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JENDL FP Decay Data File 2011 and Fission Yields Data File 2011

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The decay and fission yield data of fission products were compiled as JENDL FP Decay Data File 2011 (JENDL/FPD-2011) and JENDL FP Fission Yields Data File 2011 (JENDL/FPY-2011). After the release of JENDL FP Decay Data File 2000 (JENDL/FPD-2000) in 2000, new measured data have been accumulated and new TAGS (Total Absorption Gamma-ray Spectroscopy) data have been published. This new release is to reflect such new measured and available data. The file contains the decay data of 1284 FP nuclides (of which 142 nuclides are stable). In the compilation of the decay data, data of some nuclides were newly added and those of some nuclides were deleted. In order to keep the consistency between the number of nuclides contained of the decay data file and fission yields file, the JENDL/FPY-2011 file was also compiled.

The decay heat calculation for various kinds of fissioning nuclides were performed to confirm the validity of the JENDL/FPD-2011 and JENDL/FPY-2011 files. The calculated results were compared with the measured data and showed good agreement.The uncertainty analyses of the decay heat calculation were carried out by the method of sensitivity analysis. It was shown that the uncertainty was about 10 % at 0.1 s after a burst fission.

Keywords: Decay Data, Fission Yields Data, Fission Products, JENDL, Decay Heat, Sensitivity Analysis

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2011 年版 JENDL FP 崩壊データファイルと核分裂収率データファイル

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核分裂生成物（FP）の崩壊データ及び核分裂収率データをまとめたファイルを JENDL FP Decay Data File 2011（JENDL/FPD-2011）及び JENDL FP Fission Yields Data File 2011（JENDL/FPY-2011）として整備した。崩壊データは 2000 年に JENDL FP Decay Data File 2000（JENDL/FPD-2000）を公開したが、その後、新しい測定データが蓄積されてきたことや TAGS (全吸収ガンマ線分光法）によるデータが新たに取得されてきたことを受け、データの改訂を図ったものである。このファイルには 1284 の FP 核種（内 142 は安定核種）の崩壊データが収納されている。また、核分裂生成物データの改訂により核種の追加、削除もあったため、崩壊データとの整合性を保つために、核分裂収率のデータも合わせて改訂した。

改訂した崩壊データ及び収率データの有効性を確認するため、各種の崩壊熱計算を実施し、測定データと比較し、良く再現していることを確認した。また、崩壊熱計算における計算誤差を感度解析手法により求め、瞬時照射後 0.1 秒では約 10 % 程度の計算誤差があることを確認した。

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1 Introduction

The decay data and fission yields data of fission products (FP) are important for the analysis of the reactor decay heat and the radioactive inventory of the fission products in nuclear reactors. The accuracy of such calculation as the decay heat depends on the adopted data. Although there are about 1000 FP nuclides produced after fission, their decay data are not always reliable ones. Roughly speaking, about a half of them has no measured or poorly measured decay data because of the difficulty to obtain experimentally the data with short half-lives. It is not suitable to use such deficient decay data for decay heat calculation at short cooling times after fission when the nuclides with short half-lives mainly contribute to the decay heat. Then it is necessary to compensate such deficient decay data with some other data.

Japanese nuclear data committee (JNDC) has a long history to develop the nuclear data file for decay heat calculation [1)]. They adopted theoretical decay data, especially, decay energy values for the nuclides with deficient decay data and succeeded to show good agreement between the calculated decay heat values and measured ones. The JNDC nuclear data libraries which adopted the theoretically calculated decay energy were developed for the decay heat calculation. The libraries, however, had different format from that of the JENDL, Japanese nuclear data library, format, that is, ENDF-6 format [2)]. In order to include the decay data into the JENDL family, JENDL FP Decay Data File 2000 [3)] (JENDL/FPD-2000) with ENDF-6 format was developed and released in 2000.

It has passed more than 10 years after the release of the JENDL/FPD-2000 file and new measured decay data have been accumulated during the period. In the measurement field, the activity employing TAGS (Total Absorption Gamma-ray Spectroscopy) method was initiated by international cooperation with the aid by IAEA NDS (Nuclear Data Section) and OECD/NEA WPEC (Working Party on International Evaluation Cooperation) [4)]and the measured decay energy data of some FPs are available now [5)]. The application of TAGS method to obtain beta strength function were performed at first in '70s [6)] and extensively studied by a group at Idaho National Laboratory [7)]. Although the usefulness of such TAGS data for the decay heat calculation was fully recognized, it was rather difficult to get consistent data between the decay energy values and their spectra to suit to the evaluated data format and the TAGS data were not included in the JENDL/FPD-2000 file. When we revise the JENDL/FPD-2000 file, however, it is decided to try to include the new TAGS data with spectral data.

Using new measured decay data including the TAGS ones, JENDL FP Decay Data File 2011 (JENDL/FPD-2011) was compiled. In the compilation process, it was considered that the good prediction ability of the JENDL/FPD-2000 file should be kept even if the newly measured decay data replaced the old ones.

The fission yields data were also revised because of the increase of the number of the nuclides contained in the JENDL/FPD-2011 file. As the number of the nuclides in the yields data file needs the consistency with that in the decay data file when they are used for the decay heat or the inventory calculation, the nuclides contained in the fission yields file were selected to keep the consistency of the number of the nuclides with that of the JENDL/FPD-2011 file. Then the fission yields file JENDL FP Yields File 2011 (JENDL/FPY-2011) were compiled.

In order to confirm the applicability of the JENDL/FPD-2011 and JENDL/FPY-2011 files, the decay heat calculation using them were performed and compared with measured decay heat data of various kinds of fissioning nuclides. In the calculation, the uncertainties of the calculated results were derived by sensitivity analyses.

2 Decay Data

The JENDL/FPD-2011 file includes the decay data of 1284 fission product nuclides from A = 66 to 172. Out of them 142 nuclides are stable ones. So there are 1142 unstable nuclides in the file. As the JENDL/FPD-2000 file contains the data of 1087 unstable nuclides (1229 including stable ones), the newly added data are for at least 55 nuclides. After the compilation of the JENDL/FPD-2000 file, many isomeric states have been identified and some in the JENDL/FPD-2000 file have been rejected by experiments.

The primary data source of the decay data is the ENSDF [8] (Evaluated Nuclear Structure Data File), which has been prepared under the international cooperation. The newer data than those in the JENDL/FPD-2000 file are taken from the ENSDF file as of October 2010.

The number of the nuclides in the file is summarized in Table 2.1. The continuous spectra of gamma- and beta-rays in Table 2.1 are theoretically calculated ones. And they are used to compensate incomplete measured spectral data and theoretical decay energy values or TAGS ones are adopted to those nuclides. There are 7 newly measured TAGS data. They are adopted in the JENDL/FPD-2011 file. Since the TAGS data give beta strength function, the beta-ray spectrum can be obtained from it if the beta decay forbiddenness is suitably assumed. The gamma-ray spectrum, however, can not be obtained from the strength function. Theoretically calculated gamma-ray spectra were used to compensate the spectroscopically measured ones of the nuclides with the TAGS data. Then the theoretical decay energy values are adopted to 502 (=509-7) nuclides in gamma-ray energy and to 486 nuclides in beta-ray energy.

Table 2.1 Number of nuclides of various types

No. of Nuclides		Data Types
1284 (1229)		Total number of contained nuclides
142 (142)		Stable nuclides
1142 (1087)		Unstable nuclides or states
252 (197)		Isomeric states
	22 (8)	Second isomeric states
1102 (1053)		Gamma spectra
	683 (622)	Discrete gamma spectra
	509 (557)	Continuous gamma spectra
922 (899)		Beta spectra
	499 (467)	Discrete beta spectra
	486 (525)	Continuous beta spectra
156 (152)		Positron or EC spectra
5 (5)		Alpha spectra

JENDL/FPD-2000 in parentheses

2.1 Decay Energy and Spectra

The decay data in the ENSDF file as of October 2010 were converted from the ENSDF format to the ENDF format by RADLST code [9] which can be downloaded from National Nuclear Data Center, Brookhaven National Laboratory, USA. The data in the ENSDF file, however, are summarized with the level property of a daughter nuclide. When there are two more daughter nuclides, they are provided in different data sets. For example, in the case of ^{86}Rb decay, there are 2 decay modes, that is, β^- and electron capture decays. The β^- decay produces ^{86}Sr as its daughter nuclide. On the other hand, the electron capture decay yields ^{86}Kr nuclides. The former is in the ^{86}Sr data set and the latter in ^{86}Kr one. As the data in the ENDF format, however, are arranged in the property of a parent nuclide, the both data sets have to be merged into one data group of the parent nuclide ^{86}Rb.

And also when a daughter nuclide has an isomeric state, it sometimes happens that the radiations from the isomeric state to the ground state are included in the parent nuclide radiations. This situation brings about the double counting of the radiations as long as the meta stable state is considered as a different nuclide. In order to avoid such double counting, the radiations from the isomeric state have to be removed from those of the parent nuclide.

Although the data in the ENSDF file are provided through detailed examination by evaluators as most probable ones, the data often suffer from the so-called "Pandemonium Problem" [10]. When Q value of a FP nuclide increases, more higher-lying levels in the daughter nuclide can be populated with less intense gamma-rays. The weaker gamma-rays are not always observed in a usual $\beta - \gamma$ spectroscopy method. Since the level scheme constructed without many unobserved weak gamma-rays is incomplete, it gives a lower average gamma energy and a higher average beta energy than the true average energy values. It is not suitable to adopt the average energy values derived from such incomplete decay scheme. In order to avoid such situation, the JENDL/FPD-2000 file adopted theoretically estimated average decay energy values and they were successfully able to reproduce the measured decay heat values for various kinds of fissioning nuclides.

In the compilation of the JENDL/FPD-2011 file, the theoretical values are also adopted for the nuclides with incomplete decay scheme excepting those with the TAGS data. As it is rather difficult to determine the nuclides with incomplete decay scheme, the adoption of the JENDL/FPD-2000 file was consulted. If the highest level energy observed is low enough comparing the Q value and the average decay energy value is much lower than that of the theoretical one, the measured data are not adopted in the JENDL/FPD-2011 file.

In the case of the adoption of TAGS data, the beta-ray spectrum was calculated from the beta strength functions obtained by the TAGS method assuming allowed transition when the beta decay forbideness was not known. In order to keep the consistency between the spectrum and the average decay energy, the beta decay energy calculated from the spectrum was adopted in the JENDL/FPD-2011, which was a little bit different from the reported decay energy value. For the gamma-ray energy, the reported values of the TAGS data were adopted and theoretically estimated spectra were used to compensate the difference between the TAGS data and the spectroscopic one.

2.2 Delayed Neutron Branching Ratio

The delayed-neutron branching ratios were also revised based on the ENSDF data and the compilation by Pfeiffer, Kratz and Möller [11], although the spectral data of the delayed neutrons were not included in the JENDL/FPD-2011 file. When the ENSDF file does not contain the delayed-neutron branching, the calculated branching ratios of the empirical Kratz-Herrmann formula by Pfeiffer *et al.* were adopted.

3 Data Format and Summary Data Table of Decay Data File

3.1 Data Formats

The decay data have been compiled in the format of ENDF-6. The format is reported in the reference and briefly described here. Each datum in the file is stored in a 80 columns record and each record contains three identification numbers: MAT, MF and MT. The MAT number is a material number which is uniquely assigned to each nuclide. The MF number is a file number. The file 1, MF=1, contains the comments on the data included. The radioactive decay data are included in FILE 8, that is, MF=8. The MT number shows a reaction numbers in the ENDF-6 format. The number of MT=457, however, is assigned to radioactive decay data. Each decay datum, therefore, has the identification numbers of MF=8 and MT=457. The structure of the decay data file in the ENDF-6 format is shown in Table 3.1.

The meaning of the variables in Table 3.1 is following:

ZA : Dessignation of the original nuclide (= 1000*Z + A).

AWR : Ratio of the LST state nuclide mass to that of neutron.

LIS : State of the original nuclide (LIS=0, ground state; LI =1, first excited state *etc.*).

LISO : Isomeric state number for the original nuclide (LISO=0, ground state; LISO=1, first isomeric state; *etc.*).

NST : Nucleus stability flag (NST=0, radioactive; NST=1, stable).

$T_{1/2}$: Half-life of the original nuclide (seconds).

NC : Total number of decay energies (eV) given (NC=3 or 17).

$\overline{E}_x$: Average decay energy (eV) of "x" radiation for decay heat applications. The meaning and order of "x" are shown later.

SPI : Spin of the nuclide in its LIS state (SPI=-7.777=spin unknown).

PAR : Parity of the nuclide in its LIS state ($\pm$1.0).

NDK : Total number of decay modes given (cannot be zero).

RTYP : Mode of decay of the nuclide in its LIS state. The definition will be given later.

RFS : Isomeric state flag for daughter nuclide. (RFS=0.0, ground state; RFS=1.0, first isomeric state; *etc.*).

Table 3.1 Structure of DECAY DATA

ZA	AWR	LIS	LISO	NST	NSP	MAT	8	457
$T_{1/2}$	$\Delta T_{1/2}$	0	0	2*NC	0	MAT	8	457
$\overline{E}_{LP}$	$\Delta\overline{E}_{LP}$	$\overline{E}_{EM}$	$\Delta\overline{E}_{EM}$	$\overline{E}_{HP}$	$\Delta\overline{E}_{HP}$	MAT	8	457
. . . . .								
SPI	PAR	0	0	6*NDK	NDK	MAT	8	457
$RTYP_1$	RFS_1	Q_1	ΔQ_1	BR_1	ΔBR_1	MAT	8	457
			. . . . .					
$RTYP_{NDK}$	RFS_{NDK}	Q_{NDK}	ΔQ_{NDK}	BR_{NDK}	ΔBR_{NDK}	MAT	8	457
. . . . .								
						Repeat NSP times; omit if NSP=0		
0	STYP	LCON	0	6	NER	MAT	8	457
FD	ΔFD	$\overline{ER}$	$\Delta\overline{ER}$	FC	ΔFC	MAT	8	457
						Omit if LCON = 1		
ER_1	ΔER_1	0	0	NT	0	MT	8	457
$RTYP_1$	$TYPE_1$	RI_1	ΔRI_1	RIS_1	ΔRIS_1	MAT	8	457
$RICC_1$	$\Delta RICC_1$	$RICK_1$	$\Delta RICK_1$	$RICL_1$	$\Delta RICL_1$	MAT	8	457
			. . . . .					
ER_{NER}	ΔER_{NER}	0	0	NT	0	MT	8	457
$RTYP_{NER}$	$TYPE_{NER}$	RI_{NER}	ΔRI_{NER}	RIS_{NER}	ΔRIS_{NER}	MAT	8	457
$RICC_{NER}$	$\Delta RICC_{NER}$	$RICK_{NER}$	$\Delta RICK_{NER}$	$RICL_{NER}$	$\Delta RICL_{NER}$	MAT	8	457
						Omit if LCON = 0		
RTYP	0.0	0	LCOV	NR	NP	MAT	8	457
	ER_{int}		/		RP(E)	MAT	8	457
						Omit if LCOV = 0 or LCON = 0		
0.0	0.0	0	LB	2*NPP	NPP	MAT	8	457
			(E_k,F_k)			MAT	8	457
			. . . . .					
0	0	0	0	0	0	MAT	8	457

Q : Total decay energy (eV) available in the corresponding decay process. This is not necessary the same as the maximum energy of the emitted radiation. In the case of an isomeric transition Q will be the energy of the isomeric state.

BR : Fraction of the decay of the nuclide in its LIS state which proceeds by the corresponding decay mode, *e.g.*, if only β^- occurs and no isomeric states in the daughter nucleus are excited then BR=1.0 for β^- decay.

NSP : Total number of radiation types (STYP) for which spectral information is given.

STYP : Decay radiation type. The definition will be given later.

ER : Discrete energy (eV) of radiation produced (E_γ, E_{β^-}, $E_{e.c.}$ *etc.*).

RI : Intensity of discrete radiation produced (relative unit.).

RP : Spectrum of the continuum component of the radiation in units of probability/eV such that $\int$RP(E)dE=1.

TYPE : Type of transition for beta and electron capture. (TYPE=1.0, allowed, non-unique: TYPE=2.0, first forbidden unique; TYPE=3.0, Second-forbidden unique) .

RICC : Total internal conversion coefficient (STYP=0.0 only).

RICK : K-shell internal conversion coefficient (STYP=0.0 only).

RICL : L-shell internal conversion coefficient (STYP=0.0 only).

RIS : Internal pair formation coefficient (STYP=0.0), positron intensity (STYP=2.0).

LCON : Continuum spectrum flag (LCON=0, no continuous spectrum given; LCON=1, only continuous spectrum given; LCON=2, both discrete and continuum spectra given)

NT : Number of entries given for each discrete energy (ER).

FC : Discrete spectrum normalization factor.

FD : Discrete spectrum normalization factor.

NER : Total number of tabulated discrete energies for a given spectral type (STYP).

$\overline{ER}$: Average decay energy of radiation produced.

NR : Number of interpolation ranges for continuum spectrum.

NP : Number of points at which the distribution will be given.

E_{int} : Interpolation scheme for the continuum spectrum.

NK : Number of partial energy distributions when LCON=5 is used.

Δ : Uncertainty in any quantity.

LCOV : Flag indicating whether covariance data are given for continuum spectrum data. (LCON=1 or 2). (LCOV=0, no covariance data given; LCOV=1, covariance data given).

LB : Flag indicating the meaning of the numbers given in the array (E_k,F_k).

NPP : Number of pairs of numbers in the (E_k,F_k) array.

The average decay energy $\overline{E}_x$ for decay heat application is given for three general radiation types, E_{LP} (for light particles), E_{EM} (for electromagnetic radiation) and E_{HP} (for heavy particles) followed by the individual

components. The sum of these three general quantities is the total average (neutrino energies excluded) energy available per decay to the decay heat problem.The three quantities are more precisely defined as:

$$\begin{aligned} \overline{E}_{LP} &= \overline{E}_{\beta^-} + \overline{E}_{\beta^+} + \overline{E}_{e^-} + \cdots \\ \overline{E}_{EM} &= \overline{E}_{\gamma} + \overline{E}_{x-ray} + \overline{E}_{anni.rad.} + \cdots \\ \overline{E}_{HP} &= \overline{E}_{\alpha} + \overline{E}_{SF} + \overline{E}_{p} + \overline{E}_{n} + \cdots \end{aligned}$$

where $\overline{E}_{LP}$ means the average energy of all "electron-related" radiation such as β^-, β^+, conversion-electrons, Auger, *etc.* The quantity $\overline{E}_{EM}$ means the average energy of all "electromagnetic" radiations such as gamma rays, x-rays and annihilation radiation. The quantity E_{HP} is the average energy of all heavy charged particles and neutrons and also includes the recoil energy; but the alpha energy alone can be separated out by the usual $M_R/(M_R + M_\alpha)$ factor, where M_R and M_α are the recoil nucleus and alpha masses, respectively.

The decay mode identification, RTYP, has the following definitions.

RTYP		Decay Mode
1.	β^-	Beta decay
2.	e.c., (β^+)	Electron capture and/or positron emission
3.	IT	Isomeric transition
4.	α	Alpha decay
5.	n	Neutron emission but not delayed neutron decay
6.	SF	Spontaneous fission
7.	p	Proton emission
10.	-	Unknown

Multiple particle decay is also allowed using any combination of the above RTYP variables as illustrated in the following examples:

RTYP		Decay Mode
1.5	β^-,n	Beta decay followed by neutron emission (*delayed neutron decay*)
1.4	β^-,α	Beta decay followed by alpha emission
2.4	β^+,α	Positron decay followed by alpha emission

The decay radiation type, STYP, has the following definitions.

STYP		Radiation type
0.	γ	Gamma rays
1.	β^-	Beta rays
2.	e.c., (β^+)	Electron capture and/or positron emission
4.	α	Alpha particles
5.	n	Neutrons
6.	SF	Spontaneous fission fragments
7.	p	Protons
8.	e^-	"Discrete electrons" such as internal conversion electrons
9.	x	X-rays and annihilation radiation

3.2 Example of Decay Data in JENDL/FPD-2011

As an example of the decay data in the JENDL/FPD-2011 file the decay data of ^{106}Tc are shown here.

```
 4.31060+04 1.05004+02          0          0          0          44352 8457
 3.56000+01 6.00000-01          0          0          6          04352 8457
 1.46200+06 1.10000+04 3.13000+06 7.00000+04 0.00000+00 0.00000+004352 8457
-7.77770+01 0.00000+00          0          0          0          14352 8457
 1.00000+00 0.00000+00 6.54700+06 1.10000+04 1.00000+00 0.00000+004352 8457
 0.00000+00 0.00000+00          2          0          6         514352 8457
 5.58000-03 0.00000+00 3.13000+06 6.00000+04 4.32699-01 0.00000+004352 8457
 2.70096+05 9.00000+00          0          0         12          04352 8457
 1.00000+00 0.00000+00 1.00000+02 0.00000+00 0.00000+00 0.00000+004352 8457
 8.00000-03 8.00000-03 3.00000-02 3.00000-02 0.00000+00 0.00000+004352 8457
 2.99200+05 1.00000+02          0          0          4          04352 8457
 1.00000+00 0.00000+00 3.00000-01 1.00000-01 0.00000+00 0.00000+004352 8457
 3.53700+05 2.00000+02          0          0          4          04352 8457
 1.00000+00 0.00000+00 7.00000-01 2.00000-01 0.00000+00 0.00000+004352 8457
 3.76900+05 2.00000+02          0          0          4          04352 8457
 1.00000+00 0.00000+00 2.00000-01 1.00000-01 0.00000+00 0.00000+004352 8457

          ----------------------------------------------------

 3.66040+06 4.00000+02          0          0          4          04352 8457
 1.00000+00 0.00000+00 7.00000-01 1.00000-01 0.00000+00 0.00000+004352 8457
 3.93020+06 4.00000+02          0          0          4          04352 8457
 1.00000+00 0.00000+00 6.00000-01 1.00000-01 0.00000+00 0.00000+004352 8457
 1.00000+00 0.00000+00          0          0          1         624352 8457
         62          1                                           4352 8457
 0.00000+00 2.76148-08 1.00000+05 5.73007-08 2.00000+05 8.94029-084352 8457
 3.00000+05 1.23921-07 4.00000+05 1.60511-07 5.00000+05 1.98827-074352 8457
 6.00000+05 2.37833-07 7.00000+05 2.75458-07 8.00000+05 3.08941-074352 8457
 9.00000+05 3.32758-07 1.00000+06 3.43804-07 1.10000+06 3.44840-074352 8457
 1.20000+06 3.45185-07 1.30000+06 3.45650-07 1.40000+06 3.45602-074352 8457
 1.50000+06 3.44573-07 1.60000+06 3.42262-07 1.70000+06 3.38494-074352 8457
 1.80000+06 3.33201-07 1.90000+06 3.26397-07 2.00000+06 3.18158-074352 8457
 2.10000+06 3.08608-07 2.20000+06 2.97902-07 2.30000+06 2.86215-074352 8457
 2.40000+06 2.73735-07 2.50000+06 2.60648-07 2.60000+06 2.47142-074352 8457
 2.70000+06 2.33389-07 2.80000+06 2.19555-07 2.90000+06 2.05786-074352 8457
 3.00000+06 1.92215-07 3.10000+06 1.78956-07 3.20000+06 1.66104-074352 8457
 3.30000+06 1.53740-07 3.40000+06 1.41926-07 3.50000+06 1.30708-074352 8457
 3.60000+06 1.20119-07 3.70000+06 1.10179-07 3.80000+06 1.00896-074352 8457
 3.90000+06 9.21998-08 4.00000+06 8.40584-08 4.10000+06 7.61912-084352 8457
 4.20000+06 6.89173-08 4.30000+06 6.21491-08 4.40000+06 5.62824-084352 8457
 4.50000+06 5.07915-08 4.60000+06 4.60196-08 4.70000+06 4.16246-084352 8457
 4.80000+06 3.77218-08 4.90000+06 3.39777-08 5.00000+06 3.06414-084352 8457
 5.10000+06 2.71740-08 5.20000+06 2.38852-08 5.30000+06 1.97736-084352 8457
 5.40000+06 1.68985-08 5.50000+06 1.43624-08 5.60000+06 1.26022-084352 8457
 5.70000+06 1.07447-08 5.80000+06 9.20598-09 5.90000+06 7.31151-094352 8457
 6.00000+06 5.76034-09 6.10000+06 3.14896-09 0.00000+00 0.00000+004352 8457
 0.00000+00 1.00000+00          0          0          6         904352 8457
 1.00000-02 0.00000+00 1.45660+06 1.70000+03 0.00000+00 0.00000+004352 8457
 7.00000+03 7.00000+03          0          0          4          04352 8457
 1.00000+00 1.00000+00 1.79200-02 0.00000+00 0.00000+00 0.00000+004352 8457
 4.70000+04 1.10000+04          0          0          4          04352 8457
 1.00000+00 1.00000+00 1.80800-02 0.00000+00 0.00000+00 0.00000+004352 8457

          ----------------------------------------------------

 5.75400+06 1.10000+04          0          0          4          04352 8457
 1.00000+00 1.00000+00 1.27800-01 0.00000+00 0.00000+00 0.00000+004352 8457
 6.27700+06 1.10000+04          0          0          4          04352 8457
 1.00000+00 1.00000+00 8.31000-01 0.00000+00 0.00000+00 0.00000+004352 8457
 0.00000+00 8.00000+00          0          0          6          44352 8457
 1.00000-02 0.00000+00 5.00000+03 5.00000+03 0.00000+00 0.00000+004352 8457
 2.53000+03 0.00000+00          0          0          4          04352 8457
 1.00000+00 0.00000+00 2.00000+00 2.00000+00 0.00000+00 0.00000+004352 8457
 1.62000+04 0.00000+00          0          0          4          04352 8457
 1.00000+00 0.00000+00 4.00000-01 4.00000-01 0.00000+00 0.00000+004352 8457
```

```
2.47979+05 9.00000+00          0          0          4          04352 8457
1.00000+00 0.00000+00 1.80000+00 1.80000+00 0.00000+00 0.00000+004352 8457
2.66872+05 9.00000+00          0          0          4          04352 8457
1.00000+00 0.00000+00 3.00000-01 3.00000-01 0.00000+00 0.00000+004352 8457
0.00000+00 9.00000+00          0          0          6          44352 8457
1.00000-02 0.00000+00 2.90700+02 0.00000+00 0.00000+00 0.00000+004352 8457
2.56000+03 0.00000+00          0          0          4          04352 8457
1.00000+00 0.00000+00 1.00000-01 1.00000-01 0.00000+00 0.00000+004352 8457
1.91504+04 2.00000-01          0          0          4          04352 8457
1.00000+00 0.00000+00 4.00000-01 4.00000-01 0.00000+00 0.00000+004352 8457
1.92792+04 2.00000-01          0          0          4          04352 8457
1.00000+00 0.00000+00 8.00000-01 8.00000-01 0.00000+00 0.00000+004352 8457
2.17000+04 0.00000+00          0          0          4          04352 8457
1.00000+00 0.00000+00 2.50000-01 2.50000-01 0.00000+00 0.00000+004352 8457
0.00000+00 0.00000+00          0          0          0          04352 8  0
```

As indicated on the first line, NSP=4. That means there are four spectrum data in the decay of ^{106}Tc. They are gamma-rays (STYP=0.0), beta-rays (STYP=1.0), internal conversions (STYP=8.0) and x-rays (STYP=9.0). As the decay data of ^{106}Tc adopts the TAGS data by A. Algola et al., the average gamma energy is 3.13 MeV from TAGS data and the value is adopted in the JENDL/FPD-2011 file. The ENSDF data as of October 2010, however, show 2.22 MeV for gamma energy. Theoretically calculated spectrum is used to compensate the gap between the TAGS and the ENSDF energy values. The theoretical spectrum is given by 100 keV bin as continuous one. As for beta energy, the beta strength function obtained by the TAGS method was directly used for beta-ray spectrum data. So there are no continuous spectrum for this case. The highest level energy in the ENSDF file is 3.93 MeV. The TAGS data give the beta strength to the levels higher than 3.93 MeV. The strength data were put into the JENDL/FPD-2011 file as the discrete ones.

3.3 Summary Data Table

The half-lives, decay energy values, decay modes, Q-values, branching ratios and other information of JENDL FP Decay Data File 2011 are listed in the following Tables. The table is produced using a computer code SPEC5[12] developed by T. R. England. All nuclides have been grouped by increasing mass number, then charge and state per mass. The first column is a sequence number for the ordering of data. All other columns have specific meaning described in the ENDF-6 formats manual and are briefly summarized below except those given in the previous section(RTYPE, RFS, Q, NDK, NSP and MAT).

Symbol : Chemical symbol preceded by Z value and followed by the atomic number.

S : Isomeric state number (0=ground, 1=1st isomeric state, *etc.*).

ZZAAAS : Numeric identifier consisting of the quantity Z x 10000 + A x 10 + S, where S is the isomeric state number mentioned above.

Halflife : Total decay Half-life in seconds.

E-beta : Average beta decay energy in a unit of eV which includes all electron related radiations such as β^-, β^+, conversion electron *etc.*

E-gamma : Average gamma decay energy in a unit of eV which includes all "electromagnetic" radiation such as gamma-rays, X-rays and annihilation radiation.

E-alpha : Average alpha decay energy in a unit of eV.

Branching : Branching ratio.

Multiple particle emission is also defined by combining the RTYP indicators as decimal digits in the sequence in which particles are emitted. Thus, for beta decay followed by a delayed neutron, RTYP=1.5, and a positron decay followed by alpha decay is 2.4 *etc.* The Q-value for such cases is the energy difference based on masses of the initial and final states.

no	symbol	s	zzaaas	halflife	e-beta	e-gamma	e-alpha	rtyp	rfs	q	branching	awr	ndk	nsp	mat
1	23- v- 66	0	230660	9.9900E-03	5.4830E+06	4.7990E+06	0.0000E+00	1.00	0.0	1.6214E+07	1.0000E+00	6.5994E+01	1	2	2373
2	24-cr- 66	0	240660	1.0000E-02	3.8630E+06	1.6930E+06	0.0000E+00	1.00	0.0	1.1500E+07	1.0000E+00	6.5973E+01	1	2	2473
3	25-mn- 66	0	250660	6.6000E-02	4.7390E+06	4.6440E+06	0.0000E+00	1.00	0.0	1.3300E+07	1.0000E+00	6.5961E+01	1	2	2558
4	26-fe- 66	0	260660	4.4000E-01	2.2670E+06	1.0470E+06	0.0000E+00	1.00	0.0	6.5000E+06	1.0000E+00	6.5946E+01	1	2	2661
5	27-co- 66	0	270660	2.3300E-01	3.2200E+06	3.3730E+06	0.0000E+00	1.00	0.0	9.8900E+06	1.0000E+00	6.5373E+01	1	2	2746
6	28-ni- 66	0	280660	1.9660E+05	7.3400E+04	0.0000E+00	0.0000E+00	1.00	0.0	2.5190E+05	1.0000E+00	6.5363E+01	1	1	2849
7	29-cu- 66	0	290660	3.0720E+02	1.0667E+06	9.7800E+04	0.0000E+00	1.00	0.0	2.6409E+06	1.0000E+00	6.5363E+01	1	3	2934
8	30-zn- 66	0	300660	stable								6.5926E+01	0	0	3031
9	24-cr- 67	0	240670	3.1120E-02	4.9320E+06	3.1370E+06	0.0000E+00	1.00	0.0	1.4400E+07	1.0000E+00	6.6980E+01	1	2	2476
10	25-mn- 67	0	250670	4.2000E-02	4.5310E+06	2.4530E+06	0.0000E+00	1.00	0.0	1.2300E+07	1.0000E+00	6.6964E+01	1	2	2561
11	26-fe- 67	0	260670	4.7000E-01	3.7080E+06	1.8520E+06	0.0000E+00	1.00	0.0	9.4000E+06	1.0000E+00	6.6951E+01	1	2	2664
12	27-co- 67	0	270670	4.2500E-01	3.0100E+06	1.2490E+06	0.0000E+00	1.00	0.0	8.7000E+06	9.8900E-01	6.6365E+01	2	2	2749
								1.50	0.0	2.9000E+06	1.1000E-02				
13	28-ni- 67	0	280670	2.1000E+01	1.1492E+06	1.4341E+06	0.0000E+00	1.00	0.0	3.5760E+06	1.0000E+00	6.6357E+01	1	2	2852
14	29-cu- 67	0	290670	2.2260E+05	1.5560E+05	1.1540E+05	0.0000E+00	1.00	0.0	5.6130E+05	1.0000E+00	6.6353E+01	1	4	2937
15	30-zn- 67	0	300670	stable								6.6927E+01	0	0	3034
16	31-ga- 67	0	310670	2.8181E+05	3.6000E+04	1.5880E+05	0.0000E+00	2.00	0.0	1.0011E+06	1.0000E+00	6.6353E+01	1	4	3119
17	24-cr- 68	0	240680	1.7230E-02	4.3910E+06	2.0090E+06	0.0000E+00	1.00	0.0	1.1210E+07	1.0000E+00	6.7983E+01	1	2	2479
18	25-mn- 68	0	250680	2.8000E-02	5.0720E+06	5.0500E+06	0.0000E+00	1.00	0.0	1.4500E+07	1.0000E+00	6.7969E+01	1	2	2564
19	26-fe- 68	0	260680	1.3200E-01	2.7290E+06	1.2150E+06	0.0000E+00	1.00	1.0	8.1000E+06	1.0000E+00	6.7952E+01	1	2	2667
20	27-co- 68	0	270680	1.9900E-01	3.8000E+06	3.4000E+06	0.0000E+00	1.00	0.0	1.2100E+07	9.7600E-01	6.7361E+01	2	4	2752
								1.50	0.0	4.3000E+06	2.4000E-02				
21	27-co- 68	1	270681	1.6000E+00	3.1000E+06	3.5400E+06	0.0000E+00	1.00	0.0	1.2300E+07	1.0000E+00	6.7361E+01	1	2	2753
22	28-ni- 68	0	280680	2.9000E+01	6.6370E+05	5.8190E+05	0.0000E+00	1.00	0.0	2.1030E+06	1.0000E+00	6.7932E+01	1	2	2855
23	29-cu- 68	0	290680	3.1100E+01	1.4800E+06	1.0200E+06	0.0000E+00	1.00	0.0	4.4399E+06	1.0000E+00	6.7346E+01	1	4	2940
24	29-cu- 68	1	290681	2.2500E+02	2.0300E+05	1.1600E+06	0.0000E+00	1.00	0.0	5.1615E+06	1.6000E-01	6.7346E+01	2	4	2941
								3.00	0.0	7.2160E+05	8.4000E-01				
25	30-zn- 68	0	300680	stable								6.7925E+01	0	0	3037
26	31-ga- 68	0	310680	4.0630E+03	7.3990E+05	9.5100E+05	0.0000E+00	2.00	0.0	2.9211E+06	1.0000E+00	6.7344E+01	1	4	3122
27	24-cr- 69	0	240690	1.1570E-02	5.1210E+06	3.8210E+06	0.0000E+00	1.00	0.0	1.4516E+07	1.0000E+00	6.8991E+01	1	2	2482
28	25-mn- 69	0	250690	1.4000E-02	4.9840E+06	3.0700E+06	0.0000E+00	1.00	0.0	1.3100E+07	1.0000E+00	6.8973E+01	1	2	2567
29	26-fe- 69	0	260690	1.7000E-01	4.0460E+06	2.2360E+06	0.0000E+00	1.00	0.0	1.1600E+07	1.0000E+00	6.8958E+01	1	2	2670
30	27-co- 69	0	270690	2.1600E-01	3.5610E+06	1.6130E+06	0.0000E+00	1.00	0.0	1.0000E+07	2.9740E-01	6.8946E+01	3	2	2755
								1.00	1.0	9.7000E+06	6.9380E-01				
								1.50	0.0	5.4000E+06	8.8000E-03				
31	28-ni- 69	0	280690	1.1400E+01	1.1700E+06	2.7900E+06	0.0000E+00	1.00	0.0	5.7580E+06	1.0000E+00	6.8343E+01	1	2	2858
32	28-ni- 69	1	280691	3.5000E+00	2.3000E+06	1.2980E+06	0.0000E+00	1.00	0.0	6.0790E+06	1.0000E+00	6.8343E+01	1	2	2859
33	29-cu- 69	0	290690	1.7100E+02	8.9000E+05	5.3000E+05	0.0000E+00	1.00	0.0	2.6814E+06	1.0000E+00	6.8337E+01	1	2	2943
34	30-zn- 69	0	300690	3.3800E+03	3.2160E+05	6.0000E+00	0.0000E+00	1.00	0.0	9.1010E+05	1.0000E+00	6.8334E+01	1	2	3040
35	30-zn- 69	1	300691	4.9540E+04	2.2000E+04	4.1610E+05	0.0000E+00	1.00	0.0	1.3487E+06	3.3000E-04	6.8334E+01	2	4	3041
								3.00	0.0	4.3864E+05	9.9967E-01				
36	31-ga- 69	0	310690	stable								6.8925E+01	0	0	3125
37	32-ge- 69	0	320690	1.4060E+05	1.2000E+05	9.5000E+05	0.0000E+00	2.00	0.0	2.2272E+06	1.0000E+00	6.8336E+01	1	4	3222
38	24-cr- 70	0	240700	7.1430E-03	5.0840E+06	2.5320E+06	0.0000E+00	1.00	0.0	1.3117E+07	1.0000E+00	6.9994E+01	1	2	2485
39	25-mn- 70	0	250700	2.4180E-02	5.4450E+06	5.5650E+06	0.0000E+00	1.00	0.0	1.6898E+07	1.0000E+00	6.9979E+01	1	2	2570
40	26-fe- 70	0	260700	9.4000E-02	3.3200E+06	1.4600E+06	0.0000E+00	1.00	1.0	9.7000E+06	1.0000E+00	6.9960E+01	1	2	2673
41	27-co- 70	0	270700	1.1900E-01	4.1540E+06	4.2080E+06	0.0000E+00	1.00	0.0	1.3500E+07	9.2500E-01	6.9950E+01	2	2	2758
								1.50	0.0	6.3000E+06	7.5000E-02				
42	27-co- 70	1	270701	5.0000E-01	4.3200E+06	4.3930E+06	0.0000E+00	1.00	0.0	1.3500E+07	1.0000E+00	6.9950E+01	1	2	2759
43	28-ni- 70	0	280700	6.0000E+00	1.4300E+06	3.0600E+05	0.0000E+00	1.00	1.0	3.7000E+06	1.0000E-02	6.9335E+01	2	4	2861
								1.00	2.0	3.6000E+06	9.9000E-01				

no	symbol	s	zzaaas	halflife	e-beta	e-gamma	e-alpha	rtyp	rfs	q	branching	awr	ndk	nsp	mat
44	29-cu- 70	0	290700	4.4500E+01	1.3270E+06	3.4920E+06	0.0000E+00	1.00	0.0	6.5885E+06	1.0000E+00	6.9332E+01	1	2	2946
45	29-cu- 70	1	290701	3.3000E+01	8.6000E+05	1.5100E+06	0.0000E+00	1.00	0.0	6.6896E+06	5.2000E-01	6.9332E+01	2	4	2947
								3.00	0.0	1.0110E+05	4.8000E-01				
46	29-cu- 70	2	290702	6.6000E+00	2.4100E+06	1.3100E+06	0.0000E+00	1.00	0.0	6.8309E+06	9.3200E-01	6.9332E+01	2	4	2948
								3.00	0.0	2.4240E+05	6.8000E-02				
47	30-zn- 70	0	300700	stable								6.9925E+01	0	0	3043
48	31-ga- 70	0	310700	1.2684E+03	6.4400E+05	7.3000E+03	0.0000E+00	1.00	0.0	1.6519E+06	9.9590E-01	6.9325E+01	2	5	3128
								2.00	0.0	6.5450E+05	4.1000E-03				
49	32-ge- 70	0	320700	stable								6.9924E+01	0	0	3225
50	25-mn- 71	0	250710	1.3220E-02	5.5740E+06	3.9100E+06	0.0000E+00	1.00	0.0	1.5503E+07	1.0000E+00	7.0982E+01	1	2	2573
51	26-fe- 71	0	260710	5.8600E-02	4.4010E+06	2.7100E+06	0.0000E+00	1.00	0.0	1.2900E+07	1.0000E+00	7.0966E+01	1	2	2676
52	27-co- 71	0	270710	7.9000E-02	4.1020E+06	2.1620E+06	0.0000E+00	1.00	0.0	1.1300E+07	8.3000E-01	7.0952E+01	2	2	2761
								1.50	0.0	7.2000E+06	1.7000E-01				
53	28-ni- 71	0	280710	2.5600E+00	2.8220E+06	1.2440E+06	0.0000E+00	1.00	0.0	7.5000E+06	1.0000E+00	7.0941E+01	1	2	2864
54	29-cu- 71	0	290710	1.9500E+01	1.3588E+06	7.1207E+05	0.0000E+00	1.00	0.0	4.6180E+06	8.3400E-01	7.0932E+01	2	2	2949
								1.00	1.0	4.4600E+06	1.6600E-01				
55	30-zn- 71	0	300710	1.4700E+02	1.0480E+06	3.1500E+05	0.0000E+00	1.00	0.0	2.8100E+06	1.0000E+00	7.0318E+01	1	4	3046
56	30-zn- 71	1	300711	1.4260E+04	5.3700E+05	1.5600E+06	0.0000E+00	1.00	0.0	2.9680E+06	9.9950E-01	7.0318E+01	2	4	3047
								3.00	0.0	1.5770E+05	5.0000E-04				
57	31-ga- 71	0	310710	stable								7.0925E+01	0	0	3131
58	32-ge- 71	0	320710	9.8800E+05	4.7457E+03	4.2669E+03	0.0000E+00	2.00	0.0	2.3249E+05	1.0000E+00	7.0316E+01	1	3	3228
59	32-ge- 71	1	320711	2.0400E-02	2.8000E+04	1.6000E+05	0.0000E+00	3.00	0.0	1.9837E+05	1.0000E+00	7.0316E+01	1	3	3229
60	25-mn- 72	0	250720	9.0360E-03	6.0900E+06	6.1000E+06	0.0000E+00	1.00	0.0	1.8740E+07	1.0000E+00	7.1989E+01	1	2	2576
61	26-fe- 72	0	260720	3.8030E-02	4.0610E+06	1.8740E+06	0.0000E+00	1.00	0.0	1.1000E+07	1.0000E+00	7.1968E+01	1	2	2679
62	27-co- 72	0	270720	9.0000E-02	4.6080E+06	4.6940E+06	0.0000E+00	1.00	0.0	1.4600E+07	9.4000E-01	7.1957E+01	2	2	2764
								1.50	0.0	7.8000E+06	6.0000E-02				
63	28-ni- 72	0	280720	1.5700E+00	2.1000E+06	8.4000E+05	0.0000E+00	1.00	0.0	5.8000E+06	1.0000E+00	7.1323E+01	1	4	2867
64	29-cu- 72	0	290720	6.6300E+00	2.4900E+06	2.8200E+06	0.0000E+00	1.00	0.0	8.3620E+06	1.0000E+00	7.1318E+01	1	2	2952
65	30-zn- 72	0	300720	1.6740E+05	9.5900E+04	1.4980E+05	0.0000E+00	1.00	0.0	4.4280E+05	9.6600E-01	7.1309E+01	2	4	3049
								1.00	1.0	3.2310E+05	3.4000E-02				
66	31-ga- 72	0	310720	5.0760E+04	4.7590E+05	2.7700E+06	0.0000E+00	1.00	0.0	3.9975E+06	1.0000E+00	7.1309E+01	1	4	3134
67	31-ga- 72	1	310721	3.9680E-02	5.0100E+04	6.9200E+04	0.0000E+00	3.00	0.0	1.1966E+05	1.0000E+00	7.1309E+01	1	3	3135
68	32-ge- 72	0	320720	stable								7.1922E+01	0	0	3231
69	33-as- 72	0	330720	9.3600E+04	1.0300E+06	1.8000E+06	0.0000E+00	2.00	0.0	4.3560E+06	1.0000E+00	7.1309E+01	1	4	3316
70	25-mn- 73	0	250730	5.9360E-03	6.0090E+06	4.8040E+06	0.0000E+00	1.00	0.0	1.7283E+07	1.0000E+00	7.2993E+01	1	2	2579
71	26-fe- 73	0	260730	2.5840E-02	4.9030E+06	3.4070E+06	0.0000E+00	1.00	0.0	1.3638E+07	1.0000E+00	7.2975E+01	1	2	2682
72	27-co- 73	0	270730	4.1000E-02	4.7180E+06	2.9800E+06	0.0000E+00	1.00	0.0	1.2800E+07	7.2000E-01	7.2959E+01	2	2	2767
								1.50	0.0	8.8000E+06	2.8000E-01				
73	28-ni- 73	0	280730	8.4000E-01	3.2810E+06	1.6190E+06	0.0000E+00	1.00	0.0	9.2000E+06	9.9903E-01	7.2946E+01	2	2	2870
								1.50	0.0	1.8490E+06	9.7000E-04				
74	29-cu- 73	0	290730	4.2000E+00	1.9850E+06	7.7230E+05	0.0000E+00	1.00	0.0	6.6070E+06	9.9971E-01	7.2936E+01	2	2	2955
								1.50	0.0	1.0880E+06	2.9000E-04				
75	30-zn- 73	0	300730	2.3500E+01	1.5436E+06	1.1709E+06	0.0000E+00	1.00	0.0	4.1059E+06	1.0000E+00	7.2303E+01	1	4	3052
76	30-zn- 73	1	300731	5.8000E+00	1.6910E+06	2.7800E+05	0.0000E+00	1.00	0.0	4.1059E+06	1.0000E+00	7.2303E+01	1	2	3053
77	31-ga- 73	0	310730	1.7500E+04	4.4700E+05	3.4100E+05	0.0000E+00	1.00	0.0	1.5981E+06	1.5000E-02	7.2299E+01	2	4	3137
								1.00	1.0	1.5315E+06	9.8500E-01				
78	32-ge- 73	0	320730	stable								7.2924E+01	0	0	3234
79	32-ge- 73	1	320731	4.9900E-01	5.2600E+04	1.1220E+04	0.0000E+00	3.00	0.0	6.6590E+04	1.0000E+00	7.2297E+01	1	3	3235
80	33-as- 73	0	330730	6.9380E+06	4.8187E+03	4.8134E+03	0.0000E+00	2.00	1.0	3.4000E+05	1.0000E+00	7.2297E+01	1	3	3319
81	26-fe- 74	0	260740	1.4040E-02	4.6700E+06	2.3240E+06	0.0000E+00	1.00	0.0	1.2093E+07	1.0000E+00	7.3978E+01	1	2	2685

no	symbol	s	zzaaas	halflife	e-beta	e-gamma	e-alpha	rtyp	rfs	q	branching	awr	ndk	nsp	mat
82	27-co- 74	0	270740	3.6720E-02	5.1670E+06	5.4200E+06	0.0000E+00	1.00	0.0	1.6100E+07	1.0000E+00	7.3964E+01	1	2	2770
83	28-ni- 74	0	280740	6.8000E-01	2.6830E+06	1.1990E+06	0.0000E+00	1.00	0.0	7.6000E+06	9.9370E-01	7.3947E+01	2	2	2873
								1.50	0.0	2.5000E+06	6.3000E-03				
84	29-cu- 74	0	290740	1.6300E+00	2.5110E+06	3.2060E+06	0.0000E+00	1.00	0.0	9.7510E+06	9.9925E-01	7.3940E+01	2	2	2958
								1.50	0.0	1.5160E+06	7.5000E-04				
85	30-zn- 74	0	300740	9.5600E+01	5.7770E+05	8.5970E+05	0.0000E+00	1.00	0.0	2.2930E+06	1.1000E-01	7.3929E+01	2	2	3055
								1.00	1.0	2.2330E+06	8.9000E-01				
86	31-ga- 74	0	310740	4.8700E+02	9.9000E+05	3.0300E+06	0.0000E+00	1.00	0.0	5.3730E+06	1.0000E+00	7.3292E+01	1	2	3140
87	31-ga- 74	1	310741	9.5000E+00	0.0000E+00	3.6000E+04	0.0000E+00	1.00	0.0	5.4330E+06	2.5000E-01	7.3292E+01	2	1	3141
								3.00	0.0	5.9700E+04	7.5000E-01				
88	32-ge- 74	0	320740	stable								7.3921E+01	0	0	3237
89	33-as- 74	0	330740	1.5353E+06	2.6500E+05	7.6000E+05	0.0000E+00	1.00	0.0	1.3527E+06	3.4000E-01	7.3289E+01	2	5	3322
								2.00	0.0	2.5625E+06	6.6000E-01				
90	34-se- 74	0	340740	stable								7.3923E+01	0	0	3425
91	26-fe- 75	0	260750	1.0430E-02	5.4750E+06	4.4550E+06	0.0000E+00	1.00	0.0	1.5870E+07	1.0000E+00	7.4984E+01	1	2	2688
92	27-co- 75	0	270750	2.4170E-02	5.2590E+06	3.7450E+06	0.0000E+00	1.00	0.0	1.4400E+07	6.2000E-01	7.4967E+01	2	2	2773
								1.50	0.0	1.0800E+07	3.8000E-01				
93	28-ni- 75	0	280750	3.4400E-01	3.8270E+06	2.2160E+06	0.0000E+00	1.00	0.0	1.0200E+07	9.8400E-01	7.4952E+01	2	2	2876
								1.50	0.0	4.0000E+06	1.6000E-02				
94	29-cu- 75	0	290750	1.2240E+00	2.6880E+06	1.0900E+06	0.0000E+00	1.00	0.0	8.4000E+06	9.6400E-01	7.4941E+01	2	2	2961
								1.50	0.0	3.6000E+06	3.6000E-02				
95	30-zn- 75	0	300750	1.0200E+01	1.9400E+06	1.8200E+06	0.0000E+00	1.00	0.0	5.9060E+06	1.0000E+00	7.4289E+01	1	2	3058
96	31-ga- 75	0	310750	1.2600E+02	1.2465E+06	3.7754E+05	0.0000E+00	1.00	0.0	3.3917E+06	9.2900E-01	7.4926E+01	2	2	3143
								1.00	1.0	3.2520E+06	7.1000E-02				
97	32-ge- 75	0	320750	4.9668E+03	4.2000E+05	3.5000E+04	0.0000E+00	1.00	0.0	1.1759E+06	1.0000E+00	7.4279E+01	1	2	3240
98	32-ge- 75	1	320751	4.7700E+01	7.8040E+04	5.7800E+04	0.0000E+00	1.00	0.0	1.3156E+06	3.0000E-04	7.4279E+01	2	4	3241
								3.00	0.0	1.3969E+05	9.9970E-01				
99	33-as- 75	0	330750	stable								7.4922E+01	0	0	3325
100	34-se- 75	0	340750	1.0350E+07	1.3990E+04	3.8910E+05	0.0000E+00	2.00	0.0	8.6340E+05	1.0000E+00	7.4279E+01	1	4	3428
101	26-fe- 76	0	260760	1.0430E-02	5.1330E+06	2.7160E+06	0.0000E+00	1.00	0.0	1.3410E+07	1.0000E+00	7.5987E+01	1	2	2691
102	27-co- 76	0	270760	1.7470E-02	5.8660E+06	6.3710E+06	0.0000E+00	1.00	0.0	1.8630E+07	7.0000E-01	7.5972E+01	2	2	2776
								1.50	0.0	1.0954E+07	3.0000E-01				
103	28-ni- 76	0	280760	2.3800E-01	3.3790E+06	1.5270E+06	0.0000E+00	1.00	1.0	9.4000E+06	9.5900E-01	7.5954E+01	2	2	2879
								1.50	0.0	4.4000E+06	4.1000E-02				
104	29-cu- 76	0	290760	6.4100E-01	3.1130E+06	3.5040E+06	0.0000E+00	1.00	0.0	1.1327E+07	9.7000E-01	7.5945E+01	2	2	2964
								1.50	0.0	3.5120E+06	3.0000E-02				
105	29-cu- 76	1	290761	1.2700E+00	3.6290E+06	3.5950E+06	0.0000E+00	1.00	0.0	1.1327E+07	1.0000E+00	7.5945E+01	1	2	2965
106	30-zn- 76	0	300760	5.7000E+00	1.5900E+06	5.2300E+05	0.0000E+00	1.00	0.0	3.9936E+06	1.0000E+00	7.5281E+01	1	2	3061
107	31-ga- 76	0	310760	3.2600E+01	1.8000E+06	2.8000E+06	0.0000E+00	1.00	0.0	6.9162E+06	1.0000E+00	7.5277E+01	1	2	3146
108	32-ge- 76	0	320760	stable								7.5921E+01	0	0	3243
109	33-as- 76	0	330760	9.4500E+04	1.0600E+06	4.1700E+05	0.0000E+00	1.00	0.0	2.9626E+06	1.0000E+00	7.5270E+01	1	2	3328
110	34-se- 76	0	340760	stable								7.5919E+01	0	0	3431
111	27-co- 77	0	270770	1.1350E-02	5.6470E+06	4.5600E+06	0.0000E+00	1.00	0.0	1.6325E+07	4.7000E-01	7.6976E+01	2	2	2779
								1.50	0.0	1.2311E+07	5.3000E-01				
112	28-ni- 77	0	280770	1.2800E-01	4.4810E+06	3.0880E+06	0.0000E+00	1.00	0.0	1.1600E+07	5.1000E-01	7.6959E+01	2	2	2882
								1.50	0.0	6.2000E+06	4.9000E-01				
113	29-cu- 77	0	290770	4.6900E-01	3.2670E+06	1.5060E+06	0.0000E+00	1.00	1.0	1.0500E+07	8.5000E-01	7.6946E+01	2	2	2967
								1.50	0.0	5.9000E+06	1.5000E-01				
114	30-zn- 77	0	300770	2.0800E+00	2.5400E+06	1.9400E+06	0.0000E+00	1.00	0.0	7.2030E+06	1.0000E+00	7.6276E+01	1	2	3064
115	30-zn- 77	1	300771	1.0500E+00	0.0000E+00	3.8620E+05	0.0000E+00	3.00	0.0	7.7240E+05	1.0000E+00	7.6276E+01	1	1	3065

no	symbol	s	zzaaas	halflife	e-beta	e-gamma	e-alpha	rtyp	rfs	q	branching	awr	ndk	nsp	mat
116	31-ga- 77	0	310770	1.3200E+01	2.0430E+06	7.8930E+05	0.0000E+00	1.00	1.0	5.2215E+06	1.0000E+00	7.6929E+01	1	2	3149
117	32-ge- 77	0	320770	4.0680E+04	6.4200E+05	1.0780E+06	0.0000E+00	1.00	0.0	2.7025E+06	1.0000E+00	7.6263E+01	1	2	3246
118	32-ge- 77	1	320771	5.2900E+01	9.7000E+05	7.4000E+04	0.0000E+00	1.00	0.0	2.8622E+06	8.1000E-01	7.6263E+01	2	4	3247
								3.00	0.0	1.5970E+05	1.9000E-01				
119	33-as- 77	0	330770	1.3979E+05	2.2550E+05	8.1000E+03	0.0000E+00	1.00	0.0	6.8300E+05	9.9700E-01	7.6260E+01	2	2	3331
								1.00	1.0	5.2038E+05	3.0000E-03				
120	34-se- 77	0	340770	stable								7.6920E+01	0	0	3434
121	34-se- 77	1	340771	1.7360E+01	7.1700E+04	8.8900E+04	0.0000E+00	3.00	0.0	1.6200E+05	1.0000E+00	7.6259E+01	1	3	3435
122	35-br- 77	0	350770	2.0533E+05	5.9700E+03	3.1900E+05	0.0000E+00	2.00	0.0	1.3650E+06	9.7930E-01	7.6261E+01	2	4	3519
								2.00	1.0	1.2030E+06	2.0700E-02				
123	35-br- 77	1	350771	2.5700E+02	8.5000E+04	1.9600E+04	0.0000E+00	3.00	0.0	1.0587E+05	1.0000E+00	7.6261E+01	1	3	3520
124	27-co- 78	0	270780	4.8360E-03	6.4240E+06	6.8150E+06	0.0000E+00	1.00	0.0	2.0140E+07	1.0000E+00	7.7983E+01	1	2	2782
125	28-ni- 78	0	280780	1.1000E-01	3.9290E+06	1.8770E+06	0.0000E+00	1.00	0.0	1.0400E+07	8.9000E-01	7.7962E+01	2	2	2885
								1.50	0.0	6.1000E+06	1.1000E-01				
126	29-cu- 78	0	290780	3.4200E-01	3.8300E+06	4.0530E+06	0.0000E+00	1.00	0.0	1.3000E+07	3.5000E-01	7.7951E+01	2	2	2970
								1.50	0.0	6.2000E+06	6.5000E-01				
127	30-zn- 78	0	300780	1.4700E+00	2.2500E+06	1.5300E+06	0.0000E+00	1.00	0.0	6.2230E+06	9.9999E-01	7.7269E+01	2	2	3067
								1.50	0.0	4.3800E+06	1.0000E-05				
128	31-ga- 78	0	310780	5.0900E+00	2.5800E+06	2.5400E+06	0.0000E+00	1.00	0.0	8.1560E+06	1.0000E+00	7.7262E+01	1	4	3152
129	32-ge- 78	0	320780	5.2800E+03	2.2700E+05	2.7800E+05	0.0000E+00	1.00	0.0	9.5500E+05	1.0000E+00	7.7254E+01	1	2	3249
130	33-as- 78	0	330780	5.4420E+03	1.2600E+06	1.3100E+06	0.0000E+00	1.00	0.0	4.2080E+06	1.0000E+00	7.7252E+01	1	2	3334
131	34-se- 78	0	340780	stable								7.7917E+01	0	0	3437
132	35-br- 78	0	350780	3.8700E+02	1.0240E+06	1.0340E+06	0.0000E+00	2.00	0.0	3.5740E+06	1.0000E+00	7.7252E+01	1	4	3522
133	28-ni- 79	0	280790	2.4890E-02	4.8410E+06	3.9030E+06	0.0000E+00	1.00	0.0	1.4055E+07	8.6000E-01	7.8969E+01	2	2	2888
								1.50	0.0	8.0010E+06	1.4000E-01				
134	29-cu- 79	0	290790	1.8800E-01	3.7090E+06	1.9700E+06	0.0000E+00	1.00	0.0	9.9000E+06	4.5000E-01	7.8953E+01	2	2	2973
								1.50	0.0	5.9000E+06	5.5000E-01				
135	30-zn- 79	0	300790	9.9500E-01	3.0160E+06	2.9170E+06	0.0000E+00	1.00	0.0	9.1150E+06	9.8700E-01	7.8263E+01	2	2	3070
								1.50	0.0	2.2020E+06	1.3000E-02				
136	31-ga- 79	0	310790	2.8470E+00	2.4500E+06	2.0800E+06	3.1300E+04	1.00	0.0	6.9800E+06	9.5015E-01	7.8255E+01	3	4	3155
								1.00	1.0	6.7900E+06	4.8960E-02				
								1.50	0.0	1.2430E+06	8.9000E-04				
137	32-ge- 79	0	320790	1.8980E+01	1.7100E+06	3.0900E+05	0.0000E+00	1.00	0.0	4.1100E+06	1.0000E+00	7.8247E+01	1	4	3252
138	32-ge- 79	1	320791	3.9000E+01	1.2900E+06	1.7800E+06	0.0000E+00	1.00	0.0	4.3000E+06	9.6000E-01	7.8247E+01	2	4	3253
								3.00	0.0	1.8602E+05	4.0000E-02				
139	33-as- 79	0	330790	5.4100E+02	8.3900E+05	3.3800E+04	0.0000E+00	1.00	0.0	2.2810E+06	1.9000E-02	7.8243E+01	2	2	3337
								1.00	1.0	2.1850E+06	9.8100E-01				
140	34-se- 79	0	340790	1.1900E+13	5.5800E+04	0.0000E+00	0.0000E+00	1.00	0.0	1.5110E+05	1.0000E+00	7.8241E+01	1	1	3440
141	34-se- 79	1	340791	2.3520E+02	8.3000E+04	1.4100E+04	0.0000E+00	1.00	0.0	2.4680E+05	5.6000E-04	7.8241E+01	2	3	3441
								3.00	0.0	9.5730E+04	9.9944E-01				
142	35-br- 79	0	350790	stable								7.8918E+01	0	0	3525
143	35-br- 79	1	350791	4.8600E+00	4.7000E+04	1.5960E+05	0.0000E+00	3.00	0.0	2.0720E+05	1.0000E+00	7.8240E+01	1	3	3526
144	36-kr- 79	0	360790	1.2610E+05	2.3700E+04	2.5600E+05	0.0000E+00	2.00	0.0	1.6260E+06	1.0000E+00	7.8242E+01	1	4	3628
145	36-kr- 79	1	360791	5.0000E+01	9.0000E+04	4.0900E+04	0.0000E+00	3.00	0.0	1.3001E+05	1.0000E+00	7.8242E+01	1	3	3629
146	28-ni- 80	0	280800	1.5820E-02	5.3050E+06	2.9610E+06	0.0000E+00	1.00	0.0	1.4063E+07	1.0000E+00	7.9975E+01	1	2	2891
147	29-cu- 80	0	290800	3.9220E-02	4.3270E+06	4.5870E+06	0.0000E+00	1.00	0.0	1.5000E+07	7.7000E-01	7.9960E+01	2	2	2976
								1.50	0.0	8.8000E+06	2.3000E-01				
148	30-zn- 80	0	300800	5.4500E-01	2.5900E+06	1.7100E+06	0.0000E+00	1.00	0.0	7.5750E+06	9.9000E-01	7.9258E+01	2	2	3073
								1.50	0.0	2.8280E+06	1.0000E-02				
149	31-ga- 80	0	310800	1.6970E+00	3.1220E+06	3.5480E+06	0.0000E+00	1.00	0.0	1.0312E+07	9.9140E-01	7.9250E+01	2	2	3158
								1.50	1.0	2.0500E+06	8.6000E-03				

no	symbol	s	zzaaas	halflife	e-beta	e-gamma	e-alpha	rtyp	rfs	q	branching	awr	ndk	nsp	mat
150	32-ge- 80	0	320800	2.9500E+01	8.1510E+05	6.1970E+05	0.0000E+00	1.00	0.0	2.6360E+06	1.0000E+00	7.9239E+01	1	2	3255
151	33-as- 80	0	330800	1.5200E+01	2.1500E+06	5.8000E+05	0.0000E+00	1.00	0.0	5.5880E+06	1.0000E+00	7.9236E+01	1	2	3340
152	34-se- 80	0	340800	stable								7.9916E+01	0	0	3443
153	35-br- 80	0	350800	1.0608E+03	7.2600E+05	7.6000E+04	0.0000E+00	1.00	0.0	2.0030E+06	9.1700E-01	7.9232E+01	2	5	3528
								2.00	0.0	1.8705E+06	8.3000E-02				
154	35-br- 80	1	350801	1.5914E+04	5.9500E+04	2.4200E+04	0.0000E+00	3.00	0.0	8.5900E+04	1.0000E+00	7.9232E+01	1	3	3529
155	36-kr- 80	0	360800	stable								7.9916E+01	0	0	3631
156	28-ni- 81	0	280810	1.2280E-02	5.2520E+06	4.3870E+06	0.0000E+00	1.00	0.0	1.5364E+07	1.0000E+00	8.0983E+01	1	2	2894
157	29-cu- 81	0	290810	2.5810E-02	4.8260E+06	3.4570E+06	0.0000E+00	1.00	0.0	1.3600E+07	2.8000E-01	8.0965E+01	2	2	2979
								1.50	0.0	1.1548E+07	7.2000E-01				
158	30-zn- 81	0	300810	2.9000E-01	4.0320E+06	2.7130E+06	0.0000E+00	1.00	0.0	1.1428E+07	9.2500E-01	8.0949E+01	2	2	3076
								1.50	0.0	4.9530E+06	7.5000E-02				
159	31-ga- 81	0	310810	1.2170E+00	2.3600E+06	2.2600E+06	0.0000E+00	1.00	0.0	8.6640E+06	4.7300E-01	8.0243E+01	3	4	3161
								1.00	1.0	7.9850E+06	4.0800E-01				
								1.50	0.0	3.8360E+06	1.1900E-01				
160	32-ge- 81	0	320810	7.6000E+00	1.6800E+06	2.9600E+06	0.0000E+00	1.00	0.0	6.2420E+06	1.0000E+00	8.0234E+01	1	4	3258
161	32-ge- 81	1	320811	7.6000E+00	2.5000E+06	1.7800E+06	0.0000E+00	1.00	0.0	6.9210E+06	1.0000E+00	8.0234E+01	1	4	3259
162	33-as- 81	0	330810	3.3300E+01	1.5750E+06	2.3150E+05	0.0000E+00	1.00	0.0	3.8560E+06	9.5840E-01	8.0227E+01	2	4	3343
								1.00	1.0	3.7530E+06	4.1600E-02				
163	34-se- 81	0	340810	1.1070E+03	6.1080E+05	8.1000E+03	0.0000E+00	1.00	0.0	1.5861E+06	1.0000E+00	8.0223E+01	1	4	3446
164	34-se- 81	1	340811	3.4368E+03	1.1100E+05	1.9700E+04	0.0000E+00	1.00	0.0	1.6891E+06	5.1000E-04	8.0223E+01	2	4	3447
								3.00	0.0	1.0301E+05	9.9949E-01				
165	35-br- 81	0	350810	stable								8.0916E+01	0	0	3531
166	36-kr- 81	0	360810	7.2000E+12	4.7595E+03	7.2800E+03	0.0000E+00	2.00	0.0	2.8080E+05	1.0000E+00	8.0221E+01	1	4	3634
167	36-kr- 81	1	360811	1.3100E+01	5.9130E+04	1.3121E+05	0.0000E+00	2.00	0.0	4.7130E+05	2.5000E-05	8.0221E+01	2	4	3635
								3.00	0.0	1.9046E+05	9.9998E-01				
168	37-rb- 81	0	370810	1.6459E+04	1.2200E+05	5.1000E+05	0.0000E+00	2.00	0.0	2.2400E+06	5.5000E-02	8.0224E+01	2	4	3713
								2.00	1.0	2.0490E+06	9.4500E-01				
169	37-rb- 81	1	370811	1.8300E+03	7.9000E+04	3.0000E+04	0.0000E+00	2.00	0.0	2.3250E+06	2.3760E-02	8.0224E+01	3	4	3714
								2.00	1.0	2.1340E+06	2.4000E-04				
								3.00	0.0	8.6310E+04	9.7600E-01				
170	28-ni- 82	0	280820	8.7410E-03	5.9830E+06	3.5360E+06	0.0000E+00	1.00	0.0	1.6006E+07	1.0000E+00	8.1988E+01	1	2	2897
171	29-cu- 82	0	290820	1.8830E-02	4.6890E+06	5.0620E+06	0.0000E+00	1.00	0.0	1.4930E+07	3.8000E-01	8.1972E+01	2	2	2982
								1.50	0.0	1.2247E+07	6.2000E-01				
172	30-zn- 82	0	300820	5.7610E-02	4.2340E+06	2.1810E+06	0.0000E+00	1.00	0.0	1.0100E+07	8.3000E-01	8.1954E+01	2	2	3079
								1.50	0.0	6.7000E+06	1.7000E-01				
173	31-ga- 82	0	310820	5.9900E-01	3.7960E+06	4.1310E+06	0.0000E+00	1.00	0.0	1.2484E+07	8.0200E-01	8.1942E+01	2	2	3164
								1.50	0.0	5.2900E+06	1.9800E-01				
174	32-ge- 82	0	320820	4.5500E+00	1.4490E+06	7.6520E+05	0.0000E+00	1.00	0.0	4.6880E+06	1.0000E+00	8.1928E+01	1	2	3261
175	33-as- 82	0	330820	1.9100E+01	2.9171E+06	1.0849E+06	0.0000E+00	1.00	0.0	7.4910E+06	1.0000E+00	8.1221E+01	1	2	3346
176	33-as- 82	1	330821	1.3600E+01	1.8200E+06	2.7900E+06	0.0000E+00	1.00	0.0	7.4910E+06	1.0000E+00	8.1221E+01	1	2	3347
177	34-se- 82	0	340820	stable								8.1917E+01	0	0	3449
178	35-br- 82	0	350820	1.2702E+05	1.4600E+05	2.6600E+06	0.0000E+00	1.00	0.0	3.0931E+06	1.0000E+00	8.1213E+01	1	4	3534
179	35-br- 82	1	350821	3.6800E+02	5.4000E+04	7.5000E+03	0.0000E+00	1.00	0.0	3.1390E+06	2.4000E-02	8.1213E+01	2	4	3535
								3.00	0.0	4.5949E+04	9.7600E-01				
180	36-kr- 82	0	360820	stable								8.1913E+01	0	0	3637
181	37-rb- 82	0	370820	7.5450E+01	1.4120E+06	1.1080E+06	0.0000E+00	2.00	0.0	4.4020E+06	1.0000E+00	8.1215E+01	1	4	3716
182	37-rb- 82	1	370821	2.3299E+04	8.0000E+04	2.9170E+06	0.0000E+00	2.00	0.0	4.4710E+06	1.0000E+00	8.1215E+01	1	4	3717
183	29-cu- 83	0	290830	1.2220E-02	5.2810E+06	4.3320E+06	0.0000E+00	1.00	0.0	1.5374E+07	1.0000E+00	8.2978E+01	1	2	2985
184	30-zn- 83	0	300830	4.3610E-02	4.1020E+06	3.9530E+06	0.0000E+00	1.00	0.0	1.2500E+07	7.7000E-01	8.2961E+01	2	2	3082
								1.50	0.0	8.1000E+06	2.3000E-01				

no	symbol	s	zzaaas	halflife	e-beta	e-gamma	e-alpha	rtyp	rfs	q	branching	awr	ndk	nsp	mat
185	31-ga- 83	0	310830	3.1000E-01	3.8810E+06	3.7430E+06	0.0000E+00	1.00	0.0	1.1719E+07	3.7200E-01	8.2947E+01	2	2	3167
								1.50	0.0	8.0870E+06	6.2800E-01				
186	32-ge- 83	0	320830	1.8500E+00	2.6890E+06	2.4440E+06	0.0000E+00	1.00	0.0	8.6930E+06	9.9900E-01	8.2222E+01	2	2	3264
								1.50	1.0	1.0550E+06	1.0000E-03				
187	33-as- 83	0	330830	1.3400E+01	1.2556E+06	2.7514E+06	0.0000E+00	1.00	0.0	5.6710E+06	3.6600E-01	8.2925E+01	2	2	3349
								1.00	1.0	5.4420E+06	6.3400E-01				
188	34-se- 83	0	340830	1.3380E+03	5.0000E+05	2.6100E+06	0.0000E+00	1.00	0.0	3.6660E+06	1.0000E+00	8.2207E+01	1	2	3452
189	34-se- 83	1	340831	7.0100E+01	1.2730E+06	9.8200E+05	0.0000E+00	1.00	0.0	3.8950E+06	1.0000E+00	8.2207E+01	1	2	3453
190	35-br- 83	0	350830	8.6400E+03	3.2500E+05	7.0000E+03	0.0000E+00	1.00	0.0	9.8400E+05	3.0000E-04	8.2203E+01	2	2	3537
								1.00	1.0	9.4300E+05	9.9970E-01				
191	36-kr- 83	0	360830	stable								8.2914E+01	0	0	3640
192	36-kr- 83	1	360831	6.5880E+03	3.9100E+04	2.7700E+03	0.0000E+00	3.00	0.0	4.1544E+04	1.0000E+00	8.2202E+01	1	3	3641
193	37-rb- 83	0	370830	7.4480E+06	4.9000E+03	4.9100E+05	0.0000E+00	2.00	0.0	9.1940E+05	3.1000E-01	8.2203E+01	2	4	3719
								2.00	1.0	8.7790E+05	6.9000E-01				
194	38-sr- 83	0	380830	1.1668E+05	1.6000E+05	8.1000E+05	0.0000E+00	2.00	0.0	2.2730E+06	1.0000E+00	8.2205E+01	1	4	3822
195	38-sr- 83	1	380831	4.9500E+00	3.0300E+04	2.2750E+05	0.0000E+00	3.00	0.0	2.5915E+05	1.0000E+00	8.2205E+01	1	3	3823
196	29-cu- 84	0	290840	1.0100E-02	5.1820E+06	5.3400E+06	0.0000E+00	1.00	0.0	1.6180E+07	1.0000E+00	8.3985E+01	1	2	2988
197	30-zn- 84	0	300840	2.5340E-02	4.6230E+06	3.2970E+06	0.0000E+00	1.00	0.0	1.3043E+07	7.5000E-01	8.3966E+01	2	2	3085
								1.50	0.0	8.8540E+06	2.5000E-01				
198	31-ga- 84	0	310840	8.5000E-02	4.2280E+06	4.6330E+06	0.0000E+00	1.00	0.0	1.3700E+07	3.0000E-01	8.3953E+01	2	2	3170
								1.50	0.0	8.4000E+06	7.0000E-01				
199	32-ge- 84	0	320840	9.4700E-01	2.5460E+06	2.4600E+06	0.0000E+00	1.00	0.0	7.7050E+06	8.9800E-01	8.3937E+01	2	2	3267
								1.50	0.0	3.4500E+06	1.0200E-01				
200	33-as- 84	0	330840	4.5000E+00	3.2000E+06	3.1500E+06	0.0000E+00	1.00	0.0	1.0094E+07	9.9820E-01	8.3208E+01	2	2	3352
								1.50	1.0	1.1870E+06	1.8000E-03				
201	34-se- 84	0	340840	1.9600E+02	5.4000E+05	4.2000E+05	0.0000E+00	1.00	0.0	1.8630E+06	1.0000E+00	8.3198E+01	1	2	3455
202	35-br- 84	0	350840	1.9060E+03	1.2300E+06	1.7600E+06	0.0000E+00	1.00	0.0	4.6290E+06	1.0000E+00	8.3196E+01	1	4	3540
203	35-br- 84	1	350841	3.6000E+02	8.9000E+05	2.7700E+06	0.0000E+00	1.00	0.0	4.9490E+06	1.0000E+00	8.3196E+01	1	4	3541
204	36-kr- 84	0	360840	stable								8.3912E+01	0	0	3643
205	37-rb- 84	0	370840	2.8360E+06	1.5900E+05	8.9300E+05	0.0000E+00	1.00	0.0	8.9600E+05	3.9000E-02	8.3193E+01	2	5	3722
								2.00	0.0	2.6860E+06	9.6100E-01				
206	37-rb- 84	1	370841	1.2156E+03	7.1000E+04	3.8000E+05	0.0000E+00	3.00	0.0	4.6359E+05	1.0000E+00	8.3193E+01	1	3	3723
207	38-sr- 84	0	380840	stable								8.3914E+01	0	0	3825
208	30-zn- 85	0	300850	1.9360E-02	4.7860E+06	4.0100E+06	0.0000E+00	1.00	0.0	1.4065E+07	1.0000E+00	8.4973E+01	1	2	3088
209	31-ga- 85	0	310850	3.8840E-02	4.5090E+06	4.3050E+06	0.0000E+00	1.00	0.0	1.2700E+07	4.0000E-01	8.4957E+01	2	2	3173
								1.50	0.0	9.7000E+06	6.0000E-01				
210	32-ge- 85	0	320850	5.3500E-01	3.0290E+06	3.1830E+06	0.0000E+00	1.00	0.0	1.0066E+07	8.6000E-01	8.4943E+01	2	2	3270
								1.50	0.0	4.6590E+06	1.4000E-01				
211	33-as- 85	0	330850	2.0280E+00	2.8360E+06	3.0050E+06	0.0000E+00	1.00	0.0	9.2250E+06	4.0600E-01	8.4932E+01	2	2	3355
								1.50	0.0	4.6870E+06	5.9400E-01				
212	34-se- 85	0	340850	3.1700E+01	1.9000E+06	2.0800E+06	0.0000E+00	1.00	0.0	6.1910E+06	1.0000E+00	8.4193E+01	1	2	3458
213	35-br- 85	0	350850	1.7400E+02	1.0410E+06	6.6000E+04	0.0000E+00	1.00	0.0	2.8760E+06	1.5000E-03	8.4186E+01	2	2	3543
								1.00	1.0	2.5710E+06	9.9850E-01				
214	36-kr- 85	0	360850	3.3940E+08	2.5071E+05	2.2300E+03	0.0000E+00	1.00	0.0	6.8710E+05	1.0000E+00	8.4183E+01	1	4	3646
215	36-kr- 85	1	360851	1.6130E+04	2.5490E+05	1.5700E+05	0.0000E+00	1.00	0.0	9.9200E+05	7.8600E-01	8.4183E+01	2	4	3647
								3.00	0.0	3.0487E+05	2.1400E-01				
216	37-rb- 85	0	370850	stable								8.4912E+01	0	0	3725
217	38-sr- 85	0	380850	5.6022E+06	8.4000E+03	5.0000E+05	0.0000E+00	2.00	0.0	1.0640E+06	1.0000E+00	8.4184E+01	1	4	3828
218	38-sr- 85	1	380851	4.0578E+03	1.2200E+04	2.1800E+05	0.0000E+00	2.00	0.0	1.3030E+06	1.3400E-01	8.4184E+01	2	4	3829
								3.00	0.0	2.3878E+05	8.6600E-01				

no	symbol	s	zzaaas	halflife	e-beta	e-gamma	e-alpha	rtyp	rfs	q	branching	awr	ndk	nsp	mat
219	30-zn- 86	0	300860	1.3280E-02	5.2610E+06	3.6850E+06	0.0000E+00	1.00	0.0	1.4720E+07	1.0000E+00	8.5978E+01	1	2	3091
220	31-ga- 86	0	310860	2.8130E-02	4.6470E+06	5.1720E+06	0.0000E+00	1.00	0.0	1.6300E+07	5.8000E-01	8.5963E+01	2	2	3176
								1.50	0.0	1.0300E+07	4.2000E-01				
221	32-ge- 86	0	320860	8.7820E-02	3.3620E+06	2.6360E+06	0.0000E+00	1.00	0.0	8.0000E+06	9.4000E-01	8.5947E+01	2	2	3273
								1.50	0.0	4.1000E+06	6.0000E-02				
222	33-as- 86	0	330860	9.4500E-01	3.3170E+06	3.7780E+06	0.0000E+00	1.00	0.0	1.1541E+07	6.7000E-01	8.5937E+01	2	2	3358
								1.50	0.0	5.3800E+06	3.3000E-01				
223	34-se- 86	0	340860	1.5300E+01	1.4400E+06	2.2700E+06	0.0000E+00	1.00	0.0	5.1360E+06	1.0000E+00	8.5186E+01	1	4	3461
224	35-br- 86	0	350860	5.5000E+01	1.9000E+06	3.3000E+06	0.0000E+00	1.00	0.0	7.6260E+06	1.0000E+00	8.5181E+01	1	2	3546
225	36-kr- 86	0	360860	stable								8.5910E+01	0	0	3649
226	37-rb- 86	0	370860	1.6107E+06	6.6820E+05	9.3000E+04	0.0000E+00	1.00	0.0	1.7766E+06	9.9995E-01	8.5173E+01	2	5	3728
								2.00	0.0	5.1860E+05	5.2000E-05				
227	37-rb- 86	1	370861	6.1020E+01	9.7000E+03	5.4630E+05	0.0000E+00	3.00	0.0	5.5607E+05	1.0000E+00	8.5173E+01	1	3	3729
228	38-sr- 86	0	380860	stable								8.5909E+01	0	0	3831
229	39- y- 86	0	390860	5.3060E+04	2.1700E+05	3.5800E+06	0.0000E+00	2.00	0.0	5.2400E+06	1.0000E+00	8.5177E+01	1	4	3916
230	39- y- 86	1	390861	2.8800E+03	2.3100E+04	2.2010E+05	0.0000E+00	2.00	0.0	5.4580E+06	6.9000E-03	8.5177E+01	2	4	3917
								3.00	0.0	2.1830E+05	9.9310E-01				
231	31-ga- 87	0	310870	1.9430E-02	5.2640E+06	4.4360E+06	0.0000E+00	1.00	0.0	1.5460E+07	2.6000E-01	8.6968E+01	2	2	3179
								1.50	0.0	1.2127E+07	7.4000E-01				
232	32-ge- 87	0	320870	6.2340E-02	3.5330E+06	3.5850E+06	0.0000E+00	1.00	0.0	1.1400E+07	8.9000E-01	8.6953E+01	2	2	3276
								1.50	0.0	6.7000E+06	1.1000E-01				
233	33-as- 87	0	330870	4.8000E-01	3.4400E+06	3.4730E+06	0.0000E+00	1.00	0.0	1.0808E+07	8.4600E-01	8.6940E+01	2	2	3361
								1.50	0.0	6.8140E+06	1.5400E-01				
234	34-se- 87	0	340870	5.2900E+00	2.0790E+06	2.6440E+06	0.0000E+00	1.00	0.0	7.4310E+06	9.9800E-01	8.6182E+01	2	2	3464
								1.50	0.0	1.1420E+06	2.0000E-03				
235	35-br- 87	0	350870	5.5650E+01	1.6100E+06	3.3400E+06	0.0000E+00	1.00	0.0	6.8520E+06	9.7400E-01	8.6174E+01	2	2	3549
								1.50	0.0	1.3370E+06	2.6000E-02				
236	36-kr- 87	0	360870	4.5800E+03	1.3300E+06	7.9200E+05	0.0000E+00	1.00	0.0	3.8883E+06	1.0000E+00	8.6167E+01	1	4	3652
237	37-rb- 87	0	370870	1.5200E+18	8.1700E+04	0.0000E+00	0.0000E+00	1.00	0.0	2.8260E+05	1.0000E+00	8.6163E+01	1	1	3731
238	38-sr- 87	0	380870	stable								8.6909E+01	0	0	3834
239	38-sr- 87	1	380871	1.0130E+04	6.5000E+04	3.2150E+05	0.0000E+00	2.00	0.0	1.0590E+05	3.0000E-03	8.6162E+01	2	4	3835
								3.00	0.0	3.8853E+05	9.9700E-01				
240	39- y- 87	0	390870	2.8730E+05	6.6400E+03	4.4600E+05	0.0000E+00	2.00	1.0	1.4732E+06	1.0000E+00	8.6164E+01	1	4	3919
241	39- y- 87	1	390871	4.8130E+04	7.7000E+04	3.0680E+05	0.0000E+00	2.00	0.0	2.2425E+06	1.5700E-02	8.6164E+01	2	4	3920
								3.00	0.0	3.8079E+05	9.8430E-01				
242	31-ga- 88	0	310880	1.4210E-02	5.5050E+06	5.9410E+06	0.0000E+00	1.00	0.0	1.7448E+07	1.0000E+00	8.7975E+01	1	2	3182
243	32-ge- 88	0	320880	4.2970E-02	4.0060E+06	3.0030E+06	0.0000E+00	1.00	0.0	1.1000E+07	8.3000E-01	8.7956E+01	2	2	3279
								1.50	0.0	7.3000E+06	1.7000E-01				
244	33-as- 88	0	330880	9.2130E-02	3.7520E+06	4.2210E+06	0.0000E+00	1.00	0.0	1.2600E+07	7.7000E-01	8.7945E+01	2	2	3364
								1.50	0.0	7.1000E+06	2.3000E-01				
245	34-se- 88	0	340880	1.5300E+00	2.2150E+06	2.0320E+06	0.0000E+00	1.00	0.0	6.8510E+06	9.9330E-01	8.7176E+01	2	4	3467
								1.50	0.0	1.9010E+06	6.7000E-03				
246	35-br- 88	0	350880	1.6290E+01	2.3000E+06	2.8900E+06	0.0000E+00	1.00	0.0	8.9560E+06	9.3420E-01	8.7169E+01	2	2	3552
								1.50	0.0	1.9030E+06	6.5800E-02				
247	36-kr- 88	0	360880	1.0220E+04	3.7000E+05	1.9500E+06	0.0000E+00	1.00	0.0	2.9180E+06	1.0000E+00	8.7159E+01	1	4	3655
248	37-rb- 88	0	370880	1.0664E+03	2.0510E+06	6.7700E+05	0.0000E+00	1.00	0.0	5.3128E+06	1.0000E+00	8.7156E+01	1	4	3734
249	38-sr- 88	0	380880	stable								8.7906E+01	0	0	3837
250	39- y- 88	0	390880	9.2125E+06	6.2700E+03	2.6950E+06	0.0000E+00	2.00	0.0	3.6226E+06	1.0000E+00	8.7154E+01	1	4	3922
251	39- y- 88	1	390881	3.0100E-04	9.9000E+03	3.8251E+05	0.0000E+00	3.00	0.0	3.9286E+05	1.0000E+00	8.7154E+01	1	3	3923
252	39- y- 88	2	390882	1.3970E-02	1.1300E+04	6.6281E+05	0.0000E+00	3.00	0.0	6.7455E+05	1.0000E+00	8.7154E+01	1	3	3924

no	symbol	s	zzaaas	halflife	e-beta	e-gamma	e-alpha	rtyp	rfs	q	branching	awr	ndk	nsp	mat
253	40-zr- 88	0	400880	7.2100E+06	5.0440E+03	9.4560E+03	0.0000E+00	2.00	1.0	6.7100E+05	1.0000E+00	8.7155E+01	1	3	4019
254	31-ga- 89	0	310890	9.5200E-03	5.9290E+06	5.1370E+06	0.0000E+00	1.00	0.0	1.7500E+07	1.0000E+00	8.8980E+01	1	2	3185
255	32-ge- 89	0	320890	3.2680E-02	4.5980E+06	3.9170E+06	0.0000E+00	1.00	0.0	1.3500E+07	8.1000E-01	8.8963E+01	2	2	3282
								1.50	0.0	9.4000E+06	1.9000E-01				
256	33-as- 89	0	330890	6.5990E-02	3.9770E+06	3.9430E+06	0.0000E+00	1.00	0.0	1.1600E+07	7.0000E-01	8.8949E+01	2	2	3367
								1.50	0.0	8.5000E+06	3.0000E-01				
257	34-se- 89	0	340890	4.1000E-01	3.1260E+06	1.8940E+06	0.0000E+00	1.00	0.0	9.3900E+06	9.2200E-01	8.8936E+01	2	2	3470
								1.50	0.0	3.6720E+06	7.8000E-02				
258	35-br- 89	0	350890	4.4000E+00	2.3730E+06	2.7680E+06	0.0000E+00	1.00	0.0	8.1550E+06	8.6200E-01	8.8163E+01	2	2	3555
								1.50	0.0	3.2400E+06	1.3800E-01				
259	36-kr- 89	0	360890	1.8900E+02	1.3800E+06	1.9230E+06	0.0000E+00	1.00	0.0	5.1770E+06	1.0000E+00	8.8154E+01	1	2	3658
260	37-rb- 89	0	370890	9.0900E+02	9.7000E+05	2.2400E+06	0.0000E+00	1.00	0.0	4.4960E+06	1.0000E+00	8.8148E+01	1	2	3737
261	38-sr- 89	0	380890	4.3660E+06	5.8460E+05	0.0000E+00	0.0000E+00	1.00	0.0	1.4969E+06	9.9990E-01	8.8144E+01	2	1	3840
								1.00	1.0	5.8790E+05	9.6000E-05				
262	39- y- 89	0	390890	stable								8.8906E+01	0	0	3925
263	39- y- 89	1	390891	1.5660E+01	7.2500E+03	9.0140E+05	0.0000E+00	3.00	0.0	9.0896E+05	1.0000E+00	8.8142E+01	1	3	3926
264	40-zr- 89	0	400890	2.8230E+05	9.3900E+04	2.5760E+05	0.0000E+00	2.00	0.0	2.8330E+06	1.2300E-03	8.8145E+01	2	4	4022
								2.00	1.0	1.9240E+06	9.9877E-01				
265	40-zr- 89	1	400891	2.4970E+02	3.1100E+04	6.3500E+05	0.0000E+00	2.00	0.0	3.4210E+06	6.2300E-02	8.8145E+01	2	4	4023
								3.00	0.0	5.8780E+05	9.3770E-01				
266	32-ge- 90	0	320900	2.1370E-02	4.9980E+06	3.0740E+06	0.0000E+00	1.00	0.0	1.3573E+07	1.0000E+00	8.9967E+01	1	2	3285
267	33-as- 90	0	330900	4.7720E-02	4.5970E+06	4.3800E+06	0.0000E+00	1.00	0.0	1.4200E+07	6.9000E-01	8.9955E+01	2	2	3370
								1.50	0.0	9.2000E+06	3.1000E-01				
268	34-se- 90	0	340900	1.6030E-01	2.9040E+06	2.6330E+06	0.0000E+00	1.00	0.0	8.7000E+06	9.7000E-01	8.9939E+01	2	2	3473
								1.50	0.0	4.4000E+06	3.0000E-02				
269	35-br- 90	0	350900	1.9200E+00	2.9000E+06	2.9042E+06	0.0000E+00	1.00	0.0	1.0350E+07	7.4800E-01	8.9159E+01	2	4	3558
								1.50	0.0	3.8600E+06	2.5200E-01				
270	36-kr- 90	0	360900	3.2320E+01	1.3600E+06	1.3300E+06	0.0000E+00	1.00	0.0	4.4040E+06	8.6880E-01	8.9147E+01	2	4	3661
								1.00	1.0	4.2970E+06	1.3120E-01				
271	37-rb- 90	0	370900	1.5800E+02	1.9916E+06	2.1641E+06	0.0000E+00	1.00	0.0	6.5820E+06	1.0000E+00	8.9142E+01	1	2	3740
272	37-rb- 90	1	370901	2.5800E+02	1.4000E+06	3.2400E+06	0.0000E+00	1.00	0.0	6.6890E+06	9.7400E-01	8.9142E+01	2	4	3741
								3.00	0.0	1.0690E+05	2.6000E-02				
273	38-sr- 90	0	380900	9.0850E+08	1.9580E+05	0.0000E+00	0.0000E+00	1.00	0.0	5.4590E+05	1.0000E+00	8.9135E+01	1	1	3843
274	39- y- 90	0	390900	2.3040E+05	9.3380E+05	1.2500E+00	0.0000E+00	1.00	0.0	2.2801E+06	1.0000E+00	8.9135E+01	1	3	3928
275	39- y- 90	1	390901	1.1480E+04	4.5300E+04	6.3530E+05	0.0000E+00	1.00	1.0	2.9618E+06	1.8000E-05	8.9135E+01	2	4	3929
								3.00	0.0	6.8204E+05	9.9998E-01				
276	40-zr- 90	0	400900	stable								8.9905E+01	0	0	4025
277	40-zr- 90	1	400901	8.0920E-01	1.6000E+04	2.3300E+06	0.0000E+00	3.00	0.0	2.3190E+06	1.0000E+00	8.9132E+01	1	3	4026
278	41-nb- 90	0	410900	5.2560E+04	3.6900E+05	1.9140E+06	0.0000E+00	2.00	0.0	6.1110E+06	1.5000E-02	8.9139E+01	2	4	4116
								2.00	1.0	3.7920E+06	9.8500E-01				
279	41-nb- 90	1	410901	1.8810E+01	6.2100E+04	1.2833E+05	0.0000E+00	3.00	0.0	1.2467E+05	1.0000E+00	8.9139E+01	1	3	4117
280	32-ge- 91	0	320910	1.5980E-02	5.1300E+06	4.4790E+06	0.0000E+00	1.00	0.0	1.5253E+07	1.0000E+00	9.0975E+01	1	2	3288
281	33-as- 91	0	330910	3.4320E-02	4.8610E+06	4.1060E+06	0.0000E+00	1.00	0.0	1.3200E+07	4.2000E-01	9.0959E+01	2	2	3373
								1.50	0.0	1.0700E+07	5.8000E-01				
282	34-se- 91	0	340910	1.1390E-01	3.7850E+06	3.1260E+06	0.0000E+00	1.00	0.0	1.0800E+07	7.9000E-01	9.0945E+01	2	2	3476
								1.50	0.0	6.2000E+06	2.1000E-01				
283	35-br- 91	0	350910	5.4100E-01	3.4170E+06	2.1390E+06	0.0000E+00	1.00	0.0	9.8000E+06	8.0000E-01	9.0933E+01	2	2	3561
								1.50	0.0	5.7200E+06	2.0000E-01				
284	36-kr- 91	0	360910	8.5700E+00	2.1000E+06	1.7460E+06	0.0000E+00	1.00	0.0	6.7730E+06	1.0000E+00	9.0142E+01	1	4	3664
285	37-rb- 91	0	370910	5.8400E+01	1.6100E+06	2.3400E+06	0.0000E+00	1.00	0.0	5.9100E+06	1.0000E+00	9.0135E+01	1	4	3743

no	symbol	s	zzaaas	halflife	e-beta	e-gamma	e-alpha	rtyp	rfs	q	branching	awr	ndk	nsp	mat
286	38-sr- 91	0	380910	3.4670E+04	6.5000E+05	7.0700E+05	0.0000E+00	1.00	0.0	2.6930E+06	4.0900E-01	9.0129E+01	2	4	3846
								1.00	1.0	2.1370E+06	5.9100E-01				
287	39- y- 91	0	390910	5.0550E+06	6.0320E+05	3.1000E+03	0.0000E+00	1.00	0.0	1.5444E+06	1.0000E+00	9.0126E+01	1	2	3931
288	39- y- 91	1	390911	2.9826E+03	2.6300E+04	5.2830E+05	0.0000E+00	3.00	0.0	5.5557E+05	1.0000E+00	9.0126E+01	1	3	3932
289	40-zr- 91	0	400910	stable								9.0906E+01	0	0	4028
290	41-nb- 91	0	410910	2.1000E+10	5.1160E+03	1.0403E+04	0.0000E+00	2.00	0.0	1.2580E+06	1.0000E+00	9.0126E+01	1	3	4119
291	41-nb- 91	1	410911	5.2580E+06	9.1000E+04	3.4000E+04	0.0000E+00	2.00	0.0	1.3630E+06	3.4000E-02	9.0126E+01	2	4	4120
								3.00	0.0	1.0462E+05	9.6600E-01				
292	33-as- 92	0	330920	2.6530E-02	5.0490E+06	5.4090E+06	0.0000E+00	1.00	0.0	1.5500E+07	5.9000E-01	9.1966E+01	2	2	3376
								1.50	0.0	1.1100E+07	4.1000E-01				
293	34-se- 92	0	340920	7.4770E-02	4.1130E+06	2.2370E+06	0.0000E+00	1.00	0.0	9.9000E+06	8.8000E-01	9.1949E+01	2	2	3479
								1.50	0.0	6.5000E+06	1.2000E-01				
294	35-br- 92	0	350920	3.4300E-01	4.0060E+06	3.1990E+06	0.0000E+00	1.00	0.0	1.2200E+07	6.6900E-01	9.1939E+01	2	2	3564
								1.50	0.0	6.3400E+06	3.3100E-01				
295	36-kr- 92	0	360920	1.8400E+00	2.0000E+06	1.4000E+06	0.0000E+00	1.00	0.0	6.0050E+06	9.9967E-01	9.1136E+01	2	4	3667
								1.50	0.0	9.0700E+05	3.3000E-04				
296	37-rb- 92	0	370920	4.4920E+00	2.9000E+06	2.1500E+06	0.0000E+00	1.00	0.0	8.0930E+06	9.9989E-01	9.1130E+01	2	4	3746
								1.50	0.0	8.1200E+05	1.0700E-04				
297	38-sr- 92	0	380920	9.7600E+03	2.0000E+05	1.3400E+06	0.0000E+00	1.00	0.0	1.9490E+06	1.0000E+00	9.1121E+01	1	2	3849
298	39- y- 92	0	390920	1.2740E+04	1.4500E+06	2.5200E+05	0.0000E+00	1.00	0.0	3.6420E+06	1.0000E+00	9.1119E+01	1	4	3934
299	40-zr- 92	0	400920	stable								9.1905E+01	0	0	4031
300	41-nb- 92	0	410920	1.1000E+15	7.8000E+03	1.7000E+06	0.0000E+00	2.00	0.0	2.0056E+06	1.0000E+00	9.1118E+01	1	4	4122
301	41-nb- 92	1	410921	8.7700E+05	5.8700E+03	9.6880E+05	0.0000E+00	2.00	0.0	2.1412E+06	1.0000E+00	9.1118E+01	1	4	4123
302	42-mo- 92	0	420920	stable								9.1907E+01	0	0	4225
303	33-as- 93	0	330930	1.8620E-02	4.8490E+06	4.1110E+06	0.0000E+00	1.00	0.0	1.4313E+07	1.0000E+00	9.2970E+01	1	2	3379
304	34-se- 93	0	340930	5.8130E-02	4.1170E+06	4.1420E+06	0.0000E+00	1.00	0.0	1.2300E+07	8.9000E-01	9.2955E+01	2	2	3482
								1.50	0.0	7.8000E+06	1.1000E-01				
305	35-br- 93	0	350930	1.0200E-01	3.5540E+06	3.6720E+06	0.0000E+00	1.00	0.0	1.1100E+07	3.2000E-01	9.2942E+01	2	2	3567
								1.50	0.0	7.6000E+06	6.8000E-01				
306	36-kr- 93	0	360930	1.2860E+00	2.8800E+06	2.2600E+06	0.0000E+00	1.00	0.0	8.4850E+06	9.8050E-01	9.2133E+01	2	4	3670
								1.50	0.0	2.5670E+06	1.9500E-02				
307	37-rb- 93	0	370930	5.8400E+00	2.2000E+06	2.2700E+06	0.0000E+00	1.00	0.0	7.4650E+06	9.8610E-01	9.2124E+01	2	4	3749
								1.50	0.0	2.1750E+06	1.3900E-02				
308	38-sr- 93	0	380930	4.4540E+02	7.7000E+05	2.0200E+06	0.0000E+00	1.00	0.0	4.1400E+06	6.5800E-01	9.2116E+01	2	4	3852
								1.00	1.0	3.3810E+06	3.4200E-01				
309	39- y- 93	0	390930	3.6600E+04	1.1720E+06	9.6000E+04	0.0000E+00	1.00	0.0	2.8950E+06	1.0000E+00	9.2111E+01	1	4	3937
310	39- y- 93	1	390931	8.2000E-01	7.5000E+04	6.7965E+05	0.0000E+00	3.00	0.0	7.5872E+05	1.0000E+00	9.2111E+01	1	3	3938
311	40-zr- 93	0	400930	4.8000E+13	1.9200E+04	0.0000E+00	0.0000E+00	1.00	0.0	9.0800E+04	2.5000E-02	9.2108E+01	2	1	4034
								1.00	1.0	6.0000E+04	9.7500E-01				
312	41-nb- 93	0	410930	stable								9.2906E+01	0	0	4125
313	41-nb- 93	1	410931	5.0900E+08	2.6700E+04	1.9700E+03	0.0000E+00	3.00	0.0	3.0771E+04	1.0000E+00	9.2108E+01	1	2	4126
314	42-mo- 93	0	420930	1.3000E+11	5.0000E+03	1.0800E+04	0.0000E+00	2.00	0.0	4.0600E+05	1.2000E-01	9.2109E+01	2	3	4228
								2.00	1.0	3.7500E+05	8.8000E-01				
315	42-mo- 93	1	420931	2.4700E+04	9.6000E+04	2.3200E+06	0.0000E+00	2.00	0.0	2.8310E+06	1.2000E-03	9.2109E+01	2	4	4229
								3.00	0.0	2.4248E+06	9.9880E-01				
316	33-as- 94	0	330940	1.2950E-02	5.3720E+06	5.9020E+06	0.0000E+00	1.00	0.0	1.7158E+07	1.0000E+00	9.3977E+01	1	2	3382
317	34-se- 94	0	340940	4.1060E-02	4.1890E+06	2.3000E+06	0.0000E+00	1.00	0.0	1.1000E+07	8.6000E-01	9.3959E+01	2	2	3485
								1.50	0.0	8.2000E+06	1.4000E-01				
318	35-br- 94	0	350940	7.0000E-02	4.0190E+06	4.6610E+06	0.0000E+00	1.00	0.0	1.3500E+07	3.2000E-01	9.3948E+01	2	2	3570
								1.50	0.0	8.3000E+07	6.8000E-01				

no	symbol	s	zzaaas	halflife	e-beta	e-gamma	e-alpha	rtyp	rfs	q	branching	awr	ndk	nsp	mat
319	36-kr- 94	0	360940	2.0000E-01	2.9470E+06	1.4800E+06	0.0000E+00	1.00	0.0	7.2050E+06	9.8890E-01	9.3933E+01	2	2	3673
								1.50	0.0	3.2020E+06	1.1100E-02				
320	37-rb- 94	0	370940	2.7020E+00	2.7162E+06	3.6600E+06	0.0000E+00	1.00	0.0	1.0289E+07	8.9500E-01	9.3120E+01	2	4	3752
								1.50	0.0	3.4620E+06	1.0500E-01				
321	38-sr- 94	0	380940	7.5300E+01	7.3250E+05	1.5733E+06	0.0000E+00	1.00	0.0	3.5090E+06	1.0000E+00	9.3109E+01	1	2	3855
322	39- y- 94	0	390940	1.1220E+03	1.8100E+06	7.7000E+05	0.0000E+00	1.00	0.0	4.9190E+06	1.0000E+00	9.3105E+01	1	4	3940
323	40-zr- 94	0	400940	stable								9.3906E+01	0	0	4037
324	41-nb- 94	0	410940	6.4000E+11	1.4793E+05	1.5738E+06	0.0000E+00	1.00	0.0	2.0446E+06	1.0000E+00	9.3101E+01	1	4	4128
325	41-nb- 94	1	410941	3.7578E+02	3.2100E+04	1.1000E+04	0.0000E+00	1.00	0.0	2.0855E+06	5.0000E-03	9.3101E+01	2	4	4129
								3.00	0.0	4.0893E+04	9.9500E-01				
326	42-mo- 94	0	420940	stable								9.3905E+01	0	0	4231
327	33-as- 95	0	330950	9.9550E-03	5.1780E+06	4.4660E+06	0.0000E+00	1.00	0.0	1.5332E+07	1.0000E+00	9.4982E+01	1	2	3385
328	34-se- 95	0	340950	3.1730E-02	4.5590E+06	4.4970E+06	0.0000E+00	1.00	0.0	1.4134E+07	1.0000E+00	9.4965E+01	1	2	3488
329	35-br- 95	0	350950	6.3480E-02	3.5930E+06	3.7130E+06	0.0000E+00	1.00	0.0	1.2300E+07	6.6000E-01	9.4951E+01	2	2	3573
								1.50	0.0	9.4000E+06	3.4000E-01				
330	36-kr- 95	0	360950	7.8000E-01	3.0550E+06	3.3550E+06	0.0000E+00	1.00	0.0	9.6780E+06	9.7130E-01	9.4938E+01	2	2	3676
								1.50	0.0	4.3220E+06	2.8700E-02				
331	37-rb- 95	0	370950	3.7770E-01	2.3200E+06	2.3000E+06	0.0000E+00	1.00	0.0	9.2840E+06	9.1300E-01	9.4114E+01	2	4	3755
								1.50	0.0	4.9340E+06	8.7000E-02				
332	38-sr- 95	0	380950	2.3900E+01	2.2100E+06	1.5350E+06	0.0000E+00	1.00	0.0	6.0900E+06	1.0000E+00	9.4104E+01	1	4	3858
333	39- y- 95	0	390950	6.1800E+02	1.4400E+06	1.1100E+06	0.0000E+00	1.00	0.0	4.4510E+06	1.0000E+00	9.4098E+01	1	2	3943
334	40-zr- 95	0	400950	5.5324E+06	1.1810E+05	7.3210E+05	0.0000E+00	1.00	0.0	1.1236E+06	9.8920E-01	9.4093E+01	2	4	4040
								1.00	1.0	8.8790E+05	1.0800E-02				
335	41-nb- 95	0	410950	3.0232E+06	4.4520E+04	7.6449E+05	0.0000E+00	1.00	0.0	9.2560E+05	1.0000E+00	9.4091E+01	1	4	4131
336	41-nb- 95	1	410951	3.1200E+05	1.6900E+05	7.0800E+04	0.0000E+00	1.00	0.0	1.1613E+06	5.6000E-02	9.4091E+01	2	4	4132
								3.00	0.0	2.3569E+05	9.4400E-01				
337	42-mo- 95	0	420950	stable								9.4906E+01	0	0	4234
338	43-tc- 95	0	430950	7.2000E+04	6.3300E+03	7.9650E+05	0.0000E+00	2.00	0.0	1.6910E+06	1.0000E+00	9.4092E+01	1	4	4319
339	43-tc- 95	1	430951	5.2700E+06	1.4500E+04	6.8800E+05	0.0000E+00	2.00	0.0	1.7300E+06	9.6100E-01	9.4092E+01	2	4	4320
								3.00	0.0	3.8900E+04	3.9000E-02				
340	34-se- 96	0	340960	1.9420E-02	4.6120E+06	2.6180E+06	0.0000E+00	1.00	0.0	1.2366E+07	1.0000E+00	9.5969E+01	1	2	3491
341	35-br- 96	0	350960	4.9250E-02	4.4690E+06	4.8220E+06	0.0000E+00	1.00	0.0	1.4400E+07	7.2400E-01	9.5957E+01	2	2	3576
								1.50	0.0	9.5000E+06	2.7600E-01				
342	36-kr- 96	0	360960	8.0000E-02	3.0730E+06	1.5660E+06	0.0000E+00	1.00	0.0	8.1000E+06	9.6300E-01	9.5941E+01	2	2	3679
								1.50	0.0	4.7000E+06	3.7000E-02				
343	37-rb- 96	0	370960	2.0130E-01	3.6600E+06	3.0840E+06	0.0000E+00	1.00	0.0	1.1750E+07	8.6700E-01	9.5110E+01	2	4	3758
								1.50	0.0	5.8700E+06	1.3300E-01				
344	38-sr- 96	0	380960	1.0700E+00	1.9700E+06	1.3543E+06	0.0000E+00	1.00	0.0	5.4130E+06	1.0000E+00	9.5098E+01	1	4	3861
345	39- y- 96	0	390960	5.3400E+00	2.6565E+06	1.2056E+06	0.0000E+00	1.00	0.0	7.1060E+06	1.0000E+00	9.5092E+01	1	2	3946
346	39- y- 96	1	390961	9.6000E+00	1.6100E+06	4.3076E+06	0.0000E+00	1.00	0.0	8.2460E+06	1.0000E+00	9.5092E+01	1	4	3947
347	40-zr- 96	0	400960	stable								9.5909E+01	0	0	4043
348	41-nb- 96	0	410960	8.4060E+04	2.5300E+05	2.4610E+06	0.0000E+00	1.00	0.0	3.1870E+06	1.0000E+00	9.5084E+01	1	4	4134
349	42-mo- 96	0	420960	stable								9.5905E+01	0	0	4237
350	43-tc- 96	0	430960	3.7000E+05	8.2600E+03	2.5000E+06	0.0000E+00	2.00	0.0	2.9730E+06	1.0000E+00	9.5084E+01	1	4	4322
351	43-tc- 96	1	430961	3.0900E+03	2.6300E+04	4.8000E+04	0.0000E+00	2.00	0.0	3.0070E+06	2.0000E-02	9.5084E+01	2	4	4323
								3.00	0.0	3.4200E+04	9.8000E-01				
352	35-br- 97	0	350970	3.2320E-02	4.1950E+06	3.5080E+06	0.0000E+00	1.00	0.0	1.3300E+07	6.6000E-01	9.6961E+01	2	2	3579
								1.50	0.0	1.0300E+07	3.4000E-01				
353	36-kr- 97	0	360970	6.3000E-02	3.8340E+06	2.9930E+06	0.0000E+00	1.00	0.0	1.0300E+07	9.3300E-01	9.6947E+01	2	2	3682
								1.50	0.0	5.2000E+06	6.7000E-02				

no	symbol	s	zzaaas	halflife	e-beta	e-gamma	e-alpha	rtyp	rfs	q	branching	awr	ndk	nsp	mat
354	37-rb- 97	0	370970	1.6990E-01	3.0248E+06	2.8767E+06	0.0000E+00	1.00	0.0	1.0380E+07	7.4500E-01	9.6105E+01	2	4	3761
								1.50	0.0	6.6400E+06	2.5500E-01				
355	38-sr- 97	0	380970	4.2600E-01	2.2850E+06	2.0100E+06	0.0000E+00	1.00	0.0	7.6620E+06	8.5060E-01	9.6093E+01	3	4	3864
								1.00	1.0	6.9950E+06	1.4890E-01				
								1.50	0.0	1.6730E+06	5.0000E-04				
356	39- y- 97	0	390970	3.7500E+00	2.2000E+06	1.8200E+06	0.0000E+00	1.00	0.0	6.6920E+06	9.9945E-01	9.6086E+01	2	4	3949
								1.50	0.0	1.1170E+06	5.5000E-04				
357	39- y- 97	1	390971	1.1700E+00	2.4200E+06	2.1500E+06	0.0000E+00	1.00	0.0	7.3600E+06	9.9220E-01	9.6086E+01	3	4	3950
								1.50	0.0	1.7850E+06	8.0000E-04				
								3.00	0.0	6.6752E+05	7.0000E-03				
358	39- y- 97	2	390972	1.4200E-01	1.8500E+05	2.9100E+06	0.0000E+00	1.00	0.0	1.0215E+07	5.2000E-02	9.6086E+01	2	4	3951
								3.00	0.0	3.5226E+06	9.4800E-01				
359	40-zr- 97	0	400970	6.0300E+04	7.0500E+05	1.8700E+05	0.0000E+00	1.00	0.0	2.6589E+06	4.9500E-02	9.6078E+01	2	4	4046
								1.00	1.0	1.9155E+06	9.5050E-01				
360	41-nb- 97	0	410970	4.3300E+03	4.6880E+05	6.6500E+05	0.0000E+00	1.00	0.0	1.9347E+06	1.0000E+00	9.6076E+01	1	4	4137
361	41-nb- 97	1	410971	5.8700E+01	0.0000E+00	7.2770E+05	0.0000E+00	3.00	0.0	7.4335E+05	1.0000E+00	9.6076E+01	1	1	4138
362	42-mo- 97	0	420970	stable								9.6906E+01	0	0	4240
363	43-tc- 97	0	430970	1.3300E+14	5.1355E+03	1.1814E+04	0.0000E+00	2.00	0.0	3.2000E+05	1.0000E+00	9.6074E+01	1	3	4325
364	43-tc- 97	1	430971	7.8600E+06	8.6000E+04	1.0100E+04	0.0000E+00	2.00	0.0	4.1700E+05	3.9400E-02	9.6074E+01	2	4	4326
								3.00	0.0	9.6500E+04	9.6060E-01				
365	35-br- 98	0	350980	2.3620E-02	4.8800E+06	5.3770E+06	0.0000E+00	1.00	0.0	1.5656E+07	1.0000E+00	9.7968E+01	1	2	3582
366	36-kr- 98	0	360980	4.6000E-02	3.4920E+06	1.8510E+06	0.0000E+00	1.00	0.0	9.2000E+06	9.3000E-01	9.7950E+01	2	2	3685
								1.50	0.0	5.3000E+06	7.0000E-02				
367	37-rb- 98	0	370980	1.1400E-01	3.7110E+06	2.9230E+06	0.0000E+00	1.00	0.0	1.2420E+07	8.6200E-01	9.7101E+01	2	4	3764
								1.50	0.0	6.5100E+06	1.3800E-01				
368	37-rb- 98	1	370981	9.6000E-02	5.3850E+06	1.6800E+06	0.0000E+00	1.00	0.0	1.2693E+07	1.0000E+00	9.7100E+01	1	4	3765
369	38-sr- 98	0	380980	6.5300E-01	2.1390E+06	1.0510E+06	0.0000E+00	1.00	0.0	6.0420E+06	9.9750E-01	9.7087E+01	2	4	3867
								1.50	0.0	1.7520E+06	2.5000E-03				
370	39- y- 98	0	390980	5.4800E-01	2.9000E+06	2.8100E+06	0.0000E+00	1.00	0.0	8.8180E+06	9.9669E-01	9.7081E+01	2	4	3952
								1.50	0.0	2.4020E+06	3.3100E-03				
371	39- y- 98	1	390981	2.0000E+00	2.5000E+06	2.7400E+06	0.0000E+00	1.00	0.0	9.2280E+06	9.6600E-01	9.7081E+01	2	4	3953
								1.50	0.0	2.8120E+06	3.4000E-02				
372	40-zr- 98	0	400980	3.0700E+01	9.1000E+05	0.0000E+00	0.0000E+00	1.00	0.0	2.2380E+06	1.0000E+00	9.7072E+01	1	1	4049
373	41-nb- 98	0	410980	2.8600E+00	1.6275E+06	8.5580E+05	0.0000E+00	1.00	0.0	4.5830E+06	1.0000E+00	9.7069E+01	1	2	4140
374	41-nb- 98	1	410981	3.0780E+03	7.7000E+05	2.8120E+06	0.0000E+00	1.00	0.0	4.6670E+06	1.0000E+00	9.7069E+01	1	4	4141
375	42-mo- 98	0	420980	stable								9.7905E+01	0	0	4243
376	43-tc- 98	0	430980	1.3300E+14	1.1800E+05	1.4100E+06	0.0000E+00	1.00	0.0	1.7940E+06	1.0000E+00	9.7066E+01	1	2	4328
377	44-ru- 98	0	440980	stable								9.7906E+01	0	0	4431
378	35-br- 99	0	350990	1.5130E-02	4.5720E+06	3.9200E+06	0.0000E+00	1.00	0.0	1.3580E+07	1.0000E+00	9.8972E+01	1	2	3585
379	36-kr- 99	0	360990	4.0000E-02	4.2990E+06	3.5310E+06	0.0000E+00	1.00	0.0	1.1600E+07	8.8000E-01	9.8957E+01	2	2	3688
								1.50	0.0	6.4000E+06	1.2000E-01				
380	37-rb- 99	0	370990	5.0300E-02	3.6640E+06	2.6560E+06	0.0000E+00	1.00	0.0	1.1380E+07	8.4100E-01	9.8944E+01	2	2	3767
								1.50	0.0	7.2200E+06	1.5900E-01				
381	38-sr- 99	0	380990	2.6900E-01	3.2000E+06	2.1060E+06	0.0000E+00	1.00	0.0	7.5300E+06	9.9900E-01	9.8083E+01	2	4	3870
								1.50	0.0	1.8770E+06	1.0000E-03				
382	39- y- 99	0	390990	1.4780E+00	2.3750E+06	1.1470E+06	0.0000E+00	1.00	0.0	7.5680E+06	9.8100E-01	9.8075E+01	2	4	3955
								1.50	0.0	3.1650E+06	1.9000E-02				
383	40-zr- 99	0	400990	2.1000E+00	1.7100E+06	8.4400E+05	0.0000E+00	1.00	0.0	4.7040E+06	6.3200E-01	9.8067E+01	2	4	4052
								1.00	1.0	4.3390E+06	3.6800E-01				
384	41-nb- 99	0	410990	1.5000E+01	1.2746E+06	6.2173E+05	0.0000E+00	1.00	0.0	3.6400E+06	1.0000E+00	9.8062E+01	1	4	4143

no	symbol	s	zzaaas	halflife	e-beta	e-gamma	e-alpha	rtyp	rfs	q	branching	awr	ndk	nsp	mat
385	41-nb- 99	1	410991	1.5600E+02	1.1829E+06	1.7155E+06	0.0000E+00	1.00	0.0	4.0050E+06	9.6100E-01	9.8062E+01	2	4	4144
								3.00	0.0	3.6529E+05	3.9000E-02				
386	42-mo- 99	0	420990	2.3738E+05	3.9400E+05	1.4840E+05	0.0000E+00	1.00	0.0	1.3570E+06	1.1500E-01	9.8058E+01	2	4	4246
								1.00	1.0	1.2143E+06	8.8500E-01				
387	43-tc- 99	0	430990	6.6600E+12	8.4600E+04	7.0000E-01	0.0000E+00	1.00	0.0	2.9320E+05	1.0000E+00	9.8057E+01	1	2	4331
388	43-tc- 99	1	430991	2.1650E+04	1.5100E+04	1.2650E+05	0.0000E+00	1.00	0.0	4.3590E+05	3.7000E-05	9.8057E+01	2	4	4332
								3.00	0.0	1.4268E+05	9.9996E-01				
389	44-ru- 99	0	440990	stable								9.8906E+01	0	0	4434
390	35-br-100	0	351000	1.1550E-02	5.0300E+06	5.5850E+06	0.0000E+00	1.00	0.0	1.6167E+07	1.0000E+00	9.9979E+01	1	2	3588
391	36-kr-100	0	361000	3.1590E-02	3.9700E+06	2.1890E+06	0.0000E+00	1.00	0.0	1.0500E+07	8.3000E-01	9.9960E+01	2	2	3691
								1.50	0.0	6.9000E+06	1.7000E-01				
392	37-rb-100	0	371000	5.1000E-02	4.2760E+06	4.6740E+06	0.0000E+00	1.00	0.0	1.3100E+07	9.4000E-01	9.9949E+01	2	2	3770
								1.50	0.0	7.8000E+06	6.0000E-02				
393	38-sr-100	0	381000	2.0200E-01	2.5310E+06	1.2750E+06	0.0000E+00	1.00	0.0	7.2400E+06	9.9220E-01	9.9077E+01	2	2	3873
								1.50	0.0	2.1540E+06	7.8000E-03				
394	39- y-100	0	391000	7.3500E-01	2.9420E+06	2.9890E+06	0.0000E+00	1.00	0.0	9.3100E+06	9.9080E-01	9.9070E+01	2	2	3958
								1.50	0.0	2.4800E+06	9.2000E-03				
395	39- y-100	1	391001	9.4000E-01	3.2900E+06	2.2530E+06	0.0000E+00	1.00	0.0	9.4600E+06	9.7700E-01	9.9927E+01	2	2	3959
								1.50	0.0	2.6300E+06	2.3000E-02				
396	40-zr-100	0	401000	7.1000E+00	1.1141E+06	6.9823E+05	0.0000E+00	1.00	0.0	3.5600E+06	9.8000E-01	9.9059E+01	2	2	4055
								1.00	1.0	3.2500E+06	2.0000E-02				
397	41-nb-100	0	411000	1.5000E+00	2.5400E+06	7.1000E+05	0.0000E+00	1.00	0.0	6.2450E+06	1.0000E+00	9.9056E+01	1	4	4146
398	41-nb-100	1	411001	2.9900E+00	2.0000E+06	2.2100E+06	0.0000E+00	1.00	0.0	6.5590E+06	1.0000E+00	9.9056E+01	1	4	4147
399	42-mo-100	0	421000	stable								9.9907E+01	0	0	4249
400	43-tc-100	0	431000	1.5460E+01	1.3176E+06	7.6100E+04	0.0000E+00	1.00	0.0	3.2022E+06	9.9998E-01	9.9049E+01	2	5	4334
								2.00	0.0	1.6800E+05	1.8000E-05				
401	44-ru-100	0	441000	stable								9.9904E+01	0	0	4437
402	45-rh-100	0	451000	7.4900E+04	5.0000E+04	2.7430E+06	0.0000E+00	2.00	0.0	3.6350E+06	1.0000E+00	9.9050E+01	1	4	4516
403	45-rh-100	1	451001	2.7600E+02	7.7300E+04	6.3900E+04	0.0000E+00	2.00	0.0	3.7430E+06	1.7000E-02	9.9050E+01	2	4	4517
								3.00	0.0	1.0760E+05	9.8300E-01				
404	36-kr-101	0	361010	2.4260E-02	4.4400E+06	3.9300E+06	0.0000E+00	1.00	0.0	1.3330E+07	1.0000E+00	1.0097E+02	1	2	3694
405	37-rb-101	0	371010	3.2000E-02	4.0380E+06	3.1230E+06	0.0000E+00	1.00	0.0	1.1800E+07	7.2000E-01	1.0008E+02	2	2	3773
								1.50	0.0	8.4500E+06	2.8000E-01				
406	38-sr-101	0	381010	1.1800E-01	3.8000E+06	2.6620E+06	0.0000E+00	1.00	0.0	9.5100E+06	9.7630E-01	1.0007E+02	2	2	3876
								1.50	1.0	3.7340E+06	2.3700E-02				
407	39- y-101	0	391010	4.5000E-01	2.6910E+06	1.5230E+06	0.0000E+00	1.00	0.0	8.5500E+06	9.8060E-01	1.0006E+02	2	4	3961
								1.50	0.0	3.6800E+06	1.9400E-02				
408	40-zr-101	0	401010	2.3000E+00	2.2000E+06	1.0910E+06	0.0000E+00	1.00	0.0	5.7730E+06	1.0000E+00	1.0006E+02	1	4	4058
409	41-nb-101	0	411010	7.1000E+00	1.8580E+06	4.5000E+05	0.0000E+00	1.00	0.0	4.5690E+06	1.0000E+00	1.0005E+02	1	4	4149
410	42-mo-101	0	421010	8.7660E+02	5.4800E+05	1.4710E+06	0.0000E+00	1.00	0.0	2.8240E+06	1.0000E+00	1.0004E+02	1	4	4252
411	43-tc-101	0	431010	8.5200E+02	4.7900E+05	3.3700E+05	0.0000E+00	1.00	0.0	1.6140E+06	1.0000E+00	1.0004E+02	1	4	4337
412	44-ru-101	0	441010	stable								1.0091E+02	0	0	4440
413	45-rh-101	0	451010	1.0400E+08	4.0000E+05	1.3300E+06	0.0000E+00	2.00	0.0	5.4200E+05	1.0000E+00	1.0004E+02	1	4	4519
414	45-rh-101	1	451011	3.7500E+05	1.8800E+04	2.8700E+05	0.0000E+00	2.00	0.0	6.9900E+05	9.2800E-01	1.0004E+02	2	4	4520
								3.00	0.0	1.5741E+05	7.2000E-02				
415	36-kr-102	0	361020	1.5000E-02	4.2990E+06	2.6340E+06	0.0000E+00	1.00	0.0	1.1753E+07	1.0000E+00	1.0197E+02	1	2	3697
416	37-rb-102	0	371020	3.7000E-02	4.6180E+06	4.6170E+06	0.0000E+00	1.00	0.0	1.4600E+07	8.2000E-01	1.0196E+02	2	2	3776
								1.50	0.0	8.7000E+06	1.8000E-01				
417	38-sr-102	0	381020	6.9000E-02	3.0170E+06	1.5780E+06	0.0000E+00	1.00	1.0	8.8200E+06	9.4500E-01	1.0107E+02	2	2	3879
								1.50	0.0	3.6300E+06	5.5000E-02				

no	symbol	s	zzaaas	halflife	e-beta	e-gamma	e-alpha	rtyp	rfs	q	branching	awr	ndk	nsp	mat
418	39- y-102	0	391020	3.6000E-01	3.0960E+06	3.8230E+06	0.0000E+00	1.00	0.0	9.8500E+06	9.5100E-01	1.0193E+02	2	2	3964
								1.50	0.0	3.3600E+06	4.9000E-02				
419	39- y-102	1	391021	2.9800E-01	2.9770E+06	3.3910E+06	0.0000E+00	1.00	0.0	9.8500E+06	1.0000E+00	1.0193E+02	1	2	3965
420	40-zr-102	0	401020	2.9000E+00	1.2500E+06	7.3730E+05	0.0000E+00	1.00	1.0	4.7700E+06	1.0000E+00	1.0105E+02	1	4	4061
421	41-nb-102	0	411020	4.3000E+00	2.2800E+06	2.0900E+06	0.0000E+00	1.00	0.0	7.2100E+06	1.0000E+00	1.0104E+02	1	2	4152
422	41-nb-102	1	411021	1.3000E+00	2.8320E+06	1.4610E+06	0.0000E+00	1.00	0.0	7.2100E+06	1.0000E+00	1.0192E+02	1	2	4153
423	42-mo-102	0	421020	6.7800E+02	3.5000E+05	1.8500E+04	0.0000E+00	1.00	0.0	9.9700E+05	1.0000E+00	1.0104E+02	1	2	4255
424	43-tc-102	0	431020	5.2800E+00	1.9350E+06	1.1000E+05	0.0000E+00	1.00	0.0	4.5320E+06	1.0000E+00	1.0103E+02	1	2	4340
425	43-tc-102	1	431021	2.6100E+02	7.8000E+05	2.5200E+06	0.0000E+00	1.00	0.0	4.5320E+06	9.8000E-01	1.0103E+02	2	2	4341
								3.00	0.0	0.0000E+00	2.0000E-02				
426	44-ru-102	0	441020	stable								1.0190E+02	0	0	4443
427	45-rh-102	0	451020	1.7910E+07	1.6600E+05	4.9900E+05	0.0000E+00	1.00	0.0	1.1500E+06	2.2000E-01	1.0103E+02	2	5	4522
								2.00	0.0	2.3230E+06	7.8000E-01				
428	45-rh-102	1	451021	1.1810E+08	5.5600E+03	2.1600E+06	0.0000E+00	2.00	0.0	2.4640E+06	9.9767E-01	1.0103E+02	2	4	4523
								3.00	0.0	1.4073E+05	2.3300E-03				
429	46-pd-102	0	461020	stable								1.0191E+02	0	0	4625
430	37-rb-103	0	371030	2.3750E-02	4.3620E+06	3.5020E+06	0.0000E+00	1.00	0.0	1.2740E+07	5.1000E-01	1.0296E+02	2	2	3779
								1.50	0.0	1.0325E+07	4.9000E-01				
431	38-sr-103	0	381030	8.4520E-02	3.6940E+06	2.9490E+06	0.0000E+00	1.00	0.0	1.1400E+07	9.0000E-01	1.0295E+02	2	2	3882
								1.50	0.0	6.1000E+06	1.0000E-01				
432	39- y-103	0	391030	2.3000E-01	3.0340E+06	1.9810E+06	0.0000E+00	1.00	0.0	8.9000E+06	9.2000E-01	1.0294E+02	2	2	3967
								1.50	0.0	4.6000E+06	8.0000E-02				
433	40-zr-103	0	401030	1.3000E+00	2.4570E+06	1.4670E+06	0.0000E+00	1.00	0.0	7.6200E+06	1.0000E+00	1.0204E+02	1	2	4064
434	41-nb-103	0	411030	1.5000E+00	2.1110E+06	9.8200E+05	0.0000E+00	1.00	0.0	5.5300E+06	9.9990E-01	1.0292E+02	2	2	4155
								1.50	0.0	6.0000E+04	1.0000E-04				
435	42-mo-103	0	421030	6.7500E+01	1.1200E+06	1.1300E+06	0.0000E+00	1.00	0.0	3.6310E+06	1.0000E+00	1.0203E+02	1	4	4258
436	43-tc-103	0	431030	5.4200E+01	7.0399E+05	5.5265E+05	0.0000E+00	1.00	0.0	2.6610E+06	1.0000E+00	1.0203E+02	1	4	4343
437	44-ru-103	0	441030	3.3909E+06	6.6500E+04	4.9600E+05	0.0000E+00	1.00	0.0	7.6370E+05	1.1700E-02	1.0202E+02	2	4	4446
								1.00	1.0	7.2390E+05	9.8830E-01				
438	44-ru-103	1	441031	1.6900E-03	1.2600E+04	2.1000E+05	0.0000E+00	3.00	0.0	2.3820E+05	1.0000E+00	1.0202E+02	1	3	4447
439	45-rh-103	0	451030	stable								1.0291E+02	0	0	4525
440	45-rh-103	1	451031	3.3668E+03	3.4800E+04	1.6800E+03	0.0000E+00	3.00	0.0	3.9755E+04	1.0000E+00	1.0202E+02	1	3	4526
441	46-pd-103	0	461030	1.4680E+06	4.9690E+03	1.4554E+04	0.0000E+00	2.00	0.0	5.4300E+05	8.6000E-04	1.0202E+02	2	4	4628
								2.00	1.0	5.0320E+05	9.9914E-01				
442	37-rb-104	0	371040	1.8590E-02	4.8140E+06	5.3890E+06	0.0000E+00	1.00	0.0	1.5552E+07	6.2000E-01	1.0397E+02	2	2	3782
								1.50	0.0	1.0934E+07	3.8000E-01				
443	38-sr-104	0	381040	4.9800E-02	3.4300E+06	1.8520E+06	0.0000E+00	1.00	0.0	1.0500E+07	9.1700E-01	1.0395E+02	2	2	3885
								1.50	0.0	6.5000E+06	8.3000E-02				
444	39- y-104	0	391040	1.8000E-01	3.4940E+06	3.7500E+06	0.0000E+00	1.00	0.0	1.0800E+07	8.8000E-01	1.0394E+02	2	2	3970
								1.50	0.0	4.8000E+06	1.2000E-01				
445	40-zr-104	0	401040	1.2000E+00	1.7420E+06	8.9440E+05	0.0000E+00	1.00	0.0	6.5200E+06	9.9988E-01	1.0393E+02	2	2	4067
								1.50	0.0	1.6400E+06	1.2000E-04				
446	41-nb-104	0	411040	4.8000E+00	2.5100E+06	3.3760E+06	0.0000E+00	1.00	0.0	8.1100E+06	9.9940E-01	1.0392E+02	2	2	4158
								1.50	0.0	6.4000E+05	6.0000E-04				
447	41-nb-104	1	411041	9.4000E-01	3.1250E+06	2.1340E+06	0.0000E+00	1.00	0.0	8.3300E+06	9.9950E-01	1.0392E+02	2	2	4159
								1.50	0.0	8.6000E+05	5.0000E-04				
448	42-mo-104	0	421040	6.0000E+01	6.2290E+05	5.8470E+05	0.0000E+00	1.00	0.0	2.1500E+06	1.0000E+00	1.0302E+02	1	4	4261
449	43-tc-104	0	431040	1.0980E+03	8.5000E+05	3.2300E+06	0.0000E+00	1.00	0.0	5.5840E+06	1.0000E+00	1.0302E+02	1	4	4346
450	44-ru-104	0	441040	stable								1.0390E+02	0	0	4449
451	45-rh-104	0	451040	4.2300E+01	9.8500E+05	1.2000E+04	0.0000E+00	1.00	0.0	2.4410E+06	9.9550E-01	1.0301E+02	2	5	4528
								2.00	0.0	1.1390E+06	4.5000E-03				

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no	symbol	s	zzaaas	halflife	e-beta	e-gamma	e-alpha	rtyp	rfs	q	branching	awr	ndk	nsp	mat
452	45-rh-104	1	451041	2.6000E+02	8.3100E+04	4.4000E+04	0.0000E+00	1.00	0.0	2.5700E+06	1.3000E-03	1.0301E+02	2	4	4529
								3.00	0.0	1.2896E+05	9.9870E-01				
453	46-pd-104	0	461040	stable								1.0390E+02	0	0	4631
454	37-rb-105	0	371050	1.2530E-02	4.6720E+06	4.0870E+06	0.0000E+00	1.00	0.0	1.3966E+07	4.4000E-01	1.0497E+02	2	2	3785
								1.50	0.0	1.2155E+00	5.6000E-01				
455	38-sr-105	0	381050	3.7830E-02	4.0830E+06	3.3880E+06	0.0000E+00	1.00	0.0	1.2800E+07	9.0000E-01	1.0496E+02	2	2	3888
								1.50	0.0	8.3000E+06	1.0000E-01				
456	39- y-105	0	391050	8.8760E-02	3.3250E+06	2.3720E+06	0.0000E+00	1.00	0.0	1.0100E+07	8.0000E-01	1.0494E+02	2	2	3973
								1.50	0.0	6.3000E+06	2.0000E-01				
457	40-zr-105	0	401050	6.0000E-01	2.6620E+06	1.7640E+06	0.0000E+00	1.00	0.0	9.3900E+06	9.9870E-01	1.0493E+02	2	2	4070
								1.50	0.0	2.7100E+06	1.3000E-03				
458	41-nb-105	0	411050	2.9500E+00	2.4990E+06	1.4040E+06	0.0000E+00	1.00	0.0	6.4900E+06	9.8300E-01	1.0493E+02	2	2	4161
								1.50	0.0	1.4300E+06	1.7000E-02				
459	42-mo-105	0	421050	3.5600E+01	1.0300E+06	2.4000E+06	0.0000E+00	1.00	0.0	4.9500E+06	1.0000E+00	1.0402E+02	1	4	4264
460	43-tc-105	0	431050	4.5600E+02	7.1700E+05	1.8300E+06	0.0000E+00	1.00	0.0	3.6400E+06	1.0000E+00	1.0401E+02	1	2	4349
461	44-ru-105	0	441050	1.5980E+04	4.1300E+05	7.3800E+05	0.0000E+00	1.00	0.0	1.9190E+06	7.1700E-01	1.0401E+02	2	4	4452
								1.00	1.0	1.7890E+06	2.8300E-01				
462	45-rh-105	0	451050	1.2730E+05	1.5350E+05	7.7300E+04	0.0000E+00	1.00	0.0	5.6760E+05	1.0000E+00	1.0400E+02	1	4	4531
463	45-rh-105	1	451051	4.0000E+01	9.4000E+04	3.4590E+04	0.0000E+00	3.00	0.0	1.2957E+05	1.0000E+00	1.0400E+02	1	3	4532
464	46-pd-105	0	461050	stable								1.0490E+02	0	0	4634
465	47-ag-105	0	471050	3.5670E+06	1.7900E+04	5.3500E+05	0.0000E+00	2.00	0.0	1.3460E+06	1.0000E+00	1.0400E+02	1	4	4719
466	47-ag-105	1	471051	4.3400E+02	2.4147E+04	1.2100E+03	0.0000E+00	2.00	0.0	1.3710E+06	3.4000E-03	1.0400E+02	2	4	4720
								3.00	0.0	2.5481E+04	9.9660E-01				
467	38-sr-106	0	381060	2.4480E-02	3.8190E+06	2.3280E+06	0.0000E+00	1.00	0.0	1.0493E+07	1.0000E+00	1.0596E+02	1	2	3891
468	39- y-106	0	391060	5.7780E-02	3.8130E+06	4.1870E+06	0.0000E+00	1.00	0.0	1.2900E+07	7.6000E-01	1.0595E+02	2	2	3976
								1.50	0.0	6.6000E+06	2.4000E-01				
469	40-zr-106	0	401060	2.6250E-01	2.1380E+06	1.0910E+06	0.0000E+00	1.00	0.0	7.4000E+06	9.8500E-01	1.0594E+02	2	2	4073
								1.50	0.0	3.1000E+06	1.5000E-02				
470	41-nb-106	0	411060	9.3000E-01	3.3130E+06	2.5490E+06	0.0000E+00	1.00	0.0	9.0500E+06	9.5500E-01	1.0593E+02	2	2	4164
								1.50	0.0	2.1800E+06	4.5000E-02				
471	42-mo-106	0	421060	8.7300E+00	1.2320E+06	7.4590E+05	0.0000E+00	1.00	0.0	3.6370E+06	1.0000E+00	1.0592E+02	1	2	4267
472	43-tc-106	0	431060	3.5600E+01	1.4620E+06	3.1300E+06	0.0000E+00	1.00	0.0	6.5470E+06	1.0000E+00	1.0500E+02	1	4	4352
473	44-ru-106	0	441060	3.2120E+07	1.0030E+04	0.0000E+00	0.0000E+00	1.00	0.0	3.9400E+04	1.0000E+00	1.0500E+02	1	1	4455
474	45-rh-106	0	451060	3.0100E+01	1.4100E+06	2.0600E+05	0.0000E+00	1.00	0.0	3.5410E+06	1.0000E+00	1.0500E+02	1	4	4534
475	45-rh-106	1	451061	7.8600E+03	3.6000E+05	2.8500E+06	0.0000E+00	1.00	0.0	3.6780E+06	1.0000E+00	1.0500E+02	1	4	4535
476	46-pd-106	0	461060	stable								1.0590E+02	0	0	4637
477	47-ag-106	0	471060	1.4376E+03	5.0000E+05	7.0600E+05	0.0000E+00	2.00	0.0	2.9650E+06	1.0000E+00	1.0500E+02	1	4	4722
478	47-ag-106	1	471061	7.1540E+05	9.5700E+03	2.8100E+06	0.0000E+00	2.00	0.0	3.0550E+06	1.0000E+00	1.0500E+02	1	4	4723
479	38-sr-107	0	381070	1.9420E-02	4.5040E+06	4.0360E+06	0.0000E+00	1.00	0.0	1.3586E+07	1.0000E+00	1.0697E+02	1	2	3894
480	39- y-107	0	391070	3.5950E-02	3.6670E+06	2.8010E+06	0.0000E+00	1.00	0.0	1.2500E+07	6.8000E-01	1.0695E+02	2	2	3979
								1.50	0.0	8.9000E+06	3.2000E-01				
481	40-zr-107	0	401070	1.6360E-01	2.9820E+06	2.2010E+06	0.0000E+00	1.00	0.0	9.7000E+06	9.8300E-01	1.0694E+02	2	2	4076
								1.50	0.0	3.8000E+06	1.7000E-02				
482	41-nb-107	0	411070	3.0000E-01	2.8150E+06	1.8160E+06	0.0000E+00	1.00	0.0	7.6000E+06	9.4000E-01	1.0693E+02	2	2	4167
								1.50	0.0	3.2000E+06	6.0000E-02				
483	42-mo-107	0	421070	3.5000E+00	2.3170E+06	1.3930E+06	0.0000E+00	1.00	0.0	6.5400E+06	1.0000E+00	1.0692E+02	1	2	4270
484	43-tc-107	0	431070	2.1200E+01	1.2840E+06	1.8200E+06	0.0000E+00	1.00	0.0	4.8200E+06	1.0000E+00	1.0600E+02	1	4	4355
485	44-ru-107	0	441070	2.2500E+02	1.0600E+06	3.4500E+05	0.0000E+00	1.00	0.0	2.9400E+06	1.0000E+00	1.0599E+02	1	4	4458
486	45-rh-107	0	451070	1.3020E+03	4.3000E+05	3.1300E+05	0.0000E+00	1.00	0.0	1.5090E+06	1.0000E+00	1.0599E+02	1	4	4537
487	46-pd-107	0	461070	2.0500E+14	9.3000E+03	0.0000E+00	0.0000E+00	1.00	0.0	3.4000E+04	1.0000E+00	1.0599E+02	1	1	4640

no	symbol	s	zzaaas	halflife	e-beta	e-gamma	e-alpha	rtyp	rfs	q	branching	awr	ndk	nsp	mat
488	46-pd-107	1	461071	2.1300E+01	6.2700E+04	1.5190E+05	0.0000E+00	3.00	0.0	2.1490E+05	1.0000E+00	1.0599E+02	1	3	4641
489	47-ag-107	0	471070	stable								1.0690E+02	0	0	4725
490	47-ag-107	1	471071	4.4300E+01	7.9000E+04	1.2700E+04	0.0000E+00	3.00	0.0	9.3120E+04	1.0000E+00	1.0599E+02	1	3	4726
491	39- y-108	0	391080	2.7150E-02	4.2100E+06	4.7140E+06	0.0000E+00	1.00	0.0	1.4500E+07	7.4000E-01	1.0796E+02	2	2	3982
								1.50	0.0	9.4000E+06	2.6000E-01				
492	40-zr-108	0	401080	7.9820E-02	2.5670E+06	1.3390E+06	0.0000E+00	1.00	0.0	8.5000E+06	9.4200E-01	1.0794E+02	2	2	4079
								1.50	0.0	4.6000E+06	5.8000E-02				
493	41-nb-108	0	411080	1.9300E-01	3.5870E+06	3.1080E+06	0.0000E+00	1.00	0.0	1.0100E+07	9.3800E-01	1.0794E+02	2	2	4170
								1.50	0.0	3.8000E+06	6.2000E-02				
494	42-mo-108	0	421080	1.0900E+00	1.5938E+06	1.1523E+06	0.0000E+00	1.00	0.0	5.1200E+06	1.0000E+00	1.0700E+02	1	4	4273
495	43-tc-108	0	431080	5.1700E+00	2.2600E+06	2.9930E+06	0.0000E+00	1.00	0.0	7.7300E+06	1.0000E+00	1.0699E+02	1	2	4358
496	44-ru-108	0	441080	2.7300E+02	3.6000E+05	6.1000E+04	0.0000E+00	1.00	0.0	1.3600E+06	1.0000E+00	1.0698E+02	1	2	4461
497	45-rh-108	0	451080	1.6800E+01	1.9000E+06	3.2000E+05	0.0000E+00	1.00	0.0	4.5500E+06	1.0000E+00	1.0698E+02	1	2	4540
498	45-rh-108	1	451081	3.6000E+02	6.3000E+05	2.7200E+06	0.0000E+00	1.00	0.0	4.5500E+06	1.0000E+00	1.0698E+02	1	2	4541
499	46-pd-108	0	461080	stable								1.0790E+02	0	0	4643
500	47-ag-108	0	471080	1.4290E+02	6.0800E+05	1.8500E+04	0.0000E+00	1.00	0.0	1.6470E+06	9.7150E-01	1.0698E+02	2	5	4728
								2.00	0.0	1.9170E+06	2.8500E-02				
501	47-ag-108	1	471081	1.3800E+10	4.7830E+03	1.6210E+06	0.0000E+00	2.00	0.0	2.0270E+06	9.1300E-01	1.0698E+02	2	4	4729
								3.00	0.0	1.0951E+05	8.7000E-02				
502	48-cd-108	0	481080	stable								1.0790E+02	0	0	4831
503	39- y-109	0	391090	1.8900E-02	3.7810E+06	3.2550E+06	0.0000E+00	1.00	0.0	1.1347E+07	1.0000E+00	1.0896E+02	1	2	3985
504	40-zr-109	0	401090	5.5980E-02	3.3870E+06	2.7030E+06	0.0000E+00	1.00	0.0	1.0800E+07	9.6000E-01	1.0895E+02	2	2	4082
								1.50	0.0	5.3000E+06	4.0000E-02				
505	41-nb-109	0	411090	1.9000E-01	3.1580E+06	2.2630E+06	0.0000E+00	1.00	0.0	8.6000E+06	6.9000E-01	1.0894E+02	2	2	4173
								1.50	0.0	4.6000E+06	3.1000E-01				
506	42-mo-109	0	421090	5.3000E-01	2.6750E+06	1.8760E+06	0.0000E+00	1.00	0.0	7.8600E+06	9.9998E-01	1.0893E+02	2	2	4276
								1.50	0.0	1.1400E+06	2.0000E-05				
507	43-tc-109	0	431090	8.6000E-01	2.1440E+06	1.0990E+06	0.0000E+00	1.00	0.0	6.3200E+06	9.9920E-01	1.0892E+02	2	2	4361
								1.50	0.0	1.0100E+06	8.0000E-04				
508	44-ru-109	0	441090	3.4500E+01	1.0400E+06	1.6600E+06	0.0000E+00	1.00	0.0	4.1600E+06	1.0000E+00	1.0798E+02	1	4	4464
509	45-rh-109	0	451090	8.0000E+01	9.5000E+05	2.9900E+05	0.0000E+00	1.00	0.0	2.5920E+06	1.0000E+00	1.0797E+02	1	4	4543
510	46-pd-109	0	461090	4.9324E+04	3.6080E+05	6.4500E+02	0.0000E+00	1.00	0.0	1.1161E+06	5.0000E-04	1.0797E+02	2	4	4646
								1.00	1.0	1.0281E+06	9.9950E-01				
511	46-pd-109	1	461091	2.8140E+02	7.7000E+04	1.1135E+05	0.0000E+00	3.00	0.0	1.8890E+05	1.0000E+00	1.0797E+02	1	3	4647
512	47-ag-109	0	471090	stable								1.0890E+02	0	0	4731
513	47-ag-109	1	471091	3.9600E+01	7.4273E+04	1.1240E+04	0.0000E+00	3.00	0.0	8.8035E+04	1.0000E+00	1.0797E+02	1	3	4732
514	48-cd-109	0	481090	3.9860E+07	4.8260E+03	1.5424E+04	0.0000E+00	2.00	1.0	2.1640E+05	1.0000E+00	1.0797E+02	1	3	4834
515	40-zr-110	0	401100	3.5830E-02	2.8440E+06	1.5090E+06	0.0000E+00	1.00	0.0	9.7000E+06	9.2900E-01	1.0995E+02	2	2	4085
								1.50	0.0	6.1000E+06	7.1000E-02				
516	41-nb-110	0	411100	1.7000E-01	3.9270E+06	3.7450E+06	0.0000E+00	1.00	0.0	1.0900E+07	6.0000E-01	1.0994E+02	2	2	4176
								1.50	0.0	5.0000E+06	4.0000E-01				
517	42-mo-110	0	421100	3.0000E-01	2.1990E+06	1.1520E+06	0.0000E+00	1.00	0.0	6.4100E+06	9.9926E-01	1.0993E+02	2	2	4279
								1.50	0.0	1.9200E+06	7.4000E-04				
518	43-tc-110	0	431100	9.2000E-01	3.0320E+06	2.1700E+06	0.0000E+00	1.00	0.0	9.0200E+06	9.9960E-01	1.0898E+02	2	2	4364
								1.50	0.0	1.8200E+06	4.0000E-04				
519	44-ru-110	0	441100	1.1600E+01	6.5850E+05	5.9690E+05	0.0000E+00	1.00	1.0	2.7900E+06	1.0000E+00	1.0897E+02	1	4	4467
520	45-rh-110	0	451100	2.8500E+01	1.1500E+06	2.3800E+06	0.0000E+00	1.00	0.0	5.5700E+06	1.0000E+00	1.0897E+02	1	4	4546
521	45-rh-110	1	451101	3.2000E+00	2.1000E+06	3.3000E+05	0.0000E+00	1.00	0.0	5.5700E+06	1.0000E+00	1.0897E+02	1	4	4547
522	46-pd-110	0	461100	stable								1.0990E+02	0	0	4649
523	47-ag-110	0	471100	2.4600E+01	1.1780E+06	3.0700E+04	0.0000E+00	1.00	0.0	2.8932E+06	9.9700E-01	1.0896E+02	2	5	4734
								2.00	0.0	8.9300E+05	3.0000E-03				

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no	symbol	s	zzaaas	halflife	e-beta	e-gamma	e-alpha	rtyp	rfs	q	branching	awr	ndk	nsp	mat
524	47-ag-110	1	471101	2.1579E+07	6.8000E+04	2.7610E+06	0.0000E+00	1.00	0.0	3.0108E+06	9.8640E-01	1.0896E+02	2	4	4735
								3.00	0.0	1.1759E+05	1.3600E-02				
525	48-cd-110	0	481100	stable								1.0990E+02	0	0	4837
526	49-in-110	0	491100	1.7600E+04	1.0500E+04	3.1000E+06	0.0000E+00	2.00	0.0	3.8780E+06	1.0000E+00	1.0896E+02	1	4	4916
527	49-in-110	1	491101	4.1500E+03	6.5000E+05	1.5900E+06	0.0000E+00	2.00	0.0	3.9400E+06	1.0000E+00	1.0896E+02	1	4	4917
528	40-zr-111	0	401110	2.8640E-02	3.5750E+06	3.2090E+06	0.0000E+00	1.00	0.0	1.0893E+07	1.0000E+00	1.1096E+02	1	2	4088
529	41-nb-111	0	411110	5.4640E-02	3.3990E+06	2.5680E+06	0.0000E+00	1.00	0.0	1.0500E+07	7.8000E-01	1.1095E+02	2	2	4179
								1.50	0.0	5.9000E+06	2.2000E-01				
530	42-mo-111	0	421110	4.4930E-01	3.0980E+06	2.4130E+06	0.0000E+00	1.00	0.0	8.1000E+06	9.9690E-01	1.1093E+02	2	2	4282
								1.50	0.0	1.8000E+06	3.1000E-03				
531	43-tc-111	0	431110	2.9000E-01	2.4860E+06	1.5010E+06	0.0000E+00	1.00	0.0	7.4500E+06	9.9150E-01	1.1093E+02	2	2	4367
								1.50	0.0	2.6900E+06	8.5000E-03				
532	44-ru-111	0	441110	2.1200E+00	1.8670E+06	9.6240E+05	0.0000E+00	1.00	0.0	5.6900E+06	1.0000E+00	1.0996E+02	1	2	4470
533	45-rh-111	0	451110	1.1000E+01	1.0774E+06	8.9819E+05	0.0000E+00	1.00	0.0	3.6500E+06	1.0000E+00	1.1091E+02	1	2	4549
534	46-pd-111	0	461110	1.4040E+03	8.3200E+05	4.6800E+04	0.0000E+00	1.00	0.0	2.2130E+06	8.1000E-03	1.0996E+02	2	4	4652
								1.00	1.0	2.1530E+06	9.9190E-01				
535	46-pd-111	1	461111	1.9800E+04	1.9000E+05	1.5000E+05	0.0000E+00	1.00	0.0	2.3850E+06	1.2000E-01	1.0996E+02	3	4	4653
								1.00	1.0	2.3250E+06	1.5000E-01				
								3.00	0.0	1.7220E+05	7.3000E-01				
536	47-ag-111	0	471110	6.4370E+05	3.5100E+05	2.6500E+04	0.0000E+00	1.00	0.0	1.0368E+06	1.0000E+00	1.0995E+02	1	4	4737
537	47-ag-111	1	471111	6.4800E+01	2.0000E+05	7.1000E+03	0.0000E+00	1.00	0.0	1.0966E+06	7.0000E-03	1.0995E+02	2	4	4738
								3.00	0.0	5.9820E+04	9.9300E-01				
538	48-cd-111	0	481110	stable								1.1090E+02	0	0	4840
539	48-cd-111	1	481111	2.9120E+03	1.0500E+05	2.8400E+05	0.0000E+00	3.00	0.0	3.9621E+05	1.0000E+00	1.0995E+02	1	3	4841
540	49-in-111	0	491110	2.4233E+05	3.2000E+04	4.0600E+05	0.0000E+00	2.00	0.0	8.6100E+05	9.9995E-01	1.0995E+02	2	4	4919
								2.00	1.0	4.6500E+05	5.0000E-05				
541	49-in-111	1	491111	4.6200E+02	6.4600E+04	4.7050E+05	0.0000E+00	3.00	0.0	5.3699E+05	1.0000E+00	1.0995E+02	1	3	4920
542	40-zr-112	0	401120	2.1430E-02	3.0300E+06	1.9430E+06	0.0000E+00	1.00	0.0	8.5240E+06	1.0000E+00	1.1196E+02	1	2	4091
543	41-nb-112	0	411120	4.0340E-02	4.1780E+06	4.1860E+06	0.0000E+00	1.00	0.0	1.3000E+07	7.9000E-01	1.1195E+02	2	2	4182
								1.50	0.0	7.2000E+06	2.1000E-01				
544	42-mo-112	0	421120	1.8640E-01	2.5520E+06	1.3540E+06	0.0000E+00	1.00	0.0	7.2000E+06	9.8800E-01	1.1194E+02	2	2	4285
								1.50	0.0	2.3000E+06	1.2000E-02				
545	43-tc-112	0	431120	2.8000E-01	3.3400E+06	2.7900E+06	0.0000E+00	1.00	0.0	9.4800E+06	9.8500E-01	1.1193E+02	2	2	4370
								1.50	0.0	2.5900E+06	1.5000E-02				
546	44-ru-112	0	441120	1.7500E+00	1.1140E+06	7.2500E+05	0.0000E+00	1.00	0.0	4.2700E+06	1.0000E+00	1.1192E+02	1	2	4473
547	45-rh-112	0	451120	2.1000E+00	2.4770E+06	1.1560E+06	0.0000E+00	1.00	0.0	6.5900E+06	1.0000E+00	1.1095E+02	1	2	4552
548	45-rh-112	1	451121	6.8000E+00	1.9100E+06	2.2600E+06	0.0000E+00	1.00	0.0	6.5930E+06	1.0000E+00	1.1095E+02	1	2	4553
549	46-pd-112	0	461120	7.5710E+04	8.9000E+04	5.1300E+03	0.0000E+00	1.00	0.0	2.3400E+05	1.0000E+00	1.1095E+02	1	4	4655
550	47-ag-112	0	471120	1.1270E+04	1.4200E+06	6.9000E+05	0.0000E+00	1.00	0.0	3.9960E+06	1.0000E+00	1.1095E+02	1	3	4740
551	48-cd-112	0	481120	stable								1.1190E+02	0	0	4843
552	49-in-112	0	491120	8.9800E+02	2.4200E+05	2.6500E+05	0.0000E+00	1.00	0.0	6.6600E+05	4.4000E-01	1.1094E+02	2	5	4922
								2.00	0.0	2.5830E+06	5.6000E-01				
553	49-in-112	1	491121	1.2340E+03	1.2500E+05	3.5300E+04	0.0000E+00	3.00	0.0	1.5640E+05	1.0000E+00	1.1094E+02	1	3	4923
554	41-nb-113	0	411130	3.0250E-02	3.2941E+06	3.6375E+06	0.0000E+00	1.00	0.0	1.1900E+07	4.4000E-01	1.1296E+02	2	2	4185
								1.50	0.0	8.6000E+06	5.6000E-01				
555	42-mo-113	0	421130	9.6940E-02	3.4300E+06	2.8020E+06	0.0000E+00	1.00	0.0	9.6000E+06	9.8200E-01	1.1294E+02	2	2	4288
								1.50	0.0	3.8000E+06	1.8000E-02				
556	43-tc-113	0	431130	1.7000E-01	2.7320E+06	1.8220E+06	0.0000E+00	1.00	0.0	8.5000E+06	9.7900E-01	1.1293E+02	2	2	4373
								1.50	0.0	3.7000E+06	2.1000E-02				
557	44-ru-113	0	441130	8.0000E-01	2.5420E+06	1.3930E+06	0.0000E+00	1.00	0.0	6.4800E+06	1.0000E+00	1.1195E+02	1	3	4476

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no	symbol	s	zzaaas	halflife	e-beta	e-gamma	e-alpha	rtyp	rfs	q	branching	awr	ndk	nsp	mat
558	44-ru-113	1	441131	5.1000E-01	2.3920E+06	1.3490E+06	0.0000E+00	1.00	0.0	6.6100E+06	9.2000E-01	1.1195E+02	2	4	4477
								3.00	0.0	1.3000E+05	8.0000E-02				
559	45-rh-113	0	451130	2.8000E+00	1.6100E+06	2.8900E+05	0.0000E+00	1.00	0.0	5.0100E+06	8.2100E-01	1.1194E+02	2	4	4555
								1.00	1.0	4.9300E+06	1.7900E-01				
560	46-pd-113	0	461130	9.3000E+01	1.3700E+06	1.2100E+05	0.0000E+00	1.00	0.0	3.3400E+06	3.3000E-02	1.1194E+02	2	4	4658
								1.00	1.0	3.3000E+06	9.6700E-01				
561	46-pd-113	1	461131	3.0000E-01	3.2000E+04	1.2300E+04	0.0000E+00	3.00	0.0	8.1300E+04	1.0000E+00	1.1194E+02	1	3	4659
562	47-ag-113	0	471130	1.9330E+04	7.6400E+05	7.1900E+04	0.0000E+00	1.00	0.0	2.0160E+06	9.8400E-01	1.1194E+02	2	4	4743
								1.00	1.0	1.7520E+06	1.6000E-02				
563	47-ag-113	1	471131	6.8700E+01	1.9660E+05	2.1200E+05	0.0000E+00	1.00	0.0	2.0600E+06	3.6000E-01	1.1194E+02	2	4	4744
								3.00	0.0	4.3600E+04	6.4000E-01				
564	48-cd-113	0	481130	2.5370E+23	9.2600E+04	0.0000E+00	0.0000E+00	1.00	0.0	3.2220E+05	1.0000E+00	1.1193E+02	1	1	4846
565	48-cd-113	1	481131	4.4500E+08	1.8540E+05	8.2200E+01	0.0000E+00	1.00	0.0	5.8590E+05	9.9860E-01	1.1193E+02	2	3	4847
								3.00	0.0	2.6370E+05	1.4000E-03				
566	49-in-113	0	491130	stable								1.1290E+02	0	0	4925
567	49-in-113	1	491131	5.9684E+03	1.3400E+05	2.6050E+05	0.0000E+00	3.00	0.0	3.9170E+05	1.0000E+00	1.1193E+02	1	3	4926
568	50-sn-113	0	501130	9.9440E+06	5.2200E+03	2.3590E+04	0.0000E+00	2.00	0.0	1.0370E+06	4.0000E-08	1.1193E+02	2	4	5028
								2.00	1.0	6.4500E+05	1.0000E+00				
569	50-sn-113	1	501131	1.2840E+03	5.7300E+04	1.3700E+04	0.0000E+00	2.00	0.0	1.1140E+06	8.9000E-02	1.1193E+02	2	4	5029
								3.00	0.0	7.7389E+04	9.1100E-01				
570	41-nb-114	0	411140	2.4910E-02	4.1200E+06	4.6780E+06	0.0000E+00	1.00	0.0	1.3471E+07	1.0000E+00	1.1396E+02	1	2	4188
571	42-mo-114	0	421140	5.7180E-02	2.9250E+06	1.5780E+06	0.0000E+00	1.00	0.0	8.4000E+06	9.5700E-01	1.1394E+02	2	2	4291
								1.50	0.0	4.3000E+06	4.3000E-02				
572	43-tc-114	0	431140	1.5000E-01	3.5780E+06	3.2570E+06	0.0000E+00	1.00	0.0	1.0800E+07	9.8700E-01	1.1394E+02	2	2	4376
								1.50	0.0	4.4000E+06	1.3000E-02				
573	44-ru-114	0	441140	5.3000E-01	1.4730E+06	8.4370E+05	0.0000E+00	1.00	0.0	5.1000E+06	1.0000E+00	1.1295E+02	1	4	4479
574	45-rh-114	0	451140	1.8500E+00	2.7420E+06	1.7530E+06	0.0000E+00	1.00	0.0	7.8500E+06	1.0000E+00	1.1294E+02	1	4	4558
575	45-rh-114	1	451141	1.8500E+00	1.2300E+06	2.1800E+06	0.0000E+00	1.00	0.0	7.8500E+06	1.0000E+00	1.1294E+02	1	4	4559
576	46-pd-114	0	461140	1.4500E+02	5.3300E+05	2.5900E+04	0.0000E+00	1.00	0.0	1.4470E+06	1.0000E+00	1.1293E+02	1	4	4661
577	47-ag-114	0	471140	4.6000E+00	2.1500E+06	2.5900E+05	0.0000E+00	1.00	0.0	5.0900E+06	1.0000E+00	1.1293E+02	1	2	4746
578	47-ag-114	1	471141	1.5000E-03	1.0100E+05	9.3000E+04	0.0000E+00	3.00	0.0	1.9900E+05	1.0000E+00	1.1293E+02	1	3	4747
579	48-cd-114	0	481140	stable								1.1390E+02	0	0	4849
580	49-in-114	0	491140	7.1900E+01	7.7410E+05	2.1400E+03	0.0000E+00	1.00	0.0	1.9888E+06	9.9500E-01	1.1293E+02	2	5	4928
								2.00	0.0	1.4469E+06	5.0000E-03				
581	49-in-114	1	491141	4.2777E+06	1.4300E+05	8.0000E+04	0.0000E+00	2.00	0.0	1.6372E+06	3.2500E-02	1.1293E+02	2	4	4929
								3.00	0.0	1.9027E+05	9.6750E-01				
582	49-in-114	2	491142	4.3100E-02	4.8240E+02	2.8170E+05	0.0000E+00	3.00	1.0	3.1164E+05	1.0000E+00	1.1293E+02	1	3	4930
583	50-sn-114	0	501140	stable								1.1390E+02	0	0	5031
584	41-nb-115	0	411150	1.9250E-02	3.7360E+06	3.2730E+06	0.0000E+00	1.00	0.0	1.1291E+07	1.0000E+00	1.1496E+02	1	2	4191
585	42-mo-115	0	421150	4.6990E-02	3.5980E+06	2.9980E+06	0.0000E+00	1.00	0.0	1.0800E+07	9.4700E-01	1.1495E+02	2	2	4294
								1.50	0.0	5.4000E+06	5.3000E-02				
586	43-tc-115	0	431150	1.3590E-01	2.9950E+06	2.1620E+06	0.0000E+00	1.00	0.0	9.3000E+06	8.7000E-01	1.1494E+02	2	2	4379
								1.50	0.0	5.4000E+06	1.3000E-01				
587	44-ru-115	0	441150	7.4000E-01	2.5380E+06	1.8060E+06	0.0000E+00	1.00	0.0	7.7800E+06	9.9997E-01	1.1493E+02	2	2	4482
								1.50	0.0	1.1300E+06	3.0000E-05				
588	45-rh-115	0	451150	9.9000E-01	2.0210E+06	1.0540E+06	0.0000E+00	1.00	0.0	6.1800E+06	8.3930E-01	1.1393E+02	3	4	4561
								1.00	1.0	6.1800E+06	1.5987E-01				
								1.50	0.0	1.2000E+06	8.3000E-04				
589	46-pd-115	0	461150	2.5000E+01	1.3453E+06	1.2512E+06	0.0000E+00	1.00	0.0	4.5800E+06	7.3000E-01	1.1491E+02	2	2	4664
								1.00	1.0	4.5400E+06	2.7000E-01				

no	symbol	s	zzaaas	halflife	e-beta	e-gamma	e-alpha	rtyp	rfs	q	branching	awr	ndk	nsp	mat
590	46-pd-115	1	461151	5.0000E+01	1.3453E+06	1.2512E+06	0.0000E+00	1.00	0.0	4.6700E+06	9.0000E-02	1.1491E+02	3	2	4665
								1.00	1.0	4.6300E+06	8.3000E-01				
								3.00	0.0	8.9300E+04	8.0000E-02				
591	47-ag-115	0	471150	1.2000E+03	1.0800E+06	4.8000E+05	0.0000E+00	1.00	1.0	3.1100E+06	9.4500E-01	1.1392E+02	2	4	4749
								1.00	1.0	2.9290E+06	5.5000E-02				
592	47-ag-115	1	471151	1.8000E+01	1.0000E+06	4.9800E+05	0.0000E+00	1.00	0.0	3.1510E+06	7.5500E-01	1.1392E+02	3	4	4750
								1.00	1.0	2.9700E+06	3.5000E-02				
								3.00	0.0	4.1100E+04	2.1000E-01				
593	48-cd-115	0	481150	1.9246E+05	3.1900E+05	1.9300E+05	0.0000E+00	1.00	1.0	1.1120E+06	1.0000E+00	1.1392E+02	1	4	4852
594	48-cd-115	1	481151	3.8500E+06	6.0440E+05	3.3000E+04	0.0000E+00	1.00	0.0	1.6290E+06	9.9989E-01	1.1392E+02	2	4	4853
								1.00	1.0	1.2930E+06	1.1000E-04				
595	49-in-115	0	491150	1.3900E+22	1.5200E+05	0.0000E+00	0.0000E+00	1.00	0.0	5.0000E+05	1.0000E+00	1.1392E+02	1	1	4931
596	49-in-115	1	491151	1.6150E+04	1.7300E+05	1.6300E+05	0.0000E+00	1.00	0.0	8.3600E+05	5.0000E-02	1.1392E+02	2	4	4932
								3.00	0.0	3.3624E+05	9.5000E-01				
597	50-sn-115	0	501150	stable								1.1490E+02	0	0	5034
598	42-mo-116	0	421160	3.4540E-02	3.1780E+06	1.7370E+06	0.0000E+00	1.00	0.0	8.6170E+06	1.0000E+00	1.1595E+02	1	2	4297
599	43-tc-116	0	431160	7.2660E-02	3.6930E+06	3.4950E+06	0.0000E+00	1.00	0.0	1.1700E+07	8.8000E-01	1.1594E+02	2	2	4382
								1.50	0.0	5.6000E+06	1.2000E-01				
600	44-ru-116	0	441160	6.9390E-01	1.8430E+06	9.8600E+05	0.0000E+00	1.00	0.0	6.3000E+06	9.9947E-01	1.1593E+02	2	2	4485
								1.50	0.0	1.7000E+06	5.3000E-04				
601	45-rh-116	0	451160	6.8000E-01	2.9670E+06	2.2200E+06	0.0000E+00	1.00	0.0	9.1900E+06	9.9943E-01	1.1493E+02	2	4	4564
								1.50	0.0	1.5800E+06	5.7000E-04				
602	45-rh-116	1	451161	5.7000E-01	3.1800E+06	2.1700E+06	0.0000E+00	1.00	0.0	9.3400E+06	1.0000E+00	1.1493E+02	1	2	4565
603	46-pd-116	0	461160	1.1800E+01	6.6230E+05	6.0400E+05	0.0000E+00	1.00	0.0	2.6100E+06	1.0000E+00	1.1492E+02	1	4	4667
604	47-ag-116	0	471160	2.3000E+02	1.9500E+06	1.7500E+06	0.0000E+00	1.00	0.0	6.1760E+06	1.0000E+00	1.1492E+02	1	2	4752
605	47-ag-116	1	471161	2.0000E+01	1.3900E+06	3.0700E+06	0.0000E+00	1.00	0.0	6.2240E+06	9.3000E-01	1.1492E+02	2	4	4753
								3.00	0.0	4.7900E+04	7.0000E-02				
606	47-ag-116	2	471162	9.3000E+00	1.5200E+06	2.8500E+06	0.0000E+00	1.00	0.0	6.3050E+06	9.2000E-01	1.1492E+02	2	4	4754
								3.00	0.0	1.2880E+05	8.0000E-02				
607	48-cd-116	0	481160	stable								1.1590E+02	0	0	4855
608	49-in-116	0	491160	1.4100E+01	1.3630E+06	1.9589E+04	0.0000E+00	1.00	0.0	3.2790E+06	9.9977E-01	1.1491E+02	2	3	4934
								2.00	0.0	4.6800E+05	2.3000E-04				
609	49-in-116	1	491161	3.2570E+03	3.1400E+05	2.4900E+06	0.0000E+00	1.00	0.0	3.4060E+06	1.0000E+00	1.1491E+02	1	4	4935
610	49-in-116	2	491162	2.1800E+00	9.3145E+04	6.9000E+04	0.0000E+00	3.00	0.0	2.8966E+05	1.0000E+00	1.1491E+02	1	3	4936
611	50-sn-116	0	501160	stable								1.1590E+02	0	0	5037
612	51-sb-116	0	511160	9.5000E+02	5.2000E+05	2.2900E+06	0.0000E+00	2.00	0.0	4.7070E+06	1.0000E+00	1.1491E+02	1	4	5110
613	51-sb-116	1	511161	3.6200E+03	3.1200E+05	3.5400E+06	0.0000E+00	2.00	0.0	5.0900E+06	1.0000E+00	1.1491E+02	1	4	5111
614	42-mo-117	0	421170	3.0030E-02	3.7800E+06	3.4420E+06	0.0000E+00	1.00	0.0	1.1558E+07	1.0000E+00	1.1696E+02	1	2	4300
615	43-tc-117	0	431170	4.8470E-02	3.1730E+06	2.3900E+06	0.0000E+00	1.00	0.0	1.0200E+07	7.7000E-01	1.1695E+02	2	2	4385
								1.50	0.0	6.5000E+06	2.3000E-01				
616	44-ru-117	0	441170	3.2590E-01	2.6970E+06	2.0260E+06	0.0000E+00	1.00	0.0	8.9000E+06	9.9710E-01	1.1693E+02	2	2	4488
								1.50	0.0	2.7000E+06	2.9000E-03				
617	45-rh-117	0	451170	4.4000E-01	2.2890E+06	1.3590E+06	0.0000E+00	1.00	0.0	7.5000E+06	9.8400E-01	1.1693E+02	2	2	4567
								1.50	0.0	2.9000E+06	1.6000E-02				
618	46-pd-117	0	461170	4.3000E+00	1.9150E+06	1.0870E+06	0.0000E+00	1.00	0.0	5.7400E+06	1.0000E+00	1.1692E+02	1	2	4670
619	46-pd-117	1	461171	1.9100E-02	7.8000E+04	1.3000E+05	0.0000E+00	3.00	0.0	2.0320E+05	1.0000E+00	1.1591E+02	1	3	4671
620	47-ag-117	0	471170	7.2800E+01	1.1000E+06	1.3000E+06	0.0000E+00	1.00	0.0	4.2380E+06	8.6200E-01	1.1591E+02	2	4	4755
								1.00	1.0	4.1020E+06	1.3800E-01				
621	47-ag-117	1	471171	5.3400E+00	1.3200E+06	8.3200E+05	0.0000E+00	1.00	0.0	4.2670E+06	6.5100E-01	1.1591E+02	3	4	4756
								1.00	1.0	4.1310E+06	2.8900E-01				
								3.00	0.0	2.8600E+04	6.0000E-02				

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no	symbol	s	zzaaas	halflife	e-beta	e-gamma	e-alpha	rtyp	rfs	q	branching	awr	ndk	nsp	mat
622	48-cd-117	0	481170	8.9600E+03	4.3000E+05	1.0800E+06	0.0000E+00	1.00	0.0	2.5220E+06	8.5000E-02	1.1590E+02	2	4	4858
								1.00	1.0	2.2070E+06	9.1500E-01				
623	48-cd-117	1	481171	1.2100E+04	2.0700E+05	2.0390E+06	0.0000E+00	1.00	0.0	2.6580E+06	9.9010E-01	1.1590E+02	2	2	4859
								1.00	1.0	2.3430E+06	9.9000E-03				
624	49-in-117	0	491170	2.5920E+03	2.6400E+05	6.9000E+05	0.0000E+00	1.00	0.0	1.4550E+06	9.9630E-01	1.1590E+02	2	4	4937
								1.00	1.0	1.1400E+06	3.7000E-03				
625	49-in-117	1	491171	6.9720E+03	2.6700E+05	9.1000E+04	0.0000E+00	1.00	0.0	1.7700E+06	5.2900E-01	1.1590E+02	2	4	4938
								3.00	0.0	3.1530E+05	4.7100E-01				
626	50-sn-117	0	501170	stable								1.1690E+02	0	0	5040
627	50-sn-117	1	501171	1.1750E+06	1.5600E+05	1.5750E+05	0.0000E+00	3.00	0.0	3.1458E+05	1.0000E+00	1.1590E+02	1	3	5041
628	51-sb-117	0	511170	1.0080E+04	2.8100E+04	1.8480E+05	0.0000E+00	2.00	0.0	1.7550E+06	1.0000E+00	1.1590E+02	1	4	5113
629	43-tc-118	0	431180	4.0360E-02	3.8770E+06	3.8350E+06	0.0000E+00	1.00	0.0	1.2700E+07	8.3000E-01	1.1795E+02	2	2	4388
								1.50	0.0	6.7000E+06	1.7000E-01				
630	44-ru-118	0	441180	1.2950E-01	2.0940E+06	1.1180E+06	0.0000E+00	1.00	0.0	7.2000E+06	9.9000E-01	1.1794E+02	2	2	4491
								1.50	0.0	3.0000E+06	1.0000E-02				
631	45-rh-118	0	451180	2.6600E-01	3.0940E+06	2.4940E+06	0.0000E+00	1.00	0.0	1.0300E+07	9.6900E-01	1.1793E+02	2	2	4570
								1.50	0.0	3.2000E+06	3.1000E-02				
632	46-pd-118	0	461180	1.9000E+00	1.5600E+06	4.1400E+05	0.0000E+00	1.00	0.0	4.1000E+06	8.5600E-01	1.1691E+02	2	4	4673
								1.00	1.0	4.0000E+06	1.4400E-01				
633	47-ag-118	0	471180	3.7600E+00	2.5790E+06	1.5700E+06	0.0000E+00	1.00	0.0	7.1540E+06	1.0000E+00	1.1690E+02	1	2	4758
634	47-ag-118	1	471181	2.0000E+00	1.1278E+06	1.8527E+06	0.0000E+00	1.00	0.0	7.2820E+06	5.9000E-01	1.1690E+02	2	4	4759
								3.00	0.0	1.2774E+05	4.1000E-01				
635	48-cd-118	0	481180	3.0180E+03	1.6100E+05	0.0000E+00	0.0000E+00	1.00	0.0	5.2400E+05	1.0000E+00	1.1689E+02	1	1	4861
636	49-in-118	0	491180	5.0000E+00	1.8790E+06	7.8000E+04	0.0000E+00	1.00	0.0	4.4250E+06	1.0000E+00	1.1689E+02	1	2	4940
637	49-in-118	1	491181	2.6700E+02	6.1000E+05	2.7800E+06	0.0000E+00	1.00	0.0	4.4850E+06	1.0000E+00	1.1689E+02	1	4	4941
638	49-in-118	2	491182	8.5000E+00	1.0700E+05	7.5000E+04	0.0000E+00	1.00	0.0	4.6250E+06	1.4000E-02	1.1689E+02	2	4	4942
								3.00	1.0	1.4000E+05	9.8600E-01				
639	50-sn-118	0	501180	stable								1.1790E+02	0	0	5043
640	51-sb-118	0	511180	2.1600E+02	8.7300E+05	8.0400E+05	0.0000E+00	2.00	0.0	3.6570E+06	1.0000E+00	1.1689E+02	1	4	5116
641	51-sb-118	1	511181	1.8000E+04	3.5100E+04	2.6100E+06	0.0000E+00	2.00	0.0	3.9070E+06	1.0000E+00	1.1689E+02	1	4	5117
642	43-tc-119	0	431190	3.2470E-02	3.2640E+06	2.8470E+06	0.0000E+00	1.00	0.0	9.9200E+06	1.0000E+00	1.1895E+02	1	2	4391
643	44-ru-119	0	441190	8.1330E-02	2.9200E+06	2.3110E+06	0.0000E+00	1.00	0.0	1.0000E+07	9.8300E-01	1.1894E+02	2	2	4494
								1.50	0.0	3.8000E+06	1.7000E-02				
644	45-rh-119	0	451190	4.6690E-01	2.4760E+06	1.5980E+06	0.0000E+00	1.00	0.0	8.4000E+06	9.3600E-01	1.1893E+02	2	2	4573
								1.50	0.0	4.1000E+06	6.4000E-02				
645	46-pd-119	0	461190	9.2000E-01	2.1110E+06	1.3370E+06	0.0000E+00	1.00	0.0	7.0000E+06	6.0000E-01	1.1892E+02	2	2	4676
								1.00	1.0	7.0000E+06	4.0000E-01				
646	47-ag-119	0	471190	2.1000E+00	1.8400E+06	1.6300E+06	0.0000E+00	1.00	0.0	5.3300E+06	7.3000E-01	1.1789E+02	2	4	4761
								1.00	1.0	5.1800E+06	2.7000E-01				
647	47-ag-119	1	471191	6.0000E+00	1.9410E+06	9.3600E+05	0.0000E+00	1.00	0.0	5.3300E+06	1.0000E+00	1.1789E+02	1	2	4762
648	48-cd-119	0	481190	1.6140E+02	8.2000E+05	1.6400E+06	0.0000E+00	1.00	0.0	3.7300E+06	9.7000E-02	1.1789E+02	2	4	4864
								1.00	1.0	3.4200E+06	9.0300E-01				
649	48-cd-119	1	481191	1.3200E+02	9.0000E+05	1.9500E+06	0.0000E+00	1.00	0.0	3.8800E+06	9.9750E-01	1.1789E+02	2	4	4865
								1.00	1.0	3.5700E+06	2.5000E-03				
650	49-in-119	0	491190	1.4400E+02	6.3000E+05	7.1000E+05	0.0000E+00	1.00	0.0	2.3630E+06	9.2600E-01	1.1788E+02	2	4	4943
								1.00	1.0	2.2730E+06	7.4000E-02				
651	49-in-119	1	491191	1.0800E+03	1.0420E+06	1.2800E+04	0.0000E+00	1.00	0.0	2.6740E+06	9.5600E-01	1.1788E+02	2	4	4944
								3.00	0.0	3.1139E+05	4.4000E-02				
652	50-sn-119	0	501190	stable								1.1890E+02	0	0	5046
653	50-sn-119	1	501191	2.5320E+07	7.5500E+04	1.1500E+04	0.0000E+00	3.00	0.0	8.9536E+04	1.0000E+00	1.1788E+02	1	3	5047

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no	symbol	s	zzaaas	halflife	e-beta	e-gamma	e-alpha	rtyp	rfs	q	branching	awr	ndk	nsp	mat
654	51-sb-119	0	511190	1.3750E+05	2.1800E+04	2.3050E+04	0.0000E+00	2.00	0.0	5.9100E+05	1.0000E+00	1.1788E+02	1	4	5119
655	52-te-119	0	521190	5.7780E+04	1.3230E+04	7.6900E+05	0.0000E+00	2.00	0.0	2.2930E+06	1.0000E+00	1.1789E+02	1	4	5222
656	52-te-119	1	521191	4.0600E+05	1.6900E+04	1.5020E+06	0.0000E+00	2.00	0.0	2.5540E+06	1.0000E+00	1.1789E+02	1	4	5223
657	43-tc-120	0	431200	2.6970E-02	3.8240E+06	4.3820E+06	0.0000E+00	1.00	0.0	1.2592E+07	1.0000E+00	1.1996E+02	1	2	4394
658	44-ru-120	0	441200	6.2310E-02	2.3610E+06	1.2660E+06	0.0000E+00	1.00	0.0	8.3000E+06	9.7400E-01	1.1994E+02	2	2	4497
								1.50	0.0	4.2000E+06	2.6000E-02				
659	45-rh-120	0	451200	2.0190E-01	3.2610E+06	2.8370E+06	0.0000E+00	1.00	0.0	1.0900E+07	9.4600E-01	1.1994E+02	2	2	4576
								1.50	0.0	4.3000E+06	5.4000E-02				
660	46-pd-120	0	461200	5.0000E-01	1.3430E+06	8.1370E+05	0.0000E+00	1.00	0.0	5.5000E+06	1.0000E+00	1.1992E+02	1	2	4679
661	47-ag-120	0	471200	1.2300E+00	2.2870E+06	2.8811E+06	0.0000E+00	1.00	0.0	8.3080E+06	9.9997E-01	1.1889E+02	2	2	4764
								1.50	0.0	2.6000E+05	3.0000E-05				
662	47-ag-120	1	471201	3.2000E-01	1.3708E+06	2.0859E+06	0.0000E+00	1.00	0.0	8.5110E+06	6.3000E-01	1.1889E+02	2	4	4765
								3.00	0.0	2.0300E+05	3.7000E-01				
663	48-cd-120	0	481200	5.0800E+01	6.7700E+05	0.0000E+00	0.0000E+00	1.00	0.0	1.7800E+06	1.0000E+00	1.1888E+02	1	1	4867
664	49-in-120	0	491200	3.0800E+00	2.2400E+06	3.3100E+05	0.0000E+00	1.00	0.0	5.3700E+06	1.0000E+00	1.1888E+02	1	2	4946
665	49-in-120	1	491201	4.6200E+01	1.0000E+06	3.0000E+06	0.0000E+00	1.00	0.0	5.4400E+06	1.0000E+00	1.1888E+02	1	4	4947
666	49-in-120	2	491202	4.7300E+01	1.0000E+06	3.4500E+06	0.0000E+00	1.00	0.0	5.6700E+06	1.0000E+00	1.1888E+02	1	4	4948
667	50-sn-120	0	501200	stable								1.1990E+02	0	0	5049
668	51-sb-120	0	511200	4.9770E+05	4.2300E+04	2.4660E+06	0.0000E+00	2.00	0.0	2.6810E+06	1.0000E+00	1.1887E+02	1	4	5122
669	51-sb-120	1	511201	4.9766E+05	4.2200E+04	2.4660E+06	0.0000E+00	2.00	0.0	2.6810E+06	1.0000E+00	1.1887E+02	1	4	5123
670	52-te-120	0	521200	stable								1.1990E+02	0	0	5225
671	44-ru-121	0	441210	5.0090E-02	2.9510E+06	2.7290E+06	0.0000E+00	1.00	0.0	9.1740E+06	1.0000E+00	1.2095E+02	1	2	4500
672	45-rh-121	0	451210	1.0070E-01	2.6710E+06	1.8520E+06	0.0000E+00	1.00	0.0	9.2000E+06	8.9000E-01	1.2094E+02	2	2	4579
								1.50	0.0	5.0000E+06	1.1000E-01				
673	46-pd-121	0	461210	1.4390E+00	2.3350E+06	1.6380E+06	0.0000E+00	1.00	0.0	8.1000E+06	9.9200E-01	1.2093E+02	2	2	4682
								1.50	0.0	1.3000E+06	8.0000E-03				
674	47-ag-121	0	471210	7.8000E-01	1.6673E+06	2.0715E+06	0.0000E+00	1.00	0.0	6.6700E+06	8.9532E-01	1.1988E+02	3	4	4767
								1.00	1.0	6.4600E+06	1.0392E-01				
								1.50	0.0	1.4940E+06	7.6000E-04				
675	48-cd-121	0	481210	1.3500E+01	1.2100E+06	1.6600E+06	0.0000E+00	1.00	0.0	4.7800E+06	3.3700E-01	1.1987E+02	2	4	4870
								1.00	1.0	4.4700E+06	6.6300E-01				
676	48-cd-121	1	481211	8.3000E+00	1.1900E+06	2.1300E+06	0.0000E+00	1.00	0.0	4.9900E+06	1.0000E+00	1.1987E+02	1	4	4871
677	49-in-121	0	491210	2.3100E+01	9.9000E+05	9.3000E+05	0.0000E+00	1.00	0.0	3.3600E+06	8.8700E-01	1.1987E+02	2	4	4949
								1.00	1.0	3.3500E+06	1.1300E-01				
678	49-in-121	1	491211	2.3300E+02	1.5000E+06	6.4000E+04	0.0000E+00	1.00	0.0	3.6700E+06	9.8800E-01	1.1987E+02	2	4	4950
								3.00	0.0	3.1360E+05	1.2000E-02				
679	50-sn-121	0	501210	9.7310E+04	1.1580E+05	0.0000E+00	0.0000E+00	1.00	0.0	3.9060E+05	1.0000E+00	1.1987E+02	1	1	5052
680	50-sn-121	1	501211	1.3850E+09	3.3760E+04	4.9100E+03	0.0000E+00	1.00	0.0	3.9690E+05	2.2400E-01	1.1987E+02	2	4	5053
								3.00	0.0	6.3100E+03	7.7600E-01				
681	51-sb-121	0	511210	stable								1.2090E+02	0	0	5125
682	52-te-121	0	521210	1.6560E+06	8.4700E+03	5.7800E+05	0.0000E+00	2.00	0.0	1.0500E+06	1.0000E+00	1.1987E+02	1	4	5228
683	52-te-121	1	521211	1.4190E+07	6.4500E+04	2.1700E+05	0.0000E+00	2.00	0.0	1.3400E+06	1.1400E-01	1.1987E+02	2	4	5229
								3.00	0.0	2.9398E+05	8.8600E-01				
684	44-ru-122	0	441220	3.7240E-02	2.6800E+06	1.4500E+06	0.0000E+00	1.00	0.0	7.3330E+06	1.0000E+00	1.2195E+02	1	2	4503
685	45-rh-122	0	451220	6.7770E-02	3.3700E+06	3.0700E+06	0.0000E+00	1.00	0.0	1.1800E+07	9.0900E-01	1.2194E+02	2	2	4582
								1.50	0.0	5.3000E+06	9.1000E-02				
686	46-pd-122	0	461220	5.1870E-01	1.6500E+06	9.2090E+05	0.0000E+00	1.00	0.0	6.5000E+06	9.7500E-01	1.2193E+02	2	2	4685
								1.50	0.0	1.6000E+06	2.5000E-02				
687	47-ag-122	0	471220	5.2900E-01	3.0480E+06	2.5110E+06	0.0000E+00	1.00	0.0	9.3900E+06	9.9814E-01	1.2087E+02	2	2	4770
								1.50	0.0	1.7600E+06	1.8600E-03				

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no	symbol	s	zzaaas	halflife	e-beta	e-gamma	e-alpha	rtyp	rfs	q	branching	awr	ndk	nsp	mat
688	47-ag-122	1	471221	5.5000E-01	2.6650E+06	3.5190E+05	0.0000E+00	1.00	0.0	9.3900E+06	1.0000E+00	1.2087E+02	1	2	4771
689	48-cd-122	0	481220	5.2400E+00	7.9681E+05	4.5565E+05	0.0000E+00	1.00	0.0	2.9600E+06	1.0000E+00	1.2087E+02	1	2	4873
690	49-in-122	0	491220	1.5000E+00	2.5300E+06	6.4000E+05	0.0000E+00	1.00	0.0	6.3700E+06	1.0000E+00	1.2086E+02	1	2	4952
691	49-in-122	1	491221	1.0300E+01	1.3400E+06	3.0600E+06	0.0000E+00	1.00	0.0	6.4100E+06	1.0000E+00	1.2086E+02	1	4	4953
692	49-in-122	2	491222	1.0800E+01	1.4100E+06	3.4600E+06	0.0000E+00	1.00	0.0	6.6600E+06	1.0000E+00	1.2086E+02	1	4	4954
693	50-sn-122	0	501220	stable								1.2190E+02	0	0	5055
694	51-sb-122	0	511220	2.3534E+05	5.6210E+05	4.4520E+05	0.0000E+00	1.00	0.0	1.9831E+06	9.7590E-01	1.2086E+02	2	5	5128
								2.00	0.0	1.6160E+06	2.4100E-02				
695	51-sb-122	1	511221	5.3000E-04	6.1300E+04	7.2200E+04	0.0000E+00	3.00	0.0	1.3747E+05	1.0000E+00	1.2086E+02	1	3	5129
696	51-sb-122	2	511222	2.5146E+02	2.3200E+04	2.2300E+02	0.0000E+00	3.00	1.0	2.6087E+04	1.0000E+00	1.2086E+02	1	3	5130
697	52-te-122	0	521220	stable								1.2190E+02	0	0	5231
698	53- i-122	0	531220	2.1800E+02	1.1100E+06	9.6000E+05	0.0000E+00	2.00	0.0	4.2340E+06	1.0000E+00	1.2086E+02	1	4	5310
699	44-ru-123	0	441230	3.3720E-02	3.1430E+06	2.9030E+06	0.0000E+00	1.00	0.0	9.7390E+06	1.0000E+00	1.2296E+02	1	2	4506
700	45-rh-123	0	451230	5.1680E-02	2.9030E+06	2.1470E+06	0.0000E+00	1.00	0.0	8.4890E+06	1.0000E+00	1.2294E+02	1	2	4585
701	46-pd-123	0	461230	2.2990E-01	2.4950E+06	1.8590E+06	0.0000E+00	1.00	0.0	9.0000E+06	9.9780E-01	1.2293E+02	2	2	4688
								1.50	0.0	2.5000E+06	2.2000E-03				
702	47-ag-123	0	471230	2.9600E-01	2.6400E+06	1.8590E+06	0.0000E+00	1.00	0.0	7.6800E+06	8.1450E-01	1.2187E+02	3	4	4773
								1.00	1.0	7.3600E+06	1.8000E-01				
								1.50	0.0	2.9100E+06	5.5000E-03				
703	48-cd-123	0	481230	2.1000E+00	1.7800E+06	2.0200E+06	0.0000E+00	1.00	0.0	6.1100E+06	3.1200E-01	1.2186E+02	2	4	4876
								1.00	1.0	5.7800E+06	6.8800E-01				
704	48-cd-123	1	481231	1.8200E+00	1.7600E+06	2.5000E+06	0.0000E+00	1.00	0.0	6.4300E+06	9.8400E-01	1.2186E+02	2	4	4877
								1.00	1.0	6.1000E+06	1.6000E-02				
705	49-in-123	0	491230	6.1700E+00	1.3600E+06	1.0600E+06	0.0000E+00	1.00	0.0	4.3910E+06	3.2000E-02	1.2186E+02	2	4	4955
								1.00	1.0	4.3660E+06	9.6800E-01				
706	49-in-123	1	491231	4.7400E+01	2.0320E+06	6.6000E+04	0.0000E+00	1.00	1.0	4.6930E+06	1.0000E+00	1.2186E+02	1	4	4956
707	50-sn-123	0	501230	1.1160E+07	5.2320E+05	6.9000E+03	0.0000E+00	1.00	0.0	1.4030E+06	1.0000E+00	1.2185E+02	1	3	5058
708	50-sn-123	1	501231	2.4036E+03	4.7890E+05	1.4070E+05	0.0000E+00	1.00	0.0	1.4280E+06	1.0000E+00	1.2185E+02	1	4	5059
709	51-sb-123	0	511230	stable								1.2290E+02	0	0	5131
710	52-te-123	0	521230	2.9030E+24	2.0140E+03	2.4600E+02	0.0000E+00	2.00	0.0	5.2600E+04	1.0000E+00	1.2185E+02	1	3	5234
711	52-te-123	1	521231	1.0299E+07	1.0100E+05	1.4830E+05	0.0000E+00	3.00	0.0	2.4746E+05	1.0000E+00	1.2185E+02	1	3	5235
712	53- i-123	0	531230	4.7604E+04	2.6600E+04	1.7270E+05	0.0000E+00	2.00	0.0	1.2280E+06	9.9995E-01	1.2185E+02	2	4	5313
								2.00	1.0	9.8100E+05	5.0000E-05				
713	44-ru-124	0	441240	2.5070E-02	3.0670E+06	1.6840E+06	0.0000E+00	1.00	0.0	8.3570E+06	1.0000E+00	1.2396E+02	1	2	4509
714	45-rh-124	0	451240	4.5130E-02	3.4960E+06	3.3260E+06	0.0000E+00	1.00	0.0	1.0873E+07	1.0000E+00	1.2395E+02	1	2	4588
715	46-pd-124	0	461240	9.9350E-02	1.9810E+06	1.0720E+06	0.0000E+00	1.00	0.0	7.7000E+06	9.9450E-01	1.2393E+02	2	2	4691
								1.50	0.0	2.8000E+06	5.5000E-03				
716	47-ag-124	0	471240	1.7200E-01	3.0900E+06	2.6220E+06	0.0000E+00	1.00	0.0	1.0230E+07	9.8700E-01	1.2393E+02	2	2	4776
								1.50	0.0	2.7800E+06	1.3000E-02				
717	48-cd-124	0	481240	1.2500E+00	1.1413E+06	5.6755E+05	0.0000E+00	1.00	0.0	4.1700E+06	1.0000E+00	1.2285E+02	1	4	4879
718	49-in-124	0	491240	3.1200E+00	2.0500E+06	2.7000E+06	0.0000E+00	1.00	0.0	7.3700E+06	1.0000E+00	1.2285E+02	1	4	4958
719	49-in-124	1	491241	3.7000E+00	1.6200E+06	3.8000E+06	0.0000E+00	1.00	0.0	7.4200E+06	1.0000E+00	1.2285E+02	1	4	4959
720	50-sn-124	0	501240	stable								1.2390E+02	0	0	5061
721	51-sb-124	0	511240	5.2010E+06	3.9000E+05	1.8460E+06	0.0000E+00	1.00	0.0	2.9044E+06	1.0000E+00	1.2284E+02	1	4	5134
722	51-sb-124	1	511241	9.3000E+01	1.1400E+05	4.4000E+05	0.0000E+00	1.00	0.0	2.9153E+06	2.5000E-01	1.2284E+02	2	4	5135
								3.00	0.0	1.0860E+04	7.5000E-01				
723	51-sb-124	2	511242	1.2120E+03	2.4300E+04	2.3500E+02	0.0000E+00	3.00	1.0	2.5984E+04	1.0000E+00	1.2284E+02	1	3	5136
724	52-te-124	0	521240	stable								1.2390E+02	0	0	5237
725	53- i-124	0	531240	3.6081E+05	1.9300E+05	1.1180E+06	0.0000E+00	2.00	0.0	3.1596E+06	1.0000E+00	1.2284E+02	1	4	5316
726	45-rh-125	0	451250	3.5020E-02	3.2700E+06	2.7270E+06	0.0000E+00	1.00	0.0	9.4230E+06	1.0000E+00	1.2495E+02	1	2	4591

no	symbol	s	zzaaas	halflife	e-beta	e-gamma	e-alpha	rtyp	rfs	q	branching	awr	ndk	nsp	mat
727	46-pd-125	0	461250	8.6060E-02	2.6710E+06	2.0920E+06	0.0000E+00	1.00	0.0	7.9720E+06	1.0000E+00	1.2494E+02	1	2	4694
728	47-ag-125	0	471250	1.6600E-01	2.5910E+06	1.8150E+06	0.0000E+00	1.00	0.0	8.6000E+06	9.4900E-01	1.2493E+02	2	2	4779
								1.50	0.0	3.8000E+06	5.1000E-02				
729	48-cd-125	0	481250	6.5000E-01	2.2200E+06	2.2800E+06	0.0000E+00	1.00	0.0	7.1200E+06	4.6400E-01	1.2385E+02	2	2	4882
								1.00	1.0	6.7600E+06	5.3600E-01				
730	48-cd-125	1	481251	4.8000E-01	2.0900E+06	2.4200E+06	0.0000E+00	1.00	0.0	7.1700E+06	1.0000E+00	1.2385E+02	1	2	4883
731	49-in-125	0	491250	2.3600E+00	1.8100E+06	1.2000E+06	0.0000E+00	1.00	0.0	5.4200E+06	1.6800E-01	1.2384E+02	2	4	4961
								1.00	1.0	5.3900E+06	8.3200E-01				
732	49-in-125	1	491251	1.2200E+01	2.0970E+06	6.7203E+05	0.0000E+00	1.00	1.0	5.7500E+06	1.0000E+00	1.2384E+02	1	4	4962
733	50-sn-125	0	501250	8.3300E+05	8.0000E+05	3.3000E+05	0.0000E+00	1.00	0.0	2.3570E+06	1.0000E+00	1.2383E+02	1	4	5064
734	50-sn-125	1	501251	5.7100E+02	8.0600E+05	3.4600E+05	0.0000E+00	1.00	0.0	2.3850E+06	1.0000E+00	1.2383E+02	1	4	5065
735	51-sb-125	0	511250	8.7054E+07	1.0030E+05	4.3700E+05	0.0000E+00	1.00	0.0	7.6670E+05	7.8200E-01	1.2383E+02	2	4	5137
								1.00	1.0	6.2190E+05	2.1800E-01				
736	52-te-125	0	521250	stable								1.2490E+02	0	0	5240
737	52-te-125	1	521251	4.9590E+06	1.0400E+05	3.5000E+04	0.0000E+00	3.00	0.0	1.4478E+05	1.0000E+00	1.2383E+02	1	3	5241
738	53- i-125	0	531250	5.1322E+06	1.6600E+04	4.2300E+04	0.0000E+00	2.00	0.0	1.8577E+05	1.0000E+00	1.2383E+02	1	4	5319
739	54-xe-125	0	541250	6.0800E+04	3.3000E+04	2.7200E+05	0.0000E+00	2.00	0.0	1.6445E+06	1.0000E+00	1.2383E+02	1	4	5428
740	54-xe-125	1	541251	5.6900E+01	1.2900E+05	1.1310E+05	0.0000E+00	3.00	0.0	2.5270E+05	1.0000E+00	1.2383E+02	1	3	5429
741	45-rh-126	0	451260	3.2770E-02	3.4620E+06	3.9960E+06	0.0000E+00	1.00	0.0	1.1490E+07	1.0000E+00	1.2595E+02	1	2	4594
742	46-pd-126	0	461260	6.4590E-02	2.3590E+06	1.2760E+06	0.0000E+00	1.00	0.0	6.5210E+06	1.0000E+00	1.2594E+02	1	2	4697
743	47-ag-126	0	471260	1.0700E-01	2.9960E+06	3.4380E+06	0.0000E+00	1.00	0.0	1.1200E+07	9.6700E-01	1.2593E+02	2	2	4782
								1.50	0.0	4.3000E+06	3.3000E-02				
744	48-cd-126	0	481260	5.1500E-01	1.4905E+06	7.2089E+05	0.0000E+00	1.00	0.0	5.5600E+06	1.0000E+00	1.2592E+02	1	2	4885
745	49-in-126	0	491260	1.5300E+00	2.4000E+06	2.8100E+06	0.0000E+00	1.00	0.0	8.2100E+06	1.0000E+00	1.2483E+02	1	2	4964
746	49-in-126	1	491261	1.6400E+00	1.9900E+06	4.3000E+06	0.0000E+00	1.00	0.0	8.3100E+06	1.0000E+00	1.2483E+02	1	4	4965
747	50-sn-126	0	501260	7.3000E+12	1.0600E+05	5.6000E+04	0.0000E+00	1.00	1.0	3.6000E+05	3.2000E-01	1.2483E+02	2	4	5067
								1.00	2.0	3.4000E+05	6.8000E-01				
748	51-sb-126	0	511260	1.0670E+06	3.7000E+05	2.7600E+06	0.0000E+00	1.00	0.0	3.6700E+06	1.0000E+00	1.2483E+02	1	4	5140
749	51-sb-126	1	511261	1.1490E+03	6.5000E+05	1.5500E+06	0.0000E+00	1.00	0.0	3.6900E+06	8.6000E-01	1.2483E+02	2	4	5141
								3.00	0.0	1.7700E+04	1.4000E-01				
750	51-sb-126	2	511262	1.1000E+01	2.0200E+04	2.7000E+02	0.0000E+00	3.00	1.0	2.2700E+04	1.0000E+00	1.2483E+02	1	3	5142
751	52-te-126	0	521260	stable								1.2590E+02	0	0	5243
752	53- i-126	0	531260	1.1170E+06	1.6000E+05	4.3500E+05	0.0000E+00	1.00	0.0	1.2140E+06	4.7300E-01	1.2482E+02	2	5	5322
								2.00	0.0	2.1530E+06	5.2700E-01				
753	54-xe-126	0	541260	stable								1.2590E+02	0	0	5431
754	45-rh-127	0	451270	2.4470E-02	3.4010E+06	3.0370E+06	0.0000E+00	1.00	0.0	1.0408E+07	1.0000E+00	1.2696E+02	1	2	4597
755	46-pd-127	0	461270	6.2490E-02	2.7470E+06	2.5990E+06	0.0000E+00	1.00	0.0	8.6430E+06	1.0000E+00	1.2694E+02	1	2	4700
756	47-ag-127	0	471270	1.0900E-01	2.8870E+06	2.1810E+06	0.0000E+00	1.00	0.0	9.6000E+06	8.8000E-01	1.2693E+02	2	2	4785
								1.50	0.0	5.3000E+06	1.2000E-01				
757	48-cd-127	0	481270	4.3000E-01	2.0730E+06	2.0010E+06	0.0000E+00	1.00	0.0	8.4600E+06	7.9985E-01	1.2692E+02	3	2	4887
								1.00	1.0	8.0000E+06	1.9996E-01				
								1.50	0.0	1.2400E+06	1.9000E-04				
758	49-in-127	0	491270	1.0900E+00	2.2000E+06	1.6000E+06	1.7500E+04	1.00	0.0	6.5100E+06	2.1380E-01	1.2583E+02	3	4	4967
								1.00	1.0	6.5100E+06	7.8590E-01				
								1.50	0.0	9.9000E+05	3.0000E-04				
759	49-in-127	1	491271	3.6700E+00	2.9000E+06	4.7000E+05	2.3000E+04	1.00	0.0	6.9700E+06	9.8910E-01	1.2583E+02	3	4	4968
								1.00	1.0	6.9700E+06	4.0000E-03				
								1.50	0.0	1.4200E+06	6.9000E-03				
760	49-in-127	2	491272	1.0400E+00	2.0900E+06	2.9000E+06	0.0000E+00	1.00	0.0	8.3700E+06	1.0000E+00	1.2583E+02	1	4	4969
761	50-sn-127	0	501270	7.5600E+03	5.7000E+05	1.9100E+06	0.0000E+00	1.00	0.0	3.2290E+06	1.0000E+00	1.2582E+02	1	4	5070

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no	symbol	s	zzaaas	halflife	e-beta	e-gamma	e-alpha	rtyp	rfs	q	branching	awr	ndk	nsp	mat
762	50-sn-127	1	501271	2.4780E+02	8.9031E+05	8.8645E+05	0.0000E+00	1.00	0.0	3.2340E+06	1.0000E+00	1.2582E+02	1	2	5071
763	51-sb-127	0	511270	3.3300E+05	3.1300E+05	6.9300E+05	0.0000E+00	1.00	0.0	1.5820E+06	8.3500E-01	1.2582E+02	2	4	5143
								1.00	1.0	1.4940E+06	1.6500E-01				
764	52-te-127	0	521270	3.3700E+04	2.2460E+05	4.9000E+03	0.0000E+00	1.00	0.0	7.0200E+05	1.0000E+00	1.2582E+02	1	4	5246
765	52-te-127	1	521271	9.4200E+06	7.5900E+04	1.0900E+04	0.0000E+00	1.00	0.0	7.9000E+05	2.4000E-02	1.2582E+02	2	4	5247
								3.00	0.0	8.8260E+04	9.7600E-01				
766	53- i-127	0	531270	stable								1.2690E+02	0	0	5325
767	54-xe-127	0	541270	3.1450E+06	2.9800E+04	2.7600E+05	0.0000E+00	2.00	0.0	6.6230E+05	1.0000E+00	1.2582E+02	1	4	5434
768	54-xe-127	1	541271	6.9200E+01	1.1600E+05	1.6700E+05	0.0000E+00	3.00	0.0	2.9710E+05	1.0000E+00	1.2582E+02	1	3	5435
769	45-rh-128	0	451280	7.8340E-03	4.5950E+06	5.3420E+06	0.0000E+00	1.00	0.0	1.5143E+07	1.0000E+00	1.2796E+02	1	2	4600
770	46-pd-128	0	461280	4.4930E-02	2.7610E+06	1.5060E+06	0.0000E+00	1.00	0.0	7.5700E+06	1.0000E+00	1.2795E+02	1	2	4703
771	47-ag-128	0	471280	5.8000E-02	3.1990E+06	3.6990E+06	0.0000E+00	1.00	0.0	1.2500E+07	9.4900E-01	1.2794E+02	2	2	4788
								1.50	0.0	5.6000E+06	5.1000E-02				
772	48-cd-128	0	481280	3.4000E-01	1.8310E+06	1.0030E+06	0.0000E+00	1.00	0.0	7.1100E+06	9.9921E-01	1.2793E+02	2	2	4889
								1.50	1.0	1.1800E+06	7.9000E-04				
773	49-in-128	0	491280	8.4000E-01	2.6400E+06	3.0700E+06	0.0000E+00	1.00	0.0	8.9800E+06	9.9954E-01	1.2682E+02	2	2	4970
								1.50	1.0	1.0400E+06	4.6000E-04				
774	49-in-128	1	491281	7.2000E-01	2.3000E+06	3.5400E+06	0.0000E+00	1.00	0.0	9.3000E+06	4.8000E-01	1.2682E+02	2	4	4971
								1.00	1.0	9.0900E+06	5.2000E-01				
775	50-sn-128	0	501280	3.5440E+03	2.5100E+05	6.0000E+05	0.0000E+00	1.00	1.0	1.2740E+06	1.0000E+00	1.2681E+02	1	4	5073
776	50-sn-128	1	501281	6.5000E+00	7.1000E+04	2.0102E+06	0.0000E+00	3.00	0.0	2.0915E+06	1.0000E+00	1.2681E+02	1	3	5074
777	51-sb-128	0	511280	3.2440E+04	4.8000E+05	3.0900E+06	0.0000E+00	1.00	0.0	4.3840E+06	1.0000E+00	1.2681E+02	1	4	5146
778	51-sb-128	1	511281	6.2400E+02	9.5000E+05	1.9100E+06	0.0000E+00	1.00	0.0	4.3840E+06	9.6400E-01	1.2681E+02	2	2	5147
								3.00	0.0	2.0000E+04	3.6000E-02				
779	52-te-128	0	521280	stable								1.2790E+02	0	0	5249
780	53- i-128	0	531280	1.4994E+03	7.4500E+05	6.7600E+04	0.0000E+00	1.00	0.0	2.1220E+06	9.3100E-01	1.2681E+02	2	5	5328
								2.00	0.0	1.2540E+06	6.9000E-02				
781	54-xe-128	0	541280	stable								1.2790E+02	0	0	5437
782	55-cs-128	0	551280	2.1720E+02	8.7500E+05	8.9200E+05	0.0000E+00	2.00	0.0	3.9290E+06	1.0000E+00	1.2681E+02	1	4	5510
783	46-pd-129	0	461290	1.2680E-02	3.9990E+06	3.6810E+06	0.0000E+00	1.00	0.0	1.2280E+07	1.0000E+00	1.2895E+02	1	2	4706
784	47-ag-129	0	471290	4.4000E-02	3.1070E+06	2.7900E+06	0.0000E+00	1.00	0.0	1.0700E+07	8.8000E-01	1.2894E+02	2	2	4791
								1.50	0.0	6.7000E+06	1.2000E-01				
785	48-cd-129	0	481290	2.7000E-01	2.3040E+06	2.2280E+06	0.0000E+00	1.00	1.0	9.3000E+06	9.9230E-01	1.2893E+02	2	2	4891
								1.50	0.0	3.1000E+06	7.7000E-03				
786	49-in-129	0	491290	6.1000E-01	2.8000E+06	1.9800E+06	2.1700E+04	1.00	0.0	7.6600E+06	7.5110E-01	1.2781E+02	3	4	4973
								1.00	1.0	7.6200E+06	2.4640E-01				
								1.50	1.0	2.3000E+05	2.5000E-03				
787	49-in-129	1	491291	1.2300E+00	3.5000E+06	2.7500E+05	2.7000E+04	1.00	0.0	8.0400E+06	9.5400E-01	1.2781E+02	3	4	4974
								1.00	1.0	7.6700E+06	2.1000E-02				
								1.50	0.0	4.5000E+06	2.5000E-02				
788	49-in-129	2	491292	6.7000E-01	2.4900E+06	3.4000E+06	0.0000E+00	1.00	1.0	9.2900E+06	1.0000E+00	1.2781E+02	1	4	4975
789	50-sn-129	0	501290	1.3380E+02	1.2900E+06	1.0079E+06	0.0000E+00	1.00	0.0	4.0300E+06	1.0000E+00	1.2781E+02	1	2	5076
790	50-sn-129	1	501291	4.1400E+02	8.7000E+05	2.3200E+06	0.0000E+00	1.00	0.0	4.0700E+06	9.7800E-01	1.2781E+02	2	2	5077
								1.00	1.0	2.2200E+06	2.2000E-02				
791	51-sb-129	0	511290	1.5840E+04	3.9600E+05	1.3700E+06	0.0000E+00	1.00	0.0	2.3760E+06	7.8000E-01	1.2780E+02	2	4	5149
								1.00	1.0	2.2700E+06	2.2000E-01				
792	51-sb-129	1	511291	1.0620E+03	3.7428E+05	2.1446E+06	0.0000E+00	1.00	0.0	4.2270E+06	2.9000E-02	1.2780E+02	3	4	5150
								1.00	1.0	4.2270E+06	8.2100E-01				
								3.00	0.0	1.8511E+06	1.5000E-01				
793	52-te-129	0	521290	4.1760E+03	5.4000E+05	6.2000E+04	0.0000E+00	1.00	0.0	1.5030E+06	1.0000E+00	1.2780E+02	1	4	5252

no	symbol	s	zzaaas	halflife	e-beta	e-gamma	e-alpha	rtyp	rfs	q	branching	awr	ndk	nsp	mat
794	52-te-129	1	521291	2.9030E+06	2.6900E+05	3.7400E+04	0.0000E+00	1.00	0.0	1.6080E+06	3.6000E-01	1.2780E+02	2	4	5253
								3.00	0.0	1.0550E+05	6.4000E-01				
795	53- i-129	0	531290	4.9500E+14	5.4000E+04	2.4600E+04	0.0000E+00	1.00	0.0	1.8900E+05	1.0000E+00	1.2780E+02	1	4	5331
796	54-xe-129	0	541290	stable								1.2890E+02	0	0	5440
797	54-xe-129	1	541291	7.6720E+05	1.8191E+05	5.1200E+04	0.0000E+00	3.00	0.0	2.3610E+05	1.0000E+00	1.2780E+02	1	3	5441
798	55-cs-129	0	551290	1.1542E+05	1.5400E+04	2.8000E+05	0.0000E+00	2.00	0.0	1.1970E+06	1.0000E+00	1.2780E+02	1	4	5513
799	46-pd-130	0	461300	9.5640E-03	3.8930E+06	2.2110E+06	0.0000E+00	1.00	0.0	1.0587E+07	1.0000E+00	1.2996E+02	1	2	4709
800	47-ag-130	0	471300	5.0000E-02	4.3000E+06	5.0220E+06	0.0000E+00	1.00	0.0	1.5400E+07	8.1000E-01	1.2995E+02	2	2	4794
								1.50	0.0	9.0000E+06	1.9000E-01				
801	48-cd-130	0	481300	1.6200E-01	2.3700E+06	1.8000E+06	0.0000E+00	1.00	0.0	8.3500E+06	9.6500E-01	1.2882E+02	2	2	4893
								1.50	1.0	3.3300E+06	3.5000E-02				
802	49-in-130	0	491300	2.9000E-01	3.0000E+06	3.4300E+06	0.0000E+00	1.00	0.0	1.0250E+07	7.9256E-01	1.2881E+02	3	4	4976
								1.00	1.0	8.3000E+06	1.9814E-01				
								1.50	0.0	2.6300E+06	9.3000E-03				
803	49-in-130	1	491301	5.4000E-01	2.8300E+06	2.2600E+06	0.0000E+00	1.00	1.0	8.8000E+06	1.0000E+00	1.2881E+02	1	4	4977
804	49-in-130	2	491302	5.4000E-01	3.3320E+06	3.1900E+06	0.0000E+00	1.00	0.0	1.0650E+07	8.9400E-01	1.2881E+02	3	4	4978
								1.00	1.0	8.7000E+06	8.9498E-02				
								1.50	1.0	2.9900E+06	1.6500E-02				
805	50-sn-130	0	501300	2.2300E+02	4.5200E+05	9.3600E+05	0.0000E+00	1.00	1.0	2.1530E+06	1.0000E+00	1.2880E+02	1	4	5079
806	50-sn-130	1	501301	1.0200E+02	9.0000E+05	2.0700E+06	0.0000E+00	1.00	0.0	4.1000E+06	8.6000E-01	1.2880E+02	2	4	5080
								1.00	1.0	4.1000E+06	1.4000E-01				
807	51-sb-130	0	511300	2.3700E+03	6.9000E+05	3.2700E+06	0.0000E+00	1.00	0.0	5.0620E+06	1.0000E+00	1.2880E+02	1	4	5152
808	51-sb-130	1	511301	3.7800E+02	8.3000E+05	2.7100E+06	0.0000E+00	1.00	0.0	5.0670E+06	1.0000E+00	1.2880E+02	1	4	5153
809	52-te-130	0	521300	stable								1.2991E+02	0	0	5255
810	53- i-130	0	531300	4.4500E+04	2.7900E+05	2.1400E+06	0.0000E+00	1.00	0.0	2.9450E+06	1.0000E+00	1.2879E+02	1	4	5334
811	53- i-130	1	531301	5.3000E+02	1.5000E+05	1.1000E+05	0.0000E+00	1.00	0.0	2.9850E+06	1.6000E-01	1.2879E+02	2	4	5335
								3.00	0.0	3.9961E+04	8.4000E-01				
812	54-xe-130	0	541300	stable								1.2990E+02	0	0	5443
813	55-cs-130	0	551300	1.7526E+03	3.8700E+05	5.0300E+05	0.0000E+00	1.00	0.0	3.6000E+05	1.6000E-02	1.2879E+02	2	5	5516
								2.00	0.0	2.9810E+06	9.8400E-01				
814	55-cs-130	1	551301	2.0800E+02	8.8000E+04	5.7700E+04	0.0000E+00	2.00	0.0	3.1440E+06	1.6000E-03	1.2879E+02	2	4	5517
								3.00	0.0	1.6325E+05	9.9840E-01				
815	46-pd-131	0	461310	8.9020E-03	3.9500E+06	3.6490E+06	0.0000E+00	1.00	0.0	1.2148E+07	1.0000E+00	1.3096E+02	1	2	4712
816	47-ag-131	0	471310	1.2530E-02	4.1220E+06	3.7240E+06	0.0000E+00	1.00	0.0	1.2586E+07	3.2000E-01	1.3095E+02	2	2	4797
								1.50	0.0	1.2003E+07	6.8000E-01				
817	48-cd-131	0	481310	6.8000E-02	3.5180E+06	3.2670E+06	0.0000E+00	1.00	0.0	1.2400E+07	9.6500E-01	1.3094E+02	2	2	4895
								1.50	0.0	6.6000E+06	3.5000E-02				
818	49-in-131	0	491310	2.8000E-01	3.3000E+06	2.6120E+06	0.0000E+00	1.00	0.0	9.2220E+06	7.8900E-01	1.2980E+02	3	2	4979
								1.00	1.0	8.9810E+06	2.0100E-01				
								1.50	1.0	2.0690E+06	1.0000E-02				
819	49-in-131	1	491311	3.5000E-01	4.2500E+06	2.5000E+04	0.0000E+00	1.00	0.0	9.5240E+06	9.9000E-01	1.2980E+02	2	2	4980
								1.50	0.0	4.3180E+06	1.0000E-02				
820	49-in-131	2	491312	3.2000E-01	3.6500E+06	5.5000E+06	0.0000E+00	1.00	1.0	1.2744E+07	9.9970E-01	1.2980E+02	2	4	4981
								1.50	1.0	5.8330E+06	3.0000E-04				
821	50-sn-131	0	501310	5.6000E+01	1.4644E+06	1.1937E+06	0.0000E+00	1.00	0.0	4.7040E+06	1.0000E+00	1.3092E+02	1	2	5082
822	50-sn-131	1	501311	5.8400E+01	1.2459E+06	1.8924E+06	0.0000E+00	1.00	0.0	4.9460E+06	1.0000E+00	1.2979E+02	1	2	5083
823	51-sb-131	0	511310	1.3818E+03	6.5000E+05	2.0300E+06	0.0000E+00	1.00	0.0	3.2340E+06	9.3500E-01	1.2979E+02	2	4	5155
								1.00	1.0	3.0520E+06	6.5000E-02				
824	52-te-131	0	521310	1.5000E+03	7.1200E+05	4.1970E+05	0.0000E+00	1.00	0.0	2.2328E+06	1.0000E+00	1.2978E+02	1	4	5258
825	52-te-131	1	521311	1.1970E+05	1.5500E+05	1.3740E+06	0.0000E+00	1.00	0.0	2.4151E+06	7.4100E-01	1.2978E+02	2	4	5259
								3.00	0.0	1.8225E+05	2.5900E-01				

no	symbol	s	zzaaas	halflife	e-beta	e-gamma	e-alpha	rtyp	rfs	q	branching	awr	ndk	nsp	mat
826	53- i-131	0	531310	6.9338E+05	1.9150E+05	3.8200E+05	0.0000E+00	1.00	0.0	9.7080E+05	9.8900E-01	1.2978E+02	2	4	5337
								1.00	1.0	8.0690E+05	1.1000E-02				
827	54-xe-131	0	541310	stable								1.3090E+02	0	0	5446
828	54-xe-131	1	541311	1.0250E+06	1.4300E+05	2.0300E+04	0.0000E+00	3.00	0.0	1.6393E+05	1.0000E+00	1.2978E+02	1	3	5447
829	55-cs-131	0	551310	8.3710E+05	5.0192E+03	2.2884E+04	0.0000E+00	2.00	0.0	3.5500E+05	1.0000E+00	1.2978E+02	1	3	5519
830	56-ba-131	0	561310	9.9400E+05	4.4000E+04	4.8810E+05	0.0000E+00	2.00	0.0	1.3760E+06	1.0000E+00	1.2978E+02	1	4	5628
831	56-ba-131	1	561311	8.7600E+02	1.1000E+05	7.7400E+04	0.0000E+00	3.00	0.0	1.8750E+05	1.0000E+00	1.2978E+02	1	3	5629
832	47-ag-132	0	471320	1.1400E-02	4.2810E+06	5.0160E+06	0.0000E+00	1.00	0.0	1.4197E+07	3.9000E-01	1.3196E+02	2	2	4800
								1.50	0.0	1.2204E+07	6.1000E-01				
833	48-cd-132	0	481320	9.7000E-02	3.4050E+06	1.8970E+06	0.0000E+00	1.00	0.0	1.1700E+07	4.0000E-01	1.3194E+02	2	2	4897
								1.50	1.0	8.9000E+06	6.0000E-01				
834	49-in-132	0	491320	2.0700E-01	3.4700E+06	6.2100E+06	0.0000E+00	1.00	0.0	1.4140E+07	9.3700E-01	1.3080E+02	2	4	4982
								1.50	1.0	6.5500E+06	6.3000E-02				
835	50-sn-132	0	501320	3.9700E+01	7.2000E+05	1.2800E+06	0.0000E+00	1.00	0.0	3.1200E+06	1.0000E+00	1.3079E+02	1	4	5085
836	51-sb-132	0	511320	1.6740E+02	1.2500E+06	2.6000E+06	0.0000E+00	1.00	0.0	5.5120E+06	1.0000E+00	1.3078E+02	1	4	5158
837	51-sb-132	1	511321	2.4600E+02	1.2800E+06	2.6300E+06	0.0000E+00	1.00	0.0	5.7000E+06	1.0000E+00	1.3078E+02	1	4	5159
838	52-te-132	0	521320	2.7680E+05	9.7000E+04	2.3400E+05	0.0000E+00	1.00	0.0	5.1800E+05	1.0000E+00	1.3077E+02	1	4	5261
839	53- i-132	0	531320	8.2600E+03	4.9300E+05	2.2610E+06	0.0000E+00	1.00	0.0	3.5810E+06	1.0000E+00	1.3077E+02	1	4	5340
840	53- i-132	1	531321	4.9900E+03	1.3100E+05	3.3100E+05	0.0000E+00	1.00	0.0	3.7010E+06	1.4000E-01	1.3077E+02	2	4	5341
								3.00	0.0	1.2000E+05	8.6000E-01				
841	54-xe-132	0	541320	stable								1.3190E+02	0	0	5449
842	54-xe-132	1	541321	8.3900E-03	5.3300E+04	2.7100E+06	0.0000E+00	3.00	0.0	2.7522E+06	1.0000E+00	1.3077E+02	1	3	5450
843	55-cs-132	0	551320	5.5990E+05	1.2800E+04	7.1440E+05	0.0000E+00	1.00	0.0	1.2793E+06	1.8700E-02	1.3077E+02	2	5	5522
								2.00	0.0	2.1231E+06	9.8130E-01				
844	56-ba-132	0	561320	stable								1.3190E+02	0	0	5631
845	47-ag-133	0	471330	8.6550E-03	4.3830E+06	3.9620E+06	0.0000E+00	1.00	0.0	1.3350E+07	1.0000E+00	1.3296E+02	1	2	4803
846	48-cd-133	0	481330	1.8360E-02	3.5390E+06	3.2960E+06	0.0000E+00	1.00	0.0	1.0975E+07	7.3000E-01	1.3295E+02	2	2	4899
								1.50	0.0	9.1300E+06	2.7000E-01				
847	49-in-133	0	491330	1.6500E-01	3.7660E+06	3.4140E+06	0.0000E+00	1.00	0.0	1.2900E+07	1.5000E-01	1.3293E+02	2	2	4985
								1.50	0.0	1.0500E+07	8.5000E-01				
848	50-sn-133	0	501330	1.4500E+00	3.4000E+06	2.7300E+05	0.0000E+00	1.00	0.0	8.1000E+06	9.9920E-01	1.3178E+02	2	2	5088
								1.50	0.0	7.5000E+05	8.0000E-04				
849	51-sb-133	0	511330	1.5000E+02	6.6000E+05	2.7400E+06	0.0000E+00	1.00	0.0	4.0020E+06	8.3000E-01	1.3177E+02	2	2	5161
								1.00	1.0	3.6680E+06	1.7000E-01				
850	52-te-133	0	521330	7.5000E+02	7.0600E+05	1.1990E+06	0.0000E+00	1.00	0.0	2.9420E+06	1.0000E+00	1.3177E+02	1	4	5264
851	52-te-133	1	521331	3.3240E+03	3.7200E+05	1.8560E+06	0.0000E+00	1.00	0.0	3.2760E+06	7.2932E-01	1.3177E+02	3	4	5265
								1.00	1.0	1.6420E+06	9.0682E-02				
								3.00	0.0	3.3427E+05	1.8000E-01				
852	53- i-133	0	531330	7.4900E+04	4.0900E+05	6.1200E+05	0.0000E+00	1.00	0.0	1.7570E+06	9.7100E-01	1.3177E+02	2	4	5343
								1.00	1.0	1.5240E+06	2.9000E-02				
853	53- i-133	1	531331	9.0000E+00	4.9100E+04	1.5814E+06	0.0000E+00	3.00	0.0	1.6320E+06	1.0000E+00	1.3177E+02	1	3	5344
854	54-xe-133	0	541330	4.5300E+05	1.3600E+05	4.7100E+04	0.0000E+00	1.00	0.0	4.2740E+05	1.0000E+00	1.3176E+02	1	4	5452
855	54-xe-133	1	541331	1.8920E+05	1.9100E+05	4.0800E+04	0.0000E+00	3.00	0.0	2.3322E+05	1.0000E+00	1.3176E+02	1	3	5453
856	55-cs-133	0	551330	stable								1.3290E+02	0	0	5525
857	56-ba-133	0	561330	3.3200E+08	4.9600E+04	4.0160E+05	0.0000E+00	2.00	0.0	5.1730E+05	1.0000E+00	1.3176E+02	1	4	5634
858	56-ba-133	1	561331	1.4000E+05	2.2200E+05	6.8000E+04	0.0000E+00	2.00	0.0	8.0560E+05	9.6000E-05	1.3176E+02	2	4	5635
								3.00	0.0	2.8825E+05	9.9990E-01				
859	57-la-133	0	571330	1.4080E+04	3.8000E+04	1.3000E+05	0.0000E+00	2.00	0.0	2.0600E+06	9.9970E-01	1.3177E+02	2	4	5710
								2.00	1.0	1.7700E+06	3.0000E-04				
860	48-cd-134	0	481340	1.4330E-02	3.6300E+06	2.2440E+06	0.0000E+00	1.00	0.0	1.0112E+07	6.3000E-01	1.3395E+02	2	2	4901
								1.50	0.0	9.4100E+06	3.7000E-01				

no	symbol	s	zzaaas	halflife	e-beta	e-gamma	e-alpha	rtyp	rfs	q	branching	awr	ndk	nsp	mat
861	49-in-134	0	491340	1.4000E-01	3.9920E+06	4.6990E+06	0.0000E+00	1.00	0.0	1.4300E+07	3.5000E-01	1.3394E+02	2	2	4988
								1.50	0.0	1.0800E+07	6.5000E-01				
862	50-sn-134	0	501340	1.0500E+00	2.5303E+06	1.2480E+06	0.0000E+00	1.00	0.0	7.8400E+06	8.3000E-01	1.3278E+02	2	2	5091
								1.50	0.0	4.5500E+06	1.7000E-01				
863	51-sb-134	0	511340	7.8000E-01	2.7810E+06	2.2560E+06	0.0000E+00	1.00	0.0	8.3900E+06	9.9986E-01	1.3277E+02	2	4	5164
								1.50	0.0	7.1000E+05	1.4000E-04				
864	51-sb-134	1	511341	1.0070E+01	2.8600E+06	2.0600E+06	0.0000E+00	1.00	0.0	8.8000E+06	9.9912E-01	1.3277E+02	2	4	5165
								1.50	1.0	7.8000E+05	8.8000E-04				
865	52-te-134	0	521340	2.5100E+03	2.2400E+05	8.7100E+05	0.0000E+00	1.00	0.0	1.5130E+06	1.0000E+00	1.3276E+02	1	4	5267
866	53- i-134	0	531340	3.1500E+03	6.3400E+05	2.6000E+06	0.0000E+00	1.00	0.0	4.0520E+06	1.0000E+00	1.3276E+02	1	4	5346
867	53- i-134	1	531341	2.1120E+02	8.8600E+04	2.8600E+05	0.0000E+00	1.00	1.0	2.4030E+06	2.3000E-02	1.3276E+02	2	4	5347
								3.00	0.0	3.1650E+05	9.7700E-01				
868	54-xe-134	0	541340	stable								1.3390E+02	0	0	5455
869	54-xe-134	1	541341	2.9000E-01	6.7900E+04	1.9007E+06	0.0000E+00	3.00	0.0	1.9655E+06	1.0000E+00	1.3276E+02	1	3	5456
870	55-cs-134	0	551340	6.5173E+07	1.6380E+05	1.5544E+06	0.0000E+00	1.00	0.0	2.0587E+06	1.0000E+00	1.3276E+02	2	4	5528
								2.00	0.0	1.2333E+06	3.0000E-06				
871	55-cs-134	1	551341	1.0483E+04	1.0500E+05	2.6800E+04	0.0000E+00	3.00	0.0	1.3874E+05	1.0000E+00	1.3276E+02	1	3	5529
872	56-ba-134	0	561340	stable								1.3390E+02	0	0	5637
873	57-la-134	0	571340	3.8700E+02	7.7400E+05	7.1500E+05	0.0000E+00	2.00	0.0	3.7310E+06	1.0000E+00	1.3276E+02	1	4	5713
874	48-cd-135	0	481350	1.2760E-02	3.9560E+06	3.6620E+06	0.0000E+00	1.00	0.0	1.2193E+07	6.4000E-01	1.3496E+02	2	2	4903
								1.50	0.0	1.0168E+07	3.6000E-01				
875	49-in-135	0	491350	9.2000E-02	4.0590E+06	3.6850E+06	0.0000E+00	1.00	0.0	1.3600E+07	2.9000E-01	1.3495E+02	2	2	4991
								1.50	0.0	1.1100E+07	7.1000E-01				
876	50-sn-135	0	501350	5.3000E-01	2.5550E+06	2.4820E+06	0.0000E+00	1.00	0.0	9.0000E+06	7.9000E-01	1.3493E+02	2	2	5094
								1.50	0.0	5.3000E+06	2.1000E-01				
877	51-sb-135	0	511350	1.6790E+00	2.7500E+06	6.7000E+05	0.0000E+00	1.00	0.0	8.1200E+06	7.8000E-01	1.3377E+02	2	4	5167
								1.50	0.0	4.7000E+06	2.2000E-01				
878	52-te-135	0	521350	1.9000E+01	2.0842E+06	1.4779E+06	0.0000E+00	1.00	0.0	5.8880E+06	1.0000E+00	1.3376E+02	1	2	5270
879	53- i-135	0	531350	2.3650E+04	3.3900E+05	1.5810E+06	0.0000E+00	1.00	0.0	2.6260E+06	8.3400E-01	1.3375E+02	2	4	5349
								1.00	1.0	2.0990E+06	1.6600E-01				
880	54-xe-135	0	541350	3.2900E+04	3.2000E+05	2.4800E+05	0.0000E+00	1.00	0.0	1.1640E+06	1.0000E+00	1.3375E+02	1	4	5458
881	54-xe-135	1	541351	9.1700E+02	9.7300E+04	4.2800E+05	0.0000E+00	1.00	0.0	1.6910E+06	3.0000E-03	1.3375E+02	2	4	5459
								3.00	0.0	5.2656E+05	9.9700E-01				
882	55-cs-135	0	551350	7.3000E+13	7.5700E+04	0.0000E+00	0.0000E+00	1.00	0.0	2.6860E+05	1.0000E+00	1.3375E+02	1	1	5531
883	55-cs-135	1	551351	3.1800E+03	3.5400E+04	1.5980E+06	0.0000E+00	3.00	0.0	1.6330E+06	1.0000E+00	1.3375E+02	1	3	5532
884	56-ba-135	0	561350	stable								1.3491E+02	0	0	5640
885	56-ba-135	1	561351	1.0330E+05	2.0575E+05	6.1100E+04	0.0000E+00	3.00	0.0	2.6822E+05	1.0000E+00	1.3375E+02	1	3	5641
886	57-la-135	0	571350	7.0200E+04	5.1920E+03	3.5700E+04	0.0000E+00	2.00	0.0	1.2000E+06	1.0000E+00	1.3375E+02	2	4	5716
								2.00	1.0	9.3200E+05	5.0000E-09				
887	58-ce-135	0	581350	6.3700E+04	2.7300E+04	8.2400E+05	0.0000E+00	2.00	0.0	2.0260E+06	1.0000E+00	1.3375E+02	1	4	5822
888	58-ce-135	1	581351	2.0000E+01	1.5400E+05	2.9200E+05	0.0000E+00	3.00	0.0	4.4580E+05	1.0000E+00	1.3375E+02	1	3	5823
889	48-cd-136	0	481360	9.2520E-03	4.0980E+06	2.3510E+06	0.0000E+00	1.00	0.0	1.1170E+07	5.6000E-01	1.3596E+02	2	2	4905
								1.50	0.0	1.0554E+07	4.4000E-01				
890	49-in-136	0	491360	1.6230E-02	4.3830E+06	5.1570E+06	0.0000E+00	1.00	0.0	1.4565E+07	4.3000E-01	1.3595E+02	2	2	4994
								1.50	0.0	1.1056E+07	5.7000E-01				
891	50-sn-136	0	501360	2.5000E-01	2.6140E+06	1.4270E+06	0.0000E+00	1.00	0.0	8.4000E+06	7.0000E-01	1.3594E+02	2	2	5097
								1.50	0.0	5.2000E+06	3.0000E-01				
892	51-sb-136	0	511360	9.2300E-01	2.9530E+06	2.6050E+06	0.0000E+00	1.00	0.0	9.6000E+06	8.3700E-01	1.3593E+02	2	2	5170
								1.50	0.0	5.0000E+06	1.6300E-01				
893	52-te-136	0	521360	1.7630E+01	1.3000E+06	2.0400E+06	0.0000E+00	1.00	0.0	5.0930E+06	9.8690E-01	1.3475E+02	2	4	5273
								1.50	0.0	1.2410E+06	1.3100E-02				

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no	symbol	s	zzaaas	halflife	e-beta	e-gamma	e-alpha	rtyp	rfs	q	branching	awr	ndk	nsp	mat
894	53- i-136	0	531360	8.3400E+01	1.9900E+06	2.3500E+06	0.0000E+00	1.00	0.0	6.8570E+06	1.0000E+00	1.3475E+02	1	4	5352
895	53- i-136	1	531361	4.6900E+01	2.6800E+06	2.1330E+06	0.0000E+00	1.00	0.0	7.4970E+06	1.0000E+00	1.3475E+02	1	4	5353
896	54-xe-136	0	541360	stable								1.3591E+02	0	0	5461
897	55-cs-136	0	551360	1.1370E+06	1.3200E+05	1.4400E+06	0.0000E+00	1.00	0.0	2.5482E+06	7.5000E-01	1.3474E+02	2	4	5534
								1.00	1.0	5.1770E+05	2.5000E-01				
898	55-cs-136	1	551361	1.9000E+01	7.9380E+04	5.5000E+03	0.0000E+00	1.00	1.0	5.1770E+05	5.0000E-01	1.3591E+02	2	0	5535
								3.00	0.0	0.0000E+00	5.0000E-01				
899	56-ba-136	0	561360	stable								1.3590E+02	0	0	5643
900	56-ba-136	1	561361	3.0840E-01	1.0500E+05	1.9234E+06	0.0000E+00	3.00	0.0	2.0305E+06	1.0000E+00	1.3474E+02	1	3	5644
901	57-la-136	0	571360	5.9220E+02	6.0000E+05	4.1000E+05	0.0000E+00	2.00	0.0	2.8500E+06	1.0000E+00	1.3474E+02	1	4	5719
902	57-la-136	1	571361	1.1400E-01	4.2000E+04	1.2800E+05	0.0000E+00	3.00	0.0	2.3000E+05	1.0000E+00	1.3474E+02	1	3	5720
903	58-ce-136	0	581360	stable								1.3591E+02	0	0	5825
904	49-in-137	0	491370	1.2190E-02	4.4340E+06	4.0210E+06	0.0000E+00	1.00	0.0	1.3583E+07	2.1000E-01	1.3696E+02	2	2	4997
								1.50	0.0	1.1843E+07	7.9000E-01				
905	50-sn-137	0	501370	1.9000E-01	2.9700E+06	2.8310E+06	0.0000E+00	1.00	0.0	9.9000E+06	4.2000E-01	1.3694E+02	2	2	5100
								1.50	0.0	6.5000E+06	5.8000E-01				
906	51-sb-137	0	511370	1.6930E-01	2.5730E+06	2.3890E+06	0.0000E+00	1.00	0.0	9.3000E+06	5.1000E-01	1.3693E+02	2	2	5173
								1.50	0.0	6.1000E+06	4.9000E-01				
907	52-te-137	0	521370	2.4900E+00	2.1730E+06	1.6090E+06	0.0000E+00	1.00	0.0	6.9400E+06	9.7010E-01	1.3575E+02	2	2	5276
								1.50	1.0	1.3000E+06	2.9900E-02				
908	53- i-137	0	531370	2.4500E+01	1.8930E+06	1.1317E+06	0.0000E+00	1.00	0.0	5.8800E+06	9.2860E-01	1.3574E+02	2	2	5355
								1.50	0.0	1.8500E+06	7.1400E-02				
909	54-xe-137	0	541370	2.2910E+02	1.7000E+06	1.9000E+05	0.0000E+00	1.00	0.0	4.1623E+06	1.0000E+00	1.3574E+02	1	4	5464
910	55-cs-137	0	551370	9.4900E+08	1.8710E+05	0.0000E+00	0.0000E+00	1.00	0.0	1.1756E+06	5.3000E-02	1.3573E+02	2	1	5537
								1.00	1.0	5.1393E+05	9.4700E-01				
911	56-ba-137	0	561370	stable								1.3691E+02	0	0	5646
912	56-ba-137	1	561371	1.5312E+02	6.3640E+04	5.9480E+05	0.0000E+00	3.00	0.0	6.6166E+05	1.0000E+00	1.3573E+02	1	2	5647
913	57-la-137	0	571370	1.9000E+12	5.0540E+03	2.5327E+04	0.0000E+00	2.00	0.0	6.1400E+05	1.0000E+00	1.3573E+02	1	3	5722
914	58-ce-137	0	581370	3.2400E+04	7.8300E+03	3.7500E+04	0.0000E+00	2.00	0.0	1.2222E+06	1.0000E+00	1.3573E+02	1	4	5828
915	58-ce-137	1	581371	1.2380E+05	2.0200E+05	5.5800E+04	0.0000E+00	2.00	0.0	1.4765E+06	7.9000E-03	1.3573E+02	2	4	5829
								3.00	0.0	2.5429E+05	9.9210E-01				
916	49-in-138	0	491380	1.0350E-02	4.6520E+06	5.4650E+06	0.0000E+00	1.00	0.0	1.5426E+07	1.0000E+00	1.3796E+02	1	2	5000
917	50-sn-138	0	501380	6.6920E-02	3.0110E+06	1.6610E+06	0.0000E+00	1.00	0.0	8.2810E+06	6.8000E-01	1.3795E+02	2	2	5103
								1.50	0.0	5.9990E+06	3.2000E-01				
918	51-sb-138	0	511380	1.2560E-01	3.0300E+06	3.5780E+06	0.0000E+00	1.00	0.0	1.0800E+07	7.2000E-01	1.3794E+02	2	2	5176
								1.50	0.0	6.3000E+06	2.8000E-01				
919	52-te-138	0	521380	1.4000E+00	1.9460E+06	1.0680E+06	0.0000E+00	1.00	0.0	6.2200E+06	9.3700E-01	1.3793E+02	2	2	5279
								1.50	0.0	2.5000E+06	6.3000E-02				
920	53- i-138	0	531380	6.2300E+00	2.9000E+06	1.4200E+06	0.0000E+00	1.00	0.0	7.8200E+06	9.4440E-01	1.3674E+02	2	2	5358
								1.50	0.0	2.1600E+06	5.5600E-02				
921	54-xe-138	0	541380	8.4500E+02	6.4000E+05	1.1260E+06	0.0000E+00	1.00	0.0	2.9120E+06	1.0000E+00	1.3673E+02	1	4	5467
922	55-cs-138	0	551380	2.0050E+03	1.2400E+06	2.3600E+06	0.0000E+00	1.00	0.0	5.3750E+06	1.0000E+00	1.3673E+02	1	4	5540
923	55-cs-138	1	551381	1.7460E+02	3.3000E+05	7.0660E+05	0.0000E+00	1.00	0.0	5.4550E+06	1.9000E-01	1.3673E+02	2	4	5541
								3.00	0.0	7.9900E+04	8.1000E-01				
924	56-ba-138	0	561380	stable								1.3790E+02	0	0	5649
925	57-la-138	0	571380	3.2200E+18	3.6500E+04	1.2260E+06	0.0000E+00	1.00	0.0	1.0440E+06	3.4400E-01	1.3672E+02	2	5	5725
								2.00	0.0	1.7370E+06	6.5600E-01				
926	58-ce-138	0	581380	stable								1.3791E+02	0	0	5831
927	58-ce-138	1	581381	8.6500E-03	4.2580E+04	2.0800E+06	0.0000E+00	3.00	0.0	2.1297E+06	1.0000E+00	1.3672E+02	1	3	5832
928	59-pr-138	0	591380	8.7000E+01	1.1610E+06	8.1500E+05	0.0000E+00	2.00	0.0	4.4370E+06	1.0000E+00	1.3673E+02	1	4	5916

no	symbol	s	zzaaas	halflife	e-beta	e-gamma	e-alpha	rtyp	rfs	q	branching	awr	ndk	nsp	mat
929	59-pr-138	1	591381	7.6300E+03	1.7800E+05	7.7000E+05	0.0000E+00	2.00	0.0	4.8010E+06	6.9000E-02	1.3673E+02	2	4	5917
								2.00	1.0	2.6720E+06	9.3100E-01				
930	50-sn-139	0	501390	5.8410E-02	3.2550E+06	3.0720E+06	0.0000E+00	1.00	0.0	1.0188E+07	8.1000E-01	1.3895E+02	2	2	5106
								1.50	0.0	6.7400E+06	1.9000E-01				
931	51-sb-139	0	511390	8.8740E-02	2.9080E+06	2.6840E+06	0.0000E+00	1.00	0.0	1.0500E+07	6.5000E-01	1.3894E+02	2	2	5179
								1.50	0.0	7.5000E+06	3.5000E-01				
932	52-te-139	0	521390	3.1130E-01	2.3760E+06	2.3510E+06	0.0000E+00	1.00	0.0	8.0000E+06	9.6700E-01	1.3893E+02	2	2	5282
								1.50	0.0	3.3000E+06	3.3000E-02				
933	53- i-139	0	531390	2.2800E+00	2.5000E+06	6.6200E+05	0.0000E+00	1.00	0.0	6.8060E+06	8.9700E-01	1.3773E+02	2	4	5361
								1.50	0.0	3.0650E+06	1.0300E-01				
934	54-xe-139	0	541390	3.9680E+01	1.8100E+06	1.0170E+06	0.0000E+00	1.00	0.0	5.0560E+06	1.0000E+00	1.3773E+02	1	4	5470
935	55-cs-139	0	551390	5.5600E+02	1.6600E+06	3.0300E+05	0.0000E+00	1.00	0.0	4.2130E+06	1.0000E+00	1.3772E+02	1	4	5543
936	56-ba-139	0	561390	4.9840E+03	9.0100E+05	4.6000E+04	0.0000E+00	1.00	0.0	2.3179E+06	1.0000E+00	1.3772E+02	1	4	5652
937	57-la-139	0	571390	stable								1.3891E+02	0	0	5728
938	58-ce-139	0	581390	1.1892E+07	5.6900E+03	1.6017E+05	0.0000E+00	2.00	0.0	2.7900E+05	1.0000E+00	1.3771E+02	1	4	5834
939	58-ce-139	1	581391	5.4800E+01	5.0836E+04	6.9926E+05	0.0000E+00	3.00	0.0	7.5424E+05	1.0000E+00	1.3771E+02	1	3	5835
940	59-pr-139	0	591390	1.5880E+04	8.7690E+04	1.2930E+05	0.0000E+00	2.00	0.0	2.1290E+06	9.9983E-01	1.3772E+02	2	4	5919
								2.00	1.0	1.3750E+06	1.7000E-04				
941	50-sn-140	0	501400	4.1570E-02	3.0770E+06	1.9940E+06	0.0000E+00	1.00	0.0	8.7490E+06	7.2000E-01	1.3996E+02	2	2	5109
								1.50	0.0	7.0680E+06	2.8000E-01				
942	51-sb-140	0	511400	7.0190E-02	3.2630E+06	3.8770E+06	0.0000E+00	1.00	0.0	1.1016E+07	6.4000E-01	1.3995E+02	2	2	5182
								1.50	0.0	7.7950E+06	3.6000E-01				
943	52-te-140	0	521400	1.4870E-01	2.3360E+06	1.2750E+06	0.0000E+00	1.00	0.0	7.3000E+06	9.6100E-01	1.3994E+02	2	2	5285
								1.50	0.0	3.8000E+06	3.9000E-02				
944	53- i-140	0	531400	8.6000E-01	2.7620E+06	2.3280E+06	0.0000E+00	1.00	0.0	8.7100E+06	9.0700E-01	1.3873E+02	2	2	5364
								1.50	0.0	3.3000E+06	9.3000E-02				
945	54-xe-140	0	541400	1.3600E+01	1.0400E+06	1.4675E+06	0.0000E+00	1.00	0.0	4.0640E+06	1.0000E+00	1.3872E+02	1	4	5473
946	55-cs-140	0	551400	6.3700E+01	1.7518E+06	2.2161E+06	0.0000E+00	1.00	0.0	6.2210E+06	1.0000E+00	1.3871E+02	1	4	5546
947	56-ba-140	0	561400	1.1018E+06	3.2000E+05	1.8200E+05	0.0000E+00	1.00	0.0	1.0500E+06	1.0000E+00	1.3871E+02	1	4	5655
948	57-la-140	0	571400	1.4503E+05	5.3500E+05	2.3080E+06	0.0000E+00	1.00	0.0	3.7624E+06	1.0000E+00	1.3871E+02	1	4	5731
949	58-ce-140	0	581400	stable								1.3990E+02	0	0	5837
950	59-pr-140	0	591400	2.0340E+02	5.4700E+05	5.4400E+05	0.0000E+00	2.00	0.0	3.3880E+06	1.0000E+00	1.3871E+02	1	4	5922
951	51-sb-141	0	511410	4.7830E-02	3.0500E+06	2.8110E+06	0.0000E+00	1.00	0.0	9.5150E+06	3.5000E-01	1.4095E+02	2	2	5185
								1.50	0.0	8.6260E+06	6.5000E-01				
952	52-te-141	0	521410	1.1500E-01	2.6580E+06	2.5980E+06	0.0000E+00	1.00	0.0	9.0000E+06	9.5100E-01	1.4094E+02	2	2	5288
								1.50	0.0	4.6000E+06	4.9000E-02				
953	53- i-141	0	531410	4.3000E-01	2.4250E+06	1.7790E+06	0.0000E+00	1.00	0.0	7.6800E+06	7.8800E-01	1.4093E+02	2	2	5367
								1.50	0.0	4.4000E+06	2.1200E-01				
954	54-xe-141	0	541410	1.7300E+00	1.8000E+06	1.0080E+06	0.0000E+00	1.00	0.0	6.2800E+06	9.9956E-01	1.3972E+02	2	4	5476
								1.50	0.0	7.8200E+05	4.4000E-04				
955	55-cs-141	0	551410	2.4840E+01	1.9400E+06	9.9743E+05	0.0000E+00	1.00	0.0	5.2490E+06	9.9966E-01	1.3971E+02	2	4	5549
								1.50	0.0	7.2300E+05	3.4000E-04				
956	56-ba-141	0	561410	1.0960E+03	9.4600E+05	9.2500E+05	0.0000E+00	1.00	0.0	3.2130E+06	1.0000E+00	1.3970E+02	1	4	5658
957	57-la-141	0	571410	1.4110E+04	9.6300E+05	2.6800E+04	0.0000E+00	1.00	0.0	2.5020E+06	1.0000E+00	1.3970E+02	1	2	5734
958	58-ce-141	0	581410	2.8087E+06	1.7040E+05	7.6700E+04	0.0000E+00	1.00	0.0	5.8080E+05	1.0000E+00	1.3970E+02	1	4	5840
959	59-pr-141	0	591410	stable								1.4091E+02	0	0	5925
960	60-nd-141	0	601410	8.9600E+03	1.4200E+04	7.5100E+04	0.0000E+00	2.00	0.0	1.8230E+06	1.0000E+00	1.3970E+02	1	4	6022
961	60-nd-141	1	601411	6.2000E+01	5.8900E+04	8.1462E+05	0.0000E+00	2.00	0.0	2.5800E+06	5.0000E-04	1.3970E+02	2	4	6023
								3.00	0.0	7.5651E+05	9.9950E-01				
962	51-sb-142	0	511420	3.9860E-02	3.2830E+06	3.9160E+06	0.0000E+00	1.00	0.0	1.1096E+07	5.9000E-01	1.4196E+02	2	2	5188
								1.50	0.0	8.9470E+00	4.1000E-01				

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no	symbol	s	zzaaas	halflife	e-beta	e-gamma	e-alpha	rtyp	rfs	q	branching	awr	ndk	nsp	mat
963	52-te-142	0	521420	7.5040E-02	2.5130E+06	1.3750E+06	0.0000E+00	1.00	0.0	8.3000E+06	9.2600E-01	1.4195E+02	2	2	5291
								1.50	0.0	5.0160E+06	7.4000E-02				
964	53- i-142	0	531420	2.0000E-01	2.6920E+06	3.2030E+06	0.0000E+00	1.00	0.0	9.5000E+06	7.5000E-01	1.4194E+02	2	2	5370
								1.50	0.0	4.4000E+06	2.5000E-01				
965	54-xe-142	0	541420	1.2200E+00	1.4034E+06	1.5764E+06	0.0000E+00	1.00	0.0	5.2860E+06	9.9594E-01	1.4193E+02	2	2	5479
								1.50	0.0	1.1760E+06	4.0600E-03				
966	55-cs-142	0	551420	1.6840E+00	2.9000E+06	9.5000E+05	0.0000E+00	1.00	0.0	7.3080E+06	9.9910E-01	1.4071E+02	2	4	5552
								1.50	0.0	1.1390E+06	9.0000E-04				
967	56-ba-142	0	561420	6.3600E+02	3.8300E+05	1.0400E+06	0.0000E+00	1.00	0.0	2.2120E+06	1.0000E+00	1.4070E+02	1	4	5661
968	57-la-142	0	571420	5.4700E+03	8.6800E+05	2.3680E+06	0.0000E+00	1.00	0.0	4.5040E+06	1.0000E+00	1.4070E+02	1	4	5737
969	58-ce-142	0	581420	stable								1.4191E+02	0	0	5843
970	59-pr-142	0	591420	6.8830E+04	8.0900E+05	5.8000E+04	0.0000E+00	1.00	0.0	2.1625E+06	9.9984E-01	1.4069E+02	2	5	5928
								2.00	0.0	7.4580E+05	1.6000E-04				
971	59-pr-142	1	591421	8.8000E+02	2.4180E+03	2.9000E+02	0.0000E+00	3.00	0.0	3.6840E+03	1.0000E+00	1.4069E+02	1	2	5929
972	60-nd-142	0	601420	stable								1.4191E+02	0	0	6025
973	51-sb-143	0	511430	2.7390E-02	3.1320E+06	2.8860E+06	0.0000E+00	1.00	0.0	9.7590E+06	3.7000E-01	1.4296E+02	2	2	5191
								1.50	0.0	9.8250E+06	6.3000E-01				
974	52-te-143	0	521430	6.3840E-02	2.7100E+06	2.6510E+06	0.0000E+00	1.00	0.0	8.6650E+06	9.0000E-01	1.4295E+02	2	2	5294
								1.50	0.0	6.1300E+00	1.0000E-01				
975	53- i-143	0	531430	1.0680E-01	2.3750E+06	2.2520E+06	0.0000E+00	1.00	0.0	8.6000E+06	7.9000E-01	1.4294E+02	2	2	5373
								1.50	0.0	5.5000E+06	2.1000E-01				
976	54-xe-143	0	541430	3.0000E-01	2.0500E+06	2.0800E+06	0.0000E+00	1.00	0.0	7.4690E+06	9.9670E-01	1.4293E+02	2	2	5482
								1.50	0.0	2.2410E+06	3.3000E-03				
977	55-cs-143	0	551430	1.7910E+00	1.9350E+06	1.2170E+06	0.0000E+00	1.00	0.0	6.2640E+06	9.8360E-01	1.4170E+02	2	4	5555
								1.50	0.0	2.0810E+06	1.6400E-02				
978	56-ba-143	0	561430	1.4500E+01	1.2400E+06	1.1400E+06	0.0000E+00	1.00	0.0	4.2520E+06	1.0000E+00	1.4169E+02	1	4	5664
979	57-la-143	0	571430	8.5200E+02	1.5000E+06	2.6300E+05	0.0000E+00	1.00	0.0	3.4250E+06	1.0000E+00	1.4169E+02	1	2	5740
980	58-ce-143	0	581430	1.1894E+05	4.3100E+05	2.7900E+05	0.0000E+00	1.00	0.0	1.4615E+06	1.0000E+00	1.4168E+02	1	4	5846
981	59-pr-143	0	591430	1.1724E+06	3.1510E+05	9.0000E-03	0.0000E+00	1.00	0.0	9.3400E+05	1.0000E+00	1.4168E+02	1	2	5931
982	60-nd-143	0	601430	stable								1.4291E+02	0	0	6028
983	52-te-144	0	521440	4.3560E-02	2.4960E+06	1.7450E+06	0.0000E+00	1.00	0.0	7.3220E+06	8.5000E-01	1.4396E+02	2	2	5297
								1.50	0.0	6.4310E+06	1.5000E-01				
984	53- i-144	0	531440	8.3990E-02	2.7190E+06	3.2480E+06	0.0000E+00	1.00	0.0	1.0300E+07	8.3000E-01	1.4395E+02	2	2	5376
								1.50	0.0	5.5000E+06	1.7000E-01				
985	54-xe-144	0	541440	3.8800E-01	1.6060E+06	9.2320E+05	0.0000E+00	1.00	0.0	6.4000E+06	9.9350E-01	1.4394E+02	2	2	5485
								1.50	0.0	2.7270E+06	6.5000E-03				
986	55-cs-144	0	551440	9.9400E-01	2.6490E+06	2.1930E+06	0.0000E+00	1.00	0.0	8.5000E+06	9.6970E-01	1.4393E+02	2	2	5558
								1.50	0.0	2.5900E+06	3.0300E-02				
987	56-ba-144	0	561440	1.1500E+01	9.4630E+05	7.0500E+05	0.0000E+00	1.00	0.0	3.1200E+06	1.0000E+00	1.4392E+02	1	2	5667
988	57-la-144	0	571440	4.0800E+01	1.3600E+06	2.3300E+06	0.0000E+00	1.00	0.0	5.5400E+06	1.0000E+00	1.4268E+02	1	4	5743
989	58-ce-144	0	581440	2.4616E+07	9.1100E+04	1.9300E+04	0.0000E+00	1.00	0.0	3.1870E+05	9.9730E-01	1.4268E+02	2	4	5849
								1.00	1.0	2.5970E+05	2.7000E-03				
990	59-pr-144	0	591440	1.0370E+03	1.2090E+06	2.8900E+04	0.0000E+00	1.00	0.0	2.9975E+06	1.0000E+00	1.4268E+02	1	3	5934
991	59-pr-144	1	591441	4.3200E+02	4.2800E+04	1.2660E+04	0.0000E+00	1.00	0.0	3.0565E+06	7.0000E-04	1.4268E+02	2	4	5935
								3.00	0.0	5.9030E+04	9.9930E-01				
992	60-nd-144	0	601440	7.2000E+22	0.0000E+00	0.0000E+00	1.9040E+06	4.00	0.0	1.9051E+06	1.0000E+00	1.4267E+02	1	1	6031
993	61-pm-144	0	611440	3.1400E+07	1.4720E+04	1.5630E+06	0.0000E+00	2.00	0.0	2.3322E+06	1.0000E+00	1.4268E+02	1	4	6140
994	52-te-145	0	521450	3.7940E-02	2.8520E+06	2.7740E+06	0.0000E+00	1.00	0.0	9.0800E+06	8.5000E-01	1.4496E+02	2	2	5300
								1.50	0.0	7.1960E+06	1.5000E-01				
995	53- i-145	0	531450	5.6430E-02	2.4680E+06	2.3420E+06	0.0000E+00	1.00	0.0	7.8660E+06	6.1000E-01	1.4495E+02	2	2	5379
								1.50	0.0	7.7720E+06	3.9000E-01				

no	symbol	s	zzaaas	halflife	e-beta	e-gamma	e-alpha	rtyp	rfs	q	branching	awr	ndk	nsp	mat
996	54-xe-145	0	541450	1.8800E-01	2.2910E+06	1.8270E+06	0.0000E+00	1.00	0.0	8.5640E+06	9.5000E-01	1.4494E+02	2	2	5488
								1.50	0.0	3.7100E+06	5.0000E-02				
997	55-cs-145	0	551450	5.8700E-01	2.0700E+06	1.3870E+06	0.0000E+00	1.00	0.0	7.3600E+06	8.5300E-01	1.4369E+02	2	4	5561
								1.50	0.0	3.6410E+06	1.4700E-01				
998	56-ba-145	0	561450	4.3100E+00	1.3100E+06	2.0500E+06	0.0000E+00	1.00	0.0	5.5700E+06	1.0000E+00	1.4368E+02	1	4	5670
999	57-la-145	0	571450	2.4800E+01	9.9780E+05	1.7290E+06	0.0000E+00	1.00	0.0	4.1100E+06	1.0000E+00	1.4368E+02	1	4	5746
1000	58-ce-145	0	581450	1.8060E+02	5.3790E+05	1.0400E+06	0.0000E+00	1.00	0.0	2.5400E+06	1.0000E+00	1.4367E+02	1	4	5852
1001	59-pr-145	0	591450	2.1540E+04	6.7500E+05	1.8580E+04	0.0000E+00	1.00	0.0	1.8050E+06	1.0000E+00	1.4367E+02	1	4	5937
1002	60-nd-145	0	601450	stable								1.4491E+02	0	0	6034
1003	61-pm-145	0	611450	5.5900E+08	1.1410E+04	3.2020E+04	6.2700E-01	2.00	0.0	1.6350E+05	1.0000E+00	1.4367E+02	2	4	6143
								4.00	0.0	2.3220E+06	2.8000E-07				
1004	53- i-146	0	531460	4.6400E-02	2.8190E+06	3.3810E+06	0.0000E+00	1.00	0.0	9.6260E+06	7.6000E-01	1.4596E+02	2	2	5382
								1.50	0.0	8.1360E+06	2.4000E-01				
1005	54-xe-146	0	541460	1.4600E-01	1.9710E+06	1.0860E+06	0.0000E+00	1.00	0.0	7.6700E+06	9.8000E-01	1.4594E+02	2	2	5491
								1.50	0.0	4.0300E+06	2.0000E-02				
1006	55-cs-146	0	551460	3.2100E-01	2.6320E+06	2.1900E+06	0.0000E+00	1.00	0.0	9.3800E+06	8.5800E-01	1.4594E+02	2	2	5564
								1.50	0.0	3.7200E+06	1.4200E-01				
1007	56-ba-146	0	561460	2.2200E+00	1.1750E+06	8.3300E+05	0.0000E+00	1.00	0.0	4.1200E+06	1.0000E+00	1.4468E+02	1	2	5673
1008	57-la-146	0	571460	6.2700E+00	2.3500E+06	1.4924E+06	0.0000E+00	1.00	0.0	6.5500E+06	1.0000E+00	1.4467E+02	1	4	5749
1009	57-la-146	1	571461	1.0000E+01	1.0140E+06	2.2200E+06	0.0000E+00	1.00	0.0	6.5500E+06	1.0000E+00	1.4467E+02	1	4	5750
1010	58-ce-146	0	581460	8.1100E+02	1.9500E+05	3.1600E+05	0.0000E+00	1.00	0.0	1.0400E+06	1.0000E+00	1.4466E+02	1	4	5855
1011	59-pr-146	0	591460	1.4490E+03	1.3200E+06	1.0100E+06	0.0000E+00	1.00	0.0	4.2200E+06	1.0000E+00	1.4466E+02	1	2	5940
1012	60-nd-146	0	601460	stable								1.4591E+02	0	0	6037
1013	61-pm-146	0	611460	1.7450E+08	9.0000E+04	7.5100E+05	0.0000E+00	1.00	0.0	1.5420E+06	3.4000E-01	1.4466E+02	2	5	6146
								2.00	0.0	1.4720E+06	6.6000E-01				
1014	62-sm-146	0	621460	3.2500E+15	0.0000E+00	0.0000E+00	2.5280E+06	4.00	0.0	2.5290E+06	1.0000E+00	1.4466E+02	1	1	6231
1015	53- i-147	0	531470	3.1270E-02	2.9650E+06	2.7720E+06	0.0000E+00	1.00	0.0	9.3190E+06	5.8000E-01	1.4696E+02	2	2	5385
								1.50	0.0	8.8790E+06	4.2000E-01				
1016	54-xe-147	0	541470	1.0000E-01	2.2790E+06	2.3130E+06	0.0000E+00	1.00	0.0	8.8000E+06	9.2000E-01	1.4695E+02	2	2	5494
								1.50	0.0	4.3000E+06	8.0000E-02				
1017	55-cs-147	0	551470	2.3500E-01	2.4000E+06	1.5810E+06	0.0000E+00	1.00	0.0	8.5800E+06	7.1500E-01	1.4568E+02	2	4	5567
								1.50	0.0	4.9100E+06	2.8500E-01				
1018	56-ba-147	0	561470	8.9300E-01	1.8580E+06	1.3010E+06	0.0000E+00	1.00	0.0	6.2500E+06	9.9940E-01	1.4567E+02	2	4	5676
								1.50	0.0	4.5000E+05	6.0000E-04				
1019	57-la-147	0	571470	4.0150E+00	1.6320E+06	9.3630E+05	0.0000E+00	1.00	0.0	5.1800E+06	9.9959E-01	1.4567E+02	2	4	5752
								1.50	0.0	7.6000E+05	4.1000E-04				
1020	58-ce-147	0	581470	5.6400E+01	8.5910E+05	1.0810E+06	0.0000E+00	1.00	0.0	3.4260E+06	1.0000E+00	1.4566E+02	1	2	5858
1021	59-pr-147	0	591470	8.0400E+02	7.5000E+05	8.1400E+05	0.0000E+00	1.00	0.0	2.6970E+06	1.0000E+00	1.4566E+02	1	4	5943
1022	60-nd-147	0	601470	9.4870E+05	2.6700E+05	1.4400E+05	0.0000E+00	1.00	0.0	8.9570E+05	1.0000E+00	1.4565E+02	1	4	6040
1023	61-pm-147	0	611470	8.2788E+07	6.1930E+04	4.3600E+00	0.0000E+00	1.00	0.0	2.2410E+05	1.0000E+00	1.4565E+02	1	4	6149
1024	62-sm-147	0	621470	3.3500E+18	0.0000E+00	0.0000E+00	2.3090E+06	4.00	0.0	2.3108E+06	1.0000E+00	1.4565E+02	1	1	6234
1025	53- i-148	0	531480	2.9730E-02	3.1050E+06	3.7450E+06	0.0000E+00	1.00	0.0	1.0577E+07	6.3000E-01	1.4796E+02	2	2	5388
								1.50	0.0	9.0850E+06	3.7000E-01				
1026	54-xe-148	0	541480	5.8830E-02	2.5530E+06	1.4020E+06	0.0000E+00	1.00	0.0	7.1120E+06	9.3800E-01	1.4795E+02	2	2	5497
								1.50	0.0	5.1630E+06	6.2000E-02				
1027	55-cs-148	0	551480	1.4600E-01	2.4540E+06	2.9690E+06	0.0000E+00	1.00	0.0	1.0700E+07	7.4900E-01	1.4795E+02	2	2	5570
								1.50	0.0	5.2000E+06	2.5100E-01				
1028	56-ba-148	0	561480	6.1200E-01	1.3430E+06	8.3530E+05	0.0000E+00	1.00	0.0	5.1200E+06	9.9600E-01	1.4667E+02	2	4	5679
								1.50	0.0	7.6000E+05	4.0000E-03				
1029	57-la-148	0	571480	1.2600E+00	2.6700E+06	1.2560E+06	0.0000E+00	1.00	0.0	7.2600E+06	9.9850E-01	1.4666E+02	2	4	5755
								1.50	0.0	8.3000E+05	1.5000E-03				

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no	symbol	s	zzaaas	halflife	e-beta	e-gamma	e-alpha	rtyp	rfs	q	branching	awr	ndk	nsp	mat
1030	58-ce-148	0	581480	5.6000E+01	6.0100E+05	3.2600E+05	0.0000E+00	1.00	0.0	2.1400E+06	1.0000E+00	1.4665E+02	1	4	5861
1031	59-pr-148	0	591480	1.3740E+02	1.6850E+06	1.2359E+06	0.0000E+00	1.00	0.0	4.8800E+06	1.0000E+00	1.4665E+02	1	4	5946
1032	59-pr-148	1	591481	1.2100E+02	1.2907E+06	1.7970E+06	0.0000E+00	1.00	0.0	4.9700E+06	1.0000E+00	1.4665E+02	1	2	5947
1033	60-nd-148	0	601480	stable								1.4792E+02	0	0	6043
1034	61-pm-148	0	611480	4.6380E+05	7.2900E+05	5.7400E+05	0.0000E+00	1.00	0.0	2.4700E+06	1.0000E+00	1.4665E+02	1	4	6152
1035	61-pm-148	1	611481	3.5670E+06	1.6800E+05	1.9910E+06	0.0000E+00	1.00	0.0	2.6070E+06	9.5800E-01	1.4665E+02	2	4	6153
								3.00	0.0	1.3710E+05	4.2000E-02				
1036	62-sm-148	0	621480	2.2000E+23	0.0000E+00	0.0000E+00	1.9850E+06	4.00	0.0	1.9864E+06	1.0000E+00	1.4664E+02	1	1	6237
1037	54-xe-149	0	541490	5.7350E-02	2.6370E+06	2.6190E+06	0.0000E+00	1.00	0.0	8.5000E+06	9.0800E-01	1.4896E+02	2	2	5500
								1.50	0.0	5.9420E+06	9.2000E-02				
1038	55-cs-149	0	551490	9.4180E-02	2.5070E+06	2.4040E+06	0.0000E+00	1.00	0.0	9.6000E+06	8.1000E-01	1.4895E+02	2	2	5573
								1.50	0.0	6.1000E+06	1.9000E-01				
1039	56-ba-149	0	561490	3.4400E-01	2.0160E+06	1.5200E+06	0.0000E+00	1.00	0.0	7.3000E+06	9.9570E-01	1.4894E+02	2	2	5682
								1.50	0.0	1.5700E+06	4.3000E-03				
1040	57-la-149	0	571490	1.0500E+00	1.7830E+06	1.0870E+06	0.0000E+00	1.00	0.0	5.9000E+06	9.8570E-01	1.4893E+02	2	2	5758
								1.50	0.0	1.5000E+06	1.4300E-02				
1041	58-ce-149	0	581490	5.3000E+00	1.1752E+06	1.0450E+06	0.0000E+00	1.00	0.0	4.3600E+06	1.0000E+00	1.4893E+02	1	2	5864
1042	59-pr-149	0	591490	1.3560E+02	9.5260E+05	6.1610E+05	0.0000E+00	1.00	0.0	3.3200E+06	1.0000E+00	1.4764E+02	1	4	5949
1043	60-nd-149	0	601490	6.2210E+03	5.3000E+05	3.8400E+05	0.0000E+00	1.00	0.0	1.6900E+06	1.0000E+00	1.4764E+02	1	4	6046
1044	61-pm-149	0	611490	1.9109E+05	4.5000E+05	1.1900E+04	0.0000E+00	1.00	0.0	1.0700E+06	1.0000E+00	1.4764E+02	1	4	6155
1045	62-sm-149	0	621490	stable								1.4892E+02	0	0	6240
1046	63-eu-149	0	631490	8.0400E+06	1.9300E+04	6.5500E+04	0.0000E+00	2.00	0.0	6.9400E+05	1.0000E+00	1.4764E+02	1	4	6319
1047	54-xe-150	0	541500	3.6750E-02	3.0920E+06	1.7220E+06	0.0000E+00	1.00	0.0	8.5460E+06	8.9000E-01	1.4996E+02	2	2	5503
								1.50	0.0	6.1550E+06	1.1000E-01				
1048	55-cs-150	0	551500	8.5030E-02	2.7510E+06	3.3310E+06	0.0000E+00	1.00	0.0	1.1600E+07	8.0000E-01	1.4995E+02	2	2	5576
								1.50	0.0	6.5000E+06	2.0000E-01				
1049	56-ba-150	0	561500	3.0000E-01	1.9850E+06	1.0960E+06	0.0000E+00	1.00	0.0	6.4000E+06	9.9000E-01	1.4994E+02	2	2	5685
								1.50	0.0	2.1000E+06	1.0000E-02				
1050	57-la-150	0	571500	5.1000E-01	2.0370E+06	2.5470E+06	0.0000E+00	1.00	0.0	7.8000E+06	9.7300E-01	1.4994E+02	2	2	5761
								1.50	0.0	1.6000E+06	2.7000E-02				
1051	58-ce-150	0	581500	4.0000E+00	6.8918E+05	4.3969E+05	0.0000E+00	1.00	0.0	3.4800E+06	1.0000E+00	1.4993E+02	1	2	5867
1052	59-pr-150	0	591500	6.1900E+00	1.9000E+06	5.6000E+05	0.0000E+00	1.00	0.0	5.3900E+06	1.0000E+00	1.4864E+02	1	4	5952
1053	60-nd-150	0	601500	stable								1.4992E+02	0	0	6049
1054	61-pm-150	0	611500	9.6500E+03	7.3000E+05	1.4700E+06	0.0000E+00	1.00	0.0	3.4540E+06	1.0000E+00	1.4863E+02	1	4	6158
1055	62-sm-150	0	621500	stable								1.4992E+02	0	0	6243
1056	63-eu-150	0	631500	1.1600E+09	1.9000E+04	1.5360E+06	0.0000E+00	2.00	0.0	2.2600E+06	1.0000E+00	1.4863E+02	1	4	6322
1057	63-eu-150	1	631501	4.6100E+04	2.9700E+05	5.0000E+04	0.0000E+00	1.00	0.0	1.0140E+06	8.9000E-01	1.4863E+02	2	5	6323
								2.00	0.0	2.3020E+06	1.1000E-01				
1058	55-cs-151	0	551510	5.6210E-02	2.9640E+06	2.7950E+06	0.0000E+00	1.00	0.0	1.0600E+07	7.2000E-01	1.5096E+02	2	2	5579
								1.50	0.0	7.3000E+06	2.8000E-01				
1059	56-ba-151	0	561510	1.7910E-01	2.1830E+06	2.2510E+06	0.0000E+00	1.00	0.0	8.5000E+06	9.8200E-01	1.5095E+02	2	2	5688
								1.50	0.0	3.1000E+06	1.8000E-02				
1060	57-la-151	0	571510	9.8180E-01	2.2020E+06	1.6010E+06	0.0000E+00	1.00	0.0	7.2000E+06	9.8100E-01	1.5094E+02	2	2	5764
								1.50	0.0	2.5000E+06	1.9000E-02				
1061	58-ce-151	0	581510	1.7600E+00	1.4400E+06	8.7740E+05	0.0000E+00	1.00	0.0	5.2700E+06	1.0000E+00	1.5093E+02	1	2	5870
1062	58-ce-151	1	581511	1.0200E+00	1.7080E+06	1.3040E+05	0.0000E+00	1.00	0.0	5.2700E+06	1.0000E+00	1.5093E+02	1	2	5871
1063	59-pr-151	0	591510	1.8900E+01	1.2340E+06	7.0110E+05	0.0000E+00	1.00	0.0	4.1820E+06	1.0000E+00	1.4963E+02	1	2	5955
1064	60-nd-151	0	601510	7.4600E+02	6.0900E+05	8.5100E+05	0.0000E+00	1.00	0.0	2.4420E+06	1.0000E+00	1.4963E+02	1	4	6052
1065	61-pm-151	0	611510	1.0224E+05	3.0000E+05	3.2800E+05	0.0000E+00	1.00	0.0	1.1870E+06	1.0000E+00	1.4963E+02	1	4	6161
1066	62-sm-151	0	621510	2.8000E+09	1.9790E+04	1.3600E+01	0.0000E+00	1.00	0.0	7.6400E+04	1.0000E+00	1.4962E+02	1	4	6246

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no	symbol	s	zzaaas	halflife	e-beta	e-gamma	e-alpha	rtyp	rfs	q	branching	awr	ndk	nsp	mat
1067	63-eu-151	0	631510	stable								1.5092E+02	0	0	6325
1068	64-gd-151	0	641510	1.0700E+07	3.3800E+04	7.0300E+04	2.0800E-02	2.00	0.0	4.6400E+05	1.0000E+00	1.4962E+02	2	4	6422
								4.00	0.0	2.6530E+06	8.0000E-09				
1069	55-cs-152	0	551520	5.0620E-02	2.3760E+06	1.6980E+06	0.0000E+00	1.00	0.0	1.0269E+07	7.3000E-01	1.5196E+02	2	2	5582
								1.50	0.0	7.5840E+06	2.7000E-01				
1070	56-ba-152	0	561520	1.2300E-01	2.5240E+06	1.3900E+06	0.0000E+00	1.00	0.0	7.5000E+06	9.7200E-01	1.5195E+02	2	2	5691
								1.50	0.0	3.6000E+06	2.8000E-02				
1071	57-la-152	0	571520	3.9030E-01	2.3550E+06	2.8850E+06	0.0000E+00	1.00	0.0	9.0000E+06	9.6900E-01	1.5194E+02	2	2	5767
								1.50	0.0	3.4000E+06	3.1000E-02				
1072	58-ce-152	0	581520	1.4000E+00	1.1660E+06	7.7840E+05	0.0000E+00	1.00	0.0	4.7000E+06	1.0000E+00	1.5193E+02	1	2	5873
1073	59-pr-152	0	591520	3.6300E+00	2.1200E+06	1.6800E+06	0.0000E+00	1.00	0.0	6.3500E+06	1.0000E+00	1.5063E+02	1	4	5958
1074	60-nd-152	0	601520	6.8400E+02	3.3000E+05	1.6400E+05	0.0000E+00	1.00	0.0	1.1040E+06	1.0000E+00	1.5062E+02	1	4	6055
1075	61-pm-152	0	611520	2.4700E+02	1.3300E+06	2.8600E+05	0.0000E+00	1.00	0.0	3.5100E+06	1.0000E+00	1.5062E+02	1	4	6164
1076	61-pm-152	1	611521	4.5100E+02	9.2000E+05	1.5000E+06	0.0000E+00	1.00	0.0	3.6600E+06	1.0000E+00	1.5062E+02	1	4	6165
1077	61-pm-152	2	611522	8.2800E+02	6.6079E+05	1.7332E+06	0.0000E+00	1.00	0.0	3.6600E+06	1.0000E+00	1.5192E+02	1	2	6166
1078	62-sm-152	0	621520	stable								1.5192E+02	0	0	6249
1079	63-eu-152	0	631520	4.2720E+08	1.2400E+05	1.1680E+06	0.0000E+00	1.00	0.0	1.8199E+06	2.7900E-01	1.5062E+02	2	5	6328
								2.00	0.0	1.8748E+06	7.2100E-01				
1080	63-eu-152	1	631521	3.3522E+04	5.1200E+05	2.9400E+05	0.0000E+00	1.00	0.0	1.8655E+06	7.3000E-01	1.5062E+02	2	5	6329
								2.00	0.0	1.9204E+06	2.7000E-01				
1081	63-eu-152	2	631522	5.7600E+03	5.8100E+04	7.4800E+04	0.0000E+00	3.00	0.0	1.4781E+05	1.0000E+00	1.5062E+02	1	3	6330
1082	64-gd-152	0	641520	3.4000E+21	0.0000E+00	0.0000E+00	2.2030E+06	4.00	0.0	2.2032E+06	1.0000E+00	1.5062E+02	1	1	6425
1083	56-ba-153	0	561530	9.6980E-02	2.4980E+06	2.5250E+06	0.0000E+00	1.00	0.0	9.3000E+06	9.5300E-01	1.5296E+02	2	2	5694
								1.50	0.0	4.4000E+06	4.7000E-02				
1084	57-la-153	0	571530	2.0640E-01	2.5950E+06	2.0880E+06	0.0000E+00	1.00	0.0	8.4000E+06	9.2500E-01	1.5295E+02	2	2	5770
								1.50	0.0	4.1000E+06	7.5000E-02				
1085	58-ce-153	0	581530	2.3630E+00	1.6800E+06	1.1250E+06	0.0000E+00	1.00	0.0	6.3000E+06	1.0000E+00	1.5294E+02	1	2	5876
1086	59-pr-153	0	591530	4.2800E+00	1.7000E+06	1.0270E+06	0.0000E+00	1.00	0.0	5.7200E+06	1.0000E+00	1.5293E+02	1	2	5961
1087	60-nd-153	0	601530	3.1600E+01	1.1800E+06	2.8000E+05	0.0000E+00	1.00	0.0	3.3360E+06	1.0000E+00	1.5161E+02	1	4	6058
1088	61-pm-153	0	611530	3.1500E+02	6.9000E+05	7.6300E+04	0.0000E+00	1.00	0.0	1.8810E+06	1.0000E+00	1.5161E+02	1	4	6167
1089	62-sm-153	0	621530	1.6740E+05	2.6700E+05	6.1800E+04	0.0000E+00	1.00	0.0	8.0710E+05	1.0000E+00	1.5161E+02	1	4	6252
1090	62-sm-153	1	621531	1.0600E-02	5.4000E+04	3.1600E+04	0.0000E+00	3.00	0.0	9.8400E+04	1.0000E+00	1.5161E+02	1	3	6253
1091	63-eu-153	0	631530	stable								1.5292E+02	0	0	6331
1092	64-gd-153	0	641530	2.0770E+07	4.0000E+04	1.0520E+05	0.0000E+00	2.00	0.0	4.8340E+05	1.0000E+00	1.5161E+02	1	4	6428
1093	56-ba-154	0	561540	6.7590E-02	2.9560E+06	1.6450E+06	0.0000E+00	1.00	0.0	8.2050E+06	9.3600E-01	1.5396E+02	2	2	5697
								1.50	0.0	4.9060E+06	6.4000E-02				
1094	57-la-154	0	571540	1.3690E-01	2.6150E+06	3.1990E+06	0.0000E+00	1.00	0.0	1.0300E+07	9.0700E-01	1.5395E+02	2	2	5773
								1.50	0.0	4.9000E+06	9.3000E-02				
1095	58-ce-154	0	581540	9.7370E-01	1.6940E+06	9.5870E+05	0.0000E+00	1.00	0.0	5.5000E+06	9.9981E-01	1.5394E+02	2	2	5879
								1.50	0.0	9.0000E+05	1.9000E-04				
1096	59-pr-154	0	591540	2.3000E+00	1.8730E+06	2.4140E+06	0.0000E+00	1.00	0.0	7.4900E+06	9.9952E-01	1.5261E+02	2	4	5964
								1.50	0.0	1.0800E+06	4.8000E-04				
1097	60-nd-154	0	601540	2.5900E+01	8.7000E+05	4.6520E+05	0.0000E+00	1.00	1.0	2.8100E+06	1.0000E+00	1.5261E+02	1	4	6061
1098	61-pm-154	0	611540	1.6100E+02	8.3900E+05	1.7790E+06	0.0000E+00	1.00	0.0	3.9600E+06	1.0000E+00	1.5260E+02	1	4	6170
1099	61-pm-154	1	611541	1.0400E+02	8.8000E+05	1.7800E+06	0.0000E+00	1.00	0.0	3.9800E+06	1.0000E+00	1.5260E+02	1	4	6171
1100	62-sm-154	0	621540	stable								1.5392E+02	0	0	6255
1101	63-eu-154	0	631540	2.7140E+08	2.7200E+05	1.2430E+06	0.0000E+00	1.00	0.0	1.9690E+06	9.9982E-01	1.5260E+02	2	5	6334
								2.00	0.0	7.1770E+05	1.8000E-04				
1102	63-eu-154	1	631541	2.7600E+03	6.6000E+04	8.4000E+04	0.0000E+00	3.00	0.0	1.4530E+05	1.0000E+00	1.5260E+02	1	3	6335
1103	64-gd-154	0	641540	stable								1.5392E+02	0	0	6431

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no	symbol	s	zzaaas	halflife	e-beta	e-gamma	e-alpha	rtyp	rfs	q	branching	awr	ndk	nsp	mat
1104	65-tb-154	0	651540	7.7400E+04	6.1000E+04	2.2400E+06	0.0000E+00	2.00	0.0	3.5500E+06	1.0000E+00	1.5260E+02	1	4	6510
1105	65-tb-154	1	651541	3.3800E+04	4.4000E+04	1.3000E+06	0.0000E+00	2.00	0.0	3.5600E+06	7.8200E-01	1.5260E+02	2	4	6511
								3.00	0.0	1.2000E+04	2.1800E-01				
1106	65-tb-154	2	651542	8.1700E+04	9.3000E+04	2.0400E+06	0.0000E+00	2.00	0.0	3.7500E+06	9.8200E-01	1.5260E+02	2	4	6512
								3.00	1.0	1.9000E+05	1.8000E-02				
1107	57-la-155	0	571550	1.0400E-01	2.8170E+06	2.6980E+06	0.0000E+00	1.00	0.0	9.6000E+06	8.2000E-01	1.5496E+02	2	2	5776
								1.50	0.0	5.8000E+06	1.8000E-01				
1108	58-ce-155	0	581550	4.4500E-01	2.0150E+06	1.5710E+06	0.0000E+00	1.00	0.0	7.4000E+06	9.9740E-01	1.5495E+02	2	2	5882
								1.50	0.0	1.7000E+06	2.6000E-03				
1109	59-pr-155	0	591550	2.5850E+00	2.0710E+06	1.4800E+06	0.0000E+00	1.00	0.0	6.7000E+06	9.9630E-01	1.5494E+02	2	2	5967
								1.50	0.0	1.8000E+06	3.7000E-03				
1110	60-nd-155	0	601550	8.9000E+00	1.3660E+06	8.3390E+05	0.0000E+00	1.00	0.0	4.5000E+06	1.0000E+00	1.5360E+02	1	2	6064
1111	61-pm-155	0	611550	4.1500E+01	1.0200E+06	6.3300E+05	0.0000E+00	1.00	0.0	3.2200E+06	1.0000E+00	1.5493E+02	1	2	6173
1112	62-sm-155	0	621550	1.3380E+03	5.6800E+05	1.0290E+05	0.0000E+00	1.00	0.0	1.6267E+06	1.0000E+00	1.5359E+02	1	4	6258
1113	63-eu-155	0	631550	1.5000E+08	6.3400E+04	6.1300E+04	0.0000E+00	1.00	0.0	2.5290E+05	1.0000E+00	1.5359E+02	1	4	6337
1114	64-gd-155	0	641550	stable								1.5492E+02	0	0	6434
1115	64-gd-155	1	641551	3.1970E-02	3.9200E+04	7.3810E+04	0.0000E+00	3.00	0.0	1.2105E+05	1.0000E+00	1.5359E+02	1	3	6435
1116	65-tb-155	0	651550	4.6000E+05	3.8800E+04	1.7700E+05	0.0000E+00	2.00	0.0	8.2300E+05	1.0000E+00	1.5359E+02	1	4	6513
1117	57-la-156	0	571560	7.6900E-02	3.0360E+06	3.7320E+06	0.0000E+00	1.00	0.0	1.0460E+07	8.1000E-01	1.5596E+02	2	2	5779
								1.50	0.0	6.3790E+06	1.9000E-01				
1118	58-ce-156	0	581560	2.2610E-01	2.1180E+06	1.1710E+06	0.0000E+00	1.00	0.0	6.5000E+06	9.9300E-01	1.5595E+02	2	2	5885
								1.50	0.0	2.3000E+06	7.0000E-03				
1119	59-pr-156	0	591560	1.2160E+00	2.1490E+06	2.6880E+06	0.0000E+00	1.00	0.0	8.6000E+06	9.7700E-01	1.5594E+02	2	2	5970
								1.50	0.0	2.5000E+06	2.3000E-02				
1120	60-nd-156	0	601560	5.4900E+00	1.1220E+06	7.6570E+05	0.0000E+00	1.00	0.0	3.6900E+06	1.0000E+00	1.5593E+02	1	2	6067
1121	61-pm-156	0	611560	2.6700E+01	1.3900E+06	1.7300E+06	0.0000E+00	1.00	0.0	5.1500E+06	1.0000E+00	1.5459E+02	1	4	6176
1122	62-sm-156	0	621560	3.3800E+04	2.0000E+05	1.1400E+05	0.0000E+00	1.00	0.0	7.2200E+05	1.0000E+00	1.5459E+02	1	4	6261
1123	63-eu-156	0	631560	1.3120E+06	4.5000E+05	1.2340E+06	0.0000E+00	1.00	0.0	2.4490E+06	1.0000E+00	1.5459E+02	1	4	6340
1124	64-gd-156	0	641560	stable								1.5592E+02	0	0	6437
1125	65-tb-156	0	651560	4.6200E+05	7.9000E+04	1.9400E+06	0.0000E+00	2.00	0.0	2.4440E+06	1.0000E+00	1.5459E+02	1	4	6516
1126	65-tb-156	1	651561	8.8000E+04	1.1300E+04	3.6816E+04	0.0000E+00	3.00	0.0	4.9600E+04	1.0000E+00	1.5459E+02	1	3	6517
1127	65-tb-156	2	651562	8.7840E+04	4.0000E+04	2.3000E+03	0.0000E+00	2.00	0.0	2.5320E+06	5.0000E-01	1.5459E+02	2	4	6518
								3.00	0.0	8.8400E+04	5.0000E-01				
1128	57-la-157	0	571570	5.9190E-02	3.2500E+06	3.0650E+06	0.0000E+00	1.00	0.0	1.0239E+07	1.0000E+00	1.5696E+02	1	2	5782
1129	58-ce-157	0	581570	1.7530E-01	2.4310E+06	2.0890E+06	0.0000E+00	1.00	0.0	8.3000E+06	1.0000E+00	1.5695E+02	1	2	5888
1130	59-pr-157	0	591570	5.5360E-01	2.3870E+06	1.8810E+06	0.0000E+00	1.00	0.0	7.8000E+06	9.6200E-01	1.5695E+02	2	2	5973
								1.50	0.0	3.5000E+06	3.8000E-02				
1131	60-nd-157	0	601570	5.4330E+00	1.6680E+06	1.1400E+06	0.0000E+00	1.00	0.0	5.5800E+06	1.0000E+00	1.5694E+02	1	2	6070
1132	61-pm-157	0	611570	1.0560E+01	1.4510E+06	8.4080E+05	0.0000E+00	1.00	0.0	4.3600E+06	1.0000E+00	1.5693E+02	1	2	6179
1133	62-sm-157	0	621570	4.8200E+02	8.9000E+05	4.0900E+05	0.0000E+00	1.00	0.0	2.7300E+06	1.0000E+00	1.5558E+02	1	4	6264
1134	63-eu-157	0	631570	5.4650E+04	3.9000E+05	2.9100E+05	0.0000E+00	1.00	0.0	1.3630E+06	1.0000E+00	1.5558E+02	1	4	6343
1135	64-gd-157	0	641570	stable								1.5692E+02	0	0	6440
1136	65-tb-157	0	651570	2.2400E+09	3.3800E+03	7.2300E+03	0.0000E+00	2.00	0.0	6.0100E+04	1.0000E+00	1.5558E+02	1	4	6519
1137	66-dy-157	0	661570	2.9300E+04	9.8700E+03	3.4700E+05	0.0000E+00	2.00	0.0	1.3430E+06	1.0000E+00	1.5558E+02	1	4	6628
1138	66-dy-157	1	661571	2.1600E-02	9.5000E+04	1.0100E+05	0.0000E+00	3.00	0.0	1.9950E+05	1.0000E+00	1.5558E+02	1	3	6629
1139	58-ce-158	0	581580	1.1180E-01	2.6080E+06	1.4450E+06	0.0000E+00	1.00	0.0	7.3040E+06	1.0000E+00	1.5796E+02	1	2	5891
1140	59-pr-158	0	591580	2.9170E-01	2.5520E+06	3.1550E+06	0.0000E+00	1.00	0.0	9.7000E+06	1.0000E+00	1.5795E+02	1	2	5976
1141	60-nd-158	0	601580	2.7250E+00	1.5890E+06	9.2390E+05	0.0000E+00	1.00	0.0	4.7000E+06	1.0000E+00	1.5794E+02	1	2	6073
1142	61-pm-158	0	611580	4.8000E+00	1.5690E+06	2.1640E+06	0.0000E+00	1.00	0.0	6.1200E+06	1.0000E+00	1.5794E+02	1	2	6182
1143	62-sm-158	0	621580	3.1800E+02	4.0843E+05	5.5492E+05	0.0000E+00	1.00	0.0	1.9990E+06	1.0000E+00	1.5793E+02	1	2	6267

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no	symbol	s	zzaaas	halflife	e-beta	e-gamma	e-alpha	rtyp	rfs	q	branching	awr	ndk	nsp	mat
1144	63-eu-158	0	631580	2.7540E+03	8.9000E+05	1.3000E+06	0.0000E+00	1.00	0.0	3.4900E+06	1.0000E+00	1.5657E+02	1	4	6346
1145	64-gd-158	0	641580	stable								1.5792E+02	0	0	6443
1146	65-tb-158	0	651580	5.7000E+09	9.8000E+04	8.0200E+05	0.0000E+00	1.00	0.0	9.3480E+05	1.6600E-01	1.5657E+02	2	5	6522
								2.00	0.0	1.2195E+06	8.3400E-01				
1147	65-tb-158	1	651581	1.0700E+01	8.2400E+04	2.3900E+04	0.0000E+00	3.00	0.0	1.1030E+05	1.0000E+00	1.5657E+02	1	3	6523
1148	65-tb-158	2	651582	4.0000E-04	1.3200E+05	2.8100E+05	0.0000E+00	3.00	0.0	3.8840E+05	1.0000E+00	1.5657E+02	1	3	6524
1149	66-dy-158	0	661580	stable								1.5792E+02	0	0	6631
1150	58-ce-159	0	581590	9.2270E-02	2.3700E+06	2.4490E+06	0.0000E+00	1.00	0.0	7.8100E+06	1.0000E+00	1.5896E+02	1	2	5894
1151	59-pr-159	0	591590	1.7150E-01	2.7730E+06	2.3380E+06	0.0000E+00	1.00	0.0	8.8000E+06	1.0000E+00	1.5895E+02	1	2	5979
1152	60-nd-159	0	601590	1.4250E+00	2.0630E+06	1.6660E+06	0.0000E+00	1.00	0.0	6.6000E+06	9.9979E-01	1.5894E+02	2	2	6076
								1.50	0.0	8.0000E+05	2.1000E-04				
1153	61-pm-159	0	611590	1.4700E+00	1.7820E+06	1.1600E+06	0.0000E+00	1.00	0.0	5.3600E+06	9.9998E-01	1.5894E+02	2	2	6185
								1.50	0.0	2.9000E+05	2.0000E-05				
1154	62-sm-159	0	621590	1.1370E+01	1.0002E+06	9.6497E+05	0.0000E+00	1.00	0.0	3.8400E+06	1.0000E+00	1.5893E+02	1	2	6270
1155	63-eu-159	0	631590	1.0860E+03	9.0000E+05	3.0700E+05	0.0000E+00	1.00	0.0	2.5150E+06	1.0000E+00	1.5756E+02	1	4	6349
1156	64-gd-159	0	641590	6.6524E+04	3.0900E+05	5.6700E+04	0.0000E+00	1.00	0.0	9.7050E+05	1.0000E+00	1.5756E+02	1	4	6446
1157	65-tb-159	0	651590	stable								1.5893E+02	0	0	6525
1158	66-dy-159	0	661590	1.2476E+07	9.9700E+03	4.5200E+04	0.0000E+00	2.00	0.0	3.6560E+05	1.0000E+00	1.5756E+02	1	4	6634
1159	58-ce-160	0	581600	6.4010E-02	2.9310E+06	1.7000E+06	0.0000E+00	1.00	0.0	8.2360E+06	1.0000E+00	1.5997E+02	1	2	5897
1160	59-pr-160	0	591600	1.4220E-01	2.6390E+06	3.2330E+06	0.0000E+00	1.00	0.0	9.1660E+06	1.0000E+00	1.5996E+02	1	2	5982
1161	60-nd-160	0	601600	5.0300E-01	2.1000E+06	1.2060E+06	0.0000E+00	1.00	0.0	5.7000E+06	1.0000E+00	1.5995E+02	1	2	6079
1162	61-pm-160	0	611600	2.5470E+00	1.9690E+06	2.5000E+06	0.0000E+00	1.00	0.0	7.3000E+06	9.9927E-01	1.5994E+02	2	2	6188
								1.50	0.0	1.0000E+06	7.3000E-04				
1163	62-sm-160	0	621600	9.6000E+00	8.4670E+05	6.8980E+05	0.0000E+00	1.00	0.0	3.0000E+06	1.0000E+00	1.5993E+02	1	2	6273
1164	63-eu-160	0	631600	3.8000E+01	1.1690E+06	2.5400E+06	0.0000E+00	1.00	0.0	4.5800E+06	1.0000E+00	1.5856E+02	1	2	6352
1165	64-gd-160	0	641600	stable								1.5993E+02	0	0	6449
1166	65-tb-160	0	651600	6.2470E+06	2.5800E+05	1.1260E+06	0.0000E+00	1.00	0.0	1.8351E+06	1.0000E+00	1.5855E+02	1	4	6528
1167	66-dy-160	0	661600	stable								1.5993E+02	0	0	6637
1168	67-ho-160	0	671600	1.5360E+03	0.0000E+00	1.6300E+06	0.0000E+00	2.00	0.0	3.2900E+06	1.0000E+00	1.5855E+02	1	2	6710
1169	67-ho-160	1	671601	1.8072E+04	3.6000E+04	1.6708E+06	0.0000E+00	2.00	0.0	3.3500E+06	3.5000E-01	1.5855E+02	2	4	6711
								3.00	0.0	5.9980E+04	6.5000E-01				
1170	67-ho-160	2	671602	3.0000E+00	5.5000E+04	1.0330E+05	0.0000E+00	3.00	0.0	1.6960E+05	1.0000E+00	1.5855E+02	1	3	6712
1171	59-pr-161	0	591610	8.7870E-02	2.9760E+06	2.8370E+06	0.0000E+00	1.00	0.0	9.4630E+06	1.0000E+00	1.6096E+02	1	2	5985
1172	60-nd-161	0	601610	3.0650E-01	2.1600E+06	1.8790E+06	0.0000E+00	1.00	0.0	7.5000E+06	1.0000E+00	1.6095E+02	1	2	6082
1173	61-pm-161	0	611610	1.3340E+00	2.1080E+06	1.6960E+06	0.0000E+00	1.00	0.0	6.5000E+06	9.9200E-01	1.6095E+02	2	2	6191
								1.50	0.0	1.9000E+06	8.0000E-03				
1174	62-sm-161	0	621610	4.8000E+00	1.5070E+06	1.1380E+06	0.0000E+00	1.00	0.0	4.8000E+06	1.0000E+00	1.6094E+02	1	2	6276
1175	63-eu-161	0	631610	2.6000E+01	1.0059E+06	1.0062E+06	0.0000E+00	1.00	0.0	3.7000E+06	1.0000E+00	1.6093E+02	1	2	6355
1176	64-gd-161	0	641610	2.2000E+02	5.8620E+05	3.9300E+05	0.0000E+00	1.00	0.0	1.9555E+06	1.0000E+00	1.5955E+02	1	4	6452
1177	65-tb-161	0	651610	5.9670E+05	1.9600E+05	3.5500E+04	0.0000E+00	1.00	0.0	5.9300E+05	1.0000E+00	1.5954E+02	1	4	6531
1178	66-dy-161	0	661610	stable								1.6093E+02	0	0	6640
1179	67-ho-161	0	671610	8.9300E+03	2.7600E+04	5.8000E+04	0.0000E+00	2.00	0.0	8.5830E+05	1.0000E+00	1.5954E+02	1	4	6713
1180	67-ho-161	1	671611	6.7600E+00	1.0500E+05	1.0610E+05	0.0000E+00	3.00	0.0	2.1115E+05	1.0000E+00	1.5954E+02	1	3	6714
1181	59-pr-162	0	591620	6.4180E-02	2.9270E+06	3.5770E+06	0.0000E+00	1.00	0.0	1.0100E+07	1.0000E+00	1.6197E+02	1	2	5988
1182	60-nd-162	0	601620	2.0410E-01	2.4850E+06	1.4310E+06	0.0000E+00	1.00	0.0	7.0560E+06	1.0000E+00	1.6196E+02	1	2	6085
1183	61-pm-162	0	611620	5.6690E-01	2.0790E+06	2.6200E+06	0.0000E+00	1.00	0.0	8.4000E+06	1.0000E+00	1.6195E+02	1	2	6194
1184	62-sm-162	0	621620	2.4000E+00	1.3830E+06	8.7780E+05	0.0000E+00	1.00	0.0	3.9000E+06	1.0000E+00	1.6194E+02	1	2	6279
1185	63-eu-162	0	631620	1.0600E+01	1.4030E+06	2.0180E+06	0.0000E+00	1.00	0.0	5.6000E+06	1.0000E+00	1.6194E+02	1	2	6358
1186	64-gd-162	0	641620	5.0400E+02	2.8618E+05	5.3704E+05	0.0000E+00	1.00	0.0	1.3900E+06	1.0000E+00	1.6054E+02	1	4	6455
1187	65-tb-162	0	651620	4.5600E+02	5.3100E+05	1.1060E+06	0.0000E+00	1.00	0.0	2.5100E+06	1.0000E+00	1.6054E+02	1	4	6534

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no	symbol	s	zzaaas	halflife	e-beta	e-gamma	e-alpha	rtyp	rfs	q	branching	awr	ndk	nsp	mat
1188	66-dy-162	0	661620	stable								1.6193E+02	0	0	6643
1189	67-ho-162	0	671620	9.0000E+02	5.5400E+04	1.6200E+05	0.0000E+00	2.00	0.0	2.1400E+06	1.0000E+00	1.6054E+02	1	4	6716
1190	67-ho-162	1	671621	4.0200E+03	5.2200E+04	5.5300E+05	0.0000E+00	2.00	0.0	2.2460E+06	3.8000E-01	1.6054E+02	2	4	6717
								3.00	0.0	1.0587E+05	6.2000E-01				
1191	60-nd-163	0	601630	1.4740E-01	2.4820E+06	2.2190E+06	0.0000E+00	1.00	0.0	7.8380E+06	1.0000E+00	1.6296E+02	1	2	6088
1192	61-pm-163	0	611630	3.2010E-01	2.3930E+06	2.0190E+06	0.0000E+00	1.00	0.0	7.6000E+06	1.0000E+00	1.6295E+02	1	2	6197
1193	62-sm-163	0	621630	3.0270E+00	1.6690E+06	1.3340E+06	0.0000E+00	1.00	0.0	5.7000E+06	1.0000E+00	1.6294E+02	1	2	6282
1194	63-eu-163	0	631630	1.0770E+01	1.5410E+06	1.0720E+06	0.0000E+00	1.00	0.0	4.9000E+06	1.0000E+00	1.6294E+02	1	2	6361
1195	64-gd-163	0	641630	6.8000E+01	8.5917E+05	9.6128E+05	0.0000E+00	1.00	0.0	3.1000E+06	1.0000E+00	1.6293E+02	1	2	6458
1196	65-tb-163	0	651630	1.1700E+03	3.6200E+05	7.8900E+05	0.0000E+00	1.00	0.0	1.7850E+06	1.0000E+00	1.6153E+02	1	4	6537
1197	66-dy-163	0	661630	stable								1.6293E+02	0	0	6646
1198	67-ho-163	0	671630	1.4420E+11	0.0000E+00	0.0000E+00	0.0000E+00	2.00	0.0	2.5550E+03	1.0000E+00	1.6153E+02	1	1	6719
1199	67-ho-163	1	671631	1.0900E+00	6.0021E+04	2.3710E+05	0.0000E+00	3.00	0.0	2.9788E+05	1.0000E+00	1.6153E+02	1	3	6720
1200	68-er-163	0	681630	4.5000E+03	5.4132E+03	3.9990E+04	0.0000E+00	2.00	0.0	1.2100E+06	9.9980E-01	1.6153E+02	2	4	6828
								2.00	1.0	9.1200E+05	2.0000E-04				
1201	60-nd-164	0	601640	1.0810E-01	2.7410E+06	1.5880E+06	0.0000E+00	1.00	0.0	7.7460E+06	1.0000E+00	1.6396E+02	1	2	6091
1202	61-pm-164	0	611640	1.9160E-01	2.3480E+06	2.9260E+06	0.0000E+00	1.00	0.0	8.2710E+06	1.0000E+00	1.6396E+02	1	2	6200
1203	62-sm-164	0	621640	1.6390E+00	1.8030E+06	1.0490E+06	0.0000E+00	1.00	0.0	4.9000E+06	9.9999E-01	1.6395E+02	2	2	6285
								1.50	0.0	4.0000E+05	1.0000E-05				
1204	63-eu-164	0	631640	3.0250E+00	1.5630E+06	2.1470E+06	0.0000E+00	1.00	0.0	6.6000E+06	9.9999E-01	1.6394E+02	2	2	6364
								1.50	0.0	3.0000E+05	1.0000E-05				
1205	64-gd-164	0	641640	4.5000E+01	7.1810E+05	6.4690E+05	0.0000E+00	1.00	0.0	2.3000E+06	1.0000E+00	1.6393E+02	1	2	6461
1206	65-tb-164	0	651640	1.8000E+02	8.9000E+05	2.3600E+06	0.0000E+00	1.00	0.0	3.8900E+06	1.0000E+00	1.6252E+02	1	4	6540
1207	66-dy-164	0	661640	stable								1.6393E+02	0	0	6649
1208	67-ho-164	0	671640	1.7400E+03	1.4500E+05	2.9600E+04	0.0000E+00	1.00	0.0	9.6240E+05	4.0000E-01	1.6252E+02	2	5	6722
								2.00	0.0	9.8620E+05	6.0000E-01				
1209	67-ho-164	1	671641	2.2500E+03	8.1000E+04	4.7000E+04	0.0000E+00	3.00	0.0	1.3977E+05	1.0000E+00	1.6252E+02	1	3	6723
1210	68-er-164	0	681640	stable								1.6393E+02	0	0	6831
1211	61-pm-165	0	611650	1.5190E-01	2.5790E+06	2.2210E+06	0.0000E+00	1.00	0.0	8.0490E+06	1.0000E+00	1.6496E+02	1	2	6203
1212	62-sm-165	0	621650	6.5990E-01	1.9630E+06	1.6910E+06	0.0000E+00	1.00	0.0	6.8000E+06	9.9934E-01	1.6495E+02	2	2	6288
								1.50	0.0	1.2000E+06	6.6000E-04				
1213	63-eu-165	0	631650	2.7620E+00	1.8300E+06	1.4070E+06	0.0000E+00	1.00	0.0	5.9000E+06	9.9880E-01	1.6494E+02	2	2	6367
								1.50	0.0	1.1000E+06	1.2000E-03				
1214	64-gd-165	0	641650	1.0300E+01	1.2300E+06	8.8110E+05	0.0000E+00	1.00	0.0	4.2000E+06	1.0000E+00	1.6494E+02	1	2	6464
1215	65-tb-165	0	651650	1.2700E+02	9.1156E+05	8.3600E+05	0.0000E+00	1.00	0.0	2.9600E+06	1.3200E-01	1.6352E+02	2	2	6543
								1.00	1.0	2.8500E+06	8.6800E-01				
1216	66-dy-165	0	661650	8.4020E+03	4.4800E+05	2.2970E+04	0.0000E+00	1.00	0.0	1.2867E+06	1.0000E+00	1.6351E+02	1	4	6652
1217	66-dy-165	1	661651	7.5400E+01	1.0200E+05	1.9000E+04	0.0000E+00	1.00	0.0	1.3949E+06	2.2400E-02	1.6351E+02	2	4	6653
								3.00	0.0	1.0816E+05	9.7760E-01				
1218	67-ho-165	0	671650	stable								1.6493E+02	0	0	6725
1219	68-er-165	0	681650	3.7300E+04	5.3210E+03	3.7661E+04	0.0000E+00	2.00	0.0	3.7640E+05	1.0000E+00	1.6351E+02	1	3	6834
1220	61-pm-166	0	611660	9.8560E-02	2.6820E+06	3.3230E+06	0.0000E+00	1.00	0.0	9.3560E+06	1.0000E+00	1.6596E+02	1	2	6206
1221	62-sm-166	0	621660	4.5640E-01	2.0840E+06	1.2050E+06	0.0000E+00	1.00	0.0	6.0120E+06	9.9710E-01	1.6595E+02	2	2	6291
								1.50	0.0	1.3860E+06	2.9000E-03				
1222	63-eu-166	0	631660	1.0240E+00	1.8380E+06	2.3950E+06	0.0000E+00	1.00	0.0	7.8000E+06	1.0000E+00	1.6595E+02	1	2	6370
1223	64-gd-166	0	641660	4.8000E+00	1.1740E+06	8.0610E+05	0.0000E+00	1.00	0.0	3.4000E+06	1.0000E+00	1.6594E+02	1	2	6467
1224	65-tb-166	0	651660	2.5100E+01	7.4794E+05	2.0496E+06	0.0000E+00	1.00	0.0	4.8300E+06	1.0000E+00	1.6594E+02	1	2	6546
1225	66-dy-166	0	661660	2.9380E+05	1.6700E+05	4.2100E+04	0.0000E+00	1.00	0.0	4.8680E+05	1.0000E+00	1.6451E+02	1	4	6655
1226	67-ho-166	0	671660	9.6570E+04	6.9400E+05	2.9560E+04	0.0000E+00	1.00	0.0	1.8547E+06	1.0000E+00	1.6451E+02	1	4	6728
1227	67-ho-166	1	671661	3.8000E+10	1.4390E+05	1.5930E+06	0.0000E+00	1.00	0.0	1.8607E+06	1.0000E+00	1.6451E+02	1	4	6729

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no	symbol	s	zzaaas	halflife	e-beta	e-gamma	e-alpha	rtyp	rfs	q	branching	awr	ndk	nsp	mat
1228	68-er-166	0	681660	stable								1.6593E+02	0	0	6837
1229	69-tm-166	0	691660	2.7720E+04	8.1000E+04	1.9900E+06	0.0000E+00	2.00	0.0	3.0380E+06	1.0000E+00	1.6451E+02	1	4	6916
1230	69-tm-166	1	691661	3.4000E-01	4.4800E+04	2.1700E+04	0.0000E+00	3.00	0.0	1.0934E+05	1.0000E+00	1.6451E+02	1	3	6917
1231	62-sm-167	0	621670	2.6860E-01	2.3380E+06	2.1010E+06	0.0000E+00	1.00	0.0	7.4330E+06	1.0000E+00	1.6696E+02	1	2	6294
1232	63-eu-167	0	631670	7.7330E-01	2.0240E+06	1.6430E+06	0.0000E+00	1.00	0.0	7.1000E+06	1.0000E+00	1.6695E+02	1	2	6373
1233	64-gd-167	0	641670	4.5840E+00	1.5450E+06	1.2170E+06	0.0000E+00	1.00	0.0	5.1000E+06	1.0000E+00	1.6694E+02	1	2	6470
1234	65-tb-167	0	651670	1.9400E+01	1.0140E+06	1.0273E+06	0.0000E+00	1.00	0.0	4.1000E+06	1.0000E+00	1.6694E+02	1	2	6549
1235	66-dy-167	0	661670	3.7200E+02	7.1000E+05	5.3300E+05	0.0000E+00	1.00	0.0	2.3500E+06	1.0000E+00	1.6550E+02	1	4	6658
1236	67-ho-167	0	671670	1.1200E+04	2.1000E+05	3.5000E+05	0.0000E+00	1.00	0.0	1.0100E+06	8.8000E-01	1.6550E+02	2	4	6731
								1.00	1.0	8.0200E+05	1.2000E-01				
1237	68-er-167	0	681670	stable								1.6693E+02	0	0	6840
1238	68-er-167	1	681671	2.2690E+00	1.0800E+05	9.8200E+04	0.0000E+00	3.00	0.0	2.0780E+05	1.0000E+00	1.6550E+02	1	3	6841
1239	69-tm-167	0	691670	7.9920E+05	1.8300E+04	5.1000E+04	0.0000E+00	2.00	0.0	7.4830E+05	1.8000E-02	1.6550E+02	2	4	6919
								2.00	1.0	5.4050E+05	9.8200E-01				
1240	62-sm-168	0	621680	1.9630E-01	2.4430E+06	1.4150E+06	0.0000E+00	1.00	0.0	6.9750E+06	1.0000E+00	1.6796E+02	1	2	6297
1241	63-eu-168	0	631680	3.6510E-01	2.1680E+06	2.7490E+06	0.0000E+00	1.00	0.0	7.7310E+06	1.0000E+00	1.6796E+02	1	2	6376
1242	64-gd-168	0	641680	3.4580E+00	1.5210E+06	9.3250E+05	0.0000E+00	1.00	0.0	4.4000E+06	1.0000E+00	1.6795E+02	1	2	6473
1243	65-tb-168	0	651680	8.2000E+00	1.1700E+06	1.8530E+06	0.0000E+00	1.00	0.0	6.1000E+06	1.0000E+00	1.6794E+02	1	2	6552
1244	66-dy-168	0	661680	5.2200E+02	3.1869E+05	5.4288E+05	0.0000E+00	1.00	0.0	1.5000E+06	1.0000E+00	1.6649E+02	1	4	6661
1245	67-ho-168	0	671680	1.7900E+02	7.9000E+05	8.6000E+05	0.0000E+00	1.00	0.0	2.9300E+06	1.0000E+00	1.6649E+02	1	4	6734
1246	67-ho-168	1	671681	1.3200E+02	4.7880E+04	7.3931E+03	0.0000E+00	1.00	0.0	2.9900E+06	5.0000E-03	1.6649E+02	2	3	6735
								3.00	0.0	5.9000E+04	9.9500E-01				
1247	68-er-168	0	681680	stable								1.6793E+02	0	0	6843
1248	69-tm-168	0	691680	8.0440E+06	8.1700E+04	1.2612E+06	0.0000E+00	1.00	0.0	2.5700E+05	1.0000E-04	1.6649E+02	2	5	6922
								2.00	0.0	1.6789E+06	9.9990E-01				
1249	70-yb-168	0	701680	stable								1.6793E+02	0	0	7025
1250	63-eu-169	0	631690	2.6350E-01	2.2770E+06	1.9350E+06	0.0000E+00	1.00	0.0	7.1520E+06	1.0000E+00	1.6896E+02	1	2	6379
1251	64-gd-169	0	641690	1.5400E+00	1.9130E+06	1.6640E+06	0.0000E+00	1.00	0.0	6.2000E+06	1.0000E+00	1.6895E+02	1	2	6476
1252	65-tb-169	0	651690	4.4270E+00	1.3550E+06	9.2740E+05	0.0000E+00	1.00	0.0	5.5000E+06	1.0000E+00	1.6895E+02	1	2	6555
1253	66-dy-169	0	661690	3.9000E+01	1.1600E+06	3.1565E+05	0.0000E+00	1.00	0.0	3.2000E+06	1.0000E+00	1.6749E+02	1	4	6664
1254	67-ho-169	0	671690	2.8300E+02	4.1400E+05	6.6200E+05	0.0000E+00	1.00	0.0	2.1250E+06	1.0000E+00	1.6749E+02	1	4	6737
1255	68-er-169	0	681690	8.1150E+05	1.0300E+05	1.7200E+01	0.0000E+00	1.00	0.0	3.5140E+05	1.0000E+00	1.6748E+02	1	4	6846
1256	69-tm-169	0	691690	stable								1.6893E+02	0	0	6925
1257	70-yb-169	0	701690	2.7664E+06	1.0830E+05	3.1320E+05	0.0000E+00	2.00	0.0	9.1000E+05	1.0000E+00	1.6748E+02	1	4	7028
1258	70-yb-169	1	701691	4.6000E+01	1.9304E+04	1.2670E+03	0.0000E+00	3.00	0.0	2.4200E+04	1.0000E+00	1.6748E+02	1	2	7029
1259	63-eu-170	0	631700	1.6280E-01	2.1650E+06	2.7530E+06	0.0000E+00	1.00	0.0	7.7310E+06	1.0000E+00	1.6996E+02	1	2	6382
1260	64-gd-170	0	641700	9.6620E-01	1.9140E+06	1.1160E+06	0.0000E+00	1.00	0.0	5.5820E+06	1.0000E+00	1.6995E+02	1	2	6479
1261	65-tb-170	0	651700	2.0020E+00	1.4940E+06	2.1070E+06	0.0000E+00	1.00	0.0	7.3000E+06	1.0000E+00	1.6995E+02	1	2	6558
1262	66-dy-170	0	661700	4.1150E+01	6.4785E+05	6.2895E+05	0.0000E+00	1.00	1.0	2.4600E+06	1.0000E+00	1.6994E+02	1	2	6667
1263	67-ho-170	0	671700	1.6600E+02	7.4000E+05	1.7000E+06	0.0000E+00	1.00	0.0	3.8700E+06	1.0000E+00	1.6848E+02	1	4	6740
1264	67-ho-170	1	671701	4.3000E+01	9.5746E+05	1.3172E+06	0.0000E+00	1.00	0.0	3.9900E+06	1.0000E+00	1.6848E+02	1	2	6741
1265	68-er-170	0	681700	stable								1.6993E+02	0	0	6849
1266	69-tm-170	0	691700	1.1110E+07	3.2800E+05	4.1700E+03	0.0000E+00	1.00	0.0	9.6840E+05	9.9869E-01	1.6848E+02	2	5	6928
								2.00	0.0	3.1390E+05	1.3100E-03				
1267	70-yb-170	0	701700	stable								1.6993E+02	0	0	7031
1268	64-gd-171	0	641710	5.1180E-01	1.9880E+06	1.7600E+06	0.0000E+00	1.00	0.0	6.3760E+06	1.0000E+00	1.7096E+02	1	2	6482
1269	65-tb-171	0	651710	1.5270E+00	1.5940E+06	1.1680E+06	0.0000E+00	1.00	0.0	6.6000E+06	1.0000E+00	1.7095E+02	1	2	6561
1270	66-dy-171	0	661710	1.2430E+01	1.2500E+06	9.2900E+05	0.0000E+00	1.00	0.0	4.4000E+06	1.0000E+00	1.7095E+02	1	2	6670
1271	67-ho-171	0	671710	5.3000E+01	7.1300E+05	5.8130E+05	0.0000E+00	1.00	0.0	3.2000E+06	1.0000E+00	1.6947E+02	1	2	6743
1272	68-er-171	0	681710	2.7058E+04	4.1700E+05	3.7300E+05	0.0000E+00	1.00	0.0	1.4909E+06	1.0000E+00	1.6947E+02	1	4	6852

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no	symbol	s	zzaaas	halflife	e-beta	e-gamma	e-alpha	rtyp	rfs	q	branching	awr	ndk	nsp	mat
1273	69-tm-171	0	691710	6.0600E+07	2.4900E+04	6.1490E+02	0.0000E+00	1.00	0.0	9.6500E+04	1.0000E+00	1.6947E+02	1	4	6931
1274	70-yb-171	0	701710	stable								1.7094E+02	0	0	7034
1275	70-yb-171	1	701711	5.2500E-03	5.2000E+04	3.0500E+04	0.0000E+00	3.00	0.0	9.5282E+04	1.0000E+00	1.6947E+02	1	3	7035
1276	64-gd-172	0	641720	3.5050E-01	2.1990E+06	1.2790E+06	0.0000E+00	1.00	0.0	6.3440E+06	1.0000E+00	1.7196E+02	1	2	6485
1277	65-tb-172	0	651720	6.9020E-01	1.5110E+06	2.1250E+06	0.0000E+00	1.00	0.0	5.7370E+06	1.0000E+00	1.7196E+02	1	2	6564
1278	66-dy-172	0	661720	8.1120E+00	1.0140E+06	7.5300E+05	0.0000E+00	1.00	0.0	3.7000E+06	1.0000E+00	1.7195E+02	1	2	6673
1279	67-ho-172	0	671720	2.5000E+01	7.5713E+05	2.0579E+06	0.0000E+00	1.00	0.0	5.1000E+06	1.0000E+00	1.7195E+02	1	2	6746
1280	68-er-172	0	681720	1.7750E+05	1.2600E+05	5.0000E+05	0.0000E+00	1.00	0.0	8.9100E+05	1.0000E+00	1.7046E+02	1	4	6855
1281	69-tm-172	0	691720	2.2900E+05	5.3000E+05	4.7400E+05	0.0000E+00	1.00	0.0	1.8800E+06	1.0000E+00	1.7046E+02	1	4	6934
1282	70-yb-172	0	701720	stable								1.7194E+02	0	0	7037
1283	71-lu-172	0	711720	5.7900E+05	1.0700E+05	1.9500E+06	0.0000E+00	2.00	0.0	2.5187E+06	1.0000E+00	1.7046E+02	1	4	7116
1284	71-lu-172	1	711721	2.2000E+02	3.4000E+04	1.3700E+03	0.0000E+00	3.00	0.0	4.1860E+04	1.0000E+00	1.7046E+02	1	3	7117

4 Fission Yields Data

Fission yields data of fission products were prepared based on the ENDF/B-VI data with the modification to have consistent FP nuclides with JENDL/FPD-2011, which means that all of the FP nuclides in the JENDL/FPD-2011 file are contained in the yields file and the cumulative yields data were recalculated based on the decay chains of the JENDL/FPD-2011 file.

There are several nuclides which are included in the JENDL/FPD-2011 file, but not included in ENDF/B-VI fission yields file. For those nuclides fission yields had to be calculated. The independent fission yield $y_i(A,Z)$ of a nuclide with mass A and charge Z is given by:

$$y_i(A,Z) = Y(A) \times f(A,Z) \times r_i(A,Z), \tag{4.1}$$

where $Y(A)$ is mass yield which is the total of the independent yields of all fission products with mass A, $f(A,Z)$ the fractional independent yield, and $r_i(A,Z)$ the isomeric yield ratio.

The fractional independent yields were calculated by following equation:

$$f(A,Z) = \frac{N(A)}{\sigma_A\sqrt{2\pi}} \int_{Z-0.5}^{Z+0.5} \exp\left[-\frac{(Z-Z_p(A))^2}{2\sigma_A^2}\right] dz, \tag{4.2}$$

where $Z_p(A)$ is the most probable charge, σ_A the Gaussian width of mass A and $N(A)$ the normalization factor. The normalization factor $N(A)$ is given as the summation of all elements of each mass becomes 1.0.

$$\sum_{Z=0}^{\infty} f(A,Z) = 1.0.$$

The values of $Z_p(A)$ and σ_A were taken from the evaluation of T.R. England and B.F. Rider [13].

The isomeric yield ratio $r_i(A,Z)$ is expressed using the meta stable yield y_m and the ground state yield y_g as

$$r_i(A,Z) = \begin{cases} \frac{y_m}{y_m+y_g} & \text{if} \quad i = m, \\ \frac{y_g}{y_m+y_g} & \text{if} \quad i = g. \end{cases}$$

The ratios y_m/y_g are obtained using F functions introduced by Madland and England [14] in Table 4.1, where J_m and J_g are spins of the metastable state and the ground state, respectively.

The F functions are calculated by following equations:

A odd, $|J_m - J_g|$ even

$$\begin{aligned} F_1 &= \exp(1/<J^2>)\left\{\exp\left[-(1/<J^2>)\left(\frac{J_m+J_g+3}{2}\right)^2\right]\right. \\ &\left. +(1/<J^2>)\left(\frac{J_m+J_g+1}{2}\right)\exp\left[-(1/<J^2>)\left(\frac{J_m+J_g+1}{2}\right)^2\right]\right\} \end{aligned} \tag{4.3}$$

A odd, $|J_m - J_g|$ odd

$$F_2 = \exp(1/<J^2>)\left\{\exp\left[-(1/<J^2>)\left(\frac{J_m+J_g+2}{2}\right)^2\right]\right\} \tag{4.4}$$

A even, $|J_m - J_g|$ even

$$\begin{aligned} F_3 &= \exp\left[-(1/<J^2>)\left(\frac{J_m+J_g+2}{2}\right)\left(\frac{J_m+J_g+4}{2}\right)\right] \\ &+(1/<J^2>)\left(\frac{J_m+J_g+1}{2}\right)\exp\left[-(1/<J^2>)\left(\frac{J_m+J_g}{2}\right)\left(\frac{J_m+J_g+2}{2}\right)\right] \end{aligned} \tag{4.5}$$

Table 4.1 Isomeric yield ratio y_m/y_g

ODD A

1. $J_m - Jg$ = even integer $J_m > J_g$ $\left(\frac{F_1}{1-F_1}\right)$	2. $J_m - J_g$ = even integer $J_m < J_g$ $\left(\frac{1-F_1}{F_1}\right)$
3. $J_m - J_g$ = odd integer $J_m > J_g$ $\left(\frac{F_2}{1-F_2}\right)$	4. $J_m - J_g$ = odd integer $J_m < J_g$ $\left(\frac{1-F_2}{F_2}\right)$

EVEN A

5. $J_m - J_g$ = even integer $J_m > J_g$ $\left(\frac{F_3}{1-F_3}\right)$	6. $J_m - J_g$ = even integer $J_m < J_g$ $\left(\frac{1-F_3}{F_3}\right)$
7. $J_m - J_g$ = odd integer $J_m > J_g$ $\left(\frac{F_4}{1-F_4}\right)$	8. $J_m - J_g$ = odd integer $J_m < J_g$ $\left(\frac{1-F_4}{F_4}\right)$

A even, $|J_m - J_g|$ odd

$$F_4 = \exp\left[-(1/<J^2>)\left(\frac{J_m + J_g + 1}{2}\right)\left(\frac{J_m + J_g + 3}{2}\right)\right] \tag{4.6}$$

where $J_{rms} = \sqrt{<J^2>}$ characterizes the angular momentum of the initial fragment and following values were taken for the present calculations:

- $J_{rms} = 7.5$ for thermal fission,
- $J_{rms} = 8.0$ for fast fission,
- $J_{rms} = 10.0$ for high-energy fission.

After obtaining the independent yields, the cumulative yields were calculated. As the cumulative yield $c_i(A, Z)$ of a nuclide i is the total number of atoms of that nuclide produced over all time after one fission, it is the sum of independent yields of that nuclide and the precursor nuclides, that is,

$$c_i(A, Z) = y_i(A, Z) + \sum_{j=\text{all precursors}} y_j(A, Z).$$

Thus the cumulative yields depend on the decay chains of the fission products. The cumulative yields were calculated based on the decay chains of the JENDL/FPD-2011 file excepting the α decay chains. There are five α decaying nuclides in the JENDL/FPD-2011 file, ^{144}Nd, ^{146}Sm, ^{147}Sm, ^{148}Sm and ^{152}Gd. They have very long half-lives: the shortest one is 1.03×10^8 year of ^{146}Sm. Thus the cumulative yields of the daughter nuclides of these α decaying nuclides do not include the contribution of these nuclides.

Ternary fission yields of light nuclides were given by consulting the the England and Rider compilation and Mills one [15]. The element yields are taken from those of England and Rider's compilation and the mass distribution of the element is calculated using the Mills compilation. The energy dependence of the mass distribution in the

same element was not considered here. The yields from $Z = 1$ to $Z = 4$ were included in the yields file, even though the decay data from $Z = 1$ to $Z = 4$ are not included in the JENDL/FPD-2011 file.

The types of fission yields data contained in the JENDL/FPY-2011 file are listed in Table 4.2 comparing with those of ENDF/B-VII and JEFF-3.1.

Table 4.2 Fission yield data in JENDL/FPY-2011, JEFF-3.1 and ENDF/B-VII

Nuclides	Energy			
	Thermal	Fission	High Energy	Spontaneous
^{227}Th(9025)	◯ △			
^{229}Th(9031)	◯ △			
^{232}Th(9040)		◯ △ ×	◯ △ ×	
^{231}Pa(9131)		◯ △		
^{232}U(9219)	◯ △			
^{233}U(9222)	◯ △ ×	◯ △ ×	◯ △ ×	
^{234}U(9225)		◯ △ ×	◯ △	
^{235}U(9228)	◯ △ ×	◯ △ ×	◯ △ ×	
^{236}U(9231)		◯ △ ×	◯ △	
^{237}U(9234)		◯ △		
^{238}U(9237)		◯ △ ×	◯ △ ×	◯ △
^{237}Np(9346)	◯ △ ×	◯ △ ×	◯ △	
^{238}Np(9349)	×	◯ △ ×		
^{238}Pu(9434)	×	◯ △ ×		
^{239}Pu(9437)	◯ △ ×	◯ △ ×	◯ △	
^{240}Pu(9440)	◯ △	◯ △ ×	◯ △	
^{241}Pu(9443)	◯ △ ×	◯ △ ×		
^{242}Pu(9446)	◯ △	◯ △ ×	◯ △	
^{241}Am(9543)	◯ △ ×	◯ △ ×	◯ △	
^{242m}Am(9547)	◯ △ ×	×		
^{243}Am(9549)	×	◯ △ ×		
^{242}Cm(9631)		◯ △		×
^{243}Cm(9634)	◯ △ ×	◯ △ ×		
^{244}Cm(9637)	×	◯ △ ×		◯ △ ×
^{245}Cm(9640)	◯ △ ×	×		
^{246}Cm(9643)		◯ △		◯ △
^{248}Cm(9649)		◯ △		◯ △
^{249}Cf(9852)	◯ △			
^{250}Cf(9855)				◯ △
^{251}Cf(9858)	◯ △			
^{252}Cf(9861)				◯ △ ×
^{253}Es(9913)				◯ △
^{254}Es(9914)	◯ △			
^{254}Fm(9935)				◯ △

continued on next page

Nuclides	Energy			
	Thermal	Fission	High Energy	Spontaneous
^{255}Fm(9936)	◯ △			
^{256}Fm(9937)				◯ △
JENDL/FPY-2011 (◯): 60 sets, ENDF (△): 60 sets, JEFF (×): 39 sets				

4.1 Data Format of Yield File

The fission product yield data have been compiled in the format of ENDF-6. The fission yield data are included in FILE 8, that is, MF=8 as decay data. The MT number, however, is different from the decay data and has MT=454 for independent yield and MT=459 for cumulative yield. The structure of the yield data file is shown in Table 4.3.

Table 4.3 Structure of YIELD DATA

ZA	AWR	LE+1	0	0	0	MAT	8	454 or 459
E_1	0.0	LE	0	NN	NFP	MAT	8	454 or 459
		$C_n(E_1)$				MAT	8	454 or 459
E_2	0.0	I	0	NN	NFP	MAT	8	454 or 459
		$C_n(E_2)$				MAT	8	454 or 459
E_3	0.0	I	0	NN	NFP	MAT	8	454 or 459
		$C_n(E_3)$				MAT	8	454 or 459
				.....				
0	0	0	0	0	0	MAT	8	454 or 459

The meaning of the variable in Table 4.3 is following:

NN : State of items in the $C_n(E_i)$ array, equal to 4*NFP.

NFP : Number of fission product nuclide states to be specified at each incident energy point.

E_i : Incident neutron energy of the i^{th} point (eV),.

$C_n(E_i)$: Array of yield data for the i^{th} energy point. This array contains NFP sets of four parameters in the order of ZAFP, FPS, YI and DYI in MT=454 and ZAFP, FPS, YC and DYC in MT=459.

ZAFP : (Z,A) identifier for a particular fission product. (ZAFP = (1000*Z + A).

FPS : State designator (floating-point number) for the fission product nuclide (FPS=0.0 means the ground state, FPS=1.0 the first excited state, *etc.*).

YI : (MT=454), independent yield for a particular fission product prior to particle decay.

DYI : (MT=454), 1σ uncertainty in YI.

YC : (MT=459), cumulative yield.

DYC : 1σ uncertainty in YC

LE : Test to determine whether energy-dependent fission yields given:
LE=0, implies no energy-dependence (only one set of fission product yield data given);
LE $>$ 0, indicates that (LE+1) sets of fission product yield data are given at (LE + 1) incident neutron energies.

I_i : Interpolation scheme to be used between the E_{i-1} and E_i energy points.

4.2 Example of Fission Yield Data in JENDL/FPY-2011

An example of fission yield data is shown here.

```
 9.02320+04 2.30045+02          2          0          0          09040 8454
 5.00000+05 0.00000+00          1          0       5196       12999040 8454
 1.00100+03 0.00000+00 9.91937-06 1.58710-06 1.00200+03 0.00000+009040 8454
 3.03144-06 4.33497-07 1.00300+03 0.00000+00 4.32492-05 3.45993-069040 8454
 2.00300+03 0.00000+00 0.00000+00 0.00000+00 2.00400+03 0.00000+009040 8454
 7.20184-04 4.60918-05 2.00600+03 0.00000+00 1.00571-05 1.48845-069040 8454
 2.00800+03 0.00000+00 1.88009-07 4.66263-08 3.00600+03 0.00000+009040 8454
 7.46410-07 1.10469-07 3.00700+03 0.00000+00 2.31560-08 4.37648-099040 8454
 3.00800+03 0.00000+00 1.39535-08 3.46048-09 3.00900+03 0.00000+009040 8454
 1.64801-08 3.83987-09 4.00700+03 0.00000+00 2.62365-07 4.95871-089040 8454
 4.00800+03 0.00000+00 1.58098-07 3.92084-08 4.00900+03 0.00000+009040 8454
 1.86726-07 4.35070-08 4.01000+03 0.00000+00 1.86726-07 3.11832-089040 8454
 2.30660+04 0.00000+00 9.68224-16 6.19664-16 2.40660+04 0.00000+009040 8454
 3.19221-12 2.04302-12 2.40670+04 0.00000+00 5.58299-13 3.57311-139040 8454
 2.40680+04 0.00000+00 7.86238-14 5.03192-14 2.40690+04 0.00000+009040 8454
 1.50443-14 9.62839-15 2.40700+04 0.00000+00 0.00000+00 0.00000+009040 8454
 2.50660+04 0.00000+00 5.17134-10 3.30966-10 2.50670+04 0.00000+009040 8454
 3.83583-10 2.45493-10 2.50680+04 0.00000+00 1.63675-10 1.04753-109040 8454
          ----------------------------------------------------
 6.81670+04 0.00000+00 0.00000+00 0.00000+00 6.81670+04 1.00000+009040 8454
 0.00000+00 0.00000+00 6.81680+04 0.00000+00 6.47131-17 5.17705-179040 8454
 6.81690+04 0.00000+00 1.25712-15 1.00570-15 6.81700+04 0.00000+009040 8454
 1.15231-14 9.21847-15 6.81710+04 0.00000+00 5.46255-14 3.49603-149040 8454
 6.81720+04 0.00000+00 2.51036-13 1.60663-13 6.91660+04 0.00000+009040 8454
 0.00000+00 0.00000+00 6.91660+04 1.00000+00 0.00000+00 0.00000+009040 8454
 6.91670+04 0.00000+00 0.00000+00 0.00000+00 6.91680+04 0.00000+009040 8454
 0.00000+00 0.00000+00 6.91690+04 0.00000+00 0.00000+00 0.00000+009040 8454
 6.91700+04 0.00000+00 0.00000+00 0.00000+00 6.91710+04 0.00000+009040 8454
 1.79961-17 1.43969-17 6.91720+04 0.00000+00 2.50335-16 2.00268-169040 8454
 7.01680+04 0.00000+00 0.00000+00 0.00000+00 7.01690+04 0.00000+009040 8454
 0.00000+00 0.00000+00 7.01690+04 1.00000+00 0.00000+00 0.00000+009040 8454
 7.01700+04 0.00000+00 0.00000+00 0.00000+00 7.01710+04 0.00000+009040 8454
 0.00000+00 0.00000+00 7.01710+04 1.00000+00 0.00000+00 0.00000+009040 8454
 7.01720+04 0.00000+00 0.00000+00 0.00000+00 7.11720+04 0.00000+009040 8454
 0.00000+00 0.00000+00 7.11720+04 1.00000+00 0.00000+00 0.00000+009040 8454
 1.40000+07 0.00000+00          1          0       5196       12999040 8454
 1.00100+03 0.00000+00 1.13137-05 1.81020-06 1.00200+03 0.00000+009040 8454
 3.45757-06 4.94433-07 1.00300+03 0.00000+00 4.93287-05 3.94630-069040 8454
 2.00300+03 0.00000+00 0.00000+00 0.00000+00 2.00400+03 0.00000+009040 8454
 8.21366-04 5.25674-05 2.00600+03 0.00000+00 1.14701-05 1.69757-069040 8454
 2.00800+03 0.00000+00 2.14423-07 5.31770-08 3.00600+03 0.00000+009040 8454
 8.39712-07 1.24277-07 3.00700+03 0.00000+00 2.60505-08 4.92355-099040 8454
 3.00800+03 0.00000+00 1.56977-08 3.89304-09 3.00900+03 0.00000+009040 8454
 1.85401-08 4.31985-09 4.00700+03 0.00000+00 2.98554-07 5.64267-089040 8454
 4.00800+03 0.00000+00 1.79905-07 4.46165-08 4.00900+03 0.00000+009040 8454
 2.12481-07 4.95080-08 4.01000+03 0.00000+00 2.12481-07 3.54843-089040 8454
 2.30660+04 0.00000+00 6.54945-12 4.19164-12 2.40660+04 0.00000+009040 8454
 3.20899-09 2.05376-09 2.40670+04 0.00000+00 6.51947-10 4.17246-109040 8454
 2.40680+04 0.00000+00 1.89531-10 1.21299-10 2.40690+04 0.00000+009040 8454
 5.76178-11 3.68754-11 2.40700+04 0.00000+00 1.55815-12 9.97214-139040 8454
 2.50660+04 0.00000+00 1.59785-07 1.02262-07 2.50670+04 0.00000+009040 8454
 8.45568-08 5.41163-08 2.50680+04 0.00000+00 6.37153-08 4.07778-089040 8454
```

```
 ----------------------------------------------------

6.81670+04 0.00000+00 5.42749-13 3.47359-13 6.81670+04 1.00000+009040 8454
4.52781-14 2.89780-14 6.81680+04 0.00000+00 4.74391-12 3.03610-129040 8454
6.81690+04 0.00000+00 2.38188-11 1.52440-11 6.81700+04 0.00000+009040 8454
8.11824-11 5.19568-11 6.81710+04 0.00000+00 1.92535-10 1.23223-109040 8454
6.81720+04 0.00000+00 3.32471-10 2.12781-10 6.91660+04 0.00000+009040 8454
0.00000+00 0.00000+00 6.91660+04 1.00000+00 0.00000+00 0.00000+009040 8454
6.91670+04 0.00000+00 0.00000+00 0.00000+00 6.91680+04 0.00000+009040 8454
2.36914-15 1.89532-15 6.91690+04 0.00000+00 1.91543-14 1.22587-149040 8454
6.91700+04 0.00000+00 1.73679-13 1.11154-13 6.91710+04 0.00000+009040 8454
1.07185-12 6.85982-13 6.91720+04 0.00000+00 4.87293-12 3.11868-129040 8454
7.01680+04 0.00000+00 0.00000+00 0.00000+00 7.01690+04 0.00000+009040 8454
0.00000+00 0.00000+00 7.01690+04 1.00000+00 0.00000+00 0.00000+009040 8454
7.01700+04 0.00000+00 0.00000+00 0.00000+00 7.01710+04 0.00000+009040 8454
3.73047-17 2.98438-17 7.01710+04 1.00000+00 4.47172-16 3.57738-169040 8454
7.01720+04 0.00000+00 5.29641-15 4.23713-15 7.11720+04 0.00000+009040 8454
0.00000+00 0.00000+00 7.11720+04 1.00000+00 0.00000+00 0.00000+009040 8454
0.00000+00 0.00000+00          0          0          0          09040 8  0
```

The fission yield data shown here are those of ^{232}Th fission. There are two fission yield data in ^{232}Th nuclide: one is fission yield by fast neutron and the other those by high energy neutron. Here fast neutron is considered to be the neutron with energy 500 keV and high energy neutron is with energy of 14 MeV. Each fission yield datum is arranged in the order of ZAFP, FPS, YI and DYI as described in the previous subsection.

5 Fission Energy

It is possible to calculate energy release per fission by using the fission yield data and mass excess data. The energy release per fission were calculated for neutron induced fission using the JENDL/FPY-2011 data and mass excesses evaluated by G. Audi [16].

The total energy release by fission is obtained from the mass balance equation:

$$\begin{aligned} Q_f &= M(A_0, Z_0) - \sum_i Y_i M_i - (\bar{\nu}_t - 1)m_n + E_n, \\ &= (A_0 + \Delta M(A_0, Z_0)) - \sum_i Y_i (A_i + \Delta M_i) - (\bar{\nu}_t - 1)(1 + \Delta m_n) + E_n, \\ &= \Delta M(A_0, Z_0) - \sum_i Y_i \Delta M_i - (\bar{\nu}_t - 1)\Delta m_n + E_n + \left(A_0 + 1 - \bar{\nu}_t - \sum_i Y_i A_i \right), \\ &= \Delta M(A_0, Z_0) - \sum_i Y_i \Delta M_i - (\bar{\nu}_t - 1)\Delta m_n + E_n \end{aligned} \tag{5.1}$$

where Y_i is the cumulative yield of the end product i of fission fragment, M_i the mass and ΔM_i the mass excess of the end product i, and E_n the incident neutron energy. $M(A_0, Z_0)$ is the mass and $\Delta M(A_0, Z_0)$ the mass excess of the target nucleus (A_0, Z_0), and m_n the mass and Δm_n the mass excess of the neutron. The average number of total neutrons emitted per fission is expressed by $\bar{\nu}_t$. The last term in the large parentheses on the third line in the above equation becomes zero because the nucleon number keeps constant before and after a fission.

As a neutron of energy E_n is required to perpetuate the chain reaction in a critical reactor, the net value of the total energy released directly in a fission process becomes,

$$Q'_f = Q_f - E_n. \tag{5.2}$$

The prompt energy, which is the energy released just after fission occurred, is determined from the indepen-

dent yields of fission product:

$$E_p = \Delta M(A_0, Z_0) - \sum_i y_i \Delta m_i - (\bar{\nu}_p - 1)\Delta m_n, \tag{5.3}$$

where y_i is the independent yield of a fission product, Δm_i its mass excess, and $\bar{\nu}_p$ the average number of prompt neutrons emitted per fission.

The delayed energy E_d can be obtained by subtracting the prompt energy E_p from the total energy Q'_f:

$$E_d = Q'_f - E_p = E_\beta + E_\gamma + E_{d.n} + E_{\bar{\nu}}. \tag{5.4}$$

As seen in the above equation, the delayed energy E_d is the energy released in the beta decay process and includes the beta-ray energy, E_β, the gamma-ray energy E_γ, the delayed neutron energy $E_{d.n}$ and the antineutrino energy $E_{\bar{\nu}}$. The antineutrino escapes from reactor and does not contribute decay heat.

In these calculations, $\bar{\nu}_t$ and $\bar{\nu}_p$ values were taken from the JENDL-4 evaluation [17] even though they can be obtained from the balance of nucleon number, because the values of the JENDL-4 evaluation are derived from the detailed examination of the measured $\bar{\nu}_t$ and $\bar{\nu}_p$ values and considered to be reliable. The $\bar{\nu}_t$ and $\bar{\nu}_p$ values from the balance of nucleon number are expressed as follows:

$$\bar{\nu}_t = A_0 + 1 - \sum_i Y_i A_i,$$
$$\bar{\nu}_p = A_0 + 1 - \sum_i y_i A_i,$$

where A_0 is the target nuclide mass number, Y_i the cumulative yield, y_i the independent yield and A_i the mass number of the fission product nuclide i, respectively. The comparisons of The $\bar{\nu}_t$ and $\bar{\nu}_p$ values for some thermal fission are shown in Table 5.1. The difference between the JENDL-4 values and the calculated ones from the

Table 5.1 Comparison of $\bar{\nu}_t$ and $\bar{\nu}_d$ between JENDL evaluation and mass balance

	$\bar{\nu}_t$		$\bar{\nu}_p$	
	JENDL-4	Nucleon Balance	JENDL-4	Nucleon Balance
^{229}Th(t)	2.087	2.181	2.071	2.163
^{233}U(t)	2.485	2.370	2.478	2.350
^{235}U(t)	2.436	2.406	2.420	2.378
^{237}Np(t)	2.627	2.697	2.615	2.660
^{239}Pu(t)	2.877	2.794	2.871	2.777
^{241}Pu(t)	2.947	2.873	2.931	2.850
^{242m}Am(t)	3.271	2.744	3.264	2.724

balance of nucleon number reflects the uncertainty of the decay chains and the yields used in the calculation. It is seen from Table 5.1 that the the $\bar{\nu}_t$ and $\bar{\nu}_d$ values calculated from the balance of nucleon number have the differences from 1 % for ^{235}U to 16 % for ^{242m}Am.

The energy release of total, prompt and delayed are listed in Table 5.2, where delayed energy components, beta-ray E_β, gamma-ray E_γ and delayed neutron $E_{d.n}$ are also given. Since they are the sum of all the energy released in beta decay process, they can be obtained from the decay heat just after infinite irradiation using the decay heat calculation code developed by K. Oyamatsu [18]. As the code can not directly calculate the antineutrino energy $E_{\bar{\nu}}$, it was derived by subtracting E_β, E_γ and $E_{d.n.}$ from the E_d value.

As the delayed neutron energy is not given in the JENDL/FPD-2011 file, the delayed neutron energy $E_{d.n.}$ was calculated using the formula given in the report by T.R. England [19] as follows;

$$E_{d.n} = 2T, \tag{5.5}$$

where

$$aT^2 = (Q_\beta - S(n)). \tag{5.6}$$

The value of a is given by $a = 2/3A$, where A is the nuclide mass number. The Q_β and $S(n)$ values are beta decay Q-value and neutron separation energy, respectively.

Table 5.2 Energy Release After Neutron-Induced Fission

	Total Energy Release			Prompt Energy Release			Delayed Energy Release				
. Nuclides	Q_0	ν_t	Q'_f	E_0	ν_p	E_p	E_d	E_β	E_γ	E_ν	$E_{d.n.}$
^{227}Th(t)	197.555	2.065	188.959	180.837	2.057	172.306	16.653	4.860	5.246	6.545	0.002
^{229}Th(t)	200.365	2.087	191.592	180.929	2.071	172.285	19.307	5.674	5.923	7.705	0.005
^{232}Th(f)	207.453	1.976	199.576	178.574	1.924	169.930	29.646	8.534	8.436	12.646	0.030
^{232}Th(h)	208.675	3.925	185.067	181.572	3.897	158.190	26.877	8.058	7.902	10.887	0.030
^{231}Pa(f)	205.807	2.164	196.412	187.316	2.153	178.010	18.402	5.394	5.765	7.237	0.006
^{232}U(t)	207.463	3.128	190.288	193.124	3.123	175.989	14.299	4.163	4.521	5.613	0.002
^{233}U(t)	210.128	2.485	198.143	192.952	2.478	181.023	17.120	5.037	5.282	6.798	0.003
^{233}U(f)	210.311	2.525	198.003	193.290	2.518	181.038	16.965	4.971	5.322	6.669	0.003
^{233}U(h)	211.191	4.384	183.879	195.197	4.380	167.917	15.962	4.691	4.966	6.302	0.003
^{234}U(f)	211.141	2.432	199.583	192.269	2.421	180.800	18.783	5.559	5.764	7.456	0.004
^{234}U(h)	212.385	4.238	186.251	196.088	4.230	170.019	16.232	4.787	5.049	6.393	0.003
^{235}U(t)	214.132	2.436	202.542	192.376	2.420	180.915	21.627	6.495	6.406	8.717	0.009
^{235}U(f)	214.195	2.493	202.145	192.225	2.477	180.304	21.841	6.575	6.451	8.807	0.008
^{235}U(h)	215.068	4.506	186.771	196.496	4.497	168.272	18.499	5.480	5.674	7.339	0.006
^{236}U(f)	215.634	2.437	204.036	191.857	2.415	180.437	23.599	7.125	6.924	9.541	0.009
^{236}U(h)	216.550	4.433	188.842	196.079	4.417	168.500	20.342	6.089	6.122	8.123	0.008
^{237}U(f)	218.599	2.465	206.775	192.392	2.432	180.843	25.932	7.890	7.480	10.549	0.013
^{238}U(f)	220.531	2.403	209.207	192.178	2.357	181.226	27.981	8.566	7.965	11.431	0.019
^{238}U(h)	221.037	4.428	193.370	196.342	4.399	168.909	24.461	7.408	7.146	9.894	0.013
^{237}Np(t)	218.369	2.627	205.237	196.550	2.615	183.515	21.722	6.517	6.386	8.812	0.007
^{237}Np(f)	218.340	2.699	204.627	198.355	2.687	184.739	19.888	5.920	6.035	7.928	0.005
^{237}Np(h)	219.146	4.626	189.881	200.352	4.618	171.151	18.730	5.573	5.658	7.494	0.005
^{238}Np(f)	220.848	2.558	208.273	197.845	2.543	185.391	22.882	6.865	6.737	9.272	0.008
^{238}Pu(f)	219.576	2.915	204.120	201.686	2.910	186.270	17.850	5.278	5.403	7.166	0.003
^{239}Pu(t)	222.308	2.877	207.159	204.386	2.871	189.285	17.874	5.268	5.413	7.190	0.003
^{239}Pu(f)	222.285	2.967	206.409	204.356	2.961	188.529	17.880	5.283	5.429	7.165	0.003
^{239}Pu(h)	223.050	4.939	191.258	207.948	4.935	176.189	15.069	4.422	4.683	5.961	0.003
^{240}Pu(t)	223.780	2.820	209.091	203.574	2.811	188.957	20.134	6.005	5.960	8.165	0.004

continued on next page

	Total Energy Release			Prompt Energy Release			Delayed Energy Release				
. Nuclides	Q_0	ν_t	Q'_f	E_0	ν_p	E_p	E_d	E_β	E_γ	E_ν	$E_{d.n.}$
^{240}Pu(f)	223.773	2.895	208.478	203.735	2.886	188.513	19.965	5.946	5.938	8.077	0.004
^{240}Pu(h)	224.239	4.913	192.657	207.230	4.905	175.713	16.944	5.020	5.144	6.777	0.003
^{241}Pu(t)	226.540	2.947	210.826	204.170	2.931	188.585	22.241	6.690	6.453	9.093	0.005
^{241}Pu(f)	226.517	3.010	210.294	204.186	2.994	188.092	22.202	6.680	6.441	9.075	0.006
^{242}Pu(t)	228.213	2.893	212.935	203.576	2.878	188.419	24.516	7.440	6.893	10.175	0.008
^{242}Pu(f)	228.236	2.962	212.401	204.329	2.947	188.615	23.786	7.180	6.803	9.795	0.008
^{242}Pu(h)	228.792	4.816	197.993	206.798	4.804	176.096	21.897	6.567	6.399	8.924	0.007
^{241}Am(t)	226.667	3.116	209.589	209.370	3.111	192.332	17.257	5.090	5.200	6.965	0.002
^{241}Am(f)	226.419	3.189	208.752	209.932	3.184	192.305	16.447	4.843	4.973	6.629	0.002
^{241}Am(h)	227.307	5.146	193.845	212.891	5.141	179.469	14.376	4.236	4.346	5.792	0.002
^{242m}Am(t)	228.791	3.271	210.462	209.857	3.264	191.584	18.878	5.611	5.547	7.717	0.003
^{243}Am(f)	230.726	3.273	212.381	211.684	3.265	193.403	18.978	5.669	5.561	7.744	0.004
^{242}Cm(f)	228.410	3.529	207.998	215.594	3.527	195.199	12.799	3.727	3.935	5.136	0.001
^{243}Cm(t)	230.204	3.432	210.575	214.269	3.429	194.665	15.910	4.732	4.611	6.565	0.002
^{243}Cm(f)	230.363	3.498	210.202	215.839	3.495	195.702	14.500	4.259	4.353	5.887	0.001
^{244}Cm(f)	231.419	3.081	214. 623	214.734	3.077	197.971	16.652	4.960	4.830	6.860	0.002
^{245}Cm(t)	234.169	3.596	213.217	214.868	3.590	193.964	19.253	5.778	5.445	8.027	0.003
^{246}Cm(f)	235.376	3.068	218.685	214.249	3.059	197.631	21.054	6.374	5.831	8.844	0.005
^{248}Cm(f)	240.079	3.234	222.048	214.272	3.214	196.403	25.645	7.885	6.759	10.993	0.008
^{249}Cf(t)	242.998	4.063	218.277	227.474	4.060	202.777	15.500	4.675	4.226	6.598	0.001
^{251}Cf(t)	246.938	4.106	221.869	226.883	4.100	201.863	20.006	6.080	5.333	8.590	0.003
^{254}Es(t)	255.360	4.083	230.477	235.975	4.077	211.141	19.336	5.793	5.400	8.140	0.003
^{255}Fm(t)	258.798	4.003	234.561	242.167	4.000	217.954	16.607	4.905	4.837	6.863	0.002

t: thermal fission, f: fast fission, h: high energy fission (14 MeV)

Q_0 = Δ M(Z_0,A_0) - $\langle\ \Delta M_{fp}\ \rangle$.

$\langle\ \Delta M_{fp}\ \rangle$ = $\sum_i Y_i \Delta M_i$; Y_i = chain yields, ΔM_i = mass excess of end product.

E_0 = ΔM(Z_0,A_0) - $\langle\ \Delta m_{fp}\ \rangle$

$\langle\ \Delta m_{fp}\ \rangle$ = $\sum_i y_i \Delta m_i$; y_i = independent yields, Δm_i = mass excess

Δm_n = 8.071 MeV

Q_f = Q_0 - (ν_t - 1)Δm_n

E_p = E_0 - (ν_p - 1)Δm_n

E_d = Q'_f - E_p

6 Decay Heat Calculations and Their Uncertainties

The decay heat calculations by summation method were performed and the results were compared with the measured data of various kinds of fissioning nuclides. The comparisons were performed for the measured data of a burst fission because the contribution of capture cross section was not needed in the case of the burst fission. The build-up and decay of fission product nuclides after a fission burst can be described as:

$$\frac{dN_i}{dt} = -\lambda_i N_i + \sum_j f_{j\to i}(\lambda_j N_j) + Y_i F, \tag{6.1}$$

where

$$
\begin{aligned}
N_i &= \text{atom number of nuclide } i, \\
\lambda_i &= \text{decay constant of nuclide } i, \\
f_{j\to i} &= \text{production rate of nuclide } i \text{ by the unit decay of nuclide } j, \\
Y_i &= \text{independent fission yield of nuclide} i, \\
F &= \text{fission rate}.
\end{aligned}
$$

The decay power, $f(t)$ (MeV/s), after a burst fission, is, then , calculated as the summation of the activities of all fission product nuclides with the weight of decay energy of each nuclides,

$$f(t) = \sum_i \bar{E}_i \lambda_i N_i(t), \tag{6.2}$$

where $\bar{E}_i$ is the average decay energy of the nuclide i, that is, the decay energy released per one decay and is divided into the beta- and gamma-components $\bar{E}_{\beta i}$, $\bar{E}_{\gamma i}$ ($\bar{E}_i = \bar{E}_{\beta i} + \bar{E}_{\gamma i}$). The term of summation calculation comes from the above equation.

The atom number of nuclide $N_i(t)$ for a burst fission is analytically obtained like the following equations:

$$
\begin{aligned}
N_i(t) &= \sum_{j=1}^{i} Y_j N_i^{(j)}(t), && (6.3)\\
N_i^{(j)}(t) &= \sum_{k=j}^{i} P_{ij}(k) \exp(-\lambda_k t), && (6.4)\\
P_{ji}(k) &= \lambda_j \lambda_{j+1} \ldots \lambda_{i-1} / \prod_{l=j}^{i} (\lambda_l - \lambda_k), && (6.5)\\
&= 1, \quad \text{if} \quad i = j \quad (= k), && (6.6)
\end{aligned}
$$

where j covers all predecessors of the nuclide i. In the above expression, the production rate $f_{j\to i}$ is omitted for simplicity.

The decay heat at time t following finite irradiation time T at a rate of 1 fission/s is calculated by integrating $f(t)$:

$$
\begin{aligned}
F(T,t) &= \int_0^T f(t+t')dt', \\
&= \int_t^{T+t} f(t')dt'. && (6.7)
\end{aligned}
$$

Above equation can be rewritten as follows:

$$
\begin{aligned}
\int_t^{T+t} f(t')dt' &= \int_t^{T_0+t} f(t')dt' + \int_{T_0+t}^{T+t} f(t')dt', \\
&= \int_t^{T_0+t} f(t')dt' + \int_{(T_0-T)+(T+t)}^{T+t} f(t')dt', \\
&= \int_t^{T_0+t} f(t')dt' - \int_{T+t}^{(T_0-T)+(T+t)} f(t')dt', \\
&= F(T_0,t) - F(T_0-T, T+t). && (6.8)
\end{aligned}
$$

If the time T_0 is long enough to be regarded as infinite, the above equation becomes

$$F(T,t) = F(\infty,t) - F(\infty,T+t). \tag{6.9}$$

Thus the decay heat at time t following an irradiation during T at a rate of 1 fission/s can be easily obtained by the difference of infinite irradiation functions at t and $T+t$.

The infinite irradiation function $F(\infty,t)$ is obtained by summing the quantities $\bar{E}_i\lambda_i N_i(\infty,t)$ of individual nuclide. The nuclide concentration for infinite irradiation $N_i(\infty,t)$ is obtained by the same way as a burst fission but with different initial value. As the nuclide concentration is expressed following equation:

$$\begin{aligned} N_(\infty,t) &= \int_t^\infty N_i(t')dt', \\ &= \sum_j Y_j \sum_k P_{ji}(k)\frac{1}{\lambda_k}\exp(-\lambda_k t), \end{aligned} \tag{6.10}$$

the initial value of nuclide concentration $N_i(\infty,0)$ is given by the following equation:

$$\begin{aligned} N_i(\infty,0) &= \sum_j Y_j \sum_k P_{ji}(k)\frac{1}{\lambda_k}, \\ &= \sum_j Y_j \sum_k \frac{1}{\lambda_k}\cdot\frac{\lambda_j\cdots\lambda_{i-1}}{\prod_l(\lambda_l-\lambda_k)}, \end{aligned} \tag{6.11}$$

where the next relation can be taken into account,

$$\sum_k \frac{1}{\lambda_k\prod_l(\lambda_l-\lambda_k)} = \frac{1}{\prod_k\lambda_k}.$$

This relation leads to the following equation of the initial value of the nuclide concentration for the infinite irradiation:

$$\begin{aligned} N_i(\infty,0) &= \sum_j Y_j\frac{\lambda_j\cdots\lambda_{i-1}}{\prod_k\lambda_k}, \\ &= \frac{1}{\lambda_i}\sum_j Y_j, \\ &= \frac{Y_i^c}{\lambda_i}, \end{aligned} \tag{6.12}$$

where Y_i^c is the cumulative yield of nuclide i. Then the nuclide concentration of the infinite irradiation is easily calculated by the same way as the burst fission by setting the initial value as the cumulative yield divided by the decay constant.

Uncertainty of the summation calculation is estimated by using sensitivity coefficients. The sensitivity coefficient of the burst function $f(t)$ to variable P_k is expressed by

$$G(P_k,t) = \left(\frac{\partial f(t)}{f(t)}\right) / \left(\frac{\partial P_k}{P_k}\right) = \left(\frac{\partial f(t)}{\partial P_k}\right) / \left(\frac{f(t)}{P_k}\right). \tag{6.13}$$

The burst function $f(t)$ is considered here to be a function of three variables, that is, independent yield, decay constant and decay energy as seen in eqs. (6.2) through (6.6). Although the branching ratio also affects the summation calculation, its influence on the decay heat calculation is relatively small and it is omitted here. The relative

sensitivity coefficients of nuclide m to the three kinds of nuclear data are given as follows:

$$G(\bar{E}_m, t) = \lambda_m \bar{E}_m N_m(t)/f(t), \tag{6.14}$$

$$G(Y_m, t) = Y_m \sum_{n=m}^{N_{max}} \lambda_n \bar{E}_n N_n^{(m)}(t)/f(t), \tag{6.15}$$

$$G(\lambda_m, t) = G(\bar{E}_m, t) + \sum_{n=1}^{m} \sum_{k=n}^{N_{max}} Y_n \lambda_k \bar{E}_k \lambda_m \left(\partial N_k^{(n)}/\partial \lambda_m\right)/f(t). \tag{6.16}$$

The derivative in the second term on the right-hand side of eq. (6.16) is calculated by substituting $N_k^{(n)}$ with eq. (6.4).

$$\begin{aligned} \lambda_m \left(\partial N_k^{(n)}/\partial \lambda_m\right) &= (1-\delta_{mk}) N_k^{(n)}(t) - \sum_{i=n}^{k} \left[\lambda_m/(\lambda_m - \lambda_i)\right] P_{nk}(i) \exp(-\lambda_i t) \\ &\quad + \left[\sum_{j=n}^{k} \lambda_m/(\lambda_j - \lambda_m) - \lambda_m t\right] P_{nk}(m) \exp(-\lambda_m t) \quad \text{if} \quad n \neq k, \\ &= -\lambda_m t \exp(-\lambda_m t) \qquad\qquad \text{if} \quad n = k \quad (= m), \end{aligned} \tag{6.17}$$

where δ_{mk} is Kronecker's δ.

The uncertainty of the decay heat calculation is given using the above sensitivity coefficients. The uncertainties from the energy, the decay constant and the fission yield are given by following equation:

$$\left(\frac{\Delta f}{f}\right)_{\bar{E}} = \left[\sum_i \left(G(\bar{E}_i, t) \cdot \frac{\Delta \bar{E}_i}{\bar{E}_i}\right)^2\right]^{1/2}, \tag{6.18}$$

$$\left(\frac{\Delta f}{f}\right)_{\lambda} = \left[\sum_i \left(G(\lambda_i, t) \cdot \frac{\Delta \lambda_i}{\lambda_i}\right)^2\right]^{1/2}, \tag{6.19}$$

$$\left(\frac{\Delta f}{f}\right)_{Y} = \left[\sum_i \left(\frac{G(Y_i, t)}{Y_i}\right)^2 \mu_{ii} + \sum_i \sum_{j \neq i} \frac{G(Y_i, t) G(Y_j, t)}{Y_i Y_j} \mu_{ij}\right]^{1/2}, \tag{6.20}$$

where μ_{ij} is the covariance matrix coefficient of the independent yields Y_i. As the mass yields are much more precise than the independent yields, the uncertainties among the independent yields of the same mass chain have a strong negative correlation. Then the covariances among the different nuclides of a single mass chain are given by using the uncertainty of the mass yields [20]:

$$\mu_{ii} = \sigma_i^2 \left(1 - \frac{\sigma_i^2}{\sigma^2 + \sum_{j=1}^{n} \sigma_j^2}\right) \tag{6.21}$$

$$\mu_{ij} = -\frac{\sigma_i^2 \sigma_j^2}{\sigma^2 + \sum_{j=1}^{n} \sigma_j^2} \tag{6.22}$$

where σ_i is the uncertainty of the independent yield Y_i, σ the uncertainty of the mass yield, and n the number of nuclides in the same mass chain. In the above equations, $\Delta \bar{E}_i$, $\Delta \lambda_i$ and Δf are the uncertainties of the energy value, the decay constant and the decay heat value, respectively.

Total uncertainty of the decay heat calculation is given by combining them statistically:

$$\frac{\Delta f(t)}{f(t)} = \left[\left(\frac{\Delta f(t)}{f(t)}\right)_{\bar{E}}^2 + \left(\frac{\Delta f(t)}{f(t)}\right)_{\lambda}^2 + \left(\frac{\Delta f(t)}{f(t)}\right)_{Y}^2\right]^{1/2}. \tag{6.23}$$

Although the uncertainties of theoretical values of the decay energy and the half-life (decay constant) are given as 0.0 in the JENDL/FPD-2011 file, the uncertainty of 100 % are assumed for the nuclides with theoretically estimated values.

The calculated results using the data in the JENDL/FPD-2011 and JENDL/FPY-2011 files are compared with various kinds of measured data and are given in the next section.

7 Comparisons between Calculated Results and Measured Data

The decay heat calculations using decay data of the JENDL/FPD-2011 and the JENDL/FPY-2011 files were performed and the results were compared with measured decay heat data. Of the available measured data, the data taken at Oak Ridge National Laboratory [21, 22, 23], the University of Tokyo [24, 25, 26], Uppsala University/Studsvik [27] and University of Massachusetts, Lowell [28, 29] were used to assess the validity of the JENDL/FPD-2011 and JENDL/FPY-2011 files. All of the data were measured by spectroscopic method and beta- and gamma-ray components of the decay heat were separately measured. The available data are listed in Table 7.1.

Table 7.1 Fission experiments used in the present decay heat calculation

Data set	Fission Nuclide	Neutron Energy	Institute
1	^{235}U, ^{239}Pu, ^{241}Pu	Thermal	Oak Ridge National Laboratory
2	^{233}U, ^{235}U, ^{238}U, ^{239}Pu, ^{232}Th	Fast, Thermal (^{235}U γ)	University of Tokyo
3	^{235}U, ^{239}Pu	Thermal	Uppsala University/Studsvik
4	^{235}U, ^{238}U, ^{239}Pu	Thermal, Fast (^{238}U)	University of Massachusetts, Lowell

The comparisons between the calculated results and measured data are shown in the following subsections for each fission nuclide.

7.1 ^{235}U Fission

The measurements of the decay heat by thermal neutron fission were performed at Oak Ridge National Laboratory, Uppsala University/Studsvik and University of Massachusetts, Lowell. For gamma-ray component, it was also carried out at YAYOI reactor of the University of Tokyo, because it was widely recognized that the ORNL data at around 10^3 s were too small and another measurement had been necessary. The measurements by fast neutron were performed at YAYOI reactor of the University of Tokyo.

The comparisons and the calculated uncertainties are shown in Figs. 7.1 and 7.2 for thermal neutron fission and Figs. 7.3 and 7.4 for fast neutron fission. The vertical axis of decay heat represents the energy release per sec times cooling time, that is, $f(t) \times t$ and its unit is MeV/fission. The calculated results are shown by solid line and designated as "JENDL_2011". The uncertainty widths of the calculated results are shown by dotted lines and designated as "JENDL_2011 $\pm$ Uncertainty". The calculated results show rather good agreement with ORNL and YAYOI measurements excepting the gamma-ray component of ORNL at time region 10^2 to 10^4 s where the measured data seem to be too small comparing with other measured data and the calculated results. At that time region the calculated results agree with the YAYOI measurements. Considering the YAYOI measurement, the uncertainty of the calculation covers the measured data of beta, gamma and total decay heat at the cooling times shorter than 10^4 s as shown by the dotted lines. The gamma-ray component measured by Uppsala University/Studsvik seems

to be too high comparing with other data. The Lowell measured data for longer cooling time seem to be lower than all other data. This may be caused by an error introduced by the calculations to correct the measurements for noble gas loss. The Lowell's lower values are also seen in other fissioning nuclides described later.

The uncertainty of the calculated results of total decay heat is shown on the righthand side in Figs. 7.2 and 7.4 . The uncertainty is shown as a percentage of the total decay heat value. The contributions to the uncertainty are divided into three components, that is, energy, half-life (decay constant) and yield. It is seen that most of the uncertainty is caused mainly by energy uncertainty at short cooling time and is about 10 %. The contributions of half-life and yield uncertainties are less than 5 %. There is a little bit difference between the thermal neutron fission and fast neutron fission cases, because the contributing nuclides are a little bit different for thermal and fast fission cases. The uncertainty at higher cooling times than 10^4 s seems to drop abruptly. That fact reflects that the decay energy values of the nuclides contributing to the decay heat at that cooling time region have small uncertainty because the half-lives of the nuclides are long enough to obtain the reliable measured data. After that cooling time region, the uncertainty of fission yields becomes the major source of the decay heat uncertainty. Similar trend is seen in other fission cases described later.

7.2 ^{239}Pu Fission

The decay heat measurements were performed at ORNL, Lowell and Uppsala/Studsvik for thermal neutron fission and at YAYOI for fast neutron fission. The comparisons are shown in Figs. 7.5 and 7.6 for thermal neutron fission and Figs. 7.7 and 7.8 for fast neutron fission. The calculated beta-ray component of thermal neutron fission at 10^3 s after fission burst underestimates the measured one, but that of fast neutron fission agrees well with the measured one. Since the difference between the decay heat values of thermal neutron fission and fast neutron fission is considered to be small, the measured beta-ray component of the thermal neutron fission might have some defects. The calculated uncertainty covers well the measured data at the cooling time region shorter than 10^3 s.

7.3 ^{238}U Fission

The decay heat measurements were performed at Lowell and YAYOI for fast neutron fission. The comparisons are shown in Figs. 7.9 and 7.10. The measured data of Lowell, especially the gamma-ray component, seem to show unnatural behavior and are significantly lower than the YAYOI measured data for long cooling time region. This may be due to correction errors from noble gas loss as described previously.

The calculated results agree well with the YAYOI measured data; the uncertainty width covers the measured data at the cooling time region shorter than 10^3 s.

7.4 ^{241}Pu Fission

The decay heat measurements were performed at ORNL for thermal neutron fission. The comparisons are shown in Figs. 7.11 and 7.12. The results show good agreement within the assigned experimental uncertainty and the calculated uncertainty covers measured data at the most of the cooling times.

7.5 ^{232}Th Fission and ^{233}U Fission

The measurements were performed at YAYOI reactor, the University of Tokyo for fast neutron fission. The comparisons are shown in Figs. 7.13 and 7.14 for ^{232}Th and in Figs. 7.15 and 7.16 for ^{233}U. The calculated results

of beta-ray component of ^{232}Th fission show a little bit overestimation at shorter cooling times than 100 s and at longer cooling times than 6000 s.

The calculated decay heat of ^{233}U fission seems to agree with the measured data comparing with the ^{232}Th case, even though the calculated bata-ray component overestimates the measured data at around 10^4 s after fission burst.

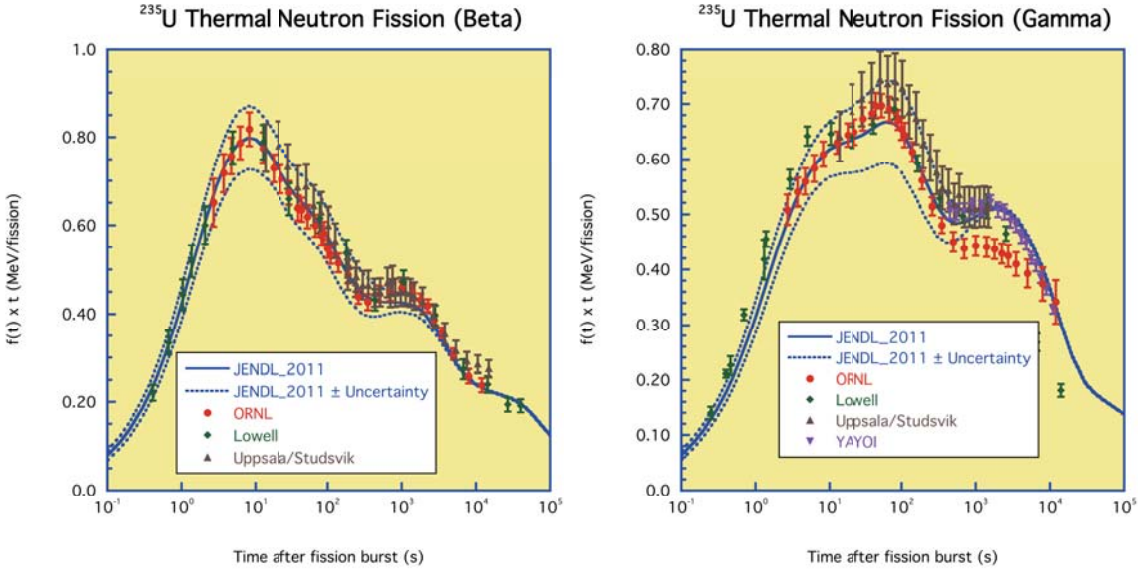

Fig. 7.1 Beta- and gamma-ray components of ^{235}U decay heat after burst fission by thermal neutrons

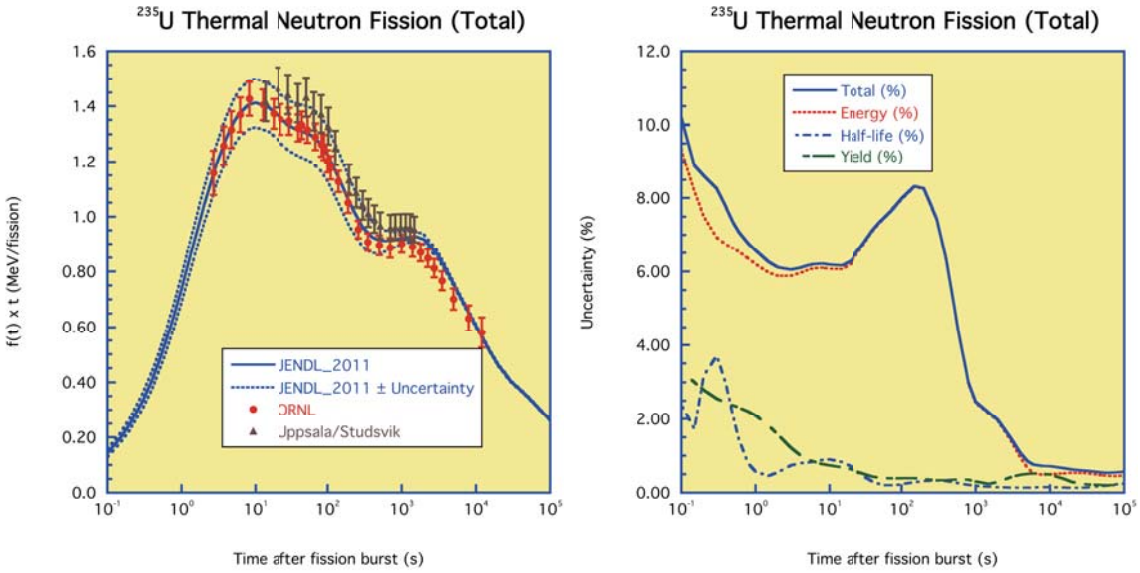

Fig. 7.2 Total decay heat and uncertainties of the calculated decay heat for ^{235}U thermal neutron fission

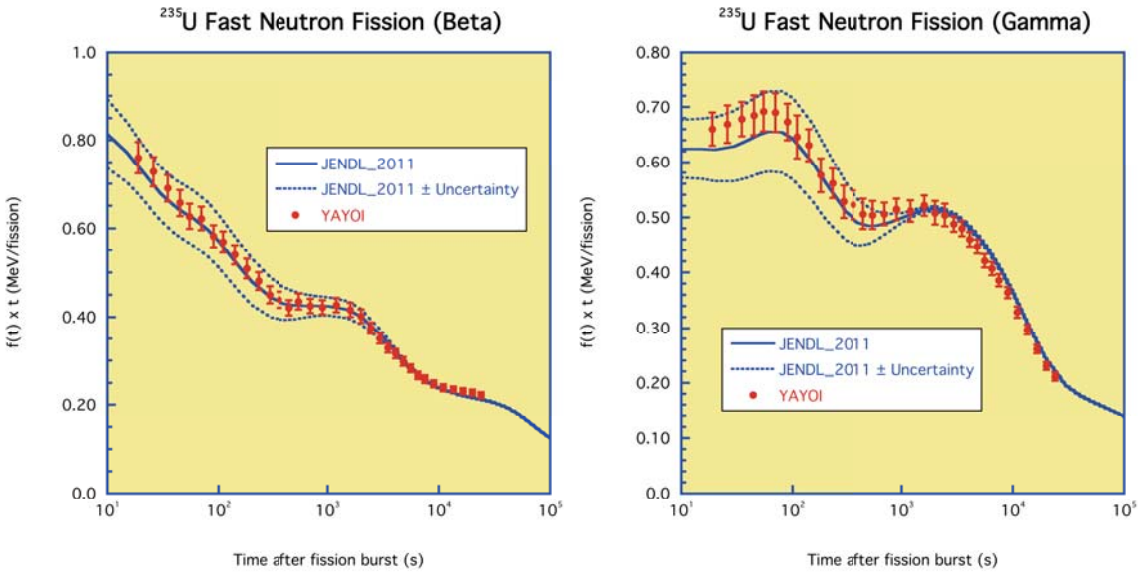

Fig. 7.3 Beta- and gamma-ray components of ^{235}U decay heat after burst fission by fast neutrons

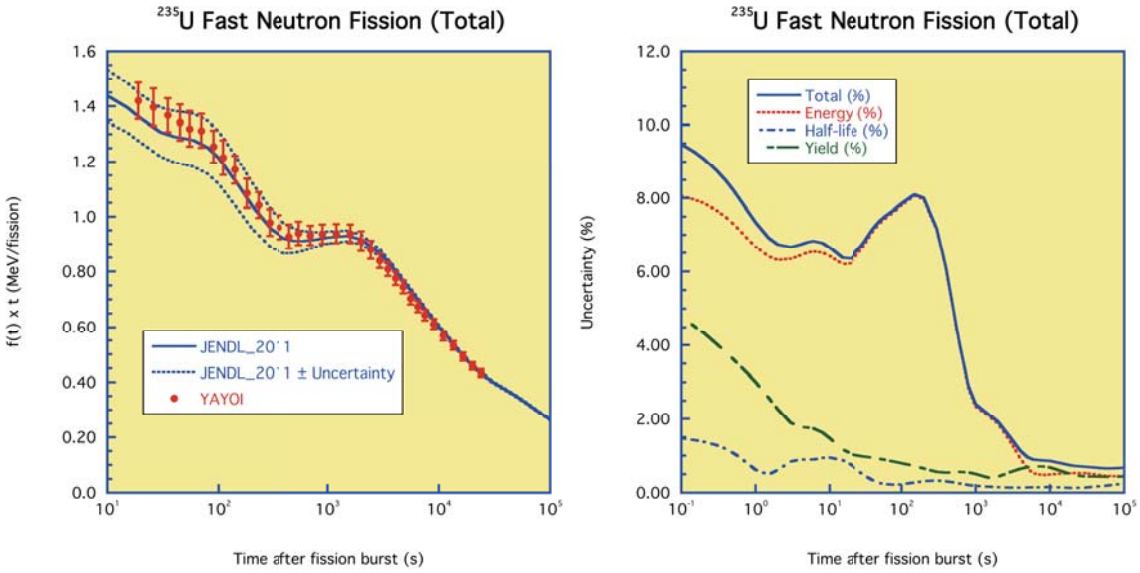

Fig. 7.4 Total decay heat and uncertainties of the calculated decay heat for ^{235}U fast neutron fission

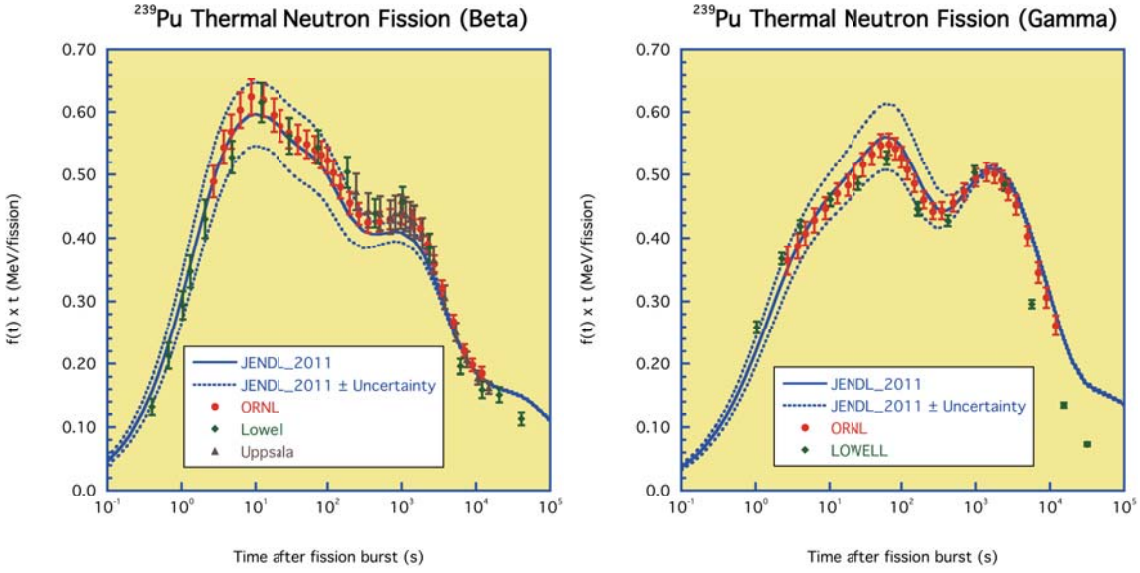

Fig. 7.5 Beta- and gamma-ray components of ^{239}Pu decay heat after burst fission by thermal neutrons

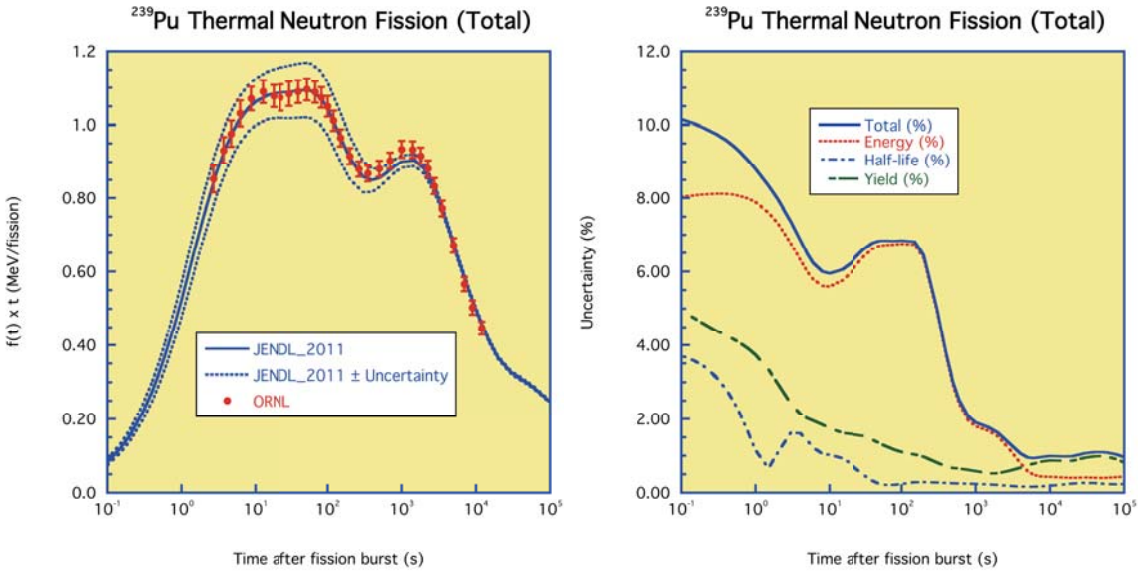

Fig. 7.6 Total decay heat and uncertainties of the calculated decay heat for ^{239}Pu thermal neutron fission

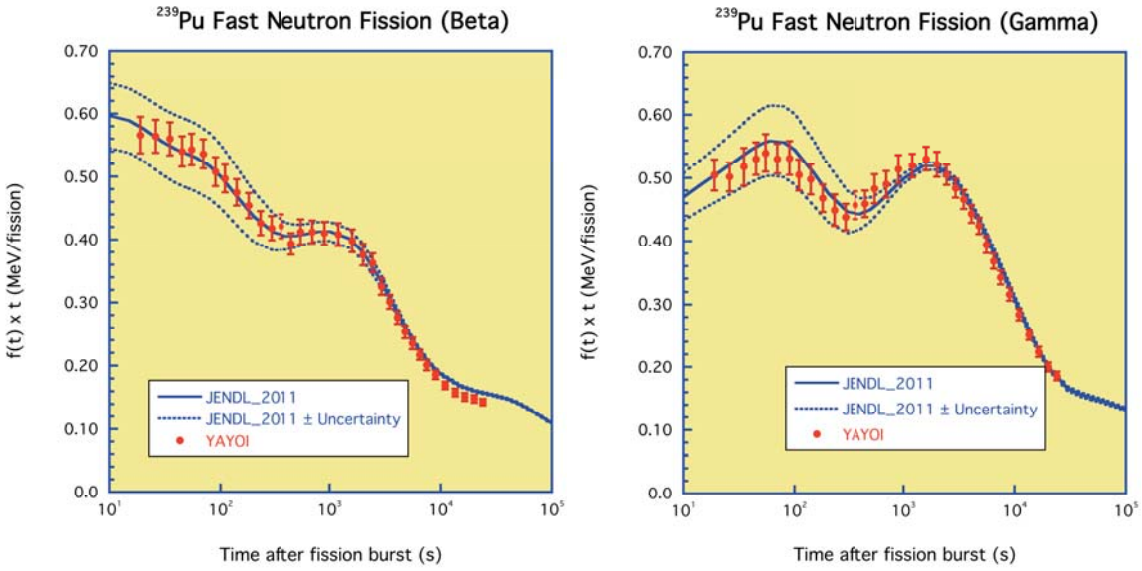

Fig. 7.7 Beta- and gamma-ray components of ^{239}Pu decay heat after burst fission by fast neutrons

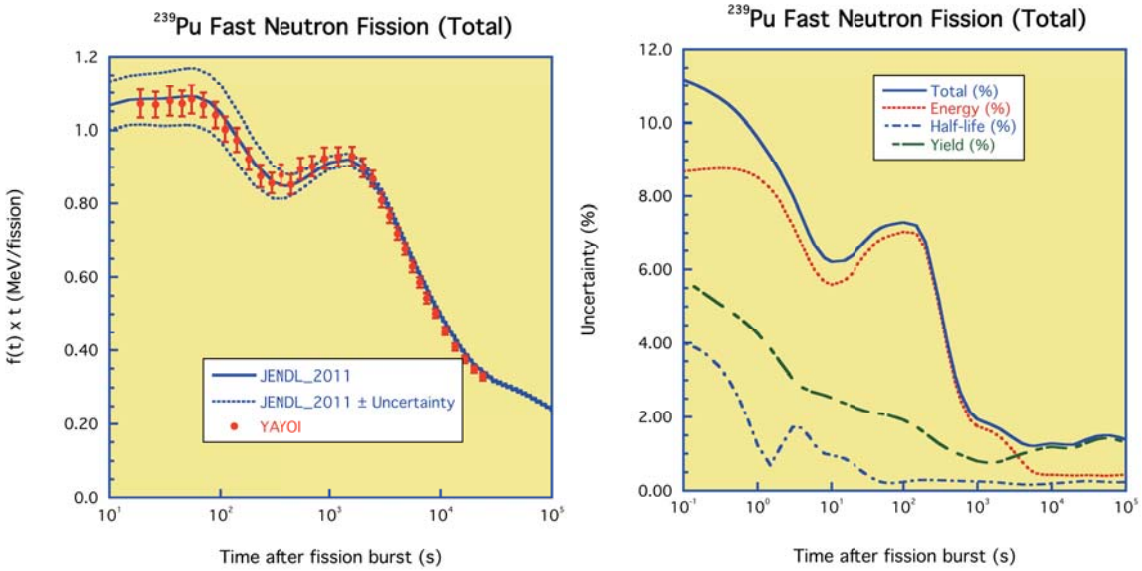

Fig. 7.8 Total decay heat and uncertainties of the calculated decay heat for ^{239}Pu fast neutron fission

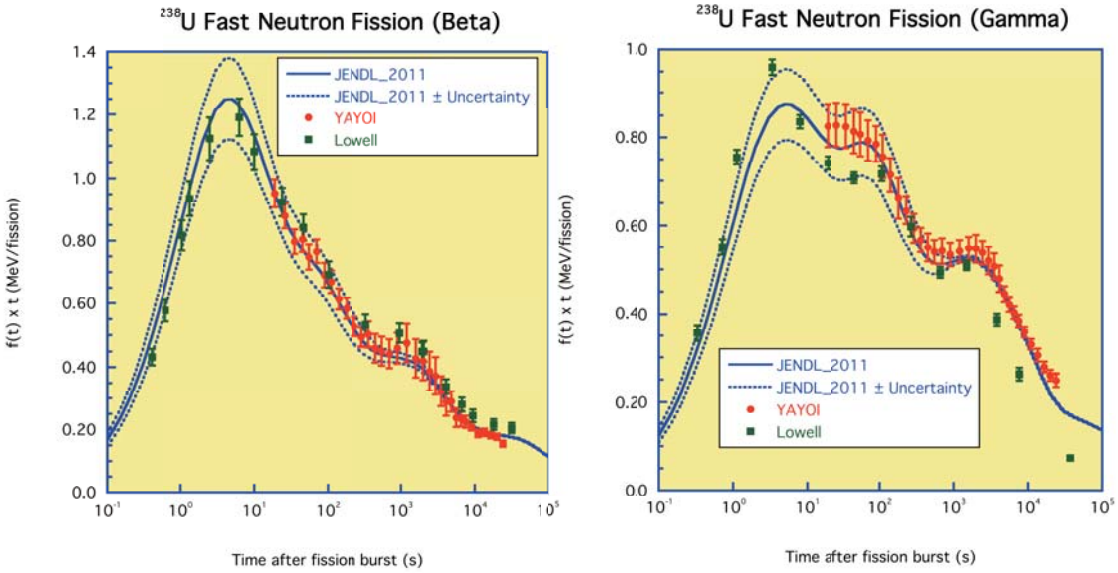

Fig. 7.9 Beta- and gamma-ray components of ^{238}U decay heat after burst fission by fast neutrons

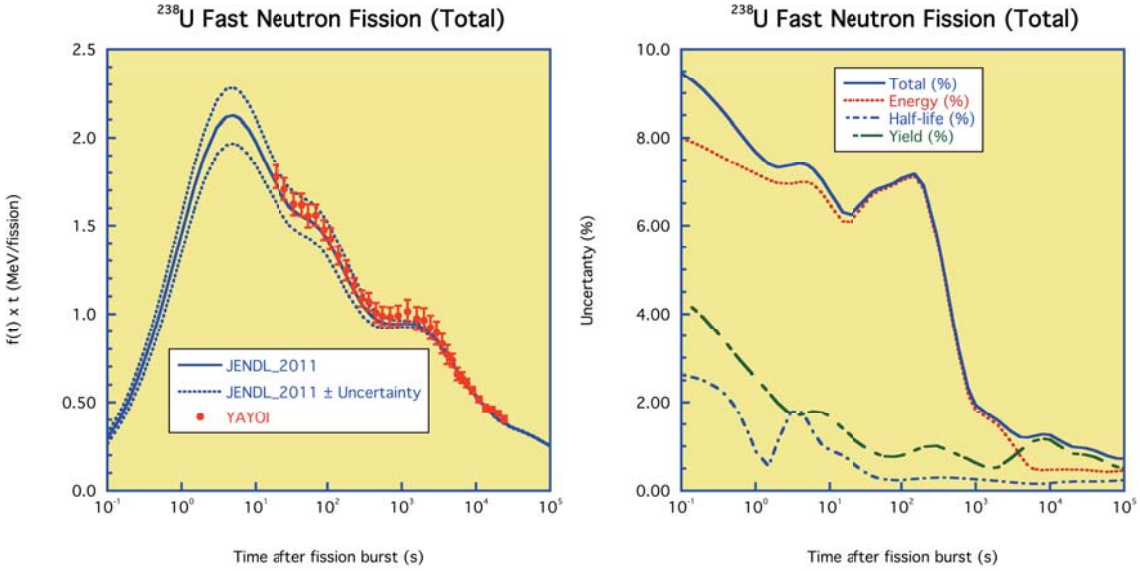

Fig. 7.10 Total decay heat and uncertainties of the calculated decay heat for ^{238}U fast neutron fission

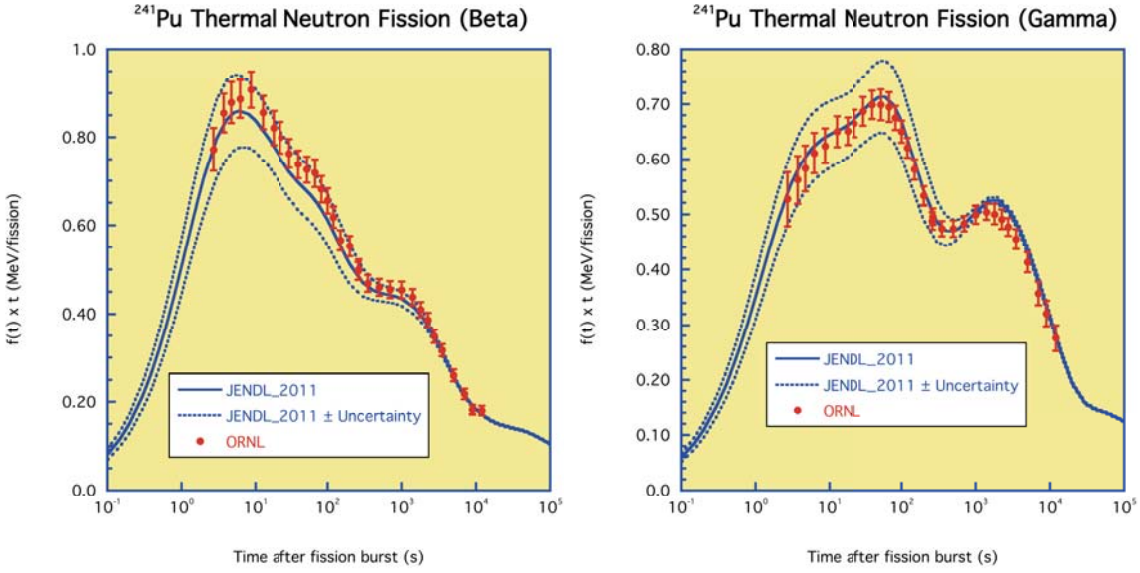

Fig. 7.11 Beta- and gamma-ray components of ^{241}Pu decay heat after burst fission by thermal neutrons

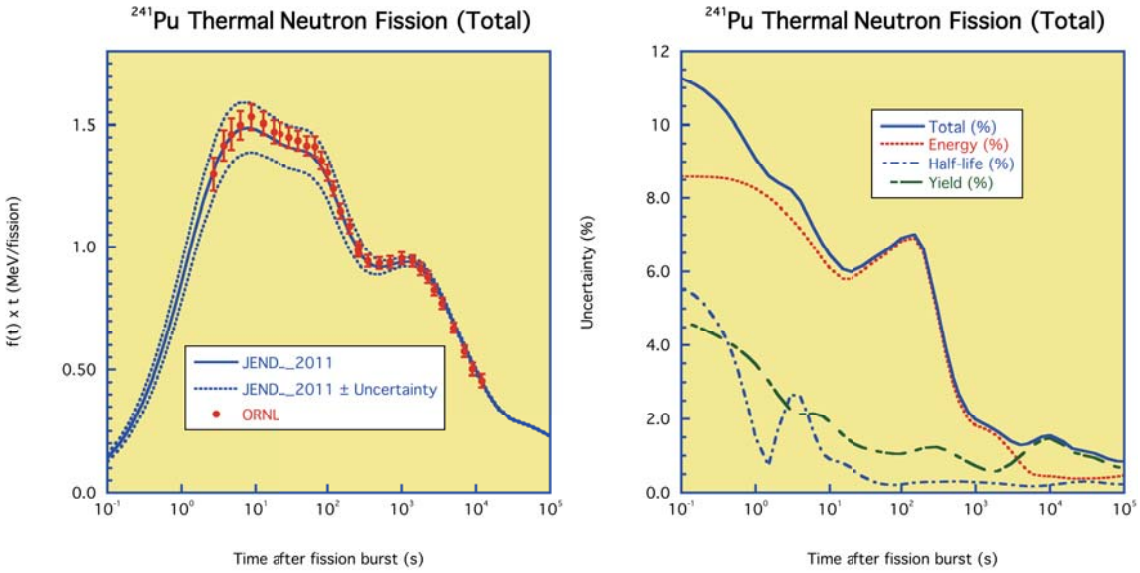

Fig. 7.12 Uncertainty of total decay heat calculation for ^{241}Pu thermal neutron fission.

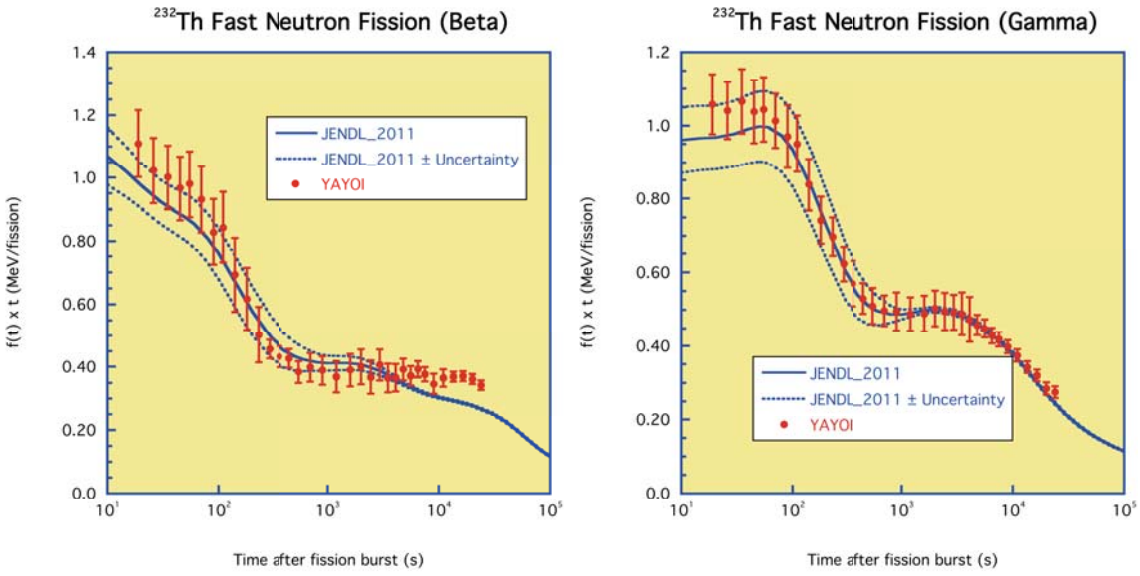

Fig. 7.13 Beta- and gamma-ray components of ^{232}Th decay heat after burst fission by fast neutrons

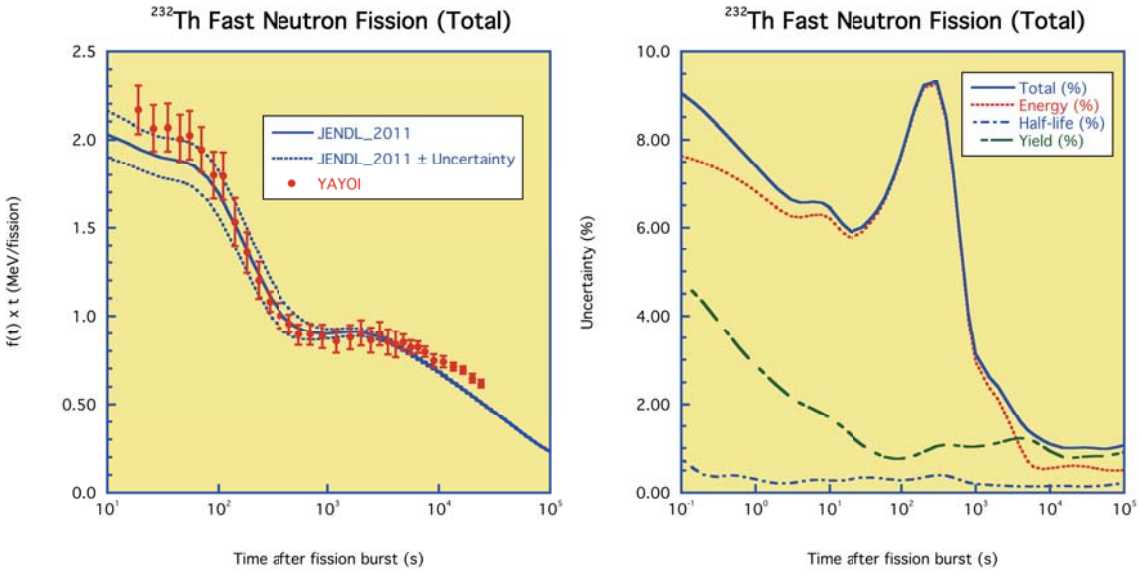

Fig. 7.14 Total decay heat and uncertainties of the calculated decay heat for ^{232}Th fast neutron fission

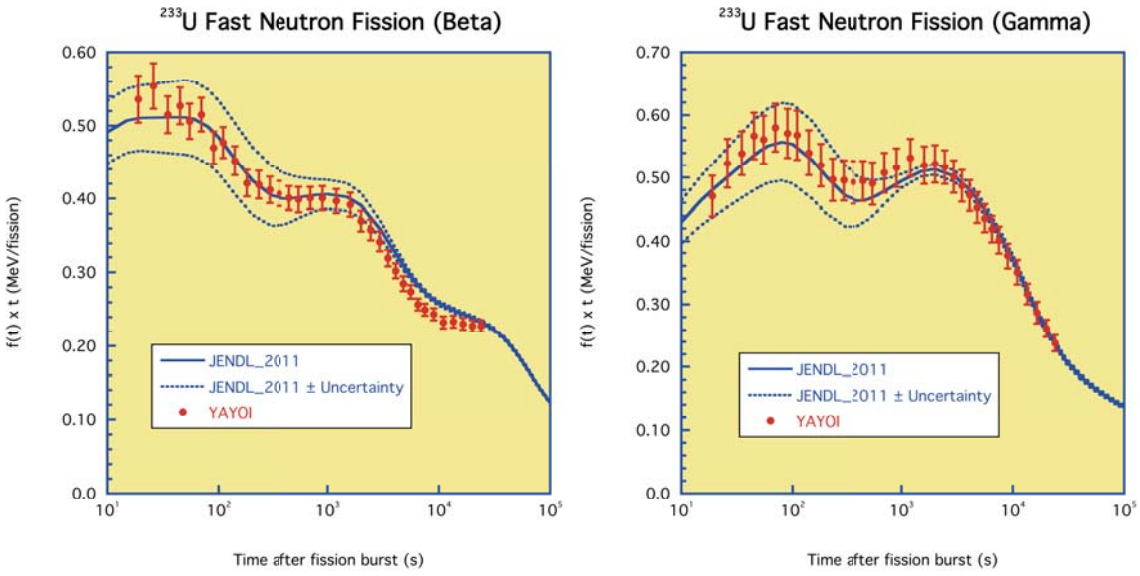

Fig. 7.15 Beta- and gamma-ray components of ^{233}U decay heat after burst fission by fast neutrons

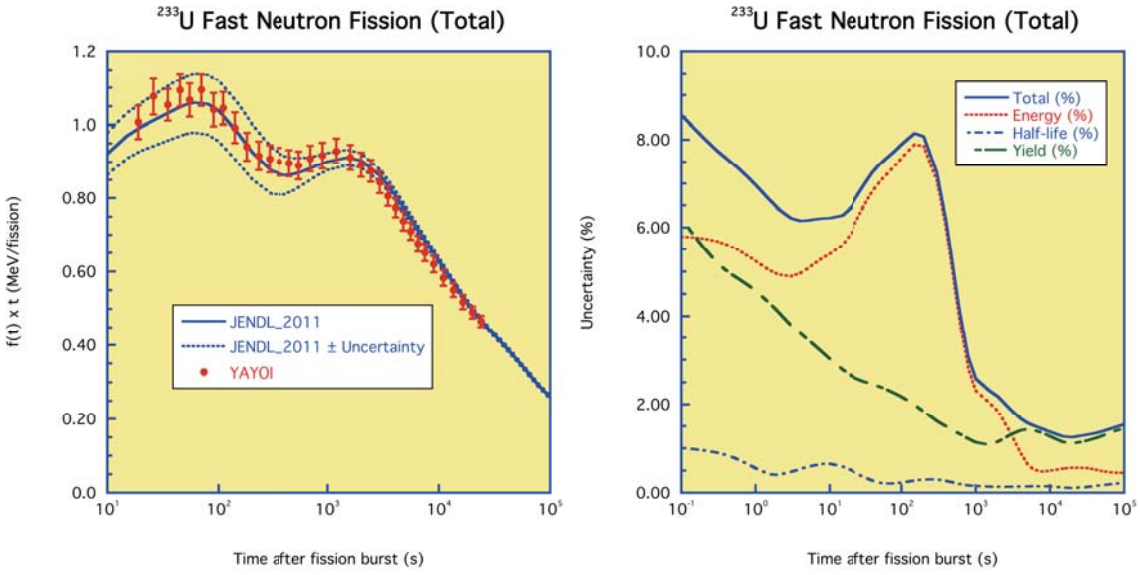

Fig. 7.16 Total decay heat and uncertainties of the calculated decay heat for ^{233}U fast neutron fission

8 Summary

JENDL FP Decay Data File 2011 (JENDL/FPD-2011) and JENDL FP Yield File 2011 (JENDL/FPY-2011) were compiled for the calculation of decay heat and nuclides inventories in spent fuel of nuclear reactors. The decay data file contains the data of 1142 unstable nuclides or states (1284 including stable nuclides). The compilation was carried out to keep the consistency between the average beta and gamma decay energy values and their spectral data by adopting the theoretically calculated spectral data for the nuclides with no or doubtful measured data. About 500 nuclides have adopted theoretically calculated spectra.

Recently measured TAGS average decay energy values were adopted in the decay data file.The spectral data of the nuclides adopting TAGS decay energy were derived from the TAGS strength function for the beta-ray spectrum. For the gamma-ray spectra, the ENSDF spectral data were compensated with the theoretical spectrum in order to keep the consistency between the TAGS decay energy and the gamma-ray spectral data.

The fission yield data were compiled based on the ENDF/B-VI yield data with the modification to coincide with the number of nuclides contained in the decay data file. The cumulative yields were calculated based on the decay chains of the JENDL/FPD-2011 file.

Both of the JENDL/FPD-2011 and JENDL/FPY-2011 files were applied to calculate the decay heat of various kinds of fissioning nuclides and the calculated results were compared with the measured decay heat data. The uncertainty of the decay heat calculation was obtained with the method of the sensitivity analysis. The calculated results of the decay heat showed good agreement with the measured data. The uncertainties of the calculated results covered well the measured data points for most of the fissioning nuclides. The good agreement showed validity of the both files for the decay heat calculation. It is expected that they will be used for the calculation of decay heat and nuclide inventories of spent fuel.

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The author is grateful to the members of “Decay Heat Evaluation Working Group” of Japanese Nuclear Data Committee and members of Nuclear Data Center , JAEA, for the continuous support and encouragement to the present work. He also gives thanks to Dr. M. Ishikawa for his continuous interest in decay heat calculation.

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国際単位系（SI）

表１．SI 基本単位

基本量	SI 基本単位	
	名称	記号
長さ	メートル	m
質量	キログラム	kg
時間	秒	s
電流	アンペア	A
熱力学温度	ケルビン	K
物質量	モル	mol
光度	カンデラ	cd

表２．基本単位を用いて表されるSI組立単位の例

組立量	SI 基本単位	
	名称	記号
面積	平方メートル	m^2
体積	立法メートル	m^3
速さ，速度	メートル毎秒	m/s
加速度	メートル毎秒毎秒	m/s^2
波数	毎メートル	m^{-1}
密度，質量密度	キログラム毎立方メートル	kg/m^3
面積密度	キログラム毎平方メートル	kg/m^2
比体積	立方メートル毎キログラム	m^3/kg
電流密度	アンペア毎平方メートル	A/m^2
磁界の強さ	アンペア毎メートル	A/m
量濃度(a)，濃度	モル毎立方メートル	mol/m^3
質量濃度	キログラム毎立法メートル	kg/m^3
輝度	カンデラ毎平方メートル	cd/m^2
屈折率(b)	（数字の） 1	1
比透磁率(b)	（数字の） 1	1

(a) 量濃度（amount concentration）は臨床化学の分野では物質濃度（substance concentration）ともよばれる。
(b) これらは無次元量あるいは次元１をもつ量であるが、そのことを表す単位記号である数字の１は通常は表記しない。

表３．固有の名称と記号で表されるSI組立単位

組立量	SI 組立単位			
	名称	記号	他のSI単位による表し方	SI基本単位による表し方
平面角	ラジアン(b)	rad	1 (b)	m/m
立体角	ステラジアン(b)	sr(c)	1 (b)	m^2/m^2
周波数	ヘルツ(d)	Hz		s^{-1}
力	ニュートン	N		$m\ kg\ s^{-2}$
圧力，応力	パスカル	Pa	N/m^2	$m^{-1}\ kg\ s^{-2}$
エネルギー，仕事，熱量	ジュール	J	N m	$m^2\ kg\ s^{-2}$
仕事率，工率，放射束	ワット	W	J/s	$m^2\ kg\ s^{-3}$
電荷，電気量	クーロン	C		s A
電位差（電圧），起電力	ボルト	V	W/A	$m^2\ kg\ s^{-3}\ A^{-1}$
静電容量	ファラド	F	C/V	$m^{-2}\ kg^{-1}\ s^4\ A^2$
電気抵抗	オーム	Ω	V/A	$m^2\ kg\ s^{-3}\ A^{-2}$
コンダクタンス	ジーメンス	S	A/V	$m^{-2}\ kg^{-1}\ s^3\ A^2$
磁束	ウエーバ	Wb	Vs	$m^2\ kg\ s^{-2}\ A^{-1}$
磁束密度	テスラ	T	Wb/m^2	$kg\ s^{-2}\ A^{-1}$
インダクタンス	ヘンリー	H	Wb/A	$m^2\ kg\ s^{-2}\ A^{-2}$
セルシウス温度	セルシウス度(e)	℃		K
光束	ルーメン	lm	cd sr(c)	cd
照度	ルクス	lx	lm/m^2	m^{-2} cd
放射性核種の放射能(f)	ベクレル(d)	Bq		s^{-1}
吸収線量, 比エネルギー分与, カーマ	グレイ	Gy	J/kg	$m^2\ s^{-2}$
線量当量, 周辺線量当量, 方向性線量当量, 個人線量当量	シーベルト(g)	Sv	J/kg	$m^2\ s^{-2}$
酸素活性	カタール	kat		s^{-1} mol

(a)SI接頭語は固有の名称と記号を持つ組立単位と組み合わせても使用できる。しかし接頭語を付した単位はもはやコヒーレントではない。
(b)ラジアンとステラジアンは数字の１に対する単位の特別な名称で、量についての情報をつたえるために使われる。実際には、使用する時には記号radおよびsrが用いられるが、習慣として組立単位としての記号である数字の１は明示されない。
(c)測光学ではステラジアンという名称と記号srを単位の表し方の中に、そのまま維持している。
(d)ヘルツは周期現象についてのみ、ベクレルは放射性核種の統計的過程についてのみ使用される。
(e)セルシウス度はケルビンの特別な名称で、セルシウス温度を表すために使用される。セルシウス度とケルビンの単位の大きさは同一である。したがって、温度差や温度間隔を表す数値はどちらの単位で表しても同じである。
(f)放射性核種の放射能（activity referred to a radionuclide）は、しばしば誤った用語で"radioactivity"と記される。
(g)単位シーベルト（PV,2002,70,205）についてはCIPM勧告2（CI-2002）を参照。

表４．単位の中に固有の名称と記号を含むSI組立単位の例

組立量	SI 組立単位		
	名称	記号	SI 基本単位による表し方
粘度	パスカル秒	Pa s	$m^{-1}\ kg\ s^{-1}$
力のモーメント	ニュートンメートル	N m	$m^2\ kg\ s^{-2}$
表面張力	ニュートン毎メートル	N/m	$kg\ s^{-2}$
角速度	ラジアン毎秒	rad/s	$m\ m^{-1}\ s^{-1}=s^{-1}$
角加速度	ラジアン毎秒毎秒	rad/s^2	$m\ m^{-1}\ s^{-2}=s^{-2}$
熱流密度，放射照度	ワット毎平方メートル	W/m^2	$kg\ s^{-3}$
熱容量，エントロピー	ジュール毎ケルビン	J/K	$m^2\ kg\ s^{-2}\ K^{-1}$
比熱容量，比エントロピー	ジュール毎キログラム毎ケルビン	J/(kg K)	$m^2\ s^{-2}\ K^{-1}$
比エネルギー	ジュール毎キログラム	J/kg	$m^2\ s^{-2}$
熱伝導率	ワット毎メートル毎ケルビン	W/(m K)	$m\ kg\ s^{-3}\ K^{-1}$
体積エネルギー	ジュール毎立方メートル	J/m^3	$m^{-1}\ kg\ s^{-2}$
電界の強さ	ボルト毎メートル	V/m	$m\ kg\ s^{-3}\ A^{-1}$
電荷密度	クーロン毎立方メートル	C/m^3	m^{-3} sA
表面電荷	クーロン毎平方メートル	C/m^2	m^{-2} sA
電束密度，電気変位	クーロン毎平方メートル	C/m^2	m^{-2} sA
誘電率	ファラド毎メートル	F/m	$m^{-3}\ kg^{-1}\ s^4\ A^2$
透磁率	ヘンリー毎メートル	H/m	$m\ kg\ s^{-2}\ A^{-2}$
モルエネルギー	ジュール毎モル	J/mol	$m^2\ kg\ s^{-2}\ mol^{-1}$
モルエントロピー, モル熱容量	ジュール毎モル毎ケルビン	J/(mol K)	$m^2\ kg\ s^{-2}\ K^{-1}\ mol^{-1}$
照射線量（X線及びγ線）	クーロン毎キログラム	C/kg	kg^{-1} sA
吸収線量率	グレイ毎秒	Gy/s	$m^2\ s^{-3}$
放射強度	ワット毎ステラジアン	W/sr	$m^4\ m^{-2}\ kg\ s^{-3}=m^2\ kg\ s^{-3}$
放射輝度	ワット毎平方メートル毎ステラジアン	$W/(m^2\ sr)$	$m^2\ m^{-2}\ kg\ s^{-3}=kg\ s^{-3}$
酵素活性濃度	カタール毎立方メートル	kat/m^3	$m^{-3}\ s^{-1}$ mol

表５．SI 接頭語

乗数	接頭語	記号	乗数	接頭語	記号
10^{24}	ヨタ	Y	10^{-1}	デシ	d
10^{21}	ゼタ	Z	10^{-2}	センチ	c
10^{18}	エクサ	E	10^{-3}	ミリ	m
10^{15}	ペタ	P	10^{-6}	マイクロ	μ
10^{12}	テラ	T	10^{-9}	ナノ	n
10^9	ギガ	G	10^{-12}	ピコ	p
10^6	メガ	M	10^{-15}	フェムト	f
10^3	キロ	k	10^{-18}	アト	a
10^2	ヘクト	h	10^{-21}	ゼプト	z
10^1	デカ	da	10^{-24}	ヨクト	y

表６．SIに属さないが、SIと併用される単位

名称	記号	SI 単位による値
分	min	1 min=60s
時	h	1h =60 min=3600 s
日	d	1 d=24 h=86 400 s
度	°	1°=(π/180) rad
分	’	1’=(1/60)°=(π/10800) rad
秒	”	1”=(1/60)’=(π/648000) rad
ヘクタール	ha	$1ha=1hm^2=10^4m^2$
リットル	L, l	$1L=11=1dm^3=10^3cm^3=10^{-3}m^3$
トン	t	$1t=10^3$ kg

表７．SIに属さないが、SIと併用される単位で、SI単位で表される数値が実験的に得られるもの

名称	記号	SI 単位で表される数値
電子ボルト	eV	$1eV=1.602\ 176\ 53(14)\times10^{-19}J$
ダルトン	Da	$1Da=1.660\ 538\ 86(28)\times10^{-27}kg$
統一原子質量単位	u	1u=1 Da
天文単位	ua	$1ua=1.495\ 978\ 706\ 91(6)\times10^{11}m$

表８．SIに属さないが、SIと併用されるその他の単位

名称	記号	SI 単位で表される数値
バール	bar	1 bar=0.1MPa=100kPa=10^5Pa
水銀柱ミリメートル	mmHg	1mmHg=133.322Pa
オングストローム	Å	1 Å=0.1nm=100pm=10^{-10}m
海里	M	1 M=1852m
バーン	b	$1\ b=100fm^2=(10^{-12}cm)2=10^{-28}m^2$
ノット	kn	1 kn=(1852/3600)m/s
ネーパ	Np	SI単位との数値的な関係は、対数量の定義に依存。
ベル	B	
デジベル	dB	

表９．固有の名称をもつCGS組立単位

名称	記号	SI 単位で表される数値
エルグ	erg	$1\ erg=10^{-7}$ J
ダイン	dyn	$1\ dyn=10^{-5}$N
ポアズ	P	$1\ P=1\ dyn\ s\ cm^{-2}=0.1Pa\ s$
ストークス	St	$1\ St=1cm^2\ s^{-1}=10^{-4}m^2\ s^{-1}$
スチルブ	sb	$1\ sb=1cd\ cm^{-2}=10^4cd\ m^{-2}$
フォト	ph	$1\ ph=1cd\ sr\ cm^{-2}\ 10^4lx$
ガル	Gal	$1\ Gal=1cm\ s^{-2}=10^{-2}ms^{-2}$
マクスウェル	Mx	$1\ Mx = 1G\ cm^2=10^{-8}Wb$
ガウス	G	$1\ G =1Mx\ cm^{-2} =10^{-4}T$
エルステッド(c)	Oe	1 Oe ≙ $(10^3/4\pi)$A m^{-1}

(c) ３元系のCGS単位系とSIでは直接比較できないため、等号「 ≙ 」は対応関係を示すものである。

表10．SIに属さないその他の単位の例

名称	記号	SI 単位で表される数値
キュリー	Ci	$1\ Ci=3.7\times10^{10}Bq$
レントゲン	R	$1\ R = 2.58\times10^{-4}C/kg$
ラド	rad	$1\ rad=1cGy=10^{-2}Gy$
レム	rem	$1\ rem=1\ cSv=10^{-2}Sv$
ガンマ	γ	$1\ \gamma=1\ nT=10\text{-}9T$
フェルミ		1フェルミ=1 fm=10-15m
メートル系カラット		1メートル系カラット = 200 mg = 2×10-4kg
トル	Torr	1 Torr = (101 325/760) Pa
標準大気圧	atm	1 atm = 101 325 Pa
カロリー	cal	1cal=4.1858J（「15℃」カロリー），4.1868J（「IT」カロリー）4.184J（「熱化学」カロリー）
ミクロン	μ	$1\ \mu=1\mu m=10^{-6}m$

（第8版，2006年改訂）

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