PNC TN941 80-53

DCA炉心実験データ集(13)

22.5cmピッチ格子における核分裂率の測定

1980年4月

動力炉・核燃料開発事業団

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22.5cmピッチ格子における核分裂率の測定

福村信男*, 仁紫明人*, 若林利男*
戸村和二*, DCA実験グループ*

要 旨

プルトニウム燃料を装荷した22.5cmピッチ格子について核分裂比の測定を行った。使用したプルトニウム燃料は, 0.87w/o富化PuO_2-UO_2の標準級(8S Pu)と原子炉級(8R Pu)の2種類である。冷却材ボイド率は0%ボイド(H_2O)と100%ボイド(空気)である。

^{238}Uの高速核分裂比δ^{28}は劣化ウラン箔と天然ウラン箔の核分裂生成物(FP)のγ線強度の比から求められた。^{235}Uの熱外核分裂比δ^{25}は高濃縮ウラン箔の裸箔とカドミカバー箔のFPのγ線強度比から求められた。

^{239}Puの熱外核分裂比δ^{49}は高濃縮プルトニウム箔の裸箔とカドミカバー箔よりδ^{25}と同じ手法により求められた。^{239}Puの低エネルギーにおける共鳴吸収領域(~0.3eV)付近の中性子の挙動を表わす指標であるδ^{49}_{28}は高濃縮プルトニウム箔と高濃縮ウラン箔のFPのγ線強度比から求められた。

下表にこれらの測定結果を示す。比較のため0.54w/o富化PuO_2-UO_2(5S Pu)の測定結果もあわせて示した。

これらの結果から8R Pu燃料は, 実効的な濃縮度としては8S Pu燃料より小さく5S Pu燃料より大きいことがわかった。0%ボイドと100%ボイドを比較した場合100%ボイドの方が燃料濃縮度依存が顕著に表われることがわかった。

* 大洗工学センター重水臨界実験室
(DCA実験グループ) 八谷雄喜, 清野英昭, 樋口幸次郎, 福村信男, 仁紫明人, 飯島一敏, 戸村和二, 相原永史, 若林利男, 小綿森樹, 竹村守雄, 金内 悟, 安保昌巡, 柴田邦広, 北山一宏, 柴公倫(現, ATR安全性実験室)

核分裂率（格子平均） / 格子体系	δ_{cell}^{28}	δ_{cell}^{25}	δ_{cell}^{49}	$\delta_{25,cell}^{49}$
5S Pu－ 0 %Void	0.105±0.004	0.0900±0.004	0.0586±0.002	0.911±0.036
5S Pu－100%Void	0.137±0.005	0.129 ±0.005	0.0837±0.003	0.952±0.038
8R Pu－ 0 %Void	0.136±0.005	0.0991±0.004	0.0745±0.003	1.36 ±0.05
8R Pu－100%Void	0.176±0.007	0.159 ±0.006	0.0890±0.004	1.40 ±0.06
8S Pu－ 0 %Void	0.172±0.007	0.103 ±0.004	0.0730±0.003	2.23 ±0.09
8S Pu－100%Void	0.199±0.008	0.179 ±0.007	0.116 ±0.005	2.04 ±0.08

Apr., 1980

Experimental Data in DCA (13)
Fission Reaction Rate Ratios at 22.5 cm Pitch Lattice

Nobuo FUKUMURA*, Akito NISHI*
Toshio WAKABAYASHI* and
Katsuji TOMURA*

Abstract

Fission reaction rate ratios have been measured in plutonium fuel loaded in 22.5 cm pitch lattice. The fuels used for the measurements were 0.87 w/o PuO_2 (standard grade)-UO_2[8sPu] and 0.87 w/o PuO_2(reactor grade)-UO_2[8RPu]. The "coolants" used in the experiment were H_2O [0% void] and Air[100% void].

The uranium fission reaction rate ratios such as δ^{28} and δ^{25} were obtained by use of natural uranium foils, depleted uranium foils and highly enriched uranium foils. The plutonium fission reaction rate ratios such as δ^{49} and δ_{25}^{49} were obtained by use of highly enriched plutonium foils and highly enriched uranium foils.

Fission reaction rate ratios measured in the DCA's lattices are shown in the following table. The results of fission reaction rate ratios measured in 0.54 w/o PuO_2-UO_2(5s) are also reprinted in the table.

The following can be concluded from the present experiment.

(1) The reactor-grade 0.87 w/o PuO_2-UO_2 fuel (8R) corresponds to a lower fuel enrichment than that of the standard-grade fuel (8s).

(2) The presence of the H_2O coolant weakens change of fuel itself, such as an increase in enrichment or an increase in the resonance part.

* Heavy Water Critical Experiment Section, O-arai Engineering Center, PNC.

Table Experimental Results of Fission Reaction Rate Ratios in 22.5 cm Pitch Lattices

Fission reaction rate ratios / Lattice condition	δ^{28}_{cell}	δ^{25}_{cell}	δ^{49}_{cell}	$\delta^{49}_{25,cell}$
5sPu- 0% Void	0.105±0.004	0.090±0.004	0.059±0.002	0.911±0.036
5sPu-100% Void	0.137±0.005	0.129±0.005	0.084±0.003	0.952±0.038
8RPu- 0% Void	0.136±0.005	0.099±0.004	0.075±0.003	1.36 ±0.05
8RPu-100% Void	0.176±0.007	0.159±0.006	0.089±0.004	1.40 ±0.06
8sPu- 0% Void	0.172±0.008	0.103±0.004	0.073±0.003	2.23 ±0.09
8sPu-100% Void	0.199±0.008	0.179±0.007	0.116±0.005	2.04 ±0.08

Contents

1. Experimental Conditions.

Table 1-1 Core Description

Core No.		A9-2	A9-1	A7-2	A7-1
Fuel loading	Center	25-8RPu	25-8RPu	9-8sPu	25-8sPu
	Outer	96-1.2U	96-1.2U	108-1.2U	96-1.2U
Coolant	Void	0% (H_2O)	100% (Air)	0% (H_2O)	100% (Air)
	Height	83.5 cm	0 cm	83.5 cm	0 cm
Lattice Pitch		Square at 22.5 cm pitch			
Moderater (D_2O)	Height	83.11 cm	103.21 cm	82.74 cm	93.58 cm
	^{10}B in D_2O	<0.1 ppm	<0.1 ppm	<0.1 ppm	<0.1 ppm
Core ID		22.5cm-8RPu-0% (8R)	22.5cm-8RPu-100% (8R)	22.5cm-8sPu-0% (8s)	22.5cm-8sPu-100% (8s)

Table 1-2 Fuel Description

(1) 1.2U

	Inner Dia. (cm)	Outer Dia. (cm)	Material	Density (g/cm^3)
Pellet	—	1.480	1.203w/o enriched UO_2	10.36
Gap	1.480	1.503	Helium	—
Sheath	1.503	1.673	Aluminium	2.674

Composition		w/o
Pellet	U-235	1.057
	U-238	86.793
	O	12.150
Sheath	Al	96.98
	Mg	2.60

(2) 5(S)Pu

	Inner Dia. (cm)	Outer Dia. (cm)	Material	Density (g/cm^3)
Pellet	—	1.469	0.542w/o enriched PuO_2-UO_2	10.17
Gap	1.469	1.506	Helium	—
Sheath	1.506	1.668	Zry-2	6.523

Composition		w/o
Pellet	U-235	0.6214
	U-238	86.782
	Pu-238	0.000102
	Pu-239	0.4304
	Pu-240	0.04115
	Pu-241	0.004359
	Pu-242	0.000303
	O	12.12
Sheath	Zr	98.22
	Sn	1.48
	Fe	0.14
	Cr	0.10
	Ni	0.06

Date of Analysis: 23 August 1971

Table 1-2 Fuel Description

(3) 8(S)Pu

	Inner Dia. (cm)	Outer Dia. (cm)	Material	Density (g/cm^3)
Pellet	—	1.472	0.862w/o enriched PuO_2-UO_2	10.17
Gap	1.472	1.506	Helium	—
Sheath	1.506	1.668	Zry-2	6.523

Composition		w/o
Pellet	U-235	0.6194
	U-238	86.503
	Pu-238	0.000145
	Pu-239	0.6849
	Pu-240	0.06584
	Pu-241	0.006960
	Pu-242	0.000510
	O	12.12
Sheath	Zr	98.22
	Sn	1.48
	Fe	0.14
	Cr	0.10
	Ni	0.06

Date of Analysis: 23 August 1971

(4) 8(R)Pu

	Inner Dia. (cm)	Outer Dia. (cm)	Material	Density (g/cm^3)
Pellet	—	1.468	0.874w/o enriched PuO_2-UO_2	10.25
Gap	1.468	1.506	Helium	—
Sheath	1.406	1.668	Zry-2	6.523

Composition		w/o
Pellet	U-235	0.6194
	U-238	86.493
	Pu-238	0.00641
	Pu-239	0.4953
	Pu-240	0.1661
	Pu-241	0.07217
	Pu-242	0.02296
	O	12.13
Sheath	Zr	98.22
	Sn	1.48
	Fe	0.14
	Cr	0.10
	Ni	0.06

Date of Analysis: 16 June 1973

Table 1-3 Fuel Ring Description

28 elements assembly in 3 circular rings

Ring	No. of elements	Pitch circle dia of elements centers (cm)
1	4	2.625
2	8	6.000
3	16	9.515

Table 1-4 Channel Assembly Description

	Inner Dia. (cm)	Outer Dia. (cm)	Material	Density (g/cm^3)
Pressure Tube	11.68	12.08	Aluminum Alloy	2.674
Air Gap	12.08	13.25	Air	0.001205
Calandria Tube	13.25	13.65	Aluminum Alloy	2.674

Composition		w/o in Al	w/o in Air	Atomic No. Density
Al		96.98		0.05788
Mg		2.60		0.00172
Air	O		23.5204	0.00001067
	N		76.4796	0.00003962

Table 1-5 Coolant Description

Coolant Void Fraction \ Material (w/o)	H	O	N
0 %	11.190	88.810	0
100 %	0	23.520	74.480

Table 1-6 Moderator Description

(1) Non ^{10}B-Bearing Moderator

Density of Moderator (D_2O: 99.42 mol/o) 1.1045, 22°C

Material	w/o in Moderator	Density (g/cm^3)
D_2O	99.48	1.10504
H_2O	0.52	0.99777

Ingredient	w/o in Moderator	Atomic No. density ($/cm^3 \times 10^{24}$)
H	0.05819	0.0003840
D	20.0083	0.06608
O	79.9345	0.03323
B	<0.00001	<0.0000005

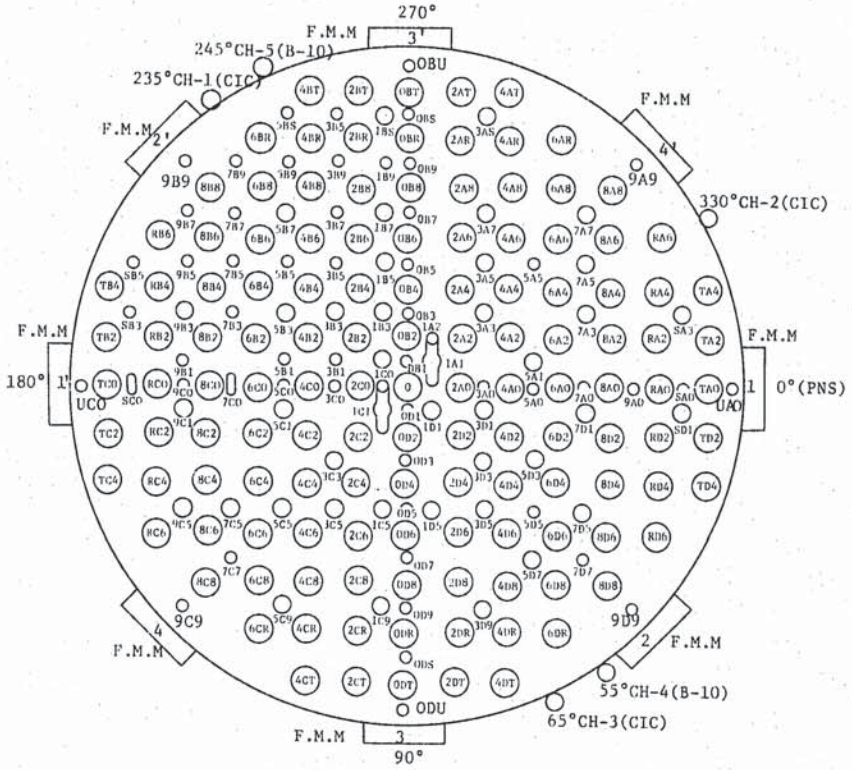

Fig. 1-1 Core Configuration of DCA
(Square Lattice of 22.5 cm Pitch)

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2. Measurement Conditions.

Table 2-1 Detector Foil Description

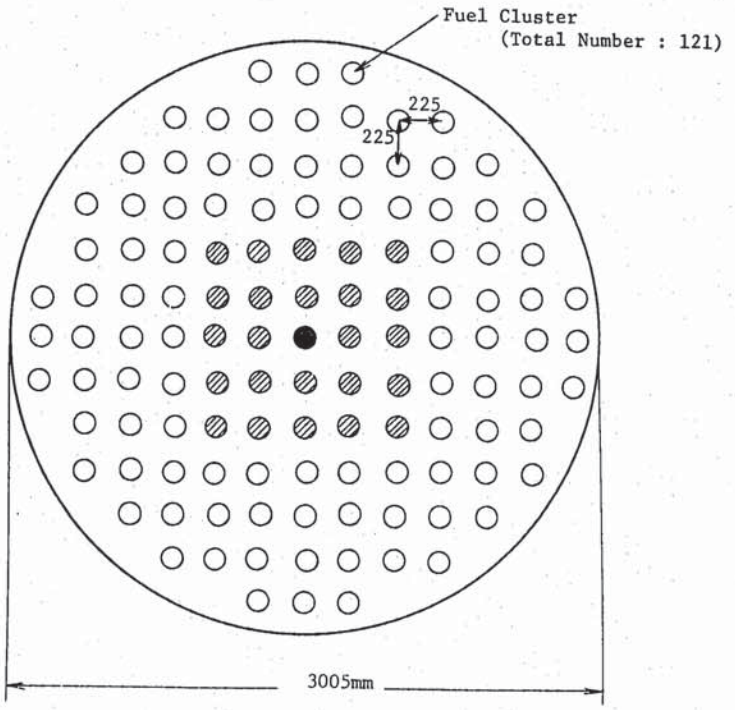
Foil ID	Dimension	Specification*	Measured Quantity (Core)
DU (DB)	14.8 mmϕ 0.10 mmt	274ppm ^{235}U depleted U-metal	δ^{28} (5S,8R,8S)
NU	14.8 mmϕ 0.12 mmt	Natural (0.72w/o ^{235}U) U-metal	
EU	14.8 mmϕ 0.10 mmt	18.04w/o U-Al alloy 89.82w/o $^{235}U/U$	δ^{25}, δ^{49}_{25} (5S)
EU	14.8 mmϕ 0.10 mmt	8.53w/o U-Al alloy 89.84w/o $^{235}U/U$	δ^{25}, δ^{49}_{25} (8R, 8S)
PU	14.5 mmϕ 0.11 mmt	36.8w/o PuO_2-Polyethylene mixture 87.46w/o Pu/PuO_2, 90.21 ^{239}Pu, 8.758 ^{240}Pu, 0.937 ^{241}Pu	δ^{25}, δ^{49}_{25} (5S)
PU	14.8 mmϕ 0.1 mmt	7.14w/o Pu-Al Alloy 99.11 ^{239}Pu, 0.880 ^{240}Pu, 0.012 ^{241}Pu	δ^{25}, δ^{49}_{25} (8R, 8S)

* See Appendix

Table 2-2 Irradiation Description

Foil	Core ID	D_2O Critical Level	H_2O Coolant Level
DU/NU	22.5cm-8sPu- 0%	83.43 cm	83.5 cm
	-8sPu-100%	93.82	0
	-8RPu- 0%	83.54	83.2
	-8RPu-100%	103.76	0
	-5sPu- 0%	90.90	91.0
	-5sPu-100%	103.44	0
EU/PU	22.5cm-8sPu- 0%	83.48	83.5
	-8sPu-100%	93.81	0
	-8RPu- 0%	83.53	83.1
	-8RPu-100%	103.76	0
	-5sPu- 0%	85.16	85.0
	-5sPu-100%	103.46	0

Irradiation Time: 1 kW × 75 Min.



● PuO_2-UO_2 Fuel Cluster with Irradiated Foils

▨ PuO_2-UO_2 Fuel Cluster with Irradiated Foils (9ch. or 25ch.)

○ 1.2 w/o UO_2 Fuel Cluster with Irradiated Foilds (111ch. or 95ch.)

Fig. 2-1 Lattice Arrangement for Activation

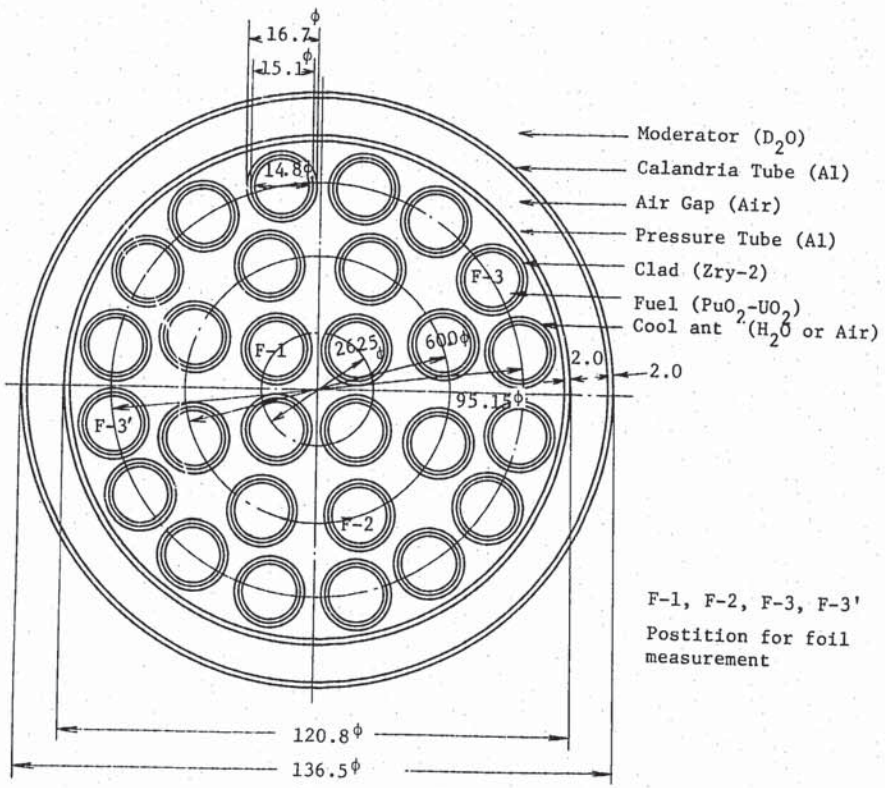


Fig. 2-2 Cross Sectional View of Fuel Cluster

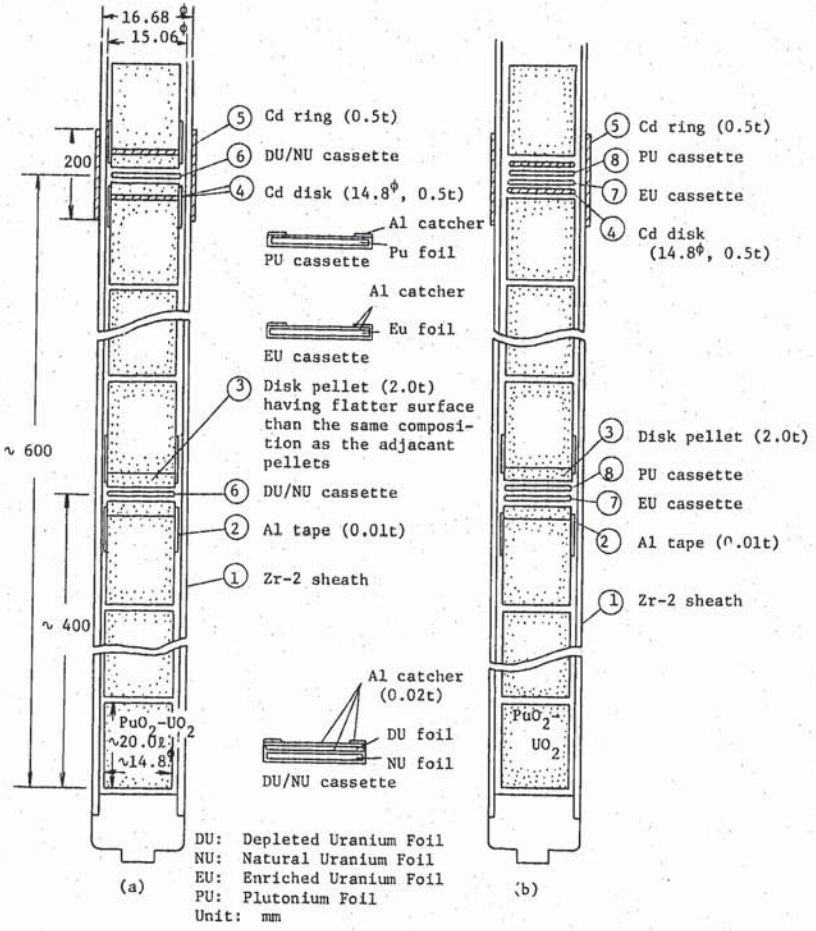


Fig. 2-3 Foil arrangement in PuO_2-UO_2 Fuel Pin.

3. Fission Reaction Rate Ratios

Table 3-1 Definition of Fission Reaction Rate Ratios

(1) Definitions of δ^{25}, δ^{49}, δ^{28} and δ^{49}_{25}

$$\delta^{25} \equiv \int_{Ecd}^{\infty} \sigma^{25}(E)\phi(E)dE \Big/ \int_{o}^{Ecd} \sigma^{25}(E)\phi(E)dE$$

$$\delta^{49} \equiv \int_{Ecd}^{\infty} \sigma^{49}(E)\phi(E)dE \Big/ \int_{o}^{Ecd} \sigma^{49}(E)\phi(E)dE$$

$$\delta^{28} \equiv \int_{E_t}^{\infty} N_f^{28}\sigma_f^{28}(E)\phi(E)dE \Big/ \int_{o}^{\infty} N_f^{25}\sigma_f^{25}(E)\phi(E)dE$$

$$\delta^{49}_{25} \equiv \int_{o}^{\infty} N_f^{49}\sigma_f^{49}(E)\phi(E)dE \Big/ \int_{o}^{\infty} N_f^{25}\sigma_f^{25}(E)\phi(E)dE$$

Where Ecd : the Cd cut-off energy

E_t : the threshold energy of ^{238}U fast fissions

σ_f^{25} or σ_f^{49} : the fission cross section of ^{235}U or ^{239}Pu

N_f^{25}, N_f^{28} or N_f^{49} : the atomic No. density of ^{235}U, ^{238}U or ^{239}Pu in the fuel.

(2) Derivation from Measurements

$$\delta^{25} = \left(\frac{[F]^b_e}{[F]^c_e} - 1\right)^{-1}$$

$$\delta^{49} = \left(\frac{[F]^b_p}{[F]^c_p} - 1\right)^{-1}$$

$$\delta^{28} = \left(\frac{N_f^{28}}{N_f^{25}}\right)\left(\frac{N_n^{25}}{N_n^{28}}\right)P_{28}(t)R^b$$

$$\delta^{49}_{25} = \left(\frac{N_f^{49}}{N_f^{25}}\right)\left(\frac{N_e^{25}}{N_p^{49}}\right)P_{49}(t)\,\frac{[F]^b_p}{[F]^b_e}$$

where $R^b \equiv \dfrac{\gamma(t)^b - N_d^{25}/N_n^{25}}{N_d^{28}/N_n^{28} - \gamma(t)^b}$, $\gamma(t) \equiv F_d^b/F_n^b$

F : the activity of fission products.
Suffixes of d, n, e, p and f indicate DU, NU, EU, PU or fuel.

b,d : bare or Cd-covered foil activity

Table 3-2-1 Data of Fission Products PU Foils
(1kW-75Min. irrad., 8s Pu Fuel, 0% Void,
D_2O level 83.48 cm, H_2O level 83.5 cm)

Ring	Height (cm)	Foil Weight	Cooling Time(Min.)	PU_c Activity		PU_b Activity			Gamma (PU_c/PU_b)	Averaged Ratio(CR)
				Raw (200 sec)	Specific (1/sec·mg)	Raw (200 sec)	Specific (1/sec·mg)	Fitted Value (1/sec·mg)		
1st	60.0	PU19 44.8 mg (Cd)	1210.3			21297	48.124			
			1213.9	2124	3.9180			47.253	8.2916E-02	8.2484E-02
			1314.9			17589	39.577			±1.6%
			1318.4	1896	3.3950			40.636	8.3548E-02	(12.12)
			1422.8			15593	35.522			(10.13)*
	40.2	PU18 44.5 mg (Bare)	1426.3	1648	2.8258			34.452	8.2021E-02	(8.973)**
			1527.3			13933	31.150			
			1530.9	1538	2.5739			30.693	8.3861E-02	
			1635.2			12455	27.744			
			1638.8	1374	2.1977			27.446	8.0074E-02	
			1743.2			11353	25.204			
			1746.7	1245	1.9019			25.414	7.4834E-02	
2nd	59.7	PU21 43.9 mg (Cd)	1245.9			25248	57.497			5.6127E-02
			1249.5	1865	3.3861			56.257	6.0189E-02	±5.6%
			1350.5			21016	47.696			(17.82)
			1354.1	1658	2.9024			50.198	5.7820E-02	(14.97)*
			1458.4			20392	46.800			(13.26)**
	39.8	PU20 44.4 mg (Bare)	1462.0	1417	2.3388			43.990	5.3168E-02	
			1563.0			17559	39.691			
			1566.5	1394	2.2856			39.633	5.7669E-02	
			1670.9			15528	34.988			
			1674.5	1195	1.8206			35.155	5.1788E-02	
			1778.8			13981	31.406			
			1782.4	1181	1.7879			31.283	5.7151E-02	
3rd	59.6	PU23 44.9 mg (Cd)	1228.1			34633	78.869			4.4743E-02
			1231.7	2034	3.6946			78.496	4.7068E-02	±4.8%
			1332.7			30386	69.077			(22.35)
			1336.2	1761	3.0713			69.933	4.3918E-02	(19.07)*
	39.7	PU22 44.6 mg (Bare)	1440.6			28368	64.971			(16.89)**
			1444.1	1696	2.9225			61.545	4.7485E-02	
			1545.2			23842	53.999			
			1548.7	1459	2.3818			55.459	4.2947E-02	
			1653.1			21881	49.470			
			1656.6	1335	2.0987			49.617	4.2298E-02	
			1761.0			20094	45.351			
			1764.5	1292	2.0005			44.790	4.4664E-02	

* Height Correction
** Cd-Cover Correction
c : Cd-covered foil
b : Bare foil

Table 3-2-2 Data of Fission Products PU Foils
(1kW-75Min. irrad., 8s Pu Fuel, 100% Void,
D_2O level 93.81 cm, H_2O level 0 cm)

Ring	Height (cm)	Foil Weight	Cooling Time(Min.)	PU_c Activity		PU_b Activity			Gamma (PU_c/PU_b)	Averaged Ratio(CR)
				Raw (200 sec)	Specific (1/sec·mg)	Raw (200 sec)	Specific (1/sec·mg)	Fitted Value (1/sec·mg)		
1st	60.1	PU11 47.0 mg (Cd)	1118.4			11544	24.66			1.1056E-01
			1122.0	1629	2.7737			24.621	1.1266E-01	±4.2%
			1186.1			10772	22.962			(9.04)
			1189.7	1540	2.5793			22.669	1.1378E-01	(8.47)*
	40.3	PU10 46.6 mg (Bare)	1256.2			9774	20.759			(7.50)**
			1259.8	1454	2.3915			20.782	1.1507E-01	
			1323.3			8972	18.989			
			1326.9	1314	2.0857			19.104	1.0918E-01	
			1390.4			8273	17.917			
			1394.0	1158	1.7439			17.079	1.0210E-01	
			1457.5			7660	16.095			
			1461.1	1149	1.7254			16.121	1.0703E-01	
2nd	59.6	PU13 46.9 mg (Cd)	1154.6			11750	25.687			1.0526E-01
			1158.2	1617	2.7596			25.668	1.0751E-01	±3.4%
			1221.7			10982	23.953			(9.50)
			1225.3	1467	2.4305			23.852	1.0190E-01	(8.98)*
	39.8	PU12 45.5 mg (Bare)	1291.8			10350	22.527			(7.96)**
			1295.4	1456	2.4064			21.963	1.0956E-01	
			1358.9			8859	19.643			
			1362.5	1259	1.9731			19.684	1.0024E-01	
			1426.0			8437	18.691			
			1429.6	1233	1.9160			17.894	1.0708E-01	
			1493.1			7766	16.696			
			1496.7	1176	1.7922			16.594	1.0800E-01	
3rd	60.5	PU17 45.3 mg (Cd)	1168.9			17419	37.316			7.5986E-02
			1175.8	1619	2.8515			36.899	7.7279E-02	±6.1%
			1236.0			15975	34.152			(13.2)
			1239.6	1472	2.5188			33.769	7.4590E-02	(12.3)*
	40.3	PU16 47.0 mg (Bare)	13061			14190	30.243			(10.9)**
			1309.7	1307	2.1454			30.745	6.9781E-02	
			1373.2			13142	28.415			
			1376.8	1390	2.3320			27.792	8.3910E-02	
			1440.3			12703	26988			
			1443.9	1219	1.9463			26.171	7.4368E-02	
			1507.4			11424	24.188			
			1511.0	1146	1.7811			24.481	7.2752E-02	

* Height Correction
** Cd-Cover Correction

Table 3-2-3 Data of Fission Products PU Foils
(1kW-75Min. irrad., 8R PU Fuel, 0% Void,
D_2O level 83.53 cm, H_2O level 83.1 cm)

Ring	Height (cm)	Foil Weight	Cooling Time(Min.)	PU_c Activity		PU_b Activity			Gamma (PU_c/PU_b)	Averaged Ratio(CR)
				Raw (200 sec)	Specific (1/sec·mg)	Raw (200 sec)	Specific (1/sec·mg)	Fitted Value (1/sec·mg)		
1st	59.0	PU35 46.9 mg (Cd)	1147.0			21617	48.216			7.6391E-02
			1150.5	2090	3.7058			48.127	7.7000E-02	±3.2%
			1222.5			19708	43.895			(13.7)
			1226.0	1901	3.4887			43.139	8.0871E-02	(11.4)*
	39.2	PU34 45.4 mg (Bare)	1294.7			17379	38.624			(10.1)**
			1298.2	1640	2.9163			39.102	7.4581E-02	
			1365.2			16376	36.354			
			1368.8	1529	2.6729			35.849	7.4558E-02	
			1437.4			15002	33.245			
			1440.9	1446	2.4908			33.235	7.4946E-02	
			1506.2			14234	31.506			
			1509.8	1339	2.2562			31.405	7.1841E-02	
2nd	58.9	PU37 45.1 mg (Cd)	1179.0			25074	54.560			6.3740E-02
			1182.6	1875	3.5564			54.254	6.5552E-02	±3.2%
			1254.6			22826	49.606			(15.7)
			1258.1	1739	3.2473			49.783	6.5230E-02	(13.7)*
	39.2	PU36 46.6 mg (Bare)	1362.8			21576	46.851			(12.2)**
			1330.3	1535	2.7837			45.889	6.0662E-02	
			1397.3			19236	41.695			
			1400.8	1531	2.7746			42.446	6.5368E-02	
			1469.5			18475	40.018			
			1473.0	1380	2.4314			39.287	6.1888E-02	
			1538.3			16919	36.590			
			1541.9	1359	2.3837			36.621	6.5091E-02	
3rd	58.9	PU39 44.9 mg (Cd)	1161.2			37140	84.893			4.6644E-02
			1164.8	2056	3.9859			84.112	4.7389E-02	±3.0%
			1236.7			32516	74.231			(21.4)
			1240.3	1828	3.4654			73.954	4.6859E-02	(18.6)*
			1308.9			29014	66.157			(16.5)**
	39.2	PU38 44.6 mg (Bare)	1312.5	1681	3.1297			66.091	4.7355E-02	
			1379.5			26207	59.686			
			1383.0	1468	2.6434			60.161	4.3939E-02	
			1451.6			25382	57.784			
			1455.2	1477	2.6640			55.876	4.7676E-02	
			1520.5			23198	52.749			
			1524.1	1366	2.4105			53.475	4.5078E-02	

* Height Correction

** Cd-Cover Correction

Table 3-2-4 Data of Fission Products PU Foils
(1kW-75Min. irrad. 8R Pu Fuel, 100% Void,
D_2O level 103.76 cm, H_2O level 0 cm)

Ring	Height (cm)	Foil Weight	Cooling Time(Min.)	PU_c Activity		PU_b Activity			Gamma (PU_c/PU_b)	Averaged Ratio(CR)
				Raw (200 sec)	Specific (1/sec·mg)	Raw (200 sec)	Specific (1/sec·mg)	Fitted Value (1/sec·mg)		
1st	58.9	PU43 47.0 mg (Cd)	1145.9			8921	17.919			1.0763E-01
			1149.5	1385	1.9961			17.801	1.1214E-01	±3.5%
			1221.4			8251	16.508			(9.29)
			1225.0	1306	1.8332			16.382	1.1191E-01	(9.71)*
	39.2	PU42 46.0 mg (Bare)	1297.5			7321	14.549			(8.59)**
			1301.0	1180	1.5734			14.994	1.0494E-01	
			1373.1			7245	14.389			
			1376.7	1121	1.4518			13.652	1.0634E-01	
			1448.7			6156	12.095			
			1452.3	1033	1.2703			12.352	1.0284E-01	
			1508.2			5855	11.461			
			1511.7	999	1.2002			11.359	1.0566E-01	
2nd	58.4	PU45 46.4 mg (Cd)	1178.0			10463	20.944			
			1181.6	1287	1.8212			20.568	8.8546E-02	
			1251.8			8876	17.635			8.8355E-02
			1257.4	1218	1.6771			17.969	9.3333E-02	±4.7%
			1329.7			8065	15.945			(11.3)
	38.7	PU44 46.5 mg (Bare)	1333.2	1115	1.4620			15.942	9.1707E-02	(11.9)*
			1405.3			7638	15.055			(10.6)**
			1408.9	979	1.1779			14.487	8.1305E-02	
			1408.8			6862	13.437			
			1484.4	981	1.1821			13.605	8.6885E-02	
			1540.2			6790	13.287			
			1543.8	865	0.9398			13.309	7.0612E-02	
3rd (1)	58.7	PU1 44.1 mg (Cd)	1160.2			13239	27.627			7.0911E-02
			1163.8	1401	2.1817			27.344	7.9788E-02	±6.6%
			1235.7			11868	24.674			(14.1)
			1239.2	1173	1.6808			24.990	6.7259E-02	(14.8)*
			1311.8			11099	23.018			(13.1)**
	39.1	PU50 45.0 mg (Bare)	1315.4	1127	1.5798			22.792	6.9312E-02	
			1387.5			10345	21.394			
			1391.1	1081	1.4787			20.789	7.1132E-02	
			1463.0			8982	18.459			
			1466.5	987	1.2722			18.971	6.7062E-02	
			1522.4			8744	17.946			
			1526.0	937	1.1624			17.662	6.5813E-02	
3rd (2)	58.2	PU3 44.6 mg (Cd)	1192.3			13547	28.107			6.2331E-02
			1195.8	1183	1.6810			28.051	5.9927E-02	±5.8%
			1268.1			12262	25.357			(16.0)
			1271.9	1183	1.6810			25.117	6.6927E-02	(16.8)*
			1343.9			11160	22.999			(14.9)**
	38.8	PU2 45.3 mg (Bare)	1347.5	1083	1.4637			22.664	6.4585E-02	
			1419.6			9918	20.341			
			1423.1	960	1.1964			20.669	5.7886E-02	
			1495.1			9461	19.363			
			1498.8	906	1.0791			19.131	5.6405E-02	

* Height Correction

** Cd-Cover Correction

Table 3-2-5 Data of Fission Products PU Foils
(1kW-75Min. irrad., 5s Pu Fuel, 0% Void,
D_2O level 85.16 cm, H_2O level 85.0 cm)

Ring	Height (cm)	Foil Weight	Cooling Time(min.)	Pu_c Activity Raw (200 sec)	Pu_c Activity Specific (1/sec·mg)	Pu_b Activity Raw (200 sec)	Pu_b Activity Specific (1/sec·mg)	Pu_b Activity Fitted Value (1/sec·mg)	Gamma (PU_c/PU_b)	Averaged Ratio(CR)
1st	60.9	PU7-4 8.62 mg (Cd)	1125.4			3.9245E-04	2.5208E-01			5.9179E-02
			1129.0	2.693E-03	1.4657E-00			2.4988E-01	5.8657E-02	±1.3%
			1200.9			3.5316E-04	2.2659E-01			(17.0)
			1204.5	2.510E-03	6.3493E-00			2.2799E-01	5.9181E-02	(14.0)*
			1276.4			3.2553E-04	2.0866E-01			(12.4)**
	39.2	PU7-3 8.46 mg (Bare)	1280.0	2.298E-03	1.2144E-00			2.0771E-01	5.8468E-02	(13.7)***
			1352.0			3.0144E-04	1.9302E-01			
			1355.5	2.191E-03	1.1463E-00			1.8902E-01	6.0648E-02	
			1427.5			2.6643E-04	1.7031E-01			
			1431.0	1.982E-03	1.0134E-00			1.7193E-01	5.8943E-02	
			1503.0			2.4683E-04	1.5759E-01			
			1506.6	1.811E-03	9.0460E-01			1.5641E-01	5.7834E-02	
2nd	60.5	PU7-6 9.24 mg (Cd)	1157.5			3.9136E-04	2.6331E-01			5.3514E-02
			1161.1	2.858E-03	1.4662E-00			2.6455E-01	5.5422E-02	±2.8%
			1233.0			3.7851E-04	2.5460E-01			(18.7)
			1236.6	2.655E-03	1.3456E-00			2.4996E-01	5.3834E-02	(15.6)*
			1308.5			3.5013E-04	2.3530E-01			(13.8)**
	39.8	Pu7-5 8.08 mg (Bare)	1312.1	2.549E-03	1.2827E-00		2.3435	2.3435E-01	5.4733E-02	(15.3)***
			1384.0			3.1794E-04	2.1342E-01			
			1387.6	2.302E-03	1.1360E-00			2.1773E-01	5.2176E-02	
			1459.6			3.0473E-04	2.0444E-01			
			1463.1	2.121E-03	1.0285E-00			2.0009E-01	5.1404E-02	
			1535.1			2.7132E-04	1.8173E-01			
			1538.6	1.834E-03	8.5810E-01			1.8143E-01	4.7297E-02	
3rd	62.2	PU7-1 8.50 mg (Cd)	1139.7			6.2989E-04	4.1928E-01			3.8680E-02
			1143.2	3.010E-03	1.6917E-00			4.1549E-01	4.0715E-02	±2.9%
			1215.2			5.6452E-04	3.7547E-01			(25.9)
			1218.7	2.600E-03	1.4265E-00			3.7883E-01	3.7655E-02	(20.7)*
			1290.7			5.2886E-04	3.5157E-01			(18.3)**
	40.0	PU7-2 8.19 mg (Bare)	1294.3	2.450E-03	1.3297E-00			3.4544E-01	3.8493E-02	(20.3)***
			1366.2			4.7106E-04	3.1285E-01			
			1369.8	2.292E-03	1.2278E-00			3.1541E-01	3.8926E-02	
			1441.7			4.4269E-04	2.9384E-01			
			1445.3	2.072E-03	1.0858E-00			2.8869E-01	3.7612E-02	
			1517.3			3.9910E-04	2.6464E-01			
			1520.8	1.835E-03	9.3293E-01			2.6528E-01	3.5168E-02	

* Height Correction
** Cd-Cover Correction
*** Polyethylene Correction

Table 3-2-6 Data of Fission Products PU Foils
(1kW-75Min. irrad., 5s Pu Fuel, 100% Void,
D_2O level 103.46 cm, H_2O level 0 cm)

Ring	Height (cm)	Foil Weight	Cooling Time(Min.)	PU_c Activity Raw (100 sec)	PU_c Activity Specific (1/sec·mg)	PU_b Activity Raw (100 sec)	PU_b Activity Specific (1/sec·mg)	PU_b Activity Fitted Value (1/sec·mg)	Gamma (PU_c/PU_b)	Averaged Ratio(CR)
1st	59.8	PU6-2 9.77 mg (Cd)	1220.5			1.3201E+04	18.097			8.9706E-02
			1263.1			1.2433E+04	17.016			±3.4%
			1265.0	1.484E-03	1.5757					(11.15)
			1303.0					16.919	9.3135E-02	(11.47)*
			1304.9	1.381E-03	1.4431	1.1682E+04	15.960			(10.16)**
	39.7	PU16-1 9.03 mg (Bare)	1336.2					15.984	9.0284E-02	(11.28)***
			1375.4			1.1222E+04	15.314			
			1377.3	1.232E-03	1.2514	1.0801E+04	14.726			
			1406.2					14.602	8.5698E-02	
			1408.2	1.191E-03	1.1986	1.0370E+04	14.118			
2nd	60.0	PU13-2 12.56 mg (Cd)	1228.3					14.135	8.4797E-02	
			1231.4	2.160E-03	1.9012	2.2396E+04	21.426			8.9559E-02
			1270.6					21.281	8.9340E-02	±0.7%
			1272.6	2.027E-03	1.7681	2.0739E+04	19.806			(11.17)
			1310.4					19.817	8.9222E-02	(11.47)*
	39.8	PU13-1 13.11 mg (Bare)	1312.5	1.910E-03	1.6510	1.9638E+04	18.731			(10.16)**
			1344.4					18.600	8.8767E-02	(11.28)***
			1346.3	1.851E-03	1.5919	1.8622E+04	17.740			
			1383.0					17.721	8.9832E-02	
			1384.9	1.790E-03	1.5309	1.7804E+04	16.942			
			1414.0					16.891	9.0632E-02	
			1417.1	1.697E-03	1.4378	1.7224E+04	16.377			
3rd (1)	59.8	PU13-4 12.86 mg (Cd)	1278.3					16.340	8.7995E-02	
			1280.1	2.246E-03	1.9408	2.4621E+04	26.384			7.3598E-02
			1318.1					26.352	7.3649E-02	±1.0%
			1320.0	2.165E-03	1.8616	2.3593E+04	25.257			(13.59)
	39.5	PU13-3 11.73 mg (Bare)	1351.9					25.074	7.4244E-02	(14.02)*
			1353.8	2.038E-03	1.7374	2.2338E+04	23.884			(12.41)**
			1390.4					24.006	7.2375E-02	(13.78)***
			1392.3	1.990E-03	1.6905	2.1518E+04	22.987			
			1422.6					22.807	7.4124E-02	
			1424.5	1.886E-03	1.5889	2.0468E+04	21.840			
(2)	59.8	PU13-6 13.13 mg (Cd)	1245.2					21.817	7.2826E-02	
			1285.5			2.7329E+04	27.614			7.0596E-02
			1325.6			2.5661E+04	25.891			±0.8%
			1327.9	2.077E-03	1.7399	2.4149E+04	24.331			(14.17)
	39.6	PU13-5 12.47 mg (Bare)	1359.8					24.448	7.1170E-02	(14.60)*
			1397.9			2.3291E+04	23.447			(12.93)**
			1399.7	1.876E-03	1.4315	2.2320E+04	22.447			(14.35)***
			1430.1					22.099	7.0021E-02	
			1431.9	1.755E-03	1.5889	2.0917E+04	21.005			
								21.143	6.7704E-02	

* Height Correction
** Cd-Cover Correction
*** Polyethylene Correction

Table 3-2-7 Data of Fission Products EU Foils
(1kW-75Min. irrad., 8s Pu Fuel, 0% Void,
D_2O level 83.48 cm, H_2O level 83.5 cm)

Ring	Height (cm)	Foil Weight	Cooling Time(Min.)	EU_c Activity		EU_b Activity			Gamma (EU_c/EU_b)	Averaged Ratio(CR)
				Raw (200 sec)	Specific (1/sec·mg)	Raw (200 sec)	Specific (1/sec·mg)	Fitted Value (1/sec·cm)		
1st	60.0	EU54 48.00 mg (Cd)	1203.2			25008	30.145			1.0435E-01
			1206.7	3101	4.3838			30.062	1.0920E-01	±3.1%
			1307.7			21686	26.072			(9.58)
			1311.3	2569	2.6324			25.566	1.0297E-01	(7.99)*
			1415.6			17346	21.042			(7.08)**
	40.2	EU53 47.85 mg (Bare)	1419.2	2156	2.1270			21.290	9.9230E-02	
			1520.2			15916	18.998			
			1523.8	1989	1.9233			18.347	1.0483E-01	
			1628.1			13100	15.547			
			1631.7	1768	1.6531			15.664	1.0553E-01	
			1736.0			11611	13.721			
			1739.6	1499	1.3242			13.644	9.7059E-02	
2nd	59.7	EU56 48.10 mg (Cd)	1238.8			27135	32.673			8.4324E-02
			1242.4	2765	2.8650			32.755	8.7413E-02	±2.7%
			1343.4			24099	28.960			(11.9)
			1346.9	2321	2.3235			28.172	8.2474E-02	(10.1)*
			1451.3			19884	24.094			(8.91)**
	39.8	EU55 48.00 mg (Bare)	1454.8	2114	2.0708			23.919	8.6576E-02	
			1555.9			17394	20.759			
			1559.4	1828	1.7222			21.133	8.1497E-02	
			1663.8			16133	19.217			
			1667.3	1702	1.5686			18.749	8.3662E-02	
			1771.7			14422	17.125			
			1775.2	1651	1.5064			17.167	8.7748E-02	
3rd	59.6	EU58 48.23 mg (Cd)	1221.0			45426	54.916			6.0538E-02
			1224.5	3238	3.4335			55.141	6.2267E-02	±3.4%
			1325.6			39794	48.042			(16.5)
			1329.1	2759	2.8507			46.614	6.1155E-02	(14.0)*
			1433.5			32311	39.199			(12.4)**
	39.7	EU57 48.12 mg (Bare)	1437.0	2436	2.4575			38.993	6.3025E-02	
			1538.0			27445	32.972			
			1541.6	2015	1.9455			33.591	5.7918E-02	
			1645.9			24841	29.794			
			1649.5	1815	1.7022			29.184	5.8327E-02	
			1753.8			21984	26.309			
			1757.4	1697	1.5587			26.262	5.9351E-02	

* Height Correction

** Cd-Cover Correction

Table 3-2-8 Data of Fission Products EU Foils
(1kW-75Min. irrad., 8s Pu Fuel, 100% Void,
D_2O level 93.81 cm, H_2O level 0 cm)

Ring	Height (cm)	Foil Weight	Cooling Time(Min.)	EU_c Activity		EU_b Activity			Gamma (EU_c/EU_b)	Averaged Ratio(CR)
				Raw (200 sec)	Specific (1/sec·mg)	Raw (200 sec)	Specific (1/sec·mg)	Fitted Value (1/sec·mg)		
1st	60.1	EU46 47.20 mg (Cd)	1114.8	2389	2.5194			15.921	1.5825E-01	1.6054E-01
			1179.0			11715	14.107			±1.7%
			1182.5	2181	2.2613			14.016	1.6133E-01	(6.23)
			1249.1			10433	12.512			(5.84)*
			1252.6	1921	1.9385			12.399	1.5635E-01	(5.17)**
	40.3	EU45 47.20 mg (Bare)	1316.2			9311	11.118			
			1319.7	1839	1.8368			11.189	1.6416E-01	
			1383.3			8794	10.475			
			1386.8	1657	1.6102			10.045	1.6030E-01	
			1450.4			8203	9.740			
			1453.9	1593	1.5315			9.7625	1.5687E-01	
2nd	59.6	EU48 47.30 mg (Cd)	1147.5			13698	16.573			1.4473E-01
			1151.1	2420	2.5516			16.721	1.5260E-01	±5.2%
			1214.6			12994	15.697			(6.91)
			1218.2	2273	2.3696			15.382	1.5405E-01	(6.53)*
			1284.7			11983	14.440			(5.78)**
	39.8	EU47 47.21 mg (Bare)	1288.3	1918	1.9300			14.029	1.3757E-01	
			1351.8			10474	12.563			
			1355.4	1758	1.7319			12.777	1.3555E-01	
			1418.9			9235	11.288			
			1422.5	1673	1.6261			11.302	1.4388E-01	
			1486.0			8988	10.716			
			1489.6	1534	1.4546			10.398	1.3989E-01	
3rd	60.5	EU52 47.70 mg (Cd)	1161.7			18660	22.581			1.1250E-01
			1165.3	2351	2.4480			22.039	1.1107E-01	±2.3%
			1228.9			15936	19.215			(8.89)
			1232.4	2126	2.1714			19.730	1.1006E-01	(8.29)*
	40.3	EU51 47.65 mg (Bare)	1299.0			14514	17.458			(7.34)**
			1302.5	2021	2.0424			17.621	1.1591E-01	
			1366.1			13480	16.444			
			1369.6	1761	1.7222			15.629	1.1020E-01	
			1433.2			12388	14.833			
			1436.7	1714	1.6651			14.446	1.1526E-01	
			1500.3			10927	13.030			
			1503.8	1577	1.4967			13.284	1.1267E-01	

* Height Correction

** Cd-Cover Correction

Table 3-2-9 Data of Fission Products EU Foils
(1kW-75Min. irrad., 8R Pu Fuel, 0% Void,
D_2O level 83.53 cm, H_2O level 83.1 cm)

Ring	Height (mm)	Foil Weight	Cooling Time(Min.)	EU_c Activity Raw (200 sec)	EU_c Activity Specific (1/sec·mg)	EU_b Activity Raw (200 sec)	EU_b Activity Specific (1/sec·mg)	EU_b Activity Fitted Value (1/sec·mg)	Gamma (EU_c/EU_b)	Averaged Ratio(CR)
1st	59.0	EU72 51.44 mg (Cd)	1139.8			24108	27.173			1.0738E-01
			1143.4	2875	2.9213			27.318	1.0694E-01	±2.1%
			1215.4			22495	25.331			(9.31)
			1218.9	2583	2.5887			24.851	1.0417E-01	(8.07)*
	39.2	EU71 51.39 mg (Bare)	1287.5			20401	22.940			(7.19)**
			1291.1	2470	2.4600			22.603	1.0883E-01	
			1358.1			18224	20.453			
			1361.6	2305	2.2720			20.513	1.1076E-01	
			1430.3			16140	18074			
			1433.8	2033	1.9622			18.480	1.0618E-01	
			1499.1			1525-	17.068			
			1502.7	1957	1.8757			16.641	1.1272E-01	
2nd	58.9	EU74 51.61 mg (Cd)	1171.9			28819	32.406			8.2618E-02
			1175.5	2602	2.6044			32.788	7.9431E-02	± 2.4%
			1247.4			27411	30.805			(12.1)
			1251.0	2528	2.5203			29.934	8.4195E-02	(10.5)*
			1319.6			25166	28.252			(9.28)**
	39.2	EU73 51.56 mg (Bare)	1323.2	2341	2.3078			27.347	8.4391E-02	
			1390.1			21154	23.691			
			1393.7	2152	2.0930			24.954	8.3874E-02	
			1462.3			20432	22.870			
			1465.9	1928	1.8385			22.641	8.1199E-02	
			1531.2			18732	20.938			
			1534.8	1759	1.6464			20.564	8.0063E-02	
3rd	58.9	EU76 51.86 mg (Cd)	1154.1			49112	55.233			5.9868E-02
			1157.6	3098	3.1537			54.345	5.8031E-02	±2.2%
			1229.6			41722	46.866			(16.7)
			1233.2	2785	2.7966			47.062	5.9489E-02	(14.5)*
			1301.8			35873	40.244			(12.9)**
	39.2	EU75 51.83 mg (Bare)	1305.4	2478	2.4523			41.311	5.9363E-02	
			1372.3			34525	38.718			
			1375.9	2272	2.2193			36.831	6.0256E-02	
			1444.5			29982	33.576			
			1448.1	2144	2.0745			33.406	6.2099E-02	
			1513.4			27.645	30.930			
			1516.9	1918	1.8188			31.238	5.8224E-02	

* Height Correction
** Cd-Cover Correction

Table 3-2-10 Data of Fission Products EU Foils
(1kW-75Min. irrad., 8R Pu Fuel, 100% Void,
D_2O level 103.76 cm, H_2O level 0 cm)

Ring	Height (cm)	Foil Weight	Cooling Time(Min.)	EU_c Activity Raw (200 sec)	EU_c Activity Specific (1/sec·mg)	EU_b Activity Raw (200 sec)	EU_b Activity Specific (1/sec·mg)	EU_b Activity Fitted Value (1/sec·mg)	Gamma (EU_c/EU_b)	Averaged Ratio(CR)
1st	58.9	EU80 52.80 mg (Cd)	1138.6			9911	10.771			1.7057E-01
			1142.3	1869	1.7749			10.398	1.6747E-01	±1.5%
			1214.3			8783	9.5102			(5.86)
			1217.9	1780	1.6760			9.6860	1.7304E-01	(6.12)*
			1290.4			8116	8.7650			(5.42)**
	39.2	EU79 52.47 mg (Bare)	1293.9	1612	1.4895			8.8309	1.6867E-01	
			1365.9			7820	8.4343			
			1369.5	1524	1.3918			8.0417	1.7308E-01	
			1441.6			6702	7.1852			
			1445.1	1478	1.3408			7.3138	1.8332E-01	
			1504.6	1319	1.1643			6.7840	1.7162E-01	
2nd	58.4	EU82 53.00 mg (Cd)	1170.9			11067	11.942			1.4510E-01
			1174.5	1883	1.7837			11.828	1.5080E-01	±2.2%
			1246.7			9739	10.473			(6.89)
			1250.3	1639	1.5138			10.650	1.4214E-01	(7.25)*
			1322.5			9264	9.9476			(6.42)**
	38.7	EU81 53.00 mg (Bare)	1326.1	1516	1.3778			9.5895	1.4367E-01	
			1398.2			8039	8.5926			
			1401.8	1386	1.2340			8.6467	1.4271E-01	
			1473.7			7278	7.7508			
			1477.3	1304	1.1433			7.8224	1.4616E-01	
			1533.1			6922	7.3570			
			1536.7	1269	1.1046			7.2553	1.5224E-01	
3rd-1	58.7	EU88 53.50 mg (Cd)	1153.1			15901	17.142			1.1659E-01
			1156.6	2052	1.9520			17.219	1.1336E-01	±1.9%
			1228.5			14744	15.873			(8.58)
			1232.1	1915	1.8019			15.323	1.1760E-01	(8.98)*
			1304.6			12421	13.325			(7.95)**
	39.1	EU87 53.46 mg (Bare)	1308.2	1754	1.6255			13.670	1.1891E-01	
			1380.3			11685	12.518			
			1384.0	1600	1.4568			12.282	1.1861E-01	
			1455.8			10383	11.090			
			1459.4	1436	1.2771			11.157	1.1447E-01	
			1515.3			9893	10.552			
			1518.9	1474	1.3188			10.449	1.2621E-01	
3rd-2	58.2	EU90 53.59 mg (Cd)	1185.1			15616	16.792			1.1111E-01
			1188.7	1951	1.8385			16.651	1.1042E-01	±4.5%
			1261.0			13837	14.845			(9.00)
			1264.6	1876	1.7565			14.873	1.1810E-01	(9.47)*
			1336.8			12602	13.494			(8.38)**
	38.8	EU89 53.58 mg (Bare)	1340.4	1527	1.3747			13.374	1.0279E-01	
			1412.4			11389	12.166			
			1416.0	1536	1.3846			12.152	1.1394E-01	
			1488.0			10611	11.337			
			1491.5	1400	1.2358			11.205	1.1029E-01	
			1547.4			9979	10.623			
			1550.9	1298	1.1242			10.652	1.0555E-01	

* Height Correction
** Cd-Cover Correction

Table 3-2-11 Data of Fission Products EU Foils
(1kW-75Min. irrad., 5s Pu Fuel, 0% Void,
D_2O level 85.16 cm, H_2O level 85.0 cm)

Ring	Height (cm)	Foil Weight	Cooling Time(Min.)	EU_c Activity Raw (200 sec)	EU_c Activity Specific (1/sec·mg)	EU_b Activity Raw (200 sec)	EU_b Activity Specific (1/sec·mg)	EU_b Activity Fitted Value (1/sec·mg)	Gamma (EU_c/EU_b)	Averaged Ratio(CR)
1st	60.9	EU6 54.98 mg (Cd)	1118.3			3.6939E-04	1.8598E-01			8.5294E-02
			1121.8	3.550E-03	1.6079E-00			1.8580E-01	8.6537E-02	±3.4%
			1193.8			3.3269E-04	1.6730E-01			(11.7)
			1197.4	3.122E-03	1.3902E-00			1.6541E-01	8.4042E-02	(9.71)*
			1269.3			2.9857E-04	1.4993E-01			(8.60)**
	39.2	EU4 54.50 mg (Bare)	1272.9	2.998E-03	1.3271E-00			1.4808E-01	8.9618E-02	
			1344.8			2.6658E-04	1.3365E-01			
			1348.4	2.634E-03	1.1420E-00			1.3379E-01	8.5356E-02	
			1420.3			2.4268E-04	1.2149E-01			
			1423.9	2.338E-03	9.9138E-01			1.2252E-01	8.0915E-02	
			1495.9			2.3113E-04	1.1561E-01			
			1499.4	2.201E-03	9.2169E-01			1.1428E-01	8.0649E-02	
2nd	60.5	EU8 50.53 mg (Cd)	1150.4			4.1123E-04	2.2391E-01			7.0526E-02
			1153.9	3.309E-03	1.6009E-00			2.2276E-01	7.1868E-02	±2.1%
			1225.9			3.7053E-04	2.0153E-01			(14.2)
			1229.4	2.999E-03	1.4310E-00			2.0074E-01	7.1286E-02	(11.8)*
			1301.4			3.3765E-04	1.8345E-01			(10.5)**
	39.8	EU5 50.43 mg (Bare)	1305.0	2.619E-03	1.2226E-00			1.8081E-01	6.7619E-02	
			1376.9			2.9317E-04	1.5899E-01			
			1380.5	2.489E-03	1.1514E-00			1.6304E-01	7.0620E-02	
			1452.4			2.8213E-04	1.5292E-01			
			1456.0	2.304E-03	1.0499E-00			1.4738E-01	7.1238E-02	
			1528.0			2.4554E-04	1.3281E-01			
			1531.5	2.000E-03	8.8325E-01			1.3385E-01	6.5986E-02	
3rd	62.2	EU17 50.82 mg (Cd)	1132.5			5.1123E-04	2.8044E-01			5.1932E-02
			1136.1	33.26E-03	1.6015E-00			2.8300E-01	5.6588E-02	±5.9%
			1208.1			4.9460E-04	2.7125E-01			(19.3)
			1211.6	3.013E-03	1.4308E-00			2.6756E-01	5.3475E-02	(15.4)*
			1283.6			4.6819E-04	2.5664E-01			(13.7)**
	40.0	EU18 50.17 mg (Bare)	1287.1	2.786E-03	1.3070E-00			2.4956E-01	5.2373E-02	
			1359.1			4.1339E-04	2.2634E-01			
			1362.7	2.444E-03	1.1205E-00			2.2897E-01	4.8939E-02	
			1434.6			3.6629E-04	2.0030E-01			
			1438.2	2.212E-03	9.9403E-01			2.0583E-01	4.8293E-02	
			1510.1			3.4030E-04	1.8593E-01			
			1513.7	2.132E-03	9.5041E-01			1.8014E-01	5.2759E-02	

* Height Correction
** Cd-Cover Correction

Table 3-2-12 Data of Fission Products EU Foils
(1kW-75Min. irrad., 5s Pu Fuel, 100% Void,
D_2O level 103.46 cm, H_2O level 0 cm)

Ring	Height (cm)	Foil Weight	Cooling Time(Min.)	EU_c Activity Raw (100 sec)	EU_c Activity Specific (1/sec·mg)	EU_b Activity Raw (100 sec)	EU_b Activity Specific (1/sec·mg)	EU_b Activity Fitted Value (1/sec·mg)	Gamma (EU_c/EU_b)	Averaged Ratio(CR)
1st	59.8	EU24 49.27 mg (Cd)	1216.1			1.4838E-04	16.431			1.2157E-01
			1218.3	1.982E-03	1.9401			16.311	1.1894E-01	±1.5%
			1259.3			1.3600E-04	15.027			(8.23)
			1261.2	1.899E-03	1.8466			15.125	1.2209E-01	(8.47)*
			1299.3			1.2868E-04	14.197			(7.50)**
	39.7	EU23 49.54 mg (Bare)	1301.2	1.778E-03	1.7102			14.111	1.2120E-01	
			1332.2			1.2299E-04	13.353			
			1334.1	1.729E-03	1.6300			13.344	1.2403E-01	
			1371.6			1.1263E-04	12.380			
			1402.1			1.0924E-04	11.996			
			1404.2	1.554E-03	1.4578			11.909	1.2242E-01	
2nd	60.0	EU18 51.27 mg (Cd)	1224.3			1.6958E-04	18.000			1.1725E-01
			1226.3	2.158E-03	2.0533			17.858	1.1509E-01	±2.3%
			1266.9			1.5493E-04	16.405			(8.53)
			1268.8	2.026E-03	1.9123			16.446	1.1627E-01	(8.76)*
			1306.7			1.4499E-04	15.327			(7.76)**
	39.8	EU17 51.88 mg (Bare)	1340.2			1.3901E-04	14.679			
			1342.3	1.899E-03	1.7747			14.568	1.2183E-01	
			1379.1			1.3291E-04	14.018			
			1381.0	1.743E-03	1.6058			13.865	1.1581E-01	
			1410.2			1.2694E-04	13.372			
			1412.1	1.661E-03	1.5170			13.444	1.1284E-01	
3rd (1)	59.8	EU20 50.90 mg (Cd)	1233.0			2.0436E-04	23.194			9.5311E-02
			1235.2	2.261E-03	2.1834			23.065	9.4661E-02	±0.8%
			1274.4			1.9091E-04	21.633			(10.49)
			1276.4	2.173E-03	2.0873			21.695	9.6213E-02	(10.82)*
			1314.3			1.8102E-04	20.487			(9.58)**
	39.5	EU19 48.74 mg (Bare)	1316.3	2.053E-03	1.9563			20.437	9.5723E-02	
			1348.2			1.7335E-04	19.599			
			1350.1	1.966E-03	1.8614			19.426	9.5818E-02	
			1386.8			1.6267E-04	18.363			
			1388.6	1.842E-03	1.7260			18.335	9.4140E-02	
			1419.0			1.5517E-04	17.496			
			1420.8	1.753E-03	1.6289			17.471	9.3235E-02	
(2)	59.8	EU22 49.80 mg (Cd)	1243.3	2.310E-03	2.2867			22.931	9.9722E-02	9.6906E-02
			1282.1			1.9861E-04	21.617			±2.6%
			1283.9	2.079E-03	2.0282			21.587	9.6987E-02	(10.32)
			1321.8			1.8882E-03	20.527			(10.63)*
	39.6	EU21 50.80 mg (Bare)	1323.7	2.079E-03	2.0282			20.374	9.9584E-02	(9.42)**
			1356.1			1.7827E-04	19.354			
			1358.0	1.986E-03	1.9251			19.411	9.9178E-02	
			1394.2			1.7078E-04	18.522			
			1396.0	1.828E-03	1.7489			18.433	9.4874E-02	
			1426.3			1.6352E-04	17.716			
			1428.2	1.779E-03	1.6942			17.679	9.5833E-02	

* Height Correction
** Cd-Cover Correction

Table 3-2-13 Data of Fission Products DU-NU Foils
(1kW-75Min. irrad., 8s Pu Fuel, 0% Void,
D_2O level 83.43 cm, H_2O level 83.5 cm)

Ring	Height (cm)	Foil Weight	Cooling Time(Min.)	DU Activity Raw (200 sec)	DU Activity Specific (1/sec·mg)	NU Activity Raw (200 sec)	NU Activity Specific (1/sec·mg)	NU Activity Fitted Value (1/sec·mg)	Gamma (DU/NU)	Averaged Ratio(F_Y)
1st	39.3	DB54 325.82 mg NU9 239.53 mg	1064.6	6426	7.9354E-02	21827	3.5219E-01	3.5414E-01	2.2407E-01	0.2275 ±1.1% (0.2398)
			1071.8							
			1140.1	5945	7.1972E-02					
			1147.3			18902	3.0134E-01	3.1036E-01	2.3190E-01	
			1215.7	5267	6.1566E-02					
			1222.8			17296	2.7398E-01	2.7145E-01	2.2680E-01	
			1291.2	4762	5.3815E-02					
			1298.3			14897	2.3310E-01	2.3752E-01	2.2657E-01	
			1366.7	4299	4.6710E-02					
			1373.8			13218	2.0449E-01	2.0852E-01	2.2400E-01	
			1442.2	3998	4.2090E-02					
			1449.3			11970	1.8323E-01	1.8445E-01	2.2820E-01	
2nd	39.3	DB56 325.58 mg NU11 302.25 mg	1096.7	5953	7.2160E-02	23501	3.6828E-01	3.7250E-01	1.9372E-01	0.1843 ±5.3% (0.1754)
			1103.8							
			1172.2	5718	6.8550E-02	22586	3.4983E-01	3.4330E-01	1.9968E-01	
			1179.4							
			1247.8	4718	5.3192E-02	19071	2.9496E-01	3.1294E-01	1.6997E-01	
			1254.9							
			1323.3	4685	5.2685E-02	18335	2.8278E-01	2.8151E-01	1.8715E-01	
			1330.4							
			1398.8	4164	4.4683E-02	16513	2.5263E-01	2.4895E-01	1.7948E-01	
			1405.9							
			1474.3	3852	3.9891E-02	13828	2.0820E-01	2.1528E-01	1.8529E-01	
			1481.4							
3rd (1)	39.9	DB77 308.54 mg NU13 305.57 mg	1078.9	6370	8.3767E-02	36114	5.7061E-01	5.7271E-01	1.4627E-01	0.1502 ±5.5% (0.1291)
			1086.0							
			1154.4	6201	8.1028E-02	32531	5.1194E-01	5.1651E-01	1.5688E-01	
			1161.5							
			1229.9	5255	6.5696E-02	28211	4.4120E-01	4.6383E-01	1.4164E-01	
			1237.1							
			1305.4	5361	6.7414E-02	27342	4.2698E-01	4.1467E-01	1.6257E-01	
			1312.6							
			1381.0	4551	5.4286E-02	23604	3.6578E-01	3.6895E-01	1.4713E-01	
			1388.1							
			1456.5	4081	4.6669E-02	20762	3.1926E-01	3.2686E-01	1.4278E-01	
			1463.6							
3rd (2)	40.1	DB79 308.21 mg NU15 306.60 mg	1111.0	6035	7.8439E-02	34335	5.4286E-01	5.5612E-01	1.4105E-01	0.1334 ±3.2% (0.1076)
			1118.1							
			1186.5	5552	7.0603E-02	31897	5.1245E-01	5.0849E-01	1.3885E-01	
			1193.6							
			1262.0	4882	5.9731E-02	27771	4.3249E-01	4.6094E-01	1.2959E-01	
			1269.1							
			1337.5	4480	5.3210E-02	25663	3.9809E-01	4.1348E-01	1.2869E-01	
			1344.7							
			1413.0	4313	5.0501E-02	24889	3.8546E-01	3.6611E-01	1.3794E-01	
			1420.2							
			1488.5	4193	4.2065E-02	19997	3.0565E-01	3.1882E-01	1.3194E-01	
			1495.7							

Table 3-2-14 Data of Fission Products DU-NU Foils
(1kW-75Min. irrad., 8s Pu Fuel, 100% Void,
D_2O level 93.82 cm, H_2O level 0 cm)

Ring	Height (cm)	Foil Weight	Cooling Time(Min.)	DU Activity Raw (200 sec)	DU Activity Specific (1/sec·mg)	NU Activity Raw (200 sec)	NU Activity Specific (1/sec·mg)	NU Activity Fitted Value (1/sec·mg)	Gamma (DU/NU)	Averaged Ratio(F_Y)
1st	39.3	DB41 334.29 mg NU1 285.46 mg NU3 289.29 mg	1105.4	4162	4.0280E-02	12160	1.9265E-01	1.9371E-01	2.0794E-01	0.2013 ±5.6% (0.1999)
			1112.5							
			1178.5	3763	3.4611E-02	10447	1.6264	1.6688E-01	2.0740E-01	
			1185.6							
			1248.6	3509	3.0812E-02		9267	1.4548E-01	2.1180E-01	
			1255.7					1.4197		
			1318.7	3020	2.3497E-02			1.2830E-01	1.8315E-01	
			1325.8			8283	1.2473			
			1385.8	3084	2.4455E-02			1.1581E-01	2.1117E-01	
			1393.0			8145	1.2231			
			1452.9	2833	2.0700E-02			1.0719E-01	1.9311E-01	
			1460.1			7024	1.0267			
2nd	40.2	DB43 334.01 mg NU3 289.29 mg NU7 292.94 mg	1141.0	3900	3.6706E-02			1.8581E-01	1.9755E-01	0.2029 ±4.0% (0.2023)
			1148.2			12064	1.8825			
			1214.1	3730	3.4161E-02			1.6262E-01	2.1007E-01	
			1221.3			9891	1.5068			
			1284.3	3292	2.7604E-02			1.4383E-01	1.9192E-01	
			1291.4			9384	1.4192			
			1354.4	3285	2.7499E-02			1.2848E-01	2.1404E-01	
			1361.5			9106	1.3711			
			1421.5	3005	2.3308E-02			1.1697E-01	1.9926E-01	
			1428.6			7627	1.1155			
			1488.6	2892	2.1616E-02			1.0858E-01	1.9909E-01	
			1495.7			7389	1.0743			
3rd	39.4	DB39 334.98 mg NU7 292.94 mg	1155.3	3967	3.7552E-02			2.3208E-01	1.6181E-01	0.1452 ±4.3% (0.1226)
			1162.4			14478	2.2735			
			1228.4	3519	3.0865E-02			2.0732E-01	1.4887E-01	
			1235.5			13381	2.0859			
			1298.5	3261	2.7014E-02			1.8742E-01	1.9414E-01	
			1305.6			12059	1.8598			
			1368.6	3170	2.5655E-02			1.7127E-01	1.4980E-01	
			1375.8			11121	1.6994			
			1435.7	3050	2.3864E-02			1.5932E-01	1.4978E-01	
			1442.9			10203	1.5424			
			1502.8	2801	2.0147E-02			1.5082E-01	1.3359E-01	
			1520.1			10037	1.5140			

Table 3-2-15 Data of Fission Products DU-NU Foils
(1kW-75Min. irrad., 8R Pu Fuel, 0% Void,
D_2O level 83.54 cm, H_2O level 83.2 cm)

Ring	Height (cm)	Foil Weight	Cooling Time(Min.)	DU Activity		NU Activity			Gamma (DU/NU)	Averaged Ratio(Fy)
				Raw (200 sec)	Specific (1/sec·mg)	Raw (200 sec)	Specific (1/sec·mg)	Fitted Value (1/sec·mg)		
1st	38.95	DB1 356.02 mg	1135.6	5453	6.0380E-02			2.9913E-01	2.0185E-01	0.2064 ±6.4% (0.2075)
			1142.7			19890	5.0138E-01			
			1211.1	4850	5.1910E-02			2.8629E-01	1.9494E-01	
			1218.2			16931	2.5372E-01			
		NU21 310.56 mg	1286.6	4811	5.1363E-02			2.3876E-01	2.1512E-01	
			1293.8			15823	2.3588E-01			
			1358.8	4209	4.2907E-02			2.1740E-01	1.9737E-01	
			1365.9			14812	2.1960E-01			
			1434.3	4411	4.5743E-02			2.0025E-01	2.2844E-01	
			1441.5			13807	2.0341E-01			
			1509.8	3783	3.6924E-02			1.8840E-01	1.9599E-01	
			1517.0			12584	1.8372E-01			
2nd	38.95	DB3 355.18 mg	1167.7	5924	6.7184E-02			3.3886E-01	1.9826E-01	0.1711 ±5.8% (0.1570)
			1174.8			22395	3.3417E-01			
			1243.2	5234	5.7469E-02			3.1011E-01	1.8532E-01	
			1250.3			20960	3.1155E-01			
		NU23 317.28 mg	1318.7	4383	4.5488E-02			2.8240E-01	1.6108E-01	
			1325.8			18825	2.7789E-01			
			1390.9	4085	4.1291E-02			2.5688E-01	1.6075E-01	
			1398.0			17384	2.5517E-01			
			1466.4	4102	4.1531E-02			2.3121E-01	1.7963E-01	
			1473.5			15589	2.2656E-01			
			1541.9	3627	3.4845E-02			2.0639E-01	1.6866E-01	
			1549.1			14242	2.0564E-01			
3rd (1)	38.92	DB5 354.35 mg	1149.8	6191	7.1136E-02			3.2482E-01	1.3555E-01	0.1413 ±4.7% (0.1176)
			1157.0			34004	5.1490E-01			
			1225.4	5458	6.0794E-02			4.6598E-01	1.3047E-01	
			1232.5			30637	4.6204E-01			
		NU25 318.67 mg	1300.9	5345	5.9200E-02			4.16598E-01	1.5047E-01	
			1308.0			28497	4.2844E-01			
			1373.1	5114	5.5940E-02			3.7669E-01	1.4850E-01	
			1380.2			23965	3.5730E-01			
			1448.6	4657	4.9491E-02			3.4417E-01	1.4380E-01	
			1455.7			22833	3.3953E-01			
			1524.1	4551	4.7995E-02			3.2053E-01	1.4974E-01	
			1531.2			21780	3.2300E-01			
(2)	38.85	DB7 351.42 mg	1181.9	5426	6.0953E-02			4.5604E-01	1.3364E-01	0.1440 ±5.8% (0.1211)
			1189.1			30193	4.5238E-01			
			1257.5	4954	5.4236E-02			4.1620E-01	1.3031E-01	
			1264.6			27806	4.1512E-01			
		NU27 320.50 mg	1333.0	5134	5.6798E-02			3.7792E-01	1.5029E-01	
			1340.1			25110	3.7304E-01			
			1405.2	4606	4.9285E-02			3.4277E-01	1.4378E-01	
			1412.3			22523	3.3266E-01			
			1480.7	4416	4.6581E-02			3.0752E-01	1.5147E-01	
			1487.8			21052	3.0970E-01			

Table 3-2-16 Data of Fission Products DU-NU Foils
(1kW-75Min. irrad., 8R Pu Fuel, 100% Void,
D_2O level 103.76 cm, H_2O level 0 cm)

Ring	Height (cm)	Foil Weight	Cooling Time(Min.)	DU Activity		NU Activity			Gamma (DU/NU)	Averaged Ratio(Fy)
				Raw (200 sec)	Specific (1/sec·mg)	Raw (200 sec)	Specific (1/sec·mg)	Fitted Value (1/sec·mg)		
1st	40.00	DB9 350.55 mg	1195.0	2557	2.6330E-02			1.1408E-01	2.3080E-01	0.2445 ±4.5% (0.2671)
			1198.6			7999	1.1406E-01			
			1296.2	2396	2.4033E-02			9.7849E-02	2.4561E-01	
			1299.8			6820	9.5685E-02			
		NU29 320.93 mg	1379.0	2210	2.1551E-02			8.3613E-02	2.5775E-01	
			1382.5			6075	8.7692E-02			
			1462.3	2109	1.9939E-02			7.8409E-02	2.5430E-01	
			1465.3			5683	7.7969E-02			
			1543.1	1866	1.6473E-02			7.2188E-02	2.2820E-01	
			1546.7			5342	7.2656E-02			
			1593.4	1862	1.6416E-02			6.9383E-02	2.3660E-01	
			1597.4			5083	6.8620E-02			
2nd	38.00	DB17 343.95 mg	1212.9	2324	2.3574E-02			1.1635E-01	2.0262E-01	0.1947 ±4.5% (0.1903)
			1216.4			8116	1.157E-01			
			1314.0	2138	2.0870E-02			1.0469E-01	1.9935E-01	
			1317.6			7544	1.0631E-01			
		NU31 322.79 mg	1396.9	1895	1.7367E-02			9.2595E-02	1.8755E-01	
			1400.4			6573	9.4708E-02			
			1480.2	1883	1.7163E-02			8.8058E-02	1.9490E-01	
			1483.7			6282	8.6761E-02			
			1558.0	1868	1.6945E-02			8.1351E-02	2.0829E-01	
			1561.6			5953	8.1664E-02			
			1611.3	1676	1.4154E-02			7.7153E-02	1.8345E-01	
			1614.9			5648	7.6939E-02			
3rd (1)	39.00	DB19 342.40 mg	1202.2	2449	2.5537E-02			1.5158E-01	1.6847E-01	0.1615 ±4.1% (0.1440)
			1205.7			10484	1.5083E-01			
			1303.3	2213	2.2090E-02			1.3494E-01	1.6370E-01	
			1306.9			9310	1.3276E-01			
		NU33 324.90 mg	1386.1	1978	1.8688E-02			1.1935E-01	1.5658E-01	
			1389.7			8714	1.2700E-01			
			1469.5	2000	1.8980E-02			1.1174E-01	1.6986E-01	
			1473.0			7743	1.0864E-01			
			1550.3	1761	1.3490E-02			1.0232E-01	1.5139E-01	
			1553.9			7137	9.9312E-02			
			1600.6	1802	1.6088E-02			9.7068E-02	1.6574E-01	
			1604.1			7117	9.9004E-02			
(2)	38.90	DB21 341.89 mg	1220.0	2268	2.2938E-02			1.4716E-01	1.5588E-01	0.1645 ±5.7% (0.1481)
			1223.5			10279	1.4656E-01			
			1321.1	2068	2.0013E-02			1.2996E-01	1.5423E-01	
			1324.7			9091	1.2840E-01			
		NU35 327.27 mg	1404.0	1915	1.7805E-02			1.1397E-01	1.5622E-01	
			1407.5			8246	1.1888E-01			
			1487.4	1949	1.8273E-02			1.0649E-01	1.7160E-01	
			1491.0			7504	1.0413E-01			
			1565.1	1779	1.5786E-02			9.7882E-02	1.6128E-01	
			1568.7			7105	9.8055E-02			
			1618.4	1835	1.6605E-02			9.2817E-02	1.7890E-01	
			1622.0			6746	9.2570E-02			

Table 3-2-17 Data of Fission Products DU-NU Foils
(1kW-75Min. irrad., 5s Pu Fuel, 0% Void,
D_2O level 90.90 cm, H_2O level 91.0 cm)

Ring	Height (cm)	Foil (Weight)	Cooling Time(Min.)	DU Activity		NU Activity			Gamma (DU/NU)	Averaged Ratio(Fγ)
				Raw (100 sec)	Specific (1/sec·mg)	Raw (100 sec)	Specific (1/sec·mg)	Fitted Value (1/sec·mg)		
1st	39.8	DB2 355.61 mg	1168.5			2.6182E+04	5.7453E+02			1.5778E-01
			1179.7	7.057E+03	9.0734E+01			5.6357E+02	1.6100E-01	±3.8%
			1210.0			2.4695E+04	5.3626E+02			(0.1391)
			1220.7	6.908E+03	8.6541E+01			5.2635E+02	1.6442E-01	
		NU39 389.50 mg	1256.0			2.3113E+04	4.9554E+02			
			1266.3	6.419E+03	7.2781E+01			4.9006E+02	1.4851E-01	
			1301.3			2.2046E+04	4.6809E+02			
			1311.0	6.401E+03	7.2274E+01			4.5984E+02	1.5717E-01	
			1357.8			2.0689E+04	4.3317E+02			
2nd	39.7	DB4 354.99 mg	1171.5			3.1219E+04	7.1116E+02			1.3278E-01
			1182.2	7.017E+03	8.9942E+01			6.9671E+02	1.2910E-01	±2.5%
			1213.7			2.9169E+04	6.5791E+02			(0.1068)
			1223.0	6.835E+03	8.4812E+01			6.4778E+02	1.3093E-01	
		NU27 386.14	1258.3			2.7182E+04	6.0630E+02			
			1268.7	6.759E+03	8.2670E+01			5.9866E+02	1.3809E-01	
			1303.7			2.5745E+04	5.6899E+02			
			1313.3	6.488E+03	7.5030E+01			5.5632E+02	1.3487E-01	
			1361.7			2.3688E+04	5.1559E+02			
3rd (1)	39.8	DB6 351.74 mg	1174.3			4.1560E+04	9.8101E+02			1.0781E-01
			1184.8	7.379E+03	1.0201E+02			9.6403E+02	1.0581E-01	±3.3%
			1216.0			3.9083E+04	9.1639E+02			(0.0764)
			1225.3	7.211E+03	9.7228E+01			8.9938E+02	1.0811E-01	
		NU43 385.81 mg	1261.0			3.6353E+04	8.4536E+02			
			1271.0	6.841E+03	8.6702E+01			8.3485E+02	1.0385E-01	
			1306.3			3.4307E+04	7.9215E+02			
			1315.7	6.906E+03	8.8551E+01			7.8031E+02	1.1348E-01	
			1366.5			3.1859E+04	7.2848E+02			
			1450.2	6.237E+03	6.9519E+01			6.6733E+02	1.0417E-01	
(2)	39.9	DB8 351.40 mg	1177.0			4.0524E+04	9.6984E+02			1.0795E-01
			1187.3	7.325E+03	1.0067E+02			9.5394E+02	1.0553E-01	±1.8%
			1218.3			3.8192E+04	9.0823E+02			(0.0766)
			1227.7	7.195E+03	9.5966E+01			8.9382E+02	1.0849E-01	
		NU30 380.02 mg	1263.5			3.5737E+04	8.4339E+02			
			1273.5	7.022E+03	9.2040E+01			8.3145E+02	1.1070E-01	
			1308.7			3.3656E+04	7.8844E+02			
			1318.2	6.710E+03	8.3155E+01			7.7674E+02	1.0706E-01	
			1371.0			3.1053E+04	7.1972E+02			

Table 3-2-18 Data of Fission Products DU-NU Foils
(1kW-75Min. irrad., 5s Pu Fuel, 100% Void,
D_2O level 103.44 cm, H_2O level 0 cm)

Ring	Height (cm)	Foil Weight	Cooling Time(Min.)	DU Activity		NU Activity			Gamma (DU/NU)	Averaged Ratio(Fγ)
				Raw (100 sec)	Specific (1/sec·mg)	Raw (100 sec)	Specific (1/sec·mg)	Fitted Value (1/sec·mg)		
1st	39.8	DB41 334.46 mg	1062.9	4.229E+03	3.6969E+01			2.1436E+02	1.7246E-01	1.7247E-01
			1066.1			1.1546E+04	2.1476E+02			±7.4%
			1102.6	4.259E+03	3.5768E+01			1.9913E+02	1.7962E-01	(0.1589)
			1104.7			1.0814E+04	1.9586E+02			
			1141.3	4.103E+03	3.1084E+01			1.8576E+02	1.6733E-01	
		NU67 391.77 mg	1143.2			1.0368E+04	1.8436E+02			
			1178.3	4.194E+03	3.3816E+01			1.7435E+02	1.9395E-01	
			1182.6			9.955E+03	1.7371E+02			
			1219.5	3.950E+03	2.6491E+01			1.6322E+02	1.6230E-01	
			1221.4			9.640E+03	1.6559E+02			
			1256.9	3.887E+03	2.4600E+01			1.5456E+02	1.5916E-01	
			1259.1			9.123E+03	1.5227E+02			
2nd	39.3	DB43 334.24 mg	1072.2	4.303E+03	3.7170E+01			2.2971E+02	1.6181E-01	1.5203E-01
			1074.2			1.1988E+04	2.2773E+02			±3.0%
			1110.7	4.160E+03	3.2874E+01			2.1499E+02	1.5291E-01	(0.1315)
			1112.8			1.1560E+04	2.1662E+02			
		NU70 389.78 mg	1149.3	4.079E+03	3.0440E+01			2.0098E+02	1.5146E-01	
			1151.2			1.0921E+04	2.0004E+02			
			1189.3	3.999E+03	2.8037E+01			1.8724E+02	1.4974E-01	
			1191.2			1.0341E+04	1.8500E+02			
			1228.1	3.996E+01	2.7947E+01			1.7467E+02	1.6000E-01	
			1230.0			9.937E+03	1.7452E+02			
			1268.6	3.855E+03	2.3712E+01			1.6236E+02	1.4605E-01	
			1270.6			9.454E+03	1.6201E+02			
3rd (1)	39.9	DB45 333.37 mg	1080.2	4.322E+03	3.8071E+01			2.9130E+02	1.3069E-01	1.2302E-01
			1082.3			1.4320E+04	2.8963E+02			±6.3%
			1118.8	4.165E+03	3.3341E+01			2.7234E+02	1.2243E-01	(0.0947)
			1120.7			1.3703E+04	2.7352E+02			
		NU66 388.42 mg	1157.8	4.151E+03	3.2919E+01			2.5465E+02	1.2927E-01	
			1159.8			1.2847E+04	2.5119E+02			
			1197.0	4.040E+03	2.9576E+01			2.3836E+02	1.2408E-01	
			1198.8			1.2374E+04	2.3886E+02			
			1235.8	4.028E+03	2.9215E+01			2.2370E+02	1.3060E-01	
			1237.6			1.1768E+04	2.2306E+02			
			1276.3	3.816E+03	2.2830E+01			2.0997E+02	1.0873E-01	
			1278.1			1.1239E+04	2.0929E+02			
(2)	39.8	DB47 308.54 mg	1088.1	4.157E+03	4.2800E+01			2.9663E+02	1.4429E-01	1.4025E-01
			1090.1			1.4285E+04	2.9679E+02			±3.3%
			1126.7	4.021E+03	3.8374E+01			2.7784E+02	1.3812E-01	(0.1163)
			1128.7			1.3462E+04	2.7484E+02			
		NU97 380.05 mg	1165.7	3.910E+03	3.4762E+01			2.5951E+02	1.3395E-01	
			1167.9			1.2840E+04	2.5825E+02			
			1204.7	3.892E+03	3.4177E+01			2.4183E+02	1.4133E-01	
			1206.6			1.2249E+04	2.4250E+02			
			1243.4	3.809E+03	3.1476E+01			2.2492E+02	1.3994E-01	
			1245.4			1.1560E+04	2.2416E+02			
			1283.8	3.787E+03	3.0761E+01			2.0795E+02	1.4792E-01	
			1285.8			1.0902E+04	2.0665E+02			

Table 3-3 Experimental Reaction Rate in 22.5 cm Pitch Lattice as a Function of Fuel Pin Position

Lattice condition	Fuel pin Position	Pu-239 fission			U-235 fission			U-238 fast fission
		Sub-Cd	epi-Cd	Total	Sub-Cd	epi-Cd	Total	
22.5 cm LP 0% Void 8s Pu	1st	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	2nd	1.37	0.894	1.32	1.21	0.930	1.17	0.855
	3rd	1.87	0.941	1.80	2.00	1.07	1.87	0.913
22.5 cm LP 100% Void 8s Pu	1st	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	2nd	1.11	1.04	1.10	1.23	1.07	1.20	1.21
	3rd	1.66	1.09	1.58	1.65	1.09	1.54	0.941
22.5 cm LP 0% Void 8R Pu	1st	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	2nd	1.24	1.01	1.22	1.31	0.976	1.26	0.853
	3rd	1.80	1.06	1.73	2.00	1.04	1.87	1.08
22.5 cm LP 100% Void 8R Pu	1st	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	2nd	1.15	0.904	1.12	1.17	0.957	1.13	0.805
	3rd	1.67	0.978	1.59	1.70	1.05	1.58	0.865
22.5 cm LP 0% Void 5s Pu	1st	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	2nd	1.18	1.05	1.17	1.31	1.04	1.28	0.980
	3rd	1.73	1.14	1.69	1.80	1.08	1.72	0.946
22.5 cm LP 100% Void 5s Pu	1st	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	2nd	1.17	1.17	1.17	1.13	1.09	1.12	0.926
	3rd	1.61	1.27	1.58	1.55	1.19	1.50	0.997

Table 3-4 Experimental Micro-Parameters in 22.5 cm Pitch Lattices

Lattice condition	Fues pin position	δ^{28}	δ^{25}	δ^{49}	δ^{49}_{25}
22.5 cm LP 8s Pu fuel 0% Void	1st	0.293	0.164	0.125	2.23
	2nd	0.214	0.126	0.0816	2.50
	3rd	0.143	0.0877	0.0629	2.14
	cell	0.172	0.103	0.0730	2.23
22.5 cm LP 8s Pu fuel 100% Void	1st	0.265	0.240	0.154	2.05
	2nd	0.268	0.209	0.144	1.89
	3rd	0.162	0.158	0.101	2.10
	cell	0.199	0.179	0.116	2.04
22.5 cm LP 8R Pu fuel 0% Void	1st	0.208	0.162	0.110	1.45
	2nd	0.157	0.121	0.0893	1.40
	3rd	0.120	0.0840	0.0645	1.34
	cell	0.136	0.0991	0.0745	1.36
22.5 cm LP 8R Pu fuel 100% Void	1st	0.285	0.226	0.132	1.40
	2nd	0.203	0.185	0.104	1.38
	3rd	0.156	0.140	0.0773	1.40
	cell	0.176	0.159	0.0890	1.40
22.5 cm LP 5s Pu fuel 0% Void	1st	0.162	0.132	0.0787	1.21
	2nd	0.124	0.105	0.0699	1.10
	3rd	0.0891	0.0787	0.0518	1.19
	cell	0.105	0.0900	0.0586	1.17
22.5 cm LP 5s Pu fuel 100R Void	1st	0.185	0.154	0.0973	0.911
	2nd	0.153	0.148	0.0973	0.956
	3rd	0.123	0.118	0.0766	0.958
	cell	0.137	0.129	0.0837	0.952

Experimental error: $\Delta\delta^{28}/\delta^{28} \sim \pm 4\%$, $\Delta\delta^{25}/\delta^{25} \sim \pm 4\%$, $\Delta\delta^{49}/\delta^{49} \sim \pm 4\%$, $\Delta\delta^{49}_{25}/\delta^{49}_{25} \sim \pm 4\%$.

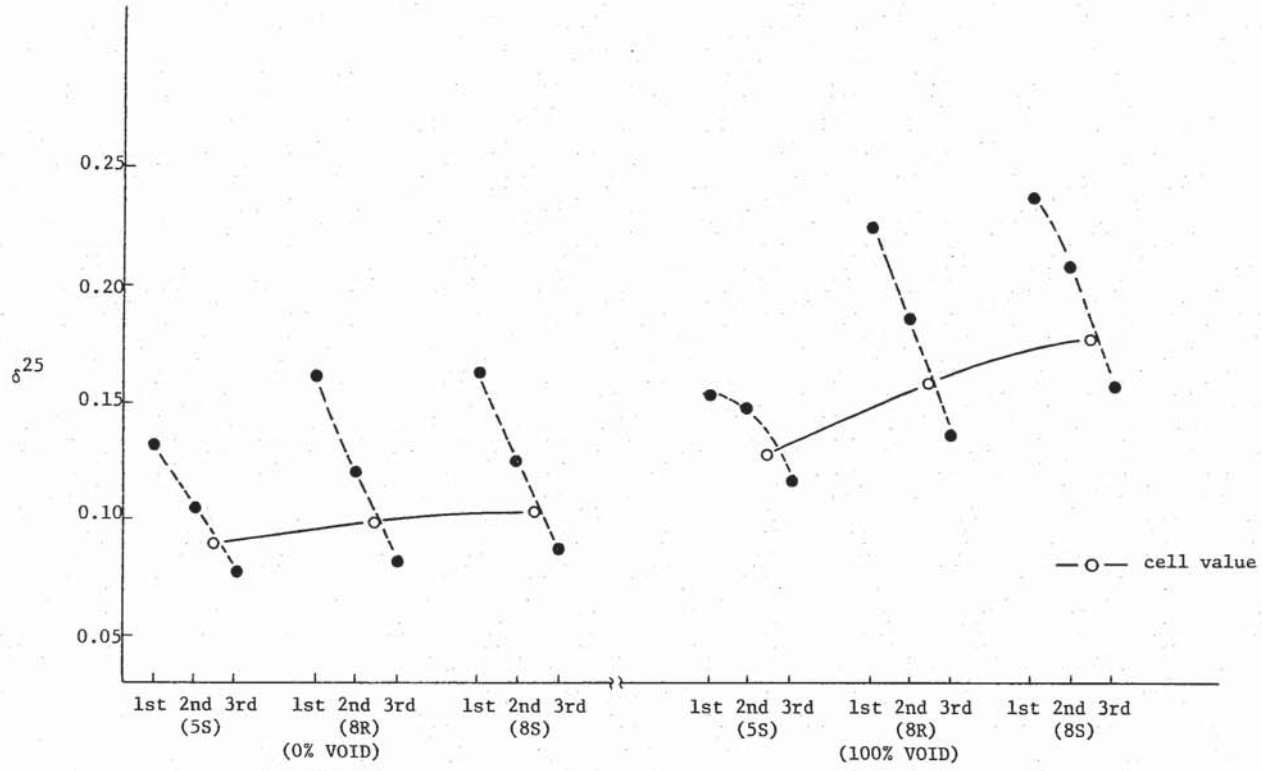


Fig. 3-1 δ^{25} in 22.5cm pitch lattice as functions of coolant void fraction, plutonium fuel enrichment and pin position in the cluster

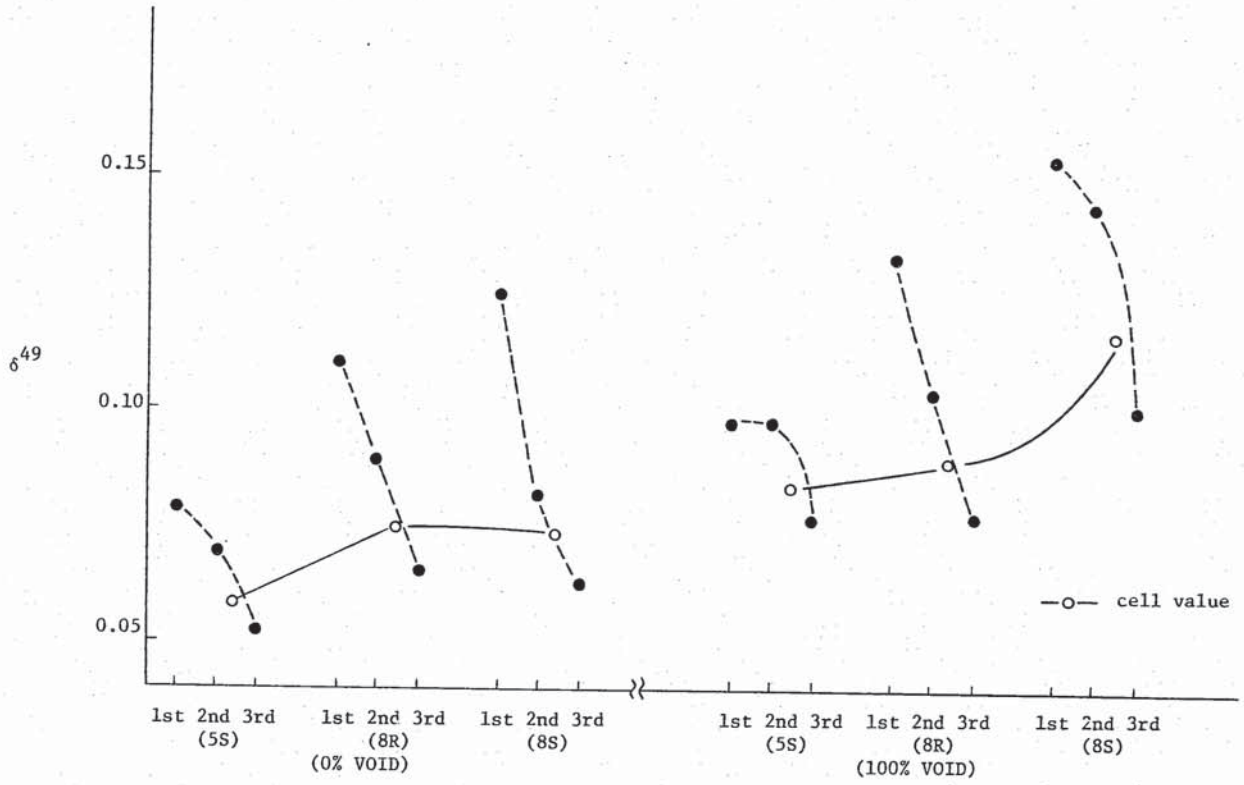


Fig. 3-2 δ^{49} in 22.5cm pitch lattice as functions of coolant void fraction, plutonium fuel enrichment and pin position in the cluster

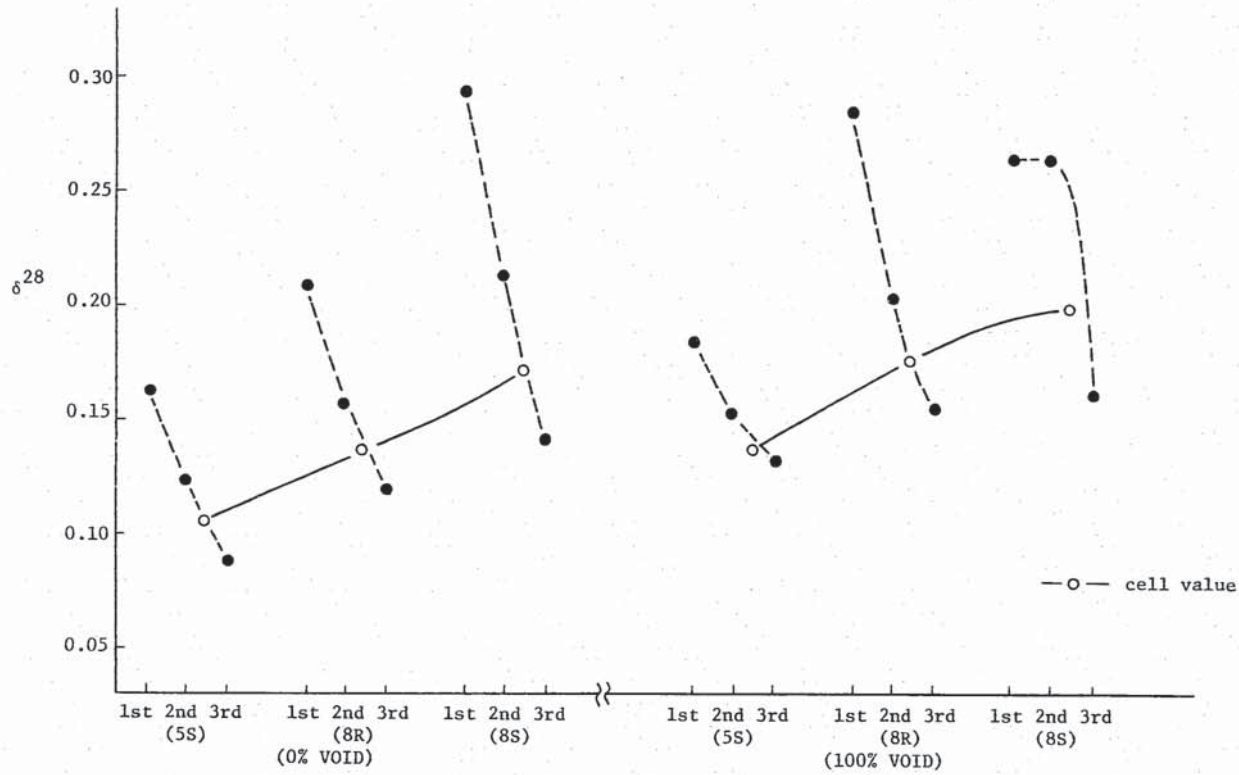


Fig. 3-3 δ^{28} in 22.5cm pitch lattice as functions of coolant void fraction, plutonium fuel enrichment and pin position in the cluster

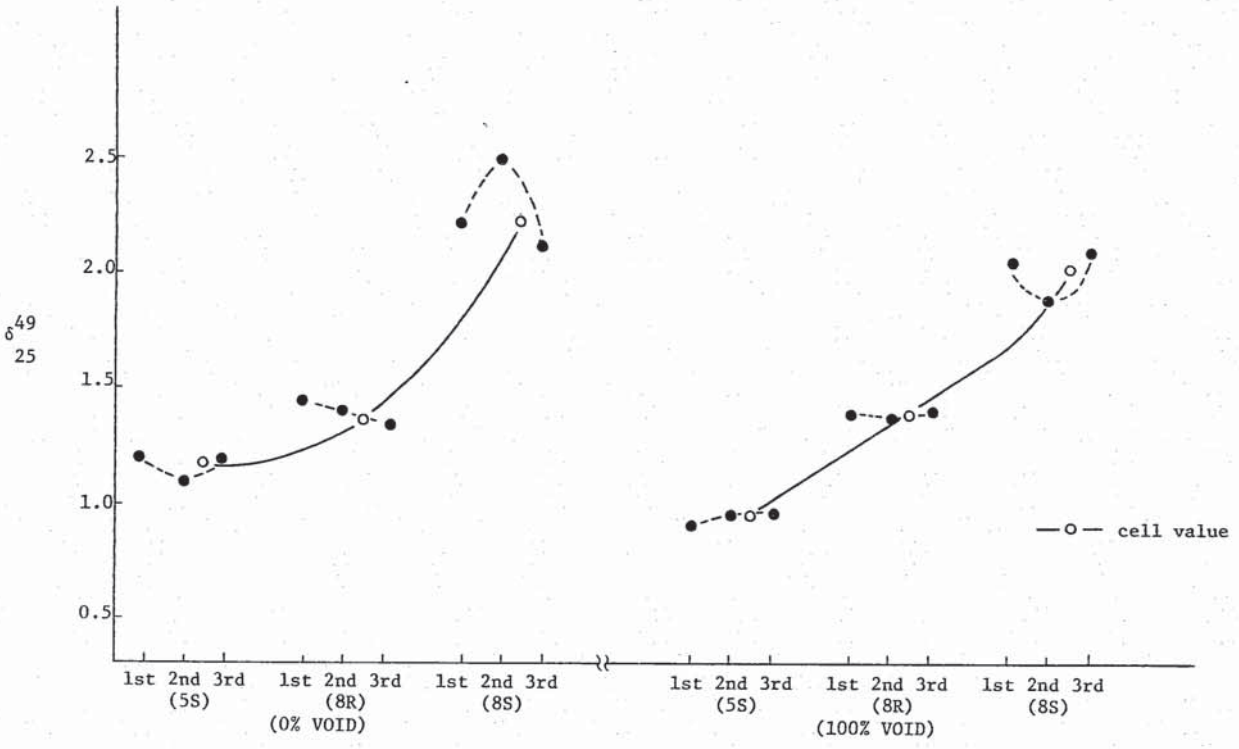


Fig. 3-4 δ^{49}_{25} in 22.5cm pitch lattice as functions of coolant void fraction, plutonium fuel enrichment and pin position in the cluster

APPENDIX

1. Depleted Uranium Metal Foil

REACTOR EXPERIMENTS, INC.
963 TERMINAL WAY SAN CARLOS, CALIFORNIA 94070
Phone: (415)592-3355 Cable Address: REACTEX

ISOTOPIC ASSAY OF DEPLETED URANIUM

Shipped on Purchase Order No. C-52-6022

U-233	1 ppm
U-234	2 ppm
U-235	0.0274%
U-236	2 ppm
U-238	99.972%

Weight Per Foil:

Foil Code	Weight (grams)
A	9.7561
B	9.6108
C	19.2419
D	19.8426
E	19.5864
F	19.7667
	97.8405 Total Weight

REACTOR EXPERIMENTS, INC.
963 TERMINAL WAY SAN CARLOS, CALIFORNIA 94070

MATERIAL DATA SHEET

Material: Uranium 238 depleted to 274 ppm U-235 Thickness: 0.002" & 0.004" Purity: 99.925%
Catalog No.: Special Diameter : 4" × 4" Lot No.: 236

CHEMICAL ANALYSIS

Impurity	Maximum Percent	Impurity	Maximum Percent	Impurity	Maximum Percent	Impurity	Maximum Percent
Cu	0.01						
V	0.005						
Si	0.02						
Fe	0.03						
Ti	<0.01						

2. Natural Uranium Metal Foil

REACTOR EXPERIMENTS, INC.
963 TERMINAL WAY SAN CARLOS, CALIFORNIA 9407C

MATERIAL DATA SHEET

Material: Natural Uranium Thickness: 0.004" Purity: 99.97%
Catalog No.: Special Diameter : (4"×4")× 3 pcs. Lot No.: 274

CHEMICAL ANALYSIS

Impurity	Maximum Percent	Impurity	Maximum Percent	Impurity	Maximum Percent	Impurity	Maximum Percent
Al	0.01						
Fe	0.02						

3. Pu-Al Alloy Metal Foil

PREPARATION AND EVALUATION OF PLUTONIUM ACTIVATION FOILS FOR USE IN THE PNC DEUTERIUM CRITICAL ASSEMBLY

FINAL REPORT TO
POWER REACTOR AND NUCLEAR FUEL DEVELOPMENT CORPORATION
CONTRACT 212B00996 AMENDMENT 1, REVISION 1

September 19, 1972

BATTELLE
PACIFIC NORTHWEST LABORATORIES
Richland, Washington 99352

Plutonium Isotopic Composition - Weight Percent

238	239	240	241	242
0.0.	94.02	5.63	0.319	0.019

Plutonium Content of Al-Pu Alloy = 5.16 %

$^{239}Pu + {}^{241}Pu$ = 94.34 %

Fissile Plutonium Content of Al-Pu Alloy = 4.87 %

Plutonium Spectrographic Analysis

Element	ppm[1]	Element	ppm[1]
Ag	0.2	Li	ND
As	ND	Mg	<5
B	<0.1	Mn	ND
Ba	ND	Mo	ND
Be	ND	Na	5
Bi	ND	Ni	<10
Ca	<1	P	ND
Cd	ND	Pb	ND
Co	<10	Si	5
Cr	<25	Sn	<5
Cu	2	Tl	--
Fe	<10	V	<20
In	ND	Zn	<50
K	ND		

1 - Approximate precision ± factor of 2

ND - Not Detectable

Weight

The weight of each foil was determined using a calibrated analytical balance having a sensitivity of 0.1 milligrams. Foil weights are shown below. Note that the individual weights are well within the specified ± 10 % of mean.

Foil	Weight	Foil	Weight
1	0.0441 grams	26	0.0459 grams
2	0.0453	27	0.0461
3	0.0446	28	0.0471
4	0.0444	29	0.0437
5	0.0471	30	0.0452
6	0.0451	31	0.0440
7	0.0457	32	0.0465
8	0.0447	33	0.0454
9	0.0443	34	0.0454
10	0.0466	35	0.0469
11	0.0470	36	0.0466
12	0.0455	37	0.0451
13	0.0469	38	0.0446
14	0.0451	39	0.0449
15	0.0434	40	0.0465
16	0.0470	41	0.0454
17	0.0453	42	0.0460
18	0.0445	43	0.0470
19	0.0448	44	0.0465
20	0.0444	45	0.0464
21	0.0439	46	0.0466
22	0.0446	47	0.0454
23	0.0449	48	0.0442
24	0.0459	49	0.0462
25	0.0463	50	0.0450

Total weight 50 foils = 2.2740 grams

Dimensions

The thickness and diameter of the foils were measured with calibrated micrometers. Both dimensions were extremely uniform and precisely as specified. The diameter measured 14.8 mm and the thickness measured 0.1 mm.

4. PuO_2 - Polyethylene Mixture Foil

昭和　　年　月　日
動力炉・核燃料開発事業団
東海事業所 Pu 燃料部
品質管理課　分析係

DCAにおける燃料体中の中性子束分布等を定量する炉物理実験に使うプルトニウム箔の製造方法及びプルトニウムの定量方法について求べる。酸化プルトニウム粉末なポリエチレン粉末とを混ぜ，140℃ で加熱後加圧することにより，プルトニウム板を製造した。所定の大きさに打抜き後γ線強度を計ることによりプルトニウム箔中のプルトニウムを定量した。

1. 製造装置

- 箔製造器の本体および押え板
- 硬質ガラス：86mm φ×10mm
- スペイサー：アルミニウムのドーナツ板，85 mm φ×75 mm φ×102 μm
- 加　熱　炉：東芝製HGR－83，800W，スライダックスで微調整
- 箔 打 抜 器：箔の直径14.51 mm
- 箔 包 装 器：Aℓ箔でプルトニウム箔を包む。
- 乳　　鉢
- マイクロメーター
- サランラップ

2. 試　料

PuO_2 粉末：Pu 含有量		87.46%	
	Pu同位体比	Pu－238	0.023 w/o
	（1971年8月23日分析）	Pu－239	90.21
		Pu－240	8.58
		Pu－241	0.37
		Pu－242	0.73
	fissile	PNC	91.15 w/o
		BNFC	91.37

- ポリエチレン粉末：120メッシュ以下
- シリコン グリース：トーレ・シリコンKK製，SH 1111高真空グリース

3. プルトニウム量の定量

（ポリエチレン1.00g +PuO_2 0.67g +シリコングリース0.15g）混合物から約0.3g を分散し，精秤したWg の試料をプルトニウム円板に作り上げる。このプルトニウム円板のγ線強度AcpmをNαI を出器で測る。一方このプルトニウム円板から打抜いた箔のγ線強度 α cpm を求める。

分散したWg 中のPuO_2 量は

$$W\times\frac{0.67}{1.00+0.67+0.15}=\frac{0.67}{1.82}\cdot Wg$$

PuO_2 1g 当りのγ線強度は

$$A\times\frac{1}{\frac{0.67}{1.82}W}=\frac{1.82}{0.67}\frac{A}{W}\ cpm/g$$

よってプルトニウム箔1枚当りのPuO_2 量は

$$a\times\frac{1}{\frac{1.82\ A}{0.67\ W}}=\frac{aW}{A}\times\frac{0.67}{1.82}\ g$$

$$=0.368\frac{aW}{A}g$$

なおプルトニウム箔1枚当りのPu 量は

$$0.368\times\frac{aW}{A}\times 0.8746=0.323\frac{aW}{A}g$$

以上の式によって求めたプルトニウム箔のPu 量を別表1，2に示す。

結　　言

得られたプルトニウム箔の厚さは100～120μmであり，Pu量は1枚当り約10mg であった。出来上枚数は約100枚であった。

製造の際ポリエチレンの溶融状況を観察するために，使用した硬質ガラス板がナットを締める時に破損しがちであった。溶融状況が殆んど一定しているので，ステンレススティール製の板に代えることができる。

Lot No.	C/2 min.	cpm	B.G (cpm)	Net cpm	Pu (mg)	PuO_2 mg	
17-1	191259	95629	306		6.84	7.70	
-2	194914	97457	"		6.79	7.70	#17-A
-3	236630	118315	"		8.47	9.60	
-4	231830	115915	"		8.298	9.41	
-5	216875	108437	"		7.762	8.80	
-6	206405	103202	"		7.38	8.38	#17-B
-7	235466	127733	"		9.148	10.37	
-8	190926	95463	"		6.831	7.74	#17-C
18-1	191730	95865	"		6.859	7.78	
-2	185445	92722	"		6.634	7.52	
-3	193402	96701	"		6.919	7.85	
-4	176538	88269	"		6.315	7.17	
-5	196864	88432	"		6.326	7.18	
-6	201504	100752	"		7.211	8.117	
-7	181928	85964	"		6.149	6.97	
19-1	196810	98405	"		7.042	7.98	
-2	175051	87525	"		6.261	7.10	
-3	180331	90165	"		6.451	7.31	
-4	183038	91519	"		6.548	7.43	
20-1	186258	93129	"		6.664	7.55	
-2	181507	90753	"		6.493	7.36	
-3	195857	97928	"		7.008	7.95	
-4	194359	97179	"		6.954	7.88	
-5	185826	92913	"		6.648	7.54	
-6	188742	94371	"		6.753	7.65	
21-1	203293	101642	"		7.275	8.24	
-2	200407	100203	"		7.171	8.13	
-3	200934	100467	"		7.190	8.15	
-4	210151	105075	"		7.521	8.53	
-5	199181	99591	"		7.127	8.08	
22-1	193218	96609	"		6.913	7.83	
-2	189259	84629	"		6.771	7.67	#22-A
-3	199336	99668	"		7.132	8.08	
-4	202321	101160	"		7.240	8.21	
-5	196292	98146	"		7.024	7.96	
-6	187995	93997	"		6.726	7.63	
-7	192830	96415	"		6.899	7.82	#22-B
-8	197520	98760	"		7.068	8.02	
23-1	192043	96021	"		6.871	7.79	
-2	188898	94449	"		6.758	7.66	
-3	188466	94233	"		6.743	7.64	
-4	202773	101386	"		7.256	8.23	
-5	191195	95597	"		6.841	7.76	
-6	188488	94244	"		6.744	7.64	
-7	190128	98064	"		7.018	7.96	
24-1	228570	114285	"		8.182	9.27	
-2	245509	122754	"		8.790	9.97	
-3	234221	117110	"		8.385	9.48	
-4	229527	114760	"		8.217	9.32	
-5	241857	120928	"		8.659	9.82	
-6	230057	115028	"		8.236	9.34	
-7	219601	109801	"		7.860	8.91	
25-1	191908	95954	"		6.866	7.78	
-2	188451	94225	"		6.742	7.64	#25-A
-3	192385	96194	"		6.884	7.80	
-4	192693	96346	"		6.894	7.81	
-5	204040	102020	"		7.302	8.28	#25-B
-6	189988	94994	"		6.79	7.71	
26-1	189836	94918	"		6.752	7.70	#26-A
-2	189882	94691	"		6.776	7.09	

cpm → Pu mg

Lot 26　　591.194 cpm
Lot 26-1.2.　　188.997 cpm

780.191 cpm/50.006 mg = 13.930 cpm/mg

5. Enriched U－Alloy Metal Foil (1)

昭和45年 3 月31日

古 河 電 気 工 業 株 式 会 社
原 子 力 部

1. 使用材料

1. 濃縮ウラン地金

（規　格）

濃　縮　度　89.85％±0.15％

不　純　物　不純物のTotal bron equivalent は3 ppm 以下とし，主な元素の含有量は下記数値（ppm）以下

B ＜1　C ＜400　Cd＜1.0　Si ＜100

Aℓ＜100　Ca＜200　Li ＜2.0

化学分析成績表

NFS 社 "Cer－tificate of Analysis" 別添付

2. 高純度アルミ地金

（規　格）　99.99％以上

化　学　分　析　表

成　分	Fe ％	Si ％	Cu ％	Al ％
規　格				99.99
分析値	0.0021	0.0023	0.0001	99.995

2. 製品重量証明書

1. 比重U濃度，濃縮度

番　号	比　重	U濃度*	U^{235}濃縮度
FE01～36	3.1565	18.03％	89.82％
FE37～40	3.1571	18.05％	89.82％

＊比重法により測定

2. 重 量

番 号	重 量	U 濃 度	U 含有量	U^{235} 量
FE01	0.79g	18.03%	0.14g	0.13g
FE02	0.77	〃	0.14	0.13
FE03	0.80	〃	0.14	0.13
FE04	0.78	〃	0.14	0.13
FE05	0.79	〃	0.14	0.13
FE06	0.73	〃	0.13	0.12
FE07	0.72	〃	0.13	0.12
FE08	0.71	〃	0.13	0.12
FE09	0.77	〃	0.14	0.13
FE10	0.80	〃	0.14	0.13
FE11	0.74	〃	0.13	0.12
FE12	0.80	〃	0.14	0.13
FE13	0.75	〃	0.14	0.13
FE14	0.72	〃	0.13	0.12
FE15	0.73	〃	0.13	0.12
FE16	0.73	〃	0.13	0.12
FE17	0.73	〃	0.13	0.12
FE18	0.81	〃	0.15	0.13
FE19	0.73	〃	0.13	0.12
FE20	0.71	18.03%	0.13	0.12
FE21	0.78	〃	0.14	0.13
FE22	0.73	〃	0.13	0.12
FE23	0.78	〃	0.14	0.13
FE24	0.79	〃	0.14	0.13
FE25	0.79	〃	0.14	0.13
FE26	0.75	〃	0.14	0.13
FE27	0.79	〃	0.14	0.13
FE28	0.75	〃	0.14	0.13
FE29	0.73	〃	0.13	0.12
FE30	0.79	〃	0.14	0.13
FE31	0.79	〃	0.14	0.13
FE32	0.73	〃	0.13	0.12
FE33	0.80	〃	0.14	0.13
FE34	0.73	〃	0.13	0.12
FE35	0.72	〃	0.13	0.12
FE36	0.76	〃	0.14	0.13
FE37	0.88	18.05%	0.16	0.14
FE38	0.84	〃	0.15	0.13
FE39	0.89	〃	0.16	0.14
FE40	0.89	〃	0.16	0.14
合計40枚	30.82g		5.53g	5.08g

NUCLEAR FUEL SERVICES, INC.
A Subsidiary of W.R. Grace & Co
Erwin, Tennessee

CERTIFICATE OF ANALYSIS

Material

Date January 5, 1967

Customer The Nissho American Corporation
110 Wall Street
New York, New York

Date Shipped

Bill of Lading No.

Purchase Order No. CEM-472

Sales Order No. 284-A

ELEMENT	A-45542 ANALYSIS, ppm	Boron Equivalents
Ni	230	0.26910
Ba	<5	0.00063
Be	<0.1	0.00000
Bi	<1	0.00000
Mo	<1	0.00040
P	<10	0.00093
Sb	<1	0.00067
Tl	<1	0.00024
Te	<1	0.00053
V	<2.5	0.00350
Mg	6	0.00022
Co	<5	0.00045
N	42	0.08064
Na	<40	0.01260
O	140	0.00003
Cr	5	0.00427
Pb	<1	0.00001
Zr	2	0.00006
Mn	<5	0.01720
Zn	<25	0.00603
Fe	56	0.03634
Ag	<0.1	0.00084
Cu	35	0.00298
Sn	<1	0.00008
B	0.25	0.25000
C	155	0.00063
Cd	<0.1	0.03120
Si	60	0.00489
Al	18	0.00220
Cs	<20	0.00316
Li	<1	0.14
Ti	2.5	0.00433
TOTAL	<1500	0.88016

Certified By:

Quality Control Department
K.D. Hensley

NUCLEAR FUEL SERVICES, INC.
A Subsidiary of W.R. Grace & Co.
Erwin, Tennessee

CERTIFICATE OF ANALYSIS

Material

Customer The Nissho American Corporation
110 Wall Street
New York, New York

Date January 5, 1967

Date Shipped

Bill of Lading No.

Purchase Order No. CEM472

Sales Order No. 284-A

ELEMENT	A-45542 ANALYSIS, ppm	Maximum Allowable
B	0.25	1.0
C	155	400
Cd	<0.1	1.0
Si	60	100
Al	18	100
Cs	<20	200
Li	<1	2
% U	>99.9	
% U-235	89.82	

Certified By:

Quality Control Department
K.D. Hensley

PNC TN941 80-53

6. Enriched U-Alloy Metal Foil (2)

原 子 燃 料 工 業 株 式 会 社

90%濃縮ウランアルミ合金箔
検 査 成 績 書

昭和47年12月

大阪府泉南郡熊取町大字野田950番地
原 子 燃 料 工 業 株 式 会 社

契約名		90%濃縮ウランアルミ合金箔
契約	番号	47A－0555
	数量	3枚
仕様書	PNC 殿 No.	
	原燃工 No.	
立合検査受験日および受験数		なし
納入	数量	90%濃縮ウランアリミ合金箔 3枚
	予定日	昭和47年12月21日
備考		
試験・検査結果		別紙の通り，全ての項目について仕様規格内であることを保証します。

大阪府泉南郡熊取町大字野田
原子燃料工業株式会社
熊取製造所

90%濃縮ウランについて

昭和４７年１２月８日
原子燃料工業（ＫＫ）
熊　取　製　造　所

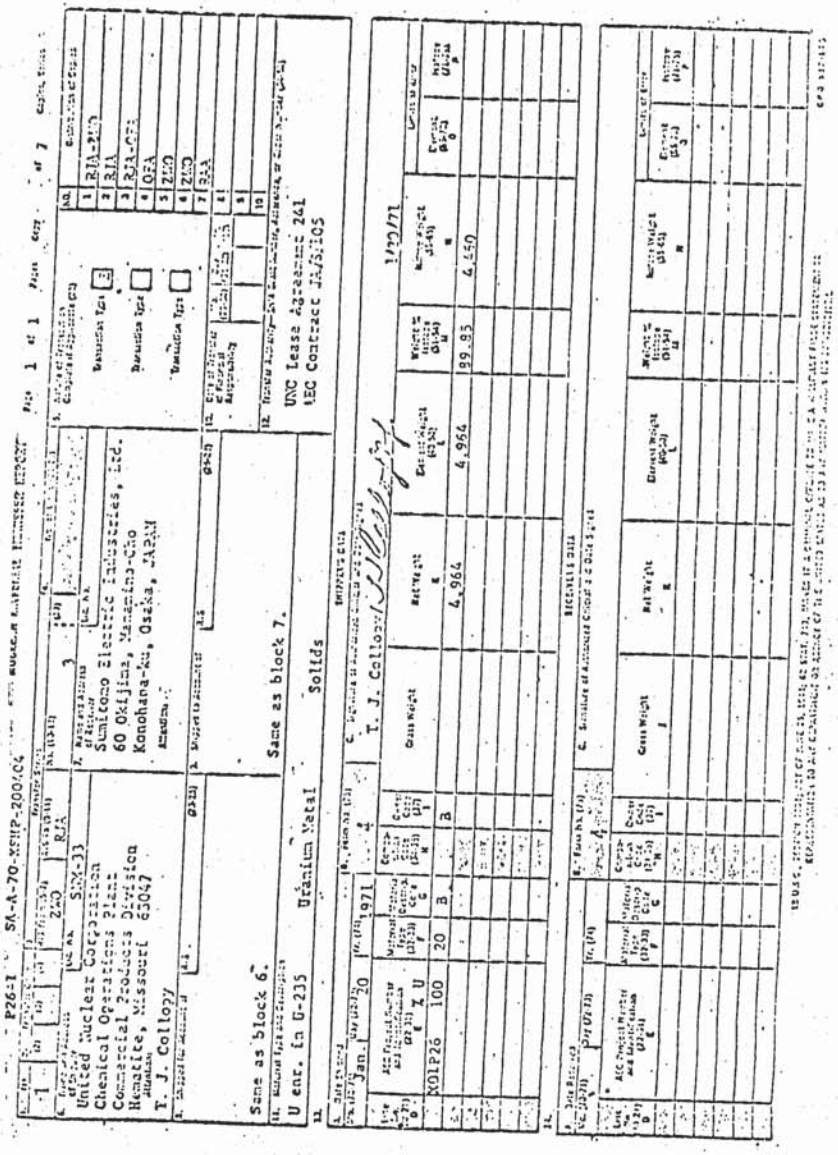
今回使用した濃縮度公称９０％のウランは次のウランをブレンディングにより一種類の濃縮度に調整いたしました。

ウランの種類及びU.S.A.E.C の証明書

	ウランの濃縮度 U－２３５	U.S.A.E.C の証明書 No.	プロジェクト名
1	８９.８５	資料 6.	ＪＲＲ－2, 16次燃料
2	８９.８３	資料 7.	ＪMTR 15, 16次燃料

ブレンディングにより調整された後の濃縮度８９.８４８％。

以　上



UNITED NUCLEAR CORPORATION

TELEPHONE [illegible]
TWX [illegible]

Certified Data for Enriched Uranium Metal

[illegible]ER: Sumitomo Shoji America, Inc.

[illegible] ORDER NO.: SA-70-X[illegible]-20040[illegible]

LOT NO.: X-01-P3[illegible]

UNC SALES NO.: P-[illegible]

LOT WEIGHT: 4.[illegible] [illegible]

[illegible]ic Assay

% U-235	[illegible]	± 0.034
% U-234	0.583	± 0.009
% U-236	0.323	± 0.011
% U-238	0.224	± 0.039

[illegible]ties, PPM

	LOT	SPEC.		LOT	SPEC.
Al	10	100	Mg	14	Info
B	0.1	1	Mn	14	Info
C	120	300	Mo	≦ 10	Info
Ca	≦ 5	200	N	10	Info
Cd	≦ 0.1	1	Ni	≦ 10	Info
Co	≦ 1	Info	Pb	≦ 1	Info
Cr	14	Info	Si	≦ 10	100
Cu	≦ 5	Info	Ag	≦ 0.01	Info
Fe	91	Info	Sn	≦ 1	Info
Li	≦ 1	2	V	≦ 1	Info
			Total	≦ 319	1500
			EBC	≦ 0.45	

Piece weight ≦ 500 grams

Piece weight ≧ 50 grams

[illegible]IED BY: B. Dewoberry DATE: JAN 4

分析成績報告書

動力炉・核燃料開発事業団
東海事業所技術部分析課

昭和46年12月

JMTR15~16次燃料用
90%濃縮ウラン同位体分析成績

住友電気工業(株)

受付番号	試料番号	試料名	交付年月日	分析成績	分析者名	依頼者名
[illegible]	5-19	[illegible](70%)	[illegible]	234U [illegible] 235U 97.33 236U [illegible] 238U [illegible]	[illegible]	

殿

(注文主) 原子燃料工業株式会社 [illegible]

(荷受主) [illegible] 御中

アルミニウム地金出荷品成分表

昭和45年12月14日 No.

住友化学工業㈱軽金属事業部
本社営業部 大阪市東区北浜5丁目15番地
名古屋市中区錦1丁目11番18号
東京営業部 東京都千代田区丸の内1丁目3番2号
菊本製造所 新居浜市菊本町1丁目10番1号
名古屋製造所 名古屋市港区千年字イの割410番地
富山製造所 富山県新湊市久々湊65番地

記号	番号	個数	総量 (kg)	Fe %	Si %	Cu %	%	%	%	Al %	備考
R5	924	110	100	0.003	0.003	0.002				99.992	[illegible]

[illegible] アルミニウム地金 [illegible]

[illegible] (2)

ロットNo.	1	ロットの大きさ	3	抜取数, ロット判定	全 合格	検査者	加田	日付	1972.12.14	承認者	[stamp]	日付	12/19

測定箇所	規格	検査ランク	測定具	1	2	3	Ave.
巾	(150)	全	ノギス	100.0	99.5	100.0	
長さ	(150)	〃	〃	100.0	100.0	100.0	
厚さ	0.1 ±0.02	〃	マイクロ	0.10	0.12	0.11	
	〃	〃	〃	0.10	0.11	0.12	
	〃	〃	〃	0.10	0.12	0.12	
	〃	〃	〃	0.10	0.11	0.12	
外観			目視	合	合	合	
判定				合	合	合	

燃料板検査記録

種類 U-Al 合金　　年 月 日

検査者

燃料板番号	合金重量 (g)	U含有率 (g/g)	U量 (g)	U-235量 (g)	ブリスター テスト	寸法 長さ	寸法 厚み	寸法 巾	被覆厚さ	ふっとう水試験	表面汚染	ラジオグラフ
		0.53	0.29	0.26								
		〃	0.26	0.23								
		〃	0.27	0.24								
		〃	0.32	0.93								

※ 規格を満足している項目には○印をつけること。