ATTACHMENT 19

ANP-3372NP, Browns Ferry Unit 3 Cycle 19 EPU (120% OLTP) LAR Reference Fuel Cycle Design (Non-Proprietary)

Browns Ferry Unit 3 Cycle 19 EPU (120% OLTP) LAR Reference Fuel Cycle Design

ANP-3372NP
Revision 1

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AREVA Inc.

Nature of Changes

Item	Page	Description and Justification
1.	2-1	Correction of typographical error, Regulation changed to Regulatory.
2.	Various	Minor changes/removal of proprietary markings/words.

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Nomenclature

ACE	AREVA's advanced critical power correlation
BLEU	blended low enriched uranium
BOC	beginning of cycle
BOL	beginning of life
BWR	boiling water reactor
CGU	commercial grade uranium
CSDM	cold shutdown margin
EOC	end of cycle
EOFP	end of full power capability
EPU	extended power uprate
FFTR	final feedwater temperature reduction
GWd/MTU	gigawatt days per metric ton of initial uranium
HEXR	hot excess reactivity
LAR	licensing amendment request
LHGR	linear heat generation rate
MCPR	minimum critical power ratio
MICROBURN-B2	AREVA Inc. advanced BWR core simulator methodology with PPR capability
MWd/MTU	megawatt days per metric ton of initial uranium
NRC	Nuclear Regulatory Commission, U. S.
PLFR	part length fuel rod
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 power correlation

1.0 Introduction

AREVA Inc. (AREVA) has performed a fuel cycle design and fuel management calculations for the Browns Ferry Unit 3 Cycle 19 LAR* with ATRIUM™† 10XM fuel at EPU (120% OLTP) conditions. 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, utilizes the pin power reconstruction (PPR) model to determine the thermal margins presented in this report. The ACE critical power correlation (References 2 and 5) was utilized for the ATRIUM 10XM assemblies in the core. The SPCB critical power correlation (Reference 6) was utilized for the ATRIUM-10 assemblies in the core. The following MICROBURN-B2 modeling features are included in this analysis:

- Control blade B-10 depletion
- Explicit neutronic treatment of the spacer grids
- Explicit modeling of the PLFR plenums
- Explicit modeling of the water rod flow

Design results for the Cycle 19 reactor core loading including projected control rod patterns and evaluations of thermal and reactivity margins are presented. The Cycle 19 results are based on projected Cycle 18 core operation as summarized in Table 2.1.

* Browns Ferry Unit 3 Cycle 19 is used as a reference design for the EPU LAR. Use of Cycle 19 throughout this report refers to this reference fuel cycle design.

† ATRIUM is a trademark of AREVA Inc.

2.0 **Summary**

The Cycle 19 fresh batch size (352 assemblies) and batch average enrichment **[ ]** were determined to meet the energy requirements provided by Tennessee Valley Authority (TVA) (Reference 4). For a complete description of the fresh reload assemblies, see Reference 3. The loading of the Cycle 19 fuel as described in this report results in a projected Cycle 19 full power energy capability of 2,534±41 GWd (18,390±300 MWd/MTU). Beyond the full power capability, the cycle has been designed to achieve 172 GWd additional energy via FFTR and coast operation.

In order to obtain optimum operating flexibility, the projected control rod patterns for Cycle 19 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. The hot and cold target k-effs used in the design are provided in Table 3.2 and 3.3. 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 19 design. Figures 2.1 and 2.2 provide a summary of the cycle design step-through projection.

The peak rod average power was verified to not exceed 6.3 kW/ft at exposures of > 54 GWd/MTU (Regulatory Guide 1.183, footnote to Table 3).

Table 2.1 Browns Ferry Unit 3 Cycle 19 Energy and Key Results Summary

Cycle Energy, GWd (Cycle Exposure, MWd/MTU)	
Cycle 18	
• Best estimate depletion to Nominal EOC 18	2,390 (17,508)
• Short window EOC 18	2,318 (16,976)
• Long window EOC 18	2,439 (17,862)
Cycle 19	
• EOFP Energy	2,534±41 (18,390±300)
• FFTR and coast Energy	172 (1,246)
• EOC Energy	2,706±41 (19,636±300)

Key Results	
BOC CSDM, %Δk/k (based on short EOC 18)	1.17
Minimum CSDM, %Δk/k (based on short EOC 18)	1.17
Cycle Exposure of Minimum CSDM, MWd/MTU (short basis)	0
Moderator Temperature of Minimum CSDM, °F (short basis)	68
Cycle R Value, %Δk/k (short basis)	0.00
BOC CSDM, %Δk/k (based on nominal EOC 18)	1.46
Minimum CSDM, %Δk/k (based on nominal EOC 18)	1.46
Cycle Exposure of Minimum CSDM, MWd/MTU (nominal basis)	0
Moderator Temperature of Minimum CSDM, °F (nominal basis)	68
Cycle R Value, %Δk/k (nominal basis)	0.00
BOC CSDM, %Δk/k (based on long EOC 18)	1.66
Minimum CSDM, %Δk/k (based on long EOC 18)	1.66
Cycle Exposure of Minimum CSDM, MWd/MTU (long basis)	0
Moderator Temperature of Minimum CSDM, °F (long basis)	68
Cycle R Value, %Δk/k (long basis)	0.00
Minimum SLC SDM, %Δk/k (based on short EOC 18)	2.63
Cycle Exposure of Minimum SLC SDM, MWd/MTU (short basis)	0
Minimum SLC SDM, %Δk/k (based on nominal EOC 18)	2.96
Cycle Exposure of Minimum SLC SDM, MWd/MTU (nominal basis)	0
Minimum SLC SDM, %Δk/k (based on long EOC 18)	3.20
Cycle Exposure of Minimum SLC SDM, MWd/MTU (long basis)	0

Table 2.1 Browns Ferry Unit 3 Cycle 19 Energy and Key Results Summary *(Continued)*

Key Results	
BOC HEXR, %Δk/k (based on short EOC 18)	1.64
Maximum HEXR, %Δk/k (based on short EOC 18)	1.70
Cycle Exposure of Maximum HEXR, MWd/MTU (short basis)	13,400
BOC HEXR, %Δk/k (based on nominal EOC 18)	1.34
Maximum HEXR, %Δk/k (based on nominal EOC 18)	1.41
Cycle Exposure of Maximum HEXR, MWd/MTU (nominal basis)	13,400
BOC HEXR, %Δk/k (based on long EOC 18)	1.12
Maximum HEXR, %Δk/k (based on long EOC 18)	1.20
Cycle Exposure of Maximum HEXR, MWd/MTU (long basis)	13,400
Minimum MAPLHGR Margin, %	17.8
Exposure of Minimum MAPLHGR Margin, MWd/MTU	9,459
Minimum LHGR Margin, %	12.6
Exposure of Minimum LHGR Margin, MWd/MTU	18,051
Minimum CPR Margin, %	8.4
Exposure of Minimum CPR Margin, MWd/MTU	16,836

Table 2.2 Browns Ferry Unit 3 Cycle 19 Fuel Cycle Design Assembly ID Range by Nuclear Fuel Type

Nuclear Fuel Type	Number of Assemblies	Assembly ID Range
14	1	FCE190
16	67	FCF301-FCF460
17	14	FCF493-FCF510
18	26	FCF557-FCF588
19	88	FCG001-FCG088
20	152	FCG201-FCG352
21	64	FCG401-FCG464
22	224	FCH001-FCH224
23	96	FCH301-FCH396
24	32	FCH501-FCH532

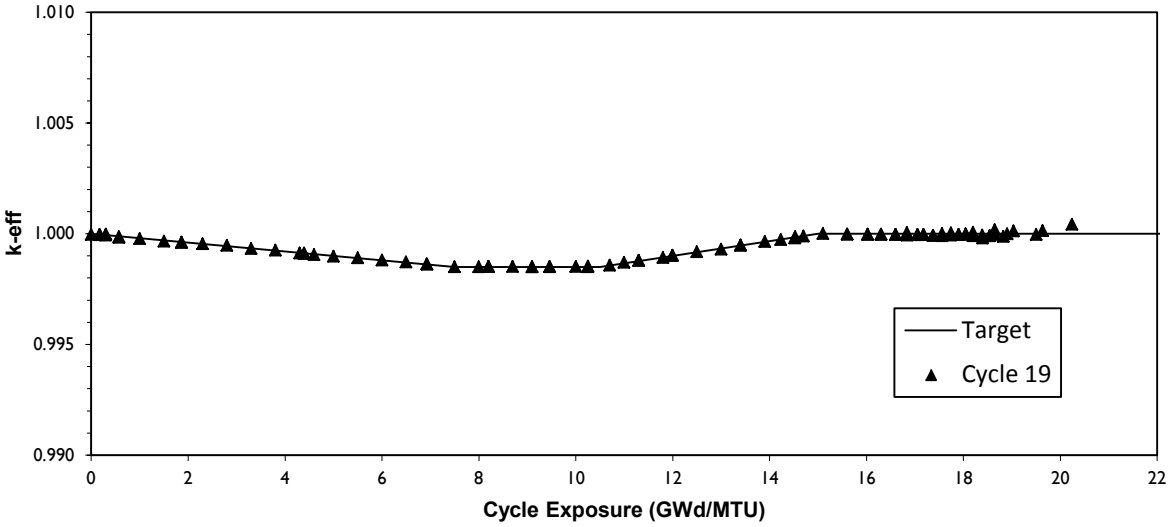

Figure 2.1 Browns Ferry Unit 3 Cycle 19 Design Step-Through k-eff versus Cycle Exposure

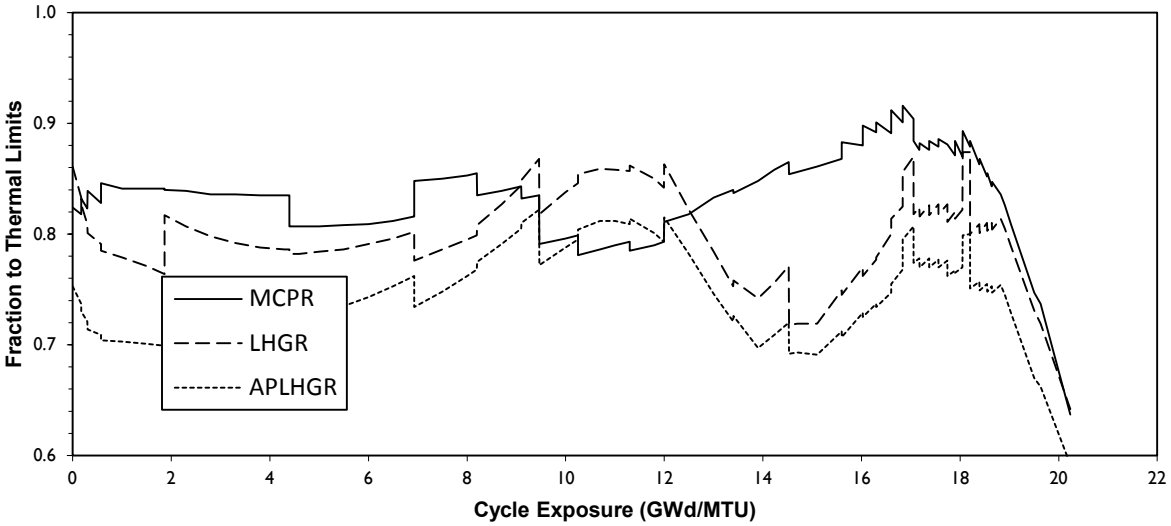

Figure 2.2 Browns Ferry Unit 3 Cycle 19 Design Margin to Thermal Limits versus Cycle Exposure

3.0 Cycle 19 Fuel Cycle Design

3.1 *General Description*

The assembly design for the Cycle 19 BFE3-19 LAR fresh reload fuel for Browns Ferry Unit 3 is described in detail in Reference 3. Elevation views of the fresh reload fuel design axial enrichment and gadolinia distributions are shown in Appendix B, Figures B.1 through B.3. The loading pattern maintains full core 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 19 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 19 is provided in Appendix C. Key results for the cycle are summarized in Table 2.1. The Cycle 19 BFE3-19 LAR fresh reload fuel assumes the use of BLEU material for one fuel type to account for about 30% of the fresh reload assemblies. This was done to account for the possibility that limited supplies of BLEU material may become available after the current inventory is exhausted.

3.2 *Control Rod Patterns and Thermal Limits*

Projected control rod patterns for Cycle 19 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 and meet the required design margin to thermal limits from Reference 4. A detailed summary of the core parameters resulting from the step-through projection analysis is provided 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 19 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. Projected control rod patterns near EOC18 are shown in Appendix E.

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 19 is in conformance with the Technical Specification limit of R + 0.38 %Δk/k at BOC. The cold target k-eff versus exposure determined to be appropriate for calculation of cold shutdown margin in Cycle 19 is shown in Table 3.3. The core hot excess reactivity was calculated at full power with all rods out, 102.5 Mlb/hr core flow, with equilibrium xenon. Tables 3.4 through 3.6 summarize the Cycle 19 reactivity margins versus cycle exposure, including the SLC shutdown margin for the cycle.

Table 3.1 Cycle 19 Core Composition and Design Parameters

Fuel Description	Cycle Loaded	Nuclear Fuel Type	Number of Assemblies
ATRIUM-10 **[ ]**	16	14	1
ATRIUM-10 **[ ]**	17	16	67
ATRIUM-10 **[ ]**	17	17	14
ATRIUM-10 **[ ]**	17	18	26
ATRIUM 10XM **[ ]**	18	19	88
ATRIUM 10XM **[ ]**	18	20	152
ATRIUM 10XM **[ ]**	18	21	64
ATRIUM 10XM **[ ]**	19	22	224
ATRIUM 10XM **[ ]**	19	23	96
ATRIUM 10XM **[ ]**	19	24	32

Number of Fuel Assemblies in Core	764
Total Number of Fresh Assemblies	352
Total Core Mass, MTU	137.79
Rated Thermal Power Level, MW_t	3,952
Rated Core Flow, Mlb/hr	102.5
Reference Pressure, psia	1,050*
Reference Inlet Subcooling, Btu/lbm	26.94†

* 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.

Table 3.2 Browns Ferry Unit 3 Cycle 19 Hot Operating Target k-eff versus Cycle Exposure

Cycle Exposure (MWd/MTU)	Hot Operating k-eff*
0.0	1.0000
7,500.0	0.9985
10,500.0	0.9985
15,000.0	1.0000
25,000.0	1.0000

Table 3.3 Browns Ferry Unit 3 Cycle 19 Cold Critical Target k-eff versus Cycle Exposure

Cycle Exposure (MWd/MTU)	Cold Critical k-eff*
0.0	0.9940
25,000.0	0.9940

* Values are linearly interpolated between cycle exposure points.

Table 3.4 Browns Ferry Unit 3 Cycle 19 Reactivity Margin Summary (Short EOC18)

Cycle Exposure (MWd/MTU)	Cold Shutdown Margin* (% Δk/k)	SLC Cold Shutdown Margin† (% Δk/k)	Hot Excess Reactivity (% Δk/k)
0	1.17	2.63	1.64
175	1.35	2.81	1.58
1,000	1.92	3.27	1.37
2,300	2.37	3.57	1.34
3,300	2.69	3.82	1.30
4,398	2.97	4.11	1.26
5,500	3.16	4.35	1.23
6,500	3.30	4.52	1.24
7,500	3.42	4.64	1.28
8,200	3.48	4.71	1.31
9,464	3.55	4.76	1.41
10,250	3.47	4.75	1.49
11,300	3.33	4.68	1.59
11,800	3.28	4.65	1.63
12,500	3.21	4.62	1.67
13,400	3.12	4.64	1.70
14,528	**2.80**	4.78	1.66
15,600	**2.59**	5.09	1.50
16,600	**2.48**	5.56	1.17
17,375	**2.46**	6.03	0.75
18,390	**2.43**	6.50	0.07
19,636	**2.62**	7.03	--

* Values in **BOLD** are limiting values at elevated moderator temperatures.

† Calculated at 366.0 °F ARO conditions.

Table 3.5 Browns Ferry Unit 3 Cycle 19 Reactivity Margin Summary (Nominal EOC18)

Cycle Exposure (MWd/MTU)	Cold Shutdown Margin* (% Δk/k)	SLC Cold Shutdown Margin† (% Δk/k)	Hot Excess Reactivity (% Δk/k)
0	1.46	2.96	1.34
175	1.65	3.16	1.27
1,000	2.25	3.63	1.05
2,300	2.71	3.92	1.03
3,300	3.03	4.15	1.00
4,398	3.24	4.43	0.95
5,500	3.44	4.65	0.94
6,500	3.57	4.79	0.95
7,500	3.67	4.92	0.99
8,200	3.73	4.98	1.03
9,464	3.75	5.02	1.13
10,250	3.64	4.99	1.21
11,300	3.51	4.93	1.30
11,800	3.47	4.90	1.34
12,500	3.43	4.87	1.38
13,400	3.33	4.89	1.41
14,528	**3.06**	5.02	1.39
15,600	**2.79**	5.31	1.26
16,600	**2.65**	5.76	0.96
17,375	**2.62**	6.21	0.57
18,390	**2.58**	6.68	-0.11
19,636	**2.76**	7.19	--

* Values in **BOLD** are limiting values at elevated moderator temperatures.

† Calculated at 366.0 °F ARO conditions.

Table 3.6 Browns Ferry Unit 3 Cycle 19 Reactivity Margin Summary (Long EOC18)

Cycle Exposure (MWd/MTU)	Cold Shutdown Margin* (% Δk/k)	SLC Cold Shutdown Margin† (% Δk/k)	Hot Excess Reactivity (% Δk/k)
0	1.66	3.20	1.12
175	1.88	3.40	1.05
1,000	2.49	3.87	0.83
2,300	2.94	4.14	0.81
3,300	3.24	4.37	0.79
4,398	3.44	4.61	0.75
5,500	3.62	4.82	0.74
6,500	3.77	4.98	0.76
7,500	3.87	5.10	0.80
8,200	3.92	5.15	0.84
9,464	3.86	5.18	0.94
10,250	3.74	5.14	1.02
11,300	3.64	5.08	1.10
11,800	3.60	5.04	1.13
12,500	3.56	5.03	1.17
13,400	3.48	5.05	1.20
14,528	**3.22**	5.17	1.20
15,600	**2.94**	5.45	1.10
16,600	**2.80**	5.89	0.83
17,375	**2.75**	6.34	0.45
18,390	**2.69**	6.79	-0.22
19,636	**2.85**	7.30	--

* Values in **BOLD** are limiting values at elevated moderator temperatures.

† Calculated at 366.0 °F ARO conditions.

	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29
60									FCF508	FCF329	FCF302	FCF382	FCF507	FCF574	FCF582
58								FCF565	FCF438	FCG010	FCG018	FCG074	FCG002	FCG026	FCH502
56						FCF365	FCF405	FCG042	FCH318	FCH382	FCH342	FCH334	FCG034	FCH042	FCG066
54						FCF412	FCG082	FCH310	FCG234	FCH326	FCG266	FCH358	FCH374	FCH390	FCH210
52					FCF493	FCF454	FCH510	FCG050	FCH518	FCH302	FCH526	FCH186	FCG418	FCH026	FCG330
50			FCF430	FCF410	FCF453	FCG057	FCH350	FCH366	FCH178	FCG282	FCH058	FCG298	FCH130	FCG410	FCH170
48			FCF389	FCG081	FCH509	FCH349	FCG058	FCH090	FCG210	FCH098	FCG442	FCH002	FCG242	FCH010	FCG450
46		FCF358	FCG041	FCH309	FCG049	FCH365	FCH089	FCG289	FCH018	FCG426	FCH066	FCG274	FCH106	FCG314	FCH194
44	FCF558	FCF437	FCH317	FCG233	FCH517	FCH177	FCG209	FCH017	FCG290	FCH122	FCG338	FCH050	FCG306	FCH034	FCG218
42	FCF330	FCG009	FCH381	FCH325	FCH301	FCG281	FCH097	FCG425	FCH121	FCG401	FCH146	FCG346	FCH162	FCG202	FCH202
40	FCF301	FCG017	FCH341	FCG265	FCH525	FCH057	FCG441	FCH065	FCG250	FCH145	FCG249	FCH082	FCG458	FCH114	FCG258
38	FCF381	FCG073	FCH333	FCH357	FCH185	FCG297	FCH001	FCG273	FCH049	FCG345	FCH081	FCG225	FCH154	FCG434	FCH218
36	FCF396	FCG001	FCG033	FCH373	FCG417	FCH129	FCG241	FCH105	FCG305	FCH161	FCG457	FCH153	FCG226	FCH138	FCG322
34	FCF573	FCG025	FCH041	FCH389	FCH025	FCG409	FCH009	FCG313	FCH033	FCG201	FCH113	FCG433	FCH137	FCG337	FCH074
32	FCF581	FCH501	FCG065	FCH209	FCG329	FCH169	FCG449	FCH193	FCG217	FCH201	FCG257	FCH217	FCG321	FCH073	FCG402
30	FCF588	FCH508	FCG072	FCH216	FCG336	FCH176	FCG456	FCH200	FCG224	FCH208	FCG264	FCH224	FCG328	FCH080	FCG408
28	FCF580	FCG032	FCH048	FCH396	FCH032	FCG416	FCH016	FCG320	FCH040	FCG208	FCH120	FCG440	FCH144	FCG343	FCH079
26	FCF392	FCG008	FCG040	FCH380	FCG424	FCH136	FCG248	FCH112	FCG312	FCH168	FCG464	FCH160	FCG232	FCH143	FCG327
24	FCF388	FCG080	FCH340	FCH364	FCH192	FCG304	FCH008	FCG280	FCH056	FCG352	FCH088	FCG231	FCH159	FCG439	FCH223
22	FCF308	FCG024	FCH348	FCG272	FCH532	FCH064	FCG448	FCH072	FCG344	FCH152	FCG255	FCH087	FCG463	FCH119	FCG263
20	FCF331	FCG016	FCH388	FCH332	FCH308	FCG288	FCH104	FCG432	FCH128	FCG407	FCH151	FCG351	FCH167	FCG207	FCH207
18	FCF499	FCF444	FCH324	FCG240	FCH524	FCH184	FCG216	FCH024	FCG296	FCH127	FCG256	FCH055	FCG311	FCH039	FCG223
16		FCF509	FCG048	FCH316	FCG056	FCH372	FCH096	FCG295	FCH023	FCG431	FCH071	FCG279	FCH111	FCG319	FCH199
14			FCF408	FCG088	FCH516	FCH356	FCG064	FCH095	FCG215	FCH103	FCG447	FCH007	FCG247	FCH015	FCG455
12			FCF372	FCF557	FCF460	FCG063	FCH355	FCH371	FCH183	FCG287	FCH063	FCG303	FCH135	FCG415	FCH175
10					FCF569	FCF459	FCH515	FCG055	FCH523	FCH307	FCH531	FCH191	FCG423	FCH031	FCG335
8						FCF564	FCG087	FCH315	FCG239	FCH331	FCG271	FCH363	FCH379	FCH395	FCH215
6						FCF436	FCF332	FCG047	FCH323	FCH387	FCH347	FCH339	FCG039	FCH047	FCG071
4								FCF364	FCF443	FCG015	FCG023	FCG079	FCG007	FCG031	FCH507
2									FCF563	FCF390	FCF307	FCF387	FCF393	FCF579	FCF587

Figure 3.1 Browns Ferry Unit 3 Cycle 19 Reference Loading Pattern

	31	33	35	37	39	41	43	45	47	49	51	53	55	57	59
60	FCF583	FCF575	FCF503	FCF383	FCF303	FCF406	FCF395								
58	FCH503	FCG027	FCG003	FCG075	FCG019	FCG011	FCF439	FCF559							
56	FCG067	FCH043	FCG035	FCH335	FCH343	FCH383	FCH319	FCG043	FCF411	FCF432					
54	FCH211	FCH391	FCH375	FCH359	FCG267	FCH327	FCG235	FCH311	FCG083	FCF560	FCF506				
52	FCG331	FCH027	FCG419	FCH187	FCH527	FCH303	FCH519	FCG051	FCH511	FCF455	FCF456	FCF495	FCF360		
50	FCH171	FCG411	FCH131	FCG299	FCH059	FCG283	FCH179	FCH367	FCH351	FCG059	FCH512	FCG084	FCF327		
48	FCG451	FCH011	FCG243	FCH003	FCG443	FCH099	FCG211	FCH091	FCG060	FCH352	FCG052	FCH312	FCG044	FCF417	
46	FCH195	FCG315	FCH107	FCG275	FCH067	FCG427	FCH019	FCG291	FCH092	FCH368	FCH520	FCG236	FCH320	FCF440	FCF391
44	FCG219	FCH035	FCG307	FCH051	FCG252	FCH123	FCG292	FCH020	FCG212	FCH180	FCH304	FCH328	FCH384	FCG012	FCF328
42	FCH203	FCG203	FCH163	FCG347	FCH147	FCG403	FCH124	FCG428	FCH100	FCG284	FCH528	FCG268	FCH344	FCG020	FCF304
40	FCG259	FCH115	FCG459	FCH083	FCG251	FCH148	FCG340	FCH068	FCG444	FCH060	FCH188	FCH360	FCH336	FCG076	FCF384
38	FCH219	FCG435	FCH155	FCG227	FCH084	FCG348	FCH052	FCG276	FCH004	FCG300	FCH132	FCG420	FCH376	FCG036	FCG004	FCF505
36	FCG323	FCH139	FCG228	FCH156	FCG460	FCH164	FCG308	FCH108	FCG244	FCH132	FCG412	FCH028	FCH392	FCH044	FCG028	FCF576
34	FCH075	FCG339	FCH140	FCG436	FCH116	FCG204	FCH036	FCG316	FCH012	FCG412	FCH028	FCH392	FCH044	FCG028	FCF576
32	FCG404	FCH076	FCG324	FCH220	FCG260	FCH204	FCG220	FCH196	FCG452	FCH172	FCG332	FCH212	FCG068	FCH504	FCF584
30	FCG406	FCH077	FCG325	FCH221	FCG261	FCH205	FCG221	FCH197	FCG453	FCH173	FCG333	FCH213	FCG069	FCH505	FCF585
28	FCH078	FCG341	FCH141	FCG437	FCH117	FCG205	FCH037	FCG317	FCH013	FCG413	FCH029	FCH393	FCH045	FCG029	FCF577
26	FCG326	FCH142	FCG230	FCH157	FCG461	FCH165	FCG309	FCH109	FCG245	FCH133	FCG421	FCH377	FCG037	FCG005	FCF501
24	FCH222	FCG438	FCH158	FCG229	FCH085	FCG349	FCH053	FCG277	FCH005	FCG301	FCH189	FCH361	FCH337	FCG077	FCF385
22	FCG262	FCH118	FCG462	FCH086	FCG253	FCH149	FCG254	FCH069	FCG445	FCH061	FCH529	FCG269	FCH345	FCG021	FCF305
20	FCH206	FCG206	FCH166	FCG350	FCH150	FCG405	FCH125	FCG429	FCH101	FCG285	FCH305	FCH329	FCH385	FCG013	FCF407
18	FCG222	FCH038	FCG310	FCH054	FCG342	FCH126	FCG294	FCH021	FCG213	FCH181	FCH521	FCG237	FCH321	FCF441	FCF369
16	FCH198	FCG318	FCH110	FCG278	FCH070	FCG430	FCH022	FCG293	FCH093	FCH369	FCG053	FCH313	FCG045	FCF510	
14	FCG454	FCH014	FCG246	FCH006	FCG446	FCH102	FCG214	FCH094	FCG062	FCH353	FCH513	FCG085	FCF326		
12	FCH174	FCG414	FCH134	FCG302	FCH062	FCG286	FCH182	FCH370	FCH354	FCG061	FCF457	FCF561	FCF434		
10	FCG334	FCH030	FCG422	FCH190	FCH530	FCH306	FCH522	FCG054	FCH514	FCF458	FCF394				
8	FCH214	FCH394	FCH378	FCH362	FCG270	FCH330	FCG238	FCH314	FCG086	FCF497					
6	FCG070	FCH046	FCG038	FCH338	FCH346	FCH386	FCH322	FCG046	FCF325	FCF562					
4	FCH506	FCG030	FCG006	FCG078	FCG022	FCG014	FCF442	FCF502							
2	FCF586	FCF578	FCE190	FCF386	FCF306	FCF409	FCF504								

Figure 3.1 Browns Ferry Unit 3 Cycle 19 Reference Loading Pattern *(Continued)*

	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29
60									17	16	16	16	17	18	18
									41.1	38.1	36.9	35.9	36.0	35.3	31.9
58	Nuclear Fuel Type							18	16	19	19	19	19	19	24
	BOC Exposure (GWd/MTU)							41.2	34.1	17.9	17.2	21.4	21.4	20.3	0.0
56						16	16	19	23	23	23	23	19	22	19
						41.0	37.9	21.5	0.0	0.0	0.0	0.0	17.8	0.0	20.9
54						16	19	23	20	23	20	23	23	23	22
						37.9	22.1	0.0	22.0	0.0	23.1	0.0	0.0	0.0	0.0
52					17	16	24	19	24	23	24	22	21	22	20
					39.5	31.8	0.0	22.0	0.0	0.0	0.0	0.0	23.7	0.0	23.2
50			16	16	16	19	23	23	22	20	22	20	22	21	22
			40.4	37.7	32.4	19.6	0.0	0.0	0.0	24.0	0.0	24.0	0.0	23.3	0.0
48			16	19	24	23	19	22	20	22	21	22	20	22	21
			37.2	21.9	0.0	0.0	19.6	0.0	22.4	0.0	24.1	0.0	22.9	0.0	22.3
46		16	19	23	19	23	22	20	22	21	22	20	22	20	22
		41.6	21.4	0.0	21.9	0.0	0.0	21.9	0.0	22.7	0.0	22.8	0.0	21.9	0.0
44	18	16	23	20	24	22	20	22	20	22	20	22	20	22	20
	41.0	34.3	0.0	21.9	0.0	0.0	21.8	0.0	22.0	0.0	23.0	0.0	22.6	0.0	22.1
42	16	19	23	23	23	20	22	21	22	21	22	20	22	20	22
	38.8	17.8	0.0	0.0	0.0	24.0	0.0	21.9	0.0	23.8	0.0	20.2	0.0	23.3	0.0
40	16	19	23	20	24	22	21	22	20	22	20	22	21	22	20
	37.4	17.2	0.0	23.1	0.0	0.0	24.0	0.0	21.0	0.0	20.9	0.0	22.8	0.0	22.7
38	16	19	23	23	22	20	22	20	22	20	22	20	22	21	22
	36.1	21.3	0.0	0.0	0.0	24.0	0.0	22.6	0.0	20.2	0.0	22.7	0.0	23.4	0.0
36	16	19	19	23	21	22	20	22	20	22	21	22	20	22	20
	36.9	21.3	18.0	0.0	23.4	0.0	23.2	0.0	22.2	0.0	22.6	0.0	22.8	0.0	23.6
34	18	19	22	23	22	21	22	20	22	20	22	21	22	20	22
	34.9	20.4	0.0	0.0	0.0	22.3	0.0	21.9	0.0	23.1	0.0	23.4	0.0	22.9	0.0
32	18	24	19	22	20	22	21	22	20	22	20	22	20	22	21
	32.1	0.0	20.8	0.0	23.1	0.0	22.8	0.0	23.4	0.0	22.6	0.0	23.4	0.0	23.7

Fuel Type	Description	Cycle Loaded	No. Per Quarter core
14	[ ]	16	0
16	[ ]	17	18
17	[ ]	17	3
18	[ ]	17	6
19	[ ]	18	22
20	[ ]	18	38
21	[ ]	18	16
22	[ ]	19	56
23	[ ]	19	24
24	[ ]	19	8

Figure 3.2 Browns Ferry Unit 3 Cycle 19 Upper Left Quarter Core Layout by Fuel Type

	31	33	35	37	39	41	43	45	47	49	51	53	55	57	59
60	18	18	17	16	16	16	16								
	32.4	35.5	36.1	35.8	36.7	37.7	37.9								
58	24	19	19	19	19	19	16	18			Nuclear Fuel Type				
	0.0	20.4	21.3	21.2	17.1	17.8	34.2	41.3			BOC Exposure (GWd/MTU)				
56	19	22	19	23	23	23	23	19	16	16					
	20.7	0.0	17.9	0.0	0.0	0.0	0.0	21.4	37.7	40.9					
54	22	23	23	23	20	23	20	23	19	18					
	0.0	0.0	0.0	0.0	23.0	0.0	21.9	0.0	22.1	40.6					
52	20	22	21	22	24	23	24	19	24	16	17				
	23.1	0.0	23.6	0.0	0.0	0.0	0.0	21.9	0.0	32.4	41.2				
50	22	21	22	20	22	20	22	23	23	19	16	17	16		
	0.0	23.2	0.0	23.9	0.0	23.9	0.0	0.0	0.0	19.5	31.9	39.8	41.3		
48	21	22	20	22	21	22	20	22	19	23	24	19	16		
	22.3	0.0	22.8	0.0	24.0	0.0	22.3	0.0	19.4	0.0	0.0	21.6	38.5		
46	22	20	22	20	22	21	22	20	22	23	19	23	19	16	
	0.0	21.9	0.0	22.7	0.0	22.6	0.0	21.9	0.0	0.0	21.6	0.0	21.4	41.2	
44	20	22	20	22	20	22	20	22	20	22	24	20	23	16	16
	22.0	0.0	22.6	0.0	20.6	0.0	21.8	0.0	21.6	0.0	0.0	21.8	0.0	34.2	37.8
42	22	20	22	20	22	21	22	21	22	20	23	23	23	19	16
	0.0	23.2	0.0	20.2	0.0	23.7	0.0	21.7	0.0	23.9	0.0	0.0	0.0	17.8	37.6
40	20	22	21	22	20	22	20	22	21	22	24	20	23	19	16
	22.6	0.0	22.6	0.0	20.9	0.0	22.8	0.0	23.8	0.0	0.0	23.0	0.0	17.0	37.4
38	22	21	22	20	22	20	22	20	22	20	22	23	23	19	16
	0.0	23.3	0.0	22.7	0.0	19.9	0.0	22.5	0.0	23.9	0.0	0.0	0.0	21.2	36.0
36	20	22	20	22	21	22	20	22	20	22	21	23	19	19	17
	23.4	0.0	22.7	0.0	22.4	0.0	22.0	0.0	23.2	0.0	23.3	0.0	17.6	21.3	35.8
34	22	20	22	21	22	20	22	20	22	21	22	23	22	19	18
	0.0	22.9	0.0	23.4	0.0	23.0	0.0	21.9	0.0	22.1	0.0	0.0	0.0	19.9	35.5
32	21	22	20	22	20	22	20	22	21	22	20	22	19	24	18
	23.8	0.0	23.2	0.0	22.6	0.0	23.4	0.0	22.7	0.0	23.0	0.0	20.6	0.0	32.0

Fuel Type	Description	Cycle Loaded	No. Per Quarter core
14	[ ]	16	0
16	[ ]	17	17
17	[ ]	17	4
18	[ ]	17	6
19	[ ]	18	22
20	[ ]	18	38
21	[ ]	18	16
22	[ ]	19	56
23	[ ]	19	24
24	[ ]	19	8

Figure 3.3 Browns Ferry Unit 3 Cycle 19 Upper Right Quarter Core Layout by Fuel Type

	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29
30	18	24	19	22	20	22	21	22	20	22	20	22	20	22	21
	31.9	0.0	20.6	0.0	23.1	0.0	22.8	0.0	23.4	0.0	22.6	0.0	23.2	0.0	23.8
28	18	19	22	23	22	21	22	20	22	20	22	21	22	20	22
	35.4	19.9	0.0	0.0	0.0	22.1	0.0	21.9	0.0	23.0	0.0	23.4	0.0	22.9	0.0
26	16	19	19	23	21	22	20	22	20	22	21	22	20	22	20
	37.0	21.3	17.5	0.0	23.3	0.0	23.2	0.0	22.1	0.0	22.5	0.0	22.7	0.0	23.4
24	16	19	23	23	22	20	22	20	22	20	22	20	22	21	22
	35.8	21.2	0.0	0.0	0.0	23.9	0.0	22.5	0.0	19.8	0.0	22.7	0.0	23.3	0.0
22	16	19	23	20	24	22	21	22	20	22	20	22	21	22	20
	37.3	17.0	0.0	23.0	0.0	0.0	23.8	0.0	22.8	0.0	20.9	0.0	22.7	0.0	22.6
20	16	19	23	23	23	20	22	21	22	21	22	20	22	20	22
	38.5	17.8	0.0	0.0	0.0	24.0	0.0	21.8	0.0	23.7	0.0	20.3	0.0	23.2	0.0
18	17	16	23	20	24	22	20	22	20	22	20	22	20	22	20
	39.8	34.0	0.0	21.9	0.0	0.0	21.6	0.0	21.8	0.0	20.6	0.0	22.6	0.0	22.0
16		17	19	23	19	23	22	20	22	21	22	20	22	20	22
		41.1	21.4	0.0	21.6	0.0	0.0	21.9	0.0	22.6	0.0	22.7	0.0	21.9	0.0
14			16	19	24	23	19	22	20	22	21	22	20	22	21
			38.0	21.6	0.0	0.0	19.3	0.0	22.3	0.0	24.0	0.0	22.8	0.0	22.3
12			16	18	16	19	23	23	22	20	22	20	22	21	22
			41.1	40.4	31.8	19.5	0.0	0.0	0.0	23.9	0.0	23.9	0.0	23.2	0.0
10					18	16	24	19	24	23	24	22	21	22	20
					41.2	32.4	0.0	21.9	0.0	0.0	0.0	0.0	23.6	0.0	23.1
8						18	19	23	20	23	20	23	23	23	22
						40.5	22.1	0.0	22.0	0.0	23.0	0.0	0.0	0.0	0.0
6						16	16	19	23	23	23	23	19	22	19
						40.8	37.6	21.3	0.0	0.0	0.0	0.0	17.9	0.0	20.7
4	Nuclear Fuel Type							16	16	19	19	19	19	19	24
	BOC Exposure (GWd/MTU)							41.3	34.3	17.7	17.0	21.2	21.3	20.4	0.0
2									18	16	16	16	16	18	18
									41.3	37.8	36.6	35.7	37.1	35.5	32.5

Fuel Type	Description	Cycle Loaded	No. Per Quarter core
14	[ ]	16	0
16	[ ]	17	17
17	[ ]	17	2
18	[ ]	17	8
19	[ ]	18	22
20	[ ]	18	38
21	[ ]	18	16
22	[ ]	19	56
23	[ ]	19	24
24	[ ]	19	8

Figure 3.4 Browns Ferry Unit 3 Cycle 19 Lower Left Quarter Core Layout by Fuel Type

	31	33	35	37	39	41	43	45	47	49	51	53	55	57	59
30	21	22	20	22	20	22	20	22	21	22	20	22	19	24	18
	23.7	0.0	23.3	0.0	22.6	0.0	23.4	0.0	22.8	0.0	23.1	0.0	20.8	0.0	32.4
28	22	20	22	21	22	20	22	20	22	21	22	23	22	19	18
	0.0	22.9	0.0	23.4	0.0	23.1	0.0	21.9	0.0	22.3	0.0	0.0	0.0	20.4	35.1
26	20	22	20	22	21	22	20	22	20	22	21	23	19	19	17
	23.6	0.0	22.8	0.0	22.6	0.0	22.1	0.0	23.2	0.0	23.4	0.0	18.2	21.4	35.7
24	22	21	22	20	22	20	22	20	22	20	22	23	23	19	16
	0.0	23.3	0.0	22.7	0.0	20.2	0.0	22.6	0.0	24.0	0.0	0.0	0.0	21.3	35.9
22	20	22	21	22	20	22	20	22	21	22	24	20	23	19	16
	22.6	0.0	22.8	0.0	21.0	0.0	21.2	0.0	24.0	0.0	0.0	23.1	0.0	17.1	37.4
20	22	20	22	20	22	21	22	21	22	20	23	23	23	19	16
	0.0	23.3	0.0	20.5	0.0	23.8	0.0	22.0	0.0	24.0	0.0	0.0	0.0	17.9	37.8
18	20	22	20	22	20	22	20	22	20	22	24	20	23	16	16
	22.0	0.0	22.6	0.0	23.0	0.0	22.0	0.0	21.7	0.0	0.0	21.9	0.0	34.2	41.0
16	22	20	22	20	22	21	22	20	22	23	19	23	19	17	
	0.0	21.9	0.0	22.8	0.0	22.8	0.0	21.9	0.0	0.0	21.9	0.0	21.4	41.2	
14	21	22	20	22	21	22	20	22	19	23	24	19	16		
	22.3	0.0	22.8	0.0	24.1	0.0	22.3	0.0	19.8	0.0	0.0	21.9	38.3		
12	22	21	22	20	22	20	22	23	23	19	16	18	16		
	0.0	23.3	0.0	24.0	0.0	24.0	0.0	0.0	0.0	19.6	32.4	40.2	40.5		
10	20	22	21	22	24	23	24	19	24	16	16				
	23.2	0.0	23.7	0.0	0.0	0.0	0.0	22.1	0.0	32.5	38.1				
8	22	23	23	23	20	23	20	23	19	17					
	0.0	0.0	0.0	0.0	23.1	0.0	22.0	0.0	22.3	39.6					
6	19	22	19	23	23	23	23	19	16	18					
	20.9	0.0	18.3	0.0	0.0	0.0	0.0	21.4	38.1	41.2					
4	24	19	19	19	19	19	16	17							
	0.0	20.7	21.3	21.4	17.3	17.9	34.4	40.9							
2	18	18	14	16	16	16	17								
	32.7	35.5	34.9	36.0	36.9	37.9	41.2								

Nuclear Fuel Type
BOC Exposure (GWd/MTU)

Fuel Type	Description	Cycle Loaded	No. Per Quarter core
14	[ ]	16	1
16	[ ]	17	15
17	[ ]	17	5
18	[ ]	17	6
19	[ ]	18	22
20	[ ]	18	38
21	[ ]	18	16
22	[ ]	19	56
23	[ ]	19	24
24	[ ]	19	8

Figure 3.5 Browns Ferry Unit 3 Cycle 19 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. ANP-10298PA Revision 0, *ACE/ATRIUM 10XM Critical Power Correlation*, AREVA NP, March 2010.

3. ANP-3343P Revision 0, *Nuclear Fuel Design Report Browns Ferry EPU (120% OLTP) Equilibrium Cycle ATRIUM 10XM Fuel,* AREVA Inc., October 2014.

4. BFE-3706 Revision 0, *Browns Ferry Unit 3 EPU Transition Energy Plan,* TVA, October 2014. (38-9226272-001)

5. ANP-3140(P) Revision 0, *Browns Ferry Units 1, 2, and 3 Improved K-factor Model for ACE/ATRIUM 10XM Critical Power Correlation,* AREVA NP, August 2012.

6. EMF-2209(P)(A) Revision 3, *SPCB Critical Power Correlation,* AREVA NP, September 2009.

Appendix A Browns Ferry Unit 3 Cycle 19 Step-Through Depletion Summary, Control Rod Patterns and Core Average Axial Power and Exposure Distributions

Table A.1 Browns Ferry Unit 3 Cycle 19 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	0.99996	5.59	3952.0	103.32	1050.04	26.71	0.480	1.736	12.15	9.05
0.175	0.99997	5.59	3952.0	106.50	1050.04	25.84	0.471	1.748	11.75	8.79
0.176	0.99995	5.41	3952.0	102.50	1050.04	26.94	0.475	1.720	11.66	8.71
0.300	0.99993	5.41	3952.0	106.29	1050.04	25.90	0.466	1.738	11.41	8.58
0.301	0.99998	5.23	3952.0	102.50	1050.04	26.94	0.470	1.704	11.29	8.49
0.575	0.99983	5.23	3952.0	106.50	1050.04	25.84	0.461	1.726	11.15	8.41
0.576	0.99987	5.14	3952.0	104.14	1050.04	26.48	0.463	1.691	11.07	8.36
1.000	0.99977	5.14	3952.0	105.78	1050.04	26.03	0.459	1.700	10.99	8.34
1.500	0.99966	5.14	3952.0	105.78	1050.04	26.03	0.458	1.700	10.87	8.32
1.864	0.99960	5.14	3952.0	105.78	1050.04	26.03	0.457	1.701	10.77	8.29
1.865	0.99962	4.86	3952.0	103.53	1050.04	26.65	0.466	1.702	11.52	8.88
2.300	0.99954	4.86	3952.0	103.73	1050.04	26.59	0.463	1.705	11.37	8.83
2.800	0.99947	4.86	3952.0	104.24	1050.04	26.45	0.461	1.710	11.25	8.81
3.300	0.99933	4.86	3952.0	104.55	1050.04	26.37	0.459	1.711	11.17	8.80
3.800	0.99926	4.86	3952.0	105.06	1050.04	26.23	0.456	1.712	11.11	8.81
4.300	0.99913	4.86	3952.0	105.27	1050.04	26.17	0.455	1.713	11.08	8.85
4.396	0.99913	4.86	3952.0	105.27	1050.04	26.17	0.454	1.713	11.08	8.87
4.398	0.99910	4.91	3952.0	106.50	1050.04	25.84	0.453	1.772	11.02	8.74
4.600	0.99906	4.91	3952.0	106.50	1050.04	25.84	0.453	1.772	11.03	8.77
5.000	0.99898	4.91	3952.0	106.50	1050.04	25.84	0.452	1.772	11.05	8.85
5.500	0.99891	4.91	3952.0	106.29	1050.04	25.90	0.452	1.770	11.08	8.96
6.000	0.99881	4.91	3952.0	105.58	1050.04	26.09	0.452	1.767	11.15	9.09
6.500	0.99872	4.91	3952.0	104.55	1050.04	26.37	0.454	1.761	11.23	9.25
6.928	0.99863	4.91	3952.0	103.32	1050.04	26.71	0.456	1.753	11.31	9.40
6.931	0.99862	4.91	3952.0	106.09	1050.04	25.95	0.448	1.685	10.94	8.96
7.500	0.99850	4.91	3952.0	104.55	1050.04	26.37	0.450	1.682	11.08	9.17
8.000	0.99850	4.91	3952.0	103.11	1050.04	26.76	0.453	1.676	11.21	9.38
8.200	0.99852	4.91	3952.0	102.50	1050.04	26.94	0.454	1.673	11.27	9.46
8.201	0.99852	5.09	3952.0	106.29	1050.04	25.90	0.451	1.714	11.39	9.56
8.700	0.99852	5.09	3952.0	104.55	1050.04	26.37	0.455	1.705	11.55	9.77
9.100	0.99851	5.09	3952.0	102.91	1050.04	26.82	0.459	1.697	11.73	10.00
9.101	0.99851	5.18	3952.0	105.06	1050.04	26.23	0.456	1.719	11.79	10.06
9.459	0.99852	5.18	3952.0	103.53	1050.04	26.65	0.460	1.712	11.97	10.24
9.464	0.99850	5.59	3952.0	106.50	1050.04	25.84	0.456	1.807	11.23	9.78
10.000	0.99852	5.59	3952.0	103.83	1050.04	26.56	0.463	1.797	11.43	9.99
10.250	0.99853	5.59	3952.0	102.60	1050.04	26.91	0.466	1.789	11.47	10.04
10.251	0.99850	5.77	3952.0	106.50	1050.04	25.84	0.462	1.830	11.58	10.14
10.700	0.99858	5.77	3952.0	104.55	1050.04	26.37	0.466	1.818	11.63	10.17
11.000	0.99870	5.77	3952.0	103.53	1050.04	26.65	0.468	1.811	11.67	10.19
11.300	0.99879	5.77	3952.0	102.50	1050.04	26.94	0.469	1.803	11.63	10.13
11.301	0.99879	5.86	3952.0	104.55	1050.04	26.37	0.467	1.822	11.70	10.19
11.800	0.99893	5.86	3952.0	103.01	1050.04	26.79	0.467	1.809	11.44	9.99
11.991	0.99901	5.86	3952.0	102.50	1050.04	26.94	0.467	1.804	11.30	9.88
11.997	0.99902	6.80	3952.0	106.50	1050.04	25.84	0.448	1.764	11.46	10.07
12.500	0.99918	6.80	3952.0	104.86	1050.04	26.28	0.446	1.747	10.85	9.59
13.000	0.99930	6.80	3952.0	103.32	1050.04	26.71	0.442	1.729	10.19	9.05
13.400	0.99948	6.80	3952.0	102.50	1050.04	26.94	0.438	1.715	9.70	8.61
13.401	0.99949	6.89	3952.0	104.45	1050.04	26.39	0.436	1.721	9.76	8.66
13.900	0.99964	6.89	3952.0	103.73	1050.04	26.59	0.429	1.699	9.45	8.41
14.230	0.99973	6.89	3952.0	103.42	1050.04	26.68	0.424	1.679	9.58	8.55
14.523	0.99980	6.89	3952.0	103.53	1050.04	26.65	0.418	1.664	9.72	8.67
14.528	0.99986	5.63	3952.0	102.71	1050.04	26.88	0.438	1.686	9.84	8.43
14.700	0.99989	5.63	3952.0	103.42	1050.04	26.68	0.434	1.683	9.81	8.41
15.100	1.00001	5.63	3952.0	104.55	1050.04	26.37	0.424	1.672	9.57	8.28
15.600	0.99998	5.63	3952.0	106.50	1050.04	25.84	0.412	1.660	9.37	8.41
15.601	0.99998	5.50	3952.0	103.11	1050.04	26.76	0.415	1.632	9.30	8.36
16.025	0.99997	5.50	3952.0	106.50	1050.04	25.84	0.402	1.636	9.46	8.61
16.026	0.99998	5.36	3952.0	103.01	1050.04	26.79	0.406	1.604	9.38	8.54
16.300	0.99997	5.36	3952.0	105.99	1050.04	25.98	0.396	1.615	9.55	8.69
16.301	0.99998	5.23	3952.0	102.50	1050.04	26.94	0.400	1.599	9.76	8.68
16.600	0.99997	5.23	3952.0	106.50	1050.04	25.84	0.389	1.617	9.97	8.87
16.601	0.99996	5.09	3952.0	102.81	1050.04	26.85	0.392	1.579	10.14	9.05

16.835	0.99993	5.09	3952.0	106.50	1050.04	25.84	0.383	1.598	10.27	9.18
16.836	1.00005	4.91	3952.0	102.50	1050.04	26.94	0.387	1.572	10.48	9.45
17.055	0.99997	4.91	3952.0	106.29	1050.04	25.90	0.378	1.593	10.59	9.54
17.059	0.99995	3.11	3952.0	103.53	1050.04	26.65	0.405	1.630	9.75	9.02
17.175	0.99996	3.11	3952.0	106.50	1050.04	25.84	0.399	1.643	9.79	9.06
17.176	0.99997	2.84	3952.0	102.81	1050.04	26.85	0.402	1.633	9.69	8.97
17.375	0.99992	2.84	3952.0	106.60	1050.04	25.82	0.392	1.643	9.77	9.03
17.376	0.99992	2.66	3952.0	102.50	1050.04	26.94	0.395	1.629	9.65	8.93
17.560	0.99991	2.66	3952.0	106.39	1050.04	25.87	0.386	1.639	9.73	8.99
17.561	1.00001	2.48	3952.0	102.50	1050.04	26.94	0.389	1.624	9.62	8.90
17.740	0.99994	2.48	3952.0	106.60	1050.04	25.82	0.380	1.635	9.70	8.95
17.741	1.00004	1.71	3952.0	102.50	1050.04	26.94	0.392	1.634	9.51	8.83
17.900	0.99996	1.71	3952.0	106.60	1050.04	25.82	0.384	1.654	9.59	8.87
17.901	0.99997	1.53	3952.0	102.50	1050.04	26.94	0.388	1.630	9.71	8.83
18.050	0.99999	1.53	3952.0	106.60	1050.04	25.82	0.379	1.655	9.77	8.88
18.051	0.99996	1.35	3952.0	102.91	1050.04	26.82	0.384	1.612	10.64	9.67
18.200	0.99990	1.35	3952.0	107.11	1050.04	25.68	0.375	1.638	10.64	9.66
18.201	1.00006	0.00	3952.0	101.99	1050.04	27.08	0.395	1.629	9.28	8.63
18.390	0.99994	0.00	3952.0	107.62	1050.04	25.55	0.384	1.668	9.38	8.65
18.398	0.99980	0.00	3952.0	102.24	1047.97	29.54	0.384	1.660	9.25	8.53
18.543	0.99990	0.00	3952.0	107.11	1047.97	28.10	0.374	1.690	9.35	8.57
18.550	0.99990	0.00	3952.0	102.50	1046.03	31.84	0.374	1.684	9.24	8.47
18.645	1.00018	0.00	3952.0	106.60	1046.03	30.53	0.366	1.708	9.33	8.52
18.652	0.99997	0.00	3952.0	102.50	1044.65	33.54	0.367	1.701	9.23	8.44
18.826	0.99988	0.00	3952.0	107.62	1044.65	31.83	0.356	1.723	9.34	8.50
18.906	0.99999	0.00	3888.8	107.62	1043.42	31.26	0.352	1.744	9.23	8.39
19.034	1.00012	0.00	3782.1	107.62	1041.36	30.29	0.345	1.781	9.04	8.20
19.501	0.99996	0.00	3414.5	107.62	1034.25	26.98	0.321	1.927	8.49	7.67
19.636	1.00014	0.00	3351.3	107.62	1033.02	26.42	0.317	1.954	8.39	7.57
20.238	1.00042	0.00	2802.0	107.62	1022.40	21.53	0.279	2.261	7.57	6.78

Table A.2 Browns Ferry Unit 3 Cycle 19 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	0.99996	5.586	1.736	0.824	12.15	0.861	8.96	0.753
0.175	0.99997	5.586	1.748	0.818	11.75	0.833	8.66	0.737
0.176	0.99995	5.405	1.720	0.832	11.66	0.827	8.65	0.730
0.300	0.99993	5.405	1.738	0.823	11.41	0.809	8.46	0.721
0.301	0.99998	5.225	1.704	0.839	11.29	0.801	8.37	0.714
0.575	0.99983	5.225	1.726	0.828	11.15	0.791	8.28	0.709
0.576	0.99987	5.135	1.691	0.846	11.07	0.785	8.23	0.704
1.000	0.99977	5.135	1.700	0.841	10.99	0.779	8.16	0.703
1.500	0.99966	5.135	1.700	0.841	10.87	0.771	8.07	0.701
1.864	0.99960	5.135	1.701	0.841	10.77	0.764	8.00	0.699
1.865	0.99962	4.865	1.702	0.840	11.52	0.817	8.52	0.748
2.300	0.99954	4.865	1.705	0.839	11.37	0.807	8.41	0.744
2.800	0.99947	4.865	1.710	0.836	11.25	0.798	8.31	0.741
3.300	0.99933	4.865	1.711	0.836	11.17	0.792	8.23	0.740
3.800	0.99926	4.865	1.712	0.835	11.11	0.788	8.16	0.740
4.300	0.99913	4.865	1.713	0.835	11.08	0.786	8.10	0.740
4.396	0.99913	4.865	1.713	0.835	11.08	0.786	8.09	0.741
4.398	0.99910	4.910	1.772	0.807	11.02	0.782	8.09	0.724
4.600	0.99906	4.910	1.772	0.807	11.03	0.782	8.08	0.725
5.000	0.99898	4.910	1.772	0.807	11.05	0.784	8.07	0.729
5.500	0.99891	4.910	1.770	0.808	11.08	0.786	7.78	0.735
6.000	0.99881	4.910	1.767	0.809	11.15	0.791	7.80	0.743
6.500	0.99872	4.910	1.761	0.812	11.23	0.796	7.84	0.753
6.928	0.99863	4.910	1.753	0.816	11.31	0.802	7.88	0.762
6.931	0.99862	4.910	1.685	0.848	10.94	0.776	7.81	0.734
7.500	0.99850	4.910	1.682	0.850	11.08	0.786	7.68	0.748
8.000	0.99850	4.910	1.676	0.853	11.21	0.795	7.76	0.762
8.200	0.99852	4.910	1.673	0.855	11.27	0.799	7.79	0.768
8.201	0.99852	5.090	1.714	0.835	11.39	0.808	7.87	0.775
8.700	0.99852	5.090	1.705	0.839	11.55	0.827	7.96	0.791
9.100	0.99851	5.090	1.697	0.843	11.73	0.844	8.04	0.805
9.101	0.99851	5.180	1.719	0.832	11.75	0.849	8.09	0.810
9.459	0.99852	5.180	1.712	0.835	11.97	0.868	8.16	0.822
9.464	0.99850	5.586	1.807	0.791	11.23	0.818	7.63	0.772
10.000	0.99852	5.586	1.797	0.796	11.43	0.838	7.71	0.788
10.250	0.99853	5.586	1.789	0.799	11.47	0.846	7.74	0.795
10.251	0.99850	5.766	1.830	0.781	11.58	0.854	7.83	0.804
10.700	0.99858	5.766	1.818	0.786	11.54	0.859	7.85	0.812
11.000	0.99870	5.766	1.811	0.790	11.52	0.858	7.81	0.812
11.300	0.99879	5.766	1.803	0.793	11.47	0.857	7.77	0.809
11.301	0.99879	5.856	1.822	0.785	11.53	0.862	7.82	0.814
11.800	0.99893	5.856	1.809	0.790	11.44	0.850	7.62	0.801
11.991	0.99901	5.856	1.804	0.793	11.30	0.842	7.53	0.793
11.997	0.99902	6.802	1.764	0.811	11.36	0.863	10.07	0.815
12.500	0.99918	6.802	1.747	0.818	10.85	0.822	9.58	0.782
13.000	0.99930	6.802	1.729	0.833	10.19	0.784	6.99	0.746
13.400	0.99948	6.802	1.715	0.840	9.70	0.753	6.76	0.721
13.401	0.99949	6.892	1.721	0.837	9.76	0.758	6.81	0.726
13.900	0.99964	6.892	1.699	0.848	7.91	0.742	7.10	0.697
14.230	0.99973	6.892	1.679	0.858	8.07	0.756	7.19	0.709
14.523	0.99980	6.892	1.664	0.865	8.18	0.771	7.31	0.720
14.528	0.99986	5.631	1.686	0.854	7.00	0.718	6.62	0.692
14.700	0.99989	5.631	1.683	0.856	7.09	0.719	6.61	0.693
15.100	1.00001	5.631	1.672	0.861	7.38	0.719	6.55	0.691
15.600	0.99998	5.631	1.660	0.868	7.61	0.749	6.93	0.712
15.601	0.99998	5.495	1.632	0.883	7.49	0.745	6.88	0.707
16.025	0.99997	5.495	1.636	0.880	7.69	0.770	7.05	0.729
16.026	0.99998	5.360	1.604	0.898	7.62	0.762	7.00	0.725
16.300	0.99997	5.360	1.615	0.892	7.73	0.777	7.10	0.737
16.301	0.99998	5.225	1.599	0.901	8.17	0.779	7.06	0.734

16.600	0.99997	5.225	1.617	0.891	8.41	0.800	7.16	0.747
16.601	0.99996	5.090	1.579	0.912	8.52	0.814	7.60	0.755
16.835	0.99993	5.090	1.598	0.901	8.59	0.825	7.71	0.768
16.836	1.00005	4.910	1.572	0.916	8.89	0.856	7.93	0.795
17.055	0.99997	4.910	1.593	0.904	9.00	0.870	8.01	0.807
17.059	0.99995	3.108	1.630	0.884	8.02	0.818	7.35	0.774
17.175	0.99996	3.108	1.643	0.876	8.06	0.824	7.38	0.778
17.176	0.99997	2.838	1.633	0.882	7.97	0.816	7.31	0.770
17.375	0.99992	2.838	1.643	0.876	8.04	0.826	7.36	0.778
17.376	0.99992	2.658	1.629	0.884	7.95	0.817	7.28	0.770
17.560	0.99991	2.658	1.639	0.879	8.02	0.827	7.32	0.777
17.561	1.00001	2.477	1.624	0.886	7.93	0.818	7.26	0.770
17.740	0.99994	2.477	1.635	0.881	7.99	0.827	7.29	0.776
17.741	1.00004	1.712	1.634	0.881	7.84	0.811	7.16	0.762
17.900	0.99996	1.712	1.654	0.871	7.89	0.820	7.19	0.767
17.901	0.99997	1.532	1.630	0.884	7.84	0.814	7.17	0.765
18.050	0.99999	1.532	1.655	0.870	7.89	0.822	7.20	0.770
18.051	0.99996	1.351	1.612	0.893	8.78	0.874	9.67	0.799
18.200	0.99990	1.351	1.638	0.879	8.75	0.874	9.66	0.800
18.201	1.00006	0.000	1.629	0.884	7.65	0.800	7.00	0.751
18.390	0.99994	0.000	1.668	0.863	7.71	0.809	7.04	0.757
18.398	0.99980	0.000	1.660	0.868	7.63	0.801	6.96	0.749
18.543	0.99990	0.000	1.690	0.852	7.69	0.810	7.00	0.755
18.550	0.99990	0.000	1.684	0.855	7.62	0.803	6.93	0.748
18.645	1.00018	0.000	1.708	0.843	7.68	0.810	6.97	0.753
18.652	0.99997	0.000	1.701	0.847	7.62	0.804	6.91	0.747
18.826	0.99988	0.000	1.723	0.836	7.69	0.814	6.96	0.754
18.906	0.99999	0.000	1.744	0.826	7.59	0.805	6.86	0.745
19.034	1.00012	0.000	1.781	0.809	7.42	0.789	6.70	0.729
19.501	0.99996	0.000	1.927	0.747	6.81	0.731	6.28	0.670
19.636	1.00014	0.000	1.954	0.737	6.68	0.719	6.19	0.662
20.238	1.00042	0.000	2.261	0.637	6.19	0.642	5.54	0.592

```
Cycle:                              19                      Core Average Exposure: MWd/MTU    13899.8
Exposure: MWd/MTU (GWd)            0.0 (   0.00 )
Delta E: MWd/MTU, (GWd)            0.0 (   0.00 )                 Axial Profile    Edit   Radial Power
Power: MWt                      3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia             1050.0                    Top 25  0.155   2.763    14  0.482 0.482  35  2
Inlet Subcooling: Btu/lbm       -26.71                        24  0.448   7.994    16  0.425 0.616   9 12
Flow: Mlb/hr                    103.32 (100.80 %)             23  0.583  10.619    17  0.393 0.469  59 36
                                                              22  0.685  12.486    18  0.448 0.506   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58               21  0.750  13.539    19  0.874 1.109  13 14
59              -- -- -- -- -- -- --             59           20  0.793  14.116    20  1.164 1.324  21 22
55          -- -- -- -- -- -- -- -- --           55           19  0.811  14.468    21  1.150 1.282  31 48
51       -- -- -- -- -- -- -- -- -- -- --        51           18  0.842  14.821    22  1.167 1.310  21 24
47    -- -- -- -- 10 -- -- -- 10 -- -- -- --     47           17  0.872  14.984    23  1.019 1.155   7 28
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43           16  0.912  15.525    24  0.975 1.110  51 40
39 -- -- -- 10 -- -- --  8 -- -- -- 10 -- -- -- 39           15  0.964  15.982
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35           14  1.000  15.949
31 -- -- -- -- --  8 -- 16 --  8 -- -- -- -- -- 31           13  1.145  15.003
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27           12  1.215  15.292
23 -- -- -- 10 -- -- --  8 -- -- -- 10 -- -- -- 23           11  1.254  15.502
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19           10  1.283  15.798
15    -- -- -- -- 10 -- -- -- 10 -- -- -- --    15            9  1.326  16.230
11       -- -- -- -- -- -- -- -- -- -- --       11            8  1.368  16.459
 7          -- -- -- -- -- -- -- --            7            7  1.421  16.565
 3              -- -- -- -- -- -- --            3            6  1.493  16.986
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58               5  1.527* 17.042*
                                                              4  1.489  16.515
Control Rod Density: %             5.59                       3  1.362  15.359
                                                              2  1.031  11.876
k-effective:                    0.99996                Bottom  1  0.271   3.392
Void Fraction:                   0.480
Core Delta-P: psia              25.480              % AXIAL TILT -26.099  -7.358
Core Plate Delta-P: psia        20.916          AVG BOT 8ft/12ft  1.1508  1.0457
Coolant Temp: Deg-F              548.6
In Channel Flow: Mlb/hr          90.76   Active Channel Flow: Mlb/hr        87.46
Total Bypass Flow (%):           12.2    (of total core flow)
Total Water Rod Flow (%):         3.2    (of total core flow)
Source Convergence           0.00010
```

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
1.324	20	21 22	1.736	0.824	22	21 38	8.96	0.753	25.7 21	29 14	4	12.15	0.861	0.0 22	29 16	4
1.310	20	19 24	1.738	0.823	22	37 40	8.84	0.748	26.4 21	13 30	4	12.03	0.853	0.0 22	15 32	4
1.310	22	21 24	1.750	0.817	22	29 46	8.92	0.741	24.3 20	29 18	4	11.96	0.848	0.0 22	27 14	4
1.309	22	23 22	1.752	0.816	22	19 36	8.84	0.734	24.2 20	27 16	4	11.85	0.841	0.0 22	13 28	4
1.308	20	37 42	1.754	0.815	22	35 42	8.79	0.728	23.9 20	15 28	4	11.80	0.837	0.0 22	31 50	4
1.306	20	23 24	1.762	0.812	22	15 30	8.56	0.728	26.9 20	21 22	5	11.76	0.834	0.0 22	49 32	4
1.299	20	31 44	1.766	0.810	22	19 40	8.26	0.722	30.1 20	9 30	5	11.72	0.831	0.0 22	23 22	4
1.296	22	31 46	1.767	0.809	22	21 20	8.41	0.721	27.9 20	17 30	5	11.71	0.831	0.0 22	21 24	4
1.290	22	15 30	1.771	0.807	22	23 36	8.23	0.720	30.1 20	29 10	5	11.62	0.824	0.0 22	27 18	4
1.283	22	35 42	1.771	0.807	22	25 38	8.33	0.718	28.3 21	11 28	5	11.62	0.824	0.0 22	21 20	5

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

Figure A.1 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 0.0 MWd/MTU

```
Cycle:                            19                    Core Average Exposure: MWd/MTU    14074.5
Exposure: MWd/MTU (GWd)        175.0 (  24.11 )
Delta E: MWd/MTU, (GWd)        175.0 (  24.11 )                 Axial Profile    Edit   Radial Power
Power: MWt                    3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia           1050.0                    Top 25  0.159   2.793    14  0.483 0.483  35  2
Inlet Subcooling: Btu/lbm     -25.84                        24  0.461   8.079    16  0.425 0.616   9 12
Flow: Mlb/hr                  106.50 (103.90 %)             23  0.601  10.729    17  0.393 0.470  59 36
                                                            22  0.705  12.616    18  0.448 0.506   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58             21  0.771  13.682    19  0.876 1.109  13 14
59              -- -- -- -- -- -- --             59         20  0.813  14.267    20  1.166 1.327  21 22
55          -- -- -- -- -- -- -- -- --           55         19  0.830  14.622    21  1.152 1.283  31 48
51       -- -- -- -- -- -- -- -- -- -- --        51         18  0.861  14.982    22  1.166 1.309  21 24
47    -- -- -- -- 10 -- -- -- 10 -- -- -- --     47         17  0.890  15.150    23  1.016 1.152   7 28
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43         16  0.929  15.696    24  0.973 1.107  51 40
39 -- -- -- 10 -- -- --  8 -- -- -- 10 -- -- -- 39         15  0.980  16.162
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35         14  1.014  16.136
31 -- -- -- -- --  8 -- 16 --  8 -- -- -- -- -- 31         13  1.159  15.192
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27         12  1.227  15.493
23 -- -- -- 10 -- -- --  8 -- -- -- 10 -- -- -- 23         11  1.264  15.709
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19         10  1.289  16.010
15    -- -- -- -- 10 -- -- -- 10 -- -- -- --    15          9  1.327  16.448
11       -- -- -- -- -- -- -- -- -- -- --       11          8  1.363  16.684
 7          -- -- -- -- -- -- -- -- --           7          7  1.407  16.797
 3             -- -- -- -- -- -- --              3          6  1.470  17.229
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58             5  1.491* 17.290*
                                                            4  1.440  16.756
Control Rod Density: %            5.59                      3  1.306  15.579
                                                            2  0.985  12.041
k-effective:                  0.99997                Bottom  1  0.259   3.438
Void Fraction:                 0.471
Core Delta-P: psia            26.578              % AXIAL TILT -24.386  -7.505
Core Plate Delta-P: psia      22.013          AVG BOT 8ft/12ft  1.1418  1.0465
Coolant Temp: Deg-F            548.6
In Channel Flow: Mlb/hr         93.66   Active Channel Flow: Mlb/hr        90.30
Total Bypass Flow (%):          12.1    (of total core flow)
Total Water Rod Flow (%):        3.2    (of total core flow)
Source Convergence           0.00009
```

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
1.327	20	21 22	1.748	0.818	22	21 38	8.66	0.737	27.0 21	29 14	5	11.75	0.833	0.4 22	29 16	4
1.313	20	19 24	1.751	0.817	22	37 40	8.58	0.734	27.6 21	13 30	5	11.65	0.826	0.4 22	15 32	5
1.311	20	37 42	1.763	0.811	22	19 36	8.59	0.724	25.9 20	29 18	5	11.58	0.822	0.4 22	33 48	5
1.309	22	21 24	1.766	0.810	22	35 42	8.53	0.718	25.8 20	27 16	5	11.51	0.816	0.4 22	47 34	5
1.308	20	23 24	1.767	0.809	22	29 46	8.40	0.716	27.2 20	21 22	5	11.46	0.813	0.4 22	31 50	5
1.308	22	23 22	1.777	0.805	22	19 40	8.50	0.713	25.5 20	15 28	5	11.43	0.811	0.4 22	23 22	5
1.301	20	31 44	1.779	0.804	22	21 20	8.26	0.710	28.2 20	17 30	5	11.43	0.810	0.4 22	21 24	5
1.294	22	31 46	1.780	0.803	22	15 30	8.09	0.710	30.4 20	9 30	5	11.42	0.810	0.4 22	49 32	5
1.288	22	15 30	1.781	0.803	22	23 36	8.06	0.707	30.4 20	29 10	5	11.33	0.804	0.4 22	21 20	5
1.285	20	33 46	1.782	0.803	22	25 38	8.29	0.705	27.0 20	23 20	5	11.29	0.801	0.4 22	19 22	5

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

Figure A.2 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 175.0 MWd/MTU

```
Cycle:                          19                      Core Average Exposure: MWd/MTU    14075.5
Exposure: MWd/MTU (GWd)       176.0 (  24.25 )
Delta E: MWd/MTU, (GWd)         1.0 (   0.14 )                Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.162   2.793    14  0.483 0.483  35  2
Inlet Subcooling: Btu/lbm    -26.94                        24  0.467   8.079    16  0.426 0.616   9 12
Flow: Mlb/hr                 102.50 (100.00 %)             23  0.609  10.730    17  0.394 0.470  59 36
                                                           22  0.717  12.617    18  0.448 0.506   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  0.787  13.683    19  0.874 1.108  13 14
59              -- -- -- -- -- -- --             59        20  0.836  14.268    20  1.167 1.326  39 40
55          -- -- -- -- -- -- -- -- --           55        19  0.862  14.623    21  1.153 1.280  31 48
51       -- -- -- -- -- -- -- -- -- -- --        51        18  0.882  14.982    22  1.167 1.307  21 24
47    -- -- -- -- 12 -- -- -- 12 -- -- -- --     47        17  0.903  15.151    23  1.014 1.148   7 28
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  0.935  15.697    24  0.972 1.108  51 40
39 -- -- -- 12 -- -- --  8 -- -- -- 12 -- -- -- 39        15  0.981  16.163
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  1.011  16.137
31 -- -- -- -- --  8 -- 16 --  8 -- -- -- -- -- 31        13  1.151  15.193
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.216  15.494
23 -- -- -- 12 -- -- --  8 -- -- -- 12 -- -- -- 23        11  1.250  15.710
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.274  16.011
15    -- -- -- -- 12 -- -- -- 12 -- -- -- --    15         9  1.311  16.449
11       -- -- -- -- -- -- -- -- -- -- -- --       11         8  1.347  16.685
 7          -- -- -- -- -- -- -- -- --           7         7  1.392  16.798
 3              -- -- -- -- -- -- --             3         6  1.455  17.230
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  1.479* 17.292*
                                                           4  1.432  16.757
Control Rod Density: %          5.41                       3  1.302  15.580
                                                           2  0.983  12.042
k-effective:                 0.99995                Bottom  1  0.258   3.438
Void Fraction:                0.475
Core Delta-P: psia           25.072              % AXIAL TILT -23.261  -7.506
Core Plate Delta-P: psia     20.510           AVG BOT 8ft/12ft  1.1339  1.0465
Coolant Temp: Deg-F           548.5
In Channel Flow: Mlb/hr       90.08   Active Channel Flow: Mlb/hr        86.82
Total Bypass Flow (%):         12.1   (of total core flow)
Total Water Rod Flow (%):       3.2   (of total core flow)
Source Convergence           0.00004
```

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
1.326	20	39 40	1.720	0.832	22	21 38	8.65	0.730	26.0 21	29 14	4	11.66	0.827	0.4 22	29 16	4
1.313	20	19 24	1.723	0.830	22	37 40	8.49	0.726	27.6 21	13 30	5	11.55	0.819	0.4 22	15 32	4
1.311	20	37 42	1.736	0.824	22	19 36	8.61	0.718	24.7 20	29 18	4	11.48	0.814	0.4 22	27 14	4
1.307	22	21 24	1.739	0.822	22	35 42	8.53	0.711	24.5 20	27 16	4	11.39	0.808	0.4 22	47 34	5
1.306	22	23 22	1.744	0.820	22	19 40	8.31	0.709	27.2 20	21 22	5	11.34	0.804	0.4 22	31 50	5
1.305	20	23 24	1.745	0.819	22	29 46	8.41	0.706	25.5 20	15 28	5	11.31	0.802	0.4 22	23 22	5
1.298	20	31 44	1.746	0.819	22	21 20	8.01	0.703	30.4 20	9 30	5	11.31	0.802	0.4 22	21 24	5
1.292	22	31 46	1.754	0.815	22	23 36	8.17	0.703	28.2 20	17 30	5	11.31	0.802	0.4 22	49 32	5
1.286	22	15 30	1.754	0.815	22	25 38	7.99	0.701	30.4 20	29 10	5	11.22	0.796	0.4 22	21 20	5
1.284	20	33 46	1.755	0.815	22	15 30	8.09	0.698	28.7 21	11 28	5	11.18	0.793	0.4 22	19 22	5

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

Figure A.3 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 176.0 MWd/MTU

```
Cycle:                          19                      Core Average Exposure: MWd/MTU    14199.6
Exposure: MWd/MTU (GWd)       300.0 (  41.34 )
Delta E: MWd/MTU, (GWd)       124.0 (  17.09 )                Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.165   2.815    14  0.482 0.482  35  2
Inlet Subcooling: Btu/lbm    -25.90                        24  0.476   8.142    16  0.424 0.614   9 12
Flow: Mlb/hr                 106.29 (103.70 %)             23  0.622  10.811    17  0.393 0.469  59 36
                                                           22  0.730  12.713    18  0.447 0.504   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           21  0.801  13.788    19  0.874 1.109  13 14
59              -- -- -- -- -- -- --             59       20  0.850  14.380    20  1.168 1.328  39 40
55          -- -- -- -- -- -- -- -- --           55       19  0.875  14.739    21  1.154 1.281  31 48
51       -- -- -- -- -- -- -- -- -- -- --        51       18  0.894  15.101    22  1.166 1.307  21 24
47    -- -- -- -- 12 -- -- -- 12 -- -- -- --     47       17  0.914  15.272    23  1.014 1.148   7 28
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43       16  0.946  15.821    24  0.971 1.107  51 40
39 -- -- -- 12 -- -- --  8 -- -- -- 12 -- -- -- 39       15  0.992  16.293
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35       14  1.020  16.270
31 -- -- -- -- --  8 -- 16 --  8 -- -- -- -- -- 31       13  1.161  15.327
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27       12  1.226  15.636
23 -- -- -- 12 -- -- --  8 -- -- -- 12 -- -- -- 23       11  1.259  15.856
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19       10  1.280  16.160
15    -- -- -- -- 12 -- -- -- 12 -- -- -- --    15        9  1.314  16.602
11       -- -- -- -- -- -- -- -- -- -- --       11        8  1.346  16.842
 7          -- -- -- -- -- -- -- --           7         7  1.385  16.960
 3              -- -- -- -- -- -- --           3         6  1.440  17.399
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           5  1.453* 17.462*
                                                           4  1.395  16.922
Control Rod Density: %         5.41                        3  1.259  15.729
                                                           2  0.947  12.155
k-effective:                0.99993                Bottom  1  0.249   3.470
Void Fraction:               0.466
Core Delta-P: psia          26.413              % AXIAL TILT -22.104  -7.585
Core Plate Delta-P: psia    21.849          AVG BOT 8ft/12ft  1.1278  1.0469
Coolant Temp: Deg-F          548.5
In Channel Flow: Mlb/hr      93.52   Active Channel Flow: Mlb/hr        90.18
Total Bypass Flow (%):       12.0    (of total core flow)
Total Water Rod Flow (%):     3.1    (of total core flow)
Source Convergence         0.00007
```

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
1.328	20	39 40	1.738	0.823	22	21 38	8.46	0.721	27.2 21	29 14	5	11.41	0.809	0.8 22	31 16	5
1.314	20	19 24	1.742	0.821	22	37 40	8.39	0.719	27.8 21	13 30	5	11.35	0.805	0.7 22	15 32	5
1.313	20	37 42	1.753	0.816	22	19 36	8.39	0.708	26.1 20	29 18	5	11.28	0.800	0.7 22	33 48	5
1.307	22	21 24	1.756	0.814	22	35 42	8.33	0.703	26.0 20	27 16	5	11.21	0.795	0.7 22	47 34	5
1.306	22	23 22	1.761	0.812	22	19 40	8.21	0.701	27.4 20	21 22	5	11.17	0.792	0.7 22	31 50	5
1.306	20	23 24	1.763	0.811	22	21 20	8.30	0.698	25.7 20	15 28	5	11.13	0.789	0.7 22	49 32	5
1.298	20	31 44	1.765	0.810	22	29 46	8.06	0.695	28.4 20	17 30	5	11.13	0.789	0.7 22	23 22	5
1.292	22	31 46	1.771	0.807	22	23 36	7.90	0.694	30.7 20	9 30	5	11.13	0.789	0.7 22	21 24	5
1.286	22	15 30	1.771	0.807	22	25 38	7.87	0.692	30.6 20	29 10	5	11.03	0.782	0.7 22	21 20	5
1.285	20	33 46	1.774	0.806	22	15 30	7.98	0.690	28.9 21	11 28	5	11.00	0.780	0.7 22	19 22	5

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

Figure A.4 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 300.0 MWd/MTU

```
Cycle:                          19                      Core Average Exposure: MWd/MTU    14200.6
Exposure: MWd/MTU (GWd)       301.0 (  41.47 )
Delta E: MWd/MTU, (GWd)         1.0 (   0.14 )                Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.166   2.815    14  0.481 0.481  35  2
Inlet Subcooling: Btu/lbm    -26.94                        24  0.479   8.142    16  0.424 0.614   9 12
Flow: Mlb/hr                 102.50 (100.00 %)             23  0.625  10.812    17  0.393 0.468  59 36
                                                           22  0.736  12.714    18  0.447 0.503   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  0.810  13.789    19  0.872 1.107  13 14
59              -- -- -- -- -- -- --             59        20  0.864  14.381    20  1.169 1.327  39 40
55          -- -- -- -- -- -- -- -- --           55        19  0.897  14.740    21  1.156 1.278  31 48
51       -- -- -- -- -- -- -- -- -- -- --        51        18  0.926  15.102    22  1.167 1.304  21 24
47    -- -- -- -- 14 -- -- -- 14 -- -- -- --     47        17  0.935  15.273    23  1.011 1.144  53 34
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  0.959  15.822    24  0.970 1.108  51 40
39 -- -- -- 14 -- -- --  8 -- -- -- 14 -- -- -- 39        15  0.998  16.294
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  1.021  16.271
31 -- -- -- -- --  8 -- 16 --  8 -- -- -- -- -- 31        13  1.157  15.329
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.218  15.637
23 -- -- -- 14 -- -- --  8 -- -- -- 14 -- -- -- 23        11  1.248  15.858
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.267  16.161
15    -- -- -- -- 14 -- -- -- 14 -- -- -- --    15         9  1.300  16.603
11       -- -- -- -- -- -- -- -- -- -- --       11         8  1.331  16.843
 7          -- -- -- -- -- -- -- -- --          7         7  1.370  16.961
 3              -- -- -- -- -- -- --            3         6  1.426  17.400
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  1.440* 17.464*
                                                           4  1.385  16.923
Control Rod Density: %         5.23                        3  1.252  15.730
                                                           2  0.943  12.155
k-effective:                0.99998                Bottom  1  0.248   3.470
Void Fraction:               0.470
Core Delta-P: psia          24.991              % AXIAL TILT -21.022  -7.585
Core Plate Delta-P: psia    20.430          AVG BOT 8ft/12ft  1.1212  1.0469
Coolant Temp: Deg-F          548.4
In Channel Flow: Mlb/hr      90.12   Active Channel Flow: Mlb/hr        86.88
Total Bypass Flow (%):       12.1    (of total core flow)
Total Water Rod Flow (%):     3.2    (of total core flow)
Source Convergence         0.00010
```

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
1.327	20	39 40	1.704	0.839	22	21 38	8.37	0.714	27.2 21	29 14	5	11.29	0.801	0.8 22	31 16	5
1.315	20	19 24	1.708	0.837	22	37 40	8.30	0.711	27.8 21	13 30	5	11.23	0.796	0.7 22	15 32	5
1.313	20	37 42	1.722	0.831	22	19 36	8.30	0.701	26.1 20	29 18	5	11.16	0.792	0.7 22	33 48	5
1.304	22	21 24	1.723	0.830	22	19 40	8.25	0.695	26.0 20	27 16	5	11.09	0.787	0.7 22	47 34	5
1.304	22	23 22	1.725	0.829	22	35 42	8.12	0.693	27.4 20	21 22	5	11.05	0.784	0.7 22	31 50	5
1.302	20	23 24	1.726	0.829	22	21 42	8.21	0.691	25.7 20	15 28	5	11.02	0.781	0.7 22	49 32	5
1.295	20	31 44	1.734	0.824	22	29 46	7.82	0.688	30.7 20	9 30	5	11.01	0.781	0.7 22	23 22	5
1.289	22	31 46	1.744	0.820	22	15 30	7.98	0.687	28.4 20	17 30	5	11.01	0.781	0.7 22	21 24	5
1.284	20	33 46	1.747	0.818	22	23 36	7.80	0.685	30.6 20	29 10	5	10.92	0.774	0.7 22	21 20	5
1.283	22	15 30	1.748	0.818	22	25 38	7.90	0.683	28.9 21	11 28	5	10.88	0.772	0.7 22	19 22	5

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

Figure A.5 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 301.0 MWd/MTU

```
Cycle:                          19                      Core Average Exposure: MWd/MTU    14474.5
Exposure: MWd/MTU (GWd)       575.0 (  79.23 )
Delta E: MWd/MTU, (GWd)       274.0 (  37.75 )                Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.169   2.864    14  0.478 0.478  35  2
Inlet Subcooling: Btu/lbm    -25.84                        24  0.488   8.284    16  0.422 0.612   9 12
Flow: Mlb/hr                 106.50 (103.90 %)             23  0.636  10.997    17  0.390 0.465  59 36
                                                           22  0.748  12.933    18  0.444 0.501   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           21  0.822  14.029    19  0.871 1.109  13 14
59              -- -- -- -- -- -- --             59       20  0.876  14.637    20  1.170 1.328  39 40
55          -- -- -- -- -- -- -- -- --           55       19  0.907  15.006    21  1.157 1.279  31 48
51       -- -- -- -- -- -- -- -- -- -- --        51       18  0.936  15.376    22  1.168 1.305  21 24
47    -- -- -- -- 14 -- -- -- 14 -- -- -- --     47       17  0.944  15.550    23  1.011 1.145  53 34
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43       16  0.967  16.102    24  0.970 1.109  51 40
39 -- -- -- 14 -- -- --  8 -- -- -- 14 -- -- -- 39       15  1.006  16.586
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35       14  1.028  16.569
31 -- -- -- -- --  8 -- 16 --  8 -- -- -- -- -- 31       13  1.165  15.627
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27       12  1.226  15.951
23 -- -- -- 14 -- -- --  8 -- -- -- 14 -- -- -- 23       11  1.255  16.179
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19       10  1.274  16.488
15    -- -- -- -- 14 -- -- -- 14 -- -- -- --    15        9  1.304  16.938
11       -- -- -- -- -- -- -- -- -- -- --       11        8  1.332  17.186
 7          -- -- -- -- -- -- -- -- --           7        7  1.365  17.313
 3              -- -- -- -- -- -- --             3        6  1.414  17.766
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           5  1.418* 17.832*
                                                           4  1.352  17.275
Control Rod Density: %         5.23                        3  1.214  16.047
                                                           2  0.911  12.394
k-effective:                0.99983                Bottom  1  0.241   3.536
Void Fraction:               0.461
Core Delta-P: psia          26.413              % AXIAL TILT -20.055  -7.714
Core Plate Delta-P: psia    21.850          AVG BOT 8ft/12ft  1.1160  1.0475
Coolant Temp: Deg-F          548.5
In Channel Flow: Mlb/hr      93.74   Active Channel Flow: Mlb/hr        90.42
Total Bypass Flow (%):       12.0    (of total core flow)
Total Water Rod Flow (%):     3.1    (of total core flow)
Source Convergence         0.00006
```

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
1.328	20	39 40	1.726	0.828	22	21 38	8.28	0.709	27.7 21	29 14	5	11.15	0.791	1.4 22	29 16	5
1.317	20	19 24	1.731	0.826	22	37 40	8.20	0.706	28.3 21	13 30	5	11.08	0.786	1.4 22	15 32	5
1.315	20	37 42	1.742	0.821	22	19 36	8.20	0.695	26.6 20	29 18	5	11.01	0.781	1.4 22	33 48	5
1.305	22	21 24	1.744	0.820	22	19 40	8.15	0.690	26.5 20	27 16	5	10.94	0.776	1.4 22	13 28	5
1.305	22	37 40	1.747	0.819	22	21 42	8.02	0.688	27.9 20	21 22	5	10.92	0.775	1.4 22	31 50	5
1.303	20	23 24	1.747	0.819	22	35 42	8.11	0.685	26.2 20	15 28	5	10.89	0.772	1.4 22	49 32	5
1.296	20	31 44	1.757	0.814	22	29 46	7.73	0.682	31.1 20	9 30	5	10.86	0.770	1.4 22	23 22	5
1.291	22	31 46	1.767	0.809	22	15 30	7.88	0.682	28.9 20	17 30	5	10.85	0.770	1.4 22	21 24	5
1.285	20	33 46	1.769	0.808	22	23 36	7.70	0.680	31.1 20	29 10	5	10.76	0.763	1.4 22	21 20	5
1.285	22	15 30	1.769	0.808	22	25 38	7.81	0.678	29.3 21	11 28	5	10.72	0.760	1.4 22	19 22	5

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

Figure A.6 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 575.0 MWd/MTU

```
Cycle:                          19                      Core Average Exposure: MWd/MTU    14475.5
Exposure: MWd/MTU (GWd)       576.0 (  79.36 )
Delta E: MWd/MTU, (GWd)         1.0 (   0.14 )                Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.172   2.864    14  0.477 0.477  35  2
Inlet Subcooling: Btu/lbm    -26.48                        24  0.494   8.284    16  0.421 0.610   9 12
Flow: Mlb/hr                 104.14 (101.60 %)             23  0.645  10.997    17  0.389 0.464  59 36
                                                           22  0.759  12.934    18  0.443 0.499   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  0.837  14.030    19  0.867 1.104  13 14
59              -- -- -- -- -- -- --             59        20  0.896  14.638    20  1.173 1.331  39 40
55          -- -- -- -- -- -- -- -- --           55        19  0.921  15.007    21  1.159 1.277  31 48
51       -- -- -- -- -- -- -- -- -- -- --        51        18  0.945  15.377    22  1.170 1.310  21 24
47    -- -- -- -- 14 -- -- -- 14 -- -- -- --     47        17  0.949  15.551    23  1.006 1.140  53 34
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  0.969  16.103    24  0.965 1.105  51 40
39 -- -- -- 14 -- -- -- 10 -- -- -- 14 -- -- -- 39        15  1.005  16.587
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  1.025  16.571
31 -- -- -- -- -- 10 -- 16 -- 10 -- -- -- -- -- 31        13  1.160  15.628
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.218  15.953
23 -- -- -- 14 -- -- -- 10 -- -- -- 14 -- -- -- 23        11  1.246  16.181
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.264  16.489
15    -- -- -- -- 14 -- -- -- 14 -- -- -- --     15         9  1.295  16.940
11       -- -- -- -- -- -- -- -- -- -- --        11         8  1.322  17.187
 7          -- -- -- -- -- -- -- -- --           7         7  1.356  17.315
 3             -- -- -- -- -- -- --              3         6  1.405  17.767
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  1.411* 17.833*
                                                           4  1.347  17.277
Control Rod Density: %          5.14                       3  1.210  16.048
                                                           2  0.909  12.395
k-effective:                 0.99987                Bottom  1  0.240   3.536
Void Fraction:                0.463
Core Delta-P: psia           25.520              % AXIAL TILT -19.318  -7.715
Core Plate Delta-P: psia     20.958          AVG BOT 8ft/12ft  1.1105  1.0475
Coolant Temp: Deg-F           548.4
In Channel Flow: Mlb/hr       91.63   Active Channel Flow: Mlb/hr        88.36
Total Bypass Flow (%):         12.0   (of total core flow)
Total Water Rod Flow (%):       3.1   (of total core flow)
Source Convergence           0.00007
```

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
1.331	20	39 40	1.691	0.846	22	21 38	8.23	0.704	27.7 21	29 14	5	11.07	0.785	1.4 22	31 16	5
1.319	20	19 24	1.694	0.844	22	37 40	8.15	0.702	28.3 21	13 30	5	11.01	0.781	1.4 22	15 32	5
1.317	20	37 42	1.707	0.838	22	19 36	8.15	0.691	26.6 20	29 18	5	10.94	0.776	1.4 22	33 48	5
1.310	22	21 24	1.710	0.836	22	35 42	8.09	0.685	26.5 20	27 16	5	10.87	0.771	1.4 22	13 28	5
1.310	20	23 24	1.720	0.832	22	19 40	7.97	0.683	27.9 20	21 22	5	10.86	0.770	1.4 22	31 50	5
1.309	22	37 40	1.721	0.831	22	23 36	8.06	0.681	26.2 20	15 28	5	10.82	0.767	1.4 22	49 32	5
1.301	20	31 44	1.721	0.831	22	25 38	7.68	0.678	31.1 20	9 30	5	10.78	0.765	1.4 22	23 22	5
1.291	22	31 46	1.722	0.830	22	21 42	7.83	0.677	28.9 20	17 30	5	10.78	0.765	1.4 22	21 24	5
1.286	20	33 46	1.738	0.823	22	29 46	7.66	0.676	31.1 20	29 10	5	10.69	0.758	1.4 22	21 20	5
1.285	22	15 30	1.742	0.821	22	45 30	7.76	0.674	29.3 21	11 28	5	10.65	0.756	1.4 22	19 22	5

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

Figure A.7 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 576.0 MWd/MTU

```
Cycle:                          19                      Core Average Exposure: MWd/MTU    14899.5
Exposure: MWd/MTU (GWd)      1000.0 ( 137.79 )
Delta E: MWd/MTU, (GWd)       424.0 (  58.42 )                 Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.175   2.943    14  0.473 0.473  35  2
Inlet Subcooling: Btu/lbm    -26.03                        24  0.500   8.510    16  0.418 0.607   9 12
Flow: Mlb/hr                 105.78 (103.20 %)             23  0.652  11.291    17  0.386 0.460  59 36
                                                           22  0.765  13.281    18  0.440 0.496   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  0.842  14.413    19  0.864 1.103  13 14
59              -- -- -- -- -- -- --             59        20  0.900  15.047    20  1.171 1.328  39 40
55          -- -- -- -- -- -- -- -- --           55        19  0.925  15.428    21  1.157 1.274  31 48
51       -- -- -- -- -- -- -- -- -- -- --        51        18  0.949  15.809    22  1.174 1.314  21 24
47    -- -- -- -- 14 -- -- -- 14 -- -- -- --     47        17  0.952  15.984    23  1.008 1.144  53 34
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  0.971  16.540    24  0.967 1.110  51 40
39 -- -- -- 14 -- -- -- 10 -- -- -- 14 -- -- -- 39        15  1.007  17.039
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  1.027  17.032
31 -- -- -- -- -- 10 -- 16 -- 10 -- -- -- -- -- 31        13  1.161  16.090
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.220  16.438
23 -- -- -- 14 -- -- -- 10 -- -- -- 14 -- -- -- 23        11  1.248  16.677
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.267  16.993
15    -- -- -- -- 14 -- -- -- 14 -- -- -- --     15         9  1.297  17.456
11       -- -- -- -- -- -- -- -- -- -- --        11         8  1.323  17.714
 7          -- -- -- -- -- -- -- -- --           7         7  1.355  17.854
 3              -- -- -- -- -- -- --             3         6  1.400  18.326
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  1.401* 18.393*
                                                           4  1.332  17.810
Control Rod Density: %          5.14                       3  1.193  16.527
                                                           2  0.896  12.754
k-effective:                 0.99977                Bottom  1  0.239   3.637
Void Fraction:                0.459
Core Delta-P: psia           26.106              % AXIAL TILT -18.907  -7.864
Core Plate Delta-P: psia     21.543          AVG BOT 8ft/12ft  1.1081  1.0482
Coolant Temp: Deg-F           548.4
In Channel Flow: Mlb/hr       93.12   Active Channel Flow: Mlb/hr        89.82
Total Bypass Flow (%):         12.0   (of total core flow)
Total Water Rod Flow (%):       3.1   (of total core flow)
Source Convergence          0.00009
```

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
1.328	20	39 40	1.700	0.841	22	21 38	8.16	0.703	28.5 21	29 14	5	10.99	0.779	2.4 22	29 16	5
1.316	20	19 24	1.704	0.839	22	37 40	8.08	0.700	29.1 21	13 30	5	10.92	0.775	2.4 22	15 32	5
1.315	20	37 42	1.716	0.834	22	19 36	8.07	0.688	27.3 20	29 18	5	10.86	0.770	2.4 22	33 48	5
1.314	22	21 24	1.719	0.832	22	35 42	8.02	0.683	27.2 20	27 16	5	10.80	0.766	2.4 22	31 50	5
1.313	22	37 40	1.728	0.827	22	19 40	7.89	0.681	28.6 20	21 22	5	10.79	0.765	2.4 22	13 28	5
1.306	20	23 24	1.731	0.826	22	21 42	7.99	0.679	26.9 20	15 28	5	10.76	0.763	2.4 22	49 32	5
1.298	20	31 44	1.731	0.826	22	23 36	7.63	0.678	31.8 20	9 30	5	10.69	0.758	2.3 22	23 22	5
1.295	22	31 46	1.731	0.826	22	25 38	7.76	0.675	29.6 20	17 30	5	10.69	0.758	2.3 22	21 24	5
1.289	22	15 30	1.748	0.818	22	29 46	7.60	0.675	31.7 20	29 10	5	10.60	0.751	2.3 22	21 20	5
1.288	22	35 42	1.752	0.816	22	45 30	7.70	0.673	30.0 21	11 28	5	10.58	0.751	2.3 22	9 28	5

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

Figure A.8 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 1,000.0 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    15399.6
Exposure: MWd/MTU (GWd)      1500.0 ( 206.68 )
Delta E: MWd/MTU, (GWd)       500.0 (  68.89 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.179   3.038    14  0.469 0.469  35  2
Inlet Subcooling: Btu/lbm    -26.03                        24  0.507   8.779    16  0.415 0.605   9 12
Flow: Mlb/hr                 105.78 (103.20 %)             23  0.659  11.641    17  0.383 0.456  59 36
                                                           22  0.772  13.694    18  0.437 0.493   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  0.848  14.867    19  0.861 1.101  13 14
59              -- -- -- -- -- -- --             59        20  0.905  15.533    20  1.168 1.322  39 40
55          -- -- -- -- -- -- -- -- --           55        19  0.929  15.926    21  1.154 1.270  31 48
51       -- -- -- -- -- -- -- -- -- -- --        51        18  0.952  16.320    22  1.178 1.317  21 24
47    -- -- -- -- 14 -- -- -- 14 -- -- -- --     47        17  0.955  16.497    23  1.011 1.148  53 34
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  0.974  17.056    24  0.971 1.117  51 40
39 -- -- -- 14 -- -- -- 10 -- -- -- 14 -- -- -- 39        15  1.009  17.574
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  1.028  17.577
31 -- -- -- -- -- 10 -- 16 -- 10 -- -- -- -- -- 31        13  1.161  16.635
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.220  17.011
23 -- -- -- 14 -- -- -- 10 -- -- -- 14 -- -- -- 23        11  1.248  17.263
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.267  17.588
15    -- -- -- -- 14 -- -- -- 14 -- -- -- --     15         9  1.297  18.065
11       -- -- -- -- -- -- -- -- -- -- --        11         8  1.322  18.336
 7          -- -- -- -- -- -- -- -- --           7         7  1.352  18.490
 3             -- -- -- -- -- -- --              3         6  1.395* 18.982
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  1.393  19.049*
                                                           4  1.321  18.433
Control Rod Density: %          5.14                       3  1.181  17.084
                                                           2  0.888  13.172
k-effective:                 0.99966                Bottom  1  0.239   3.756
Void Fraction:                0.458
Core Delta-P: psia           26.090              % AXIAL TILT -18.471  -8.015
Core Plate Delta-P: psia     21.528            AVG BOT 8ft/12ft  1.1055  1.0489
Coolant Temp: Deg-F           548.4
In Channel Flow: Mlb/hr       93.13   Active Channel Flow: Mlb/hr        89.83
Total Bypass Flow (%):         12.0   (of total core flow)
Total Water Rod Flow (%):       3.1   (of total core flow)
Source Convergence          0.00007
```

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
1.322	20	39 40	1.700	0.841	22	21 38	8.07	0.701	29.3 21	29 14	5	10.87	0.771	3.6 22	29 16	5
1.317	22	21 24	1.704	0.839	22	37 40	8.00	0.698	29.9 21	13 30	5	10.81	0.767	3.6 22	15 32	5
1.316	22	37 40	1.716	0.833	22	19 36	7.97	0.685	28.1 20	29 18	5	10.74	0.762	3.5 22	33 48	5
1.312	20	19 24	1.720	0.832	22	35 42	7.92	0.680	28.0 20	27 16	5	10.73	0.761	3.5 22	31 50	5
1.310	20	37 42	1.728	0.827	22	19 40	7.79	0.678	29.4 20	21 22	5	10.69	0.758	3.5 22	49 32	5
1.300	20	23 24	1.731	0.826	22	21 42	7.56	0.677	32.6 20	9 30	5	10.67	0.757	3.5 22	13 28	5
1.299	22	31 46	1.733	0.825	22	23 36	7.89	0.676	27.8 20	15 28	5	10.57	0.749	3.5 22	23 22	5
1.293	22	15 30	1.733	0.825	22	25 38	7.53	0.674	32.6 20	29 10	5	10.56	0.749	3.5 22	21 24	5
1.293	20	31 44	1.750	0.817	22	29 46	7.66	0.672	30.4 20	17 30	5	10.50	0.745	3.5 22	9 28	5
1.292	22	35 42	1.751	0.817	22	45 30	7.63	0.672	30.8 21	11 28	5	10.48	0.743	3.4 22	21 20	5

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

Figure A.9 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 1,500.0 MWd/MTU

```
Cycle:                          19                      Core Average Exposure: MWd/MTU    15763.5
Exposure: MWd/MTU (GWd)      1864.0 ( 256.84 )
Delta E: MWd/MTU, (GWd)       364.0 (  50.16 )                 Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.182   3.108    14  0.466 0.466  35  2
Inlet Subcooling: Btu/lbm    -26.03                        24  0.513   8.977    16  0.413 0.603   9 12
Flow: Mlb/hr                 105.78 (103.20 %)             23  0.666  11.899    17  0.381 0.453  59 36
                                                           22  0.778  13.997    18  0.434 0.491   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  0.853  15.199    19  0.859 1.100  13 14
59              -- -- -- -- -- -- --             59        20  0.910  15.888    20  1.165 1.318  39 40
55          -- -- -- -- -- -- -- -- --           55        19  0.933  16.291    21  1.151 1.266  31 48
51       -- -- -- -- -- -- -- -- -- -- --        51        18  0.956  16.694    22  1.180 1.318  21 24
47    -- -- -- -- 14 -- -- -- 14 -- -- -- --     47        17  0.959  16.872    23  1.014 1.151  53 34
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  0.977  17.433    24  0.974 1.123  51 40
39 -- -- -- 14 -- -- -- 10 -- -- -- 14 -- -- -- 39        15  1.011  17.964
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  1.029  17.975
31 -- -- -- -- -- 10 -- 16 -- 10 -- -- -- -- -- 31        13  1.161  17.032
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.219  17.427
23 -- -- -- 14 -- -- -- 10 -- -- -- 14 -- -- -- 23        11  1.247  17.690
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.266  18.021
15    -- -- -- -- 14 -- -- -- 14 -- -- -- --     15         9  1.295  18.508
11       -- -- -- -- -- -- -- -- -- -- --        11         8  1.320  18.787
 7          -- -- -- -- -- -- -- -- --           7         7  1.348  18.951
 3              -- -- -- -- -- -- --             3         6  1.389* 19.458
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  1.385  19.524*
                                                           4  1.312  18.883
Control Rod Density: %          5.14                       3  1.172  17.486
                                                           2  0.881  13.474
k-effective:                 0.99960                Bottom  1  0.239   3.842
Void Fraction:                0.457
Core Delta-P: psia           26.076              % AXIAL TILT -18.058  -8.109
Core Plate Delta-P: psia     21.513           AVG BOT 8ft/12ft  1.1030  1.0493
Coolant Temp: Deg-F           548.4
In Channel Flow: Mlb/hr        93.14   Active Channel Flow: Mlb/hr        89.84
Total Bypass Flow (%):         12.0   (of total core flow)
Total Water Rod Flow (%):       3.1   (of total core flow)
Source Convergence           0.00007
```

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
1.318	22	21 24	1.701	0.841	22	21 38	8.00	0.699	29.9 21	29 14	5	10.77	0.764	4.4 22	29 16	5
1.318	20	39 40	1.705	0.839	22	37 40	7.93	0.696	30.5 21	13 30	5	10.71	0.760	4.4 22	15 32	5
1.318	22	37 40	1.716	0.833	22	19 36	7.89	0.681	28.8 20	29 18	5	10.66	0.756	4.3 22	31 50	5
1.308	20	19 24	1.720	0.832	22	35 42	7.85	0.677	28.6 20	27 16	5	10.65	0.755	4.4 22	33 48	5
1.306	20	37 42	1.728	0.827	22	19 40	7.50	0.675	33.2 20	9 30	5	10.62	0.753	4.3 22	49 32	5
1.301	22	31 46	1.731	0.826	22	21 42	7.72	0.675	30.0 20	21 22	5	10.58	0.750	4.3 22	13 28	5
1.295	20	23 24	1.734	0.825	22	23 36	7.82	0.673	28.4 20	15 28	5	10.47	0.742	4.3 22	23 22	5
1.295	22	15 30	1.734	0.825	22	25 38	7.48	0.673	33.1 20	29 10	5	10.46	0.742	4.3 22	21 24	5
1.293	22	35 42	1.749	0.818	22	29 46	7.57	0.670	31.4 21	11 28	5	10.43	0.739	4.3 23	7 26	5
1.293	22	39 42	1.750	0.817	22	45 30	7.59	0.669	31.0 20	17 30	5	10.43	0.739	4.3 22	9 28	5

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

Figure A.10 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 1,864.0 MWd/MTU

```
Cycle:                          19                      Core Average Exposure: MWd/MTU    15764.7
Exposure: MWd/MTU (GWd)      1865.2 ( 257.00 )
Delta E: MWd/MTU, (GWd)         1.2 (   0.16 )                 Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.175   3.108    14  0.467 0.467  35  2
Inlet Subcooling: Btu/lbm    -26.65                        24  0.493   8.977    16  0.424 0.621   9 12
Flow: Mlb/hr                 103.53 (101.00 %)             23  0.640  11.900    17  0.390 0.467  59 36
                                                           22  0.746  13.997    18  0.442 0.505   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           21  0.815  15.200    19  0.877 1.134  47 48
59              -- -- -- -- -- -- --             59       20  0.865  15.889    20  1.145 1.327  45 34
55          -- -- -- -- -- -- -- -- --           55       19  0.894  16.292    21  1.147 1.311  47 32
51       -- -- -- -- -- -- -- -- -- -- --        51       18  0.920  16.695    22  1.164 1.338  47 34
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47       17  0.940  16.873    23  1.046 1.197  53 34
43 -- -- -- -- -- 16 --  8 -- 16 -- -- -- -- -- 43       16  0.963  17.434    24  1.011 1.213  51 40
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39       15  1.002  17.966
35 -- -- -- -- -- 12 --  8 -- 12 -- -- -- -- -- 35       14  1.025  17.976
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31       13  1.160  17.034
27 -- -- -- -- -- 12 --  8 -- 12 -- -- -- -- -- 27       12  1.221  17.429
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23       11  1.252  17.691
19 -- -- -- -- -- 16 --  8 -- 16 -- -- -- -- -- 19       10  1.274  18.023
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15        9  1.308  18.509
11       -- -- -- -- -- -- -- -- -- -- --       11        8  1.336  18.789
 7          -- -- -- -- -- -- -- -- --           7        7  1.369  18.953
 3             -- -- -- -- -- -- --              3        6  1.416  19.460
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           5  1.421* 19.525*
                                                           4  1.358  18.885
Control Rod Density: %          4.86                       3  1.226  17.487
                                                           2  0.929  13.475
k-effective:                 0.99962                Bottom  1  0.252   3.842
Void Fraction:                0.466
Core Delta-P: psia           25.338                % AXIAL TILT -20.484  -8.109
Core Plate Delta-P: psia     20.778          AVG BOT 8ft/12ft  1.1185  1.0493
Coolant Temp: Deg-F           548.4
In Channel Flow: Mlb/hr       91.06   Active Channel Flow: Mlb/hr        87.80
Total Bypass Flow (%):         12.0   (of total core flow)
Total Water Rod Flow (%):       3.2   (of total core flow)
Source Convergence          0.00009
```

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
1.338	22	47 34	1.702	0.840	22	45 30	8.52	0.748	30.5 21	13 30	5	11.52	0.817	4.4 22	15 32	5
1.336	22	45 32	1.704	0.839	22	47 28	8.39	0.740	31.0 20	13 26	5	11.52	0.817	4.2 22	47 34	5
1.331	22	45 36	1.706	0.838	22	45 26	8.32	0.737	31.4 21	11 28	5	11.49	0.815	4.2 22	11 26	5
1.327	20	45 34	1.713	0.835	22	49 30	8.14	0.733	33.3 20	11 24	5	11.46	0.813	2.4 22	13 24	5
1.314	22	47 38	1.730	0.826	22	45 22	8.48	0.730	28.4 20	15 28	5	11.45	0.812	3.8 22	15 26	5
1.312	22	49 32	1.737	0.823	22	47 38	8.18	0.728	32.0 21	13 22	5	11.45	0.812	4.3 22	49 32	5
1.312	20	45 38	1.743	0.820	22	43 28	8.05	0.725	33.2 20	9 30	5	11.37	0.806	3.6 22	49 40	5
1.311	21	47 32	1.746	0.819	22	49 36	8.10	0.721	32.0 21	9 26	5	11.36	0.806	4.1 22	9 24	5
1.308	22	45 40	1.748	0.818	22	43 24	8.31	0.720	29.1 20	15 24	5	11.36	0.806	2.4 22	15 22	5
1.307	20	47 36	1.772	0.807	23	9 20	8.04	0.717	32.2 20	11 20	5	11.33	0.804	4.3 22	9 28	5

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

Figure A.11 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 1,865.2 MWd/MTU

```
Cycle:                          19                      Core Average Exposure: MWd/MTU    16199.5
Exposure: MWd/MTU (GWd)      2300.0 ( 316.91 )
Delta E: MWd/MTU, (GWd)       434.8 (  59.91 )                 Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.179   3.191    14  0.463 0.463  35  2
Inlet Subcooling: Btu/lbm    -26.59                        24  0.502   9.209    16  0.421 0.619   9 12
Flow: Mlb/hr                 103.73 (101.20 %)             23  0.650  12.200    17  0.387 0.463  59 36
                                                           22  0.755  14.348    18  0.439 0.502   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  0.823  15.583    19  0.874 1.132  47 48
59              -- -- -- -- -- -- --             59        20  0.873  16.295    20  1.143 1.322  45 34
55          -- -- -- -- -- -- -- -- --           55        19  0.901  16.712    21  1.144 1.305  47 32
51       -- -- -- -- -- -- -- -- -- -- --        51        18  0.926  17.127    22  1.167 1.340  47 34
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  0.945  17.314    23  1.049 1.200  53 34
43 -- -- -- -- -- 16 --  8 -- 16 -- -- -- -- -- 43        16  0.968  17.879    24  1.014 1.218  51 40
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39        15  1.006  18.429
35 -- -- -- -- -- 12 --  8 -- 12 -- -- -- -- -- 35        14  1.027  18.450
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31        13  1.161  17.507
27 -- -- -- -- -- 12 --  8 -- 12 -- -- -- -- -- 27        12  1.220  17.927
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23        11  1.250  18.202
19 -- -- -- -- -- 16 --  8 -- 16 -- -- -- -- -- 19        10  1.273  18.543
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15         9  1.305  19.043
11       -- -- -- -- -- -- -- -- -- -- --       11         8  1.333  19.334
 7          -- -- -- -- -- -- -- -- --          7         7  1.364  19.511
 3             -- -- -- -- -- -- --             3         6  1.408  20.036
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  1.409* 20.103*
                                                           4  1.344  19.436
Control Rod Density: %          4.86                       3  1.210  17.985
                                                           2  0.917  13.852
k-effective:                 0.99954                Bottom  1  0.251   3.951
Void Fraction:                0.463
Core Delta-P: psia           25.389                % AXIAL TILT -19.840  -8.268
Core Plate Delta-P: psia     20.829          AVG BOT 8ft/12ft  1.1147  1.0500
Coolant Temp: Deg-F           548.4
In Channel Flow: Mlb/hr       91.26   Active Channel Flow: Mlb/hr        87.99
Total Bypass Flow (%):         12.0   (of total core flow)
Total Water Rod Flow (%):       3.1   (of total core flow)
Source Convergence          0.00007
```

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
1.340	22	47 34	1.705	0.839	22	45 30	8.41	0.744	31.3 21	13 30	5	11.37	0.807	5.3 22	47 34	5
1.338	22	45 32	1.707	0.838	22	47 28	8.28	0.736	31.7 20	13 26	5	11.37	0.806	5.5 22	15 32	5
1.333	22	45 36	1.710	0.836	22	45 26	8.22	0.733	32.2 21	11 28	5	11.35	0.805	5.2 22	11 26	5
1.322	20	45 34	1.715	0.834	22	49 30	8.06	0.731	34.0 20	11 24	5	11.34	0.804	5.4 22	49 32	5
1.316	22	47 38	1.731	0.826	22	45 22	8.36	0.725	29.2 20	15 28	5	11.32	0.803	3.5 22	13 24	5
1.314	22	49 32	1.741	0.822	22	47 38	8.08	0.724	32.7 21	13 22	5	11.30	0.802	4.8 22	15 26	5
1.310	22	45 40	1.746	0.819	22	43 28	7.97	0.722	33.9 20	9 30	5	11.25	0.798	4.6 22	49 40	5
1.306	20	45 38	1.748	0.818	22	49 36	8.02	0.718	32.8 21	9 26	5	11.25	0.798	5.1 22	9 24	5
1.305	21	47 32	1.751	0.817	22	43 24	8.19	0.715	29.9 20	15 24	5	11.23	0.796	3.4 22	15 22	5
1.303	22	49 36	1.776	0.805	22	19 40	7.97	0.715	32.9 20	11 20	5	11.22	0.796	5.3 23	7 26	5

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

Figure A.12 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 2,300.0 MWd/MTU

```
Cycle:                          19                      Core Average Exposure: MWd/MTU    16699.5
Exposure: MWd/MTU (GWd)      2800.0 ( 385.80 )
Delta E: MWd/MTU, (GWd)       500.0 (  68.89 )                 Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.184   3.288    14  0.460 0.460  35  2
Inlet Subcooling: Btu/lbm    -26.45                        24  0.511   9.479    16  0.418 0.616   9 12
Flow: Mlb/hr                 104.24 (101.70 %)             23  0.661  12.550    17  0.384 0.459  59 36
                                                           22  0.765  14.756    18  0.436 0.499   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           21  0.833  16.028    19  0.871 1.131  47 48
59              -- -- -- -- -- -- --             59       20  0.881  16.767    20  1.140 1.316  45 34
55          -- -- -- -- -- -- -- -- --           55       19  0.908  17.198    21  1.141 1.300  47 32
51       -- -- -- -- -- -- -- -- -- -- --        51       18  0.933  17.627    22  1.171 1.343  47 34
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47       17  0.951  17.824    23  1.052 1.204  53 34
43 -- -- -- -- -- 16 --  8 -- 16 -- -- -- -- -- 43       16  0.972  18.394    24  1.018 1.225  51 40
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39       15  1.009  18.963
35 -- -- -- -- -- 12 --  8 -- 12 -- -- -- -- -- 35       14  1.028  18.995
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31       13  1.160  18.052
27 -- -- -- -- -- 12 --  8 -- 12 -- -- -- -- -- 27       12  1.218  18.499
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23       11  1.247  18.788
19 -- -- -- -- -- 16 --  8 -- 16 -- -- -- -- -- 19       10  1.270  19.140
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15        9  1.302  19.655
11       -- -- -- -- -- -- -- -- -- -- --       11        8  1.329  19.959
 7          -- -- -- -- -- -- -- -- --          7        7  1.358  20.150
 3             -- -- -- -- -- -- --             3        6  1.400* 20.696
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           5  1.398  20.763*
                                                           4  1.330  20.064
Control Rod Density: %          4.86                       3  1.196  18.549
                                                           2  0.906  14.280
k-effective:                 0.99947                Bottom  1  0.249   4.075
Void Fraction:                0.461
Core Delta-P: psia           25.552              % AXIAL TILT -19.162  -8.420
Core Plate Delta-P: psia     20.992          AVG BOT 8ft/12ft  1.1105  1.0508
Coolant Temp: Deg-F           548.4
In Channel Flow: Mlb/hr       91.73   Active Channel Flow: Mlb/hr        88.46
Total Bypass Flow (%):         12.0   (of total core flow)
Total Water Rod Flow (%):       3.1   (of total core flow)
Source Convergence          0.00006
```

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
1.343	22	47 34	1.710	0.836	22	45 30	8.31	0.741	32.2 21	13 30	5	11.25	0.798	6.6 22	49 32	5
1.340	22	45 32	1.711	0.836	22	47 28	8.19	0.734	32.6 20	13 26	5	11.25	0.798	6.6 22	47 34	5
1.336	22	45 36	1.715	0.834	22	45 26	8.14	0.732	33.1 21	11 28	5	11.23	0.796	6.4 22	11 26	5
1.321	22	47 38	1.718	0.832	22	49 30	7.99	0.731	34.9 20	11 24	5	11.23	0.796	6.7 22	15 32	5
1.318	22	49 32	1.736	0.824	22	45 22	8.01	0.723	33.6 21	13 22	5	11.22	0.796	4.6 22	13 24	5
1.316	20	45 34	1.746	0.819	22	47 38	8.26	0.722	30.0 20	15 28	5	11.17	0.792	6.0 22	15 26	5
1.313	22	45 40	1.750	0.817	22	49 36	7.89	0.721	34.8 20	9 30	5	11.16	0.792	6.3 22	9 24	5
1.307	22	49 36	1.752	0.816	22	43 28	7.96	0.719	33.6 21	9 26	5	11.16	0.791	5.8 22	49 40	5
1.304	22	43 34	1.756	0.814	22	43 24	7.92	0.716	33.8 20	11 20	5	11.15	0.791	6.5 23	7 26	5
1.302	22	43 24	1.777	0.805	22	19 40	8.10	0.712	30.8 20	15 24	5	11.13	0.789	6.3 23	9 20	5

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

Figure A.13 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 2,800.0 MWd/MTU

```
Cycle:                          19                      Core Average Exposure: MWd/MTU    17199.5
Exposure: MWd/MTU (GWd)      3300.0 ( 454.69 )
Delta E: MWd/MTU, (GWd)       500.0 (  68.89 )                 Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.188   3.387    14  0.456 0.456  35  2
Inlet Subcooling: Btu/lbm    -26.37                        24  0.521   9.755    16  0.416 0.614   9 12
Flow: Mlb/hr                 104.55 (102.00 %)             23  0.672  12.906    17  0.381 0.456  59 36
                                                           22  0.774  15.170    18  0.433 0.496   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  0.841  16.478    19  0.868 1.129  47 48
59              -- -- -- -- -- -- --             59        20  0.889  17.243    20  1.136 1.310  45 34
55          -- -- -- -- -- -- -- -- --           55        19  0.915  17.688    21  1.137 1.295  47 32
51       -- -- -- -- -- -- -- -- -- -- --        51        18  0.939  18.131    22  1.174 1.347  47 34
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  0.955  18.337    23  1.056 1.208  53 34
43 -- -- -- -- -- 16 --  8 -- 16 -- -- -- -- -- 43        16  0.976  18.911    24  1.022 1.233  51 40
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39        15  1.011  19.499
35 -- -- -- -- -- 12 --  8 -- 12 -- -- -- -- -- 35        14  1.028  19.540
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31        13  1.158  18.596
27 -- -- -- -- -- 12 --  8 -- 12 -- -- -- -- -- 27        12  1.214  19.070
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23        11  1.243  19.373
19 -- -- -- -- -- 16 --  8 -- 16 -- -- -- -- -- 19        10  1.266  19.736
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15         9  1.299  20.266
11       -- -- -- -- -- -- -- -- -- -- --       11         8  1.325  20.582
 7          -- -- -- -- -- -- -- -- --          7         7  1.353  20.787
 3             -- -- -- -- -- -- --             3         6  1.394* 21.352
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  1.390  21.417*
                                                           4  1.319  20.686
Control Rod Density: %          4.86                       3  1.184  19.108
                                                           2  0.897  14.703
k-effective:                 0.99933                Bottom  1  0.248   4.198
Void Fraction:                0.459
Core Delta-P: psia           25.643              % AXIAL TILT -18.556  -8.545
Core Plate Delta-P: psia     21.083           AVG BOT 8ft/12ft  1.1067  1.0514
Coolant Temp: Deg-F           548.4
In Channel Flow: Mlb/hr       92.02   Active Channel Flow: Mlb/hr        88.75
Total Bypass Flow (%):        12.0    (of total core flow)
Total Water Rod Flow (%):      3.1    (of total core flow)
Source Convergence          0.00010
```

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
1.347	22	47 34	1.711	0.836	22	45 30	8.23	0.740	33.1 21	13 30	5	11.17	0.792	7.8 22	49 32	5
1.343	22	45 32	1.714	0.834	22	47 28	8.12	0.733	33.5 20	13 26	5	11.16	0.792	7.8 22	47 34	5
1.339	22	45 36	1.715	0.834	22	45 26	8.08	0.732	33.9 21	11 28	5	11.13	0.789	7.6 22	11 26	5
1.325	22	47 38	1.720	0.831	22	49 30	7.94	0.732	35.7 20	11 24	5	11.13	0.789	5.8 22	13 24	5
1.322	22	49 32	1.739	0.822	22	45 22	7.94	0.723	34.4 21	13 22	5	11.10	0.787	7.8 22	15 32	5
1.317	22	45 40	1.748	0.818	22	47 38	7.83	0.721	35.6 20	9 30	5	11.10	0.787	7.7 23	7 26	5
1.312	22	49 36	1.751	0.817	22	49 36	7.91	0.720	34.4 21	9 26	5	11.10	0.787	7.5 23	9 20	5
1.310	20	45 34	1.757	0.814	22	43 28	8.17	0.720	30.9 20	15 28	5	11.09	0.787	7.5 22	9 24	5
1.306	22	43 34	1.761	0.812	22	43 24	7.88	0.718	34.6 20	11 20	5	11.08	0.786	7.0 22	49 40	5
1.305	22	43 24	1.779	0.804	22	19 40	8.10	0.712	30.6 20	13 18	5	11.06	0.784	7.2 22	15 26	5

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

Figure A.14 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 3,300.0 MWd/MTU

```
Cycle:                          19                      Core Average Exposure: MWd/MTU    17699.5
Exposure: MWd/MTU (GWd)      3800.0 ( 523.59 )
Delta E: MWd/MTU, (GWd)       500.0 (  68.89 )                 Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.192   3.489    14  0.452 0.452  35  2
Inlet Subcooling: Btu/lbm    -26.23                        24  0.530  10.035    16  0.413 0.612   9 12
Flow: Mlb/hr                 105.06 (102.50 %)             23  0.683  13.268    17  0.378 0.452  59 36
                                                           22  0.784  15.588    18  0.431 0.493   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           21  0.850  16.932    19  0.865 1.128  47 48
59              -- -- -- -- -- -- --             59       20  0.896  17.723    20  1.133 1.305  45 34
55          -- -- -- -- -- -- -- -- --           55       19  0.921  18.182    21  1.133 1.290  47 32
51       -- -- -- -- -- -- -- -- -- -- --        51       18  0.944  18.637    22  1.178 1.351  47 34
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47       17  0.960  18.852    23  1.060 1.213  53 34
43 -- -- -- -- -- 16 --  8 -- 16 -- -- -- -- -- 43       16  0.979  19.430    24  1.027 1.241  51 40
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39       15  1.012  20.036
35 -- -- -- -- -- 12 --  8 -- 12 -- -- -- -- -- 35       14  1.028  20.086
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31       13  1.155  19.139
27 -- -- -- -- -- 12 --  8 -- 12 -- -- -- -- -- 27       12  1.210  19.639
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23       11  1.239  19.955
19 -- -- -- -- -- 16 --  8 -- 16 -- -- -- -- -- 19       10  1.263  20.330
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15        9  1.295  20.876
11       -- -- -- -- -- -- -- -- -- -- --       11        8  1.321  21.204
 7          -- -- -- -- -- -- -- -- --          7        7  1.349  21.421
 3             -- -- -- -- -- -- --             3        6  1.388* 22.005
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           5  1.382  22.068*
                                                           4  1.310  21.303
Control Rod Density: %           4.86                      3  1.173  19.661
                                                           2  0.888  15.122
k-effective:                  0.99926                Bottom  1  0.247   4.321
Void Fraction:                 0.456
Core Delta-P: psia            25.810              % AXIAL TILT -17.985  -8.645
Core Plate Delta-P: psia      21.250          AVG BOT 8ft/12ft  1.1029  1.0518
Coolant Temp: Deg-F            548.4
In Channel Flow: Mlb/hr         92.49   Active Channel Flow: Mlb/hr        89.22
Total Bypass Flow (%):          12.0   (of total core flow)
Total Water Rod Flow (%):        3.1   (of total core flow)
Source Convergence           0.00010
```

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
1.351	22	47 34	1.712	0.835	22	45 30	8.16	0.740	33.9 21	13 30	5	11.11	0.788	9.0 22	49 32	5
1.346	22	45 32	1.716	0.833	22	45 26	7.90	0.734	36.5 20	11 24	5	11.10	0.788	8.9 22	47 34	5
1.342	22	45 36	1.718	0.832	22	47 28	8.06	0.733	34.3 20	13 26	5	11.08	0.786	8.7 23	9 20	5
1.329	22	47 38	1.723	0.830	22	49 30	8.02	0.733	34.8 21	11 28	5	11.06	0.784	8.9 23	7 26	5
1.327	22	49 32	1.744	0.820	22	45 22	7.88	0.723	35.3 21	13 22	5	11.05	0.784	8.6 22	49 26	5
1.321	22	45 40	1.751	0.817	22	47 38	7.87	0.722	35.3 21	9 26	5	11.04	0.783	7.0 22	13 24	5
1.318	22	49 36	1.752	0.816	22	49 36	7.78	0.722	36.4 20	9 30	5	11.03	0.782	8.7 22	9 24	5
1.309	22	43 34	1.761	0.812	22	43 28	7.84	0.721	35.4 20	11 20	5	11.02	0.781	8.1 22	49 40	5
1.308	22	43 24	1.763	0.811	22	43 24	8.09	0.719	31.8 20	15 28	5	11.01	0.781	8.4 24	9 22	5
1.305	20	45 34	1.781	0.803	22	19 40	8.05	0.713	31.5 20	13 18	5	11.00	0.780	9.0 22	15 32	5

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

Figure A.15 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 3,800.0 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    18199.4
Exposure: MWd/MTU (GWd)      4300.0 ( 592.48 )
Delta E: MWd/MTU, (GWd)       500.0 (  68.89 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)           N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                     Top 25  0.196   3.593    14  0.449 0.449  35  2
Inlet Subcooling: Btu/lbm    -26.17                         24  0.539  10.321    16  0.410 0.610   9 12
Flow: Mlb/hr                 105.27 (102.70 %)              23  0.693  13.635    17  0.376 0.448  59 36
                                                            22  0.792  16.012    18  0.428 0.490   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58             21  0.857  17.390    19  0.862 1.126  47 48
59              -- -- -- -- -- -- --             59         20  0.902  18.206    20  1.130 1.299  45 34
55          -- -- -- -- -- -- -- -- --           55         19  0.926  18.679    21  1.130 1.285  47 32
51       -- -- -- -- -- -- -- -- -- -- --        51         18  0.948  19.146    22  1.182 1.355  47 34
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47         17  0.962  19.368    23  1.063 1.218  53 34
43 -- -- -- -- -- 16 --  8 -- 16 -- -- -- -- -- 43         16  0.980  19.949    24  1.031 1.249  51 40
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39         15  1.013  20.573
35 -- -- -- -- -- 12 --  8 -- 12 -- -- -- -- -- 35         14  1.026  20.631
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31         13  1.152  19.680
27 -- -- -- -- -- 12 --  8 -- 12 -- -- -- -- -- 27         12  1.205  20.205
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23         11  1.234  20.536
19 -- -- -- -- -- 16 --  8 -- 16 -- -- -- -- -- 19         10  1.258  20.922
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15          9  1.291  21.483
11       -- -- -- -- -- -- -- -- -- -- --       11          8  1.318  21.823
 7          -- -- -- -- -- -- -- -- --          7          7  1.346  22.054
 3             -- -- -- -- -- -- --             3          6  1.385* 22.657
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58             5  1.378  22.716*
                                                            4  1.304  21.917
Control Rod Density: %         4.86                         3  1.167  20.211
                                                            2  0.883  15.538
k-effective:                0.99913                 Bottom  1  0.247   4.443
Void Fraction:               0.455
Core Delta-P: psia          25.871           % AXIAL TILT -17.526  -8.726
Core Plate Delta-P: psia    21.311         AVG BOT 8ft/12ft  1.0997  1.0521
Coolant Temp: Deg-F          548.3
In Channel Flow: Mlb/hr       92.69   Active Channel Flow: Mlb/hr        89.41
Total Bypass Flow (%):        12.0    (of total core flow)
Total Water Rod Flow (%):      3.1    (of total core flow)
Source Convergence          0.00008
```

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
1.355	22	47 34	1.713	0.835	22	45 30	8.10	0.740	34.8 21	13 30	5	11.08	0.786	9.9 23	9 20	5
1.349	22	45 32	1.716	0.833	22	45 26	7.87	0.737	37.4 20	11 24	5	11.07	0.785	10.2 22	49 32	5
1.346	22	45 36	1.721	0.831	22	47 28	7.97	0.734	35.6 21	11 28	5	11.06	0.785	10.1 22	47 34	5
1.334	22	47 38	1.726	0.829	22	49 30	8.00	0.734	35.2 20	13 26	5	11.03	0.783	10.1 23	7 26	5
1.331	22	49 32	1.747	0.819	22	45 22	7.84	0.725	36.1 21	9 26	5	11.01	0.781	9.5 22	49 40	5
1.325	22	45 40	1.753	0.816	22	47 38	7.83	0.725	36.1 21	13 22	5	11.01	0.781	9.8 22	49 26	5
1.323	22	49 36	1.754	0.815	22	49 36	7.82	0.725	36.3 20	11 20	5	11.00	0.780	9.6 24	9 22	5
1.312	22	43 34	1.762	0.812	22	43 28	7.74	0.724	37.3 20	9 30	5	11.00	0.780	9.1 22	47 24	5
1.310	22	43 24	1.764	0.811	22	43 24	8.02	0.718	32.6 20	15 28	5	10.99	0.780	9.8 22	9 24	5
1.299	20	45 34	1.782	0.802	22	19 40	8.01	0.715	32.4 20	13 18	5	10.91	0.774	9.6 22	47 42	5

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

Figure A.16 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 4,300.0 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    18295.3
Exposure: MWd/MTU (GWd)      4395.8 ( 605.68 )
Delta E: MWd/MTU, (GWd)        95.8 (  13.20 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.197   3.613    14  0.448 0.448  35  2
Inlet Subcooling: Btu/lbm    -26.17                        24  0.540  10.376    16  0.410 0.609   9 12
Flow: Mlb/hr                 105.27 (102.70 %)             23  0.694  13.706    17  0.375 0.448  59 36
                                                           22  0.794  16.093    18  0.427 0.490   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           21  0.858  17.478    19  0.862 1.125  47 48
59              -- -- -- -- -- -- --             59       20  0.903  18.299    20  1.129 1.298  45 34
55          -- -- -- -- -- -- -- -- --           55       19  0.927  18.774    21  1.129 1.284  47 32
51       -- -- -- -- -- -- -- -- -- -- --        51       18  0.949  19.243    22  1.182 1.356  47 34
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47       17  0.963  19.468    23  1.064 1.219  53 34
43 -- -- -- -- -- 16 --  8 -- 16 -- -- -- -- -- 43       16  0.980  20.049    24  1.032 1.250  51 40
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39       15  1.012  20.676
35 -- -- -- -- -- 12 --  8 -- 12 -- -- -- -- -- 35       14  1.026  20.736
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31       13  1.151  19.784
27 -- -- -- -- -- 12 --  8 -- 12 -- -- -- -- -- 27       12  1.204  20.314
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23       11  1.232  20.647
19 -- -- -- -- -- 16 --  8 -- 16 -- -- -- -- -- 19       10  1.257  21.035
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15        9  1.290  21.599
11       -- -- -- -- -- -- -- -- -- -- --       11        8  1.317  21.942
 7          -- -- -- -- -- -- -- -- --          7        7  1.345  22.175
 3              -- -- -- -- -- -- --            3        6  1.384* 22.781
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           5  1.378  22.840*
                                                           4  1.304  22.034
Control Rod Density: %           4.86                      3  1.166  20.315
                                                           2  0.882  15.617
k-effective:                  0.99913                Bottom  1  0.247   4.467
Void Fraction:                 0.454
Core Delta-P: psia            25.869              % AXIAL TILT -17.459  -8.739
Core Plate Delta-P: psia      21.309          AVG BOT 8ft/12ft  1.0992  1.0522
Coolant Temp: Deg-F            548.3
In Channel Flow: Mlb/hr         92.69   Active Channel Flow: Mlb/hr        89.41
Total Bypass Flow (%):          11.9   (of total core flow)
Total Water Rod Flow (%):        3.1   (of total core flow)
Source Convergence           0.00009
```

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
1.356	22	47 34	1.713	0.835	22	45 30	8.09	0.741	35.0 21	13 30	5	11.08	0.786	10.1 23	9 20	5
1.349	22	45 32	1.716	0.833	22	45 26	7.86	0.738	37.5 20	11 24	5	11.06	0.785	10.4 22	49 32	5
1.346	22	45 36	1.722	0.831	22	47 28	7.97	0.735	35.8 21	11 28	5	11.06	0.784	10.3 22	47 34	5
1.335	22	47 38	1.726	0.828	22	49 30	8.00	0.735	35.4 20	13 26	5	11.03	0.783	10.3 23	7 26	5
1.332	22	49 32	1.747	0.819	22	45 22	7.83	0.726	36.3 21	9 26	5	11.02	0.781	9.8 22	49 40	5
1.325	22	45 40	1.753	0.816	22	47 38	7.82	0.726	36.4 20	11 20	5	11.01	0.781	9.8 24	9 22	5
1.324	22	49 36	1.754	0.815	22	49 36	7.83	0.725	36.3 21	13 22	5	11.01	0.781	10.0 22	49 26	5
1.312	22	43 34	1.762	0.811	22	43 28	7.73	0.724	37.4 20	9 30	5	11.00	0.780	9.3 22	47 24	5
1.311	22	43 24	1.764	0.811	22	43 24	8.01	0.719	32.8 20	15 28	5	11.00	0.780	10.1 22	9 24	5
1.299	22	47 42	1.782	0.802	22	17 42	8.00	0.716	32.5 20	13 18	5	10.91	0.774	9.8 22	47 42	5

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

Figure A.17 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 4,395.8 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    18297.6
Exposure: MWd/MTU (GWd)      4398.1 ( 606.00 )
Delta E: MWd/MTU, (GWd)         2.3 (   0.32 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.195   3.614    14  0.454 0.454  35  2
Inlet Subcooling: Btu/lbm    -25.84                        24  0.536  10.377    16  0.412 0.614   9 12
Flow: Mlb/hr                 106.50 (103.90 %)             23  0.689  13.708    17  0.377 0.443  59 36
                                                           22  0.787  16.095    18  0.429 0.483   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           21  0.849  17.481    19  0.866 1.140  47 48
59              -- -- -- -- -- -- --             59       20  0.898  18.301    20  1.116 1.273  43 44
55          -- -- -- -- -- -- -- -- --           55       19  0.925  18.776    21  1.152 1.252  45 42
51       -- -- -- -- -- -- -- -- -- -- --        51       18  0.951  19.246    22  1.179 1.320  43 42
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47       17  0.955  19.470    23  1.069 1.209  51 42
43 -- -- -- -- -- -- 14 -- 14 -- -- -- -- -- -- 43       16  0.976  20.051    24  1.038 1.236  51 40
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39       15  1.011  20.679
35 -- -- -- -- 14 --  8 --  6 -- 14 -- -- -- -- 35       14  1.027  20.738
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31       13  1.153  19.786
27 -- -- -- -- 14 --  6 --  8 -- 14 -- -- -- -- 27       12  1.207  20.316
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23       11  1.237  20.649
19 -- -- -- -- -- -- 14 -- 14 -- -- -- -- -- -- 19       10  1.262  21.037
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15        9  1.296  21.602
11       -- -- -- -- -- -- -- -- -- -- --       11        8  1.322  21.945
 7          -- -- -- -- -- -- -- -- --          7        7  1.350  22.178
 3              -- -- -- -- -- -- --            3        6  1.389* 22.784
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           5  1.381  22.843*
                                                           4  1.306  22.037
Control Rod Density: %           4.91                      3  1.167  20.318
                                                           2  0.882  15.619
k-effective:                  0.99910                Bottom  1  0.247   4.467
Void Fraction:                 0.453
Core Delta-P: psia            26.334              % AXIAL TILT -17.810  -8.740
Core Plate Delta-P: psia      21.773          AVG BOT 8ft/12ft  1.1015  1.0522
Coolant Temp: Deg-F            548.4
In Channel Flow: Mlb/hr         93.79   Active Channel Flow: Mlb/hr        90.48
Total Bypass Flow (%):          11.9   (of total core flow)
Total Water Rod Flow (%):        3.1   (of total core flow)
Source Convergence           0.00009
```

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
1.320	22	43 42	1.772	0.807	22	17 42	8.09	0.724	32.5 20	13 18	5	11.02	0.782	10.1 23	9 20	5
1.319	22	41 44	1.782	0.803	22	41 44	8.04	0.723	33.2 20	15 16	5	10.96	0.777	10.0 22	15 18	5
1.308	22	45 44	1.782	0.802	22	45 22	7.77	0.722	36.4 20	11 20	5	10.96	0.777	9.9 23	19 10	5
1.305	22	43 46	1.784	0.802	22	19 40	7.96	0.717	33.4 20	17 14	5	10.93	0.775	9.9 22	17 16	5
1.302	22	15 40	1.788	0.800	22	21 42	7.99	0.717	32.9 20	17 18	5	10.89	0.772	9.8 22	49 40	5
1.298	22	39 46	1.789	0.799	22	39 46	7.72	0.715	36.2 20	19 12	5	10.88	0.772	9.8 22	47 42	5
1.295	22	47 42	1.796	0.796	22	15 18	7.83	0.715	34.7 21	15 20	5	10.84	0.768	9.7 24	9 22	5
1.287	22	41 48	1.802	0.794	22	17 16	7.59	0.712	37.6 20	11 24	5	10.82	0.768	9.4 22	39 50	5
1.286	22	47 38	1.808	0.791	22	47 42	7.73	0.710	35.4 21	19 16	5	10.81	0.766	9.4 22	41 48	5
1.281	22	37 48	1.813	0.789	23	9 20	7.64	0.708	36.3 21	13 22	5	10.80	0.766	10.0 22	13 16	5

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

Figure A.18 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 4,398.1 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    18499.4
Exposure: MWd/MTU (GWd)      4600.0 ( 633.82 )
Delta E: MWd/MTU, (GWd)       201.9 (  27.82 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.197   3.656    14  0.453 0.453  35  2
Inlet Subcooling: Btu/lbm    -25.84                        24  0.539  10.493    16  0.411 0.613   9 12
Flow: Mlb/hr                 106.50 (103.90 %)             23  0.693  13.857    17  0.376 0.441  59 36
                                                           22  0.790  16.266    18  0.427 0.482   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           21  0.851  17.665    19  0.864 1.139  47 48
59              -- -- -- -- -- -- --             59       20  0.900  18.496    20  1.114 1.271  43 44
55          -- -- -- -- -- -- -- -- --           55       19  0.927  18.977    21  1.150 1.250  45 42
51       -- -- -- -- -- -- -- -- -- -- --        51       18  0.952  19.452    22  1.181 1.321  43 42
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47       17  0.956  19.678    23  1.071 1.212  51 42
43 -- -- -- -- -- -- 14 -- 14 -- -- -- -- -- -- 43       16  0.977  20.261    24  1.040 1.239  51 40
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39       15  1.011  20.895
35 -- -- -- -- 14 --  8 --  6 -- 14 -- -- -- -- 35       14  1.026  20.958
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31       13  1.151  20.005
27 -- -- -- -- 14 --  6 --  8 -- 14 -- -- -- -- 27       12  1.205  20.545
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23       11  1.235  20.884
19 -- -- -- -- -- -- 14 -- 14 -- -- -- -- -- -- 19       10  1.260  21.277
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15        9  1.294  21.847
11       -- -- -- -- -- -- -- -- -- -- --       11        8  1.321  22.195
 7          -- -- -- -- -- -- -- -- --          7        7  1.349  22.434
 3              -- -- -- -- -- -- --            3        6  1.388* 23.047
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           5  1.381  23.105*
                                                           4  1.305  22.285
Control Rod Density: %          4.91                       3  1.166  20.539
                                                           2  0.881  15.786
k-effective:                 0.99906                Bottom  1  0.247   4.517
Void Fraction:                0.453
Core Delta-P: psia           26.329              % AXIAL TILT -17.668  -8.770
Core Plate Delta-P: psia     21.769          AVG BOT 8ft/12ft  1.1004  1.0523
Coolant Temp: Deg-F           548.4
In Channel Flow: Mlb/hr       93.79   Active Channel Flow: Mlb/hr        90.49
Total Bypass Flow (%):         11.9   (of total core flow)
Total Water Rod Flow (%):       3.1   (of total core flow)
Source Convergence          0.00009
```

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
1.321	22	43 42	1.772	0.807	22	43 20	8.08	0.725	32.9 20	13 18	5	11.03	0.782	10.6 23	9 20	5
1.320	22	41 44	1.783	0.802	22	41 44	8.03	0.725	33.6 20	15 16	5	10.96	0.777	10.3 23	19 10	5
1.310	22	45 44	1.784	0.802	22	45 22	7.77	0.724	36.8 20	11 20	5	10.96	0.777	10.5 22	15 18	5
1.306	22	43 46	1.784	0.801	22	19 40	7.95	0.719	33.7 20	17 14	5	10.93	0.775	10.4 22	17 16	5
1.303	22	15 40	1.789	0.799	22	21 42	7.97	0.717	33.2 20	17 18	5	10.90	0.773	10.2 22	49 40	5
1.299	22	39 46	1.791	0.798	22	39 46	7.72	0.717	36.5 20	19 12	5	10.89	0.772	10.3 22	47 42	5
1.297	22	47 42	1.797	0.796	22	15 18	7.81	0.716	35.1 21	15 20	5	10.85	0.769	10.2 24	9 22	5
1.289	22	41 48	1.803	0.793	22	17 16	7.59	0.714	37.9 20	11 24	5	10.82	0.768	9.9 22	39 50	5
1.288	22	47 38	1.808	0.791	22	47 42	7.70	0.710	35.7 21	19 16	5	10.80	0.766	9.9 22	41 48	5
1.282	22	37 48	1.813	0.789	22	49 30	7.63	0.710	36.6 21	13 22	5	10.78	0.764	10.3 22	47 16	5

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

Figure A.19 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 4,600.0 MWd/MTU

```
Cycle:                          19                      Core Average Exposure: MWd/MTU    18899.5
Exposure: MWd/MTU (GWd)      5000.0 ( 688.93 )
Delta E: MWd/MTU, (GWd)       400.0 (  55.11 )                 Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.200   3.741    14  0.449 0.449  35  2
Inlet Subcooling: Btu/lbm    -25.84                        24  0.546  10.725    16  0.409 0.611   9 12
Flow: Mlb/hr                 106.50 (103.90 %)             23  0.701  14.154    17  0.373 0.438  59 36
                                                           22  0.796  16.607    18  0.425 0.480   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  0.856  18.032    19  0.862 1.137  47 48
59              -- -- -- -- -- -- --             59        20  0.904  18.884    20  1.112 1.267  43 44
55          -- -- -- -- -- -- -- -- --           55        19  0.930  19.377    21  1.147 1.247  45 42
51       -- -- -- -- -- -- -- -- -- -- --        51        18  0.954  19.862    22  1.184 1.324  43 42
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  0.958  20.089    23  1.074 1.217  51 42
43 -- -- -- -- -- -- 14 -- 14 -- -- -- -- -- -- 43        16  0.977  20.675    24  1.043 1.246  51 40
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39        15  1.010  21.324
35 -- -- -- -- 14 --  8 --  6 -- 14 -- -- -- -- 35        14  1.024  21.393
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31        13  1.147  20.436
27 -- -- -- -- 14 --  6 --  8 -- 14 -- -- -- -- 27        12  1.200  20.997
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23        11  1.229  21.346
19 -- -- -- -- -- -- 14 -- 14 -- -- -- -- -- -- 19        10  1.256  21.749
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15         9  1.290  22.333
11       -- -- -- -- -- -- -- -- -- -- --       11         8  1.318  22.691
 7          -- -- -- -- -- -- -- -- --          7         7  1.347  22.941
 3             -- -- -- -- -- -- --             3         6  1.387* 23.569
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  1.379  23.624*
                                                           4  1.303  22.775
Control Rod Density: %          4.91                       3  1.164  20.977
                                                           2  0.878  16.116
k-effective:                 0.99898                Bottom  1  0.247   4.615
Void Fraction:                0.452
Core Delta-P: psia           26.320              % AXIAL TILT -17.370  -8.825
Core Plate Delta-P: psia     21.759          AVG BOT 8ft/12ft  1.0982  1.0525
Coolant Temp: Deg-F           548.4
In Channel Flow: Mlb/hr       93.80   Active Channel Flow: Mlb/hr        90.49
Total Bypass Flow (%):         11.9   (of total core flow)
Total Water Rod Flow (%):       3.1   (of total core flow)
Source Convergence          0.00009
```

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
1.324	22	43 42	1.772	0.807	22	43 20	8.07	0.729	33.6 20	13 18	5	11.05	0.784	11.5 23	9 20	5
1.322	22	41 44	1.782	0.802	22	41 44	7.77	0.728	37.4 20	11 20	5	10.97	0.778	11.3 23	19 10	5
1.314	22	45 44	1.782	0.802	22	45 22	8.00	0.727	34.3 20	15 16	5	10.94	0.776	11.4 22	15 18	5
1.309	22	43 46	1.785	0.801	22	19 40	7.92	0.721	34.4 20	17 14	5	10.93	0.775	11.2 22	49 40	5
1.307	22	15 40	1.791	0.798	22	21 42	7.71	0.720	37.2 20	19 12	5	10.91	0.774	11.3 22	17 16	5
1.302	22	39 46	1.795	0.797	22	39 46	7.93	0.719	33.9 20	17 18	5	10.89	0.773	11.2 22	47 42	5
1.301	22	47 42	1.799	0.795	22	15 18	7.58	0.718	38.5 20	11 24	5	10.87	0.771	11.1 24	9 22	5
1.293	22	41 48	1.806	0.792	22	17 16	7.78	0.717	35.7 21	15 20	5	10.84	0.768	10.8 22	39 50	5
1.293	22	47 38	1.809	0.790	22	47 42	7.61	0.712	37.2 21	13 22	5	10.80	0.766	10.8 22	41 48	5
1.286	22	49 36	1.811	0.790	22	49 30	7.66	0.711	36.3 21	19 16	5	10.79	0.765	10.8 24	21 10	5

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

Figure A.20 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 5,000.0 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    19399.5
Exposure: MWd/MTU (GWd)      5500.0 ( 757.82 )
Delta E: MWd/MTU, (GWd)       500.0 (  68.89 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.203   3.849    14  0.446 0.446  35  2
Inlet Subcooling: Btu/lbm    -25.90                        24  0.553  11.018    16  0.406 0.608   9 12
Flow: Mlb/hr                 106.29 (103.70 %)             23  0.709  14.531    17  0.371 0.435  59 36
                                                           22  0.802  17.036    18  0.422 0.477   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  0.861  18.493    19  0.859 1.135  47 48
59              -- -- -- -- -- -- --             59        20  0.907  19.371    20  1.109 1.263  43 44
55          -- -- -- -- -- -- -- -- --           55        19  0.932  19.877    21  1.143 1.243  45 42
51       -- -- -- -- -- -- -- -- -- -- --        51        18  0.956  20.376    22  1.187 1.327  43 42
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  0.958  20.604    23  1.078 1.224  51 42
43 -- -- -- -- -- -- 14 -- 14 -- -- -- -- -- -- 43        16  0.977  21.194    24  1.048 1.254  51 40
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39        15  1.009  21.860
35 -- -- -- -- 14 --  8 --  6 -- 14 -- -- -- -- 35        14  1.020  21.935
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31        13  1.141  20.973
27 -- -- -- -- 14 --  6 --  8 -- 14 -- -- -- -- 27        12  1.192  21.558
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23        11  1.222  21.922
19 -- -- -- -- -- -- 14 -- 14 -- -- -- -- -- -- 19        10  1.250  22.338
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15         9  1.286  22.938
11       -- -- -- -- -- -- -- -- -- -- --       11         8  1.315  23.310
 7          -- -- -- -- -- -- -- -- --          7         7  1.345  23.573
 3              -- -- -- -- -- -- --            3         6  1.386* 24.220
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  1.380  24.271*
                                                           4  1.305  23.387
Control Rod Density: %          4.91                       3  1.164  21.523
                                                           2  0.878  16.529
k-effective:                 0.99891                Bottom  1  0.247   4.737
Void Fraction:                0.452
Core Delta-P: psia           26.238                % AXIAL TILT -17.121  -8.883
Core Plate Delta-P: psia     21.677          AVG BOT 8ft/12ft  1.0960  1.0527
Coolant Temp: Deg-F           548.4
In Channel Flow: Mlb/hr       93.62   Active Channel Flow: Mlb/hr        90.32
Total Bypass Flow (%):         11.9   (of total core flow)
Total Water Rod Flow (%):       3.1   (of total core flow)
Source Convergence          0.00009
```

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
1.327	22	43 42	1.770	0.808	22	43 20	7.78	0.735	38.3 20	11 20	5	11.08	0.786	12.7 23	9 20	5
1.326	22	41 44	1.781	0.803	22	41 44	8.06	0.734	34.4 20	13 18	5	11.00	0.780	12.4 23	19 10	5
1.319	22	45 44	1.781	0.803	22	45 22	7.98	0.732	35.1 20	15 16	5	10.97	0.778	12.3 22	49 40	5
1.314	22	43 46	1.785	0.801	22	19 40	7.71	0.727	38.0 20	19 12	5	10.95	0.777	12.6 22	15 18	5
1.311	22	15 40	1.792	0.798	22	21 42	7.92	0.726	35.2 20	17 14	5	10.92	0.775	12.4 22	17 16	5
1.307	22	47 42	1.795	0.797	22	39 46	7.58	0.723	39.3 20	11 24	5	10.92	0.774	12.3 24	9 22	5
1.305	22	39 46	1.801	0.794	22	15 18	7.90	0.721	34.8 20	17 18	5	10.92	0.774	12.4 22	47 42	5
1.299	22	41 48	1.807	0.791	22	43 46	7.75	0.720	36.6 21	15 20	5	10.88	0.772	12.0 22	39 50	5
1.297	22	47 38	1.809	0.791	22	49 30	7.59	0.716	38.1 21	13 22	5	10.83	0.768	11.9 24	21 10	5
1.291	22	49 36	1.811	0.790	22	47 42	7.51	0.715	39.0 20	23 12	5	10.82	0.767	12.0 22	41 48	5

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

Figure A.21 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 5,500.0 MWd/MTU

```
Cycle:                          19                      Core Average Exposure: MWd/MTU    19899.5
Exposure: MWd/MTU (GWd)      6000.0 ( 826.72 )
Delta E: MWd/MTU, (GWd)       500.0 (  68.89 )                Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.206   3.958    14  0.442 0.442  35  2
Inlet Subcooling: Btu/lbm    -26.09                        24  0.559  11.316    16  0.404 0.606   9 12
Flow: Mlb/hr                 105.58 (103.00 %)             23  0.715  14.911    17  0.368 0.431  59 36
                                                           22  0.807  17.468    18  0.420 0.475   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           21  0.864  18.956    19  0.855 1.133  47 48
59              -- -- -- -- -- -- --             59       20  0.909  19.859    20  1.105 1.258  43 44
55          -- -- -- -- -- -- -- -- --           55       19  0.933  20.379    21  1.139 1.238  45 42
51       -- -- -- -- -- -- -- -- -- -- --        51       18  0.956  20.890    22  1.191 1.331  43 42
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47       17  0.958  21.120    23  1.081 1.231  51 42
43 -- -- -- -- -- -- 14 -- 14 -- -- -- -- -- -- 43       16  0.975  21.712    24  1.053 1.263  51 40
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39       15  1.006  22.394
35 -- -- -- -- 14 --  8 --  6 -- 14 -- -- -- -- 35       14  1.016  22.475
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31       13  1.134  21.507
27 -- -- -- -- 14 --  6 --  8 -- 14 -- -- -- -- 27       12  1.184  22.116
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23       11  1.214  22.493
19 -- -- -- -- -- -- 14 -- 14 -- -- -- -- -- -- 19       10  1.243  22.923
15    -- -- -- -- -- -- -- -- -- -- -- -- -- --    15        9  1.281  23.541
11       -- -- -- -- -- -- -- -- -- -- -- --       11        8  1.312  23.927
 7          -- -- -- -- -- -- -- -- --            7        7  1.345  24.204
 3              -- -- -- -- -- -- --              3        6  1.388* 24.871
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           5  1.384  24.920*
                                                           4  1.310  24.001
Control Rod Density: %          4.91                       3  1.170  22.071
                                                           2  0.882  16.942
k-effective:                 0.99881                Bottom  1  0.249   4.860
Void Fraction:                0.452
Core Delta-P: psia           25.973              % AXIAL TILT -17.006  -8.933
Core Plate Delta-P: psia     21.412          AVG BOT 8ft/12ft  1.0946  1.0528
Coolant Temp: Deg-F           548.3
In Channel Flow: Mlb/hr       92.97   Active Channel Flow: Mlb/hr        89.69
Total Bypass Flow (%):         11.9   (of total core flow)
Total Water Rod Flow (%):       3.1   (of total core flow)
Source Convergence          0.00010
```

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
1.331	22	43 42	1.767	0.809	22	43 20	7.80	0.743	39.1 20	11 20	5	11.15	0.791	13.9 23	9 20	5
1.329	22	41 44	1.776	0.805	22	41 44	8.06	0.740	35.3 20	13 18	5	11.06	0.784	13.6 23	19 10	5
1.323	22	45 44	1.777	0.805	22	45 22	7.98	0.737	36.0 20	15 16	5	11.04	0.783	13.5 22	49 40	5
1.319	22	43 46	1.784	0.802	22	19 40	7.74	0.735	38.8 20	19 12	5	10.99	0.779	13.4 24	9 22	5
1.315	22	15 40	1.791	0.798	22	39 46	7.92	0.733	36.1 20	17 14	5	10.98	0.778	13.7 22	15 18	5
1.313	22	47 42	1.791	0.798	22	21 42	7.59	0.730	40.1 20	11 24	5	10.96	0.777	13.5 22	47 42	5
1.309	22	39 46	1.801	0.794	22	15 18	7.88	0.725	35.6 20	17 18	5	10.94	0.776	13.6 22	17 16	5
1.304	22	41 48	1.804	0.793	22	49 30	7.74	0.725	37.4 21	15 20	5	10.94	0.776	13.1 22	39 50	5
1.302	22	47 38	1.805	0.792	22	43 46	7.52	0.721	39.8 20	23 12	5	10.90	0.773	13.1 24	21 10	5
1.296	22	49 36	1.808	0.791	22	47 42	7.58	0.721	38.9 21	13 22	5	10.86	0.770	13.1 22	41 48	5

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

Figure A.22 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 6,000.0 MWd/MTU

```
Cycle:                          19                      Core Average Exposure: MWd/MTU    20399.3
Exposure: MWd/MTU (GWd)      6500.0 ( 895.61 )
Delta E: MWd/MTU, (GWd)       500.0 (  68.89 )                 Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.209   4.069    14  0.438 0.438  35  2
Inlet Subcooling: Btu/lbm    -26.37                        24  0.564  11.616    16  0.401 0.604   9 12
Flow: Mlb/hr                 104.55 (102.00 %)             23  0.721  15.295    17  0.365 0.427  59 36
                                                           22  0.810  17.903    18  0.417 0.472   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           21  0.866  19.421    19  0.852 1.131  47 48
59              -- -- -- -- -- -- --             59       20  0.910  20.348    20  1.102 1.254  43 44
55          -- -- -- -- -- -- -- -- --           55       19  0.933  20.881    21  1.135 1.234  45 42
51       -- -- -- -- -- -- -- -- -- -- --        51       18  0.955  21.404    22  1.195 1.335  43 42
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47       17  0.956  21.634    23  1.085 1.238  51 42
43 -- -- -- -- -- -- 14 -- 14 -- -- -- -- -- -- 43       16  0.972  22.228    24  1.058 1.271  51 40
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39       15  1.001  22.927
35 -- -- -- -- 14 --  8 --  6 -- 14 -- -- -- -- 35       14  1.010  23.013
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31       13  1.125  22.037
27 -- -- -- -- 14 --  6 --  8 -- 14 -- -- -- -- 27       12  1.174  22.669
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23       11  1.204  23.061
19 -- -- -- -- -- -- 14 -- 14 -- -- -- -- -- -- 19       10  1.235  23.505
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15        9  1.275  24.141
11       -- -- -- -- -- -- -- -- -- -- --       11        8  1.309  24.542
 7          -- -- -- -- -- -- -- -- --           7        7  1.345  24.836
 3              -- -- -- -- -- -- --             3        6  1.392* 25.524
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           5  1.391  25.572*
                                                           4  1.320  24.619
Control Rod Density: %          4.91                       3  1.180  22.623
                                                           2  0.889  17.357
k-effective:                 0.99872                Bottom  1  0.252   4.985
Void Fraction:                0.454
Core Delta-P: psia           25.601              % AXIAL TILT -17.002  -8.979
Core Plate Delta-P: psia     21.041          AVG BOT 8ft/12ft  1.0937  1.0529
Coolant Temp: Deg-F           548.3
In Channel Flow: Mlb/hr       92.05   Active Channel Flow: Mlb/hr        88.79
Total Bypass Flow (%):         12.0   (of total core flow)
Total Water Rod Flow (%):       3.1   (of total core flow)
Source Convergence          0.00009
```

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
1.335	22	43 42	1.761	0.812	22	17 42	7.84	0.753	39.9 20	11 20	5	11.23	0.796	15.1 23	9 20	5
1.333	22	41 44	1.770	0.808	22	41 44	8.08	0.748	36.1 20	13 18	5	11.14	0.790	14.8 23	19 10	5
1.328	22	45 44	1.772	0.807	22	45 22	7.77	0.744	39.6 20	19 12	5	11.12	0.789	14.7 22	49 40	5
1.324	22	43 46	1.781	0.803	22	19 40	7.99	0.744	36.8 20	15 16	5	11.08	0.786	14.6 24	9 22	5
1.319	22	15 40	1.786	0.801	22	39 46	7.94	0.740	36.9 20	17 14	5	11.02	0.782	14.3 22	39 50	5
1.318	22	47 42	1.790	0.799	22	21 42	7.61	0.739	41.0 20	11 24	5	11.02	0.782	14.7 22	47 42	5
1.313	22	39 46	1.795	0.797	22	15 18	7.87	0.730	36.4 20	17 18	5	11.02	0.781	14.9 22	15 18	5
1.310	22	41 48	1.799	0.795	22	49 30	7.73	0.730	38.2 21	15 20	5	10.99	0.779	14.2 24	21 10	5
1.306	22	47 38	1.801	0.794	22	47 42	7.55	0.729	40.6 20	23 12	5	10.98	0.779	14.8 22	17 16	5
1.302	22	49 40	1.802	0.794	22	43 46	7.60	0.728	39.7 21	9 26	5	10.92	0.775	14.3 22	41 48	5

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

Figure A.23 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 6,500.0 MWd/MTU

```
Cycle:                          19
Exposure: MWd/MTU (GWd)      6927.6 ( 954.53 )
Delta E: MWd/MTU, (GWd)       427.6 (  58.92 )
Power: MWt                   3952.0 (100.00 %)
Core Pressure: psia          1050.0
Inlet Subcooling: Btu/lbm     -26.71
Flow: Mlb/hr                 103.32 (100.80 %)

    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58
59              -- -- -- -- -- -- --              59
55          -- -- -- -- -- -- -- -- --          55
51       -- -- -- -- -- -- -- -- -- -- --       51
47    -- -- -- -- -- -- -- -- -- -- -- -- --    47
43 -- -- -- -- -- -- 14 -- 14 -- -- -- -- -- -- 43
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39
35 -- -- -- -- 14 --  8 --  6 -- 14 -- -- -- -- 35
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31
27 -- -- -- -- 14 --  6 --  8 -- 14 -- -- -- -- 27
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23
19 -- -- -- -- -- -- 14 -- 14 -- -- -- -- -- -- 19
15    -- -- -- -- -- -- -- -- -- -- -- -- -- --    15
11       -- -- -- -- -- -- -- -- -- -- --       11
 7          -- -- -- -- -- -- -- -- --           7
 3              -- -- -- -- -- -- --             3
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58

Control Rod Density: %         4.91

k-effective:                0.99863
Void Fraction:               0.456
Core Delta-P: psia          25.162
Core Plate Delta-P: psia    20.603
Coolant Temp: Deg-F          548.3
In Channel Flow: Mlb/hr      90.94   Active Channel Flow: Mlb/hr        87.71
Total Bypass Flow (%):        12.0   (of total core flow)
Total Water Rod Flow (%):      3.1   (of total core flow)
Source Convergence          0.00009
```

```
Core Average Exposure: MWd/MTU    20827.0

                 Axial Profile    Edit   Radial Power
          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Top 25    0.211   4.165    14  0.435 0.435  35  2
    24    0.568  11.874    16  0.399 0.603   9 12
    23    0.725  15.625    17  0.363 0.424  59 36
    22    0.812  18.275    18  0.415 0.470   1 30
    21    0.867  19.819    19  0.849 1.129  47 48
    20    0.910  20.766    20  1.099 1.250  43 44
    19    0.932  21.310    21  1.131 1.230  45 42
    18    0.953  21.843    22  1.198 1.338  43 42
    17    0.953  22.073    23  1.088 1.243  51 42
    16    0.969  22.669    24  1.062 1.279  51 40
    15    0.997  23.380
    14    1.004  23.470
    13    1.117  22.487
    12    1.164  23.139
    11    1.195  23.543
    10    1.228  24.000
     9    1.270  24.652
     8    1.306  25.068
     7    1.345  25.376
     6    1.396  26.084
     5   1.400* 26.133*
     4    1.332  25.152
     3    1.193  23.099
     2    0.899  17.716
Bottom   1    0.255   5.092

% AXIAL TILT -17.097  -9.018
AVG BOT 8ft/12ft  1.0934  1.0530
```

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
1.338	22	43 42	1.753	0.816	22	17 42	7.88	0.762	40.6 20	11 20	5	11.31	0.802	16.1 23	9 20	5
1.336	22	41 44	1.762	0.812	22	41 44	8.11	0.756	36.9 20	13 18	5	11.22	0.796	15.8 23	19 10	5
1.333	22	45 44	1.766	0.810	22	45 22	7.81	0.754	40.4 20	19 12	5	11.21	0.795	15.7 22	49 40	5
1.328	22	43 46	1.778	0.804	22	19 40	8.01	0.751	37.5 20	15 16	5	11.17	0.792	15.6 24	9 22	5
1.323	22	47 42	1.780	0.803	22	39 46	7.96	0.748	37.6 20	17 14	5	11.11	0.788	15.3 22	39 50	5
1.322	22	15 40	1.786	0.801	22	45 44	7.65	0.747	41.6 20	11 24	5	11.09	0.787	15.7 22	47 42	5
1.316	22	39 46	1.786	0.801	22	21 42	7.58	0.738	41.3 20	23 12	5	11.07	0.785	15.2 24	21 10	5
1.315	22	41 48	1.791	0.798	22	47 42	7.74	0.736	38.9 21	15 20	5	11.06	0.785	15.9 22	15 18	5
1.310	22	47 38	1.791	0.798	22	43 46	7.63	0.736	40.4 21	9 26	5	11.03	0.782	15.8 22	17 16	5
1.308	22	49 40	1.792	0.798	22	49 30	7.87	0.736	37.2 20	17 18	5	8.46	0.781	46.0 20	49 42	5

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

Figure A.24 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 6,927.6 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    20830.4
Exposure: MWd/MTU (GWd)      6931.0 ( 955.00 )
Delta E: MWd/MTU, (GWd)         3.4 (   0.47 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.213   4.166    14  0.419 0.419  35  2
Inlet Subcooling: Btu/lbm    -25.95                        24  0.575  11.876    16  0.382 0.590  11 52
Flow: Mlb/hr                 106.09 (103.50 %)             23  0.735  15.628    17  0.348 0.405  35 60
                                                           22  0.826  18.278    18  0.398 0.447   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  0.886  19.822    19  0.814 1.110  47 48
59              -- -- -- -- -- -- --             59        20  0.928  20.770    20  1.137 1.311  39 40
55          -- -- -- -- -- -- -- -- --           55        19  0.942  21.314    21  1.152 1.261  35 40
51       -- -- -- -- -- -- -- -- -- -- --        51        18  0.960  21.846    22  1.227 1.392  41 40
47    -- -- -- -- -- 10 -- 10 -- -- -- -- --     47        17  0.962  22.077    23  1.025 1.209  41 52
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  0.978  22.672    24  0.980 1.227  39 52
39 -- -- 14 -- -- -- -- -- -- -- -- 14 -- -- 39        15  1.006  23.384
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  1.012  23.473
31 -- -- -- -- 14 --  8 --  8 -- 14 -- -- -- 31        13  1.125  22.491
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.171  23.142
23 -- -- 14 -- -- -- -- -- -- -- -- 14 -- -- 23        11  1.200  23.546
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.230  24.004
15    -- -- -- -- -- 10 -- 10 -- -- -- -- --    15         9  1.268  24.657
11       -- -- -- -- -- -- -- -- -- -- --       11         8  1.301  25.072
 7          -- -- -- -- -- -- -- -- --          7         7  1.337  25.380
 3              -- -- -- -- -- -- --            3         6  1.383* 26.088
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  1.380  26.137*
                                                           4  1.304  25.156
Control Rod Density: %          4.91                       3  1.160  23.103
                                                           2  0.872  17.719
k-effective:                 0.99862                Bottom  1  0.247   5.093
Void Fraction:                0.448
Core Delta-P: psia           26.144              % AXIAL TILT -16.030  -9.018
Core Plate Delta-P: psia     21.583          AVG BOT 8ft/12ft  1.0876  1.0530
Coolant Temp: Deg-F           548.3
In Channel Flow: Mlb/hr       93.46   Active Channel Flow: Mlb/hr        90.17
Total Bypass Flow (%):         11.9   (of total core flow)
Total Water Rod Flow (%):       3.1   (of total core flow)
Source Convergence          0.00010
```

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
1.392	22	41 40	1.685	0.848	22	39 38	7.81	0.734	37.6 20	17 14	5	10.94	0.776	15.8 23	19 10	5
1.390	22	37 40	1.694	0.844	22	19 40	7.60	0.734	40.4 20	19 12	5	10.81	0.767	15.8 22	17 16	5
1.387	22	39 38	1.702	0.840	22	21 42	7.85	0.733	37.2 20	17 18	5	10.78	0.764	13.8 22	39 42	5
1.384	22	39 42	1.704	0.839	22	37 40	7.77	0.729	37.5 20	15 16	5	10.77	0.764	15.3 22	39 50	5
1.364	22	43 42	1.722	0.831	22	35 38	7.60	0.727	39.5 21	19 16	5	10.74	0.762	15.3 22	41 48	5
1.364	22	35 38	1.727	0.828	22	41 36	7.56	0.726	39.9 21	19 20	5	10.70	0.759	15.8 22	15 18	5
1.364	22	41 44	1.728	0.827	22	29 38	7.69	0.717	37.0 20	21 22	5	10.68	0.758	15.4 22	17 50	5
1.360	22	33 40	1.731	0.826	22	43 24	7.71	0.712	36.0 20	21 18	5	10.68	0.757	15.6 22	15 48	5
1.357	22	43 38	1.733	0.825	22	43 42	7.36	0.712	40.6 20	17 22	5	10.67	0.757	15.2 24	21 10	5
1.346	22	31 38	1.736	0.824	22	35 42	7.41	0.705	38.9 21	15 20	5	10.65	0.755	14.7 22	41 40	5

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

Figure A.25 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 6,931.0 MWd/MTU

```
Cycle:                          19                      Core Average Exposure: MWd/MTU    21399.4
Exposure: MWd/MTU (GWd)      7500.0 (1033.40 )
Delta E: MWd/MTU, (GWd)       569.0 (  78.40 )                Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.216   4.297    14  0.416 0.416  35  2
Inlet Subcooling: Btu/lbm    -26.37                        24  0.581  12.228    16  0.380 0.588  11 52
Flow: Mlb/hr                 104.55 (102.00 %)             23  0.742  16.077    17  0.345 0.402  35 60
                                                           22  0.830  18.784    18  0.396 0.445   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  0.888  20.364    19  0.812 1.108  47 48
59              -- -- -- -- -- -- --             59        20  0.928  21.337    20  1.132 1.302  39 40
55          -- -- -- -- -- -- -- -- --           55        19  0.942  21.890    21  1.147 1.250  35 40
51       -- -- -- -- -- -- -- -- -- -- --        51        18  0.959  22.434    22  1.230 1.394  41 40
47    -- -- -- -- -- 10 -- 10 -- -- -- -- --     47        17  0.960  22.665    23  1.031 1.218  41 52
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  0.974  23.262    24  0.986 1.239  39 52
39 -- -- 14 -- -- -- -- -- -- -- -- 14 -- -- 39        15  1.000  23.990
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  1.004  24.082
31 -- -- -- -- 14 --  8 --  8 -- 14 -- -- -- 31        13  1.113  23.089
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.158  23.764
23 -- -- 14 -- -- -- -- -- -- -- -- 14 -- -- 23        11  1.187  24.184
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.219  24.658
15    -- -- -- -- -- 10 -- 10 -- -- -- -- --    15         9  1.261  25.332
11       -- -- -- -- -- -- -- -- -- -- --       11         8  1.297  25.766
 7          -- -- -- -- -- -- -- --            7         7  1.337  26.095
 3              -- -- -- -- -- -- --            3         6  1.389  26.829
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  1.391* 26.878*
                                                           4  1.318  25.856
Control Rod Density: %          4.91                       3  1.174  23.726
                                                           2  0.882  18.187
k-effective:                 0.99850                Bottom  1  0.250   5.233
Void Fraction:                0.450
Core Delta-P: psia           25.586                % AXIAL TILT -16.077  -9.040
Core Plate Delta-P: psia     21.026          AVG BOT 8ft/12ft  1.0867  1.0529
Coolant Temp: Deg-F           548.3
In Channel Flow: Mlb/hr       92.07   Active Channel Flow: Mlb/hr        88.81
Total Bypass Flow (%):         11.9   (of total core flow)
Total Water Rod Flow (%):       3.1   (of total core flow)
Source Convergence          0.00008
```

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
1.394	22	41 40	1.682	0.850	22	39 38	7.68	0.748	41.3 20	19 12	5	11.08	0.786	17.2 23	19 10	5
1.390	22	37 40	1.688	0.847	22	19 40	7.87	0.746	38.6 20	17 14	5	10.91	0.774	16.6 22	39 50	5
1.387	22	39 38	1.697	0.843	22	21 42	7.86	0.741	38.1 20	17 18	5	10.89	0.773	17.1 22	17 16	5
1.386	22	39 42	1.701	0.841	22	37 40	7.81	0.739	38.5 20	15 16	5	10.85	0.770	16.6 22	41 48	5
1.369	22	43 42	1.721	0.831	22	35 38	7.62	0.736	40.4 21	19 16	5	10.82	0.767	16.5 24	21 10	5
1.368	22	41 44	1.724	0.829	22	43 42	7.54	0.731	40.8 21	19 20	5	10.80	0.766	16.7 22	17 50	5
1.362	22	35 38	1.725	0.829	22	41 36	7.63	0.718	37.9 20	21 22	5	10.78	0.765	16.8 22	15 48	5
1.359	22	43 38	1.726	0.829	22	43 24	7.35	0.717	41.5 20	17 22	5	10.77	0.764	15.1 22	39 42	5
1.358	22	33 40	1.729	0.827	22	29 38	7.69	0.717	36.9 20	21 18	5	10.76	0.763	17.1 22	15 18	5
1.343	22	35 42	1.733	0.825	22	35 42	7.43	0.713	39.8 21	15 20	5	8.19	0.762	46.7 20	41 50	5

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

Figure A.26 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 7,500.0 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    21899.4
Exposure: MWd/MTU (GWd)      8000.0 (1102.30 )
Delta E: MWd/MTU, (GWd)       500.0 (  68.89 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.219   4.413    14  0.412 0.412  35  2
Inlet Subcooling: Btu/lbm    -26.76                        24  0.585  12.539    16  0.377 0.587  11 52
Flow: Mlb/hr                 103.11 (100.60 %)             23  0.746  16.474    17  0.343 0.398  35 60
                                                           22  0.832  19.231    18  0.393 0.442  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  0.888  20.841    19  0.808 1.106  47 48
59              -- -- -- -- -- -- --             59        20  0.928  21.836    20  1.128 1.296  39 40
55          -- -- -- -- -- -- -- -- --           55        19  0.940  22.396    21  1.142 1.244  35 40
51       -- -- -- -- -- -- -- -- -- -- --        51        18  0.956  22.949    22  1.234 1.398  41 40
47    -- -- -- -- -- 10 -- 10 -- -- -- -- --     47        17  0.956  23.180    23  1.035 1.226  41 52
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  0.969  23.777    24  0.991 1.248  39 52
39 -- -- 14 -- -- -- -- -- -- -- -- 14 -- -- 39        15  0.994  24.518
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  0.996  24.613
31 -- -- -- -- 14 --  8 --  8 -- 14 -- -- -- 31        13  1.102  23.609
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.145  24.305
23 -- -- 14 -- -- -- -- -- -- -- -- 14 -- -- 23        11  1.175  24.738
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.209  25.229
15    -- -- -- -- -- 10 -- 10 -- -- -- -- --    15         9  1.254  25.923
11       -- -- -- -- -- -- -- -- -- -- --       11         8  1.294  26.375
 7          -- -- -- -- -- -- -- -- --           7         7  1.339  26.723
 3             -- -- -- -- -- -- --              3         6  1.396  27.483
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  1.404* 27.534*
                                                           4  1.335  26.479
Control Rod Density: %         4.91                        3  1.191  24.282
                                                           2  0.894  18.604
k-effective:                0.99850                Bottom  1  0.254   5.358
Void Fraction:               0.453
Core Delta-P: psia          25.076              % AXIAL TILT -16.241  -9.061
Core Plate Delta-P: psia    20.517          AVG BOT 8ft/12ft  1.0865  1.0528
Coolant Temp: Deg-F          548.3
In Channel Flow: Mlb/hr       90.77   Active Channel Flow: Mlb/hr        87.55
Total Bypass Flow (%):        12.0    (of total core flow)
Total Water Rod Flow (%):      3.1    (of total core flow)
Source Convergence          0.00009
```

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
1.398	22	41 40	1.676	0.853	22	39 38	7.76	0.762	42.1 20	19 12	5	11.21	0.795	18.4 23	19 10	5
1.393	22	37 40	1.681	0.851	22	19 40	7.92	0.757	39.4 20	17 14	5	11.05	0.783	17.8 22	39 50	5
1.391	22	39 38	1.690	0.846	22	21 42	7.88	0.750	38.9 20	17 18	5	10.97	0.778	18.3 22	17 16	5
1.390	22	39 42	1.694	0.844	22	37 40	7.85	0.749	39.3 20	15 16	5	10.96	0.778	17.6 24	21 10	5
1.373	22	43 42	1.714	0.834	22	35 38	7.65	0.745	41.2 21	19 16	5	10.96	0.777	17.8 22	41 48	5
1.373	22	41 44	1.716	0.833	22	43 42	7.55	0.738	41.6 21	19 20	5	8.26	0.776	47.5 20	41 50	5
1.365	22	35 38	1.719	0.832	22	43 24	7.36	0.724	42.3 20	17 22	5	10.91	0.774	17.9 22	17 50	5
1.363	22	43 38	1.720	0.832	22	41 36	7.63	0.724	38.7 20	21 22	5	8.38	0.772	45.7 20	15 16	5
1.361	22	33 40	1.724	0.829	22	29 38	7.69	0.723	37.7 20	21 18	5	10.88	0.772	18.0 22	15 48	5
1.346	22	35 42	1.726	0.828	22	41 44	9.38	0.721	14.2 24	21 10	5	10.82	0.768	18.4 22	15 18	5

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

Figure A.27 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 8,000.0 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    22099.4
Exposure: MWd/MTU (GWd)      8200.0 (1129.80 )
Delta E: MWd/MTU, (GWd)       200.0 (  27.56 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.219   4.460    14  0.411 0.411  35  2
Inlet Subcooling: Btu/lbm    -26.94                        24  0.586  12.665    16  0.377 0.586  11 52
Flow: Mlb/hr                 102.50 (100.00 %)             23  0.747  16.634    17  0.342 0.397  35 60
                                                           22  0.832  19.409    18  0.392 0.441  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  0.888  21.032    19  0.807 1.105  47 48
59              -- -- -- -- -- -- --             59        20  0.927  22.036    20  1.127 1.294  39 40
55          -- -- -- -- -- -- -- -- --           55        19  0.939  22.598    21  1.141 1.242  35 40
51       -- -- -- -- -- -- -- -- -- -- --        51        18  0.955  23.154    22  1.236 1.400  41 40
47    -- -- -- -- -- 10 -- 10 -- -- -- -- --     47        17  0.954  23.386    23  1.036 1.229  41 52
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  0.967  23.983    24  0.993 1.252  39 52
39 -- -- 14 -- -- -- -- -- -- -- -- 14 -- -- 39        15  0.991  24.729
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  0.992  24.824
31 -- -- -- -- 14 --  8 --  8 -- 14 -- -- -- 31        13  1.097  23.815
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.140  24.519
23 -- -- 14 -- -- -- -- -- -- -- -- 14 -- -- 23        11  1.169  24.958
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.205  25.455
15    -- -- -- -- -- 10 -- 10 -- -- -- -- --    15         9  1.251  26.158
11       -- -- -- -- -- -- -- -- -- -- --       11         8  1.293  26.618
 7          -- -- -- -- -- -- -- -- --          7         7  1.340  26.975
 3             -- -- -- -- -- -- --             3         6  1.400  27.745
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  1.410* 27.798*
                                                           4  1.344  26.731
Control Rod Density: %          4.91                       3  1.200  24.506
                                                           2  0.900  18.772
k-effective:                 0.99852                Bottom  1  0.256   5.409
Void Fraction:                0.454
Core Delta-P: psia           24.861              % AXIAL TILT -16.358  -9.071
Core Plate Delta-P: psia     20.302           AVG BOT 8ft/12ft  1.0867  1.0528
Coolant Temp: Deg-F           548.3
In Channel Flow: Mlb/hr       90.21   Active Channel Flow: Mlb/hr        87.00
Total Bypass Flow (%):         12.0   (of total core flow)
Total Water Rod Flow (%):       3.1   (of total core flow)
Source Convergence          0.00009
```

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
1.400	22	41 40	1.673	0.855	22	39 38	7.79	0.768	42.4 20	19 12	5	11.27	0.799	18.8 23	19 10	5
1.394	22	37 40	1.678	0.852	22	19 40	7.95	0.762	39.8 20	17 14	5	11.11	0.788	18.2 22	39 50	5
1.392	22	39 38	1.686	0.848	22	21 42	7.87	0.754	39.7 20	15 16	5	8.29	0.782	47.9 20	41 50	5
1.392	22	39 42	1.691	0.846	22	37 40	7.89	0.753	39.3 20	17 18	5	11.02	0.782	18.1 24	21 10	5
1.375	22	43 42	1.711	0.836	22	35 38	7.67	0.749	41.5 21	19 16	5	11.02	0.781	18.7 22	17 16	5
1.375	22	41 44	1.712	0.835	22	43 42	7.56	0.741	42.0 21	19 20	5	11.01	0.781	18.2 22	41 48	5
1.366	22	35 38	1.716	0.833	22	43 24	9.46	0.728	14.6 24	21 10	5	10.96	0.777	18.3 22	17 50	5
1.365	22	43 38	1.717	0.833	22	41 36	7.37	0.727	42.6 20	17 22	5	8.40	0.776	46.1 20	15 16	5
1.363	22	33 40	1.722	0.831	22	41 44	7.63	0.726	39.0 20	21 22	5	10.92	0.775	18.5 22	15 48	5
1.347	22	41 36	1.722	0.831	22	29 38	7.70	0.726	38.0 20	21 18	5	8.38	0.772	45.9 20	17 14	5

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

Figure A.28 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 8,200.0 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    22100.4
Exposure: MWd/MTU (GWd)      8201.0 (1130.00 )
Delta E: MWd/MTU, (GWd)         1.0 (   0.14 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.210   4.461    14  0.413 0.413  35  2
Inlet Subcooling: Btu/lbm    -25.90                        24  0.561  12.665    16  0.379 0.590  11 52
Flow: Mlb/hr                 106.29 (103.70 %)             23  0.717  16.634    17  0.344 0.400  35 60
                                                           22  0.802  19.410    18  0.395 0.444  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  0.861  21.033    19  0.813 1.114  47 48
59              -- -- -- -- -- -- --             59        20  0.908  22.037    20  1.122 1.291  39 40
55          -- -- -- -- -- -- -- -- --           55        19  0.927  22.599    21  1.136 1.242  41 42
51       -- -- -- -- -- -- -- -- -- -- --        51        18  0.948  23.155    22  1.232 1.401  41 40
47    -- -- -- -- -- 10 -- 10 -- -- -- -- --     47        17  0.952  23.387    23  1.044 1.240  41 52
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  0.969  23.984    24  1.001 1.263  39 52
39 -- -- 14 -- -- -- -- -- -- -- -- 14 -- -- 39        15  0.995  24.730
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  0.999  24.825
31 -- -- -- -- 14 --  0 --  0 -- 14 -- -- -- 31        13  1.108  23.816
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.152  24.520
23 -- -- 14 -- -- -- -- -- -- -- -- 14 -- -- 23        11  1.183  24.959
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.220  25.456
15    -- -- -- -- -- 10 -- 10 -- -- -- -- --    15         9  1.266  26.159
11       -- -- -- -- -- -- -- -- -- -- --       11         8  1.309  26.619
 7          -- -- -- -- -- -- -- -- --          7         7  1.355  26.976
 3              -- -- -- -- -- -- --            3         6  1.414  27.747
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  1.423* 27.800*
                                                           4  1.353  26.732
Control Rod Density: %          5.09                       3  1.206  24.507
                                                           2  0.904  18.773
k-effective:                 0.99852                Bottom  1  0.257   5.409
Void Fraction:                0.451
Core Delta-P: psia           26.291                % AXIAL TILT -17.552  -9.071
Core Plate Delta-P: psia     21.730          AVG BOT 8ft/12ft  1.0960  1.0528
Coolant Temp: Deg-F           548.4
In Channel Flow: Mlb/hr       93.61   Active Channel Flow: Mlb/hr        90.30
Total Bypass Flow (%):         11.9   (of total core flow)
Total Water Rod Flow (%):       3.1   (of total core flow)
Source Convergence          0.00008
```

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	22	41 40	1.714	0.835	22	19 40	7.87	0.775	42.4 20	19 12	5	11.39	0.808	18.8 23	19 10	5
1.393	22	39 42	1.722	0.830	22	21 42	8.03	0.770	39.8 20	17 14	5	11.23	0.796	18.2 22	39 50	5
1.389	22	37 40	1.724	0.829	22	39 38	7.95	0.762	39.7 20	15 16	5	8.38	0.790	47.9 20	41 50	5
1.385	22	39 38	1.738	0.823	22	37 40	7.98	0.761	39.3 20	17 18	5	11.14	0.790	18.1 24	21 10	5
1.382	22	41 44	1.739	0.822	22	43 42	7.75	0.757	41.5 21	19 16	5	11.14	0.790	18.7 22	17 16	5
1.381	22	43 42	1.749	0.818	22	43 24	7.64	0.749	42.0 21	19 20	5	11.13	0.790	18.2 22	41 48	5
1.366	22	43 38	1.753	0.816	22	41 44	9.56	0.736	14.6 24	21 10	5	11.08	0.786	18.3 22	17 50	5
1.351	22	33 40	1.769	0.808	22	41 36	7.44	0.735	42.6 20	17 22	5	8.49	0.785	46.1 20	15 16	5
1.349	22	35 38	1.772	0.807	22	35 42	7.71	0.734	39.0 20	21 22	5	11.04	0.783	18.5 22	15 48	5
1.348	22	43 46	1.790	0.799	22	35 38	7.78	0.734	38.0 20	21 18	5	8.46	0.780	45.9 20	17 14	5

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

Figure A.29 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 8,201.0 MWd/MTU

```
Cycle:                          19                      Core Average Exposure: MWd/MTU    22599.4
Exposure: MWd/MTU (GWd)      8700.0 (1198.70 )
Delta E: MWd/MTU, (GWd)       499.0 (  68.76 )                 Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.211   4.573    14  0.410 0.410  35  2
Inlet Subcooling: Btu/lbm    -26.37                        24  0.563  12.965    16  0.376 0.588  11 52
Flow: Mlb/hr                 104.55 (102.00 %)             23  0.719  17.017    17  0.341 0.396  35 60
                                                           22  0.801  19.840    18  0.392 0.442  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  0.859  21.494    19  0.809 1.112  47 48
59              -- -- -- -- -- -- --             59        20  0.905  22.523    20  1.118 1.285  39 40
55          -- -- -- -- -- -- -- -- --           55        19  0.923  23.096    21  1.132 1.237  41 42
51       -- -- -- -- -- -- -- -- -- -- --        51        18  0.943  23.663    22  1.237 1.405  41 40
47    -- -- -- -- -- 10 -- 10 -- -- -- -- --     47        17  0.947  23.896    23  1.048 1.248  41 52
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  0.962  24.495    24  1.005 1.273  39 52
39 -- -- 14 -- -- -- -- -- -- -- -- 14 -- -- 39        15  0.987  25.255
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  0.990  25.351
31 -- -- -- -- 14 --  0 --  0 -- 14 -- -- -- 31        13  1.095  24.332
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.138  25.057
23 -- -- 14 -- -- -- -- -- -- -- -- 14 -- -- 23        11  1.170  25.511
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.209  26.026
15    -- -- -- -- -- 10 -- 10 -- -- -- -- --    15         9  1.259  26.751
11       -- -- -- -- -- -- -- -- -- -- --       11         8  1.306  27.232
 7          -- -- -- -- -- -- -- -- --          7         7  1.358  27.612
 3              -- -- -- -- -- -- --            3         6  1.424  28.412
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  1.440* 28.470*
                                                           4  1.376  27.372
Control Rod Density: %          5.09                       3  1.230  25.078
                                                           2  0.922  19.201
k-effective:                 0.99852                Bottom  1  0.262   5.538
Void Fraction:                0.455
Core Delta-P: psia           25.671              % AXIAL TILT -17.922  -9.126
Core Plate Delta-P: psia     21.110          AVG BOT 8ft/12ft  1.0970  1.0529
Coolant Temp: Deg-F           548.4
In Channel Flow: Mlb/hr       92.03   Active Channel Flow: Mlb/hr        88.76
Total Bypass Flow (%):         12.0   (of total core flow)
Total Water Rod Flow (%):       3.1   (of total core flow)
Source Convergence          0.00009
```

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
1.405	22	41 40	1.705	0.839	22	19 40	7.96	0.791	43.3 20	19 12	5	11.55	0.827	20.1 23	19 10	5
1.397	22	39 42	1.714	0.834	22	21 42	8.10	0.784	40.6 20	17 14	5	11.38	0.811	19.4 22	39 50	5
1.392	22	37 40	1.716	0.833	22	39 38	8.01	0.774	40.5 20	15 16	5	8.47	0.807	48.8 20	41 50	5
1.388	22	39 38	1.729	0.827	22	43 42	8.02	0.772	40.1 20	17 18	5	11.27	0.805	19.6 22	17 16	4
1.386	22	43 42	1.730	0.827	22	37 40	7.81	0.769	42.4 21	19 16	5	11.29	0.803	19.2 24	21 10	5
1.386	22	41 44	1.741	0.821	22	41 44	7.67	0.758	42.8 21	19 20	5	11.27	0.803	19.4 22	41 48	5
1.370	22	43 38	1.741	0.821	22	43 24	9.77	0.755	15.6 24	21 10	5	11.22	0.800	19.5 22	17 50	5
1.354	22	43 46	1.763	0.811	22	41 36	7.76	0.744	39.8 20	13 18	5	11.17	0.797	19.6 22	15 48	5
1.354	22	33 40	1.765	0.810	22	35 42	7.48	0.744	43.4 20	17 22	5	8.54	0.797	47.0 20	15 16	5
1.352	22	35 38	1.782	0.802	22	35 38	7.52	0.743	42.8 21	21 14	5	8.54	0.795	46.7 20	17 14	5

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

Figure A.30 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 8,700.0 MWd/MTU

```
Cycle:                          19                      Core Average Exposure: MWd/MTU    22999.4
Exposure: MWd/MTU (GWd)      9100.0 (1253.90 )
Delta E: MWd/MTU, (GWd)       400.0 (  55.11 )                 Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.212   4.663    14  0.407 0.407  35  2
Inlet Subcooling: Btu/lbm    -26.82                        24  0.564  13.206    16  0.375 0.587  11 52
Flow: Mlb/hr                 102.91 (100.40 %)             23  0.718  17.324    17  0.339 0.394  35 60
                                                           22  0.799  20.184    18  0.390 0.440  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  0.856  21.863    19  0.807 1.110  47 48
59              -- -- -- -- -- -- --             59        20  0.901  22.912    20  1.115 1.280  39 40
55          -- -- -- -- -- -- -- -- --           55        19  0.919  23.492    21  1.128 1.233  41 42
51       -- -- -- -- -- -- -- -- -- -- --        51        18  0.938  24.067    22  1.240 1.409  41 40
47    -- -- -- -- -- 10 -- 10 -- -- -- -- --     47        17  0.941  24.302    23  1.051 1.255  41 52
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  0.955  24.902    24  1.009 1.280  39 52
39 -- -- 14 -- -- -- -- -- -- -- -- 14 -- -- 39        15  0.980  25.673
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  0.981  25.770
31 -- -- -- -- 14 --  0 --  0 -- 14 -- -- -- 31        13  1.083  24.741
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.125  25.482
23 -- -- 14 -- -- -- -- -- -- -- -- 14 -- -- 23        11  1.158  25.948
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.200  26.478
15    -- -- -- -- -- 10 -- 10 -- -- -- -- --    15         9  1.253  27.223
11       -- -- -- -- -- -- -- -- -- -- --       11         8  1.304  27.722
 7          -- -- -- -- -- -- -- -- --          7         7  1.362  28.123
 3              -- -- -- -- -- -- --            3         6  1.434  28.949
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  1.458* 29.015*
                                                           4  1.399  27.893
Control Rod Density: %          5.09                       3  1.254  25.544
                                                           2  0.940  19.550
k-effective:                 0.99851                Bottom  1  0.268   5.643
Void Fraction:                0.459
Core Delta-P: psia           25.097              % AXIAL TILT -18.365  -9.176
Core Plate Delta-P: psia     20.537           AVG BOT 8ft/12ft  1.0985  1.0530
Coolant Temp: Deg-F           548.3
In Channel Flow: Mlb/hr       90.54   Active Channel Flow: Mlb/hr        87.31
Total Bypass Flow (%):         12.0   (of total core flow)
Total Water Rod Flow (%):       3.1   (of total core flow)
Source Convergence          0.00009
```

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
1.409	22	41 40	1.697	0.843	22	19 40	8.04	0.805	44.0 20	19 12	5	11.73	0.844	20.5 23	19 10	4
1.400	22	39 42	1.706	0.838	22	21 20	8.17	0.796	41.3 20	17 14	5	11.52	0.828	20.4 22	39 50	5
1.395	22	37 40	1.709	0.837	22	39 38	8.08	0.786	41.2 20	15 16	5	11.44	0.823	20.6 22	17 16	4
1.391	22	39 38	1.719	0.832	22	43 42	8.07	0.782	40.8 20	17 18	5	11.50	0.822	19.7 24	21 10	4
1.390	22	41 44	1.722	0.830	22	37 40	7.86	0.779	43.0 21	19 16	5	8.54	0.820	49.5 20	41 50	5
1.390	22	43 42	1.729	0.827	22	41 44	10.00	0.776	16.1 24	21 10	4	11.39	0.818	20.4 22	41 48	5
1.373	22	43 38	1.734	0.825	22	43 24	7.71	0.768	43.4 21	19 20	5	11.41	0.816	19.9 22	17 12	4
1.359	22	43 46	1.757	0.814	22	41 36	9.85	0.764	16.1 23	19 10	4	11.34	0.813	20.1 22	15 14	4
1.356	22	33 40	1.759	0.813	22	35 42	9.83	0.761	15.7 22	17 12	4	11.24	0.810	20.7 22	15 18	4
1.353	22	35 38	1.775	0.806	22	35 38	9.76	0.759	16.5 22	17 16	5	8.59	0.809	47.7 20	15 16	5

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

Figure A.31 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 9,100.0 MWd/MTU

```
Cycle:                          19                      Core Average Exposure: MWd/MTU    23000.4
Exposure: MWd/MTU (GWd)      9101.0 (1254.00 )
Delta E: MWd/MTU, (GWd)         1.0 (   0.14 )                 Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.211   4.663    14  0.409 0.409  35  2
Inlet Subcooling: Btu/lbm    -26.23                        24  0.562  13.206    16  0.375 0.588  11 52
Flow: Mlb/hr                 105.06 (102.50 %)             23  0.716  17.325    17  0.340 0.395  35 60
                                                           22  0.795  20.184    18  0.391 0.442  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  0.849  21.864    19  0.809 1.115  47 48
59              -- -- -- -- -- -- --             59        20  0.891  22.913    20  1.113 1.279  39 40
55          -- -- -- -- -- -- -- -- --           55        19  0.904  23.493    21  1.127 1.234  41 42
51       -- -- -- -- -- -- -- -- -- -- --        51        18  0.923  24.068    22  1.238 1.408  41 40
47    -- -- -- -- -- 10 -- 10 -- -- -- -- --     47        17  0.931  24.303    23  1.055 1.262  41 52
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  0.949  24.903    24  1.012 1.287  39 52
39 -- -- 14 -- -- -- -- -- -- -- -- 14 -- -- 39        15  0.977  25.674
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  0.980  25.771
31 -- -- -- -- 10 --  0 --  0 -- 10 -- -- -- 31        13  1.085  24.742
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.129  25.483
23 -- -- 14 -- -- -- -- -- -- -- -- 14 -- -- 23        11  1.164  25.949
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.207  26.480
15    -- -- -- -- -- 10 -- 10 -- -- -- -- --    15         9  1.261  27.224
11       -- -- -- -- -- -- -- -- -- -- --       11         8  1.312  27.724
 7          -- -- -- -- -- -- -- -- --          7         7  1.371  28.124
 3             -- -- -- -- -- -- --             3         6  1.443  28.950
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  1.466* 29.016*
                                                           4  1.405  27.894
Control Rod Density: %          5.18                       3  1.259  25.545
                                                           2  0.943  19.551
k-effective:                 0.99851                Bottom  1  0.269   5.643
Void Fraction:                0.456
Core Delta-P: psia           25.901              % AXIAL TILT -18.991  -9.176
Core Plate Delta-P: psia     21.340          AVG BOT 8ft/12ft  1.1025  1.0530
Coolant Temp: Deg-F           548.4
In Channel Flow: Mlb/hr       92.47   Active Channel Flow: Mlb/hr        89.18
Total Bypass Flow (%):         12.0   (of total core flow)
Total Water Rod Flow (%):       3.1   (of total core flow)
Source Convergence          0.00009
```

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
1.408	22	41 40	1.719	0.832	22	19 40	8.09	0.810	44.0 20	19 12	5	11.75	0.849	21.0 23	19 10	5
1.402	22	39 42	1.728	0.827	22	21 42	8.23	0.801	41.3 20	17 14	5	11.60	0.833	20.4 22	39 50	5
1.395	22	37 40	1.741	0.821	22	37 40	8.13	0.791	41.2 20	15 16	5	11.50	0.828	20.6 22	17 16	4
1.394	22	41 44	1.742	0.821	22	43 42	8.12	0.787	40.8 20	17 18	5	11.57	0.826	19.7 24	21 10	4
1.392	22	43 42	1.748	0.818	22	41 44	7.91	0.784	43.0 21	19 16	5	8.59	0.826	49.5 20	41 50	5
1.387	22	39 38	1.749	0.818	22	39 38	10.06	0.780	16.1 24	21 10	4	11.47	0.824	20.4 22	41 48	5
1.368	22	43 38	1.775	0.805	22	43 24	7.76	0.772	43.4 21	19 20	5	11.42	0.821	20.5 22	17 50	5
1.364	22	43 46	1.777	0.805	22	35 42	9.91	0.769	16.1 23	19 10	4	11.36	0.818	20.6 22	15 48	5
1.357	22	33 40	1.798	0.795	22	43 46	9.89	0.765	15.7 22	17 12	4	11.30	0.814	20.7 22	15 18	4
1.353	22	35 38	1.798	0.795	22	27 40	9.82	0.764	16.5 22	17 16	5	8.65	0.814	47.7 20	15 16	5

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

Figure A.32 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 9,101.0 MWd/MTU

```
Cycle:                          19
Exposure: MWd/MTU (GWd)      9459.4 (1303.40 )
Delta E: MWd/MTU, (GWd)       358.4 (  49.38 )
Power: MWt                   3952.0 (100.00 %)
Core Pressure: psia          1050.0
Inlet Subcooling: Btu/lbm     -26.65
Flow: Mlb/hr                 103.53 (101.00 %)

    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58
59              -- -- -- -- -- -- --              59
55          -- -- -- -- -- -- -- -- --          55
51       -- -- -- -- -- -- -- -- -- -- --       51
47    -- -- -- -- -- 10 -- 10 -- -- -- -- --    47
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43
39 -- -- 14 -- -- -- -- -- -- -- -- 14 -- -- 39
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35
31 -- -- -- -- 10 --  0 --  0 -- 10 -- -- -- 31
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27
23 -- -- 14 -- -- -- -- -- -- -- -- 14 -- -- 23
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19
15    -- -- -- -- -- 10 -- 10 -- -- -- -- --    15
11       -- -- -- -- -- -- -- -- -- -- --       11
 7          -- -- -- -- -- -- -- -- --           7
 3              -- -- -- -- -- -- --             3
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58

Control Rod Density: %         5.18

k-effective:                0.99852
Void Fraction:               0.460
Core Delta-P: psia          25.362
Core Plate Delta-P: psia    20.801
Coolant Temp: Deg-F          548.4
In Channel Flow: Mlb/hr      91.07
Total Bypass Flow (%):        12.0
Total Water Rod Flow (%):      3.1
Source Convergence          0.00010
```

Core Average Exposure: MWd/MTU 23358.8

	Axial Profile		Edit	Radial Power			
N(PRA)	Power	Exposure	Zone	Avg.	Max.	IR	JR
Top 25	0.211	4.744	14	0.406	0.406	35	2
24	0.561	13.421	16	0.374	0.587	11	52
23	0.714	17.598	17	0.338	0.393	35	60
22	0.792	20.490	18	0.389	0.440	29	60
21	0.845	22.190	19	0.807	1.113	47	48
20	0.886	23.255	20	1.110	1.275	39	40
19	0.899	23.841	21	1.124	1.231	41	42
18	0.918	24.423	22	1.241	1.410	41	40
17	0.925	24.661	23	1.058	1.267	41	52
16	0.943	25.263	24	1.016	1.293	39	52
15	0.969	26.044					
14	0.972	26.142					
13	1.074	25.105					
12	1.118	25.861					
11	1.153	26.339					
10	1.199	26.884					
9	1.255	27.648					
8	1.311	28.165					
7	1.374	28.586					
6	1.453	29.438					
5	1.482*	29.512*					
4	1.427	28.371					
3	1.282	25.973					
2	0.961	19.872					
Bottom 1	0.274	5.739					

% AXIAL TILT -19.452 -9.236
AVG BOT 8ft/12ft 1.1042 1.0532

Active Channel Flow: Mlb/hr 87.82
(of total core flow)
(of total core flow)

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
1.410	22	41 40	1.712	0.835	22	19 40	8.16	0.822	44.6 20	19 12	5	11.97	0.868	21.4 23	19 10	4
1.405	22	39 42	1.721	0.831	22	21 42	8.29	0.813	42.0 20	17 14	5	11.81	0.851	20.8 22	39 50	4
1.398	22	41 44	1.733	0.825	22	43 42	8.18	0.801	41.8 20	15 16	5	11.65	0.845	21.5 22	17 16	4
1.397	22	37 40	1.734	0.824	22	37 40	10.24	0.799	16.8 24	21 10	4	11.71	0.843	20.6 24	21 10	4
1.396	22	43 42	1.738	0.823	22	41 44	8.17	0.797	41.4 20	17 18	5	11.66	0.841	20.8 22	41 48	4
1.389	22	39 38	1.742	0.821	22	39 38	7.96	0.794	43.6 21	19 16	5	11.64	0.840	20.8 22	17 12	4
1.371	22	43 38	1.768	0.809	22	43 24	10.13	0.790	16.8 23	19 10	4	8.65	0.838	50.1 20	41 50	5
1.369	22	43 46	1.772	0.807	22	35 42	10.12	0.788	16.5 22	17 12	4	11.57	0.836	21.0 22	15 14	4
1.359	22	33 40	1.786	0.801	22	43 46	10.02	0.783	16.9 22	17 16	4	11.45	0.831	21.6 22	15 18	4
1.356	22	45 44	1.791	0.799	22	45 44	7.80	0.781	44.0 21	19 20	5	8.72	0.825	48.1 20	17 14	5

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

Figure A.33 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 9,459.4 MWd/MTU

```
Cycle:                          19                      Core Average Exposure: MWd/MTU    23363.3
Exposure: MWd/MTU (GWd)      9463.9 (1304.00 )
Delta E: MWd/MTU, (GWd)         4.6 (   0.63 )                 Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.220   4.745    14  0.416 0.416  35  2
Inlet Subcooling: Btu/lbm    -25.84                        24  0.585  13.424    16  0.381 0.580   9 12
Flow: Mlb/hr                 106.50 (103.90 %)             23  0.743  17.602    17  0.345 0.405  59 36
                                                           22  0.818  20.494    18  0.399 0.458   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  0.865  22.194    19  0.826 1.093  47 48
59              -- -- -- -- -- -- --             59        20  0.896  23.259    20  1.102 1.220  39 40
55          -- -- -- -- -- -- -- -- --           55        19  0.904  23.845    21  1.076 1.198  31 48
51       -- -- -- -- -- -- -- -- -- -- --        51        18  0.909  24.428    22  1.228 1.347  15 30
47    -- -- -- -- 12 -- -- -- 12 -- -- -- --     47        17  0.915  24.665    23  1.091 1.245  53 34
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  0.933  25.268    24  1.062 1.264  39 52
39 -- -- -- 12 -- -- --  8 -- -- -- 12 -- -- -- 39        15  0.959  26.049
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  0.961  26.147
31 -- -- -- -- --  8 --  0 --  8 -- -- -- -- -- 31        13  1.063  25.110
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.108  25.866
23 -- -- -- 12 -- -- --  8 -- -- -- 12 -- -- -- 23        11  1.144  26.344
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.191  26.890
15    -- -- -- -- 12 -- -- -- 12 -- -- -- --     15         9  1.249  27.653
11       -- -- -- -- -- -- -- -- -- -- --        11         8  1.307  28.171
 7          -- -- -- -- -- -- -- -- --           7         7  1.372  28.592
 3              -- -- -- -- -- -- --             3         6  1.452  29.444
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  1.482* 29.519*
                                                           4  1.425  28.377
Control Rod Density: %          5.59                       3  1.276  25.978
                                                           2  0.952  19.876
k-effective:                 0.99850                Bottom  1  0.271   5.741
Void Fraction:                0.456
Core Delta-P: psia           26.419              % AXIAL TILT -18.877  -9.237
Core Plate Delta-P: psia     21.856          AVG BOT 8ft/12ft  1.0983  1.0532
Coolant Temp: Deg-F           548.5
In Channel Flow: Mlb/hr       93.76   Active Channel Flow: Mlb/hr        90.44
Total Bypass Flow (%):         12.0   (of total core flow)
Total Water Rod Flow (%):       3.1   (of total core flow)
Source Convergence          0.00008
```

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
1.347	22	15 30	1.807	0.791	22	19 40	7.63	0.772	45.1 20	9 30	5	11.23	0.818	22.0 23	19 10	5
1.343	22	49 32	1.810	0.790	22	45 30	7.59	0.766	44.7 20	29 10	5	11.18	0.809	21.3 23	9 20	5
1.342	22	31 46	1.811	0.790	22	49 30	7.81	0.765	41.8 20	15 16	5	11.09	0.804	21.4 23	25 8	5
1.337	22	39 38	1.814	0.788	22	21 38	7.63	0.765	44.1 21	25 10	5	11.08	0.802	21.2 23	7 26	5
1.336	22	37 40	1.817	0.787	22	29 46	9.78	0.763	16.8 24	21 10	4	8.27	0.798	49.9 20	39 8	5
1.333	22	41 40	1.817	0.787	22	21 42	7.64	0.762	43.7 21	9 26	5	11.04	0.798	21.0 22	9 34	5
1.332	22	47 34	1.819	0.786	22	37 40	7.53	0.759	44.6 20	19 12	5	11.00	0.797	21.4 23	23 8	5
1.331	22	31 50	1.828	0.782	22	29 50	7.68	0.758	42.6 21	13 30	5	8.17	0.797	50.7 20	9 32	5
1.329	22	39 42	1.829	0.782	22	19 36	7.79	0.757	41.0 20	13 18	5	11.04	0.795	20.6 22	23 10	5
1.319	22	33 48	1.836	0.779	22	35 42	7.72	0.757	42.0 20	17 14	5	11.00	0.795	21.0 24	21 10	5

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

Figure A.34 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 9,463.9 MWd/MTU

```
Cycle:                          19                    Core Average Exposure: MWd/MTU    23899.3
Exposure: MWd/MTU (GWd)     10000.0 (1377.90 )
Delta E: MWd/MTU, (GWd)       536.1 (  73.86 )              Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)        N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                  Top 25  0.219   4.871    14  0.412 0.412  35  2
Inlet Subcooling: Btu/lbm    -26.56                      24  0.583  13.759    16  0.378 0.578   9 12
Flow: Mlb/hr                 103.83 (101.30 %)           23  0.739  18.026    17  0.342 0.401  59 36
                                                         22  0.811  20.963    18  0.397 0.455   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58          21  0.857  22.690    19  0.822 1.090  47 48
59              -- -- -- -- -- -- --             59      20  0.887  23.773    20  1.098 1.214  39 40
55          -- -- -- -- -- -- -- -- --           55      19  0.896  24.364    21  1.071 1.190  31 48
51       -- -- -- -- -- -- -- -- -- -- --        51      18  0.900  24.949    22  1.233 1.351  15 30
47    -- -- -- -- 12 -- -- -- 12 -- -- -- --     47      17  0.906  25.191    23  1.095 1.250  53 34
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43      16  0.923  25.795    24  1.066 1.271  39 52
39 -- -- -- 12 -- -- --  8 -- -- -- 12 -- -- -- 39      15  0.947  26.591
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35      14  0.949  26.690
31 -- -- -- -- --  8 --  0 --  8 -- -- -- -- -- 31      13  1.047  25.641
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27      12  1.091  26.419
23 -- -- -- 12 -- -- --  8 -- -- -- 12 -- -- -- 23      11  1.128  26.916
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19      10  1.179  27.486
15    -- -- -- -- 12 -- -- -- 12 -- -- -- --    15       9  1.242  28.281
11       -- -- -- -- -- -- -- -- -- -- --       11       8  1.306  28.829
 7          -- -- -- -- -- -- -- -- --           7       7  1.378  29.285
 3              -- -- -- -- -- -- --             3       6  1.467  30.179
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58          5  1.507* 30.271*
                                                         4  1.460  29.104
Control Rod Density: %          5.59                     3  1.315  26.630
                                                         2  0.983  20.363
k-effective:                 0.99852              Bottom  1  0.280   5.887
Void Fraction:                0.463
Core Delta-P: psia           25.479          % AXIAL TILT -19.700  -9.324
Core Plate Delta-P: psia     20.917       AVG BOT 8ft/12ft  1.1018  1.0534
Coolant Temp: Deg-F          548.4
In Channel Flow: Mlb/hr       91.34   Active Channel Flow: Mlb/hr        88.08
Total Bypass Flow (%):        12.0    (of total core flow)
Total Water Rod Flow (%):      3.1    (of total core flow)
Source Convergence          0.00008
```

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
1.351	22	15 30	1.797	0.796	22	49 30	7.71	0.788	45.9 20	9 30	5	11.43	0.838	22.7 23	19 10	4
1.347	22	49 32	1.797	0.796	22	19 40	9.99	0.787	17.9 24	21 10	4	11.31	0.828	22.6 23	9 20	5
1.344	22	31 46	1.797	0.796	22	45 30	7.69	0.782	45.6 20	29 10	5	11.24	0.824	22.7 23	25 8	5
1.341	22	39 38	1.804	0.793	22	21 38	7.73	0.782	45.0 21	25 10	5	11.35	0.823	21.4 22	23 10	4
1.340	22	37 40	1.806	0.792	22	29 46	9.90	0.780	17.9 23	19 10	4	11.24	0.820	22.1 23	23 8	4
1.338	22	41 40	1.808	0.791	22	21 42	7.89	0.779	42.7 20	15 16	5	11.21	0.820	22.4 23	7 26	5
1.337	22	47 34	1.809	0.790	22	37 40	7.73	0.778	44.6 21	9 26	5	11.18	0.817	22.3 22	9 34	5
1.335	22	31 50	1.816	0.788	22	29 50	7.62	0.775	45.5 20	19 12	5	11.22	0.816	21.8 24	21 10	4
1.334	22	39 42	1.821	0.785	22	19 36	7.80	0.772	42.9 20	17 14	5	8.35	0.815	50.9 20	39 8	5
1.323	22	33 48	1.827	0.783	22	35 42	7.87	0.771	41.9 20	13 18	5	8.24	0.813	51.7 20	9 32	5

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

Figure A.35 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 10,000.0 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    24149.3
Exposure: MWd/MTU (GWd)     10250.0 (1412.30 )
Delta E: MWd/MTU, (GWd)       250.0 (  34.45 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.219   4.930    14  0.410 0.410  35  2
Inlet Subcooling: Btu/lbm    -26.91                        24  0.581  13.914    16  0.377 0.578   9 12
Flow: Mlb/hr                 102.60 (100.10 %)             23  0.736  18.223    17  0.341 0.399  59 36
                                                           22  0.808  21.180    18  0.396 0.454   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  0.853  22.920    19  0.820 1.089  47 48
59              -- -- -- -- -- -- --             59        20  0.883  24.011    20  1.096 1.210  39 40
55          -- -- -- -- -- -- -- -- --           55        19  0.891  24.604    21  1.069 1.188  31 48
51       -- -- -- -- -- -- -- -- -- -- --        51        18  0.896  25.191    22  1.235 1.353  15 32
47    -- -- -- -- 12 -- -- -- 12 -- -- -- --     47        17  0.902  25.434    23  1.097 1.254  53 34
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  0.918  26.040    24  1.068 1.273  39 52
39 -- -- -- 12 -- -- --  8 -- -- -- 12 -- -- -- 39        15  0.943  26.842
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  0.943  26.941
31 -- -- -- -- --  8 --  0 --  8 -- -- -- -- -- 31        13  1.040  25.886
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.084  26.674
23 -- -- -- 12 -- -- --  8 -- -- -- 12 -- -- -- 23        11  1.122  27.180
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.174  27.762
15    -- -- -- -- 12 -- -- -- 12 -- -- -- --    15         9  1.239  28.572
11       -- -- -- -- -- -- -- -- -- -- --       11         8  1.305  29.135
 7          -- -- -- -- -- -- -- -- --          7         7  1.381  29.609
 3              -- -- -- -- -- -- --            3         6  1.473  30.524
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  1.518* 30.626*
                                                           4  1.476  29.448
Control Rod Density: %           5.59                      3  1.333  26.941
                                                           2  0.997  20.595
k-effective:                  0.99853                Bottom  1  0.284   5.957
Void Fraction:                 0.466
Core Delta-P: psia            25.051              % AXIAL TILT -20.082  -9.371
Core Plate Delta-P: psia      20.489           AVG BOT 8ft/12ft  1.1035  1.0535
Coolant Temp: Deg-F           548.4
In Channel Flow: Mlb/hr        90.23   Active Channel Flow: Mlb/hr        86.99
Total Bypass Flow (%):         12.1    (of total core flow)
Total Water Rod Flow (%):       3.2    (of total core flow)
Source Convergence           0.00008
```

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
1.353	22	15 32	1.789	0.799	22	49 30	7.74	0.795	46.4 20	9 30	5	11.47	0.846	23.4 23	19 10	4
1.350	22	49 32	1.791	0.798	22	45 30	10.04	0.794	18.5 24	21 10	4	11.43	0.837	22.6 23	9 20	4
1.346	22	31 46	1.792	0.798	22	19 40	9.99	0.791	18.5 23	19 10	4	11.44	0.833	22.0 22	23 10	4
1.342	22	39 38	1.799	0.795	22	21 38	7.73	0.790	46.0 20	29 10	5	11.36	0.832	22.6 23	25 8	4
1.341	22	37 40	1.800	0.795	22	29 46	7.76	0.789	45.4 21	25 10	5	11.32	0.830	22.7 23	23 8	4
1.339	22	47 34	1.804	0.793	22	21 42	7.77	0.786	45.0 21	9 26	5	11.27	0.829	23.0 23	7 26	5
1.339	22	41 40	1.804	0.792	22	37 40	7.89	0.783	43.1 20	15 16	5	11.24	0.825	22.9 22	9 34	5
1.338	22	31 50	1.808	0.791	22	29 50	9.92	0.782	18.1 22	17 12	4	11.25	0.822	22.4 24	21 10	4
1.335	22	39 42	1.816	0.787	22	19 36	9.92	0.781	17.9 22	23 10	4	8.36	0.821	51.3 20	39 8	5
1.325	22	33 48	1.823	0.784	22	35 42	7.63	0.779	45.9 20	19 12	5	8.28	0.820	52.1 20	9 32	5

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

Figure A.36 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 10,250.0 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    24150.3
Exposure: MWd/MTU (GWd)     10251.0 (1412.40 )
Delta E: MWd/MTU, (GWd)         1.0 (   0.14 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.217   4.930    14  0.410 0.410  35  2
Inlet Subcooling: Btu/lbm    -25.84                        24  0.576  13.915    16  0.377 0.577   9 12
Flow: Mlb/hr                 106.50 (103.90 %)             23  0.729  18.224    17  0.340 0.399  59 36
                                                           22  0.797  21.181    18  0.396 0.454   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  0.837  22.921    19  0.822 1.091  47 48
59              -- -- -- -- -- -- --             59        20  0.859  24.012    20  1.095 1.210  39 40
55          -- -- -- -- -- -- -- -- --           55        19  0.858  24.605    21  1.067 1.190  31 48
51       -- -- -- -- -- -- -- -- -- -- --        51        18  0.873  25.192    22  1.234 1.356  15 30
47    -- -- -- -- 10 -- -- -- 10 -- -- -- --     47        17  0.887  25.435    23  1.100 1.259  53 34
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  0.910  26.041    24  1.070 1.275  39 52
39 -- -- -- 10 -- -- --  8 -- -- -- 10 -- -- -- 39        15  0.939  26.843
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  0.944  26.942
31 -- -- -- -- --  8 --  0 --  8 -- -- -- -- -- 31        13  1.045  25.887
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.092  26.675
23 -- -- -- 10 -- -- --  8 -- -- -- 10 -- -- -- 23        11  1.133  27.181
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.187  27.763
15    -- -- -- -- 10 -- -- -- 10 -- -- -- --    15         9  1.254  28.573
11       -- -- -- -- -- -- -- -- -- -- --       11         8  1.321  29.136
 7          -- -- -- -- -- -- -- -- --          7         7  1.398  29.610
 3              -- -- -- -- -- -- --            3         6  1.490  30.526
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  1.533* 30.628*
                                                           4  1.488  29.450
Control Rod Density: %           5.77                      3  1.343  26.942
                                                           2  1.004  20.596
k-effective:                  0.99850                Bottom  1  0.286   5.957
Void Fraction:                 0.462
Core Delta-P: psia            26.522              % AXIAL TILT -21.298  -9.371
Core Plate Delta-P: psia      21.957          AVG BOT 8ft/12ft  1.1116  1.0535
Coolant Temp: Deg-F            548.5
In Channel Flow: Mlb/hr         93.72   Active Channel Flow: Mlb/hr        90.38
Total Bypass Flow (%):          12.0   (of total core flow)
Total Water Rod Flow (%):        3.1   (of total core flow)
Source Convergence           0.00010
```

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
1.356	22	15 30	1.830	0.781	22	49 30	7.83	0.804	46.4 20	9 30	5	11.58	0.854	23.4 23	19 10	4
1.354	22	49 32	1.832	0.781	22	45 30	10.14	0.802	18.5 24	21 10	4	11.54	0.845	22.6 23	9 20	4
1.349	22	31 46	1.838	0.778	22	21 38	7.81	0.799	46.0 20	29 10	5	11.56	0.842	22.0 22	23 10	4
1.344	22	39 38	1.839	0.778	22	19 40	10.09	0.799	18.5 23	19 10	4	11.42	0.841	23.3 23	25 8	5
1.343	22	37 40	1.840	0.777	22	29 46	7.85	0.797	45.4 21	25 10	5	11.40	0.838	23.0 23	7 26	5
1.342	22	31 50	1.844	0.776	22	37 40	7.86	0.795	45.0 21	9 26	5	11.43	0.838	22.7 23	23 8	4
1.340	22	47 34	1.850	0.773	22	29 50	7.98	0.792	43.1 20	15 16	5	11.37	0.835	22.9 22	9 34	5
1.337	22	41 40	1.850	0.773	22	21 42	10.01	0.790	18.1 22	17 12	4	11.37	0.831	22.4 24	21 10	4
1.333	22	39 42	1.855	0.771	22	19 36	10.02	0.789	17.9 22	23 10	4	8.46	0.830	51.3 20	39 8	5
1.326	22	33 48	1.862	0.768	22	35 42	7.72	0.788	45.9 20	19 12	5	8.37	0.829	52.1 20	9 32	5

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

Figure A.37 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 10,251.0 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    24599.2
Exposure: MWd/MTU (GWd)     10700.0 (1474.30 )
Delta E: MWd/MTU, (GWd)       449.0 (  61.87 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.217   5.034    14  0.407 0.407  35  2
Inlet Subcooling: Btu/lbm    -26.37                        24  0.574  14.190    16  0.375 0.576   9 12
Flow: Mlb/hr                 104.55 (102.00 %)             23  0.726  18.573    17  0.338 0.397  59 36
                                                           22  0.792  21.565    18  0.394 0.453   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           21  0.832  23.323    19  0.819 1.087  47 48
59              -- -- -- -- -- -- --             59       20  0.854  24.426    20  1.091 1.205  39 40
55          -- -- -- -- -- -- -- -- --           55       19  0.853  25.018    21  1.064 1.186  31 48
51       -- -- -- -- -- -- -- -- -- -- --        51       18  0.869  25.612    22  1.237 1.359  15 32
47    -- -- -- -- 10 -- -- -- 10 -- -- -- --     47       17  0.882  25.862    23  1.104 1.265  53 34
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43       16  0.905  26.473    24  1.074 1.278  51 40
39 -- -- -- 10 -- -- --  8 -- -- -- 10 -- -- -- 39       15  0.934  27.289
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35       14  0.938  27.390
31 -- -- -- -- --  8 --  0 --  8 -- -- -- -- -- 31       13  1.037  26.325
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27       12  1.082  27.133
23 -- -- -- 10 -- -- --  8 -- -- -- 10 -- -- -- 23       11  1.124  27.657
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19       10  1.181  28.263
15    -- -- -- -- 10 -- -- -- 10 -- -- -- --    15        9  1.251  29.101
11       -- -- -- -- -- -- -- -- -- -- --       11        8  1.321  29.694
 7          -- -- -- -- -- -- -- -- --          7        7  1.401  30.200
 3              -- -- -- -- -- -- --             3        6  1.497  31.155
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           5  1.545* 31.277*
                                                           4  1.507  30.081
Control Rod Density: %          5.77                       3  1.366  27.513
                                                           2  1.023  21.023
k-effective:                 0.99858                Bottom  1  0.291   6.085
Void Fraction:                0.466
Core Delta-P: psia           25.825              % AXIAL TILT -21.753  -9.481
Core Plate Delta-P: psia     21.261          AVG BOT 8ft/12ft  1.1137  1.0539
Coolant Temp: Deg-F           548.5
In Channel Flow: Mlb/hr       91.95   Active Channel Flow: Mlb/hr        88.66
Total Bypass Flow (%):         12.1   (of total core flow)
Total Water Rod Flow (%):       3.2   (of total core flow)
Source Convergence          0.00008
```

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
1.359	22	15 32	1.818	0.786	22	49 30	7.85	0.812	47.1 20	9 30	5	11.54	0.859	24.5 23	19 10	4
1.358	22	49 32	1.821	0.785	22	45 30	10.15	0.809	19.4 23	19 10	4	11.59	0.857	23.7 23	9 20	4
1.353	22	31 46	1.830	0.782	22	29 46	7.85	0.808	46.7 20	29 10	5	11.55	0.854	23.7 23	25 8	4
1.347	22	31 50	1.831	0.781	22	21 38	10.13	0.808	19.4 24	21 10	4	11.61	0.854	23.1 22	23 10	4
1.347	22	39 38	1.831	0.781	22	19 40	7.86	0.805	46.2 21	25 10	5	11.56	0.853	23.4 23	7 26	4
1.346	22	37 40	1.836	0.779	22	37 40	7.89	0.804	45.7 21	9 26	5	11.46	0.848	23.8 23	23 8	4
1.344	22	47 34	1.837	0.779	22	29 50	10.13	0.804	18.8 22	23 10	4	11.39	0.844	24.0 22	9 34	5
1.340	22	41 40	1.843	0.776	22	21 42	10.07	0.801	19.1 22	17 12	4	11.63	0.844	21.5 22	9 24	4
1.336	22	39 42	1.848	0.774	22	19 36	10.09	0.799	18.5 23	9 20	4	11.37	0.839	23.5 22	7 32	5
1.330	22	33 48	1.855	0.771	22	35 42	10.09	0.799	18.6 22	9 28	4	11.37	0.839	23.5 22	33 10	5

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

Figure A.38 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 10,700.0 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    24899.3
Exposure: MWd/MTU (GWd)     11000.0 (1515.60 )
Delta E: MWd/MTU, (GWd)       300.0 (  41.34 )                  Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.217   5.104    14  0.405 0.405  35  2
Inlet Subcooling: Btu/lbm    -26.65                        24  0.574  14.374    16  0.374 0.574   9 12
Flow: Mlb/hr                 103.53 (101.00 %)             23  0.725  18.805    17  0.337 0.395  59 36
                                                           22  0.791  21.820    18  0.392 0.452   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           21  0.831  23.591    19  0.817 1.085  47 48
59              -- -- -- -- -- -- --             59       20  0.853  24.701    20  1.089 1.201  39 40
55          -- -- -- -- -- -- -- -- --           55       19  0.852  25.294    21  1.062 1.184  31 48
51       -- -- -- -- -- -- -- -- -- -- --        51       18  0.868  25.892    22  1.240 1.361  15 32
47    -- -- -- -- 10 -- -- -- 10 -- -- -- --     47       17  0.882  26.147    23  1.106 1.268  53 34
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43       16  0.904  26.761    24  1.075 1.281  51 40
39 -- -- -- 10 -- -- --  8 -- -- -- 10 -- -- -- 39       15  0.933  27.586
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35       14  0.936  27.689
31 -- -- -- -- --  8 --  0 --  8 -- -- -- -- -- 31       13  1.034  26.617
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27       12  1.079  27.438
23 -- -- -- 10 -- -- --  8 -- -- -- 10 -- -- -- 23       11  1.122  27.973
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19       10  1.179  28.595
15    -- -- -- -- 10 -- -- -- 10 -- -- -- --    15        9  1.250  29.454
11       -- -- -- -- -- -- -- -- -- -- --       11        8  1.322  30.066
 7          -- -- -- -- -- -- -- -- --          7        7  1.401  30.595
 3              -- -- -- -- -- -- --            3        6  1.497  31.577
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           5  1.545* 31.712*
                                                           4  1.510  30.506
Control Rod Density: %          5.77                       3  1.374  27.899
                                                           2  1.029  21.312
k-effective:                 0.99870                Bottom  1  0.293   6.172
Void Fraction:                0.468
Core Delta-P: psia           25.456              % AXIAL TILT -21.854  -9.557
Core Plate Delta-P: psia     20.893            AVG BOT 8ft/12ft  1.1142  1.0542
Coolant Temp: Deg-F           548.5
In Channel Flow: Mlb/hr       91.02   Active Channel Flow: Mlb/hr        87.75
Total Bypass Flow (%):         12.1   (of total core flow)
Total Water Rod Flow (%):       3.2   (of total core flow)
Source Convergence          0.00010
```

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
1.361	22	15 32	1.811	0.790	22	49 30	7.81	0.812	47.6 20	9 30	5	11.52	0.858	24.5 23	25 8	4
1.360	22	49 32	1.815	0.788	22	45 30	7.83	0.811	47.2 20	29 10	5	11.53	0.858	24.4 23	9 20	4
1.356	22	31 46	1.822	0.785	22	29 46	10.10	0.810	20.1 23	19 10	4	11.54	0.858	24.2 23	7 26	4
1.350	22	31 50	1.825	0.783	22	21 38	10.12	0.807	19.5 22	23 10	4	11.57	0.856	23.8 22	23 10	4
1.349	22	39 38	1.826	0.783	22	19 40	7.83	0.806	46.7 21	25 10	5	11.41	0.855	25.2 23	19 10	4
1.348	22	37 40	1.829	0.782	22	29 50	7.86	0.806	46.2 21	9 26	5	11.67	0.852	22.2 22	9 24	4
1.346	22	47 34	1.830	0.781	22	37 40	10.05	0.806	20.1 24	21 10	4	11.40	0.849	24.5 23	23 8	4
1.342	22	41 40	1.837	0.778	22	21 42	10.12	0.805	19.2 22	9 28	4	11.42	0.847	24.0 22	9 34	4
1.339	22	39 42	1.843	0.776	22	19 36	10.11	0.805	19.2 23	9 20	4	11.49	0.845	23.1 23	7 24	4
1.333	22	33 48	1.849	0.774	22	47 28	10.19	0.802	17.9 24	9 22	4	11.41	0.844	23.7 23	7 34	4

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

Figure A.39 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 11,000.0 MWd/MTU

```
Cycle:                           19                   Core Average Exposure: MWd/MTU    25199.3
Exposure: MWd/MTU (GWd)     11300.0 (1557.00 )
Delta E: MWd/MTU, (GWd)       300.0 (  41.34 )             Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)        N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                  Top 25  0.217   5.174    14  0.404 0.404  35  2
Inlet Subcooling: Btu/lbm    -26.94                      24  0.574  14.558    16  0.373 0.573   9 12
Flow: Mlb/hr                 102.50 (100.00 %)           23  0.725  19.038    17  0.336 0.394  59 36
                                                         22  0.791  22.074    18  0.391 0.451   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58          21  0.831  23.859    19  0.816 1.083  47 48
59             -- -- -- -- -- -- -- --             59    20  0.854  24.976    20  1.086 1.198  39 40
55          -- -- -- -- -- -- -- -- -- --          55    19  0.853  25.569    21  1.060 1.181  31 48
51       -- -- -- -- -- -- -- -- -- -- -- --       51    18  0.869  26.173    22  1.242 1.363  15 32
47    -- -- -- -- 10 -- -- -- 10 -- -- -- --    47       17  0.884  26.431    23  1.108 1.271  53 34
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43       16  0.906  27.049    24  1.077 1.284  51 40
39 -- -- -- 10 -- -- --  8 -- -- -- 10 -- -- -- 39       15  0.934  27.883
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35       14  0.937  27.987
31 -- -- -- -- --  8 --  0 --  8 -- -- -- -- -- 31       13  1.034  26.908
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27       12  1.079  27.742
23 -- -- -- 10 -- -- --  8 -- -- -- 10 -- -- -- 23       11  1.121  28.289
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19       10  1.179  28.928
15    -- -- -- -- 10 -- -- -- 10 -- -- -- --    15        9  1.250  29.806
11       -- -- -- -- -- -- -- -- -- -- -- --       11        8  1.322  30.439
 7          -- -- -- -- -- -- -- -- -- --           7        7  1.400  30.989
 3             -- -- -- -- -- -- -- --              3        6  1.493  31.999
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           5  1.540* 32.147*
                                                          4  1.507  30.931
Control Rod Density: %         5.77                       3  1.375  28.287
                                                          2  1.031  21.602
k-effective:                0.99879              Bottom  1  0.294   6.259
Void Fraction:                0.469
Core Delta-P: psia           25.081            % AXIAL TILT -21.760  -9.630
Core Plate Delta-P: psia     20.519        AVG BOT 8ft/12ft  1.1138  1.0544
Coolant Temp: Deg-F          548.5
In Channel Flow: Mlb/hr       90.10   Active Channel Flow: Mlb/hr        86.86
Total Bypass Flow (%):         12.1   (of total core flow)
Total Water Rod Flow (%):       3.2   (of total core flow)
Source Convergence          0.00008
```

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
1.363	22	15	32	1.803	0.793	22	49	30	7.77	0.809	47.7	20	29	10	5	11.47	0.857	24.9	23	7	26	4
1.362	22	49	32	1.808	0.791	22	45	30	7.73	0.809	48.1	20	9	30	5	11.43	0.857	25.2	23	25	8	4
1.359	22	31	46	1.814	0.788	22	29	46	10.07	0.805	19.8	23	9	20	4	11.63	0.855	22.9	22	9	24	4
1.353	22	31	50	1.818	0.786	22	21	38	10.06	0.805	19.8	22	9	28	4	11.39	0.853	25.1	23	9	20	4
1.352	22	39	38	1.820	0.786	22	29	50	9.99	0.805	20.7	23	19	10	4	11.44	0.853	24.5	22	23	10	4
1.351	22	37	40	1.820	0.786	22	19	40	10.03	0.805	20.1	22	23	10	4	11.22	0.846	25.9	23	19	10	4
1.347	22	47	34	1.821	0.785	22	23	40	7.80	0.804	46.7	21	9	26	5	11.43	0.846	23.8	23	7	24	4
1.344	22	41	40	1.830	0.781	22	21	42	10.07	0.804	19.5	22	27	10	4	11.42	0.846	23.9	22	9	34	4
1.341	22	39	42	1.836	0.779	22	19	36	7.76	0.803	47.2	21	25	10	5	11.27	0.845	25.2	23	23	8	4
1.337	22	33	48	1.841	0.777	22	47	28	10.13	0.802	18.6	24	9	22	4	11.34	0.845	24.5	23	7	34	4

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

Figure A.40 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 11,300.0 MWd/MTU

```
Cycle:                          19                      Core Average Exposure: MWd/MTU    25200.3
Exposure: MWd/MTU (GWd)     11301.0 (1557.10 )
Delta E: MWd/MTU, (GWd)         1.0 (   0.14 )                 Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.213   5.174    14  0.405 0.405  35  2
Inlet Subcooling: Btu/lbm    -26.37                        24  0.565  14.559    16  0.374 0.575   9 12
Flow: Mlb/hr                 104.55 (102.00 %)             23  0.713  19.038    17  0.337 0.395  59 36
                                                           22  0.775  22.075    18  0.393 0.453   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           21  0.811  23.860    19  0.819 1.087  47 48
59              -- -- -- -- -- -- --             59       20  0.840  24.977    20  1.084 1.195  39 40
55          -- -- -- -- -- -- -- -- --           55       19  0.844  25.570    21  1.058 1.182  31 48
51       -- -- -- -- -- -- -- -- -- -- --        51       18  0.863  26.174    22  1.240 1.365  49 32
47    -- -- -- -- 10 -- -- -- 10 -- -- -- --     47       17  0.880  26.432    23  1.113 1.277  53 34
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43       16  0.905  27.050    24  1.082 1.290  51 40
39 -- -- -- 10 -- -- --  6 -- -- -- 10 -- -- -- 39       15  0.936  27.884
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35       14  0.940  27.988
31 -- -- -- -- --  6 --  0 --  6 -- -- -- -- -- 31       13  1.039  26.909
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27       12  1.085  27.743
23 -- -- -- 10 -- -- --  6 -- -- -- 10 -- -- -- 23       11  1.128  28.290
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19       10  1.188  28.929
15    -- -- -- -- 10 -- -- -- 10 -- -- -- --    15        9  1.259  29.807
11       -- -- -- -- -- -- -- -- -- -- --       11        8  1.331  30.440
 7          -- -- -- -- -- -- -- -- --          7        7  1.409  30.991
 3              -- -- -- -- -- -- --            3        6  1.503  32.000
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           5  1.548* 32.148*
                                                           4  1.514  30.933
Control Rod Density: %          5.86                       3  1.381  28.288
                                                           2  1.035  21.603
k-effective:                 0.99879                Bottom  1  0.295   6.260
Void Fraction:                0.467
Core Delta-P: psia           25.856              % AXIAL TILT -22.497  -9.630
Core Plate Delta-P: psia     21.292           AVG BOT 8ft/12ft  1.1193  1.0544
Coolant Temp: Deg-F           548.5
In Channel Flow: Mlb/hr       91.94   Active Channel Flow: Mlb/hr        88.64
Total Bypass Flow (%):         12.1   (of total core flow)
Total Water Rod Flow (%):       3.2   (of total core flow)
Source Convergence          0.00010
```

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
1.365	22	49 32	1.822	0.785	22	49 30	7.82	0.814	47.7 20	29 10	5	11.53	0.862	24.9 23	7 26	4
1.363	22	15 32	1.839	0.778	22	29 50	7.78	0.814	48.1 20	9 30	5	11.49	0.861	25.2 23	25 8	4
1.359	22	31 46	1.839	0.778	22	45 30	10.12	0.810	19.8 23	9 20	4	11.70	0.859	22.9 22	9 24	4
1.356	22	31 50	1.844	0.775	22	29 46	10.12	0.810	19.8 22	9 28	4	11.45	0.858	25.1 23	9 20	4
1.349	22	47 34	1.845	0.775	22	19 40	10.04	0.809	20.7 23	19 10	4	11.51	0.857	24.5 22	23 10	4
1.347	22	21 24	1.854	0.771	22	21 38	10.09	0.809	20.1 22	23 10	4	11.28	0.851	25.9 23	19 10	4
1.346	22	37 40	1.855	0.771	22	21 42	7.85	0.809	46.7 21	9 26	5	11.49	0.851	23.8 23	7 24	4
1.343	22	41 40	1.856	0.770	22	23 40	10.13	0.808	19.5 22	27 10	4	11.49	0.851	23.9 22	9 34	4
1.340	22	39 42	1.860	0.769	22	47 28	7.80	0.808	47.2 21	25 10	5	11.41	0.849	24.5 23	7 34	4
1.339	22	33 48	1.871	0.764	22	19 36	10.19	0.807	18.6 24	9 22	4	11.33	0.849	25.2 23	23 8	4

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

Figure A.41 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 11,301.0 MWd/MTU

```
Cycle:                          19                      Core Average Exposure: MWd/MTU    25699.4
Exposure: MWd/MTU (GWd)     11800.0 (1625.90 )
Delta E: MWd/MTU, (GWd)       499.0 (  68.76 )                Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.215   5.288    14  0.402 0.402  35  2
Inlet Subcooling: Btu/lbm    -26.79                        24  0.569  14.861    16  0.372 0.573   9 12
Flow: Mlb/hr                 103.01 (100.50 %)             23  0.717  19.420    17  0.335 0.393  59 36
                                                           22  0.780  22.492    18  0.391 0.451   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  0.817  24.296    19  0.816 1.083  47 48
59              -- -- -- -- -- -- --             59        20  0.846  25.429    20  1.081 1.191  39 40
55          -- -- -- -- -- -- -- -- --           55        19  0.852  26.025    21  1.055 1.178  31 48
51       -- -- -- -- -- -- -- -- -- -- --        51        18  0.872  26.639    22  1.243 1.365  49 32
47    -- -- -- -- 10 -- -- -- 10 -- -- -- --     47        17  0.890  26.908    23  1.116 1.280  53 34
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  0.916  27.532    24  1.083 1.293  51 40
39 -- -- -- 10 -- -- --  6 -- -- -- 10 -- -- -- 39        15  0.946  28.382
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  0.949  28.488
31 -- -- -- -- --  6 --  0 --  6 -- -- -- -- -- 31        13  1.046  27.397
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.091  28.252
23 -- -- -- 10 -- -- --  6 -- -- -- 10 -- -- -- 23        11  1.134  28.820
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.193  29.487
15    -- -- -- -- 10 -- -- -- 10 -- -- -- --    15         9  1.263  30.398
11       -- -- -- -- -- -- -- -- -- -- --       11         8  1.331  31.064
 7          -- -- -- -- -- -- -- -- --          7         7  1.402  31.649
 3             -- -- -- -- -- -- --             3         6  1.485  32.700
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  1.523* 32.868*
                                                           4  1.488  31.636
Control Rod Density: %          5.86                       3  1.361  28.930
                                                           2  1.022  22.085
k-effective:                 0.99893                Bottom  1  0.291   6.405
Void Fraction:                0.467
Core Delta-P: psia           25.265                % AXIAL TILT -21.775  -9.755
Core Plate Delta-P: psia     20.702          AVG BOT 8ft/12ft  1.1161  1.0549
Coolant Temp: Deg-F           548.5
In Channel Flow: Mlb/hr       90.57   Active Channel Flow: Mlb/hr        87.31
Total Bypass Flow (%):         12.1   (of total core flow)
Total Water Rod Flow (%):       3.2   (of total core flow)
Source Convergence          0.00009
```

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
1.365	22	49 32	1.809	0.790	22	49 30	7.62	0.801	48.5 20	29 10	5	11.44	0.850	24.1 22	9 24	4
1.364	22	15 32	1.823	0.784	22	29 50	7.56	0.798	48.9 20	9 30	5	11.21	0.848	26.1 23	7 26	4
1.364	22	31 46	1.826	0.783	22	45 30	9.87	0.797	20.9 23	9 20	4	11.14	0.844	26.4 23	25 8	4
1.359	22	31 50	1.827	0.783	22	23 40	9.89	0.796	20.6 22	27 10	4	11.21	0.839	25.0 23	7 24	4
1.351	22	21 24	1.828	0.782	22	29 46	9.99	0.796	19.3 22	9 24	4	11.14	0.839	25.7 22	23 10	4
1.351	22	37 40	1.831	0.781	22	39 24	7.65	0.795	47.6 21	9 26	5	11.20	0.838	25.0 22	9 34	4
1.350	22	47 34	1.833	0.780	22	19 40	9.85	0.795	20.9 22	9 28	4	11.21	0.838	24.9 22	33 10	4
1.345	22	41 40	1.840	0.777	22	21 42	9.87	0.794	20.6 23	7 28	4	11.05	0.837	26.3 23	9 20	4
1.345	22	39 42	1.846	0.775	22	47 28	9.94	0.794	19.6 24	9 22	4	11.11	0.836	25.6 23	7 34	4
1.343	22	33 48	1.857	0.770	22	19 36	7.60	0.794	48.0 21	25 10	5	11.11	0.836	25.6 23	33 8	4

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

Figure A.42 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 11,800.0 MWd/MTU

```
Cycle:                          19                      Core Average Exposure: MWd/MTU    25890.4
Exposure: MWd/MTU (GWd)     11991.1 (1652.20 )
Delta E: MWd/MTU, (GWd)       191.1 (  26.33 )                 Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.216   5.332    14  0.402 0.402  35  2
Inlet Subcooling: Btu/lbm    -26.94                        24  0.571  14.978    16  0.372 0.573   9 12
Flow: Mlb/hr                 102.50 (100.00 %)             23  0.720  19.566    17  0.335 0.392  59 36
                                                           22  0.783  22.653    18  0.391 0.451   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  0.820  24.465    19  0.815 1.082  47 48
59              -- -- -- -- -- -- --             59        20  0.851  25.604    20  1.079 1.189  39 40
55          -- -- -- -- -- -- -- -- --           55        19  0.856  26.200    21  1.054 1.177  31 48
51       -- -- -- -- -- -- -- -- -- -- --        51        18  0.877  26.819    22  1.244 1.366  31 46
47    -- -- -- -- 10 -- -- -- 10 -- -- -- --     47        17  0.896  27.091    23  1.117 1.281  53 34
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  0.922  27.719    24  1.084 1.294  51 40
39 -- -- -- 10 -- -- --  6 -- -- -- 10 -- -- -- 39        15  0.952  28.575
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  0.955  28.681
31 -- -- -- -- --  6 --  0 --  6 -- -- -- -- -- 31        13  1.051  27.586
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.096  28.448
23 -- -- -- 10 -- -- --  6 -- -- -- 10 -- -- -- 23        11  1.138  29.024
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.196  29.701
15    -- -- -- -- 10 -- -- -- 10 -- -- -- --    15         9  1.265  30.625
11       -- -- -- -- -- -- -- -- -- -- --       11         8  1.330  31.303
 7          -- -- -- -- -- -- -- -- --          7         7  1.397  31.901
 3             -- -- -- -- -- -- --             3         6  1.476  32.966
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  1.509* 33.140*
                                                           4  1.472  31.902
Control Rod Density: %          5.86                       3  1.349  29.173
                                                           2  1.013  22.267
k-effective:                 0.99901                Bottom  1  0.288   6.460
Void Fraction:                0.467
Core Delta-P: psia           25.062              % AXIAL TILT -21.340  -9.797
Core Plate Delta-P: psia     20.499          AVG BOT 8ft/12ft  1.1142  1.0551
Coolant Temp: Deg-F           548.4
In Channel Flow: Mlb/hr       90.11   Active Channel Flow: Mlb/hr        86.87
Total Bypass Flow (%):         12.1   (of total core flow)
Total Water Rod Flow (%):       3.2   (of total core flow)
Source Convergence          0.00009
```

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
1.366	22	31 46	1.804	0.793	22	49 30	7.53	0.793	48.9 20	29 10	5	11.30	0.842	24.6 22	9 24	4
1.365	22	49 32	1.816	0.787	22	23 40	9.88	0.790	19.7 22	9 24	4	11.04	0.838	26.6 23	7 26	4
1.365	22	15 32	1.817	0.787	22	29 50	7.45	0.789	49.3 20	9 32	5	10.97	0.835	26.8 23	25 8	4
1.359	22	31 50	1.820	0.786	22	39 24	9.74	0.789	21.3 23	9 20	4	11.06	0.831	25.5 23	7 24	4
1.352	22	37 40	1.821	0.785	22	29 46	9.75	0.788	21.0 22	27 10	4	11.06	0.830	25.3 22	33 10	4
1.352	22	21 24	1.821	0.785	22	45 30	7.55	0.788	47.9 21	9 26	5	11.04	0.830	25.5 22	9 34	4
1.350	22	47 34	1.828	0.782	22	19 40	9.74	0.787	21.0 23	7 28	4	10.96	0.829	26.1 22	23 10	4
1.346	22	39 42	1.832	0.780	22	39 42	9.74	0.787	20.9 23	7 26	4	10.95	0.827	26.1 23	7 34	4
1.346	22	41 40	1.840	0.777	22	47 28	9.74	0.786	20.9 23	27 8	4	10.95	0.827	26.0 23	33 8	4
1.345	22	33 48	1.850	0.773	22	19 36	9.81	0.786	20.0 24	9 22	4	10.87	0.826	26.7 23	51 42	4

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

Figure A.43 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 11,991.1 MWd/MTU

```
Cycle:                              19                 Core Average Exposure: MWd/MTU    25896.2
Exposure: MWd/MTU (GWd)        11996.8 (1653.00 )
Delta E: MWd/MTU, (GWd)            5.7 (   0.79 )           Axial Profile    Edit   Radial Power
Power: MWt                      3952.0 (100.00 %)      N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia             1050.0                 Top 25  0.237   5.334   14  0.402 0.402  35  2
Inlet Subcooling: Btu/lbm       -25.84                     24  0.629  14.981   16  0.386 0.601   9 12
Flow: Mlb/hr                    106.50 (103.90 %)          23  0.796  19.571   17  0.347 0.398  59 36
                                                           22  0.867  22.658   18  0.395 0.453  59 32
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  0.911  24.470   19  0.833 1.140  47 48
59             -- -- -- -- -- -- -- --            59       20  0.950  25.609   20  1.064 1.210  47 44
55          -- -- -- -- -- -- -- -- -- --         55       19  0.965  26.206   21  1.048 1.190  45 42
51       -- -- -- -- -- 14 -- -- -- -- --         51       18  0.975  26.825   22  1.222 1.391  39 50
47    -- -- -- -- -- -- -- -- -- -- -- -- --      47       17  0.957  27.097   23  1.151 1.334  41 52
43 -- -- -- -- -- 14 -- -- -- 14 -- -- -- -- -- 43       16  0.955  27.724   24  1.127 1.364  39 52
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39       15  0.964  28.581
35 -- -- -- 14 --  6 --  0 --  6 -- 14 -- -- -- 35       14  0.949  28.687
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31       13  1.032  27.591
27 -- -- -- 14 --  6 --  0 --  6 -- 14 -- -- -- 27       12  1.066  28.454
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23       11  1.101  29.030
19 -- -- -- -- -- 14 -- -- -- 14 -- -- -- -- -- 19       10  1.153  29.708
15    -- -- -- -- -- -- -- -- -- -- -- -- --      15        9  1.217  30.632
11       -- -- -- -- -- 14 -- -- -- -- --         11        8  1.276  31.310
 7          -- -- -- -- -- -- -- -- -- --          7        7  1.337  31.908
 3             -- -- -- -- -- -- -- --             3        6  1.405  32.974
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58             5  1.425* 33.148*
                                                            4  1.378  31.910
Control Rod Density: %            6.80                      3  1.252  29.180
                                                            2  0.936  22.272
k-effective:                   0.99902              Bottom  1  0.266   6.461
Void Fraction:                   0.448
Core Delta-P: psia              26.279            % AXIAL TILT -15.247  -9.798
Core Plate Delta-P: psia        21.712        AVG BOT 8ft/12ft  1.0728  1.0551
Coolant Temp: Deg-F              548.4
In Channel Flow: Mlb/hr          93.84  Active Channel Flow: Mlb/hr        90.55
Total Bypass Flow (%):            11.9  (of total core flow)
Total Water Rod Flow (%):          3.1  (of total core flow)
Source Convergence             0.00006
```

Top Ten Thermal Limits Summary - Sorted by Margin

Power Value	Power FT	Power IR	Power JR	MCPR Value	MCPR Margin	MCPR FT	MCPR IR	MCPR JR	APLHGR Value	APLHGR Margin	APLHGR Exp.	APLHGR FT	APLHGR IR	APLHGR JR	APLHGR K	LHGR Value	LHGR Margin	LHGR Exp.	LHGR FT	LHGR IR	LHGR JR	LHGR K
1.391	22	39	50	1.764	0.811	22	41	48	10.07	0.815	21.2	23	51	42	4	11.36	0.863	26.7	23	51	42	4
1.390	22	45	44	1.764	0.811	22	47	42	7.73	0.810	48.2	20	49	42	5	11.46	0.859	25.2	22	49	40	4
1.388	22	47	42	1.764	0.811	22	45	44	9.91	0.809	22.2	23	19	10	4	11.14	0.852	27.4	23	41	52	4
1.382	22	41	48	1.770	0.808	22	39	50	7.67	0.807	48.7	20	19	12	5	11.22	0.852	26.6	22	39	50	4
1.382	22	43	46	1.770	0.808	22	43	46	9.96	0.807	21.4	22	49	44	4	11.13	0.845	26.6	22	49	18	4
1.374	22	49	40	1.786	0.800	22	29	46	10.05	0.806	20.0	24	9	22	4	11.26	0.839	24.6	22	9	24	4
1.364	24	39	52	1.792	0.798	22	49	40	9.85	0.801	21.7	22	17	12	4	11.37	0.839	23.4	24	51	40	4
1.363	22	37	48	1.792	0.798	22	17	42	9.78	0.798	22.1	24	21	10	4	11.01	0.837	26.8	22	17	50	4
1.360	24	51	40	1.794	0.797	22	35	46	9.81	0.794	21.2	22	21	12	4	10.98	0.836	26.9	22	47	16	4
1.360	22	43	42	1.794	0.797	23	41	52	7.82	0.793	45.3	20	13	18	5	11.03	0.834	26.1	22	47	42	4

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

Figure A.44 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 11,996.8 MWd/MTU

```
Cycle:                          19                      Core Average Exposure: MWd/MTU    26399.3
Exposure: MWd/MTU (GWd)     12500.0 (1722.30 )
Delta E: MWd/MTU, (GWd)       503.2 (  69.33 )                Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.240   5.462    14  0.400 0.400  35  2
Inlet Subcooling: Btu/lbm    -26.28                        24  0.637  15.321    16  0.385 0.598   9 12
Flow: Mlb/hr                 104.86 (102.30 %)             23  0.805  20.001    17  0.345 0.396  59 36
                                                           22  0.878  23.129    18  0.394 0.452  59 32
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  0.925  24.966    19  0.831 1.134  47 48
59              -- -- -- -- -- -- --             59        20  0.966  26.128    20  1.062 1.203  47 44
55          -- -- -- -- -- -- -- -- --           55        19  0.984  26.733    21  1.046 1.184  45 42
51       -- -- -- -- -- 14 -- -- -- -- --        51        18  0.995  27.358    22  1.226 1.390  39 50
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  0.979  27.621    23  1.152 1.332  51 42
43 -- -- -- -- -- 14 -- -- 14 -- -- -- -- -- 43           16  0.977  28.240    24  1.128 1.362  39 52
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39           15  0.986  29.101
35 -- -- -- 14 --  6 --  0 --  6 -- 14 -- -- -- 35        14  0.969  29.199
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31        13  1.051  28.083
27 -- -- -- 14 --  6 --  0 --  6 -- 14 -- -- -- 27        12  1.083  28.962
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23        11  1.116  29.553
19 -- -- -- -- -- 14 -- -- -- 14 -- -- -- -- -- 19        10  1.165  30.256
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15         9  1.223  31.209
11       -- -- -- -- -- 14 -- -- -- -- --       11         8  1.273  31.912
 7          -- -- -- -- -- -- -- -- --          7         7  1.320  32.536
 3             -- -- -- -- -- -- --             3         6  1.371  33.630
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  1.376* 33.810*
                                                           4  1.323  32.548
Control Rod Density: %          6.80                       3  1.202  29.760
                                                           2  0.900  22.706
k-effective:                 0.99918                Bottom  1  0.256   6.591
Void Fraction:                0.446
Core Delta-P: psia           25.612              % AXIAL TILT -13.647  -9.768
Core Plate Delta-P: psia     21.046          AVG BOT 8ft/12ft  1.0657  1.0547
Coolant Temp: Deg-F           548.3
In Channel Flow: Mlb/hr       92.39   Active Channel Flow: Mlb/hr        89.15
Total Bypass Flow (%):         11.9   (of total core flow)
Total Water Rod Flow (%):       3.1   (of total core flow)
Source Convergence          0.00008
```

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
1.390	22	39 50	1.747	0.818	22	47 42	9.58	0.782	22.3 23	51 42	4	10.85	0.822	26.4 22	49 40	4
1.387	22	45 44	1.748	0.818	22	41 48	7.37	0.780	49.1 20	49 20	5	10.73	0.822	27.6 23	51 20	4
1.387	22	47 42	1.751	0.817	22	45 44	7.29	0.774	49.5 20	41 50	5	10.46	0.811	28.9 23	19 52	5
1.380	22	41 48	1.752	0.816	22	39 50	9.58	0.774	21.0 24	51 40	4	10.52	0.811	28.2 22	39 50	5
1.378	22	43 46	1.756	0.814	22	43 46	9.39	0.771	22.9 23	41 10	4	10.74	0.809	25.7 22	9 24	4
1.377	22	49 40	1.770	0.808	22	49 40	9.43	0.769	22.2 22	49 18	4	7.94	0.808	54.4 20	7 40	5
1.367	22	37 48	1.770	0.808	22	29 46	9.31	0.761	22.4 22	43 12	4	10.48	0.804	27.7 22	49 18	4
1.362	24	39 52	1.775	0.805	22	35 46	9.27	0.760	22.8 24	39 10	4	10.79	0.804	24.6 24	51 40	4
1.361	24	51 40	1.777	0.805	22	37 48	7.43	0.760	46.0 20	47 18	5	7.85	0.802	54.6 20	49 42	5
1.360	22	31 46	1.777	0.805	23	41 52	9.28	0.759	22.5 22	39 12	5	7.78	0.801	55.2 20	39 8	5

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

Figure A.45 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 12,500.0 MWd/MTU

```
Cycle:                          19                      Core Average Exposure: MWd/MTU    26899.3
Exposure: MWd/MTU (GWd)     13000.0 (1791.20 )
Delta E: MWd/MTU, (GWd)       500.0 (  68.89 )                Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.244   5.592    14  0.399 0.399  35  2
Inlet Subcooling: Btu/lbm    -26.71                        24  0.646  15.664    16  0.384 0.597   9 12
Flow: Mlb/hr                 103.32 (100.80 %)             23  0.816  20.434    17  0.345 0.395  59 36
                                                           22  0.893  23.605    18  0.394 0.452  59 32
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  0.943  25.468    19  0.829 1.130  47 48
59              -- -- -- -- -- -- --             59        20  0.987  26.653    20  1.059 1.197  47 44
55          -- -- -- -- -- -- -- -- --           55        19  1.007  27.269    21  1.043 1.178  45 42
51       -- -- -- -- -- 14 -- -- -- -- --        51        18  1.022  27.900    22  1.228 1.390  39 50
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  1.006  28.154    23  1.154 1.333  51 42
43 -- -- -- -- -- 14 -- -- 14 -- -- -- -- -- 43           16  1.005  28.766    24  1.129 1.363  51 40
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39           15  1.014  29.632
35 -- -- -- 14 --  6 --  0 --  6 -- 14 -- -- -- 35        14  0.995  29.721
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31        13  1.076  28.582
27 -- -- -- 14 --  6 --  0 --  6 -- 14 -- -- -- 27        12  1.105  29.476
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23        11  1.134  30.082
19 -- -- -- -- -- 14 -- -- -- 14 -- -- -- -- -- 19        10  1.179  30.806
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15         9  1.229  31.785
11       -- -- -- -- -- 14 -- -- -- -- --       11         8  1.267  32.509
 7          -- -- -- -- -- -- -- -- --          7         7  1.297  33.150
 3             -- -- -- -- -- -- --             3         6  1.328* 34.264
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  1.317  34.442*
                                                           4  1.255  33.153
Control Rod Density: %           6.80                      3  1.138  30.309
                                                           2  0.854  23.118
k-effective:                  0.99930                Bottom  1  0.242   6.715
Void Fraction:                 0.442
Core Delta-P: psia            24.973              % AXIAL TILT -11.569  -9.704
Core Plate Delta-P: psia      20.408           AVG BOT 8ft/12ft  1.0565  1.0541
Coolant Temp: Deg-F            548.2
In Channel Flow: Mlb/hr         91.05   Active Channel Flow: Mlb/hr        87.86
Total Bypass Flow (%):          11.9   (of total core flow)
Total Water Rod Flow (%):        3.1   (of total core flow)
Source Convergence           0.00008
```

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
1.390	22	39 50	1.729	0.833	22	47 42	6.99	0.746	49.9 20	49 20	5	10.19	0.784	28.1 22	49 40	5
1.386	22	47 42	1.730	0.832	22	41 48	9.05	0.744	23.0 23	51 20	4	10.06	0.784	29.4 23	51 20	5
1.385	22	45 44	1.731	0.832	22	39 50	6.96	0.740	49.7 20	41 50	6	7.56	0.778	55.2 20	7 40	5
1.380	22	41 48	1.734	0.830	22	45 44	9.05	0.736	21.8 24	51 22	4	9.95	0.774	29.2 22	39 50	5
1.379	22	49 40	1.740	0.828	22	43 46	8.83	0.733	24.2 23	41 10	5	9.86	0.772	29.9 23	19 52	5
1.376	22	43 46	1.746	0.825	22	49 40	8.85	0.731	23.6 22	49 18	5	10.11	0.769	26.8 22	9 24	4
1.371	22	37 48	1.746	0.825	22	33 18	8.94	0.727	21.8 22	49 22	5	7.44	0.768	55.4 20	49 42	5
1.363	24	51 40	1.746	0.825	22	17 42	8.90	0.727	22.2 22	51 38	5	7.39	0.768	56.0 20	39 8	5
1.362	22	31 46	1.747	0.824	22	37 48	8.80	0.726	23.4 22	39 12	5	9.86	0.767	29.2 22	49 18	5
1.361	24	39 52	1.750	0.823	22	31 16	7.03	0.725	46.8 20	47 18	5	7.41	0.764	55.4 20	41 50	6

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

Figure A.46 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 13,000.0 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    27299.4
Exposure: MWd/MTU (GWd)     13400.0 (1846.30 )
Delta E: MWd/MTU, (GWd)       400.0 (  55.11 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.248   5.697    14  0.398 0.398  35  2
Inlet Subcooling: Btu/lbm    -26.94                        24  0.655  15.942    16  0.383 0.596   9 12
Flow: Mlb/hr                 102.50 (100.00 %)             23  0.828  20.785    17  0.344 0.394  59 36
                                                           22  0.907  23.992    18  0.393 0.452  59 32
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  0.960  25.877    19  0.828 1.128  47 48
59              -- -- -- -- -- -- --             59        20  1.008  27.082    20  1.057 1.193  47 44
55          -- -- -- -- -- -- -- -- --           55        19  1.031  27.707    21  1.040 1.174  45 42
51       -- -- -- -- -- 14 -- -- -- -- --        51        18  1.047  28.345    22  1.230 1.390  39 50
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  1.033  28.593    23  1.156 1.334  51 42
43 -- -- -- -- -- 14 -- -- 14 -- -- -- -- -- 43           16  1.032  29.198    24  1.130 1.364  51 40
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39           15  1.041  30.068
35 -- -- -- 14 --  6 --  0 --  6 -- 14 -- -- -- 35        14  1.020  30.148
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31           13  1.099  28.991
27 -- -- -- 14 --  6 --  0 --  6 -- 14 -- -- -- 27        12  1.126  29.895
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23           11  1.151  30.511
19 -- -- -- -- -- 14 -- -- -- 14 -- -- -- -- -- 19        10  1.191  31.251
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15         9  1.233  32.247
11       -- -- -- -- -- 14 -- -- -- -- --       11         8  1.259  32.983
 7          -- -- -- -- -- -- -- -- --          7         7  1.273  33.633
 3              -- -- -- -- -- -- --            3         6  1.288* 34.755
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  1.261  34.926*
                                                           4  1.192  33.613
Control Rod Density: %          6.80                       3  1.077  30.725
                                                           2  0.809  23.430
k-effective:                 0.99948                Bottom  1  0.230   6.808
Void Fraction:                0.438
Core Delta-P: psia           24.602              % AXIAL TILT  -9.538  -9.624
Core Plate Delta-P: psia     20.037          AVG BOT 8ft/12ft  1.0473  1.0536
Coolant Temp: Deg-F           548.1
In Channel Flow: Mlb/hr       90.35   Active Channel Flow: Mlb/hr        87.19
Total Bypass Flow (%):         11.9   (of total core flow)
Total Water Rod Flow (%):       3.1   (of total core flow)
Source Convergence          0.00007
```

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
1.390	22	39 50	1.715	0.840	22	47 42	6.76	0.721	49.9 20	49 42	6	9.70	0.753	29.0 22	49 40	5
1.386	22	47 42	1.716	0.839	22	39 50	6.71	0.719	50.3 20	41 50	6	9.57	0.751	30.2 23	51 20	5
1.383	22	45 44	1.716	0.839	22	41 48	8.60	0.715	24.3 23	51 20	5	7.23	0.749	55.8 20	7 40	5
1.381	22	49 40	1.721	0.837	22	33 18	8.61	0.708	23.1 24	51 22	5	7.18	0.744	55.7 20	39 8	6
1.379	22	41 48	1.722	0.836	22	23 48	8.43	0.705	25.0 23	41 10	5	7.20	0.743	55.5 20	49 42	6
1.375	22	43 46	1.722	0.836	22	45 44	6.80	0.703	47.0 20	47 18	6	7.15	0.743	56.0 20	41 50	6
1.373	22	37 48	1.722	0.836	22	17 42	8.44	0.702	24.3 22	49 18	5	9.47	0.742	30.0 22	39 50	5
1.364	24	51 40	1.725	0.835	22	31 16	6.52	0.701	50.5 20	23 12	6	9.37	0.739	30.8 23	19 52	5
1.363	22	31 46	1.728	0.834	22	43 46	8.52	0.699	22.8 22	51 24	5	9.60	0.739	28.2 22	9 24	5
1.361	24	39 52	1.729	0.833	22	49 40	8.54	0.699	22.5 22	49 22	5	9.38	0.736	30.0 22	49 18	5

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

Figure A.47 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 13,400.0 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    27300.3
Exposure: MWd/MTU (GWd)     13401.0 (1846.50 )
Delta E: MWd/MTU, (GWd)         1.0 (   0.14 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)           N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                     Top 25  0.248   5.698    14  0.392 0.392  35  2
Inlet Subcooling: Btu/lbm    -26.39                         24  0.655  15.943    16  0.383 0.598   9 12
Flow: Mlb/hr                 104.45 (101.90 %)              23  0.827  20.786    17  0.344 0.396  59 36
                                                            22  0.905  23.993    18  0.392 0.455  59 32
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58             21  0.955  25.878    19  0.828 1.132  47 48
59              -- -- -- -- -- -- --             59         20  0.999  27.083    20  1.057 1.199  47 44
55          -- -- -- -- -- -- -- -- --           55         19  1.016  27.708    21  1.039 1.179  45 42
51       -- -- -- -- -- 10 -- -- -- -- --        51         18  1.032  28.347    22  1.230 1.393  47 42
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47         17  1.022  28.594    23  1.157 1.343  51 42
43 -- -- -- -- -- 14 -- -- 14 -- -- -- -- -- 43            16  1.026  29.199    24  1.132 1.373  51 40
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39            15  1.038  30.069
35 -- -- -- 14 --  6 --  0 --  6 -- 14 -- -- -- 35         14  1.019  30.149
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31         13  1.101  28.992
27 -- -- -- 14 --  6 --  0 --  6 -- 14 -- -- -- 27         12  1.130  29.896
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23         11  1.156  30.512
19 -- -- -- -- -- 14 -- -- -- 14 -- -- -- -- -- 19         10  1.198  31.253
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15          9  1.240  32.248
11       -- -- -- -- -- 10 -- -- -- -- --       11          8  1.267  32.984
 7          -- -- -- -- -- -- -- -- --          7          7  1.281  33.634
 3              -- -- -- -- -- -- --            3          6  1.295* 34.756
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58             5  1.268  34.928*
                                                            4  1.198  33.614
Control Rod Density: %           6.89                       3  1.082  30.726
                                                            2  0.812  23.431
k-effective:                  0.99949                Bottom  1  0.231   6.809
Void Fraction:                 0.436
Core Delta-P: psia            25.320              % AXIAL TILT -10.115  -9.624
Core Plate Delta-P: psia      20.754          AVG BOT 8ft/12ft  1.0509  1.0536
Coolant Temp: Deg-F            548.1
In Channel Flow: Mlb/hr         92.10   Active Channel Flow: Mlb/hr        88.89
Total Bypass Flow (%):          11.8    (of total core flow)
Total Water Rod Flow (%):        3.1    (of total core flow)
Source Convergence           0.00009
```

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
1.393	22	47 42	1.721	0.837	22	47 42	6.81	0.726	49.9 20	49 42	6	9.76	0.758	29.0 22	49 40	5
1.390	22	49 40	1.730	0.833	22	45 44	6.76	0.724	50.3 20	41 50	6	9.63	0.756	30.2 23	51 20	5
1.389	22	45 44	1.730	0.832	22	17 42	8.66	0.719	24.3 23	51 20	5	7.27	0.754	55.8 20	7 40	5
1.387	22	39 50	1.732	0.831	22	49 40	8.66	0.712	23.1 24	51 22	5	7.23	0.749	55.7 20	39 8	6
1.380	22	41 48	1.735	0.830	22	41 48	8.49	0.709	25.0 23	41 10	5	7.20	0.748	56.0 20	41 50	6
1.379	22	43 46	1.738	0.829	22	15 40	6.85	0.708	47.0 20	47 18	6	7.25	0.748	55.5 20	49 42	6
1.373	24	51 40	1.738	0.829	24	51 40	8.50	0.706	24.3 22	49 18	5	9.54	0.748	30.0 22	39 50	5
1.367	22	37 48	1.740	0.827	22	21 50	6.57	0.706	50.5 20	23 12	6	9.43	0.745	30.8 23	19 52	5
1.363	22	45 22	1.741	0.827	22	43 46	8.57	0.703	22.8 22	51 24	5	9.66	0.744	28.2 22	9 24	5
1.362	22	43 42	1.744	0.826	23	51 42	8.59	0.703	22.5 22	49 22	5	9.44	0.740	30.0 22	49 18	5

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

Figure A.48 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 13,401.0 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    27799.2
Exposure: MWd/MTU (GWd)     13900.0 (1915.20 )
Delta E: MWd/MTU, (GWd)       499.0 (  68.76 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.253   5.831    14  0.391 0.391  35  2
Inlet Subcooling: Btu/lbm    -26.59                        24  0.668  16.296    16  0.383 0.596   9 12
Flow: Mlb/hr                 103.73 (101.20 %)             23  0.844  21.232    17  0.343 0.395  59 36
                                                           22  0.927  24.484    18  0.391 0.455  59 32
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  0.981  26.397    19  0.827 1.130  47 48
59              -- -- -- -- -- -- --             59        20  1.029  27.627    20  1.055 1.194  47 44
55          -- -- -- -- -- -- -- -- --           55        19  1.049  28.263    21  1.036 1.174  45 42
51       -- -- -- -- -- 10 -- -- -- -- --        51        18  1.068  28.910    22  1.232 1.393  47 42
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  1.060  29.153    23  1.160 1.344  51 42
43 -- -- -- -- -- 14 -- -- 14 -- -- -- -- -- 43           16  1.064  29.752    24  1.134 1.375  51 40
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39           15  1.076  30.629
35 -- -- -- 14 --  6 --  0 --  6 -- 14 -- -- -- 35        14  1.054  30.698
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31        13  1.134  29.515
27 -- -- -- 14 --  6 --  0 --  6 -- 14 -- -- -- 27        12  1.159  30.432
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23        11  1.179  31.059
19 -- -- -- -- -- 14 -- -- -- 14 -- -- -- -- -- 19        10  1.213  31.817
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15         9  1.243  32.831
11       -- -- -- -- -- 10 -- -- -- -- --       11         8  1.252* 33.575
 7          -- -- -- -- -- -- -- -- --          7         7  1.246  34.227
 3             -- -- -- -- -- -- --             3         6  1.237  35.350
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  1.192  35.504*
                                                           4  1.111  34.155
Control Rod Density: %          6.89                       3  0.998  31.214
                                                           2  0.751  23.797
k-effective:                 0.99964                Bottom  1  0.213   6.918
Void Fraction:                0.429
Core Delta-P: psia           24.951              % AXIAL TILT  -7.218  -9.493
Core Plate Delta-P: psia     20.386          AVG BOT 8ft/12ft  1.0378  1.0527
Coolant Temp: Deg-F          548.0
In Channel Flow: Mlb/hr       91.51   Active Channel Flow: Mlb/hr        88.34
Total Bypass Flow (%):         11.8   (of total core flow)
Total Water Rod Flow (%):       3.1   (of total core flow)
Source Convergence          0.00006
```

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
1.393	22	47 42	1.699	0.848	22	47 42	7.10	0.697	42.1 20	45 28	19	7.91	0.742	47.3 20	45 28	19
1.393	22	49 40	1.702	0.846	22	17 42	6.47	0.696	50.7 20	49 20	6	7.95	0.740	46.8 20	47 26	19
1.388	22	39 50	1.705	0.844	22	15 40	7.18	0.695	40.6 20	21 44	19	8.06	0.737	45.1 20	39 18	19
1.388	22	45 44	1.708	0.843	22	49 40	6.63	0.694	48.2 20	19 12	8	7.00	0.725	55.8 20	7 40	6
1.380	22	41 48	1.710	0.842	24	51 40	7.10	0.693	41.5 20	47 26	19	8.10	0.724	43.0 20	23 42	19
1.378	22	43 46	1.713	0.841	22	45 44	7.27	0.688	38.5 20	37 42	19	6.89	0.721	56.5 20	39 8	6
1.375	24	51 40	1.718	0.838	22	23 48	6.73	0.682	45.1 20	13 18	8	6.90	0.719	56.2 20	49 42	6
1.370	22	37 48	1.719	0.838	22	41 48	8.13	0.681	25.2 23	51 20	5	7.10	0.718	53.8 20	41 50	8
1.364	22	45 22	1.721	0.837	22	33 18	6.66	0.680	45.9 20	17 14	8	9.23	0.717	29.0 22	49 40	6
1.361	22	51 38	1.722	0.836	22	21 50	6.65	0.679	45.9 20	15 16	8	9.11	0.717	30.4 23	51 42	6

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

Figure A.49 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 13,900.0 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    28129.2
Exposure: MWd/MTU (GWd)     14230.0 (1960.70 )
Delta E: MWd/MTU, (GWd)       330.0 (  45.47 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.256   5.921    14  0.391 0.391  35  2
Inlet Subcooling: Btu/lbm    -26.68                        24  0.677  16.533    16  0.382 0.596   9 12
Flow: Mlb/hr                 103.42 (100.90 %)             23  0.856  21.531    17  0.343 0.395  59 36
                                                           22  0.941  24.815    18  0.391 0.455  59 32
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  0.998  26.748    19  0.827 1.129  47 48
59              -- -- -- -- -- -- --             59        20  1.049  27.996    20  1.053 1.192  47 44
55          -- -- -- -- -- -- -- -- --           55        19  1.071  28.639    21  1.034 1.171  45 42
51       -- -- -- -- -- 10 -- -- -- -- --        51        18  1.092  29.293    22  1.233 1.395  49 40
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  1.085  29.533    23  1.162 1.346  51 42
43 -- -- -- -- -- 14 -- -- 14 -- -- -- -- -- 43           16  1.089  30.129    24  1.136 1.376  51 40
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39           15  1.101  31.010
35 -- -- -- 14 --  6 --  0 --  6 -- 14 -- -- -- 35        14  1.076  31.071
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31        13  1.155  29.870
27 -- -- -- 14 --  6 --  0 --  6 -- 14 -- -- -- 27        12  1.177  30.794
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23        11  1.193  31.426
19 -- -- -- -- -- 14 -- -- -- 14 -- -- -- -- -- 19        10  1.220  32.195
15    -- -- -- -- -- -- -- -- -- -- -- -- -- --    15         9  1.242* 33.216
11       -- -- -- -- -- 10 -- -- -- -- --       11         8  1.241  33.961
 7          -- -- -- -- -- -- -- -- --          7         7  1.221  34.609
 3             -- -- -- -- -- -- --             3         6  1.199  35.727
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  1.143  35.866*
                                                           4  1.057  34.491
Control Rod Density: %          6.89                       3  0.946  31.515
                                                           2  0.713  24.023
k-effective:                 0.99973                Bottom  1  0.202   6.986
Void Fraction:                0.424
Core Delta-P: psia           24.772              % AXIAL TILT  -5.301  -9.381
Core Plate Delta-P: psia     20.207          AVG BOT 8ft/12ft  1.0290  1.0521
Coolant Temp: Deg-F           547.9
In Channel Flow: Mlb/hr       91.26   Active Channel Flow: Mlb/hr        88.12
Total Bypass Flow (%):         11.8   (of total core flow)
Total Water Rod Flow (%):       3.0   (of total core flow)
Source Convergence          0.00007
```

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
1.395	22	49 40	1.679	0.858	22	47 42	7.19	0.709	42.6 20	45 28	19	8.07	0.756	47.4 20	47 26	19
1.393	22	47 42	1.685	0.854	22	17 42	7.28	0.708	41.1 20	21 44	19	8.00	0.755	47.9 20	15 34	19
1.389	22	39 50	1.686	0.854	22	49 40	7.21	0.707	42.0 20	47 26	19	8.16	0.751	45.7 20	39 18	19
1.387	22	45 44	1.686	0.854	22	15 40	7.34	0.699	39.0 20	37 42	19	8.18	0.735	43.6 20	23 42	19
1.380	22	41 48	1.693	0.850	22	15 18	6.55	0.689	48.7 20	19 12	8	7.02	0.714	54.3 20	41 50	8
1.377	22	43 46	1.694	0.850	24	51 40	6.53	0.686	48.4 20	11 20	8	6.98	0.707	53.9 20	49 42	8
1.376	24	51 40	1.698	0.848	22	23 48	8.55	0.685	20.0 22	39 42	19	6.78	0.707	56.3 20	7 40	6
1.371	22	37 48	1.700	0.847	22	41 48	6.74	0.678	44.5 20	13 18	9	9.57	0.707	23.6 22	39 42	19
1.364	22	45 22	1.704	0.845	22	33 18	6.67	0.677	45.3 20	15 16	9	7.31	0.704	49.7 20	17 18	15
1.363	22	51 38	1.709	0.842	22	43 46	6.67	0.677	45.3 20	17 14	9	6.68	0.703	56.9 20	39 8	6

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

Figure A.50 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 14,230.0 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    28422.2
Exposure: MWd/MTU (GWd)     14522.9 (2001.10 )
Delta E: MWd/MTU, (GWd)       292.9 (  40.36 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.260   6.002    14  0.391 0.391  35  2
Inlet Subcooling: Btu/lbm    -26.65                        24  0.686  16.746    16  0.382 0.596   9 12
Flow: Mlb/hr                 103.53 (101.00 %)             23  0.867  21.801    17  0.343 0.394  59 36
                                                           22  0.956  25.113    18  0.391 0.455  59 32
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  1.015  27.064    19  0.827 1.128  47 48
59              -- -- -- -- -- -- --             59        20  1.068  28.329    20  1.051 1.189  47 44
55          -- -- -- -- -- -- -- -- --           55        19  1.092  28.979    21  1.032 1.167  45 42
51       -- -- -- -- -- 10 -- -- -- -- --        51        18  1.114  29.641    22  1.234 1.397  49 40
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  1.107  29.879    23  1.164 1.348  51 42
43 -- -- -- -- -- 14 -- -- 14 -- -- -- -- -- 43           16  1.112  30.471    24  1.138 1.378  51 40
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39           15  1.123  31.356
35 -- -- -- 14 --  6 --  0 --  6 -- 14 -- -- -- 35        14  1.096  31.409
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31           13  1.175  30.190
27 -- -- -- 14 --  6 --  0 --  6 -- 14 -- -- -- 27        12  1.193  31.120
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23           11  1.205  31.756
19 -- -- -- -- -- 14 -- -- -- 14 -- -- -- -- -- 19        10  1.227  32.531
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15         9  1.241* 33.557
11       -- -- -- -- -- 10 -- -- -- -- --       11         8  1.229  34.301
 7          -- -- -- -- -- -- -- -- --          7         7  1.198  34.942
 3             -- -- -- -- -- -- --             3         6  1.164  36.053
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  1.098  36.174*
                                                           4  1.008  34.775
Control Rod Density: %         6.89                        3  0.899  31.768
                                                           2  0.678  24.215
k-effective:                0.99980                Bottom  1  0.193   7.044
Void Fraction:               0.418
Core Delta-P: psia          24.744              % AXIAL TILT  -3.513  -9.264
Core Plate Delta-P: psia    20.180          AVG BOT 8ft/12ft  1.0208  1.0515
Coolant Temp: Deg-F          547.8
In Channel Flow: Mlb/hr      91.39   Active Channel Flow: Mlb/hr        88.25
Total Bypass Flow (%):        11.7   (of total core flow)
Total Water Rod Flow (%):      3.0   (of total core flow)
Source Convergence         0.00008
```

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
1.397	22	49 40	1.664	0.865	22	47 42	7.31	0.720	42.5 20	47 26	19	8.18	0.771	47.8 20	47 26	19
1.393	22	47 42	1.668	0.863	22	49 40	7.26	0.720	43.0 20	45 28	19	8.09	0.767	48.4 20	15 34	19
1.390	22	39 50	1.671	0.862	22	15 40	7.37	0.720	41.5 20	21 44	19	8.26	0.764	46.2 20	39 18	19
1.385	22	45 44	1.674	0.860	22	17 42	7.41	0.708	39.4 20	37 42	19	8.24	0.745	44.1 20	23 42	19
1.380	22	41 48	1.679	0.858	22	15 18	8.67	0.698	20.6 22	39 42	19	7.47	0.720	49.8 20	15 16	15
1.378	24	51 40	1.682	0.856	22	23 48	8.66	0.690	19.3 22	47 28	19	7.44	0.720	50.1 20	17 18	15
1.376	22	43 46	1.682	0.856	24	51 40	6.60	0.689	47.9 20	19 12	9	9.67	0.718	24.2 22	39 42	19
1.372	22	37 48	1.684	0.855	22	41 48	8.61	0.689	19.7 22	45 26	19	7.37	0.717	50.5 20	41 50	15
1.366	22	51 38	1.692	0.851	22	33 18	8.57	0.688	20.2 22	37 44	19	7.34	0.715	50.6 20	49 42	15
1.364	22	45 22	1.694	0.850	22	17 16	6.57	0.684	47.8 20	11 20	9	7.62	0.714	47.3 20	47 18	15

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

Figure A.51 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 14,522.9 MWd/MTU

```
Cycle:                          19                      Core Average Exposure: MWd/MTU    28427.6
Exposure: MWd/MTU (GWd)     14528.3 (2001.80 )
Delta E: MWd/MTU, (GWd)         5.4 (   0.74 )                 Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.232   6.004    14  0.399 0.399  35  2
Inlet Subcooling: Btu/lbm    -26.88                        24  0.612  16.750    16  0.370 0.566   9 12
Flow: Mlb/hr                 102.71 (100.20 %)             23  0.768  21.805    17  0.333 0.389  59 36
                                                           22  0.839  25.119    18  0.390 0.452   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           21  0.876  27.070    19  0.816 1.060  47 48
59              -- -- -- -- -- -- --             59       20  0.917  28.335    20  1.046 1.197  33 34
55          -- -- -- -- -- -- -- -- --           55       19  0.951  28.985    21  1.074 1.185  29 32
51       -- -- -- -- -- -- -- -- -- -- --        51       18  0.996  29.647    22  1.245 1.396  33 32
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47       17  1.033  29.885    23  1.146 1.309  51 42
43 -- -- -- --  6 --  6 --  6 --  8 -- -- -- -- 43       16  1.072  30.478    24  1.113 1.354  51 40
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39       15  1.109  31.362
35 -- -- -- --  6 -- -- -- -- --  6 -- -- -- -- 35       14  1.105  31.415
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31       13  1.201  30.196
27 -- -- -- --  6 -- -- -- -- --  6 -- -- -- -- 27       12  1.232  31.126
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23       11  1.254  31.762
19 -- -- -- --  8 --  6 --  6 --  6 -- -- -- -- 19       10  1.284  32.538
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15        9  1.306* 33.564
11       -- -- -- -- -- -- -- -- -- -- --       11        8  1.303  34.308
 7          -- -- -- -- -- -- -- -- --          7        7  1.283  34.948
 3             -- -- -- -- -- -- --             3        6  1.264  36.059
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           5  1.213  36.180*
                                                           4  1.132  34.780
Control Rod Density: %           5.63                      3  1.022  31.773
                                                           2  0.775  24.218
k-effective:                 0.99986                Bottom  1  0.221   7.045
Void Fraction:                0.438
Core Delta-P: psia           24.752              % AXIAL TILT -11.685  -9.263
Core Plate Delta-P: psia     20.191          AVG BOT 8ft/12ft  1.0766  1.0515
Coolant Temp: Deg-F          548.0
In Channel Flow: Mlb/hr       90.49   Active Channel Flow: Mlb/hr        87.32
Total Bypass Flow (%):         11.9   (of total core flow)
Total Water Rod Flow (%):       3.1   (of total core flow)
Source Convergence          0.00006
```

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
1.396	22	33 32	1.686	0.854	22	33 32	6.62	0.692	48.1 20	23 12	9	7.00	0.718	55.0 20	23 50	9
1.392	22	31 34	1.706	0.844	22	31 34	6.64	0.691	47.7 21	25 10	9	7.10	0.717	53.7 21	25 10	9
1.379	22	33 36	1.710	0.842	22	25 34	6.58	0.690	48.4 20	11 24	8	6.84	0.717	56.7 20	7 40	6
1.378	22	35 34	1.713	0.841	22	33 26	6.61	0.689	47.8 20	29 52	8	7.08	0.717	53.8 20	31 10	8
1.365	22	51 38	1.748	0.824	22	9 24	6.56	0.689	48.4 21	9 26	8	7.20	0.716	52.4 21	9 26	8
1.365	22	49 40	1.750	0.823	22	49 26	6.60	0.687	47.7 20	9 30	9	7.11	0.716	53.4 20	9 32	9
1.360	22	49 36	1.750	0.823	22	49 40	6.75	0.686	45.4 20	27 28	6	7.10	0.715	53.5 20	41 50	9
1.355	22	51 34	1.751	0.822	22	9 34	6.55	0.684	47.9 20	19 12	9	7.07	0.714	53.7 20	39 8	8
1.354	24	51 40	1.755	0.821	22	49 32	6.47	0.683	48.9 20	11 20	8	7.01	0.714	54.4 20	49 42	8
1.354	22	31 50	1.766	0.815	22	39 50	6.55	0.679	47.4 21	27 12	9	6.89	0.714	55.7 20	49 24	8

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

Figure A.52 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 14,528.3 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    28599.2
Exposure: MWd/MTU (GWd)     14700.0 (2025.50 )
Delta E: MWd/MTU, (GWd)       171.7 (  23.66 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)           N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                     Top 25  0.234   6.046    14  0.399 0.399  35  2
Inlet Subcooling: Btu/lbm    -26.68                         24  0.617  16.862    16  0.370 0.566   9 12
Flow: Mlb/hr                 103.42 (100.90 %)              23  0.775  21.947    17  0.332 0.389  59 36
                                                            22  0.847  25.274    18  0.390 0.452   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58             21  0.885  27.232    19  0.816 1.061  47 48
59              -- -- -- -- -- -- --             59         20  0.927  28.505    20  1.045 1.196  33 34
55          -- -- -- -- -- -- -- -- --           55         19  0.962  29.162    21  1.073 1.183  29 32
51       -- -- -- -- -- -- -- -- -- -- --        51         18  1.008  29.832    22  1.245 1.399  33 32
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47         17  1.046  30.077    23  1.147 1.310  51 42
43 -- -- -- --  6 --  6 --  6 --  8 -- -- -- -- 43         16  1.085  30.674    24  1.114 1.355  51 40
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39         15  1.123  31.566
35 -- -- -- --  6 -- -- -- -- --  6 -- -- -- -- 35       14  1.117  31.618
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31         13  1.213  30.391
27 -- -- -- --  6 -- -- -- -- --  6 -- -- -- -- 27       12  1.243  31.325
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23         11  1.262  31.965
19 -- -- -- --  8 --  6 --  6 --  6 -- -- -- -- 19       10  1.288  32.745
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15        9  1.305* 33.774
11       -- -- -- -- -- -- -- -- -- -- --       11        8  1.296  34.517
 7          -- -- -- -- -- -- -- -- --          7         7  1.269  35.154
 3             -- -- -- -- -- -- --             3         6  1.244  36.261
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           5  1.187  36.374*
                                                           4  1.104  34.960
Control Rod Density: %          5.63                       3  0.994  31.936
                                                           2  0.755  24.341
k-effective:                 0.99989                Bottom  1  0.216   7.082
Void Fraction:                0.434
Core Delta-P: psia           24.972              % AXIAL TILT -10.664  -9.237
Core Plate Delta-P: psia     20.411          AVG BOT 8ft/12ft  1.0720  1.0514
Coolant Temp: Deg-F          548.0
In Channel Flow: Mlb/hr       91.16   Active Channel Flow: Mlb/hr        87.97
Total Bypass Flow (%):         11.9   (of total core flow)
Total Water Rod Flow (%):       3.1   (of total core flow)
Source Convergence          0.00010
```

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
1.399	22	33 32	1.683	0.856	22	33 32	6.61	0.693	48.3 20	23 12	9	7.09	0.719	54.0 21	25 10	9
1.395	22	31 34	1.701	0.847	22	31 34	6.63	0.692	47.9 21	25 10	9	6.97	0.718	55.2 20	23 50	9
1.381	22	33 36	1.708	0.843	22	25 34	6.64	0.690	47.5 20	11 24	9	7.17	0.717	52.8 20	31 10	9
1.380	22	35 34	1.711	0.842	22	33 26	6.68	0.690	46.9 20	29 52	9	7.11	0.716	53.4 21	9 26	9
1.366	22	51 38	1.742	0.827	22	9 24	6.63	0.689	47.6 21	9 26	9	7.08	0.716	53.8 20	41 50	9
1.366	22	49 40	1.744	0.826	22	49 40	6.56	0.685	48.0 20	9 30	9	6.98	0.715	54.8 20	49 24	9
1.359	22	49 36	1.747	0.824	22	49 26	6.55	0.684	48.0 20	11 20	9	7.08	0.715	53.6 20	9 32	9
1.355	22	31 50	1.747	0.824	22	9 34	6.53	0.684	48.2 20	19 12	9	7.09	0.714	53.5 20	49 42	9
1.355	24	51 40	1.753	0.821	22	49 32	6.71	0.683	45.7 20	27 28	6	7.04	0.713	54.0 20	39 8	8
1.354	22	51 34	1.759	0.819	22	39 50	6.52	0.678	47.6 21	27 12	9	7.08	0.713	53.4 20	7 40	8

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

Figure A.53 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 14,700.0 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    28999.2
Exposure: MWd/MTU (GWd)     15100.0 (2080.60 )
Delta E: MWd/MTU, (GWd)       400.0 (  55.11 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.241   6.148    14  0.398 0.398  35  2
Inlet Subcooling: Btu/lbm    -26.37                        24  0.635  17.130    16  0.370 0.567   9 12
Flow: Mlb/hr                 104.55 (102.00 %)             23  0.798  22.283    17  0.333 0.388  59 36
                                                           22  0.875  25.644    18  0.390 0.452   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  0.916  27.619    19  0.817 1.063  47 48
59              -- -- -- -- -- -- --             59        20  0.961  28.911    20  1.042 1.191  33 34
55          -- -- -- -- -- -- -- -- --           55        19  0.997  29.583    21  1.070 1.176  29 32
51       -- -- -- -- -- -- -- -- -- -- --        51        18  1.044  30.273    22  1.246 1.400  33 32
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  1.083  30.535    23  1.151 1.314  51 42
43 -- -- -- --  6 --  6 --  6 --  8 -- -- -- -- 43        16  1.122  31.143    24  1.117 1.357  51 40
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39        15  1.158  32.050
35 -- -- -- --  6 -- -- -- -- --  6 -- -- -- -- 35        14  1.148  32.098
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31        13  1.242  30.852
27 -- -- -- --  6 -- -- -- -- --  6 -- -- -- -- 27        12  1.266  31.796
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23        11  1.278  32.442
19 -- -- -- --  8 --  6 --  6 --  6 -- -- -- -- 19        10  1.294  33.230
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15         9  1.298* 34.263
11       -- -- -- -- -- -- -- -- -- -- --       11         8  1.273  35.000
 7          -- -- -- -- -- -- -- -- --          7         7  1.229  35.623
 3             -- -- -- -- -- -- --             3         6  1.187  36.717
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  1.116  36.806*
                                                           4  1.025  35.360
Control Rod Density: %         5.63                        3  0.917  32.295
                                                           2  0.697  24.614
k-effective:                1.00001                Bottom  1  0.199   7.164
Void Fraction:               0.424
Core Delta-P: psia          25.267              % AXIAL TILT  -7.584  -9.148
Core Plate Delta-P: psia    20.705          AVG BOT 8ft/12ft  1.0572  1.0511
Coolant Temp: Deg-F          547.8
In Channel Flow: Mlb/hr       92.23   Active Channel Flow: Mlb/hr        89.04
Total Bypass Flow (%):        11.8    (of total core flow)
Total Water Rod Flow (%):      3.1    (of total core flow)
Source Convergence         0.00005
```

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
1.400	22	33 32	1.672	0.861	22	33 32	6.55	0.691	48.9 20	23 12	9	7.38	0.719	50.8 20	9 32	15
1.397	22	31 34	1.689	0.853	22	31 34	6.58	0.690	48.5 21	25 10	9	7.04	0.719	54.5 21	25 10	9
1.380	22	33 36	1.698	0.848	22	25 34	6.59	0.689	48.1 20	11 24	9	6.92	0.718	55.8 20	23 50	9
1.380	22	35 34	1.702	0.846	22	33 26	6.64	0.688	47.2 20	29 10	9	7.04	0.717	54.4 20	41 50	9
1.369	22	51 38	1.720	0.837	22	9 24	6.57	0.687	48.1 21	9 26	9	7.11	0.716	53.4 20	31 10	9
1.368	22	49 40	1.723	0.836	22	49 40	6.50	0.684	48.7 20	19 12	9	7.05	0.715	54.0 21	9 26	9
1.357	22	49 36	1.731	0.832	22	9 34	6.73	0.683	45.4 20	51 32	15	7.04	0.714	54.1 20	49 42	9
1.357	24	51 40	1.733	0.831	22	49 26	6.50	0.683	48.6 20	11 20	9	7.43	0.714	49.5 20	49 24	15
1.355	22	31 50	1.738	0.829	22	39 50	6.47	0.677	48.1 21	27 12	9	7.10	0.712	53.1 20	39 8	9
1.354	22	51 34	1.740	0.828	22	23 10	6.46	0.672	47.5 21	11 28	9	7.12	0.709	52.6 20	7 40	9

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

Figure A.54 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 15,100.0 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    29499.2
Exposure: MWd/MTU (GWd)     15600.0 (2149.50 )
Delta E: MWd/MTU, (GWd)       500.0 (  68.89 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.248   6.279    14  0.399 0.399  35  2
Inlet Subcooling: Btu/lbm    -25.84                        24  0.657  17.475    16  0.370 0.567   9 12
Flow: Mlb/hr                 106.50 (103.90 %)             23  0.826  22.717    17  0.333 0.388  59 36
                                                           22  0.908  26.123    18  0.390 0.453   1 30
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           21  0.952  28.121    19  0.818 1.065  47 48
59              -- -- -- -- -- -- --             59       20  0.999  29.438    20  1.039 1.189  33 34
55          -- -- -- -- -- -- -- -- --           55       19  1.036  30.130    21  1.066 1.173  29 32
51       -- -- -- -- -- -- -- -- -- -- --        51       18  1.086  30.846    22  1.245 1.407  33 32
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47       17  1.124  31.129    23  1.157 1.318  51 42
43 -- -- -- --  6 --  6 --  6 --  8 -- -- -- -- 43       16  1.162  31.749    24  1.121 1.358  51 40
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39       15  1.196  32.675
35 -- -- -- --  6 -- -- -- -- --  6 -- -- -- -- 35       14  1.181  32.717
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31       13  1.274  31.442
27 -- -- -- --  6 -- -- -- -- --  6 -- -- -- -- 27       12  1.291  32.396
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23       11  1.292  33.045
19 -- -- -- --  8 --  6 --  6 --  6 -- -- -- -- 19       10  1.297* 33.839
15    -- -- -- -- -- -- -- -- -- -- -- -- -- --    15        9  1.286  34.870
11       -- -- -- -- -- -- -- -- -- -- -- --       11        8  1.245  35.591
 7          -- -- -- -- -- -- -- -- --           7         7  1.182  36.189
 3              -- -- -- -- -- -- --             3         6  1.122  37.260
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           5  1.038  37.312*
                                                           4  0.941  35.822
Control Rod Density: %          5.63                       3  0.837  32.707
                                                           2  0.637  24.927
k-effective:                 0.99998                Bottom  1  0.182   7.259
Void Fraction:                0.412
Core Delta-P: psia           25.850              % AXIAL TILT  -4.108  -8.986
Core Plate Delta-P: psia     21.287          AVG BOT 8ft/12ft  1.0402  1.0504
Coolant Temp: Deg-F           547.7
In Channel Flow: Mlb/hr       94.05   Active Channel Flow: Mlb/hr        90.84
Total Bypass Flow (%):         11.7   (of total core flow)
Total Water Rod Flow (%):       3.0   (of total core flow)
Source Convergence          0.00008
```

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
1.407	22	33 32	1.660	0.868	22	33 32	6.93	0.712	46.5	20	37 50	15	7.61	0.749	51.5	20	9 32	15
1.404	22	31 34	1.674	0.860	22	31 34	6.92	0.708	46.1	20	9 30	15	7.54	0.748	52.2	20	37 50	15
1.382	22	35 34	1.690	0.852	22	25 34	7.02	0.708	44.7	20	31 52	15	7.53	0.747	52.2	20	41 50	15
1.381	22	33 36	1.694	0.850	22	33 26	6.93	0.708	45.9	20	11 24	15	7.66	0.743	50.3	20	49 24	15
1.372	22	51 38	1.699	0.848	22	9 24	6.79	0.699	46.6	20	41 50	15	7.48	0.742	52.1	20	49 42	15
1.370	22	49 40	1.706	0.844	22	49 40	6.76	0.695	46.6	20	49 42	15	7.63	0.742	50.5	20	31 52	15
1.358	24	51 40	1.716	0.839	22	23 10	6.64	0.692	47.7	21	25 10	10	7.45	0.731	51.3	21	25 10	15
1.355	22	37 52	1.718	0.838	22	9 34	6.63	0.688	47.5	21	9 26	10	7.45	0.730	51.1	21	9 26	15
1.355	22	31 50	1.718	0.838	22	39 50	6.69	0.682	45.7	20	13 26	15	7.36	0.729	52.1	20	13 26	15
1.355	22	33 52	1.725	0.835	22	49 26	6.73	0.681	45.0	20	35 48	15	7.43	0.727	51.0	21	33 50	15

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

Figure A.55 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 15,600.0 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    29500.3
Exposure: MWd/MTU (GWd)     15601.0 (2149.60 )
Delta E: MWd/MTU, (GWd)         1.0 (   0.14 )                  Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.253   6.279    14  0.399 0.399  35  2
Inlet Subcooling: Btu/lbm    -26.76                        24  0.668  17.476    16  0.369 0.564   9 12
Flow: Mlb/hr                 103.11 (100.60 %)             23  0.841  22.718    17  0.332 0.385  59 36
                                                           22  0.929  26.124    18  0.389 0.452  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  0.980  28.122    19  0.815 1.057  47 48
59              -- -- -- -- -- -- --             59        20  1.018  29.439    20  1.042 1.189  33 34
55          -- -- -- -- -- -- -- -- --           55        19  1.048  30.131    21  1.067 1.173  29 32
51       -- -- -- -- -- -- -- -- -- -- --        51        18  1.091  30.847    22  1.248 1.405  33 32
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  1.125  31.130    23  1.151 1.307  51 42
43 -- -- -- --  8 --  8 --  8 --  8 -- -- -- -- 43        16  1.159  31.750    24  1.116 1.346  51 40
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39        15  1.189  32.676
35 -- -- -- --  6 -- -- -- -- --  6 -- -- -- -- 35        14  1.172  32.718
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31        13  1.262  31.443
27 -- -- -- --  6 -- -- -- -- --  6 -- -- -- -- 27        12  1.278  32.398
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23        11  1.278  33.046
19 -- -- -- --  8 --  8 --  8 --  8 -- -- -- -- 19        10  1.283* 33.840
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15         9  1.273  34.872
11       -- -- -- -- -- -- -- -- -- -- --       11         8  1.233  35.592
 7          -- -- -- -- -- -- -- -- --           7         7  1.173  36.191
 3             -- -- -- -- -- -- --              3         6  1.115  37.261
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  1.035  37.313*
                                                           4  0.940  35.823
Control Rod Density: %          5.50                       3  0.837  32.707
                                                           2  0.638  24.927
k-effective:                 0.99998                Bottom  1  0.182   7.259
Void Fraction:                0.415
Core Delta-P: psia           24.603              % AXIAL TILT  -3.329  -8.985
Core Plate Delta-P: psia     20.043          AVG BOT 8ft/12ft  1.0333  1.0504
Coolant Temp: Deg-F           547.6
In Channel Flow: Mlb/hr       91.02   Active Channel Flow: Mlb/hr        87.88
Total Bypass Flow (%):         11.7   (of total core flow)
Total Water Rod Flow (%):       3.0   (of total core flow)
Source Convergence          0.00009
```

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
1.405	22	33 32	1.632	0.883	22	33 32	6.88	0.707	46.5 20	37 50	15	7.49	0.745	52.4 20	23 50	15
1.404	22	31 34	1.641	0.877	22	31 34	6.98	0.704	44.8 20	29 52	15	7.52	0.741	51.5 20	9 32	15
1.383	22	33 36	1.657	0.869	22	25 34	6.85	0.701	46.1 20	9 30	15	7.46	0.740	52.2 20	41 50	15
1.381	22	35 34	1.657	0.869	22	33 26	6.85	0.700	45.9 20	11 24	15	7.58	0.738	50.6 20	29 52	15
1.360	22	51 38	1.697	0.848	22	9 24	6.74	0.693	46.6 20	41 50	15	7.60	0.737	50.3 20	49 24	15
1.358	22	49 40	1.700	0.847	22	31 50	6.68	0.687	46.5 20	11 20	15	7.39	0.733	52.2 20	49 42	15
1.357	22	31 50	1.704	0.845	22	49 40	6.56	0.684	47.7 21	25 10	10	7.40	0.726	51.3 21	25 10	15
1.353	22	33 52	1.706	0.844	22	23 10	6.54	0.680	47.5 21	9 26	10	7.37	0.724	51.3 20	25 48	15
1.351	22	35 50	1.708	0.843	22	33 10	6.70	0.678	45.0 20	35 48	15	7.39	0.723	51.0 21	33 50	15
1.351	22	31 38	1.709	0.843	22	39 50	8.36	0.675	21.0 22	35 50	15	7.29	0.723	52.2 20	47 26	15

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

Figure A.56 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 15,601.0 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    29924.2
Exposure: MWd/MTU (GWd)     16025.0 (2208.00 )
Delta E: MWd/MTU, (GWd)       424.0 (  58.42 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.261   6.396    14  0.399 0.399  35  2
Inlet Subcooling: Btu/lbm    -25.84                        24  0.690  17.783    16  0.369 0.564   9 12
Flow: Mlb/hr                 106.50 (103.90 %)             23  0.869  23.105    17  0.332 0.385  25 60
                                                           22  0.961  26.554    18  0.389 0.453  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  1.015  28.577    19  0.817 1.060  47 48
59              -- -- -- -- -- -- --             59        20  1.054  29.912    20  1.039 1.185  27 28
55          -- -- -- -- -- -- -- -- --           55        19  1.083  30.617    21  1.063 1.168  29 32
51       -- -- -- -- -- -- -- -- -- -- --        51        18  1.127  31.353    22  1.247 1.408  31 34
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  1.160  31.651    23  1.158 1.311  51 42
43 -- -- -- --  8 --  8 --  8 --  8 -- -- -- -- 43        16  1.191  32.279    24  1.121 1.348  51 40
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39        15  1.219  33.218
35 -- -- -- --  6 -- -- -- -- --  6 -- -- -- -- 35        14  1.197  33.251
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31        13  1.286  31.950
27 -- -- -- --  6 -- -- -- -- --  6 -- -- -- -- 27        12  1.296* 32.910
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23        11  1.288  33.557
19 -- -- -- --  8 --  8 --  8 --  8 -- -- -- -- 19        10  1.282  34.351
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15         9  1.260  35.376
11       -- -- -- -- -- -- -- -- -- -- --       11         8  1.206  36.078
 7          -- -- -- -- -- -- -- -- --          7         7  1.130  36.649
 3             -- -- -- -- -- -- --             3         6  1.059  37.694
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  0.968  37.712*
                                                           4  0.869  36.183
Control Rod Density: %         5.50                        3  0.771  33.027
                                                           2  0.588  25.171
k-effective:                0.99997                Bottom  1  0.168   7.333
Void Fraction:               0.402
Core Delta-P: psia          25.713              % AXIAL TILT  -0.242  -8.793
Core Plate Delta-P: psia    21.151          AVG BOT 8ft/12ft  1.0174  1.0496
Coolant Temp: Deg-F          547.6
In Channel Flow: Mlb/hr       94.12   Active Channel Flow: Mlb/hr        90.94
Total Bypass Flow (%):         11.6   (of total core flow)
Total Water Rod Flow (%):       3.0   (of total core flow)
Source Convergence          0.00008
```

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
1.408	22	31 34	1.636	0.880	22	33 32	7.05	0.729	47.1 20	37 50	15	7.69	0.770	53.0 20	23 50	15
1.408	22	33 32	1.642	0.877	22	31 34	7.16	0.728	45.5 20	29 52	15	7.66	0.766	52.9 20	41 50	15
1.381	22	33 36	1.665	0.865	22	25 34	7.02	0.721	46.5 20	11 24	15	7.81	0.766	51.3 20	31 10	15
1.380	22	25 28	1.666	0.865	22	33 26	7.00	0.721	46.7 20	9 30	15	7.70	0.764	52.2 20	9 32	15
1.363	22	51 38	1.691	0.852	22	9 24	6.91	0.715	47.2 20	41 50	15	7.77	0.760	51.0 20	49 24	15
1.360	22	49 40	1.691	0.851	22	31 50	6.86	0.710	47.2 20	11 20	15	7.59	0.758	52.8 20	49 42	15
1.357	22	31 50	1.697	0.848	22	23 10	8.61	0.697	21.2 22	33 52	15	7.63	0.755	51.9 21	25 10	15
1.356	22	33 52	1.698	0.848	22	49 40	8.57	0.697	21.7 22	35 50	15	7.57	0.747	51.8 21	9 26	15
1.355	22	37 52	1.702	0.846	22	25 50	6.84	0.697	45.6 20	35 48	15	7.57	0.747	51.7 21	33 50	15
1.352	22	35 50	1.702	0.846	22	33 10	8.58	0.696	21.6 22	39 50	15	7.55	0.746	52.0 20	25 48	15

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

Figure A.57 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 16,025.0 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    29925.2
Exposure: MWd/MTU (GWd)     16026.0 (2208.20 )
Delta E: MWd/MTU, (GWd)         1.0 (   0.14 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.265   6.396    14  0.396 0.396  35  2
Inlet Subcooling: Btu/lbm    -26.79                        24  0.699  17.784    16  0.369 0.566   9 12
Flow: Mlb/hr                 103.01 (100.50 %)             23  0.882  23.106    17  0.332 0.385  59 36
                                                           22  0.979  26.555    18  0.388 0.450  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  1.041  28.578    19  0.813 1.062  47 48
59              -- -- -- -- -- -- --             59        20  1.076  29.913    20  1.042 1.186  27 28
55          -- -- -- -- -- -- -- -- --           55        19  1.097  30.618    21  1.065 1.168  29 32
51       -- -- -- -- -- -- -- -- -- -- --        51        18  1.134  31.354    22  1.249 1.408  33 32
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  1.161  31.652    23  1.152 1.311  51 42
43 -- -- -- --  8 --  8 --  8 -- 10 -- -- -- -- 43        16  1.188  32.280    24  1.116 1.347  51 40
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39        15  1.213  33.219
35 -- -- -- --  8 -- -- -- -- --  8 -- -- -- -- 35        14  1.189  33.252
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31        13  1.275  31.952
27 -- -- -- --  8 -- -- -- -- --  8 -- -- -- -- 27        12  1.283* 32.911
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23        11  1.274  33.558
19 -- -- -- -- 10 --  8 --  8 --  8 -- -- -- -- 19        10  1.269  34.352
15    -- -- -- -- -- -- -- -- -- -- -- -- -- --    15         9  1.247  35.377
11       -- -- -- -- -- -- -- -- -- -- -- --       11         8  1.195  36.079
 7          -- -- -- -- -- -- -- -- --            7         7  1.122  36.650
 3             -- -- -- -- -- -- --               3         6  1.053  37.695
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  0.965  37.713*
                                                           4  0.868  36.184
Control Rod Density: %          5.36                       3  0.770  33.028
                                                           2  0.588  25.172
k-effective:                0.99998                Bottom  1  0.168   7.333
Void Fraction:               0.406
Core Delta-P: psia          24.436              % AXIAL TILT   0.512  -8.793
Core Plate Delta-P: psia    19.877          AVG BOT 8ft/12ft  1.0107  1.0496
Coolant Temp: Deg-F          547.5
In Channel Flow: Mlb/hr      90.99   Active Channel Flow: Mlb/hr        87.89
Total Bypass Flow (%):        11.7   (of total core flow)
Total Water Rod Flow (%):      3.0   (of total core flow)
Source Convergence         0.00010
```

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
1.408	22	33 32	1.604	0.898	22	33 32	7.00	0.725	47.1 20	37 50	15	7.62	0.762	52.9 20	37 50	15
1.407	22	31 34	1.615	0.892	22	31 34	7.10	0.721	45.4 20	31 52	15	7.62	0.762	52.9 20	41 50	15
1.384	22	25 28	1.633	0.882	22	25 34	7.00	0.720	46.5 20	11 24	15	7.66	0.760	52.2 20	9 32	15
1.382	22	33 36	1.638	0.879	22	33 26	6.97	0.718	46.7 20	9 30	15	7.72	0.757	51.3 20	31 10	15
1.363	22	49 40	1.664	0.866	22	49 40	6.87	0.712	47.2 20	41 50	15	7.57	0.756	52.8 20	49 42	15
1.362	22	51 38	1.668	0.863	22	9 24	6.85	0.709	47.2 20	11 20	15	7.74	0.756	50.9 20	11 24	15
1.351	22	23 30	1.682	0.856	22	31 50	8.53	0.693	21.6 22	39 50	15	7.56	0.748	51.9 21	25 10	15
1.348	22	31 50	1.685	0.855	22	49 26	6.80	0.692	45.6 20	35 48	15	7.53	0.744	51.8 21	9 26	15
1.348	22	39 50	1.685	0.855	22	39 50	8.51	0.692	21.7 22	35 50	15	7.41	0.740	52.7 20	13 26	15
1.348	22	31 38	1.689	0.853	22	23 32	6.74	0.691	46.3 20	13 26	15	7.50	0.740	51.7 21	33 50	15

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

Figure A.58 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 16,026.0 MWd/MTU

```
Cycle:                          19                      Core Average Exposure: MWd/MTU    30199.2
Exposure: MWd/MTU (GWd)     16300.0 (2245.90 )
Delta E: MWd/MTU, (GWd)       274.0 (  37.75 )                 Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.271   6.474    14  0.397 0.397  35  2
Inlet Subcooling: Btu/lbm    -25.98                        24  0.715  17.991    16  0.369 0.566   9 12
Flow: Mlb/hr                 105.99 (103.40 %)             23  0.902  23.367    17  0.332 0.384  59 36
                                                           22  1.003  26.847    18  0.388 0.450  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  1.065  28.888    19  0.815 1.064  47 48
59              -- -- -- -- -- -- --             59        20  1.100  30.233    20  1.040 1.183  27 28
55          -- -- -- -- -- -- -- -- --           55        19  1.120  30.945    21  1.063 1.164  31 30
51       -- -- -- -- -- -- -- -- -- -- --        51        18  1.156  31.692    22  1.248 1.408  33 32
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  1.183  31.997    23  1.157 1.315  51 42
43 -- -- -- --  8 --  8 --  8 -- 10 -- -- -- -- 43        16  1.208  32.629    24  1.119 1.349  51 40
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39        15  1.230  33.574
35 -- -- -- --  8 -- -- -- -- --  8 -- -- -- -- 35        14  1.203  33.600
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31        13  1.288  32.281
27 -- -- -- --  8 -- -- -- -- --  8 -- -- -- -- 27        12  1.293* 33.242
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23        11  1.279  33.887
19 -- -- -- -- 10 --  8 --  8 --  8 -- -- -- -- 19        10  1.267  34.678
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15         9  1.238  35.697
11       -- -- -- -- -- -- -- -- -- -- --       11         8  1.176  36.384
 7          -- -- -- -- -- -- -- -- --          7         7  1.094  36.935
 3             -- -- -- -- -- -- --             3         6  1.017  37.961*
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  0.923  37.956
                                                           4  0.824  36.402
Control Rod Density: %          5.36                       3  0.730  33.221
                                                           2  0.557  25.319
k-effective:                0.99997                Bottom  1  0.160   7.377
Void Fraction:               0.396
Core Delta-P: psia          25.431              % AXIAL TILT   2.516  -8.642
Core Plate Delta-P: psia    20.871          AVG BOT 8ft/12ft  1.0000  1.0488
Coolant Temp: Deg-F          547.4
In Channel Flow: Mlb/hr      93.71   Active Channel Flow: Mlb/hr        90.55
Total Bypass Flow (%):        11.6   (of total core flow)
Total Water Rod Flow (%):      3.0   (of total core flow)
Source Convergence         0.00009
```

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
1.408	22	33 32	1.615	0.892	22	33 32	7.10	0.737	47.5 20	23 12	15	7.73	0.777	53.3 20	41 50	15
1.407	22	31 34	1.623	0.887	22	31 34	7.21	0.735	45.8 20	31 52	15	7.74	0.777	53.3 20	23 12	15
1.382	22	25 28	1.645	0.875	22	25 34	7.09	0.732	46.9 20	11 24	15	7.85	0.775	51.7 20	31 10	15
1.379	22	27 26	1.650	0.873	22	33 26	7.05	0.729	47.1 20	9 30	15	7.76	0.774	52.7 20	9 32	15
1.365	22	51 38	1.663	0.866	22	49 40	6.98	0.726	47.6 20	19 12	15	7.68	0.771	53.3 20	49 42	15
1.364	22	49 40	1.665	0.865	22	9 24	6.95	0.722	47.6 20	11 20	15	7.84	0.770	51.4 20	11 24	15
1.351	22	37 52	1.681	0.857	22	31 50	8.67	0.706	22.0 22	21 12	15	7.70	0.765	52.4 21	25 10	15
1.350	22	39 50	1.682	0.856	22	39 50	8.68	0.705	21.6 22	37 52	15	7.65	0.759	52.2 21	9 26	15
1.350	22	23 30	1.687	0.853	22	23 10	8.67	0.705	21.7 22	33 52	15	7.60	0.754	52.1 21	33 50	15
1.349	22	33 52	1.689	0.853	22	49 26	8.63	0.704	22.2 22	35 50	15	7.58	0.753	52.3 20	35 48	15

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

Figure A.59 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 16,300.0 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    30200.2
Exposure: MWd/MTU (GWd)     16301.0 (2246.10 )
Delta E: MWd/MTU, (GWd)         1.0 (   0.14 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.272   6.475    14  0.396 0.396  35  2
Inlet Subcooling: Btu/lbm    -26.94                        24  0.717  17.992    16  0.369 0.565   9 12
Flow: Mlb/hr                 102.50 (100.00 %)             23  0.905  23.368    17  0.332 0.382  59 36
                                                           22  1.010  26.848    18  0.388 0.449  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  1.078  28.889    19  0.813 1.061  47 48
59              -- -- -- -- -- -- --             59        20  1.121  30.234    20  1.041 1.177  27 28
55          -- -- -- -- -- -- -- -- --           55        19  1.145  30.946    21  1.065 1.158  31 30
51       -- -- -- -- -- -- -- -- -- -- --        51        18  1.172  31.693    22  1.250 1.400  27 30
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  1.190  31.999    23  1.153 1.308  51 42
43 -- -- -- -- 12 --  8 --  8 -- 12 -- -- -- -- 43        16  1.210  32.630    24  1.116 1.341  51 40
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39        15  1.227  33.576
35 -- -- -- --  8 -- -- -- -- --  8 -- -- -- -- 35        14  1.197  33.601
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31        13  1.279  32.282
27 -- -- -- --  8 -- -- -- -- --  8 -- -- -- -- 27        12  1.282* 33.244
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23        11  1.267  33.888
19 -- -- -- -- 12 --  8 --  8 -- 12 -- -- -- -- 19        10  1.255  34.680
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15         9  1.226  35.698
11       -- -- -- -- -- -- -- -- -- -- --       11         8  1.166  36.385
 7          -- -- -- -- -- -- -- -- --          7         7  1.086  36.936
 3             -- -- -- -- -- -- --             3         6  1.011  37.962*
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  0.919  37.957
                                                           4  0.822  36.402
Control Rod Density: %           5.23                      3  0.728  33.222
                                                           2  0.556  25.320
k-effective:                 0.99998                Bottom  1  0.159   7.378
Void Fraction:                0.400
Core Delta-P: psia           24.168              % AXIAL TILT   3.230  -8.641
Core Plate Delta-P: psia     19.610          AVG BOT 8ft/12ft  0.9943  1.0488
Coolant Temp: Deg-F           547.3
In Channel Flow: Mlb/hr       90.57   Active Channel Flow: Mlb/hr        87.50
Total Bypass Flow (%):         11.6   (of total core flow)
Total Water Rod Flow (%):       3.0   (of total core flow)
Source Convergence          0.00006
```

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
1.400	22	27 30	1.599	0.901	22	33 32	7.06	0.734	47.5	20	23 12 15	8.17	0.779	48.9	21	41 42 20
1.400	22	31 34	1.607	0.896	22	31 34	7.15	0.730	45.9	20	29 52 15	8.23	0.778	48.1	20	17 44 20
1.375	22	25 28	1.625	0.886	22	25 34	7.05	0.728	46.9	20	11 24 15	7.69	0.775	53.5	20	23 50 15
1.373	22	27 26	1.630	0.883	22	33 26	7.34	0.726	42.8	20	43 44 20	7.70	0.774	53.3	20	41 50 15
1.358	22	49 40	1.647	0.875	22	49 40	7.00	0.724	47.1	20	9 30 15	7.80	0.770	51.7	20	31 10 15
1.357	22	51 38	1.651	0.872	22	9 24	6.95	0.723	47.6	20	19 12 15	7.71	0.769	52.7	20	9 32 15
1.344	22	39 50	1.666	0.865	22	39 50	6.92	0.719	47.6	20	11 20 15	7.64	0.768	53.3	20	49 42 15
1.344	22	23 30	1.667	0.864	22	31 50	7.15	0.705	42.4	21	19 42 20	7.80	0.767	51.4	20	49 24 15
1.343	22	37 52	1.668	0.863	22	49 26	8.63	0.703	22.0	22	21 12 15	7.64	0.760	52.4	21	25 10 15
1.341	24	51 40	1.673	0.861	22	25 50	8.63	0.701	21.6	22	37 52 15	7.60	0.754	52.2	21	9 26 15

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

Figure A.60 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 16,301.0 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    30499.2
Exposure: MWd/MTU (GWd)     16600.0 (2287.30 )
Delta E: MWd/MTU, (GWd)       299.0 (  41.20 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.278   6.563    14  0.396 0.396  35  2
Inlet Subcooling: Btu/lbm    -25.84                        24  0.735  18.224    16  0.369 0.566   9 12
Flow: Mlb/hr                 106.50 (103.90 %)             23  0.928  23.661    17  0.332 0.382  59 36
                                                           22  1.037  27.177    18  0.388 0.449  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           21  1.106  29.240    19  0.814 1.065  13 14
59              -- -- -- -- -- -- --             59       20  1.149  30.599    20  1.039 1.172  27 28
55          -- -- -- -- -- -- -- -- --           55       19  1.171  31.319    21  1.061 1.152  31 30
51       -- -- -- -- -- -- -- -- -- -- --        51       18  1.196  32.074    22  1.248 1.399  29 28
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47       17  1.212  32.385    23  1.159 1.313   9 20
43 -- -- -- -- 12 --  8 --  8 -- 12 -- -- -- -- 43       16  1.229  33.017    24  1.120 1.345   9 22
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39       15  1.244  33.968
35 -- -- -- --  8 -- -- -- -- --  8 -- -- -- -- 35       14  1.211  33.983
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31       13  1.292* 32.643
27 -- -- -- --  8 -- -- -- -- --  8 -- -- -- -- 27       12  1.292  33.605
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23       11  1.271  34.244
19 -- -- -- -- 12 --  8 --  8 -- 12 -- -- -- -- 19       10  1.252  35.032
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15        9  1.216  36.041
11       -- -- -- -- -- -- -- -- -- -- --       11        8  1.146  36.710
 7          -- -- -- -- -- -- -- -- --          7        7  1.056  37.237
 3              -- -- -- -- -- -- --            3        6  0.972  38.240*
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           5  0.874  38.208
                                                           4  0.775  36.627
Control Rod Density: %          5.23                       3  0.685  33.420
                                                           2  0.524  25.471
k-effective:                0.99997                Bottom  1  0.150   7.423
Void Fraction:               0.389
Core Delta-P: psia          25.521              % AXIAL TILT   5.416  -8.451
Core Plate Delta-P: psia    20.960          AVG BOT 8ft/12ft  0.9822  1.0479
Coolant Temp: Deg-F          547.3
In Channel Flow: Mlb/hr      94.22   Active Channel Flow: Mlb/hr        91.07
Total Bypass Flow (%):        11.5   (of total core flow)
Total Water Rod Flow (%):      3.0   (of total core flow)
Source Convergence         0.00005
```

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
1.399	22	29 28	1.617	0.891	22	33 32	7.16	0.747	47.9 20	23 12	15	8.41	0.800	48.6 20	17 44	20
1.398	22	27 30	1.623	0.887	22	31 34	7.50	0.745	43.2 20	17 44	20	8.27	0.793	49.4 21	41 42	20
1.371	22	25 28	1.645	0.875	22	25 34	7.26	0.745	46.3 20	29 52	15	7.80	0.791	54.0 20	23 50	15
1.368	22	27 26	1.650	0.873	22	49 40	7.14	0.741	47.4 20	11 24	15	7.82	0.790	53.8 20	41 50	15
1.360	22	9 24	1.650	0.873	22	33 26	7.06	0.737	48.0 20	19 12	15	7.94	0.788	52.2 20	31 10	15
1.360	22	11 22	1.653	0.871	22	9 24	7.07	0.735	47.6 20	9 30	15	7.75	0.784	53.7 20	49 42	15
1.347	22	37 52	1.665	0.865	22	39 50	7.02	0.733	48.0 20	11 20	15	7.80	0.783	53.2 20	9 32	15
1.347	22	39 50	1.670	0.862	22	31 50	7.26	0.718	42.9 21	19 42	20	7.72	0.781	53.8 20	49 24	15
1.345	24	9 22	1.672	0.861	22	23 10	8.76	0.717	22.5 22	21 12	15	7.78	0.778	52.9 21	25 10	15
1.344	22	33 52	1.675	0.860	22	33 10	8.79	0.717	22.1 22	23 10	15	7.71	0.770	52.7 21	9 26	15

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

Figure A.61 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 16,600.0 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    30500.2
Exposure: MWd/MTU (GWd)     16601.0 (2287.40 )
Delta E: MWd/MTU, (GWd)         1.0 (   0.14 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.280   6.563    14  0.394 0.394  35  2
Inlet Subcooling: Btu/lbm    -26.85                        24  0.739  18.224    16  0.367 0.563   9 12
Flow: Mlb/hr                 102.81 (100.30 %)             23  0.935  23.662    17  0.331 0.381  59 36
                                                           22  1.048  27.178    18  0.386 0.447  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           21  1.124  29.241    19  0.810 1.057  13 14
59              -- -- -- -- -- -- --             59       20  1.177  30.601    20  1.043 1.175  27 28
55          -- -- -- -- -- -- -- -- --           55       19  1.188  31.320    21  1.063 1.155  31 30
51       -- -- -- -- -- -- -- -- -- -- --        51       18  1.205  32.075    22  1.252 1.402  27 32
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47       17  1.216  32.386    23  1.151 1.306  51 20
43 -- -- -- -- 12 -- 10 --  8 -- 12 -- -- -- -- 43       16  1.228  33.018    24  1.114 1.338   9 40
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39       15  1.239  33.969
35 -- -- -- -- 10 -- -- -- -- -- 10 -- -- -- -- 35       14  1.203  33.985
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31       13  1.282* 32.645
27 -- -- -- -- 10 -- -- -- -- -- 10 -- -- -- -- 27       12  1.280  33.606
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23       11  1.259  34.246
19 -- -- -- -- 12 --  8 -- 10 -- 12 -- -- -- -- 19       10  1.240  35.033
15    -- -- -- -- -- -- -- -- -- -- -- -- --     15        9  1.204  36.042
11       -- -- -- -- -- -- -- -- -- -- --        11        8  1.136  36.711
 7          -- -- -- -- -- -- -- -- --           7        7  1.048  37.238
 3              -- -- -- -- -- -- --             3        6  0.967  38.241*
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           5  0.871  38.209
                                                           4  0.774  36.627
Control Rod Density: %           5.09                      3  0.684  33.421
                                                           2  0.524  25.472
k-effective:                 0.99996                Bottom  1  0.150   7.424
Void Fraction:                0.392
Core Delta-P: psia           24.184                % AXIAL TILT   6.096  -8.451
Core Plate Delta-P: psia     19.625          AVG BOT 8ft/12ft  0.9762  1.0479
Coolant Temp: Deg-F           547.2
In Channel Flow: Mlb/hr       90.90   Active Channel Flow: Mlb/hr        87.83
Total Bypass Flow (%):         11.6   (of total core flow)
Total Water Rod Flow (%):       3.0   (of total core flow)
Source Convergence          0.00008
```

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
1.402	22	27 32	1.579	0.912	22	33 32	7.60	0.755	43.2 20	17 44	20	8.52	0.814	49.0 21	19 42	20
1.402	22	29 28	1.588	0.907	22	31 34	7.09	0.740	47.9 20	23 12	15	8.50	0.808	48.6 20	17 44	20
1.377	22	25 34	1.602	0.899	22	25 34	7.20	0.739	46.3 20	29 52	15	7.75	0.786	54.0 20	23 50	15
1.372	22	33 26	1.609	0.895	22	33 26	7.46	0.738	42.9 21	19 42	20	7.73	0.782	53.8 20	41 50	15
1.356	22	11 40	1.632	0.882	22	49 40	7.10	0.737	47.4 20	11 24	15	7.87	0.781	52.2 20	31 10	15
1.354	22	9 38	1.635	0.881	22	9 24	7.04	0.732	47.6 20	9 30	15	7.76	0.779	53.2 20	9 32	15
1.351	22	23 32	1.642	0.877	22	23 32	9.05	0.730	20.9 22	17 42	20	7.69	0.778	53.7 20	49 42	15
1.341	22	31 24	1.650	0.873	22	49 26	6.99	0.730	48.0 20	19 12	15	7.68	0.777	53.8 20	49 24	15
1.340	22	39 12	1.655	0.870	22	31 50	6.97	0.728	48.0 20	11 20	15	7.70	0.770	52.9 21	25 10	15
1.339	22	23 52	1.656	0.870	22	9 34	8.99	0.726	21.0 22	19 44	20	7.66	0.765	52.7 21	9 26	15

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

Figure A.62 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 16,601.0 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    30734.2
Exposure: MWd/MTU (GWd)     16835.0 (2319.60 )
Delta E: MWd/MTU, (GWd)       234.0 (  32.24 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.286   6.634    14  0.395 0.395  35  2
Inlet Subcooling: Btu/lbm    -25.84                        24  0.754  18.411    16  0.367 0.563   9 12
Flow: Mlb/hr                 106.50 (103.90 %)             23  0.955  23.898    17  0.331 0.380  59 36
                                                           22  1.070  27.444    18  0.386 0.448  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  1.146  29.526    19  0.812 1.060  13 14
59              -- -- -- -- -- -- --             59        20  1.199  30.899    20  1.040 1.171  27 28
55          -- -- -- -- -- -- -- -- --           55        19  1.208  31.622    21  1.060 1.150  31 30
51       -- -- -- -- -- -- -- -- -- -- --        51        18  1.224  32.381    22  1.250 1.399  29 28
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  1.232  32.694    23  1.156 1.311   9 42
43 -- -- -- -- 12 -- 10 --  8 -- 12 -- -- -- -- 43        16  1.241  33.325    24  1.117 1.341   9 40
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39        15  1.250  34.278
35 -- -- -- -- 10 -- -- -- -- -- 10 -- -- -- -- 35        14  1.212  34.284
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31        13  1.291* 32.927
27 -- -- -- -- 10 -- -- -- -- -- 10 -- -- -- -- 27        12  1.286  33.888
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23        11  1.261  34.522
19 -- -- -- -- 12 --  8 -- 10 -- 12 -- -- -- -- 19        10  1.237  35.305
15    -- -- -- -- -- -- -- -- -- -- -- -- --     15         9  1.195  36.306
11       -- -- -- -- -- -- -- -- -- -- --        11         8  1.120  36.959
 7          -- -- -- -- -- -- -- -- --           7         7  1.025  37.466
 3              -- -- -- -- -- -- --             3         6  0.937  38.450*
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  0.837  38.397
                                                           4  0.739  36.794
Control Rod Density: %          5.09                       3  0.653  33.568
                                                           2  0.500  25.584
k-effective:                 0.99993                Bottom  1  0.143   7.458
Void Fraction:                0.383
Core Delta-P: psia           25.442              % AXIAL TILT   7.776  -8.285
Core Plate Delta-P: psia     20.882          AVG BOT 8ft/12ft  0.9667  1.0471
Coolant Temp: Deg-F           547.2
In Channel Flow: Mlb/hr       94.26   Active Channel Flow: Mlb/hr        91.12
Total Bypass Flow (%):         11.5   (of total core flow)
Total Water Rod Flow (%):       2.9   (of total core flow)
Source Convergence          0.00009
```

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
1.399	22	29 28	1.598	0.901	22	33 32	7.71	0.768	43.6 20	17 44	20	8.59	0.825	49.4 21	19 42	20
1.399	22	27 30	1.605	0.897	22	31 34	7.16	0.751	48.3 20	23 12	15	8.63	0.825	49.0 20	17 44	20
1.373	22	25 28	1.622	0.888	22	25 34	7.27	0.749	46.7 20	29 52	15	7.83	0.797	54.4 20	23 50	15
1.367	22	33 26	1.629	0.884	22	33 26	7.52	0.747	43.2 21	19 42	20	7.82	0.794	54.2 20	41 50	15
1.357	22	9 24	1.638	0.879	22	49 40	7.16	0.746	47.7 20	11 24	15	7.96	0.794	52.6 20	31 10	15
1.357	22	11 40	1.638	0.879	22	9 24	9.18	0.743	21.3 22	17 42	20	7.83	0.790	53.5 20	9 32	15
1.348	22	23 32	1.659	0.868	22	49 26	7.07	0.741	48.4 20	19 12	15	7.77	0.789	54.1 20	49 42	15
1.343	22	37 10	1.660	0.868	22	23 32	7.09	0.740	47.9 20	9 30	15	7.74	0.787	54.2 20	49 24	15
1.343	22	39 12	1.660	0.867	22	39 50	9.12	0.739	21.4 22	19 44	20	7.80	0.784	53.2 21	25 10	15
1.341	24	9 40	1.660	0.867	22	31 50	7.04	0.738	48.4 20	11 20	15	7.75	0.777	53.1 21	9 26	15

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

Figure A.63 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 16,835.0 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    30735.2
Exposure: MWd/MTU (GWd)     16836.0 (2319.80 )
Delta E: MWd/MTU, (GWd)         1.0 (   0.14 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.286   6.634    14  0.393 0.393  35  2
Inlet Subcooling: Btu/lbm    -26.94                        24  0.753  18.412    16  0.366 0.563   9 12
Flow: Mlb/hr                 102.50 (100.00 %)             23  0.954  23.899    17  0.329 0.379  35 60
                                                           22  1.073  27.445    18  0.385 0.446  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  1.156  29.527    19  0.807 1.060  13 14
59              -- -- -- -- -- -- --             59        20  1.218  30.901    20  1.044 1.171  27 28
55          -- -- -- -- -- -- -- -- --           55        19  1.233  31.623    21  1.063 1.148  31 30
51       -- -- -- -- -- -- -- -- -- -- --        51        18  1.251  32.382    22  1.254 1.399  29 28
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  1.248  32.696    23  1.149 1.302   9 20
43 -- -- -- -- 14 -- 10 -- 12 -- 14 -- -- -- -- 43        16  1.249  33.326    24  1.111 1.331   9 22
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39        15  1.251  34.279
35 -- -- -- -- 10 -- -- -- -- -- 10 -- -- -- -- 35        14  1.209  34.286
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31        13  1.283* 32.928
27 -- -- -- -- 10 -- -- -- -- -- 10 -- -- -- -- 27        12  1.275  33.889
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23        11  1.248  34.523
19 -- -- -- -- 14 -- 12 -- 10 -- 14 -- -- -- -- 19        10  1.224  35.306
15    -- -- -- -- -- -- -- -- -- -- -- -- --     15         9  1.183  36.307
11       -- -- -- -- -- -- -- -- -- -- --        11         8  1.109  36.960
 7          -- -- -- -- -- -- -- -- --           7         7  1.015  37.467
 3              -- -- -- -- -- -- --             3         6  0.929  38.451*
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  0.831  38.398
                                                           4  0.735  36.794
Control Rod Density: %           4.91                      3  0.649  33.568
                                                           2  0.497  25.585
k-effective:                  1.00005                Bottom  1  0.143   7.458
Void Fraction:                 0.387
Core Delta-P: psia            24.001              % AXIAL TILT   8.616  -8.284
Core Plate Delta-P: psia      19.443          AVG BOT 8ft/12ft  0.9607  1.0471
Coolant Temp: Deg-F           547.1
In Channel Flow: Mlb/hr        90.66   Active Channel Flow: Mlb/hr        87.62
Total Bypass Flow (%):          11.5   (of total core flow)
Total Water Rod Flow (%):        3.0   (of total core flow)
Source Convergence           0.00008
```

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
1.399	22	29 28	1.572	0.916	22	33 32	7.93	0.795	44.2 20	17 18	19	8.89	0.856	49.6 20	17 18	19
1.396	22	27 30	1.573	0.915	22	31 34	7.67	0.776	45.0 20	25 18	20	8.70	0.848	50.8 21	41 42	19
1.373	22	25 28	1.598	0.901	22	25 34	9.45	0.768	21.8 22	19 18	19	8.54	0.835	51.0 20	25 18	20
1.372	22	27 26	1.600	0.900	22	27 26	7.65	0.768	44.2 21	19 20	19	8.38	0.816	50.6 20	33 42	20
1.350	22	11 22	1.622	0.888	22	49 40	9.43	0.767	21.7 22	17 20	19	7.86	0.798	54.2 20	41 50	15
1.347	22	9 24	1.625	0.886	22	39 50	7.54	0.763	45.0 20	27 20	20	7.85	0.797	54.1 20	23 12	15
1.345	22	23 30	1.626	0.885	22	9 24	7.20	0.755	48.3 20	23 12	15	7.94	0.792	52.6 20	31 10	15
1.345	22	29 24	1.630	0.884	22	31 50	7.28	0.748	46.5 20	29 10	15	10.48	0.789	25.6 22	19 18	19
1.343	22	21 12	1.632	0.882	22	31 24	7.10	0.745	48.4 20	19 12	15	7.76	0.788	54.2 20	11 20	15
1.340	22	23 10	1.632	0.882	22	23 10	7.13	0.743	47.7 20	11 24	15	10.47	0.788	25.5 22	17 20	19

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

Figure A.64 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 16,836.0 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    30953.8
Exposure: MWd/MTU (GWd)     17054.7 (2349.90 )
Delta E: MWd/MTU, (GWd)       218.7 (  30.13 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.290   6.702    14  0.393 0.393  35  2
Inlet Subcooling: Btu/lbm    -25.90                        24  0.767  18.589    16  0.366 0.564   9 12
Flow: Mlb/hr                 106.29 (103.70 %)             23  0.972  24.124    17  0.329 0.379  35 60
                                                           22  1.093  27.700    18  0.385 0.447  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  1.177  29.801    19  0.809 1.064  13 14
59              -- -- -- -- -- -- --             59        20  1.238  31.189    20  1.042 1.166  27 28
55          -- -- -- -- -- -- -- -- --           55        19  1.251  31.915    21  1.060 1.143  31 30
51       -- -- -- -- -- -- -- -- -- -- --        51        18  1.267  32.678    22  1.252 1.395  29 28
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  1.262  32.991    23  1.155 1.307   9 20
43 -- -- -- -- 14 -- 10 -- 12 -- 14 -- -- -- -- 43        16  1.260  33.617    24  1.115 1.334   9 22
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39        15  1.261  34.571
35 -- -- -- -- 10 -- -- -- -- -- 10 -- -- -- -- 35        14  1.216  34.567
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31        13  1.290* 33.193
27 -- -- -- -- 10 -- -- -- -- -- 10 -- -- -- -- 27        12  1.280  34.151
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23        11  1.250  34.780
19 -- -- -- -- 14 -- 12 -- 10 -- 14 -- -- -- -- 19        10  1.222  35.558
15    -- -- -- -- -- -- -- -- -- -- -- -- --     15         9  1.174  36.549
11       -- -- -- -- -- -- -- -- -- -- --        11         8  1.094  37.186
 7          -- -- -- -- -- -- -- -- --           7         7  0.994  37.673
 3              -- -- -- -- -- -- --             3         6  0.902  38.639*
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  0.800  38.565
                                                           4  0.704  36.942
Control Rod Density: %           4.91                      3  0.621  33.699
                                                           2  0.476  25.685
k-effective:                 0.99997                Bottom  1  0.137   7.488
Void Fraction:                0.378
Core Delta-P: psia           25.296              % AXIAL TILT  10.120  -8.114
Core Plate Delta-P: psia     20.737          AVG BOT 8ft/12ft  0.9520  1.0462
Coolant Temp: Deg-F           547.1
In Channel Flow: Mlb/hr       94.11   Active Channel Flow: Mlb/hr        90.99
Total Bypass Flow (%):         11.5   (of total core flow)
Total Water Rod Flow (%):       2.9   (of total core flow)
Source Convergence          0.00009
```

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
1.395	22	29 28	1.593	0.904	22	31 34	8.01	0.807	44.6 20	17 18	19	9.00	0.870	50.0 20	17 18	19
1.392	22	27 30	1.594	0.903	22	33 32	7.74	0.785	45.3 20	25 18	20	8.74	0.856	51.2 21	41 42	19
1.368	22	25 28	1.620	0.889	22	25 28	9.54	0.779	22.2 22	19 18	19	8.63	0.847	51.3 20	25 18	20
1.366	22	27 26	1.622	0.888	22	27 26	9.53	0.777	22.2 22	17 20	19	8.43	0.825	51.0 20	33 42	20
1.352	22	11 22	1.628	0.884	22	39 50	7.69	0.775	44.6 21	19 20	19	7.93	0.810	54.5 20	41 50	15
1.350	22	9 24	1.629	0.884	22	49 40	7.59	0.771	45.4 20	27 20	20	7.92	0.808	54.5 20	23 12	15
1.346	22	21 12	1.631	0.883	22	9 24	7.26	0.763	48.6 20	23 12	15	8.02	0.803	53.0 20	31 10	15
1.345	22	23 10	1.634	0.881	22	23 10	7.34	0.758	46.9 20	29 10	15	10.59	0.800	26.1 22	19 18	19
1.341	22	23 30	1.637	0.880	22	31 50	7.17	0.755	48.7 20	19 12	15	7.83	0.799	54.5 20	11 20	15
1.340	22	27 10	1.645	0.875	22	33 10	7.18	0.751	48.1 20	11 24	15	10.57	0.799	26.0 22	17 20	19

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

Figure A.65 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 17,054.7 MWd/MTU

```
Cycle:                           19                    Core Average Exposure: MWd/MTU    30958.2
Exposure: MWd/MTU (GWd)     17059.0 (2350.50 )
Delta E: MWd/MTU, (GWd)         4.4 (   0.60 )             Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)        N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                  Top 25  0.236   6.703    14  0.390 0.390  35  2
Inlet Subcooling: Btu/lbm    -26.65                      24  0.622  18.593    16  0.365 0.566   9 12
Flow: Mlb/hr                 103.53 (101.00 %)           23  0.790  24.128    17  0.327 0.375  25 60
                                                         22  0.895  27.704    18  0.381 0.443  29 60
   2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           21  0.974  29.806    19  0.805 1.078  13 14
59             -- -- -- -- -- -- -- --           59      20  1.051  31.195    20  1.054 1.143  35 14
55          -- -- -- -- -- -- -- -- -- --        55      19  1.108  31.921    21  1.031 1.128  39 14
51       -- -- -- -- -- -- -- -- -- -- -- --     51      18  1.170  32.684    22  1.255 1.373  37 14
47    -- -- -- -- -- -- -- -- -- -- -- -- -- --  47      17  1.215  32.997    23  1.153 1.309  41 10
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43      16  1.252  33.623    24  1.116 1.331   9 40
39 -- -- -- -- -- -- --  6 --  0 -- -- -- -- -- 39      15  1.280  34.577
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35      14  1.256  34.573
31 -- -- -- --  0 -- -- -- -- -- --  0 -- -- -- 31      13  1.347* 33.198
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27      12  1.345  34.157
23 -- -- -- -- -- -- --  0 --  6 -- -- -- -- -- 23      11  1.321  34.785
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19      10  1.296  35.563
15    -- -- -- -- -- -- -- -- -- -- -- -- -- --  15       9  1.255  36.554
11       -- -- -- -- -- -- -- -- -- -- -- --     11       8  1.184  37.191
 7          -- -- -- -- -- -- -- -- -- --         7       7  1.097  37.678
 3             -- -- -- -- -- -- -- --            3       6  1.020  38.643*
   2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  0.931  38.569
                                                          4  0.841  36.945
Control Rod Density: %         3.11                       3  0.756  33.701
                                                          2  0.587  25.687
k-effective:                0.99995               Bottom  1  0.170   7.489
Void Fraction:                0.405
Core Delta-P: psia           24.669             % AXIAL TILT   0.196  -8.111
Core Plate Delta-P: psia     20.117         AVG BOT 8ft/12ft  1.0260  1.0462
Coolant Temp: Deg-F           547.4
In Channel Flow: Mlb/hr       91.42  Active Channel Flow: Mlb/hr        88.30
Total Bypass Flow (%):         11.7  (of total core flow)
Total Water Rod Flow (%):       3.0  (of total core flow)
Source Convergence          0.00009
```

```
                          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
1.373 22   37 14    1.630  0.884 22   23 48     7.35  0.774 48.6 20   23 12 15     8.02  0.818 54.5 20   19 12 15
1.365 22   39 12    1.636  0.880 22   39 16     7.28  0.766 48.7 20   19 12 15     8.00  0.818 54.6 20   23 50 15
1.365 22   39 16    1.639  0.879 22   39 50     7.35  0.758 46.7 20   17 18 15     7.91  0.807 54.5 20   11 20 15
1.364 22   11 40    1.647  0.874 22   49 40     7.34  0.757 46.9 20   29 10 15     7.97  0.804 53.6 20   15 16 15
1.355 22   35 12    1.647  0.874 22   25 50     7.19  0.757 48.7 20   11 20 15     7.95  0.801 53.5 20   17 18 15
1.354 22   31 12    1.648  0.874 22   31 50     7.29  0.757 47.4 20   17 14 15     7.99  0.800 53.0 20   31 10 15
1.354 22   33 14    1.648  0.874 22   23 10     7.23  0.756 48.1 20   11 24 15     7.90  0.797 53.6 20   25 48 15
1.349 22   41 14    1.656  0.869 22   41 18     7.31  0.756 47.1 20   25 14 15     7.84  0.797 54.2 21   39 48 15
1.349 22   41 18    1.660  0.868 22   15 40     7.28  0.754 47.2 20   15 16 15     7.93  0.796 53.2 20   17 14 15
1.348 22   37 10    1.661  0.867 22    9 24     7.32  0.754 46.6 20   13 18 15     7.81  0.796 54.4 20   49 24 15

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

Figure A.66 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 17,059.0 MWd/MTU

Cycle: 19
Exposure: MWd/MTU (GWd) 17175.0 (2366.50)
Delta E: MWd/MTU, (GWd) 116.0 (15.98)
Power: MWt 3952.0 (100.00 %)
Core Pressure: psia 1050.0
Inlet Subcooling: Btu/lbm -25.84
Flow: Mlb/hr 106.50 (103.90 %)

```
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58
59             -- -- -- -- -- -- -- --             59
55          -- -- -- -- -- -- -- -- -- --          55
51       -- -- -- -- -- -- -- -- -- -- -- --       51
47    -- -- -- -- -- -- -- -- -- -- -- -- -- --    47
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43
39 -- -- -- -- -- -- --  6 --  0 -- -- -- -- -- 39
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35
31 -- -- -- --  0 -- -- -- -- --  0 -- -- -- -- 31
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27
23 -- -- -- -- -- -- --  0 --  6 -- -- -- -- -- 23
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19
15    -- -- -- -- -- -- -- -- -- -- -- -- -- --    15
11       -- -- -- -- -- -- -- -- -- -- -- --       11
 7          -- -- -- -- -- -- -- -- -- --          7
 3             -- -- -- -- -- -- -- --             3
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58
```

Control Rod Density: % 3.11

k-effective: 0.99996
Void Fraction: 0.399
Core Delta-P: psia 25.711
Core Plate Delta-P: psia 21.158
Coolant Temp: Deg-F 547.5
In Channel Flow: Mlb/hr 94.12 Active Channel Flow: Mlb/hr 90.93
Total Bypass Flow (%): 11.6 (of total core flow)
Total Water Rod Flow (%): 3.0 (of total core flow)
Source Convergence 0.00006

Core Average Exposure: MWd/MTU 31074.2

N(PRA)	Axial Profile Power	Axial Profile Exposure
Top 25	0.239	6.732
24	0.630	18.670
23	0.800	24.227
22	0.905	27.816
21	0.984	29.928
20	1.061	31.326
19	1.117	32.059
18	1.178	32.830
17	1.222	33.149
16	1.258	33.778
15	1.285	34.735
14	1.261	34.728
13	1.352*	33.345
12	1.349	34.303
11	1.323	34.929
10	1.296	35.704
9	1.251	36.691
8	1.177	37.320
7	1.086	37.796
6	1.006	38.754*
5	0.915	38.669
4	0.824	37.036
3	0.740	33.783
2	0.575	25.750
Bottom 1	0.167	7.508
% AXIAL TILT	0.973	-8.055
AVG BOT 8ft/12ft	1.0216	1.0460

Edit Zone	Radial Power Avg.	Radial Power Max.	IR	JR
14	0.390	0.390	35	2
16	0.365	0.566	9	12
17	0.327	0.375	25	60
18	0.381	0.443	29	60
19	0.806	1.080	13	14
20	1.053	1.142	35	14
21	1.030	1.127	39	14
22	1.254	1.372	37	14
23	1.157	1.312	41	10
24	1.118	1.334	9	40

Top Ten Thermal Limits Summary - Sorted by Margin

Power Value	FT	IR	JR	MCPR Value	Margin	FT	IR	JR	APLHGR Value	Margin	Exp.	FT	IR	JR	K	LHGR Value	Margin	Exp.	FT	IR	JR	K
1.372	22	37	14	1.643	0.876	22	23	48	7.38	0.778	48.8	20	23	12	15	8.06	0.824	54.7	20	19	12	15
1.367	22	39	12	1.649	0.873	22	39	50	7.31	0.771	48.9	20	19	12	15	8.04	0.823	54.8	20	23	50	15
1.365	22	11	40	1.650	0.873	22	39	16	7.37	0.762	47.1	20	29	10	15	7.95	0.813	54.7	20	11	20	15
1.363	22	39	16	1.657	0.869	22	23	10	7.23	0.762	48.9	20	11	20	15	8.00	0.809	53.8	20	15	16	15
1.356	22	35	12	1.657	0.869	22	49	40	7.32	0.761	47.6	20	17	14	15	8.04	0.807	53.2	20	31	10	15
1.355	22	31	12	1.657	0.869	22	25	50	7.37	0.761	46.9	20	17	18	15	7.98	0.806	53.7	20	17	18	15
1.353	22	33	14	1.658	0.868	22	31	50	7.26	0.761	48.3	20	11	24	15	7.97	0.802	53.4	20	17	14	15
1.351	22	37	10	1.670	0.862	22	33	10	7.33	0.759	47.3	20	25	14	15	7.93	0.802	53.8	20	25	48	15
1.349	22	41	14	1.670	0.862	22	9	24	7.31	0.758	47.4	20	15	16	15	7.88	0.802	54.3	21	21	14	15
1.347	22	41	18	1.672	0.861	22	41	18	7.35	0.758	46.8	20	13	18	15	7.84	0.801	54.6	20	49	24	15

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

Figure A.67 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 17,175.0 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    31075.2
Exposure: MWd/MTU (GWd)     17176.0 (2366.60 )
Delta E: MWd/MTU, (GWd)         1.0 (   0.14 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.251   6.733    14  0.387 0.387  35  2
Inlet Subcooling: Btu/lbm    -26.85                        24  0.661  18.671    16  0.363 0.563   9 12
Flow: Mlb/hr                 102.81 (100.30 %)             23  0.836  24.227    17  0.325 0.372  25 60
                                                           22  0.939  27.817    18  0.379 0.439  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           21  1.007  29.929    19  0.801 1.073  13 14
59              -- -- -- -- -- -- --             59       20  1.075  31.328    20  1.058 1.143  21 18
55          -- -- -- -- -- -- -- -- --           55       19  1.124  32.061    21  1.035 1.122  21 14
51       -- -- -- -- -- -- -- -- -- -- --        51       18  1.179  32.832    22  1.258 1.365  23 14
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47       17  1.218  33.150    23  1.147 1.302   9 20
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43       16  1.250  33.779    24  1.109 1.326   9 22
39 -- -- -- -- -- --  6 --  6 -- -- -- -- -- -- 39       15  1.274  34.736
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35       14  1.248  34.729
31 -- -- -- --  6 -- -- -- -- --  6 -- -- -- -- 31       13  1.337* 33.346
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27       12  1.333  34.305
23 -- -- -- -- -- --  6 --  6 -- -- -- -- -- -- 23       11  1.306  34.930
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19       10  1.280  35.705
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15        9  1.236  36.692
11       -- -- -- -- -- -- -- -- -- -- --       11        8  1.164  37.321
 7          -- -- -- -- -- -- -- -- --          7        7  1.076  37.797
 3             -- -- -- -- -- -- --             3        6  0.998  38.754*
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           5  0.909  38.670
                                                           4  0.820  37.037
Control Rod Density: %          2.84                       3  0.737  33.783
                                                           2  0.574  25.751
k-effective:                0.99997                Bottom  1  0.166   7.508
Void Fraction:               0.402
Core Delta-P: psia          24.349              % AXIAL TILT   1.964  -8.055
Core Plate Delta-P: psia    19.799          AVG BOT 8ft/12ft  1.0127  1.0460
Coolant Temp: Deg-F          547.3
In Channel Flow: Mlb/hr      90.81   Active Channel Flow: Mlb/hr        87.71
Total Bypass Flow (%):        11.7   (of total core flow)
Total Water Rod Flow (%):      3.0   (of total core flow)
Source Convergence         0.00005
```

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
1.365	22	23 14	1.633	0.882	22	23 48	7.31	0.770	48.8 20	23 12	15	7.97	0.816	54.7 20	19 12	15
1.360	22	21 16	1.638	0.879	22	39 50	7.23	0.763	48.9 20	19 12	15	7.94	0.813	54.8 20	23 50	15
1.359	22	11 22	1.638	0.879	22	21 16	7.16	0.755	48.9 20	11 20	15	7.88	0.806	54.7 20	11 20	15
1.356	22	21 12	1.640	0.878	22	49 40	7.31	0.754	46.9 20	17 18	15	7.92	0.801	53.8 20	15 16	15
1.347	22	27 14	1.648	0.874	22	31 50	7.20	0.754	48.3 20	11 24	15	7.91	0.799	53.7 20	17 18	15
1.346	22	25 12	1.650	0.873	22	25 50	7.29	0.754	47.1 20	29 10	15	7.94	0.797	53.2 20	31 10	15
1.346	22	29 12	1.656	0.870	22	25 16	7.24	0.753	47.6 20	17 14	15	7.89	0.794	53.4 20	17 14	15
1.345	22	19 18	1.656	0.870	22	15 40	7.26	0.752	47.3 20	25 14	15	7.80	0.794	54.3 21	21 14	15
1.342	22	13 24	1.656	0.870	22	23 10	7.24	0.751	47.4 20	15 16	15	7.85	0.794	53.7 20	25 14	15
1.342	22	25 16	1.656	0.869	22	19 18	7.28	0.751	46.8 20	13 18	15	7.95	0.793	52.7 20	11 24	15

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

Figure A.68 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 17,176.0 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    31274.2
Exposure: MWd/MTU (GWd)     17375.0 (2394.00 )
Delta E: MWd/MTU, (GWd)       199.0 (  27.42 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.258   6.787    14  0.387 0.387  35  2
Inlet Subcooling: Btu/lbm    -25.82                        24  0.680  18.813    16  0.363 0.563   9 12
Flow: Mlb/hr                 106.60 (104.00 %)             23  0.860  24.408    17  0.325 0.372  25 60
                                                           22  0.965  28.021    18  0.379 0.440  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  1.034  30.148    19  0.802 1.075  13 14
59              -- -- -- -- -- -- --             59        20  1.100  31.560    20  1.056 1.139  21 18
55          -- -- -- -- -- -- -- -- --           55        19  1.147  32.304    21  1.033 1.120  21 14
51       -- -- -- -- -- -- -- -- -- -- --        51        18  1.199  33.086    22  1.257 1.363  23 14
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  1.235  33.413    23  1.152 1.306   9 20
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  1.263  34.044    24  1.112 1.328   9 22
39 -- -- -- -- -- --  6 --  6 -- -- -- -- -- -- 39        15  1.284  35.006
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  1.255  34.993
31 -- -- -- --  6 -- -- -- -- --  6 -- -- -- -- 31        13  1.342* 33.596
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.336  34.554
23 -- -- -- -- -- --  6 --  6 -- -- -- -- -- -- 23        11  1.306  35.175
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.275  35.944
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15         9  1.227  36.922
11       -- -- -- -- -- -- -- -- -- -- --       11         8  1.148  37.537
 7          -- -- -- -- -- -- -- -- --          7         7  1.053  37.996
 3             -- -- -- -- -- -- --             3         6  0.968  38.938*
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  0.874  38.837
                                                           4  0.783  37.187
Control Rod Density: %         2.84                        3  0.702  33.918
                                                           2  0.546  25.855
k-effective:                0.99992                Bottom  1  0.158   7.540
Void Fraction:               0.392
Core Delta-P: psia          25.643                % AXIAL TILT   3.811  -7.945
Core Plate Delta-P: psia    21.091          AVG BOT 8ft/12ft  1.0017  1.0455
Coolant Temp: Deg-F          547.4
In Channel Flow: Mlb/hr      94.27   Active Channel Flow: Mlb/hr        91.10
Total Bypass Flow (%):        11.6   (of total core flow)
Total Water Rod Flow (%):      3.0   (of total core flow)
Source Convergence         0.00009
```

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
1.363	22	23 14	1.643	0.876	22	39 50	7.36	0.778	49.1 20	23 12	15	8.04	0.826	55.1 20	19 12	15
1.359	22	11 22	1.646	0.875	22	23 48	7.29	0.772	49.2 20	19 12	15	8.02	0.823	54.9 20	23 12	15
1.357	22	21 12	1.647	0.874	22	49 40	7.21	0.763	49.2 20	11 20	15	7.95	0.816	55.0 20	11 20	15
1.356	22	21 16	1.651	0.872	22	21 16	7.35	0.762	47.4 20	29 10	15	7.98	0.810	54.1 20	15 16	15
1.347	22	25 12	1.656	0.870	22	31 50	7.25	0.762	48.6 20	11 24	15	8.02	0.808	53.5 20	31 10	15
1.345	22	29 12	1.658	0.869	22	23 10	7.29	0.761	47.9 20	17 14	15	7.95	0.806	54.0 20	17 18	15
1.344	22	27 14	1.658	0.868	22	25 50	7.33	0.759	47.2 20	17 18	15	7.96	0.804	53.7 20	17 14	15
1.342	22	23 10	1.662	0.866	22	9 24	7.30	0.759	47.6 20	25 14	15	7.86	0.803	54.6 21	21 14	15
1.341	22	9 24	1.667	0.864	22	33 10	7.28	0.758	47.7 20	15 16	15	7.85	0.802	54.7 20	11 24	15
1.340	22	19 18	1.669	0.863	22	41 48	7.33	0.758	47.1 20	13 18	15	7.90	0.802	54.1 20	25 14	15

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

Figure A.69 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 17,375.0 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    31275.3
Exposure: MWd/MTU (GWd)     17376.0 (2394.20 )
Delta E: MWd/MTU, (GWd)         1.0 (   0.14 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.263   6.787    14  0.385 0.385  35  2
Inlet Subcooling: Btu/lbm    -26.94                        24  0.692  18.814    16  0.361 0.559   9 12
Flow: Mlb/hr                 102.50 (100.00 %)             23  0.876  24.409    17  0.324 0.370  25 60
                                                           22  0.989  28.022    18  0.377 0.437  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  1.067  30.149    19  0.797 1.066  13 14
59              -- -- -- -- -- -- --             59        20  1.127  31.561    20  1.060 1.137  21 18
55          -- -- -- -- -- -- -- -- --           55        19  1.163  32.305    21  1.037 1.114  21 14
51       -- -- -- -- -- -- -- -- -- -- --        51        18  1.207  33.087    22  1.261 1.355  23 14
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  1.236  33.414    23  1.142 1.296   9 20
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  1.259  34.046    24  1.103 1.319   9 22
39 -- -- -- -- -- --  8 --  8 -- -- -- -- -- -- 39        15  1.276  35.008
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  1.244  34.995
31 -- -- -- -- 10 -- -- -- -- -- 10 -- -- -- -- 31        13  1.328* 33.598
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.320  34.555
23 -- -- -- -- -- --  8 --  8 -- -- -- -- -- -- 23        11  1.290  35.176
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.259  35.945
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15         9  1.212  36.923
11       -- -- -- -- -- -- -- -- -- -- --       11         8  1.136  37.538
 7          -- -- -- -- -- -- -- -- --          7         7  1.043  37.997
 3             -- -- -- -- -- -- --             3         6  0.961  38.939*
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  0.869  38.837
                                                           4  0.780  37.187
Control Rod Density: %          2.66                       3  0.700  33.919
                                                           2  0.545  25.856
k-effective:                 0.99992                Bottom  1  0.158   7.540
Void Fraction:                0.395
Core Delta-P: psia           24.147                % AXIAL TILT   4.759  -7.944
Core Plate Delta-P: psia     19.597          AVG BOT 8ft/12ft  0.9933  1.0455
Coolant Temp: Deg-F           547.2
In Channel Flow: Mlb/hr       90.58   Active Channel Flow: Mlb/hr        87.51
Total Bypass Flow (%):         11.6   (of total core flow)
Total Water Rod Flow (%):       3.0   (of total core flow)
Source Convergence          0.00006
```

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
1.355	22	23 14	1.629	0.884	22	23 48	7.28	0.770	49.1 20	23 12	15	7.95	0.817	55.1 20	19 12	15
1.352	22	11 22	1.630	0.884	22	49 40	7.21	0.763	49.2 20	19 12	15	7.94	0.814	54.9 20	23 12	15
1.350	22	21 16	1.632	0.882	22	21 16	7.15	0.757	49.2 20	11 20	15	7.87	0.808	55.0 20	11 20	15
1.346	22	21 12	1.634	0.881	22	39 50	7.20	0.756	48.6 20	11 24	15	7.90	0.802	54.1 20	15 16	15
1.338	22	13 24	1.643	0.876	22	15 40	7.27	0.754	47.4 20	29 10	15	7.88	0.799	54.0 20	17 18	15
1.338	22	27 14	1.644	0.876	22	31 50	7.28	0.754	47.2 20	17 18	15	7.92	0.798	53.5 20	31 10	15
1.337	22	25 12	1.644	0.876	22	47 24	7.22	0.753	47.9 20	17 14	15	7.79	0.797	54.7 20	11 24	15
1.336	22	19 18	1.645	0.875	22	9 24	7.23	0.752	47.6 20	25 14	15	7.87	0.795	53.7 20	17 14	15
1.336	22	29 12	1.646	0.875	22	25 16	7.26	0.751	47.1 20	13 18	15	7.83	0.794	54.1 20	25 14	15
1.336	22	15 22	1.647	0.874	22	25 50	7.21	0.751	47.7 20	15 16	15	7.78	0.794	54.6 21	21 14	15

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

Figure A.70 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 17,376.0 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    31459.1
Exposure: MWd/MTU (GWd)     17560.0 (2419.50 )
Delta E: MWd/MTU, (GWd)       184.0 (  25.35 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.269   6.839    14  0.385 0.385  35  2
Inlet Subcooling: Btu/lbm    -25.87                        24  0.709  18.952    16  0.361 0.559   9 12
Flow: Mlb/hr                 106.39 (103.80 %)             23  0.897  24.583    17  0.324 0.370  25 60
                                                           22  1.012  28.220    18  0.377 0.437  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  1.090  30.362    19  0.798 1.068  13 14
59              -- -- -- -- -- -- --             59        20  1.149  31.787    20  1.059 1.134  21 18
55          -- -- -- -- -- -- -- -- --           55        19  1.182  32.537    21  1.036 1.113  21 14
51       -- -- -- -- -- -- -- -- -- -- --        51        18  1.224  33.328    22  1.260 1.354  23 14
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  1.250  33.660    23  1.146 1.300   9 20
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  1.270  34.293    24  1.106 1.322   9 22
39 -- -- -- -- -- --  8 --  8 -- -- -- -- -- -- 39        15  1.284  35.258
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  1.250  35.238
31 -- -- -- -- 10 -- -- -- -- -- 10 -- -- -- -- 31        13  1.334* 33.828
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.324  34.783
23 -- -- -- -- -- --  8 --  8 -- -- -- -- -- -- 23        11  1.290  35.399
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.256  36.163
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15         9  1.205  37.132
11       -- -- -- -- -- -- -- -- -- -- --       11         8  1.122  37.733
 7          -- -- -- -- -- -- -- -- --          7         7  1.023  38.176
 3             -- -- -- -- -- -- --             3         6  0.935  39.103*
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  0.838  38.985
                                                           4  0.747  37.319
Control Rod Density: %         2.66                        3  0.668  34.037
                                                           2  0.521  25.948
k-effective:                0.99991                Bottom  1  0.151   7.569
Void Fraction:               0.386
Core Delta-P: psia          25.479            % AXIAL TILT   6.364  -7.828
Core Plate Delta-P: psia    20.928          AVG BOT 8ft/12ft  0.9836  1.0450
Coolant Temp: Deg-F          547.3
In Channel Flow: Mlb/hr       94.13   Active Channel Flow: Mlb/hr        90.98
Total Bypass Flow (%):         11.5   (of total core flow)
Total Water Rod Flow (%):       3.0   (of total core flow)
Source Convergence          0.00010
```

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
1.354	22	23 14	1.639	0.879	22	49 40	7.32	0.777	49.4 20	23 12	15	8.02	0.827	55.4 20	19 12	15
1.353	22	11 22	1.641	0.877	22	39 50	7.26	0.771	49.5 20	19 12	15	7.98	0.822	55.3 20	23 12	15
1.348	22	21 16	1.643	0.877	22	23 48	7.20	0.764	49.5 20	11 20	15	7.93	0.818	55.4 20	11 20	15
1.348	22	21 12	1.647	0.874	22	21 16	7.24	0.763	48.9 20	11 24	15	7.95	0.810	54.4 20	15 16	15
1.337	22	25 12	1.652	0.872	22	9 24	7.32	0.762	47.7 20	29 10	15	7.99	0.808	53.8 20	31 10	15
1.337	22	13 24	1.654	0.871	22	31 50	7.26	0.760	48.2 20	17 14	15	7.92	0.806	54.3 20	17 18	15
1.336	22	9 24	1.655	0.870	22	23 10	7.30	0.758	47.5 20	17 18	15	7.84	0.805	55.0 20	11 24	15
1.336	22	27 14	1.657	0.869	22	25 50	7.30	0.758	47.4 20	13 18	15	7.93	0.805	54.0 20	17 14	15
1.336	22	29 12	1.659	0.868	22	15 40	7.26	0.758	47.9 20	25 14	15	7.83	0.802	54.9 21	21 14	15
1.333	22	23 10	1.659	0.868	22	47 24	7.25	0.758	48.0 20	15 16	15	7.87	0.802	54.4 20	25 14	15

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

Figure A.71 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 17,560.0 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    31460.1
Exposure: MWd/MTU (GWd)     17561.0 (2419.70 )
Delta E: MWd/MTU, (GWd)         1.0 (   0.14 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.270   6.840    14  0.381 0.381  35  2
Inlet Subcooling: Btu/lbm    -26.94                        24  0.711  18.953    16  0.358 0.555   9 12
Flow: Mlb/hr                 102.50 (100.00 %)             23  0.902  24.584    17  0.321 0.367  25 60
                                                           22  1.021  28.221    18  0.375 0.433  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  1.106  30.363    19  0.792 1.059  13 14
59              -- -- -- -- -- -- --             59        20  1.175  31.788    20  1.063 1.132  21 18
55          -- -- -- -- -- -- -- -- --           55        19  1.207  32.538    21  1.041 1.105  21 14
51       -- -- -- -- -- -- -- -- -- -- --        51        18  1.244  33.329    22  1.264 1.346  23 14
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  1.261  33.661    23  1.137 1.290   9 20
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  1.273  34.294    24  1.097 1.313   9 22
39 -- -- -- -- -- -- 10 -- 10 -- -- -- -- -- -- 39        15  1.282  35.259
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  1.244  35.240
31 -- -- -- -- 14 -- -- -- -- -- 14 -- -- -- -- 31        13  1.324* 33.829
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.312  34.785
23 -- -- -- -- -- -- 10 -- 10 -- -- -- -- -- -- 23        11  1.277  35.400
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.243  36.164
15    -- -- -- -- -- -- -- -- -- -- -- -- -- --    15         9  1.192  37.133
11       -- -- -- -- -- -- -- -- -- -- -- --       11         8  1.111  37.734
 7          -- -- -- -- -- -- -- -- --            7         7  1.014  38.177
 3              -- -- -- -- -- -- --              3         6  0.927  39.104*
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  0.832  38.986
                                                           4  0.742  37.320
Control Rod Density: %           2.48                      3  0.664  34.037
                                                           2  0.518  25.948
k-effective:                 1.00001                Bottom  1  0.150   7.569
Void Fraction:                0.389
Core Delta-P: psia           24.069              % AXIAL TILT   7.242  -7.827
Core Plate Delta-P: psia     19.520          AVG BOT 8ft/12ft  0.9768  1.0450
Coolant Temp: Deg-F           547.1
In Channel Flow: Mlb/hr       90.62   Active Channel Flow: Mlb/hr        87.57
Total Bypass Flow (%):         11.6   (of total core flow)
Total Water Rod Flow (%):       3.0   (of total core flow)
Source Convergence          0.00007
```

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
1.346	22	23 14	1.624	0.886	22	49 40	7.26	0.770	49.4 20	23 12	15	7.93	0.818	55.4 20	19 12	15
1.346	22	11 22	1.628	0.885	22	23 14	7.19	0.763	49.5 20	19 12	15	7.92	0.815	55.2 20	23 12	15
1.342	22	21 16	1.630	0.884	22	21 16	7.22	0.761	48.9 20	11 24	15	7.88	0.812	55.4 20	11 20	15
1.336	22	21 12	1.634	0.881	22	47 24	7.15	0.759	49.5 20	11 20	15	8.04	0.805	52.9 20	17 32	19
1.335	22	13 24	1.634	0.881	22	15 40	7.26	0.755	47.5 20	17 18	15	7.88	0.803	54.4 20	15 16	15
1.331	22	15 22	1.634	0.881	22	39 50	7.24	0.754	47.7 20	29 10	15	7.82	0.803	55.0 20	11 24	15
1.330	22	27 14	1.638	0.879	22	9 24	7.20	0.753	48.2 20	17 14	15	7.87	0.801	54.3 20	17 18	15
1.329	22	25 16	1.639	0.879	22	25 16	7.22	0.753	47.9 20	25 14	15	7.90	0.800	53.8 20	31 10	15
1.329	22	19 18	1.643	0.876	22	19 18	7.25	0.752	47.4 20	13 18	15	7.85	0.796	54.0 20	17 14	15
1.328	22	9 24	1.644	0.876	22	31 50	7.20	0.752	48.0 20	15 16	15	7.81	0.796	54.4 20	25 14	15

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

Figure A.72 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 17,561.0 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    31639.1
Exposure: MWd/MTU (GWd)     17740.0 (2444.30 )
Delta E: MWd/MTU, (GWd)       179.0 (  24.66 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.275   6.892    14  0.382 0.382  35  2
Inlet Subcooling: Btu/lbm    -25.82                        24  0.726  19.090    16  0.358 0.556   9 12
Flow: Mlb/hr                 106.60 (104.00 %)             23  0.921  24.758    17  0.321 0.367  25 60
                                                           22  1.042  28.419    18  0.375 0.434  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           21  1.126  30.578    19  0.794 1.062  13 14
59              -- -- -- -- -- -- --             59        20  1.194  32.016    20  1.062 1.129  21 18
55          -- -- -- -- -- -- -- -- --           55        19  1.224  32.772    21  1.039 1.105  21 14
51       -- -- -- -- -- -- -- -- -- -- --        51        18  1.259  33.570    22  1.263 1.347  11 22
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  1.272  33.905    23  1.141 1.294   9 20
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  1.282  34.537    24  1.100 1.316   9 22
39 -- -- -- -- -- -- 10 -- 10 -- -- -- -- -- -- 39        15  1.289  35.503
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  1.248  35.476
31 -- -- -- -- 14 -- -- -- -- -- 14 -- -- -- -- 31        13  1.329* 34.052
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.315  35.005
23 -- -- -- -- -- -- 10 -- 10 -- -- -- -- -- -- 23        11  1.278  35.614
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.240  36.372
15    -- -- -- -- -- -- -- -- -- -- -- -- -- --    15         9  1.185  37.333
11       -- -- -- -- -- -- -- -- -- -- -- --       11         8  1.098  37.920
 7          -- -- -- -- -- -- -- -- --            7         7  0.996  38.346
 3             -- -- -- -- -- -- --               3         6  0.904  39.258*
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           5  0.805  39.123
                                                           4  0.714  37.442
Control Rod Density: %          2.48                       3  0.638  34.147
                                                           2  0.497  26.033
k-effective:                0.99994                Bottom  1  0.144   7.595
Void Fraction:               0.380
Core Delta-P: psia          25.480              % AXIAL TILT   8.633  -7.702
Core Plate Delta-P: psia    20.930          AVG BOT 8ft/12ft  0.9684  1.0444
Coolant Temp: Deg-F          547.2
In Channel Flow: Mlb/hr      94.35   Active Channel Flow: Mlb/hr        91.21
Total Bypass Flow (%):        11.5   (of total core flow)
Total Water Rod Flow (%):      2.9   (of total core flow)
Source Convergence         0.00007
```

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
1.347	22	11 22	1.635	0.881	22	49 40	7.29	0.776	49.7 20	23 12	15	7.99	0.827	55.7 20	19 12	15
1.345	22	23 14	1.642	0.877	22	23 14	7.24	0.770	49.8 20	19 12	15	7.95	0.823	55.6 20	23 12	15
1.340	22	21 16	1.643	0.877	22	39 50	7.25	0.767	49.1 20	11 24	15	7.93	0.821	55.7 20	11 20	15
1.339	22	21 12	1.646	0.875	22	21 16	7.19	0.766	49.7 20	11 20	15	8.09	0.813	53.2 20	17 32	19
1.333	22	13 24	1.646	0.875	22	9 24	7.29	0.761	48.0 20	29 10	15	7.93	0.811	54.7 20	15 16	15
1.331	22	9 24	1.650	0.873	22	13 24	7.23	0.760	48.5 20	17 14	15	7.86	0.810	55.3 20	11 24	15
1.328	22	15 22	1.651	0.872	22	15 40	7.28	0.759	47.8 20	17 18	15	7.96	0.809	54.1 20	31 10	15
1.328	22	27 14	1.654	0.871	22	23 10	7.29	0.759	47.7 20	13 18	15	7.90	0.807	54.6 20	17 18	15
1.328	22	25 12	1.655	0.870	22	25 16	7.24	0.758	48.1 20	25 14	15	7.91	0.805	54.3 20	17 14	15
1.327	22	29 12	1.655	0.870	22	31 50	7.23	0.758	48.3 20	15 16	15	7.80	0.803	55.2 21	21 14	15

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

Figure A.73 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 17,740.0 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    31640.1
Exposure: MWd/MTU (GWd)     17741.0 (2444.50 )
Delta E: MWd/MTU, (GWd)         1.0 (   0.14 )                  Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.263   6.892    14  0.376 0.376  35  2
Inlet Subcooling: Btu/lbm    -26.94                        24  0.693  19.091    16  0.354 0.548   9 12
Flow: Mlb/hr                 102.50 (100.00 %)             23  0.878  24.759    17  0.317 0.361  25 60
                                                           22  0.996  28.420    18  0.370 0.427  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  1.079  30.579    19  0.783 1.047  13 14
59              -- -- -- -- -- -- --             59        20  1.148  32.017    20  1.072 1.135  17 26
55          -- -- -- -- -- -- -- -- --           55        19  1.183  32.774    21  1.040 1.097  13 22
51       -- -- -- -- -- -- -- -- -- -- --        51        18  1.225  33.572    22  1.271 1.354  17 28
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  1.251  33.906    23  1.126 1.279   9 20
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  1.271  34.538    24  1.086 1.302   9 22
39 -- -- -- -- -- -- 10 -- 10 -- -- -- -- -- -- 39        15  1.284  35.504
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  1.250  35.478
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31        13  1.334* 34.053
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.322  35.007
23 -- -- -- -- -- -- 10 -- 10 -- -- -- -- -- -- 23        11  1.287  35.616
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.251  36.374
15    -- -- -- -- -- -- -- -- -- -- -- -- --     15         9  1.199  37.334
11       -- -- -- -- -- -- -- -- -- -- --        11         8  1.118  37.921
 7          -- -- -- -- -- -- -- -- --           7         7  1.023  38.347
 3             -- -- -- -- -- -- --              3         6  0.940  39.259*
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  0.850  39.124
                                                           4  0.766  37.443
Control Rod Density: %          1.71                       3  0.691  34.147
                                                           2  0.541  26.034
k-effective:                 1.00004                Bottom  1  0.157   7.595
Void Fraction:                0.392
Core Delta-P: psia           24.126              % AXIAL TILT   5.827  -7.702
Core Plate Delta-P: psia     19.579          AVG BOT 8ft/12ft  0.9873  1.0444
Coolant Temp: Deg-F           547.1
In Channel Flow: Mlb/hr       90.59   Active Channel Flow: Mlb/hr        87.53
Total Bypass Flow (%):         11.6   (of total core flow)
Total Water Rod Flow (%):       3.0   (of total core flow)
Source Convergence          0.00009
```

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
1.354	22	17 28	1.634	0.881	22	17 34	7.16	0.762	49.7 20	23 12	15	7.84	0.811	55.7 20	19 12	15
1.353	22	19 30	1.637	0.880	22	41 32	7.19	0.760	49.1 20	11 24	15	7.81	0.808	55.7 20	11 20	15
1.339	22	21 28	1.641	0.877	22	49 40	7.10	0.756	49.8 20	19 12	15	7.81	0.807	55.5 20	23 12	15
1.339	22	19 26	1.641	0.877	22	15 26	7.08	0.754	49.7 20	11 20	15	7.80	0.804	55.3 20	11 24	15
1.337	22	13 24	1.642	0.877	22	13 24	7.13	0.751	48.8 20	13 26	15	7.79	0.797	54.7 20	15 16	15
1.336	22	11 22	1.648	0.874	22	15 40	7.17	0.747	47.8 20	17 18	15	7.69	0.794	55.4 20	13 26	15
1.335	22	15 26	1.651	0.872	22	19 26	7.17	0.746	47.7 20	13 18	15	7.77	0.794	54.6 20	17 18	15
1.334	22	23 30	1.653	0.871	22	9 24	7.15	0.746	48.0 20	29 10	15	7.81	0.793	54.1 20	31 10	15
1.328	22	15 22	1.655	0.870	22	23 14	7.10	0.746	48.5 20	17 14	15	7.76	0.790	54.3 20	17 14	15
1.326	22	23 14	1.656	0.869	22	15 32	7.14	0.745	47.9 20	15 24	15	7.78	0.788	53.9 20	13 18	15

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

Figure A.74 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 17,741.0 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    31799.2
Exposure: MWd/MTU (GWd)     17900.0 (2466.40 )
Delta E: MWd/MTU, (GWd)       159.0 (  21.91 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.268   6.937    14  0.376 0.376  35  2
Inlet Subcooling: Btu/lbm    -25.82                        24  0.707  19.210    16  0.354 0.549   9 12
Flow: Mlb/hr                 106.60 (104.00 %)             23  0.896  24.910    17  0.317 0.362  25 60
                                                           22  1.014  28.592    18  0.370 0.428  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  1.097  30.765    19  0.785 1.050  13 14
59              -- -- -- -- -- -- --             59        20  1.165  32.215    20  1.070 1.130  17 26
55          -- -- -- -- -- -- -- -- --           55        19  1.198  32.977    21  1.038 1.096  13 22
51       -- -- -- -- -- -- -- -- -- -- --        51        18  1.238  33.782    22  1.269 1.349  19 30
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  1.261  34.121    23  1.131 1.283   9 20
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  1.278  34.753    24  1.089 1.305   9 22
39 -- -- -- -- -- -- 10 -- 10 -- -- -- -- -- -- 39        15  1.290  35.722
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  1.254  35.689
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31        13  1.338* 34.252
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.325  35.204
23 -- -- -- -- -- -- 10 -- 10 -- -- -- -- -- -- 23        11  1.287  35.808
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.249  36.560
15    -- -- -- -- -- -- -- -- -- -- -- -- --     15         9  1.193  37.513
11       -- -- -- -- -- -- -- -- -- -- --        11         8  1.107  38.087
 7          -- -- -- -- -- -- -- -- --           7         7  1.007  38.498
 3             -- -- -- -- -- -- --              3         6  0.919  39.397*
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  0.827  39.249
                                                           4  0.741  37.556
Control Rod Density: %         1.71                        3  0.668  34.249
                                                           2  0.524  26.113
k-effective:                0.99996                Bottom  1  0.152   7.619
Void Fraction:               0.384
Core Delta-P: psia          25.545              % AXIAL TILT   7.044  -7.599
Core Plate Delta-P: psia    20.997          AVG BOT 8ft/12ft  0.9799  1.0439
Coolant Temp: Deg-F          547.2
In Channel Flow: Mlb/hr      94.32   Active Channel Flow: Mlb/hr        91.17
Total Bypass Flow (%):        11.5   (of total core flow)
Total Water Rod Flow (%):      3.0   (of total core flow)
Source Convergence         0.00005
```

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
1.349	22	19 30	1.654	0.871	22	49 40	7.19	0.767	49.9 20	23 12	15	7.89	0.820	55.9 20	19 12	15
1.349	22	17 28	1.660	0.867	22	13 24	7.21	0.765	49.4 20	11 24	15	7.86	0.816	55.9 20	11 20	15
1.338	22	11 22	1.660	0.867	22	17 34	7.14	0.763	50.0 20	19 12	15	7.84	0.814	55.9 20	23 12	15
1.335	22	13 24	1.663	0.866	22	9 24	7.12	0.760	50.0 20	11 20	15	7.83	0.810	55.5 20	11 24	15
1.334	22	21 28	1.664	0.865	22	15 26	7.14	0.754	49.0 20	13 26	15	7.83	0.803	55.0 20	15 16	15
1.334	22	19 26	1.665	0.865	22	39 50	7.19	0.752	48.2 20	29 10	15	7.86	0.801	54.4 20	31 10	15
1.331	22	15 26	1.665	0.865	22	41 32	7.20	0.752	48.0 20	13 18	15	7.80	0.799	54.9 20	17 18	15
1.330	22	23 30	1.667	0.864	22	15 40	7.14	0.751	48.7 20	17 14	15	7.72	0.799	55.7 20	13 26	15
1.326	22	23 14	1.669	0.863	22	23 14	7.19	0.751	48.0 20	17 18	15	7.81	0.798	54.6 20	17 14	15
1.325	22	15 22	1.673	0.861	22	21 16	7.14	0.750	48.5 20	15 16	15	7.83	0.796	54.2 20	13 18	15

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

Figure A.75 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 17,900.0 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    31800.2
Exposure: MWd/MTU (GWd)     17901.0 (2466.50 )
Delta E: MWd/MTU, (GWd)         1.0 (   0.14 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.268   6.938    14  0.374 0.374  35  2
Inlet Subcooling: Btu/lbm    -26.94                        24  0.704  19.210    16  0.351 0.545   9 12
Flow: Mlb/hr                 102.50 (100.00 %)             23  0.893  24.911    17  0.315 0.360  25 60
                                                           22  1.015  28.593    18  0.367 0.426  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  1.103  30.766    19  0.779 1.040  13 14
59              -- -- -- -- -- -- --             59        20  1.179  32.216    20  1.074 1.135  21 30
55          -- -- -- -- -- -- -- -- --           55        19  1.223  32.978    21  1.045 1.092  21 26
51       -- -- -- -- -- -- -- -- -- -- -- --     51        18  1.265  33.784    22  1.274 1.352  19 30
47    -- -- -- -- -- -- -- -- -- -- -- -- -- --  47        17  1.277  34.123    23  1.120 1.270   9 20
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  1.285  34.754    24  1.079 1.292   9 22
39 -- -- -- -- -- -- 14 -- 14 -- -- -- -- -- -- 39        15  1.290  35.723
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  1.250  35.690
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31        13  1.330* 34.254
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.314  35.205
23 -- -- -- -- -- -- 14 -- 14 -- -- -- -- -- -- 23        11  1.275  35.809
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.237  36.562
15    -- -- -- -- -- -- -- -- -- -- -- -- -- --  15         9  1.181  37.514
11       -- -- -- -- -- -- -- -- -- -- -- --     11         8  1.097  38.088
 7          -- -- -- -- -- -- -- -- --           7         7  0.999  38.499
 3             -- -- -- -- -- -- --              3         6  0.914  39.398*
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  0.823  39.250
                                                           4  0.739  37.556
Control Rod Density: %          1.53                       3  0.666  34.249
                                                           2  0.522  26.114
k-effective:                0.99997                Bottom  1  0.152   7.619
Void Fraction:               0.388
Core Delta-P: psia          24.070                % AXIAL TILT   7.735  -7.598
Core Plate Delta-P: psia    19.523          AVG BOT 8ft/12ft  0.9749  1.0439
Coolant Temp: Deg-F          547.1
In Channel Flow: Mlb/hr      90.62   Active Channel Flow: Mlb/hr        87.57
Total Bypass Flow (%):       11.6    (of total core flow)
Total Water Rod Flow (%):     3.0    (of total core flow)
Source Convergence         0.00008
```

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
1.352	22	19 30	1.630	0.884	22	41 32	7.17	0.765	49.9	20	23 12 15	7.84	0.814	56.0	20	19 12 15
1.347	22	17 28	1.631	0.883	22	17 34	7.15	0.758	49.4	20	11 24 15	7.83	0.812	55.8	20	23 12 15
1.344	22	23 30	1.632	0.882	22	23 32	7.09	0.757	50.0	20	19 12 15	7.78	0.807	55.9	20	11 20 15
1.344	22	21 28	1.636	0.880	22	39 34	7.05	0.752	50.0	20	11 20 15	7.76	0.802	55.5	20	11 24 15
1.338	22	19 26	1.641	0.878	22	19 26	7.15	0.750	48.4	20	25 14 15	7.77	0.797	55.0	20	15 16 15
1.326	22	13 24	1.646	0.875	22	23 14	7.09	0.749	49.0	20	13 26 15	7.82	0.797	54.4	20	31 10 15
1.326	22	11 22	1.647	0.875	22	25 16	7.16	0.749	48.2	20	29 10 15	7.76	0.795	54.9	20	17 18 15
1.325	22	15 26	1.647	0.874	22	21 16	7.17	0.749	48.0	20	17 18 15	8.06	0.795	51.7	21	25 22 19
1.323	22	23 14	1.647	0.874	22	15 26	7.09	0.746	48.7	20	17 14 15	8.15	0.795	50.8	21	33 24 19
1.320	22	21 16	1.648	0.874	22	49 40	7.14	0.745	48.0	20	13 18 15	7.75	0.794	54.9	20	25 14 15

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

Figure A.76 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 17,901.0 MWd/MTU

```
Cycle:                          19                      Core Average Exposure: MWd/MTU    31949.2
Exposure: MWd/MTU (GWd)     18050.0 (2487.00 )
Delta E: MWd/MTU, (GWd)       149.0 (  20.53 )                Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.272   6.981    14  0.374 0.374  35  2
Inlet Subcooling: Btu/lbm    -25.82                        24  0.717  19.324    16  0.351 0.545   9 12
Flow: Mlb/hr                 106.60 (104.00 %)             23  0.910  25.054    17  0.315 0.360  25 60
                                                           22  1.034  28.757    18  0.367 0.426  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  1.121  30.944    19  0.780 1.043  13 14
59              -- -- -- -- -- -- --             59        20  1.196  32.406    20  1.072 1.130  21 30
55          -- -- -- -- -- -- -- -- --           55        19  1.238  33.176    21  1.043 1.087  13 22
51       -- -- -- -- -- -- -- -- -- -- --        51        18  1.277  33.987    22  1.273 1.346  19 30
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  1.287  34.328    23  1.125 1.274   9 20
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  1.293  34.958    24  1.082 1.295   9 22
39 -- -- -- -- -- -- 14 -- 14 -- -- -- -- -- -- 39        15  1.296  35.928
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  1.254  35.888
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31        13  1.334* 34.440
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.318  35.390
23 -- -- -- -- -- -- 14 -- 14 -- -- -- -- -- -- 23        11  1.276  35.987
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.235  36.734
15    -- -- -- -- -- -- -- -- -- -- -- -- -- --    15         9  1.176  37.679
11       -- -- -- -- -- -- -- -- -- -- -- --       11         8  1.087  38.241
 7          -- -- -- -- -- -- -- -- --            7         7  0.983  38.638
 3             -- -- -- -- -- -- --               3         6  0.893  39.525*
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  0.798  39.364
                                                           4  0.713  37.658
Control Rod Density: %          1.53                       3  0.641  34.341
                                                           2  0.503  26.186
k-effective:                 0.99999                Bottom  1  0.146   7.641
Void Fraction:                0.379
Core Delta-P: psia           25.485              % AXIAL TILT   8.983  -7.494
Core Plate Delta-P: psia     20.938          AVG BOT 8ft/12ft  0.9673  1.0434
Coolant Temp: Deg-F           547.1
In Channel Flow: Mlb/hr       94.35   Active Channel Flow: Mlb/hr        91.21
Total Bypass Flow (%):         11.5   (of total core flow)
Total Water Rod Flow (%):       2.9   (of total core flow)
Source Convergence          0.00009
```

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
1.346	22	19 30	1.655	0.870	22	17 34	7.20	0.770	50.2 20	23 12	15	7.89	0.822	56.2 20	19 12	15
1.342	22	17 28	1.656	0.870	22	41 32	7.13	0.764	50.2 20	19 12	15	7.87	0.819	56.0 20	23 12	15
1.340	22	23 30	1.656	0.869	22	23 32	7.18	0.763	49.6 20	11 24	15	7.83	0.815	56.2 20	11 20	15
1.339	22	21 28	1.660	0.868	22	49 40	7.09	0.759	50.2 20	11 20	15	7.80	0.809	55.8 20	11 24	15
1.333	22	19 26	1.660	0.868	22	23 14	7.19	0.755	48.4 20	29 10	15	7.87	0.804	54.6 20	31 10	15
1.327	22	11 22	1.661	0.867	22	39 34	7.17	0.754	48.6 20	25 14	15	7.81	0.804	55.2 20	15 16	15
1.325	22	13 24	1.662	0.867	22	39 50	7.19	0.753	48.3 20	17 18	15	8.11	0.802	52.0 21	25 22	19
1.323	22	23 14	1.663	0.866	22	21 16	7.11	0.753	49.3 20	13 26	15	7.79	0.801	55.1 20	17 18	15
1.322	22	15 26	1.663	0.866	22	25 16	7.13	0.752	48.9 20	17 14	15	8.19	0.801	51.0 21	33 24	19
1.319	22	21 16	1.664	0.865	22	19 26	7.17	0.751	48.2 20	13 18	15	7.78	0.801	55.2 20	25 14	15

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

Figure A.77 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 18,050.0 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    31950.2
Exposure: MWd/MTU (GWd)     18051.0 (2487.20 )
Delta E: MWd/MTU, (GWd)         1.0 (   0.14 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.269   6.981    14  0.372 0.372  35  2
Inlet Subcooling: Btu/lbm    -26.82                        24  0.707  19.324    16  0.349 0.541   9 12
Flow: Mlb/hr                 102.91 (100.40 %)             23  0.897  25.055    17  0.313 0.358  25 60
                                                           22  1.021  28.758    18  0.365 0.424  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  1.111  30.945    19  0.774 1.035  13 14
59              -- -- -- -- -- -- --             59        20  1.190  32.408    20  1.076 1.137  21 30
55          -- -- -- -- -- -- -- -- --           55        19  1.239  33.177    21  1.050 1.099  23 28
51       -- -- -- -- -- -- -- -- -- -- --        51        18  1.288  33.989    22  1.277 1.353  23 30
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  1.312  34.329    23  1.115 1.262   9 20
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  1.320  34.960    24  1.074 1.283   9 22
39 -- -- -- -- -- -- 18 -- 18 -- -- -- -- -- -- 39        15  1.313  35.929
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  1.262  35.889
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31        13  1.337* 34.441
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.316  35.391
23 -- -- -- -- -- -- 18 -- 18 -- -- -- -- -- -- 23        11  1.272  35.989
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.229  36.736
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15         9  1.169  37.680
11       -- -- -- -- -- -- -- -- -- -- --       11         8  1.081  38.242
 7          -- -- -- -- -- -- -- -- --          7         7  0.979  38.639
 3             -- -- -- -- -- -- --             3         6  0.890  39.525*
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  0.797  39.364
                                                           4  0.713  37.659
Control Rod Density: %          1.35                       3  0.642  34.341
                                                           2  0.504  26.186
k-effective:                 0.99996                Bottom  1  0.146   7.642
Void Fraction:                0.384
Core Delta-P: psia           24.175                % AXIAL TILT   9.249  -7.494
Core Plate Delta-P: psia     19.628          AVG BOT 8ft/12ft  0.9685  1.0434
Coolant Temp: Deg-F           547.0
In Channel Flow: Mlb/hr       91.01   Active Channel Flow: Mlb/hr        87.96
Total Bypass Flow (%):         11.6   (of total core flow)
Total Water Rod Flow (%):       3.0   (of total core flow)
Source Convergence          0.00006
```

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
1.353	22	23 30	1.612	0.893	22	23 32	9.67	0.799	23.6	22	27 22 17	8.78	0.874	52.5	21	33 24 17
1.349	22	19 30	1.620	0.889	22	39 34	7.74	0.790	45.8	21	27 24 17	8.70	0.871	53.0	21	25 22 17
1.348	22	21 28	1.629	0.884	22	41 32	9.53	0.789	24.0	22	25 24 17	8.14	0.820	53.4	20	27 20 17
1.340	22	17 28	1.634	0.881	22	17 34	7.71	0.788	46.0	21	25 22 17	7.88	0.819	56.0	20	23 12 15
1.337	22	19 26	1.635	0.881	22	25 16	7.56	0.776	46.4	20	29 22 17	8.20	0.819	52.8	20	31 40 17
1.325	22	27 30	1.636	0.880	22	33 32	7.52	0.775	46.7	20	27 20 17	7.85	0.818	56.2	20	19 12 15
1.320	22	23 14	1.637	0.880	22	19 26	7.20	0.770	50.2	20	23 12 15	10.62	0.815	27.8	22	33 40 17
1.317	22	21 16	1.642	0.877	22	25 28	7.24	0.762	48.6	20	25 14 15	7.76	0.808	56.2	20	11 20 15
1.317	22	15 26	1.643	0.876	22	23 18	7.10	0.760	50.2	20	19 12 15	7.84	0.806	55.2	20	25 14 15
1.316	22	25 28	1.643	0.876	22	31 34	7.26	0.759	48.0	20	23 16 15	10.47	0.805	28.1	22	25 24 17

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

Figure A.78 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 18,051.0 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    32099.2
Exposure: MWd/MTU (GWd)     18200.0 (2507.70 )
Delta E: MWd/MTU, (GWd)       149.0 (  20.53 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.273   7.024    14  0.373 0.373  35  2
Inlet Subcooling: Btu/lbm    -25.68                        24  0.720  19.438    16  0.349 0.542   9 12
Flow: Mlb/hr                 107.11 (104.50 %)             23  0.914  25.199    17  0.313 0.358  25 60
                                                           22  1.039  28.923    18  0.365 0.424  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  1.129  31.125    19  0.776 1.038  13 14
59              -- -- -- -- -- -- --             59        20  1.206  32.599    20  1.074 1.132  21 30
55          -- -- -- -- -- -- -- -- --           55        19  1.252  33.377    21  1.048 1.094  23 28
51       -- -- -- -- -- -- -- -- -- -- --        51        18  1.299  34.196    22  1.276 1.348  23 30
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  1.320  34.540    23  1.120 1.267   9 20
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  1.325  35.169    24  1.077 1.286   9 22
39 -- -- -- -- -- -- 18 -- 18 -- -- -- -- -- -- 39        15  1.317  36.137
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  1.265  36.089
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31        13  1.340* 34.629
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.318  35.575
23 -- -- -- -- -- -- 18 -- 18 -- -- -- -- -- -- 23        11  1.272  36.167
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.227  36.907
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15         9  1.163  37.843
11       -- -- -- -- -- -- -- -- -- -- --       11         8  1.071  38.393
 7          -- -- -- -- -- -- -- -- --          7         7  0.964  38.775
 3             -- -- -- -- -- -- --             3         6  0.871  39.649*
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  0.775  39.474
                                                           4  0.690  37.757
Control Rod Density: %          1.35                       3  0.620  34.430
                                                           2  0.487  26.255
k-effective:                 0.99990                Bottom  1  0.142   7.663
Void Fraction:                0.375
Core Delta-P: psia           25.633              % AXIAL TILT  10.398  -7.384
Core Plate Delta-P: psia     21.086          AVG BOT 8ft/12ft  0.9614  1.0429
Coolant Temp: Deg-F           547.1
In Channel Flow: Mlb/hr       94.83   Active Channel Flow: Mlb/hr        91.69
Total Bypass Flow (%):         11.5   (of total core flow)
Total Water Rod Flow (%):       2.9   (of total core flow)
Source Convergence          0.00009
```

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
1.348	22	23 30	1.638	0.879	22	23 32	9.66	0.800	23.9 22	27 22	17	8.75	0.874	52.8 21	33 24	17
1.344	22	19 30	1.646	0.875	22	39 34	9.52	0.790	24.3 22	25 24	17	8.69	0.873	53.3 21	25 22	17
1.343	22	21 28	1.653	0.871	22	25 16	7.71	0.789	46.0 21	27 24	17	7.90	0.826	56.4 20	19 12	15
1.336	22	17 28	1.655	0.870	22	41 32	7.69	0.788	46.3 21	25 22	17	7.91	0.825	56.3 20	23 12	15
1.332	22	19 26	1.658	0.869	22	17 34	7.55	0.777	46.6 20	29 22	17	8.15	0.823	53.6 20	27 20	17
1.320	22	23 14	1.658	0.868	22	23 14	7.52	0.777	47.0 20	27 20	17	8.20	0.822	53.0 20	31 40	17
1.319	22	27 30	1.661	0.867	22	21 16	7.23	0.775	50.4 20	23 12	15	10.62	0.818	28.1 22	33 40	17
1.318	22	11 22	1.661	0.867	22	19 26	7.14	0.766	50.5 20	19 12	15	7.81	0.816	56.4 20	11 20	15
1.316	22	21 16	1.661	0.867	22	33 32	7.26	0.765	48.8 20	25 14	15	7.87	0.812	55.4 20	25 14	15
1.315	22	13 24	1.663	0.866	22	23 18	7.15	0.762	49.8 20	11 24	15	7.90	0.809	54.9 20	31 10	15

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

Figure A.79 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 18,200.0 MWd/MTU

```
Cycle:                          19                      Core Average Exposure: MWd/MTU    32100.2
Exposure: MWd/MTU (GWd)     18201.0 (2507.80 )
Delta E: MWd/MTU, (GWd)         1.0 (   0.14 )                 Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.254   7.024    14  0.364 0.364  35  2
Inlet Subcooling: Btu/lbm    -27.08                        24  0.669  19.439    16  0.342 0.531   9 12
Flow: Mlb/hr                 101.99 ( 99.50 %)             23  0.848  25.200    17  0.306 0.350  25 60
                                                           22  0.965  28.924    18  0.357 0.415  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  1.050  31.126    19  0.760 1.015  13 14
59              -- -- -- -- -- -- --             59        20  1.125  32.601    20  1.081 1.144  29 26
55          -- -- -- -- -- -- -- -- --           55        19  1.173  33.378    21  1.069 1.122  23 28
51       -- -- -- -- -- -- -- -- -- -- --        51        18  1.224  34.197    22  1.288 1.370  23 30
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  1.254  34.542    23  1.096 1.239   9 20
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  1.277  35.170    24  1.054 1.258   9 22
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39        15  1.291  36.138
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  1.259  36.091
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31        13  1.346* 34.630
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.332  35.576
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23        11  1.293  36.168
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.253  36.909
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15         9  1.197  37.844
11       -- -- -- -- -- -- -- -- -- -- --       11         8  1.114  38.394
 7          -- -- -- -- -- -- -- -- --          7         7  1.020  38.776
 3             -- -- -- -- -- -- --             3         6  0.942  39.650*
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  0.861  39.475
                                                           4  0.789  37.758
Control Rod Density: %          0.00                       3  0.724  34.430
                                                           2  0.573  26.256
k-effective:                 1.00006                Bottom  1  0.168   7.663
Void Fraction:                0.395
Core Delta-P: psia           24.010              % AXIAL TILT   4.743  -7.383
Core Plate Delta-P: psia     19.468          AVG BOT 8ft/12ft  0.9964  1.0429
Coolant Temp: Deg-F           547.1
In Channel Flow: Mlb/hr       90.10   Active Channel Flow: Mlb/hr        87.03
Total Bypass Flow (%):         11.7   (of total core flow)
Total Water Rod Flow (%):       3.0   (of total core flow)
Source Convergence          0.00006
```

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
1.370	22	23 30	1.629	0.884	22	31 24	7.00	0.751	50.4 20	23 12	15	7.65	0.800	56.4 20	19 12	15
1.369	22	29 28	1.629	0.884	22	23 32	7.04	0.743	48.8 20	25 14	15	7.66	0.799	56.3 20	23 12	15
1.367	22	29 24	1.634	0.882	22	31 34	6.92	0.742	50.5 20	19 12	15	7.57	0.791	56.4 20	11 20	15
1.363	22	25 28	1.641	0.877	22	25 28	7.08	0.741	48.2 20	23 16	15	7.66	0.785	54.8 20	23 16	15
1.361	22	27 30	1.642	0.877	22	33 32	6.94	0.740	49.8 20	11 24	15	7.55	0.785	56.0 20	11 24	15
1.361	22	27 26	1.643	0.876	22	27 26	7.10	0.739	47.6 20	25 18	15	7.60	0.785	55.4 20	25 14	15
1.358	22	21 28	1.645	0.875	22	39 34	6.86	0.736	50.4 20	11 20	15	7.58	0.782	55.5 20	15 16	15
1.353	22	23 26	1.646	0.875	22	23 26	7.00	0.735	48.5 20	17 18	15	7.63	0.782	54.9 20	31 10	15
1.346	22	29 20	1.647	0.874	22	29 20	7.03	0.735	48.1 20	27 20	15	7.57	0.780	55.4 20	17 18	15
1.345	22	25 20	1.650	0.873	22	25 20	6.98	0.735	48.7 20	29 10	15	7.85	0.780	52.3 20	25 18	15

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

Figure A.80 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 18,201.0 MWd/MTU

```
Cycle:                          19                      Core Average Exposure: MWd/MTU    32289.4
Exposure: MWd/MTU (GWd)     18390.1 (2533.90 )
Delta E: MWd/MTU, (GWd)       189.1 (  26.06 )                  Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1050.0                    Top 25  0.260   7.077    14  0.364 0.364  35  2
Inlet Subcooling: Btu/lbm    -25.55                        24  0.687  19.576    16  0.342 0.531   9 12
Flow: Mlb/hr                 107.62 (105.00 %)             23  0.871  25.374    17  0.306 0.350  25 60
                                                           22  0.990  29.123    18  0.357 0.415  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           21  1.074  31.342    19  0.763 1.020  13 14
59              -- -- -- -- -- -- --             59       20  1.147  32.832    20  1.079 1.136  29 26
55          -- -- -- -- -- -- -- -- --           55       19  1.192  33.619    21  1.067 1.115  23 28
51       -- -- -- -- -- -- -- -- -- -- --        51       18  1.239  34.448    22  1.286 1.362  23 30
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47       17  1.266  34.798    23  1.102 1.246   9 20
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43       16  1.284  35.427    24  1.059 1.264   9 22
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39       15  1.297  36.398
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35       14  1.262  36.344
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31       13  1.349* 34.869
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27       12  1.334  35.813
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23       11  1.293  36.397
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19       10  1.250  37.131
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15        9  1.188  38.056
11       -- -- -- -- -- -- -- -- -- -- --       11        8  1.100  38.590
 7          -- -- -- -- -- -- -- -- --          7        7  1.001  38.955
 3             -- -- -- -- -- -- --             3        6  0.917  39.815*
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           5  0.833  39.626
                                                           4  0.760  37.895
Control Rod Density: %         0.00                        3  0.695  34.556
                                                           2  0.551  26.356
k-effective:                0.99994                Bottom  1  0.161   7.694
Void Fraction:               0.384
Core Delta-P: psia          25.972              % AXIAL TILT   6.275  -7.271
Core Plate Delta-P: psia    21.430          AVG BOT 8ft/12ft  0.9868  1.0424
Coolant Temp: Deg-F          547.2
In Channel Flow: Mlb/hr      95.22   Active Channel Flow: Mlb/hr        92.03
Total Bypass Flow (%):        11.5   (of total core flow)
Total Water Rod Flow (%):      3.0   (of total core flow)
Source Convergence         0.00006
```

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
1.362	22	23 30	1.668	0.863	22	23 32	7.04	0.757	50.7 20	23 12	15	7.71	0.809	56.8 20	19 12	15
1.360	22	29 28	1.672	0.861	22	31 24	6.97	0.750	50.7 20	19 12	15	7.71	0.807	56.6 20	23 12	15
1.358	22	29 24	1.677	0.859	22	31 34	7.06	0.746	49.1 20	25 14	15	7.64	0.801	56.7 20	11 20	15
1.354	22	25 28	1.685	0.855	22	25 28	6.98	0.746	50.1 20	11 24	15	7.59	0.793	56.3 20	11 24	15
1.353	22	27 30	1.685	0.854	22	39 34	7.09	0.744	48.5 20	23 16	15	7.69	0.791	55.2 20	31 10	15
1.352	22	27 26	1.686	0.854	22	29 20	6.91	0.744	50.7 20	11 20	15	7.64	0.791	55.7 20	25 14	15
1.351	22	21 28	1.686	0.854	22	33 32	7.02	0.741	48.9 20	29 10	15	7.63	0.790	55.8 20	15 16	15
1.345	22	23 26	1.687	0.854	22	23 26	7.09	0.740	47.9 20	25 18	15	7.68	0.790	55.1 20	23 16	15
1.338	22	29 20	1.687	0.854	22	27 26	7.02	0.739	48.8 20	17 18	15	7.60	0.787	55.7 20	17 18	15
1.338	22	25 20	1.687	0.854	22	25 20	6.95	0.738	49.4 20	17 14	15	7.62	0.786	55.4 20	17 14	15

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

Figure A.81 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 18,390.1 MWd/MTU

```
Cycle:                          19                      Core Average Exposure: MWd/MTU    32297.3
Exposure: MWd/MTU (GWd)     18398.1 (2535.00 )
Delta E: MWd/MTU, (GWd)         8.0 (   1.10 )                Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1048.0                    Top 25  0.256   7.079    14  0.366 0.366  35  2
Inlet Subcooling: Btu/lbm    -29.54                        24  0.673  19.581    16  0.344 0.535   9 12
Flow: Mlb/hr                 102.24 ( 99.75 %)             23  0.854  25.381    17  0.308 0.351  25 60
                                                           22  0.971  29.131    18  0.359 0.417  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  1.054  31.351    19  0.767 1.021  13 14
59              -- -- -- -- -- -- --             59        20  1.127  32.841    20  1.078 1.133  29 26
55          -- -- -- -- -- -- -- -- --           55        19  1.172  33.629    21  1.065 1.112  23 28
51       -- -- -- -- -- -- -- -- -- -- --        51        18  1.220  34.458    22  1.283 1.358  23 30
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  1.248  34.809    23  1.104 1.245   9 20
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  1.269  35.438    24  1.061 1.262   9 22
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39        15  1.284  36.409
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  1.253  36.354
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31        13  1.344* 34.879
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.333  35.823
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23        11  1.297  36.407
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.260  37.140
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15         9  1.204  38.065
11       -- -- -- -- -- -- -- -- -- -- --       11         8  1.121  38.599
 7          -- -- -- -- -- -- -- -- --          7         7  1.024  38.963
 3             -- -- -- -- -- -- --             3         6  0.942  39.822*
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  0.858  39.632
                                                           4  0.783  37.901
Control Rod Density: %           0.00                      3  0.718  34.562
                                                           2  0.569  26.360
k-effective:                  0.99980                Bottom  1  0.166   7.695
Void Fraction:                 0.384
Core Delta-P: psia            23.895            % AXIAL TILT   4.668  -7.266
Core Plate Delta-P: psia      19.342          AVG BOT 8ft/12ft  0.9957  1.0424
Coolant Temp: Deg-F           546.3
In Channel Flow: Mlb/hr        90.41   Active Channel Flow: Mlb/hr        87.38
Total Bypass Flow (%):         11.6   (of total core flow)
Total Water Rod Flow (%):       3.0   (of total core flow)
Source Convergence          0.00005
```

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
1.358	22	23 30	1.660	0.868	22	23 32	6.96	0.749	50.7 20	23 12	15	7.63	0.801	56.8 20	19 12	15
1.355	22	29 28	1.662	0.866	22	31 24	6.89	0.742	50.7 20	19 12	15	7.62	0.798	56.6 20	23 12	15
1.353	22	29 24	1.666	0.864	22	31 34	6.90	0.738	50.1 20	11 24	15	7.55	0.792	56.7 20	11 20	15
1.350	22	25 28	1.674	0.860	22	25 28	6.97	0.738	49.1 20	25 14	15	7.51	0.784	56.3 20	11 24	15
1.348	22	27 30	1.675	0.860	22	39 34	6.83	0.736	50.7 20	11 20	15	7.60	0.782	55.2 20	31 10	15
1.348	22	27 26	1.676	0.859	22	33 32	7.00	0.735	48.5 20	23 16	15	7.55	0.782	55.8 20	15 16	15
1.347	22	21 28	1.677	0.859	22	27 26	6.94	0.733	49.0 20	29 10	15	7.54	0.781	55.7 20	25 14	15
1.341	22	23 26	1.677	0.859	22	23 26	6.94	0.731	48.8 20	17 18	15	7.59	0.780	55.1 20	23 16	15
1.334	22	25 20	1.677	0.859	22	29 20	7.00	0.730	47.9 20	25 18	15	7.52	0.778	55.7 20	17 18	15
1.334	22	29 20	1.679	0.858	22	25 20	6.88	0.730	49.5 20	17 14	15	7.54	0.777	55.4 20	17 14	15

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

Figure A.82 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 18,398.1 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    32442.5
Exposure: MWd/MTU (GWd)     18543.2 (2555.00 )
Delta E: MWd/MTU, (GWd)       145.2 (  20.00 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1048.0                    Top 25  0.261   7.119    14  0.366 0.366  35  2
Inlet Subcooling: Btu/lbm    -28.10                        24  0.689  19.687    16  0.344 0.535   9 12
Flow: Mlb/hr                 107.11 (104.50 %)             23  0.874  25.515    17  0.307 0.351  25 60
                                                           22  0.992  29.284    18  0.359 0.417  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  1.075  31.517    19  0.768 1.024  13 14
59              -- -- -- -- -- -- --             59        20  1.146  33.019    20  1.076 1.128  29 26
55          -- -- -- -- -- -- -- -- --           55        19  1.189  33.813    21  1.063 1.108  23 28
51       -- -- -- -- -- -- -- -- -- -- --        51        18  1.234  34.650    22  1.282 1.353  23 30
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  1.260  35.005    23  1.109 1.250   9 20
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  1.278  35.634    24  1.064 1.266   9 22
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39        15  1.291  36.607
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  1.258  36.548
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31        13  1.349* 35.062
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.337  36.005
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23        11  1.299  36.584
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.258  37.312
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15         9  1.199  38.229
11       -- -- -- -- -- -- -- -- -- -- --       11         8  1.110  38.751
 7          -- -- -- -- -- -- -- -- --          7         7  1.007  39.101
 3             -- -- -- -- -- -- --             3         6  0.919  39.949*
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  0.830  39.747
                                                           4  0.753  38.006
Control Rod Density: %          0.00                       3  0.688  34.658
                                                           2  0.545  26.436
k-effective:                 0.99990                Bottom  1  0.160   7.719
Void Fraction:                0.374
Core Delta-P: psia           25.574              % AXIAL TILT   6.099  -7.181
Core Plate Delta-P: psia     21.021          AVG BOT 8ft/12ft  0.9870  1.0420
Coolant Temp: Deg-F           546.4
In Channel Flow: Mlb/hr       94.84   Active Channel Flow: Mlb/hr        91.70
Total Bypass Flow (%):         11.5   (of total core flow)
Total Water Rod Flow (%):       2.9   (of total core flow)
Source Convergence          0.00006
```

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
1.353	22	23 30	1.690	0.852	22	23 32	7.00	0.755	50.9 20	23 12	15	7.69	0.810	57.0 20	19 12	15
1.350	22	29 28	1.694	0.850	22	31 24	6.94	0.749	51.0 20	19 12	15	7.67	0.806	56.8 20	23 12	15
1.347	22	29 24	1.698	0.848	22	31 34	6.94	0.744	50.3 20	11 24	15	7.62	0.801	57.0 20	11 20	15
1.345	22	25 28	1.703	0.845	22	25 16	6.88	0.743	50.9 20	11 20	15	7.56	0.791	56.6 20	11 24	15
1.343	22	27 30	1.706	0.844	22	29 20	7.00	0.743	49.4 20	25 14	15	7.66	0.791	55.4 20	31 10	15
1.342	22	21 28	1.706	0.844	22	39 34	7.02	0.740	48.7 20	23 16	15	7.60	0.790	56.0 20	15 16	15
1.342	22	27 26	1.706	0.844	22	25 28	6.99	0.739	49.2 20	29 10	15	7.59	0.788	56.0 20	25 14	15
1.335	22	23 26	1.707	0.844	22	25 20	6.92	0.736	49.7 20	17 14	15	7.60	0.786	55.6 20	17 14	15
1.330	22	25 20	1.707	0.843	22	33 18	6.97	0.736	49.0 20	17 18	15	7.56	0.786	56.0 21	25 10	15
1.329	22	29 20	1.708	0.843	22	33 32	7.02	0.734	48.1 20	25 18	15	7.63	0.786	55.3 20	23 16	15

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

Figure A.83 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 18,543.2 MWd/MTU

```
Cycle:                          19                      Core Average Exposure: MWd/MTU    32449.6
Exposure: MWd/MTU (GWd)     18550.5 (2556.00 )
Delta E: MWd/MTU, (GWd)         7.3 (   1.00 )                Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1046.0                    Top 25  0.256   7.121    14  0.367 0.367  35  2
Inlet Subcooling: Btu/lbm    -31.84                        24  0.677  19.692    16  0.346 0.539   9 12
Flow: Mlb/hr                 102.50 (100.00 %)             23  0.859  25.522    17  0.308 0.352  25 60
                                                           22  0.976  29.292    18  0.360 0.418  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  1.058  31.525    19  0.772 1.025  13 14
59              -- -- -- -- -- -- --             59        20  1.128  33.028    20  1.075 1.126  29 26
55          -- -- -- -- -- -- -- -- --           55        19  1.172  33.822    21  1.062 1.106  23 28
51       -- -- -- -- -- -- -- -- -- -- --        51        18  1.218  34.660    22  1.280 1.349  23 30
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  1.244  35.014    23  1.111 1.249   9 20
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  1.264  35.644    24  1.066 1.265   9 22
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39        15  1.280  36.617
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  1.250  36.557
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31        13  1.345* 35.072
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.338  36.014
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23        11  1.304  36.593
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.269  37.321
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15         9  1.214  38.237
11       -- -- -- -- -- -- -- -- -- -- --       11         8  1.129  38.758
 7          -- -- -- -- -- -- -- -- --          7         7  1.027  39.108
 3             -- -- -- -- -- -- --             3         6  0.940  39.955*
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  0.850  39.753
                                                           4  0.772  38.011
Control Rod Density: %           0.00                      3  0.706  34.662
                                                           2  0.560  26.440
k-effective:                 0.99990                Bottom  1  0.163   7.720
Void Fraction:                0.374
Core Delta-P: psia           23.792              % AXIAL TILT   4.685  -7.177
Core Plate Delta-P: psia     19.228          AVG BOT 8ft/12ft  0.9950  1.0420
Coolant Temp: Deg-F           545.5
In Channel Flow: Mlb/hr       90.73   Active Channel Flow: Mlb/hr        87.71
Total Bypass Flow (%):         11.5   (of total core flow)
Total Water Rod Flow (%):       2.9   (of total core flow)
Source Convergence          0.00010
```

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
1.349	22	23 30	1.684	0.855	22	23 32	6.93	0.748	50.9 20	23 12	15	7.62	0.803	57.0 20	19 12	15
1.346	22	29 28	1.687	0.854	22	31 24	6.88	0.743	51.0 20	19 12	15	7.60	0.798	56.8 20	23 12	15
1.343	22	29 24	1.691	0.852	22	31 34	6.87	0.737	50.4 20	11 24	15	7.54	0.794	57.0 20	11 20	15
1.341	22	25 28	1.699	0.848	22	39 34	6.82	0.736	51.0 20	11 20	15	7.59	0.784	55.4 20	31 10	15
1.339	22	21 28	1.699	0.848	22	25 28	6.93	0.735	49.4 20	25 14	15	7.48	0.784	56.6 20	11 24	15
1.339	22	27 30	1.700	0.847	22	25 16	6.92	0.733	49.2 20	29 10	15	7.53	0.783	56.0 20	15 16	15
1.338	22	27 26	1.700	0.847	22	29 20	6.95	0.732	48.7 20	23 16	15	7.51	0.781	56.0 20	25 14	15
1.332	22	23 26	1.701	0.847	22	33 32	6.86	0.730	49.7 20	17 14	15	7.53	0.779	55.6 20	17 14	15
1.326	22	25 20	1.701	0.847	22	25 20	6.90	0.729	49.0 20	17 18	15	7.49	0.779	56.0 21	25 10	15
1.326	22	29 20	1.702	0.846	22	23 26	6.89	0.727	48.9 20	13 18	15	7.49	0.778	55.9 20	17 18	15

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

Figure A.84 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 18,550.5 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    32543.9
Exposure: MWd/MTU (GWd)     18644.8 (2569.00 )
Delta E: MWd/MTU, (GWd)        94.3 (  13.00 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1046.0                    Top 25  0.260   7.147    14  0.366 0.366  35  2
Inlet Subcooling: Btu/lbm    -30.53                        24  0.688  19.761    16  0.345 0.538   9 12
Flow: Mlb/hr                 106.60 (104.00 %)             23  0.873  25.609    17  0.308 0.351  25 60
                                                           22  0.991  29.392    18  0.359 0.418  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  1.073  31.633    19  0.772 1.027  13 14
59              -- -- -- -- -- -- --             59        20  1.143  33.143    20  1.074 1.123  29 26
55          -- -- -- -- -- -- -- -- --           55        19  1.184  33.942    21  1.061 1.103  23 28
51       -- -- -- -- -- -- -- -- -- -- --        51        18  1.229  34.784    22  1.279 1.346  23 30
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  1.254  35.141    23  1.114 1.253   9 20
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  1.272  35.771    24  1.068 1.268   9 22
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39        15  1.286  36.746
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  1.255  36.683
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31        13  1.350* 35.191
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.343  36.133
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23        11  1.307  36.708
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.270  37.433
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15         9  1.211  38.345
11       -- -- -- -- -- -- -- -- -- -- --       11         8  1.121  38.858
 7          -- -- -- -- -- -- -- -- --          7         7  1.014  39.199
 3             -- -- -- -- -- -- --             3         6  0.921  40.037*
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  0.827  39.827
                                                           4  0.747  38.078
Control Rod Density: %          0.00                       3  0.681  34.724
                                                           2  0.540  26.488
k-effective:                 1.00018                Bottom  1  0.158   7.735
Void Fraction:                0.366
Core Delta-P: psia           25.200              % AXIAL TILT   5.791  -7.122
Core Plate Delta-P: psia     20.636          AVG BOT 8ft/12ft  0.9885  1.0417
Coolant Temp: Deg-F           545.6
In Channel Flow: Mlb/hr       94.45   Active Channel Flow: Mlb/hr        91.35
Total Bypass Flow (%):         11.4   (of total core flow)
Total Water Rod Flow (%):       2.9   (of total core flow)
Source Convergence          0.00007
```

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
1.346	22	23 30	1.708	0.843	22	23 32	6.97	0.753	51.1 20	23 12	15	7.68	0.810	57.2 20	19 12	15
1.343	22	29 28	1.713	0.841	22	31 24	6.92	0.749	51.1 20	19 12	15	7.65	0.805	57.0 20	23 12	15
1.340	22	29 24	1.717	0.839	22	31 34	6.91	0.742	50.5 20	11 24	15	7.60	0.801	57.1 20	11 20	15
1.337	22	25 28	1.718	0.838	22	25 16	6.86	0.742	51.1 20	11 20	15	7.65	0.791	55.6 20	31 10	15
1.336	22	21 28	1.719	0.838	22	21 12	6.96	0.739	49.5 20	25 14	15	7.53	0.790	56.7 20	11 24	15
1.336	22	27 30	1.721	0.837	22	23 10	6.96	0.738	49.3 20	29 10	15	7.58	0.790	56.2 20	15 16	15
1.334	22	27 26	1.723	0.836	22	29 20	6.98	0.736	48.9 20	23 16	15	7.59	0.787	55.8 20	17 14	15
1.328	22	23 26	1.724	0.835	22	25 20	6.90	0.735	49.8 20	17 14	15	7.55	0.787	56.2 21	25 10	15
1.324	22	25 20	1.724	0.835	22	33 18	6.93	0.733	49.1 20	17 18	15	7.56	0.786	56.1 20	25 14	15
1.323	22	29 20	1.724	0.835	22	11 22	6.93	0.733	49.1 20	13 18	15	7.53	0.783	56.1 20	17 18	15

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

Figure A.85 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 18,644.8 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    32551.2
Exposure: MWd/MTU (GWd)     18652.1 (2570.00 )
Delta E: MWd/MTU, (GWd)         7.3 (   1.00 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1044.6                    Top 25  0.256   7.149    14  0.367 0.367  35  2
Inlet Subcooling: Btu/lbm    -33.54                        24  0.678  19.766    16  0.347 0.541   9 12
Flow: Mlb/hr                 102.50 (100.00 %)             23  0.861  25.616    17  0.309 0.353  25 60
                                                           22  0.978  29.399    18  0.361 0.419  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           21  1.059  31.641    19  0.775 1.027  13 14
59              -- -- -- -- -- -- --             59       20  1.129  33.152    20  1.074 1.121  21 30
55          -- -- -- -- -- -- -- -- --           55       19  1.170  33.951    21  1.061 1.102  23 28
51       -- -- -- -- -- -- -- -- -- -- -- --     51       18  1.215  34.793    22  1.278 1.343  23 30
47    -- -- -- -- -- -- -- -- -- -- -- -- -- --  47       17  1.241  35.151    23  1.115 1.252   9 20
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43       16  1.261  35.781    24  1.070 1.266   9 22
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39       15  1.277  36.755
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35       14  1.249  36.692
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31       13  1.346* 35.200
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27       12  1.342  36.142
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23       11  1.310  36.717
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19       10  1.277  37.442
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15        9  1.222  38.353
11       -- -- -- -- -- -- -- -- -- -- --       11        8  1.135  38.866
 7          -- -- -- -- -- -- -- -- --           7        7  1.030  39.206
 3             -- -- -- -- -- -- --              3        6  0.939  40.044*
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           5  0.845  39.833
                                                           4  0.765  38.083
Control Rod Density: %           0.00                      3  0.699  34.728
                                                           2  0.554  26.492
k-effective:                  0.99997                Bottom  1  0.162   7.736
Void Fraction:                 0.367
Core Delta-P: psia            23.659              % AXIAL TILT   4.628  -7.118
Core Plate Delta-P: psia      19.087          AVG BOT 8ft/12ft  0.9950  1.0417
Coolant Temp: Deg-F            544.9
In Channel Flow: Mlb/hr         90.78   Active Channel Flow: Mlb/hr        87.79
Total Bypass Flow (%):          11.4   (of total core flow)
Total Water Rod Flow (%):        2.9   (of total core flow)
Source Convergence           0.00009
```

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
1.343	22	23 30	1.701	0.847	22	23 32	6.91	0.747	51.1 20	23 12	15	7.62	0.804	57.2 20	19 12	15
1.340	22	29 28	1.703	0.845	22	31 24	6.87	0.743	51.1 20	19 12	15	7.59	0.798	57.0 20	23 12	15
1.337	22	29 24	1.707	0.844	22	31 34	6.81	0.736	51.1 20	11 20	15	7.54	0.795	57.1 20	11 20	15
1.334	22	25 28	1.712	0.841	22	25 16	6.85	0.736	50.5 20	11 24	15	7.59	0.785	55.6 20	31 10	15
1.334	22	21 28	1.715	0.840	22	39 34	6.90	0.733	49.5 20	25 14	15	7.52	0.784	56.2 20	15 16	15
1.333	22	27 30	1.715	0.840	22	21 12	6.91	0.732	49.3 20	29 10	15	7.47	0.783	56.8 20	11 24	15
1.331	22	27 26	1.715	0.839	22	29 20	6.85	0.730	49.8 20	17 14	15	7.53	0.781	55.8 20	17 14	15
1.326	22	23 26	1.716	0.839	22	25 28	6.91	0.729	48.9 20	23 16	15	7.49	0.780	56.2 21	25 10	15
1.321	22	25 20	1.716	0.839	22	25 20	6.87	0.727	49.2 20	17 18	15	7.49	0.780	56.1 20	25 14	15
1.320	22	27 18	1.716	0.839	22	33 18	6.88	0.727	49.1 20	13 18	15	7.47	0.777	56.1 20	17 18	15

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

Figure A.86 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 18,652.1 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    32725.4
Exposure: MWd/MTU (GWd)     18826.3 (2594.00 )
Delta E: MWd/MTU, (GWd)       174.2 (  24.00 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3952.0 (100.00 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1044.6                    Top 25  0.263   7.197    14  0.367 0.367  35  2
Inlet Subcooling: Btu/lbm    -31.83                        24  0.697  19.894    16  0.347 0.540   9 12
Flow: Mlb/hr                 107.62 (105.00 %)             23  0.884  25.778    17  0.308 0.352  25 60
                                                           22  1.003  29.585    18  0.360 0.419  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  1.084  31.842    19  0.776 1.030  13 14
59              -- -- -- -- -- -- --             59        20  1.152  33.365    20  1.072 1.117  21 30
55          -- -- -- -- -- -- -- -- --           55        19  1.190  34.172    21  1.059 1.098  23 28
51       -- -- -- -- -- -- -- -- -- -- --        51        18  1.232  35.022    22  1.276 1.339  23 30
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  1.254  35.385    23  1.119 1.257   9 20
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  1.271  36.015    24  1.073 1.270   9 22
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39        15  1.285  36.992
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  1.254  36.924
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31        13  1.352* 35.421
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.346  36.362
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23        11  1.312  36.932
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.274  37.651
15    -- -- -- -- -- -- -- -- -- -- -- -- --     15         9  1.214  38.552
11       -- -- -- -- -- -- -- -- -- -- --        11         8  1.120  39.050
 7          -- -- -- -- -- -- -- -- --           7         7  1.008  39.372
 3             -- -- -- -- -- -- --              3         6  0.910  40.195*
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  0.813  39.968
                                                           4  0.732  38.206
Control Rod Density: %           0.00                      3  0.667  34.840
                                                           2  0.529  26.581
k-effective:                  0.99988                Bottom  1  0.155   7.763
Void Fraction:                 0.356
Core Delta-P: psia            25.409              % AXIAL TILT   6.289  -7.018
Core Plate Delta-P: psia      20.837          AVG BOT 8ft/12ft  0.9849  1.0412
Coolant Temp: Deg-F           545.0
In Channel Flow: Mlb/hr        95.44   Active Channel Flow: Mlb/hr        92.35
Total Bypass Flow (%):         11.3    (of total core flow)
Total Water Rod Flow (%):       2.9    (of total core flow)
Source Convergence           0.00009
```

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
1.339	22	23 30	1.723	0.836	22	23 10	6.96	0.754	51.3 20	23 12	15	7.69	0.814	57.5 20	19 12	15
1.336	22	29 28	1.724	0.835	22	21 12	6.92	0.751	51.4 20	19 12	15	7.63	0.807	57.4 20	23 12	15
1.332	22	29 24	1.731	0.832	22	11 22	6.86	0.744	51.4 20	11 20	15	7.61	0.805	57.4 20	11 20	15
1.330	22	25 28	1.731	0.832	22	23 32	6.90	0.743	50.8 20	11 24	15	7.65	0.794	55.9 20	31 10	15
1.329	22	21 28	1.732	0.831	22	9 24	6.95	0.739	49.6 20	29 10	15	7.58	0.793	56.5 20	15 16	15
1.328	22	27 30	1.733	0.831	22	25 16	6.93	0.739	49.8 20	25 14	15	7.52	0.792	57.0 20	11 24	15
1.326	22	27 26	1.734	0.830	22	31 24	6.89	0.737	50.1 20	17 14	15	7.60	0.791	56.1 20	17 14	15
1.321	22	23 26	1.738	0.828	22	31 34	6.94	0.735	49.1 20	23 16	15	7.56	0.790	56.5 21	25 10	15
1.317	22	25 20	1.739	0.828	22	23 14	6.93	0.734	49.3 20	13 18	15	7.54	0.788	56.4 20	25 14	15
1.317	22	27 18	1.743	0.826	22	21 16	6.88	0.733	49.9 20	15 16	15	7.59	0.786	55.7 20	13 18	15

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

Figure A.87 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 18,826.3 MWd/MTU

```
Cycle:                          19                      Core Average Exposure: MWd/MTU    32805.3
Exposure: MWd/MTU (GWd)     18906.1 (2605.00 )
Delta E: MWd/MTU, (GWd)        79.8 (  11.00 )                 Axial Profile    Edit   Radial Power
Power: MWt                   3888.8 ( 98.40 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1043.4                    Top 25  0.265   7.220    14  0.367 0.367  35  2
Inlet Subcooling: Btu/lbm    -31.26                        24  0.705  19.954    16  0.347 0.540   9 12
Flow: Mlb/hr                 107.62 (105.00 %)             23  0.894  25.854    17  0.309 0.352  25 60
                                                           22  1.014  29.671    18  0.360 0.419  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           21  1.095  31.935    19  0.777 1.032  13 14
59              -- -- -- -- -- -- --             59        20  1.162  33.465    20  1.071 1.115  21 30
55          -- -- -- -- -- -- -- -- --           55        19  1.199  34.275    21  1.058 1.096  23 28
51       -- -- -- -- -- -- -- -- -- -- --        51        18  1.239  35.129    22  1.276 1.337  23 30
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  1.260  35.493    23  1.122 1.259   9 20
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  1.275  36.122    24  1.074 1.272   9 22
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39        15  1.288  37.101
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  1.256  37.030
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31        13  1.354* 35.522
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.348  36.463
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23        11  1.312  37.030
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.273  37.746
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15         9  1.210  38.643
11       -- -- -- -- -- -- -- -- -- -- --       11         8  1.113  39.134
 7          -- -- -- -- -- -- -- -- --          7         7  0.998  39.448
 3              -- -- -- -- -- -- --            3         6  0.898  40.263*
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           5  0.799  40.029
                                                           4  0.718  38.260
Control Rod Density: %           0.00                      3  0.654  34.890
                                                           2  0.519  26.620
k-effective:                 0.99999                Bottom  1  0.152   7.775
Void Fraction:                0.352
Core Delta-P: psia           25.315              % AXIAL TILT   7.027  -6.969
Core Plate Delta-P: psia     20.745          AVG BOT 8ft/12ft  0.9804  1.0410
Coolant Temp: Deg-F           544.9
In Channel Flow: Mlb/hr       95.50   Active Channel Flow: Mlb/hr        92.42
Total Bypass Flow (%):         11.3   (of total core flow)
Total Water Rod Flow (%):       2.9   (of total core flow)
Source Convergence          0.00010
```

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
1.337	22	23 30	1.744	0.826	22	23 10	6.86	0.745	51.5 20	23 12	15	7.59	0.805	57.6 20	19 12	15
1.334	22	29 28	1.745	0.825	22	21 12	6.83	0.742	51.5 20	19 12	15	7.53	0.798	57.5 20	23 12	15
1.331	22	29 24	1.753	0.822	22	11 22	6.77	0.735	51.5 20	11 20	15	7.51	0.796	57.5 20	11 20	15
1.328	22	25 28	1.754	0.821	22	9 24	6.80	0.733	50.9 20	11 24	15	7.55	0.785	56.0 20	31 10	15
1.327	22	21 28	1.759	0.819	22	25 16	6.86	0.730	49.7 20	29 10	15	7.48	0.783	56.6 20	15 16	15
1.326	22	27 30	1.761	0.818	22	23 32	6.84	0.729	49.9 20	25 14	15	7.42	0.783	57.2 20	11 24	15
1.324	22	27 26	1.762	0.817	22	31 24	6.80	0.728	50.2 20	17 14	15	7.50	0.782	56.2 20	17 14	15
1.319	22	23 26	1.763	0.817	22	23 14	6.83	0.725	49.5 20	13 18	15	7.47	0.782	56.6 21	25 10	15
1.315	22	25 20	1.766	0.815	22	31 34	6.85	0.725	49.3 20	23 16	15	7.44	0.778	56.5 20	25 14	15
1.315	22	27 18	1.768	0.815	22	21 16	6.78	0.724	50.0 20	15 16	15	7.50	0.777	55.8 20	13 18	15

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

Figure A.88 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 18,906.1 MWd/MTU

```
Cycle:                          19                      Core Average Exposure: MWd/MTU    32932.9
Exposure: MWd/MTU (GWd)     19033.7 (2622.60 )
Delta E: MWd/MTU, (GWd)       127.6 (  17.58 )                 Axial Profile    Edit   Radial Power
Power: MWt                   3782.1 ( 95.70 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1041.4                    Top 25  0.270   7.256    14  0.368 0.368  35  2
Inlet Subcooling: Btu/lbm    -30.29                        24  0.719  20.051    16  0.347 0.540   9 12
Flow: Mlb/hr                 107.62 (105.00 %)             23  0.912  25.977    17  0.309 0.352  25 60
                                                           22  1.034  29.812    18  0.361 0.420  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  1.114  32.087    19  0.778 1.034  13 14
59              -- -- -- -- -- -- --             59        20  1.179  33.625    20  1.070 1.112  21 30
55          -- -- -- -- -- -- -- -- --           55        19  1.213  34.440    21  1.056 1.093  23 28
51       -- -- -- -- -- -- -- -- -- -- --        51        18  1.251  35.299    22  1.275 1.334  23 30
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  1.269  35.666    23  1.125 1.262   9 20
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  1.282  36.296    24  1.077 1.275   9 22
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39        15  1.293  37.276
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  1.259  37.200
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31        13  1.356* 35.685
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.349  36.624
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23        11  1.311  37.187
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.268  37.898
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15         9  1.202  38.788
11       -- -- -- -- -- -- -- -- -- -- --       11         8  1.100  39.266
 7          -- -- -- -- -- -- -- -- --          7         7  0.981  39.566
 3             -- -- -- -- -- -- --             3         6  0.878  40.369*
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  0.778  40.123
                                                           4  0.697  38.345
Control Rod Density: %         0.00                        3  0.634  34.967
                                                           2  0.504  26.681
k-effective:                1.00012                Bottom  1  0.147   7.794
Void Fraction:               0.345
Core Delta-P: psia          25.158              % AXIAL TILT   8.241  -6.888
Core Plate Delta-P: psia    20.590          AVG BOT 8ft/12ft  0.9727  1.0406
Coolant Temp: Deg-F          544.8
In Channel Flow: Mlb/hr      95.58   Active Channel Flow: Mlb/hr        92.54
Total Bypass Flow (%):        11.2   (of total core flow)
Total Water Rod Flow (%):      2.8   (of total core flow)
Source Convergence         0.00009
```

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
1.334	22	23 30	1.781	0.809	22	23 10	6.70	0.729	51.7 20	23 12	15	7.42	0.789	57.8 20	19 12	15
1.331	22	29 28	1.783	0.808	22	21 12	6.68	0.727	51.7 20	19 12	15	7.35	0.782	57.8 20	23 12	15
1.327	22	29 24	1.792	0.804	22	9 24	6.62	0.720	51.7 20	11 20	15	7.34	0.780	57.7 20	11 20	15
1.324	22	25 28	1.792	0.803	22	11 22	6.64	0.717	51.1 20	11 24	15	7.38	0.769	56.2 20	31 10	15
1.324	22	21 28	1.805	0.798	22	25 16	6.70	0.714	49.9 20	29 10	15	7.31	0.767	56.8 20	15 16	15
1.323	22	27 30	1.807	0.797	22	23 14	6.66	0.712	50.1 20	25 14	15	7.34	0.767	56.4 20	17 14	15
1.321	22	27 26	1.809	0.796	22	33 10	6.64	0.712	50.4 20	17 14	15	7.30	0.766	56.8 21	25 10	15
1.316	22	23 26	1.810	0.795	22	23 32	6.67	0.710	49.6 20	13 18	15	7.25	0.766	57.4 20	11 24	15
1.312	22	27 18	1.812	0.795	22	31 24	6.62	0.709	50.2 20	15 16	15	7.33	0.762	56.0 20	13 18	15
1.312	22	25 20	1.813	0.794	22	21 16	6.67	0.708	49.5 20	23 16	15	7.26	0.762	56.7 20	25 14	15

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

Figure A.89 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 19,033.7 MWd/MTU

```
Cycle:                          19                          Core Average Exposure: MWd/MTU    33400.4
Exposure: MWd/MTU (GWd)     19501.2 (2687.00 )
Delta E: MWd/MTU, (GWd)       467.5 (  64.42 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3414.5 ( 86.40 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1034.2                    Top 25  0.289   7.396    14  0.368 0.368  35  2
Inlet Subcooling: Btu/lbm    -26.98                        24  0.775  20.424    16  0.347 0.541   9 12
Flow: Mlb/hr                 107.62 (105.00 %)             23  0.982  26.450    17  0.309 0.353  25 60
                                                           22  1.108  30.350    18  0.361 0.421  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  1.184  32.664    19  0.783 1.042  13 14
59              -- -- -- -- -- -- --             59        20  1.243  34.234    20  1.065 1.100  29 26
55          -- -- -- -- -- -- -- -- --           55        19  1.265  35.063    21  1.051 1.081  23 28
51       -- -- -- -- -- -- -- -- -- -- --        51        18  1.293  35.939    22  1.271 1.322  23 30
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  1.300  36.312    23  1.138 1.275   9 20
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  1.301  36.936    24  1.086 1.284   9 22
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39        15  1.305  37.920
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  1.264  37.826
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31        13  1.360* 36.281
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.348  37.216
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23        11  1.301  37.760
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.246  38.450
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15         9  1.165  39.308
11       -- -- -- -- -- -- -- -- -- -- --       11         8  1.049  39.738
 7          -- -- -- -- -- -- -- -- --          7         7  0.918  39.983
 3             -- -- -- -- -- -- --             3         6  0.808  40.739*
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  0.707  40.449
                                                           4  0.629  38.636
Control Rod Density: %         0.00                        3  0.572  35.231
                                                           2  0.456  26.892
k-effective:                0.99996                Bottom  1  0.134   7.859
Void Fraction:               0.321
Core Delta-P: psia          24.627              % AXIAL TILT  12.589  -6.557
Core Plate Delta-P: psia    20.068          AVG BOT 8ft/12ft  0.9446  1.0390
Coolant Temp: Deg-F          544.2
In Channel Flow: Mlb/hr      95.89   Active Channel Flow: Mlb/hr        92.95
Total Bypass Flow (%):        10.9   (of total core flow)
Total Water Rod Flow (%):      2.7   (of total core flow)
Source Convergence         0.00010
```

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
1.322	22	23 30	1.927	0.747	22	23 10	6.28	0.670	50.0 20	19 12	17	6.81	0.731	58.6 20	19 12	15
1.319	22	29 28	1.935	0.744	22	21 12	6.11	0.669	52.4 20	23 12	15	6.74	0.723	58.5 20	11 20	15
1.315	22	29 24	1.944	0.741	22	9 24	6.05	0.664	52.4 20	11 20	15	6.72	0.721	58.5 20	23 12	15
1.311	22	21 28	1.948	0.739	22	11 22	6.31	0.659	48.0 20	29 10	17	6.76	0.711	57.0 20	31 10	15
1.311	22	25 28	1.967	0.732	22	33 10	6.05	0.659	51.8 20	11 24	15	6.70	0.710	57.6 21	25 10	15
1.310	22	27 30	1.978	0.728	22	25 12	6.20	0.657	49.3 20	17 14	17	6.73	0.710	57.2 20	17 14	15
1.308	22	27 26	1.980	0.727	22	29 12	6.21	0.653	48.7 20	13 18	17	6.68	0.708	57.5 20	15 16	15
1.302	22	23 26	1.981	0.727	23	41 10	6.05	0.652	50.8 20	25 14	15	6.84	0.708	55.6 20	21 8	15
1.302	22	27 18	1.981	0.727	22	23 14	6.15	0.652	49.4 20	15 16	17	6.62	0.707	58.1 20	11 24	15
1.301	22	11 22	1.987	0.725	22	25 16	6.05	0.647	50.2 20	23 16	15	6.73	0.706	56.7 20	13 18	15

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

Figure A.90 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 19,501.2 MWd/MTU

```
Cycle:                          19                      Core Average Exposure: MWd/MTU    33535.2
Exposure: MWd/MTU (GWd)     19636.0 (2705.60 )
Delta E: MWd/MTU, (GWd)       134.8 (  18.57 )                Axial Profile    Edit   Radial Power
Power: MWt                   3351.3 ( 84.80 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1033.0                    Top 25  0.293   7.438    14  0.369 0.369  35  2
Inlet Subcooling: Btu/lbm    -26.42                        24  0.785  20.537    16  0.348 0.541   9 12
Flow: Mlb/hr                 107.62 (105.00 %)             23  0.995  26.593    17  0.310 0.353  25 60
                                                           22  1.123  30.511    18  0.362 0.421  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           21  1.198  32.836    19  0.784 1.044  13 14
59              -- -- -- -- -- -- --             59       20  1.254  34.415    20  1.064 1.098  29 26
55          -- -- -- -- -- -- -- -- --           55       19  1.274  35.247    21  1.049 1.078  23 28
51       -- -- -- -- -- -- -- -- -- -- --        51       18  1.299  36.127    22  1.270 1.319  23 30
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47       17  1.303  36.501    23  1.141 1.278  19 10
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43       16  1.302  37.122    24  1.088 1.286   9 22
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39       15  1.304  38.107
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35       14  1.262  38.007
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31       13  1.358* 36.453
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27       12  1.345  37.387
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23       11  1.296  37.925
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19       10  1.240  38.608
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15        9  1.157  39.455
11       -- -- -- -- -- -- -- -- -- -- --       11        8  1.039  39.870
 7          -- -- -- -- -- -- -- -- --          7        7  0.908  40.099
 3             -- -- -- -- -- -- --             3        6  0.798  40.841*
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58           5  0.698  40.538
                                                           4  0.620  38.715
Control Rod Density: %         0.00                      3  0.564  35.303
                                                         2  0.451  26.949
k-effective:                1.00014                Bottom  1  0.132   7.877
Void Fraction:               0.317
Core Delta-P: psia          24.539              % AXIAL TILT  13.296  -6.453
Core Plate Delta-P: psia    19.981          AVG BOT 8ft/12ft  0.9396  1.0385
Coolant Temp: Deg-F          544.2
In Channel Flow: Mlb/hr      95.94   Active Channel Flow: Mlb/hr        93.02
Total Bypass Flow (%):        10.9   (of total core flow)
Total Water Rod Flow (%):      2.7   (of total core flow)
Source Convergence         0.00008
```

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
1.319	22	23 30	1.954	0.737	22	23 10	6.19	0.662	50.2 20	19 12	17	6.68	0.719	58.8 20	19 12	15
1.317	22	29 28	1.964	0.733	22	21 12	6.17	0.660	50.1 20	23 12	17	6.61	0.712	58.7 20	11 20	15
1.312	22	29 24	1.973	0.730	22	9 24	5.94	0.653	52.6 20	11 20	15	6.59	0.709	58.7 20	23 12	15
1.309	22	21 28	1.978	0.728	22	11 22	6.21	0.650	48.3 20	29 10	17	6.88	0.699	54.3 20	31 10	17
1.308	22	25 28	1.998	0.721	22	33 10	6.16	0.648	48.7 20	17 14	18	6.80	0.699	55.1 21	25 10	17
1.308	22	27 30	2.007	0.717	23	41 10	5.94	0.648	52.0 20	11 24	15	6.60	0.699	57.4 20	17 14	15
1.305	22	27 26	2.009	0.717	22	25 12	6.11	0.644	48.9 20	13 18	17	6.73	0.698	55.8 20	21 8	15
1.301	22	11 22	2.013	0.715	22	29 12	6.10	0.643	48.8 20	15 16	18	6.55	0.696	57.8 20	15 16	15
1.300	22	21 12	2.015	0.715	22	23 14	5.93	0.640	51.0 20	25 14	15	6.48	0.695	58.5 20	11 24	15
1.300	22	23 10	2.016	0.714	22	17 50	5.93	0.636	50.4 20	23 16	15	6.60	0.695	57.0 20	13 18	15

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

Figure A.91 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 19,636.0 MWd/MTU

```
Cycle:                          19                      Core Average Exposure: MWd/MTU    34137.4
Exposure: MWd/MTU (GWd)     20238.3 (2788.60 )
Delta E: MWd/MTU, (GWd)       602.3 (  82.99 )                  Axial Profile    Edit   Radial Power
Power: MWt                   2802.0 ( 70.90 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1022.4                    Top 25  0.323   7.637    14  0.369 0.369  35  2
Inlet Subcooling: Btu/lbm    -21.53                        24  0.878  21.072    16  0.348 0.541   9 12
Flow: Mlb/hr                 107.62 (105.00 %)             23  1.112  27.270    17  0.310 0.353  25 60
                                                           22  1.247  31.278    18  0.362 0.423  29 60
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  1.314  33.649    19  0.791 1.057  13 14
59              -- -- -- -- -- -- --             59        20  1.358  35.260    20  1.057 1.085  23 12
55          -- -- -- -- -- -- -- -- --           55        19  1.357  36.100    21  1.040 1.068  25 10
51       -- -- -- -- -- -- -- -- -- -- --        51        18  1.365* 36.990    22  1.264 1.317  23 10
47    -- -- -- -- -- -- -- -- -- -- -- -- --     47        17  1.350  37.360    23  1.161 1.301  19 10
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  1.330  37.964    24  1.102 1.303   9 22
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39        15  1.318  38.945
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  1.265  38.815
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31        13  1.357  37.220
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.335  38.144
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23        11  1.268  38.650
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.190  39.295
15    -- -- -- -- -- -- -- -- -- -- -- -- --    15         9  1.085  40.089
11       -- -- -- -- -- -- -- -- -- -- --       11         8  0.949  40.433
 7          -- -- -- -- -- -- -- -- --           7         7  0.807  40.584
 3             -- -- -- -- -- -- --              3         6  0.693  41.263*
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  0.597  40.904
                                                           4  0.526  39.039
Control Rod Density: %           0.00                      3  0.478  35.598
                                                           2  0.384  27.185
k-effective:                  1.00042                Bottom  1  0.113   7.950
Void Fraction:                 0.279
Core Delta-P: psia            23.786          % AXIAL TILT  20.268  -5.931
Core Plate Delta-P: psia      19.240       AVG BOT 8ft/12ft  0.8933  1.0358
Coolant Temp: Deg-F            543.4
In Channel Flow: Mlb/hr         96.40   Active Channel Flow: Mlb/hr        93.64
Total Bypass Flow (%):          10.4   (of total core flow)
Total Water Rod Flow (%):        2.6   (of total core flow)
Source Convergence           0.00010
```

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
1.317	22	23 10	2.261	0.637	22	23 10	5.54	0.592	50.0 20	19 12	18	6.19	0.642	55.9 20	19 12	18
1.312	22	9 24	2.280	0.632	22	21 12	5.49	0.586	50.0 20	23 12	18	6.13	0.629	54.9 21	25 10	18
1.311	22	21 12	2.288	0.629	22	9 24	5.43	0.580	50.2 20	11 20	18	6.05	0.628	55.9 20	23 12	18
1.310	22	11 22	2.302	0.626	22	11 22	5.44	0.579	49.7 20	17 14	18	6.09	0.628	55.4 20	17 14	18
1.303	24	9 22	2.309	0.624	23	41 10	5.52	0.578	48.3 20	29 10	18	6.04	0.628	56.0 20	11 20	18
1.302	24	21 10	2.321	0.620	22	17 12	5.38	0.573	49.7 20	13 18	18	6.17	0.626	54.0 20	31 10	18
1.301	23	19 10	2.324	0.619	23	9 42	5.38	0.572	49.7 20	15 16	18	6.32	0.624	51.8 20	21 8	18
1.299	22	23 30	2.328	0.619	22	33 10	6.74	0.570	26.3 22	23 10	18	6.01	0.621	55.4 20	13 18	18
1.299	23	9 20	2.336	0.616	22	11 18	5.29	0.567	50.3 20	11 24	18	5.97	0.619	55.8 20	15 16	18
1.296	22	29 28	2.352	0.612	22	25 12	6.66	0.567	27.0 22	21 12	18	5.98	0.610	54.6 20	9 32	18

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

Figure A.92 Browns Ferry Unit 3 Cycle 19 Control Rod Pattern and Axial Distributions at 20,238.3 MWd/MTU

Appendix B Elevation Views of the Browns Ferry Unit 3 Cycle 19 Fresh Reload Batch Fuel Assemblies

[

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Figure B.1 Elevation View for the Browns Ferry Unit 3 Cycle 19 Fresh Fuel Reload Batch BFE ATRIUM 10XM [ ] CGU Fuel Assembly Design

[

]

Figure B.2 Elevation View for the Browns Ferry Unit 3 Cycle 19 Fresh Fuel Reload Batch BFE ATRIUM 10XM [ ] BLEU Fuel Assembly Design

[

]

Figure B.3 Elevation View for the Browns Ferry Unit 3 Cycle 19 Fresh Fuel Reload Batch BFE ATRIUM 10XM [ ] CGU Fuel Assembly Design

Appendix C Browns Ferry Unit 3 Cycle 19 Fresh Fuel Locations

Table C.1 Browns Ferry Unit 3 Cycle 19 Reload Fuel Identification and Locations (Core Coordinates)

Assembly Type: ATRIUM 10XM
Bundle Description: [ ]
Number Loaded: 224

Fuel ID	Core Coord.	Fuel ID	Core Coord.	Fuel ID	Core Coord.	Fuel ID	Core Coord.
FCH001	13-38	FCH039	27-18	FCH077	33-30	FCH115	33-40
FCH002	23-48	FCH040	17-28	FCH078	31-28	FCH116	39-34
FCH003	37-48	FCH041	5-34	FCH079	29-28	FCH117	39-28
FCH004	47-38	FCH042	27-56	FCH080	27-30	FCH118	33-22
FCH005	47-24	FCH043	33-56	FCH081	21-38	FCH119	27-22
FCH006	37-14	FCH044	55-34	FCH082	23-40	FCH120	21-28
FCH007	23-14	FCH045	55-28	FCH083	37-40	FCH121	17-42
FCH008	13-24	FCH046	33- 6	FCH084	39-38	FCH122	19-44
FCH009	13-34	FCH047	27- 6	FCH085	39-24	FCH123	41-44
FCH010	27-48	FCH048	5-28	FCH086	37-22	FCH124	43-42
FCH011	33-48	FCH049	17-38	FCH087	23-22	FCH125	43-20
FCH012	47-34	FCH050	23-44	FCH088	21-24	FCH126	41-18
FCH013	47-28	FCH051	37-44	FCH089	13-46	FCH127	19-18
FCH014	33-14	FCH052	43-38	FCH090	15-48	FCH128	17-20
FCH015	27-14	FCH053	43-24	FCH091	45-48	FCH129	11-36
FCH016	13-28	FCH054	37-18	FCH092	47-46	FCH130	25-50
FCH017	15-44	FCH055	23-18	FCH093	47-16	FCH131	35-50
FCH018	17-46	FCH056	17-24	FCH094	45-14	FCH132	49-36
FCH019	43-46	FCH057	11-40	FCH095	15-14	FCH133	49-26
FCH020	45-44	FCH058	21-50	FCH096	13-16	FCH134	35-12
FCH021	45-18	FCH059	39-50	FCH097	13-42	FCH135	25-12
FCH022	43-16	FCH060	49-40	FCH098	19-48	FCH136	11-26
FCH023	17-16	FCH061	49-22	FCH099	41-48	FCH137	25-34
FCH024	15-18	FCH062	39-12	FCH100	47-42	FCH138	27-36
FCH025	9-34	FCH063	21-12	FCH101	47-20	FCH139	33-36
FCH026	27-52	FCH064	11-22	FCH102	41-14	FCH140	35-34
FCH027	33-52	FCH065	15-40	FCH103	19-14	FCH141	35-28
FCH028	51-34	FCH066	21-46	FCH104	13-20	FCH142	33-26
FCH029	51-28	FCH067	39-46	FCH105	15-36	FCH143	27-26
FCH030	33-10	FCH068	45-40	FCH106	25-46	FCH144	25-28
FCH031	27-10	FCH069	45-22	FCH107	35-46	FCH145	19-40
FCH032	9-28	FCH070	39-16	FCH108	45-36	FCH146	21-42
FCH033	17-34	FCH071	21-16	FCH109	45-26	FCH147	39-42
FCH034	27-44	FCH072	15-22	FCH110	35-16	FCH148	41-40
FCH035	33-44	FCH073	27-32	FCH111	25-16	FCH149	41-22
FCH036	43-34	FCH074	29-34	FCH112	15-26	FCH150	39-20
FCH037	43-28	FCH075	31-34	FCH113	21-34	FCH151	21-20
FCH038	33-18	FCH076	33-32	FCH114	27-40	FCH152	19-22

and Locations (Core Coordinates) *(Continued)*

Assembly Type: ATRIUM 10XM
Bundle Description: [ ]
Number Loaded: 224

Fuel ID	Core Coord.	Fuel ID	Core Coord.	Fuel ID	Core Coord.	Fuel ID	Core Coord.
FCH153	23-36	FCH171	31-50	FCH189	51-24	FCH207	29-20
FCH154	25-38	FCH172	49-32	FCH190	37-10	FCH208	19-30
FCH155	35-38	FCH173	49-30	FCH191	23-10	FCH209	7-32
FCH156	37-36	FCH174	31-12	FCH192	9-24	FCH210	29-54
FCH157	37-26	FCH175	29-12	FCH193	15-32	FCH211	31-54
FCH158	35-24	FCH176	11-30	FCH194	29-46	FCH212	53-32
FCH159	25-24	FCH177	11-44	FCH195	31-46	FCH213	53-30
FCH160	23-26	FCH178	17-50	FCH196	45-32	FCH214	31- 8
FCH161	19-36	FCH179	43-50	FCH197	45-30	FCH215	29- 8
FCH162	25-42	FCH180	49-44	FCH198	31-16	FCH216	7-30
FCH163	35-42	FCH181	49-18	FCH199	29-16	FCH217	23-32
FCH164	41-36	FCH182	43-12	FCH200	15-30	FCH218	29-38
FCH165	41-26	FCH183	17-12	FCH201	19-32	FCH219	31-38
FCH166	35-20	FCH184	11-18	FCH202	29-42	FCH220	37-32
FCH167	25-20	FCH185	9-38	FCH203	31-42	FCH221	37-30
FCH168	19-26	FCH186	23-52	FCH204	41-32	FCH222	31-24
FCH169	11-32	FCH187	37-52	FCH205	41-30	FCH223	29-24
FCH170	29-50	FCH188	51-38	FCH206	31-20	FCH224	23-30

Table C.1 Browns Ferry Unit 3 Cycle 19 Reload Fuel Identification and Locations (Core Coordinates) *(Continued)*

Assembly Type: ATRIUM 10XM
Bundle Description: [ ]
Number Loaded: 96

Fuel ID	Core Coord.	Fuel ID	Core Coord.	Fuel ID	Core Coord.	Fuel ID	Core Coord.
FCH301	9-42	FCH325	7-42	FCH349	11-48	FCH373	7-36
FCH302	19-52	FCH326	19-54	FCH350	13-50	FCH374	25-54
FCH303	41-52	FCH327	41-54	FCH351	47-50	FCH375	35-54
FCH304	51-42	FCH328	53-42	FCH352	49-48	FCH376	53-36
FCH305	51-20	FCH329	53-20	FCH353	49-14	FCH377	53-26
FCH306	41-10	FCH330	41- 8	FCH354	47-12	FCH378	35- 8
FCH307	19-10	FCH331	19- 8	FCH355	13-12	FCH379	25- 8
FCH308	9-20	FCH332	7-20	FCH356	11-14	FCH380	7-26
FCH309	7-46	FCH333	5-38	FCH357	7-38	FCH381	5-42
FCH310	15-54	FCH334	23-56	FCH358	23-54	FCH382	19-56
FCH311	45-54	FCH335	37-56	FCH359	37-54	FCH383	41-56
FCH312	53-46	FCH336	55-38	FCH360	53-38	FCH384	55-42
FCH313	53-16	FCH337	55-24	FCH361	53-24	FCH385	55-20
FCH314	45- 8	FCH338	37- 6	FCH362	37- 8	FCH386	41- 6
FCH315	15- 8	FCH339	23- 6	FCH363	23- 8	FCH387	19- 6
FCH316	7-16	FCH340	5-24	FCH364	7-24	FCH388	5-20
FCH317	5-44	FCH341	5-40	FCH365	11-46	FCH389	7-34
FCH318	17-56	FCH342	21-56	FCH366	15-50	FCH390	27-54
FCH319	43-56	FCH343	39-56	FCH367	45-50	FCH391	33-54
FCH320	55-44	FCH344	55-40	FCH368	49-46	FCH392	53-34
FCH321	55-18	FCH345	55-22	FCH369	49-16	FCH393	53-28
FCH322	43- 6	FCH346	39- 6	FCH370	45-12	FCH394	33- 8
FCH323	17- 6	FCH347	21- 6	FCH371	15-12	FCH395	27- 8
FCH324	5-18	FCH348	5-22	FCH372	11-16	FCH396	7-28

Table C.1 Browns Ferry Unit 3 Cycle 19 Reload Fuel Identification and Locations (Core Coordinates) *(Continued)*

Assembly Type: ATRIUM 10XM
Bundle Description: [ ]
Number Loaded: 32

Fuel ID	Core Coord.	Fuel ID	Core Coord.	Fuel ID	Core Coord.	Fuel ID	Core Coord.
FCH501	3-32	FCH509	9-48	FCH517	9-44	FCH525	9-40
FCH502	29-58	FCH510	13-52	FCH518	17-52	FCH526	21-52
FCH503	31-58	FCH511	47-52	FCH519	43-52	FCH527	39-52
FCH504	57-32	FCH512	51-48	FCH520	51-44	FCH528	51-40
FCH505	57-30	FCH513	51-14	FCH521	51-18	FCH529	51-22
FCH506	31- 4	FCH514	47-10	FCH522	43-10	FCH530	39-10
FCH507	29- 4	FCH515	13-10	FCH523	17-10	FCH531	21-10
FCH508	3-30	FCH516	9-14	FCH524	9-18	FCH532	9-22

Appendix D Browns Ferry Unit 3 Cycle 19 Radial Exposure and Power Distributions

	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29
60									41.091	38.140	36.897	35.882	36.045	35.254	31.869
58								41.212	34.051	17.932	17.221	21.392	21.368	20.290	0.000
56						41.035	37.885	21.470	0.000	0.000	0.000	0.000	17.841	0.000	20.872
54						37.875	22.085	0.000	22.020	0.000	23.092	0.000	0.000	0.000	0.000
52					39.462	31.776	0.000	21.972	0.000	0.000	0.000	0.000	23.731	0.000	23.180
50			40.353	37.684	32.377	19.614	0.000	0.000	0.000	23.972	0.000	24.000	0.000	23.267	0.000
48			37.227	21.903	0.000	0.000	19.613	0.000	22.359	0.000	24.066	0.000	22.875	0.000	22.346
46		41.574	21.400	0.000	21.894	0.000	0.000	21.904	0.000	22.748	0.000	22.798	0.000	21.926	0.000
44	41.043	34.323	0.000	21.921	0.000	0.000	21.767	0.000	22.041	0.000	23.028	0.000	22.645	0.000	22.052
42	38.765	17.816	0.000	0.000	0.000	24.047	0.000	21.901	0.000	23.847	0.000	20.208	0.000	23.290	0.000
40	37.442	17.167	0.000	23.052	0.000	0.000	23.958	0.000	21.004	0.000	20.863	0.000	22.768	0.000	22.652
38	36.076	21.287	0.000	0.000	0.000	23.972	0.000	22.622	0.000	20.248	0.000	22.690	0.000	23.365	0.000
36	36.878	21.342	18.032	0.000	23.445	0.000	23.202	0.000	22.172	0.000	22.573	0.000	22.803	0.000	23.550
34	34.916	20.367	0.000	0.000	0.000	22.281	0.000	21.926	0.000	23.084	0.000	23.423	0.000	22.935	0.000
32	32.110	0.000	20.801	0.000	23.111	0.000	22.792	0.000	23.405	0.000	22.604	0.000	23.351	0.000	23.713
30	31.883	0.000	20.612	0.000	23.050	0.000	22.764	0.000	23.394	0.000	22.579	0.000	23.185	0.000	23.790
28	35.369	19.900	0.000	0.000	0.000	22.106	0.000	21.905	0.000	23.017	0.000	23.422	0.000	22.890	0.000
26	36.979	21.332	17.548	0.000	23.329	0.000	23.180	0.000	22.080	0.000	22.473	0.000	22.667	0.000	23.447
24	35.795	21.177	0.000	0.000	0.000	23.900	0.000	22.545	0.000	19.849	0.000	22.664	0.000	23.327	0.000
22	37.278	16.969	0.000	23.032	0.000	0.000	23.847	0.000	22.818	0.000	20.917	0.000	22.673	0.000	22.612
20	38.507	17.756	0.000	0.000	0.000	23.964	0.000	21.752	0.000	23.695	0.000	20.269	0.000	23.218	0.000
18	39.805	34.045	0.000	21.860	0.000	0.000	21.641	0.000	21.822	0.000	20.601	0.000	22.566	0.000	22.009
16		41.138	21.375	0.000	21.627	0.000	0.000	21.935	0.000	22.642	0.000	22.714	0.000	21.895	0.000
14			37.950	21.578	0.000	0.000	19.335	0.000	22.266	0.000	23.975	0.000	22.785	0.000	22.339
12			41.143	40.385	31.825	19.519	0.000	0.000	0.000	23.943	0.000	23.909	0.000	23.185	0.000
10					41.192	32.377	0.000	21.918	0.000	0.000	0.000	0.000	23.637	0.000	23.051
8						40.493	22.099	0.000	21.951	0.000	22.991	0.000	0.000	0.000	0.000
6						40.823	37.592	21.333	0.000	0.000	0.000	0.000	17.926	0.000	20.716
4								41.268	34.266	17.709	16.988	21.210	21.303	20.405	0.000
2									41.263	37.750	36.629	35.749	37.134	35.498	32.466

Figure D.1 Browns Ferry Unit 3 Cycle 19 BOC Exposure Distribution (GWd/MTU)

	31	33	35	37	39	41	43	45	47	49	51	53	55	57	59
60	32.364	35.496	36.063	35.822	36.727	37.749	37.858								
58	0.000	20.378	21.327	21.245	17.097	17.753	34.216	41.290							
56	20.749	0.000	17.927	0.000	0.000	0.000	0.000	21.352	37.703	40.899					
54	0.000	0.000	0.000	0.000	22.999	0.000	21.948	0.000	22.065	40.597					
52	23.057	0.000	23.618	0.000	0.000	0.000	0.000	21.893	0.000	32.350	41.242				
50	0.000	23.162	0.000	23.907	0.000	23.932	0.000	0.000	0.000	19.515	31.947	39.805	41.337		
48	22.347	0.000	22.786	0.000	23.964	0.000	22.268	0.000	19.364	0.000	0.000	21.571	38.490		
46	0.000	21.901	0.000	22.710	0.000	22.612	0.000	21.947	0.000	0.000	21.624	0.000	21.373	41.196	
44	22.028	0.000	22.575	0.000	20.589	0.000	21.821	0.000	21.626	0.000	0.000	21.834	0.000	34.247	37.800
42	0.000	23.206	0.000	20.218	0.000	23.697	0.000	21.720	0.000	23.926	0.000	0.000	0.000	17.789	37.632
40	22.625	0.000	22.650	0.000	20.894	0.000	22.801	0.000	23.811	0.000	0.000	23.014	0.000	17.034	37.367
38	0.000	23.339	0.000	22.666	0.000	19.858	0.000	22.530	0.000	23.868	0.000	0.000	0.000	21.184	35.964
36	23.435	0.000	22.659	0.000	22.441	0.000	22.046	0.000	23.164	0.000	23.291	0.000	17.576	21.337	35.843
34	0.000	22.897	0.000	23.403	0.000	22.983	0.000	21.887	0.000	22.077	0.000	0.000	0.000	19.915	35.498
32	23.760	0.000	23.158	0.000	22.551	0.000	23.350	0.000	22.732	0.000	23.029	0.000	20.629	0.000	32.032
30	23.697	0.000	23.345	0.000	22.573	0.000	23.369	0.000	22.765	0.000	23.113	0.000	20.767	0.000	32.393
28	0.000	22.925	0.000	23.412	0.000	23.073	0.000	21.903	0.000	22.302	0.000	0.000	0.000	20.432	35.083
26	23.593	0.000	22.773	0.000	22.590	0.000	22.095	0.000	23.177	0.000	23.447	0.000	18.186	21.361	35.713
24	0.000	23.348	0.000	22.673	0.000	20.246	0.000	22.619	0.000	23.973	0.000	0.000	0.000	21.277	35.927
22	22.628	0.000	22.788	0.000	20.969	0.000	21.225	0.000	23.955	0.000	0.000	23.057	0.000	17.115	37.445
20	0.000	23.278	0.000	20.513	0.000	23.837	0.000	21.955	0.000	24.032	0.000	0.000	0.000	17.857	37.770
18	22.024	0.000	22.612	0.000	23.040	0.000	22.018	0.000	21.694	0.000	0.000	21.884	0.000	34.222	40.982
16	0.000	21.908	0.000	22.790	0.000	22.829	0.000	21.889	0.000	0.000	21.877	0.000	21.430	41.167	
14	22.329	0.000	22.848	0.000	24.063	0.000	22.326	0.000	19.774	0.000	0.000	21.933	38.281		
12	0.000	23.345	0.000	23.989	0.000	23.956	0.000	0.000	0.000	19.571	32.433	40.203	40.464		
10	23.168	0.000	23.743	0.000	0.000	0.000	0.000	22.125	0.000	32.497	38.055				
8	0.000	0.000	0.000	0.000	23.069	0.000	21.986	0.000	22.333	39.623					
6	20.947	0.000	18.342	0.000	0.000	0.000	0.000	21.432	38.147	41.158					
4	0.000	20.721	21.334	21.410	17.307	17.895	34.421	40.917							
2	32.686	35.498	34.944	36.024	36.909	37.908	41.197								

Figure D.1 Browns Ferry Unit 3 Cycle 19 BOC Exposure Distribution (GWd/MTU) *(Continued)*

	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29
60									46.157	44.555	44.309	43.712	44.074	43.825	40.936
58								48.111	43.554	31.503	32.147	36.397	36.694	35.976	16.903
56						45.522	45.536	34.220	16.903	19.010	20.326	20.958	37.663	21.058	40.504
54						45.389	35.378	18.123	40.809	22.286	43.900	23.645	23.869	23.808	23.301
52					47.107	43.478	18.261	41.302	22.897	24.265	24.454	24.558	45.547	24.441	44.958
50			44.870	45.211	44.019	36.526	21.407	23.408	24.142	46.166	24.811	46.299	24.744	45.281	24.240
48			44.978	35.229	18.268	21.419	41.070	24.249	44.924	24.806	45.301	23.744	44.791	24.273	44.668
46		48.219	34.138	18.113	41.234	23.426	24.280	44.652	25.015	44.912	23.685	44.163	23.789	43.886	24.620
44	46.277	43.761	16.837	40.675	22.853	24.145	44.530	25.123	44.548	24.336	44.554	23.364	43.806	23.247	43.890
42	45.132	31.354	18.929	22.163	24.108	46.165	24.930	44.490	24.657	45.593	23.882	42.097	23.208	44.265	23.400
40	44.765	32.061	20.246	43.711	23.842	24.273	45.313	24.176	44.018	25.070	43.723	24.527	44.229	23.552	43.412
38	43.880	36.295	20.929	23.536	24.022	45.902	23.918	44.460	24.821	43.164	24.594	44.763	23.727	44.205	22.296
36	44.950	36.723	37.900	23.950	45.378	24.894	45.372	24.248	43.765	23.336	43.287	22.776	43.737	22.630	43.358
34	43.570	36.155	21.242	24.079	24.822	44.840	24.674	44.161	23.332	43.916	22.400	43.366	22.498	43.243	21.270
32	41.251	17.079	40.668	23.714	45.699	25.220	45.367	24.752	44.812	22.951	42.956	21.959	43.516	21.780	42.727
30	41.054	17.094	40.515	23.726	45.654	25.227	45.343	24.753	44.801	22.952	42.933	21.956	43.361	21.769	42.790
28	44.018	35.769	21.283	24.111	24.846	44.702	24.685	44.147	23.329	43.858	22.406	43.364	22.447	43.158	21.258
26	45.053	36.746	37.517	23.991	45.300	24.915	45.355	24.247	43.686	23.339	43.207	22.778	43.586	22.586	43.249
24	43.635	36.232	20.975	23.573	24.047	45.854	23.923	44.373	24.786	42.819	24.618	44.748	23.728	44.161	22.281
22	44.623	31.917	20.285	43.721	23.865	24.292	45.223	24.157	45.537	25.082	43.791	24.555	44.159	23.552	43.365
20	44.896	31.326	18.962	22.192	24.135	46.118	24.955	44.382	24.704	45.527	23.970	42.208	23.243	44.212	23.388
18	44.933	43.529	16.873	40.646	22.887	24.180	44.465	25.175	44.428	24.452	42.572	23.484	43.781	23.265	43.841
16		47.810	34.136	18.149	41.033	23.467	24.322	44.721	25.083	44.898	23.800	44.173	23.844	43.875	24.605
14			45.613	34.948	18.312	21.462	40.873	24.300	44.891	24.870	45.277	23.801	44.752	24.284	44.645
12			45.659	48.065	43.550	36.478	21.456	23.451	24.178	46.174	24.850	46.248	24.761	45.207	24.213
10					48.985	44.044	18.289	41.274	22.920	24.286	24.474	24.573	45.466	24.430	44.817
8						48.137	35.395	18.146	40.759	22.296	43.817	23.646	23.859	23.787	23.264
6						45.320	45.306	34.100	16.900	19.016	20.332	20.954	37.726	21.027	40.328
4								47.958	43.751	31.312	31.941	36.225	36.611	36.042	16.853
2									46.518	44.183	44.053	43.570	45.129	44.027	41.448

Figure D.2 Browns Ferry Unit 3 Cycle 19 EOC Exposure Distribution (19.6 GWd/MTU)

	31	33	35	37	39	41	43	45	47	49	51	53	55	57	59
60	41.385	44.039	44.096	43.672	44.160	44.181	43.090								
58	16.904	36.051	36.663	36.282	32.064	31.370	43.731	48.206							
56	40.397	21.068	37.760	20.988	20.364	19.049	16.939	34.143	45.398	45.391					
54	23.308	23.828	23.897	23.684	43.856	22.333	40.785	18.166	35.368	48.214					
52	44.860	24.470	45.483	24.610	24.511	24.322	22.951	41.275	18.294	43.996	48.746				
50	24.255	45.221	24.797	46.277	24.887	46.194	24.209	23.474	21.466	36.463	43.633	47.252	45.778		
48	44.684	24.321	44.784	23.831	45.293	24.905	44.917	24.323	40.910	21.466	18.303	34.926	46.132		
46	24.637	43.910	23.875	44.197	23.829	44.900	25.112	44.753	24.343	23.482	41.038	18.144	34.122	47.871	
44	43.884	23.298	43.821	23.514	42.590	24.482	44.452	25.202	44.473	24.202	22.902	40.632	16.873	43.726	43.014
42	23.414	44.226	23.274	42.193	24.002	45.554	24.732	44.379	24.986	46.106	24.158	22.210	18.974	31.365	44.068
40	43.394	23.576	44.160	24.579	43.794	25.110	45.546	24.184	45.214	24.321	23.890	43.724	20.302	31.987	44.717
38	22.299	44.188	23.741	44.764	24.633	42.843	24.805	44.383	23.949	45.849	24.072	23.595	20.993	36.255	43.816
36	43.255	22.597	43.581	22.777	43.180	23.342	43.665	24.262	45.356	24.939	45.288	24.011	37.558	36.767	43.948
34	21.267	43.167	22.442	43.335	22.390	43.820	23.332	44.145	24.707	44.698	24.869	24.130	21.300	35.791	44.133
32	42.766	21.762	43.322	21.915	42.870	22.935	44.767	24.765	45.333	25.252	45.656	23.743	40.542	17.101	41.187
30	42.705	21.766	43.490	21.914	42.889	22.931	44.779	24.760	45.356	25.239	45.718	23.729	40.649	17.082	41.518
28	21.258	43.222	22.476	43.335	22.375	43.896	23.328	44.148	24.687	44.870	24.835	24.088	21.245	36.213	43.734
26	43.379	22.614	43.692	22.757	43.285	23.325	43.702	24.250	45.357	24.905	45.388	23.955	38.027	36.735	43.801
24	22.279	44.169	23.702	44.727	24.570	43.145	24.806	44.454	23.923	45.908	24.027	23.542	20.934	36.292	43.754
22	43.374	23.527	44.222	24.490	43.787	25.044	44.189	24.163	45.310	24.274	23.846	43.721	20.253	32.020	44.776
20	23.377	44.233	23.174	42.328	23.850	45.565	24.635	44.525	24.924	46.154	24.110	22.166	18.933	31.393	44.154
18	43.842	23.224	43.751	23.333	44.537	24.314	44.511	25.110	44.469	24.141	22.852	40.641	16.842	43.667	46.071
16	24.592	43.845	23.762	44.135	23.663	44.960	24.994	44.623	24.264	23.416	41.213	18.103	34.160	47.814	
14	44.624	24.240	44.740	23.717	45.277	24.782	44.876	24.221	41.184	21.401	18.252	35.228	45.930		
12	24.199	45.314	24.706	46.263	24.786	46.129	24.114	23.376	21.373	36.464	44.056	47.846	44.976		
10	44.906	24.396	45.521	24.523	24.424	24.236	22.867	41.406	18.222	44.108	45.748				
8	23.252	23.755	23.818	23.600	43.847	22.251	40.751	18.089	35.570	47.067					
6	40.523	21.001	38.056	20.911	20.282	18.963	16.851	34.156	45.801	45.764					
4	16.848	36.324	36.642	36.390	32.186	31.417	43.838	47.564							
2	41.653	44.043	43.290	43.842	44.295	44.267	46.215								

Figure D.2 Browns Ferry Unit 3 Cycle 19 EOC Exposure Distribution (19.6 GWd/MTU) *(Continued)*

	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29
60									0.288	0.360	0.421	0.451	0.466	0.488	0.503
58								0.381	0.504	0.735	0.815	0.833	0.862	0.872	0.861
56						0.250	0.413	0.679	0.820	0.908	0.975	1.017	1.062	1.030	1.059
54						0.405	0.704	0.875	0.955	1.028	1.044	1.105	1.136	1.149	1.136
52					0.431	0.614	0.877	0.983	1.051	1.096	1.105	1.120	1.135	1.188	1.208
50			0.251	0.406	0.611	0.891	1.011	1.083	1.094	1.088	1.084	1.104	1.178	1.206	1.252
48			0.420	0.708	0.878	1.012	1.103	1.128	1.149	1.109	0.868	0.909	1.181	1.254	1.281
46		0.369	0.681	0.877	0.987	1.086	1.130	1.184	1.184	1.136	0.922	0.932	1.202	1.280	1.295
44	0.298	0.503	0.821	0.959	1.055	1.098	1.161	1.188	1.221	1.213	1.197	1.209	1.253	1.277	1.297
42	0.358	0.736	0.909	1.031	1.100	1.092	1.116	1.153	1.217	1.228	1.274	1.303	1.279	1.251	1.216
40	0.417	0.816	0.977	1.047	1.108	1.088	0.873	0.929	1.221	1.277	1.322	1.307	1.265	1.212	0.944
38	0.450	0.834	1.019	1.109	1.124	1.108	0.913	0.939	1.215	1.306	1.308	1.304	1.270	1.184	0.934
36	0.466	0.864	1.063	1.140	1.143	1.182	1.182	1.204	1.262	1.281	1.268	1.271	1.254	1.210	1.162
34	0.491	0.874	1.033	1.153	1.192	1.222	1.254	1.279	1.275	1.252	1.212	1.183	1.211	1.199	1.154
32	0.505	0.865	1.063	1.140	1.213	1.253	1.275	1.289	1.273	1.210	0.942	0.934	1.164	1.155	0.973
30	0.506	0.866	1.065	1.141	1.214	1.254	1.275	1.290	1.273	1.210	0.942	0.934	1.166	1.155	0.972
28	0.491	0.879	1.036	1.155	1.194	1.224	1.255	1.279	1.275	1.253	1.213	1.184	1.211	1.200	1.155
26	0.467	0.866	1.070	1.143	1.146	1.184	1.182	1.204	1.263	1.282	1.271	1.272	1.256	1.211	1.162
24	0.452	0.838	1.022	1.111	1.126	1.110	0.913	0.938	1.213	1.310	1.310	1.306	1.272	1.185	0.934
22	0.419	0.820	0.979	1.049	1.110	1.090	0.874	0.928	1.204	1.278	1.324	1.309	1.268	1.214	0.943
20	0.359	0.738	0.911	1.033	1.102	1.094	1.118	1.156	1.219	1.234	1.280	1.307	1.282	1.253	1.216
18	0.292	0.505	0.823	0.961	1.057	1.100	1.165	1.191	1.226	1.219	1.226	1.216	1.257	1.278	1.297
16		0.370	0.682	0.879	0.991	1.089	1.133	1.187	1.188	1.142	0.929	0.938	1.205	1.281	1.294
14			0.415	0.710	0.882	1.015	1.109	1.131	1.153	1.114	0.872	0.912	1.185	1.255	1.280
12			0.252	0.418	0.616	0.895	1.014	1.087	1.097	1.091	1.087	1.107	1.180	1.207	1.251
10					0.441	0.613	0.879	0.986	1.054	1.098	1.107	1.121	1.137	1.188	1.208
8						0.416	0.705	0.877	0.957	1.030	1.046	1.107	1.137	1.149	1.134
6						0.250	0.418	0.681	0.820	0.909	0.976	1.018	1.062	1.029	1.058
4								0.371	0.504	0.737	0.818	0.834	0.862	0.870	0.859
2									0.299	0.361	0.423	0.451	0.463	0.486	0.498

Figure D.3 Browns Ferry Unit 3 Cycle 19 Radial Power Distribution at 0.0 MWd/MTU

	31	33	35	37	39	41	43	45	47	49	51	53	55	57	59
60	0.500	0.487	0.466	0.452	0.423	0.360	0.296								
58	0.861	0.871	0.863	0.835	0.818	0.737	0.505	0.381							
56	1.060	1.030	1.063	1.018	0.977	0.910	0.821	0.681	0.416	0.249					
54	1.136	1.150	1.138	1.107	1.047	1.031	0.958	0.877	0.705	0.413					
52	1.210	1.189	1.138	1.122	1.107	1.099	1.054	0.986	0.878	0.610	0.423				
50	1.252	1.209	1.181	1.107	1.087	1.091	1.097	1.086	1.013	0.893	0.612	0.403	0.247		
48	1.282	1.256	1.186	0.912	0.872	1.114	1.153	1.131	1.108	1.014	0.880	0.709	0.414		
46	1.296	1.283	1.206	0.938	0.928	1.143	1.188	1.187	1.133	1.089	0.990	0.879	0.681	0.371	
44	1.299	1.279	1.258	1.217	1.226	1.219	1.226	1.191	1.165	1.100	1.057	0.961	0.822	0.505	0.296
42	1.217	1.254	1.283	1.308	1.280	1.234	1.219	1.156	1.119	1.095	1.102	1.033	0.911	0.738	0.362
40	0.944	1.214	1.268	1.309	1.324	1.278	1.204	0.928	0.875	1.090	1.110	1.050	0.979	0.819	0.419
38	0.934	1.184	1.271	1.305	1.308	1.309	1.213	0.938	0.913	1.110	1.126	1.111	1.022	0.838	0.453
36	1.163	1.210	1.254	1.268	1.267	1.279	1.262	1.203	1.182	1.184	1.146	1.143	1.070	0.866	0.469
34	1.154	1.197	1.207	1.177	1.205	1.248	1.273	1.278	1.254	1.225	1.194	1.155	1.035	0.878	0.490
32	0.972	1.152	1.159	0.922	0.930	1.202	1.270	1.288	1.275	1.253	1.214	1.140	1.065	0.865	0.504
30	0.972	1.151	1.157	0.921	0.929	1.202	1.269	1.287	1.274	1.253	1.212	1.139	1.063	0.864	0.502
28	1.153	1.195	1.205	1.175	1.203	1.246	1.271	1.277	1.253	1.221	1.192	1.152	1.032	0.872	0.490
26	1.160	1.207	1.250	1.265	1.263	1.277	1.260	1.202	1.181	1.182	1.142	1.139	1.061	0.863	0.468
24	0.933	1.181	1.267	1.300	1.303	1.303	1.212	0.938	0.912	1.107	1.123	1.108	1.018	0.834	0.451
22	0.943	1.210	1.262	1.303	1.318	1.274	1.217	0.927	0.873	1.088	1.108	1.047	0.976	0.816	0.418
20	1.215	1.249	1.276	1.297	1.271	1.226	1.215	1.151	1.115	1.091	1.099	1.030	0.909	0.735	0.359
18	1.296	1.275	1.251	1.206	1.195	1.211	1.219	1.186	1.161	1.097	1.054	0.958	0.820	0.503	0.291
16	1.293	1.278	1.200	0.931	0.921	1.134	1.182	1.182	1.129	1.085	0.986	0.876	0.680	0.368	
14	1.279	1.252	1.180	0.908	0.867	1.108	1.147	1.126	1.100	1.011	0.877	0.705	0.414		
12	1.250	1.203	1.176	1.102	1.082	1.087	1.092	1.081	1.008	0.890	0.610	0.416	0.251		
10	1.206	1.185	1.133	1.118	1.103	1.095	1.049	0.980	0.874	0.609	0.431				
8	1.134	1.146	1.134	1.103	1.043	1.026	0.954	0.873	0.701	0.403					
6	1.056	1.027	1.056	1.015	0.973	0.905	0.817	0.677	0.413	0.255					
4	0.859	0.867	0.861	0.832	0.813	0.732	0.499	0.366							
2	0.497	0.486	0.482	0.451	0.420	0.356	0.285								

Figure D.3 Browns Ferry Unit 3 Cycle 19 Radial Power Distribution at 0.0 MWd/MTU *(Continued)*

	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29
60									0.223	0.283	0.323	0.338	0.350	0.381	0.415
58								0.309	0.437	0.637	0.697	0.694	0.702	0.732	0.873
56						0.193	0.342	0.601	0.870	0.986	1.048	1.073	0.942	1.097	0.942
54						0.334	0.624	0.923	0.901	1.151	1.009	1.215	1.224	1.226	1.219
52					0.330	0.529	0.937	0.927	1.172	1.240	1.252	1.273	1.044	1.266	1.066
50				0.335	0.527	0.793	1.087	1.188	1.238	1.057	1.284	1.073	1.277	1.051	1.279
48			0.347	0.626	0.938	1.088	1.015	1.228	1.053	1.266	1.060	1.299	1.086	1.292	1.062
46		0.295	0.602	0.925	0.928	1.189	1.228	1.050	1.255	1.049	1.296	1.094	1.309	1.100	1.297
44	0.228	0.435	0.870	0.902	1.174	1.239	1.058	1.255	1.072	1.283	1.091	1.316	1.113	1.330	1.111
42	0.281	0.637	0.987	1.154	1.243	1.057	1.264	1.053	1.277	1.056	1.303	1.122	1.332	1.116	1.334
40	0.319	0.695	1.048	1.010	1.261	1.291	1.056	1.284	1.083	1.281	1.097	1.305	1.090	1.331	1.127
38	0.334	0.690	1.070	1.214	1.278	1.073	1.287	1.082	1.286	1.101	1.302	1.097	1.324	1.097	1.354
36	0.343	0.695	0.934	1.216	1.038	1.263	1.069	1.288	1.104	1.325	1.103	1.340	1.120	1.347	1.133
34	0.377	0.723	1.086	1.211	1.246	1.041	1.268	1.081	1.317	1.115	1.348	1.112	1.351	1.130	1.358
32	0.409	0.863	0.930	1.199	1.039	1.243	1.037	1.275	1.089	1.333	1.133	1.361	1.130	1.352	1.096
30	0.410	0.863	0.931	1.199	1.039	1.243	1.038	1.276	1.089	1.334	1.133	1.362	1.132	1.353	1.096
28	0.377	0.727	1.087	1.212	1.248	1.043	1.270	1.082	1.318	1.118	1.351	1.115	1.354	1.133	1.360
26	0.343	0.697	0.938	1.218	1.040	1.266	1.071	1.291	1.107	1.328	1.106	1.345	1.125	1.352	1.136
24	0.336	0.692	1.072	1.216	1.280	1.076	1.290	1.084	1.288	1.107	1.307	1.102	1.330	1.102	1.358
22	0.320	0.698	1.050	1.012	1.264	1.293	1.059	1.286	1.073	1.285	1.101	1.310	1.095	1.336	1.130
20	0.282	0.639	0.989	1.157	1.246	1.060	1.267	1.056	1.280	1.061	1.310	1.128	1.338	1.121	1.338
18	0.226	0.438	0.873	0.905	1.177	1.242	1.062	1.259	1.077	1.290	1.115	1.324	1.119	1.336	1.116
16		0.301	0.604	0.928	0.932	1.192	1.231	1.053	1.260	1.055	1.304	1.102	1.315	1.105	1.302
14			0.344	0.629	0.941	1.091	1.020	1.231	1.057	1.271	1.066	1.305	1.091	1.297	1.066
12			0.195	0.342	0.531	0.796	1.090	1.191	1.241	1.061	1.289	1.078	1.282	1.055	1.283
10					0.335	0.529	0.939	0.930	1.175	1.243	1.256	1.277	1.049	1.270	1.070
8						0.341	0.625	0.926	0.903	1.154	1.012	1.218	1.227	1.230	1.222
6						0.195	0.346	0.603	0.870	0.987	1.050	1.075	0.944	1.099	0.945
4								0.296	0.437	0.640	0.699	0.696	0.703	0.732	0.873
2									0.230	0.284	0.325	0.338	0.346	0.381	0.413

Figure D.4 Browns Ferry Unit 3 Cycle 19 Radial Power Distribution at 18,390.1 MWd/MTU (EOFP)

	31	33	35	37	39	41	43	45	47	49	51	53	55	57	59
60	0.413	0.381	0.350	0.338	0.324	0.282	0.227								
58	0.873	0.731	0.701	0.694	0.698	0.638	0.436	0.308							
56	0.943	1.097	0.941	1.072	1.048	0.986	0.870	0.602	0.343	0.194					
54	1.219	1.226	1.224	1.215	1.010	1.151	0.901	0.924	0.623	0.338					
52	1.067	1.266	1.045	1.273	1.252	1.239	1.172	0.927	0.937	0.526	0.324				
50	1.279	1.052	1.277	1.074	1.284	1.057	1.238	1.188	1.087	0.793	0.528	0.334	0.191		
48	1.063	1.292	1.087	1.300	1.062	1.266	1.054	1.227	1.016	1.087	0.938	0.627	0.342		
46	1.297	1.100	1.310	1.097	1.299	1.051	1.255	1.049	1.227	1.188	0.929	0.925	0.601	0.295	
44	1.112	1.330	1.115	1.319	1.110	1.284	1.073	1.254	1.058	1.238	1.173	0.902	0.870	0.435	0.226
42	1.334	1.118	1.333	1.124	1.305	1.057	1.275	1.052	1.263	1.057	1.242	1.154	0.987	0.637	0.283
40	1.127	1.332	1.091	1.306	1.097	1.281	1.069	1.281	1.056	1.289	1.260	1.010	1.048	0.696	0.319
38	1.354	1.099	1.326	1.098	1.303	1.103	1.283	1.081	1.286	1.072	1.276	1.213	1.070	0.691	0.335
36	1.134	1.349	1.123	1.342	1.104	1.325	1.104	1.287	1.067	1.262	1.037	1.215	0.935	0.696	0.347
34	1.359	1.132	1.353	1.114	1.349	1.116	1.316	1.080	1.266	1.040	1.244	1.210	1.085	0.725	0.376
32	1.096	1.352	1.131	1.362	1.133	1.332	1.088	1.273	1.036	1.241	1.037	1.196	0.929	0.862	0.408
30	1.096	1.352	1.130	1.361	1.133	1.332	1.088	1.273	1.035	1.240	1.036	1.196	0.928	0.861	0.407
28	1.359	1.131	1.352	1.113	1.349	1.115	1.315	1.080	1.266	1.039	1.243	1.209	1.084	0.722	0.376
26	1.135	1.349	1.121	1.341	1.103	1.325	1.104	1.287	1.068	1.261	1.036	1.214	0.931	0.694	0.347
24	1.357	1.100	1.326	1.098	1.303	1.101	1.285	1.081	1.286	1.072	1.276	1.212	1.069	0.689	0.334
22	1.130	1.334	1.091	1.306	1.097	1.281	1.080	1.283	1.055	1.289	1.259	1.009	1.047	0.695	0.318
20	1.338	1.119	1.334	1.121	1.304	1.056	1.276	1.052	1.263	1.057	1.242	1.154	0.987	0.636	0.280
18	1.115	1.334	1.115	1.318	1.092	1.284	1.072	1.254	1.059	1.239	1.173	0.902	0.870	0.435	0.220
16	1.301	1.103	1.312	1.096	1.298	1.050	1.256	1.050	1.228	1.189	0.928	0.925	0.601	0.299	
14	1.066	1.296	1.088	1.301	1.062	1.267	1.054	1.228	1.014	1.087	0.938	0.625	0.343		
12	1.283	1.053	1.280	1.075	1.286	1.058	1.239	1.188	1.087	0.793	0.526	0.341	0.195		
10	1.069	1.269	1.047	1.275	1.254	1.241	1.173	0.926	0.937	0.526	0.329				
8	1.222	1.229	1.226	1.217	1.011	1.152	0.902	0.924	0.623	0.335					
6	0.944	1.099	0.941	1.074	1.048	0.986	0.869	0.601	0.344	0.202					
4	0.873	0.731	0.703	0.694	0.696	0.637	0.434	0.301							
2	0.412	0.382	0.364	0.339	0.323	0.281	0.222								

Figure D.4 Browns Ferry Unit 3 Cycle 19 Radial Power Distribution at 18,390.1 MWd/MTU (EOFP) *(Continued)*

Appendix E Browns Ferry Unit 3 Cycle 18 EOC Projection Control Rod Patterns and Core Average Axial Power and Exposure Distributions

```
Cycle:                          18                          Core Average Exposure: MWd/MTU    33188.5
Exposure: MWd/MTU (GWd)     16975.7 (2317.80 )
Delta E: MWd/MTU, (GWd)       175.7 (  23.99 )                    Axial Profile    Edit   Radial Power
Power: MWt                   3192.1 ( 92.31 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1038.9                    Top 25  0.278   6.809    12  0.321 0.628  49 12
Inlet Subcooling: Btu/lbm    -26.97                        24  0.793  19.574    13  0.242 0.281   7 50
Flow: Mlb/hr                 107.62 (105.00 %)             23  1.012  25.854    14  0.307 0.764  47 10
                                                           22  1.154  29.984    15  0.468 0.657  11 50
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  1.219  32.438    16  1.024 1.221  25 26
59              -- -- -- -- -- -- --             59        20  1.257  33.806    17  1.046 1.132  47 26
55          -- -- -- -- -- -- -- -- --           55        19  1.280  34.869    18  1.119 1.269  37 28
51       -- -- -- -- -- -- -- -- -- -- -- --     51        18  1.304  35.583    19  1.191 1.327  11 44
47    -- -- -- -- -- -- -- -- -- -- -- -- -- --  47        17  1.308  35.590    20  1.394 1.477  37 26
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  1.380  36.071    21  1.340 1.374  31 46
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39        15  1.392  36.935
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  1.358  37.066
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31        13  1.405* 36.414
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.382  37.065
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23        11  1.328  37.502
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.254  37.936
15    -- -- -- -- -- -- -- -- -- -- -- -- -- --  15         9  1.164  38.903
11       -- -- -- -- -- -- -- -- -- -- -- --     11         8  1.032  39.372
 7          -- -- -- -- -- -- -- -- --           7         7  0.881  39.418
 3             -- -- -- -- -- -- -- --           3         6  0.749  40.284
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  0.625  40.304*
                                                           4  0.525  38.913
Control Rod Density: %         0.00                        3  0.455  36.030
                                                           2  0.360  28.135
k-effective:                0.99995                Bottom  1  0.105   8.336
Void Fraction:                0.284
Core Delta-P: psia           24.342             % AXIAL TILT  16.418  -7.262
Core Plate Delta-P: psia     19.777          AVG BOT 8ft/12ft  0.9341  1.0428
Coolant Temp: Deg-F          543.7
In Channel Flow: Mlb/hr       96.10   Active Channel Flow: Mlb/hr        93.28
Total Bypass Flow (%):         10.7   (of total core flow)
Total Water Rod Flow (%):       2.6   (of total core flow)
Source Convergence          0.00008
```

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
1.477	20	37 26	1.915	0.741	20	37 26	7.86	0.650	23.8 20	37 26	15	6.61	0.681	51.5 17	13 36	18
1.475	20	35 28	1.924	0.738	20	39 24	7.83	0.650	24.2 20	39 28	15	6.77	0.677	48.9 18	49 24	18
1.470	20	27 36	1.926	0.737	20	41 26	7.76	0.649	25.1 20	41 26	15	6.54	0.674	51.5 16	47 22	18
1.463	20	35 38	1.927	0.737	20	39 28	7.81	0.649	24.3 20	39 24	15	6.34	0.671	53.8 16	49 28	18
1.463	20	39 28	1.930	0.736	20	25 34	7.75	0.648	25.0 20	35 42	15	8.63	0.671	29.2 20	41 26	15
1.459	20	37 30	1.931	0.735	20	35 38	7.74	0.648	25.1 20	27 40	15	6.48	0.671	51.9 17	35 14	18
1.456	20	39 24	1.933	0.735	20	33 26	7.78	0.648	24.4 20	23 40	15	6.45	0.670	52.2 16	49 20	18
1.456	20	29 38	1.936	0.733	20	33 40	7.80	0.647	24.2 20	31 42	15	8.60	0.669	29.3 20	25 42	15
1.453	20	33 30	1.937	0.733	20	23 40	7.75	0.647	24.9 20	25 38	15	6.57	0.669	50.4 18	45 24	18
1.452	20	37 40	1.939	0.733	20	37 30	7.74	0.647	25.0 20	37 30	15	6.66	0.668	49.1 18	23 50	18

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

Figure E.1 Browns Ferry Unit 3 Cycle 18 Control Rod Pattern and Axial Distributions at 16,975.7 MWd/MTU

```
Cycle:                          18                          Core Average Exposure: MWd/MTU    33720.2
Exposure: MWd/MTU (GWd)     17507.6 (2390.40 )
Delta E: MWd/MTU, (GWd)       257.6 (  35.17 )                    Axial Profile    Edit   Radial Power
Power: MWt                   2793.4 ( 80.78 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1030.1                    Top 25  0.296   6.978    12  0.318 0.625  49 12
Inlet Subcooling: Btu/lbm    -23.27                        24  0.850  20.037    13  0.240 0.279   7 50
Flow: Mlb/hr                 107.62 (105.00 %)             23  1.082  26.444    14  0.304 0.762  47 10
                                                           22  1.225  30.656    15  0.464 0.655  11 50
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  1.283  33.145    16  1.022 1.218  25 26
59              -- -- -- -- -- -- --             59        20  1.313  34.533    17  1.049 1.131  47 26
55          -- -- -- -- -- -- -- -- --           55        19  1.326  35.607    18  1.117 1.266  37 28
51       -- -- -- -- -- -- -- -- -- -- -- --     51        18  1.341  36.332    19  1.199 1.338  11 44
47    -- -- -- -- -- -- -- -- -- -- -- -- -- --  47        17  1.335  36.338    20  1.395 1.474  37 26
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  1.402  36.816    21  1.339 1.369  31 46
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39        15  1.407  37.684
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  1.365  37.795
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31        13  1.408* 37.126
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.378  37.764
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23        11  1.310  38.170
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.220  38.563
15    -- -- -- -- -- -- -- -- -- -- -- -- -- --  15         9  1.113  39.480
11       -- -- -- -- -- -- -- -- -- -- -- --     11         8  0.971  39.879
 7          -- -- -- -- -- -- -- -- --           7         7  0.815  39.847
 3             -- -- -- -- -- -- -- --           3         6  0.684  40.647*
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  0.567  40.606
                                                           4  0.475  39.166
Control Rod Density: %         0.00                        3  0.412  36.249
                                                           2  0.327  28.308
k-effective:                0.99997                Bottom  1  0.096   8.390
Void Fraction:                0.260
Core Delta-P: psia           23.830             % AXIAL TILT  20.595  -6.783
Core Plate Delta-P: psia     19.274          AVG BOT 8ft/12ft  0.9076  1.0405
Coolant Temp: Deg-F          543.2
In Channel Flow: Mlb/hr       96.41   Active Channel Flow: Mlb/hr        93.70
Total Bypass Flow (%):         10.4   (of total core flow)
Total Water Rod Flow (%):       2.5   (of total core flow)
Source Convergence          0.00008
```

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
1.474	20	37 26	2.176	0.653	20	37 26	5.59	0.584	44.2 18	49 24	18	5.95	0.621	52.4 17	13 36	18
1.472	20	35 28	2.181	0.651	20	39 24	6.98	0.583	24.9 20	37 26	15	6.11	0.618	49.9 18	49 24	18
1.467	20	27 36	2.185	0.650	20	41 26	6.94	0.582	25.3 20	39 28	15	5.91	0.616	52.5 16	47 22	18
1.460	20	35 38	2.188	0.649	20	39 28	6.88	0.581	26.1 20	41 26	15	5.83	0.613	53.1 16	49 20	18
1.459	20	39 28	2.193	0.647	20	25 34	6.93	0.581	25.4 20	39 24	15	5.84	0.611	52.7 17	35 48	18
1.457	20	37 30	2.194	0.647	20	35 38	6.87	0.580	26.1 20	37 30	15	5.70	0.610	54.7 16	49 28	18
1.453	20	39 24	2.196	0.647	20	33 40	6.86	0.580	26.2 20	27 40	15	6.01	0.609	50.1 18	23 50	18
1.453	20	29 38	2.196	0.647	20	33 26	6.88	0.580	26.0 20	25 38	15	5.82	0.607	52.6 18	45 24	18
1.450	20	33 30	2.198	0.646	20	23 40	6.87	0.580	26.1 20	35 42	15	5.80	0.607	52.7 16	45 20	18
1.449	20	37 40	2.201	0.645	20	49 26	6.90	0.580	25.5 20	23 40	15	7.69	0.605	30.4 20	41 26	15

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

Figure E.2 Browns Ferry Unit 3 Cycle 18 Control Rod Pattern and Axial Distributions at 17,507.6 MWd/MTU

```
Cycle:                          18                          Core Average Exposure: MWd/MTU    34075.0
Exposure: MWd/MTU (GWd)     17862.2 (2438.80 )
Delta E: MWd/MTU, (GWd)       354.6 (  48.41 )                    Axial Profile    Edit   Radial Power
Power: MWt                   2538.0 ( 73.40 %)          N(PRA) Power Exposure  Zone  Avg.  Max.  IR JR
Core Pressure: psia          1024.4                    Top 25  0.310   7.097    12  0.316 0.624  49 12
Inlet Subcooling: Btu/lbm    -20.92                        24  0.893  20.365    13  0.238 0.277   7 50
Flow: Mlb/hr                 107.62 (105.00 %)             23  1.134  26.860    14  0.302 0.761  47 10
                                                           22  1.277  31.128    15  0.462 0.654  11 50
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            21  1.330  33.638    16  1.021 1.216  25 26
59              -- -- -- -- -- -- --             59        20  1.352  35.036    17  1.051 1.132   9 40
55          -- -- -- -- -- -- -- -- --           55        19  1.358  36.113    18  1.116 1.264  37 28
51       -- -- -- -- -- -- -- -- -- -- -- --     51        18  1.366  36.843    19  1.204 1.345  11 44
47    -- -- -- -- -- -- -- -- -- -- -- -- -- --  47        17  1.353  36.846    20  1.396 1.472  37 26
43 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 43        16  1.414  37.318    21  1.338 1.366  31 46
39 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 39        15  1.414* 38.188
35 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 35        14  1.366  38.282
31 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 31        13  1.405  37.601
27 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 27        12  1.368  38.228
23 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 23        11  1.291  38.609
19 -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- 19        10  1.190  38.970
15    -- -- -- -- -- -- -- -- -- -- -- -- -- --  15         9  1.075  39.849
11       -- -- -- -- -- -- -- -- -- -- -- --     11         8  0.927  40.199
 7          -- -- -- -- -- -- -- -- --           7         7  0.771  40.115
 3             -- -- -- -- -- -- -- --           3         6  0.644  40.871*
    2  6 10 14 18 22 26 30 34 38 42 46 50 54 58            5  0.531  40.791
                                                           4  0.445  39.321
Control Rod Density: %          0.00                       3  0.386  36.383
                                                           2  0.307  28.415
k-effective:                 0.99997                Bottom  1  0.090   8.423
Void Fraction:                 0.243
Core Delta-P: psia            23.507             % AXIAL TILT  23.491  -6.435
Core Plate Delta-P: psia      18.957          AVG BOT 8ft/12ft  0.8886  1.0387
Coolant Temp: Deg-F           543.0
In Channel Flow: Mlb/hr        96.61   Active Channel Flow: Mlb/hr        93.96
Total Bypass Flow (%):         10.2    (of total core flow)
Total Water Rod Flow (%):       2.5    (of total core flow)
Source Convergence          0.00009
```

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	
1.472	20	37 26	2.383	0.596	20	37 26	5.19	0.545	44.8 18	49 24	18		5.51	0.579	53.1 17	13 36	18	
1.470	20	35 28	2.387	0.595	20	39 24	6.40	0.538	25.6 20	37 26	15		5.67	0.578	50.5 18	49 24	18	
1.465	20	27 36	2.389	0.594	20	41 26	5.10	0.537	45.1 18	23 50	18		5.47	0.575	53.1 16	47 22	18	
1.458	20	35 38	2.394	0.593	20	49 26	5.02	0.537	46.4 18	45 24	18		5.41	0.573	53.8 16	49 20	18	
1.457	20	39 28	2.395	0.593	20	39 34	6.37	0.537	26.0 20	39 28	15		5.41	0.570	53.4 17	35 48	18	
1.455	20	37 30	2.400	0.592	20	25 34	6.35	0.536	26.1 20	39 24	15		5.57	0.569	50.7 18	23 50	18	
1.451	20	29 38	2.401	0.591	20	9 26	6.30	0.536	26.9 20	37 30	15		5.27	0.569	55.3 16	49 28	18	
1.450	20	39 24	2.402	0.591	20	35 38	6.30	0.535	26.9 20	41 26	15		5.38	0.566	53.2 18	45 24	18	
1.448	20	33 30	2.402	0.591	20	33 40	6.31	0.535	26.7 20	25 38	15		5.36	0.565	53.4 16	45 20	18	
1.446	20	29 34	2.403	0.591	20	33 26	6.29	0.535	27.0 20	27 40	15		5.33	0.564	53.7 16	39 14	18	

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

Figure E.3 Browns Ferry Unit 3 Cycle 18 Control Rod Pattern and Axial Distributions at 17,862.2 MWd/MTU