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REVISED FAST REACTOR LIBRARY
FOR USE WITH RIBD

April 1969

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REVISED FAST REACTOR LIBRARY
FOR USE WITH RIBD

By

L. D. O'Dell and W. L. Bunch
Reactor Physics and Operational Department
FFTF Project

April 1969

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REVISED FAST REACTOR LIBRARY FOR USE WITH RIBD

L. D. O'Dell and W. L. Bunch

ABSTRACT

A revised nuclear data library has been generated for use with RIBD to calculate fission product inventories and decay heat rates associated with fuels irradiated in fast reactor environments. Nuclear data include fission yield from both ^{239}Pu and ^{238}U , half life, capture cross section, and decay energies for each of 450 isotopes and isomeric states that can be produced as a result of fission. Recent literature was reviewed to obtain available experimental data. Theoretical values were employed as necessary to complete the library.

REVISED FAST REACTOR LIBRARY FOR USE WITH RIBD

L. D. O'Dell and W. L. Bunch

I. INTRODUCTION

The computer code RIBD⁽¹⁾ is a grid processor that calculates isotopic concentrations resulting from two fission sources with normal down-chain decay by beta emission and isomeric transfers and inter-chain coupling resulting from n-gamma reactions. Calculations can be made to follow the irradiation history through an unlimited number of step changes of unrestricted duration and variability including shutdown periods, restarts at different power levels and/or any other level changes. Included in the program complex file is a library containing pertinent nuclear data for 450 fission product nuclides formed either directly from fission or as a result of neutron capture and/or radioactive decay. The original library contains yield data for thermal-neutron induced fission of ^{235}U and ^{239}Pu . For calculating inventories in fast reactor systems, it is desirable to use yield data from fast-neutron fission of ^{239}Pu and ^{238}U . In addition, it is necessary to use spectrum-weighted capture cross sections to account for inter-chain coupling, rather than the thermal cross sections in the original library. Such a library was generated for use in fast reactor studies.⁽²⁾ The revised and upgraded version of the fast reactor library described below supersedes the library presented in Reference 2.

II. DISCUSSION

The RIBD library contains the following nuclear data: half life; fission yield from each of two nuclides, in the present case ^{239}Pu and ^{238}U ; neutron capture cross section; fraction of capture events that go to the isomeric state; if in the isomeric state, the fraction of decays by beta emission (if in the ground state, the fraction that decay to an isomer); and the average beta and gamma energy release per disintegration. The library is sized to accommodate 450 isotopes or isomeric states, which is adequate to include essentially all of the known isotopes associated with the fission processes. A complete review was made of available data to generate the RIBD library in Table I.

Half lives were obtained by cross checking the Nuclear Data Sheets⁽³⁾ and the Table of Isotopes⁽⁴⁾ as well as those in the original RIBD library. Yield values for the fast-neutron induced fission of ^{239}Pu are based on the compilation of Anderson,⁽⁵⁾ whereas those for ^{238}U are based on the values of Weaver, Strom, and Killeen.⁽⁶⁾ Fast Test Reactor spectrum-weighted absorption cross sections were generated for the library by Schenter.⁽⁷⁾ For those isotopes for which experimental data were not available, an optical potential model was used to generate an energy-dependent cross section for several key isotopes. For isotopes with short half lives, in which case capture is unimportant, interpolated values were employed in the library since a more rigorous evaluation was not justified. Branching ratios and decay energies were also obtained from References 3 and 4, with cross reference to a compilation in ORNL-NSIC-5.⁽⁸⁾

REFERENCES

1. R. O. Gumprecht. Mathematical Basis of Computer Code RIBD, DUN-4136. Douglas-United Nuclear, Inc., Richland, Washington, June 1968.
2. W. L. Bunch and D. R. Marr. Fast Reactor Library for Use with RIBD, BNWL-CC-868. Battelle-Northwest, Richland, Washington, October 1966.
3. Nuclear Data Sheets, Nuclear Data Group, edited by Katherine Way, Oak Ridge National Laboratory, Oak Ridge, Tennessee.
4. C. M. Lederer, J. M. Hollander, and I. Perlman. Table of Isotopes, 6th Edition. John Wiley and Sons, Inc., New York, 1967.
5. C. A. Anderson, Jr. Fission Product Yields from Fast Neutron Fission of ^{239}Pu , LA-3383. Los Alamos Scientific Laboratory, Los Alamos, New Mexico, December 1965.
6. L. E. Weaver, P. O. Strom, and P. A. Killeen. Estimated Total Chain and Independent Fission Yields for Several Neutron-Induced Fission Processes, USNRDL-TR-633. Naval Radiological Defense Laboratory, San Francisco, California, March 1963.
7. R. E. Schenter. Unpublished Data, Battelle-Northwest, Richland, Washington.
8. W. B. Cottrell and A. W. Savolainen, Editors. U.S. Reactor Containment Technology, A Compilation of Current Practices in Analysis, Design, Construction, Test and Operation, Vol. I, ORNL-NSIC-5. Oak Ridge National Laboratory, Oak Ridge, Tennessee, August 1965.

NOMENCLATURE

Although most of the titles in Table I are felt to be self explanatory, a brief definition of each follows for clarity:

- A = Atomic mass
- Z = Atomic number
- ELT = Symbol for element
- ISO = Isomeric state is denoted both by the number 1 and by the asterisk following the element symbol
- HALF-LIFE IN DAYS = Isotope half-life, in days
- PU239 FISSION YIELD, % = Percentage yield factor from the fast fission of ^{239}Pu
- U238 FISSION YIELD, % = Percentage yield factor from the fast fission of ^{238}U
- ABSORPTION C. SECTION = The n-gamma cross section, in barns
- ALPHA = Fraction of the n-gamma events resulting in a metastable isomer
- BETA = The fraction of ground state beta emissions going to the metastable isomer of one higher Z; in this case, $(1 - \beta)$ is the fraction going to the ground state. Or, the fraction of decays of a metastable isomer that emit a beta and decay to the ground state of the next higher Z; in this case, $(1 - \beta)$ is the fraction of decays that are isomeric transitions to the ground state of the same Z.
- BETA DECAY ENERGY, MEV = Average energy of beta particles per disintegration
- GAMMA DECAY ENERGY, MEV = Average energy of gammas per disintegration

TABLE I. Revised RIBD Fast Reactor Library

A	Z	ELT	ISO	HALF-LIFE IN DAYS	PU239 FISS YIELD, %	U238 FISS YIELD, %	ABSORPTION C. SECTION
72	30	ZN	2	1.940+00	0.000	0.000	1.000-01
72	31	GA	2	5.870-01	0.000	0.000	1.000-01
72	32	GE	2	0.000	0.000	0.000	1.000-01
73	30	ZN	2	1.390-03	0.000	0.000	1.000-01
73	31	GA	2	2.000-01	0.000	0.000	1.000-01
73	32	GE	2	0.000	0.000	0.000	1.000-01
74	31	GA	2	5.550-03	0.000	0.000	1.000-01
74	32	GE	2	0.000	0.000	0.000	1.000-01
75	31	GA	2	1.390-03	0.000	0.000	1.000-01
75	32	GE*	1	5.670-04	0.000	0.000	1.000-01
75	32	GE	2	5.690-02	0.000	0.000	1.000-01
75	33	AS	2	0.000	0.000	0.000	3.210-01
76	31	GA	2	3.700-04	0.000	9.700-04	1.000-01
76	32	GE	2	0.000	0.000	0.000	1.000-01
76	33	AS	2	1.100+00	0.000	0.000	1.000-01
76	34	SE	2	0.000	0.000	0.000	1.000-01
77	32	GE*	1	6.250-04	9.000-03	1.840-03	1.000-01
77	32	GE	2	4.710-01	9.000-03	1.840-03	1.000-01
77	33	AS	2	1.630+00	0.000	0.000	1.000-01
77	34	SE*	1	2.080-04	0.000	0.000	1.000-01
77	34	SE	2	0.000	0.000	0.000	1.000-01
78	32	GE	2	6.120-02	3.900-02	1.410-02	1.000-01
78	33	AS	2	6.320-02	0.000	0.000	1.000-01
78	34	SE	2	0.000	0.000	0.000	1.000-01
79	33	AS	2	6.250-03	7.000-02	4.060-02	1.000-01
79	34	SE*	1	2.710-03	0.000	0.000	1.000-01
79	34	SE	2	2.370+07	0.000	0.000	1.000-01
79	35	BR	2	0.000	0.000	0.000	1.000-01
80	33	AS	2	1.740-04	1.090-01	8.720-02	1.000-01
80	34	SE	2	0.000	1.000-03	0.000	1.000-01
80	35	BR*	1	1.880-01	0.000	0.000	1.000-01
80	35	BR	2	1.250-02	0.000	0.000	1.000-01
80	36	KR	2	0.000	0.000	0.000	1.000-01
81	33	AS	2	3.820-04	1.730-01	1.570-01	1.000-01
81	34	SE*	1	3.960-02	2.000-03	0.000	1.000-01
81	34	SE	2	1.290-02	2.000-03	0.000	1.000-01
81	35	BR	2	0.000	0.000	0.000	1.260-01
81	36	KR	2	0.000	0.000	0.000	1.000-01
82	34	SE	2	0.000	2.590-01	2.610-01	1.000-01
82	35	BR	2	1.470+00	0.000	0.000	1.000-01
82	36	KR	2	0.000	0.000	0.000	1.000-01
83	34	SE*	1	7.990-04	1.870-01	1.940-01	1.000-01
83	34	SE	2	1.740-02	1.870-01	1.940-01	1.000-01
83	35	BR	2	9.580-02	6.000-03	0.000	1.000-01
83	36	KR*	1	7.920-02	0.000	0.000	5.230-01
83	36	KR	2	0.000	0.000	0.000	5.230-01
84	34	SE	2	2.290-03	4.790-01	8.180-01	1.000-01
84	35	BR*	1	4.170-03	2.000-02	2.060-03	1.000-01
84	35	BR	2	2.210-02	2.000-02	2.060-03	1.000-01

TABLE I. (contd)

A	Z	ELT	ISO	HALF-LIFE IN DAYS	PU239 FISS YIELD, %	U238 FISS YIELD, %	ABSORPTION C. SECTION
84	36	KR	2	0.000	0.000	0.000	2.000-02
85	33	AS	2	4.980-06	1.100-01	6.490-01	1.000-01
85	34	SE	2	4.510-04	4.130-01	3.070-01	1.000-01
85	35	BR	2	2.080-03	1.620-01	5.030-02	1.000-01
85	36	KR*	1	1.830-01	3.000-03	0.000	1.000-01
85	36	KR	2	3.870+03	3.000-03	0.000	2.500-02
85	37	RB	2	0.000	0.000	0.000	2.410-01
86	34	SE	2	1.850-04	4.420-01	1.150+00	1.080-01
86	35	BR	2	6.250-04	4.150-01	1.800-01	1.080-01
86	36	KR	2	0.000	4.200-02	2.010-03	5.000-03
86	37	RB*	1	7.220-04	0.000	0.000	1.080-01
86	37	RB	2	1.870+01	0.000	0.000	1.080-01
86	38	SR	2	0.000	0.000	0.000	7.100-02
87	34	SE	2	1.850-04	2.640-01	1.270+00	1.170-01
87	35	BR	2	6.370-04	6.910-01	4.220-01	1.170-01
87	36	KR	2	5.280-02	1.910-01	3.450-02	1.170-01
87	37	RB	2	0.000	5.000-03	0.000	2.000-02
87	38	SR*	1	1.170-01	0.000	0.000	8.000-02
87	38	SR	2	0.000	0.000	0.000	8.000-02
88	35	BR	2	1.850-04	8.490-01	1.930+00	1.260-01
88	36	KR	2	1.170-01	5.430-01	1.710-01	1.260-01
88	37	RB	2	1.250-02	3.800-02	0.000	1.260-01
88	38	SR	2	0.000	0.000	0.000	7.000-03
89	35	BR	2	5.210-05	5.670-01	2.270+00	1.360-01
89	36	KR	2	2.220-03	1.030+00	5.190-01	1.360-01
89	37	RB	2	1.070-02	1.990-01	1.410-02	1.360-01
89	38	SR	2	5.200+01	3.000-03	0.000	1.360-01
89	39	Y*	1	1.850-04	0.000	0.000	1.800-02
89	39	Y	2	0.000	0.000	0.000	1.800-02
90	35	BR	2	1.850-05	2.440-01	2.010+00	1.470-01
90	36	KR	2	3.820-04	1.220+00	9.340-01	1.470-01
90	37	RB	2	2.010-03	6.270-01	1.540-01	1.470-01
90	38	SR	2	1.020+04	3.000-02	0.000	1.700-02
90	39	Y*	1	1.330-01	0.000	0.000	1.470-01
90	39	Y	2	2.670+00	0.000	0.000	1.470-01
90	40	ZR	2	0.000	0.000	0.000	7.000-03
91	36	KR	2	1.160-04	1.070+00	3.300+00	1.590-01
91	37	RB*	1	9.720-03	6.730-01	2.580-01	1.590-01
91	37	RB	2	8.350-04	6.730-01	2.580-01	1.590-01
91	38	SR	2	4.040-01	1.810-01	5.740-02	1.590-01
91	39	Y*	1	3.470-02	1.000-03	0.000	1.590-01
91	39	Y	2	5.900+01	1.000-03	0.000	1.590-01
91	40	ZR	2	0.000	0.000	0.000	5.100-02
92	36	KR	2	3.470-05	5.460-01	3.230+00	1.720-01
92	37	RB	2	6.130-05	1.890+00	1.070+00	1.720-01
92	38	SR	2	1.080-01	6.870-01	8.810-02	1.720-01
92	39	Y	2	1.500-01	2.200-02	0.000	1.720-01
92	40	ZR	2	0.000	0.000	0.000	2.400-02
93	36	KR	2	2.310-05	1.840-01	2.720+00	1.860-01

TABLE I. (contd)

A	Z	ELT	ISO	HALF-LIFE IN DAYS	PU239 FISS YIELD, %	U238 FISS YIELD, %	ABSORPTION C. SECTION
93	37	RB	2	6.483-05	1.770+00	1.730+00	1.860-01
93	38	SR	2	5.693-03	1.690+00	3.890-01	1.860-01
93	39	Y	2	4.170-01	1.570-01	0.000	1.860-01
93	40	ZR	2	3.470+08	1.000-03	0.000	1.030-01
93	41	NB*	1	1.350+03	0.000	0.000	5.600-02
93	41	NB	2	0.000	0.000	0.000	5.600-02
94	36	KR	2	1.623-05	4.000-02	1.870+00	2.010-01
94	37	RB	2	3.363-05	1.100+00	2.380+00	2.010-01
94	38	SR	2	9.033-04	2.750+00	9.670-01	2.010-01
94	39	Y	2	1.323-02	7.000-01	2.610-02	2.010-01
94	40	ZR	2	0.000	1.600-02	0.000	2.400-02
94	41	NB*	1	4.583-03	0.000	0.000	2.010-01
94	41	NB	2	7.300+06	0.000	0.000	2.010-01
94	42	MO	2	0.000	0.000	0.000	2.010-01
95	36	KR	2	1.163-05	5.000-03	1.470+00	2.170-01
95	37	RB	2	2.313-05	4.220-01	2.590+00	2.170-01
95	38	SR	2	5.563-04	2.840+00	1.360+00	2.170-01
95	39	Y	2	7.293-03	1.910+00	1.100-01	2.170-01
95	40	ZR	2	6.503+01	1.230-01	0.000	2.170-01
95	41	NB*	1	3.753+00	0.000	0.000	2.170-01
95	41	NB	2	3.503+01	0.000	0.000	2.170-01
95	42	MO	2	0.000	0.000	0.000	2.420-01
96	39	Y	2	1.603-03	4.720+00	5.750+00	2.350-01
96	40	ZR	2	0.000	5.260-01	0.000	3.600-02
96	41	NB	2	9.583-01	0.000	0.000	2.350-01
96	42	MO	2	0.000	0.000	0.000	5.900-02
97	36	KR	2	1.163-05	0.000	2.970-01	2.540-01
97	37	RB	2	2.313-05	1.200-02	1.810+00	2.540-01
97	38	SR	2	3.473-05	6.470-01	2.700+00	2.540-01
97	39	Y	2	4.633-05	3.030+00	1.100+00	2.540-01
97	40	ZR	2	7.083-01	1.440+00	2.970-02	2.540-01
97	41	NB*	1	6.943-04	3.200-02	0.000	2.540-01
97	41	NB	2	5.143-02	3.200-02	0.000	2.540-01
97	42	MO	2	0.000	0.000	0.000	2.620-01
98	40	ZR	2	6.943-04	5.150+00	6.000+00	2.740-01
98	41	NB*	1	3.543-02	1.710-01	0.000	2.740-01
98	41	NB	2	1.163-05	1.710-01	0.000	2.740-01
98	42	MO	2	0.000	3.000-03	0.000	9.900-02
99	40	ZR	2	4.053-04	4.590+00	5.970+00	2.960-01
99	41	NB	2	1.673-03	1.170+00	1.220-01	2.960-01
99	42	MO	2	2.793+00	3.500-02	0.000	2.960-01
99	43	TC*	1	2.503-01	0.000	0.000	7.340-01
99	43	TC	2	7.673+07	0.000	0.000	7.340-01
99	44	RU	2	0.000	0.000	0.000	2.960-01
100	41	NB	2	2.083-03	5.780+00	6.280+00	3.200-01
100	42	MO	2	0.000	2.190-01	9.440-03	7.400-02
100	43	TC	2	1.973-04	0.000	0.000	3.200-01
100	44	RU	2	0.000	0.000	0.000	2.720-01
101	41	NB	2	6.943-04	5.310+00	6.020+00	3.190-01

TABLE I. (contd)

A	Z	ELT	ISO	HALF-LIFE IN DAYS	PU239 FISS YIELD, %	U238 FISS YIELD, %	ABSORPTION C. SECTION
101	42	MO	2	1.040-02	6.830-01	3.170-01	3.190-01
101	43	TC	2	9.720-03	1.100-02	0.000	3.190-01
101	44	RU	2	0.000	0.000	0.000	6.260-01
102	42	MO	2	7.980-03	5.940+00	6.350+00	3.180-01
102	43	TC	2	5.790-05	6.400-02	0.000	3.180-01
102	44	RU	2	0.000	0.000	0.000	2.590-01
103	43	TC	2	5.790-04	5.850+00	6.380+00	3.180-01
103	44	RU	2	3.960+01	2.000-03	0.000	3.180-01
103	45	RH*	1	3.960-02	0.000	0.000	5.570-01
103	45	RH	2	0.000	0.000	0.000	5.570-01
104	42	MO	2	1.110-03	4.860+00	5.630+00	3.170-01
104	43	TC	2	1.250-02	7.280-01	2.960-01	3.170-01
104	44	RU	2	0.000	1.400-02	0.000	1.140-01
104	45	RH*	1	3.060-03	0.000	0.000	3.170-01
104	45	RH	2	4.860-04	0.000	0.000	3.170-01
104	46	PD	2	0.000	0.000	0.000	3.220-01
105	42	MO	2	4.630-04	3.710+00	4.810+00	3.160-01
105	43	TC	2	6.940-03	1.520+00	4.260-01	3.160-01
105	44	RU	2	1.830-01	7.000-02	0.000	3.160-01
105	45	RH*	1	3.470-04	0.000	0.000	3.160-01
105	45	RH	2	1.500+00	0.000	0.000	3.160-01
105	46	PD	2	0.000	0.000	0.000	9.330-01
106	44	RU	2	3.650+02	4.700+00	4.530+00	3.150-01
106	45	RH*	1	9.170-02	1.000-03	0.000	3.150-01
106	45	RH	2	3.470-04	1.000-03	0.000	3.150-01
106	46	PD	2	0.000	0.000	0.000	1.660-01
107	43	TC	2	3.360-04	3.140+00	1.290+00	3.140-01
107	44	RU	2	2.920-03	5.460-01	1.930-03	3.140-01
107	45	RH	2	1.530-02	1.200-02	0.000	3.140-01
107	46	PD	2	2.560+09	0.000	0.000	8.820-01
107	47	AG	2	0.000	0.000	0.000	4.580-01
108	44	RU	2	3.130-03	2.660+00	6.270-01	3.130-01
108	45	RH	2	1.970-04	4.400-02	0.000	3.130-01
108	46	PD	2	0.000	0.000	0.000	1.500-01
108	47	AG*	1	1.820+03	0.000	0.000	3.130-01
108	47	AG	2	1.670-03	0.000	0.000	3.130-01
108	48	CD	2	0.000	0.000	0.000	3.130-01
109	45	RH	2	3.470-04	1.670+00	3.100-01	3.130-01
109	46	PD*	1	3.330-03	0.000	0.000	3.130-01
109	46	PD	2	5.830-01	0.000	0.000	3.130-01
109	47	AG*	1	4.510-04	0.000	0.000	8.610-01
109	47	AG	2	0.000	0.000	0.000	8.610-01
110	46	PD	2	0.000	8.200-01	1.400-01	1.630-01
110	47	AG*	1	2.600+02	0.000	0.000	3.120-01
110	47	AG	2	2.780-04	0.000	0.000	3.120-01
110	48	CD	2	0.000	0.000	0.000	1.520-01
111	46	PD*	1	2.290-01	2.500-01	3.680-02	3.110-01
111	46	PD	2	1.530-02	2.500-01	3.680-02	3.110-01
111	47	AG*	1	8.680-04	0.000	0.000	3.110-01

TABLE I. (contd)

A	Z	ELT	ISO	HALF-LIFE IN DAYS	PU239 FISS YIELD, %	U238 FISS YIELD, %	ABSORPTION C. SECTION
111	47	AG	2	7.500+00	0.000	0.000	3.110-01
111	48	CD*	1	3.400-02	0.000	0.000	6.240-01
111	48	CD	2	0.000	0.000	0.000	6.240-01
112	46	PD	2	8.750-01	1.500-01	4.460-02	3.100-01
112	47	AG	2	1.350-01	0.000	0.000	3.100-01
112	48	CD	2	0.000	0.000	0.000	1.720-01
113	46	PD	2	9.720-04	1.090-01	4.750-02	3.090-01
113	47	AG*	1	8.350-04	0.000	0.000	3.090-01
113	47	AG	2	2.210-01	0.000	0.000	3.090-01
113	48	CD*	1	5.110+03	0.000	0.000	5.140-01
113	48	CD	2	0.000	0.000	0.000	5.140-01
113	49	IN	2	0.000	0.000	0.000	3.090-01
114	46	PD	2	1.670-03	9.700-02	3.810-02	3.090-01
114	47	AG	2	5.790-05	2.000-03	0.000	3.090-01
114	48	CD	2	0.000	0.000	0.000	1.520-01
114	49	IN*	1	5.000+01	0.000	0.000	3.090-01
114	49	IN	2	8.350-04	0.000	0.000	3.090-01
115	46	PD	2	5.210-04	8.700-02	3.570-02	3.080-01
115	47	AG*	1	2.310-04	4.000-03	3.000-05	3.080-01
115	47	AG	2	1.460-02	4.000-03	3.000-05	3.080-01
115	48	CD*	1	4.300+01	0.000	0.000	3.080-01
115	48	CD	2	2.350+00	0.000	0.000	3.080-01
115	49	IN*	1	1.890-01	0.000	0.000	5.480-01
115	49	IN	2	0.000	0.000	0.000	5.480-01
115	50	SN	2	0.000	0.000	0.000	3.080-01
116	46	PD	2	3.470-04	7.000-02	3.390-02	3.070-01
116	47	AG	2	1.740-03	1.900-02	6.900-04	3.070-01
116	48	CD	2	0.000	1.000-03	0.000	3.070-01
116	49	IN*	1	3.750-02	0.000	0.000	3.070-01
116	49	IN	2	1.620-04	0.000	0.000	3.070-01
116	50	SN	2	0.000	0.000	0.000	8.400-02
117	47	AG	2	7.640-04	8.400-02	3.390-02	3.060-01
117	48	CD*	1	1.420-01	1.000-03	0.000	3.060-01
117	48	CD	2	1.000-01	1.000-03	0.000	3.060-01
117	49	IN*	1	8.040-02	0.000	0.000	3.060-01
117	49	IN	2	3.000-02	0.000	0.000	3.060-01
117	50	SN*	1	1.400+01	0.000	0.000	2.810-01
117	50	SN	2	0.000	0.000	0.000	2.810-01
118	48	CD	2	3.470-02	8.600-02	3.360-02	3.050-01
118	49	IN	2	5.790-05	0.000	0.000	3.050-01
118	50	SN	2	0.000	0.000	0.000	5.200-02
119	48	CD*	1	1.870-03	4.200-02	1.690-02	3.050-01
119	48	CD	2	6.940-03	4.200-02	1.690-02	3.050-01
119	49	IN*	1	1.250-02	0.000	0.000	3.050-01
119	49	IN	2	1.600-03	0.000	0.000	3.050-01
119	50	SN*	1	2.500+02	0.000	0.000	2.310-01
119	50	SN	2	0.000	0.000	0.000	2.310-01
120	49	IN	2	5.790-04	8.900-02	3.390-02	3.040-01
120	50	SN	2	0.000	0.000	0.000	3.300-02

TABLE I. (contd)

A	Z	ELT	ISO	HALF-LIFE IN DAYS	PU239 FISS YIELD, %	U238 FISS YIELD, %	ABSORPTION C. SECTION
121	48	CD	2	2.430-03	8.200-02	2.570-02	3.030-01
121	49	IN*	1	2.150-03	5.000-03	4.290-03	3.030-01
121	49	IN	2	3.470-04	5.000-03	4.290-03	3.030-01
121	50	SN*	1	7.300+03	0.000	3.500-04	3.030-01
121	50	SN	2	1.130+00	0.000	3.500-04	3.030-01
121	51	SB	2	0.000	0.000	0.000	6.390-01
122	49	IN	2	8.680-05	9.600-02	3.680-02	3.020-01
122	50	SN	2	0.000	1.000-03	5.000-05	3.020-01
122	51	SB*	1	2.850-03	0.000	0.000	3.020-01
122	51	SB	2	2.750+00	0.000	0.000	3.020-01
122	52	TE	2	0.000	0.000	0.000	3.020-01
123	49	IN	2	1.160-04	1.050-01	3.880-02	3.010-01
123	50	SN*	1	1.250+02	2.000-03	0.000	3.010-01
123	50	SN	2	2.850-02	2.000-03	0.000	3.010-01
123	51	SB	2	0.000	0.000	0.000	4.260-01
123	52	TE*	1	1.040+02	0.000	0.000	3.010-01
123	52	TE	2	0.000	0.000	0.000	3.010-01
124	50	SN	2	0.000	1.290-01	4.250-02	3.010-01
124	51	SB*	1	1.460-02	0.000	0.000	3.010-01
124	51	SB	2	6.000+01	0.000	0.000	3.010-01
124	52	TE	2	0.000	0.000	0.000	1.290-01
125	50	SN*	1	6.740-03	8.200-02	2.370-02	3.000-01
125	50	SN	2	9.400+00	8.200-02	2.370-02	3.000-01
125	51	SB	2	9.860+02	2.000-03	7.200-04	4.420-01
125	52	TE*	1	5.800+01	0.000	0.000	2.560-01
125	52	TE	2	0.000	0.000	0.000	2.560-01
126	50	SN	2	3.650+07	2.660-01	5.630-02	5.400-02
126	51	SB*	1	1.320-02	7.000-03	5.700-04	2.750-01
126	51	SB	2	1.250+01	7.000-03	5.700-04	2.750-01
126	52	TE	2	0.000	0.000	0.000	3.900-02
127	50	SN	2	8.750-02	3.670-01	1.070-01	2.520-01
127	51	SB	2	3.880+00	6.200-02	9.470-03	2.520-01
127	52	TE*	1	1.090+02	0.000	0.000	2.520-01
127	52	TE	2	3.920-01	0.000	0.000	2.520-01
127	53	I	2	0.000	0.000	0.000	5.200-01
128	50	SN	2	3.960-02	4.810-01	3.090-01	2.300-01
128	51	SB*	1	4.000-01	1.090-01	2.420-02	2.300-01
128	51	SB	2	6.940-03	1.090-01	2.420-02	2.300-01
128	52	TE	2	0.000	1.100-02	5.400-04	1.700-02
128	53	I	2	1.740-02	0.000	0.000	2.300-01
128	54	XE	2	0.000	0.000	0.000	2.300-01
129	51	SB	2	1.790-01	1.130+00	8.760-01	2.110-01
129	52	TE*	1	3.400+01	3.500-02	2.200-03	2.110-01
129	52	TE	2	4.790-02	3.500-02	2.200-03	2.110-01
129	53	I	2	5.840+09	1.000-03	0.000	4.410-01
129	54	XE	2	0.000	0.000	0.000	2.110-01
130	50	SN	2	1.810-03	5.520-01	1.340+00	1.930-01
130	51	SB	2	6.940-03	1.410+00	4.480-01	1.930-01
130	52	TE	2	0.000	3.800-01	3.660-02	8.000-03

TABLE I. (contd)

A	Z	ELT	ISO	HALF-LIFE IN DAYS	PU239 FISS YIELD, %	U238 FISS YIELD, %	ABSORPTION C. SECTION
130	53	I	2	5.210-01	0.000	0.000	1.930-01
130	54	XE	2	0.000	0.000	0.000	8.600-02
131	51	SB	2	1.740-02	2.200+00	2.950+00	1.770-01
131	52	TE*	1	1.250+00	5.660-01	7.160-02	1.770-01
131	52	TE	2	1.740-02	5.660-01	7.160-02	1.770-01
131	53	I	2	8.050+00	6.400-02	0.000	1.770-01
131	54	XE*	1	1.180+01	0.000	0.000	2.910-01
131	54	XE	2	0.000	0.000	0.000	2.910-01
132	51	SB	2	1.460-03	1.890+00	4.170+00	1.620-01
132	52	TE	2	3.250+00	2.340+00	3.710-01	1.620-01
132	53	I	2	9.580-02	3.110-01	0.000	1.620-01
132	54	XE	2	0.000	3.000-03	0.000	6.700-02
133	51	SB	2	2.920-03	1.200+00	4.310+00	1.480-01
133	52	TE*	1	3.470-02	1.720+00	4.940-01	1.480-01
133	52	TE	2	8.680-03	1.720+00	4.940-01	1.480-01
133	53	I	2	8.750-01	1.040+00	2.660-02	1.480-01
133	54	XE*	1	2.300+00	1.400-02	0.000	1.480-01
133	54	XE	2	5.300+00	1.400-02	0.000	1.480-01
133	55	CS	2	0.000	0.000	0.000	4.380-01
134	51	SB	2	5.560-04	5.230-01	3.540+00	1.360-01
134	52	TE	2	2.920-02	3.460+00	2.310+00	1.360-01
134	53	I	2	3.680-02	2.320+00	5.210-01	1.360-01
134	54	XE	2	0.000	1.480-01	0.000	4.700-02
134	55	CS*	1	1.210-01	0.000	0.000	1.360-01
134	55	CS	2	7.660+02	0.000	0.000	1.360-01
134	56	BA	2	0.000	0.000	0.000	1.570-01
135	51	SB	2	2.310-05	1.600-01	1.540+00	1.240-01
135	52	TE	2	1.160-04	2.470+00	2.730+00	1.240-01
135	53	I	2	2.790-01	3.660+00	1.420+00	1.240-01
135	54	XE*	1	1.080-02	2.720-01	5.810-02	1.240-01
135	54	XE	2	3.830-01	2.720-01	5.810-02	1.240-01
135	55	CS	2	7.300+08	7.000-03	0.000	2.180-01
135	56	BA*	1	1.210+00	0.000	0.000	1.240-01
135	56	BA	2	0.000	0.000	0.000	1.240-01
136	53	I	2	9.610-04	5.200+00	4.930+00	1.140-01
136	54	XE	2	0.000	1.690+00	7.750-01	1.200-02
136	55	CS	2	1.300+01	0.000	8.560-03	1.140-01
136	56	BA	2	0.000	0.000	0.000	2.700-02
137	53	I	2	2.780-04	3.240+00	4.410+00	1.040-01
137	54	XE	2	2.710-03	3.250+00	1.470+00	1.040-01
137	55	CS	2	1.100+04	3.510-01	1.200-01	3.800-02
137	56	BA*	1	1.810-03	1.000-03	0.000	1.390-01
137	56	BA	2	0.000	1.000-03	0.000	1.390-01
138	53	I	2	6.940-05	1.290+00	3.370+00	9.600-02
138	54	XE	2	1.180-02	3.680+00	2.190+00	9.600-02
138	55	CS	2	2.220-02	1.100+00	4.930-01	9.600-02
138	56	BA	2	0.000	2.900-02	0.000	6.000-03
139	53	I	2	2.310-05	3.310-01	2.120+00	8.800-02
139	54	XE	2	4.750-04	2.660+00	2.710+00	8.800-02

TABLE I. (contd)

A	Z	ELT	ISO	HALF-LIFE IN DAYS	PU239 FISS YIELD, %	U238 FISS YIELD, %	ABSORPTION C. SECTION
139	55	CS	2	6.600-03	2.150+00	1.100+00	8.800-02
139	56	BA	2	5.900-02	1.670-01	2.980-02	8.800-02
139	57	LA	2	0.000	1.000-03	0.000	3.200-02
140	54	XE	2	1.850-04	1.440+00	3.550+00	8.000-02
140	55	CS	2	7.640-04	2.990+00	1.680+00	8.000-02
140	56	BA	2	1.280+01	6.560-01	2.760-01	8.000-02
140	57	LA	2	1.670+00	1.200-02	0.000	8.000-02
140	58	CE	2	0.000	0.000	0.000	2.700-02
141	54	XE	2	2.310-05	5.100-01	2.420+00	9.800-02
141	55	CS	2	2.890-04	2.970+00	2.290+00	9.800-02
141	56	BA	2	1.250-02	1.770+00	7.390-01	9.800-02
141	57	LA	2	1.580-01	9.900-02	8.210-03	9.800-02
141	58	CE	2	3.300+01	0.000	0.000	9.800-02
141	59	PR	2	0.000	0.000	0.000	9.200-02
142	54	XE	2	1.740-05	1.110-01	1.380+00	1.200-01
142	55	CS	2	2.680-05	1.860+00	2.460+00	1.200-01
142	56	BA	2	7.640-03	2.950+00	1.280+00	1.200-01
142	57	LA	2	5.900-02	4.730-01	1.050-01	1.200-01
142	58	CE	2	0.000	6.000-03	0.000	3.400-02
142	59	PR	2	8.000-01	0.000	0.000	1.200-01
142	60	ND	2	0.000	0.000	0.000	4.500-02
143	54	XE	2	1.160-05	1.300-02	6.610-01	1.460-01
143	55	CS	2	2.310-05	6.710-01	2.030+00	1.460-01
143	56	BA	2	1.390-04	2.890+00	1.750+00	1.460-01
143	57	LA	2	9.720-03	1.270+00	3.950-01	1.460-01
143	58	CE	2	1.380+00	5.100-02	0.000	1.460-01
143	59	PR	2	1.380+01	0.000	0.000	1.460-01
143	60	ND	2	0.000	0.000	0.000	2.410-01
144	54	XE	2	1.160-05	0.000	2.180-01	1.790-01
144	55	CS	2	2.310-05	1.490-01	1.330+00	1.790-01
144	56	BA	2	3.470-05	1.790+00	1.980+00	1.790-01
144	57	LA	2	4.630-05	2.110+00	8.050-01	1.790-01
144	58	CE	2	2.840+02	2.460-01	2.180-02	1.790-01
144	59	PR	2	1.180-02	2.000-03	0.000	1.790-01
144	60	ND	2	0.000	0.000	0.000	7.000-02
145	58	CE	2	2.080-03	3.530+00	3.770+00	2.190-01
145	59	PR	2	2.500-01	2.000-02	0.000	2.190-01
145	60	ND	2	0.000	0.000	0.000	4.550-01
146	58	CE	2	9.720-03	2.750+00	3.000+00	2.680-01
146	59	PR	2	1.740-02	1.010-01	0.000	2.680-01
146	60	ND	2	0.000	1.000-03	0.000	9.800-02
147	58	CE	2	8.330-04	1.930+00	2.500+00	3.280-01
147	59	PR	2	8.330-03	3.150-01	1.260-02	3.280-01
147	60	ND	2	1.110+01	6.000-03	0.000	3.280-01
147	61	PM	2	9.500+02	0.000	0.000	8.920-01
147	62	SM	2	0.000	0.000	0.000	8.610-01
148	58	CE	2	4.860-04	1.100+00	1.970+00	4.010-01
148	59	PR	2	1.350-03	6.090-01	1.040-01	4.010-01
148	60	ND	2	0.000	3.700-02	0.000	1.790-01

TABLE I. (contd)

A	Z	ELT	ISO	HALF-LIFE IN DAYS	PU239 FISS YIELD, %	U238 FISS YIELD, %	ABSORPTION C. SECTION
148	61	PM*	1	5,400+00	0.000	0.000	4.010-01
148	61	PM	2	4,100+01	0.000	0.000	4.010-01
148	62	SM	2	0.000	0.000	0.000	1.870-01
149	60	ND	2	7,500-02	1.430+00	1.740+00	4.910-01
149	61	PM	2	2,210+00	2.000-03	0.000	4.910-01
149	62	SM	2	0.000	0.000	0.000	1.170+00
150	60	ND	2	0.000	1.140+00	1,330+00	2,740-01
150	62	SM	2	0.000	0.000	0.000	2,630-01
151	60	ND	2	8,330-03	8,330-01	9,470-01	6,310-01
151	61	PM	2	1,170+00	5,700-02	1,420-03	6,310-01
151	62	SM	2	3,290+04	1.000-03	0.000	1.050+00
151	63	EU	2	0.000	0.000	0.000	3.080+00
152	61	PM	2	4,510-03	6,950-01	6,260-01	6,650-01
152	62	SM	2	0.000	5.000-03	1,280-02	3,680-01
152	63	EU*	1	3,880-01	0.000	0.000	6,650-01
152	63	EU	2	4,750+03	0.000	0.000	6,650-01
152	64	GD	2	0.000	0.000	0.000	6,650-01
153	61	PM	2	3,820-03	4,610-01	3,960-01	6,990-01
153	62	SM	2	1,960+00	1,900-02	0.000	6,990-01
153	63	EU	2	0.000	0.000	0.000	1,360+00
154	61	PM	2	1,740-03	3,040-01	2,430-01	7,360-01
154	62	SM	2	0.000	5,500-02	1,230-03	2,240-01
154	63	EU	2	5,840+03	0.000	0.000	2,170+00
154	64	GD	2	0.000	0.000	0.000	5,790-01
155	62	SM	2	1,670-02	2,540-01	1,470-01	7,750-01
155	63	EU	2	6,210+02	6,000-03	0.000	1,800+00
155	64	GD	2	0.000	0.000	0.000	1,990+00
156	62	SM	2	3,920-01	1,610-01	6,860-02	8,150-01
156	63	EU	2	1,500+01	1,900-02	1,000-04	8,150-01
156	64	GD	2	0.000	0.000	0.000	7,280-01
157	63	EU	2	6,420-01	1,180-01	4,060-02	8,580-01
157	64	GD	2	0.000	2,000-03	0.000	1,130+00
158	63	EU	2	4,170-02	6,700-02	1,770-02	9,030-01
158	64	GD	2	0.000	5,000-03	0.000	3,680-01
159	63	EU	2	1,320-02	3,560-02	8,080-03	9,500-01
159	64	GD	2	7,500-01	1,000-02	4,000-05	9,210-01
159	65	TB	2	0.000	0.000	0.000	1,380+00
160	63	EU	2	1,740-03	1,300-02	3,320-03	1,000+00
160	64	GD	2	0.000	1,200-02	7,000-05	1,000+00
160	65	TB	2	7,240+01	0.000	0.000	1,000+00
160	66	DY	2	0.000	0.000	0.000	1,000+00
161	64	GD	2	2,570-03	1,200-02	1,550-03	1,010+00
161	65	TB	2	6,900+00	2,000-03	0.000	1,010+00
161	66	DY	2	0.000	0.000	0.000	1,010+00
162	64	GD	2	3,650+02	0.000	0.000	1,020+00
162	65	TB	2	8,330-02	0.000	0.000	1,020+00
162	66	DY	2	0.000	0.000	0.000	1,020+00
163	65	TB	2	2,920-01	0.000	0.000	1,030+00
163	66	DY	2	0.000	0.000	0.000	1,030+00

TABLE I. (contd)

A	Z	ELT	ISO	HALF-LIFE IN DAYS	PU239 FISS YIELD, %	U238 FISS YIELD, %	ABSORPTION C. SECTION
164	66	DY	2	0.000	0.000	0.000	1.040+00
165	66	DY*	1	8.730-04	0.000	0.000	1.050+00
165	66	DY	2	9.580-02	0.000	0.000	1.050+00
165	67	HO	2	0.000	0.000	0.000	1.270+00
166	66	DY	2	3.330+00	0.000	0.000	1.060+00
166	67	HO	2	1.130+00	0.000	0.000	1.060+00
166	68	ER	2	0.000	0.000	0.000	1.060+00
167	68	ER*	1	2.890-05	0.000	0.000	1.070+00
167	68	ER	2	0.000	0.000	0.000	1.070+00

TABLE I. (contd)

A	Z	ELT	ISO	ALPHA	BETA	BETA DECAY ENERGY, MEV	GAMMA DECAY ENERGY, MEV
72	30	ZN	2	0.000	0.000	1.220-01	1.510-01
72	31	GA	2	0.000	0.000	3.900-01	2.700+00
72	32	GE	2	0.000	0.000	0.000	0.000
73	30	ZN	2	0.000	0.000	1.600+00	0.000
73	31	GA	2	0.000	0.000	4.700-01	3.270-01
73	32	GE	2	0.000	0.000	0.000	0.000
74	31	GA	2	0.000	0.000	9.160-01	3.263+00
74	32	GE	2	4.000-01	0.000	0.000	0.000
75	31	GA	2	0.000	0.000	1.086+00	2.100-02
75	32	GE*	1	0.000	0.000	0.000	1.390-01
75	32	GE	2	0.000	0.000	3.540-01	3.500-02
75	33	AS	2	0.000	0.000	0.000	0.000
76	31	GA	2	0.000	0.000	2.000+00	1.252+00
76	32	GE	2	5.000-01	0.000	0.000	0.000
76	33	AS	2	0.000	0.000	8.410-01	4.650-01
76	34	SE	2	2.590-01	0.000	0.000	0.000
77	32	GE*	1	0.000	6.400-01	9.000-01	3.840-01
77	32	GE	2	0.000	0.000	5.230-01	3.020-01
77	33	AS	2	0.000	0.000	2.330-01	1.000-02
77	34	SE*	1	0.000	0.000	0.000	1.620-01
77	34	SE	2	0.000	0.000	0.000	0.000
78	32	GE	2	0.000	0.000	3.000-01	2.600-01
78	33	AS	2	0.000	0.000	1.100+00	8.000-01
78	34	SE	2	8.750-01	0.000	0.000	0.000
79	33	AS	2	0.000	1.000+00	7.000-01	0.000
79	34	SE*	1	0.000	0.000	0.000	9.600-02
79	34	SE	2	0.000	0.000	5.300-02	0.000
79	35	BR	2	2.540-01	0.000	0.000	0.000
80	33	AS	2	0.000	0.000	1.850+00	4.350-01
80	34	SE	2	2.000-01	0.000	0.000	0.000
80	35	BR*	1	0.000	0.000	0.000	1.300-02
80	35	BR	2	0.000	0.000	6.400-01	7.500-02
80	36	KR	2	0.000	0.000	0.000	0.000
81	33	AS	2	0.000	0.000	1.700+00	0.000
81	34	SE*	1	0.000	0.000	0.000	8.000-03
81	34	SE	2	0.000	0.000	5.170-01	6.000-03
81	35	BR	2	0.000	0.000	0.000	0.000
81	36	KR	2	0.000	0.000	0.000	0.000
82	34	SE	2	9.200-01	0.000	0.000	0.000
82	35	BR	2	0.000	0.000	1.350-01	2.556+00
82	36	KR	2	1.000+00	0.000	0.000	0.000
83	34	SE*	1	0.000	1.000+00	1.130+00	2.004+00
83	34	SE	2	0.000	0.000	5.000-01	1.339+00
83	35	BR	2	0.000	1.000+00	3.130-01	7.000-03
83	36	KR*	1	0.000	0.000	0.000	4.200-02
83	36	KR	2	0.000	0.000	0.000	0.000
84	34	SE	2	0.000	0.000	4.670-01	0.000
84	35	BR*	1	0.000	1.000+00	5.950-01	2.357+00
84	35	BR	2	0.000	0.000	1.066+00	1.722+00

TABLE I. (contd)

A	Z	ELT	ISO	ALPHA	BETA	BETA DECAY ENERGY, MEV	GAMMA DECAY ENERGY, MEV
84	36	KR	2	7.140-01	0.000	0.000	0.000
85	33	AS	2	0.000	0.000	9.000-01	0.000
85	34	SE	2	0.000	0.000	1.250+00	1.250+00
85	35	BR	2	0.000	1.000+00	8.300-01	0.000
85	36	KR*	1	0.000	8.100-01	2.330-01	1.810-01
85	36	KR	2	0.000	0.000	2.320-01	2.110-01
85	37	RB	2	1.000-01	0.000	0.000	0.000
86	34	SE	2	0.000	0.000	1.000+00	1.000+00
86	35	BR	2	0.000	0.000	2.000+00	2.055+00
86	36	KR	2	0.000	0.000	0.000	0.000
86	37	RB*	1	0.000	0.000	0.000	5.600-01
86	37	RB	2	0.000	0.000	5.620-01	9.500-02
86	38	SR	2	1.000+00	0.000	0.000	0.000
87	34	SE	2	0.000	0.000	2.000+00	2.000+00
87	35	BR	2	0.000	0.000	1.410+00	3.780+00
87	36	KR	2	0.000	0.000	1.010+00	1.374+00
87	37	RB	2	0.000	0.000	9.200-02	0.000
87	38	SR*	1	0.000	0.000	0.000	3.100-01
87	38	SR	2	0.000	0.000	0.000	0.000
88	35	BR	2	0.000	0.000	2.900+00	0.000
88	36	KR	2	0.000	0.000	3.310-01	2.070+00
88	37	RB	2	0.000	0.000	1.610+00	5.690-01
88	38	SR	2	0.000	0.000	0.000	0.000
89	35	BR	2	0.000	0.000	2.370+00	0.000
89	36	KR	2	0.000	0.000	1.300+00	0.000
89	37	RB	2	0.000	0.000	5.100-01	2.225+00
89	38	SR	2	0.000	9.000-03	4.870-01	0.000
89	39	Y*	1	0.000	0.000	0.000	9.010-01
89	39	Y	2	1.000-03	0.000	0.000	0.000
90	35	BR	2	0.000	0.000	1.000+00	0.000
90	36	KR	2	0.000	0.000	1.070+00	1.407+00
90	37	RB	2	0.000	0.000	1.900+00	3.188+00
90	38	SR	2	0.000	0.000	2.000-01	0.000
90	39	Y*	1	0.000	0.000	0.000	6.440-01
90	39	Y	2	0.000	0.000	7.490-01	0.000
90	40	ZR	2	0.000	0.000	0.000	0.000
91	36	KR	2	0.000	0.000	1.200+00	0.000
91	37	RB*	1	0.000	1.000+00	1.500+00	0.000
91	37	RB	2	0.000	0.000	1.833+00	0.000
91	38	SR	2	0.000	6.200-01	5.330-01	8.450-01
91	39	Y*	1	0.000	0.000	0.000	5.510-01
91	39	Y	2	0.000	0.000	5.120-01	4.000-03
91	40	ZR	2	0.000	0.000	0.000	0.000
92	36	KR	2	0.000	0.000	1.670+00	0.000
92	37	RB	2	0.000	0.000	2.500+00	0.000
92	38	SR	2	0.000	0.000	2.150-01	1.258+00
92	39	Y	2	0.000	0.000	1.200+00	2.290-01
92	40	ZR	2	0.000	0.000	0.000	0.000
93	36	KR	2	0.000	0.000	2.660+00	0.000

TABLE I. (contd)

A	Z	ELT	ISO	ALPHA	BETA	BETA DECAY ENERGY, MEV	GAMMA DECAY ENERGY, MEV
93	37	RB	2	0.000	0.000	2.000+00	0.000
93	38	SR	2	0.000	0.000	1.400+00	1.000+00
93	39	Y	2	0.000	0.000	1.030+00	9.300-02
93	40	ZR	2	0.000	1.000+00	2.100-02	0.000
93	41	HB*	1	0.000	0.000	0.000	2.900-02
93	41	HB	2	9.090-01	0.000	0.000	0.000
94	36	KR	2	0.000	0.000	2.140+00	0.000
94	37	RB	2	0.000	0.000	3.000+00	0.000
94	38	SR	2	0.000	0.000	9.000-01	0.000
94	39	Y	2	0.000	0.000	1.800+00	7.240-01
94	40	ZR	2	0.000	0.000	0.000	0.000
94	41	HB*	1	0.000	1.000-03	1.000-03	2.000-03
94	41	HB	2	0.000	0.000	1.670-01	1.573+00
94	42	MO	2	0.000	0.000	0.000	0.000
95	36	KR	2	0.000	0.000	3.100+00	0.000
95	37	RB	2	0.000	0.000	2.500+00	0.000
95	38	SR	2	0.000	0.000	1.800+00	0.000
95	39	Y	2	0.000	0.000	1.200+00	0.000
95	40	ZR	2	0.000	2.000-02	1.270-01	7.330-01
95	41	HB*	1	0.000	0.000	0.000	2.350-01
95	41	HB	2	0.000	0.000	5.300-02	7.450-01
95	42	MO	2	0.000	0.000	0.000	0.000
96	39	Y	2	0.000	0.000	1.167+00	1.600+00
96	40	ZR	2	0.000	0.000	0.000	0.000
96	41	HB	2	0.000	0.000	2.400-01	2.400+00
96	42	MO	2	0.000	0.000	0.000	0.000
97	36	KR	2	0.000	0.000	3.500+00	0.000
97	37	RB	2	0.000	0.000	2.900+00	0.000
97	38	SR	2	0.000	0.000	2.300+00	0.000
97	39	Y	2	0.000	0.000	1.700+00	0.000
97	40	ZR	2	0.000	9.600-01	6.400-01	8.100-02
97	41	HB*	1	0.000	0.000	0.000	7.470-01
97	41	HB	2	0.000	0.000	4.240-01	6.650-01
97	42	MO	2	0.000	0.000	0.000	0.000
98	40	ZR	2	0.000	0.000	1.000+00	1.000+00
98	41	HB*	1	0.000	1.000+00	9.870-01	2.307+00
98	41	HB	2	0.000	0.000	1.300+00	1.300+00
98	42	MO	2	0.000	0.000	0.000	0.000
99	40	ZR	2	0.000	0.000	9.000-01	9.000-01
99	41	HB	2	0.000	0.000	1.067+00	3.600-02
99	42	MO	2	0.000	9.000-01	3.760-01	1.370-01
99	43	TC*	1	0.000	0.000	0.000	1.410-01
99	43	TC	2	0.000	0.000	9.700-02	0.000
99	44	RU	2	0.000	0.000	0.000	0.000
100	41	HB	2	0.000	0.000	2.033+00	9.220-01
100	42	MO	2	0.000	0.000	0.000	0.000
100	43	TC	2	0.000	0.000	1.123+00	5.610-01
100	44	RU	2	0.000	0.000	0.000	0.000
101	41	HB	2	0.000	0.000	6.250-01	6.250-01

TABLE I. (contd)

A	Z	ELT	ISO	ALPHA	BETA	BETA DECAY ENERGY, MEV	GAMMA DECAY ENERGY, MEV
101	42	MO	2	0.000	0.000	5.000-01	1.147+00
101	43	TC	2	0.000	0.000	4.000-01	3.000-01
101	44	RU	2	0.000	0.000	0.000	0.000
102	42	MO	2	0.000	0.000	3.100-01	1.300+00
102	43	TC	2	0.000	0.000	1.100+00	0.000
102	44	RU	2	0.000	0.000	0.000	0.000
103	43	TC	2	0.000	0.000	7.000-01	4.400-02
103	44	RU	2	0.000	9.940-01	8.000-02	4.730-01
103	45	RH*	1	0.000	0.000	0.000	4.000-02
103	45	RH	2	7.100-02	0.000	0.000	0.000
104	42	MO	2	0.000	0.000	1.167+00	1.300+00
104	43	TC	2	0.000	0.000	9.400-01	2.980+00
104	44	RU	2	0.000	0.000	0.000	0.000
104	45	RH*	1	0.000	1.000-03	0.000	1.270-01
104	45	RH	2	0.000	0.000	8.300-01	1.300-02
104	46	PD	2	0.000	0.000	0.000	0.000
105	42	MO	2	0.000	0.000	1.650+00	0.000
105	43	TC	2	0.000	0.000	1.080+00	0.000
105	44	RU	2	0.000	2.060-01	3.830-01	7.260-01
105	45	RH*	1	0.000	0.000	0.000	1.300-01
105	45	RH	2	7.150-01	0.000	1.830-01	3.200-02
105	46	PD	2	0.000	0.000	0.000	0.000
106	44	RU	2	0.000	0.000	1.300-02	0.000
106	45	RH*	1	0.000	1.000+00	3.280-01	2.374+00
106	45	RH	2	0.000	0.000	1.074+00	2.000-01
106	46	PD	2	0.000	0.000	0.000	0.000
107	43	TC	2	0.000	0.000	1.500+00	0.000
107	44	RU	2	0.000	0.000	1.027+00	2.180-01
107	45	RH	2	0.000	0.000	4.000-01	2.900-01
107	46	PD	2	0.000	0.000	1.200-02	0.000
107	47	AG	2	1.000-02	0.000	0.000	0.000
108	44	RU	2	0.000	0.000	4.150-01	4.600-02
108	45	RH	2	0.000	0.000	1.201+00	3.740-01
108	46	PD	2	1.600-02	0.000	0.000	0.000
108	47	AG*	1	0.000	9.000-01	0.000	1.593+00
108	47	AG	2	0.000	0.000	6.640-01	1.700-02
108	48	CD	2	0.000	0.000	0.000	0.000
109	45	RH	2	0.000	1.000+00	8.000-01	4.000-01
109	46	PD*	1	0.000	0.000	0.000	1.090-01
109	46	PD	2	0.000	1.000+00	3.420-01	0.000
109	47	AG*	1	0.000	0.000	0.000	8.800-02
109	47	AG	2	3.300-02	0.000	0.000	0.000
110	46	PD	2	1.670-01	0.000	0.000	0.000
110	47	AG*	1	0.000	9.800-01	8.480-02	2.600+00
110	47	AG	2	0.000	0.000	9.270-01	2.600-02
110	48	CD	2	3.200-02	0.000	0.000	0.000
111	46	PD*	1	0.000	3.260-01	1.580-01	3.030-01
111	46	PD	2	0.000	1.000+00	7.330-01	1.070-01
111	47	AG*	1	0.000	0.000	0.000	6.500-02

TABLE I. (contd)

A	Z	ELT	ISO	ALPHA	BETA	BETA DECAY ENERGY, MEV	GAMMA DECAY ENERGY, MEV
111	47	AG	2	0.000	0.000	3.390-01	2.300-02
111	48	CD*	1	0.000	0.000	0.000	2.770-01
111	48	CD	2	0.000	0.000	0.000	0.000
112	46	PD	2	0.000	0.000	7.000-02	1.800-02
112	47	AG	2	0.000	0.000	1.040+00	4.860-01
112	48	CD	2	1.000+00	0.000	0.000	0.000
113	46	PD	2	0.000	1.000+00	1.100+00	0.000
113	47	AG*	1	0.000	1.000-01	6.700-02	2.790-01
113	47	AG	2	0.000	0.000	5.860-01	4.140-01
113	48	CD*	1	0.000	9.990-01	2.000-01	0.000
113	48	CD	2	0.000	0.000	0.000	0.000
113	49	IN	2	6.700-01	0.000	0.000	0.000
114	46	PD	2	0.000	0.000	4.670-01	0.000
114	47	AG	2	0.000	0.000	1.370+00	5.700-01
114	48	CD	2	1.130-01	0.000	0.000	0.000
114	49	IN*	1	0.000	0.000	0.000	7.700-02
114	49	IN	2	0.000	0.000	6.500-01	2.000-03
115	46	PD	2	0.000	5.000-01	1.500+00	0.000
115	47	AG*	1	0.000	1.000+00	2.960-01	1.256+00
115	47	AG	2	0.000	9.000-02	5.540-01	1.063+00
115	48	CD*	1	0.000	1.000+00	5.280-01	3.100-02
115	48	CD	2	0.000	1.000+00	3.000-01	1.930-01
115	49	IN*	1	0.000	5.500-02	1.700-02	3.170-01
115	49	IN	2	7.800-01	0.000	1.630-01	0.000
115	50	SN	2	0.000	0.000	0.000	0.000
116	46	PD	2	0.000	0.000	0.000	0.000
116	47	AG	2	0.000	0.000	1.667+00	1.220+00
116	48	CD	2	0.000	0.000	0.000	0.000
116	49	IN*	1	0.000	1.000+00	2.930-01	2.494+00
116	49	IN	2	0.000	0.000	1.097+00	1.700-02
116	50	SN	2	1.000+00	0.000	0.000	0.000
117	47	AG	2	0.000	5.000-01	9.500-01	9.500-01
117	48	CD*	1	0.000	1.000+00	3.080-01	1.359+00
117	48	CD	2	0.000	1.000+00	5.730-01	5.730-01
117	49	IN*	1	0.000	5.300-01	4.490-01	1.190-01
117	49	IN	2	0.000	0.000	2.470-01	7.010-01
117	50	SN*	1	0.000	0.000	0.000	3.210-01
117	50	SN	2	0.000	0.000	0.000	0.000
118	48	CD	2	0.000	0.000	2.670-01	2.000-01
118	49	IN	2	0.000	0.000	1.339+00	1.850-01
118	50	SN	2	1.000+00	0.000	0.000	0.000
119	48	CD*	1	0.000	1.000+00	8.000-01	1.167+00
119	48	CD	2	0.000	1.000+00	9.330-01	1.700-01
119	49	IN*	1	0.000	9.600-01	8.460-01	6.600-02
119	49	IN	2	0.000	0.000	5.330-01	7.790-01
119	50	SN*	1	0.000	0.000	0.000	9.000-02
119	50	SN	2	0.000	0.000	0.000	0.000
120	49	IN	2	0.000	0.000	6.860-01	2.831+00
120	50	SN	2	7.000-03	0.000	0.000	0.000

TABLE I. (contd)

A	Z	ELT	ISO	ALPHA	BETA	BETA DECAY ENERGY, MEV	GAMMA DECAY ENERGY, MEV
121	48	CD	2	0.000	0.000	1.120+00	1.120+00
121	49	IN*	1	0.000	1.000+00	1.233+00	0.000
121	49	IN	2	0.000	0.000	9.670-01	9.400-01
121	50	SN*	1	0.000	1.000+00	1.400-01	1.000-02
121	50	SN	2	0.000	0.000	1.270-01	0.000
121	51	SB	2	1.000-02	0.000	0.000	0.000
122	49	IN	2	0.000	0.000	1.667+00	1.700+00
122	50	SN	2	5.000-03	0.000	0.000	0.000
122	51	SB*	1	0.000	0.000	0.000	4.300-02
122	51	SB	2	0.000	0.000	5.010-01	4.120-01
122	52	TE	2	3.330-01	0.000	0.000	0.000
123	49	IN	2	0.000	0.000	1.100+00	1.100+00
123	50	SN*	1	0.000	1.000+00	4.660-01	2.200-02
123	50	SN	2	0.000	0.000	4.730-01	1.340-01
123	51	SB	2	1.300-02	0.000	0.000	0.000
123	52	TE*	1	0.000	0.000	0.000	1.340-01
123	52	TE	2	0.000	0.000	0.000	0.000
124	50	SN	2	9.620-01	0.000	0.000	0.000
124	51	SB*	1	0.000	2.000-01	6.250-01	1.280-01
124	51	SB	2	0.000	0.000	3.520-01	2.117+00
124	52	TE	2	7.140-01	0.000	0.000	0.000
125	50	SN*	1	0.000	1.000+00	7.000-01	3.260-01
125	50	SN	2	0.000	0.000	7.600-01	9.500-02
125	51	SB	2	0.000	2.100-01	1.020-01	4.600-01
125	52	TE*	1	0.000	0.000	0.000	1.450-01
125	52	TE	2	0.000	0.000	0.000	0.000
126	50	SN	2	0.000	1.060+00	1.090-01	7.700-02
126	51	SB*	1	0.000	1.000-02	6.000-03	1.320-01
126	51	SB	2	0.000	0.000	6.330-01	1.870+00
126	52	TE	2	1.000-01	0.000	0.000	0.000
127	50	SN	2	0.000	0.000	1.610+00	0.000
127	51	SB	2	0.000	1.500-01	4.000-01	5.810-01
127	52	TE*	1	0.000	8.000-03	2.000-03	9.000-02
127	52	TE	2	0.000	0.000	2.300-01	1.000-03
127	53	I	2	0.000	0.000	0.000	0.000
128	50	SN	2	0.000	3.000-02	2.460-01	5.700-01
128	51	SB*	1	0.000	1.000+00	3.330-01	3.300+00
128	51	SB	2	0.000	0.000	8.660-01	1.808+00
128	52	TE	2	1.080-01	0.000	0.000	0.000
128	53	I	2	0.000	0.000	6.340-01	7.300-02
128	54	XE	2	0.000	0.000	0.000	0.000
129	51	SB	2	0.000	0.000	6.050-01	5.870-01
129	52	TE*	1	0.000	3.600-01	0.000	1.060-01
129	52	TE	2	0.000	0.000	4.560-01	1.100-01
129	53	I	2	0.000	0.000	5.000-02	4.000-02
129	54	XE	2	0.000	0.000	0.000	0.000
130	50	SN	2	0.000	0.000	5.000-01	5.000-01
130	51	SB	2	0.000	0.000	1.413+00	7.600-01
130	52	TE	2	1.300-01	0.000	0.000	0.000

TABLE I. (contd)

A	Z	ELT	ISO	ALPHA	BETA	BETA DECAY ENERGY, MEV	GAMMA DECAY ENERGY, MEV
130	53	I	2	0.000	0.000	2.760-01	2.133+00
130	54	XE	2	0.000	0.000	0.000	0.000
131	51	SB	2	0.000	1.500-01	8.270-01	6.930-01
131	52	TE*	1	0.000	8.200-01	1.530-01	1.191+00
131	52	TE	2	0.000	0.000	6.360-01	3.600-01
131	53	I	2	0.000	6.000-03	1.810-01	3.900-01
131	54	XE*	1	0.000	0.000	0.000	1.630-01
131	54	XE	2	0.000	0.000	0.000	0.000
132	51	SB	2	0.000	0.000	2.600+00	0.000
132	52	TE	2	0.000	0.000	7.300-02	2.310-01
132	53	I	2	0.000	0.000	4.340-01	1.992+00
132	54	XE	2	9.620-01	0.000	0.000	0.000
133	51	SB	2	0.000	7.200-01	2.100+00	0.000
133	52	TE*	1	0.000	8.700-01	4.390-01	1.639+00
133	52	TE	2	0.000	0.000	8.000-01	6.000-01
133	53	I	2	0.000	2.400-02	4.500-01	5.550-01
133	54	XE*	1	0.000	0.000	0.000	2.330-01
133	54	XE	2	0.000	0.000	1.130-01	8.100-02
133	55	CS	2	8.500-02	0.000	0.000	0.000
134	51	SB	2	0.000	0.000	2.900+00	0.000
134	52	TE	2	0.000	0.000	2.170-01	1.300-01
134	53	I	2	0.000	0.000	6.000-01	1.937+00
134	54	XE	2	9.620-01	0.000	0.000	0.000
134	55	CS*	1	0.000	1.000-02	2.000-03	1.370-01
134	55	CS	2	0.000	0.000	1.660-01	1.591+00
134	56	BA	2	3.800-02	0.000	0.000	0.000
135	51	SB	2	0.000	0.000	1.750+00	1.750+00
135	52	TE	2	0.000	0.000	2.000+00	0.000
135	53	I	2	0.000	2.700-01	3.080-01	1.540+00
135	54	XE*	1	0.000	0.000	0.000	5.200-01
135	54	XE	2	0.000	0.000	3.020-01	2.680-01
135	55	CS	2	0.000	0.000	7.000-02	0.000
135	56	BA*	1	0.000	0.000	0.000	4.300-02
135	56	BA	2	0.000	0.000	0.000	0.000
136	53	I	2	0.000	0.000	1.150+00	2.480+00
136	54	XE	2	0.000	0.000	0.000	0.000
136	55	CS	2	0.000	0.000	1.200-01	2.231+00
136	56	BA	2	1.000-02	0.000	0.000	0.000
137	53	I	2	0.000	0.000	1.158+00	2.300-01
137	54	XE	2	0.000	0.000	1.330+00	1.500-01
137	55	CS	2	0.000	9.500-01	1.920-01	0.000
137	56	BA*	1	0.000	0.000	0.000	6.610-01
137	56	BA	2	0.000	0.000	0.000	0.000
138	53	I	2	0.000	0.000	2.560+00	0.000
138	54	XE	2	0.000	0.000	1.000+00	4.200-01
138	55	CS	2	0.000	0.000	1.080+00	2.010+00
138	56	BA	2	0.000	0.000	0.000	0.000
139	53	I	2	0.000	0.000	2.160+00	0.000
139	54	XE	2	0.000	0.000	1.700+00	3.590-01

TABLE I. (contd)

A	Z	ELT	ISO	ALPHA	BETA	BETA DECAY ENERGY, MEV	GAMMA DECAY ENERGY, MEV
139	55	CS	2	0.000	0.000	1.300+00	2.300-01
139	56	BA	2	0.000	0.000	7.640-01	4.400-02
139	57	LA	2	0.000	0.000	0.000	0.000
140	54	XE	2	0.000	0.000	1.300+00	0.000
140	55	CS	2	0.000	0.000	1.525+00	1.525+00
140	56	BA	2	0.000	0.000	2.680-01	2.370-01
140	57	LA	2	0.000	0.000	4.950-01	2.110+00
140	58	CE	2	0.000	0.000	0.000	0.000
141	54	XE	2	0.000	0.000	2.000+00	0.000
141	55	CS	2	0.000	0.000	1.600+00	0.000
141	56	BA	2	0.000	0.000	9.300-01	3.010-01
141	57	LA	2	0.000	0.000	7.850-01	2.700-02
141	58	CE	2	0.000	0.000	1.630-01	9.700-02
141	59	PR	2	0.000	0.000	0.000	0.000
142	54	XE	2	0.000	0.000	1.700+00	0.000
142	55	CS	2	0.000	0.000	2.300+00	0.000
142	56	BA	2	0.000	0.000	7.500-01	6.240-01
142	57	LA	2	0.000	0.000	8.300-01	1.884+00
142	58	CE	2	0.000	0.000	0.000	0.000
142	59	PR	2	0.000	0.000	6.970-01	5.800-02
142	60	ND	2	0.000	0.000	0.000	0.000
143	54	XE	2	0.000	0.000	2.300+00	0.000
143	55	CS	2	0.000	0.000	1.900+00	0.000
143	56	BA	2	0.000	0.000	1.500+00	0.000
143	57	LA	2	0.000	0.000	1.100+00	2.420-01
143	58	CE	2	0.000	0.000	3.550-01	3.340-01
143	59	PR	2	0.000	0.000	3.110-01	0.000
143	60	ND	2	0.000	0.000	0.000	0.000
144	54	XE	2	0.000	0.000	1.900+00	0.000
144	55	CS	2	0.000	0.000	2.600+00	0.000
144	56	BA	2	0.000	0.000	1.100+00	0.000
144	57	LA	2	0.000	0.000	1.700+00	0.000
144	58	CE	2	0.000	0.000	8.700-02	2.900-02
144	59	PR	2	0.000	0.000	9.700-01	3.100-02
144	60	ND	2	0.000	0.000	0.000	0.000
145	58	CE	2	0.000	0.000	8.900-01	0.000
145	59	PR	2	0.000	0.000	6.000-01	1.600-02
145	60	ND	2	0.000	0.000	0.000	0.000
146	58	CE	2	0.000	0.000	2.300-01	3.270-01
146	59	PR	2	0.000	0.000	1.010+00	1.120+00
146	60	ND	2	0.000	0.000	0.000	0.000
147	58	CE	2	0.000	0.000	1.550+00	0.000
147	59	PR	2	0.000	0.000	7.130-01	7.570-01
147	60	ND	2	0.000	0.000	2.280-01	2.360-01
147	61	PM	2	5.220-01	0.000	7.400-02	0.000
147	62	SM	2	0.000	0.000	0.000	0.000
148	58	CE	2	0.000	0.000	5.000-01	5.000-01
148	59	PR	2	0.000	0.000	1.400+00	3.000-01
148	60	ND	2	0.000	0.000	0.000	0.000

TABLE I. (contd)

A	Z	ELT	ISO	ALPHA	BETA	BETA DECAY ENERGY, MEV	GAMMA DECAY ENERGY, MEV
148	61	PM*	1	0.000	1.000+00	6.140-01	6.230-01
148	61	PM	2	0.000	0.000	1.470-01	1.836+00
148	62	SM	2	0.000	0.000	0.000	0.000
149	60	ND	2	0.000	0.000	5.000-01	3.300-01
149	61	PM	2	0.000	0.000	3.500-01	8.000-03
149	62	SM	2	0.000	0.000	0.000	0.000
150	60	ND	2	0.000	0.000	0.000	0.000
150	62	SM	2	0.000	0.000	0.000	0.000
151	60	ND	2	0.000	0.000	6.400-01	9.100-01
151	61	PM	2	0.000	0.000	3.700-01	5.000-01
151	62	SM	2	0.000	0.000	2.500-02	0.000
151	63	EU	2	3.220-01	0.000	0.000	0.000
152	61	PM	2	0.000	0.000	7.330-01	1.300+00
152	62	SM	2	0.000	0.000	0.000	0.000
152	63	EU*	1	0.000	1.000+00	5.820-01	2.740-01
152	63	EU	2	0.000	0.000	2.610-01	1.007+00
152	64	GD	2	0.000	0.000	0.000	0.000
153	61	PM	2	0.000	0.000	5.500-01	1.500-01
153	62	SM	2	0.000	0.000	2.190-01	1.490-01
153	63	EU	2	0.000	0.000	0.000	0.000
154	61	PM	2	0.000	0.000	8.330-01	0.000
154	62	SM	2	0.000	0.000	0.000	0.000
154	63	EU	2	0.000	0.000	1.990-01	1.178+00
154	64	GD	2	0.000	0.000	0.000	0.000
155	62	SM	2	0.000	0.000	6.000-01	8.600-02
155	63	EU	2	0.000	0.000	5.600-02	8.700-02
155	64	GD	2	0.000	0.000	0.000	0.000
156	62	SM	2	0.000	0.000	3.000-01	1.050-01
156	63	EU	2	0.000	0.000	4.300-01	1.200+00
156	64	GD	2	0.000	0.000	0.000	0.000
157	63	EU	2	0.000	0.000	3.920-01	3.360-01
157	64	GD	2	0.000	0.000	0.000	0.000
158	63	EU	2	0.000	0.000	8.700-01	4.350-01
158	64	GD	2	0.000	0.000	0.000	0.000
159	63	EU	2	0.000	0.000	6.640-01	5.750-01
159	64	GD	2	0.000	0.000	3.000-01	6.000-02
159	65	TB	2	0.000	0.000	0.000	0.000
160	63	EU	2	0.000	0.000	1.200+00	0.000
160	64	GD	2	0.000	0.000	0.000	0.000
160	65	TB	2	0.000	0.000	2.020-01	9.500-01
160	66	DY	2	0.000	0.000	0.000	0.000
161	64	GD	2	0.000	0.000	5.000-01	3.510-01
161	65	TB	2	0.000	0.000	1.700-01	5.000-02
161	66	DY	2	0.000	0.000	0.000	0.000
162	64	GD	2	0.000	0.000	3.250-01	3.250-01
162	65	TB	2	0.000	0.000	6.250-01	6.250-01
162	66	DY	2	0.000	0.000	0.000	0.000
163	65	TB	2	0.000	0.000	8.150-01	2.250-01
163	66	DY	2	0.000	0.000	0.000	0.000

TABLE I. (contd)

A	Z	ELT	ISO	ALPHA	BETA	BETA DECAY ENERGY, MEV	GAMMA DECAY ENERGY, MEV
164	66	DY	2	7.140-01	0.000	0.000	0.000
165	66	DY*	1	0.000	3.000-02	7.000-03	1.180-01
165	66	DY	2	0.000	0.000	4.190-01	1.900-02
165	67	HO	2	0.000	0.000	0.000	0.000
166	66	DY	2	0.000	0.000	1.310-01	1.400-02
166	67	HO	2	0.000	0.000	5.960-01	7.700-02
166	68	ER	2	1.000-02	0.000	0.000	0.000
167	68	ER*	1	0.000	0.000	0.000	8.900-02
167	68	ER	2	0.000	0.000	0.000	0.000

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