

가

BFS

KAFAX-E66

KAFAX-F22[4]

KAFAX-E66

2. BFS

BFS-75-1, BFS-73-1

IPPE

BFS-1

BFS-55-2, BFS-55-1

IPPE

BFS-75-1

2

1998

IPPE

BFS-1

(IC:inner core)

15.11%

LEZ(Low Enrichment Zone)

(OC:outer core)

19.96%

HEZ(High Enrichment Zone)

2

RB-1

RB-2

RB-1(Radial

Blanket-1)

U-238

(pellet)

RB-2(Radial Blanket-2)

50 cm

BFS-73-1

BFS-1

U-235 18.5%

가

가

BFS-55-2

2

40%

BFS-55-1

BFS-55-1

1987

1

BFS-75-1

가,

가,

BFS-73-1

가,

가

BFS-55-2

가

BFS-55-1

가

3.

KAFAX-E66, KAFAX-F22

KAFAX-F22 1997

가

JEF-2.2

80

24

KALIMER

150

12

9 25 BFS
 (coarse meshed) RZ TWODANT[5] 150 , 80 9
 25 (hex-z)
 DIF-3D [6]

DIF-3D

4.

4.1 (Keff)

DIF-3D JEF-2.2 가 KAFAX-F22 9
 (JEF(9g)) ENDF/B-VI 가 KAFAX-E66 9 25
 (ENDF(9g), ENDF(25g)) 1
 BFS 1%
 BFS-73-1, BFS-75-1 JEF(9g) 가 0.5% ENDF(9g)
 BFS-55-1, BFS-55-2 ENDF(9g) 가 1%
 0.2%
 9

4.2

(C/E) 2
 C28/F49, F49/F25, F28/F25 3
 3 U-238 U-235
 (F28/F28) 1%
 0.1% Pu-239
 U-235 (F49/F25) BFS-55-2
 가 2.4% 1.3% ENDF/B-VI 가
 0.2% F28/F28
 2 가 JEF(9g) 가

4.3

, U-235 U-238

2 - 9 . BFS-73-1 , U-235

235 ENDF(9g)가 C/E 0.82, ENDF(25g)가 0.78, JEF(9g)가 0.75 ENDF(9g) 0.07 7% JEF(9g) 4% ENDF(9g)가 0.98, ENDF(25g) 0.99, JEF(9g)가 0.98 1% . U-238

0.91 ENDF(9g)가 C/E 0.91, ENDF(25g)가 0.93, JEF(9g)가 2% .

ENDF(9g)가 0.98, ENDF(25g) 0.99, JEF(9g)가 0.98 1% . U-235

ENDF(9g)가 C/E 1.04, ENDF(25g)가 1.06, JEF(9g)가 0.98 ENDF(9g) 2% JEF(9g) 가

. ENDF(9g)가 0.99, ENDF(25g) 1.00, JEF(9g)가 0.99 1% . U-238 ENDF(9g)가 C/E 0.94, ENDF(25g)가 0.96, JEF(9g)가 0.92 ENDF(9g) 2% JEF(9g) ENDF(9g)가 1.00, ENDF(25g) 1.00, JEF(9g)가 1.00

BFS-75-1 , U-235

ENDF(9g)가 C/E 1.01, ENDF(25g)가 1.01, JEF(9g)가 0.97 ENDF(9g) 2% JEF(9g) 가

ENDF(9g)가 0.98, ENDF(25g) 0.98, JEF(9g)가 0.98 . U-238

0.91 ENDF(9g)가 C/E 0.93, ENDF(25g)가 0.94, JEF(9g)가 2% 1% .

ENDF(9g)가 0.94, ENDF(25g) 0.94, JEF(9g)가 0.93 1%, . U-235

ENDF(9g)가 C/E 0.92, ENDF(25g)가 0.95, JEF(9g)가 0.89 ENDF(9g) 3% JEF(9g) 3% .

0.99 . U-238

ENDF(9g)가 C/E 0.88, ENDF(25g)가 0.90, JEF(9g)가 0.89 ENDF(9g) 1% JEF(9g) 2% 0.91

. U-238 U-235 가

5.

ENDF/B-
 VI 150 KAFAX-E66 가
 IPPE BFS ,
 JEF-2.2
 2% 0.2%
 가 JEF-2.2 ENDF/B-VI가
 U-238 U-235 가
 0.1%
 가 JEF-2.2 가
 ENDF/B-VI
 JEF-2.2 가 가
 가
 가 가

[1] H. Song, et al, "Evaluation of Core Nuclear Analysis for LMR using Measured Physics Parameters of BFS-73-1 Critical Assembly", Annals of Nuclear Energy, Vol. 27(2000).

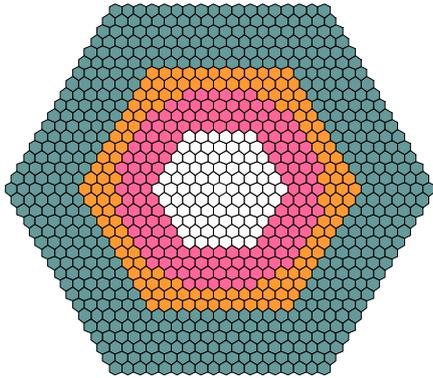
[2] 2 , "BFS-75-1 ", KAERI/TR-1786/2001, (2001).

[3] , , "KAFAX-E66: KALIMER 150 12 ", NDL-23/01, (2001).

[4] , , "KAFAX-F22: JEF-2.2 ", KAERI/TR-842/97, (1995).

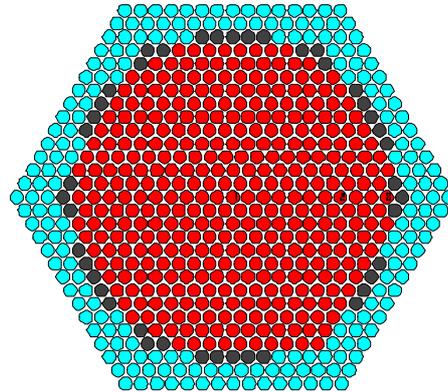
[5] R. E. Alcouffe, et al, "User's Guide for TWODANT: A Code Package for Two-Dimensional, Diffusion-Accelerated, Neutron Transport", LA-10049-M, Los Alamos National Laboratory (Feb. 1990).

[6] R. D. Lawrence, "The DIF-3D Nodal Neutronics Option for Two- and Three-Dimensional Diffusion Theory Calculations in Hexagonal Geometry", ANL-83-1, Argonne National Laboratory (Mar. 1983).



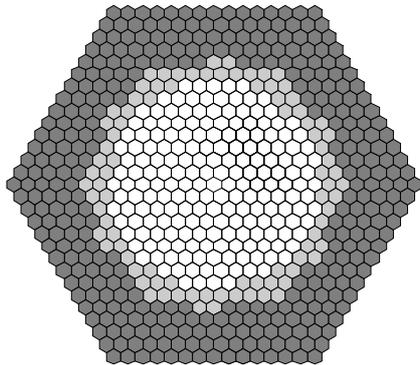
- LEZ(Low Enrichment Zone) 15.11%
- HEZ(High Enrichment Zone) 19.96%
- RB-1(Radial Blanket-1)U238
- RB-2(Radial Blanket-2)UO₂

BFS-75-1



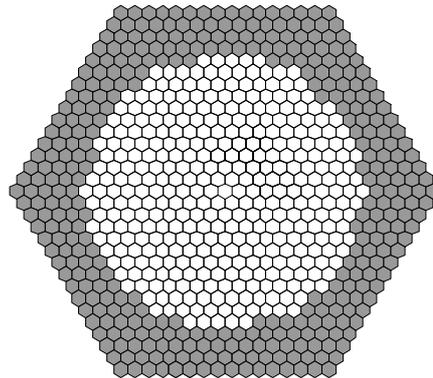
- Fuel Cell (18.5%)
- Fuel Cell (18.6%)
- Radial Blanket(UO₂)

BFS-73-1



- Inner core
- Outer core(same as BFS-55-1 core fuel rod)
- Blanket

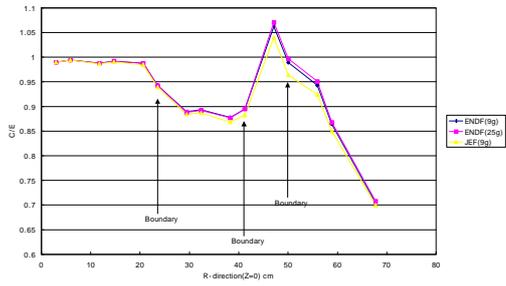
BFS-55-2



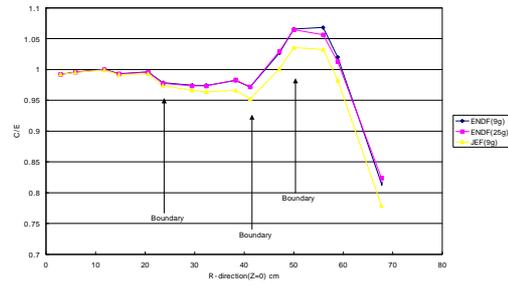
- Core
- Blanket

BFS-55-1

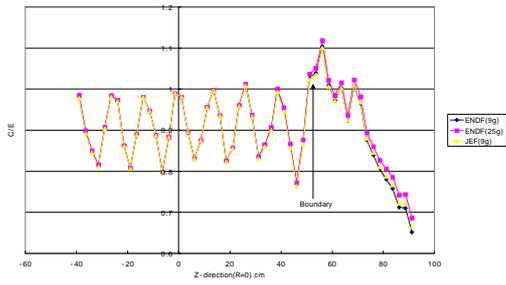
1. BFS layout



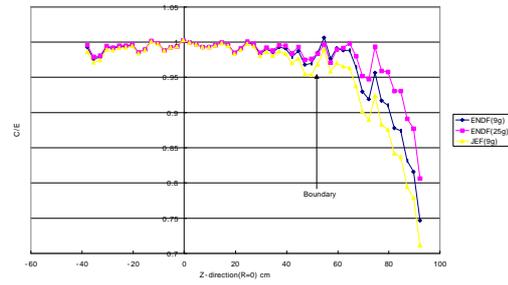
2. BFS-75-1 U-238 ()



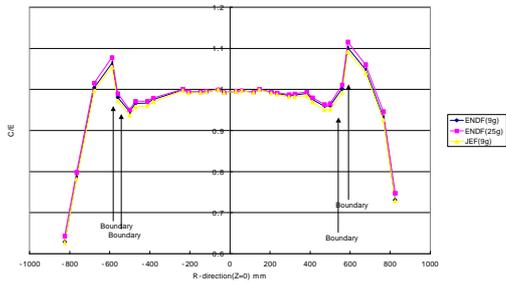
3. BFS-75-1 U-235 ()



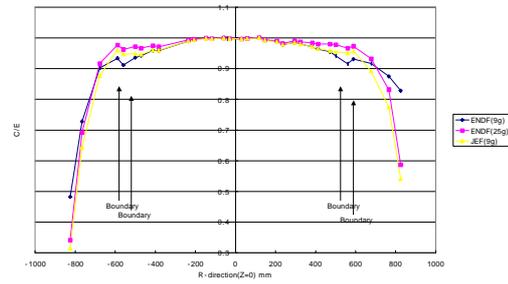
4. BFS-75-1 U-238 ()



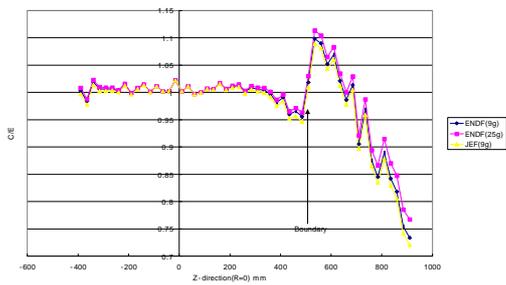
5. BFS-75-1 U-235 ()



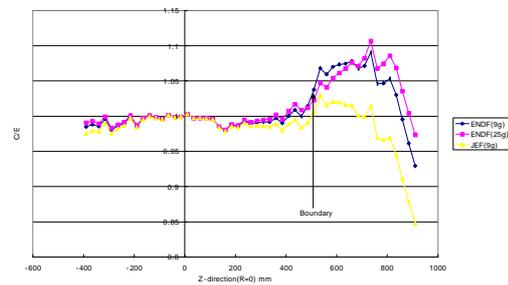
6. BFS-73-1 U-238 ()



7. BFS-73-1 U-235 ()



8. BFS-73-1 U-238 ()



9. BFS-73-1 U-235 ()

1 BFS

Keff	Core	ENDF(9g)	9g(JEF-ENDF)%	ENDF(9g-25g)%
	BFS-75-1	0.99579	0.31	0.16
	BFS-73-1	0.99900	0.47	0.17
	BFS-55-2	0.97531	-0.34	0.03
	BFS-55-1	0.98151	-1.00	-0.03
C/E-1	Core	JEF(9g)	ENDF(9g)	ENDF(25g)
	BFS-75-1	-0.0024	-0.0170	-0.0186
	BFS-73-1	0.0029	-0.0089	-0.0106

2

(C/E)

BFS-75-1

		ENDF(9g)	ENDF(25g)	JEF(9g)
Segment	F49/F25	1.0069 ± 0.0118	1.0077 ± 0.0118	0.9970 ± 0.0117
Fission	F28/F25	1.0805 ± 0.0169	1.0844 ± 0.0169	1.0590 ± 0.0165
Segment	F28/F25	1.0606 ± 0.0163	1.0645 ± 0.0163	1.0400 ± 0.0160
Fission	F40/F49	1.1457 ± 0.0317	1.1474 ± 0.0317	1.0783 ± 0.0298
Chamber(F48/F49	1.0892 ± 0.0409	1.0905 ± 0.0409	1.0631 ± 0.0399
Two or	F49/F25	1.0015 ± 0.0143	1.0023 ± 0.0144	0.9919 ± 0.0142
Four	F37/F49	1.0664 ± 0.0303	1.0680 ± 0.0304	0.9850 ± 0.0280
Electrodes	F53/F49	1.0712 ± 0.0369	1.0724 ± 0.0370	1.0542 ± 0.0364
Absolute	F37/F49	1.0885 ± 0.0361	1.0902 ± 0.0362	1.0055 ± 0.0334
Fission	F48/F49	1.1091 ± 0.0136	1.1105 ± 0.0136	1.0826 ± 0.0132
Chamber	F40/F49	1.1641 ± 0.0234	1.1658 ± 0.0234	1.0957 ± 0.0220
	F51/F49	1.0563 ± 0.0420	1.0578 ± 0.0421	0.9671 ± 0.0385
	F53/F49	1.0638 ± 0.0656	1.0651 ± 0.0657	1.0470 ± 0.0645
	F64/F49	1.2429 ± 0.0464	1.2449 ± 0.0465	1.1714 ± 0.0437
Absolute	C28/F25	0.9631 ± 0.0159	0.9622 ± 0.0159	0.9860 ± 0.0163
Fission				
Chamber				
Calibration		0.9474 ± 0.0231	0.9466 ± 0.0231	0.9699 ± 0.0237
through				
the thermal				
column				
Small Size	F49/F25	0.9900 ± 0.0131	0.9908 ± 0.0132	0.9805 ± 0.0130
Fission	F48/F49	1.1564 ± 0.0147	1.1577 ± 0.0148	1.1287 ± 0.0144
Chamber	F40/F49	1.0971 ± 0.0249	1.0988 ± 0.0250	1.0326 ± 0.0235
	F37/F49	1.0426 ± 0.0207	1.0442 ± 0.0208	0.9631 ± 0.0191
	F51/F49	1.0574 ± 0.0369	1.0589 ± 0.0369	0.9681 ± 0.0337
	F53/F49	0.8337 ± 0.0358	0.8347 ± 0.0358	0.8205 ± 0.0352
	F64/F49	1.0152 ± 0.0155	1.0169 ± 0.0155	0.9569 ± 0.0146

BFS-73-1

		ENDF(9g)	ENDF(25g)	JEF(9g)
C28/F25	Absolute Fission Chamber	0.9490	0.9445	0.9796
F49/F25	Segment Chamber	0.9947	0.9971	0.9866
	Small Size Chamber	0.9956	0.9980	0.9875
	Solid State Dector	0.9798	0.9822	0.9718
F49/F25	Segment Chamber	1.0333	1.0371	1.0178
	Small Size Chamber	1.0333	1.0371	1.0178
	Solid State Detector	1.0029	1.0066	0.9879

BFS-55-2

	ENDF(9g)	ENDF(25g)	JEF(9g)
F28/F25	1.0812 ± 0.0181	1.0918 ± 0.0183	0.9373 ± 0.0157
F49/F25	1.0100 ± 0.0134	1.0123 ± 0.0134	0.9873 ± 0.0131
F40/F49	1.1658 ± 0.0336	1.1712 ± 0.0337	1.0149 ± 0.0292
F41/F49	1.0121 ± 0.0181	1.0101 ± 0.0181	1.1131 ± 0.0199
C28/F25	0.9259 ± 0.0209	0.9232 ± 0.0208	0.9104 ± 0.0205
C28/F49	0.9445 ± 0.0232	0.9398 ± 0.0231	0.9501 ± 0.0234

BFS-55-1

	ENDF(9g)	ENDF(25g)	JEF(9g)
F28/F25	0.9870 ± 0.0166	0.9999 ± 0.0168	0.9590 ± 0.0161
F49/F25	0.9921 ± 0.0139	0.9950 ± 0.0139	0.9842 ± 0.0138
F40/F49	1.0439 ± 0.0329	1.0508 ± 0.0331	0.9753 ± 0.0307
F41/F49	0.9930 ± 0.0197	0.9903 ± 0.0196	1.0090 ± 0.0200
C28/F25	0.9572 ± 0.0224	0.9545 ± 0.0224	0.9761 ± 0.0229
C28/F49	0.9866 ± 0.0253	0.9809 ± 0.0252	1.0140 ± 0.0260
C36/F25	0.9616 ± 0.0140	0.9612 ± 0.0140	0.9587 ± 0.0139

3

		9g(JEF-ENDF) %	ENDF(9g-25g)%
F28/F25	BFS-75-1	-0.07	-0.01
	BFS-73-1	-0.06	-0.01
	BFS-55-2	-0.43	-0.03
	BFS-55-1	-0.08	-0.04
F49/F25	BFS-75-1	-1.07	-0.09
	BFS-73-1	-0.9	-0.27
	BFS-55-2	-2.4	-0.24
	BFS-55-1	-0.85	-0.31
C28/F49	BFS-73-1	0.34	0.05
	BFS-55-2	0.07	0.06
	BFS-55-1	0.32	0.07