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Civilian Radioactive Waste Management System
Management & Operating Contractor

Summary Report of Commercial Reactor Criticality Data for Davis-Besse Unit 1

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1.0 INTRODUCTION

The "Summary Report of Commercial Reactor Criticality Data for Davis-Besse Unit 1" contains the detailed information necessary to perform commercial reactor criticality (CRC) analyses for the Davis-Besse Unit 1 reactor.

1.1 Background

The United States Department of Energy (DOE) Office of Civilian Radioactive Waste Management (OCRWM) is developing a methodology for criticality analysis to support disposal of commerical spent nuclear fuel in a geologic repository. A topical report on the disposal criticality analysis methodology is scheduled to be submitted to the United States Nuclear Regulatory Commission (NRC) for formal review in October 1998. This summary report provides data that will be used in analyses that will support the development of parts of the disposal criticality analysis methodology.

1.2 Objective

The objective of this report is to present the data required for performing analytical CRC evaluations for the Davis-Besse 1 reactor. Results from the CRC evaluations will support the development and validation of the neutronics models used for criticality analyses involving commercial spent nuclear fuel. These models and their validation will be discussed in the Disposal Criticality Analysis Methodology Topical Report.

1.3 Scope

The scope of this Summary Report is the presentation of data required to perform 7 statepoint calculations from cycles 1 and 5 of Davis-Besse 1. The only interface for the development of the information in this document is with Framatome Cogema Fuels (FCF). FCF is one of the teammates of the Civilian Radioactive Waste Management System Management and Operating Contractor (M&O). FCF independently requested and received permission from Toledo Edison Company, the owner/operator of Davis-Besse 1, to publish the information related to statepoint measurements that is recorded in this document. All the information contained in this report is documented in an FCF calculational file (Reference 5). The data provided in Reference 5 was obtained from various other reports, calculations, and drawings developed under an NRC accepted quality assurance program (Reference 1), and the data has supported prior licensing submittals. The data therefore will be considered acceptable for quality affecting activities and for use in analyses affecting procurement, construction, or fabrication.

1.4 Quality Assurance

The Quality Assurance (QA) program applies to the development of this report. The data provided in this report will indirectly be used to develop the methodology for evaluating the Monitored Geologic Repository (MGR) waste package and engineered barrier segment. The QAP-2-3 (*Classification of Permanent Items*) evaluation entitled *Classification of the Preliminary MGDS Repository Design* (Reference 2, TBV-228) has identified the waste package

as an MGR (formerly MGDS) item important to safety, waste isolation, and physical protection of materials. The Waste Package responsible manager has evaluated the technical document development activity in accordance with QAP-2-0, *Conduct of Activities*. The QAP-2-0 activity evaluation, *Develop Technical Documents* (Reference 3), has determined that the preparation and review of this technical document is subject to *Quality Assurance Requirements and Description* (Reference 4) requirements. As specified in NLP-3-18, *Documentation of QA Controls on Drawings, Specifications, Design Analyses, and Technical Documents*, this activity is subject to QA controls. No scientific and engineering software or computational software was used in the development of this report.

2.0 REACTOR DESIGN INFORMATION

This section provides general material and geometry data for modeling the Davis-Besse 1 reactor. Figures 2-1 through 2-10 provide pictorial representations of various components that must be modeled. A radial view of the reactor internals is presented in Figure 2-1. This includes the 177 fuel assemblies (FA) in the reactor core region. A radial representation of a single fuel assembly is provided in Figure 2-2. The core liner, core barrel, thermal shield, and pressure vessel cladding are represented as stainless steel (SS304 from Reference 5 or A240, Type 304 from 1997 *Annual Book of ASTM Standards*, Vol. 01.03, Section 1, Iron and Steel Products, p. 37, Table 1). The pressure vessel is carbon steel (CS533B from Reference 5 or A533, Type B, Class 1 from 1997 *Annual Book of ASTM Standards*, Vol. 01.04, Section 1, Iron and Steel Products, p. 257, Table 1). Table 2-1 provides dimensions from the center of the core (from Assy 1, Assy 2, ... , Assy 8, core liner, etc., - Figure 2-1) to the outside surface of the pressure vessel.

Table 2-1. Dimensions from Core Center to Outside Surface of Pressure Vessel

Description	Thickness (cm)	Outer Dimensions (cm)
Core Center	-	0.00000
½ Assembly 1	10.84072	10.84072
Water	0.12954	10.97026
Assembly 2	21.68144	32.65170
Water	0.12954	32.78124
Assembly 3	21.68144	54.46268
Water	0.12954	54.59222
Assembly 4	21.68144	76.27366
Water	0.12954	76.40320
Assembly 5	21.68144	98.08464
Water	0.12954	98.21418
Assembly 6	21.68144	119.89562
Water	0.12954	120.02516
Assembly 7	21.68144	141.70660
Water	0.12954	141.83614
Assembly 8	21.68144	163.51758
Water	0.27442	163.79200
Core Liner	1.905	165.697
Water	13.373	179.070
Core Barrel	5.080	184.150
Water	2.540	186.690
Thermal Shield	5.080	191.770
Water	24.925	216.695
Pressure Vessel Clad	0.476	217.171
Pressure Vessel	21.431	238.602

Figure 2-1. Horizontal View of the Vessel Internals Along Core Midplane

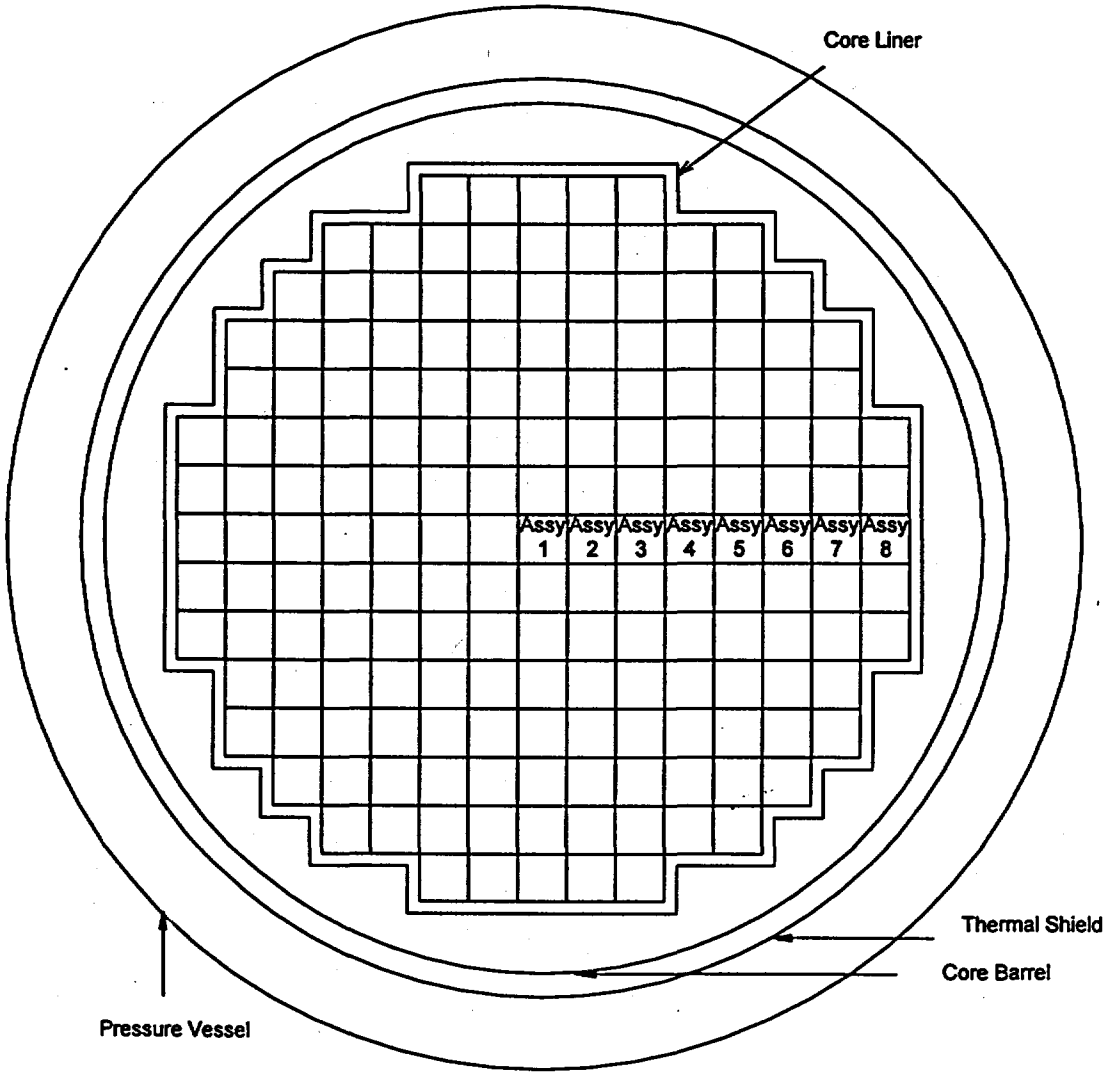


Table 2-2 summarizes fuel assembly and reactor core data used for modeling the Davis-Besse 1 reactor. Additional fuel cycle design, core operations, and reactor criticality statepoint information are provided in Sections 3 and 4.

Table 2-2. Davis-Besse 1 Fuel Assembly/Core Data

Fuel Assembly Array Size	15 x 15
Number of Fuel Pins (N_R) / Assembly	208
Number of Guide Tubes (N_{GT}) / Assembly	16
Number of Instrument Tubes (N_{IT}) / Assembly	1
Number of Assemblies in Core	177
System Pressure	2200 psia/1.52×10^7 Pa
Core Height (H)	363.728 cm
Pin Pitch	1.44272 cm
Fuel Pin Clading OD (outer diameter - OD_C)	1.0922 cm
Fuel Cladding Material	zircaloy
Guide Tube OD (OD_{GT})	1.3462 cm
Guide Tube Material	zircaloy
Instrument Tube OD (OD_{IT})	1.38193 cm
Instrument Tube Material	zircaloy
Assembly Pitch (P)	21.81098 cm
Inconel Intermediate Spacer Grid Height	3.81 cm

Grid Volume (six intermediate spacer grids) in Single Assembly:

Volume of Inconel Grid $= V_{IG} =$ 532.056482 cm^3

V_{M+G} = Volume of Moderator plus Grid in Fuel Assembly (excluding inside guide tubes and instrument tube).

$= P^2 H - H [N_R \pi (OD_C)^2/4.0 + N_{GT} \pi (OD_{GT})^2/4.0 + N_{IT} \pi (OD_{IT})^2/4.0]$

= 93,321.63695 cm^3

Assembly Volume Fraction of Inconel Grid $= V_{IG}/V_{M+G} = 0.00570132$

(Note: The number of digits shown above for volumes and volume fraction are an artifact of the computational process and is taken directly from Reference 5).

Figure 2-2 presents a radial view of a single fuel assembly showing the locations of the guide tubes, instrument tube, and fuel pins. Figure 2-3 provides axial dimensions, by region, for the B&W Mark-B4 fuel assembly. This assembly contains 6 Inconel intermediate spacer grids and two inconel end spacer grids. The 6 intermediate spacer grids are inside the active fuel region.

Figure 2-2. Radial View of a Single Fuel Assembly

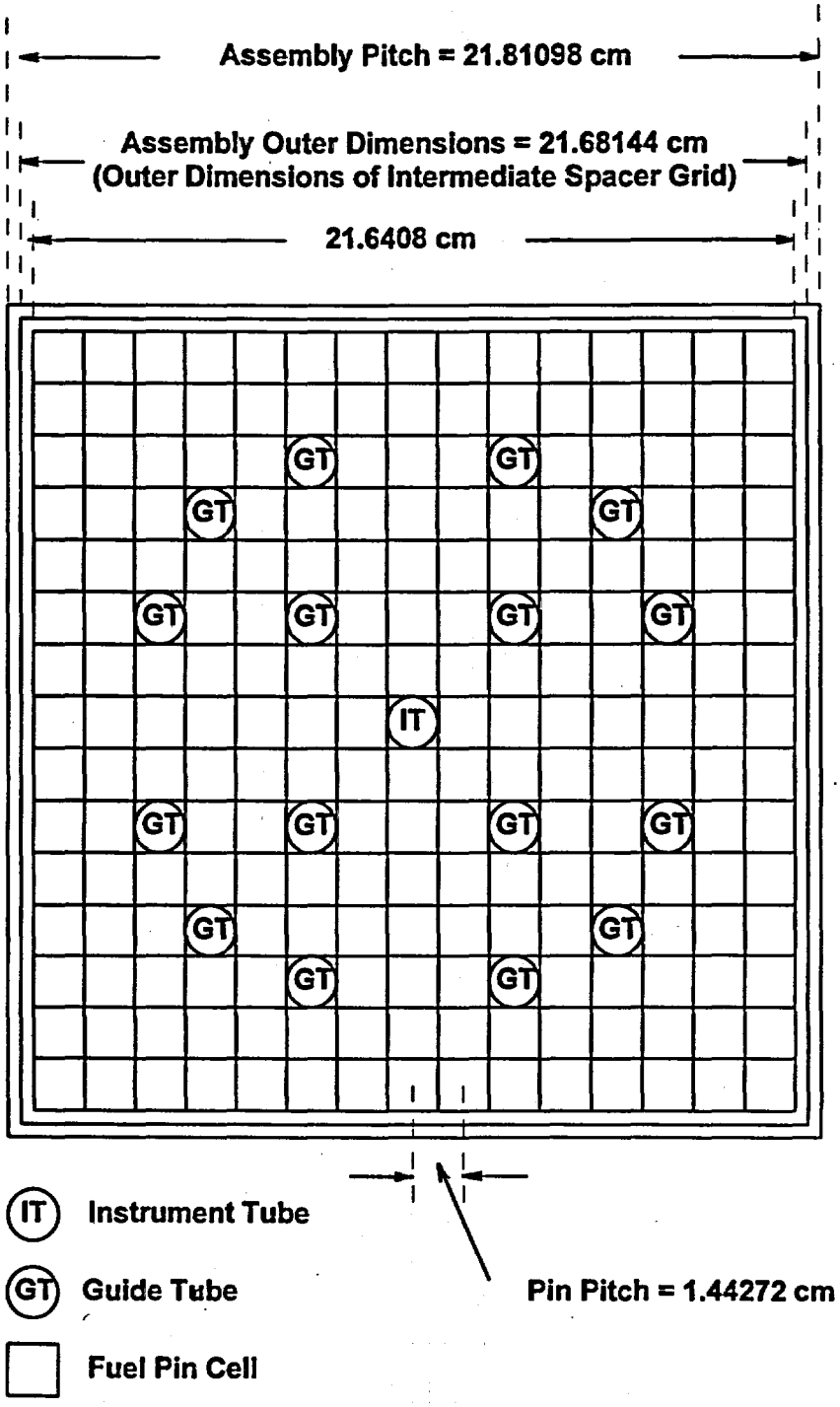
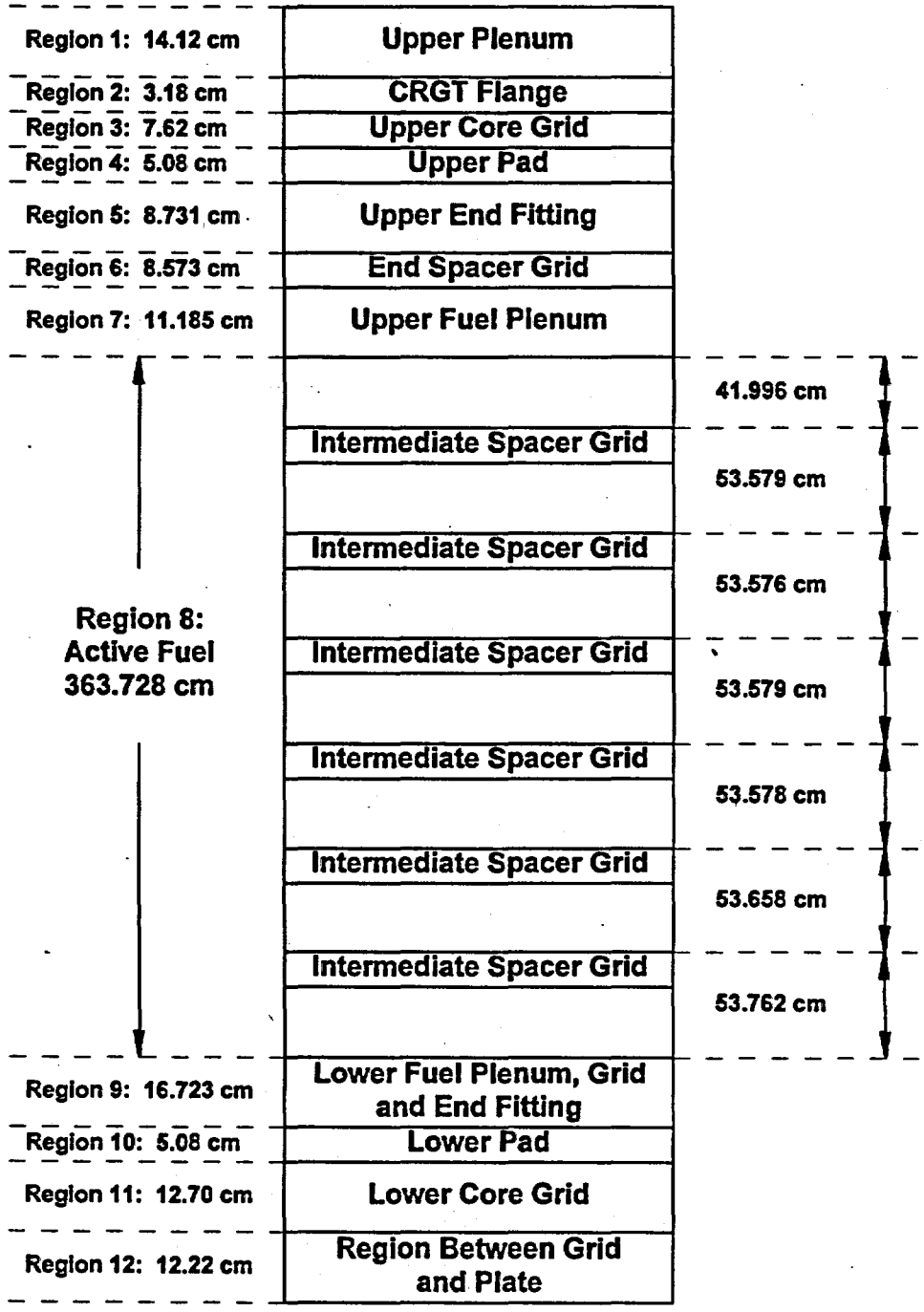


Figure 2-3. Axial Dimensions by Region for Mark-B4 Fuel Assembly



Figures 2-4 through 2-6 provide axial dimensions for the guide tubes, instrument tube, and fuel pins shown in Figure 2-2. Figures 2-7 through 2-10 provide axial dimensions for rod cluster control assemblies (RCCAs) with rods at 0% and 100% withdrawn, black axial power shaping rod assemblies (APSRs), and burnable poison rod assemblies (BPRAs).

Regions 1-4 and 10-12 are represented as homogenized regions of stainless steel and water. For assemblies containing no form of neutron control material, the volume fractions of stainless steel and water in these regions are given in Table 2-3 below.

Table 2-3. Volume Fractions for Regions 1-4 and 10-12 for Non-Control Assemblies

	Volume Fractions	
Region	SS*	Water
1	0.0578	0.9422
2	0.1381	0.8619
3	0.2491	0.7509
4	0.3418	0.6582
10	0.2848	0.7152
11	0.2400	0.7600
12	0.0300	0.9700

* SS = stainless steel.

Regions 5, 6, 7, and 9 contain various combinations of guide tubes, instrument tube, and fuel rod assemblies (no fuel pellets), as well as other materials (stainless steel, Inconel, zircaloy, and water). The fraction of guide tubes, instrument tube, and fuel rod assemblies will be represented explicitly in these regions. The other materials will be homogenized within the remaining portions of the regions. Note that the water inside the guide tubes and instrument tube will be represented explicitly within the respective tubes. The volume fractions of other materials, by region, are presented in Table 2-4.

Table 2-4. Volume Fractions for Regions 5-9 for Non-Control Assemblies

	Volume Fractions*			
Region	SS	Inc	Zr	Water
5	0.2756	0.0441	0.0081	0.6722
6	0.0	0.0457	0.0069	0.9474
7	0.0	0.0	0.0	1.0
9	0.1656	0.0306	0.0125	0.7913

* The volume fractions presented exclude the guide tube, instrument tube, and fuel rod assembly portions of these regions. Note: Inc = Inconel; Zr = zircaloy.

Figure 2-4. Axial Dimensions for Guide Tubes for Mark-B4 Fuel Assembly

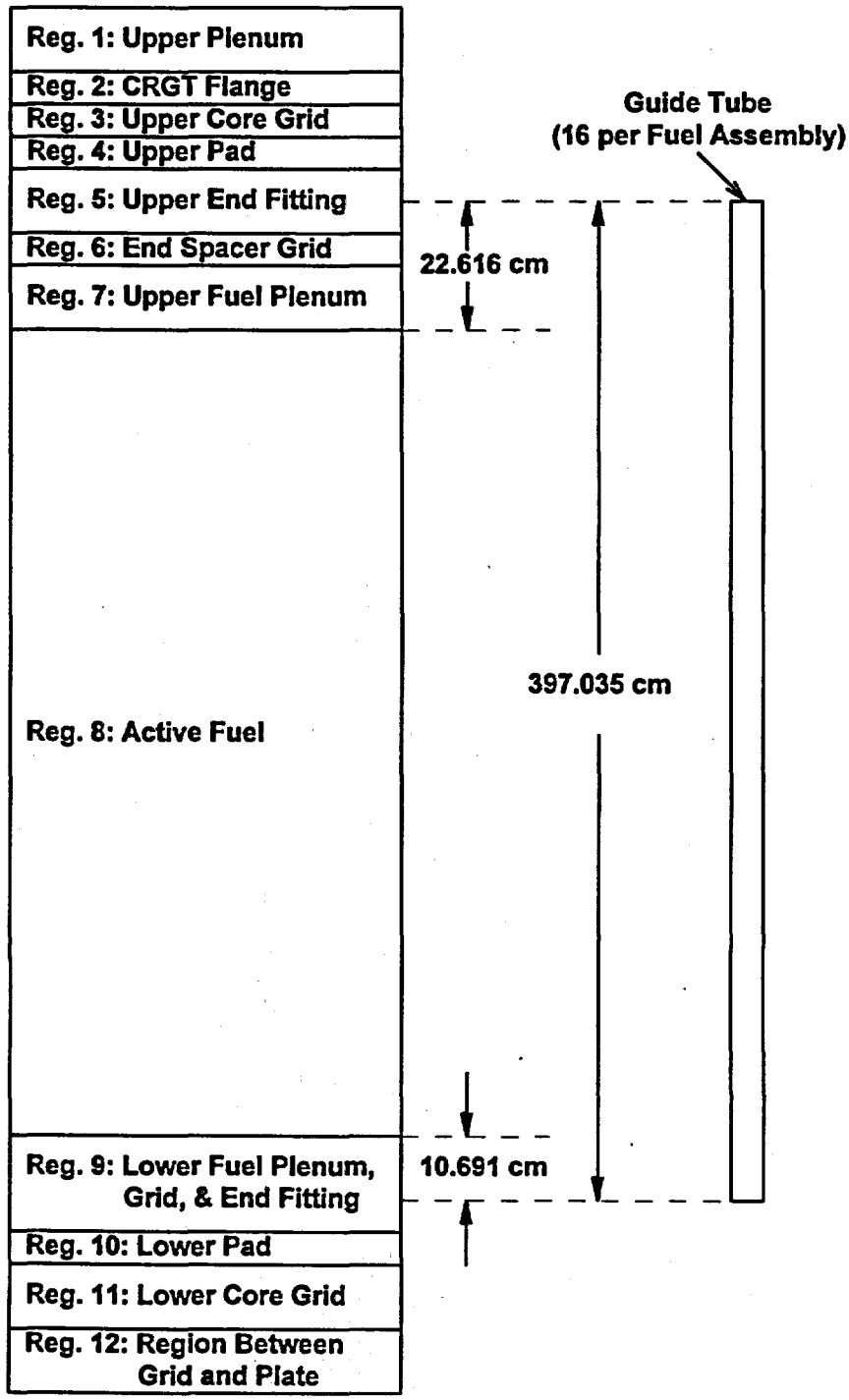


Figure 2-5. Axial Dimensions for Instrument Tube for Mark-B4 Fuel Assembly

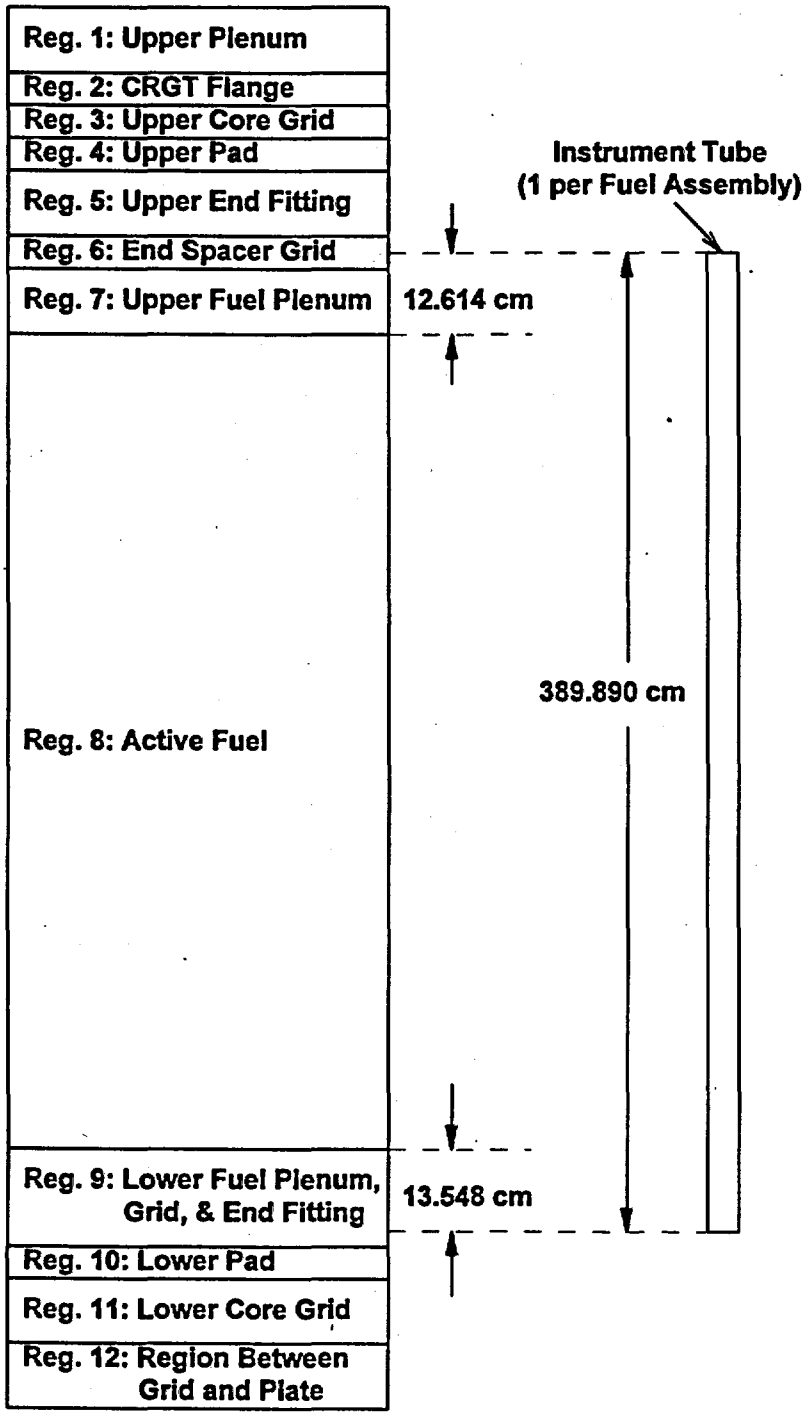
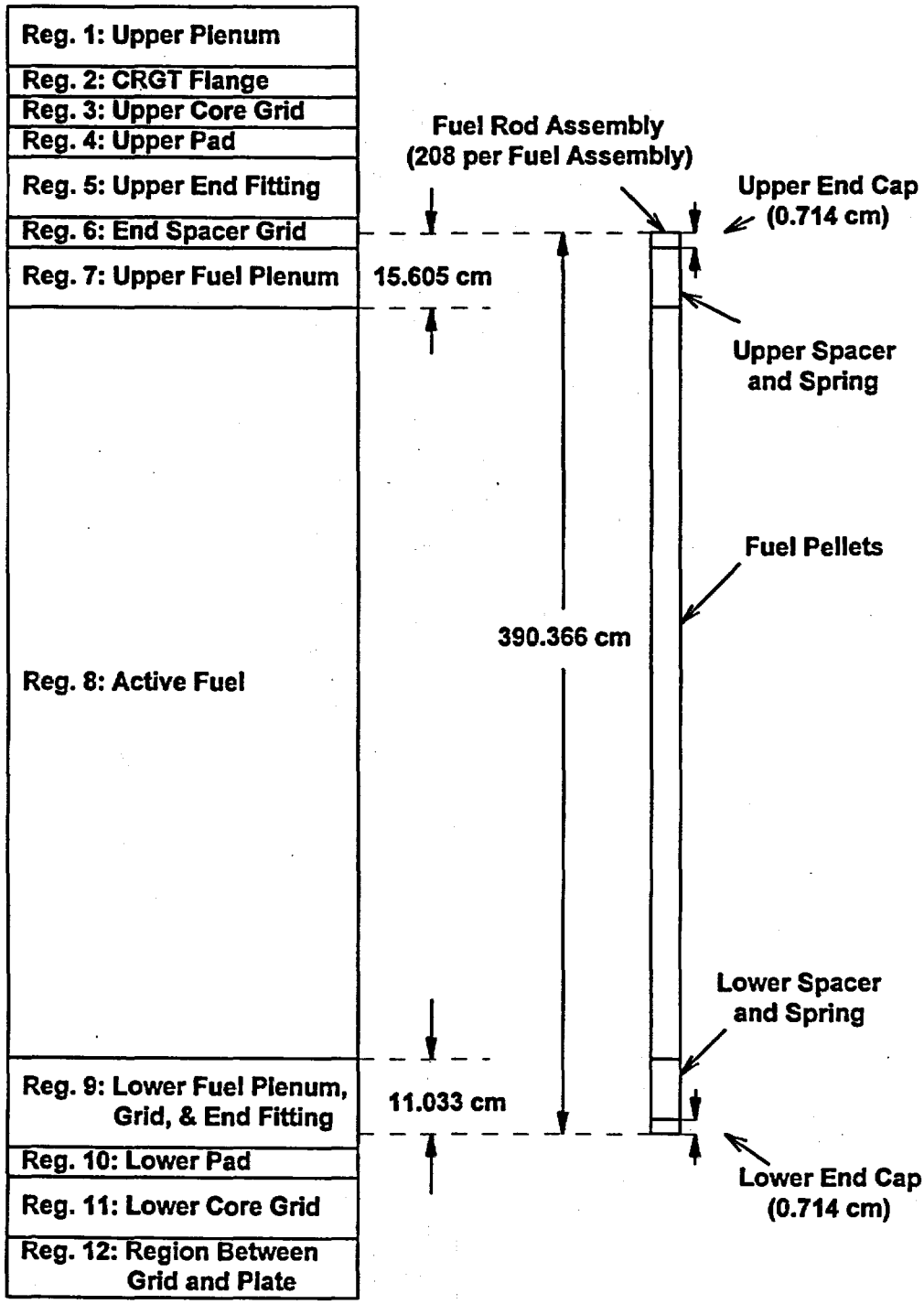


Figure 2-6. Axial Dimensions for Fuel Rod Assembly for Mark-B4 Fuel Assembly



Regions 6, 7, and 9 contain various amounts of stainless steel and zircaloy in the fuel rod assembly which represent the end caps, spacers, and springs. In addition, these regions also contain helium and fission gases, as well as the zircaloy cladding. Note that these regions of the fuel rod assembly do not contain fuel pellets. The fuel rod assembly volume fractions for materials in these regions are as follows:

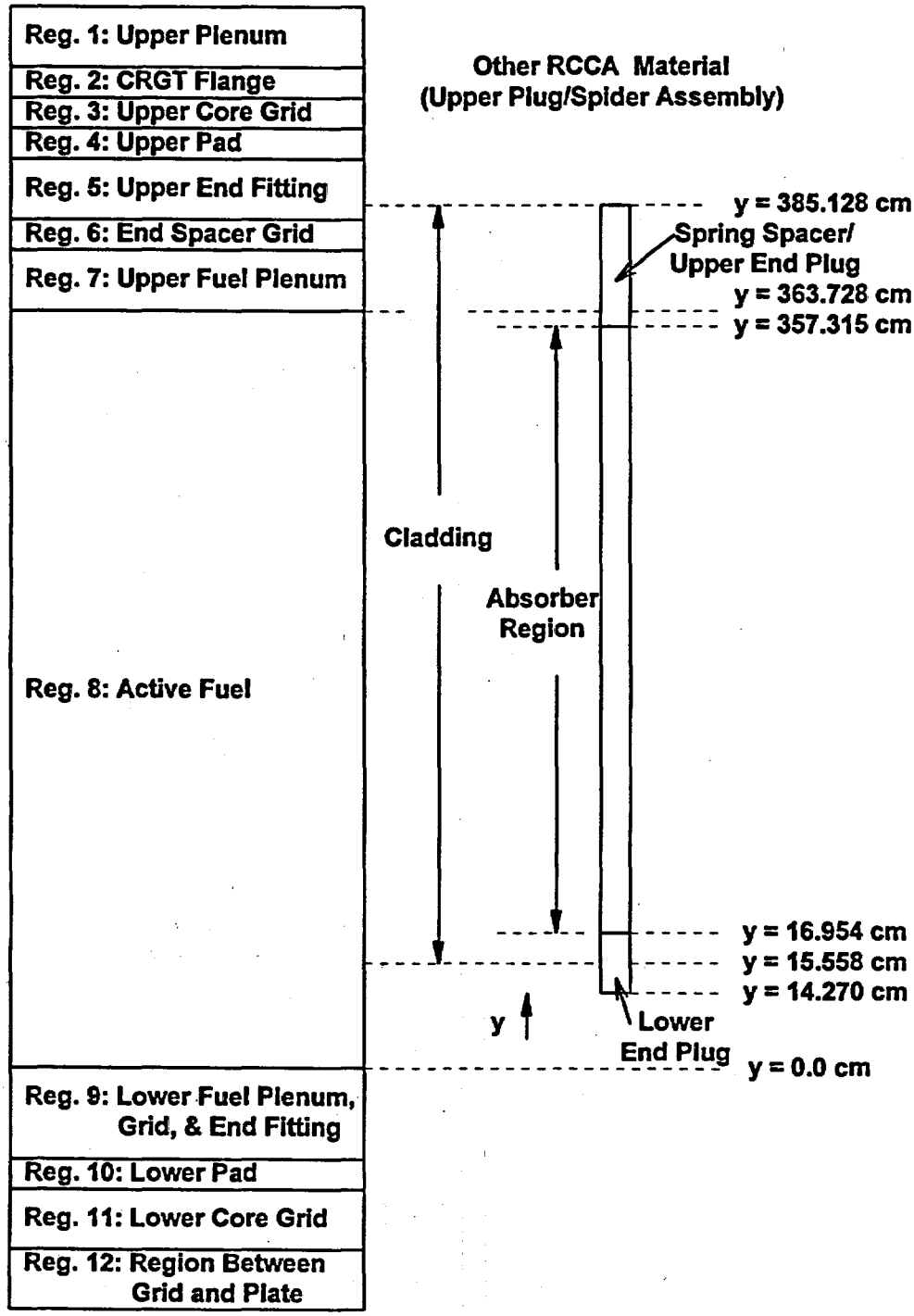
Table 2-5. Fuel Rod Assembly Volume Fractions for Non-Control Assemblies - Regions 6-9

	Fuel Rod Assembly Volume Fractions			
Region	SS	Zr	Cladding*	Gas
6	0.0	0.3344	0.1940	0.4716
7	0.0810	0.0439	0.2313	0.6438
9	0.1230	0.1926	0.2163	0.4681

* The zircaloy cladding extends the entire length of the fuel rod but does not include the ends of the end caps (i.e., extends 388.938 cm and excludes the final 0.714 cm of each end of the fuel rod assembly). There are 208 fuel rod assemblies in each fuel assembly.

The volume fractions of materials in regions 1 through 5 of assemblies containing neutron control materials are given in Tables 2-6 through 2-9 below.

Figure 2-7. RCCA Axial Dimensions for Mark-B4 Fuel Assembly (0% Withdrawn)



RCCA Materials:

Lower end plug - stainless steel

Cladding - stainless steel

Absorber - Ag-In-Cd

Spring spacer - stainless steel, volume fraction of spacer spring/plug inside of clad = 0.3090

Upper plug & spider assembly - stainless steel

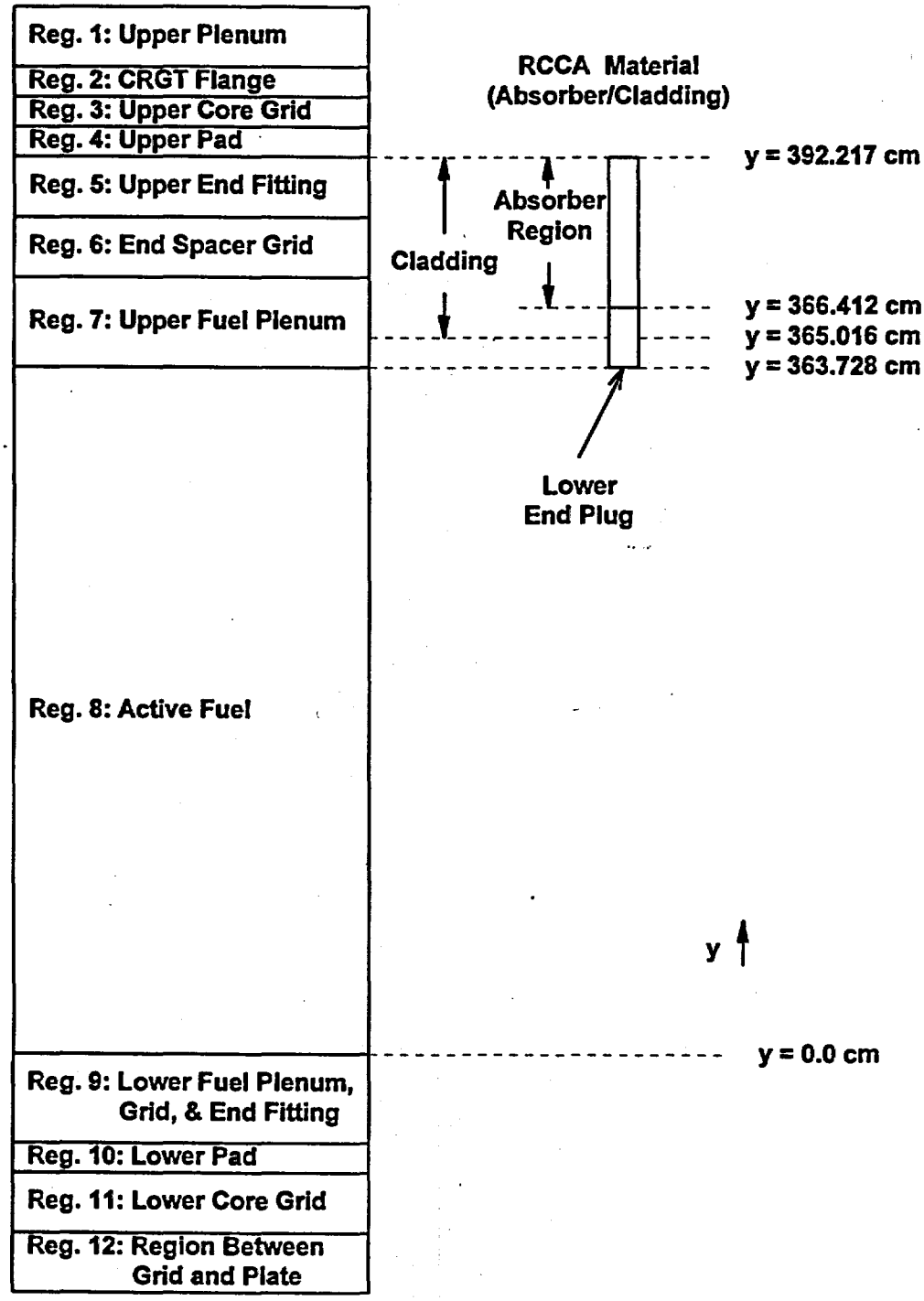
RCCA Volume Fractions:

The rods are represented explicitly in the active fuel, upper fuel plenum, and end spacer grid regions, and to the ends of the control rod cladding in the upper end fitting region. The remainder of materials are homogenized in regions 1 - 5. The volume fractions of these materials (including non-RCCA materials) for RCCAs with rods at 0% withdrawn are given in Table 2-6.

Table 2-6. Volume Fractions in Assemblies with RCCAs (0% Withdrawn) - Regions 1-5

	Volume Fractions (rods 0% Withdrawn)			
Region	SS	Inc	Zr	Water
1	0.0934	0.0	0.0	0.9066
2	0.1945	0.0	0.0	0.8055
3	0.3481	0.0	0.0	0.6519
4	0.3748	0.0	0.0	0.6252
5	0.2981	0.0441	0.0081	0.6497

Figure 2-8. RCCA Axial Dimensions for Mark-B4 Fuel Assembly (100% Withdrawn)



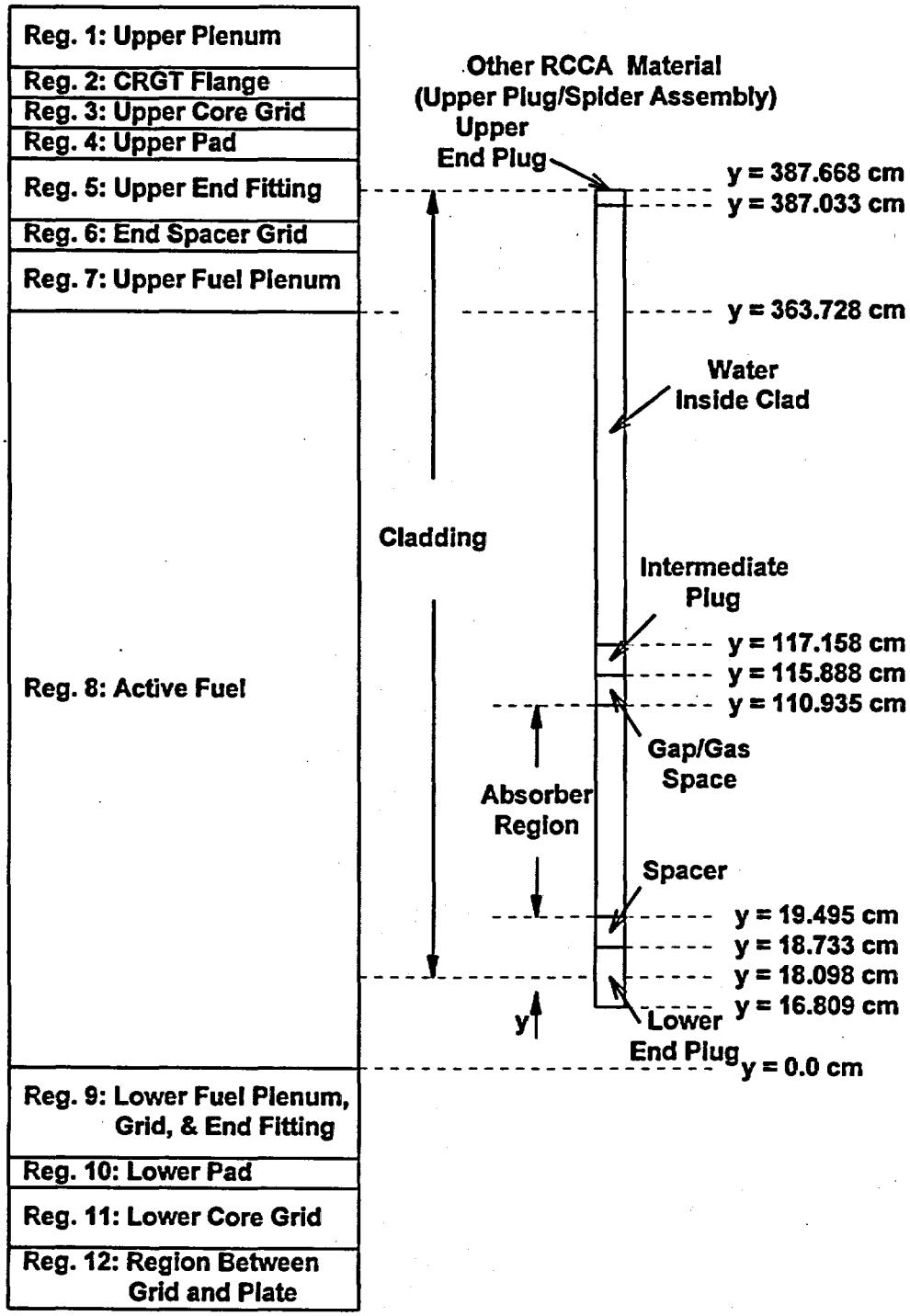
For rods 100% withdrawn the cladding and absorber material inside the cladding are represented explicitly through region 5 (upper end fitting). This extends beyond the guide tubes. Materials for the remaining regions are homogenized. The volume fractions of these materials (including non-RCCA materials) for RCCAs with rods at 100% withdrawn are given in Table 2-7.

Table 2-7. Volume Fractions in Assemblies with RCCAs (100% Withdrawn) - Regions 1-5

	Volume Fractions (rods 100% Withdrawn)				
Region	SS	Inc	Zr	Ag-In-Cd	Water
1	0.0638	0.0	0.0	0.0262	0.9100
2	0.1442	0.0	0.0	0.0262	0.8296
3	0.2553	0.0	0.0	0.0262	0.7185
4	0.3481	0.0	0.0	0.0262	0.6257
5	0.2820	0.0451	0.0083	Explicit*	0.6646

* Material is not homogenized for this region.

Figure 2-9. Black APSR Axial Dimensions for Mark-B4 Fuel Assembly (0% Withdrawn)



Black APSRs Materials:

Lower end plug - stainless steel

Cladding - stainless steel

Absorber - Ag-In-Cd

Spacer - zircaloy (annular design), volume = 6.11 cm^3 (16 APSRs)

Intermediate plug - stainless steel, volume = 16.15 cm^3 (16 APSRs)

Upper end plug & spider assembly - stainless steel

Black APSRs Volume Fractions:

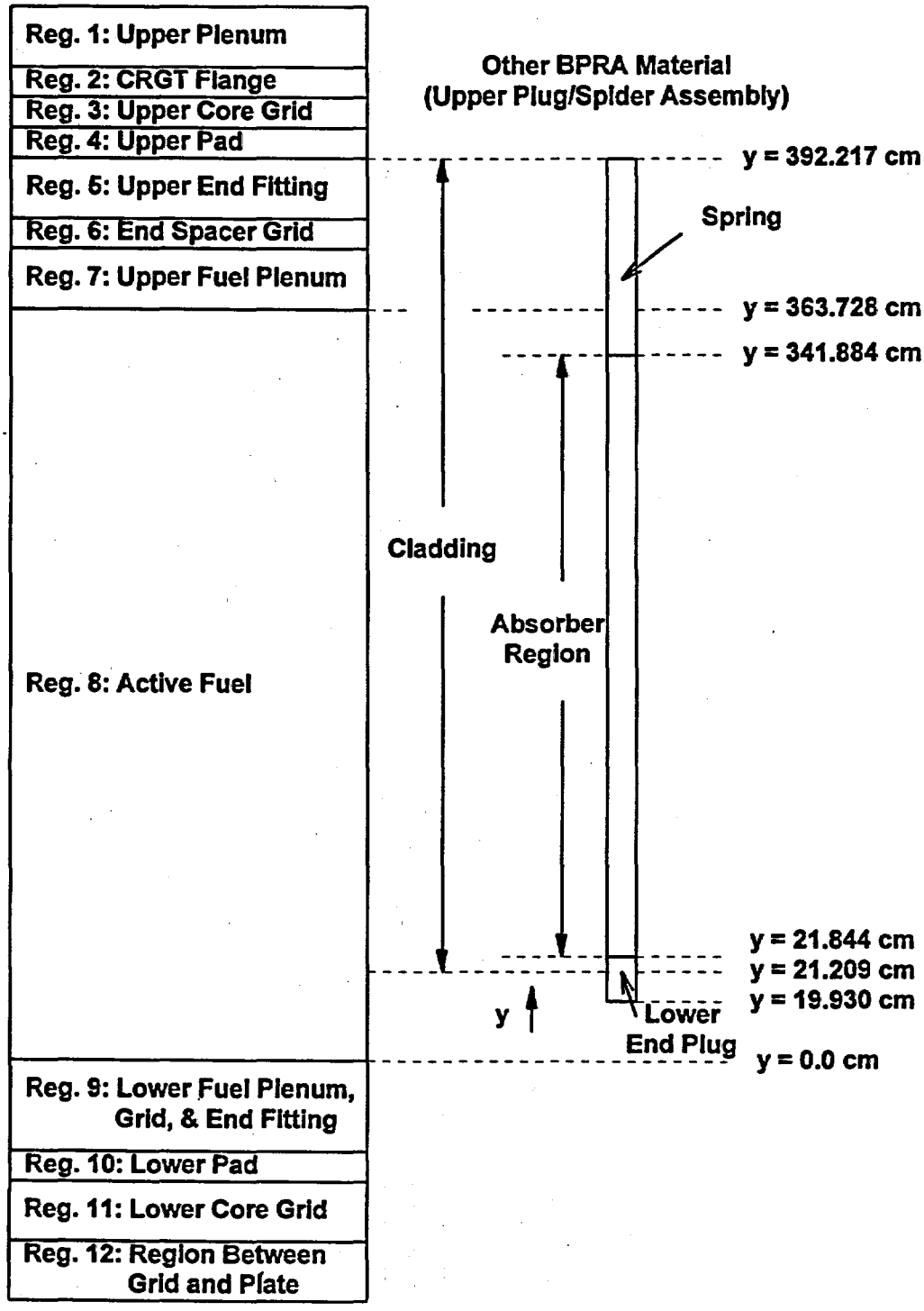
The rods and other materials inside the cladding are represented explicitly in the active fuel, upper fuel plenum, end spacer grid regions, and to the ends of the APSR cladding in the upper end fitting region. The remainder of the materials are homogenized in regions 1 - 5. The volume fractions of these materials (including non-APSR materials) for black APSRs with rods at 0% withdrawn are given in Table 2-8.

Table 2-8. Volume Fractions in Assemblies with Black APSRs (0% Withdrawn) - Regions 1-5

	Volume Fractions (rods 0% Withdrawn)			
Region	SS	Inc	Zr	Water
1	0.1096	0.0	0.0	0.8904
2	0.2212	0.0	0.0	0.7788
3	0.2828	0.0	0.0	0.7172
4	0.3748	0.0	0.0	0.6252
5	0.2960	0.0441	0.0081	0.6518

Black APSRs at 100% withdrawn should be treated the same as RCCAs.

Figure 2-10. BPRA Axial Dimensions for Mark-B4 Fuel Assembly



BPRA Materials:

Lower end plug - zircaloy

Cladding - zircaloy

Absorber - Al_2O_3 - B_4C

Spring - stainless steel, volume fraction of spring inside of clad = 0.2090

Upper end plug - zircaloy

Spider assembly - stainless steel

BPRA Volume Fractions:

The burnable absorber and other material inside the cladding are represented explicitly through region 5 (upper end fitting). This extends beyond the guide tubes. Materials for the remaining regions are homogenized. The volume fractions of these materials (including non-BPRA materials) are given in Table 2-9.

Table 2-9. Volume Fractions in Assemblies with BPRAs - Regions 1-5

	Volume Fractions BPRAs			
Region	SS	Inc	Zr	Water
1	0.0699	0.0	0.0	0.9301
2	0.1827	0.0	0.0	0.8173
3	0.2937	0.0	0.0069	0.6994
4	0.3890	0.0	0.0120	0.5990
5	0.2874	0.0450	0.0083	0.6593

3.0 FUEL CYCLE DESIGN INFORMATION

This section provides fuel assembly design data for cycles 1 through 5 of the Davis-Besse 1 reactor. Material and geometry data for the fuel assembly components are presented in Section 3.1. The fuel assembly locations for cycles 1 through 5, fuel enrichments, and burnable absorber enrichments for each assembly, and control rod bank locations are presented in Section 3.2.

3.1 Fuel Batch Data

Material and geometry data for each fuel batch present in cycles 1-5 are given in Table 3-1. This includes the fuel assembly type, the enrichment and kilograms of uranium in each fuel assembly (by batch), the diameter of the fuel pellets, and the type of fuel assembly grid material. The axial dimensions of the Mk-B4 and Mk-B5 fuel assembly types in Table 3-1 are represented by the Mark-B4 fuel assembly shown in Figure 2-3. Information concerning the use of burnable poison rods and the mode of operation (operated with regulating control banks inserted) is given. The radial dimensions of the fuel clad, instrument tube, and guide tube are also presented. In addition, material and radial dimensions for RCCAs, APSRs, and BPRAs are provided. This data should be used in modeling each fuel assembly type for burnup calculations and the reactor criticality calculations for the statepoints defined in Table 3-2.

The length of each fuel cycle, expressed as effective-full-power-days (EFPD), is provided in Table 3-2. The time during each cycle where statepoint criticality data was measured is also presented.

Table 3-1. Fuel Assembly/Pin/Cycle Description for Cycle 1-5

Cycle	Fresh Fuel Batch	Assembly Type	wt% U235	kgU/ Assembly	FP Pellet OD (cm)	FA Grid Material	APSRs Black/Gray	BP Cycle	Rodded Cycle
1A*	1	Mk-B4	1.98	472.24	0.93345	Inconel	Black	Yes	No
	2	Mk-B4	2.63	472.24	0.93345	Inconel	-	-	-
	3	Mk-B4	2.96	472.24	0.93345	Inconel	-	-	-
1B*	-	-	-	-	-	-	-	No	Yes
2	4	Mk-B4	3.04	468.25	0.93904	Inconel	Black	No	No
3	5a	Mk-B4	3.04	468.25	0.93904	Inconel	Black	No	No
	5b	Mk-B4	2.99	468.25	0.93853	Inconel	-	-	-
4	6	Mk-B4	2.99	468.25	0.93853	Inconel	Black	No	No
5	7	Mk-B5	3.19	468.25	0.93853	Inconel	Black	Yes	No

FP - Fuel Pin; FA - Fuel Assembly; BP - Burnable Poison; OD - outer diameter

* - Cycle 1A (0.0 - 86.7 EFPD) was a BP cycle and operated in a feed and bleed mode (non-rodded). At 86.7 EFPD the BP was removed and Cycle 1B (86.7 - 374.0 EFPD) operated in a rodded mode.

Description	Material	OD(cm)	ID(cm)
Fuel Clad	zircaloy	1.09220	0.95758
Instrument Tube	zircaloy	1.38193	1.12014
Guide Tube	zircaloy	1.34620	1.26492

ID - inner diameter

RCCAs and Black APSRs

Pellet Material	Ag-In-Cd
Fraction of Pellet Materials	Ag(79.8%), In(15.0%), Cd(5.0%)
Pellet Density	10.17 g/cc
Pellet OD	0.99568 cm
Clad Material	SS304
Clad OD	1.11760 cm
Clad ID	1.01092 cm

BPRAs

Pellet Material	Al_2O_3-B_4C
Pellet Density	3.7 g/cc
Pellet OD	0.8636 cm
Clad Material	zircaloy
Clad OD	1.0922 cm
Clad ID	0.9144 cm

Table 3-2. Cycle Length and Time During Cycle Statepoint Data Measured for Cycles 1-5

Cycle	End-of-Cycle EFPD	Statepoint Number	Time of Measurement EFPD
1	374.0	SP39	0.0
		SP40	86.7
		SP41	303.5
2	296.0	-	-
3	272.7	-	-
4	271.7	-	-
5	395.1	SP42	0.0
		SP43	50.4
		SP44	94.9
		SP45	184.9

3.2 Fuel Assembly Data

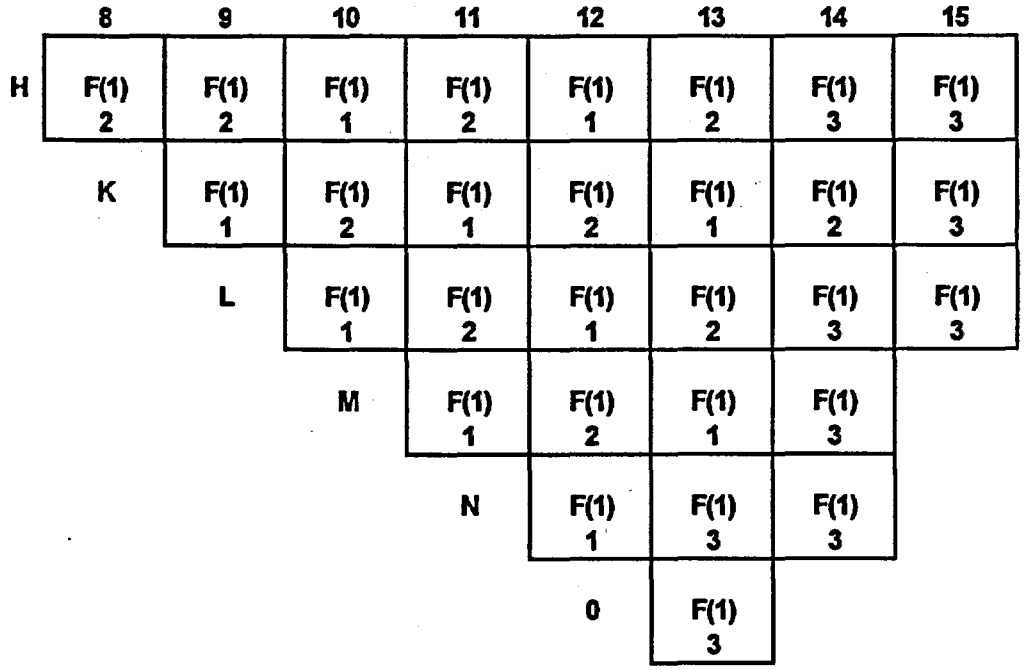
The fuel assembly loadings for each cycle are presented in Figures 3-1 through 3-6. A one-eighth core representation is used, where the fuel assembly at the center of the core is in location H8. Included in these figures are the location of the fuel assemblies in the current cycle, the location in a previous cycle (if applicable), the cycle that the fuel was first inserted, and the fuel batch number for each fuel assembly. The enrichment of U-235 (by batch) and the location of the various control rod banks are also presented for each cycle. In addition, the location of BPRAs and weight percent of B_4C in each BPRA for cycles 1A and 5 are presented in Figure 3-1 and 3-6.

Each fuel assembly is given a unique alphanumeric designation which is then used in tracking the assembly through its entire period of operation. This includes both the time that each fuel assembly was in the reactor during reactor operation (i.e., producing power) and the time spent in a non-power producing mode (e.g., in the reactor during shutdown or in the spent fuel pool).

Starting with the letter A for cycle 1, each subsequent cycle is assigned a unique letter designation (B for cycle 2, C for cycle 3, D for cycle 4, and E for cycle 5). In addition, each one-eighth core location is assigned an unique number. As noted in Table 2-2, the Davis-Besse Unit 1 reactor contains 177 fuel assemblies. Assuming eighth core symmetry reduces this number to 29 fuel assemblies represented. Thus, the locations are numbered 1 through 29. Starting at the center of the core, H8 is location number 1. Location numbers 2 through 8 are assigned to H9 through H15. Proceeding from left to right (then down), K9 becomes location 9, K15 becomes location 15, L10 becomes location 16, M11 becomes location 22, etc., to O13 becomes location 29.

Using this nomenclature, the assemblies in cycle 1 are labeled A1 (for H8) through A29 (for O13). For subsequent cycles, a complete set of labels is not required since a combination of burned and fresh fuel is used. From Figure 3-3 it is seen that the first fresh fuel assembly encountered in cycle 2 is in location H15. Thus, the cycle 2 labeling for new fuel starts with assembly B8. Figures 3-7 through 3-12 were constructed by applying this nomenclature to the fuel assembly location data given in Figures 3-1 through 3-6. Note that the nomenclature accommodates the shuffling of symmetric components of fuel assemblies to two separate locations in the one-eighth core representation. This is seen in Figure 3-9 where assembly A24 from core location M13 (representing 8 fuel assemblies in the core) in cycle 1 was shuffled for cycle 2 to core locations L10 and N12 (each representing 4 fuel assemblies in the core). The assembly represented at N12 was then given the identification A24a.

Figure 3-1. Cycle 1A One-Eighth Core Loading for Davis-Besse 1



CR F(c) B	= Previous FA Position, Column (C), Row (R) - (normalized to 1/8 core) = Cycle (c) FA was Fresh (F) = Fuel Batch (B)

Cycle	Batch	Wt % U-235
1	1	1.98
	2	2.63
	3	2.96

BPRA Loading	Location
1.09 Wt% B4C	L11, M12
1.26 Wt% B4C	H11, H13, K12, L13, N13
1.43 Wt% B4C	H9, K10, K14

Control Rod Bank	Core Location
5	H12, L10 N12
6	H10, L14
7	H8, H14 M11
8	L12

Figure 3-2. Cycle 1B One-Eighth Core Loading for Davis-Besse 1

	8	9	10	11	12	13	14	15
H	F(1) 2	N12* F(1) 1	F(1) 1	F(1) 2	F(1) 1	F(1) 2	F(1) 3	F(1) 3
K		F(1) 1	F(1) 2	F(1) 1	F(1) 2	F(1) 1	F(1) 2	F(1) 3
L			F(1) 1	F(1) 2	F(1) 1	F(1) 2	F(1) 3	F(1) 3
M				F(1) 1	F(1) 2	F(1) 1	F(1) 3	
N					H9* F(1) 2	F(1) 3	F(1) 3	
0						F(1) 3		

* From Cycle 1A

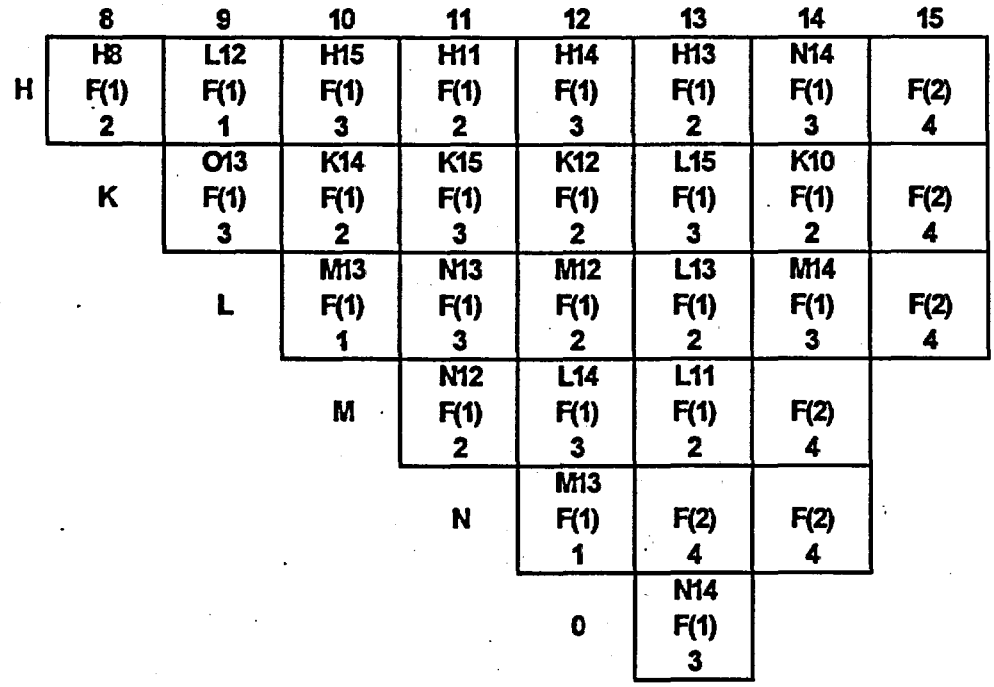
CR F(c) B	= Previous FA Position, Column (C), Row (R) - (normalized to 1/8 core) = Cycle (c) FA was Fresh (F) = Fuel Batch (B)

BPRAs removed at 86.7 EFPD of cycle 1A.
Cycle 1B is from 86.7 EFPD to 374.0 EFPD.

Cycle	Batch	Wt % U-235
1	1	1.98
	2	2.63
	3	2.96

Control Rod Bank	Core Location
5	H10, L14
6	H8, H12, N12
7	H14, L10
8	L12

Figure 3-3. Cycle 2 One-Eighth Core Loading for Davis-Besse 1



CR	= Previous FA Position, Column (C), Row (R) - (normalized to 1/8 core)
F(c)	= Cycle (c) FA was Fresh (F)
B	= Fuel Batch (B)

Cycle	Batch	Wt % U-235
2	1	1.98
	2	2.63
	3	2.96
	4	3.04

NO BPRAs

Control Rod Bank	Core Location
5	K13
6	H10, M11
7	H14, L10, N12
8	L12

Figure 3-4. Cycle 3 One-Eighth Core Loading for Davis-Besse 1

	8	9	10	11	12	13	14	15
H	L10* F(1) 1	H14 F(1) 3	H15 F(2) 4	H12 F(1) 3	F(3) 5B	H9* F(1) 1	O13 F(1) 3	F(3) 5B
K		K15 F(2) 4	L11 F(1) 3	M12 F(1) 3	K11* F(1) 1	N13 F(2) 4	K13 F(1) 3	F(3) 5B
L			K15 F(2) 4	N14 F(2) 4	K13* F(1) 1	L14 F(1) 3	L15 F(2) 4	F(3) 5A
M				K9 F(1) 3	M14 F(2) 4	K11 F(1) 3	F(3) 5B	
N					H10 F(1) 3	F(3) 5B	F(3) 5B	
0						L12* F(1) 1		

* From Cycle 1

CR	= Previous FA Position, Column (C), Row (R) - (normalized to 1/8 core)
F(c)	= Cycle (c) FA was Fresh (F)
B	= Fuel Batch (B)

Cycle	Batch	Wt % U-235
3	1	1.98
	3	2.96
	4	3.04
	5A	3.04
	5B	2.99

NO BPRAs

Control Rod Bank	Core Location
5	H12, M11
6	K13
7	H10, H14, N12
8	L12

Figure 3-5. Cycle 4 One-Eighth Core Loading for Davis-Besse 1

	8	9	10	11	12	13	14	15
H	L10* F(1) 1	M13** F(1) 2	N14 F(3) 5B	H10 F(2) 4	H12 F(3) 5B	L10 F(2) 4	H15 F(3) 5B	F(4) 6
K		N14 F(3) 5B	K9*/M11* F(1) 1	L15 F(3) 5A	M12 F(2) 4	N13 F(3) 5B	L12** F(1) 2	F(4) 6
L			K9 F(2) 4	L14 F(2) 4	L13** F(1) 2	H10*/H12* F(1) 1	F(4) 6	F(4) 6
M				K15 F(3) 5B	L11 F(2) 4	K13 F(2) 4	F(4) 6	
N					K15 F(3) 5B	M14 F(3) 5B	F(4) 6	
0						F(4) 6		

* From Cycle 1
** From Cycle 2

CR	= Previous FA Position, Column (C), Row (R) - (normalized to 1/8 core)
F(c)	= Cycle (c) FA was Fresh (F)
B	= Fuel Batch (B)

Cycle	Batch	Wt % U-235
4	1	1.98
	2	2.63
	4	3.04
	5A	3.04
	5B	2.99
	6	2.99

NO BPRAs

Control Rod Bank	Core Location
5	H12, M11
6	K13
7	H10, H14, N12
8	L12

Figure 3-6. Cycle 5 One-Eighth Core Loading for Davis-Besse 1

	8	9	10	11	12	13	14	15
H	L10* F(1) 1	H10 F(3) 5B	H12 F(3) 5B	F(5) 7	H14 F(3) 5B	F(5) 7	K13 F(3) 5B	H15 F(4) 6
K		N12 F(3) 5B	F(5) 7	L11 F(2) 4	F(5) 7	N13 F(3) 5B	F(5) 7	K15 F(4) 6
L			K13 F(3) 5B	F(5) 7	M12 F(2) 4	F(5) 7	N14 F(4) 6	M14 F(4) 6
M				M11 F(3) 5B	F(5) 7	K11 F(3) 5A	L15 F(4) 6	
N					K9 F(3) 5B	F(5) 7	L14 F(4) 6	
0						O13 F(4) 6		

* From Cycle 1

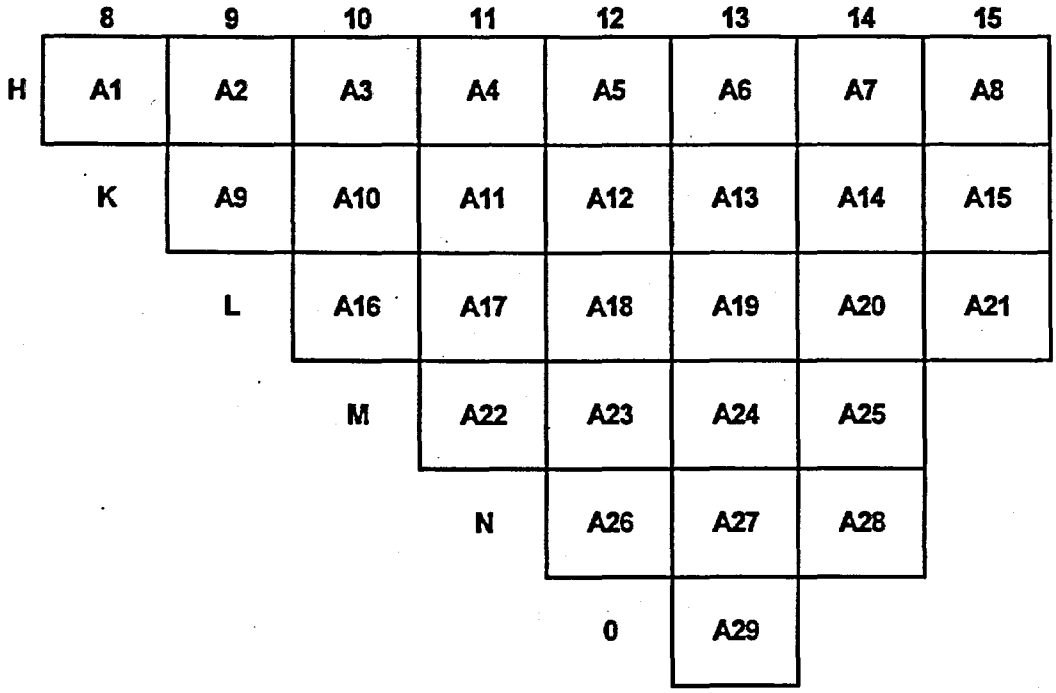
CR	= Previous FA Position, Column (C), Row (R) - (normalized to 1/8 core)
F(c)	= Cycle (c) FA was Fresh (F)
B	= Fuel Batch (B)

Cycle	Batch	Wt % U-235
5	1	1.98
	4	3.04
	5A	3.04
	5B	2.99
	6	2.99
	7	3.19

BPRA Loading	Location
0.2 Wt% B4C	N13
0.5 Wt% B4C	K14, L13
0.8 Wt% B4C	H11, K10, L11, M12
1.1 Wt% B4C	H13, K12

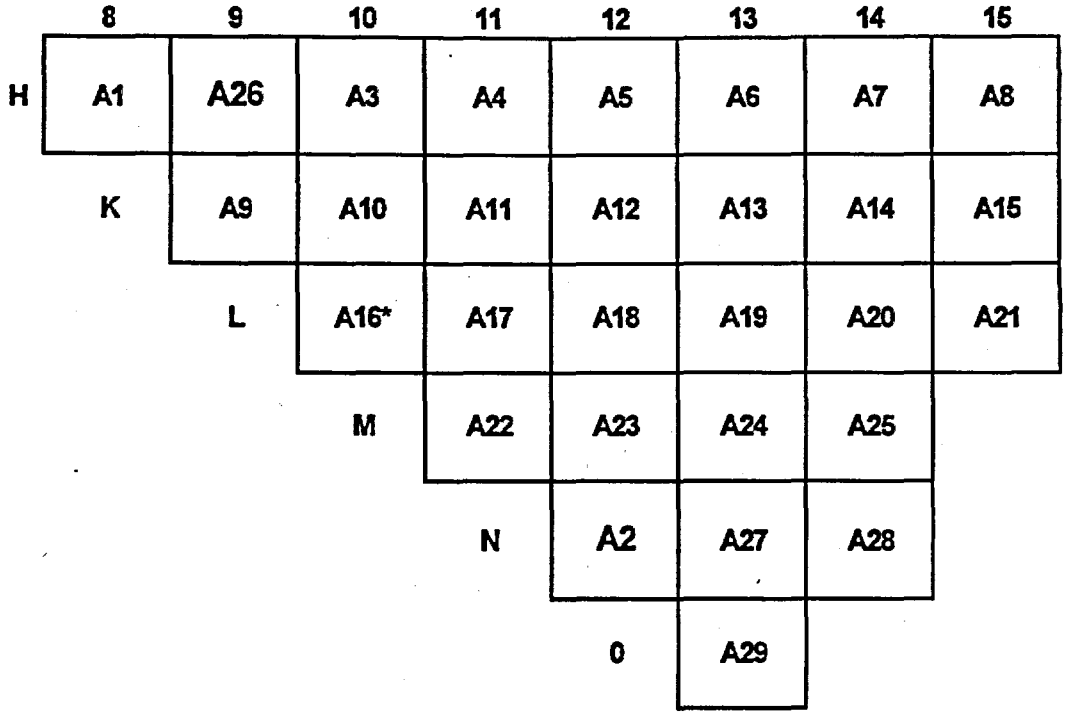
Control Rod Bank	Core Location
5	H12, M11
6	K13
7	H10, H14, N12
8	L12

Figure 3-7. Davis-Besse 1, Cycle 1A Fuel Assembly Identification & Locations



A	Cycle 1A
B	Cycle 2
C	Cycle 3
D	Cycle 4
E	Cycle 5

Figure 3-8. Davis-Besse 1, Cycle 1B Fuel Assembly Identification & Locations



* Assemblies requiring SAS2H depletions for Cycle 5 statepoint calculations

A	Cycle 1B
B	Cycle 2
C	Cycle 3
D	Cycle 4
E	Cycle 5

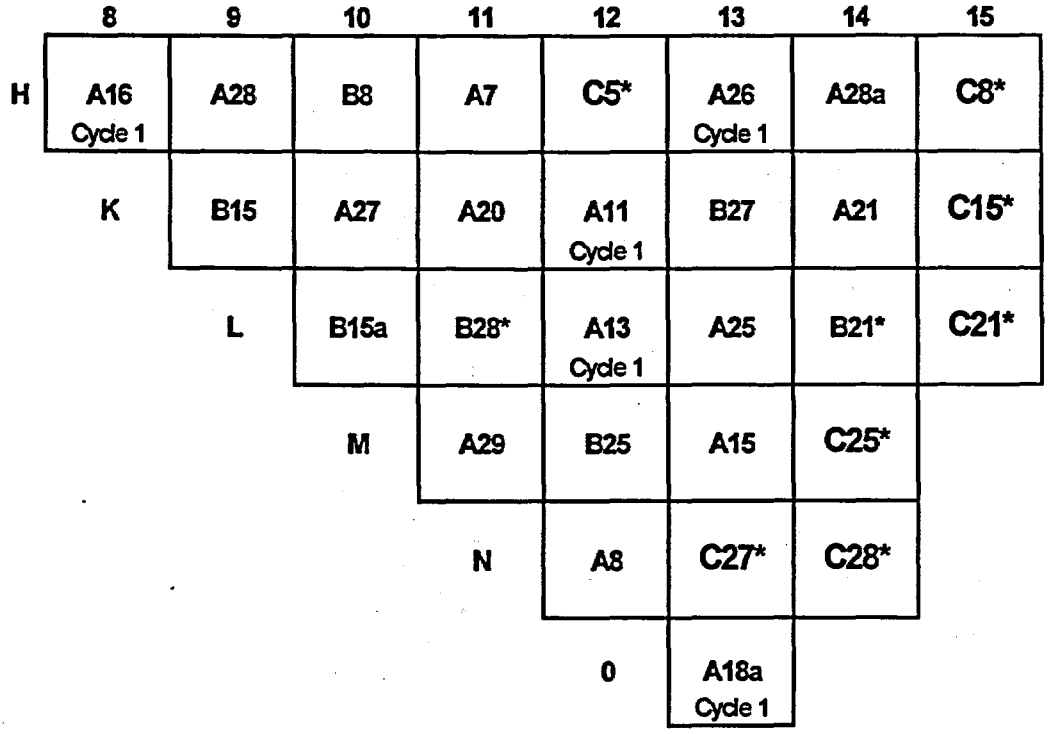
Figure 3-9. Davis-Besse 1, Cycle 2 Fuel Assembly Identification & Locations

	8	9	10	11	12	13	14	15
H	A1	A18	A8	A4	A7	A6	A28	B8
K	A29	A14	A15	A12	A21	A10	B15	
L	A24	A27	A23	A19	A25	B21*		
M	A2	A20	A17	B25				
N	A24a	B27	B28*					
0	A28a							

* Assemblies requiring SAS2H depletions for Cycle 5 statepoint calculations

A	Cycle 1
B	Cycle 2
C	Cycle 3
D	Cycle 4
E	Cycle 5

Figure 3-10. Davis-Besse 1, Cycle 3 Fuel Assembly Identification & Locations



* Assemblies requiring SAS2H depletions for Cycle 5 statepoint calculations

A	Cycle 1
B	Cycle 2
C	**Cycle 3**
D	Cycle 4
E	Cycle 5

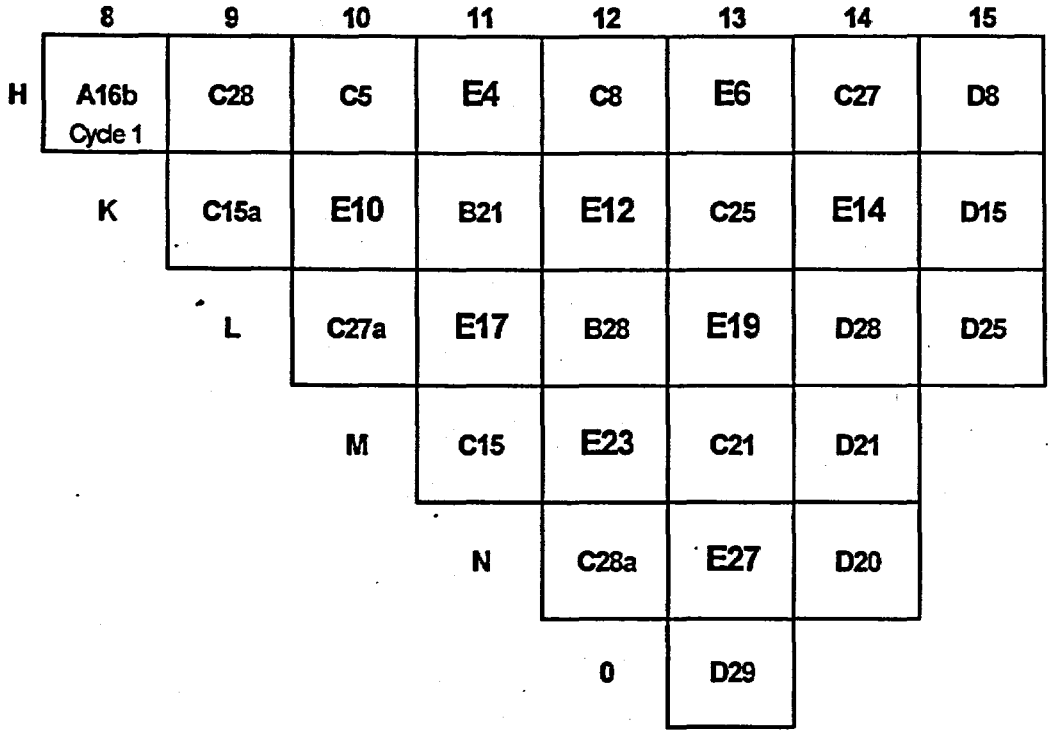
Figure 3-11. Davis-Besse 1, Cycle 4 Fuel Assembly Identification & Locations

	8	9	10	11	12	13	14	15
H	A16a Cycle 1	A17 Cycle 2	C28*	B8	C5*	B15a	C8*	D8*
K		C28a*	A9/A22 Cycle 1	C21*	B25	C27*	A23 Cycle 2	D15*
L			B15	B21*	A19 Cycle 2	A3/A5 Cycle 1	D20*	D21*
M				C15*	B28*	B27	D25*	
N					C15a*	C25*	D28*	
O						D29*		

* Assemblies requiring SAS2H depletions for Cycle 5 statepoint calculations

A	Cycle 1
B	Cycle 2
C	Cycle 3
D	**Cycle 4**
E	Cycle 5

Figure 3-12. Davis-Besse 1, Cycle 5 Fuel Assembly Identification & Locations



A Cycle 1
B Cycle 2
C Cycle 3
D Cycle 4
E Cycle 5

To aid in the burnup calculations, and thus the generation of isotopic data for the statepoint calculations, the information provided in Figures 3-1 through 3-12 was reduced to two tables. Table 3-3 traces each fuel assembly (and subsequent split by shuffling symmetric components to more than one location, if applicable) by assembly identification and cycle from the time the assembly was first inserted in the reactor through cycle 5. Those assemblies which split for a subesquent cycle (i.e., with an "a" designator) carry a hyphen (-) designator in the cycle column to indicate those cycles where the assemblies are present prior to the split. This will aid the burnup calculation process by indicating where redundant data generation is not required. Note that only those fuel assemblies which contribute to the statepoint calculations in cycle 5 are included in this table. These are the fuel assemblies that require burnup calculations. The location of each assembly in each cycle is indicated by the coordinates given in the figures (e.g., H8, K12).

Table 3-4 is a repeat of portions of Table 3-3 where control rod bank indicators (e.g., CR7 for bank 7, CR8 for bank 8 or APSRs) are given for those assemblies that contained control rods during cycle operation. Control rod insertion must be modeled in the burnup calculations for those assemblies and axial locations where rods are inserted. (More data concerning rod insertion time by axial node is given is Section 4). The wt% of B_4C in assemblies that contain burnable absorber (BA) rods (or BPRAs) is also indicated by assembly and cycle. For those cycles and assemblies where neither rod banks nor BPRAs are present, the assembly presence is indicated with an "X".

Table 3-3. Fuel Assembly Locations by Cycle for Burnup Calculations

Assembly Number/Batch	Assembly Location in Cycle					
	1A	1B	2	3	4	5
Cycle 1						
A1/2	H8*	H8				
A2/2	H9	N12*	<= Assembly shuffle for Cycle 1B			
A3/1	H10	H10				
A4/2	H11	H11				
A5/1	H12	H12*				
A6/2	H13	H13				
A7/3	H14*	H14*				
A8/3	H15	H15				
A9/1	K9	K9				
A10/2	K10	K10				
A11/1	K11	K11				
A12/2	K12	K12				
A13/1	K13	K13				
A14/2	K14	K14				
A15/3	K15	K15				
A16/1	L10	L10*				
A16b/1	-	-				H8
A17/2	L11	L11				
A18/1	L12*	L12*				
A19/2	L13	L13				
A20/3	L14	L14				
A21/3	L15	L15				
A22/1	M11*	M11				
A23/2	M12	M12				
A24/1	M13	M13				
A25/3	M14	M14				
A26/1	N12	H9	<= Assembly shuffle for Cycle 1B			
A27/3	N13	N13				
A28/3	N14	N14				
A29/3	O13	O13				

* Contains control rod. See Table 3-4.

Table 3-3. Fuel Assembly Locations by Cycle for Burnup Calculations (Cont'd)

Assembly Number/Batch	Assembly Location in Cycle					
	1A	1B	2	3	4	5
Cycle 2						
B21/4			L15	L14	L11	K11
B28/4			N14	L11	M12	L12*
Cycle 3						
C5/5B				H12	H12	H10*
C8/5B				H15	H14*	H12
C15/5B				K15	M11	M11
C15a/5B				-	N12*	K9
C21/5A				L15	K11	M13
C25/5B				M14	N13	K13
C27/5B				N13	K13	H14*
C27a/5B				-	-	L10
C28/5B				N14	H10*	H9
C28a/5B				-	K9	N12*
Cycle 4						
D8/6					H15	H15
D15/6					K15	K15
D20/6					L14	N14
D21/6					L15	M14
D25/6					M14	L15
D28/6					N14	L14
D29/6					O13	O13
Cycle 5						
E4/7						H11
E6/7						H13
E10/7						K10
E12/7						K12
E14/7						K14
E17/7						L11
E19/7						L13
E23/7						M12
E27/7						N13

* Contains control rod. See Table 3-4.

Table 3-4. Control Rod and BA Loading by Cycle for Burnup Calculations

Assembly Number/Batch	Wt% B4C or Rod Bank ID/ Assembly Location in Cycle					
	1A	1B	2	3	4	5
Cycle 1						
A1/2	CR7/H8	CR6/H8				
A2/2	1.43/H9	CR6/N12				
A4/2	1.26/H11	X				
A5/1	X	CR6/H12				
A6/2	1.26/H13	X				
A7/3	CR7/H14	CR7/H14				
A10	1.43/K10	X				
A12/2	1.26/K12	X				
A14/2	1.43/K14	X				
A16b/1	X	CR7/L10				X
A17/2	1.09/L11	X				
A18/1	CR8/L12	CR8/L12				
A19/2	1.26/L13	X				
A22/1	CR7/M11	X				
A23/2	1.09/M12	X				
A27/3	1.26/N13	X				
Cycle 2						
B28/4			X	X	X	CR8/L12
Cycle 3						
C5/5B				X	X	CR7/H10
C8/5B				X	CR7/H14	X
C15a/5B				-	CR7/N12	X
C27/5B				X	X	CR7/H14
C28/5B				X	CR7/H10	X
C28a/5B				-	X	CR7/N12
Cycle 4 No assemblies inserted in Cycle 4 contained BPRAs or control rods						
Cycle 5						
E4/7						0.8/H11
E6/7						1.1/H13
E10/7						0.8/K10
E12/7						1.1/K12
E14/7						0.5/K14
E17/7						0.8/L11
E19/7						0.5/L13
E23/7						0.8/M12
E27/7						0.2/N13

4.0 CORE OPERATIONS AND STATEPOINT INFORMATION

This section provides core operations data for the burnup calculations required to generate isotopic concentrations for the statepoint evaluations. The measured critical conditions for the statepoints evaluated are also contained in this section.

4.1 Core Follow Data

The use of commercial reactor criticality data for model validation requires detailed knowledge of how the reactor was operated for the lifetime of every fuel assembly contributing to the criticality database. This is necessary in order to adequately model the conditions for burnup calculations at each axial location of each fuel assembly represented in the reactor core for each statepoint evaluation. Thus, core follow calculations based on core operation data are used to provide local conditions as a function of time to be used for all burnup calculations performed in support of the statepoint evaluations. In addition, measured global data such as rod insertions and boron letdown data are also provided.

The core follow calculations provide three-dimensional thermal-hydraulic (TH) feedback and burnup data. These data are presented at axial node locations. The nodal spacings for the axial nodes are presented in Table 4-1, where node 1 represents the top axial node in the reactor core. Tables 4-2 through 4-58 provide axial burnup profiles for each assembly at each datapoint or statepoint along with axial fuel temperature and moderator specific volume distributions used in the burnup calculations between datapoints or statepoints. The statepoint evaluations for Davis-Besse 1 occur at beginning-of-life (0 EFPD of cycle 1), 86.7 EFPD and 303.5 EFPD of cycle 1, the beginning of cycle 5 (0 EFPD), and 50.4 EFPD, 94.9 EFPD, and 184.9 EFPD of cycle 5. Some of the fuel assemblies present in cycle 5 for the statepoint evaluations were initially inserted in the core in each of the 5 cycles. The modeling of fuel assembly operating history for assemblies which were first inserted prior to cycle 5 requires burnup, fuel temperature, and moderator specific volume data for the cycles since the fuel was first inserted into the core. These data are provided at datapoints for cycles 2 through 4 and at statepoints for cycles 1 and 5. The data is given by axial node location.

Control rod insertion time (by axial node) for each assembly with a control rod inserted during core operation is provided in Tables 4-59 through 4-72. This data was also obtained from the core follow calculations based on core operations data. In addition, boron letdown data for cycles 1-5 are provided in Table 4-73.

Table 4-1. Axial Node Spacings for Davis-Besse 1 Burnup Calculations

Axial Node	Node Spacing (cm)
1	21.8440
2	20.0025
3	20.0025
4	20.0025
5	20.0025
6	20.0025
7	20.0025
8	20.0025
9	20.0025
10	20.0025
11	20.0025
12	20.0025
13	20.0025
14	20.0025
15	20.0025
16	20.0025
17	20.0025
18	21.8440

Table 4-2. Burnup and TH Feedback Parameters by Axial Node for Assembly A1

Axial	Burnup	SP39 to SP40		Burnup	SP40 to SP41	
Node	SP40	T-Fuel	Spec.Vol	SP41	T-Fuel	Spec.Vol
1	0.776	789.1	0.0243	5.245	1120.6	0.0242
2	1.709	1004.6	0.0243	9.366	1344.0	0.0240
3	3.228	1259.1	0.0241	12.571	1386.2	0.0239
4	4.195	1406.0	0.0240	14.096	1378.1	0.0237
5	4.820	1496.8	0.0238	14.795	1361.8	0.0235
6	5.224	1542.9	0.0236	15.103	1344.4	0.0233
7	5.453	1566.3	0.0234	15.215	1330.3	0.0232
8	5.547	1572.3	0.0233	15.231	1320.0	0.0230
9	5.540	1566.0	0.0231	15.205	1313.7	0.0229
10	5.463	1552.1	0.0229	15.169	1309.9	0.0227
11	5.346	1534.2	0.0227	15.137	1308.0	0.0226
12	5.204	1513.8	0.0226	15.105	1308.4	0.0224
13	5.030	1489.3	0.0224	15.039	1311.8	0.0223
14	4.793	1455.5	0.0223	14.854	1316.4	0.0221
15	4.440	1395.2	0.0221	14.384	1318.4	0.0220
16	3.906	1302.7	0.0220	13.318	1301.8	0.0219
17	3.119	1166.6	0.0219	11.104	1230.8	0.0218
18	1.828	929.1	0.0218	6.629	1021.1	0.0217

Table 4-3. Burnup and TH Feedback Parameters by Axial Node for Assembly A2

Axial	Burnup	SP39 to SP40		Burnup	SP40 to SP41	
Node	SP40	T-Fuel	Spec.Vol	SP41	T-Fuel	Spec.Vol
1	1.070	844.0	0.0239	5.038	1063.5	0.0239
2	1.903	1019.4	0.0239	8.807	1272.9	0.0238
3	2.837	1183.4	0.0238	11.453	1331.4	0.0237
4	3.612	1305.6	0.0236	12.855	1335.4	0.0235
5	4.149	1387.7	0.0235	13.536	1323.2	0.0233
6	4.494	1438.0	0.0233	13.833	1310.0	0.0232
7	4.686	1462.8	0.0232	13.901	1299.0	0.0230
8	4.754	1467.0	0.0230	13.816	1287.8	0.0229
9	4.730	1458.1	0.0229	13.648	1273.9	0.0228
10	4.644	1440.6	0.0227	13.491	1260.2	0.0226
11	4.526	1419.1	0.0226	13.417	1251.2	0.0225
12	4.393	1395.9	0.0224	13.448	1249.4	0.0224
13	4.239	1369.5	0.0223	13.540	1257.5	0.0222
14	4.036	1334.0	0.0222	13.552	1273.5	0.0221
15	3.735	1280.7	0.0221	13.252	1284.2	0.0220
16	3.278	1199.5	0.0220	12.313	1272.0	0.0219
17	2.625	1084.0	0.0219	10.255	1200.6	0.0218
18	1.728	909.6	0.0218	6.245	991.2	0.0217

Datapoint or Statepoint

Statepoint	EFPD / Cycle
SP39	0.0 / Cy1
SP40	86.7 / Cy1
SP41	303.5 / Cy1

Burnup	- GWd/MTU
T-Fuel	- °F
Spec. Vol.	- ft^3 / lbm

Table 4-4. Burnup and TH Feedback Parameters by Axial Node for Assembly A3

Axial	Burnup	SP39 to SP40		Burnup	SP40 to SP41	
Node	SP40	T-Fuel	Spec.Vol	SP41	T-Fuel	Spec.Vol
1	0.672	756.4	0.0237	4.734	1039.0	0.0238
2	1.500	959.7	0.0237	8.335	1248.4	0.0237
3	2.693	1156.5	0.0236	10.831	1310.9	0.0236
4	3.432	1269.8	0.0235	12.077	1318.6	0.0234
5	3.915	1343.8	0.0233	12.654	1305.7	0.0233
6	4.224	1388.2	0.0232	12.887	1289.5	0.0231
7	4.386	1408.1	0.0231	12.935	1276.3	0.0230
8	4.426	1408.0	0.0229	12.880	1266.8	0.0228
9	4.371	1393.3	0.0228	12.772	1259.7	0.0227
10	4.256	1371.0	0.0226	12.660	1254.4	0.0226
11	4.121	1347.3	0.0225	12.582	1251.0	0.0225
12	3.989	1325.4	0.0224	12.549	1250.5	0.0223
13	3.856	1303.5	0.0223	12.529	1253.8	0.0222
14	3.693	1275.5	0.0222	12.430	1259.7	0.0221
15	3.444	1231.0	0.0221	12.082	1261.8	0.0220
16	3.043	1159.1	0.0220	11.196	1244.3	0.0219
17	2.430	1050.3	0.0219	9.298	1171.5	0.0218
18	1.420	848.8	0.0218	5.495	968.4	0.0217

Table 4-5. Burnup and TH Feedback Parameters by Axial Node for Assembly A4

Axial	Burnup	SP39 to SP40		Burnup	SP40 to SP41	
Node	SP40	T-Fuel	Spec.Vol	SP41	T-Fuel	Spec.Vol
1	1.196	860.1	0.0237	5.795	1095.0	0.0242
2	2.028	1031.3	0.0237	9.731	1315.3	0.0241
3	2.833	1171.9	0.0236	12.098	1391.4	0.0239
4	3.498	1277.7	0.0235	13.371	1394.9	0.0237
5	3.974	1350.8	0.0233	13.966	1382.5	0.0235
6	4.279	1394.7	0.0232	14.192	1369.0	0.0234
7	4.432	1412.3	0.0230	14.206	1358.0	0.0232
8	4.447	1406.9	0.0229	14.085	1349.0	0.0230
9	4.347	1383.7	0.0228	13.886	1340.0	0.0229
10	4.179	1352.5	0.0226	13.692	1331.2	0.0227
11	4.005	1323.7	0.0225	13.582	1325.6	0.0226
12	3.863	1301.6	0.0224	13.585	1324.3	0.0224
13	3.749	1284.5	0.0223	13.660	1329.4	0.0223
14	3.626	1264.5	0.0222	13.682	1337.1	0.0222
15	3.422	1227.8	0.0221	13.420	1341.8	0.0220
16	3.049	1160.0	0.0220	12.526	1328.6	0.0219
17	2.456	1054.1	0.0219	10.474	1250.1	0.0218
18	1.605	884.5	0.0218	6.384	1026.2	0.0217

Datapoint or Statepoint	EFPD / Cycle
SP39	0.0 / Cy1
SP40	86.7 / Cy1
SP41	303.5 / Cy1

Burnup	- GWd/MTU
T-Fuel	- °F
Spec. Vol.	- ft^3 / lbm

Table 4-6. Burnup and TH Feedback Parameters by Axial Node for Assembly A5

Axial	Burnup	SP39 to SP40		Burnup	SP40 to SP41	
Node	SP40	T-Fuel	Spec.Vol	SP41	T-Fuel	Spec.Vol
1	1.141	843.7	0.0236	4.877	1041.6	0.0238
2	2.063	1028.3	0.0236	8.567	1247.9	0.0237
3	2.808	1159.2	0.0235	10.935	1313.7	0.0236
4	3.426	1257.4	0.0234	12.141	1323.3	0.0234
5	3.882	1326.3	0.0233	12.707	1312.0	0.0233
6	4.174	1367.3	0.0231	12.925	1297.5	0.0231
7	4.317	1382.9	0.0230	12.931	1285.6	0.0230
8	4.323	1375.3	0.0228	12.786	1275.4	0.0228
9	4.209	1349.3	0.0227	12.545	1264.6	0.0227
10	4.024	1315.7	0.0226	12.304	1255.0	0.0226
11	3.843	1286.8	0.0225	12.164	1248.8	0.0225
12	3.707	1266.9	0.0224	12.164	1247.5	0.0223
13	3.610	1254.2	0.0223	12.263	1253.3	0.0222
14	3.516	1240.7	0.0222	12.331	1264.9	0.0221
15	3.348	1210.6	0.0221	12.133	1271.3	0.0220
16	3.003	1148.2	0.0220	11.332	1255.4	0.0219
17	2.411	1043.6	0.0219	9.446	1182.6	0.0218
18	1.406	843.8	0.0218	5.587	977.9	0.0217

Table 4-7. Burnup and TH Feedback Parameters by Axial Node for Assembly A6

Axial	Burnup	SP39 to SP40		Burnup	SP40 to SP41	
Node	SP40	T-Fuel	Spec.Vol	SP41	T-Fuel	Spec.Vol
1	1.159	849.8	0.0238	5.374	1066.4	0.0242
2	1.997	1018.2	0.0237	9.239	1299.4	0.0241
3	2.845	1164.7	0.0236	11.700	1389.3	0.0239
4	3.556	1274.4	0.0235	13.038	1398.5	0.0237
5	4.061	1349.0	0.0234	13.668	1386.7	0.0235
6	4.384	1393.4	0.0232	13.920	1373.5	0.0234
7	4.552	1412.2	0.0231	13.961	1363.2	0.0232
8	4.583	1408.9	0.0229	13.865	1354.9	0.0230
9	4.500	1388.6	0.0228	13.690	1347.3	0.0229
10	4.350	1360.9	0.0227	13.517	1340.3	0.0227
11	4.193	1335.8	0.0225	13.425	1335.8	0.0226
12	4.064	1317.2	0.0224	13.443	1335.3	0.0224
13	3.958	1303.0	0.0223	13.530	1340.0	0.0223
14	3.837	1285.1	0.0222	13.563	1348.1	0.0222
15	3.626	1249.3	0.0221	13.315	1353.3	0.0220
16	3.229	1180.4	0.0220	12.438	1341.3	0.0219
17	2.596	1070.8	0.0219	10.424	1260.9	0.0218
18	1.688	896.0	0.0218	6.387	1031.3	0.0217

Datapoint or Statepoint	EFPD / Cycle
SP39	0.0 / Cy1
SP40	86.7 / Cy1
SP41	303.5 / Cy1

Burnup	- GWd/MTU
T-Fuel	- °F
Spec. Vol.	- ft^3 / lbm

Table 4-8. Burnup and TH Feedback Parameters by Axial Node for Assembly A7

Axial	Burnup	SP39 to SP40		Burnup	SP40 to SP41	
Node	SP40	T-Fuel	Spec.Vol	SP41	T-Fuel	Spec.Vol
1	0.735	771.1	0.0241	3.564	917.8	0.0242
2	1.646	973.5	0.0240	7.515	1245.7	0.0241
3	3.118	1212.8	0.0239	10.850	1377.4	0.0239
4	4.051	1346.5	0.0238	12.372	1394.1	0.0237
5	4.650	1429.1	0.0236	13.073	1383.4	0.0235
6	5.033	1476.2	0.0235	13.397	1368.7	0.0234
7	5.246	1496.6	0.0233	13.520	1357.2	0.0232
8	5.321	1498.6	0.0231	13.524	1349.2	0.0230
9	5.289	1488.7	0.0230	13.462	1343.8	0.0229
10	5.191	1472.8	0.0228	13.381	1340.5	0.0227
11	5.070	1455.6	0.0227	13.329	1339.5	0.0226
12	4.951	1440.5	0.0225	13.321	1341.4	0.0224
13	4.827	1424.2	0.0224	13.330	1347.1	0.0223
14	4.659	1400.2	0.0222	13.263	1355.4	0.0222
15	4.373	1355.5	0.0221	12.936	1359.7	0.0220
16	3.879	1275.4	0.0220	12.034	1343.7	0.0219
17	3.087	1144.9	0.0219	10.073	1262.3	0.0218
18	1.774	909.3	0.0218	6.196	1028.4	0.0217

Table 4-9. Burnup and TH Feedback Parameters by Axial Node for Assembly A8

Axial	Burnup	SP39 to SP40		Burnup	SP40 to SP41	
Node	SP40	T-Fuel	Spec.Vol	SP41	T-Fuel	Spec.Vol
1	0.680	742.4	0.0233	3.078	863.4	0.0232
2	1.403	886.6	0.0232	5.676	1049.4	0.0231
3	2.133	1016.8	0.0232	7.446	1131.4	0.0230
4	2.725	1109.0	0.0231	8.453	1150.3	0.0229
5	3.130	1168.7	0.0230	8.948	1145.8	0.0228
6	3.388	1202.9	0.0229	9.174	1136.0	0.0227
7	3.533	1219.2	0.0228	9.259	1127.4	0.0226
8	3.589	1222.6	0.0227	9.269	1121.3	0.0225
9	3.580	1217.1	0.0226	9.241	1117.4	0.0224
10	3.529	1206.8	0.0225	9.205	1115.0	0.0223
11	3.459	1195.3	0.0224	9.180	1114.3	0.0222
12	3.381	1183.9	0.0223	9.171	1115.5	0.0221
13	3.290	1171.0	0.0222	9.156	1118.9	0.0221
14	3.162	1151.3	0.0221	9.072	1123.2	0.0220
15	2.952	1116.2	0.0220	8.798	1123.1	0.0219
16	2.602	1056.1	0.0219	8.124	1105.5	0.0218
17	2.041	957.7	0.0219	6.706	1038.8	0.0217
18	1.132	784.3	0.0218	3.911	863.2	0.0217

Datapoint or Statepoint	EFPD / Cycle
SP39	0.0 / Cy1
SP40	86.7 / Cy1
SP41	303.5 / Cy1

Burnup	- GWd/MTU
T-Fuel	- °F
Spec. Vol.	- ft^3 / lbm

Table 4-10. Burnup and TH Feedback Parameters by Axial Node for Assembly A9

Axial	Burnup	SP39 to SP40		Burnup	SP40 to SP41	
Node	SP40	T-Fuel	Spec.Vol	SP41	T-Fuel	Spec.Vol
1	1.026	830.7	0.0238	5.056	1035.1	0.0239
2	1.940	1020.1	0.0237	8.741	1243.1	0.0237
3	2.784	1169.9	0.0236	10.969	1315.9	0.0236
4	3.491	1281.8	0.0235	12.195	1324.0	0.0234
5	3.992	1358.3	0.0234	12.782	1309.9	0.0233
6	4.313	1404.7	0.0232	13.024	1292.7	0.0231
7	4.487	1426.6	0.0231	13.088	1278.9	0.0230
8	4.541	1429.2	0.0229	13.058	1269.3	0.0229
9	4.505	1417.8	0.0228	12.982	1262.6	0.0227
10	4.409	1398.6	0.0227	12.900	1258.0	0.0226
11	4.286	1376.6	0.0225	12.838	1255.3	0.0225
12	4.156	1354.5	0.0224	12.801	1255.2	0.0223
13	4.014	1330.4	0.0223	12.758	1258.4	0.0222
14	3.831	1298.6	0.0222	12.626	1263.9	0.0221
15	3.557	1250.0	0.0221	12.245	1265.9	0.0220
16	3.132	1174.3	0.0220	11.335	1248.7	0.0219
17	2.498	1062.0	0.0219	9.421	1176.0	0.0218
18	1.460	856.8	0.0218	5.579	972.7	0.0217

Table 4-11. Burnup and TH Feedback Parameters by Axial Node for Assembly A10

Axial	Burnup	SP39 to SP40		Burnup	SP40 to SP41	
Node	SP40	T-Fuel	Spec.Vol	SP41	T-Fuel	Spec.Vol
1	1.160	855.5	0.0237	5.541	1072.0	0.0242
2	1.972	1023.9	0.0237	9.434	1304.6	0.0241
3	2.789	1167.8	0.0236	11.846	1394.9	0.0239
4	3.470	1276.4	0.0235	13.137	1402.3	0.0237
5	3.956	1351.3	0.0233	13.735	1389.5	0.0235
6	4.267	1396.5	0.0232	13.968	1375.2	0.0234
7	4.427	1416.0	0.0231	14.001	1363.6	0.0232
8	4.457	1413.6	0.0229	13.918	1354.7	0.0230
9	4.381	1395.0	0.0228	13.771	1347.2	0.0229
10	4.241	1368.2	0.0226	13.624	1340.9	0.0227
11	4.086	1341.7	0.0225	13.533	1336.8	0.0226
12	3.947	1319.1	0.0224	13.520	1336.2	0.0224
13	3.820	1298.7	0.0223	13.546	1339.7	0.0223
14	3.671	1273.6	0.0222	13.505	1346.2	0.0222
15	3.440	1231.8	0.0221	13.194	1350.1	0.0220
16	3.047	1160.7	0.0220	12.284	1336.0	0.0219
17	2.451	1054.2	0.0219	10.274	1254.3	0.0218
18	1.616	887.4	0.0218	6.300	1026.0	0.0217

Datapoint or Statepoint	EFPD / Cycle
SP39	0.0 / Cy1
SP40	86.7 / Cy1
SP41	303.5 / Cy1

Burnup	- GWd/MTU
T-Fuel	- °F
Spec. Vol.	- ft^3 / lbm

Table 4-12. Burnup and TH Feedback Parameters by Axial Node for Assembly A11

Axial	Burnup	SP39 to SP40		Burnup	SP40 to SP41	
Node	SP40	T-Fuel	Spec.Vol	SP41	T-Fuel	Spec.Vol
1	1.104	837.9	0.0236	5.086	1029.4	0.0238
2	2.014	1022.6	0.0236	8.754	1237.8	0.0237
3	2.770	1157.0	0.0235	10.919	1314.8	0.0236
4	3.395	1256.9	0.0234	12.095	1327.3	0.0234
5	3.848	1326.3	0.0232	12.655	1316.3	0.0233
6	4.136	1367.4	0.0231	12.865	1301.6	0.0231
7	4.273	1382.5	0.0230	12.856	1289.6	0.0230
8	4.268	1373.0	0.0228	12.674	1278.1	0.0228
9	4.131	1341.9	0.0227	12.366	1264.0	0.0227
10	3.910	1302.3	0.0226	12.052	1251.5	0.0226
11	3.707	1270.4	0.0225	11.875	1244.5	0.0225
12	3.566	1249.6	0.0223	11.875	1243.0	0.0223
13	3.475	1237.8	0.0222	12.011	1250.5	0.0222
14	3.401	1228.2	0.0221	12.142	1266.7	0.0221
15	3.265	1202.2	0.0221	12.003	1275.1	0.0220
16	2.942	1141.8	0.0220	11.231	1258.6	0.0219
17	2.367	1038.1	0.0219	9.368	1184.5	0.0218
18	1.381	840.4	0.0218	5.545	978.1	0.0217

Table 4-13. Burnup and TH Feedback Parameters by Axial Node for Assembly A12

Axial	Burnup	SP39 to SP40		Burnup	SP40 to SP41	
Node	SP40	T-Fuel	Spec.Vol	SP41	T-Fuel	Spec.Vol
1	1.252	865.5	0.0236	5.782	1087.1	0.0241
2	2.079	1030.9	0.0235	9.678	1305.6	0.0240
3	2.823	1161.4	0.0235	11.984	1383.4	0.0238
4	3.453	1261.9	0.0233	13.228	1389.9	0.0236
5	3.917	1332.6	0.0232	13.816	1377.9	0.0235
6	4.212	1374.3	0.0231	14.027	1365.4	0.0233
7	4.348	1388.9	0.0229	13.982	1355.5	0.0231
8	4.326	1374.7	0.0228	13.683	1342.8	0.0230
9	4.132	1330.3	0.0227	13.163	1317.6	0.0228
10	3.808	1274.3	0.0226	12.633	1295.6	0.0227
11	3.555	1237.4	0.0225	12.377	1285.3	0.0225
12	3.413	1217.8	0.0223	12.435	1282.3	0.0224
13	3.347	1212.5	0.0223	12.752	1293.9	0.0223
14	3.337	1218.7	0.0222	13.142	1326.8	0.0222
15	3.296	1206.8	0.0221	13.205	1340.5	0.0220
16	3.007	1150.5	0.0220	12.451	1327.6	0.0219
17	2.437	1048.5	0.0219	10.438	1249.4	0.0218
18	1.592	880.3	0.0218	6.363	1025.8	0.0217

Datapoint or Statepoint	EFPD / Cycle
SP39	0.0 / Cy1
SP40	86.7 / Cy1
SP41	303.5 / Cy1

Burnup	- GWd/MTU
T-Fuel	- °F
Spec. Vol.	- ft^3 / lbm

Table 4-14. Burnup and TH Feedback Parameters by Axial Node for Assembly A13

Axial	Burnup	SP39 to SP40		Burnup	SP40 to SP41	
Node	SP40	T-Fuel	Spec.Vol	SP41	T-Fuel	Spec.Vol
1	1.032	821.3	0.0236	4.859	1015.2	0.0238
2	1.928	1000.9	0.0235	8.427	1222.8	0.0237
3	2.718	1139.8	0.0235	10.579	1299.0	0.0235
4	3.374	1240.9	0.0233	11.770	1312.0	0.0234
5	3.844	1310.0	0.0232	12.346	1301.9	0.0232
6	4.142	1350.7	0.0231	12.575	1288.2	0.0231
7	4.290	1366.6	0.0230	12.588	1277.0	0.0230
8	4.300	1359.2	0.0228	12.431	1266.3	0.0228
9	4.183	1331.8	0.0227	12.152	1252.9	0.0227
10	3.984	1296.6	0.0226	11.867	1241.2	0.0226
11	3.802	1268.8	0.0225	11.713	1234.9	0.0224
12	3.676	1251.4	0.0224	11.730	1233.9	0.0223
13	3.592	1242.0	0.0223	11.873	1241.7	0.0222
14	3.518	1233.8	0.0222	12.007	1257.8	0.0221
15	3.374	1208.5	0.0221	11.870	1266.3	0.0220
16	3.035	1148.0	0.0220	11.106	1250.2	0.0219
17	2.434	1043.2	0.0219	9.261	1177.1	0.0218
18	1.415	843.2	0.0218	5.477	972.0	0.0217

Table 4-15. Burnup and TH Feedback Parameters by Axial Node for Assembly A14

Axial	Burnup	SP39 to SP40		Burnup	SP40 to SP41	
Node	SP40	T-Fuel	Spec.Vol	SP41	T-Fuel	Spec.Vol
1	0.916	798.8	0.0236	4.638	1008.1	0.0239
2	1.667	951.2	0.0235	8.099	1233.0	0.0238
3	2.513	1102.1	0.0234	10.361	1321.1	0.0237
4	3.211	1206.9	0.0233	11.612	1338.6	0.0235
5	3.690	1275.8	0.0232	12.208	1330.2	0.0233
6	3.994	1316.9	0.0231	12.461	1317.1	0.0232
7	4.158	1335.6	0.0230	12.530	1306.3	0.0230
8	4.205	1336.0	0.0228	12.489	1298.3	0.0229
9	4.160	1323.1	0.0227	12.389	1291.9	0.0228
10	4.058	1303.9	0.0226	12.289	1286.9	0.0226
11	3.943	1285.2	0.0225	12.240	1284.3	0.0225
12	3.838	1270.0	0.0224	12.258	1285.0	0.0224
13	3.738	1256.2	0.0223	12.309	1290.5	0.0222
14	3.609	1237.1	0.0222	12.292	1299.1	0.0221
15	3.389	1201.2	0.0221	12.018	1302.7	0.0220
16	3.001	1135.5	0.0220	11.185	1284.4	0.0219
17	2.396	1030.9	0.0219	9.336	1206.0	0.0218
18	1.552	867.0	0.0218	5.696	988.6	0.0217

Datapoint or Statepoint	EFPD / Cycle
SP39	0.0 / Cyl
SP40	86.7 / Cyl
SP41	303.5 / Cyl

Burnup	- GWd/MTU
T-Fuel	- °F
Spec. Vol.	- ft^3 / lbm

Table 4-16. Burnup and TH Feedback Parameters by Axial Node for Assembly A15

Axial	Burnup	SP39 to SP40		Burnup	SP40 to SP41	
Node	SP40	T-Fuel	Spec.Vol	SP41	T-Fuel	Spec.Vol
1	0.656	735.1	0.0231	3.093	862.7	0.0231
2	1.328	868.8	0.0231	5.563	1033.6	0.0230
3	1.976	986.4	0.0230	7.160	1104.7	0.0229
4	2.511	1070.8	0.0230	8.079	1122.3	0.0228
5	2.883	1126.2	0.0229	8.539	1118.3	0.0227
6	3.119	1158.9	0.0228	8.745	1109.2	0.0226
7	3.250	1174.1	0.0227	8.818	1101.0	0.0226
8	3.297	1176.6	0.0226	8.817	1095.1	0.0225
9	3.282	1170.2	0.0225	8.779	1090.9	0.0224
10	3.228	1159.2	0.0224	8.736	1088.2	0.0223
11	3.158	1147.4	0.0223	8.708	1087.1	0.0222
12	3.083	1136.0	0.0222	8.702	1087.9	0.0221
13	2.999	1123.4	0.0222	8.693	1091.1	0.0220
14	2.883	1105.0	0.0221	8.621	1095.1	0.0219
15	2.692	1072.8	0.0220	8.364	1094.5	0.0219
16	2.372	1017.0	0.0219	7.719	1076.4	0.0218
17	1.862	924.9	0.0219	6.356	1012.3	0.0217
18	1.041	767.0	0.0218	3.691	844.4	0.0217

Table 4-17. Burnup and TH Feedback Parameters by Axial Node for Assembly A16b*

Axial	Burnup	SP39 to SP40		Burnup	SP40 to SP41		Burnup	SP41 to SP42	
Node	SP40	T-Fuel	Spec.Vol	SP41	T-Fuel	Spec.Vol	SP42	T-Fuel	Spec.Vol
1	1.081	834.5	0.0236	3.758	891.9	0.0239	4.795	963.8	0.0238
2	1.986	1018.6	0.0236	7.543	1201.8	0.0238	9.545	1215.6	0.0237
3	2.753	1155.8	0.0235	10.142	1337.6	0.0237	12.640	1263.4	0.0236
4	3.389	1257.8	0.0234	11.351	1361.3	0.0235	14.037	1258.2	0.0234
5	3.847	1328.3	0.0232	11.899	1352.0	0.0233	14.610	1244.0	0.0233
6	4.137	1369.8	0.0231	12.114	1337.1	0.0232	14.826	1233.6	0.0231
7	4.275	1385.3	0.0230	12.130	1324.3	0.0230	14.862	1230.9	0.0230
8	4.276	1377.1	0.0228	12.000	1312.9	0.0229	14.768	1234.2	0.0229
9	4.155	1350.0	0.0227	11.766	1301.3	0.0228	14.562	1237.2	0.0227
10	3.963	1315.0	0.0226	11.515	1291.6	0.0226	14.300	1233.4	0.0226
11	3.776	1284.5	0.0225	11.347	1286.1	0.0225	14.081	1222.9	0.0225
12	3.634	1263.1	0.0224	11.307	1286.2	0.0224	13.981	1211.2	0.0223
13	3.533	1249.0	0.0222	11.366	1293.8	0.0222	13.999	1203.8	0.0222
14	3.438	1234.4	0.0221	11.412	1306.9	0.0221	14.046	1205.9	0.0221
15	3.272	1203.8	0.0221	11.227	1312.9	0.0220	13.898	1217.4	0.0220
16	2.935	1141.5	0.0220	10.492	1292.7	0.0219	13.158	1222.0	0.0219
17	2.358	1037.4	0.0219	8.783	1209.6	0.0218	11.210	1179.7	0.0218
18	1.376	839.9	0.0218	5.413	984.6	0.0217	6.989	1007.3	0.0217

* This assembly is labeled A16 for cycle 1.

Datapoint or Statepoint	EFPD / Cycle
SP39	0.0 / Cy1
SP40	86.7 / Cy1
SP41	303.5 / Cy1
SP42	0.0 / Cy5

Burnup	- GWd/MTU
T-Fuel	- °F
Spec. Vol.	- ft^3 / lbm

Table 4-17. Burnup and TH Feedback Parameters by Axial Node for Assembly A16b (Cont'd)

Axial	Burnup	SP42 to SP43		Burnup	SP43 to SP44		Burnup	SP44 to SP45	
Node	SP43	T-Fuel	Spec.Vol	SP44	T-Fuel	Spec.Vol	SP45	T-Fuel	Spec.Vol
1	5.526	873.8	0.0230	6.213	880.8	0.0230	7.804	945.2	0.0231
2	10.638	957.1	0.0230	11.656	963.3	0.0229	13.932	1030.0	0.0230
3	13.878	981.8	0.0229	15.019	981.6	0.0229	17.457	1031.9	0.0229
4	15.366	997.1	0.0228	16.572	988.2	0.0228	19.037	1022.3	0.0228
5	15.992	1006.3	0.0227	17.232	989.6	0.0227	19.681	1013.5	0.0227
6	16.229	1008.3	0.0226	17.478	986.5	0.0226	19.896	1005.9	0.0226
7	16.261	1005.0	0.0225	17.503	980.4	0.0225	19.890	998.9	0.0225
8	16.151	999.0	0.0225	17.377	973.1	0.0224	19.742	992.5	0.0225
9	15.927	993.1	0.0224	17.136	966.1	0.0224	19.490	987.4	0.0224
10	15.650	988.8	0.0223	16.845	960.4	0.0223	19.201	983.8	0.0223
11	15.423	985.8	0.0222	16.608	955.7	0.0222	18.971	981.6	0.0222
12	15.319	983.3	0.0221	16.498	951.2	0.0221	18.864	980.1	0.0221
13	15.333	979.4	0.0220	16.504	946.1	0.0221	18.864	978.9	0.0220
14	15.367	973.1	0.0220	16.525	939.5	0.0220	18.866	977.2	0.0220
15	15.193	964.2	0.0219	16.328	931.4	0.0219	18.633	975.1	0.0219
16	14.400	951.2	0.0218	15.489	920.4	0.0219	17.722	970.8	0.0218
17	12.320	920.4	0.0218	13.295	893.5	0.0218	15.324	950.6	0.0217
18	7.719	822.3	0.0217	8.366	804.5	0.0217	9.741	852.7	0.0217

Table 4-18. Burnup and TH Feedback Parameters by Axial Node for Assembly A17

Axial	Burnup	SP39 to SP40		Burnup	SP40 to SP41	
Node	SP40	T-Fuel	Spec.Vol	SP41	T-Fuel	Spec.Vol
1	1.150	846.5	0.0236	5.527	1069.1	0.0241
2	1.977	1015.0	0.0235	9.436	1301.0	0.0240
3	2.781	1158.0	0.0234	11.844	1391.6	0.0238
4	3.443	1263.9	0.0233	13.128	1400.3	0.0237
5	3.909	1335.6	0.0232	13.716	1388.8	0.0235
6	4.200	1377.0	0.0231	13.920	1376.1	0.0233
7	4.325	1390.0	0.0229	13.857	1366.1	0.0231
8	4.284	1372.2	0.0228	13.522	1354.3	0.0230
9	4.062	1322.3	0.0227	12.947	1328.9	0.0228
10	3.703	1260.4	0.0225	12.360	1305.3	0.0227
11	3.424	1219.6	0.0224	12.066	1294.0	0.0226
12	3.274	1199.0	0.0223	12.120	1291.0	0.0224
13	3.216	1195.6	0.0222	12.465	1304.0	0.0223
14	3.229	1205.8	0.0222	12.903	1338.0	0.0222
15	3.218	1198.4	0.0221	13.015	1352.1	0.0220
16	2.954	1145.2	0.0220	12.301	1339.9	0.0219
17	2.399	1044.4	0.0219	10.332	1258.9	0.0218
18	1.553	874.2	0.0218	6.309	1030.2	0.0217

Datapoint or Statepoint	EFPD / Cycle
SP39	0.0 / Cy1
SP40	86.7 / Cy1
SP41	303.5 / Cy1
SP42	0.0 / Cy5
SP43	50.4 / Cy5
SP44	94.9 / Cy5
SP45	184.9 / Cy5

Burnup	- GWd/MTU
T-Fuel	- °F
Spec. Vol.	- ft^3 / lbm

Table 4-19. Burnup and TH Feedback Parameters by Axial Node for Assembly A18

Axial	Burnup	SP39 to SP40		Burnup	SP40 to SP41	
Node	SP40	T-Fuel	Spec.Vol	SP41	T-Fuel	Spec.Vol
1	1.023	811.8	0.0232	4.946	1013.7	0.0235
2	1.878	983.8	0.0232	8.482	1214.7	0.0234
3	2.595	1114.7	0.0231	10.538	1286.3	0.0233
4	3.185	1208.7	0.0230	11.656	1297.9	0.0231
5	3.610	1273.1	0.0229	12.189	1288.0	0.0230
6	3.873	1310.0	0.0228	12.369	1275.1	0.0229
7	3.970	1320.4	0.0226	12.229	1266.2	0.0227
8	3.874	1295.1	0.0225	11.424	1251.5	0.0226
9	3.499	1180.9	0.0224	9.730	1132.1	0.0225
10	2.434	1006.1	0.0223	7.765	1050.7	0.0224
11	2.013	962.7	0.0223	7.121	1038.3	0.0223
12	1.931	948.4	0.0222	7.316	1033.4	0.0222
13	1.961	958.5	0.0222	8.397	1045.1	0.0222
14	2.232	1077.0	0.0221	10.155	1234.8	0.0221
15	2.928	1152.2	0.0220	11.509	1262.2	0.0220
16	2.797	1115.1	0.0220	11.049	1246.4	0.0219
17	2.267	1016.5	0.0219	9.240	1174.2	0.0218
18	1.321	827.2	0.0218	5.456	970.5	0.0217

Table 4-20. Burnup and TH Feedback Parameters by Axial Node for Assembly A19

Axial	Burnup	SP39 to SP40		Burnup	SP40 to SP41	
Node	SP40	T-Fuel	Spec.Vol	SP41	T-Fuel	Spec.Vol
1	1.060	825.0	0.0235	5.390	1059.3	0.0240
2	1.837	981.8	0.0234	9.084	1270.2	0.0238
3	2.606	1118.9	0.0233	11.285	1345.0	0.0237
4	3.243	1217.2	0.0232	12.484	1356.4	0.0235
5	3.694	1284.0	0.0231	13.057	1346.0	0.0233
6	3.978	1323.0	0.0230	13.272	1332.8	0.0232
7	4.108	1336.6	0.0229	13.239	1322.4	0.0230
8	4.090	1323.4	0.0227	12.958	1309.4	0.0229
9	3.910	1281.7	0.0226	12.460	1284.5	0.0227
10	3.605	1229.3	0.0225	11.952	1262.7	0.0226
11	3.370	1195.8	0.0224	11.713	1252.7	0.0225
12	3.244	1179.2	0.0223	11.782	1250.1	0.0224
13	3.188	1176.3	0.0222	12.104	1262.1	0.0222
14	3.186	1184.6	0.0221	12.499	1295.4	0.0221
15	3.154	1175.3	0.0220	12.571	1311.1	0.0220
16	2.877	1122.7	0.0220	11.847	1295.4	0.0219
17	2.322	1022.8	0.0219	9.909	1219.2	0.0218
18	1.505	860.8	0.0218	6.011	1003.6	0.0217

Datapoint or Statepoint	EFPD / Cycle
SP39	0.0 / Cyl
SP40	86.7 / Cyl
SP41	303.5 / Cyl

Burnup - GWd/MTU
T-Fuel - °F
Spec. Vol. - ft^3 / lbm

Table 4-21. Burnup and TH Feedback Parameters by Axial Node for Assembly A20

Axial	Burnup	SP39 to SP40		Burnup	SP40 to SP41	
Node	SP40	T-Fuel	Spec.Vol	SP41	T-Fuel	Spec.Vol
1	0.621	740.7	0.0236	4.383	1003.5	0.0237
2	1.448	935.4	0.0236	7.782	1205.2	0.0236
3	2.644	1127.1	0.0235	10.187	1266.4	0.0235
4	3.398	1235.1	0.0234	11.419	1276.3	0.0233
5	3.884	1303.3	0.0233	12.011	1267.1	0.0232
6	4.192	1343.4	0.0231	12.269	1254.7	0.0230
7	4.351	1360.4	0.0230	12.331	1244.6	0.0229
8	4.385	1357.9	0.0229	12.263	1236.3	0.0228
9	4.316	1340.5	0.0227	12.117	1228.6	0.0227
10	4.184	1316.7	0.0226	11.967	1222.2	0.0225
11	4.046	1295.5	0.0225	11.887	1218.5	0.0224
12	3.933	1280.3	0.0224	11.901	1218.6	0.0223
13	3.839	1268.9	0.0223	11.974	1224.2	0.0222
14	3.728	1254.0	0.0222	11.992	1233.7	0.0221
15	3.529	1221.9	0.0221	11.750	1238.2	0.0220
16	3.146	1157.7	0.0220	10.932	1221.9	0.0218
17	2.496	1046.8	0.0219	9.072	1152.2	0.0217
18	1.416	841.2	0.0218	5.325	954.1	0.0217

Table 4-22. Burnup and TH Feedback Parameters by Axial Node for Assembly A21

Axial	Burnup	SP39 to SP40		Burnup	SP40 to SP41	
Node	SP40	T-Fuel	Spec.Vol	SP41	T-Fuel	Spec.Vol
1	0.457	686.6	0.0228	2.384	796.9	0.0227
2	0.958	788.9	0.0227	4.274	930.9	0.0226
3	1.463	880.6	0.0227	5.483	985.0	0.0226
4	1.866	947.6	0.0226	6.172	998.8	0.0225
5	2.138	990.2	0.0226	6.514	996.6	0.0224
6	2.309	1015.0	0.0225	6.664	990.0	0.0224
7	2.400	1025.8	0.0224	6.707	983.7	0.0223
8	2.427	1026.2	0.0224	6.690	978.6	0.0222
9	2.406	1019.3	0.0223	6.642	974.5	0.0222
10	2.355	1008.9	0.0222	6.590	971.5	0.0221
11	2.293	998.1	0.0222	6.556	969.8	0.0221
12	2.233	988.5	0.0221	6.547	969.9	0.0220
13	2.172	979.0	0.0221	6.544	972.1	0.0219
14	2.090	965.5	0.0220	6.494	974.9	0.0219
15	1.955	941.5	0.0219	6.300	973.4	0.0218
16	1.724	899.1	0.0219	5.800	956.9	0.0217
17	1.347	826.7	0.0219	4.743	903.3	0.0217
18	0.741	709.5	0.0218	2.715	769.3	0.0217

Datapoint or Statepoint	EFPD / Cycle
SP39	0.0 / Cy1
SP40	86.7 / Cy1
SP41	303.5 / Cy1

Burnup	- GWd/MTU
T-Fuel	- °F
Spec. Vol.	- ft^3 / lbm

Table 4-23. Burnup and TH Feedback Parameters by Axial Node for Assembly A22

Axial	Burnup	SP39 to SP40		Burnup	SP40 to SP41	
Node	SP40	T-Fuel	Spec.Vol	SP41	T-Fuel	Spec.Vol
1	0.634	737.8	0.0234	4.650	1033.5	0.0238
2	1.365	905.4	0.0234	8.186	1247.8	0.0237
3	2.525	1112.7	0.0233	10.695	1313.2	0.0235
4	3.218	1220.3	0.0232	11.929	1323.2	0.0234
5	3.654	1286.7	0.0231	12.479	1313.0	0.0232
6	3.919	1324.0	0.0229	12.667	1299.9	0.0231
7	4.027	1334.0	0.0228	12.602	1289.2	0.0229
8	3.976	1314.8	0.0227	12.294	1275.8	0.0228
9	3.757	1267.3	0.0226	11.784	1254.1	0.0227
10	3.430	1210.5	0.0225	11.266	1233.8	0.0226
11	3.163	1170.6	0.0224	10.988	1222.6	0.0224
12	3.017	1151.6	0.0223	11.025	1219.9	0.0223
13	2.970	1150.7	0.0222	11.322	1231.8	0.0222
14	2.992	1160.6	0.0221	11.689	1258.4	0.0221
15	2.977	1154.7	0.0220	11.762	1273.0	0.0220
16	2.745	1108.0	0.0220	11.109	1257.9	0.0219
17	2.223	1009.5	0.0219	9.291	1184.1	0.0218
18	1.293	822.6	0.0218	5.492	977.5	0.0217

Table 4-24. Burnup and TH Feedback Parameters by Axial Node for Assembly A23

Axial	Burnup	SP39 to SP40		Burnup	SP40 to SP41	
Node	SP40	T-Fuel	Spec.Vol	SP41	T-Fuel	Spec.Vol
1	1.040	817.9	0.0234	5.517	1079.6	0.0240
2	1.797	970.9	0.0233	9.318	1294.7	0.0239
3	2.539	1107.4	0.0232	11.595	1367.8	0.0237
4	3.146	1203.7	0.0231	12.812	1376.0	0.0236
5	3.570	1268.2	0.0230	13.375	1365.0	0.0234
6	3.832	1304.9	0.0229	13.569	1352.6	0.0232
7	3.939	1315.0	0.0228	13.500	1343.3	0.0231
8	3.889	1295.9	0.0227	13.160	1329.9	0.0229
9	3.665	1245.9	0.0226	12.582	1303.1	0.0228
10	3.311	1185.0	0.0225	11.998	1278.6	0.0226
11	3.041	1146.0	0.0224	11.717	1266.4	0.0225
12	2.904	1128.3	0.0223	11.795	1262.6	0.0224
13	2.863	1128.5	0.0222	12.174	1275.2	0.0223
14	2.898	1143.3	0.0221	12.648	1310.7	0.0221
15	2.915	1141.7	0.0220	12.791	1327.9	0.0220
16	2.690	1096.1	0.0220	12.100	1313.2	0.0219
17	2.184	1000.0	0.0219	10.142	1236.0	0.0218
18	1.411	844.6	0.0218	6.139	1016.6	0.0217

Datapoint or Statepoint	EFPD / Cycle
SP39	0.0 / Cy1
SP40	86.7 / Cy1
SP41	303.5 / Cy1

Burnup	- GWd/MTU
T-Fuel	- °F
Spec. Vol.	- ft^3 / lbm

Table 4-25. Burnup and TH Feedback Parameters by Axial Node for Assembly A24

Axial	Burnup	SP39 to SP40		Burnup	SP40 to SP41	
Node	SP40	T-Fuel	Spec.Vol	SP41	T-Fuel	Spec.Vol
1	0.883	782.3	0.0232	4.420	976.4	0.0235
2	1.654	936.1	0.0232	7.641	1168.1	0.0234
3	2.303	1057.7	0.0231	9.524	1233.7	0.0233
4	2.832	1142.1	0.0230	10.552	1245.2	0.0232
5	3.210	1198.4	0.0229	11.052	1237.5	0.0230
6	3.447	1230.8	0.0228	11.244	1226.4	0.0229
7	3.554	1241.4	0.0227	11.236	1217.2	0.0228
8	3.540	1230.8	0.0226	11.062	1207.2	0.0227
9	3.408	1201.3	0.0225	10.766	1193.3	0.0226
10	3.204	1165.2	0.0224	10.467	1180.4	0.0224
11	3.025	1138.0	0.0223	10.308	1173.1	0.0223
12	2.911	1122.7	0.0222	10.332	1171.5	0.0222
13	2.851	1117.3	0.0222	10.496	1179.0	0.0221
14	2.814	1115.5	0.0221	10.664	1194.9	0.0220
15	2.726	1099.5	0.0220	10.576	1202.5	0.0219
16	2.466	1051.4	0.0219	9.894	1186.2	0.0218
17	1.971	954.5	0.0219	8.206	1118.0	0.0217
18	1.126	787.2	0.0218	4.791	923.8	0.0217

Table 4-26. Burnup and TH Feedback Parameters by Axial Node for Assembly A25

Axial	Burnup	SP39 to SP40		Burnup	SP40 to SP41	
Node	SP40	T-Fuel	Spec.Vol	SP41	T-Fuel	Spec.Vol
1	0.707	744.5	0.0231	3.606	903.5	0.0232
2	1.404	885.0	0.0231	6.316	1074.7	0.0231
3	2.043	1000.8	0.0230	7.957	1134.6	0.0230
4	2.545	1081.6	0.0229	8.865	1146.5	0.0229
5	2.892	1133.2	0.0228	9.314	1140.9	0.0228
6	3.109	1162.9	0.0227	9.502	1131.7	0.0227
7	3.217	1174.3	0.0226	9.535	1123.6	0.0226
8	3.229	1170.1	0.0226	9.466	1116.6	0.0225
9	3.163	1154.2	0.0225	9.337	1109.8	0.0224
10	3.051	1133.4	0.0224	9.206	1103.8	0.0223
11	2.937	1115.0	0.0223	9.130	1100.1	0.0222
12	2.846	1102.0	0.0222	9.131	1099.6	0.0221
13	2.774	1092.9	0.0221	9.178	1103.4	0.0221
14	2.694	1081.5	0.0221	9.182	1109.8	0.0220
15	2.550	1056.9	0.0220	8.979	1111.4	0.0219
16	2.272	1006.5	0.0219	8.323	1094.3	0.0218
17	1.790	915.3	0.0219	6.850	1031.8	0.0217
18	0.993	759.7	0.0218	3.957	859.1	0.0217

Datapoint or Statepoint	EFPD / Cycle
SP39	0.0 / Cy1
SP40	86.7 / Cy1
SP41	303.5 / Cy1

Burnup	- GWd/MTU
T-Fuel	- °F
Spec. Vol.	- ft^3 / lbm

Table 4-27. Burnup and TH Feedback Parameters by Axial Node for Assembly A26

Axial	Burnup	SP39 to SP40		Burnup	SP40 to SP41	
Node	SP40	T-Fuel	Spec.Vol	SP41	T-Fuel	Spec.Vol
1	0.889	781.8	0.0232	4.944	1042.2	0.0238
2	1.633	930.0	0.0231	8.455	1248.9	0.0237
3	2.247	1047.1	0.0231	10.451	1320.0	0.0236
4	2.749	1130.0	0.0230	11.477	1329.6	0.0234
5	3.110	1184.6	0.0229	11.932	1317.3	0.0233
6	3.334	1215.9	0.0228	12.085	1301.5	0.0231
7	3.432	1225.4	0.0227	12.082	1289.0	0.0230
8	3.411	1214.2	0.0226	11.989	1281.1	0.0228
9	3.283	1186.3	0.0225	11.841	1276.9	0.0227
10	3.096	1152.5	0.0224	11.684	1275.0	0.0226
11	2.923	1125.1	0.0223	11.580	1274.0	0.0225
12	2.806	1109.0	0.0222	11.553	1273.7	0.0223
13	2.742	1102.4	0.0222	11.570	1274.8	0.0222
14	2.696	1097.7	0.0221	11.548	1276.6	0.0221
15	2.595	1079.7	0.0220	11.310	1274.0	0.0220
16	2.344	1032.1	0.0219	10.546	1252.4	0.0219
17	1.884	939.5	0.0219	8.781	1176.9	0.0218
18	1.091	781.4	0.0218	5.176	969.6	0.0217

Table 4-28. Burnup and TH Feedback Parameters by Axial Node for Assembly A27

Axial	Burnup	SP39 to SP40		Burnup	SP40 to SP41	
Node	SP40	T-Fuel	Spec.Vol	SP41	T-Fuel	Spec.Vol
1	0.876	774.2	0.0230	4.469	988.7	0.0236
2	1.465	890.3	0.0230	7.588	1185.5	0.0235
3	1.982	988.4	0.0229	9.433	1253.9	0.0234
4	2.411	1063.6	0.0228	10.425	1267.4	0.0233
5	2.725	1112.3	0.0228	10.897	1261.3	0.0231
6	2.924	1140.8	0.0227	11.080	1251.6	0.0230
7	3.016	1150.6	0.0226	11.095	1243.3	0.0229
8	3.013	1143.9	0.0225	11.000	1236.2	0.0227
9	2.929	1124.7	0.0224	10.847	1228.6	0.0226
10	2.801	1100.5	0.0223	10.702	1221.4	0.0225
11	2.674	1079.5	0.0223	10.631	1216.1	0.0224
12	2.578	1065.3	0.0222	10.660	1214.7	0.0223
13	2.510	1056.4	0.0221	10.751	1218.6	0.0222
14	2.441	1046.4	0.0220	10.797	1226.2	0.0220
15	2.317	1023.8	0.0220	10.603	1228.8	0.0219
16	2.069	975.5	0.0219	9.876	1210.1	0.0218
17	1.660	893.6	0.0219	8.197	1137.6	0.0217
18	1.072	776.7	0.0218	4.902	935.3	0.0217

Datapoint or Statepoint	EFPD / Cycle
SP39	0.0 / Cyl
SP40	86.7 / Cyl
SP41	303.5 / Cyl

Burnup	- GWd/MTU
T-Fuel	- °F
Spec. Vol.	- ft^3 / lbm

Table 4-29. Burnup and TH Feedback Parameters by Axial Node for Assembly A28

Axial	Burnup	SP39 to SP40		Burnup	SP40 to SP41	
Node	SP40	T-Fuel	Spec.Vol	SP41	T-Fuel	Spec.Vol
1	0.491	685.7	0.0226	2.418	793.5	0.0226
2	0.921	770.7	0.0225	4.241	923.2	0.0226
3	1.268	836.0	0.0225	5.315	975.4	0.0225
4	1.545	885.8	0.0225	5.908	989.8	0.0225
5	1.746	919.6	0.0224	6.201	988.5	0.0224
6	1.872	938.8	0.0224	6.320	982.9	0.0223
7	1.933	945.9	0.0223	6.337	977.2	0.0223
8	1.937	942.8	0.0222	6.293	972.0	0.0222
9	1.896	932.2	0.0222	6.217	967.2	0.0222
10	1.829	918.6	0.0221	6.140	962.8	0.0221
11	1.759	906.0	0.0221	6.094	959.9	0.0220
12	1.700	896.4	0.0221	6.089	959.2	0.0220
13	1.652	888.9	0.0220	6.105	961.2	0.0219
14	1.597	879.6	0.0220	6.084	964.1	0.0219
15	1.503	861.8	0.0219	5.923	962.4	0.0218
16	1.333	828.1	0.0219	5.461	945.0	0.0217
17	1.050	772.1	0.0219	4.463	891.5	0.0217
18	0.588	681.2	0.0218	2.553	760.1	0.0217

Table 4-30. Burnup and TH Feedback Parameters by Axial Node for Assembly A29

Axial	Burnup	SP39 to SP40		Burnup	SP40 to SP41	
Node	SP40	T-Fuel	Spec.Vol	SP41	T-Fuel	Spec.Vol
1	0.549	697.5	0.0226	2.778	831.6	0.0228
2	0.993	785.1	0.0226	4.839	977.3	0.0228
3	1.336	850.3	0.0225	6.046	1034.9	0.0227
4	1.613	900.9	0.0225	6.703	1048.4	0.0226
5	1.817	935.8	0.0224	7.021	1046.3	0.0225
6	1.946	955.8	0.0224	7.147	1040.2	0.0225
7	2.007	963.0	0.0223	7.163	1034.3	0.0224
8	2.008	959.2	0.0223	7.114	1029.2	0.0223
9	1.961	947.4	0.0222	7.033	1024.3	0.0222
10	1.887	932.3	0.0222	6.953	1019.9	0.0222
11	1.811	918.4	0.0221	6.909	1016.6	0.0221
12	1.748	907.9	0.0221	6.910	1015.6	0.0220
13	1.696	899.8	0.0220	6.934	1017.4	0.0220
14	1.639	890.0	0.0220	6.918	1020.3	0.0219
15	1.544	871.5	0.0219	6.746	1018.9	0.0218
16	1.371	837.0	0.0219	6.236	1001.7	0.0218
17	1.091	781.0	0.0219	5.120	941.9	0.0217
18	0.627	689.3	0.0218	2.954	793.7	0.0217

Datapoint or Statepoint	EFPD / Cycle
SP39	0.0 / Cy1
SP40	86.7 / Cy1
SP41	303.5 / Cy1

Burnup	- GWd/MTU
T-Fuel	- °F
Spec. Vol.	- ft^3 / lbm

Table 4-31. Burnup and TH Feedback Parameters by Axial Node for Assembly B21

Axial	Burnup	DP1 to DP2		Burnup	DP2 to DP3		Burnup	DP3 to DP4	
Node	DP2	T-Fuel	Spec.Vol	DP3	T-Fuel	Spec.Vol	DP4	T-Fuel	Spec.Vol
1	1.549	795.2	0.0229	3.425	873.9	0.0230	9.004	1020.0	0.0239
2	2.645	935.5	0.0228	5.606	1008.9	0.0229	14.087	1167.6	0.0238
3	3.225	1006.6	0.0228	6.615	1053.6	0.0229	16.340	1223.1	0.0236
4	3.499	1040.2	0.0227	7.019	1064.6	0.0228	17.271	1241.6	0.0235
5	3.610	1054.2	0.0226	7.158	1065.6	0.0227	17.639	1245.5	0.0233
6	3.645	1059.2	0.0225	7.206	1065.6	0.0226	17.789	1243.1	0.0232
7	3.648	1060.1	0.0225	7.233	1066.7	0.0225	17.857	1237.3	0.0230
8	3.643	1059.1	0.0224	7.265	1068.5	0.0224	17.910	1231.0	0.0229
9	3.644	1057.3	0.0223	7.308	1069.9	0.0224	17.995	1227.6	0.0228
10	3.660	1055.6	0.0223	7.362	1070.3	0.0223	18.117	1228.5	0.0226
11	3.694	1054.9	0.0222	7.421	1070.0	0.0222	18.261	1233.4	0.0225
12	3.737	1055.3	0.0221	7.475	1069.9	0.0221	18.404	1241.4	0.0224
13	3.775	1056.3	0.0220	7.516	1071.1	0.0220	18.509	1249.8	0.0223
14	3.784	1055.9	0.0220	7.522	1074.1	0.0220	18.516	1254.9	0.0221
15	3.718	1048.5	0.0219	7.434	1076.9	0.0219	18.318	1254.1	0.0220
16	3.492	1022.9	0.0218	7.092	1070.7	0.0218	17.594	1240.4	0.0219
17	2.930	955.2	0.0218	6.117	1029.6	0.0217	15.489	1187.8	0.0218
18	1.722	797.5	0.0217	3.738	880.2	0.0217	9.917	1019.5	0.0217

Axial	Burnup	DP4 to SP42		Burnup	SP42 to SP43		Burnup	SP43 to SP44	
Node	SP42	T-Fuel	Spec.Vol	SP43	T-Fuel	Spec.Vol	SP44	T-Fuel	Spec.Vol
1	15.514	1015.3	0.0237	16.471	892.5	0.0236	17.363	898.8	0.0235
2	23.382	1120.0	0.0236	24.784	968.8	0.0235	26.087	973.7	0.0235
3	26.581	1139.0	0.0234	28.221	1008.3	0.0234	29.736	1009.7	0.0233
4	27.793	1135.2	0.0233	29.591	1038.2	0.0232	31.235	1034.1	0.0232
5	28.229	1125.4	0.0232	30.117	1055.8	0.0231	31.826	1044.5	0.0231
6	28.384	1114.6	0.0230	30.301	1059.4	0.0230	32.028	1043.9	0.0230
7	28.416	1102.2	0.0229	30.306	1049.9	0.0229	32.009	1033.6	0.0228
8	28.327	1083.0	0.0228	30.153	1031.7	0.0227	31.802	1016.0	0.0227
9	28.137	1056.2	0.0227	29.900	1014.4	0.0226	31.492	997.6	0.0226
10	28.065	1038.0	0.0225	29.793	1003.3	0.0225	31.349	983.7	0.0225
11	28.128	1030.3	0.0224	29.855	1000.0	0.0224	31.401	976.4	0.0224
12	28.273	1031.2	0.0223	30.036	1005.6	0.0223	31.603	976.3	0.0223
13	28.510	1043.3	0.0222	30.331	1015.7	0.0222	31.936	980.8	0.0222
14	28.755	1063.0	0.0221	30.605	1018.7	0.0221	32.231	982.1	0.0221
15	28.656	1074.0	0.0220	30.488	1011.2	0.0220	32.098	976.0	0.0220
16	27.791	1074.2	0.0219	29.548	993.1	0.0219	31.092	960.0	0.0219
17	24.932	1055.2	0.0218	26.524	965.0	0.0218	27.918	932.2	0.0218
18	16.577	955.1	0.0217	17.707	889.9	0.0217	18.694	865.4	0.0218

Datapoint or Statepoint	EFPD / Cycle
DP1	0.0 / Cy2
DP2	150.3 / Cy2
DP3	0.0 / Cy3
DP4	0.0 / Cy4
SP42	0.0 / Cy5
SP43	50.4 / Cy5
SP44	94.9 / Cy5

Burnup	- GWd/MTU
T-Fuel	- °F
Spec. Vol.	- ft^3 / lbm

Table 4-31. Burnup and TH Feedback Parameters by Axial Node for Assembly B21 (Cont'd)

Axial	Burnup	SP44 to SP45	
Node	SP45	T-Fuel	Spec.Vol
1	19.377	949.8	0.0237
2	28.955	1025.9	0.0236
3	32.944	1057.0	0.0234
4	34.568	1072.1	0.0233
5	35.172	1075.7	0.0232
6	35.322	1072.5	0.0230
7	35.227	1062.1	0.0229
8	34.955	1045.3	0.0228
9	34.618	1028.5	0.0226
10	34.492	1016.5	0.0225
11	34.601	1011.2	0.0224
12	34.869	1014.7	0.0223
13	35.246	1024.9	0.0222
14	35.544	1032.1	0.0221
15	35.366	1031.8	0.0220
16	34.241	1020.2	0.0219
17	30.783	989.9	0.0218
18	20.747	915.8	0.0217

Table 4-32. Burnup and TH Feedback Parameters by Axial Node for Assembly B28

Axial	Burnup	DP1 to DP2		Burnup	DP2 to DP3		Burnup	DP3 to DP4	
Node	DP2	T-Fuel	Spec.Vol	DP3	T-Fuel	Spec.Vol	DP4	T-Fuel	Spec.Vol
1	1.596	803.8	0.0230	3.531	883.1	0.0231	10.651	1114.5	0.0241
2	2.779	954.2	0.0229	5.868	1023.9	0.0230	16.314	1273.1	0.0240
3	3.444	1035.5	0.0229	7.007	1071.7	0.0229	18.611	1316.8	0.0238
4	3.775	1075.5	0.0228	7.494	1084.2	0.0228	19.432	1320.8	0.0237
5	3.917	1093.3	0.0227	7.679	1086.1	0.0228	19.680	1313.4	0.0235
6	3.966	1100.1	0.0226	7.751	1086.9	0.0227	19.689	1299.2	0.0233
7	3.972	1101.8	0.0225	7.792	1088.8	0.0226	19.515	1272.9	0.0232
8	3.964	1100.8	0.0225	7.832	1091.2	0.0225	19.245	1238.5	0.0230
9	3.961	1098.4	0.0224	7.883	1092.7	0.0224	19.182	1220.9	0.0229
10	3.980	1096.2	0.0223	7.948	1092.9	0.0223	19.286	1218.8	0.0227
11	4.022	1095.2	0.0222	8.020	1092.0	0.0222	19.506	1229.7	0.0226
12	4.078	1095.7	0.0221	8.087	1091.3	0.0221	19.870	1257.1	0.0225
13	4.129	1097.2	0.0221	8.135	1092.0	0.0221	20.231	1287.2	0.0223
14	4.141	1097.0	0.0220	8.137	1095.1	0.0220	20.365	1301.1	0.0222
15	4.060	1088.7	0.0219	8.023	1098.2	0.0219	20.237	1306.3	0.0221
16	3.789	1059.0	0.0218	7.616	1091.7	0.0218	19.596	1303.7	0.0219
17	3.144	982.9	0.0218	6.517	1048.8	0.0217	17.491	1267.8	0.0218
18	1.820	811.3	0.0217	3.939	893.7	0.0217	11.413	1092.2	0.0217

Datapoint or Statepoint	EFPD / Cycle
DP1	0.0 / Cy2
DP2	150.3 / Cy2
DP3	0.0 / Cy3
DP4	0.0 / Cy4
SP44	94.9 / Cy5
SP45	184.9 / Cy5

Burnup	- GWd/MTU
T-Fuel	- °F
Spec. Vol.	- ft^3 / lbm

Table 4-32. Burnup and TH Feedback Parameters by Axial Node for Assembly B28 (Cont'd)

Axial	Burnup	DP4 to SP42		Burnup	SP42 to SP43		Burnup	SP43 to SP44	
Node	SP42	T-Fuel	Spec.Vol	SP43	T-Fuel	Spec.Vol	SP44	T-Fuel	Spec.Vol
1	16.302	955.8	0.0236	17.246	880.6	0.0233	18.121	884.4	0.0233
2	24.639	1058.8	0.0235	26.025	952.8	0.0233	27.303	953.5	0.0232
3	28.022	1086.2	0.0233	29.641	990.5	0.0232	31.121	988.6	0.0231
4	29.234	1087.9	0.0232	31.007	1021.1	0.0230	32.610	1012.9	0.0230
5	29.619	1082.4	0.0231	31.482	1039.1	0.0229	33.151	1024.2	0.0229
6	29.688	1075.3	0.0229	31.577	1042.3	0.0228	33.261	1023.7	0.0228
7	29.541	1067.6	0.0228	31.350	1020.1	0.0227	32.972	1005.7	0.0226
8	29.201	1054.2	0.0227	30.615	921.1	0.0226	31.941	933.9	0.0225
9	28.905	1030.5	0.0226	30.041	851.7	0.0225	31.079	845.9	0.0225
10	28.826	1013.3	0.0225	29.910	838.3	0.0224	30.892	828.4	0.0224
11	28.952	1004.7	0.0224	30.039	837.0	0.0224	31.017	823.7	0.0223
12	29.276	1002.3	0.0223	30.453	855.3	0.0223	31.493	833.2	0.0223
13	29.715	1010.2	0.0222	31.445	988.9	0.0222	32.887	920.1	0.0222
14	30.042	1026.7	0.0221	31.927	1021.8	0.0221	33.543	973.0	0.0221
15	29.973	1035.2	0.0220	31.855	1017.7	0.0220	33.478	974.5	0.0220
16	29.144	1032.7	0.0219	30.944	997.7	0.0219	32.500	957.5	0.0219
17	26.275	1011.2	0.0218	27.893	962.6	0.0218	29.289	924.7	0.0218
18	17.604	921.4	0.0217	18.743	886.2	0.0217	19.725	858.1	0.0218

Axial	Burnup	SP44 to SP45	
Node	SP45	T-Fuel	Spec.Vol
1	20.071	929.3	0.0234
2	30.070	997.9	0.0233
3	34.209	1030.5	0.0232
4	35.819	1046.4	0.0231
5	36.348	1051.5	0.0229
6	36.235	1051.4	0.0228
7	35.562	1035.0	0.0227
8	34.236	943.1	0.0226
9	33.112	866.8	0.0225
10	32.947	850.0	0.0224
11	33.435	843.0	0.0223
12	34.259	856.4	0.0223
13	36.010	976.4	0.0222
14	36.815	1018.1	0.0221
15	36.725	1022.9	0.0220
16	35.624	1011.8	0.0219
17	32.119	978.2	0.0218
18	21.746	903.9	0.0217

Datapoint or Statepoint	EFPD / Cycle
DP4	0.0 / Cy4
SP42	0.0 / Cy5
SP43	50.4 / Cy5
SP44	94.9 / Cy5
SP45	50.4 / Cy5

Burnup - GWd/MTU
T-Fuel - °F
Spec. Vol. - ft^3 / lbm

Table 4-33. Burnup and TH Feedback Parameters by Axial Node for Assembly C5

Axial	Burnup	DP3 to DP4		Burnup	DP4 to SP42		Burnup	SP42 to SP43	
Node	DP4	T-Fuel	Spec.Vol	SP42	T-Fuel	Spec.Vol	SP43	T-Fuel	Spec.Vol
1	7.005	1156.5	0.0244	13.649	1041.2	0.0239	14.215	780.6	0.0235
2	10.672	1378.9	0.0243	20.314	1174.6	0.0238	21.190	845.5	0.0234
3	12.078	1451.9	0.0241	22.842	1208.0	0.0237	24.257	971.6	0.0233
4	12.529	1464.5	0.0239	23.700	1210.8	0.0235	25.421	1042.9	0.0232
5	12.647	1461.6	0.0237	23.971	1204.8	0.0233	25.804	1067.2	0.0231
6	12.653	1453.4	0.0235	24.050	1196.8	0.0232	25.921	1073.6	0.0230
7	12.613	1442.4	0.0233	24.055	1188.3	0.0230	25.923	1069.7	0.0228
8	12.581	1431.8	0.0232	24.030	1178.0	0.0229	25.868	1059.8	0.0227
9	12.619	1426.6	0.0230	24.017	1165.2	0.0228	25.820	1048.3	0.0226
10	12.726	1428.7	0.0229	24.052	1153.7	0.0226	25.828	1038.7	0.0225
11	12.872	1436.6	0.0227	24.127	1145.9	0.0225	25.893	1033.1	0.0224
12	13.027	1448.5	0.0225	24.224	1142.5	0.0224	25.997	1031.3	0.0223
13	13.141	1460.1	0.0224	24.317	1144.2	0.0223	26.102	1030.6	0.0222
14	13.171	1467.4	0.0222	24.355	1149.3	0.0222	26.140	1027.2	0.0221
15	13.087	1468.6	0.0221	24.225	1152.2	0.0220	25.981	1017.4	0.0220
16	12.714	1455.3	0.0219	23.592	1146.6	0.0219	25.270	998.3	0.0219
17	11.400	1393.7	0.0218	21.349	1115.6	0.0218	22.856	965.0	0.0218
18	7.433	1143.2	0.0217	14.322	983.9	0.0217	15.368	878.3	0.0217

Axial	Burnup	SP43 to SP44		Burnup	SP44 to SP45	
Node	SP44	T-Fuel	Spec.Vol	SP45	T-Fuel	Spec.Vol
1	14.754	790.5	0.0234	16.094	846.2	0.0236
2	22.053	873.5	0.0234	24.478	1015.4	0.0235
3	25.629	1002.9	0.0233	28.707	1065.3	0.0234
4	27.001	1040.2	0.0232	30.238	1073.6	0.0233
5	27.460	1051.5	0.0231	30.720	1074.2	0.0231
6	27.600	1052.1	0.0229	30.837	1070.5	0.0230
7	27.593	1045.6	0.0228	30.792	1063.6	0.0229
8	27.512	1034.7	0.0227	30.679	1054.3	0.0227
9	27.433	1022.2	0.0226	30.584	1044.0	0.0226
10	27.414	1010.8	0.0225	30.569	1034.9	0.0225
11	27.466	1002.4	0.0224	30.638	1028.9	0.0224
12	27.569	997.2	0.0223	30.759	1027.0	0.0223
13	27.678	993.8	0.0222	30.875	1028.1	0.0222
14	27.712	989.2	0.0221	30.895	1029.4	0.0221
15	27.526	980.2	0.0220	30.659	1027.4	0.0220
16	26.745	963.6	0.0219	29.760	1017.8	0.0219
17	24.179	934.1	0.0218	26.910	991.9	0.0218
18	16.288	856.5	0.0218	18.215	910.0	0.0217

Datapoint or Statepoint	EFPD / Cycle
DP3	0.0 / Cy3
DP4	0.0 / Cy4
SP42	0.0 / Cy5
SP43	50.4 / Cy5
SP44	94.9 / Cy5
SP45	184.9 / Cy5

Burnup - GWd/MTU
T-Fuel - °F
Spec. Vol. - ft^3 / lbm

Table 4-34. Burnup and TH Feedback Parameters by Axial Node for Assembly C8

Axial	Burnup	DP3 to DP4		Burnup	DP4 to SP42		Burnup	SP42 to SP43	
Node	DP4	T-Fuel	Spec.Vol	SP42	T-Fuel	Spec.Vol	SP43	T-Fuel	Spec.Vol
1	4.129	936.1	0.0236	8.175	909.3	0.0239	9.288	990.5	0.0239
2	6.841	1135.8	0.0235	14.805	1157.0	0.0238	16.425	1090.7	0.0237
3	8.265	1222.5	0.0234	18.214	1218.2	0.0237	20.075	1125.0	0.0236
4	8.904	1253.6	0.0233	19.510	1227.6	0.0235	21.536	1154.9	0.0235
5	9.183	1263.1	0.0231	20.050	1225.0	0.0234	22.172	1172.3	0.0233
6	9.322	1265.0	0.0230	20.335	1219.0	0.0232	22.490	1175.0	0.0232
7	9.411	1264.8	0.0229	20.562	1213.6	0.0231	22.690	1163.4	0.0230
8	9.488	1264.8	0.0228	20.825	1211.0	0.0229	22.886	1141.4	0.0229
9	9.565	1266.1	0.0226	21.131	1211.5	0.0228	23.121	1118.3	0.0228
10	9.640	1269.1	0.0225	21.391	1212.2	0.0227	23.337	1102.6	0.0226
11	9.706	1273.5	0.0224	21.542	1211.7	0.0225	23.487	1098.2	0.0225
12	9.755	1278.5	0.0223	21.567	1209.8	0.0224	23.552	1105.2	0.0224
13	9.776	1283.2	0.0222	21.438	1205.5	0.0223	23.487	1118.7	0.0223
14	9.749	1285.6	0.0221	21.171	1199.0	0.0221	23.263	1127.9	0.0222
15	9.612	1281.3	0.0220	20.763	1191.9	0.0220	22.847	1124.7	0.0220
16	9.177	1257.6	0.0219	19.878	1177.2	0.0219	21.882	1106.9	0.0219
17	7.983	1182.4	0.0218	17.542	1130.7	0.0218	19.350	1070.6	0.0218
18	5.025	973.6	0.0217	11.383	982.1	0.0217	12.636	956.3	0.0217

Axial	Burnup	SP43 to SP44		Burnup	SP44 to SP45	
Node	SP44	T-Fuel	Spec.Vol	SP45	T-Fuel	Spec.Vol
1	10.317	990.7	0.0238	12.620	1045.5	0.0240
2	17.918	1089.6	0.0237	21.177	1139.2	0.0238
3	21.781	1118.5	0.0236	25.374	1161.7	0.0237
4	23.374	1140.7	0.0234	27.096	1171.2	0.0235
5	24.081	1150.5	0.0233	27.816	1172.1	0.0234
6	24.417	1148.3	0.0231	28.101	1166.8	0.0232
7	24.591	1135.4	0.0230	28.197	1154.3	0.0231
8	24.729	1113.9	0.0229	28.262	1134.8	0.0229
9	24.901	1090.1	0.0227	28.391	1113.6	0.0228
10	25.075	1071.7	0.0226	28.569	1097.5	0.0226
11	25.214	1062.7	0.0225	28.756	1090.4	0.0225
12	25.302	1063.2	0.0224	28.912	1094.2	0.0224
13	25.279	1070.5	0.0223	28.949	1106.5	0.0223
14	25.087	1076.7	0.0222	28.783	1119.3	0.0221
15	24.661	1074.2	0.0220	28.328	1124.8	0.0220
16	23.626	1058.8	0.0219	27.168	1118.0	0.0219
17	20.921	1025.2	0.0218	24.135	1087.6	0.0218
18	13.724	924.9	0.0218	15.979	983.0	0.0217

Datapoint or Statepoint	EFPD / Cycle
DP3	0.0 / Cy3
DP4	0.0 / Cy4
SP42	0.0 / Cy5
SP43	50.4 / Cy5
SP44	94.9 / Cy5
SP45	184.9 / Cy5

Burnup	- GWd/MTU
T-Fuel	- °F
Spec. Vol.	- ft^3 / lbm

Table 4-35. Burnup and TH Feedback Parameters by Axial Node for Assembly C15

Axial	Burnup	DP3 to DP4		Burnup	DP4 to SP42		Burnup	SP42 to SP43	
Node	DP4	T-Fuel	Spec.Vol	SP42	T-Fuel	Spec.Vol	SP43	T-Fuel	Spec.Vol
1	4.137	935.4	0.0235	10.771	1075.2	0.0239	11.787	939.6	0.0239
2	6.683	1120.0	0.0234	16.512	1225.0	0.0238	18.061	1057.9	0.0238
3	7.973	1200.4	0.0233	19.008	1266.5	0.0237	20.861	1117.4	0.0236
4	8.564	1230.4	0.0232	20.005	1267.6	0.0235	22.063	1159.4	0.0235
5	8.829	1239.9	0.0231	20.397	1258.0	0.0233	22.571	1183.0	0.0234
6	8.961	1241.7	0.0229	20.568	1246.2	0.0232	22.776	1187.2	0.0232
7	9.043	1241.1	0.0228	20.635	1231.9	0.0230	22.793	1170.9	0.0231
8	9.113	1240.6	0.0227	20.578	1210.4	0.0229	22.623	1139.3	0.0229
9	9.183	1241.5	0.0226	20.409	1182.5	0.0228	22.349	1110.5	0.0228
10	9.253	1244.3	0.0225	20.292	1162.4	0.0226	22.182	1096.0	0.0227
11	9.315	1248.5	0.0224	20.275	1154.3	0.0225	22.179	1096.8	0.0225
12	9.363	1253.6	0.0223	20.337	1157.2	0.0224	22.326	1114.8	0.0224
13	9.384	1258.3	0.0222	20.501	1172.6	0.0223	22.620	1143.3	0.0223
14	9.357	1260.6	0.0220	20.698	1194.5	0.0222	22.897	1158.5	0.0222
15	9.219	1256.1	0.0219	20.660	1207.8	0.0221	22.852	1152.9	0.0220
16	8.791	1232.4	0.0218	20.044	1206.3	0.0219	22.139	1128.6	0.0219
17	7.634	1159.0	0.0217	17.952	1171.1	0.0218	19.819	1082.4	0.0218
18	4.799	956.4	0.0217	11.862	1022.1	0.0217	13.136	959.2	0.0217

Axial	Burnup	SP43 to SP44		Burnup	SP44 to SP45	
Node	SP44	T-Fuel	Spec.Vol	SP45	T-Fuel	Spec.Vol
1	12.731	945.2	0.0238	14.860	1000.7	0.0239
2	19.493	1058.0	0.0237	22.626	1110.1	0.0238
3	22.558	1110.7	0.0236	26.111	1151.8	0.0237
4	23.920	1142.5	0.0234	27.632	1167.5	0.0235
5	24.511	1156.3	0.0233	28.231	1171.7	0.0233
6	24.736	1155.4	0.0231	28.371	1168.2	0.0232
7	24.712	1140.0	0.0230	28.221	1153.7	0.0230
8	24.449	1111.9	0.0229	27.851	1127.1	0.0229
9	24.081	1082.3	0.0227	27.434	1100.5	0.0228
10	23.863	1063.4	0.0226	27.255	1083.5	0.0226
11	23.859	1057.5	0.0225	27.367	1078.0	0.0225
12	24.059	1064.9	0.0224	27.704	1087.8	0.0224
13	24.444	1082.1	0.0223	28.191	1110.5	0.0223
14	24.782	1093.9	0.0222	28.564	1127.6	0.0221
15	24.734	1091.0	0.0220	28.474	1131.9	0.0220
16	23.940	1071.6	0.0219	27.535	1121.9	0.0219
17	21.425	1030.8	0.0218	24.663	1086.7	0.0218
18	14.233	924.5	0.0218	16.483	977.8	0.0217

Datapoint or Statepoint	EFPD / Cycle
DP3	0.0 / Cy3
DP4	0.0 / Cy4
SP42	0.0 / Cy5
SP43	50.4 / Cy5
SP44	94.9 / Cy5
SP45	184.9 / Cy5

Burnup	- GWd/MTU
T-Fuel	- °F
Spec. Vol.	- ft^3 / lbm

Table 4-36. Burnup and TH Feedback Parameters by Axial Node for Assembly C15a

Axial	Burnup	DP3 to DP4		Burnup	DP4 to SP42		Burnup	SP42 to SP43	
Node	DP4	T-Fuel	Spec.Vol	SP42	T-Fuel	Spec.Vol	SP43	T-Fuel	Spec.Vol
1	4.223	935.4	0.0235	8.567	930.4	0.0240	9.470	911.3	0.0235
2	6.808	1120.0	0.0234	15.312	1191.8	0.0239	16.643	1000.0	0.0234
3	8.107	1200.4	0.0233	18.706	1254.5	0.0237	20.264	1035.6	0.0233
4	8.696	1230.4	0.0232	19.966	1262.4	0.0236	21.682	1065.1	0.0232
5	8.954	1239.9	0.0231	20.472	1257.9	0.0234	22.275	1081.2	0.0231
6	9.080	1241.7	0.0229	20.714	1249.6	0.0232	22.550	1085.1	0.0229
7	9.158	1241.1	0.0228	20.854	1239.7	0.0231	22.684	1080.1	0.0228
8	9.224	1240.6	0.0227	20.926	1227.4	0.0229	22.730	1070.1	0.0227
9	9.292	1241.5	0.0226	20.941	1213.3	0.0228	22.713	1059.3	0.0226
10	9.359	1244.3	0.0225	20.949	1202.1	0.0227	22.696	1050.4	0.0225
11	9.420	1248.5	0.0224	20.975	1196.6	0.0225	22.712	1044.9	0.0224
12	9.468	1253.6	0.0223	21.022	1197.1	0.0224	22.762	1042.4	0.0223
13	9.491	1258.3	0.0222	21.089	1203.5	0.0223	22.835	1040.5	0.0222
14	9.468	1260.6	0.0220	21.130	1212.7	0.0222	22.870	1035.8	0.0221
15	9.338	1256.1	0.0219	20.972	1217.7	0.0220	22.684	1026.3	0.0220
16	8.918	1232.4	0.0218	20.240	1209.9	0.0219	21.880	1009.7	0.0219
17	7.758	1159.0	0.0217	17.983	1166.3	0.0218	19.457	978.9	0.0218
18	4.887	956.4	0.0217	11.745	1010.6	0.0217	12.754	880.8	0.0217

Axial	Burnup	SP43 to SP44		Burnup	SP44 to SP45	
Node	SP44	T-Fuel	Spec.Vol	SP45	T-Fuel	Spec.Vol
1	10.317	918.7	0.0234	12.286	986.8	0.0236
2	17.886	1006.7	0.0234	20.690	1073.8	0.0235
3	21.704	1036.0	0.0233	24.790	1088.0	0.0234
4	23.242	1055.5	0.0231	26.422	1089.6	0.0232
5	23.895	1062.5	0.0230	27.079	1085.6	0.0231
6	24.187	1060.6	0.0229	27.340	1079.1	0.0230
7	24.312	1052.7	0.0228	27.424	1070.6	0.0228
8	24.333	1041.6	0.0227	27.413	1060.8	0.0227
9	24.288	1029.8	0.0226	27.353	1051.2	0.0226
10	24.247	1019.3	0.0225	27.313	1043.0	0.0225
11	24.250	1011.4	0.0224	27.328	1037.6	0.0224
12	24.295	1006.0	0.0223	27.386	1035.6	0.0223
13	24.368	1001.7	0.0222	27.461	1035.8	0.0222
14	24.395	996.2	0.0221	27.472	1036.2	0.0221
15	24.182	987.4	0.0220	27.215	1034.5	0.0219
16	23.316	972.9	0.0219	26.245	1027.1	0.0218
17	20.748	945.6	0.0218	23.412	1003.0	0.0218
18	13.642	858.9	0.0217	15.507	915.1	0.0217

Datapoint or Statepoint	EFPD / Cycle
DP3	0.0 / Cy3
DP4	0.0 / Cy4
SP42	0.0 / Cy5
SP43	50.4 / Cy5
SP44	94.9 / Cy5
SP45	184.9 / Cy5

Burnup	- GWd/MTU
T-Fuel	- °F
Spec. Vol.	- ft^3 / lbm

Table 4-37. Burnup and TH Feedback Parameters by Axial Node for Assembly C21

Axial	Burnup	DP3 to DP4		Burnup	DP4 to SP42		Burnup	SP42 to SP43	
Node	DP4	T-Fuel	Spec.Vol	SP42	T-Fuel	Spec.Vol	SP43	T-Fuel	Spec.Vol
1	3.424	870.6	0.0231	10.459	1111.5	0.0242	11.304	882.8	0.0237
2	5.411	1019.0	0.0230	15.876	1279.1	0.0240	17.217	1000.9	0.0236
3	6.406	1085.1	0.0229	18.173	1325.6	0.0238	19.820	1065.0	0.0235
4	6.862	1110.9	0.0228	19.059	1326.8	0.0237	20.914	1110.1	0.0234
5	7.067	1119.0	0.0227	19.391	1316.9	0.0235	21.367	1135.6	0.0232
6	7.165	1120.1	0.0227	19.528	1305.2	0.0233	21.549	1143.1	0.0231
7	7.220	1118.7	0.0226	19.586	1292.5	0.0232	21.586	1134.1	0.0229
8	7.262	1117.0	0.0225	19.572	1276.3	0.0230	21.504	1114.0	0.0228
9	7.306	1116.7	0.0224	19.497	1257.6	0.0229	21.362	1094.7	0.0227
10	7.353	1118.4	0.0223	19.450	1244.0	0.0227	21.284	1084.3	0.0226
11	7.400	1121.9	0.0222	19.457	1238.2	0.0226	21.303	1084.5	0.0225
12	7.438	1126.6	0.0221	19.508	1239.8	0.0225	21.412	1096.1	0.0224
13	7.456	1131.0	0.0220	19.610	1249.3	0.0223	21.598	1113.5	0.0222
14	7.432	1133.0	0.0220	19.714	1263.2	0.0222	21.751	1121.4	0.0221
15	7.314	1128.5	0.0219	19.636	1271.7	0.0221	21.653	1113.4	0.0220
16	6.953	1106.9	0.0218	19.045	1267.5	0.0219	20.957	1087.4	0.0219
17	6.005	1042.2	0.0217	17.051	1225.7	0.0218	18.721	1036.4	0.0218
18	3.781	873.9	0.0217	11.272	1057.6	0.0217	12.371	909.5	0.0217

Axial	Burnup	SP43 to SP44		Burnup	SP44 to SP45	
Node	SP44	T-Fuel	Spec.Vol	SP45	T-Fuel	Spec.Vol
1	12.088	886.5	0.0236	13.874	940.4	0.0236
2	18.448	998.5	0.0235	21.151	1049.2	0.0235
3	21.308	1053.0	0.0234	24.416	1089.6	0.0234
4	22.559	1084.5	0.0232	25.826	1105.1	0.0233
5	23.093	1098.7	0.0231	26.384	1109.0	0.0231
6	23.301	1099.7	0.0230	26.542	1106.2	0.0230
7	23.315	1089.4	0.0229	26.479	1095.7	0.0229
8	23.176	1070.3	0.0227	26.273	1077.6	0.0227
9	22.975	1049.9	0.0226	26.043	1059.2	0.0226
10	22.862	1035.9	0.0225	25.956	1046.5	0.0225
11	22.880	1030.5	0.0224	26.048	1041.5	0.0224
12	23.022	1033.8	0.0223	26.276	1046.8	0.0223
13	23.264	1042.9	0.0222	26.581	1060.2	0.0222
14	23.452	1048.3	0.0221	26.787	1071.0	0.0221
15	23.340	1042.9	0.0220	26.634	1073.2	0.0220
16	22.562	1023.2	0.0219	25.722	1063.0	0.0219
17	20.133	982.5	0.0218	22.955	1028.7	0.0218
18	13.308	875.5	0.0218	15.226	924.3	0.0217

Datapoint or Statepoint	EFPD / Cycle
DP3	0.0 / Cy3
DP4	0.0 / Cy4
SP42	0.0 / Cy5
SP43	50.4 / Cy5
SP44	94.9 / Cy5
SP45	184.9 / Cy5

Burnup - GWd/MTU
T-Fuel - °F
Spec. Vol. - ft^3 / lbm

Table 4-38. Burnup and TH Feedback Parameters by Axial Node for Assembly C25

Axial	Burnup	DP3 to DP4		Burnup	DP4 to SP42		Burnup	SP42 to SP43	
Node	DP4	T-Fuel	Spec.Vol	SP42	T-Fuel	Spec.Vol	SP43	T-Fuel	Spec.Vol
1	4.786	988.2	0.0237	9.705	959.0	0.0237	10.707	941.5	0.0239
2	7.533	1176.4	0.0236	15.391	1109.0	0.0236	16.921	1060.7	0.0238
3	8.835	1253.1	0.0235	18.116	1166.1	0.0234	19.938	1115.5	0.0236
4	9.417	1281.9	0.0233	19.304	1179.0	0.0233	21.317	1153.1	0.0235
5	9.676	1290.1	0.0232	19.815	1177.4	0.0232	21.939	1174.0	0.0233
6	9.794	1289.6	0.0231	20.055	1171.4	0.0230	22.218	1178.7	0.0232
7	9.851	1285.4	0.0229	20.182	1164.1	0.0229	22.321	1168.3	0.0230
8	9.893	1280.9	0.0228	20.257	1155.6	0.0228	22.325	1146.8	0.0229
9	9.954	1279.4	0.0227	20.317	1146.5	0.0227	22.315	1125.2	0.0228
10	10.040	1282.3	0.0226	20.388	1139.0	0.0226	22.348	1112.1	0.0226
11	10.139	1289.2	0.0224	20.475	1134.7	0.0224	22.440	1109.6	0.0225
12	10.232	1298.6	0.0223	20.570	1134.2	0.0223	22.585	1118.5	0.0224
13	10.293	1307.5	0.0222	20.648	1137.2	0.0222	22.741	1134.3	0.0223
14	10.283	1312.1	0.0221	20.647	1141.6	0.0221	22.788	1142.7	0.0222
15	10.142	1308.8	0.0220	20.423	1142.5	0.0220	22.549	1136.9	0.0220
16	9.688	1286.0	0.0219	19.611	1131.2	0.0219	21.644	1115.9	0.0219
17	8.446	1209.8	0.0218	17.281	1086.1	0.0218	19.094	1073.6	0.0218
18	5.347	996.7	0.0217	11.148	944.0	0.0217	12.380	951.0	0.0217

Axial	Burnup	SP43 to SP44		Burnup	SP44 to SP45	
Node	SP44	T-Fuel	Spec.Vol	SP45	T-Fuel	Spec.Vol
1	11.634	944.1	0.0238	13.727	1000.0	0.0239
2	18.328	1058.5	0.0237	21.410	1109.6	0.0238
3	21.596	1105.3	0.0235	25.077	1145.5	0.0236
4	23.124	1132.1	0.0234	26.753	1157.5	0.0235
5	23.821	1143.5	0.0233	27.468	1159.2	0.0233
6	24.124	1142.6	0.0231	27.716	1154.9	0.0232
7	24.202	1131.0	0.0230	27.712	1143.4	0.0230
8	24.147	1110.4	0.0228	27.585	1124.4	0.0229
9	24.073	1087.8	0.0227	27.473	1104.4	0.0227
10	24.067	1071.6	0.0226	27.484	1090.3	0.0226
11	24.153	1064.1	0.0225	27.634	1084.2	0.0225
12	24.327	1065.6	0.0224	27.887	1088.5	0.0224
13	24.534	1073.6	0.0223	28.157	1101.7	0.0222
14	24.615	1079.3	0.0221	28.261	1113.3	0.0221
15	24.365	1075.1	0.0220	27.976	1117.1	0.0220
16	23.384	1057.7	0.0219	26.865	1109.3	0.0219
17	20.647	1021.4	0.0218	23.791	1077.7	0.0218
18	13.438	916.3	0.0218	15.620	971.7	0.0217

Datapoint or Statepoint	EFPD / Cycle
DP3	0.0 / Cy3
DP4	0.0 / Cy4
SP42	0.0 / Cy5
SP43	50.4 / Cy5
SP44	94.9 / Cy5
SP45	184.9 / Cy5

Burnup	- GWd/MTU
T-Fuel	- °F
Spec. Vol.	- ft^3 / lbm

Table 4-39. Burnup and TH Feedback Parameters by Axial Node for Assembly C27

Axial	Burnup	DP3 to DP4		Burnup	DP4 to SP42		Burnup	SP42 to SP43	
Node	DP4	T-Fuel	Spec.Vol	SP42	T-Fuel	Spec.Vol	SP43	T-Fuel	Spec.Vol
1	5.248	1029.9	0.0241	11.402	1032.8	0.0238	11.895	762.3	0.0234
2	8.517	1249.1	0.0239	17.624	1166.8	0.0237	18.425	834.0	0.0233
3	10.126	1340.6	0.0238	20.372	1203.2	0.0236	21.707	963.5	0.0233
4	10.829	1371.5	0.0236	21.486	1205.1	0.0234	23.136	1036.5	0.0232
5	11.130	1379.0	0.0235	21.941	1197.9	0.0233	23.712	1062.0	0.0231
6	11.266	1377.8	0.0233	22.155	1189.1	0.0231	23.969	1068.8	0.0229
7	11.336	1373.0	0.0232	22.285	1180.1	0.0230	24.095	1064.5	0.0228
8	11.406	1368.9	0.0230	22.391	1169.2	0.0229	24.172	1053.8	0.0227
9	11.528	1369.7	0.0229	22.511	1156.2	0.0227	24.256	1041.3	0.0226
10	11.698	1376.3	0.0227	22.672	1146.1	0.0226	24.392	1031.3	0.0225
11	11.868	1386.3	0.0226	22.823	1140.1	0.0225	24.539	1026.7	0.0224
12	11.995	1396.3	0.0224	22.915	1138.0	0.0224	24.649	1027.7	0.0223
13	12.048	1403.6	0.0223	22.930	1140.7	0.0223	24.690	1031.3	0.0222
14	11.994	1406.2	0.0222	22.840	1146.4	0.0221	24.615	1032.2	0.0221
15	11.789	1401.3	0.0220	22.543	1149.2	0.0220	24.295	1025.3	0.0220
16	11.266	1379.3	0.0219	21.724	1143.1	0.0219	23.392	1006.1	0.0219
17	9.878	1300.4	0.0218	19.384	1109.2	0.0218	20.860	968.0	0.0218
18	6.280	1065.4	0.0217	12.777	974.6	0.0217	13.772	870.0	0.0217

Axial	Burnup	SP43 to SP44		Burnup	SP44 to SP45	
Node	SP44	T-Fuel	Spec.Vol	SP45	T-Fuel	Spec.Vol
1	12.362	769.8	0.0233	13.534	821.8	0.0235
2	19.206	858.1	0.0233	21.414	993.0	0.0234
3	22.986	987.9	0.0232	25.852	1046.0	0.0233
4	24.627	1026.1	0.0231	27.670	1055.9	0.0232
5	25.280	1037.7	0.0230	28.355	1056.5	0.0230
6	25.562	1038.0	0.0229	28.615	1052.3	0.0229
7	25.680	1030.8	0.0228	28.693	1044.5	0.0228
8	25.729	1018.9	0.0227	28.706	1033.8	0.0227
9	25.781	1005.4	0.0225	28.736	1022.0	0.0226
10	25.890	993.4	0.0224	28.845	1011.7	0.0225
11	26.028	985.6	0.0223	28.999	1005.6	0.0223
12	26.143	982.5	0.0223	29.141	1005.0	0.0222
13	26.199	982.4	0.0222	29.219	1008.8	0.0221
14	26.130	981.5	0.0221	29.154	1013.5	0.0220
15	25.791	975.7	0.0220	28.782	1015.0	0.0219
16	24.821	960.5	0.0219	27.699	1007.6	0.0218
17	22.127	929.0	0.0218	24.715	980.9	0.0217
18	14.630	843.6	0.0217	16.416	893.9	0.0217

Datapoint or Statepoint	EFPD / Cycle
DP3	0.0 / Cy3
DP4	0.0 / Cy4
SP42	0.0 / Cy5
SP43	50.4 / Cy5
SP44	94.9 / Cy5
SP45	184.9 / Cy5

Burnup	- GWd/MTU
T-Fuel	- °F
Spec. Vol.	- ft^3 / lbm

Table 4-40. Burnup and TH Feedback Parameters by Axial Node for Assembly C27a

Axial	Burnup	DP3 to DP4		Burnup	DP4 to SP42		Burnup	SP42 to SP43	
Node	DP4	T-Fuel	Spec.Vol	SP42	T-Fuel	Spec.Vol	SP43	T-Fuel	Spec.Vol
1	5.248	1029.9	0.0241	11.370	1032.8	0.0238	12.398	938.9	0.0238
2	8.517	1249.1	0.0239	17.569	1166.8	0.0237	19.107	1045.4	0.0237
3	10.126	1340.6	0.0238	20.305	1203.2	0.0236	22.106	1092.0	0.0236
4	10.829	1371.5	0.0236	21.416	1205.1	0.0234	23.385	1125.5	0.0234
5	11.130	1379.0	0.0235	21.869	1197.9	0.0233	23.935	1144.2	0.0233
6	11.266	1377.8	0.0233	22.084	1189.1	0.0231	24.182	1147.8	0.0231
7	11.336	1373.0	0.0232	22.218	1180.1	0.0230	24.291	1137.5	0.0230
8	11.406	1368.9	0.0230	22.331	1169.2	0.0229	24.342	1118.0	0.0229
9	11.528	1369.7	0.0229	22.462	1156.2	0.0227	24.407	1097.7	0.0227
10	11.698	1376.3	0.0227	22.633	1146.1	0.0226	24.538	1083.5	0.0226
11	11.868	1386.3	0.0226	22.790	1140.1	0.0225	24.692	1078.7	0.0225
12	11.995	1396.3	0.0224	22.881	1138.0	0.0224	24.818	1084.0	0.0224
13	12.048	1403.6	0.0223	22.887	1140.7	0.0223	24.879	1094.5	0.0223
14	11.994	1406.2	0.0222	22.784	1146.4	0.0221	24.811	1100.3	0.0221
15	11.789	1401.3	0.0220	22.472	1149.2	0.0220	24.485	1095.1	0.0220
16	11.266	1379.3	0.0219	21.645	1143.1	0.0219	23.576	1076.0	0.0219
17	9.878	1300.4	0.0218	19.308	1109.2	0.0218	21.045	1037.7	0.0218
18	6.280	1065.4	0.0217	12.726	974.6	0.0217	13.928	932.9	0.0217

Axial	Burnup	SP43 to SP44		Burnup	SP44 to SP45	
Node	SP44	T-Fuel	Spec.Vol	SP45	T-Fuel	Spec.Vol
1	13.355	945.4	0.0237	15.510	1000.7	0.0239
2	20.532	1046.5	0.0236	23.646	1099.4	0.0238
3	23.761	1089.8	0.0235	27.244	1132.9	0.0236
4	25.176	1114.4	0.0234	28.792	1143.6	0.0235
5	25.797	1124.7	0.0232	29.426	1144.8	0.0233
6	26.063	1123.3	0.0231	29.643	1140.0	0.0232
7	26.149	1111.8	0.0230	29.655	1129.0	0.0230
8	26.147	1092.8	0.0228	29.591	1112.0	0.0229
9	26.155	1071.9	0.0227	29.567	1093.8	0.0227
10	26.245	1055.1	0.0226	29.668	1079.2	0.0226
11	26.388	1046.0	0.0225	29.859	1072.0	0.0225
12	26.533	1045.2	0.0224	30.065	1074.3	0.0224
13	26.631	1049.8	0.0222	30.210	1083.9	0.0222
14	26.586	1053.1	0.0221	30.177	1093.4	0.0221
15	26.246	1048.9	0.0220	29.799	1096.9	0.0220
16	25.266	1032.9	0.0219	28.692	1089.3	0.0219
17	22.562	998.6	0.0218	25.665	1059.6	0.0218
18	14.976	904.9	0.0218	17.152	960.8	0.0217

Datapoint or Statepoint — EFPD / Cycle

DP3	0.0 / Cy3
DP4	0.0 / Cy4
SP42	0.0 / Cy5
SP43	50.4 / Cy5
SP44	94.9 / Cy5
SP45	184.9 / Cy5

Burnup - GWd/MTU
T-Fuel - °F
Spec. Vol. - ft^3 / lbm

Table 4-41. Burnup and TH Feedback Parameters by Axial Node for Assembly C28

Axial	Burnup	DP3 to DP4		Burnup	DP4 to SP42		Burnup	SP42 to SP43	
Node	DP4	T-Fuel	Spec.Vol	SP42	T-Fuel	Spec.Vol	SP43	T-Fuel	Spec.Vol
1	3.357	865.2	0.0231	8.258	979.9	0.0241	9.086	886.0	0.0233
2	5.357	1014.8	0.0230	14.747	1265.1	0.0240	15.967	968.8	0.0232
3	6.379	1082.6	0.0229	17.877	1322.5	0.0239	19.314	1005.5	0.0232
4	6.850	1108.2	0.0228	18.880	1320.5	0.0237	20.467	1035.6	0.0230
5	7.059	1115.8	0.0227	19.205	1309.3	0.0235	20.873	1052.0	0.0229
6	7.155	1116.2	0.0227	19.324	1297.3	0.0233	21.023	1056.4	0.0228
7	7.209	1113.9	0.0226	19.389	1286.1	0.0232	21.085	1052.6	0.0227
8	7.261	1112.0	0.0225	19.452	1276.2	0.0230	21.125	1043.9	0.0226
9	7.332	1112.7	0.0224	19.535	1267.5	0.0229	21.179	1033.5	0.0225
10	7.422	1116.6	0.0223	19.635	1261.1	0.0227	21.255	1024.2	0.0224
11	7.507	1122.7	0.0222	19.729	1257.6	0.0226	21.336	1017.5	0.0223
12	7.565	1129.0	0.0221	19.797	1257.3	0.0225	21.400	1013.5	0.0222
13	7.580	1133.8	0.0220	19.825	1259.8	0.0223	21.428	1010.3	0.0221
14	7.530	1134.9	0.0220	19.791	1264.3	0.0222	21.385	1005.3	0.0220
15	7.374	1128.8	0.0219	19.608	1267.3	0.0221	21.173	996.3	0.0219
16	6.980	1105.9	0.0218	18.964	1262.0	0.0219	20.463	980.9	0.0219
17	6.000	1040.5	0.0217	16.925	1218.5	0.0218	18.270	951.2	0.0218
18	3.749	870.8	0.0217	11.126	1051.4	0.0217	12.041	854.5	0.0217

Axial	Burnup	SP43 to SP44		Burnup	SP44 to SP45	
Node	SP44	T-Fuel	Spec.Vol	SP45	T-Fuel	Spec.Vol
1	9.865	892.9	0.0233	11.694	962.1	0.0234
2	17.109	976.8	0.0232	19.716	1049.1	0.0233
3	20.644	1007.3	0.0231	23.509	1060.5	0.0232
4	21.909	1025.9	0.0230	24.852	1060.9	0.0231
5	22.368	1032.7	0.0229	25.312	1057.0	0.0230
6	22.535	1031.5	0.0228	25.449	1051.1	0.0228
7	22.589	1024.8	0.0227	25.468	1043.6	0.0227
8	22.608	1014.8	0.0226	25.457	1034.6	0.0226
9	22.635	1003.5	0.0225	25.467	1025.2	0.0225
10	22.688	993.0	0.0224	25.515	1016.7	0.0224
11	22.754	984.4	0.0223	25.583	1010.6	0.0223
12	22.810	978.2	0.0222	25.643	1007.5	0.0222
13	22.833	973.3	0.0221	25.662	1006.8	0.0221
14	22.779	967.7	0.0220	25.590	1006.6	0.0220
15	22.541	959.4	0.0220	25.312	1004.8	0.0219
16	21.775	946.0	0.0219	24.455	997.7	0.0218
17	19.450	920.3	0.0218	21.891	975.5	0.0217
18	12.848	835.1	0.0217	14.554	889.6	0.0217

Datapoint or Statepoint — EFPD / Cycle

Statepoint	EFPD / Cycle
DP3	0.0 / Cy3
DP4	0.0 / Cy4
SP42	0.0 / Cy5
SP43	50.4 / Cy5
SP44	94.9 / Cy5
SP45	184.9 / Cy5

Burnup - GWd/MTU
T-Fuel - °F
Spec. Vol. - ft^3 / lbm

Table 4-42. Burnup and TH Feedback Parameters by Axial Node for Assembly C28a

Axial	Burnup	DP3 to DP4		Burnup	DP4 to SP42		Burnup	SP42 to SP43	
Node	DP4	T-Fuel	Spec.Vol	SP42	T-Fuel	Spec.Vol	SP43	T-Fuel	Spec.Vol
1	3.363	865.2	0.0231	9.773	1076.5	0.0240	10.313	788.9	0.0238
2	5.363	1014.8	0.0230	15.059	1240.6	0.0239	15.959	880.2	0.0237
3	6.381	1082.6	0.0229	17.361	1286.9	0.0237	18.898	1042.7	0.0236
4	6.848	1108.2	0.0228	18.213	1285.7	0.0236	20.144	1138.8	0.0235
5	7.054	1115.8	0.0227	18.490	1273.2	0.0234	20.584	1175.9	0.0233
6	7.148	1116.2	0.0227	18.587	1260.6	0.0232	20.740	1187.0	0.0232
7	7.200	1113.9	0.0226	18.650	1250.3	0.0231	20.790	1179.8	0.0230
8	7.251	1112.0	0.0225	18.734	1242.4	0.0230	20.814	1160.7	0.0229
9	7.322	1112.7	0.0224	18.858	1236.8	0.0228	20.874	1140.0	0.0228
10	7.412	1116.6	0.0223	19.005	1233.2	0.0227	20.986	1127.1	0.0226
11	7.497	1122.7	0.0222	19.129	1231.4	0.0226	21.122	1125.8	0.0225
12	7.554	1129.0	0.0221	19.195	1230.7	0.0224	21.244	1136.4	0.0224
13	7.568	1133.8	0.0220	19.189	1231.0	0.0223	21.315	1152.7	0.0223
14	7.519	1134.9	0.0220	19.102	1232.2	0.0222	21.277	1162.2	0.0222
15	7.363	1128.8	0.0219	18.876	1232.8	0.0220	21.034	1155.7	0.0220
16	6.971	1105.9	0.0218	18.229	1225.8	0.0219	20.274	1128.7	0.0219
17	5.994	1040.5	0.0217	16.259	1185.0	0.0218	18.046	1074.4	0.0218
18	3.747	870.8	0.0217	10.684	1026.8	0.0217	11.861	936.7	0.0217

Axial	Burnup	SP43 to SP44		Burnup	SP44 to SP45	
Node	SP44	T-Fuel	Spec.Vol	SP45	T-Fuel	Spec.Vol
1	10.825	796.6	0.0237	12.108	853.5	0.0238
2	16.837	907.6	0.0236	19.303	1059.3	0.0237
3	20.361	1067.5	0.0235	23.602	1124.8	0.0235
4	21.873	1119.3	0.0234	25.335	1142.1	0.0234
5	22.419	1138.0	0.0232	25.922	1147.5	0.0233
6	22.609	1141.0	0.0231	26.075	1145.5	0.0231
7	22.641	1131.4	0.0230	26.040	1135.6	0.0230
8	22.615	1112.7	0.0228	25.953	1118.3	0.0228
9	22.617	1091.4	0.0227	25.929	1099.0	0.0227
10	22.692	1075.2	0.0226	26.026	1084.1	0.0226
11	22.825	1068.1	0.0225	26.221	1077.6	0.0225
12	22.978	1070.3	0.0224	26.451	1081.8	0.0223
13	23.100	1078.5	0.0222	26.634	1094.0	0.0222
14	23.096	1084.5	0.0221	26.652	1105.9	0.0221
15	22.839	1079.9	0.0220	26.355	1109.8	0.0220
16	21.993	1059.2	0.0219	25.366	1099.4	0.0219
17	19.556	1015.2	0.0218	22.567	1062.6	0.0218
18	12.863	899.6	0.0218	14.909	950.1	0.0217

Datapoint or Statepoint	EFPD / Cycle
DP3	0.0 / Cy3
DP4	0.0 / Cy4
SP42	0.0 / Cy5
SP43	50.4 / Cy5
SP44	94.9 / Cy5
SP45	184.9 / Cy5

Burnup - GWd/MTU
T-Fuel - °F
Spec. Vol. - ft^3 / lbm

Table 4-43. Burnup and TH Feedback Parameters by Axial Node for Assembly D8

Axial	Burnup	DP4 to SP42		Burnup	SP42 to SP43		Burnup	SP43 to SP44	
Node	SP42	T-Fuel	Spec.Vol	SP43	T-Fuel	Spec.Vol	SP44	T-Fuel	Spec.Vol
1	3.907	919.6	0.0235	4.342	759.7	0.0228	4.755	767.6	0.0228
2	6.692	1122.6	0.0234	7.434	856.8	0.0228	8.132	865.1	0.0227
3	8.197	1207.4	0.0233	9.168	922.2	0.0227	10.066	923.6	0.0227
4	8.890	1234.7	0.0232	10.018	965.1	0.0227	11.034	953.1	0.0226
5	9.204	1240.5	0.0231	10.413	986.1	0.0226	11.483	963.4	0.0226
6	9.382	1239.2	0.0230	10.622	992.3	0.0225	11.709	963.6	0.0225
7	9.535	1237.1	0.0229	10.774	989.0	0.0224	11.856	957.8	0.0224
8	9.719	1237.4	0.0227	10.939	979.8	0.0224	12.002	947.8	0.0223
9	9.933	1240.2	0.0226	11.128	968.7	0.0223	12.169	936.4	0.0223
10	10.114	1243.5	0.0225	11.291	959.9	0.0222	12.314	926.5	0.0222
11	10.217	1245.6	0.0224	11.390	955.8	0.0221	12.404	920.3	0.0221
12	10.226	1246.0	0.0223	11.408	956.5	0.0221	12.424	918.0	0.0221
13	10.128	1243.7	0.0222	11.324	959.8	0.0220	12.348	918.3	0.0220
14	9.937	1238.0	0.0221	11.141	961.5	0.0219	12.169	918.3	0.0220
15	9.661	1227.6	0.0220	10.849	956.4	0.0219	11.863	913.4	0.0219
16	9.125	1200.9	0.0219	10.250	939.2	0.0218	11.214	899.7	0.0218
17	7.850	1127.7	0.0218	8.824	899.0	0.0218	9.663	866.1	0.0218
18	4.827	927.6	0.0217	5.440	792.2	0.0217	5.973	773.5	0.0217

Axial	Burnup	SP44 to SP45	
Node	SP45	T-Fuel	Spec.Vol
1	5.761	820.7	0.0229
2	9.784	932.1	0.0228
3	12.044	973.2	0.0227
4	13.136	986.4	0.0226
5	13.611	987.6	0.0226
6	13.823	984.0	0.0225
7	13.944	977.1	0.0224
8	14.063	967.8	0.0223
9	14.209	957.5	0.0223
10	14.346	948.9	0.0222
11	14.442	944.1	0.0221
12	14.476	943.8	0.0220
13	14.415	947.4	0.0220
14	14.242	952.0	0.0219
15	13.914	953.3	0.0218
16	13.182	944.8	0.0218
17	11.402	912.5	0.0217
18	7.101	815.3	0.0217

Datapoint or Statepoint	EFPD / Cycle
DP4	0.0 / Cy4
SP42	0.0 / Cy5
SP43	50.4 / Cy5
SP44	94.9 / Cy5
SP45	184.9 / Cy5

Burnup - GWd/MTU
T-Fuel - °F
Spec. Vol. - ft^3 / lbm

Table 4-44. Burnup and TH Feedback Parameters by Axial Node for Assembly D15

Axial	Burnup	DP4 to SP42		Burnup	SP42 to SP43		Burnup	SP43 to SP44	
Node	SP42	T-Fuel	Spec.Vol	SP43	T-Fuel	Spec.Vol	SP44	T-Fuel	Spec.Vol
1	3.922	917.2	0.0234	4.397	774.5	0.0228	4.843	780.2	0.0228
2	6.539	1105.3	0.0234	7.337	876.4	0.0228	8.078	879.0	0.0228
3	7.898	1185.0	0.0233	8.904	933.4	0.0227	9.823	929.3	0.0227
4	8.540	1212.0	0.0231	9.682	970.2	0.0227	10.705	955.8	0.0226
5	8.839	1218.0	0.0230	10.057	989.8	0.0226	11.131	966.0	0.0226
6	9.009	1217.0	0.0229	10.257	995.9	0.0225	11.348	966.4	0.0225
7	9.154	1215.0	0.0228	10.401	992.6	0.0224	11.487	960.5	0.0224
8	9.330	1215.2	0.0227	10.559	983.4	0.0224	11.626	950.3	0.0223
9	9.539	1218.2	0.0226	10.743	972.5	0.0223	11.788	938.7	0.0223
10	9.715	1221.5	0.0225	10.903	964.1	0.0222	11.931	928.8	0.0222
11	9.817	1223.8	0.0224	11.001	960.6	0.0221	12.023	922.9	0.0221
12	9.828	1224.4	0.0223	11.024	962.0	0.0221	12.049	921.0	0.0221
13	9.732	1222.0	0.0222	10.945	965.8	0.0220	11.979	921.8	0.0220
14	9.543	1216.2	0.0221	10.765	967.8	0.0219	11.804	922.2	0.0220
15	9.272	1205.7	0.0220	10.477	962.4	0.0219	11.501	917.8	0.0219
16	8.746	1179.1	0.0219	9.884	943.8	0.0218	10.856	903.3	0.0218
17	7.501	1106.5	0.0218	8.482	901.4	0.0218	9.325	867.4	0.0218
18	4.595	910.7	0.0217	5.209	792.4	0.0217	5.741	773.1	0.0217

Axial	Burnup	SP44 to SP45	
Node	SP45	T-Fuel	Spec.Vol
1	5.895	828.0	0.0229
2	9.765	933.2	0.0228
3	11.805	972.5	0.0227
4	12.803	985.4	0.0226
5	13.255	986.9	0.0226
6	13.460	983.6	0.0225
7	13.573	977.0	0.0224
8	13.686	967.7	0.0223
9	13.830	957.6	0.0223
10	13.969	949.2	0.0222
11	14.069	944.7	0.0221
12	14.112	944.8	0.0220
13	14.059	948.7	0.0220
14	13.890	953.5	0.0219
15	13.564	954.7	0.0218
16	12.832	946.2	0.0218
17	11.065	914.2	0.0217
18	6.863	813.9	0.0217

Datapoint or Statepoint	EFPD / Cycle
DP4	0.0 / Cy4
SP42	0.0 / Cy5
SP43	50.4 / Cy5
SP44	94.9 / Cy5
SP45	184.9 / Cy5

Burnup	- GWd/MTU
T-Fuel	- °F
Spec. Vol.	- ft^3 / lbm

Table 4-45. Burnup and TH Feedback Parameters by Axial Node for Assembly D20

Axial	Burnup	DP4 to SP42		Burnup	SP42 to SP43		Burnup	SP43 to SP44	
Node	SP42	T-Fuel	Spec.Vol	SP43	T-Fuel	Spec.Vol	SP44	T-Fuel	Spec.Vol
1	5.643	1058.2	0.0241	6.016	722.6	0.0226	6.364	726.2	0.0225
2	9.005	1270.5	0.0240	9.631	793.4	0.0225	10.208	795.0	0.0225
3	10.581	1354.3	0.0238	11.365	835.6	0.0225	12.074	832.5	0.0225
4	11.290	1381.1	0.0237	12.176	863.2	0.0224	12.964	852.8	0.0224
5	11.622	1385.2	0.0235	12.568	878.2	0.0224	13.396	861.2	0.0223
6	11.813	1381.6	0.0233	12.782	882.9	0.0223	13.623	861.7	0.0223
7	11.963	1376.2	0.0232	12.930	879.8	0.0223	13.764	856.8	0.0222
8	12.119	1371.5	0.0230	13.067	872.1	0.0222	13.885	848.5	0.0222
9	12.286	1368.5	0.0229	13.213	863.6	0.0221	14.011	839.4	0.0221
10	12.434	1367.8	0.0227	13.348	857.7	0.0221	14.132	832.1	0.0221
11	12.534	1369.2	0.0226	13.449	856.1	0.0220	14.230	828.0	0.0220
12	12.576	1372.1	0.0225	13.505	858.5	0.0220	14.292	827.3	0.0220
13	12.544	1375.1	0.0223	13.492	862.4	0.0219	14.289	828.3	0.0219
14	12.435	1376.1	0.0222	13.391	863.6	0.0219	14.193	828.4	0.0219
15	12.212	1371.2	0.0221	13.152	858.1	0.0218	13.941	824.0	0.0219
16	11.648	1346.2	0.0219	12.531	841.7	0.0218	13.276	811.4	0.0218
17	10.145	1264.4	0.0218	10.899	806.3	0.0217	11.540	782.1	0.0218
18	6.359	1036.3	0.0217	6.827	729.6	0.0217	7.230	715.1	0.0217

Axial	Burnup	SP44 to SP45	
Node	SP45	T-Fuel	Spec.Vol
1	7.173	759.4	0.0225
2	11.496	833.6	0.0225
3	13.581	864.8	0.0224
4	14.558	875.5	0.0224
5	15.009	877.2	0.0223
6	15.222	874.6	0.0223
7	15.339	868.8	0.0222
8	15.438	860.7	0.0222
9	15.553	852.2	0.0221
10	15.676	845.2	0.0220
11	15.789	841.7	0.0220
12	15.869	842.0	0.0219
13	15.880	845.1	0.0219
14	15.785	848.4	0.0218
15	15.510	848.6	0.0218
16	14.772	841.2	0.0217
17	12.849	816.0	0.0217
18	8.072	742.8	0.0217

Datapoint or Statepoint

Statepoint	EFPD / Cycle
DP4	0.0 / Cy4
SP42	0.0 / Cy5
SP43	50.4 / Cy5
SP44	94.9 / Cy5
SP45	184.9 / Cy5

Burnup	- GWd/MTU
T-Fuel	- °F
Spec. Vol.	- ft^3 / lbm

Table 4-46. Burnup and TH Feedback Parameters by Axial Node for Assembly D21

Axial	Burnup	DP4 to SP42		Burnup	SP42 to SP43		Burnup	SP43 to SP44	
Node	SP42	T-Fuel	Spec.Vol	SP43	T-Fuel	Spec.Vol	SP44	T-Fuel	Spec.Vol
1	3.264	856.3	0.0231	3.880	837.8	0.0231	4.451	840.0	0.0231
2	5.430	1015.4	0.0230	6.454	971.2	0.0231	7.388	964.4	0.0230
3	6.527	1084.0	0.0229	7.788	1036.8	0.0230	8.918	1019.0	0.0229
4	7.047	1109.1	0.0229	8.456	1076.3	0.0229	9.697	1047.6	0.0228
5	7.292	1115.2	0.0228	8.786	1098.5	0.0228	10.085	1059.9	0.0227
6	7.426	1114.5	0.0227	8.956	1105.6	0.0227	10.273	1060.6	0.0227
7	7.532	1112.2	0.0226	9.054	1100.0	0.0226	10.361	1052.7	0.0226
8	7.646	1110.9	0.0225	9.136	1086.3	0.0225	10.414	1038.9	0.0225
9	7.774	1111.2	0.0224	9.227	1071.6	0.0224	10.473	1023.6	0.0224
10	7.882	1112.2	0.0223	9.316	1062.1	0.0223	10.540	1011.8	0.0223
11	7.949	1113.4	0.0222	9.388	1060.7	0.0223	10.609	1006.0	0.0222
12	7.964	1114.4	0.0222	9.432	1067.2	0.0222	10.667	1006.5	0.0222
13	7.916	1114.0	0.0221	9.422	1077.0	0.0221	10.681	1010.7	0.0221
14	7.803	1111.2	0.0220	9.332	1082.4	0.0220	10.605	1013.3	0.0220
15	7.601	1103.1	0.0219	9.111	1076.0	0.0219	10.370	1008.5	0.0219
16	7.154	1078.8	0.0218	8.579	1051.4	0.0218	9.773	989.8	0.0219
17	6.083	1011.4	0.0218	7.305	994.9	0.0218	8.337	944.2	0.0218
18	3.661	841.1	0.0217	4.416	850.3	0.0217	5.062	822.6	0.0217

Axial	Burnup	SP44 to SP45	
Node	SP45	T-Fuel	Spec.Vol
1	5.744	886.7	0.0231
2	9.424	1008.0	0.0230
3	11.277	1053.7	0.0229
4	12.179	1068.8	0.0228
5	12.591	1071.6	0.0227
6	12.755	1068.3	0.0227
7	12.803	1059.9	0.0226
8	12.820	1047.2	0.0225
9	12.862	1033.3	0.0224
10	12.938	1022.6	0.0223
11	13.038	1017.7	0.0222
12	13.136	1019.7	0.0221
13	13.181	1027.2	0.0220
14	13.114	1035.2	0.0220
15	12.849	1038.0	0.0219
16	12.147	1028.9	0.0218
17	10.425	990.3	0.0217
18	6.402	866.8	0.0217

Datapoint or Statepoint	EFPD / Cycle
DP4	0.0 / Cy4
SP42	0.0 / Cy5
SP43	50.4 / Cy5
SP44	94.9 / Cy5
SP45	184.9 / Cy5

Burnup	- GWd/MTU
T-Fuel	- °F
Spec. Vol.	- ft^3 / lbm

Table 4-47. Burnup and TH Feedback Parameters by Axial Node for Assembly D25

Axial	Burnup	DP4 to SP42		Burnup	SP42 to SP43		Burnup	SP43 to SP44	
Node	SP42	T-Fuel	Spec.Vol	SP43	T-Fuel	Spec.Vol	SP44	T-Fuel	Spec.Vol
1	4.613	971.1	0.0236	5.001	731.9	0.0226	5.362	734.9	0.0225
2	7.468	1165.2	0.0235	8.112	809.4	0.0225	8.705	808.9	0.0225
3	8.835	1241.2	0.0234	9.627	849.0	0.0225	10.345	843.9	0.0225
4	9.458	1266.8	0.0233	10.342	873.3	0.0224	11.129	861.4	0.0224
5	9.747	1271.3	0.0231	10.682	886.2	0.0224	11.503	868.4	0.0223
6	9.899	1268.3	0.0230	10.855	890.2	0.0223	11.688	868.6	0.0223
7	10.000	1262.8	0.0229	10.954	887.4	0.0223	11.782	864.0	0.0222
8	10.077	1256.5	0.0228	11.015	880.7	0.0222	11.828	856.7	0.0222
9	10.137	1250.5	0.0227	11.057	873.3	0.0221	11.853	848.7	0.0221
10	10.186	1246.7	0.0225	11.095	868.0	0.0221	11.880	842.1	0.0221
11	10.228	1246.0	0.0224	11.136	866.2	0.0220	11.916	838.1	0.0220
12	10.257	1248.3	0.0223	11.176	867.7	0.0220	11.960	836.8	0.0220
13	10.271	1252.6	0.0222	11.203	870.1	0.0219	11.994	836.8	0.0219
14	10.243	1256.3	0.0221	11.181	870.3	0.0219	11.974	835.9	0.0219
15	10.093	1253.0	0.0220	11.015	864.6	0.0218	11.796	831.2	0.0218
16	9.612	1229.6	0.0219	10.481	849.3	0.0218	11.220	818.9	0.0218
17	8.314	1155.7	0.0218	9.058	814.7	0.0217	9.695	790.1	0.0218
18	5.138	950.1	0.0217	5.599	732.6	0.0217	5.997	718.7	0.0217

Axial	Burnup	SP44 to SP45	
Node	SP45	T-Fuel	Spec.Vol
1	6.192	768.0	0.0226
2	10.018	846.3	0.0225
3	11.868	875.6	0.0225
4	12.733	885.5	0.0224
5	13.124	887.1	0.0223
6	13.297	884.6	0.0223
7	13.369	879.4	0.0222
8	13.396	872.4	0.0222
9	13.410	865.2	0.0221
10	13.437	859.4	0.0221
11	13.485	856.4	0.0220
12	13.543	856.5	0.0220
13	13.588	858.8	0.0219
14	13.568	861.3	0.0218
15	13.368	861.0	0.0218
16	12.721	853.0	0.0217
17	11.011	827.4	0.0217
18	6.839	749.3	0.0217

Datapoint or Statepoint	EFPD / Cycle
DP4	0.0 / Cy4
SP42	0.0 / Cy5
SP43	50.4 / Cy5
SP44	94.9 / Cy5
SP45	184.9 / Cy5

Burnup	- GWd/MTU
T-Fuel	- °F
Spec. Vol.	- ft^3 / lbm

Table 4-48. Burnup and TH Feedback Parameters by Axial Node for Assembly D28

Axial	Burnup	DP4 to SP42		Burnup	SP42 to SP43		Burnup	SP43 to SP44	
Node	SP42	T-Fuel	Spec.Vol	SP43	T-Fuel	Spec.Vol	SP44	T-Fuel	Spec.Vol
1	3.193	849.0	0.0230	4.028	934.7	0.0237	4.800	935.6	0.0236
2	5.277	1002.9	0.0229	6.655	1105.6	0.0237	7.909	1093.0	0.0235
3	6.315	1068.3	0.0229	8.007	1191.0	0.0235	9.523	1164.6	0.0234
4	6.794	1090.7	0.0228	8.685	1244.0	0.0234	10.350	1202.3	0.0233
5	7.008	1095.2	0.0227	9.015	1274.3	0.0233	10.759	1219.1	0.0232
6	7.111	1093.1	0.0226	9.168	1285.1	0.0231	10.940	1221.4	0.0230
7	7.171	1088.7	0.0225	9.222	1279.7	0.0230	10.984	1212.9	0.0229
8	7.208	1083.4	0.0224	9.220	1264.1	0.0229	10.947	1196.9	0.0228
9	7.230	1078.4	0.0224	9.198	1247.4	0.0227	10.886	1179.2	0.0227
10	7.245	1074.7	0.0223	9.190	1237.4	0.0226	10.853	1165.9	0.0225
11	7.256	1073.3	0.0222	9.212	1237.4	0.0225	10.873	1159.8	0.0224
12	7.267	1074.2	0.0221	9.265	1247.0	0.0224	10.948	1161.1	0.0223
13	7.272	1076.8	0.0220	9.326	1260.6	0.0222	11.043	1166.6	0.0222
14	7.251	1078.7	0.0220	9.337	1266.7	0.0221	11.075	1169.5	0.0221
15	7.138	1074.9	0.0219	9.201	1257.8	0.0220	10.921	1162.5	0.0220
16	6.778	1054.9	0.0218	8.729	1224.2	0.0219	10.362	1137.4	0.0219
17	5.822	993.7	0.0218	7.501	1148.2	0.0218	8.918	1076.9	0.0218
18	3.550	832.0	0.0217	4.597	960.5	0.0217	5.490	919.9	0.0217

Axial	Burnup	SP44 to SP45	
Node	SP45	T-Fuel	Spec.Vol
1	6.542	989.8	0.0237
2	10.632	1139.2	0.0236
3	12.675	1196.9	0.0235
4	13.668	1217.7	0.0233
5	14.113	1223.1	0.0232
6	14.267	1220.8	0.0230
7	14.264	1212.2	0.0229
8	14.186	1198.3	0.0228
9	14.109	1183.2	0.0227
10	14.096	1171.8	0.0225
11	14.165	1167.2	0.0224
12	14.297	1171.0	0.0223
13	14.436	1181.1	0.0222
14	14.481	1191.0	0.0221
15	14.290	1193.9	0.0220
16	13.590	1180.7	0.0219
17	11.765	1130.7	0.0218
18	7.333	973.3	0.0217

Datapoint or Statepoint	EFPD / Cycle
DP4	0.0 / Cy4
SP42	0.0 / Cy5
SP43	50.4 / Cy5
SP44	94.9 / Cy5
SP45	184.9 / Cy5

Burnup	- GWd/MTU
T-Fuel	- °F
Spec. Vol.	- ft^3 / lbm

Table 4-49. Burnup and TH Feedback Parameters by Axial Node for Assembly D29

Axial	Burnup	DP4 to SP42		Burnup	SP42 to SP43		Burnup	SP43 to SP44	
Node	SP42	T-Fuel	Spec.Vol	SP43	T-Fuel	Spec.Vol	SP44	T-Fuel	Spec.Vol
1	3.494	878.4	0.0232	3.910	754.0	0.0228	4.303	760.5	0.0228
2	5.855	1052.2	0.0231	6.585	858.7	0.0228	7.264	863.6	0.0227
3	7.076	1123.4	0.0230	8.032	926.6	0.0227	8.905	922.5	0.0227
4	7.635	1147.0	0.0229	8.751	972.8	0.0227	9.745	955.3	0.0226
5	7.876	1151.1	0.0228	9.084	998.4	0.0226	10.140	969.4	0.0226
6	7.990	1148.2	0.0227	9.237	1007.5	0.0225	10.315	972.1	0.0225
7	8.053	1143.0	0.0226	9.304	1005.9	0.0224	10.379	967.5	0.0224
8	8.091	1137.1	0.0225	9.323	998.3	0.0224	10.382	958.6	0.0223
9	8.110	1131.3	0.0224	9.321	989.6	0.0223	10.359	948.8	0.0223
10	8.119	1127.0	0.0224	9.319	984.1	0.0222	10.344	941.0	0.0222
11	8.129	1125.3	0.0223	9.334	983.9	0.0222	10.357	937.0	0.0221
12	8.141	1126.4	0.0222	9.368	988.2	0.0221	10.401	936.7	0.0221
13	8.155	1129.5	0.0221	9.405	993.6	0.0220	10.452	938.1	0.0220
14	8.144	1132.3	0.0220	9.406	994.8	0.0219	10.458	937.6	0.0219
15	8.039	1129.3	0.0219	9.278	986.4	0.0219	10.311	931.0	0.0219
16	7.667	1109.3	0.0218	8.826	962.2	0.0218	9.798	912.7	0.0218
17	6.632	1046.3	0.0218	7.611	910.0	0.0218	8.440	871.4	0.0218
18	4.083	871.1	0.0217	4.679	789.0	0.0217	5.189	768.5	0.0217

Axial	Burnup	SP44 to SP45	
Node	SP45	T-Fuel	Spec.Vol
1	5.244	807.8	0.0228
2	8.826	918.6	0.0228
3	10.783	962.0	0.0227
4	11.757	978.5	0.0226
5	12.187	982.4	0.0225
6	12.354	980.7	0.0225
7	12.395	975.3	0.0224
8	12.378	967.1	0.0223
9	12.349	958.2	0.0222
10	12.345	951.2	0.0222
11	12.382	947.9	0.0221
12	12.452	949.1	0.0220
13	12.522	953.2	0.0220
14	12.528	957.2	0.0219
15	12.348	956.6	0.0218
16	11.733	945.3	0.0218
17	10.121	909.1	0.0217
18	6.250	804.5	0.0217

Datapoint or Statepoint	EFPD / Cycle
DP4	0.0 / Cy4
SP42	0.0 / Cy5
SP43	50.4 / Cy5
SP44	94.9 / Cy5
SP45	184.9 / Cy5

Burnup	- GWd/MTU
T-Fuel	- °F
Spec. Vol.	- ft^3 / lbm

Table 4-50. Burnup and TH Feedback Parameters by Axial Node for Assembly E4

Axial	Burnup	SP42 to SP43		Burnup	SP43 to SP44		Burnup	SP44 to SP45	
Node	SP43	T-Fuel	Spec.Vol	SP44	T-Fuel	Spec.Vol	SP45	T-Fuel	Spec.Vol
1	1.060	1051.2	0.0242	2.050	1065.6	0.0242	4.331	1140.5	0.0245
2	1.599	1249.5	0.0241	3.112	1266.1	0.0241	6.571	1356.9	0.0243
3	1.972	1380.3	0.0239	3.830	1388.1	0.0239	7.879	1450.9	0.0241
4	2.223	1465.7	0.0238	4.290	1453.7	0.0238	8.579	1478.5	0.0240
5	2.360	1508.7	0.0236	4.531	1478.7	0.0236	8.878	1486.6	0.0238
6	2.412	1520.5	0.0234	4.621	1482.5	0.0234	8.941	1485.7	0.0236
7	2.402	1514.0	0.0233	4.597	1473.5	0.0232	8.861	1477.8	0.0234
8	2.352	1496.2	0.0231	4.503	1455.5	0.0231	8.716	1463.8	0.0232
9	2.296	1474.7	0.0229	4.395	1432.4	0.0229	8.590	1447.9	0.0230
10	2.262	1459.7	0.0228	4.327	1413.7	0.0228	8.546	1435.5	0.0228
11	2.265	1457.2	0.0226	4.323	1404.5	0.0226	8.601	1430.1	0.0227
12	2.303	1466.6	0.0225	4.383	1404.9	0.0225	8.732	1433.6	0.0225
13	2.356	1479.5	0.0224	4.471	1410.7	0.0224	8.874	1443.5	0.0224
14	2.386	1483.9	0.0222	4.521	1412.8	0.0222	8.936	1453.0	0.0222
15	2.360	1471.9	0.0221	4.470	1401.0	0.0221	8.828	1453.8	0.0221
16	2.246	1429.2	0.0219	4.253	1362.9	0.0220	8.420	1434.6	0.0219
17	1.985	1332.7	0.0218	3.750	1276.3	0.0219	7.444	1367.6	0.0218
18	1.406	1121.2	0.0217	2.637	1082.6	0.0218	5.210	1158.2	0.0217

Table 4-51. Burnup and TH Feedback Parameters by Axial Node for Assembly E6

Axial	Burnup	SP42 to SP43		Burnup	SP43 to SP44		Burnup	SP44 to SP45	
Node	SP43	T-Fuel	Spec.Vol	SP44	T-Fuel	Spec.Vol	SP45	T-Fuel	Spec.Vol
1	1.049	1046.5	0.0242	2.024	1057.9	0.0242	4.267	1131.4	0.0244
2	1.573	1239.4	0.0241	3.051	1252.1	0.0240	6.434	1340.9	0.0243
3	1.951	1372.1	0.0239	3.775	1374.4	0.0239	7.755	1438.0	0.0241
4	2.211	1460.4	0.0238	4.248	1441.7	0.0237	8.481	1468.4	0.0239
5	2.355	1505.7	0.0236	4.499	1469.0	0.0236	8.796	1477.3	0.0237
6	2.412	1519.2	0.0234	4.594	1473.8	0.0234	8.866	1476.7	0.0235
7	2.403	1513.3	0.0233	4.574	1464.7	0.0232	8.787	1468.4	0.0233
8	2.354	1495.7	0.0231	4.479	1445.4	0.0231	8.638	1453.8	0.0232
9	2.299	1474.2	0.0229	4.372	1421.4	0.0229	8.507	1437.4	0.0230
10	2.267	1459.9	0.0228	4.306	1402.9	0.0228	8.461	1424.7	0.0228
11	2.274	1458.9	0.0226	4.309	1394.5	0.0226	8.525	1419.5	0.0227
12	2.320	1470.9	0.0225	4.381	1396.6	0.0225	8.673	1423.7	0.0225
13	2.382	1485.7	0.0224	4.485	1404.5	0.0224	8.841	1434.9	0.0224
14	2.420	1492.4	0.0222	4.549	1408.8	0.0222	8.928	1445.8	0.0222
15	2.397	1481.3	0.0221	4.505	1398.2	0.0221	8.833	1447.7	0.0221
16	2.275	1437.9	0.0219	4.278	1359.5	0.0220	8.414	1428.5	0.0219
17	2.000	1336.8	0.0218	3.755	1271.2	0.0219	7.411	1359.3	0.0218
18	1.428	1128.2	0.0217	2.662	1082.5	0.0218	5.223	1155.2	0.0217

Datapoint or Statepoint

Statepoint	EFPD / Cycle
SP42	0.0 / Cy5
SP43	50.4 / Cy5
SP44	94.9 / Cy5
SP45	184.9 / Cy5

Burnup - GWd/MTU
T-Fuel - °F
Spec. Vol. - ft^3 / lbm

Table 4-52. Burnup and TH Feedback Parameters by Axial Node for Assembly E10

Axial	Burnup	SP42 to SP43		Burnup	SP43 to SP44		Burnup	SP44 to SP45	
Node	SP43	T-Fuel	Spec.Vol	SP44	T-Fuel	Spec.Vol	SP45	T-Fuel	Spec.Vol
1	1.020	1034.2	0.0241	1.977	1049.8	0.0241	4.197	1130.3	0.0244
2	1.548	1230.1	0.0240	3.014	1247.9	0.0240	6.385	1343.4	0.0242
3	1.916	1359.1	0.0239	3.720	1367.6	0.0239	7.661	1436.0	0.0241
4	2.163	1443.3	0.0237	4.171	1431.5	0.0237	8.338	1462.1	0.0239
5	2.297	1486.8	0.0235	4.407	1457.4	0.0235	8.627	1468.3	0.0237
6	2.351	1500.4	0.0234	4.496	1461.8	0.0234	8.695	1466.6	0.0235
7	2.346	1495.7	0.0232	4.483	1453.7	0.0232	8.635	1459.2	0.0233
8	2.307	1480.4	0.0230	4.409	1436.9	0.0230	8.522	1447.3	0.0231
9	2.261	1461.6	0.0229	4.322	1416.7	0.0229	8.422	1434.1	0.0230
10	2.232	1448.3	0.0227	4.262	1400.0	0.0227	8.383	1423.3	0.0228
11	2.231	1444.5	0.0226	4.253	1390.5	0.0226	8.420	1418.1	0.0227
12	2.257	1449.8	0.0225	4.292	1388.5	0.0225	8.511	1419.8	0.0225
13	2.293	1458.1	0.0223	4.350	1390.2	0.0223	8.606	1426.7	0.0224
14	2.310	1459.2	0.0222	4.375	1388.6	0.0222	8.632	1433.3	0.0222
15	2.279	1444.5	0.0221	4.314	1375.1	0.0221	8.511	1432.7	0.0221
16	2.166	1401.1	0.0219	4.101	1337.6	0.0220	8.115	1413.8	0.0219
17	1.910	1306.4	0.0218	3.610	1253.2	0.0218	7.169	1343.7	0.0218
18	1.347	1100.7	0.0217	2.530	1065.0	0.0218	5.007	1140.2	0.0217

Table 4-53. Burnup and TH Feedback Parameters by Axial Node for Assembly E12

Axial	Burnup	SP42 to SP43		Burnup	SP43 to SP44		Burnup	SP44 to SP45	
Node	SP43	T-Fuel	Spec.Vol	SP44	T-Fuel	Spec.Vol	SP45	T-Fuel	Spec.Vol
1	1.155	1088.4	0.0241	2.224	1096.1	0.0241	4.622	1157.4	0.0244
2	1.691	1280.8	0.0240	3.274	1287.5	0.0240	6.788	1356.4	0.0242
3	2.016	1394.4	0.0239	3.896	1391.2	0.0238	7.937	1443.8	0.0241
4	2.229	1466.0	0.0237	4.290	1448.4	0.0237	8.548	1472.7	0.0239
5	2.352	1504.4	0.0235	4.510	1472.7	0.0235	8.807	1482.6	0.0237
6	2.396	1513.7	0.0234	4.583	1475.2	0.0233	8.802	1482.6	0.0235
7	2.352	1497.1	0.0232	4.501	1459.6	0.0232	8.583	1469.5	0.0233
8	2.231	1453.4	0.0230	4.278	1421.4	0.0230	8.235	1439.2	0.0231
9	2.118	1410.7	0.0229	4.057	1376.8	0.0229	7.942	1404.4	0.0230
10	2.067	1389.7	0.0228	3.951	1350.3	0.0227	7.865	1383.5	0.0228
11	2.076	1389.8	0.0226	3.957	1342.2	0.0226	7.999	1376.9	0.0227
12	2.157	1414.8	0.0225	4.092	1353.0	0.0225	8.293	1390.4	0.0225
13	2.303	1461.4	0.0224	4.348	1382.4	0.0224	8.686	1423.6	0.0224
14	2.389	1484.3	0.0222	4.506	1403.9	0.0222	8.905	1446.3	0.0222
15	2.379	1476.9	0.0221	4.489	1399.6	0.0221	8.846	1451.3	0.0221
16	2.265	1435.0	0.0219	4.274	1362.7	0.0220	8.440	1432.8	0.0219
17	2.002	1337.8	0.0218	3.769	1276.5	0.0219	7.460	1365.6	0.0218
18	1.441	1133.2	0.0217	2.693	1089.4	0.0218	5.293	1162.4	0.0217

Datapoint or Statepoint	EFPD / Cycle
SP42	0.0 / Cy5
SP43	50.4 / Cy5
SP44	94.9 / Cy5
SP45	184.9 / Cy5

Burnup	- GWd/MTU
T-Fuel	- °F
Spec. Vol.	- ft^3 / lbm

Table 4-54. Burnup and TH Feedback Parameters by Axial Node for Assembly E14

Axial	Burnup	SP42 to SP43		Burnup	SP43 to SP44		Burnup	SP44 to SP45	
Node	SP43	T-Fuel	Spec.Vol	SP44	T-Fuel	Spec.Vol	SP45	T-Fuel	Spec.Vol
1	0.859	966.2	0.0240	1.659	976.4	0.0239	3.523	1053.0	0.0241
2	1.392	1170.8	0.0239	2.690	1179.3	0.0238	5.658	1264.0	0.0240
3	1.781	1307.3	0.0238	3.423	1301.9	0.0237	6.970	1359.6	0.0238
4	2.045	1397.4	0.0236	3.895	1368.2	0.0235	7.682	1394.1	0.0236
5	2.191	1444.9	0.0235	4.145	1396.3	0.0234	7.996	1403.1	0.0235
6	2.254	1461.8	0.0233	4.247	1403.1	0.0232	8.085	1402.6	0.0233
7	2.257	1459.6	0.0232	4.246	1396.0	0.0231	8.044	1395.6	0.0231
8	2.224	1446.1	0.0230	4.182	1380.1	0.0229	7.944	1383.6	0.0230
9	2.185	1429.9	0.0229	4.105	1361.6	0.0228	7.853	1370.0	0.0228
10	2.163	1419.1	0.0227	4.058	1346.9	0.0227	7.825	1359.0	0.0227
11	2.171	1418.6	0.0226	4.064	1339.7	0.0225	7.876	1354.3	0.0226
12	2.208	1427.5	0.0224	4.122	1340.2	0.0224	7.989	1357.6	0.0224
13	2.257	1439.3	0.0223	4.201	1344.9	0.0223	8.114	1366.7	0.0223
14	2.285	1443.7	0.0222	4.245	1346.2	0.0222	8.172	1375.7	0.0222
15	2.255	1430.3	0.0220	4.190	1334.5	0.0220	8.069	1376.7	0.0220
16	2.127	1383.6	0.0219	3.958	1296.4	0.0219	7.660	1356.5	0.0219
17	1.832	1276.0	0.0218	3.412	1207.4	0.0218	6.656	1281.5	0.0218
18	1.222	1053.8	0.0217	2.271	1011.9	0.0218	4.451	1080.5	0.0217

Table 4-55. Burnup and TH Feedback Parameters by Axial Node for Assembly E17

Axial	Burnup	SP42 to SP43		Burnup	SP43 to SP44		Burnup	SP44 to SP45	
Node	SP43	T-Fuel	Spec.Vol	SP44	T-Fuel	Spec.Vol	SP45	T-Fuel	Spec.Vol
1	1.151	1088.4	0.0242	2.219	1097.3	0.0242	4.617	1159.0	0.0245
2	1.726	1295.0	0.0241	3.342	1301.3	0.0241	6.917	1367.9	0.0243
3	2.073	1415.9	0.0239	4.005	1411.0	0.0239	8.128	1455.6	0.0241
4	2.298	1491.6	0.0238	4.420	1470.0	0.0237	8.765	1484.9	0.0239
5	2.428	1528.0	0.0236	4.651	1492.3	0.0236	9.031	1495.0	0.0237
6	2.471	1536.8	0.0234	4.724	1494.7	0.0234	9.015	1495.3	0.0235
7	2.420	1518.6	0.0232	4.630	1478.4	0.0232	8.773	1481.8	0.0233
8	2.286	1473.2	0.0231	4.384	1440.3	0.0231	8.395	1449.7	0.0232
9	2.160	1426.9	0.0229	4.142	1392.7	0.0229	8.082	1414.1	0.0230
10	2.105	1404.3	0.0228	4.027	1364.4	0.0228	8.006	1391.5	0.0228
11	2.117	1405.4	0.0227	4.038	1356.4	0.0226	8.163	1384.2	0.0227
12	2.210	1434.5	0.0225	4.193	1369.3	0.0225	8.494	1398.8	0.0225
13	2.373	1484.5	0.0224	4.478	1402.2	0.0224	8.925	1433.0	0.0224
14	2.471	1508.7	0.0222	4.657	1426.1	0.0222	9.167	1457.5	0.0222
15	2.464	1502.0	0.0221	4.646	1422.7	0.0221	9.111	1463.6	0.0221
16	2.346	1462.1	0.0220	4.424	1385.8	0.0220	8.694	1445.7	0.0219
17	2.066	1360.6	0.0218	3.890	1295.7	0.0219	7.670	1380.2	0.0218
18	1.457	1138.9	0.0217	2.725	1094.9	0.0218	5.350	1166.8	0.0217

Datapoint or Statepoint	EFPD / Cycle
SP42	0.0 / Cy5
SP43	50.4 / Cy5
SP44	94.9 / Cy5
SP45	184.9 / Cy5

Burnup - GWd/MTU
T-Fuel - °F
Spec. Vol. - ft^3 / lbm

Table 4-56. Burnup and TH Feedback Parameters by Axial Node for Assembly E19

Axial	Burnup	SP42 to SP43		Burnup	SP43 to SP44		Burnup	SP44 to SP45	
Node	SP43	T-Fuel	Spec.Vol	SP44	T-Fuel	Spec.Vol	SP45	T-Fuel	Spec.Vol
1	1.073	1057.7	0.0243	2.064	1063.6	0.0242	4.289	1125.1	0.0243
2	1.689	1281.9	0.0242	3.249	1278.6	0.0241	6.668	1337.1	0.0242
3	2.071	1414.3	0.0240	3.963	1393.7	0.0239	7.943	1429.8	0.0240
4	2.319	1497.2	0.0238	4.410	1456.0	0.0237	8.618	1459.9	0.0238
5	2.465	1537.2	0.0237	4.663	1481.1	0.0236	8.913	1469.7	0.0237
6	2.522	1549.7	0.0235	4.756	1484.8	0.0234	8.931	1470.3	0.0235
7	2.485	1535.6	0.0233	4.686	1471.0	0.0232	8.730	1458.3	0.0233
8	2.366	1497.0	0.0231	4.467	1435.9	0.0231	8.395	1429.1	0.0231
9	2.254	1456.6	0.0230	4.250	1392.8	0.0229	8.117	1395.5	0.0229
10	2.208	1438.0	0.0228	4.154	1367.8	0.0228	8.060	1374.4	0.0228
11	2.227	1440.7	0.0227	4.175	1361.2	0.0226	8.217	1367.6	0.0227
12	2.322	1468.7	0.0225	4.332	1373.5	0.0225	8.536	1381.6	0.0225
13	2.485	1514.2	0.0224	4.611	1404.5	0.0224	8.952	1414.4	0.0224
14	2.580	1537.0	0.0222	4.784	1426.4	0.0222	9.186	1437.4	0.0222
15	2.566	1528.4	0.0221	4.763	1422.0	0.0221	9.123	1443.3	0.0221
16	2.428	1484.2	0.0220	4.512	1383.1	0.0220	8.679	1426.0	0.0219
17	2.100	1370.2	0.0218	3.906	1286.3	0.0219	7.571	1356.1	0.0218
18	1.411	1122.1	0.0217	2.619	1072.2	0.0218	5.098	1137.8	0.0217

Table 4-57. Burnup and TH Feedback Parameters by Axial Node for Assembly E23

Axial	Burnup	SP42 to SP43		Burnup	SP43 to SP44		Burnup	SP44 to SP45	
Node	SP43	T-Fuel	Spec.Vol	SP44	T-Fuel	Spec.Vol	SP45	T-Fuel	Spec.Vol
1	1.009	1031.4	0.0242	1.949	1043.3	0.0242	4.120	1118.9	0.0244
2	1.572	1239.9	0.0241	3.047	1251.6	0.0241	6.410	1338.6	0.0243
3	1.995	1388.0	0.0240	3.851	1385.8	0.0239	7.849	1441.2	0.0241
4	2.291	1488.5	0.0238	4.386	1460.6	0.0237	8.650	1472.9	0.0239
5	2.457	1535.6	0.0236	4.672	1488.4	0.0236	8.984	1483.6	0.0237
6	2.515	1548.8	0.0235	4.769	1492.6	0.0234	8.997	1484.3	0.0235
7	2.470	1532.1	0.0233	4.684	1477.0	0.0232	8.764	1470.8	0.0233
8	2.336	1488.2	0.0231	4.437	1438.7	0.0231	8.385	1438.2	0.0231
9	2.211	1443.1	0.0230	4.194	1390.8	0.0229	8.073	1401.1	0.0230
10	2.158	1421.7	0.0228	4.084	1363.0	0.0228	8.008	1377.5	0.0228
11	2.179	1425.7	0.0227	4.109	1356.5	0.0226	8.188	1370.3	0.0227
12	2.286	1458.3	0.0225	4.286	1371.8	0.0225	8.550	1386.2	0.0225
13	2.465	1509.8	0.0224	4.596	1407.4	0.0224	9.016	1422.3	0.0224
14	2.573	1536.2	0.0222	4.793	1432.9	0.0222	9.282	1448.1	0.0222
15	2.564	1528.9	0.0221	4.781	1429.9	0.0221	9.227	1455.1	0.0221
16	2.426	1484.9	0.0220	4.530	1391.2	0.0220	8.774	1437.3	0.0219
17	2.109	1374.3	0.0218	3.938	1294.9	0.0219	7.671	1368.9	0.0218
18	1.461	1139.5	0.0217	2.713	1088.2	0.0218	5.278	1153.9	0.0217

Datapoint or Statepoint	EFPD / Cycle
SP42	0.0 / Cy5
SP43	50.4 / Cy5
SP44	94.9 / Cy5
SP45	184.9 / Cy5

Burnup - GWd/MTU
T-Fuel - °F
Spec. Vol. - ft^3 / lbm

Table 4-58. Burnup and TH Feedback Parameters by Axial Node for Assembly E27

Axial	Burnup	SP42 to SP43		Burnup	SP43 to SP44		Burnup	SP44 to SP45	
Node	SP43	T-Fuel	Spec.Vol	SP44	T-Fuel	Spec.Vol	SP45	T-Fuel	Spec.Vol
1	0.696	896.0	0.0238	1.348	906.7	0.0236	2.899	982.0	0.0237
2	1.197	1094.8	0.0237	2.313	1105.3	0.0236	4.889	1192.1	0.0237
3	1.592	1234.6	0.0236	3.049	1229.8	0.0235	6.183	1285.3	0.0235
4	1.871	1330.4	0.0235	3.543	1298.5	0.0233	6.912	1319.9	0.0234
5	2.028	1382.0	0.0233	3.808	1328.3	0.0232	7.238	1330.6	0.0232
6	2.095	1401.6	0.0232	3.915	1335.8	0.0231	7.330	1330.5	0.0231
7	2.098	1399.5	0.0230	3.912	1328.9	0.0229	7.286	1322.8	0.0230
8	2.063	1384.6	0.0229	3.845	1312.8	0.0228	7.184	1308.8	0.0228
9	2.022	1367.6	0.0228	3.766	1294.3	0.0227	7.096	1292.8	0.0227
10	2.003	1357.9	0.0226	3.723	1280.4	0.0226	7.080	1280.3	0.0226
11	2.018	1359.9	0.0225	3.739	1274.6	0.0225	7.151	1275.3	0.0224
12	2.065	1372.9	0.0224	3.812	1277.2	0.0223	7.287	1279.7	0.0223
13	2.124	1388.6	0.0223	3.907	1284.0	0.0222	7.428	1290.9	0.0222
14	2.156	1395.2	0.0221	3.959	1286.9	0.0221	7.492	1301.6	0.0221
15	2.125	1381.2	0.0220	3.904	1276.0	0.0220	7.387	1302.8	0.0220
16	1.992	1332.3	0.0219	3.667	1238.7	0.0219	6.979	1281.9	0.0219
17	1.688	1222.6	0.0218	3.118	1151.6	0.0218	5.997	1209.4	0.0218
18	1.076	996.9	0.0217	1.992	956.4	0.0218	3.879	1017.7	0.0217

Datapoint or Statepoint	EFPD / Cycle
SP42	0.0 / Cy5
SP43	50.4 / Cy5
SP44	94.9 / Cy5
SP45	184.9 / Cy5

Burnup - GWd/MTU
T-Fuel - °F
Spec. Vol. - ft^3 / lbm

Table 4-59. Rod Insertion Time by Axial Node for Assembly A1

Axial Node	Time Rod Inserted (EFPD) SP39 to SP40	SP40 to SP41
1	86.3	33.9
2	56.8	18.6
3	0.4	0.0
4	0.0	0.0
5	0.0	0.0
6	0.0	0.0
7	0.0	0.0
8	0.0	0.0
9	0.0	0.0
10	0.0	0.0
11	0.0	0.0
12	0.0	0.0
13	0.0	0.0
14	0.0	0.0
15	0.0	0.0
16	0.0	0.0
17	0.0	0.0
18	0.0	0.0

Table 4-60. Rod Insertion Time by Axial Node for Assembly A2

Axial Node	Time Rod Inserted (EFPD) SP40 to SP41
1	34.8
2	19.2
3	0.0
4	0.0
5	0.0
6	0.0
7	0.0
8	0.0
9	0.0
10	0.0
11	0.0
12	0.0
13	0.0
14	0.0
15	0.0
16	0.0
17	0.0
18	0.0

Datapoint or Statepoint	EFPD / Cycle
SP39	0.0 / Cy1
SP40	86.7 / Cy1
SP41	303.5 / Cy1

Table 4-61. Rod Insertion Time by Axial Node for Assembly A5

Axial Node	Time Rod Inserted (EFPD) SP40 to SP41
1	32.8
2	18.0
3	0.0
4	0.0
5	0.0
6	0.0
7	0.0
8	0.0
9	0.0
10	0.0
11	0.0
12	0.0
13	0.0
14	0.0
15	0.0
16	0.0
17	0.0
18	0.0

Table 4-62. Rod Insertion Time by Axial Node for Assembly A7

Axial Node	Time Rod Inserted (EFPD) SP39 to SP40	SP40 to SP41
1	86.3	193.3
2	57.4	75.3
3	0.4	34.5
4	0.0	35.3
5	0.0	36.0
6	0.0	36.1
7	0.0	35.8
8	0.0	35.3
9	0.0	35.0
10	0.0	35.0
11	0.0	35.4
12	0.0	36.1
13	0.0	36.6
14	0.0	36.6
15	0.0	36.0
16	0.0	34.8
17	0.0	34.2
18	0.0	5.4

Datapoint or Statepoint	EFPD / Cycle
SP39	0.0 / Cy1
SP40	86.7 / Cy1
SP41	303.5 / Cy1

Table 4-63. Rod Insertion Time by Axial Node for Assembly A16b*

Axial Node	Time Rod Inserted (EFPD) SP40 to SP41	SP41 to SP42
1	194.1	57.4
2	77.8	15.2
3	37.0	4.4
4	38.1	0.0
5	39.0	0.0
6	39.3	0.0
7	38.9	0.0
8	38.3	0.0
9	37.8	0.0
10	38.0	0.0
11	38.7	0.0
12	39.8	0.0
13	40.7	0.0
14	40.8	0.0
15	40.0	0.0
16	38.5	0.0
17	37.6	0.0
18	5.9	0.0

* This assembly is labeled A16 for cycle 1.

Table 4-64. Rod Insertion Time by Axial Node for Assembly A18

Axial Node	Time Rod Inserted (EFPD) SP39 to SP40	SP40 to SP41
1	0.0	0.0
2	0.0	0.0
3	0.0	0.0
4	0.0	0.0
5	0.0	0.0
6	0.0	0.0
7	0.3	1.2
8	2.5	26.8
9	5.3	115.4
10	67.3	196.9
11	86.7	216.8
12	83.2	201.6
13	78.0	124.3
14	57.4	34.0
15	0.0	1.2
16	0.0	0.0
17	0.0	0.0
18	0.0	0.0

Datapoint or Statepoint	EFPD / Cycle
SP39	0.0 / Cy1
SP40	86.7 / Cy1
SP41	303.5 / Cy1
SP42	0.0 / Cy5

Table 4-65. Rod Insertion Time by Axial Node for Assembly A22

Axial Node	Time Rod Inserted (EFPD) SP39 to SP40
1	86.3
2	57.3
3	0.4
4	0.0
5	0.0
6	0.0
7	0.0
8	0.0
9	0.0
10	0.0
11	0.0
12	0.0
13	0.0
14	0.0
15	0.0
16	0.0
17	0.0
18	0.0

Table 4-66. Rod Insertion Time by Axial Node for Assembly B28

Axial Node	Time Rod Inserted (EFPD) SP42 to SP43	SP43 to SP44	SP44 to SP45
1	0.0	0.0	0.0
2	0.0	0.0	0.0
3	0.0	0.0	0.0
4	0.0	0.0	0.0
5	0.0	0.0	0.0
6	0.0	0.0	9.9
7	0.0	0.0	34.3
8	26.7	18.8	57.9
9	50.4	44.5	90.0
10	50.4	44.5	90.0
11	50.4	44.5	53.6
12	50.4	44.5	32.9
13	2.0	6.3	7.2
14	0.0	0.0	0.0
15	0.0	0.0	0.0
16	0.0	0.0	0.0
17	0.0	0.0	0.0
18	0.0	0.0	0.0

Datapoint or Statepoint	EFPD / Cycle
SP39	0.0 / Cy1
SP40	86.7 / Cy1
SP42	0.0 / Cy5
SP43	50.4 / Cy5
SP44	94.9 / Cy5
SP45	184.9 / Cy5

Table 4-67. Rod Insertion Time by Axial Node for Assembly C5

Axial Node	Time Rod Inserted (EFPD) SP42 to SP43	SP43 to SP44	SP44 to SP45
1	50.4	44.5	82.5
2	50.4	39.8	26.8
3	7.6	2.4	0.0
4	0.0	0.0	0.0
5	0.0	0.0	0.0
6	0.0	0.0	0.0
7	0.0	0.0	0.0
8	0.0	0.0	0.0
9	0.0	0.0	0.0
10	0.0	0.0	0.0
11	0.0	0.0	0.0
12	0.0	0.0	0.0
13	0.0	0.0	0.0
14	0.0	0.0	0.0
15	0.0	0.0	0.0
16	0.0	0.0	0.0
17	0.0	0.0	0.0
18	0.0	0.0	0.0

Table 4-68. Rod Insertion Time by Axial Node for Assembly C8

Axial Node	Time Rod Inserted (EFPD) DP4 to SP42
1	217.5
2	34.7
3	0.0
4	0.0
5	0.0
6	0.0
7	0.0
8	0.0
9	0.0
10	0.0
11	0.0
12	0.0
13	0.0
14	0.0
15	0.0
16	0.0
17	0.0
18	0.0

Datapoint or Statepoint	EFPD / Cycle
DP4	0.0 / Cy4
SP42	0.0 / Cy5
SP43	50.4 / Cy5
SP44	94.9 / Cy5
SP45	184.9 / Cy5

Table 4-69. Rod Insertion Time by Axial Node for Assembly C15a

Axial Node	Time Rod Inserted (EFPD) DP4 to SP42
1	217.8
2	35.4
3	0.0
4	0.0
5	0.0
6	0.0
7	0.0
8	0.0
9	0.0
10	0.0
11	0.0
12	0.0
13	0.0
14	0.0
15	0.0
16	0.0
17	0.0
18	0.0

Table 4-70. Rod Insertion Time by Axial Node for Assembly C27

Axial Node	Time Rod Inserted (EFPD) SP42 to SP43	SP43 to SP44	SP44 to SP45
1	50.5	44.5	82.5
2	50.4	39.8	26.8
3	7.6	2.4	0.0
4	0.0	0.0	0.0
5	0.0	0.0	0.0
6	0.0	0.0	0.0
7	0.0	0.0	0.0
8	0.0	0.0	0.0
9	0.0	0.0	0.0
10	0.0	0.0	0.0
11	0.0	0.0	0.0
12	0.0	0.0	0.0
13	0.0	0.0	0.0
14	0.0	0.0	0.0
15	0.0	0.0	0.0
16	0.0	0.0	0.0
17	0.0	0.0	0.0
18	0.0	0.0	0.0

Datapoint or Statepoint	EFPD / Cycle
DP4	0.0 / Cy4
SP42	0.0 / Cy5
SP43	50.4 / Cy5
SP44	94.9 / Cy5
SP45	184.9 / Cy5

Table 4-71. Rod Insertion Time by Axial Node for Assembly C28

Axial Node	Time Rod Inserted (EFPD) DP4 to SP42
1	218.7
2	36.8
3	0.0
4	0.0
5	0.0
6	0.0
7	0.0
8	0.0
9	0.0
10	0.0
11	0.0
12	0.0
13	0.0
14	0.0
15	0.0
16	0.0
17	0.0
18	0.0

Table 4-72. Rod Insertion Time by Axial Node for Assembly C28a

Axial	Time Rod Inserted (EFPD)		
Node	SP42 to SP43	SP43 to SP44	SP44 to SP45
1	50.4	44.4	82.6
2	50.4	39.7	26.9
3	7.6	2.5	0.0
4	0.0	0.0	0.0
5	0.0	0.0	0.0
6	0.0	0.0	0.0
7	0.0	0.0	0.0
8	0.0	0.0	0.0
9	0.0	0.0	0.0
10	0.0	0.0	0.0
11	0.0	0.0	0.0
12	0.0	0.0	0.0
13	0.0	0.0	0.0
14	0.0	0.0	0.0
15	0.0	0.0	0.0
16	0.0	0.0	0.0
17	0.0	0.0	0.0
18	0.0	0.0	0.0

Datapoint or Statepoint	EFPD / Cycle
DP4	0.0 / Cy4
SP42	0.0 / Cy5
SP43	50.4 / Cy5
SP44	94.9 / Cy5
SP45	184.9 / Cy5

Table 4-73. Critical Boron Data for Davis-Besse 1 Burnup Calculations

$$ppmB = A + B \cdot EFPD$$

Cycle	A (ppmB)	B (ppmB/EFPD)
1A	1168.79	-1.00
1B	1438.11	-2.92
2[a]	840.69	-3.07
3[b]	738.53	-3.00
4[c]	721.77	-2.81
5	1047.60	-2.85

[a] For cycle 2, use equation out to 270 EFPD and 10 ppmB from 270 EFPD to the end-of-cycle
[b] For cycle 3, use equation out to 242 EFPD and 10 ppmB from 242 EFPD to the end-of-cycle
[c] For cycle 4, use equation out to 253 EFPD and 10 ppmB from 253 EFPD to the end-of-cycle

4.2 Statepoint Critical Condition Measurements

Measured critical conditions for 7 reactor startups (or statepoints) are provided in Table 4-74. The data includes the initial startup of the reactor or beginning-of-life (BOL), 86.7 EFPD and 303.5 EFPD of cycle 1, the beginning-of-cycle (BOC) of cycle 5, and 50.4 EFPD, 94.9 EFPD, and 184.9 EFPD of cycles 5. The cycle and statepoint number, along with the EFPDs during the cycle for which the startup occurred, are provided. The elapsed time (in hours) since the reactor was shutdown (downtime) prior to the startup is also given for each statepoint. In addition, Table 4-74 provides the measured soluble boron concentration (ppmB), rod bank positions, and temperature of the moderator or coolant in the reactor (for each statepoint) when criticality was achieved.

Table 4-75 provides shutdown and startup dates for each cycle and statepoint. The cycle shutdown and startup dates can be used in determining the downtime between cycles for fuel assemblies when performing the burnup calculations.

Table 4-74. Statepoint Data for Davis-Besse Unit 1 - Measured Critical Conditions

Cycle(SP)	EFPD	Downtime (Hours)	ppmB	Rod Positions, cm above bottom of fuel* Bk 5	Bk 6	Bk 7	Bk 8	T(coolant) (F)
1(SP39)	0.0	0.0	1520	WD	WD	199	150	528
1(SP40)	86.7	2040.0	1615	WD	WD	289	150	532
1(SP41)	303.5	835.3	938	WD	WD	254	150	532
5(SP42)	0.0	3024.0	1419	WD	WD	331	121	534
5(SP43)	50.4	551.4	1243	WD	345	83	150	535
5(SP44)	94.9	13,464.0	1176	WD	WD	169	150	533
5(SP45)	184.9	883.5	949	WD	WD	157	150	532

Bk = Rod Bank
WD = Rod Withdrawn

* Measured from the bottom of the active fuel region to the bottom of the control rod absorber region (See Figure 2-7)

Table 4-75. Shutdown and Startup Dates for Davis-Besse Unit 1

Cycle(SP)	EFPD	Shutdown Date	Startup Date
1(SP39)	0.0	-	12 Aug 1977
1(SP40)	86.7	29 Apr 1978	23 Jul 1978
1(SP41)	303.5	02 Dec 1979	06 Jan 1980
2(-)*	0.0	07 Apr 1980	01 Nov 1980
3(-)*	0.0	13 Mar 1982	29 Aug 1982
4(-)*	0.0	25 Jul 1983	27 Sep 1983
5(SP42)*	0.0	11 Sep 1984	15 Jan 1985
5(SP43)	50.4	21 Mar 1985	13 Apr 1985
5(SP44)	94.9	09 Jun 1985	22 Dec 1986
5(SP45)	184.9	08 May 1987	14 Jun 1987
	395.1 (EOC)	10 Mar 1988	

EOC = end-of-cycle

* Shutdown date is for previous cycle.

5.0 CONCLUSIONS

The data reported herein is acceptable for quality affecting activities and for use in analyses affecting procurement, construction, or fabrication. The classification analysis for the repository (which includes the waste package) carries TBV-228 because of the preliminary status of the basis for the MGR design. This report conservatively assumes that the resolution of TBV-228 will find the waste package to be quality affecting; consequently, use of any of the data reported herein does not need to carry TBV-228.

6.0 REFERENCES

1. *Quality Assurance Program for Framatome Cogema Fuels*, Document Number: 56-1177617-04, FCF, August 5, 1996.

2. *Classification of the Preliminary MGDS Repository Design*, Document Identifier Number (DI#) B00000000-01717-0200-00134 REV 00, Civilian Radioactive Waste Management System (CRWMS) Management and Operating Contractor (M&O).

3. QAP-2-0 Activity Evaluation, ID No WP-06, *Develop Technical Documents*, CRWMS M&O, August 3, 1997.

4. *Quality Assurance Requirements and Description*, DOE/RW-0333P, REV 7, DOE OCRWM.

5. *Davis-Besse NEMO Depletion and Statepoints*, Document Number: 32-1267159-00, FCF.