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Updated Decay and Photon Libraries for the Origen Code

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UPDATED DECAY AND PHOTON LIBRARIES FOR THE ORIGEN CODE

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ABSTRACT

Previously existing decay and photon libraries for the ORIGEN computer code have been updated by utilizing a variety of sources. Information obtained from the Evaluated Nuclear Structure Data File (ENSDF) at ORNL was used to revise the half-lives, branching ratios, and recoverable heat values for 427 isotopes. Fifty-seven delayed-neutron precursors were included, based on information in ENDF/B-IV. The natural abundances and the Radionuclide Concentration Guide values were updated for all isotopes. The decay heat values predicted using the new decay library were found to compare favorably with those given in the proposed 1978 ANS Standard 5.1 (draft ANSI/ANS-5.1, *Proposed American National Standard Decay Heat Power in Light Water Reactors*). A new photon library was also generated for 427 isotopes, based principally on data presented in ENSDF. The photon library includes decay gamma and x-rays, conversion photons, (α,n) gamma rays, prompt and fission product gamma rays from spontaneous fission, and bremsstrahlung. Both of the revised libraries are listed.

1. INTRODUCTION AND SUMMARY

1.1 Introduction

1.1.1 Background

The ORIGEN[1] computer code is a versatile tool for calculating the buildup and depletion of isotopes in nuclear materials. This computer code was written in the late 1960s and early 1970s in the ORNL Chemical Technology Division, and at that time the required nuclear data libraries (half-lives, cross sections, fission product yields, etc.) and reactor models (PWR-U, PWR-Pu, LMFBR, HTGR, and MSBR) were developed. The code was principally intended for use in generating spent fuel and waste characteristics (composition, thermal power, etc.) that would form the basis for the study and design of fuel reprocessing plants, spent fuel

shipping casks, waste treatment and disposal facilities, and waste shipping casks. Since fuel cycle operations were being examined generically, and thus were expected to accommodate a wide range of fuel characteristics, it was only necessary that the ORIGEN results be somewhat representative of this range. The decay and photon data used by ORIGEN at this time were abstracted by manual means, principally from the Table of Isotopes.[2]

Soon after the ORIGEN computer code had been documented, it was made available to users outside of ORNL through the Radiation Shielding Information Center at ORNL. Because ORIGEN was relatively simple and had convenient and detailed output edits, many organizations acquired it. Some of these organizations began using ORIGEN for applications which were more complex than those for which it had originally been intended. These applications were generally much more specific than the early ORNL generic fuel cycle studies, and many were environmental impact studies that required relatively precise calculations of minor isotopes such as ^{3}H, ^{14}C, ^{232}U, and $^{242,244}Cm$. The initial responses to this were attempts to update specific aspects of ORIGEN and its data bases.[3,4] However, these attempts soon resulted in inconsistencies and a large number of different data bases.

In an effort to remedy these problems, a concerted program was initiated in 1975 in the ORNL Chemical Technology Division to update the ORIGEN computer code and its associated data bases and reactor models. This report is the second of several documents describing the various aspects of this program. The first report[5] described revised uranium-plutonium cycle LWR models for ORIGEN and was basically concerned with cross-section processing and reactor physics calculations. Other reports to be issued in the future will document a revised version of the ORIGEN computer code, additional updated cross-section/fission-product-yield libraries, and additional reactor models.

1.1.2 Scope

This report is concerned with the description and listing of two revised ORIGEN libraries containing data related to the decay of radioactive isotopes:

1. a "decay library" containing information such as half-lives, decay branching, recoverable heat, etc., and
2. a "photon library" containing the energies and intensities of photons (including bremsstrahlung) resulting from the decay of radioactive isotopes (but not from particle capture).

Although the data come from several sources, the largest portion was derived from the Evaluated Nuclear Structure Data File (ENSDF)[6,7] at ORNL. This file will be discussed further in Sect. 1.1.3.

The body of this report describes the contents of the new data libraries, the rules used to generate the data from ENSDF, and the sources of miscellaneous data used in the libraries. The description of the decay library is relatively straightforward since the generation of this information simply involves the compilation of data already in existence on ENSDF and/or available from other sources. The description of the generation of the photon library is somewhat more complex since (1) there are several photon sources, and (2) a considerable amount of calculation is required to determine the intensity and spectrum of the bremsstrahlung, which are included in this library.

1.1.3 Description of ENSDF

The ORNL Nuclear Data Project has been a recognized center for the systematic collection and evaluation of data from nuclear structure experiments since 1948.[7] The principal means of information output for the Project has been the "Nuclear Data Sheets."[8] The process of organizing nuclear data for publication in this periodical has led to the development of a structure for containing such data. In 1971, a formal structure was developed for entering nuclear structure data into computer files.[6] These files, from which the "Nuclear Data Sheets" are presently prepared, have formed the basis for updating portions of the ORIGEN decay and photon libraries.

ENSDF is built around the properties of nuclear energy levels in individual isotopes.[7] The information contained in ENSDF involves the properties (e.g., energy, spin, parity, half-life) of identified levels

as well as the transitions between these levels (e.g., decay modes and probabilities). The data in ENSDF are based on experimental results only and are not derived from calculations based on nuclear systematics. ENSDF also contains files with "adopted levels" which, in contrast to ref. 2, contain the recommended nuclear properties based on the Nuclear Data Project's evaluation of one or more experiments. These adopted data were used in updating the ORIGEN libraries.

One of the principal features of ENSDF is that it contains information relative to the energy levels of the isotope of interest. However, the decay-related data necessary for engineering purposes are based on the properties of the daughter products since the gamma rays, recoverable heat, etc., are characteristic of the energy levels of the daughter nucleus. Thus, generation of a complete set of decay-related information for ORIGEN requires that a mechanism be provided for accessing the data related to the energy levels of the daughter(s) of the isotope of interest. Computer codes have been developed by the Nuclear Data Project for this purpose,[9] and engineering-oriented information has been published for selected nuclides.[9,10]

1.2 Summary

The work described in this report consisted of gathering and processing a large amount of data needed to update the decay and photon libraries used by the ORIGEN computer code. The information included in the new decay library is as follows: (1) half-life; (2) the fraction of decay events (i.e., branching ratios) that proceed via beta decay, beta decay to an excited state, positron plus electron capture decay, positron plus electron capture decay to an excited state, alpha decay, spontaneous fission decay, internal transition decay, and (β,n) decay (from delayed-neutron precursors); (3) the average recoverable heat from each decay event; (4) the abundance of each naturally occurring isotope; and (5) the Radionuclide Concentration Guide (RCG) values (which specify the maximum permissible concentration of each nuclide) for all nuclides in air and water. The information in items 1 through 3 has been updated for 427 nuclides by using data from ENSDF. The remaining information was updated for all

1299 isotopes (stable and radioactive) considered in ORIGEN by utilizing several sources that will be described in Sect. 2. The revised ORIGEN decay library is listed in Appendix A.

Updating the photon library led to the creation of two subsidiary libraries (designated as master libraries), plus two sets of equations, each describing a different type of photon resulting from radioactive decay. The first master library includes the energy and intensity of decay gamma rays for the same 427 isotopes mentioned in the previous paragraph. The second master library contains the energy and intensity of the bremsstrahlung produced by all beta- and positron-emitters in the group of 427 isotopes. The bremsstrahlung was cast into an energy group structure with a maximum of 70 energy groups (depending on the maximum beta or positron energy), thus forming the library. A uranium dioxide matrix was assumed in the calculation of the bremsstrahlung, which is media-dependent. Finally, information was developed in equation form concerning the gamma rays produced by (α,n) reactions and spontaneous fission decay events by the actinides.

The photon library used by ORIGEN was generated by combining the information in the two master libraries plus that contained in the two sets of equations into a consolidated photon library with a fixed energy group structure. This library is listed in Appendix B.

As was noted previously, values for the decay-related properties for 427 radioactive isotopes were updated using ENSDF. Since the ORIGEN library contains approximately 1000 radioactive isotopes, it is evident that the update is only partially complete. However, the significance of this apparent incompleteness is markedly reduced by three additional considerations:

1. The 427 isotopes considered in this effort include nearly all of those considered to be important at decay times longer than a few days.

2. Many of the isotopes not included have such short half-lives (on the order of seconds or tens of seconds) that their properties can only be calculated based on nuclear structure systematics. While the results of these calculations may never be available from ENSDF,

they can be obtained from ENDF/B-IV[11] and have been previously incorporated into the updated libraries.[4]

3. This revision of the decay and photon libraries will be supplemented as additional information becomes available from ENSDF or elsewhere.

2. DESCRIPTION OF THE UPDATED ORIGEN DECAY LIBRARY

The ORIGEN decay library contains information that is independent of the nuclear system being considered. This library serves two principal functions in ORIGEN: (1) it specifies the entire list of nuclides that will be considered in the calculation in each of three segments (i.e., activation products, actinides, and fission products); and (2) it supplies system-independent parameters. The specific parameters contained in the decay library for each isotope are as follows:

1. half-life;
2. the probability of beta decay to an excited state;
3. the probability of (positron + electron capture) decay to an excited state;
4. the probability of (positron + electron capture) decay to a ground state;
5. the probability of alpha decay;
6. the probability of the internal transition decay of an excited state;
7. the average, recoverable energy per decay event;
8. the probability of spontaneous fission decay;
9. the probability of decay via emission of a beta particle and a neutron [i.e., (β,n) decay];
10. the natural abundance; and
11. the RCG values for both air and water.

Two changes have been made in the content of the updated decay library as compared with the original libraries.[1,3,4] The first change involved

elimination of the parameter specifying the fraction of the recoverable energy per decay event (item 7 above) that is emitted in the form of photons with an energy greater than 200 keV. This was desirable because (1) the parameter was redundant with information available in the photon spectrum table, (2) the definition of the parameter was somewhat arbitrary (i.e., the 200-keV cutoff), and (3) the parameter is difficult to generate. The second change made in the new decay library was the inclusion of the (β,n) decay mode. This decay mode, which results in the production of the delayed neutrons necessary for reactor control, occurs only in relatively short-lived fission products and yields a daughter having an atomic mass different from that of the parent [i.e., the (β,n) decay of ^{90}Br produces ^{89}Kr, not ^{90}Kr].

The first seven of the items in the list of parameters above were extracted from ENSDF[7] for those nuclides in the file. Decay information for those radioactive isotopes not in ENSDF was taken from ENDF/B-IV.[11] The processing of these items is described in Sect. 2.1. Items 8 through 11 were obtained from various sources, and the development of these parameters will be discussed in Sects. 2.2 through 2.5 respectively. A listing of the updated ORIGEN decay library is provided in Appendix A.

2.1 Half-Lives, Branching Ratios, and Recoverable Energy

Each half-life specified in the ORIGEN decay library is the total half-life, which gives the rate of disappearance of a radioactive isotope by all decay modes. The branching ratios specify the probability that a particular daughter isotope will be produced by each decay event of a parent isotope (i.e., that the parent will disappear via a particular decay mode). When combined within the ORIGEN computer code, these parameters determine the rate at which each daughter isotope is formed from its parent. The half-life and branching ratio information for the isotopes listed in Table 1 was abstracted from ENSDF and incorporated into the updated ORIGEN decay library. If the required information was not available from ENSDF, the next source to be consulted was the fission product decay data in ENDF/B-IV.[11] The incorporation of ENDF/B-IV data

Table 1. Radioactive isotopes for which decay data were taken from ENSDF

ELEMENT	ATOMIC MASS											
H	003											
HE	006											
LI	008											
BE	010											
C	014	015										
N	013	016										
NE	023											
NA	022	024	025									
MG	027	028										
AL	028	029	030									
SI	031											
CL	036	038	038M									
AR	037	041										
K	040	042	043									
CA	045	047										
SC	046	046M	047	048	050							
TI	051											
V	049	052	053									
CR	051	055										
MN	053	054	056	057	058							
CO	058	058M	060	060M	061	062						
NI	065	066										
CU	062	064	066	067								
ZN	065	069	069M	072	074							
GA	070	072	074	076								
GE	077											
AS	076	077	078	082	082M							
SE	075											
BR	080	080M	082	082M	083	084	085	088				
KR	083M	085	085M	087	088	089	090	092				
RB	086	088	089	090	090M	092	094					
SR	085	087M	089	090	091	092						
Y	089M	090	091	091M	092	093	094					
ZR	089	093	095	097	101							
NB	093M	094	094M	095	095M	096	097	097M	098	098M	099	099M
MO	093	093M	099	101								
TC	098	099	099M	100	101	102	102M	104				
RU	097	103	105	106	107							
RH	103M	104	104M	105	105M	106	106M	107	108	108M		
PD	103	109										
AG	108	108M	109M	110	110M	111	114	115	116	116M	118	118M
AG	120											
CD	107	109	115	115M								
IN	114	114M	115M	116	116M	118	118M	120	120M	122	122M	123
IN	130											
SN	113	117M	119M	123	123M	125	125M	126	127	130	132	
SB	122	124	124M	125	126	126M	127	128	128M	129	130	130M
SB	131	132	132M	134								
TE	121	121M	123	123M	125M	127	127M	129	129M	131	131M	132
TE	133	133M	134	135								
I	126	128	129	130	130M	131	132	133	133M	134	134M	135
I	136	136M	138									
XE	125M	127	127M	131M	133	133M	134M	135	135M	137	138	139

Table 1 (continued)

ELEMENT	ATOMIC MASS									
CS	132	134	134M	135	135M	136	137	138	138M	139
BA	131	133	133M	135M	137M	139	140	141	142	
LA	137	138	140	141	142					
CE	137	137M	139	139M	141	143	144	145	146	
PR	142	143	144	144M	145	148				
ND	147	149								
PM	145	147	148	148M	149	150				
SM	145	147	148	151	153					
EU	152	152M	154	155	156					
GD	152	153								
TB	157	160								
DY	157									
HO	166	166M								
ER	171									
TM	170	171								
YB	169	175								
LU	177									
HF	181									
TA	182									
W	181	187	188							
RE	188									
OS	191									
IR	192	194								
PT	195M									
AU	199									
HG	203									
TL	207	208	209							
PB	210	211	212	214						
BI	210	211	212	213	214					
PO	210	211	213	214	215	216	218			
AT	217									
RN	219	220	222							
FR	221	223								
RA	223	224	225	226						
AC	225	227	228							
TH	227	228	229	230	231	232	234			
PA	231	232	233	234	234M					
U	231	232	233	234	235	236	237	238	239	240
NP	235	236	236M	237	238	239	240	240M		
PU	236	238	239	240	241	242	243	244		
AM	239	240	241	242M	242	243				
CM	242	243	244	245	246	247	248	249		
BK	249	250								
CF	249	250	251	252	253					

TOTAL NUMBER OF NUCLIDES = 427

into the ORIGEN library was accomplished previously.[4] In the library described in this report, the contribution of ENDF/B-IV is generally limited to information concerning short-lived fission products that have not been observed experimentally. The half-life and branching ratio information for the radioactive isotopes not present in ENSDF or ENDF/B-IV is that developed for the original version of ORIGEN.[1] The principal source of these values was the Table of Isotopes.[2] In general, the half-lives and branching ratios are directly available from the sources cited here with little or no mathematical manipulation.

The recoverable energy per decay event (the "Q"-value) indicates the amount of heat that would be deposited in the radioactive material and in shielding material from each decay event. The Q-value being considered here has an "engineering" connotation and should not be confused with the "physics" Q-value that is generally given by sources such as the Table of Isotopes[2] and the "Chart of the Nuclides."[12] The difference between the two Q's is that the physics value defines the total decay energy (including the neutrinos released in beta decay), while the engineering value includes only the recoverable energy. Thus, the engineering Q-value is the appropriate one to use in calculating the decay heat of spent reactor fuels, for example. The engineering Q-value includes the energy of all photons (x-rays, gamma rays), the kinetic energy of all particles released during decay (beta particles, positrons, alpha particles, neutrons, fission fragments, conversion electrons, etc.), the mass energy of positrons, and the recoil energy of the resulting daughter nucleus. Only the energy of the neutrinos emitted during beta and positron decay is not included. Determination of the average beta and positron energy involves calculation of the (continuous) energy spectrum of the beta particles or positrons being emitted. This spectrum calculation, in turn, depends on the type of transition being considered (e.g., allowed, first-forbidden, etc.) and the isotope being considered. Relatively sophisticated calculations, which are described in Sect. 3.4, have been performed for the data taken from ENSDF. The methods used in calculating the beta spectra for the ENDF/B-IV isotopes are described in ref. 13. A computer code developed by Arnold[14] was

used in determining the average particle energies for the data taken from the Table of Isotopes. The contribution of spontaneous fission decay to the recoverable energy is assumed to be 200 MeV multiplied by the spontaneous fission branching ratio. The source of the recoverable energy data for each isotope was the same as that of its half-life and branching ratio data.

2.2 Spontaneous Fission Branching Ratios

The spontaneous fission branching ratios are necessary to determine the neutron emission rate of irradiated nuclear materials. The spontaneous fission branching ratios used in the updated ORIGEN decay library were taken from the evaluation of Reich.[15] The single exception to this is the branching ratio for ^{250}Cm, which was taken from ENSDF.[7]

2.3 (β,n) Decay Branching Ratios

The most important aspect of the nuclides that decay via the (β,n) mechanism is that they are the source of the delayed neutrons which are necessary for the control of nuclear reactors (i.e., they are the delayed-neutron precursors). However, even though the neutronic analysis in ORIGEN is not sophisticated enough to account for this effect, the nuclides that decay via the (β,n) mechanism are important for another reason. In general, the decay of the fission product isotopes proceeds from the short-lived isotopes to the stable isotopes with no change in atomic mass because virtually all of the isotopes decay via beta emission or internal transition from an excited state to a ground state. In contrast, (β,n) decay results in a change in the atomic mass of the fission product decay chain because of the emission of a neutron. For example, approximately 12% of all ^{90}Br and ^{90}Kr decays proceed via the (β,n) mechanism. Since the fission yield of these two isotopes accounts for 80% of the production of ^{90}Sr, it is evident that diverting 12% of the potential ^{90}Sr into the atomic mass 89 decay chain could be significant in some cases, even when the diversion of material from the atomic mass 91 chain to the atomic mass 90 chain (∿25% of that diverted from the atomic mass 90 chain) is accounted for.

The (β,n) branching ratios for 57 isotopes have been included in the updated ORIGEN decay library. These branching ratios were taken from ENDF/B-IV as listed in ref. 13.

2.4 Natural Isotopic Abundances

The abundances of the naturally occurring isotopes are used in ORIGEN to simplify the specification of the amounts of naturally occurring, unenriched materials by allowing the total amount of an element to be input instead of the amount of each isotope. The natural isotopic abundance data for 287 isotopes used in the updated ORIGEN decay library are based on the recent evaluation of Holden.[16]

2.5 Radionuclide Concentration Guide Values

The RCG values, as defined and specified in Part 10, Title 20 of the Code of Federal Regulations[17] (10 CFR 20), specify the maximum permissible concentration of a large number of isotopes in soluble and insoluble forms, for both inhalation and ingestion, and for occupational and unrestricted exposure. Typical units of a RCG value are curies per cubic meter (Ci/m^3). When the number of curies of a given isotope are divided by the RCG value for that isotope, the result is the volume of air or water (depending on the type of RCG value used) which would be required to dilute that isotope to its RCG value. This dilution volume is a measure of the toxicity of that isotope. An indication of the toxicity of the mixture can be obtained by performing this calculation for all of the isotopes in a mixture and summing the volumes. It should be noted that this measure of toxicity is only valid in the case where the mixture is directly ingested or inhaled, an extremely unlikely circumstance. Nevertheless, calculational simplicity makes it very useful in many instances where only approximate answers are required.

The RCG values used in ORIGEN are for unrestricted exposure. The smallest (i.e., most toxic) of the soluble or insoluble RCG values for an isotope is used in each case. The RCGs for both inhalation (air)

and ingestion (water) are included in the updated ORIGEN decay library. The source of the RCG data used in this library was 10 CFR 20.[17] If values were explicitly listed for a given isotope, they were used. In all other cases, the default prescription given in 10 CFR 20 for calculating the RCG values was used.

2.6 Comparison of ORIGEN Decay Heat Predictions with the Decay Heat Values Given by ANS Standard 5.1

The recently revised ANS-5.1 decay heat standard[18] specifies, among other things, decay heat values for decay times ranging from 1.0 to 10^9 sec that result from the irradiation of ^{235}U in a thermal-neutron spectrum for 10^{13} sec at a very low flux level (to eliminate the effects of neutron captures). The standard is based on statistical analysis of experimental results at decay times shorter than about 10^5 sec and on CINDER[19] calculations using an ENDF/B-IV data base[11,13] at decay times between 10^5 and 10^9 sec. A similar calculation has been performed with a revised version of the ORIGEN[1] computer code using the values in the decay library described herein and thermal fission product yields from ENDF/B-IV.[11] The differences between the two sets of decay heat values are plotted in Fig. 1.

The curve labeled "ORIGEN" shows the difference between the ANS Standard 5.1 and the ORIGEN calculation using the decay data as it is given in Appendix A. The curve labeled "ORIGEN LESS Tc-99" uses the data given in Appendix A except that ^{99}Tc is assumed to be stable. The assumption that ^{99}Tc is stable is necessary for a valid comparison since it formed the basis of the data[13] used in calculating the decay heat values given by ANS Standard 5.1.

As is evident by inspection, the agreement between ORIGEN less ^{99}Tc and the ANS Standard 5.1 is excellent for decay times longer than about 50 sec, with the deviation generally falling in the ±1% range. The exception to this is found at times between 10^6 and 5×10^7 sec, where the deviation approaches -2.0%. The increased deviation in this time range is attributable to different values in the two data bases for the average energy of the beta particles emitted during the decay of ^{144}Pr.

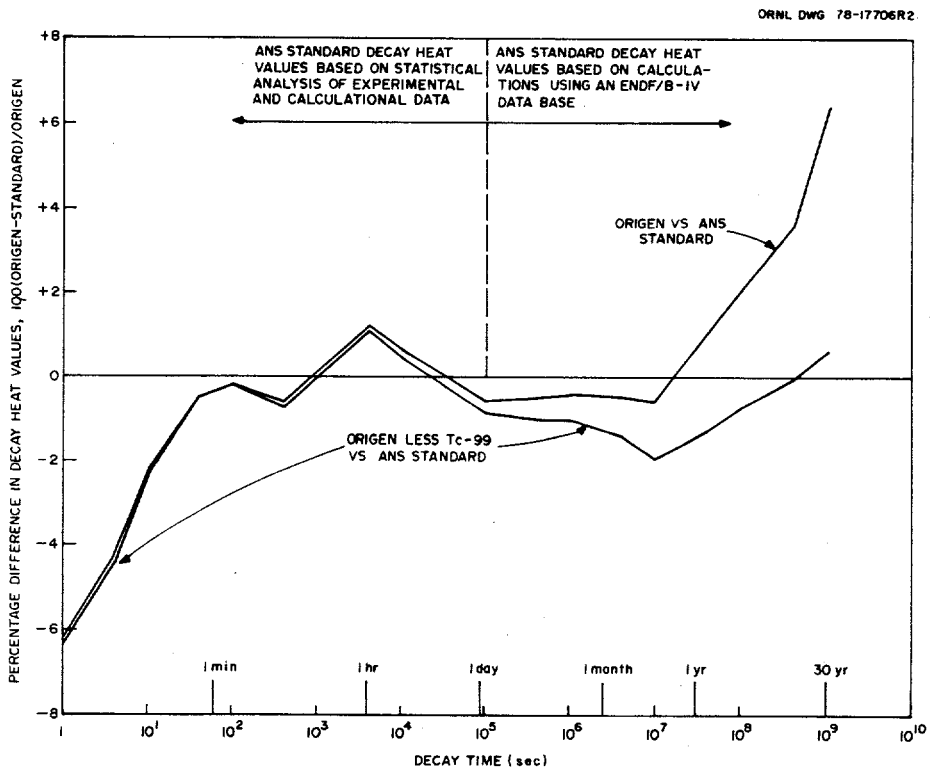

Fig. 1. Differences between ORIGEN and ANS Standard 5.1 decay heat values for 10^{13}-sec irradiation of ^{235}U.

3. DESCRIPTION OF THE UPDATED PHOTON LIBRARY

The ORIGEN photon library contains information concerning the energies and intensities of photons emitted as a result of the decay of radioactive isotopes. Five photon sources were considered in the updated photon library:

1. x-rays and gamma rays from radioactive decay,
2. gamma rays from (α,n) reactions,
3. prompt fission gamma rays from spontaneous fission,
4. gamma rays from the fission products produced during spontaneous fission, and
5. bremsstrahlung.

These sources are maintained separately, either in a "master" library in a format compatible with their inherent nature or in the form of equations. An ORIGEN-readable photon library is created by accessing all of the master photon libraries and equations and casting them into a fixed energy group structure in the three-part library (activation products, actinides, and fission products) that is typical of ORIGEN. The updated, ORIGEN-readable photon library is listed in Appendix B.

The photon library is used by ORIGEN to calculate the photon spectrum emanating from a mixture of isotopes as a function of decay time. This spectrum is then used as input to computer codes that calculate shielding thicknesses, such as ANISN.[20] Thus, it is desirable that the photon energy group structure used in ORIGEN be compatible with the cross-section energy group structure used in the shielding codes. This has been accomplished by requiring that the energy group structure used in the ORIGEN photon library have integral boundaries with a standard ORNL 21-energy-group structure as used in the AMPX[21] system. The resulting photon group structure, which is given in Table 2, has the same number of groups as the old ORIGEN[1] photon library, although the boundaries have been changed. The correspondence between the standard 21-energy-group structure in AMPX and the new ORIGEN structure is given in Table 2.

Table 2. ORIGEN photon-energy-group structures

Energy group boundaries (MeV)						Energy group number	
Lower		Upper		Average			
Actinides	Activation and fission products	Actinides	Activation and fission products	Actinides	Activation and fission products	Actinides (ANISN)[a]	Activation and fission products (ANISN)[a]
0.000[b]	-	0.020	-	0.015	-	1 (21)	-
0.020	-	0.030	-	0.025	-	2 (20)	-
0.030	-	0.045	-	0.0375	-	3 (19)	-
0.045	-	0.070	-	0.0575	-	4 (18)	-
0.070	-	0.100	-	0.085	-	5 (17)	-
0.100	-	0.150	-	0.125	-	6 (16)	-
0.150	0.000[b]	0.300	0.300	0.225	0.150	7 (15)	1 (15-21)
0.300	0.300	0.450	0.450	0.375	0.375	8 (14)	2 (14)
0.450	0.450	0.700	0.700	0.575	0.575	9 (13)	3 (13)
0.700	0.700	1.000	1.000	0.850	0.850	10 (12)	4 (12)
1.000	1.000	1.500	1.500	1.250	1.250	11 (11)	5 (11)
1.500	1.500	2.000	2.000	1.750	1.750	12 (10)	6 (10)
2.000	2.000	2.500	2.500	2.250	2.250	13 (9)	7 (9)
2.500	2.500	3.000	3.000	2.750	2.750	14 (8)	8 (8)
3.000	3.000	4.000	4.000	3.500	3.500	15 (7)	9 (7)
4.000	4.000	6.000	6.000	5.000	5.000	16 (5, 6)	10 (5, 6)
6.000	6.000	8.000	8.000	7.000	7.000	17 (3, 4)	11 (3, 4)
8.000	8.000	14.000	14.000	11.000	11.000	18 (1, 2)	12 (1, 2)

[a]A standard 21-energy-group structure for use in the ANISN shielding code as defined in ref. 2.

[b]0.01 MeV in ref. 2.

The structure, sources, and calculational procedures used to generate the updated photon library will be described in more detail in the remainder of Sect. 3.

3.1 X-Rays and Gamma Rays from Radioactive Decay

The photons that fall under this category include the x-rays and gamma rays that result from beta, positron, electron capture, alpha, or internal transition decays. Such emissions are characterized by having fixed energies and intensities that depend only on the isotope involved. These data are maintained in a master library format in which each x- and gamma-ray energy and intensity are specified separately and in which each isotope appears only once (i.e., the activation product--actinide--fission product distinction is not present). All of the x- and gamma-ray data in the updated photon library were taken from ENSDF;[7] Table 1 lists the nuclides included, with the exception of those that do not have decay photons.

The master x- and gamma-ray library contains the photon energy and intensity data exactly as they appear in ENSDF. However, when the individual photons are incorporated into the ORIGEN-readable photon library with a fixed energy group structure, as in Appendix B, the intensities of the photons are adjusted to conserve energy. This is because all photons in a given energy group are assumed to have the average group energy, thus requiring a change in the intensity if the photon energy release rate is to be conserved. The equation used to make this adjustment is as follows:

$$I = I_a(E_a/E), \tag{1}$$

where

I = group photon intensity to be used in the ORIGEN-readable library, photons/dis;

I_a = actual group photon intensity taken from ENSDF and present in the master library, photons/dis;

E_a = actual photon energy taken from ENSDF and present in the master library, MeV;

E = average energy of the ORIGEN-readable library energy group as given in Table 2, MeV.

3.2 Gamma Rays from (α,n) Reactions

The interaction of alpha particles with matter results in occasional events wherein the alpha particle is captured by some isotope and ejects a neutron along with prompt gamma rays. For engineering purposes, the most important isotope undergoing these (α,n) reactions is ^{18}O, which comprises 20.4 at. % of natural oxygen. The photons resulting from (α,n) reactions have not been studied to any great extent for most isotopes, with the exception of ^{238}Pu. The (α,n) photon spectrum and production rate used in generating the ORIGEN-readable photon library were based on fitting data for the $^{238}PuO_2$ system,[22,23] as given by the following equation:

$$N(E) = 2.13 \times 10^{-8} \left(e^{-1.38E}\right), \qquad (2)$$

where

N(E) = number of photons at energy E, photons dis^{-1} MeV^{-1};

E = photon energy, MeV.

This equation was assumed to be valid for predicting the (α,n) photons produced by all alpha-emitting isotopes. For each alpha-emitter in the decay library, the (α,n) photon intensity is calculated for each of the energy groups listed in Table 2, multiplied by the alpha branching ratio, and incorporated directly into the ORIGEN-readable library at the time it is being generated.

3.3 Gamma Rays from Spontaneous Fission

The spontaneous fission of an isotope such as ^{252}Cf results in the production of prompt gamma rays in the same way as the neutron-induced fission of ^{235}U. Spontaneous fission also results in the production of fission products, and thus fission product gamma rays, as does neutron-induced fission. Based on information given by Blizard,[24] the intensity of the fission product gamma rays at equilibrium is about 0.75 of that from the prompt fission gammas for ^{235}U; their energy spectrum is very similar to that of ^{235}U. Data given by Peele and Maienschein[25] constitute an updated spectrum and intensity for the prompt fission gamma rays emitted by ^{235}U. If it is assumed that the prompt and fission-product decay gamma rays from spontaneous fission are the same as those for ^{235}U, combining the 0.75 factor with Peele's data gives the following equations for predicting the intensity and spectrum of all the spontaneous fission gamma rays:

$$N(E) = 11.5 \qquad 0.1 \leq E \leq 0.6 \text{ MeV}, \tag{3a}$$

$$= 35.4\ (e^{-1.78E}) \qquad 0.6 \leq E < 1.5 \text{ MeV}, \tag{3b}$$

$$= 12.6\ (e^{-1.09E}) \qquad 1.5 \leq E \leq 10.5 \text{ MeV}, \tag{3c}$$

$$= 0 \qquad E < 0.1;\ E > 10.5, \tag{3d}$$

where

$N(E)$ = number of photons at energy E, photons fission^{-1} MeV^{-1};

E = photon energy, MeV.

The spontaneous fission gamma-ray photon intensity is calculated for each of the energy groups listed in Table 2 as well as for each isotope decaying via spontaneous fission in the decay library, multiplied by the spontaneous fission branching ratio, and incorporated directly into the ORIGEN-readable photon library at the time it is being generated.

3.4 Bremsstrahlung

For engineering purposes, bremsstrahlung can be defined as a continuous photon spectrum resulting from the interaction (i.e., deceleration) of beta particles and positrons with the coulomb fields of nuclei. Bremsstrahlung is different from the photons considered in Sects. 3.2 and 3.3 in that its energy spectrum is always continuous whereas the other photons are actually line spectra, modeled as being continuous in some cases. Bremsstrahlung is negligible in many cases because of the generally low intensity and energy of the radiation. However, in cases where nuclides with high-energy beta particles are present or in cases where other, high-energy, high-intensity gamma-ray emitters are absent, bremsstrahlung can contribute significantly to the penetrating radiation dose.

The first step in calculating the bremsstrahlung production rate was to generate a "beta" library containing the end-point (i.e., maximum) energy, intensity, and type of transition (e.g., allowed, first-forbidden, etc.) for all nuclides decaying via beta or positron emission. The beta library was generated using information in ENSDF[7] for those nuclides listed in Table 1.

The second step was to calculate the intensity and (continuous) energy spectrum of the beta particles and positrons. This was accomplished by using a computer program written by Gove and Martin,[26] with the previously described beta library as the input.

The third step was to calculate the intensity and (continuous) energy spectrum of the bremsstrahlung resulting from the deceleration of the beta particles and positrons. This was accomplished by using a computer program developed by Dillman et al.,[27] with the beta particle and positron spectra described above as the input. The formulas used in their computer program were taken from refs. 28-30. At this point, the calculation becomes media-dependent since the intensity of the bremsstrahlung is approximately proportional to the square of the atomic number.[31] The medium chosen for the photon library in Appendix B was uranium dioxide. Changing the surrounding medium to water reduced the

bremsstrahlung intensity by about a factor of 10. The results of the bremsstrahlung calculation were cast into a fine energy group structure in which the energy range between 0 and 13.5 MeV was divided (nonuniformly) into 70 intervals. Bremsstrahlung libraries for both uranium dioxide and water media are stored in this format, and either can be incorporated into the ORIGEN-readable library at the time the decay gamma photon library is collapsed into the group structure given in Table 2. The intensities of the bremsstrahlung are adjusted to conserve energy using Eq. (1).

3.5 Generation of the ORIGEN-Readable Photon Library

Given the existence of the information described in Sects. 3.1-3.4, the generation of the ORIGEN-readable photon library listed in Appendix B is straightforward. The master decay gamma-ray and bremsstrahlung libraries are accessed; each pair of energy/intensity data is adjusted according to Eq. (1) and the energy group structure in Table 2, and then the (α,n) and spontaneous fission gamma-ray intensities are calculated in the correct energy group structure using Eqs. (2) and (3) and added to the decay gamma rays and bremsstrahlung. The only other significant information required as input is the list of nuclides in each of the three library segments (i.e., activation products, actinides, and fission products). Since this procedure requires about 40 sec on an IBM 360/91 computer, the ORIGEN-readable library is easily recast into a different group structure or regenerated using a different list of isotopes.

4. FUTURE ACTIVITIES

The decay and photon libraries described in the previous sections updated the following information:

1. the spontaneous fission branching ratio, the (β,n) branching ratio, and the RCG values for all radioactive isotopes;
2. the natural abundance of all naturally occurring (usually non-radioactive) isotopes; and

3. the half-life, the recoverable energy per decay event, and the branching ratios for beta decay to an excited state, (positron + electron capture) decay, (positron + electron capture) decay to an excited state, alpha decay, and internal transition decay for the list of isotopes given in Table 1.

Thus, what remains to be accomplished in the future is an update of the information listed in item 3 above for the radioactive isotopes contained in the ORIGEN libraries but not included in Table 1. These 605 nuclides are listed in Table 3. The decay and photon information for these isotopes will be revised and documented as data become available from ENSDF. However, it should be noted that many of these isotopes have never been observed experimentally and their decay-related properties, which were taken from ENDF/B-IV,[11] are derived from calculations based on nuclear systematics. This effectively means that these isotopes may never appear in ENSDF and that decay and photon information for them will not be revised unless new calculations are performed.

Table 3. Radioactive isotopes for which decay data were not taken from ENSDF

ELEMENT	ATOMIC MASS											
H	004											
BE	008	011										
B	012											
O	019											
F	020											
NA	024M											
SI	032											
P	032	033	034									
S	035	037										
AR	039	042										
K	044											
CA	041	049										
SC	049											
V	050	054										
FE	055	059										
CO	072	073	074	075								
NI	059	063	072	073	074	075	076	077	078			
CU	072	073	074	075	076	077	078	079	080	081		
ZN	063	071	071M	073	075	076	077	078	079	080	081	082
ZN	083											
GA	072M	073	075	077	078	079	080	081	082	083	084	085
GE	071	071M	073M	075	075M	077M	078	079	080	081	082	083
GE	084	085	086	087	088							
AS	079	080	081	083	084	085	086	087	088	089	090	
SE	077M	079	079M	081	081M	083	083M	084	085	085M	086	087
SE	088	089	090	091	092	093						
BR	079M	084M	086	086M	087	089	090	091	092	093	094	095
BR	096											
KR	079	079M	081	081M	091	093	094	095	096	097	098	
RB	086M	087	091	093	095	096	097	098	099	100	101	
SR	085M	093	094	095	096	097	098	099	100	101	102	103
SR	104											
Y	090M	095	096	097	098	099	100	101	102	103	104	105
Y	106	107										
ZR	090M	098	099	100	102	103	104	105	106	107	108	109
NB	092	100	100M	101	102	103	104	105	106	107	108	109
NB	110	111	112									
MO	102	103	104	105	106	107	108	109	110	111	112	113
MO	114	115										
TC	097	097M	103	105	106	107	108	109	110	111	112	113
TC	114	115	116	117	118							
RU	108	109	110	111	112	113	114	115	116	117	118	119
RU	120											
RH	109	109M	110	110M	111	112	113	114	115	116	117	118
RH	119	120	121	122	123							
PD	107	107M	109M	111	111M	112	113	114	115	116	117	118
PD	119	120	121	122	123	124	125	126				
AG	111M	112	113	113M	115M	117	117M	119	121	122	123	124
AG	125	126	127	128								
CD	111M	113M	117	117M	118	119	119M	120	121	122	123	124
CD	125	126	127	128	129	130	131	132				
IN	113M	115	117	117M	119	119M	121	121M	123M	124	125	125M
IN	126	127	127M	128	129	131	132	133	134			

Table 3 (continued)

ELEMENT	ATOMIC MASS											
SN	113M	121	121M	127M	128	129	129M	131	133	134	135	136
SB	122M	133	134M	135	136	137	138	139				
TE	136	137	138	139	140	141	142					
I	125	137	139	140	141	142	143	144	145			
XE	125	129M	140	141	142	143	144	145	146	147		
CS	131	140	141	142	143	144	145	146	147	148	149	150
BA	131M	136M	143	144	145	146	147	148	149	150	151	152
LA	143	144	145	146	147	148	149	150	151	152	153	154
LA	155											
CE	142	147	148	149	150	151	152	153	154	155	156	157
PR	142M	146	147	149	150	151	152	153	154	155	156	157
PR	158	159										
ND	144	151	152	153	154	155	156	157	158	159	160	161
PM	151	152	152M	153	154	154M	155	156	157	158	159	160
PM	161	162										
SM	146	149	155	156	157	158	159	160	161	162	163	164
SM	165											
EU	157	158	159	160	161	162	163	164	165			
GD	155M	159	161	162	163	164	165					
TB	161	162	162M	163	163M	164	165					
DY	159	165	165M	166								
HO	163											
ER	163	165	167M	169	172							
TM	170M	172	173									
YB	175M	177										
LU	176	176M	177M									
HF	175	178M	179M	180M	182							
TA	180	182M	183									
W	183M	185	185M	189								
RE	186	187	188M	189								
OS	185	190M	191M	193	194							
IR	192M	194M										
PT	190	191	193	193M	197	197M	199	199M				
AU	198	200										
HG	197	197M	199M	205								
TL	204	206										
PB	204	205	209									
BI	208	210M										
PO	211M	212										
RN	218											
RA	222	228										
TH	226	233										
PA	235											
U	230	241										
NP	241											
PU	237	245	246									
AM	244M	244	245	246								
CM	241	250	251									
BK	251											
CF	254	255										
ES	253	254	254M	255								

TOTAL NUMBER OF NUCLIDES = 605

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APPENDIX A: LISTING OF THE UPDATED ORIGEN DECAY LIBRARY

The updated ORIGEN master decay library discussed in Sect. 2 is listed in Table A.1. Table A.2 defines the variable names used in Table A.1.

Table A.1. Updated ORIGEN master decay library

NO.	ISOTOPE		IU	HALF-LIFE	FB1	FPEC	FPEC1	FAL	FIT	FSF	FBN	Q	ABUND	AFCG	WFCG
1	H	1	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.00E 02	1.0E 00	1.0E 00
2	H	2	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.50E-02	1.0E 00	1.0E 00
3	H	3	1	3.897E 08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.680E-03	0.0	1.0E-10	3.0E-06
4	H	4	1	1.000E-03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0E-08	1.0E 00
5	HE	3	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.30E-04	1.0E 00	1.0E 00
6	HE	4	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.00E 02	1.0E 00	1.0E 00
7	HE	6	1	8.081E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.568E 00	0.0	3.0E-08	1.0E 00
8	LI	6	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.50E 00	1.0E 00	1.0E 00
9	LI	7	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.25E 01	1.0E 00	1.0E 00
10	LI	8	1	8.420E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.290E 00	0.0	3.0E-08	1.0E 00
11	BE	8	1	2.000E-16	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	9.500E-02	0.0	2.0E-14	3.0E-08
12	BE	9	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.00E 02	1.0E 00	1.0E 00
13	BE	10	1	5.049E 13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.025E-01	0.0	1.0E-10	3.0E-06
14	BE	11	1	1.360E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.151E 01	0.0	3.0E-08	1.0E 00
15	B	10	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.00E 01	1.0E 00	1.0E 00
16	B	11	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.00E 01	1.0E 00	1.0E 00
17	B	12	1	2.030E-02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.337E 01	0.0	3.0E-08	1.0E 00
18	C	12	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.89E 01	1.0E 00	1.0E 00
19	C	13	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.11E 00	1.0E 00	1.0E 00
20	C	14	1	1.808E 11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.947E-02	0.0	1.0E-10	3.0E-06
21	C	15	1	2.449E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.871E 00	0.0	3.0E-08	1.0E 00
22	N	13	1	5.982E 02	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	1.511E 00	0.0	3.0E-08	1.0E 00
23	N	14	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.96E 01	1.0E 00	1.0E 00
24	N	15	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.66E-01	1.0E 00	1.0E 00
25	N	16	1	7.120E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.311E 00	0.0	3.0E-08	1.0E 00
26	O	16	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.98E 01	1.0E 00	1.0E 00
27	O	17	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.80E-02	1.0E 00	1.0E 00
28	O	18	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.04E-01	1.0E 00	1.0E 00
29	O	19	1	2.900E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.819E 00	0.0	3.0E-08	1.0E 00
30	F	19	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.00E 02	1.0E 00	1.0E 00
31	F	20	1	1.140E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.030E 00	0.0	3.0E-08	1.0E 00
32	NE	20	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.05E 01	1.0E 00	1.0E 00
33	NE	21	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.70E-01	1.0E 00	1.0E 00
34	NE	22	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.22E 00	1.0E 00	1.0E 00
35	NE	23	1	3.724E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.068E 00	0.0	3.0E-08	1.0E 00
36	NA	22	1	8.211E 07	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	2.387E 00	0.0	1.0E-10	3.0E-06
37	NA	23	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.00E 02	1.0E 00	1.0E 00
38	NA	24	1	5.400E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.675E 00	0.0	1.0E-10	3.0E-06
39	NA	24M	1	1.990E-02	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	4.720E-01	0.0	3.0E-08	1.0E 00
40	NA	25	1	5.960E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.936E 00	0.0	3.0E-08	1.0E 00
41	MG	24	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.90E 01	1.0E 00	1.0E 00
42	MG	25	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.00E 01	1.0E 00	1.0E 00
43	MG	26	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.10E 01	1.0E 00	1.0E 00
44	MG	27	1	5.677E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.593E 00	0.0	3.0E-08	1.0E 00
45	MG	28	1	7.528E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.533E 00	0.0	1.0E-10	3.0E-06
46	AI	27	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.00E 02	1.0E 00	1.0E 00
47	AL	28	1	1.344E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.026E 00	0.0	3.0E-08	1.0E 00
48	AL	29	1	3.912E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.351E 00	0.0	3.0E-08	1.0E 00
49	AL	30	1	3.685E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.723E 00	0.0	3.0E-08	1.0E 00
50	SI	28	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.22E 01	1.0E 00	1.0E 00

Table A.1 (continued)

NO.	ISOTOPE	IU	HALF-LIFE	FB1	FPEC	FPEC1	FAL	FIT	FSF	FBN	Q	ABUND	ARCG	WRCG
51	SI 29	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.67E 00	1.0E 00	1.0E 00
52	SI 30	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.10E 00	1.0E 00	1.0E 00
53	SI 31	1	9.438E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.965E-01	0.0	1.0E-10	3.0E-06
54	SI 32	5	6.500E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.100E-01	0.0	1.0E-10	3.0E-06
55	P 31	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.00E 02	1.0E 00	1.0E 00
56	P 32	4	1.430E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.710E 00	0.0	1.0E-10	3.0E-06
57	P 33	4	2.500E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.480E-01	0.0	1.0E-10	3.0E-06
58	P 34	1	1.240E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.100E 00	0.0	3.0E-08	1.0E 00
59	S 32	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.50E 01	1.0E 00	1.0E 00
60	S 33	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.50E-01	1.0E 00	1.0E 00
61	S 34	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.21E 00	1.0E 00	1.0E 00
62	S 35	4	8.800E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.674E-01	0.0	1.0E-10	3.0E-06
63	S 36	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.70E-02	1.0E 00	1.0E 00
64	S 37	2	5.060E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.800E 00	0.0	3.0E-08	1.0E 00
65	CL 35	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.58E 01	1.0E 00	1.0E 00
66	CL 36	1	9.499E 12	0.0	1.900E-02	0.0	0.0	0.0	0.0	0.0	2.467E-01	0.0	1.0E-10	3.0E-06
67	CL 37	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.42E 01	1.0E 00	1.0E 00
68	CL 38	1	2.233E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.016E 00	0.0	3.0E-08	1.0E 00
69	CL 38M	1	7.160E-01	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	6.713E-01	0.0	3.0E-08	1.0E 00
70	AR 36	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.37E-01	1.0E 00	1.0E 00
71	AR 37	1	3.026E 06	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	2.168E-03	0.0	1.0E-10	3.0E-06
72	AR 38	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.30E-02	1.0E 00	1.0E 00
73	AR 39	5	2.690E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.650E-01	0.0	1.0E-10	3.0E-06
74	AR 40	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.96E 01	1.0E 00	1.0E 00
75	AR 41	1	6.577E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.748E 00	0.0	3.0E-08	1.0E 00
76	AR 42	5	3.300E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.000E-01	0.0	1.0E-10	3.0E-06
77	K 39	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.33E 01	1.0E 00	1.0E 00
78	K 40	1	4.039E 16	0.0	1.070E-01	0.0	0.0	0.0	0.0	0.0	6.816E-01	1.20E-02	1.0E-10	3.0E-06
79	K 41	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.73E 00	1.0E 00	1.0E 00
80	K 42	1	4.450E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.706E 00	0.0	1.0E-10	3.0E-06
81	K 43	1	8.136E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.279E 00	0.0	1.0E-10	3.0E-06
82	K 44	2	2.200E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.200E 00	0.0	3.0E-08	1.0E 00
83	CA 40	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.69E 01	1.0E 00	1.0E 00
84	CA 41	7	8.100E 01	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	4.270E-01	0.0	1.0E-10	3.0E-06
85	CA 42	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.46E-01	1.0E 00	1.0E 00
86	CA 43	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.30E-01	1.0E 00	1.0E 00
87	CA 44	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.09E 00	1.0E 00	1.0E 00
88	CA 45	1	1.408E 07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.720E-02	0.0	1.0E-10	3.0E-06
89	CA 46	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.50E-03	1.0E 00	1.0E 00
90	CA 47	1	3.919E 05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.408E 00	0.0	1.0E-10	3.0E-06
91	CA 48	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.90E-01	1.0E 00	1.0E 00
92	CA 49	2	8.800E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.260E 00	0.0	3.0E-08	1.0E 00
93	SC 45	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.00E 02	1.0E 00	1.0E 00
94	SC 46	1	7.240E 06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.122E 00	0.0	1.0E-10	3.0E-06
95	SC 46M	1	1.867E 01	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	1.372E-01	0.0	3.0E-08	1.0E 00
96	SC 47	1	2.895E 05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.708E-01	0.0	1.0E-10	3.0E-06
97	SC 48	1	1.577E 05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.568E 00	0.0	1.0E-10	3.0E-06
98	SC 49	2	5.750E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.008E 00	0.0	3.0E-08	1.0E 00
99	SC 50	1	1.025E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.827E 00	0.0	3.0E-08	1.0E 00
100	TI 46	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.25E 00	1.0E 00	1.0E 00
101	TI 47	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.45E 00	1.0E 00	1.0E 00

Table A.1 (continued)

NO.	ISOTOPE	IU	HALF-LIFE	FB1	FPEC	FPEC1	FAL	FIT	FSF	FBN	Q	ABUND	AFCG	WRCG
102	TI 48	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.37E 01	1.0E 00	1.0E 00
103	TI 49	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.40E 00	1.0E 00	1.0E 00
104	TI 50	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.20E 00	1.0E 00	1.0E 00
105	TI 51	1	3.456E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.235E 00	0.0	3.0E-08	1.0E 00
106	V 49	1	2.351E 07	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	4.298E-03	0.0	1.0E-10	3.0E-06
107	V 50	5	4.000E 16	0.0	7.000E-01	0.0	0.0	0.0	0.0	0.0	1.860E 00	2.50E-01	1.0E-10	3.0E-06
108	V 51	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.98E 01	1.0E 00	1.0E 00
109	V 52	1	2.250E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.514E 00	0.0	3.0E-08	1.0E 00
110	V 53	1	9.660E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.037E 00	0.0	3.0E-08	1.0E 00
111	V 54	1	5.500E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.300E 00	0.0	3.0E-08	1.0E 00
112	CR 50	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.35E 00	1.0E 00	1.0E 00
113	CR 51	1	2.394E 06	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	3.610E-02	0.0	1.0E-10	3.0E-06
114	CR 52	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.38E 01	1.0E 00	1.0E 00
115	CR 53	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.50E 00	1.0E 00	1.0E 00
116	CR 54	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.36E 00	1.0E 00	1.0E 00
117	CR 55	1	2.130E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.101E 00	0.0	3.0E-08	1.0E 00
118	MN 53	1	1.168E 14	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	5.196E-03	0.0	1.0E-10	3.0E-06
119	MN 54	1	2.700E 07	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	8.400E-01	0.0	1.0E-10	3.0E-06
120	MN 55	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.00E 02	1.0E 00	1.0E 00
121	MN 56	1	9.283E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.521E 00	0.0	1.0E-10	3.0E-06
122	MN 57	1	9.660E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.171E 00	0.0	3.0E-08	1.0E 00
123	MN 58	1	6.530E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.995E 00	0.0	3.0E-08	1.0E 00
124	FE 54	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.81E 00	1.0E 00	1.0E 00
125	FE 55	5	2.600E 00	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	2.320E-01	0.0	1.0E-10	3.0E-06
126	FE 56	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.18E 01	1.0E 00	1.0E 00
127	FE 57	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.15E 00	1.0E 00	1.0E 00
128	FE 58	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.90E-01	1.0E 00	1.0E 00
129	FE 59	4	4.500E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.573E 00	0.0	1.0E-10	3.0E-06
130	CO 58	1	6.115E 06	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	1.010E 00	0.0	1.0E-10	3.0E-06
131	CO 58M	1	3.294E 04	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	2.466E-02	0.0	1.0E-10	3.0E-06
132	CO 59	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.00E 02	1.0E 00	1.0E 00
133	CO 60	1	1.663E 08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.601E 00	0.0	1.0E-10	3.0E-06
134	CO 60M	1	6.282E 02	0.0	0.0	0.0	0.0	9.975E-01	0.0	0.0	6.303E-02	0.0	3.0E-08	1.0E 00
135	CO 61	1	5.940E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.460E-01	0.0	3.0E-08	1.0E 00
136	CO 62	1	9.000E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.200E 00	0.0	3.0E-08	1.0E 00
137	NI 58	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.83E 01	1.0E 00	1.0E 00
138	NI 59	7	8.000E 01	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	1.074E 00	0.0	1.0E-10	3.0E-06
139	NI 60	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.61E 01	1.0E 00	1.0E 00
140	NI 61	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.13E 00	1.0E 00	1.0E 00
141	NI 62	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.59E 00	1.0E 00	1.0E 00
142	NI 63	5	9.200E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.700E-02	0.0	1.0E-10	3.0E-06
143	NI 64	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.10E-01	1.0E 00	1.0E 00
144	NI 65	1	9.072E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.181E 00	0.0	1.0E-10	3.0E-06
145	CU 62	1	5.844E 02	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	2.282E 00	0.0	3.0E-08	1.0E 00
146	CU 63	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.92E 01	1.0E 00	1.0E 00
147	CU 64	1	4.572E 04	0.0	6.280E-01	0.0	0.0	0.0	0.0	0.0	3.130E-01	0.0	1.0E-10	3.0E-06
148	CU 65	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.08E 01	1.0E 00	1.0E 00
149	ZN 63	2	3.850E 01	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	1.186E 00	0.0	3.0E-08	1.0E 00
150	ZN 64	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.86E 01	1.0E 00	1.0E 00
151	ZN 65	1	2.107E 07	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	5.911E-01	0.0	1.0E-10	3.0E-06
152	NI 66	1	1.966E 05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.700E-02	0.0	1.0E-10	3.0E-06

Table A.1 (continued)

NO.	ISOTOPE	IN	HALF-LIFE	FB1	FPEC	FPEC1	FAL	FIT	FSF	FBN	Q	ABUND	APCG	WRCG
153	CU 66	1	3.060E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.155E 00	0.0	3.0E-08	1.0E 00
154	ZN 66	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.79E 01	1.0E 00	1.0E 00
155	CU 67	1	2.227E 05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.709E-01	0.0	1.0E-10	3.0E-06
156	ZN 67	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.10E 00	1.0E 00	1.0E 00
157	ZN 68	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.88E 01	1.0E 00	1.0E 00
158	ZN 69	1	3.420E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.209E-01	0.0	3.0E-08	1.0E 00
159	ZN 69M	1	4.954E 04	0.0	0.0	0.0	0.0	9.997E-01	0.0	0.0	4.388E-01	0.0	1.0E-10	3.0E-06
160	GA 69	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.01E 01	1.0E 00	1.0E 00
161	ZN 70	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.20E-01	1.0E 00	1.0E 00
162	GA 70	1	1.266E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.531E-01	0.0	3.0E-08	1.0E 00
163	GE 70	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.05E 01	1.0E 00	1.0E 00
164	ZN 71	2	2.400E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.806E 00	0.0	3.0E-08	1.0E 00
165	ZN 71M	3	3.920E 00	0.0	0.0	0.0	0.0	5.000E-04	0.0	0.0	2.963E 00	0.0	1.0E-10	3.0E-06
166	GA 71	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.99E 01	1.0E 00	1.0E 00
167	GE 71	4	1.180E 01	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	2.350E-01	0.0	1.0E-10	3.0E-06
168	GE 71M	1	2.190E-02	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	1.960E-01	0.0	3.0E-08	1.0E 00
169	CO 72	1	1.227E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.579E 00	0.0	3.0E-08	1.0E 00
170	NI 72	1	2.419E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.207E 00	0.0	3.0E-08	1.0E 00
171	CU 72	1	6.002E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.691E 00	0.0	3.0E-08	1.0E 00
172	ZN 72	1	1.674E 05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.553E-01	0.0	1.0E-10	3.0E-06
173	GA 72	1	5.076E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.207E 00	0.0	1.0E-10	3.0E-06
174	GA 72M	1	3.968E-02	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	1.200E-01	0.0	3.0E-08	1.0E 00
175	GE 72	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.74E 01	1.0E 00	1.0E 00
176	CO 73	1	1.155E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.624E 00	0.0	3.0E-08	1.0E 00
177	NI 73	1	3.935E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.375E 00	0.0	3.0E-08	1.0E 00
178	CU 73	1	3.948E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.458E 00	0.0	3.0E-08	1.0E 00
179	ZN 73	1	2.350E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.455E 00	0.0	3.0E-08	1.0E 00
180	GA 73	1	1.757E 04	1.000E 00	0.0	0.0	0.0	0.0	0.0	0.0	7.630E-01	0.0	1.0E-10	3.0E-06
181	GE 73	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.80E 00	1.0E 00	1.0E 00
182	GE 73M	1	5.300E-01	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	6.700E-02	0.0	3.0E-08	1.0E 00
183	CO 74	1	1.075E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.537E 00	0.0	3.0E-08	1.0E 00
184	NI 74	1	6.483E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.250E 00	0.0	3.0E-08	1.0E 00
185	CU 74	1	5.731E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.606E 00	0.0	3.0E-08	1.0E 00
186	ZN 74	1	9.500E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.084E 00	0.0	3.0E-08	1.0E 00
187	GA 74	1	4.860E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.341E 00	0.0	3.0E-08	1.0E 00
188	GE 74	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.65E 01	1.0E 00	1.0E 00
189	SE 74	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.70E-01	1.0E 00	1.0E 00
190	CO 75	1	8.016E-02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.568E 00	0.0	3.0E-08	1.0E 00
191	NI 75	1	1.796E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.419E 00	0.0	3.0E-08	1.0E 00
192	CU 75	1	7.666E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.506E 00	0.0	3.0E-08	1.0E 00
193	ZN 75	1	9.000E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.278E 00	0.0	3.0E-08	1.0E 00
194	GA 75	1	1.140E 02	4.000E-02	0.0	0.0	0.0	0.0	0.0	0.0	1.381E 00	0.0	3.0E-08	1.0E 00
195	GE 75	1	4.968E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.660E-01	0.0	3.0E-08	1.0E 00
196	GE 75M	1	4.890E 01	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	1.390E-01	0.0	3.0E-08	1.0E 00
197	AS 75	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.00E 02	1.0E 00	1.0E 00
198	SE 75	1	1.035E 07	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	4.049E-01	0.0	1.0E-10	3.0E-06
199	NI 76	1	2.684E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.272E 00	0.0	3.0E-08	1.0E 00
200	CU 76	1	2.211E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.629E 00	0.0	3.0E-08	1.0E 00
201	ZN 76	1	5.400E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.199E 00	0.0	3.0E-08	1.0E 00
202	GA 76	1	2.710E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.869E 00	0.0	3.0E-08	1.0E 00
203	GE 76	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.80E 00	1.0E 00	1.0E 00

Table A.1 (continued)

NO.	ISOTOPE	IU	HALF-LIFE	FB1	FPEC	FPEC1	FAL	FIT	FSF	FBN	Q	ABUND	ARCG	WRCG
204	AS 76	1	9.475E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.494E 00	0.0	1.0E-10	3.0E-06
205	SE 76	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.03E 00	1.0E 00	1.0E 00
206	NI 77	1	1.028E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.390E 00	0.0	3.0E-08	1.0E 00
207	CU 77	1	2.946E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.522E 00	0.0	3.0E-08	1.0E 00
208	ZN 77	1	1.400E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.227E 00	0.0	3.0E-08	1.0E 00
209	GA 77	1	1.300E 01	8.800E-01	0.0	0.0	0.0	0.0	0.0	0.0	2.559E 00	0.0	3.0E-08	1.0E 00
210	GE 77	1	4.068E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.733E 00	0.0	1.0E-10	3.0E-06
211	GE 77M	1	5.430E 01	0.0	0.0	0.0	0.0	2.100E-01	0.0	0.0	1.034E 00	0.0	3.0E-08	1.0E 00
212	AS 77	1	1.397E 05	2.480E-03	0.0	0.0	0.0	0.0	0.0	0.0	2.376E-01	0.0	1.0E-10	3.0E-06
213	SE 77	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.60E 00	1.0E 00	1.0E 00
214	SE 77M	1	1.750E 01	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	2.500E-01	0.0	3.0E-08	1.0E 00
215	NI 78	1	1.376E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.303E 00	0.0	3.0E-08	1.0E 00
216	CU 78	1	1.206E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.591E 00	0.0	3.0E-08	1.0E 00
217	ZN 78	1	2.429E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.094E 00	0.0	3.0E-08	1.0E 00
218	GA 78	1	4.900E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.584E 00	0.0	3.0E-08	1.0E 00
219	GE 78	1	5.220E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.150E-01	0.0	3.0E-08	1.0E 00
220	AS 78	1	5.442E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.637E 00	0.0	3.0E-08	1.0E 00
221	SE 78	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.35E 01	1.0E 00	1.0E 00
222	KR 78	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.50E-01	1.0E 00	1.0E 00
223	CU 79	1	1.474E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.538E 00	0.0	3.0E-08	1.0E 00
224	ZN 79	1	3.821E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.261E 00	0.0	3.0E-08	1.0E 00
225	GA 79	1	2.860E 00	0.0	0.0	0.0	0.0	0.0	0.0	1.400E-03	3.502E 00	0.0	3.0E-08	1.0E 00
226	GE 79	1	4.300E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.144E 00	0.0	3.0E-08	1.0E 00
227	AS 79	1	5.400E 02	1.000E 00	0.0	0.0	0.0	0.0	0.0	0.0	8.790E-01	0.0	3.0E-08	1.0E 00
228	SE 79	1	2.050E 12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.200E-02	0.0	1.0E-10	3.0E-06
229	SE 79M	1	2.334E 02	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	9.500E-02	0.0	3.0E-08	1.0E 00
230	BR 79	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.07E 01	1.0E 00	1.0E 00
231	BR 79M	1	4.860E 00	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	2.100E-01	0.0	3.0E-08	1.0E 00
232	KR 79	3	3.490E 01	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	1.620E 00	0.0	1.0E-10	3.0E-06
233	KR 79M	1	5.500E 01	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	1.270E-01	0.0	3.0E-08	1.0E 00
234	CU 80	1	9.110E-02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.538E 00	0.0	3.0E-08	1.0E 00
235	ZN 80	1	7.113E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.065E 00	0.0	3.0E-08	1.0E 00
236	GA 80	1	1.700E 00	0.0	0.0	0.0	0.0	0.0	0.0	8.600E-03	5.623E 00	0.0	3.0E-08	1.0E 00
237	GE 80	1	2.400E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.029E 00	0.0	3.0E-08	1.0E 00
238	AS 80	1	1.650E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.129E 00	0.0	3.0E-08	1.0E 00
239	SE 80	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.98E 01	1.0E 00	1.0E 00
240	BR 80	1	1.044E 03	0.0	8.260E-02	0.0	0.0	0.0	0.0	0.0	1.323E 00	0.0	3.0E-08	1.0E 00
241	BR 80M	1	1.591E 04	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	8.453E-02	0.0	1.0E-10	3.0E-06
242	KR 80	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.25E 00	1.0E 00	1.0E 00
243	CU 81	1	7.447E-02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.112E 00	0.0	3.0E-08	1.0E 00
244	ZN 81	1	1.294E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.266E 00	0.0	3.0E-08	1.0E 00
245	GA 81	1	7.053E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.480E 00	0.0	3.0E-08	1.0E 00
246	GE 81	1	1.010E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.247E 00	0.0	3.0E-08	1.0E 00
247	AS 81	1	3.200E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.669E 00	0.0	3.0E-08	1.0E 00
248	SE 81	1	1.110E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.130E-01	0.0	3.0E-08	1.0E 00
249	SE 81M	1	3.438E 03	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	1.030E-01	0.0	3.0E-08	1.0E 00
250	BR 81	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.93E 01	1.0E 00	1.0E 00
251	KR 81	1	6.623E 12	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	1.400E-01	0.0	1.0E-10	3.0E-06
252	KR 81M	1	1.330E 01	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	1.900E-01	0.0	3.0E-08	1.0E 00
253	ZN 82	1	1.353E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.729E 00	0.0	3.0E-08	1.0E 00
254	GA 82	1	1.538E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.590E 00	0.0	3.0E-08	1.0E 00

Table A.1 (continued)

NO.	ISOTOPE	IN	HALF-LIFE	FB1	FPEC	FPEC1	FAL	FIT	FSF	FBN	Q	ABUND	ARCG	WRCG
255	GE 82	1	4.600E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.064E 00	0.0	3.0E-08	1.0E 00
256	AS 82	1	2.100E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.489E 00	0.0	3.0E-08	1.0E 00
257	AS 82M	1	1.300E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.704E 00	0.0	3.0E-08	1.0E 00
258	SE 82	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.20E 00	1.0E 00	1.0E 00
259	BR 82	1	1.271E 05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.779E 00	0.0	1.0E-10	3.0E-06
260	BR 82M	1	3.678E 02	0.0	0.0	0.0	0.0	9.760E-01	0.0	0.0	7.812E-02	0.0	3.0E-08	1.0E 00
261	KR 82	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.16E 01	1.0E 00	1.0E 00
262	ZN 83	1	8.386E-02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.226E 00	0.0	3.0E-08	1.0E 00
263	GA 83	1	1.477E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.139E 00	0.0	3.0E-08	1.0E 00
264	GE 83	1	1.900E 00	0.0	0.0	0.0	0.0	0.0	0.0	1.600E-03	5.041E 00	0.0	3.0E-08	1.0E 00
265	AS 83	1	1.350E 01	6.400E-01	0.0	0.0	0.0	0.0	0.0	0.0	2.661E 00	0.0	3.0E-08	1.0E 00
266	SE 83	1	1.350E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.001E 00	0.0	3.0E-08	1.0E 00
267	SE 83M	1	7.000E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.211E 00	0.0	3.0E-08	1.0E 00
268	BR 83	1	8.604E 03	9.997E-01	0.0	0.0	0.0	0.0	0.0	0.0	3.286E-01	0.0	1.0E-10	3.0E-06
269	KR 83	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.15E 01	1.0E 00	1.0E 00
270	KR 83M	1	6.588E 03	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	4.076E-02	0.0	3.0E-08	1.0E 00
271	GA 84	1	9.887E-02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.545E 00	0.0	3.0E-08	1.0E 00
272	GE 84	1	1.200E 00	0.0	0.0	0.0	0.0	0.0	0.0	9.600E-02	4.335E 00	0.0	3.0E-08	1.0E 00
273	AS 84	1	5.800E 00	0.0	0.0	0.0	0.0	0.0	0.0	1.300E-03	5.865E 00	0.0	3.0E-08	1.0E 00
274	SE 84	1	1.980E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.390E-01	0.0	3.0E-08	1.0E 00
275	BR 84	1	1.908E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.036E 00	0.0	3.0E-08	1.0E 00
276	BR 84M	1	3.600E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.664E 00	0.0	3.0E-08	1.0E 00
277	KR 84	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.70E 01	1.0E 00	1.0E 00
278	SE 84	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.60E-01	1.0E 00	1.0E 00
279	GA 85	1	9.197E-02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.079E 00	0.0	3.0E-08	1.0E 00
280	GE 85	1	2.342E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.069E 00	0.0	3.0E-08	1.0E 00
281	AS 85	1	2.030E 00	0.0	0.0	0.0	0.0	0.0	0.0	2.000E-01	5.037E 00	0.0	3.0E-08	1.0E 00
282	SE 85	1	3.900E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.354E 00	0.0	3.0E-08	1.0E 00
283	SE 85M	1	1.900E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.494E 00	0.0	3.0E-08	1.0E 00
284	BR 85	1	1.720E 02	1.000E 00	0.0	0.0	0.0	0.0	0.0	0.0	1.041E 00	0.0	3.0E-08	1.0E 00
285	KR 85	1	3.383E 08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.527E-01	0.0	1.0E-10	3.0E-06
286	KR 85M	1	1.613E 04	0.0	0.0	0.0	0.0	2.110E-01	0.0	0.0	4.131E-01	0.0	1.0E-10	3.0E-06
287	RB 85	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.22E 01	1.0E 00	1.0E 00
288	SR 85	1	5.602E 06	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	5.205E-01	0.0	1.0E-10	3.0E-06
289	SR 85M	2	7.000E 01	0.0	1.400E-01	0.0	0.0	8.600E-01	0.0	0.0	3.920E-01	0.0	3.0E-08	1.0E 00
290	GE 86	1	2.589E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.557E 00	0.0	3.0E-08	1.0E 00
291	AS 86	1	9.000E-01	0.0	0.0	0.0	0.0	0.0	0.0	3.800E-02	6.806E 00	0.0	3.0E-08	1.0E 00
292	SE 86	1	1.660E 01	5.000E-01	0.0	0.0	0.0	0.0	0.0	0.0	2.439E 00	0.0	3.0E-08	1.0E 00
293	BR 86	1	5.500E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.093E 00	0.0	3.0E-08	1.0E 00
294	BR 86M	1	4.500E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.752E 00	0.0	3.0E-08	1.0E 00
295	KR 86	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.73E 01	1.0E 00	1.0E 00
296	RB 86	1	1.612E 06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.623E-01	0.0	1.0E-10	3.0E-06
297	RB 86M	1	6.108E 01	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	5.600E-01	0.0	3.0E-08	1.0E 00
298	SR 86	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.84E 00	1.0E 00	1.0E 00
299	GE 87	1	1.255E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.125E 00	0.0	3.0E-08	1.0E 00
300	AS 87	1	3.000E-01	0.0	0.0	0.0	0.0	0.0	0.0	3.100E-01	5.897E 00	0.0	3.0E-08	1.0E 00
301	SE 87	1	5.600E 00	0.0	0.0	0.0	0.0	0.0	0.0	1.800E-03	4.238E 00	0.0	3.0E-08	1.0E 00
302	BR 87	1	5.580E 01	0.0	0.0	0.0	0.0	0.0	0.0	2.300E-02	3.862E 00	0.0	3.0E-08	1.0E 00
303	KR 87	1	4.578E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.120E 00	0.0	3.0E-08	1.0E 00
304	RB 87	1	1.482E 18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.410E-01	2.78E 01	1.0E-10	3.0E-06
305	SR 87	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.00E 00	1.0E 00	1.0E 00

Table A.1 (continued)

NO.	ISOTOPE	IU	HALF-LIFE	FB1	FPEC	FPEC1	FAL	FIT	FSF	FBN	Q	ABUND	ARCG	WECG
306	SE 87M	1	1.010E 04	0.0	3.000E-03	0.0	0.0	1.000E 00	0.0	0.0	3.861E-01	0.0	1.0E-10	3.0E-06
307	GE 88	1	1.427E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.499E 00	0.0	3.0E-08	1.0E 00
308	AS 88	1	1.299E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.906E 00	0.0	3.0E-08	1.0E 00
309	SE 88	1	1.500E 00	0.0	0.0	0.0	0.0	0.0	0.0	5.000E-03	3.727E 00	0.0	3.0E-08	1.0E 00
310	BR 88	1	1.630E 01	0.0	0.0	0.0	0.0	0.0	0.0	4.600E-02	2.529E 00	0.0	3.0E-08	1.0E 00
311	KR 88	1	1.022E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.319E 00	0.0	1.0E-10	3.0E-06
312	RB 88	1	1.068E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.684E 00	0.0	3.0E-08	1.0E 00
313	SR 88	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.26E 01	1.0E 00	1.0E 00
314	AS 89	1	1.294E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.334E 00	0.0	3.0E-08	1.0E 00
315	SE 89	1	4.100E-01	0.0	0.0	0.0	0.0	0.0	0.0	5.000E-02	5.095E 00	0.0	3.0E-08	1.0E 00
316	BR 89	1	4.500E 00	0.0	0.0	0.0	0.0	0.0	0.0	8.600E-02	4.797E 00	0.0	3.0E-08	1.0E 00
317	KR 89	1	1.902E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.198E 00	0.0	3.0E-08	1.0E 00
318	RB 89	1	9.120E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.099E 00	0.0	3.0E-08	1.0E 00
319	SR 89	1	4.363E 06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.832E-01	0.0	1.0E-10	3.0E-06
320	Y 89	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.00E 02	1.0E 00	1.0E 00
321	Y 89M	1	1.606E 01	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	9.168E-01	0.0	3.0E-08	1.0E 00
322	ZR 89	1	2.824E 05	0.0	1.612E-03	9.984E-01	0.0	0.0	0.0	0.0	1.258E 00	0.0	1.0E-10	3.0E-06
323	AS 90	1	9.009E-02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.027E 00	0.0	3.0E-08	1.0E 00
324	SE 90	1	5.545E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.590E 00	0.0	3.0E-08	1.0E 00
325	BR 90	1	1.600E 00	0.0	0.0	0.0	0.0	0.0	0.0	1.200E-01	5.674E 00	0.0	3.0E-08	1.0E 00
326	KR 90	1	3.232E 01	1.220E-01	0.0	0.0	0.0	0.0	0.0	0.0	2.591E 00	0.0	3.0E-08	1.0E 00
327	RB 90	1	1.530E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.021E 00	0.0	3.0E-08	1.0E 00
328	RB 90M	1	2.580E 02	0.0	0.0	0.0	0.0	4.300E-02	0.0	0.0	4.472E 00	0.0	3.0E-08	1.0E 00
329	SR 90	1	9.190E 08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.958E-01	0.0	1.0E-10	3.0E-06
330	Y 90	1	2.304E 05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.350E-01	0.0	1.0E-10	3.0E-06
331	Y 90M	1	1.116E 04	1.000E 00	0.0	0.0	0.0	9.960E-01	0.0	0.0	6.830E-01	0.0	1.0E-10	3.0E-06
332	ZR 90	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.15E 01	1.0E 00	1.0E 00
333	ZR 90M	1	8.300E-01	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	2.315E 00	0.0	3.0E-08	1.0E 00
334	SR 91	1	1.845E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.545E 00	0.0	3.0E-08	1.0E 00
335	BR 91	1	6.000E-01	0.0	0.0	0.0	0.0	0.0	0.0	7.000E-02	5.392E 00	0.0	3.0E-08	1.0E 00
336	KR 91	1	8.700E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.301E 00	0.0	3.0E-08	1.0E 00
337	RB 91	1	5.820E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.067E 00	0.0	3.0E-08	1.0E 00
338	SR 91	1	3.420E 04	5.800E-01	0.0	0.0	0.0	0.0	0.0	0.0	1.352E 00	0.0	1.0E-10	3.0E-06
339	Y 91	1	5.055E 06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.059E-01	0.0	1.0E-10	3.0E-06
340	Y 91M	1	2.983E 03	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	5.576E-01	0.0	3.0E-08	1.0E 00
341	ZR 91	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.12E 01	1.0E 00	1.0E 00
342	SR 92	1	2.478E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.570E 00	0.0	3.0E-08	1.0E 00
343	BR 92	1	3.000E-01	0.0	0.0	0.0	0.0	0.0	0.0	2.600E-01	6.690E 00	0.0	3.0E-08	1.0E 00
344	KR 92	1	1.840E 00	0.0	0.0	0.0	0.0	0.0	0.0	4.000E-04	3.189E 00	0.0	3.0E-08	1.0E 00
345	RB 92	1	4.480E 00	0.0	0.0	0.0	0.0	0.0	0.0	1.200E-04	3.734E 00	0.0	3.0E-08	1.0E 00
346	SR 92	1	9.756E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.535E 00	0.0	1.0E-10	3.0E-06
347	Y 92	1	1.274E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.698E 00	0.0	1.0E-10	3.0E-06
348	ZR 92	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.71E 01	1.0E 00	1.0E 00
349	NB 92	4	1.016E 01	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	2.010E 00	0.0	1.0E-10	3.0E-06
350	MO 92	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.48E 01	1.0E 00	1.0E 00
351	SR 93	1	1.068E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.514E 00	0.0	3.0E-08	1.0E 00
352	BR 93	1	2.012E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.564E 00	0.0	3.0E-08	1.0E 00
353	KR 93	1	1.270E 00	0.0	0.0	0.0	0.0	0.0	0.0	3.200E-02	4.797E 00	0.0	3.0E-08	1.0E 00
354	RB 93	1	5.800E 00	0.0	0.0	0.0	0.0	0.0	0.0	1.620E-02	3.442E 00	0.0	3.0E-08	1.0E 00
355	SR 93	1	4.500E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.556E 00	0.0	3.0E-08	1.0E 00
356	Y 93	1	3.636E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.262E 00	0.0	1.0E-10	3.0E-06

Table A.1 (continued)

NO.	ISOTOPE	IU	HALF-LIFE	FB1	FPEC	FPEC1	FAL	FIT	FSF	FBN	Q	ABUND	ARCG	WRCG
357	ZR 93	1	4.828E 13	9.500E-01	0.0	0.0	0.0	0.0	0.0	0.0	1.960E-02	0.0	1.0E-10	3.0E-06
358	NB 93	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.00E 02	1.0E 00	1.0E 00
359	NB 93M	1	4.292E 08	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	2.989E-02	0.0	1.0E-10	3.0E-06
360	MO 93	1	1.104E 11	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	1.577E-02	0.0	1.0E-10	3.0E-06
361	MO 93M	1	2.466E 04	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	2.360E 00	0.0	1.0E-10	3.0E-06
362	RB 94	1	1.105E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.456E 00	0.0	3.0E-08	1.0E 00
363	KR 94	1	2.100E-01	0.0	0.0	0.0	0.0	0.0	0.0	4.400E-02	3.868E 00	0.0	3.0E-08	1.0E 00
364	RB 94	1	2.690E 00	0.0	0.0	0.0	0.0	0.0	0.0	1.110E-01	4.735E 00	0.0	3.0E-08	1.0E 00
365	SR 94	1	7.560E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.112E 00	0.0	3.0E-08	1.0E 00
366	Y 94	1	1.146E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.811E 00	0.0	3.0E-08	1.0E 00
367	ZR 94	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.74E 01	1.0E 00	1.0E 00
368	NB 94	1	6.406E 11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.719E 00	0.0	1.0E-10	3.0E-06
369	NB 94M	1	3.756E 02	0.0	0.0	0.0	0.0	9.952E-01	0.0	0.0	4.710E-02	0.0	3.0E-08	1.0E 00
370	MO 94	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.30E 00	1.0E 00	1.0E 00
371	RB 95	1	1.166E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.496E 00	0.0	3.0E-08	1.0E 00
372	KR 95	1	5.000E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.889E 00	0.0	3.0E-08	1.0E 00
373	RB 95	1	3.600E-01	0.0	0.0	0.0	0.0	0.0	0.0	7.100E-02	4.522E 00	0.0	3.0E-08	1.0E 00
374	SR 95	1	2.600E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.301E 00	0.0	3.0E-08	1.0E 00
375	Y 95	1	6.300E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.234E 00	0.0	3.0E-08	1.0E 00
376	ZR 95	1	5.528E 06	7.000E-03	0.0	0.0	0.0	0.0	0.0	0.0	8.545E-01	0.0	1.0E-10	3.0E-06
377	NB 95	1	3.037E 06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.092E-01	0.0	1.0E-10	3.0E-06
378	NB 95M	1	3.118E 05	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	2.344E-01	0.0	1.0E-10	3.0E-06
379	MO 95	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.59E 01	1.0E 00	1.0E 00
380	RB 96	1	8.379E-02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.369E 00	0.0	3.0E-08	1.0E 00
381	KR 96	1	4.404E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.853E 00	0.0	3.0E-08	1.0E 00
382	RB 96	1	2.070E-01	0.0	0.0	0.0	0.0	0.0	0.0	1.270E-01	6.171E 00	0.0	3.0E-08	1.0E 00
383	SR 96	1	4.000E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.472E 00	0.0	3.0E-08	1.0E 00
384	Y 96	1	1.380E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.869E 00	0.0	3.0E-08	1.0E 00
385	ZR 96	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.80E 00	1.0E 00	1.0E 00
386	NB 96	1	8.406E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.805E 00	0.0	1.0E-10	3.0E-06
387	MO 96	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.67E 01	1.0E 00	1.0E 00
388	RU 96	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.50E 00	1.0E 00	1.0E 00
389	KR 97	1	1.485E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.996E 00	0.0	3.0E-08	1.0E 00
390	RB 97	1	1.700E-01	0.0	0.0	0.0	0.0	0.0	0.0	2.100E-01	5.231E 00	0.0	3.0E-08	1.0E 00
391	SR 97	1	2.000E-01	0.0	0.0	0.0	0.0	0.0	0.0	9.500E-04	4.187E 00	0.0	3.0E-08	1.0E 00
392	Y 97	1	1.110E 00	0.0	0.0	0.0	0.0	0.0	0.0	1.600E-02	3.097E 00	0.0	3.0E-08	1.0E 00
393	ZR 97	1	6.084E 04	9.463E-01	0.0	0.0	0.0	0.0	0.0	0.0	8.791E-01	0.0	1.0E-10	3.0E-06
394	NB 97	1	4.326E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.123E 00	0.0	3.0E-08	1.0E 00
395	NB 97M	1	6.000E 01	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	7.427E-01	0.0	3.0E-08	1.0E 00
396	MO 97	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.60E 00	1.0E 00	1.0E 00
397	TC 97	8	2.600E 00	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	3.000E-01	0.0	1.0E-10	3.0E-06
398	TC 97M	4	9.000E 01	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	9.650E-02	0.0	1.0E-10	3.0E-06
399	RU 97	1	2.506E 05	0.0	9.992E-01	7.540E-04	0.0	0.0	0.0	0.0	2.522E-01	0.0	1.0E-10	3.0E-06
400	KR 98	1	2.243E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.707E 00	0.0	3.0E-08	1.0E 00
401	RB 98	1	1.400E-01	0.0	0.0	0.0	0.0	0.0	0.0	2.600E-01	6.805E 00	0.0	3.0E-08	1.0E 00
402	SR 98	1	8.500E-01	0.0	0.0	0.0	0.0	0.0	0.0	5.000E-03	3.186E 00	0.0	3.0E-08	1.0E 00
403	Y 98	1	3.000E-01	0.0	0.0	0.0	0.0	0.0	0.0	4.800E-03	4.787E 00	0.0	3.0E-08	1.0E 00
404	ZR 98	1	3.100E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.030E-01	0.0	3.0E-08	1.0E 00
405	NB 98	1	2.800E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.082E 00	0.0	3.0E-08	1.0E 00
406	NB 98M	1	3.090E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.245E 00	0.0	3.0E-08	1.0E 00
407	MO 98	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.41E 01	1.0E 00	1.0E 00

Table A.1 (continued)

NO.	ISOTOPE	IU	HALF-LIFE	FB1	FPEC	FPEC1	FAL	FIT	FSF	FBN	Q	ABUND	AFCG	WFCG
408	TC 98	1	1.325E 14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.532E 00	0.0	1.0E-10	3.0E-06
409	RU 98	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.90E 00	1.0E 00	1.0E 00
410	RB 99	1	7.600E-02	0.0	0.0	0.0	0.0	0.0	0.0	3.700E-01	6.022E 00	0.0	3.0E-08	1.0E 00
411	SR 99	1	5.600E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.204E 00	0.0	3.0E-08	1.0E 00
412	Y 99	1	8.000E-01	0.0	0.0	0.0	0.0	0.0	0.0	3.800E-02	3.738E 00	0.0	3.0E-08	1.0E 00
413	ZR 99	1	2.400E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.414E 00	0.0	3.0E-08	1.0E 00
414	NB 99	1	1.430E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.557E 00	0.0	3.0E-08	1.0E 00
415	NB 99M	1	1.560E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.169E 00	0.0	3.0E-08	1.0E 00
416	MO 99	1	2.376E 05	8.755E-01	0.0	0.0	0.0	0.0	0.0	0.0	5.418E-01	0.0	1.0E-10	3.0E-06
417	TC 99	1	6.722E 12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.460E-02	0.0	1.0E-10	3.0E-06
418	TC 99M	1	2.167E 04	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	1.422E-01	0.0	1.0E-10	3.0E-06
419	RU 99	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.27E 01	1.0E 00	1.0E 00
420	RB100	1	1.006E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.459E 00	0.0	3.0E-08	1.0E 00
421	SR100	1	1.046E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.964E 00	0.0	3.0E-08	1.0E 00
422	Y 100	1	7.563E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.826E 00	0.0	3.0E-08	1.0E 00
423	ZR100	1	7.100E 00	5.000E-01	0.0	0.0	0.0	0.0	0.0	0.0	1.369E 00	0.0	3.0E-08	1.0E 00
424	NB100	1	2.400E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.980E 00	0.0	3.0E-08	1.0E 00
425	NB100M	1	2.410E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.484E 00	0.0	3.0E-08	1.0E 00
426	MO100	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.60E 00	1.0E 00	1.0E 00
427	TC100	1	1.580E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.485E 00	0.0	3.0E-08	1.0E 00
428	RU100	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.26E 01	1.0E 00	1.0E 00
429	RB101	1	1.133E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.375E 00	0.0	3.0E-08	1.0E 00
430	SR101	1	2.519E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.094E 00	0.0	3.0E-08	1.0E 00
431	Y 101	1	9.762E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.613E 00	0.0	3.0E-08	1.0E 00
432	ZR101	1	3.300E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.123E 00	0.0	3.0E-08	1.0E 00
433	NB101	1	7.000E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.231E 00	0.0	3.0E-08	1.0E 00
434	MO101	1	8.772E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.927E 00	0.0	3.0E-08	1.0E 00
435	TC101	1	8.520E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.097E-01	0.0	3.0E-08	1.0E 00
436	RU101	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.70E 01	1.0E 00	1.0E 00
437	SR102	1	4.147E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.880E 00	0.0	3.0E-08	1.0E 00
438	Y 102	1	2.726E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.734E 00	0.0	3.0E-08	1.0E 00
439	ZR102	1	2.862E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.170E 00	0.0	3.0E-08	1.0E 00
440	NB102	1	3.000E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.175E 00	0.0	3.0E-08	1.0E 00
441	MO102	1	6.660E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.110E-01	0.0	3.0E-08	1.0E 00
442	TC102	1	5.280E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.740E 00	0.0	3.0E-08	1.0E 00
443	TC102M	1	2.610E 02	0.0	0.0	0.0	0.0	5.000E-02	0.0	0.0	3.202E 00	0.0	3.0E-08	1.0E 00
444	RU102	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.16E 01	1.0E 00	1.0E 00
445	PD102	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.00E 00	1.0E 00	1.0E 00
446	SR103	1	1.386E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.022E 00	0.0	3.0E-08	1.0E 00
447	Y 103	1	3.660E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.539E 00	0.0	3.0E-08	1.0E 00
448	ZR103	1	1.770E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.137E 00	0.0	3.0E-08	1.0E 00
449	NB103	1	1.567E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.119E 00	0.0	3.0E-08	1.0E 00
450	MO103	1	6.000E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.294E 00	0.0	3.0E-08	1.0E 00
451	TC103	1	5.000E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.227E 00	0.0	3.0E-08	1.0E 00
452	RU103	1	3.394E 06	9.006E-01	0.0	0.0	0.0	0.0	0.0	0.0	5.644E-01	0.0	1.0E-10	3.0E-06
453	RH103	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.00E 02	1.0E 00	1.0E 00
454	RH103M	1	3.367E 03	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	3.883E-02	0.0	3.0E-08	1.0E 00
455	PD103	1	1.465E 06	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	1.950E-02	0.0	1.0E-10	3.0E-06
456	SR104	1	1.925E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.972E 00	0.0	3.0E-08	1.0E 00
457	Y 104	1	1.442E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.626E 00	0.0	3.0E-08	1.0E 00
458	ZR104	1	3.783E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.977E 00	0.0	3.0E-08	1.0E 00

Table A.1 (continued)

NO.	ISOTOPE	IU	HALF-LIFE	FB1	FPEC	FPEC1	FAL	FIT	FSF	FBN	Q	ABUND	ARCG	WPCG
459	NB104	1	1.000E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.095E 00	0.0	3.0E-08	1.0E 00
460	MO104	1	9.600E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.035E 00	0.0	3.0E-08	1.0E 00
461	TC104	1	1.092E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.668E 00	0.0	3.0E-08	1.0E 00
462	RU104	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.87E 01	1.0E 00	1.0E 00
463	RH104	1	4.230E 01	0.0	4.500E-03	0.0	0.0	0.0	0.0	0.0	9.974E-01	0.0	3.0E-08	1.0E 00
464	RH104M	1	2.604E 02	0.0	0.0	0.0	0.0	9.987E-01	0.0	0.0	1.400E-01	0.0	3.0E-08	1.0E 00
465	PD104	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.10E 01	1.0E 00	1.0E 00
466	Y 105	1	1.736E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.646E 00	0.0	3.0E-08	1.0E 00
467	ZR105	1	5.586E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.010E 00	0.0	3.0E-08	1.0E 00
468	NB105	1	1.800E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.956E 00	0.0	3.0E-08	1.0E 00
469	MO105	1	5.400E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.115E 00	0.0	3.0E-08	1.0E 00
470	TC105	1	4.800E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.861E 00	0.0	3.0E-08	1.0E 00
471	RU105	1	1.598E 04	2.800E-01	0.0	0.0	0.0	0.0	0.0	0.0	1.184E 00	0.0	1.0E-10	3.0E-06
472	RH105	1	1.273E 05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.309E-01	0.0	1.0E-10	3.0E-06
473	RH105M	1	4.500E 01	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	1.289E-01	0.0	3.0E-08	1.0E 00
474	PD105	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.22E 01	1.0E 00	1.0E 00
475	Y 106	1	9.292E-02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.460E 00	0.0	3.0E-08	1.0E 00
476	ZR106	1	9.801E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.960E 00	0.0	3.0E-08	1.0E 00
477	NB106	1	5.352E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.005E 00	0.0	3.0E-08	1.0E 00
478	MO106	1	9.000E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.795E 00	0.0	3.0E-08	1.0E 00
479	TC106	1	3.700E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.888E 00	0.0	3.0E-08	1.0E 00
480	RU106	1	3.181E 07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.003E-02	0.0	1.0E-10	3.0E-06
481	RH106	1	2.990E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.618E 00	0.0	3.0E-08	1.0E 00
482	RH106M	1	7.920E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.215E 00	0.0	1.0E-10	3.0E-06
483	PD106	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.73E 01	1.0E 00	1.0E 00
484	CD106	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.30E 00	1.0E 00	1.0E 00
485	Y 107	1	1.046E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.476E 00	0.0	3.0E-08	1.0E 00
486	ZR107	1	2.485E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.999E 00	0.0	3.0E-08	1.0E 00
487	NB107	1	6.694E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.968E 00	0.0	3.0E-08	1.0E 00
488	MO107	1	6.391E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.693E 00	0.0	3.0E-08	1.0E 00
489	TC107	1	2.900E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.801E 00	0.0	3.0E-08	1.0E 00
490	RU107	1	2.520E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.452E 00	0.0	3.0E-08	1.0E 00
491	RH107	1	1.302E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.069E-01	0.0	3.0E-08	1.0E 00
492	PD107	1	2.050E 14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000E-02	0.0	1.0E-10	3.0E-06
493	PD107M	1	2.130E 01	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	2.100E-01	0.0	3.0E-08	1.0E 00
494	AG107	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.18E 01	1.0E 00	1.0E 00
495	CD107	1	2.336E 04	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	7.661E-02	0.0	1.0E-10	3.0E-06
496	ZR108	1	4.076E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.856E 00	0.0	3.0E-08	1.0E 00
497	NB108	1	2.220E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.013E 00	0.0	3.0E-08	1.0E 00
498	MO108	1	1.500E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.691E 00	0.0	3.0E-08	1.0E 00
499	TC108	1	5.200E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.621E 00	0.0	3.0E-08	1.0E 00
500	RU108	1	2.700E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.160E-01	0.0	3.0E-08	1.0E 00
501	RH108	1	1.680E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.332E 00	0.0	3.0E-08	1.0E 00
502	RH108M	1	3.540E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.179E 00	0.0	3.0E-08	1.0E 00
503	PD108	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.67E 01	1.0E 00	1.0E 00
504	AG108	1	1.422E 02	0.0	2.350E-02	0.0	0.0	0.0	0.0	0.0	6.286E-01	0.0	3.0E-08	1.0E 00
505	AG108M	1	4.008E 09	0.0	9.110E-01	0.0	0.0	8.900E-02	0.0	0.0	1.641E 00	0.0	1.0E-10	3.0E-06
506	CD108	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.90E-01	1.0E 00	1.0E 00
507	ZR109	1	1.387E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.861E 00	0.0	3.0E-08	1.0E 00
508	NB109	1	2.861E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.896E 00	0.0	3.0E-08	1.0E 00
509	MO109	1	1.033E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.592E 00	0.0	3.0E-08	1.0E 00

Table A.1 (continued)

NO.	ISOTOPE	IU	HALF-LIFE	FB1	FPEC	FPEC1	FAL	FIT	FSF	FBN	Q	ABUND	ARCG	WRCG
510	TC109	1	5.100E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.723E 00	0.0	3.0E-08	1.0E 00
511	RU109	1	3.500E 01	5.000E-01	0.0	0.0	0.0	0.0	0.0	0.0	2.382E 00	0.0	3.0E-08	1.0E 00
512	RH109	1	9.000E 01	5.000E-01	0.0	0.0	0.0	0.0	0.0	0.0	1.275E 00	0.0	3.0E-08	1.0E 00
513	RH109M	1	5.000E 01	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	2.500E-01	0.0	3.0E-08	1.0E 00
514	PD109	1	4.846E 04	9.995E-01	0.0	0.0	0.0	0.0	0.0	0.0	4.486E-01	0.0	1.0E-10	3.0E-06
515	PD109M	1	2.814E 02	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	1.880E-01	0.0	3.0E-08	1.0E 00
516	AG109	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.82E 01	1.0E 00	1.0E 00
517	AG109M	1	3.960E 01	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	8.696E-02	0.0	3.0E-08	1.0E 00
518	CD109	1	4.009E 07	0.0	0.0	1.000E 00	0.0	0.0	0.0	0.0	1.074E-01	0.0	1.0E-10	3.0E-06
519	NB110	1	1.258E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.832E 00	0.0	3.0E-08	1.0E 00
520	MO110	1	1.892E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.508E 00	0.0	3.0E-08	1.0E 00
521	TC110	1	9.300E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.638E 00	0.0	3.0E-08	1.0E 00
522	RU110	1	1.600E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.539E 00	0.0	3.0E-08	1.0E 00
523	RH110	1	2.900E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.613E 00	0.0	3.0E-08	1.0E 00
524	RH110M	1	3.000E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.537E 00	0.0	3.0E-08	1.0E 00
525	PD110	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.18E 01	1.0E 00	1.0E 00
526	AG110	1	2.460E 01	0.0	3.000E-03	0.0	0.0	0.0	0.0	0.0	1.212E 00	0.0	3.0E-08	1.0E 00
527	AG110M	1	2.159E 07	0.0	0.0	0.0	0.0	1.330E-02	0.0	0.0	2.817E 00	0.0	1.0E-10	3.0E-06
528	CD110	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.25E 01	1.0E 00	1.0E 00
529	NB111	1	1.561E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.773E 00	0.0	3.0E-08	1.0E 00
530	MO111	1	3.917E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.478E 00	0.0	3.0E-08	1.0E 00
531	TC111	1	1.336E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.568E 00	0.0	3.0E-08	1.0E 00
532	RU111	1	1.542E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.242E 00	0.0	3.0E-08	1.0E 00
533	RH111	1	6.300E 01	4.000E-03	0.0	0.0	0.0	0.0	0.0	0.0	2.275E 00	0.0	3.0E-08	1.0E 00
534	PD111	1	1.320E 03	9.920E-01	0.0	0.0	0.0	0.0	0.0	0.0	8.970E-01	0.0	3.0E-08	1.0E 00
535	PD111M	1	1.980E 04	7.940E-01	0.0	0.0	0.0	6.800E-01	0.0	0.0	5.880E-01	0.0	1.0E-10	3.0E-06
536	AG111	1	6.437E 05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.779E-01	0.0	1.0E-10	3.0E-06
537	AG111M	1	6.500E 01	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	6.500E-02	0.0	3.0E-08	1.0E 00
538	CD111	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.28E 01	1.0E 00	1.0E 00
539	CD111M	1	2.922E 03	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	3.960E-01	0.0	3.0E-08	1.0E 00
540	NB112	1	8.510E-02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.605E 00	0.0	3.0E-08	1.0E 00
541	MO112	1	6.892E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.334E 00	0.0	3.0E-08	1.0E 00
542	TC112	1	3.553E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.550E 00	0.0	3.0E-08	1.0E 00
543	RU112	1	7.000E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.206E 00	0.0	3.0E-08	1.0E 00
544	RH112	1	4.700E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.073E 00	0.0	3.0E-08	1.0E 00
545	PD112	1	7.236E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.550E-01	0.0	1.0E-10	3.0E-06
546	AG112	1	1.127E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.093E 00	0.0	1.0E-10	3.0E-06
547	CD112	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.41E 01	1.0E 00	1.0E 00
548	SN112	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.00E 00	1.0E 00	1.0E 00
549	MO113	1	1.971E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.412E 00	0.0	3.0E-08	1.0E 00
550	TC113	1	4.583E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.427E 00	0.0	3.0E-08	1.0E 00
551	RU113	1	2.766E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.044E 00	0.0	3.0E-08	1.0E 00
552	RH113	1	9.000E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.013E 00	0.0	3.0E-08	1.0E 00
553	PD113	1	9.000E 01	1.000E-01	0.0	0.0	0.0	0.0	0.0	0.0	1.986E 00	0.0	3.0E-08	1.0E 00
554	AG113	1	1.908E 04	1.300E-02	0.0	0.0	0.0	0.0	0.0	0.0	1.053E 00	0.0	1.0E-10	3.0E-06
555	AG113M	1	6.600E 01	4.500E-02	0.0	0.0	0.0	0.0	0.0	0.0	1.181E 00	0.0	3.0E-08	1.0E 00
556	CD113	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.22E 01	1.0E 00	1.0E 00
557	CD113M	1	4.604E 08	0.0	0.0	0.0	0.0	1.000E-03	0.0	0.0	2.840E-01	0.0	1.0E-10	3.0E-06
558	IN113	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.30E 00	1.0E 00	1.0E 00
559	IN113M	1	5.969E 03	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	3.930E-01	0.0	3.0E-08	1.0E 00
560	SN113	1	9.945E 06	0.0	0.0	1.000E 00	0.0	0.0	0.0	0.0	2.874E-02	0.0	1.0E-10	3.0E-06

Table A.1 (continued)

NO.	ISOTOPE	IU	HALF-LIFE	FB1	FPEC	FPEC1	FAL	FIT	FSF	FBN	Q	ABUND	ARCG	WRCG
561	SN113M	2	2.000E 01	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	1.099E 00	0.0	3.0E-08	1.0E 00
562	MO114	1	3.215E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.197E 00	0.0	3.0E-08	1.0E 00
563	TC114	1	1.734E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.481E 00	0.0	3.0E-08	1.0E 00
564	RU114	1	5.053E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.946E 00	0.0	3.0E-08	1.0E 00
565	RH114	1	1.700E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.858E 00	0.0	3.0E-08	1.0E 00
566	PD114	1	1.440E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.173E 00	0.0	3.0E-08	1.0E 00
567	AG114	1	4.520E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.050E 00	0.0	3.0E-08	1.0E 00
568	CD114	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.87E 01	1.0E 00	1.0E 00
569	IN114	1	7.190E 01	0.0	3.374E-02	0.0	0.0	0.0	0.0	0.0	7.745E-01	0.0	3.0E-08	1.0E 00
570	IN114M	1	4.278E 06	0.0	4.300E-02	0.0	0.0	9.570E-01	0.0	0.0	2.379E-01	0.0	1.0E-10	3.0E-06
571	SN114	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.70E-01	1.0E 00	1.0E 00
572	MO115	1	1.160E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.218E 00	0.0	3.0E-08	1.0E 00
573	TC115	1	2.225E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.323E 00	0.0	3.0E-08	1.0E 00
574	RU115	1	7.294E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.890E 00	0.0	3.0E-08	1.0E 00
575	RH115	1	6.022E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.785E 00	0.0	3.0E-08	1.0E 00
576	PD115	1	3.800E 01	2.700E-01	0.0	0.0	0.0	0.0	0.0	0.0	2.579E 00	0.0	3.0E-08	1.0E 00
577	AG115	1	1.200E 03	2.046E-02	0.0	0.0	0.0	0.0	0.0	0.0	1.725E 00	0.0	3.0E-08	1.0E 00
578	AG115M	1	1.700E 01	2.700E-01	0.0	0.0	0.0	0.0	0.0	0.0	1.908E 00	0.0	3.0E-08	1.0E 00
579	CD115	1	1.925E 05	1.000E 00	0.0	0.0	0.0	0.0	0.0	0.0	5.355E-01	0.0	1.0E-10	3.0E-06
580	CD115M	1	3.853E 06	7.000E-05	0.0	0.0	0.0	0.0	0.0	0.0	6.292E-01	0.0	1.0E-10	3.0E-06
581	IN115	1	1.577E 22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.420E-01	9.57E 01	1.0E-10	3.0E-06
582	IN115M	1	1.548E 04	0.0	0.0	0.0	0.0	9.630E-01	0.0	0.0	3.364E-01	0.0	1.0E-10	3.0E-06
583	SN115	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.80E-01	1.0E 00	1.0E 00
584	TC116	1	1.062E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.262E 00	0.0	3.0E-08	1.0E 00
585	RU116	1	1.405E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.729E 00	0.0	3.0E-08	1.0E 00
586	RH116	1	8.333E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.737E 00	0.0	3.0E-08	1.0E 00
587	PD116	1	1.400E 01	5.000E-01	0.0	0.0	0.0	0.0	0.0	0.0	1.569E 00	0.0	3.0E-08	1.0E 00
588	AG116	1	1.608E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.424E 00	0.0	3.0E-08	1.0E 00
589	AG116M	1	1.040E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.010E 00	0.0	3.0E-08	1.0E 00
590	CD116	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.50E 00	1.0E 00	1.0E 00
591	IN116	1	1.410E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.382E 00	0.0	3.0E-08	1.0E 00
592	IN116M	1	3.249E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.777E 00	0.0	3.0E-08	1.0E 00
593	SN116	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.47E 01	1.0E 00	1.0E 00
594	TC117	1	1.352E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.023E 00	0.0	3.0E-08	1.0E 00
595	RU117	1	3.089E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.820E 00	0.0	3.0E-08	1.0E 00
596	RH117	1	1.076E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.588E 00	0.0	3.0E-08	1.0E 00
597	PD117	1	5.000E 00	5.000E-01	0.0	0.0	0.0	0.0	0.0	0.0	3.369E 00	0.0	3.0E-08	1.0E 00
598	AG117	1	7.320E 01	2.000E-01	0.0	0.0	0.0	0.0	0.0	0.0	2.479E 00	0.0	3.0E-08	1.0E 00
599	AG117M	1	5.300E 00	5.000E-01	0.0	0.0	0.0	0.0	0.0	0.0	2.600E 00	0.0	3.0E-08	1.0E 00
600	CD117	1	9.360E 03	9.300E-01	0.0	0.0	0.0	0.0	0.0	0.0	1.215E 00	0.0	1.0E-10	3.0E-06
601	CD117M	1	1.224E 04	4.400E-01	0.0	0.0	0.0	0.0	0.0	0.0	1.371E 00	0.0	1.0E-10	3.0E-06
602	IN117	1	2.640E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.600E-01	0.0	3.0E-09	1.0E 00
603	IN117M	1	6.984E 03	0.0	0.0	0.0	0.0	4.700E-01	0.0	0.0	6.370E-01	0.0	3.0E-08	1.0E 00
604	SN117	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.75E 00	1.0E 00	1.0E 00
605	SN117M	1	1.210E 06	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	3.129E-01	0.0	1.0E-10	3.0E-06
606	TC118	1	7.722E-02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.927E 00	0.0	3.0E-08	1.0E 00
607	RU118	1	6.163E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.429E 00	0.0	3.0E-08	1.0E 00
608	RH118	1	2.953E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.688E 00	0.0	3.0E-08	1.0E 00
609	PD118	1	3.100E 00	5.000E-01	0.0	0.0	0.0	0.0	0.0	0.0	2.256E 00	0.0	3.0E-08	1.0E 00
610	AG118	1	3.700E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.184E 00	0.0	3.0E-08	1.0E 00
611	AG118M	1	2.800E 00	0.0	0.0	0.0	0.0	4.100E-01	0.0	0.0	2.123E 00	0.0	3.0E-08	1.0E 00

Table A.1 (continued)

NO.	ISOTOPE	IU	HALF-LIFE	FB1	FPEC	FPEC1	FAL	FIT	FSF	FBN	Q	ABUND	ARCG	WRCG
612	CD118	1	3.018E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.390E-01	0.0	3.0E-08	1.0E 00
613	IN118	1	5.000E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.037E 00	0.0	3.0E-08	1.0E 00
614	IN118M	1	2.670E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.304E 00	0.0	3.0E-08	1.0E 00
615	SN118	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.43E 01	1.0E 00	1.0E 00
616	RH119	1	1.771E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.565E 00	0.0	3.0E-08	1.0E 00
617	RH119	1	4.477E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.316E 00	0.0	3.0E-08	1.0E 00
618	PD119	1	1.712E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.282E 00	0.0	3.0E-08	1.0E 00
619	AG119	1	6.000E 00	5.000E-01	0.0	0.0	0.0	0.0	0.0	0.0	3.180E 00	0.0	3.0E-08	1.0E 00
620	CD119	1	5.640E 02	1.000E 00	0.0	0.0	0.0	0.0	0.0	0.0	1.850E 00	0.0	3.0E-08	1.0E 00
621	CD119M	1	1.920E 02	5.000E-01	0.0	0.0	0.0	0.0	0.0	0.0	2.064E 00	0.0	3.0E-08	1.0E 00
622	IN119	1	1.500E 02	5.000E-02	0.0	0.0	0.0	0.0	0.0	0.0	1.349E 00	0.0	3.0E-08	1.0E 00
623	IN119M	1	1.080E 03	0.0	0.0	0.0	0.0	5.000E-02	0.0	0.0	1.425E 00	0.0	3.0E-08	1.0E 00
624	SN119	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.60E 00	1.0E 00	1.0E 00
625	SN119M	1	2.117E 07	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	8.720E-02	0.0	1.0E-10	3.0E-06
626	RH120	1	2.932E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.321E 00	0.0	3.0E-08	1.0E 00
627	RH120	1	1.624E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.383E 00	0.0	3.0E-08	1.0E 00
628	PD120	1	4.272E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.951E 00	0.0	3.0E-08	1.0E 00
629	AG120	1	1.170E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.569E 00	0.0	3.0E-08	1.0E 00
630	CD120	1	5.080E 01	5.000E-01	0.0	0.0	0.0	0.0	0.0	0.0	9.480E-01	0.0	3.0E-08	1.0E 00
631	IN120	1	4.440E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.906E 00	0.0	3.0E-08	1.0E 00
632	IN120M	1	3.080E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.703E 00	0.0	3.0E-08	1.0E 00
633	SN120	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.24E 01	1.0E 00	1.0E 00
634	TE120	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.10E-02	1.0E 00	1.0E 00
635	RH121	1	2.210E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.233E 00	0.0	3.0E-08	1.0E 00
636	PD121	1	6.221E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.959E 00	0.0	3.0E-08	1.0E 00
637	AG121	1	3.000E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.862E 00	0.0	3.0E-08	1.0E 00
638	CD121	1	1.280E 01	1.800E-01	0.0	0.0	0.0	0.0	0.0	0.0	2.795E 00	0.0	3.0E-08	1.0E 00
639	IN121	1	2.800E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.032E 00	0.0	3.0E-08	1.0E 00
640	IN121M	1	1.980E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.173E 00	0.0	3.0E-08	1.0E 00
641	SN121	1	9.648E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.040E-01	0.0	1.0E-10	3.0E-06
642	SN121M	1	1.577E 09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.380E-01	0.0	1.0E-10	3.0E-06
643	SB121	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.73E 01	1.0E 00	1.0E 00
644	TE121	1	1.469E 06	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	5.854E-01	0.0	1.0E-10	3.0E-06
645	TE121M	1	1.331E 07	0.0	1.140E-01	0.0	0.0	8.860E-01	0.0	0.0	2.950E-01	0.0	1.0E-10	3.0E-06
646	RH122	1	1.053E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.971E 00	0.0	3.0E-08	1.0E 00
647	PD122	1	1.270E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.766E 00	0.0	3.0E-08	1.0E 00
648	AG122	1	1.000E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.878E 00	0.0	3.0E-08	1.0E 00
649	CD122	1	5.500E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.449E 00	0.0	3.0E-08	1.0E 00
650	IN122	1	1.000E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.649E 00	0.0	3.0E-08	1.0E 00
651	IN122M	1	1.500E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.309E-01	0.0	3.0E-08	1.0E 00
652	SN122	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.60E 00	1.0E 00	1.0E 00
653	SB122	1	2.333E 05	0.0	2.400E-02	0.0	0.0	0.0	0.0	0.0	1.009E 00	0.0	1.0E-10	3.0E-06
654	SB122M	1	2.520E 02	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	1.620E-01	0.0	3.0E-08	1.0E 00
655	TE122	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.50E 00	1.0E 00	1.0E 00
656	RH123	1	1.335E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.918E 00	0.0	3.0E-08	1.0E 00
657	PD123	1	3.100E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.690E 00	0.0	3.0E-08	1.0E 00
658	AG123	1	8.627E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.699E 00	0.0	3.0E-08	1.0E 00
659	CD123	1	8.404E 00	2.300E-01	0.0	0.0	0.0	0.0	0.0	0.0	3.368E 00	0.0	3.0E-08	1.0E 00
660	IN123	1	5.970E 00	9.500E-01	0.0	0.0	0.0	0.0	0.0	0.0	2.341E 00	0.0	3.0E-08	1.0E 00
661	IN123M	1	4.800E 01	5.000E-01	0.0	0.0	0.0	0.0	0.0	0.0	2.719E 00	0.0	3.0E-08	1.0E 00
662	SN123	1	1.116E 07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.269E-01	0.0	1.0E-10	3.0E-06

Table A.1 (continued)

NO.	ISOTOPE	ID	HALF-LIFE	FB1	FPEC	FPEC1	FAL	FIT	FSF	FBN	Q	ABUND	APCG	WRCG
663	SN123M	1	2.405E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.148E-01	0.0	3.0E-08	1.0E 00
664	SB123	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.27E 01	1.0E 00	1.0E 00
665	TE123	1	3.156E 20	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	2.524E-02	8.89E-01	1.0E-10	3.0E-06
666	TE123M	1	1.034E 07	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	2.457E-01	0.0	1.0E-10	3.0E-06
667	PD124	1	5.601E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.518E 00	0.0	3.0E-08	1.0E 00
668	AG124	1	2.685E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.633E 00	0.0	3.0E-08	1.0E 00
669	CD124	1	1.717E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.287E 00	0.0	3.0E-08	1.0E 00
670	IN124	1	3.200E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.455E 00	0.0	3.0E-08	1.0E 00
671	SN124	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.60E 00	1.0E 00	1.0E 00
672	SB124	1	5.201E 06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.240E 00	0.0	1.0E-10	3.0E-06
673	SB124M	1	9.300E 01	0.0	0.0	0.0	0.0	8.000E-01	0.0	0.0	4.337E-01	0.0	3.0E-08	1.0E 00
674	TE124	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.62E 00	1.0E 00	1.0E 00
675	XE124	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.00E-01	1.0E 00	1.0E 00
676	PD125	1	1.831E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.369E 00	0.0	3.0E-08	1.0E 00
677	AG125	1	3.820E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.479E 00	0.0	3.0E-08	1.0E 00
678	CD125	1	1.622E 00	3.000E-01	0.0	0.0	0.0	0.0	0.0	0.0	4.040E 00	0.0	3.0E-08	1.0E 00
679	IN125	1	2.330E 00	7.000E-01	0.0	0.0	0.0	0.0	0.0	0.0	3.231E 00	0.0	3.0E-08	1.0E 00
680	IN125M	1	1.200E 01	9.200E-01	0.0	0.0	0.0	0.0	0.0	0.0	3.351E 00	0.0	3.0E-08	1.0E 00
681	SN125	1	8.329E 05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.118E 00	0.0	1.0E-10	3.0E-06
682	SN125M	1	5.712E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.135E 00	0.0	3.0E-08	1.0E 00
683	SB125	1	8.741E 07	2.300E-01	0.0	0.0	0.0	0.0	0.0	0.0	5.274E-01	0.0	1.0E-10	3.0E-06
684	TE125	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.00E 00	1.0E 00	1.0E 00
685	TE125M	1	5.011E 06	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	1.418E-01	0.0	1.0E-10	3.0E-06
686	I 125	4	5.970E 01	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	1.490E-01	0.0	1.0E-10	3.0E-06
687	XE125	3	1.700E 01	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	1.900E 00	0.0	1.0E-10	3.0E-06
688	XE125M	1	5.700E 01	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	2.501E-01	0.0	3.0E-08	1.0E 00
689	PD126	1	2.870E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.333E 00	0.0	3.0E-08	1.0E 00
690	AG126	1	1.555E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.267E 00	0.0	3.0E-08	1.0E 00
691	CD126	1	3.766E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.960E 00	0.0	3.0E-08	1.0E 00
692	IN126	1	1.530E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.132E 00	0.0	3.0E-08	1.0E 00
693	SN126	1	3.156E 12	1.000E 00	0.0	0.0	0.0	0.0	0.0	0.0	2.104E-01	0.0	1.0E-10	3.0E-06
694	SB126	1	1.071E 06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.117E 00	0.0	1.0E-10	3.0E-06
695	SB126M	1	1.140E 03	0.0	0.0	0.0	0.0	1.400E-01	0.0	0.0	2.148E 00	0.0	3.0E-08	1.0E 00
696	TE126	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.87E 01	1.0E 00	1.0E 00
697	I 126	1	1.125E 06	0.0	5.600E-01	0.0	0.0	0.0	0.0	0.0	5.771E-01	0.0	1.0E-10	3.0E-06
698	XE126	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.00E-02	1.0E 00	1.0E 00
699	AG127	1	2.052E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.288E 00	0.0	3.0E-08	1.0E 00
700	CD127	1	6.590E-01	5.000E-01	0.0	0.0	0.0	0.0	0.0	0.0	4.659E 00	0.0	3.0E-08	1.0E 00
701	IN127	1	2.000E 00	0.0	0.0	0.0	0.0	0.0	0.0	6.700E-03	4.066E 00	0.0	3.0E-08	1.0E 00
702	IN127M	1	3.640E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.248E 00	0.0	3.0E-08	1.0E 00
703	SN127	1	7.560E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.442E 00	0.0	1.0E-10	3.0E-06
704	SN127M	1	2.480E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.628E 00	0.0	3.0E-08	1.0E 00
705	SB127	1	3.326E 05	1.390E-01	0.0	0.0	0.0	0.0	0.0	0.0	1.001E 00	0.0	1.0E-10	3.0E-06
706	TE127	1	3.366E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.278E-01	0.0	1.0E-10	3.0E-06
707	TE127M	1	9.418E 06	0.0	0.0	0.0	0.0	9.760E-01	0.0	0.0	9.074E-02	0.0	1.0E-10	3.0E-06
708	I 127	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.00E 02	1.0E 00	1.0E 00
709	XE127	1	3.146E 06	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	3.110E-01	0.0	1.0E-10	3.0E-06
710	XE127M	1	7.000E 01	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	2.278E-01	0.0	3.0E-08	1.0E 00
711	AG128	1	1.024E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.893E 00	0.0	3.0E-08	1.0E 00
712	CD128	1	1.290E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.695E 00	0.0	3.0E-08	1.0E 00
713	IN128	1	3.700E 00	0.0	0.0	0.0	0.0	0.0	0.0	1.200E-02	5.869E 00	0.0	3.0E-08	1.0E 00

Table A.1 (continued)

NO.	ISOTOPE	IU	HALF-LIFE	FB1	FPEC	FPEC1	FAL	PIT	FSF	FBN	Q	ABUND	ARCG	WRCG
714	SN128	1	3.540E 03	1.000E 00	0.0	0.0	0.0	0.0	0.0	0.0	8.140E-01	0.0	3.0E-08	1.0E 00
715	SB128	1	3.244E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.482E 00	0.0	1.0E-10	3.0E-06
716	SB128M	1	6.240E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.960E 00	0.0	3.0E-08	1.0E 00
717	TE128	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.17E 01	1.0E 00	1.0E 00
718	I 128	1	1.499E 03	0.0	6.000E-02	0.0	0.0	0.0	0.0	0.0	8.322E-01	0.0	3.0E-08	1.0E 00
719	XE128	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.91E 00	1.0E 00	1.0E 00
720	CD129	1	3.377E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.427E 00	0.0	3.0E-08	1.0E 00
721	IN129	1	8.000E-01	5.180E-01	0.0	0.0	0.0	0.0	0.0	3.500E-02	4.619E 00	0.0	3.0E-08	1.0E 00
722	SN129	1	4.500E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.530E 00	0.0	3.0E-08	1.0E 00
723	SN129M	1	1.500E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.687E 00	0.0	3.0E-08	1.0E 00
724	SB129	1	1.555E 04	1.307E-01	0.0	0.0	0.0	0.0	0.0	0.0	1.885E 00	0.0	1.0E-10	3.0E-06
725	TE129	1	4.176E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.027E-01	0.0	3.0E-08	1.0E 00
726	TE129M	1	2.903E 06	0.0	0.0	0.0	0.0	6.500E-01	0.0	0.0	2.958E-01	0.0	1.0E-10	3.0E-06
727	I 129	1	4.954E 14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.804E-02	0.0	1.0E-10	3.0E-06
728	XE129	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.64E 01	1.0E 00	1.0E 00
729	XE129M	1	6.912E 05	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	2.360E-01	0.0	1.0E-10	3.0E-06
730	CD130	1	5.240E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.578E 00	0.0	3.0E-08	1.0E 00
731	IN130	1	5.300E-01	0.0	0.0	0.0	0.0	0.0	0.0	4.500E-02	5.373E 00	0.0	3.0E-08	1.0E 00
732	SN130	1	2.232E 02	1.000E 00	0.0	0.0	0.0	0.0	0.0	0.0	1.315E 00	0.0	3.0E-08	1.0E 00
733	SB130	1	2.400E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.949E 00	0.0	3.0E-08	1.0E 00
734	SB130M	1	3.780E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.716E 00	0.0	3.0E-08	1.0E 00
735	TE130	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.45E 01	1.0E 00	1.0E 00
736	I 130	1	4.450E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.429E 00	0.0	1.0E-10	3.0E-06
737	I 130M	1	5.400E 02	0.0	0.0	0.0	0.0	8.300E-01	0.0	0.0	3.076E-01	0.0	3.0E-08	1.0E 00
738	XE130	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.10E 00	1.0E 00	1.0E 00
739	BA130	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.10E-01	1.0E 00	1.0E 00
740	CD131	1	1.193E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.404E 00	0.0	3.0E-08	1.0E 00
741	IN131	1	3.000E-01	0.0	0.0	0.0	0.0	0.0	0.0	9.500E-02	5.419E 00	0.0	3.0E-08	1.0E 00
742	SN131	1	6.300E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.012E 00	0.0	3.0E-08	1.0E 00
743	SB131	1	1.380E 03	6.800E-02	0.0	0.0	0.0	0.0	0.0	0.0	2.442E 00	0.0	3.0E-08	1.0E 00
744	TE131	1	1.500E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.139E 00	0.0	3.0E-08	1.0E 00
745	TE131M	1	1.080E 05	0.0	0.0	0.0	0.0	2.220E-01	0.0	0.0	1.622E 00	0.0	1.0E-10	3.0E-06
746	I 131	1	6.947E 05	1.110E-02	0.0	0.0	0.0	0.0	0.0	0.0	5.730E-01	0.0	1.0E-10	3.0E-06
747	XE131	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.12E 01	1.0E 00	1.0E 00
748	XE131M	1	1.028E 06	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	1.623E-01	0.0	1.0E-10	3.0E-06
749	CS131	4	9.700E 00	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	3.500E-01	0.0	1.0E-10	3.0E-06
750	BA131	1	1.020E 06	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	6.219E-01	0.0	1.0E-10	3.0E-06
751	BA131M	2	1.500E 01	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	1.800E-01	0.0	3.0E-08	1.0E 00
752	CD132	1	1.448E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.689E 00	0.0	3.0E-08	1.0E 00
753	IN132	1	1.200E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.485E 00	0.0	3.0E-08	1.0E 00
754	SN132	1	4.000E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.062E 00	0.0	3.0E-08	1.0E 00
755	SB132	1	1.680E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.936E 00	0.0	3.0E-08	1.0E 00
756	SB132M	1	2.520E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.931E 00	0.0	3.0E-08	1.0E 00
757	TE132	1	2.815E 05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.342E-01	0.0	1.0E-10	3.0E-06
758	I 132	1	8.280E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.773E 00	0.0	1.0E-10	3.0E-06
759	XE132	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.69E 01	1.0E 00	1.0E 00
760	CS132	1	5.594E 05	0.0	9.800E-01	0.0	0.0	0.0	0.0	0.0	7.259E-01	0.0	1.0E-10	3.0E-06
761	BA132	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.00E-01	1.0E 00	1.0E 00
762	IN133	1	1.139E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.803E 00	0.0	3.0E-08	1.0E 00
763	SN133	1	1.470E 00	0.0	0.0	0.0	0.0	0.0	0.0	2.100E-04	4.887E 00	0.0	3.0E-08	1.0E 00
764	SB133	1	1.440E 02	2.200E-02	0.0	0.0	0.0	0.0	0.0	0.0	3.700E 00	0.0	3.0E-08	1.0E 00

Table A.1 (continued)

NO.	ISOTOPE	IU	HALF-LIFE	FB1	FPEC	FPEC1	FAL	FIT	FSF	FBN	Q	ABUND	ARCG	WRCG
765	TE133	1	7.470E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.746E 00	0.0	3.0E-08	1.0E 00
766	TE133M	1	3.324E 03	0.0	0.0	0.0	0.0	1.300E-01	0.0	0.0	2.982E 00	0.0	3.0E-08	1.0E 00
767	I 133	1	7.488E 04	2.882E-02	0.0	0.0	0.0	0.0	0.0	0.0	1.013E 00	0.0	1.0E-10	3.0E-06
768	I 133M	1	9.000E 00	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	1.631E 00	0.0	3.0E-08	1.0E 00
769	XE133	1	4.532E 05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.807E-01	0.0	1.0E-10	3.0E-06
770	XE133M	1	1.892E 05	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	2.317E-01	0.0	1.0E-10	3.0E-06
771	CS133	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.00E 02	1.0E 00	1.0E 00
772	BA133	1	3.389E 08	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	4.521E-01	0.0	1.0E-10	3.0E-06
773	BA133M	1	1.400E 05	0.0	0.0	0.0	0.0	9.999E-01	0.0	0.0	2.858E-01	0.0	1.0E-10	3.0E-06
774	IN134	1	7.754E-02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.148E 00	0.0	3.0E-08	1.0E 00
775	SN134	1	8.447E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.135E 00	0.0	3.0E-08	1.0E 00
776	SB134	1	1.100E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.930E 00	0.0	3.0E-08	1.0E 00
777	SB134M	1	1.070E 01	0.0	0.0	0.0	0.0	0.0	0.0	8.000E-04	5.048E 00	0.0	3.0E-08	1.0E 00
778	TE134	1	2.508E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.182E 00	0.0	3.0E-08	1.0E 00
779	I 134	1	3.156E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.248E 00	0.0	3.0E-08	1.0E 00
780	I 134M	1	2.220E 02	0.0	0.0	0.0	0.0	9.800E-01	0.0	0.0	3.468E-01	0.0	3.0E-08	1.0E 00
781	XE134	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.04E 01	1.0E 00	1.0E 00
782	XE134M	1	2.900E-01	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	1.904E 00	0.0	3.0E-08	1.0E 00
783	CS134	1	6.507E 07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.717E 00	0.0	1.0E-10	3.0E-06
784	CS134M	1	1.044E 04	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	1.352E-01	0.0	1.0E-10	3.0E-06
785	BA134	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.40E 00	1.0E 00	1.0E 00
786	SN135	1	2.911E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.641E 00	0.0	3.0E-08	1.0E 00
787	SB135	1	1.700E 00	0.0	0.0	0.0	0.0	0.0	0.0	8.000E-02	4.872E 00	0.0	3.0E-08	1.0E 00
788	TE135	1	1.920E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.106E 00	0.0	3.0E-08	1.0E 00
789	I 135	1	2.380E 04	1.540E-01	0.0	0.0	0.0	0.0	0.0	0.0	1.936E 00	0.0	1.0E-10	3.0E-06
790	XE135	1	3.272E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.645E-01	0.0	1.0E-10	3.0E-06
791	XE135M	1	9.174E 02	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	5.267E-01	0.0	3.0E-08	1.0E 00
792	CS135	1	7.258E 13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.630E-02	0.0	1.0E-10	3.0E-06
793	CS135M	2	5.300E 01	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	1.619E 00	0.0	3.0E-08	1.0E 00
794	BA135	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.59E 00	1.0E 00	1.0E 00
795	BA135M	1	1.033E 05	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	2.666E-01	0.0	1.0E-10	3.0E-06
796	SN136	1	4.130E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.898E 00	0.0	3.0E-08	1.0E 00
797	SB136	1	2.313E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.576E 00	0.0	3.0E-08	1.0E 00
798	TE136	1	2.100E 01	0.0	0.0	0.0	0.0	0.0	0.0	5.000E-03	2.841E 00	0.0	3.0E-08	1.0E 00
799	I 136	1	8.300E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.256E 00	0.0	3.0E-08	1.0E 00
800	I 136M	1	4.600E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.824E 00	0.0	3.0E-08	1.0E 00
801	XE136	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.90E 00	1.0E 00	1.0E 00
802	CS136	1	1.132E 06	1.648E-01	0.0	0.0	0.0	0.0	0.0	0.0	2.300E 00	0.0	1.0E-10	3.0E-06
803	BA136	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.90E 00	1.0E 00	1.0E 00
804	BA136M	1	3.080E-01	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	2.040E 00	0.0	3.0E-08	1.0E 00
805	CE136	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.90E-01	1.0E 00	1.0E 00
806	SB137	1	2.837E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.846E 00	0.0	3.0E-08	1.0E 00
807	TE137	1	3.500E 00	0.0	0.0	0.0	0.0	0.0	0.0	5.000E-03	4.292E 00	0.0	3.0E-08	1.0E 00
808	I 137	1	2.460E 01	0.0	0.0	0.0	0.0	0.0	0.0	5.400E-02	3.543E 00	0.0	3.0E-08	1.0E 00
809	XE137	1	2.298E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.963E 00	0.0	3.0E-08	1.0E 00
810	CS137	1	9.467E 08	9.460E-01	0.0	0.0	0.0	0.0	0.0	0.0	1.866E-01	0.0	1.0E-10	3.0E-06
811	BA137	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.12E 01	1.0E 00	1.0E 00
812	BA137M	1	1.531E 02	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	6.624E-01	0.0	3.0E-08	1.0E 00
813	LA137	1	1.893E 12	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	3.026E-02	0.0	1.0E-10	3.0E-06
814	CE137	1	3.240E 04	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	4.021E-02	0.0	1.0E-10	3.0E-06
815	CE137M	1	1.238E 05	0.0	1.000E-02	0.0	0.0	9.900E-01	0.0	0.0	2.534E-01	0.0	1.0E-10	3.0E-06

Table A.1 (continued)

NO.	ISOTOPE	ID	HALF-LIFE	FR1	FPEC	FPEC1	FAL	FIT	FSF	FBN	Q	ABUND	AFCG	WPCG
816	SB138	1	1.304E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.449E 00	0.0	3.0E-08	1.0E 00
817	TE138	1	1.640E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.588E 00	0.0	3.0E-08	1.0E 00
818	I 138	1	6.400E 00	0.0	0.0	0.0	0.0	0.0	0.0	2.500E-02	4.000E 00	0.0	3.0E-08	1.0E 00
819	XE138	1	8.502E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.801E 00	0.0	3.0E-08	1.0E 00
820	CS138	1	1.932E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.558E 00	0.0	3.0E-08	1.0E 00
821	CS138M	1	1.740E 02	0.0	0.0	0.0	0.0	7.500E-01	0.0	0.0	9.339E-01	0.0	3.0E-08	1.0E 00
822	PA138	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.17E 01	1.0E 00	1.0E 00
823	LA138	1	4.260E 18	0.0	6.710E-01	0.0	0.0	0.0	0.0	0.0	2.906E-01	8.90E-02	1.0E-10	3.0E-06
824	CE138	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.50E-01	1.0E 00	1.0E 00
825	SB139	1	1.719E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.496E 00	0.0	3.0E-08	1.0E 00
826	TE139	1	4.237E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.250E 00	0.0	3.0E-08	1.0E 00
827	I 139	1	2.400E 00	0.0	0.0	0.0	0.0	0.0	0.0	1.000E-01	4.224E 00	0.0	3.0E-08	1.0E 00
828	XE139	1	3.950E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.672E 00	0.0	3.0E-08	1.0E 00
829	CS139	1	5.640E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.997E 00	0.0	3.0E-08	1.0E 00
830	BA139	1	4.962E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.394E-01	0.0	3.0E-08	1.0E 00
831	LA139	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.99E 01	1.0E 00	1.0E 00
832	CE139	1	1.189E 07	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	1.930E-01	0.0	1.0E-10	3.0E-06
833	CE139M	1	5.620E 01	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	7.519E-01	0.0	3.0E-08	1.0E 00
834	TE140	1	7.519E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.242E 00	0.0	3.0E-08	1.0E 00
835	I 140	1	8.600E-01	0.0	0.0	0.0	0.0	0.0	0.0	3.200E-01	5.020E 00	0.0	3.0E-08	1.0E 00
836	XE140	1	1.360E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.243E 00	0.0	3.0E-08	1.0E 00
837	CS140	1	6.380E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.062E 00	0.0	3.0E-08	1.0E 00
838	BA140	1	1.105E 06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.707E-01	0.0	1.0E-10	3.0E-06
839	LA140	1	1.448E 05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.828E 00	0.0	1.0E-10	3.0E-06
840	CE140	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.85E 01	1.0E 00	1.0E 00
841	TE141	1	2.358E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.010E 00	0.0	3.0E-08	1.0E 00
842	I 141	1	4.000E-01	0.0	0.0	0.0	0.0	0.0	0.0	1.200E-01	4.834E 00	0.0	3.0E-08	1.0E 00
843	XE141	1	1.720E 00	0.0	0.0	0.0	0.0	0.0	0.0	5.400E-04	3.841E 00	0.0	3.0E-08	1.0E 00
844	CS141	1	2.500E 01	0.0	0.0	0.0	0.0	0.0	0.0	7.300E-04	3.202E 00	0.0	3.0E-08	1.0E 00
845	BA141	1	1.096E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.729E 00	0.0	3.0E-08	1.0E 00
846	LA141	1	1.415E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.907E-01	0.0	1.0E-10	3.0E-06
847	CE141	1	2.809E 06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.470E-01	0.0	1.0E-10	3.0E-06
848	PR141	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.00E 02	1.0E 00	1.0E 00
849	TE142	1	4.913E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.631E 00	0.0	3.0E-08	1.0E 00
850	I 142	1	1.960E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.836E 00	0.0	3.0E-08	1.0E 00
851	XE142	1	1.220E 00	0.0	0.0	0.0	0.0	0.0	0.0	5.100E-03	2.863E 00	0.0	3.0E-08	1.0E 00
852	CS142	1	1.700E 00	0.0	0.0	0.0	0.0	0.0	0.0	2.100E-03	4.589E 00	0.0	3.0E-03	1.0E 00
853	BA142	1	6.420E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.469E 00	0.0	3.0E-08	1.0E 00
854	LA142	1	5.562E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.572E 00	0.0	3.0E-08	1.0E 00
855	CE142	1	3.311E 18	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	0.0	1.11E 01	2.0E-14	3.0E-08
856	PR142	1	6.887E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.671E-01	0.0	1.0E-10	3.0E-06
857	PR142M	1	8.760E 02	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	2.500E-01	0.0	3.0E-08	1.0E 00
858	ND142	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.72E 01	1.0E 00	1.0E 00
859	I 143	1	3.281E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.511E 00	0.0	3.0E-08	1.0E 00
860	XE143	1	3.000E-01	0.0	0.0	0.0	0.0	0.0	0.0	1.100E-02	4.488E 00	0.0	3.0E-08	1.0E 00
861	CS143	1	1.700E 00	0.0	0.0	0.0	0.0	0.0	0.0	1.130E-02	3.733E 00	0.0	3.0E-08	1.0E 00
862	BA143	1	1.360E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.659E 00	0.0	3.0E-08	1.0E 00
863	LA143	1	8.400E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.972E 00	0.0	3.0E-08	1.0E 00
864	CE143	1	1.188E 05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.105E-01	0.0	1.0E-10	3.0E-06
865	PR143	1	1.172E 06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.143E-01	0.0	1.0E-10	3.0E-06
866	ND143	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.22E 01	1.0E 00	1.0E 00

Table A.1 (continued)

NO.	ISOTOPE	IU	HALF-LIFE	FB1	FPEC	FPEC1	FAL	FIT	FSF	FBN	Q	ABUND	APCG	WPCG
867	I 144	1	1.327E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.217E 00	0.0	3.0E-08	1.0E 00
868	XE144	1	1.000E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.204E 00	0.0	3.0E-08	1.0E 00
869	CS144	1	1.020E 00	0.0	0.0	0.0	0.0	0.0	0.0	1.100E-02	5.391E 00	0.0	3.0E-08	1.0E 00
870	BA144	1	1.100E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.694E 00	0.0	3.0E-08	1.0E 00
871	LA144	1	4.000E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.447E 00	0.0	3.0E-08	1.0E 00
872	CE144	1	2.456E 07	1.200E-02	0.0	0.0	0.0	0.0	0.0	0.0	1.119E-01	0.0	1.0E-10	3.0E-06
873	PR144	1	1.037E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.240E 00	0.0	3.0E-08	1.0E 00
874	PR144M	1	4.320E 02	0.0	0.0	0.0	0.0	9.994E-01	0.0	0.0	5.772E-02	0.0	3.0E-08	1.0E 00
875	ND144	1	6.623E 22	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	0.0	2.38E 01	2.0E-14	3.0E-08
876	SM144	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.10E 00	1.0E 00	1.0E 00
877	I 145	1	1.867E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.227E 00	0.0	3.0E-08	1.0E 00
878	XE145	1	9.000E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.036E 00	0.0	3.0E-08	1.0E 00
879	CS145	1	5.600E-01	0.0	0.0	0.0	0.0	0.0	0.0	4.400E-02	4.022E 00	0.0	3.0E-08	1.0E 00
880	BA145	1	6.200E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.208E 00	0.0	3.0E-08	1.0E 00
881	LA145	1	2.900E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.578E 00	0.0	3.0E-08	1.0E 00
882	CE145	1	1.800E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.485E 00	0.0	3.0E-08	1.0E 00
883	PR145	1	2.153E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.915E-01	0.0	1.0E-10	3.0E-06
884	ND145	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.30E 00	1.0E 00	1.0E 00
885	PM145	1	5.586E 08	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	4.302E-02	0.0	1.0E-10	3.0E-06
886	SM145	1	2.938E 07	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	9.322E-02	0.0	1.0E-10	3.0E-06
887	XE146	1	9.372E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.953E 00	0.0	3.0E-08	1.0E 00
888	CS146	1	1.900E-01	0.0	0.0	0.0	0.0	0.0	0.0	3.900E-02	5.802E 00	0.0	3.0E-08	1.0E 00
889	BA146	1	2.200E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.940E 00	0.0	3.0E-08	1.0E 00
890	LA146	1	8.300E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.125E 00	0.0	3.0E-08	1.0E 00
891	CE146	1	8.520E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.391E-01	0.0	3.0E-08	1.0E 00
892	PR146	1	1.452E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.563E 00	0.0	3.0E-08	1.0E 00
893	ND146	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.72E 01	1.0E 00	1.0E 00
894	SM146	8	7.000E 01	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	2.540E 00	0.0	2.0E-14	3.0E-08
895	XE147	1	2.638E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.716E 00	0.0	3.0E-08	1.0E 00
896	CS147	1	5.578E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.906E 00	0.0	3.0E-08	1.0E 00
897	BA147	1	2.227E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.658E 00	0.0	3.0E-08	1.0E 00
898	LA147	1	1.000E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.875E 00	0.0	3.0E-08	1.0E 00
899	CE147	1	7.000E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.123E 00	0.0	3.0E-08	1.0E 00
900	PR147	1	7.200E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.568E 00	0.0	3.0E-08	1.0E 00
901	ND147	1	9.556E 05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.070E-01	0.0	1.0E-10	3.0E-06
902	PM147	1	8.279E 07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.051E-02	0.0	1.0E-10	3.0E-06
903	SM147	1	3.377E 18	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	2.310E 00	1.51E 01	2.0E-14	3.0E-08
904	CS148	1	2.016E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.566E 00	0.0	3.0E-08	1.0E 00
905	BA148	1	5.901E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.620E 00	0.0	3.0E-08	1.0E 00
906	LA148	1	1.300E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.601E 00	0.0	3.0E-08	1.0E 00
907	CE148	1	4.300E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.860E-01	0.0	3.0E-08	1.0E 00
908	PR148	1	1.380E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.821E 00	0.0	3.0E-08	1.0E 00
909	ND148	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.70E 00	1.0E 00	1.0E 00
910	PM148	1	4.640E 05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.299E 00	0.0	1.0E-10	3.0E-06
911	PM148M	1	3.568E 06	0.0	0.0	0.0	0.0	4.900E-02	0.0	0.0	2.139E 00	0.0	1.0E-10	3.0E-06
912	SM148	1	2.525E 23	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	2.014E 00	1.13E 01	2.0E-14	3.0E-08
913	CS149	1	2.782E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.721E 00	0.0	3.0E-08	1.0E 00
914	BA149	1	9.175E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.308E 00	0.0	3.0E-08	1.0E 00
915	LA149	1	2.864E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.582E 00	0.0	3.0E-08	1.0E 00
916	CE149	1	1.000E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.514E 00	0.0	3.0E-08	1.0E 00
917	PR149	1	1.380E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.409E 00	0.0	3.0E-08	1.0E 00

Table A.1 (continued)

NO.	ISOTOPE	IU	HALF-LIFE	FR1	FPEC	FPEC1	FAL	FIT	FSF	FEM	Q	ABUND	APCG	WPCG
918	ND149	1	6.228E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.900E-01	0.0	3.0E-08	1.0E 00
919	PM149	1	1.911E 05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.769E-01	0.0	1.0E-10	3.0E-06
920	SM149	1	3.154E 23	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	0.0	1.39E 01	2.0E-14	3.0E-08
921	CS150	1	1.244E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.261E 00	0.0	3.0E-08	1.0E 00
922	BA150	1	1.797E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.411E 00	0.0	3.0E-08	1.0E 00
923	LA150	1	6.485E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.270E 00	0.0	3.0E-08	1.0E 00
924	CE150	1	1.000E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.520E 00	0.0	3.0E-08	1.0E 00
925	PR150	1	1.240E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.212E 00	0.0	3.0E-08	1.0E 00
926	ND150	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.60E 00	1.0E 00	1.0E 00
927	PM150	1	9.648E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.283E 00	0.0	1.0E-10	3.0E-06
928	SM150	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.40E 00	1.0E 00	1.0E 00
929	BA151	1	4.368E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.077E 00	0.0	3.0E-08	1.0E 00
930	LA151	1	9.536E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.400E 00	0.0	3.0E-08	1.0E 00
931	CE151	1	1.000E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.098E 00	0.0	3.0E-08	1.0E 00
932	PR151	1	4.000E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.377E 00	0.0	3.0E-08	1.0E 00
933	ND151	1	7.440E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.483E 00	0.0	3.0E-08	1.0E 00
934	PM151	1	1.022E 05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.210E-01	0.0	1.0E-10	3.0E-06
935	SM151	1	2.840E 09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.978E-02	0.0	1.0E-10	3.0E-06
936	EU151	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.79E 01	1.0E 00	1.0E 00
937	BA152	1	7.548E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.192E 00	0.0	3.0E-08	1.0E 00
938	LA152	1	3.094E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.072E 00	0.0	3.0E-08	1.0E 00
939	CE152	1	1.403E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.236E 00	0.0	3.0E-08	1.0E 00
940	PR152	1	8.318E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.986E 00	0.0	3.0E-08	1.0E 00
941	ND152	1	6.900E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.620E-01	0.0	3.0E-08	1.0E 00
942	PM152	1	2.460E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.727E 00	0.0	3.0E-08	1.0E 00
943	PM152M	1	4.500E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.707E 00	0.0	3.0E-08	1.0E 00
944	SM152	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.66E 01	1.0E 00	1.0E 00
945	EU152	1	4.292E 08	0.0	7.214E-01	0.0	0.0	0.0	0.0	0.0	1.279E 00	0.0	1.0E-10	3.0E-06
946	EU152M	1	3.355E 04	0.0	2.800E-01	0.0	0.0	0.0	0.0	0.0	8.035E-01	0.0	1.0E-10	3.0E-06
947	GD152	1	3.408E 21	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	2.198E 00	2.00E-01	2.0E-14	3.0E-08
948	LA153	1	4.371E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.208E 00	0.0	3.0E-08	1.0E 00
949	CE153	1	1.725E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.811E 00	0.0	3.0E-08	1.0E 00
950	PR153	1	7.743E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.144E 00	0.0	3.0E-08	1.0E 00
951	ND153	1	6.754E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.088E 00	0.0	3.0E-08	1.0E 00
952	PM153	1	3.240E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.500E-01	0.0	3.0E-08	1.0E 00
953	SM153	1	1.681E 05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.310E-01	0.0	1.0E-10	3.0E-06
954	EU153	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.21E 01	1.0E 00	1.0E 00
955	GD153	1	2.091E 07	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	1.454E-01	0.0	1.0E-10	3.0E-06
956	LA154	1	1.753E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.834E 00	0.0	3.0E-08	1.0E 00
957	CE154	1	3.591E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.951E 00	0.0	3.0E-08	1.0E 00
958	PR154	1	1.307E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.723E 00	0.0	3.0E-08	1.0E 00
959	ND154	1	6.683E 05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.079E 00	0.0	1.0E-10	3.0E-06
960	PM154	1	1.680E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.645E 00	0.0	3.0E-08	1.0E 00
961	PM154M	1	1.080E 02	0.0	0.0	0.0	0.0	1.000E-01	0.0	0.0	2.556E 00	0.0	3.0E-08	1.0E 00
962	SM154	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.26E 01	1.0E 00	1.0E 00
963	EU154	1	2.714E 08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.509E 00	0.0	1.0E-10	3.0E-06
964	GD154	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.10E 00	1.0E 00	1.0E 00
965	LA155	1	2.215E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.120E 00	0.0	3.0E-08	1.0E 00
966	CE155	1	7.125E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.571E 00	0.0	3.0E-08	1.0E 00
967	PR155	1	1.891E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.884E 00	0.0	3.0E-08	1.0E 00
968	ND155	1	2.606E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.553E 00	0.0	3.0E-08	1.0E 00

Table A.1 (continued)

NO.	ISOTOPE	IU	HALF-LIFE	FB1	FPEC	FPEC1	FAL	FIT	FSF	FBN	Q	ABUND	ARCG	WRCG
969	PM155	1	3.656E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.961E 00	0.0	3.0E-08	1.0E 00
970	SM155	1	1.332E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.840E-01	0.0	3.0E-08	1.0E 00
971	EU155	1	1.565E 08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.227E-01	0.0	1.0E-10	3.0E-06
972	GD155M	1	3.100E-02	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	1.215E-01	0.0	3.0E-08	1.0E 00
973	GD155	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.48E 01	1.0E 00	1.0E 00
974	CE156	1	1.162E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.831E 00	0.0	3.0E-08	1.0E 00
975	PR156	1	5.104E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.509E 00	0.0	3.0E-08	1.0E 00
976	ND156	1	5.849E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.725E 00	0.0	3.0E-08	1.0E 00
977	PM156	1	1.310E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.215E 00	0.0	3.0E-08	1.0E 00
978	SM156	1	3.384E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.270E-01	0.0	1.0E-10	3.0E-06
979	EU156	1	1.312E 06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.741E 00	0.0	1.0E-10	3.0E-06
980	GD156	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.06E 01	1.0E 00	1.0E 00
981	DY156	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.70E-02	1.0E 00	1.0E 00
982	CE157	1	3.617E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.353E 00	0.0	3.0E-08	1.0E 00
983	PR157	1	6.779E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.788E 00	0.0	3.0E-08	1.0E 00
984	ND157	1	4.149E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.245E 00	0.0	3.0E-08	1.0E 00
985	PM157	1	6.802E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.626E 00	0.0	3.0E-08	1.0E 00
986	SM157	1	4.800E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.521E 00	0.0	3.0E-08	1.0E 00
987	EU157	1	5.472E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.520E-01	0.0	1.0E-10	3.0E-06
988	GD157	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.57E 01	1.0E 00	1.0E 00
989	TB157	1	4.734E 09	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	8.097E-03	0.0	1.0E-10	3.0E-06
990	DY157	1	2.916E 04	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	3.673E-01	0.0	1.0E-10	3.0E-06
991	PR158	1	2.629E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.318E 00	0.0	3.0E-08	1.0E 00
992	ND158	1	7.889E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.536E 00	0.0	3.0E-08	1.0E 00
993	PM158	1	3.801E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.145E 00	0.0	3.0E-08	1.0E 00
994	SM158	1	2.639E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.070E-01	0.0	3.0E-08	1.0E 00
995	EU158	1	2.754E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.130E 00	0.0	3.0E-08	1.0E 00
996	GD158	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.48E 01	1.0E 00	1.0E 00
997	DY158	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.03E-01	1.0E 00	1.0E 00
998	PR159	1	3.141E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.728E 00	0.0	3.0E-08	1.0E 00
999	ND159	1	1.408E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.959E 00	0.0	3.0E-08	1.0E 00
1000	PM159	1	4.230E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.455E 00	0.0	3.0E-08	1.0E 00
1001	SM159	1	1.622E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.977E 00	0.0	3.0E-08	1.0E 00
1002	EU159	1	1.086E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.582E 00	0.0	3.0E-08	1.0E 00
1003	GD159	1	6.696E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.500E-01	0.0	1.0E-10	3.0E-06
1004	TB159	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.00E 02	1.0E 00	1.0E 00
1005	DY159	4	1.440E 02	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	3.800E-01	0.0	1.0E-10	3.0E-06
1006	ND160	1	2.121E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.372E 00	0.0	3.0E-08	1.0E 00
1007	PM160	1	9.963E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.893E 00	0.0	3.0E-08	1.0E 00
1008	SM160	1	3.491E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.791E 00	0.0	3.0E-08	1.0E 00
1009	EU160	1	5.100E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.269E 00	0.0	3.0E-08	1.0E 00
1010	GD160	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.18E 01	1.0E 00	1.0E 00
1011	TB160	1	6.247E 06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.374E 00	0.0	1.0E-10	3.0E-06
1012	DY160	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.34E 00	1.0E 00	1.0E 00
1013	ND161	1	5.558E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.868E 00	0.0	3.0E-08	1.0E 00
1014	PM161	1	1.188E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.322E 00	0.0	3.0E-08	1.0E 00
1015	SM161	1	1.288E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.746E 00	0.0	3.0E-08	1.0E 00
1016	EU161	1	4.206E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.077E 00	0.0	3.0E-08	1.0E 00
1017	GD161	1	2.220E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.224E 00	0.0	3.0E-08	1.0E 00
1018	TB161	1	5.979E 05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.380E-01	0.0	1.0E-10	3.0E-06
1019	DY161	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.90E 01	1.0E 00	1.0E 00

Table A.1 (continued)

NO.	ISOTOPE	IU	HALF-LIFE	FB1	FPEC	FPEC1	FAL	FIT	FSF	FBN	Q	ABUND	ARCG	WPCG
1020	PM162	1	3.999E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.818E 00	0.0	3.0E-08	1.0E 00
1021	SM162	1	1.959E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.179E 00	0.0	3.0E-08	1.0E 00
1022	EU162	1	2.698E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.349E 00	0.0	3.0E-08	1.0E 00
1023	GD162	1	6.000E 02	2.000E-02	0.0	0.0	0.0	0.0	0.0	0.0	6.130E-01	0.0	3.0E-08	1.0E 00
1024	TB162	1	4.482E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.682E 00	0.0	3.0E-08	1.0E 00
1025	TB162M	1	8.028E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.832E 00	0.0	1.0E-10	3.0E-06
1026	DY162	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.55E 01	1.0E 00	1.0E 00
1027	EB162	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.40E-01	1.0E 00	1.0E 00
1028	SM163	1	2.563E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.579E 00	0.0	3.0E-08	1.0E 00
1029	EU163	1	1.484E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.008E 00	0.0	3.0E-08	1.0E 00
1030	GD163	1	9.277E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.667E 00	0.0	3.0E-08	1.0E 00
1031	TB163	1	1.170E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.018E 00	0.0	3.0E-08	1.0E 00
1032	TB163M	2	7.000E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.490E-01	0.0	3.0E-08	1.0E 00
1033	DY163	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.49E 01	1.0E 00	1.0E 00
1034	HO163	5	3.300E 01	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	9.000E-03	0.0	1.0E-10	3.0E-06
1035	ER163	2	7.500E 01	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	1.210E 00	0.0	3.0E-08	1.0E 00
1036	SM164	1	4.247E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.937E 00	0.0	3.0E-08	1.0E 00
1037	EU164	1	2.170E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.410E 00	0.0	3.0E-08	1.0E 00
1038	GD164	1	1.301E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.075E 00	0.0	3.0E-08	1.0E 00
1039	TB164	1	1.800E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.363E 00	0.0	3.0E-08	1.0E 00
1040	DY164	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.81E 01	1.0E 00	1.0E 00
1041	ER164	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.56E 00	1.0E 00	1.0E 00
1042	SM165	1	9.274E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.389E 00	0.0	3.0E-08	1.0E 00
1043	EU165	1	2.548E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.780E 00	0.0	3.0E-08	1.0E 00
1044	GD165	1	1.002E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.327E 00	0.0	3.0E-08	1.0E 00
1045	TB165	1	3.275E 01	5.000E-01	0.0	0.0	0.0	0.0	0.0	0.0	1.703E 00	0.0	3.0E-08	1.0E 00
1046	DY165	1	8.460E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.810E-01	0.0	1.0E-10	3.0E-06
1047	DY165M	1	7.536E 01	0.0	0.0	0.0	0.0	9.750E-01	0.0	0.0	1.260E-01	0.0	3.0E-08	1.0E 00
1048	HO165	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.00E 02	1.0E 00	1.0E 00
1049	ER165	3	1.030E 01	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	3.700E-01	0.0	1.0E-10	3.0E-06
1050	DY166	1	2.934E 05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.970E-01	0.0	1.0E-10	3.0E-06
1051	HO166	1	9.648E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.231E-01	0.0	1.0E-10	3.0E-06
1052	HO166M	1	3.787E 10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.869E 00	0.0	1.0E-10	3.0E-06
1053	ER166	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.34E 01	1.0E 00	1.0E 00
1054	ER167	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.29E 01	1.0E 00	1.0E 00
1055	ER167M	1	2.300E 00	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	2.080E-01	0.0	3.0E-08	1.0E 00
1056	ER169	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.71E 01	1.0E 00	1.0E 00
1057	YB168	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.40E-01	1.0E 00	1.0E 00
1058	ER169	4	9.400E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.400E-01	0.0	1.0E-10	3.0E-06
1059	TM169	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.00E 02	1.0E 00	1.0E 00
1060	YB169	1	2.766E 06	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	4.256E-01	0.0	1.0E-10	3.0E-06
1061	ER170	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.49E 01	1.0E 00	1.0E 00
1062	TM170	1	1.111E 07	0.0	1.460E-03	0.0	0.0	0.0	0.0	0.0	3.348E-01	0.0	1.0E-10	3.0E-06
1063	TM170M	1	4.100E-06	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	0.0	3.0E-08	1.0E 00
1064	YB170	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.14E 00	1.0E 00	1.0E 00
1065	ER171	1	2.707E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.066E-01	0.0	1.0E-10	3.0E-06
1066	TM171	1	6.059E 07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.616E-02	0.0	1.0E-10	3.0E-06
1067	YB171	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.44E 01	1.0E 00	1.0E 00
1068	ER172	3	4.900E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.100E-01	0.0	1.0E-10	3.0E-06
1069	TM172	3	6.360E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.880E 00	0.0	1.0E-10	3.0E-06
1070	YB172	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.19E 01	1.0E 00	1.0E 00

Table A.1 (continued)

NO.	ISOTOPE	IU	HALF-LIFE	FB1	FPEC	FPEC1	FAL	FIT	FSF	FBN	Q	ABUND	ARCG	WRCG
1071	TM173	3	8.240E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.320E 00	0.0	1.0E-10	3.0E-06
1072	YB173	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.62E 01	1.0E 00	1.0E 00
1073	YB174	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.16E 01	1.0E 00	1.0E 00
1074	YB175	1	3.620E 05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.693E-01	0.0	1.0E-10	3.0E-06
1075	YB175M	1	6.700E-02	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	5.130E-01	0.0	3.0E-08	1.0E 00
1076	YB176	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.26E 01	1.0E 00	1.0E 00
1077	YB177	3	1.900E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.400E 00	0.0	3.0E-08	1.0E 00
1078	LU175	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.74E 01	1.0E 00	1.0E 00
1079	LU176	9	3.000E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.020E 00	2.60E 00	1.0E-10	3.0E-06
1080	LU176M	3	3.690E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.310E 00	0.0	1.0E-10	3.0E-06
1081	LU177	1	5.797E 05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.820E-01	0.0	1.0E-10	3.0E-06
1082	LU177M	4	1.550E 02	0.0	0.0	0.0	0.0	2.200E-01	0.0	0.0	1.358E 00	0.0	1.0E-10	3.0E-06
1083	HF174	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.60E-01	1.0E 00	1.0E 00
1084	HF175	4	7.000E 01	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	5.900E-01	0.0	1.0E-10	3.0E-06
1085	HF176	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.20E 00	1.0E 00	1.0E 00
1086	HF177	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.86E 01	1.0E 00	1.0E 00
1087	HF178	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.71E 01	1.0E 00	1.0E 00
1088	HF178M	1	4.000E 00	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	1.147E 00	0.0	3.0E-08	1.0E 00
1089	HF179	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.37E 01	1.0E 00	1.0E 00
1090	HF179M	1	1.860E 01	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	3.780E-01	0.0	3.0E-08	1.0E 00
1091	HF180	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.52E 01	1.0E 00	1.0E 00
1092	HF180M	3	5.500E 00	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	1.142E 00	0.0	1.0E-10	3.0E-06
1093	HF181	1	3.663E 06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.540E-01	0.0	1.0E-10	3.0E-06
1094	HF182	8	9.000E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.000E-01	0.0	1.0E-10	3.0E-06
1095	TA180	5	1.600E 13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.000E-01	1.20E-02	1.0E-10	3.0E-06
1096	TA181	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.00E 02	1.0E 00	1.0E 00
1097	TA182	1	9.936E 06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.502E 00	0.0	1.0E-10	3.0E-06
1098	TA182M	2	1.650E 01	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	5.030E-01	0.0	3.0E-08	1.0E 00
1099	TA183	4	5.100E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.070E 00	0.0	1.0E-10	3.0E-06
1100	W 180	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.30E-01	1.0E 00	1.0E 00
1101	W 181	1	1.047E 07	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	4.757E-02	0.0	1.0E-10	3.0E-06
1102	W 182	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.63E 01	1.0E 00	1.0E 00
1103	W 183M	1	5.200E 00	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	2.600E-01	0.0	3.0E-08	1.0E 00
1104	W 183	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.43E 01	1.0E 00	1.0E 00
1105	W 184	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.07E 01	1.0E 00	1.0E 00
1106	W 185	4	7.510E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.325E-01	0.0	1.0E-10	3.0E-06
1107	W 185M	2	1.670E 00	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	1.970E-01	0.0	3.0E-08	1.0E 00
1108	W 186	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.86E 01	1.0E 00	1.0E 00
1109	W 187	1	8.604E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.651E-01	0.0	1.0E-10	3.0E-06
1110	W 188	1	5.996E 06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.009E-01	0.0	1.0E-10	3.0E-06
1111	W 189	2	1.150E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.000E 00	0.0	3.0E-08	1.0E 00
1112	RE185	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.74E 01	1.0E 00	1.0E 00
1113	RE186	3	9.064E 01	0.0	6.500E-02	0.0	0.0	0.0	0.0	0.0	1.045E 00	0.0	1.0E-10	3.0E-06
1114	RE187	9	5.000E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.590E 00	6.26E 01	1.0E-10	3.0E-06
1115	RE188	1	6.113E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.371E-01	0.0	1.0E-10	3.0E-06
1116	RE188M	2	1.870E 01	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	1.720E-01	0.0	3.0E-08	1.0E 00
1117	RE189	3	2.430E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.010E 00	0.0	1.0E-10	3.0E-06
1118	OS184	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.80E-02	1.0E 00	1.0E 00
1119	OS185	4	9.400E 01	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	1.015E 00	0.0	1.0E-10	3.0E-06
1120	OS186	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.58E 00	1.0E 00	1.0E 00
1121	OS187	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.60E 00	1.0E 00	1.0E 00

Table A.1 (continued)

NO.	ISOTOPE	IU	HALF-LIFE	FB1	FPEC	FPEC1	FAL	FIT	FSF	FBE	Q	ABUND	ARCG	WRCG
1122	OS188	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.33E 01	1.0E 00	1.0E 00
1123	OS189	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.61E 01	1.0E 00	1.0E 00
1124	OS190	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.64E 01	1.0E 00	1.0E 00
1125	OS190M	2	9.900E 00	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	1.706E 00	0.0	3.0E-08	1.0E 00
1126	OS191	1	1.331E 06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.450E-01	0.0	1.0E-10	3.0E-06
1127	OS191M	3	1.300E 01	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	7.400E-02	0.0	1.0E-10	3.0E-06
1128	OS192	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.10E 01	1.0E 00	1.0E 00
1129	OS193	3	3.100E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.132E 00	0.0	1.0E-10	3.0E-06
1130	OS194	5	6.000E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.700E-02	0.0	1.0E-10	3.0E-06
1131	IR191	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.73E 01	1.0E 00	1.0E 00
1132	IR192	1	6.395E 06	0.0	4.780E-02	0.0	0.0	0.0	0.0	0.0	9.959E-01	0.0	1.0E-10	3.0E-06
1133	IR192M	5	2.410E 02	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	1.610E-01	0.0	1.0E-10	3.0E-06
1134	IR193	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.27E 01	1.0E 00	1.0E 00
1135	IR194	1	6.894E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.002E-01	0.0	1.0E-10	3.0E-06
1136	IR194M	1	3.200E-02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000E-01	0.0	3.0E-08	1.0E 00
1137	PT190	9	6.000E 02	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	3.250E 00	1.30E-02	2.0E-14	3.0E-08
1138	PT191	4	3.000E 00	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	8.000E-01	0.0	1.0E-10	3.0E-06
1139	PT192	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.87E-01	1.0E 00	1.0E 00
1140	PT193	5	5.000E 02	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	5.000E-02	0.0	1.0E-10	3.0E-06
1141	PT193M	4	4.300E 00	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	1.480E-01	0.0	1.0E-10	3.0E-06
1142	PT194	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.29E 01	1.0E 00	1.0E 00
1143	PT195	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.38E 01	1.0E 00	1.0E 00
1144	PT195M	1	2.713E 05	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	2.457E-01	0.0	1.0E-10	3.0E-06
1145	PT196	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.53E 01	1.0E 00	1.0E 00
1146	PT197	3	1.800E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.500E-01	0.0	1.0E-10	3.0E-06
1147	PT197M	2	8.000E 01	0.0	0.0	0.0	0.0	9.700E-01	0.0	0.0	4.220E-01	0.0	3.0E-08	1.0E 00
1148	PT198	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.20E 00	1.0E 00	1.0E 00
1149	PT199	2	3.000E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.680E 00	0.0	3.0E-08	1.0E 00
1150	PT199M	1	1.410E 01	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	4.250E-01	0.0	3.0E-08	1.0E 00
1151	AU197	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.00E 02	1.0E 00	1.0E 00
1152	AU198	4	2.698E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.374E 00	0.0	1.0E-10	3.0E-06
1153	AU199	1	2.713E 05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.307E-01	0.0	1.0E-10	3.0E-06
1154	AU200	2	4.840E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.200E 00	0.0	3.0E-08	1.0E 00
1155	HG196	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.50E-01	1.0E 00	1.0E 00
1156	HG197	3	6.500E 01	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	4.200E-01	0.0	1.0E-10	3.0E-06
1157	HG197M	3	2.400E 01	0.0	6.000E-02	0.0	0.0	9.400E-01	0.0	0.0	3.250E-01	0.0	1.0E-10	3.0E-06
1158	HG198	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.00E 01	1.0E 00	1.0E 00
1159	HG199	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.68E 01	1.0E 00	1.0E 00
1160	HG199M	2	4.300E 01	0.0	0.0	0.0	0.0	1.000E 00	0.0	0.0	5.330E-01	0.0	3.0E-08	1.0E 00
1161	HG200	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.31E 01	1.0E 00	1.0E 00
1162	HG201	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.32E 01	1.0E 00	1.0E 00
1163	HG202	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.98E 01	1.0E 00	1.0E 00
1164	HG203	1	4.025E 06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.360E-01	0.0	1.0E-10	3.0E-06
1165	HG204	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.90E 00	1.0E 00	1.0E 00
1166	HG205	2	5.500E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.600E 00	0.0	3.0E-08	1.0E 00
1167	TL203	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.95E 01	1.0E 00	1.0E 00
1168	TL204	5	3.800E 00	0.0	2.100E-02	0.0	0.0	0.0	0.0	0.0	7.560E-01	0.0	1.0E-10	3.0E-06
1169	TL205	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.05E 01	1.0E 00	1.0E 00
1170	TL206	2	4.190E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.524E 00	0.0	3.0E-08	1.0E 00
1171	TL207	1	2.862E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.954E-01	0.0	3.0E-08	1.0E 00
1172	TL208	1	1.842E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.970E 00	0.0	3.0E-08	1.0E 00

Table A.1 (continued)

NC.	ISOTOPE	IU	HALF-LIFE	FB1	FPEC	FPEC1	FAL	FIT	FSF	FBN	Q	ABUND	APCG	WPCG
1173	TL209	1	1.320E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.803E 00	0.0	3.0E-08	1.0E 00
1174	PB204	5	1.400E 17	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	2.600E 00	1.40E 00	2.0E-14	3.0E-08
1175	PB205	8	3.000E 01	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	3.500E-02	0.0	1.0E-10	3.0E-06
1176	PB206	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.41E 01	1.0E 00	1.0E 00
1177	PB207	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.21E 01	1.0E 00	1.0E 00
1178	PB208	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.24E 01	1.0E 00	1.0E 00
1179	PB209	3	3.300E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.940E-01	0.0	1.0E-10	3.0E-06
1180	PB210	1	7.037E 08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.908E-02	0.0	1.0E-10	3.0E-06
1181	PB211	1	2.166E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.055E-01	0.0	3.0E-08	1.0E 00
1182	PB212	1	3.830E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.212E-01	0.0	1.0E-10	3.0E-06
1183	PB214	1	1.608E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.380E-01	0.0	3.0E-08	1.0E 00
1184	BI208	7	3.680E 02	0.0	1.000E 00	0.0	0.0	0.0	0.0	0.0	2.870E 00	0.0	1.0E-10	3.0E-06
1185	BI209	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.00E 02	1.0E 00	1.0E 00
1186	BI210	1	4.330E 05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.890E-01	0.0	1.0E-10	3.0E-06
1187	BI210M	8	3.000E 00	0.0	0.0	0.0	9.960E-01	0.0	0.0	0.0	5.296E 00	0.0	2.0E-14	3.0E-08
1188	BI211	1	1.278E 02	0.0	0.0	0.0	9.972E-01	0.0	0.0	0.0	6.729E 00	0.0	2.0E-14	3.0E-08
1189	BI212	1	3.633E 03	0.0	0.0	0.0	3.593E-01	0.0	0.0	0.0	2.869E 00	0.0	2.0E-14	3.0E-08
1190	BI213	1	2.739E 03	0.0	0.0	0.0	2.160E-02	0.0	0.0	0.0	7.092E-01	0.0	2.0E-14	3.0E-08
1191	BI214	1	1.194E 03	0.0	0.0	0.0	2.100E-04	0.0	0.0	0.0	2.162E 00	0.0	2.0E-14	3.0E-08
1192	PO210	1	1.196E 07	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	5.408E 00	0.0	2.0E-14	3.0E-08
1193	PO211M	1	2.500E 01	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	7.600E 00	0.0	2.0E-14	3.0E-08
1194	PO211	1	5.600E-01	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	7.592E 00	0.0	2.0E-14	3.0E-08
1195	PO212	1	3.000E-07	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	8.940E 00	0.0	2.0E-14	3.0E-08
1196	PO213	1	4.200E-06	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	8.537E 00	0.0	2.0E-14	3.0E-08
1197	PO214	1	1.643E-04	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	7.833E 00	0.0	2.0E-14	3.0E-08
1198	PO215	1	1.780E-03	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	7.531E 00	0.0	2.0E-14	3.0E-08
1199	PO216	1	1.500E-01	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	6.906E 00	0.0	2.0E-14	3.0E-08
1200	PO218	1	1.830E 02	0.0	0.0	0.0	9.998E-01	0.0	0.0	0.0	6.113E 00	0.0	2.0E-14	3.0E-08
1201	AT217	1	3.230E-02	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	7.199E 00	0.0	2.0E-14	3.0E-08
1202	RN218	1	3.500E-02	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	7.260E 00	0.0	2.0E-14	3.0E-08
1203	RN219	1	3.960E 00	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	7.000E 00	0.0	2.0E-14	3.0E-08
1204	RN220	1	5.560E 01	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	6.405E 00	0.0	2.0E-14	3.0E-08
1205	RN222	1	3.304E 05	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	5.590E 00	0.0	2.0E-14	3.0E-08
1206	FR221	1	2.880E 02	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	6.511E 00	0.0	2.0E-14	3.0E-08
1207	FR223	1	1.308E 03	0.0	0.0	0.0	6.000E-05	0.0	0.0	0.0	4.381E-01	0.0	2.0E-14	3.0E-08
1208	RA222	1	3.800E 01	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	6.680E 00	0.0	2.0E-14	3.0E-08
1209	RA223	1	9.879E 05	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	6.007E 00	0.0	2.0E-14	3.0E-08
1210	RA224	1	3.162E 05	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	5.790E 00	0.0	2.0E-14	3.0E-08
1211	RA225	1	1.279E 06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.183E-01	0.0	1.0E-10	3.0E-06
1212	RA226	1	5.049E 10	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	4.871E 00	0.0	2.0E-14	3.0E-08
1213	RA228	5	6.700E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.300E-02	0.0	1.0E-10	3.0E-06
1214	AC225	1	8.640E 05	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	5.893E 00	0.0	2.0E-14	3.0E-08
1215	AC227	1	6.871E 08	0.0	0.0	0.0	1.380E-02	0.0	0.0	0.0	8.169E-02	0.0	2.0E-14	3.0E-08
1216	AC228	1	2.207E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.458E 00	0.0	1.0E-10	3.0E-06
1217	TH226	2	3.100E 01	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	6.450E 00	0.0	2.0E-14	3.0E-08
1218	TH227	1	1.617E 06	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	6.157E 00	0.0	2.0E-14	3.0E-08
1219	TH228	1	6.037E 07	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	5.517E 00	0.0	2.0E-14	3.0E-08
1220	TH229	1	2.316E 11	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	5.161E 00	0.0	2.0E-14	3.0E-08
1221	TH230	1	2.430E 12	0.0	0.0	0.0	1.000E 00	0.0	5.000E-13	0.0	4.774E 00	0.0	2.0E-14	3.0E-08
1222	TH231	1	9.187E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.466E-02	0.0	1.0E-10	3.0E-06
1223	TH232	1	4.434E 17	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	4.084E 00	1.00E 02	2.0E-14	3.0E-08

Table A.1 (continued)

NO.	ISOTOPE	IU	HALF-LIFE	FB1	FPEC	FPEC1	FAL	FIT	FSF	FBN	Q	ABUND	ARCG	WRCG
1224	TH233	2	2.210E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.270E-01	0.0	3.0E-08	1.0E 00
1225	TH234	1	2.082E 06	1.000E 00	0.0	0.0	0.0	0.0	0.0	0.0	6.840E-02	0.0	1.0E-10	3.0E-06
1226	PA231	1	1.034E 12	0.0	0.0	0.0	1.000E 00	0.0	3.000E-12	0.0	5.083E 00	0.0	2.0E-14	3.0E-08
1227	PA232	1	1.132E 05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.103E 00	0.0	1.0E-10	3.0E-06
1228	PA233	1	2.333E 06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.829E-01	0.0	1.0E-10	3.0E-06
1229	PA234M	1	7.020E 01	0.0	0.0	0.0	0.0	1.300E-03	0.0	0.0	8.337E-01	0.0	3.0E-08	1.0E 00
1230	PA234	1	2.412E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.423E 00	0.0	1.0E-10	3.0E-06
1231	PA235	2	2.410E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.710E-01	0.0	3.0E-08	1.0E 00
1232	U 230	4	2.080E 01	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	5.991E 00	0.0	2.0E-14	3.0E-08
1233	U 231	1	3.629E 05	0.0	1.000E 00	0.0	5.500E-05	0.0	0.0	0.0	8.908E-02	0.0	2.0E-14	3.0E-08
1234	U 232	1	2.272E 09	0.0	0.0	0.0	1.000E 00	0.0	1.000E-12	0.0	5.416E 00	0.0	2.0E-14	3.0E-08
1235	U 233	1	5.002E 12	0.0	0.0	0.0	1.000E 00	0.0	1.300E-12	0.0	4.904E 00	0.0	2.0E-14	3.0E-08
1236	U 234	1	7.716E 12	0.0	0.0	0.0	1.000E 00	0.0	1.000E-11	0.0	4.859E 00	5.40E-03	2.0E-14	3.0E-08
1237	U 235	1	2.221E 16	0.0	0.0	0.0	1.000E 00	0.0	2.600E-09	0.0	4.418E 00	7.20E-01	2.0E-14	3.0E-08
1238	U 236	1	7.389E 14	0.0	0.0	0.0	1.000E 00	0.0	1.200E-09	0.0	4.570E 00	0.0	2.0E-14	3.0E-08
1239	U 237	1	5.832E 05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.192E-01	0.0	1.0E-10	3.0E-06
1240	U 238	1	1.410E 17	0.0	0.0	0.0	1.000E 00	0.0	5.100E-07	0.0	4.279E 00	9.43E 01	2.0E-14	3.0E-08
1241	U 239	1	1.412E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.541E-01	0.0	3.0E-08	1.0E 00
1242	U 240	1	5.076E 04	1.000E 00	0.0	0.0	0.0	0.0	0.0	0.0	1.384E-01	0.0	1.0E-10	3.0E-06
1243	U 241	1	1.000E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.040E-01	0.0	3.0E-08	1.0E 00
1244	NP235	1	3.422E 07	0.0	9.999E-01	0.0	1.400E-05	0.0	0.0	0.0	9.856E-03	0.0	2.0E-14	3.0E-08
1245	NP236M	1	8.100E 04	0.0	9.100E-01	0.0	0.0	0.0	0.0	0.0	3.403E-01	0.0	1.0E-10	3.0E-06
1246	NP236	1	3.629E 12	0.0	5.200E-01	0.0	0.0	0.0	0.0	0.0	1.333E-01	0.0	1.0E-10	3.0E-06
1247	NP237	1	6.753E 13	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	5.156E 00	0.0	2.0E-14	3.0E-08
1248	NP238	1	1.829E 05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.080E-01	0.0	1.0E-10	3.0E-06
1249	NP239	1	2.035E 05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.078E-01	0.0	1.0E-10	3.0E-06
1250	NP240M	1	4.440E 02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.776E-01	0.0	3.0E-08	1.0E 00
1251	NP240	1	3.900E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.788E 00	0.0	3.0E-08	1.0E 00
1252	NP241	2	1.600E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.710E-01	0.0	3.0E-08	1.0E 00
1253	PU236	1	8.997E 07	0.0	0.0	0.0	1.000E 00	0.0	8.000E-10	0.0	5.871E 00	0.0	2.0E-14	3.0E-08
1254	PU237	4	4.560E 01	0.0	1.000E 00	0.0	3.300E-05	0.0	0.0	0.0	1.620E-02	0.0	2.0E-14	3.0E-08
1255	PU238	1	2.769E 09	0.0	0.0	0.0	1.000E 00	0.0	1.840E-09	0.0	5.591E 00	0.0	2.0E-14	3.0E-08
1256	PU239	1	7.594E 11	0.0	0.0	0.0	1.000E 00	0.0	4.400E-12	0.0	5.199E 00	0.0	2.0E-14	3.0E-08
1257	PU240	1	2.063E 11	0.0	0.0	0.0	1.000E 00	0.0	5.000E-08	0.0	5.253E 00	0.0	2.0E-14	3.0E-08
1258	PU241	1	4.544E 08	0.0	0.0	0.0	2.450E-07	0.0	0.0	0.0	5.230E-03	0.0	2.0E-14	3.0E-08
1259	PU242	1	1.221E 13	0.0	0.0	0.0	1.000E 00	0.0	5.550E-06	0.0	4.982E 00	0.0	2.0E-14	3.0E-08
1260	PU243	1	1.784E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.947E-01	0.0	1.0E-10	3.0E-06
1261	PU244	1	2.607E 15	0.0	0.0	0.0	9.987E-01	0.0	1.200E-03	0.0	4.892E 00	0.0	2.0E-14	3.0E-08
1262	PU245	3	1.060E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.000E-01	0.0	1.0E-10	3.0E-06
1263	PU246	4	1.085E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.420E-01	0.0	1.0E-10	3.0E-06
1264	AM239	1	4.284E 04	0.0	9.999E-01	0.0	1.000E-04	0.0	0.0	0.0	3.830E-01	0.0	2.0E-14	3.0E-08
1265	AM240	1	1.829E 05	0.0	1.000E 00	0.0	1.900E-06	0.0	0.0	0.0	1.085E 00	0.0	2.0E-14	3.0E-08
1266	AM241	1	1.364E 10	0.0	0.0	0.0	1.000E 00	0.0	4.100E-12	0.0	5.604E 00	0.0	2.0E-14	3.0E-08
1267	AM242M	1	4.797E 09	0.0	0.0	0.0	5.000E-03	9.950E-01	1.600E-10	0.0	6.664E-02	0.0	2.0E-14	3.0E-08
1268	AM242	1	5.767E 04	0.0	1.730E-01	0.0	0.0	0.0	0.0	0.0	1.960E-01	0.0	1.0E-10	3.0E-06
1269	AM243	1	2.329E 11	0.0	0.0	0.0	1.000E 00	0.0	1.800E-10	0.0	5.423E 00	0.0	2.0E-14	3.0E-08
1270	AM244M	2	2.600E 01	0.0	4.100E-04	0.0	0.0	0.0	0.0	0.0	4.830E-01	0.0	3.0E-08	1.0E 00
1271	AM244	3	1.010E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.840E-01	0.0	1.0E-10	3.0E-06
1272	AM245	3	2.070E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.130E-01	0.0	1.0E-10	3.0E-06
1273	AM246	2	2.500E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.362E 00	0.0	3.0E-08	1.0E 00
1274	CM241	4	3.600E 01	0.0	9.900E-01	0.0	1.000E-02	0.0	0.0	0.0	5.360E-01	0.0	2.0E-14	3.0E-08

Table A.1 (continued)

NO.	ISOTOPE	IU	HALF-LIFE	FB1	FPEC	FPEC1	FAL	FIT	FSF	FBN	Q	ABUND	ARCG	WRCG
1275	CM242	1	1.410E 07	0.0	0.0	0.0	1.000E 00	0.0	6.800E-08	0.0	1.960E-01	0.0	2.0E-14	3.0E-08
1276	CM243	1	9.994E 08	0.0	0.0	0.0	9.976E-01	0.0	0.0	0.0	6.189E 00	0.0	2.0E-14	3.0E-08
1277	CM244	1	5.715E 08	0.0	0.0	0.0	1.000E 00	0.0	1.346E-06	0.0	5.901E 00	0.0	2.0E-14	3.0E-08
1278	CM245	1	2.682E 11	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	5.598E 00	0.0	2.0E-14	3.0E-08
1279	CM246	1	1.493E 11	0.0	0.0	0.0	9.997E-01	0.0	2.610E-04	0.0	5.523E 00	0.0	2.0E-14	3.0E-08
1280	CM247	1	4.923E 14	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	5.390E 00	0.0	2.0E-14	3.0E-08
1281	CM248	1	1.070E 13	0.0	0.0	0.0	9.174E-01	0.0	8.330E-02	0.0	2.100E 01	0.0	2.0E-14	3.0E-08
1282	CM249	1	3.849E 03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.936E-01	0.0	3.0E-08	1.0E 00
1283	CM250	7	1.740E 01	0.0	0.0	0.0	2.500E-01	0.0	6.100E-01	0.0	1.220E 02	0.0	2.0E-14	3.0E-08
1284	CM251	1	1.000E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.000E-01	0.0	3.0E-08	1.0E 00
1285	BK249	1	2.765E 07	0.0	0.0	0.0	1.450E-05	0.0	4.600E-10	0.0	1.250E-01	0.0	2.0E-14	3.0E-08
1286	BK250	1	1.160E 04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.172E 00	0.0	1.0E-10	3.0E-06
1287	BK251	2	5.700E 01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.100E 00	0.0	3.0E-08	1.0E 00
1288	CF249	1	1.106E 10	0.0	0.0	0.0	1.000E 00	0.0	5.000E-09	0.0	7.806E 00	0.0	2.0E-14	3.0E-08
1289	CF250	1	4.128E 08	0.0	0.0	0.0	9.992E-01	0.0	7.700E-04	0.0	6.267E 00	0.0	2.0E-14	3.0E-08
1290	CF251	1	2.834E 10	0.0	0.0	0.0	1.000E 00	0.0	0.0	0.0	6.027E 00	0.0	2.0E-14	3.0E-08
1291	CF252	1	8.325E 07	0.0	0.0	0.0	9.691E-01	0.0	3.100E-02	0.0	1.204E 01	0.0	2.0E-14	3.0E-08
1292	CF253	1	1.539E 06	0.0	0.0	0.0	3.100E-03	0.0	0.0	0.0	9.782E-02	0.0	2.0E-14	3.0E-08
1293	CF254	4	6.050E 01	0.0	0.0	0.0	3.100E-03	0.0	9.969E-01	0.0	1.944E 02	0.0	2.0E-14	3.0E-08
1294	CF255	3	1.500E 00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000E-01	0.0	3.0E-08	1.0E 00
1295	ES253	4	2.047E 01	0.0	0.0	0.0	1.000E 00	0.0	8.700E-08	0.0	9.782E-02	0.0	2.0E-14	3.0E-08
1296	ES254M	3	3.930E 01	0.0	7.800E-04	0.0	9.827E-01	1.547E-02	1.030E-03	0.0	8.173E 00	0.0	2.0E-14	3.0E-08
1297	ES254	4	2.757E 02	0.0	0.0	0.0	1.000E 00	0.0	3.000E-08	0.0	6.623E 00	0.0	2.0E-14	3.0E-08
1298	ES255	4	3.900E 01	0.0	0.0	0.0	1.000E 00	0.0	4.167E-05	0.0	7.370E 00	0.0	2.0E-14	3.0E-08
1299	SF250	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table A.2. Definitions of variable names used in Table A.1

Name of variable	Definition
IU	Units of half-life 1 = seconds 2 = minutes 3 = hours 4 = days 5 = years 6 = stable 7 = kiloyears (1 KY = 10^3 years) 8 = megayears (1 MY = 10^6 years) 9 = gigayears (1 GY = 10^9 years)
HALF-LIFE	Total half-life of an isotope
FB1	Beta decay branching ratio[a] to an excited state
FPEC	(positron + electron capture) decay branching ratio to a ground state
FPEC1	(positron + electron capture) decay branching ratio to an excited state
FAL	Alpha decay branching ratio
FIT	Internal transition decay branching ratio
FSF	Spontaneous fission decay branching ratio
FBN	(β,n) decay branching ratio
Q	Average recoverable energy per decay event, MeV/dis
ABUND	Natural abundance of isotope, at. %

Table A.2 (continued)

Name of variable	Definition
ARCG	Radionuclide Concentration Guide value for continuous inhalation of isotope in an unrestricted area, Ci/m^3
WRCG	Radionuclide Concentration Guide value for continuous ingestion of isotope in an unrestricted area, Ci/m^3

[a]The branching ratio is the fraction of all decay events that proceed via a given decay mode.

NOTE: FB = 1.0 - FB1 - FPEC - FPEC1 - FAL - FIT - FSF - FBN, where FB is the beta decay branching ratio to a ground state.

APPENDIX B: LISTING OF THE UPDATED ORIGEN PHOTON LIBRARY

Tables B.1, B.2, and B.3 contain a listing of the updated ORIGEN photon library for the activation products, actinides plus daughters, and fission products respectively. Table B.4 (or Table 3.1) defines the energy group structures used in these tables.

The format of the photon library is

NR	ISOTOPE	NG_1	$INT(NG_1)$	. . .	NG_5	$INT(NG_5)$
		NG_6	$INT(NG_6)$	. . .	NG_{10}	$INT(NG_{10})$
		NG_{11}	$INT(NG_{11})$	. . .	NG_i	$INT(NG_i)$

where

NR = library segment number

= 101 for activation products

= 102 for actinides plus daughters

= 103 for fission products

ISOTOPE = isotope designation

NG_i = energy group number (see Table B.4); if there are $\underline{i}$ groups with nonzero intensities, $NG_{i+1} = -1$

$INT(NG_i)$ = intensity of photons in energy group NG_i, photons/dis

The $NG_i/INT(NG_i)$ pair is specified only when the intensity is nonzero.

Table B.1. Updated photon library: activation products

101	H	3	1	2.45E-05	-1											
101	HF	6	1	5.67E-01	2	7.18E-02	3	4.56E-02	4	1.86E-02	5	9.97E-03				
			6	2.94E-03	7	4.89E-04	8	9.55E-05	9	8.03E-06	-1					
101	LI	8	1	2.56E 00	2	4.52E-01	3	3.68E-01	4	2.09E-01	5	1.80E-01				
			6	1.22E-01	7	5.02E-02	8	3.34E-02	9	6.45E-02	10	3.03E-02				
			11	6.67E-03	12	1.08E-03	-1									
101	BE	8	1	1.26E-08	4	3.34E-09	5	1.90E-09	6	9.52E-10	7	4.77E-10				
			8	2.39E-10	9	1.76E-10	10	5.24E-11	11	3.40E-12	12	2.15E-13				
			-1													
101	BE	10	1	3.49E-02	2	3.28E-04	3	1.96E-06	-1							
101	C	14	1	3.12E-03	-1											
101	C	15	1	1.13E 00	2	1.75E-01	3	1.30E-01	4	6.63E-02	5	5.00E-02				
			6	2.84E-02	7	1.02E-02	8	6.05E-03	9	9.42E-03	10	3.01E-03				
			11	2.65E-04	12	3.68E-06	-1									
101	N	13	1	3.11E-01	2	3.19E-02	3	1.79E 00	4	4.91E-03	5	1.44E-03				
			6	8.22E-05	7	1.05E-11	-1									
101	N	16	1	1.05E 00	2	1.61E-01	3	1.19E-01	4	6.08E-02	5	4.58E-02				
			6	2.80E-02	7	9.59E-03	8	1.34E-02	9	9.63E-03	10	3.60E-03				
			11	6.56E-01	12	6.72E-04	-1									
101	NE	23	1	7.14E-01	2	4.84E-01	3	6.50E-02	4	2.88E-02	5	1.76E-02				
			6	1.64E-02	7	2.55E-03	8	9.70E-04	9	1.93E-04	-1					
101	NA	22	1	1.71E-01	2	1.37E-02	3	1.60E 00	4	9.75E-04	5	1.02E 00				
			6	7.27E-07	7	6.03E-08	8	9.02E-10	-1							
101	NA	24	1	1.52E-01	2	1.06E-02	3	3.69E-03	4	4.90E-04	5	1.09E 00				
			6	1.86E-07	7	4.26E-08	8	1.00E 00	9	6.85E-04	10	7.12E-06				
			-1													
101	NA	25	1	5.42E-01	2	2.02E-01	3	1.71E-01	4	1.87E-01	5	1.25E-02				
			6	9.23E-02	7	1.58E-03	8	7.31E-04	9	2.76E-05	-1					
101	MG	27	1	2.17E-01	2	1.76E-02	3	7.59E-03	4	7.14E-01	5	2.27E-01				
			6	7.51E-07	-1											
101	MG	28	1	1.58E-01	2	3.91E-01	3	1.12E-03	4	4.24E-01	5	6.17E-01				
			6	4.09E-02	-1											
101	AL	28	1	4.28E-01	2	4.95E-02	3	2.91E-02	4	1.06E-02	5	4.62E-03				
			6	1.02E 00	7	6.10E-05	8	9.67E-07	-1							
101	AL	29	1	3.19E-01	2	3.32E-02	3	1.77E-02	4	7.35E-03	5	9.37E-01				
			6	4.00E-04	7	8.99E-02	-1									
101	AL	30	1	8.94E-01	2	1.30E-01	3	9.07E-02	4	4.30E-02	5	4.65E-01				
			6	3.26E-02	7	6.41E-01	8	7.02E-02	9	3.20E-01	10	2.02E-02				
			-1													
101	SI	31	1	1.68E-01	2	1.25E-02	3	4.73E-03	4	7.39E-04	5	7.59E-04				
			-1													
101	SI	32	1	5.35E-03	-1											
101	P	32	1	2.06E-01	2	1.73E-02	3	7.42E-03	4	1.54E-03	5	2.08E-04				
			6	3.39E-07	-1											
101	P	33	1	7.22E-03	-1											
101	S	35	1	3.28E-03	-1											
101	CI	36	1	4.88E-02	2	1.07E-03	3	3.25E-04	4	3.20E-10	5	5.55E-13				
			-1													

Table B.1 (continued)

101	CL 38	1	5.67E-01	2	7.67E-02	3	5.23E-02	4	2.41E-02	5	1.58E-02					
		6	3.12E-01	7	4.26E-01	8	8.90E-04	9	8.38E-04	10	9.26E-07					
		-1														
101	CL 38M	1	1.07E-06	3	1.17E 00	-1										
101	AR 37	1	1.48E-03	-1												
101	AR 41	1	1.21E-01	2	7.25E-03	3	2.13E-03	4	2.05E-04	5	1.03E 00					
		6	5.01E-04	7	3.47E-08	-1										
101	K 40	1	1.09E-01	2	7.13E-03	3	2.30E-03	4	2.46E-04	5	1.25E-01					
		-1														
101	K 42	1	5.15E-01	2	6.69E-02	3	4.05E-02	4	1.70E-02	5	9.07E-03					
		6	1.59E-01	7	7.23E-04	8	1.07E-04	9	1.03E-05	-1						
101	K 43	1	1.33E-01	2	9.92E-01	3	9.79E-01	4	5.25E-03	5	1.78E-02					
		6	4.77E-08	-1												
101	CA 45	1	7.46E-03	-1												
101	CA 47	1	8.52E-02	2	5.08E-03	3	6.04E-02	4	6.78E-02	5	7.77E-01					
		6	3.08E-04	-1												
101	SC 46	1	1.41E-02	2	3.61E-06	3	1.61E-07	4	1.05E 00	5	8.96E-01					
		7	1.07E-07	-1												
101	SC 46M	1	5.34E-01	-1												
101	SC 47	1	7.49E-01	2	1.80E-04	3	2.29E-06	-1								
101	SC 48	1	1.29E-01	2	6.87E-04	3	2.33E-05	4	1.16E 00	5	1.88E 00					
		-1														
101	SC 50	1	6.09E-01	2	7.90E-02	3	8.52E-01	4	2.16E-02	5	9.09E-01					
		6	9.10E-01	7	7.86E-04	8	2.05E-04	9	3.89E-05	-1						
101	TI 51	1	2.74E-01	2	8.21E-01	3	2.59E-02	4	7.90E-02	5	9.99E-04					
		6	4.39E-05	-1												
101	V 49	1	5.95E-03	-1												
101	V 52	1	3.57E-01	2	3.87E-02	3	2.20E-02	4	8.41E-03	5	1.16E 00					
		6	1.17E-03	7	5.52E-06	-1										
101	V 53	1	3.45E-01	2	3.89E-02	3	2.39E-02	4	5.81E-03	5	8.27E-01					
		6	1.78E-04	7	6.18E-07	-1										
101	CR 51	1	7.45E-03	2	8.36E-02	-1										
101	CR 55	1	3.70E-01	2	4.06E-02	3	2.28E-02	4	7.72E-03	5	2.98E-03					
		6	7.14E-04	7	4.99E-05	8	1.67E-16	-1								
101	MN 54	1	9.17E-03	4	9.82E-01	-1										
101	MN 56	1	2.70E-01	2	2.85E-02	3	1.61E-02	4	9.91E-01	5	3.79E-03					
		6	2.82E-01	7	1.35E-01	8	1.89E-02	9	1.62E-03	-1						
101	MN 57	1	4.80E-01	2	5.94E-02	3	7.61E-02	4	1.33E-02	5	5.78E-03					
		6	6.67E-03	7	1.63E-05	8	1.93E-09	-1								
101	MN 58	1	1.69E 00	2	2.42E-01	3	3.91E-01	4	1.09E 00	5	7.95E-01					
		6	2.04E-01	7	3.61E-02	8	3.62E-02	9	7.87E-03	10	5.54E-04					
		-1														
101	FE 59	1	1.62E-02	2	6.47E-05	3	9.70E-06	4	1.68E-06	5	1.50E-07					
		6	1.62E-14	-1												
101	CO 58M	1	1.24E-02	-1												
101	CO 58	1	3.88E-02	2	2.13E-03	3	2.67E-01	4	9.55E-01	5	9.10E-06					
		6	4.95E-03	7	1.95E-13	-1										
101	CO 60	1	1.11E-02	2	8.22E-05	3	4.72E-06	4	7.47E-05	5	2.00E 00					
		7	1.06E-05	8	3.28E-08	-1										
101	CO 60M	1	2.29E-02	2	8.02E-08	3	3.12E-08	4	7.62E-05	5	2.66E-03					
		7	7.68E-06	-1												

Table B.1 (continued)

101	CO 61	1	5.06E-01	2	7.23E-03	3	2.14E-03	4	3.83E-02	5	2.09E-06
		-1									
101	CO 62	1	5.83E-01	2	7.52E-02	3	4.86E-02	4	2.05E-02	5	8.98E-01
		6	2.65E-02	7	1.76E-01	8	2.58E-04	9	1.38E-02	10	2.44E-03
		-1									
101	NI 63	1	4.44E-04	-1							
101	NI 65	1	1.90E-01	2	6.21E-02	3	1.24E-02	4	3.97E-03	5	4.12E-01
		6	8.25E-03	-1							
101	NI 66	1	5.95E-03	-1							
101	CU 62	1	6.63E-01	2	8.84E-02	3	1.79E 00	4	2.67E-02	5	1.81E-02
		6	5.22E-03	7	1.59E-03	8	3.17E-04	9	1.61E-04	-1	
101	CU 64	1	3.72E-02	2	2.11E-03	3	3.19E-01	4	1.78E-04	5	5.30E-03
		6	1.76E-08	-1							
101	CU 66	1	3.59E-01	2	3.91E-02	3	2.19E-02	4	9.20E-03	5	6.94E-02
		6	3.99E-04	7	1.33E-05	8	7.68E-11	-1			
101	CU 67	1	7.64E-01	2	8.46E-03	3	6.56E-07	-1			
101	ZN 63	1	4.94E-01	2	6.13E-02	3	3.81E-02	4	1.51E-02	5	7.66E-03
		6	2.04E-03	7	2.95E-04	8	4.60E-05	9	1.91E-06	-1	
101	ZN 65	1	2.34E-02	2	1.92E-04	3	2.60E-02	4	3.40E-05	5	4.53E-01
		-1									
101	ZN 69	1	7.36E-02	2	2.78E-03	3	4.17E-04	4	5.89E-06	-1	
101	ZN 69M	1	1.23E-03	2	1.11E 00	3	3.29E-04	4	1.45E-16	-1	
101	ZN 71	1	3.49E-01	2	3.80E-02	3	2.12E-02	4	7.20E-03	5	2.84E-03
		6	4.36E-04	7	2.46E-05	8	1.69E-07	-1			
101	ZN 71M	1	1.57E-01	2	1.15E-02	3	4.36E-03	4	7.24E-04	5	8.10E-05
		6	4.04E-06	7	3.34E-08	-1					
101	GA 70	1	1.92E-01	2	1.54E-02	3	6.38E-03	4	1.24E-03	5	4.30E-03
		6	7.18E-08	-1							
101	GA 72	1	1.47E-01	2	2.09E-02	3	3.43E-01	4	1.14E 00	5	1.51E-01
		6	1.27E-01	7	3.51E-01	8	1.26E-01	9	3.17E-04	-1	
101	GE 75	1	1.07E-01	2	5.88E-03	3	1.55E-03	4	1.02E-04	5	4.09E-07
		-1									
101	GE 77	1	2.07E 00	2	4.27E-01	3	3.20E-01	4	2.14E-01	5	1.72E-01
		6	2.24E-02	7	1.74E-02	-1					
101	GE 77M	1	3.21E-01	2	3.66E-02	3	2.12E-02	4	7.58E-03	5	3.23E-03
		6	5.65E-04	7	3.69E-05	8	5.41E-07	-1			
101	AS 76	1	3.62E-01	2	4.08E-02	3	5.47E-01	4	1.34E-02	5	7.72E-02
		6	5.30E-03	7	1.04E-02	8	5.04E-04	-1			
101	AS 77	1	8.21E-02	2	8.89E-04	3	5.69E-03	-1			
101	SE 75	1	2.28E 00	2	1.32E-01	3	4.28E-04	4	1.26E-06	-1	
101	SE 79	1	3.87E-03	-1							
101	SE 83	1	1.54E-01	2	1.20E-02	3	5.51E-03	4	1.64E-03	5	6.28E-04
		6	9.57E-05	7	5.31E-06	8	7.20E-08	-1			
101	SE 83M	1	4.91E-01	2	6.04E-02	3	3.76E-02	4	1.51E-02	5	8.06E-03
		6	2.51E-03	7	4.92E-04	8	1.40E-04	9	3.80E-05	-1	
101	BR 80	1	2.09E-01	2	1.93E-02	3	1.02E 00	4	2.41E-02	5	9.64E-03
		6	1.20E-05	-1							
101	BR 80M	1	1.60E-01	-1							
101	BR 82	1	7.52E-02	2	1.82E-03	3	1.51E 00	4	1.00E 00	5	7.18E-01
		6	8.96E-03	-1							

Table B.1 (continued)

101	BR	82M	1	3.59E-02	2	3.22E-05	3	3.12E-04	4	1.84E-03	5	2.32E-04				
			6	1.61E-05	7	1.15E-07	8	1.19E-08	9	1.86E-11	-1					
101	BR	83	1	7.42E-02	2	2.87E-03	3	1.35E-02	4	4.61E-06	-1					
101	KR	79	1	1.48E-02	2	1.23E-03	3	5.15E-04	4	9.84E-05	5	1.08E-05				
			6	1.82E-09	-1											
101	KR	83M	1	1.72E-02	-1											
101	KR	85	1	5.23E-02	2	1.20E-03	3	3.91E-03	-1							
101	KR	85M	1	8.08E-01	2	1.15E-01	3	2.38E-04	4	8.63E-05	-1					
101	KR	87	1	4.73E-01	2	5.90E-01	3	6.03E-02	4	9.93E-02	5	3.10E-02				
			6	2.96E-02	7	2.96E-02	8	1.27E-01	9	5.01E-03	-1					
101	KR	88	1	4.91E-01	2	4.23E-02	3	1.79E-02	4	1.70E-01	5	7.78E-02				
			6	1.30E-01	7	6.17E-01	8	7.65E-03	-1							
101	RE	86	1	2.03E-01	2	1.75E-02	3	7.91E-03	4	1.84E-03	5	7.62E-02				
			6	1.61E-06	-1											
101	RB	87	1	7.94E-03	-1											
101	RB	88	1	7.90E-01	2	1.13E-01	3	7.92E-02	4	1.86E-01	5	3.51E-02				
			6	2.40E-01	7	5.48E-03	8	2.35E-02	9	6.79E-03	10	1.56E-03				
			-1													
101	RB	89	1	3.86E-01	2	4.03E-02	3	1.40E-01	4	1.16E-01	5	9.21E-01				
			6	3.06E-02	7	1.57E-01	8	1.13E-01	9	1.41E-02	10	6.17E-04				
			-1													
101	SR	85	1	5.35E-02	3	8.76E-01	4	1.43E-04	-1							
101	SR	87	1	1.55E-04	-1											
101	SR	87M	1	9.69E-03	2	8.52E-01	-1									
101	SR	89	1	1.70E-01	2	1.29E-02	3	5.05E-03	4	1.02E-03	5	6.56E-05				
			-1													
101	SR	90	1	7.14E-02	2	7.30E-04	3	3.70E-06	-1							
101	SR	91	1	2.33E-01	2	2.09E-02	3	1.62E-01	4	2.60E-01	5	3.01E-01				
			6	6.14E-03	7	5.39E-05	8	2.39E-09	-1							
101	Y	89M	1	5.39E-04	4	1.07E 00	-1									
101	Y	90	1	6.18E-01	2	6.36E-02	3	3.38E-02	4	1.05E-02	5	3.47E-03				
			6	2.71E-04	7	2.98E-08	-1									
101	Y	90M	1	2.97E-10	2	5.56E-12	3	1.88E-13	-1							
101	Y	91	1	1.77E-01	2	1.39E-02	3	5.59E-03	4	1.02E-03	5	2.99E-03				
			-1													
101	Y	92	1	5.26E-01	2	9.42E-02	3	6.98E-02	4	1.90E-01	5	6.56E-02				
			6	7.31E-03	7	1.02E-03	8	1.88E-04	9	5.88E-05	-1					
101	Y	93	1	5.30E-01	2	4.71E-02	3	3.49E-02	4	3.25E-02	5	1.41E-02				
			6	1.72E-02	7	3.43E-03	8	1.92E-06	-1							
101	Y	94	1	6.30E-01	2	1.06E-01	3	1.19E-01	4	8.43E-01	5	1.50E-01				
			6	6.86E-02	7	2.49E-02	8	1.35E-02	9	2.27E-04	10	1.80E-07				
			-1													
101	Y	96	1	1.09E 00	2	1.64E-01	3	1.20E-01	4	5.95E-02	5	4.27E-02				
			6	2.21E-02	7	7.20E-03	8	3.71E-03	9	3.73E-03	10	2.58E-04				
			-1													
101	ZR	89	1	1.09E-01	2	5.65E-03	3	4.05E-01	4	1.07E 00	5	1.38E-04				
			6	1.04E-02	-1											
101	ZR	93	1	5.34E-04	-1											
101	ZR	95	1	1.54E-02	2	2.99E-05	3	3.43E-06	4	8.69E-01	-1					
101	ZR	97	1	2.43E-01	2	4.46E-02	3	7.72E-02	4	2.47E-02	5	6.13E-02				
			6	1.72E-02	-1											

Table B.1 (continued)

101	NP 93M	1	1.26E-02	-1													
101	NP 94	1	2.25E-02	2	7.69E-05	3	4.53E-16	4	1.85E 00	-1							
101	NP 95	1	2.73E-03	4	9.01E-01	-1											
101	NP 95M	1	4.58E-01	-1													
101	NP 96	1	2.97E-01	2	1.27E-01	3	1.74E 00	4	2.69E 00	5	1.38E 00						
		6	1.30E-03	-1													
101	NP 97	1	1.26E-01	2	7.68E-03	3	1.13E 00	4	1.89E-03	5	2.84E-03						
		6	1.30E-03	-1													
101	NP 97M	1	1.48E-03	4	8.57E-01	-1											
101	NP 98	1	1.04E 00	2	1.33E-01	3	9.45E-02	4	1.21E-01	5	4.97E-02						
		6	1.09E-02	7	2.13E-03	8	8.04E-04	9	3.64E-04	10	1.21E-09						
		-1															
101	MO 93M	1	9.69E-01	3	1.10E 00	5	1.19E 00	-1									
101	MO 93	1	7.13E-02	-1													
101	MO 99	1	2.27E-01	2	1.75E-02	3	2.55E-03	4	1.48E-01	5	4.20E-05						
		-1															
101	MO101	1	5.62E-01	2	7.43E-02	3	4.57E-01	4	1.64E-01	5	3.64E-01						
		6	1.31E-01	7	8.84E-02	8	4.80E-13	-1									
101	TC 99	1	1.80E-02	2	5.25E-12	-1											
101	TC100	1	4.98E-01	2	6.13E-02	3	1.63E-01	4	1.57E-02	5	9.07E-03						
		6	6.51E-03	7	4.78E-04	8	6.19E-05	9	2.26E-06	-1							
101	TC101	1	1.90E-01	2	7.32E-01	3	7.77E-02	4	1.18E-02	5	6.41E-06						
		-1															
101	RU 97	1	1.33E 00	2	8.83E-02	3	1.10E-02	4	2.02E-03	-1							
101	RU103	1	1.59E-02	2	3.99E-03	3	8.47E-01	-1									
101	RU105	1	2.53E-01	2	2.09E-01	3	4.38E-01	4	4.97E-01	5	7.23E-03						
		6	1.14E-03	-1													
101	RU106	1	2.76E-04	-1													
101	RU107	1	6.04E-01	2	1.09E-01	3	2.88E-02	4	1.25E-01	5	7.93E-02						
		6	1.11E-03	7	1.26E-04	8	1.21E-05	9	2.59E-08	-1							
101	RH104	1	3.25E-01	2	3.43E-02	3	3.78E-02	4	6.06E-03	5	2.80E-03						
		6	2.14E-04	7	1.13E-06	-1											
101	RH104M	1	2.87E-01	2	1.92E-04	3	1.95E-02	4	1.59E-03	5	8.47E-04						
		6	1.74E-04	-1													
101	RH105	1	2.89E-02	2	2.06E-01	3	1.71E-06	-1									
101	RH105M	1	2.35E-01	-1													
101	RH106	1	5.05E-01	2	6.44E-02	3	3.36E-01	4	2.01E-02	5	2.56E-02						
		6	4.77E-03	7	1.47E-03	8	2.15E-04	9	2.81E-05	-1							
101	RH106M	1	2.04E-01	2	3.45E-01	3	1.28E 00	4	8.74E-01	5	6.18E-01						
		6	2.63E-01	7	2.42E-02	-1											
101	RH107	1	1.88E-01	2	8.23E-01	3	5.08E-02	4	4.12E-03	5	7.44E-04						
		-1															
101	PD103	1	9.61E-02	2	2.11E-04	3	3.44E-05	-1									
101	PD107	1	1.10E-04	-1													
101	PD109	1	1.63E-01	2	4.54E-03	3	1.35E-03	4	2.05E-04	5	2.03E-07						
		-1															
101	AG108	1	1.76E-01	2	1.97E-02	3	3.22E-02	4	1.12E-03	5	2.86E-04						
		6	9.30E-06	-1													
101	AG108M	1	1.32E-01	2	1.04E 00	3	9.70E-01	4	7.73E-01	-1							
101	AG109M	1	7.50E-02	-1													

Table B.1 (continued)

101	AG110	1	4.06E-01	2	4.63E-02	3	7.85E-02	4	1.02E-02	5	4.48E-03					
		6	9.23E-04	7	9.09E-05	8	1.29E-06	-1								
101	AG110M	1	1.38E-02	2	4.58E-02	3	1.32E 00	4	1.59E 00	5	3.21E-01					
		6	1.24E-01	7	9.29E-06	-1										
101	AG111	1	1.05E-01	2	5.85E-02	3	1.08E-03	4	1.26E-04	-1						
101	CD107	1	1.56E-01	2	3.61E-04	3	4.00E-03	4	1.51E-03	5	6.29E-05					
		-1														
101	CD109	1	1.78E-01	-1												
101	CD112	1	1.62E-03	2	2.15E-03	3	5.41E-01	4	2.39E-02	5	9.84E-02					
		6	4.69E-02	7	3.52E-02	8	1.96E-02	9	4.13E-05	-1						
101	CD113	1	1.07E-02	2	1.02E-07	-1										
101	CD115	1	1.30E-01	2	3.00E-03	3	3.90E-01	4	3.44E-05	5	1.27E-08					
		-1														
101	CD115M	1	1.76E-01	2	1.39E-02	3	7.32E-03	4	1.56E-02	5	6.94E-03					
		6	1.16E-08	-1												
101	IN114	1	2.39E-01	2	2.19E-02	3	1.06E-02	4	2.66E-03	5	2.68E-03					
		6	1.27E-05	-1												
101	IN114M	1	2.57E-01	3	4.27E-02	4	3.69E-02	-1								
101	IN115	1	2.42E-02	2	1.10E-04	3	4.26E-09	-1								
101	IN116	1	4.84E-01	2	6.01E-02	3	3.60E-02	4	1.51E-02	5	1.97E-02					
		6	1.94E-03	7	4.80E-04	8	3.08E-05	9	5.21E-07	-1						
101	IN116M	1	1.10E-01	2	3.37E-01	3	1.25E-02	4	1.20E-01	5	1.37E 00					
		6	1.10E-01	7	1.46E-01	-1										
101	IN118	1	6.31E-01	2	8.33E-02	3	1.04E-01	4	3.54E-02	5	1.62E-01					
		6	6.62E-02	7	1.18E-03	8	3.86E-04	9	1.17E-04	-1						
101	IN120	1	1.39E 00	2	2.22E-01	3	2.01E-01	4	5.66E-01	5	1.66E 00					
		6	5.93E-02	7	1.27E-01	8	2.05E-02	9	1.64E-03	10	5.00E-05					
		-1														
101	IN120M	1	3.19E-03	4	1.34E-02	5	1.95E-01	7	3.38E-02	-1						
101	SN113	1	1.57E-01	-1												
101	SN117M	1	1.05E 00	-1												
101	SN119M	1	7.60E-02	-1												
101	SN123	1	1.47E-01	2	1.04E-02	3	3.76E-03	4	5.34E-04	5	5.54E-03					
		-1														
101	SN123M	1	1.05E 00	2	7.75E-03	3	2.54E-03	4	1.99E-04	5	2.81E-06					
		-1														
101	SN125	1	2.66E-01	2	4.12E-02	3	2.60E-02	4	9.81E-02	5	1.36E-01					
		6	2.60E-03	7	2.13E-02	-1										
101	SN125M	1	2.45E-01	2	9.10E-01	3	1.51E-02	4	3.79E-03	5	1.41E-02					
		6	2.00E-03	7	1.88E-05	-1										
101	SB122	1	1.62E-01	2	1.23E-02	3	7.51E-01	4	1.15E-03	5	1.32E-02					
		6	9.72E-05	-1												
101	SB124	1	1.06E-01	2	1.90E-02	3	1.12E 00	4	1.61E-01	5	9.33E-02					
		6	4.78E-01	7	5.50E-02	8	4.02E-05	-1								
101	SB124M	1	4.20E-03	2	2.30E-04	3	6.05E-01	4	3.86E-06	5	2.82E-03					
		-1														
101	SB125	1	2.02E-01	2	3.61E-01	3	4.64E-01	-1								
101	SB126	1	2.32E-01	2	9.74E-01	3	3.03E 00	4	7.61E-01	5	4.34E-02					
		6	2.21E-07	-1												
101	SB126M	1	1.55E-01	2	9.60E-01	3	2.01E 00	4	1.53E-02	5	2.35E-02					
		6	1.23E-06	-1												

Table B.1 (continued)

101	TE121	1	1.38E-01	3	9.68E-01	-1					
101	TE121M	1	1.25E 00	4	1.75E-03	5	2.20E-02	-1			
101	TE123	1	1.35E-01	-1							
101	TE123M	1	9.86E-01	-1							
101	TE125M	1	2.37E-01	-1							
101	TE127	1	4.56E-02	2	1.32E-02	3	4.23E-05	-1			
101	TE127M	1	7.04E-02	2	7.89E-07	3	4.29E-06	-1			
101	TE129	1	1.97E-01	2	1.07E-02	3	7.58E-02	4	3.33E-03	5	6.04E-03
		-1									
101	TE129M	1	7.58E-02	2	1.51E-03	3	3.91E-02	4	8.01E-03	5	3.67E-04
		6	3.02E-10	-1							
101	TE131	1	9.33E-01	2	3.57E-02	3	2.65E-01	4	9.13E-02	5	6.42E-02
		6	1.83E-03	7	1.20E-04	-1					
101	TE131M	1	5.43E-01	2	1.29E-01	3	1.21E-01	4	9.27E-01	5	2.68E-01
		6	2.90E-02	7	2.51E-02	-1					
101	I 126	1	9.55E-02	2	3.34E-01	3	4.18E-01	4	5.25E-02	5	4.28E-03
		6	2.16E-04	7	5.22E-04	-1					
101	I 128	1	2.29E-01	2	2.09E-01	3	2.42E-02	4	8.31E-03	5	7.77E-04
		6	2.66E-05	-1							
101	I 129	1	1.67E-01	-1							
101	I 130	1	6.80E-02	2	3.85E-01	3	2.11E 00	4	7.34E-01	5	1.26E-01
		6	1.16E-03	-1							
101	I 130M	1	6.22E-02	2	9.30E-04	3	1.68E-01	4	1.76E-04	5	2.62E-03
		6	5.60E-03	7	5.74E-04	8	1.42E-04	-1			
101	I 131	1	1.76E-01	2	7.94E-01	3	8.61E-02	4	1.53E-02	-1	
101	I 132	1	1.86E-01	2	4.02E-02	3	1.68E 00	4	1.09E 00	5	2.34E-01
		6	2.17E-02	7	1.73E-02	8	4.20E-04	-1			
101	XE125	1	1.32E-03	2	1.05E-04	3	4.12E-05	4	6.80E-06	5	5.17E-07
		-1									
101	XE125M	1	7.76E-01	-1							
101	XE127	1	1.44E 00	2	1.72E-01	3	1.53E-04	-1			
101	XE127M	1	9.50E-01	-1							
101	XE131M	1	1.34E-01	-1							
101	XE133	1	3.15E-01	2	6.52E-05	-1					
101	XE133M	1	2.77E-01	-1							
101	XE135	1	1.58E 00	2	8.67E-03	3	3.17E-02	4	1.15E-03	5	3.45E-05
		-1									
101	XE135M	1	2.78E-02	2	9.98E-08	3	7.44E-01	4	1.00E-10	-1	
101	XE137	1	6.65E-01	2	8.98E-02	3	2.98E-01	4	3.57E-02	5	2.30E-02
		6	1.51E-02	7	2.88E-03	8	2.56E-03	9	3.66E-04	-1	
101	CS132	1	1.53E-01	2	7.20E-04	3	1.17E 00	4	6.75E-04	5	1.24E-02
		6	7.96E-04	-1							
101	CS134	1	3.10E-02	2	5.88E-04	3	1.27E 00	4	8.82E-01	5	5.83E-02
		-1									
101	CS134M	1	1.81E-01	-1							
101	CS135	1	4.41E-03	-1							
101	CS136	1	6.80E-01	2	4.30E-01	3	9.32E-03	4	9.60E-01	5	8.64E-01
		6	1.01E-03	-1							
101	CS137	1	2.99E-02	2	4.51E-04	3	8.47E-05	4	5.59E-06	5	2.13E-08
		-1									

Table B.1 (continued)

101	CS138	1 4.65E-01	2 1.11E-01	3 3.84E-01	4 7.73E-02	5 1.17E 00
		6 1.26E-02	7 1.57E-01	8 7.84E-02	9 5.20E-03	10 1.43E-04
		-1				
101	BA131	1 8.64E-01	2 1.49E-01	3 4.32E-01	4 1.18E-02	5 1.17E-02
		-1				
101	BA133	1 6.04E-01	2 8.30E-01	-1		
101	BA133M	1 4.55E-01	-1			
101	BA135M	1 4.07E-01	-1			
101	BA137M	1 1.66E-02	3 1.03E 00	-1		
101	BA139	1 5.40E-01	2 2.86E-02	3 1.48E-02	4 4.37E-03	5 4.92E-03
		6 1.93E-04	7 1.39E-06	-1		
101	BA140	1 1.67E-01	2 7.72E-02	3 1.87E-01	4 1.27E-05	-1
101	BA141	1 1.33E 00	2 3.87E-01	3 2.78E-01	4 1.38E-01	5 1.40E-01
		6 4.88E-02	7 1.07E-02	8 3.95E-07	9 9.55E-13	-1
101	LA137	1 1.68E-01	-1			
101	LA138	1 1.10E-03	4 3.05E-01	-1		
101	LA140	1 1.80E-01	2 2.07E-01	3 3.69E-01	4 4.16E-01	5 1.36E-04
		6 8.72E-01	7 9.16E-03	8 3.32E-02	9 2.73E-04	-1
101	LA141	1 3.11E-01	2 3.23E-02	3 1.78E-02	4 5.59E-03	5 3.05E-02
		6 1.86E-03	7 1.45E-03	-1		
101	CE137	1 1.78E-01	2 1.97E-02	3 6.14E-04	4 7.63E-04	5 1.04E-05
		-1				
101	CE137M	1 3.20E-01	4 5.40E-03	5 1.59E-04	-1	
101	CE139	1 1.07E 00	-1			
101	CE139M	1 1.34E-02	4 8.21E-01	-1		
101	CE141	1 5.31E-01	2 1.22E-04	3 1.02E-06	-1	
101	CE142	1 1.26E-08	4 3.34E-09	5 1.90E-09	6 9.52E-10	7 4.77E-10
		8 2.39E-10	9 1.76E-10	10 5.24E-11	11 3.40E-12	12 2.15E-13
		-1				
101	CE143	1 1.18E 00	2 4.02E-02	3 9.04E-02	4 5.88E-02	5 5.05E-03
		-1				
101	CE144	1 1.45E-01	2 2.53E-08	-1		
101	CE145	1 6.04E-01	2 2.18E-01	3 3.38E-02	4 6.41E-01	5 1.21E-01
		6 2.44E-06	-1			
101	PR142	1 2.61E-01	2 2.54E-02	3 1.32E-02	4 3.79E-03	5 1.10E-03
		6 3.34E-02	-1			
101	PR143	1 7.27E-02	2 2.79E-03	3 4.49E-04	4 5.15E-06	-1
101	PR144	1 4.18E-01	2 4.84E-02	3 4.66E-02	4 1.06E-02	5 8.42E-03
		6 9.77E-04	7 7.61E-03	8 6.82E-06	-1	
101	PR145	1 2.06E-01	2 1.73E-02	3 1.27E-02	4 9.25E-03	5 2.98E-03
		6 1.57E-06	-1			
101	ND144	1 1.26E-08	4 3.34E-09	5 1.90E-09	6 9.52E-10	7 4.77E-10
		8 2.39E-10	9 1.76E-10	10 5.24E-11	11 3.40E-12	12 2.15E-13
		-1				
101	ND147	1 3.60E-01	2 4.28E-02	3 1.36E-01	4 3.60E-08	-1
101	ND149	1 1.39E 00	2 2.07E-01	3 1.80E-01	4 9.89E-03	5 6.51E-03
		6 4.89E-06	-1			
101	ND151	1 1.79E-01	2 1.49E-02	3 6.68E-03	4 1.61E-03	5 3.84E-04
		6 2.00E-05	7 1.85E-08	-1		
101	PM145	1 2.08E-01	-1			
101	PM147	1 5.26E-03	-1			

Table B.1 (continued)

101	PM148	1	4.52E-01	2	4.29E-02	3	2.57E-01	4	1.41E-01	5	2.62E-01						
		6	2.21E-04	7	1.58E-06	-1											
101	PM148M	1	3.54E-01	2	2.99E-01	3	2.11E 00	4	4.77E-01	5	1.63E-01						
		-1															
101	PM149	1	1.45E-01	2	4.39E-03	3	2.24E-03	4	1.88E-03	5	1.53E-10						
		-1															
101	PM150	1	2.60E-01	2	7.21E-01	3	6.33E-02	4	3.27E-01	5	5.13E-01						
		6	1.19E-01	7	1.91E-02	8	1.11E-02	9	7.11E-04	-1							
101	PM151	1	6.38E-02	2	2.45E-03	3	4.62E-04	4	1.89E-05	5	6.44E-08						
		-1															
101	SM145	1	4.36E-01	3	2.40E-05	-1											
101	SM146	1	1.26E-08	4	3.34E-09	5	1.90E-09	6	9.52E-10	7	4.77E-10						
		8	2.39E-10	9	1.76E-10	10	5.24E-11	11	3.40E-12	12	2.15E-13						
		-1															
101	SM147	1	1.26E-08	4	3.34E-09	5	1.90E-09	6	9.52E-10	7	4.77E-10						
		8	2.39E-10	9	1.76E-10	10	5.24E-11	11	3.40E-12	12	2.15E-13						
		-1															
101	SM148	1	1.26E-08	4	3.34E-09	5	1.90E-09	6	9.52E-10	7	4.77E-10						
		8	2.39E-10	9	1.76E-10	10	5.24E-11	11	3.40E-12	12	2.15E-13						
		-1															
101	SM149	1	1.26E-08	4	3.34E-09	5	1.90E-09	6	9.52E-10	7	4.77E-10						
		8	2.39E-10	9	1.76E-10	10	5.24E-11	11	3.40E-12	12	2.15E-13						
		-1															
101	SM151	1	6.79E-04	-1													
101	SM153	1	4.50E-01	2	1.14E-03	3	1.98E-03	4	2.62E-06	-1							
101	SM155	1	1.57E-01	2	1.15E-02	3	4.28E-03	4	6.75E-04	5	4.95E-05						
		6	1.31E-10	-1													
101	EU152	1	5.80E-01	2	3.17E-01	3	3.81E-02	4	3.42E-01	5	4.99E-01						
		6	2.52E-03	-1													
101	EU152M	1	2.44E-01	2	3.21E-02	3	8.69E-03	4	2.93E-01	5	1.08E-02						
		6	1.53E-04	-1													
101	EU154	1	5.77E-01	2	1.34E-02	3	9.47E-02	4	4.76E-01	5	5.27E-01						
		6	1.58E-02	-1													
101	EU155	1	4.07E-01	-1													
101	EU156	1	2.16E-01	2	1.33E-02	3	1.13E-01	4	2.30E-01	5	4.27E-01						
		6	9.57E-02	7	1.58E-01	-1											
101	GD152	1	1.26E-08	4	3.34E-09	5	1.90E-09	6	9.52E-10	7	4.77E-10						
		8	2.39E-10	9	1.76E-10	10	5.24E-11	11	3.40E-12	12	2.15E-13						
		-1															
101	GD153	1	7.04E-01	-1													
101	GD159	1	6.72E-02	2	2.48E-03	3	3.97E-04	4	5.06E-06	-1							
101	GD161	1	1.60E-01	2	1.18E-02	3	4.51E-03	4	7.39E-04	5	6.00E-05						
		6	1.74E-09	-1													
101	GD162	1	7.54E-02	2	3.02E-03	3	5.22E-04	4	8.18E-06	-1							
101	TB157	1	3.32E-02	-1													
101	TB160	1	8.48E-01	2	2.53E-02	3	7.58E-03	4	7.21E-01	5	3.02E-01						
		6	1.98E-17	-1													
101	TB161	1	2.44E-02	2	1.31E-04	3	3.91E-07	-1									
101	TB162	1	1.22E-01	2	7.53E-03	3	2.34E-03	4	2.47E-04	5	1.30E-05						
		6	6.62E-07	7	2.48E-09	-1											

Table B.1 (continued)

101	DY157	1	2.93E-01	2	8.28E-01	3	2.05E-03	4	1.43E-03	5	1.36E-04
		-1									
101	DY165	1	1.17E-01	2	7.09E-03	3	2.14E-03	4	2.03E-04	5	3.65E-06
		-1									
101	DY165M	1	3.53E-05	2	1.27E-06	3	1.89E-07	4	2.07E-09	-1	
101	DY166	1	1.56E-02	2	1.59E-05	3	4.82E-12	-1			
101	HO166	1	2.73E-01	2	1.73E-02	3	7.99E-03	4	2.02E-03	5	1.06E-02
		6	3.07E-03	-1							
101	HO166M	1	1.78E 00	2	1.87E-01	3	3.02E-01	4	1.41E 00	5	3.06E-02
		-1									
101	ER169	1	1.21E-02	2	1.52E-06	-1					
101	ER171	1	1.12E 00	2	5.49E-01	3	1.07E-02	4	1.88E-02	5	2.53E-04
		-1									
101	ER172	1	1.17E-02	2	7.17E-06	3	1.28E-12	-1			
101	TM170	1	1.10E-01	2	2.87E-03	3	4.84E-04	4	7.49E-06	-1	
101	TM171	1	5.30E-03	-1							
101	TM172	1	1.42E-01	2	1.16E-02	3	5.10E-03	4	1.14E-03	5	1.92E-04
		6	1.47E-06	-1							
101	TM173	1	6.94E-02	2	2.58E-03	3	4.14E-04	4	9.73E-06	5	1.88E-07
		-1									
101	YB169	1	1.87E 00	2	8.11E-02	3	1.58E-04	4	2.32E-06	-1	
101	YB175	1	1.11E-01	2	6.88E-02	-1					
101	YB177	1	1.12E-01	2	7.20E-03	3	2.36E-03	4	2.76E-04	5	1.00E-05
		-1									
101	LU176	1	3.19E-02	2	3.34E-04	3	4.06E-06	-1			
101	LU176M	1	1.15E-01	2	6.84E-03	3	2.02E-03	4	1.83E-04	5	3.00E-06
		-1									
101	LU177	1	2.49E-01	2	1.96E-03	3	5.38E-09	-1			
101	LU177M	1	5.99E-02	2	3.05E-03	3	7.43E-04	4	3.83E-05	5	2.34E-08
		-1									
101	HF181	1	6.07E-01	2	1.29E-01	3	7.27E-01	-1			
101	HF182	1	3.39E-03	-1							
101	TA182	1	9.65E-01	2	2.28E-04	3	7.75E-06	4	1.14E-02	5	9.28E-01
		6	1.64E-10	-1							
101	TA183	1	3.40E-02	2	4.21E-04	3	8.86E-06	4	1.16E-11	-1	
101	W 181	1	2.73E-01	-1							
101	W 185	1	1.82E-02	2	3.11E-05	-1					
101	W 187	1	3.24E-01	2	2.45E-03	3	6.91E-01	4	4.86E-02	5	2.12E-05
		-1									
101	W 188	1	2.38E-02	2	1.52E-06	-1					
101	RE186	1	7.53E-02	2	3.45E-03	3	7.37E-04	4	2.70E-05	5	2.17E-10
		-1									
101	RE187	1	1.21E-15	-1							
101	RE188	1	4.14E-01	2	2.23E-02	3	3.73E-02	4	1.35E-02	5	3.43E-03
		6	1.94E-03	7	1.58E-05	-1					
101	RE189	1	8.78E-02	2	3.46E-03	3	6.13E-04	4	1.32E-05	-1	
101	OS191	1	6.68E-01	-1							
101	OS194	1	7.51E-04	-1							
101	IR192	1	6.46E-01	2	9.51E-01	3	5.79E-01	4	3.14E-03	5	4.99E-04
		-1									

Table B.1 (continued)

101	IR192M	1	2.06E-05	2	1.28E-06	3	4.16E-07	4	5.28E-08	5	3.18E-09				
		-1													
101	IR194	1	5.69E-01	2	1.66E-01	3	4.73E-02	4	1.47E-02	5	1.57E-02				
		6	2.27E-03	7	8.71E-05	-1									
101	IR194M	1	6.49E-03	-1											
101	PT190	1	1.26E-08	4	3.34E-09	5	1.90E-09	6	9.52E-10	7	4.77E-10				
		8	2.39E-10	9	1.76E-10	10	5.24E-11	11	3.40E-12	12	2.15E-13				
		-1													
101	PT195M	1	5.05E-01	-1											
101	PT197	1	3.65E-02	2	5.35E-04	3	1.74E-05	-1							
101	PT197M	1	1.45E-03	2	2.88E-05	3	1.53E-06	-1							
101	PT199	1	1.47E-01	2	1.07E-02	3	4.12E-03	4	7.53E-04	5	9.03E-05				
		6	1.00E-07	-1											
101	AU198	1	7.26E-02	2	2.87E-03	3	4.93E-04	4	7.98E-06	5	4.09E-09				
		-1													
101	AU199	1	6.02E-01	2	6.53E-06	-1									
101	HG203	1	1.59E 00	-1											
101	PB204	1	1.26E-08	4	3.34E-09	5	1.90E-09	6	9.52E-10	7	4.77E-10				
		8	2.39E-10	9	1.76E-10	10	5.24E-11	11	3.40E-12	12	2.15E-13				
		-1													
101	PB209	1	3.70E-02	2	5.37E-04	3	1.51E-05	-1							
101	BI210	1	9.84E-02	2	5.18E-03	3	1.32E-03	4	8.06E-05	5	2.27E-07				
		-1													
101	BI210M	1	1.25E-08	4	3.32E-09	5	1.89E-09	6	9.48E-10	7	4.75E-10				
		8	2.38E-10	9	1.75E-10	10	5.22E-11	11	3.38E-12	12	2.14E-13				
		-1													
101	BI211	1	1.28E-02	2	1.14E-01	3	2.25E-11	4	3.33E-09	5	1.89E-09				
		6	9.49E-10	7	4.76E-10	8	2.39E-10	9	1.76E-10	10	5.23E-11				
		11	3.39E-12	12	2.14E-13	-1									
101	PO210	1	1.26E-08	4	1.00E-05	5	1.90E-09	6	9.52E-10	7	4.77E-10				
		8	2.39E-10	9	1.76E-10	10	5.24E-11	11	3.40E-12	12	2.15E-13				
		-1													
101	PO211	1	1.26E-08	3	5.45E-03	4	5.60E-03	5	1.90E-09	6	9.52E-10				
		7	4.77E-10	8	2.39E-10	9	1.76E-10	10	5.24E-11	11	3.40E-12				
		12	2.15E-13	-1											
101	PO211M	1	1.26E-08	4	3.34E-09	5	1.90E-09	6	9.52E-10	7	4.77E-10				
		8	2.39E-10	9	1.76E-10	10	5.24E-11	11	3.40E-12	12	2.15E-13				
		-1													
-1	THERE ARE 322 NUCLIDES IN THIS PHOTON LIBRARY SEGMENT AND 1634 NON-ZERO INTENSITIES														

Table B.2. Updated photon library: actinides and daughters

102	TL207	1	2.95E-01	2	6.09E-02	3	3.94E-02	4	5.58E-02	5	3.28E-02
		6	2.08E-02	7	2.57E-02	8	9.09E-03	9	3.12E-03	10	2.94E-03
		11	1.91E-05	-1							
102	TL208	1	3.67E-01	2	7.01E-02	3	4.56E-02	4	6.51E-02	5	1.03E-01
		6	2.50E-02	7	1.29E-01	8	1.23E-02	9	1.07E 00	10	1.43E-01
		11	4.26E-03	12	2.05E-05	14	9.49E-01	-1			
102	TL209	1	4.85E-01	2	8.29E-02	3	5.43E-02	4	7.82E-02	5	2.30E-01
		6	7.52E-01	7	4.07E-02	8	1.66E-02	9	7.88E-01	10	1.61E-03
		11	2.65E-04	12	8.92E-01	-1					
102	PB209	1	1.16E-01	2	2.22E-02	3	1.37E-02	4	1.77E-02	5	9.07E-03
		6	4.90E-03	7	4.10E-03	8	5.37E-04	9	1.51E-05	-1	
102	PB210	1	2.64E-01	2	5.58E-05	3	1.01E-05	4	3.28E-02	-1	
102	PB211	1	2.73E-01	2	5.56E-02	3	3.59E-02	4	5.09E-02	5	3.45E-02
		6	1.85E-02	7	2.34E-02	8	5.66E-02	9	2.94E-03	10	3.53E-02
		11	1.14E-03	-1							
102	PB212	1	2.23E-01	2	9.72E-03	3	5.60E-03	4	6.47E-03	5	3.43E-01
		6	6.69E-03	7	4.74E-01	8	2.75E-02	9	2.35E-07	-1	
102	PB214	1	4.06E-01	2	5.01E-02	3	3.11E-02	4	5.12E-02	5	2.25E-01
		6	1.20E-02	7	3.53E-01	8	3.50E-01	9	1.24E-02	10	1.59E-02
		-1									
102	BI210M	7	8.35E-09	10	3.32E-09	11	1.89E-09	12	9.48E-10	13	4.75E-10
		14	2.38E-10	15	1.75E-10	16	5.22E-11	17	3.38E-12	18	2.14E-13
		-1									
102	BI210	1	2.32E-01	2	4.71E-02	3	3.02E-02	4	4.20E-02	5	2.40E-02
		6	1.48E-02	7	1.70E-02	8	5.18E-03	9	1.32E-03	10	8.06E-05
		11	2.27E-07	-1							
102	BI211	1	1.02E-02	2	1.51E-07	3	9.19E-08	4	1.17E-07	5	2.13E-02
		6	3.04E-08	7	3.16E-08	8	1.14E-01	9	2.25E-11	10	3.33E-09
		11	1.89E-09	12	9.49E-10	13	4.76E-10	14	2.39E-10	15	1.76E-10
		16	5.23E-11	17	3.39E-12	18	2.14E-13	-1			
102	BI212	1	2.60E-01	2	3.73E-02	3	3.61E-02	4	3.56E-02	5	2.40E-02
		6	1.45E-02	7	2.43E-02	8	9.93E-03	9	7.42E-03	10	1.31E-01
		11	8.91E-03	12	3.38E-02	13	2.91E-10	14	8.60E-11	15	6.33E-11
		16	1.88E-11	17	1.22E-12	18	7.71E-14	-1			
102	BI213	1	2.70E-01	2	5.13E-02	3	3.31E-02	4	4.64E-02	5	6.56E-02
		6	1.68E-02	7	2.66E-02	8	3.28E-01	9	2.76E-03	10	3.60E-03
		11	3.45E-03	12	2.06E-11	13	1.03E-11	14	5.17E-12	15	3.80E-12
		16	1.13E-12	17	7.34E-14	18	4.64E-15	-1			
102	BI214	1	7.68E-01	2	1.61E-01	3	1.06E-01	4	1.53E-01	5	1.03E-01
		6	6.21E-02	7	8.63E-02	8	5.08E-02	9	5.40E-01	10	1.19E-01
		11	3.44E-01	12	2.76E-01	13	8.51E-02	14	1.48E-03	15	2.78E-04
		16	1.10E-14	17	7.14E-16	18	4.51E-17	-1			
102	PO210	7	8.38E-09	10	1.00E-05	11	1.90E-09	12	9.52E-10	13	4.77E-10
		14	2.39E-10	15	1.76E-10	16	5.24E-11	17	3.40E-12	18	2.15E-13
		-1									
102	PO211M	7	8.38E-09	10	3.34E-09	11	1.90E-09	12	9.52E-10	13	4.77E-10
		14	2.39E-10	15	1.76E-10	16	5.24E-11	17	3.40E-12	18	2.15E-13
		-1									

Table B.2 (continued)

102	PO211	7 8.38E-09	9 5.45E-03	10 5.60E-03	11 1.90E-09	12 9.52E-10
		13 4.77E-10	14 2.39E-10	15 1.76E-10	16 5.24E-11	17 3.40E-12
		18 2.15E-13	-1			
102	PO212	7 8.38E-09	10 3.34E-09	11 1.90E-09	12 9.52E-10	13 4.77E-10
		14 2.39E-10	15 1.76E-10	16 5.24E-11	17 3.40E-12	18 2.15E-13
		-1				
102	PO213	7 8.38E-09	10 3.57E-05	11 1.90E-09	12 9.52E-10	13 4.77E-10
		14 2.39E-10	15 1.76E-10	16 5.24E-11	17 3.40E-12	18 2.15E-13
		-1				
102	PO214	7 6.71E-07	10 9.78E-05	11 1.90E-09	12 9.52E-10	13 4.77E-10
		14 2.39E-10	15 1.76E-10	16 5.24E-11	17 3.40E-12	18 2.15E-13
		-1				
102	PO215	7 8.38E-09	8 4.68E-04	10 3.34E-09	11 1.90E-09	12 9.52E-10
		13 4.77E-10	14 2.39E-10	15 1.76E-10	16 5.24E-11	17 3.40E-12
		18 2.15E-13	-1			
102	PO216	7 8.38E-09	10 3.34E-09	11 1.90E-09	12 9.52E-10	13 4.77E-10
		14 2.39E-10	15 1.76E-10	16 5.24E-11	17 3.40E-12	18 2.15E-13
		-1				
102	PO218	7 8.38E-09	10 3.34E-09	11 1.90E-09	12 9.52E-10	13 4.77E-10
		14 2.39E-10	15 1.76E-10	16 5.24E-11	17 3.40E-12	18 2.15E-13
		-1				
102	AT217	7 2.65E-04	9 4.13E-04	10 3.34E-09	11 1.90E-09	12 9.52E-10
		13 4.77E-10	14 2.39E-10	15 1.76E-10	16 5.24E-11	17 3.40E-12
		18 2.15E-13	-1			
102	BN218	7 8.38E-09	10 3.34E-09	11 1.90E-09	12 9.52E-10	13 4.77E-10
		14 2.39E-10	15 1.76E-10	16 5.24E-11	17 3.40E-12	18 2.15E-13
		-1				
102	BN219	1 1.12E-02	5 1.67E-02	6 1.35E-03	7 1.20E-01	8 7.18E-02
		9 6.51E-04	10 2.55E-05	11 5.07E-06	12 9.52E-10	13 4.77E-10
		14 2.39E-10	15 1.76E-10	16 5.24E-11	17 3.40E-12	18 2.15E-13
		-1				
102	BN220	7 8.38E-09	9 6.69E-04	10 3.34E-09	11 1.90E-09	12 9.52E-10
		13 4.77E-10	14 2.39E-10	15 1.76E-10	16 5.24E-11	17 3.40E-12
		18 2.15E-13	-1			
102	BN222	7 8.38E-09	9 6.92E-04	10 3.34E-09	11 1.90E-09	12 9.52E-10
		13 4.77E-10	14 2.39E-10	15 1.76E-10	16 5.24E-11	17 3.40E-12
		18 2.15E-13	-1			
102	FR221	1 2.50E-02	5 2.68E-02	6 9.78E-04	7 1.22E-01	8 2.32E-03
		10 3.34E-09	11 1.90E-09	12 9.52E-10	13 4.77E-10	14 2.39E-10
		15 1.76E-10	16 5.24E-11	17 3.40E-12	18 2.15E-13	-1
102	FR223	1 6.45E-01	2 4.67E-02	3 2.54E-02	4 3.42E-01	5 1.66E-01
		6 2.59E-02	7 6.67E-02	8 1.16E-02	9 8.07E-04	10 8.32E-03
		11 2.89E-09	12 5.71E-14	13 2.86E-14	14 1.44E-14	15 1.06E-14
		16 3.15E-15	17 2.04E-16	18 1.29E-17	-1	
102	RA222	7 4.27E 01	10 2.75E 01	11 1.28E 01	12 6.25E 00	13 3.62E 00
		14 2.10E 00	15 1.89E 00	16 8.10E-01	17 9.33E-02	18 1.07E-02
		-1				
102	RA223	1 2.86E-01	3 8.43E-07	5 5.13E-01	6 5.01E-02	7 2.12E-01
		8 8.48E-02	9 2.52E-03	10 2.93E-05	11 1.90E-09	12 9.52E-10
		13 4.77E-10	14 2.39E-10	15 1.76E-10	16 5.24E-11	17 3.40E-12
		18 2.15E-13	-1			

Table B.2 (continued)

102	PA224	1	4.58E-03	5	4.27E-03	7	4.19E-02	8	4.37E-05	9	7.92E-05						
		10	3.34E-09	11	1.90E-09	12	9.52E-10	13	4.77E-10	14	2.39E-10						
		15	1.76E-10	16	5.24E-11	17	3.40E-12	18	2.15E-13	-1							
102	PA225	1	2.40E-01	2	9.04E-03	3	3.14E-01	4	5.82E-03	5	2.30E-03						
		6	8.96E-04	7	3.05E-04	8	1.03E-06	-1									
102	PA226	1	9.41E-03	5	6.18E-03	7	2.72E-02	8	7.55E-06	9	6.37E-06						
		10	3.34E-09	11	1.90E-09	12	9.52E-10	13	4.77E-10	14	2.39E-10						
		15	1.76E-10	16	5.24E-11	17	3.40E-12	18	2.15E-13	-1							
102	PA228	1	1.16E-03	2	1.49E-05	3	1.76E-07	-1									
102	AC225	1	2.04E-01	2	3.83E-06	3	2.58E-04	4	5.14E-03	5	9.23E-02						
		6	1.93E-02	7	1.70E-02	8	2.82E-04	9	1.48E-03	10	3.34E-09						
		11	1.90E-09	12	9.52E-10	13	4.77E-10	14	2.39E-10	15	1.76E-10						
		16	5.24E-11	17	3.40E-12	18	2.15E-13	-1									
102	AC227	1	7.95E-03	2	6.50E-05	3	1.03E-06	4	7.79E-05	5	5.17E-04						
		6	1.96E-04	7	1.72E-04	8	7.40E-06	10	4.61E-11	11	2.62E-11						
		12	1.31E-11	13	6.59E-12	14	3.30E-12	15	2.43E-12	16	7.24E-13						
		17	4.69E-14	18	2.96E-15	-1											
102	AC228	1	7.98E-01	2	5.40E-02	3	3.48E-02	4	5.39E-02	5	5.18E-02						
		6	2.01E-02	7	1.28E-01	8	1.84E-01	9	7.83E-02	10	7.14E-01						
		11	4.86E-02	12	8.53E-02	-1											
102	TH226	7	4.12E 01	10	2.65E 01	11	1.23E 01	12	6.03E 00	13	3.50E 00						
		14	2.03E 00	15	1.82E 00	16	7.82E-01	17	9.01E-02	18	1.04E-02						
		-1															
102	TH227	1	5.09E-01	2	2.89E-03	3	4.97E-03	4	8.12E-02	5	9.49E-02						
		6	1.18E-02	7	3.01E-01	8	5.74E-02	9	4.99E-05	10	1.69E-04						
		11	4.10E-07	12	9.52E-10	13	4.77E-10	14	2.39E-10	15	1.76E-10						
		16	5.24E-11	17	3.40E-12	18	2.15E-13	-1									
102	TH228	1	1.16E-01	5	1.18E-02	6	1.18E-03	7	3.47E-03	10	3.34E-09						
		11	1.90E-09	12	9.52E-10	13	4.77E-10	14	2.39E-10	15	1.76E-10						
		16	5.24E-11	17	3.40E-12	18	2.15E-13	-1									
102	TH229	1	1.09E 00	2	4.06E-04	3	1.02E-01	4	5.93E-03	5	5.94E-01						
		6	7.43E-02	7	1.08E-01	10	3.34E-09	11	1.90E-09	12	9.52E-10						
		13	4.77E-10	14	2.39E-10	15	1.76E-10	16	5.24E-11	17	3.40E-12						
		18	2.15E-13	-1													
102	TH230	1	1.05E-01	4	4.48E-03	6	5.18E-04	7	2.04E-04	10	3.34E-09						
		11	1.90E-09	12	9.52E-10	13	4.78E-10	14	2.40E-10	15	1.76E-10						
		16	5.25E-11	17	3.40E-12	18	2.15E-13	-1									
102	TH231	1	4.87E-02	2	1.59E-01	3	4.58E-03	4	9.38E-03	5	9.22E-02						
		6	6.42E-03	7	2.24E-03	8	2.95E-05	-1									
102	TH232	1	8.14E-02	4	1.54E-03	6	4.33E-04	7	8.38E-09	10	3.34E-09						
		11	1.90E-09	12	9.52E-10	13	4.77E-10	14	2.39E-10	15	1.76E-10						
		16	5.24E-11	17	3.40E-12	18	2.15E-13	-1									
102	TH234	1	1.73E-01	2	6.20E-03	3	2.94E-03	4	4.59E-02	5	6.27E-02						
		6	2.46E-03	7	2.56E-05	-1											
102	PA231	1	5.78E-01	2	1.04E-01	3	2.80E-03	4	4.31E-03	5	1.95E-03						
		6	7.15E-04	7	2.55E-02	8	7.35E-02	9	3.39E-05	10	3.35E-09						
		11	1.90E-09	12	9.55E-10	13	4.79E-10	14	2.40E-10	15	1.77E-10						
		16	5.28E-11	17	3.44E-12	18	2.19E-13	-1									
102	PA232	1	7.75E-01	2	9.52E-03	3	5.46E-03	4	8.01E-03	5	3.26E-02						
		6	5.25E-02	7	8.37E-02	8	1.01E-01	9	2.50E-01	10	8.42E-01						
		11	4.48E-03	-1													

Table B.2 (continued)

102	PA233	1 7.13E-01	2 7.05E-03	3 3.68E-03	4 3.46E-03	5 3.16E-01
		6 6.95E-02	7 1.10E-02	8 3.99E-01	9 2.09E-07	-1
102	PA234M	1 9.84E-01	2 2.09E-01	3 1.38E-01	4 2.01E-01	5 1.27E-01
		6 8.31E-02	7 1.14E-01	8 5.05E-02	9 2.58E-02	10 1.08E-02
		11 7.20E-03	12 9.55E-04	13 8.56E-09	-1	
102	PA234	1 1.85E 00	2 5.73E-02	3 3.70E-02	4 8.49E-02	5 5.48E-01
		6 3.54E-01	7 3.36E-01	8 8.10E-02	9 4.67E-01	10 1.42E 00
		11 1.54E-01	12 6.74E-02	-1		
102	PA235	1 2.86E-01	2 5.89E-02	3 3.81E-02	4 5.36E-02	5 3.14E-02
		6 1.97E-02	7 2.41E-02	8 8.35E-03	9 2.78E-03	10 3.48E-04
		11 1.47E-05	-1			
102	U 230	7 8.38E-09	10 3.34E-09	11 1.90E-09	12 9.52E-10	13 4.77E-10
		14 2.39E-10	15 1.76E-10	16 5.24E-11	17 3.40E-12	18 2.15E-13
		-1				
102	U 231	1 8.47E-01	2 1.23E-01	4 4.55E-03	5 5.73E-01	6 1.12E-01
		7 9.92E-03	10 1.84E-13	11 1.04E-13	12 5.23E-14	13 2.63E-14
		14 1.32E-14	15 9.68E-15	16 2.88E-15	17 1.87E-16	18 1.18E-17
		-1				
102	U 232	1 1.63E-01	4 2.11E-03	6 7.74E-04	7 4.57E-05	8 2.97E-05
		9 1.74E-07	10 3.34E-09	11 1.90E-09	12 9.53E-10	13 4.78E-10
		14 2.40E-10	15 1.76E-10	16 5.26E-11	17 3.41E-12	18 2.16E-13
		-1				
102	U 233	1 8.19E-02	2 2.09E-04	3 1.00E-03	4 1.98E-04	5 4.23E-04
		6 3.49E-04	7 4.19E-04	8 1.60E-04	9 9.83E-07	10 3.34E-09
		11 1.90E-09	12 9.53E-10	13 4.78E-10	14 2.40E-10	15 1.76E-10
		16 5.26E-11	17 3.42E-12	18 2.17E-13	-1	
102	U 234	1 1.36E-01	4 1.09E-03	6 3.87E-04	7 8.44E-09	9 4.55E-07
		10 2.95E-08	11 1.92E-09	12 9.61E-10	13 4.83E-10	14 2.43E-10
		15 1.79E-10	16 5.37E-11	17 3.54E-12	18 2.31E-13	-1
102	U 235	1 5.98E-01	3 9.13E-04	4 1.78E-04	5 7.80E-02	6 1.54E-01
		7 5.45E-01	8 1.36E-03	9 6.69E-05	10 9.12E-06	11 6.87E-09
		12 3.38E-09	13 1.89E-09	14 1.06E-09	15 9.11E-10	16 3.68E-10
		17 3.97E-11	18 4.39E-12	-1		
102	U 236	6 1.71E-04	7 1.60E-08	10 8.27E-09	11 4.19E-09	12 2.07E-09
		13 1.13E-09	14 6.17E-10	15 5.15E-10	16 1.98E-10	17 2.02E-11
		18 2.14E-12	-1			
102	U 237	1 8.35E-01	2 3.10E-02	3 4.40E-03	4 3.92E-01	5 1.82E-01
		6 3.17E-01	7 2.39E-01	8 1.41E-02	-1	
102	U 238	1 1.14E-01	4 6.03E-04	7 3.27E-06	10 2.10E-06	11 9.77E-07
		12 4.78E-07	13 2.77E-07	14 1.61E-07	15 1.44E-07	16 6.19E-08
		17 7.13E-09	18 8.20E-10	-1		
102	U 239	1 4.50E-01	2 4.86E-02	3 8.29E-02	4 4.34E-02	5 4.65E-01
		6 1.69E-02	7 1.85E-02	8 6.27E-03	9 5.90E-03	10 8.74E-03
		11 1.03E-04	-1			
102	U 240	1 7.17E-01	2 1.79E-02	3 3.02E-02	4 1.19E-02	5 4.88E-03
		6 2.00E-03	7 7.78E-04	8 4.75E-06	-1	
102	NP235	1 4.97E-01	5 1.78E-02	6 3.99E-03	7 1.17E-13	10 4.67E-14
		11 2.66E-14	12 1.33E-14	13 6.68E-15	14 3.35E-15	15 2.46E-15
		16 7.34E-16	17 4.76E-17	18 3.00E-18	-1	
102	NP236M	1 4.01E-01	3 1.31E-04	4 9.65E-05	5 3.39E-01	6 7.59E-02
		9 1.43E-02	-1			

Table B.2 (continued)

102	NP236	1	1.97E 00	2	3.95E-03	3	4.48E-03	4	2.99E-03	5	6.34E-01						
		6	2.03E-01	7	1.97E-01	8	3.66E-05	9	7.94E-08	-1							
102	NP237	1	7.85E-01	2	1.15E-01	4	7.49E-03	5	2.02E-01	6	2.29E-02						
		7	1.12E-02	8	2.82E-05	9	2.40E-05	10	3.34E-09	11	1.90E-09						
		12	9.52E-10	13	4.77E-10	14	2.39E-10	15	1.76E-10	16	5.24E-11						
		17	3.40E-12	18	2.15E-13	-1											
102	NP238	1	8.00E-01	2	5.20E-02	3	3.40E-02	4	4.44E-02	5	2.60E-02						
		6	1.99E-02	7	1.74E-02	8	6.59E-03	9	4.37E-03	10	3.33E-01						
		11	2.09E-01	-1													
102	NP239	1	9.26E-01	2	1.21E-02	3	8.22E-03	4	2.22E-02	5	1.65E-01						
		6	4.76E-01	7	3.30E-01	8	3.18E-02	9	1.37E-04	-1							
102	NP240M	1	8.69E-01	2	7.76E-02	3	5.17E-02	4	7.62E-02	5	4.78E-02						
		6	3.15E-02	7	6.51E-02	8	2.62E-02	9	3.68E-01	10	6.98E-02						
		11	2.77E-02	12	1.07E-02	-1											
102	NP240	1	2.32E 00	2	1.11E-01	3	7.32E-02	4	1.01E-01	5	2.38E-01						
		6	2.55E-01	7	3.62E-01	8	2.57E-01	9	6.18E-01	10	7.47E-01						
		11	7.89E-02	12	1.61E-05	-1											
102	PU236	1	1.80E-01	4	5.71E-04	6	1.05E-04	7	4.85E-06	9	5.20E-06						
		10	6.63E-09	11	3.43E-09	12	1.70E-09	13	9.11E-10	14	4.91E-10						
		15	4.02E-10	16	1.49E-10	17	1.46E-11	18	1.50E-12	-1							
102	PU237	7	2.77E-13	10	1.10E-13	11	6.26E-14	12	3.14E-14	13	1.58E-14						
		14	7.90E-15	15	5.81E-15	16	1.73E-15	17	1.12E-16	18	7.08E-18						
		-1															
102	PU238	1	1.57E-01	3	4.52E-04	5	8.69E-05	7	6.92E-06	10	4.88E-07						
		11	1.99E-08	12	2.67E-09	13	1.48E-09	14	8.18E-10	15	6.96E-10						
		16	2.76E-10	17	2.91E-11	18	3.17E-12	-1									
102	PU239	1	5.71E-02	3	6.24E-05	4	2.11E-04	5	2.12E-05	6	8.44E-05						
		7	1.20E-05	8	6.38E-05	9	2.35E-06	10	2.14E-07	11	2.38E-09						
		12	9.56E-10	13	4.80E-10	14	2.41E-10	15	1.77E-10	16	5.30E-11						
		17	3.46E-12	18	2.22E-13	-1											
102	PU240	1	1.50E-01	4	3.54E-04	6	5.84E-05	7	3.59E-06	9	1.88E-07						
		10	2.15E-07	11	9.75E-08	12	4.77E-08	13	2.76E-08	14	1.60E-08						
		15	1.43E-08	16	6.12E-09	17	7.02E-10	18	8.06E-11	-1							
102	PU241	1	7.60E-04	7	2.05E-15	10	8.18E-16	11	4.65E-16	12	2.33E-16						
		13	1.17E-16	14	5.87E-17	15	4.31E-17	16	1.28E-17	17	8.32E-19						
		18	5.26E-20	-1													
102	PU242	1	1.18E-01	3	4.10E-04	6	6.14E-05	7	3.85E-05	10	2.28E-05						
		11	1.06E-05	12	5.19E-06	13	3.01E-06	14	1.75E-06	15	1.57E-06						
		16	6.73E-07	17	7.75E-08	18	8.92E-09	-1									
102	PU243	1	3.46E-01	2	3.51E-02	3	3.06E-02	4	2.97E-02	5	2.41E-01						
		6	1.09E-02	7	4.87E-03	8	7.74E-03	9	5.49E-06	-1							
102	PU244	1	1.06E-01	3	2.86E-04	7	7.67E-03	10	4.93E-03	11	2.30E-03						
		12	1.12E-03	13	6.51E-04	14	3.77E-04	15	3.39E-04	16	1.46E-04						
		17	1.68E-05	18	1.93E-06	-1											
102	PU245	1	1.42E-01	2	2.79E-02	3	1.75E-02	4	2.36E-02	5	1.28E-02						
		6	7.50E-03	7	7.86E-03	8	2.01E-03	9	3.83E-04	10	1.47E-05						
		11	8.97E-08	-1													
102	AM239	1	1.65E 00	3	1.07E-03	4	4.24E-03	5	4.50E-01	6	7.87E-01						
		7	3.86E-01	8	3.43E-04	9	2.31E-04	10	3.34E-13	11	1.90E-13						
		12	9.52E-14	13	4.77E-14	14	2.39E-14	15	1.76E-14	16	5.24E-15						
		17	3.40E-16	18	2.15E-17	-1											

Table B.2 (continued)

102	AM240	1	1.11E 00	3	1.03E-03	5	2.33E-01	6	3.75E-01	7	3.59E-04						
		8	1.22E-03	9	2.09E-03	10	1.11E 00	11	1.62E-03	12	1.81E-15						
		13	9.07E-16	14	4.55E-16	15	3.35E-16	16	9.96E-17	17	6.46E-18						
		18	4.08E-19	-1													
102	AM241	1	2.21E-01	2	2.53E-02	3	2.07E-03	4	3.72E-01	5	2.44E-04						
		6	2.33E-04	7	1.30E-05	8	1.26E-05	9	6.91E-06	10	2.03E-06						
		11	1.91E-09	12	9.56E-10	13	4.80E-10	14	2.41E-10	15	1.77E-10						
		16	5.29E-11	17	3.46E-12	18	2.21E-13	-1									
102	AM242M	1	4.42E-01	2	6.53E-08	4	2.02E-03	5	4.88E-04	6	5.34E-04						
		7	2.22E-04	10	6.73E-10	11	3.15E-10	12	1.54E-10	13	8.90E-11						
		14	5.15E-11	15	4.61E-11	16	1.97E-11	17	2.25E-12	18	2.58E-13						
		-1															
102	AM242	1	6.46E-01	2	1.46E-02	3	9.70E-03	4	1.16E-02	5	4.88E-02						
		6	7.80E-02	7	2.62E-03	8	3.32E-04	9	8.97E-06	-1							
102	AM243	1	2.33E-01	3	6.50E-02	4	1.23E-04	5	5.83E-01	6	6.64E-03						
		7	1.79E-05	9	1.46E-05	10	4.08E-09	11	2.24E-09	12	1.12E-09						
		13	5.75E-10	14	2.96E-10	15	2.27E-10	16	7.43E-11	17	5.91E-12						
		18	5.04E-13	-1													
102	AM244M	1	3.01E-01	2	6.22E-02	3	4.03E-02	4	5.71E-02	5	3.37E-02						
		6	2.14E-02	7	2.66E-02	8	9.60E-03	9	3.43E-03	10	5.00E-04						
		11	3.15E-05	-1													
102	AM244	1	6.20E-02	2	1.10E-02	3	6.39E-03	4	7.49E-03	5	3.19E-03						
		6	1.37E-03	7	6.12E-04	8	7.86E-06	-1									
102	AM245	1	1.54E-01	2	3.03E-02	3	1.90E-02	4	2.55E-02	5	1.38E-02						
		6	7.98E-03	7	7.95E-03	8	1.73E-03	9	2.27E-04	10	1.45E-06						
		-1															
102	AM246	1	2.17E-01	2	4.38E-02	3	2.80E-02	4	3.87E-02	5	2.20E-02						
		6	1.34E-02	7	1.51E-02	8	4.41E-03	9	1.04E-03	10	5.18E-05						
		11	2.90E-08	-1													
102	CM241	7	8.38E-11	10	3.34E-11	11	1.90E-11	12	9.52E-12	13	4.77E-12						
		14	2.39E-12	15	1.76E-12	16	5.24E-13	17	3.40E-14	18	2.15E-15						
		-1															
102	CM242	1	1.63E-01	3	3.82E-04	6	2.04E-05	7	1.04E-05	9	2.62E-06						
		10	5.57E-07	11	1.64E-07	12	6.45E-08	13	3.74E-08	14	2.16E-08						
		15	1.94E-08	16	8.30E-09	17	9.53E-10	18	1.10E-10	-1							
102	CM243	1	8.75E-01	3	1.43E-03	4	4.52E-03	5	1.68E-01	6	2.95E-01						
		7	3.22E-01	8	5.66E-04	10	3.33E-09	11	1.89E-09	12	9.49E-10						
		13	4.76E-10	14	2.39E-10	15	1.76E-10	16	5.23E-11	17	3.39E-12						
		18	2.14E-13	-1													
102	CM244	1	1.50E-01	3	2.97E-04	7	8.61E-06	10	5.54E-06	11	2.58E-06						
		12	1.26E-06	13	7.30E-07	14	4.23E-07	15	3.81E-07	16	1.63E-07						
		17	1.88E-08	18	2.16E-09	-1											
102	CM245	1	8.70E-01	3	1.16E-03	5	1.67E-01	6	3.59E-01	7	5.10E-02						
		10	3.34E-09	11	1.90E-09	12	9.52E-10	13	4.77E-10	14	2.39E-10						
		15	1.76E-10	16	5.24E-11	17	3.40E-12	18	2.15E-13	-1							
102	CM246	1	1.33E-01	3	3.33E-04	7	1.67E-03	10	1.07E-03	11	4.99E-04						
		12	2.44E-04	13	1.42E-04	14	8.21E-05	15	7.38E-05	16	3.16E-05						
		17	3.65E-06	18	4.20E-07	-1											
102	CM247	1	1.53E-01	4	9.22E-04	5	1.46E-02	6	3.53E-02	7	6.79E-02						
		8	8.42E-01	10	3.34E-09	11	1.90E-09	12	9.52E-10	13	4.77E-10						
		14	2.39E-10	15	1.76E-10	16	5.24E-11	17	3.40E-12	18	2.15E-13						
		-1															

Table B.2 (continued)

102	CM248	1	1.02E-01	3	2.37E-04	7	5.32E-01	10	3.42E-01	11	1.59E-01						
		12	7.79E-02	13	4.52E-02	14	2.62E-02	15	2.35E-02	16	1.01E-02						
		17	1.16E-03	18	1.34E-04	-1											
102	CM249	1	1.66E-01	2	3.20E-02	3	2.01E-02	4	2.71E-02	5	1.49E-02						
		6	1.35E-02	7	9.08E-03	8	5.61E-03	9	2.99E-02	10	1.71E-06						
		-1															
102	CM250	7	3.90E 00	10	2.51E 00	11	1.17E 00	12	5.70E-01	13	3.31E-01						
		14	1.92E-01	15	1.72E-01	16	7.40E-02	17	8.52E-03	18	9.80E-04						
		-1															
102	BK249	1	1.45E-02	2	1.71E-03	3	7.05E-04	4	4.12E-04	5	2.87E-05						
		6	1.03E-07	7	2.94E-09	8	1.78E-07	10	1.89E-09	11	8.80E-10						
		12	4.30E-10	13	2.49E-10	14	1.45E-10	15	1.30E-10	16	5.58E-11						
		17	6.43E-12	18	7.39E-13	-1											
102	BK250	1	6.13E-01	2	3.03E-02	3	1.95E-02	4	2.57E-02	5	1.54E-02						
		6	1.70E-02	7	8.53E-03	8	2.25E-03	9	6.61E-04	10	5.57E-01						
		11	3.26E-01	12	5.42E-08	-1											
102	CF249	1	3.36E 01	3	6.16E-04	4	2.51E-03	5	3.29E-03	6	6.31E-02						
		7	4.48E-02	8	8.22E-01	9	2.07E-04	10	1.65E-03	11	1.15E-08						
		12	5.63E-09	13	3.19E-09	14	1.81E-09	15	1.59E-09	16	6.59E-10						
		17	7.33E-11	18	8.25E-12	-1											
102	CF250	7	4.92E-03	10	3.16E-03	11	1.47E-03	12	7.20E-04	13	4.18E-04						
		14	2.42E-04	15	2.18E-04	16	9.34E-05	17	1.08E-05	18	1.24E-06						
		-1															
102	CF251	1	7.66E-01	4	8.35E-03	5	3.55E-03	6	4.63E-01	7	2.42E-01						
		10	3.34E-09	11	1.90E-09	12	9.52E-10	13	4.77E-10	14	2.39E-10						
		15	1.76E-10	16	5.24E-11	17	3.40E-12	18	2.15E-13	-1							
102	CF252	1	1.09E-01	3	1.76E-04	6	9.32E-05	7	1.98E-01	10	1.27E-01						
		11	5.93E-02	12	2.90E-02	13	1.68E-02	14	9.75E-03	15	8.76E-03						
		16	3.76E-03	17	4.33E-04	18	4.98E-05	-1									
102	CF253	1	4.33E-02	2	7.19E-03	3	3.99E-03	4	4.28E-03	5	1.52E-03						
		6	5.13E-04	7	1.13E-04	10	1.03E-11	11	5.88E-12	12	2.95E-12						
		13	1.48E-12	14	7.42E-13	15	5.46E-13	16	1.63E-13	17	1.05E-14						
		18	6.65E-16	-1													
102	CF254	7	6.37E 00	10	4.10E 00	11	1.91E 00	12	9.32E-01	13	5.41E-01						
		14	3.13E-01	15	2.82E-01	16	1.21E-01	17	1.39E-02	18	1.60E-03						
		-1															
102	ES253	7	5.64E-07	10	3.61E-07	11	1.68E-07	12	8.23E-08	13	4.77E-08						
		14	2.76E-08	15	2.48E-08	16	1.06E-08	17	1.22E-09	18	1.40E-10						
		-1															
102	ES254M	1	1.18E-01	2	2.28E-02	3	1.41E-02	4	1.86E-02	5	9.80E-03						
		6	5.54E-03	7	1.20E-02	8	1.38E-03	9	3.30E-04	10	4.25E-03						
		11	1.97E-03	12	9.63E-04	13	5.59E-04	14	3.24E-04	15	2.91E-04						
		16	1.25E-04	17	1.44E-05	18	1.66E-06	-1									
102	ES254	7	2.00E-07	10	1.27E-07	11	5.93E-08	12	2.90E-08	13	1.67E-08						
		14	9.67E-09	15	8.65E-09	16	3.69E-09	17	4.23E-10	18	4.84E-11						
		-1															
102	ES255	7	2.66E-04	10	1.71E-04	11	7.97E-05	12	3.90E-05	13	2.26E-05						
		14	1.31E-05	15	1.18E-05	16	5.05E-06	17	5.82E-07	18	6.70E-08						
		-1															
-1	THERE ARE 114 NUCLIDES IN THIS PHOTON LIBRARY SEGMENT AND 1403 NON-ZERO INTENSITIES																

Table B.3. Updated photon library: fission products

103	H 3	1	2.45E-05	-1												
103	BE 10	1	3.49E-02	2	3.28E-04	3	1.96E-06	-1								
103	C 14	1	3.12E-03	-1												
103	NI 66	1	5.95E-03	-1												
103	CU 66	1	3.59E-01	2	3.91E-02	3	2.19E-02	4	9.20E-03	5	6.94E-02					
		6	3.99E-04	7	1.33E-05	8	7.68E-11	-1								
103	CU 67	1	7.64E-01	2	8.46E-03	3	6.56E-07	-1								
103	ZN 69	1	7.36E-02	2	2.78E-03	3	4.17E-04	4	5.89E-06	-1						
103	ZN 69M	1	1.23E-03	2	1.11E 00	3	3.29E-04	4	1.45E-16	-1						
103	GA 70	1	1.92E-01	2	1.54E-02	3	6.38E-03	4	1.24E-03	5	4.30E-03					
		6	7.18E-08	-1												
103	ZN 71	1	3.49E-01	2	3.80E-02	3	2.12E-02	4	7.20E-03	5	2.84E-03					
		6	4.36E-04	7	2.46E-05	8	1.69E-07	-1								
103	ZN 71M	1	1.57E-01	2	1.15E-02	3	4.36E-03	4	7.24E-04	5	8.10E-05					
		6	4.04E-06	7	3.34E-08	-1										
103	ZN 72	1	1.03E 00	2	3.04E-11	-1										
103	GA 72	1	1.47E-01	2	2.09E-02	3	3.43E-01	4	1.14E 00	5	1.51E-01					
		6	1.27E-01	7	3.51E-01	8	1.26E-01	9	3.17E-04	-1						
103	ZN 74	1	1.33E 00	2	8.14E-02	3	1.45E-02	4	4.17E-03	5	1.18E-03					
		6	6.39E-05	7	4.75E-09	-1										
103	GA 74	1	3.92E-01	2	4.55E-02	3	1.24E 00	4	1.74E-01	5	3.49E-01					
		6	1.62E-01	7	5.78E-01	8	6.66E-02	9	4.27E-02	10	6.71E-08					
		-1														
103	GE 75	1	1.07E-01	2	5.88E-03	3	1.55E-03	4	1.02E-04	5	4.09E-07					
		-1														
103	GA 76	1	7.93E-01	2	2.65E-01	3	9.77E-01	4	1.71E-01	5	2.54E-01					
		6	1.52E-01	7	1.56E-01	8	2.23E-01	9	1.73E-01	10	4.07E-03					
		11	5.61E-13	-1												
103	AS 76	1	3.62E-01	2	4.08E-02	3	5.47E-01	4	1.34E-02	5	7.72E-02					
		6	5.30E-03	7	1.04E-02	8	5.04E-04	-1								
103	GE 77	1	2.07E 00	2	4.27E-01	3	3.20E-01	4	2.14E-01	5	1.72E-01					
		6	2.24E-02	7	1.74E-02	-1										
103	GE 77M	1	3.21E-01	2	3.66E-02	3	2.12E-02	4	7.58E-03	5	3.23E-03					
		6	5.65E-04	7	3.69E-05	8	5.41E-07	-1								
103	AS 77	1	8.21E-02	2	8.89E-04	3	5.69E-03	-1								
103	GE 78	1	4.76E-02	2	9.84E-04	3	5.14E-05	-1								
103	AS 78	1	4.70E-01	2	7.68E-02	3	8.92E-01	4	1.29E-01	5	3.08E-01					
		6	1.36E-01	7	2.82E-02	8	2.83E-02	9	9.06E-04	-1						
103	GE 79	1	5.72E-01	2	7.76E-02	3	5.22E-02	4	2.32E-02	5	1.42E-02					
		6	5.52E-03	7	1.33E-03	8	4.59E-04	9	1.57E-04	-1						
103	AS 79	1	2.69E-01	2	2.59E-02	3	1.29E-02	4	3.56E-03	5	9.19E-04					
		6	3.50E-05	-1												
103	SE 79	1	3.87E-03	-1												
103	AS 80	1	9.57E-01	2	1.40E-01	3	1.00E-01	4	4.85E-02	5	3.37E-02					
		6	1.65E-02	7	5.14E-03	8	2.51E-03	9	2.25E-03	10	1.09E-04					
		-1														
103	BR 80	1	2.09E-01	2	1.93E-02	3	1.02E 00	4	2.41E-02	5	9.64E-03					
		6	1.20E-05	-1												
103	BR 80M	1	1.60E-01	-1												

Table B.3 (continued)

103	AS 82	1	1.92E 00	2	2.85E-01	3	3.77E-01	4	1.01E-01	5	1.05E-01
		6	1.00E-01	7	1.24E-02	8	3.93E-02	9	2.35E-02	10	1.07E-03
		11	2.09E-06	-1							
103	AS 82M	2	6.78E-01	3	1.07E 00	4	4.30E-01	5	2.49E-01	6	8.67E-01
		7	6.20E-02	8	1.66E-01	9	6.66E-02	-1			
103	BR 82	1	7.52E-02	2	1.82E-03	3	1.51E 00	4	1.00E 00	5	7.18E-01
		6	8.96E-03	-1							
103	BR 82M	1	3.59E-02	2	3.22E-05	3	3.12E-04	4	1.84E-03	5	2.32E-04
		6	1.61E-05	7	1.15E-07	8	1.19E-08	9	1.86E-11	-1	
103	SR 83	1	1.54E-01	2	1.20E-02	3	5.51E-03	4	1.64E-03	5	6.28E-04
		6	9.57E-05	7	5.31E-06	8	7.20E-08	-1			
103	SR 83M	1	4.91E-01	2	6.04E-02	3	3.76E-02	4	1.51E-02	5	8.06E-03
		6	2.51E-03	7	4.92E-04	8	1.40E-04	9	3.80E-05	-1	
103	BR 83	1	7.42E-02	2	2.87E-03	3	1.35E-02	4	4.61E-06	-1	
103	KR 83M	1	1.72E-02	-1							
103	BR 84	1	4.51E-01	2	6.64E-02	3	5.73E-02	4	5.36E-01	5	1.18E-01
		6	2.09E-01	7	1.09E-01	8	2.32E-02	9	1.48E-01	10	2.31E-03
		-1									
103	BR 85	1	3.40E-01	2	3.62E-02	3	1.98E-02	4	3.07E-02	5	2.31E-03
		6	2.52E-04	7	2.69E-06	-1					
103	KR 85	1	5.23E-02	2	1.20E-03	3	3.91E-03	-1			
103	KR 85M	1	8.08E-01	2	1.15E-01	3	2.38E-04	4	8.63E-05	-1	
103	BR 86	1	2.03E-01	2	1.75E-02	3	7.91E-03	4	1.84E-03	5	7.62E-02
		6	1.61E-06	-1							
103	KR 87	1	4.73E-01	2	5.90E-01	3	6.03E-02	4	9.93E-02	5	3.10E-02
		6	2.96E-02	7	2.96E-02	8	1.27E-01	9	5.01E-03	-1	
103	BR 87	1	7.94E-03	-1							
103	SR 87	1	1.55E-04	-1							
103	SR 87M	1	9.69E-03	2	8.52E-01	-1					
103	BR 88	1	9.56E-01	2	1.43E-01	3	1.11E-01	4	1.87E 00	5	2.71E-01
		6	2.09E-01	7	8.82E-02	8	1.49E-01	9	2.38E-01	10	2.99E-01
		11	7.78E-06	-1							
103	KR 88	1	4.91E-01	2	4.23E-02	3	1.79E-02	4	1.70E-01	5	7.78E-02
		6	1.30E-01	7	6.17E-01	8	7.65E-03	-1			
103	BR 88	1	7.90E-01	2	1.13E-01	3	7.92E-02	4	1.86E-01	5	3.51E-02
		6	2.40E-01	7	5.48E-03	8	2.35E-02	9	6.79E-03	10	1.56E-03
		-1									
103	KR 89	1	8.28E-01	2	1.81E-01	3	3.84E-01	4	2.85E-01	5	2.48E-01
		6	2.05E-01	7	5.89E-02	8	5.62E-02	9	9.61E-02	10	7.09E-03
		-1									
103	BR 89	1	3.86E-01	2	4.03E-02	3	1.40E-01	4	1.16E-01	5	9.21E-01
		6	3.06E-02	7	1.57E-01	8	1.13E-01	9	1.41E-02	10	6.17E-04
		-1									
103	SR 89	1	1.70E-01	2	1.29E-02	3	5.05E-03	4	1.02E-03	5	6.56E-05
		-1									
103	Y 89M	1	5.39E-04	4	1.07E 00	-1					
103	KR 90	1	9.75E-01	2	8.07E-02	3	4.18E-01	4	4.98E-02	5	4.08E-01
		6	1.94E-01	7	2.93E-02	8	1.49E-02	9	2.40E-03	-1	
103	BR 90	1	7.05E-01	2	1.00E-01	3	7.10E-02	4	3.69E-01	5	1.04E-01
		6	3.85E-02	7	3.45E-02	8	7.86E-03	9	1.78E-01	10	2.06E-01
		-1									

Table B.3 (continued)

103	RH	90M	1	4.40E-01	2	6.34E-02	3	4.67E-02	4	1.02E 00	5	3.77E-01							
			6	1.35E-01	7	8.78E-02	8	1.63E-01	9	2.36E-01	10	3.75E-02							
			-1																
103	SR	90	1	7.14E-02	2	7.30E-04	3	3.70E-06	-1										
103	Y	90	1	6.18E-01	2	6.36E-02	3	3.38E-02	4	1.05E-02	5	3.47E-03							
			6	2.71E-04	7	2.98E-08	-1												
103	Y	90M	1	2.97E-10	2	5.56E-12	3	1.88E-13	-1										
103	SR	91	1	2.33E-01	2	2.09E-02	3	1.62E-01	4	2.60E-01	5	3.01E-01							
			6	6.14E-03	7	5.39E-05	8	2.39E-09	-1										
103	Y	91	1	1.77E-01	2	1.39E-02	3	5.59E-03	4	1.02E-03	5	2.99E-03							
			-1																
103	Y	91M	1	3.02E-03	3	9.22E-01	-1												
103	KR	92	1	1.26E 00	2	1.78E-01	3	1.98E-01	4	1.51E-01	5	4.41E-01							
			6	2.68E-02	7	1.30E-02	8	1.08E-02	9	6.91E-03	10	8.56E-05							
			-1																
103	RH	92	1	1.39E 00	2	2.23E-01	3	1.75E-01	4	1.33E-01	5	7.75E-02							
			6	4.78E-02	7	1.58E-02	8	1.79E-02	9	1.36E-02	10	3.26E-02							
			11	2.57E-03	-1														
103	SR	92	1	8.53E-02	2	3.92E-02	3	6.77E-03	4	4.15E-02	5	1.02E 00							
			6	2.93E-07	-1														
103	Y	92	1	5.26E-01	2	9.42E-02	3	6.98E-02	4	1.90E-01	5	6.56E-02							
			6	7.31E-03	7	1.02E-03	8	1.88E-04	9	5.88E-05	-1								
103	Y	93	1	5.30E-01	2	4.71E-02	3	3.49E-02	4	3.25E-02	5	1.41E-02							
			6	1.72E-02	7	3.43E-03	8	1.92E-06	-1										
103	ZR	93	1	5.34E-04	-1														
103	NB	93M	1	1.26E-02	-1														
103	RH	94	1	1.59E 00	2	2.60E-01	3	2.02E-01	4	1.09E 00	5	8.78E-02							
			6	5.42E-02	7	2.07E-02	8	1.28E-02	9	2.05E-02	10	6.05E-03							
			11	3.99E-04	12	1.44E-06	-1												
103	Y	94	1	6.30E-01	2	1.06E-01	3	1.19E-01	4	8.43E-01	5	1.50E-01							
			6	6.86E-02	7	2.49E-02	8	1.35E-02	9	2.27E-04	10	1.80E-07							
			-1																
103	NB	94	1	2.25E-02	2	7.69E-05	3	4.53E-16	4	1.85E 00	-1								
103	NB	94M	1	4.92E-02	2	1.56E-07	3	4.44E-08	4	4.95E-03	5	2.72E-11							
			-1																
103	ZR	95	1	1.54E-02	2	2.99E-05	3	3.43E-06	4	8.69E-01	-1								
103	NB	95	1	2.73E-03	4	9.01E-01	-1												
103	NB	95M	1	4.58E-01	-1														
103	Y	96	1	1.09E 00	2	1.64E-01	3	1.20E-01	4	5.95E-02	5	4.27E-02							
			6	2.21E-02	7	7.20E-03	8	3.71E-03	9	3.73E-03	10	2.58E-04							
			-1																
103	NB	96	1	2.97E-01	2	1.27E-01	3	1.74E 00	4	2.69E 00	5	1.38E 00							
			6	1.30E-03	-1														
103	ZR	97	1	2.43E-01	2	4.46E-02	3	7.72E-02	4	2.47E-02	5	6.13E-02							
			6	1.72E-02	-1														
103	NB	97	1	1.26E-01	2	7.68E-03	3	1.13E 00	4	1.89E-03	5	2.84E-03							
			6	1.30E-03	-1														
103	NB	97M	1	1.48E-03	4	8.57E-01	-1												
103	NB	98	1	1.04E 00	2	1.33E-01	3	9.45E-02	4	1.21E-01	5	4.97E-02							
			6	1.09E-02	7	2.13E-03	8	8.04E-04	9	3.64E-04	10	1.21E-09							
			-1																

Table B.3 (continued)

103	NP 98M	1	2.98E-02	2	1.02E-01	3	5.84E-02	4	1.79E 00	5	2.63E-01						
		6	2.40E-01	-1													
103	NP 99	1	5.66E-01	2	7.19E-02	3	4.58E-02	4	1.89E-02	5	1.03E-02						
		6	3.17E-03	7	5.63E-04	8	1.24E-04	9	1.43E-05	-1							
103	NP 99M	1	7.44E-01	2	1.24E-01	3	1.75E-01	4	7.12E-02	5	6.38E-02						
		6	3.49E-02	7	1.71E-02	8	1.79E-01	9	4.18E-03	-1							
103	MO 99	1	2.27E-01	2	1.75E-02	3	2.55E-03	4	1.48E-01	5	4.20E-05						
		-1															
103	TC 99	1	1.80E-02	2	5.25E-12	-1											
103	TC 99M	1	8.43E-01	-1													
103	TC100	1	4.98E-01	2	6.13E-02	3	1.63E-01	4	1.57E-02	5	9.07E-03						
		6	6.51E-03	7	4.78E-04	8	6.19E-05	9	2.26E-06	-1							
103	ZR101	1	3.05E 00	2	3.25E-01	3	1.20E-01	4	5.97E-02	5	4.30E-02						
		6	2.22E-02	7	7.24E-03	8	3.72E-03	9	3.72E-03	10	2.50E-04						
		-1															
103	MO101	1	5.62E-01	2	7.43E-02	3	4.57E-01	4	1.64E-01	5	3.64E-01						
		6	1.31E-01	7	8.84E-02	8	4.80E-13	-1									
103	TC101	1	1.90E-01	2	7.32E-01	3	7.77E-02	4	1.18E-02	5	6.41E-06						
		-1															
103	TC102	1	5.72E-01	2	7.32E-02	3	7.29E-01	4	1.97E-02	5	1.15E-01						
		6	3.66E-03	7	7.47E-04	8	2.16E-04	9	5.50E-05	-1							
103	TC102M	1	2.99E-01	2	9.06E-02	3	1.34E 00	4	1.45E-02	5	4.28E-01						
		6	3.05E-01	7	2.40E-01	8	4.43E-03	9	2.12E-06	-1							
103	RH103	1	1.59E-02	2	3.99E-03	3	8.47E-01	-1									
103	RH103M	1	1.14E-02	-1													
103	TC104	1	7.13E-01	2	9.63E-01	3	4.44E-01	4	2.89E-01	5	2.02E-01						
		6	2.81E-01	7	7.46E-02	8	6.64E-02	9	3.55E-02	10	7.38E-07						
		-1															
103	RH104	1	3.25E-01	2	3.43E-02	3	3.78E-02	4	6.06E-03	5	2.80E-03						
		6	2.14E-04	7	1.13E-06	-1											
103	RH104M	1	2.87E-01	2	1.92E-04	3	1.95E-02	4	1.59E-03	5	8.47E-04						
		6	1.74E-04	-1													
103	RU105	1	2.53E-01	2	2.09E-01	3	4.38E-01	4	4.97E-01	5	7.23E-03						
		6	1.14E-03	-1													
103	RH105	1	2.89E-02	2	2.06E-01	3	1.71E-06	-1									
103	RH105M	1	2.35E-01	-1													
103	RU106	1	2.76E-04	-1													
103	RH106	1	5.05E-01	2	6.44E-02	3	3.36E-01	4	2.01E-02	5	2.56E-02						
		6	4.77E-03	7	1.47E-03	8	2.15E-04	9	2.81E-05	-1							
103	RH106M	1	2.04E-01	2	3.45E-01	3	1.28E 00	4	8.74E-01	5	6.18E-01						
		6	2.63E-01	7	2.42E-02	-1											
103	RU107	1	6.04E-01	2	1.09E-01	3	2.88E-02	4	1.25E-01	5	7.93E-02						
		6	1.11E-03	7	1.26E-04	8	1.21E-05	9	2.59E-08	-1							
103	RH107	1	1.88E-01	2	8.23E-01	3	5.08E-02	4	4.12E-03	5	7.44E-04						
		-1															
103	PD107	1	1.10E-04	-1													
103	RH108	1	9.73E-01	2	6.19E-01	3	4.33E-01	4	3.29E-02	5	1.91E-02						
		6	8.62E-02	7	1.62E-03	8	5.53E-04	9	2.06E-04	-1							
103	RH108M	2	1.35E 00	3	1.09E 00	4	1.04E 00	5	1.04E-01	6	6.94E-02						
		-1															

Table B.3 (continued)

103	AG108	1	1.76E-01	2	1.97E-02	3	3.22E-02	4	1.12E-03	5	2.86E-04
		6	9.30E-06	-1							
103	AG108M	1	1.32E-01	2	1.04E 00	3	9.70E-01	4	7.73E-01	-1	
103	PD109	1	1.63E-01	2	4.54E-03	3	1.35E-03	4	2.05E-04	5	2.03E-07
		-1									
103	AG109M	1	7.50E-02	-1							
103	CD109	1	1.78E-01	-1							
103	RH110	1	1.29E 00	2	1.75E-01	3	1.19E-01	4	5.39E-02	5	3.48E-02
		6	1.57E-02	7	4.62E-03	8	2.15E-03	9	1.67E-03	10	4.00E-05
		-1									
103	AG110	1	4.06E-01	2	4.63E-02	3	7.85E-02	4	1.02E-02	5	4.48E-03
		6	9.23E-04	7	9.09E-05	8	1.29E-06	-1			
103	AG110M	1	1.38E-02	2	4.58E-02	3	1.32E 00	4	1.59E 00	5	3.21E-01
		6	1.24E-01	7	9.29E-06	-1					
103	AG111	1	1.05E-01	2	5.85E-02	3	1.08E-03	4	1.26E-04	-1	
103	CD112	1	1.62E-03	2	2.15E-03	3	5.41E-01	4	2.39E-02	5	9.84E-02
		6	4.69E-02	7	3.52E-02	8	1.96E-02	9	4.13E-05	-1	
103	CD113	1	1.07E-02	2	1.02E-07	-1					
103	CD113M	1	3.31E-02	2	3.54E-04	3	4.13E-06	-1			
103	AG114	1	7.31E-01	2	1.02E-01	3	2.34E-01	4	3.75E-02	5	3.56E-02
		6	1.32E-02	7	5.17E-03	8	9.72E-04	9	5.22E-04	10	3.53E-07
		-1									
103	IN114	1	2.39E-01	2	2.19E-02	3	1.06E-02	4	2.66E-03	5	2.68E-03
		6	1.27E-05	-1							
103	IN114M	1	2.57E-01	3	4.27E-02	4	3.69E-02	-1			
103	AG115	1	1.02E 00	2	1.29E-01	3	1.84E-01	4	3.61E-02	5	6.16E-02
		6	1.04E-01	7	7.90E-02	8	3.98E-03	9	2.55E-08	-1	
103	CD115	1	1.30E-01	2	3.00E-03	3	3.90E-01	4	3.44E-05	5	1.27E-08
		-1									
103	CD115M	1	1.76E-01	2	1.39E-02	3	7.32E-03	4	1.56E-02	5	6.94E-03
		6	1.16E-08	-1							
103	IN115	1	2.42E-02	2	1.10E-04	3	4.26E-09	-1			
103	IN115M	1	5.66E-02	2	4.19E-01	3	1.38E-05	4	1.23E-09	-1	
103	AG116	1	9.70E-01	2	1.43E-01	3	8.63E-01	4	1.00E-01	5	1.98E-01
		6	1.74E-02	7	1.21E-01	8	2.68E-03	9	2.41E-03	10	1.22E-04
		-1									
103	AG116M	1	8.35E-01	2	1.22E-01	3	8.66E-01	4	6.73E-01	5	3.01E-01
		6	1.44E-02	7	4.52E-03	8	2.24E-03	9	2.15E-03	10	1.52E-04
		-1									
103	IN116	1	4.84E-01	2	6.01E-02	3	3.60E-02	4	1.51E-02	5	1.97E-02
		6	1.94E-03	7	4.80E-04	8	3.08E-05	9	5.21E-07	-1	
103	IN116M	1	1.10E-01	2	3.37E-01	3	1.25E-02	4	1.20E-01	5	1.37E 00
		6	1.10E-01	7	1.46E-01	-1					
103	SN117M	1	1.05E 00	-1							
103	AG118	1	9.88E-01	2	1.46E-01	3	9.86E-01	4	1.53E-01	5	8.54E-02
		6	1.76E-02	7	5.52E-03	8	2.71E-03	9	2.46E-03	10	1.36E-04
		-1									
103	AG118M	1	1.46E 00	2	3.51E-02	3	1.47E-01	4	3.55E-02	5	3.49E-02
		6	8.52E-03	7	1.03E-02	8	2.07E-02	9	1.28E-02	10	3.45E-09
		-1									

Table B.3 (continued)

103	IN118	1	6.31E-01	2	8.33E-02	3	1.04E-01	4	3.54E-02	5	1.62E-01
		6	6.62E-02	7	1.18E-03	8	3.86E-04	9	1.17E-04	-1	
103	IN118M	1	2.10E-01	2	8.27E-02	3	7.36E-01	4	3.26E-02	5	1.72E 00
		6	2.16E-02	7	3.29E-02	-1					
103	SN119M	1	7.60E-02	-1							
103	AG120	1	9.94E-01	2	1.44E-01	3	1.02E-01	4	4.85E-02	5	3.29E-02
		6	1.56E-02	7	4.65E-03	8	2.17E-03	9	1.73E-03	10	6.54E-05
		-1									
103	CD120	1	1.59E-01	2	1.16E-02	3	4.35E-03	4	6.76E-04	5	4.66E-05
		-1									
103	IN120	1	1.39E 00	2	2.22E-01	3	2.01E-01	4	5.66E-01	5	1.66E 00
		6	5.93E-02	7	1.27E-01	8	2.05E-02	9	1.64E-03	10	5.00E-05
		-1									
103	IN120M	1	3.19E-03	4	1.34E-02	5	1.95E-01	7	3.38E-02	-1	
103	IN122	1	2.69E 00	2	2.97E-01	3	1.61E-01	4	1.74E-01	5	2.26E 00
		6	2.42E-02	7	7.44E-03	8	3.66E-03	9	3.48E-03	10	2.46E-04
		-1									
103	IN122M	5	2.65E-01	-1							
103	SB122	1	1.62E-01	2	1.23E-02	3	7.51E-01	4	1.15E-03	5	1.32E-02
		6	9.72E-05	-1							
103	IN123	1	4.59E-01	2	5.29E-02	3	4.09E-02	4	2.05E-02	5	7.64E-01
		6	1.16E-03	7	2.52E-03	8	9.14E-06	9	7.68E-09	-1	
103	SN123	1	1.47E-01	2	1.04E-02	3	3.76E-03	4	5.34E-04	5	5.54E-03
		-1									
103	SN123M	1	1.05E 00	2	7.75E-03	3	2.54E-03	4	1.99E-04	5	2.81E-06
		-1									
103	TE123	1	1.35E-01	-1							
103	TE123M	1	9.86E-01	-1							
103	SB124	1	1.06E-01	2	1.90E-02	3	1.12E 00	4	1.61E-01	5	9.33E-02
		6	4.78E-01	7	5.50E-02	8	4.02E-05	-1			
103	SB124M	1	4.20E-03	2	2.30E-04	3	6.05E-01	4	3.86E-06	5	2.82E-03
		-1									
103	SN125	1	2.66E-01	2	4.12E-02	3	2.60E-02	4	9.81E-02	5	1.36E-01
		6	2.60E-03	7	2.13E-02	-1					
103	SN125M	1	2.45E-01	2	9.10E-01	3	1.51E-02	4	3.79E-03	5	1.41E-02
		6	2.00E-03	7	1.88E-05	-1					
103	SB125	1	2.02E-01	2	3.61E-01	3	4.64E-01	-1			
103	TE125M	1	2.37E-01	-1							
103	SN126	1	3.90E-01	2	1.80E-06	-1					
103	SB126	1	2.32E-01	2	9.74E-01	3	3.03E 00	4	7.61E-01	5	4.34E-02
		6	2.21E-07	-1							
103	SB126M	1	1.55E-01	2	9.60E-01	3	2.01E 00	4	1.53E-02	5	2.35E-02
		6	1.23E-06	-1							
103	SN127	1	5.05E-01	2	1.59E-01	3	2.45E-01	4	4.87E-01	5	6.72E-01
		6	5.90E-02	7	8.07E-02	8	4.80E-02	9	2.79E-08	-1	
103	SB127	1	2.85E-01	2	1.16E-01	3	8.03E-01	4	1.67E-01	5	8.30E-03
		-1									
103	TE127	1	4.56E-02	2	1.32E-02	3	4.23E-05	-1			
103	TE127M	1	7.04E-02	2	7.89E-07	3	4.29E-06	-1			
103	SB128	1	5.18E-01	2	6.59E-01	3	1.51E 00	4	2.05E 00	5	1.79E-01
		6	1.65E-02	7	1.01E-06	-1					

Table B.3 (continued)

103	SB128M	1	1.29E-02	2	7.95E-01	3	3.51E-02	4	1.88E 00	5	5.58E-02
		6	7.31E-03	-1							
103	I 128	1	2.29E-01	2	2.09E-01	3	2.42E-02	4	8.31E-03	5	7.77E-04
		6	2.66E-05	-1							
103	SB129	1	1.79E-01	2	5.84E-02	3	4.11E-01	4	8.37E-01	5	1.71E-01
		6	1.54E-01	7	8.84E-03	-1					
103	TE129	1	1.97E-01	2	1.07E-02	3	7.58E-02	4	3.33E-03	5	6.04E-03
		-1									
103	TE129M	1	7.58E-02	2	1.51E-03	3	3.91E-02	4	8.01E-03	5	3.67E-04
		6	3.02E-10	-1							
103	I 129	1	1.67E-01	-1							
103	IN130	1	2.00E 00	2	2.06E-01	3	1.54E-01	4	9.91E-01	5	1.03E 00
		6	3.38E-02	7	1.19E-02	8	6.68E-03	9	8.50E-03	10	1.29E-03
		11	3.92E-06	-1							
103	SN130	1	1.61E 00	2	2.14E-01	3	3.73E-02	4	7.12E-01	5	8.36E-07
		-1									
103	SB130	1	1.15E 00	2	7.55E-01	3	4.66E-01	4	2.41E 00	5	2.37E-01
		6	1.32E-01	7	3.61E-03	8	7.18E-08	-1			
103	SB130M	1	8.47E-01	2	1.31E-01	3	2.79E-01	4	2.06E 00	5	4.89E-01
		6	4.27E-02	7	4.53E-05	8	4.45E-06	9	6.66E-08	-1	
103	I 130	1	6.80E-02	2	3.85E-01	3	2.11E 00	4	7.34E-01	5	1.26E-01
		6	1.16E-03	-1							
103	I 130M	1	6.22E-02	2	9.30E-04	3	1.68E-01	4	1.76E-04	5	2.62E-03
		6	5.60E-03	7	5.74E-04	8	1.42E-04	-1			
103	SB131	1	2.90E-01	2	9.37E-02	3	4.28E-01	4	8.82E-01	5	2.63E-01
		6	1.74E-01	7	8.38E-02	8	1.31E-02	-1			
103	TE131	1	9.33E-01	2	3.57E-02	3	2.65E-01	4	9.13E-02	5	6.42E-02
		6	1.83E-03	7	1.20E-04	-1					
103	TE131M	1	5.43E-01	2	1.29E-01	3	1.21E-01	4	9.27E-01	5	2.68E-01
		6	2.90E-02	7	2.51E-02	-1					
103	I 131	1	1.76E-01	2	7.94E-01	3	8.61E-02	4	1.53E-02	-1	
103	XE131M	1	1.34E-01	-1							
103	SN132	1	1.29E 00	2	4.19E-01	3	6.94E-02	4	8.96E-01	5	1.51E-01
		6	5.37E-06	-1							
103	SB132	1	1.03E 00	2	2.83E-01	3	1.25E 00	4	1.51E 00	5	2.51E-01
		6	1.26E-01	7	1.07E-02	8	2.43E-02	9	2.20E-05	10	1.39E-12
		-1									
103	SB132M	1	1.12E 00	2	1.40E-01	3	1.32E 00	4	1.21E 00	5	2.87E-01
		6	6.15E-02	8	3.87E-02	-1					
103	TE132	1	1.56E 00	-1							
103	I 132	1	1.86E-01	2	4.02E-02	3	1.68E 00	4	1.09E 00	5	2.34E-01
		6	2.17E-02	7	1.73E-02	8	4.20E-04	-1			
103	CS132	1	1.53E-01	2	7.20E-04	3	1.17E 00	4	6.75E-04	5	1.24E-02
		6	7.96E-04	-1							
103	TE133	1	2.61E-01	2	9.50E-01	3	3.63E-02	4	1.93E-01	5	2.29E-01
		6	6.15E-02	7	5.50E-03	8	6.54E-04	-1			
103	TE133M	1	7.32E-01	2	2.03E-01	3	4.60E-01	4	1.70E 00	5	8.90E-02
		6	1.11E-01	7	6.63E-02	-1					
103	I 133	1	1.14E-01	2	1.48E-02	3	8.29E-01	4	7.99E-02	5	4.67E-02
		6	2.67E-05	-1							
103	I 133M	1	1.49E-01	3	1.13E 00	4	1.07E 00	-1			

Table B.3 (continued)

103	XE133	1	3.15E-01	2	6.52E-05	-1					
103	XE133M	1	2.77E-01	-1							
103	SB134	1	3.48E 00	2	1.71E-01	3	1.26E-01	4	5.36E-01	5	1.07E 00
		6	2.41E-02	7	8.03E-03	8	4.23E-03	9	4.57E-03	10	4.22E-04
		11	2.39E-08	-1							
103	TE134	1	1.31E 00	2	2.22E-01	3	3.57E-01	4	4.76E-01	5	3.78E-03
		-1									
103	I 134	1	2.75E-01	2	1.58E-01	3	4.95E-01	4	1.88E 00	5	3.19E-01
		6	1.44E-01	7	1.07E-02	8	1.97E-03	-1			
103	I 134M	1	1.63E 00	2	4.01E-03	3	7.72E-06	4	4.07E-02	5	8.94E-07
		6	9.75E-08	7	1.09E-09	-1					
103	XE134M	1	1.09E 00	4	1.97E 00	-1					
103	CS134	1	3.10E-02	2	5.88E-04	3	1.27E 00	4	8.82E-01	5	5.83E-02
		-1									
103	CS134M	1	1.81E-01	-1							
103	TE135	1	1.16E 00	2	1.37E-01	3	9.51E-01	4	2.38E-01	5	3.23E-02
		6	1.55E-02	7	4.70E-03	8	2.22E-03	9	1.77E-03	10	4.75E-05
		-1									
103	I 135	1	1.90E-01	2	6.33E-02	3	8.28E-02	4	1.03E-01	5	7.39E-01
		6	2.41E-01	7	2.61E-02	-1					
103	XE135	1	1.58E 00	2	8.67E-03	3	3.17E-02	4	1.15E-03	5	3.45E-05
		-1									
103	XE135M	1	2.78E-02	2	9.98E-08	3	7.44E-01	4	1.00E-10	-1	
103	CS135	1	4.41E-03	-1							
103	CS135M	1	6.68E-03	4	1.86E 00	-1					
103	BA135M	1	4.07E-01	-1							
103	I 136	1	1.66E 00	2	2.51E-01	3	1.61E-01	4	1.17E-01	5	1.04E 00
		6	6.65E-02	7	1.93E-01	8	1.19E-01	9	2.14E-02	10	3.77E-05
		11	4.15E-09	-1							
103	I 136M	1	9.55E-01	2	1.18E 00	3	7.53E-03	4	3.08E-02	5	1.05E 00
		-1									
103	CS136	1	6.80E-01	2	4.30E-01	3	9.32E-03	4	9.60E-01	5	8.64E-01
		6	1.01E-03	-1							
103	XE137	1	6.65E-01	2	8.98E-02	3	2.98E-01	4	3.57E-02	5	2.30E-02
		6	1.51E-02	7	2.88E-03	8	2.56E-03	9	3.66E-04	-1	
103	CS137	1	2.99E-02	2	4.51E-04	3	8.47E-05	4	5.59E-06	5	2.13E-08
		-1									
103	BA137M	1	1.66E-02	3	1.03E 00	-1					
103	I 138	1	1.29E 00	2	2.01E-01	3	1.51E 00	4	7.74E-02	5	5.84E-02
		6	3.26E-02	7	1.14E-02	8	6.41E-03	9	8.07E-03	10	1.20E-03
		11	4.68E-06	-1							
103	XE138	1	8.83E-01	2	3.51E-01	3	2.92E-02	4	3.81E-02	5	3.59E-02
		6	2.00E-01	7	2.07E-01	8	4.56E-08	-1			
103	CS138	1	4.65E-01	2	1.11E-01	3	3.84E-01	4	7.73E-02	5	1.17E 00
		6	1.26E-02	7	1.57E-01	8	7.84E-02	9	5.20E-03	10	1.43E-04
		-1									
103	CS138M	1	4.05E-01	2	1.84E-02	3	2.08E-01	4	2.89E-03	5	2.88E-01
		6	1.02E-04	7	1.30E-05	8	1.62E-06	9	2.71E-08	-1	
103	LA138	1	1.10E-03	4	3.05E-01	-1					

Table B.3 (continued)

103	XE139	1	2.30E 00	2	1.70E-01	3	1.86E-01	4	1.36E-01	5	1.22E-01
		6	7.93E-02	7	5.23E-02	8	2.95E-02	9	6.39E-03	10	1.44E-07
		-1									
103	CS139	1	6.28E-01	2	8.49E-02	3	8.21E-02	4	3.47E-02	5	1.13E-01
		6	3.32E-02	7	2.48E-02	8	1.22E-02	9	6.66E-03	-1	
103	BA139	1	5.40E-01	2	2.86E-02	3	1.48E-02	4	4.37E-03	5	4.92E-03
		6	1.93E-04	7	1.39E-06	-1					
103	BA140	1	1.67E-01	2	7.72E-02	3	1.87E-01	4	1.27E-05	-1	
103	LA140	1	1.80E-01	2	2.07E-01	3	3.69E-01	4	4.16E-01	5	1.36E-04
		6	8.72E-01	7	9.16E-03	8	3.32E-02	9	2.73E-04	-1	
103	BA141	1	1.33E 00	2	3.87E-01	3	2.78E-01	4	1.38E-01	5	1.40E-01
		6	4.88E-02	7	1.07E-02	8	3.95E-07	9	9.55E-13	-1	
103	LA141	1	3.11E-01	2	3.23E-02	3	1.78E-02	4	5.59E-03	5	3.05E-02
		6	1.86E-03	7	1.45E-03	-1					
103	CE141	1	5.31E-01	2	1.22E-04	3	1.02E-06	-1			
103	BA142	1	8.36E-01	2	1.84E-01	3	4.40E-02	4	2.99E-01	5	4.72E-01
		6	2.52E-06	-1							
103	LA142	1	2.79E-01	2	3.89E-02	3	6.20E-01	4	1.34E-01	5	1.81E-01
		6	2.20E-01	7	3.55E-01	8	2.14E-01	9	7.73E-02	10	4.25E-14
		-1									
103	CE142	1	1.26E-08	4	3.34E-09	5	1.90E-09	6	9.52E-10	7	4.77E-10
		8	2.39E-10	9	1.76E-10	10	5.24E-11	11	3.40E-12	12	2.15E-13
		-1									
103	PR142	1	2.61E-01	2	2.54E-02	3	1.32E-02	4	3.79E-03	5	1.10E-03
		6	3.34E-02	-1							
103	CE143	1	1.18E 00	2	4.02E-02	3	9.04E-02	4	5.88E-02	5	5.05E-03
		-1									
103	PR143	1	7.27E-02	2	2.79E-03	3	4.49E-04	4	5.15E-06	-1	
103	CE144	1	1.45E-01	2	2.53E-08	-1					
103	PR144	1	4.18E-01	2	4.84E-02	3	4.66E-02	4	1.06E-02	5	8.42E-03
		6	9.77E-04	7	7.61E-03	8	6.82E-06	-1			
103	PR144M	1	7.86E-02	2	4.37E-09	3	7.27E-04	4	5.75E-04	5	2.25E-11
		-1									
103	ND144	1	1.26E-08	4	3.34E-09	5	1.90E-09	6	9.52E-10	7	4.77E-10
		8	2.39E-10	9	1.76E-10	10	5.24E-11	11	3.40E-12	12	2.15E-13
		-1									
103	CE145	1	6.04E-01	2	2.18E-01	3	3.38E-02	4	6.41E-01	5	1.21E-01
		6	2.44E-06	-1							
103	PR145	1	2.06E-01	2	1.73E-02	3	1.27E-02	4	9.25E-03	5	2.98E-03
		6	1.57E-06	-1							
103	CE146	1	5.44E-01	2	2.68E-01	3	9.50E-03	-1			
103	ND147	1	3.60E-01	2	4.28E-02	3	1.36E-01	4	3.60E-08	-1	
103	PM147	1	5.26E-03	-1							
103	SM147	1	1.26E-08	4	3.34E-09	5	1.90E-09	6	9.52E-10	7	4.77E-10
		8	2.39E-10	9	1.76E-10	10	5.24E-11	11	3.40E-12	12	2.15E-13
		-1									
103	PR148	1	6.91E-01	2	8.11E-01	3	4.08E-01	4	1.53E-01	5	2.91E-01
		6	6.22E-02	7	3.55E-02	8	1.45E-02	9	1.41E-04	-1	
103	PM148	1	4.52E-01	2	4.29E-02	3	2.57E-01	4	1.41E-01	5	2.62E-01
		6	2.21E-04	7	1.58E-06	-1					
103	PM148M	1	3.54E-01	2	2.99E-01	3	2.11E 00	4	4.77E-01	5	1.63E-01
		-1									

Table B.3 (continued)

103	SM148	1	1.26E-08	4	3.34E-09	5	1.90E-09	6	9.52E-10	7	4.77E-10		
		8	2.39E-10	9	1.76E-10	10	5.24E-11	11	3.40E-12	12	2.15E-13		
		-1											
103	PR149	1	4.04E-01	2	4.61E-02	3	2.69E-02	4	9.76E-03	5	4.29E-03		
		6	8.31E-04	7	6.98E-05	8	3.13E-06	-1					
103	ND149	1	1.39E 00	2	2.07E-01	3	1.80E-01	4	9.89E-03	5	6.51E-03		
		6	4.89E-06	-1									
103	PM149	1	1.45E-01	2	4.39E-03	3	2.24E-03	4	1.88E-03	5	1.53E-10		
		-1											
103	SM149	1	1.26E-08	4	3.34E-09	5	1.90E-09	6	9.52E-10	7	4.77E-10		
		8	2.39E-10	9	1.76E-10	10	5.24E-11	11	3.40E-12	12	2.15E-13		
		-1											
103	PM150	1	2.60E-01	2	7.21E-01	3	6.33E-02	4	3.27E-01	5	5.13E-01		
		6	1.19E-01	7	1.91E-02	8	1.11E-02	9	7.11E-04	-1			
103	ND151	1	1.79E-01	2	1.49E-02	3	6.68E-03	4	1.61E-03	5	3.84E-04		
		6	2.00E-05	7	1.85E-08	-1							
103	PM151	1	6.38E-02	2	2.45E-03	3	4.62E-04	4	1.89E-05	5	6.44E-08		
		-1											
103	SM151	1	6.79E-04	-1									
103	EU152	1	5.80E-01	2	3.17E-01	3	3.81E-02	4	3.42E-01	5	4.99E-01		
		6	2.52E-03	-1									
103	EU152M	1	2.44E-01	2	3.21E-02	3	8.69E-03	4	2.93E-01	5	1.08E-02		
		6	1.53E-04	-1									
103	GD152	1	1.26E-08	4	3.34E-09	5	1.90E-09	6	9.52E-10	7	4.77E-10		
		8	2.39E-10	9	1.76E-10	10	5.24E-11	11	3.40E-12	12	2.15E-13		
		-1											
103	PM153	1	1.90E-01	2	1.56E-02	3	6.60E-03	4	1.35E-03	5	1.86E-04		
		6	4.92E-07	-1									
103	SM153	1	4.50E-01	2	1.14E-03	3	1.98E-03	4	2.62E-06	-1			
103	GD153	1	7.04E-01	-1									
103	EU154	1	5.77E-01	2	1.34E-02	3	9.47E-02	4	4.76E-01	5	5.27E-01		
		6	1.58E-02	-1									
103	SM155	1	1.57E-01	2	1.15E-02	3	4.28E-03	4	6.75E-04	5	4.95E-05		
		6	1.31E-10	-1									
103	EU155	1	4.07E-01	-1									
103	SM156	1	3.29E-02	2	4.82E-04	3	2.53E-05	-1					
103	EU156	1	2.16E-01	2	1.33E-02	3	1.13E-01	4	2.30E-01	5	4.27E-01		
		6	9.57E-02	7	1.58E-01	-1							
103	EU157	1	9.21E-02	2	4.77E-03	3	1.29E-03	4	1.13E-04	5	2.11E-06		
		-1											
103	EU159	1	2.91E-01	2	2.96E-02	3	1.56E-02	4	4.84E-03	5	1.63E-03		
		6	1.68E-04	7	2.01E-06	-1							
103	GD159	1	6.72E-02	2	2.48E-03	3	3.97E-04	4	5.06E-06	-1			
103	TB160	1	8.48E-01	2	2.53E-02	3	7.58E-03	4	7.21E-01	5	3.02E-01		
		6	1.98E-17	-1									
103	GD161	1	1.60E-01	2	1.18E-02	3	4.51E-03	4	7.39E-04	5	6.00E-05		
		6	1.74E-09	-1									
103	TB161	1	2.44E-02	2	1.31E-04	3	3.91E-07	-1					
103	GD162	1	7.54E-02	2	3.02E-03	3	5.22E-04	4	8.18E-06	-1			
103	TB162	1	1.22E-01	2	7.53E-03	3	2.34E-03	4	2.47E-04	5	1.30E-05		
		6	6.62E-07	7	2.48E-09	-1							

Table B.3 (continued)

103	TB164	1	2.42E-01	2	2.14E-02	3	1.01E-02	4	2.62E-03	5	6.94E-04
		6	6.08E-05	7	2.12E-06	8	6.96E-09	-1			
103	DY165	1	1.17E-01	2	7.09E-03	3	2.14E-03	4	2.03E-04	5	3.65E-06
		-1									
103	DY165M	1	3.53E-05	2	1.27E-06	3	1.89E-07	4	2.07E-09	-1	
103	DY166	1	1.56E-02	2	1.59E-05	3	4.82E-12	-1			
103	HO166	1	2.73E-01	2	1.73E-02	3	7.99E-03	4	2.02E-03	5	1.06E-02
		6	3.07E-03	-1							
103	HO166M	1	1.78E 00	2	1.87E-01	3	3.02E-01	4	1.41E 00	5	3.06E-02
		-1									
103	ER169	1	1.21E-02	2	1.52E-06	-1					
103	YB169	1	1.87E 00	2	8.11E-02	3	1.58E-04	4	2.32E-06	-1	
103	TM170	1	1.10E-01	2	2.87E-03	3	4.84E-04	4	7.49E-06	-1	
103	ER171	1	1.12E 00	2	5.49E-01	3	1.07E-02	4	1.88E-02	5	2.53E-04
		-1									
103	TM171	1	5.30E-03	-1							
103	ER172	1	1.17E-02	2	7.17E-06	3	1.28E-12	-1			
103	TM172	1	1.42E-01	2	1.16E-02	3	5.10E-03	4	1.14E-03	5	1.92E-04
		6	1.47E-06	-1							

-1 THERE ARE 288 NUCLIDES IN THIS PHOTON LIERARY SEGMENT AND 1688 NON-ZERO INTENSITIES

Table B.4. Photon energy group structures for activation products, actinides, and fission products

Group	Lower boundary	Upper boundary	Average energy
	Activation and fission products[a]		
1	0.0	3.0000E-01	1.5000E-01
2	3.0000E-01	4.5000E-01	3.7500E-01
3	4.5000E-01	7.0000E-01	5.7500E-01
4	7.0000E-01	1.0000E 00	8.5000E-01
5	1.0000E 00	1.5000E 00	1.2500E 00
6	1.5000E 00	2.0000E 00	1.7500E 00
7	2.0000E 00	2.5000E 00	2.2500E 00
8	2.5000E 00	3.0000E 00	2.7500E 00
9	3.0000E 00	4.0000E 00	3.5000E 00
10	4.0000E 00	6.0000E 00	5.0000E 00
11	6.0000E 00	8.0000E 00	7.0000E 00
12	8.0000E 00	1.1000E 01	9.5000E 00
	Actinides and daughters[b]		
1	0.0	2.0000E-02	1.0000E-02
2	2.0000E-02	3.0000E-02	2.5000E-02
3	3.0000E-02	4.5000E-02	3.7500E-02
4	4.5000E-02	7.0000E-02	5.7500E-02
5	7.0000E-02	1.0000E-01	8.5000E-02
6	1.0000E-01	1.5000E-01	1.2500E-01
7	1.5000E-01	3.0000E-01	2.2500E-01
8	3.0000E-01	4.5000E-01	3.7500E-01
9	4.5000E-01	7.0000E-01	5.7500E-01
10	7.0000E-01	1.0000E 00	8.5000E-01
11	1.0000E 00	1.5000E 00	1.2500E 00
12	1.5000E 00	2.0000E 00	1.7500E 00
13	2.0000E 00	2.5000E 00	2.2500E 00
14	2.5000E 00	3.0000E 00	2.7500E 00
15	3.0000E 00	4.0000E 00	3.5000E 00
16	4.0000E 00	6.0000E 00	5.0000E 00
17	6.0000E 00	8.0000E 00	7.0000E 00
18	8.0000E 00	1.1000E 01	9.5000E 00

[a]Tables B.1 and B.3.

[b]Table B.2.

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