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ESTIMATION OF FISSION PRODUCT SPECTRA IN
DISCHARGED FUEL FROM FAST REACTORS

by

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ABSTRACT

The fission product spectra in discharged fuel from fast fission power reactors have been calculated over a wide range of operating conditions (reactor operating times from 10 to 10,000 days and cooling times from zero to infinity). These calculations are based on recent yield data for fission of uranium and plutonium. From these calculated data are presented derived values of total curies and energy dissipation rates as functions of operating time and cooling time.

Information on fission product spectra for both active and inactive isotopes as a function of irradiation and cooling times is often desirable. Calculation of fission product decay chain yields for thermal fission of uranium-235 have been presented by Faller, Chapman, and West,⁽¹⁾ and in project handbooks.⁽²⁾

The calculated data for fast fission are based on the generalized decay equations developed by Rutherford⁽³⁾ and on reactor production and decay equations presented by Gillette.⁽⁴⁾ General forms of these equations are given in the Appendix (page 3). To calculate chain yields, basic data are necessary on the instantaneous yield from fission as a function of mass number. Data for fast fission yields were presented by Nehemias, Dennis and Ambo⁽⁵⁾ based on the work of Engelder⁽⁶⁾ and Moteff.⁽⁷⁾ More recent data have been supplied by Glendenin and Steinberg⁽⁸⁾ and by Blomeke.⁽⁹⁾ These latter data were used to estimate the fission product spectra resulting from fast fission of plutonium-239 and uranium-235.

One of the assumptions required for these calculations was that of the distribution of nuclear charge in fission for a given mass number. The data of Glendenin, Coryell and Edwards⁽¹⁰⁾ were used. These indicate that the predominant distribution of nuclear charge arising directly in fission is about three beta decays removed from a stable isotope. Most of the isotopes formed directly in fission have half-lives so short that they may be neglected. Most are so short that they have never been measured. Therefore, one hundred per cent yield was assumed for the first isotope of

reasonably long half-life along a decay chain. Generally, isotopes with half-lives less than 1 hour were not considered. Chain yields for uranium-235 and plutonium-239 are given in Tables 1 and 2.

Fissions were assumed to occur at a uniform rate throughout the irradiation period, and any neutron absorption in the reactor by the fission products themselves was neglected. Fission product isotope concentrations are expressed as atoms per 100 atoms of uranium-235 or plutonium-239 fissioned (atom per cent).

The spectra of fission products for uranium-235 irradiated for periods of 10, 30, 85, 135, 365 and 10,000 days, and cooled from 0 to infinite days are given in Tables 3 to 8; similar data for plutonium-239 are given in Tables 9 to 14.

The gross fission product activity expressed as total curies per watt of reactor power is presented in Figures 1 and 2. The curie is defined as the quantity of any radioactive species decaying at a rate of 3.7×10^{10} disintegrations per second. Since most fission products decay first by beta emission, total curies are nearly equal to beta curies. These plots are similar to that for thermal fission of uranium presented by Glasstone.⁽¹¹⁾ Individual fission product activities may be calculated from the data in Tables 3 through 14.

Rates of total energy dissipation resulting from fission product decay are presented as functions of irradiation and cooling times in Figures 3 and 4 for fast fission of uranium-235 and plutonium-239. The contributions of gross beta and gamma energies are shown on Figures 5 through 8.

Equations of the form suggested by Way and Wigner⁽¹²⁾ were developed for total curies, beta, gamma, and gross fission product heating as functions of reactor operating time and cooling time after discharge from the reactor. Over the range from 1 hour to 150 days, these equations fit the calculated data within ± 15 per cent; from 150 days to 300 days to within ± 50 per cent.

Use of the data herein presented should aid in the design and evaluation of processing schemes and equipment insofar as estimating activity levels, shielding requirements, heat generation, radiation damage effects, and individual and total fission product concentrations.

APPENDIX

1. Equations

a. Formation and decay within reactor

For isotopes of a particular chain decaying according to the typical scheme:

$$\frac{dA}{dt} = R_A - \lambda_A A \quad (1)$$

where

A, B, C, D = atoms of corresponding isotope at any time

$t_{1/2}$ = half-life of isotope, days

$\lambda_A = 0.693/(t_{1/2})_A$, decay constant for A

R_A = rate of production by fission of A, atoms/day

t_P = reactor operating time in days;

similarly,

$$\frac{dB}{dt} = \lambda_A A + R_B - \lambda_B B \quad (2)$$

where

R_B = rate of production of B, atoms/day

λ_B = decay constant for B

B = atoms of isotope B at any time.

Also

$$\frac{dC}{dt} = \lambda_B B + R_C - \lambda_C C \quad (3)$$

$$\frac{dD}{dt} = \lambda_C C + R_D \quad (4)$$

As noted in the text R_C and $R_D \cong 0$. The solutions of these equations are then as follows:

$$A = \frac{R_A}{\lambda_A} (1 - e^{-\lambda_A t_P}) \quad (5)$$

$$B = \frac{R_A + R_B}{\lambda_B} \left(1 - e^{-\lambda_B t P} \right) - \frac{R_A}{\lambda_B - \lambda_A} \left(e^{-\lambda_A t P} - e^{-\lambda_B t P} \right) \quad (6)$$

$$C = \frac{R_A + R_B}{\lambda_C} \left(1 - e^{-\lambda_C t P} \right) + \frac{e^{-\lambda_B t P} - e^{-\lambda_C t P}}{\lambda_C - \lambda_B} \left[\frac{R_A \lambda_A - R_B (\lambda_B - \lambda_A)}{\lambda_B - \lambda_A} \right] - \frac{R_A \lambda_B (e^{-\lambda_A t} - e^{-\lambda_C t})}{(\lambda_B - \lambda_A)(\lambda_C - \lambda_A)} \quad (7)$$

$$D = (R_A + R_B) \left(t + \frac{e^{-\lambda_C t P} - 1}{\lambda_C} - \frac{\lambda_C \lambda_A R_A - \lambda_C R_B (\lambda_B - \lambda_A)}{(\lambda_C - \lambda_B)(\lambda_C - \lambda_A)} \right) \left[\frac{1 - e^{-\lambda_B t P}}{\lambda_B} - \frac{1 - e^{-\lambda_C t P}}{\lambda_C} \right] - \frac{\lambda_B \lambda_C R_A}{(\lambda_B - \lambda_A)(\lambda_C - \lambda_A)} \left[\frac{1 - e^{-\lambda_A t P}}{\lambda_A} - \frac{1 - e^{-\lambda_C t}}{\lambda_C} \right] \quad (8)$$

b. Cooling after discharge from reactor

$$\frac{dA}{dt} = -\lambda_A A \quad (9)$$

$$\frac{dB}{dt} = \lambda_A A - \lambda_B B \quad (10)$$

$$\frac{dC}{dt} = \lambda_B B - \lambda_C C \quad (11)$$

$$\frac{dD}{dt} = \lambda_C C \quad (12)$$

Solving:

$$A = A_0 e^{-\lambda_A t_c} \quad (13)$$

where

A_0 = atoms of isotope A at reactor discharge

t_c = cooling time after reactor discharge days

$$B = \frac{\lambda_A A_0}{\lambda_B - \lambda_A} \left(e^{-\lambda_A t_c} - e^{-\lambda_B t_c} \right) + B_0 e^{-\lambda_B t_c} \quad (14)$$

$$C = \frac{\lambda_A \lambda_B A_0}{\lambda_B - \lambda_A} \left[\frac{e^{-\lambda_A t_c} - e^{-\lambda_C t_c}}{\lambda_C - \lambda_A} - \frac{e^{-\lambda_B t_c} - e^{-\lambda_C t_c}}{\lambda_C - \lambda_B} \right] + \frac{\lambda_B B_0}{\lambda_C - \lambda_B} \\ (e^{-\lambda_B t_c} - e^{-\lambda_C t_c}) + C_0 e^{-\lambda_C t_c} \quad (15)$$

$$D = (A_0 + B_0 + C_0 + D_0) + \frac{\lambda_B \lambda_C A_0 e^{-\lambda_A t_c}}{(\lambda_B - \lambda_A)(\lambda_C - \lambda_A)} \\ + \left[\frac{\lambda_C B_0}{\lambda_C - \lambda_B} + \frac{\lambda_A \lambda_C A_0}{(\lambda_B - \lambda_A)(\lambda_C - \lambda_A)} \right] e^{-\lambda_B t_c} \\ - \left[C_0 - \frac{\lambda_B B_0}{\lambda_C - \lambda_B} + \frac{\lambda_A \lambda_B A_0}{(\lambda_C - \lambda_A)(\lambda_C - \lambda_B)} \right] e^{-\lambda_C t_c} \quad (16)$$

Note: The stable element of a chain (such as "D") is usually calculated by difference rather than by an equation such as (8) or (16).

2. Use of the foregoing data will be illustrated by the following example:

Example

Given:

100 grams of plutonium-239 fuel irradiated to a burnup of 0.5% in 200 days and cooled 15 days.

Calculate:

- (1) Power level, watts
- (2) Total curies
- (3) Gamma watts
- (4) Total energy dissipation due to fission product decay.

Solution:

- (1) Power level, watts.

$$\frac{(0.5 \text{ gram fissioned})}{200 \text{ days irradiated}} \left(\frac{0.95 \times 10^6 \text{ watt-days}}{\text{gram fissioned}} \right) = 2,375 \text{ watts}$$

- (2) From Fig. 2 at 200 days irradiation and 15 days cooled total curies per watt equal 0.35. $0.35 \times 2,375 = 831$ total curies.

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(3) Gamma watts.

From Fig. 7 gamma watts equal 9×10^{-4} watt-watt of reactor power. $2,375 \times 9 \times 10^{-4} = 2.14$ gamma watts

- (4) Total energy dissipation due to fission product decay.
From Fig. 4 at 200 days irradiation and 15 days cooled total energy dissipation is 1.5×10^{-3} watt per watt of reactor power. $(1.5 \times 10^{-3})(2,375) = 3.56$ watts total energy dissipation.

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8. Rate of Beta Energy Dissipation by Fission Products from Fast Fission of Plutonium-239

FIGURE 1
GROSS FISSION PRODUCT ACTIVITY FOR FAST FISSION OF URANIUM-235

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FIGURE 2

GROSS FISSION PRODUCT ACTIVITY FOR FAST FISSION OF PLUTONIUM-239

FIGURE 3

RATE OF ENERGY DISSIPATION BY FISSION PRODUCTS FROM FAST FISSION OF URANIUM-235

FIGURE 4

RATE OF ENERGY DISSIPATION BY FISSION PRODUCTS FROM FAST FISSION OF PLUTONIUM-239

FIGURE 5

RATE OF GAMMA ENERGY DISSIPATION BY FISSION PRODUCTS FROM FAST FISSION OF URANIUM-235

FIGURE 6

RATE OF BETA ENERGY DISSIPATION BY FISSION PRODUCTS FOR FAST FISSION OF URANIUM-235

FIGURE 7

RATE OF GAMMA ENERGY DISSIPATION BY FISSION PRODUCTS FROM FAST FISSION OF PLUTONIUM-239

FIGURE 8

RATE OF BETA ENERGY DISSIPATION BY FISSION PRODUCTS FROM FAST FISSION OF PLUTONIUM-239

Table 1

YIELDS FROM FAST FISSION U^{235} (ca. 1 MEV NEUTRONS)(Atoms per 100 Atoms U^{235} Fissioned)

<u>Mass No.</u>	<u>Yield</u>	<u>Mass No.</u>	<u>Yield</u>	<u>Mass No.</u>	<u>Yield</u>
74	0.001	102	5.300	130	1.525
75	0.002	103	4.000	131	3.110
76	0.004	104	2.775	132	4.450
77	0.009	105	1.026	133	6.620
78	0.020	106	0.470	134	7.810
79	0.042	107	0.280	135	6.560
80	0.075	108	0.163	136	6.420
81	0.133	109	0.087	137	6.190
82	0.250	110	0.079	138	6.120
83	0.382	111	0.067	139	6.250
84	0.625	112	0.042	140	5.800
85	1.142	113	0.043	141	5.300
86	1.644	114	0.044	142	5.190
87	2.890	115	0.045	143	5.190
88	3.500	116	0.045	144	4.770
89	4.185	117	0.048	145	4.320
90	4.420	118	0.048	146	3.870
91	5.310	119	0.052	147	3.240
92	5.300	120	0.052	148	2.280
93	5.425	121	0.055	149	1.185
94	5.700	122	0.053	150	0.735
95	6.770	123	0.053	151	0.465
96	6.750	124	0.080	152	0.282
97	6.560	125	0.123	153	0.142
98	6.240	126	0.180	154	0.067
99	6.200	127	0.260	155	0.029
100	6.750	128	0.430	156	0.013
101	6.050	129	0.790	157	0.007

 $\Sigma = 201.009$ $\Sigma 74 \text{ to } 116 = 100.845$ $\Sigma 117 \text{ to } 157 = 100.164$ 201.009

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Table 2

YIELDS FROM FAST FISSION OF Pu^{239} (ca. 2 MEV NEUTRONS)(Atoms per 100 Atoms Pu^{239} Fissioned)

<u>Mass. No.</u>	<u>Yield</u>	<u>Mass No.</u>	<u>Yield</u>	<u>Mass No.</u>	<u>Yield</u>
82	0.008	107	4.800	132	6.380
83	0.098	108	3.300	133	6.250
84	0.200	109	1.700	134	6.300
85	0.330	110	0.840	135	6.220
86	0.530	111	0.490	136	6.000
87	0.810	112	0.185	137	5.800
88	1.270	113	0.170	138	5.600
89	1.840	114	0.127	139	5.300
90	2.300	115	0.094	140	5.000
91	2.770	116	0.008	141	4.700
92	3.300	117	0.007	142	4.400
93	3.750	118	0.007	143	4.900
94	4.200	119	0.007	144	3.700
95	5.270	120	0.008	145	3.250
96	5.100	121	0.009	146	2.900
97	5.200	122	0.011	147	2.550
98	5.600	123	0.128	148	2.200
99	5.900	124	0.180	149	1.900
100	6.000	125	0.260	150	1.580
101	6.200	126	0.400	151	1.300
102	6.350	127	0.620	152	0.900
103	6.430	128	1.100	153	0.480
104	6.600	129	1.800	154	0.300
105	4.820	130	3.000	155	0.180
106	6.350	131	4.900	156	0.080
				157	0.020

 $\Sigma = 203.567$ $\Sigma 83 \text{ to } 118 = 102.954$ $\Sigma 119 \text{ to } 157 = 100.613$ 203.567

Table 3

FISSION PRODUCT SPECTRUM FOR FAST FISSION (CA 1 MEV NEUTRONS) OF U^{235} (10 DAYS IRRADIATED)

Element	Mass No	Half Life	(Atoms per 100 Atoms U^{235} Fissioned)									
			0 Days	15 Days	30 Days	60 Days	100 Days	300 Days	1 Year	2 Years	10 Years	∞
Ge	74	Stable	0 001	0 001	0 001	0 001	0 001	0 001	0 001	0 001	0 001	0 001
	76	Stable	0 004	0 004	0 004	0 004	0 004	0 004	0 004	0 004	0 004	0 004
			0 005	0 005	0 005	0 005	0 005	0 005	0 005	0 005	0 005	0 005
As	75	Stable	0 002	0 002	0 002	0 002	0 002	0 002	0 002	0 002	0 002	0 002
	77	39h	0 002	-	-	-	-	-	-	-	-	-
			0 004	0 002	0 002	0 002	0 002	0 002	0 002	0 002	0 002	0 002
Se	77	Stable	0 007	0 009	0 009	0 009	0 009	0 009	0 009	0 009	0 009	0 009
	78	Stable	0 020	0 020	0 020	0 020	0 020	0 020	0 020	0 020	0 020	0 020
	79	6.5×10^4 y	0 042	0 042	0 042	0 042	0 042	0 042	0 042	0 042	0 042	-
	80	Stable	0 075	0 075	0 075	0 075	0 075	0 075	0 075	0 075	0 075	0 075
	81	56.5m	0 001	-	-	-	-	-	-	-	-	-
	82	Stable	0 250	0 250	0 250	0 250	0 250	0 250	0 250	0 250	0 250	0 250
	83	25m	0 001	-	-	-	-	-	-	-	-	-
			0 396	0 396	0 396	0 396	0 396	0 396	0 396	0 396	0 396	0 354
Br	79	Stable	-	-	-	-	-	-	-	-	-	0 042
	81	Stable	0 132	0 133	0 133	0 133	0 133	0 133	0 133	0 133	0 133	0 133
	83	2.33h	0 005	-	-	-	-	-	-	-	-	-
	84	30m	0 002	-	-	-	-	-	-	-	-	-
	85	30m	0 003	-	-	-	-	-	-	-	-	-
			0 142	0 133	0 133	0 133	0 133	0 133	0 133	0 133	0 133	0 175
Kr	83m	114m	0 004	-	-	-	-	-	-	-	-	-
	83	Stable	0 372	0 382	0 382	0 382	0 382	0 382	0 382	0 382	0 382	0 382
	84	Stable	0 623	0 625	0 625	0 625	0 625	0 625	0 625	0 625	0 625	0 625
	85m	4.4h	0 030	-	-	-	-	-	-	-	-	-
	85	9.4y	0 266	0 299	0 296	0 296	0 293	0 280	0 276	0 253	0 152	-
	86	Stable	1 644	1 644	1 644	1 644	1 644	1 644	1 644	1 644	1 644	1 644
	87	78m	0 023	-	-	-	-	-	-	-	-	-
	88	2.77h	0 058	-	-	-	-	-	-	-	-	-
	89	3.18m	0 001	-	-	-	-	-	-	-	-	-
			3 021	2 950	2 947	2 947	2 944	2 931	2 927	2 904	2 803	2 651
Rb	85	Stable	0 843	0 843	0 846	0 846	0 849	0 862	0 866	0 889	0 990	1 142
	87	6×10^{10} y	2 867	2 890	2 890	2 890	2 890	2 890	2 890	2 890	2 890	-
	88	17.8m	0 006	-	-	-	-	-	-	-	-	-
	89	15.4m	0 006	-	-	-	-	-	-	-	-	-
	90	2.7m	0 001	-	-	-	-	-	-	-	-	-
			3 723	3 733	3 736	3 736	3 739	3 752	3 756	3 779	3 880	1 142
Sr	87	Stable	-	-	-	-	-	-	-	-	-	2 890
	88	Stable	3 436	3 500	3 500	3 500	3 500	3 500	3 500	3 500	3 500	3 500
	89	53d	3 925	3 240	2 660	1 800	1 075	0 077	0 034	-	-	-
	90	28y	4 417	4 417	4 417	4 412	4 400	4 335	4 330	4 220	3 460	-
	91	9.7h	0 311	-	-	-	-	-	-	-	-	-
	92	2.7h	0 087	-	-	-	-	-	-	-	-	-
			12 176	11 157	10 577	9 712	8 975	7 912	7 864	7 720	6 960	6 390
Y	89	Stable	0 253	0 945	1 525	2 385	3 110	4 108	4 151	4 185	4 185	4 185
	90	61h	0 002	0 002	0 002	0 002	0 002	0 002	0 002	0 002	0 001	-
	91m	51m	0 012	-	-	-	-	-	-	-	-	-
	91	57d	4 987	4 175	3 485	2 420	1 490	0 130	0 059	0 001	-	-
	92	3.6h	0 114	-	-	-	-	-	-	-	-	-
	93	10h	0 324	-	-	-	-	-	-	-	-	-
	94	16.5m	0 010	-	-	-	-	-	-	-	-	-
	95	10.5m	0 008	-	-	-	-	-	-	-	-	-
			5 710	5 122	5 012	4 807	4 602	4 240	4 212	4 188	4 186	4 185
Zr	90	Stable	-	0 001	0 001	0 006	0 018	0 083	0 088	0 198	0 959	4 420
	91	Stable	-	1 135	1 825	2 890	3 820	5 180	5 251	5 309	5 310	5 310
	92	Stable	5 099	5 300	5 300	5 300	5 300	5 300	5 300	5 300	5 300	5 300
	93	9.5×10^5 y	5 101	5 425	5 425	5 425	5 425	5 425	5 425	5 425	5 425	-
	94	Stable	5 690	5 700	5 700	5 700	5 700	5 700	5 700	5 700	5 700	5 700
	95	65d	6 420	5 430	4 620	3 310	2 215	0 262	0 131	0 003	-	-
	96	Stable	6 750	6 750	6 750	6 750	6 750	6 750	6 750	6 750	6 750	6 750
	97	17h	0 672	-	-	-	-	-	-	-	-	-
			29 732	29 741	29 621	29 381	29 228	28 700	28 645	28 685	29 444	27 480
Nb	93	Stable	-	-	-	-	-	-	-	-	-	5 425
	95	35d	0 321	1 019	1 426	1 675	1 741	0 289	0 147	0 003	-	-
	97m	60s	0 001	-	-	-	-	-	-	-	-	-
	97	72.1m	0 048	-	-	-	-	-	-	-	-	-
			0 370	1 019	1 426	1 675	1 741	0 289	0 147	0 003	-	5 425
Mo	95	Stable	0 021	0 321	0 724	1 785	2 814	6 219	6 492	6 764	6 770	6 770
	97	Stable	5 839	6 560	6 560	6 560	6 560	6 560	6 560	6 560	6 560	6 560
	98	Stable	6 240	6 240	6 240	6 240	6 240	6 240	6 240	6 240	6 240	6 240
	99	67h	1 992	0 048	0 001	-	-	-	-	-	-	-
	100	Stable	6 750	6 750	6 750	6 750	6 750	6 750	6 750	6 750	6 750	6 750
	101	14.6m	0 009	-	-	-	-	-	-	-	-	-
	102	12m	0 006	-	-	-	-	-	-	-	-	-
			20 857	19 919	20 275	21 335	22 364	25 769	26 042	26 314	26 320	26 320

Table 3 (Cont'd.)

Element	Mass No.	Half Life	(Atoms per 100 Atoms U ²³⁵ Fissioned)									
			0 Days	15 Days	30 Days	60 Days	100 Days	300 Days	1 Year	2 Years	10 Years	∞
Tc	99m	6h	0.194	0.004	-	-	-	-	-	-	-	-
	99	9.2 x 10 ⁵ y	4.014	6.148	6.199	6.200	6.200	6.200	6.200	6.200	6.200	-
	101	14m	0.009	-	-	-	-	-	-	-	-	-
			4.217	6.152	6.199	6.200	6.200	6.200	6.200	6.200	6.200	-
Ru	99	Stable	-	-	-	-	-	-	-	-	-	6.200
	101	Stable	6.032	6.050	6.050	6.050	6.050	6.050	6.050	6.050	6.050	6.050
	102	Stable	5.294	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300
	103	39.8d	3.670	2.840	2.180	1.298	0.645	0.020	0.007	-	-	-
	104	Stable	2.775	2.775	2.775	2.775	2.775	2.775	2.775	2.775	2.775	2.775
	105	4.5h	0.028	-	-	-	-	-	-	-	-	-
	106	1.0y	0.466	0.453	0.439	0.416	0.385	0.263	0.232	0.116	0.001	-
			18.265	17.418	16.744	15.839	15.155	14.408	14.364	14.241	14.126	20.325
Rh	103m	57m	0.004	0.003	0.002	0.001	-	-	-	-	-	-
	103	Stable	0.326	1.157	1.818	2.701	3.355	3.980	3.993	4.000	4.000	4.000
	105	36.5h	0.217	-	-	-	-	-	-	-	-	-
	108	9h	0.009	-	-	-	-	-	-	-	-	-
	109	1h	0.001	-	-	-	-	-	-	-	-	-
			0.557	1.160	1.820	2.702	3.355	3.980	3.993	4.000	4.000	4.000
Pd	105	Stable	0.781	1.026	1.026	1.026	1.026	1.026	1.026	1.026	1.026	1.026
	106	Stable	0.004	0.017	0.031	0.054	0.085	0.207	0.238	0.354	0.469	0.470
	107	7 x 10 ⁶ y	0.280	0.280	0.280	0.280	0.280	0.280	0.280	0.280	0.280	-
	108	Stable	0.154	0.163	0.163	0.163	0.163	0.163	0.163	0.163	0.163	0.163
	109	13.6h	0.007	-	-	-	-	-	-	-	-	-
	110	Stable	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079
	112	21h	0.005	-	-	-	-	-	-	-	-	-
			1.310	1.565	1.579	1.602	1.633	1.755	1.786	1.902	2.017	1.738
Ag	107	Stable	-	-	-	-	-	-	-	-	-	0.280
	109	Stable	0.079	0.087	0.087	0.087	0.087	0.087	0.087	0.087	0.087	0.087
	111	7.6d	0.044	0.011	0.003	-	-	-	-	-	-	-
	112	3.2h	0.001	-	-	-	-	-	-	-	-	-
	113	5.3h	0.001	-	-	-	-	-	-	-	-	-
			0.125	0.098	0.090	0.087	0.087	0.087	0.087	0.087	0.087	0.367
Cd	111	Stable	0.023	0.056	0.064	0.067	0.067	0.067	0.067	0.067	0.067	0.067
	112	Stable	0.036	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042
	113	Stable	0.042	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043
	114	Stable	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044
	115m	43d	0.004	0.003	0.002	0.001	0.001	-	-	-	-	-
	115	53h	0.012	-	-	-	-	-	-	-	-	-
	116	Stable	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045
			0.206	0.233	0.240	0.242	0.242	0.241	0.241	0.241	0.241	0.241
In	115m	4.5h	0.001	-	-	-	-	-	-	-	-	-
	115	6 x 10 ¹⁴ y	0.028	0.042	0.043	0.044	0.044	0.045	0.045	0.045	0.045	-
			0.029	0.042	0.043	0.044	0.044	0.045	0.045	0.045	0.045	-
Sn	115	Stable	-	-	-	-	-	-	-	-	-	0.045
	117m	14d	0.041	0.020	0.009	-	-	-	-	-	-	-
	117	Stable	0.007	0.028	0.039	0.048	0.048	0.048	0.048	0.048	0.048	0.048
	118	Stable	0.048	0.048	0.048	0.048	0.048	0.048	0.048	0.048	0.048	0.048
	119m	250d	0.052	0.051	0.050	0.046	0.037	0.022	0.021	0.006	-	-
	119	Stable	-	0.001	0.002	0.006	0.015	0.030	0.031	0.046	0.052	0.052
	120	Stable	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052
	121	27.5h	0.006	-	-	-	-	-	-	-	-	-
	122	Stable	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053
	123	39.5m	0.001	-	-	-	-	-	-	-	-	-
	124	Stable	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080
	125	9.4d	0.045	0.015	0.005	-	-	-	-	-	-	-
	126	50m	0.001	-	-	-	-	-	-	-	-	-
	127	1.5h	0.002	-	-	-	-	-	-	-	-	-
			0.388	0.348	0.338	0.333	0.333	0.333	0.333	0.333	0.333	0.378
Sb	121	Stable	0.049	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055
	123	Stable	0.052	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053
	125	2.7y	0.078	0.107	0.116	0.118	0.115	0.100	0.096	0.074	0.010	-
	126	9h	0.010	-	-	-	-	-	-	-	-	-
	127	93h	0.120	0.009	0.001	-	-	-	-	-	-	-
	128	1.1h	0.003	-	-	-	-	-	-	-	-	-
	129	4.2h	0.016	-	-	-	-	-	-	-	-	-
	130	40m	0.004	-	-	-	-	-	-	-	-	-
	131	23.1m	0.007	-	-	-	-	-	-	-	-	-
			0.339	0.224	0.225	0.226	0.223	0.208	0.204	0.182	0.118	0.198

Table 3 (Cont'd.)

Element	Mass No.	Half Life	(Atoms per 100 Atoms U ²³⁵ Fissioned)									
			0 Days	15 Days	30 Days	60 Days	100 Days	300 Days	1 Year	2 Years	10 Years	∞
Te	125m	58d	-	-	0.001	0.004	0.006	0.006	0.006	0.004	-	-
	125	Stable	-	0.001	0.001	0.001	0.002	0.017	0.021	0.045	0.113	0.123
	126	Stable	0.170	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180
	127m	115d	0.021	0.036	0.034	0.029	0.023	0.007	0.005	-	-	-
	127	9.3h	0.010	-	-	-	-	-	-	-	-	-
	128	Stable	0.427	0.430	0.430	0.430	0.430	0.430	0.430	0.430	0.430	0.430
	129m	33.5d	0.136	0.099	0.073	0.039	0.017	-	-	-	-	-
	129	72m	0.005	-	-	-	-	-	-	-	-	-
	130	Stable	1.521	1.525	1.525	1.525	1.525	1.525	1.525	1.525	1.525	1.525
	131m	30h	0.083	-	-	-	-	-	-	-	-	-
	131	24.8m	0.008	-	-	-	-	-	-	-	-	-
	132	77.7h	1.835	0.074	0.003	-	-	-	-	-	-	-
	134	44m	0.035	-	-	-	-	-	-	-	-	-
			4.251	2.345	2.247	2.208	2.183	2.165	2.167	2.184	2.248	2.258
I	127	Stable	0.107	0.215	0.225	0.231	0.237	0.253	0.255	0.260	0.260	0.260
	129	1.72 x 10 ⁷ y	0.633	0.691	0.717	0.751	0.773	0.790	0.790	0.790	0.790	-
	131	8.14d	2.095	0.580	0.154	0.011	0.001	-	-	-	-	-
	132	2.4h	0.057	0.002	-	-	-	-	-	-	-	-
	133	20.5h	0.816	-	-	-	-	-	-	-	-	-
	134	52.5m	0.042	-	-	-	-	-	-	-	-	-
	135	6.68h	0.264	-	-	-	-	-	-	-	-	-
			4.014	1.488	1.096	0.993	1.011	1.043	1.045	1.050	1.050	0.260
Xe	129	Stable	-	-	-	-	-	-	-	-	-	0.790
	131	Stable	0.917	2.530	2.956	3.099	3.109	3.110	3.110	3.110	3.110	3.110
	132	Stable	2.558	4.374	4.447	4.450	4.450	4.450	4.450	4.450	4.450	4.450
	133	5.27d	3.419	0.590	0.082	0.002	-	-	-	-	-	-
	134	Stable	7.733	7.810	7.810	7.810	7.810	7.810	7.810	7.810	7.810	7.810
	135m	15.6m	0.003	-	-	-	-	-	-	-	-	-
	135	9.13h	0.362	-	-	-	-	-	-	-	-	-
	136	Stable	6.791	6.791	6.791	6.791	6.791	6.791	6.791	6.791	6.791	6.791
	138	17m	0.010	-	-	-	-	-	-	-	-	-
			21.793	22.095	22.086	22.152	22.160	22.161	22.161	22.161	22.161	22.951
Cs	133	Stable	2.385	6.030	6.538	6.618	6.620	6.620	6.620	6.620	6.620	6.620
	135	3 x 10 ⁶ y	5.931	6.560	6.560	6.560	6.560	6.560	6.560	6.560	6.560	-
	137	27y	5.819	5.810	5.800	5.790	5.775	5.690	5.670	5.530	4.500	-
	138	32.9m	0.020	-	-	-	-	-	-	-	-	-
	139	9.5m	0.006	-	-	-	-	-	-	-	-	-
			14.161	18.400	18.898	18.968	18.955	18.870	18.850	18.710	17.680	6.620
Ba	135	Stable	-	-	-	-	-	-	-	-	-	6.560
	137	Stable	-	0.009	0.019	0.029	0.044	0.129	0.149	0.289	1.319	5.819
	138	Stable	6.090	6.120	6.120	6.120	6.120	6.120	6.120	6.120	6.120	6.120
	139	85m	0.057	-	-	-	-	-	-	-	-	-
	140	12.8d	4.495	1.997	0.890	0.176	0.020	-	-	-	-	-
	141	18m	0.010	-	-	-	-	-	-	-	-	-
			10.642	8.126	7.029	6.325	6.184	6.249	6.269	6.409	7.439	18.499
La	139	Stable	6.187	6.250	6.250	6.250	6.250	6.250	6.250	6.250	6.250	6.250
	140	40h	0.465	0.301	0.136	0.027	0.003	-	-	-	-	-
	141	3.7h	0.107	-	-	-	-	-	-	-	-	-
	142	74m	0.039	-	-	-	-	-	-	-	-	-
	143	19m	0.010	-	-	-	-	-	-	-	-	-
			6.808	6.551	6.386	6.277	6.253	6.250	6.250	6.250	6.250	6.250
Ce	140	Stable	0.840	3.502	4.774	5.597	5.777	5.800	5.800	5.800	5.800	5.800
	141	33.1d	4.350	3.260	2.383	1.269	0.548	0.008	-	-	-	-
	142	Stable	5.151	5.190	5.190	5.190	5.190	5.190	5.190	5.190	5.190	5.190
	143	33h	1.024	-	-	-	-	-	-	-	-	-
	144	282d	4.695	4.520	4.360	4.050	3.670	2.247	1.910	0.779	-	-
	145	1.8h	0.047	-	-	-	-	-	-	-	-	-
	146	14.6m	0.005	-	-	-	-	-	-	-	-	-
			16.112	16.472	16.707	16.106	15.185	13.245	12.900	11.769	10.990	10.990
Pr	141	Stable	0.833	2.040	2.917	4.031	4.752	5.292	5.300	5.300	5.300	5.300
	143	13.7d	4.070	2.340	1.118	0.245	0.033	-	-	-	-	-
	145	4.5h	0.117	-	-	-	-	-	-	-	-	-
	146	24m	0.009	-	-	-	-	-	-	-	-	-
			5.029	4.380	4.035	4.276	4.785	5.292	5.300	5.300	5.300	5.300

Table 3 (Cont'd.)

Element	Mass No.	Half Life	(Atoms per 100 Atoms U ²³⁵ Fissioned)									
			0 Days	15 Days	30 Days	60 Days	100 Days	300 Days	1 Year	2 Years	10 Years	∞
Nd	143	Stable	0.086	2.850	4.072	4.945	5.157	5.190	5.190	5.190	5.190	5.190
	144	Stable	0.075	0.250	0.410	0.720	1.100	2.523	2.860	3.991	4.770	4.770
	145	Stable	4.156	4.320	4.320	4.320	4.320	4.320	4.320	4.320	4.320	4.320
	146	Stable	3.856	3.870	3.870	3.870	3.870	3.870	3.870	3.870	3.870	3.870
	147	11.3d	2.422	0.964	0.384	0.061	0.005	-	-	-	-	-
	148	Stable	2.280	2.280	2.280	2.280	2.280	2.280	2.280	2.280	2.280	2.280
	149	2h	0.015	-	-	-	-	-	-	-	-	-
	150	Stable	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735
	151	15m	0.001	-	-	-	-	-	-	-	-	-
			13.626	15.269	16.071	16.931	17.467	18.918	19.255	20.386	21.165	21.165
Pm	147	2.6y	0.808	2.255	2.810	3.068	3.046	2.630	2.502	1.915	0.225	-
	149	54h	0.364	0.004	-	-	-	-	-	-	-	-
	151	27.5h	0.077	-	-	-	-	-	-	-	-	-
			1.249	2.259	2.810	3.068	3.046	2.630	2.502	1.915	0.225	-
Sm	147	Stable	0.010	0.021	0.046	0.111	0.189	0.610	0.738	1.325	3.015	3.240
	149	Stable	0.806	1.181	1.185	1.185	1.185	1.185	1.185	1.185	1.185	1.185
	151	73y	0.387	0.465	0.465	0.464	0.463	0.461	0.461	0.457	0.424	-
	152	Stable	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282
	153	47h	0.039	0.001	-	-	-	-	-	-	-	-
	154	Stable	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067
	156	10h	0.001	-	-	-	-	-	-	-	-	-
			1.592	2.017	2.045	2.109	2.186	2.605	2.733	3.316	4.973	4.774
Eu	151	Stable	-	-	-	0.001	0.002	0.004	0.004	0.008	0.041	0.465
	153	Stable	0.013	0.141	0.142	0.142	0.142	0.142	0.142	0.142	0.142	0.142
	155	1.7y	0.029	0.029	0.028	0.027	0.026	0.021	0.019	0.013	-	-
	156	15.4d	0.011	0.006	0.003	0.001	-	-	-	-	-	-
	157	15.4h	0.001	-	-	-	-	-	-	-	-	-
			0.144	0.176	0.173	0.171	0.170	0.167	0.165	0.163	0.183	0.607
Gd	155	Stable	-	-	0.001	0.002	0.003	0.008	0.010	0.016	0.029	0.029
	156	Stable	0.001	0.007	0.010	0.012	0.013	0.013	0.013	0.013	0.013	0.013
	157	Stable	0.006	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
			0.007	0.014	0.018	0.021	0.023	0.028	0.030	0.036	0.049	0.049

Table 4

FISSION PRODUCT SPECTRA FOR FAST FISSION (CA 1 MEV NEUTRONS) OF U^{235} (30 DAYS IRRADIATED)

Element	Mass No.	Half Life	(Atoms per 100 Atoms U^{235} Fissioned)									
			0 Days	15 Days	30 Days	60 Days	100 Days	300 Days	1 Year	2 Years	10 Years	∞
Ge	74	Stable	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
	76	Stable	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004
			0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
As	75	Stable	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
	77	39h	0.001	-	-	-	-	-	-	-	-	-
			0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Se	77	Stable	0.008	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
	78	Stable	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
	79	$6.5 \times 10^4 y$	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	-
	80	Stable	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075
	82	Stable	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
			0.395	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.354
Br	79	Stable	-	-	-	-	-	-	-	-	-	0.042
	81	Stable	0.133	0.133	0.133	0.133	0.133	0.133	0.133	0.133	0.133	0.133
	83	2.33h	0.002	-	-	-	-	-	-	-	-	-
	84	30m	0.001	-	-	-	-	-	-	-	-	-
	85	30m	0.001	-	-	-	-	-	-	-	-	-
			0.137	0.133	0.133	0.133	0.133	0.133	0.133	0.133	0.133	0.175
Kr	83m	114m	0.001	-	-	-	-	-	-	-	-	-
	83	Stable	0.379	0.382	0.382	0.382	0.382	0.382	0.382	0.382	0.382	0.382
	84	Stable	0.624	0.625	0.625	0.625	0.625	0.625	0.625	0.625	0.625	0.625
	85m	4.36h	0.010	-	-	-	-	-	-	-	-	-
	85	9.4y	0.264	0.264	0.264	0.262	0.259	0.250	0.247	0.233	0.136	-
	86	Stable	1.644	1.644	1.644	1.644	1.644	1.644	1.644	1.644	1.644	1.644
	87	78m	0.011	-	-	-	-	-	-	-	-	-
	88	2.77h	0.019	-	-	-	-	-	-	-	-	-
			2.952	2.915	2.915	2.913	2.910	2.901	2.898	2.884	2.787	2.651
Rb	85	Stable	0.867	0.878	0.878	0.880	0.883	0.892	0.895	0.909	1.006	1.142
	87	$6 \times 10^{10} y$	2.879	2.890	2.890	2.890	2.890	2.890	2.890	2.890	2.890	-
	88	17.8m	0.003	-	-	-	-	-	-	-	-	-
	89	15.4m	0.002	-	-	-	-	-	-	-	-	-
			3.751	3.768	3.768	3.770	3.773	3.782	3.785	3.799	3.896	1.142
Sr	87	Stable	-	-	-	-	-	-	-	-	-	2.890
	88	Stable	3.478	3.500	3.500	3.500	3.500	3.500	3.500	3.500	3.500	3.500
	89	53d	3.465	2.850	2.342	1.578	0.944	0.068	0.030	-	-	-
	90	28y	4.420	4.419	4.416	4.410	4.400	4.370	4.340	4.210	3.460	-
	91	9.7h	0.104	-	-	-	-	-	-	-	-	-
	92	2.7h	0.035	-	-	-	-	-	-	-	-	-
			11.502	10.769	10.258	9.488	8.844	7.938	7.870	7.710	6.960	6.390
Y	89	Stable	0.718	1.335	1.843	2.607	3.241	4.117	4.155	4.185	4.185	4.185
	90	61h	-	0.001	0.001	0.001	0.001	0.001	0.001	0.001	-	-
	91m	51m	0.003	-	-	-	-	-	-	-	-	-
	91	57d	4.360	3.730	3.105	2.155	1.328	0.117	0.054	-	-	-
	92	3.6h	0.039	-	-	-	-	-	-	-	-	-
	93	10h	0.108	-	-	-	-	-	-	-	-	-
	94	16.5m	0.003	-	-	-	-	-	-	-	-	-
	95	10.5m	0.003	-	-	-	-	-	-	-	-	-
			5.234	5.066	4.949	4.763	4.570	4.235	4.210	4.186	4.185	4.185
Zr	90	Stable	-	-	0.003	0.009	0.019	0.049	0.079	0.209	0.960	4.420
	91	Stable	0.843	1.580	2.205	3.155	3.982	5.193	5.256	5.310	5.310	5.310
	92	Stable	5.226	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300
	93	$9.5 \times 10^5 y$	5.317	5.425	5.425	5.425	5.425	5.425	5.425	5.425	5.425	-
	94	Stable	5.697	5.700	5.700	5.700	5.700	5.700	5.700	5.700	5.700	5.700
	95	65d	5.790	4.920	4.160	2.995	2.010	0.247	0.118	0.003	-	-
	96	Stable	6.750	6.750	6.750	6.750	6.750	6.750	6.750	6.750	6.750	6.750
	97	17h	0.224	-	-	-	-	-	-	-	-	-
			29.847	29.675	29.543	29.334	29.186	28.664	28.628	28.697	29.445	27.480
Nb	93	Stable	-	-	-	-	-	-	-	-	-	5.425
	95	35d	0.797	1.298	1.562	1.678	1.508	0.262	0.134	0.003	-	-
	97	72m	0.016	-	-	-	-	-	-	-	-	-
			0.813	1.298	1.562	1.678	1.508	0.262	0.134	0.003	-	5.425
Mo	95	Stable	0.180	0.552	1.048	2.097	3.252	6.261	6.518	6.764	6.770	6.770
	97	Stable	6.320	6.560	6.560	6.560	6.560	6.560	6.560	6.560	6.560	6.560
	98	Stable	6.240	6.240	6.240	6.240	6.240	6.240	6.240	6.240	6.240	6.240
	99	67h	0.832	0.020	-	-	-	-	-	-	-	-
	100	Stable	6.750	6.750	6.750	6.750	6.750	6.750	6.750	6.750	6.750	6.750
	101	14.6m	0.003	-	-	-	-	-	-	-	-	-
	102	12m	0.002	-	-	-	-	-	-	-	-	-
			20.327	20.122	20.598	21.647	22.802	25.811	26.068	26.314	26.320	26.320

Table 4 (Cont'd.)

Element	Mass No.	Half Life	(Atoms per 100 Atoms U ²³⁵ Fissioned)									
			0 Days	15 Days	30 Days	60 Days	100 Days	300 Days	1 Year	2 Years	10 Years	∞
Tc	99m	6h	0.065	--	-	-	-	-	-	-	-	-
	99	2.12 x 10 ⁵ y	5.303	6.180	6.200	6.200	6.200	6.200	6.200	6.200	6.200	-
	101	14m	0.003	-	-	-	-	-	-	-	-	-
			5.371	6.180	6.200	6.200	6.200	6.200	6.200	6.200	6.200	-
Ru	99	Stable	-	-	-	-	-	-	-	-	-	6.200
	101	Stable	6.044	6.050	6.050	6.050	6.050	6.050	6.050	6.050	6.050	6.050
	102	Stable	5.298	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300
	103	39.8d	3.125	2.415	1.852	1.102	0.549	0.017	0.006	-	-	-
	104	Stable	2.775	2.775	2.775	2.775	2.775	2.775	2.775	2.775	2.775	2.775
	105	4.5h	0.009	-	-	-	-	-	-	-	-	-
	106	1y	0.454	0.451	0.428	0.405	0.375	0.256	0.227	0.113	0.001	-
			17.705	16.991	16.405	15.632	15.049	14.398	14.358	14.238	14.126	20.325
Rh	103	Stable	0.875	1.585	2.148	2.898	3.451	3.983	3.994	4.000	4.000	4.000
	105	36.5h	0.075	-	-	-	-	-	-	-	-	-
	108	9h	0.003	-	-	-	-	-	-	-	-	-
			0.953	1.585	2.148	2.898	3.451	3.983	3.994	4.000	4.000	4.000
Pd	105	Stable	0.942	1.026	1.026	1.026	1.026	1.026	1.026	1.026	1.026	1.026
	106	Stable	0.016	0.019	0.042	0.065	0.095	0.214	0.243	0.357	0.469	0.470
	107	7 x 10 ⁶ y	0.280	0.280	0.280	0.280	0.280	0.280	0.280	0.280	0.280	-
	108	Stable	0.160	0.163	0.163	0.163	0.163	0.163	0.163	0.163	0.163	0.163
	109	13.6h	0.002	-	-	-	-	-	-	-	-	-
	110	Stable	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079
	112	21h	0.002	-	-	-	-	-	-	-	-	-
			1.481	1.567	1.590	1.613	1.643	1.762	1.791	1.905	2.017	1.738
Ag	107	Stable	-	-	-	-	-	-	-	-	-	0.280
	109	Stable	0.085	0.087	0.087	0.087	0.087	0.087	0.087	0.087	0.087	0.087
	111	7.6d	0.023	0.006	0.002	-	-	-	-	-	-	-
			0.108	0.093	0.089	0.087	0.087	0.087	0.087	0.087	0.087	0.367
Cd	111	Stable	0.044	0.061	0.065	0.067	0.067	0.067	0.067	0.067	0.067	0.067
	112	Stable	0.040	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042
	113	Stable	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043
	114	Stable	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044
	115m	43d	0.004	0.002	0.002	0.001	-	-	-	-	-	-
	115	53h	0.003	-	-	-	-	-	-	-	-	-
	116	Stable	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045
			0.223	0.237	0.241	0.242	0.241	0.241	0.241	0.241	0.241	0.241
In	115	6 x 10 ¹⁴ y	0.038	0.043	0.043	0.044	0.045	0.045	0.045	0.045	0.045	-
Sn	115	Stable	-	-	-	-	-	-	-	-	-	0.045
	117m	14d	0.027	0.013	0.006	0.001	-	-	-	-	-	-
	117	Stable	0.021	0.035	0.042	0.047	0.048	0.048	0.048	0.048	0.048	0.048
	118	Stable	0.048	0.048	0.048	0.048	0.048	0.048	0.048	0.048	0.048	0.048
	119m	250d	0.052	0.049	0.046	0.042	0.037	0.022	0.018	0.007	-	-
	119	Stable	-	0.003	0.006	0.010	0.015	0.030	0.034	0.045	0.052	0.052
	120	Stable	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052
	121	27.5h	0.002	-	-	-	-	-	-	-	-	-
	122	Stable	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053
	124	Stable	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080
	125	9.4d	0.026	0.009	0.003	-	-	-	-	-	-	-
			0.361	0.342	0.336	0.333	0.333	0.333	0.333	0.333	0.333	0.378
Sb	121	Stable	0.053	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055
	123	Stable	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053
	125	2.7y	0.097	0.113	0.118	0.118	0.115	0.100	0.096	0.074	0.010	-
	127	93h	0.048	0.003	-	-	-	-	-	-	-	-
	128	1.1h	0.001	-	-	-	-	-	-	-	-	-
	129	4.2h	0.005	-	-	-	-	-	-	-	-	-
	130	40m	0.002	-	-	-	-	-	-	-	-	-
	131	23.1m	0.003	-	-	-	-	-	-	-	-	-
			0.262	0.224	0.226	0.226	0.223	0.208	0.204	0.182	0.118	0.108
Te	125m	58d	-	0.001	0.002	0.005	0.007	0.006	0.006	0.004	-	-
	125	Stable	-	-	-	-	0.001	0.017	0.021	0.045	0.113	0.123
	126	Stable	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180
	127m	115d	0.032	0.071	0.070	0.057	0.045	0.013	0.009	0.001	-	-
	127	9.3h	0.005	-	-	-	-	-	-	-	-	-
	128	Stable	0.429	0.430	0.430	0.430	0.430	0.430	0.430	0.430	0.430	0.430
	129m	33.5d	0.112	0.082	0.060	0.033	0.009	-	-	-	-	-
	129	72m	0.002	-	-	-	-	-	-	-	-	-
	130	Stable	1.523	1.525	1.525	1.525	1.525	1.525	1.525	1.525	1.525	1.525
	131m	30h	0.028	-	-	-	-	-	-	-	-	-
	131	24.8m	0.003	-	-	-	-	-	-	-	-	-
	132	77.7h	0.690	0.028	0.001	-	-	-	-	-	-	-
	134	44m	0.001	-	-	-	-	-	-	-	-	-
			3.005	2.317	2.268	2.230	2.197	2.171	2.171	2.185	2.248	2.258

Table 4 (Cont'd.)

Element	Mass No.	Half Life	(Atoms per 100 Atoms U^{235} Fissioned)									
			0 Days	15 Days	30 Days	60 Days	100 Days	300 Days	1 Year	2 Years	10 Years	∞
I	127	Stable	0.175	0.186	0.190	0.203	0.215	0.247	0.251	0.259	0.260	0.260
	129	1.7×10^7 y	0.671	0.708	0.730	0.757	0.781	0.790	0.790	0.790	0.790	-
	131	8d	1.102	0.290	0.080	0.006	-	-	-	-	-	-
	132	2.4h	0.022	0.001	-	-	-	-	-	-	-	-
	133	20.5h	0.273	-	-	-	-	-	-	-	-	-
	134	52.5m	0.001	-	-	-	-	-	-	-	-	-
	135	6.68h	0.088	-	-	-	-	-	-	-	-	-
			2.332	1.185	1.000	0.966	0.996	1.037	1.041	1.049	1.050	0.260
Xe	129	Stable	-	-	-	-	-	-	-	-	-	0.790
	131	Stable	1.974	2.820	3.030	3.104	3.110	3.110	3.110	3.110	3.110	3.110
	132	Stable	3.738	4.421	4.449	4.450	4.450	4.450	4.450	4.450	4.450	4.450
	133	5.3d	1.655	0.276	0.039	0.001	-	-	-	-	-	-
	134	Stable	7.808	7.810	7.810	7.810	7.810	7.810	7.810	7.810	7.810	7.810
	135m	15.6m	0.001	-	-	-	-	-	-	-	-	-
	135	9.13h	0.110	-	-	-	-	-	-	-	-	-
	136	Stable	6.791	6.791	6.791	6.791	6.791	6.791	6.791	6.791	6.791	6.791
	138	17m	0.003	-	-	-	-	-	-	-	-	-
			22.080	22.118	22.119	22.156	22.161	22.161	22.161	22.161	22.161	22.951
Cs	133	Stable	4.692	6.344	6.581	6.619	6.620	6.620	6.620	6.620	6.620	6.620
	135	2.1×10^6 y	6.361	6.560	6.560	6.560	6.560	6.560	6.560	6.560	6.560	-
	137	27y	5.790	5.784	5.778	5.766	5.749	5.669	5.643	5.501	4.480	-
	138	32.9m	0.007	-	-	-	-	-	-	-	-	-
	139	9.5m	0.002	-	-	-	-	-	-	-	-	-
			16.852	18.688	18.919	18.945	18.929	18.849	18.823	18.681	17.660	6.620
Ba	135	Stable	-	-	-	-	-	-	-	-	-	6.560
	137	Stable	0.029	0.035	0.041	0.053	0.070	0.150	0.176	0.318	1.339	5.819
	138	Stable	6.110	6.120	6.120	6.120	6.120	6.120	6.120	6.120	6.120	6.120
	139	85m	0.018	-	-	-	-	-	-	-	-	-
	140	12.8d	2.909	1.291	0.577	0.114	0.013	-	-	-	-	-
	141	18m	0.003	-	-	-	-	-	-	-	-	-
			9.069	7.446	6.738	6.287	6.203	6.270	6.296	6.438	7.459	18.499
La	139	Stable	6.230	6.250	6.250	6.250	6.250	6.250	6.250	6.250	6.250	6.250
	140	40h	0.361	0.194	0.086	0.017	0.002	-	-	-	-	-
	141	3.7h	0.039	-	-	-	-	-	-	-	-	-
	142	74m	0.013	-	-	-	-	-	-	-	-	-
	143	19m	0.003	-	-	-	-	-	-	-	-	-
			6.646	6.444	6.336	6.267	6.252	6.250	6.250	6.250	6.250	6.250
Ce	140	Stable	2.530	4.315	5.137	5.669	5.785	5.800	5.800	5.800	5.800	5.800
	141	33.1d	3.858	2.745	2.075	1.103	0.478	0.007	-	-	-	-
	142	Stable	5.177	5.190	5.190	5.190	5.190	5.190	5.190	5.190	5.190	5.190
	143	33h	0.343	0.027	-	-	-	-	-	-	-	-
	144	282d	4.650	4.475	4.315	4.015	3.640	2.220	1.895	0.772	-	-
	145	1.8h	0.016	-	-	-	-	-	-	-	-	-
	146	14.6m	0.001	-	-	-	-	-	-	-	-	-
			16.575	16.752	16.717	15.977	15.093	13.217	12.885	11.762	10.990	10.990
Pr	141	Stable	1.400	2.555	3.225	4.197	4.822	5.293	5.300	5.300	5.300	5.300
	143	13.7d	2.505	1.322	0.637	0.138	0.018	-	-	-	-	-
	145	4.5h	0.039	-	-	-	-	-	-	-	-	-
	146	24m	0.003	-	-	-	-	-	-	-	-	-
			3.947	3.877	3.862	4.335	4.840	5.293	5.300	5.300	5.300	5.300
Nd	143	Stable	2.339	3.841	4.553	5.052	5.172	5.190	5.190	5.190	5.190	5.190
	144	Stable	0.120	0.295	0.455	0.755	1.130	2.550	2.875	3.998	4.770	4.770
	145	Stable	4.265	4.320	4.320	4.320	4.320	4.320	4.320	4.320	4.320	4.320
	146	Stable	3.866	3.870	3.870	3.870	3.870	3.870	3.870	3.870	3.870	3.870
	147	11.3d	1.478	0.590	0.235	0.037	0.003	-	-	-	-	-
	148	Stable	2.280	2.280	2.280	2.280	2.280	2.280	2.280	2.280	2.280	2.280
	149	2h	0.005	-	-	-	-	-	-	-	-	-
	150	Stable	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735
	151	15m	0.001	-	-	-	-	-	-	-	-	-
			15.089	15.931	16.448	17.049	17.510	18.945	19.270	20.393	21.165	21.165
Pm	147	2.6y	1.748	2.610	2.935	3.068	3.010	2.605	2.485	1.902	0.224	-
	149	54h	0.129	0.001	-	-	-	-	-	-	-	-
	151	27.5h	0.026	-	-	-	-	-	-	-	-	-
			1.903	2.611	2.935	3.068	3.010	2.605	2.485	1.902	0.224	-
Sm	147	Stable	0.014	0.040	0.070	0.135	0.227	0.635	0.755	1.338	3.016	3.240
	149	Stable	1.051	1.184	1.185	1.185	1.185	1.185	1.185	1.185	1.185	1.185
	151	73y	0.438	0.464	0.465	0.464	0.464	0.462	0.461	0.457	0.423	-
	152	Stable	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282
	153	47h	0.013	-	-	-	-	-	-	-	-	-
	154	Stable	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067
			1.866	2.038	2.069	2.133	2.225	2.631	2.750	3.329	4.973	4.774
Eu	151	Stable	-	-	-	0.001	0.001	0.003	0.004	0.008	0.042	0.465
	153	Stable	0.129	0.142	0.142	0.142	0.142	0.142	0.142	0.142	0.142	0.142
	155	1.7y	0.029	0.028	0.028	0.027	0.026	0.020	0.019	0.013	-	-
	156	15.4d	0.007	-	-	-	-	-	-	-	-	-
			0.165	0.170	0.170	0.170	0.169	0.165	0.165	0.163	0.184	0.607
Gd	155	Stable	-	0.001	0.001	0.002	0.003	0.009	0.010	0.016	0.029	0.029
	156	Stable	0.006	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
	157	Stable	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
			0.013	0.021	0.021	0.022	0.023	0.029	0.030	0.036	0.049	0.049

Table 5

FISSION PRODUCT SPECTRUM FROM FAST FISSION (CA 1 MEV NEUTRONS) OF U^{235} (85 DAYS IRRADIATED)

Element	Mass No	Half Life	(Atoms Per 100 Atoms After Cooling)									
			0 Days	15 Days	30 Days	60 Days	100 Days	300 Days	1 Year	2 Years	10 Years	∞
Ge	74	Stable	0 001	0 001	0 001	0 001	0 001	0 001	0 001	0 001	0 001	0 001
	76	Stable	0 004	0 004	0 004	0 004	0 004	0 004	0 004	0 004	0 004	0 004
			0 005	0 005	0 005	0 005	0 005	0 005	0 005	0 005	0 005	0 005
As	75	Stable	0 002	0 002	0 002	0 002	0 002	0 002	0 002	0 002	0 002	0 002
Se	77	Stable	0 009	0 009	0 009	0 009	0 009	0 009	0 009	0 009	0 009	0 009
	78	Stable	0 020	0 020	0 020	0 020	0 020	0 020	0 020	0 020	0 020	0 020
	79	$6 \times 10^4 y$	0 042	0 042	0 042	0 042	0 042	0 042	0 042	0 042	0 042	-
	80	Stable	0 075	0 075	0 075	0 075	0 075	0 075	0 075	0 075	0 075	0 075
	82	Stable	0 250	0 250	0 250	0 250	0 250	0 250	0 250	0 250	0 250	0 250
			0 396	0 396	0 396	0 396	0 396	0 396	0 396	0 396	0 396	0 354
Kr	83	Stable	0 382	0 382	0 382	0 382	0 382	0 382	0 382	0 382	0 382	0 382
	84	Stable	0 625	0 625	0 625	0 625	0 625	0 625	0 625	0 625	0 625	0 625
	85	$9.4 y$	0 326	0 326	0 325	0 324	0 321	0 308	0 304	0 283	0 159	-
	86	Stable	1 644	1 644	1 644	1 644	1 644	1 644	1 644	1 644	1 644	1 644
			2 977	2 977	2 976	2 975	2 972	2 959	2 955	2 934	2 810	2 651
Br	79	Stable	-	-	-	-	-	-	-	-	-	0 042
	81	Stable	0.133	0.133	0.133	0.133	0.133	0.133	0.133	0.133	0.133	0.133
			0.133	0.133	0.133	0.133	0.133	0.133	0.133	0.133	0.133	0.175
Sr	87	Stable	-	-	-	-	-	-	-	-	-	2 890
	88	Stable	3 500	3 500	3 500	3 500	3 500	3 500	3 500	3 500	3 500	3 500
	89	53d	2 524	2 060	1 706	1 151	0 682	0 050	0 020	-	-	-
	90	28y	4 420	4 415	4 411	4 402	4 390	4 330	4 312	4 206	3 449	-
			10 444	9 975	9 617	9 053	8 572	7 880	7 832	7 706	6 949	6 390
Y	89	Stable	1 661	2 125	2 479	3 034	3 503	4 135	4 165	4 185	4 185	4 185
	91	57d	3.320	2.765	2.300	1 600	0.985	0.087	0.039	-	-	-
			4.981	4 890	4.779	4.634	4 488	4.222	4 204	4 185	4 185	4 185
Zr	90	Stable	-	0 005	0 009	0 018	0 030	0 090	0 108	0 214	0 971	4 420
	91	Stable	1 990	2.545	3.010	3.710	4.325	5.223	5.271	5 310	5 310	5 310
	92	Stable	5 300	5 300	5 300	5 300	5 300	5 300	5 300	5 300	5 300	5 300
	93	$9.5 \times 10^5 y$	5 425	5 425	5 425	5 425	5 425	5 425	5 425	5 425	5 425	-
	94	Stable	5 700	5 700	5 700	5 700	5 700	5 700	5 700	5 700	5 700	5 700
	95	65d	4 446	3 802	3 245	2 358	1 539	0 182	0 090	-	-	-
	96	Stable	6 750	6 750	6 750	6 750	6 750	6 750	6 750	6 750	6 750	6 750
	97	17h	0 078	-	-	-	-	-	-	-	-	-
			29.689	29.527	29.439	29.261	29.069	28 670	28.644	28 699	29 456	27 480
Nb	93	Stable	-	-	-	-	-	-	-	-	-	5 425
	95	35d	1 388	1 610	1 696	1 622	1 306	0 215	0 108	0 003	-	-
	97	72m	0 002	-	-	-	-	-	-	-	-	-
			1 390	1 610	1 696	1 622	1 306	0 215	0 108	0 003	-	5 425
Mo	95	Stable	0 936	1 358	1 829	2 790	3 925	6 373	6 572	6 767	6 770	6 770
	97	Stable	6 480	6 560	6 560	6 560	6 560	6 560	6 560	6 560	6 560	6 560
	98	Stable	6.240	6 240	6 240	6 240	6 240	6 240	6 240	6 240	6 240	6 240
	99	67h	0 295	0 010	-	-	-	-	-	-	-	-
	100	Stable	6 750	6 750	6 750	6 750	6 750	6 750	6 750	6 750	6 750	6 750
	101	14.6m	0 001	-	-	-	-	-	-	-	-	-
	102	12m	0 001	-	-	-	-	-	-	-	-	-
			20.703	20.918	21 379	22 340	23 475	25 923	26 122	26.317	26 320	26 320
Tc	99m	6h	0 023	-	-	-	-	-	-	-	-	-
	99	$2.1 \times 10^5 y$	5 882	6 190	6 200	6 200	6 200	6 200	6 200	6 200	6 200	-
			5 905	6 190	6 200	6 200	6 200	6 200	6 200	6 200	6 200	-
Ru	99	Stable	-	-	-	-	-	-	-	-	-	6 200
	101	Stable	6 049	6 050	6 050	6 050	6 050	6 050	6 050	6 050	6 050	6 050
	102	Stable	5 299	5 300	5 300	5 300	5 300	5 300	5 300	5 300	5 300	5 300
	103	39.8d	2 096	1 618	1 247	0 751	0 375	0 012	0 004	-	-	-
	104	Stable	2 775	2 775	2 775	2 775	2 775	2 775	2 775	2 775	2 775	2 775
	105	4.5h	0 003	-	-	-	-	-	-	-	-	-
	106	1.0y	0 434	0 421	0 410	0 388	0 359	0 246	0 217	0 109	0 001	-
			16 656	16 164	15 782	15 264	14.859	14 383	14 346	14 234	14 126	20 325
Rh	103	Stable	1 904	2 382	2 753	3 249	3 625	3 988	3 996	4 000	4 000	4 000

Table 5 (Cont'd.)

Element	Mass No	Half Life	(Atoms Per 100 Atoms After Cooling)									
			0 Days	15 Days	30 Days	60 Days	100 Days	300 Days	1 Year	2 Years	10 Years	∞
Pd	105	Stable	1 023	1 026	1 026	1 026	1 026	1 026	1 026	1 026	1 026	1 026
	106	Stable	0 036	0 049	0 060	0 082	0 111	0 224	0 253	0 361	0 469	0 470
	107	7×10^6 y	0 280	0 280	0 280	0 280	0 280	0 280	0 280	0 280	0 280	-
	108	Stable	0 163	0 163	0 163	0 163	0 163	0 163	0 163	0 163	0 163	0 163
	110	Stable	0 079	0 079	0 079	0 079	0 079	0 079	0 079	0 079	0 079	0 079
			1 581	1 597	1 608	1 630	1 659	1 772	1 801	1 909	2 017	1 738
Ag	107	Stable	-	-	-	-	-	-	-	-	-	0 280
	109	Stable	0 087	0 087	0 087	0 087	0 087	0 087	0 087	0 087	0 087	0 087
	111	7 6d	0 008	0 002	0 001	-	-	-	-	-	-	-
			0 095	0 089	0 088	0 087	0 087	0 087	0 087	0 087	0 087	0 367
Cd	111	Stable	0 059	0 065	0 066	0 067	0 067	0 067	0 067	0 067	0 067	0 067
	112	Stable	0 042	0 042	0 042	0 042	0 042	0 042	0 042	0 042	0 042	0 042
	113	Stable	0 043	0 043	0 043	0 043	0 043	0 043	0 043	0 043	0 043	0 043
	114	Stable	0 044	0 044	0 044	0 044	0 044	0 044	0 044	0 044	0 044	0 043
	115	43d	0 005	0 004	0 003	0 002	0 001	-	-	-	-	-
	116	Stable	0 045	0 045	0 045	0 045	0 045	0 045	0 045	0 045	0 045	0 045
			0 238	0 243	0 243	0 243	0 242	0 241	0 241	0 241	0 241	0 241
In	115	6×10^{14} y	0 040	0 041	0 042	0 043	0 044	0 045	0 045	0 045	0 045	-
Sn	115	Stable	-	-	-	-	-	-	-	-	-	0.045
	117m	14d	0 011	-	-	-	-	-	-	-	-	-
	117	Stable	0 037	0 048	0 048	0 048	0 048	0 048	0 048	0 048	0 048	0 048
	118	Stable	0 048	0 048	0 048	0 048	0 048	0 048	0 048	0 048	0 048	0 048
	119m	250d	0 046	0 044	0 042	0 039	0 035	0 020	0 017	0 006	-	-
	119	Stable	0 006	0 008	0 010	0 013	0 017	0 032	0 035	0 046	0 052	0 052
	120	Stable	0 052	0 052	0 052	0 052	0 052	0 052	0 052	0 052	0 052	0 052
	121	27 5h	0 001	-	-	-	-	-	-	-	-	-
	122	Stable	0 053	0 053	0 053	0 053	0 053	0 053	0 053	0 053	0 053	0 053
	124	Stable	0 080	0 080	0 080	0 080	0 080	0 080	0 080	0 080	0 080	0 080
	125	9 4d	0 020	0 007	0 002	-	-	-	-	-	-	-
			0 354	0 340	0 335	0 333	0 333	0 333	0 333	0 333	0 333	0 378
Sb	121	Stable	0 054	0 055	0 055	0 055	0 055	0 055	0 055	0 055	0 055	0 055
	123	Stable	0 053	0 053	0 053	0 053	0 053	0 053	0 053	0 053	0 053	0 053
	125	2 7y	0 103	0 116	0 121	0 118	0 114	0 100	0 095	0 074	0 009	-
	126	9h	0 001	-	-	-	-	-	-	-	-	-
	127	93h	0 017	0 001	-	-	-	-	-	-	-	-
			0 228	0 225	0 229	0 226	0 222	0 208	0 203	0 182	0 117	0 108
Te	125m	58d	-	-	-	0 005	0 006	0 006	0 006	0 005	0 001	-
	125	Stable	-	-	-	-	0.003	0 017	0 022	0 044	0 113	0 123
	126	Stable	0 179	0 180	0 180	0 180	0 180	0 180	0 180	0 180	0 180	0 180
	127	115d	0 022	0 022	0 020	0 017	0 013	0 004	0 003	-	-	-
	128	Stable	0 430	0 430	0 430	0 430	0 430	0 430	0 430	0 430	0 430	0 430
	129	33 5d	0 071	0 052	0 038	0 021	0 009	-	-	-	-	-
	130	Stable	1 525	1 525	1 525	1 525	1 525	1 525	1 525	1 525	1 525	1 525
	131	30h	0 010	-	-	-	-	-	-	-	-	-
	132	77 7h	0 245	0 010	-	-	-	-	-	-	-	-
			2 482	2 219	2 193	2 178	2 166	2 162	2 166	2 184	2 249	2 258
I	127	Stable	0 221	0 237	0 240	0 243	0 247	0 256	0 257	0 260	0 260	0 260
	129	1.7×10^7 y	0 719	0 738	0 752	0 769	0 781	0 790	0 790	0 790	0 790	-
	131	8 14d	0 422	0 116	0 031	0 003	-	-	-	-	-	-
	132	2 4h	0 008	-	-	-	-	-	-	-	-	-
	133	20 5h	0 096	-	-	-	-	-	-	-	-	-
	134	44m	0 005	-	-	-	-	-	-	-	-	-
	135	6 68h	0 031	-	-	-	-	-	-	-	-	-
			1 502	1 091	1 023	1 015	1 028	1 046	1 047	1 050	1 050	0 260
Xe	129	Stable	-	-	-	-	-	-	-	-	-	0 790
	131	Stable	2 678	2 994	3 079	3 107	3 110	3 110	3 110	3 110	3 110	3 110
	132	Stable	4 197	4 440	4 450	4 450	4 450	4 450	4 450	4 450	4 450	4 450
	133	5 3d	0 696	0 097	0 015	-	-	-	-	-	-	-
	134	Stable	7 805	7 810	7 810	7 810	7 810	7 810	7 810	7 810	7 810	7 810
	135	9 1h	0 004	-	-	-	-	-	-	-	-	-
	136	Stable	6 420	6 420	6 420	6 420	6 420	6 420	6 420	6 420	6 420	6 420
	138	17m	0 001	-	-	-	-	-	-	-	-	-
			21 801	21 761	21 774	21 787	21 790	21 790	21 790	21 790	21 790	22 580
Cs	133	Stable	5 828	6 523	6 605	6 620	6 620	6 620	6 620	6 620	6 620	6 620
	135	3×10^6 y	6 525	6 560	6 560	6 560	6 560	6 560	6 560	6 560	6 560	-
	137	27y	6 190	6 183	6 177	6 164	6 146	6 061	6 033	5 880	4 787	-
	138	33m	0 003	-	-	-	-	-	-	-	-	-
			18 546	19 266	19 342	19 344	19 326	19 241	19 213	19 060	17 967	6 620

Table 5 (Cont'd.)

Element	Mass No	Half Life	(Atoms Per 100 Atoms After Cooling)									
			0 Days	15 Days	30 Days	60 Days	100 Days	300 Days	1 Year	2 Years	10 Years	∞
Ba	135	Stable	-	-	-	-	-	-	-	-	-	6 560
	137	Stable	-	0 007	0 013	0 026	0 044	0 129	0 157	0 310	1 403	6 190
	138	Stable	6 116	6 120	6 120	6 120	6 120	6 120	6 120	6 120	6 120	6 120
	139	83m	0 006	-	-	-	-	-	-	-	-	-
	140	12 8d	1 253	0 555	0 247	0 049	0 006	-	-	-	-	-
	141	18m	0 001	-	-	-	-	-	-	-	-	-
			7 376	6 682	6 380	6 195	6 170	6 249	6 277	6 430	7 523	18 870
La	139	Stable	6 244	6 250	6 250	6 250	6 250	6 250	6 250	6 250	6 250	6 250
	140	40h	0 165	0 085	0 037	0 007	-	-	-	-	-	-
	141	3 7h	0 014	-	-	-	-	-	-	-	-	-
	142	74m	0 004	-	-	-	-	-	-	-	-	-
	143	19m	0 001	-	-	-	-	-	-	-	-	-
			6 428	6 335	6 287	6 257	6 250	6 250	6 250	6 250	6 250	6 250
Ce	140	Stable	4 382	5 160	5 516	5 744	5 794	5 800	5 800	5 800	5 800	5 800
	141	33d	2 461	1 800	1 314	0 699	0 300	0 005	-	-	-	-
	142	Stable	5 186	5 190	5 190	5 190	5 190	5 190	5 190	5 190	5 190	5 190
	143	33h	0 122	-	-	-	-	-	-	-	-	-
	144	282d	4 279	4 120	3 973	3 712	3 351	2 056	1 740	0 706	-	-
	145	1 8h	0 006	-	-	-	-	-	-	-	-	-
			16 436	16 270	15 993	15 345	14 635	13 051	12 730	11 696	10 990	10 990
Pr	141	Stable	2 824	3 500	3 986	4 601	5 000	5 295	5 300	5 300	5 300	5 300
	143	13 7d	1 197	0 615	0 289	0 064	0 008	-	-	-	-	-
	145	4 5h	0 014	-	-	-	-	-	-	-	-	-
	146	24m	0 001	-	-	-	-	-	-	-	-	-
			4 036	4 115	4 275	4 665	5 008	5 295	5 300	5 300	5 300	5 300
Nd	143	Stable	3 870	4 575	4 901	5 126	5 182	5 190	5 190	5 190	5 190	5 190
	144	Stable	0 491	0 650	0 797	1 058	1 419	2 714	3 030	4 064	4 770	4 770
	145	Stable	4 300	4 320	4 320	4 320	4 320	4 320	4 320	4 320	4 320	4 320
	146	Stable	3 869	3 870	3 870	3 870	3 870	3 870	3 870	3 870	3 870	3 870
	147	11 3d	0 636	0 247	0 097	0 015	0 001	-	-	-	-	-
	148	Stable	2 280	2 280	2 280	2 280	2 280	2 280	2 280	2 280	2 280	2 280
	149	2h	0 002	-	-	-	-	-	-	-	-	-
	150	Stable	0 735	0 735	0 735	0 735	0 735	0 735	0 735	0 735	0 735	0 735
			16 183	16 677	17 000	17 404	17 807	19 109	19 425	20 459	21 165	21 165
Pm	147	2 6y	2 542	2 891	3 005	3 022	2 947	2 555	2 434	1 862	0 220	-
	149	54h	0 047	-	-	-	-	-	-	-	-	-
	151	27 5h	0 009	-	-	-	-	-	-	-	-	-
			2 598	2 891	3 005	3 022	2 947	2 555	2 434	1 862	0 220	-
Sm	147	Stable	0 062	0 102	0 138	0 203	0 292	0 685	0 806	1 378	3 020	3 240
	149	Stable	1 136	1 185	1 185	1 185	1 185	1 185	1 185	1 185	1 185	1 185
	151	73y	0 456	0 465	0 465	0 464	0 463	0 462	0 460	0 457	0 424	-
	152	Stable	0 282	0 282	0 282	0 282	0 282	0 282	0 282	0 282	0 282	0 282
	153	47h	0 005	-	-	-	-	-	-	-	-	-
	154	Stable	0 067	0 067	0 067	0 067	0 067	0 067	0 067	0 067	0 067	0 067
			2 008	2 101	2 137	2 201	2 289	2 681	2 800	3 369	4 978	4 774
Eu	151	Stable	-	-	-	0 001	0 002	0 003	0 005	0 008	0 041	0 465
	153	Stable	0 137	0 142	0 142	0 142	0 142	0 142	0 142	0 142	0 142	0 142
	155	1 7y	0 029	0 028	0 028	0 027	0 026	0 021	0 019	0 013	-	-
	156	15d	0 002	0 001	-	-	-	-	-	-	-	-
			0 168	0 171	0 170	0 170	0 170	0 166	0 166	0 163	0 183	0 607
Gd	155	Stable	-	0 001	0 001	0 002	0 003	0 008	0 010	0 016	0 029	0 029
	156	Stable	0 011	0 012	0 013	0 013	0 013	0 013	0 013	0 013	0 013	0 013
	157	Stable	0 007	0 007	0 007	0 007	0 007	0 007	0 007	0 007	0 007	0 007
			0 018	0 020	0 021	0 022	0 023	0 028	0 030	0 036	0 049	0 049

Table 6

FISSION PRODUCT SPECTRUM FROM FAST FISSION (CA. 1 MEV NEUTRONS) OF U^{235} (135 DAYS IRRADIATED)

Element	Mass No.	Half Life	(Atoms per 100 Atoms of Fissioned After Cooling)									
			0 Days	15 Days	30 Days	60 Days	100 Days	300 Days	1 Year	2 Years	10 Years	∞
Ge	74	Stable	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
	76	Stable	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004
			0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
As	75	Stable	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Se	77	Stable	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
	78	Stable	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
	79	6×10^4 y	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	-
	80	Stable	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075
	82	Stable	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
			0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.354
Br	79	Stable	-	-	-	-	-	-	-	-	-	0.042
	81	Stable	0.133	0.133	0.133	0.133	0.133	0.133	0.133	0.133	0.133	0.133
			0.133	0.133	0.133	0.133	0.133	0.133	0.133	0.133	0.133	0.175
Kr	83	Stable	0.382	0.382	0.382	0.382	0.382	0.382	0.382	0.382	0.382	0.382
	84	Stable	0.625	0.625	0.625	0.625	0.625	0.625	0.625	0.625	0.625	0.625
	85m	4.36h	0.002	-	-	-	-	-	-	-	-	-
	85	9.4y	0.322	0.322	0.321	0.320	0.317	0.304	0.300	0.279	0.155	-
	86	Stable	1.644	1.644	1.644	1.644	1.644	1.644	1.644	1.644	1.644	1.644
			2.975	2.973	2.972	2.971	2.968	2.955	2.951	2.930	2.806	2.651
Rb	85	Stable	0.818	0.820	0.821	0.822	0.825	0.838	0.842	0.863	0.987	1.142
	87	6.2×10^{10} y	2.890	2.890	2.890	2.890	2.890	2.890	2.890	2.890	2.890	-
			3.708	3.710	3.711	3.712	3.715	3.728	3.732	3.753	3.877	1.142
Sr	87	Stable	-	-	-	-	-	-	-	-	-	2.890
	88	Stable	3.500	3.500	3.500	3.500	3.500	3.500	3.500	3.500	3.500	3.500
	89	53d	1.955	1.610	1.321	0.888	0.527	0.038	-	-	-	-
	90	28y	4.420	4.415	4.411	4.402	4.390	4.330	4.312	4.206	3.449	-
			9.875	9.525	9.232	8.790	8.417	7.868	7.812	7.706	6.949	6.390
Y	89	Stable	2.230	2.575	2.864	3.297	3.658	4.147	4.185	4.185	4.185	4.185
	91	57d	2.620	2.180	1.818	1.265	0.752	0.068	0.031	-	-	-
			4.852	4.755	4.682	4.562	4.410	4.215	4.216	4.185	4.185	4.185
Zr	90	Stable	0.000	0.005	0.009	0.018	0.030	0.090	0.108	0.214	0.971	4.420
	91	Stable	2.690	3.130	3.492	4.045	4.558	5.242	5.279	5.310	5.310	5.310
	92	Stable	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300
	93	9.5×10^5 y	5.425	5.425	5.425	5.425	5.425	5.425	5.425	5.425	5.425	-
	94	Stable	5.700	5.700	5.700	5.700	5.700	5.700	5.700	5.700	5.700	5.700
	95	65d	3.595	3.050	2.610	1.900	1.245	0.142	0.077	-	-	-
	96	Stable	6.750	6.750	6.750	6.750	6.750	6.750	6.750	6.750	6.750	6.750
	97	17h	0.050	-	-	-	-	-	-	-	-	-
			29.510	29.360	29.286	29.138	29.008	28.649	28.639	28.699	29.456	27.480
Nb	93	Stable	-	-	-	-	-	-	-	-	-	5.425
	95	35d	1.470	1.580	1.460	1.420	1.105	0.168	0.093	0.010	-	-
	97	72m	0.003	-	-	-	-	-	-	-	-	-
			1.473	1.580	1.460	1.420	1.105	0.168	0.093	0.010	-	5.425
Mo	95	Stable	1.705	2.140	2.700	3.450	4.420	6.460	6.600	6.760	6.770	6.770
	97	Stable	6.507	6.560	6.560	6.560	6.560	6.560	6.560	6.560	6.560	6.560
	98	Stable	6.240	6.240	6.240	6.240	6.240	6.240	6.240	6.240	6.240	6.240
	99	67h	0.190	-	-	-	-	-	-	-	-	-
	100	Stable	6.750	6.750	6.750	6.750	6.750	6.750	6.750	6.750	6.750	6.750
	101	14.6m	0.001	-	-	-	-	-	-	-	-	-
	102	12m	0.001	-	-	-	-	-	-	-	-	-
			21.394	21.690	22.250	23.000	23.970	26.010	26.150	26.310	26.320	26.320
Tc	99m	6h	0.014	-	-	-	-	-	-	-	-	-
	99	2.1×10^5 y	5.996	6.200	6.200	6.200	6.200	6.200	6.200	6.200	6.200	-
			6.010	6.200	6.200	6.200	6.200	6.200	6.200	6.200	6.200	-
Ru	99	Stable	-	-	-	-	-	-	-	-	-	6.200
	101	Stable	6.049	6.050	6.050	6.050	6.050	6.050	6.050	6.050	6.050	6.050
	102	Stable	5.299	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300
	103	40d	1.550	1.195	0.926	0.554	0.274	0.006	0.002	-	-	-
	104	Stable	2.775	2.775	2.775	2.775	2.775	2.775	2.775	2.775	2.775	2.775
	105	4.5h	0.002	-	-	-	-	-	-	-	-	-
	106	1.0y	0.416	0.405	0.393	0.372	0.345	0.236	0.208	0.104	-	-
			16.091	15.725	15.444	15.051	14.744	14.367	14.335	14.229	14.125	20.325
Rh	103	Stable	2.450	2.805	3.074	3.446	3.726	3.994	3.998	4.000	4.000	4.000

Table 6 (Cont'd.)

Element	Mass No.	Half Life	(Atoms per 100 Atoms of Fissioned After Cooling)									
			0 Days	15 Days	30 Days	60 Days	100 Days	300 Days	1 Year	2 Years	10 Years	∞
Pd	105	Stable	1.024	1.026	1.026	1.026	1.026	1.026	1.026	1.026	1.026	1.026
	106	Stable	0.054	0.065	0.077	0.098	0.125	0.234	0.262	0.366	0.470	0.470
	107	7×10^6 y	0.280	0.280	0.280	0.280	0.280	0.280	0.280	0.280	0.280	-
	108	Stable	0.163	0.163	0.163	0.163	0.163	0.163	0.163	0.163	0.163	0.163
	110	Stable	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079
			1.600	1.613	1.625	1.646	1.673	1.782	1.810	1.914	2.018	1.738
Ag	107	Stable	-	-	-	-	-	-	-	-	-	0.280
	109	Stable	0.087	0.087	0.087	0.087	0.087	0.087	0.087	0.087	0.087	0.087
	111	7.6d	0.054	0.013	0.003	-	-	-	-	-	-	-
			0.141	0.100	0.090	0.087	0.087	0.087	0.087	0.087	0.087	0.367
Cd	111	Stable	0.013	0.054	0.064	0.067	0.067	0.067	0.067	0.067	0.067	0.067
	112	Stable	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042
	113	Stable	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043
	114	Stable	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044
	115	43d	0.005	0.004	0.003	0.002	0.001	-	-	-	-	-
	115m	53h	0.012	-	-	-	-	-	-	-	-	-
	116	Stable	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045
			0.204	0.232	0.241	0.243	0.242	0.241	0.241	0.241	0.241	0.241
In	115	6×10^{14} y	0.028	0.042	0.043	0.044	0.045	0.045	0.045	0.045	0.045	-
Sn	115	Stable	-	-	-	-	-	-	-	-	-	0.045
	117m	14d	0.007	0.004	0.002	-	-	-	-	-	-	-
	117	Stable	0.041	0.044	0.046	0.048	0.048	0.048	0.048	0.048	0.048	0.048
	118	Stable	0.048	0.048	0.048	0.048	0.048	0.048	0.048	0.048	0.048	0.048
	119m	250d	0.043	0.042	0.040	0.037	0.033	0.019	0.016	0.006	-	-
	119	Stable	0.009	0.010	0.012	0.015	0.019	0.033	0.036	0.046	0.052	0.052
	120	Stable	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052
	122	Stable	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053
	124	Stable	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080
	125	9.4d	0.012	0.004	0.001	-	-	-	-	-	-	-
			0.345	0.337	0.334	0.333	0.333	0.333	0.333	0.333	0.333	0.378
Sb	121	Stable	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055
	123	Stable	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053
	125	2.7y	0.108	0.115	0.116	0.115	0.112	0.097	0.093	0.072	0.009	-
	126	9h	0.001	-	-	-	-	-	-	-	-	-
	127	93h	0.011	-	-	-	-	-	-	-	-	-
			0.228	0.223	0.224	0.223	0.220	0.205	0.201	0.180	0.117	0.108
			2.375	2.209	2.188	2.175	2.167	2.166	2.168	2.186	2.249	2.258
Te	125m	58d	0.003	0.004	0.006	0.007	0.007	0.006	0.006	0.004	0.001	-
	125	Stable	-	-	-	0.001	0.004	0.020	0.024	0.047	0.113	0.123
	126	Stable	0.179	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180
	127m	115d	0.028	0.025	0.023	0.019	0.015	0.005	0.003	-	-	-
	128	Stable	0.430	0.430	0.430	0.430	0.430	0.430	0.430	0.430	0.430	0.430
	129m	33.5d	0.050	0.039	0.024	0.013	0.006	-	-	-	-	-
	130	Stable	1.525	1.525	1.525	1.525	1.525	1.525	1.525	1.525	1.525	1.525
	131	30h	0.006	-	-	-	-	-	-	-	-	-
	132	77.7h	0.154	0.006	-	-	-	-	-	-	-	-
			2.375	2.209	2.188	2.175	2.167	2.166	2.168	2.186	2.249	2.258
I	127	Stable	0.221	0.235	0.237	0.241	0.245	0.255	0.257	0.260	0.260	0.260
	129	1.7×10^7 y	0.740	0.751	0.766	0.777	0.784	0.790	0.790	0.790	0.790	-
	131	8d	0.270	0.073	0.020	0.001	-	-	-	-	-	-
	132	2.4h	0.005	-	-	-	-	-	-	-	-	-
	133	20.5h	0.061	-	-	-	-	-	-	-	-	-
	134	52.5m	0.003	-	-	-	-	-	-	-	-	-
	135	6.68h	0.019	-	-	-	-	-	-	-	-	-
			1.319	1.059	1.023	1.019	1.029	1.045	1.047	1.050	1.050	0.260
Xe	129	Stable	-	-	-	-	-	-	-	-	-	0.790
	131	Stable	2.834	3.037	3.090	3.109	3.110	3.110	3.110	3.110	3.110	3.110
	132	Stable	4.291	4.444	4.450	4.450	4.450	4.450	4.450	4.450	4.450	4.450
	133	5.3d	0.375	0.064	0.009	-	-	-	-	-	-	-
	134	Stable	7.807	7.810	7.810	7.810	7.810	7.810	7.810	7.810	7.810	7.810
	135	9.13h	0.026	-	-	-	-	-	-	-	-	-
	136	Stable	6.420	6.420	6.420	6.420	6.420	6.420	6.420	6.420	6.420	6.420
	138	17m	0.001	-	-	-	-	-	-	-	-	-
			21.754	21.775	21.779	21.789	21.790	21.790	21.790	21.790	21.790	22.580
Cs	133	Stable	6.184	6.556	6.611	6.620	6.620	6.620	6.620	6.620	6.620	6.620
	135	3×10^6 y	6.515	6.560	6.560	6.560	6.560	6.560	6.560	6.560	6.560	-
	137	27y	6.190	6.184	6.177	6.165	6.148	6.065	6.038	5.890	4.830	-
	138	33m	0.002	-	-	-	-	-	-	-	-	-
			18.891	19.300	19.348	19.345	19.328	19.245	19.218	19.070	18.010	6.620

Table 6 (Cont'd.)

Element	Mass No	Half Life	(Atoms per 100 Atoms of Fissioned After Cooling)										∞
			0 Days	15 Days	30 Days	60 Days	100 Days	300 Days	1 Year	2 Years	10 Years		
Ba	135	Stable	-	-	-	-	-	-	-	-	-	6 560	
	137	Stable	-	0 006	0 013	0 025	0 042	0 125	0 152	0 300	1 360	6 190	
	138	Stable	6 117	6 120	6 120	6 120	6 120	6 120	6 120	6 120	6 120	6 120	
	139	85m	0 004	-	-	-	-	-	-	-	-	-	
	140	12 8d	0 788	0 351	0 155	0 030	0 004	-	-	-	-	-	
	141	18m	0 001	-	-	-	-	-	-	-	-	-	
			6.910	6 477	6 288	6.175	6 166	6 245	6 272	6 420	7 480	18 870	
La	139	Stable	6 246	6 250	6 250	6 250	6 250	6 250	6 250	6 250	6 250	6 250	
	140	40h	0 120	0 052	0 023	0 005	-	-	-	-	-	-	
	141	3 7h	0 009	-	-	-	-	-	-	-	-	-	
	142	74m	0 003	-	-	-	-	-	-	-	-	-	
	143	19m	0 001	-	-	-	-	-	-	-	-	-	
			6 379	6 302	6 273	6 255	6 250	6 250	6 250	6 250	6 250	6 250	
Ce	140	Stable	4.892	5 397	5 622	5 765	5 796	5 800	5 800	5 800	5 800	5 800	
	141	33d	1 705	1 242	0 915	0 486	0 215	0 002	-	-	-	-	
	142	Stable	5 187	5 190	5 190	5 190	5 190	5 190	5 190	5 190	5 190	5 190	
	143	33h	0 074	-	-	-	-	-	-	-	-	-	
	144	282d	3 990	3 840	3 695	3 455	3 130	1 915	1 625	0 066	-	-	
	145	1 8h	0 004	-	-	-	-	-	-	-	-	-	
			15.852	15 669	15 422	14 896	14 331	12 907	12 615	11 056	10 990	10 990	
Pr	141	Stable	3 585	4 058	4 385	4 814	5 085	5 298	5 300	5 300	5 300	5 300	
	143	13 7d	0 755	0 403	0 188	0 041	0 005	-	-	-	-	-	
	145	4 5h	0 009	-	-	-	-	-	-	-	-	-	
	146	24m	0 001	-	-	-	-	-	-	-	-	-	
			4.350	4 461	4 573	4 855	5 090	5 298	5 300	5 300	5 300	5 300	
Nd	143	Stable	4 360	4 787	5 002	5 149	5 185	5 190	5 190	5 190	5 190	5 190	
	144	Stable	0 780	0 930	1 075	1 315	1 640	2 855	3 145	4 704	4 770	4 770	
	145	Stable	4 307	4 320	4 320	4 320	4 320	4 320	4 320	4 320	4 320	4 320	
	146	Stable	3 869	3 870	3 870	3 870	3 870	3 870	3 870	3 870	3 870	3 870	
	147	11 3d	0 400	0 157	0 061	0 009	-	-	-	-	-	-	
	148	Stable	2 280	2 280	2 280	2 280	2 280	2 280	2 280	2 280	2 280	2 280	
	149	2h	0 001	-	-	-	-	-	-	-	-	-	
	150	Stable	0 735	0 735	0 735	0 735	0 735	0 735	0 735	0 735	0 735	0 735	
			16 732	17 079	17 343	17 678	18 030	19 250	19 540	21 099	21 165	21 165	
Pm	147	2 6y	2 755	2 960	3 030	3 010	2 955	2 537	2 420	1 855	0 217	-	
	149	55h	0 029	-	-	-	-	-	-	-	-	-	
	151	27h	0 005	-	-	-	-	-	-	-	-	-	
			2 789	2 960	3 030	3 010	2 955	2 537	2 420	1 855	0 217	-	
Sm	147	Stable	0 085	0 123	0 149	0 221	0 285	0 703	0 820	1 385	3 023	3 240	
	149	Stable	1 155	1 185	1 185	1 185	1 185	1 185	1 185	1 185	1 185	1 185	
	151	73y	0 458	0 463	0 463	0 463	0 462	0 460	0 458	0 456	0 422	-	
	152	Stable	0 282	0 282	0 282	0 282	0 282	0 282	0 282	0 282	0 282	0 282	
	153	47h	0 003	-	-	-	-	-	-	-	-	-	
	154	Stable	0 067	0 067	0 067	0 067	0 067	0 067	0 067	0 067	0 067	0 067	
		2 050	2 120	2 146	2 218	2 281	2 697	2 812	3 375	4 979	4 774		
Eu	151	Stable	0 002	0 002	0 002	0 002	0 003	0 005	0 007	0 009	0 043	0 465	
	153	Stable	0 139	0 142	0 142	0 142	0 142	0 142	0 142	0 142	0 142	0 142	
	155	1 7y	0 029	0 029	0 028	0 027	0 026	0 021	0 019	0 013	0 001	-	
	156	15d	0 002	0 001	-	-	-	-	-	-	-	-	
			0 172	0 174	0 172	0 171	0 171	0 168	0 168	0 164	0 186	0 607	
Gd	155	Stable	-	-	0 001	0 002	0 003	0 008	0 010	0 016	0 028	0 029	
	156	Stable	0 011	0 012	0 013	0 013	0 013	0 013	0 013	0 013	0 013	0 013	
	157	Stable	0 007	0 007	0 007	0 007	0 007	0 007	0 007	0 007	0 007	0 007	
			0 018	0 019	0 021	0 022	0 023	0 028	0 030	0 036	0 048	0 049	

Table 7

FISSION PRODUCT SPECTRUM FOR FAST FISSION (CA. 1 MEV NEUTRONS) OF U^{235} (365 DAYS IRRADIATED)

Element	Mass No.	Half Life	(Atoms per 100 Atoms of U^{235} Fissioned)									
			0 Days	15 Days	30 Days	60 Days	100 Days	300 Days	1 Year	2 Years	10 Years	∞
Ge	74	Stable	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
	76	Stable	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004
			0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
As	75	Stable	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Se	77	Stable	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
	78	Stable	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
	79	$6.5 \times 10^4 y$	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	-
	80	Stable	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075
	82	Stable	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
			0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.354
Br	79	Stable	-	-	-	-	-	-	-	-	-	0.042
	81	Stable	0.133	0.133	0.133	0.133	0.133	0.133	0.133	0.133	0.133	0.133
			0.133	0.133	0.133	0.133	0.133	0.133	0.133	0.133	0.133	0.175
Kr	83	Stable	0.382	0.382	0.382	0.382	0.382	0.382	0.382	0.382	0.382	0.382
	84	Stable	0.625	0.625	0.625	0.625	0.625	0.625	0.625	0.625	0.625	0.625
	85m	4.36h	0.001	-	-	-	-	-	-	-	-	-
	85	9.4y	0.257	0.256	0.255	0.253	0.251	0.240	0.236	0.217	0.131	-
	86	Stable	1.644	1.644	1.644	1.644	1.644	1.644	1.644	1.644	1.644	1.644
	87	78m	0.001	-	-	-	-	-	-	-	-	-
	88	2.77h	0.002	-	-	-	-	-	-	-	-	-
			2.912	2.907	2.906	2.904	2.902	2.891	2.887	2.868	2.782	2.651
Rb	85	Stable	0.884	0.886	0.887	0.889	0.891	0.902	0.906	0.925	1.011	1.142
	87	$6 \times 10^{10} y$	2.889	2.890	2.890	2.890	2.890	2.890	2.890	2.890	2.890	-
			3.773	3.776	3.777	3.779	3.781	3.792	3.796	3.815	3.901	1.142
Sr	87	Stable	-	-	-	-	-	-	-	-	-	2.890
	88	Stable	3.498	3.500	3.500	3.500	3.500	3.500	3.500	3.500	3.500	3.500
	89	53d	0.872	0.717	0.589	0.398	0.239	0.018	0.008	-	-	-
	90	28y	4.410	4.406	4.401	4.392	4.380	4.321	4.302	4.197	3.440	-
			8.780	8.623	8.490	8.290	8.119	7.839	7.810	7.697	6.940	6.390
Y	89	Stable	3.313	3.468	3.596	3.787	3.946	4.167	4.177	4.185	4.185	4.185
	90	61h	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001	-
	91	57d	1.182	0.984	0.821	0.572	0.351	0.031	0.013	-	-	-
			4.497	4.454	4.419	4.361	4.299	4.200	4.192	4.187	4.186	4.185
Zr	90	Stable	0.008	0.012	0.017	0.026	0.038	0.097	0.116	0.221	0.979	4.420
	91	Stable	4.128	4.326	4.489	4.738	4.959	5.279	5.297	5.310	5.310	5.310
	92	Stable	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300
	93	$9.5 \times 10^5 y$	5.425	5.425	5.425	5.425	5.425	5.425	5.425	5.425	5.425	5.425
	94	Stable	5.700	5.700	5.700	5.700	5.700	5.700	5.700	5.700	5.700	5.700
	95	65d	1.702	1.445	1.225	0.877	0.587	0.069	0.035	0.001	-	-
	96	Stable	6.750	6.750	6.750	6.750	6.750	6.750	6.750	6.750	6.750	6.750
	97	17h	0.019	-	-	-	-	-	-	-	-	-
			29.032	28.958	28.906	28.816	28.759	28.620	28.623	28.707	29.464	27.480
Nb	93	Stable	-	-	-	-	-	-	-	-	-	5.425
	95	35d	0.895	0.872	0.822	0.688	0.572	0.078	0.039	0.001	-	-
	97	72m	0.001	-	-	-	-	-	-	-	-	-
			0.896	0.872	0.822	0.688	0.572	0.078	0.039	0.001	-	5.425
Mo	95	Stable	4.173	4.453	4.723	5.205	5.611	6.623	6.696	6.768	6.770	6.770
	97	Stable	6.540	6.560	6.560	6.560	6.560	6.560	6.560	6.560	6.560	6.560
	98	Stable	6.240	6.240	6.240	6.240	6.240	6.240	6.240	6.240	6.240	6.240
	99	67h	0.068	0.002	-	-	-	-	-	-	-	-
	100	Stable	6.750	6.750	6.750	6.750	6.750	6.750	6.750	6.750	6.750	6.750
			23.771	24.005	24.273	24.755	25.161	26.173	26.246	26.318	26.320	26.320
Tc	99m	6h	0.006	-	-	-	-	-	-	-	-	-
	99	$2.12 \times 10^5 y$	6.126	6.198	6.200	6.200	6.200	6.200	6.200	6.200	6.200	-
			6.132	6.198	6.200	6.200	6.200	6.200	6.200	6.200	6.200	-
Ru	99	Stable	-	-	-	-	-	-	-	-	-	6.200
	101	Stable	6.050	6.050	6.050	6.050	6.050	6.050	6.050	6.050	6.050	6.050
	102	Stable	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300
	103	39.8d	0.626	0.483	0.373	0.221	0.110	0.003	0.001	-	-	-
	104	Stable	2.775	2.775	2.775	2.775	2.775	2.775	2.775	2.775	2.775	2.775
	106	1y	0.339	0.330	0.320	0.303	0.280	0.192	0.170	0.085	-	-
			15.090	14.938	14.818	14.649	14.515	14.320	14.296	14.210	14.125	20.325

Table 7 (Cont'd.)

Element	Mass No.	Half Life	(Atoms per 100 Atoms U ²³⁵ Fissioned)									
			0 Days	15 Days	30 Days	60 Days	100 Days	300 Days	1 Year	2 Years	10 Years	∞
Rh	103m	57m	0.001	-	-	-	-	-	-	-	-	-
	103	Stable	3.373	3.517	3.627	3.779	3.890	3.997	3.999	4.000	4.000	4.000
	105	36.5h	0.006	-	-	-	-	-	-	-	-	-
			3.380	3.517	3.627	3.779	3.890	3.997	3.999	4.000	4.000	4.000
Pd	105	Stable	1.020	1.026	1.026	1.026	1.026	1.026	1.026	1.026	1.026	1.026
	106	Stable	0.131	0.140	0.150	0.167	0.190	0.278	0.300	0.385	0.470	0.470
	107	7 x 10 ⁶ y	0.280	0.280	0.280	0.280	0.280	0.280	0.280	0.280	0.280	-
	108	Stable	0.163	0.163	0.163	0.163	0.163	0.163	0.163	0.163	0.163	0.163
	110	Stable	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079
			1.673	1.688	1.698	1.715	1.738	1.826	1.848	1.933	2.018	1.738
Ag	107	Stable	-	-	-	-	-	-	-	-	-	0.280
	109	Stable	0.087	0.087	0.087	0.087	0.087	0.087	0.087	0.087	0.087	0.087
	111	7.6d	0.002	0.001	-	-	-	-	-	-	-	-
			0.089	0.088	0.087	0.087	0.087	0.087	0.087	0.087	0.087	0.367
Cd	111	Stable	0.065	0.066	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067
	112	Stable	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042
	113	Stable	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043
	114	Stable	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044
	116	Stable	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045
			0.239	0.240	0.241	0.241	0.241	0.241	0.241	0.241	0.241	0.241
In	115	6 x 10 ¹⁴ y	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045	-
Sn	115	Stable	-	-	-	-	-	-	-	-	-	0.045
	117	Stable	0.048	0.048	0.048	0.048	0.048	0.048	0.048	0.048	0.048	0.048
	118	Stable	0.048	0.048	0.048	0.048	0.048	0.048	0.048	0.048	0.048	0.048
	119m	250d	0.030	0.029	0.029	0.027	0.021	0.013	0.012	0.003	-	-
	119	Stable	0.022	0.023	0.023	0.025	0.031	0.039	0.040	0.049	0.052	0.052
	120	Stable	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052
	122	Stable	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053
	124	Stable	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080
	125	9.4d	0.002	0.001	-	-	-	-	-	-	-	-
			0.335	0.334	0.333	0.333	0.333	0.333	0.333	0.333	0.333	0.378
Sb	121	Stable	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055
	123	Stable	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053
	125	2.7y	0.110	0.110	0.109	0.107	0.104	0.090	0.086	0.067	0.009	-
	126	9h	0.001	-	-	-	-	-	-	-	-	-
	127	93h	0.004	-	-	-	-	-	-	-	-	-
			0.223	0.218	0.217	0.215	0.212	0.198	0.194	0.175	0.117	0.108
Te	125m	58d	0.007	0.006	0.006	0.006	0.006	0.006	0.004	0.004	-	-
	125	Stable	0.004	0.006	0.008	0.010	0.013	0.027	0.033	0.052	0.114	0.123
	126	Stable	0.179	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180
	127m	115d	0.017	0.017	0.016	0.014	0.011	0.003	0.002	-	-	-
	128	Stable	0.430	0.430	0.430	0.430	0.430	0.430	0.430	0.430	0.430	0.430
	129m	33.5d	0.020	0.014	0.011	0.006	0.001	-	-	-	-	-
	130	Stable	1.525	1.525	1.525	1.525	1.525	1.525	1.525	1.525	1.525	1.525
	131m	30h	0.003	-	-	-	-	-	-	-	-	-
	132	77.7h	0.057	0.002	-	-	-	-	-	-	-	-
			2.242	2.180	2.176	2.171	2.166	2.171	2.174	2.191	2.249	2.258
I	127	Stable	0.239	0.243	0.244	0.246	0.249	0.257	0.258	0.260	0.260	0.260
	129	1.7 x 10 ⁷ y	0.770	0.776	0.779	0.784	0.789	0.790	0.790	0.790	0.790	-
	131	8.14d	0.098	0.027	0.007	-	-	-	-	-	-	-
	132	2.4h	0.002	-	-	-	-	-	-	-	-	-
	133	20.5h	0.022	-	-	-	-	-	-	-	-	-
	135	6.68h	0.007	-	-	-	-	-	-	-	-	-
			1.138	1.046	1.030	1.030	1.038	1.047	1.048	1.050	1.050	0.260
Xe	129	Stable	-	-	-	-	-	-	-	-	-	0.790
	131	Stable	3.009	3.083	3.103	3.110	3.110	3.110	3.110	3.110	3.110	3.110
	132	Stable	4.391	4.448	4.450	4.450	4.450	4.450	4.450	4.450	4.450	4.450
	133	5.27d	0.138	0.056	0.007	-	-	-	-	-	-	-
	134	Stable	7.810	7.810	7.810	7.810	7.810	7.810	7.810	7.810	7.810	7.810
	135m	15.6m	0.001	-	-	-	-	-	-	-	-	-
	135	9.13h	0.001	-	-	-	-	-	-	-	-	-
	136	Stable	6.791	6.791	6.791	6.791	6.791	6.791	6.791	6.791	6.791	6.791
			22.151	22.188	22.161	22.161	22.161	22.161	22.161	22.161	22.161	22.951
Cs	133	Stable	6.460	6.564	6.613	6.620	6.620	6.620	6.620	6.620	6.620	6.620
	135	3 x 10 ⁶ y	6.541	6.560	6.560	6.560	6.560	6.560	6.560	6.560	6.560	-
	137	27y	5.760	5.754	5.748	5.737	5.721	5.644	5.619	5.481	4.495	-
			18.761	18.878	18.921	18.917	18.901	18.824	18.799	18.661	17.675	6.620

Table 7 (Cont'd.)

Element	Mass No.	Half Life	(Atoms per 100 Atoms U ²³⁵ Fissioned)									
			0 Days	15 Days	30 Days	60 Days	100 Days	300 Days	1 Year	2 Years	10 Years	∞
Ba	135	Stable	-	-	-	-	-	-	-	-	-	6.560
	137	Stable	0.059	0.065	0.071	0.082	0.099	0.175	0.200	0.338	1.324	5.819
	138	Stable	6.120	6.120	6.120	6.120	6.120	6.120	6.120	6.120	6.120	6.120
	139	85m	0.001	-	-	-	-	-	-	-	-	-
	140	12.8d	0.295	0.131	0.058	0.012	0.001	-	-	-	-	-
			6.475	6.316	6.249	6.214	6.220	6.295	6.320	6.458	7.444	18.499
La	139	Stable	6.249	6.250	6.250	6.250	6.250	6.250	6.250	6.250	6.250	6.250
	140	40h	0.038	0.020	0.009	0.001	-	-	-	-	-	-
	141	3.7h	0.003	-	-	-	-	-	-	-	-	-
	142	74m	0.001	-	-	-	-	-	-	-	-	-
			6.291	6.270	6.259	6.251	6.250	6.250	6.250	6.250	6.250	6.250
Ce	140	Stable	5.467	5.649	5.733	5.787	5.799	5.800	5.800	5.800	5.800	5.800
	141	33.1d	0.694	0.503	0.367	0.195	0.085	0.001	-	-	-	-
	142	Stable	5.189	5.190	5.190	5.190	5.190	5.190	5.190	5.190	5.190	5.190
	143	33h	0.028	-	-	-	-	-	-	-	-	-
	144	282d	3.140	3.027	2.914	2.710	2.456	1.503	1.279	0.521	-	-
	145	1.8h	0.001	-	-	-	-	-	-	-	-	-
			14.519	14.369	14.204	13.882	13.530	12.494	12.269	11.511	10.990	10.990
Pr	141	Stable	4.603	4.797	4.933	5.105	5.215	5.299	5.300	5.300	5.300	5.300
	143	13.7d	0.282	0.146	0.068	0.015	0.002	-	-	-	-	-
	145	4.5h	0.003	-	-	-	-	-	-	-	-	-
			4.888	4.943	5.001	5.120	5.217	5.299	5.300	5.300	5.300	5.300
Nd	143	Stable	4.880	5.044	5.122	5.175	5.188	5.190	5.190	5.190	5.190	5.190
	144	Stable	1.630	1.743	1.856	2.060	2.314	3.267	3.491	4.249	4.770	4.770
	145	Stable	4.316	4.320	4.320	4.320	4.320	4.320	4.320	4.320	4.320	4.320
	146	Stable	3.870	3.870	3.870	3.870	3.870	3.870	3.870	3.870	3.870	3.870
	147	11.3d	0.145	0.057	0.023	0.004	-	-	-	-	-	-
	148	Stable	2.280	2.280	2.280	2.280	2.280	2.280	2.280	2.280	2.280	2.280
	149	2h	0.001	-	-	-	-	-	-	-	-	-
	150	Stable	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735
			17.857	18.049	18.206	18.444	18.707	19.662	19.886	20.644	21.165	21.165
Pm	147	2.6y	2.730	2.765	2.790	2.760	2.665	2.310	2.200	1.686	0.198	-
	149	54h	0.010	-	-	-	-	-	-	-	-	-
	151	27.5h	0.002	-	-	-	-	-	-	-	-	-
			2.742	2.765	2.790	2.760	2.665	2.310	2.200	1.686	0.198	-
Sm	147	Stable	0.365	0.418	0.427	0.476	0.575	0.930	1.040	1.554	3.042	3.240
	149	Stable	1.174	1.185	1.185	1.185	1.185	1.185	1.185	1.185	1.185	1.185
	151	73y	0.463	0.465	0.465	0.465	0.465	0.463	0.463	0.459	0.424	-
	152	Stable	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282
	153	47h	0.001	-	-	-	-	-	-	-	-	-
	154	Stable	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067
			2.352	2.417	2.426	2.475	2.574	2.927	3.037	3.547	5.000	4.774
Eu	151	Stable	-	-	-	-	-	0.002	0.002	0.006	0.041	0.465
	153	Stable	0.141	0.142	0.142	0.142	0.142	0.142	0.142	0.142	0.142	0.142
	155	1.7y	0.025	0.024	0.024	0.023	0.022	0.018	0.016	0.014	0.001	-
	156	15.4d	0.001	-	-	-	-	-	-	-	-	-
			0.167	0.166	0.166	0.165	0.164	0.162	0.160	0.162	0.184	0.607
Gd	155	Stable	0.004	0.005	0.005	0.006	0.007	0.011	0.013	0.015	0.028	0.029
	156	Stable	0.012	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
	157	Stable	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
			0.023	0.025	0.025	0.026	0.027	0.031	0.033	0.035	0.048	0.049

Table 8

FISSION PRODUCT SPECTRUM FOR FAST FISSION (CA. 1 MEV NEUTRONS) OF U^{235} (10,000 DAYS IRRADIATED)

Element	Mass No.	Half Life	(Atoms per 100 Atoms U^{235} Fissioned)									
			0 Days	15 Days	30 Days	60 Days	100 Days	300 Days	1 Year	2 Years	10 Years	∞
Ge	74	Stable	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
	76	Stable	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004
			0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
As	75	Stable	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Se	77	Stable	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
	78	Stable	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
	79	$6.5 \times 10^4 y$	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	-
	80	Stable	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075
	82	Stable	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250
			0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.354
Br	79	Stable	-	-	-	-	-	-	-	-	-	0.042
	81	Stable	0.133	0.133	0.133	0.133	0.133	0.133	0.133	0.133	0.133	0.133
			0.133	0.133	0.133	0.133	0.133	0.133	0.133	0.133	0.133	0.175
Kr	83	Stable	0.382	0.382	0.382	0.382	0.382	0.382	0.382	0.382	0.382	0.382
	84	Stable	0.625	0.625	0.625	0.625	0.625	0.625	0.625	0.625	0.625	0.625
	85	9.4y	0.115	0.115	0.114	0.113	0.112	0.109	0.108	0.101	0.055	-
	86	Stable	1.644	1.644	1.644	1.644	1.644	1.644	1.644	1.644	1.644	1.644
			2.766	2.766	2.765	2.764	2.763	2.760	2.759	2.752	2.706	2.651
Rb	85	Stable	1.027	1.027	1.028	1.029	1.030	1.033	1.034	1.041	1.087	1.142
	87	$6 \times 10^{10} y$	2.890	2.890	2.890	2.890	2.890	2.890	2.890	2.890	2.890	-
			3.917	3.917	3.918	3.919	3.920	3.923	3.924	3.931	3.977	1.142
Sr	87	Stable	-	-	-	-	-	-	-	-	-	2.890
	88	Stable	3.500	3.500	3.500	3.500	3.500	3.500	3.500	3.500	3.500	3.500
	89	53d	0.032	0.027	0.023	0.014	0.009	-	-	-	-	-
	90	28y	3.215	3.212	3.203	3.202	3.193	3.150	3.136	3.059	2.509	-
			6.747	6.739	6.726	6.716	6.702	6.650	6.636	6.559	6.009	6.390
Y	89	Stable	4.153	4.158	4.162	4.171	4.176	4.185	4.185	4.185	4.185	4.185
	90	61h	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	-	-
	91	57d	0.044	0.036	0.030	0.021	0.013	0.001	-	-	-	-
			4.198	4.195	4.193	4.193	4.190	4.187	4.186	4.186	4.185	4.185
Zr	90	Stable	1.204	1.207	1.216	1.217	1.226	1.269	1.283	1.360	1.911	4.420
	91	Stable	5.266	5.274	5.280	5.289	5.297	5.309	5.310	5.310	5.310	5.310
	92	Stable	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300
	93	$9.5 \times 10^5 y$	5.425	5.425	5.425	5.425	5.425	5.425	5.425	5.425	5.425	-
	94	Stable	5.700	5.700	5.700	5.700	5.700	5.700	5.700	5.700	5.700	5.700
	95	65d	0.064	0.054	0.046	0.033	0.022	0.003	0.002	-	-	-
	96	Stable	6.750	6.750	6.750	6.750	6.750	6.750	6.750	6.750	6.750	6.750
	97	17h	0.001	-	-	-	-	-	-	-	-	-
			29.710	29.710	29.717	29.714	29.720	29.756	29.770	29.845	30.396	27.480
Nb	93	Stable	-	-	-	-	-	-	-	-	-	5.425
	95	35d	0.035	0.033	0.031	0.026	0.022	0.004	0.001	-	-	-
			0.035	0.033	0.031	0.026	0.022	0.004	0.001	-	-	5.425
Mo	95	Stable	6.671	6.683	6.693	6.711	6.726	6.763	6.767	6.770	6.770	6.700
	97	Stable	6.559	6.560	6.560	6.560	6.560	6.560	6.560	6.560	6.560	6.560
	98	Stable	6.240	6.240	6.240	6.240	6.240	6.240	6.240	6.240	6.240	6.240
	99	67h	0.002	-	-	-	-	-	-	-	-	-
	100	Stable	6.750	6.750	6.750	6.750	6.750	6.750	6.750	6.750	6.750	6.750
			26.222	26.233	26.243	26.261	26.276	26.313	26.317	26.320	26.320	26.320
Tc	99	$2.12 \times 10^5 y$	6.198	6.200	6.200	6.200	6.200	6.200	6.200	6.200	6.200	-
Ru	99	Stable	-	-	-	-	-	-	-	-	-	6.200
	101	Stable	6.050	6.050	6.050	6.050	6.050	6.050	6.050	6.050	6.050	6.050
	102	Stable	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300
	103	39.8d	0.023	0.018	0.014	0.008	0.004	-	-	-	-	-
	104	Stable	2.775	2.775	2.775	2.775	2.775	2.775	2.775	2.775	2.775	2.775
	106	1y	0.025	0.024	0.023	0.022	0.021	0.014	0.012	0.006	-	-
			14.173	14.167	14.162	14.155	14.150	14.139	14.137	14.131	14.125	20.325
Rh	103	Stable	3.977	3.982	3.986	3.992	3.996	4.000	4.000	4.000	4.000	4.000

Element	Mass No.	Half Life	(Atoms per 100 Atoms U ²³⁵ Fissioned)									
			0 Days	15 Days	30 Days	60 Days	100 Days	300 Days	1 Year	2 Years	10 Years	∞
Pd	105	Stable	1.026	1.026	1.026	1.026	1.026	1.026	1.026	1.026	1.026	1.026
	106	Stable	0.445	0.446	0.447	0.448	0.449	0.456	0.458	0.464	0.470	0.470
	107	7 x 10 ⁶ y	0.280	0.280	0.280	0.280	0.280	0.280	0.280	0.280	0.280	-
	108	Stable	0.163	0.163	0.163	0.163	0.163	0.163	0.163	0.163	0.163	0.163
	110	Stable	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079
			1.993	1.994	1.995	1.996	1.997	2.004	2.006	2.012	2.018	1.738
Ag	107	Stable	-	-	-	-	-	-	-	-	-	0.280
	109	Stable	0.087	0.087	0.087	0.087	0.087	0.087	0.087	0.087	0.087	0.087
			0.087	0.087	0.087	0.087	0.087	0.087	0.087	0.087	0.087	0.367
Cd	111	Stable	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067
	112	Stable	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042
	113	Stable	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043
	114	Stable	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044
	116	Stable	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045
			0.241	0.241	0.241	0.241	0.241	0.241	0.241	0.241	0.241	0.241
In	115	6 x 10 ¹⁴ y	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045	-
Sn	115	Stable	-	-	-	-	-	-	-	-	-	0.045
	117	Stable	0.048	0.048	0.048	0.048	0.048	0.048	0.048	0.048	0.048	0.048
	118	Stable	0.048	0.048	0.048	0.048	0.048	0.048	0.048	0.048	0.048	0.048
	119	Stable	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052
	120	Stable	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052
	122	Stable	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053
	124	Stable	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080
		0.333	0.333	0.333	0.333	0.333	0.333	0.333	0.333	0.333	0.378	
Sb	121	Stable	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055
	123	Stable	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053
	125	2.7y	0.018	0.017	0.017	0.017	0.016	0.014	0.014	0.010	0.001	-
		0.126	0.125	0.125	0.125	0.124	0.122	0.122	0.118	0.109	0.108	
Te	125m	58d	0.001	0.001	0.001	0.001	0.001	0.001	0.001	-	-	-
	125	Stable	0.104	0.105	0.105	0.105	0.106	0.108	0.108	0.113	0.122	0.123
	126	Stable	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180
	127m	115d	0.001	0.001	0.001	-	-	-	-	-	-	-
	128	Stable	0.430	0.430	0.430	0.430	0.430	0.430	0.430	0.430	0.430	0.430
	129m	33.5d	0.001	0.001	-	-	-	-	-	-	-	-
	130	Stable	1.525	1.525	1.525	1.525	1.525	1.525	1.525	1.525	1.525	1.525
	132	77.7h	0.002	-	-	-	-	-	-	-	-	-
		2.244	2.243	2.242	2.241	2.242	2.244	2.244	2.248	2.257	2.258	
I	127	Stable	0.259	0.259	0.259	0.260	0.260	0.260	0.260	0.260	0.260	0.260
	129	1.72 x 10 ⁷ y	0.789	0.789	0.790	0.790	0.790	0.790	0.790	0.790	0.790	-
	131	8.14d	0.004	0.001	-	-	-	-	-	-	-	-
	133	20.5h	0.001	-	-	-	-	-	-	-	-	-
		1.053	1.049	1.049	1.050	1.050	1.050	1.050	1.050	1.050	0.260	
Xe	129	Stable	-	-	-	-	-	-	-	-	-	0.790
	131	Stable	3.106	3.109	3.110	3.110	3.110	3.110	3.110	3.110	3.110	3.110
	132	Stable	4.448	4.450	4.450	4.450	4.450	4.450	4.450	4.450	4.450	4.450
	133	5.27d	0.005	0.001	-	-	-	-	-	-	-	-
	134	Stable	7.810	7.810	7.810	7.810	7.810	7.810	7.810	7.810	7.810	7.810
	136	Stable	6.791	6.791	6.791	6.791	6.791	6.791	6.791	6.791	6.791	6.791
			22.160	22.161	22.161	22.161	22.161	22.161	22.161	22.161	22.161	22.951
Ca	133	Stable	6.614	6.619	6.620	6.620	6.620	6.620	6.620	6.620	6.620	6.620
	135	3 x 10 ⁶ y	6.560	6.560	6.560	6.560	6.560	6.560	6.560	6.560	6.560	-
	137	27y	4.226	4.222	4.217	4.209	4.196	4.138	4.119	4.014	3.268	-
		17.400	17.401	17.397	17.389	17.376	17.318	17.299	17.194	16.448	6.620	
Ba	135	Stable	-	-	-	-	-	-	-	-	-	6.560
	137	Stable	1.593	1.597	1.602	1.610	1.623	1.681	1.700	1.805	2.551	5.819
	138	Stable	6.120	6.120	6.120	6.120	6.120	6.120	6.120	6.120	6.120	6.120
	140	12.8d	0.010	0.005	0.002	-	-	-	-	-	-	-
		7.723	7.722	7.724	7.730	7.743	7.801	7.820	7.925	8.671	18.499	
La	139	Stable	6.250	6.250	6.250	6.250	6.250	6.250	6.250	6.250	6.250	6.250
	140	40h	0.001	0.001	-	-	-	-	-	-	-	-
		6.251	6.251	6.250	6.250	6.250	6.250	6.250	6.250	6.250	6.250	6.250

Table 8 (Cont'd.)

Element	Mass No.	Half Life	(Atoms per 100 Atoms U ²³⁵ Fissioned)									
			0 Days	15 Days	30 Days	60 Days	100 Days	300 Days	1 Year	2 Years	10 Years	∞
Ce	140	Stable	5.789	5.794	5.798	5.800	5.800	5.800	5.800	5.800	5.800	5.800
	141	33.1d	0.025	0.018	0.013	0.007	0.003	-	-	-	-	-
	142	Stable	5.190	5.190	5.190	5.190	5.190	5.190	5.190	5.190	5.190	5.190
	143	33h	0.001	-	-	-	-	-	-	-	-	-
	144	282d	0.195	0.188	0.181	0.168	0.153	0.093	0.079	0.032	-	-
			11.200	11.190	11.182	11.165	11.146	11.083	11.069	11.022	10.990	10.990
Pr	141	Stable	5.275	5.282	5.287	5.293	5.297	5.300	5.300	5.300	5.300	5.300
	143	13.7d	0.011	0.005	0.002	-	-	-	-	-	-	-
			5.286	5.287	5.289	5.293	5.297	5.300	5.300	5.300	5.300	5.300
Nd	143	Stable	5.178	5.185	5.188	5.190	5.190	5.190	5.190	5.190	5.190	5.190
	144	Stable	4.575	4.582	4.589	4.602	4.617	4.677	4.691	4.738	4.770	4.770
	145	Stable	4.320	4.320	4.320	4.320	4.320	4.320	4.320	4.320	4.320	4.320
	146	Stable	3.870	3.870	3.870	3.870	3.870	3.870	3.870	3.870	3.870	3.870
	147	11.3d	0.005	0.003	0.001	-	-	-	-	-	-	-
	148	Stable	2.280	2.280	2.280	2.280	2.280	2.280	2.280	2.280	2.280	2.280
	150	Stable	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735
			20.963	20.975	20.983	20.997	21.012	21.072	21.086	21.133	21.165	21.165
Pm	147	2.6y	0.442	0.440	0.438	0.429	0.416	0.359	0.356	0.262	0.030	-
	149	54h	0.001	-	-	-	-	-	-	-	-	-
			0.443	0.440	0.438	0.429	0.416	0.359	0.356	0.262	0.030	-
Sm	147	Stable	2.793	2.797	2.801	2.811	2.824	2.881	2.884	2.978	3.210	3.240
	149	Stable	1.184	1.185	1.185	1.185	1.185	1.185	1.185	1.185	1.185	1.185
	151	73y	0.410	0.410	0.410	0.409	0.409	0.407	0.406	0.402	0.372	-
	152	Stable	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282
	154	Stable	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067
			4.736	4.741	4.745	4.754	4.767	4.822	4.824	4.914	5.116	4.774
Eu	151	Stable	0.055	0.055	0.055	0.056	0.056	0.058	0.059	0.063	0.093	0.465
	153	Stable	0.142	0.142	0.142	0.142	0.142	0.142	0.142	0.142	0.142	0.142
	155	1.7y	0.003	0.003	0.003	0.003	0.002	0.002	0.002	0.001	-	-
			0.200	0.200	0.200	0.201	0.200	0.202	0.203	0.206	0.235	0.607
Gd	155	Stable	0.026	0.026	0.026	0.026	0.027	0.027	0.027	0.028	0.029	0.029
	156	Stable	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
	157	Stable	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
			0.046	0.046	0.046	0.046	0.047	0.047	0.047	0.048	0.049	0.049

Table 9

FISSION PRODUCT SPECTRUM FOR FAST FISSION (CA. 2 MEV NEUTRONS) OF Pu^{239} (10 DAYS IRRADIATED)[illegible]

Table 9 (Cont'd.)

Element	Mass No.	Half Life	(Atoms per 100 Atoms of Pu ²³⁹ Fissioned)										∞
			0 Days	15 Days	30 Days	60 Days	100 Days	300 Days	1 Year	2 Years	10 Years		
Ru	99	Stable	-	-	-	-	-	-	-	-	-	5.900	
	101	Stable	6.182	6.200	6.200	6.200	6.200	6.200	6.200	6.200	6.200	6.200	
	102	Stable	6.343	6.350	6.350	6.350	6.350	6.350	6.350	6.350	6.350	6.350	
	103	39.8d	5.900	4.560	3.500	2.082	1.036	0.032	0.011	-	-	-	
	104	Stable	6.600	6.600	6.600	6.600	6.600	6.600	6.600	6.600	6.600	6.600	
	105	4.5h	0.130	-	-	-	-	-	-	-	-	-	
	106	1.0y	6.290	6.120	5.930	5.615	5.200	3.555	3.135	1.566	0.007	-	
			31.445	29.830	28.580	26.847	25.386	22.737	22.296	20.716	19.157	25.050	
Rh	103m	57m	0.006	0.005	0.004	0.002	0.001	-	-	-	-	-	
	103	Stable	0.524	1.865	2.926	4.346	5.393	6.398	6.419	6.430	6.430	6.430	
	105	36.5h	1.018	0.001	-	-	-	-	-	-	-	-	
	108	9h	0.178	-	-	-	-	-	-	-	-	-	
	109	1h	0.010	-	-	-	-	-	-	-	-	-	
			1.736	1.871	2.930	4.348	5.394	6.398	6.419	6.430	6.430	6.430	
Pd	105	Stable	3.672	4.819	4.820	4.820	4.820	4.820	4.820	4.820	4.820	4.820	
	106	Stable	0.060	0.230	0.420	0.735	1.150	2.795	3.215	4.784	6.343	6.350	
	107	7 x 10 ⁶ y	4.800	4.800	4.800	4.800	4.800	4.800	4.800	4.800	4.800	-	
	108	Stable	3.122	3.300	3.300	3.300	3.300	3.300	3.300	3.300	3.300	3.300	
	109	13.6h	0.139	-	-	-	-	-	-	-	-	-	
	110	Stable	0.840	0.840	0.840	0.840	0.840	0.840	0.840	0.840	0.840	0.840	
	111	22m	0.001	-	-	-	-	-	-	-	-	-	
	112	21h	0.023	-	-	-	-	-	-	-	-	-	
			12.657	13.989	14.180	14.495	14.910	16.555	16.975	18.544	20.103	15.310	
Ag	107	Stable	-	-	-	-	-	-	-	-	-	4.800	
	109	Stable	1.551	1.700	1.700	1.700	1.700	1.700	1.700	1.700	1.700	1.700	
	111	7.6d	0.321	0.082	0.021	0.001	-	-	-	-	-	-	
	112	3.2h	0.003	-	-	-	-	-	-	-	-	-	
	113	5.3h	0.005	-	-	-	-	-	-	-	-	-	
		1.880	1.782	1.721	1.701	1.700	1.700	1.700	1.700	1.700	1.700	6.500	
Cd	111	Stable	0.168	0.408	0.469	0.489	0.490	0.490	0.490	0.490	0.490	0.490	
	112	Stable	0.159	0.185	0.185	0.185	0.185	0.185	0.185	0.185	0.185	0.185	
	113	Stable	0.165	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	
	114	Stable	0.127	0.127	0.127	0.127	0.127	0.127	0.127	0.127	0.127	0.127	
	115m	43d	0.008	0.006	0.005	0.003	0.002	-	-	-	-	-	
	115	53h	0.026	-	-	-	-	-	-	-	-	-	
	116	Stable	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	
			0.661	0.904	0.964	0.982	0.982	0.980	0.980	0.980	0.980	0.980	
In	115m	4.5h	0.002	-	-	-	-	-	-	-	-	-	
	115	6 x 10 ¹⁴ y	0.058	0.088	0.089	0.091	0.092	0.094	0.094	0.094	0.094	-	
		0.060	0.088	0.089	0.091	0.092	0.094	0.094	0.094	0.094	-		
Sn	115	Stable	-	-	-	-	-	-	-	-	-	0.094	
	117m	14d	0.006	0.003	0.001	-	-	-	-	-	-	-	
	117	Stable	0.001	0.004	0.006	0.007	0.007	0.007	0.007	0.007	0.007	0.007	
	118	Stable	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	
	119m	250d	0.007	0.007	0.006	0.006	0.005	0.003	0.003	0.001	-	-	
	119	Stable	-	-	0.001	0.001	0.002	0.004	0.004	0.006	0.007	0.007	
	120	Stable	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	
	121	27.5h	0.001	-	-	-	-	-	-	-	-	-	
	122	Stable	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	
	123	39.5m	0.001	-	-	-	-	-	-	-	-	-	
	124	Stable	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	
	125	9.4d	0.094	0.031	0.010	0.001	-	-	-	-	-	-	
	126	50m	0.002	-	-	-	-	-	-	-	-	-	
	127	1.5h	0.006	-	-	-	-	-	-	-	-	-	
		0.324	0.257	0.230	0.221	0.220	0.220	0.220	0.220	0.220	0.314		
Sb	121	Stable	0.008	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	
	123	Stable	0.127	0.128	0.128	0.128	0.128	0.128	0.128	0.128	0.128	0.128	
	125	2.7y	0.166	0.226	0.245	0.249	0.243	0.211	0.202	0.156	0.020	-	
	126	9h	0.022	-	-	-	-	-	-	-	-	-	
	127	93h	0.285	0.021	0.002	-	-	-	-	-	-	-	
	128	1.1h	0.008	-	-	-	-	-	-	-	-	-	
	129	4.2h	0.037	-	-	-	-	-	-	-	-	-	
	130	40m	0.010	-	-	-	-	-	-	-	-	-	
	131	23.1m	0.011	-	-	-	-	-	-	-	-	-	
		0.674	0.384	0.384	0.386	0.380	0.348	0.339	0.293	0.157	0.137		
Te	125m	58d	-	0.003	0.005	0.010	0.014	0.012	0.012	0.009	0.001	-	
	125	Stable	-	-	-	-	0.003	0.037	0.046	0.095	0.239	0.260	
	126	Stable	0.376	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	
	127m	115d	0.050	0.086	0.081	0.068	0.054	0.016	0.011	0.001	-	-	
	127	9.3h	0.024	-	-	-	-	-	-	-	-	-	
	128	Stable	1.092	1.100	1.100	1.100	1.100	1.100	1.100	1.100	1.100	1.100	
	129m	33.5d	0.309	0.226	0.166	0.089	0.039	0.001	-	-	-	-	
	129	72m	0.011	-	-	-	-	-	-	-	-	-	
	130	Stable	2.990	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	
	131m	30h	0.132	-	-	-	-	-	-	-	-	-	
	131	24.8m	0.012	-	-	-	-	-	-	-	-	-	
	132	77.7h	2.630	0.106	0.005	-	-	-	-	-	-	-	
	134	44m	0.028	-	-	-	-	-	-	-	-	-	
			7.654	4.921	4.757	4.667	4.610	4.566	4.569	4.605	4.740	4.760	

Table 9 (Cont'd.)

Element	Mass No.	Half Life	(Atoms per 100 Atoms of Pu ²³⁹ Fissioned)									
			0 Days	15 Days	30 Days	60 Days	100 Days	300 Days	1 Year	2 Years	10 Years	∞
I	127	Stable	0.255	0.513	0.537	0.552	0.566	0.604	0.609	0.619	0.620	0.620
	129	1.72 x 10 ⁷ y	1.443	1.574	1.634	1.711	1.761	1.799	1.800	1.800	1.800	-
	131	8.14d	3.344	0.928	0.247	0.017	0.001	-	-	-	-	-
	132	2.4h	0.081	0.003	-	-	-	-	-	-	-	-
	133	20.5h	0.770	-	-	-	-	-	-	-	-	-
	134	52.5m	0.034	-	-	-	-	-	-	-	-	-
	135	6.68h	0.250	-	-	-	-	-	-	-	-	-
			6.177	3.018	2.418	2.280	2.328	2.403	2.409	2.419	2.420	0.620
Xe	129	Stable	-	-	-	-	-	-	-	-	-	1.800
	131	Stable	1.401	3.972	4.653	4.883	4.899	4.900	4.900	4.900	4.900	4.900
	132	Stable	3.669	6.271	6.375	6.380	6.380	6.380	6.380	6.380	6.380	6.380
	133	5.27d	3.222	0.556	0.077	0.002	-	-	-	-	-	-
	134	Stable	6.239	6.300	6.300	6.300	6.300	6.300	6.300	6.300	6.300	6.300
	135m	15.6m	0.003	-	-	-	-	-	-	-	-	-
	135	9.13h	0.343	-	-	-	-	-	-	-	-	-
	136	Stable	6.348	6.348	6.348	6.348	6.348	6.348	6.348	6.348	6.348	6.348
	138	17m	0.009	-	-	-	-	-	-	-	-	-
			21.234	23.447	23.753	23.913	23.927	23.928	23.928	23.928	23.928	25.728
Cs	133	Stable	2.258	5.694	6.173	6.248	6.250	6.250	6.250	6.350	6.250	6.250
	135	3 x 10 ⁶ y	5.624	6.220	6.220	6.220	6.220	6.220	6.220	6.220	6.220	-
	137	27y	5.450	5.444	5.439	5.427	5.412	5.336	5.312	5.178	4.217	-
	138	32.9m	0.018	-	-	-	-	-	-	-	-	-
	139	9.5m	0.005	-	-	-	-	-	-	-	-	-
			13.355	17.358	17.832	17.895	17.882	17.806	17.782	17.648	16.687	6.250
Ba	135	Stable	-	-	-	-	-	-	-	-	-	6.220
	137	Stable	0.002	0.008	0.013	0.025	0.040	0.116	0.140	0.274	1.235	5.452
	138	Stable	5.573	5.600	5.600	5.600	5.600	5.600	5.600	5.600	5.600	5.600
	139	85m	0.048	-	-	-	-	-	-	-	-	-
	140	12.8d	3.870	1.720	0.766	0.152	0.017	-	-	-	-	-
	141	18m	0.009	-	-	-	-	-	-	-	-	-
			9.502	7.328	6.379	5.777	5.657	5.716	5.740	5.874	6.835	17.272
La	139	Stable	5.247	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300
	140	40h	0.401	0.259	0.117	0.023	0.003	-	-	-	-	-
	141	3.7h	0.104	-	-	-	-	-	-	-	-	-
	142	74m	0.033	-	-	-	-	-	-	-	-	-
	143	19m	0.009	-	-	-	-	-	-	-	-	-
			5.794	5.559	5.417	5.323	5.303	5.300	5.300	5.300	5.300	5.300
Ce	140	Stable	0.729	3.021	4.117	4.825	4.980	5.000	5.000	5.000	5.000	5.000
	141	33.1d	4.240	3.178	2.320	1.235	0.534	0.008	-	-	-	-
	142	Stable	4.367	4.400	4.400	4.400	4.400	4.400	4.400	4.400	4.400	4.400
	143	33h	0.966	-	-	-	-	-	-	-	-	-
	144	282d	3.645	3.513	3.383	3.146	2.851	1.745	1.485	0.605	-	-
	145	1.8h	0.035	-	-	-	-	-	-	-	-	-
	146	14.6m	0.004	-	-	-	-	-	-	-	-	-
			13.986	14.112	14.220	13.606	12.765	11.153	10.885	10.005	9.400	9.400
Pr	141	Stable	0.347	1.522	2.380	3.465	4.166	4.692	4.700	4.700	4.700	4.700
	143	13.7d	3.836	2.202	1.052	0.231	0.031	-	-	-	-	-
	145	4.5h	0.088	-	-	-	-	-	-	-	-	-
	146	24m	0.007	-	-	-	-	-	-	-	-	-
			4.278	3.724	3.432	3.696	4.197	4.692	4.700	4.700	4.700	4.700
Nd	143	Stable	0.089	2.698	3.848	4.669	4.869	4.900	4.900	4.900	4.900	4.900
	144	Stable	0.055	0.187	0.317	0.554	0.849	1.955	2.215	3.095	3.700	3.700
	145	Stable	3.127	3.250	3.250	3.250	3.250	3.250	3.250	3.250	3.250	3.250
	146	Stable	2.889	2.900	2.900	2.900	2.900	2.900	2.900	2.900	2.900	2.900
	147	11.3d	1.905	0.759	0.302	0.048	0.004	-	-	-	-	-
	148	Stable	2.200	2.200	2.200	2.200	2.200	2.200	2.200	2.200	2.200	2.200
	149	2h	0.023	-	-	-	-	-	-	-	-	-
	150	Stable	1.580	1.580	1.580	1.580	1.580	1.580	1.580	1.580	1.580	1.580
	151	15m	0.002	-	-	-	-	-	-	-	-	-
			11.870	13.574	14.397	15.201	15.652	16.785	17.045	17.925	18.530	18.530
Pm	147	2.6y	0.644	1.771	2.213	2.414	2.386	2.067	1.969	1.508	0.177	-
	149	54h	0.582	0.006	-	-	-	-	-	-	-	-
	151	27.5h	0.214	-	-	-	-	-	-	-	-	-
			1.440	1.777	2.213	2.414	2.386	2.067	1.969	1.508	0.177	-
Sm	147	Stable	0.001	0.021	0.035	0.088	0.160	0.483	0.581	1.042	2.373	2.550
	149	Stable	1.315	1.894	1.900	1.900	1.900	1.900	1.900	1.900	1.900	1.900
	151	73y	1.084	1.300	1.299	1.298	1.296	1.290	1.288	1.275	1.182	-
	152	Stable	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
	153	47h	0.132	0.003	-	-	-	-	-	-	-	-
	154	Stable	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
	156	10h	0.005	-	-	-	-	-	-	-	-	-
			3.737	4.417	4.434	4.486	4.556	4.873	4.969	5.417	6.655	5.650

Table 9 (Cont'd.)

Element	Mass No.	Half Life	(Atoms per 100 Atoms of Pu ²³⁹ Fissioned)									
			0 Days	15 Days	30 Days	60 Days	100 Days	300 Days	1 Year	2 Years	10 Years	∞
Eu	151	Stable	-	-	0.001	0.002	0.004	0.010	0.012	0.025	0.118	1.300
	153	Stable	0.348	0.477	0.480	0.480	0.480	0.480	0.480	0.480	0.480	0.480
	155	1.7y	0.180	0.177	0.174	0.168	0.161	0.129	0.120	0.080	0.003	-
	156	15.4d	0.065	0.035	0.018	0.005	0.001	-	-	-	-	-
	157	15.4h	0.002	-	-	-	-	-	-	-	-	-
			0.595	0.689	0.673	0.655	0.646	0.619	0.612	0.585	0.601	1.780
Gd	155	Stable	-	-	0.006	0.012	0.019	0.051	0.060	0.100	0.177	0.180
	156	Stable	0.010	0.045	0.062	0.075	0.079	0.080	0.080	0.080	0.080	0.080
	157	Stable	0.018	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
			0.028	0.065	0.088	0.107	0.118	0.151	0.160	0.200	0.277	0.280

Table 10

FISSION PRODUCT SPECTRUM FOR FAST FISSION (CA. 2 MEV NEUTRONS) OF Pu²³⁹ (30 DAYS IRRADIATED)

Element	Mass No.	Half Life	(Atoms per 100 Atoms of Pu ²³⁹ Fissioned)									
			0 Days	15 Days	30 Days	60 Days	100 Days	300 Days	1 Year	2 Years	10 Years	∞
Se	82	Stable	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
Kr	83	Stable	0.098	0.098	0.098	0.098	0.098	0.098	0.098	0.098	0.098	0.098
	84	Stable	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200
	85m	4.36h	0.003	-	-	-	-	-	-	-	-	-
	85	9.4y	0.076	0.076	0.076	0.075	0.075	0.072	0.071	0.067	0.039	-
	86	Stable	0.530	0.530	0.530	0.530	0.530	0.530	0.530	0.530	0.530	0.530
	87	78m	0.003	-	-	-	-	-	-	-	-	-
	88	2.77h	0.007	-	-	-	-	-	-	-	-	-
			0.917	0.904	0.904	0.903	0.903	0.900	0.899	0.895	0.867	0.828
Rb	85	Stable	0.251	0.254	0.254	0.255	0.255	0.258	0.259	0.263	0.291	0.330
	87	6 x 10 ¹⁰ y	0.807	0.810	0.810	0.810	0.810	0.810	0.810	0.810	0.810	-
	88	17.8m	0.001	-	-	-	-	-	-	-	-	-
	89	15.4m	0.001	-	-	-	-	-	-	-	-	-
			1.060	1.064	1.064	1.065	1.065	1.068	1.069	1.073	1.101	0.330
Sr	87	Stable	-	-	-	-	-	-	-	-	-	0.810
	88	Stable	1.262	1.270	1.270	1.270	1.270	1.270	1.270	1.270	1.270	1.270
	89	53d	1.522	1.253	1.030	0.695	0.415	0.030	0.013	-	-	-
	90	28y	2.299	2.298	2.294	2.290	2.283	2.253	2.243	2.188	1.796	-
	91	9.7h	0.054	-	-	-	-	-	-	-	-	-
	92	2.7h	0.018	-	-	-	-	-	-	-	-	-
			5.155	4.821	4.594	4.255	3.968	3.553	3.526	3.458	3.066	2.080
Y	89	Stable	0.317	0.587	0.810	1.145	1.425	1.810	1.827	1.840	1.840	1.840
	90	61h	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	-	-
	91m	51m	0.002	-	-	-	-	-	-	-	-	-
	91	57d	2.275	1.942	1.620	1.125	0.692	0.061	0.028	-	-	-
	92	3.6h	0.024	-	-	-	-	-	-	-	-	-
	93	10h	0.075	-	-	-	-	-	-	-	-	-
	94	16.5m	0.002	-	-	-	-	-	-	-	-	-
	95	10.5m	0.002	-	-	-	-	-	-	-	-	-
			2.698	2.530	2.431	2.271	2.118	1.872	1.856	1.841	1.840	1.840
Zr	90	Stable	-	0.001	0.005	0.009	0.016	0.046	0.056	0.111	0.504	2.300
	91	Stable	0.439	0.828	1.150	1.645	2.078	2.709	2.742	2.770	2.770	2.770
	92	Stable	3.258	3.300	3.300	3.300	3.300	3.300	3.300	3.300	3.300	3.300
	93	9.5 x 10 ⁵ y	3.675	3.750	3.750	3.750	3.750	3.750	3.750	3.750	3.750	-
	94	Stable	4.198	4.200	4.200	4.200	4.200	4.200	4.200	4.200	4.200	4.200
	95	65d	4.510	3.825	3.240	2.330	1.555	0.185	0.092	0.002	-	-
	96	Stable	5.100	5.100	5.100	5.100	5.100	5.100	5.100	5.100	5.100	5.100
	97	17h	0.177	-	-	-	-	-	-	-	-	-
			21.357	21.004	20.745	20.334	19.999	19.290	19.240	19.233	19.624	17.670
Nb	93	Stable	-	-	-	-	-	-	-	-	-	3.750
	95	35d	0.620	1.010	1.215	1.305	1.173	0.204	0.104	0.002	-	-
	97	72m	0.013	-	-	-	-	-	-	-	-	-
			0.633	1.010	1.215	1.305	1.173	0.204	0.104	0.002	-	3.750
Mo	95	Stable	0.138	0.435	0.815	1.635	2.542	4.881	5.074	5.266	5.270	5.270
	97	Stable	5.010	5.200	5.200	5.200	5.200	5.200	5.200	5.200	5.200	5.200
	98	Stable	5.600	5.600	5.600	5.600	5.600	5.600	5.600	5.600	5.600	5.600
	99	67h	0.794	0.019	-	-	-	-	-	-	-	-
	100	Stable	6.000	6.000	6.000	6.000	6.000	6.000	6.000	6.000	6.000	6.000
	101	14.6m	0.003	-	-	-	-	-	-	-	-	-
	102	12m	0.002	-	-	-	-	-	-	-	-	-
			17.547	17.254	17.615	18.435	19.342	21.681	21.874	22.066	22.070	22.070
Tc	99m	6h	0.062	-	-	-	-	-	-	-	-	-
	99	2.12 x 10 ⁵ y	5.044	5.881	5.900	5.900	5.900	5.900	5.900	5.900	5.900	-
	101	14m	0.003	-	-	-	-	-	-	-	-	-
			5.109	5.881	5.900	5.900	5.900	5.900	5.900	5.900	5.900	-
Ru	99	Stable	-	-	-	-	-	-	-	-	-	5.900
	101	Stable	6.194	6.200	6.200	6.200	6.200	6.200	6.200	6.200	6.200	6.200
	102	Stable	6.348	6.350	6.350	6.350	6.350	6.350	6.350	6.350	6.350	6.350
	103	39.8d	5.020	3.880	2.980	1.770	0.882	0.027	0.009	-	-	-
	104	Stable	6.600	6.600	6.600	6.600	6.600	6.600	6.600	6.600	6.600	6.600
	105	4.5h	0.043	-	-	-	-	-	-	-	-	-
	106	1y	6.140	5.960	5.785	5.470	5.070	3.470	3.060	1.530	0.007	-
			30.345	28.990	27.915	26.390	25.102	22.647	22.219	20.680	19.157	25.050
Rh	103	Stable	1.410	2.550	3.450	4.660	5.548	6.403	6.421	6.430	6.430	6.430
	105	36.5h	0.353	-	-	-	-	-	-	-	-	-
	108	9h	0.060	-	-	-	-	-	-	-	-	-
	109	1h	0.003	-	-	-	-	-	-	-	-	-
			1.826	2.550	3.450	4.660	5.548	6.403	6.421	6.430	6.430	6.430

Table 10 (Cont'd.)

Element	Mass No.	Half Life	(Atoms per 100 Atoms of Pu ²³⁹ Fissioned)									
			0 Days	15 Days	30 Days	60 Days	100 Days	300 Days	1 Year	2 Years	10 Years	∞
Pd	105	Stable	4.424	4.820	4.820	4.820	4.820	4.820	4.820	4.820	4.820	4.820
	106	Stable	0.210	0.390	0.565	0.880	1.280	2.880	3.290	4.820	6.343	6.350
	107	7 x 10 ⁶ y	4.800	4.800	4.800	4.800	4.800	4.800	4.800	4.800	4.800	-
	108	Stable	3.240	3.300	3.300	3.300	3.300	3.300	3.300	3.300	3.300	3.300
	109	13.6h	0.047	-	-	-	-	-	-	-	-	-
	110	Stable	0.840	0.840	0.840	0.840	0.840	0.840	0.840	0.840	0.840	0.840
	112	21h	0.008	-	-	-	-	-	-	-	-	-
			13.569	14.150	14.325	14.640	15.040	16.640	17.050	18.580	20.103	15.310
Ag	107	Stable	-	-	-	-	-	-	-	-	-	4.800
	109	Stable	1.650	1.700	1.700	1.700	1.700	1.700	1.700	1.700	1.700	1.700
	111	7.6d	0.168	0.043	0.011	0.001	-	-	-	-	-	-
	112	3.2h	0.001	-	-	-	-	-	-	-	-	-
	113	5.3h	0.002	-	-	-	-	-	-	-	-	-
			1.821	1.743	1.711	1.701	1.700	1.700	1.700	1.700	1.700	6.500
Cd	111	Stable	0.322	0.447	0.479	0.489	0.490	0.490	0.490	0.490	0.490	0.490
	112	Stable	0.176	0.185	0.185	0.185	0.185	0.185	0.185	0.185	0.185	0.185
	113	Stable	0.168	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170
	114	Stable	0.127	0.127	0.127	0.127	0.127	0.127	0.127	0.127	0.127	0.127
	115m	43d	0.009	0.005	0.004	0.003	0.001	-	-	-	-	-
	115	53h	0.007	-	-	-	-	-	-	-	-	-
	116	Stable	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
			0.817	0.942	0.973	0.982	0.981	0.980	0.980	0.980	0.980	0.980
In	115	6 x 10 ¹⁴ y	0.078	0.089	0.090	0.091	0.093	0.094	0.094	0.094	0.094	-
Sn	115	Stable	-	-	-	-	-	-	-	-	-	0.094
	117m	14d	0.004	0.002	0.001	-	-	-	-	-	-	-
	117	Stable	0.003	0.005	0.006	0.007	0.007	0.007	0.007	0.007	0.007	0.007
	118	Stable	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
	119m	250d	0.007	0.007	0.006	0.006	0.005	0.003	0.003	0.001	-	-
	119	Stable	-	-	0.001	0.001	0.002	0.004	0.004	0.006	0.007	0.007
	120	Stable	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
	122	Stable	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011
	124	Stable	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180
	125	9.4d	0.055	0.018	0.006	0.001	-	-	-	-	-	-
	126	50m	0.001	-	-	-	-	-	-	-	-	-
			0.276	0.238	0.226	0.221	0.220	0.220	0.220	0.220	0.220	0.314
Sb	121	Stable	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
	123	Stable	0.128	0.128	0.128	0.128	0.128	0.128	0.128	0.128	0.128	0.128
	125	2.7y	0.204	0.238	0.248	0.248	0.242	0.210	0.202	0.155	0.020	-
	126	9h	0.007	-	-	-	-	-	-	-	-	-
	127	93h	0.115	0.008	0.001	-	-	-	-	-	-	-
	128	1.1h	0.003	-	-	-	-	-	-	-	-	-
	129	4.2h	0.012	-	-	-	-	-	-	-	-	-
	130	40m	0.003	-	-	-	-	-	-	-	-	-
	131	23.1m	0.004	-	-	-	-	-	-	-	-	-
			0.485	0.383	0.386	0.385	0.379	0.347	0.339	0.292	0.157	0.137
Te	125m	58d	0.001	0.004	0.006	0.011	0.014	0.012	0.012	0.009	0.001	-
	125	Stable	-	-	-	-	0.004	0.038	0.046	0.096	0.239	0.260
	126	Stable	0.392	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400
	127m	115d	0.075	0.169	0.167	0.135	0.106	0.032	0.022	0.002	-	-
	127	9.3h	0.011	-	-	-	-	-	-	-	-	-
	128	Stable	1.097	1.100	1.100	1.100	1.100	1.100	1.100	1.100	1.100	1.100
	129m	33.5d	0.255	0.187	0.137	0.074	0.021	0.001	-	-	-	-
	129	72m	0.004	-	-	-	-	-	-	-	-	-
	130	Stable	2.997	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
	131m	30h	0.044	-	-	-	-	-	-	-	-	-
	131	24.8m	0.004	-	-	-	-	-	-	-	-	-
	132	77.7h	0.990	0.040	0.002	-	-	-	-	-	-	-
	134	44m	0.001	-	-	-	-	-	-	-	-	-
			5.871	4.900	4.812	4.720	4.645	4.583	4.580	4.607	4.740	4.760
I	127	Stable	0.419	0.443	0.452	0.485	0.514	0.588	0.598	0.618	0.620	0.620
	129	1.7 x 10 ⁷ y	1.529	1.613	1.663	1.726	1.779	1.799	1.800	1.800	1.800	-
	131	8d	1.762	0.463	0.128	0.009	-	-	-	-	-	-
	132	2.4h	0.031	0.001	-	-	-	-	-	-	-	-
	133	20.5h	0.257	-	-	-	-	-	-	-	-	-
	134	52.5m	0.001	-	-	-	-	-	-	-	-	-
	135	6.68h	0.083	-	-	-	-	-	-	-	-	-
			4.082	2.520	2.243	2.220	2.293	2.387	2.398	2.418	2.420	0.620

Table 10 (Cont'd.)

Element	Mass No.	Half Life	(Atoms per 100 Atoms of Pu ²³⁹ Fissioned)									
			0 Days	15 Days	30 Days	60 Days	100 Days	300 Days	1 Year	2 Years	10 Years	∞
Xe	129	Stable	-	-	-	-	-	-	-	-	-	1.800
	131	Stable	3.086	4.437	4.772	4.891	4.900	4.900	4.900	4.900	4.900	4.900
	132	Stable	5.359	6.339	6.378	6.380	6.380	6.380	6.380	6.380	6.380	6.380
	133	5.3d	1.560	0.260	0.036	0.001	-	-	-	-	-	-
	134	Stable	6.298	6.300	6.300	6.300	6.300	6.300	6.300	6.300	6.300	6.300
	135m	15.6m	0.001	-	-	-	-	-	-	-	-	-
	135	9.13h	0.104	-	-	-	-	-	-	-	-	-
	136	Stable	6.348	6.348	6.348	6.348	6.348	6.348	6.348	6.348	6.348	6.348
	138	17m	0.003	-	-	-	-	-	-	-	-	-
			22.759	23.684	23.834	23.920	23.928	23.928	23.928	23.928	23.928	25.728
Cs	133	Stable	4.433	5.990	6.214	6.249	6.250	6.250	6.250	6.250	6.250	6.250
	135	2.1 x 10 ⁶ y	6.032	6.220	6.220	6.220	6.220	6.220	6.220	6.220	6.220	-
	137	27y	5.447	5.441	5.436	5.424	5.409	5.333	5.309	5.175	4.215	-
	138	32.9m	0.006	-	-	-	-	-	-	-	-	-
	139	9.5m	0.002	-	-	-	-	-	-	-	-	-
			15.920	17.651	17.870	17.893	17.879	17.803	17.779	17.645	16.685	6.250
Ba	135	Stable	-	-	-	-	-	-	-	-	-	6.220
	137	Stable	0.005	0.011	0.016	0.028	0.043	0.119	0.143	0.277	1.237	5.452
	138	Stable	5.591	5.600	5.600	5.600	5.600	5.600	5.600	5.600	5.600	5.600
	139	85m	0.015	-	-	-	-	-	-	-	-	-
	140	12.8d	2.501	1.114	0.496	0.098	0.011	-	-	-	-	-
	141	18m	0.003	-	-	-	-	-	-	-	-	-
			8.115	6.725	6.112	5.726	5.654	5.719	5.743	5.877	6.837	17.272
La	139	Stable	5.283	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300
	140	40h	0.311	0.167	0.074	0.015	0.002	-	-	-	-	-
	141	3.7h	0.035	-	-	-	-	-	-	-	-	-
	142	74m	0.011	-	-	-	-	-	-	-	-	-
	143	19m	0.003	-	-	-	-	-	-	-	-	-
			5.643	5.467	5.374	5.315	5.302	5.300	5.300	5.300	5.300	5.300
Ce	140	Stable	2.188	3.719	4.430	4.887	4.987	5.000	5.000	5.000	5.000	5.000
	141	33.1d	3.420	2.520	1.840	0.980	0.424	0.006	-	-	-	-
	142	Stable	4.389	4.400	4.400	4.400	4.400	4.400	4.400	4.400	4.400	4.400
	143	33h	0.323	0.025	-	-	-	-	-	-	-	-
	144	282d	3.610	3.475	3.350	3.118	2.825	1.727	1.472	0.600	-	-
	145	1.8h	0.012	-	-	-	-	-	-	-	-	-
	146	14.6m	0.001	-	-	-	-	-	-	-	-	-
			13.943	14.139	14.020	13.385	12.636	11.133	10.872	10.000	9.400	9.400
Pr	141	Stable	1.242	2.180	2.860	3.720	4.276	4.694	4.700	4.700	4.700	4.700
	143	13.7d	2.360	1.247	0.598	0.130	0.017	-	-	-	-	-
	145	4.5h	0.029	-	-	-	-	-	-	-	-	-
	146	24m	0.002	-	-	-	-	-	-	-	-	-
			3.633	3.427	3.458	3.850	4.293	4.694	4.700	4.700	4.700	4.700
Nd	143	Stable	2.214	3.628	4.302	4.770	4.883	4.900	4.900	4.900	4.900	4.900
	144	Stable	0.090	0.225	0.350	0.582	0.875	1.973	2.228	3.100	3.700	3.700
	145	Stable	3.209	3.250	3.250	3.250	3.250	3.250	3.250	3.250	3.250	3.250
	146	Stable	2.897	2.900	2.900	2.900	2.900	2.900	2.900	2.900	2.900	2.900
	147	11.3d	1.163	0.464	0.185	0.029	0.002	-	-	-	-	-
	148	Stable	2.200	2.200	2.200	2.200	2.200	2.200	2.200	2.200	2.200	2.200
	149	2h	0.008	-	-	-	-	-	-	-	-	-
	150	Stable	1.580	1.580	1.580	1.580	1.580	1.580	1.580	1.580	1.580	1.580
	151	15m	0.001	-	-	-	-	-	-	-	-	-
			13.362	14.247	14.767	15.311	15.690	16.603	17.058	17.930	18.530	18.530
Pm	147	2.6y	1.372	2.054	2.308	2.411	2.366	2.046	1.952	1.493	0.176	-
	149	54h	0.206	0.002	-	-	-	-	-	-	-	-
	151	27.5h	0.072	-	-	-	-	-	-	-	-	-
			1.650	2.056	2.308	2.411	2.366	2.046	1.952	1.493	0.176	-
Sm	147	Stable	0.015	0.032	0.057	0.110	0.182	0.504	0.598	1.057	2.374	2.550
	149	Stable	1.684	1.898	1.900	1.900	1.900	1.900	1.900	1.900	1.900	1.900
	151	73y	1.227	1.299	1.299	1.298	1.296	1.290	1.288	1.275	1.182	-
	152	Stable	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
	153	47h	0.044	0.001	-	-	-	-	-	-	-	-
	154	Stable	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
	156	10h	0.002	-	-	-	-	-	-	-	-	-
			4.174	4.430	4.456	4.508	4.578	4.894	4.986	5.432	6.656	5.650
Eu	151	Stable	-	0.001	0.001	0.002	0.004	0.010	0.012	0.025	0.118	1.300
	153	Stable	0.436	0.479	0.480	0.480	0.480	0.480	0.480	0.480	0.480	0.480
	155	1.7y	0.177	0.174	0.172	0.166	0.158	0.127	0.118	0.079	0.003	-
	156	14d	0.043	0.023	0.012	0.003	0.001	-	-	-	-	-
	157	15.4h	0.001	-	-	-	-	-	-	-	-	-
			0.657	0.677	0.665	0.651	0.643	0.617	0.610	0.584	0.601	1.780
Gd	155	Stable	0.003	0.006	0.008	0.014	0.022	0.053	0.062	0.101	0.177	0.180
	156	Stable	0.035	0.057	0.068	0.077	0.079	0.080	0.080	0.080	0.080	0.080
	157	Stable	0.019	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
			0.057	0.083	0.096	0.101	0.121	0.153	0.162	0.201	0.277	0.280

Table 11

FISSION PRODUCT SPECTRUM FOR FAST FISSION (CA 2 MEV NEUTRONS) OF PU²³⁹ (85 DAYS IRRADIATED)

Element	Mass No	Half Life	(Atoms per 100 Atoms of Pu ²³⁹ Fissioned)									
			0 Days	15 Days	30 Days	60 Days	100 Days	300 Days	1 Year	2 Years	10 Years	∞
Se	82	Stable	0 008	0 008	0 008	0 008	0 008	0 008	0 008	0 008	0 008	0 008
Kr	83	Stable	0 098	0 098	0 098	0 098	0 098	0 098	0 098	0 098	0 098	0 098
	84	Stable	0 200	0 200	0 200	0 200	0 200	0 200	0 200	0 200	0 200	0 200
	85m	4 36h	0 001	-	-	-	-	-	-	-	-	-
	85	9 4y	0 076	0 076	0 076	0 075	0 075	0 072	0 071	0 067	0 039	-
	86	Stable	0 530	0 530	0 530	0 530	0 530	0 530	0 530	0 530	0 530	0 530
	87	78m	0 001	-	-	-	-	-	-	-	-	-
	88	2 77h	0 002	-	-	-	-	-	-	-	-	-
			0 908	0 904	0 904	0 903	0 903	0 900	0 899	0 895	0 867	0 828
Ro	85	Stable	0 253	0 254	0 254	0 255	0 255	0 258	0 259	0 263	0 291	0 330
	87	4 3 x 10 ¹⁰ y	0 809	0 810	0 810	0 810	0 810	0 810	0 810	0 810	0 810	-
			1 062	1 064	1 064	1 065	1 065	1 068	1 069	1 073	1 101	0 330
Sr	87	Stable	-	-	-	-	-	-	-	-	-	0 810
	88	Stable	1 268	1 270	1 270	1 270	1 270	1 270	1 270	1 270	1 270	1 270
	89	53d	1 110	0 905	0 750	0 506	0 300	0 022	0 009	-	-	-
	90	28y	2 294	2 292	2 287	2 282	2 277	2 248	2 240	2 183	1 795	-
			4 672	4 467	4 307	4 058	3 847	3 540	3 519	3 453	3 065	2 080
Y	89	Stable	0 730	0 935	1 090	1 334	1 540	1 818	1 831	1 840	1 840	1 840
	90	61h	0 001	0 001	0 001	0 001	0 001	0 001	0 001	0 001	0 001	-
	91	57d	1 725	1 438	1 196	0 833	0 512	0 045	0 020	-	-	-
			2 456	2 374	2 287	2 168	2 053	1 864	1 852	1 841	1 841	1 840
Zr	90	Stable	0 005	0 007	0 012	0 017	0 022	0 051	0 059	0 116	0 504	2 300
	91	Stable	1 045	1 332	1 574	1 937	2 258	2 725	2 750	2 770	2 770	2 770
	92	Stable	3 300	3 300	3 300	3 300	3 300	3 300	3 300	3 300	3 300	3 300
	93	1 1 x 10 ⁶ y	3 750	3 750	3 750	3 750	3 750	3 750	3 750	3 750	3 750	-
	94	Stable	4 200	4 200	4 200	4 200	4 200	4 200	4 200	4 200	4 200	4 200
	95	65d	3 440	2 960	2 525	1 835	1 198	0 142	0 070	-	-	-
	96	Stable	5 100	5 100	5 100	5 100	5 100	5 100	5 100	5 100	5 100	5 100
	97	17h	0 062	-	-	-	-	-	-	-	-	-
			20 902	20 649	20 461	20 139	19 828	19 268	19 229	19 236	19 624	17 670
			-	-	-	-	-	-	-	-	-	3 750
Nb	93	Stable	-	-	-	-	-	-	-	-	-	3 750
	95	35d	1 080	1 252	1 320	1 262	1 017	0 167	0 084	0 002	-	-
	97	74m	0 004	-	-	-	-	-	-	-	-	-
			1 084	1 252	1 320	1 262	1 017	0 167	0 084	0 002	-	3 750
Mo	95	Stable	0 750	1 058	1 425	2 173	3 055	4 961	5 116	5 268	5 270	5 270
	97	Stable	5 134	5 200	5 200	5 200	5 200	5 200	5 200	5 200	5 200	5 200
	98	Stable	5 600	5 600	5 600	5 600	5 600	5 600	5 600	5 600	5 600	5 600
	99	67h	0 230	0 007	-	-	-	-	-	-	-	-
	100	Stable	6 000	6 000	6 000	6 000	6 000	6 000	6 000	6 000	6 000	6 000
	101	14 6m	0 001	-	-	-	-	-	-	-	-	-
	102	12m	0 001	-	-	-	-	-	-	-	-	-
			17 766	17 865	18 225	18 973	19 955	21 761	21 916	22 068	22 070	22 070
Tc	99m	6h	0 022	-	-	-	-	-	-	-	-	-
	99	2 12 x 10 ⁵ y	5 598	5 893	5 900	5 900	5 900	5 900	5 900	5 900	5 900	-
	101	14m	0 001	-	-	-	-	-	-	-	-	-
			5 621	5 893	5 900	5 900	5 900	5 900	5 900	5 900	5 900	-
Ru	99	Stable	-	-	-	-	-	-	-	-	-	5 900
	101	Stable	6 193	6 200	6 200	6 200	6 200	6 200	6 200	6 200	6 200	6 200
	102	Stable	6 349	6 350	6 350	6 350	6 350	6 350	6 350	6 350	6 350	6 350
	103	39 8d	3 370	2 600	2 005	1 207	0 597	0 019	0 006	-	-	-
	104	Stable	6 600	6 600	6 600	6 600	6 600	6 600	6 600	6 600	6 600	6 600
	105	4 5h	0 015	-	-	-	-	-	-	-	-	-
	106	1 0y	5 860	5 700	5 545	5 240	4 850	3 320	2 935	1 468	0 006	-
			28 392	27 450	26 700	25 597	24 577	22 489	22 091	20 618	19 156	25 050
Rh	103m	57m	0 001	-	-	-	-	-	-	-	-	-
	103	Stable	3 059	3 830	4 425	5 223	5 833	6 411	6 424	6 430	6 430	6 430
	105	36 5h	0 125	-	-	-	-	-	-	-	-	-
	108	9h	0 021	-	-	-	-	-	-	-	-	-
	109	1h	0 001	-	-	-	-	-	-	-	-	-
			3 207	3 830	4 425	5 223	5 833	6 411	6 424	6 430	6 430	6 430
Pd	105	Stable	4 680	4 820	4 820	4 820	4 820	4 820	4 820	4 820	4 820	4 820
	106	Stable	0 490	0 650	0 805	1 110	1 500	3 030	3 415	4 882	6 344	6 350
	107	7 x 10 ⁶ y	4 800	4 800	4 800	4 800	4 800	4 800	4 800	4 800	4 800	-
	108	Stable	3 279	3 300	3 300	3 300	3 300	3 300	3 300	3 300	3 300	3 300
	109	13 6h	0 016	-	-	-	-	-	-	-	-	-
	110	Stable	0 840	0 840	0 840	0 840	0 840	0 840	0 840	0 840	0 840	0 840
	112	21a	0 003	-	-	-	-	-	-	-	-	-
			14 108	14 410	14 565	14 870	15 260	16 790	17 175	18 642	20 104	15 310

Table 11 (Cont'd.)

Element	Mass No.	Half Life	(Atoms per 100 Atoms of Pu ²³⁹ Fissioned)									
			0 Days	15 Days	30 Days	60 Days	100 Days	300 Days	1 Year	2 Years	10 Years	∞
Ag	107	Stable	-	-	-	-	-	-	-	-	-	4.800
	109	Stable	1.683	1.700	1.700	1.700	1.700	1.700	1.700	1.700	1.700	1.700
	111	7.6d	0.062	0.015	0.004	-	-	-	-	-	-	-
	113	5.3h	0.001	-	-	-	-	-	-	-	-	-
			1.746	1.715	1.704	1.700	1.700	1.700	1.700	1.700	1.700	6.500
Cd	111	Stable	0.428	0.475	0.486	0.490	0.490	0.490	0.490	0.490	0.490	0.490
	112	Stable	0.182	0.185	0.185	0.185	0.185	0.185	0.185	0.185	0.185	0.185
	113	Stable	0.169	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170
	114	Stable	0.127	0.127	0.127	0.127	0.127	0.127	0.127	0.127	0.127	0.127
	115m	43d	0.010	0.008	0.006	0.004	0.002	-	-	-	-	-
	115	53h	0.003	-	-	-	-	-	-	-	-	-
	116	Stable	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
			0.927	0.973	0.982	0.984	0.982	0.980	0.980	0.980	0.980	0.980
In	115	6 x 10 ¹⁴ y	0.081	0.086	0.088	0.090	0.092	0.094	0.094	0.094	0.094	-
Sn	115	Stable	-	-	-	-	-	-	-	-	-	0.094
	117m	14d	0.002	0.001	-	-	-	-	-	-	-	-
	117	Stable	0.005	0.006	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
	118	Stable	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
	119m	250d	0.006	0.006	0.006	0.005	0.005	0.003	0.002	0.001	-	-
	119	Stable	0.001	0.001	0.001	0.002	0.002	0.004	0.005	0.006	0.007	0.007
	120	Stable	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
	122	Stable	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011
	124	Stable	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180
	125	9.4d	0.022	0.007	0.002	-	-	-	-	-	-	-
			0.242	0.227	0.222	0.220	0.220	0.220	0.220	0.220	0.220	0.314
Sb	121	Stable	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
	123	Stable	0.128	0.128	0.128	0.128	0.128	0.128	0.128	0.128	0.128	0.128
	125	2.7y	0.225	0.239	0.244	0.246	0.242	0.211	0.201	0.156	0.020	-
	126	9h	0.003	-	-	-	-	-	-	-	-	-
	127	93h	0.040	0.002	-	-	-	-	-	-	-	-
	128	1.1h	0.001	-	-	-	-	-	-	-	-	-
	129	4.2h	0.004	-	-	-	-	-	-	-	-	-
	130	40m	0.001	-	-	-	-	-	-	-	-	-
	131	23.1m	0.001	-	-	-	-	-	-	-	-	-
			0.412	0.378	0.381	0.383	0.379	0.348	0.338	0.293	0.157	0.137
Te	125m	58d	0.013	0.014	0.014	0.014	0.014	0.012	0.012	0.009	0.001	-
	125	Stable	-	-	-	-	0.004	0.037	0.047	0.095	0.239	0.260
	126	Stable	0.397	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400
	127m	115d	0.052	0.053	0.048	0.040	0.032	0.010	0.006	0.001	-	-
	128	Stable	1.099	1.100	1.100	1.100	1.100	1.100	1.100	1.100	1.100	1.100
	129m	33.5d	0.161	0.118	0.087	0.047	0.020	-	-	-	-	-
	130	Stable	2.999	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
	131m	30h	0.016	-	-	-	-	-	-	-	-	-
	132	77.7h	0.350	0.009	-	-	-	-	-	-	-	-
	134	44m	0.003	-	-	-	-	-	-	-	-	-
			5.090	4.694	4.649	4.601	4.570	4.559	4.565	4.605	4.740	4.760
I	127	Stable	0.528	0.565	0.572	0.580	0.588	0.610	0.614	0.619	0.620	0.620
	129	1.7 x 10 ⁷ y	1.635	1.682	1.713	1.753	1.780	1.800	1.800	1.800	1.800	-
	131	8d	0.665	0.182	0.049	0.004	-	-	-	-	-	-
	132	2.4h	0.007	-	-	-	-	-	-	-	-	-
	133	20.5h	0.093	-	-	-	-	-	-	-	-	-
	134	52.5m	0.004	-	-	-	-	-	-	-	-	-
	135	6.68h	0.029	-	-	-	-	-	-	-	-	-
			2.961	2.429	2.334	2.337	2.368	2.410	2.414	2.419	2.420	0.620
Xe	129	Stable	-	-	-	-	-	-	-	-	-	1.800
	131	Stable	4.218	4.718	4.851	4.896	4.900	4.900	4.900	4.900	4.900	4.900
	132	Stable	6.023	6.371	6.380	6.380	6.380	6.380	6.380	6.380	6.380	6.380
	133	5.27d	0.561	0.092	0.014	-	-	-	-	-	-	-
	134	Stable	6.293	6.300	6.300	6.300	6.300	6.300	6.300	6.300	6.300	6.300
	135	9.13h	0.043	-	-	-	-	-	-	-	-	-
	136	Stable	6.348	6.348	6.348	6.348	6.348	6.348	6.348	6.348	6.348	6.348
	138	17m	0.001	-	-	-	-	-	-	-	-	-
			23.487	23.829	23.893	23.924	23.928	23.928	23.928	23.928	23.928	25.728
Cs	133	Stable	5.596	6.158	6.236	6.250	6.250	6.250	6.250	6.250	6.250	6.250
	135	3 x 10 ⁶ y	6.148	6.220	6.220	6.220	6.220	6.220	6.220	6.220	6.220	-
	137	27y	5.443	5.437	5.432	5.420	5.405	5.329	5.305	5.171	4.212	-
	138	32.9m	0.002	-	-	-	-	-	-	-	-	-
	139	9.5m	0.001	-	-	-	-	-	-	-	-	-
			17.190	17.815	17.888	17.890	17.875	17.799	17.775	17.641	16.682	6.250

Table 11 (Cont'd.)

Element	Mass No	Half Life	(Atoms per 100 Atoms of Pu ²³⁹ Fissioned)									
			0 Days	15 Days	30 Days	60 Days	100 Days	300 Days	1 Year	2 Years	10 Years	∞
Ba	135	Stable	-	-	-	-	-	-	-	-	-	6 220
	137	Stable	0 009	0 015	0 020	0 032	0 047	0 123	0 147	0 281	1 240	5 452
	138	Stable	5 597	5 600	5 600	5 600	5 600	5 600	5 600	5 600	5 600	5 600
	139	85m	0 005	-	-	-	-	-	-	-	-	-
	140	12 8d	1 080	0 479	0 213	0 042	0 005	-	-	-	-	-
	141	18m	0 001	-	-	-	-	-	-	-	-	-
			6 692	6 094	5 833	5 674	5 652	5 723	5 747	5 881	6 840	17 272
La	139	Stable	5 294	5 300	5 300	5 300	5 300	5 300	5 300	5 300	5 300	5 300
	140	40h	0 142	0 073	0 032	0 006	-	-	-	-	-	-
	141	3 7h	0 012	-	-	-	-	-	-	-	-	-
	142	74m	0 004	-	-	-	-	-	-	-	-	-
	143	19m	0 001	-	-	-	-	-	-	-	-	-
			5 453	5 373	5 332	5 306	5 300	5 300	5 300	5 300	5 300	5 300
Ce	140	Stable	3 778	4 448	4 755	4 952	4 995	5 000	5 000	5 000	5 000	5 000
	141	33d	2 182	1 595	1 165	0 620	0 266	0 004	0 001	-	-	-
	142	Stable	4 396	4 400	4 400	4 400	4 400	4 400	4 400	4 400	4 400	4 400
	143	33h	0 115	-	-	-	-	-	-	-	-	-
	144	282d	3 320	3 200	3 082	2 880	2 600	1 595	1 350	0 548	-	-
	145	1 8h	0 004	-	-	-	-	-	-	-	-	-
			13 795	13 643	13 402	12 852	12 261	10 999	10 751	9 948	9 400	9 400
Pr	141	Stable	2 505	3 105	3 535	4 080	4 434	4 696	4 699	4 700	4 700	4 700
	143	13 7d	1 125	0 583	0 273	0 060	0 008	-	-	-	-	-
	145	4 5h	0 010	-	-	-	-	-	-	-	-	-
	146	24m	0 001	-	-	-	-	-	-	-	-	-
			3 641	3 688	3 808	4 140	4 442	4 696	4 699	4 700	4 700	4 700
Nd	143	Stable	3 659	4 317	4 627	4 840	4 892	4 900	4 900	4 900	4 900	4 900
	144	Stable	0 380	0 500	0 618	0 820	1 100	2 105	2 350	3 152	3 700	3 700
	145	Stable	3 236	3 250	3 250	3 250	3 250	3 250	3 250	3 250	3 250	3 250
	146	Stable	2 899	2 900	2 900	2 900	2 900	2 900	2 900	2 900	2 900	2 900
	147	11 3d	0 500	0 194	0 076	0 012	0 001	-	-	-	-	-
	148	Stable	2 200	2 200	2 200	2 200	2 200	2 200	2 200	2 200	2 200	2 200
	149	2h	0 003	-	-	-	-	-	-	-	-	-
	150	Stable	1 580	1 580	1 580	1 580	1 580	1 580	1 580	1 580	1 580	1 580
			14 457	14 941	15 251	15 602	15 923	16 935	17 180	17 982	18 530	18 530
Pm	147	2 6y	2 000	2 276	2 364	2 378	2 319	2 010	1 915	1 465	0 173	-
	149	54h	0 073	0 001	-	-	-	-	-	-	-	-
	151	27 5h	0 025	-	-	-	-	-	-	-	-	-
			2 098	2 277	2 364	2 378	2 319	2 010	1 915	1 465	0 173	-
Sm	147	Stable	0 050	0 080	0 110	0 160	0 230	0 540	0 635	1 085	2 377	2 550
	149	Stable	1 824	1 899	1 900	1 900	1 900	1 900	1 900	1 900	1 900	1 900
	151	73y	1 275	1 300	1 299	1 296	1 295	1 290	1 286	1 277	1 183	-
	152	Stable	0 900	0 900	0 900	0 900	0 900	0 900	0 900	0 900	0 900	0 900
	153	47h	0 016	-	-	-	-	-	-	-	-	-
	154	Stable	0 300	0 300	0 300	0 300	0 300	0 300	0 300	0 300	0 300	0 300
	156	10h	0 001	-	-	-	-	-	-	-	-	-
			4 366	4 479	4 509	4 556	4 625	4 930	5 021	5 462	6 660	5 650
Eu	151	Stable	-	-	0 001	0 004	0 005	0 010	0 014	0 023	0 117	1 300
	153	Stable	0 464	0 480	0 480	0 480	0 480	0 480	0 480	0 480	0 480	0 480
	155	1 7y	0 180	0 177	0 173	0 168	0 161	0 128	0 119	0 080	0 003	-
	156	15 4d	0 010	0 005	0 003	0 001	-	-	-	-	-	-
			0 654	0 662	0 657	0 653	0 646	0 618	0 613	0 583	0 600	1 780
Gd	155	Stable	-	0 003	0 007	0 012	0 019	0 052	0 061	0 100	0 177	0 180
	156	Stable	0 069	0 075	0 077	0 079	0 080	0 080	0 080	0 080	0 080	0 080
	157	Stable	0 020	0 020	0 020	0 020	0 020	0 020	0 020	0 020	0 020	0 020
			0 089	0 098	0 104	0 111	0 119	0 152	0 161	0 200	0 277	0 280

Table 12

FISSION PRODUCT SPECTRUM FOR FAST FISSION (CA. 2 MEV NEUTRONS) OF Pu²³⁹(135 DAYS IRRADIATED)

Element	Mass No.	Half Life	(Atoms per 100 Atoms of Pu ²³⁹ Fissioned)									
			0 Days	15 Days	30 Days	60 Days	100 Days	300 Days	1 Year	2 Years	10 Years	∞
Se	82	Stable	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
Kr	83	Stable	0.098	0.098	0.098	0.098	0.098	0.098	0.098	0.098	0.098	0.098
	84	Stable	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200
	85	9.4y	0.076	0.076	0.076	0.075	0.075	0.072	0.071	0.067	0.039	-
	86	Stable	0.530	0.530	0.530	0.530	0.530	0.530	0.530	0.530	0.530	0.530
	88	2.77h	0.002	-	-	-	-	-	-	-	-	-
			0.906	0.904	0.904	0.903	0.903	0.900	0.899	0.895	0.867	0.828
Rb	85	Stable	0.254	0.254	0.254	0.255	0.255	0.258	0.259	0.263	0.291	0.330
	87	4.3 x 10 ¹⁰ y	0.810	0.810	0.810	0.810	0.810	0.810	0.810	0.810	0.810	-
			1.064	1.064	1.064	1.065	1.065	1.068	1.069	1.073	1.101	0.330
Sr	87	Stable	-	-	-	-	-	-	-	-	-	0.810
	88	Stable	1.268	1.270	1.270	1.270	1.270	1.270	1.270	1.270	1.270	1.270
	89	53d	0.860	0.708	0.581	0.391	0.232	0.017	0.007	-	-	-
	90	28y	2.290	2.288	2.283	2.278	2.272	2.244	2.236	2.179	1.392	-
			4.418	4.266	4.134	3.939	3.774	3.531	3.513	3.449	2.662	2.080
Y	89	Stable	0.980	1.132	1.259	1.449	1.608	1.823	1.833	1.840	1.840	1.840
	90	61h	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	-	-
	91	57d	1.363	1.136	0.946	0.668	0.405	0.036	0.016	-	-	-
			2.344	2.269	2.206	2.118	2.014	1.860	1.850	1.841	1.840	1.840
Zr	90	Stable	0.009	0.011	0.016	0.021	0.027	0.055	0.063	0.120	0.908	2.300
	91	Stable	1.407	1.634	1.824	2.102	2.365	2.734	2.754	2.770	2.770	2.770
	92	Stable	3.300	3.300	3.300	3.300	3.300	3.300	3.300	3.300	3.300	3.300
	93	1.1 x 10 ⁶ y	3.750	3.750	3.750	3.750	3.750	3.750	3.750	3.750	3.750	-
	94	Stable	4.200	4.200	4.200	4.200	4.200	4.200	4.200	4.200	4.200	4.200
	95	65d	2.800	2.390	2.030	1.480	0.970	0.110	0.060	-	-	-
	96	Stable	5.100	5.100	5.100	5.100	5.100	5.100	5.100	5.100	5.100	5.100
	97	17h	0.039	-	-	-	-	-	-	-	-	-
			20.605	20.385	20.220	19.953	19.712	19.249	19.227	19.240	20.028	17.670
Nb	93	Stable	-	-	-	-	-	-	-	-	-	3.750
	95	35d	1.145	1.216	1.219	1.103	0.860	0.135	0.067	0.002	-	-
	97	74m	0.003	-	-	-	-	-	-	-	-	-
			1.148	1.216	1.219	1.103	0.860	0.135	0.067	0.002	-	3.750
Mo	95	Stable	1.325	1.664	2.021	2.687	3.440	5.025	5.143	5.268	5.270	5.270
	97	Stable	5.158	5.200	5.200	5.200	5.200	5.200	5.200	5.200	5.200	5.200
	98	Stable	5.600	5.600	5.600	5.600	5.600	5.600	5.600	5.600	5.600	5.600
	99	67h	0.180	-	-	-	-	-	-	-	-	-
	100	Stable	6.000	6.000	6.000	6.000	6.000	6.000	6.000	6.000	6.000	6.000
	101	14.6m	0.001	-	-	-	-	-	-	-	-	-
	102	12m	0.001	-	-	-	-	-	-	-	-	-
			18.265	18.464	18.821	19.487	20.240	21.825	21.943	22.068	22.070	22.070
Tc	99m	6h	0.014	-	-	-	-	-	-	-	-	-
	99	2.12 x 10 ⁵ y	5.706	5.900	5.900	5.900	5.900	5.900	5.900	5.900	5.900	-
	101	14m	0.001	-	-	-	-	-	-	-	-	-
			5.721	5.900	5.900	5.900	5.900	5.900	5.900	5.900	5.900	-
Ru	99	Stable	-	-	-	-	-	-	-	-	-	5.900
	101	Stable	6.198	6.200	6.200	6.200	6.200	6.200	6.200	6.200	6.200	6.200
	102	Stable	6.349	6.350	6.350	6.350	6.350	6.350	6.350	6.350	6.350	6.350
	103	39.8d	2.490	1.920	1.490	0.890	0.440	0.014	-	-	-	-
	104	Stable	6.600	6.600	6.600	6.600	6.600	6.600	6.600	6.600	6.600	6.600
	105	4.5h	0.010	-	-	-	-	-	-	-	-	-
	106	1.0y	5.620	5.460	5.300	5.020	4.650	3.180	2.810	1.400	0.006	-
			27.267	26.530	25.940	25.060	24.240	22.344	21.960	20.550	19.156	25.050
Rh	103m	57m	0.002	0.002	0.001	0.001	-	-	-	-	-	-
	103	Stable	3.938	4.508	4.939	5.539	5.990	6.416	6.430	6.430	6.430	6.430
	105	36.5h	0.079	-	-	-	-	-	-	-	-	-
	108	9h	0.013	-	-	-	-	-	-	-	-	-
	109	1h	0.001	-	-	-	-	-	-	-	-	-
			4.033	4.510	4.940	5.540	5.990	6.416	6.430	6.430	6.430	6.430
Pd	105	Stable	4.731	4.820	4.820	4.820	4.820	4.820	4.820	4.820	4.820	4.820
	106	Stable	0.730	0.890	1.050	1.330	1.700	3.170	3.540	4.950	6.344	6.350
	107	7 x 10 ⁶ y	4.800	4.800	4.800	4.800	4.800	4.800	4.800	4.800	4.800	-
	108	Stable	3.287	3.300	3.300	3.300	3.300	3.300	3.300	3.390	3.300	3.300
	109	13.6h	0.010	-	-	-	-	-	-	-	-	-
	110	Stable	0.840	0.840	0.840	0.840	0.840	0.840	0.840	0.840	0.840	0.840
	112	21h	0.002	-	-	-	-	-	-	-	-	-
			14.400	14.650	14.810	15.090	15.460	16.930	17.300	18.710	20.104	15.310

Table 12 (Cont'd.)

Element	Mass No.	Half Life	(Atoms per 100 Atoms of Pu ²³⁹ Fissioned)									
			0 Days	15 Days	30 Days	60 Days	100 Days	300 Days	1 Year	2 Years	10 Years	∞
Ag	107	Stable	-	-	-	-	-	-	-	-	-	4.800
	109	Stable	1.689	1.700	1.700	1.700	1.700	1.700	1.700	1.700	1.700	1.700
	111	7.6d	0.039	0.010	0.003	-	-	-	-	-	-	-
			1.728	1.710	1.703	1.700	1.700	1.700	1.700	1.700	1.700	6.500
Cd	111	Stable	0.451	0.480	0.487	0.490	0.490	0.490	0.490	0.490	0.490	0.490
	112	Stable	0.183	0.185	0.185	0.185	0.185	0.185	0.185	0.185	0.185	0.185
	113	Stable	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170
	114	Stable	0.127	0.127	0.127	0.127	0.127	0.127	0.127	0.127	0.127	0.127
	115m	43d	0.003	0.003	0.002	0.001	-	-	-	-	-	-
	115	53h	0.002	-	-	-	-	-	-	-	-	-
	116	Stable	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
			0.944	0.973	0.979	0.981	0.980	0.980	0.980	0.980	0.980	0.980
In	115	6 x 10 ¹⁴ y	0.089	0.091	0.092	0.093	0.094	0.094	0.094	0.094	0.094	-
Sn	115	Stable	-	-	-	-	-	-	-	-	-	0.094
	117m	14d	0.001	-	-	-	-	-	-	-	-	-
	117	Stable	0.006	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
	118	Stable	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
	119m	250d	0.006	0.006	0.005	0.005	0.004	0.003	0.002	0.001	-	-
	119	Stable	0.001	0.001	0.002	0.002	0.003	0.004	0.005	0.006	0.007	0.007
	120	Stable	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
	122	Stable	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011
	124	Stable	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180
	125	9.4d	0.014	0.005	0.001	-	-	-	-	-	-	-
			0.236	0.225	0.221	0.220	0.220	0.220	0.220	0.220	0.220	0.314
Sb	121	Stable	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
	123	Stable	0.128	0.128	0.128	0.128	0.128	0.128	0.128	0.128	0.128	0.128
	125	2.7y	0.235	0.244	0.254	0.243	0.236	0.205	0.196	0.152	0.020	-
	126	9h	0.002	-	-	-	-	-	-	-	-	-
	127	93h	0.026	-	-	-	-	-	-	-	-	-
	128	1.1h	0.001	-	-	-	-	-	-	-	-	-
	129	4.2h	0.003	-	-	-	-	-	-	-	-	-
	130	40m	0.001	-	-	-	-	-	-	-	-	-
	131	23.1m	0.001	-	-	-	-	-	-	-	-	-
			0.406	0.381	0.381	0.381	0.373	0.342	0.333	0.289	0.157	0.137
Te	125m	58d	0.011	0.011	0.012	0.013	0.014	0.012	0.012	0.009	0.001	-
	125	Stable	-	-	0.003	0.004	0.010	0.043	0.052	0.099	0.239	0.260
	126	Stable	0.398	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400
	127m	115d	0.066	0.060	0.055	0.046	0.036	0.011	0.007	0.001	-	-
	128	Stable	1.099	1.100	1.100	1.100	1.100	1.100	1.100	1.100	1.100	1.100
	129m	33.5d	0.120	0.088	0.064	0.035	0.015	-	-	-	-	-
	130	Stable	2.999	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
	131m	30h	0.010	-	-	-	-	-	-	-	-	-
	132	77.7h	0.220	0.009	-	-	-	-	-	-	-	-
	134	44m	0.002	-	-	-	-	-	-	-	-	-
I			4.925	4.668	4.634	4.598	4.575	4.566	4.571	4.609	4.740	4.760
	127	Stable	0.528	0.560	0.565	0.574	0.584	0.609	0.613	0.619	0.620	0.620
	129	1.7 x 10 ⁷ y	1.677	1.712	1.736	1.765	1.785	1.800	1.800	1.800	1.800	-
	131	8d	0.420	0.114	0.031	0.002	-	-	-	-	-	-
	132	2.4h	0.007	-	-	-	-	-	-	-	-	-
	133	20.5h	0.059	-	-	-	-	-	-	-	-	-
	134	52.5m	0.002	-	-	-	-	-	-	-	-	-
	135	6.68h	0.019	-	-	-	-	-	-	-	-	-
Xe			2.712	2.386	2.332	2.341	2.369	2.409	2.413	2.419	2.420	0.620
	129	Stable	-	-	-	-	-	-	-	-	-	1.800
	131	Stable	4.469	4.786	4.869	4.898	4.900	4.900	4.900	4.900	4.900	4.900
	132	Stable	6.153	6.371	6.380	6.380	6.380	6.380	6.380	6.380	6.380	6.380
	133	5.27d	0.354	0.060	-	-	-	-	-	-	-	-
	134	Stable	6.296	6.300	6.300	6.300	6.300	6.300	6.300	6.300	6.300	6.300
	135	9.13h	0.025	-	-	-	-	-	-	-	-	-
	136	Stable	6.348	6.348	6.348	6.348	6.348	6.348	6.348	6.348	6.348	6.348
	138	17m	0.001	-	-	-	-	-	-	-	-	-
Cs			23.646	23.865	23.897	23.926	23.928	23.928	23.928	23.928	23.928	25.728
	133	Stable	5.837	6.190	6.250	6.250	6.250	6.250	6.250	6.250	6.250	6.250
	135	3 x 10 ⁶ y	6.176	6.220	6.220	6.220	6.220	6.220	6.220	6.220	6.220	-
	137	27y	5.429	5.423	5.418	5.406	5.391	5.316	5.292	5.158	4.201	-
	138	32.9m	0.002	-	-	-	-	-	-	-	-	-
			17.444	17.833	17.888	17.876	17.861	17.786	17.762	17.628	16.671	6.250

Table 12 (Cont'd.)

Element	Mass No.	Half Life	(Atoms per 100 Atoms of Pu ²³⁹ Fissioned)									
			0 Days	15 Days	30 Days	60 Days	100 Days	300 Days	1 Year	2 Years	10 Years	∞
Ba	135	Stable	-	-	-	-	-	-	-	-	-	6.220
	137	Stable	0.023	0.029	0.034	0.046	0.061	0.136	0.160	0.294	1.251	5.452
	138	Stable	5.597	5.600	5.600	5.600	5.600	5.600	5.600	5.600	5.600	5.600
	139	85m	0.003	-	-	-	-	-	-	-	-	-
	140	12.8d	0.680	0.302	0.134	0.026	0.003	-	-	-	-	-
	141	18m	0.001	-	-	-	-	-	-	-	-	-
			6.304	5.931	5.768	5.672	5.664	5.736	5.760	5.894	6.851	17.272
La	139	Stable	5.297	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300
	140	40h	0.100	0.045	0.020	0.004	-	-	-	-	-	-
	141	3.7h	0.008	-	-	-	-	-	-	-	-	-
	142	74m	0.002	-	-	-	-	-	-	-	-	-
	143	19m	0.001	-	-	-	-	-	-	-	-	-
			5.408	5.345	5.320	5.304	5.300	5.300	5.300	5.300	5.300	5.300
Ce	140	Stable	4.220	4.653	4.842	4.970	4.997	5.000	5.000	5.000	5.000	5.000
	141	33d	1.560	1.142	0.835	0.445	0.192	0.003	-	-	-	-
	142	Stable	4.398	4.400	4.400	4.400	4.400	4.400	4.400	4.400	4.400	4.400
	143	33h	0.072	-	-	-	-	-	-	-	-	-
	144	282d	3.150	3.030	2.920	2.730	2.470	1.510	1.280	0.052	-	-
	145	1.8h	0.003	-	-	-	-	-	-	-	-	-
			13.403	13.225	13.001	12.545	12.059	10.913	10.680	9.452	9.400	9.400
Pr	141	Stable	3.131	3.558	3.865	4.255	4.508	4.697	4.700	4.700	4.700	4.700
	143	13.7d	0.710	0.380	0.178	0.039	0.005	-	-	-	-	-
	145	4.5h	0.006	-	-	-	-	-	-	-	-	-
	146	24m	0.001	-	-	-	-	-	-	-	-	-
			3.848	3.938	4.043	4.294	4.513	4.697	4.700	4.700	4.700	4.700
Nd	143	Stable	4.117	4.520	4.722	4.861	4.895	4.900	4.900	4.900	4.900	4.900
	144	Stable	0.550	0.670	0.780	0.970	1.230	2.190	2.420	3.648	3.700	3.700
	145	Stable	3.241	3.250	3.250	3.250	3.250	3.250	3.250	3.250	3.250	3.250
	146	Stable	2.899	2.900	2.900	2.900	2.900	2.900	2.900	2.900	2.900	2.900
	147	11.3d	0.315	0.123	0.048	0.007	-	-	-	-	-	-
	148	Stable	2.200	2.200	2.200	2.200	2.200	2.200	2.200	2.200	2.200	2.200
	149	2h	0.002	-	-	-	-	-	-	-	-	-
	150	Stable	1.580	1.580	1.580	1.580	1.580	1.580	1.580	1.580	1.580	1.580
			14.904	15.243	15.480	15.768	16.055	17.020	17.250	18.478	18.530	18.530
Pm	147	2.6y	2.170	2.337	2.382	2.373	2.310	1.998	1.905	1.460	0.171	-
	149	54h	0.046	-	-	-	-	-	-	-	-	-
	151	27.5h	0.015	-	-	-	-	-	-	-	-	-
			2.231	2.337	2.382	2.373	2.310	1.998	1.905	1.460	0.171	-
Sm	147	Stable	0.065	0.090	0.120	0.170	0.240	0.552	0.645	1.090	2.379	2.550
	149	Stable	1.852	1.900	1.900	1.900	1.900	1.900	1.900	1.900	1.900	1.900
	151	73y	1.280	1.295	1.294	1.291	1.290	1.285	1.281	1.272	1.178	-
	152	Stable	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
	153	47h	0.010	-	-	-	-	-	-	-	-	-
	154	Stable	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
			4.407	4.485	4.514	4.561	4.630	4.937	5.026	5.462	6.657	5.650
Eu	151	Stable	0.005	0.005	0.006	0.009	0.010	0.015	0.019	0.028	0.122	1.300
	153	Stable	0.470	0.480	0.480	0.480	0.480	0.480	0.480	0.480	0.480	0.480
	155	1.7y	0.179	0.177	0.173	0.168	0.161	0.128	0.119	0.080	0.003	-
	156	15.4d	0.010	0.005	0.003	-	-	-	-	-	-	-
			0.664	0.667	0.662	0.657	0.651	0.623	0.618	0.588	0.605	1.780
Gd	155	Stable	0.001	0.003	0.007	0.012	0.019	0.052	0.061	0.100	0.177	0.180
	156	Stable	0.070	0.075	0.077	0.080	0.080	0.080	0.080	0.080	0.080	0.080
	157	Stable	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
			0.091	0.098	0.104	0.112	0.119	0.152	0.161	0.200	0.277	0.280

Table 13

FISSION PRODUCT SPECTRUM FOR FAST FISSION (CA 2 MEV NEUTRONS) OF Pu^{239} (365 DAYS IRRADIATED)

Element	Mass No	Half Life	(Atoms per 100 Atoms of Pu^{239} Fissioned)									
			0 Days	15 Days	30 Days	60 Days	100 Days	300 Days	1 Year	2 Years	10 Years	∞
Se	82	Stable	0 008	0 008	0 008	0 008	0 008	0 008	0 008	0 008	0 008	0 008
Kr	83	Stable	0 098	0 098	0 098	0 098	0 098	0 098	0 098	0 098	0 098	0 098
	84	Stable	0 200	0 200	0 200	0 200	0 200	0 200	0 200	0 200	0 200	0 200
	85	9 4y	0 074	0 074	0 073	0 073	0 072	0 069	0 068	0 062	0 038	-
	86	Stable	0 530	0 530	0 530	0 530	0 530	0 530	0 530	0 530	0 530	0 530
Rb	85	Stable	0 902	0 902	0 901	0 901	0 900	0 897	0 896	0 890	0 866	0 828
	87	6 x 10 ¹⁰ y	0 256	0 256	0 257	0 257	0 258	0 261	0 262	0 268	0 292	0 330
			0 810	0 810	0 810	0 810	0 810	0 810	0 810	0 810	0 810	-
			1 066	1 066	1 067	1 067	1 068	1 071	1 072	1 078	1 102	0 330
Sr	87	-	-	-	-	-	-	-	-	-	-	0 810
	88	Stable	1 270	1 270	1 270	1 270	1 270	1 270	1 270	1 270	1 270	1 270
	89	53d	0 383	0 315	0 259	0 175	0 105	0 008	0 003	-	-	-
	90	28y	2 270	2 268	2 265	2 261	2 257	2 225	2 218	2 160	1 775	-
Y			3 923	3 853	3 794	3 706	3 632	3 503	3 491	3 430	3 045	2 080
	89	Stable	1 457	1 525	1 581	1 665	1 735	1 832	1 837	1 840	1 840	1 840
	90	61h	0 001	0 001	0 001	0 001	0 001	0 001	0 001	0 001	-	-
	91	57d	0 617	0 514	0 428	0 298	0 183	0 016	0 007	-	-	-
Zr			2 075	2 040	2 010	1 964	1 919	1 849	1 845	1 841	1 840	1 840
	90	Stable	0 029	0 031	0 034	0 038	0 042	0 074	0 081	0 139	0 525	2 300
	91	Stable	2 153	2 256	2 342	2 472	2 587	2 754	2 763	2 770	2 770	2 770
	92	Stable	3 300	3 300	3 300	3 300	3 300	3 300	3 300	3 300	3 300	3 300
Nb	93	9 5 x 10 ⁵ y	3 750	3 750	3 750	3 750	3 750	3 750	3 750	3 750	3 750	-
	94	Stable	4 200	4 200	4 200	4 200	4 200	4 200	4 200	4 200	4 200	4 200
	95	65d	1 325	1 125	0 952	0 683	0 457	0 054	0 027	0 001	-	-
	96	Stable	5 100	5 100	5 100	5 100	5 100	5 100	5 100	5 100	5 100	5 100
Mo	97	17h	0 015	-	-	-	-	-	-	-	-	-
			19 872	19 762	19 678	19 543	19 436	19 232	19 221	19 260	19 645	17 670
	93	Stable	-	-	-	-	-	-	-	-	-	3 750
	95	35d	0 696	0 678	0 640	0 535	0 445	0 061	0 030	0 001	-	-
Tc	97	72m	0 001	-	-	-	-	-	-	-	-	-
			0 697	0 678	0 640	0 535	0 445	0 061	0 030	0 001	-	3 750
	95	Stable	3 249	3 467	3 678	4 052	4 368	5 155	5 213	5 268	5 270	5 270
	97	Stable	5 184	5 200	5 200	5 200	5 200	5 200	5 200	5 200	5 200	5 200
Ru	98	Stable	5 600	5 600	5 600	5 600	5 600	5 600	5 600	5 600	5 600	5 600
	99	67h	0 065	0 002	-	-	-	-	-	-	-	-
	100	Stable	6 000	6 000	6 000	6 000	6 000	6 000	6 000	6 000	6 000	6 000
			20 098	20 269	20 478	20 852	21 168	21 955	22 013	22 068	22 070	22 070
Rh	99m	6h	0 005	-	-	-	-	-	-	-	-	-
	99	2 12 x 10 ⁵ y	5 830	5 898	5 900	5 900	5 900	5 900	5 900	5 900	5 900	-
			5 835	5 898	5 900	5 900	5 900	5 900	5 900	5 900	5 900	-
			-	-	-	-	-	-	-	-	-	5 900
Pd	101	Stable	6 200	6 200	6 200	6 200	6 200	6 200	6 200	6 200	6 200	6 200
	102	Stable	6 350	6 350	6 350	6 350	6 350	6 350	6 350	6 350	6 350	6 350
	103	39 8d	1 006	0 776	0 599	0 354	0 176	0 005	0 002	-	-	-
	104	Stable	6 600	6 600	6 600	6 600	6 600	6 600	6 600	6 600	6 600	6 600
Ag	106	1y	4 580	4 450	4 320	4 090	3 785	2 590	2 290	1 145	0 001	-
			24 736	24 376	24 069	23 594	23 111	21 745	21 442	20 295	19 151	25 050
	103m	57m	0 001	0 001	0 001	-	-	-	-	-	-	-
	103	Stable	5 423	5 653	5 830	6 076	6 254	6 425	6 428	6 430	6 430	6 430
Cd	105	36 5h	0 029	-	-	-	-	-	-	-	-	-
	108	9h	0 005	-	-	-	-	-	-	-	-	-
			5 458	5 654	5 831	6 076	6 254	6 425	6 428	6 430	6 430	6 430
			-	-	-	-	-	-	-	-	-	4 800
In	107	Stable	1 696	1 700	1 700	1 700	1 700	1 700	1 700	1 700	1 700	1 700
	109	Stable	0 015	0 004	0 001	-	-	-	-	-	-	-
	111	7 6d	1 711	1 704	1 701	1 700	1 700	1 700	1 700	1 700	1 700	6 500
			-	-	-	-	-	-	-	-	-	-
Sn	111	Stable	0 475	0 486	0 489	0 490	0 490	4 490	0 490	0 490	0 490	0 490
	112	Stable	0 185	0 185	0 185	0 185	0 185	0 185	0 185	0 185	0 185	0 185
	113	Stable	0 170	0 170	0 170	0 170	0 170	0 170	0 170	0 170	0 170	0 170
	114	Stable	0 127	0 127	0 127	0 127	0 127	0 127	0 127	0 127	0 127	0 127
Sb	115m	43d	0 001	0 001	0 001	0 001	-	-	-	-	-	-
	115	53h	0 001	-	-	-	-	-	-	-	-	-
	116	Stable	0 008	0 008	0 008	0 008	0 008	0 008	0 008	0 008	0 008	0 008
			0 967	0 977	0 980	0 981	0 980	0 980	0 980	0 980	0 980	0 980

Table 13 (Cont'd.)

Element	Mass No.	Half Life	(Atoms per 100 Atoms of Pu ²³⁹ Fissioned)									
			0 Days	15 Days	30 Days	60 Days	100 Days	300 Days	1 Year	2 Years	10 Years	∞
In	115m	4.5h	0.001	-	-	-	-	-	-	-	-	-
	115	6 x 10 ¹⁴ y	0.091	0.093	0.093	0.093	0.094	0.094	0.094	0.094	0.094	-
			0.092	0.093	0.093	0.093	0.094	0.094	0.094	0.094	0.094	-
Sn	115	Stable	-	-	-	-	-	-	-	-	-	0.094
	117	Stable	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
	118	Stable	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
	119m	250d	0.004	0.004	0.004	0.004	0.003	0.002	0.002	0.001	-	-
	119	Stable	0.003	0.003	0.003	0.003	0.004	0.005	0.005	0.006	0.007	0.007
	120	Stable	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
	122	Stable	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011
	124	Stable	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180
	125	9.4d	0.005	0.002	0.001	-	-	-	-	-	-	-
			0.225	0.222	0.221	0.220	0.220	0.220	0.220	0.220	0.220	0.314
Sb	121	Stable	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
	123	Stable	0.128	0.128	0.128	0.128	0.128	0.128	0.128	0.128	0.128	0.128
	125	2.7y	0.230	0.230	0.229	0.225	0.219	0.190	0.181	0.140	0.018	-
	126	9h	0.001	-	-	-	-	-	-	-	-	-
	127	93h	0.009	-	-	-	-	-	-	-	-	-
			0.377	0.367	0.366	0.362	0.356	0.327	0.318	0.277	0.155	0.137
Te	125m	58d	0.015	0.012	0.012	0.012	0.013	0.012	0.011	0.009	0.001	-
	125	Stable	0.010	0.016	0.018	0.023	0.028	0.058	0.068	0.111	0.241	0.250
Te	126	Stable	0.399	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400
	127m	115d	0.040	0.038	0.034	0.029	0.022	0.007	0.005	0.001	-	-
	128	Stable	1.100	1.100	1.100	1.100	1.100	1.100	1.100	1.100	1.100	1.100
	129m	33.5d	0.045	0.033	0.024	0.013	0.003	-	-	-	-	-
	130	Stable	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
	131m	30h	0.004	-	-	-	-	-	-	-	-	-
	132	77.7h	0.082	0.003	-	-	-	-	-	-	-	-
			4.695	4.602	4.588	4.577	4.566	4.577	4.584	4.621	4.742	4.760
I	127	Stable	0.571	0.582	0.586	0.591	0.598	0.613	0.615	0.619	0.620	0.620
	129	1.72 x 10 ⁷ y	1.755	1.767	1.776	1.787	1.797	1.800	1.800	1.800	1.800	-
	131	8.14d	0.158	0.043	0.011	0.001	-	-	-	-	-	-
	132	2.4h	0.003	-	-	-	-	-	-	-	-	-
	133	20.5h	0.021	-	-	-	-	-	-	-	-	-
	135	6.68h	0.007	-	-	-	-	-	-	-	-	-
			2.515	2.392	2.373	2.379	2.395	2.413	2.415	2.419	2.420	0.620
Xe	129	Stable	-	-	-	-	-	-	-	-	-	1.800
	131	Stable	4.738	4.857	4.889	4.899	4.900	4.900	4.900	4.900	4.900	4.900
	132	Stable	6.295	6.377	6.380	6.380	6.380	6.380	6.380	6.380	6.380	6.380
	133	5.27d	0.130	0.053	0.007	-	-	-	-	-	-	-
	134	Stable	6.300	6.300	6.300	6.300	6.300	6.300	6.300	6.300	6.300	6.300
	135m	15.6m	0.001	-	-	-	-	-	-	-	-	-
	135	9.13h	0.010	-	-	-	-	-	-	-	-	-
	136	Stable	6.348	6.348	6.348	6.348	6.348	6.348	6.348	6.348	6.348	6.348
			23.822	23.935	23.924	23.927	23.928	23.928	23.928	23.928	23.928	25.728
Cs	133	Stable	6.099	6.197	6.243	6.250	6.250	6.250	6.250	6.250	6.250	6.250
	135	3 x 10 ⁶ y	6.202	6.220	6.220	6.220	6.220	6.220	6.220	6.220	6.220	-
	137	27y	5.399	5.393	5.388	5.376	5.361	5.286	5.262	5.130	4.177	-
			17.700	17.810	17.851	17.846	17.831	17.756	17.732	17.600	16.647	6.250
Ba	135	Stable	-	-	-	-	-	-	-	-	-	6.220
	137	Stable	0.053	0.059	0.064	0.076	0.091	0.166	0.190	0.322	1.275	5.452
	138	Stable	5.600	5.600	5.600	5.600	5.600	5.600	5.600	5.600	5.600	5.600
	139	85m	0.001	-	-	-	-	-	-	-	-	-
	140	12.8d	0.254	0.113	0.050	0.010	0.001	-	-	-	-	-
La	139	Stable	5.299	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300
	140	40h	0.033	0.017	0.008	0.001	-	-	-	-	-	-
	141	3.7h	0.003	-	-	-	-	-	-	-	-	-
	142	74m	0.001	-	-	-	-	-	-	-	-	-
			5.336	5.317	5.308	5.301	5.300	5.300	5.300	5.300	5.300	5.300
Ce	140	Stable	4.713	4.870	4.942	4.989	4.999	5.000	5.000	5.000	5.000	5.000
	141	33.1d	0.615	0.446	0.326	0.173	0.075	0.001	-	-	-	-
	142	Stable	4.399	4.400	4.400	4.400	4.400	4.400	4.400	4.400	4.400	4.400
	143	33h	0.027	-	-	-	-	-	-	-	-	-
	144	282d	2.440	2.350	2.270	2.105	1.910	1.168	0.993	0.405	-	-
	145	1.8h	0.001	-	-	-	-	-	-	-	-	-
			12.195	12.066	11.938	11.667	11.384	10.569	10.393	9.805	9.400	9.400
Pr	141	Stable	4.082	4.254	4.374	4.507	4.625	4.699	4.700	4.700	4.700	4.700
	143	13.7d	0.266	0.137	0.064	0.014	0.002	-	-	-	-	-
	145	4.5h	0.002	-	-	-	-	-	-	-	-	-
			4.350	4.391	4.438	4.541	4.627	4.699	4.700	4.700	4.700	4.700

Table 13 (Cont'd.)

Element	Mass No.	Half Life	(Atoms per 100 Atoms of Pu ²³⁹ Fissioned)									
			0 Days	15 Days	30 Days	60 Days	100 Days	300 Days	1 Year	2 Years	10 Years	∞
Nd	143	Stable	4.607	4.763	4.836	4.886	4.898	4.900	4.900	4.900	4.900	4.900
	144	Stable	1.260	1.350	1.430	1.595	1.790	2.532	2.707	3.295	3.700	3.700
	145	Stable	3.247	3.250	3.250	3.250	3.250	3.250	3.250	3.250	3.250	3.250
	146	Stable	2.900	2.900	2.900	2.900	2.900	2.900	2.900	2.900	2.900	2.900
	147	11.3d	0.114	0.045	0.018	0.003	-	-	-	-	-	-
	148	Stable	2.200	2.200	2.200	2.200	2.200	2.200	2.200	2.200	2.200	2.200
	149	2h	0.001	-	-	-	-	-	-	-	-	-
	150	Stable	1.580	1.580	1.580	1.580	1.580	1.580	1.580	1.580	1.580	1.580
			15.909	16.088	16.214	16.414	16.618	17.362	17.537	18.125	18.530	18.530
Pm	147	2.6y	2.147	2.176	2.194	2.173	2.097	1.818	1.731	1.328	0.156	-
	149	54h	0.017	0.002	-	-	-	-	-	-	-	-
	151	27.5h	0.006	-	-	-	-	-	-	-	-	-
			2.170	2.178	2.194	2.173	2.097	1.818	1.731	1.328	0.156	-
Sm	147	Stable	0.289	0.329	0.338	0.374	0.453	0.732	0.819	1.222	2.394	2.550
	149	Stable	1.882	1.898	1.900	1.900	1.900	1.900	1.900	1.900	1.900	1.900
	151	73y	1.294	1.299	1.299	1.298	1.296	1.290	1.288	1.274	1.182	-
	152	Stable	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
	153	47y	0.004	-	-	-	-	-	-	-	-	-
	154	Stable	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
			4.669	4.726	4.737	4.772	4.849	5.122	5.207	5.596	6.676	5.650
Eu	151	Stable	-	0.001	0.001	0.002	0.004	0.010	0.012	0.026	0.118	1.300
	153	Stable	0.476	0.480	0.480	0.480	0.480	0.480	0.480	0.480	0.480	0.480
	155	1.7y	0.147	0.145	0.142	0.138	0.131	0.105	0.098	0.065	0.003	-
	156	15.4d	0.005	0.002	0.001	-	-	-	-	-	-	-
			0.628	0.628	0.624	0.620	0.615	0.595	0.590	0.571	0.601	1.780
Gd	155	Stable	0.033	0.035	0.038	0.042	0.049	0.075	0.082	0.115	0.177	0.180
	156	Stable	0.075	0.078	0.079	0.080	0.080	0.080	0.080	0.080	0.080	0.080
	157	Stable	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
			0.128	0.133	0.137	0.142	0.149	0.175	0.182	0.215	0.277	0.280

Table 14

FISSION PRODUCT SPECTRUM FOR FAST FISSION(CA. 2 MEV NEUTRONS) OF Pu^{239} (10,000 DAYS IRRADIATED)

Element	Mass No.	Half Life	(Atoms per 100 Atoms of Pu ²³⁹ Fissioned)									
			0 Days	15 Days	30 Days	60 Days	100 Days	300 Days	1 Year	2 Years	10 Years	∞
Se	82	Stable	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
Kr	83	Stable	0.098	0.098	0.098	0.098	0.098	0.098	0.098	0.098	0.098	0.098
	84	Stable	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200
	85	9.4y	0.033	0.033	0.033	0.033	0.032	0.031	0.031	0.029	0.016	-
	86	Stable	0.530	0.530	0.530	0.530	0.530	0.530	0.530	0.530	0.530	0.530
			0.861	0.861	0.861	0.861	0.860	0.859	0.859	0.857	0.844	0.828
Rb	85	Stable	0.297	0.297	0.297	0.297	0.298	0.299	0.299	0.301	0.314	0.330
	87	6.2 x 10 ¹⁰ y	0.810	0.810	0.810	0.810	0.810	0.810	0.810	0.810	0.810	-
			1.107	1.107	1.107	1.107	1.108	1.109	1.109	1.111	1.124	0.330
Sr	87	Stable	-	-	-	-	-	-	-	-	-	0.810
	88	Stable	1.270	1.270	1.270	1.270	1.270	1.270	1.270	1.270	1.270	1.270
	89	53d	0.014	0.012	0.010	0.006	0.004	-	-	-	-	-
	90	28y	1.670	1.668	1.667	1.663	1.659	1.636	1.629	1.589	1.303	-
			2.954	2.950	2.947	2.939	2.933	2.906	2.899	2.859	2.573	2.080
Y	89	Stable	1.826	1.828	1.830	1.834	1.836	1.840	1.840	1.840	1.840	1.840
	91	57d	0.023	0.019	0.016	0.011	0.007	-	-	-	-	-
			1.849	1.847	1.846	1.845	1.843	1.840	1.840	1.840	1.840	1.840
Zr	90	Stable	0.630	0.632	0.633	0.637	0.641	0.664	0.671	0.711	0.997	2.300
	91	Stable	2.747	2.751	2.754	2.759	2.763	2.770	2.770	2.770	2.770	2.770
	92	Stable	3.300	3.300	3.300	3.300	3.300	3.300	3.300	3.300	3.300	3.300
	93	9.5 x 10 ⁵ y	3.750	3.750	3.750	3.750	3.750	3.750	3.750	3.750	3.750	-
	94		Stable	4.200	4.200	4.200	4.200	4.200	4.200	4.200	4.200	4.200
	95	65d	0.050	0.042	0.036	0.026	0.017	0.002	0.001	-	-	-
	96	Stable	5.100	5.100	5.100	5.100	5.100	5.100	5.100	5.100	5.100	5.100
	97	17h	0.001	-	-	-	-	-	-	-	-	-
			19.778	19.775	19.773	19.772	19.771	19.786	19.792	19.831	20.117	17.670
Nb	93	Stable	-	-	-	-	-	-	-	-	-	3.750
	95	35d	0.027	0.026	0.024	0.020	0.017	0.003	0.001	-	-	-
			0.027	0.026	0.024	0.020	0.017	0.003	0.001	-	-	3.750
Mo	95	Stable	5.193	5.202	5.210	5.224	5.236	5.265	5.268	5.270	5.270	5.270
	97	Stable	5.199	5.200	5.200	5.200	5.200	5.200	5.200	5.200	5.200	5.200
	98	Stable	5.600	5.600	5.600	5.600	5.600	5.600	5.600	5.600	5.600	5.600
	99	67h	0.002	-	-	-	-	-	-	-	-	-
	100	Stable	6.000	6.000	6.000	6.000	6.000	6.000	6.000	6.000	6.000	6.000
			21.994	22.002	22.010	22.024	22.036	22.065	22.068	22.070	22.070	22.070
Tc	99	2.12 x 10 ⁵ y	5.898	5.900	5.900	5.900	5.900	5.900	5.900	5.900	5.900	-
Ru	99	Stable	-	-	-	-	-	-	-	-	-	5.900
	101	Stable	6.200	6.200	6.200	6.200	6.200	6.200	6.200	6.200	6.200	6.200
	102	Stable	6.350	6.350	6.350	6.350	6.350	6.350	6.350	6.350	6.350	6.350
	103	39.8d	0.037	0.029	0.022	0.013	0.007	-	-	-	-	-
	104	Stable	6.600	6.600	6.600	6.600	6.600	6.600	6.600	6.600	6.600	6.600
	106	1.0y	0.334	0.326	0.316	0.299	0.277	0.190	0.167	0.084	-	-
			19.521	19.505	19.488	19.462	19.434	19.340	19.317	19.234	19.150	20.050
Rh	103	Stable	6.393	6.401	6.408	6.417	6.423	6.430	6.430	6.430	6.430	6.430
	105	36.5h	0.001	-	-	-	-	-	-	-	-	-
			6.394	6.401	6.408	6.417	6.423	6.430	6.430	6.430	6.430	6.430
Pd	105	Stable	4.819	4.820	4.820	4.820	4.820	4.820	4.820	4.820	4.820	4.820
	106	Stable	6.016	6.024	6.034	6.051	6.073	6.160	6.183	6.266	6.350	6.350
	107	7 x 10 ⁶ y	4.800	4.800	4.800	4.800	4.800	4.800	4.800	4.800	4.800	-
	108	Stable	3.300	3.300	3.300	3.300	3.300	3.300	3.300	3.300	3.300	3.300
	110	Stable	0.840	0.840	0.840	0.840	0.840	0.840	0.840	0.840	0.840	0.840
			19.775	19.784	19.794	19.811	19.833	19.920	19.943	20.026	20.110	15.310
Ag	107	Stable	-	-	-	-	-	-	-	-	-	4.800
	109	Stable	1.700	1.700	1.700	1.700	1.700	1.700	1.700	1.700	1.700	1.700
	111	7.6d	0.001	-	-	-	-	-	-	-	-	-
			1.701	1.700	1.700	1.700	1.700	1.700	1.700	1.700	1.700	6.500
Cd	111	Stable	0.489	0.490	0.490	0.490	0.490	0.490	0.490	0.490	0.490	0.490
	112	Stable	0.185	0.185	0.185	0.185	0.185	0.185	0.185	0.185	0.185	0.185
	113	Stable	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170
	114	Stable	0.127	0.127	0.127	0.127	0.127	0.127	0.127	0.127	0.127	0.127
	116	Stable	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
			0.979	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980	0.980
In	115	6 x 10 ¹⁴ y	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	-

Table 14 (Cont'd.)

Element	Mass No.	Half Life	(Atoms per 100 Atoms of Pu ²³⁹ Fissioned)									
			0 Days	15 Days	30 Days	60 Days	100 Days	300 Days	1 Year	2 Years	10 Years	∞
Sn	115	Stable	-	-	-	-	-	-	-	-	-	0.094
	117	Stable	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
	118	Stable	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
	119	Stable	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
	120	Stable	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
	122	Stable	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011
	124	Stable	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180
			0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.220	0.314
Sb	121	Stable	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
	123	Stable	0.128	0.128	0.128	0.128	0.128	0.128	0.128	0.128	0.128	0.128
	125	2.7y	0.037	0.036	0.036	0.035	0.034	0.030	0.029	0.022	0.003	-
			0.174	0.173	0.173	0.172	0.171	0.167	0.166	0.159	0.140	0.137
Te	125m	58d	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001	-	-
	125	Stable	0.221	0.222	0.222	0.223	0.224	0.228	0.229	0.237	0.257	0.260
	126	Stable	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400
	127m	115d	0.002	0.001	0.001	0.001	0.001	-	-	-	-	-
	128	Stable	1.100	1.100	1.100	1.100	1.100	1.100	1.100	1.100	1.100	1.100
	129m	33.5d	0.002	0.001	0.001	-	-	-	-	-	-	-
	130	Stable	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
	132	77.7h	0.003	-	-	-	-	-	-	-	-	-
			4.730	4.726	4.726	4.726	4.727	4.730	4.731	4.738	4.757	4.760
I	127	Stable	0.618	0.619	0.619	0.619	0.619	0.620	0.620	0.620	0.620	0.620
	129	1.72 x 10 ⁷ y	1.798	1.799	1.799	1.800	1.800	1.800	1.800	1.800	1.800	-
	131	8.14d	0.006	0.002	-	-	-	-	-	-	-	-
	133	20.5h	0.001	-	-	-	-	-	-	-	-	-
			2.423	2.420	2.418	2.419	2.419	2.420	2.420	2.420	2.420	0.620
Xe	129	Stable	-	-	-	-	-	-	-	-	-	1.800
	131	Stable	4.894	4.898	4.900	4.900	4.900	4.900	4.900	4.900	4.900	4.900
	132	Stable	6.377	6.380	6.380	6.380	6.380	6.380	6.380	6.380	6.380	6.380
	133	5.27d	0.005	0.001	-	-	-	-	-	-	-	-
	134	Stable	6.300	6.300	6.300	6.300	6.300	6.300	6.300	6.300	6.300	6.300
	136	Stable	6.348	6.348	6.348	6.348	6.348	6.348	6.348	6.348	6.348	6.348
			23.924	23.927	23.928	23.928	23.928	23.928	23.928	23.928	23.928	25.728
Cs	133	Stable	6.244	6.249	6.250	6.250	6.250	6.250	6.250	6.250	6.250	6.250
	135	3 x 10 ⁸ y	6.220	6.220	6.220	6.220	6.220	6.220	6.220	6.220	6.220	-
	137	27y	3.960	3.956	3.952	3.944	3.933	3.880	3.863	3.768	3.090	-
			16.424	16.425	16.422	16.414	16.403	16.350	16.333	16.238	15.560	6.250
Ba	135	Stable	-	-	-	-	-	-	-	-	-	6.220
	137	Stable	1.492	1.496	1.500	1.508	1.519	1.572	1.589	1.684	2.362	5.452
	138	Stable	5.600	5.600	5.600	5.600	5.600	5.600	5.600	5.600	5.600	5.600
	140	12.8d	0.009	0.004	0.002	-	-	-	-	-	-	-
			7.101	7.100	7.102	7.108	7.119	7.172	7.189	7.284	7.962	17.272
La	139	Stable	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300
	140	40h	0.001	0.001	-	-	-	-	-	-	-	-
			5.301	5.301	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300
Ce	140	Stable	4.990	4.995	4.998	5.000	5.000	5.000	5.000	5.000	5.000	5.000
	141	33.1d	0.022	0.016	0.012	0.006	0.003	-	-	-	-	-
	142	Stable	4.400	4.400	4.400	4.400	4.400	4.400	4.400	4.400	4.400	4.400
	143	33h	0.001	-	-	-	-	-	-	-	-	-
	144	282d	0.151	0.145	0.140	0.130	0.118	0.072	0.061	0.025	-	-
			9.564	9.556	9.550	9.536	9.521	9.472	9.461	9.425	9.400	9.400
Pr	141	Stable	4.678	4.684	4.688	4.694	4.697	4.700	4.700	4.700	4.700	4.700
	143	13.7d	0.010	0.005	0.002	-	-	-	-	-	-	-
			4.688	4.689	4.690	4.694	4.697	4.700	4.700	4.700	4.700	4.700
Nd	143	Stable	4.889	4.895	4.898	4.900	4.900	4.900	4.900	4.900	4.900	4.900
	144	Stable	3.549	3.555	3.560	3.570	3.582	3.628	3.639	3.675	3.700	3.700
	145	Stable	3.250	3.250	3.250	3.250	3.250	3.250	3.250	3.250	3.250	3.250
	146	Stable	2.900	2.900	2.900	2.900	2.900	2.900	2.900	2.900	2.900	2.900
	147	11.3d	0.004	0.002	0.001	-	-	-	-	-	-	-
	148	Stable	2.200	2.200	2.200	2.200	2.200	2.200	2.200	2.200	2.200	2.200
	150	Stable	1.580	1.580	1.580	1.580	1.580	1.580	1.580	1.580	1.580	1.580
			18.372	18.382	18.389	18.400	18.412	18.458	18.469	18.505	18.530	18.530
Pm	147	2.6y	0.348	0.346	0.344	0.338	0.327	0.283	0.280	0.206	0.024	-
	149	54h	0.001	-	-	-	-	-	-	-	-	-
			0.349	0.346	0.344	0.338	0.327	0.283	0.280	0.206	0.024	-

Table 14 (Cont'd.)

Element	Mass No.	Half Life	(Atoms per 100 Atoms of Pu ²³⁹ Fissioned)									
			0 Days	15 Days	30 Days	60 Days	100 Days	300 Days	1 Year	2 Years	10 Years	∞
Sm	147	Stable	2.198	2.202	2.205	2.212	2.223	2.267	2.270	2.344	2.526	2.550
	149	Stable	1.899	1.900	1.900	1.900	1.900	1.900	1.900	1.900	1.900	1.900
	151	73y	1.144	1.144	1.143	1.142	1.141	1.135	1.133	1.122	1.040	-
	152	Stable	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
	154	Stable	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
			6.441	6.446	6.448	6.454	6.464	6.502	6.503	6.566	6.666	5.650
Eu	151	Stable	0.156	0.156	0.157	0.158	0.159	0.165	0.167	0.178	0.269	1.300
	153	Stable	0.480	0.480	0.480	0.480	0.480	0.480	0.480	0.480	0.480	0.480
	155	1.7y	0.016	0.016	0.016	0.015	0.014	0.012	0.011	0.007	-	-
			0.652	0.652	0.653	0.653	0.653	0.657	0.658	0.665	0.740	1.780
Gd	155	Stable	0.164	0.164	0.164	0.165	0.166	0.168	0.169	0.173	0.180	0.180
	156	Stable	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080
	157	Stable	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
			0.264	0.264	0.264	0.265	0.266	0.268	0.269	0.273	0.280	0.280