	A17054	JLW825	A17191	JLW687	A17192	JLW722	A17055	JLW653	A17056
30	JLK611	A17061	JLW704	A17062	JLW694	A17195	JLW720	A17063	JLW805	A17064	JLW683	A17065	JLW667
28	JLK599	JLW877	A17197	JLW719	A17071	JLW684	A17198	JLW712	A17072	JLW661	A17073	JLW685	JLK507
26	JLK600	JLW837	A17201	JLW728	A17077	JLW764	A17202	JLW738	A17078	JLW791	A17079	JLW765	JLK508
24	JLK612	A17083	JLW748	A17084	JLW756	A17205	JLW729	A17085	JLW859	A17086	JLW763	A17087	JLW781
22	JLK636	JLW887	A17093	JLW843	A17094	JLW839	A17207	JLW767	A17208	JLW731	A17095	JLW797	A17096
20	JLK504	A17101	A17211	A17212	JLW747	A17102	JLW746	A17103	JLW792	A17104	JLW749	A17105	JLW755
18	JLK604	JLW886	A17215	JLW845	A17216	JLW745	A17217	JLW774	A17111	JLW737	A17218	JLW858	A17112
16		JLK628	JLW898	A17115	JLW835	A17116	JLW773	A17117	JLW757	A17118	JLW730	A17119	JLW776
14			JLK629	A17125	A17223	JLW739	A17126	JLW790	A17224	JLW783	A17225	JLW784	A17226
12			JLW889	A17129	JLW841	A17231	JLW853	A17130	JLW798	A17131	JLW852	A17232	JLW782
10			JLK596	JLW893	A17235	JLW857	A17236	JLW758	A17237	JLW766	A17135	JLW775	A17136
8				JLK624	A17139	JLW891	A17140	A17141	JLW899	A17241	JLW851	A17142	JLW799
6					JLK580	JLW894	JLW847	JLW833	A17243	A17244	A17147	JLW740	A17245
4								JLB103	JLW883	A17149	JLW897	A17150	JLW848
2									JLK608	JLW789	JLK632	JLK616	JLK620

	27	29	31	33	35	37	39	41	43	45	47	49	51
52	JLK621	JLK617	JLK622	JLW666	JLK509								
50	JLW817	A17003	JLW868	A17004	JLW867	JLK625							
48	A17156	JLW715	A17006	A17157	A17158	JLW832	JLW818	JLW871	JLK581				
46	JLW656	A17011	JLW814	A17160	JLW866	A17012	A17013	A17014	JLW874	JLK577			
44	A17017	JLW680	A17018	JLW689	A17164	JLW697	A17165	JLW808	A17166	JLW872	JLK597		
42	JLW673	A17169	JLW813	A17022	JLW657	A17023	JLW812	A17170	JLW824	A17024	JLW876		
40	A17175	JLW671	A17176	JLW672	A17177	JLW665	A17027	JLW716	A17178	A17028	JLB050		
38	JLW679	A17034	JLW725	A17035	JLW698	A17036	JLW682	A17037	JLW830	A17038	JLW828	JLK613	
36	A17041	JLW807	A17183	JLW718	A17042	JLW681	A17184	JLW710	A17185	JLW882	A17186	JLW879	JLK609
34	JLW700	A17048	JLW706	A17049	JLW663	A17050	JLW709	A17051	JLW708	A17189	A17190	A17052	JLK461
32	A17057	JLW658	A17058	JLW724	A17193	JLW688	A17194	JLW826	A17059	JLW822	A17060	JLW878	JLK633
30	JLW674	A17066	JLW692	A17067	JLW806	A17068	JLW726	A17196	JLW699	A17069	JLW707	A17070	JLK444
28	JLK513	JLW690	A17074	JLW664	A17075	JLW717	A17199	JLW691	A17076	JLW727	A17200	JLW820	JLK601
26	JLK510	JLW770	A17080	JLW794	A17081	JLW743	A17203	JLW771	A17082	JLW736	A17204	JLW846	JLK602
24	JLW788	A17088	JLW772	A17089	JLW860	A17090	JLW735	A17206	JLW761	A17091	JLW751	A17092	JLK614
22	A17097	JLW802	A17098	JLW733	A17209	JLW768	A17210	JLW840	A17099	JLW844	A17100	JLW888	JLK634
20	JLW762	A17106	JLW750	A17107	JLW793	A17108	JLW753	A17109	JLW752	A17213	A17214	A17110	JLW732
18	A17113	JLW861	A17219	JLW744	A17114	JLW779	A17220	JLW754	A17221	JLW884	A17222	JLW885	JLK606
16	JLW777	A17120	JLW734	A17121	JLW760	A17122	JLW780	A17123	JLW836	A17124	JLW838	JLK610	
14	A17227	JLW785	A17228	JLW786	A17229	JLW795	A17127	JLW742	A17230	A17128	JLB108		
12	JLW787	A17233	JLW855	A17132	JLW801	A17133	JLW854	A17234	JLW842	A17134	JLW890		
10	A17137	JLW778	A17138	JLW769	A17238	JLW759	A17239	JLW862	A17240	JLW896	JLK626		
8	JLW800	A17143	JLW856	A17242	JLW900	A17144	A17145	A17146	JLW892	JLK630			
6	A17246	JLW741	A17148	A17247	A17248	JLW834	JLW850	JLW895	JLK598				
4	JLW849	A17151	JLW902	A17152	JLW901	JLK512							
2	JLK605	JLK618	JLK488	JLW796	JLK588								

Figure 3.1 Brunswick Unit 1 Cycle 17 Reference Loading Pattern

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

	1	3	5	7	9	11	13	15	17	19	21	23	25
52									12 34.4	14 20.9	12 29.7	12 29.3	12 31.6
50	Nuclear Fuel Type BOC Exposure (Gwd/MTU)							11 33.2	16 12.0	30 0.0	16 17.1	30 0.0	15 20.4
48				12 35.0	16 18.9	15 16.8	15 10.2	31 0.0	31 0.0	30 0.0	14 22.3	31 0.0	
46			11 37.4	16 16.5	30 0.0	30 0.0	30 0.0	16 18.3	31 0.0	15 20.1	30 0.0	14 22.5	
44		12 38.0	16 16.7	31 0.0	15 18.7	31 0.0	14 22.7	31 0.0	14 22.7	30 0.0	14 22.8	30 0.0	
42		16 18.4	30 0.0	15 16.5	31 0.0	15 22.2	30 0.0	14 22.8	30 0.0	15 22.1	31 0.0	14 22.8	
40		10 34.3	30 0.0	31 0.0	14 22.2	30 0.0	14 22.5	31 0.0	14 22.8	31 0.0	14 22.8	31 0.0	
38	12 30.0	16 17.9	30 0.0	15 13.4	30 0.0	14 22.4	30 0.0	14 22.4	30 0.0	14 21.9	30 0.0	14 22.7	
36	11 31.9	16 17.7	31 0.0	15 20.4	31 0.0	14 20.1	31 0.0	14 22.6	30 0.0	14 21.0	31 0.0	15 20.3	30 0.0
34	14 21.9	30 0.0	31 0.0	31 0.0	14 22.1	30 0.0	14 21.4	30 0.0	14 23.1	30 0.0	14 22.8	30 0.0	14 22.3
32	12 30.3	15 12.6	30 0.0	15 19.1	30 0.0	15 18.9	31 0.0	14 22.8	31 0.0	14 22.4	30 0.0	14 22.2	30 0.0
30	12 33.3	30 0.0	14 22.3	30 0.0	14 22.5	31 0.0	14 20.5	30 0.0	15 20.9	30 0.0	14 21.4	30 0.0	14 22.1
28	12 35.6	16 13.4	31 0.0	14 17.1	30 0.0	14 22.5	31 0.0	14 21.3	30 0.0	14 23.1	30 0.0	14 22.5	10 31.8

Fuel Type	Description	Cycle Loaded	No. Per Quarter core
10	GE14-P10DNAB413-16GZ	15	2
11	GE14-P10DNAB429-18GZ	15	3
12	GE14-P10DNAB437-12G6	15	10
14	GE14-P10DNAB407-16GZ	16	38
15	GE14-P10DNAB425-18GZ	16	15
16	GE14-P10DNAB437-12G6	16	10
22	GE14-P10DNAB416-17GZ	14	0
30	[]	17	38
31	[]	17	24

**Figure 3.2 Brunswick Unit 1 Cycle 17 Upper Left Quarter Core
Layout by Fuel Type**

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

	27	29	31	33	35	37	39	41	43	45	47	49	51
52	12 31.4	12 31.4	12 31.8	14 21.9	10 34.4								
50	15 21.1	30 0.0	16 17.4	30 0.0	16 18.2	12 37.9							
	Nuclear Fuel Type BOC Exposure (GWD/MTU)												
48	31 0.0	14 22.6	30 0.0	31 0.0	31 0.0	15 20.5	15 17.6	16 19.5	11 38.6				
46	14 22.5	30 0.0	15 20.6	31 0.0	16 18.4	30 0.0	30 0.0	30 0.0	16 17.4	11 39.3			
44	30 0.0	14 23.3	30 0.0	14 23.1	31 0.0	14 23.0	31 0.0	15 19.2	31 0.0	16 17.3	11 38.1		
42	14 23.3	31 0.0	15 22.5	30 0.0	14 23.0	30 0.0	15 22.3	31 0.0	15 19.0	30 0.0	16 19.7		
40	31 0.0	14 22.8	31 0.0	14 23.1	31 0.0	14 23.1	30 0.0	14 22.9	31 0.0	30 0.0	22 31.0		
38	14 22.9	30 0.0	14 23.0	30 0.0	14 23.0	30 0.0	14 23.5	30 0.0	15 22.2	30 0.0	15 20.3	12 31.3	
36	30 0.0	15 20.6	31 0.0	14 23.3	30 0.0	14 23.4	31 0.0	14 23.1	31 0.0	16 18.1	31 0.0	16 12.7	12 34.6
34	14 23.6	30 0.0	14 22.9	30 0.0	14 23.2	30 0.0	14 23.0	30 0.0	14 23.0	31 0.0	31 0.0	30 0.0	10 33.5
32	30 0.0	14 22.7	30 0.0	14 22.9	31 0.0	14 22.9	31 0.0	15 22.3	30 0.0	15 20.8	30 0.0	16 17.0	12 29.9
30	14 22.9	30 0.0	14 22.9	30 0.0	15 20.9	30 0.0	14 23.0	31 0.0	14 23.5	30 0.0	14 22.8	30 0.0	10 29.9
28	10 33.6	14 23.2	30 0.0	14 23.6	30 0.0	14 22.9	31 0.0	14 23.6	30 0.0	14 22.4	31 0.0	15 21.5	12 35.5

Fuel Type	Description	Cycle Loaded	No. Per Quarter core
10	GE14-P10DNAB413-16GZ	15	4
11	GE14-P10DNAB429-18GZ	15	3
12	GE14-P10DNAB437-12G6	15	8
14	GE14-P10DNAB407-16GZ	16	37
15	GE14-P10DNAB425-18GZ	16	15
16	GE14-P10DNAB437-12G6	16	10
22	GE14-P10DNAB416-17GZ	14	1
30	[]	17	38
31	[]	17	24

**Figure 3.3 Brunswick Unit 1 Cycle 17 Upper Right Quarter Core
Layout by Fuel Type**

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

	1	3	5	7	9	11	13	15	17	19	21	23	25
26	12 35.4	15 18.3	31 0.0	14 17.7	30 0.0	14 22.9	31 0.0	14 21.8	30 0.0	14 23.4	30 0.0	14 22.8	10 32.9
24	12 34.1	30 0.0	14 22.6	30 0.0	14 22.9	31 0.0	14 20.7	30 0.0	15 21.0	30 0.0	14 21.9	30 0.0	14 22.4
22	12 30.2	16 15.5	30 0.0	15 20.0	30 0.0	15 21.0	31 0.0	14 23.0	31 0.0	14 22.5	30 0.0	14 22.5	30 0.0
20	10 34.1	30 0.0	31 0.0	31 0.0	14 22.5	30 0.0	14 22.1	30 0.0	14 23.2	30 0.0	14 22.9	30 0.0	14 22.7
18	12 30.7	16 17.8	31 0.0	15 20.9	31 0.0	14 22.0	31 0.0	14 23.0	30 0.0	14 21.8	31 0.0	15 20.5	30 0.0
16		12 36.6	16 18.2	30 0.0	15 18.7	30 0.0	14 22.7	30 0.0	14 22.7	30 0.0	14 22.0	30 0.0	14 22.9
14			12 18.4	30 0.0	31 0.0	14 22.5	30 0.0	14 22.8	31 0.0	14 23.0	31 0.0	14 22.9	31 0.0
12			16 19.1	30 0.0	15 17.9	31 0.0	15 22.3	30 0.0	14 23.0	30 0.0	15 22.4	31 0.0	14 23.1
10			11 37.4	16 17.2	31 0.0	15 19.0	31 0.0	14 23.0	31 0.0	14 23.0	30 0.0	14 23.1	30 0.0
8				12 38.0	16 17.1	30 0.0	30 0.0	30 0.0	16 18.5	31 0.0	15 20.3	30 0.0	14 22.5
6					11 35.9	16 19.3	15 17.3	15 11.2	31 0.0	31 0.0	30 0.0	14 22.4	31 0.0
4	Nuclear Fuel Type BOC Exposure (GWd/MTU)							22 34.4	16 14.3	30 0.0	16 17.3	30 0.0	15 20.8
2									12 34.4	14 21.4	12 29.9	12 30.5	12 31.8

Fuel Type	Description	Cycle Loaded	No. Per Quarter core
10	GE14-P10DNAB413-16GZ	15	2
11	GE14-P10DNAB429-18GZ	15	2
12	GE14-P10DNAB437-12G6	15	11
14	GE14-P10DNAB407-16GZ	16	37
15	GE14-P10DNAB425-18GZ	16	15
16	GE14-P10DNAB437-12G6	16	10
22	GE14-P10DNAB416-17GZ	14	1
30	[]	17	38
31	[]	17	24

**Figure 3.4 Brunswick Unit 1 Cycle 17 Lower Left Quarter Core
Layout by Fuel Type**

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

	27	29	31	33	35	37	39	41	43	45	47	49	51
26	10 34.2	14 23.2	30 0.0	14 23.5	30 0.0	14 22.8	31 0.0	14 23.5	30 0.0	14 22.4	31 0.0	15 21.3	12 35.3
24	14 22.8	30 0.0	14 22.8	30 0.0	15 21.0	30 0.0	14 23.0	31 0.0	14 23.5	30 0.0	14 22.8	30 0.0	12 34.6
22	30 0.0	14 22.6	30 0.0	14 22.9	31 0.0	14 23.1	31 0.0	15 22.4	30 0.0	15 20.5	30 0.0	16 17.1	12 30.6
20	14 23.6	30 0.0	14 23.0	30 0.0	14 23.3	30 0.0	14 23.0	30 0.0	14 23.0	31 0.0	31 0.0	30 0.0	14 22.0
18	30 0.0	15 20.5	31 0.0	14 23.3	30 0.0	14 23.3	31 0.0	14 23.1	31 0.0	16 18.1	31 0.0	16 15.4	12 35.4
16	14 23.0	30 0.0	14 23.0	30 0.0	14 23.1	30 0.0	14 23.4	30 0.0	15 22.2	30 0.0	15 20.3	12 34.4	
14	31 0.0	14 22.9	31 0.0	14 23.1	31 0.0	14 23.0	30 0.0	14 22.9	31 0.0	30 0.0	22 32.7		
12	14 23.3	31 0.0	15 22.4	30 0.0	14 23.0	30 0.0	15 22.3	31 0.0	15 18.9	30 0.0	16 19.4		
10	30 0.0	14 23.3	30 0.0	14 23.2	31 0.0	14 23.1	31 0.0	15 19.0	31 0.0	16 17.2	12 38.6		
8	14 22.5	30 0.0	15 20.4	31 0.0	16 18.4	30 0.0	30 0.0	30 0.0	16 17.1	12 38.6			
6	31 0.0	14 22.6	30 0.0	31 0.0	31 0.0	15 20.5	15 17.4	16 19.3	11 38.6				
4	15 21.0	30 0.0	16 17.2	30 0.0	16 18.0	10 34.4	Nuclear Fuel Type BOC Exposure (GWd/MTU)						
2	12 35.2	12 31.4	10 26.6	14 21.7	11 33.8								

Fuel Type	Description	Cycle Loaded	No. Per Quarter core
10	GE14-P10DNAB413-16GZ	15	3
11	GE14-P10DNAB429-18GZ	15	2
12	GE14-P10DNAB437-12G6	15	9
14	GE14-P10DNAB407-16GZ	16	38
15	GE14-P10DNAB425-18GZ	16	15
16	GE14-P10DNAB437-12G6	16	10
22	GE14-P10DNAB416-17GZ	14	1
30	[]	17	38
31	[]	17	24

**Figure 3.5 Brunswick Unit 1 Cycle 17 Lower Right Quarter Core
Layout by Fuel Type**

4.0 References

1. EMF-2158(P)(A) Revision 0, *Siemens Power Corporation Methodology for Boiling Water Reactors: Evaluation and Validation of CASMO-4/MICROBURN-B2*, Siemens Power Corporation, October, 1999.
2. EMF-2209(P)(A) Revision 2, *SPCB Critical Power Correlation*, Framatome ANP, September 2003.

**Appendix A Brunswick Unit 1 Cycle 17 Step-through Depletion Summary, Control Rod
Patterns and Core Average Axial Power and Exposure Distributions**

Table A.1 Brunswick Unit 1 Cycle 17 Design Depletion Summary

Cycle Exposure (Gwd/MT)	Calculated K-eff	Control Rod Density	Total Core Power MWt	Total Core Flow (Mlb/hr)	Ref. Pressure (psia)	Inlet Sub- Cooling (Btu/lb)	Void Fraction	Core Minimum CPR	Core Maximum LHGR (kW/ft)	Core Maximum APLHGR (kW/ft)
0.000	1.00274	7.30	2923.0	76.23	1044.65	21.56	0.505	1.480	11.86	9.03
0.200	1.00220	7.30	2923.0	76.31	1044.65	21.54	0.502	1.487	11.50	8.80
0.500	1.00174	7.30	2923.0	80.46	1044.70	20.29	0.488	1.521	11.32	8.81
1.000	1.00145	7.30	2923.0	80.23	1044.70	20.35	0.487	1.523	11.26	8.82
1.500	1.00094	7.30	2923.0	78.23	1044.68	20.94	0.488	1.507	11.15	8.79
2.000	1.00060	7.30	2923.0	76.77	1044.66	21.39	0.489	1.495	11.03	8.75
2.500	1.00026	7.30	2923.0	76.23	1044.65	21.56	0.487	1.493	10.92	8.72
2.501	1.00014	7.24	2923.0	80.46	1044.70	20.29	0.483	1.572	11.54	8.70
3.000	0.99975	7.24	2923.0	79.31	1044.69	20.61	0.483	1.560	11.23	8.55
3.500	0.99914	7.24	2923.0	77.69	1044.67	21.10	0.484	1.543	11.03	8.49
4.000	0.99874	7.24	2923.0	76.69	1044.65	21.42	0.484	1.534	10.84	8.51
4.500	0.99855	7.24	2923.0	76.23	1044.65	21.56	0.483	1.527	10.65	8.54
4.501	0.99823	7.48	2923.0	80.08	1044.70	20.40	0.478	1.569	10.86	8.51
5.000	0.99807	7.48	2923.0	79.46	1044.69	20.57	0.477	1.560	10.68	8.46
5.001	0.99790	7.30	2923.0	80.46	1044.70	20.28	0.486	1.585	10.88	8.72
5.500	0.99744	7.30	2923.0	79.00	1044.69	20.71	0.487	1.563	10.75	8.68
6.000	0.99714	7.30	2923.0	77.77	1044.67	21.08	0.488	1.540	10.65	8.67
6.500	0.99683	7.30	2923.0	76.23	1044.65	21.56	0.490	1.516	10.59	8.66
6.501	0.99667	7.54	2923.0	79.77	1044.69	20.49	0.485	1.558	10.76	8.77
7.000	0.99611	7.54	2923.0	77.23	1044.66	21.24	0.490	1.524	10.75	8.83
7.500	0.99612	7.54	2923.0	76.23	1044.65	21.56	0.491	1.505	10.74	8.91
7.501	0.99543	7.54	2923.0	80.46	1044.70	20.29	0.489	1.502	10.99	9.02
8.000	0.99526	7.54	2923.0	78.69	1044.68	20.80	0.492	1.490	11.01	9.12
8.500	0.99494	7.54	2923.0	76.23	1044.65	21.56	0.498	1.468	11.11	9.31
9.000	0.99554	7.54	2923.0	76.23	1044.65	21.56	0.498	1.468	11.16	9.43
9.001	0.99507	7.91	2923.0	80.46	1044.70	20.29	0.493	1.489	11.44	9.68
9.500	0.99500	7.91	2923.0	78.31	1044.68	20.91	0.499	1.471	11.53	9.83
10.000	0.99499	7.91	2923.0	76.46	1044.65	21.49	0.504	1.457	11.61	9.98
10.001	0.99520	9.61	2923.0	80.16	1044.70	20.37	0.476	1.483	10.23	8.93
10.500	0.99506	9.61	2923.0	78.15	1044.67	20.96	0.481	1.472	10.09	8.86
11.000	0.99531	9.61	2923.0	77.54	1044.67	21.15	0.482	1.473	9.99	8.82
11.500	0.99519	9.61	2923.0	76.23	1044.65	21.56	0.484	1.456	9.89	8.76
12.000	0.99535	9.61	2923.0	76.23	1044.65	21.56	0.483	1.452	9.82	8.73
12.500	0.99575	9.61	2923.0	77.00	1044.66	21.32	0.479	1.454	9.74	8.69
12.501	0.99608	8.03	2923.0	76.23	1044.65	21.56	0.500	1.471	11.27	9.85
13.000	0.99612	8.03	2923.0	76.46	1044.65	21.49	0.496	1.467	10.85	9.50
13.500	0.99626	8.03	2923.0	77.31	1044.66	21.23	0.489	1.470	10.36	9.12
14.000	0.99687	8.03	2923.0	79.93	1044.70	20.44	0.475	1.484	9.82	8.66
14.001	0.99693	7.79	2923.0	76.23	1044.65	21.56	0.480	1.457	9.67	8.53
14.500	0.99736	7.79	2923.0	78.77	1044.68	20.78	0.466	1.470	9.13	8.22
14.700	0.99735	7.79	2923.0	79.39	1044.69	20.59	0.462	1.471	9.23	8.30
14.701	0.99754	7.66	2923.0	77.39	1044.66	21.20	0.464	1.461	9.43	8.44
15.000	0.99776	7.66	2923.0	79.31	1044.69	20.62	0.454	1.473	9.57	8.57
15.001	0.99781	6.69	2923.0	76.23	1044.65	21.56	0.478	1.465	9.54	8.63
15.500	0.99803	6.69	2923.0	80.16	1044.70	20.38	0.459	1.494	9.51	8.60
15.501	0.99830	6.08	2923.0	76.23	1044.65	21.56	0.471	1.493	10.11	9.17
16.000	0.99841	6.08	2923.0	80.46	1044.70	20.29	0.452	1.526	10.11	9.16
16.001	0.99868	4.62	2923.0	76.23	1044.65	21.56	0.471	1.511	8.47	7.60
16.500	0.99862	4.62	2923.0	80.46	1044.70	20.29	0.451	1.544	8.48	7.64
16.501	0.99909	4.38	2923.0	77.39	1044.66	21.20	0.453	1.507	9.05	8.20
16.900	0.99868	4.38	2923.0	80.46	1044.70	20.28	0.440	1.535	9.22	8.32
16.901	0.99894	4.14	2923.0	77.00	1044.66	21.31	0.444	1.501	9.56	8.68
17.200	0.99884	4.14	2923.0	80.46	1044.70	20.29	0.431	1.532	9.65	8.74
17.201	0.99912	3.89	2923.0	77.39	1044.66	21.20	0.435	1.506	9.89	9.03
17.500	0.99868	3.89	2923.0	80.46	1044.70	20.28	0.424	1.535	9.91	9.03
17.501	0.99877	2.19	2923.0	77.00	1044.66	21.31	0.455	1.510	8.62	7.76
17.750	0.99865	2.19	2923.0	80.46	1044.70	20.29	0.443	1.543	8.66	7.81
17.751	0.99905	1.95	2923.0	77.85	1044.67	21.05	0.446	1.515	8.83	7.80
18.000	0.99870	1.95	2923.0	80.46	1044.70	20.28	0.435	1.541	8.92	7.88
18.001	0.99891	1.70	2923.0	77.77	1044.67	21.08	0.440	1.519	9.66	8.62
18.200	0.99870	1.70	2923.0	80.46	1044.70	20.28	0.431	1.542	9.70	8.63
18.201	0.99911	0.00	2923.0	76.23	1044.65	21.56	0.457	1.520	9.16	8.19
18.500	0.99871	0.00	2923.0	80.46	1044.70	20.29	0.442	1.571	9.16	8.19
18.501	0.99887	0.00	2923.0	76.23	1038.04	25.65	0.439	1.556	9.04	8.08
18.909	0.99910	0.00	2923.0	76.23	1028.03	32.12	0.410	1.610	8.93	7.98
19.155	0.99910	0.00	2923.0	80.46	1028.07	30.30	0.396	1.648	8.99	8.05
19.360	0.99905	0.00	2840.5	80.46	1024.16	29.29	0.387	1.694	8.77	7.86
20.265	0.99906	0.00	2450.2	80.46	1006.69	24.61	0.343	1.943	7.64	6.87

**Table A.2 Brunswick Unit 1 Cycle 17 Design Depletion Thermal
Margin Summary**

Cycle Exposure (GWD/MT)	Calculated K-eff	Control Rod Density	Core Limiting CPR	Fraction of Limiting CPR	Core Limiting LHGR (kW/ft)	Fraction of Limiting LHGR	Core Limiting APLHGR (kW/ft)	Fraction of Limiting APLHGR
0.000	1.00274	7.299	1.480	0.912	11.86	0.885	8.54	0.808
0.200	1.00220	7.299	1.487	0.908	11.50	0.858	8.55	0.810
0.500	1.00174	7.299	1.521	0.888	11.32	0.845	8.55	0.814
1.000	1.00145	7.299	1.523	0.886	11.26	0.840	8.50	0.813
1.500	1.00094	7.299	1.507	0.896	11.15	0.832	8.40	0.809
2.000	1.00060	7.299	1.495	0.903	11.03	0.823	8.28	0.803
2.500	1.00026	7.299	1.493	0.904	10.92	0.815	8.20	0.799
2.501	1.00014	7.238	1.572	0.859	11.54	0.861	8.44	0.798
3.000	0.99975	7.238	1.560	0.866	11.23	0.838	8.48	0.800
3.500	0.99914	7.238	1.543	0.875	11.03	0.823	8.49	0.805
4.000	0.99874	7.238	1.534	0.880	10.84	0.809	8.51	0.813
4.500	0.99855	7.238	1.527	0.884	9.29	0.811	8.54	0.821
4.501	0.99823	7.482	1.569	0.860	10.86	0.810	7.54	0.776
5.000	0.99807	7.482	1.560	0.865	10.68	0.797	8.11	0.778
5.001	0.99790	7.299	1.585	0.852	9.02	0.813	8.05	0.803
5.500	0.99744	7.299	1.563	0.864	8.91	0.810	7.95	0.799
6.000	0.99714	7.299	1.540	0.877	8.82	0.810	7.87	0.797
6.500	0.99683	7.299	1.516	0.891	8.74	0.810	7.80	0.796
6.501	0.99667	7.543	1.558	0.866	8.85	0.820	7.90	0.806
7.000	0.99611	7.543	1.524	0.886	8.75	0.819	7.82	0.804
7.500	0.99612	7.543	1.505	0.897	8.68	0.821	7.54	0.808
7.501	0.99543	7.543	1.502	0.899	8.28	0.823	7.71	0.819
8.000	0.99526	7.543	1.490	0.906	8.26	0.829	7.72	0.826
8.500	0.99494	7.543	1.468	0.920	8.27	0.838	7.76	0.837
9.000	0.99554	7.543	1.468	0.920	8.27	0.846	7.79	0.847
9.001	0.99507	7.908	1.489	0.907	8.48	0.868	7.99	0.869
9.500	0.99500	7.908	1.471	0.918	8.49	0.878	8.03	0.879
10.000	0.99499	7.908	1.457	0.927	8.47	0.885	8.35	0.889
10.001	0.99520	9.611	1.483	0.910	8.73	0.845	7.81	0.824
10.500	0.99506	9.611	1.472	0.917	8.59	0.839	7.69	0.818
11.000	0.99531	9.611	1.473	0.916	8.48	0.837	7.59	0.814
11.500	0.99519	9.611	1.456	0.927	8.36	0.834	7.50	0.810
12.000	0.99535	9.611	1.452	0.930	8.28	0.834	7.43	0.809
12.500	0.99575	9.611	1.454	0.928	8.20	0.834	7.36	0.808
12.501	0.99608	8.029	1.471	0.918	11.24	0.880	7.74	0.877
13.000	0.99612	8.029	1.467	0.920	10.85	0.854	7.42	0.848
13.500	0.99626	8.029	1.470	0.919	10.31	0.820	7.03	0.817
14.000	0.99687	8.029	1.484	0.910	9.82	0.780	6.71	0.780
14.001	0.99693	7.786	1.457	0.927	7.81	0.780	7.11	0.768
14.500	0.99736	7.786	1.470	0.919	8.00	0.806	7.30	0.795
14.700	0.99735	7.786	1.471	0.917	8.06	0.816	7.36	0.804
14.701	0.99754	7.664	1.461	0.924	8.19	0.829	8.01	0.828
15.000	0.99776	7.664	1.473	0.917	8.29	0.844	8.08	0.838
15.001	0.99781	6.691	1.465	0.922	8.73	0.850	7.91	0.838
15.500	0.99803	6.691	1.494	0.904	8.69	0.855	7.89	0.842
15.501	0.99830	6.083	1.493	0.904	8.85	0.892	7.84	0.857
16.000	0.99841	6.083	1.526	0.885	8.79	0.896	7.91	0.859
16.001	0.99868	4.623	1.511	0.894	6.99	0.729	6.72	0.708
16.500	0.99862	4.623	1.544	0.907	5.64	0.757	6.95	0.738
16.501	0.99909	4.380	1.507	0.929	7.87	0.807	7.42	0.798
16.900	0.99868	4.380	1.535	0.912	7.98	0.825	7.51	0.812
16.901	0.99894	4.136	1.501	0.933	8.27	0.865	7.82	0.853
17.200	0.99884	4.136	1.532	0.914	8.32	0.876	7.86	0.861
17.201	0.99912	3.893	1.506	0.930	8.56	0.906	8.15	0.894
17.500	0.99868	3.893	1.535	0.912	8.56	0.912	8.14	0.897
17.501	0.99877	2.190	1.510	0.927	7.27	0.780	6.99	0.766
17.750	0.99865	2.190	1.543	0.907	7.32	0.789	7.04	0.774
17.751	0.99905	1.946	1.515	0.924	7.40	0.798	6.70	0.781
18.000	0.99870	1.946	1.541	0.908	5.24	0.805	6.77	0.788
18.001	0.99891	1.703	1.519	0.921	8.42	0.881	7.67	0.864
18.200	0.99870	1.703	1.542	0.908	8.42	0.885	7.67	0.867
18.201	0.99911	0.000	1.520	0.921	5.51	0.833	6.90	0.790
18.500	0.99871	0.000	1.571	0.891	5.48	0.848	6.90	0.793
18.501	0.99887	0.000	1.556	0.912	5.42	0.840	6.82	0.784
18.909	0.99910	0.000	1.610	0.901	5.37	0.858	6.76	0.782
19.155	0.99910	0.000	1.648	0.880	5.37	0.875	6.81	0.791
19.360	0.99905	0.000	1.694	0.856	5.22	0.865	6.64	0.785
20.265	0.99906	0.000	1.943	0.746	4.48	0.800	5.92	0.758

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: Mwd/MTU	13166.4
Exposure: Mwd/MTU (Gwd)	0.0 (0.00)		
Delta E: Mwd/MTU, (Gwd)	0.0 (0.00)		
Power: MWt	2923.0 (100.00 %)		
Core Pressure: psia	1044.6		
Inlet Subcooling: Btu/lbm	-21.56		
Flow: Mlb/hr	76.23 (99.00 %)		
		Axial Profile	Edit Radial Power
		N(PRA) Power Exposure	Zone Avg. Max. IR JR
		Top 25	0.102 1.972 10 0.762 1.235 25 28
		24	0.350 5.812 11 0.445 0.552 15 50
		23	0.489 8.212 12 0.515 0.774 5 14
		22	0.597 10.420 14 1.110 1.342 23 28
		21	0.692 11.955 15 1.021 1.223 17 30
		20	0.774 12.913 16 0.787 1.084 17 46
		19	0.846 13.499 22 0.570 0.607 47 40
		18	0.907 13.860 30 1.077 1.361 23 30
		17	0.969 14.097 31 1.072 1.232 13 32
		16	1.041 13.361
		15	1.103 13.667
		14	1.214 13.937
		13	1.265 14.434
		12	1.301 14.933
		11	1.341 15.340
		10	1.382 15.671
		9	1.418 15.918
		8	1.433* 16.270
		7	1.416 16.688
		6	1.407 17.103
		5	1.389 17.357*
		4	1.328 17.080
		3	1.167 15.434
		2	0.857 11.499
		Bottom 1	0.215 3.148
			% AXIAL TILT -23.464 -13.188
			AVG BOT 8ft/12ft 1.1612 1.0719
Control Rod Density: %	7.30		
k-effective:	1.00274		
Void Fraction:	0.505		
Core Delta-P: psia	23.643		
Core Plate Delta-P: psia	19.112		
Coolant Temp: Deg-F	548.5		
In Channel Flow: Mlb/hr	63.90	Active Channel Flow: Mlb/hr	63.90
Total Bypass Flow (%):	16.2	(of total core flow)	
Total Water Rod Flow (%):	-0.0	(of total core flow)	
Source Convergence	0.00036		

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	Value	Margin	Exp.	FT	IR	Value	Margin	Exp.
1.361	30	23	30	1.480	0.912	30	23	8.54	0.808	26.4	14	17	11.86	0.885	0.0
1.342	14	23	28	1.485	0.909	30	13	8.39	0.808	28.9	14	25	11.55	0.862	0.0
1.340	14	25	30	1.496	0.902	14	25	8.39	0.806	28.6	14	23	11.50	0.858	0.0
1.306	30	21	28	1.502	0.899	30	21	8.46	0.805	27.2	14	11	11.43	0.853	0.0
1.300	30	25	32	1.505	0.897	30	9	8.32	0.786	26.2	14	9	11.41	0.851	0.0
1.292	30	21	32	1.507	0.896	31	13	8.30	0.786	26.6	14	19	11.31	0.844	0.0
1.281	14	21	30	1.508	0.895	30	11	7.56	0.777	37.6	10	25	11.27	0.841	0.0
1.279	14	23	32	1.509	0.894	14	23	7.96	0.765	28.7	14	23	9.17	0.821	35.7
1.260	30	15	30	1.514	0.891	31	13	7.90	0.762	29.2	14	31	9.14	0.821	35.9
1.257	30	19	30	1.518	0.890	30	15	7.85	0.761	26.9	15	13	10.95	0.817	0.0

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

Figure A.1 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 0.0 Mwd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: MWd/MTU	13366.4
Exposure: MWd/MTU (GWd)	200.0 (20.02)		
Delta E: MWd/MTU, (GWd)	200.0 (20.02)		
Power: MWt	2923.0 (100.00 %)		
Core Pressure: psia	1044.6		
Inlet Subcooling: Btu/lbm	-21.54		
Flow: Mlb/hr	76.31 (99.10 %)		
		Axial Profile	Edit Radial Power
		N(PRA) Power Exposure	Zone Avg. Max. IR JR
		Top 25	0.104 1.997 10 0.763 1.236 25 28
		24	0.358 5.887 11 0.447 0.553 15 50
		23	0.500 8.317 12 0.517 0.777 5 14
		22	0.609 10.548 14 1.112 1.344 23 28
		21	0.705 12.104 15 1.023 1.225 17 30
		20	0.788 13.080 16 0.789 1.085 17 46
		19	0.859 13.682 22 0.571 0.608 47 40
		18	0.919 14.056 30 1.074 1.357 23 30
		17	0.981 14.306 31 1.070 1.230 13 32
		16	1.052 13.576
		15	1.113 13.895
		14	1.223 14.166
		13	1.273 14.672
		12	1.308 15.178
		11	1.346 15.593
		10	1.385 15.931
		9	1.417 16.185
		8	1.429* 16.540
		7	1.406 16.955
		6	1.388 17.368
		5	1.362 17.619*
		4	1.296 17.330
		3	1.136 15.654
		2	0.834 11.661
		Bottom 1	0.209 3.189
			% AXIAL TILT -22.365 -13.253
			AVG BOT 8ft/12ft 1.1555 1.0725
Control Rod Density: %	7.30		
k-effective:	1.00220		
Void Fraction:	0.502		
Core Delta-P: psia	23.626		
Core Plate Delta-P: psia	19.096		
Coolant Temp: Deg-F	548.5		
In Channel Flow: Mlb/hr	63.99	Active Channel Flow: Mlb/hr	63.99
Total Bypass Flow (%):	16.1	(of total core flow)	
Total Water Rod Flow (%):	-0.0	(of total core flow)	
Source Convergence	0.00036		

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	Value	Margin	Exp. FT	IR	Value	Margin	Exp. FT	IR
1.357	30	23	30	1.487	0.908	30	23	8.55	0.810	26.8	14	11.50	0.858	0.5	30
1.344	14	23	28	1.490	0.906	14	25	8.46	0.807	27.6	14	11.35	0.847	0.5	30
1.342	14	25	30	1.496	0.902	30	13	8.21	0.792	29.2	14	11.33	0.845	0.5	30
1.302	30	21	28	1.503	0.898	14	23	8.21	0.791	29.0	14	11.23	0.838	0.5	31
1.297	30	25	32	1.513	0.892	30	21	8.32	0.788	26.6	14	11.19	0.835	0.5	30
1.288	30	21	32	1.515	0.891	30	9	8.29	0.787	26.9	14	11.19	0.835	0.5	31
1.282	14	21	30	1.518	0.889	31	13	7.40	0.762	38.0	10	11.15	0.832	0.5	30
1.280	14	23	32	1.519	0.889	30	11	7.77	0.755	27.2	15	8.95	0.807	36.3	14
1.257	30	15	30	1.523	0.886	30	21	7.83	0.754	29.1	14	8.96	0.806	36.1	14
1.254	30	19	30	1.524	0.886	31	13	7.77	0.753	26.6	15	9.24	0.805	32.9	14

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

Figure A.2 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 200.0 MWd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: MWd/MTU	13666.4
Exposure: MWd/MTU (Gwd)	500.0 (50.05)		
Delta E: MWd/MTU, (Gwd)	300.0 (30.03)		
Power: MWt	2923.0 (100.00 %)		
Core Pressure: psia	1044.7		
Inlet Subcooling: Btu/lbm	-20.29		
Flow: Mlb/hr	80.46 (104.50 %)		
		Axial Profile	Edit Radial Power
		N(PRA) Power Exposure	Zone Avg. Max. IR JR
		Top 25	10 0.761 1.234 25 28
		24	11 0.446 0.552 15 50
		23	12 0.516 0.777 5 14
		22	14 1.114 1.343 23 28
		21	15 1.025 1.228 17 30
		20	16 0.790 1.088 17 46
		19	22 0.569 0.606 47 40
		18	30 1.073 1.353 23 30
		17	31 1.069 1.230 13 32
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		Bottom 1	
		0.198	3.249
		% AXIAL TILT -20.420 -13.322	
		AVG BOT 8ft/12ft 1.1453 1.0734	
Control Rod Density: %	7.30		
k-effective:	1.00174		
Void Fraction:	0.488		
Core Delta-P: psia	25.391		
Core Plate Delta-P: psia	20.859		
Coolant Temp: Deg-F	548.5		
In Channel Flow: Mlb/hr	67.67	Active Channel Flow: Mlb/hr	67.67
Total Bypass Flow (%):	15.9	(of total core flow)	
Total Water Rod Flow (%):	-0.0	(of total core flow)	
Source Convergence	0.00044		

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	Value	Margin	Exp. FT	IR	Value	Margin	Exp. FT	IR
1.353	30	23	30	1.521	0.888	14	25	8.55	0.814	27.3	14	11.32	0.845	1.2	30
1.343	14	23	28	1.527	0.884	30	23	8.47	0.810	28.1	14	11.30	0.843	1.2	30
1.341	14	25	30	1.534	0.880	14	23	8.34	0.793	27.1	14	11.19	0.835	1.2	31
1.299	30	21	28	1.538	0.878	30	13	8.31	0.792	27.5	14	11.16	0.833	1.2	31
1.293	30	25	32	1.553	0.869	30	9	7.91	0.768	30.0	14	11.00	0.821	1.3	30
1.285	30	21	32	1.553	0.869	30	21	7.89	0.766	30.3	14	9.24	0.809	33.4	14
1.284	14	21	30	1.558	0.866	30	11	7.81	0.758	27.1	15	10.76	0.803	1.2	30
1.281	14	23	32	1.559	0.866	31	13	7.79	0.757	27.1	15	9.18	0.801	33.0	14
1.256	30	15	30	1.565	0.863	31	13	7.91	0.756	27.9	14	10.72	0.800	1.2	30
1.251	30	19	30	1.565	0.863	30	21	7.78	0.753	26.1	15	10.72	0.800	1.2	30

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

Figure A.3 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 500.0 MWd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: Mwd/MTU	14166.5
Exposure: Mwd/MTU (Gwd)	1000.0 (100.10)		
Delta E: Mwd/MTU, (Gwd)	500.0 (50.05)		
Power: MWt	2923.0 (100.00 %)		
Core Pressure: psia	1044.7		
Inlet Subcooling: Btu/lbm	-20.35		
Flow: Mlb/hr	80.23 (104.20 %)		
		Axial Profile	Edit Radial Power
		N(PRA) Power Exposure	Zone Avg. Max. IR JR
		Top 25	10 0.756 1.225 25 28
		24	11 0.444 0.552 15 50
		23	12 0.513 0.777 5 14
		22	14 1.112 1.333 23 28
		21	15 1.025 1.231 11 32
		20	16 0.788 1.088 17 46
		19	22 0.567 0.602 47 40
		18	30 1.075 1.352 23 30
		17	31 1.072 1.240 13 32
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Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: MWd/MTU	14666.5
Exposure: MWd/MTU (Gwd)	1500.0 (150.15)		
Delta E: MWd/MTU, (Gwd)	500.0 (50.05)		
Power: MWt	2923.0 (100.00 %)		
Core Pressure: psia	1044.7		
Inlet Subcooling: Btu/lbm	-20.94		
Flow: Mlb/hr	78.23 (101.60 %)		
		Axial Profile	Edit Radial Power
		N(PRA) Power Exposure Zone Avg. Max. IR JR	
		Top 25	10 0.751 1.213 25 28
		24	11 0.443 0.553 15 50
		23	12 0.512 0.777 5 14
		22	14 1.108 1.321 23 28
		21	15 1.024 1.234 11 32
		20	16 0.788 1.088 17 46
		19	22 0.567 0.601 47 40
		18	30 1.077 1.349 23 30
		17	31 1.075 1.247 13 32
		16	15 1.086 15.011
		15	14 1.144 15.410
		14	13 1.257 15.687
		13	12 1.302 16.253
		12	11 1.330 16.799
		11	10 1.359 17.256
		10	9 1.388 17.637
		9	8 1.408* 17.924
		8	7 1.405 18.283
		7	6 1.366 18.658
		6	5 1.330 19.036
		5	4 1.282 19.238*
		4	3 1.197 18.853
		3	2 1.035 16.978
		2	1 0.757 12.631
		Bottom 1	0.194 3.438
			% AXIAL TILT -18.591 -13.369
			AVG BOT 8ft/12ft 1.1357 1.0752
Control Rod Density: %	7.30		
k-effective:	1.00094		
Void Fraction:	0.488		
Core Delta-P: psia	24.318		
Core Plate Delta-P: psia	19.787		
Coolant Temp: Deg-F	548.4		
In Channel Flow: Mlb/hr	65.76	Active Channel Flow: Mlb/hr	65.76
Total Bypass Flow (%):	15.9	(of total core flow)	
Total Water Rod Flow (%):	-0.0	(of total core flow)	
Source Convergence	0.00043		

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	Value	Margin	Exp.	FT	Value	Margin	Exp.	FT
1.349	30	23	30	1.507	0.896	30	23	8.40	0.809	28.9	14	11.15	0.832	3.7	30
1.321	14	23	28	1.522	0.887	14	25	8.32	0.806	29.9	14	11.11	0.829	3.7	30
1.319	14	25	30	1.526	0.885	30	13	8.21	0.789	28.8	14	11.02	0.823	3.7	31
1.299	30	21	28	1.535	0.880	31	13	8.15	0.786	29.2	14	10.97	0.819	3.7	31
1.292	30	25	32	1.535	0.879	14	23	8.20	0.770	27.6	14	9.00	0.804	35.3	14
1.289	30	21	32	1.537	0.878	30	9	7.71	0.757	28.7	15	9.25	0.800	32.2	14
1.274	14	21	30	1.541	0.876	31	13	7.68	0.754	28.7	15	9.26	0.795	31.4	15
1.269	30	15	30	1.541	0.876	30	11	7.78	0.753	29.6	14	8.93	0.795	35.1	15
1.269	14	23	32	1.544	0.874	30	21	7.74	0.749	29.6	14	10.62	0.792	3.6	30
1.259	30	19	30	1.545	0.874	30	21	7.77	0.747	28.8	14	8.89	0.792	35.2	14

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

Figure A.5 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 1,500.0 MWd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: MWd/MTU	15166.5
Exposure: MWd/MTU (Gwd)	2000.0 (200.20)		
Delta E: MWd/MTU, (Gwd)	500.0 (50.05)		
Power: MWt	2923.0 (100.00 %)		
Core Pressure: psia	1044.7		
Inlet Subcooling: Btu/lbm	-21.39		
Flow: Mlb/hr	76.77 (99.70 %)		
		Axial Profile	Edit Radial Power
		N(PRA) Power Exposure	Zone Avg. Max. IR JR
		Top 25	0.119 2.242 10 0.746 1.201 25 28
		24	0.402 6.616 11 0.442 0.555 15 50
		23	0.558 9.333 12 0.511 0.777 5 14
		22	0.671 11.783 14 1.105 1.310 23 28
		21	0.768 13.526 15 1.023 1.236 11 32
		20	0.849 14.661 16 0.787 1.088 17 46
		19	0.917 15.400 22 0.566 0.600 47 40
		18	0.973 15.888 30 1.080 1.346 23 30
		17	1.030 16.255 31 1.079 1.254 13 32
		16	1.095 15.572
		15	1.150 16.001
		14	1.262 16.279
		13	1.305 16.867
		12	1.331 17.426
		11	1.357 17.897
		10	1.381 18.291
		9	1.398* 18.587
		8	1.392 18.945
		7	1.351 19.302
		6	1.311 19.663
		5	1.260 19.843*
		4	1.174 19.418
		3	1.013 17.465
		2	0.743 12.988
		Bottom 1	0.191 3.530
			% AXIAL TILT -17.331 -13.342
			AVG BOT 8ft/12ft 1.1281 1.0758
Control Rod Density: %	7.30		
k-effective:	1.00060		
Void Fraction:	0.489		
Core Delta-P: psia	23.623		
Core Plate Delta-P: psia	19.093		
Coolant Temp: Deg-F	548.4		
In Channel Flow: Mlb/hr	64.51	Active Channel Flow: Mlb/hr	64.51
Total Bypass Flow (%):	16.0	(of total core flow)	
Total Water Rod Flow (%):	-0.0	(of total core flow)	
Source Convergence	0.00047		

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	Value	Margin	Exp. FT	IR	Value	Margin	Exp. FT	IR
1.346	30	23	30	1.495	0.903	30	23	8.28	0.803	30.0	14	11.03	0.823	4.9	30
1.310	14	23	28	1.519	0.889	14	25	8.22	0.802	30.8	14	10.98	0.819	4.9	30
1.308	14	25	30	1.524	0.886	30	13	8.12	0.786	29.7	14	10.91	0.814	4.9	31
1.299	30	21	28	1.528	0.884	31	13	8.07	0.782	29.7	14	10.84	0.809	4.8	31
1.290	30	25	32	1.530	0.882	30	21	8.21	0.777	28.4	14	9.15	0.799	33.1	14
1.290	30	21	32	1.531	0.882	30	9	7.69	0.756	29.0	15	8.85	0.797	36.3	14
1.274	30	15	30	1.532	0.881	14	23	7.60	0.751	29.5	15	8.84	0.794	36.0	15
1.268	14	21	30	1.534	0.880	30	11	7.95	0.750	28.0	14	9.15	0.793	32.3	15
1.262	14	23	32	1.535	0.879	31	13	7.70	0.749	30.4	14	8.75	0.788	36.1	14
1.261	30	19	30	1.539	0.877	14	21	7.66	0.745	30.4	14	10.54	0.787	4.7	30

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

Figure A.6 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 2,000.0 MWd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: MWd/MTU	15666.5
Exposure: MWd/MTU (GWd)	2500.0 (250.25)		
Delta E: MWd/MTU, (GWd)	500.0 (50.05)		
Power: MWt	2923.0 (100.00 %)		
Core Pressure: psia	1044.6		
Inlet Subcooling: Btu/lbm	-21.56		
Flow: Mlb/hr	76.23 (99.00 %)		
		Axial Profile	Edit Radial Power
		N(PRA) Power Exposure	Zone Avg. Max. IR JR
		Top 25	0.123 2.315 10 0.742 1.191 25 28
		24	0.414 6.832 11 0.441 0.556 15 50
		23	0.574 9.632 12 0.510 0.776 5 14
		22	0.687 12.145 14 1.102 1.299 23 28
		21	0.784 13.940 15 1.021 1.238 11 32
		20	0.864 15.119 16 0.787 1.087 17 46
		19	0.930 15.895 22 0.566 0.599 47 40
		18	0.984 16.413 30 1.082 1.344 23 30
		17	1.038 16.810 31 1.083 1.260 13 32
		16	1.101 16.137
		15	1.154 16.595
		14	1.265 16.874
		13	1.307 17.482
		12	1.330 18.053
		11	1.353 18.536
		10	1.376 18.942
		9	1.390* 19.246
		8	1.381 19.602
		7	1.337 19.939
		6	1.295 20.281
		5	1.242 20.437*
		4	1.154 19.971
		3	0.996 17.943
		2	0.731 13.338
		Bottom 1	0.189 3.622
			% AXIAL TILT -16.270 -13.276
			AVG BOT 8ft/12ft 1.1216 1.0761
Control Rod Density: %	7.30		
k-effective:	1.00026		
Void Fraction:	0.487		
Core Delta-P: psia	23.346		
Core Plate Delta-P: psia	18.817		
Coolant Temp: Deg-F	548.3		
In Channel Flow: Mlb/hr	64.06	Active Channel Flow: Mlb/hr	64.06
Total Bypass Flow (%):	16.0	(of total core flow)	
Total Water Rod Flow (%):	-0.0	(of total core flow)	
Source Convergence	0.00044		

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	Value	Margin	Exp. FT	IR	Value	Margin	Exp. FT	IR
1.344	30	23	30	1.493	0.904	30	23	8.20	0.799	30.7	14	10.92	0.815	6.1	30
1.299	14	23	28	1.524	0.886	14	25	8.14	0.799	31.6	14	10.86	0.811	6.1	30
1.298	30	21	28	1.526	0.885	30	21	8.21	0.783	29.3	14	10.80	0.806	6.0	31
1.297	14	25	30	1.529	0.883	30	13	8.04	0.783	30.5	14	10.73	0.801	6.0	31
1.292	30	21	32	1.530	0.883	31	13	7.99	0.778	30.6	14	9.06	0.798	34.1	14
1.290	30	25	32	1.532	0.881	31	13	7.64	0.756	29.9	15	9.11	0.796	33.1	14
1.279	30	15	30	1.534	0.880	30	9	7.92	0.753	28.9	14	8.75	0.794	36.9	15
1.264	30	19	30	1.534	0.880	30	11	7.53	0.749	30.3	15	9.04	0.790	33.3	15
1.263	14	21	30	1.536	0.879	14	21	7.63	0.746	31.2	14	8.63	0.784	37.0	14
1.260	31	13	32	1.538	0.878	14	23	7.67	0.742	29.6	14	8.59	0.783	37.3	15

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

Figure A.7 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 2,500.0 MWd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: Mwd/MTU	15667.5
Exposure: Mwd/MTU (Gwd)	2501.0 (250.35)		
Delta E: Mwd/MTU, (Gwd)	1.0 (0.10)		
Power: MWt	2923.0 (100.00 %)		
Core Pressure: psia	1044.7		
Inlet Subcooling: Btu/lbm	-20.29		
Flow: Mlb/hr	80.46 (104.50 %)		
		Axial Profile	Edit Radial Power
		N(PRA) Power Exposure Zone Avg. Max. IR JR	
		Top 25	0.133 2.316 10 0.683 1.016 25 28
		24	0.449 6.832 11 0.445 0.558 15 50
		23	0.622 9.633 12 0.516 0.789 5 14
		22	0.742 12.145 14 1.104 1.238 17 38
		21	0.843 13.941 15 1.007 1.250 11 32
		20	0.923 15.120 16 0.797 1.104 17 46
		19	0.985 15.896 22 0.574 0.610 47 40
		18	1.041 16.414 30 1.095 1.291 9 28
		17	1.084 16.812 31 1.067 1.259 17 40
		16	1.118 16.138
		15	1.137 16.597
		14	1.199 16.875
		13	1.180 17.483
		12	1.176 18.055
		11	1.185 18.538
		10	1.205 18.943
		9	1.235 19.248
		8	1.269 19.603
		7	1.303 19.940
		6	1.328 20.282
		5	1.331* 20.438*
		4	1.285 19.972
		3	1.144 17.944
		2	0.858 13.339
		Bottom 1	0.224 3.622
			% AXIAL TILT -13.715 -13.276
			AVG BOT 8ft/12ft 1.0965 1.0761
Control Rod Density: %	7.24		
k-effective:	1.00014		
Void Fraction:	0.483		
Core Delta-P: psia	25.175		
Core Plate Delta-P: psia	20.644		
Coolant Temp: Deg-F	548.6		
In Channel Flow: Mlb/hr	67.79	Active Channel Flow: Mlb/hr	67.79
Total Bypass Flow (%):	15.8	(of total core flow)	
Total Water Rod Flow (%):	-0.0	(of total core flow)	
Source Convergence	0.00037		

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	Value	Margin	Exp. FT	IR	Value	Margin	Exp. FT	IR
1.291	30	9	28	1.572	0.859	30	9	8.44	0.798	26.2	14	11.54	0.861	4.0	30
1.275	30	17	36	1.576	0.857	31	17	8.45	0.792	25.4	15	11.27	0.841	4.9	30
1.274	30	19	38	1.585	0.852	30	9	8.28	0.790	21.1	15	11.05	0.825	4.7	30
1.265	30	9	32	1.586	0.851	31	17	7.83	0.784	31.2	15	9.18	0.802	33.1	14
1.262	30	15	38	1.589	0.850	30	19	8.04	0.774	28.5	15	10.60	0.791	4.8	31
1.259	30	19	34	1.589	0.849	30	17	8.17	0.772	28.3	14	10.57	0.789	5.1	30
1.259	31	17	40	1.592	0.848	31	13	7.81	0.771	32.4	14	10.54	0.787	5.4	30
1.258	30	19	30	1.595	0.847	30	19	7.68	0.771	31.4	15	8.96	0.786	33.6	15
1.255	31	17	32	1.596	0.846	30	7	8.16	0.762	27.0	14	8.62	0.786	37.4	15
1.253	31	11	30	1.602	0.843	30	25	7.99	0.762	29.2	14	9.18	0.784	30.9	15

* LHGR calculated with pin-power reconstruction

* CPR calculated with pin-power reconstruction & CPR limit type 3

* Thermal limit file:

Figure A.8 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 2,501.0 MWd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: MWd/MTU	16166.6
Exposure: MWd/MTU (Gwd)	3000.0 (300.31)	Axial Profile	Edit Radial Power
Delta E: MWd/MTU, (Gwd)	499.0 (49.95)	N(PRA) Power Exposure Zone Avg. Max. IR JR	
Power: MWt	2923.0 (100.00 %)	Top 25 0.138 2.398 10 0.680 1.011 25 28	
Core Pressure: psia	1044.7	24 0.463 7.073 11 0.444 0.559 15 50	
Inlet Subcooling: Btu/lbm	-20.61	23 0.640 9.966 12 0.514 0.787 5 14	
Flow: Mlb/hr	79.31 (103.00 %)	22 0.760 12.545 14 1.101 1.234 17 38	
		21 0.860 14.394 15 1.006 1.250 11 32	
1 3 5 7 9 11 13 15 17 19 21 23 25		20 0.938 15.617 16 0.796 1.103 17 46	:JR
1	51	19 0.998 16.426 22 0.573 0.608 47 40	
3	47	18 1.052 16.974 30 1.097 1.293 9 28	
5	43	17 1.093 17.395 31 1.071 1.263 17 40	
7	39	16 1.124 16.715	
9	35	15 1.141 17.183	
11	31	14 1.203 17.440	
13	27	13 1.182 18.039	
15	23	12 1.177 18.608	
17	19	11 1.184 19.095	
19	15	10 1.202 19.510	
21	11	9 1.228 19.829	
23	7	8 1.259 20.200	
25	3	7 1.290 20.554	
IR: 2 6 10 14 18 22 26 30 34 38 42 46 50		6 1.311* 20.907	
		5 1.310 21.064*	
		4 1.262 20.577	
		3 1.122 18.482	
		2 0.842 13.742	
		Bottom 1 0.221 3.729	
Control Rod Density: %	7.24	% AXIAL TILT -12.591 -13.100	
k-effective:	0.99975	AVG BOT 8ft/12ft 1.0895 1.0754	
Void Fraction:	0.483		
Core Delta-P: psia	24.609		
Core Plate Delta-P: psia	20.079		
Coolant Temp: Deg-F	548.5		
In Channel Flow: Mlb/hr	66.80	Active Channel Flow: Mlb/hr	66.80
Total Bypass Flow (%):	15.8	(of total core flow)	
Total Water Rod Flow (%):	-0.0	(of total core flow)	
Source Convergence	0.00040		

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	Value	Margin	Exp. FT	IR	Value	Margin	Exp. FT	IR
1.293	30	9	28	1.560	0.866	30	9	8.48	0.800	26.3	15	11.23	0.838	5.2	30
1.278	30	19	38	1.563	0.864	31	17	8.22	0.781	27.1	14	11.00	0.821	6.1	30
1.277	30	17	36	1.573	0.858	31	17	8.16	0.778	21.9	15	10.81	0.806	5.9	30
1.270	30	9	32	1.576	0.856	31	13	8.01	0.777	29.3	15	9.16	0.790	31.9	15
1.266	30	15	38	1.577	0.856	30	19	8.14	0.776	29.2	14	8.90	0.785	34.1	14
1.263	31	17	40	1.580	0.854	30	17	7.68	0.774	32.0	15	8.65	0.777	35.9	15
1.262	30	19	30	1.584	0.852	30	19	8.01	0.769	30.0	14	8.76	0.776	34.5	15
1.261	30	19	34	1.585	0.852	30	9	8.14	0.767	27.9	14	8.42	0.775	38.3	15
1.260	31	17	32	1.590	0.849	30	25	7.55	0.762	32.2	15	10.39	0.775	6.5	30
1.258	31	11	30	1.591	0.849	30	11	7.65	0.760	33.2	14	9.00	0.772	31.4	14

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

Figure A.9 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 3,000.0 MWd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: MWd/MTU	16666.6
Exposure: MWd/MTU (Gwd)	3500.0 (350.36)	Axial Profile	Edit Radial Power
Delta E: MWd/MTU, (Gwd)	500.0 (50.05)	N(PRA) Power Exposure Zone Avg. Max. IR JR	
Power: MWt	2923.0 (100.00 %)	Top 25 0.143 2.483 10 0.677 1.004 25 28	
Core Pressure: psia	1044.7	24 0.477 7.322 11 0.444 0.560 15 50	
Inlet Subcooling: Btu/lbm	-21.10	23 0.657 10.310 12 0.513 0.787 5 14	
Flow: Mlb/hr	77.69 (100.90 %)	22 0.777 12.955 14 1.097 1.231 7 28	
		21 0.875 14.858 15 1.005 1.250 11 32	
1 3 5 7 9 11 13 15 17 19 21 23 25		20 0.951 16.123 16 0.796 1.103 17 46	:JR
1	51	19 1.009 16.964 22 0.573 0.608 47 40	
3	47	18 1.061 17.542 30 1.099 1.296 9 28	
5	43	17 1.098 17.984 31 1.074 1.267 17 40	
7	39	16 1.127 17.295	
9	35	15 1.142 17.772	
11	31	14 1.202 18.007	
13	27	13 1.180 18.596	
15	23	12 1.173 19.163	
17	19	11 1.179 19.653	
19	15	10 1.195 20.076	
21	11	9 1.220 20.408	
23	7	8 1.249 20.794	
25	3	7 1.278 21.162	
IR: 2 6 10 14 18 22 26 30 34 38 42 46 50		6 1.298* 21.525	
		5 1.296 21.682*	
		4 1.247 21.172	
		3 1.109 19.012	
		2 0.835 14.140	
		Bottom 1 0.221 3.835	
Control Rod Density: %	7.24	% AXIAL TILT -11.681 -12.900	
k-effective:	0.99914	AVG BOT 8ft/12ft 1.0833 1.0746	
Void Fraction:	0.484		
Core Delta-P: psia	23.856		
Core Plate Delta-P: psia	19.327		
Coolant Temp: Deg-F	548.5		
In Channel Flow: Mlb/hr	65.41	Active Channel Flow: Mlb/hr	65.41
Total Bypass Flow (%):	15.8	(of total core flow)	
Total Water Rod Flow (%):	-0.0	(of total core flow)	
Source Convergence	0.00037		

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	Value	Margin	Exp.	FT	IR	Value	Margin	Exp.
1.296	30	9	28	1.543	0.875	30	9	8.49	0.805	27.2	15	23	11.03	0.823	6.5
1.281	30	19	38	1.547	0.873	31	17	7.97	0.777	30.2	15	21	10.83	0.808	7.3
1.278	30	17	36	1.559	0.866	31	13	8.09	0.777	30.0	14	15	9.29	0.795	31.1
1.274	30	9	32	1.559	0.866	31	17	8.01	0.776	30.9	14	21	10.65	0.795	7.1
1.270	30	15	38	1.563	0.864	30	19	8.09	0.774	22.8	15	9	8.58	0.777	36.8
1.267	31	17	40	1.568	0.861	30	17	8.07	0.771	28.0	14	7	8.95	0.775	32.3
1.264	31	17	32	1.572	0.859	30	19	8.10	0.769	28.7	14	13	8.71	0.775	35.0
1.264	30	19	30	1.573	0.858	15	11	7.58	0.769	32.8	15	7	8.82	0.772	33.3
1.263	31	11	30	1.574	0.857	30	11	8.06	0.758	27.6	14	15	8.27	0.769	39.2
1.263	30	19	34	1.577	0.856	30	25	7.46	0.757	33.0	15	13	9.05	0.768	30.3

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

Figure A.10 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 3,500.0 MWd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: MWd/MTU	17166.6
Exposure: MWd/MTU (Gwd)	4000.0 (400.41)		
Delta E: MWd/MTU, (Gwd)	500.0 (50.05)		
Power: MWt	2923.0 (100.00 %)		
Core Pressure: psia	1044.7		
Inlet Subcooling: Btu/lbm	-21.42		
Flow: Mlb/hr	76.69 (99.60 %)		
		Axial Profile	Edit Radial Power
		N(PRA) Power Exposure	Zone Avg. Max. IR JR
		Top 25	10 0.674 0.996 25 28
		24	11 0.443 0.561 15 50
		23	12 0.512 0.785 5 14
		22	14 1.094 1.229 7 28
		21	15 1.004 1.250 11 32
		20	16 0.795 1.102 17 46
		19	22 0.572 0.606 47 40
		18	30 1.101 1.299 9 28
		17	31 1.078 1.271 17 40
		16	
		15	
		14	
		13	
		12	
		11	
		10	
		9	
		8	
		7	
		6	
		5	
		4	
		3	
		2	
		Bottom 1	
			% AXIAL TILT -10.716 -12.684
			AVG BOT 8ft/12ft 1.0768 1.0736
Control Rod Density: %	7.24		
k-effective:	0.99874		
Void Fraction:	0.484		
Core Delta-P: psia	23.379		
Core Plate Delta-P: psia	18.851		
Coolant Temp: Deg-F	548.4		
In Channel Flow: Mlb/hr	64.56	Active Channel Flow: Mlb/hr	64.56
Total Bypass Flow (%):	15.8	(of total core flow)	
Total Water Rod Flow (%):	-0.0	(of total core flow)	
Source Convergence	0.00040		

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	Value	Margin	Exp.	FT	Value	Margin	Exp.	FT
1.299	30	9	28	1.534	0.880	30	9	8.51	0.813	28.1	15	10.84	0.809	7.6	30
1.284	30	19	38	1.536	0.879	31	17	8.03	0.783	31.7	14	9.29	0.803	32.1	15
1.281	30	17	36	1.546	0.873	31	13	8.05	0.779	30.9	14	10.66	0.796	8.5	30
1.279	30	9	32	1.547	0.872	31	17	7.93	0.779	31.0	15	10.50	0.784	8.2	30
1.274	30	15	38	1.552	0.870	30	19	8.07	0.771	29.6	14	8.84	0.781	34.2	14
1.271	31	17	40	1.558	0.866	30	17	8.00	0.767	23.7	15	8.52	0.779	37.7	15
1.268	31	11	30	1.561	0.865	30	19	8.09	0.766	28.4	14	8.90	0.778	33.2	14
1.268	31	17	32	1.561	0.865	15	11	7.49	0.764	33.6	15	9.01	0.772	31.2	14
1.266	30	19	30	1.564	0.863	30	11	7.92	0.762	28.8	14	8.52	0.764	35.9	14
1.265	30	19	34	1.564	0.863	30	9	7.37	0.753	33.8	15	8.14	0.763	40.1	15

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

Figure A.11 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 4,000.0 MWd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: MWd/MTU	17666.6
Exposure: MWd/MTU (Gwd)	4500.0 (450.46)		
Delta E: MWd/MTU, (Gwd)	500.0 (50.05)		
Power: MWt	2923.0 (100.00 %)		
Core Pressure: psia	1044.6		
Inlet Subcooling: Btu/lbm	-21.56		
Flow: Mlb/hr	76.23 (99.00 %)		
		Axial Profile	Edit Radial Power
		N(PRA) Power Exposure	Zone Avg. Max. IR JR
		Top 25	0.153 2.663 10 0.670 0.989 25 28
		24	0.506 7.842 11 0.442 0.561 15 50
		23	0.693 11.025 12 0.510 0.783 5 14
		22	0.811 13.801 14 1.091 1.227 7 28
		21	0.907 15.810 15 1.003 1.250 11 32
		20	0.980 17.157 16 0.793 1.101 17 46
		19	1.033 18.059 22 0.571 0.604 47 40
		18	1.080 18.690 30 1.104 1.302 9 28
		17	1.112 19.172 31 1.082 1.276 17 40
		16	1.134 18.460
		15	1.144 18.952
		14	1.202 19.140
		13	1.177 19.708
		12	1.167 20.268
		11	1.170 20.762
		10	1.184 21.200
		9	1.206 21.555
		8	1.233 21.968
		7	1.258 22.362
		6	1.273* 22.744
		5	1.265 22.897*
		4	1.212 22.340
		3	1.074 20.050
		2	0.809 14.921
		Bottom 1	0.216 4.046
			% AXIAL TILT -9.711 -12.453
			AVG BOT 8ft/12ft 1.0700 1.0726
Control Rod Density: %	7.24		
k-effective:	0.99855		
Void Fraction:	0.483		
Core Delta-P: psia	23.138		
Core Plate Delta-P: psia	18.610		
Coolant Temp: Deg-F	548.4		
In Channel Flow: Mlb/hr	64.18	Active Channel Flow: Mlb/hr	64.18
Total Bypass Flow (%):	15.8	(of total core flow)	
Total Water Rod Flow (%):	-0.0	(of total core flow)	
Source Convergence	0.00045		

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	Value	Margin	Exp.	FT	IR	Value	Margin	Exp.
1.302	30	9	28	1.527	0.884	30	9	8.54	0.821	29.0	15	23	9.29	0.811	33.0
1.288	30	19	38	1.529	0.883	31	17	8.05	0.792	32.5	14	21	10.65	0.795	8.8
1.285	30	9	32	1.532	0.881	31	17	8.02	0.782	31.7	14	15	8.87	0.790	35.2
1.285	30	17	36	1.537	0.878	31	13	7.89	0.781	31.9	15	21	10.50	0.783	9.6
1.278	30	15	38	1.545	0.874	30	19	8.12	0.775	29.3	14	15	8.87	0.782	34.2
1.276	31	17	40	1.550	0.871	30	17	8.04	0.775	30.4	14	13	8.47	0.781	38.5
1.274	31	11	30	1.551	0.871	30	19	7.91	0.761	24.5	15	9	8.98	0.776	32.1
1.273	31	17	32	1.554	0.869	15	11	7.40	0.760	34.4	15	7	10.35	0.772	9.4
1.269	30	19	30	1.555	0.868	30	19	7.77	0.752	29.6	14	7	8.94	0.767	31.4
1.268	30	19	34	1.556	0.868	30	9	7.28	0.749	34.6	15	13	8.01	0.758	40.9

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

Figure A.12 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 4,500.0 MWd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: MWd/MTU	17667.6
Exposure: MWd/MTU (GWd)	4501.0 (450.56)		
Delta E: MWd/MTU, (GWd)	1.0 (0.10)		
Power: MWt	2923.0 (100.00 %)		
Core Pressure: psia	1044.7		
Inlet Subcooling: Btu/lbm	-20.40		
Flow: Mlb/hr	80.08 (104.00 %)		
		Axial Profile	Edit Radial Power
		N(PRA) Power Exposure	Zone Avg. Max. IR JR
		Top 25	0.152 2.663 10 0.662 0.958 25 28
		24	0.505 7.843 11 0.446 0.567 15 50
		23	0.690 11.026 12 0.515 0.792 5 14
		22	0.805 13.802 14 1.085 1.236 7 28
		21	0.893 15.811 15 1.007 1.253 11 32
		20	0.956 17.158 16 0.802 1.114 17 46
		19	1.007 18.060 22 0.577 0.610 47 40
		18	1.045 18.692 30 1.102 1.308 9 28
		17	1.065 19.173 31 1.085 1.282 17 40
		16	1.102 18.461
		15	1.126 18.953
		14	1.194 19.141
		13	1.178 19.709
		12	1.175 20.269
		11	1.184 20.764
		10	1.201 21.201
		9	1.227 21.556
		8	1.256 21.969
		7	1.282 22.363
		6	1.297* 22.745
		5	1.289 22.898*
		4	1.234 22.342
		3	1.094 20.051
		2	0.823 14.922
		Bottom 1	0.220 4.046
			% AXIAL TILT -11.506 -12.453
			AVG BOT 8ft/12ft 1.0795 1.0726
Control Rod Density: %	7.48		
k-effective:	0.99823		
Void Fraction:	0.478		
Core Delta-P: psia	24.888		
Core Plate Delta-P: psia	20.358		
Coolant Temp: Deg-F	548.5		
In Channel Flow: Mlb/hr	67.51	Active Channel Flow: Mlb/hr	67.51
Total Bypass Flow (%):	15.7	(of total core flow)	
Total Water Rod Flow (%):	-0.0	(of total core flow)	
Source Convergence	0.00041		

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	Value	Margin	Exp. FT	IR	Value	Margin	Exp. FT	IR
1.308	30	9	28	1.569	0.860	31	17	7.54	0.776	34.4	15	10.86	0.810	8.8	30
1.293	30	9	32	1.570	0.860	30	9	8.05	0.775	24.5	15	10.70	0.799	9.6	30
1.284	30	19	38	1.592	0.848	30	9	7.82	0.773	31.9	15	10.55	0.787	9.4	30
1.284	30	15	38	1.594	0.847	15	11	7.90	0.771	31.7	14	8.18	0.774	40.9	15
1.282	31	17	40	1.595	0.846	31	13	7.93	0.767	29.6	14	8.73	0.770	34.2	14
1.280	30	17	36	1.596	0.846	30	11	8.05	0.767	27.8	15	8.44	0.770	37.5	14
1.274	31	11	30	1.600	0.844	31	17	7.42	0.764	34.6	15	8.34	0.770	38.6	15
1.272	30	13	40	1.600	0.844	30	19	7.92	0.764	30.4	14	8.47	0.769	37.0	15
1.272	30	11	34	1.604	0.842	30	17	7.48	0.759	35.6	14	8.84	0.765	32.2	14
1.262	30	15	42	1.608	0.840	30	15	7.40	0.740	34.0	14	10.20	0.761	9.9	30

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

Figure A.13 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 4,501.0 MWd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: MWd/MTU	18166.6
Exposure: MWd/MTU (Gwd)	5000.0 (500.51)		
Delta E: MWd/MTU, (Gwd)	499.0 (49.95)		
Power: MWt	2923.0 (100.00 %)		
Core Pressure: psia	1044.7		
Inlet Subcooling: Btu/lbm	-20.57		
Flow: Mlb/hr	79.46 (103.20 %)		
		Axial Profile	Edit Radial Power
		N(PRA) Power Exposure Zone Avg. Max. IR JR	
1 3 5 7 9 11 13 15 17 19 21 23 25		Top 25 0.157 2.757 10 0.653 0.951 25 28	
1		24 0.520 8.113 11 0.444 0.567 15 50	
3		23 0.708 11.396 12 0.513 0.790 5 14	
5		22 0.822 14.235 14 1.082 1.233 7 28	
7		21 0.909 16.292 15 1.006 1.253 11 32	
9		20 0.971 17.672 16 0.800 1.113 17 46	
11		19 1.019 18.601 22 0.575 0.608 47 40	
13		18 1.055 19.254 30 1.104 1.311 9 28	
15		17 1.072 19.746 31 1.089 1.287 17 40	
17		16 1.106 19.029	
19		15 1.127 19.533	
21		14 1.194 19.703	
23		13 1.176 20.263	
25		12 1.172 20.822	
IR: 2 6 10 14 18 22 26 30 34 38 42 46 50		11 1.179 21.320	
		10 1.196 21.766	
		9 1.221 22.134	
		8 1.248 22.560	
		7 1.272 22.967	
		6 1.285* 23.355	
		5 1.274 23.505*	
		4 1.217 22.922	
		3 1.076 20.566	
		2 0.809 15.309	
		Bottom 1 0.216 4.151	
Control Rod Density: %	7.48	% AXIAL TILT -10.512 -12.257	
k-effective:	0.99807	AVG BOT 8ft/12ft 1.0728 1.0716	
Void Fraction:	0.477		
Core Delta-P: psia	24.571		
Core Plate Delta-P: psia	20.042		
Coolant Temp: Deg-F	548.5		
In Channel Flow: Mlb/hr	67.00	Active Channel Flow: Mlb/hr	67.00
Total Bypass Flow (%):	15.7	(of total core flow)	
Total Water Rod Flow (%):	-0.0	(of total core flow)	
Source Convergence	0.00045		

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	Value	Margin	Exp. FT	IR	Value	Margin	Exp. FT	IR
1.311	30	9	28	1.560	0.865	31	17	8.11	0.778	28.7	15	10.68	0.797	10.0	30
1.298	30	9	32	1.562	0.864	30	9	7.79	0.775	32.7	15	10.54	0.787	10.8	30
1.288	30	15	38	1.582	0.853	31	17	7.87	0.773	32.6	14	10.40	0.776	10.5	30
1.288	30	19	38	1.583	0.853	30	9	7.46	0.772	35.2	15	8.70	0.774	35.1	14
1.287	31	17	40	1.584	0.853	31	13	7.96	0.768	25.3	15	8.30	0.773	39.4	15
1.284	30	17	36	1.585	0.852	30	19	7.89	0.767	31.3	14	8.81	0.769	33.1	14
1.280	31	11	30	1.585	0.852	15	11	7.76	0.760	31.2	14	8.05	0.769	41.7	15
1.277	30	11	34	1.587	0.851	30	11	7.33	0.760	35.4	15	8.84	0.769	32.7	15
1.277	30	13	40	1.588	0.850	30	17	7.38	0.754	36.4	14	8.28	0.763	38.4	14
1.267	30	15	42	1.600	0.844	30	15	7.54	0.749	33.6	14	8.32	0.762	37.9	15

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

Figure A.14 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 5,000.0 MWd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: MWd/MTU	18167.6
Exposure: MWd/MTU (GWd)	5001.0 (500.61)		
Delta E: MWd/MTU, (GWd)	1.0 (0.10)		
Power: MWt	2923.0 (100.00 %)		
Core Pressure: psia	1044.7		
Inlet Subcooling: Btu/lbm	-20.28		
Flow: Mlb/hr	80.46 (104.50 %)		
		Axial Profile	Edit Radial Power
		N(PRA) Power Exposure	Zone Avg. Max. IR JR
		Top 25	0.146 2.757 10 0.656 0.937 25 28
		24	0.483 8.114 11 0.445 0.576 15 50
		23	0.655 11.397 12 0.519 0.791 5 14
		22	0.758 14.236 14 1.069 1.234 7 28
		21	0.833 16.292 15 1.028 1.220 11 32
		20	0.882 17.673 16 0.808 1.138 17 46
		19	0.924 18.603 22 0.578 0.609 47 40
		18	0.963 19.255 30 1.096 1.315 9 28
		17	0.993 19.747 31 1.103 1.278 13 36
		16	1.017 19.031
		15	1.047 19.535
		14	1.143 19.704
		13	1.189 20.264
		12	1.233 20.823
		11	1.272 21.321
		10	1.306 21.768
		9	1.330 22.135
		8	1.336 22.561
		7	1.345 22.968
		6	1.347* 23.356
		5	1.330 23.506*
		4	1.270 22.924
		3	1.124 20.567
		2	0.847 15.310
		Bottom 1	0.227 4.151
			% AXIAL TILT -17.313 -12.257
			AVG BOT 8ft/12ft 1.1082 1.0716
Control Rod Density: %	7.30		
k-effective:	0.99790		
Void Fraction:	0.486		
Core Delta-P: psia	25.248		
Core Plate Delta-P: psia	20.717		
Coolant Temp: Deg-F	548.6		
In Channel Flow: Mlb/hr	67.75	Active Channel Flow: Mlb/hr	67.75
Total Bypass Flow (%):	15.8	(of total core flow)	
Total Water Rod Flow (%):	-0.0	(of total core flow)	
Source Convergence	0.00044		

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	Value	Margin	Exp. FT	IR	Value	Margin	Exp. FT	IR
1.315	30	9	28	1.585	0.852	30	9	8.05	0.803	33.7	14	9.02	0.813	36.2	14
1.304	30	17	36	1.586	0.851	30	11	7.95	0.796	34.1	14	10.88	0.812	10.0	30
1.291	30	11	34	1.603	0.842	31	13	7.56	0.782	35.2	15	8.92	0.807	36.7	14
1.291	30	9	32	1.604	0.841	31	9	7.55	0.775	34.3	15	10.74	0.802	8.9	30
1.278	31	13	36	1.615	0.836	30	17	7.90	0.774	31.2	14	10.70	0.799	9.1	30
1.266	30	15	34	1.620	0.834	30	15	7.47	0.763	36.4	14	10.66	0.795	10.9	30
1.264	30	19	42	1.623	0.832	30	9	7.56	0.758	31.4	16	10.55	0.787	9.1	30
1.262	30	7	30	1.627	0.830	12	5	7.46	0.750	34.6	14	10.52	0.785	10.7	30
1.260	30	21	44	1.632	0.827	30	7	7.73	0.749	26.4	15	8.34	0.782	40.0	15
1.260	30	25	44	1.633	0.827	31	17	7.43	0.748	34.8	14	8.25	0.782	41.1	15

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

Figure A.15 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 5,001.0 MWd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: Mwd/MTU	18666.7
Exposure: Mwd/MTU (Gwd)	5500.0 (550.56)	Axial Profile	Edit Radial Power
Delta E: Mwd/MTU, (Gwd)	499.0 (49.95)	N(PRA) Power Exposure	Zone Avg. Max. IR JR
Power: Mwt	2923.0 (100.00 %)	Top 25	0.151 2.848 10 0.653 0.930 25 28
Core Pressure: psia	1044.7	24	0.496 8.373 11 0.444 0.576 15 50
Inlet Subcooling: Btu/lbm	-20.71	23	0.672 11.748 12 0.517 0.789 5 14
Flow: Mlb/hr	79.00 (102.60 %)	22	0.774 14.644 14 1.066 1.231 7 28
		21	0.848 16.741 15 1.026 1.220 11 32
1 3 5 7 9 11 13 15 17 19 21 23 25		20	0.895 18.148 16 0.807 1.136 17 46
1		19	0.936 19.100 22 0.577 0.607 47 40
3		18	0.973 19.774 30 1.099 1.319 9 28
5		17	0.999 20.281 31 1.106 1.283 13 36
7		16	1.021 19.555
9		15	1.047 20.074
11		14	1.141 20.242
13		13	1.185 20.823
15		12	1.227 21.403
17		11	1.264 21.920
19		10	1.297 22.382
21		9	1.320 22.760
23		8	1.327 23.190
25		7	1.335 23.601
IR: 2 6 10 14 18 22 26 30 34 38 42 46 50		6	1.337* 23.990
		5	1.319 24.132*
		4	1.258 23.521
		3	1.113 21.096
		2	0.839 15.709
		Bottom 1	0.225 4.259
Control Rod Density: %	7.30	% AXIAL TILT	-16.402 -12.230
k-effective:	0.99744	AVG BOT 8ft/12ft	1.1019 1.0715
Void Fraction:	0.487		
Core Delta-P: psia	24.554		
Core Plate Delta-P: psia	20.024		
Coolant Temp: Deg-F	548.5		
In Channel Flow: Mlb/hr	66.49	Active Channel Flow: Mlb/hr	66.49
Total Bypass Flow (%):	15.8	(of total core flow)	
Total Water Rod Flow (%):	-0.0	(of total core flow)	
Source Convergence	0.00050		

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	Value	Margin	Exp. FT	IR	Value	Margin	Exp. FT	IR
1.319	30	9	28	1.563	0.864	30	9	7.95	0.799	34.5	14	8.91	0.810	37.1	14
1.308	30	17	36	1.584	0.852	31	13	7.86	0.793	34.9	14	8.81	0.805	37.6	14
1.297	30	11	34	1.584	0.852	30	11	7.49	0.781	36.0	15	10.75	0.802	11.2	30
1.297	30	9	32	1.590	0.849	30	17	7.45	0.770	35.1	15	10.56	0.788	10.0	30
1.283	31	13	36	1.599	0.844	31	9	7.81	0.769	32.0	14	10.55	0.787	12.1	30
1.271	30	15	34	1.603	0.842	30	9	7.39	0.761	37.1	14	10.55	0.787	10.3	30
1.267	30	19	42	1.615	0.836	31	17	7.49	0.755	32.2	16	8.23	0.779	40.9	15
1.267	30	7	30	1.615	0.836	30	11	7.35	0.746	35.5	14	10.42	0.778	11.8	30
1.266	30	11	38	1.618	0.834	30	15	7.67	0.745	27.2	15	8.05	0.776	42.6	15
1.263	31	17	40	1.621	0.833	12	5	7.33	0.743	35.4	14	8.10	0.776	42.0	15

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

Figure A.16 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 5,500.0 MWd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: MWd/MTU	19166.7
Exposure: MWd/MTU (Gwd)	6000.0 (600.61)	Axial Profile	Edit Radial Power
Delta E: MWd/MTU, (Gwd)	500.0 (50.05)	N(PRA) Power Exposure Zone Avg. Max. IR JR	
Power: MWt	2923.0 (100.00 %)	Top 25	0.155 2.941 10 0.650 0.922 25 28
Core Pressure: psia	1044.7	24	0.509 8.639 11 0.443 0.576 15 50
Inlet Subcooling: Btu/lbm	-21.08	23	0.687 12.109 12 0.515 0.787 5 14
Flow: Mlb/hr	77.77 (101.00 %)	22	0.787 15.061 14 1.063 1.228 7 28
		21	0.861 17.198 15 1.024 1.219 11 32
		20	0.906 18.630 16 0.805 1.134 17 46
		19	0.945 19.604 22 0.576 0.606 47 40
		18	0.980 20.298 30 1.101 1.323 9 28
		17	1.004 20.820 31 1.110 1.289 13 36
		16	1.022 20.082
		15	1.046 20.615
		14	1.138 20.780
		13	1.180 21.382
		12	1.221 21.981
		11	1.258 22.516
		10	1.290 22.993
		9	1.313 23.383
		8	1.319 23.815
		7	1.327 24.230
		6	1.330* 24.621
		5	1.311 24.754*
		4	1.250 24.114
		3	1.105 21.621
		2	0.832 16.104
		Bottom 1	0.224 4.367
			% AXIAL TILT -15.703 -12.180
			AVG BOT 8ft/12ft 1.0968 1.0712
Control Rod Density: %	7.30		
k-effective:	0.99714		
Void Fraction:	0.488		
Core Delta-P: psia	23.980		
Core Plate Delta-P: psia	19.451		
Coolant Temp: Deg-F	548.5		
In Channel Flow: Mlb/hr	65.43	Active Channel Flow: Mlb/hr	65.43
Total Bypass Flow (%):	15.9	(of total core flow)	
Total Water Rod Flow (%):	-0.0	(of total core flow)	
Source Convergence	0.00046		

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	Value	Margin	Exp. FT	IR	Value	Margin	Exp. FT	IR
1.323	30	9	28	1.540	0.877	30	9	7.87	0.797	35.4	14	8.82	0.810	38.1	14
1.311	30	17	36	1.567	0.862	31	13	7.78	0.791	35.8	14	8.72	0.805	38.5	14
1.302	30	11	34	1.569	0.860	30	17	7.44	0.781	36.8	15	10.65	0.795	12.3	30
1.302	30	9	32	1.584	0.852	30	11	7.38	0.769	35.9	15	10.47	0.781	13.2	30
1.289	31	13	36	1.586	0.851	30	9	7.74	0.767	32.9	14	10.45	0.780	11.4	30
1.275	30	15	34	1.592	0.848	30	11	7.33	0.760	37.9	14	10.44	0.779	11.2	30
1.271	30	19	42	1.595	0.846	31	9	7.45	0.754	33.0	16	8.14	0.777	41.8	15
1.271	30	11	38	1.599	0.844	31	17	7.30	0.746	36.3	14	7.97	0.775	43.4	15
1.271	30	7	30	1.614	0.837	30	15	7.62	0.744	28.0	15	8.00	0.773	42.8	15
1.268	31	17	40	1.616	0.835	31	13	7.25	0.740	36.2	14	10.35	0.772	13.0	30

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

Figure A.17 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 6,000.0 MWd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: MWd/MTU	19667.7
Exposure: MWd/MTU (GWd)	6501.0 (650.76)		
Delta E: MWd/MTU, (GWd)	1.0 (0.10)		
Power: MWt	2923.0 (100.00 %)		
Core Pressure: psia	1044.7		
Inlet Subcooling: Btu/lbm	-20.49		
Flow: Mlb/hr	79.77 (103.60 %)		
		Axial Profile	Edit Radial Power
		N(PRA) Power Exposure	Zone Avg. Max. IR JR
		Top 25	0.160 3.038 10 0.647 0.914 25 28
		24	0.524 8.913 11 0.444 0.579 15 50
		23	0.704 12.479 12 0.516 0.790 5 14
		22	0.801 15.487 14 1.057 1.229 7 28
		21	0.868 17.663 15 1.024 1.213 11 32
		20	0.904 19.120 16 0.809 1.140 17 46
		19	0.931 20.115 22 0.579 0.608 47 40
		18	0.950 20.827 30 1.104 1.328 9 28
		17	0.954 21.363 31 1.114 1.295 13 36
		16	0.985 20.611
		15	1.021 21.156
		14	1.122 21.318
		13	1.172 21.939
		12	1.220 22.558
		11	1.263 23.110
		10	1.299 23.603
		9	1.326 24.003
		8	1.335 24.438
		7	1.344 24.857
		6	1.346* 25.249
		5	1.327 25.373*
		4	1.263 24.705
		3	1.115 22.143
		2	0.839 16.497
		Bottom 1	0.226 4.474
			% AXIAL TILT -16.696 -12.114
			AVG BOT 8ft/12ft 1.0993 1.0708
Control Rod Density: %	7.54		
k-effective:	0.99667		
Void Fraction:	0.485		
Core Delta-P: psia	24.892		
Core Plate Delta-P: psia	20.362		
Coolant Temp: Deg-F	548.5		
In Channel Flow: Mlb/hr	67.17	Active Channel Flow: Mlb/hr	67.17
Total Bypass Flow (%):	15.8	(of total core flow)	
Total Water Rod Flow (%):	-0.0	(of total core flow)	
Source Convergence	0.00049		

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	Value	Margin	Exp. FT	IR	Value	Margin	Exp. FT	IR
1.328	30	9	28	1.558	0.866	30	9	7.90	0.806	36.2	14	8.85	0.820	39.0	14
1.312	30	17	36	1.583	0.853	31	13	7.81	0.800	36.6	14	8.75	0.815	39.4	14
1.310	30	9	32	1.593	0.847	30	17	7.54	0.796	37.6	15	10.76	0.803	13.5	30
1.307	30	11	34	1.598	0.845	30	11	7.46	0.782	36.7	15	10.60	0.791	14.4	30
1.295	31	13	36	1.607	0.840	30	9	7.82	0.780	33.7	14	8.04	0.789	44.2	15
1.283	30	11	38	1.611	0.838	31	9	7.41	0.774	38.7	14	10.57	0.788	12.5	30
1.281	30	7	30	1.612	0.837	30	11	7.55	0.769	33.8	16	8.16	0.787	42.6	15
1.276	30	19	42	1.617	0.835	31	17	7.38	0.760	37.1	14	10.54	0.786	12.3	30
1.274	31	17	40	1.632	0.827	30	15	7.71	0.757	28.8	15	8.06	0.786	43.7	15
1.272	30	15	34	1.639	0.824	12	5	7.31	0.751	36.9	14	8.27	0.783	41.0	14

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

Figure A.19 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 6,501.0 MWd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: MWd/MTU	20166.7	
Exposure: MWd/MTU (Gwd)	7000.0 (700.71)			
Delta E: MWd/MTU, (Gwd)	499.0 (49.95)			
Power: MWt	2923.0 (100.00 %)			
Core Pressure: psia	1044.7			
Inlet Subcooling: Btu/lbm	-21.24			
Flow: Mlb/hr	77.23 (100.30 %)			
		Axial Profile	Edit Radial Power	
		N(PRA) Power Exposure Zone Avg. Max. IR JR		
		Top 25	0.164 3.137 10 0.644 0.906 25 28	
		24	0.533 9.194 11 0.443 0.579 15 50	
		23	0.714 12.856 12 0.514 0.789 5 14	
		22	0.809 15.918 14 1.053 1.225 7 28	
		21	0.874 18.130 15 1.022 1.212 11 32	
		20	0.909 19.606 16 0.807 1.138 17 46	
		19	0.935 20.616 22 0.578 0.607 47 40	
		18	0.952 21.339 30 1.107 1.333 9 28	
		17	0.953 21.876 31 1.118 1.300 13 36	
		16	0.982 21.119	
		15	1.016 21.683	
		14	1.115 21.846	
		13	1.164 22.491	
		12	1.211 23.131	
		11	1.253 23.704	
		10	1.291 24.214	
		9	1.318 24.627	
		8	1.329 25.066	
		7	1.341 25.489	
		6	1.346* 25.882	
		5	1.330 25.998*	
		4	1.269 25.299	
		3	1.121 22.667	
		2	0.844 16.892	
		Bottom 1	0.228 4.583	
			% AXIAL TILT -16.466 -12.077	
			AVG BOT 8ft/12ft 1.0967 1.0704	
Control Rod Density: %	7.54			
k-effective:	0.99611			
Void Fraction:	0.490			
Core Delta-P: psia	23.758			
Core Plate Delta-P: psia	19.229			
Coolant Temp: Deg-F	548.5			
In Channel Flow: Mlb/hr	64.96	Active Channel Flow: Mlb/hr	64.96	
Total Bypass Flow (%):	15.9	(of total core flow)		
Total Water Rod Flow (%):	-0.0	(of total core flow)		
Source Convergence	0.00049			

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	Value	Margin	Exp.	FT	Value	Margin	Exp.	FT
1.333	30	9	28	1.524	0.886	30	9	7.82	0.804	37.0	14	8.75	0.819	39.9	14
1.316	30	9	32	1.548	0.872	31	13	7.53	0.802	38.4	15	8.66	0.814	40.3	14
1.315	30	17	36	1.561	0.865	30	17	7.73	0.798	37.4	14	10.75	0.803	14.6	30
1.313	30	11	34	1.569	0.860	30	9	7.45	0.786	37.5	15	8.01	0.793	45.1	15
1.300	31	13	36	1.578	0.855	30	11	7.80	0.783	34.5	14	10.59	0.790	15.4	30
1.288	30	11	38	1.581	0.854	31	17	7.39	0.779	39.5	14	8.01	0.788	44.5	15
1.285	30	7	30	1.585	0.852	31	9	7.55	0.774	34.6	16	10.53	0.786	13.7	30
1.280	30	19	42	1.585	0.852	30	11	7.37	0.764	37.9	14	8.06	0.784	43.5	15
1.280	31	17	40	1.607	0.840	31	11	7.70	0.761	29.6	15	8.20	0.784	41.8	14
1.276	30	15	34	1.612	0.838	30	15	7.28	0.755	37.9	14	10.48	0.782	13.5	30

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

Figure A.20 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 7,000.0 MWd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: Mwd/MTU	20666.8
Exposure: Mwd/MTU (Gwd)	7500.0 (750.76)	Axial Profile	Edit Radial Power
Delta E: Mwd/MTU, (Gwd)	500.0 (50.05)	N(PRA) Power Exposure Zone Avg. Max. IR JR	
Power: Mwt	2923.0 (100.00 %)	Top 25	0.167 3.238 10 0.639 0.897 25 28
Core Pressure: psia	1044.6	24	0.542 9.480 11 0.441 0.578 15 50
Inlet Subcooling: Btu/lbm	-21.56	23	0.725 13.239 12 0.512 0.786 5 14
Flow: Mlb/hr	76.23 (99.00 %)	22	0.818 16.354 14 1.050 1.222 7 28
		21	0.882 18.602 15 1.019 1.211 11 32
		20	0.915 20.096 16 0.805 1.136 17 46
		19	0.940 21.120 22 0.577 0.605 47 40
		18	0.955 21.852 30 1.110 1.338 9 28
		17	0.954 22.390 31 1.123 1.306 13 36
		16	0.980 21.626
		15	1.012 22.208
		14	1.109 22.371
		13	1.157 23.039
		12	1.204 23.702
		11	1.246 24.295
		10	1.284 24.822
		9	1.313 25.249
		8	1.325 25.693
		7	1.339 26.121
		6	1.345* 26.517
		5	1.330 26.625*
		4	1.268 25.897
		3	1.119 23.196
		2	0.842 17.290
		Bottom 1	0.228 4.692
Control Rod Density: %	7.54	% AXIAL TILT -16.126 -12.036	
k-effective:	0.99612	AVG BOT 8ft/12ft 1.0934 1.0701	
Void Fraction:	0.491		
Core Delta-P: psia	23.308		
Core Plate Delta-P: psia	18.780		
Coolant Temp: Deg-F	548.4		
In Channel Flow: Mlb/hr	64.09	Active Channel Flow: Mlb/hr	64.09
Total Bypass Flow (%):	15.9	(of total core flow)	
Total Water Rod Flow (%):	-0.0	(of total core flow)	
Source Convergence	0.00046		

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	Value	Margin	Exp. FT	IR	Value	Margin	Exp. FT	K
1.338	30	9	28	1.505	0.897	30	9	7.54	0.808	39.2	15	8.68	0.821	40.8	14
1.322	30	9	32	1.528	0.884	31	13	7.76	0.804	37.8	14	8.59	0.816	41.2	14
1.319	30	17	36	1.542	0.876	30	17	7.67	0.798	38.2	14	10.74	0.802	15.8	30
1.319	30	11	34	1.548	0.872	30	9	7.43	0.790	38.3	15	7.98	0.798	45.9	15
1.306	31	13	36	1.558	0.866	30	11	7.77	0.787	35.3	14	7.96	0.791	45.3	15
1.294	30	11	38	1.560	0.865	31	17	7.38	0.783	40.2	14	10.59	0.790	16.5	30
1.291	30	7	30	1.571	0.859	31	9	7.54	0.779	35.4	16	8.15	0.786	42.7	14
1.286	31	17	40	1.584	0.852	30	11	7.36	0.769	38.6	14	8.06	0.785	43.6	14
1.285	30	19	42	1.587	0.851	31	11	7.69	0.765	30.4	15	7.98	0.784	44.3	15
1.281	30	15	34	1.594	0.847	30	15	7.07	0.759	39.3	15	10.51	0.784	14.8	30

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

FigureA.21 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 7,500.0 MWd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: MWd/MTU	20667.8
Exposure: MWd/MTU (Gwd)	7501.0 (750.86)	Axial Profile	Edit Radial Power
Delta E: MWd/MTU, (Gwd)	1.0 (0.10)	N(PRA) Power Exposure	Zone Avg. Max. IR JR
Power: MWt	2923.0 (100.00 %)	Top 25	10 0.714 1.129 25 28
Core Pressure: psia	1044.7	24 0.545 9.481	11 0.437 0.575 15 50
Inlet Subcooling: Btu/lbm	-20.29	23 0.728 13.240	12 0.498 0.772 5 14
Flow: Mlb/hr	80.46 (104.50 %)	22 0.820 16.355	14 1.071 1.268 23 32
		21 0.881 18.603	15 0.983 1.245 23 36
		20 0.907 20.097	16 0.791 1.130 17 46
		19 0.929 21.121	22 0.568 0.594 47 40
		18 0.947 21.853	30 1.129 1.406 25 32
		17 0.956 22.391	31 1.085 1.305 13 36
		16 0.958 21.627	
		15 0.971 22.209	
		14 1.051 22.372	
		13 1.088 23.040	
		12 1.129 23.703	
		11 1.172 24.296	
		10 1.220 24.823	
		9 1.271 25.250	
		8 1.322 25.694	
		7 1.367 26.123	
		6 1.400 26.518	
		5 1.407* 26.626*	
		4 1.362 25.899	
		3 1.219 23.197	
		2 0.927 17.291	
		Bottom 1 0.253 4.692	
		% AXIAL TILT -17.520 -12.036	
		AVG BOT 8ft/12ft 1.0945 1.0701	
Control Rod Density: %	7.54	Active Channel Flow: Mlb/hr	67.75
k-effective:	0.99543	(of total core flow)	
Void Fraction:	0.489	(of total core flow)	
Core Delta-P: psia	25.282		
Core Plate Delta-P: psia	20.752		
Coolant Temp: Deg-F	548.6		
In Channel Flow: Mlb/hr	67.75		
Total Bypass Flow (%):	15.8		
Total Water Rod Flow (%):	-0.0		
Source Convergence	0.00048		

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	Value	Margin	Exp.	FT	Value	Margin	Exp.	FT
1.406	30	25	32	1.502	0.899	30	25	7.71	0.819	38.3	15	8.28	0.823	45.3	15
1.379	30	23	34	1.535	0.880	30	23	7.63	0.815	38.8	15	10.99	0.820	14.3	30
1.378	30	23	30	1.536	0.879	30	23	7.86	0.812	35.4	16	10.84	0.809	13.6	30
1.325	30	21	28	1.594	0.847	31	13	8.22	0.811	29.4	15	8.75	0.809	38.7	16
1.312	30	21	32	1.606	0.840	30	21	7.52	0.792	39.4	14	10.82	0.807	14.9	30
1.305	31	13	36	1.608	0.839	30	21	7.57	0.790	38.5	14	10.79	0.805	15.3	30
1.300	30	25	36	1.609	0.839	31	21	7.54	0.787	38.6	14	10.79	0.805	14.6	30
1.300	30	11	38	1.647	0.820	30	25	7.52	0.786	38.8	14	8.53	0.804	40.5	15
1.298	31	21	36	1.650	0.818	30	13	7.42	0.784	39.9	14	10.75	0.803	14.3	30
1.290	30	13	40	1.653	0.817	14	23	7.32	0.781	38.7	15	7.84	0.802	47.9	14

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

Figure A.22 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 7,501.0 MWd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: MWd/MTU				21166.8								
Exposure: MWd/MTU (Gwd)	8000.0 (800.81)													
Delta E: MWd/MTU, (Gwd)	499.0 (49.95)													
Power: MWt	2923.0 (100.00 %)													
Core Pressure: psia	1044.7													
Inlet Subcooling: Btu/lbm	-20.80													
Flow: Mlb/hr	78.69 (102.20 %)													
1	3	5	7	9	11	13	15	17	19	21	23	25		
1				--	--	--	--	--					51	:JR
3		--	--	--	--	--	--	--	--	--			47	
5	--	--	--	--	--	--	--	--	--	--	--		43	
7	--	--	--	16	--	8	--	16	--	--	--		39	
9	--	--	--	--	--	--	--	--	--	--	--	--	35	
11	--	--	16	--	8	--	--	8	--	16	--	--	31	
13	--	--	--	--	--	--	--	--	--	--	--	--	27	
15	--	--	16	--	8	--	--	8	--	16	--	--	23	
17	--	--	--	--	--	--	--	--	--	--	--	--	19	
19	--	--	--	16	--	8	--	16	--	--	--		15	
21	--	--	--	--	--	--	--	--	--	--	--	--	11	
23	--	--	--	--	--	--	--	--	--	--	--	--	7	
25	--	--	--	--	--	--	--	--	--	--	--	--	3	
IR: 2	6	10	14	18	22	26	30	34	38	42	46	50		
Control Rod Density: %	7.54													
k-effective:	0.99526													
Void Fraction:	0.492													
Core Delta-P: psia	24.483													
Core Plate Delta-P: psia	19.953													
Coolant Temp: Deg-F	548.6													
In Channel Flow: Mlb/hr	66.20	Active Channel Flow: Mlb/hr				66.20								
Total Bypass Flow (%):	15.9	(of total core flow)												
Total Water Rod Flow (%):	-0.0	(of total core flow)												
Source Convergence	0.00046													

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	Value	Margin	Exp. FT	IR	Value	Margin	Exp. FT	IR
1.402	30	25	32	1.490	0.906	30	25	7.72	0.826	39.1	15	8.26	0.829	46.2	15
1.378	30	23	34	1.518	0.890	30	23	7.64	0.822	39.6	15	11.01	0.822	15.5	30
1.371	30	23	30	1.526	0.885	30	23	7.88	0.820	36.2	16	8.75	0.817	39.6	16
1.321	30	21	28	1.565	0.863	31	13	8.24	0.819	30.2	15	8.51	0.810	41.4	15
1.312	31	13	36	1.586	0.851	31	21	7.53	0.799	40.2	14	10.84	0.809	16.1	30
1.310	30	21	32	1.592	0.848	30	21	7.56	0.794	39.3	14	7.82	0.808	48.7	14
1.307	30	11	38	1.593	0.847	30	21	7.55	0.794	39.4	14	10.82	0.808	16.5	30
1.301	30	25	36	1.619	0.834	30	13	7.41	0.789	40.7	14	7.99	0.806	46.7	15
1.301	31	21	36	1.627	0.830	30	25	7.40	0.786	40.3	14	10.78	0.804	15.2	30
1.296	30	13	40	1.627	0.830	30	11	7.30	0.785	39.4	15	10.77	0.804	15.7	31

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

Figure A.23 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 8,000.0 MWd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: MWd/MTU	21666.8
Exposure: MWd/MTU (Gwd)	8500.0 (850.87)		
Delta E: MWd/MTU, (Gwd)	500.0 (50.05)		
Power: MWt	2923.0 (100.00 %)		
Core Pressure: psia	1044.6		
Inlet Subcooling: Btu/lbm	-21.56		
Flow: Mlb/hr	76.23 (99.00 %)		
1 3 5 7 9 11 13 15 17 19 21 23 25		Axial Profile	Edit Radial Power
1		N(PRA) Power Exposure	Zone Avg. Max. IR JR
3		Top 25 0.173 3.448	10 0.702 1.099 25 28
5		24 0.559 10.070	11 0.435 0.575 15 50
7		23 0.743 14.026	12 0.495 0.771 5 14
9		22 0.831 17.242	14 1.063 1.248 25 34
11		21 0.889 19.554	15 0.979 1.233 23 36
13		20 0.912 21.077	16 0.789 1.127 17 46
15		19 0.931 22.123	22 0.567 0.593 47 40
17		18 0.946 22.874	30 1.135 1.401 25 32
19		17 0.950 23.420	31 1.095 1.319 13 36
21		16 0.948 22.614	
23		15 0.956 23.208	
25		14 1.033 23.359	
IR: 2 6 10 14 18 22 26 30 34 38 42 46 50		13 1.068 24.062	
		12 1.109 24.763	
		11 1.153 25.397	
		10 1.204 25.969	
		9 1.259 26.445	
		8 1.316 26.938	
		7 1.369 27.411	
		6 1.410 27.839	
		5 1.424* 27.954*	
		4 1.383 27.184	
		3 1.237 24.346	
		2 0.939 18.164	
		Bottom 1 0.258 4.935	
Control Rod Density: %	7.54	% AXIAL TILT -17.500 -12.006	
k-effective:	0.99494	AVG BOT 8ft/12ft 1.0915 1.0692	
Void Fraction:	0.498		
Core Delta-P: psia	23.404		
Core Plate Delta-P: psia	18.876		
Coolant Temp: Deg-F	548.6		
In Channel Flow: Mlb/hr	64.05	Active Channel Flow: Mlb/hr	64.05
Total Bypass Flow (%):	16.0	(of total core flow)	
Total Water Rod Flow (%):	-0.0	(of total core flow)	
Source Convergence	0.00048		

Top Ten Thermal Limits Summary - Sorted by Margin

Power			MCPR			APLHGR			LHGR		
Value	FT	IR JR	Value	Margin	FT IR JR	Value	Margin	Exp. FT IR JR K	Value	Margin	Exp. FT IR JR K
1.401	30	25 32	1.468	0.920	30 25 32	7.76	0.837	39.9 15 21 46 5	8.27	0.838	47.1 15 21 46 5
1.379	30	23 34	1.493	0.904	30 23 34	7.68	0.833	40.4 15 13 42 5	11.11	0.829	16.7 30 21 44 4
1.368	30	23 30	1.506	0.896	30 23 30	8.32	0.832	31.1 15 9 38 4	8.78	0.828	40.6 16 17 46 5
1.319	31	13 36	1.530	0.882	31 13 36	7.93	0.831	37.0 16 17 46 5	8.64	0.819	41.1 15 9 38 4
1.319	30	21 28	1.555	0.868	31 21 36	7.57	0.809	41.0 14 11 40 5	7.84	0.817	49.5 14 13 38 5
1.314	30	11 38	1.567	0.862	30 21 32	7.59	0.805	40.2 14 19 44 5	10.94	0.816	17.3 30 13 40 4
1.311	30	21 32	1.571	0.859	30 21 28	7.58	0.803	40.1 14 23 44 5	8.00	0.816	47.6 15 13 42 5
1.305	31	21 36	1.582	0.853	30 13 40	7.43	0.798	41.4 14 13 38 5	7.93	0.815	48.2 14 19 44 5
1.303	30	25 36	1.591	0.849	30 11 38	7.45	0.797	41.1 14 15 44 5	10.92	0.815	16.9 31 19 46 4
1.302	30	13 40	1.599	0.844	30 25 36	7.33	0.793	40.2 15 21 42 5	10.92	0.815	17.7 30 11 38 4

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

Figure A.24 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 8,500.0 MWd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: MWd/MTU				22166.8						
Exposure: MWd/MTU (Gwd)	9000.0 (900.92)											
Delta E: MWd/MTU, (Gwd)	500.0 (50.05)											
Power: MWt	2923.0 (100.00 %)	N (PRA)		Power Exposure	Edit	Radial Power						
Core Pressure: psia	1044.6	Top	25	0.176	3.555	Zone	Avg.	Max.	IR	JR		
Inlet Subcooling: Btu/lbm	-21.56		24	0.567	10.370	10	0.696	1.087	25	28		
Flow: Mlb/hr	76.23 (99.00 %)		23	0.752	14.425	11	0.432	0.572	15	50		
			22	0.839	17.690	12	0.492	0.768	5	14		
			21	0.895	20.033	14	1.060	1.243	25	34		
			20	0.917	21.569	15	0.977	1.229	23	36		
		:JR	19	0.934	22.625	16	0.786	1.125	17	46		
1			18	0.947	23.384	22	0.565	0.590	47	40		
3			17	0.948	23.932	31	1.100	1.327	13	36		
5			16	0.943	23.103							
7			15	0.949	23.701							
9			14	1.025	23.846							
11			13	1.059	24.565							
13			12	1.100	25.286							
15			11	1.146	25.940							
17			10	1.197	26.537							
19			9	1.255	27.039							
21			8	1.315	27.558							
23			7	1.371	28.056							
25			6	1.415	28.503							
IR: 2	6	10	14	18	22	26	30	34	38	42	46	50
			5	1.431*	28.625*							
			4	1.388	27.836							
Control Rod Density: %	7.54		3	1.238	24.930							
			2	0.936	18.607							
k-effective:	0.99554	Bottom	1	0.257	5.058							
Void Fraction:	0.498											
Core Delta-P: psia	23.400	% AXIAL TILT				-17.359	-11.993					
Core Plate Delta-P: psia	18.872	AVG BOT 8ft/12ft				1.0892	1.0688					
Coolant Temp: Deg-F	548.5											
In Channel Flow: Mlb/hr	64.05	Active Channel Flow: Mlb/hr				64.05						
Total Bypass Flow (%):	16.0	(of total core flow)										
Total Water Rod Flow (%):	-0.0	(of total core flow)										
Source Convergence	0.00049											

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	Value	Margin	Exp.	FT	Value	Margin	Exp.	FT
1.402	30	25	32	1.468	0.920	30	25	7.79	0.847	40.7	15	8.27	0.846	47.9	15
1.383	30	23	34	1.489	0.906	30	23	8.02	0.841	37.2	16	8.79	0.837	41.5	16
1.366	30	23	30	1.508	0.895	30	23	7.70	0.841	41.2	15	11.16	0.833	17.9	30
1.327	31	13	36	1.520	0.888	31	13	8.33	0.839	32.0	15	7.96	0.825	49.1	14
1.321	30	11	38	1.547	0.872	31	21	7.58	0.817	41.8	14	7.84	0.825	50.3	14
1.320	30	21	28	1.564	0.863	30	21	7.62	0.814	41.0	14	8.63	0.825	41.9	15
1.314	30	21	32	1.572	0.859	30	21	7.59	0.810	40.9	14	8.00	0.823	48.4	15
1.310	31	21	36	1.573	0.858	30	13	7.48	0.807	41.9	14	11.00	0.821	18.1	31
1.308	30	13	40	1.583	0.853	30	11	7.44	0.805	42.2	14	8.28	0.819	44.9	14
1.307	30	25	36	1.590	0.849	31	13	7.34	0.800	41.0	15	10.96	0.818	18.9	30

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

Figure A.25 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 9,000.0 MWd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: MWd/MTU	22167.8
Exposure: MWd/MTU (Gwd)	9001.0 (901.02)		
Delta E: MWd/MTU, (Gwd)	1.0 (0.10)		
Power: MWt	2923.0 (100.00 %)		
Core Pressure: psia	1044.7		
Inlet Subcooling: Btu/lbm	-20.29		
Flow: Mlb/hr	80.46 (104.50 %)		
		Axial Profile	Edit Radial Power
		N(PRA) Power Exposure Zone Avg. Max. IR JR	
1 3 5 7 9 11 13 15 17 19 21 23 25		Top 25 0.175 3.555 10 0.699 1.101 25 28	
1		24 0.564 10.371 11 0.434 0.582 15 50	
3		23 0.746 14.426 12 0.489 0.762 5 14	
5		22 0.826 17.691 14 1.060 1.263 25 34	
7		21 0.872 20.034 15 0.974 1.249 23 36	
9		20 0.880 21.569 16 0.788 1.147 17 46	
11		19 0.878 22.626 22 0.566 0.587 47 40	
13		18 0.884 23.385 30 1.140 1.425 25 32	
15		17 0.891 23.933 31 1.098 1.328 21 36	
17		16 0.905 23.104	
19		15 0.928 23.702	
21		14 1.016 23.847	
23		13 1.062 24.566	
25		12 1.111 25.287	
IR: 2 6 10 14 18 22 26 30 34 38 42 46 50		11 1.164 25.941	
		10 1.222 26.538	
		9 1.285 27.040	
		8 1.348 27.560	
		7 1.406 28.057	
		6 1.451 28.505	
		5 1.467* 28.627*	
		4 1.423 27.837	
		3 1.269 24.931	
		2 0.961 18.608	
		Bottom 1 0.264 5.059	
Control Rod Density: %	7.91	% AXIAL TILT -20.079 -11.993	
k-effective:	0.99507	AVG BOT 8ft/12ft 1.1047 1.0688	
Void Fraction:	0.493		
Core Delta-P: psia	25.380		
Core Plate Delta-P: psia	20.848		
Coolant Temp: Deg-F	548.7		
In Channel Flow: Mlb/hr	67.71	Active Channel Flow: Mlb/hr	67.71
Total Bypass Flow (%):	15.9	(of total core flow)	
Total Water Rod Flow (%):	-0.0	(of total core flow)	
Source Convergence	0.00046		

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	Value	Margin	Exp. FT	IR	Value	Margin	Exp. FT	IR
1.425	30	25	32	1.489	0.907	30	25	7.99	0.869	40.7	15	8.48	0.868	47.9	15
1.404	30	23	34	1.513	0.892	30	23	7.90	0.862	41.2	15	9.02	0.859	41.5	16
1.385	30	23	30	1.535	0.879	30	23	8.17	0.862	37.8	16	11.44	0.854	17.9	30
1.332	30	21	28	1.574	0.857	31	21	8.55	0.861	32.0	15	8.05	0.848	50.4	14
1.330	30	25	36	1.592	0.848	31	13	7.78	0.838	41.8	14	8.74	0.847	43.1	15
1.328	30	21	32	1.597	0.846	30	21	7.81	0.835	41.0	14	8.16	0.847	49.1	14
1.328	31	21	36	1.609	0.839	30	21	7.79	0.831	40.9	14	8.20	0.844	48.4	15
1.321	30	21	44	1.613	0.837	30	25	7.67	0.827	41.9	14	11.27	0.841	18.1	31
1.318	30	11	38	1.620	0.833	30	13	7.64	0.827	42.2	14	8.50	0.840	44.9	14
1.318	31	13	36	1.624	0.831	30	21	7.52	0.820	41.0	15	11.25	0.839	18.9	30

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

Figure A.26 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 9,001.0 MWd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: MWd/MTU	22666.8
Exposure: MWd/MTU (Gwd)	9500.0 (950.97)		
Delta E: MWd/MTU, (Gwd)	499.0 (49.95)		
Power: MWt	2923.0 (100.00 %)		
Core Pressure: psia	1044.7		
Inlet Subcooling: Btu/lbm	-20.91		
Flow: Mlb/hr	78.31 (101.70 %)		
1 3 5 7 9 11 13 15 17 19 21 23 25		Axial Profile	Edit Radial Power
1		N(PRA) Power Exposure	Zone Avg. Max. IR JR
3		Top 25 0.177 3.663	10 0.694 1.089 25 28
5		24 0.569 10.673	11 0.432 0.581 15 50
7		23 0.751 14.826	12 0.487 0.760 5 14
9		22 0.829 18.136	14 1.056 1.256 25 34
11		21 0.873 20.503	15 0.972 1.243 23 36
13		20 0.880 22.043	16 0.786 1.144 17 46
15		19 0.876 23.099	22 0.565 0.586 47 40
17		18 0.880 23.861	30 1.143 1.425 25 32
19		17 0.886 24.413	31 1.103 1.333 21 36
21		16 0.897 23.571	
23		15 0.918 24.181	
25		14 1.004 24.325	
IR: 2 6 10 14 18 22 26 30 34 38 42 46 50		13 1.049 25.066	
		12 1.098 25.810	
		11 1.152 26.489	
		10 1.212 27.113	
		9 1.277 27.645	
		8 1.344 28.194	
		7 1.408 28.719	
		6 1.460 29.188	
		5 1.482* 29.317*	
		4 1.443 28.507	
		3 1.290 25.528	
		2 0.976 19.060	
		Bottom 1 0.268 5.185	
Control Rod Density: %	7.91		
k-effective:	0.99500		
Void Fraction:	0.499		
Core Delta-P: psia	24.426	% AXIAL TILT	-20.345 -12.039
Core Plate Delta-P: psia	19.896	AVG BOT 8ft/12ft	1.1046 1.0686
Coolant Temp: Deg-F	548.6		
In Channel Flow: Mlb/hr	65.81	Active Channel Flow: Mlb/hr	65.81
Total Bypass Flow (%):	16.0	(of total core flow)	
Total Water Rod Flow (%):	-0.0	(of total core flow)	
Source Convergence	0.00043		

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	Value	Margin	Exp.	FT	IR	Value	Margin	Exp.
1.425	30	25	32	1.471	0.918	30	25	8.03	0.879	41.5	15	21	8.49	0.878	48.8
1.406	30	23	34	1.491	0.905	30	23	8.30	0.877	38.0	16	17	9.11	0.869	41.7
1.383	30	23	30	1.518	0.889	30	23	8.60	0.872	32.9	15	9	11.53	0.862	19.1
1.333	30	25	36	1.548	0.872	31	21	7.91	0.871	42.0	15	13	8.19	0.858	49.9
1.333	31	21	36	1.562	0.864	31	13	7.79	0.846	42.6	14	11	8.88	0.858	42.8
1.331	30	21	28	1.575	0.857	30	21	7.85	0.846	41.8	14	19	8.05	0.856	51.2
1.330	30	21	32	1.590	0.849	30	25	7.82	0.841	41.7	14	23	11.42	0.855	19.3
1.326	30	21	44	1.590	0.849	30	21	7.70	0.837	42.7	14	15	11.34	0.855	20.1
1.324	31	13	36	1.591	0.849	30	13	7.66	0.835	43.0	14	13	8.19	0.851	49.2
1.322	30	11	38	1.595	0.846	30	21	7.55	0.830	41.8	15	21	11.32	0.850	19.6

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

Figure A.27 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 9,500.0 MWd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: MWd/MTU	23166.9
Exposure: MWd/MTU (GWd)	10000.0 (1001.00)		
Delta E: MWd/MTU, (GWd)	500.0 (50.05)		
Power: MWt	2923.0 (100.00 %)		
Core Pressure: psia	1044.7		
Inlet Subcooling: Btu/lbm	-21.49		
Flow: Mlb/hr	76.46 (99.30 %)		
		Axial Profile	Edit Radial Power
		N(PRA) Power Exposure	Zone Avg. Max. IR JR
		Top 25	0.178 3.773 10 0.689 1.076 25 28
		24	0.573 10.979 11 0.431 0.579 15 50
		23	0.754 15.229 12 0.485 0.758 5 14
		22	0.830 18.582 14 1.052 1.249 25 34
		21	0.873 20.974 15 0.970 1.238 23 36
		20	0.879 22.517 16 0.784 1.141 17 46
		19	0.875 23.571 22 0.564 0.585 47 40
		18	0.877 24.335 30 1.147 1.425 25 32
		17	0.881 24.890 31 1.108 1.338 21 36
		16	0.891 24.034
		15	0.909 24.654
		14	0.994 24.798
		13	1.038 25.560
		12	1.088 26.327
		11	1.142 27.032
		10	1.203 27.684
		9	1.271 28.247
		8	1.341 28.828
		7	1.409 29.383
		6	1.466 29.876
		5	1.495* 30.016*
		4	1.462 29.187
		3	1.309 26.136
		2	0.989 19.520
		Bottom 1	0.272 5.313
			% AXIAL TILT -20.581 -12.089
			AVG BOT 8ft/12ft 1.1046 1.0685
Control Rod Density: %	7.91		
k-effective:	0.99499		
Void Fraction:	0.504		
Core Delta-P: psia	23.623		
Core Plate Delta-P: psia	19.094		
Coolant Temp: Deg-F	548.6		
In Channel Flow: Mlb/hr	64.19	Active Channel Flow: Mlb/hr	64.19
Total Bypass Flow (%):	16.0	(of total core flow)	
Total Water Rod Flow (%):	-0.0	(of total core flow)	
Source Convergence	0.00035		

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	Value	Margin	Exp. FT	IR	Value	Margin	Exp. FT	IR
1.425	30	25	32	1.457	0.927	30	25	8.35	0.889	38.9	16	8.47	0.885	49.7	15
1.409	30	23	34	1.473	0.916	30	23	8.10	0.888	41.7	15	9.13	0.880	42.6	16
1.381	30	23	30	1.501	0.899	30	23	8.62	0.881	33.8	15	11.61	0.877	20.4	30
1.338	31	21	36	1.525	0.885	31	21	7.90	0.877	42.9	15	11.53	0.872	20.5	31
1.337	30	25	36	1.537	0.879	31	13	7.86	0.854	42.7	14	8.20	0.868	50.8	14
1.332	30	21	32	1.557	0.867	30	21	7.78	0.852	43.4	14	11.39	0.868	21.3	30
1.331	30	21	28	1.565	0.862	30	13	7.83	0.849	42.5	14	8.88	0.866	43.7	15
1.330	30	21	44	1.569	0.860	30	25	7.70	0.844	43.5	14	8.03	0.863	52.0	14
1.330	31	13	36	1.570	0.860	30	21	7.65	0.841	43.8	14	11.34	0.861	20.8	30
1.326	30	11	38	1.575	0.857	30	21	7.57	0.838	42.6	15	8.16	0.856	50.1	15

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

Figure A.28 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 10,000.0 MWd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: MWd/MTU	23167.9
Exposure: MWd/MTU (Gwd)	10001.0 (1001.10)		
Delta E: MWd/MTU, (Gwd)	1.0 (0.10)		
Power: MWt	2923.0 (100.00 %)		
Core Pressure: psia	1044.7		
Inlet Subcooling: Btu/lbm	-20.37		
Flow: Mlb/hr	80.16 (104.10 %)		
		Axial Profile	Edit Radial Power
		N(PRA) Power Exposure Zone Avg. Max. IR JR	
		Top 25	0.169 3.773 10 0.689 1.072 25 28
		24	0.543 10.980 11 0.437 0.568 15 50
		23	0.718 15.230 12 0.485 0.783 5 14
		22	0.802 18.583 14 1.036 1.224 21 30
		21	0.863 20.975 15 1.009 1.208 11 32
		20	0.899 22.518 16 0.789 1.101 17 46
		19	0.931 23.572 22 0.570 0.600 47 40
		18	0.961 24.336 30 1.120 1.379 23 30
		17	0.982 24.891 31 1.148 1.353 13 36
		16	1.022 24.035
		15	1.066 24.655
		14	1.178 24.799
		13	1.233 25.561
		12	1.279 26.328
		11	1.313 27.033
		10	1.326* 27.685
		9	1.312 28.248
		8	1.311 28.829
		7	1.318 29.384
		6	1.315 29.877
		5	1.284 30.017*
		4	1.198 29.189
		3	1.025 26.138
		2	0.749 19.521
		Bottom 1	0.202 5.313
			% AXIAL TILT -14.729 -12.089
			AVG BOT 8ft/12ft 1.0953 1.0685
Control Rod Density: %	9.61		
k-effective:	0.99520		
Void Fraction:	0.476		
Core Delta-P: psia	24.996		
Core Plate Delta-P: psia	20.464		
Coolant Temp: Deg-F	548.4		
In Channel Flow: Mlb/hr	67.56	Active Channel Flow: Mlb/hr	67.56
Total Bypass Flow (%):	15.7	(of total core flow)	
Total Water Rod Flow (%):	-0.0	(of total core flow)	
Source Convergence	0.00046		

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	Value	Margin	Exp. FT	IR	Value	Margin	Exp. FT	IR
1.379	30	23	30	1.483	0.910	30	13	7.81	0.824	39.7	14	8.73	0.845	42.9	14
1.368	30	13	40	1.509	0.895	31	13	7.70	0.813	39.7	14	8.61	0.832	42.8	14
1.365	30	15	38	1.511	0.893	31	13	7.68	0.801	38.4	14	8.64	0.823	41.5	14
1.360	30	21	32	1.512	0.893	30	23	7.50	0.784	38.7	14	8.09	0.813	46.4	15
1.353	31	13	36	1.532	0.881	30	21	7.05	0.782	42.9	15	8.44	0.806	41.8	14
1.346	31	13	32	1.541	0.876	30	21	7.35	0.769	39.1	14	7.99	0.798	45.8	14
1.345	30	21	28	1.542	0.875	31	17	7.20	0.763	37.9	15	7.82	0.792	47.0	15
1.344	30	11	38	1.543	0.875	30	15	7.14	0.757	40.1	14	7.87	0.787	45.9	14
1.344	30	15	30	1.555	0.868	30	19	6.94	0.756	43.0	14	8.15	0.785	42.6	15
1.337	30	19	30	1.559	0.866	30	15	7.46	0.756	35.7	14	7.61	0.779	47.9	15

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

Figure A.29 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 10,001.0 MWd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: Mwd/MTU	23667.0
Exposure: Mwd/MTU (Gwd)	10500.0 (1051.10)		
Delta E: Mwd/MTU, (Gwd)	499.0 (49.95)		
Power: Mwt	2923.0 (100.00 %)		
Core Pressure: psia	1044.7		
Inlet Subcooling: Btu/lbm	-20.96		
Flow: Mlb/hr	78.15 (101.50 %)		
		Axial Profile	Edit Radial Power
		N(PRA) Power Exposure Zone Avg. Max. IR JR	
		Top 25	
		24 0.546 11.271 11 0.436 0.567 15 50	
		23 0.721 15.615 12 0.484 0.781 5 14	
		22 0.804 19.015 14 1.032 1.216 21 30	
		21 0.864 21.439 15 1.006 1.203 11 32	
		20 0.899 23.002 16 0.788 1.099 17 46	
		19 0.930 24.073 22 0.569 0.599 47 40	
		18 0.958 24.853 30 1.123 1.377 23 30	
		17 0.978 25.419 31 1.152 1.357 13 36	
		16 1.016 24.561	
		15 1.058 25.205	
		14 1.168 25.354	
		13 1.222 26.141	
		12 1.268 26.930	
		11 1.302 27.651	
		10 1.316 28.309	
		9 1.305 28.866	
		8 1.307 29.446	
		7 1.318 30.004	
		6 1.321* 30.496	
		5 1.297 30.622*	
		4 1.216 29.752	
		3 1.044 26.620	
		2 0.763 19.873	
		Bottom 1 0.207 5.410	
			% AXIAL TILT -14.936 -12.016
			AVG BOT 8ft/12ft 1.0952 1.0682
Control Rod Density: %	9.61		
k-effective:	0.99506		
Void Fraction:	0.481		
Core Delta-P: psia	24.117		
Core Plate Delta-P: psia	19.587		
Coolant Temp: Deg-F	548.4		
In Channel Flow: Mlb/hr	65.81	Active Channel Flow: Mlb/hr	65.81
Total Bypass Flow (%):	15.8	(of total core flow)	
Total Water Rod Flow (%):	-0.0	(of total core flow)	
Source Convergence	0.00035		

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	Value	Margin	Exp. FT	IR	Value	Margin	Exp. FT	IR
1.377	30	23	30	1.472	0.917	30	13	7.69	0.818	40.5	14	8.59	0.839	43.9	14
1.369	30	13	40	1.485	0.909	31	13	7.58	0.807	40.6	14	8.48	0.828	43.7	14
1.367	30	15	38	1.488	0.907	31	13	7.57	0.795	39.2	14	8.50	0.817	42.4	14
1.361	30	21	32	1.496	0.902	30	23	7.04	0.787	43.6	15	7.95	0.808	47.3	15
1.357	31	13	36	1.513	0.892	30	21	7.39	0.779	39.5	14	8.31	0.802	42.7	14
1.351	31	13	32	1.518	0.889	31	17	7.29	0.768	39.8	14	7.87	0.794	46.6	14
1.347	30	15	30	1.527	0.884	30	21	6.89	0.760	44.2	14	7.71	0.788	47.9	15
1.347	30	11	38	1.533	0.880	30	15	7.10	0.757	38.6	15	7.75	0.783	46.7	14
1.345	30	21	28	1.538	0.877	30	15	7.40	0.755	36.5	14	8.01	0.779	43.4	15
1.339	30	19	30	1.538	0.877	30	19	6.97	0.751	41.8	14	7.37	0.776	50.3	15

* LHGR calculated with pin-power reconstruction

* CPR calculated with pin-power reconstruction & CPR limit type 3

* Thermal limit file:

FigureA.30 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 10,500.0 Mwd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: MWd/MTU	24167.0
Exposure: MWd/MTU (GWd)	11000.0 (1101.10)		
Delta E: MWd/MTU, (GWd)	500.0 (50.05)		
Power: MWt	2923.0 (100.00 %)		
Core Pressure: psia	1044.7		
Inlet Subcooling: Btu/lbm	-21.15		
Flow: Mlb/hr	77.54 (100.70 %)		
		Axial Profile	Edit Radial Power
		N(PRA) Power Exposure	Zone Avg. Max. IR JR
		Top 25	0.173 3.984 10 0.678 1.046 25 28
		24	0.553 11.564 11 0.434 0.565 15 50
		23	0.729 16.003 12 0.482 0.778 5 14
		22	0.811 19.448 14 1.028 1.208 21 30
		21	0.870 21.905 15 1.004 1.199 11 32
		20	0.904 23.487 16 0.786 1.097 17 46
		19	0.934 24.575 22 0.568 0.598 47 40
		18	0.961 25.370 30 1.126 1.374 23 30
		17	0.979 25.947 31 1.157 1.361 13 36
		16	1.015 25.086
		15	1.055 25.751
		14	1.164 25.904
		13	1.216 26.717
		12	1.262 27.528
		11	1.295 28.265
		10	1.309 28.929
		9	1.299 29.481
		8	1.302 30.063
		7	1.313 30.626
		6	1.318* 31.119
		5	1.297 31.233*
		4	1.219 30.326
		3	1.048 27.112
		2	0.766 20.233
		Bottom 1	0.207 5.509
			% AXIAL TILT -14.653 -11.950
			AVG BOT 8ft/12ft 1.0926 1.0679
Control Rod Density: %	9.61		
k-effective:	0.99531		
Void Fraction:	0.482		
Core Delta-P: psia	23.835		
Core Plate Delta-P: psia	19.306		
Coolant Temp: Deg-F	548.4		
In Channel Flow: Mlb/hr	65.27	Active Channel Flow: Mlb/hr	65.27
Total Bypass Flow (%):	15.8	(of total core flow)	
Total Water Rod Flow (%):	-0.0	(of total core flow)	
Source Convergence	0.00048		

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	JR	Exp.	FT	IR	JR	Value	Margin	Exp.
1.374	30	23	30	1.473	0.916	31	13	32	7.59	0.814	41.4	14	8.48	0.837	44.8
1.371	30	13	40	1.475	0.915	30	13	40	7.49	0.804	41.3	14	8.37	0.825	44.6
1.370	30	15	38	1.475	0.915	31	13	36	7.48	0.792	40.0	14	8.39	0.815	43.3
1.362	30	21	32	1.493	0.904	30	23	30	6.98	0.785	44.4	15	7.86	0.806	48.1
1.361	31	13	36	1.506	0.897	31	17	40	7.31	0.776	40.3	14	8.21	0.800	43.6
1.356	31	13	32	1.506	0.896	30	21	32	7.35	0.771	39.5	14	7.78	0.792	47.4
1.351	30	15	30	1.526	0.885	31	21	40	6.82	0.759	44.9	14	7.62	0.787	48.7
1.349	30	11	38	1.526	0.885	30	21	28	7.47	0.758	35.9	14	7.66	0.781	47.5
1.344	30	21	28	1.529	0.883	30	15	30	7.03	0.755	39.4	15	8.02	0.778	43.2
1.342	31	17	40	1.534	0.880	30	19	30	6.96	0.748	41.6	14	7.91	0.775	44.2

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

Figure A.31 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 11,000.0 MWd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: MWd/MTU	25167.1
Exposure: MWd/MTU (Gwd)	12000.0 (1201.20)		
Delta E: MWd/MTU, (Gwd)	500.0 (50.05)		
Power: MWt	2923.0 (100.00 %)		
Core Pressure: psia	1044.6		
Inlet Subcooling: Btu/lbm	-21.56		
Flow: Mlb/hr	76.23 (99.00 %)		
1 3 5 7 9 11 13 15 17 19 21 23 25		Axial Profile	Edit Radial Power
1		N(PRA) Power Exposure Zone Avg. Max. IR JR	
3		Top 25 0.177 4.200 10 0.667 1.018 25 28	
5		24 0.565 12.162 11 0.432 0.562 15 50	
7		23 0.741 16.789 12 0.479 0.774 5 14	
9		22 0.823 20.326 14 1.020 1.189 21 30	
11		21 0.882 22.846 15 0.999 1.192 11 32	
13		20 0.915 24.465 16 0.785 1.094 17 46	
15		19 0.944 25.585 22 0.567 0.598 47 40	
17		18 0.970 26.408 30 1.131 1.372 13 40	
19		17 0.986 27.004 31 1.167 1.369 13 36	
21		16 1.019 26.134	
23		15 1.057 26.840	
25		14 1.163 27.001	
IR: 2 6 10 14 18 22 26 30 34 38 42 46 50		13 1.213 27.861	
		12 1.256 28.715	
		11 1.286 29.482	
		10 1.298 30.160	
		9 1.287 30.702	
		8 1.289 31.287	
		7 1.300 31.861	
		6 1.305* 32.360	
		5 1.287 32.456*	
		4 1.215 31.477	
		3 1.050 28.104	
		2 0.766 20.957	
		Bottom 1 0.207 5.708	
Control Rod Density: %	9.61		
k-effective:	0.99535		
Void Fraction:	0.483		
Core Delta-P: psia	23.239	% AXIAL TILT -13.889 -11.809	
Core Plate Delta-P: psia	18.711	AVG BOT 8ft/12ft 1.0875 1.0672	
Coolant Temp: Deg-F	548.4		
In Channel Flow: Mlb/hr	64.14	Active Channel Flow: Mlb/hr	64.14
Total Bypass Flow (%):	15.9	(of total core flow)	
Total Water Rod Flow (%):	-0.0	(of total core flow)	
Source Convergence	0.00045		

Top Ten Thermal Limits Summary - Sorted by Margin

Power			MCPR			APLHGR			LHGR		
Value	FT	IR JR	Value	Margin	FT	IR JR	Value	Margin	Exp. FT	IR JR	K
1.372	30	13 40	1.452	0.930	31	13 32	7.43	0.809	42.9 14	11 18 11	8.28
1.372	30	15 38	1.454	0.929	31	13 36	7.35	0.800	42.7 14	17 42 11	8.19
1.369	31	13 36	1.479	0.913	30	13 40	7.33	0.788	41.6 14	9 20 11	8.22
1.364	31	13 32	1.483	0.910	31	17 40	7.26	0.774	41.0 14	19 26 20	7.68
1.363	30	23 30	1.497	0.902	30	23 30	7.17	0.773	41.8 14	19 10 11	8.13
1.359	30	21 32	1.503	0.898	31	21 40	6.74	0.770	45.8 15	13 42 5	7.62
1.355	30	15 30	1.503	0.898	30	21 32	7.39	0.761	37.5 14	25 34 20	7.46
1.352	30	11 38	1.516	0.890	30	15 30	6.91	0.752	40.8 15	11 22 11	7.91
1.349	31	17 40	1.526	0.884	30	11 38	6.63	0.744	45.9 14	11 40 6	7.51
1.338	30	19 30	1.527	0.884	30	15 38	6.82	0.744	43.0 14	13 16 11	7.74

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

Figure A.33 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 12,000.0 MWd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: MWd/MTU	25667.0
Exposure: MWd/MTU (GWD)	12500.0 (1251.30)		
Delta E: MWd/MTU, (GWD)	500.0 (50.05)		
Power: MWt	2923.0 (100.00 %)		
Core Pressure: psia	1044.7		
Inlet Subcooling: Btu/lbm	-21.32		
Flow: Mlb/hr	77.00 (100.00 %)		
		Axial Profile	Edit Radial Power
		N(PRA) Power Exposure Zone Avg. Max. IR JR	
		Top 25	0.181 4.310 10 0.662 1.004 25 28
		24	0.576 12.465 11 0.431 0.560 15 50
		23	0.755 17.187 12 0.478 0.772 5 14
		22	0.837 20.770 14 1.017 1.183 13 38
		21	0.896 23.322 15 0.998 1.190 9 38
		20	0.929 24.958 16 0.784 1.092 17 46
		19	0.957 26.094 22 0.567 0.597 47 40
		18	0.982 26.931 30 1.133 1.371 15 38
		17	0.997 27.535 31 1.172 1.371 13 36
		16	1.028 26.660
		15	1.064 27.386
		14	1.169 27.549
		13	1.217 28.433
		12	1.258 29.307
		11	1.286 30.089
		10	1.296* 30.772
		9	1.281 31.309
		8	1.279 31.894
		7	1.286 32.474
		6	1.287 32.976
		5	1.265 33.062*
		4	1.192 32.050
		3	1.029 28.598
		2	0.750 21.319
		Bottom 1	0.203 5.807
			% AXIAL TILT -12.787 -11.731
			AVG BOT 8ft/12ft 1.0812 1.0668
Control Rod Density: %	9.61		
k-effective:	0.99575		
Void Fraction:	0.479		
Core Delta-P: psia	23.529		
Core Plate Delta-P: psia	19.000		
Coolant Temp: Deg-F	548.4		
In Channel Flow: Mlb/hr	64.84	Active Channel Flow: Mlb/hr	64.84
Total Bypass Flow (%):	15.8	(of total core flow)	
Total Water Rod Flow (%):	-0.0	(of total core flow)	
Source Convergence	0.00041		

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	Value	Margin	Exp. FT	IR	Value	Margin	Exp. FT	IR
1.371	31	13	36	1.454	0.928	31	13	7.36	0.808	43.7	14	8.20	0.834	47.4	14
1.371	30	15	38	1.455	0.928	31	13	7.31	0.801	43.5	14	8.12	0.825	47.2	14
1.370	30	13	40	1.483	0.910	30	13	7.27	0.788	42.4	14	8.15	0.814	45.9	14
1.367	31	13	32	1.484	0.909	31	17	7.27	0.780	41.8	14	7.61	0.804	50.6	15
1.356	30	23	30	1.505	0.897	31	21	7.15	0.774	42.3	14	8.08	0.803	45.3	14
1.355	30	21	32	1.513	0.892	30	23	7.40	0.767	38.2	14	7.55	0.791	49.9	14
1.355	30	15	30	1.516	0.891	30	21	6.61	0.755	45.9	15	8.01	0.788	44.4	14
1.351	31	17	40	1.522	0.887	30	15	6.86	0.752	41.6	15	7.41	0.787	51.0	15
1.351	30	11	38	1.530	0.882	30	11	6.73	0.744	44.3	14	7.45	0.781	49.9	14
1.336	30	19	30	1.533	0.880	30	15	6.90	0.740	41.4	14	7.69	0.775	46.6	15

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

Figure A.34 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 12,500.0 MWd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: MWd/MTU	25668.1
Exposure: MWd/MTU (Gwd)	12501.0 (1251.40)		
Delta E: MWd/MTU, (Gwd)	1.0 (0.10)		
Power: MWt	2923.0 (100.00 %)		
Core Pressure: psia	1044.6		
Inlet Subcooling: Btu/lbm	-21.56		
Flow: Mlb/hr	76.23 (99.00 %)		
		Axial Profile	Edit Radial Power
		N(PRA) Power Exposure	Zone Avg. Max. IR JR
1 3 5 7 9 11 13 15 17 19 21 23 25		Top 25	0.194 4.310 10 0.665 1.007 25 28
1		24	0.620 12.466 11 0.420 0.544 15 50
3		23	0.807 17.188 12 0.482 0.765 5 14
5		22	0.882 20.771 14 1.032 1.227 19 28
7		21	0.921 23.323 15 0.962 1.215 17 30
9		20	0.920 24.959 16 0.778 1.075 17 46
11		19	0.907 26.095 22 0.560 0.594 47 40
13		18	0.881 26.932 30 1.159 1.417 21 28
15		17	0.870 27.536 31 1.132 1.360 11 30
17		16	0.879 26.661
19		15	0.897 27.387
21		14	0.980 27.550
23		13	1.022 28.434
25		12	1.070 29.308
IR: 2 6 10 14 18 22 26 30 34 38 42 46 50		11	1.121 30.090
		10	1.179 30.774
		9	1.244 31.310
		8	1.312 31.896
		7	1.378 32.475
		6	1.435 32.977
		5	1.470* 33.064*
		4	1.449 32.051
		3	1.307 28.599
		2	0.984 21.319
		Bottom 1	0.272 5.808
Control Rod Density: %	8.03		
k-effective:	0.99608		
Void Fraction:	0.500		
Core Delta-P: psia	23.444	% AXIAL TILT	-18.613 -11.730
Core Plate Delta-P: psia	18.915	AVG BOT 8ft/12ft	1.0884 1.0668
Coolant Temp: Deg-F	548.6		
In Channel Flow: Mlb/hr	64.04	Active Channel Flow: Mlb/hr	64.04
Total Bypass Flow (%):	16.0	(of total core flow)	
Total Water Rod Flow (%):	-0.0	(of total core flow)	
Source Convergence	0.00043		

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	Value	Margin	Exp.	FT	IR	Value	Margin	Exp.
1.417	30	21	28	1.471	0.918	30	9 28	7.74	0.877	45.0	15	7 32	11.24	0.880	24.4 30
1.416	30	19	30	1.476	0.915	30	19 30	8.23	0.867	37.3	15	9 38	11.27	0.878	23.8 31
1.386	30	9	28	1.479	0.913	30	21 28	7.38	0.850	46.5	15	13 42	11.16	0.869	23.9 30
1.378	30	9	32	1.490	0.906	30	9 32	7.73	0.846	43.4	14	9 34	11.04	0.861	24.0 30
1.363	30	17	28	1.517	0.890	31	17 32	7.54	0.846	45.7	14	9 30	8.00	0.853	51.4 15
1.360	31	11	30	1.528	0.883	30	23 30	7.44	0.845	45.2	15	7 36	8.17	0.852	49.5 14
1.359	30	23	30	1.531	0.882	31	17 40	7.45	0.834	43.8	15	11 32	8.41	0.851	46.9 15
1.354	31	17	32	1.532	0.881	31	11 30	7.80	0.833	40.9	14	7 28	8.28	0.850	48.1 14
1.339	30	7	30	1.541	0.876	31	9 36	7.72	0.831	40.0	16	45 18	10.93	0.848	23.5 31
1.333	31	17	40	1.542	0.875	30	17 28	9.85	0.820	19.9	31	7 34	10.79	0.844	24.3 30

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

Figure A.35 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 12,501.0 MWd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: MWd/MTU	26167.1
Exposure: MWd/MTU (GWd)	13000.0 (1301.30)		
Delta E: MWd/MTU, (GWd)	499.0 (49.95)		
Power: MWt	2923.0 (100.00 %)		
Core Pressure: psia	1044.7		
Inlet Subcooling: Btu/lbm	-21.49		
Flow: Mlb/hr	76.46 (99.30 %)		
		Axial Profile	Edit Radial Power
		N(PRA) Power Exposure	Zone Avg. Max. IR JR
		Top 25	0.199 4.430 10 0.659 0.994 25 28
		24	0.636 12.798 11 0.419 0.543 15 50
		23	0.827 17.620 12 0.481 0.763 5 14
		22	0.903 21.245 14 1.029 1.218 19 28
		21	0.943 23.818 15 0.960 1.209 17 30
		20	0.942 25.454 16 0.778 1.074 17 46
		19	0.927 26.583 22 0.559 0.594 47 40
		18	0.900 27.406 30 1.160 1.412 19 30
		17	0.887 28.004 31 1.137 1.363 11 30
		16	0.894 27.114
		15	0.911 27.849
		14	0.992 28.011
		13	1.032 28.915
		12	1.077 29.811
		11	1.124 30.617
		10	1.178 31.328
		9	1.237 31.895
		8	1.297 32.513
		7	1.355 33.123
		6	1.404 33.652
		5	1.432* 33.755*
		4	1.409 32.733
		3	1.272 29.214
		2	0.957 21.782
		Bottom 1	0.264 5.937
			% AXIAL TILT -16.879 -11.747
			AVG BOT 8ft/12ft 1.0788 1.0664
Control Rod Density: %	8.03		
k-effective:	0.99612		
Void Fraction:	0.496		
Core Delta-P: psia	23.470		
Core Plate Delta-P: psia	18.942		
Coolant Temp: Deg-F	548.6		
In Channel Flow: Mlb/hr	64.28	Active Channel Flow: Mlb/hr	64.28
Total Bypass Flow (%):	15.9	(of total core flow)	
Total Water Rod Flow (%):	-0.0	(of total core flow)	
Source Convergence	0.00046		

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	Value	Margin	Exp. FT	IR	Value	Margin	Exp. FT	IR
1.412	30	19	30	1.467	0.920	30	9 28	7.42	0.848	45.9 15	7 32 4	10.85	0.854	25.1 31	7 34 4
1.411	30	21	28	1.479	0.913	30	19 30	7.87	0.836	38.2 15	9 38 4	10.77	0.853	25.6 30	7 30 4
1.387	30	9	28	1.483	0.910	30	9 32	7.28	0.823	46.5 14	9 30 5	10.76	0.846	24.9 30	9 32 4
1.378	30	9	32	1.486	0.908	30	21 28	7.08	0.821	47.3 15	13 42 5	10.58	0.834	25.2 30	9 28 4
1.363	31	11	30	1.514	0.891	31	17 32	7.35	0.820	45.2 14	9 34 5	7.88	0.830	50.4 14	9 30 5
1.362	30	17	28	1.524	0.886	31	17 40	7.09	0.819	46.9 15	7 36 5	7.49	0.828	54.3 15	45 22 5
1.356	31	17	32	1.525	0.885	31	11 30	7.51	0.814	40.9 16	45 36 4	7.98	0.827	49.0 14	9 34 5
1.350	30	23	30	1.531	0.882	31	9 36	7.20	0.812	44.6 15	11 32 5	10.50	0.824	24.7 31	9 36 4
1.338	30	7	30	1.536	0.879	31	13 32	7.47	0.805	41.7 14	7 28 4	8.04	0.820	47.7 15	9 38 4
1.335	31	17	40	1.538	0.877	30	23 30	9.50	0.798	21.0 31	7 34 4	8.25	0.818	45.2 16	45 36 4

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

Figure A.36 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 13,000.0 MWd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: MWd/MTU	26667.1
Exposure: MWd/MTU (Gwd)	13500.0 (1351.40)		
Delta E: MWd/MTU, (Gwd)	500.0 (50.05)		
Power: MWt	2923.0 (100.00 %)		
Core Pressure: psia	1044.7		
Inlet Subcooling: Btu/lbm	-21.23		
Flow: Mlb/hr	77.31 (100.40 %)		
		Axial Profile	Edit Radial Power
		N(PRA) Power Exposure Zone Avg. Max. IR JR	
		Top 25	0.205 4.553 10 0.654 0.980 25 28
		24	0.656 13.140 11 0.419 0.542 15 50
		23	0.850 18.064 12 0.481 0.761 5 14
		22	0.929 21.732 14 1.026 1.208 19 28
		21	0.969 24.326 15 0.960 1.205 11 32
		20	0.968 25.962 16 0.778 1.074 17 46
		19	0.953 27.083 22 0.559 0.594 47 40
		18	0.924 27.891 30 1.162 1.407 19 30
		17	0.909 28.482 31 1.141 1.365 11 30
		16	0.914 27.576
		15	0.929 28.319
		14	1.010 28.479
		13	1.047 29.402
		12	1.088 30.319
		11	1.131 31.147
		10	1.178 31.883
		9	1.230 32.478
		8	1.280 33.124
		7	1.327 33.762
		6	1.364 34.314
		5	1.382* 34.430*
		4	1.356 33.397
		3	1.225 29.814
		2	0.921 22.234
		Bottom 1	0.254 6.064
			% AXIAL TILT -14.693 -11.729
			AVG BOT 8ft/12ft 1.0669 1.0659
Control Rod Density: %	8.03		
k-effective:	0.99626		
Void Fraction:	0.489		
Core Delta-P: psia	23.748		
Core Plate Delta-P: psia	19.220		
Coolant Temp: Deg-F	548.6		
In Channel Flow: Mlb/hr	65.07	Active Channel Flow: Mlb/hr	65.07
Total Bypass Flow (%):	15.8	(of total core flow)	
Total Water Rod Flow (%):	-0.0	(of total core flow)	
Source Convergence	0.00043		

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	Value	Margin	Exp. FT	IR	Value	Margin	Exp. FT	IR
1.407	30	19	30	1.470	0.919	30	9 28	7.03	0.817	47.4	15	10.31	0.820	26.2	31
1.402	30	21	28	1.483	0.911	30	9 32	7.47	0.799	39.0	15	10.21	0.816	26.8	30
1.387	30	9	28	1.489	0.906	30	19 30	6.97	0.795	47.2	14	10.23	0.813	26.0	30
1.377	30	9	32	1.501	0.899	30	21 28	7.25	0.792	41.7	16	7.23	0.807	55.1	15
1.365	31	11	30	1.518	0.889	31	17 32	7.03	0.792	46.0	14	7.23	0.806	55.0	14
1.360	30	17	28	1.522	0.887	31	11 30	6.78	0.790	47.7	15	7.55	0.803	51.2	14
1.356	31	17	32	1.524	0.886	31	17 40	6.73	0.787	48.1	15	10.05	0.800	26.3	30
1.341	30	23	30	1.527	0.884	31	9 36	6.91	0.785	45.3	15	10.14	0.799	25.2	31
1.336	30	7	30	1.535	0.879	31	13 32	7.07	0.775	43.5	14	7.84	0.797	47.3	16
1.336	31	17	40	1.551	0.871	30	13 40	9.12	0.767	21.1	31	7.04	0.790	55.4	15

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

Figure A.37 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 13,500.0 MWd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: MWD/MTU	27168.0																																																																																																																																																																																								
Exposure: MWD/MTU (GWd)	14001.0 (1401.50)																																																																																																																																																																																										
Delta E: MWD/MTU, (GWd)	1.0 (0.10)																																																																																																																																																																																										
Power: MWt	2923.0 (100.00 %)																																																																																																																																																																																										
Core Pressure: psia	1044.6																																																																																																																																																																																										
Inlet Subcooling: Btu/lbm	-21.56																																																																																																																																																																																										
Flow: Mlb/hr	76.23 (99.00 %)																																																																																																																																																																																										
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IR: 2	6	10	14	18	22	26	30	34	38	42	46	50																																																																																																																																																																															
Control Rod Density: %	7.79																																																																																																																																																																																										
k-effective:	0.99693																																																																																																																																																																																										
Void Fraction:	0.480																																																																																																																																																																																										
Core Delta-P: psia	23.103																																																																																																																																																																																										
Core Plate Delta-P: psia	18.576																																																																																																																																																																																										
Coolant Temp: Deg-F	548.4																																																																																																																																																																																										
In Channel Flow: Mlb/hr	64.23	Active Channel Flow: Mlb/hr	64.23																																																																																																																																																																																								
Total Bypass Flow (%):	15.7	(of total core flow)																																																																																																																																																																																									
Total Water Rod Flow (%):	-0.0	(of total core flow)																																																																																																																																																																																									
Source Convergence	0.00045																																																																																																																																																																																										

Axial Profile		Edit	Radial Power			
N(PRA)	Power Exposure	Zone	Avg.	Max.	IR	JR
Top 25	0.212 4.680	10	0.646	0.959	25	28
24	0.678 13.493	11	0.418	0.542	15	50
23	0.880 16.522	12	0.460	0.756	5	14
22	0.967 22.235	14	1.024	1.190	19	28
21	1.015 24.850	15	0.959	1.200	11	32
20	1.023 26.485	16	0.777	1.075	17	46
19	1.022 27.597	22	0.557	0.591	47	40
18	1.009 28.390	30	1.162	1.393	19	30
17	0.976 28.973	31	1.145	1.360	11	30
16	0.965 28.049					
15	0.967 28.800					
14	1.039 28.956					
13	1.066 29.896					
12	1.097 30.833					
11	1.129 31.681					
10	1.165 32.440					
9	1.204 33.059					
8	1.240 33.729					
7	1.271 34.389					
6	1.291 34.959					
5	1.294* 35.083*					
4	1.262 34.038					
3	1.138 30.393					
2	0.855 22.669					
Bottom 1	0.235 6.186					

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	Value	Margin	Exp.	FT	Value	Margin	Exp.	FT
1.393	30	19	30	1.457	0.927	30	9	7.11	0.768	42.5	14	7.81	0.780	45.8	14
1.383	30	21	28	1.464	0.922	30	9	6.60	0.768	47.5	15	7.98	0.772	43.0	14
1.376	30	9	28	1.485	0.909	30	19	7.24	0.763	39.9	14	9.67	0.768	26.0	31
1.368	30	9	32	1.491	0.905	31	17	6.75	0.750	43.6	16	6.79	0.765	55.8	15
1.360	31	11	30	1.498	0.901	31	17	6.58	0.747	46.8	14	6.78	0.764	55.7	14
1.354	31	17	32	1.500	0.900	31	9	7.08	0.745	39.8	15	9.47	0.760	27.3	30
1.348	30	17	28	1.501	0.900	31	11	6.48	0.745	48.0	14	7.65	0.758	45.0	15
1.338	31	17	40	1.504	0.898	31	13	6.82	0.742	40.8	15	9.36	0.757	27.9	30
1.326	30	11	34	1.504	0.897	30	21	6.31	0.740	48.4	15	9.40	0.754	27.2	30
1.324	30	7	30	1.522	0.887	30	13	6.42	0.736	46.0	15	7.35	0.754	48.1	16

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

Figure A.39 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 14,001.0 MWd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: MWd/MTU				27868.2								
Exposure: MWd/MTU (GWd)	14701.0 (1471.60)													
Delta E: MWd/MTU, (GWd)	1.0 (0.10)													
Power: MWt	2923.0 (100.00 %)													
Core Pressure: psia	1044.7													
Inlet Subcooling: Btu/lbm	-21.20													
Flow: Mlb/hr	77.39 (100.50 %)													
1	3	5	7	9	11	13	15	17	19	21	23	25		
1													51	:JR
3													47	
5						14		14					43	
7													39	
9					14		10		10		14			35
11													31	
13					8					8			27	
15													23	
17					14		10		10		14		19	
19													15	
21					14		14						11	
23													7	
25													3	
IR: 2	6	10	14	18	22	26	30	34	38	42	46	50		
Control Rod Density: %	7.66													
k-effective:	0.99754													
Void Fraction:	0.464													
Core Delta-P: psia	23.377													
Core Plate Delta-P: psia	18.851													
Coolant Temp: Deg-F	548.4													
In Channel Flow: Mlb/hr	65.36													
Total Bypass Flow (%):	15.5													
Total Water Rod Flow (%):	-0.0													
Source Convergence	0.00037													

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	Value	Margin	Exp.	FT	Value	Margin	Exp.	FT
1.385	30	19	30	1.461	0.924	30	9	8.01	0.828	37.7	15	8.19	0.829	47.0	14
1.371	30	21	28	1.467	0.920	30	9	7.48	0.817	43.5	14	8.50	0.827	43.5	15
1.366	30	9	28	1.484	0.910	31	17	7.36	0.808	44.0	14	8.17	0.819	46.1	15
1.358	30	9	32	1.489	0.907	30	19	7.58	0.807	40.9	14	8.05	0.819	47.4	14
1.353	31	11	30	1.492	0.905	31	17	7.67	0.801	38.9	15	8.33	0.817	44.1	14
1.352	31	17	32	1.497	0.902	31	9	7.02	0.767	43.5	14	7.57	0.783	48.9	14
1.339	30	17	28	1.501	0.899	31	11	6.95	0.754	42.8	14	7.72	0.775	46.3	14
1.337	31	17	40	1.505	0.897	31	13	7.23	0.751	38.4	14	8.02	0.772	42.6	14
1.319	31	13	32	1.511	0.893	30	21	6.97	0.749	42.0	14	7.62	0.769	46.7	14
1.318	30	11	34	1.518	0.889	30	13	6.96	0.749	42.1	14	7.44	0.768	48.7	14

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

Figure A.42 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 14,701.0 MWd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: MWd/MTU	28167.2
Exposure: MWd/MTU (GWd)	15000.0 (1501.50)		
Delta E: MWd/MTU, (GWd)	299.0 (29.93)		
Power: MWt	2923.0 (100.00 %)		
Core Pressure: psia	1044.7		
Inlet Subcooling: Btu/lbm	-20.62		
Flow: Mlb/hr	79.31 (103.00 %)		
		Axial Profile	Edit Radial Power
		N(PRA) Power Exposure	Zone Avg. Max. IR JR
1 3 5 7 9 11 13 15 17 19 21 23 25		Top 25	10 0.637 0.936 25 28
1		24 0.738 14.240	11 0.416 0.540 15 50
3		23 0.957 19.491	12 0.478 0.748 5 14
5		22 1.055 23.305	14 1.021 1.168 19 28
7		21 1.114 25.976	15 0.959 1.189 11 32
9		20 1.131 27.622	16 0.775 1.074 17 46
11		19 1.118 28.730	22 0.554 0.587 47 40
13		18 1.095 29.505	30 1.163 1.377 19 30
15		17 1.051 30.049	31 1.151 1.352 11 30
17		16 1.031 29.066	
19		15 1.026 29.816	
21		14 1.093 29.950	
23		13 1.111 30.913	
25		12 1.131 31.875	
IR: 2 6 10 14 18 22 26 30 34 38 42 46 50		11 1.148 32.751	
		10 1.164 33.537	
		9 1.177 34.186	
		8 1.183* 34.882	
		7 1.179 35.560	
		6 1.161 36.138	
		5 1.131 36.256*	
		4 1.080 35.174	
		3 0.968 31.416	
		2 0.727 23.438	
		Bottom 1 0.200 6.401	
Control Rod Density: %	7.66	% AXIAL TILT	-2.547 -11.313
k-effective:	0.99776	AVG BOT 8ft/12ft	0.9998 1.0625
Void Fraction:	0.454		
Core Delta-P: psia	24.130		
Core Plate Delta-P: psia	19.603		
Coolant Temp: Deg-F	548.3		
In Channel Flow: Mlb/hr	67.09	Active Channel Flow: Mlb/hr	67.09
Total Bypass Flow (%):	15.4	(of total core flow)	
Total Water Rod Flow (%):	-0.0	(of total core flow)	
Source Convergence	0.00047		

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	Value	Margin	Exp. FT	IR	Value	Margin	Exp. FT	IR
1.377	30	19	30	1.473	0.917	30	9 28	8.08	0.838	38.2	15	8.29	0.844	47.5	14
1.365	30	9	28	1.478	0.913	30	9 32	7.58	0.832	44.0	14	8.57	0.840	44.1	15
1.361	30	21	28	1.496	0.902	31	17 40	7.69	0.823	41.4	14	8.30	0.837	46.6	15
1.357	30	9	32	1.506	0.897	31	9 36	7.81	0.819	39.4	15	8.44	0.833	44.7	14
1.352	31	11	30	1.510	0.894	31	17 32	7.42	0.818	44.5	14	8.11	0.829	47.9	14
1.348	31	17	32	1.511	0.893	30	19 30	7.11	0.780	44.0	14	7.66	0.797	49.4	14
1.336	31	17	40	1.512	0.893	31	11 30	7.06	0.769	43.2	14	7.82	0.789	46.8	14
1.332	30	17	28	1.519	0.889	31	13 32	7.10	0.767	42.4	14	7.77	0.789	47.2	14
1.317	31	13	32	1.528	0.883	30	13 40	7.32	0.764	38.8	14	8.11	0.785	43.1	14
1.317	30	11	34	1.536	0.879	30	21 28	7.05	0.762	42.5	14	7.54	0.783	49.2	14

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

Figure A.43 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 15,000.0 MWd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: MWD/MTU	28168.1
Exposure: MWD/MTU (Gwd)	15001.0 (1501.60)		
Delta E: MWD/MTU, (Gwd)	1.0 (0.10)		
Power: MWt	2923.0 (100.00 %)		
Core Pressure: psia	1044.6		
Inlet Subcooling: Btu/lbm	-21.56		
Flow: Mlb/hr	76.23 (99.00 %)		
		Axial Profile	Edit Radial Power
		N(PRA)	Power Exposure Zone Avg. Max. IR JR
		Top 25	0.202 4.950 10 0.599 0.833 25 28
		24	0.646 14.241 11 0.415 0.546 15 50
		23	0.834 19.492 12 0.477 0.743 5 14
		22	0.919 23.306 14 1.010 1.162 15 36
		21	0.966 25.977 15 0.979 1.172 9 38
		20	0.977 27.623 16 0.777 1.093 17 46
		19	0.990 28.731 22 0.555 0.586 47 40
		18	1.006 29.507 30 1.158 1.373 15 38
		17	1.019 30.051 31 1.168 1.378 13 36
		16	1.033 29.067
		15	1.036 29.817
		14	1.112 29.951
		13	1.136 30.914
		12	1.161 31.876
		11	1.184 32.752
		10	1.205 33.538
		9	1.224 34.187
		8	1.238 34.883
		7	1.245* 35.561
		6	1.244 36.139
		5	1.235 36.257*
		4	1.206 35.175
		3	1.104 31.417
		2	0.842 23.438
		Bottom 1	0.234 6.401
			% AXIAL TILT -9.990 -11.312
			AVG BOT 8ft/12ft 1.0550 1.0625
Control Rod Density: %	6.69		
k-effective:	0.99781		
Void Fraction:	0.478		
Core Delta-P: psia	23.113		
Core Plate Delta-P: psia	18.587		
Coolant Temp: Deg-F	548.4		
In Channel Flow: Mlb/hr	64.22	Active Channel Flow: Mlb/hr	64.22
Total Bypass Flow (%):	15.7	(of total core flow)	
Total Water Rod Flow (%):	-0.0	(of total core flow)	
Source Convergence	0.00037		

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	Value	Margin	Exp. FT	IR	Value	Margin	Exp. FT	IR
1.378	31	13	36	1.465	0.922	31	13	7.91	0.838	40.4	14	8.73	0.850	43.5	14
1.373	30	15	38	1.499	0.901	30	17	7.63	0.832	43.3	14	8.38	0.846	46.8	14
1.370	30	17	36	1.503	0.898	31	17	7.14	0.774	42.8	14	7.57	0.799	50.5	14
1.348	31	17	40	1.511	0.893	30	9	7.06	0.766	42.7	14	7.60	0.790	49.2	14
1.336	30	9	28	1.517	0.890	31	9	5.91	0.750	56.0	10	6.53	0.782	60.4	10
1.336	30	11	38	1.517	0.890	30	13	6.64	0.741	45.6	14	7.48	0.776	49.1	14
1.333	30	13	40	1.521	0.887	30	9	6.80	0.739	43.0	14	7.29	0.769	50.5	14
1.331	30	11	34	1.529	0.883	30	15	6.64	0.733	44.6	14	7.19	0.765	51.3	14
1.326	30	19	34	1.554	0.868	30	11	6.22	0.729	48.2	15	6.95	0.742	51.5	14
1.324	30	9	32	1.567	0.862	31	17	6.33	0.728	48.0	14	6.45	0.741	57.3	15

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

Figure A.44 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 15,001.0 MWD/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: MWd/MTU	28667.2
Exposure: MWd/MTU (GWd)	15500.0 (1551.60)		
Delta E: MWd/MTU, (GWd)	499.0 (49.95)		
Power: MWt	2923.0 (100.00 %)		
Core Pressure: psia	1044.7		
Inlet Subcooling: Btu/lbm	-20.38		
Flow: Mlb/hr	80.16 (104.10 %)		
		Axial Profile	Edit Radial Power
		N(PRA) Power Exposure Zone Avg. Max. IR JR	
1	3 5 7 9 11 13 15 17 19 21 23 25	Top 25	0.211 5.075 10 0.594 0.817 25 28
3	-- -- -- -- -- -- -- -- -- -- --	24	0.674 14.587 11 0.415 0.545 15 50
5	-- -- -- -- -- -- -- -- -- -- --	23	0.870 19.940 12 0.478 0.743 5 14
7	-- -- -- -- -- -- -- -- -- -- --	22	0.958 23.800 14 1.007 1.159 11 36
9	-- -- -- -- -- -- -- -- -- -- --	21	1.006 26.497 15 0.980 1.173 9 38
11	-- -- -- -- -- -- -- -- -- -- --	20	1.016 28.149 16 0.780 1.095 17 46
13	-- -- -- -- -- -- -- -- -- -- --	19	1.028 29.263 22 0.556 0.587 47 40
15	-- -- -- -- -- -- -- -- -- -- --	18	1.044 30.048 30 1.158 1.366 15 38
17	-- -- -- -- -- -- -- -- -- -- --	17	1.056 30.599 31 1.172 1.374 13 36
19	-- -- -- -- -- -- -- -- -- -- --	16	1.070 29.599
21	-- -- -- -- -- -- -- -- -- -- --	15	1.073 30.351
23	-- -- -- -- -- -- -- -- -- -- --	14	1.149 30.474
25	-- -- -- -- -- -- -- -- -- -- --	13	1.171 31.449
IR: 2 6 10 14 18 22 26 30 34 38 42 46 50		12	1.190 32.423
		11	1.204 33.309
		10	1.214 34.105
		9	1.219* 34.763
		8	1.215 35.465
		7	1.202 36.147
		6	1.180 36.725
		5	1.150 36.838*
		4	1.108 35.743
		3	1.008 31.937
		2	0.768 23.835
		Bottom 1	0.213 6.513
Control Rod Density: %	6.69	% AXIAL TILT	-6.359 -11.181
k-effective:	0.99803	AVG BOT 8ft/12ft	1.0369 1.0616
Void Fraction:	0.459		
Core Delta-P: psia	24.681		
Core Plate Delta-P: psia	20.153		
Coolant Temp: Deg-F	548.4		
In Channel Flow: Mlb/hr	67.74	Active Channel Flow: Mlb/hr	67.74
Total Bypass Flow (%):	15.5	(of total core flow)	
Total Water Rod Flow (%):	-0.0	(of total core flow)	
Source Convergence	0.00038		

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	Value	Margin	Exp. FT	IR	Value	Margin	Exp. FT	IR
1.374	31	13	36	1.494	0.904	31	13	7.89	0.842	41.2	14	8.69	0.855	44.4	14
1.366	30	15	38	1.533	0.881	30	9	7.60	0.835	44.1	14	8.34	0.850	47.6	14
1.364	30	17	36	1.534	0.880	31	17	7.08	0.774	43.5	14	7.56	0.805	51.3	14
1.344	31	17	40	1.538	0.878	31	9	7.00	0.765	43.5	14	7.49	0.793	50.8	14
1.339	30	9	28	1.538	0.878	30	17	5.85	0.759	56.6	10	6.09	0.788	64.1	10
1.335	30	11	38	1.544	0.874	30	13	6.86	0.751	43.7	14	7.52	0.787	49.9	14
1.331	30	13	40	1.544	0.874	30	9	6.65	0.748	46.3	14	7.32	0.780	51.2	14
1.328	30	11	34	1.561	0.865	30	15	6.70	0.745	45.2	14	7.18	0.772	52.0	14
1.325	30	9	32	1.580	0.854	30	11	6.69	0.729	43.3	14	6.96	0.750	52.3	14
1.318	30	19	34	1.590	0.849	31	17	8.60	0.722	20.9	30	9.51	0.742	24.0	30

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

Figure A.45 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 15,500.0 MWd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: Mwd/MTU	28668.2
Exposure: Mwd/MTU (GWd)	15501.0 (1551.70)		
Delta E: Mwd/MTU, (GWd)	1.0 (0.10)		
Power: MWt	2923.0 (100.00 %)		
Core Pressure: psia	1044.6		
Inlet Subcooling: Btu/lbm	-21.56		
Flow: Mlb/hr	76.23 (99.60 %)		
		Axial Profile	Edit Radial Power
		N(PRA) Power Exposure Zone	Avg. Max. IR JR
		Top 25	0.194 5.076 10 0.617 0.895 25 28
		24	0.619 14.588 11 0.407 0.534 15 50
		23	0.800 19.941 12 0.469 0.728 5 14
		22	0.884 23.801 14 1.017 1.147 15 36
		21	0.934 26.498 15 0.969 1.151 9 38
		20	0.951 28.150 16 0.765 1.074 17 46
		19	0.973 29.264 22 0.546 0.577 47 40
		18	1.003 30.049 30 1.166 1.366 17 36
		17	1.035 30.600 31 1.158 1.358 13 36
		16	1.077 29.600
		15	1.115 30.352
		14	1.221 30.475
		13	1.258 31.450
		12	1.281 32.424
		11	1.284* 33.310
		10	1.266 34.106
		9	1.250 34.764
		8	1.231 35.466
		7	1.209 36.148
		6	1.181 36.726
		5	1.149 36.839*
		4	1.105 35.744
		3	1.005 31.938
		2	0.766 23.835
		Bottom 1	0.212 6.513
		% AXIAL TILT	-8.987 -11.181
		AVG BOT 8ft/12ft	1.0648 1.0616
Control Rod Density: %	6.08		
k-effective:	0.99830		
Void Fraction:	0.471		
Core Delta-P: psia	23.080		
Core Plate Delta-P: psia	18.554		
Coolant Temp: Deg-F	548.3		
In Channel Flow: Mlb/hr	64.25	Active Channel Flow: Mlb/hr	64.25
Total Bypass Flow (%):	15.7	(of total core flow)	
Total Water Rod Flow (%):	-0.0	(of total core flow)	
Source Convergence	0.00042		

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	Value	Margin	Exp. FT	IR	Value	Margin	Exp. FT	IR
1.366	30	17	36	1.493	0.904	31	13	7.84	0.857	43.2	14	8.85	0.892	46.6	14
1.358	31	13	36	1.521	0.888	30	17	7.81	0.855	43.3	14	8.75	0.886	47.0	14
1.356	30	19	34	1.533	0.881	31	17	7.38	0.805	43.2	14	8.05	0.836	49.1	14
1.351	30	15	38	1.540	0.876	30	9	7.26	0.798	44.0	14	8.02	0.831	48.9	14
1.328	31	17	40	1.542	0.876	30	19	6.16	0.797	56.5	10	7.91	0.813	48.2	14
1.324	30	23	34	1.545	0.874	31	9	7.18	0.787	43.8	14	7.90	0.812	48.4	14
1.323	30	19	30	1.550	0.871	30	13	7.19	0.774	42.0	14	7.73	0.811	50.1	14
1.317	30	9	28	1.552	0.870	30	9	7.24	0.774	41.3	14	6.68	0.809	61.2	10
1.312	30	11	38	1.555	0.868	30	15	7.15	0.771	42.2	14	10.11	0.798	25.4	30
1.309	30	17	28	1.565	0.863	30	19	9.17	0.767	20.5	30	10.09	0.797	25.4	30

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

Figure A.46 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 15,501.0 MWd/MTU

Brunswick Unit 1 Cycle 17 Fuel Cycle Design

Cycle:	17	Core Average Exposure: MWD/MTU	29167.2
Exposure: MWD/MTU (GWd)	16000.0 (1601.60)		
Delta E: MWD/MTU, (GWd)	499.0 (49.95)		
Power: MWt	2923.0 (100.00 %)		
Core Pressure: psia	1044.7		
Inlet Subcooling: Btu/lbm	-20.29		
Flow: Mlb/hr	80.46 (104.50 %)		
		Axial Profile	Edit Radial Power
		N(PRA) Power Exposure Zone Avg. Max. IR JR	
		Top 25	0.204 5.196 10 0.611 0.876 25 28
		24	0.652 14.920 11 0.408 0.535 15 50
		23	0.841 20.369 12 0.470 0.729 5 14
		22	0.929 24.277 14 1.013 1.140 15 36
		21	0.979 27.000 15 0.970 1.153 9 38
		20	0.994 28.662 16 0.769 1.078 17 46
		19	1.015 29.788 22 0.548 0.579 47 40
		18	1.043 30.589 30 1.166 1.357 17 36
		17	1.073 31.157 31 1.162 1.353 13 36
		16	1.113 30.155
		15	1.150 30.927
		14	1.255 31.049
		13	1.287 32.042
		12	1.303* 33.026
		11	1.297 33.914
		10	1.268 34.702
		9	1.238 35.352
		8	1.203 36.046
		7	1.163 36.717
		6	1.116 37.281
		5	1.066 37.380*
		4	1.010 36.264
		3	0.914 32.411
		2	0.697 24.196
		Bottom 1	0.193 6.614
			% AXIAL TILT -5.150 -11.038
			AVG BOT 8ft/12ft 1.0448 1.0610
Control Rod Density: %	6.08		
k-effective:	0.99841		
Void Fraction:	0.452		
Core Delta-P: psia	24.777		
Core Plate Delta-P: psia	20.250		
Coolant Temp: Deg-F	548.3		
In Channel Flow: Mlb/hr	68.04	Active Channel Flow: Mlb/hr	68.04
Total Bypass Flow (%):	15.4	(of total core flow)	
Total Water Rod Flow (%):	-0.0	(of total core flow)	
Source Convergence	0.00046		

Top Ten Thermal Limits Summary - Sorted by Margin

Power				MCPR				APLHGR				LHGR			
Value	FT	IR	JR	Value	Margin	FT	IR	Value	Margin	Exp. FT	IR	Value	Margin	Exp. FT	IR
1.357	30	17	36	1.526	0.885	31	13	7.91	0.859	42.6	14	8.79	0.896	47.5	14
1.353	31	13	36	1.566	0.862	30	17	7.86	0.858	43.0	14	8.70	0.890	47.9	14
1.344	30	19	34	1.567	0.862	31	17	6.11	0.808	57.1	10	8.04	0.843	49.9	14
1.344	30	15	38	1.567	0.862	30	9	7.34	0.806	44.0	14	8.00	0.837	49.8	14
1.324	31	17	40	1.567	0.861	31	9	7.22	0.800	44.8	14	7.93	0.822	49.0	14
1.317	30	9	28	1.577	0.856	30	13	7.21	0.797	44.5	14	8.02	0.821	48.0	14
1.311	30	11	38	1.579	0.855	30	9	7.25	0.787	42.8	14	7.75	0.821	50.9	14
1.311	30	23	34	1.584	0.852	30	19	7.30	0.786	42.0	14	6.26	0.812	64.1	10
1.309	30	19	30	1.590	0.849	30	15	7.19	0.782	43.0	14	10.11	0.806	26.5	30
1.307	30	13	40	1.613	0.837	30	11	9.15	0.771	21.2	30	7.67	0.805	50.1	14

- * LHGR calculated with pin-power reconstruction
- * CPR calculated with pin-power reconstruction & CPR limit type 3
- * Thermal limit file:

Figure A.47 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 16,000.0 MWD/MTU

Cycle:	17	
Exposure: Mwd/MTU (Gwd)	16001.0	(1601.70 %)
Delta E: Mwd/MTU, (Gwd)	1.0	(0.10 %)
Power: MWt	2923.0	(100.00 %)
Core Pressure: psia	1044.6	
Inlet Subcooling: Btu/lbm	-21.56	
Flow: Mlb/hr	76.23	(99.00 %)

Axial Profile			Edit	Radial Power		
N (PRA)	Power	Exposure	Zone	Avg.	Max.	IR JR
Top 25	0.199	5.196	10	0.624	0.925	25 28
24	0.634	14.921	11	0.401	0.526	15 50
23	0.820	20.370	12	0.463	0.716	5 14
22	0.910	24.278	14	1.022	1.150	21 30
21	0.968	27.001	15	0.961	1.133	9 38
20	0.997	28.663	16	0.756	1.059	17 46
19	0.998	29.789	22	0.539	0.569	47 40
18	1.009	30.590	30	1.172	1.371	21 32
17	1.025	31.158	31	1.152	1.338	13 36
16	1.054	30.156				
15	1.081	30.928				
14	1.175	31.050				
13	1.206	32.043				
12	1.228	33.027				
11	1.240	33.915				
10	1.245*	34.703				
9	1.243	35.354				
8	1.232	36.047				
7	1.213	36.718				
6	1.187	37.282				
5	1.159	37.381*				
4	1.122	36.265				
3	1.033	32.412				
2	0.797	24.197				
Bottom 1	0.223	6.614				

k-effective:	0.99868
Void Fraction:	0.471
Core Delta-P: psia	23.075
Core Plate Delta-P: psia	18.550
Coolant Temp: Deg-F	548.3
In Channel Flow: Mlb/hr	64.25
Total Bypass Flow (%):	15.7
Total Water Rod Flow (%):	-0.0
Source Convergence	0.00047

% AXIAL TILT	-8.619	-11.037
AVG BOT 8ft/12ft	1.0547	1.0610

Active Channel Flow: Mlb/hr 64.25
(of total core flow)
(of total core flow)

Power			MCPR			APLHGR				LHGR												
Value	FT	IR	JR	Value	Margin	FT	IR	JR	K	Value	Margin	Exp.	FT	IR	JR	K						
1.371	30	21	32	1.511	0.894	31	13	36	6.72	0.708	39.9	14	13	30	21	6.99	0.729	49.5	14	21	30	10
1.367	30	19	34	1.536	0.879	30	19	34	6.30	0.708	45.9	14	21	30	10	5.60	0.726	64.1	10	27	28	15
1.357	30	23	34	1.541	0.876	30	21	22	6.30	0.707	45.7	14	23	32	10	6.94	0.724	49.6	14	23	32	10
1.354	30	17	36	1.546	0.873	30	17	36	6.40	0.704	44.2	14	15	32	21	6.64	0.721	52.8	14	19	28	10
1.354	30	19	30	1.549	0.872	30	19	30	6.28	0.704	45.7	14	19	26	10	6.74	0.718	51.3	14	21	20	10
1.341	30	21	28	1.550	0.871	30	9	28	6.39	0.702	43.7	14	21	34	10	6.72	0.717	51.5	14	19	22	10
1.338	31	13	36	1.553	0.869	31	17	40	6.33	0.701	44.6	14	19	32	10	6.56	0.715	53.2	14	27	20	10
1.329	30	15	38	1.556	0.867	30	23	34	6.23	0.701	46.0	14	27	34	9	7.39	0.715	43.0	14	13	30	21
1.325	30	25	32	1.559	0.866	31	9	36	6.20	0.696	46.2	14	13	38	15	7.02	0.715	47.6	14	15	32	21
1.320	30	23	30	1.564	0.863	30	9	32	6.21	0.692	45.4	14	15	36	15	6.56	0.713	52.9	14	13	38	15

- ```
* LHGR calculated with pin-power reconstruction
* CPR calculated with pin-power reconstruction & CPR limit type 3
* Thermal limit file:
```

**Figure A.48 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 16,001.0 MWd/MTU**

## Brunswick Unit 1 Cycle 17 Fuel Cycle Design

|                           |                    |                                |                                   |  |
|---------------------------|--------------------|--------------------------------|-----------------------------------|--|
| Cycle:                    | 17                 | Core Average Exposure: MWd/MTU | 29667.2                           |  |
| Exposure: MWd/MTU (Gwd)   | 16500.0 (1651.70 ) |                                |                                   |  |
| Delta E: MWd/MTU, (Gwd)   | 499.0 ( 49.95 )    |                                |                                   |  |
| Power: MWt                | 2923.0 (100.00 %)  |                                |                                   |  |
| Core Pressure: psia       | 1044.7             |                                |                                   |  |
| Inlet Subcooling: Btu/lbm | -20.29             |                                |                                   |  |
| Flow: Mlb/hr              | 80.46 (104.50 %)   |                                |                                   |  |
|                           |                    | Axial Profile                  | Edit Radial Power                 |  |
|                           |                    | N(PRA) Power Exposure          | Zone Avg. Max. IR JR              |  |
|                           |                    | Top 25                         | 0.209 5.319 10 0.619 0.905 25 28  |  |
|                           |                    | 24                             | 0.669 15.260 11 0.403 0.528 15 50 |  |
|                           |                    | 23                             | 0.865 20.810 12 0.465 0.717 5 14  |  |
|                           |                    | 22                             | 0.959 24.768 14 1.018 1.134 21 34 |  |
|                           |                    | 21                             | 1.018 27.522 15 0.963 1.136 9 38  |  |
|                           |                    | 20                             | 1.046 29.200 16 0.761 1.064 17 46 |  |
|                           |                    | 19                             | 1.044 30.326 22 0.541 0.573 47 40 |  |
|                           |                    | 18                             | 1.052 31.133 30 1.170 1.352 19 34 |  |
|                           |                    | 17                             | 1.067 31.709 31 1.157 1.332 13 36 |  |
|                           |                    | 16                             | 1.094 30.700                      |  |
|                           |                    | 15                             | 1.119 31.486                      |  |
|                           |                    | 14                             | 1.212 31.603                      |  |
|                           |                    | 13                             | 1.237 32.610                      |  |
|                           |                    | 12                             | 1.252 33.605                      |  |
|                           |                    | 11                             | 1.254* 34.498                     |  |
|                           |                    | 10                             | 1.246 35.289                      |  |
|                           |                    | 9                              | 1.229 35.939                      |  |
|                           |                    | 8                              | 1.201 36.627                      |  |
|                           |                    | 7                              | 1.164 37.289                      |  |
|                           |                    | 6                              | 1.118 37.841                      |  |
|                           |                    | 5                              | 1.070 37.926*                     |  |
|                           |                    | 4                              | 1.021 36.793                      |  |
|                           |                    | 3                              | 0.933 32.898                      |  |
|                           |                    | 2                              | 0.721 24.572                      |  |
|                           |                    | Bottom 1                       | 0.202 6.721                       |  |
|                           |                    |                                | % AXIAL TILT -4.441 -10.892       |  |
|                           |                    |                                | AVG BOT 8ft/12ft 1.0329 1.0602    |  |
| Control Rod Density: %    | 4.62               |                                |                                   |  |
| k-effective:              | 0.99862            |                                |                                   |  |
| Void Fraction:            | 0.451              |                                |                                   |  |
| Core Delta-P: psia        | 24.757             |                                |                                   |  |
| Core Plate Delta-P: psia  | 20.230             |                                |                                   |  |
| Coolant Temp: Deg-F       | 548.3              |                                |                                   |  |
| In Channel Flow: Mlb/hr   | 68.05              | Active Channel Flow: Mlb/hr    | 68.05                             |  |
| Total Bypass Flow (%):    | 15.4               | (of total core flow)           |                                   |  |
| Total Water Rod Flow (%): | -0.0               | (of total core flow)           |                                   |  |
| Source Convergence        | 0.00042            |                                |                                   |  |

## Top Ten Thermal Limits Summary - Sorted by Margin

| Power |    |    |    | MCPR  |        |    |    | APLHGR |        |         |    | LHGR  |        |         |    |
|-------|----|----|----|-------|--------|----|----|--------|--------|---------|----|-------|--------|---------|----|
| Value | FT | IR | JR | Value | Margin | FT | IR | Value  | Margin | Exp. FT | IR | Value | Margin | Exp. FT | IR |
| 1.352 | 30 | 19 | 34 | 1.544 | 0.907  | 31 | 13 | 6.95   | 0.738  | 40.6    | 14 | 5.64  | 0.757  | 64.7    | 10 |
| 1.351 | 30 | 21 | 32 | 1.576 | 0.888  | 30 | 9  | 6.60   | 0.731  | 44.8    | 14 | 7.43  | 0.746  | 46.3    | 14 |
| 1.343 | 30 | 17 | 36 | 1.579 | 0.887  | 31 | 9  | 6.35   | 0.719  | 46.8    | 14 | 7.23  | 0.743  | 48.3    | 14 |
| 1.339 | 30 | 23 | 34 | 1.583 | 0.884  | 30 | 19 | 6.27   | 0.712  | 47.2    | 14 | 6.72  | 0.736  | 53.6    | 14 |
| 1.335 | 30 | 19 | 30 | 1.586 | 0.883  | 31 | 17 | 6.48   | 0.711  | 43.9    | 14 | 7.02  | 0.732  | 49.5    | 14 |
| 1.332 | 31 | 13 | 36 | 1.590 | 0.881  | 30 | 9  | 6.34   | 0.711  | 46.0    | 14 | 7.57  | 0.729  | 42.5    | 15 |
| 1.321 | 30 | 15 | 38 | 1.590 | 0.881  | 30 | 17 | 6.41   | 0.710  | 44.9    | 14 | 6.96  | 0.727  | 49.7    | 14 |
| 1.318 | 30 | 21 | 28 | 1.595 | 0.877  | 30 | 21 | 6.39   | 0.710  | 45.0    | 14 | 6.71  | 0.726  | 52.6    | 14 |
| 1.305 | 31 | 17 | 40 | 1.598 | 0.876  | 30 | 13 | 6.51   | 0.707  | 42.7    | 14 | 6.82  | 0.724  | 51.0    | 14 |
| 1.303 | 30 | 25 | 32 | 1.603 | 0.874  | 30 | 19 | 6.46   | 0.706  | 43.4    | 14 | 6.82  | 0.724  | 50.9    | 14 |

- \* LHGR calculated with pin-power reconstruction
- \* CPR calculated with pin-power reconstruction & CPR limit type 3
- \* Thermal limit file:

**Figure A.49 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 16,500.0 MWd/MTU**

## Brunswick Unit 1 Cycle 17 Fuel Cycle Design

|                           |                    |                                |                                   |
|---------------------------|--------------------|--------------------------------|-----------------------------------|
| Cycle:                    | 17                 | Core Average Exposure: MWd/MTU | 29668.3                           |
| Exposure: MWd/MTU (Gwd)   | 16501.0 (1651.80 ) |                                |                                   |
| Delta E: MWd/MTU, (Gwd)   | 1.0 ( 0.10 )       |                                |                                   |
| Power: MWt                | 2923.0 (100.00 %)  |                                |                                   |
| Core Pressure: psia       | 1044.7             |                                |                                   |
| Inlet Subcooling: Btu/lbm | -21.20             |                                |                                   |
| Flow: Mlb/hr              | 77.39 (100.50 %)   |                                |                                   |
|                           |                    | Axial Profile                  | Edit Radial Power                 |
|                           |                    | N(PRA) Power Exposure          | Zone Avg. Max. IR JR              |
|                           |                    | Top 25                         | 0.211 5.319 10 0.617 0.906 25 28  |
|                           |                    | 24                             | 0.675 15.261 11 0.400 0.524 15 50 |
|                           |                    | 23                             | 0.875 20.811 12 0.463 0.712 5 14  |
|                           |                    | 22                             | 0.975 24.769 14 1.021 1.138 21 34 |
|                           |                    | 21                             | 1.043 27.524 15 0.961 1.128 9 38  |
|                           |                    | 20                             | 1.085 29.201 16 0.756 1.057 17 46 |
|                           |                    | 19                             | 1.101 30.327 22 0.538 0.569 47 40 |
|                           |                    | 18                             | 1.092 31.134 30 1.170 1.356 19 34 |
|                           |                    | 17                             | 1.091 31.711 31 1.157 1.331 13 36 |
|                           |                    | 16                             | 1.108 30.701                      |
|                           |                    | 15                             | 1.124 31.487                      |
|                           |                    | 14                             | 1.209 31.604                      |
|                           |                    | 13                             | 1.227 32.611                      |
|                           |                    | 12                             | 1.237* 33.606                     |
|                           |                    | 11                             | 1.236 34.500                      |
|                           |                    | 10                             | 1.226 35.290                      |
|                           |                    | 9                              | 1.208 35.940                      |
|                           |                    | 8                              | 1.179 36.628                      |
|                           |                    | 7                              | 1.142 37.290                      |
|                           |                    | 6                              | 1.096 37.842                      |
|                           |                    | 5                              | 1.048 37.927*                     |
|                           |                    | 4                              | 0.999 36.794                      |
|                           |                    | 3                              | 0.912 32.898                      |
|                           |                    | 2                              | 0.704 24.572                      |
|                           |                    | Bottom 1                       | 0.197 6.721                       |
|                           |                    | % AXIAL TILT                   | -2.508 -10.892                    |
|                           |                    | AVG BOT 8ft/12ft               | 1.0197 1.0602                     |
| Control Rod Density: %    | 4.38               |                                |                                   |
| k-effective:              | 0.99909            |                                |                                   |
| Void Fraction:            | 0.453              |                                |                                   |
| Core Delta-P: psia        | 23.336             |                                |                                   |
| Core Plate Delta-P: psia  | 18.811             |                                |                                   |
| Coolant Temp: Deg-F       | 548.2              |                                |                                   |
| In Channel Flow: Mlb/hr   | 65.39              | Active Channel Flow: Mlb/hr    | 65.39                             |
| Total Bypass Flow (%):    | 15.5               | (of total core flow)           |                                   |
| Total Water Rod Flow (%): | -0.0               | (of total core flow)           |                                   |
| Source Convergence        | 0.00042            |                                |                                   |

## Top Ten Thermal Limits Summary - Sorted by Margin

| Power |    |    |    | MCPR  |        |    |    | APLHGR |        |      |    | LHGR |       |        |      |
|-------|----|----|----|-------|--------|----|----|--------|--------|------|----|------|-------|--------|------|
| Value | FT | IR | JR | Value | Margin | FT | IR | Value  | Margin | Exp. | FT | IR   | Value | Margin | Exp. |
| 1.356 | 30 | 19 | 34 | 1.507 | 0.929  | 31 | 13 | 7.42   | 0.798  | 41.9 | 14 | 13   | 7.87  | 0.807  | 48.1 |
| 1.352 | 30 | 21 | 32 | 1.537 | 0.911  | 30 | 19 | 7.08   | 0.791  | 45.8 | 14 | 15   | 7.75  | 0.806  | 49.2 |
| 1.345 | 30 | 17 | 36 | 1.538 | 0.911  | 30 | 9  | 6.96   | 0.765  | 44.1 | 14 | 21   | 7.87  | 0.782  | 45.4 |
| 1.343 | 30 | 23 | 34 | 1.546 | 0.905  | 30 | 17 | 6.85   | 0.758  | 44.8 | 14 | 23   | 7.66  | 0.777  | 47.2 |
| 1.339 | 30 | 19 | 30 | 1.548 | 0.905  | 31 | 17 | 7.23   | 0.741  | 36.6 | 15 | 11   | 7.51  | 0.772  | 48.3 |
| 1.331 | 31 | 13 | 36 | 1.551 | 0.903  | 31 | 9  | 6.72   | 0.735  | 43.6 | 14 | 15   | 5.70  | 0.763  | 64.7 |
| 1.318 | 30 | 15 | 38 | 1.552 | 0.902  | 30 | 21 | 6.69   | 0.729  | 43.3 | 14 | 11   | 7.41  | 0.761  | 48.1 |
| 1.318 | 30 | 21 | 28 | 1.553 | 0.902  | 30 | 9  | 6.72   | 0.726  | 42.7 | 15 | 17   | 7.28  | 0.754  | 48.9 |
| 1.310 | 30 | 17 | 28 | 1.556 | 0.900  | 30 | 19 | 6.53   | 0.726  | 45.2 | 14 | 13   | 7.21  | 0.750  | 49.3 |
| 1.304 | 30 | 25 | 32 | 1.562 | 0.897  | 30 | 23 | 6.66   | 0.725  | 43.2 | 14 | 13   | 6.93  | 0.747  | 52.3 |

\* LHGR calculated with pin-power reconstruction

\* CPR calculated with pin-power reconstruction &amp; CPR limit type 3

\* Thermal limit file:

**Figure A.50 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 16,501.0 MWd/MTU**

## Brunswick Unit 1 Cycle 17 Fuel Cycle Design

|                           |                    |                                |                                   |
|---------------------------|--------------------|--------------------------------|-----------------------------------|
| Cycle:                    | 17                 | Core Average Exposure: MWD/MTU | 30067.3                           |
| Exposure: MWD/MTU (GWd)   | 16900.0 (1691.70 ) |                                |                                   |
| Delta E: MWD/MTU, (GWd)   | 399.0 ( 39.94 )    |                                |                                   |
| Power: MWT                | 2923.0 (100.00 %)  |                                |                                   |
| Core Pressure: psia       | 1044.7             |                                |                                   |
| Inlet Subcooling: Btu/lbm | -20.28             |                                |                                   |
| Flow: Mlb/hr              | 80.46 (104.50 %)   |                                |                                   |
|                           |                    | Axial Profile                  | Edit Radial Power                 |
|                           |                    | N(PRA) Power Exposure          | Zone Avg. Max. IR JR              |
|                           |                    | Top 25                         | 0.218 5.423 10 0.613 0.891 25 28  |
|                           |                    | 24                             | 0.699 15.551 11 0.403 0.526 15 50 |
|                           |                    | 23                             | 0.905 21.186 12 0.465 0.714 5 14  |
|                           |                    | 22                             | 1.008 25.188 14 1.018 1.125 21 34 |
|                           |                    | 21                             | 1.075 27.972 15 0.963 1.130 9 38  |
|                           |                    | 20                             | 1.115 29.668 16 0.760 1.061 17 46 |
|                           |                    | 19                             | 1.130 30.801 22 0.541 0.573 47 40 |
|                           |                    | 18                             | 1.119 31.604 30 1.169 1.342 19 34 |
|                           |                    | 17                             | 1.117 32.180 31 1.160 1.325 13 36 |
|                           |                    | 16                             | 1.134 31.157                      |
|                           |                    | 15                             | 1.149 31.950                      |
|                           |                    | 14                             | 1.233 32.059                      |
|                           |                    | 13                             | 1.249 33.073                      |
|                           |                    | 12                             | 1.253* 34.072                     |
|                           |                    | 11                             | 1.245 34.965                      |
|                           |                    | 10                             | 1.226 35.751                      |
|                           |                    | 9                              | 1.198 36.394                      |
|                           |                    | 8                              | 1.158 37.072                      |
|                           |                    | 7                              | 1.108 37.720                      |
|                           |                    | 6                              | 1.049 38.254                      |
|                           |                    | 5                              | 0.991 38.321*                     |
|                           |                    | 4                              | 0.934 37.169                      |
|                           |                    | 3                              | 0.849 33.241                      |
|                           |                    | 2                              | 0.656 24.837                      |
|                           |                    | Bottom 1                       | 0.184 6.796                       |
|                           |                    | % AXIAL TILT                   | 0.224 -10.697                     |
|                           |                    | AVG BOT 8ft/12ft               | 1.0056 1.0592                     |
| Control Rod Density: %    | 4.38               |                                |                                   |
| k-effective:              | 0.99868            |                                |                                   |
| Void Fraction:            | 0.440              |                                |                                   |
| Core Delta-P: psia        | 24.571             |                                |                                   |
| Core Plate Delta-P: psia  | 20.046             |                                |                                   |
| Coolant Temp: Deg-F       | 548.2              |                                |                                   |
| In Channel Flow: Mlb/hr   | 68.15              | Active Channel Flow: Mlb/hr    | 68.15                             |
| Total Bypass Flow (%):    | 15.3               | (of total core flow)           |                                   |
| Total Water Rod Flow (%): | -0.0               | (of total core flow)           |                                   |
| Source Convergence        | 0.00043            |                                |                                   |

## Top Ten Thermal Limits Summary - Sorted by Margin

| Power |    |    |    | MCPR  |        |    |    | APLHGR |        |         |    | LHGR  |        |         |    |
|-------|----|----|----|-------|--------|----|----|--------|--------|---------|----|-------|--------|---------|----|
| Value | FT | IR | JR | Value | Margin | FT | IR | Value  | Margin | Exp. FT | IR | Value | Margin | Exp. FT | IR |
| 1.342 | 30 | 19 | 34 | 1.535 | 0.912  | 31 | 13 | 7.51   | 0.812  | 42.6    | 14 | 7.98  | 0.825  | 48.8    | 14 |
| 1.336 | 30 | 21 | 32 | 1.562 | 0.897  | 30 | 9  | 7.14   | 0.803  | 46.4    | 14 | 7.81  | 0.818  | 49.9    | 14 |
| 1.335 | 30 | 17 | 36 | 1.567 | 0.893  | 31 | 9  | 7.03   | 0.777  | 44.7    | 14 | 7.99  | 0.801  | 46.1    | 15 |
| 1.328 | 30 | 23 | 34 | 1.575 | 0.889  | 31 | 17 | 6.95   | 0.774  | 45.3    | 14 | 7.73  | 0.790  | 47.8    | 14 |
| 1.325 | 31 | 13 | 36 | 1.576 | 0.888  | 30 | 9  | 7.38   | 0.760  | 37.2    | 15 | 7.61  | 0.788  | 48.9    | 14 |
| 1.322 | 30 | 19 | 30 | 1.576 | 0.888  | 30 | 19 | 6.79   | 0.745  | 43.9    | 14 | 5.70  | 0.786  | 65.1    | 10 |
| 1.311 | 30 | 15 | 38 | 1.582 | 0.885  | 30 | 17 | 6.77   | 0.745  | 44.2    | 14 | 7.39  | 0.771  | 49.6    | 14 |
| 1.300 | 30 | 21 | 28 | 1.592 | 0.879  | 30 | 13 | 6.65   | 0.742  | 45.7    | 14 | 7.45  | 0.770  | 48.8    | 15 |
| 1.299 | 30 | 9  | 28 | 1.596 | 0.877  | 30 | 21 | 6.86   | 0.742  | 42.6    | 14 | 7.33  | 0.764  | 49.4    | 14 |
| 1.299 | 31 | 17 | 40 | 1.600 | 0.875  | 30 | 19 | 6.48   | 0.735  | 47.1    | 14 | 7.03  | 0.763  | 52.9    | 14 |

- \* LHGR calculated with pin-power reconstruction
- \* CPR calculated with pin-power reconstruction & CPR limit type 3
- \* Thermal limit file:

**Figure A.51 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 16,900.0 MWD/MTU**

## Brunswick Unit 1 Cycle 17 Fuel Cycle Design

|                           |                    |                                |                                   |
|---------------------------|--------------------|--------------------------------|-----------------------------------|
| Cycle:                    | 17                 | Core Average Exposure: Mwd/MTU | 30068.3                           |
| Exposure: Mwd/MTU (Gwd)   | 16901.0 (1691.80 ) |                                |                                   |
| Delta E: Mwd/MTU, (Gwd)   | 1.0 ( 0.10 )       |                                |                                   |
| Power: MWt                | 2923.0 (100.00 %)  |                                |                                   |
| Core Pressure: psia       | 1044.7             |                                |                                   |
| Inlet Subcooling: Btu/lbm | -21.31             |                                |                                   |
| Flow: Mlb/hr              | 77.00 (100.00 %)   |                                |                                   |
|                           |                    | Axial Profile                  | Edit Radial Power                 |
|                           |                    | N(PRA) Power Exposure Zone     | Avg. Max. IR JR                   |
|                           |                    | Top 25                         | 0.218 5.424 10 0.612 0.892 25 28  |
|                           |                    | 24                             | 0.695 15.551 11 0.400 0.523 15 50 |
|                           |                    | 23                             | 0.901 21.187 12 0.463 0.708 5 14  |
|                           |                    | 22                             | 1.008 25.189 14 1.021 1.128 21 34 |
|                           |                    | 21                             | 1.083 27.974 15 0.961 1.122 9 38  |
|                           |                    | 20                             | 1.134 29.669 16 0.755 1.053 17 46 |
|                           |                    | 19                             | 1.164 30.802 22 0.538 0.570 47 40 |
|                           |                    | 18                             | 1.174 31.605 30 1.169 1.346 19 34 |
|                           |                    | 17                             | 1.154 32.181 31 1.161 1.323 13 36 |
|                           |                    | 16                             | 1.156 31.158                      |
|                           |                    | 15                             | 1.160 31.951                      |
|                           |                    | 14                             | 1.235 32.060                      |
|                           |                    | 13                             | 1.243* 33.074                     |
|                           |                    | 12                             | 1.242 34.073                      |
|                           |                    | 11                             | 1.230 34.966                      |
|                           |                    | 10                             | 1.208 35.752                      |
|                           |                    | 9                              | 1.179 36.395                      |
|                           |                    | 8                              | 1.140 37.073                      |
|                           |                    | 7                              | 1.090 37.721                      |
|                           |                    | 6                              | 1.032 38.255                      |
|                           |                    | 5                              | 0.975 38.322*                     |
|                           |                    | 4                              | 0.919 37.170                      |
|                           |                    | 3                              | 0.835 33.242                      |
|                           |                    | 2                              | 0.646 24.838                      |
|                           |                    | Bottom 1                       | 0.181 6.797                       |
|                           |                    |                                | % AXIAL TILT 1.710 -10.696        |
|                           |                    |                                | AVG BOT 8ft/12ft 0.9969 1.0592    |
| Control Rod Density: %    | 4.14               |                                |                                   |
| k-effective:              | 0.99894            |                                |                                   |
| Void Fraction:            | 0.444              |                                |                                   |
| Core Delta-P: psia        | 23.015             |                                |                                   |
| Core Plate Delta-P: psia  | 18.492             |                                |                                   |
| Coolant Temp: Deg-F       | 548.1              |                                |                                   |
| In Channel Flow: Mlb/hr   | 65.14              | Active Channel Flow: Mlb/hr    | 65.14                             |
| Total Bypass Flow (%):    | 15.4               | (of total core flow)           |                                   |
| Total Water Rod Flow (%): | -0.0               | (of total core flow)           |                                   |
| Source Convergence        | 0.00049            |                                |                                   |

## Top Ten Thermal Limits Summary - Sorted by Margin

| Power |    |    |    | MCPR  |        |    |    | APLHGR |        |         |    | LHGR  |        |         |    |
|-------|----|----|----|-------|--------|----|----|--------|--------|---------|----|-------|--------|---------|----|
| Value | FT | IR | JR | Value | Margin | FT | IR | Value  | Margin | Exp. FT | IR | Value | Margin | Exp. FT | IR |
| 1.346 | 30 | 19 | 34 | 1.501 | 0.933  | 31 | 13 | 7.82   | 0.853  | 43.3    | 14 | 8.27  | 0.865  | 49.8    | 14 |
| 1.337 | 30 | 21 | 32 | 1.526 | 0.918  | 30 | 9  | 7.49   | 0.845  | 46.7    | 14 | 8.19  | 0.860  | 50.2    | 14 |
| 1.337 | 30 | 17 | 36 | 1.532 | 0.914  | 30 | 19 | 7.39   | 0.819  | 44.9    | 14 | 8.16  | 0.836  | 48.0    | 15 |
| 1.331 | 30 | 23 | 34 | 1.539 | 0.910  | 31 | 17 | 7.30   | 0.816  | 45.8    | 14 | 8.13  | 0.833  | 48.0    | 14 |
| 1.326 | 30 | 19 | 30 | 1.541 | 0.909  | 31 | 9  | 7.58   | 0.792  | 39.0    | 15 | 8.00  | 0.832  | 49.3    | 14 |
| 1.323 | 31 | 13 | 36 | 1.541 | 0.909  | 30 | 17 | 7.10   | 0.784  | 44.5    | 14 | 7.72  | 0.810  | 50.0    | 15 |
| 1.308 | 30 | 15 | 38 | 1.542 | 0.908  | 30 | 9  | 7.10   | 0.778  | 43.9    | 14 | 7.60  | 0.806  | 50.9    | 14 |
| 1.304 | 30 | 17 | 28 | 1.553 | 0.901  | 30 | 21 | 7.08   | 0.776  | 43.8    | 14 | 7.60  | 0.800  | 50.2    | 14 |
| 1.302 | 31 | 21 | 36 | 1.554 | 0.901  | 31 | 21 | 7.04   | 0.773  | 44.5    | 15 | 7.52  | 0.799  | 51.1    | 14 |
| 1.300 | 30 | 21 | 28 | 1.556 | 0.900  | 30 | 19 | 6.75   | 0.763  | 46.9    | 14 | 5.78  | 0.797  | 65.1    | 10 |

- \* LHGR calculated with pin-power reconstruction
- \* CPR calculated with pin-power reconstruction & CPR limit type 3
- \* Thermal limit file:

**Figure A.52 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 16,901.0 Mwd/MTU**

## Brunswick Unit 1 Cycle 17 Fuel Cycle Design

|                                          |                    |                                |                      |
|------------------------------------------|--------------------|--------------------------------|----------------------|
| Cycle:                                   | 17                 | Core Average Exposure: MWd/MTU | 30367.2              |
| Exposure: MWd/MTU (GWd)                  | 17200.0 (1721.80 ) |                                |                      |
| Delta E: MWd/MTU, (GWd)                  | 299.0 ( 29.93 )    |                                |                      |
| Power: MWt                               | 2923.0 (100.00 %)  |                                |                      |
| Core Pressure: psia                      | 1044.7             |                                |                      |
| Inlet Subcooling: Btu/lbm                | -20.29             |                                |                      |
| Flow: Mlb/hr                             | 80.46 (104.50 %)   |                                |                      |
|                                          |                    |                                |                      |
| 1 3 5 7 9 11 13 15 17 19 21 23 25        |                    | Axial Profile                  | Edit Radial Power    |
| 1                                        |                    | N(PRA)                         | Zone Avg. Max. IR JR |
| 3                                        |                    | Top 25                         | 10 0.609 0.879 25 28 |
| 5                                        |                    | 24                             | 11 0.401 0.524 15 50 |
| 7                                        |                    | 23                             | 12 0.465 0.709 5 14  |
| 9                                        |                    | 22                             | 14 1.018 1.120 19 36 |
| 11                                       |                    | 21                             | 15 0.962 1.124 9 38  |
| 13                                       |                    | 20                             | 16 0.759 1.057 17 46 |
| 15                                       |                    | 19                             | 22 0.540 0.572 47 40 |
| 17                                       |                    | 18                             | 30 1.168 1.335 19 34 |
| 19                                       |                    | 17                             | 31 1.163 1.318 13 36 |
| 21                                       |                    | 16                             |                      |
| 23                                       |                    | 15                             |                      |
| 25                                       |                    | 14                             |                      |
| IR: 2 6 10 14 18 22 26 30 34 38 42 46 50 |                    | 13                             |                      |
|                                          |                    | 12                             |                      |
|                                          |                    | 11                             |                      |
|                                          |                    | 10                             |                      |
|                                          |                    | 9                              |                      |
|                                          |                    | 8                              |                      |
|                                          |                    | 7                              |                      |
|                                          |                    | 6                              |                      |
|                                          |                    | 5                              |                      |
|                                          |                    | 4                              |                      |
|                                          |                    | 3                              |                      |
|                                          |                    | 2                              |                      |
|                                          |                    | Bottom 1                       |                      |
| Control Rod Density: %                   | 4.14               |                                |                      |
| k-effective:                             | 0.99884            |                                |                      |
| Void Fraction:                           | 0.431              |                                |                      |
| Core Delta-P: psia                       | 24.439             | % AXIAL TILT                   | 3.830 -10.512        |
| Core Plate Delta-P: psia                 | 19.914             | AVG BOT 8ft/12ft               | 0.9857 1.0582        |
| Coolant Temp: Deg-F                      | 548.1              |                                |                      |
| In Channel Flow: Mlb/hr                  | 68.22              | Active Channel Flow: Mlb/hr    | 68.22                |
| Total Bypass Flow (%):                   | 15.2               | (of total core flow)           |                      |
| Total Water Rod Flow (%):                | -0.0               | (of total core flow)           |                      |
| Source Convergence                       | 0.00040            |                                |                      |

## Top Ten Thermal Limits Summary - Sorted by Margin

| Power |    |    |    | MCPR  |        |    |    | APLHGR |        |         |    | LHGR  |        |         |    |
|-------|----|----|----|-------|--------|----|----|--------|--------|---------|----|-------|--------|---------|----|
| Value | FT | IR | JR | Value | Margin | FT | IR | Value  | Margin | Exp. FT | IR | Value | Margin | Exp. FT | IR |
| 1.335 | 30 | 19 | 34 | 1.532 | 0.914  | 31 | 13 | 7.86   | 0.861  | 43.8    | 14 | 8.32  | 0.876  | 50.3    | 14 |
| 1.328 | 30 | 17 | 36 | 1.554 | 0.901  | 30 | 9  | 7.51   | 0.852  | 47.1    | 14 | 8.21  | 0.868  | 50.7    | 14 |
| 1.324 | 30 | 31 | 22 | 1.562 | 0.896  | 31 | 9  | 7.43   | 0.827  | 45.4    | 14 | 8.22  | 0.848  | 48.5    | 15 |
| 1.320 | 30 | 23 | 34 | 1.569 | 0.892  | 31 | 17 | 7.36   | 0.827  | 46.3    | 14 | 8.05  | 0.842  | 49.8    | 14 |
| 1.318 | 31 | 13 | 36 | 1.570 | 0.892  | 30 | 9  | 7.67   | 0.805  | 39.5    | 15 | 8.16  | 0.841  | 48.5    | 14 |
| 1.314 | 30 | 33 | 24 | 1.572 | 0.891  | 30 | 19 | 7.17   | 0.790  | 44.3    | 14 | 7.66  | 0.817  | 51.4    | 14 |
| 1.303 | 30 | 15 | 38 | 1.579 | 0.887  | 30 | 17 | 7.12   | 0.790  | 45.0    | 14 | 7.73  | 0.816  | 50.5    | 15 |
| 1.297 | 30 | 9  | 28 | 1.591 | 0.880  | 31 | 21 | 7.15   | 0.787  | 44.2    | 14 | 5.77  | 0.812  | 65.5    | 10 |
| 1.294 | 31 | 17 | 40 | 1.592 | 0.879  | 31 | 11 | 7.05   | 0.778  | 44.9    | 15 | 7.58  | 0.810  | 51.6    | 14 |
| 1.293 | 31 | 21 | 36 | 1.593 | 0.879  | 30 | 13 | 6.96   | 0.770  | 44.8    | 14 | 7.49  | 0.808  | 52.4    | 14 |

- \* LHGR calculated with pin-power reconstruction
- \* CPR calculated with pin-power reconstruction & CPR limit type 3
- \* Thermal limit file:

**Figure A.53 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 17,200.0 MWd/MTU**



## Brunswick Unit 1 Cycle 17 Fuel Cycle Design

|                           |                    |                                |                                   |
|---------------------------|--------------------|--------------------------------|-----------------------------------|
| Cycle:                    | 17                 | Core Average Exposure: MWd/MTU | 30368.2                           |
| Exposure: MWd/MTU (GWd)   | 17201.0 (1721.90 ) | Axial Profile                  | Edit Radial Power                 |
| Delta E: MWd/MTU, (GWd)   | 1.0 ( 0.10 )       | N(PRA) Power Exposure          | Zone Avg. Max. IR JR              |
| Power: MWt                | 2923.0 (100.00 %)  | Top 25                         | 0.220 5.505 10 0.607 0.880 25 28  |
| Core Pressure: psia       | 1044.7             | 24                             | 0.702 15.775 11 0.399 0.521 15 50 |
| Inlet Subcooling: Btu/lbm | -21.20             | 23                             | 0.910 21.477 12 0.462 0.704 5 14  |
| Flow: Mlb/hr              | 77.39 (100.50 %)   | 22                             | 1.021 25.516 14 1.021 1.124 19 36 |
|                           |                    | 21                             | 1.101 28.324 15 0.960 1.116 9 38  |
|                           |                    | 20                             | 1.158 30.036 16 0.754 1.050 17 46 |
|                           |                    | 19                             | 1.198 31.179 22 0.537 0.569 47 40 |
|                           |                    | 18                             | 1.225 31.984 30 1.168 1.339 19 34 |
|                           |                    | 17                             | 1.228 32.555 31 1.164 1.316 13 36 |
|                           |                    | 16                             | 1.213 31.517                      |
|                           |                    | 15                             | 1.201 32.310                      |
|                           |                    | 14                             | 1.266* 32.410                     |
|                           |                    | 13                             | 1.262 33.426                      |
|                           |                    | 12                             | 1.251 34.424                      |
|                           |                    | 11                             | 1.229 35.314                      |
|                           |                    | 10                             | 1.197 36.094                      |
|                           |                    | 9                              | 1.159 36.729                      |
|                           |                    | 8                              | 1.110 37.395                      |
|                           |                    | 7                              | 1.050 38.029                      |
|                           |                    | 6                              | 0.983 38.547                      |
|                           |                    | 5                              | 0.918 38.598*                     |
|                           |                    | 4                              | 0.857 37.430                      |
|                           |                    | 3                              | 0.775 33.478                      |
|                           |                    | 2                              | 0.600 25.021                      |
|                           |                    | Bottom 1                       | 0.168 6.848                       |
| Control Rod Density: %    | 3.89               | % AXIAL TILT                   | 4.824 -10.511                     |
| k-effective:              | 0.99912            | AVG BOT 8ft/12ft               | 0.9829 1.0582                     |
| Void Fraction:            | 0.435              |                                |                                   |
| Core Delta-P: psia        | 23.081             |                                |                                   |
| Core Plate Delta-P: psia  | 18.558             |                                |                                   |
| Coolant Temp: Deg-F       | 548.0              |                                |                                   |
| In Channel Flow: Mlb/hr   | 65.53              | Active Channel Flow: Mlb/hr    | 65.53                             |
| Total Bypass Flow (%):    | 15.3               | (of total core flow)           |                                   |
| Total Water Rod Flow (%): | -0.0               | (of total core flow)           |                                   |
| Source Convergence        | 0.00046            |                                |                                   |

## Top Ten Thermal Limits Summary - Sorted by Margin

| Power |    |    |    | MCPR  |        |    |    | APLHGR |        |         |    | LHGR  |        |         |    |
|-------|----|----|----|-------|--------|----|----|--------|--------|---------|----|-------|--------|---------|----|
| Value | FT | IR | JR | Value | Margin | FT | IR | Value  | Margin | Exp. FT | IR | Value | Margin | Exp. FT | K  |
| 1.339 | 30 | 19 | 34 | 1.506 | 0.930  | 31 | 13 | 8.15   | 0.894  | 43.9    | 14 | 8.56  | 0.906  | 50.8    | 14 |
| 1.331 | 30 | 17 | 36 | 1.527 | 0.917  | 30 | 9  | 7.81   | 0.885  | 47.1    | 14 | 8.54  | 0.902  | 50.6    | 14 |
| 1.327 | 30 | 31 | 22 | 1.535 | 0.912  | 30 | 19 | 7.76   | 0.863  | 45.3    | 14 | 8.41  | 0.879  | 49.7    | 14 |
| 1.324 | 30 | 23 | 34 | 1.541 | 0.908  | 31 | 17 | 7.67   | 0.862  | 46.3    | 14 | 8.53  | 0.878  | 48.5    | 14 |
| 1.319 | 30 | 33 | 24 | 1.543 | 0.907  | 31 | 9  | 7.77   | 0.827  | 41.0    | 15 | 8.32  | 0.871  | 49.9    | 15 |
| 1.316 | 31 | 13 | 36 | 1.545 | 0.906  | 30 | 9  | 7.42   | 0.822  | 44.9    | 14 | 7.97  | 0.848  | 51.2    | 15 |
| 1.303 | 31 | 21 | 36 | 1.545 | 0.906  | 30 | 17 | 7.38   | 0.814  | 44.6    | 14 | 7.87  | 0.846  | 52.0    | 14 |
| 1.301 | 30 | 35 | 26 | 1.548 | 0.905  | 31 | 21 | 7.33   | 0.814  | 45.1    | 14 | 7.84  | 0.845  | 52.3    | 14 |
| 1.300 | 30 | 15 | 38 | 1.552 | 0.902  | 31 | 17 | 7.31   | 0.812  | 45.6    | 15 | 7.80  | 0.840  | 52.3    | 15 |
| 1.297 | 31 | 17 | 32 | 1.557 | 0.899  | 31 | 11 | 7.09   | 0.801  | 46.8    | 14 | 7.74  | 0.837  | 52.6    | 14 |

- \* LHGR calculated with pin-power reconstruction
- \* CPR calculated with pin-power reconstruction & CPR limit type 3
- \* Thermal limit file:

**Figure A.54 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 17,201.0 MWd/MTU**

## Brunswick Unit 1 Cycle 17 Fuel Cycle Design

|                                          |                    |                                            |                   |
|------------------------------------------|--------------------|--------------------------------------------|-------------------|
| Cycle:                                   | 17                 | Core Average Exposure: MWd/MTU             | 30667.3           |
| Exposure: MWd/MTU (Gwd)                  | 17500.0 (1751.80 ) |                                            |                   |
| Delta E: MWd/MTU, (Gwd)                  | 299.0 ( 29.93 )    |                                            |                   |
| Power: MWt                               | 2923.0 (100.00 %)  |                                            |                   |
| Core Pressure: psia                      | 1044.7             |                                            |                   |
| Inlet Subcooling: Btu/lbm                | -20.28             |                                            |                   |
| Flow: Mlb/hr                             | 80.46 (104.50 %)   |                                            |                   |
|                                          |                    | Axial Profile                              | Edit Radial Power |
|                                          |                    | N(PRA) Power Exposure Zone Avg. Max. IR JR |                   |
| 1 3 5 7 9 11 13 15 17 19 21 23 25        |                    | Top 25 0.225 5.586 10 0.604 0.867 25 28    |                   |
| 1                                        |                    | 24 0.722 16.001 11 0.401 0.523 15 50       |                   |
| 3                                        |                    | 23 0.935 21.769 12 0.464 0.706 5 14        |                   |
| 5                                        |                    | 22 1.047 25.845 14 1.018 1.116 19 36       |                   |
| 7                                        |                    | 21 1.125 28.679 15 0.961 1.118 9 38        |                   |
| 9                                        |                    | 20 1.180 30.409 16 0.758 1.054 17 46       |                   |
| 11                                       |                    | 19 1.217 31.565 22 0.540 0.572 47 40       |                   |
| 13                                       |                    | 18 1.241 32.379 30 1.167 1.330 33 20       |                   |
| 15                                       |                    | 17 1.243 32.951 31 1.166 1.311 13 36       |                   |
| 17                                       |                    | 16 1.228 31.891                            |                   |
| 19                                       |                    | 15 1.215 32.681                            |                   |
| 21                                       |                    | 14 1.279* 32.767                           |                   |
| 23                                       |                    | 13 1.273 33.781                            |                   |
| 25                                       |                    | 12 1.258 34.777                            |                   |
| IR: 2 6 10 14 18 22 26 30 34 38 42 46 50 |                    | 11 1.231 35.660                            |                   |
|                                          |                    | 10 1.194 36.431                            |                   |
|                                          |                    | 9 1.150 37.056                             |                   |
|                                          |                    | 8 1.093 37.708                             |                   |
|                                          |                    | 7 1.026 38.325                             |                   |
|                                          |                    | 6 0.952 38.824                             |                   |
|                                          |                    | 5 0.881 38.857*                            |                   |
|                                          |                    | 4 0.817 37.672                             |                   |
|                                          |                    | 3 0.737 33.697                             |                   |
|                                          |                    | 2 0.572 25.190                             |                   |
|                                          |                    | Bottom 1 0.160 6.897                       |                   |
| Control Rod Density: %                   | 3.89               | % AXIAL TILT                               | 6.675 -10.300     |
| k-effective:                             | 0.99868            | AVG BOT 8ft/12ft                           | 0.9728 1.0571     |
| Void Fraction:                           | 0.424              |                                            |                   |
| Core Delta-P: psia                       | 24.344             |                                            |                   |
| Core Plate Delta-P: psia                 | 19.820             |                                            |                   |
| Coolant Temp: Deg-F                      | 548.0              |                                            |                   |
| In Channel Flow: Mlb/hr                  | 68.27              | Active Channel Flow: Mlb/hr                | 68.27             |
| Total Bypass Flow (%):                   | 15.2               | (of total core flow)                       |                   |
| Total Water Rod Flow (%):                | -0.0               | (of total core flow)                       |                   |
| Source Convergence                       | 0.00039            |                                            |                   |

## Top Ten Thermal Limits Summary ~ Sorted by Margin

| Power |    |    |    | MCPR  |        |    |    | APLHGR |        |      |    | LHGR |       |        |      |
|-------|----|----|----|-------|--------|----|----|--------|--------|------|----|------|-------|--------|------|
| Value | FT | IR | JR | Value | Margin | FT | IR | Value  | Margin | Exp. | FT | IR   | Value | Margin | Exp. |
| 1.330 | 30 | 33 | 20 | 1.535 | 0.912  | 31 | 13 | 8.14   | 0.897  | 44.4 | 14 | 13   | 8.56  | 0.912  | 51.3 |
| 1.321 | 30 | 17 | 36 | 1.554 | 0.901  | 30 | 9  | 7.79   | 0.888  | 47.6 | 14 | 15   | 8.51  | 0.905  | 51.2 |
| 1.316 | 30 | 31 | 22 | 1.563 | 0.896  | 31 | 9  | 7.69   | 0.868  | 46.7 | 14 | 23   | 8.41  | 0.884  | 50.2 |
| 1.312 | 30 | 29 | 20 | 1.570 | 0.892  | 31 | 17 | 7.75   | 0.867  | 45.8 | 14 | 21   | 8.51  | 0.882  | 49.0 |
| 1.311 | 31 | 13 | 36 | 1.571 | 0.891  | 30 | 9  | 7.81   | 0.835  | 41.4 | 15 | 11   | 8.33  | 0.878  | 50.4 |
| 1.310 | 30 | 33 | 24 | 1.574 | 0.890  | 30 | 19 | 7.40   | 0.824  | 45.4 | 14 | 15   | 8.04  | 0.855  | 51.2 |
| 1.294 | 30 | 35 | 26 | 1.580 | 0.886  | 31 | 11 | 7.40   | 0.821  | 45.0 | 14 | 13   | 7.87  | 0.853  | 52.8 |
| 1.294 | 30 | 15 | 38 | 1.581 | 0.885  | 30 | 17 | 7.36   | 0.821  | 45.5 | 14 | 11   | 7.88  | 0.852  | 52.5 |
| 1.293 | 30 | 9  | 28 | 1.583 | 0.885  | 31 | 21 | 7.29   | 0.813  | 46.1 | 15 | 17   | 7.80  | 0.845  | 52.8 |
| 1.293 | 31 | 21 | 36 | 1.587 | 0.882  | 31 | 35 | 7.09   | 0.804  | 47.2 | 14 | 17   | 7.75  | 0.844  | 53.1 |

- \* LHGR calculated with pin-power reconstruction
- \* CPR calculated with pin-power reconstruction & CPR limit type 3
- \* Thermal limit file:

**Figure A.55 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 17,500.0 MWd/MTU**

## Brunswick Unit 1 Cycle 17 Fuel Cycle Design

|                           |                    |                                |                                   |
|---------------------------|--------------------|--------------------------------|-----------------------------------|
| Cycle:                    | 17                 | Core Average Exposure: MWd/MTU | 30668.3                           |
| Exposure: MWd/MTU (Gwd)   | 17501.0 (1751.90 ) |                                |                                   |
| Delta E: MWd/MTU, (Gwd)   | 1.0 ( 0.10 )       |                                |                                   |
| Power: MWt                | 2923.0 (100.00 %)  |                                |                                   |
| Core Pressure: psia       | 1044.7             |                                |                                   |
| Inlet Subcooling: Btu/lbm | -21.31             |                                |                                   |
| Flow: Mlb/hr              | 77.00 (100.00 %)   |                                |                                   |
|                           |                    | Axial Profile                  | Edit Radial Power                 |
|                           |                    | N(PRA) Power Exposure          | Zone Avg. Max. IR JR              |
|                           |                    | Top 25                         | 0.196 5.586 10 0.565 0.768 25 28  |
|                           |                    | 24                             | 0.625 16.002 11 0.393 0.514 15 50 |
|                           |                    | 23                             | 0.808 21.770 12 0.457 0.692 5 14  |
|                           |                    | 22                             | 0.905 25.846 14 1.022 1.151 13 30 |
|                           |                    | 21                             | 0.973 28.680 15 0.959 1.167 11 32 |
|                           |                    | 20                             | 1.023 30.410 16 0.748 1.044 17 46 |
|                           |                    | 19                             | 1.058 31.566 22 0.532 0.564 47 40 |
|                           |                    | 18                             | 1.082 32.381 30 1.149 1.350 35 18 |
|                           |                    | 17                             | 1.109 32.952 31 1.204 1.364 13 32 |
|                           |                    | 16                             | 1.150 31.893                      |
|                           |                    | 15                             | 1.180 32.682                      |
|                           |                    | 14                             | 1.275 32.768                      |
|                           |                    | 13                             | 1.292 33.783                      |
|                           |                    | 12                             | 1.294* 34.778                     |
|                           |                    | 11                             | 1.281 35.661                      |
|                           |                    | 10                             | 1.255 36.433                      |
|                           |                    | 9                              | 1.221 37.057                      |
|                           |                    | 8                              | 1.178 37.709                      |
|                           |                    | 7                              | 1.129 38.326                      |
|                           |                    | 6                              | 1.078 38.825                      |
|                           |                    | 5                              | 1.033 38.858*                     |
|                           |                    | 4                              | 0.993 37.672                      |
|                           |                    | 3                              | 0.925 33.698                      |
|                           |                    | 2                              | 0.731 25.190                      |
|                           |                    | Bottom 1                       | 0.207 6.897                       |
|                           |                    |                                | % AXIAL TILT -3.970 -10.299       |
|                           |                    |                                | AVG BOT 8ft/12ft 1.0414 1.0571    |
| Control Rod Density: %    | 2.19               |                                |                                   |
| k-effective:              | 0.99877            |                                |                                   |
| Void Fraction:            | 0.455              |                                |                                   |
| Core Delta-P: psia        | 23.259             |                                |                                   |
| Core Plate Delta-P: psia  | 18.736             |                                |                                   |
| Coolant Temp: Deg-F       | 548.2              |                                |                                   |
| In Channel Flow: Mlb/hr   | 65.02              | Active Channel Flow: Mlb/hr    | 65.02                             |
| Total Bypass Flow (%):    | 15.6               | (of total core flow)           |                                   |
| Total Water Rod Flow (%): | -0.0               | (of total core flow)           |                                   |
| Source Convergence        | 0.00039            |                                |                                   |

## Top Ten Thermal Limits Summary - Sorted by Margin

| Power |    |    |    | MCPR  |        |    |    | APLHGR |        |         |    | LHGR  |        |         |    |
|-------|----|----|----|-------|--------|----|----|--------|--------|---------|----|-------|--------|---------|----|
| Value | FT | IR | JR | Value | Margin | FT | IR | Value  | Margin | Exp. FT | IR | Value | Margin | Exp. FT | IR |
| 1.364 | 31 | 13 | 32 | 1.510 | 0.927  | 31 | 13 | 6.99   | 0.766  | 43.5    | 15 | 7.27  | 0.780  | 51.9    | 15 |
| 1.351 | 31 | 21 | 40 | 1.527 | 0.917  | 31 | 11 | 6.66   | 0.758  | 47.4    | 14 | 7.30  | 0.774  | 50.9    | 14 |
| 1.350 | 30 | 35 | 18 | 1.534 | 0.913  | 31 | 13 | 6.75   | 0.757  | 46.0    | 14 | 6.90  | 0.770  | 55.1    | 14 |
| 1.350 | 30 | 37 | 20 | 1.534 | 0.913  | 31 | 21 | 6.73   | 0.754  | 45.9    | 14 | 7.02  | 0.769  | 53.6    | 14 |
| 1.348 | 31 | 11 | 30 | 1.535 | 0.912  | 31 | 13 | 6.65   | 0.751  | 46.6    | 14 | 7.24  | 0.769  | 51.0    | 14 |
| 1.343 | 31 | 13 | 28 | 1.550 | 0.903  | 31 | 23 | 6.64   | 0.749  | 46.5    | 14 | 7.35  | 0.765  | 49.4    | 14 |
| 1.341 | 31 | 23 | 42 | 1.556 | 0.899  | 30 | 9  | 6.89   | 0.748  | 42.9    | 14 | 6.89  | 0.765  | 54.6    | 15 |
| 1.338 | 31 | 13 | 36 | 1.560 | 0.897  | 31 | 17 | 6.60   | 0.748  | 47.0    | 15 | 7.33  | 0.763  | 49.3    | 14 |
| 1.335 | 30 | 33 | 16 | 1.563 | 0.895  | 31 | 25 | 6.64   | 0.747  | 46.3    | 14 | 7.26  | 0.761  | 50.0    | 14 |
| 1.322 | 31 | 25 | 40 | 1.568 | 0.893  | 30 | 15 | 6.63   | 0.747  | 46.4    | 14 | 7.25  | 0.760  | 49.9    | 14 |

- \* LHGR calculated with pin-power reconstruction
- \* CPR calculated with pin-power reconstruction & CPR limit type 3
- \* Thermal limit file:

**Figure A.56 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 17,501.0 MWd/MTU**

## Brunswick Unit 1 Cycle 17 Fuel Cycle Design

|                           |                    |                                |                                   |
|---------------------------|--------------------|--------------------------------|-----------------------------------|
| Cycle:                    | 17                 | Core Average Exposure: MWd/MTU | 30917.3                           |
| Exposure: MWd/MTU (GWd)   | 17750.0 (1776.80 ) |                                |                                   |
| Delta E: MWd/MTU, (GWd)   | 249.0 ( 24.93 )    |                                |                                   |
| Power: MWt                | 2923.0 (100.00 %)  |                                |                                   |
| Core Pressure: psia       | 1044.7             |                                |                                   |
| Inlet Subcooling: Btu/lbm | -20.29             |                                |                                   |
| Flow: Mlb/hr              | 80.46 (104.50 %)   |                                |                                   |
|                           |                    | Axial Profile                  | Edit Radial Power                 |
|                           |                    | N(PRA) Power Exposure          | Zone Avg. Max. IR JR              |
|                           |                    | Top 25                         | 0.202 5.647 10 0.563 0.760 25 28  |
|                           |                    | 24                             | 0.645 16.169 11 0.394 0.515 15 50 |
|                           |                    | 23                             | 0.834 21.987 12 0.458 0.693 5 14  |
|                           |                    | 22                             | 0.932 26.089 14 1.020 1.146 13 30 |
|                           |                    | 21                             | 1.000 28.941 15 0.960 1.165 11 32 |
|                           |                    | 20                             | 1.047 30.685 16 0.751 1.048 17 46 |
|                           |                    | 19                             | 1.080 31.850 22 0.534 0.566 47 40 |
|                           |                    | 18                             | 1.103 32.671 30 1.148 1.347 37 20 |
|                           |                    | 17                             | 1.127 33.250 31 1.205 1.359 13 32 |
|                           |                    | 16                             | 1.167 32.189                      |
|                           |                    | 15                             | 1.195 32.986                      |
|                           |                    | 14                             | 1.289 33.067                      |
|                           |                    | 13                             | 1.303* 34.086                     |
|                           |                    | 12                             | 1.301 35.082                      |
|                           |                    | 11                             | 1.283 35.962                      |
|                           |                    | 10                             | 1.252 36.727                      |
|                           |                    | 9                              | 1.212 37.343                      |
|                           |                    | 8                              | 1.162 37.986                      |
|                           |                    | 7                              | 1.105 38.591                      |
|                           |                    | 6                              | 1.046 39.078                      |
|                           |                    | 5                              | 0.993 39.100*                     |
|                           |                    | 4                              | 0.948 37.906                      |
|                           |                    | 3                              | 0.880 33.915                      |
|                           |                    | 2                              | 0.696 25.362                      |
|                           |                    | Bottom 1                       | 0.197 6.946                       |
|                           |                    |                                | % AXIAL TILT -1.918 -10.198       |
|                           |                    |                                | AVG BOT 8ft/12ft 1.0301 1.0566    |
| Control Rod Density: %    | 2.19               |                                |                                   |
| k-effective:              | 0.99865            |                                |                                   |
| Void Fraction:            | 0.443              |                                |                                   |
| Core Delta-P: psia        | 24.694             |                                |                                   |
| Core Plate Delta-P: psia  | 20.169             |                                |                                   |
| Coolant Temp: Deg-F       | 548.2              |                                |                                   |
| In Channel Flow: Mlb/hr   | 68.09              | Active Channel Flow: Mlb/hr    | 68.09                             |
| Total Bypass Flow (%):    | 15.4               | (of total core flow)           |                                   |
| Total Water Rod Flow (%): | -0.0               | (of total core flow)           |                                   |
| Source Convergence        | 0.00041            |                                |                                   |

## Top Ten Thermal Limits Summary - Sorted by Margin

| Power |    |    |    | MCPR  |        |    |    | APLHGR |        |         |    | LHGR  |        |         |    |
|-------|----|----|----|-------|--------|----|----|--------|--------|---------|----|-------|--------|---------|----|
| Value | FT | IR | JR | Value | Margin | FT | IR | Value  | Margin | Exp. FT | IR | Value | Margin | Exp. FT | IR |
| 1.359 | 31 | 13 | 32 | 1.543 | 0.907  | 31 | 13 | 7.04   | 0.774  | 43.9    | 15 | 7.32  | 0.789  | 52.3    | 15 |
| 1.348 | 31 | 31 | 14 | 1.557 | 0.899  | 31 | 11 | 6.70   | 0.765  | 47.7    | 14 | 7.34  | 0.782  | 51.3    | 14 |
| 1.347 | 30 | 37 | 20 | 1.565 | 0.895  | 31 | 13 | 6.79   | 0.764  | 46.4    | 14 | 6.95  | 0.779  | 55.4    | 14 |
| 1.346 | 30 | 35 | 18 | 1.567 | 0.893  | 31 | 21 | 6.77   | 0.761  | 46.2    | 14 | 7.07  | 0.778  | 53.9    | 14 |
| 1.345 | 31 | 11 | 30 | 1.570 | 0.892  | 31 | 13 | 6.69   | 0.759  | 47.0    | 14 | 7.27  | 0.776  | 51.4    | 14 |
| 1.339 | 31 | 23 | 42 | 1.579 | 0.887  | 31 | 23 | 6.69   | 0.758  | 46.9    | 14 | 7.39  | 0.773  | 49.8    | 14 |
| 1.337 | 31 | 13 | 28 | 1.587 | 0.882  | 30 | 9  | 6.66   | 0.758  | 47.3    | 15 | 6.97  | 0.773  | 54.6    | 15 |
| 1.334 | 31 | 13 | 36 | 1.591 | 0.880  | 31 | 17 | 6.70   | 0.756  | 46.6    | 14 | 7.04  | 0.771  | 53.6    | 14 |
| 1.332 | 30 | 33 | 16 | 1.596 | 0.877  | 31 | 25 | 6.93   | 0.756  | 43.3    | 14 | 7.38  | 0.771  | 49.7    | 14 |
| 1.318 | 31 | 25 | 40 | 1.603 | 0.873  | 30 | 37 | 6.66   | 0.753  | 46.8    | 14 | 7.32  | 0.771  | 50.4    | 14 |

- \* LHGR calculated with pin-power reconstruction
- \* CPR calculated with pin-power reconstruction & CPR limit type 3
- \* Thermal limit file:

**Figure A.57 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 17,750.0 MWd/MTU**

## Brunswick Unit 1 Cycle 17 Fuel Cycle Design

|                           |                    |                                |                                   |  |
|---------------------------|--------------------|--------------------------------|-----------------------------------|--|
| Cycle:                    | 17                 | Core Average Exposure: MWd/MTU | 30918.3                           |  |
| Exposure: MWd/MTU (Gwd)   | 17751.0 (1776.90 ) |                                |                                   |  |
| Delta E: MWd/MTU, (Gwd)   | 1.0 ( 0.10 )       |                                |                                   |  |
| Power: MWt                | 2923.0 (100.00 %)  |                                |                                   |  |
| Core Pressure: psia       | 1044.7             |                                |                                   |  |
| Inlet Subcooling: Btu/lbm | -21.05             |                                |                                   |  |
| Flow: Mlb/hr              | 77.85 (101.10 %)   |                                |                                   |  |
|                           |                    | Axial Profile                  | Edit Radial Power                 |  |
|                           |                    | N(PRA) Power Exposure          | Zone Avg. Max. IR JR              |  |
|                           |                    | Top 25                         | 0.200 5.647 10 0.567 0.780 25 28  |  |
|                           |                    | 24                             | 0.639 16.169 11 0.390 0.511 15 50 |  |
|                           |                    | 23                             | 0.827 21.988 12 0.454 0.687 5 14  |  |
|                           |                    | 22                             | 0.929 26.090 14 1.024 1.149 13 30 |  |
|                           |                    | 21                             | 1.001 28.942 15 0.956 1.160 11 32 |  |
|                           |                    | 20                             | 1.057 30.686 16 0.744 1.038 17 46 |  |
|                           |                    | 19                             | 1.101 31.852 22 0.529 0.561 47 40 |  |
|                           |                    | 18                             | 1.140 32.672 30 1.152 1.347 37 20 |  |
|                           |                    | 17                             | 1.167 33.251 31 1.200 1.358 13 32 |  |
|                           |                    | 16                             | 1.194 32.190                      |  |
|                           |                    | 15                             | 1.210 32.987                      |  |
|                           |                    | 14                             | 1.296 33.068                      |  |
|                           |                    | 13                             | 1.303* 34.087                     |  |
|                           |                    | 12                             | 1.297 35.083                      |  |
|                           |                    | 11                             | 1.275 35.963                      |  |
|                           |                    | 10                             | 1.241 36.728                      |  |
|                           |                    | 9                              | 1.200 37.345                      |  |
|                           |                    | 8                              | 1.149 37.987                      |  |
|                           |                    | 7                              | 1.092 38.593                      |  |
|                           |                    | 6                              | 1.032 39.080                      |  |
|                           |                    | 5                              | 0.978 39.101*                     |  |
|                           |                    | 4                              | 0.932 37.907                      |  |
|                           |                    | 3                              | 0.863 33.916                      |  |
|                           |                    | 2                              | 0.682 25.363                      |  |
|                           |                    | Bottom 1                       | 0.193 6.946                       |  |
|                           |                    | % AXIAL TILT                   | -0.726 -10.198                    |  |
|                           |                    | AVG BOT 8ft/12ft               | 1.0244 1.0566                     |  |
| Control Rod Density: %    | 1.95               |                                |                                   |  |
| k-effective:              | 0.99905            |                                |                                   |  |
| Void Fraction:            | 0.446              |                                |                                   |  |
| Core Delta-P: psia        | 23.510             |                                |                                   |  |
| Core Plate Delta-P: psia  | 18.987             |                                |                                   |  |
| Coolant Temp: Deg-F       | 548.1              |                                |                                   |  |
| In Channel Flow: Mlb/hr   | 65.82              | Active Channel Flow: Mlb/hr    | 65.82                             |  |
| Total Bypass Flow (%):    | 15.4               | (of total core flow)           |                                   |  |
| Total Water Rod Flow (%): | -0.0               | (of total core flow)           |                                   |  |
| Source Convergence        | 0.00035            |                                |                                   |  |

## Top Ten Thermal Limits Summary - Sorted by Margin

| Power |    |    |    | MCPR  |        |    |    | APLHGR |        |      |    | LHGR |       |        |      |
|-------|----|----|----|-------|--------|----|----|--------|--------|------|----|------|-------|--------|------|
| Value | FT | IR | JR | Value | Margin | FT | IR | Value  | Margin | Exp. | FT | IR   | Value | Margin | Exp. |
| 1.358 | 31 | 13 | 32 | 1.515 | 0.924  | 31 | 13 | 6.70   | 0.781  | 49.7 | 14 | 19   | 7.40  | 0.798  | 52.3 |
| 1.348 | 31 | 31 | 14 | 1.532 | 0.914  | 31 | 13 | 7.09   | 0.779  | 43.9 | 15 | 11   | 7.12  | 0.797  | 55.2 |
| 1.347 | 30 | 37 | 20 | 1.533 | 0.913  | 31 | 11 | 6.76   | 0.773  | 47.7 | 14 | 15   | 7.46  | 0.794  | 51.3 |
| 1.347 | 30 | 35 | 18 | 1.537 | 0.911  | 31 | 21 | 6.63   | 0.772  | 49.6 | 14 | 27   | 5.23  | 0.790  | 66.5 |
| 1.344 | 31 | 39 | 26 | 1.546 | 0.906  | 31 | 13 | 6.85   | 0.771  | 46.4 | 14 | 13   | 7.18  | 0.786  | 53.6 |
| 1.341 | 31 | 11 | 30 | 1.553 | 0.901  | 31 | 23 | 7.07   | 0.771  | 43.3 | 14 | 13   | 7.10  | 0.786  | 54.5 |
| 1.336 | 31 | 23 | 42 | 1.556 | 0.900  | 31 | 25 | 6.82   | 0.771  | 46.8 | 14 | 17   | 7.15  | 0.786  | 53.9 |
| 1.332 | 30 | 33 | 16 | 1.567 | 0.893  | 30 | 9  | 6.91   | 0.770  | 45.4 | 14 | 15   | 7.18  | 0.785  | 53.4 |
| 1.327 | 31 | 13 | 36 | 1.570 | 0.892  | 31 | 35 | 6.84   | 0.769  | 46.2 | 14 | 17   | 7.31  | 0.783  | 51.7 |
| 1.326 | 30 | 33 | 20 | 1.571 | 0.891  | 30 | 37 | 6.78   | 0.768  | 47.0 | 14 | 11   | 7.13  | 0.782  | 53.6 |

- \* LHGR calculated with pin-power reconstruction
- \* CPR calculated with pin-power reconstruction & CPR limit type 3
- \* Thermal limit file:

**Figure A.58 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 17,751.0 MWd/MTU**



## Brunswick Unit 1 Cycle 17 Fuel Cycle Design

|                           |                    |                                |                                   |
|---------------------------|--------------------|--------------------------------|-----------------------------------|
| Cycle:                    | 17                 | Core Average Exposure: MWd/MTU | 31168.3                           |
| Exposure: MWd/MTU (Gwd)   | 18001.0 (1801.90 ) |                                |                                   |
| Delta E: MWd/MTU, (Gwd)   | 1.0 ( 0.10 )       |                                |                                   |
| Power: MWt                | 2923.0 (100.00 %)  |                                |                                   |
| Core Pressure: psia       | 1044.7             |                                |                                   |
| Inlet Subcooling: Btu/lbm | -21.08             |                                |                                   |
| Flow: Mlb/hr              | 77.77 (101.00 %)   |                                |                                   |
|                           |                    | Axial Profile                  | Edit Radial Power                 |
|                           |                    | N(PRA) Power Exposure          | Zone Avg. Max. IR JR              |
|                           |                    | Top 25                         | 0.201 5.709 10 0.571 0.792 25 28  |
|                           |                    | 24                             | 0.642 16.341 11 0.388 0.507 15 50 |
|                           |                    | 23                             | 0.831 22.210 12 0.452 0.682 5 14  |
|                           |                    | 22                             | 0.934 26.340 14 1.026 1.146 13 30 |
|                           |                    | 21                             | 1.009 29.212 15 0.954 1.152 11 32 |
|                           |                    | 20                             | 1.068 30.971 16 0.740 1.032 17 46 |
|                           |                    | 19                             | 1.118 32.149 22 0.527 0.559 47 40 |
|                           |                    | 18                             | 1.165 32.980 30 1.155 1.344 37 20 |
|                           |                    | 17                             | 1.205 33.566 31 1.196 1.355 39 22 |
|                           |                    | 16                             | 1.252 32.498                      |
|                           |                    | 15                             | 1.270 33.299                      |
|                           |                    | 14                             | 1.340* 33.374                     |
|                           |                    | 13                             | 1.332 34.394                      |
|                           |                    | 12                             | 1.311 35.389                      |
|                           |                    | 11                             | 1.278 36.263                      |
|                           |                    | 10                             | 1.235 37.021                      |
|                           |                    | 9                              | 1.184 37.627                      |
|                           |                    | 8                              | 1.125 38.258                      |
|                           |                    | 7                              | 1.060 38.850                      |
|                           |                    | 6                              | 0.992 39.323                      |
|                           |                    | 5                              | 0.931 39.331*                     |
|                           |                    | 4                              | 0.880 38.126                      |
|                           |                    | 3                              | 0.812 34.119                      |
|                           |                    | 2                              | 0.642 25.523                      |
|                           |                    | Bottom 1                       | 0.182 6.992                       |
|                           |                    | % AXIAL TILT                   | 1.702 -10.071                     |
|                           |                    | AVG BOT 8ft/12ft               | 1.0178 1.0561                     |
| Control Rod Density: %    | 1.70               |                                |                                   |
| k-effective:              | 0.99891            |                                |                                   |
| Void Fraction:            | 0.440              |                                |                                   |
| Core Delta-P: psia        | 23.403             |                                |                                   |
| Core Plate Delta-P: psia  | 18.880             |                                |                                   |
| Coolant Temp: Deg-F       | 548.1              |                                |                                   |
| In Channel Flow: Mlb/hr   | 65.79              | Active Channel Flow: Mlb/hr    | 65.79                             |
| Total Bypass Flow (%):    | 15.4               | (of total core flow)           |                                   |
| Total Water Rod Flow (%): | -0.0               | (of total core flow)           |                                   |
| Source Convergence        | 0.00030            |                                |                                   |

## Top Ten Thermal Limits Summary - Sorted by Margin

| Power |    |    |    | MCPR  |        |    |    | APLHGR |        |         |    | LHGR  |        |         |    |
|-------|----|----|----|-------|--------|----|----|--------|--------|---------|----|-------|--------|---------|----|
| Value | FT | IR | JR | Value | Margin | FT | IR | Value  | Margin | Exp. FT | IR | Value | Margin | Exp. FT | IR |
| 1.355 | 31 | 39 | 22 | 1.519 | 0.921  | 31 | 13 | 7.67   | 0.864  | 46.4    | 14 | 8.42  | 0.881  | 49.8    | 14 |
| 1.350 | 31 | 39 | 26 | 1.521 | 0.921  | 31 | 39 | 7.51   | 0.855  | 47.3    | 14 | 8.23  | 0.872  | 50.9    | 14 |
| 1.345 | 31 | 31 | 14 | 1.536 | 0.911  | 31 | 11 | 7.30   | 0.819  | 46.0    | 15 | 5.61  | 0.862  | 66.7    | 10 |
| 1.344 | 30 | 37 | 20 | 1.538 | 0.910  | 31 | 31 | 7.40   | 0.817  | 44.4    | 14 | 7.77  | 0.856  | 54.0    | 15 |
| 1.343 | 30 | 35 | 18 | 1.549 | 0.904  | 31 | 25 | 7.34   | 0.816  | 45.0    | 15 | 7.72  | 0.846  | 53.5    | 14 |
| 1.333 | 31 | 11 | 30 | 1.553 | 0.901  | 31 | 35 | 7.23   | 0.809  | 45.7    | 14 | 7.74  | 0.842  | 53.0    | 15 |
| 1.332 | 30 | 33 | 20 | 1.554 | 0.901  | 31 | 23 | 7.37   | 0.807  | 43.6    | 14 | 7.51  | 0.833  | 54.5    | 14 |
| 1.331 | 31 | 31 | 18 | 1.556 | 0.900  | 31 | 13 | 7.10   | 0.806  | 47.1    | 14 | 7.51  | 0.825  | 53.8    | 14 |
| 1.330 | 31 | 29 | 12 | 1.557 | 0.899  | 31 | 31 | 7.17   | 0.806  | 46.2    | 14 | 7.68  | 0.823  | 51.7    | 14 |
| 1.329 | 31 | 35 | 22 | 1.566 | 0.894  | 30 | 37 | 7.18   | 0.804  | 45.8    | 14 | 7.66  | 0.820  | 51.7    | 14 |

- \* LHGR calculated with pin-power reconstruction
- \* CPR calculated with pin-power reconstruction & CPR limit type 3
- \* Thermal limit file:

**Figure A.60 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 18,001.0 MWd/MTU**

## Brunswick Unit 1 Cycle 17 Fuel Cycle Design

|                           |                    |                                |                                   |
|---------------------------|--------------------|--------------------------------|-----------------------------------|
| Cycle:                    | 17                 | Core Average Exposure: MWd/MTU | 31367.4                           |
| Exposure: MWd/MTU (GWd)   | 18200.0 (1821.90 ) |                                |                                   |
| Delta E: MWd/MTU, (GWd)   | 199.0 ( 19.92 )    |                                |                                   |
| Power: MWt                | 2923.0 (100.00 %)  |                                |                                   |
| Core Pressure: psia       | 1044.7             |                                |                                   |
| Inlet Subcooling: Btu/lbm | -20.28             |                                |                                   |
| Flow: Mlb/hr              | 80.46 (104.50 %)   |                                |                                   |
|                           |                    | Axial Profile                  | Edit Radial Power                 |
|                           |                    | N(PRA) Power Exposure          | Zone Avg. Max. IR JR              |
|                           |                    | Top 25                         | 0.206 5.758 10 0.569 0.784 25 28  |
|                           |                    | 24                             | 0.659 16.478 11 0.390 0.509 15 50 |
|                           |                    | 23                             | 0.852 22.387 12 0.453 0.683 5 14  |
|                           |                    | 22                             | 0.956 26.541 14 1.024 1.141 13 30 |
|                           |                    | 21                             | 1.030 29.429 15 0.955 1.149 11 32 |
|                           |                    | 20                             | 1.087 31.200 16 0.743 1.035 17 46 |
|                           |                    | 19                             | 1.135 32.389 22 0.529 0.561 47 40 |
|                           |                    | 18                             | 1.180 33.230 30 1.154 1.341 37 20 |
|                           |                    | 17                             | 1.218 33.824 31 1.197 1.354 39 22 |
|                           |                    | 16                             | 1.263 32.755                      |
|                           |                    | 15                             | 1.281 33.561                      |
|                           |                    | 14                             | 1.350* 33.625                     |
|                           |                    | 13                             | 1.339 34.644                      |
|                           |                    | 12                             | 1.316 35.635                      |
|                           |                    | 11                             | 1.279 36.503                      |
|                           |                    | 10                             | 1.232 37.253                      |
|                           |                    | 9                              | 1.177 37.850                      |
|                           |                    | 8                              | 1.113 38.469                      |
|                           |                    | 7                              | 1.042 39.049                      |
|                           |                    | 6                              | 0.968 39.509*                     |
|                           |                    | 5                              | 0.902 39.506                      |
|                           |                    | 4                              | 0.847 38.292                      |
|                           |                    | 3                              | 0.779 34.271                      |
|                           |                    | 2                              | 0.616 25.644                      |
|                           |                    | Bottom 1                       | 0.175 7.027                       |
|                           |                    |                                | % AXIAL TILT 3.252 -9.957         |
|                           |                    |                                | AVG BOT 8ft/12ft 1.0090 1.0556    |
| Control Rod Density: %    | 1.70               |                                |                                   |
| k-effective:              | 0.99870            |                                |                                   |
| Void Fraction:            | 0.431              |                                |                                   |
| Core Delta-P: psia        | 24.518             |                                |                                   |
| Core Plate Delta-P: psia  | 19.994             |                                |                                   |
| Coolant Temp: Deg-F       | 548.1              |                                |                                   |
| In Channel Flow: Mlb/hr   | 68.19              | Active Channel Flow: Mlb/hr    | 68.19                             |
| Total Bypass Flow (%):    | 15.3               | (of total core flow)           |                                   |
| Total Water Rod Flow (%): | -0.0               | (of total core flow)           |                                   |
| Source Convergence        | 0.00041            |                                |                                   |

## Top Ten Thermal Limits Summary - Sorted by Margin

| Power |    |    |    | MCPR  |        |    |    | APLHGR |        |         |    | LHGR  |        |         |    |
|-------|----|----|----|-------|--------|----|----|--------|--------|---------|----|-------|--------|---------|----|
| Value | FT | IR | JR | Value | Margin | FT | IR | Value  | Margin | Exp. FT | IR | Value | Margin | Exp. FT | IR |
| 1.354 | 31 | 39 | 22 | 1.542 | 0.908  | 31 | 39 | 7.67   | 0.867  | 46.7    | 14 | 8.42  | 0.885  | 50.2    | 14 |
| 1.349 | 31 | 39 | 26 | 1.543 | 0.907  | 31 | 39 | 7.50   | 0.856  | 47.6    | 14 | 8.22  | 0.875  | 51.2    | 14 |
| 1.342 | 31 | 31 | 14 | 1.559 | 0.898  | 31 | 11 | 7.33   | 0.825  | 46.3    | 15 | 5.59  | 0.872  | 66.9    | 10 |
| 1.341 | 30 | 37 | 20 | 1.561 | 0.897  | 31 | 31 | 7.44   | 0.824  | 44.8    | 14 | 7.79  | 0.861  | 54.3    | 15 |
| 1.340 | 30 | 35 | 18 | 1.575 | 0.889  | 31 | 25 | 7.35   | 0.819  | 45.3    | 15 | 7.75  | 0.853  | 53.9    | 14 |
| 1.333 | 31 | 41 | 24 | 1.577 | 0.888  | 31 | 23 | 7.34   | 0.816  | 45.1    | 14 | 7.77  | 0.848  | 53.3    | 15 |
| 1.329 | 31 | 29 | 12 | 1.579 | 0.886  | 31 | 35 | 7.29   | 0.812  | 45.3    | 14 | 7.53  | 0.838  | 54.9    | 14 |
| 1.327 | 30 | 33 | 20 | 1.580 | 0.886  | 31 | 13 | 7.18   | 0.812  | 46.7    | 14 | 7.54  | 0.832  | 54.2    | 14 |
| 1.327 | 31 | 31 | 18 | 1.584 | 0.884  | 31 | 31 | 7.20   | 0.812  | 46.5    | 14 | 7.70  | 0.828  | 52.0    | 14 |
| 1.326 | 30 | 33 | 16 | 1.590 | 0.880  | 30 | 37 | 7.21   | 0.809  | 46.1    | 14 | 7.70  | 0.828  | 52.0    | 14 |

- \* LHGR calculated with pin-power reconstruction
- \* CPR calculated with pin-power reconstruction & CPR limit type 3
- \* Thermal limit file:

**Figure A.61 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 18,200.0 MWd/MTU**



## Brunswick Unit 1 Cycle 17 Fuel Cycle Design

|                           |                    |                                |                                   |
|---------------------------|--------------------|--------------------------------|-----------------------------------|
| Cycle:                    | 17                 | Core Average Exposure: Mwd/MTU | 31368.5                           |
| Exposure: Mwd/MTU (Gwd)   | 18201.0 (1822.00 ) |                                |                                   |
| Delta E: Mwd/MTU, (Gwd)   | 1.0 ( 0.10 )       |                                |                                   |
| Power: MWt                | 2923.0 (100.00 %)  |                                |                                   |
| Core Pressure: psia       | 1044.6             |                                |                                   |
| Inlet Subcooling: Btu/lbm | -21.56             |                                |                                   |
| Flow: Mlb/hr              | 76.23 ( 99.00 %)   |                                |                                   |
|                           |                    | Axial Profile                  | Edit Radial Power                 |
|                           |                    | N(PRA) Power Exposure          | Zone Avg. Max. IR JR              |
|                           |                    | Top 25                         | 0.184 5.759 10 0.577 0.831 25 28  |
|                           |                    | 24                             | 0.587 16.479 11 0.377 0.493 15 50 |
|                           |                    | 23                             | 0.760 22.388 12 0.439 0.662 5 14  |
|                           |                    | 22                             | 0.854 26.542 14 1.037 1.153 37 26 |
|                           |                    | 21                             | 0.923 29.430 15 0.943 1.164 29 18 |
|                           |                    | 20                             | 0.978 31.201 16 0.722 1.005 17 46 |
|                           |                    | 19                             | 1.026 32.390 22 0.512 0.544 47 40 |
|                           |                    | 18                             | 1.075 33.231 30 1.167 1.368 37 24 |
|                           |                    | 17                             | 1.120 33.826 31 1.181 1.370 39 26 |
|                           |                    | 16                             | 1.178 32.757                      |
|                           |                    | 15                             | 1.217 33.562                      |
|                           |                    | 14                             | 1.319 33.626                      |
|                           |                    | 13                             | 1.335* 34.646                     |
|                           |                    | 12                             | 1.332 35.636                      |
|                           |                    | 11                             | 1.311 36.504                      |
|                           |                    | 10                             | 1.278 37.254                      |
|                           |                    | 9                              | 1.235 37.851                      |
|                           |                    | 8                              | 1.183 38.470                      |
|                           |                    | 7                              | 1.126 39.050                      |
|                           |                    | 6                              | 1.070 39.510*                     |
|                           |                    | 5                              | 1.024 39.507                      |
|                           |                    | 4                              | 0.989 38.292                      |
|                           |                    | 3                              | 0.933 34.272                      |
|                           |                    | 2                              | 0.750 25.644                      |
|                           |                    | Bottom 1                       | 0.215 7.027                       |
|                           |                    |                                | % AXIAL TILT -5.185 -9.956        |
|                           |                    |                                | AVG BOT 8ft/12ft 1.0575 1.0556    |
| Control Rod Density: %    | 0.00               |                                |                                   |
| k-effective:              | 0.99911            |                                |                                   |
| Void Fraction:            | 0.457              |                                |                                   |
| Core Delta-P: psia        | 23.014             |                                |                                   |
| Core Plate Delta-P: psia  | 18.492             |                                |                                   |
| Coolant Temp: Deg-F       | 548.2              |                                |                                   |
| In Channel Flow: Mlb/hr   | 64.31              | Active Channel Flow: Mlb/hr    | 64.31                             |
| Total Bypass Flow (%):    | 15.6               | (of total core flow)           |                                   |
| Total Water Rod Flow (%): | -0.0               | (of total core flow)           |                                   |
| Source Convergence        | 0.00047            |                                |                                   |

## Top Ten Thermal Limits Summary - Sorted by Margin

| Power |    |    |    | MCPR  |        |    |    | APLHGR |        |      |    | LHGR |       |        |      |
|-------|----|----|----|-------|--------|----|----|--------|--------|------|----|------|-------|--------|------|
| Value | FT | IR | JR | Value | Margin | FT | IR | Value  | Margin | Exp. | FT | IR   | Value | Margin | Exp. |
| 1.370 | 31 | 39 | 26 | 1.520 | 0.921  | 30 | 37 | 6.90   | 0.790  | 46.0 | 15 | 35   | 5.51  | 0.833  | 66.5 |
| 1.368 | 30 | 37 | 24 | 1.521 | 0.920  | 30 | 35 | 6.92   | 0.785  | 45.2 | 15 | 29   | 7.35  | 0.809  | 54.0 |
| 1.362 | 31 | 31 | 18 | 1.534 | 0.913  | 31 | 39 | 7.04   | 0.780  | 44.8 | 14 | 37   | 7.30  | 0.806  | 54.2 |
| 1.359 | 30 | 35 | 26 | 1.536 | 0.912  | 30 | 29 | 6.97   | 0.775  | 45.1 | 14 | 37   | 7.37  | 0.801  | 52.9 |
| 1.358 | 31 | 35 | 22 | 1.538 | 0.910  | 30 | 27 | 6.93   | 0.772  | 45.3 | 14 | 39   | 7.24  | 0.794  | 53.7 |
| 1.356 | 30 | 29 | 16 | 1.544 | 0.907  | 30 | 33 | 6.82   | 0.771  | 46.7 | 14 | 35   | 7.26  | 0.791  | 53.2 |
| 1.351 | 30 | 33 | 20 | 1.544 | 0.907  | 31 | 31 | 6.84   | 0.771  | 46.5 | 14 | 33   | 7.69  | 0.789  | 48.2 |
| 1.349 | 31 | 39 | 22 | 1.549 | 0.904  | 30 | 29 | 6.88   | 0.769  | 45.4 | 14 | 27   | 7.38  | 0.786  | 51.3 |
| 1.346 | 30 | 27 | 18 | 1.550 | 0.903  | 31 | 39 | 6.90   | 0.768  | 45.2 | 14 | 31   | 7.21  | 0.785  | 53.0 |
| 1.345 | 31 | 27 | 14 | 1.557 | 0.899  | 31 | 35 | 6.93   | 0.766  | 44.3 | 14 | 31   | 7.17  | 0.783  | 53.2 |

- \* LHGR calculated with pin-power reconstruction
- \* CPR calculated with pin-power reconstruction & CPR limit type 3
- \* Thermal limit file:

**Figure A.62 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 18,201.0 MWD/MTU**

## Brunswick Unit 1 Cycle 17 Fuel Cycle Design

|                                          |                    |                                |                      |
|------------------------------------------|--------------------|--------------------------------|----------------------|
| Cycle:                                   | 17                 | Core Average Exposure: MWd/MTU | 31667.3              |
| Exposure: MWd/MTU (Gwd)                  | 18500.0 (1851.90 ) |                                |                      |
| Delta E: MWd/MTU, (Gwd)                  | 299.0 ( 29.93 )    |                                |                      |
| Power: MWt                               | 2923.0 (100.00 %)  |                                |                      |
| Core Pressure: psia                      | 1044.7             |                                |                      |
| Inlet Subcooling: Btu/lbm                | -20.29             |                                |                      |
| Flow: Mlb/hr                             | 80.46 (104.50 %)   |                                |                      |
|                                          |                    | Axial Profile                  | Edit Radial Power    |
|                                          |                    | N(PRA) Power Exposure          | Zone Avg. Max. IR JR |
| 1 3 5 7 9 11 13 15 17 19 21 23 25        |                    | Top 25                         | 10 0.574 0.818 25 28 |
| 1                                        |                    | 24                             | 11 0.379 0.495 15 50 |
| 3                                        |                    | 23                             | 12 0.441 0.665 5 14  |
| 5                                        |                    | 22                             | 14 1.034 1.147 37 26 |
| 7                                        |                    | 21                             | 15 0.945 1.156 29 18 |
| 9                                        |                    | 20                             | 16 0.726 1.010 17 46 |
| 11                                       |                    | 19                             | 22 0.515 0.548 47 40 |
| 13                                       |                    | 18                             | 30 1.165 1.362 37 24 |
| 15                                       |                    | 17                             | 31 1.183 1.367 39 26 |
| 17                                       |                    | 16                             |                      |
| 19                                       |                    | 15                             |                      |
| 21                                       |                    | 14                             |                      |
| 23                                       |                    | 13                             |                      |
| 25                                       |                    | 12                             |                      |
| IR: 2 6 10 14 18 22 26 30 34 38 42 46 50 |                    | 11                             |                      |
|                                          |                    | 10                             |                      |
|                                          |                    | 9                              |                      |
|                                          |                    | 8                              |                      |
|                                          |                    | 7                              |                      |
|                                          |                    | 6                              |                      |
|                                          |                    | 5                              |                      |
|                                          |                    | 4                              |                      |
|                                          |                    | 3                              |                      |
|                                          |                    | 2                              |                      |
|                                          |                    | Bottom 1                       |                      |
| Control Rod Density: %                   | 0.00               |                                |                      |
| k-effective:                             | 0.99871            |                                |                      |
| Void Fraction:                           | 0.442              |                                |                      |
| Core Delta-P: psia                       | 24.764             | % AXIAL TILT                   | -2.647 -9.853        |
| Core Plate Delta-P: psia                 | 20.240             | AVG BOT 8ft/12ft               | 1.0429 1.0552        |
| Coolant Temp: Deg-F                      | 548.2              |                                |                      |
| In Channel Flow: Mlb/hr                  | 68.07              | Active Channel Flow: Mlb/hr    | 68.07                |
| Total Bypass Flow (%):                   | 15.4               | (of total core flow)           |                      |
| Total Water Rod Flow (%):                | -0.0               | (of total core flow)           |                      |
| Source Convergence                       | 0.00038            |                                |                      |

## Top Ten Thermal Limits Summary - Sorted by Margin

| Power |    |       | MCPR  |        |          | APLHGR |        |                  | LHGR  |        |                  |
|-------|----|-------|-------|--------|----------|--------|--------|------------------|-------|--------|------------------|
| Value | FT | IR JR | Value | Margin | FT IR JR | Value  | Margin | Exp. FT IR JR K  | Value | Margin | Exp. FT IR JR K  |
| 1.367 | 31 | 39 26 | 1.571 | 0.891  | 30 37 24 | 6.90   | 0.793  | 46.5 15 35 24 12 | 5.48  | 0.848  | 66.8 10 27 28 15 |
| 1.362 | 30 | 37 24 | 1.572 | 0.891  | 31 39 26 | 7.10   | 0.790  | 45.2 14 37 26 15 | 7.33  | 0.812  | 54.4 15 29 36 12 |
| 1.354 | 31 | 31 18 | 1.576 | 0.888  | 30 35 26 | 6.91   | 0.787  | 45.6 15 29 18 12 | 7.29  | 0.810  | 54.7 15 35 30 12 |
| 1.351 | 31 | 35 22 | 1.587 | 0.882  | 31 39 22 | 7.03   | 0.785  | 45.6 14 37 22 15 | 7.43  | 0.807  | 52.8 14 37 28 15 |
| 1.350 | 30 | 35 26 | 1.589 | 0.881  | 30 29 16 | 7.00   | 0.784  | 45.7 14 39 30 15 | 7.22  | 0.801  | 54.6 14 35 20 15 |
| 1.348 | 30 | 29 16 | 1.596 | 0.877  | 30 27 18 | 6.87   | 0.780  | 47.1 14 35 20 15 | 7.39  | 0.798  | 52.5 14 37 22 15 |
| 1.347 | 31 | 39 22 | 1.599 | 0.876  | 30 33 20 | 6.89   | 0.780  | 46.9 14 33 36 15 | 7.15  | 0.797  | 54.9 15 41 22 15 |
| 1.342 | 30 | 33 20 | 1.601 | 0.874  | 31 31 18 | 6.95   | 0.777  | 45.6 14 31 38 15 | 7.67  | 0.795  | 49.1 14 39 30 15 |
| 1.340 | 31 | 27 14 | 1.602 | 0.874  | 31 35 22 | 6.86   | 0.774  | 46.5 14 27 38 15 | 7.25  | 0.795  | 53.6 14 27 38 12 |
| 1.336 | 30 | 27 18 | 1.606 | 0.872  | 30 29 34 | 6.78   | 0.774  | 47.7 15 41 22 15 | 7.04  | 0.792  | 55.6 14 37 36 15 |

- \* LHGR calculated with pin-power reconstruction
- \* CPR calculated with pin-power reconstruction & CPR limit type 3
- \* Thermal limit file:

**Figure A.63 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 18,500.0 MWd/MTU**

## Brunswick Unit 1 Cycle 17 Fuel Cycle Design

|                           |                    |                                |                                   |
|---------------------------|--------------------|--------------------------------|-----------------------------------|
| Cycle:                    | 17                 | Core Average Exposure: MWd/MTU | 31668.3                           |
| Exposure: MWd/MTU (Gwd)   | 18501.0 (1852.00 ) |                                |                                   |
| Delta E: MWd/MTU, (Gwd)   | 1.0 ( 0.10 )       |                                |                                   |
| Power: MWt                | 2923.0 (100.00 %)  |                                |                                   |
| Core Pressure: psia       | 1038.0             |                                |                                   |
| Inlet Subcooling: Btu/lbm | -25.65             |                                |                                   |
| Flow: Mlb/hr              | 76.23 ( 99.00 %)   |                                |                                   |
|                           |                    | Axial Profile                  | Edit Radial Power                 |
|                           |                    | N(PRA) Power Exposure          | Zone Avg. Max. IR JR              |
|                           |                    | Top 25                         | 0.186 5.827 10 0.576 0.819 25 28  |
|                           |                    | 24                             | 0.595 16.668 11 0.381 0.496 15 50 |
|                           |                    | 23                             | 0.769 22.633 12 0.443 0.666 5 14  |
|                           |                    | 22                             | 0.863 26.818 14 1.033 1.143 37 26 |
|                           |                    | 21                             | 0.930 29.728 15 0.947 1.152 29 18 |
|                           |                    | 20                             | 0.983 31.518 16 0.732 1.012 17 46 |
|                           |                    | 19                             | 1.029 32.722 22 0.517 0.550 47 40 |
|                           |                    | 18                             | 1.074 33.579 30 1.164 1.355 37 24 |
|                           |                    | 17                             | 1.118 34.188 31 1.182 1.360 39 26 |
|                           |                    | 16                             | 1.175 33.122                      |
|                           |                    | 15                             | 1.214 33.939                      |
|                           |                    | 14                             | 1.317 33.999                      |
|                           |                    | 13                             | 1.335* 35.023                     |
|                           |                    | 12                             | 1.334 36.013                      |
|                           |                    | 11                             | 1.316 36.875                      |
|                           |                    | 10                             | 1.284 37.615                      |
|                           |                    | 9                              | 1.243 38.200                      |
|                           |                    | 8                              | 1.191 38.805                      |
|                           |                    | 7                              | 1.131 39.368                      |
|                           |                    | 6                              | 1.069 39.812*                     |
|                           |                    | 5                              | 1.015 39.797                      |
|                           |                    | 4                              | 0.974 38.572                      |
|                           |                    | 3                              | 0.912 34.536                      |
|                           |                    | 2                              | 0.733 25.857                      |
|                           |                    | Bottom 1                       | 0.209 7.089                       |
|                           |                    |                                | % AXIAL TILT -4.904 -9.852        |
|                           |                    |                                | AVG BOT 8ft/12ft 1.0551 1.0552    |
| Control Rod Density: %    | 0.00               |                                |                                   |
| k-effective:              | 0.99887            |                                |                                   |
| Void Fraction:            | 0.439              |                                |                                   |
| Core Delta-P: psia        | 22.646             |                                |                                   |
| Core Plate Delta-P: psia  | 18.103             |                                |                                   |
| Coolant Temp: Deg-F       | 546.7              |                                |                                   |
| In Channel Flow: Mlb/hr   | 64.47              | Active Channel Flow: Mlb/hr    | 64.47                             |
| Total Bypass Flow (%):    | 15.4               | (of total core flow)           |                                   |
| Total Water Rod Flow (%): | -0.0               | (of total core flow)           |                                   |
| Source Convergence        | 0.00038            |                                |                                   |

## Top Ten Thermal Limits Summary - Sorted by Margin

| Power |    |       | MCPR  |        |          | APLHGR |        |                  | LHGR  |        |                  |
|-------|----|-------|-------|--------|----------|--------|--------|------------------|-------|--------|------------------|
| Value | FT | IR JR | Value | Margin | FT       | Value  | Margin | Exp. FT          | Value | Margin | Exp. FT          |
| 1.360 | 31 | 39 26 | 1.556 | 0.912  | 30 37 24 | 6.82   | 0.784  | 46.5 15 35 24 12 | 5.42  | 0.840  | 66.8 10 27 28 15 |
| 1.355 | 30 | 37 24 | 1.563 | 0.908  | 30 35 26 | 6.83   | 0.779  | 45.6 15 29 36 12 | 7.25  | 0.803  | 54.4 15 29 36 12 |
| 1.347 | 31 | 31 18 | 1.563 | 0.908  | 31 39 26 | 6.96   | 0.774  | 45.0 14 37 26 12 | 7.21  | 0.801  | 54.7 15 35 30 12 |
| 1.343 | 31 | 35 22 | 1.574 | 0.902  | 30 29 16 | 6.89   | 0.770  | 45.6 14 37 22 15 | 7.30  | 0.797  | 53.4 14 37 28 12 |
| 1.343 | 30 | 35 26 | 1.578 | 0.900  | 31 39 22 | 6.87   | 0.768  | 45.7 14 39 30 15 | 7.16  | 0.790  | 54.1 14 35 20 12 |
| 1.342 | 30 | 29 16 | 1.582 | 0.897  | 30 27 18 | 6.74   | 0.765  | 47.1 14 35 20 15 | 7.63  | 0.787  | 48.6 14 37 22 12 |
| 1.340 | 31 | 39 22 | 1.585 | 0.896  | 30 33 20 | 6.75   | 0.765  | 46.9 14 33 36 15 | 7.17  | 0.786  | 53.6 14 27 38 12 |
| 1.335 | 30 | 33 20 | 1.587 | 0.895  | 31 31 18 | 6.80   | 0.764  | 45.8 14 27 38 12 | 7.52  | 0.782  | 49.3 14 39 24 12 |
| 1.334 | 31 | 27 14 | 1.593 | 0.892  | 30 29 34 | 6.82   | 0.762  | 45.6 14 31 38 15 | 7.02  | 0.782  | 54.9 15 41 22 15 |
| 1.329 | 31 | 31 14 | 1.594 | 0.891  | 31 35 22 | 6.85   | 0.760  | 44.7 14 31 20 12 | 7.11  | 0.780  | 53.7 14 29 14 12 |

- \* LHGR calculated with pin-power reconstruction
- \* CPR calculated with pin-power reconstruction & CPR limit type 3
- \* Thermal limit file:

**Figure A.64 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 18,501.0 MWd/MTU**

## Brunswick Unit 1 Cycle 17 Fuel Cycle Design

|                           |                    |                                |                                   |
|---------------------------|--------------------|--------------------------------|-----------------------------------|
| Cycle:                    | 17                 | Core Average Exposure: MWd/MTU | 32076.3                           |
| Exposure: MWd/MTU (GWd)   | 18909.0 (1892.80 ) |                                |                                   |
| Delta E: MWd/MTU, (GWd)   | 408.0 ( 40.84 )    |                                |                                   |
| Power: MWt                | 2923.0 (100.00 %)  |                                |                                   |
| Core Pressure: psia       | 1028.0             |                                |                                   |
| Inlet Subcooling: Btu/lbm | -32.12             |                                |                                   |
| Flow: Mlb/hr              | 76.23 ( 99.00 %)   |                                |                                   |
|                           |                    | Axial Profile                  | Edit Radial Power                 |
|                           |                    | N(PRA) Power Exposure          | Zone Avg. Max. IR JR              |
|                           |                    | Top 25                         | 0.188 5.921 10 0.574 0.805 25 28  |
|                           |                    | 24                             | 0.604 16.929 11 0.385 0.500 15 50 |
|                           |                    | 23                             | 0.781 22.970 12 0.448 0.672 5 14  |
|                           |                    | 22                             | 0.874 27.198 14 1.028 1.130 37 26 |
|                           |                    | 21                             | 0.939 30.138 15 0.953 1.136 29 18 |
|                           |                    | 20                             | 0.989 31.950 16 0.746 1.023 17 46 |
|                           |                    | 19                             | 1.032 33.174 22 0.523 0.556 47 40 |
|                           |                    | 18                             | 1.075 34.052 30 1.161 1.335 37 24 |
|                           |                    | 17                             | 1.118 34.680 31 1.183 1.344 39 26 |
|                           |                    | 16                             | 1.175 33.617                      |
|                           |                    | 15                             | 1.215 34.451                      |
|                           |                    | 14                             | 1.322 34.506                      |
|                           |                    | 13                             | 1.345 35.537                      |
|                           |                    | 12                             | 1.349* 36.526                     |
|                           |                    | 11                             | 1.336 37.381                      |
|                           |                    | 10                             | 1.307 38.109                      |
|                           |                    | 9                              | 1.266 38.678                      |
|                           |                    | 8                              | 1.209 39.263                      |
|                           |                    | 7                              | 1.139 39.804                      |
|                           |                    | 6                              | 1.062 40.224*                     |
|                           |                    | 5                              | 0.990 40.187                      |
|                           |                    | 4                              | 0.932 38.947                      |
|                           |                    | 3                              | 0.863 34.887                      |
|                           |                    | 2                              | 0.693 26.139                      |
|                           |                    | Bottom 1                       | 0.197 7.171                       |
|                           |                    | % AXIAL TILT                   | -4.363 -9.711                     |
|                           |                    | AVG BOT 8ft/12ft               | 1.0519 1.0547                     |
| Control Rod Density: %    | 0.00               |                                |                                   |
| k-effective:              | 0.99910            |                                |                                   |
| Void Fraction:            | 0.410              |                                |                                   |
| Core Delta-P: psia        | 22.075             |                                |                                   |
| Core Plate Delta-P: psia  | 17.500             |                                |                                   |
| Coolant Temp: Deg-F       | 544.2              |                                |                                   |
| In Channel Flow: Mlb/hr   | 64.73              | Active Channel Flow: Mlb/hr    | 64.73                             |
| Total Bypass Flow (%):    | 15.1               | (of total core flow)           |                                   |
| Total Water Rod Flow (%): | -0.0               | (of total core flow)           |                                   |
| Source Convergence        | 0.00036            |                                |                                   |

## Top Ten Thermal Limits Summary - Sorted by Margin

| Power |    |    |    | MCPR  |        |    |    | APLHGR |        |         |    | LHGR  |        |         |    |
|-------|----|----|----|-------|--------|----|----|--------|--------|---------|----|-------|--------|---------|----|
| Value | FT | IR | JR | Value | Margin | FT | IR | Value  | Margin | Exp. FT | IR | Value | Margin | Exp. FT | IR |
| 1.344 | 31 | 39 | 26 | 1.610 | 0.901  | 30 | 37 | 6.76   | 0.782  | 47.1    | 15 | 5.37  | 0.858  | 67.3    | 10 |
| 1.335 | 30 | 37 | 24 | 1.610 | 0.901  | 31 | 39 | 6.77   | 0.776  | 46.2    | 15 | 7.19  | 0.802  | 55.0    | 15 |
| 1.326 | 31 | 39 | 22 | 1.622 | 0.894  | 31 | 39 | 6.91   | 0.774  | 45.6    | 14 | 7.14  | 0.799  | 55.3    | 15 |
| 1.326 | 31 | 31 | 18 | 1.623 | 0.893  | 30 | 35 | 6.82   | 0.766  | 45.8    | 14 | 7.25  | 0.798  | 53.9    | 14 |
| 1.322 | 31 | 35 | 22 | 1.629 | 0.890  | 30 | 29 | 6.79   | 0.766  | 46.1    | 14 | 7.12  | 0.791  | 54.7    | 14 |
| 1.322 | 30 | 29 | 16 | 1.636 | 0.886  | 31 | 41 | 6.69   | 0.764  | 47.3    | 14 | 7.60  | 0.791  | 49.3    | 14 |
| 1.320 | 30 | 35 | 26 | 1.642 | 0.883  | 30 | 33 | 6.49   | 0.763  | 48.7    | 15 | 7.52  | 0.787  | 49.9    | 14 |
| 1.317 | 31 | 27 | 14 | 1.643 | 0.882  | 30 | 27 | 6.73   | 0.763  | 46.6    | 14 | 7.12  | 0.787  | 54.2    | 14 |
| 1.315 | 31 | 31 | 14 | 1.644 | 0.882  | 31 | 31 | 6.71   | 0.762  | 46.9    | 14 | 6.90  | 0.785  | 56.5    | 15 |
| 1.313 | 30 | 33 | 20 | 1.645 | 0.881  | 31 | 31 | 6.76   | 0.760  | 45.9    | 14 | 6.89  | 0.784  | 56.6    | 15 |

- \* LHGR calculated with pin-power reconstruction
- \* CPR calculated with pin-power reconstruction & CPR limit type 3
- \* Thermal limit file:

**Figure A.65 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 18,909.0 MWd/MTU**

## Brunswick Unit 1 Cycle 17 Fuel Cycle Design

|                           |                    |                                |                                   |
|---------------------------|--------------------|--------------------------------|-----------------------------------|
| Cycle:                    | 17                 | Core Average Exposure: MWd/MTU | 32322.7                           |
| Exposure: MWd/MTU (GWd)   | 19155.4 (1917.50 ) |                                |                                   |
| Delta E: MWd/MTU, (GWd)   | 246.4 ( 24.66 )    |                                |                                   |
| Power: MWt                | 2923.0 (100.00 %)  |                                |                                   |
| Core Pressure: psia       | 1028.1             |                                |                                   |
| Inlet Subcooling: Btu/lbm | -30.30             |                                |                                   |
| Flow: Mlb/hr              | 80.46 (104.50 %)   |                                |                                   |
|                           |                    | Axial Profile                  | Edit Radial Power                 |
|                           |                    | N(PRA) Power Exposure          | Zone Avg. Max. IR JR              |
|                           |                    | Top 25                         | 0.195 5.978 10 0.571 0.795 25 28  |
|                           |                    | 24                             | 0.629 17.089 11 0.386 0.501 15 50 |
|                           |                    | 23                             | 0.812 23.177 12 0.449 0.673 5 14  |
|                           |                    | 22                             | 0.907 27.430 14 1.025 1.126 37 26 |
|                           |                    | 21                             | 0.971 30.387 15 0.955 1.130 29 18 |
|                           |                    | 20                             | 1.019 32.213 16 0.749 1.027 17 46 |
|                           |                    | 19                             | 1.059 33.449 22 0.525 0.559 47 40 |
|                           |                    | 18                             | 1.100 34.337 30 1.161 1.330 37 24 |
|                           |                    | 17                             | 1.140 34.977 31 1.185 1.342 39 26 |
|                           |                    | 16                             | 1.195 33.916                      |
|                           |                    | 15                             | 1.235 34.760                      |
|                           |                    | 14                             | 1.341 34.813                      |
|                           |                    | 13                             | 1.361 35.849                      |
|                           |                    | 12                             | 1.362* 36.839                     |
|                           |                    | 11                             | 1.343 37.692                      |
|                           |                    | 10                             | 1.308 38.413                      |
|                           |                    | 9                              | 1.258 38.972                      |
|                           |                    | 8                              | 1.192 39.544                      |
|                           |                    | 7                              | 1.110 40.068                      |
|                           |                    | 6                              | 1.020 40.471*                     |
|                           |                    | 5                              | 0.938 40.417                      |
|                           |                    | 4                              | 0.873 39.163                      |
|                           |                    | 3                              | 0.803 35.087                      |
|                           |                    | 2                              | 0.645 26.300                      |
|                           |                    | Bottom 1                       | 0.184 7.217                       |
|                           |                    |                                | % AXIAL TILT -1.837 -9.623        |
|                           |                    |                                | AVG BOT 8ft/12ft 1.0382 1.0544    |
| Control Rod Density: %    | 0.00               |                                |                                   |
| k-effective:              | 0.99910            |                                |                                   |
| Void Fraction:            | 0.396              |                                |                                   |
| Core Delta-P: psia        | 23.772             |                                |                                   |
| Core Plate Delta-P: psia  | 19.197             |                                |                                   |
| Coolant Temp: Deg-F       | 544.3              |                                |                                   |
| In Channel Flow: Mlb/hr   | 68.50              | Active Channel Flow: Mlb/hr    | 68.50                             |
| Total Bypass Flow (%):    | 14.9               | (of total core flow)           |                                   |
| Total Water Rod Flow (%): | -0.0               | (of total core flow)           |                                   |
| Source Convergence        | 0.00028            |                                |                                   |

## Top Ten Thermal Limits Summary - Sorted by Margin

| Power |    |    |    | MCPR  |        |    |    | APLHGR |        |      |    | LHGR |       |        |      |
|-------|----|----|----|-------|--------|----|----|--------|--------|------|----|------|-------|--------|------|
| Value | FT | IR | JR | Value | Margin | FT | IR | Value  | Margin | Exp. | FT | IR   | Value | Margin | Exp. |
| 1.342 | 31 | 39 | 26 | 1.648 | 0.880  | 31 | 39 | 6.81   | 0.791  | 47.4 | 15 | 35   | 5.37  | 0.875  | 67.5 |
| 1.330 | 30 | 37 | 24 | 1.654 | 0.877  | 30 | 37 | 6.82   | 0.784  | 46.5 | 15 | 29   | 7.23  | 0.811  | 55.4 |
| 1.324 | 31 | 39 | 22 | 1.658 | 0.875  | 31 | 39 | 6.97   | 0.783  | 45.9 | 14 | 37   | 7.31  | 0.808  | 54.3 |
| 1.320 | 31 | 31 | 18 | 1.666 | 0.870  | 31 | 41 | 6.89   | 0.778  | 46.7 | 14 | 39   | 7.32  | 0.808  | 54.3 |
| 1.317 | 31 | 35 | 22 | 1.670 | 0.868  | 30 | 35 | 6.89   | 0.777  | 46.5 | 14 | 37   | 7.17  | 0.801  | 55.1 |
| 1.316 | 30 | 29 | 16 | 1.675 | 0.865  | 30 | 29 | 6.73   | 0.775  | 48.6 | 15 | 41   | 7.66  | 0.800  | 49.6 |
| 1.314 | 30 | 35 | 26 | 1.681 | 0.862  | 31 | 31 | 6.80   | 0.772  | 46.7 | 14 | 27   | 7.58  | 0.798  | 50.3 |
| 1.313 | 31 | 27 | 14 | 1.688 | 0.859  | 31 | 29 | 6.78   | 0.772  | 47.0 | 14 | 35   | 7.18  | 0.797  | 54.6 |
| 1.312 | 31 | 31 | 14 | 1.690 | 0.858  | 30 | 33 | 6.75   | 0.771  | 47.3 | 14 | 33   | 7.06  | 0.796  | 55.9 |
| 1.307 | 30 | 33 | 20 | 1.690 | 0.858  | 31 | 27 | 6.81   | 0.769  | 46.3 | 14 | 31   | 6.94  | 0.794  | 56.9 |

- \* LHGR calculated with pin-power reconstruction
- \* CPR calculated with pin-power reconstruction & CPR limit type 3
- \* Thermal limit file:

**Figure A.66 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 19,155.4 MWd/MTU**

## Brunswick Unit 1 Cycle 17 Fuel Cycle Design

|                           |                    |                                |                                   |
|---------------------------|--------------------|--------------------------------|-----------------------------------|
| Cycle:                    | 17                 | Core Average Exposure: MWd/MTU | 32527.3                           |
| Exposure: MWd/MTU (GWd)   | 19359.8 (1937.90 ) |                                |                                   |
| Delta E: MWd/MTU, (GWd)   | 204.4 ( 20.46 )    |                                |                                   |
| Power: MWt                | 2840.5 ( 97.18 %)  |                                |                                   |
| Core Pressure: psia       | 1024.2             |                                |                                   |
| Inlet Subcooling: Btu/lbm | -29.29             |                                |                                   |
| Flow: Mlb/hr              | 80.46 (104.50 %)   |                                |                                   |
|                           |                    | Axial Profile                  | Edit Radial Power                 |
|                           |                    | N(PRA) Power Exposure          | Zone Avg. Max. IR JR              |
|                           |                    | Top 25                         | 0.201 6.029 10 0.569 0.788 25 28  |
|                           |                    | 24                             | 0.648 17.229 11 0.388 0.503 15 50 |
|                           |                    | 23                             | 0.835 23.358 12 0.450 0.676 5 14  |
|                           |                    | 22                             | 0.932 27.632 14 1.023 1.123 37 26 |
|                           |                    | 21                             | 0.995 30.604 15 0.956 1.126 29 18 |
|                           |                    | 20                             | 1.041 32.440 16 0.752 1.031 17 46 |
|                           |                    | 19                             | 1.079 33.684 22 0.527 0.561 47 40 |
|                           |                    | 18                             | 1.118 34.582 30 1.160 1.326 37 24 |
|                           |                    | 17                             | 1.156 35.230 31 1.186 1.339 39 26 |
|                           |                    | 16                             | 1.210 34.170                      |
|                           |                    | 15                             | 1.247 35.022                      |
|                           |                    | 14                             | 1.353 35.072                      |
|                           |                    | 13                             | 1.371* 36.112                     |
|                           |                    | 12                             | 1.368 37.102                      |
|                           |                    | 11                             | 1.345 37.951                      |
|                           |                    | 10                             | 1.305 38.664                      |
|                           |                    | 9                              | 1.250 39.214                      |
|                           |                    | 8                              | 1.176 39.772                      |
|                           |                    | 7                              | 1.086 40.280                      |
|                           |                    | 6                              | 0.990 40.664*                     |
|                           |                    | 5                              | 0.903 40.595                      |
|                           |                    | 4                              | 0.834 39.328                      |
|                           |                    | 3                              | 0.765 35.238                      |
|                           |                    | 2                              | 0.616 26.421                      |
|                           |                    | Bottom 1                       | 0.175 7.253                       |
|                           |                    | % AXIAL TILT                   | 0.001 -9.529                      |
|                           |                    | AVG BOT 8ft/12ft               | 1.0279 1.0540                     |
| Control Rod Density: %    | 0.00               |                                |                                   |
| k-effective:              | 0.99905            |                                |                                   |
| Void Fraction:            | 0.387              |                                |                                   |
| Core Delta-P: psia        | 23.576             |                                |                                   |
| Core Plate Delta-P: psia  | 19.003             |                                |                                   |
| Coolant Temp: Deg-F       | 543.8              |                                |                                   |
| In Channel Flow: Mlb/hr   | 68.61              | Active Channel Flow: Mlb/hr    | 68.61                             |
| Total Bypass Flow (%):    | 14.7               | (of total core flow)           |                                   |
| Total Water Rod Flow (%): | -0.0               | (of total core flow)           |                                   |
| Source Convergence        | 0.00034            |                                |                                   |

## Top Ten Thermal Limits Summary - Sorted by Margin

| Power |    |    |    | MCPR  |        |    |    | APLHGR |        |         |    | LHGR  |        |         |    |
|-------|----|----|----|-------|--------|----|----|--------|--------|---------|----|-------|--------|---------|----|
| Value | FT | IR | JR | Value | Margin | FT | IR | Value  | Margin | Exp. FT | IR | Value | Margin | Exp. FT | IR |
| 1.339 | 31 | 39 | 26 | 1.694 | 0.856  | 31 | 39 | 6.64   | 0.785  | 47.7    | 15 | 5.22  | 0.865  | 67.7    | 10 |
| 1.326 | 30 | 37 | 24 | 1.703 | 0.851  | 31 | 39 | 6.65   | 0.778  | 46.8    | 15 | 7.05  | 0.794  | 55.7    | 15 |
| 1.322 | 31 | 39 | 22 | 1.708 | 0.849  | 31 | 41 | 6.80   | 0.778  | 46.5    | 14 | 7.14  | 0.792  | 54.6    | 14 |
| 1.315 | 31 | 31 | 18 | 1.716 | 0.845  | 30 | 37 | 6.75   | 0.777  | 47.0    | 14 | 7.13  | 0.791  | 54.6    | 15 |
| 1.312 | 31 | 35 | 22 | 1.728 | 0.839  | 31 | 31 | 6.74   | 0.774  | 46.8    | 14 | 6.99  | 0.784  | 55.4    | 14 |
| 1.312 | 30 | 29 | 16 | 1.731 | 0.838  | 31 | 29 | 6.60   | 0.774  | 48.9    | 15 | 7.47  | 0.783  | 50.0    | 14 |
| 1.310 | 31 | 27 | 14 | 1.733 | 0.837  | 30 | 35 | 6.58   | 0.768  | 48.4    | 14 | 6.92  | 0.783  | 56.2    | 15 |
| 1.310 | 31 | 31 | 14 | 1.736 | 0.835  | 31 | 27 | 6.60   | 0.767  | 48.0    | 14 | 7.40  | 0.781  | 50.6    | 14 |
| 1.309 | 30 | 35 | 26 | 1.738 | 0.834  | 30 | 29 | 6.52   | 0.767  | 49.0    | 14 | 7.00  | 0.780  | 54.9    | 14 |
| 1.304 | 31 | 41 | 24 | 1.742 | 0.832  | 31 | 35 | 6.63   | 0.766  | 47.0    | 14 | 6.77  | 0.777  | 57.2    | 15 |

- \* LHGR calculated with pin-power reconstruction
- \* CPR calculated with pin-power reconstruction & CPR limit type 3
- \* Thermal limit file:

**Figure A.67 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 19,359.8 MWd/MTU**

## Brunswick Unit 1 Cycle 17 Fuel Cycle Design

|                           |                    |                                |    |    |    |         |    |    |    |    |    |    |    |     |
|---------------------------|--------------------|--------------------------------|----|----|----|---------|----|----|----|----|----|----|----|-----|
| Cycle:                    | 17                 | Core Average Exposure: MWd/MTU |    |    |    | 33432.5 |    |    |    |    |    |    |    |     |
| Exposure: MWd/MTU (GWd)   | 20265.0 (2028.60 ) |                                |    |    |    |         |    |    |    |    |    |    |    |     |
| Delta E: MWd/MTU, (GWd)   | 905.2 ( 90.61 )    |                                |    |    |    |         |    |    |    |    |    |    |    |     |
| Power: MWt                | 2450.2 ( 83.82 %)  |                                |    |    |    |         |    |    |    |    |    |    |    |     |
| Core Pressure: psia       | 1006.7             |                                |    |    |    |         |    |    |    |    |    |    |    |     |
| Inlet Subcooling: Btu/lbm | -24.61             |                                |    |    |    |         |    |    |    |    |    |    |    |     |
| Flow: Mlb/hr              | 80.46 (104.50 %)   |                                |    |    |    |         |    |    |    |    |    |    |    |     |
|                           |                    |                                |    |    |    |         |    |    |    |    |    |    |    |     |
| 1                         | 3                  | 5                              | 7  | 9  | 11 | 13      | 15 | 17 | 19 | 21 | 23 | 25 |    |     |
| 1                         |                    |                                |    |    |    |         |    |    |    |    |    |    | 51 | :JR |
| 3                         |                    |                                |    |    |    |         |    |    |    |    |    |    | 47 |     |
| 5                         |                    |                                |    |    |    |         |    |    |    |    |    |    | 43 |     |
| 7                         |                    |                                |    |    |    |         |    |    |    |    |    |    | 39 |     |
| 9                         |                    |                                |    |    |    |         |    |    |    |    |    |    | 35 |     |
| 11                        |                    |                                |    |    |    |         |    |    |    |    |    |    | 31 |     |
| 13                        |                    |                                |    |    |    |         |    |    |    |    |    |    | 27 |     |
| 15                        |                    |                                |    |    |    |         |    |    |    |    |    |    | 23 |     |
| 17                        |                    |                                |    |    |    |         |    |    |    |    |    |    | 19 |     |
| 19                        |                    |                                |    |    |    |         |    |    |    |    |    |    | 15 |     |
| 21                        |                    |                                |    |    |    |         |    |    |    |    |    |    | 11 |     |
| 23                        |                    |                                |    |    |    |         |    |    |    |    |    |    | 7  |     |
| 25                        |                    |                                |    |    |    |         |    |    |    |    |    |    | 3  |     |
| IR: 2                     | 6                  | 10                             | 14 | 18 | 22 | 26      | 30 | 34 | 38 | 42 | 46 | 50 |    |     |
|                           |                    |                                |    |    |    |         |    |    |    |    |    |    |    |     |
| Control Rod Density: %    | 0.00               |                                |    |    |    |         |    |    |    |    |    |    |    |     |
| k-effective:              | 0.99906            |                                |    |    |    |         |    |    |    |    |    |    |    |     |
| Void Fraction:            | 0.343              |                                |    |    |    |         |    |    |    |    |    |    |    |     |
| Core Delta-P: psia        | 22.649             |                                |    |    |    |         |    |    |    |    |    |    |    |     |
| Core Plate Delta-P: psia  | 18.085             |                                |    |    |    |         |    |    |    |    |    |    |    |     |
| Coolant Temp: Deg-F       | 541.9              |                                |    |    |    |         |    |    |    |    |    |    |    |     |
| In Channel Flow: Mlb/hr   | 69.15              | Active Channel Flow: Mlb/hr    |    |    |    | 69.15   |    |    |    |    |    |    |    |     |
| Total Bypass Flow (%):    | 14.1               | (of total core flow)           |    |    |    |         |    |    |    |    |    |    |    |     |
| Total Water Rod Flow (%): | -0.0               | (of total core flow)           |    |    |    |         |    |    |    |    |    |    |    |     |
| Source Convergence        | 0.00040            |                                |    |    |    |         |    |    |    |    |    |    |    |     |

## Top Ten Thermal Limits Summary - Sorted by Margin

| Power |    |    |    | MCPR  |        |    |    | APLHGR |        |      |    | LHGR  |        |      |    |
|-------|----|----|----|-------|--------|----|----|--------|--------|------|----|-------|--------|------|----|
| Value | FT | IR | JR | Value | Margin | FT | IR | Value  | Margin | Exp. | FT | Value | Margin | Exp. | FT |
| 1.326 | 31 | 39 | 26 | 1.943 | 0.746  | 31 | 41 | 5.92   | 0.758  | 50.2 | 15 | 4.48  | 0.800  | 68.7 | 10 |
| 1.311 | 31 | 39 | 22 | 1.955 | 0.742  | 31 | 39 | 6.02   | 0.755  | 48.3 | 14 | 6.18  | 0.712  | 57.5 | 15 |
| 1.306 | 30 | 37 | 24 | 1.958 | 0.741  | 31 | 39 | 6.03   | 0.753  | 47.8 | 14 | 6.32  | 0.709  | 55.5 | 14 |
| 1.300 | 31 | 41 | 24 | 1.975 | 0.734  | 31 | 29 | 5.99   | 0.751  | 48.1 | 14 | 6.28  | 0.704  | 55.4 | 15 |
| 1.297 | 31 | 31 | 14 | 1.988 | 0.729  | 31 | 31 | 5.84   | 0.750  | 50.3 | 14 | 6.56  | 0.703  | 51.8 | 14 |
| 1.295 | 31 | 27 | 14 | 1.996 | 0.726  | 31 | 27 | 5.88   | 0.745  | 49.3 | 15 | 6.17  | 0.701  | 56.4 | 15 |
| 1.291 | 31 | 31 | 18 | 2.002 | 0.724  | 31 | 9  | 5.82   | 0.745  | 50.1 | 14 | 6.10  | 0.701  | 57.3 | 14 |
| 1.290 | 30 | 29 | 16 | 2.003 | 0.724  | 31 | 39 | 5.83   | 0.743  | 49.7 | 14 | 6.58  | 0.700  | 51.2 | 14 |
| 1.290 | 31 | 29 | 12 | 2.005 | 0.723  | 30 | 37 | 5.85   | 0.742  | 49.3 | 14 | 6.01  | 0.698  | 58.2 | 14 |
| 1.289 | 31 | 35 | 22 | 2.015 | 0.720  | 30 | 43 | 5.92   | 0.741  | 48.0 | 14 | 6.12  | 0.695  | 56.4 | 14 |

- \* LHGR calculated with pin-power reconstruction
- \* CPR calculated with pin-power reconstruction & CPR limit type 3
- \* Thermal limit file:

**Figure A.68 Brunswick Unit 1 Cycle 17 Control Rod Pattern and Axial Distributions at 20,265.0 MWd/MTU**

**Appendix B    Elevation Views of the Brunswick Unit 1 Cycle 17 Fresh Reload Batch Fuel Assemblies**



[

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**Figure B.1 Elevation View for the Brunswick Unit 1 Cycle 17 Fresh  
Fuel Reload Batch BRK1-17 ATRIUM-10 [ ] Fuel  
Assembly Design (Fabrication Batch BRK1-17)**

[

]

**Figure B.2 Elevation View for the Brunswick Unit 1 Cycle 17 Fresh  
Fuel Reload Batch BRK1-17 ATRIUM-10 [ ] Fuel  
Assembly Design (Fabrication Batch BRK1-17)**

[

]

Figure B.3 [

] Fuel Rod Distribution

[

]

Figure B.4 [

] Fuel Rod Distribution

[

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**Figure B.5 Fuel Rod Axial Descriptions**

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**Figure B.5 Fuel Rod Axial Descriptions** *(Continued)*

## **Appendix C   Brunswick Unit 1 Cycle 17 Fresh Fuel Locations**

**Table C.1 Brunswick Unit 1 Cycle 17 Reload Fuel Identification and Locations (Core Coordinates)**

**Assembly Type: ATRIUM-10 BRK1-17**  
**Bundle Description: [                      ]**  
**Number Loaded: 152**

| Fuel ID | Core Coord. | Fuel ID | Core Coord. | Fuel ID | Core Coord. | Fuel ID | Core Coord. |
|---------|-------------|---------|-------------|---------|-------------|---------|-------------|
| A17001  | 19-50       | A17039  | 17-36       | A17077  | 9-26        | A17115  | 7-16        |
| A17002  | 23-50       | A17040  | 25-36       | A17078  | 17-26       | A17116  | 11-16       |
| A17003  | 29-50       | A17041  | 27-36       | A17079  | 21-26       | A17117  | 15-16       |
| A17004  | 33-50       | A17042  | 35-36       | A17080  | 31-26       | A17118  | 19-16       |
| A17005  | 21-48       | A17043  | 3-34        | A17081  | 35-26       | A17119  | 23-16       |
| A17006  | 31-48       | A17044  | 11-34       | A17082  | 43-26       | A17120  | 29-16       |
| A17007  | 11-46       | A17045  | 15-34       | A17083  | 3-24        | A17121  | 33-16       |
| A17008  | 13-46       | A17046  | 19-34       | A17084  | 7-24        | A17122  | 37-16       |
| A17009  | 15-46       | A17047  | 23-34       | A17085  | 15-24       | A17123  | 41-16       |
| A17010  | 23-46       | A17048  | 29-34       | A17086  | 19-24       | A17124  | 45-16       |
| A17011  | 29-46       | A17049  | 33-34       | A17087  | 23-24       | A17125  | 7-14        |
| A17012  | 37-46       | A17050  | 37-34       | A17088  | 29-24       | A17126  | 13-14       |
| A17013  | 39-46       | A17051  | 41-34       | A17089  | 33-24       | A17127  | 39-14       |
| A17014  | 41-46       | A17052  | 49-34       | A17090  | 37-24       | A17128  | 45-14       |
| A17015  | 21-44       | A17053  | 5-32        | A17091  | 45-24       | A17129  | 7-12        |
| A17016  | 25-44       | A17054  | 9-32        | A17092  | 49-24       | A17130  | 15-12       |
| A17017  | 27-44       | A17055  | 21-32       | A17093  | 5-22        | A17131  | 19-12       |
| A17018  | 31-44       | A17056  | 25-32       | A17094  | 9-22        | A17132  | 33-12       |
| A17019  | 7-42        | A17057  | 27-32       | A17095  | 21-22       | A17133  | 37-12       |
| A17020  | 15-42       | A17058  | 31-32       | A17096  | 25-22       | A17134  | 45-12       |
| A17021  | 19-42       | A17059  | 43-32       | A17097  | 27-22       | A17135  | 21-10       |
| A17022  | 33-42       | A17060  | 47-32       | A17098  | 31-22       | A17136  | 25-10       |
| A17023  | 37-42       | A17061  | 3-30        | A17099  | 43-22       | A17137  | 27-10       |
| A17024  | 45-42       | A17062  | 7-30        | A17100  | 47-22       | A17138  | 31-10       |
| A17025  | 7-40        | A17063  | 15-30       | A17101  | 3-20        | A17139  | 11- 8       |
| A17026  | 13-40       | A17064  | 19-30       | A17102  | 11-20       | A17140  | 13- 8       |
| A17027  | 39-40       | A17065  | 23-30       | A17103  | 15-20       | A17141  | 15- 8       |
| A17028  | 45-40       | A17066  | 29-30       | A17104  | 19-20       | A17142  | 23- 8       |
| A17029  | 7-38        | A17067  | 33-30       | A17105  | 23-20       | A17143  | 29- 8       |
| A17030  | 11-38       | A17068  | 37-30       | A17106  | 29-20       | A17144  | 37- 8       |
| A17031  | 15-38       | A17069  | 45-30       | A17107  | 33-20       | A17145  | 39- 8       |
| A17032  | 19-38       | A17070  | 49-30       | A17108  | 37-20       | A17146  | 41- 8       |
| A17033  | 23-38       | A17071  | 9-28        | A17109  | 41-20       | A17147  | 21- 6       |
| A17034  | 29-38       | A17072  | 17-28       | A17110  | 49-20       | A17148  | 31- 6       |
| A17035  | 33-38       | A17073  | 21-28       | A17111  | 17-18       | A17149  | 19- 4       |
| A17036  | 37-38       | A17074  | 31-28       | A17112  | 25-18       | A17150  | 23- 4       |
| A17037  | 41-38       | A17075  | 35-28       | A17113  | 27-18       | A17151  | 29- 4       |
| A17038  | 45-38       | A17076  | 43-28       | A17114  | 35-18       | A17152  | 33- 4       |



**Table C.1 Brunswick Unit 1 Cycle 17 Reload Fuel Identification  
and Locations (Core Coordinates) (Continued)**

**Assembly Type: ATRIUM-10 BRK1-17**  
**Bundle Description: [ ]**  
**Number Loaded: 96**

| Fuel<br>ID | Core<br>Coord. | Fuel<br>ID | Core<br>Coord. | Fuel<br>ID | Core<br>Coord. | Fuel<br>ID | Core<br>Coord. |
|------------|----------------|------------|----------------|------------|----------------|------------|----------------|
| A17153     | 17-48          | A17177     | 35-40          | A17201     | 5-26           | A17225     | 21-14          |
| A17154     | 19-48          | A17178     | 43-40          | A17202     | 13-26          | A17226     | 25-14          |
| A17155     | 25-48          | A17179     | 5-36           | A17203     | 39-26          | A17227     | 27-14          |
| A17156     | 27-48          | A17180     | 9-36           | A17204     | 47-26          | A17228     | 31-14          |
| A17157     | 33-48          | A17181     | 13-36          | A17205     | 11-24          | A17229     | 35-14          |
| A17158     | 35-48          | A17182     | 21-36          | A17206     | 41-24          | A17230     | 43-14          |
| A17159     | 19-46          | A17183     | 31-36          | A17207     | 13-22          | A17231     | 11-12          |
| A17160     | 33-46          | A17184     | 39-36          | A17208     | 17-22          | A17232     | 23-12          |
| A17161     | 9-44           | A17185     | 43-36          | A17209     | 35-22          | A17233     | 29-12          |
| A17162     | 13-44          | A17186     | 47-36          | A17210     | 39-22          | A17234     | 41-12          |
| A17163     | 17-44          | A17187     | 5-34           | A17211     | 5-20           | A17235     | 9-10           |
| A17164     | 35-44          | A17188     | 7-34           | A17212     | 7-20           | A17236     | 13-10          |
| A17165     | 39-44          | A17189     | 45-34          | A17213     | 45-20          | A17237     | 17-10          |
| A17166     | 43-44          | A17190     | 47-34          | A17214     | 47-20          | A17238     | 35-10          |
| A17167     | 11-42          | A17191     | 13-32          | A17215     | 5-18           | A17239     | 39-10          |
| A17168     | 23-42          | A17192     | 17-32          | A17216     | 9-18           | A17240     | 43-10          |
| A17169     | 29-42          | A17193     | 35-32          | A17217     | 13-18          | A17241     | 19- 8          |
| A17170     | 41-42          | A17194     | 39-32          | A17218     | 21-18          | A17242     | 33- 8          |
| A17171     | 9-40           | A17195     | 11-30          | A17219     | 31-18          | A17243     | 17- 6          |
| A17172     | 17-40          | A17196     | 41-30          | A17220     | 39-18          | A17244     | 19- 6          |
| A17173     | 21-40          | A17197     | 5-28           | A17221     | 43-18          | A17245     | 25- 6          |
| A17174     | 25-40          | A17198     | 13-28          | A17222     | 47-18          | A17246     | 27- 6          |
| A17175     | 27-40          | A17199     | 39-28          | A17223     | 9-14           | A17247     | 33- 6          |
| A17176     | 31-40          | A17200     | 47-28          | A17224     | 17-14          | A17248     | 35- 6          |

## **Appendix D    Brunswick Unit 1 Cycle 17 Radial Exposure and Power Distributions**

|    | 1      | 3      | 5      | 7      | 9      | 11     | 13     | 15     | 17     | 19     | 21     | 23     | 25     |
|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 52 |        |        |        |        |        |        |        |        | 34.400 | 20.929 | 29.748 | 29.348 | 31.626 |
| 50 |        |        |        |        |        |        |        | 33.229 | 12.010 | 0.000  | 17.062 | 0.000  | 20.445 |
| 48 |        |        |        |        | 34.965 | 18.905 | 16.792 | 10.190 | 0.000  | 0.000  | 0.000  | 22.297 | 0.000  |
| 46 |        |        |        | 37.380 | 16.476 | 0.000  | 0.000  | 0.000  | 18.262 | 0.000  | 20.079 | 0.000  | 22.451 |
| 44 |        |        | 38.037 | 16.739 | 0.000  | 18.739 | 0.000  | 22.726 | 0.000  | 22.717 | 0.000  | 22.840 | 0.000  |
| 42 |        |        | 18.383 | 0.000  | 16.480 | 0.000  | 22.197 | 0.000  | 22.813 | 0.000  | 22.132 | 0.000  | 22.783 |
| 40 |        |        | 34.331 | 0.000  | 0.000  | 22.226 | 0.000  | 22.475 | 0.000  | 22.805 | 0.000  | 22.772 | 0.000  |
| 38 |        | 29.984 | 17.895 | 0.000  | 13.439 | 0.000  | 22.399 | 0.000  | 22.403 | 0.000  | 21.898 | 0.000  | 22.700 |
| 36 | 31.876 | 17.736 | 0.000  | 20.391 | 0.000  | 20.135 | 0.000  | 22.647 | 0.000  | 21.000 | 0.000  | 20.322 | 0.000  |
| 34 | 21.872 | 0.000  | 0.000  | 0.000  | 22.110 | 0.000  | 21.394 | 0.000  | 23.055 | 0.000  | 22.759 | 0.000  | 22.279 |
| 32 | 30.341 | 12.604 | 0.000  | 19.140 | 0.000  | 18.894 | 0.000  | 22.806 | 0.000  | 22.425 | 0.000  | 22.220 | 0.000  |
| 30 | 33.281 | 0.000  | 22.327 | 0.000  | 22.453 | 0.000  | 20.527 | 0.000  | 20.895 | 0.000  | 21.446 | 0.000  | 22.111 |
| 28 | 35.559 | 13.385 | 0.000  | 17.099 | 0.000  | 22.534 | 0.000  | 21.312 | 0.000  | 23.086 | 0.000  | 22.458 | 31.829 |
| 26 | 35.416 | 18.271 | 0.000  | 17.669 | 0.000  | 22.914 | 0.000  | 21.837 | 0.000  | 23.386 | 0.000  | 22.832 | 32.889 |
| 24 | 34.090 | 0.000  | 22.584 | 0.000  | 22.891 | 0.000  | 20.711 | 0.000  | 20.985 | 0.000  | 21.925 | 0.000  | 22.434 |
| 22 | 30.203 | 15.503 | 0.000  | 19.962 | 0.000  | 21.025 | 0.000  | 23.047 | 0.000  | 22.478 | 0.000  | 22.505 | 0.000  |
| 20 | 34.051 | 0.000  | 0.000  | 0.000  | 22.514 | 0.000  | 22.111 | 0.000  | 23.245 | 0.000  | 22.914 | 0.000  | 22.663 |
| 18 | 30.714 | 17.826 | 0.000  | 20.864 | 0.000  | 21.980 | 0.000  | 22.951 | 0.000  | 21.843 | 0.000  | 20.519 | 0.000  |
| 16 |        | 36.594 | 18.175 | 0.000  | 18.732 | 0.000  | 22.747 | 0.000  | 22.740 | 0.000  | 22.023 | 0.000  | 22.909 |
| 14 |        |        | 18.399 | 0.000  | 0.000  | 22.472 | 0.000  | 22.799 | 0.000  | 22.996 | 0.000  | 22.904 | 0.000  |
| 12 |        |        | 19.080 | 0.000  | 17.944 | 0.000  | 22.326 | 0.000  | 22.989 | 0.000  | 22.356 | 0.000  | 23.057 |
| 10 |        |        | 37.430 | 17.216 | 0.000  | 18.967 | 0.000  | 22.986 | 0.000  | 23.045 | 0.000  | 23.106 | 0.000  |
| 8  |        |        |        | 38.021 | 17.055 | 0.000  | 0.000  | 0.000  | 18.495 | 0.000  | 20.333 | 0.000  | 22.522 |
| 6  |        |        |        |        | 35.901 | 19.280 | 17.337 | 11.212 | 0.000  | 0.000  | 0.000  | 22.389 | 0.000  |
| 4  |        |        |        |        |        |        |        | 34.394 | 14.311 | 0.000  | 17.341 | 0.000  | 20.847 |
| 2  |        |        |        |        |        |        |        |        | 34.385 | 21.433 | 29.865 | 30.467 | 31.778 |

Figure D.1 Brunswick Unit 1 Cycle 17 BOC Exposure Distribution (GWd/MTU)

|    | 27     | 29     | 31     | 33     | 35     | 37     | 39     | 41     | 43     | 45     | 47     | 49     | 51     |
|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 52 | 31.422 | 31.378 | 31.834 | 21.879 | 34.358 |        |        |        |        |        |        |        |        |
| 50 | 21.136 | 0.000  | 17.420 | 0.000  | 18.158 | 37.884 |        |        |        |        |        |        |        |
| 48 | 0.000  | 22.565 | 0.000  | 0.000  | 0.000  | 20.532 | 17.575 | 19.487 | 38.640 |        |        |        |        |
| 46 | 22.483 | 0.000  | 20.595 | 0.000  | 18.421 | 0.000  | 0.000  | 0.000  | 17.439 | 39.304 |        |        |        |
| 44 | 0.000  | 23.288 | 0.000  | 23.147 | 0.000  | 23.030 | 0.000  | 19.155 | 0.000  | 17.274 | 38.054 |        |        |
| 42 | 23.348 | 0.000  | 22.490 | 0.000  | 23.040 | 0.000  | 22.343 | 0.000  | 18.976 | 0.000  | 19.696 |        |        |
| 40 | 0.000  | 22.818 | 0.000  | 23.077 | 0.000  | 23.144 | 0.000  | 22.939 | 0.000  | 0.000  | 31.040 |        |        |
| 38 | 22.918 | 0.000  | 22.987 | 0.000  | 23.036 | 0.000  | 23.515 | 0.000  | 22.198 | 0.000  | 20.283 | 31.321 |        |
| 36 | 0.000  | 20.584 | 0.000  | 23.321 | 0.000  | 23.366 | 0.000  | 23.076 | 0.000  | 18.092 | 0.000  | 12.676 | 34.631 |
| 34 | 23.636 | 0.000  | 22.852 | 0.000  | 23.191 | 0.000  | 23.020 | 0.000  | 23.024 | 0.000  | 0.000  | 0.000  | 33.460 |
| 32 | 0.000  | 22.749 | 0.000  | 22.862 | 0.000  | 22.908 | 0.000  | 22.308 | 0.000  | 20.787 | 0.000  | 17.021 | 29.914 |
| 30 | 22.922 | 0.000  | 22.865 | 0.000  | 20.938 | 0.000  | 23.007 | 0.000  | 23.463 | 0.000  | 22.821 | 0.000  | 29.920 |
| 28 | 33.644 | 23.187 | 0.000  | 23.554 | 0.000  | 22.858 | 0.000  | 23.566 | 0.000  | 22.397 | 0.000  | 21.543 | 35.453 |
| 26 | 34.185 | 23.225 | 0.000  | 23.474 | 0.000  | 22.838 | 0.000  | 23.546 | 0.000  | 22.380 | 0.000  | 21.305 | 35.344 |
| 24 | 22.793 | 0.000  | 22.819 | 0.000  | 20.953 | 0.000  | 22.972 | 0.000  | 23.462 | 0.000  | 22.824 | 0.000  | 34.556 |
| 22 | 0.000  | 22.599 | 0.000  | 22.857 | 0.000  | 23.063 | 0.000  | 22.376 | 0.000  | 20.517 | 0.000  | 17.074 | 30.644 |
| 20 | 23.596 | 0.000  | 22.960 | 0.000  | 23.271 | 0.000  | 23.034 | 0.000  | 23.020 | 0.000  | 0.000  | 0.000  | 22.047 |
| 18 | 0.000  | 20.451 | 0.000  | 23.277 | 0.000  | 23.327 | 0.000  | 23.081 | 0.000  | 18.118 | 0.000  | 15.371 | 35.423 |
| 16 | 22.970 | 0.000  | 22.954 | 0.000  | 23.064 | 0.000  | 23.369 | 0.000  | 22.168 | 0.000  | 20.337 | 34.385 |        |
| 14 | 0.000  | 22.932 | 0.000  | 23.128 | 0.000  | 22.980 | 0.000  | 22.915 | 0.000  | 0.000  | 32.673 |        |        |
| 12 | 23.309 | 0.000  | 22.356 | 0.000  | 23.031 | 0.000  | 22.299 | 0.000  | 18.908 | 0.000  | 19.351 |        |        |
| 10 | 0.000  | 23.315 | 0.000  | 23.212 | 0.000  | 23.078 | 0.000  | 18.976 | 0.000  | 17.196 | 38.649 |        |        |
| 8  | 22.523 | 0.000  | 20.417 | 0.000  | 18.382 | 0.000  | 0.000  | 0.000  | 17.101 | 38.638 |        |        |        |
| 6  | 0.000  | 22.592 | 0.000  | 0.000  | 0.000  | 20.509 | 17.415 | 19.338 | 38.576 |        |        |        |        |
| 4  | 20.969 | 0.000  | 17.224 | 0.000  | 18.027 | 34.381 |        |        |        |        |        |        |        |
| 2  | 35.156 | 31.435 | 26.628 | 21.681 | 33.786 |        |        |        |        |        |        |        |        |

Figure D.1 Brunswick Unit 1 Cycle 17 BOC Exposure Distribution (GWd/MTU) (Continued)

|    | 1      | 3      | 5      | 7      | 9      | 11     | 13     | 15     | 17     | 19     | 21     | 23     | 25     |
|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 52 |        |        |        |        |        |        |        |        | 42.790 | 31.012 | 39.769 | 39.350 | 41.282 |
| 50 |        |        |        |        |        |        |        | 43.920 | 27.033 | 16.425 | 33.620 | 17.091 | 36.206 |
| 48 |        |        |        |        | 43.283 | 30.831 | 31.331 | 27.532 | 19.248 | 20.282 | 20.857 | 41.181 | 20.479 |
| 46 |        |        |        | 45.982 | 30.538 | 17.317 | 19.482 | 21.304 | 39.320 | 22.666 | 41.163 | 22.746 | 42.686 |
| 44 |        |        | 45.972 | 30.695 | 17.967 | 38.070 | 22.142 | 43.577 | 23.326 | 43.759 | 23.005 | 43.235 | 22.313 |
| 42 |        |        | 29.886 | 17.073 | 36.044 | 22.604 | 43.930 | 24.468 | 44.412 | 24.043 | 43.378 | 22.829 | 43.048 |
| 40 |        |        | 46.112 | 19.234 | 22.277 | 43.792 | 24.640 | 44.616 | 24.382 | 44.444 | 23.174 | 43.420 | 23.058 |
| 38 |        | 40.781 | 34.505 | 21.161 | 36.004 | 24.740 | 44.605 | 24.973 | 44.358 | 24.235 | 43.011 | 23.256 | 43.767 |
| 36 | 40.481 | 32.223 | 19.237 | 41.001 | 23.588 | 42.290 | 24.123 | 44.251 | 23.716 | 42.263 | 23.325 | 41.947 | 23.242 |
| 34 | 32.064 | 16.527 | 20.461 | 22.988 | 43.683 | 24.506 | 43.114 | 23.948 | 44.108 | 23.543 | 43.886 | 23.632 | 43.422 |
| 32 | 40.503 | 29.599 | 21.321 | 40.904 | 24.103 | 41.415 | 23.651 | 44.009 | 23.997 | 44.094 | 24.144 | 43.849 | 24.633 |
| 30 | 43.270 | 17.731 | 41.911 | 23.741 | 43.959 | 23.991 | 41.977 | 23.655 | 43.050 | 24.250 | 43.195 | 23.993 | 43.866 |
| 28 | 45.357 | 30.909 | 21.644 | 39.089 | 23.376 | 43.458 | 23.129 | 42.535 | 23.542 | 44.241 | 24.098 | 43.699 | 51.109 |
| 26 | 45.159 | 34.976 | 21.583 | 39.514 | 23.324 | 43.774 | 23.084 | 42.980 | 23.511 | 44.493 | 24.062 | 44.043 | 51.981 |
| 24 | 43.867 | 17.567 | 42.054 | 23.617 | 44.260 | 23.836 | 42.015 | 23.554 | 43.045 | 24.169 | 43.569 | 23.903 | 44.062 |
| 22 | 40.126 | 32.322 | 21.234 | 41.520 | 23.923 | 43.109 | 23.463 | 44.143 | 23.871 | 44.043 | 24.033 | 44.006 | 24.536 |
| 20 | 42.633 | 16.293 | 20.353 | 22.861 | 43.891 | 24.272 | 43.560 | 23.756 | 44.142 | 23.393 | 43.922 | 23.507 | 43.710 |
| 18 | 39.141 | 32.155 | 19.203 | 41.397 | 23.424 | 43.692 | 23.873 | 44.329 | 23.529 | 42.856 | 23.173 | 41.973 | 23.132 |
| 16 |        | 46.822 | 34.995 | 21.295 | 40.419 | 24.446 | 44.716 | 24.762 | 44.528 | 24.054 | 42.991 | 23.116 | 43.842 |
| 14 |        |        | 32.946 | 19.475 | 22.160 | 43.799 | 24.427 | 44.735 | 24.193 | 44.422 | 23.012 | 43.384 | 22.929 |
| 12 |        |        | 30.922 | 17.258 | 37.280 | 22.429 | 43.848 | 24.276 | 44.382 | 23.865 | 43.401 | 22.673 | 43.159 |
| 10 |        |        | 45.501 | 31.159 | 17.875 | 38.133 | 21.964 | 43.673 | 23.134 | 43.932 | 22.832 | 43.320 | 22.181 |
| 8  |        |        |        | 46.571 | 30.971 | 17.155 | 19.297 | 21.091 | 39.334 | 22.457 | 41.211 | 22.578 | 42.604 |
| 6  |        |        |        |        | 44.043 | 31.036 | 31.645 | 28.319 | 18.987 | 20.044 | 20.654 | 41.108 | 20.333 |
| 4  |        |        |        |        |        |        |        | 44.304 | 28.865 | 16.170 | 33.681 | 16.909 | 36.457 |
| 2  |        |        |        |        |        |        |        |        | 42.565 | 31.300 | 39.728 | 40.250 | 41.298 |

Figure D.2 Brunswick Unit 1 Cycle 17 EOC Exposure Distribution (19.4 GWd/MTU)

|    | 27     | 29     | 31     | 33     | 35     | 37     | 39     | 41     | 43     | 45     | 47     | 49     | 51     |
|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 52 | 41.022 | 40.963 | 41.344 | 31.430 | 41.918 |        |        |        |        |        |        |        |        |
| 50 | 36.769 | 16.797 | 33.531 | 15.779 | 31.943 | 47.461 |        |        |        |        |        |        |        |
| 48 | 20.381 | 41.181 | 20.404 | 19.655 | 18.507 | 36.208 | 31.255 | 30.717 | 46.202 |        |        |        |        |
| 46 | 42.620 | 22.471 | 41.223 | 22.083 | 38.809 | 20.432 | 18.599 | 16.489 | 30.702 | 47.234 |        |        |        |
| 44 | 22.221 | 43.376 | 22.597 | 43.699 | 22.646 | 43.201 | 21.275 | 37.663 | 17.066 | 30.439 | 45.508 |        |        |
| 42 | 43.458 | 22.561 | 43.318 | 23.501 | 44.034 | 23.681 | 43.271 | 21.601 | 37.387 | 16.193 | 30.512 |        |        |
| 40 | 22.963 | 43.223 | 22.743 | 44.187 | 23.690 | 44.510 | 23.677 | 43.471 | 21.104 | 18.244 | 42.510 |        |        |
| 38 | 43.891 | 22.970 | 43.575 | 23.628 | 44.299 | 24.105 | 44.698 | 23.529 | 42.590 | 20.173 | 35.739 | 41.361 |        |
| 36 | 23.137 | 41.906 | 22.849 | 43.808 | 22.991 | 44.117 | 23.065 | 43.888 | 22.507 | 38.414 | 18.415 | 26.871 | 42.339 |
| 34 | 44.499 | 23.329 | 43.590 | 22.948 | 43.628 | 23.060 | 43.636 | 23.361 | 43.567 | 22.003 | 19.541 | 15.586 | 41.658 |
| 32 | 24.511 | 44.028 | 23.678 | 43.963 | 23.274 | 43.352 | 22.563 | 43.340 | 22.912 | 41.331 | 20.235 | 32.906 | 39.298 |
| 30 | 44.450 | 23.648 | 44.008 | 23.659 | 42.445 | 22.744 | 43.182 | 22.760 | 43.755 | 22.362 | 41.216 | 16.498 | 39.328 |
| 28 | 52.524 | 44.053 | 23.621 | 44.161 | 22.823 | 43.148 | 22.071 | 43.386 | 22.061 | 42.345 | 20.072 | 36.789 | 44.408 |
| 26 | 52.969 | 44.093 | 23.615 | 44.074 | 22.819 | 43.121 | 22.069 | 43.383 | 22.065 | 42.332 | 20.086 | 36.579 | 44.299 |
| 24 | 44.288 | 23.620 | 43.984 | 23.646 | 42.443 | 22.733 | 43.120 | 22.762 | 43.764 | 22.388 | 41.248 | 16.544 | 43.686 |
| 22 | 24.450 | 43.858 | 23.650 | 43.921 | 23.251 | 43.509 | 22.554 | 43.440 | 22.925 | 41.132 | 20.300 | 33.076 | 40.152 |
| 20 | 44.403 | 23.278 | 43.655 | 22.915 | 43.664 | 23.040 | 43.669 | 23.357 | 43.556 | 22.020 | 19.592 | 15.761 | 31.677 |
| 18 | 23.055 | 41.718 | 22.799 | 43.711 | 22.961 | 44.069 | 23.052 | 43.916 | 22.496 | 38.384 | 18.399 | 29.358 | 43.226 |
| 16 | 43.828 | 22.896 | 43.474 | 23.583 | 44.303 | 24.085 | 44.549 | 23.517 | 42.559 | 20.129 | 35.717 | 44.055 |        |
| 14 | 22.860 | 43.249 | 22.681 | 44.188 | 23.654 | 44.332 | 23.664 | 43.429 | 21.089 | 18.202 | 43.891 |        |        |
| 12 | 43.350 | 22.483 | 43.141 | 23.451 | 43.982 | 23.658 | 43.213 | 21.600 | 37.348 | 16.193 | 30.199 |        |        |
| 10 | 22.118 | 43.342 | 22.541 | 43.732 | 22.609 | 43.216 | 21.266 | 37.503 | 17.104 | 30.453 | 46.118 |        |        |
| 8  | 42.551 | 22.395 | 41.013 | 22.050 | 38.762 | 20.416 | 18.597 | 16.507 | 30.440 | 46.697 |        |        |        |
| 6  | 20.268 | 41.125 | 20.372 | 19.647 | 18.511 | 36.191 | 31.122 | 30.603 | 46.166 |        |        |        |        |
| 4  | 36.508 | 16.742 | 33.347 | 15.831 | 31.874 | 43.938 |        |        |        |        |        |        |        |
| 2  | 44.371 | 41.017 | 36.485 | 31.333 | 41.875 |        |        |        |        |        |        |        |        |

Figure D.2 Brunswick Unit 1 Cycle 17 EOC Exposure Distribution (19.4 GWd/MTU) (Continued)

|    | 1     | 3     | 5     | 7     | 9     | 11    | 13    | 15    | 17    | 19    | 21    | 23    | 25    |
|----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 52 |       |       |       |       |       |       |       |       | 0.446 | 0.530 | 0.547 | 0.556 | 0.547 |
| 50 |       |       |       |       |       |       |       | 0.552 | 0.744 | 0.788 | 0.875 | 0.863 | 0.848 |
| 48 |       |       |       |       | 0.443 | 0.614 | 0.728 | 0.824 | 0.887 | 0.944 | 1.016 | 1.020 | 1.009 |
| 46 |       |       |       | 0.453 | 0.722 | 0.825 | 0.917 | 1.006 | 1.084 | 1.066 | 1.112 | 1.135 | 1.090 |
| 44 |       |       | 0.422 | 0.716 | 0.849 | 0.979 | 1.039 | 1.084 | 1.052 | 1.078 | 1.188 | 1.146 | 1.011 |
| 42 |       |       | 0.589 | 0.808 | 0.977 | 1.069 | 1.141 | 1.191 | 1.104 | 1.147 | 1.201 | 1.181 | 1.022 |
| 40 |       |       | 0.605 | 0.895 | 1.031 | 1.133 | 1.219 | 1.197 | 1.206 | 1.208 | 1.224 | 1.211 | 1.186 |
| 38 |       | 0.570 | 0.844 | 0.979 | 1.099 | 1.190 | 1.194 | 1.238 | 1.182 | 1.214 | 1.219 | 1.248 | 1.193 |
| 36 | 0.451 | 0.734 | 0.880 | 1.017 | 1.034 | 1.110 | 1.207 | 1.179 | 0.941 | 0.935 | 1.191 | 1.220 | 1.003 |
| 34 | 0.525 | 0.770 | 0.925 | 1.050 | 1.075 | 1.146 | 1.217 | 1.216 | 0.930 | 0.954 | 1.204 | 1.254 | 1.010 |
| 32 | 0.529 | 0.822 | 0.999 | 1.106 | 1.189 | 1.216 | 1.232 | 1.216 | 1.194 | 1.207 | 1.292 | 1.279 | 1.300 |
| 30 | 0.530 | 0.857 | 1.020 | 1.142 | 1.155 | 1.193 | 1.237 | 1.260 | 1.223 | 1.257 | 1.281 | 1.361 | 1.340 |
| 28 | 0.530 | 0.906 | 1.027 | 1.134 | 1.024 | 1.033 | 1.202 | 1.216 | 1.011 | 1.013 | 1.306 | 1.342 | 1.235 |
| 26 | 0.530 | 0.860 | 1.027 | 1.131 | 1.024 | 1.032 | 1.201 | 1.213 | 1.011 | 1.011 | 1.304 | 1.340 | 1.222 |
| 24 | 0.526 | 0.860 | 1.025 | 1.145 | 1.155 | 1.191 | 1.233 | 1.258 | 1.221 | 1.255 | 1.280 | 1.358 | 1.335 |
| 22 | 0.529 | 0.866 | 1.014 | 1.111 | 1.192 | 1.207 | 1.230 | 1.216 | 1.192 | 1.205 | 1.289 | 1.276 | 1.297 |
| 20 | 0.449 | 0.778 | 0.939 | 1.061 | 1.083 | 1.151 | 1.212 | 1.214 | 0.928 | 0.952 | 1.199 | 1.250 | 1.010 |
| 18 | 0.453 | 0.740 | 0.896 | 1.036 | 1.050 | 1.108 | 1.207 | 1.175 | 0.939 | 0.930 | 1.187 | 1.213 | 1.000 |
| 16 |       | 0.554 | 0.875 | 1.011 | 1.105 | 1.193 | 1.195 | 1.236 | 1.179 | 1.209 | 1.214 | 1.244 | 1.188 |
| 14 |       |       | 0.774 | 0.927 | 1.045 | 1.136 | 1.219 | 1.195 | 1.203 | 1.202 | 1.220 | 1.204 | 1.181 |
| 12 |       |       | 0.623 | 0.832 | 0.985 | 1.072 | 1.139 | 1.190 | 1.103 | 1.144 | 1.193 | 1.176 | 1.017 |
| 10 |       |       | 0.435 | 0.728 | 0.856 | 0.981 | 1.039 | 1.084 | 1.050 | 1.075 | 1.183 | 1.140 | 1.007 |
| 8  |       |       |       | 0.463 | 0.725 | 0.825 | 0.916 | 1.003 | 1.079 | 1.062 | 1.107 | 1.130 | 1.086 |
| 6  |       |       |       |       | 0.435 | 0.613 | 0.724 | 0.827 | 0.882 | 0.938 | 1.011 | 1.015 | 1.005 |
| 4  |       |       |       |       |       |       |       | 0.510 | 0.736 | 0.782 | 0.868 | 0.857 | 0.842 |
| 2  |       |       |       |       |       |       |       |       | 0.439 | 0.523 | 0.541 | 0.546 | 0.541 |

**Figure D.3 Brunswick Unit 1 Cycle 17 Radial Power Distribution  
at 0.0 MWd/MTU**

|    | 27    | 29    | 31    | 33    | 35    | 37    | 39    | 41    | 43    | 45    | 47    | 49    | 51    |
|----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 52 | 0.546 | 0.539 | 0.528 | 0.518 | 0.417 |       |       |       |       |       |       |       |       |
| 50 | 0.846 | 0.856 | 0.866 | 0.779 | 0.730 | 0.530 |       |       |       |       |       |       |       |
| 48 | 1.008 | 1.014 | 1.009 | 0.937 | 0.888 | 0.822 | 0.719 | 0.602 | 0.416 |       |       |       |       |
| 46 | 1.088 | 1.130 | 1.103 | 1.059 | 1.076 | 0.996 | 0.905 | 0.811 | 0.705 | 0.435 |       |       |       |
| 44 | 1.008 | 1.137 | 1.180 | 1.069 | 1.042 | 1.073 | 1.025 | 0.965 | 0.834 | 0.701 | 0.409 |       |       |
| 42 | 1.017 | 1.174 | 1.188 | 1.137 | 1.092 | 1.176 | 1.124 | 1.052 | 0.958 | 0.796 | 0.578 |       |       |
| 40 | 1.183 | 1.203 | 1.213 | 1.193 | 1.191 | 1.178 | 1.200 | 1.112 | 1.016 | 0.885 | 0.607 |       |       |
| 38 | 1.190 | 1.240 | 1.201 | 1.198 | 1.162 | 1.218 | 1.170 | 1.170 | 1.073 | 0.978 | 0.802 | 0.544 |       |
| 36 | 1.000 | 1.209 | 1.178 | 0.917 | 0.927 | 1.155 | 1.185 | 1.085 | 1.032 | 1.066 | 0.874 | 0.724 | 0.419 |
| 34 | 1.002 | 1.244 | 1.191 | 0.941 | 0.915 | 1.193 | 1.187 | 1.129 | 1.064 | 1.047 | 0.923 | 0.759 | 0.435 |
| 32 | 1.296 | 1.265 | 1.277 | 1.187 | 1.173 | 1.193 | 1.205 | 1.179 | 1.168 | 1.087 | 0.992 | 0.844 | 0.516 |
| 30 | 1.330 | 1.348 | 1.260 | 1.238 | 1.200 | 1.232 | 1.191 | 1.163 | 1.123 | 1.115 | 0.997 | 0.836 | 0.525 |
| 28 | 1.211 | 1.325 | 1.289 | 0.995 | 0.992 | 1.181 | 1.171 | 1.003 | 0.996 | 1.073 | 0.990 | 0.823 | 0.508 |
| 26 | 1.203 | 1.326 | 1.289 | 0.995 | 0.992 | 1.181 | 1.171 | 1.004 | 0.997 | 1.074 | 0.991 | 0.824 | 0.508 |
| 24 | 1.329 | 1.347 | 1.262 | 1.238 | 1.199 | 1.232 | 1.190 | 1.164 | 1.125 | 1.118 | 0.999 | 0.840 | 0.511 |
| 22 | 1.294 | 1.265 | 1.276 | 1.185 | 1.173 | 1.194 | 1.206 | 1.181 | 1.170 | 1.093 | 0.998 | 0.856 | 0.525 |
| 20 | 0.999 | 1.243 | 1.189 | 0.940 | 0.913 | 1.193 | 1.189 | 1.129 | 1.064 | 1.050 | 0.929 | 0.774 | 0.522 |
| 18 | 0.998 | 1.208 | 1.176 | 0.915 | 0.926 | 1.156 | 1.186 | 1.087 | 1.033 | 1.065 | 0.878 | 0.728 | 0.431 |
| 16 | 1.186 | 1.237 | 1.197 | 1.196 | 1.161 | 1.218 | 1.172 | 1.171 | 1.074 | 0.978 | 0.801 | 0.530 |       |
| 14 | 1.179 | 1.199 | 1.211 | 1.191 | 1.189 | 1.178 | 1.200 | 1.113 | 1.016 | 0.884 | 0.594 |       |       |
| 12 | 1.015 | 1.171 | 1.186 | 1.134 | 1.089 | 1.176 | 1.124 | 1.053 | 0.961 | 0.797 | 0.580 |       |       |
| 10 | 1.005 | 1.135 | 1.178 | 1.067 | 1.041 | 1.071 | 1.025 | 0.967 | 0.837 | 0.705 | 0.413 |       |       |
| 8  | 1.085 | 1.128 | 1.102 | 1.059 | 1.076 | 0.996 | 0.905 | 0.813 | 0.710 | 0.445 |       |       |       |
| 6  | 1.004 | 1.012 | 1.009 | 0.938 | 0.890 | 0.824 | 0.720 | 0.603 | 0.417 |       |       |       |       |
| 4  | 0.842 | 0.855 | 0.867 | 0.784 | 0.735 | 0.525 |       |       |       |       |       |       |       |
| 2  | 0.525 | 0.541 | 0.549 | 0.526 | 0.449 |       |       |       |       |       |       |       |       |

**Figure D.3 Brunswick Unit 1 Cycle 17 Radial Power Distribution  
at 0.0 MWd/MTU (Continued)**



|    | 1     | 3     | 5     | 7     | 9     | 11    | 13    | 15    | 17    | 19    | 21    | 23    | 25    |
|----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 52 |       |       |       |       |       |       |       |       | 0.399 | 0.491 | 0.485 | 0.480 | 0.456 |
| 50 |       |       |       |       |       |       |       | 0.501 | 0.764 | 0.892 | 0.833 | 0.904 | 0.776 |
| 48 |       |       |       |       | 0.387 | 0.565 | 0.683 | 0.867 | 1.033 | 1.097 | 1.103 | 0.926 | 1.088 |
| 46 |       |       |       | 0.399 | 0.691 | 0.905 | 1.011 | 1.091 | 1.027 | 1.190 | 1.041 | 1.188 | 1.002 |
| 44 |       |       | 0.367 | 0.686 | 0.941 | 0.932 | 1.127 | 0.984 | 1.204 | 1.034 | 1.246 | 1.059 | 1.257 |
| 42 |       |       | 0.547 | 0.895 | 0.948 | 1.135 | 1.005 | 1.192 | 1.033 | 1.243 | 1.094 | 1.294 | 1.091 |
| 40 |       |       | 0.553 | 1.000 | 1.135 | 0.999 | 1.196 | 1.032 | 1.249 | 1.070 | 1.302 | 1.103 | 1.311 |
| 38 |       | 0.501 | 0.806 | 1.084 | 1.075 | 1.207 | 1.039 | 1.235 | 1.067 | 1.276 | 1.106 | 1.309 | 1.101 |
| 36 | 0.398 | 0.722 | 1.021 | 1.000 | 1.213 | 1.063 | 1.266 | 1.074 | 1.283 | 1.103 | 1.308 | 1.126 | 1.296 |
| 34 | 0.484 | 0.888 | 1.094 | 1.189 | 1.044 | 1.252 | 1.091 | 1.285 | 1.089 | 1.289 | 1.083 | 1.270 | 1.066 |
| 32 | 0.486 | 0.853 | 1.108 | 1.051 | 1.243 | 1.118 | 1.307 | 1.097 | 1.293 | 1.074 | 1.245 | 1.029 | 1.185 |
| 30 | 0.472 | 0.919 | 0.939 | 1.196 | 1.062 | 1.290 | 1.123 | 1.306 | 1.109 | 1.255 | 1.033 | 1.160 | 0.931 |
| 28 | 0.452 | 0.850 | 1.111 | 1.053 | 1.261 | 1.093 | 1.320 | 1.115 | 1.289 | 1.057 | 1.192 | 0.935 | 0.795 |
| 26 | 0.449 | 0.806 | 1.107 | 1.046 | 1.258 | 1.088 | 1.318 | 1.113 | 1.288 | 1.055 | 1.191 | 0.933 | 0.788 |
| 24 | 0.460 | 0.908 | 0.930 | 1.187 | 1.053 | 1.282 | 1.115 | 1.302 | 1.104 | 1.253 | 1.029 | 1.158 | 0.928 |
| 22 | 0.471 | 0.835 | 1.097 | 1.035 | 1.230 | 1.092 | 1.296 | 1.092 | 1.288 | 1.071 | 1.242 | 1.028 | 1.185 |
| 20 | 0.411 | 0.872 | 1.083 | 1.176 | 1.029 | 1.236 | 1.076 | 1.275 | 1.082 | 1.284 | 1.078 | 1.269 | 1.067 |
| 18 | 0.391 | 0.709 | 1.013 | 0.987 | 1.196 | 1.037 | 1.252 | 1.063 | 1.276 | 1.093 | 1.305 | 1.121 | 1.296 |
| 16 |       | 0.472 | 0.809 | 1.079 | 1.021 | 1.188 | 1.025 | 1.225 | 1.061 | 1.271 | 1.102 | 1.307 | 1.099 |
| 14 |       |       | 0.673 | 1.002 | 1.123 | 0.985 | 1.184 | 1.022 | 1.242 | 1.063 | 1.299 | 1.099 | 1.311 |
| 12 |       |       | 0.555 | 0.897 | 0.931 | 1.123 | 0.993 | 1.184 | 1.027 | 1.238 | 1.087 | 1.292 | 1.088 |
| 10 |       |       | 0.366 | 0.680 | 0.932 | 0.921 | 1.118 | 0.978 | 1.197 | 1.028 | 1.242 | 1.055 | 1.256 |
| 8  |       |       |       | 0.397 | 0.681 | 0.895 | 1.001 | 1.081 | 1.018 | 1.183 | 1.034 | 1.184 | 1.001 |
| 6  |       |       |       |       | 0.373 | 0.557 | 0.672 | 0.852 | 1.021 | 1.088 | 1.097 | 0.923 | 1.085 |
| 4  |       |       |       |       |       |       |       | 0.468 | 0.740 | 0.882 | 0.825 | 0.898 | 0.771 |
| 2  |       |       |       |       |       |       |       |       | 0.390 | 0.482 | 0.480 | 0.472 | 0.452 |

**Figure D.4 Brunswick Unit 1 Cycle 17 Radial Power Distribution  
at 19,155.4 MWd/MTU (EOFP)**

|    | 27    | 29    | 31    | 33    | 35    | 37    | 39    | 41    | 43    | 45    | 47    | 49    | 51    |
|----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 52 | 0.455 | 0.462 | 0.464 | 0.469 | 0.361 |       |       |       |       |       |       |       |       |
| 50 | 0.771 | 0.894 | 0.818 | 0.867 | 0.701 | 0.456 |       |       |       |       |       |       |       |
| 48 | 1.086 | 0.920 | 1.092 | 1.078 | 1.005 | 0.772 | 0.653 | 0.546 | 0.355 |       |       |       |       |
| 46 | 1.001 | 1.185 | 1.030 | 1.180 | 1.013 | 1.069 | 0.987 | 0.883 | 0.667 | 0.377 |       |       |       |
| 44 | 1.257 | 1.054 | 1.246 | 1.031 | 1.200 | 0.978 | 1.114 | 0.916 | 0.918 | 0.665 | 0.353 |       |       |
| 42 | 1.088 | 1.296 | 1.092 | 1.248 | 1.034 | 1.194 | 1.000 | 1.122 | 0.916 | 0.874 | 0.531 |       |       |
| 40 | 1.312 | 1.106 | 1.309 | 1.074 | 1.258 | 1.032 | 1.197 | 0.987 | 1.115 | 0.981 | 0.559 |       |       |
| 38 | 1.101 | 1.314 | 1.105 | 1.287 | 1.072 | 1.246 | 1.033 | 1.200 | 0.997 | 1.070 | 0.774 | 0.489 |       |
| 36 | 1.298 | 1.127 | 1.317 | 1.099 | 1.299 | 1.080 | 1.275 | 1.043 | 1.209 | 1.023 | 1.014 | 0.742 | 0.379 |
| 34 | 1.060 | 1.277 | 1.092 | 1.305 | 1.102 | 1.303 | 1.090 | 1.259 | 1.042 | 1.189 | 1.086 | 0.870 | 0.414 |
| 32 | 1.187 | 1.032 | 1.258 | 1.086 | 1.315 | 1.113 | 1.323 | 1.098 | 1.249 | 1.037 | 1.097 | 0.820 | 0.468 |
| 30 | 0.927 | 1.167 | 1.035 | 1.275 | 1.126 | 1.329 | 1.118 | 1.304 | 1.058 | 1.192 | 0.925 | 0.893 | 0.459 |
| 28 | 0.785 | 0.937 | 1.207 | 1.071 | 1.314 | 1.126 | 1.342 | 1.098 | 1.268 | 1.009 | 1.087 | 0.767 | 0.433 |
| 26 | 0.782 | 0.938 | 1.207 | 1.071 | 1.314 | 1.126 | 1.342 | 1.099 | 1.268 | 1.008 | 1.088 | 0.768 | 0.433 |
| 24 | 0.928 | 1.169 | 1.037 | 1.277 | 1.126 | 1.330 | 1.118 | 1.305 | 1.059 | 1.193 | 0.925 | 0.894 | 0.449 |
| 22 | 1.188 | 1.034 | 1.260 | 1.086 | 1.317 | 1.115 | 1.324 | 1.099 | 1.250 | 1.039 | 1.099 | 0.824 | 0.472 |
| 20 | 1.060 | 1.279 | 1.093 | 1.307 | 1.103 | 1.305 | 1.093 | 1.261 | 1.041 | 1.189 | 1.086 | 0.875 | 0.475 |
| 18 | 1.299 | 1.130 | 1.320 | 1.100 | 1.302 | 1.083 | 1.277 | 1.046 | 1.210 | 1.020 | 1.012 | 0.727 | 0.379 |
| 16 | 1.101 | 1.316 | 1.107 | 1.290 | 1.075 | 1.249 | 1.038 | 1.202 | 0.999 | 1.069 | 0.770 | 0.471 |       |
| 14 | 1.313 | 1.106 | 1.312 | 1.077 | 1.262 | 1.036 | 1.200 | 0.989 | 1.116 | 0.980 | 0.548 |       |       |
| 12 | 1.089 | 1.299 | 1.095 | 1.251 | 1.037 | 1.197 | 1.001 | 1.124 | 0.917 | 0.876 | 0.533 |       |       |
| 10 | 1.258 | 1.057 | 1.249 | 1.033 | 1.203 | 0.979 | 1.117 | 0.920 | 0.921 | 0.669 | 0.358 |       |       |
| 8  | 1.001 | 1.186 | 1.033 | 1.182 | 1.014 | 1.071 | 0.989 | 0.885 | 0.672 | 0.389 |       |       |       |
| 6  | 1.084 | 0.920 | 1.093 | 1.080 | 1.007 | 0.774 | 0.656 | 0.547 | 0.357 |       |       |       |       |
| 4  | 0.768 | 0.893 | 0.819 | 0.870 | 0.704 | 0.452 |       |       |       |       |       |       |       |
| 2  | 0.437 | 0.462 | 0.477 | 0.475 | 0.384 |       |       |       |       |       |       |       |       |

**Figure D.4 Brunswick Unit 1 Cycle 17 Radial Power Distribution  
at 19,155.4 MWd/MTU (EOFP) (Continued)**

## **Distribution**

### **Controlled Distribution**

#### Richland

K. D. Hartley, 34  
T. E. Millsaps, 40  
J. L. Parker, 34

### **E-Mail Notification**

O. C. Brown  
D. G. Carr  
S. W. Evans  
M. E. Garrett  
D. R. Tinkler