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REQUESTS FOR FISSION YIELD MEASUREMENTS

A SUPPLEMENT TO WRENDA 93/94

(published as INDC(SEC)-104)

Issued by participants of the
IAEA Co-ordinated Research Programme
on the
Compilation and Evaluation of Fission Yield Nuclear Data

Compiled and edited by

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International Atomic Energy Agency
Vienna, Austria

February 1994

IAEA NUCLEAR DATA SECTION, WAGRAMERSTRASSE 5, A-1400 VIENNA

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Note: The requests contained in this supplement are not included in the official international WRENDA computer file.

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ABSTRACT

The IAEA Co-ordinated Research Programme (CRP) on the Compilation and Evaluation of Fission Yield Nuclear Data has been established with the goal to improve the evaluation process, include the energy dependence of yields and full covariance information in the data base. The evaluation of experimental fission yield information is supplemented by semi-empirical model calculations.

Measured fission yields are still insufficient to provide users with reliable data for the requested yield sets. Therefore CRP participants elaborated and issued requests for further measurements:

- General requests, primarily for systematic studies, to help improving model parameters and evaluating the energy dependence of yields;
- Tables of specific deficient yield data, where no or only one measurement exists, or where data are discrepant.

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REQUESTS FOR FISSION YIELD MEASUREMENTS

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IAEA Co-ordinated Research Programme
on the
Compilation and Evaluation of Fission Yield Nuclear Data

1. INTRODUCTION

The IAEA Co-ordinated Research Programme (CRP) on the Compilation and Evaluation of Fission Yield Nuclear Data has been established to enable and support the co-operation of scientists in the improvement of existing fission yield evaluations.

Many yield sets (60 in the US evaluation) have been requested by users. Altogether, there are still far more gaps (where no or only one measurement exists) than yields with sufficient measurements. Semiempirical models are used in evaluations for fitting and/or predicting yields. Furthermore, for the first time the dependence of yield data on the incident neutron energy will be part of the evaluations.

Consequently, many more measurements are needed. To improve the model parameters and for evaluating the energy dependence of yields, systematic studies of yields by experiment are required. Details of the requested data are given in the subsequent sections. Background information on the CRP work and the requests issued can be found in a review paper:

M. Lammer, NEANSC Specialists' Meeting on Fission Product Nuclear Data, Tokai, Japan, 25-27 May 1992; Proceedings: NEA/NSC/DOC(92)9, page 68.

2. GENERAL REQUESTS FOR FISSION YIELD MEASUREMENTS

General requests for fission yield measurements are issued for any fissioning system (= combination of fissioning nuclide and neutron energy) at various neutron energies and yield types. Also included are requests for systematic investigations of fission yields and related quantities by measurement. Such investigations from single experiments would yield more information on systematics than data from different experiments covering e.g. only one neutron energy or fissioning nuclide each, even though the latter may be of higher accuracy than the former.

2.1 Measurements for individual fissioning systems

Ternary fission yields:

Many new measurements of ternary yields, also versus binary fragment, should be conducted for all fissioning systems presented in Section 3.

Chain yields:

Section 3 presents tables of chain yields with data deficiencies. New accurate measurements for discrepant data and many more measurements of complete mass distributions where data are lacking should be performed.

Measurements should be made of yields in the wing and valley region of mass distributions, in particular for Th-227 thermal fission.

Independent yields:

There are so many unmeasured independent yields that only cases of discrepancies are listed in the detailed tables in Section 3.2. Practically all fissioning systems need further measurements. Special care should be taken by measurers to take into account isomeric yields, branching fractions and delayed neutron emission in independent yield measurements.

Isomeric yield ratios:

Further measurements of isomeric yield ratios are needed to fill gaps and for the improvement and testing of models.

2.2 Studies of the energy dependence of yields

It is recommended to measure the energy dependence of yields with monoenergetic neutrons and spectra with varying spectral index.

Mono-energetic measurements should be performed of:

- independent yields
- ternary fission yields
- isomeric yield ratios
- chain yields

for neutron energies ranging from thermal to very high (above 20 MeV). Measurements of ternary fission yields are most important for applications.

2.3 Systematic studies for the improvement of model calculations

Direct measurements of the energy dependence of the pairing effect with a double ionization chamber should be conducted to confirm the observation, that the pairing effect drops with the excitation energy and with Z of the fissioning nucleus.

For the understanding of the energy dissipation in fission at the scission point it is desirable to measure simultaneously the kinetic energy, neutron emission and the emission angle versus (Z,A) of the fragments for different neutron energies.

Systematic trends of the odd-even effect as a function of (Z,A) of the fissioning nuclide and of the neutron energy should be studied in detail by measurement.

There are insufficient nuclear-charge-distribution data for most fast-neutron-induced fission reactions to determine even-odd- Z factors directly. Further measurements are needed.

Independent yield measurements for fragments near symmetry are needed for a number of fission reactions with different A , Z , and excitation energies, as the behaviour of semiempirical model parameters near symmetric fission (distribution width, charge displacement) is still uncertain.

More measurements of yields at the wings and in the valleys of mass distributions, are required for many fission reactions to allow a systematic study of Gaussian shapes to represent mass distributions.

The priorities for measurements are:

- 1st priority: independent yields
- 2nd priority: yields at wings

Fission reactions:

- 1st priority for U-235
- 2nd priority for other reactions

3. TABLES OF DEFICIENT YIELD DATA

3.1 Chain yield measurements required

(Re)measurements of chain yields are required as given in the tables below. The abbreviations used in the tables have the following meaning:

A = mass number

no = number of measurements (blank or 0 = zero)

reason = reason for request: D or blank (blank means: insufficient measurements, i.e.: no = 0, blank or 1)

D = discrepant data with large chi-squared; the number in brackets gives the probability (in %) for the occurrence of the maximum contribution (from the most discrepant measurement) to the calculated chi-squared.

NUCLEUS: 90-TH-227, NEUTRON ENERGY: THERMAL.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
3			95	1		110			133	1	
4			96			111	1		134		
71)			97	1		112	1		135		
to) 0			98			113	1		136		
76)			99	1		114			137	1	
77) 1			100			115	1		138		
78)			101			116)			139		
to) 0			102			to) 0			140	1	
88)			103	1		126)			141	1	
89) 1			104			127) 1			142		
90) 1			105	1		128			143	1	
91) 1			106	1		129	1		144	1	
92			107			130			145)		
93			108			131	1		to) 0		
94			109	1		132	1		162)		

NUCLEUS: 90-TH-229, NEUTRON ENERGY: THERMAL.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
3			88	5	D(3.31)	118	1		149	1	
4			91	6	D(6.37)	119			150		
71			93	3	D(3.02)	120			151	1	
72			96			121	1		152)		
73			98			122			to) 0		
74			99	4	D(1.72)	123			162)		
75			100			124					
76			101			125	2	D(7.70)			
77	2	D(6.79)	102			126	1				
78	1		103	2	D(8.45)	127	2	D(8.05)			
79	1		104			128					
80	1		107			129	3	D(8.69)			
81			108			131	8	D(4.48)			
82			110			132	6	D(7.64)			
85	1		114			133	5	D(8.59)			
86	2	D(1.50)	116			148	1				

NUCLEUS: 92-U-232, NEUTRON ENERGY: THERMAL.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
3			93	1		128			143	1	
4			94	1		129	1		144	1	
71)			95	1		130			145	1	
to) 0			96			136			146	1	
86)			98			137			147)		
87 1			100)			139	1		to) 0		
88 1			to) 0			140	1		162)		
89 1			126)			141	1				
90			127 1			142	2	D(2.47)			

NUCLEUS: 92-U-233, NEUTRON ENERGY: THERMAL.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
1	1		77	1		117	1		130		
2	1		78	1		118	1		147	9	D(7.09)
3	4	D(1.63)	79	1		119	1		151	8	D(9.91)
4	9	D(8.16)	80	1		120	1		153	1	
6	3	D(6.60)	82	1		122	1		155		
7	1		83	4	D(3.01)	123			156	1	
8	1		84	4	D(2.80)	124	1		157	1	
9	1		103	9	D(3.35)	125	1		158		
10	1		110	1		126			159	1	
71)			113			127	2	D(4.06)	160		
to) 0			114			128			161	1	
76)			116			129			162		

NUCLEUS: 92-U-235, NEUTRON ENERGY: THERMAL.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
3	15	D(9.99)	18	3	D(4.21)	97	21	D(2.88)	129	5	D(3.02)
4			20	3	D(4.23)	106	14	D(7.75)	130	2	D(4.33)
6	5	D(9.37)	21	1		109	8	D(6.40)	147	19	D(4.06)
7	1		32			110	3	D(4.34)	149	14	D(7.95)
11			66			112	7	D(0.74)	153	11	D(4.49)
13	1		67			115	11	D(9.11)	154	8	D(8.30)
14	2	D(4.94)	71			116	1		158	4	D(5.48)
15	3	D(4.16)	72			117	4	D(3.44)	160		
16			74	1		125	7	D(2.24)	162		
17	1		81	6	D(7.14)	127	18	D(3.84)			

NUCLEUS: 93-NP-237, NEUTRON ENERGY: THERMAL.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
3			87	1		96			103	1	
4			88	1		97	1		104	1	
71)			89			98			105	1	
to) 0			90			99	1		106)		
84)			91)			100			to) 0		
85 1			to) 1			101	1		114)		
86			95)			102			115	1	

NUCLEUS: 93-NP-237, NEUTRON ENERGY: THERMAL (cont'd).

A	no	reason	A	no	reason	A	no	reason	A	no	reason
116	)		134	1		143	1		152		
to	)	0	135	1		144			153		
126	)		136			145			154		
127	1		137			146	1		155		
128			138	1		147	1		156	1	
129	1		139			148			157)	
130			140	1		149	1		to	)	0
131	2	D(3.89)	141	1		150			162)	
133	1		142	1		151	1				

NUCLEUS: 93-NP-238, NEUTRON ENERGY: THERMAL.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
3			71	)		85	)		111)	
4			to	)	0	to	)	1	to	)	0
			84	)		110	)		162)	

NUCLEUS: 94-PU-238, NEUTRON ENERGY: THERMAL.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
3			96			109	1		137)	
4			97	1		110	)		to	)	1
71	)		98			to	)	0	143)	
to	)	0	99	1		126	)		144		
86	)		100			127	1		145	1	
87	1		101	1		128	1		146		
88			102			129	1		147	1	
89	1		103	1		130			148		
90			104	1		131	)		149	1	
91	1		105	1		to	)	1	150)	
92	1		106			135	)		to	)	0
93	1		107			136			162)	
94	1		108								

NUCLEUS: 94-PU-239, NEUTRON ENERGY: THERMAL.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
1	1		77	1		114	1		133	16	D(8.27)
3			78	1		116	)		134	7	D(1.86)
4			79			to	)	1	153		
7	)		80			120	)		156	6	D(2.83)
to	)	1	82			121			157	1	
16	)		85	10	D(0.19)	122	1		158		
20	1		90	7	D(5.87)	123			160		
71			102	1		124	1		162		
72	1		109	5	D(6.00)	125	1		163		
73	)		110	1		126	1		164		
to	)	0	112	4	D(3.20)	128	1		165		
76	)		113	3	D(4.02)	130			166	1	

NUCLEUS: 94-PU-241, NEUTRON ENERGY: THERMAL.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
3	1		84	1		108	1		121)	
4			86	1		110			to	)	1
71	)		91	6	D(1.88)	111			130)	
to	)	0	98	1		112	3	D(1.57)	134	4	D(6.49)
76	)		100	1		113	1		139	1	
77	1		101	1		114	)		155)	
78	)		105	1		to	)	0	to	)	1
to	)	0	106	1		120	)		162)	
82	)		107	1							

NUCLEUS: 95-AM-241, NEUTRON ENERGY: THERMAL.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
3			98			115	1		143	1	
4			100			116	)		146		
71	)		101			to	)	0	148		
to	)	0	102			126	)		150		
82	)		104			128			152		
84	1		106			129	1		154		
85			107			130			155	1	
86	1		108			132	1		158		
87			109	1		133	4	D(0.72)	159	1	
88	1		110			135	1		160		
90	1		111			136	1		161	1	
94			113	3	D(0.95)	137	4	D(9.84)	162		
96			114			142	1				

NUCLEUS: 95-AM-242-M, NEUTRON ENERGY: THERMAL.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
3			97	1		125	1		145		
4			98			126	)		146		
71	)		99	1		to	)	0	147	1	
to	)	0	100			130	)		148		
82	)		101			131	1		149	1	
84			102			132	1		150		
85			103	1		133			151	1	
86	1		104	)		134			152		
87			to	)	0	135			153	1	
88			108	)		136			154		
89	1		109	1		137	1		155		
90	1		110	)		138			156	1	
91			to	)	0	139	1		157	1	
92	1		114	)		140	1		158		
93	1					141	1		159		
94			116	)		142			160		
95	1		to	)	0	143	1		161	1	
96			124	)		144	1		162		

NUCLEUS: 96-CM-243, NEUTRON ENERGY: THERMAL.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
3			100			116	)		143	1	
4			101	1		to	)	0	144	1	
71	)		103	1		126	)		145	1	
to	)	0	104	1		127	1		147	1	
91	)		109	1		129	1		148		
92	1		110			133	1		149		
93	1		111			134			150		
94	1		112	1		136			151	1	
95	1		113			137			152)	
96			114			138			to	)	0
98			115	1		142			162)	

NUCLEUS: 96-CM-245, NEUTRON ENERGY: THERMAL.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
3			88	2	D(8.34)	113			141	3	D(5.65)
4			91	4	D(2.63)	114	1		142	2	D(3.74)
71	)		93	3	D(2.18)	116	)		143	3	D(3.89)
to	)	0	94			to	)	0	144	2	D(1.35)
76	)		96			120	)		145	1	
77	1		97	4	D(2.42)	121	1		148		
78			98			122			150		
79			100			123			152	1	
80			101	1		124			153	1	
81			102	1		126			154		
82			104	1		131	3	D(9.73)	155		
83	1		107	1		132	2	D(0.17)	156	2	D(0.36)
84	1		108	1		133	1		157)	
85			109	1		135	3	D(0.09)	to	)	0
86			110			136			162)	
87	1		112	1		138	2	D(0.24)			

NUCLEUS: 98-CF-249, NEUTRON ENERGY: THERMAL.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
3			98	1		122	1		145	1	
4			99	5	D(9.22)	123	1		148		
71	)		100	1		124			149	6	D(1.36)
to	)	0	104	1		125	1		150		
82	)		108	2	D(1.80)	126			152		
83	1		110	1		127	6	D(0.77)	153	7	D(4.32)
84			112	4	D(1.92)	129	1		154		
85	)		113	1		130	3	D(0.72)	155	1	
to	)	1	114	1		131	4	D(8.91)	156	8	D(3.08)
90	)		116	)		136			158		
91	5	D(2.58)	to	)	1	137	3	D(8.11)	160		
96	1		120	)		141	5	D(7.76)	162		

NUCLEUS: 98-CF-251, NEUTRON ENERGY: THERMAL.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
3			105	1		123			143	1	
4			106			124			144		
71	)		107			125	1		145		
to	)	0	108			126			146		
90	)		109	1		127	1		147	1	
91	1		110			128			148		
92			111	1		129	1		149	1	
93	1		112	1		130			150		
94			113	1		131	1		151	1	
95	1		114			134			152)	
96			115	2	D(6.87)	135	1		to	)	0
97	1		116			136	)		155)	
98			117			to	)	0	156	1	
99	1		118			139	)		157)	
100	)		119			140	1		to	)	0
to	)	0	120			141	1		162)	
104	)		122			142					

NUCLEUS: 99-ES-254, NEUTRON ENERGY: THERMAL.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
3			101			125	1		143	1	
4			102			126			144	1	
71	)		103	1		127	1		145)	
to	)	0	104			128			to	)	0
88	)		105	1		129	1		150)	
89	1		106	1		130			151	1	
90			107			131	1		152		
91	1		108			132	1		153	1	
92			109	1		133	1		154		
93			110			134			155		
94			111	1		135	1		156	1	
95	1		112	1		136			157	1	
96			113	1		137			158		
97	1		114			138			159		
98			116	)		139			160		
99	1		to	)	0	140	1		161		
100			124	)		142			162		

NUCLEUS: 100-FM-255, NEUTRON ENERGY: THERMAL.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
3			96			108			122		
4			97	1		109	1		123		
71	)		98			110			124		
to	)	0	99	1		111	1		125	1	
90	)		100	)		112	1		126		
91	1		to	)	0	113	1		127	1	
92			104	)		114			128		
93	1		105	1		116	)		129	1	
94			106			to	)	0	130		
95			107			120	)		132	1	

NUCLEUS:100-FM-255, NEUTRON ENERGY: THERMAL (cont'd).

A	no	reason	A	no	reason	A	no	reason	A	no	reason
134			141			149	1		155		
135	1		142			150			156		
136	)		143	1		151	1		157	1	
to	)	0	144	)		152			158)	
139	)		to	)	0	153	1		to	)	0
140	1		148	)		154			162)	

NUCLEUS:100-FM-257, NEUTRON ENERGY: THERMAL.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
3			113	)		130			140	1	
4			to	)	0	131			141)	
71	)		126	)		132	1		to	)	0
to	)	0	127	1		133	)		162)	
111	)		128			to	)	0			
112	1		129			139)				

NUCLEUS: 90-TH-232, NEUTRON ENERGY: FAST.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
3			91	4	D(0.10)	114			139	4	D(8.67)
4			96			115	11	D(0.00)	145	1	
71	)		98			116	)		146	3	D(2.74)
72	3	D(8.79)	100			to	)	0	150	1	
74			101			126	)		152		
75			102			127	1		153	1	
76			104			128			154		
78	)		107			129	1		155		
to	)	0	108			130			156	1	
82	)		110			131	14	D(0.00)	157)	
83	5	D(3.92)	111	5	D(5.25)	132	13	D(0.55)	to	)	0
84	3	D(6.11)	112	7	D(3.47)	133	3	D(9.49)	162)	
86	1		113			138	1				

NUCLEUS: 91-PA-231, NEUTRON ENERGY: FAST.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
3			92	)		110			129	1	
4			to	)	0	113	1		130		
71	)		96	)		114			131	1	
to	)	0	98			115	1		133	1	
82	)		99	1		116	)		134		
83	1		100			to	)	0	135	1	
84			101			120	)		136		
85	1		102			122	)		137	1	
86			104			to	)	0	138		
87			105	1		126	)		139		
88			107			127	1		141	1	
90			108			128			142		

NUCLEUS: 91-PA-231, NEUTRON ENERGY: FAST (cont'd)

A	no	reason	A	no	reason	A	no	reason	A	no	reason
144	1		148			151			154)	
145			149	1		152			to	)	0
146			150			153	1		162)	

NUCLEUS: 92-U-232, NEUTRON ENERGY: FAST.

No measurements

NUCLEUS: 92-U-233, NEUTRON ENERGY: FAST.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
3			96	1		116			130	1	
4	1		98	1		117	1		154		
71	)		100	1		118	1		155		
to	)	0	101			119	1		156	1	
82	)		102			120	1		157	1	
83	1		103	3	D(3.45)	121			158		
84	1		104			122	1		159	1	
86	1		105			123			160		
88	1		106	1		124	1		161	1	
90	1		107	)		126	1		162		
93	1		to	)	0	127	2	D(0.17)			
94	1		114	)		128	1				

NUCLEUS: 92-U-235, NEUTRON ENERGY: FAST.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
1	1		108			117	)		154	1	
3			109			to	)	0	155		
4			110			124	)		156	19	D(0.00)
71	)		111	24	D(0.00)	126	1		157		
to	)	0	112	6	D(0.02)	127	5	D(0.15)	158		
82	)		113	1		128	1		159	1	
87	9	D(1.11)	114			129	1		160		
96	1	D(0.44)	115	6	D(0.00)	130	1		161	7	D(0.44)
99	15	D(2.46)	116	1		143	25	D(6.93)	162		
107						144	27	D(2.25)			

NUCLEUS: 92-U-236, NEUTRON ENERGY: FAST.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
3			86			94			103	1	
4			87			95	1		104		
71	)		88			96			105		
to	)	0	89	1		98			106	1	
84	)		90			100			107		
85	1		92	1		102			108		

NUCLEUS: 92-U-236, NEUTRON ENERGY: FAST (cont'd)

A	no	reason	A	no	reason	A	no	reason	A	no	reason
109			127	2	D(1.37)	148	1		156	1	
110			128	1		149	1		157		
111	1		129	1		150	1		158		
112	)		130	1		151	2	D(0.25)	159		
to	)	0	136	1		152	1		160		
124	)		138	1		153			161	1	
125	2	D(5.91)	143	2	D(2.97)	154			162		
126	1		145	1		155					

NUCLEUS: 92-U-238, NEUTRON ENERGY: FAST.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
3			89	21	D(0.17)	116	)		154	1	
4			91	9	D(2.43)	to	)	0	155		
66	1		92	7	D(2.70)	120	)		157		
67	2	D(4.39)	96	1		121	5	D(5.05)	158		
71			98	1		122			160		
72	1		100	1		123			161	8	D(9.37)
73			102			124			162)	
74			104			126	1		to	)	0
75			105	9	D(6.56)	127	12	D(1.97)	171)	
76			107	1		128	1		172	1	
78	)		108			130	1		173		
to	)	0	109	5	D(0.96)	131	17	D(0.12)	174		
84	)		110			132	20	D(0.11)	175	1	
85	9	D(0.00)	111	26	D(0.00)	134	5	D(3.02)	176		
86	3	D(7.00)	112	6	D(1.09)	135	15	D(1.78)	177	2	D(5.40)
87	5	D(7.15)	114			148	5	D(7.21)			
88	7	D(0.86)	115	16	D(3.72)	153	13	D(0.97)			

NUCLEUS: 93-NP-237, NEUTRON ENERGY: FAST.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
3			107			123			155		
4			108			124			156	1	
71	)		110			126	1		157)	
to	)	0	113	1		127	3	D(5.39)	to	)	0
82	)		114			128	1		162)	
87	2	D(6.09)	116	)		129	2	D(2.90)			
95	5	D(6.49)	to	)	0	130	1				
99	1		120	)		144	4	D(9.58)			
106	4	D(8.02)	122			153					

NUCLEUS: 93-NP-238, NEUTRON ENERGY: FAST.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
3	)		131	1		134	1		137)	
to	)	0	132	1		135	1		to	)	0
130	)		133			136	1		162)	

NUCLEUS: 94-PU-238, NEUTRON ENERGY: FAST.

No measurements

NUCLEUS: 94-PU-239, NEUTRON ENERGY: FAST.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
3	1		97	18	D(2.55)	114	1		132	6	D(6.53)
4			101	1		115	10	D(0.02)	141	9	D(6.18)
71	)		102	1		116	1		153	1	
to	)	0	104	1		117	)		154	2	D(0.41)
76	)		107			to	)	0	155		
77	2	D(0.00)	108			124	)		156	6	D(0.39)
78	)		109	4	D(3.20)	125	3	D(1.44)	158		
to	)	0	110			126	1		159		
82	)		111	11	D(0.13)	127	1		160		
88	4	D(7.53)	112	4	D(2.59)	128	1		162		
95	17	D(2.46)	113	1		130	1				

NUCLEUS: 94-PU-240, NEUTRON ENERGY: FAST.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
3			94	1		112	1		153)	
4			96	1		113	1		to	)	1
71			98	1		114			157)	
72	1		99	)		116	)		158		
73	)		to	)	1	to	)	0	159	1	
to	)	0	105	)		124	)		160		
82	)		107			126	1		161	1	
83	)		108			128	1		162)	
to	)	1	109	1		129	1		to	)	0
89	)		110			130	1		168)	
92	1		111	1					169	1	

NUCLEUS: 94-PU-241, NEUTRON ENERGY: FAST.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
3			94	1		113	1		153)	
4			96	1		114			to	)	1
71			98	)		116	)		157)	
72	1		to	)	1	to	)	0	158		
73	)		105	)		124	)		159	1	
to	)	0	107			126	1		160		
82	)		108			128	1		161	1	
83	)		109	1		129	1		162)	
to	)	1	110			130	1		to	)	0
89	)		111	1					168)	
92	1		112	1					169	1	

NUCLEUS: 94-PU-242, NEUTRON ENERGY: FAST.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
3	)		94	1		104	1		130	1	
to	)	0	96	1		105			141	1	
82	)		98	1		106	1		150	2	D(0.21)
83	)		99			107	)		153		
to	)	1	100	1		to	)	0	154	1	
87	)		101	1		124	)		>154	0	
89			102	1		126	1				
90	1		103			127	1				

NUCLEUS: 95-AM-241, NEUTRON ENERGY: FAST.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
3	)		100			116	)		148	1	
to	)	0	101			to	)	0	150	1	
87	)		102			124	)		152	1	
88	1		103	)		125	1		153	1	
89			to	)	1	126	1		154		
90			106	)		127	2	D(0.00)	155	1	
91			107			130	1		156	1	
92	1		108			132	1		157		
93	)		109	1		133	4	D(7.44)	158		
to	)	0	110			134	)		159	1	
96	)		111	1		to	)	1	160		
97	2	D(0.62)	112	1		138	)		161	1	
98			113			145	1		>161	0	
99	1		114			146	1				

NUCLEUS: 95-AM-242-M, NEUTRON ENERGY: FAST.

No measurements

NUCLEUS: 96-CM-243, NEUTRON ENERGY: FAST.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
3	)	0	125	1		139			>145	0	
to	94	)	126	)		140					
95	1		to	)	0	141	1				
96	)		136	)		142					
to	)	0	137	1		143					
124	)		138			144	1				

NUCLEUS: 96-CM-244, NEUTRON ENERGY: FAST.

A no reason	A no reason	A no reason	A no reason
3) 0	125 1	139	145)
to 94) 0	126)	140	to) 0
95 1	to) 0	141 1	154)
96)	136)	142	155 1
to) 0	137 1	143	>155 0
124)	138	144 1	

NUCLEUS: 96-CM-245, NEUTRON ENERGY: FAST.

No measurements

NUCLEUS: 96-CM-246, NEUTRON ENERGY: FAST.

A no reason	A no reason	A no reason	A no reason
3) 0	125 1	139	145)
to 94) 0	126)	140	to) 0
95 1	to) 0	141 1	154)
96)	136)	142	155 1
to) 0	137 1	143	>155 0
124)	138	144 1	

NUCLEUS: 96-CM-248, NEUTRON ENERGY: FAST.

A no reason	A no reason	A no reason	A no reason
3) 0	125 1	139	145)
to 94) 0	126)	140	to) 0
95 1	to) 0	141 1	154)
96)	136)	142	155 1
to) 0	137 1	143	>155 0
124)	138	144 1	

NUCLEUS: 90-TH-232, NEUTRON ENERGY: 14 MEV.

A no reason	A no reason	A no reason	A no reason
3	96	124	146
4	97 6 D(9.96)	125	148
66 2 D(0.54)	98	126	149 2 D(0.38)
71	100	128	150
72 1	102	130	151 1
73 2 D(0.77)	104	131 5 D(2.76)	152
74	107	132 9 D(0.44)	154
75	108	133 5 D(3.54)	155
76	109 3 D(2.92)	134 3 D(7.52)	156 1
78 1	110	135 1	157 1
79 1	112 8 D(0.32)	136 1	158
80)	114)	137	159 1
to) 0	to) 0	138	160
87)	120)	139 2 D(7.47)	161 1
90 1	122	144 1	>161 0
94	123	145 2 D(0.00)	

NUCLEUS: 91-PA-231, NEUTRON ENERGY: 14 MEV.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
3	)		93	1		106	)		130		
to	)	0	94			to	)	0	131	1	
83	)		95			111	)		134	1	
84	1		96			112	1		135	1	
85	)		97	1		113	1		136)	
to	)	0	98	)		114	)		to	)	0
90	)		to	)	0	to	)	0	142)	
91	1		104	)		128	)		143	1	
92			105	1		129	1		>143	0	

NUCLEUS: 92-U-233, NEUTRON ENERGY: 14 MEV.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
1	1		96			126			155		
3	1		98			128			156	1	
4	1		100			129			157		
66	1		101			130			158		
67	1		102			131	2	D(0.08)	159	1	
71			104			134	1		160		
72	1		106	1		135	1		161	1	
73	)		107			136			162		
to	)	0	108			138			163		
82	)		110			139	1		164		
83	1		113	3	D(1.27)	142			165		
84			114			144			166	1	
85			115	5	D(7.37)	145			167		
86			116	)		146			168		
87	1		to	)	0	148			169	1	
88	1		120	)		149			170		
89	1		121	2	D(3.24)	150			171		
90			122			151	1		172	1	
91	3	D(8.26)	123			152			173		
92	2	D(2.48)	124			153	1		174		
94			125	1		154			175	1	

NUCLEUS: 92-U-235, NEUTRON ENERGY: 14 MEV.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
1	1		80			98			117)	
3	1		81			100			to	)	0
4			82			101			120)	
66	2	D(1.40)	83	1		102			122		
67	1		84			104			123		
71			85			105	3	D(1.22)	124		
72	3	D(7.18)	86			106	2	D(2.31)	125		
73	1		87	1		107			126	1	
74			88	1		108			127	1	
75			92			110			128		
76			93	1		112	3	D(2.80)	129	1	
77	1		94			113	1		130		
78			96			114			132	7	D(1.91)
79			97	5	D(7.19)	116			133	1	

NUCLEUS: 92-U-235, NEUTRON ENERGY: 14 MEV (cont'd).

A	no	reason	A	no	reason	A	no	reason	A	no	reason
134	1		145			157			166	1	
135			146			158			167		
136	1		148	4	D(1.95)	159	1		168		
137	2	D(4.97)	149	)		160			169	1	
138			to	)	0	161	4	D(3.87)	170		
139	1		152	)		162	)		171		
142			154			to	)	0	172	1	
143	1		155			165)				

NUCLEUS: 92-U-238, NEUTRON ENERGY: 14 MEV.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
1	1		91	22	D(0.21)	119			154		
3	1		94	1		120			155		
4			95	14	D(9.13)	122			156	5	D(6.48)
66	1		96			123	1		157		
67	1		98			124			158		
71			100			125	8	D(3.71)	159	1	
72	1		103	13	D(2.15)	126			160		
73	1		105	20	D(5.66)	128	1		162		
74			107	1		129	9	D(0.00)	163		
75			108			130			164		
76			109	4	D(4.05)	131	16	D(0.00)	165		
79			110			134	10	D(6.54)	166	1	
80			111	11	D(0.64)	143	18	D(5.10)	167		
81	1		112	13	D(4.95)	144	10	D(7.57)	168		
82			114			146			169	1	
86	1		116			150			170		
88	4	D(6.31)	117	3	D(0.00)	151	4	D(3.14)	171		
89	12	D(3.40)	118	1		152			172	1	

NUCLEUS: 93-NP-237, NEUTRON ENERGY: 14 MEV.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
1	1		102			128	1		146	1	
3	1		103	1		129	1		147	1	
4	1		104			130	1		148		
39	1		106			133			149		
71	)		107			134	1		150	1	
to	)	0	108			135	1		151		
90	)		109	1		136			152		
92			110			137			153	1	
93	1		111	1		139	1		154		
94			113			140	1		155		
95			114			141			156		
96			115	1		142	1		157	1	
98			116	)		143	1		>157	0	
100			to	)	0	144					
101			126	)		145					

NUCLEUS: 94-PU-239, NEUTRON ENERGY: 14 MEV.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
3	)		99	3	D(4.97)	113			138	1	
to	)	0	100			114			139		
86	)		101			115	5	D(5.35)	141	1	
87	1		102			116	)		142		
88	1		104			to	)	0	143		
90			105	1		130	)		145		
91	1		106	1		131	1		146		
92			107			132	2	D(1.24)	148)	
93			108			133			to	)	0
94			109	1		134	1		155)	
95	1		110			135			156	2	D(3.97)
96			111	5	D(0.15)	136	2	D(0.00)	>156	0	
98			112	1		137	1				

NUCLEUS: 94-PU-240, NEUTRON ENERGY: 14 MEV.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
3			98			119	)		147	1	
4			99	1		to	)	0	148		
66	1		100			124	)		150		
67	1		101			125	1		151	1	
71			102			126			152		
72	1		103	1		127	1		153		
73	1		104			128			154		
74	)		105	2	D(5.07)	129			155	1	
to	)	0	106	1		130			156	1	
86	)		107			131	1		157	1	
87	1		108			132	1		158		
88	1		109	1		133	1		159	1	
89	1		110			134			160		
90	1		111	1		135	1		161	1	
93	1		112	1		136			162		
94			113			137	)		to		
95	1		114			to	)	1	168		
96			116			145	)		169	1	
97	1		118	1		146					

NUCLEUS: 94-PU-242, NEUTRON ENERGY: 14 MEV.

A	no	reason	A	no	reason	A	no	reason	A	no	reason
3	)		101	1		116			136		
to	)	0	102			118			137		
86	)		103	1		119			138	1	
87	1		104	1		120			139		
88	1		106			122			141	1	
89	1		107	1		123			142		
90			108			124			143	1	
93	1		109	1		125	1		144)	
94	1		110			126			to	)	0
95	1		111	1		127	1		150)	
96			112	1		130	1		151	1	
98			114			131	1		>151	0	
100			115	1		134	1				

NUCLEUS: 95-AM-241, NEUTRON ENERGY: 14 MEV.

A no reason	A no reason	A no reason	A no reason
3)	102	128	148
to) 0	103 1	129	149 1
86)	104 1	130	150
87 1	105 1	131 1	151 1
88 1	106 1	132	152
89	107 1	133 1	153 1
90	108	134	154
92 1	109 1	135 1	155 1
93	110	136	156 1
94 1	111 1	137 1	157 1
95 1	112 1	138	158
96	113 1	139)	159 1
97 1	114	to) 1	160
98	116)	144)	161 1
99 1	to) 0	145	>161 0
100	126)	146	
101	127 1	147 1	

NUCLEUS: 90-TH-232, NEUTRON ENERGY: SPONTANEOUS

A no reason	A no reason	A no reason	A no reason
3)	85	131 1	136 1
to) 0	86 1	132 1	>136 0
82)	87)	133	
83 1	to) 0	134 1	
84 1	130)	135	

NUCLEUS: 92-U-238, NEUTRON ENERGY: SPONTANEOUS

A no reason	A no reason	A no reason	A no reason
3)	94)	106 1	144 1
to) 0	to) 0	107)	145
82)	98)	to) 0	146
85	100	130)	148
87	101	137	149 1
88	102	138	>149 0
91 1	103 1	139	
92 1	104	140 1	
93 1	105 1	142	

NUCLEUS: 94-PU-240, NEUTRON ENERGY: SPONTANEOUS

A no reason	A no reason	A no reason	A no reason
3	90	98	106
4 1	91 1	99 1	107
71)	92)	100)	108
to) 0	to) 0	to) 0	109 1
88)	96)	104)	110
89 1	97 1	105 1	111 1

NUCLEUS: 94-PU-240, NEUTRON ENERGY: SPONTANEOUS (cont'd)

A no reason	A no reason	A no reason	A no reason
112	131 1	136)	143 1
113	132	to) 0	144
114	133 1	139)	145
115 1	134	140 1	146
116)	135 1	141 1	147 1
to) 0		142	>147 0
130)			

NUCLEUS: 94-PU-242, NEUTRON ENERGY: SPONTANEOUS

A no reason	A no reason	A no reason	A no reason
3	71)	121)	136)
4 1	to) 0	to) 1	to) 1
	120)	131)	162)
			>162 0

NUCLEUS: 96-CM-242, NEUTRON ENERGY: SPONTANEOUS

A no reason	A no reason	A no reason	A no reason
3)	102	113	132 1
to) 0	103	114	133 1
90)	104	115 1	134 1
91 1	105 1	116)	135
92 1	106 1	to) 0	136
93)	107	126)	137
to) 0	108	127 1	138
98)	109 1	128	139 1
99 1	110	129 1	140 1
100	111	130	>140 0
101	112 1	131	

NUCLEUS: 96-CM-244, NEUTRON ENERGY: SPONTANEOUS

A no reason	A no reason	A no reason	A no reason
1 1	89 1	107	137 1
3 1	90 1	108	138
4 3 D(9.45)	91 1	109 1	139 1
71)	92	110	141 1
to) 0	93	111 1	142
76)	94	112 1	143 1
77 1	95 1	113 1	144 1
78)	96	114	145)
to) 0	97 1	116)	to) 0
82)	98	to) 0	148)
83 1	100	126)	150
84 1	101	127 1	151 1
85	102	128	152
86	103 1	129 1	153 1
87	104	130	>153 0
88	106 1	136 1	

NUCLEUS: 96-CM-246, NEUTRON ENERGY: SPONTANEOUS

A	no	reason	A	no	reason	A	no	reason	A	no	reason
3	)		102			112	1		137		
to	)	0	103	1		113	)		138		
94	)		104			to	)	0	139		
95	1		105	1		130	)		140)	
96			106			131	1		to	)	1
97	1		107			132	1		144)	
98			108			133	1		145		
99	1		109			134			146		
100			110			135	1		147	1	
101			111	1		136			>147	0	

NUCLEUS: 96-CM-248, NEUTRON ENERGY: SPONTANEOUS

A	no	reason	A	no	reason	A	no	reason	A	no	reason
3	)		96			114			138		
to	)	0	97	1		116	)		139	1	
82	)		98			to	)	0	142	1	
84	1		100			124	)		143	1	
85	1		101			125	1		145		
86	1		102			126			146		
87			104			127	1		147	1	
88			105	1		128			148		
89	1		107			129	1		149		
90			108			130			150		
92			109	1		134	1		151	1	
93			110			135	1		152		
94			111	1		136	1		153	1	
95	1		113	1		137	1		>153	0	

NUCLEUS: 98-CF-250, NEUTRON ENERGY: SPONTANEOUS

A	no	reason	A	no	reason	A	no	reason	A	no	reason
1	1		93			116	)		136	1	
3	1		94			to	)	0	137		
4	1		96			120	)		138		
71	)		98			121	1		142	1	
to	)	0	100			122			145		
82	)		101	1		123			146		
83	2	D(0.46)	102			124			147	1	
84	1		104	1		125	1		148		
85	1		107	1		126			149	1	
86	1		108			127	1		150		
87			109	1		128			151	1	
88			110			129	1		152		
89	1		111	1		130			153	1	
90			113	1		134	1		>153	0	
92			114			135	1				

NUCLEUS: 98-CF-252, NEUTRON ENERGY: SPONTANEOUS

A	no	reason	A	no	reason	A	no	reason	A	no	reason
1	2	D(2.54)	97	9	D(3.60)	119			145	1	
2	1		98			120			147	12	D(3.10)
3	)		99	10	D(2.81)	121	2	D(2.21)	148	1	
to	)	0	100			122			150		
77	)		102			123			151	7	D(2.32)
78	1		105	9	D(0.70)	124			152	1	
79	)		106	3	D(4.85)	125	1		154		
to	)	0	108			126			156	6	D(1.70)
82	)		110			128	3	D(8.81)	158		
87			112	3	D(6.90)	130			159	1	
90			114			131	10	D(7.21)	160		
91	6	D(5.20)	115	8	D(6.14)	132	14	D(3.13)	162)	
92	4	D(6.96)	116			133	6	D(1.14)	to	)	0
93	4	D(5.70)	117	3	D(9.49)	136			165)	
96			118			137	7	D(7.76)	166	1	

NUCLEUS: 100-FM-254, NEUTRON ENERGY: SPONTANEOUS

A	no	reason	A	no	reason	A	no	reason	A	no	reason
3	)		104			125	1		146		
to	)	0	105	1		126			147	1	
87	)		107			128			148		
88	1		108			129	1		149	1	
89			109	1		130			150		
90			110			133	1		151		
91	1		111	1		134			152		
92			112	1		135	1		153	1	
93	1		113			136			154		
94			114			137			155		
96			116			138			156		
98			to			139	1		157	1	
99	1		120			141	2	D(4.19)	158		
100			122			142	1		159	1	
101			123			143	2	D(5.83)	>159	0	
102			124			145					

NUCLEUS: 100-FM-256, NEUTRON ENERGY: SPONTANEOUS

A	no	reason	A	no	reason	A	no	reason	A	no	reason
1	1		105	1		120			133	1	
3	1		106			121	1		134		
4	)		107			122			135	1	
to	)	0	108			123			136		
90	)		109	1		124			137		
91	1		110			125	1		138		
92	)		111	1		126			139	1	
to	)	0	113	1		127	1		140	1	
96	)		114			128			141	1	
97	1		116			129	1		142		
98	)		117			130			143	1	
to	)	0	118	1		131	1		144		
104	)		119			132	1		145	1	

NUCLEUS:100-FM-256, NEUTRON ENERGY: SPONTANEOUS

A	no	reason	A	no	reason	A	no	reason	A	no	reason
146			150			154			158		
147			151	1		155			159	1	
148			152			156	1		>159	0	
149	1		153	1		157	1				

3.2 Independent yield measurements required

There are so many unmeasured independent yields that only cases of discrepancies are listed in the detailed tables. To illustrate the general situation, the numbers of mass chains for which data exist are listed below for different fissioning systems (taken from the UKFY2 file of measured and recommended yields):

Th229T: 1*	Am241T: 1*	U 236F: 1*	U 235H: 27*
U 233T: 44	Am242mT: 2*	U 238F: 21*	U 238H: 22*
U 235T: 73	Cm245T: 1*	Np237F: 3*	Pu239H: 4
Np237T: 2*	Cf249T: 8*	Pu239F: 2	Am241H: 7*
Pu238T: 5*	Th232F: 13*	Pu240F: 2*	Cm244S: 1*
Pu239T: 44	U 233F: 0	Th232H: 29*	Cf252S: 9
Pu241T: 15*	U 235F: 22*	U 233H: 14*	

T = thermal, F = fast, H = high (14 MeV), S = spontaneous
 * for most or all chains only 1 measurement per yield

Practically all fissioning systems need further measurements. Where measurements exist, discrepancies among independent yields are given in the tables below. The abbreviations used in the tables are the same as those used in Section 3.1:

A = mass number
 elem. = element symbol; (G) = ground state
 (M) = metastable state
 (T) = total (sum g+m)
 no = number of measurements
 D = discrepant data with large chi-squared; the number in brackets gives the probability (in %) for the occurrence of the maximum contribution (from the most discrepant measurement) to the calculated chi-squared.

ENERGY: THERMAL, NUCLIDE: U-233

A	Elem.	no	discrep.	A	Elem.	no	discrep.	A	Elem.	no	discrep.
82	BR(G)	2	D(0.00)	99	NB	2	D(0.00)	135	XE(G)	4	D(0.00)
87	BR	3	D(0.01)	131	TE(M)	2	D(0.01)	135	XE(M)	2	D(0.01)
89	BR	4	D(0.01)	131	I	2	D(0.01)	135	XE(T)	3	D(0.01)
90	BR	2	D(0.00)	132	SN	2	D(0.00)	137	I	2	D(0.00)
95	ZR	2	D(0.00)	132	SB(G)	3	D(0.00)	137	XE	2	D(0.01)
96	NB	3	D(0.00)	132	TE	2	D(0.01)	139	I	2	D(0.01)
97	NB	2	D(0.00)	133	TE(M)	2	D(0.00)	148	PM(G)	3	D(0.01)
98	NB	2	D(0.00)	133	I (G)	4	D(0.01)	148	PM(M)	3	D(0.01)
99	Y	2	D(0.00)	134	I (T)	3	D(0.01)				

ENERGY: THERMAL, NUCLIDE: U-235

A	Elem.	no	discrep.	A	Elem.	no	discrep.	A	Elem.	no	discrep.
77	GA	2	D(0.00)	95	Y	6	D(0.00)	124	IN(G)	2	D(0.00)
78	GA	2	D(0.01)	95	ZR	4	D(0.00)	128	SN(M)	2	D(0.01)
78	AS	3	D(0.01)	96	RB	6	D(0.00)	128	SB(M)	4	D(0.00)
83	SE(M)	2	D(0.01)	96	ZR	3	D(0.01)	128	I	2	D(0.01)
83	SE(T)	4	D(0.00)	96	NB	7	D(0.00)	130	SB(G)	5	D(0.01)
84	GE	4	D(0.01)	97	RB	5	D(0.00)	130	SB(M)	4	D(0.00)
84	BR(G)	2	D(0.00)	97	ZR	3	D(0.00)	130	I	2	D(0.01)
85	AS	3	D(0.01)	98	SR	4	D(0.01)	131	TE(G)	5	D(0.00)
85	BR	4	D(0.00)	98	Y	3	D(0.00)	131	TE(M)	4	D(0.01)
86	AS	3	D(0.00)	98	ZR	3	D(0.01)	131	I	5	D(0.01)
86	SE	5	D(0.00)	98	NB(T)	4	D(0.01)	132	SB(G)	5	D(0.01)
86	KR	4	D(0.01)	99	SR	3	D(0.00)	132	SB(M)	2	D(0.01)
86	RB(G)	3	D(0.00)	99	Y	3	D(0.00)	132	TE	4	D(0.01)
87	SE	5	D(0.01)	99	ZR	4	D(0.01)	132	I (G)	3	D(0.00)
87	KR	5	D(0.00)	99	NB(M)	3	D(0.01)	132	I (M)	3	D(0.01)
88	SE	6	D(0.00)	99	NB(T)	4	D(0.00)	132	I (T)	2	D(0.00)
88	KR	6	D(0.00)	100	Y	3	D(0.00)	133	SB	3	D(0.01)
88	RB	7	D(0.00)	100	NB(T)	3	D(0.00)	133	TE(G)	5	D(0.00)
89	RB	8	D(0.01)	101	Y	2	D(0.01)	133	TE(M)	4	D(0.01)
90	BR	7	D(0.01)	101	ZR	2	D(0.00)	133	XE(M)	3	D(0.00)
90	RB(M)	2	D(0.00)	101	NB	3	D(0.01)	134	I (M)	4	D(0.00)
90	RB(T)	7	D(0.01)	102	NB(T)	2	D(0.00)	134	I (T)	4	D(0.01)
91	BR	7	D(0.01)	103	ZR	2	D(0.00)	135	XE(G)	8	D(0.01)
91	SR	5	D(0.00)	103	MO	2	D(0.01)	135	XE(T)	5	D(0.00)
92	KR	7	D(0.00)	104	ZR	2	D(0.01)	136	I (M)	3	D(0.01)
92	RB	9	D(0.01)	104	MO	2	D(0.00)	136	CS	9	D(0.00)
92	SR	4	D(0.00)	104	TC	3	D(0.00)	137	I	4	D(0.00)
92	Y	4	D(0.00)	106	NB	2	D(0.00)	137	XE	6	D(0.01)
93	KR	7	D(0.01)	106	MO	2	D(0.00)	137	CS	2	D(0.00)
94	KR	5	D(0.01)	106	TC	2	D(0.01)	138	XE	3	D(0.00)
94	RB	8	D(0.01)	112	AG(G)	2	D(0.00)	138	CS(G)	3	D(0.00)
95	RB	8	D(0.00)	121	CD(G)	3	D(0.00)				

ENERGY: THERMAL, NUCLIDE: PU-239

A	Elem.	no	discrep.	A	Elem.	no	discrep.	A	Elem.	no	discrep.
93	KR	2	D(0.01)	105	TC	4	D(0.01)	136	CS	5	D(0.01)
93	RB	2	D(0.01)	128	I	2	D(0.01)	138	CS(M)	2	D(0.01)
95	RB	2	D(0.01)	132	SB(M)	3	D(0.00)	150	PM	2	D(0.00)
103	TC	2	D(0.01)	135	XE(M)	2	D(0.01)				
104	TC	4	D(0.00)	135	XE(T)	3	D(0.00)				

ENERGY: FAST, NUCLIDE: TH-232

A	Elem.	no	discrep.
136	CS	3	D(0.00)

ENERGY: FAST, NUCLIDE: U-235

A	Elem.	no	discrep.
135	XE(T)	2	D(0.01)
136	CS	4	D(0.01)

ENERGY: FAST, NUCLIDE: U-238

A	Elem.	no	discrep.
136	CS	3	D(0.00)

ENERGY: FAST, NUCLIDE: PU-239

A	Elem.	no	discrep.
136	CS	7	D(0.01)

ENERGY: 14 MEV, NUCLIDE: TH-232

A	Elem.	no	discrep.
112	AG	3	D(0.00)
136	CS	2	D(0.01)

ENERGY: 14 MEV, NUCLIDE: U-235

A	Elem.	no	discrep.
82	BR	2	D(0.00)
136	CS	4	D(0.01)

ENERGY: 14 MEV, NUCLIDE: U-238

A	Elem.	no	discrep.
133	XE(G)	2	D(0.01)
136	CS	8	D(0.00)

ENERGY: 14 MEV, NUCLIDE: PU-239

A	Elem.	no	discrep.
133	XE(T)	2	D(0.01)

ENERGY: SPONT., NUCLIDE: CF-252

A	Elem.	no	discrep.
144	LA	2	D(0.01)