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Delayed Fission Gamma-ray Characteristics of ^{232}Th, ^{233}U, ^{235}U, ^{238}U, and ^{239}Pu.

Taylor K. Lane and Edward J. Parma

Prepared by
Sandia National Laboratories
Albuquerque, New Mexico 87185 and Livermore, California 94550

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Taylor K. Lane and Edward J. Parma
Applied Nuclear Technologies Department
Sandia National Laboratories
P.O. Box 5800
Albuquerque, NM 87185-1146
tlane@sandia.gov
ejparma@sandia.gov

Abstract

Delayed fission gamma-rays play an important role in determining the time dependent ionizing dose for experiments in the central irradiation cavity of the Annular Core Research Reactor (ACRR). Delayed gamma-rays are produced from both fission product decay and from activation of materials in the core, such as cladding and support structures. Knowing both the delayed gamma-ray emission rate and the time-dependent gamma-ray energy spectrum is necessary in order to properly determine the dose contributions from delayed fission gamma-rays. This information is especially important when attempting to deconvolute the time-dependent neutron, prompt gamma-ray, and delayed gamma-ray contribution to the response of a diamond photo-conducting diode (PCD) or fission chamber in time frames of milliseconds to seconds following a reactor pulse. This work focused on investigating delayed gamma-ray characteristics produced from fission products from thermal, fast, and high energy fission of Th-232, U-233, U-235, U-238, and Pu-239. This work uses a modified version of CINDER2008, a transmutation code developed at Los Alamos National Laboratory, to model time and energy dependent photon characteristics due to fission. This modified code adds the capability to track photon-induced transmutations, photo-fission, and the subsequent radiation caused by fission products due to photo-fission. The data is compared against previous work done with SNL-modified CINDER2008 [1] and experimental data [2, 3] and other published literature, including ENDF/B-VII.1 [4]. The ability to produce a high-fidelity (7,428 group) energy-dependent photon fluence at various times post-fission can improve the delayed photon characterization for radiation effects tests at research reactors, as well as other applications.

Acknowledgments

The authors would like to acknowledge Billy Martin for all of his help during the beginning of this project to get CINDER up and running. His pre-built executable, spectra conversion utilities, and delayed gamma-ray library saved the authors tremendous amounts of time. Rick Vega's assistance with Python allowed the authors to post-process and visualize the large amounts of data generated by CINDER rapidly. For that, we are thankful. Furthermore, the authors would like to thank those who graciously sent us their data, particularly Marian Jandel, Olivier Litaize, and Ionel Stetcu. Lastly, Taylor would personally like to extend deep appreciation to Ed Parma and Ken Reil for giving him great latitude, responsibility, and flexibility while he returned to graduate school.

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Executive Summary

A study of the fission gamma-ray characteristics of ^{232}Th, ^{233}U, ^{235}U, ^{238}U, and ^{239}Pu is performed to improve the delayed gamma-ray characterization in radiation transport models. Of particular interest is the fluence used to predict the delayed gamma-ray dose to experiments within the ACRR central cavity. These characterization spectra currently use a time-independent 48-group structure. CINDER, the software used in this report, provides 7,428 group gamma-ray spectra from $t = 10^{-6} - 10^{8}$ seconds. This line data is re-binned into the current 48-group structure and compared over time. Furthermore, other fission gamma-ray characteristics are also reported.

A comprehensive investigation of available literature highlights the variability of fission gamma-ray data over the past sixty years (for a condensed review please see Fig. 3). Much of the literature focused on the prompt emission of fission photons (times typically less than 1 μs). These prompt fission gamma-ray spectra (PFGS) results are compared to the earliest spectra generated by CINDER. The agreement is quite good and gives confidence to the results in regimes where comparative literature does not exist. Also, the PFGS literature is compared to the characterization fluence currently used to evaluate its adequacy. The 48-group characterization fluence compares quite well to both sets of ^{235}U and ^{239}Pu PFGS literature data. However, as the time post-fission increases, the agreement wanes (see Fig. 28). This implies that the current characterization fluence is adequate for only relatively short time periods (< 1 s). The available literature spectra at $t > 1$ s are used to compare against the CINDER delayed fission gamma-ray spectra (DFGS).

The agreement between the results presented herein and literature varies greatly and is likely caused by the amount of literature available and the quality of the ENDF cross-section libraries used within CINDER. The experimental data by Fisher and Engle [2, 3] is one of the most comprehensive sets of literature data and is used as a comparison for the CINDER results. The photon energy release and multiplicity rates compare well with the Fisher and Engle data, across most of the nuclides (see Figs. 5, 9, 12, 17, and 20). The relative DFGS are relatively consistent across both data sets (see Figs. 8, 11, 16, 19, and 24), but the agreement breaks down when comparing absolute DFGS (see Figs. 7, 10, 15, 18, and 23). This cause for discrepancy is currently unknown. The DFGS is more rigorously investigated for ^{235}U and ^{239}Pu by comparing it to data from Beddingfield and Cecil [7]. The data aligns quite well (see Figs. 14 and 22), save a few outlying ratios.

The fission gamma-ray characteristics of interest are the total fission gamma-ray energy released (E_γ), the fission gamma-ray multiplicity (N_γ), and their rates over time, as well as the average photon energy (ε_γ). The values were calculated out to 10^8 seconds and compared to available literature. The variability in the published values for these characteristics can be quite large. This notwithstanding, the total energy release values compare quite well across most nuclides, however the photon multiplicities are substantially higher than in literature. This, in turn, causes ε_γ to be lower than literature values, generally. This is likely caused by the low-energy threshold for CINDER being substantially lower than other studies; the large number of low-energy photons leads to an artificially high photon multiplicity. This does not appear to effect E_γ. In total, the agreement is quite good (see Tables 5, 6, 7, 8, and 9). Substantial amounts of data are included in the Appendix.

Nomenclature

A	mass number
ACRR	Annular Core Research Reactor
DANCE	Detector for Advanced Neutron Capture Experiments
DASA	Defense Atomic Support Agency
DFG	delayed fission gamma-ray(s)
DFGS	delayed fission gamma-ray spectrum
DOE	Department of Energy
ENDF	Evaluated Nuclear Data Files
eV	electron-volt
E_γ	energy released by fission due to gamma-rays
ε_γ	average energy per fission gamma-ray
F	fast ENDF fission yield library
F&E or F/E	Fisher and Engle (refers to Refs. [2, 3])
FREC-II	Fueled Ring External Cavity II
HE	high-energy (14-MeV) ENDF fission yield library
keV	kiloelectron-volt (10^3 eV)
LANL	Los Alamos National Laboratory
LANSCE	Los Alamos Neutron Science Center
LM	linear model
LP or L/P	Lane/Parma (refers to this work.)
MCHF	Monte Carlo Hauser-Feshbach
MeV	megaelectron-volt (10^6 eV)
N_γ	number of gamma-rays released per fission (gamma-ray multiplicity)
ns	nanosecond (10^{-9} s)
PCD	photo-conducting diode
PFG	prompt fission gamma-ray(s)
PFGS	prompt fission gamma-ray spectrum
ODE	ordinary differential equation
PCD	photo-conducting diode
QOI	quantity of interest
sh	shake, unit of time (1 sh = 10 ns)
SNL	Sandia National Laboratories
T	thermal ENDF fission yield library
ν	number of neutrons released per fission (neutron multiplicity)
μs	microsecond (10^{-6} s)
Z	atomic number

1 Introduction

Photon emission characteristics have long been an understudied aspect of nuclear fission. Neutron emission properties of nuclear fission have been studied feverishly since its discovery because neutron emission is critical to a sustained nuclear chain reaction. Consequently, gamma-ray emission studies have historically taken a back seat to neutron emission investigations. However, there has been a recent resurgence in gamma-ray emission work since the new millenium due to: materials requirements for advanced reactor fuels, fissile material identification from active interrogation, and delayed heating in reactors, to name a few. The main application of interest to this work is the delayed photon characterization of reactors, such as the Annular Core Research Reactor (ACRR). Regardless of application, this work aims to provide accurate fission gamma-ray data for a variety of fissionable nuclides over a wide energy range and time frame.

The ability to properly characterize the energy-dependent neutron and photon fluxes in the ACRR and Fueled Ring External Cavity (FREC-II) is critical to accurately and reliably performing qualification testing and designing experiments [8]. This characterization involves both modeling and experimental components using an assortment of available tools. There are a variety of spectrum-modifying “bucket" environments available to ACRR users. These buckets can be used in the central cavity of the ACRR to tailor the radiation environment to a customer’s needs [9, 10]. Understanding the total energy released by fission gamma-rays as a function of time allows experimental designers to more accurately predict the flux inside these buckets. This work will aid ACRR users by providing them with a more accurate, and time-dependent, photon characterization fluence.

This report is broken into sections as follows. Section 2 is a review of fission gamma-ray literature over the past sixty years. It is provided as a reference for readers so that a reader can have a comprehensive literature survey in one place. Furthermore, this allows a reader to come to his or her own conclusions about why the data presented herein may or may not agree well with certain pieces of literature due to differences in approach. The following section, Section 3, provides a brief explanation of the underlying physics involved in CINDER and the ENDF library and its data. Section 4 presents the data generated by CINDER, organized by material. The section is organized this way because different work was performed for each nuclide due to the availability of data and the prior work done in the literature. No applications are presented in this section. Although the authors prefer to not call their work a validation or verification of CINDER, this section is used to compare the results to literature, which gives confidence to the data used in the following section. The next section, Section 5, is used to contrast the novel data by CINDER to the current characterization fluence used in the ACRR. Finally, Section 6 draws conclusions from the data presented in Sections 4 and 5 and provides directions for future work. The Appendix includes substantial amounts of data, from both this work and literature. This data is included for the ease of the reader. Furthermore, a myriad of useful figures from the CINDER data are also included, as well as an example CINDER input. Finally, this document is extensively hyperlinked for ease of use; all parenthetical citations are shown in a blue font which goes to the full citation where a hyperlinked DOI is included, if available. All Section, Figure, and Table references are hyperlinked, as well as the Table of Contents, List of Figures, and List of Tables, but in black text.

2 History of Selected Fission Gamma-Ray Literature

A historical account of published literature relevant to fission gamma-rays is used to compare, and verify, several aspects of the work performed in this report. Selected literature is presented chronologically and details of the work, such as data collection methods, applicable energy range, time range of interest, and their results are reviewed. This is provided because the scientific community relies on nuclear data libraries, such as Evaluated Nuclear Data File (ENDF), which evaluates a collection of published data to produce a single value for a specific characteristic. However, each study was performed under different conditions, used different collection methods, made different approximations, and used different experimental apparatuses. These conditions can drive possible systematic uncertainties that dominate the non-biased uncertainties (counting statistics, etc.) which are quoted within the literature. This leads to a set of highly variable valuations for a specific characteristic, such as the total energy released by fission gamma-rays, that are difficult to compare amongst each other. Because of this, this section is used to more easily ascertain reasons for possible disagreements with the results of this report. Primarily, the results reported for the literature are for prompt fission gamma-rays from thermal neutron induced fission of ^{235}U, because it is the most studied. But, many of the studies investigate multiple materials under a variety of conditions. Some complete data tables are included in the Appendix, while for other works the reader should refer to the original work.

Just like the highly variable results, nomenclature in the literature is diverse. Every attempt was made to maintain a consistent nomenclature throughout this report. Three main fission gamma-ray characteristics are typically of interest to researchers: total average energy release, average multiplicity, and average energy. These three characteristics are represented by E_γ, N_γ, and ε_γ throughout this report, where $\varepsilon_\gamma = E_\gamma / N_\gamma$. The overbar typically used to denote averages is not used this work because all quantities of interest are averages. Neutron multiplicity is widely accepted in nuclear science and technology to be symbolized by ν. However, because the subscript field is typically occupied to denote "prompt" or "delayed," instead of differentiating between particle type, photon multiplicity uses a completely different symbol, N_γ. This is to easily distinguish between the multiplicity of the two particles. It is important to mention that these three characteristics take on different valuations depending on the time frame of interest. However, because there is no widely accepted consensus on the time differentiation between a prompt gamma-ray and a delayed gamma-ray, no subscript notation denoting the time frame is used. This was done to prevent readers from assuming that similarly marked variables from two different works can be easily compared. Instead, the applicable time frame and energy range are explicitly included.

Also, the terms "photon", "gamma-ray", and "γ-ray" are used interchangeably throughout this report. In addition, the nuclear engineering community typically uses the phrase "flux" for what other scientific fields would call either a "fluence" (*number/area*) or a "fluence rate" (*number/area-time*). This difference in nomenclature presents difficulties when the intended audience spans both sides of this divide. In this report, the profile used to characterize the delayed gamma-ray environment will be called any combination of the three: "characterization spectra", "characterization flux", and "characterization fluence". Regardless of its moniker, the units are consistently inverse energy (1/MeV).

2.1 Francis and Gamble (1955)

In the 1955 Semiannual Progress Report for Oak Ridge National Laboratory's Physics Division, Francis and Gamble [11] report results from an experiment using a 1.5 x 1 inch cylindrical NaI crystal in coincidence with a parallel-plate fission chamber to measure the prompt (< 4 μs) fission gamma-ray spectrum of ^{235}U up to 8 MeV. No multiplicity or energy release values are given.

2.2 Maienschein, Peelle, Zobel, and Love (1958)

Maienschein, Peelle, Zobel, and Love [12] presented data at the Second United Nations International Conference on the Peaceful Uses of Atomic Energy in 1958 in which they measured fission gamma-rays from ^{235}U from 3×10^{-9} - 1×10^{8} seconds. The results are split into three time categories: prompt, short, and long. These categories are defined as $3 \times 10^{-9} < t < 5 \times 10^{-8}$ s, $5 \times 10^{-8} < t < 10^{-5}$ s, and $1 < t < 10^{8}$ s, respectively. The data was measured using single-crystal, Compton, and pair NaI scintillation spectrometers. The authors posit that $E_\gamma = 7.2 \pm 0.8$ MeV, $N_\gamma = 7.4 \pm 0.8$, and $\varepsilon_\gamma = 0.97 \pm 0.15$ MeV for prompt fission gamma-rays in the 0.3 - 10 MeV energy range. The total delayed fission gamma-ray release, from 1 to 10^8 seconds, was given as $E_\gamma = 5.7 \pm 0.7$ MeV for energies greater than 0.3 MeV. Two figures depict the delayed photon multiplicity rates (without any response corrections), at various times post-fission ranging from 1.7 to 1000 seconds, as a function of photon energy. Additionally, a figure is given which plots the prompt photon count rate, averaged over various energy intervals, as a function of time for times less than 100 shakes (1 shake = 10 ns) post-fission.

2.3 Fisher and Engle (1962/1964)

Fisher and Engle [2, 3] measured the delayed gamma-rays emitted from ^{232}Th, ^{233}U, ^{235}U, ^{238}U, and ^{239}Pu by exposing material foils to Godiva II [13, 14], a fast burst assembly at Los Alamos National Laboratory (LANL), formerly Los Alamos Scientific Laboratory. The foils were transported away from Godiva II using a pneumatic system and the delayed gamma-rays were measured from 0.2 - 45 seconds after fission using a well shielded NaI scintillator behind a CH_2 filter. The CH_2 filter was used to shield the detector system from β particles. The results were binned into intervals from 0.2 - 0.5, 1.0 - 2.0, 4.0 - 5.5, 10.0 - 13.0, and 35.0 - 45.0 seconds after fission. Values for E_γ, N_γ, ε_γ, and a 17-group energy spectrum were recorded for each time interval for all five materials. These values were integrated over time to calculate a total value from 0.2 - 45.0 seconds.

This work is one of only a few to present data on nuclides other than ^{235}U and ^{239}Pu. However, the drawback is that this data only extends to 45 seconds, and therefore does not account for any long-lived fission product de-excitations. Because of this, the values presented by Fisher and Engle are not total delayed energy released and multiplicity values; thus, they cannot be compared to evaluated or theoretical calculations as such. The data is useful because many, but not all, aspects

of the experimental apparatus are given, therefore simulations can be reasonably compared to this data (as shown by Durkee, *et al.* [15] and Hecht, *et al.* [1]).

2.4 Thomas and Grover (1967)

Thomas and Grover [16] recognized that recent experimental work did not agree with the theoretical prediction of E_γ for prompt fission gamma-rays. They showed that when fission fragments possess excitation energies greater than the neutron binding energy, neutron emission competes with gamma-ray emission when the neutrons must carry away a large amount of orbital angular momentum. The takeaway from their work was that higher-spin fragments tend to produce more gamma-ray emission than lower-spin fragments. Using an average pair of fission fragments (^{96}Sr and ^{140}Xe), the products' de-excitation was calculated and resulted in $E_\gamma = 7.08$ MeV, $N_\gamma = 8.2$, and $\varepsilon_\gamma = 0.87$ MeV for prompt gamma-ray emission from thermal neutron induced fission in ^{235}U. When compared to Maienschein, *et al.* [12], the reported photon multiplicity is higher (but within quoted uncertainties), and E_γ is in good agreement, which leads to the average photon energy being slightly lower than the experimental value (but still within quoted uncertainties).

2.5 Peelle and Maienschein (1971)

Peelle and Maienschein [17] employed a system of single-crystal, Compton, and pair NaI scintillation spectrometers to measure the prompt fission gamma-rays emitted by thermal neutron induced fission of ^{235}U. The applicable energy range was from 0.01 to 10.5 MeV and the time range of interest was $\leq 69 \times 10^{-9}$ seconds. The counts were used in a spectrum unfolding calculation which resulted in $E_\gamma = 7.25 \pm 0.26$ MeV, $N_\gamma = 8.13 \pm 0.35$, and $\varepsilon_\gamma = 0.97 \pm 0.05$ MeV over the full energy range. Results were also calculated for a subset of the energy range, 0.14 - 10.0 MeV, for comparison to an unpublished Verbinski and Sund DASA report, and the results were $E_\gamma = 7.18 \pm 0.26$ MeV, $N_\gamma = 7.45 \pm 0.32$, and $\varepsilon_\gamma = 0.96 \pm 0.06$ MeV. A figure showing the energy-dependent PFGS for photons above 0.8 MeV and emitted within 55 ns after fission is also shown.

This work shows that the applicable energy range studied can affect the final characteristics considerably. Changing the energy range from 0.01 - 10.5 to 0.14 - 10.0 MeV caused percent differences in E_γ, N_γ, and ε_γ of -8.3%, -1.0%, and +8.1%, respectively. The difference in the total energy released is within quoted uncertainties, but this is not the case for the photon multiplicity. This causes the discrepancy in the average photon energy. The data is also substantially higher than the unpublished data in the DASA report ($E_\gamma = 6.69 \pm 0.3$ MeV, $N_\gamma = 6.51 \pm 0.3$, and $\varepsilon_\gamma = 1.03 \pm 0.07$ MeV), to which Peelle and Maienschein compare to. Photons with an energy above 10 MeV are so rare, their contribution is negligible. What these discrepancies show are that lower energy photons, in the tens of keV energy range, do affect the photon multiplicity valuations.

2.6 Verbinski, Weber, and Sund (1973)

In 1973, Verbinski, Weber, and Sund [5] published work in which they measured the prompt fission gamma-rays emitted from ^{235}U, ^{239}Pu, and ^{252}Cf(sf) in less than 1×10^{-9} seconds after thermal neutron induced fission. The experimental apparatus consisted of a NaI gamma-ray spectrometer surrounded by a NaI anti-Compton sheath with an applicable energy range of 0.14 - 10.0 MeV. Prompt fission neutrons were positively rejected by time of flight discrimination. 13 group energy spectra for all three materials were reported, after being run through a double spectrum unfolding routine, with total values for ^{235}U being: $E_\gamma = 6.51 \pm 0.3$ MeV, $N_\gamma = 6.70 \pm 0.3$, and $\varepsilon_\gamma = 0.97 \pm 0.05$ MeV. The main conclusions from the authors is that as the mass number increases there is an overall increase in E_γ and N_γ even though a systematic softening of the energy spectra occurs. The latter of which is featured in Fig. 1 by plotting the photon multiplicity for all three materials as a function of energy.

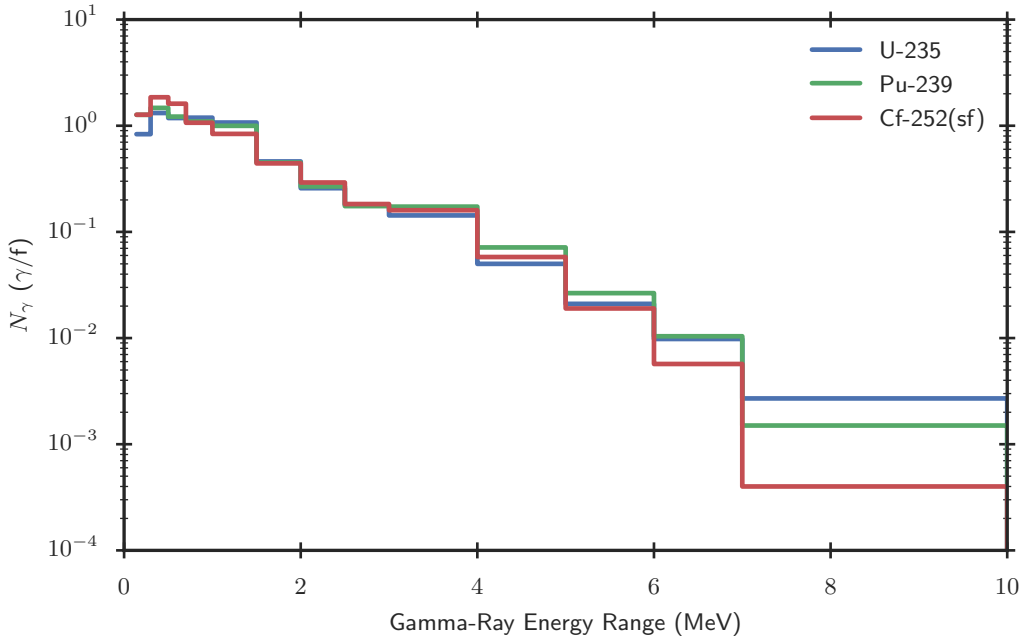

Figure 1. Photon multiplicity as a function of energy, as reported by Verbinski, Weber, and Sund in 1973 [5].

2.7 Pleasonton (1973)

Pleasonton's work [24] measured the prompt fission gamma-rays emitted within 5×10^{-9} seconds after fission of ^{233}U and ^{239}Pu using the Oak Ridge Research Reactor and a NaI spectrometer with an energy range of 0.122 - 6.13 MeV. This work was quite valuable because the majority of the published literature, at that time and still today, focused on other nuclides, such as ^{235}U.

Both material foils were greater than 99% enriched and were exposed to a thermal flux of approximately 10^8 n-cm^{-2}-s^{-1}. The gamma-ray energy released and multiplicity for ^{233}U was reported as 6.69 ± 0.3 MeV and 6.31 ± 0.3, respectively, which gives $\varepsilon_\gamma = 1.06 \pm 0.07$ MeV. The results for ^{239}Pu, given in the same order, are 6.73 ± 0.35 MeV, 6.88 ± 0.35, and 0.98 ± 0.07 MeV. Pleasonton also presents extensive data on the energy released and multiplicity of gamma-rays as a function of fission fragment mass.

The reported values are based on the assumption that prompt fission gamma-rays are emitted isotropically from individual fission fragments. Pleasonton notes that Hoffman measured an anisotropy of approximately 12% and 15% for ^{233}U and ^{239}Pu, respectively. Therefore, he suggests his results should be decreased by 6 or 7%. However, decreasing the results would lead to less agreement with the Verbinski, Weber, and Sund data for ^{239}Pu (no published data was available for ^{233}U at the time). Thus, it appears that in 1973 a consensus on E_γ, N_γ and ε_γ values, or the theory behind how to accurately calculate them, had not been met.

2.8 Hoffman and Hoffman (1974)

Hoffman and Hoffman [18] wrote an annual review of post-fission phenomena in 1974. In this review, one section was devoted to photon emission and the authors noted, "gamma-ray emission from fragment nuclei has received less study than most other aspects of nuclear fission. Consequently, gamma-ray phenomenology has not been well understood, which has impeded theoretical development in this area." This statement supports the last sentence of the previous section. Linear approximations to F. Pleasonton's data are shown for E_γ, N_γ and ε_γ. These approximations are $E_\gamma = 0.028A + 0.09$, $N_\gamma = 0.112A - 19.94$, and $\varepsilon_\gamma = E_\gamma / N_\gamma$, respectively. It is important to note that these approximation use the compound nucleus mass number (i.e. $A = 236$ for fission of ^{235}U).

A section on the angular distribution of post fission gamma-rays explains that data has shown a 12-15% increase photon emission along the fission line, when compared to perpendicular to the fission axis. The anisotropy can be approximated by $W(\theta) \simeq a_0 + a_2 \cos^2 \theta$ where θ is measured from the fission axis. This could be explained as a major factor in the variability in experimental results since each counting system is configured differently. The section goes on to explain that the anisotropy is not constant amongst materials. Anisotropy increases as the total fragment kinetic energy increases. This further complicates interpretation of results, such as Fisher and Engle, who use the same detector configuration, but for multiple materials.

2.9 Frehaut, Bertin, and Bois (1982)

Frehaut, Bertin, and Bois [19] simultaneously measured the average number of prompt neutrons and prompt gamma-ray energy in the energy range of 1 - 15 MeV for ^{232}Th, ^{235}U, and ^{237}Np. The energy-dependent results are reported relative to the PFG energy release of Cf-252. This was done to maintain calibration of the detector system and the value used was $E_\gamma = 7.06$ MeV. The

total prompt fission gamma-ray energy release values, as a function of neutron multiplicity are,

$$E_\gamma = (0.64 \pm 0.07)\,\nu_p + (4.48 \pm 0.20)\,, \quad (1)$$
$$E_\gamma = (0.98 \pm 0.08)\,\nu_p + (4.37 \pm 0.21)\,, \quad (2)$$
$$E_\gamma = (0.90 \pm 0.07)\,\nu_p + (4.40 \pm 0.20)\,, \quad (3)$$

for ^{232}Th, ^{235}U, and ^{237}Np, respectively. Complete incident neutron energy dependent data tables can be found in Appendix F.

2.10 ENDF/B-V.2 (1985)

ENDF/B-V.2 [20] is released and provides total prompt and delayed fission gamma-ray energy release values with no dependence on the incident neutron energy in MT=458. The data primarily used in this evaluation is from R. Sher [21], from which the values are calculated by a combination of mass-defect systematics and fits to experimental data. However, only the systematic study was performed for many isotopes because experimental data was not available. Uncertainties for the "primary" fissionable isotopes (^{232}Th, ^{233}U, ^{235}U, ^{238}U, ^{239}Pu, and ^{241}Pu) are quoted at 0.25 MeV; other fissionable isotopes have uncertainties up to 2.0 MeV.

2.11 Beddingfield and Cecil (1998)

Beddingfield and Cecil [7] measure the gamma-ray spectra given off by fission of ^{235}U and ^{239}Pu approximately 1250 seconds after fission. These measurements are performed with an unknown detector system, but the resolution of the system allows for isolation of gamma-ray peaks caused by fission products specific to the original fissile material. In this work the authors show that by taking the ratio of the gamma-ray peak intensity for a number of nuclides in different fission product mass regions and weighting them against theoretical ENDF/B-VI fission product yields [22, 23], one can ascertain whether the fissile material is ^{235}U or ^{239}Pu.

2.12 ENDF/B-VI.8 (2001)

ENDF/B-VI.8 [22] is released and has no updates to MT=458 from ENDF/B-V.2 for ^{232}Th, ^{233}U, ^{235}U, ^{238}U, and ^{239}Pu.

2.13 Valentine (2001)

Valentine [6] fits ν, Z, and A dependent functional forms for E_γ, N_γ, and ε_γ based on data from Pleasonton [24], Verbinski, *et al.* [5], and Peelle and Maienschein [17]:

$$E_\gamma(\nu,Z,A) = \left[2.51 \pm 0.01 - \left(1.13 \times 10^{-5} \pm 7.2 \times 10^{-8}\right) Z^2\sqrt{A}\right] \nu + 4.0, \tag{4}$$

$$\varepsilon_\gamma = -1.33 \pm 0.05 + (119.6 \pm 2.5)\, Z^{1/3}/A, \tag{5}$$

$$N_\gamma = E_\gamma(\nu,Z,A)\,/\varepsilon_\gamma. \tag{6}$$

The E_γ, N_γ, and ε_γ values which resulted from this work are shown in Table 1. In addition, Valentine fit a negative binomial to the photon multiplicity distribution based on Brunson's [25] double Poisson model. Verbeke, Hagmann, and Wright (2010) [26] later expanded on this model.

Table 1. Fission gamma-ray characteristics of various isotopes, as reported by Valentine (2001).

Isotope	E_γ (MeV)	N_γ	ε_γ (MeV)
^{233}U	6.61 ± 0.03	6.67 ± 0.47	0.99 ± 0.07
^{235}U	6.53 ± 0.03	6.73 ± 0.49	0.97 ± 0.07
^{238}U	6.06 ± 0.03	6.36 ± 0.47	0.95 ± 0.07
^{239}Pu	6.78 ± 0.04	7.14 ± 0.53	0.95 ± 0.07

2.14 Madland (2006)

Madland [27] presented, for the the first time, the total energy release from fission, and its components (including prompt fission gamma-ray contributions), for ^{235}U, ^{238}U, and ^{239}Pu as a function of the incident neutron energy. Madland used data from Frehaut, Bertin, and Bois (1982) [19] and other sources to fit linear approximations of the prompt fission gamma-ray energy release as a function of incident neutron energy only, by eliminating the dependence on prompt neutron multiplicity. The fits were first-order for the uranium isotopes, while the plutonium isotope followed a second-order approximation. These approximations are given by

$$E_\gamma = (6.600 \pm 0.03) + (0.0777 \pm 0.004)\, E_n, \tag{7}$$

$$E_\gamma = 6.6800 + 0.1239 E_n, \tag{8}$$

$$E_\gamma = (6.741 \pm 0.02) + (0.1165 \pm 0.004)\, E_n - (0.0017 \pm 0.0002)\, E_n^2, \tag{9}$$

for ^{235}U, ^{238}U, and ^{239}Pu fission systems, respectively. The approximation constants for ^{238}U have no uncertainties because the data was modified from ^{237}Np measurements and the uncertainties are not equitable. Thus, the uncertainties are neglected, but non-zero.

2.15 ENDF/B-VII.0 (2006)

ENDF/B-VII.0 [28] is released and updates the prompt fission gamma-ray energy value for ^{235}U, ^{238}U, and ^{239}Pu, as well as the delayed E_γ for ^{235}U. The prompt E_γ value for ^{235}U is decreased from 6.97 ± 0.05 MeV in ENDF/B-VI.8 to 6.60 ± 2.0 MeV in the current version. No justification is given for the large (30%) uncertainty. The MT=458 data is shown below in Table 2.

Table 2. Prompt and Delayed Fission-Gamma Energy Release values from MT=458 of ENDF/B-VII.0 for ^{232}Th, ^{233}U, ^{235}U, ^{238}U, and ^{239}Pu [28].

Nuclide	E_γ	
	Prompt	Delayed
^{232}Th	7.11 ± 0.90	8.16 ± 0.10
^{233}U	7.72 ± 0.52	5.01 ± 0.06
^{235}U	6.60 ± 2.00	5.60 ± 0.30
^{238}U	6.68 ± 0.53	8.25 ± 0.07
^{239}Pu	6.74 ± 0.22	5.17 ± 0.06

2.16 Verbeke, Hagmann, and Wright (2010)

Verbeke, Hagmann, and Wright [26] combine the work of Valentine [6] and Peelle and Maienschein [17] to provide a piecewise mathematical expression for the prompt fission gamma-ray spectrum for ^{235}U,

$$N(E) = \begin{cases} 38.13\,(E - 0.085)\,e^{1.648E} & E < 0.3 \text{ MeV} \\ 26.8e^{-2.30E} & 0.3 < E < 1.0 \text{ MeV} \\ 8.0e^{-1.10E} & 1.0 < E < 8.0 \text{ MeV} \end{cases}, \tag{10}$$

from 0.3 to 8 MeV. This is the second work to build upon the data of Peelle and Maienschein [17]. Any possible systematic uncertainties in the underlying data may persist to this data.

2.17 ENDF/B-VII.1 (2011)

ENDF/B-VII.1 [4] is released and provides an incident neutron energy dependence for ^{238}U and ^{239}Pu and cites Madland [27] for the change. However, the ENDF/B-VII.0 values for ^{235}U remain unchanged although Madland performed an analysis on all three nuclides. The prompt

relationships for ^{238}U and ^{239}Pu are given by,

$$E_\gamma = (6.6800 \pm 0.53) + (0.1239 \pm 0.0124)\, E_n, \tag{11}$$

$$E_\gamma = (6.7410 \pm 0.47) + (0.1165 \pm 0.0117)\, E_n - (0.0017 \pm 0.0002)\, E_n^2, \tag{12}$$

respectively. The delayed relationships, in the same order, are

$$E_\gamma = (8.25 \pm 0.07) - (0.0750 \pm 0.0075)\, E_n, \tag{13}$$

$$E_\gamma = (5.17 \pm 0.06) - (0.0750 \pm 0.0075)\, E_n. \tag{14}$$

These expressions match Madland's results, with the exception of the constant uncertainties. However, ^{235}U continues to be independent of incident neutron energy and the large uncertainty associated with its prompt E_γ value remains.

2.18 Jandel, et al. (2012)

Jandel, *et al.* [29] publish a report which details a parameterized model (PM) for correlating N_γ and E_γ from the fission of ^{235}U in the DANCE array at LANSCE. This parameterized model is compared to the CGMF code and the results for the two codes are: $N_\gamma = 6.2$ and 6.79, $E_\gamma = 6.46$ and 6.35 MeV, and $\varepsilon_\gamma = 1.04$ and 0.935 MeV, for PM and CGMF, respectively. These results are derived from fission induced by neutrons in the 4 eV to 100 keV range, with a time window of less than 10 ns. For more information on CGMF, please see [30].

2.19 Becker, et al. (2013)

Prompt neutron and gamma-ray emission characteristics from primary fission fragments were calculated by Becker, *et al.* [31] for (n_{th}, f) of ^{235}U and ^{239}Pu and the spontaneous fission of ^{252}Cf using a Monte Carlo Hauser-Feshbach (MCHF) model. Gamma-ray characteristics such as the PFGS, multiplicity distribution, E_γ, N_γ, and ε_γ, were calculated and compared to available experimental data. A benefit of these calculations is that there is no time cutoff and represent an energy range of > 140 keV. The most comparable results given by the MCHF model, for ^{235}U, were $E_\gamma = 7.06$ MeV, $N_\gamma = 8.05$, and $\varepsilon_\gamma = 0.88$ MeV. The total average values, when compared to Peelle and Maienschein (1971) [17], are slightly higher for N_γ and slightly lower for both E_γ and ε_γ. The authors also compare the gamma-ray multiplicity as a function of gamma-ray energy to data by Verbinski, Weber, and Sund (1973) [5] for ^{235}U; the spectrum from Becker, *et al.* is higher than experimental data in the sub-200 keV range, and lower in the > 5 MeV range. E_γ, N_γ and ε_γ values are also calculated for ^{239}Pu and ^{252}Cf(sf) and compared to available experimental data.

2.20 Chyzh, et al. (2013)

Chyzh, *et al.* [32] unfolded fission gamma-ray measurements of ^{235}U and ^{239}Pu from the DANCE array at LANSCE using both iterative Bayesian and singular-value decomposition meth-

ods. The reported values are averaged over incident neutron energy ranges from either thermal or 2 eV up to 100 keV. In addition to N_γ, E_γ, and ε_γ values, the energy spectra for both materials are presented. Furthermore, the correlations between the photon multiplicity and the gamma-ray energy release values are investigated.

2.21 Oberstedt, et al. (2013)

Oberstedt, *et al.* [33] measured PFG characteristics from ^{235}U in multiple experimental facilities using numerous lanthanide halide detector systems, such as $LaCl_3$, $LaBr_3$, and $CeBr_3$ scintillators, over an energy range of 0.1 - 6.0 MeV. The prompt fission gamma-ray spectrum (PFGS) is unfolded and compared across all five detector systems, as well as to outside data such as Verbinski, Weber, and Sund and ENDF/B-VII.1. Results, averaged across all five detector systems, are $E_\gamma = 6.92 \pm 0.09$ MeV, $N_\gamma = 8.19 \pm 0.11$, and $\varepsilon_\gamma = 0.85 \pm 0.02$ MeV. These results agree with more recent calculations, such as Becker, *et al.* [31], and less with older experimental data [5, 17] and the ENDF/B-VII.1 library [4]. The total energy released agrees with many published values, but the gamma-ray multiplicity is higher than most, which consequently leads to a lower ε_γ.

2.22 Ullmann, et al. (2013)

Ullmann, *et al.* [34] investigate prompt fission gamma-ray production from ^{239}Pu using the Detector for Advanced Neutron Capture Experiments (DANCE) at the Los Alamos Neutron Science Center (LANSCE). DANCE is a 160-element, nearly 4π BaF_2 array. A parameterization is generated based on MCHF calculations, then the experimental data is collected and optimized via a simulated annealing technique. This parameterization resulted in $E_\gamma = 7.46 \pm 0.06$ MeV, $N_\gamma = 7.15 \pm 0.09$, and $\varepsilon_\gamma = 1.04 \pm 0.02$ MeV. Furthermore, a photon multiplicity distribution and PFGS were reported.

2.23 Hecht, Blakeley, Martin, and Leonard (2014)

In this work [1], Hecht, Blakeley, Martin, and Leonard use two software packages, MCNP6 coupled to CINDER2008 and Geant4, to simulate the experiment performed by Fisher and Engle (F&E) [2, 3]. Because many experimental aspects were not published/recorded by Fisher and Engle, the authors follow Durkee, *et al.* [15] in referring to their work as a comparison instead of a high-fidelity validation. Geant4 and MCNP6 were run with identical geometries and the energy and time dependence of delayed gamma-ray emission of the fissionable nuclides ^{232}Th, ^{233}U, ^{235}U, ^{238}U, and ^{239}Pu were examined. For comparison to the F&E data, the time rate of change of E_γ, N_γ, and ε_γ were reported. Table 3 is adapted from Table 1 in the original work and shows the results of their comparison.

It appears that the simulation results are in agreement between each other but are generally lower than the values reported by F&E for gamma-ray energy release rate and the pho-

Table 3. Summary of Hecht, Blakeley, Martin, and Leonard (2014) results (adapted from Table 1 in [1]).

Interval (s)	Fisher and Engle Photons/fiss/sec	Geant4 Photons/fiss/sec	MCNP6/CINDER Photons/fiss/sec
0.2 - 0.5	0.613(74)	0.600	0.487
1.0 - 2.0	0.324(39)	0.306	0.279
4.0 - 5.5	0.169(20)	0.125	0.120
10.0 - 13.0	0.0775(93)	0.0542	0.0528
35.0 - 45.0	0.0225(27)	0.0159	0.0162
0.2 - 45.0	3.31(46)	2.58	2.40
Interval (s)	MeV/fiss/sec	MeV/fiss/sec	MeV/fiss/sec
0.2 - 0.5	0.564(68)	0.565	0.520
1.0 - 2.0	0.311(37)	0.285	0.290
4.0 - 5.5	0.153(18)	0.117	0.124
10.0 - 13.0	0.0706(85)	0.0516	0.0539
35.0 - 45.0	0.0221(27)	0.0154	0.0166
0.2 - 45.0	3.18(45)	2.39	2.46
Interval (s)	MeV/photon	MeV/photon	MeV/photon
0.2 - 0.5	0.920(138)	0.943	1.067
1.0 - 2.0	0.960(144)	0.932	1.040
4.0 - 5.5	0.905(136)	0.932	1.031
10.0 - 13.0	0.911(137)	0.953	1.020
35.0 - 45.0	0.982(147)	0.967	1.021
0.2 - 45.0	0.96(14)	0.93	1.03

ton multiplicity rate. For the MCNP6/CINDER results, the average photon energy is noticeably higher than Geant4 and the experimental data. The authors explain this discrepancy may be caused by the different applicable energy ranges, and the different fission product libraries used by the software packages. It was concluded that there was good agreement between the two software packages, with Geant4 more closely matching the experimental data during short times and MCNP6/CINDER more closely matching during longer times. However, an equally likely reason for the disagreement to the experimental data, suggested by the authors of this work, is because Fisher and Engle's experimental setup caused the detector to align with the fission axis of the material foils. Because of this, it is possible that the values should be decreased by 12-15% due to photon emission anisotropy, as suggested in Hoffman and Hoffman [18].

2.24 Jandel, et al. (2013/2014)

Jandel, *et al.* [35, 36] reported the prompt fission gamma-ray characteristics of various nuclides using DANCE at LANSCE. The measurements were parameterized (PM) and compared to a MCHF model, CGMF. For more information on CGMF, please see [30]. New characteristics results are compared to previously published results by the same authors, and others, for ^{233}U, ^{235}U, and ^{239}Pu. These results are shown in Table 4.

Table 4. Gamma-ray characteristics from Jandel, *et al.* [36].

Isotope	E_γ	N_γ	ε_γ
^{233}U	7.24	6.76	1.077
^{235}U	6.48	6.35	1.025
^{239}Pu	7.4	7.1	1.052

2.25 Litaize, Regnier, and Serot (2014)

Litaize, Regnier, and Serot [37] use a MCHF code, FIFRELIN, to calculate fission gamma-ray characteristics and the PFGS of ^{235}U and ^{238}U. This approach includes fission modes (see [38]) which the MCHF models used in [31, 36, 39] do not. For more information on the FIFRELIN code, please see [40]. The reported gamma-ray characteristics for ^{235}U are $E_\gamma = 6.65$ MeV, $N_\gamma = 7.57$, and $\varepsilon_\gamma = 0.88$ MeV for a low-energy threshold of 100 keV and a time range of 10 ns. The gamma-ray characteristics for ^{238}U, in the same order, are 7.04 MeV, 9.0, and 0.78 MeV. The PFGS for ^{235}U compares well with data from Oberstedt, *et al.* [33] except above 4 MeV where FIFRELIN is lower than the experimental data. This trend is not observed in the ^{238}U PFGS comparison.

2.26 Serot, Litaize, and Regnier (2014)

Serot, Litaize, and Regnier [41] follow the same methodology outlined in Section 2.25, but for ^{239}Pu. The reported gamma-ray characteristics for ^{239}Pu are $E_\gamma = 6.81$ MeV, $N_\gamma = 7.19$, and $\varepsilon_\gamma = 0.95$ MeV. Furthermore, the PFGS aligns with data from Verbinski, Weber, and Sund [5], except for a slight underestimation in the 1.5 - 3.5 MeV range and an overestimation above 4 MeV.

2.27 Stetcu, et al. (2014)

Stetcu, *et al.* [39] calculate E_γ, N_γ, ε_γ and the PFGS for ^{235}U and ^{239}Pu using a MCHF approach. They investigate the effects on these characteristics caused by changing the low-energy threshold and spin parameter α in the MCHF model. They show that as the low-energy threshold approaches zero, the average photon multiplicity can increase significantly. For ^{235}U, $E_\gamma = 6.45$

MeV, $N_\gamma = 7.41$, and $\varepsilon_\gamma = 0.87$ MeV. In the same order, the values for ^{239}Pu are 6.66 MeV, 7.48, and 0.89 MeV. It should be noted that the MCHF spin parameter which yielded the best agreement to literature varied between nuclides: $\alpha = 1.7$ for ^{235}U and $\alpha = 1.5$ for ^{239}Pu, with a low-energy threshold of 100 keV.

2.28 Summary

Visualizing the data in a timeline, as shown in Fig. 3, shows a clustering of work from the late 1950s to the early 1970s, then a gap with sparse activity until the turn of the century, followed by a cluster of work in the new millennium. The early work cluster focused predominately on experimentally collected data, with only Thomas and Grover performing a theoretical calculation. However, the more recent work cluster consists more of calculations than experiments. There is no doubt that this trend is a result of the rise of computer software capabilities. The ENDF library releases are interspersed through the timeline and are classified as data 'evaluations' since theoretical, simulated, and experimental data are all used. ENDF is well accepted in the nuclear field and is the main data library of CINDER, the software used in this work. The different materials, applicable energy ranges, time ranges, and limitations of the different works lead to high variability in the literature and complicate the process of validating the work performed herein. As an example of this variability, the prompt fission gamma-ray energy release, E_γ, for ^{235}U is plotted as a function of time in Fig. 2. The averages for each data collection method (measured, calculated, and evaluated) are shown as dashed lines, as well as annotated at the top center of the figure.

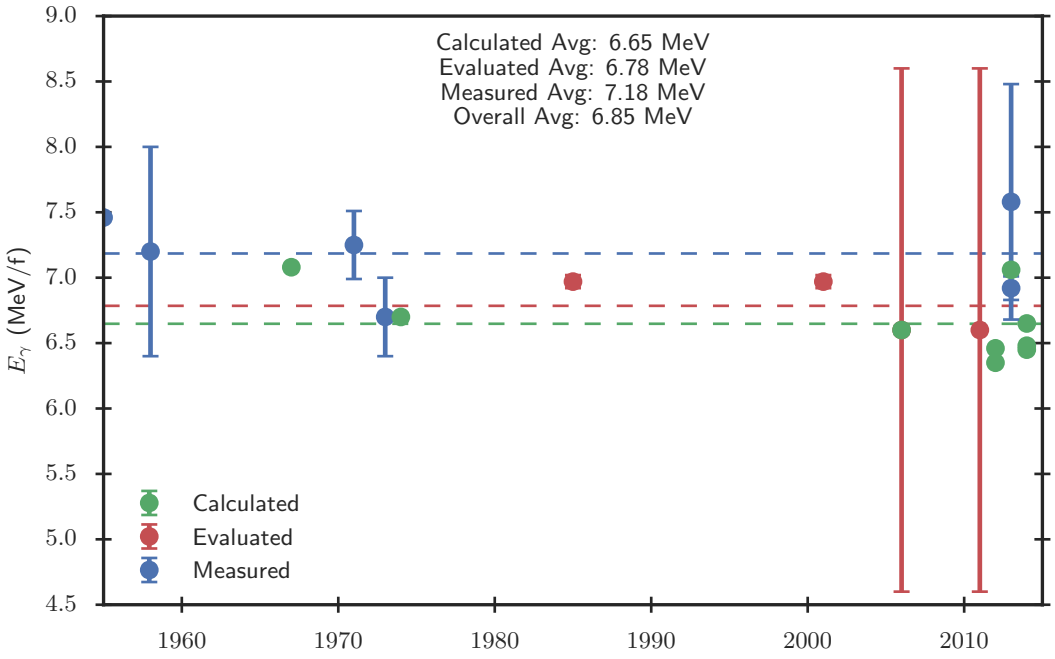

Figure 2. Prompt E_γ values for ^{235}U, as reported by published literature, over time. Averages, by data collection method, are shown as dashed horizontal lines.

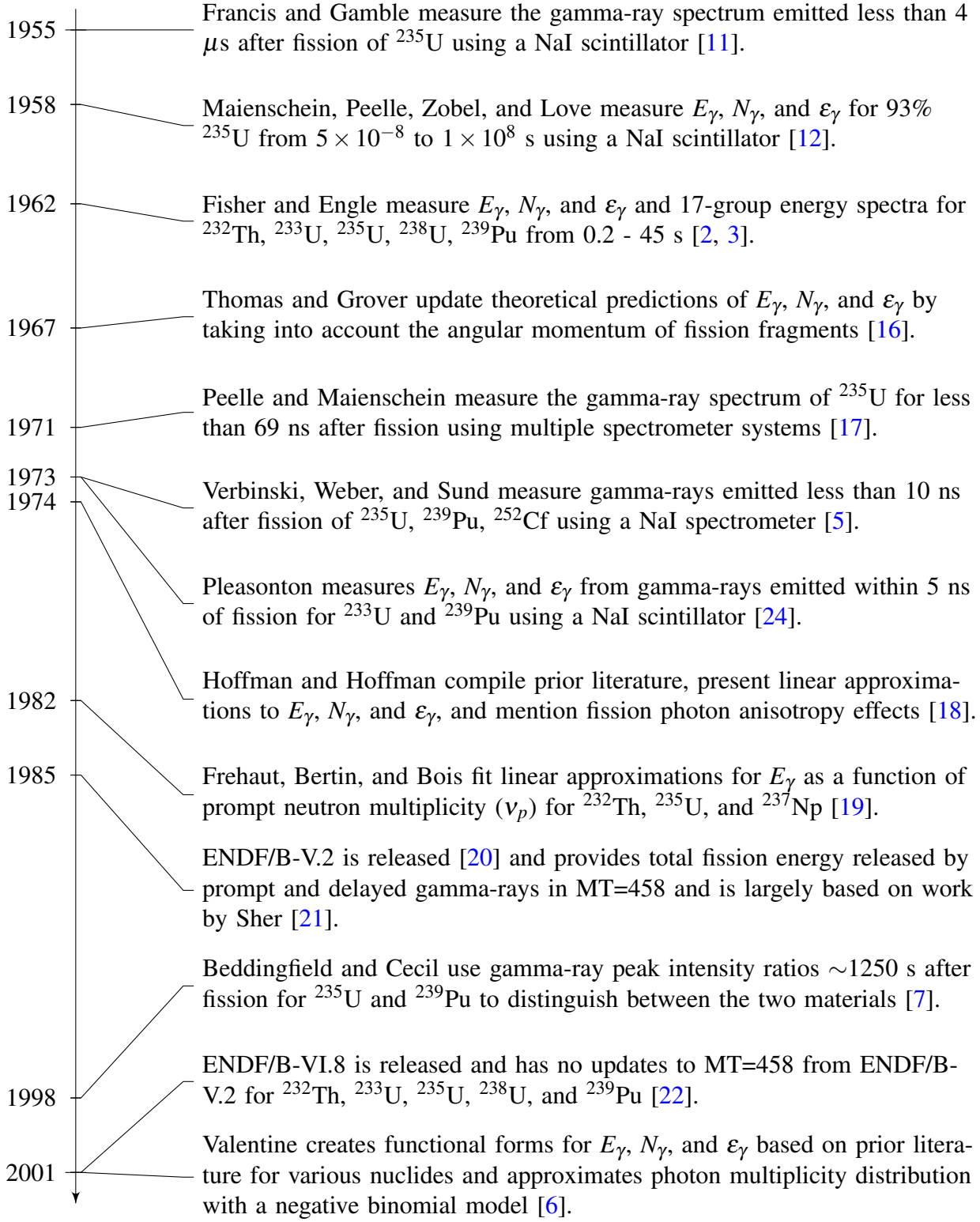

Figure 3. Timeline of selected fission gamma-ray literature.

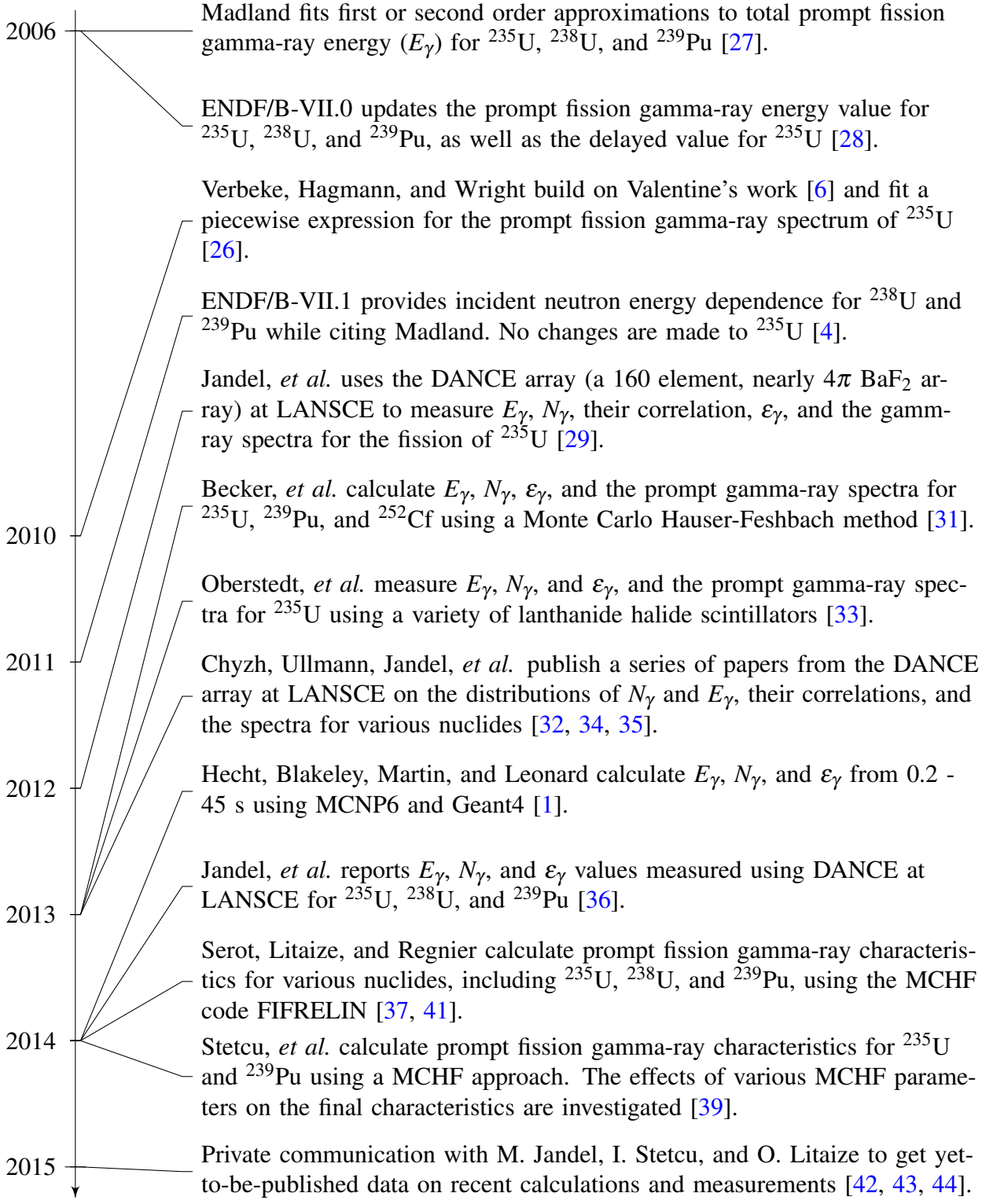

Figure 3 (Continued). Timeline of selected fission gamma-ray literature.

3 Methodology

3.1 CINDER

The software necessary to model the time and energy dependence of fission gamma-rays must have the capability to transmute radionuclides from the original fissioning nuclide through the fission product decay chain, modeling the emitted radiation throughout this process. There are numerous simulation codes with these capabilities. Some simply solve the Bateman equations (via Transmutation Trajectory Analysis, Chebyshev Rational Approximation Method, etc.), whereas others couple the Bateman equations to a transport solver. While it can be argued that these coupled codes are more accurate because they account for self-shielding and geometry effects, all codes rely on a limited set of transmutation and fission yield data. Because of this, it was chosen that a non-coupled (i.e. transmutation-only) code would be studied since all of the codes must go through this transmutation step and any model errors present in the transport solver are eliminated. Upon this decision, the transmutation subroutine within the ubiquitious MCNP6 [45], CINDER [46], was chosen because of the built-in high resolution energy group structure. The simulations were run with 7,428 groups (approximately 1 keV bin width) from 0.001 - 30 MeV. This is in stark contrast to the popular 25-group energy structure employed in many other codes. In addition to the high resolution spectra output, CINDER reports a 25-group spectra as well, which provides an easy means for comparisons to other codes whose only group structure is 25 groups.

3.1.1 Theory

The transmutation of nuclides can be modeled by a coupled set of ordinary differential equations (ODEs) known as the Bateman equations. There is an ODE in time for each nuclide of interest,

$$\frac{dN_m(t)}{dt} = -N_m(t)\beta_m + \bar{Y}_m + \sum_{k \neq m} N_k(t)\gamma_{k\rightarrow m} \tag{15}$$

where $N_m(t)$ is the time-dependent number density of isotope m, $\bar{Y}_m$ is the 'other' loss or gain factor for isotope m which accounts for losses associated with numerical methods and approximations to true fission chains, $\gamma_{k\rightarrow m}$ is the fraction of isotope k that transmutes to isotope m, and the loss fraction for isotope m is given by

$$\beta_m = \lambda^m + \phi_n \sigma^m_{n,abs}, \tag{16}$$

where λ^m is the decay constant for isotope m, ϕ_n is the neutron flux (or the neutron fluence rate with units of $n/cm^2 - s$), $\sigma^m_{n,abs}$ is the microscopic neutron absorption cross-section for isotope m.

As part of his PhD work, William Martin modified CINDER2008 to include the effects of photon-induced transmutation, photofission, and photofission product yields [47]. This SNL-modified, dual-particle version of CINDER2008 will be referred to simply as CINDER for the remainder of this report. The work to do this modification was extensive and has spurred various publications [1, 48, 49], but the salient point of the work is that the loss fraction in Eq. 15 was

modified to include photon transmutation. Therefore Eq. 16, as implemented, is

$$\beta_m = \lambda^m + \phi_n \sigma^m_{n,abs} + \phi_g \sigma^m_{g,abs}, \tag{17}$$

where ϕ_g is the photon flux (or the photon fluence rate with units of $\gamma/cm^2 - s$), and $\sigma^m_{g,abs}$ is the microscopic photon absorption cross-section for isotope m.

3.1.2 Implementation

CINDER requires four text-based input files titled: *input, fluxes, material,* and *locate*. In short, *input* is where the user defines the parameters of the problem such as the time steps, material volume, output energy group structure, flux magnitude, and fission power, among other things. The file *fluxes* is used to define the normalized multi-group neutron and gamma flux profiles, *material* defines a material, or a set of materials, similar to a MCNP ZAID format, and *locate* is a pointer to the necessary data library files. For a more in-depth explanation of the inputs of CINDER2008 please refer to the manual [50]. It is important to note there is no formal manual for the SNL-modified version of CINDER2008 that accounts for photon transmutation. There are various differences between the versions and additional required inputs for the SNL-modified version. Because of this,the four input files used to model the thermal neutron induced fission of Uranium-235 have been included in the appendix. For more information on the details of the SNL-modified CINDER2008 please contact one of the authors or William Martin.

3.2 ENDF Library

3.2.1 Components of Energy Release Due to Fission (MF=1, MT=458)

In this section of the ENDF library, the total energy released from neutron induced fission and its components are evaluated. ENDF reports the "total energy released by the emission of 'prompt' gamma-rays" (EGP) and the "total energy released by the emission of delayed gamma-rays" (EGD) and their uncertainties within this section. ENDF/B-VII.1 recently included an incident neutron energy dependence for ^{238}U and ^{239}Pu (as explained in Section 2.15). For details on the format of this section please refer to Section 1.5 of Ref. [51].

3.2.2 Energy Distributions for Photon Production (MF=15, MT=18)

In this section of the ENDF library, the outgoing photon energy spectrum is given, as a differential fluence (dN/dE with units of 1/MeV). Figure 4 shows the outgoing photon energy spectrum for various nuclides. It should be noted that the ENDF photon spectra for ^{233}U and ^{239}Pu are identical. It is not known which is based on the other, therefore the accuracy of both spectra should be questioned.

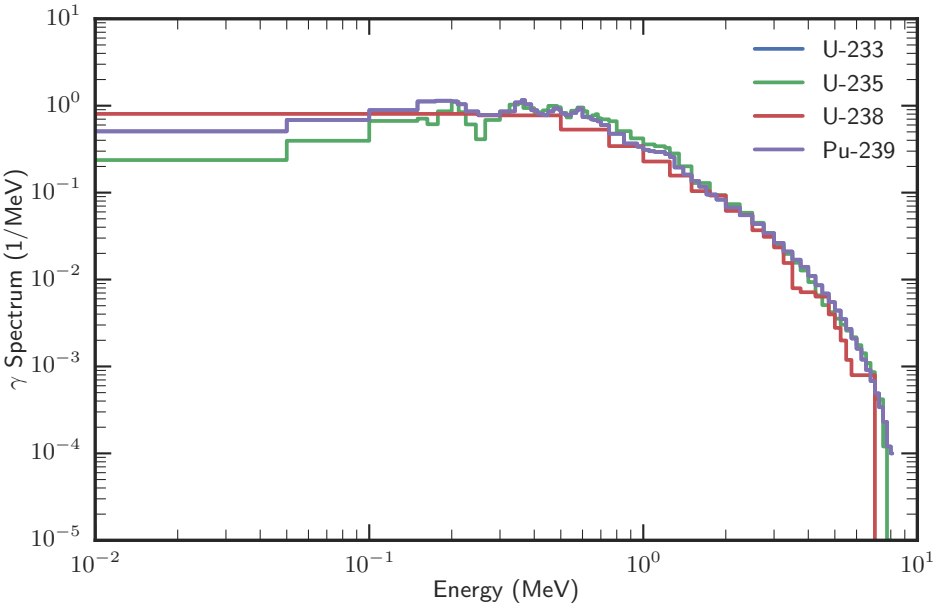

Figure 4. Post-fission photon spectra for various nuclides using ENDF/B-VII.1 MF=15 MT=18.

The average photon energy (ε_γ) can be calculated by taking the first moment of the given spectrum,

$$\varepsilon_\gamma = \int_0^\infty EN(E)\,dE \approx \sum_{i=1}^{I} E_i^{mid} N\left(E_i^{mid}\right) \Delta E_i, \tag{18}$$

where i is the energy bin index, I is the number of energy bins, N is the spectrum, and ΔE_i is the energy bin width of bin i. With E_γ given in MT=458, and ε_γ calculated from MT=18, then the photon multiplicity can be calculated by $N_\gamma = E_\gamma/\varepsilon_\gamma$. This procedure is used throughout the results section to calculate N_γ and ε_γ values from ENDF data.

4 Results

Results from this work are presented by nuclide because the number and type of results as well as the analyses performed is not consistent amongst the nuclides. This is because the amount of literature and data for each nuclide is different. In the future more rigorous analyses of nuclides with limited published literature, such as ^{232}Th, ^{233}U, and ^{241}Pu, are planned.

For each of the nuclides, a comparison was performed to the work performed by Fisher and Engle using the GODIVA II assembly (see Section 2.3). Problems were run in CINDER to mimic the experimental setup of F/E as accurately as possible: small foil-sized materials were bombarded by a fast burst flux and data was collected from 0.2 to 45 seconds. Fisher and Engle reported the differential rate of the photon multiplicity and the gamma-ray energy release, dN_γ/dt and dE_γ/dt, respectively, as well as the average photon energy over time (ε_γ). In all of the material sections, the Fisher and Engle data and the CINDER data are directly compared (denoted by F/E and Lane/Parma or L/P, respectively). In the ^{235}U section, other Fisher and Engle simulations are used for comparisons as well.

4.1 ^{232}Th

4.1.1 Fisher and Engle Comparison

A problem was run in CINDER that simulated the conditions present during the Fisher and Engle experiment with the Godiva II assembly [2, 3]. Small foil-sized volumes of material, as described by Fisher and Engle, were bombarded by a flux typical of a fast burst reactor. The data from CINDER from 0.2 to 45 seconds was compared to the data gathered by Fisher and Engle. Figure 5 shows the differential rate of the photon multiplicity and gamma-ray energy release, as well as the average photon energy, as calculated by CINDER in this work (denoted by Lane/Parma in blue) and measured by Fisher and Engle (denoted by F/E in green).

Integrating the Lane/Parma curve for dN_γ/dt gives a total photon multiplicity value of 4.46 from 0.2 - 45 seconds. This is lower than Fisher and Engle's valuation of $N_\gamma = 5.07 \pm 0.71$, but it is within the quoted uncertainty of $\pm 1\sigma$. Furthermore, as discussed in Sections 2.8 and 2.23, photon emission anisotropy may have caused the N_γ results to be 12-15% higher than the average emission characteristics since Fisher and Engle's experimental setup aligned the fission axis and the detector system. When their value is lowered by 13.5% to $N_\gamma = 4.44 \pm 0.62$, CINDER agrees within 0.5%. Integrating the CINDER dE_γ/dt curve gives $E_\gamma = 4.50$ in comparison to Fisher and Engle's value of 5.04 ± 0.71. The calculated value is lower than the measured, but within the experimental uncertainty. In addition, the average photon energy results agree, within the uncertainties, to the measured data. This agreement becomes even better if N_γ is lowered as described above. This comparison is only good for the relatively limited temporal range; for total values of N_γ and E_γ, other analyses must be performed.

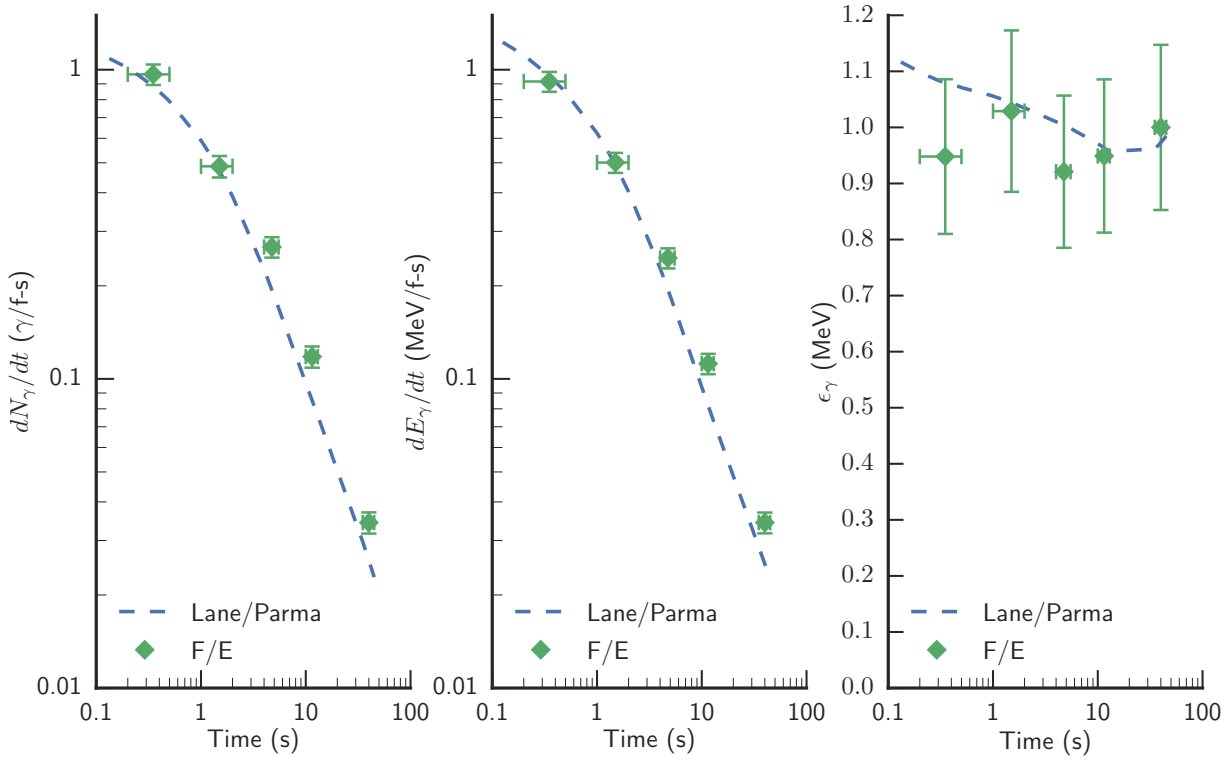

Figure 5. Differential N_γ and E_γ rate and ε_γ comparison plot for ^{232}Th from 0.2 to 45 seconds.

4.1.2 Incident Neutron Energy Dependence for E_γ

The E_γ data presented by Frehaut, Bertin, and Bois [19] for ^{232}Th, as a function of the incident neutron energy (E_n), was reported in a multi-group fashion and normalized to the energy release of ^{252}Cf(sf). These values were unnormalized using $E_{\gamma,Cf}$ = 7.06 MeV and then a linear model was fit to approximate the data, similar to Madland's treatment of the ^{235}U data by Frehaut. This linear model allows one to compare the Frehaut E_γ data at the same energies as the ENDF fission yield libraries (2 MeV and 14 MeV) and extrapolating out to thermal energies (0.0253 eV). The data points were sampled independently in their E_γ and E_n uncertainties and a linear model was fit to the data. This process was repeated 5000 times to get a mean and standard deviation for each of the model coefficients, which resulted in

$$E_\gamma = (0.0722 \pm 0.0024)\, E_n + (5.6207 \pm 0.0196)\,. \tag{19}$$

Figure 6 shows the linear approximation, surrounded by a $\pm 1\sigma$ envelope, in comparison to the experimental data. Even though the data shows non-linear behavior, a linear model was fit for simplicity. Even with the simplicity, the percent difference between all of the data and the linear model was less than 11%, with the majority of the points being within 3.5%.

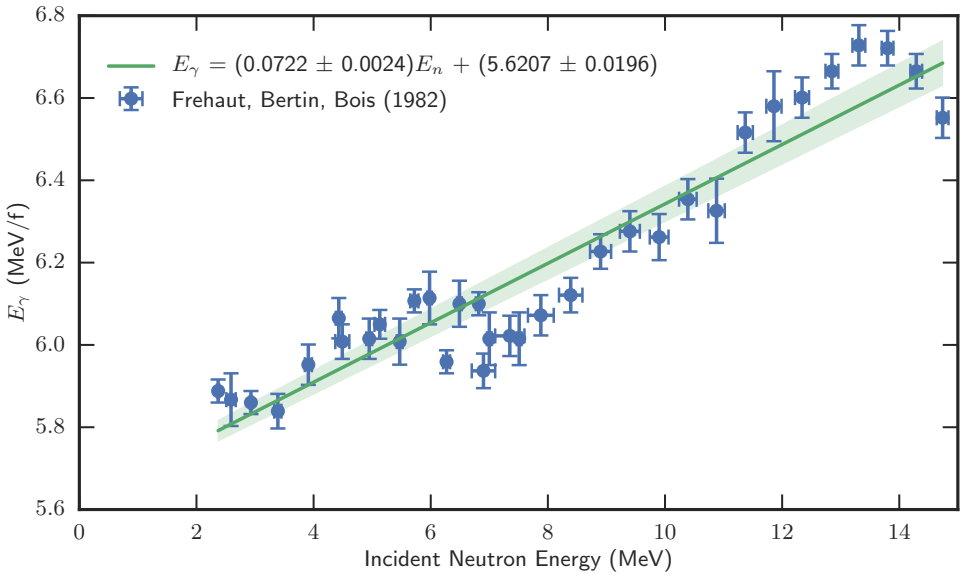

Figure 6. Linear fit to E_γ data from Frehaut, Bertin, and Bois for ^{232}Th. Uncertainties shown are $\pm 1\sigma$.

4.1.3 Gamma-ray Characteristic Summary

The values for the linear model (denoted by LM) and the other data presented within this section are compared with literature values for E_γ, N_γ, and ε_γ in Table 5. Total valuations are given at the top of the table, with partial (0.2 - 45 s) valuations at the bottom.

Table 5. Summary of fission gamma-ray characteristics for ^{232}Th, compared to literature. The thermal, fast, and 14-MeV ENDF fission yield libraries are denoted by T, F, and HE, respectively.

Source	E_n (MeV)	ΔE (MeV)	Δt (s)	N_γ (γ/f)	E_γ (MeV/f)	ε_γ (MeV/γ)
CINDER	T	0.001 - 30	10^{-6} - 10^{8}	10.38	8.88	0.86
CINDER	F	0.001 - 30	10^{-6} - 10^{8}	10.38	8.88	0.86
CINDER	HE	0.001 - 30	10^{-6} - 10^{8}	9.80	8.21	0.84
LM (based on [19])	2.53×10^{-8}				5.62 ± 0.02	
LM (based on [19])	2.0				5.77 ± 0.02	
LM (based on [19])	14.0				6.63 ± 0.05	
Hoffman and Hoffman [18]				6.16	6.61	1.07
Sher [21]					7.11 ± 0.90	
ENDF/B-VII.1 [4]					7.11 ± 0.90	
CINDER	F	0.001 - 30	0.2 - 45	4.46	4.50	0.98
Fisher and Engle [2, 3]		0.137 - 6.419	0.2 - 45	5.07 ± 0.71	5.04 ± 0.71	0.99 ± 0.15

4.1.4 Gamma-ray Spectra Comparison

Fisher and Engle also measured a 17-group γ-ray spectrum using a NaI scintillator. The 7,428 group data given by CINDER (L/P) was re-binned into the same 17-group structure followed by Fisher and Engle. The spectra are compared at each time interval in Fig. 7 where the color indicates similar time intervals, dashed lines are Fisher and Engle spectra, while solid lines are spectra from this work.

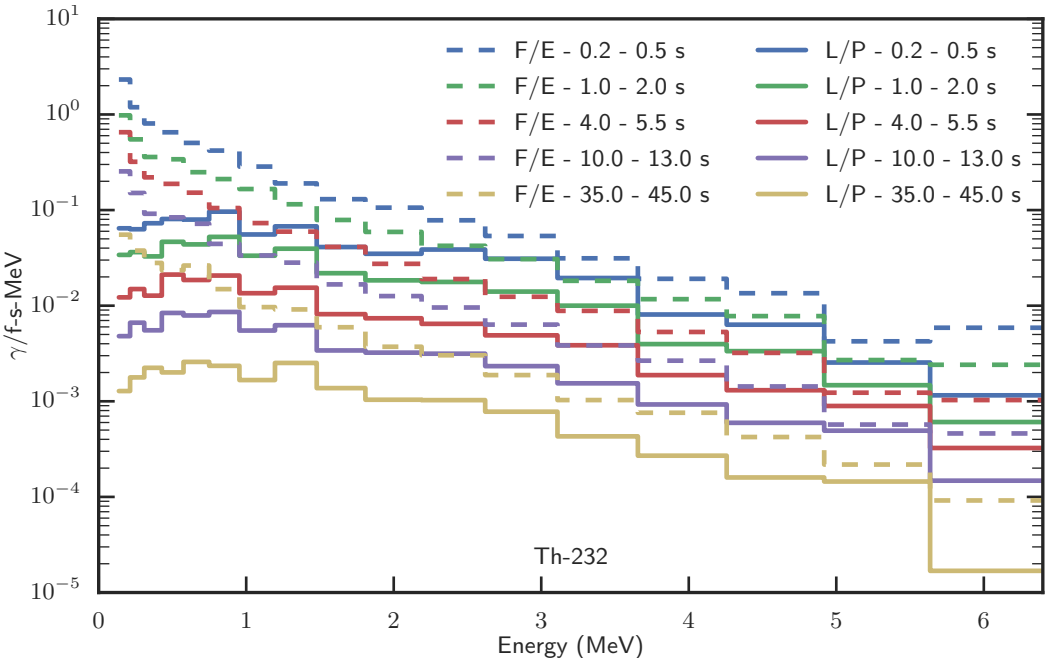

Figure 7. 17-group γ-ray energy spectra for ^{232}Th, compared to Fisher and Engle data.

The spectra comparison shows that the CINDER data is generally lower than the Fisher and Engle data, which corroborates the assertion that the Fisher and Engle spectrum may be artificially high due to photon anisotropy. However, as the energy increases the data reaches better agreement. The disagreement in the lower energy ranges may also be caused by the CH_2 filter used by Fisher and Engle attenuating photons from higher energies down to lower energies. Overall the CINDER spectra are similar in shape to the Fisher and Engle spectra.

Similar to Fisher and Engle, plots relating the ratio of each energy spectra to the 0.2 - 0.5 second time interval spectra are generated. The plot for ^{232}Th is shown in Fig. 8 and shows close agreement between the two datasets. The cause for the absolute magnitude of the photon energy spectra being different, while the ratios are in agreement, is unknown as of yet. However, the authors believe, as previously mentioned, that it may be caused by not properly accounting for anisotropic photon emission.

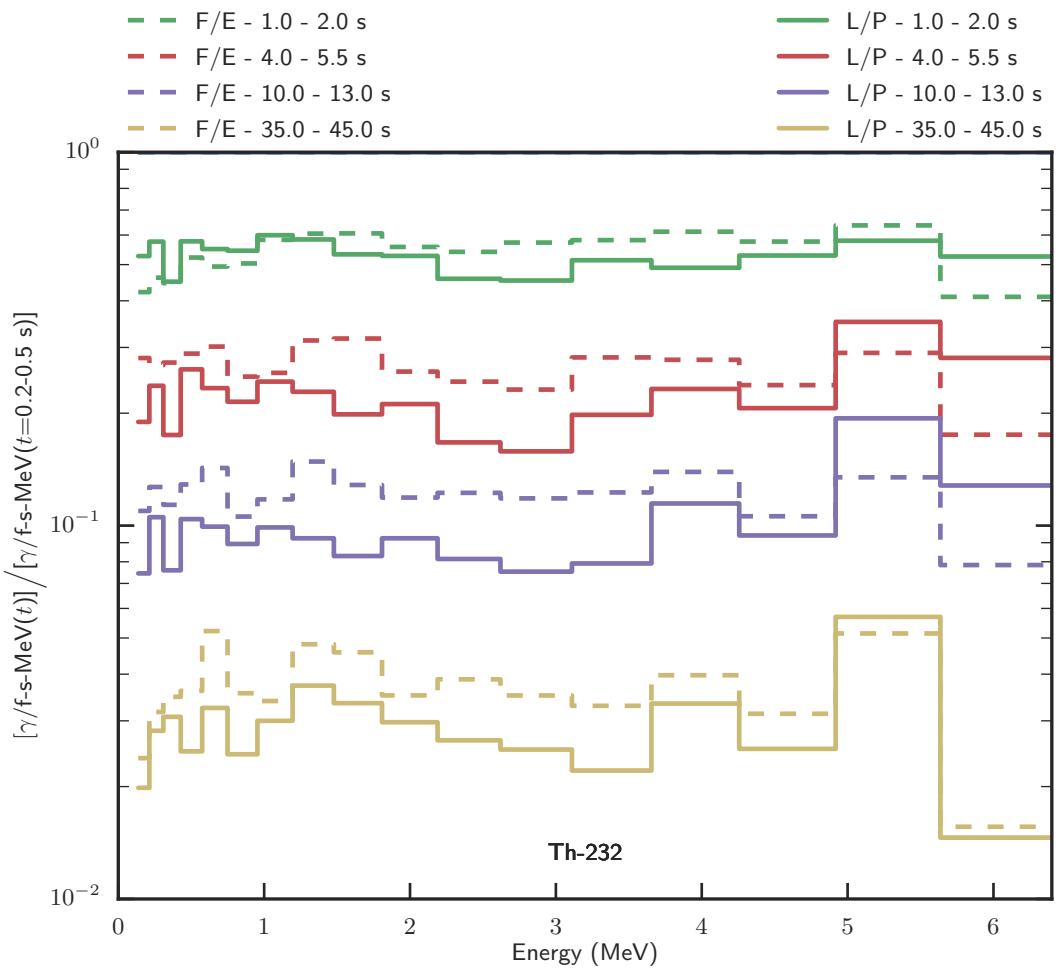

Figure 8. Ratios of 17-group ^{232}Th γ-ray energy spectra, compared to Fisher and Engle data.

4.2 ^{233}U

4.2.1 Fisher and Engle Comparison

A problem was set up in CINDER that simulated the conditions present during the Fisher and Engle experiment with the Godiva II assembly [2, 3]. Small foil-sized volumes of material, as described by Fisher and Engle, were bombarded by a flux typical of a fast burst reactor. The data from CINDER from 0.2 to 45 seconds was compared to the data gathered by Fisher and Engle. Figure 9 shows the differential rate of the photon multiplicity and gamma-ray energy release, as well as the average photon energy, as calculated by CINDER in this work (denoted by Lane/Parma in blue) and measured by Fisher and Engle (denoted by F/E in green).

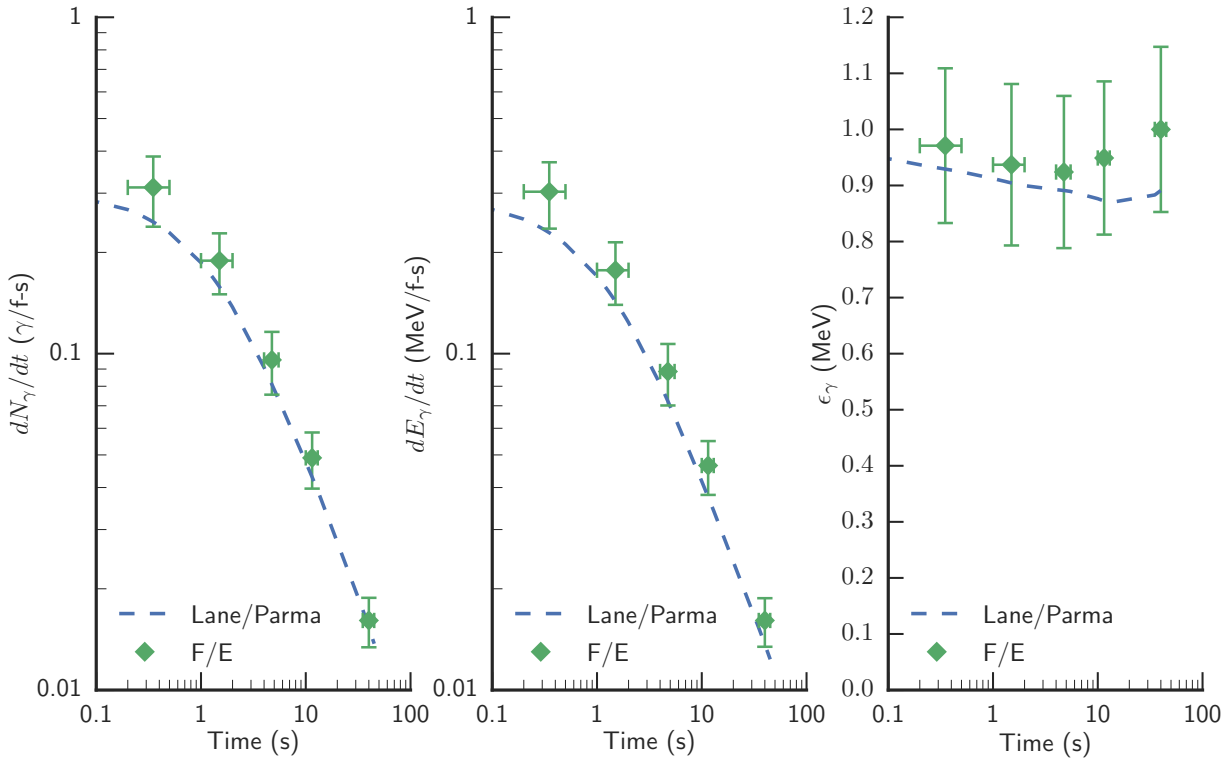

Figure 9. Differential N_γ and E_γ rate and ε_γ comparison plot for ^{233}U from 0.2 to 45 seconds.

The multiplicity and energy release rates are generally lower than the experimental data, but align more as time increases. When the two Lane/Parma curves are integrated from 0.2 to 45 seconds, the total values are $N_\gamma = 1.91$ and $E_\gamma = 1.70$, which yield $\varepsilon_\gamma = 0.90$. These values compare to the original data, $N_\gamma = 2.02 \pm 0.28$ and $E_\gamma = 1.97$, and $\varepsilon_\gamma = 0.99 \pm 0.15$, quite well. All of the calculated values are within experimental uncertainties. Decreasing the experimental photon multiplicity value by 12-15% due to photon emission anisotropy, as was done for the ^{232}Th results, would lead to poorer agreement between the two methods. The authors feel this discrepancy is caused by a lack of accurate data for ^{233}U in the ENDF library, considering that the outgoing photon spectra for ^{233}U and ^{239}Pu are identical and the fission gamma-ray energy release values in MT-458 haven't been updated for ^{233}U since ENDF/B-V.2 in 1985 at least.

4.2.2 Characteristic Summary

The Fisher and Engle data only studies a subset of the post-fission temporal range. For a more complete picture on the fission gamma-ray characteristics, CINDER was run out to 1×10^8 seconds using all three ENDF fission yield libraries. The results from these simulations are given in Table 6, along with other literature values.

Table 6. Summary of fission gamma-ray characteristics for ^{233}U, compared to literature. The thermal, fast, and 14-MeV ENDF fission yield libraries are denoted by T, F, and HE, respectively.

Source	E_n (MeV)	ΔE (MeV)	Δt (s)	N_γ (γ/f)	E_γ (MeV/f)	ε_γ (MeV/γ)
CINDER	T	0.001 - 30	10^{-6} - 10^{8}	6.44	5.55	0.86
CINDER	F	0.001 - 30	10^{-6} - 10^{8}	6.47	5.58	0.86
CINDER	HE	0.001 - 30	10^{-6} - 10^{8}	5.98	5.15	0.86
Pleasonton [24]				6.31 ± 0.30	6.69 ± 0.30	1.06 ± 0.07
Hoffman and Hoffman [18]				6.27	6.64	1.06
Sher [21]					7.73 ± 0.52	
ENDF/B-VII.1 [4]		0.025 - 8.1		8.90 ± 0.60	7.72 ± 0.52	0.87
Jandel, *et al.* [35]		> 0		6.76	7.24	1.08
CINDER	F	0.001 - 30	0.2 - 45	1.91	1.70	0.90
Fisher and Engle [2, 3]		0.137 - 6.419	0.2 - 45	2.02 ± 0.28	1.97 ± 0.28	0.98 ± 0.15

4.2.3 Gamma-ray Spectra Comparison

Fisher and Engle also measured a 17-group γ-ray spectrum using a NaI scintillator. The spectra were measured over each time interval and compared to the re-binned CINDER data over the same time intervals. This comparison can be found in Fig. 10 where the color corresponds to the time interval, dashed lines are Fisher and Engle data, and solid lines are CINDER data.

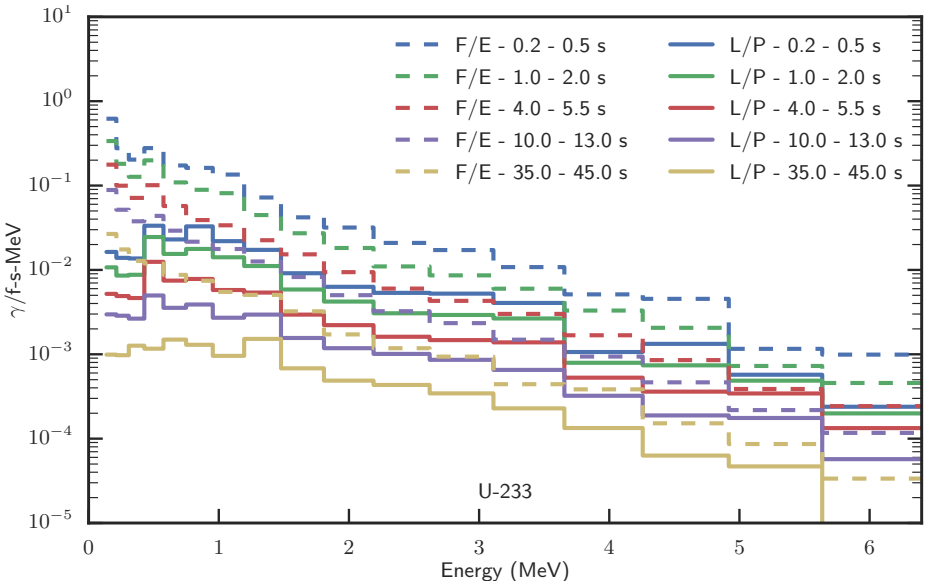

Figure 10. 17-group γ-ray energy spectra for ^{233}U, compared to Fisher and Engle data.

Generally, the CINDER spectra are lower than the Fisher and Engle spectra. This furthers the assertion that the Fisher and Engle data may be a little high, due to not accurately treating photon emission anisotropy. The disagreement between the data is largest at lower energies, and this disagreement may be driven by the CH_2 filter used by Fisher and Engle attenuating more photons down into the lower energy range. Overall, the shape and behavior of the CINDER data follows the Fisher and Engle data. The ratios of the energy spectra compared to the 0.2 - 0.5 second spectrum are given in Fig. 11 and show good agreement between the two datasets. It is unclear why the spectra, when normalized to the 0.2 - 0.5 second spectra, show such promising agreement but this agreement is not present for the absolute spectra.

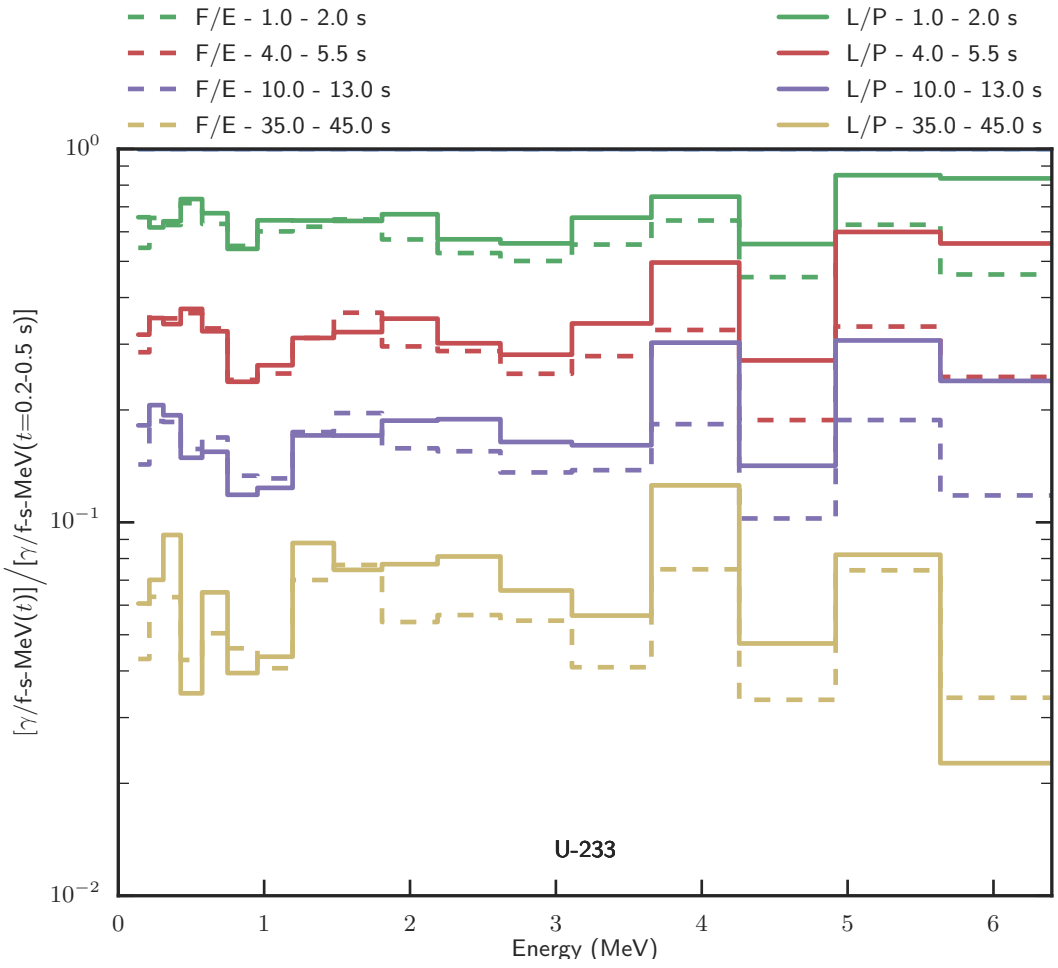

Figure 11. Ratios of 17-group ^{233}U γ-ray energy spectra, compared to Fisher and Engle data.

4.3 ^{235}U

4.3.1 Fisher and Engle Comparison

A problem was set up in CINDER that simulated the conditions during the Fisher and Engle experiment [2, 3]. The data from CINDER from 0.2 to 45 seconds was compared to the F/E data, as well as a recent study done by Hecht, *et al.* which used Geant4 and MCNP/CINDER to simulate the experiment. Figure 12 shows the differential rate of the photon multiplicity and gamma-ray energy release, as well as the average photon energy, as calculated by CINDER in this work (denoted by Lane/Parma in blue), measured by Fisher and Engle (denoted by F/E in green), and simulated by Hecht, *et al.* (denoted by Hecht-G4 in red and Hecht-M/C in purple).

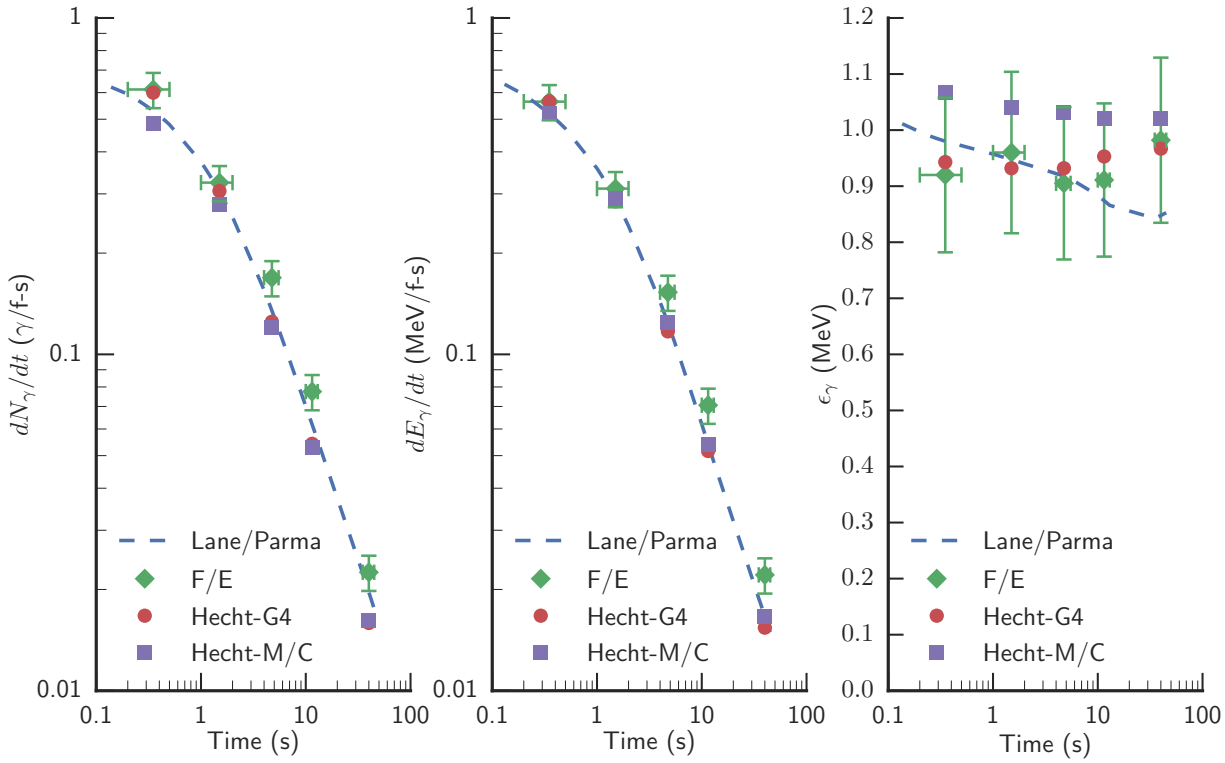

Figure 12. Differential N_γ and E_γ rate and ε_γ comparison plot for ^{235}U from 0.2 to 45 seconds.

The CINDER data shows good agreement between all data sets. The general trend is that the experimental N_γ and E_γ rates are higher than the simulated data. The CINDER E_γ rate intersects simulation data at all time steps, while the N_γ rate is close to overlapping, especially at later time steps. Hecht, *et al.* contributed the high ε_γ in Hecht-M/C as possibly stemming from the energy re-binning process. But, the downward trend in their data agrees with the Lane/Parma ε_γ results. This downward trend is not apparent in the Geant4 or F/E data. The discrepancies aside, the CINDER data is within the experimental uncertainties of the original data and shows good agreement with the other simulations.

4.3.2 Characteristic Summary

The Fisher and Engle data only studies a subset of the post-fission temporal range. For a more complete picture on the fission γ-ray characteristics, CINDER was run out to 1×10^8 seconds using all three ENDF fission yield libraries. The results from these simulations, along with other literature values presented in Section 2, are given in Table 7 with total valuations at the top and partial (0.2 - 45 s) valuations at the bottom.

Table 7. Summary of fission gamma-ray characteristics for ^{235}U, compared to literature. The thermal, fast, and 14-MeV ENDF fission yield libraries are denoted by T, F, and HE, respectively.

Source	E_n (MeV)	ΔE (MeV)	Δt (s)	N_γ (γ/f)	E_γ (MeV/f)	ε_γ (MeV/γ)
CINDER	T	0.001 - 30	10^{-6} - 10^{8}	9.36	6.89	0.74
CINDER	F	0.001 - 30	10^{-6} - 10^{8}	9.47	6.95	0.74
CINDER	HE	0.001 - 30	10^{-6} - 10^{8}	8.49	6.07	0.72
Maienschein, *et al.* [12]		0.3 - 10	5×10^{-8} - 10^{8}	7.4 ± 0.80	7.2 ± 0.80	0.97 ± 0.15
Thomas and Grover [16]				8.2	7.08	0.87
Peelle and Maienschein [17]		0.01 - 10.5	$< 69\times10^{-9}$	8.13 ± 0.35	7.25 ± 0.26	0.97 ± 0.05
Peelle and Maienschein [17]		0.14 - 10.0	$< 69\times10^{-9}$	7.45 ± 0.32	7.18 ± 0.26	0.96 ± 0.06
Verbinski, *et al.* [5]		0.14 - 10.0	$< 10^{-8}$	6.51 ± 0.30	6.70 ± 0.30	0.97 ± 0.05
Hoffman and Hoffman [18]				6.49	6.70	1.03
Sher [21]					6.97 ± 0.50	
Frehaut, *et al.* [19]	1.73 ± 0.19			6.78 ± 0.04		
Frehaut, *et al.* [19]	14.18 ± 0.1			7.91 ± 0.04		
Madland [27]	2.53×10^{-8}				6.60 ± 0.03	
Madland [27]	2				6.76 ± 0.03	
Madland [27]	14				7.69 ± 0.08	
ENDF/B-VII.1 [4]		0.025 - 8.1		7.04 ± 2.13	6.60 ± 2.00	0.94
Jandel, *et al.* (PM) [29]		> 0.15		6.2	6.46	1.04
Jandel, *et al.* (CGMF) [29]		> 0.15		6.79	6.35	0.94
Becker, *et al.* [31]		> 0.14		8.05	7.06	0.88
Chyzh, *et al.* [32]		0.15 - 9.5		6.95 ± 0.30	7.58 ± 0.90	1.09 ± 0.12
Jandel, *et al.* [35]		> 0		6.35	6.48	1.03
Oberstedt, *et al.* [33]		0.1 - 6.0		8.19 ± 0.11	6.98 ± 0.09	0.85 ± 0.02
Litaize, *et al.* [37]	2.53×10^{-8}	0.1 - 4.0	$< 10^{-8}$	7.57	6.65	0.88
Stetcu, *et al.* [39]		> 0.1		7.41	6.45	0.87
CINDER	F	0.001 - 30	0.2 - 45	3.07	2.79	0.85
Fisher and Engle [2, 3]		0.137 - 6.419	0.2 - 45	3.31 ± 0.46	3.18 ± 0.45	0.96 ± 0.14
Hecht, *et al.* (G4) [1]			0.2 - 45	2.39	2.58	0.93
Hecht, *et al.* (M/C) [1]	F	0 - 25	0.2 - 45	2.46	2.40	1.03

4.3.3 Gamma-ray Spectra Comparison

As outlined in Section 2.11, Beddingfield and Cecil showcased the ability to distinguish between ^{235}U and ^{239}Pu by measuring the gamma-ray spectrum approximately 1200 seconds after fission, taking the ratio of gamma-ray peak intensities, and comparing them to theoretical ratios from ENDF. Ratios of the gamma-ray peak intensities were calculated using the photon spectra given from CINDER. These ratios were then compared to the ratios calculated by Beddingfield and Cecil as a verification measure. Figure 13 shows the photon spectra given by CINDER 1000 seconds post-fission for ^{235}U with relevant gamma-ray peaks identified by fission product.

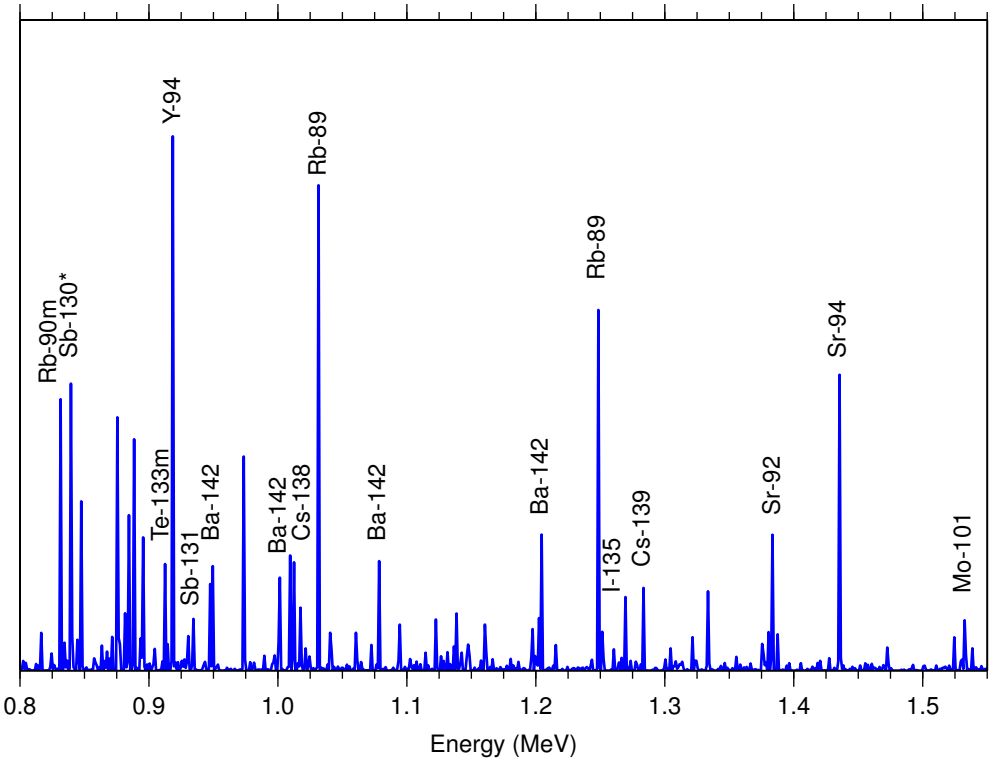

Figure 13. γ-ray spectrum with relevant radionuclide peaks identified for ^{235}U at 1000 seconds.

CINDER gives a normalized spectra, hence the lack of ticks on the ordinate of Fig. 13. But, because each peak is normalized to the same value, their ratio remains the same, regardless of normalization. Using this spectrum, the gamma-ray peak intensity ratios, as outlined in [7], were calculated and compared to the data gathered by Beddingfield and Cecil and the ENDF library. These ratios are shown in Figure 14 as 'calculated', 'observed', and 'theoretical', respectively.

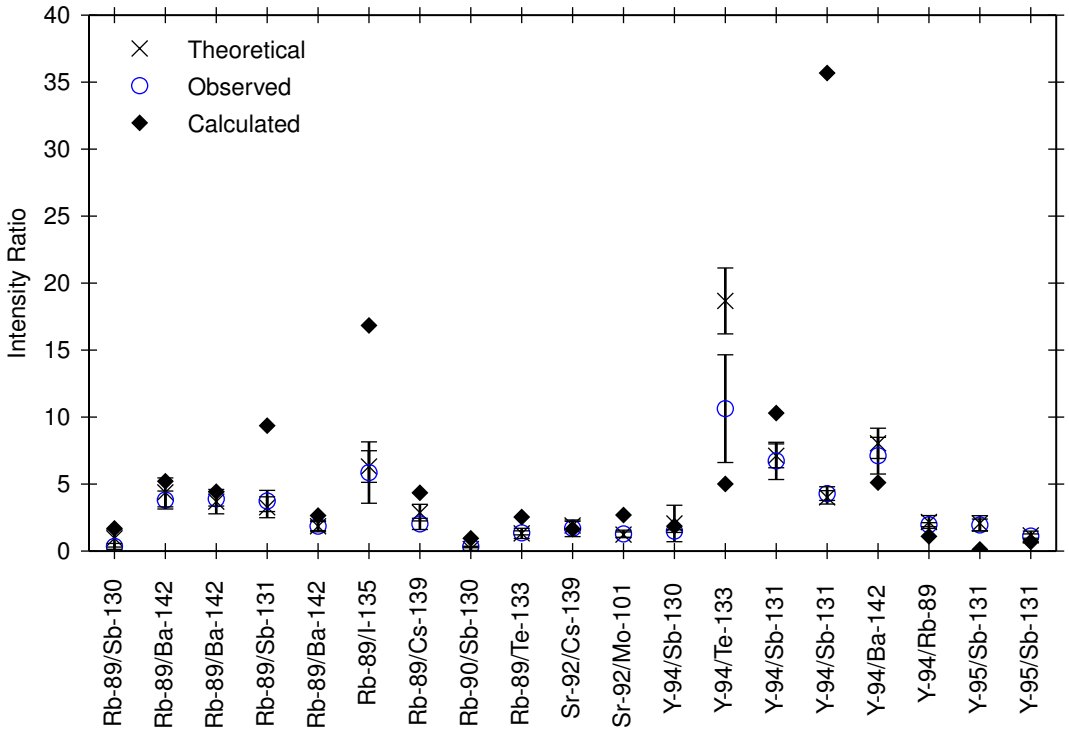

Figure 14. Comparison of various radionuclide peak intensity ratios for ^{235}U, where 'theoretical' is derived from ENDF data, 'observed' was measured by Beddingfield and Cecil, and 'calculated' was output by CINDER.

In general, there is good agreement between the three datasets. However, there are ratios in which all three datasets disagree. This may stem from a poor understanding of one of the nuclides, which causes errors in ENDF, and consequently CINDER, or the ratio is simply not a particularly good metric for this material. Lastly, the CINDER data presents a snapshot of the spectrum, whereas the measured data was gathered over a span of $\sim$350 seconds. Any of these could cause discrepancies. However, the spectra calculated by CINDER is within the experimental uncertainty for the majority of intensity ratios associated with the measured data. The tabulated data for this plot can be found in Appendix E.

Fisher and Engle also measured a 17-group γ-ray spectrum using a NaI scintillator. These spectra are compared to the 7,428 group CINDER data (re-binned into the same 17-group structure), as well as spectra calculated in a Fisher and Engle comparison using MCNPX by Durkee, *et al.* [15] in Fig. 15. The color indicates the time intervals, solid lines are the CINDER data, dashed lines are Fisher and Engle data, and the dotted lines are the Durkee, *et al.* spectra.

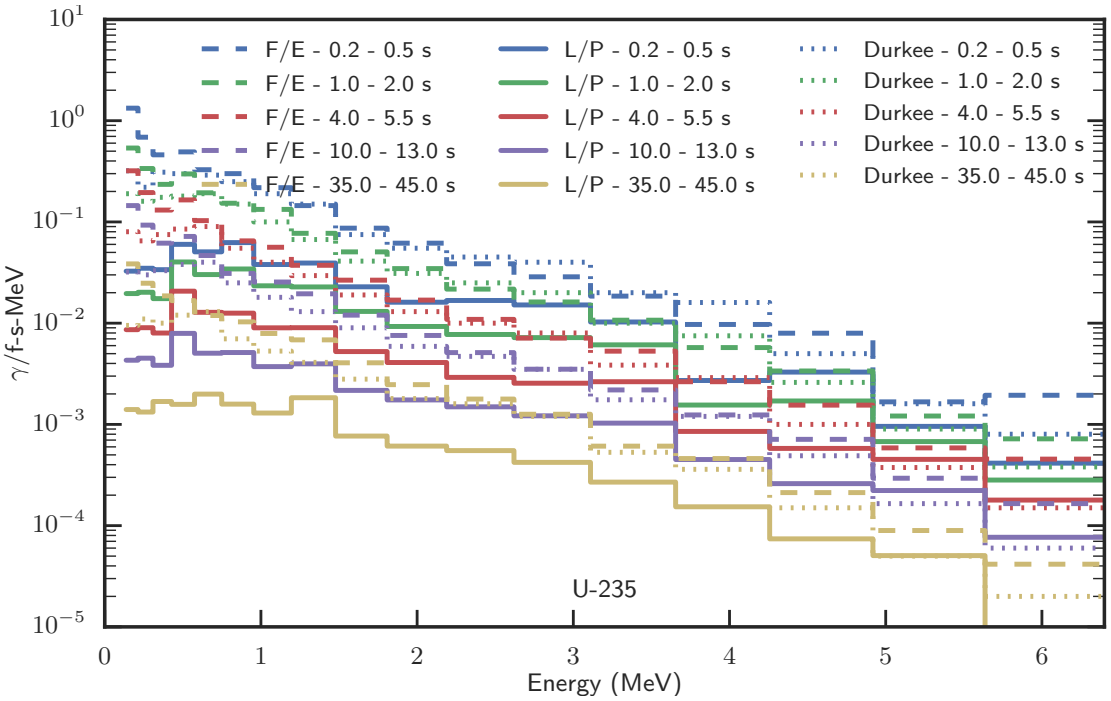

Figure 15. 17-group γ-ray energy spectra for ^{235}U compared to Fisher and Engle and Durkee, *et al.* data.

The data from Durkee, *et al.* aligns more closely to the Fisher and Engle data than the CINDER spectra do, which is expected from a detailed radiation transport calculation such as MCNPX. However, similar to the CINDER results, the Durkee *et al.* data is generally lower than the Fisher and Engle spectra. This further corroborates that the Fisher and Engle data is slightly high, particularly in the lower energy ranges. The ratio of the spectra to the 0.2 - 0.5 second time interval spectrum are illustrated in Fig. 16 and show good agreement between all three datasets.

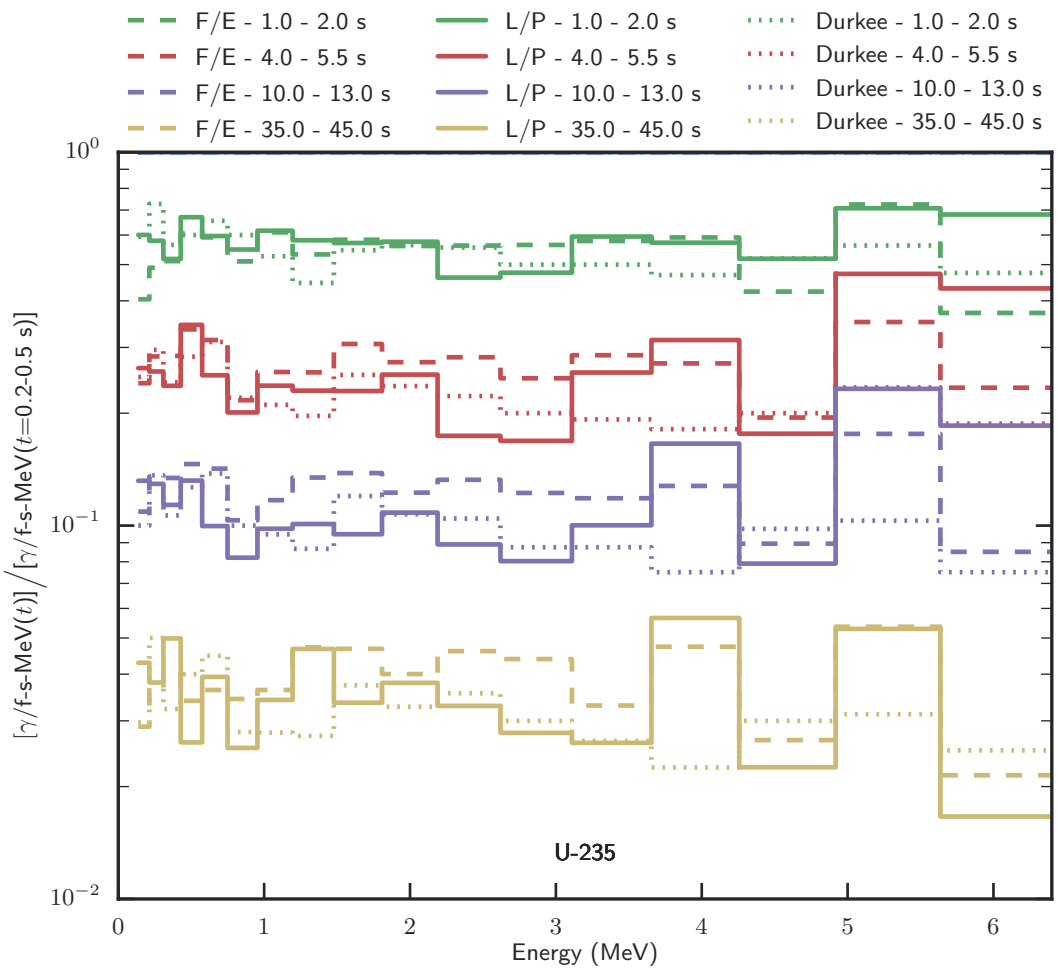

Figure 16. Ratios of 17-group ^{235}U γ-ray energy spectra, compared to Fisher and Engle and Durkee, *et al.* data.

4.4 ^{238}U

4.4.1 Fisher and Engle Comparison

A problem was set up in CINDER that simulated the conditions present during the Fisher and Engle experiment with the Godiva II assembly [2, 3]. Small foil-sized volumes of material, as described by Fisher and Engle, were bombarded by a flux typical of a fast burst reactor. The data from CINDER from 0.2 to 45 seconds was compared to the data gathered by Fisher and Engle. Figure 17 shows the differential rate of the photon multiplicity and gamma-ray energy release, as well as the average photon energy, as calculated by CINDER in this work (denoted by Lane/Parma in blue) and measured by Fisher and Engle (denoted by F/E in green).

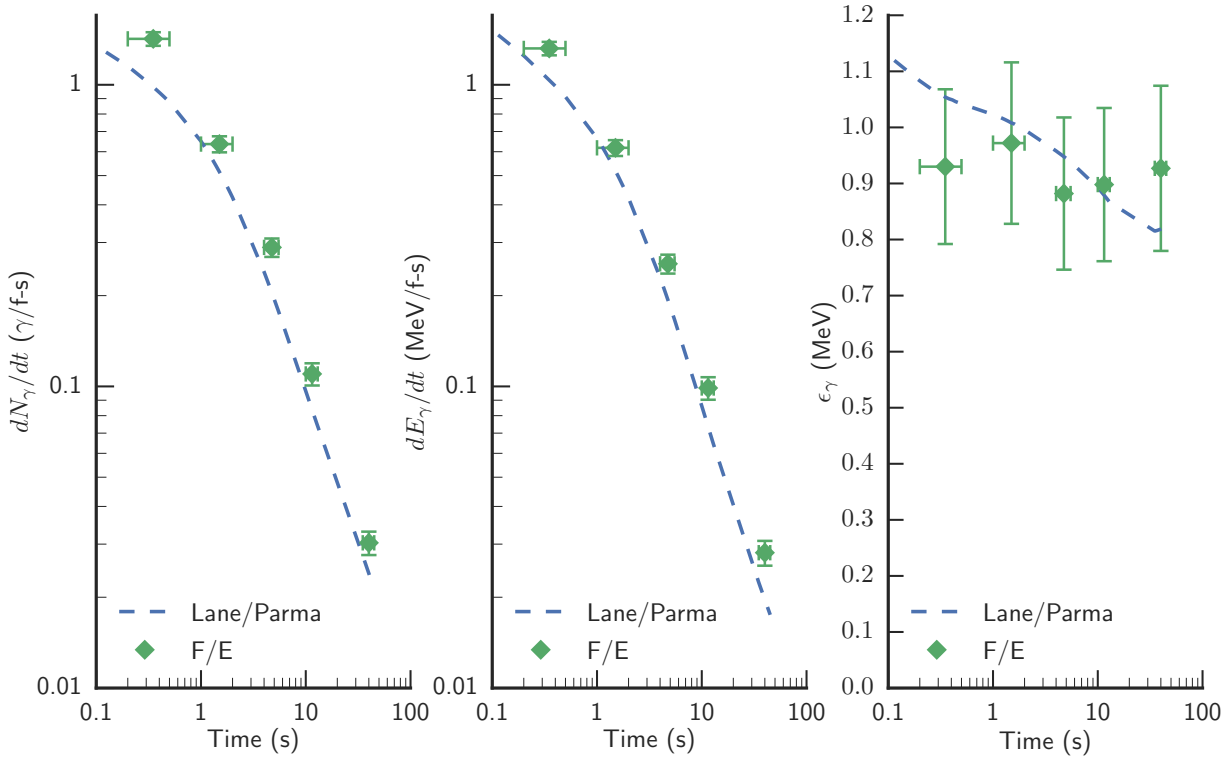

Figure 17. Differential N_γ and E_γ rate and ε_γ comparison plot for ^{238}U from 0.2 to 45 seconds.

4.4.2 Characteristic Summary

The Fisher and Engle data only studies a subset of the post-fission temporal range. For a more complete picture on the fission gamma-ray characteristics, CINDER was run out to 1×10^8 seconds using all three ENDF fission yield libraries. The results from these simulations are given in Table 8, along with other literature values. The ENDF fission yield libraries are denoted in the incident neutron energy column (E_n) as 'T', 'F', and 'HE', for the thermal, fast, and 14-MeV libraries, respectively. Furthermore, the last two rows of the table compare the Fisher and Engle experiment and the CINDER results out to 45 seconds, while the remainder of the results present total N_γ, E_γ, and ε_γ results. Various parameters of each study are presented to allow the reader to compare and contrast results. In addition, the parameters show the difficulty in directly comparing N_γ, E_γ, and ε_γ results from different work.

Table 8. Summary of fission gamma-ray characteristics for ^{238}U, compared to literature. The thermal, fast, and 14-MeV ENDF fission yield libraries are denoted by T, F, and HE, respectively.

Source	E_n (MeV)	ΔE (MeV)	Δt (s)	N_γ (γ/f)	E_γ (MeV/f)	ε_γ (MeV/γ)
CINDER	T	0.001 - 30	10^{-6} - 10^{8}	10.08	8.26	0.82
CINDER	F	0.001 - 30	10^{-6} - 10^{8}	10.08	8.26	0.82
CINDER	HE	0.001 - 30	10^{-6} - 10^{8}	9.05	7.30	0.81
Hoffman and Hoffman [18]				6.83	6.78	0.99
Sher [21]					6.54 ± 0.53	
Madland [27]	2.0				6.93	
Madland [27]	14.0				8.41	
ENDF/B-VII.1 [4]	2.0	0.005 - 7.25		8.99 ± 0.71	6.92 ± 0.55	0.77
ENDF/B-VII.1 [4]	14.0	0.005 - 7.25		10.92 ± 0.92	8.41 ± 0.71	0.77
Litaize, *et al.* [37]	1.8	0.1 - 4.0	10^{-8}	9.0	7.04	0.78
CINDER	F	0.001 - 30	0.2 - 45	4.62	4.37	0.82
Fisher and Engle [2, 3]		0.137 - 6.419	0.2 - 45	5.50 ± 0.77	5.08 ± 0.71	0.99 ± 0.15

4.4.3 Gamma-ray Spectra Comparison

The 17-group γ-ray spectra measured by Fisher and Engle is compared to the re-binned CINDER spectra. The line color of Fig. 18 indicates the time interval, the solid lines are CINDER spectra, and the dashed lines are Fisher and Engle data.

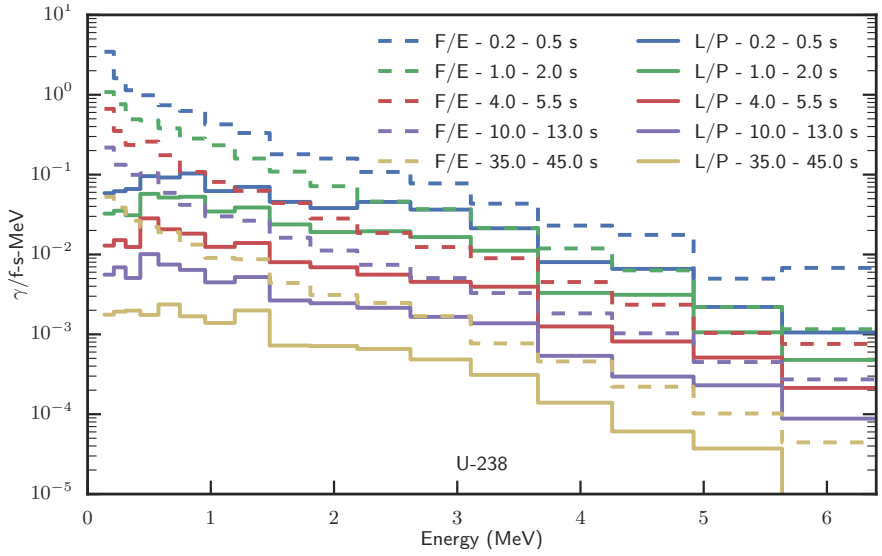

Figure 18. 17-group γ-ray energy spectra for ^{238}U compared to Fisher and Engle data.

In general, the Fisher and Engle spectra are higher than the CINDER spectra, especially so at the lower energies. This bolsters the claim that the Fisher and Engle results are slightly high, due to not properly accounting for photon emission anisotropy. The ratios of the spectra to the 0.2 - 0.5 second interval spectrum are shown in Fig. 19. The ratios, or relative spectra, are in close agreement between the two datasets. The only large discrpancies are in the highest and lowest energy groups, where the Lane/Parma data is higher than the Fisher and Engle data. Furthermore, the cause for the discrepancy in the absolute spectrum, which is not present in the relative spectra, is unknown.

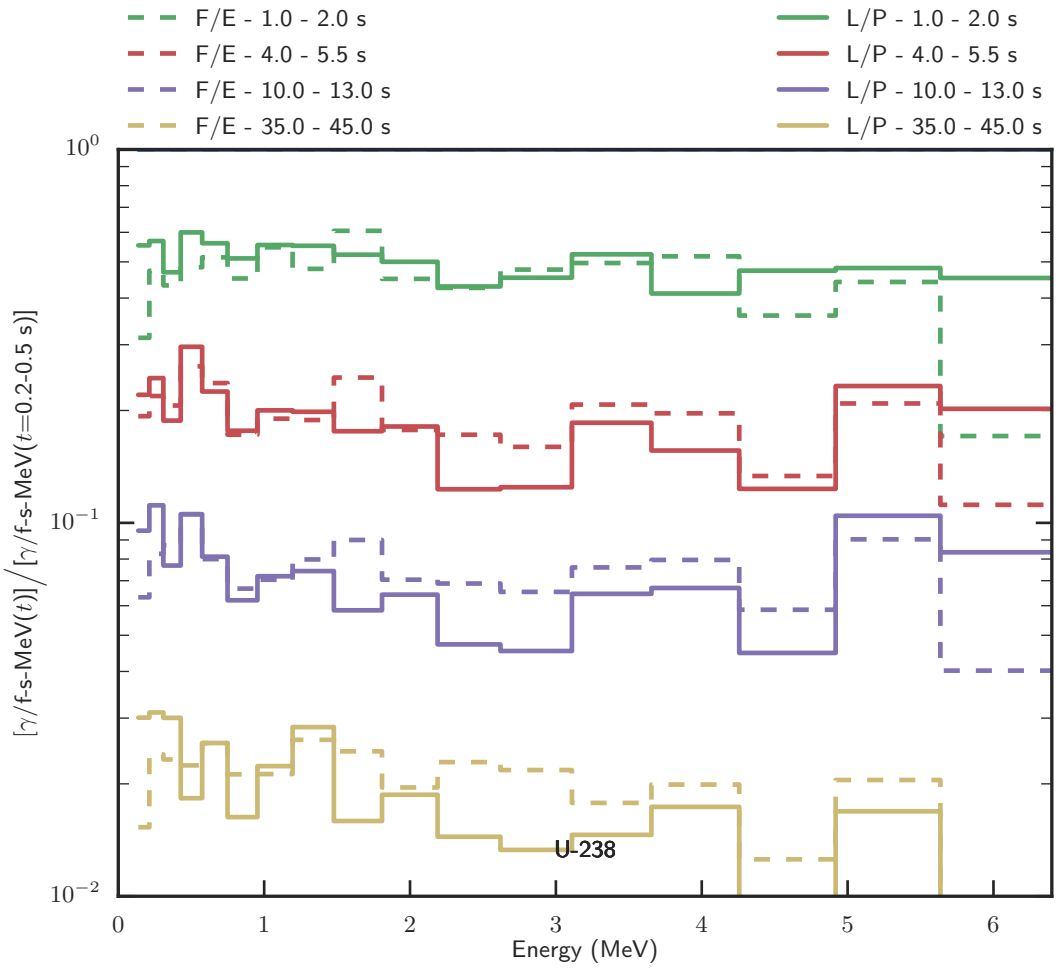

Figure 19. Ratios of 17-group ^{238}U γ-ray energy spectra, compared to Fisher and Engle data.

4.5 ^{239}Pu

4.5.1 Fisher and Engle Comparison

A problem designed to simulate the Fisher and Engle experiment [2, 3] was performed using CINDER from 0.2 to 45 seconds. The results of this experiment, the time rate of change of N_γ and E_γ as well as the average photon energy, are shown in comparison to the original data in Fig. 20. The Lane/Parma data is generally lower than the Fisher and Engle data, especially at earlier times. The cause of this discrepancy is unknown.

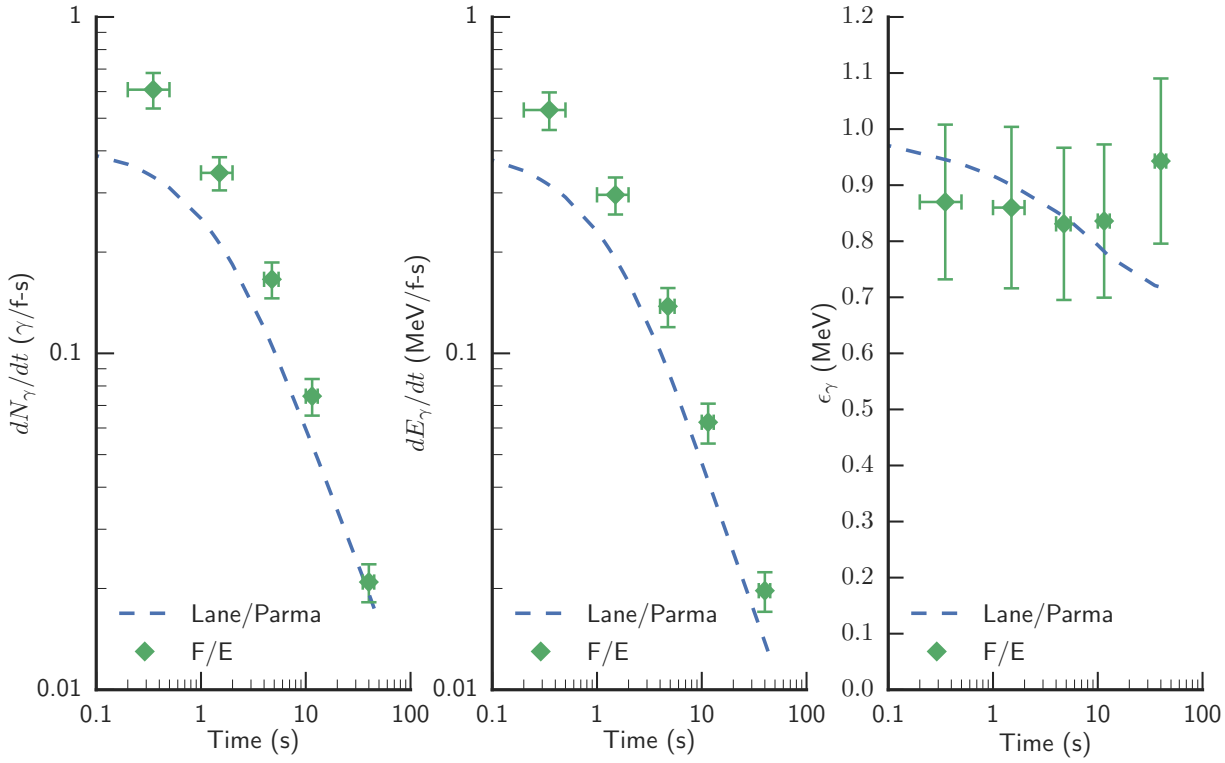

Figure 20. Differential N_γ and E_γ rate and ϵ_γ comparison plot for ^{239}Pu from 0.2 to 45 seconds.

4.5.2 Characteristic Summary

The Fisher and Engle data only studies a subset of the post-fission temporal range. For a more complete picture on the fission gamma-ray characteristics, CINDER was run out to 1×10^8 seconds using all three ENDF fission yield libraries. The results from these simulations are given in Table 9, along with other literature values. The ENDF fission yield libraries are denoted in the incident neutron energy column (E_n) as 'T', 'F', and 'HE', for the thermal, fast, and 14-MeV

libraries, respectively. Furthermore, the last two rows of the table compare the Fisher and Engle experiment and the CINDER results out to 45 seconds, while the remainder of the results present total N_γ, E_γ, and ε_γ results. Various parameters of each study, such as the incident neutron energy (E_n), applicable energy range (ΔE), and the time range of interest (Δt), are presented to allow the reader to compare and contrast results. In addition, the parameters show the difficulty in directly comparing N_γ, E_γ, and ε_γ results from different work.

Table 9. Summary of fission gamma-ray characteristics for ^{239}Pu, compared to literature. The thermal, fast, and 14-MeV ENDF fission yield libraries are denoted by T, F, and HE, respectively.

Source	E_n (MeV)	ΔE (MeV)	Δt (s)	N_γ (γ/f)	E_γ (MeV/f)	ε_γ (MeV/γ)
CINDER	T	0.001 - 30	10^{-6} - 10^{8}	7.31	6.66	0.91
CINDER	F	0.001 - 30	10^{-6} - 10^{8}	7.28	6.67	0.92
CINDER	HE	0.001 - 30	10^{-6} - 10^{8}	6.14	5.65	0.92
Verbinski, *et al.* [5]		0.14 - 10.0	$< 10^{-8}$	7.23 ± 0.30	6.81 ± 0.30	0.94 ± 0.01
Pleasonton [24]				6.88 ± 0.35	6.73 ± 0.35	0.98 ± 0.07
Hoffman and Hoffman [18]				6.94	6.81	0.98
Sher [21]					7.76 ± 0.22	
Madland [27]	2.53×10^{-8}				6.74 ± 0.02	
Madland [27]	2.0				6.97 ± 0.02	
Madland [27]	14.0				8.04 ± 0.04	
ENDF/B-VII.1 [4]	2.53×10^{-8}	0.025 - 8.1		7.75 ± 0.54	6.74 ± 0.47	0.87
ENDF/B-VII.1 [4]	2.0	0.025 - 8.1		8.01 ± 0.56	6.97 ± 0.49	0.87
ENDF/B-VII.1 [4]	14.0	0.025 - 8.1		9.24 ± 0.68	8.04 ± 0.59	0.87
Becker, *et al.* [31]		> 0.14		8.62	7.67	0.89
Chyzh, *et al.* [32]		0.15 - 9.5		7.50 ± 0.30	7.35 ± 1.09	0.98 ± 0.14
Ullmann, *et al.* [34]		> 0.15		7.15 ± 0.09	7.46 ± 0.06	1.04 ± 0.02
Jandel, *et al.* [36]		> 0		7.10	7.40	1.05
Serot, *et al.* [41]		> 0.14		7.19	6.81	0.95
Stetcu, *et al.* [39]		> 0.10		7.48	6.66	0.89
CINDER	F	0.001 - 30	0.2 - 45	2.45	2.01	0.71
Fisher and Engle [2, 3]		0.137 - 6.419	0.2 - 45	3.26 ± 0.82	2.86 ± 0.71	0.88 ± 0.13

4.5.3 Gamma-ray Spectra Comparison

As outlined in Section 2.11, Beddingfield and Cecil showcased the ability to distinguish between ^{235}U and ^{239}Pu by measuring the gamma-ray spectrum approximately 1200 seconds after fission, taking the ratio of gamma-ray peak intensities, and comparing them to theoretical ratios from ENDF. Ratios of the gamma-ray peak intensities were calculated using the photon spectra output by CINDER. These ratios were then compared to the ratios calculated by Beddingfield

and Cecil as a verification measure. Figure 21 shows the photon spectra given by CINDER 1000 seconds post-fission for ^{239}Pu with relevant gamma-ray peaks identified by fission product.

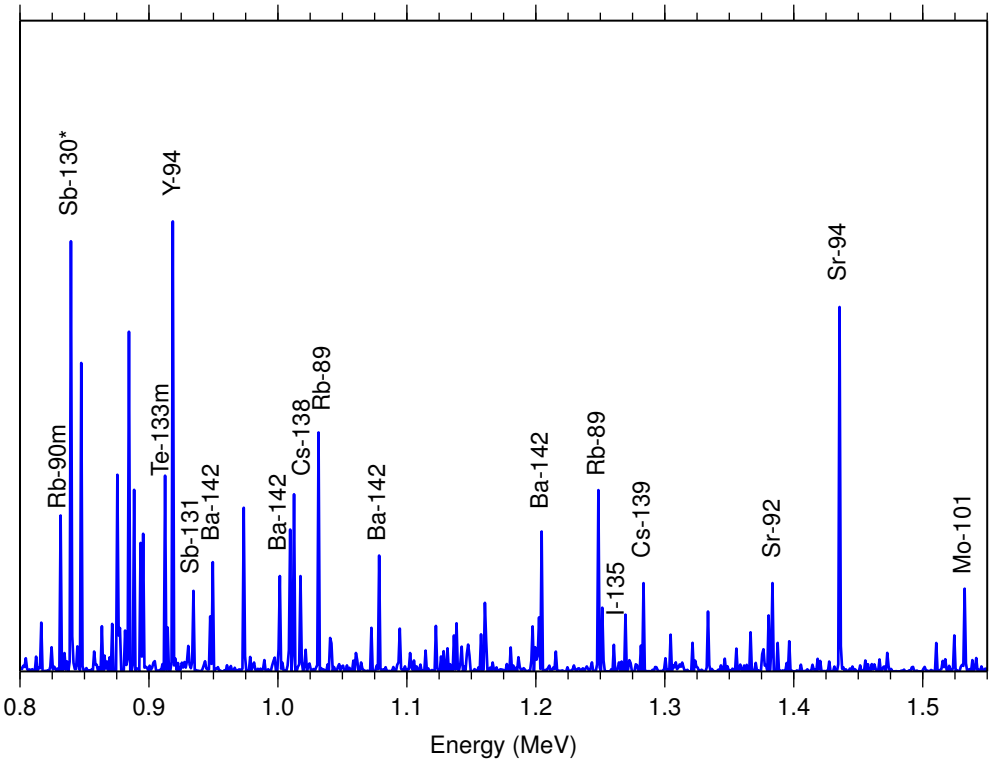

Figure 21. γ-ray spectrum with relevant radionuclide peaks identified for ^{239}Pu at 1000 seconds.

CINDER gives a normalized spectra, hence the lack of ticks on the ordinate of Fig. 21. But, because each peak is normalized to the same value, their ratio remains the same, regardless of normalization. Using this spectrum, the gamma-ray peak intensity ratios, as outlined in [7], were calculated and compared to the data gathered by Beddingfield and Cecil, as well as the ENDF library. These ratios are shown in Figure 22 as 'calculated', 'observed', and 'theoretical', respectively.

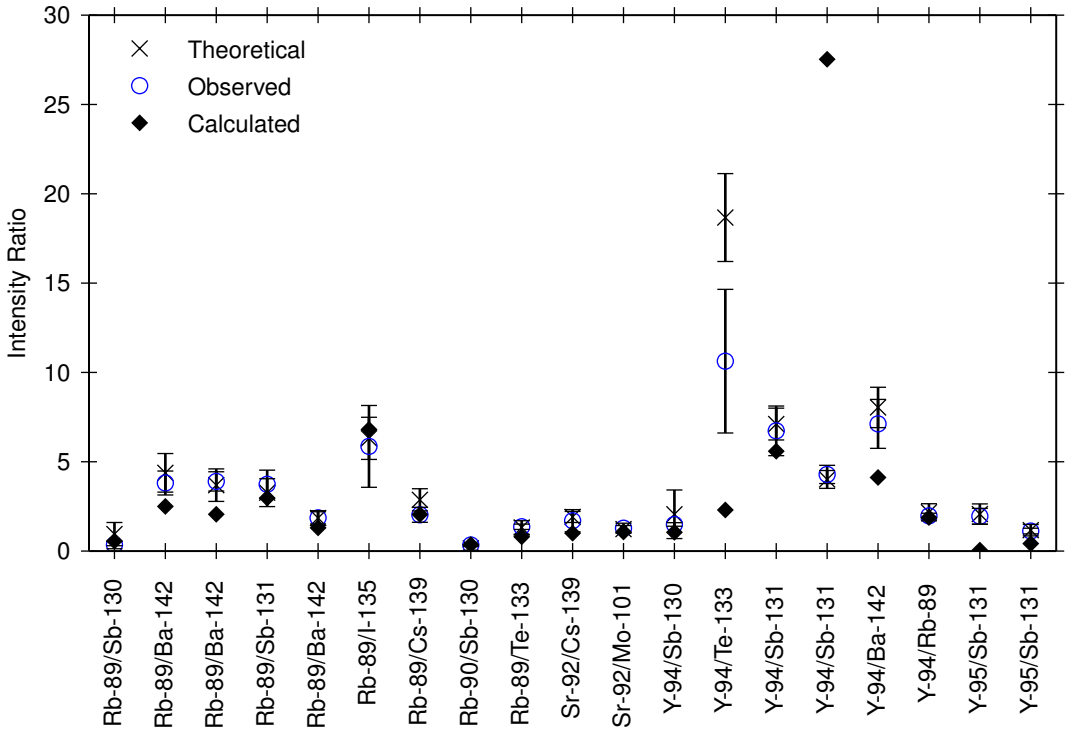

Figure 22. Comparison of various radionuclide peak intensity ratios for ^{239}Pu, where 'theoretical' is derived from ENDF data, 'observed' was measured by Beddingfield and Cecil, and 'calculated' was output by CINDER.

In general, there is good agreement between the three datasets. However, there are ratios in which all three datasets disagree. The biggest differences involve ratios of ^{94}Y; this is true for both ^{235}U and ^{239}Pu spectrum comparisons. For some of the ratios involving ^{94}Y, particularly ^{94}Y/^{133}Te, large uncertainties in the observed and theoretical ratios exist. It is unclear what is causing these discrepancies. The tabulated data for the ratio comparisons can be found in Appendix E. In its totality, this comparison with the Beddingfield and Cecil provides more confidence in the CINDER spectra when they're used in various applications in the next section of the report.

Fisher and Engle also measured 17-group γ-ray energy spectra for all five time intervals using a NaI scintillator. These measured spectra are compared to the 7,428 group CINDER spectra which have been re-binned into the same 17-group Fisher and Engle structure in Fig. 23. For more information on this 17 group structure, please refer to Appendix D.

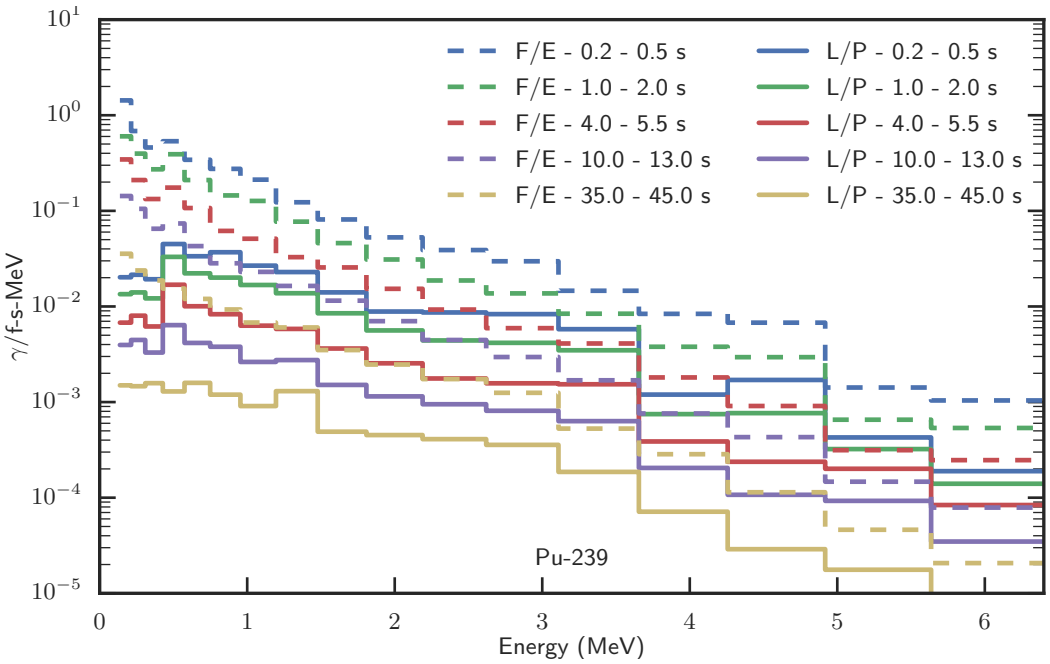

Figure 23. 17-group ^{239}Pu γ-ray energy spectrum compared to Fisher and Engle data.

In general the Fisher and Engle data is higher than the CINDER spectra. This further supports the claim that the Fisher and Engle photon multiplicity values are slightly high, due to neglecting photon emission anisotropy. The discrepancy between the sets of spectra are greatest at the lower energies and this could be caused by the re-binning process and/or the CH_2 filter used by Filter and Engle attenuating photons into this energy range. Overall, the general shapes of the spectra agree. To further inspect the spectra, the ratios of the spectra to the 0.2 - 0.5 second spectrum are shown in Fig. 24. This illustration shows close agreement between the two datasets. The reason for the discrepancies between the absolute magnitude of the spectra is currently unknown, but the authors suspect it could be caused by anisotropic photon emission not captured in the Fisher and Engle measurements, as previously mentioned.

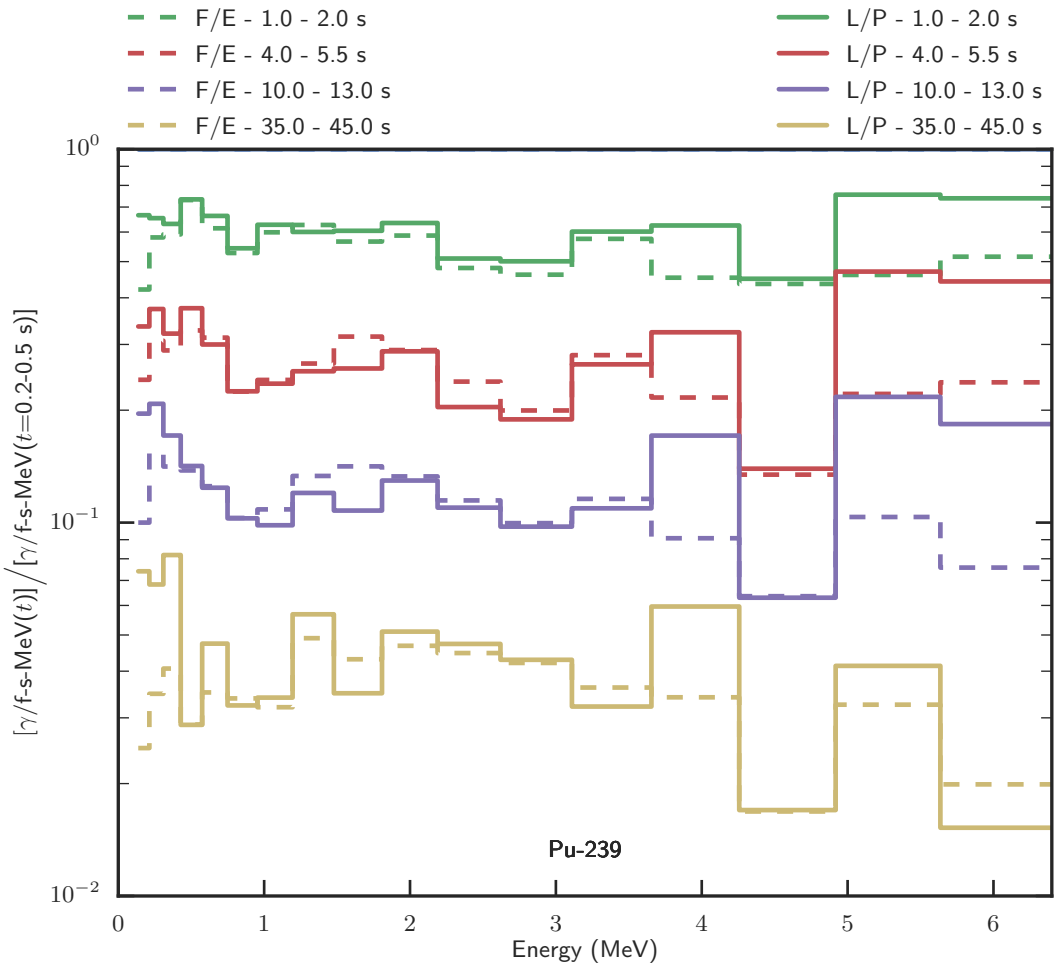

Figure 24. Ratios of 17-group ^{239}Pu γ-ray energy spectra, compared to Fisher and Engle data.

5 ACRR Central Cavity Characterization

Recent work has focused on properly characterizing the flux environment in the central cavity of the ACRR [8] using different spectrum modified "buckets" [10, 9]. The ACRR is water-moderated, UO_2-BeO fueled pool-type reactor. The fuel consists of 21.5 wt% UO_2 and 78.5 wt% BeO, with the uranium enriched to 35% ^{235}U. The fuel pellets are cylindrical and pre-cracked to allow for the high thermal stresses associated with large pulse operations. This fuel design creates an epithermal flux profile for the dry, 9-inch diameter central irradiation cavity. These characterization reports break the environment into three parts: neutrons, prompt gamma-rays, and delayed gamma-rays. For the neutron component, the authors use the output spectrum from an MCNP tally as a trial spectrum for a spectrum adjustment code. The neutron trial spectrum, along with foil activation data from recent experiments, are used to generate the neutron environment in the ACRR. Spectrum adjustment does not work for photon spectra, in comparison to neutron spectra [10]. Therefore, for photon characterization the process is to generate a fission photon source in MCNP, then place that source in the position of each ACRR fuel rod, and run a source-only transport calculation to characterize the delayed photon environment in the central cavity. The prompt photon contribution is calculated with a mixed-field MCNP calculation, but no spectrum unfolding is performed.

5.1 Time-dependent Delayed Fission Gamma-ray Spectra

For the delayed photon profile, the authors currently use a time-independent 48-group characterization flux/fluence/spectra (also referred to as the "Char. Flux" or simply "CF"). This is shown in Fig. 25 as "Char. Flux" in black, and is compared to all available ^{235}U prompt fission gamma-ray spectra from the literature in Section 2. The legend for Fig. 25 can be expanded to:

Char. Flux	Used in ACRR environment characterization.
Stetcu	See Section 2.27 and Refs. [39, 43].
ENDF/B-VII.1	See Section 2.17 and Ref. [4].
Oberstedt	See Section 2.21 and Ref. [33].
Litaize	See Section 2.25 and Refs. [40, 37, 44].
Verbeke	See Section 2.16 and Ref. [26].
Becker	See Section 2.19 and Ref. [31].
Jandel	See Sections 2.18 and 2.24 and Refs. [29, 36].
Regnier	From Figure 2 of Ref. [33].
Francis	See Section 2.1 and Ref. [11].
Peelle	See Section 2.5 and Ref. [17].
Verbinski	See Section 2.6 and Ref. [5].
Maienschein	See Section 2.2 and Ref. [12].

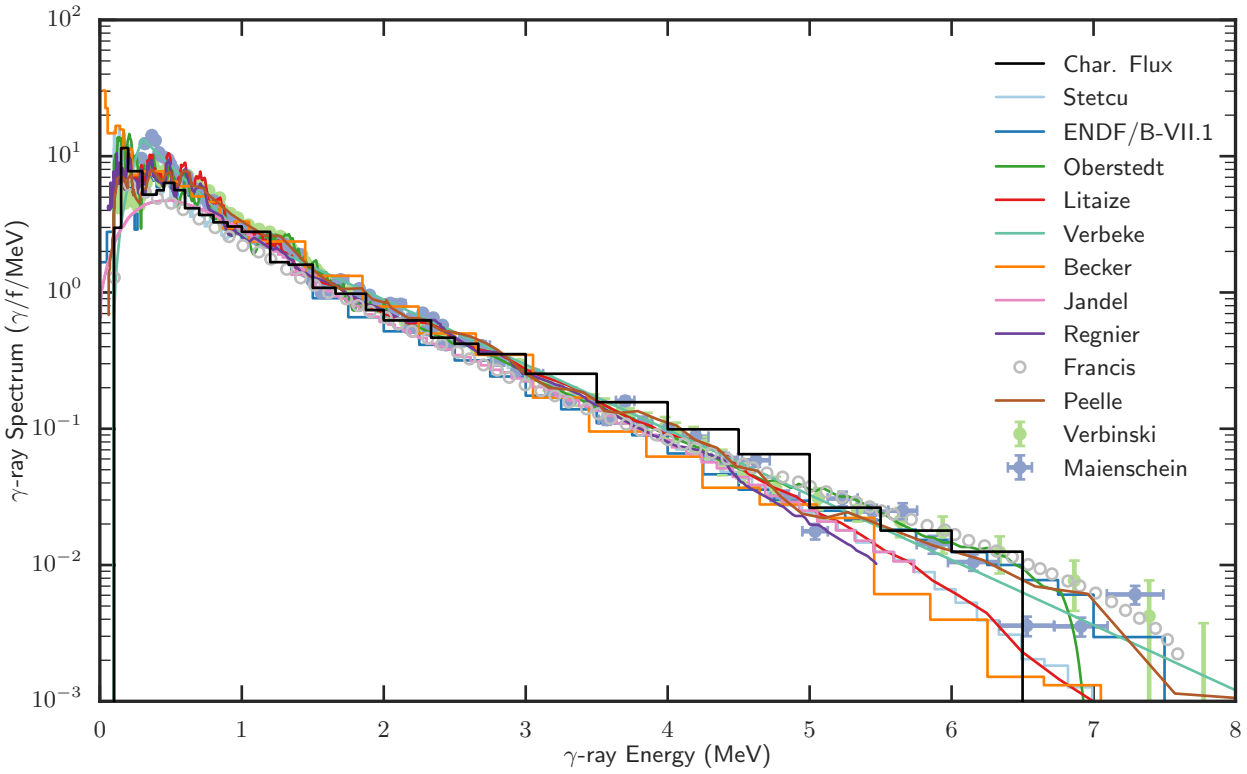

Figure 25. ^{235}U PFGS from available literature, compared to the characterization fluence, shown in black.

This flux is used to characterize the delayed fission gamma-ray spectra (DFGS), but is plotted against the available PFGS from literature for two reasons. First, the available data for delayed fission gamma-ray spectra is scant. Secondly, it is important to show that this characterization fluence matches up reasonably well to published literature (during early enough times post-fission). As shown later in this section, the characterization fluence agrees less and less as time progresses. Furthermore, it is interesting to see the wide variety in PFGS data. On this logarithmically scaled spectra plot, there is quite an appreciable spread in the data at low energies (< 1.5 MeV) and the high energies (> 5.5 MeV). As mentioned in previous sections, a variety of measurement and calculation techniques were performed over the course of the past 60 years to generate each of these spectra. To illustrate the incongruity in the data, a zoom detail of Fig. 25 is shown from 0 to 1.5 MeV in Fig. 26.

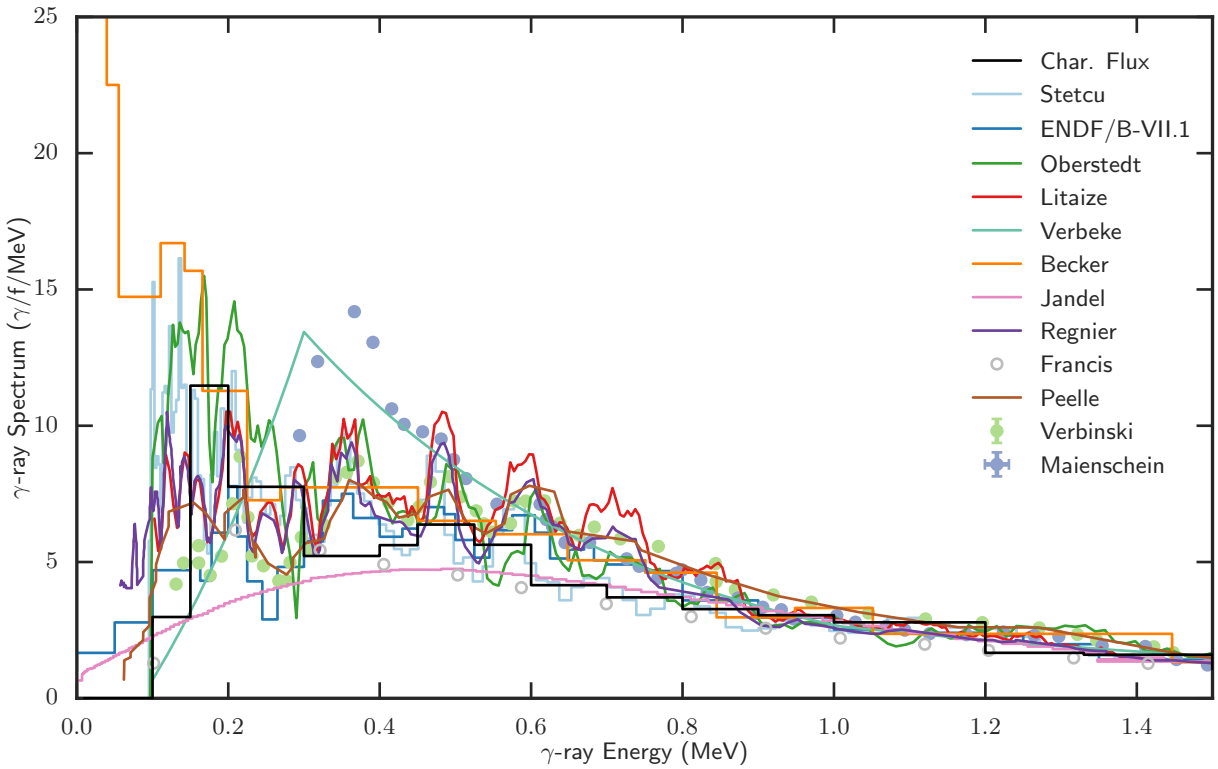

Figure 26. ^{235}U PFGS from available literature, compared to the characterization fluence shown in black (zoom detail).

After inspecting the zoom detail of the spectra in Fig. 26, it is interesting to notice that as time has progressed, and the computational abilities have expanded, more detailed accounts of the spectra are being published. As shown by the Stetcu, Oberstedt, Litaize, and Regnier data, there are low energy structures in the data that arise from transitions between discrete states according to [39]. This behavior is not captured in the characterization fluence, but it agrees reasonably well elsewhere in the energy range. To see how this agreement changes over time, the high-fidelity spectra generated by CINDER from ^{235}U, were re-binned into the same 48-group structure used by the characterization fluence, and plotted against the characterization fluence at every time step from 10^{-6} to 10^{8} seconds in Fig. 27. Also included, for comparison sake, is the current ENDF/B-VII.1 fission photon spectrum for ^{235}U.

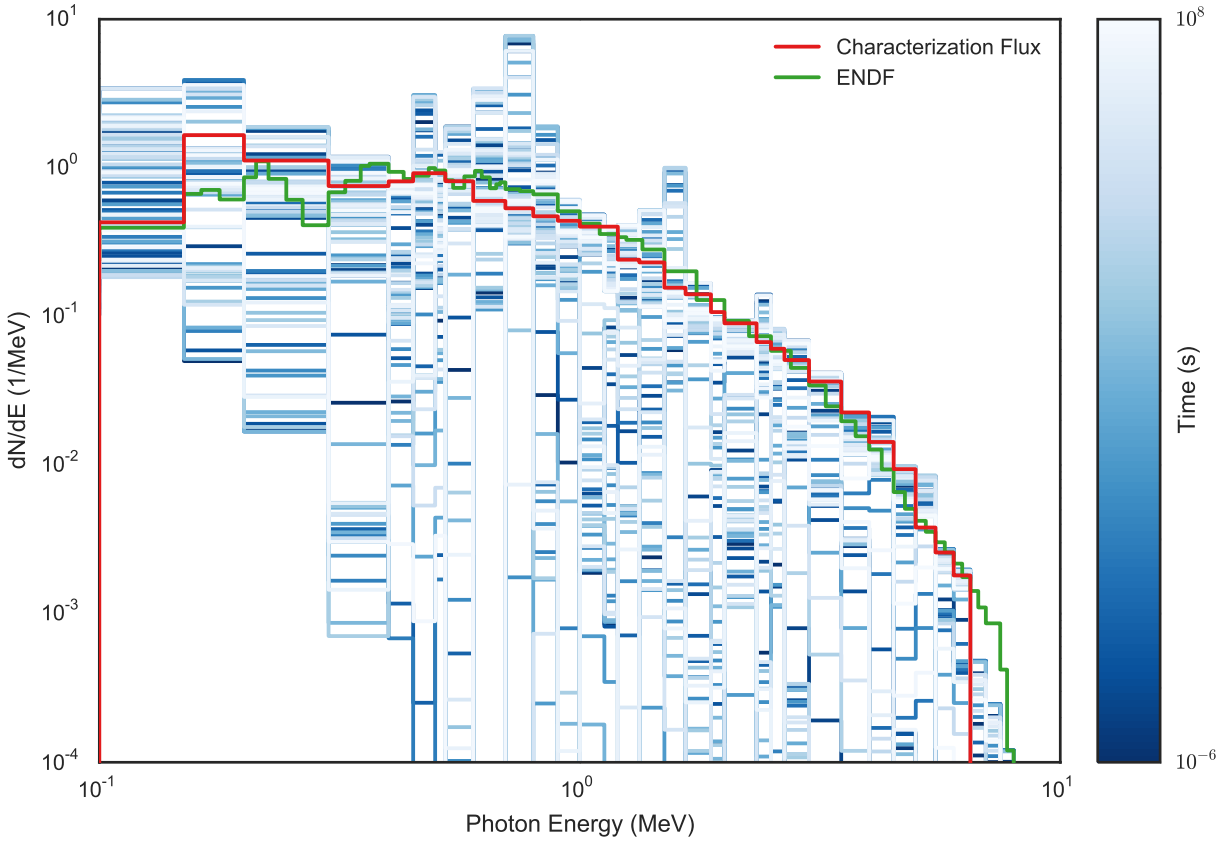

Figure 27. ^{235}U γ-ray spectra over time, compared to the characterization and ENDF spectra.

The spectra plotted are normalized dN/dE spectra, meaning they all integrate to unity. This implies that the plot is conveying how the 'shape' of the spectra changes. This plot attempts to highlight the magnitude effects by varying the color of the spectra over time. The darker the blue, the earlier the time. Conversely, the spectra fade to white as time progresses. A salient feature of this illustration is that there is no general trend, in time nor energy. There is not a simple progression of darker spectra nearer the characterization fluence than the lighter spectra. Nor, is there a apparent softening of the spectra over time. This illustration is useful to highlight that the DFGS changes, and changes drastically, over time. *But when is the characterization 'good', and how different are the spectra when it's 'bad'?* Figure 28 highlights the differences between the spectra over time and attempts to answer these questions.

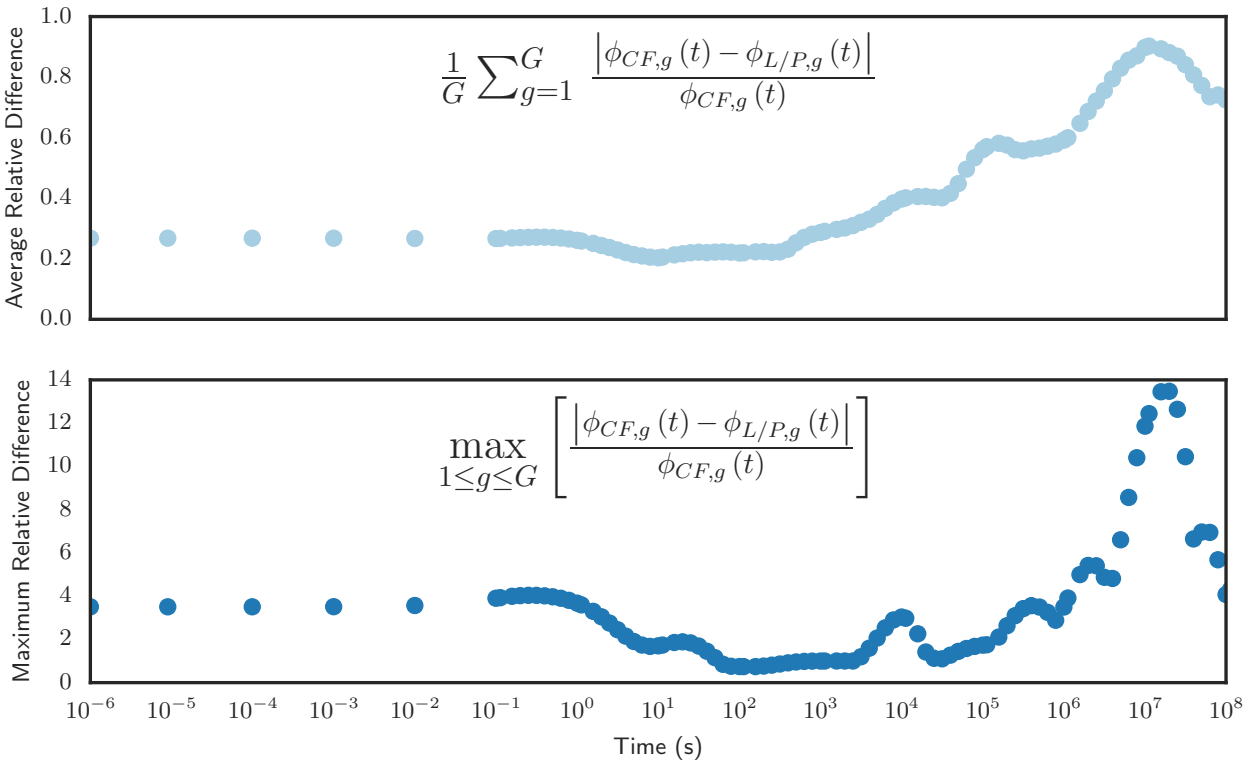

Figure 28. Relative difference between the characterization fluence and the re-binned CINDER γ-ray spectra for ^{235}U over time.

To analyze the agreement, or lack thereof, between the characterization fluence and the time-dependent CINDER spectra, the relative difference between the CINDER spectra at each time is calculated. To highlight discrepancies between spectra over all energy bins, the average relative difference is plotted in the top frame in light blue. This metric is simply the relative difference in each energy bin, averaged over all energy bins, at each time step. This shows that the overall agreement between the CINDER spectra and the characterization fluence generally diverges over time, and that the percent difference is less than 50% out to approximately 10,000 seconds (2.8 hours). The bottom panel, in dark blue, shows the maximum relative difference in a single energy bin, at each time step. This illustrates that an increasing average relative difference, may be driven by a few energy groups (or simply one), with the others agreeing quite well. Generally speaking, the ACRR characterization efforts could greatly benefit from a new time-dependent characterization fluence since the current model does not accurately model the DFGS from ^{235}U as accurately as the CINDER results.

Figure 29 illustrates the difference between the 48-group spectra at various decades in time. It also gives the spectra as a ratio to the characterization spectra. It shows that the current characterization spectra drastically underestimates photons in the lowest energy group at early times, underestimates photons in the highest two energy groups at 0.1 seconds, overestimates these high-energy γ-rays after 1,000 seconds, and neglects the fact that a single isotope can dominate a spectra at certain times (see the peak to the left of 1 MeV at 10,000 seconds and the peak in the third-to-last energy group at 100 seconds). The current characterization spectra is shown to be at times almost 5 times different that the CINDER results. This is especially critical for the low energy photons because at low levels, the may be considered negligible due to attenuation, but at these elevated levels, they can contribute to the dose the experimental package is exposed to.

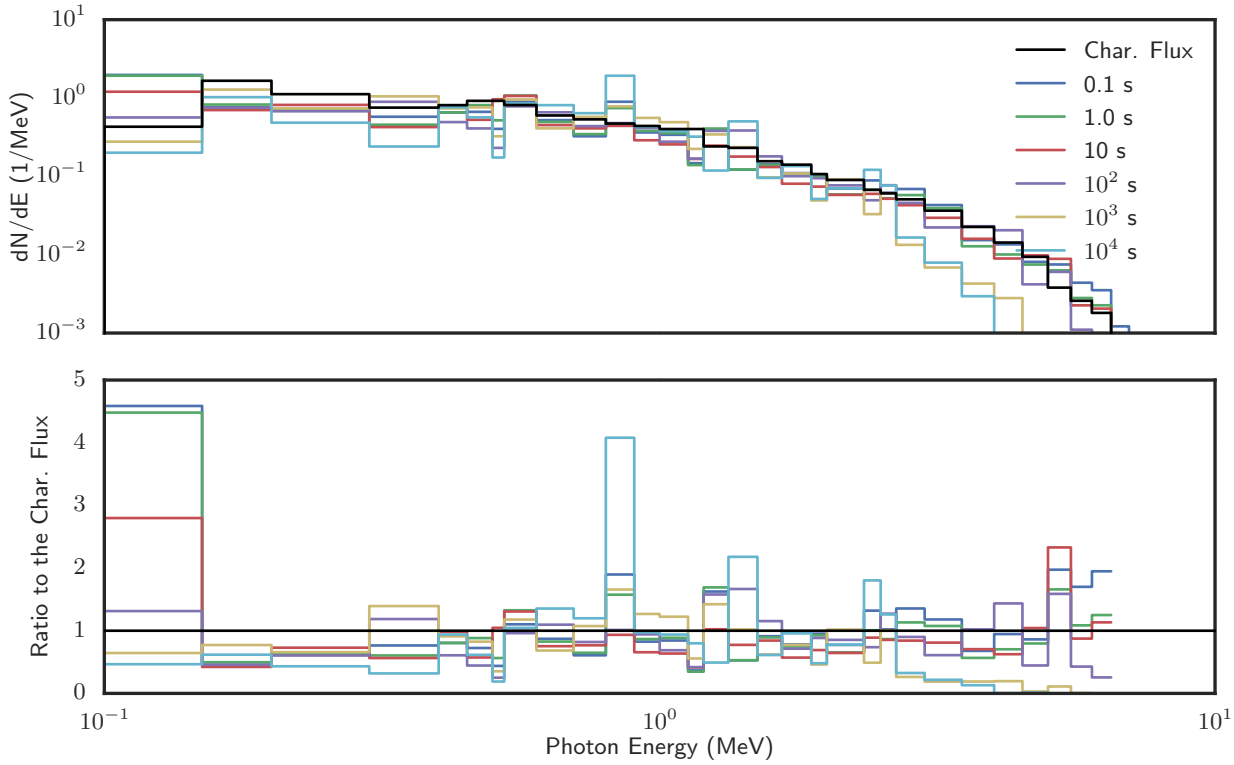

Figure 29. 48-Group Spectra for thermal fission of ^{235}U at various decades in time.

5.2 Time-dependent Gamma-ray Energy Release Curves

The second aspect of properly characterizing the delayed photon component of the ACRR flux is to determine how much energy is released from fission as gamma-rays. Many of the studies referenced within have provided a total valuation, but few have published the curve of E_γ as a function of time. This value is critical to properly determining the amount of energy that has consequently been transported from the fuel rods, to the central cavity, via delayed photon emission. Figures

30 and 31 show the amount of energy released by photons from thermal-neutron induced fission of ^{235}U, at various times. Complete data tables for these curves, and for other delayed fission gamma-ray characteristics, are given in Appendix C.

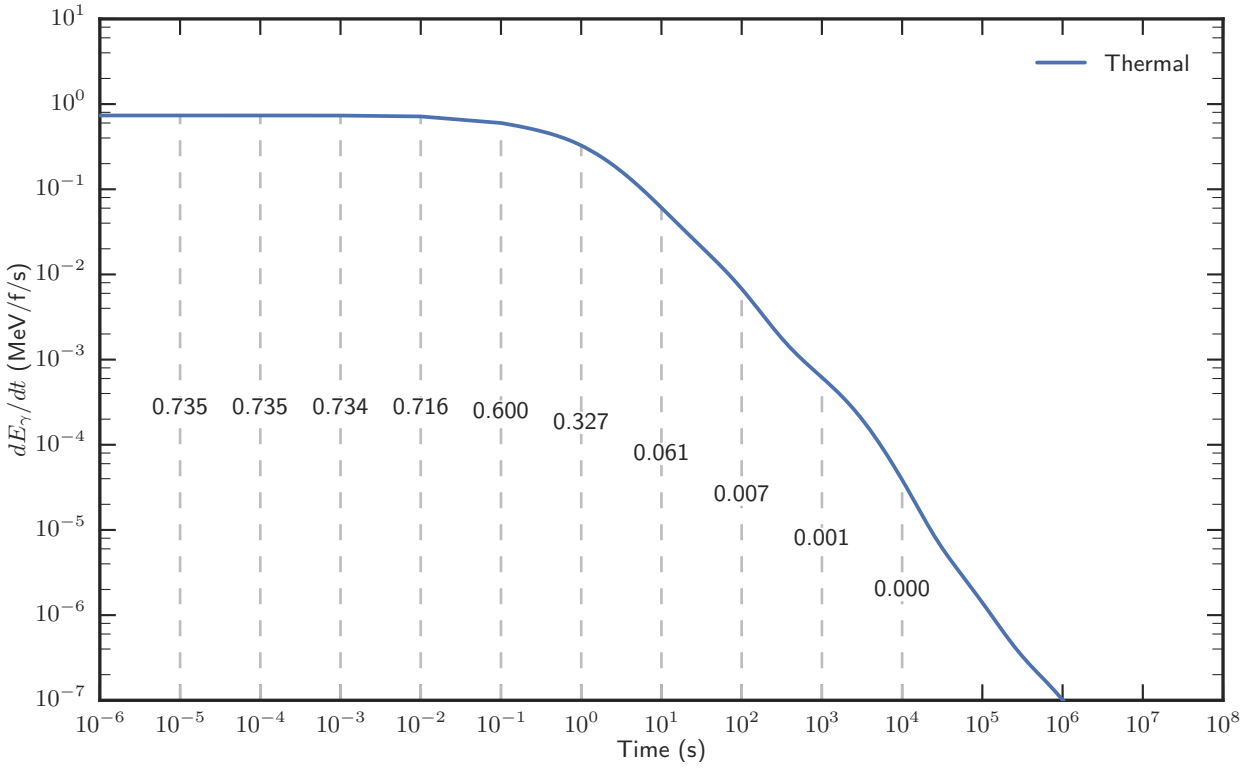

Figure 30. Annotated dE_γ/dt curve over time for thermal-neutron induced fission of ^{235}U.

Figure 30 shows that the differential E_γ contribution remains constant through 1×10^{-3} seconds. From there, it begins to wane, until it becomes negligible (to the keV level) between 10^3 and 10^4 seconds. This curve is beneficial when a sample in the cavity may only be present for a section of time after fission. The contributions can be summed from t_1 to t_2 to get a total release value. For the total release value where t_1 is set to the time of fission (i.e. $t_1 = 0$), then Figure 31 gives the integrated energy release value at various times post-fission. The curve annotations provide the integrated E_γ at that time (the total energy released by delayed fission gamma-rays up to that point in time), as well as the percentage of final E_γ value (where final is considered at $t = 10^8$ seconds). It is interesting to note that 1 second post-fission only 6.5% of the delayed γ-ray energy has been released. An important takeaway from this figure is that if a experimental package is removed from the reactor within approximately 3 hours of the pulse (10^4 seconds), only 85% of the delayed gamma-ray energy is released. Prior to this work, it was assumed that the vast majority of the delayed γ-ray energy was deposited by 10^4 seconds. This curve shows that a non-negligible amount, 15%, has yet to be released. For the data at every time point of this curve, instead of only the selected decades, please refer to Table C.7 of Appendix C.

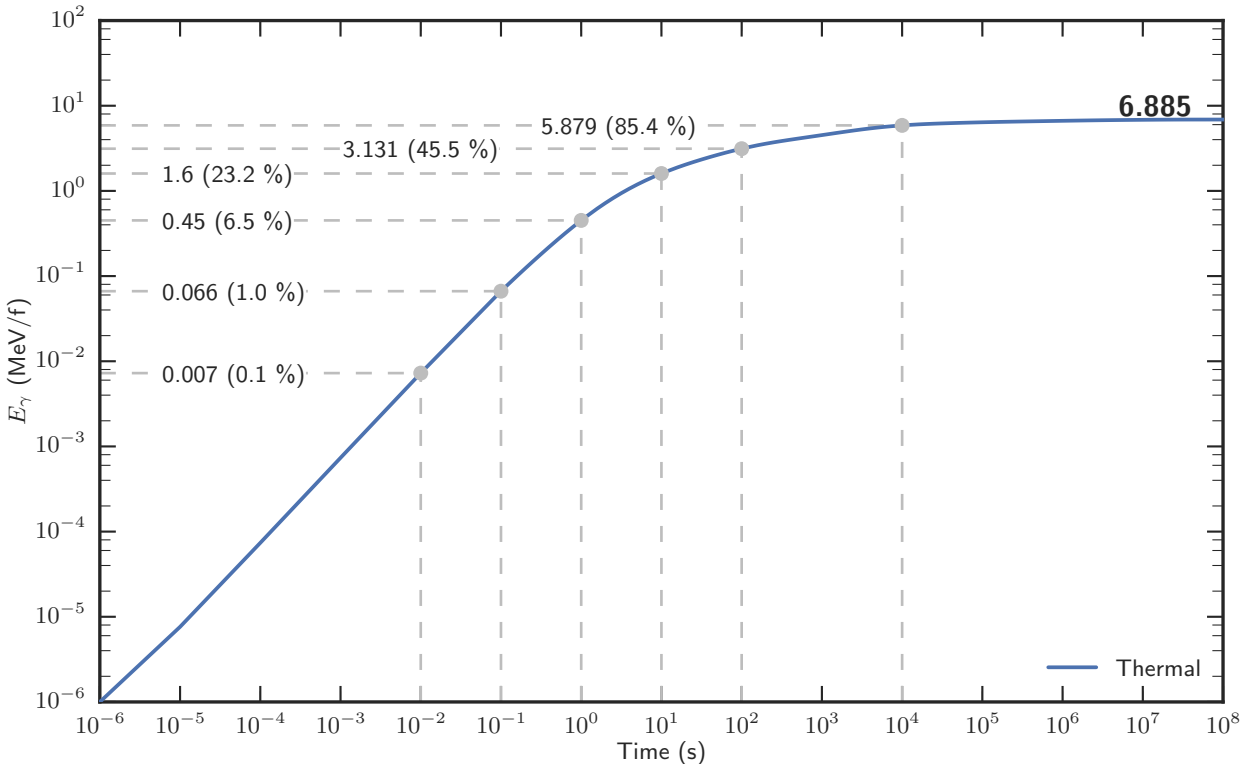

Figure 31. Annotated E_γ curve over time for thermal-neutron induced fission of ^{235}U.

Since the majority of fission in the ACRR is from ^{235}U, the curves of Figs. 30 and 31 should represent the photon energy deposition rates in the central irradiation cavity well. There are slight differences between the E_γ results from the thermal and fast fission yield libraries for ^{235}U (1% difference in the final value and 6.5% at 100 seconds). Thus, it may be appropriate to perform an average of the two curves, weighted according to the neutron spectrum. The photon energy release curves for other materials can be found in Appendix B with the data for those curves in Appendix C.

6 Conclusions

This work has provided a comprehensive review of the literature available, from the past six decades, on fission gamma-ray properties. In doing so, a substantial base of data was available for comparing the novel CINDER results to. This comparison is not a rigorous validation effort, since each data set has its own intricacies. However, a more substantial comparison was performed against the data gathered during the Fisher and Engle experiments using Godiva-II from 1962-1964. This effort can also not be considered a rigorous validation since many aspects of the experiment are unknown. That being said, the CINDER data compared quite well during this comparison, with the notable exception of ^{239}Pu. Generally, the Fisher and Engle was higher than the CINDER data, which may be caused by the inability to capture anisotropic photon emission during 1962-1964. The spectra comparison to Fisher and Engle showed a large discrepancy in the magnitude of the spectra, but when the spectra were compared on a ratio basis, the agreement was quite good. The cause of the disagreement in the absolute spectra remains unknown.

As shown in the tables within the Characteristic Summary subsection for each material in the Results section, the CINDER-calculated N_γ values are markedly higher than the literature values, while the E_γ values are quite accurate. Consequently, the ε_γ values for CINDER is lower than the published data. The high multiplicity values are caused by CINDER's ability to track photon emission down to 0.001 MeV. No other experiment or calculation in open literature has covered this energy range. The results from Ref. [39] show that as the low-energy threshold decreases for their MCHF simulation, the average photon multiplicity (N_γ) increases substantially. This is due to the fact that a substantial amount of these low energy photons are ignored by other models, whereas CINDER includes them in the multiplicity calculations. The possibility of modifying this lower energy cutoff in CINDER is being investigated. This multiplicity skew does not effect E_γ significantly since those photons would contribute so little energy to E_γ. Because the energy release values align so well with literature, some confidence can be given to the energy release curve shown in Fig. 31 and others in Appendix C. Since the N_γ values do not agree with literature, all spectra given by CINDER (as shown in Fig. 27) are normalized dN/dE spectra. This prevents the inaccuracy of the N_γ valuation from leading to errors in the spectra. The main delayed fission gamma-ray characteristics calculated by CINDER are summarized in Table 10.

The results generated by this work have implications from a scientific standpoint, but they also have direct applications. Work is currently being performed to implement gamma-ray time dependence for the ACRR characterization efforts. Comparing the results to what is currently being used shows that the current method is accurate during certain time regimes, but not for others. The results from this work can remedy this inaccuracy. Furthermore, the spectra generated by CINDER are substantially higher fidelity than the 48-group structure currently used. At any point in the future, the characterization team could re-bin the 7,428 group data into any other group structure. Future work in planned to investigate other materials, that have little to no available data, as well as running CINDER with the JEFF data library. Furthermore, weighted averages of the spectra and E_γ curves should be performed depending on the neutron spectra of the ACRR with the different "bucket" environments. This would lead to an even more refined estimate of the delayed γ-ray characterization.

Table 10. Summary of CINDER Delayed Gamma-ray Characteristic Results

Nuclide	Fission Yield	N_γ	E_γ (MeV)	ε_γ (MeV)
^{232}Th	Thermal	10.38	8.88	0.86
	Fast	10.38	8.88	0.86
	14-MeV	9.80	8.21	0.84
^{233}U	Thermal	6.44	5.55	0.86
	Fast	6.47	5.58	0.86
	14-MeV	5.98	5.15	0.86
^{235}U	Thermal	9.36	6.89	0.74
	Fast	9.47	6.95	0.74
	14-MeV	8.49	6.07	0.72
^{238}U	Thermal	10.08	8.26	0.82
	Fast	10.08	8.26	0.82
	14-MeV	9.05	7.30	0.81
^{239}Pu	Thermal	7.31	6.66	0.91
	Fast	7.28	6.67	0.92
	14-MeV	6.14	5.65	0.92

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A CINDER2008 Input Files - Thermal Neutron Induced Fission of Uranium-235

The files included in this appendix are the files necessary to run CINDER. They are specific to the SNL-modified version of CINDER2008, but can be generalized to the orginal CINDER2008. For a description of the files please see Section 3.1.2 Implementation. The files model a 10^{-6} second neutron pulse incident on 1 cm^3 of 100% Uranium-235. The 63-group neutron flux simulates a 10^{24} #/cm^2-s beam with a particle energy centered around 2 MeV; all other groups are zero. The output files have a group structure with a maximum bin-width of 1 keV. The output is evaluated every decade from 10^{-6} to 0.1 seconds. From 0.1 to 10^8 seconds (3.17 years), the output is evaluated ten times per decade in logarithmically-spaced intervals. The fission product yield libraries correspond to thermal-neutron induced fission. The neutron cross-section libraries are from the CINDER '90 library, whereas the photon cross-section libraries are from CINDER2008.

A.1 input

```
Uranium 235
1.0,1E24,1E-24,1E-24,1E-24,1E-24,,,,0,1,-1,0,0,,,1,1,,,,,,1.0,1
U235 Constant N+G Flux
CSTNFLUX CSTGFLUX
 U-235
1,1,0
1E-6, 's'
5,0,0
9E-6, 's'
9E-5, 's'
9E-4, 's'
9E-3, 's'
9E-2, 's'
10,0,0
0.0126, 's'
-0.0585, 's'
-0.0995, 's'
-0.1512, 's'
-0.2162, 's'
-0.2981, 's'
-0.4012, 's'
-0.5310, 's'
-0.6943, 's'
-0.9000, 's'
10,0,0
0.1259, 's'
```

```
-0.5849, 's'
-0.9953, 's'
-1.5118, 's'
-2.1623, 's'
-2.9811, 's'
-4.0119, 's'
-5.3096, 's'
-6.9433, 's'
-9.0000, 's'
10,0,0
1.2589, 's'
-5.8489, 's'
-9.9526, 's'
-15.119, 's'
-21.623, 's'
-29.811, 's'
-40.119, 's'
-53.096, 's'
-69.433, 's'
-90.000, 's'
10,0,0
12.5893, 's'
-58.4893, 's'
-99.5262, 's'
-151.189, 's'
-216.228, 's'
-298.107, 's'
-401.187, 's'
-530.957, 's'
-694.328, 's'
-900.000, 's'
10,0,0
125.8925, 's'
-584.893, 's'
-995.262, 's'
-1511.89, 's'
-2162.28, 's'
-2981.07, 's'
-4011.87, 's'
-5309.57, 's'
-6943.28, 's'
-9000.00, 's'
10,0,0
1258.925, 's'
-5848.93, 's'
```

```
-9952.62, 's'
-15118.9, 's'
-21622.8, 's'
-29810.7, 's'
-40118.7, 's'
-53095.7, 's'
-69432.8, 's'
-90000.0, 's'
10,0,0
12589.25, 's'
-58489.3, 's'
-99526.2, 's'
-151189, 's'
-216228, 's'
-298107, 's'
-401187, 's'
-530957, 's'
-694328, 's'
-900000, 's'
10,0,0
125892.5, 's'
-584893, 's'
-995262, 's'
-1511893, 's'
-2162278, 's'
-2981072, 's'
-4011872, 's'
-5309573, 's'
-6943282, 's'
-9000000, 's'
10,0,0
1258925, 's'
-5848930, 's'
-9952620, 's'
-15118930, 's'
-21622780, 's'
-29810720, 's'
-40118720, 's'
-53095730, 's'
-69432820, 's'
-90000000, 's'
```

A.2 fluxes

```
 100 Percent Enriched Uranium 235                                              63  25
CSTNFLUX                                          .1000000E+01
.0000E+01 .0000E+01 .0000E+01 .0000E+01 .0000E+01 .0000E+01 .0000E+01 .0000E+01
.0000E+01 .0000E+01 .0000E+01 .0000E+01 .0000E+01 .0000E+01 .0000E+01 .0000E+01
.0000E+01 .0000E+01 .0000E+01 .0000E+01 .0000E+01 .0000E+01 .0000E+01 .0000E+01
.0000E+01 .0000E+01 .0000E+01 .0000E+01 .0000E+01 .0000E+01 .0000E+01 .0000E+01
.0000E+01 .0000E+01 .0000E+01 .0000E+01 .0000E+01 .0000E+01 .0000E+01 .0000E+01
.0000E+01 .0000E+01 .0000E+01 .0000E+01 .0000E+01 .0000E+01 .0000E+01 .0000E+01
.0000E+01 .0000E+01 .0000E+01 .0000E+01 .0000E+01 .1000E+01 .0000E+01 .0000E+01
.0000E+01 .0000E+01 .0000E+01 .0000E+01 .0000E+01 .0000E+01 .0000E+01
CSTGFLUX                                          .2500000E+02
.1000E+01 .1000E+01 .1000E+01 .1000E+01 .1000E+01 .1000E+01 .1000E+01 .1000E+01
.1000E+01 .1000E+01 .1000E+01 .1000E+01 .1000E+01 .1000E+01 .1000E+01 .1000E+01
.1000E+01 .1000E+01 .1000E+01 .1000E+01 .1000E+01 .1000E+01 .1000E+01 .1000E+01
.1000E+01
```

A.3 material

```
Pure Uranium 235
U-235   1 .5000E-01
2350920 .10000000E01
```

A.4 locate

```
C:\Users\xxxxx\Documents\Delayed_Gamma\CINDER2008.b9\Data\c90lib0742

C:\Users\xxxxx\Documents\Delayed_Gamma\CINDER2008.b9\Data\cindergl.dat
C:\Users\xxxxx\Documents\Delayed_Gamma\CINDER2008.b9\Data\cinderdn.dat
C:\Users\xxxxx\Documents\Delayed_Gamma\CINDER2008.b9\Data\C08lib_gamma_v1.3
```

B Additional Figures

B.1 Spectra Ratios to the characterization fluence

The 48-group spectra, re-binned from the 7,428 group CINDER spectra, is shown at each time step as a ratio of the characterization fluence. It is also plotted only at various decades in time to enhance readability. This section includes plots for the thermal-neutron induced fission of ^{235}U, as well as the fast fission of ^{238}U and ^{239}Pu, respectively.

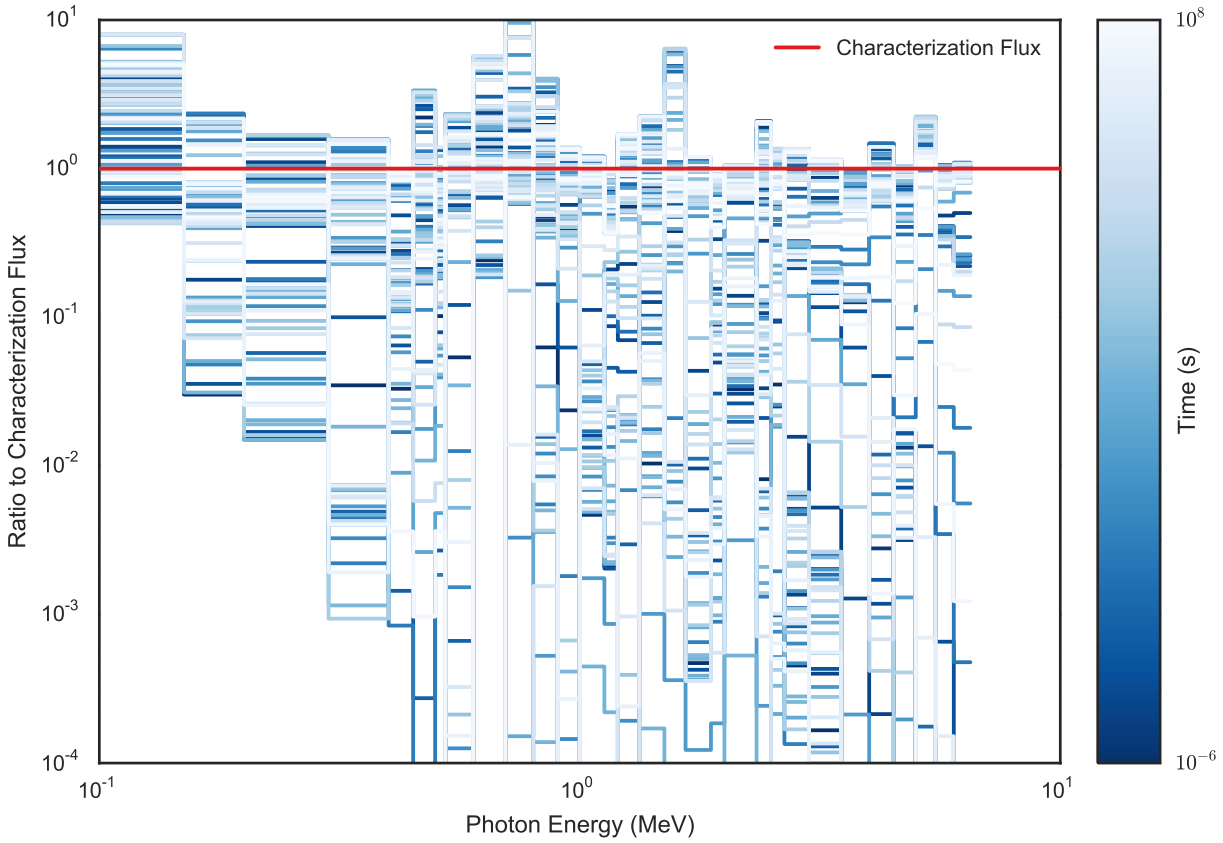


Figure B.1. Ratio of ^{235}U CINDER spectra to the characterization fluence.

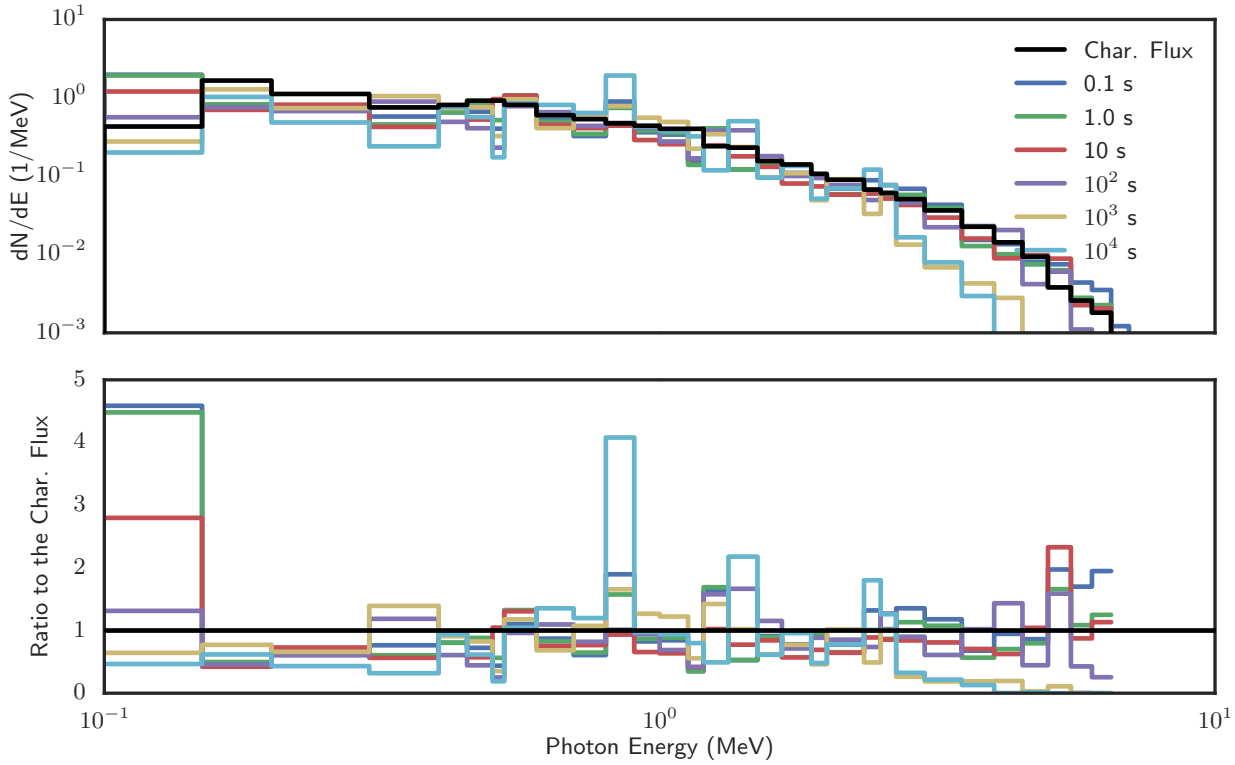


Figure B.2. 48-Group Spectra for thermal fission of ^{235}U at various decades in time.

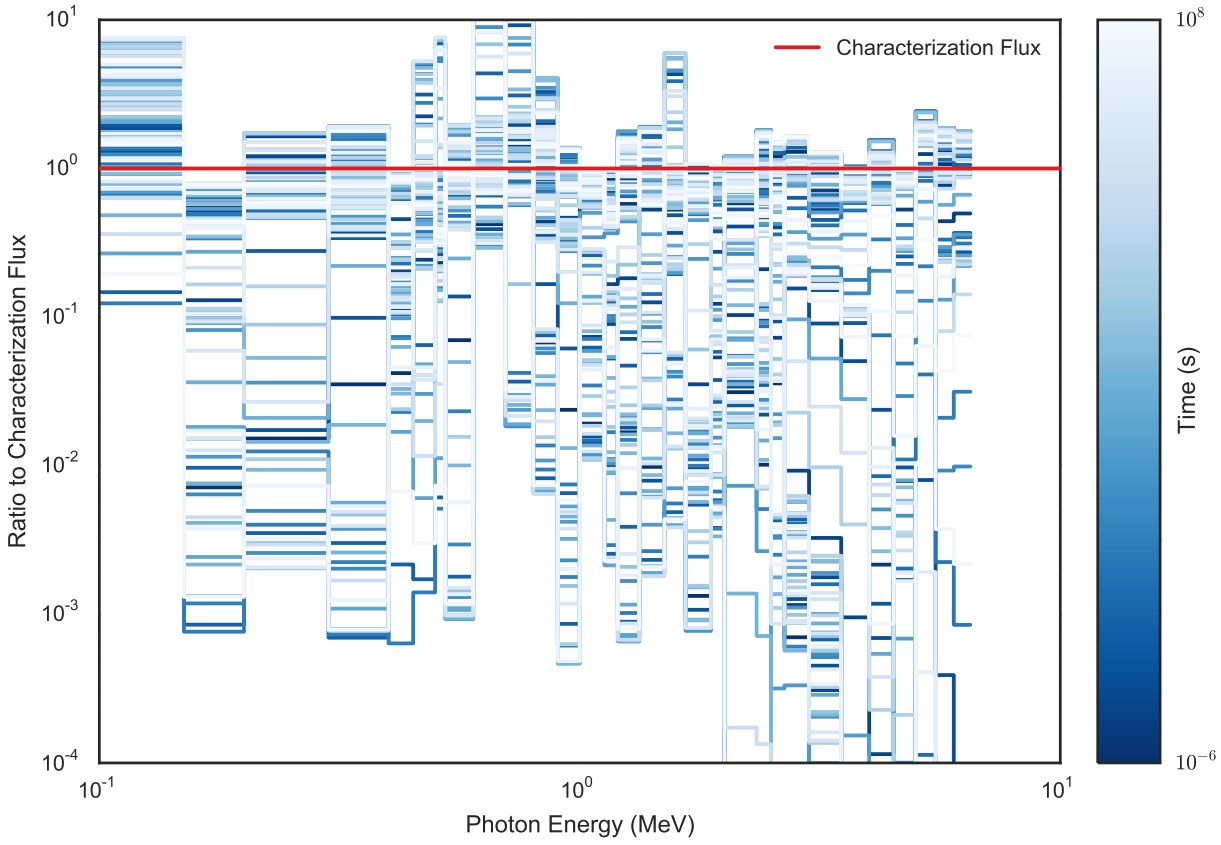


Figure B.3. Ratio of ^{238}U CINDER spectra to the characterization fluence.

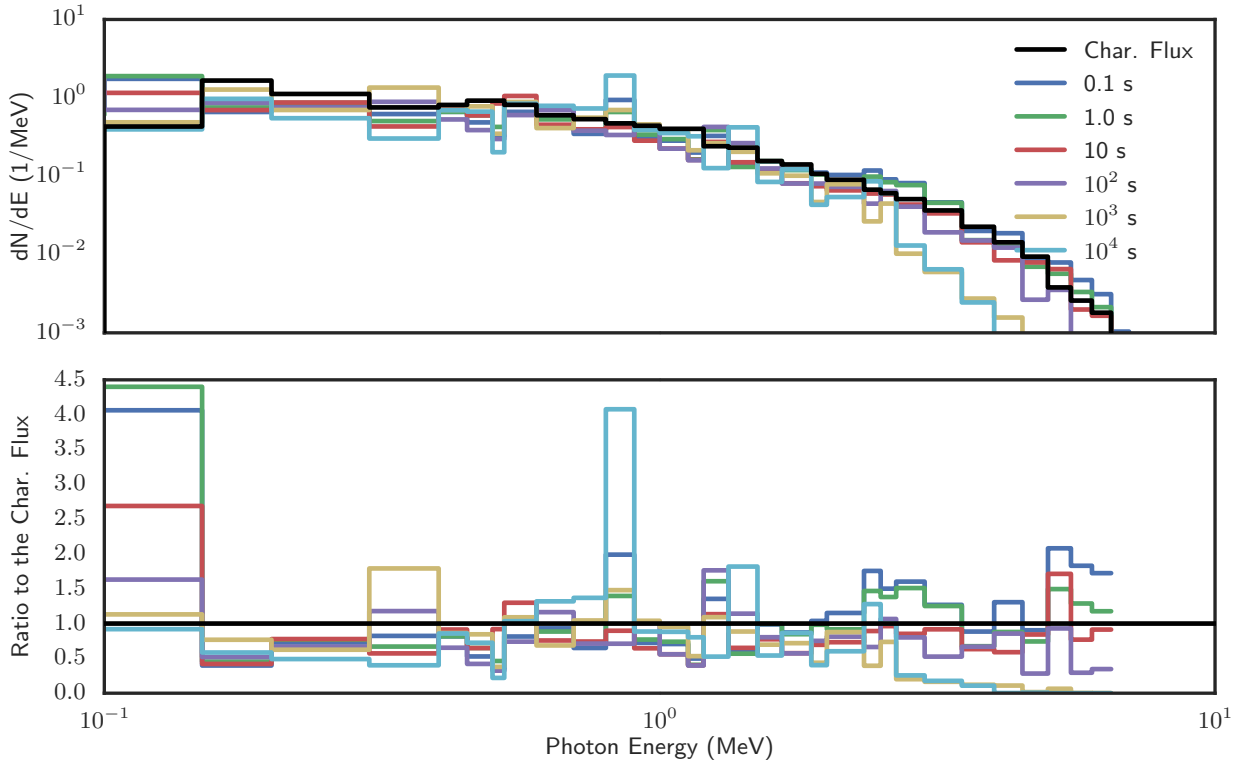


Figure B.4. 48-Group Spectra for fast fission of ^{238}U at various decades in time.

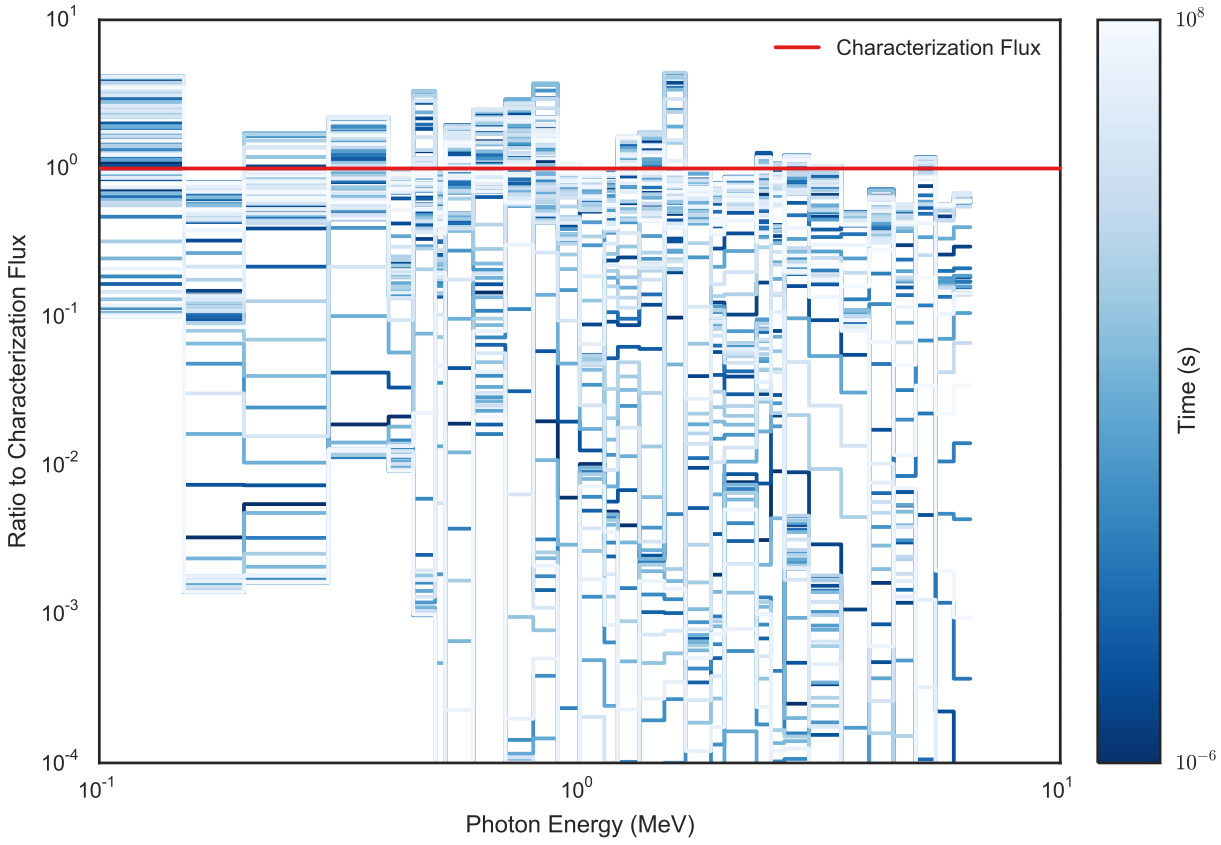


Figure B.5. Ratio of ^{239}Pu CINDER spectra to the characterization fluence.

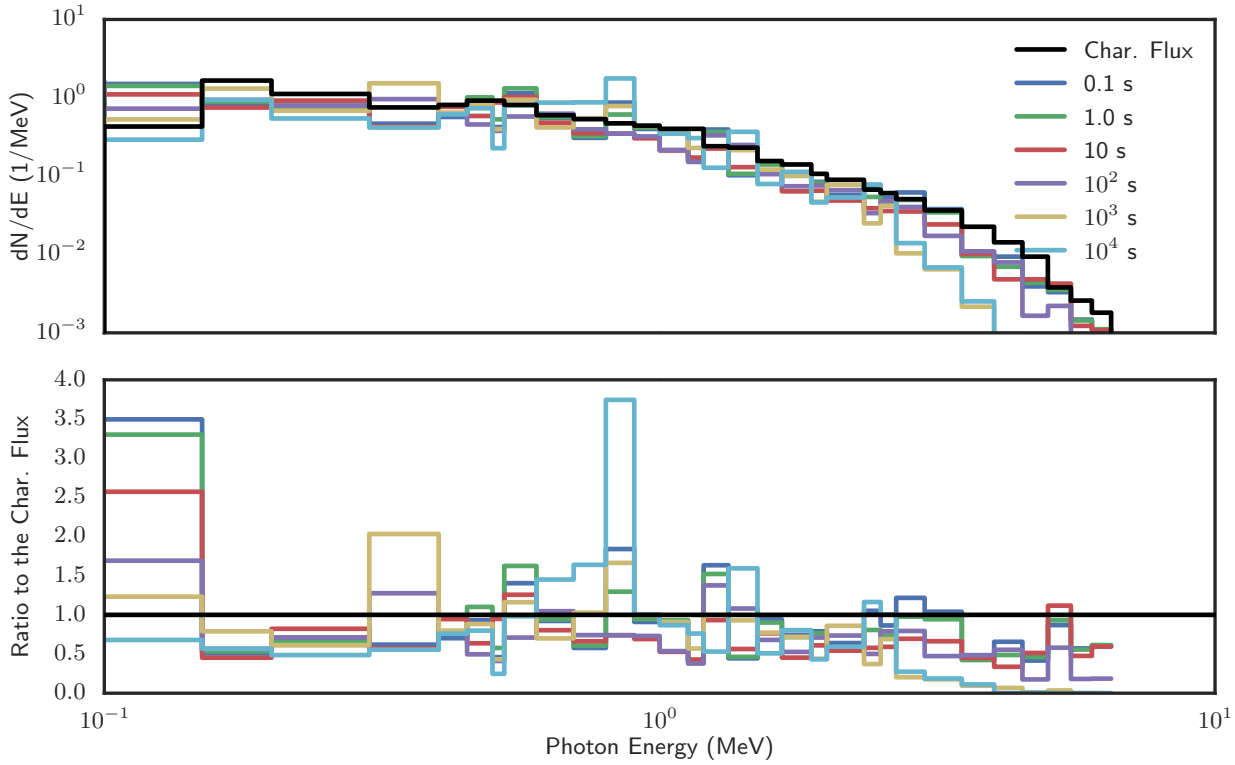


Figure B.6. 48-Group Spectra for fast fission of ^{239}Pu at various decades in time.

B.2 Line Spectra re-binned into 48-Group Spectra

The figures in the section are given to show the resolution of the line spectra and how it compares to the 48-Group characterization spectra. Figures are only included for the thermal neutron induced fission of ^{235}U at various decades in time, however should a reader want figures (or the ASCII-formatted data) from any of the other materials please contact the authors.

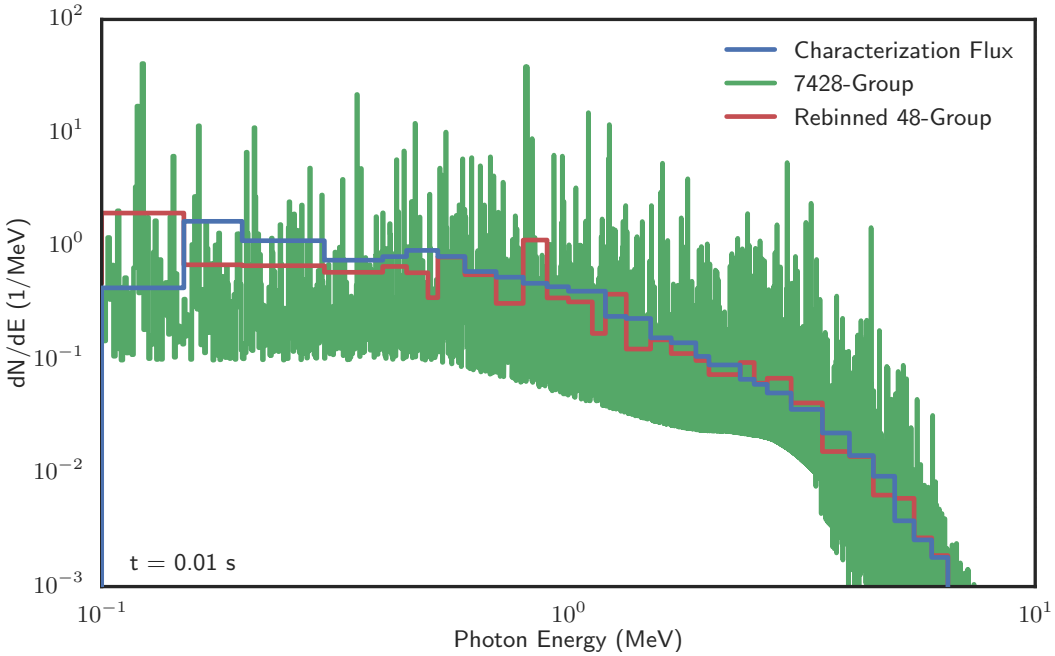


Figure B.7. (n_{th},f) ^{235}U line spectra re-binned into 48-group spectra at $t = 0.01$ s.

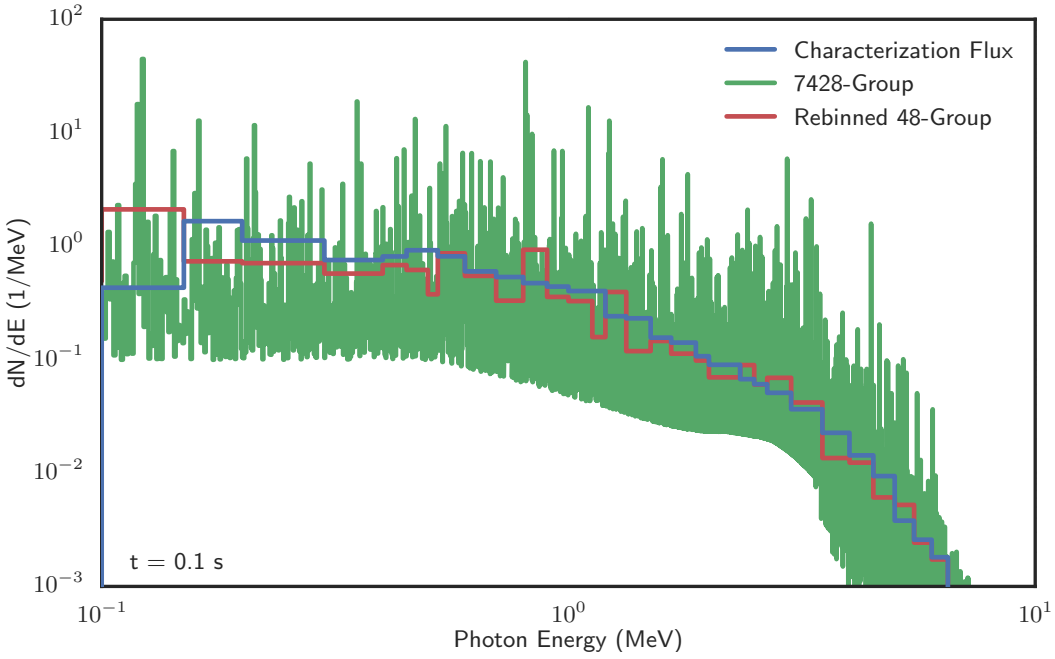


Figure B.8. (n_{th},f) ^{235}U line spectra re-binned into 48-group spectra at $t = 0.1$ s.

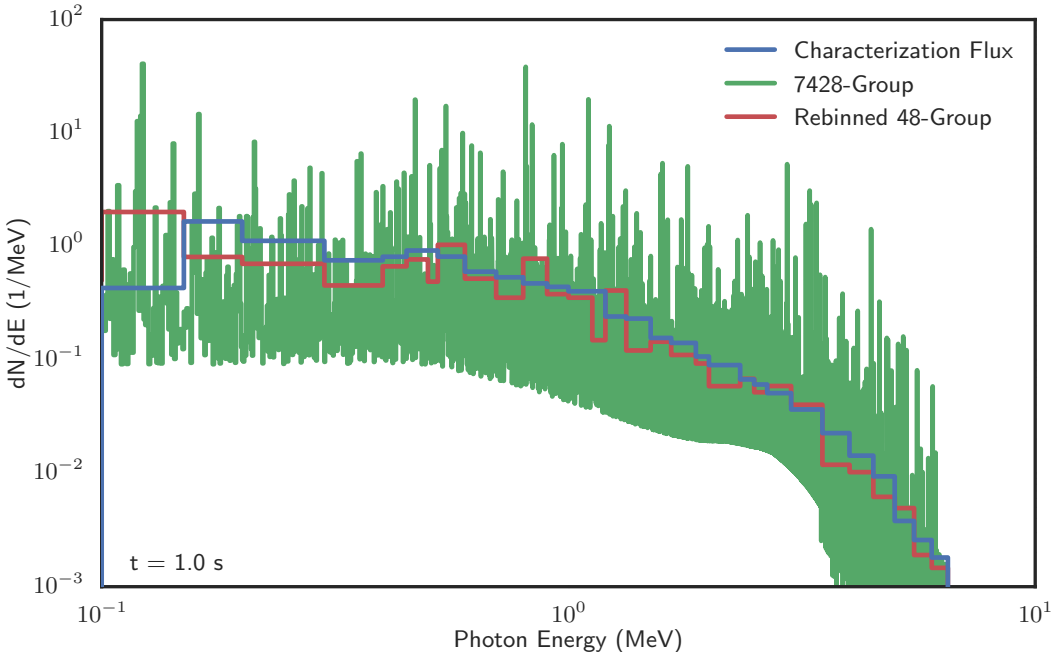


Figure B.9. (n_{th},f) ^{235}U line spectra re-binned into 48-group spectra at $t = 1$ s.

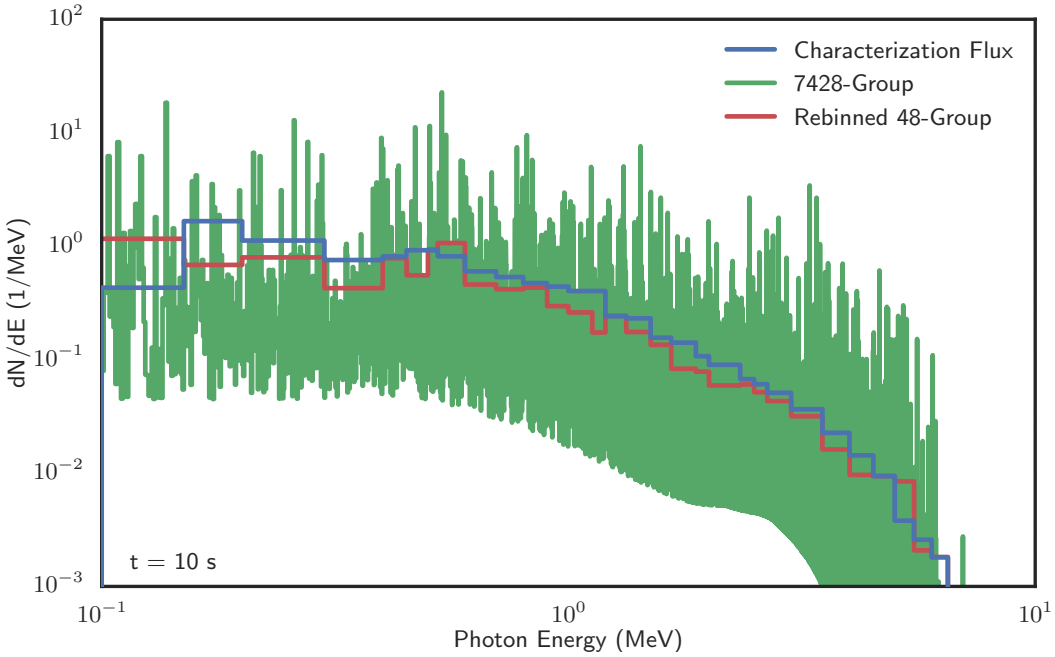


Figure B.10. (n_{th},f) ^{235}U line spectra re-binned into 48-group spectra at $t = 10$ s.

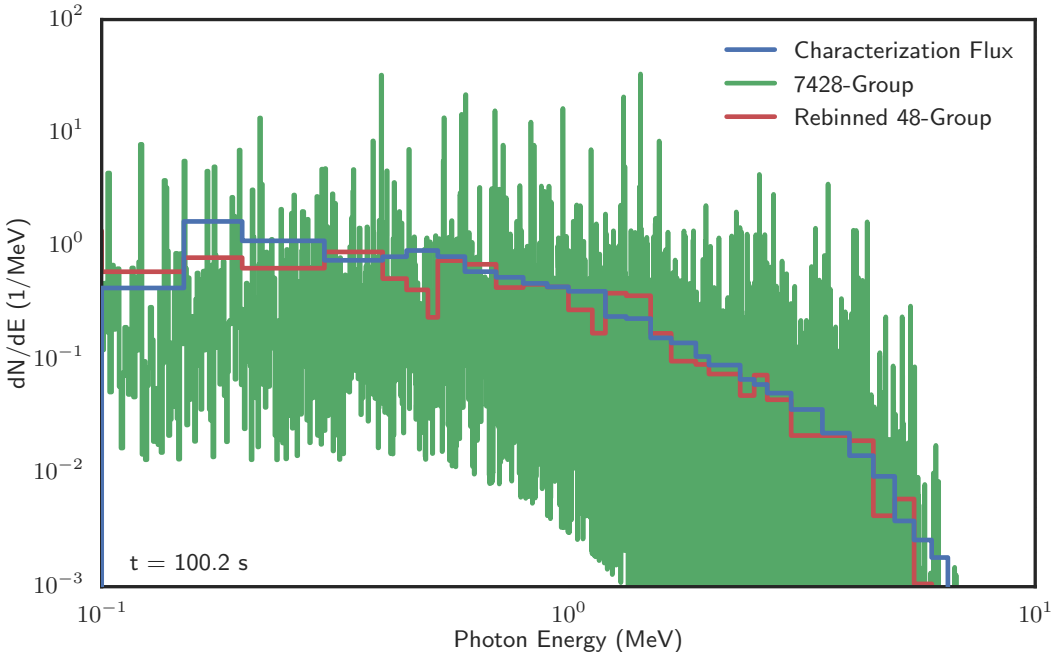


Figure B.11. (n_{th},f) ^{235}U line spectra re-binned into 48-group spectra at $t = 100$ s.

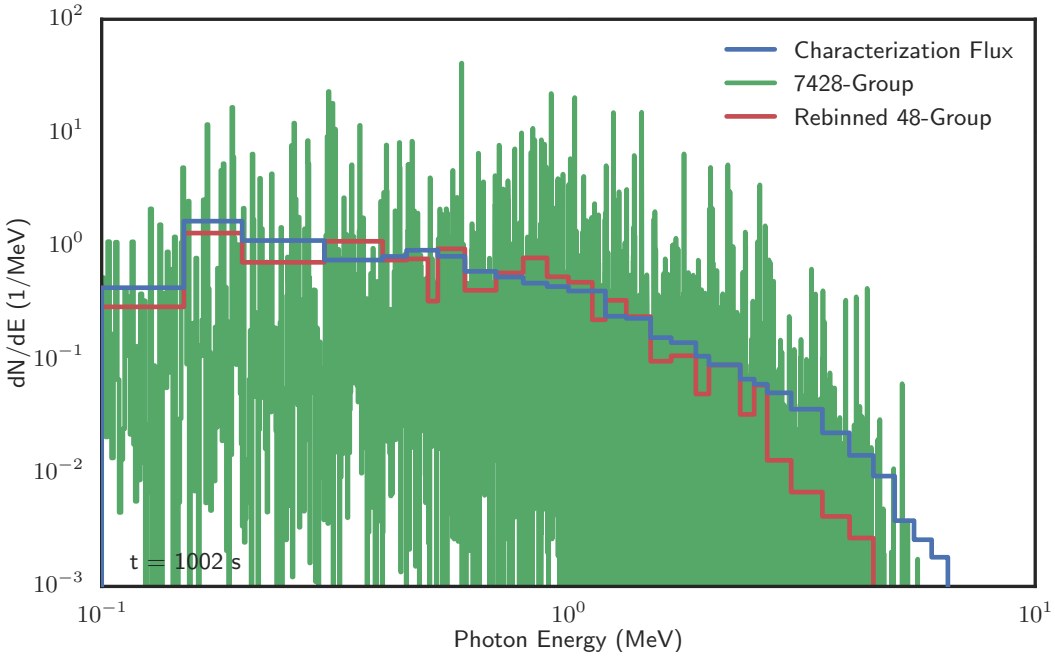


Figure B.12. (n_{th},f) ^{235}U line spectra re-binned into 48-group spectra at $t = 1000$ s.

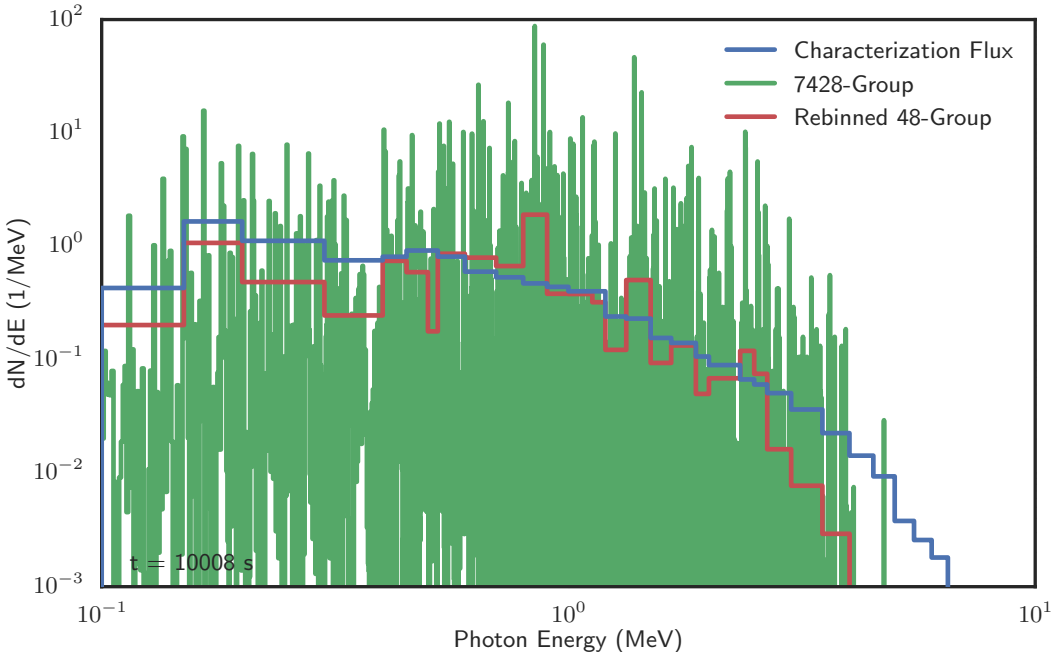


Figure B.13. (n_{th},f) ^{235}U line spectra re-binned into 48-group spectra at $t = 10,000$ s.

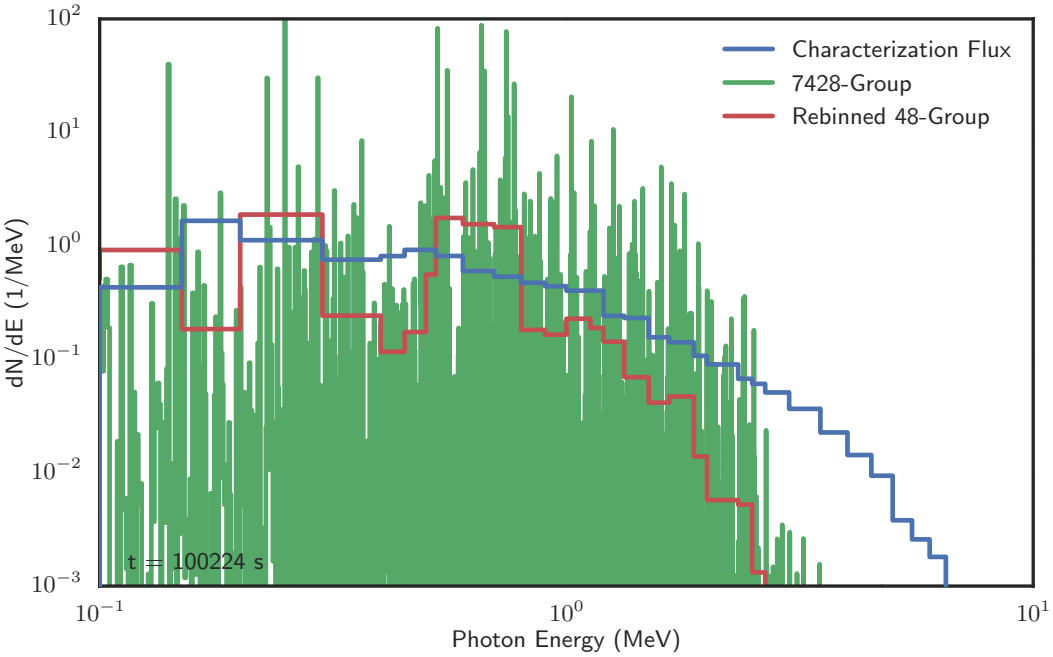


Figure B.14. (n_{th},f) ^{235}U line spectra re-binned into 48-group spectra at $t = 100,000$ s.

B.3 Annotated Total Photon Energy Release Over Time

This section includes figures of the annotated total photon energy release per fission, E_γ and the differential E_γ rate (dE_γ/dt), for all of the combinations of materials and ENDF fission yield libraries presented in the main body of the report. The section is ordered by material (^{232}Th, ^{233}U, ^{235}U, ^{238}U, and ^{239}Pu), and each material has six figures, two (E_γ and dE_γ/dt) for each fission yield library: thermal, fast, and 14-MeV. The figures are paired, where the top figure of a page shows the differential E_γ curves and the bottom figure shows the integral E_γ curve.

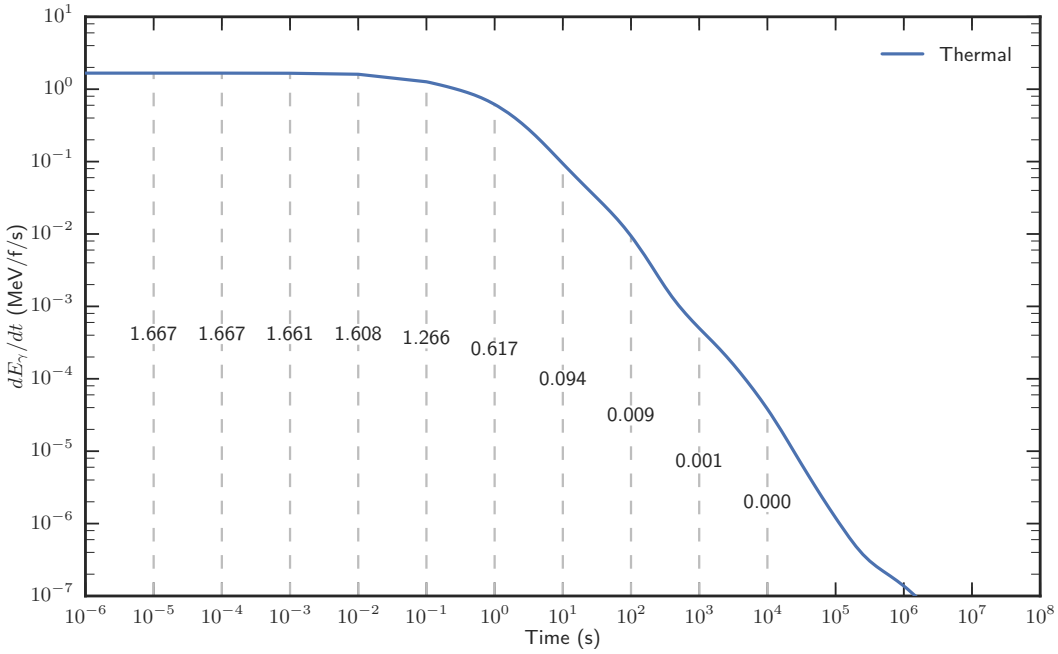


Figure B.15. Annotated dE_γ/dt over time for ^{232}Th - Thermal Fission Yield Library.

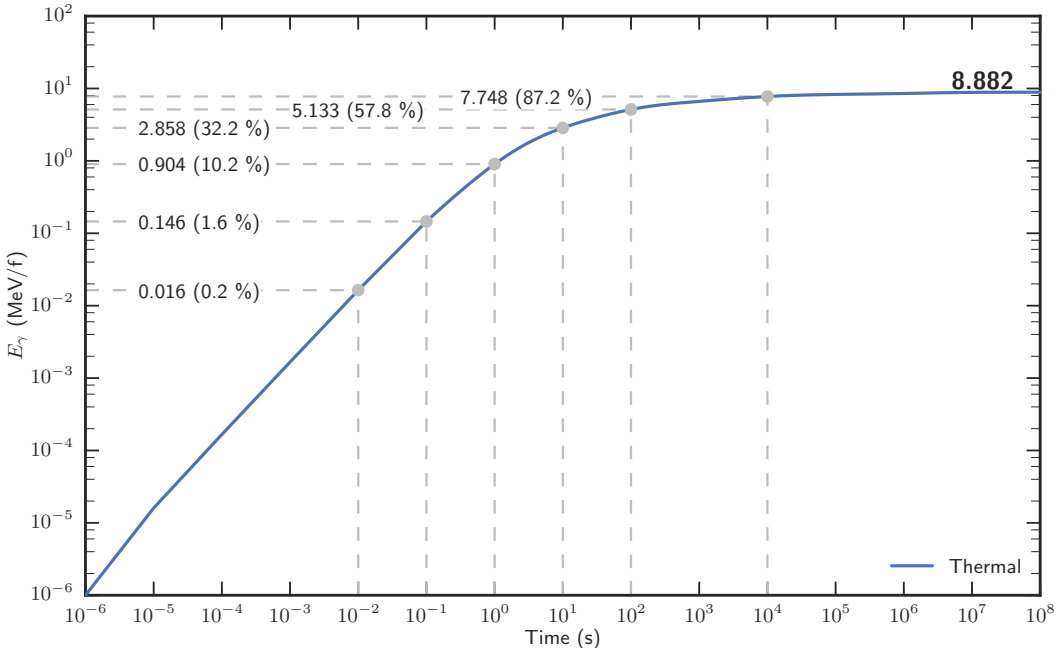


Figure B.16. Annotated E_γ over time for ^{232}Th - Thermal Fission Yield Library.

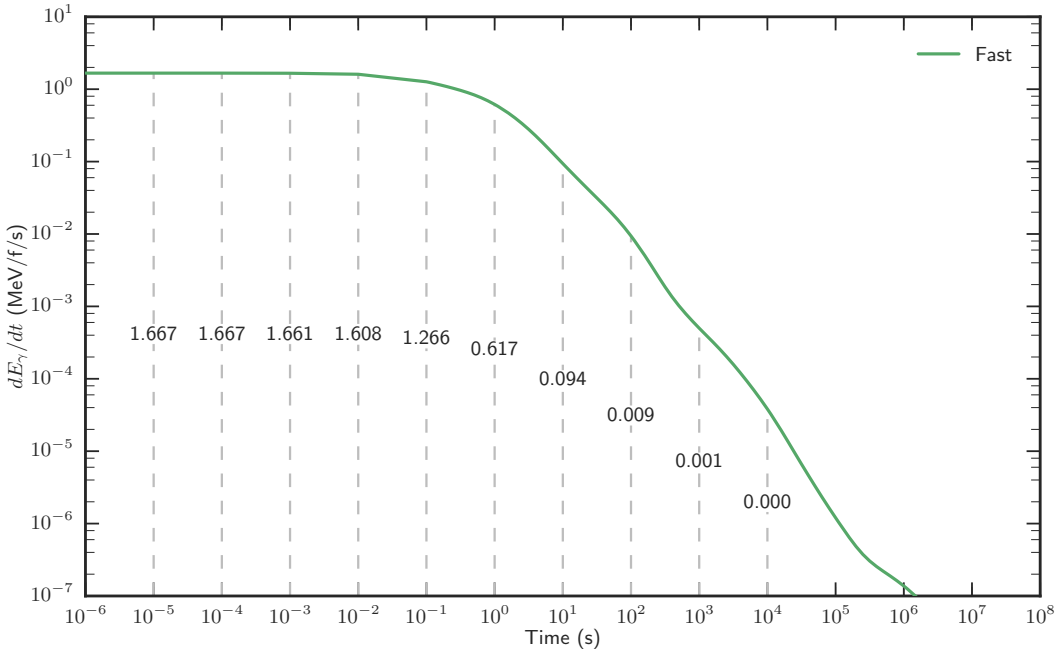


Figure B.17. Annotated dE_γ/dt over time for ^{232}Th - Fast Fission Yield Library.

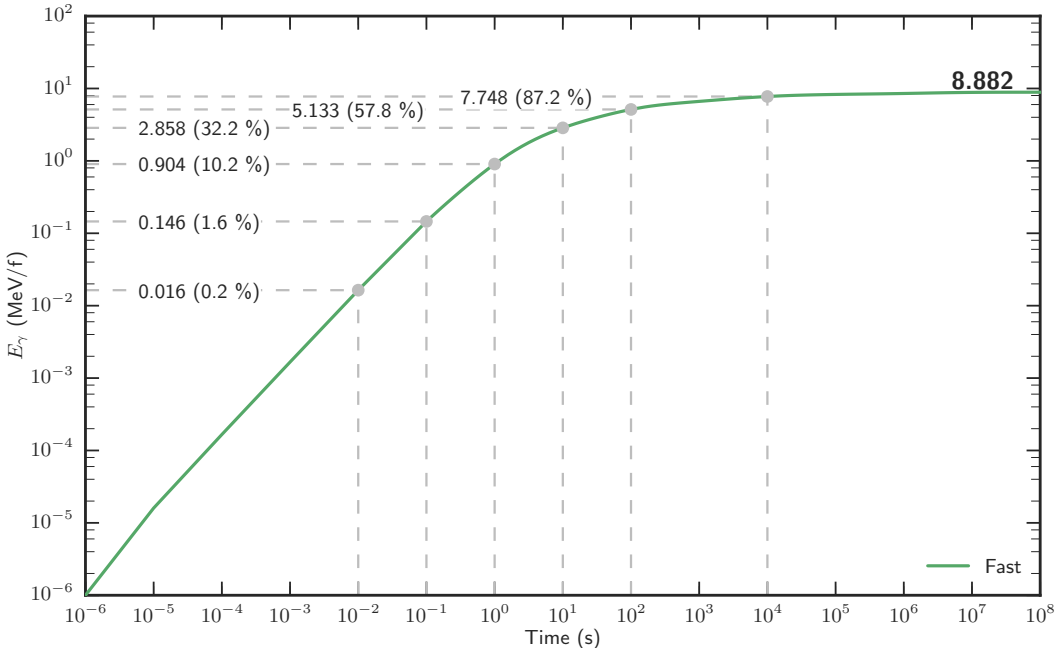


Figure B.18. Annotated E_γ over time for ^{232}Th - Fast Fission Yield Library.

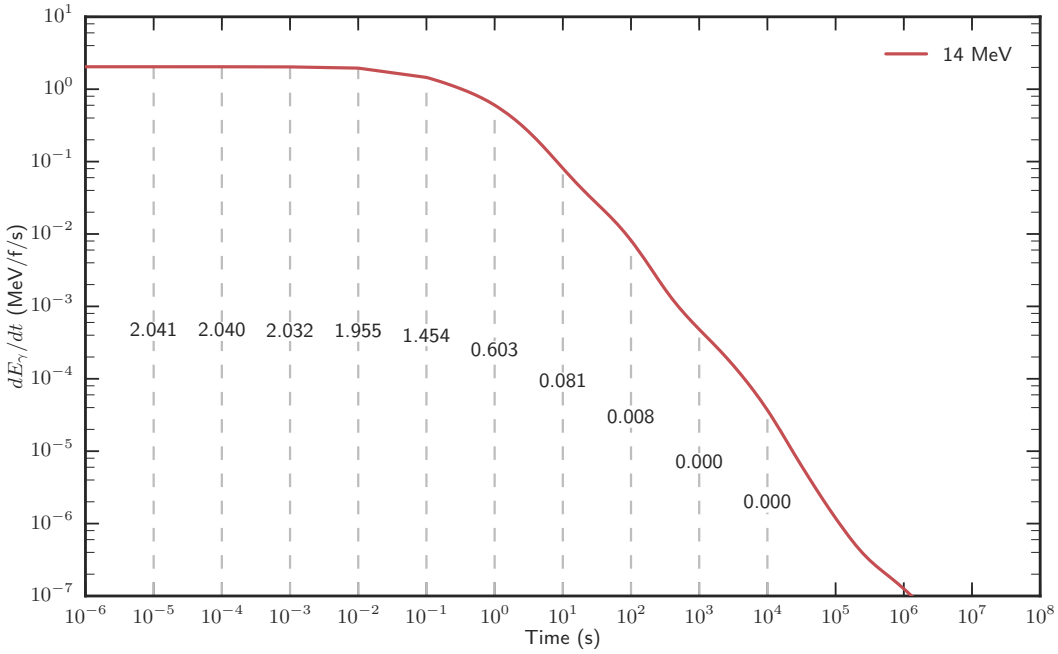


Figure B.19. Annotated dE_γ/dt over time for ^{232}Th - 14-MeV Fission Yield Library.

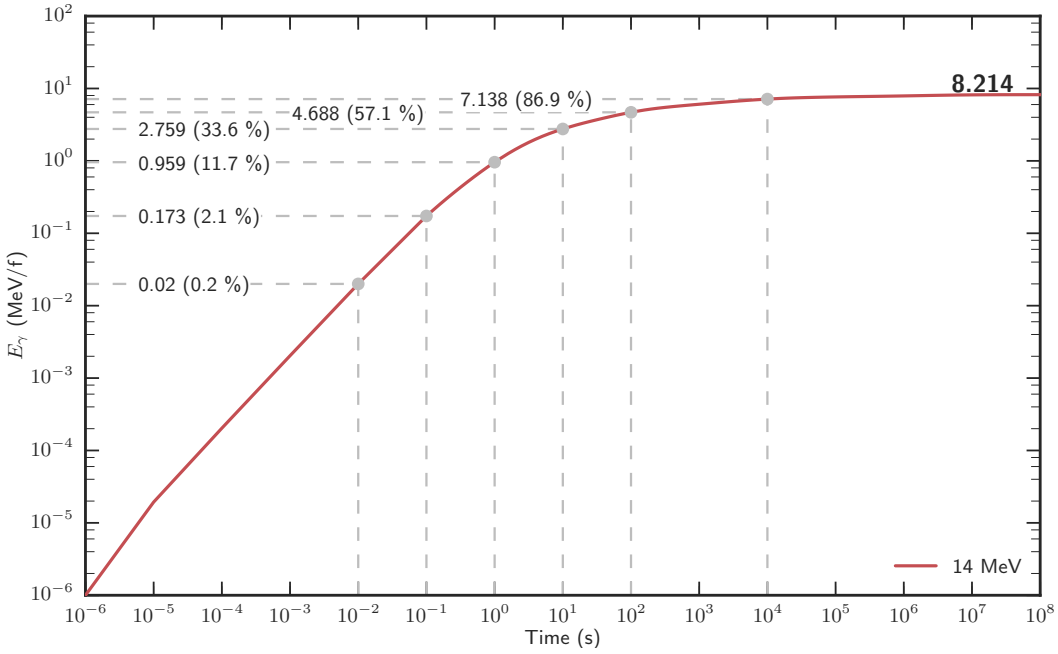


Figure B.20. Annotated E_γ over time for ^{232}Th - 14-MeV Fission Yield Library.

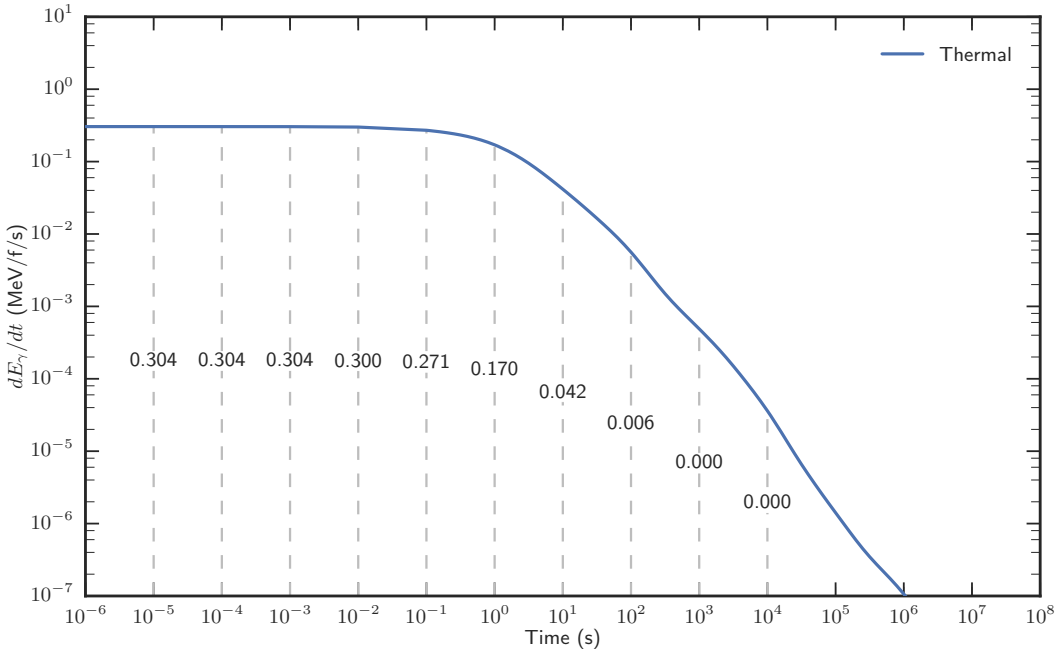


Figure B.21. Annotated dE_γ/dt over time for ^{233}U - Thermal Fission Yield Library.

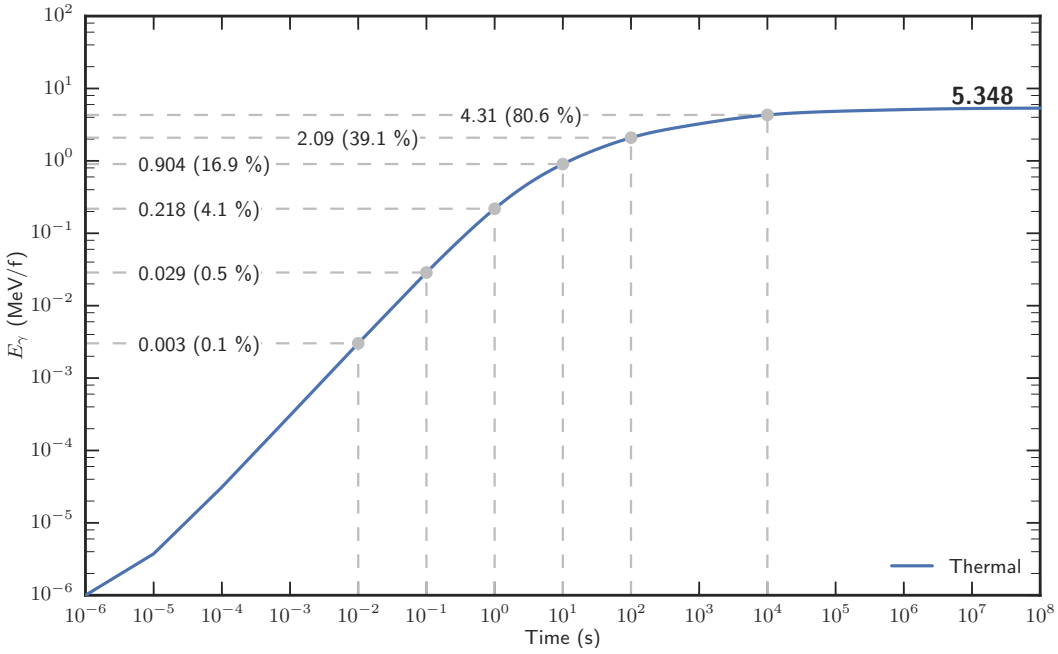


Figure B.22. Annotated E_γ over time for ^{233}U - Thermal Fission Yield Library.

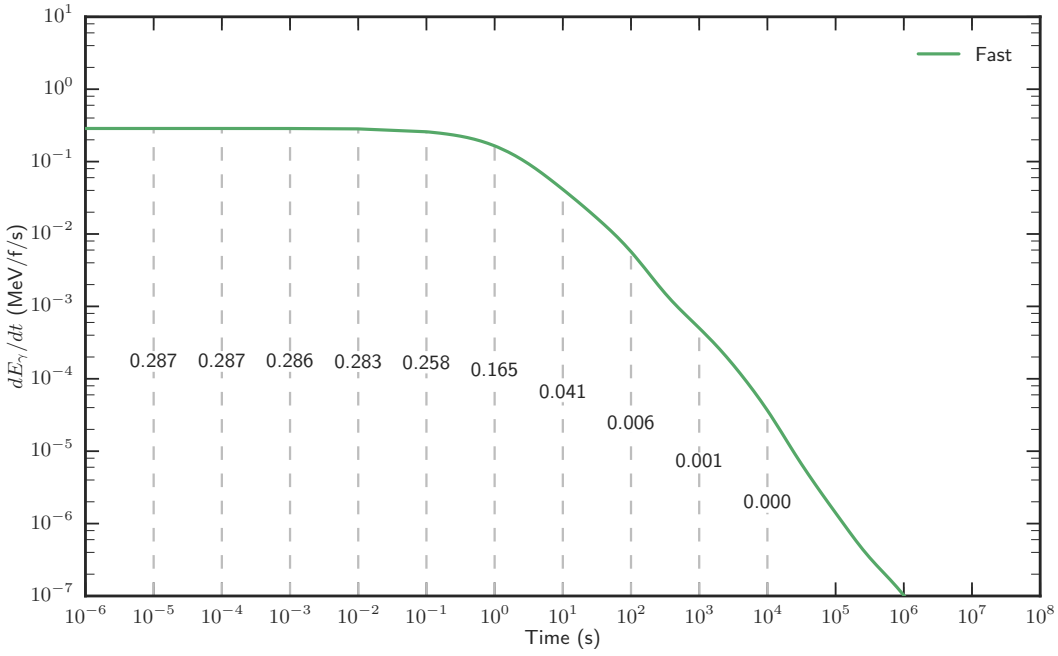


Figure B.23. Annotated dE_γ/dt over time for ^{233}U - Fast Fission Yield Library.

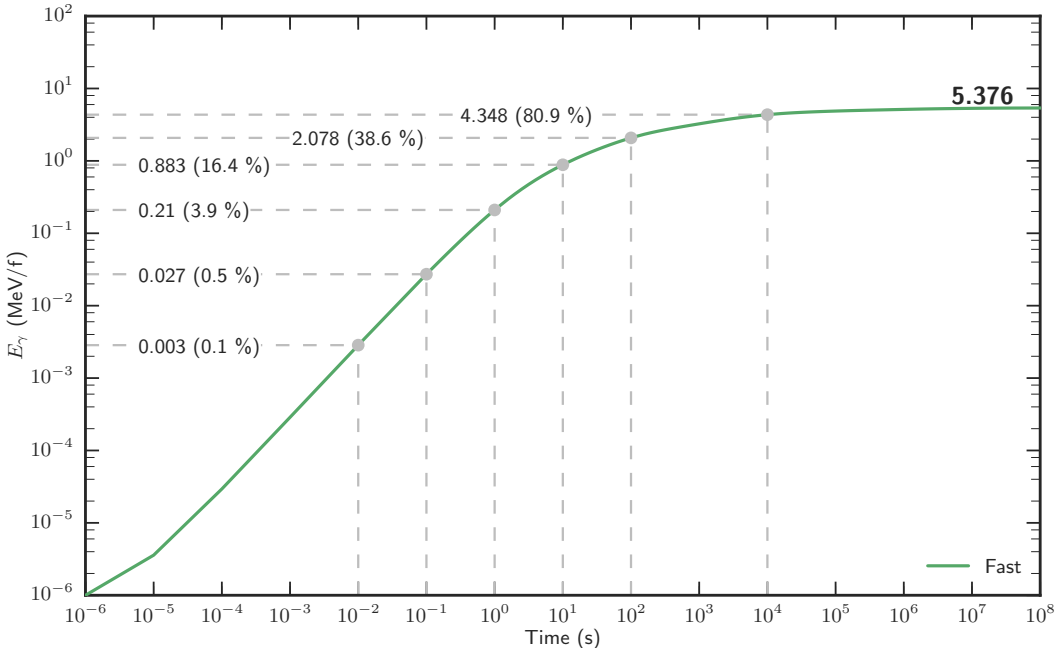


Figure B.24. Annotated E_γ over time for ^{233}U - Fast Fission Yield Library.

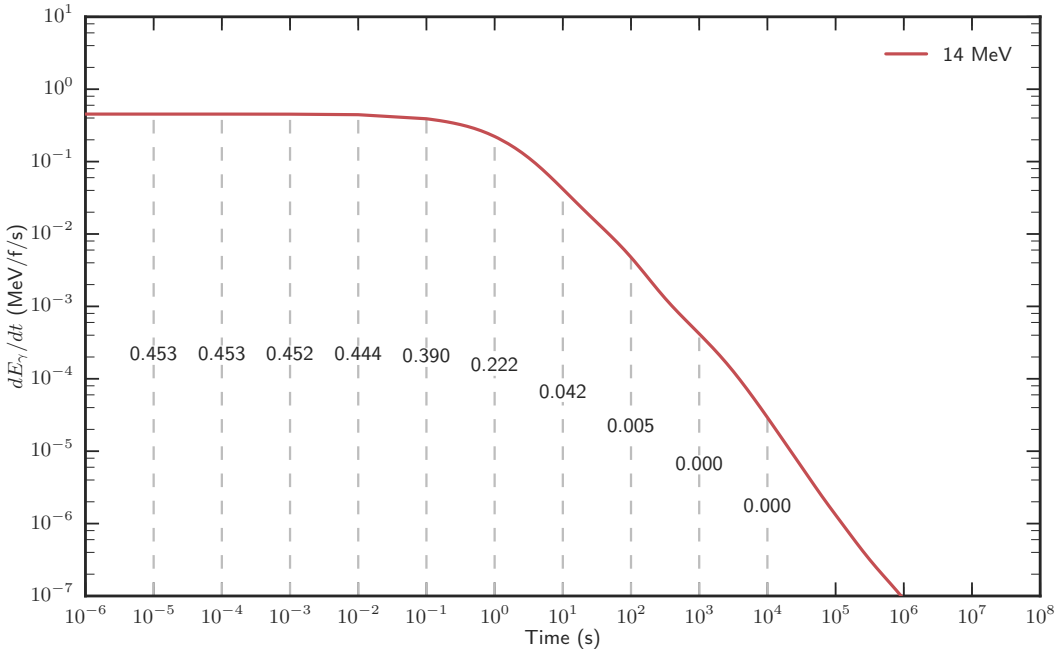


Figure B.25. Annotated dE_γ/dt over time for ^{233}U - 14-MeV Fission Yield Library.

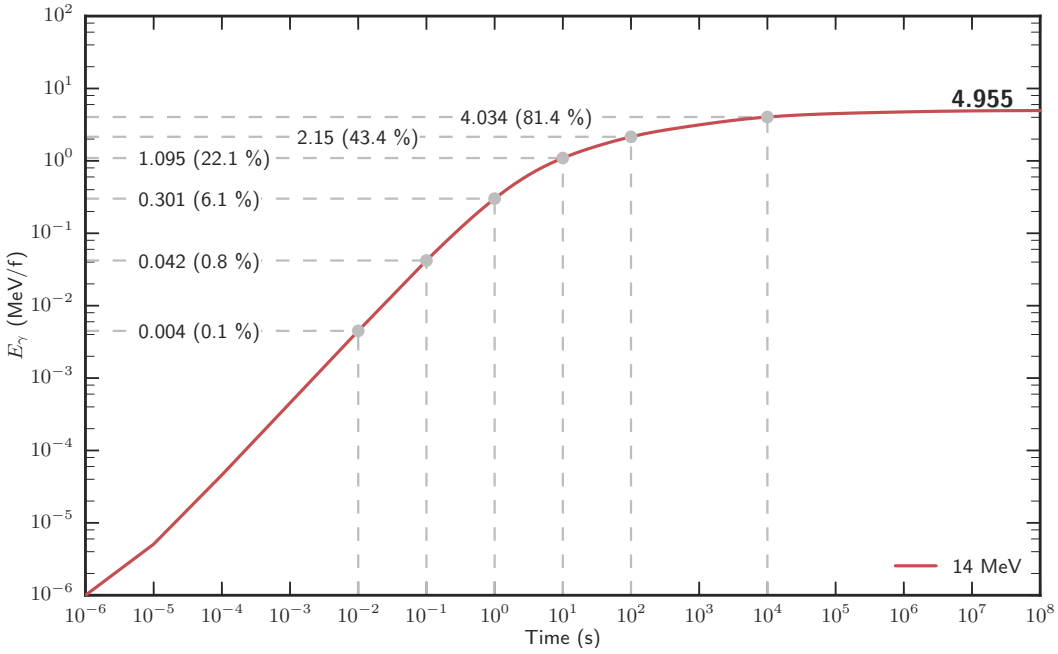


Figure B.26. Annotated E_γ over time for ^{233}U - 14-MeV Fission Yield Library.

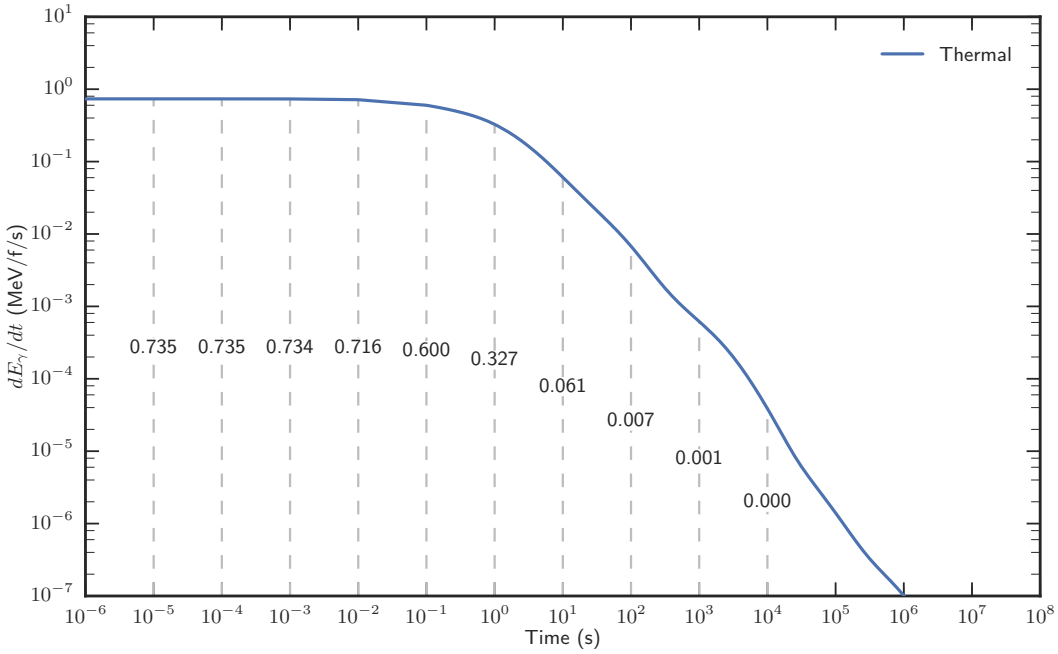


Figure B.27. Annotated dE_γ/dt over time for ^{235}U - Thermal Fission Yield Library.

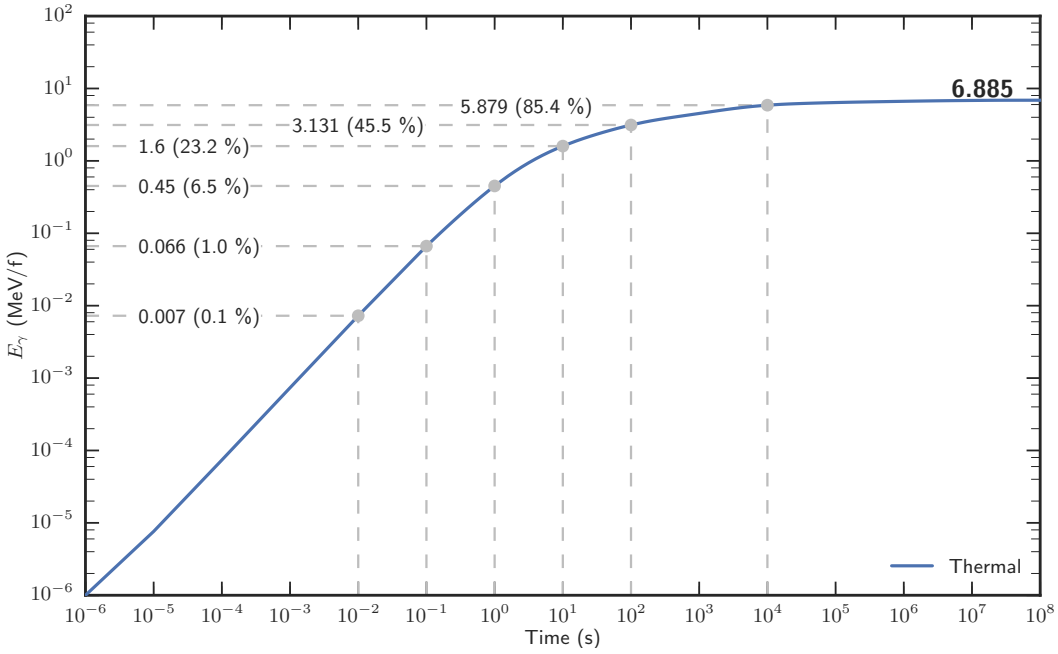


Figure B.28. Annotated E_γ over time for ^{235}U - Thermal Fission Yield Library.

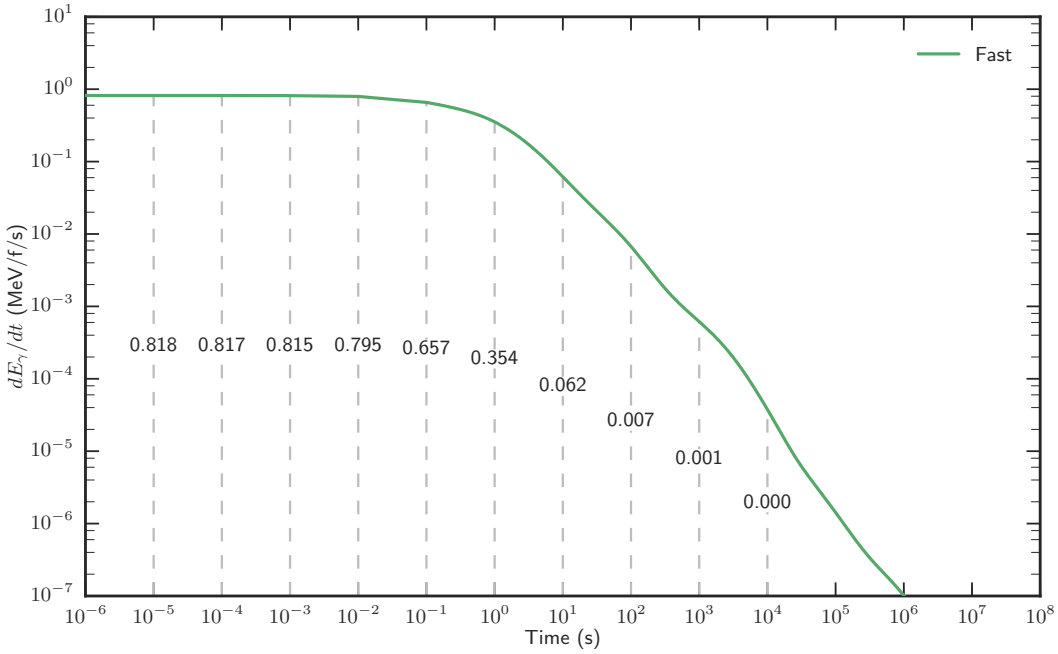


Figure B.29. Annotated dE_γ/dt over time for ^{235}U - Fast Fission Yield Library.

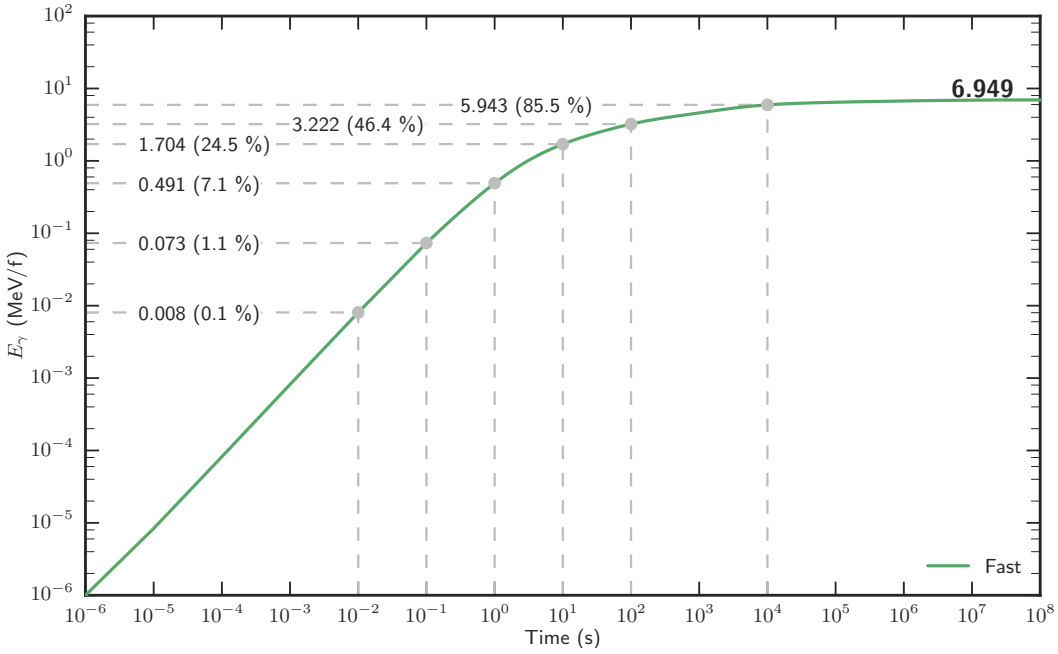


Figure B.30. Annotated E_γ over time for ^{235}U - Fast Fission Yield Library.

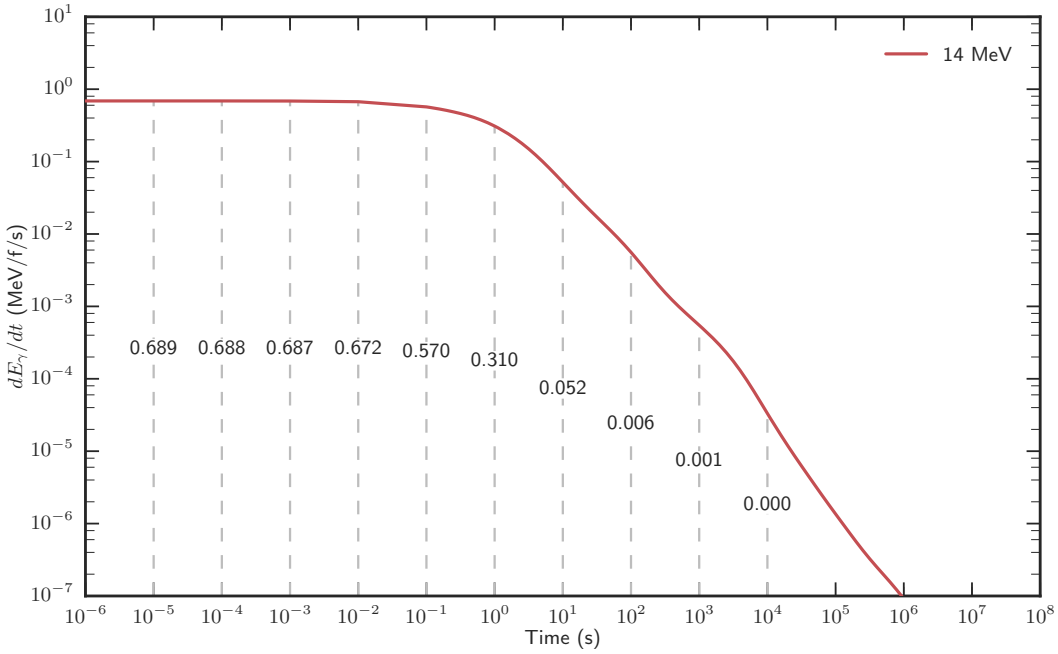


Figure B.31. Annotated dE_γ/dt over time for ^{235}U - 14-MeV Fission Yield Library.

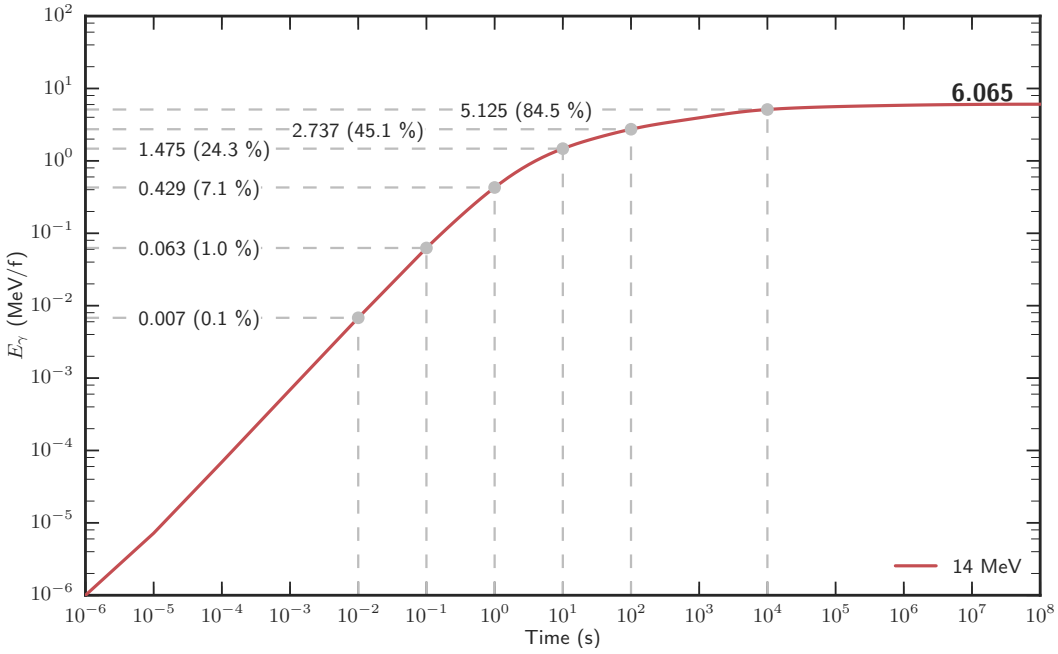


Figure B.32. Annotated E_γ over time for ^{235}U - 14-MeV Fission Yield Library.

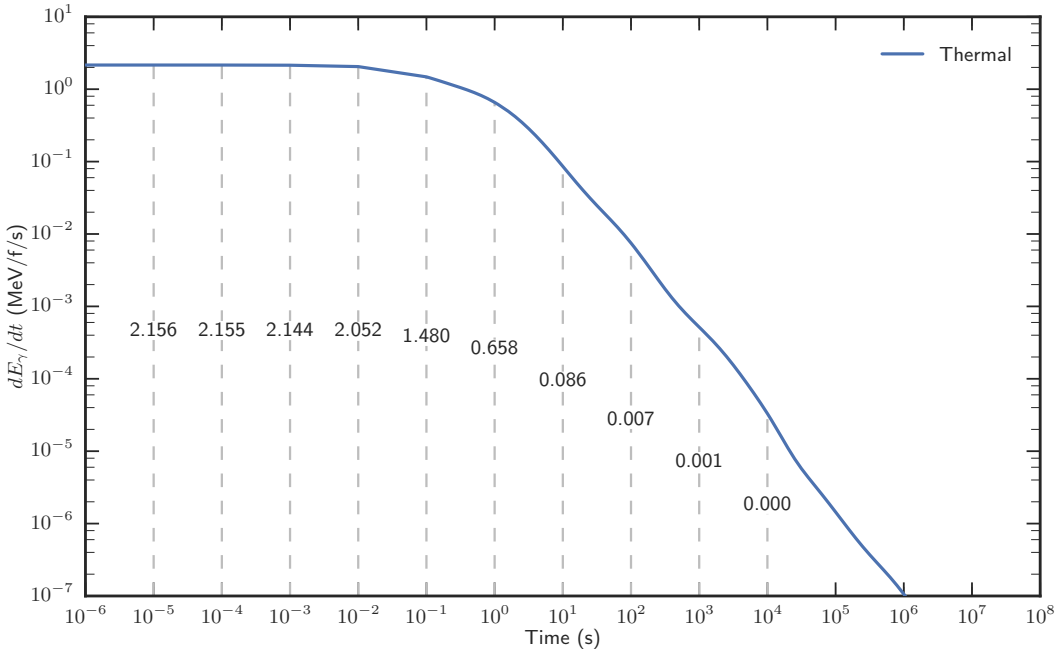


Figure B.33. Annotated dE_γ/dt over time for ^{238}U - Thermal Fission Yield Library.

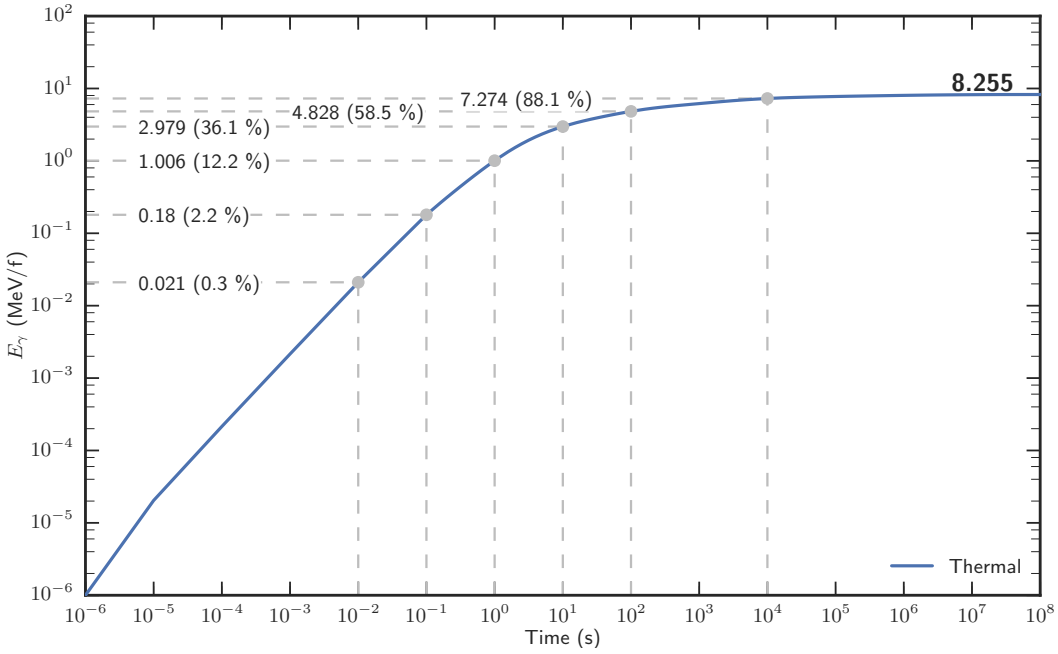


Figure B.34. Annotated E_γ over time for ^{238}U - Thermal Fission Yield Library.

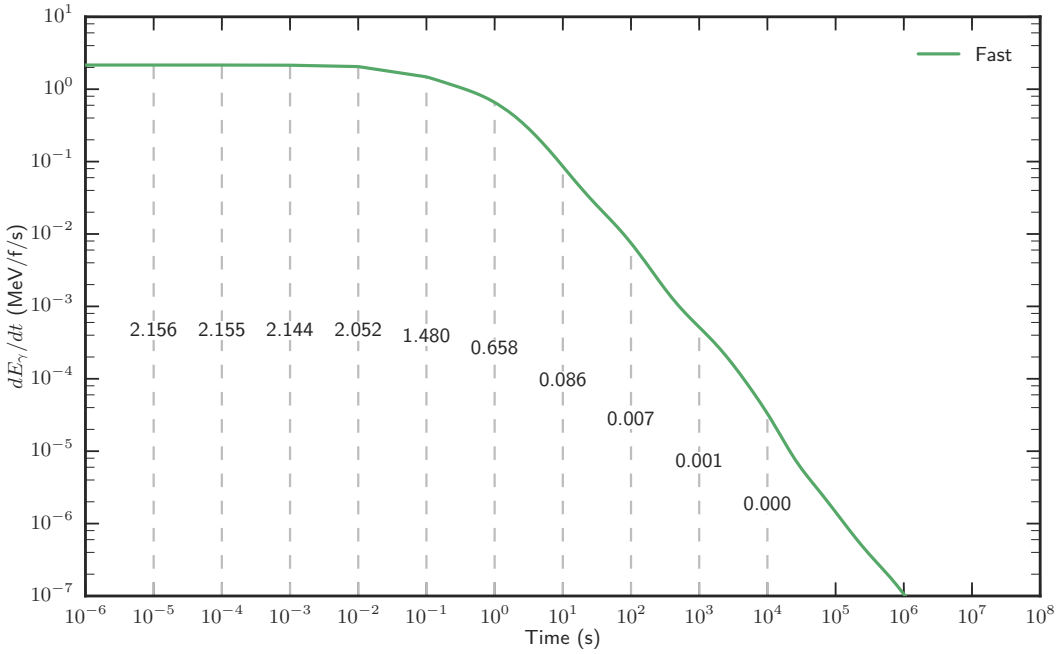


Figure B.35. Annotated dE_γ/dt over time for ^{238}U - Fast Fission Yield Library.

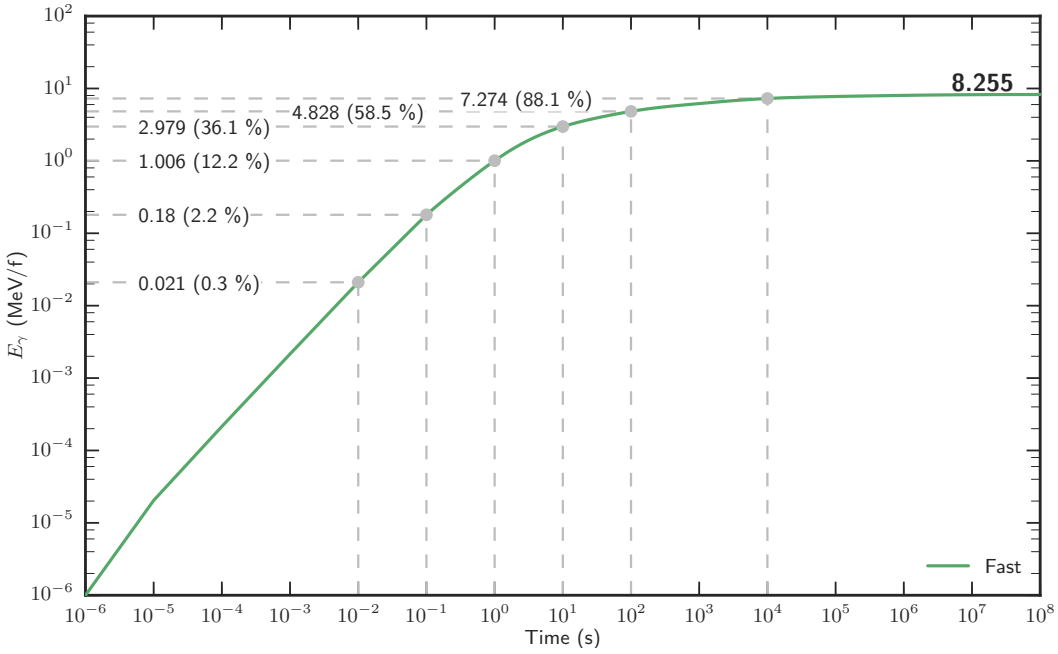


Figure B.36. Annotated E_γ over time for ^{238}U - Fast Fission Yield Library.

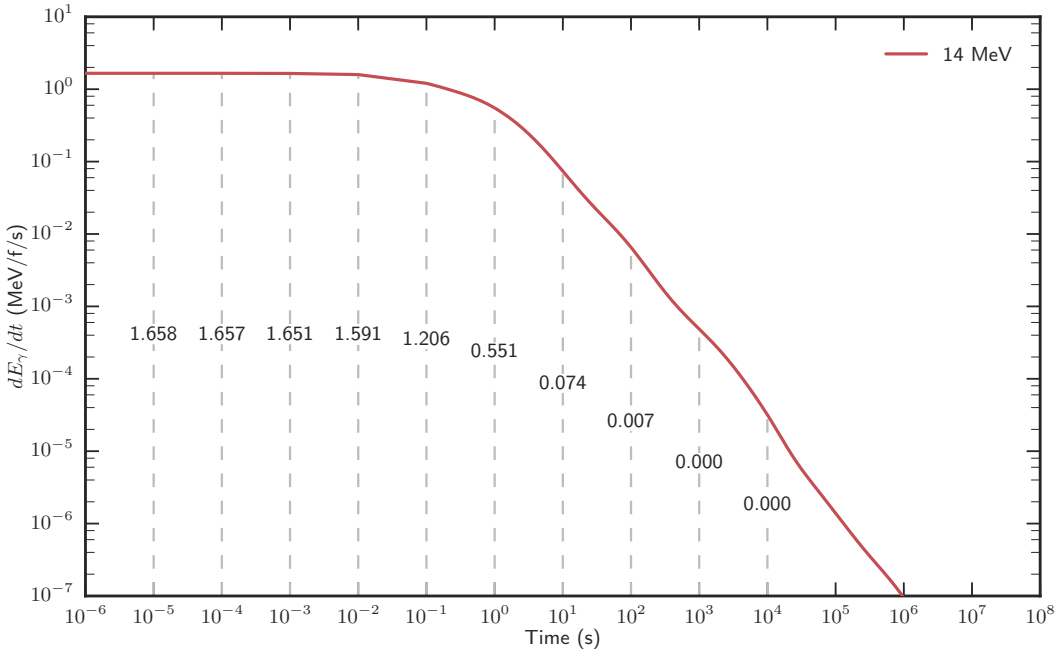


Figure B.37. Annotated dE_γ/dt over time for ^{238}U - 14-MeV Fission Yield Library.

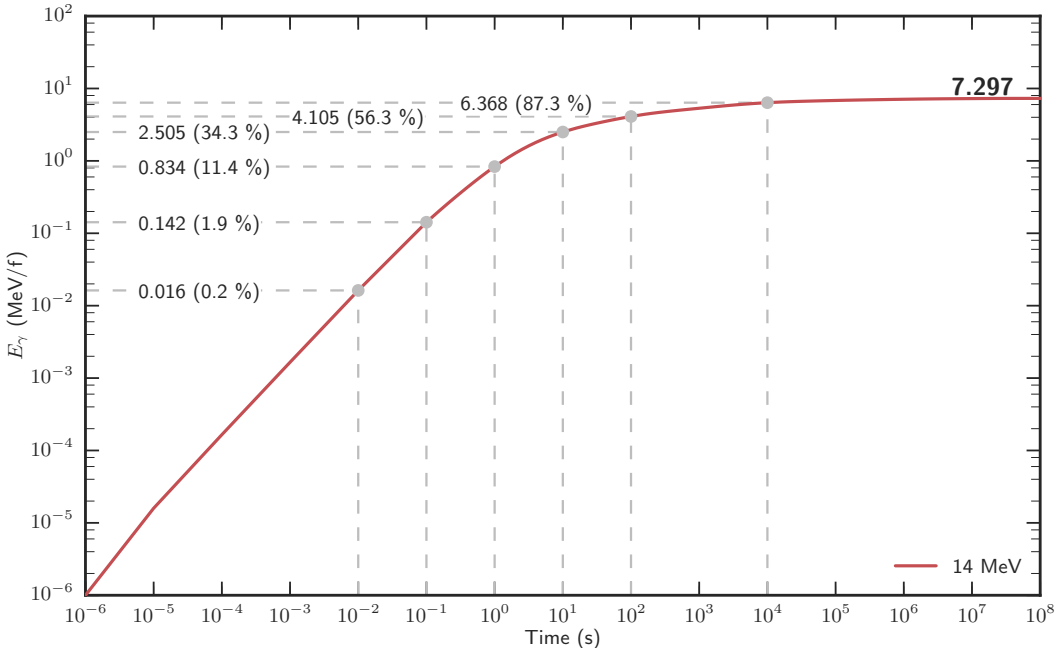


Figure B.38. Annotated E_γ over time for ^{238}U - 14-MeV Fission Yield Library.

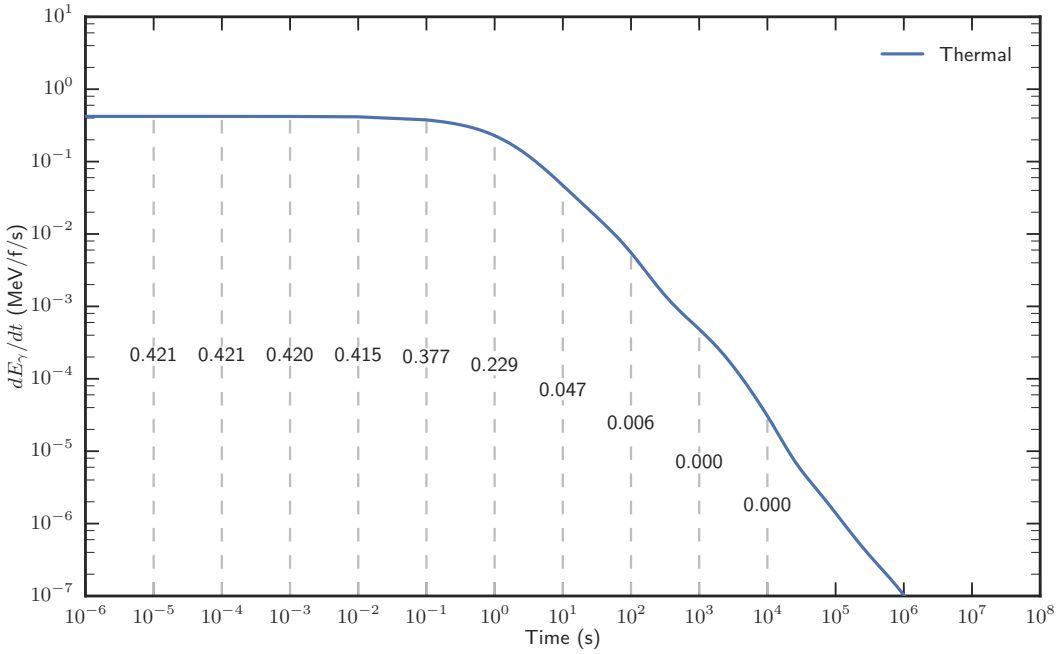


Figure B.39. Annotated dE_γ/dt over time for ^{239}Pu - Thermal Fission Yield Library.

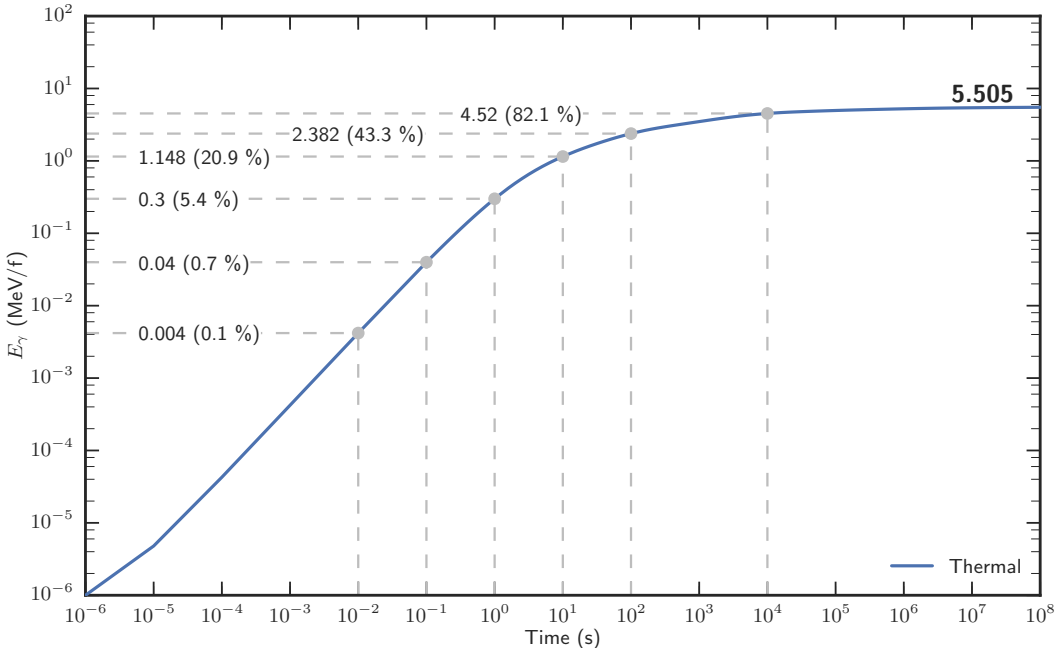


Figure B.40. Annotated E_γ over time for ^{239}Pu - Thermal Fission Yield Library.

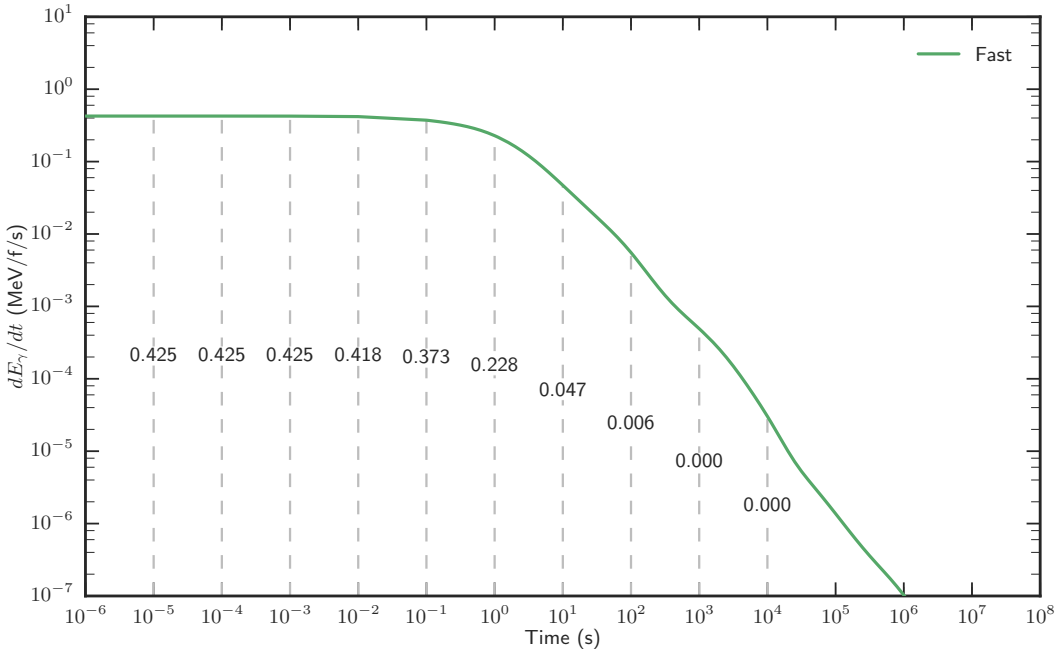


Figure B.41. Annotated dE_γ/dt over time for ^{239}Pu - Fast Fission Yield Library.

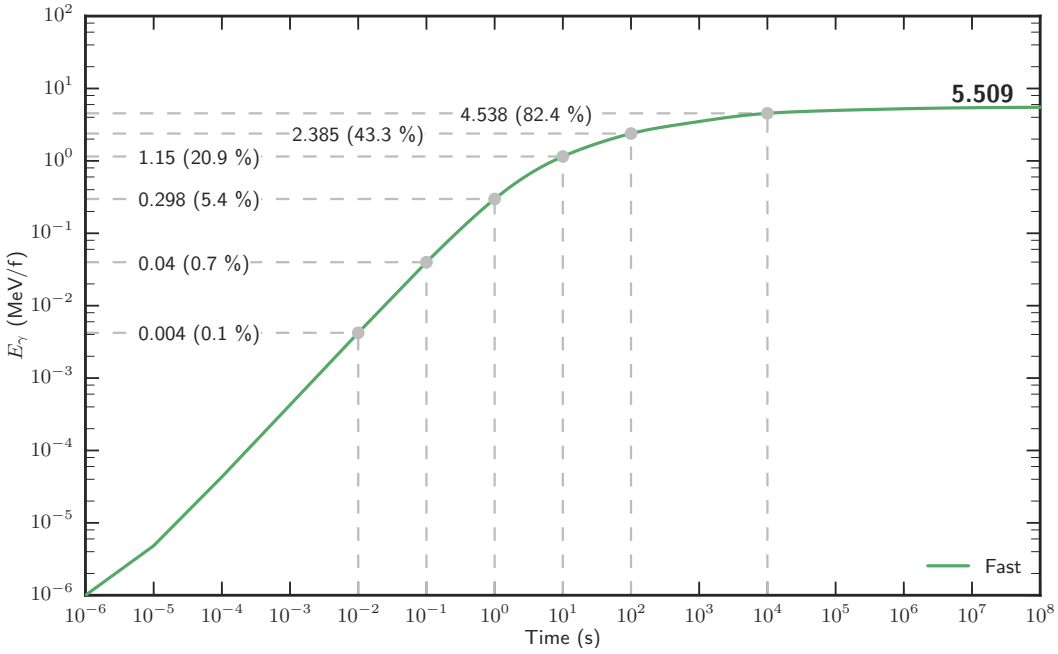


Figure B.42. Annotated E_γ over time for ^{239}Pu - Fast Fission Yield Library.

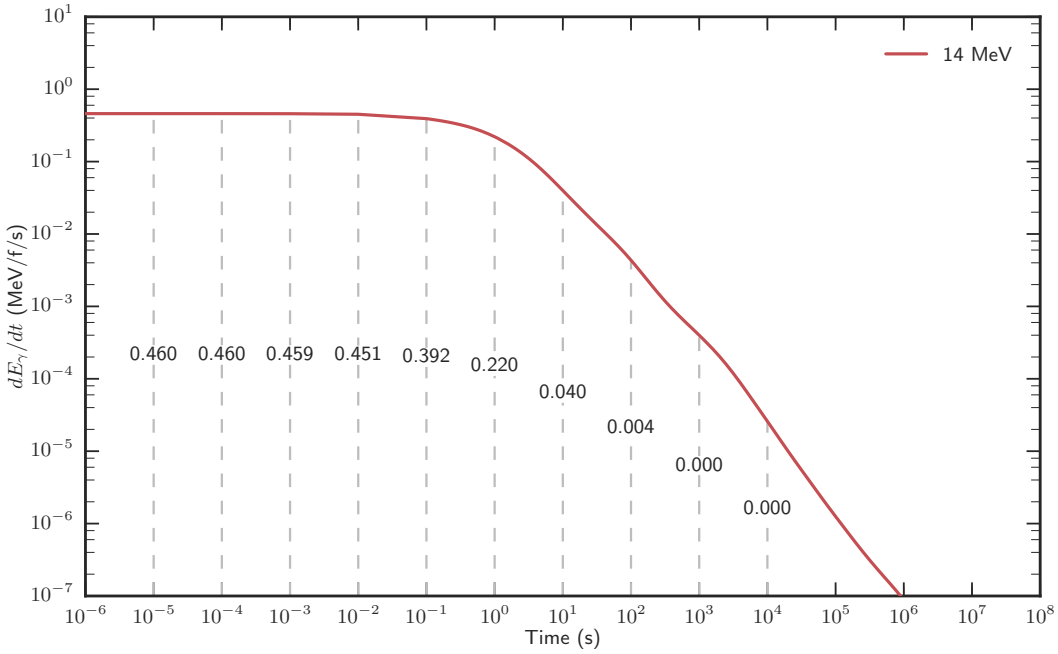


Figure B.43. Annotated dE_γ/dt over time for ^{239}Pu - 14-MeV Fission Yield Library.

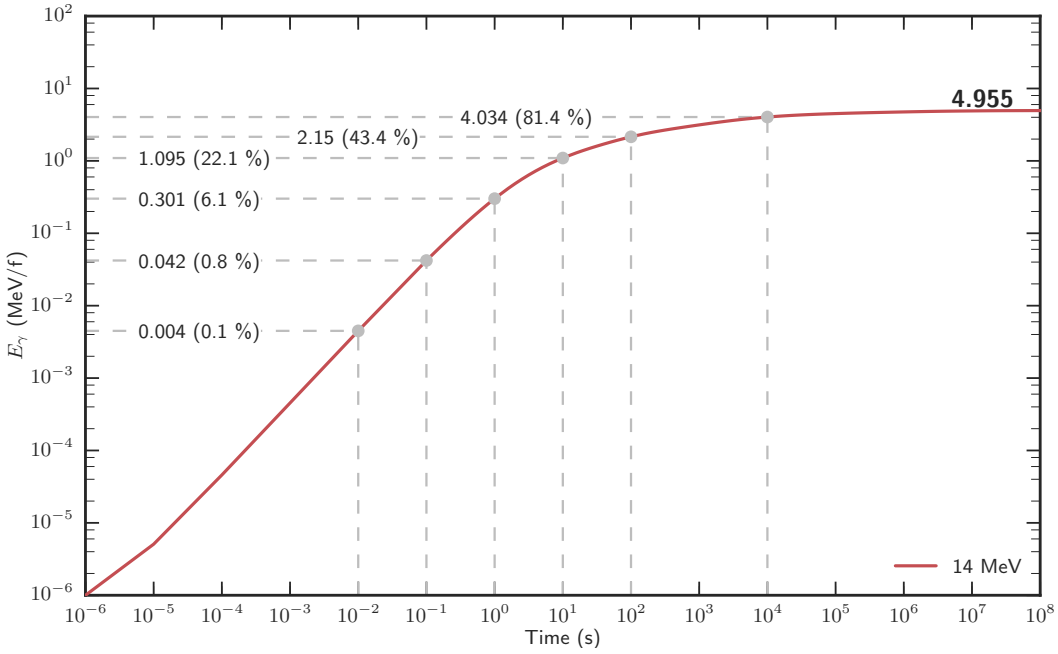


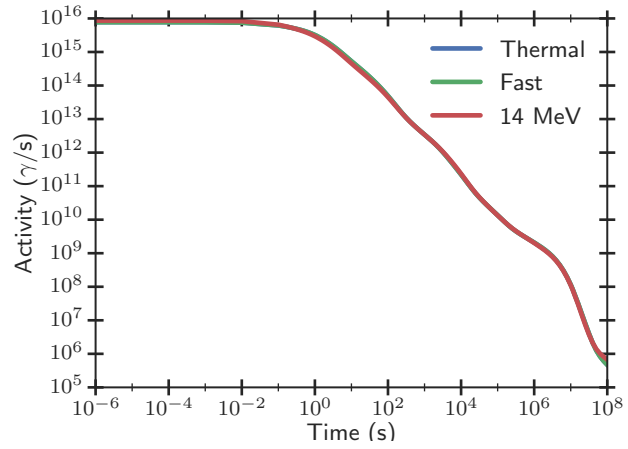
Figure B.44. Annotated E_γ over time for ^{239}Pu - 14-MeV Fission Yield Library.

C CINDER Data

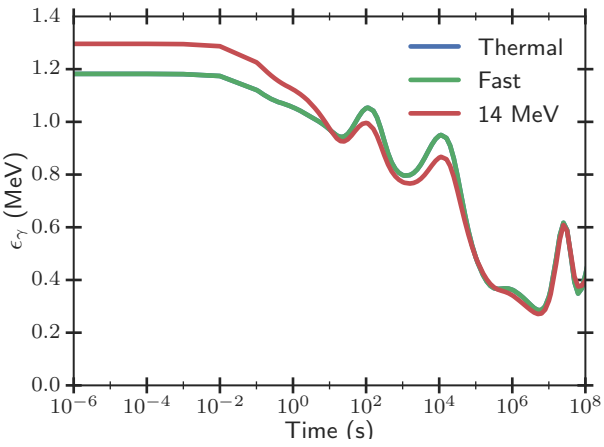
C.1 Characteristic Dependence on ENDF Fission Yield Library Selection

The cross-sections, fission yields, and nuclide properties used in CINDER are derived from the ENDF library. Because of this, CINDER is limited to studying the regimes where the ENDF data was evaluated. The ENDF fission product yields were evaluated for: thermal-neutron induced fission, fast (2 MeV) neutron induced fission, and 14 MeV neutron induced fission. This appendix shows how these different fission yields propagate through CINDER to the final quantities of interest by plotting the CINDER results for all the three fission yields for all five nuclides. The general trend for all materials is that the thermal and fast fission yield sublibraries result in virtually identical characteristics as a function of time. The 14 MeV sublibrary typically results in a higher average photon energy during early times and then a lower energy later. Furthermore, this results in lower E_γ and N_γ valuations for the 14 MeV sublibrary, in comparison to thermal and fast. Madland [27] showed that E_γ has a dependence on the incident neutron energy, but as shown in this appendix the difference between thermal and 14 MeV energies is typically less than 10% at any given time for any of the QOIs presented.

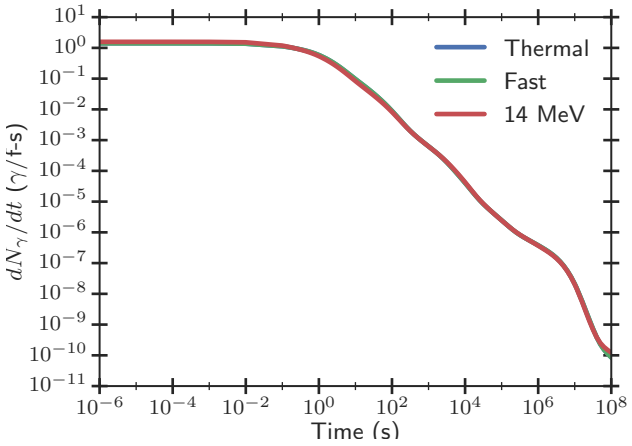
The figures contained within this appendix show the time evolution of different quantities of interest such as: total fission photon activity (in Bq), average fission gamma-ray energy, fission gamma-ray multiplicity and fission gamma energy release rates, total fission photon multiplicity, and total photon energy per fission. The plots contain the natural decay of the fissionable material. This distinction is important because relatively active materials, like ^{239}Pu which has a half-life 3 orders of magnitude smaller than ^{235}U, have a photon activity at long times (10^7+ seconds) that is dominated by natural decay photons, not fission photons. This effect can be seen in Fig. C.5(e) where the total photon multiplicity is monotonically increasing because the number of fissions remains constant, and the photon activity levels off to natural decay levels as shown in Fig. C.5(a). The other, less active materials do not show any of these effects within the 10^8 time frame studied herein.



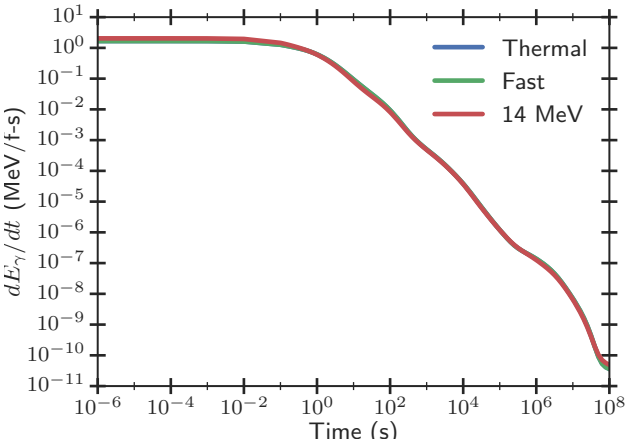
(a) Photon Activity



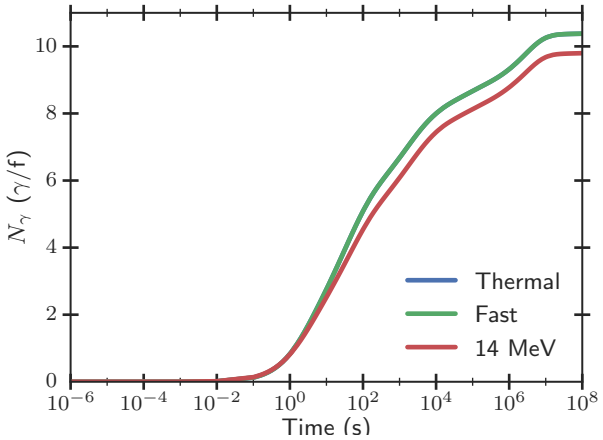
(b) Average Photon Energy



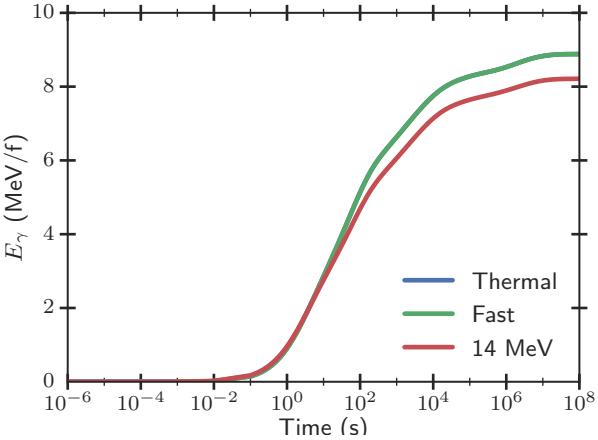
(c) Fission Gamma-Ray Multiplicity Rate



(d) Fission Gamma-Ray Energy Rate

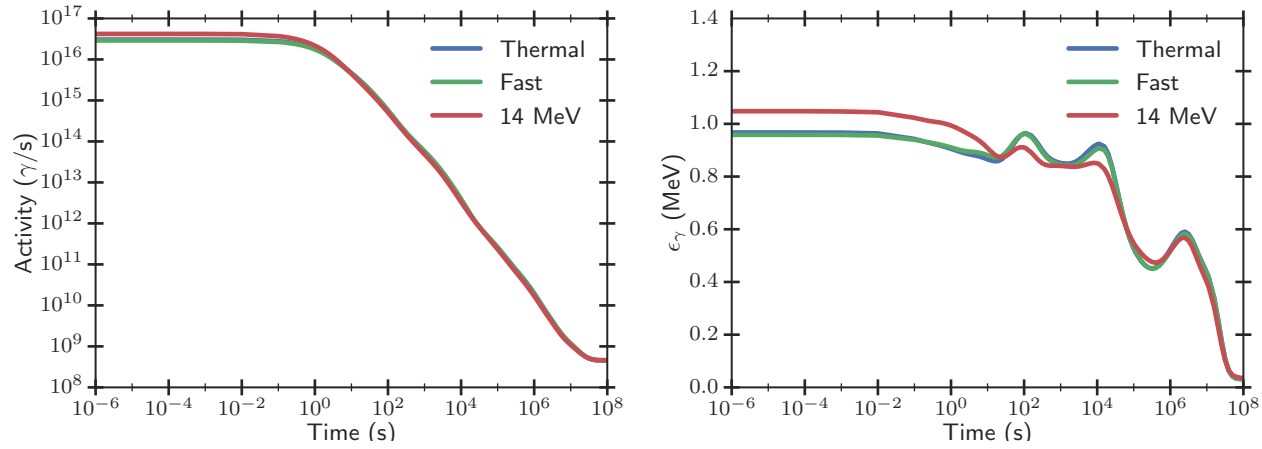


(e) Total Gamma-Rays per Fission



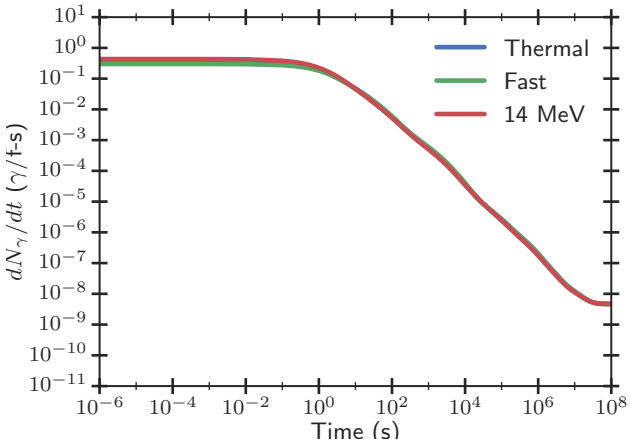
(f) Total Gamma-Ray Energy per Fission

Figure C.1. Time-dependent ^{232}Th fission gamma-ray characteristics using CINDER for thermal, fast, and 14 MeV ENDF fission yield libraries.

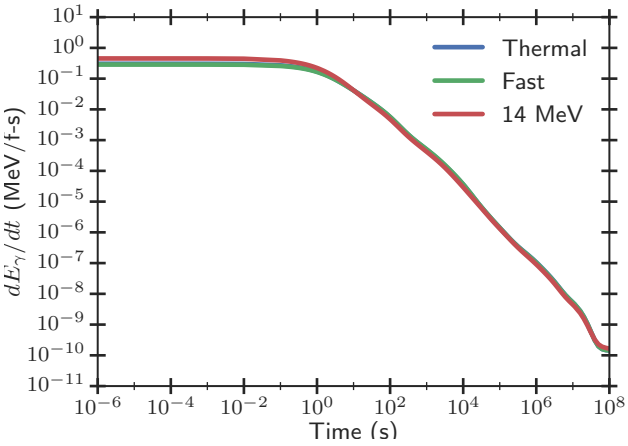


(a) Photon Activity

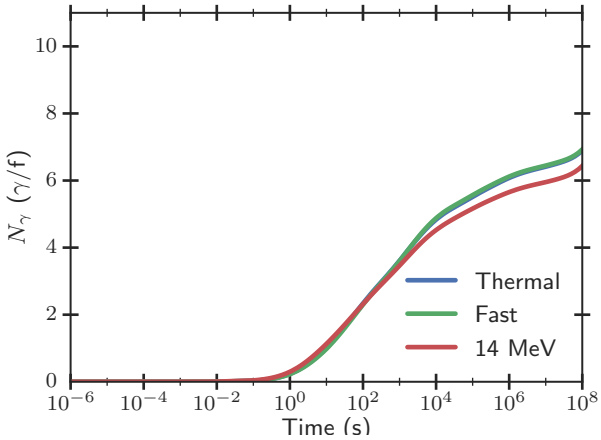
(b) Average Photon Energy



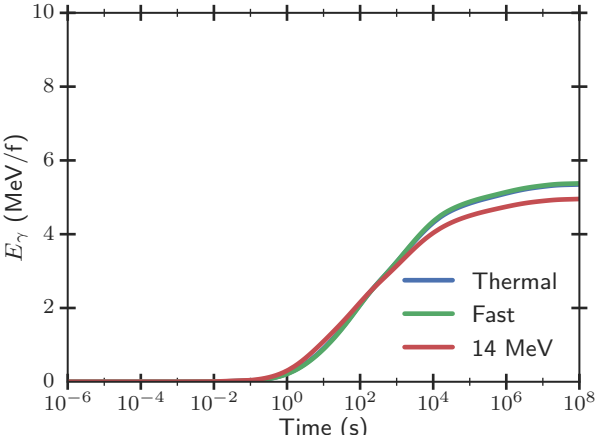
(c) Fission Gamma-Ray Multiplicity Rate



(d) Fission Gamma-Ray Energy Rate

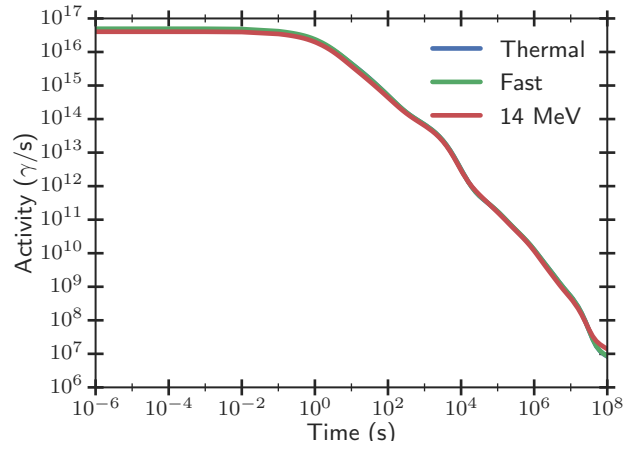


(e) Total Gamma-Rays per Fission

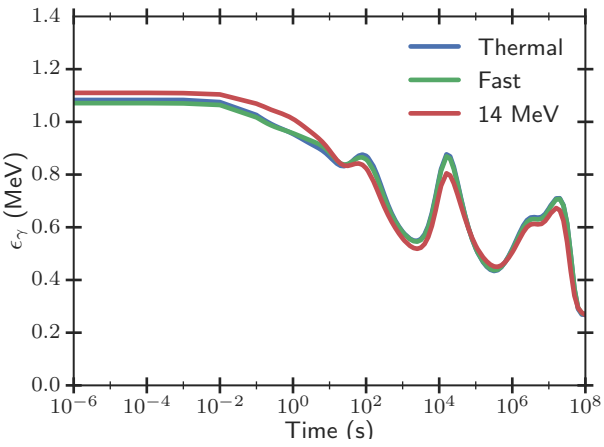


(f) Total Gamma-Ray Energy per Fission

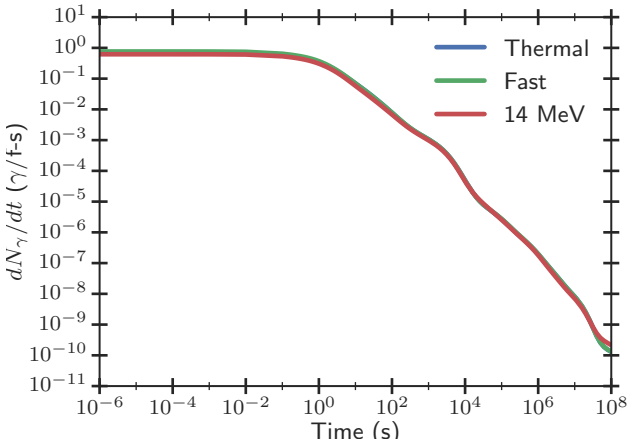
Figure C.2. Time-dependent ^{233}U fission gamma-ray characteristics using CINDER for thermal, fast, and 14 MeV ENDF fission yield libraries.



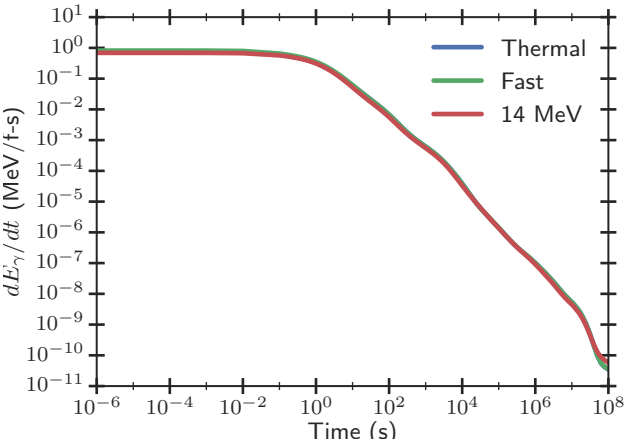
(a) Photon Activity



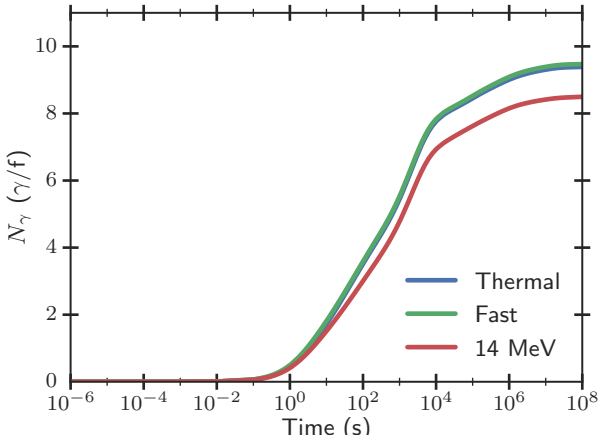
(b) Average Photon Energy



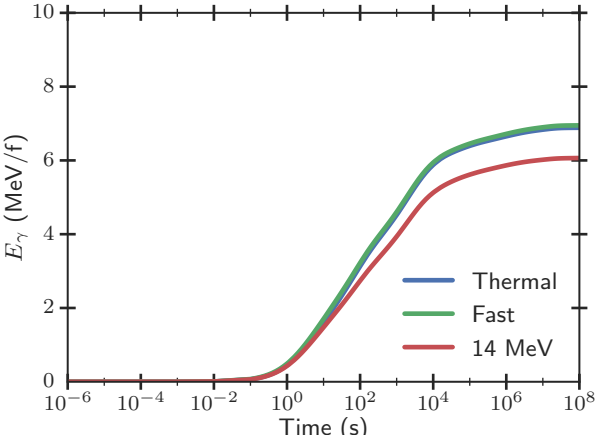
(c) Fission Gamma-Ray Multiplicity Rate



(d) Fission Gamma-Ray Energy Rate

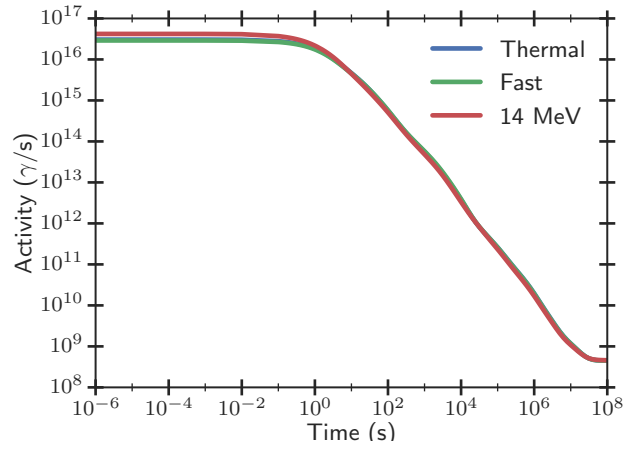


(e) Total Gamma-Rays per Fission

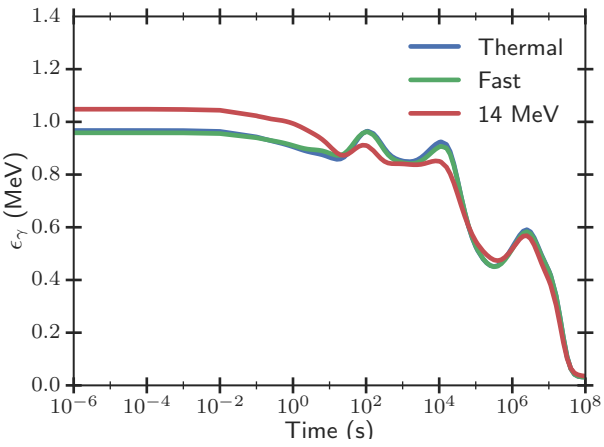


(f) Total Gamma-Ray Energy per Fission

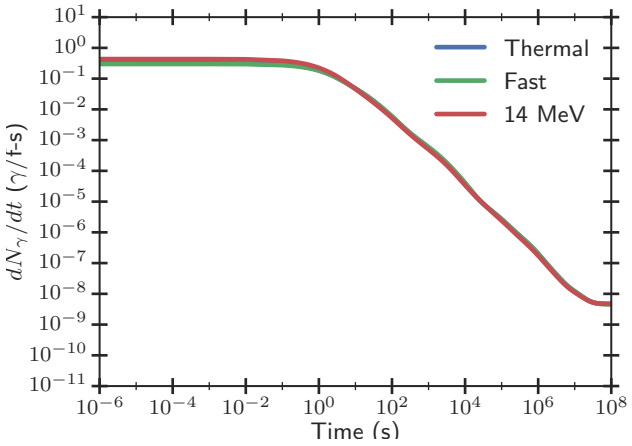
Figure C.3. Time-dependent ^{235}U fission gamma-ray characteristics using CINDER for thermal, fast, and 14 MeV ENDF fission yield libraries.



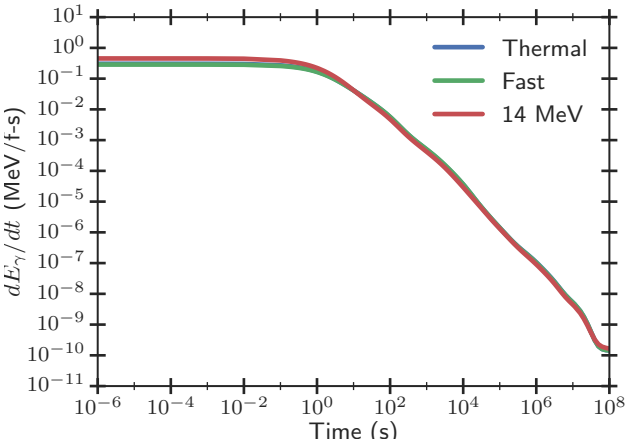
(a) Photon Activity



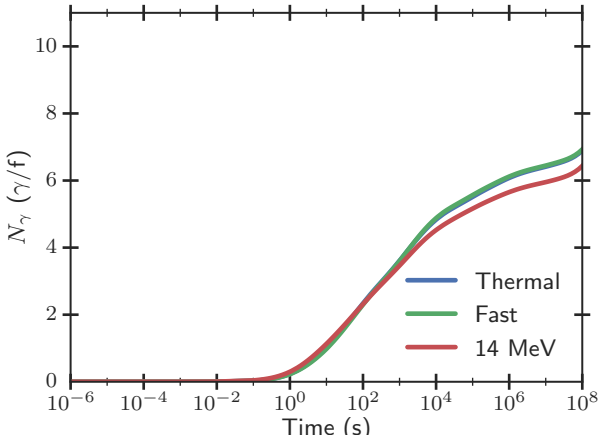
(b) Average Photon Energy



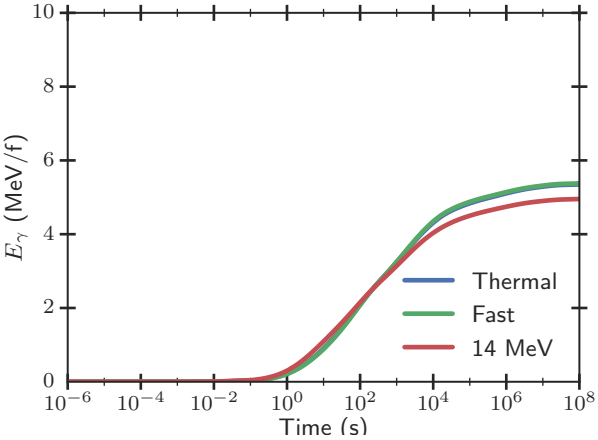
(c) Fission Gamma-Ray Multiplicity Rate



(d) Fission Gamma-Ray Energy Rate

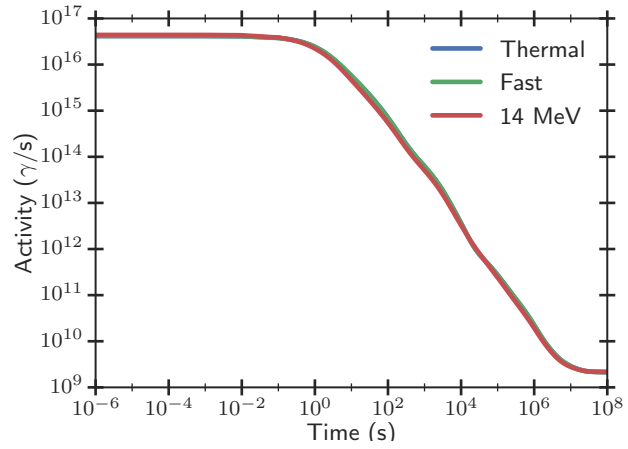


(e) Total Gamma-Rays per Fission

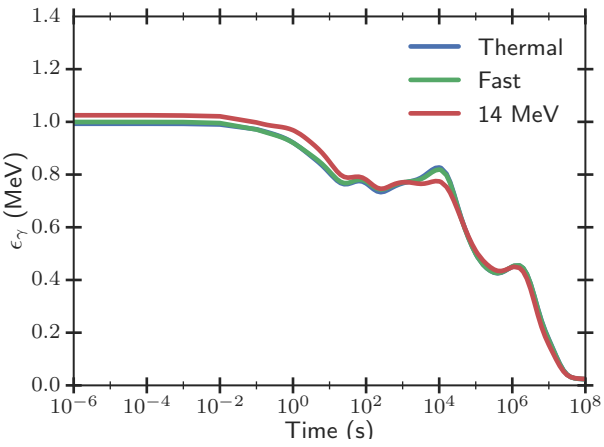


(f) Total Gamma-Ray Energy per Fission

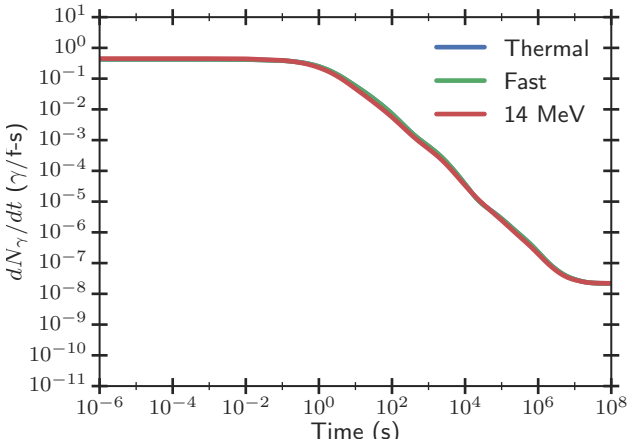
Figure C.4. Time-dependent ^{238}U fission gamma-ray characteristics using CINDER for thermal, fast, and 14 MeV ENDF fission yield libraries.



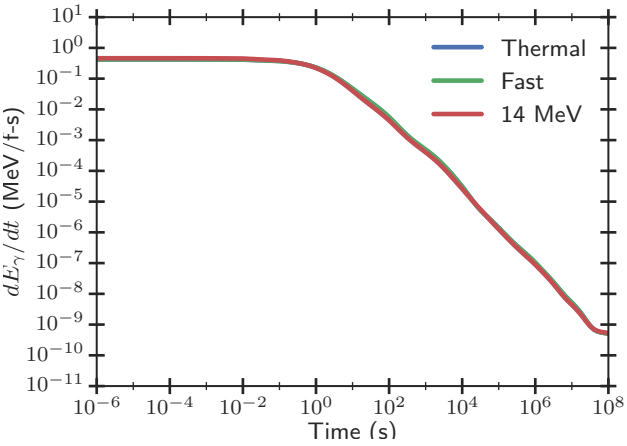
(a) Photon Activity



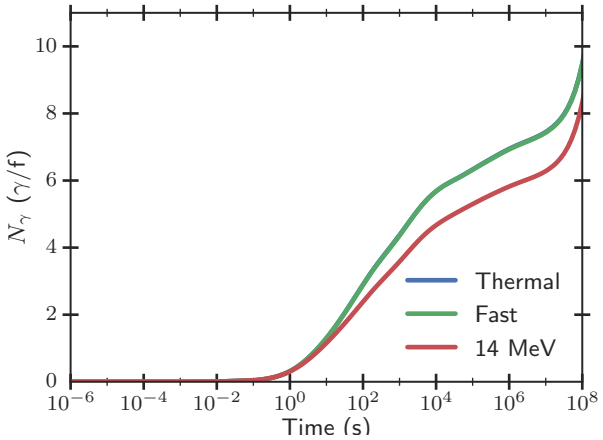
(b) Average Photon Energy



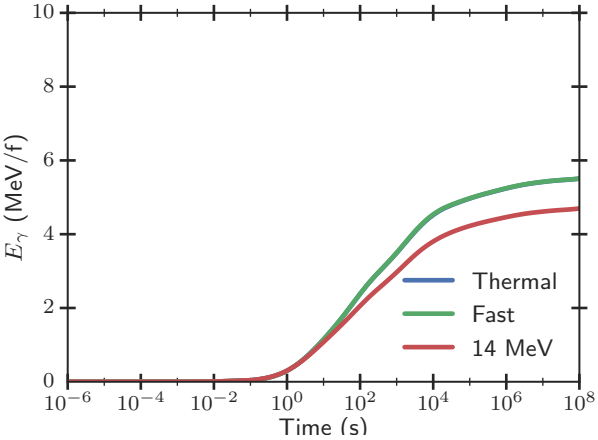
(c) Fission Gamma-Ray Multiplicity Rate



(d) Fission Gamma-Ray Energy Rate



(e) Total Gamma-Rays per Fission



(f) Total Gamma-Ray Energy per Fission

Figure C.5. Time-dependent ^{239}Pu fission gamma-ray characteristics using CINDER for thermal, fast, and 14 MeV ENDF fission yield libraries.

C.2 Tabulated CINDER Characteristic Data

Figures C.1 - C.5 plot various gamma-ray characteristics over time. The data in those plots is tabulated in the tables that follow. The tables are ordered by material: ^{232}Th, ^{233}U, ^{235}U, ^{238}U, and ^{239}Pu, where each material will have three 2-page tables: results using the thermal, fast, and 14-MeV ENDF fission yield libraries, in that order.

Table C.1: Summary of fission gamma-ray characteristics for ^{232}Th with thermal ENDF fission yield libraries.

Time (s)	Activity (Bq)	ε_γ (MeV)	dN_γ/dt (#/f/s)	dE_γ/dt (MeV/f/s)	N_γ (#/f)	N_γ Fraction	E_γ (MeV/f)	E_γ Fraction
1.000E-06	6.489E+03	2.241E-02	1.410E+00	1.667E+00	1.000E-06	9.635E-08	1.000E-06	1.126E-07
1.000E-05	7.732E+15	1.182E+00	1.410E+00	1.667E+00	1.369E-05	1.319E-06	1.600E-05	1.802E-06
1.000E-04	7.732E+15	1.182E+00	1.410E+00	1.667E+00	1.406E-04	1.355E-05	1.660E-04	1.869E-05
1.000E-03	7.730E+15	1.182E+00	1.406E+00	1.661E+00	1.408E-03	1.357E-04	1.663E-03	1.873E-04
1.000E-02	7.709E+15	1.181E+00	1.370E+00	1.608E+00	1.390E-02	1.339E-03	1.637E-02	1.843E-03
1.000E-01	7.510E+15	1.174E+00	1.129E+00	1.266E+00	1.264E-01	1.218E-02	1.457E-01	1.640E-02
1.126E-01	6.190E+15	1.121E+00	1.107E+00	1.237E+00	1.404E-01	1.353E-02	1.615E-01	1.818E-02
1.585E-01	6.069E+15	1.117E+00	1.040E+00	1.147E+00	1.897E-01	1.828E-02	2.162E-01	2.434E-02
1.995E-01	5.700E+15	1.103E+00	9.923E-01	1.087E+00	2.314E-01	2.229E-02	2.620E-01	2.949E-02
2.512E-01	5.440E+15	1.095E+00	9.429E-01	1.025E+00	2.814E-01	2.711E-02	3.165E-01	3.564E-02
3.162E-01	5.169E+15	1.087E+00	8.916E-01	9.639E-01	3.410E-01	3.286E-02	3.812E-01	4.291E-02
3.981E-01	4.888E+15	1.081E+00	8.373E-01	9.001E-01	4.118E-01	3.968E-02	4.575E-01	5.151E-02
5.012E-01	4.590E+15	1.075E+00	7.791E-01	8.344E-01	4.951E-01	4.771E-02	5.469E-01	6.157E-02
6.310E-01	4.271E+15	1.071E+00	7.173E-01	7.646E-01	5.923E-01	5.707E-02	6.507E-01	7.326E-02
7.943E-01	3.932E+15	1.066E+00	6.520E-01	6.917E-01	7.041E-01	6.784E-02	7.696E-01	8.664E-02
1.000E+00	3.574E+15	1.061E+00	5.846E-01	6.168E-01	8.312E-01	8.009E-02	9.042E-01	1.018E-01
1.126E+00	3.205E+15	1.055E+00	5.498E-01	5.784E-01	9.027E-01	8.697E-02	9.794E-01	1.103E-01
1.585E+00	3.014E+15	1.052E+00	4.506E-01	4.695E-01	1.132E+00	1.091E-01	1.220E+00	1.373E-01
1.995E+00	2.470E+15	1.042E+00	3.871E-01	4.002E-01	1.304E+00	1.257E-01	1.398E+00	1.574E-01
2.512E+00	2.122E+15	1.034E+00	3.278E-01	3.363E-01	1.489E+00	1.434E-01	1.589E+00	1.789E-01
3.162E+00	1.797E+15	1.026E+00	2.738E-01	2.787E-01	1.684E+00	1.623E-01	1.789E+00	2.014E-01
3.981E+00	1.501E+15	1.018E+00	2.256E-01	2.279E-01	1.889E+00	1.820E-01	1.996E+00	2.247E-01
5.012E+00	1.237E+15	1.010E+00	1.839E-01	1.842E-01	2.100E+00	2.023E-01	2.208E+00	2.486E-01
6.310E+00	1.008E+15	1.002E+00	1.487E-01	1.476E-01	2.316E+00	2.231E-01	2.424E+00	2.729E-01
7.943E+00	8.153E+14	9.927E-01	1.199E-01	1.178E-01	2.535E+00	2.443E-01	2.641E+00	2.973E-01
1.000E+01	6.571E+14	9.826E-01	9.672E-02	9.390E-02	2.758E+00	2.657E-01	2.858E+00	3.218E-01
1.126E+01	5.302E+14	9.709E-01	8.670E-02	8.362E-02	2.873E+00	2.769E-01	2.970E+00	3.344E-01
1.585E+01	4.753E+14	9.645E-01	6.344E-02	6.016E-02	3.218E+00	3.101E-01	3.300E+00	3.715E-01
1.995E+01	3.478E+14	9.482E-01	5.131E-02	4.836E-02	3.453E+00	3.327E-01	3.523E+00	3.966E-01
2.512E+01	2.813E+14	9.425E-01	4.126E-02	3.896E-02	3.693E+00	3.558E-01	3.748E+00	4.220E-01
3.162E+01	2.262E+14	9.441E-01	3.291E-02	3.141E-02	3.934E+00	3.790E-01	3.977E+00	4.478E-01
3.981E+01	1.804E+14	9.545E-01	2.599E-02	2.529E-02	4.175E+00	4.023E-01	4.209E+00	4.739E-01
5.012E+01	1.425E+14	9.728E-01	2.028E-02	2.020E-02	4.413E+00	4.252E-01	4.444E+00	5.003E-01
6.310E+01	1.112E+14	9.960E-01	1.564E-02	1.595E-02	4.647E+00	4.477E-01	4.678E+00	5.267E-01
7.943E+01	8.575E+13	1.020E+00	1.189E-02	1.237E-02	4.871E+00	4.694E-01	4.910E+00	5.527E-01
1.000E+02	6.520E+13	1.040E+00	8.924E-03	9.388E-03	5.086E+00	4.900E-01	5.133E+00	5.779E-01
1.126E+02	4.892E+13	1.052E+00	7.660E-03	8.073E-03	5.190E+00	5.001E-01	5.243E+00	5.903E-01
1.585E+02	4.199E+13	1.054E+00	4.867E-03	5.071E-03	5.477E+00	5.278E-01	5.545E+00	6.243E-01
1.995E+02	2.668E+13	1.042E+00	3.575E-03	3.633E-03	5.651E+00	5.445E-01	5.724E+00	6.444E-01
2.512E+02	1.960E+13	1.016E+00	2.649E-03	2.583E-03	5.811E+00	5.599E-01	5.884E+00	6.625E-01
3.162E+02	1.452E+13	9.753E-01	1.999E-03	1.854E-03	5.963E+00	5.745E-01	6.028E+00	6.787E-01
3.981E+02	1.096E+13	9.272E-01	1.543E-03	1.360E-03	6.108E+00	5.885E-01	6.160E+00	6.935E-01
5.012E+02	8.458E+12	8.815E-01	1.214E-03	1.027E-03	6.250E+00	6.022E-01	6.283E+00	7.074E-01
6.310E+02	6.657E+12	8.458E-01	9.683E-04	7.955E-04	6.391E+00	6.158E-01	6.401E+00	7.207E-01
7.943E+02	5.308E+12	8.216E-01	7.776E-04	6.271E-04	6.534E+00	6.296E-01	6.517E+00	7.338E-01
1.000E+03	4.263E+12	8.064E-01	6.268E-04	5.001E-04	6.678E+00	6.435E-01	6.633E+00	7.468E-01
1.126E+03	3.436E+12	7.979E-01	5.611E-04	4.466E-04	6.753E+00	6.507E-01	6.693E+00	7.535E-01

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Table C.1 – *Continued from previous page.*

Time (s)	Activity (Bq)	ε_γ (MeV)	dN_γ/dt (#/f/s)	dE_γ/dt (MeV/f/s)	N_γ (#/f)	N_γ Fraction	E_γ (MeV/f)	E_γ Fraction
1.585E+03	3.076E+12	7.959E-01	4.046E-04	3.228E-04	6.975E+00	6.720E-01	6.870E+00	7.734E-01
1.995E+03	2.218E+12	7.979E-01	3.196E-04	2.576E-04	7.123E+00	6.864E-01	6.989E+00	7.868E-01
2.512E+03	1.752E+12	8.059E-01	2.479E-04	2.031E-04	7.270E+00	7.005E-01	7.108E+00	8.002E-01
3.162E+03	1.359E+12	8.193E-01	1.888E-04	1.583E-04	7.412E+00	7.142E-01	7.225E+00	8.134E-01
3.981E+03	1.035E+12	8.384E-01	1.413E-04	1.218E-04	7.547E+00	7.272E-01	7.340E+00	8.263E-01
5.012E+03	7.744E+11	8.622E-01	1.044E-04	9.277E-05	7.674E+00	7.394E-01	7.450E+00	8.388E-01
6.310E+03	5.723E+11	8.886E-01	7.649E-05	6.991E-05	7.791E+00	7.507E-01	7.556E+00	8.507E-01
7.943E+03	4.193E+11	9.140E-01	5.569E-05	5.205E-05	7.899E+00	7.611E-01	7.656E+00	8.619E-01
1.000E+04	3.053E+11	9.347E-01	4.033E-05	3.821E-05	7.998E+00	7.706E-01	7.748E+00	8.723E-01
1.126E+04	2.211E+11	9.475E-01	3.408E-05	3.238E-05	8.045E+00	7.751E-01	7.793E+00	8.773E-01
1.585E+04	1.868E+11	9.502E-01	2.081E-05	1.954E-05	8.171E+00	7.873E-01	7.912E+00	8.908E-01
1.995E+04	1.141E+11	9.386E-01	1.502E-05	1.366E-05	8.244E+00	7.943E-01	7.980E+00	8.984E-01
2.512E+04	8.234E+10	9.096E-01	1.104E-05	9.503E-06	8.311E+00	8.008E-01	8.040E+00	9.052E-01
3.162E+04	6.053E+10	8.607E-01	8.331E-06	6.627E-06	8.374E+00	8.069E-01	8.092E+00	9.111E-01
3.981E+04	4.567E+10	7.955E-01	6.430E-06	4.649E-06	8.435E+00	8.127E-01	8.139E+00	9.163E-01
5.012E+04	3.525E+10	7.230E-01	5.031E-06	3.277E-06	8.494E+00	8.184E-01	8.179E+00	9.209E-01
6.310E+04	2.758E+10	6.514E-01	3.964E-06	2.325E-06	8.552E+00	8.240E-01	8.216E+00	9.250E-01
7.943E+04	2.173E+10	5.866E-01	3.134E-06	1.666E-06	8.610E+00	8.296E-01	8.248E+00	9.286E-01
1.000E+05	1.718E+10	5.315E-01	2.475E-06	1.204E-06	8.668E+00	8.352E-01	8.278E+00	9.320E-01
1.126E+05	1.357E+10	4.862E-01	2.189E-06	1.021E-06	8.697E+00	8.380E-01	8.292E+00	9.335E-01
1.585E+05	1.200E+10	4.662E-01	1.537E-06	6.431E-07	8.783E+00	8.463E-01	8.330E+00	9.378E-01
1.995E+05	8.424E+09	4.185E-01	1.223E-06	4.827E-07	8.839E+00	8.517E-01	8.353E+00	9.404E-01
2.512E+05	6.707E+09	3.945E-01	9.933E-07	3.753E-07	8.897E+00	8.572E-01	8.375E+00	9.429E-01
3.162E+05	5.445E+09	3.778E-01	8.251E-07	3.042E-07	8.956E+00	8.629E-01	8.397E+00	9.454E-01
3.981E+05	4.523E+09	3.687E-01	6.981E-07	2.554E-07	9.018E+00	8.689E-01	8.420E+00	9.480E-01
5.012E+05	3.827E+09	3.659E-01	5.972E-07	2.191E-07	9.085E+00	8.754E-01	8.445E+00	9.507E-01
6.310E+05	3.274E+09	3.668E-01	5.137E-07	1.891E-07	9.157E+00	8.823E-01	8.471E+00	9.537E-01
7.943E+05	2.816E+09	3.682E-01	4.418E-07	1.622E-07	9.235E+00	8.898E-01	8.500E+00	9.570E-01
1.000E+06	2.422E+09	3.672E-01	3.791E-07	1.375E-07	9.319E+00	8.980E-01	8.531E+00	9.604E-01
1.126E+06	2.078E+09	3.627E-01	3.495E-07	1.255E-07	9.365E+00	9.024E-01	8.547E+00	9.623E-01
1.585E+06	1.916E+09	3.591E-01	2.736E-07	9.432E-08	9.508E+00	9.162E-01	8.598E+00	9.680E-01
1.995E+06	1.500E+09	3.447E-01	2.284E-07	7.598E-08	9.611E+00	9.261E-01	8.633E+00	9.719E-01
2.512E+06	1.252E+09	3.327E-01	1.866E-07	5.964E-08	9.719E+00	9.364E-01	8.668E+00	9.759E-01
3.162E+06	1.023E+09	3.196E-01	1.478E-07	4.524E-08	9.827E+00	9.469E-01	8.702E+00	9.797E-01
3.981E+06	8.105E+08	3.060E-01	1.125E-07	3.303E-08	9.934E+00	9.572E-01	8.734E+00	9.833E-01
5.012E+06	6.168E+08	2.936E-01	8.148E-08	2.326E-08	1.003E+01	9.668E-01	8.763E+00	9.866E-01
6.310E+06	4.467E+08	2.855E-01	5.565E-08	1.591E-08	1.012E+01	9.754E-01	8.788E+00	9.894E-01
7.943E+06	3.051E+08	2.859E-01	3.552E-08	1.067E-08	1.020E+01	9.826E-01	8.810E+00	9.919E-01
1.000E+07	1.947E+08	3.004E-01	2.101E-08	7.046E-09	1.026E+01	9.882E-01	8.828E+00	9.939E-01
1.126E+07	1.152E+08	3.353E-01	1.554E-08	5.643E-09	1.028E+01	9.904E-01	8.836E+00	9.948E-01
1.585E+07	8.520E+07	3.631E-01	5.885E-09	2.828E-09	1.033E+01	9.951E-01	8.856E+00	9.970E-01
1.995E+07	3.226E+07	4.806E-01	2.910E-09	1.655E-09	1.035E+01	9.968E-01	8.865E+00	9.980E-01
2.512E+07	1.595E+07	5.689E-01	1.440E-09	8.884E-10	1.036E+01	9.979E-01	8.871E+00	9.988E-01
3.162E+07	7.892E+06	6.171E-01	7.298E-10	4.300E-10	1.036E+01	9.986E-01	8.876E+00	9.993E-01
3.981E+07	4.001E+06	5.891E-01	3.887E-10	1.921E-10	1.037E+01	9.990E-01	8.878E+00	9.996E-01
5.012E+07	2.131E+06	4.942E-01	2.293E-10	8.993E-11	1.037E+01	9.994E-01	8.880E+00	9.997E-01
6.310E+07	1.257E+06	3.922E-01	1.535E-10	5.348E-11	1.037E+01	9.996E-01	8.881E+00	9.998E-01
7.943E+07	8.415E+05	3.484E-01	1.119E-10	4.109E-11	1.038E+01	9.998E-01	8.881E+00	9.999E-01
1.000E+08	6.134E+05	3.672E-01	8.575E-11	3.602E-11	1.038E+01	1.000E+00	8.882E+00	1.000E+00

Table C.2: Summary of fission gamma-ray characteristics for ^{232}Th with fast ENDF fission yield libraries.

Time (s)	Activity (Bq)	ε_γ (MeV)	dN_γ/dt (#/f/s)	dE_γ/dt (MeV/f/s)	N_γ (#/f)	N_γ Fraction	E_γ (MeV/f)	E_γ Fraction
1.000E-06	6.489E+03	2.241E-02	1.410E+00	1.667E+00	1.000E-06	9.635E-08	1.000E-06	1.126E-07
1.000E-05	7.732E+15	1.182E+00	1.410E+00	1.667E+00	1.369E-05	1.319E-06	1.600E-05	1.802E-06
1.000E-04	7.732E+15	1.182E+00	1.410E+00	1.667E+00	1.406E-04	1.355E-05	1.660E-04	1.869E-05
1.000E-03	7.730E+15	1.182E+00	1.406E+00	1.661E+00	1.408E-03	1.357E-04	1.663E-03	1.873E-04
1.000E-02	7.709E+15	1.181E+00	1.370E+00	1.608E+00	1.390E-02	1.339E-03	1.637E-02	1.843E-03
1.000E-01	7.510E+15	1.174E+00	1.129E+00	1.266E+00	1.264E-01	1.218E-02	1.457E-01	1.640E-02
1.126E-01	6.190E+15	1.121E+00	1.107E+00	1.237E+00	1.404E-01	1.353E-02	1.615E-01	1.818E-02
1.585E-01	6.069E+15	1.117E+00	1.040E+00	1.147E+00	1.897E-01	1.828E-02	2.162E-01	2.434E-02
1.995E-01	5.700E+15	1.103E+00	9.923E-01	1.087E+00	2.314E-01	2.229E-02	2.620E-01	2.949E-02
2.512E-01	5.440E+15	1.095E+00	9.429E-01	1.025E+00	2.814E-01	2.711E-02	3.165E-01	3.564E-02
3.162E-01	5.169E+15	1.087E+00	8.916E-01	9.639E-01	3.410E-01	3.286E-02	3.812E-01	4.291E-02
3.981E-01	4.888E+15	1.081E+00	8.373E-01	9.001E-01	4.118E-01	3.968E-02	4.575E-01	5.151E-02
5.012E-01	4.590E+15	1.075E+00	7.791E-01	8.344E-01	4.951E-01	4.771E-02	5.469E-01	6.157E-02
6.310E-01	4.271E+15	1.071E+00	7.173E-01	7.646E-01	5.923E-01	5.707E-02	6.507E-01	7.326E-02
7.943E-01	3.932E+15	1.066E+00	6.520E-01	6.917E-01	7.041E-01	6.784E-02	7.696E-01	8.664E-02
1.000E+00	3.574E+15	1.061E+00	5.846E-01	6.168E-01	8.312E-01	8.009E-02	9.042E-01	1.018E-01
1.126E+00	3.205E+15	1.055E+00	5.498E-01	5.784E-01	9.027E-01	8.697E-02	9.794E-01	1.103E-01
1.585E+00	3.014E+15	1.052E+00	4.506E-01	4.695E-01	1.132E+00	1.091E-01	1.220E+00	1.373E-01
1.995E+00	2.470E+15	1.042E+00	3.871E-01	4.002E-01	1.304E+00	1.257E-01	1.398E+00	1.574E-01
2.512E+00	2.122E+15	1.034E+00	3.278E-01	3.363E-01	1.489E+00	1.434E-01	1.589E+00	1.789E-01
3.162E+00	1.797E+15	1.026E+00	2.738E-01	2.787E-01	1.684E+00	1.623E-01	1.789E+00	2.014E-01
3.981E+00	1.501E+15	1.018E+00	2.256E-01	2.279E-01	1.889E+00	1.820E-01	1.996E+00	2.247E-01
5.012E+00	1.237E+15	1.010E+00	1.839E-01	1.842E-01	2.100E+00	2.023E-01	2.208E+00	2.486E-01
6.310E+00	1.008E+15	1.002E+00	1.487E-01	1.476E-01	2.316E+00	2.231E-01	2.424E+00	2.729E-01
7.943E+00	8.153E+14	9.927E-01	1.199E-01	1.178E-01	2.535E+00	2.443E-01	2.641E+00	2.973E-01
1.000E+01	6.571E+14	9.826E-01	9.672E-02	9.390E-02	2.758E+00	2.657E-01	2.858E+00	3.218E-01
1.126E+01	5.302E+14	9.709E-01	8.670E-02	8.362E-02	2.873E+00	2.769E-01	2.970E+00	3.344E-01
1.585E+01	4.753E+14	9.645E-01	6.344E-02	6.016E-02	3.218E+00	3.101E-01	3.300E+00	3.715E-01
1.995E+01	3.478E+14	9.482E-01	5.131E-02	4.836E-02	3.453E+00	3.327E-01	3.523E+00	3.966E-01
2.512E+01	2.813E+14	9.425E-01	4.126E-02	3.896E-02	3.693E+00	3.558E-01	3.748E+00	4.220E-01
3.162E+01	2.262E+14	9.441E-01	3.291E-02	3.141E-02	3.934E+00	3.790E-01	3.977E+00	4.478E-01
3.981E+01	1.804E+14	9.545E-01	2.599E-02	2.529E-02	4.175E+00	4.023E-01	4.209E+00	4.739E-01
5.012E+01	1.425E+14	9.728E-01	2.028E-02	2.020E-02	4.413E+00	4.252E-01	4.444E+00	5.003E-01
6.310E+01	1.112E+14	9.960E-01	1.564E-02	1.595E-02	4.647E+00	4.477E-01	4.678E+00	5.267E-01
7.943E+01	8.575E+13	1.020E+00	1.189E-02	1.237E-02	4.871E+00	4.694E-01	4.910E+00	5.527E-01
1.000E+02	6.520E+13	1.040E+00	8.924E-03	9.388E-03	5.086E+00	4.900E-01	5.133E+00	5.779E-01
1.126E+02	4.892E+13	1.052E+00	7.660E-03	8.073E-03	5.190E+00	5.001E-01	5.243E+00	5.903E-01
1.585E+02	4.199E+13	1.054E+00	4.867E-03	5.071E-03	5.477E+00	5.278E-01	5.545E+00	6.243E-01
1.995E+02	2.668E+13	1.042E+00	3.575E-03	3.633E-03	5.651E+00	5.445E-01	5.724E+00	6.444E-01
2.512E+02	1.960E+13	1.016E+00	2.649E-03	2.583E-03	5.811E+00	5.599E-01	5.884E+00	6.625E-01
3.162E+02	1.452E+13	9.753E-01	1.999E-03	1.854E-03	5.963E+00	5.745E-01	6.028E+00	6.787E-01
3.981E+02	1.096E+13	9.272E-01	1.543E-03	1.360E-03	6.108E+00	5.885E-01	6.160E+00	6.935E-01
5.012E+02	8.458E+12	8.815E-01	1.214E-03	1.027E-03	6.250E+00	6.022E-01	6.283E+00	7.074E-01
6.310E+02	6.657E+12	8.458E-01	9.683E-04	7.955E-04	6.391E+00	6.158E-01	6.401E+00	7.207E-01
7.943E+02	5.308E+12	8.216E-01	7.776E-04	6.271E-04	6.534E+00	6.296E-01	6.517E+00	7.338E-01
1.000E+03	4.263E+12	8.064E-01	6.268E-04	5.001E-04	6.678E+00	6.435E-01	6.633E+00	7.468E-01
1.126E+03	3.436E+12	7.979E-01	5.611E-04	4.466E-04	6.753E+00	6.507E-01	6.693E+00	7.535E-01

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Table C.2 – *Continued from previous page.*

Time (s)	Activity (Bq)	ε_γ (MeV)	dN_γ/dt (#/f/s)	dE_γ/dt (MeV/f/s)	N_γ (#/f)	N_γ Fraction	E_γ (MeV/f)	E_γ Fraction
1.585E+03	3.076E+12	7.959E-01	4.046E-04	3.228E-04	6.975E+00	6.720E-01	6.870E+00	7.734E-01
1.995E+03	2.218E+12	7.979E-01	3.196E-04	2.576E-04	7.123E+00	6.864E-01	6.989E+00	7.868E-01
2.512E+03	1.752E+12	8.059E-01	2.479E-04	2.031E-04	7.270E+00	7.005E-01	7.108E+00	8.002E-01
3.162E+03	1.359E+12	8.193E-01	1.888E-04	1.583E-04	7.412E+00	7.142E-01	7.225E+00	8.134E-01
3.981E+03	1.035E+12	8.384E-01	1.413E-04	1.218E-04	7.547E+00	7.272E-01	7.340E+00	8.263E-01
5.012E+03	7.744E+11	8.622E-01	1.044E-04	9.277E-05	7.674E+00	7.394E-01	7.450E+00	8.388E-01
6.310E+03	5.723E+11	8.886E-01	7.649E-05	6.991E-05	7.791E+00	7.507E-01	7.556E+00	8.507E-01
7.943E+03	4.193E+11	9.140E-01	5.569E-05	5.205E-05	7.899E+00	7.611E-01	7.656E+00	8.619E-01
1.000E+04	3.053E+11	9.347E-01	4.033E-05	3.821E-05	7.998E+00	7.706E-01	7.748E+00	8.723E-01
1.126E+04	2.211E+11	9.475E-01	3.408E-05	3.238E-05	8.045E+00	7.751E-01	7.793E+00	8.773E-01
1.585E+04	1.868E+11	9.502E-01	2.081E-05	1.954E-05	8.171E+00	7.873E-01	7.912E+00	8.908E-01
1.995E+04	1.141E+11	9.386E-01	1.502E-05	1.366E-05	8.244E+00	7.943E-01	7.980E+00	8.984E-01
2.512E+04	8.234E+10	9.096E-01	1.104E-05	9.503E-06	8.311E+00	8.008E-01	8.040E+00	9.052E-01
3.162E+04	6.053E+10	8.607E-01	8.331E-06	6.627E-06	8.374E+00	8.069E-01	8.092E+00	9.111E-01
3.981E+04	4.567E+10	7.955E-01	6.430E-06	4.649E-06	8.435E+00	8.127E-01	8.139E+00	9.163E-01
5.012E+04	3.525E+10	7.230E-01	5.031E-06	3.277E-06	8.494E+00	8.184E-01	8.179E+00	9.209E-01
6.310E+04	2.758E+10	6.514E-01	3.964E-06	2.325E-06	8.552E+00	8.240E-01	8.216E+00	9.250E-01
7.943E+04	2.173E+10	5.866E-01	3.134E-06	1.666E-06	8.610E+00	8.296E-01	8.248E+00	9.286E-01
1.000E+05	1.718E+10	5.315E-01	2.475E-06	1.204E-06	8.668E+00	8.352E-01	8.278E+00	9.320E-01
1.126E+05	1.357E+10	4.862E-01	2.189E-06	1.021E-06	8.697E+00	8.380E-01	8.292E+00	9.335E-01
1.585E+05	1.200E+10	4.662E-01	1.537E-06	6.431E-07	8.783E+00	8.463E-01	8.330E+00	9.378E-01
1.995E+05	8.424E+09	4.185E-01	1.223E-06	4.827E-07	8.839E+00	8.517E-01	8.353E+00	9.404E-01
2.512E+05	6.707E+09	3.945E-01	9.933E-07	3.753E-07	8.897E+00	8.572E-01	8.375E+00	9.429E-01
3.162E+05	5.445E+09	3.778E-01	8.251E-07	3.042E-07	8.956E+00	8.629E-01	8.397E+00	9.454E-01
3.981E+05	4.523E+09	3.687E-01	6.981E-07	2.554E-07	9.018E+00	8.689E-01	8.420E+00	9.480E-01
5.012E+05	3.827E+09	3.659E-01	5.972E-07	2.191E-07	9.085E+00	8.754E-01	8.445E+00	9.507E-01
6.310E+05	3.274E+09	3.668E-01	5.137E-07	1.891E-07	9.157E+00	8.823E-01	8.471E+00	9.537E-01
7.943E+05	2.816E+09	3.682E-01	4.418E-07	1.622E-07	9.235E+00	8.898E-01	8.500E+00	9.570E-01
1.000E+06	2.422E+09	3.672E-01	3.791E-07	1.375E-07	9.319E+00	8.980E-01	8.531E+00	9.604E-01
1.126E+06	2.078E+09	3.627E-01	3.495E-07	1.255E-07	9.365E+00	9.024E-01	8.547E+00	9.623E-01
1.585E+06	1.916E+09	3.591E-01	2.736E-07	9.432E-08	9.508E+00	9.162E-01	8.598E+00	9.680E-01
1.995E+06	1.500E+09	3.447E-01	2.284E-07	7.598E-08	9.611E+00	9.261E-01	8.633E+00	9.719E-01
2.512E+06	1.252E+09	3.327E-01	1.866E-07	5.964E-08	9.719E+00	9.364E-01	8.668E+00	9.759E-01
3.162E+06	1.023E+09	3.196E-01	1.478E-07	4.524E-08	9.827E+00	9.469E-01	8.702E+00	9.797E-01
3.981E+06	8.105E+08	3.060E-01	1.125E-07	3.303E-08	9.934E+00	9.572E-01	8.734E+00	9.833E-01
5.012E+06	6.168E+08	2.936E-01	8.148E-08	2.326E-08	1.003E+01	9.668E-01	8.763E+00	9.866E-01
6.310E+06	4.467E+08	2.855E-01	5.565E-08	1.591E-08	1.012E+01	9.754E-01	8.788E+00	9.894E-01
7.943E+06	3.051E+08	2.859E-01	3.552E-08	1.067E-08	1.020E+01	9.826E-01	8.810E+00	9.919E-01
1.000E+07	1.947E+08	3.004E-01	2.101E-08	7.046E-09	1.026E+01	9.882E-01	8.828E+00	9.939E-01
1.126E+07	1.152E+08	3.353E-01	1.554E-08	5.643E-09	1.028E+01	9.904E-01	8.836E+00	9.948E-01
1.585E+07	8.520E+07	3.631E-01	5.885E-09	2.828E-09	1.033E+01	9.951E-01	8.856E+00	9.970E-01
1.995E+07	3.226E+07	4.806E-01	2.910E-09	1.655E-09	1.035E+01	9.968E-01	8.865E+00	9.980E-01
2.512E+07	1.595E+07	5.689E-01	1.440E-09	8.884E-10	1.036E+01	9.979E-01	8.871E+00	9.988E-01
3.162E+07	7.892E+06	6.171E-01	7.298E-10	4.300E-10	1.036E+01	9.986E-01	8.876E+00	9.993E-01
3.981E+07	4.001E+06	5.891E-01	3.887E-10	1.921E-10	1.037E+01	9.990E-01	8.878E+00	9.996E-01
5.012E+07	2.131E+06	4.942E-01	2.293E-10	8.993E-11	1.037E+01	9.994E-01	8.880E+00	9.997E-01
6.310E+07	1.257E+06	3.922E-01	1.535E-10	5.348E-11	1.037E+01	9.996E-01	8.881E+00	9.998E-01
7.943E+07	8.415E+05	3.484E-01	1.119E-10	4.109E-11	1.038E+01	9.998E-01	8.881E+00	9.999E-01
1.000E+08	6.134E+05	3.672E-01	8.575E-11	3.602E-11	1.038E+01	1.000E+00	8.882E+00	1.000E+00

Table C.3: Summary of fission gamma-ray characteristics for ^{233}Th with 14-MeV ENDF fission yield libraries.

Time (s)	Activity (Bq)	ε_γ (MeV)	dN_γ/dt (#/f/s)	dE_γ/dt (MeV/f/s)	N_γ (#/f)	N_γ Fraction	E_γ (MeV/f)	E_γ Fraction
1.000E-06	6.489E+03	2.241E-02	1.575E+00	2.041E+00	1.000E-06	1.021E-07	1.000E-06	1.217E-07
1.000E-05	8.634E+15	1.296E+00	1.575E+00	2.041E+00	1.517E-05	1.549E-06	1.937E-05	2.358E-06
1.000E-04	8.634E+15	1.296E+00	1.574E+00	2.040E+00	1.569E-04	1.601E-05	2.030E-04	2.472E-05
1.000E-03	8.631E+15	1.296E+00	1.569E+00	2.032E+00	1.571E-03	1.604E-04	2.036E-03	2.478E-04
1.000E-02	8.602E+15	1.295E+00	1.519E+00	1.955E+00	1.547E-02	1.579E-03	1.998E-02	2.432E-03
1.000E-01	8.327E+15	1.287E+00	1.186E+00	1.454E+00	1.372E-01	1.400E-02	1.734E-01	2.111E-02
1.126E-01	6.503E+15	1.226E+00	1.156E+00	1.410E+00	1.520E-01	1.551E-02	1.914E-01	2.331E-02
1.585E-01	6.336E+15	1.220E+00	1.064E+00	1.278E+00	2.029E-01	2.071E-02	2.531E-01	3.082E-02
1.995E-01	5.834E+15	1.201E+00	1.001E+00	1.189E+00	2.452E-01	2.503E-02	3.037E-01	3.698E-02
2.512E-01	5.486E+15	1.188E+00	9.367E-01	1.102E+00	2.953E-01	3.014E-02	3.629E-01	4.418E-02
3.162E-01	5.135E+15	1.176E+00	8.723E-01	1.016E+00	3.541E-01	3.614E-02	4.317E-01	5.256E-02
3.981E-01	4.782E+15	1.165E+00	8.074E-01	9.325E-01	4.229E-01	4.317E-02	5.115E-01	6.228E-02
5.012E-01	4.426E+15	1.155E+00	7.412E-01	8.494E-01	5.027E-01	5.131E-02	6.034E-01	7.346E-02
6.310E-01	4.063E+15	1.146E+00	6.735E-01	7.664E-01	5.945E-01	6.068E-02	7.083E-01	8.623E-02
7.943E-01	3.692E+15	1.138E+00	6.051E-01	6.843E-01	6.989E-01	7.134E-02	8.267E-01	1.007E-01
1.000E+00	3.317E+15	1.131E+00	5.367E-01	6.027E-01	8.164E-01	8.333E-02	9.591E-01	1.168E-01
1.126E+00	2.942E+15	1.123E+00	5.020E-01	5.617E-01	8.817E-01	9.000E-02	1.032E+00	1.257E-01
1.585E+00	2.752E+15	1.119E+00	4.061E-01	4.487E-01	1.090E+00	1.113E-01	1.264E+00	1.539E-01
1.995E+00	2.226E+15	1.105E+00	3.462E-01	3.788E-01	1.245E+00	1.270E-01	1.434E+00	1.746E-01
2.512E+00	1.898E+15	1.094E+00	2.915E-01	3.154E-01	1.409E+00	1.438E-01	1.613E+00	1.964E-01
3.162E+00	1.598E+15	1.082E+00	2.421E-01	2.583E-01	1.583E+00	1.616E-01	1.800E+00	2.191E-01
3.981E+00	1.327E+15	1.067E+00	1.985E-01	2.088E-01	1.763E+00	1.800E-01	1.991E+00	2.424E-01
5.012E+00	1.088E+15	1.052E+00	1.610E-01	1.666E-01	1.948E+00	1.989E-01	2.185E+00	2.660E-01
6.310E+00	8.824E+14	1.035E+00	1.295E-01	1.315E-01	2.137E+00	2.181E-01	2.378E+00	2.895E-01
7.943E+00	7.097E+14	1.016E+00	1.037E-01	1.033E-01	2.327E+00	2.375E-01	2.570E+00	3.129E-01
1.000E+01	5.684E+14	9.959E-01	8.307E-02	8.095E-02	2.519E+00	2.571E-01	2.759E+00	3.359E-01
1.126E+01	4.554E+14	9.744E-01	7.419E-02	7.148E-02	2.618E+00	2.672E-01	2.855E+00	3.476E-01
1.585E+01	4.067E+14	9.635E-01	5.385E-02	5.045E-02	2.912E+00	2.972E-01	3.135E+00	3.817E-01
1.995E+01	2.952E+14	9.368E-01	4.352E-02	4.034E-02	3.112E+00	3.176E-01	3.321E+00	4.044E-01
2.512E+01	2.386E+14	9.269E-01	3.511E-02	3.251E-02	3.315E+00	3.384E-01	3.510E+00	4.273E-01
3.162E+01	1.925E+14	9.257E-01	2.820E-02	2.633E-02	3.521E+00	3.594E-01	3.701E+00	4.506E-01
3.981E+01	1.546E+14	9.335E-01	2.251E-02	2.134E-02	3.729E+00	3.806E-01	3.896E+00	4.743E-01
5.012E+01	1.234E+14	9.479E-01	1.781E-02	1.720E-02	3.936E+00	4.018E-01	4.095E+00	4.985E-01
6.310E+01	9.766E+13	9.654E-01	1.394E-02	1.368E-02	4.142E+00	4.228E-01	4.295E+00	5.229E-01
7.943E+01	7.640E+13	9.814E-01	1.076E-02	1.068E-02	4.344E+00	4.434E-01	4.494E+00	5.471E-01
1.000E+02	5.897E+13	9.925E-01	8.190E-03	8.158E-03	4.539E+00	4.633E-01	4.688E+00	5.707E-01
1.126E+02	4.490E+13	9.960E-01	7.083E-03	7.042E-03	4.635E+00	4.731E-01	4.783E+00	5.824E-01
1.585E+02	3.883E+13	9.942E-01	4.604E-03	4.481E-03	4.903E+00	5.005E-01	5.048E+00	6.145E-01
1.995E+02	2.524E+13	9.733E-01	3.437E-03	3.251E-03	5.068E+00	5.173E-01	5.206E+00	6.339E-01
2.512E+02	1.884E+13	9.460E-01	2.585E-03	2.353E-03	5.224E+00	5.332E-01	5.351E+00	6.515E-01
3.162E+02	1.417E+13	9.105E-01	1.972E-03	1.720E-03	5.372E+00	5.483E-01	5.484E+00	6.676E-01
3.981E+02	1.081E+13	8.725E-01	1.530E-03	1.282E-03	5.515E+00	5.630E-01	5.607E+00	6.826E-01
5.012E+02	8.386E+12	8.383E-01	1.206E-03	9.794E-04	5.656E+00	5.774E-01	5.723E+00	6.968E-01
6.310E+02	6.613E+12	8.119E-01	9.624E-04	7.633E-04	5.797E+00	5.917E-01	5.836E+00	7.105E-01
7.943E+02	5.276E+12	7.931E-01	7.736E-04	6.035E-04	5.939E+00	6.062E-01	5.948E+00	7.241E-01
1.000E+03	4.241E+12	7.801E-01	6.242E-04	4.817E-04	6.083E+00	6.209E-01	6.059E+00	7.377E-01
1.126E+03	3.422E+12	7.716E-01	5.593E-04	4.300E-04	6.157E+00	6.285E-01	6.117E+00	7.447E-01

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Table C.3 – *Continued from previous page.*

Time (s)	Activity (Bq)	ε_γ (MeV)	dN_γ/dt (#/f/s)	dE_γ/dt (MeV/f/s)	N_γ (#/f)	N_γ Fraction	E_γ (MeV/f)	E_γ Fraction
1.585E+03	3.066E+12	7.688E-01	4.051E-04	3.103E-04	6.379E+00	6.511E-01	6.287E+00	7.654E-01
1.995E+03	2.221E+12	7.659E-01	3.223E-04	2.476E-04	6.528E+00	6.663E-01	6.401E+00	7.793E-01
2.512E+03	1.767E+12	7.681E-01	2.528E-04	1.957E-04	6.676E+00	6.815E-01	6.516E+00	7.933E-01
3.162E+03	1.386E+12	7.740E-01	1.952E-04	1.530E-04	6.822E+00	6.963E-01	6.629E+00	8.071E-01
3.981E+03	1.070E+12	7.841E-01	1.482E-04	1.183E-04	6.963E+00	7.107E-01	6.740E+00	8.206E-01
5.012E+03	8.125E+11	7.983E-01	1.108E-04	9.040E-05	7.096E+00	7.243E-01	6.848E+00	8.337E-01
6.310E+03	6.074E+11	8.159E-01	8.167E-05	6.818E-05	7.221E+00	7.371E-01	6.951E+00	8.462E-01
7.943E+03	4.477E+11	8.348E-01	5.945E-05	5.065E-05	7.336E+00	7.488E-01	7.048E+00	8.580E-01
1.000E+04	3.259E+11	8.520E-01	4.276E-05	3.695E-05	7.441E+00	7.596E-01	7.138E+00	8.690E-01
1.126E+04	2.344E+11	8.642E-01	3.594E-05	3.117E-05	7.491E+00	7.646E-01	7.181E+00	8.742E-01
1.585E+04	1.970E+11	8.673E-01	2.162E-05	1.855E-05	7.623E+00	7.781E-01	7.295E+00	8.881E-01
1.995E+04	1.185E+11	8.582E-01	1.548E-05	1.289E-05	7.699E+00	7.859E-01	7.359E+00	8.960E-01
2.512E+04	8.486E+10	8.327E-01	1.133E-05	8.960E-06	7.768E+00	7.929E-01	7.416E+00	9.029E-01
3.162E+04	6.211E+10	7.908E-01	8.515E-06	6.280E-06	7.833E+00	7.995E-01	7.465E+00	9.089E-01
3.981E+04	4.668E+10	7.375E-01	6.529E-06	4.441E-06	7.895E+00	8.058E-01	7.509E+00	9.142E-01
5.012E+04	3.579E+10	6.802E-01	5.058E-06	3.157E-06	7.954E+00	8.119E-01	7.548E+00	9.190E-01
6.310E+04	2.773E+10	6.241E-01	3.947E-06	2.258E-06	8.013E+00	8.179E-01	7.583E+00	9.233E-01
7.943E+04	2.164E+10	5.720E-01	3.099E-06	1.630E-06	8.070E+00	8.237E-01	7.615E+00	9.271E-01
1.000E+05	1.699E+10	5.258E-01	2.446E-06	1.190E-06	8.127E+00	8.296E-01	7.644E+00	9.307E-01
1.126E+05	1.341E+10	4.863E-01	2.169E-06	1.016E-06	8.156E+00	8.325E-01	7.658E+00	9.324E-01
1.585E+05	1.189E+10	4.685E-01	1.538E-06	6.541E-07	8.241E+00	8.412E-01	7.696E+00	9.370E-01
1.995E+05	8.433E+09	4.252E-01	1.234E-06	4.967E-07	8.298E+00	8.470E-01	7.720E+00	9.399E-01
2.512E+05	6.767E+09	4.024E-01	1.007E-06	3.874E-07	8.356E+00	8.529E-01	7.743E+00	9.427E-01
3.162E+05	5.521E+09	3.847E-01	8.367E-07	3.114E-07	8.416E+00	8.590E-01	7.766E+00	9.455E-01
3.981E+05	4.587E+09	3.722E-01	7.052E-07	2.568E-07	8.479E+00	8.655E-01	7.789E+00	9.483E-01
5.012E+05	3.866E+09	3.641E-01	5.991E-07	2.152E-07	8.546E+00	8.723E-01	7.813E+00	9.512E-01
6.310E+05	3.284E+09	3.592E-01	5.102E-07	1.811E-07	8.618E+00	8.797E-01	7.839E+00	9.544E-01
7.943E+05	2.797E+09	3.550E-01	4.341E-07	1.517E-07	8.696E+00	8.876E-01	7.866E+00	9.577E-01
1.000E+06	2.380E+09	3.495E-01	3.683E-07	1.258E-07	8.778E+00	8.960E-01	7.895E+00	9.612E-01
1.126E+06	2.019E+09	3.417E-01	3.380E-07	1.139E-07	8.823E+00	9.005E-01	7.910E+00	9.630E-01
1.585E+06	1.853E+09	3.369E-01	2.618E-07	8.395E-08	8.960E+00	9.146E-01	7.955E+00	9.685E-01
1.995E+06	1.435E+09	3.207E-01	2.180E-07	6.738E-08	9.059E+00	9.246E-01	7.986E+00	9.723E-01
2.512E+06	1.195E+09	3.091E-01	1.782E-07	5.299E-08	9.161E+00	9.351E-01	8.017E+00	9.761E-01
3.162E+06	9.767E+08	2.974E-01	1.416E-07	4.052E-08	9.265E+00	9.457E-01	8.048E+00	9.798E-01
3.981E+06	7.765E+08	2.861E-01	1.083E-07	2.993E-08	9.367E+00	9.561E-01	8.077E+00	9.833E-01
5.012E+06	5.938E+08	2.763E-01	7.884E-08	2.134E-08	9.464E+00	9.660E-01	8.103E+00	9.865E-01
6.310E+06	4.322E+08	2.707E-01	5.401E-08	1.473E-08	9.550E+00	9.748E-01	8.126E+00	9.894E-01
7.943E+06	2.961E+08	2.728E-01	3.446E-08	9.907E-09	9.622E+00	9.822E-01	8.146E+00	9.918E-01
1.000E+07	1.889E+08	2.875E-01	2.027E-08	6.499E-09	9.679E+00	9.879E-01	8.163E+00	9.939E-01
1.126E+07	1.111E+08	3.207E-01	1.491E-08	5.174E-09	9.701E+00	9.902E-01	8.171E+00	9.948E-01
1.585E+07	8.172E+07	3.471E-01	5.500E-09	2.539E-09	9.748E+00	9.949E-01	8.188E+00	9.969E-01
1.995E+07	3.015E+07	4.617E-01	2.665E-09	1.475E-09	9.764E+00	9.966E-01	8.197E+00	9.979E-01
2.512E+07	1.461E+07	5.534E-01	1.311E-09	7.976E-10	9.775E+00	9.977E-01	8.202E+00	9.986E-01
3.162E+07	7.186E+06	6.085E-01	6.815E-10	3.995E-10	9.781E+00	9.984E-01	8.206E+00	9.991E-01
3.981E+07	3.736E+06	5.862E-01	3.880E-10	1.939E-10	9.785E+00	9.988E-01	8.209E+00	9.994E-01
5.012E+07	2.127E+06	4.998E-01	2.526E-10	1.044E-10	9.789E+00	9.991E-01	8.210E+00	9.996E-01
6.310E+07	1.385E+06	4.131E-01	1.873E-10	7.029E-11	9.792E+00	9.994E-01	8.211E+00	9.997E-01
7.943E+07	1.027E+06	3.752E-01	1.494E-10	5.645E-11	9.794E+00	9.997E-01	8.213E+00	9.999E-01
1.000E+08	8.189E+05	3.779E-01	1.224E-10	4.873E-11	9.797E+00	1.000E+00	8.214E+00	1.000E+00

Table C.4: Summary of fission gamma-ray characteristics for ^{233}U with thermal ENDF fission yield libraries.

Time (s)	Activity (Bq)	ε_γ (MeV)	dN_γ/dt (#/f/s)	dE_γ/dt (MeV/f/s)	N_γ (#/f)	N_γ Fraction	E_γ (MeV/f)	E_γ Fraction
1.000E-06	4.382E+08	2.335E-02	3.147E-01	3.044E-01	1.000E-06	1.450E-07	1.000E-06	1.870E-07
1.000E-05	3.053E+16	9.672E-01	3.147E-01	3.044E-01	3.832E-06	5.558E-07	3.739E-06	6.992E-07
1.000E-04	3.053E+16	9.672E-01	3.146E-01	3.043E-01	3.215E-05	4.663E-06	3.113E-05	5.820E-06
1.000E-03	3.052E+16	9.671E-01	3.143E-01	3.039E-01	3.152E-04	4.570E-05	3.048E-04	5.699E-05
1.000E-02	3.049E+16	9.668E-01	3.112E-01	2.999E-01	3.130E-03	4.539E-04	3.022E-03	5.650E-04
1.000E-01	3.019E+16	9.637E-01	2.872E-01	2.708E-01	3.006E-02	4.359E-03	2.870E-02	5.367E-03
1.126E-01	2.786E+16	9.428E-01	2.845E-01	2.677E-01	3.366E-02	4.881E-03	3.209E-02	6.001E-03
1.585E-01	2.760E+16	9.410E-01	2.757E-01	2.580E-01	4.652E-02	6.746E-03	4.416E-02	8.257E-03
1.995E-01	2.675E+16	9.355E-01	2.687E-01	2.504E-01	5.768E-02	8.365E-03	5.458E-02	1.021E-02
2.512E-01	2.607E+16	9.319E-01	2.609E-01	2.422E-01	7.137E-02	1.035E-02	6.732E-02	1.259E-02
3.162E-01	2.531E+16	9.283E-01	2.519E-01	2.330E-01	8.804E-02	1.277E-02	8.276E-02	1.547E-02
3.981E-01	2.444E+16	9.249E-01	2.417E-01	2.227E-01	1.083E-01	1.570E-02	1.014E-01	1.896E-02
5.012E-01	2.345E+16	9.214E-01	2.302E-01	2.113E-01	1.326E-01	1.923E-02	1.238E-01	2.315E-02
6.310E-01	2.233E+16	9.179E-01	2.174E-01	1.987E-01	1.616E-01	2.344E-02	1.504E-01	2.812E-02
7.943E-01	2.109E+16	9.140E-01	2.034E-01	1.851E-01	1.960E-01	2.842E-02	1.817E-01	3.398E-02
1.000E+00	1.973E+16	9.099E-01	1.882E-01	1.704E-01	2.363E-01	3.426E-02	2.183E-01	4.082E-02
1.126E+00	1.826E+16	9.054E-01	1.801E-01	1.626E-01	2.594E-01	3.763E-02	2.393E-01	4.474E-02
1.585E+00	1.747E+16	9.030E-01	1.558E-01	1.395E-01	3.365E-01	4.880E-02	3.086E-01	5.770E-02
1.995E+00	1.511E+16	8.959E-01	1.392E-01	1.240E-01	3.970E-01	5.758E-02	3.627E-01	6.782E-02
2.512E+00	1.350E+16	8.914E-01	1.228E-01	1.090E-01	4.647E-01	6.739E-02	4.229E-01	7.907E-02
3.162E+00	1.191E+16	8.875E-01	1.071E-01	9.470E-02	5.395E-01	7.823E-02	4.891E-01	9.145E-02
3.981E+00	1.039E+16	8.842E-01	9.239E-02	8.143E-02	6.211E-01	9.008E-02	5.612E-01	1.049E-01
5.012E+00	8.963E+15	8.814E-01	7.903E-02	6.943E-02	7.095E-01	1.029E-01	6.390E-01	1.195E-01
6.310E+00	7.667E+15	8.785E-01	6.718E-02	5.879E-02	8.043E-01	1.166E-01	7.222E-01	1.350E-01
7.943E+00	6.517E+15	8.751E-01	5.688E-02	4.952E-02	9.057E-01	1.313E-01	8.106E-01	1.516E-01
1.000E+01	5.518E+15	8.706E-01	4.802E-02	4.155E-02	1.014E+00	1.470E-01	9.043E-01	1.691E-01
1.126E+01	4.658E+15	8.654E-01	4.395E-02	3.792E-02	1.071E+00	1.554E-01	9.543E-01	1.784E-01
1.585E+01	4.264E+15	8.628E-01	3.380E-02	2.899E-02	1.250E+00	1.813E-01	1.108E+00	2.072E-01
1.995E+01	3.279E+15	8.578E-01	2.804E-02	2.409E-02	1.377E+00	1.997E-01	1.217E+00	2.275E-01
2.512E+01	2.720E+15	8.591E-01	2.303E-02	1.995E-02	1.509E+00	2.188E-01	1.331E+00	2.488E-01
3.162E+01	2.234E+15	8.662E-01	1.870E-02	1.645E-02	1.644E+00	2.385E-01	1.449E+00	2.709E-01
3.981E+01	1.814E+15	8.798E-01	1.504E-02	1.351E-02	1.783E+00	2.585E-01	1.572E+00	2.939E-01
5.012E+01	1.459E+15	8.986E-01	1.200E-02	1.104E-02	1.922E+00	2.787E-01	1.698E+00	3.175E-01
6.310E+01	1.164E+15	9.199E-01	9.501E-03	8.931E-03	2.061E+00	2.989E-01	1.828E+00	3.417E-01
7.943E+01	9.217E+14	9.400E-01	7.467E-03	7.134E-03	2.200E+00	3.190E-01	1.959E+00	3.663E-01
1.000E+02	7.244E+14	9.554E-01	5.823E-03	5.611E-03	2.337E+00	3.389E-01	2.090E+00	3.908E-01
1.126E+02	5.649E+14	9.636E-01	5.110E-03	4.929E-03	2.405E+00	3.488E-01	2.156E+00	4.032E-01
1.585E+02	4.957E+14	9.647E-01	3.483E-03	3.328E-03	2.603E+00	3.774E-01	2.346E+00	4.386E-01
1.995E+02	3.379E+14	9.555E-01	2.696E-03	2.534E-03	2.729E+00	3.958E-01	2.466E+00	4.611E-01
2.512E+02	2.615E+14	9.402E-01	2.102E-03	1.935E-03	2.853E+00	4.138E-01	2.582E+00	4.827E-01
3.162E+02	2.039E+14	9.204E-01	1.660E-03	1.493E-03	2.976E+00	4.315E-01	2.693E+00	5.036E-01
3.981E+02	1.610E+14	8.998E-01	1.329E-03	1.172E-03	3.098E+00	4.493E-01	2.802E+00	5.240E-01
5.012E+02	1.289E+14	8.822E-01	1.074E-03	9.338E-04	3.222E+00	4.672E-01	2.911E+00	5.443E-01
6.310E+02	1.042E+14	8.694E-01	8.723E-04	7.510E-04	3.348E+00	4.856E-01	3.020E+00	5.647E-01
7.943E+02	8.462E+13	8.610E-01	7.089E-04	6.064E-04	3.477E+00	5.043E-01	3.131E+00	5.854E-01
1.000E+03	6.877E+13	8.554E-01	5.745E-04	4.892E-04	3.609E+00	5.234E-01	3.244E+00	6.065E-01
1.126E+03	5.573E+13	8.516E-01	5.146E-04	4.375E-04	3.678E+00	5.334E-01	3.302E+00	6.174E-01

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Table C.4 – *Continued from previous page.*

Time (s)	Activity (Bq)	ε_γ (MeV)	dN_γ/dt (#/f/s)	dE_γ/dt (MeV/f/s)	N_γ (#/f)	N_γ Fraction	E_γ (MeV/f)	E_γ Fraction
1.585E+03	4.992E+13	8.502E-01	3.700E-04	3.141E-04	3.881E+00	5.628E-01	3.474E+00	6.497E-01
1.995E+03	3.589E+13	8.489E-01	2.918E-04	2.483E-04	4.017E+00	5.825E-01	3.590E+00	6.712E-01
2.512E+03	2.831E+13	8.508E-01	2.269E-04	1.941E-04	4.151E+00	6.019E-01	3.704E+00	6.926E-01
3.162E+03	2.201E+13	8.557E-01	1.737E-04	1.501E-04	4.281E+00	6.208E-01	3.816E+00	7.135E-01
3.981E+03	1.685E+13	8.640E-01	1.313E-04	1.149E-04	4.406E+00	6.389E-01	3.925E+00	7.338E-01
5.012E+03	1.274E+13	8.752E-01	9.831E-05	8.736E-05	4.524E+00	6.561E-01	4.029E+00	7.533E-01
6.310E+03	9.537E+12	8.886E-01	7.297E-05	6.584E-05	4.635E+00	6.722E-01	4.128E+00	7.719E-01
7.943E+03	7.079E+12	9.022E-01	5.370E-05	4.909E-05	4.739E+00	6.872E-01	4.222E+00	7.894E-01
1.000E+04	5.209E+12	9.142E-01	3.912E-05	3.608E-05	4.834E+00	7.011E-01	4.310E+00	8.058E-01
1.126E+04	3.795E+12	9.224E-01	3.309E-05	3.058E-05	4.880E+00	7.077E-01	4.352E+00	8.137E-01
1.585E+04	3.210E+12	9.243E-01	2.026E-05	1.852E-05	5.002E+00	7.254E-01	4.464E+00	8.347E-01
1.995E+04	1.965E+12	9.142E-01	1.469E-05	1.303E-05	5.074E+00	7.358E-01	4.529E+00	8.468E-01
2.512E+04	1.425E+12	8.873E-01	1.095E-05	9.210E-06	5.140E+00	7.454E-01	4.587E+00	8.576E-01
3.162E+04	1.062E+12	8.413E-01	8.415E-06	6.574E-06	5.203E+00	7.545E-01	4.638E+00	8.672E-01
3.981E+04	8.163E+11	7.813E-01	6.634E-06	4.757E-06	5.265E+00	7.635E-01	4.684E+00	8.759E-01
5.012E+04	6.436E+11	7.170E-01	5.295E-06	3.475E-06	5.326E+00	7.724E-01	4.727E+00	8.838E-01
6.310E+04	5.137E+11	6.563E-01	4.240E-06	2.559E-06	5.388E+00	7.814E-01	4.766E+00	8.911E-01
7.943E+04	4.113E+11	6.036E-01	3.385E-06	1.897E-06	5.450E+00	7.904E-01	4.802E+00	8.979E-01
1.000E+05	3.284E+11	5.603E-01	2.683E-06	1.412E-06	5.513E+00	7.994E-01	4.836E+00	9.043E-01
1.126E+05	2.603E+11	5.263E-01	2.371E-06	1.213E-06	5.544E+00	8.041E-01	4.853E+00	9.074E-01
1.585E+05	2.300E+11	5.118E-01	1.637E-06	7.848E-07	5.636E+00	8.174E-01	4.899E+00	9.159E-01
1.995E+05	1.588E+11	4.794E-01	1.268E-06	5.886E-07	5.696E+00	8.260E-01	4.927E+00	9.212E-01
2.512E+05	1.230E+11	4.642E-01	9.858E-07	4.480E-07	5.754E+00	8.345E-01	4.954E+00	9.262E-01
3.162E+05	9.563E+10	4.545E-01	7.703E-07	3.473E-07	5.811E+00	8.428E-01	4.979E+00	9.311E-01
3.981E+05	7.473E+10	4.509E-01	6.030E-07	2.740E-07	5.868E+00	8.509E-01	5.005E+00	9.358E-01
5.012E+05	5.850E+10	4.544E-01	4.696E-07	2.183E-07	5.923E+00	8.589E-01	5.030E+00	9.406E-01
6.310E+05	4.556E+10	4.649E-01	3.614E-07	1.739E-07	5.977E+00	8.668E-01	5.056E+00	9.453E-01
7.943E+05	3.506E+10	4.813E-01	2.734E-07	1.371E-07	6.029E+00	8.743E-01	5.081E+00	9.501E-01
1.000E+06	2.652E+10	5.016E-01	2.030E-07	1.064E-07	6.078E+00	8.814E-01	5.106E+00	9.548E-01
1.126E+06	1.969E+10	5.242E-01	1.730E-07	9.275E-08	6.101E+00	8.848E-01	5.119E+00	9.571E-01
1.585E+06	1.678E+10	5.362E-01	1.080E-07	6.150E-08	6.166E+00	8.942E-01	5.154E+00	9.637E-01
1.995E+06	1.048E+10	5.693E-01	7.888E-08	4.618E-08	6.204E+00	8.997E-01	5.176E+00	9.678E-01
2.512E+06	7.652E+09	5.854E-01	5.795E-08	3.424E-08	6.239E+00	9.049E-01	5.197E+00	9.717E-01
3.162E+06	5.622E+09	5.908E-01	4.275E-08	2.490E-08	6.272E+00	9.096E-01	5.216E+00	9.753E-01
3.981E+06	4.147E+09	5.824E-01	3.169E-08	1.775E-08	6.303E+00	9.140E-01	5.234E+00	9.786E-01
5.012E+06	3.074E+09	5.602E-01	2.381E-08	1.259E-08	6.331E+00	9.182E-01	5.249E+00	9.815E-01
6.310E+06	2.310E+09	5.287E-01	1.841E-08	9.119E-09	6.359E+00	9.221E-01	5.263E+00	9.841E-01
7.943E+06	1.786E+09	4.953E-01	1.472E-08	6.849E-09	6.386E+00	9.261E-01	5.276E+00	9.866E-01
1.000E+07	1.428E+09	4.653E-01	1.206E-08	5.255E-09	6.413E+00	9.301E-01	5.289E+00	9.889E-01
1.126E+07	1.170E+09	4.357E-01	1.093E-08	4.564E-09	6.428E+00	9.322E-01	5.295E+00	9.901E-01
1.585E+07	1.060E+09	4.177E-01	8.233E-09	2.803E-09	6.472E+00	9.385E-01	5.312E+00	9.932E-01
1.995E+07	7.987E+08	3.404E-01	6.853E-09	1.812E-09	6.503E+00	9.430E-01	5.321E+00	9.950E-01
2.512E+07	6.648E+08	2.644E-01	5.855E-09	1.057E-09	6.536E+00	9.478E-01	5.329E+00	9.964E-01
3.162E+07	5.680E+08	1.806E-01	5.225E-09	5.685E-10	6.572E+00	9.530E-01	5.334E+00	9.974E-01
3.981E+07	5.069E+08	1.088E-01	4.889E-09	3.082E-10	6.613E+00	9.590E-01	5.338E+00	9.980E-01
5.012E+07	4.743E+08	6.303E-02	4.738E-09	1.973E-10	6.663E+00	9.662E-01	5.340E+00	9.985E-01
6.310E+07	4.596E+08	4.164E-02	4.678E-09	1.596E-10	6.724E+00	9.751E-01	5.343E+00	9.990E-01
7.943E+07	4.538E+08	3.411E-02	4.655E-09	1.481E-10	6.800E+00	9.861E-01	5.345E+00	9.994E-01
1.000E+08	4.516E+08	3.182E-02	4.647E-09	1.439E-10	6.896E+00	1.000E+00	5.348E+00	1.000E+00

Table C.5: Summary of fission gamma-ray characteristics for ^{233}U with fast ENDF fission yield libraries.

Time (s)	Activity (Bq)	ε_γ (MeV)	dN_γ/dt (#/f/s)	dE_γ/dt (MeV/f/s)	N_γ (#/f)	N_γ Fraction	E_γ (MeV/f)	E_γ Fraction
1.000E-06	4.382E+08	2.335E-02	2.991E-01	2.867E-01	1.000E-06	1.443E-07	1.000E-06	1.860E-07
1.000E-05	2.902E+16	9.584E-01	2.991E-01	2.867E-01	3.692E-06	5.330E-07	3.580E-06	6.659E-07
1.000E-04	2.902E+16	9.584E-01	2.991E-01	2.867E-01	3.062E-05	4.419E-06	2.938E-05	5.465E-06
1.000E-03	2.902E+16	9.583E-01	2.988E-01	2.863E-01	2.997E-04	4.326E-05	2.872E-04	5.342E-05
1.000E-02	2.899E+16	9.581E-01	2.962E-01	2.830E-01	2.977E-03	4.297E-04	2.849E-03	5.299E-04
1.000E-01	2.873E+16	9.556E-01	2.747E-01	2.581E-01	2.867E-02	4.138E-03	2.720E-02	5.059E-03
1.126E-01	2.665E+16	9.397E-01	2.723E-01	2.556E-01	3.211E-02	4.635E-03	3.044E-02	5.661E-03
1.585E-01	2.642E+16	9.384E-01	2.643E-01	2.470E-01	4.443E-02	6.413E-03	4.197E-02	7.806E-03
1.995E-01	2.564E+16	9.344E-01	2.578E-01	2.403E-01	5.513E-02	7.958E-03	5.196E-02	9.664E-03
2.512E-01	2.501E+16	9.319E-01	2.505E-01	2.328E-01	6.827E-02	9.855E-03	6.419E-02	1.194E-02
3.162E-01	2.430E+16	9.293E-01	2.420E-01	2.243E-01	8.428E-02	1.217E-02	7.904E-02	1.470E-02
3.981E-01	2.348E+16	9.268E-01	2.323E-01	2.147E-01	1.037E-01	1.497E-02	9.702E-02	1.805E-02
5.012E-01	2.254E+16	9.242E-01	2.213E-01	2.039E-01	1.271E-01	1.835E-02	1.186E-01	2.206E-02
6.310E-01	2.147E+16	9.213E-01	2.092E-01	1.920E-01	1.550E-01	2.238E-02	1.443E-01	2.684E-02
7.943E-01	2.029E+16	9.180E-01	1.957E-01	1.789E-01	1.881E-01	2.715E-02	1.746E-01	3.247E-02
1.000E+00	1.898E+16	9.144E-01	1.812E-01	1.650E-01	2.268E-01	3.274E-02	2.099E-01	3.905E-02
1.126E+00	1.758E+16	9.104E-01	1.735E-01	1.576E-01	2.492E-01	3.597E-02	2.303E-01	4.283E-02
1.585E+00	1.683E+16	9.083E-01	1.503E-01	1.356E-01	3.235E-01	4.669E-02	2.975E-01	5.534E-02
1.995E+00	1.458E+16	9.024E-01	1.344E-01	1.209E-01	3.819E-01	5.513E-02	3.502E-01	6.513E-02
2.512E+00	1.304E+16	8.991E-01	1.188E-01	1.065E-01	4.473E-01	6.456E-02	4.089E-01	7.605E-02
3.162E+00	1.152E+16	8.966E-01	1.037E-01	9.281E-02	5.196E-01	7.501E-02	4.737E-01	8.811E-02
3.981E+00	1.006E+16	8.950E-01	8.955E-02	8.005E-02	5.988E-01	8.643E-02	5.445E-01	1.013E-01
5.012E+00	8.687E+15	8.939E-01	7.666E-02	6.842E-02	6.844E-01	9.879E-02	6.210E-01	1.155E-01
6.310E+00	7.437E+15	8.925E-01	6.525E-02	5.808E-02	7.765E-01	1.121E-01	7.031E-01	1.308E-01
7.943E+00	6.330E+15	8.901E-01	5.536E-02	4.906E-02	8.750E-01	1.263E-01	7.906E-01	1.470E-01
1.000E+01	5.370E+15	8.862E-01	4.686E-02	4.129E-02	9.801E-01	1.415E-01	8.835E-01	1.643E-01
1.126E+01	4.546E+15	8.811E-01	4.296E-02	3.774E-02	1.037E+00	1.496E-01	9.332E-01	1.736E-01
1.585E+01	4.168E+15	8.784E-01	3.321E-02	2.898E-02	1.211E+00	1.749E-01	1.086E+00	2.021E-01
1.995E+01	3.222E+15	8.726E-01	2.767E-02	2.416E-02	1.336E+00	1.929E-01	1.195E+00	2.223E-01
2.512E+01	2.684E+15	8.731E-01	2.281E-02	2.005E-02	1.467E+00	2.117E-01	1.310E+00	2.436E-01
3.162E+01	2.213E+15	8.791E-01	1.861E-02	1.658E-02	1.602E+00	2.312E-01	1.429E+00	2.657E-01
3.981E+01	1.805E+15	8.911E-01	1.504E-02	1.365E-02	1.739E+00	2.511E-01	1.553E+00	2.888E-01
5.012E+01	1.459E+15	9.078E-01	1.206E-02	1.117E-02	1.879E+00	2.712E-01	1.680E+00	3.126E-01
6.310E+01	1.170E+15	9.265E-01	9.591E-03	9.052E-03	2.019E+00	2.915E-01	1.812E+00	3.370E-01
7.943E+01	9.304E+14	9.438E-01	7.569E-03	7.239E-03	2.160E+00	3.117E-01	1.945E+00	3.617E-01
1.000E+02	7.343E+14	9.563E-01	5.923E-03	5.698E-03	2.298E+00	3.318E-01	2.078E+00	3.865E-01
1.126E+02	5.746E+14	9.620E-01	5.205E-03	5.007E-03	2.368E+00	3.419E-01	2.145E+00	3.990E-01
1.585E+02	5.049E+14	9.620E-01	3.557E-03	3.381E-03	2.569E+00	3.709E-01	2.338E+00	4.348E-01
1.995E+02	3.451E+14	9.503E-01	2.753E-03	2.571E-03	2.699E+00	3.896E-01	2.460E+00	4.575E-01
2.512E+02	2.671E+14	9.339E-01	2.147E-03	1.961E-03	2.826E+00	4.079E-01	2.577E+00	4.793E-01
3.162E+02	2.083E+14	9.135E-01	1.696E-03	1.514E-03	2.951E+00	4.259E-01	2.690E+00	5.003E-01
3.981E+02	1.645E+14	8.926E-01	1.358E-03	1.188E-03	3.076E+00	4.439E-01	2.800E+00	5.209E-01
5.012E+02	1.317E+14	8.750E-01	1.099E-03	9.478E-04	3.202E+00	4.622E-01	2.911E+00	5.414E-01
6.310E+02	1.066E+14	8.625E-01	8.956E-04	7.651E-04	3.332E+00	4.809E-01	3.022E+00	5.620E-01
7.943E+02	8.688E+13	8.543E-01	7.302E-04	6.200E-04	3.464E+00	5.001E-01	3.135E+00	5.831E-01
1.000E+03	7.084E+13	8.490E-01	5.939E-04	5.020E-04	3.600E+00	5.197E-01	3.250E+00	6.045E-01
1.126E+03	5.761E+13	8.454E-01	5.327E-04	4.496E-04	3.671E+00	5.300E-01	3.310E+00	6.157E-01

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Table C.5 – *Continued from previous page.*

Time (s)	Activity (Bq)	ε_γ (MeV)	dN_γ/dt (#/f/s)	dE_γ/dt (MeV/f/s)	N_γ (#/f)	N_γ Fraction	E_γ (MeV/f)	E_γ Fraction
1.585E+03	5.168E+13	8.439E-01	3.848E-04	3.239E-04	3.882E+00	5.604E-01	3.488E+00	6.487E-01
1.995E+03	3.733E+13	8.417E-01	3.045E-04	2.565E-04	4.023E+00	5.808E-01	3.607E+00	6.708E-01
2.512E+03	2.954E+13	8.424E-01	2.373E-04	2.006E-04	4.163E+00	6.010E-01	3.725E+00	6.928E-01
3.162E+03	2.302E+13	8.454E-01	1.822E-04	1.552E-04	4.300E+00	6.207E-01	3.841E+00	7.143E-01
3.981E+03	1.768E+13	8.514E-01	1.380E-04	1.188E-04	4.431E+00	6.396E-01	3.953E+00	7.352E-01
5.012E+03	1.339E+13	8.605E-01	1.032E-04	8.998E-05	4.555E+00	6.575E-01	4.060E+00	7.552E-01
6.310E+03	1.001E+13	8.720E-01	7.633E-05	6.752E-05	4.672E+00	6.743E-01	4.162E+00	7.742E-01
7.943E+03	7.405E+12	8.845E-01	5.587E-05	5.007E-05	4.780E+00	6.899E-01	4.258E+00	7.921E-01
1.000E+04	5.420E+12	8.961E-01	4.044E-05	3.659E-05	4.879E+00	7.042E-01	4.348E+00	8.086E-01
1.126E+04	3.923E+12	9.049E-01	3.410E-05	3.094E-05	4.926E+00	7.110E-01	4.390E+00	8.165E-01
1.585E+04	3.308E+12	9.074E-01	2.070E-05	1.864E-05	5.051E+00	7.292E-01	4.504E+00	8.377E-01
1.995E+04	2.008E+12	9.007E-01	1.496E-05	1.312E-05	5.125E+00	7.397E-01	4.569E+00	8.498E-01
2.512E+04	1.451E+12	8.772E-01	1.110E-05	9.269E-06	5.192E+00	7.494E-01	4.627E+00	8.606E-01
3.162E+04	1.077E+12	8.349E-01	8.514E-06	6.629E-06	5.256E+00	7.586E-01	4.679E+00	8.702E-01
3.981E+04	8.259E+11	7.786E-01	6.689E-06	4.797E-06	5.318E+00	7.676E-01	4.725E+00	8.789E-01
5.012E+04	6.489E+11	7.171E-01	5.316E-06	3.499E-06	5.380E+00	7.766E-01	4.768E+00	8.869E-01
6.310E+04	5.157E+11	6.583E-01	4.237E-06	2.569E-06	5.442E+00	7.855E-01	4.808E+00	8.942E-01
7.943E+04	4.110E+11	6.063E-01	3.367E-06	1.896E-06	5.504E+00	7.945E-01	4.844E+00	9.010E-01
1.000E+05	3.266E+11	5.631E-01	2.656E-06	1.405E-06	5.566E+00	8.034E-01	4.878E+00	9.073E-01
1.126E+05	2.577E+11	5.288E-01	2.343E-06	1.205E-06	5.597E+00	8.080E-01	4.894E+00	9.103E-01
1.585E+05	2.273E+11	5.141E-01	1.608E-06	7.733E-07	5.688E+00	8.210E-01	4.940E+00	9.188E-01
1.995E+05	1.560E+11	4.809E-01	1.242E-06	5.778E-07	5.746E+00	8.295E-01	4.967E+00	9.239E-01
2.512E+05	1.205E+11	4.652E-01	9.627E-07	4.376E-07	5.803E+00	8.377E-01	4.994E+00	9.288E-01
3.162E+05	9.339E+10	4.546E-01	7.514E-07	3.381E-07	5.859E+00	8.458E-01	5.019E+00	9.335E-01
3.981E+05	7.289E+10	4.500E-01	5.880E-07	2.659E-07	5.914E+00	8.537E-01	5.044E+00	9.381E-01
5.012E+05	5.704E+10	4.523E-01	4.580E-07	2.114E-07	5.968E+00	8.614E-01	5.068E+00	9.427E-01
6.310E+05	4.443E+10	4.616E-01	3.524E-07	1.680E-07	6.020E+00	8.690E-01	5.093E+00	9.473E-01
7.943E+05	3.419E+10	4.767E-01	2.665E-07	1.321E-07	6.071E+00	8.763E-01	5.117E+00	9.518E-01
1.000E+06	2.585E+10	4.958E-01	1.976E-07	1.022E-07	6.119E+00	8.832E-01	5.141E+00	9.563E-01
1.126E+06	1.917E+10	5.172E-01	1.683E-07	8.901E-08	6.142E+00	8.866E-01	5.154E+00	9.585E-01
1.585E+06	1.633E+10	5.288E-01	1.048E-07	5.883E-08	6.205E+00	8.956E-01	5.187E+00	9.648E-01
1.995E+06	1.017E+10	5.612E-01	7.639E-08	4.411E-08	6.242E+00	9.010E-01	5.209E+00	9.688E-01
2.512E+06	7.411E+09	5.774E-01	5.612E-08	3.273E-08	6.276E+00	9.059E-01	5.228E+00	9.725E-01
3.162E+06	5.444E+09	5.833E-01	4.147E-08	2.387E-08	6.308E+00	9.105E-01	5.247E+00	9.759E-01
3.981E+06	4.023E+09	5.756E-01	3.087E-08	1.711E-08	6.337E+00	9.148E-01	5.264E+00	9.790E-01
5.012E+06	2.995E+09	5.543E-01	2.334E-08	1.223E-08	6.365E+00	9.188E-01	5.279E+00	9.818E-01
6.310E+06	2.264E+09	5.240E-01	1.814E-08	8.926E-09	6.392E+00	9.227E-01	5.292E+00	9.844E-01
7.943E+06	1.760E+09	4.920E-01	1.458E-08	6.750E-09	6.419E+00	9.265E-01	5.305E+00	9.868E-01
1.000E+07	1.414E+09	4.631E-01	1.198E-08	5.200E-09	6.446E+00	9.305E-01	5.318E+00	9.890E-01
1.126E+07	1.162E+09	4.341E-01	1.086E-08	4.521E-09	6.461E+00	9.326E-01	5.324E+00	9.902E-01
1.585E+07	1.054E+09	4.161E-01	8.197E-09	2.778E-09	6.504E+00	9.389E-01	5.340E+00	9.933E-01
1.995E+07	7.952E+08	3.389E-01	6.830E-09	1.797E-09	6.535E+00	9.433E-01	5.350E+00	9.950E-01
2.512E+07	6.626E+08	2.631E-01	5.842E-09	1.049E-09	6.568E+00	9.480E-01	5.357E+00	9.964E-01
3.162E+07	5.667E+08	1.796E-01	5.218E-09	5.651E-10	6.604E+00	9.532E-01	5.362E+00	9.974E-01
3.981E+07	5.062E+08	1.083E-01	4.885E-09	3.073E-10	6.645E+00	9.592E-01	5.366E+00	9.981E-01
5.012E+07	4.739E+08	6.291E-02	4.737E-09	1.976E-10	6.695E+00	9.664E-01	5.369E+00	9.985E-01
6.310E+07	4.595E+08	4.171E-02	4.678E-09	1.602E-10	6.756E+00	9.752E-01	5.371E+00	9.990E-01
7.943E+07	4.538E+08	3.424E-02	4.655E-09	1.487E-10	6.832E+00	9.862E-01	5.373E+00	9.994E-01
1.000E+08	4.516E+08	3.195E-02	4.648E-09	1.445E-10	6.928E+00	1.000E+00	5.376E+00	1.000E+00

Table C.6: Summary of fission gamma-ray characteristics for ^{233}U with 14-MeV ENDF fission yield libraries.

Time (s)	Activity (Bq)	ε_γ (MeV)	dN_γ/dt (#/f/s)	dE_γ/dt (MeV/f/s)	N_γ (#/f)	N_γ Fraction	E_γ (MeV/f)	E_γ Fraction
1.000E-06	4.382E+08	2.335E-02	4.323E-01	4.531E-01	1.000E-06	1.554E-07	1.000E-06	2.018E-07
1.000E-05	4.194E+16	1.048E+00	4.322E-01	4.530E-01	4.890E-06	7.599E-07	5.077E-06	1.025E-06
1.000E-04	4.193E+16	1.048E+00	4.322E-01	4.530E-01	4.379E-05	6.805E-06	4.584E-05	9.253E-06
1.000E-03	4.193E+16	1.048E+00	4.316E-01	4.519E-01	4.325E-04	6.721E-05	4.530E-04	9.143E-05
1.000E-02	4.187E+16	1.047E+00	4.257E-01	4.445E-01	4.291E-03	6.667E-04	4.487E-03	9.055E-04
1.000E-01	4.130E+16	1.044E+00	3.817E-01	3.905E-01	4.063E-02	6.313E-03	4.206E-02	8.489E-03
1.126E-01	3.703E+16	1.023E+00	3.770E-01	3.849E-01	4.541E-02	7.055E-03	4.694E-02	9.475E-03
1.585E-01	3.657E+16	1.021E+00	3.615E-01	3.677E-01	6.235E-02	9.689E-03	6.422E-02	1.296E-02
1.995E-01	3.507E+16	1.017E+00	3.496E-01	3.544E-01	7.693E-02	1.195E-02	7.902E-02	1.595E-02
2.512E-01	3.391E+16	1.014E+00	3.362E-01	3.398E-01	9.466E-02	1.471E-02	9.697E-02	1.957E-02
3.162E-01	3.261E+16	1.011E+00	3.211E-01	3.240E-01	1.160E-01	1.803E-02	1.185E-01	2.392E-02
3.981E-01	3.115E+16	1.009E+00	3.045E-01	3.066E-01	1.416E-01	2.201E-02	1.444E-01	2.914E-02
5.012E-01	2.954E+16	1.007E+00	2.863E-01	2.877E-01	1.721E-01	2.674E-02	1.750E-01	3.532E-02
6.310E-01	2.777E+16	1.005E+00	2.665E-01	2.670E-01	2.080E-01	3.231E-02	2.110E-01	4.259E-02
7.943E-01	2.585E+16	1.002E+00	2.455E-01	2.451E-01	2.498E-01	3.881E-02	2.528E-01	5.103E-02
1.000E+00	2.382E+16	9.983E-01	2.238E-01	2.224E-01	2.980E-01	4.631E-02	3.009E-01	6.073E-02
1.126E+00	2.171E+16	9.937E-01	2.125E-01	2.105E-01	3.255E-01	5.058E-02	3.282E-01	6.623E-02
1.585E+00	2.061E+16	9.910E-01	1.797E-01	1.764E-01	4.155E-01	6.456E-02	4.170E-01	8.415E-02
1.995E+00	1.743E+16	9.817E-01	1.580E-01	1.540E-01	4.848E-01	7.533E-02	4.847E-01	9.784E-02
2.512E+00	1.533E+16	9.746E-01	1.372E-01	1.327E-01	5.610E-01	8.718E-02	5.588E-01	1.128E-01
3.162E+00	1.331E+16	9.672E-01	1.174E-01	1.127E-01	6.438E-01	1.000E-01	6.386E-01	1.289E-01
3.981E+00	1.139E+16	9.596E-01	9.915E-02	9.438E-02	7.325E-01	1.138E-01	7.234E-01	1.460E-01
5.012E+00	9.619E+15	9.518E-01	8.270E-02	7.801E-02	8.262E-01	1.284E-01	8.122E-01	1.639E-01
6.310E+00	8.023E+15	9.433E-01	6.834E-02	6.379E-02	9.242E-01	1.436E-01	9.042E-01	1.825E-01
7.943E+00	6.630E+15	9.333E-01	5.615E-02	5.175E-02	1.026E+00	1.594E-01	9.986E-01	2.015E-01
1.000E+01	5.447E+15	9.216E-01	4.600E-02	4.177E-02	1.131E+00	1.757E-01	1.095E+00	2.210E-01
1.126E+01	4.462E+15	9.081E-01	4.148E-02	3.737E-02	1.186E+00	1.843E-01	1.145E+00	2.310E-01
1.585E+01	4.024E+15	9.009E-01	3.075E-02	2.713E-02	1.352E+00	2.101E-01	1.293E+00	2.609E-01
1.995E+01	2.983E+15	8.822E-01	2.506E-02	2.191E-02	1.466E+00	2.278E-01	1.393E+00	2.812E-01
2.512E+01	2.431E+15	8.744E-01	2.033E-02	1.774E-02	1.584E+00	2.461E-01	1.496E+00	3.019E-01
3.162E+01	1.972E+15	8.726E-01	1.641E-02	1.440E-02	1.703E+00	2.646E-01	1.600E+00	3.230E-01
3.981E+01	1.592E+15	8.772E-01	1.319E-02	1.170E-02	1.824E+00	2.835E-01	1.707E+00	3.445E-01
5.012E+01	1.280E+15	8.865E-01	1.056E-02	9.473E-03	1.947E+00	3.025E-01	1.816E+00	3.665E-01
6.310E+01	1.024E+15	8.974E-01	8.410E-03	7.626E-03	2.070E+00	3.216E-01	1.927E+00	3.889E-01
7.943E+01	8.159E+14	9.067E-01	6.661E-03	6.072E-03	2.193E+00	3.407E-01	2.039E+00	4.115E-01
1.000E+02	6.462E+14	9.115E-01	5.240E-03	4.770E-03	2.315E+00	3.598E-01	2.150E+00	4.340E-01
1.126E+02	5.083E+14	9.104E-01	4.618E-03	4.190E-03	2.377E+00	3.694E-01	2.207E+00	4.454E-01
1.585E+02	4.480E+14	9.074E-01	3.187E-03	2.839E-03	2.556E+00	3.972E-01	2.368E+00	4.780E-01
1.995E+02	3.092E+14	8.908E-01	2.480E-03	2.172E-03	2.673E+00	4.153E-01	2.471E+00	4.987E-01
2.512E+02	2.406E+14	8.757E-01	1.936E-03	1.667E-03	2.787E+00	4.330E-01	2.570E+00	5.187E-01
3.162E+02	1.878E+14	8.611E-01	1.520E-03	1.293E-03	2.899E+00	4.505E-01	2.666E+00	5.381E-01
3.981E+02	1.475E+14	8.501E-01	1.204E-03	1.016E-03	3.011E+00	4.678E-01	2.761E+00	5.572E-01
5.012E+02	1.168E+14	8.438E-01	9.602E-04	8.080E-04	3.122E+00	4.852E-01	2.855E+00	5.762E-01
6.310E+02	9.315E+13	8.415E-01	7.702E-04	6.478E-04	3.235E+00	5.026E-01	2.949E+00	5.953E-01
7.943E+02	7.472E+13	8.411E-01	6.194E-04	5.209E-04	3.348E+00	5.202E-01	3.045E+00	6.145E-01
1.000E+03	6.009E+13	8.410E-01	4.979E-04	4.184E-04	3.463E+00	5.381E-01	3.141E+00	6.340E-01
1.126E+03	4.830E+13	8.404E-01	4.446E-04	3.735E-04	3.522E+00	5.473E-01	3.191E+00	6.441E-01

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Table C.6 – *Continued from previous page.*

Time (s)	Activity (Bq)	ε_γ (MeV)	dN_γ/dt (#/f/s)	dE_γ/dt (MeV/f/s)	N_γ (#/f)	N_γ Fraction	E_γ (MeV/f)	E_γ Fraction
1.585E+03	4.313E+13	8.400E-01	3.185E-04	2.670E-04	3.697E+00	5.745E-01	3.338E+00	6.737E-01
1.995E+03	3.090E+13	8.382E-01	2.516E-04	2.107E-04	3.814E+00	5.927E-01	3.436E+00	6.935E-01
2.512E+03	2.441E+13	8.373E-01	1.963E-04	1.643E-04	3.930E+00	6.107E-01	3.533E+00	7.131E-01
3.162E+03	1.904E+13	8.373E-01	1.508E-04	1.265E-04	4.043E+00	6.282E-01	3.628E+00	7.322E-01
3.981E+03	1.463E+13	8.386E-01	1.141E-04	9.604E-05	4.151E+00	6.451E-01	3.719E+00	7.506E-01
5.012E+03	1.107E+13	8.416E-01	8.534E-05	7.217E-05	4.254E+00	6.611E-01	3.805E+00	7.680E-01
6.310E+03	8.279E+12	8.456E-01	6.324E-05	5.373E-05	4.351E+00	6.760E-01	3.887E+00	7.845E-01
7.943E+03	6.135E+12	8.496E-01	4.664E-05	3.973E-05	4.440E+00	6.900E-01	3.963E+00	7.999E-01
1.000E+04	4.525E+12	8.518E-01	3.437E-05	2.923E-05	4.524E+00	7.029E-01	4.034E+00	8.143E-01
1.126E+04	3.334E+12	8.504E-01	2.939E-05	2.491E-05	4.564E+00	7.092E-01	4.068E+00	8.211E-01
1.585E+04	2.851E+12	8.476E-01	1.889E-05	1.565E-05	4.675E+00	7.264E-01	4.162E+00	8.399E-01
1.995E+04	1.833E+12	8.282E-01	1.424E-05	1.143E-05	4.743E+00	7.369E-01	4.217E+00	8.511E-01
2.512E+04	1.381E+12	8.031E-01	1.088E-05	8.355E-06	4.807E+00	7.470E-01	4.268E+00	8.615E-01
3.162E+04	1.055E+12	7.683E-01	8.392E-06	6.100E-06	4.870E+00	7.568E-01	4.315E+00	8.709E-01
3.981E+04	8.141E+11	7.269E-01	6.512E-06	4.451E-06	4.931E+00	7.662E-01	4.358E+00	8.797E-01
5.012E+04	6.317E+11	6.836E-01	5.062E-06	3.250E-06	4.991E+00	7.755E-01	4.398E+00	8.877E-01
6.310E+04	4.911E+11	6.420E-01	3.945E-06	2.385E-06	5.049E+00	7.846E-01	4.435E+00	8.950E-01
7.943E+04	3.827E+11	6.046E-01	3.082E-06	1.766E-06	5.107E+00	7.935E-01	4.469E+00	9.019E-01
1.000E+05	2.990E+11	5.730E-01	2.407E-06	1.317E-06	5.163E+00	8.023E-01	4.500E+00	9.083E-01
1.126E+05	2.335E+11	5.473E-01	2.116E-06	1.135E-06	5.192E+00	8.067E-01	4.516E+00	9.114E-01
1.585E+05	2.053E+11	5.361E-01	1.446E-06	7.369E-07	5.273E+00	8.194E-01	4.559E+00	9.201E-01
1.995E+05	1.403E+11	5.095E-01	1.114E-06	5.518E-07	5.326E+00	8.276E-01	4.585E+00	9.254E-01
2.512E+05	1.081E+11	4.952E-01	8.603E-07	4.161E-07	5.377E+00	8.355E-01	4.610E+00	9.305E-01
3.162E+05	8.346E+10	4.837E-01	6.669E-07	3.173E-07	5.427E+00	8.432E-01	4.634E+00	9.353E-01
3.981E+05	6.470E+10	4.758E-01	5.181E-07	2.452E-07	5.475E+00	8.508E-01	4.657E+00	9.399E-01
5.012E+05	5.026E+10	4.732E-01	4.013E-07	1.913E-07	5.522E+00	8.581E-01	4.680E+00	9.445E-01
6.310E+05	3.893E+10	4.767E-01	3.082E-07	1.499E-07	5.568E+00	8.653E-01	4.702E+00	9.489E-01
7.943E+05	2.990E+10	4.863E-01	2.336E-07	1.170E-07	5.613E+00	8.722E-01	4.723E+00	9.533E-01
1.000E+06	2.266E+10	5.007E-01	1.744E-07	9.038E-08	5.655E+00	8.787E-01	4.745E+00	9.576E-01
1.126E+06	1.692E+10	5.182E-01	1.494E-07	7.885E-08	5.675E+00	8.818E-01	4.755E+00	9.598E-01
1.585E+06	1.449E+10	5.279E-01	9.464E-08	5.248E-08	5.731E+00	8.905E-01	4.786E+00	9.659E-01
1.995E+06	9.181E+09	5.545E-01	6.964E-08	3.944E-08	5.765E+00	8.958E-01	4.804E+00	9.697E-01
2.512E+06	6.756E+09	5.663E-01	5.145E-08	2.923E-08	5.796E+00	9.006E-01	4.822E+00	9.733E-01
3.162E+06	4.991E+09	5.681E-01	3.811E-08	2.122E-08	5.825E+00	9.052E-01	4.839E+00	9.766E-01
3.981E+06	3.697E+09	5.569E-01	2.838E-08	1.511E-08	5.852E+00	9.094E-01	4.853E+00	9.796E-01
5.012E+06	2.753E+09	5.326E-01	2.147E-08	1.072E-08	5.878E+00	9.134E-01	4.867E+00	9.823E-01
6.310E+06	2.083E+09	4.991E-01	1.672E-08	7.750E-09	5.903E+00	9.172E-01	4.879E+00	9.847E-01
7.943E+06	1.622E+09	4.635E-01	1.346E-08	5.802E-09	5.928E+00	9.211E-01	4.890E+00	9.869E-01
1.000E+07	1.306E+09	4.310E-01	1.112E-08	4.438E-09	5.953E+00	9.250E-01	4.900E+00	9.890E-01
1.126E+07	1.079E+09	3.990E-01	1.014E-08	3.852E-09	5.966E+00	9.271E-01	4.906E+00	9.901E-01
1.585E+07	9.833E+08	3.800E-01	7.805E-09	2.373E-09	6.007E+00	9.335E-01	4.920E+00	9.930E-01
1.995E+07	7.572E+08	3.040E-01	6.632E-09	1.555E-09	6.037E+00	9.381E-01	4.928E+00	9.946E-01
2.512E+07	6.434E+08	2.345E-01	5.793E-09	9.368E-10	6.069E+00	9.431E-01	4.934E+00	9.959E-01
3.162E+07	5.620E+08	1.617E-01	5.266E-09	5.372E-10	6.105E+00	9.487E-01	4.939E+00	9.969E-01
3.981E+07	5.109E+08	1.020E-01	4.981E-09	3.226E-10	6.147E+00	9.552E-01	4.943E+00	9.976E-01
5.012E+07	4.832E+08	6.476E-02	4.846E-09	2.278E-10	6.198E+00	9.630E-01	4.946E+00	9.981E-01
6.310E+07	4.701E+08	4.700E-02	4.784E-09	1.911E-10	6.260E+00	9.728E-01	4.948E+00	9.987E-01
7.943E+07	4.641E+08	3.994E-02	4.750E-09	1.751E-10	6.338E+00	9.849E-01	4.951E+00	9.993E-01
1.000E+08	4.608E+08	3.687E-02	4.727E-09	1.651E-10	6.435E+00	1.000E+00	4.955E+00	1.000E+00

Table C.7: Summary of fission gamma-ray characteristics for ^{235}U with thermal ENDF fission yield libraries.

Time (s)	Activity (Bq)	ε_γ (MeV)	dN_γ/dt (#/f/s)	dE_γ/dt (MeV/f/s)	N_γ (#/f)	N_γ Fraction	E_γ (MeV/f)	E_γ Fraction
1.000E-06	1.977E+06	1.184E-01	6.788E-01	7.351E-01	1.000E-06	1.065E-07	1.000E-06	1.452E-07
1.000E-05	4.388E+16	1.083E+00	6.788E-01	7.351E-01	7.109E-06	7.572E-07	7.616E-06	1.106E-06
1.000E-04	4.388E+16	1.083E+00	6.786E-01	7.350E-01	6.819E-05	7.263E-06	7.377E-05	1.071E-05
1.000E-03	4.387E+16	1.083E+00	6.774E-01	7.336E-01	6.784E-04	7.226E-05	7.346E-04	1.067E-04
1.000E-02	4.379E+16	1.083E+00	6.661E-01	7.161E-01	6.724E-03	7.162E-04	7.258E-03	1.054E-03
1.000E-01	4.306E+16	1.075E+00	5.846E-01	5.998E-01	6.300E-02	6.711E-03	6.647E-02	9.654E-03
1.126E-01	3.779E+16	1.026E+00	5.764E-01	5.885E-01	7.032E-02	7.490E-03	7.396E-02	1.074E-02
1.585E-01	3.726E+16	1.021E+00	5.505E-01	5.550E-01	9.618E-02	1.024E-02	1.002E-01	1.455E-02
1.995E-01	3.559E+16	1.008E+00	5.312E-01	5.312E-01	1.184E-01	1.261E-02	1.225E-01	1.779E-02
2.512E-01	3.434E+16	9.999E-01	5.105E-01	5.065E-01	1.453E-01	1.547E-02	1.493E-01	2.168E-02
3.162E-01	3.300E+16	9.922E-01	4.879E-01	4.807E-01	1.777E-01	1.893E-02	1.814E-01	2.634E-02
3.981E-01	3.154E+16	9.853E-01	4.635E-01	4.537E-01	2.167E-01	2.308E-02	2.196E-01	3.190E-02
5.012E-01	2.996E+16	9.790E-01	4.365E-01	4.248E-01	2.631E-01	2.802E-02	2.649E-01	3.848E-02
6.310E-01	2.822E+16	9.731E-01	4.073E-01	3.939E-01	3.179E-01	3.386E-02	3.181E-01	4.620E-02
7.943E-01	2.633E+16	9.672E-01	3.759E-01	3.612E-01	3.818E-01	4.067E-02	3.797E-01	5.515E-02
1.000E+00	2.430E+16	9.610E-01	3.426E-01	3.269E-01	4.557E-01	4.854E-02	4.505E-01	6.543E-02
1.126E+00	2.215E+16	9.541E-01	3.250E-01	3.089E-01	4.977E-01	5.302E-02	4.905E-01	7.124E-02
1.585E+00	2.101E+16	9.504E-01	2.738E-01	2.571E-01	6.352E-01	6.765E-02	6.204E-01	9.011E-02
1.995E+00	1.770E+16	9.389E-01	2.401E-01	2.235E-01	7.406E-01	7.888E-02	7.190E-01	1.044E-01
2.512E+00	1.552E+16	9.309E-01	2.078E-01	1.918E-01	8.563E-01	9.120E-02	8.263E-01	1.200E-01
3.162E+00	1.343E+16	9.230E-01	1.773E-01	1.623E-01	9.815E-01	1.045E-01	9.414E-01	1.367E-01
3.981E+00	1.146E+16	9.153E-01	1.496E-01	1.358E-01	1.115E+00	1.188E-01	1.063E+00	1.545E-01
5.012E+00	9.672E+15	9.078E-01	1.249E-01	1.124E-01	1.257E+00	1.339E-01	1.191E+00	1.730E-01
6.310E+00	8.074E+15	9.002E-01	1.034E-01	9.218E-02	1.405E+00	1.496E-01	1.324E+00	1.923E-01
7.943E+00	6.685E+15	8.914E-01	8.517E-02	7.501E-02	1.559E+00	1.661E-01	1.461E+00	2.122E-01
1.000E+01	5.506E+15	8.807E-01	6.997E-02	6.072E-02	1.719E+00	1.830E-01	1.600E+00	2.324E-01
1.126E+01	4.523E+15	8.678E-01	6.322E-02	5.442E-02	1.802E+00	1.920E-01	1.673E+00	2.430E-01
1.585E+01	4.087E+15	8.607E-01	4.707E-02	3.962E-02	2.055E+00	2.189E-01	1.889E+00	2.743E-01
1.995E+01	3.043E+15	8.417E-01	3.841E-02	3.201E-02	2.231E+00	2.376E-01	2.036E+00	2.957E-01
2.512E+01	2.483E+15	8.335E-01	3.114E-02	2.590E-02	2.411E+00	2.568E-01	2.185E+00	3.174E-01
3.162E+01	2.013E+15	8.318E-01	2.504E-02	2.096E-02	2.593E+00	2.762E-01	2.338E+00	3.395E-01
3.981E+01	1.619E+15	8.371E-01	2.002E-02	1.697E-02	2.778E+00	2.959E-01	2.493E+00	3.621E-01
5.012E+01	1.294E+15	8.479E-01	1.592E-02	1.371E-02	2.963E+00	3.156E-01	2.651E+00	3.850E-01
6.310E+01	1.029E+15	8.610E-01	1.259E-02	1.098E-02	3.148E+00	3.353E-01	2.811E+00	4.083E-01
7.943E+01	8.140E+14	8.716E-01	9.920E-03	8.688E-03	3.332E+00	3.549E-01	2.972E+00	4.316E-01
1.000E+02	6.413E+14	8.758E-01	7.787E-03	6.783E-03	3.514E+00	3.743E-01	3.131E+00	4.547E-01
1.126E+02	5.034E+14	8.710E-01	6.868E-03	5.938E-03	3.606E+00	3.841E-01	3.211E+00	4.664E-01
1.585E+02	4.440E+14	8.646E-01	4.786E-03	3.982E-03	3.874E+00	4.126E-01	3.439E+00	4.994E-01
1.995E+02	3.094E+14	8.320E-01	3.781E-03	3.023E-03	4.049E+00	4.313E-01	3.582E+00	5.203E-01
2.512E+02	2.444E+14	7.996E-01	3.026E-03	2.305E-03	4.225E+00	4.500E-01	3.720E+00	5.403E-01
3.162E+02	1.956E+14	7.617E-01	2.461E-03	1.778E-03	4.404E+00	4.691E-01	3.853E+00	5.596E-01
3.981E+02	1.591E+14	7.223E-01	2.040E-03	1.398E-03	4.588E+00	4.887E-01	3.983E+00	5.785E-01
5.012E+02	1.319E+14	6.853E-01	1.717E-03	1.121E-03	4.782E+00	5.093E-01	4.113E+00	5.973E-01
6.310E+02	1.110E+14	6.529E-01	1.460E-03	9.134E-04	4.988E+00	5.313E-01	4.245E+00	6.165E-01
7.943E+02	9.438E+13	6.256E-01	1.246E-03	7.506E-04	5.209E+00	5.548E-01	4.381E+00	6.362E-01
1.000E+03	8.053E+13	6.025E-01	1.060E-03	6.184E-04	5.446E+00	5.801E-01	4.521E+00	6.567E-01
1.126E+03	6.854E+13	5.833E-01	9.729E-04	5.593E-04	5.574E+00	5.937E-01	4.595E+00	6.675E-01

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Table C.7 – *Continued from previous page.*

Time (s)	Activity (Bq)	ε_γ (MeV)	dN_γ/dt (#/f/s)	dE_γ/dt (MeV/f/s)	N_γ (#/f)	N_γ Fraction	E_γ (MeV/f)	E_γ Fraction
1.585E+03	6.289E+13	5.749E-01	7.427E-04	4.133E-04	5.968E+00	6.356E-01	4.819E+00	6.999E-01
1.995E+03	4.801E+13	5.565E-01	6.024E-04	3.311E-04	6.244E+00	6.650E-01	4.971E+00	7.221E-01
2.512E+03	3.894E+13	5.496E-01	4.737E-04	2.598E-04	6.522E+00	6.946E-01	5.124E+00	7.442E-01
3.162E+03	3.062E+13	5.484E-01	3.590E-04	1.994E-04	6.792E+00	7.235E-01	5.273E+00	7.659E-01
3.981E+03	2.321E+13	5.553E-01	2.608E-04	1.495E-04	7.046E+00	7.505E-01	5.416E+00	7.867E-01
5.012E+03	1.686E+13	5.732E-01	1.813E-04	1.097E-04	7.274E+00	7.748E-01	5.550E+00	8.061E-01
6.310E+03	1.172E+13	6.053E-01	1.206E-04	7.886E-05	7.470E+00	7.956E-01	5.672E+00	8.238E-01
7.943E+03	7.796E+12	6.539E-01	7.761E-05	5.571E-05	7.632E+00	8.129E-01	5.782E+00	8.398E-01
1.000E+04	5.017E+12	7.178E-01	4.921E-05	3.878E-05	7.762E+00	8.268E-01	5.879E+00	8.539E-01
1.126E+04	3.181E+12	7.880E-01	3.898E-05	3.201E-05	7.818E+00	8.327E-01	5.924E+00	8.604E-01
1.585E+04	2.520E+12	8.211E-01	2.067E-05	1.812E-05	7.955E+00	8.473E-01	6.039E+00	8.771E-01
1.995E+04	1.336E+12	8.767E-01	1.419E-05	1.233E-05	8.026E+00	8.549E-01	6.101E+00	8.862E-01
2.512E+04	9.173E+11	8.690E-01	1.030E-05	8.544E-06	8.089E+00	8.616E-01	6.155E+00	8.940E-01
3.162E+04	6.661E+11	8.292E-01	7.922E-06	6.107E-06	8.149E+00	8.679E-01	6.203E+00	9.009E-01
3.981E+04	5.121E+11	7.709E-01	6.342E-06	4.492E-06	8.207E+00	8.742E-01	6.246E+00	9.072E-01
5.012E+04	4.100E+11	7.083E-01	5.164E-06	3.355E-06	8.266E+00	8.805E-01	6.287E+00	9.131E-01
6.310E+04	3.338E+11	6.497E-01	4.205E-06	2.516E-06	8.327E+00	8.870E-01	6.325E+00	9.186E-01
7.943E+04	2.718E+11	5.984E-01	3.392E-06	1.883E-06	8.389E+00	8.936E-01	6.361E+00	9.238E-01
1.000E+05	2.193E+11	5.550E-01	2.701E-06	1.403E-06	8.452E+00	9.002E-01	6.394E+00	9.287E-01
1.126E+05	1.746E+11	5.194E-01	2.387E-06	1.202E-06	8.484E+00	9.036E-01	6.411E+00	9.311E-01
1.585E+05	1.543E+11	5.037E-01	1.635E-06	7.649E-07	8.576E+00	9.135E-01	6.456E+00	9.377E-01
1.995E+05	1.057E+11	4.678E-01	1.258E-06	5.666E-07	8.636E+00	9.198E-01	6.483E+00	9.417E-01
2.512E+05	8.130E+10	4.505E-01	9.699E-07	4.257E-07	8.693E+00	9.259E-01	6.509E+00	9.454E-01
3.162E+05	6.270E+10	4.389E-01	7.535E-07	3.270E-07	8.749E+00	9.319E-01	6.533E+00	9.489E-01
3.981E+05	4.871E+10	4.340E-01	5.875E-07	2.568E-07	8.804E+00	9.377E-01	6.557E+00	9.524E-01
5.012E+05	3.798E+10	4.371E-01	4.565E-07	2.047E-07	8.858E+00	9.435E-01	6.581E+00	9.559E-01
6.310E+05	2.951E+10	4.485E-01	3.505E-07	1.637E-07	8.910E+00	9.491E-01	6.605E+00	9.593E-01
7.943E+05	2.266E+10	4.670E-01	2.644E-07	1.297E-07	8.960E+00	9.544E-01	6.629E+00	9.628E-01
1.000E+06	1.709E+10	4.907E-01	1.954E-07	1.012E-07	9.008E+00	9.594E-01	6.653E+00	9.663E-01
1.126E+06	1.263E+10	5.180E-01	1.661E-07	8.859E-08	9.030E+00	9.619E-01	6.665E+00	9.680E-01
1.585E+06	1.074E+10	5.332E-01	1.026E-07	5.938E-08	9.092E+00	9.684E-01	6.699E+00	9.729E-01
1.995E+06	6.633E+09	5.787E-01	7.414E-08	4.496E-08	9.128E+00	9.723E-01	6.720E+00	9.760E-01
2.512E+06	4.793E+09	6.064E-01	5.371E-08	3.365E-08	9.161E+00	9.758E-01	6.740E+00	9.790E-01
3.162E+06	3.472E+09	6.266E-01	3.884E-08	2.474E-08	9.191E+00	9.790E-01	6.759E+00	9.817E-01
3.981E+06	2.511E+09	6.368E-01	2.795E-08	1.785E-08	9.219E+00	9.819E-01	6.777E+00	9.843E-01
5.012E+06	1.807E+09	6.384E-01	2.014E-08	1.282E-08	9.244E+00	9.846E-01	6.793E+00	9.866E-01
6.310E+06	1.302E+09	6.365E-01	1.468E-08	9.376E-09	9.266E+00	9.870E-01	6.807E+00	9.887E-01
7.943E+06	9.488E+08	6.388E-01	1.086E-08	7.068E-09	9.287E+00	9.892E-01	6.820E+00	9.906E-01
1.000E+07	7.023E+08	6.506E-01	8.055E-09	5.405E-09	9.307E+00	9.913E-01	6.833E+00	9.925E-01
1.126E+07	5.207E+08	6.710E-01	6.847E-09	4.675E-09	9.316E+00	9.923E-01	6.840E+00	9.934E-01
1.585E+07	4.426E+08	6.828E-01	3.965E-09	2.813E-09	9.341E+00	9.949E-01	6.857E+00	9.959E-01
1.995E+07	2.563E+08	7.094E-01	2.498E-09	1.774E-09	9.354E+00	9.963E-01	6.866E+00	9.973E-01
2.512E+07	1.615E+08	7.101E-01	1.444E-09	9.873E-10	9.364E+00	9.974E-01	6.873E+00	9.983E-01
3.162E+07	9.332E+07	6.839E-01	7.812E-10	4.804E-10	9.371E+00	9.982E-01	6.878E+00	9.990E-01
3.981E+07	5.050E+07	6.149E-01	4.249E-10	2.106E-10	9.376E+00	9.987E-01	6.881E+00	9.994E-01
5.012E+07	2.747E+07	4.957E-01	2.599E-10	9.501E-11	9.380E+00	9.991E-01	6.883E+00	9.996E-01
6.310E+07	1.680E+07	3.656E-01	1.879E-10	5.451E-11	9.383E+00	9.994E-01	6.883E+00	9.998E-01
7.943E+07	1.215E+07	2.900E-01	1.519E-10	4.087E-11	9.386E+00	9.997E-01	6.884E+00	9.999E-01
1.000E+08	9.821E+06	2.690E-01	1.294E-10	3.464E-11	9.388E+00	1.000E+00	6.885E+00	1.000E+00

Table C.8: Summary of fission gamma-ray characteristics for ^{235}U with fast ENDF fission yield libraries.

Time (s)	Activity (Bq)	ε_γ (MeV)	dN_γ/dt (#/f/s)	dE_γ/dt (MeV/f/s)	N_γ (#/f)	N_γ Fraction	E_γ (MeV/f)	E_γ Fraction
1.000E-06	1.977E+06	1.184E-01	7.634E-01	8.176E-01	1.000E-06	1.056E-07	1.000E-06	1.439E-07
1.000E-05	4.935E+16	1.071E+00	7.634E-01	8.176E-01	7.871E-06	8.310E-07	8.358E-06	1.203E-06
1.000E-04	4.935E+16	1.071E+00	7.632E-01	8.174E-01	7.657E-05	8.084E-06	8.194E-05	1.179E-05
1.000E-03	4.934E+16	1.071E+00	7.617E-01	8.150E-01	7.628E-04	8.053E-05	8.165E-04	1.175E-04
1.000E-02	4.924E+16	1.070E+00	7.468E-01	7.946E-01	7.551E-03	7.972E-04	8.060E-03	1.160E-03
1.000E-01	4.828E+16	1.064E+00	6.457E-01	6.567E-01	7.022E-02	7.413E-03	7.337E-02	1.056E-02
1.126E-01	4.174E+16	1.017E+00	6.358E-01	6.440E-01	7.829E-02	8.266E-03	8.156E-02	1.174E-02
1.585E-01	4.110E+16	1.013E+00	6.055E-01	6.061E-01	1.068E-01	1.127E-02	1.103E-01	1.586E-02
1.995E-01	3.914E+16	1.001E+00	5.833E-01	5.795E-01	1.311E-01	1.385E-02	1.346E-01	1.936E-02
2.512E-01	3.771E+16	9.935E-01	5.597E-01	5.523E-01	1.607E-01	1.697E-02	1.638E-01	2.357E-02
3.162E-01	3.618E+16	9.869E-01	5.341E-01	5.241E-01	1.962E-01	2.072E-02	1.988E-01	2.861E-02
3.981E-01	3.453E+16	9.811E-01	5.063E-01	4.942E-01	2.388E-01	2.522E-02	2.405E-01	3.461E-02
5.012E-01	3.273E+16	9.760E-01	4.760E-01	4.623E-01	2.895E-01	3.056E-02	2.898E-01	4.170E-02
6.310E-01	3.077E+16	9.713E-01	4.429E-01	4.281E-01	3.491E-01	3.686E-02	3.476E-01	5.002E-02
7.943E-01	2.863E+16	9.667E-01	4.073E-01	3.917E-01	4.185E-01	4.419E-02	4.145E-01	5.965E-02
1.000E+00	2.633E+16	9.618E-01	3.697E-01	3.537E-01	4.985E-01	5.263E-02	4.912E-01	7.068E-02
1.126E+00	2.390E+16	9.567E-01	3.499E-01	3.338E-01	5.438E-01	5.741E-02	5.345E-01	7.691E-02
1.585E+00	2.262E+16	9.539E-01	2.925E-01	2.766E-01	6.912E-01	7.297E-02	6.746E-01	9.707E-02
1.995E+00	1.891E+16	9.455E-01	2.548E-01	2.394E-01	8.035E-01	8.483E-02	7.804E-01	1.123E-01
2.512E+00	1.647E+16	9.397E-01	2.189E-01	2.044E-01	9.258E-01	9.775E-02	8.951E-01	1.288E-01
3.162E+00	1.415E+16	9.339E-01	1.855E-01	1.722E-01	1.057E+00	1.116E-01	1.018E+00	1.464E-01
3.981E+00	1.199E+16	9.282E-01	1.552E-01	1.431E-01	1.197E+00	1.264E-01	1.147E+00	1.650E-01
5.012E+00	1.003E+16	9.225E-01	1.285E-01	1.177E-01	1.343E+00	1.418E-01	1.281E+00	1.843E-01
6.310E+00	8.306E+15	9.160E-01	1.054E-01	9.573E-02	1.495E+00	1.578E-01	1.420E+00	2.043E-01
7.943E+00	6.816E+15	9.079E-01	8.601E-02	7.716E-02	1.651E+00	1.743E-01	1.561E+00	2.246E-01
1.000E+01	5.560E+15	8.971E-01	7.000E-02	6.183E-02	1.812E+00	1.913E-01	1.704E+00	2.452E-01
1.126E+01	4.525E+15	8.833E-01	6.294E-02	5.511E-02	1.895E+00	2.001E-01	1.777E+00	2.557E-01
1.585E+01	4.069E+15	8.755E-01	4.635E-02	3.954E-02	2.146E+00	2.266E-01	1.995E+00	2.870E-01
1.995E+01	2.996E+15	8.532E-01	3.765E-02	3.171E-02	2.318E+00	2.448E-01	2.141E+00	3.080E-01
2.512E+01	2.434E+15	8.423E-01	3.049E-02	2.554E-02	2.494E+00	2.634E-01	2.289E+00	3.293E-01
3.162E+01	1.971E+15	8.376E-01	2.456E-02	2.063E-02	2.673E+00	2.823E-01	2.439E+00	3.509E-01
3.981E+01	1.588E+15	8.399E-01	1.972E-02	1.672E-02	2.855E+00	3.014E-01	2.592E+00	3.729E-01
5.012E+01	1.275E+15	8.476E-01	1.576E-02	1.351E-02	3.038E+00	3.207E-01	2.747E+00	3.953E-01
6.310E+01	1.019E+15	8.572E-01	1.256E-02	1.085E-02	3.221E+00	3.401E-01	2.906E+00	4.181E-01
7.943E+01	8.117E+14	8.644E-01	9.945E-03	8.605E-03	3.405E+00	3.595E-01	3.065E+00	4.410E-01
1.000E+02	6.429E+14	8.653E-01	7.837E-03	6.723E-03	3.588E+00	3.788E-01	3.222E+00	4.637E-01
1.126E+02	5.066E+14	8.579E-01	6.921E-03	5.887E-03	3.681E+00	3.886E-01	3.302E+00	4.751E-01
1.585E+02	4.474E+14	8.506E-01	4.836E-03	3.949E-03	3.951E+00	4.171E-01	3.527E+00	5.076E-01
1.995E+02	3.126E+14	8.166E-01	3.822E-03	2.999E-03	4.128E+00	4.359E-01	3.670E+00	5.281E-01
2.512E+02	2.471E+14	7.847E-01	3.055E-03	2.286E-03	4.306E+00	4.546E-01	3.806E+00	5.477E-01
3.162E+02	1.975E+14	7.484E-01	2.483E-03	1.766E-03	4.486E+00	4.736E-01	3.938E+00	5.667E-01
3.981E+02	1.605E+14	7.114E-01	2.053E-03	1.390E-03	4.672E+00	4.932E-01	4.067E+00	5.853E-01
5.012E+02	1.327E+14	6.769E-01	1.723E-03	1.114E-03	4.867E+00	5.138E-01	4.196E+00	6.038E-01
6.310E+02	1.114E+14	6.467E-01	1.463E-03	9.086E-04	5.073E+00	5.356E-01	4.328E+00	6.227E-01
7.943E+02	9.457E+13	6.211E-01	1.247E-03	7.472E-04	5.295E+00	5.590E-01	4.463E+00	6.422E-01
1.000E+03	8.058E+13	5.994E-01	1.060E-03	6.157E-04	5.532E+00	5.840E-01	4.603E+00	6.624E-01
1.126E+03	6.851E+13	5.810E-01	9.719E-04	5.567E-04	5.660E+00	5.975E-01	4.677E+00	6.730E-01

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Table C.8 – *Continued from previous page.*

Time (s)	Activity (Bq)	ε_γ (MeV)	dN_γ/dt (#/f/s)	dE_γ/dt (MeV/f/s)	N_γ (#/f)	N_γ Fraction	E_γ (MeV/f)	E_γ Fraction
1.585E+03	6.283E+13	5.728E-01	7.410E-04	4.109E-04	6.053E+00	6.390E-01	4.899E+00	7.049E-01
1.995E+03	4.790E+13	5.545E-01	6.004E-04	3.285E-04	6.328E+00	6.681E-01	5.051E+00	7.268E-01
2.512E+03	3.881E+13	5.472E-01	4.715E-04	2.572E-04	6.605E+00	6.973E-01	5.202E+00	7.485E-01
3.162E+03	3.048E+13	5.454E-01	3.567E-04	1.968E-04	6.874E+00	7.258E-01	5.350E+00	7.698E-01
3.981E+03	2.306E+13	5.516E-01	2.586E-04	1.470E-04	7.126E+00	7.524E-01	5.490E+00	7.900E-01
5.012E+03	1.672E+13	5.685E-01	1.791E-04	1.074E-04	7.352E+00	7.762E-01	5.621E+00	8.089E-01
6.310E+03	1.158E+13	5.996E-01	1.188E-04	7.694E-05	7.545E+00	7.966E-01	5.741E+00	8.261E-01
7.943E+03	7.683E+12	6.474E-01	7.625E-05	5.420E-05	7.704E+00	8.134E-01	5.848E+00	8.415E-01
1.000E+04	4.929E+12	7.109E-01	4.826E-05	3.771E-05	7.832E+00	8.269E-01	5.943E+00	8.551E-01
1.126E+04	3.120E+12	7.813E-01	3.826E-05	3.115E-05	7.887E+00	8.327E-01	5.986E+00	8.614E-01
1.585E+04	2.473E+12	8.144E-01	2.047E-05	1.779E-05	8.022E+00	8.469E-01	6.098E+00	8.775E-01
1.995E+04	1.323E+12	8.691E-01	1.419E-05	1.221E-05	8.093E+00	8.544E-01	6.160E+00	8.864E-01
2.512E+04	9.174E+11	8.605E-01	1.040E-05	8.541E-06	8.156E+00	8.611E-01	6.214E+00	8.941E-01
3.162E+04	6.724E+11	8.211E-01	8.039E-06	6.147E-06	8.216E+00	8.675E-01	6.261E+00	9.010E-01
3.981E+04	5.197E+11	7.646E-01	6.444E-06	4.539E-06	8.276E+00	8.737E-01	6.305E+00	9.073E-01
5.012E+04	4.166E+11	7.043E-01	5.242E-06	3.396E-06	8.336E+00	8.801E-01	6.346E+00	9.131E-01
6.310E+04	3.389E+11	6.477E-01	4.263E-06	2.549E-06	8.398E+00	8.866E-01	6.384E+00	9.187E-01
7.943E+04	2.756E+11	5.978E-01	3.437E-06	1.909E-06	8.460E+00	8.932E-01	6.421E+00	9.239E-01
1.000E+05	2.222E+11	5.555E-01	2.735E-06	1.424E-06	8.524E+00	8.999E-01	6.455E+00	9.289E-01
1.126E+05	1.768E+11	5.206E-01	2.418E-06	1.222E-06	8.556E+00	9.034E-01	6.472E+00	9.313E-01
1.585E+05	1.563E+11	5.053E-01	1.661E-06	7.812E-07	8.650E+00	9.132E-01	6.518E+00	9.379E-01
1.995E+05	1.074E+11	4.702E-01	1.281E-06	5.806E-07	8.710E+00	9.196E-01	6.546E+00	9.419E-01
2.512E+05	8.278E+10	4.534E-01	9.903E-07	4.378E-07	8.769E+00	9.258E-01	6.572E+00	9.457E-01
3.162E+05	6.402E+10	4.421E-01	7.708E-07	3.369E-07	8.826E+00	9.319E-01	6.597E+00	9.493E-01
3.981E+05	4.983E+10	4.370E-01	6.019E-07	2.645E-07	8.882E+00	9.378E-01	6.622E+00	9.529E-01
5.012E+05	3.891E+10	4.395E-01	4.676E-07	2.102E-07	8.938E+00	9.436E-01	6.646E+00	9.564E-01
6.310E+05	3.023E+10	4.496E-01	3.586E-07	1.673E-07	8.991E+00	9.493E-01	6.671E+00	9.599E-01
7.943E+05	2.318E+10	4.665E-01	2.695E-07	1.316E-07	9.042E+00	9.547E-01	6.695E+00	9.634E-01
1.000E+06	1.742E+10	4.883E-01	1.982E-07	1.018E-07	9.091E+00	9.598E-01	6.719E+00	9.669E-01
1.126E+06	1.281E+10	5.138E-01	1.680E-07	8.872E-08	9.114E+00	9.622E-01	6.731E+00	9.686E-01
1.585E+06	1.086E+10	5.281E-01	1.028E-07	5.878E-08	9.176E+00	9.688E-01	6.765E+00	9.735E-01
1.995E+06	6.644E+09	5.719E-01	7.388E-08	4.425E-08	9.212E+00	9.726E-01	6.786E+00	9.765E-01
2.512E+06	4.776E+09	5.990E-01	5.337E-08	3.305E-08	9.245E+00	9.761E-01	6.806E+00	9.794E-01
3.162E+06	3.450E+09	6.192E-01	3.860E-08	2.430E-08	9.275E+00	9.792E-01	6.825E+00	9.821E-01
3.981E+06	2.495E+09	6.295E-01	2.783E-08	1.757E-08	9.302E+00	9.821E-01	6.842E+00	9.845E-01
5.012E+06	1.799E+09	6.312E-01	2.011E-08	1.266E-08	9.327E+00	9.847E-01	6.858E+00	9.868E-01
6.310E+06	1.300E+09	6.296E-01	1.470E-08	9.293E-09	9.349E+00	9.871E-01	6.872E+00	9.888E-01
7.943E+06	9.501E+08	6.323E-01	1.089E-08	7.024E-09	9.370E+00	9.893E-01	6.885E+00	9.907E-01
1.000E+07	7.042E+08	6.448E-01	8.072E-09	5.375E-09	9.390E+00	9.913E-01	6.898E+00	9.926E-01
1.126E+07	5.218E+08	6.659E-01	6.856E-09	4.649E-09	9.399E+00	9.923E-01	6.904E+00	9.935E-01
1.585E+07	4.432E+08	6.781E-01	3.959E-09	2.795E-09	9.424E+00	9.950E-01	6.921E+00	9.959E-01
1.995E+07	2.559E+08	7.061E-01	2.491E-09	1.763E-09	9.437E+00	9.963E-01	6.931E+00	9.973E-01
2.512E+07	1.610E+08	7.077E-01	1.439E-09	9.817E-10	9.447E+00	9.974E-01	6.938E+00	9.983E-01
3.162E+07	9.301E+07	6.823E-01	7.801E-10	4.790E-10	9.454E+00	9.982E-01	6.942E+00	9.990E-01
3.981E+07	5.043E+07	6.140E-01	4.265E-10	2.116E-10	9.459E+00	9.987E-01	6.945E+00	9.994E-01
5.012E+07	2.757E+07	4.962E-01	2.627E-10	9.679E-11	9.463E+00	9.991E-01	6.947E+00	9.996E-01
6.310E+07	1.698E+07	3.685E-01	1.912E-10	5.635E-11	9.466E+00	9.994E-01	6.948E+00	9.998E-01
7.943E+07	1.236E+07	2.947E-01	1.550E-10	4.242E-11	9.469E+00	9.997E-01	6.949E+00	9.999E-01
1.000E+08	1.002E+07	2.737E-01	1.322E-10	3.588E-11	9.472E+00	1.000E+00	6.949E+00	1.000E+00

Table C.9: Summary of fission gamma-ray characteristics for ^{235}U with 14-MeV ENDF fission yield libraries.

Time (s)	Activity (Bq)	ε_γ (MeV)	dN_γ/dt (#/f/s)	dE_γ/dt (MeV/f/s)	N_γ (#/f)	N_γ Fraction	E_γ (MeV/f)	E_γ Fraction
1.000E-06	1.977E+06	1.184E-01	6.203E-01	6.885E-01	1.000E-06	1.177E-07	1.000E-06	1.649E-07
1.000E-05	4.010E+16	1.110E+00	6.203E-01	6.885E-01	6.583E-06	7.747E-07	7.197E-06	1.187E-06
1.000E-04	4.010E+16	1.110E+00	6.202E-01	6.884E-01	6.240E-05	7.344E-06	6.916E-05	1.140E-05
1.000E-03	4.009E+16	1.110E+00	6.191E-01	6.866E-01	6.201E-04	7.298E-05	6.879E-04	1.134E-04
1.000E-02	4.002E+16	1.109E+00	6.084E-01	6.717E-01	6.144E-03	7.231E-04	6.800E-03	1.121E-03
1.000E-01	3.933E+16	1.104E+00	5.328E-01	5.695E-01	5.750E-02	6.767E-03	6.265E-02	1.033E-02
1.126E-01	3.444E+16	1.069E+00	5.253E-01	5.600E-01	6.416E-02	7.551E-03	6.977E-02	1.150E-02
1.585E-01	3.396E+16	1.066E+00	5.014E-01	5.304E-01	8.772E-02	1.032E-02	9.480E-02	1.563E-02
1.995E-01	3.241E+16	1.058E+00	4.834E-01	5.085E-01	1.079E-01	1.270E-02	1.161E-01	1.914E-02
2.512E-01	3.125E+16	1.052E+00	4.639E-01	4.853E-01	1.324E-01	1.558E-02	1.418E-01	2.338E-02
3.162E-01	2.999E+16	1.046E+00	4.427E-01	4.609E-01	1.619E-01	1.905E-02	1.725E-01	2.845E-02
3.981E-01	2.862E+16	1.041E+00	4.195E-01	4.346E-01	1.972E-01	2.321E-02	2.092E-01	3.450E-02
5.012E-01	2.712E+16	1.036E+00	3.942E-01	4.064E-01	2.391E-01	2.814E-02	2.526E-01	4.165E-02
6.310E-01	2.548E+16	1.031E+00	3.665E-01	3.756E-01	2.885E-01	3.395E-02	3.033E-01	5.001E-02
7.943E-01	2.369E+16	1.025E+00	3.371E-01	3.435E-01	3.459E-01	4.071E-02	3.620E-01	5.970E-02
1.000E+00	2.179E+16	1.019E+00	3.063E-01	3.097E-01	4.121E-01	4.850E-02	4.292E-01	7.077E-02
1.126E+00	1.980E+16	1.011E+00	2.902E-01	2.922E-01	4.496E-01	5.292E-02	4.671E-01	7.702E-02
1.585E+00	1.876E+16	1.007E+00	2.436E-01	2.418E-01	5.722E-01	6.734E-02	5.897E-01	9.723E-02
1.995E+00	1.575E+16	9.925E-01	2.129E-01	2.090E-01	6.658E-01	7.836E-02	6.822E-01	1.125E-01
2.512E+00	1.376E+16	9.821E-01	1.835E-01	1.782E-01	7.682E-01	9.041E-02	7.822E-01	1.290E-01
3.162E+00	1.186E+16	9.713E-01	1.558E-01	1.496E-01	8.785E-01	1.034E-01	8.888E-01	1.466E-01
3.981E+00	1.007E+16	9.605E-01	1.304E-01	1.238E-01	9.957E-01	1.172E-01	1.001E+00	1.650E-01
5.012E+00	8.428E+15	9.494E-01	1.078E-01	1.010E-01	1.118E+00	1.316E-01	1.117E+00	1.841E-01
6.310E+00	6.966E+15	9.376E-01	8.820E-02	8.154E-02	1.246E+00	1.466E-01	1.235E+00	2.037E-01
7.943E+00	5.702E+15	9.244E-01	7.178E-02	6.525E-02	1.376E+00	1.620E-01	1.355E+00	2.234E-01
1.000E+01	4.640E+15	9.090E-01	5.829E-02	5.196E-02	1.510E+00	1.777E-01	1.475E+00	2.433E-01
1.126E+01	3.768E+15	8.914E-01	5.238E-02	4.618E-02	1.580E+00	1.859E-01	1.537E+00	2.535E-01
1.585E+01	3.386E+15	8.817E-01	3.853E-02	3.295E-02	1.788E+00	2.105E-01	1.719E+00	2.834E-01
1.995E+01	2.491E+15	8.551E-01	3.134E-02	2.638E-02	1.932E+00	2.273E-01	1.841E+00	3.035E-01
2.512E+01	2.026E+15	8.416E-01	2.542E-02	2.120E-02	2.078E+00	2.446E-01	1.963E+00	3.238E-01
3.162E+01	1.643E+15	8.342E-01	2.054E-02	1.711E-02	2.228E+00	2.622E-01	2.088E+00	3.443E-01
3.981E+01	1.328E+15	8.331E-01	1.655E-02	1.385E-02	2.380E+00	2.801E-01	2.215E+00	3.652E-01
5.012E+01	1.070E+15	8.366E-01	1.329E-02	1.118E-02	2.533E+00	2.982E-01	2.344E+00	3.865E-01
6.310E+01	8.594E+14	8.409E-01	1.065E-02	8.971E-03	2.689E+00	3.165E-01	2.475E+00	4.080E-01
7.943E+01	6.887E+14	8.421E-01	8.511E-03	7.125E-03	2.845E+00	3.349E-01	2.606E+00	4.297E-01
1.000E+02	5.502E+14	8.371E-01	6.780E-03	5.587E-03	3.003E+00	3.534E-01	2.737E+00	4.513E-01
1.126E+02	4.383E+14	8.240E-01	6.025E-03	4.905E-03	3.083E+00	3.629E-01	2.803E+00	4.622E-01
1.585E+02	3.895E+14	8.140E-01	4.299E-03	3.331E-03	3.320E+00	3.908E-01	2.992E+00	4.933E-01
1.995E+02	2.779E+14	7.749E-01	3.447E-03	2.559E-03	3.479E+00	4.095E-01	3.113E+00	5.133E-01
2.512E+02	2.228E+14	7.426E-01	2.792E-03	1.979E-03	3.640E+00	4.284E-01	3.230E+00	5.326E-01
3.162E+02	1.805E+14	7.089E-01	2.291E-03	1.550E-03	3.806E+00	4.479E-01	3.345E+00	5.515E-01
3.981E+02	1.481E+14	6.765E-01	1.906E-03	1.233E-03	3.977E+00	4.681E-01	3.459E+00	5.703E-01
5.012E+02	1.232E+14	6.471E-01	1.604E-03	9.959E-04	4.158E+00	4.894E-01	3.574E+00	5.893E-01
6.310E+02	1.037E+14	6.208E-01	1.361E-03	8.131E-04	4.351E+00	5.120E-01	3.691E+00	6.086E-01
7.943E+02	8.800E+13	5.973E-01	1.159E-03	6.677E-04	4.557E+00	5.363E-01	3.812E+00	6.286E-01
1.000E+03	7.492E+13	5.761E-01	9.845E-04	5.488E-04	4.777E+00	5.622E-01	3.937E+00	6.492E-01
1.126E+03	6.364E+13	5.575E-01	9.028E-04	4.956E-04	4.896E+00	5.762E-01	4.003E+00	6.600E-01

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Table C.9 – *Continued from previous page.*

Time (s)	Activity (Bq)	ε_γ (MeV)	dN_γ/dt (#/f/s)	dE_γ/dt (MeV/f/s)	N_γ (#/f)	N_γ Fraction	E_γ (MeV/f)	E_γ Fraction
1.585E+03	5.836E+13	5.490E-01	6.893E-04	3.650E-04	5.261E+00	6.192E-01	4.200E+00	6.926E-01
1.995E+03	4.456E+13	5.295E-01	5.600E-04	2.919E-04	5.517E+00	6.494E-01	4.335E+00	7.148E-01
2.512E+03	3.620E+13	5.213E-01	4.415E-04	2.288E-04	5.776E+00	6.798E-01	4.470E+00	7.370E-01
3.162E+03	2.854E+13	5.183E-01	3.352E-04	1.752E-04	6.029E+00	7.095E-01	4.601E+00	7.587E-01
3.981E+03	2.167E+13	5.225E-01	2.436E-04	1.307E-04	6.266E+00	7.374E-01	4.726E+00	7.793E-01
5.012E+03	1.575E+13	5.364E-01	1.688E-04	9.502E-05	6.478E+00	7.624E-01	4.842E+00	7.985E-01
6.310E+03	1.091E+13	5.630E-01	1.118E-04	6.763E-05	6.660E+00	7.839E-01	4.948E+00	8.159E-01
7.943E+03	7.225E+12	6.051E-01	7.165E-05	4.748E-05	6.810E+00	8.015E-01	5.042E+00	8.314E-01
1.000E+04	4.632E+12	6.626E-01	4.566E-05	3.321E-05	6.931E+00	8.157E-01	5.125E+00	8.451E-01
1.126E+04	2.952E+12	7.272E-01	3.652E-05	2.767E-05	6.982E+00	8.218E-01	5.163E+00	8.514E-01
1.585E+04	2.361E+12	7.575E-01	2.056E-05	1.654E-05	7.113E+00	8.372E-01	5.265E+00	8.681E-01
1.995E+04	1.329E+12	8.047E-01	1.487E-05	1.185E-05	7.186E+00	8.458E-01	5.323E+00	8.777E-01
2.512E+04	9.610E+11	7.968E-01	1.117E-05	8.565E-06	7.253E+00	8.537E-01	5.376E+00	8.864E-01
3.162E+04	7.223E+11	7.666E-01	8.612E-06	6.246E-06	7.318E+00	8.612E-01	5.424E+00	8.944E-01
3.981E+04	5.567E+11	7.253E-01	6.724E-06	4.575E-06	7.381E+00	8.686E-01	5.468E+00	9.017E-01
5.012E+04	4.347E+11	6.804E-01	5.275E-06	3.356E-06	7.442E+00	8.759E-01	5.509E+00	9.084E-01
6.310E+04	3.410E+11	6.363E-01	4.146E-06	2.469E-06	7.504E+00	8.831E-01	5.547E+00	9.146E-01
7.943E+04	2.680E+11	5.956E-01	3.261E-06	1.826E-06	7.564E+00	8.902E-01	5.582E+00	9.204E-01
1.000E+05	2.108E+11	5.599E-01	2.559E-06	1.356E-06	7.624E+00	8.973E-01	5.615E+00	9.258E-01
1.126E+05	1.654E+11	5.301E-01	2.254E-06	1.165E-06	7.654E+00	9.008E-01	5.631E+00	9.284E-01
1.585E+05	1.457E+11	5.169E-01	1.550E-06	7.536E-07	7.741E+00	9.111E-01	5.675E+00	9.357E-01
1.995E+05	1.002E+11	4.862E-01	1.199E-06	5.640E-07	7.798E+00	9.177E-01	5.702E+00	9.402E-01
2.512E+05	7.749E+10	4.705E-01	9.295E-07	4.262E-07	7.853E+00	9.242E-01	5.727E+00	9.444E-01
3.162E+05	6.009E+10	4.585E-01	7.236E-07	3.265E-07	7.907E+00	9.305E-01	5.752E+00	9.484E-01
3.981E+05	4.678E+10	4.512E-01	5.635E-07	2.535E-07	7.959E+00	9.367E-01	5.775E+00	9.523E-01
5.012E+05	3.643E+10	4.499E-01	4.359E-07	1.985E-07	8.011E+00	9.428E-01	5.799E+00	9.562E-01
6.310E+05	2.818E+10	4.553E-01	3.323E-07	1.552E-07	8.061E+00	9.487E-01	5.822E+00	9.600E-01
7.943E+05	2.148E+10	4.671E-01	2.480E-07	1.200E-07	8.108E+00	9.543E-01	5.844E+00	9.637E-01
1.000E+06	1.603E+10	4.840E-01	1.808E-07	9.134E-08	8.152E+00	9.594E-01	5.866E+00	9.672E-01
1.126E+06	1.169E+10	5.051E-01	1.525E-07	7.889E-08	8.173E+00	9.619E-01	5.877E+00	9.690E-01
1.585E+06	9.859E+09	5.173E-01	9.167E-08	5.097E-08	8.229E+00	9.685E-01	5.906E+00	9.739E-01
1.995E+06	5.926E+09	5.560E-01	6.505E-08	3.780E-08	8.261E+00	9.723E-01	5.925E+00	9.769E-01
2.512E+06	4.205E+09	5.811E-01	4.647E-08	2.790E-08	8.290E+00	9.757E-01	5.942E+00	9.797E-01
3.162E+06	3.004E+09	6.004E-01	3.332E-08	2.035E-08	8.316E+00	9.787E-01	5.957E+00	9.823E-01
3.981E+06	2.154E+09	6.107E-01	2.392E-08	1.465E-08	8.340E+00	9.815E-01	5.972E+00	9.847E-01
5.012E+06	1.546E+09	6.127E-01	1.726E-08	1.055E-08	8.361E+00	9.840E-01	5.985E+00	9.868E-01
6.310E+06	1.116E+09	6.109E-01	1.263E-08	7.742E-09	8.380E+00	9.863E-01	5.996E+00	9.888E-01
7.943E+06	8.167E+08	6.128E-01	9.387E-09	5.854E-09	8.398E+00	9.884E-01	6.008E+00	9.906E-01
1.000E+07	6.068E+08	6.237E-01	6.978E-09	4.483E-09	8.415E+00	9.904E-01	6.018E+00	9.924E-01
1.126E+07	4.511E+08	6.424E-01	5.942E-09	3.879E-09	8.423E+00	9.913E-01	6.023E+00	9.932E-01
1.585E+07	3.841E+08	6.529E-01	3.487E-09	2.347E-09	8.445E+00	9.939E-01	6.038E+00	9.956E-01
1.995E+07	2.254E+08	6.730E-01	2.254E-09	1.498E-09	8.457E+00	9.953E-01	6.046E+00	9.969E-01
2.512E+07	1.457E+08	6.648E-01	1.375E-09	8.594E-10	8.466E+00	9.964E-01	6.052E+00	9.979E-01
3.162E+07	8.889E+07	6.250E-01	8.226E-10	4.472E-10	8.473E+00	9.972E-01	6.056E+00	9.986E-01
3.981E+07	5.318E+07	5.436E-01	5.204E-10	2.255E-10	8.479E+00	9.979E-01	6.059E+00	9.990E-01
5.012E+07	3.364E+07	4.333E-01	3.720E-10	1.266E-10	8.483E+00	9.984E-01	6.061E+00	9.993E-01
6.310E+07	2.405E+07	3.404E-01	2.978E-10	8.740E-11	8.487E+00	9.989E-01	6.062E+00	9.996E-01
7.943E+07	1.925E+07	2.935E-01	2.512E-10	6.936E-11	8.492E+00	9.994E-01	6.063E+00	9.998E-01
1.000E+08	1.624E+07	2.761E-01	2.144E-10	5.731E-11	8.497E+00	1.000E+00	6.065E+00	1.000E+00

Table C.10: Summary of fission gamma-ray characteristics for ^{238}U with thermal ENDF fission yield libraries.

Time (s)	Activity (Bq)	ε_γ (MeV)	dN_γ/dt (#/f/s)	dE_γ/dt (MeV/f/s)	N_γ (#/f)	N_γ Fraction	E_γ (MeV/f)	E_γ Fraction
1.000E-06	1.985E+04	2.038E-02	1.782E+00	2.156E+00	1.000E-06	9.916E-08	1.000E-06	1.211E-07
1.000E-05	4.567E+16	1.210E+00	1.782E+00	2.156E+00	1.704E-05	1.690E-06	2.041E-05	2.472E-06
1.000E-04	4.567E+16	1.210E+00	1.781E+00	2.155E+00	1.774E-04	1.759E-05	2.144E-04	2.598E-05
1.000E-03	4.565E+16	1.210E+00	1.775E+00	2.144E+00	1.778E-03	1.763E-04	2.149E-03	2.604E-04
1.000E-02	4.549E+16	1.208E+00	1.713E+00	2.052E+00	1.747E-02	1.733E-03	2.103E-02	2.548E-03
1.000E-01	4.390E+16	1.198E+00	1.322E+00	1.480E+00	1.540E-01	1.527E-02	1.800E-01	2.180E-02
1.126E-01	3.387E+16	1.120E+00	1.288E+00	1.433E+00	1.705E-01	1.690E-02	1.983E-01	2.403E-02
1.585E-01	3.300E+16	1.113E+00	1.189E+00	1.298E+00	2.273E-01	2.254E-02	2.610E-01	3.162E-02
1.995E-01	3.048E+16	1.091E+00	1.124E+00	1.210E+00	2.747E-01	2.724E-02	3.124E-01	3.785E-02
2.512E-01	2.880E+16	1.077E+00	1.059E+00	1.128E+00	3.312E-01	3.284E-02	3.729E-01	4.517E-02
3.162E-01	2.714E+16	1.065E+00	9.954E-01	1.051E+00	3.979E-01	3.946E-02	4.437E-01	5.375E-02
3.981E-01	2.551E+16	1.056E+00	9.307E-01	9.753E-01	4.768E-01	4.728E-02	5.267E-01	6.380E-02
5.012E-01	2.385E+16	1.048E+00	8.635E-01	8.989E-01	5.693E-01	5.645E-02	6.233E-01	7.551E-02
6.310E-01	2.213E+16	1.041E+00	7.929E-01	8.207E-01	6.768E-01	6.711E-02	7.349E-01	8.902E-02
7.943E-01	2.032E+16	1.035E+00	7.192E-01	7.400E-01	8.003E-01	7.936E-02	8.623E-01	1.045E-01
1.000E+00	1.843E+16	1.029E+00	6.435E-01	6.576E-01	9.404E-01	9.325E-02	1.006E+00	1.219E-01
1.126E+00	1.649E+16	1.022E+00	6.041E-01	6.149E-01	1.019E+00	1.010E-01	1.086E+00	1.316E-01
1.585E+00	1.548E+16	1.018E+00	4.924E-01	4.954E-01	1.271E+00	1.260E-01	1.341E+00	1.624E-01
1.995E+00	1.262E+16	1.006E+00	4.210E-01	4.192E-01	1.458E+00	1.446E-01	1.529E+00	1.852E-01
2.512E+00	1.079E+16	9.956E-01	3.542E-01	3.485E-01	1.658E+00	1.644E-01	1.727E+00	2.092E-01
3.162E+00	9.077E+15	9.840E-01	2.935E-01	2.851E-01	1.869E+00	1.853E-01	1.933E+00	2.342E-01
3.981E+00	7.521E+15	9.714E-01	2.397E-01	2.297E-01	2.087E+00	2.070E-01	2.144E+00	2.597E-01
5.012E+00	6.144E+15	9.580E-01	1.933E-01	1.825E-01	2.310E+00	2.291E-01	2.356E+00	2.854E-01
6.310E+00	4.954E+15	9.443E-01	1.542E-01	1.434E-01	2.536E+00	2.515E-01	2.568E+00	3.110E-01
7.943E+00	3.952E+15	9.296E-01	1.221E-01	1.114E-01	2.762E+00	2.738E-01	2.776E+00	3.363E-01
1.000E+01	3.128E+15	9.127E-01	9.634E-02	8.599E-02	2.986E+00	2.961E-01	2.979E+00	3.608E-01
1.126E+01	2.469E+15	8.925E-01	8.530E-02	7.514E-02	3.100E+00	3.074E-01	3.080E+00	3.731E-01
1.585E+01	2.186E+15	8.809E-01	6.041E-02	5.115E-02	3.435E+00	3.406E-01	3.370E+00	4.082E-01
1.995E+01	1.548E+15	8.468E-01	4.807E-02	3.981E-02	3.657E+00	3.627E-01	3.557E+00	4.308E-01
2.512E+01	1.232E+15	8.280E-01	3.826E-02	3.124E-02	3.881E+00	3.848E-01	3.740E+00	4.531E-01
3.162E+01	9.806E+14	8.164E-01	3.040E-02	2.473E-02	4.104E+00	4.069E-01	3.922E+00	4.751E-01
3.981E+01	7.790E+14	8.137E-01	2.409E-02	1.972E-02	4.327E+00	4.291E-01	4.104E+00	4.972E-01
5.012E+01	6.173E+14	8.185E-01	1.902E-02	1.573E-02	4.549E+00	4.511E-01	4.287E+00	5.193E-01
6.310E+01	4.873E+14	8.272E-01	1.492E-02	1.246E-02	4.769E+00	4.729E-01	4.470E+00	5.415E-01
7.943E+01	3.824E+14	8.352E-01	1.161E-02	9.743E-03	4.986E+00	4.944E-01	4.651E+00	5.634E-01
1.000E+02	2.975E+14	8.393E-01	8.944E-03	7.493E-03	5.197E+00	5.154E-01	4.828E+00	5.849E-01
1.126E+02	2.292E+14	8.378E-01	7.789E-03	6.504E-03	5.303E+00	5.258E-01	4.917E+00	5.956E-01
1.585E+02	1.996E+14	8.351E-01	5.151E-03	4.236E-03	5.600E+00	5.553E-01	5.163E+00	6.254E-01
1.995E+02	1.320E+14	8.224E-01	3.868E-03	3.140E-03	5.785E+00	5.736E-01	5.314E+00	6.438E-01
2.512E+02	9.913E+13	8.118E-01	2.903E-03	2.325E-03	5.960E+00	5.909E-01	5.456E+00	6.609E-01
3.162E+02	7.439E+13	8.009E-01	2.193E-03	1.734E-03	6.125E+00	6.074E-01	5.588E+00	6.769E-01
3.981E+02	5.620E+13	7.905E-01	1.681E-03	1.313E-03	6.284E+00	6.231E-01	5.712E+00	6.920E-01
5.012E+02	4.307E+13	7.812E-01	1.313E-03	1.015E-03	6.438E+00	6.384E-01	5.832E+00	7.065E-01
6.310E+02	3.364E+13	7.732E-01	1.044E-03	8.008E-04	6.591E+00	6.536E-01	5.950E+00	7.208E-01
7.943E+02	2.676E+13	7.669E-01	8.409E-04	6.409E-04	6.745E+00	6.688E-01	6.068E+00	7.350E-01
1.000E+03	2.155E+13	7.622E-01	6.809E-04	5.168E-04	6.902E+00	6.844E-01	6.187E+00	7.495E-01
1.126E+03	1.745E+13	7.590E-01	6.107E-04	4.628E-04	6.983E+00	6.924E-01	6.249E+00	7.569E-01

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Table C.10 – *Continued from previous page.*

Time (s)	Activity (Bq)	ε_γ (MeV)	dN_γ/dt (#/f/s)	dE_γ/dt (MeV/f/s)	N_γ (#/f)	N_γ Fraction	E_γ (MeV/f)	E_γ Fraction
1.585E+03	1.565E+13	7.579E-01	4.406E-04	3.332E-04	7.224E+00	7.163E-01	6.431E+00	7.791E-01
1.995E+03	1.129E+13	7.563E-01	3.469E-04	2.625E-04	7.386E+00	7.324E-01	6.553E+00	7.939E-01
2.512E+03	8.889E+12	7.567E-01	2.676E-04	2.032E-04	7.544E+00	7.481E-01	6.674E+00	8.084E-01
3.162E+03	6.858E+12	7.595E-01	2.021E-04	1.548E-04	7.697E+00	7.632E-01	6.790E+00	8.225E-01
3.981E+03	5.179E+12	7.658E-01	1.496E-04	1.162E-04	7.841E+00	7.775E-01	6.901E+00	8.360E-01
5.012E+03	3.835E+12	7.763E-01	1.091E-04	8.624E-05	7.974E+00	7.908E-01	7.005E+00	8.486E-01
6.310E+03	2.795E+12	7.907E-01	7.863E-05	6.344E-05	8.096E+00	8.028E-01	7.103E+00	8.604E-01
7.943E+03	2.015E+12	8.069E-01	5.619E-05	4.616E-05	8.206E+00	8.137E-01	7.192E+00	8.712E-01
1.000E+04	1.440E+12	8.214E-01	3.984E-05	3.309E-05	8.305E+00	8.235E-01	7.274E+00	8.811E-01
1.126E+04	1.021E+12	8.306E-01	3.326E-05	2.767E-05	8.351E+00	8.281E-01	7.312E+00	8.857E-01
1.585E+04	8.523E+11	8.320E-01	1.968E-05	1.608E-05	8.473E+00	8.402E-01	7.412E+00	8.979E-01
1.995E+04	5.044E+11	8.169E-01	1.411E-05	1.110E-05	8.542E+00	8.470E-01	7.468E+00	9.047E-01
2.512E+04	3.617E+11	7.861E-01	1.058E-05	7.829E-06	8.606E+00	8.534E-01	7.517E+00	9.106E-01
3.162E+04	2.712E+11	7.398E-01	8.354E-06	5.731E-06	8.667E+00	8.595E-01	7.561E+00	9.159E-01
3.981E+04	2.141E+11	6.860E-01	6.833E-06	4.324E-06	8.730E+00	8.656E-01	7.602E+00	9.209E-01
5.012E+04	1.751E+11	6.328E-01	5.662E-06	3.303E-06	8.794E+00	8.720E-01	7.641E+00	9.257E-01
6.310E+04	1.451E+11	5.834E-01	4.686E-06	2.522E-06	8.861E+00	8.787E-01	7.679E+00	9.302E-01
7.943E+04	1.201E+11	5.382E-01	3.846E-06	1.914E-06	8.931E+00	8.856E-01	7.715E+00	9.346E-01
1.000E+05	9.856E+10	4.976E-01	3.125E-06	1.444E-06	9.002E+00	8.927E-01	7.750E+00	9.388E-01
1.126E+05	8.008E+10	4.622E-01	2.796E-06	1.248E-06	9.040E+00	8.964E-01	7.767E+00	9.409E-01
1.585E+05	7.166E+10	4.462E-01	2.002E-06	8.187E-07	9.150E+00	9.073E-01	7.814E+00	9.466E-01
1.995E+05	5.130E+10	4.090E-01	1.587E-06	6.212E-07	9.223E+00	9.146E-01	7.844E+00	9.502E-01
2.512E+05	4.066E+10	3.915E-01	1.255E-06	4.771E-07	9.297E+00	9.219E-01	7.872E+00	9.536E-01
3.162E+05	3.216E+10	3.802E-01	9.888E-07	3.715E-07	9.370E+00	9.291E-01	7.900E+00	9.570E-01
3.981E+05	2.534E+10	3.757E-01	7.711E-07	2.924E-07	9.442E+00	9.363E-01	7.927E+00	9.603E-01
5.012E+05	1.976E+10	3.792E-01	5.900E-07	2.308E-07	9.512E+00	9.432E-01	7.954E+00	9.635E-01
6.310E+05	1.512E+10	3.912E-01	4.402E-07	1.811E-07	9.579E+00	9.498E-01	7.981E+00	9.668E-01
7.943E+05	1.128E+10	4.115E-01	3.189E-07	1.399E-07	9.641E+00	9.560E-01	8.007E+00	9.699E-01
1.000E+06	8.172E+09	4.388E-01	2.250E-07	1.062E-07	9.697E+00	9.615E-01	8.032E+00	9.730E-01
1.126E+06	5.767E+09	4.718E-01	1.868E-07	9.160E-08	9.723E+00	9.641E-01	8.045E+00	9.745E-01
1.585E+06	4.787E+09	4.904E-01	1.090E-07	5.929E-08	9.791E+00	9.708E-01	8.079E+00	9.787E-01
1.995E+06	2.793E+09	5.440E-01	7.711E-08	4.421E-08	9.829E+00	9.746E-01	8.101E+00	9.813E-01
2.512E+06	1.976E+09	5.734E-01	5.537E-08	3.279E-08	9.863E+00	9.780E-01	8.120E+00	9.837E-01
3.162E+06	1.419E+09	5.921E-01	4.000E-08	2.395E-08	9.894E+00	9.811E-01	8.139E+00	9.859E-01
3.981E+06	1.025E+09	5.988E-01	2.877E-08	1.716E-08	9.922E+00	9.839E-01	8.156E+00	9.880E-01
5.012E+06	7.374E+08	5.962E-01	2.065E-08	1.218E-08	9.948E+00	9.864E-01	8.171E+00	9.898E-01
6.310E+06	5.291E+08	5.900E-01	1.487E-08	8.750E-09	9.971E+00	9.887E-01	8.184E+00	9.914E-01
7.943E+06	3.811E+08	5.884E-01	1.078E-08	6.450E-09	9.992E+00	9.908E-01	8.197E+00	9.930E-01
1.000E+07	2.763E+08	5.982E-01	7.773E-09	4.820E-09	1.001E+01	9.927E-01	8.208E+00	9.944E-01
1.126E+07	1.992E+08	6.201E-01	6.501E-09	4.124E-09	1.002E+01	9.936E-01	8.214E+00	9.950E-01
1.585E+07	1.666E+08	6.343E-01	3.599E-09	2.427E-09	1.004E+01	9.959E-01	8.229E+00	9.969E-01
1.995E+07	9.224E+07	6.742E-01	2.215E-09	1.525E-09	1.005E+01	9.970E-01	8.237E+00	9.978E-01
2.512E+07	5.677E+07	6.884E-01	1.265E-09	8.600E-10	1.006E+01	9.979E-01	8.243E+00	9.986E-01
3.162E+07	3.243E+07	6.796E-01	6.879E-10	4.374E-10	1.007E+01	9.986E-01	8.248E+00	9.991E-01
3.981E+07	1.763E+07	6.358E-01	3.802E-10	2.118E-10	1.007E+01	9.990E-01	8.250E+00	9.994E-01
5.012E+07	9.743E+06	5.572E-01	2.323E-10	1.111E-10	1.008E+01	9.993E-01	8.252E+00	9.996E-01
6.310E+07	5.954E+06	4.782E-01	1.604E-10	7.060E-11	1.008E+01	9.996E-01	8.253E+00	9.998E-01
7.943E+07	4.110E+06	4.402E-01	1.182E-10	5.208E-11	1.008E+01	9.998E-01	8.254E+00	9.999E-01
1.000E+08	3.029E+06	4.406E-01	8.866E-11	4.053E-11	1.008E+01	1.000E+00	8.255E+00	1.000E+00

Table C.11: Summary of fission gamma-ray characteristics for ^{238}U with fast ENDF fission yield libraries.

Time (s)	Activity (Bq)	ε_γ (MeV)	dN_γ/dt (#/f/s)	dE_γ/dt (MeV/f/s)	N_γ (#/f)	N_γ Fraction	E_γ (MeV/f)	E_γ Fraction
1.000E-06	1.985E+04	2.038E-02	1.782E+00	2.156E+00	1.000E-06	9.916E-08	1.000E-06	1.211E-07
1.000E-05	4.567E+16	1.210E+00	1.782E+00	2.156E+00	1.704E-05	1.690E-06	2.041E-05	2.472E-06
1.000E-04	4.567E+16	1.210E+00	1.781E+00	2.155E+00	1.774E-04	1.759E-05	2.144E-04	2.598E-05
1.000E-03	4.565E+16	1.210E+00	1.775E+00	2.144E+00	1.778E-03	1.763E-04	2.149E-03	2.604E-04
1.000E-02	4.549E+16	1.208E+00	1.713E+00	2.052E+00	1.747E-02	1.733E-03	2.103E-02	2.548E-03
1.000E-01	4.390E+16	1.198E+00	1.322E+00	1.480E+00	1.540E-01	1.527E-02	1.800E-01	2.180E-02
1.126E-01	3.387E+16	1.120E+00	1.288E+00	1.433E+00	1.705E-01	1.690E-02	1.983E-01	2.403E-02
1.585E-01	3.300E+16	1.113E+00	1.189E+00	1.298E+00	2.273E-01	2.254E-02	2.610E-01	3.162E-02
1.995E-01	3.048E+16	1.091E+00	1.124E+00	1.210E+00	2.747E-01	2.724E-02	3.124E-01	3.785E-02
2.512E-01	2.880E+16	1.077E+00	1.059E+00	1.128E+00	3.312E-01	3.284E-02	3.729E-01	4.517E-02
3.162E-01	2.714E+16	1.065E+00	9.954E-01	1.051E+00	3.979E-01	3.946E-02	4.437E-01	5.375E-02
3.981E-01	2.551E+16	1.056E+00	9.307E-01	9.753E-01	4.768E-01	4.728E-02	5.267E-01	6.380E-02
5.012E-01	2.385E+16	1.048E+00	8.635E-01	8.989E-01	5.693E-01	5.645E-02	6.233E-01	7.551E-02
6.310E-01	2.213E+16	1.041E+00	7.929E-01	8.207E-01	6.768E-01	6.711E-02	7.349E-01	8.902E-02
7.943E-01	2.032E+16	1.035E+00	7.192E-01	7.400E-01	8.003E-01	7.936E-02	8.623E-01	1.045E-01
1.000E+00	1.843E+16	1.029E+00	6.435E-01	6.576E-01	9.404E-01	9.325E-02	1.006E+00	1.219E-01
1.126E+00	1.649E+16	1.022E+00	6.041E-01	6.149E-01	1.019E+00	1.010E-01	1.086E+00	1.316E-01
1.585E+00	1.548E+16	1.018E+00	4.924E-01	4.954E-01	1.271E+00	1.260E-01	1.341E+00	1.624E-01
1.995E+00	1.262E+16	1.006E+00	4.210E-01	4.192E-01	1.458E+00	1.446E-01	1.529E+00	1.852E-01
2.512E+00	1.079E+16	9.956E-01	3.542E-01	3.485E-01	1.658E+00	1.644E-01	1.727E+00	2.092E-01
3.162E+00	9.077E+15	9.840E-01	2.935E-01	2.851E-01	1.869E+00	1.853E-01	1.933E+00	2.342E-01
3.981E+00	7.521E+15	9.714E-01	2.397E-01	2.297E-01	2.087E+00	2.070E-01	2.144E+00	2.597E-01
5.012E+00	6.144E+15	9.580E-01	1.933E-01	1.825E-01	2.310E+00	2.291E-01	2.356E+00	2.854E-01
6.310E+00	4.954E+15	9.443E-01	1.542E-01	1.434E-01	2.536E+00	2.515E-01	2.568E+00	3.110E-01
7.943E+00	3.952E+15	9.296E-01	1.221E-01	1.114E-01	2.762E+00	2.738E-01	2.776E+00	3.363E-01
1.000E+01	3.128E+15	9.127E-01	9.634E-02	8.599E-02	2.986E+00	2.961E-01	2.979E+00	3.608E-01
1.126E+01	2.469E+15	8.925E-01	8.530E-02	7.514E-02	3.100E+00	3.074E-01	3.080E+00	3.731E-01
1.585E+01	2.186E+15	8.809E-01	6.041E-02	5.115E-02	3.435E+00	3.406E-01	3.370E+00	4.082E-01
1.995E+01	1.548E+15	8.468E-01	4.807E-02	3.981E-02	3.657E+00	3.627E-01	3.557E+00	4.308E-01
2.512E+01	1.232E+15	8.280E-01	3.826E-02	3.124E-02	3.881E+00	3.848E-01	3.740E+00	4.531E-01
3.162E+01	9.806E+14	8.164E-01	3.040E-02	2.473E-02	4.104E+00	4.069E-01	3.922E+00	4.751E-01
3.981E+01	7.790E+14	8.137E-01	2.409E-02	1.972E-02	4.327E+00	4.291E-01	4.104E+00	4.972E-01
5.012E+01	6.173E+14	8.185E-01	1.902E-02	1.573E-02	4.549E+00	4.511E-01	4.287E+00	5.193E-01
6.310E+01	4.873E+14	8.272E-01	1.492E-02	1.246E-02	4.769E+00	4.729E-01	4.470E+00	5.415E-01
7.943E+01	3.824E+14	8.352E-01	1.161E-02	9.743E-03	4.986E+00	4.944E-01	4.651E+00	5.634E-01
1.000E+02	2.975E+14	8.393E-01	8.944E-03	7.493E-03	5.197E+00	5.154E-01	4.828E+00	5.849E-01
1.126E+02	2.292E+14	8.378E-01	7.789E-03	6.504E-03	5.303E+00	5.258E-01	4.917E+00	5.956E-01
1.585E+02	1.996E+14	8.351E-01	5.151E-03	4.236E-03	5.600E+00	5.553E-01	5.163E+00	6.254E-01
1.995E+02	1.320E+14	8.224E-01	3.868E-03	3.140E-03	5.785E+00	5.736E-01	5.314E+00	6.438E-01
2.512E+02	9.913E+13	8.118E-01	2.903E-03	2.325E-03	5.960E+00	5.909E-01	5.456E+00	6.609E-01
3.162E+02	7.439E+13	8.009E-01	2.193E-03	1.734E-03	6.125E+00	6.074E-01	5.588E+00	6.769E-01
3.981E+02	5.620E+13	7.905E-01	1.681E-03	1.313E-03	6.284E+00	6.231E-01	5.712E+00	6.920E-01
5.012E+02	4.307E+13	7.812E-01	1.313E-03	1.015E-03	6.438E+00	6.384E-01	5.832E+00	7.065E-01
6.310E+02	3.364E+13	7.732E-01	1.044E-03	8.008E-04	6.591E+00	6.536E-01	5.950E+00	7.208E-01
7.943E+02	2.676E+13	7.669E-01	8.409E-04	6.409E-04	6.745E+00	6.688E-01	6.068E+00	7.350E-01
1.000E+03	2.155E+13	7.622E-01	6.809E-04	5.168E-04	6.902E+00	6.844E-01	6.187E+00	7.495E-01
1.126E+03	1.745E+13	7.590E-01	6.107E-04	4.628E-04	6.983E+00	6.924E-01	6.249E+00	7.569E-01

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Table C.11 – *Continued from previous page.*

Time (s)	Activity (Bq)	ε_γ (MeV)	dN_γ/dt (#/f/s)	dE_γ/dt (MeV/f/s)	N_γ (#/f)	N_γ Fraction	E_γ (MeV/f)	E_γ Fraction
1.585E+03	1.565E+13	7.579E-01	4.406E-04	3.332E-04	7.224E+00	7.163E-01	6.431E+00	7.791E-01
1.995E+03	1.129E+13	7.563E-01	3.469E-04	2.625E-04	7.386E+00	7.324E-01	6.553E+00	7.939E-01
2.512E+03	8.889E+12	7.567E-01	2.676E-04	2.032E-04	7.544E+00	7.481E-01	6.674E+00	8.084E-01
3.162E+03	6.858E+12	7.595E-01	2.021E-04	1.548E-04	7.697E+00	7.632E-01	6.790E+00	8.225E-01
3.981E+03	5.179E+12	7.658E-01	1.496E-04	1.162E-04	7.841E+00	7.775E-01	6.901E+00	8.360E-01
5.012E+03	3.835E+12	7.763E-01	1.091E-04	8.624E-05	7.974E+00	7.908E-01	7.005E+00	8.486E-01
6.310E+03	2.795E+12	7.907E-01	7.863E-05	6.344E-05	8.096E+00	8.028E-01	7.103E+00	8.604E-01
7.943E+03	2.015E+12	8.069E-01	5.619E-05	4.616E-05	8.206E+00	8.137E-01	7.192E+00	8.712E-01
1.000E+04	1.440E+12	8.214E-01	3.984E-05	3.309E-05	8.305E+00	8.235E-01	7.274E+00	8.811E-01
1.126E+04	1.021E+12	8.306E-01	3.326E-05	2.767E-05	8.351E+00	8.281E-01	7.312E+00	8.857E-01
1.585E+04	8.523E+11	8.320E-01	1.968E-05	1.608E-05	8.473E+00	8.402E-01	7.412E+00	8.979E-01
1.995E+04	5.044E+11	8.169E-01	1.411E-05	1.110E-05	8.542E+00	8.470E-01	7.468E+00	9.047E-01
2.512E+04	3.617E+11	7.861E-01	1.058E-05	7.829E-06	8.606E+00	8.534E-01	7.517E+00	9.106E-01
3.162E+04	2.712E+11	7.398E-01	8.354E-06	5.731E-06	8.667E+00	8.595E-01	7.561E+00	9.159E-01
3.981E+04	2.141E+11	6.860E-01	6.833E-06	4.324E-06	8.730E+00	8.656E-01	7.602E+00	9.209E-01
5.012E+04	1.751E+11	6.328E-01	5.662E-06	3.303E-06	8.794E+00	8.720E-01	7.641E+00	9.257E-01
6.310E+04	1.451E+11	5.834E-01	4.686E-06	2.522E-06	8.861E+00	8.787E-01	7.679E+00	9.302E-01
7.943E+04	1.201E+11	5.382E-01	3.846E-06	1.914E-06	8.931E+00	8.856E-01	7.715E+00	9.346E-01
1.000E+05	9.856E+10	4.976E-01	3.125E-06	1.444E-06	9.002E+00	8.927E-01	7.750E+00	9.388E-01
1.126E+05	8.008E+10	4.622E-01	2.796E-06	1.248E-06	9.040E+00	8.964E-01	7.767E+00	9.409E-01
1.585E+05	7.166E+10	4.462E-01	2.002E-06	8.187E-07	9.150E+00	9.073E-01	7.814E+00	9.466E-01
1.995E+05	5.130E+10	4.090E-01	1.587E-06	6.212E-07	9.223E+00	9.146E-01	7.844E+00	9.502E-01
2.512E+05	4.066E+10	3.915E-01	1.255E-06	4.771E-07	9.297E+00	9.219E-01	7.872E+00	9.536E-01
3.162E+05	3.216E+10	3.802E-01	9.888E-07	3.715E-07	9.370E+00	9.291E-01	7.900E+00	9.570E-01
3.981E+05	2.534E+10	3.757E-01	7.711E-07	2.924E-07	9.442E+00	9.363E-01	7.927E+00	9.603E-01
5.012E+05	1.976E+10	3.792E-01	5.900E-07	2.308E-07	9.512E+00	9.432E-01	7.954E+00	9.635E-01
6.310E+05	1.512E+10	3.912E-01	4.402E-07	1.811E-07	9.579E+00	9.498E-01	7.981E+00	9.668E-01
7.943E+05	1.128E+10	4.115E-01	3.189E-07	1.399E-07	9.641E+00	9.560E-01	8.007E+00	9.699E-01
1.000E+06	8.172E+09	4.388E-01	2.250E-07	1.062E-07	9.697E+00	9.615E-01	8.032E+00	9.730E-01
1.126E+06	5.767E+09	4.718E-01	1.868E-07	9.160E-08	9.723E+00	9.641E-01	8.045E+00	9.745E-01
1.585E+06	4.787E+09	4.904E-01	1.090E-07	5.929E-08	9.791E+00	9.708E-01	8.079E+00	9.787E-01
1.995E+06	2.793E+09	5.440E-01	7.711E-08	4.421E-08	9.829E+00	9.746E-01	8.101E+00	9.813E-01
2.512E+06	1.976E+09	5.734E-01	5.537E-08	3.279E-08	9.863E+00	9.780E-01	8.120E+00	9.837E-01
3.162E+06	1.419E+09	5.921E-01	4.000E-08	2.395E-08	9.894E+00	9.811E-01	8.139E+00	9.859E-01
3.981E+06	1.025E+09	5.988E-01	2.877E-08	1.716E-08	9.922E+00	9.839E-01	8.156E+00	9.880E-01
5.012E+06	7.374E+08	5.962E-01	2.065E-08	1.218E-08	9.948E+00	9.864E-01	8.171E+00	9.898E-01
6.310E+06	5.291E+08	5.900E-01	1.487E-08	8.750E-09	9.971E+00	9.887E-01	8.184E+00	9.914E-01
7.943E+06	3.811E+08	5.884E-01	1.078E-08	6.450E-09	9.992E+00	9.908E-01	8.197E+00	9.930E-01
1.000E+07	2.763E+08	5.982E-01	7.773E-09	4.820E-09	1.001E+01	9.927E-01	8.208E+00	9.944E-01
1.126E+07	1.992E+08	6.201E-01	6.501E-09	4.124E-09	1.002E+01	9.936E-01	8.214E+00	9.950E-01
1.585E+07	1.666E+08	6.343E-01	3.599E-09	2.427E-09	1.004E+01	9.959E-01	8.229E+00	9.969E-01
1.995E+07	9.224E+07	6.742E-01	2.215E-09	1.525E-09	1.005E+01	9.970E-01	8.237E+00	9.978E-01
2.512E+07	5.677E+07	6.884E-01	1.265E-09	8.600E-10	1.006E+01	9.979E-01	8.243E+00	9.986E-01
3.162E+07	3.243E+07	6.796E-01	6.879E-10	4.374E-10	1.007E+01	9.986E-01	8.248E+00	9.991E-01
3.981E+07	1.763E+07	6.358E-01	3.802E-10	2.118E-10	1.007E+01	9.990E-01	8.250E+00	9.994E-01
5.012E+07	9.743E+06	5.572E-01	2.323E-10	1.111E-10	1.008E+01	9.993E-01	8.252E+00	9.996E-01
6.310E+07	5.954E+06	4.782E-01	1.604E-10	7.060E-11	1.008E+01	9.996E-01	8.253E+00	9.998E-01
7.943E+07	4.110E+06	4.402E-01	1.182E-10	5.208E-11	1.008E+01	9.998E-01	8.254E+00	9.999E-01
1.000E+08	3.029E+06	4.406E-01	8.866E-11	4.053E-11	1.008E+01	1.000E+00	8.255E+00	1.000E+00

Table C.12: Summary of fission gamma-ray characteristics for ^{238}U with 14-MeV ENDF fission yield libraries.

Time (s)	Activity (Bq)	ε_γ (MeV)	dN_γ/dt (#/f/s)	dE_γ/dt (MeV/f/s)	N_γ (#/f)	N_γ Fraction	E_γ (MeV/f)	E_γ Fraction
1.000E-06	1.985E+04	2.038E-02	1.375E+00	1.658E+00	1.000E-06	1.105E-07	1.000E-06	1.370E-07
1.000E-05	3.524E+16	1.206E+00	1.375E+00	1.658E+00	1.337E-05	1.478E-06	1.592E-05	2.182E-06
1.000E-04	3.523E+16	1.206E+00	1.374E+00	1.657E+00	1.371E-04	1.515E-05	1.651E-04	2.263E-05
1.000E-03	3.522E+16	1.206E+00	1.370E+00	1.651E+00	1.372E-03	1.516E-04	1.654E-03	2.266E-04
1.000E-02	3.511E+16	1.205E+00	1.329E+00	1.591E+00	1.352E-02	1.494E-03	1.624E-02	2.226E-03
1.000E-01	3.407E+16	1.197E+00	1.065E+00	1.206E+00	1.212E-01	1.340E-02	1.421E-01	1.948E-02
1.126E-01	2.728E+16	1.133E+00	1.041E+00	1.173E+00	1.345E-01	1.487E-02	1.571E-01	2.153E-02
1.585E-01	2.667E+16	1.127E+00	9.697E-01	1.075E+00	1.806E-01	1.997E-02	2.087E-01	2.860E-02
1.995E-01	2.485E+16	1.109E+00	9.205E-01	1.010E+00	2.194E-01	2.425E-02	2.515E-01	3.446E-02
2.512E-01	2.359E+16	1.097E+00	8.706E-01	9.463E-01	2.657E-01	2.937E-02	3.020E-01	4.139E-02
3.162E-01	2.231E+16	1.087E+00	8.198E-01	8.838E-01	3.206E-01	3.544E-02	3.615E-01	4.954E-02
3.981E-01	2.101E+16	1.078E+00	7.676E-01	8.213E-01	3.856E-01	4.262E-02	4.313E-01	5.911E-02
5.012E-01	1.967E+16	1.070E+00	7.121E-01	7.563E-01	4.619E-01	5.105E-02	5.126E-01	7.025E-02
6.310E-01	1.825E+16	1.062E+00	6.544E-01	6.897E-01	5.506E-01	6.085E-02	6.065E-01	8.311E-02
7.943E-01	1.677E+16	1.054E+00	5.935E-01	6.208E-01	6.525E-01	7.212E-02	7.135E-01	9.777E-02
1.000E+00	1.521E+16	1.046E+00	5.315E-01	5.511E-01	7.682E-01	8.490E-02	8.340E-01	1.143E-01
1.126E+00	1.362E+16	1.037E+00	4.995E-01	5.155E-01	8.331E-01	9.208E-02	9.012E-01	1.235E-01
1.585E+00	1.280E+16	1.032E+00	4.086E-01	4.151E-01	1.041E+00	1.151E-01	1.115E+00	1.528E-01
1.995E+00	1.047E+16	1.016E+00	3.505E-01	3.519E-01	1.197E+00	1.323E-01	1.272E+00	1.743E-01
2.512E+00	8.982E+15	1.004E+00	2.963E-01	2.937E-01	1.364E+00	1.508E-01	1.439E+00	1.972E-01
3.162E+00	7.593E+15	9.911E-01	2.467E-01	2.412E-01	1.541E+00	1.703E-01	1.613E+00	2.210E-01
3.981E+00	6.323E+15	9.774E-01	2.025E-01	1.951E-01	1.725E+00	1.906E-01	1.791E+00	2.455E-01
5.012E+00	5.190E+15	9.632E-01	1.640E-01	1.555E-01	1.914E+00	2.115E-01	1.972E+00	2.702E-01
6.310E+00	4.203E+15	9.484E-01	1.314E-01	1.225E-01	2.105E+00	2.327E-01	2.152E+00	2.950E-01
7.943E+00	3.367E+15	9.322E-01	1.045E-01	9.545E-02	2.298E+00	2.540E-01	2.330E+00	3.194E-01
1.000E+01	2.677E+15	9.137E-01	8.276E-02	7.383E-02	2.491E+00	2.753E-01	2.505E+00	3.432E-01
1.126E+01	2.121E+15	8.921E-01	7.340E-02	6.458E-02	2.589E+00	2.861E-01	2.592E+00	3.551E-01
1.585E+01	1.881E+15	8.799E-01	5.217E-02	4.408E-02	2.877E+00	3.180E-01	2.841E+00	3.893E-01
1.995E+01	1.337E+15	8.449E-01	4.160E-02	3.436E-02	3.069E+00	3.392E-01	3.002E+00	4.114E-01
2.512E+01	1.066E+15	8.260E-01	3.312E-02	2.698E-02	3.262E+00	3.606E-01	3.160E+00	4.331E-01
3.162E+01	8.488E+14	8.147E-01	2.634E-02	2.140E-02	3.456E+00	3.820E-01	3.318E+00	4.546E-01
3.981E+01	6.750E+14	8.123E-01	2.090E-02	1.708E-02	3.649E+00	4.033E-01	3.475E+00	4.762E-01
5.012E+01	5.355E+14	8.174E-01	1.652E-02	1.365E-02	3.842E+00	4.246E-01	3.634E+00	4.979E-01
6.310E+01	4.234E+14	8.261E-01	1.299E-02	1.084E-02	4.034E+00	4.458E-01	3.793E+00	5.197E-01
7.943E+01	3.329E+14	8.342E-01	1.013E-02	8.490E-03	4.222E+00	4.667E-01	3.950E+00	5.413E-01
1.000E+02	2.597E+14	8.378E-01	7.832E-03	6.544E-03	4.407E+00	4.871E-01	4.105E+00	5.625E-01
1.126E+02	2.007E+14	8.356E-01	6.833E-03	5.686E-03	4.499E+00	4.973E-01	4.182E+00	5.731E-01
1.585E+02	1.751E+14	8.322E-01	4.562E-03	3.723E-03	4.761E+00	5.262E-01	4.398E+00	6.027E-01
1.995E+02	1.169E+14	8.162E-01	3.461E-03	2.779E-03	4.926E+00	5.444E-01	4.531E+00	6.210E-01
2.512E+02	8.870E+13	8.029E-01	2.632E-03	2.079E-03	5.083E+00	5.618E-01	4.657E+00	6.381E-01
3.162E+02	6.744E+13	7.901E-01	2.017E-03	1.571E-03	5.234E+00	5.785E-01	4.776E+00	6.544E-01
3.981E+02	5.169E+13	7.791E-01	1.566E-03	1.207E-03	5.381E+00	5.947E-01	4.889E+00	6.700E-01
5.012E+02	4.013E+13	7.706E-01	1.235E-03	9.438E-04	5.525E+00	6.107E-01	5.000E+00	6.852E-01
6.310E+02	3.165E+13	7.642E-01	9.880E-04	7.501E-04	5.669E+00	6.266E-01	5.110E+00	7.003E-01
7.943E+02	2.532E+13	7.592E-01	7.980E-04	6.026E-04	5.815E+00	6.427E-01	5.221E+00	7.154E-01
1.000E+03	2.045E+13	7.551E-01	6.474E-04	4.865E-04	5.964E+00	6.592E-01	5.333E+00	7.307E-01
1.126E+03	1.659E+13	7.515E-01	5.810E-04	4.357E-04	6.041E+00	6.677E-01	5.391E+00	7.387E-01

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Table C.12 – *Continued from previous page.*

Time (s)	Activity (Bq)	ε_γ (MeV)	dN_γ/dt (#/f/s)	dE_γ/dt (MeV/f/s)	N_γ (#/f)	N_γ Fraction	E_γ (MeV/f)	E_γ Fraction
1.585E+03	1.489E+13	7.498E-01	4.214E-04	3.141E-04	6.271E+00	6.931E-01	5.563E+00	7.623E-01
1.995E+03	1.080E+13	7.452E-01	3.343E-04	2.483E-04	6.426E+00	7.103E-01	5.678E+00	7.781E-01
2.512E+03	8.568E+12	7.427E-01	2.605E-04	1.932E-04	6.580E+00	7.273E-01	5.792E+00	7.937E-01
3.162E+03	6.677E+12	7.417E-01	1.990E-04	1.480E-04	6.730E+00	7.438E-01	5.903E+00	8.089E-01
3.981E+03	5.101E+12	7.434E-01	1.491E-04	1.116E-04	6.872E+00	7.595E-01	6.009E+00	8.235E-01
5.012E+03	3.821E+12	7.488E-01	1.097E-04	8.311E-05	7.005E+00	7.743E-01	6.110E+00	8.372E-01
6.310E+03	2.810E+12	7.580E-01	7.945E-05	6.117E-05	7.128E+00	7.878E-01	6.203E+00	8.501E-01
7.943E+03	2.036E+12	7.699E-01	5.682E-05	4.442E-05	7.239E+00	8.001E-01	6.290E+00	8.619E-01
1.000E+04	1.456E+12	7.819E-01	4.023E-05	3.182E-05	7.339E+00	8.112E-01	6.368E+00	8.726E-01
1.126E+04	1.031E+12	7.909E-01	3.357E-05	2.662E-05	7.386E+00	8.163E-01	6.405E+00	8.777E-01
1.585E+04	8.602E+11	7.930E-01	1.992E-05	1.560E-05	7.508E+00	8.299E-01	6.502E+00	8.909E-01
1.995E+04	5.104E+11	7.832E-01	1.433E-05	1.087E-05	7.579E+00	8.376E-01	6.556E+00	8.984E-01
2.512E+04	3.673E+11	7.584E-01	1.074E-05	7.725E-06	7.643E+00	8.448E-01	6.604E+00	9.050E-01
3.162E+04	2.752E+11	7.194E-01	8.409E-06	5.654E-06	7.706E+00	8.517E-01	6.648E+00	9.109E-01
3.981E+04	2.155E+11	6.724E-01	6.790E-06	4.238E-06	7.768E+00	8.585E-01	6.688E+00	9.165E-01
5.012E+04	1.740E+11	6.242E-01	5.549E-06	3.208E-06	7.832E+00	8.656E-01	6.726E+00	9.217E-01
6.310E+04	1.422E+11	5.782E-01	4.542E-06	2.432E-06	7.897E+00	8.728E-01	6.763E+00	9.268E-01
7.943E+04	1.164E+11	5.355E-01	3.705E-06	1.841E-06	7.964E+00	8.803E-01	6.798E+00	9.315E-01
1.000E+05	9.495E+10	4.969E-01	3.005E-06	1.392E-06	8.033E+00	8.879E-01	6.831E+00	9.361E-01
1.126E+05	7.700E+10	4.632E-01	2.689E-06	1.204E-06	8.069E+00	8.918E-01	6.848E+00	9.383E-01
1.585E+05	6.891E+10	4.478E-01	1.929E-06	7.939E-07	8.175E+00	9.036E-01	6.893E+00	9.446E-01
1.995E+05	4.944E+10	4.115E-01	1.530E-06	6.022E-07	8.246E+00	9.114E-01	6.922E+00	9.485E-01
2.512E+05	3.922E+10	3.935E-01	1.209E-06	4.606E-07	8.317E+00	9.192E-01	6.949E+00	9.523E-01
3.162E+05	3.099E+10	3.809E-01	9.498E-07	3.558E-07	8.387E+00	9.270E-01	6.976E+00	9.559E-01
3.981E+05	2.434E+10	3.746E-01	7.367E-07	2.769E-07	8.456E+00	9.346E-01	7.002E+00	9.595E-01
5.012E+05	1.888E+10	3.759E-01	5.600E-07	2.159E-07	8.523E+00	9.420E-01	7.027E+00	9.630E-01
6.310E+05	1.435E+10	3.855E-01	4.140E-07	1.669E-07	8.586E+00	9.490E-01	7.052E+00	9.664E-01
7.943E+05	1.061E+10	4.032E-01	2.966E-07	1.270E-07	8.644E+00	9.554E-01	7.076E+00	9.697E-01
1.000E+06	7.600E+09	4.284E-01	2.062E-07	9.480E-08	8.696E+00	9.611E-01	7.099E+00	9.728E-01
1.126E+06	5.285E+09	4.597E-01	1.696E-07	8.101E-08	8.720E+00	9.637E-01	7.110E+00	9.743E-01
1.585E+06	4.347E+09	4.776E-01	9.615E-08	5.112E-08	8.781E+00	9.705E-01	7.140E+00	9.785E-01
1.995E+06	2.464E+09	5.317E-01	6.677E-08	3.763E-08	8.814E+00	9.742E-01	7.159E+00	9.810E-01
2.512E+06	1.711E+09	5.636E-01	4.733E-08	2.773E-08	8.844E+00	9.774E-01	7.175E+00	9.833E-01
3.162E+06	1.213E+09	5.859E-01	3.397E-08	2.028E-08	8.870E+00	9.803E-01	7.191E+00	9.854E-01
3.981E+06	8.705E+08	5.969E-01	2.447E-08	1.465E-08	8.894E+00	9.830E-01	7.205E+00	9.874E-01
5.012E+06	6.270E+08	5.987E-01	1.770E-08	1.056E-08	8.916E+00	9.854E-01	7.218E+00	9.892E-01
6.310E+06	4.537E+08	5.967E-01	1.295E-08	7.749E-09	8.936E+00	9.876E-01	7.230E+00	9.908E-01
7.943E+06	3.318E+08	5.985E-01	9.568E-09	5.834E-09	8.954E+00	9.896E-01	7.241E+00	9.923E-01
1.000E+07	2.452E+08	6.097E-01	7.043E-09	4.436E-09	8.971E+00	9.915E-01	7.252E+00	9.938E-01
1.126E+07	1.805E+08	6.298E-01	5.959E-09	3.824E-09	8.979E+00	9.924E-01	7.257E+00	9.945E-01
1.585E+07	1.527E+08	6.418E-01	3.426E-09	2.293E-09	9.001E+00	9.948E-01	7.271E+00	9.964E-01
1.995E+07	8.779E+07	6.694E-01	2.181E-09	1.461E-09	9.012E+00	9.961E-01	7.279E+00	9.974E-01
2.512E+07	5.590E+07	6.699E-01	1.308E-09	8.403E-10	9.021E+00	9.971E-01	7.285E+00	9.983E-01
3.162E+07	3.352E+07	6.424E-01	7.648E-10	4.416E-10	9.028E+00	9.978E-01	7.289E+00	9.988E-01
3.981E+07	1.960E+07	5.774E-01	4.679E-10	2.268E-10	9.033E+00	9.984E-01	7.292E+00	9.992E-01
5.012E+07	1.199E+07	4.848E-01	3.195E-10	1.294E-10	9.037E+00	9.988E-01	7.294E+00	9.995E-01
6.310E+07	8.189E+06	4.048E-01	2.420E-10	8.851E-11	9.041E+00	9.992E-01	7.295E+00	9.997E-01
7.943E+07	6.201E+06	3.658E-01	1.916E-10	6.822E-11	9.044E+00	9.996E-01	7.296E+00	9.998E-01
1.000E+08	4.911E+06	3.560E-01	1.521E-10	5.424E-11	9.048E+00	1.000E+00	7.297E+00	1.000E+00

Table C.13: Summary of fission gamma-ray characteristics for ^{239}Pu with thermal ENDF fission yield libraries.

Time (s)	Activity (Bq)	ε_γ (MeV)	dN_γ/dt (#/f/s)	dE_γ/dt (MeV/f/s)	N_γ (#/f)	N_γ Fraction	E_γ (MeV/f)	E_γ Fraction
1.000E-06	2.136E+09	2.115E-02	4.241E-01	4.211E-01	1.000E-06	1.054E-07	1.000E-06	1.816E-07
1.000E-05	4.152E+16	9.928E-01	4.241E-01	4.211E-01	4.817E-06	5.077E-07	4.789E-06	8.700E-07
1.000E-04	4.152E+16	9.928E-01	4.240E-01	4.210E-01	4.298E-05	4.530E-06	4.268E-05	7.753E-06
1.000E-03	4.151E+16	9.928E-01	4.236E-01	4.204E-01	4.244E-04	4.473E-05	4.213E-04	7.653E-05
1.000E-02	4.147E+16	9.925E-01	4.196E-01	4.154E-01	4.219E-03	4.447E-04	4.183E-03	7.598E-04
1.000E-01	4.108E+16	9.900E-01	3.878E-01	3.769E-01	4.055E-02	4.275E-03	3.984E-02	7.236E-03
1.126E-01	3.797E+16	9.718E-01	3.842E-01	3.726E-01	4.542E-02	4.787E-03	4.456E-02	8.094E-03
1.585E-01	3.761E+16	9.700E-01	3.719E-01	3.587E-01	6.277E-02	6.616E-03	6.134E-02	1.114E-02
1.995E-01	3.641E+16	9.646E-01	3.621E-01	3.479E-01	7.782E-02	8.202E-03	7.583E-02	1.377E-02
2.512E-01	3.545E+16	9.607E-01	3.509E-01	3.356E-01	9.625E-02	1.014E-02	9.350E-02	1.698E-02
3.162E-01	3.435E+16	9.566E-01	3.381E-01	3.220E-01	1.186E-01	1.250E-02	1.149E-01	2.087E-02
3.981E-01	3.310E+16	9.523E-01	3.236E-01	3.066E-01	1.457E-01	1.536E-02	1.406E-01	2.554E-02
5.012E-01	3.168E+16	9.476E-01	3.073E-01	2.896E-01	1.783E-01	1.879E-02	1.713E-01	3.113E-02
6.310E-01	3.008E+16	9.424E-01	2.892E-01	2.708E-01	2.170E-01	2.287E-02	2.077E-01	3.773E-02
7.943E-01	2.831E+16	9.364E-01	2.694E-01	2.504E-01	2.626E-01	2.768E-02	2.503E-01	4.546E-02
1.000E+00	2.637E+16	9.295E-01	2.482E-01	2.287E-01	3.158E-01	3.329E-02	2.995E-01	5.441E-02
1.126E+00	2.430E+16	9.214E-01	2.369E-01	2.172E-01	3.463E-01	3.650E-02	3.276E-01	5.951E-02
1.585E+00	2.319E+16	9.168E-01	2.034E-01	1.835E-01	4.474E-01	4.715E-02	4.195E-01	7.621E-02
1.995E+00	1.991E+16	9.021E-01	1.806E-01	1.610E-01	5.262E-01	5.546E-02	4.902E-01	8.905E-02
2.512E+00	1.768E+16	8.914E-01	1.584E-01	1.395E-01	6.137E-01	6.469E-02	5.678E-01	1.031E-01
3.162E+00	1.551E+16	8.804E-01	1.372E-01	1.192E-01	7.099E-01	7.482E-02	6.520E-01	1.184E-01
3.981E+00	1.343E+16	8.692E-01	1.174E-01	1.007E-01	8.141E-01	8.581E-02	7.420E-01	1.348E-01
5.012E+00	1.149E+16	8.580E-01	9.940E-02	8.413E-02	9.258E-01	9.758E-02	8.373E-01	1.521E-01
6.310E+00	9.731E+15	8.464E-01	8.352E-02	6.965E-02	1.044E+00	1.101E-01	9.371E-01	1.702E-01
7.943E+00	8.177E+15	8.339E-01	6.984E-02	5.727E-02	1.170E+00	1.233E-01	1.041E+00	1.890E-01
1.000E+01	6.837E+15	8.201E-01	5.824E-02	4.690E-02	1.301E+00	1.372E-01	1.148E+00	2.085E-01
1.126E+01	5.702E+15	8.053E-01	5.302E-02	4.229E-02	1.371E+00	1.446E-01	1.204E+00	2.187E-01
1.585E+01	5.191E+15	7.976E-01	4.030E-02	3.133E-02	1.586E+00	1.671E-01	1.373E+00	2.494E-01
1.995E+01	3.945E+15	7.774E-01	3.332E-02	2.559E-02	1.737E+00	1.831E-01	1.490E+00	2.706E-01
2.512E+01	3.262E+15	7.679E-01	2.736E-02	2.089E-02	1.893E+00	1.996E-01	1.610E+00	2.924E-01
3.162E+01	2.679E+15	7.634E-01	2.231E-02	1.704E-02	2.055E+00	2.166E-01	1.733E+00	3.148E-01
3.981E+01	2.184E+15	7.639E-01	1.807E-02	1.388E-02	2.220E+00	2.340E-01	1.860E+00	3.378E-01
5.012E+01	1.769E+15	7.680E-01	1.454E-02	1.124E-02	2.388E+00	2.517E-01	1.989E+00	3.613E-01
6.310E+01	1.423E+15	7.730E-01	1.161E-02	9.008E-03	2.558E+00	2.696E-01	2.121E+00	3.852E-01
7.943E+01	1.137E+15	7.756E-01	9.191E-03	7.110E-03	2.728E+00	2.875E-01	2.252E+00	4.091E-01
1.000E+02	8.998E+14	7.736E-01	7.195E-03	5.516E-03	2.896E+00	3.053E-01	2.382E+00	4.327E-01
1.126E+02	7.044E+14	7.666E-01	6.316E-03	4.809E-03	2.982E+00	3.143E-01	2.447E+00	4.445E-01
1.585E+02	6.183E+14	7.615E-01	4.277E-03	3.185E-03	3.225E+00	3.399E-01	2.630E+00	4.778E-01
1.995E+02	4.187E+14	7.448E-01	3.267E-03	2.405E-03	3.379E+00	3.562E-01	2.745E+00	4.987E-01
2.512E+02	3.198E+14	7.363E-01	2.495E-03	1.829E-03	3.528E+00	3.719E-01	2.855E+00	5.185E-01
3.162E+02	2.443E+14	7.331E-01	1.920E-03	1.412E-03	3.672E+00	3.870E-01	2.960E+00	5.377E-01
3.981E+02	1.880E+14	7.355E-01	1.498E-03	1.112E-03	3.812E+00	4.018E-01	3.063E+00	5.565E-01
5.012E+02	1.467E+14	7.419E-01	1.189E-03	8.911E-04	3.950E+00	4.164E-01	3.167E+00	5.752E-01
6.310E+02	1.164E+14	7.495E-01	9.573E-04	7.242E-04	4.090E+00	4.311E-01	3.271E+00	5.942E-01
7.943E+02	9.372E+13	7.565E-01	7.774E-04	5.926E-04	4.231E+00	4.460E-01	3.379E+00	6.138E-01
1.000E+03	7.611E+13	7.623E-01	6.319E-04	4.846E-04	4.376E+00	4.613E-01	3.490E+00	6.339E-01
1.126E+03	6.186E+13	7.669E-01	5.670E-04	4.360E-04	4.452E+00	4.692E-01	3.548E+00	6.444E-01

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Table C.13 – *Continued from previous page.*

Time (s)	Activity (Bq)	ε_γ (MeV)	dN_γ/dt (#/f/s)	dE_γ/dt (MeV/f/s)	N_γ (#/f)	N_γ Fraction	E_γ (MeV/f)	E_γ Fraction
1.585E+03	5.551E+13	7.690E-01	4.087E-04	3.162E-04	4.676E+00	4.928E-01	3.720E+00	6.758E-01
1.995E+03	4.001E+13	7.738E-01	3.218E-04	2.500E-04	4.825E+00	5.086E-01	3.836E+00	6.969E-01
2.512E+03	3.150E+13	7.770E-01	2.484E-04	1.941E-04	4.973E+00	5.241E-01	3.951E+00	7.177E-01
3.162E+03	2.432E+13	7.813E-01	1.878E-04	1.480E-04	5.115E+00	5.391E-01	4.062E+00	7.379E-01
3.981E+03	1.839E+13	7.877E-01	1.392E-04	1.109E-04	5.249E+00	5.532E-01	4.168E+00	7.572E-01
5.012E+03	1.363E+13	7.966E-01	1.016E-04	8.198E-05	5.373E+00	5.663E-01	4.268E+00	7.753E-01
6.310E+03	9.943E+12	8.072E-01	7.320E-05	5.984E-05	5.486E+00	5.782E-01	4.360E+00	7.920E-01
7.943E+03	7.166E+12	8.175E-01	5.230E-05	4.315E-05	5.589E+00	5.890E-01	4.444E+00	8.072E-01
1.000E+04	5.120E+12	8.250E-01	3.708E-05	3.066E-05	5.680E+00	5.987E-01	4.520E+00	8.210E-01
1.126E+04	3.630E+12	8.268E-01	3.098E-05	2.555E-05	5.723E+00	6.032E-01	4.555E+00	8.275E-01
1.585E+04	3.033E+12	8.248E-01	1.845E-05	1.481E-05	5.837E+00	6.152E-01	4.648E+00	8.443E-01
1.995E+04	1.806E+12	8.029E-01	1.332E-05	1.028E-05	5.902E+00	6.221E-01	4.699E+00	8.536E-01
2.512E+04	1.304E+12	7.716E-01	1.003E-05	7.311E-06	5.962E+00	6.284E-01	4.745E+00	8.619E-01
3.162E+04	9.818E+11	7.290E-01	7.908E-06	5.395E-06	6.021E+00	6.346E-01	4.786E+00	8.694E-01
3.981E+04	7.742E+11	6.822E-01	6.428E-06	4.098E-06	6.079E+00	6.408E-01	4.825E+00	8.765E-01
5.012E+04	6.293E+11	6.376E-01	5.275E-06	3.150E-06	6.140E+00	6.471E-01	4.862E+00	8.832E-01
6.310E+04	5.164E+11	5.971E-01	4.313E-06	2.418E-06	6.202E+00	6.537E-01	4.898E+00	8.898E-01
7.943E+04	4.222E+11	5.606E-01	3.494E-06	1.844E-06	6.266E+00	6.604E-01	4.933E+00	8.961E-01
1.000E+05	3.421E+11	5.277E-01	2.800E-06	1.398E-06	6.330E+00	6.672E-01	4.967E+00	9.022E-01
1.126E+05	2.741E+11	4.993E-01	2.487E-06	1.211E-06	6.364E+00	6.707E-01	4.983E+00	9.052E-01
1.585E+05	2.435E+11	4.867E-01	1.744E-06	7.988E-07	6.461E+00	6.810E-01	5.029E+00	9.135E-01
1.995E+05	1.707E+11	4.581E-01	1.366E-06	6.070E-07	6.524E+00	6.877E-01	5.058E+00	9.188E-01
2.512E+05	1.337E+11	4.445E-01	1.073E-06	4.659E-07	6.587E+00	6.943E-01	5.086E+00	9.238E-01
3.162E+05	1.050E+11	4.344E-01	8.445E-07	3.612E-07	6.650E+00	7.009E-01	5.113E+00	9.287E-01
3.981E+05	8.268E+10	4.277E-01	6.651E-07	2.829E-07	6.712E+00	7.074E-01	5.139E+00	9.335E-01
5.012E+05	6.511E+10	4.253E-01	5.203E-07	2.225E-07	6.773E+00	7.139E-01	5.165E+00	9.382E-01
6.310E+05	5.094E+10	4.277E-01	4.021E-07	1.746E-07	6.833E+00	7.202E-01	5.191E+00	9.429E-01
7.943E+05	3.937E+10	4.341E-01	3.057E-07	1.353E-07	6.890E+00	7.263E-01	5.216E+00	9.475E-01
1.000E+06	2.993E+10	4.424E-01	2.290E-07	1.031E-07	6.945E+00	7.321E-01	5.241E+00	9.520E-01
1.126E+06	2.242E+10	4.503E-01	1.966E-07	8.915E-08	6.972E+00	7.349E-01	5.253E+00	9.542E-01
1.585E+06	1.925E+10	4.534E-01	1.276E-07	5.801E-08	7.047E+00	7.427E-01	5.286E+00	9.603E-01
1.995E+06	1.249E+10	4.547E-01	9.745E-08	4.333E-08	7.093E+00	7.476E-01	5.307E+00	9.641E-01
2.512E+06	9.540E+09	4.447E-01	7.636E-08	3.224E-08	7.138E+00	7.523E-01	5.327E+00	9.676E-01
3.162E+06	7.476E+09	4.222E-01	6.130E-08	2.369E-08	7.182E+00	7.570E-01	5.345E+00	9.709E-01
3.981E+06	6.001E+09	3.865E-01	5.034E-08	1.714E-08	7.228E+00	7.619E-01	5.362E+00	9.740E-01
5.012E+06	4.928E+09	3.406E-01	4.238E-08	1.235E-08	7.276E+00	7.669E-01	5.377E+00	9.767E-01
6.310E+06	4.149E+09	2.914E-01	3.669E-08	9.026E-09	7.327E+00	7.723E-01	5.391E+00	9.792E-01
7.943E+06	3.592E+09	2.460E-01	3.261E-08	6.781E-09	7.384E+00	7.783E-01	5.404E+00	9.816E-01
1.000E+07	3.193E+09	2.079E-01	2.959E-08	5.181E-09	7.448E+00	7.850E-01	5.416E+00	9.838E-01
1.126E+07	2.897E+09	1.751E-01	2.831E-08	4.499E-09	7.484E+00	7.889E-01	5.422E+00	9.849E-01
1.585E+07	2.772E+09	1.589E-01	2.540E-08	2.840E-09	7.607E+00	8.018E-01	5.439E+00	9.880E-01
1.995E+07	2.487E+09	1.118E-01	2.403E-08	1.968E-09	7.709E+00	8.125E-01	5.449E+00	9.898E-01
2.512E+07	2.353E+09	8.190E-02	2.311E-08	1.329E-09	7.831E+00	8.254E-01	5.457E+00	9.913E-01
3.162E+07	2.262E+09	5.750E-02	2.254E-08	9.218E-10	7.979E+00	8.410E-01	5.465E+00	9.926E-01
3.981E+07	2.207E+09	4.089E-02	2.224E-08	7.020E-10	8.162E+00	8.603E-01	5.471E+00	9.939E-01
5.012E+07	2.177E+09	3.157E-02	2.208E-08	5.998E-10	8.391E+00	8.844E-01	5.478E+00	9.951E-01
6.310E+07	2.162E+09	2.716E-02	2.201E-08	5.549E-10	8.677E+00	9.146E-01	5.485E+00	9.964E-01
7.943E+07	2.155E+09	2.521E-02	2.196E-08	5.308E-10	9.036E+00	9.524E-01	5.494E+00	9.980E-01
1.000E+08	2.150E+09	2.417E-02	2.192E-08	5.140E-10	9.487E+00	1.000E+00	5.505E+00	1.000E+00

Table C.14: Summary of fission gamma-ray characteristics for ^{239}Pu with fast ENDF fission yield libraries.

Time (s)	Activity (Bq)	ε_γ (MeV)	dN_γ/dt (#/f/s)	dE_γ/dt (MeV/f/s)	N_γ (#/f)	N_γ Fraction	E_γ (MeV/f)	E_γ Fraction
1.000E-06	2.136E+09	2.115E-02	4.256E-01	4.254E-01	1.000E-06	1.056E-07	1.000E-06	1.815E-07
1.000E-05	4.167E+16	9.995E-01	4.256E-01	4.254E-01	4.831E-06	5.103E-07	4.829E-06	8.766E-07
1.000E-04	4.167E+16	9.995E-01	4.256E-01	4.254E-01	4.314E-05	4.557E-06	4.312E-05	7.827E-06
1.000E-03	4.167E+16	9.994E-01	4.251E-01	4.247E-01	4.260E-04	4.500E-05	4.257E-04	7.727E-05
1.000E-02	4.162E+16	9.991E-01	4.202E-01	4.183E-01	4.230E-03	4.468E-04	4.219E-03	7.659E-04
1.000E-01	4.114E+16	9.953E-01	3.844E-01	3.732E-01	4.044E-02	4.272E-03	3.983E-02	7.231E-03
1.126E-01	3.763E+16	9.709E-01	3.805E-01	3.686E-01	4.526E-02	4.781E-03	4.451E-02	8.079E-03
1.585E-01	3.725E+16	9.688E-01	3.681E-01	3.543E-01	6.244E-02	6.596E-03	6.110E-02	1.109E-02
1.995E-01	3.604E+16	9.625E-01	3.584E-01	3.435E-01	7.733E-02	8.169E-03	7.540E-02	1.369E-02
2.512E-01	3.509E+16	9.583E-01	3.475E-01	3.316E-01	9.558E-02	1.010E-02	9.285E-02	1.686E-02
3.162E-01	3.402E+16	9.542E-01	3.351E-01	3.184E-01	1.178E-01	1.244E-02	1.140E-01	2.069E-02
3.981E-01	3.281E+16	9.500E-01	3.212E-01	3.038E-01	1.446E-01	1.528E-02	1.395E-01	2.532E-02
5.012E-01	3.145E+16	9.456E-01	3.055E-01	2.874E-01	1.770E-01	1.869E-02	1.699E-01	3.085E-02
6.310E-01	2.991E+16	9.407E-01	2.879E-01	2.692E-01	2.155E-01	2.276E-02	2.061E-01	3.741E-02
7.943E-01	2.819E+16	9.350E-01	2.686E-01	2.494E-01	2.609E-01	2.756E-02	2.484E-01	4.509E-02
1.000E+00	2.630E+16	9.283E-01	2.479E-01	2.282E-01	3.140E-01	3.317E-02	2.975E-01	5.401E-02
1.126E+00	2.427E+16	9.207E-01	2.368E-01	2.170E-01	3.446E-01	3.640E-02	3.255E-01	5.910E-02
1.585E+00	2.318E+16	9.163E-01	2.037E-01	1.839E-01	4.456E-01	4.708E-02	4.175E-01	7.580E-02
1.995E+00	1.994E+16	9.027E-01	1.811E-01	1.617E-01	5.246E-01	5.542E-02	4.884E-01	8.867E-02
2.512E+00	1.773E+16	8.929E-01	1.588E-01	1.403E-01	6.124E-01	6.469E-02	5.664E-01	1.028E-01
3.162E+00	1.555E+16	8.830E-01	1.375E-01	1.200E-01	7.088E-01	7.487E-02	6.511E-01	1.182E-01
3.981E+00	1.346E+16	8.729E-01	1.176E-01	1.014E-01	8.132E-01	8.590E-02	7.417E-01	1.346E-01
5.012E+00	1.151E+16	8.627E-01	9.941E-02	8.469E-02	9.250E-01	9.771E-02	8.377E-01	1.521E-01
6.310E+00	9.732E+15	8.519E-01	8.340E-02	7.006E-02	1.044E+00	1.102E-01	9.381E-01	1.703E-01
7.943E+00	8.165E+15	8.400E-01	6.963E-02	5.754E-02	1.169E+00	1.234E-01	1.042E+00	1.892E-01
1.000E+01	6.817E+15	8.264E-01	5.801E-02	4.707E-02	1.300E+00	1.373E-01	1.150E+00	2.087E-01
1.126E+01	5.679E+15	8.115E-01	5.277E-02	4.240E-02	1.370E+00	1.447E-01	1.206E+00	2.190E-01
1.585E+01	5.166E+15	8.036E-01	4.006E-02	3.135E-02	1.583E+00	1.672E-01	1.375E+00	2.497E-01
1.995E+01	3.922E+15	7.826E-01	3.311E-02	2.557E-02	1.733E+00	1.830E-01	1.492E+00	2.709E-01
2.512E+01	3.241E+15	7.725E-01	2.718E-02	2.086E-02	1.889E+00	1.995E-01	1.612E+00	2.927E-01
3.162E+01	2.661E+15	7.675E-01	2.217E-02	1.702E-02	2.049E+00	2.164E-01	1.735E+00	3.150E-01
3.981E+01	2.170E+15	7.679E-01	1.796E-02	1.386E-02	2.213E+00	2.338E-01	1.862E+00	3.380E-01
5.012E+01	1.758E+15	7.721E-01	1.446E-02	1.124E-02	2.380E+00	2.515E-01	1.991E+00	3.615E-01
6.310E+01	1.416E+15	7.774E-01	1.155E-02	9.017E-03	2.549E+00	2.693E-01	2.123E+00	3.853E-01
7.943E+01	1.131E+15	7.805E-01	9.149E-03	7.131E-03	2.718E+00	2.871E-01	2.255E+00	4.093E-01
1.000E+02	8.957E+14	7.794E-01	7.161E-03	5.539E-03	2.886E+00	3.049E-01	2.385E+00	4.329E-01
1.126E+02	7.011E+14	7.734E-01	6.284E-03	4.831E-03	2.971E+00	3.138E-01	2.450E+00	4.448E-01
1.585E+02	6.152E+14	7.688E-01	4.248E-03	3.202E-03	3.212E+00	3.393E-01	2.635E+00	4.783E-01
1.995E+02	4.159E+14	7.538E-01	3.238E-03	2.416E-03	3.366E+00	3.556E-01	2.750E+00	4.992E-01
2.512E+02	3.170E+14	7.461E-01	2.470E-03	1.835E-03	3.513E+00	3.711E-01	2.860E+00	5.191E-01
3.162E+02	2.418E+14	7.430E-01	1.900E-03	1.415E-03	3.655E+00	3.862E-01	2.965E+00	5.383E-01
3.981E+02	1.860E+14	7.449E-01	1.484E-03	1.113E-03	3.794E+00	4.008E-01	3.069E+00	5.571E-01
5.012E+02	1.453E+14	7.502E-01	1.183E-03	8.948E-04	3.931E+00	4.153E-01	3.172E+00	5.759E-01
6.310E+02	1.158E+14	7.565E-01	9.576E-04	7.297E-04	4.070E+00	4.300E-01	3.278E+00	5.950E-01
7.943E+02	9.375E+13	7.620E-01	7.823E-04	5.996E-04	4.213E+00	4.450E-01	3.386E+00	6.147E-01
1.000E+03	7.659E+13	7.664E-01	6.391E-04	4.920E-04	4.359E+00	4.604E-01	3.499E+00	6.351E-01
1.126E+03	6.257E+13	7.698E-01	5.747E-04	4.432E-04	4.435E+00	4.685E-01	3.557E+00	6.458E-01

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Table C.14 – *Continued from previous page.*

Time (s)	Activity (Bq)	ε_γ (MeV)	dN_γ/dt (#/f/s)	dE_γ/dt (MeV/f/s)	N_γ (#/f)	N_γ Fraction	E_γ (MeV/f)	E_γ Fraction
1.585E+03	5.626E+13	7.712E-01	4.158E-04	3.219E-04	4.662E+00	4.925E-01	3.733E+00	6.777E-01
1.995E+03	4.071E+13	7.740E-01	3.278E-04	2.542E-04	4.815E+00	5.086E-01	3.851E+00	6.991E-01
2.512E+03	3.209E+13	7.755E-01	2.530E-04	1.968E-04	4.965E+00	5.245E-01	3.968E+00	7.203E-01
3.162E+03	2.477E+13	7.780E-01	1.910E-04	1.495E-04	5.109E+00	5.397E-01	4.080E+00	7.407E-01
3.981E+03	1.870E+13	7.825E-01	1.413E-04	1.115E-04	5.245E+00	5.541E-01	4.187E+00	7.601E-01
5.012E+03	1.383E+13	7.895E-01	1.027E-04	8.200E-05	5.371E+00	5.674E-01	4.287E+00	7.782E-01
6.310E+03	1.005E+13	7.988E-01	7.370E-05	5.959E-05	5.486E+00	5.795E-01	4.379E+00	7.949E-01
7.943E+03	7.215E+12	8.086E-01	5.243E-05	4.279E-05	5.589E+00	5.904E-01	4.462E+00	8.101E-01
1.000E+04	5.133E+12	8.162E-01	3.702E-05	3.031E-05	5.681E+00	6.001E-01	4.538E+00	8.237E-01
1.126E+04	3.624E+12	8.189E-01	3.086E-05	2.522E-05	5.723E+00	6.046E-01	4.573E+00	8.301E-01
1.585E+04	3.021E+12	8.174E-01	1.826E-05	1.456E-05	5.836E+00	6.165E-01	4.664E+00	8.466E-01
1.995E+04	1.788E+12	7.974E-01	1.313E-05	1.007E-05	5.900E+00	6.233E-01	4.714E+00	8.558E-01
2.512E+04	1.285E+12	7.674E-01	9.852E-06	7.148E-06	5.960E+00	6.296E-01	4.759E+00	8.639E-01
3.162E+04	9.645E+11	7.255E-01	7.753E-06	5.265E-06	6.017E+00	6.356E-01	4.799E+00	8.712E-01
3.981E+04	7.590E+11	6.791E-01	6.295E-06	3.996E-06	6.075E+00	6.417E-01	4.837E+00	8.781E-01
5.012E+04	6.163E+11	6.348E-01	5.163E-06	3.071E-06	6.134E+00	6.479E-01	4.874E+00	8.847E-01
6.310E+04	5.055E+11	5.948E-01	4.223E-06	2.360E-06	6.195E+00	6.544E-01	4.909E+00	8.911E-01
7.943E+04	4.134E+11	5.588E-01	3.423E-06	1.802E-06	6.257E+00	6.610E-01	4.943E+00	8.973E-01
1.000E+05	3.351E+11	5.266E-01	2.746E-06	1.370E-06	6.320E+00	6.677E-01	4.976E+00	9.032E-01
1.126E+05	2.688E+11	4.989E-01	2.441E-06	1.188E-06	6.353E+00	6.711E-01	4.992E+00	9.061E-01
1.585E+05	2.390E+11	4.865E-01	1.717E-06	7.873E-07	6.449E+00	6.812E-01	5.037E+00	9.144E-01
1.995E+05	1.681E+11	4.585E-01	1.348E-06	6.000E-07	6.511E+00	6.878E-01	5.065E+00	9.195E-01
2.512E+05	1.320E+11	4.450E-01	1.060E-06	4.611E-07	6.574E+00	6.944E-01	5.093E+00	9.245E-01
3.162E+05	1.038E+11	4.349E-01	8.367E-07	3.583E-07	6.635E+00	7.009E-01	5.119E+00	9.293E-01
3.981E+05	8.191E+10	4.282E-01	6.598E-07	2.811E-07	6.697E+00	7.074E-01	5.146E+00	9.341E-01
5.012E+05	6.459E+10	4.260E-01	5.168E-07	2.215E-07	6.757E+00	7.138E-01	5.172E+00	9.388E-01
6.310E+05	5.059E+10	4.286E-01	3.997E-07	1.739E-07	6.817E+00	7.201E-01	5.197E+00	9.434E-01
7.943E+05	3.913E+10	4.351E-01	3.041E-07	1.348E-07	6.874E+00	7.262E-01	5.222E+00	9.480E-01
1.000E+06	2.977E+10	4.434E-01	2.279E-07	1.028E-07	6.929E+00	7.319E-01	5.247E+00	9.525E-01
1.126E+06	2.231E+10	4.512E-01	1.957E-07	8.889E-08	6.956E+00	7.348E-01	5.259E+00	9.547E-01
1.585E+06	1.916E+10	4.542E-01	1.270E-07	5.780E-08	7.030E+00	7.426E-01	5.293E+00	9.608E-01
1.995E+06	1.243E+10	4.552E-01	9.689E-08	4.311E-08	7.076E+00	7.474E-01	5.313E+00	9.645E-01
2.512E+06	9.486E+09	4.449E-01	7.587E-08	3.203E-08	7.120E+00	7.521E-01	5.333E+00	9.680E-01
3.162E+06	7.428E+09	4.221E-01	6.086E-08	2.348E-08	7.165E+00	7.568E-01	5.351E+00	9.713E-01
3.981E+06	5.958E+09	3.858E-01	4.994E-08	1.694E-08	7.210E+00	7.616E-01	5.367E+00	9.743E-01
5.012E+06	4.889E+09	3.392E-01	4.203E-08	1.216E-08	7.257E+00	7.666E-01	5.382E+00	9.771E-01
6.310E+06	4.115E+09	2.892E-01	3.639E-08	8.851E-09	7.308E+00	7.720E-01	5.396E+00	9.795E-01
7.943E+06	3.563E+09	2.432E-01	3.238E-08	6.631E-09	7.364E+00	7.779E-01	5.409E+00	9.818E-01
1.000E+07	3.170E+09	2.048E-01	2.941E-08	5.058E-09	7.428E+00	7.847E-01	5.421E+00	9.840E-01
1.126E+07	2.879E+09	1.720E-01	2.816E-08	4.393E-09	7.464E+00	7.885E-01	5.427E+00	9.851E-01
1.585E+07	2.757E+09	1.560E-01	2.532E-08	2.778E-09	7.587E+00	8.015E-01	5.443E+00	9.881E-01
1.995E+07	2.479E+09	1.097E-01	2.398E-08	1.930E-09	7.688E+00	8.121E-01	5.453E+00	9.898E-01
2.512E+07	2.348E+09	8.049E-02	2.308E-08	1.309E-09	7.810E+00	8.250E-01	5.461E+00	9.913E-01
3.162E+07	2.260E+09	5.672E-02	2.253E-08	9.139E-10	7.958E+00	8.407E-01	5.468E+00	9.927E-01
3.981E+07	2.206E+09	4.056E-02	2.224E-08	7.000E-10	8.141E+00	8.600E-01	5.475E+00	9.939E-01
5.012E+07	2.177E+09	3.148E-02	2.209E-08	6.005E-10	8.370E+00	8.842E-01	5.482E+00	9.951E-01
6.310E+07	2.163E+09	2.718E-02	2.201E-08	5.558E-10	8.656E+00	9.144E-01	5.489E+00	9.964E-01
7.943E+07	2.155E+09	2.525E-02	2.196E-08	5.317E-10	9.015E+00	9.523E-01	5.498E+00	9.980E-01
1.000E+08	2.150E+09	2.421E-02	2.192E-08	5.149E-10	9.466E+00	1.000E+00	5.509E+00	1.000E+00

Table C.15: Summary of fission gamma-ray characteristics for ^{239}Pu with 14-MeV ENDF fission yield libraries.

Time (s)	Activity (Bq)	ε_γ (MeV)	dN_γ/dt (#/f/s)	dE_γ/dt (MeV/f/s)	N_γ (#/f)	N_γ Fraction	E_γ (MeV/f)	E_γ Fraction
1.000E-06	2.136E+09	2.115E-02	4.485E-01	4.597E-01	1.000E-06	1.202E-07	1.000E-06	2.129E-07
1.000E-05	4.391E+16	1.025E+00	4.485E-01	4.597E-01	5.037E-06	6.053E-07	5.138E-06	1.094E-06
1.000E-04	4.391E+16	1.025E+00	4.484E-01	4.596E-01	4.540E-05	5.456E-06	4.651E-05	9.901E-06
1.000E-03	4.390E+16	1.025E+00	4.478E-01	4.586E-01	4.487E-04	5.393E-05	4.597E-04	9.786E-05
1.000E-02	4.384E+16	1.024E+00	4.413E-01	4.505E-01	4.450E-03	5.348E-04	4.551E-03	9.688E-04
1.000E-01	4.320E+16	1.021E+00	3.930E-01	3.920E-01	4.199E-02	5.046E-03	4.247E-02	9.041E-03
1.126E-01	3.847E+16	9.977E-01	3.878E-01	3.863E-01	4.691E-02	5.638E-03	4.737E-02	1.008E-02
1.585E-01	3.797E+16	9.959E-01	3.712E-01	3.679E-01	6.433E-02	7.731E-03	6.468E-02	1.377E-02
1.995E-01	3.634E+16	9.910E-01	3.584E-01	3.542E-01	7.929E-02	9.529E-03	7.948E-02	1.692E-02
2.512E-01	3.509E+16	9.881E-01	3.441E-01	3.392E-01	9.745E-02	1.171E-02	9.740E-02	2.074E-02
3.162E-01	3.369E+16	9.858E-01	3.284E-01	3.231E-01	1.193E-01	1.434E-02	1.189E-01	2.532E-02
3.981E-01	3.215E+16	9.838E-01	3.110E-01	3.054E-01	1.455E-01	1.749E-02	1.447E-01	3.080E-02
5.012E-01	3.045E+16	9.820E-01	2.919E-01	2.861E-01	1.766E-01	2.122E-02	1.752E-01	3.729E-02
6.310E-01	2.858E+16	9.800E-01	2.715E-01	2.653E-01	2.131E-01	2.562E-02	2.109E-01	4.491E-02
7.943E-01	2.658E+16	9.773E-01	2.499E-01	2.433E-01	2.557E-01	3.073E-02	2.525E-01	5.375E-02
1.000E+00	2.447E+16	9.735E-01	2.277E-01	2.205E-01	3.048E-01	3.664E-02	3.002E-01	6.391E-02
1.126E+00	2.229E+16	9.684E-01	2.161E-01	2.086E-01	3.328E-01	3.999E-02	3.272E-01	6.966E-02
1.585E+00	2.116E+16	9.650E-01	1.829E-01	1.744E-01	4.244E-01	5.100E-02	4.151E-01	8.837E-02
1.995E+00	1.791E+16	9.531E-01	1.611E-01	1.519E-01	4.950E-01	5.949E-02	4.820E-01	1.026E-01
2.512E+00	1.577E+16	9.433E-01	1.400E-01	1.306E-01	5.727E-01	6.883E-02	5.550E-01	1.182E-01
3.162E+00	1.371E+16	9.325E-01	1.200E-01	1.106E-01	6.573E-01	7.900E-02	6.334E-01	1.349E-01
3.981E+00	1.175E+16	9.211E-01	1.015E-01	9.224E-02	7.480E-01	8.990E-02	7.165E-01	1.525E-01
5.012E+00	9.933E+15	9.091E-01	8.468E-02	7.589E-02	8.439E-01	1.014E-01	8.031E-01	1.710E-01
6.310E+00	8.290E+15	8.962E-01	6.997E-02	6.171E-02	9.443E-01	1.135E-01	8.924E-01	1.900E-01
7.943E+00	6.850E+15	8.819E-01	5.745E-02	4.974E-02	1.048E+00	1.260E-01	9.834E-01	2.094E-01
1.000E+01	5.624E+15	8.658E-01	4.703E-02	3.988E-02	1.156E+00	1.389E-01	1.076E+00	2.290E-01
1.126E+01	4.604E+15	8.481E-01	4.240E-02	3.556E-02	1.212E+00	1.457E-01	1.123E+00	2.391E-01
1.585E+01	4.151E+15	8.386E-01	3.146E-02	2.557E-02	1.382E+00	1.660E-01	1.263E+00	2.690E-01
1.995E+01	3.080E+15	8.128E-01	2.569E-02	2.053E-02	1.499E+00	1.801E-01	1.358E+00	2.891E-01
2.512E+01	2.515E+15	7.993E-01	2.091E-02	1.654E-02	1.619E+00	1.946E-01	1.454E+00	3.095E-01
3.162E+01	2.047E+15	7.911E-01	1.695E-02	1.336E-02	1.742E+00	2.094E-01	1.551E+00	3.302E-01
3.981E+01	1.659E+15	7.883E-01	1.370E-02	1.081E-02	1.868E+00	2.245E-01	1.650E+00	3.513E-01
5.012E+01	1.341E+15	7.894E-01	1.103E-02	8.732E-03	1.995E+00	2.398E-01	1.751E+00	3.727E-01
6.310E+01	1.080E+15	7.915E-01	8.845E-03	7.003E-03	2.124E+00	2.553E-01	1.853E+00	3.944E-01
7.943E+01	8.659E+14	7.918E-01	7.046E-03	5.555E-03	2.254E+00	2.709E-01	1.955E+00	4.163E-01
1.000E+02	6.898E+14	7.884E-01	5.568E-03	4.347E-03	2.384E+00	2.865E-01	2.057E+00	4.380E-01
1.126E+02	5.451E+14	7.807E-01	4.914E-03	3.810E-03	2.450E+00	2.944E-01	2.108E+00	4.489E-01
1.585E+02	4.811E+14	7.754E-01	3.390E-03	2.572E-03	2.640E+00	3.173E-01	2.255E+00	4.801E-01
1.995E+02	3.319E+14	7.586E-01	2.625E-03	1.968E-03	2.764E+00	3.322E-01	2.348E+00	4.999E-01
2.512E+02	2.570E+14	7.498E-01	2.032E-03	1.515E-03	2.884E+00	3.466E-01	2.438E+00	5.191E-01
3.162E+02	1.989E+14	7.459E-01	1.579E-03	1.180E-03	3.001E+00	3.607E-01	2.526E+00	5.377E-01
3.981E+02	1.546E+14	7.475E-01	1.239E-03	9.330E-04	3.117E+00	3.746E-01	2.612E+00	5.561E-01
5.012E+02	1.213E+14	7.530E-01	9.844E-04	7.477E-04	3.231E+00	3.884E-01	2.699E+00	5.746E-01
6.310E+02	9.637E+13	7.596E-01	7.912E-04	6.054E-04	3.347E+00	4.022E-01	2.787E+00	5.933E-01
7.943E+02	7.746E+13	7.651E-01	6.402E-04	4.922E-04	3.464E+00	4.163E-01	2.876E+00	6.124E-01
1.000E+03	6.268E+13	7.687E-01	5.185E-04	3.996E-04	3.583E+00	4.306E-01	2.968E+00	6.319E-01
1.126E+03	5.076E+13	7.707E-01	4.646E-04	3.583E-04	3.645E+00	4.380E-01	3.016E+00	6.420E-01

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Table C.15 – *Continued from previous page.*

Time (s)	Activity (Bq)	ε_γ (MeV)	dN_γ/dt (#/f/s)	dE_γ/dt (MeV/f/s)	N_γ (#/f)	N_γ Fraction	E_γ (MeV/f)	E_γ Fraction
1.585E+03	4.548E+13	7.712E-01	3.343E-04	2.575E-04	3.828E+00	4.601E-01	3.157E+00	6.721E-01
1.995E+03	3.273E+13	7.701E-01	2.637E-04	2.026E-04	3.951E+00	4.748E-01	3.251E+00	6.922E-01
2.512E+03	2.582E+13	7.680E-01	2.043E-04	1.565E-04	4.072E+00	4.893E-01	3.344E+00	7.120E-01
3.162E+03	2.000E+13	7.659E-01	1.553E-04	1.187E-04	4.188E+00	5.034E-01	3.434E+00	7.310E-01
3.981E+03	1.520E+13	7.648E-01	1.158E-04	8.870E-05	4.299E+00	5.167E-01	3.519E+00	7.491E-01
5.012E+03	1.134E+13	7.658E-01	8.529E-05	6.556E-05	4.403E+00	5.292E-01	3.598E+00	7.660E-01
6.310E+03	8.350E+12	7.687E-01	6.234E-05	4.816E-05	4.499E+00	5.407E-01	3.672E+00	7.817E-01
7.943E+03	6.103E+12	7.726E-01	4.555E-05	3.531E-05	4.587E+00	5.513E-01	3.740E+00	7.962E-01
1.000E+04	4.459E+12	7.752E-01	3.341E-05	2.587E-05	4.668E+00	5.610E-01	3.803E+00	8.096E-01
1.126E+04	3.271E+12	7.742E-01	2.854E-05	2.202E-05	4.707E+00	5.657E-01	3.833E+00	8.161E-01
1.585E+04	2.794E+12	7.716E-01	1.832E-05	1.380E-05	4.815E+00	5.787E-01	3.915E+00	8.336E-01
1.995E+04	1.794E+12	7.533E-01	1.382E-05	1.010E-05	4.881E+00	5.866E-01	3.964E+00	8.440E-01
2.512E+04	1.353E+12	7.309E-01	1.059E-05	7.428E-06	4.944E+00	5.942E-01	4.010E+00	8.536E-01
3.162E+04	1.037E+12	7.013E-01	8.237E-06	5.498E-06	5.005E+00	6.015E-01	4.052E+00	8.626E-01
3.981E+04	8.064E+11	6.675E-01	6.445E-06	4.075E-06	5.065E+00	6.087E-01	4.091E+00	8.709E-01
5.012E+04	6.310E+11	6.322E-01	5.054E-06	3.020E-06	5.124E+00	6.159E-01	4.128E+00	8.787E-01
6.310E+04	4.948E+11	5.975E-01	3.970E-06	2.243E-06	5.183E+00	6.229E-01	4.162E+00	8.860E-01
7.943E+04	3.887E+11	5.649E-01	3.124E-06	1.673E-06	5.241E+00	6.299E-01	4.194E+00	8.928E-01
1.000E+05	3.058E+11	5.357E-01	2.456E-06	1.254E-06	5.298E+00	6.368E-01	4.224E+00	8.992E-01
1.126E+05	2.404E+11	5.108E-01	2.166E-06	1.083E-06	5.327E+00	6.403E-01	4.238E+00	9.023E-01
1.585E+05	2.121E+11	4.997E-01	1.499E-06	7.103E-07	5.411E+00	6.504E-01	4.280E+00	9.111E-01
1.995E+05	1.468E+11	4.737E-01	1.166E-06	5.366E-07	5.466E+00	6.569E-01	4.305E+00	9.165E-01
2.512E+05	1.142E+11	4.600E-01	9.094E-07	4.079E-07	5.520E+00	6.634E-01	4.330E+00	9.217E-01
3.162E+05	8.903E+10	4.485E-01	7.117E-07	3.129E-07	5.573E+00	6.697E-01	4.353E+00	9.267E-01
3.981E+05	6.968E+10	4.396E-01	5.578E-07	2.423E-07	5.625E+00	6.760E-01	4.376E+00	9.316E-01
5.012E+05	5.461E+10	4.344E-01	4.358E-07	1.891E-07	5.676E+00	6.821E-01	4.398E+00	9.363E-01
6.310E+05	4.266E+10	4.339E-01	3.379E-07	1.478E-07	5.726E+00	6.882E-01	4.420E+00	9.410E-01
7.943E+05	3.308E+10	4.375E-01	2.591E-07	1.149E-07	5.775E+00	6.940E-01	4.441E+00	9.455E-01
1.000E+06	2.537E+10	4.432E-01	1.968E-07	8.826E-08	5.822E+00	6.997E-01	4.462E+00	9.500E-01
1.126E+06	1.927E+10	4.484E-01	1.706E-07	7.676E-08	5.845E+00	7.024E-01	4.473E+00	9.522E-01
1.585E+06	1.670E+10	4.500E-01	1.135E-07	5.058E-08	5.910E+00	7.103E-01	4.502E+00	9.584E-01
1.995E+06	1.111E+10	4.457E-01	8.784E-08	3.789E-08	5.951E+00	7.152E-01	4.520E+00	9.623E-01
2.512E+06	8.600E+09	4.313E-01	6.937E-08	2.809E-08	5.992E+00	7.201E-01	4.537E+00	9.659E-01
3.162E+06	6.791E+09	4.049E-01	5.592E-08	2.046E-08	6.033E+00	7.250E-01	4.553E+00	9.693E-01
3.981E+06	5.475E+09	3.659E-01	4.613E-08	1.466E-08	6.074E+00	7.300E-01	4.567E+00	9.723E-01
5.012E+06	4.516E+09	3.177E-01	3.912E-08	1.045E-08	6.118E+00	7.353E-01	4.580E+00	9.751E-01
6.310E+06	3.830E+09	2.672E-01	3.423E-08	7.592E-09	6.166E+00	7.410E-01	4.592E+00	9.776E-01
7.943E+06	3.351E+09	2.218E-01	3.082E-08	5.695E-09	6.219E+00	7.474E-01	4.603E+00	9.799E-01
1.000E+07	3.017E+09	1.848E-01	2.835E-08	4.371E-09	6.280E+00	7.547E-01	4.613E+00	9.821E-01
1.126E+07	2.775E+09	1.542E-01	2.731E-08	3.810E-09	6.315E+00	7.589E-01	4.618E+00	9.832E-01
1.585E+07	2.674E+09	1.395E-01	2.496E-08	2.460E-09	6.435E+00	7.734E-01	4.633E+00	9.862E-01
1.995E+07	2.444E+09	9.856E-02	2.385E-08	1.749E-09	6.535E+00	7.854E-01	4.641E+00	9.881E-01
2.512E+07	2.335E+09	7.332E-02	2.308E-08	1.224E-09	6.656E+00	8.000E-01	4.649E+00	9.897E-01
3.162E+07	2.260E+09	5.303E-02	2.261E-08	8.888E-10	6.805E+00	8.178E-01	4.656E+00	9.912E-01
3.981E+07	2.214E+09	3.930E-02	2.235E-08	7.053E-10	6.989E+00	8.400E-01	4.662E+00	9.926E-01
5.012E+07	2.188E+09	3.156E-02	2.221E-08	6.178E-10	7.219E+00	8.676E-01	4.669E+00	9.940E-01
6.310E+07	2.174E+09	2.782E-02	2.212E-08	5.763E-10	7.506E+00	9.021E-01	4.677E+00	9.957E-01
7.943E+07	2.166E+09	2.605E-02	2.207E-08	5.516E-10	7.867E+00	9.455E-01	4.686E+00	9.976E-01
1.000E+08	2.161E+09	2.499E-02	2.201E-08	5.323E-10	8.321E+00	1.000E+00	4.697E+00	1.000E+00

C.3 48-Group CINDER Gamma-ray Spectra Data

The 48-group spectra, which was re-binned from the line data from CINDER, highlighted by Fig. 27 and Figs. B.7-B.14, is tabulated for ease of use for any future work performed by readers. The tables are arranged by material: ^{232}Th, ^{233}U, ^{235}U, ^{238}U, and ^{239}Pu. Each material has three tables: results using the thermal, fast, and 14-MeV ENDF fission yield libraries, in that order. The tables have the energy group bins in the first (low) and second (high) columns, the third column has the characterization fluence for comparisons, and the remaining columns show the spectra at the times in the first row: 0.01, 0.1, 1.0, 10, 100, 1,000, and 10,000 seconds.

Table C.16. Re-binned 48-Group Spectra for ^{232}Th - Thermal Fission Yield Library

Lo (MeV)	Hi (MeV)	Char. Flux	10^{-2} s	10^{-1} s	10^{0} s	10^{1} s	10^{2} s	10^{3} s	10^{4} s
1.000E-03	1.000E-02	0.000E+00	6.329E-01	7.075E-01	9.061E-01	1.674E+00	1.085E+00	1.367E+00	5.669E-01
1.000E-02	2.000E-02	0.000E+00	1.352E+00	1.494E+00	1.672E+00	2.155E+00	1.972E+00	3.283E+00	1.694E+00
2.000E-02	3.000E-02	0.000E+00	3.096E-01	3.355E-01	3.901E-01	7.384E-01	7.387E-01	8.951E-01	1.263E+00
3.000E-02	4.500E-02	0.000E+00	1.480E+00	1.671E+00	2.211E+00	4.656E+00	2.576E+00	3.132E+00	1.342E+00
4.500E-02	6.000E-02	0.000E+00	3.689E-01	3.956E-01	3.758E-01	4.639E-01	1.791E-01	7.300E-02	1.154E-01
6.000E-02	8.000E-02	0.000E+00	2.981E-01	3.161E-01	3.099E-01	2.971E-01	3.063E-01	3.916E-01	4.686E-02
8.000E-02	1.000E-01	0.000E+00	4.184E-01	4.579E-01	5.317E-01	9.924E-01	1.200E+00	1.122E+00	4.564E-01
1.000E-01	1.500E-01	4.300E-01	1.430E+00	1.619E+00	1.766E+00	1.178E+00	4.416E-01	2.459E-01	1.601E-01
1.500E-01	2.000E-01	1.660E+00	7.458E-01	8.087E-01	8.349E-01	6.292E-01	5.923E-01	1.237E+00	1.457E+00
2.000E-01	3.000E-01	1.120E+00	7.066E-01	7.652E-01	7.974E-01	8.599E-01	6.329E-01	7.427E-01	4.113E-01
3.000E-01	4.000E-01	7.540E-01	7.873E-01	7.880E-01	6.304E-01	5.117E-01	8.607E-01	8.041E-01	2.050E-01
4.000E-01	4.500E-01	8.110E-01	6.224E-01	6.450E-01	6.302E-01	7.372E-01	5.973E-01	8.822E-01	1.035E+00
4.500E-01	5.000E-01	9.200E-01	4.546E-01	4.725E-01	5.306E-01	4.138E-01	2.975E-01	7.709E-01	5.098E-01
5.000E-01	5.250E-01	9.200E-01	3.254E-01	3.475E-01	4.043E-01	6.852E-01	1.476E-01	2.034E-01	1.431E-01
5.250E-01	6.000E-01	8.130E-01	5.965E-01	6.480E-01	7.414E-01	8.605E-01	8.125E-01	8.062E-01	7.393E-01
6.000E-01	7.000E-01	5.990E-01	5.559E-01	5.320E-01	4.780E-01	4.345E-01	6.032E-01	4.096E-01	7.287E-01
7.000E-01	8.000E-01	5.340E-01	3.451E-01	3.755E-01	4.287E-01	5.602E-01	4.202E-01	4.821E-01	4.802E-01
8.000E-01	9.000E-01	4.720E-01	1.185E+00	8.791E-01	7.214E-01	5.495E-01	4.805E-01	7.261E-01	1.627E+00
9.000E-01	1.000E+00	4.400E-01	3.061E-01	3.098E-01	3.455E-01	2.960E-01	4.053E-01	4.689E-01	2.999E-01
1.000E+00	1.125E+00	4.020E-01	2.774E-01	2.755E-01	3.040E-01	2.911E-01	2.868E-01	5.445E-01	3.583E-01
1.125E+00	1.200E+00	4.020E-01	1.937E-01	1.768E-01	1.605E-01	1.861E-01	1.558E-01	1.845E-01	2.922E-01
1.200E+00	1.330E+00	2.410E-01	3.271E-01	3.488E-01	4.100E-01	2.738E-01	4.287E-01	4.015E-01	1.183E-01
1.330E+00	1.500E+00	2.310E-01	1.668E-01	1.627E-01	1.654E-01	2.145E-01	4.057E-01	2.198E-01	5.605E-01
1.500E+00	1.660E+00	1.560E-01	1.624E-01	1.580E-01	1.606E-01	1.514E-01	3.091E-01	8.222E-02	1.189E-01
1.660E+00	1.875E+00	1.410E-01	1.204E-01	1.198E-01	1.142E-01	9.356E-02	1.077E-01	9.840E-02	1.630E-01
1.875E+00	2.000E+00	1.070E-01	1.138E-01	1.157E-01	1.113E-01	9.662E-02	1.210E-01	6.604E-02	6.646E-02
2.000E+00	2.333E+00	8.990E-02	1.006E-01	9.798E-02	8.670E-02	8.590E-02	9.055E-02	9.456E-02	1.005E-01
2.333E+00	2.500E+00	6.720E-02	1.256E-01	1.222E-01	1.005E-01	1.057E-01	8.139E-02	4.739E-02	2.011E-01
2.500E+00	2.666E+00	6.063E-02	8.256E-02	8.252E-02	7.649E-02	8.324E-02	9.328E-02	7.925E-02	1.145E-01
2.666E+00	3.000E+00	5.090E-02	7.529E-02	7.751E-02	6.801E-02	5.305E-02	6.850E-02	1.524E-02	2.177E-02
3.000E+00	3.500E+00	3.650E-02	4.727E-02	4.846E-02	4.448E-02	3.599E-02	2.824E-02	9.194E-03	1.091E-02
3.500E+00	4.000E+00	2.260E-02	2.239E-02	2.046E-02	1.706E-02	1.982E-02	2.702E-02	7.612E-03	4.610E-03
4.000E+00	4.500E+00	1.430E-02	2.071E-02	1.872E-02	1.546E-02	1.625E-02	2.587E-02	3.954E-03	1.209E-04
4.500E+00	5.000E+00	9.390E-03	9.929E-03	1.012E-02	9.951E-03	1.477E-02	9.564E-03	3.751E-04	2.375E-04
5.000E+00	5.500E+00	3.800E-03	9.507E-03	8.942E-03	8.022E-03	1.356E-02	1.347E-02	6.110E-04	7.363E-10
5.500E+00	6.000E+00	2.580E-03	5.017E-03	5.031E-03	3.914E-03	2.780E-03	2.667E-03	2.211E-05	2.837E-16
6.000E+00	6.500E+00	1.808E-03	3.428E-03	3.435E-03	2.693E-03	2.364E-03	7.829E-04	3.678E-06	7.580E-22
6.500E+00	7.000E+00	0.000E+00	1.284E-03	1.272E-03	8.113E-04	2.172E-05	1.180E-04	1.890E-08	1.890E-56
7.000E+00	7.500E+00	0.000E+00	7.318E-04	7.301E-04	4.832E-04	9.520E-05	2.129E-05	7.491E-21	0.000E+00
7.500E+00	8.000E+00	0.000E+00	4.136E-04	4.137E-04	2.674E-04	1.400E-06	1.504E-09	2.034E-34	0.000E+00
8.000E+00	9.000E+00	0.000E+00	2.018E-04	2.036E-04	1.324E-04	5.824E-07	1.330E-11	1.797E-36	0.000E+00
9.000E+00	1.000E+01	0.000E+00	6.093E-05	6.153E-05	3.806E-05	1.355E-07	2.088E-30	0.000E+00	0.000E+00
1.000E+01	1.200E+01	0.000E+00	9.153E-06	9.001E-06	4.447E-06	9.041E-09	1.221E-33	0.000E+00	0.000E+00
1.200E+01	1.400E+01	0.000E+00	3.431E-07	3.583E-07	2.267E-07	5.676E-11	1.477E-34	0.000E+00	0.000E+00
1.400E+01	1.700E+01	0.000E+00	2.987E-09	3.178E-09	2.052E-09	4.264E-13	1.713E-56	0.000E+00	0.000E+00
1.700E+01	2.000E+01	0.000E+00	1.265E-12	5.733E-13	2.501E-14	4.847E-21	9.780E-37	0.000E+00	0.000E+00
2.000E+01	3.000E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
3.000E+01	5.000E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Table C.17. Re-binned 48-Group Spectra for ^{232}Th - Fast Fission Yield Library

Lo (MeV)	Hi (MeV)	Char. Flux	10^{-2} s	10^{-1} s	10^{0} s	10^{1} s	10^{2} s	10^{3} s	10^{4} s
1.000E-03	1.000E-02	0.000E+00	6.329E-01	7.075E-01	9.061E-01	1.674E+00	1.085E+00	1.367E+00	5.669E-01
1.000E-02	2.000E-02	0.000E+00	1.352E+00	1.494E+00	1.672E+00	2.155E+00	1.972E+00	3.283E+00	1.694E+00
2.000E-02	3.000E-02	0.000E+00	3.096E-01	3.355E-01	3.901E-01	7.384E-01	7.387E-01	8.951E-01	1.263E+00
3.000E-02	4.500E-02	0.000E+00	1.480E+00	1.671E+00	2.211E+00	4.656E+00	2.576E+00	3.132E+00	1.342E+00
4.500E-02	6.000E-02	0.000E+00	3.689E-01	3.956E-01	3.758E-01	4.639E-01	1.791E-01	7.300E-02	1.154E-01
6.000E-02	8.000E-02	0.000E+00	2.981E-01	3.161E-01	3.099E-01	2.971E-01	3.063E-01	3.916E-01	4.686E-02
8.000E-02	1.000E-01	0.000E+00	4.184E-01	4.579E-01	5.317E-01	9.924E-01	1.200E+00	1.122E+00	4.564E-01
1.000E-01	1.500E-01	4.300E-01	1.430E+00	1.619E+00	1.766E+00	1.178E+00	4.416E-01	2.459E-01	1.601E-01
1.500E-01	2.000E-01	1.660E+00	7.458E-01	8.087E-01	8.349E-01	6.292E-01	5.923E-01	1.237E+00	1.457E+00
2.000E-01	3.000E-01	1.120E+00	7.066E-01	7.652E-01	7.974E-01	8.599E-01	6.329E-01	7.427E-01	4.113E-01
3.000E-01	4.000E-01	7.540E-01	7.873E-01	7.880E-01	6.304E-01	5.117E-01	8.607E-01	8.041E-01	2.050E-01
4.000E-01	4.500E-01	8.110E-01	6.224E-01	6.450E-01	6.302E-01	7.372E-01	5.973E-01	8.822E-01	1.035E+00
4.500E-01	5.000E-01	9.200E-01	4.546E-01	4.725E-01	5.306E-01	4.138E-01	2.975E-01	7.709E-01	5.098E-01
5.000E-01	5.250E-01	9.200E-01	3.254E-01	3.475E-01	4.043E-01	6.852E-01	1.476E-01	2.034E-01	1.431E-01
5.250E-01	6.000E-01	8.130E-01	5.965E-01	6.480E-01	7.414E-01	8.605E-01	8.125E-01	8.062E-01	7.393E-01
6.000E-01	7.000E-01	5.990E-01	5.559E-01	5.320E-01	4.780E-01	4.345E-01	6.032E-01	4.096E-01	7.287E-01
7.000E-01	8.000E-01	5.340E-01	3.451E-01	3.755E-01	4.287E-01	5.602E-01	4.202E-01	4.821E-01	4.802E-01
8.000E-01	9.000E-01	4.720E-01	1.185E+00	8.791E-01	7.214E-01	5.495E-01	4.805E-01	7.261E-01	1.627E+00
9.000E-01	1.000E+00	4.400E-01	3.061E-01	3.098E-01	3.455E-01	2.960E-01	4.053E-01	4.689E-01	2.999E-01
1.000E+00	1.125E+00	4.020E-01	2.774E-01	2.755E-01	3.040E-01	2.911E-01	2.868E-01	5.445E-01	3.583E-01
1.125E+00	1.200E+00	4.020E-01	1.937E-01	1.768E-01	1.605E-01	1.861E-01	1.558E-01	1.845E-01	2.922E-01
1.200E+00	1.330E+00	2.410E-01	3.271E-01	3.488E-01	4.100E-01	2.738E-01	4.287E-01	4.015E-01	1.183E-01
1.330E+00	1.500E+00	2.310E-01	1.668E-01	1.627E-01	1.654E-01	2.145E-01	4.057E-01	2.198E-01	5.605E-01
1.500E+00	1.660E+00	1.560E-01	1.624E-01	1.580E-01	1.606E-01	1.514E-01	3.091E-01	8.222E-02	1.189E-01
1.660E+00	1.875E+00	1.410E-01	1.204E-01	1.198E-01	1.142E-01	9.356E-02	1.077E-01	9.840E-02	1.630E-01
1.875E+00	2.000E+00	1.070E-01	1.138E-01	1.157E-01	1.113E-01	9.662E-02	1.210E-01	6.604E-02	6.646E-02
2.000E+00	2.333E+00	8.990E-02	1.006E-01	9.798E-02	8.670E-02	8.590E-02	9.055E-02	9.456E-02	1.005E-01
2.333E+00	2.500E+00	6.720E-02	1.256E-01	1.222E-01	1.005E-01	1.057E-01	8.139E-02	4.739E-02	2.011E-01
2.500E+00	2.666E+00	6.063E-02	8.256E-02	8.252E-02	7.649E-02	8.324E-02	9.328E-02	7.925E-02	1.145E-01
2.666E+00	3.000E+00	5.090E-02	7.529E-02	7.751E-02	6.801E-02	5.305E-02	6.850E-02	1.524E-02	2.177E-02
3.000E+00	3.500E+00	3.650E-02	4.727E-02	4.846E-02	4.448E-02	3.599E-02	2.824E-02	9.194E-03	1.091E-02
3.500E+00	4.000E+00	2.260E-02	2.239E-02	2.046E-02	1.706E-02	1.982E-02	2.702E-02	7.612E-03	4.610E-03
4.000E+00	4.500E+00	1.430E-02	2.071E-02	1.872E-02	1.546E-02	1.625E-02	2.587E-02	3.954E-03	1.209E-04
4.500E+00	5.000E+00	9.390E-03	9.929E-03	1.012E-02	9.951E-03	1.477E-02	9.564E-03	3.751E-04	2.375E-04
5.000E+00	5.500E+00	3.800E-03	9.507E-03	8.942E-03	8.022E-03	1.356E-02	1.347E-02	6.110E-04	7.363E-10
5.500E+00	6.000E+00	2.580E-03	5.017E-03	5.031E-03	3.914E-03	2.780E-03	2.667E-03	2.211E-05	2.837E-16
6.000E+00	6.500E+00	1.808E-03	3.428E-03	3.435E-03	2.693E-03	2.364E-03	7.829E-04	3.678E-06	7.580E-22
6.500E+00	7.000E+00	0.000E+00	1.284E-03	1.272E-03	8.113E-04	2.172E-05	1.180E-04	1.890E-08	1.890E-56
7.000E+00	7.500E+00	0.000E+00	7.318E-04	7.301E-04	4.832E-04	9.520E-05	2.129E-05	7.491E-21	0.000E+00
7.500E+00	8.000E+00	0.000E+00	4.136E-04	4.137E-04	2.674E-04	1.400E-06	1.504E-09	2.034E-34	0.000E+00
8.000E+00	9.000E+00	0.000E+00	2.018E-04	2.036E-04	1.324E-04	5.824E-07	1.330E-11	1.797E-36	0.000E+00
9.000E+00	1.000E+01	0.000E+00	6.093E-05	6.153E-05	3.806E-05	1.355E-07	2.088E-30	0.000E+00	0.000E+00
1.000E+01	1.200E+01	0.000E+00	9.153E-06	9.001E-06	4.447E-06	9.041E-09	1.221E-33	0.000E+00	0.000E+00
1.200E+01	1.400E+01	0.000E+00	3.431E-07	3.583E-07	2.267E-07	5.676E-11	1.477E-34	0.000E+00	0.000E+00
1.400E+01	1.700E+01	0.000E+00	2.987E-09	3.178E-09	2.052E-09	4.264E-13	1.713E-56	0.000E+00	0.000E+00
1.700E+01	2.000E+01	0.000E+00	1.265E-12	5.733E-13	2.501E-14	4.847E-21	9.780E-37	0.000E+00	0.000E+00
2.000E+01	3.000E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
3.000E+01	5.000E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Table C.18. Re-binned 48-Group Spectra for ^{232}Th - 14-MeV Fission Yield Library

Lo (MeV)	Hi (MeV)	Char. Flux	10^{-2} s	10^{-1} s	10^{0} s	10^{1} s	10^{2} s	10^{3} s	10^{4} s
1.000E-03	1.000E-02	0.000E+00	4.829E-01	5.360E-01	6.891E-01	1.385E+00	9.955E-01	1.199E+00	7.004E-01
1.000E-02	2.000E-02	0.000E+00	1.108E+00	1.248E+00	1.530E+00	2.965E+00	2.663E+00	3.341E+00	1.461E+00
2.000E-02	3.000E-02	0.000E+00	6.651E-01	7.466E-01	9.474E-01	1.455E+00	1.587E+00	1.817E+00	2.598E+00
3.000E-02	4.500E-02	0.000E+00	7.361E-01	8.451E-01	1.233E+00	3.049E+00	1.966E+00	2.506E+00	1.218E+00
4.500E-02	6.000E-02	0.000E+00	3.379E-01	3.628E-01	3.947E-01	4.560E-01	2.808E-01	9.694E-02	1.478E-01
6.000E-02	8.000E-02	0.000E+00	3.358E-01	3.472E-01	3.115E-01	3.296E-01	5.554E-01	3.980E-01	1.299E-01
8.000E-02	1.000E-01	0.000E+00	5.213E-01	5.643E-01	5.206E-01	8.143E-01	1.206E+00	1.141E+00	4.574E-01
1.000E-01	1.500E-01	4.300E-01	1.048E+00	1.232E+00	1.500E+00	1.187E+00	5.446E-01	2.499E-01	1.616E-01
1.500E-01	2.000E-01	1.660E+00	6.156E-01	6.621E-01	6.501E-01	6.121E-01	7.597E-01	1.347E+00	1.523E+00
2.000E-01	3.000E-01	1.120E+00	6.953E-01	7.655E-01	8.064E-01	8.918E-01	6.866E-01	6.718E-01	4.305E-01
3.000E-01	4.000E-01	7.540E-01	8.589E-01	8.944E-01	8.193E-01	5.661E-01	8.036E-01	8.880E-01	3.572E-01
4.000E-01	4.500E-01	8.110E-01	5.574E-01	5.771E-01	5.739E-01	6.532E-01	5.727E-01	8.010E-01	8.494E-01
4.500E-01	5.000E-01	9.200E-01	4.125E-01	4.238E-01	4.917E-01	5.560E-01	4.480E-01	8.403E-01	5.691E-01
5.000E-01	5.250E-01	9.200E-01	3.973E-01	4.327E-01	5.666E-01	6.694E-01	3.417E-01	2.616E-01	1.485E-01
5.250E-01	6.000E-01	8.130E-01	5.503E-01	5.984E-01	6.560E-01	7.542E-01	6.808E-01	7.543E-01	7.847E-01
6.000E-01	7.000E-01	5.990E-01	5.552E-01	5.386E-01	5.088E-01	4.780E-01	6.206E-01	4.303E-01	7.226E-01
7.000E-01	8.000E-01	5.340E-01	3.820E-01	4.172E-01	4.620E-01	5.369E-01	3.984E-01	5.765E-01	6.415E-01
8.000E-01	9.000E-01	4.720E-01	1.118E+00	8.142E-01	6.653E-01	5.370E-01	4.370E-01	8.116E-01	1.621E+00
9.000E-01	1.000E+00	4.400E-01	3.040E-01	3.082E-01	3.620E-01	2.957E-01	3.855E-01	4.713E-01	3.382E-01
1.000E+00	1.125E+00	4.020E-01	2.832E-01	2.833E-01	3.228E-01	3.186E-01	2.716E-01	5.119E-01	3.750E-01
1.125E+00	1.200E+00	4.020E-01	2.463E-01	2.413E-01	2.844E-01	3.193E-01	1.629E-01	1.870E-01	2.697E-01
1.200E+00	1.330E+00	2.410E-01	2.980E-01	3.189E-01	3.711E-01	2.896E-01	4.519E-01	3.683E-01	1.700E-01
1.330E+00	1.500E+00	2.310E-01	1.786E-01	1.758E-01	1.850E-01	2.197E-01	3.800E-01	2.018E-01	4.483E-01
1.500E+00	1.660E+00	1.560E-01	1.706E-01	1.674E-01	1.793E-01	1.632E-01	2.856E-01	8.066E-02	1.033E-01
1.660E+00	1.875E+00	1.410E-01	1.295E-01	1.290E-01	1.233E-01	9.844E-02	1.046E-01	9.251E-02	1.344E-01
1.875E+00	2.000E+00	1.070E-01	1.328E-01	1.342E-01	1.121E-01	1.009E-01	1.172E-01	5.475E-02	5.330E-02
2.000E+00	2.333E+00	8.990E-02	1.152E-01	1.120E-01	9.316E-02	8.206E-02	8.421E-02	8.415E-02	7.644E-02
2.333E+00	2.500E+00	6.720E-02	1.312E-01	1.268E-01	9.640E-02	9.409E-02	7.598E-02	3.935E-02	1.430E-01
2.500E+00	2.666E+00	6.063E-02	9.541E-02	9.312E-02	7.623E-02	7.516E-02	8.253E-02	6.559E-02	8.358E-02
2.666E+00	3.000E+00	5.090E-02	8.802E-02	8.830E-02	7.062E-02	5.315E-02	6.677E-02	1.350E-02	1.650E-02
3.000E+00	3.500E+00	3.650E-02	5.930E-02	5.831E-02	4.642E-02	3.466E-02	2.534E-02	7.536E-03	7.973E-03
3.500E+00	4.000E+00	2.260E-02	3.311E-02	2.949E-02	2.024E-02	1.851E-02	2.400E-02	5.715E-03	3.233E-03
4.000E+00	4.500E+00	1.430E-02	2.581E-02	2.236E-02	1.482E-02	1.366E-02	2.186E-02	3.028E-03	7.686E-05
4.500E+00	5.000E+00	9.390E-03	1.612E-02	1.468E-02	9.861E-03	1.241E-02	7.153E-03	3.003E-04	1.621E-04
5.000E+00	5.500E+00	3.800E-03	1.544E-02	1.335E-02	8.104E-03	1.112E-02	1.081E-02	4.573E-04	5.745E-10
5.500E+00	6.000E+00	2.580E-03	9.637E-03	8.612E-03	4.569E-03	2.546E-03	2.310E-03	1.669E-05	2.489E-16
6.000E+00	6.500E+00	1.808E-03	6.601E-03	5.950E-03	3.351E-03	2.142E-03	7.270E-04	3.098E-06	3.226E-18
6.500E+00	7.000E+00	0.000E+00	2.365E-03	2.131E-03	1.105E-03	3.182E-05	1.055E-04	1.505E-08	1.380E-56
7.000E+00	7.500E+00	0.000E+00	1.268E-03	1.154E-03	6.370E-04	6.816E-05	1.399E-05	4.397E-21	0.000E+00
7.500E+00	8.000E+00	0.000E+00	6.683E-04	6.143E-04	3.494E-04	2.240E-06	1.426E-09	1.717E-34	0.000E+00
8.000E+00	9.000E+00	0.000E+00	2.891E-04	2.731E-04	1.662E-04	8.522E-07	1.270E-11	1.517E-36	0.000E+00
9.000E+00	1.000E+01	0.000E+00	7.918E-05	7.718E-05	4.602E-05	1.928E-07	1.369E-28	0.000E+00	0.000E+00
1.000E+01	1.200E+01	0.000E+00	1.381E-05	1.307E-05	5.353E-06	1.261E-08	8.324E-32	0.000E+00	0.000E+00
1.200E+01	1.400E+01	0.000E+00	8.178E-07	6.443E-07	2.370E-07	6.917E-11	1.011E-32	0.000E+00	0.000E+00
1.400E+01	1.700E+01	0.000E+00	2.505E-09	2.801E-09	2.134E-09	5.030E-13	1.967E-56	0.000E+00	0.000E+00
1.700E+01	2.000E+01	0.000E+00	7.163E-11	2.974E-11	1.003E-13	7.977E-20	6.693E-35	0.000E+00	0.000E+00
2.000E+01	3.000E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
3.000E+01	5.000E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Table C.19. Re-binned 48-Group Spectra for ^{233}U - Thermal Fission Yield Library

Lo (MeV)	Hi (MeV)	Char. Flux	10^{-2} s	10^{-1} s	10^{0} s	10^{1} s	10^{2} s	10^{3} s	10^{4} s
1.000E-03	1.000E-02	0.000E+00	8.512E-01	8.880E-01	1.101E+00	2.096E+00	1.203E+00	1.280E+00	6.730E-01
1.000E-02	2.000E-02	0.000E+00	3.593E+00	3.721E+00	4.239E+00	6.954E+00	3.199E+00	1.087E+00	7.614E-01
2.000E-02	3.000E-02	0.000E+00	4.825E-01	5.089E-01	6.901E-01	1.530E+00	1.115E+00	1.361E+00	2.119E+00
3.000E-02	4.500E-02	0.000E+00	1.665E+00	1.732E+00	2.117E+00	4.218E+00	2.372E+00	2.244E+00	1.281E+00
4.500E-02	6.000E-02	0.000E+00	2.518E-01	2.595E-01	2.870E-01	3.632E-01	3.125E-01	8.953E-02	1.526E-01
6.000E-02	8.000E-02	0.000E+00	2.057E-01	2.094E-01	2.367E-01	3.863E-01	5.893E-01	3.780E-01	9.391E-02
8.000E-02	1.000E-01	0.000E+00	4.222E-01	4.357E-01	5.188E-01	1.184E+00	1.247E+00	3.342E-01	2.650E-01
1.000E-01	1.500E-01	4.300E-01	1.679E+00	1.708E+00	1.594E+00	1.181E+00	4.688E-01	2.146E-01	1.564E-01
1.500E-01	2.000E-01	1.660E+00	9.439E-01	9.696E-01	9.776E-01	7.064E-01	7.078E-01	1.275E+00	1.174E+00
2.000E-01	3.000E-01	1.120E+00	6.580E-01	6.555E-01	6.111E-01	7.619E-01	6.237E-01	6.963E-01	4.502E-01
3.000E-01	4.000E-01	7.540E-01	4.759E-01	4.666E-01	4.218E-01	4.593E-01	8.616E-01	8.860E-01	2.771E-01
4.000E-01	4.500E-01	8.110E-01	5.750E-01	5.888E-01	6.341E-01	7.815E-01	5.471E-01	6.974E-01	7.832E-01
4.500E-01	5.000E-01	9.200E-01	8.475E-01	8.789E-01	1.007E+00	4.952E-01	4.671E-01	7.382E-01	5.238E-01
5.000E-01	5.250E-01	9.200E-01	4.092E-01	4.273E-01	5.402E-01	8.880E-01	1.986E-01	2.769E-01	1.681E-01
5.250E-01	6.000E-01	8.130E-01	1.179E+00	1.222E+00	1.354E+00	1.027E+00	8.442E-01	9.682E-01	7.829E-01
6.000E-01	7.000E-01	5.990E-01	4.816E-01	4.785E-01	4.912E-01	4.801E-01	5.838E-01	4.131E-01	8.525E-01
7.000E-01	8.000E-01	5.340E-01	2.841E-01	2.914E-01	3.185E-01	4.252E-01	4.551E-01	5.453E-01	6.572E-01
8.000E-01	9.000E-01	4.720E-01	1.054E+00	9.558E-01	7.237E-01	4.580E-01	5.914E-01	9.066E-01	1.607E+00
9.000E-01	1.000E+00	4.400E-01	3.987E-01	4.049E-01	4.153E-01	3.050E-01	3.523E-01	5.732E-01	4.449E-01
1.000E+00	1.125E+00	4.020E-01	4.004E-01	4.063E-01	4.108E-01	2.723E-01	3.010E-01	5.566E-01	3.664E-01
1.125E+00	1.200E+00	4.020E-01	1.566E-01	1.547E-01	1.672E-01	2.020E-01	1.718E-01	2.303E-01	2.894E-01
1.200E+00	1.330E+00	2.410E-01	3.834E-01	3.882E-01	3.740E-01	2.299E-01	3.722E-01	3.919E-01	1.168E-01
1.330E+00	1.500E+00	2.310E-01	1.165E-01	1.162E-01	1.288E-01	2.008E-01	4.254E-01	2.391E-01	5.222E-01
1.500E+00	1.660E+00	1.560E-01	1.296E-01	1.281E-01	1.261E-01	1.396E-01	2.073E-01	9.199E-02	1.052E-01
1.660E+00	1.875E+00	1.410E-01	9.962E-02	9.875E-02	9.647E-02	8.164E-02	1.072E-01	1.061E-01	1.453E-01
1.875E+00	2.000E+00	1.070E-01	8.042E-02	8.034E-02	8.175E-02	8.054E-02	1.021E-01	5.461E-02	6.158E-02
2.000E+00	2.333E+00	8.990E-02	5.605E-02	5.368E-02	4.929E-02	5.729E-02	7.582E-02	9.232E-02	8.647E-02
2.333E+00	2.500E+00	6.720E-02	6.378E-02	6.092E-02	5.076E-02	5.763E-02	5.176E-02	4.041E-02	1.646E-01
2.500E+00	2.666E+00	6.063E-02	4.430E-02	4.307E-02	3.968E-02	5.229E-02	8.101E-02	7.321E-02	9.306E-02
2.666E+00	3.000E+00	5.090E-02	5.574E-02	5.486E-02	4.726E-02	4.408E-02	5.118E-02	1.685E-02	2.072E-02
3.000E+00	3.500E+00	3.650E-02	3.594E-02	3.562E-02	3.371E-02	2.757E-02	2.488E-02	8.754E-03	9.694E-03
3.500E+00	4.000E+00	2.260E-02	1.146E-02	1.080E-02	1.119E-02	1.656E-02	2.612E-02	5.887E-03	3.695E-03
4.000E+00	4.500E+00	1.430E-02	1.074E-02	9.980E-03	8.496E-03	9.815E-03	2.295E-02	3.142E-03	6.356E-05
4.500E+00	5.000E+00	9.390E-03	7.154E-03	7.094E-03	8.263E-03	1.050E-02	4.830E-03	3.910E-04	1.733E-04
5.000E+00	5.500E+00	3.800E-03	6.461E-03	6.203E-03	7.053E-03	9.973E-03	7.066E-03	4.180E-04	7.930E-10
5.500E+00	6.000E+00	2.580E-03	2.599E-03	2.370E-03	2.193E-03	2.429E-03	1.333E-03	1.460E-05	5.443E-16
6.000E+00	6.500E+00	1.808E-03	2.249E-03	2.084E-03	2.035E-03	2.183E-03	4.265E-04	1.497E-06	4.133E-19
6.500E+00	7.000E+00	0.000E+00	4.398E-04	3.392E-04	1.260E-04	1.763E-05	5.832E-05	6.581E-09	4.510E-26
7.000E+00	7.500E+00	0.000E+00	2.548E-04	1.979E-04	8.091E-05	3.888E-05	6.712E-06	1.692E-21	2.952E-26
7.500E+00	8.000E+00	0.000E+00	1.386E-04	1.054E-04	3.616E-05	2.330E-07	2.575E-10	4.560E-28	6.286E-27
8.000E+00	9.000E+00	0.000E+00	6.193E-05	4.724E-05	1.633E-05	6.788E-08	2.295E-12	2.045E-28	2.820E-27
9.000E+00	1.000E+01	0.000E+00	1.441E-05	1.111E-05	3.930E-06	1.505E-08	5.518E-30	4.858E-29	6.697E-28
1.000E+01	1.200E+01	0.000E+00	1.178E-06	9.264E-07	3.272E-07	9.642E-10	4.342E-31	3.980E-30	5.486E-29
1.200E+01	1.400E+01	0.000E+00	2.458E-08	2.166E-08	9.837E-09	2.441E-12	1.124E-32	1.030E-31	1.420E-30
1.400E+01	1.700E+01	0.000E+00	1.710E-10	1.655E-10	8.734E-11	1.208E-14	9.502E-35	8.710E-34	1.201E-32
1.700E+01	2.000E+01	0.000E+00	3.483E-13	1.243E-13	4.747E-17	1.070E-23	2.704E-38	1.857E-37	2.560E-36
2.000E+01	3.000E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
3.000E+01	5.000E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Table C.20. Re-binned 48-Group Spectra for ^{233}U - Fast Fission Yield Library

Lo (MeV)	Hi (MeV)	Char. Flux	10^{-2} s	10^{-1} s	10^{0} s	10^{1} s	10^{2} s	10^{3} s	10^{4} s
1.000E-03	1.000E-02	0.000E+00	8.697E-01	9.023E-01	1.108E+00	2.056E+00	1.182E+00	1.296E+00	7.108E-01
1.000E-02	2.000E-02	0.000E+00	3.729E+00	3.872E+00	4.580E+00	7.653E+00	3.533E+00	1.090E+00	7.181E-01
2.000E-02	3.000E-02	0.000E+00	6.184E-01	6.513E-01	8.779E-01	1.820E+00	1.326E+00	1.547E+00	2.442E+00
3.000E-02	4.500E-02	0.000E+00	1.545E+00	1.583E+00	1.861E+00	3.683E+00	2.165E+00	2.118E+00	1.249E+00
4.500E-02	6.000E-02	0.000E+00	2.268E-01	2.349E-01	2.724E-01	3.654E-01	3.368E-01	9.559E-02	1.634E-01
6.000E-02	8.000E-02	0.000E+00	1.769E-01	1.831E-01	2.192E-01	4.023E-01	6.938E-01	3.740E-01	1.253E-01
8.000E-02	1.000E-01	0.000E+00	3.576E-01	3.713E-01	4.646E-01	1.141E+00	1.289E+00	3.365E-01	2.644E-01
1.000E-01	1.500E-01	4.300E-01	1.588E+00	1.623E+00	1.547E+00	1.142E+00	4.851E-01	2.258E-01	1.562E-01
1.500E-01	2.000E-01	1.660E+00	9.028E-01	9.261E-01	9.409E-01	6.729E-01	7.588E-01	1.308E+00	1.149E+00
2.000E-01	3.000E-01	1.120E+00	6.873E-01	6.784E-01	6.050E-01	7.589E-01	6.237E-01	6.773E-01	4.401E-01
3.000E-01	4.000E-01	7.540E-01	4.541E-01	4.464E-01	4.110E-01	4.501E-01	8.271E-01	9.139E-01	3.148E-01
4.000E-01	4.500E-01	8.110E-01	4.923E-01	5.038E-01	5.724E-01	7.310E-01	5.355E-01	6.819E-01	7.618E-01
4.500E-01	5.000E-01	9.200E-01	8.604E-01	8.904E-01	1.020E+00	4.896E-01	4.664E-01	7.561E-01	5.765E-01
5.000E-01	5.250E-01	9.200E-01	3.776E-01	3.948E-01	5.037E-01	8.188E-01	2.091E-01	3.085E-01	1.839E-01
5.250E-01	6.000E-01	8.130E-01	1.192E+00	1.232E+00	1.372E+00	9.757E-01	8.081E-01	9.854E-01	7.816E-01
6.000E-01	7.000E-01	5.990E-01	4.756E-01	4.759E-01	5.039E-01	5.043E-01	5.885E-01	4.092E-01	8.348E-01
7.000E-01	8.000E-01	5.340E-01	2.739E-01	2.814E-01	3.139E-01	4.317E-01	4.540E-01	5.867E-01	7.370E-01
8.000E-01	9.000E-01	4.720E-01	1.228E+00	1.117E+00	7.857E-01	4.666E-01	5.628E-01	9.043E-01	1.572E+00
9.000E-01	1.000E+00	4.400E-01	4.235E-01	4.305E-01	4.459E-01	3.327E-01	3.572E-01	5.596E-01	4.439E-01
1.000E+00	1.125E+00	4.020E-01	4.135E-01	4.194E-01	4.242E-01	2.750E-01	2.948E-01	5.362E-01	3.697E-01
1.125E+00	1.200E+00	4.020E-01	1.582E-01	1.581E-01	1.784E-01	2.230E-01	1.678E-01	2.275E-01	2.857E-01
1.200E+00	1.330E+00	2.410E-01	3.817E-01	3.846E-01	3.673E-01	2.395E-01	3.774E-01	3.690E-01	1.188E-01
1.330E+00	1.500E+00	2.310E-01	1.132E-01	1.137E-01	1.290E-01	2.074E-01	4.343E-01	2.430E-01	5.211E-01
1.500E+00	1.660E+00	1.560E-01	1.302E-01	1.291E-01	1.281E-01	1.436E-01	2.079E-01	9.308E-02	9.916E-02
1.660E+00	1.875E+00	1.410E-01	9.307E-02	9.298E-02	9.260E-02	8.077E-02	1.043E-01	1.056E-01	1.385E-01
1.875E+00	2.000E+00	1.070E-01	7.836E-02	7.859E-02	8.059E-02	7.840E-02	9.936E-02	5.250E-02	5.631E-02
2.000E+00	2.333E+00	8.990E-02	5.026E-02	4.926E-02	4.804E-02	5.730E-02	7.500E-02	9.176E-02	8.146E-02
2.333E+00	2.500E+00	6.720E-02	6.080E-02	5.852E-02	4.985E-02	6.035E-02	5.167E-02	3.797E-02	1.498E-01
2.500E+00	2.666E+00	6.063E-02	4.172E-02	4.103E-02	3.877E-02	5.342E-02	8.018E-02	6.896E-02	8.644E-02
2.666E+00	3.000E+00	5.090E-02	5.232E-02	5.170E-02	4.442E-02	4.458E-02	5.136E-02	1.553E-02	1.876E-02
3.000E+00	3.500E+00	3.650E-02	3.363E-02	3.362E-02	3.198E-02	2.724E-02	2.419E-02	8.139E-03	8.747E-03
3.500E+00	4.000E+00	2.260E-02	1.019E-02	9.980E-03	1.127E-02	1.720E-02	2.596E-02	5.366E-03	3.322E-03
4.000E+00	4.500E+00	1.430E-02	9.784E-03	9.332E-03	8.292E-03	1.045E-02	2.296E-02	2.968E-03	6.092E-05
4.500E+00	5.000E+00	9.390E-03	5.933E-03	6.176E-03	7.887E-03	1.034E-02	5.129E-03	3.539E-04	1.591E-04
5.000E+00	5.500E+00	3.800E-03	5.128E-03	5.202E-03	6.607E-03	9.796E-03	7.373E-03	4.063E-04	7.719E-10
5.500E+00	6.000E+00	2.580E-03	1.595E-03	1.641E-03	1.940E-03	2.305E-03	1.384E-03	1.422E-05	4.611E-16
6.000E+00	6.500E+00	1.808E-03	1.420E-03	1.470E-03	1.793E-03	2.030E-03	4.377E-04	1.510E-06	1.513E-18
6.500E+00	7.000E+00	0.000E+00	1.118E-04	1.060E-04	6.532E-05	1.632E-05	6.010E-05	6.740E-09	4.361E-26
7.000E+00	7.500E+00	0.000E+00	6.625E-05	6.399E-05	4.755E-05	4.313E-05	7.310E-06	1.826E-21	2.855E-26
7.500E+00	8.000E+00	0.000E+00	2.937E-05	2.790E-05	1.671E-05	1.186E-07	2.090E-10	4.438E-28	6.078E-27
8.000E+00	9.000E+00	0.000E+00	1.292E-05	1.233E-05	7.456E-06	2.592E-08	1.860E-12	1.991E-28	2.726E-27
9.000E+00	1.000E+01	0.000E+00	3.237E-06	3.095E-06	1.850E-06	5.565E-09	5.448E-30	4.728E-29	6.476E-28
1.000E+01	1.200E+01	0.000E+00	3.588E-07	3.366E-07	1.796E-07	3.602E-10	4.266E-31	3.873E-30	5.305E-29
1.200E+01	1.400E+01	0.000E+00	1.754E-08	1.600E-08	7.883E-09	1.467E-12	1.104E-32	1.003E-31	1.373E-30
1.400E+01	1.700E+01	0.000E+00	1.398E-10	1.347E-10	7.100E-11	9.654E-15	9.335E-35	8.477E-34	1.161E-32
1.700E+01	2.000E+01	0.000E+00	4.077E-13	1.437E-13	2.362E-17	3.723E-24	2.215E-38	1.807E-37	2.475E-36
2.000E+01	3.000E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
3.000E+01	5.000E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Table C.21. Re-binned 48-Group Spectra for ^{233}U - 14-MeV Fission Yield Library

Lo (MeV)	Hi (MeV)	Char. Flux	10^{-2} s	10^{-1} s	10^{0} s	10^{1} s	10^{2} s	10^{3} s	10^{4} s
1.000E-03	1.000E-02	0.000E+00	6.449E-01	6.653E-01	7.587E-01	1.488E+00	1.202E+00	1.235E+00	8.858E-01
1.000E-02	2.000E-02	0.000E+00	2.319E+00	2.461E+00	3.113E+00	6.302E+00	4.262E+00	1.018E+00	8.825E-01
2.000E-02	3.000E-02	0.000E+00	1.027E+00	1.101E+00	1.505E+00	2.685E+00	2.236E+00	2.015E+00	3.242E+00
3.000E-02	4.500E-02	0.000E+00	1.040E+00	1.020E+00	8.645E-01	1.890E+00	1.805E+00	1.843E+00	1.165E+00
4.500E-02	6.000E-02	0.000E+00	2.663E-01	2.798E-01	3.276E-01	3.597E-01	4.991E-01	1.336E-01	1.770E-01
6.000E-02	8.000E-02	0.000E+00	2.113E-01	2.191E-01	2.508E-01	4.586E-01	9.264E-01	3.419E-01	1.880E-01
8.000E-02	1.000E-01	0.000E+00	3.125E-01	3.260E-01	3.819E-01	9.886E-01	1.383E+00	2.429E-01	1.717E-01
1.000E-01	1.500E-01	4.300E-01	1.085E+00	1.149E+00	1.285E+00	1.200E+00	6.145E-01	2.855E-01	1.567E-01
1.500E-01	2.000E-01	1.660E+00	7.508E-01	7.774E-01	8.013E-01	5.921E-01	7.774E-01	1.267E+00	1.363E+00
2.000E-01	3.000E-01	1.120E+00	8.626E-01	8.485E-01	6.774E-01	8.286E-01	6.849E-01	5.606E-01	4.428E-01
3.000E-01	4.000E-01	7.540E-01	6.646E-01	6.690E-01	6.578E-01	5.177E-01	8.229E-01	1.035E+00	4.426E-01
4.000E-01	4.500E-01	8.110E-01	4.160E-01	4.267E-01	4.845E-01	6.138E-01	6.970E-01	6.608E-01	6.854E-01
4.500E-01	5.000E-01	9.200E-01	5.888E-01	6.224E-01	8.195E-01	6.614E-01	5.170E-01	7.759E-01	6.171E-01
5.000E-01	5.250E-01	9.200E-01	4.223E-01	4.522E-01	5.845E-01	6.973E-01	4.990E-01	3.610E-01	2.198E-01
5.250E-01	6.000E-01	8.130E-01	8.349E-01	8.760E-01	1.014E+00	7.818E-01	6.819E-01	9.786E-01	7.831E-01
6.000E-01	7.000E-01	5.990E-01	4.883E-01	4.931E-01	5.594E-01	5.518E-01	5.383E-01	4.456E-01	8.907E-01
7.000E-01	8.000E-01	5.340E-01	3.109E-01	3.243E-01	3.704E-01	4.490E-01	4.383E-01	6.121E-01	9.196E-01
8.000E-01	9.000E-01	4.720E-01	1.506E+00	1.323E+00	7.169E-01	4.847E-01	5.182E-01	9.490E-01	1.207E+00
9.000E-01	1.000E+00	4.400E-01	4.034E-01	4.193E-01	4.947E-01	4.135E-01	3.186E-01	4.729E-01	3.934E-01
1.000E+00	1.125E+00	4.020E-01	3.772E-01	3.886E-01	4.382E-01	3.106E-01	2.776E-01	5.324E-01	4.124E-01
1.125E+00	1.200E+00	4.020E-01	3.647E-01	3.792E-01	4.723E-01	4.498E-01	1.704E-01	2.021E-01	2.323E-01
1.200E+00	1.330E+00	2.410E-01	2.958E-01	3.034E-01	3.176E-01	2.190E-01	3.157E-01	3.669E-01	1.859E-01
1.330E+00	1.500E+00	2.310E-01	1.485E-01	1.507E-01	1.748E-01	2.038E-01	3.758E-01	2.696E-01	4.785E-01
1.500E+00	1.660E+00	1.560E-01	1.510E-01	1.517E-01	1.598E-01	1.535E-01	2.084E-01	9.635E-02	9.559E-02
1.660E+00	1.875E+00	1.410E-01	1.010E-01	1.019E-01	1.063E-01	8.789E-02	9.754E-02	9.451E-02	1.120E-01
1.875E+00	2.000E+00	1.070E-01	7.461E-02	7.491E-02	7.731E-02	9.079E-02	1.014E-01	5.461E-02	5.343E-02
2.000E+00	2.333E+00	8.990E-02	6.443E-02	6.302E-02	6.050E-02	6.039E-02	7.091E-02	8.496E-02	7.203E-02
2.333E+00	2.500E+00	6.720E-02	6.915E-02	6.649E-02	5.550E-02	5.618E-02	5.360E-02	3.825E-02	1.240E-01
2.500E+00	2.666E+00	6.063E-02	5.373E-02	5.262E-02	4.636E-02	4.953E-02	7.191E-02	6.842E-02	7.598E-02
2.666E+00	3.000E+00	5.090E-02	5.942E-02	5.930E-02	5.192E-02	4.850E-02	5.665E-02	1.646E-02	1.611E-02
3.000E+00	3.500E+00	3.650E-02	3.828E-02	3.852E-02	3.697E-02	2.988E-02	2.211E-02	9.117E-03	7.373E-03
3.500E+00	4.000E+00	2.260E-02	1.424E-02	1.368E-02	1.331E-02	1.648E-02	2.267E-02	5.577E-03	2.945E-03
4.000E+00	4.500E+00	1.430E-02	1.094E-02	1.024E-02	8.723E-03	9.946E-03	1.817E-02	2.415E-03	6.468E-05
4.500E+00	5.000E+00	9.390E-03	6.453E-03	6.557E-03	7.418E-03	1.049E-02	4.518E-03	3.414E-04	1.333E-04
5.000E+00	5.500E+00	3.800E-03	5.803E-03	5.662E-03	6.197E-03	1.007E-02	6.704E-03	2.804E-04	6.924E-10
5.500E+00	6.000E+00	2.580E-03	2.555E-03	2.503E-03	2.189E-03	2.414E-03	1.377E-03	9.810E-06	5.509E-16
6.000E+00	6.500E+00	1.808E-03	1.868E-03	1.860E-03	1.840E-03	2.099E-03	3.431E-04	9.598E-07	1.233E-15
6.500E+00	7.000E+00	0.000E+00	3.232E-04	2.994E-04	1.644E-04	2.697E-05	6.485E-05	7.319E-09	5.017E-26
7.000E+00	7.500E+00	0.000E+00	1.578E-04	1.468E-04	8.993E-05	4.858E-05	8.602E-06	2.175E-21	3.283E-26
7.500E+00	8.000E+00	0.000E+00	7.296E-05	6.715E-05	3.828E-05	4.693E-07	1.073E-10	5.271E-28	6.992E-27
8.000E+00	9.000E+00	0.000E+00	3.068E-05	2.815E-05	1.655E-05	7.574E-08	1.035E-12	2.364E-28	3.136E-27
9.000E+00	1.000E+01	0.000E+00	8.377E-06	7.422E-06	4.098E-06	1.507E-08	5.382E-29	5.616E-29	7.450E-28
1.000E+01	1.200E+01	0.000E+00	1.544E-06	1.169E-06	3.998E-07	9.686E-10	5.178E-31	4.600E-30	6.103E-29
1.200E+01	1.400E+01	0.000E+00	3.196E-07	1.881E-07	1.640E-08	4.026E-12	1.339E-32	1.191E-31	1.580E-30
1.400E+01	1.700E+01	0.000E+00	2.385E-10	2.373E-10	1.447E-10	2.671E-14	1.096E-34	1.007E-33	1.336E-32
1.700E+01	2.000E+01	0.000E+00	8.947E-11	3.292E-11	5.987E-15	3.503E-21	2.892E-36	2.146E-37	2.847E-36
2.000E+01	3.000E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
3.000E+01	5.000E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Table C.22. Re-binned 48-Group Spectra for ^{235}U - Thermal Fission Yield Library

Lo (MeV)	Hi (MeV)	Char. Flux	10^{-2} s	10^{-1} s	10^{0} s	10^{1} s	10^{2} s	10^{3} s	10^{4} s
1.000E-03	1.000E-02	0.000E+00	6.852E-01	7.412E-01	9.762E-01	2.145E+00	1.283E+00	1.481E+00	6.178E-01
1.000E-02	2.000E-02	0.000E+00	2.924E+00	3.169E+00	3.871E+00	7.838E+00	3.724E+00	1.059E+00	4.763E-01
2.000E-02	3.000E-02	0.000E+00	3.448E-01	3.969E-01	5.518E-01	1.514E+00	1.335E+00	1.461E+00	1.952E+00
3.000E-02	4.500E-02	0.000E+00	1.305E+00	1.410E+00	1.850E+00	4.059E+00	2.365E+00	2.277E+00	1.338E+00
4.500E-02	6.000E-02	0.000E+00	2.770E-01	2.815E-01	2.892E-01	3.699E-01	3.908E-01	7.673E-02	1.254E-01
6.000E-02	8.000E-02	0.000E+00	2.637E-01	2.764E-01	2.868E-01	4.209E-01	7.660E-01	3.627E-01	6.163E-02
8.000E-02	1.000E-01	0.000E+00	4.735E-01	5.111E-01	5.289E-01	1.151E+00	1.408E+00	4.711E-01	3.861E-01
1.000E-01	1.500E-01	4.300E-01	1.834E+00	1.972E+00	1.927E+00	1.203E+00	5.648E-01	2.770E-01	2.004E-01
1.500E-01	2.000E-01	1.660E+00	7.198E-01	7.586E-01	8.250E-01	7.015E-01	7.568E-01	1.281E+00	1.026E+00
2.000E-01	3.000E-01	1.120E+00	6.780E-01	7.009E-01	6.972E-01	8.166E-01	6.773E-01	7.375E-01	4.844E-01
3.000E-01	4.000E-01	7.540E-01	5.962E-01	5.766E-01	4.567E-01	4.253E-01	8.947E-01	1.051E+00	2.404E-01
4.000E-01	4.500E-01	8.110E-01	6.425E-01	6.529E-01	6.533E-01	7.978E-01	4.930E-01	7.376E-01	7.621E-01
4.500E-01	5.000E-01	9.200E-01	6.371E-01	6.663E-01	8.118E-01	5.273E-01	4.091E-01	7.593E-01	5.664E-01
5.000E-01	5.250E-01	9.200E-01	3.849E-01	4.036E-01	5.188E-01	9.633E-01	2.309E-01	3.247E-01	1.739E-01
5.250E-01	6.000E-01	8.130E-01	8.434E-01	8.962E-01	1.078E+00	1.062E+00	7.818E-01	9.580E-01	8.494E-01
6.000E-01	7.000E-01	5.990E-01	5.355E-01	5.218E-01	4.953E-01	4.514E-01	6.568E-01	4.097E-01	8.112E-01
7.000E-01	8.000E-01	5.340E-01	3.085E-01	3.247E-01	3.459E-01	4.098E-01	4.380E-01	5.737E-01	6.402E-01
8.000E-01	9.000E-01	4.720E-01	1.042E+00	8.955E-01	7.435E-01	4.411E-01	4.778E-01	7.825E-01	1.926E+00
9.000E-01	1.000E+00	4.400E-01	3.534E-01	3.636E-01	3.815E-01	2.890E-01	4.144E-01	5.577E-01	4.288E-01
1.000E+00	1.125E+00	4.020E-01	3.354E-01	3.393E-01	3.566E-01	2.557E-01	2.769E-01	4.918E-01	3.776E-01
1.125E+00	1.200E+00	4.020E-01	1.591E-01	1.473E-01	1.393E-01	1.667E-01	1.687E-01	2.241E-01	3.214E-01
1.200E+00	1.330E+00	2.410E-01	3.732E-01	3.917E-01	4.076E-01	2.466E-01	3.803E-01	3.430E-01	1.186E-01
1.330E+00	1.500E+00	2.310E-01	1.275E-01	1.218E-01	1.223E-01	1.788E-01	3.849E-01	2.358E-01	5.033E-01
1.500E+00	1.660E+00	1.560E-01	1.467E-01	1.423E-01	1.393E-01	1.315E-01	1.800E-01	9.707E-02	9.553E-02
1.660E+00	1.875E+00	1.410E-01	1.124E-01	1.100E-01	1.056E-01	8.053E-02	1.006E-01	1.090E-01	1.351E-01
1.875E+00	2.000E+00	1.070E-01	9.599E-02	1.019E-01	9.917E-02	7.397E-02	9.465E-02	4.926E-02	5.148E-02
2.000E+00	2.333E+00	8.990E-02	7.452E-02	6.957E-02	5.881E-02	5.798E-02	7.678E-02	9.148E-02	7.006E-02
2.333E+00	2.500E+00	6.720E-02	9.319E-02	8.875E-02	6.772E-02	5.977E-02	4.955E-02	3.296E-02	1.212E-01
2.500E+00	2.666E+00	6.063E-02	6.585E-02	6.198E-02	5.255E-02	5.177E-02	7.711E-02	6.116E-02	7.639E-02
2.666E+00	3.000E+00	5.090E-02	7.101E-02	6.897E-02	5.767E-02	4.285E-02	4.585E-02	1.335E-02	1.656E-02
3.000E+00	3.500E+00	3.650E-02	4.469E-02	4.306E-02	3.927E-02	2.957E-02	2.227E-02	6.859E-03	7.924E-03
3.500E+00	4.000E+00	2.260E-02	1.802E-02	1.534E-02	1.281E-02	1.595E-02	2.308E-02	4.279E-03	2.950E-03
4.000E+00	4.500E+00	1.430E-02	1.603E-02	1.354E-02	1.007E-02	8.941E-03	2.053E-02	2.794E-03	4.587E-05
4.500E+00	5.000E+00	9.390E-03	9.570E-03	8.094E-03	7.481E-03	9.793E-03	4.185E-03	2.917E-04	1.130E-04
5.000E+00	5.500E+00	3.800E-03	9.550E-03	7.501E-03	6.307E-03	8.852E-03	6.034E-03	4.197E-04	8.105E-10
5.500E+00	6.000E+00	2.580E-03	6.043E-03	4.387E-03	2.801E-03	2.256E-03	1.104E-03	1.489E-05	2.913E-16
6.000E+00	6.500E+00	1.808E-03	4.926E-03	3.523E-03	2.260E-03	2.050E-03	4.613E-04	2.127E-06	2.756E-19
6.500E+00	7.000E+00	0.000E+00	1.901E-03	1.217E-03	4.500E-04	1.541E-05	4.446E-05	5.786E-09	6.403E-21
7.000E+00	7.500E+00	0.000E+00	1.147E-03	7.110E-04	2.526E-04	3.702E-05	7.627E-06	2.453E-21	3.609E-21
7.500E+00	8.000E+00	0.000E+00	6.824E-04	4.071E-04	1.328E-04	5.432E-07	7.594E-10	4.227E-23	5.883E-22
8.000E+00	9.000E+00	0.000E+00	3.348E-04	1.927E-04	5.850E-05	1.345E-07	6.772E-12	1.848E-23	2.572E-22
9.000E+00	1.000E+01	0.000E+00	9.347E-05	5.154E-05	1.420E-05	2.388E-08	4.241E-25	4.438E-24	6.176E-23
1.000E+01	1.200E+01	0.000E+00	1.003E-05	5.542E-06	1.485E-06	1.320E-09	3.945E-26	4.128E-25	5.745E-24
1.200E+01	1.400E+01	0.000E+00	3.066E-07	2.058E-07	8.460E-08	1.573E-11	1.488E-27	1.557E-26	2.166E-25
1.400E+01	1.700E+01	0.000E+00	1.288E-09	1.300E-09	7.685E-10	1.333E-13	1.300E-29	1.361E-28	1.894E-27
1.700E+01	2.000E+01	0.000E+00	1.594E-12	2.604E-13	9.693E-16	2.036E-22	1.458E-32	1.526E-31	2.124E-30
2.000E+01	3.000E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
3.000E+01	5.000E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Table C.23. Re-binned 48-Group Spectra for ^{235}U - Fast Fission Yield Library

Lo (MeV)	Hi (MeV)	Char. Flux	10^{-2} s	10^{-1} s	10^{0} s	10^{1} s	10^{2} s	10^{3} s	10^{4} s
1.000E-03	1.000E-02	0.000E+00	6.157E-01	6.703E-01	8.869E-01	2.096E+00	1.301E+00	1.458E+00	6.308E-01
1.000E-02	2.000E-02	0.000E+00	2.938E+00	3.178E+00	3.798E+00	8.166E+00	3.919E+00	1.053E+00	4.922E-01
2.000E-02	3.000E-02	0.000E+00	3.422E-01	3.691E-01	5.086E-01	1.613E+00	1.477E+00	1.472E+00	2.027E+00
3.000E-02	4.500E-02	0.000E+00	1.188E+00	1.297E+00	1.683E+00	3.810E+00	2.320E+00	2.228E+00	1.338E+00
4.500E-02	6.000E-02	0.000E+00	2.751E-01	2.884E-01	2.991E-01	3.862E-01	4.282E-01	8.033E-02	1.366E-01
6.000E-02	8.000E-02	0.000E+00	2.643E-01	2.729E-01	2.880E-01	4.416E-01	8.483E-01	3.649E-01	7.578E-02
8.000E-02	1.000E-01	0.000E+00	4.702E-01	4.907E-01	5.004E-01	1.150E+00	1.372E+00	4.539E-01	3.616E-01
1.000E-01	1.500E-01	4.300E-01	1.964E+00	2.108E+00	2.011E+00	1.162E+00	5.981E-01	2.915E-01	2.026E-01
1.500E-01	2.000E-01	1.660E+00	6.869E-01	7.343E-01	8.075E-01	6.830E-01	7.958E-01	1.303E+00	1.074E+00
2.000E-01	3.000E-01	1.120E+00	6.741E-01	7.079E-01	7.026E-01	7.953E-01	6.424E-01	7.197E-01	4.849E-01
3.000E-01	4.000E-01	7.540E-01	5.898E-01	5.727E-01	4.528E-01	4.260E-01	8.939E-01	1.103E+00	2.463E-01
4.000E-01	4.500E-01	8.110E-01	6.640E-01	6.806E-01	6.670E-01	7.831E-01	5.200E-01	7.530E-01	7.461E-01
4.500E-01	5.000E-01	9.200E-01	5.841E-01	6.165E-01	7.679E-01	5.529E-01	4.138E-01	7.718E-01	5.929E-01
5.000E-01	5.250E-01	9.200E-01	3.522E-01	3.761E-01	4.889E-01	9.323E-01	2.369E-01	3.276E-01	1.784E-01
5.250E-01	6.000E-01	8.130E-01	8.047E-01	8.638E-01	1.033E+00	1.066E+00	7.497E-01	9.466E-01	8.614E-01
6.000E-01	7.000E-01	5.990E-01	5.612E-01	5.466E-01	5.196E-01	4.589E-01	6.954E-01	4.077E-01	7.961E-01
7.000E-01	8.000E-01	5.340E-01	3.137E-01	3.303E-01	3.529E-01	4.174E-01	4.335E-01	5.806E-01	6.710E-01
8.000E-01	9.000E-01	4.720E-01	1.135E+00	9.296E-01	7.798E-01	4.312E-01	4.633E-01	7.877E-01	1.904E+00
9.000E-01	1.000E+00	4.400E-01	3.505E-01	3.566E-01	3.795E-01	2.958E-01	4.391E-01	5.367E-01	3.823E-01
1.000E+00	1.125E+00	4.020E-01	3.234E-01	3.276E-01	3.532E-01	2.604E-01	2.758E-01	4.802E-01	3.806E-01
1.125E+00	1.200E+00	4.020E-01	1.705E-01	1.577E-01	1.490E-01	1.733E-01	1.718E-01	2.243E-01	3.220E-01
1.200E+00	1.330E+00	2.410E-01	3.780E-01	3.942E-01	4.085E-01	2.430E-01	3.869E-01	3.330E-01	1.224E-01
1.330E+00	1.500E+00	2.310E-01	1.242E-01	1.187E-01	1.210E-01	1.749E-01	3.674E-01	2.393E-01	5.052E-01
1.500E+00	1.660E+00	1.560E-01	1.497E-01	1.458E-01	1.445E-01	1.348E-01	1.711E-01	9.668E-02	9.391E-02
1.660E+00	1.875E+00	1.410E-01	1.134E-01	1.127E-01	1.104E-01	8.305E-02	9.736E-02	1.080E-01	1.338E-01
1.875E+00	2.000E+00	1.070E-01	9.845E-02	9.807E-02	9.287E-02	7.817E-02	9.107E-02	4.972E-02	5.009E-02
2.000E+00	2.333E+00	8.990E-02	7.397E-02	6.970E-02	5.861E-02	5.912E-02	7.498E-02	8.948E-02	6.878E-02
2.333E+00	2.500E+00	6.720E-02	9.448E-02	8.938E-02	6.802E-02	6.034E-02	4.844E-02	3.284E-02	1.200E-01
2.500E+00	2.666E+00	6.063E-02	6.211E-02	6.021E-02	5.179E-02	5.152E-02	7.333E-02	5.943E-02	7.528E-02
2.666E+00	3.000E+00	5.090E-02	6.866E-02	6.904E-02	5.878E-02	4.307E-02	4.449E-02	1.294E-02	1.629E-02
3.000E+00	3.500E+00	3.650E-02	4.160E-02	4.183E-02	4.019E-02	3.162E-02	2.151E-02	6.785E-03	7.764E-03
3.500E+00	4.000E+00	2.260E-02	1.550E-02	1.354E-02	1.188E-02	1.612E-02	2.148E-02	4.141E-03	2.927E-03
4.000E+00	4.500E+00	1.430E-02	1.403E-02	1.234E-02	1.023E-02	9.621E-03	1.936E-02	2.671E-03	4.802E-05
4.500E+00	5.000E+00	9.390E-03	6.400E-03	6.090E-03	6.194E-03	9.395E-03	4.222E-03	2.804E-04	1.134E-04
5.000E+00	5.500E+00	3.800E-03	5.998E-03	5.230E-03	4.931E-03	8.451E-03	5.928E-03	4.006E-04	8.357E-10
5.500E+00	6.000E+00	2.580E-03	2.690E-03	2.432E-03	1.902E-03	2.080E-03	1.058E-03	1.428E-05	2.873E-16
6.000E+00	6.500E+00	1.808E-03	1.877E-03	1.728E-03	1.466E-03	1.815E-03	4.702E-04	2.217E-06	3.427E-19
6.500E+00	7.000E+00	0.000E+00	4.727E-04	3.972E-04	1.814E-04	1.535E-05	4.109E-05	5.375E-09	6.562E-21
7.000E+00	7.500E+00	0.000E+00	2.421E-04	2.052E-04	1.003E-04	4.465E-05	9.343E-06	2.957E-21	3.698E-21
7.500E+00	8.000E+00	0.000E+00	1.184E-04	1.007E-04	4.628E-05	4.335E-07	5.219E-10	4.252E-23	6.029E-22
8.000E+00	9.000E+00	0.000E+00	4.622E-05	4.056E-05	1.986E-05	7.900E-08	4.694E-12	1.859E-23	2.636E-22
9.000E+00	1.000E+01	0.000E+00	1.002E-05	9.271E-06	4.829E-06	1.553E-08	4.255E-25	4.464E-24	6.330E-23
1.000E+01	1.200E+01	0.000E+00	1.218E-06	1.138E-06	5.120E-07	9.689E-10	3.958E-26	4.153E-25	5.888E-24
1.200E+01	1.400E+01	0.000E+00	4.519E-08	4.494E-08	2.538E-08	5.589E-12	1.493E-27	1.566E-26	2.220E-25
1.400E+01	1.700E+01	0.000E+00	3.894E-10	3.963E-10	2.296E-10	4.149E-14	1.305E-29	1.369E-28	1.941E-27
1.700E+01	2.000E+01	0.000E+00	2.337E-13	8.597E-14	1.790E-15	7.197E-22	1.463E-32	1.535E-31	2.176E-30
2.000E+01	3.000E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
3.000E+01	5.000E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Table C.24. Re-binned 48-Group Spectra for ^{235}U - 14-MeV Fission Yield Library

Lo (MeV)	Hi (MeV)	Char. Flux	10^{-2} s	10^{-1} s	10^{0} s	10^{1} s	10^{2} s	10^{3} s	10^{4} s
1.000E-03	1.000E-02	0.000E+00	5.903E-01	6.256E-01	7.652E-01	1.654E+00	1.295E+00	1.376E+00	9.104E-01
1.000E-02	2.000E-02	0.000E+00	2.295E+00	2.461E+00	3.067E+00	6.744E+00	4.501E+00	9.763E-01	6.761E-01
2.000E-02	3.000E-02	0.000E+00	8.813E-01	9.524E-01	1.270E+00	2.398E+00	2.278E+00	2.226E+00	3.457E+00
3.000E-02	4.500E-02	0.000E+00	8.856E-01	9.175E-01	1.008E+00	2.442E+00	1.965E+00	2.009E+00	1.234E+00
4.500E-02	6.000E-02	0.000E+00	2.845E-01	3.004E-01	3.386E-01	3.760E-01	5.386E-01	1.474E-01	1.941E-01
6.000E-02	8.000E-02	0.000E+00	2.349E-01	2.430E-01	2.607E-01	4.714E-01	1.018E+00	3.844E-01	2.016E-01
8.000E-02	1.000E-01	0.000E+00	3.638E-01	3.796E-01	4.090E-01	1.048E+00	1.398E+00	3.081E-01	2.217E-01
1.000E-01	1.500E-01	4.300E-01	1.235E+00	1.325E+00	1.418E+00	1.218E+00	6.347E-01	3.095E-01	1.720E-01
1.500E-01	2.000E-01	1.660E+00	7.005E-01	7.317E-01	7.512E-01	6.306E-01	8.046E-01	1.315E+00	1.224E+00
2.000E-01	3.000E-01	1.120E+00	7.734E-01	7.847E-01	6.918E-01	8.260E-01	6.986E-01	6.008E-01	4.490E-01
3.000E-01	4.000E-01	7.540E-01	7.094E-01	7.080E-01	6.402E-01	4.924E-01	8.689E-01	1.127E+00	4.477E-01
4.000E-01	4.500E-01	8.110E-01	4.908E-01	5.012E-01	5.329E-01	6.728E-01	6.164E-01	6.101E-01	6.281E-01
4.500E-01	5.000E-01	9.200E-01	5.786E-01	6.124E-01	7.962E-01	6.611E-01	4.675E-01	7.692E-01	6.364E-01
5.000E-01	5.250E-01	9.200E-01	4.266E-01	4.600E-01	5.903E-01	7.390E-01	4.385E-01	3.552E-01	2.221E-01
5.250E-01	6.000E-01	8.130E-01	7.891E-01	8.359E-01	9.732E-01	8.485E-01	6.818E-01	9.410E-01	7.903E-01
6.000E-01	7.000E-01	5.990E-01	5.463E-01	5.433E-01	5.738E-01	5.227E-01	6.072E-01	4.501E-01	8.913E-01
7.000E-01	8.000E-01	5.340E-01	3.367E-01	3.525E-01	3.806E-01	4.473E-01	4.562E-01	6.596E-01	9.493E-01
8.000E-01	9.000E-01	4.720E-01	1.193E+00	9.991E-01	6.695E-01	4.756E-01	4.807E-01	9.297E-01	1.390E+00
9.000E-01	1.000E+00	4.400E-01	3.835E-01	3.959E-01	4.508E-01	3.547E-01	3.384E-01	4.974E-01	4.414E-01
1.000E+00	1.125E+00	4.020E-01	3.576E-01	3.658E-01	4.021E-01	2.952E-01	2.747E-01	4.877E-01	3.939E-01
1.125E+00	1.200E+00	4.020E-01	3.226E-01	3.303E-01	3.936E-01	4.032E-01	1.778E-01	2.163E-01	2.514E-01
1.200E+00	1.330E+00	2.410E-01	3.491E-01	3.594E-01	3.653E-01	2.312E-01	3.338E-01	3.405E-01	1.734E-01
1.330E+00	1.500E+00	2.310E-01	1.512E-01	1.505E-01	1.636E-01	1.881E-01	3.454E-01	2.151E-01	4.225E-01
1.500E+00	1.660E+00	1.560E-01	1.671E-01	1.659E-01	1.660E-01	1.432E-01	1.752E-01	9.934E-02	8.896E-02
1.660E+00	1.875E+00	1.410E-01	1.185E-01	1.189E-01	1.177E-01	8.664E-02	9.523E-02	9.329E-02	1.139E-01
1.875E+00	2.000E+00	1.070E-01	8.643E-02	8.579E-02	8.080E-02	8.264E-02	9.576E-02	5.050E-02	4.693E-02
2.000E+00	2.333E+00	8.990E-02	7.573E-02	7.300E-02	6.406E-02	5.946E-02	7.007E-02	7.720E-02	6.292E-02
2.333E+00	2.500E+00	6.720E-02	8.490E-02	8.058E-02	6.168E-02	5.359E-02	4.836E-02	3.377E-02	1.085E-01
2.500E+00	2.666E+00	6.063E-02	6.382E-02	6.190E-02	5.054E-02	4.693E-02	6.792E-02	5.703E-02	6.195E-02
2.666E+00	3.000E+00	5.090E-02	6.941E-02	6.921E-02	5.640E-02	4.569E-02	4.974E-02	1.439E-02	1.436E-02
3.000E+00	3.500E+00	3.650E-02	4.397E-02	4.411E-02	3.955E-02	3.040E-02	2.115E-02	7.880E-03	6.500E-03
3.500E+00	4.000E+00	2.260E-02	1.674E-02	1.562E-02	1.380E-02	1.588E-02	2.078E-02	4.666E-03	2.554E-03
4.000E+00	4.500E+00	1.430E-02	1.393E-02	1.278E-02	1.024E-02	1.008E-02	1.730E-02	2.356E-03	5.109E-05
4.500E+00	5.000E+00	9.390E-03	6.966E-03	6.961E-03	7.092E-03	1.004E-02	3.844E-03	2.919E-04	1.130E-04
5.000E+00	5.500E+00	3.800E-03	6.402E-03	6.005E-03	5.734E-03	9.231E-03	5.518E-03	3.090E-04	6.801E-10
5.500E+00	6.000E+00	2.580E-03	3.100E-03	2.982E-03	2.278E-03	2.206E-03	1.024E-03	1.089E-05	3.999E-16
6.000E+00	6.500E+00	1.808E-03	2.189E-03	2.128E-03	1.806E-03	1.966E-03	3.456E-04	1.336E-06	5.829E-16
6.500E+00	7.000E+00	0.000E+00	5.117E-04	4.683E-04	2.467E-04	2.114E-05	4.379E-05	5.355E-09	6.871E-21
7.000E+00	7.500E+00	0.000E+00	2.590E-04	2.369E-04	1.342E-04	5.056E-05	9.856E-06	2.977E-21	3.872E-21
7.500E+00	8.000E+00	0.000E+00	1.288E-04	1.167E-04	6.305E-05	6.038E-07	2.734E-10	4.788E-23	6.312E-22
8.000E+00	9.000E+00	0.000E+00	5.610E-05	5.078E-05	2.801E-05	1.202E-07	2.521E-12	2.093E-23	2.760E-22
9.000E+00	1.000E+01	0.000E+00	1.574E-05	1.408E-05	7.277E-06	2.477E-08	5.081E-25	5.027E-24	6.627E-23
1.000E+01	1.200E+01	0.000E+00	2.646E-06	2.223E-06	7.995E-07	1.601E-09	4.725E-26	4.675E-25	6.164E-24
1.200E+01	1.400E+01	0.000E+00	2.332E-07	1.563E-07	3.627E-08	8.807E-12	1.782E-27	1.763E-26	2.325E-25
1.400E+01	1.700E+01	0.000E+00	5.303E-10	5.350E-10	3.259E-10	6.418E-14	1.558E-29	1.541E-28	2.032E-27
1.700E+01	2.000E+01	0.000E+00	4.730E-11	1.772E-11	4.880E-15	2.202E-20	1.749E-32	1.728E-31	2.278E-30
2.000E+01	3.000E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
3.000E+01	5.000E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Table C.25. Re-binned 48-Group Spectra for ^{238}U - Thermal Fission Yield Library

Lo (MeV)	Hi (MeV)	Char. Flux	10^{-2} s	10^{-1} s	10^{0} s	10^{1} s	10^{2} s	10^{3} s	10^{4} s
1.000E-03	1.000E-02	0.000E+00	5.244E-01	6.069E-01	8.253E-01	2.115E+00	1.499E+00	1.566E+00	6.916E-01
1.000E-02	2.000E-02	0.000E+00	2.111E+00	2.443E+00	3.059E+00	7.903E+00	5.666E+00	1.521E+00	8.261E-01
2.000E-02	3.000E-02	0.000E+00	3.157E-01	3.571E-01	4.888E-01	1.863E+00	2.252E+00	1.522E+00	2.255E+00
3.000E-02	4.500E-02	0.000E+00	9.994E-01	1.177E+00	1.617E+00	3.800E+00	2.353E+00	2.335E+00	1.426E+00
4.500E-02	6.000E-02	0.000E+00	3.240E-01	3.621E-01	3.694E-01	4.533E-01	6.845E-01	1.014E-01	1.291E-01
6.000E-02	8.000E-02	0.000E+00	3.668E-01	3.963E-01	3.902E-01	6.339E-01	1.592E+00	1.482E+00	2.818E-01
8.000E-02	1.000E-01	0.000E+00	6.173E-01	6.844E-01	6.061E-01	1.227E+00	1.721E+00	5.056E-01	3.962E-01
1.000E-01	1.500E-01	4.300E-01	1.471E+00	1.747E+00	1.892E+00	1.156E+00	7.016E-01	4.867E-01	3.955E-01
1.500E-01	2.000E-01	1.660E+00	5.785E-01	6.595E-01	7.532E-01	6.971E-01	8.619E-01	1.274E+00	9.701E-01
2.000E-01	3.000E-01	1.120E+00	7.235E-01	8.162E-01	8.610E-01	8.708E-01	7.498E-01	6.992E-01	5.490E-01
3.000E-01	4.000E-01	7.540E-01	6.259E-01	6.204E-01	5.049E-01	4.310E-01	8.890E-01	1.351E+00	3.022E-01
4.000E-01	4.500E-01	8.110E-01	6.205E-01	6.619E-01	6.627E-01	7.416E-01	5.296E-01	7.013E-01	6.955E-01
4.500E-01	5.000E-01	9.200E-01	4.584E-01	4.854E-01	5.977E-01	5.958E-01	3.870E-01	7.781E-01	6.665E-01
5.000E-01	5.250E-01	9.200E-01	2.911E-01	3.236E-01	4.252E-01	8.465E-01	2.979E-01	3.478E-01	2.020E-01
5.250E-01	6.000E-01	8.130E-01	5.820E-01	6.618E-01	8.285E-01	1.056E+00	6.019E-01	8.863E-01	8.409E-01
6.000E-01	7.000E-01	5.990E-01	5.797E-01	5.575E-01	5.302E-01	4.535E-01	6.972E-01	4.107E-01	7.902E-01
7.000E-01	8.000E-01	5.340E-01	3.089E-01	3.468E-01	3.902E-01	3.962E-01	3.803E-01	5.577E-01	7.312E-01
8.000E-01	9.000E-01	4.720E-01	1.377E+00	9.392E-01	6.592E-01	4.234E-01	3.354E-01	6.984E-01	1.925E+00
9.000E-01	1.000E+00	4.400E-01	3.174E-01	3.178E-01	3.390E-01	2.837E-01	4.529E-01	4.576E-01	3.897E-01
1.000E+00	1.125E+00	4.020E-01	2.888E-01	2.839E-01	2.972E-01	2.249E-01	2.243E-01	3.828E-01	3.543E-01
1.125E+00	1.200E+00	4.020E-01	2.228E-01	2.001E-01	1.637E-01	1.612E-01	1.596E-01	2.138E-01	3.228E-01
1.200E+00	1.330E+00	2.410E-01	3.023E-01	3.264E-01	3.875E-01	2.735E-01	4.252E-01	2.632E-01	1.266E-01
1.330E+00	1.500E+00	2.310E-01	1.508E-01	1.409E-01	1.311E-01	1.504E-01	2.639E-01	2.046E-01	4.201E-01
1.500E+00	1.660E+00	1.560E-01	1.614E-01	1.541E-01	1.555E-01	1.208E-01	1.254E-01	1.087E-01	8.438E-02
1.660E+00	1.875E+00	1.410E-01	1.232E-01	1.230E-01	1.195E-01	8.105E-02	8.061E-02	1.013E-01	1.221E-01
1.875E+00	2.000E+00	1.070E-01	1.089E-01	1.111E-01	1.052E-01	7.435E-02	8.043E-02	4.681E-02	4.310E-02
2.000E+00	2.333E+00	8.990E-02	1.075E-01	1.036E-01	8.252E-02	6.585E-02	7.303E-02	7.892E-02	5.414E-02
2.333E+00	2.500E+00	6.720E-02	1.212E-01	1.180E-01	9.865E-02	6.000E-02	4.457E-02	2.647E-02	8.598E-02
2.500E+00	2.666E+00	6.063E-02	8.952E-02	9.102E-02	8.375E-02	5.842E-02	6.462E-02	4.465E-02	6.064E-02
2.666E+00	3.000E+00	5.090E-02	7.667E-02	8.156E-02	7.686E-02	4.339E-02	4.078E-02	1.024E-02	1.302E-02
3.000E+00	3.500E+00	3.650E-02	4.443E-02	4.631E-02	4.570E-02	3.349E-02	1.918E-02	5.984E-03	6.470E-03
3.500E+00	4.000E+00	2.260E-02	2.286E-02	2.000E-02	1.525E-02	1.430E-02	1.510E-02	2.737E-03	2.445E-03
4.000E+00	4.500E+00	1.430E-02	2.174E-02	1.869E-02	1.257E-02	8.422E-03	1.224E-02	1.568E-03	3.801E-05
4.500E+00	5.000E+00	9.390E-03	8.633E-03	8.486E-03	6.978E-03	7.917E-03	2.647E-03	1.492E-04	6.722E-05
5.000E+00	5.500E+00	3.800E-03	9.048E-03	7.907E-03	5.681E-03	6.512E-03	3.534E-03	2.428E-04	6.795E-10
5.500E+00	6.000E+00	2.580E-03	4.836E-03	4.721E-03	3.323E-03	1.985E-03	7.582E-04	9.671E-06	1.413E-15
6.000E+00	6.500E+00	1.808E-03	3.232E-03	3.117E-03	2.128E-03	1.652E-03	6.264E-04	3.943E-06	9.307E-16
6.500E+00	7.000E+00	0.000E+00	1.111E-03	1.037E-03	5.612E-04	4.087E-05	2.376E-05	3.528E-09	1.026E-16
7.000E+00	7.500E+00	0.000E+00	5.693E-04	5.255E-04	2.750E-04	3.005E-05	5.415E-06	3.219E-18	4.972E-17
7.500E+00	8.000E+00	0.000E+00	2.990E-04	2.732E-04	1.361E-04	1.666E-06	2.237E-09	1.405E-18	2.171E-17
8.000E+00	9.000E+00	0.000E+00	1.254E-04	1.139E-04	5.470E-05	2.905E-07	2.013E-11	5.522E-19	8.535E-18
9.000E+00	1.000E+01	0.000E+00	3.086E-05	2.793E-05	1.179E-05	5.183E-08	9.717E-21	1.156E-19	1.787E-18
1.000E+01	1.200E+01	0.000E+00	4.492E-06	4.121E-06	1.174E-06	2.924E-09	9.500E-22	1.130E-20	1.747E-19
1.200E+01	1.400E+01	0.000E+00	6.354E-08	6.590E-08	4.252E-08	1.275E-11	4.042E-23	4.809E-22	7.433E-21
1.400E+01	1.700E+01	0.000E+00	4.969E-10	5.550E-10	3.836E-10	8.902E-14	3.633E-25	4.323E-24	6.682E-23
1.700E+01	2.000E+01	0.000E+00	1.109E-12	5.707E-13	5.543E-14	5.043E-19	1.500E-29	1.785E-28	2.759E-27
2.000E+01	3.000E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
3.000E+01	5.000E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Table C.26. Re-binned 48-Group Spectra for ^{238}U - Fast Fission Yield Library

Lo (MeV)	Hi (MeV)	Char. Flux	10^{-2} s	10^{-1} s	10^{0} s	10^{1} s	10^{2} s	10^{3} s	10^{4} s
1.000E-03	1.000E-02	0.000E+00	5.244E-01	6.069E-01	8.253E-01	2.115E+00	1.499E+00	1.566E+00	6.916E-01
1.000E-02	2.000E-02	0.000E+00	2.111E+00	2.443E+00	3.059E+00	7.903E+00	5.666E+00	1.521E+00	8.261E-01
2.000E-02	3.000E-02	0.000E+00	3.157E-01	3.571E-01	4.888E-01	1.863E+00	2.252E+00	1.522E+00	2.255E+00
3.000E-02	4.500E-02	0.000E+00	9.994E-01	1.177E+00	1.617E+00	3.800E+00	2.353E+00	2.335E+00	1.426E+00
4.500E-02	6.000E-02	0.000E+00	3.240E-01	3.621E-01	3.694E-01	4.533E-01	6.845E-01	1.014E-01	1.291E-01
6.000E-02	8.000E-02	0.000E+00	3.668E-01	3.963E-01	3.902E-01	6.339E-01	1.592E+00	1.482E+00	2.818E-01
8.000E-02	1.000E-01	0.000E+00	6.173E-01	6.844E-01	6.061E-01	1.227E+00	1.721E+00	5.056E-01	3.962E-01
1.000E-01	1.500E-01	4.300E-01	1.471E+00	1.747E+00	1.892E+00	1.156E+00	7.016E-01	4.867E-01	3.955E-01
1.500E-01	2.000E-01	1.660E+00	5.785E-01	6.595E-01	7.532E-01	6.971E-01	8.619E-01	1.274E+00	9.701E-01
2.000E-01	3.000E-01	1.120E+00	7.235E-01	8.162E-01	8.610E-01	8.708E-01	7.498E-01	6.992E-01	5.490E-01
3.000E-01	4.000E-01	7.540E-01	6.259E-01	6.204E-01	5.049E-01	4.310E-01	8.890E-01	1.351E+00	3.022E-01
4.000E-01	4.500E-01	8.110E-01	6.205E-01	6.619E-01	6.627E-01	7.416E-01	5.296E-01	7.013E-01	6.955E-01
4.500E-01	5.000E-01	9.200E-01	4.584E-01	4.854E-01	5.977E-01	5.958E-01	3.870E-01	7.781E-01	6.665E-01
5.000E-01	5.250E-01	9.200E-01	2.911E-01	3.236E-01	4.252E-01	8.465E-01	2.979E-01	3.478E-01	2.020E-01
5.250E-01	6.000E-01	8.130E-01	5.820E-01	6.618E-01	8.285E-01	1.056E+00	6.019E-01	8.863E-01	8.409E-01
6.000E-01	7.000E-01	5.990E-01	5.797E-01	5.575E-01	5.302E-01	4.535E-01	6.972E-01	4.107E-01	7.902E-01
7.000E-01	8.000E-01	5.340E-01	3.089E-01	3.468E-01	3.902E-01	3.962E-01	3.803E-01	5.577E-01	7.312E-01
8.000E-01	9.000E-01	4.720E-01	1.377E+00	9.392E-01	6.592E-01	4.234E-01	3.354E-01	6.984E-01	1.925E+00
9.000E-01	1.000E+00	4.400E-01	3.174E-01	3.178E-01	3.390E-01	2.837E-01	4.529E-01	4.576E-01	3.897E-01
1.000E+00	1.125E+00	4.020E-01	2.888E-01	2.839E-01	2.972E-01	2.249E-01	2.243E-01	3.828E-01	3.543E-01
1.125E+00	1.200E+00	4.020E-01	2.228E-01	2.001E-01	1.637E-01	1.612E-01	1.596E-01	2.138E-01	3.228E-01
1.200E+00	1.330E+00	2.410E-01	3.023E-01	3.264E-01	3.875E-01	2.735E-01	4.252E-01	2.632E-01	1.266E-01
1.330E+00	1.500E+00	2.310E-01	1.508E-01	1.409E-01	1.311E-01	1.504E-01	2.639E-01	2.046E-01	4.201E-01
1.500E+00	1.660E+00	1.560E-01	1.614E-01	1.541E-01	1.555E-01	1.208E-01	1.254E-01	1.087E-01	8.438E-02
1.660E+00	1.875E+00	1.410E-01	1.232E-01	1.230E-01	1.195E-01	8.105E-02	8.061E-02	1.013E-01	1.221E-01
1.875E+00	2.000E+00	1.070E-01	1.089E-01	1.111E-01	1.052E-01	7.435E-02	8.043E-02	4.681E-02	4.310E-02
2.000E+00	2.333E+00	8.990E-02	1.075E-01	1.036E-01	8.252E-02	6.585E-02	7.303E-02	7.892E-02	5.414E-02
2.333E+00	2.500E+00	6.720E-02	1.212E-01	1.180E-01	9.865E-02	6.000E-02	4.457E-02	2.647E-02	8.598E-02
2.500E+00	2.666E+00	6.063E-02	8.952E-02	9.102E-02	8.375E-02	5.842E-02	6.462E-02	4.465E-02	6.064E-02
2.666E+00	3.000E+00	5.090E-02	7.667E-02	8.156E-02	7.686E-02	4.339E-02	4.078E-02	1.024E-02	1.302E-02
3.000E+00	3.500E+00	3.650E-02	4.443E-02	4.631E-02	4.570E-02	3.349E-02	1.918E-02	5.984E-03	6.470E-03
3.500E+00	4.000E+00	2.260E-02	2.286E-02	2.000E-02	1.525E-02	1.430E-02	1.510E-02	2.737E-03	2.445E-03
4.000E+00	4.500E+00	1.430E-02	2.174E-02	1.869E-02	1.257E-02	8.422E-03	1.224E-02	1.568E-03	3.801E-05
4.500E+00	5.000E+00	9.390E-03	8.633E-03	8.486E-03	6.978E-03	7.917E-03	2.647E-03	1.492E-04	6.722E-05
5.000E+00	5.500E+00	3.800E-03	9.048E-03	7.907E-03	5.681E-03	6.512E-03	3.534E-03	2.428E-04	6.795E-10
5.500E+00	6.000E+00	2.580E-03	4.836E-03	4.721E-03	3.323E-03	1.985E-03	7.582E-04	9.671E-06	1.413E-15
6.000E+00	6.500E+00	1.808E-03	3.232E-03	3.117E-03	2.128E-03	1.652E-03	6.264E-04	3.943E-06	9.307E-16
6.500E+00	7.000E+00	0.000E+00	1.111E-03	1.037E-03	5.612E-04	4.087E-05	2.376E-05	3.528E-09	1.026E-16
7.000E+00	7.500E+00	0.000E+00	5.693E-04	5.255E-04	2.750E-04	3.005E-05	5.415E-06	3.219E-18	4.972E-17
7.500E+00	8.000E+00	0.000E+00	2.990E-04	2.732E-04	1.361E-04	1.666E-06	2.237E-09	1.405E-18	2.171E-17
8.000E+00	9.000E+00	0.000E+00	1.254E-04	1.139E-04	5.470E-05	2.905E-07	2.013E-11	5.522E-19	8.535E-18
9.000E+00	1.000E+01	0.000E+00	3.086E-05	2.793E-05	1.179E-05	5.183E-08	9.717E-21	1.156E-19	1.787E-18
1.000E+01	1.200E+01	0.000E+00	4.492E-06	4.121E-06	1.174E-06	2.924E-09	9.500E-22	1.130E-20	1.747E-19
1.200E+01	1.400E+01	0.000E+00	6.354E-08	6.590E-08	4.252E-08	1.275E-11	4.042E-23	4.809E-22	7.433E-21
1.400E+01	1.700E+01	0.000E+00	4.969E-10	5.550E-10	3.836E-10	8.902E-14	3.633E-25	4.323E-24	6.682E-23
1.700E+01	2.000E+01	0.000E+00	1.109E-12	5.707E-13	5.543E-14	5.043E-19	1.500E-29	1.785E-28	2.759E-27
2.000E+01	3.000E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
3.000E+01	5.000E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Table C.27. Re-binned 48-Group Spectra for ^{238}U - 14-MeV Fission Yield Library

Lo (MeV)	Hi (MeV)	Char. Flux	10^{-2} s	10^{-1} s	10^{0} s	10^{1} s	10^{2} s	10^{3} s	10^{4} s
1.000E-03	1.000E-02	0.000E+00	5.154E-01	5.814E-01	7.870E-01	1.992E+00	1.437E+00	1.521E+00	8.757E-01
1.000E-02	2.000E-02	0.000E+00	1.923E+00	2.171E+00	2.798E+00	7.850E+00	5.319E+00	1.558E+00	9.354E-01
2.000E-02	3.000E-02	0.000E+00	5.699E-01	6.429E-01	8.673E-01	2.124E+00	2.423E+00	2.197E+00	3.483E+00
3.000E-02	4.500E-02	0.000E+00	8.291E-01	9.464E-01	1.303E+00	3.253E+00	2.147E+00	2.163E+00	1.431E+00
4.500E-02	6.000E-02	0.000E+00	3.101E-01	3.403E-01	3.750E-01	4.393E-01	6.447E-01	1.430E-01	2.021E-01
6.000E-02	8.000E-02	0.000E+00	3.160E-01	3.348E-01	3.378E-01	5.817E-01	1.535E+00	1.578E+00	4.128E-01
8.000E-02	1.000E-01	0.000E+00	5.623E-01	6.059E-01	5.351E-01	1.088E+00	1.513E+00	4.254E-01	3.222E-01
1.000E-01	1.500E-01	4.300E-01	1.335E+00	1.535E+00	1.680E+00	1.186E+00	7.172E-01	4.237E-01	3.470E-01
1.500E-01	2.000E-01	1.660E+00	6.351E-01	6.919E-01	7.264E-01	7.090E-01	8.928E-01	1.326E+00	1.109E+00
2.000E-01	3.000E-01	1.120E+00	7.275E-01	7.934E-01	7.995E-01	8.694E-01	7.376E-01	6.303E-01	4.984E-01
3.000E-01	4.000E-01	7.540E-01	7.259E-01	7.313E-01	6.254E-01	4.668E-01	9.079E-01	1.304E+00	4.441E-01
4.000E-01	4.500E-01	8.110E-01	5.788E-01	6.023E-01	6.029E-01	7.100E-01	5.746E-01	6.428E-01	6.311E-01
4.500E-01	5.000E-01	9.200E-01	4.568E-01	4.850E-01	6.321E-01	6.684E-01	4.417E-01	7.722E-01	7.096E-01
5.000E-01	5.250E-01	9.200E-01	3.632E-01	4.008E-01	5.256E-01	7.715E-01	3.886E-01	3.719E-01	1.926E-01
5.250E-01	6.000E-01	8.130E-01	6.321E-01	6.963E-01	8.241E-01	9.409E-01	6.059E-01	8.484E-01	7.874E-01
6.000E-01	7.000E-01	5.990E-01	5.869E-01	5.691E-01	5.433E-01	4.542E-01	6.554E-01	4.146E-01	7.838E-01
7.000E-01	8.000E-01	5.340E-01	3.448E-01	3.756E-01	3.976E-01	3.992E-01	4.126E-01	6.341E-01	9.229E-01
8.000E-01	9.000E-01	4.720E-01	1.199E+00	8.527E-01	6.390E-01	4.475E-01	3.723E-01	7.721E-01	1.617E+00
9.000E-01	1.000E+00	4.400E-01	3.309E-01	3.380E-01	3.837E-01	2.850E-01	3.832E-01	4.604E-01	4.135E-01
1.000E+00	1.125E+00	4.020E-01	2.999E-01	3.005E-01	3.282E-01	2.539E-01	2.370E-01	4.049E-01	3.665E-01
1.125E+00	1.200E+00	4.020E-01	2.710E-01	2.669E-01	2.977E-01	3.150E-01	1.673E-01	2.099E-01	2.737E-01
1.200E+00	1.330E+00	2.410E-01	3.218E-01	3.406E-01	3.687E-01	2.474E-01	3.734E-01	2.779E-01	1.543E-01
1.330E+00	1.500E+00	2.310E-01	1.566E-01	1.509E-01	1.521E-01	1.665E-01	2.918E-01	1.886E-01	3.618E-01
1.500E+00	1.660E+00	1.560E-01	1.715E-01	1.675E-01	1.697E-01	1.299E-01	1.454E-01	1.023E-01	7.974E-02
1.660E+00	1.875E+00	1.410E-01	1.268E-01	1.274E-01	1.246E-01	8.385E-02	8.528E-02	9.293E-02	1.083E-01
1.875E+00	2.000E+00	1.070E-01	1.121E-01	1.129E-01	9.945E-02	7.698E-02	8.742E-02	4.557E-02	4.086E-02
2.000E+00	2.333E+00	8.990E-02	1.008E-01	9.721E-02	7.932E-02	6.098E-02	6.947E-02	7.357E-02	5.181E-02
2.333E+00	2.500E+00	6.720E-02	1.149E-01	1.102E-01	8.441E-02	5.524E-02	4.472E-02	2.637E-02	8.155E-02
2.500E+00	2.666E+00	6.063E-02	8.396E-02	8.304E-02	6.944E-02	4.906E-02	6.018E-02	4.354E-02	5.415E-02
2.666E+00	3.000E+00	5.090E-02	7.783E-02	8.014E-02	6.777E-02	4.241E-02	4.410E-02	1.048E-02	1.215E-02
3.000E+00	3.500E+00	3.650E-02	4.709E-02	4.811E-02	4.373E-02	3.176E-02	1.858E-02	5.957E-03	5.813E-03
3.500E+00	4.000E+00	2.260E-02	2.232E-02	1.996E-02	1.548E-02	1.402E-02	1.576E-02	3.039E-03	2.260E-03
4.000E+00	4.500E+00	1.430E-02	1.783E-02	1.540E-02	1.118E-02	8.116E-03	1.271E-02	1.569E-03	4.045E-05
4.500E+00	5.000E+00	9.390E-03	8.234E-03	7.940E-03	6.344E-03	7.489E-03	2.902E-03	1.598E-04	7.017E-05
5.000E+00	5.500E+00	3.800E-03	8.313E-03	7.234E-03	5.086E-03	6.355E-03	4.095E-03	2.297E-04	6.287E-10
5.500E+00	6.000E+00	2.580E-03	4.555E-03	4.308E-03	2.782E-03	1.802E-03	8.367E-04	8.614E-06	1.424E-15
6.000E+00	6.500E+00	1.808E-03	3.034E-03	2.849E-03	1.854E-03	1.500E-03	4.548E-04	2.322E-06	9.423E-16
6.500E+00	7.000E+00	0.000E+00	9.546E-04	8.648E-04	4.394E-04	3.185E-05	3.224E-05	4.298E-09	1.002E-16
7.000E+00	7.500E+00	0.000E+00	4.802E-04	4.303E-04	2.170E-04	3.132E-05	6.225E-06	3.357E-18	4.861E-17
7.500E+00	8.000E+00	0.000E+00	2.457E-04	2.180E-04	1.067E-04	1.214E-06	1.077E-09	1.465E-18	2.123E-17
8.000E+00	9.000E+00	0.000E+00	1.020E-04	9.051E-05	4.426E-05	2.158E-07	9.786E-12	5.759E-19	8.343E-18
9.000E+00	1.000E+01	0.000E+00	2.571E-05	2.297E-05	1.044E-05	4.015E-08	1.125E-20	1.206E-19	1.747E-18
1.000E+01	1.200E+01	0.000E+00	3.901E-06	3.509E-06	1.135E-06	2.399E-09	1.100E-21	1.179E-20	1.708E-19
1.200E+01	1.400E+01	0.000E+00	1.142E-07	9.941E-08	4.846E-08	1.349E-11	4.678E-23	5.016E-22	7.266E-21
1.400E+01	1.700E+01	0.000E+00	6.006E-10	6.491E-10	4.376E-10	1.002E-13	4.205E-25	4.509E-24	6.532E-23
1.700E+01	2.000E+01	0.000E+00	1.017E-11	4.117E-12	5.570E-14	2.451E-18	1.737E-29	1.862E-28	2.697E-27
2.000E+01	3.000E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
3.000E+01	5.000E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Table C.28. Re-binned 48-Group Spectra for ^{239}Pu - Thermal Fission Yield Library

Lo (MeV)	Hi (MeV)	Char. Flux	10^{-2} s	10^{-1} s	10^{0} s	10^{1} s	10^{2} s	10^{3} s	10^{4} s
1.000E-03	1.000E-02	0.000E+00	8.711E-01	9.083E-01	1.156E+00	2.354E+00	1.591E+00	1.502E+00	7.923E-01
1.000E-02	2.000E-02	0.000E+00	4.165E+00	4.344E+00	5.368E+00	1.079E+01	6.841E+00	8.251E-01	3.168E-01
2.000E-02	3.000E-02	0.000E+00	7.000E-01	7.381E-01	1.026E+00	2.612E+00	2.638E+00	1.678E+00	2.872E+00
3.000E-02	4.500E-02	0.000E+00	1.347E+00	1.389E+00	1.683E+00	3.471E+00	2.236E+00	2.137E+00	1.412E+00
4.500E-02	6.000E-02	0.000E+00	2.950E-01	3.034E-01	3.453E-01	5.016E-01	8.804E-01	1.340E-01	1.537E-01
6.000E-02	8.000E-02	0.000E+00	3.123E-01	3.226E-01	3.919E-01	8.399E-01	1.802E+00	3.600E-01	1.032E-01
8.000E-02	1.000E-01	0.000E+00	4.395E-01	4.501E-01	5.239E-01	1.314E+00	1.632E+00	4.642E-01	3.479E-01
1.000E-01	1.500E-01	4.300E-01	1.412E+00	1.442E+00	1.370E+00	1.094E+00	7.264E-01	5.378E-01	2.978E-01
1.500E-01	2.000E-01	1.660E+00	8.106E-01	8.350E-01	8.902E-01	7.647E-01	9.316E-01	1.303E+00	9.114E-01
2.000E-01	3.000E-01	1.120E+00	7.612E-01	7.617E-01	7.276E-01	9.234E-01	8.082E-01	7.012E-01	5.323E-01
3.000E-01	4.000E-01	7.540E-01	5.294E-01	5.156E-01	4.389E-01	4.473E-01	1.001E+00	1.516E+00	3.992E-01
4.000E-01	4.500E-01	8.110E-01	5.900E-01	5.998E-01	6.428E-01	7.821E-01	6.407E-01	6.887E-01	6.118E-01
4.500E-01	5.000E-01	9.200E-01	7.966E-01	8.273E-01	9.974E-01	5.958E-01	4.749E-01	8.222E-01	7.253E-01
5.000E-01	5.250E-01	9.200E-01	4.219E-01	4.394E-01	5.515E-01	9.010E-01	3.733E-01	3.712E-01	2.380E-01
5.250E-01	6.000E-01	8.130E-01	1.071E+00	1.113E+00	1.309E+00	1.057E+00	5.710E-01	9.155E-01	8.046E-01
6.000E-01	7.000E-01	5.990E-01	5.793E-01	5.794E-01	5.878E-01	4.792E-01	6.400E-01	4.295E-01	8.914E-01
7.000E-01	8.000E-01	5.340E-01	3.123E-01	3.181E-01	3.335E-01	3.574E-01	3.913E-01	5.409E-01	8.680E-01
8.000E-01	9.000E-01	4.720E-01	9.033E-01	8.155E-01	5.888E-01	3.439E-01	3.553E-01	7.886E-01	1.799E+00
9.000E-01	1.000E+00	4.400E-01	3.832E-01	3.894E-01	4.083E-01	3.072E-01	3.663E-01	4.505E-01	4.267E-01
1.000E+00	1.125E+00	4.020E-01	3.649E-01	3.692E-01	3.722E-01	2.127E-01	2.144E-01	3.637E-01	3.530E-01
1.125E+00	1.200E+00	4.020E-01	1.559E-01	1.537E-01	1.589E-01	1.643E-01	1.553E-01	2.298E-01	3.163E-01
1.200E+00	1.330E+00	2.410E-01	4.064E-01	4.087E-01	3.809E-01	2.274E-01	3.090E-01	2.399E-01	1.327E-01
1.330E+00	1.500E+00	2.310E-01	1.052E-01	1.039E-01	1.070E-01	1.304E-01	2.504E-01	2.140E-01	3.717E-01
1.500E+00	1.660E+00	1.560E-01	1.507E-01	1.492E-01	1.416E-01	1.174E-01	1.043E-01	1.173E-01	7.988E-02
1.660E+00	1.875E+00	1.410E-01	1.114E-01	1.109E-01	1.059E-01	6.492E-02	7.492E-02	1.038E-01	1.163E-01
1.875E+00	2.000E+00	1.070E-01	8.340E-02	8.266E-02	7.935E-02	6.572E-02	7.694E-02	4.682E-02	4.697E-02
2.000E+00	2.333E+00	8.990E-02	5.895E-02	5.721E-02	5.171E-02	4.748E-02	6.358E-02	7.864E-02	5.405E-02
2.333E+00	2.500E+00	6.720E-02	7.633E-02	7.287E-02	5.405E-02	3.749E-02	3.135E-02	2.520E-02	7.956E-02
2.500E+00	2.666E+00	6.063E-02	5.306E-02	5.164E-02	4.324E-02	3.417E-02	4.452E-02	4.181E-02	6.215E-02
2.666E+00	3.000E+00	5.090E-02	6.718E-02	6.569E-02	5.104E-02	3.411E-02	3.951E-02	1.043E-02	1.430E-02
3.000E+00	3.500E+00	3.650E-02	4.144E-02	4.079E-02	3.527E-02	2.335E-02	1.663E-02	6.345E-03	6.994E-03
3.500E+00	4.000E+00	2.260E-02	1.067E-02	1.003E-02	9.472E-03	9.839E-03	1.034E-02	2.172E-03	2.581E-03
4.000E+00	4.500E+00	1.430E-02	1.102E-02	1.022E-02	7.488E-03	4.815E-03	7.299E-03	9.582E-04	2.841E-05
4.500E+00	5.000E+00	9.390E-03	4.151E-03	4.002E-03	4.281E-03	4.488E-03	1.440E-03	1.153E-04	4.540E-05
5.000E+00	5.500E+00	3.800E-03	3.639E-03	3.358E-03	3.464E-03	3.945E-03	1.992E-03	1.239E-04	6.561E-10
5.500E+00	6.000E+00	2.580E-03	1.662E-03	1.503E-03	1.365E-03	1.149E-03	4.206E-04	4.657E-06	3.421E-16
6.000E+00	6.500E+00	1.808E-03	1.207E-03	1.090E-03	1.043E-03	9.891E-04	2.658E-04	1.336E-06	2.300E-16
6.500E+00	7.000E+00	0.000E+00	2.254E-04	1.642E-04	7.919E-05	1.724E-05	1.551E-05	1.960E-09	5.771E-18
7.000E+00	7.500E+00	0.000E+00	1.071E-04	7.375E-05	3.199E-05	1.492E-05	2.275E-06	1.969E-19	2.990E-18
7.500E+00	8.000E+00	0.000E+00	5.220E-05	3.355E-05	1.110E-05	4.145E-07	4.416E-10	4.236E-20	6.453E-19
8.000E+00	9.000E+00	0.000E+00	2.055E-05	1.267E-05	3.725E-06	1.939E-08	4.013E-12	1.506E-20	2.294E-19
9.000E+00	1.000E+01	0.000E+00	4.153E-06	2.489E-06	6.867E-07	1.965E-09	2.910E-22	2.983E-21	4.545E-20
1.000E+01	1.200E+01	0.000E+00	3.144E-07	1.993E-07	5.981E-08	1.167E-10	2.533E-23	2.596E-22	3.955E-21
1.200E+01	1.400E+01	0.000E+00	6.308E-09	5.575E-09	2.776E-09	5.378E-13	9.858E-25	1.010E-23	1.539E-22
1.400E+01	1.700E+01	0.000E+00	4.799E-11	4.635E-11	2.505E-11	3.761E-15	8.545E-27	8.759E-26	1.334E-24
1.700E+01	2.000E+01	0.000E+00	8.610E-14	2.923E-14	5.307E-17	2.846E-21	6.677E-30	6.843E-29	1.043E-27
2.000E+01	3.000E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
3.000E+01	5.000E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Table C.29. Re-binned 48-Group Spectra for ^{239}Pu - Fast Fission Yield Library

Lo (MeV)	Hi (MeV)	Char. Flux	10^{-2} s	10^{-1} s	10^{0} s	10^{1} s	10^{2} s	10^{3} s	10^{4} s
1.000E-03	1.000E-02	0.000E+00	8.568E-01	9.004E-01	1.144E+00	2.382E+00	1.622E+00	1.533E+00	8.142E-01
1.000E-02	2.000E-02	0.000E+00	4.086E+00	4.293E+00	5.331E+00	1.117E+01	7.181E+00	8.641E-01	3.253E-01
2.000E-02	3.000E-02	0.000E+00	7.189E-01	7.639E-01	1.053E+00	2.687E+00	2.610E+00	1.741E+00	3.007E+00
3.000E-02	4.500E-02	0.000E+00	1.326E+00	1.376E+00	1.653E+00	3.417E+00	2.249E+00	2.128E+00	1.451E+00
4.500E-02	6.000E-02	0.000E+00	2.877E-01	2.997E-01	3.439E-01	5.058E-01	9.107E-01	1.399E-01	1.685E-01
6.000E-02	8.000E-02	0.000E+00	3.124E-01	3.260E-01	3.959E-01	8.492E-01	1.887E+00	3.628E-01	1.246E-01
8.000E-02	1.000E-01	0.000E+00	4.583E-01	4.710E-01	5.243E-01	1.289E+00	1.635E+00	4.675E-01	3.484E-01
1.000E-01	1.500E-01	4.300E-01	1.460E+00	1.503E+00	1.419E+00	1.106E+00	7.273E-01	5.299E-01	2.922E-01
1.500E-01	2.000E-01	1.660E+00	8.128E-01	8.426E-01	8.895E-01	7.513E-01	9.415E-01	1.311E+00	9.412E-01
2.000E-01	3.000E-01	1.120E+00	7.888E-01	7.948E-01	7.523E-01	9.209E-01	7.947E-01	6.840E-01	5.453E-01
3.000E-01	4.000E-01	7.540E-01	4.769E-01	4.672E-01	4.226E-01	4.328E-01	9.619E-01	1.532E+00	4.188E-01
4.000E-01	4.500E-01	8.110E-01	5.576E-01	5.692E-01	6.193E-01	7.668E-01	6.242E-01	6.483E-01	6.160E-01
4.500E-01	5.000E-01	9.200E-01	8.224E-01	8.570E-01	1.013E+00	5.864E-01	4.566E-01	8.130E-01	7.349E-01
5.000E-01	5.250E-01	9.200E-01	4.036E-01	4.235E-01	5.311E-01	8.725E-01	3.782E-01	3.985E-01	2.274E-01
5.250E-01	6.000E-01	8.130E-01	1.093E+00	1.142E+00	1.321E+00	1.022E+00	5.772E-01	9.442E-01	7.985E-01
6.000E-01	7.000E-01	5.990E-01	5.544E-01	5.524E-01	5.655E-01	4.816E-01	6.269E-01	4.190E-01	8.689E-01
7.000E-01	8.000E-01	5.340E-01	3.002E-01	3.085E-01	3.241E-01	3.539E-01	3.959E-01	5.486E-01	8.750E-01
8.000E-01	9.000E-01	4.720E-01	9.984E-01	8.685E-01	6.117E-01	3.494E-01	3.489E-01	7.850E-01	1.767E+00
9.000E-01	1.000E+00	4.400E-01	3.938E-01	4.002E-01	4.165E-01	3.043E-01	3.216E-01	4.383E-01	4.421E-01
1.000E+00	1.125E+00	4.020E-01	3.684E-01	3.727E-01	3.742E-01	2.125E-01	2.160E-01	3.663E-01	3.489E-01
1.125E+00	1.200E+00	4.020E-01	1.632E-01	1.596E-01	1.658E-01	1.727E-01	1.520E-01	2.293E-01	3.061E-01
1.200E+00	1.330E+00	2.410E-01	3.903E-01	3.936E-01	3.667E-01	2.249E-01	3.316E-01	2.403E-01	1.280E-01
1.330E+00	1.500E+00	2.310E-01	1.046E-01	1.027E-01	1.070E-01	1.303E-01	2.496E-01	2.150E-01	3.681E-01
1.500E+00	1.660E+00	1.560E-01	1.489E-01	1.469E-01	1.407E-01	1.191E-01	1.061E-01	1.207E-01	7.936E-02
1.660E+00	1.875E+00	1.410E-01	1.053E-01	1.050E-01	1.009E-01	6.402E-02	7.430E-02	1.015E-01	1.135E-01
1.875E+00	2.000E+00	1.070E-01	8.486E-02	8.458E-02	8.189E-02	6.531E-02	7.606E-02	4.712E-02	4.619E-02
2.000E+00	2.333E+00	8.990E-02	5.935E-02	5.752E-02	5.237E-02	4.881E-02	6.616E-02	7.731E-02	5.335E-02
2.333E+00	2.500E+00	6.720E-02	7.404E-02	7.066E-02	5.425E-02	3.893E-02	3.373E-02	2.498E-02	7.823E-02
2.500E+00	2.666E+00	6.063E-02	5.358E-02	5.241E-02	4.458E-02	3.588E-02	4.788E-02	4.188E-02	6.085E-02
2.666E+00	3.000E+00	5.090E-02	6.259E-02	6.194E-02	4.974E-02	3.537E-02	4.044E-02	1.036E-02	1.397E-02
3.000E+00	3.500E+00	3.650E-02	3.796E-02	3.797E-02	3.445E-02	2.421E-02	1.728E-02	6.468E-03	6.838E-03
3.500E+00	4.000E+00	2.260E-02	1.035E-02	9.767E-03	9.561E-03	1.018E-02	1.097E-02	2.154E-03	2.519E-03
4.000E+00	4.500E+00	1.430E-02	1.019E-02	9.387E-03	6.973E-03	4.822E-03	7.928E-03	9.732E-04	2.882E-05
4.500E+00	5.000E+00	9.390E-03	3.849E-03	3.914E-03	4.349E-03	4.820E-03	1.652E-03	1.106E-04	4.604E-05
5.000E+00	5.500E+00	3.800E-03	3.459E-03	3.303E-03	3.536E-03	4.247E-03	2.207E-03	1.315E-04	6.427E-10
5.500E+00	6.000E+00	2.580E-03	1.468E-03	1.476E-03	1.437E-03	1.228E-03	4.694E-04	5.065E-06	3.192E-16
6.000E+00	6.500E+00	1.808E-03	1.069E-03	1.083E-03	1.111E-03	1.077E-03	3.361E-04	1.719E-06	5.179E-16
6.500E+00	7.000E+00	0.000E+00	1.687E-04	1.606E-04	1.049E-04	1.744E-05	1.607E-05	2.009E-09	5.780E-18
7.000E+00	7.500E+00	0.000E+00	7.455E-05	7.043E-05	4.538E-05	1.579E-05	2.457E-06	1.953E-19	2.995E-18
7.500E+00	8.000E+00	0.000E+00	3.297E-05	3.069E-05	1.775E-05	4.428E-07	3.440E-10	4.200E-20	6.463E-19
8.000E+00	9.000E+00	0.000E+00	1.219E-05	1.127E-05	6.330E-06	2.803E-08	3.154E-12	1.493E-20	2.297E-19
9.000E+00	1.000E+01	0.000E+00	2.473E-06	2.270E-06	1.229E-06	3.565E-09	2.924E-22	2.958E-21	4.551E-20
1.000E+01	1.200E+01	0.000E+00	2.498E-07	2.261E-07	1.081E-07	2.070E-10	2.545E-23	2.574E-22	3.961E-21
1.200E+01	1.400E+01	0.000E+00	1.171E-08	1.042E-08	4.952E-09	9.504E-13	9.905E-25	1.002E-23	1.542E-22
1.400E+01	1.700E+01	0.000E+00	8.610E-11	8.369E-11	4.469E-11	6.684E-15	8.586E-27	8.684E-26	1.336E-24
1.700E+01	2.000E+01	0.000E+00	6.737E-13	2.380E-13	5.393E-17	2.254E-20	6.707E-30	6.787E-29	1.044E-27
2.000E+01	3.000E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
3.000E+01	5.000E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Table C.30. Re-binned 48-Group Spectra for ^{239}Pu - 14-MeV Fission Yield Library

Lo (MeV)	Hi (MeV)	Char. Flux	10^{-2} s	10^{-1} s	10^{0} s	10^{1} s	10^{2} s	10^{3} s	10^{4} s
1.000E-03	1.000E-02	0.000E+00	7.326E-01	7.614E-01	9.061E-01	1.927E+00	1.546E+00	1.523E+00	1.104E+00
1.000E-02	2.000E-02	0.000E+00	2.874E+00	3.092E+00	4.235E+00	9.532E+00	6.296E+00	8.291E-01	5.092E-01
2.000E-02	3.000E-02	0.000E+00	1.013E+00	1.098E+00	1.585E+00	3.211E+00	3.128E+00	2.299E+00	3.820E+00
3.000E-02	4.500E-02	0.000E+00	1.225E+00	1.202E+00	1.002E+00	2.155E+00	1.919E+00	1.953E+00	1.312E+00
4.500E-02	6.000E-02	0.000E+00	2.506E-01	2.655E-01	3.234E-01	4.285E-01	8.404E-01	1.788E-01	1.865E-01
6.000E-02	8.000E-02	0.000E+00	2.261E-01	2.378E-01	2.979E-01	6.855E-01	1.598E+00	3.460E-01	1.978E-01
8.000E-02	1.000E-01	0.000E+00	3.141E-01	3.284E-01	3.866E-01	1.057E+00	1.452E+00	3.448E-01	2.378E-01
1.000E-01	1.500E-01	4.300E-01	1.044E+00	1.112E+00	1.247E+00	1.152E+00	7.574E-01	4.947E-01	2.430E-01
1.500E-01	2.000E-01	1.660E+00	6.514E-01	6.838E-01	7.590E-01	6.595E-01	8.916E-01	1.305E+00	1.142E+00
2.000E-01	3.000E-01	1.120E+00	9.456E-01	9.314E-01	7.350E-01	9.034E-01	7.817E-01	5.501E-01	5.033E-01
3.000E-01	4.000E-01	7.540E-01	5.594E-01	5.639E-01	5.683E-01	4.936E-01	1.011E+00	1.505E+00	5.228E-01
4.000E-01	4.500E-01	8.110E-01	4.246E-01	4.384E-01	5.131E-01	6.606E-01	6.955E-01	5.638E-01	5.331E-01
4.500E-01	5.000E-01	9.200E-01	6.164E-01	6.559E-01	8.809E-01	6.682E-01	4.956E-01	7.713E-01	6.693E-01
5.000E-01	5.250E-01	9.200E-01	3.942E-01	4.242E-01	5.653E-01	7.621E-01	5.445E-01	4.331E-01	3.469E-01
5.250E-01	6.000E-01	8.130E-01	8.677E-01	9.222E-01	1.138E+00	8.602E-01	5.868E-01	9.583E-01	7.484E-01
6.000E-01	7.000E-01	5.990E-01	5.040E-01	5.113E-01	5.923E-01	5.322E-01	5.557E-01	4.842E-01	1.037E+00
7.000E-01	8.000E-01	5.340E-01	2.856E-01	2.996E-01	3.461E-01	3.919E-01	4.466E-01	6.696E-01	1.145E+00
8.000E-01	9.000E-01	4.720E-01	1.685E+00	1.468E+00	6.803E-01	3.817E-01	3.900E-01	8.756E-01	1.340E+00
9.000E-01	1.000E+00	4.400E-01	3.875E-01	4.041E-01	4.865E-01	3.921E-01	2.838E-01	3.962E-01	4.085E-01
1.000E+00	1.125E+00	4.020E-01	3.497E-01	3.608E-01	4.116E-01	2.752E-01	2.358E-01	3.984E-01	3.709E-01
1.125E+00	1.200E+00	4.020E-01	3.508E-01	3.655E-01	4.615E-01	4.258E-01	1.659E-01	2.127E-01	2.512E-01
1.200E+00	1.330E+00	2.410E-01	2.989E-01	3.076E-01	3.228E-01	2.105E-01	2.949E-01	2.687E-01	1.937E-01
1.330E+00	1.500E+00	2.310E-01	1.301E-01	1.316E-01	1.534E-01	1.525E-01	2.617E-01	2.000E-01	3.145E-01
1.500E+00	1.660E+00	1.560E-01	1.471E-01	1.479E-01	1.571E-01	1.310E-01	1.350E-01	1.197E-01	7.708E-02
1.660E+00	1.875E+00	1.410E-01	9.523E-02	9.620E-02	1.008E-01	6.931E-02	7.714E-02	8.683E-02	9.634E-02
1.875E+00	2.000E+00	1.070E-01	6.618E-02	6.635E-02	6.863E-02	7.166E-02	8.248E-02	4.625E-02	4.139E-02
2.000E+00	2.333E+00	8.990E-02	5.822E-02	5.691E-02	5.485E-02	5.014E-02	6.272E-02	6.764E-02	4.846E-02
2.333E+00	2.500E+00	6.720E-02	6.575E-02	6.318E-02	5.232E-02	4.203E-02	3.975E-02	2.665E-02	7.401E-02
2.500E+00	2.666E+00	6.063E-02	5.023E-02	4.929E-02	4.322E-02	3.556E-02	4.762E-02	4.308E-02	4.663E-02
2.666E+00	3.000E+00	5.090E-02	5.589E-02	5.601E-02	4.840E-02	3.762E-02	4.375E-02	1.164E-02	1.122E-02
3.000E+00	3.500E+00	3.650E-02	3.536E-02	3.574E-02	3.450E-02	2.505E-02	1.620E-02	7.090E-03	5.030E-03
3.500E+00	4.000E+00	2.260E-02	1.192E-02	1.126E-02	1.079E-02	1.079E-02	1.142E-02	2.757E-03	1.910E-03
4.000E+00	4.500E+00	1.430E-02	9.995E-03	9.219E-03	7.395E-03	5.807E-03	8.548E-03	1.110E-03	3.193E-05
4.500E+00	5.000E+00	9.390E-03	4.442E-03	4.451E-03	4.736E-03	5.944E-03	2.312E-03	1.492E-04	6.625E-05
5.000E+00	5.500E+00	3.800E-03	4.109E-03	3.863E-03	3.865E-03	5.498E-03	3.265E-03	1.316E-04	5.537E-10
5.500E+00	6.000E+00	2.580E-03	1.962E-03	1.907E-03	1.581E-03	1.389E-03	6.849E-04	4.853E-06	4.099E-16
6.000E+00	6.500E+00	1.808E-03	1.384E-03	1.360E-03	1.244E-03	1.196E-03	2.811E-04	1.114E-06	5.393E-15
6.500E+00	7.000E+00	0.000E+00	3.075E-04	2.852E-04	1.703E-04	1.912E-05	2.916E-05	3.369E-09	6.250E-18
7.000E+00	7.500E+00	0.000E+00	1.529E-04	1.416E-04	8.895E-05	2.879E-05	4.983E-06	2.368E-19	3.238E-18
7.500E+00	8.000E+00	0.000E+00	7.535E-05	6.907E-05	4.134E-05	5.118E-07	1.658E-10	5.083E-20	6.989E-19
8.000E+00	9.000E+00	0.000E+00	3.263E-05	2.985E-05	1.796E-05	7.820E-08	1.569E-12	1.807E-20	2.484E-19
9.000E+00	1.000E+01	0.000E+00	8.685E-06	7.866E-06	4.462E-06	1.525E-08	3.823E-22	3.580E-21	4.922E-20
1.000E+01	1.200E+01	0.000E+00	1.237E-06	1.072E-06	4.571E-07	9.679E-10	3.327E-23	3.116E-22	4.284E-21
1.200E+01	1.400E+01	0.000E+00	7.598E-08	5.614E-08	1.984E-08	4.605E-12	1.295E-24	1.213E-23	1.667E-22
1.400E+01	1.700E+01	0.000E+00	2.886E-10	2.887E-10	1.783E-10	3.221E-14	1.122E-26	1.051E-25	1.445E-24
1.700E+01	2.000E+01	0.000E+00	1.087E-11	4.040E-12	1.706E-15	4.730E-21	8.770E-30	8.213E-29	1.129E-27
2.000E+01	3.000E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
3.000E+01	5.000E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

C.4 Tabulated 17-Group Gamma-ray Spectra Data for Fisher and Engle Comparison

The tables included below represent the data used to generate Figs. 7, 8, 10, 11, 15, 16, 18, 19, 23, and 24. The tables are ordered by material where each material has five tables for the time intervals recorded by Fisher and Engle: 0.2 - 0.5, 1.0 - 2.0, 4.0 - 5.5, 10 - 13, and 35 - 45 seconds. The first two columns give the low and high energy bin edges. As in the figures, F/E denotes Fisher and Engle data [2, 3], L/P denotes this work, and Durkee is from the data in Ref. [15]. The Abs. columns represent the absolute spectra (Figs. 7, 10, 15, 18, and 23) whereas Rel. represents the relative spectra, in Figs. 8, 11, 16, 19, and 24, which is computed by taking each energy bin value in the absolute spectra and dividing it by that energy bin value in the absolute $t = 0.2 - 0.5$ second spectra. Therefore, all of the relative spectra for $t = 0.2 - 0.5$ seconds are equal to unity. Note: the Durkee, *et al.* study focused solely on ^{235}U.

Table C.31. 17-Group Spectra for ^{232}Th at $t = 0.2 - 0.5$ seconds.

Lo (MeV)	Hi (MeV)	F/E Abs.	L/P Abs.	F/E Rel.	L/P Rel.
1.370E-01	2.130E-01	2.320E+00	6.448E-02	1.000E+00	1.000E+00
2.130E-01	3.090E-01	1.190E+00	6.303E-02	1.000E+00	1.000E+00
3.090E-01	4.280E-01	8.050E-01	7.283E-02	1.000E+00	1.000E+00
4.280E-01	5.750E-01	6.510E-01	8.069E-02	1.000E+00	1.000E+00
5.750E-01	7.490E-01	5.040E-01	7.952E-02	1.000E+00	1.000E+00
7.490E-01	9.540E-01	4.190E-01	9.626E-02	1.000E+00	1.000E+00
9.540E-01	1.195E+00	2.850E-01	5.557E-02	1.000E+00	1.000E+00
1.195E+00	1.478E+00	1.900E-01	6.756E-02	1.000E+00	1.000E+00
1.478E+00	1.808E+00	1.300E-01	4.106E-02	1.000E+00	1.000E+00
1.808E+00	2.189E+00	1.060E-01	3.490E-02	1.000E+00	1.000E+00
2.189E+00	2.620E+00	7.820E-02	3.866E-02	1.000E+00	1.000E+00
2.620E+00	3.110E+00	5.360E-02	3.098E-02	1.000E+00	1.000E+00
3.110E+00	3.655E+00	3.130E-02	1.947E-02	1.000E+00	1.000E+00
3.655E+00	4.257E+00	1.910E-02	8.086E-03	1.000E+00	1.000E+00
4.257E+00	4.918E+00	1.350E-02	6.328E-03	1.000E+00	1.000E+00
4.918E+00	5.636E+00	4.240E-03	2.544E-03	1.000E+00	1.000E+00
5.636E+00	6.419E+00	5.880E-03	1.155E-03	1.000E+00	1.000E+00

Table C.32. 17-Group Spectra for ^{232}Th at $t = 1.0 - 2.0$ seconds.

Lo (MeV)	Hi (MeV)	F/E Abs.	L/P Abs.	F/E Rel.	L/P Rel.
1.370E-01	2.130E-01	9.790E-01	3.398E-02	4.220E-01	5.270E-01
2.130E-01	3.090E-01	5.490E-01	3.632E-02	4.613E-01	5.762E-01
3.090E-01	4.280E-01	3.590E-01	3.278E-02	4.460E-01	4.501E-01
4.280E-01	5.750E-01	3.400E-01	4.657E-02	5.223E-01	5.772E-01
5.750E-01	7.490E-01	2.490E-01	4.376E-02	4.940E-01	5.504E-01
7.490E-01	9.540E-01	2.110E-01	5.244E-02	5.036E-01	5.447E-01
9.540E-01	1.195E+00	1.660E-01	3.331E-02	5.825E-01	5.994E-01
1.195E+00	1.478E+00	1.150E-01	3.945E-02	6.053E-01	5.839E-01
1.478E+00	1.808E+00	7.880E-02	2.187E-02	6.062E-01	5.326E-01
1.808E+00	2.189E+00	5.910E-02	1.841E-02	5.575E-01	5.276E-01
2.189E+00	2.620E+00	4.230E-02	1.771E-02	5.409E-01	4.582E-01
2.620E+00	3.110E+00	3.070E-02	1.404E-02	5.728E-01	4.533E-01
3.110E+00	3.655E+00	1.820E-02	1.000E-02	5.815E-01	5.137E-01
3.655E+00	4.257E+00	1.170E-02	3.965E-03	6.126E-01	4.903E-01
4.257E+00	4.918E+00	7.780E-03	3.346E-03	5.763E-01	5.287E-01
4.918E+00	5.636E+00	2.700E-03	1.473E-03	6.368E-01	5.793E-01
5.636E+00	6.419E+00	2.410E-03	6.068E-04	4.099E-01	5.256E-01

Table C.33. 17-Group Spectra for ^{232}Th at $t = 4.0 - 5.5$ seconds.

Lo (MeV)	Hi (MeV)	F/E Abs.	L/P Abs.	F/E Rel.	L/P Rel.
1.370E-01	2.130E-01	6.520E-01	1.222E-02	2.810E-01	1.895E-01
2.130E-01	3.090E-01	3.200E-01	1.493E-02	2.689E-01	2.368E-01
3.090E-01	4.280E-01	2.200E-01	1.273E-02	2.733E-01	1.748E-01
4.280E-01	5.750E-01	1.880E-01	2.115E-02	2.888E-01	2.621E-01
5.750E-01	7.490E-01	1.520E-01	1.856E-02	3.016E-01	2.334E-01
7.490E-01	9.540E-01	1.050E-01	2.066E-02	2.506E-01	2.146E-01
9.540E-01	1.195E+00	7.310E-02	1.350E-02	2.565E-01	2.430E-01
1.195E+00	1.478E+00	5.950E-02	1.542E-02	3.132E-01	2.282E-01
1.478E+00	1.808E+00	4.120E-02	8.152E-03	3.169E-01	1.986E-01
1.808E+00	2.189E+00	2.740E-02	7.384E-03	2.585E-01	2.116E-01
2.189E+00	2.620E+00	1.900E-02	6.458E-03	2.430E-01	1.670E-01
2.620E+00	3.110E+00	1.240E-02	4.897E-03	2.313E-01	1.581E-01
3.110E+00	3.655E+00	8.830E-03	3.856E-03	2.821E-01	1.980E-01
3.655E+00	4.257E+00	5.310E-03	1.878E-03	2.780E-01	2.322E-01
4.257E+00	4.918E+00	3.210E-03	1.306E-03	2.378E-01	2.063E-01
4.918E+00	5.636E+00	1.230E-03	8.933E-04	2.901E-01	3.512E-01
5.636E+00	6.419E+00	1.030E-03	3.248E-04	1.752E-01	2.813E-01

Table C.34. 17-Group Spectra for ^{232}Th at $t = 10 - 13$ seconds.

Lo (MeV)	Hi (MeV)	F/E Abs.	L/P Abs.	F/E Rel.	L/P Rel.
1.370E-01	2.130E-01	2.540E-01	4.802E-03	1.095E-01	7.447E-02
2.130E-01	3.090E-01	1.510E-01	6.638E-03	1.269E-01	1.053E-01
3.090E-01	4.280E-01	9.150E-02	5.527E-03	1.137E-01	7.589E-02
4.280E-01	5.750E-01	8.390E-02	8.397E-03	1.289E-01	1.041E-01
5.750E-01	7.490E-01	7.190E-02	7.901E-03	1.427E-01	9.936E-02
7.490E-01	9.540E-01	4.430E-02	8.595E-03	1.057E-01	8.929E-02
9.540E-01	1.195E+00	3.350E-02	5.495E-03	1.175E-01	9.888E-02
1.195E+00	1.478E+00	2.820E-02	6.248E-03	1.484E-01	9.248E-02
1.478E+00	1.808E+00	1.670E-02	3.403E-03	1.285E-01	8.289E-02
1.808E+00	2.189E+00	1.260E-02	3.228E-03	1.189E-01	9.247E-02
2.189E+00	2.620E+00	9.570E-03	3.147E-03	1.224E-01	8.140E-02
2.620E+00	3.110E+00	6.340E-03	2.332E-03	1.183E-01	7.528E-02
3.110E+00	3.655E+00	3.840E-03	1.542E-03	1.227E-01	7.917E-02
3.655E+00	4.257E+00	2.660E-03	9.268E-04	1.393E-01	1.146E-01
4.257E+00	4.918E+00	1.430E-03	5.955E-04	1.059E-01	9.410E-02
4.918E+00	5.636E+00	5.710E-04	4.929E-04	1.347E-01	1.938E-01
5.636E+00	6.419E+00	4.610E-04	1.478E-04	7.840E-02	1.281E-01

Table C.35. 17-Group Spectra for ^{232}Th at $t = 35 - 45$ seconds.

Lo (MeV)	Hi (MeV)	F/E Abs.	L/P Abs.	F/E Rel.	L/P Rel.
1.370E-01	2.130E-01	5.530E-02	1.280E-03	2.384E-02	1.985E-02
2.130E-01	3.090E-01	3.770E-02	1.778E-03	3.168E-02	2.821E-02
3.090E-01	4.280E-01	2.800E-02	2.240E-03	3.478E-02	3.075E-02
4.280E-01	5.750E-01	2.350E-02	2.005E-03	3.610E-02	2.485E-02
5.750E-01	7.490E-01	2.630E-02	2.583E-03	5.218E-02	3.248E-02
7.490E-01	9.540E-01	1.490E-02	2.350E-03	3.556E-02	2.441E-02
9.540E-01	1.195E+00	9.660E-03	1.667E-03	3.389E-02	3.001E-02
1.195E+00	1.478E+00	9.140E-03	2.519E-03	4.811E-02	3.728E-02
1.478E+00	1.808E+00	5.950E-03	1.374E-03	4.577E-02	3.346E-02
1.808E+00	2.189E+00	3.720E-03	1.038E-03	3.509E-02	2.974E-02
2.189E+00	2.620E+00	3.030E-03	1.028E-03	3.875E-02	2.660E-02
2.620E+00	3.110E+00	1.880E-03	7.785E-04	3.507E-02	2.513E-02
3.110E+00	3.655E+00	1.030E-03	4.299E-04	3.291E-02	2.208E-02
3.655E+00	4.257E+00	7.590E-04	2.699E-04	3.974E-02	3.337E-02
4.257E+00	4.918E+00	4.230E-04	1.597E-04	3.133E-02	2.524E-02
4.918E+00	5.636E+00	2.180E-04	1.448E-04	5.142E-02	5.694E-02
5.636E+00	6.419E+00	9.180E-05	1.686E-05	1.561E-02	1.460E-02

Table C.36. 17-Group Spectra for ^{233}U at $t = 0.2 - 0.5$ seconds.

Lo (MeV)	Hi (MeV)	F/E Abs.	L/P Abs.	F/E Rel.	L/P Rel.
1.370E-01	2.130E-01	6.200E-01	1.634E-02	1.000E+00	1.000E+00
2.130E-01	3.090E-01	2.770E-01	1.390E-02	1.000E+00	1.000E+00
3.090E-01	4.280E-01	2.030E-01	1.367E-02	1.000E+00	1.000E+00
4.280E-01	5.750E-01	2.780E-01	3.343E-02	1.000E+00	1.000E+00
5.750E-01	7.490E-01	1.730E-01	2.299E-02	1.000E+00	1.000E+00
7.490E-01	9.540E-01	1.620E-01	3.283E-02	1.000E+00	1.000E+00
9.540E-01	1.195E+00	1.350E-01	2.193E-02	1.000E+00	1.000E+00
1.195E+00	1.478E+00	7.220E-02	1.729E-02	1.000E+00	1.000E+00
1.478E+00	1.808E+00	4.200E-02	9.135E-03	1.000E+00	1.000E+00
1.808E+00	2.189E+00	3.180E-02	6.306E-03	1.000E+00	1.000E+00
2.189E+00	2.620E+00	2.090E-02	5.347E-03	1.000E+00	1.000E+00
2.620E+00	3.110E+00	1.720E-02	5.236E-03	1.000E+00	1.000E+00
3.110E+00	3.655E+00	1.080E-02	4.060E-03	1.000E+00	1.000E+00
3.655E+00	4.257E+00	5.130E-03	1.064E-03	1.000E+00	1.000E+00
4.257E+00	4.918E+00	4.540E-03	1.329E-03	1.000E+00	1.000E+00
4.918E+00	5.636E+00	1.160E-03	5.725E-04	1.000E+00	1.000E+00
5.636E+00	6.419E+00	9.910E-04	2.388E-04	1.000E+00	1.000E+00

Table C.37. 17-Group Spectra for ^{233}U at $t = 1.0 - 2.0$ seconds.

Lo (MeV)	Hi (MeV)	F/E Abs.	L/P Abs.	F/E Rel.	L/P Rel.
1.370E-01	2.130E-01	3.370E-01	1.073E-02	5.435E-01	6.564E-01
2.130E-01	3.090E-01	1.810E-01	8.569E-03	6.534E-01	6.163E-01
3.090E-01	4.280E-01	1.270E-01	8.754E-03	6.256E-01	6.403E-01
4.280E-01	5.750E-01	1.990E-01	2.454E-02	7.158E-01	7.342E-01
5.750E-01	7.490E-01	1.090E-01	1.547E-02	6.301E-01	6.729E-01
7.490E-01	9.540E-01	8.910E-02	1.773E-02	5.500E-01	5.400E-01
9.540E-01	1.195E+00	8.120E-02	1.412E-02	6.015E-01	6.440E-01
1.195E+00	1.478E+00	4.470E-02	1.112E-02	6.191E-01	6.433E-01
1.478E+00	1.808E+00	2.720E-02	5.861E-03	6.476E-01	6.416E-01
1.808E+00	2.189E+00	1.820E-02	4.217E-03	5.723E-01	6.687E-01
2.189E+00	2.620E+00	1.100E-02	3.063E-03	5.263E-01	5.729E-01
2.620E+00	3.110E+00	8.620E-03	2.925E-03	5.012E-01	5.586E-01
3.110E+00	3.655E+00	5.990E-03	2.658E-03	5.546E-01	6.546E-01
3.655E+00	4.257E+00	3.300E-03	7.927E-04	6.433E-01	7.451E-01
4.257E+00	4.918E+00	2.060E-03	7.396E-04	4.537E-01	5.563E-01
4.918E+00	5.636E+00	7.270E-04	4.869E-04	6.267E-01	8.506E-01
5.636E+00	6.419E+00	4.570E-04	1.992E-04	4.612E-01	8.339E-01

Table C.38. 17-Group Spectra for ^{233}U at $t = 4.0 - 5.5$ seconds.

Lo (MeV)	Hi (MeV)	F/E Abs.	L/P Abs.	F/E Rel.	L/P Rel.
1.370E-01	2.130E-01	1.770E-01	5.200E-03	2.855E-01	3.182E-01
2.130E-01	3.090E-01	9.960E-02	4.901E-03	3.596E-01	3.525E-01
3.090E-01	4.280E-01	7.140E-02	4.642E-03	3.517E-01	3.396E-01
4.280E-01	5.750E-01	1.010E-01	1.247E-02	3.633E-01	3.730E-01
5.750E-01	7.490E-01	5.720E-02	7.468E-03	3.306E-01	3.249E-01
7.490E-01	9.540E-01	3.900E-02	7.814E-03	2.407E-01	2.380E-01
9.540E-01	1.195E+00	3.380E-02	5.777E-03	2.504E-01	2.634E-01
1.195E+00	1.478E+00	2.250E-02	5.390E-03	3.116E-01	3.118E-01
1.478E+00	1.808E+00	1.530E-02	2.953E-03	3.643E-01	3.232E-01
1.808E+00	2.189E+00	9.410E-03	2.215E-03	2.959E-01	3.512E-01
2.189E+00	2.620E+00	6.010E-03	1.613E-03	2.876E-01	3.017E-01
2.620E+00	3.110E+00	4.300E-03	1.472E-03	2.500E-01	2.812E-01
3.110E+00	3.655E+00	3.010E-03	1.384E-03	2.787E-01	3.409E-01
3.655E+00	4.257E+00	1.680E-03	5.281E-04	3.275E-01	4.964E-01
4.257E+00	4.918E+00	8.530E-04	3.608E-04	1.879E-01	2.714E-01
4.918E+00	5.636E+00	3.880E-04	3.432E-04	3.345E-01	5.995E-01
5.636E+00	6.419E+00	2.430E-04	1.333E-04	2.452E-01	5.583E-01

Table C.39. 17-Group Spectra for ^{233}U at $t = 10 - 13$ seconds.

Lo (MeV)	Hi (MeV)	F/E Abs.	L/P Abs.	F/E Rel.	L/P Rel.
1.370E-01	2.130E-01	8.860E-02	2.972E-03	1.429E-01	1.819E-01
2.130E-01	3.090E-01	5.170E-02	2.864E-03	1.866E-01	2.060E-01
3.090E-01	4.280E-01	3.770E-02	2.646E-03	1.857E-01	1.936E-01
4.280E-01	5.750E-01	4.370E-02	4.978E-03	1.572E-01	1.489E-01
5.750E-01	7.490E-01	2.920E-02	3.553E-03	1.688E-01	1.545E-01
7.490E-01	9.540E-01	2.160E-02	3.891E-03	1.333E-01	1.185E-01
9.540E-01	1.195E+00	1.770E-02	2.712E-03	1.311E-01	1.237E-01
1.195E+00	1.478E+00	1.260E-02	2.955E-03	1.745E-01	1.709E-01
1.478E+00	1.808E+00	8.240E-03	1.560E-03	1.962E-01	1.708E-01
1.808E+00	2.189E+00	5.020E-03	1.181E-03	1.579E-01	1.872E-01
2.189E+00	2.620E+00	3.240E-03	1.010E-03	1.550E-01	1.889E-01
2.620E+00	3.110E+00	2.340E-03	8.596E-04	1.360E-01	1.642E-01
3.110E+00	3.655E+00	1.490E-03	6.530E-04	1.380E-01	1.608E-01
3.655E+00	4.257E+00	9.400E-04	3.222E-04	1.832E-01	3.029E-01
4.257E+00	4.918E+00	4.650E-04	1.885E-04	1.024E-01	1.418E-01
4.918E+00	5.636E+00	2.180E-04	1.758E-04	1.879E-01	3.071E-01
5.636E+00	6.419E+00	1.170E-04	5.714E-05	1.181E-01	2.392E-01

Table C.40. 17-Group Spectra for ^{233}U at $t = 35 - 45$ seconds.

Lo (MeV)	Hi (MeV)	F/E Abs.	L/P Abs.	F/E Rel.	L/P Rel.
1.370E-01	2.130E-01	2.670E-02	9.907E-04	4.306E-02	6.062E-02
2.130E-01	3.090E-01	1.750E-02	9.752E-04	6.318E-02	7.015E-02
3.090E-01	4.280E-01	1.280E-02	1.265E-03	6.305E-02	9.251E-02
4.280E-01	5.750E-01	1.190E-02	1.165E-03	4.281E-02	3.484E-02
5.750E-01	7.490E-01	8.730E-03	1.493E-03	5.046E-02	6.494E-02
7.490E-01	9.540E-01	7.450E-03	1.296E-03	4.599E-02	3.948E-02
9.540E-01	1.195E+00	5.490E-03	9.576E-04	4.067E-02	4.367E-02
1.195E+00	1.478E+00	5.060E-03	1.522E-03	7.008E-02	8.805E-02
1.478E+00	1.808E+00	3.230E-03	6.815E-04	7.690E-02	7.460E-02
1.808E+00	2.189E+00	1.720E-03	4.872E-04	5.409E-02	7.726E-02
2.189E+00	2.620E+00	1.180E-03	4.332E-04	5.646E-02	8.101E-02
2.620E+00	3.110E+00	9.380E-04	3.439E-04	5.453E-02	6.569E-02
3.110E+00	3.655E+00	4.420E-04	2.285E-04	4.093E-02	5.627E-02
3.655E+00	4.257E+00	3.840E-04	1.336E-04	7.485E-02	1.256E-01
4.257E+00	4.918E+00	1.520E-04	6.299E-05	3.348E-02	4.738E-02
4.918E+00	5.636E+00	8.630E-05	4.688E-05	7.440E-02	8.190E-02
5.636E+00	6.419E+00	3.360E-05	5.409E-06	3.391E-02	2.265E-02

Table C.41. 17-Group Spectra for ^{235}U at $t = 0.2 - 0.5$ seconds.

Lo (MeV)	Hi (MeV)	F/E Abs.	L/P Abs.	Durkee Abs.	F/E Rel.	L/P Rel.	Durkee Rel.
1.370E-01	2.130E-01	1.330E+00	3.265E-02	3.200E-01	1.000E+00	1.000E+00	1.000E+00
2.130E-01	3.090E-01	6.870E-01	2.879E-02	2.200E-01	1.000E+00	1.000E+00	1.000E+00
3.090E-01	4.280E-01	4.600E-01	3.369E-02	3.100E-01	1.000E+00	1.000E+00	1.000E+00
4.280E-01	5.750E-01	4.920E-01	5.987E-02	3.000E-01	1.000E+00	1.000E+00	1.000E+00
5.750E-01	7.490E-01	3.280E-01	5.056E-02	2.900E-01	1.000E+00	1.000E+00	1.000E+00
7.490E-01	9.540E-01	3.000E-01	6.244E-02	2.500E-01	1.000E+00	1.000E+00	1.000E+00
9.540E-01	1.195E+00	2.180E-01	3.778E-02	1.900E-01	1.000E+00	1.000E+00	1.000E+00
1.195E+00	1.478E+00	1.450E-01	3.916E-02	1.500E-01	1.000E+00	1.000E+00	1.000E+00
1.478E+00	1.808E+00	8.680E-02	2.285E-02	7.500E-02	1.000E+00	1.000E+00	1.000E+00
1.808E+00	2.189E+00	6.170E-02	1.600E-02	5.500E-02	1.000E+00	1.000E+00	1.000E+00
2.189E+00	2.620E+00	3.860E-02	1.673E-02	4.500E-02	1.000E+00	1.000E+00	1.000E+00
2.620E+00	3.110E+00	2.870E-02	1.513E-02	4.000E-02	1.000E+00	1.000E+00	1.000E+00
3.110E+00	3.655E+00	1.850E-02	1.026E-02	2.000E-02	1.000E+00	1.000E+00	1.000E+00
3.655E+00	4.257E+00	9.710E-03	2.711E-03	1.600E-02	1.000E+00	1.000E+00	1.000E+00
4.257E+00	4.918E+00	7.960E-03	3.283E-03	5.000E-03	1.000E+00	1.000E+00	1.000E+00
4.918E+00	5.636E+00	1.670E-03	9.553E-04	1.600E-03	1.000E+00	1.000E+00	1.000E+00
5.636E+00	6.419E+00	1.940E-03	4.139E-04	8.000E-04	1.000E+00	1.000E+00	1.000E+00

Table C.42. 17-Group Spectra for ^{235}U at $t = 1.0 - 2.0$ seconds.

Lo (MeV)	Hi (MeV)	F/E Abs.	L/P Abs.	Durkee Abs.	F/E Rel.	L/P Rel.	Durkee Rel.
1.370E-01	2.130E-01	5.370E-01	1.960E-02	1.900E-01	4.038E-01	6.004E-01	5.938E-01
2.130E-01	3.090E-01	3.370E-01	1.807E-02	1.600E-01	4.905E-01	6.278E-01	7.273E-01
3.090E-01	4.280E-01	2.350E-01	1.744E-02	1.750E-01	5.109E-01	5.176E-01	5.645E-01
4.280E-01	5.750E-01	2.980E-01	4.013E-02	1.800E-01	6.057E-01	6.703E-01	6.000E-01
5.750E-01	7.490E-01	1.940E-01	3.015E-02	1.900E-01	5.915E-01	5.963E-01	6.552E-01
7.490E-01	9.540E-01	1.530E-01	3.427E-02	1.500E-01	5.100E-01	5.487E-01	6.000E-01
9.540E-01	1.195E+00	1.330E-01	2.326E-02	1.000E-01	6.101E-01	6.155E-01	5.263E-01
1.195E+00	1.478E+00	7.720E-02	2.274E-02	6.700E-02	5.324E-01	5.806E-01	4.467E-01
1.478E+00	1.808E+00	5.060E-02	1.305E-02	4.100E-02	5.829E-01	5.712E-01	5.467E-01
1.808E+00	2.189E+00	3.460E-02	9.236E-03	3.100E-02	5.608E-01	5.774E-01	5.636E-01
2.189E+00	2.620E+00	2.170E-02	7.710E-03	2.500E-02	5.622E-01	4.609E-01	5.556E-01
2.620E+00	3.110E+00	1.620E-02	7.194E-03	2.000E-02	5.645E-01	4.756E-01	5.000E-01
3.110E+00	3.655E+00	1.070E-02	6.095E-03	1.000E-02	5.784E-01	5.942E-01	5.000E-01
3.655E+00	4.257E+00	5.740E-03	1.552E-03	7.500E-03	5.911E-01	5.724E-01	4.688E-01
4.257E+00	4.918E+00	3.370E-03	1.702E-03	2.600E-03	4.234E-01	5.186E-01	5.200E-01
4.918E+00	5.636E+00	1.210E-03	6.763E-04	9.000E-04	7.246E-01	7.079E-01	5.625E-01
5.636E+00	6.419E+00	7.200E-04	2.819E-04	3.800E-04	3.711E-01	6.811E-01	4.750E-01

Table C.43. 17-Group Spectra for ^{235}U at $t = 4.0 - 5.5$ seconds.

Lo (MeV)	Hi (MeV)	F/E Abs.	L/P Abs.	Durkee Abs.	F/E Rel.	L/P Rel.	Durkee Rel.
1.370E-01	2.130E-01	3.200E-01	8.623E-03	8.000E-02	2.406E-01	2.641E-01	2.500E-01
2.130E-01	3.090E-01	1.950E-01	8.901E-03	6.500E-02	2.838E-01	3.092E-01	2.955E-01
3.090E-01	4.280E-01	1.310E-01	7.974E-03	7.500E-02	2.848E-01	2.367E-01	2.419E-01
4.280E-01	5.750E-01	1.650E-01	2.068E-02	8.500E-02	3.354E-01	3.454E-01	2.833E-01
5.750E-01	7.490E-01	1.030E-01	1.278E-02	9.000E-02	3.140E-01	2.527E-01	3.103E-01
7.490E-01	9.540E-01	6.500E-02	1.254E-02	5.500E-02	2.167E-01	2.008E-01	2.200E-01
9.540E-01	1.195E+00	5.620E-02	8.917E-03	4.000E-02	2.578E-01	2.360E-01	2.105E-01
1.195E+00	1.478E+00	3.730E-02	8.967E-03	2.950E-02	2.572E-01	2.290E-01	1.967E-01
1.478E+00	1.808E+00	2.660E-02	5.239E-03	1.900E-02	3.065E-01	2.293E-01	2.533E-01
1.808E+00	2.189E+00	1.690E-02	4.083E-03	1.300E-02	2.739E-01	2.552E-01	2.364E-01
2.189E+00	2.620E+00	1.090E-02	2.896E-03	1.000E-02	2.824E-01	1.731E-01	2.222E-01
2.620E+00	3.110E+00	7.120E-03	2.551E-03	8.000E-03	2.481E-01	1.686E-01	2.000E-01
3.110E+00	3.655E+00	5.290E-03	2.632E-03	3.850E-03	2.859E-01	2.566E-01	1.925E-01
3.655E+00	4.257E+00	2.640E-03	8.520E-04	2.900E-03	2.719E-01	3.143E-01	1.812E-01
4.257E+00	4.918E+00	1.550E-03	5.789E-04	1.000E-03	1.947E-01	1.763E-01	2.000E-01
4.918E+00	5.636E+00	5.860E-04	4.512E-04	3.750E-04	3.509E-01	4.723E-01	2.344E-01
5.636E+00	6.419E+00	4.540E-04	1.787E-04	1.500E-04	2.340E-01	4.318E-01	1.875E-01

Table C.44. 17-Group Spectra for ^{235}U at $t = 10 - 13$ seconds.

Lo (MeV)	Hi (MeV)	F/E Abs.	L/P Abs.	Durkee Abs.	F/E Rel.	L/P Rel.	Durkee Rel.
1.370E-01	2.130E-01	1.450E-01	4.305E-03	3.200E-02	1.090E-01	1.318E-01	1.000E-01
2.130E-01	3.090E-01	9.300E-02	4.503E-03	3.000E-02	1.354E-01	1.564E-01	1.364E-01
3.090E-01	4.280E-01	6.170E-02	3.827E-03	3.300E-02	1.341E-01	1.136E-01	1.065E-01
4.280E-01	5.750E-01	7.190E-02	7.919E-03	3.800E-02	1.461E-01	1.323E-01	1.267E-01
5.750E-01	7.490E-01	4.660E-02	5.042E-03	4.000E-02	1.421E-01	9.973E-02	1.379E-01
7.490E-01	9.540E-01	3.100E-02	5.117E-03	2.500E-02	1.033E-01	8.195E-02	1.000E-01
9.540E-01	1.195E+00	2.550E-02	3.695E-03	1.800E-02	1.170E-01	9.779E-02	9.474E-02
1.195E+00	1.478E+00	1.950E-02	3.920E-03	1.300E-02	1.345E-01	1.001E-01	8.667E-02
1.478E+00	1.808E+00	1.200E-02	2.167E-03	9.000E-03	1.382E-01	9.485E-02	1.200E-01
1.808E+00	2.189E+00	7.560E-03	1.744E-03	5.900E-03	1.225E-01	1.090E-01	1.073E-01
2.189E+00	2.620E+00	5.120E-03	1.481E-03	4.700E-03	1.326E-01	8.853E-02	1.044E-01
2.620E+00	3.110E+00	3.510E-03	1.215E-03	3.500E-03	1.223E-01	8.035E-02	8.750E-02
3.110E+00	3.655E+00	2.190E-03	1.025E-03	1.750E-03	1.184E-01	9.994E-02	8.750E-02
3.655E+00	4.257E+00	1.240E-03	4.498E-04	1.200E-03	1.277E-01	1.659E-01	7.500E-02
4.257E+00	4.918E+00	7.120E-04	2.599E-04	4.900E-04	8.945E-02	7.917E-02	9.800E-02
4.918E+00	5.636E+00	2.940E-04	2.219E-04	1.650E-04	1.760E-01	2.323E-01	1.031E-01
5.636E+00	6.419E+00	1.650E-04	7.664E-05	6.000E-05	8.505E-02	1.852E-01	7.500E-02

Table C.45. 17-Group Spectra for ^{235}U at $t = 35 - 45$ seconds.

Lo (MeV)	Hi (MeV)	F/E Abs.	L/P Abs.	Durkee Abs.	F/E Rel.	L/P Rel.	Durkee Rel.
1.370E-01	2.130E-01	3.850E-02	1.402E-03	9.500E-03	2.895E-02	4.293E-02	2.969E-02
2.130E-01	3.090E-01	2.480E-02	1.323E-03	1.100E-02	3.610E-02	4.597E-02	5.000E-02
3.090E-01	4.280E-01	1.860E-02	1.680E-03	1.000E-02	4.043E-02	4.987E-02	3.226E-02
4.280E-01	5.750E-01	1.670E-02	1.576E-03	1.200E-02	3.394E-02	2.633E-02	4.000E-02
5.750E-01	7.490E-01	1.190E-02	1.988E-03	1.300E-02	3.628E-02	3.933E-02	4.483E-02
7.490E-01	9.540E-01	1.030E-02	1.584E-03	7.000E-03	3.433E-02	2.537E-02	2.800E-02
9.540E-01	1.195E+00	7.910E-03	1.294E-03	5.300E-03	3.628E-02	3.425E-02	2.789E-02
1.195E+00	1.478E+00	6.840E-03	1.813E-03	4.100E-03	4.717E-02	4.629E-02	2.733E-02
1.478E+00	1.808E+00	4.060E-03	7.671E-04	2.800E-03	4.677E-02	3.358E-02	3.733E-02
1.808E+00	2.189E+00	2.470E-03	6.104E-04	1.800E-03	4.003E-02	3.816E-02	3.273E-02
2.189E+00	2.620E+00	1.780E-03	5.505E-04	1.600E-03	4.611E-02	3.291E-02	3.556E-02
2.620E+00	3.110E+00	1.260E-03	4.216E-04	1.200E-03	4.390E-02	2.787E-02	3.000E-02
3.110E+00	3.655E+00	6.100E-04	2.686E-04	5.300E-04	3.297E-02	2.619E-02	2.650E-02
3.655E+00	4.257E+00	4.600E-04	1.535E-04	3.600E-04	4.737E-02	5.662E-02	2.250E-02
4.257E+00	4.918E+00	2.120E-04	7.404E-05	1.500E-04	2.663E-02	2.255E-02	3.000E-02
4.918E+00	5.636E+00	8.950E-05	5.030E-05	5.000E-05	5.359E-02	5.266E-02	3.125E-02
5.636E+00	6.419E+00	4.160E-05	6.803E-06	2.000E-05	2.144E-02	1.644E-02	2.500E-02

Table C.46. 17-Group Spectra for ^{238}U at $t = 0.2 - 0.5$ seconds.

Lo (MeV)	Hi (MeV)	F/E Abs.	L/P Abs.	F/E Rel.	L/P Rel.
1.370E-01	2.130E-01	3.450E+00	5.863E-02	1.000E+00	1.000E+00
2.130E-01	3.090E-01	1.610E+00	6.202E-02	1.000E+00	1.000E+00
3.090E-01	4.280E-01	1.140E+00	6.603E-02	1.000E+00	1.000E+00
4.280E-01	5.750E-01	9.860E-01	9.571E-02	1.000E+00	1.000E+00
5.750E-01	7.490E-01	7.390E-01	9.202E-02	1.000E+00	1.000E+00
7.490E-01	9.540E-01	6.270E-01	1.033E-01	1.000E+00	1.000E+00
9.540E-01	1.195E+00	4.260E-01	6.224E-02	1.000E+00	1.000E+00
1.195E+00	1.478E+00	3.320E-01	7.018E-02	1.000E+00	1.000E+00
1.478E+00	1.808E+00	1.800E-01	4.553E-02	1.000E+00	1.000E+00
1.808E+00	2.189E+00	1.590E-01	3.816E-02	1.000E+00	1.000E+00
2.189E+00	2.620E+00	1.080E-01	4.544E-02	1.000E+00	1.000E+00
2.620E+00	3.110E+00	7.760E-02	3.645E-02	1.000E+00	1.000E+00
3.110E+00	3.655E+00	4.330E-02	2.129E-02	1.000E+00	1.000E+00
3.655E+00	4.257E+00	2.300E-02	8.034E-03	1.000E+00	1.000E+00
4.257E+00	4.918E+00	1.760E-02	6.602E-03	1.000E+00	1.000E+00
4.918E+00	5.636E+00	4.980E-03	2.202E-03	1.000E+00	1.000E+00
5.636E+00	6.419E+00	6.790E-03	1.056E-03	1.000E+00	1.000E+00

Table C.47. 17-Group Spectra for ^{238}U at $t = 1.0 - 2.0$ seconds.

Lo (MeV)	Hi (MeV)	F/E Abs.	L/P Abs.	F/E Rel.	L/P Rel.
1.370E-01	2.130E-01	1.080E+00	3.245E-02	3.130E-01	5.535E-01
2.130E-01	3.090E-01	7.620E-01	3.526E-02	4.733E-01	5.686E-01
3.090E-01	4.280E-01	4.930E-01	3.097E-02	4.325E-01	4.690E-01
4.280E-01	5.750E-01	4.770E-01	5.740E-02	4.838E-01	5.997E-01
5.750E-01	7.490E-01	3.800E-01	5.162E-02	5.142E-01	5.609E-01
7.490E-01	9.540E-01	2.830E-01	5.277E-02	4.514E-01	5.109E-01
9.540E-01	1.195E+00	2.330E-01	3.454E-02	5.469E-01	5.549E-01
1.195E+00	1.478E+00	1.590E-01	3.875E-02	4.789E-01	5.522E-01
1.478E+00	1.808E+00	1.090E-01	2.380E-02	6.056E-01	5.226E-01
1.808E+00	2.189E+00	7.160E-02	1.909E-02	4.503E-01	5.003E-01
2.189E+00	2.620E+00	4.600E-02	1.953E-02	4.259E-01	4.297E-01
2.620E+00	3.110E+00	3.700E-02	1.653E-02	4.768E-01	4.535E-01
3.110E+00	3.655E+00	2.150E-02	1.115E-02	4.965E-01	5.239E-01
3.655E+00	4.257E+00	1.190E-02	3.305E-03	5.174E-01	4.114E-01
4.257E+00	4.918E+00	6.320E-03	3.127E-03	3.591E-01	4.737E-01
4.918E+00	5.636E+00	2.200E-03	1.060E-03	4.418E-01	4.814E-01
5.636E+00	6.419E+00	1.160E-03	4.782E-04	1.708E-01	4.527E-01

Table C.48. 17-Group Spectra for ^{238}U at $t = 4.0 - 5.5$ seconds.

Lo (MeV)	Hi (MeV)	F/E Abs.	L/P Abs.	F/E Rel.	L/P Rel.
1.370E-01	2.130E-01	6.660E-01	1.292E-02	1.930E-01	2.203E-01
2.130E-01	3.090E-01	3.520E-01	1.514E-02	2.186E-01	2.442E-01
3.090E-01	4.280E-01	2.350E-01	1.241E-02	2.061E-01	1.879E-01
4.280E-01	5.750E-01	2.590E-01	2.835E-02	2.627E-01	2.962E-01
5.750E-01	7.490E-01	1.750E-01	2.068E-02	2.368E-01	2.248E-01
7.490E-01	9.540E-01	1.080E-01	1.823E-02	1.722E-01	1.765E-01
9.540E-01	1.195E+00	8.100E-02	1.246E-02	1.901E-01	2.001E-01
1.195E+00	1.478E+00	6.260E-02	1.392E-02	1.886E-01	1.984E-01
1.478E+00	1.808E+00	4.410E-02	8.012E-03	2.450E-01	1.760E-01
1.808E+00	2.189E+00	2.820E-02	6.914E-03	1.774E-01	1.812E-01
2.189E+00	2.620E+00	1.860E-02	5.591E-03	1.722E-01	1.230E-01
2.620E+00	3.110E+00	1.240E-02	4.541E-03	1.598E-01	1.246E-01
3.110E+00	3.655E+00	8.980E-03	3.948E-03	2.074E-01	1.854E-01
3.655E+00	4.257E+00	4.520E-03	1.255E-03	1.965E-01	1.562E-01
4.257E+00	4.918E+00	2.350E-03	8.141E-04	1.335E-01	1.233E-01
4.918E+00	5.636E+00	1.040E-03	5.122E-04	2.088E-01	2.326E-01
5.636E+00	6.419E+00	7.590E-04	2.134E-04	1.118E-01	2.020E-01

Table C.49. 17-Group Spectra for ^{238}U at $t = 10 - 13$ seconds.

Lo (MeV)	Hi (MeV)	F/E Abs.	L/P Abs.	F/E Rel.	L/P Rel.
1.370E-01	2.130E-01	2.180E-01	5.587E-03	6.319E-02	9.530E-02
2.130E-01	3.090E-01	1.330E-01	6.910E-03	8.261E-02	1.114E-01
3.090E-01	4.280E-01	9.930E-02	5.075E-03	8.711E-02	7.686E-02
4.280E-01	5.750E-01	1.040E-01	1.010E-02	1.055E-01	1.055E-01
5.750E-01	7.490E-01	5.910E-02	7.470E-03	7.997E-02	8.118E-02
7.490E-01	9.540E-01	4.180E-02	6.409E-03	6.667E-02	6.204E-02
9.540E-01	1.195E+00	3.000E-02	4.479E-03	7.042E-02	7.196E-02
1.195E+00	1.478E+00	2.650E-02	5.213E-03	7.982E-02	7.428E-02
1.478E+00	1.808E+00	1.620E-02	2.656E-03	9.000E-02	5.832E-02
1.808E+00	2.189E+00	1.120E-02	2.451E-03	7.044E-02	6.423E-02
2.189E+00	2.620E+00	7.430E-03	2.148E-03	6.880E-02	4.727E-02
2.620E+00	3.110E+00	5.070E-03	1.654E-03	6.534E-02	4.538E-02
3.110E+00	3.655E+00	3.290E-03	1.375E-03	7.598E-02	6.456E-02
3.655E+00	4.257E+00	1.830E-03	5.377E-04	7.957E-02	6.694E-02
4.257E+00	4.918E+00	1.030E-03	2.960E-04	5.852E-02	4.484E-02
4.918E+00	5.636E+00	4.500E-04	2.301E-04	9.036E-02	1.045E-01
5.636E+00	6.419E+00	2.730E-04	8.809E-05	4.021E-02	8.340E-02

Table C.50. 17-Group Spectra for ^{238}U at $t = 35 - 45$ seconds.

Lo (MeV)	Hi (MeV)	F/E Abs.	L/P Abs.	F/E Rel.	L/P Rel.
1.370E-01	2.130E-01	5.280E-02	1.764E-03	1.530E-02	3.008E-02
2.130E-01	3.090E-01	3.860E-02	1.926E-03	2.398E-02	3.106E-02
3.090E-01	4.280E-01	2.650E-02	1.984E-03	2.325E-02	3.005E-02
4.280E-01	5.750E-01	2.210E-02	1.752E-03	2.241E-02	1.831E-02
5.750E-01	7.490E-01	1.900E-02	2.368E-03	2.571E-02	2.573E-02
7.490E-01	9.540E-01	1.330E-02	1.683E-03	2.121E-02	1.629E-02
9.540E-01	1.195E+00	9.050E-03	1.389E-03	2.124E-02	2.231E-02
1.195E+00	1.478E+00	8.710E-03	1.992E-03	2.623E-02	2.838E-02
1.478E+00	1.808E+00	4.400E-03	7.241E-04	2.444E-02	1.590E-02
1.808E+00	2.189E+00	3.110E-03	7.136E-04	1.956E-02	1.870E-02
2.189E+00	2.620E+00	2.470E-03	6.561E-04	2.287E-02	1.444E-02
2.620E+00	3.110E+00	1.690E-03	4.851E-04	2.178E-02	1.331E-02
3.110E+00	3.655E+00	7.700E-04	3.109E-04	1.778E-02	1.460E-02
3.655E+00	4.257E+00	4.580E-04	1.394E-04	1.991E-02	1.735E-02
4.257E+00	4.918E+00	2.210E-04	6.084E-05	1.256E-02	9.216E-03
4.918E+00	5.636E+00	1.020E-04	3.718E-05	2.048E-02	1.688E-02
5.636E+00	6.419E+00	4.440E-05	6.530E-06	6.539E-03	6.182E-03

Table C.51. 17-Group Spectra for ^{239}Pu at $t = 0.2 - 0.5$ seconds.

Lo (MeV)	Hi (MeV)	F/E Abs.	L/P Abs.	F/E Rel.	L/P Rel.
1.370E-01	2.130E-01	1.430E+00	2.021E-02	1.000E+00	1.000E+00
2.130E-01	3.090E-01	6.840E-01	2.146E-02	1.000E+00	1.000E+00
3.090E-01	4.280E-01	4.600E-01	1.926E-02	1.000E+00	1.000E+00
4.280E-01	5.750E-01	5.350E-01	4.499E-02	1.000E+00	1.000E+00
5.750E-01	7.490E-01	3.420E-01	3.352E-02	1.000E+00	1.000E+00
7.490E-01	9.540E-01	2.750E-01	3.692E-02	1.000E+00	1.000E+00
9.540E-01	1.195E+00	2.120E-01	2.673E-02	1.000E+00	1.000E+00
1.195E+00	1.478E+00	1.230E-01	2.291E-02	1.000E+00	1.000E+00
1.478E+00	1.808E+00	8.130E-02	1.404E-02	1.000E+00	1.000E+00
1.808E+00	2.189E+00	5.280E-02	8.850E-03	1.000E+00	1.000E+00
2.189E+00	2.620E+00	3.890E-02	8.656E-03	1.000E+00	1.000E+00
2.620E+00	3.110E+00	2.970E-02	8.315E-03	1.000E+00	1.000E+00
3.110E+00	3.655E+00	1.460E-02	5.787E-03	1.000E+00	1.000E+00
3.655E+00	4.257E+00	8.370E-03	1.197E-03	1.000E+00	1.000E+00
4.257E+00	4.918E+00	6.770E-03	1.704E-03	1.000E+00	1.000E+00
4.918E+00	5.636E+00	1.420E-03	4.268E-04	1.000E+00	1.000E+00
5.636E+00	6.419E+00	1.040E-03	1.894E-04	1.000E+00	1.000E+00

Table C.52. 17-Group Spectra for ^{239}Pu at $t = 1.0 - 2.0$ seconds.

Lo (MeV)	Hi (MeV)	F/E Abs.	L/P Abs.	F/E Rel.	L/P Rel.
1.370E-01	2.130E-01	6.020E-01	1.345E-02	4.210E-01	6.656E-01
2.130E-01	3.090E-01	3.970E-01	1.403E-02	5.804E-01	6.537E-01
3.090E-01	4.280E-01	2.720E-01	1.215E-02	5.913E-01	6.309E-01
4.280E-01	5.750E-01	3.910E-01	3.302E-02	7.308E-01	7.340E-01
5.750E-01	7.490E-01	2.100E-01	2.221E-02	6.140E-01	6.628E-01
7.490E-01	9.540E-01	1.450E-01	2.004E-02	5.273E-01	5.428E-01
9.540E-01	1.195E+00	1.270E-01	1.678E-02	5.991E-01	6.276E-01
1.195E+00	1.478E+00	7.710E-02	1.375E-02	6.268E-01	6.004E-01
1.478E+00	1.808E+00	4.600E-02	8.488E-03	5.658E-01	6.046E-01
1.808E+00	2.189E+00	3.100E-02	5.615E-03	5.871E-01	6.345E-01
2.189E+00	2.620E+00	1.870E-02	4.411E-03	4.807E-01	5.096E-01
2.620E+00	3.110E+00	1.370E-02	4.166E-03	4.613E-01	5.009E-01
3.110E+00	3.655E+00	8.400E-03	3.482E-03	5.753E-01	6.017E-01
3.655E+00	4.257E+00	3.790E-03	7.481E-04	4.528E-01	6.248E-01
4.257E+00	4.918E+00	2.950E-03	7.664E-04	4.357E-01	4.498E-01
4.918E+00	5.636E+00	6.540E-04	3.224E-04	4.606E-01	7.555E-01
5.636E+00	6.419E+00	5.360E-04	1.399E-04	5.154E-01	7.387E-01

Table C.53. 17-Group Spectra for ^{239}Pu at $t = 4.0 - 5.5$ seconds.

Lo (MeV)	Hi (MeV)	F/E Abs.	L/P Abs.	F/E Rel.	L/P Rel.
1.370E-01	2.130E-01	3.450E-01	6.773E-03	2.413E-01	3.352E-01
2.130E-01	3.090E-01	2.100E-01	8.010E-03	3.070E-01	3.733E-01
3.090E-01	4.280E-01	1.330E-01	6.178E-03	2.891E-01	3.207E-01
4.280E-01	5.750E-01	1.750E-01	1.688E-02	3.271E-01	3.751E-01
5.750E-01	7.490E-01	1.070E-01	1.005E-02	3.129E-01	2.999E-01
7.490E-01	9.540E-01	6.170E-02	8.296E-03	2.244E-01	2.247E-01
9.540E-01	1.195E+00	5.110E-02	6.296E-03	2.410E-01	2.355E-01
1.195E+00	1.478E+00	3.280E-02	5.825E-03	2.667E-01	2.543E-01
1.478E+00	1.808E+00	2.560E-02	3.632E-03	3.149E-01	2.587E-01
1.808E+00	2.189E+00	1.530E-02	2.545E-03	2.898E-01	2.875E-01
2.189E+00	2.620E+00	9.280E-03	1.765E-03	2.386E-01	2.039E-01
2.620E+00	3.110E+00	5.930E-03	1.572E-03	1.997E-01	1.890E-01
3.110E+00	3.655E+00	4.100E-03	1.535E-03	2.808E-01	2.653E-01
3.655E+00	4.257E+00	1.810E-03	3.873E-04	2.162E-01	3.234E-01
4.257E+00	4.918E+00	9.100E-04	2.376E-04	1.344E-01	1.394E-01
4.918E+00	5.636E+00	3.140E-04	2.006E-04	2.211E-01	4.702E-01
5.636E+00	6.419E+00	2.470E-04	8.380E-05	2.375E-01	4.425E-01

Table C.54. 17-Group Spectra for ^{239}Pu at $t = 10 - 13$ seconds.

Lo (MeV)	Hi (MeV)	F/E Abs.	L/P Abs.	F/E Rel.	L/P Rel.
1.370E-01	2.130E-01	1.430E-01	3.957E-03	1.000E-01	1.958E-01
2.130E-01	3.090E-01	1.050E-01	4.464E-03	1.535E-01	2.080E-01
3.090E-01	4.280E-01	6.500E-02	3.296E-03	1.413E-01	1.711E-01
4.280E-01	5.750E-01	7.380E-02	6.379E-03	1.379E-01	1.418E-01
5.750E-01	7.490E-01	4.280E-02	4.156E-03	1.251E-01	1.240E-01
7.490E-01	9.540E-01	2.830E-02	3.790E-03	1.029E-01	1.027E-01
9.540E-01	1.195E+00	2.300E-02	2.630E-03	1.085E-01	9.837E-02
1.195E+00	1.478E+00	1.640E-02	2.751E-03	1.333E-01	1.201E-01
1.478E+00	1.808E+00	1.150E-02	1.512E-03	1.415E-01	1.077E-01
1.808E+00	2.189E+00	7.020E-03	1.147E-03	1.330E-01	1.296E-01
2.189E+00	2.620E+00	4.460E-03	9.493E-04	1.147E-01	1.097E-01
2.620E+00	3.110E+00	2.960E-03	8.111E-04	9.966E-02	9.754E-02
3.110E+00	3.655E+00	1.690E-03	6.319E-04	1.158E-01	1.092E-01
3.655E+00	4.257E+00	7.600E-04	2.048E-04	9.080E-02	1.710E-01
4.257E+00	4.918E+00	4.300E-04	1.072E-04	6.352E-02	6.293E-02
4.918E+00	5.636E+00	1.470E-04	9.266E-05	1.035E-01	2.171E-01
5.636E+00	6.419E+00	7.880E-05	3.477E-05	7.577E-02	1.836E-01

Table C.55. 17-Group Spectra for ^{239}Pu at $t = 35 - 45$ seconds.

Lo (MeV)	Hi (MeV)	F/E Abs.	L/P Abs.	F/E Rel.	L/P Rel.
1.370E-01	2.130E-01	3.560E-02	1.497E-03	2.490E-02	7.406E-02
2.130E-01	3.090E-01	2.380E-02	1.465E-03	3.480E-02	6.827E-02
3.090E-01	4.280E-01	1.870E-02	1.577E-03	4.065E-02	8.187E-02
4.280E-01	5.750E-01	1.540E-02	1.292E-03	2.879E-02	2.873E-02
5.750E-01	7.490E-01	1.200E-02	1.589E-03	3.509E-02	4.741E-02
7.490E-01	9.540E-01	9.300E-03	1.196E-03	3.382E-02	3.239E-02
9.540E-01	1.195E+00	6.790E-03	9.085E-04	3.203E-02	3.399E-02
1.195E+00	1.478E+00	6.030E-03	1.301E-03	4.902E-02	5.681E-02
1.478E+00	1.808E+00	3.500E-03	4.901E-04	4.305E-02	3.491E-02
1.808E+00	2.189E+00	2.470E-03	4.518E-04	4.678E-02	5.106E-02
2.189E+00	2.620E+00	1.740E-03	4.096E-04	4.473E-02	4.732E-02
2.620E+00	3.110E+00	1.250E-03	3.568E-04	4.209E-02	4.291E-02
3.110E+00	3.655E+00	5.280E-04	1.861E-04	3.616E-02	3.216E-02
3.655E+00	4.257E+00	2.850E-04	7.137E-05	3.405E-02	5.960E-02
4.257E+00	4.918E+00	1.140E-04	2.894E-05	1.684E-02	1.698E-02
4.918E+00	5.636E+00	4.620E-05	1.764E-05	3.254E-02	4.133E-02
5.636E+00	6.419E+00	2.070E-05	2.885E-06	1.990E-02	1.523E-02

D Tabulated Fisher and Engle Data

The tables presented in this appendix are directly transcribed from Fisher and Engle, 1962 [2]. Because the original data presented within this work is directly compared to Fisher and Engle's data, the authors believed it would be beneficial, for any future work, to contain both sets of data in one location. However, to avoid duplication many of the tables (such as the 17-group spectra data) are not included in this section of the appendix because they are included in Appendix C.

Table D.1. Results of Delayed Gamma Spectra Integrated over Energy for Different Time Intervals after Fission

Isotope	Time Interval (sec)	Photons/ Fission-sec	MeV/ Fission-sec	MeV/ Photon
^{232}Th	0.2 - 0.5	0.966	0.916	0.948
	1.0 - 2.0	0.487	0.501	1.029
	4.0 - 5.5	0.267	0.246	0.921
	10.0 - 13.0	0.118	0.112	0.949
	35.0 - 45.0	0.0343	0.0343	1.000
^{233}U	0.2 - 0.5	0.312	0.303	0.971
	1.0 - 2.0	0.189	0.177	0.937
	4.0 - 5.5	0.0958	0.0885	0.924
	10.0 - 13.0	0.0490	0.0465	0.949
	35.0 - 45.0	0.0161	0.0161	1.000
^{235}U	0.2 - 0.5	0.613	0.564	0.920
	1.0 - 2.0	0.324	0.311	0.960
	4.0 - 5.5	0.169	0.153	0.905
	10.0 - 13.0	0.0775	0.0706	0.911
	35.0 - 45.0	0.0225	0.0221	0.982
^{238}U	0.2 - 0.5	1.42	1.32	0.930
	1.0 - 2.0	0.636	0.618	0.972
	4.0 - 5.5	0.289	0.255	0.882
	10.0 - 13.0	0.110	0.0988	0.898
	35.0 - 45.0	0.0303	0.0281	0.927
^{239}Pu	0.2 - 0.5	0.608	0.529	0.870
	1.0 - 2.0	0.344	0.296	0.860
	4.0 - 5.5	0.166	0.138	0.831
	10.0 - 13.0	0.0746	0.0624	0.836
	35.0 - 45.0	0.0209	0.0197	0.943

Table D.2. Results of Delayed Gamma Spectra Integrated over Energy and Time from 0.20 - 45.0 sec after Fission

Isotope	Photons/Fission	MeV/Fission	MeV/Photon
232	5.07	5.04	0.994
233	2.02	1.97	0.975
235	3.31	3.18	0.961
238	5.50	5.08	0.924
239	3.26	2.86	0.877

E Tabulated Beddingfield and Cecil Data

The table presented in this appendix is adapted from a table originally presented by Beddingfield and Cecil, 1998 [7]. Furthermore, the data presented within Table E.1 is plotted for materials ^{235}U and ^{239}Pu in Figures 14 and 22, respectively. In those figures 'Theoretical' corresponds to the 'ENDF/B-VI' columns, 'Observed' corresponds to the 'Beddingfield and Cecil' columns, and 'Calculated' corresponds to the 'CINDER' columns.

Table E.1. γ-ray Peak Intensity Ratios for U-235 and Pu-239.

Numerator (keV)	Denominator (keV)	Intensity Ratios					
		ENDF/B-VI		Beddingfield and Cecil		CINDER	
		Pu-239	U-235	Pu-239	U-235	Pu-239	U-235
Rb-89 (1031.9)	Sb-130 (839.4)	0.95±0.65	2.65±1.98	0.35±0.22	2.05±0.05	0.56	1.69
	Ba-142 (1000.9)	4.38±1.08	9.07±1.21	3.81±0.67	10.88±0.65	2.50	5.21
	Ba-142 (1078.5)	3.69±0.91	7.65±1.02	3.90±0.54	7.24±0.47	2.06	4.43
	Sb-131 (933.1)	3.27±0.78	9.03±1.19	3.74±0.79	10.63±0.81	2.97	9.36
Rb-89 (1248.1)	Ba-142 (1204)	1.85±0.41	3.82±0.51	1.86±0.34	4.00±0.27	1.30	2.65
	I-135 (1260.4)	6.31±1.18	17.42±1.71	5.86±2.29	19.66±2.75	6.81	16.84
	Cs-139 (1283.2)	2.87±0.62	6.03±0.73	2.03±0.42	7.04±0.46	2.05	4.35
Rb-90 (831.7)	Sb-130 (839.4)	0.15±0.10	0.38±0.29	0.34±0.02	0.78±0.03	0.36	0.95
	Te-133 (912.7)	1.32±0.38	3.04±0.65	1.36±0.15	3.85±0.26	0.80	2.54
Sr-92 (1383.9)	Cs-139 (1283.2)	1.91±0.31	3.17±0.44	1.70±0.62	3.36±0.32	1.00	1.64
	Mo-101 (1532.5)	1.23±0.20	3.05±0.35	1.28±0.28	3.23±0.28	1.07	2.69
Y-94 (918.8)	Sb-130 (839.4)	2.06±1.36	3.18±2.36	1.49±0.10	3.02±0.47	1.05	1.86
	Te-133 (912.7)	18.67±2.46	25.52±3.25	10.63±4.02	25.01±5.55	2.30	5.01
	Sb-131 (933.1)	7.11±0.89	10.84±1.23	6.73±1.39	14.01±2.58	5.59	10.30
	Sb-131 (943.4)	4.01±0.50	6.11±0.69	4.29±0.51	5.96±0.96	44.13	59.96
	Ba-142 (948.8)	8.04±1.13	9.58±1.10	7.12±1.37	9.98±1.82	4.12	5.11
	Rb-89 (1031.9)	2.17±0.48	1.20±0.12	1.97±0.15	1.07±0.16	1.88	1.10
Y-95 (954.2)	Sb-131 (933.1)	2.07±0.57	3.00±0.47	1.95±0.44	3.29±0.39	0.05	0.12
	Sb-131 (943.4)	1.17±0.32	1.69±0.26	1.12±0.16	1.69±0.14	0.42	0.69

F Tabulated Frehaut, Bertin, and Bois Data

The tables in this appendix are adapted from Ref. [19] to include the unnormalized values of E_γ.

Table F.1. Experimental values of ν_p and E_γ for fission of ^{232}Th for incident neutron energies (E_n) from 1 - 15 MeV (where $R = E_\gamma/E_{\gamma Cf}$ and $E_{\gamma Cf} = 7.06$ MeV).

$E_n \pm \Delta E_n$ (MeV)	$\nu_p \pm \Delta\nu_p$ (n/fission)	$R \pm \Delta R$ (MeV/MeV)	$E_\gamma \pm \Delta E_\gamma$ (MeV)
2.37 ± 0.02	2.146 ± 0.012	0.834 ± 0.004	5.888 ± 0.028
2.59 ± 0.08	2.184 ± 0.021	0.831 ± 0.009	5.867 ± 0.064
2.93 ± 0.02	2.215 ± 0.015	0.830 ± 0.004	5.860 ± 0.028
3.39 ± 0.06	2.236 ± 0.014	0.827 ± 0.006	5.839 ± 0.042
3.91 ± 0.06	2.890 ± 0.015	0.843 ± 0.007	5.952 ± 0.049
4.43 ± 0.05	2.369 ± 0.015	0.859 ± 0.007	6.065 ± 0.049
4.49 ± 0.12	2.338 ± 0.200	0.851 ± 0.006	6.008 ± 0.042
4.95 ± 0.05	2.440 ± 0.015	0.852 ± 0.007	6.015 ± 0.049
5.13 ± 0.09	2.490 ± 0.017	0.857 ± 0.005	6.050 ± 0.035
5.47 ± 0.05	2.519 ± 0.018	0.851 ± 0.008	6.008 ± 0.056
5.72 ± 0.07	2.547 ± 0.023	0.865 ± 0.004	6.107 ± 0.028
5.98 ± 0.04	2.623 ± 0.200	0.866 ± 0.009	6.114 ± 0.064
6.27 ± 0.06	2.776 ± 0.014	0.844 ± 0.004	5.959 ± 0.028
6.49 ± 0.04	2.849 ± 0.018	0.864 ± 0.008	6.100 ± 0.056
6.82 ± 0.05	2.776 ± 0.024	0.864 ± 0.004	6.100 ± 0.028
7.00 ± 0.04	2.984 ± 0.021	0.852 ± 0.009	6.015 ± 0.064
7.51 ± 0.04	3.035 ± 0.023	0.852 ± 0.009	6.015 ± 0.064
6.90 ± 0.20	3.015 ± 0.110	0.841 ± 0.006	5.937 ± 0.042
7.35 ± 0.25	3.066 ± 0.014	0.853 ± 0.007	6.022 ± 0.049
7.88 ± 0.22	3.055 ± 0.013	0.860 ± 0.007	6.072 ± 0.049
8.39 ± 0.20	3.115 ± 0.012	0.867 ± 0.006	6.121 ± 0.042
8.90 ± 0.18	3.150 ± 0.014	0.882 ± 0.006	6.227 ± 0.042
9.40 ± 0.17	3.211 ± 0.016	0.889 ± 0.007	6.276 ± 0.049
9.90 ± 0.16	3.278 ± 0.015	0.887 ± 0.008	6.262 ± 0.056
10.39 ± 0.15	3.329 ± 0.017	0.900 ± 0.007	6.354 ± 0.049
10.88 ± 0.14	3.441 ± 0.200	0.896 ± 0.011	6.326 ± 0.078
11.37 ± 0.13	3.487 ± 0.016	0.923 ± 0.007	6.516 ± 0.049
11.86 ± 0.13	3.586 ± 0.021	0.932 ± 0.012	6.580 ± 0.085
12.34 ± 0.12	3.623 ± 0.019	0.935 ± 0.007	6.601 ± 0.049
12.85 ± 0.11	3.692 ± 0.018	0.944 ± 0.006	6.665 ± 0.042
13.31 ± 0.11	3.792 ± 0.021	0.953 ± 0.007	6.728 ± 0.049
13.80 ± 0.10	3.891 ± 0.200	0.952 ± 0.006	6.721 ± 0.042
14.29 ± 0.10	3.978 ± 0.026	0.944 ± 0.006	6.665 ± 0.042
14.74 ± 0.10	4.061 ± 0.023	0.928 ± 0.007	6.552 ± 0.049

Table F.2. Experimental values of ν_p and E_γ for fission of ^{235}U for incident neutron energies (E_n) from 1 - 15 MeV (where $R = E_\gamma/E_{\gamma Cf}$ and $E_{\gamma Cf} = 7.06$ MeV).

$E_n \pm \Delta E_n$ (MeV)	$\nu_p \pm \Delta\nu_p$ (n/fission)	$R \pm \Delta R$ (MeV/MeV)	$E_\gamma \pm \Delta E_\gamma$ (MeV)
1.14 ± 0.24	2.475 ± 0.018	0.960 ± 0.005	6.778 ± 0.035
1.73 ± 0.19	2.557 ± 0.017	0.971 ± 0.004	6.855 ± 0.028
2.30 ± 0.16	2.610 ± 0.019	0.982 ± 0.005	6.933 ± 0.035
2.85 ± 0.14	2.685 ± 0.019	0.988 ± 0.005	6.975 ± 0.035
3.38 ± 0.13	2.751 ± 0.021	0.991 ± 0.005	6.996 ± 0.035
3.91 ± 0.12	2.816 ± 0.022	1.023 ± 0.006	7.222 ± 0.042
4.43 ± 0.11	2.919 ± 0.022	1.026 ± 0.006	7.244 ± 0.042
4.95 ± 0.10	2.981 ± 0.023	1.038 ± 0.006	7.328 ± 0.042
5.47 ± 0.09	3.084 ± 0.022	1.036 ± 0.006	7.314 ± 0.042
5.99 ± 0.09	3.170 ± 0.023	1.042 ± 0.006	7.357 ± 0.042
6.03 ± 0.34	3.173 ± 0.021	1.040 ± 0.006	7.342 ± 0.042
6.50 ± 0.08	3.278 ± 0.025	1.028 ± 0.007	7.258 ± 0.049
6.61 ± 0.29	3.311 ± 0.021	1.034 ± 0.006	7.300 ± 0.042
7.17 ± 0.25	3.387 ± 0.019	1.040 ± 0.005	7.342 ± 0.035
7.71 ± 0.23	3.460 ± 0.020	1.039 ± 0.005	7.335 ± 0.035
8.23 ± 0.21	3.537 ± 0.021	1.038 ± 0.005	7.328 ± 0.035
8.75 ± 0.19	3.609 ± 0.023	1.049 ± 0.005	7.406 ± 0.035
9.26 ± 0.17	3.681 ± 0.022	1.055 ± 0.005	7.448 ± 0.035
9.77 ± 0.16	3.768 ± 0.025	1.061 ± 0.005	7.491 ± 0.035
10.27 ± 0.15	3.843 ± 0.026	1.069 ± 0.005	7.547 ± 0.035
10.76 ± 0.14	3.903 ± 0.029	1.083 ± 0.006	7.646 ± 0.042
11.26 ± 0.14	3.993 ± 0.029	1.087 ± 0.005	7.674 ± 0.035
11.75 ± 0.13	4.068 ± 0.035	1.103 ± 0.006	7.787 ± 0.042
12.24 ± 0.12	4.118 ± 0.030	1.104 ± 0.005	7.794 ± 0.035
12.72 ± 0.12	4.215 ± 0.031	1.108 ± 0.006	7.822 ± 0.042
13.21 ± 0.11	4.279 ± 0.027	1.111 ± 0.005	7.844 ± 0.035
13.69 ± 0.11	4.365 ± 0.036	1.110 ± 0.005	7.837 ± 0.035
14.18 ± 0.10	4.408 ± 0.032	1.121 ± 0.006	7.914 ± 0.042
14.66 ± 0.10	4.459 ± 0.040	1.132 ± 0.007	7.992 ± 0.049

Table F.3. Experimental values of ν_p and E_γ for fission of ^{237}Np for incident neutron energies (E_n) from 1 - 15 MeV (where $R = E_\gamma/E_{\gamma Cf}$ and $E_{\gamma Cf} = 7.06$ MeV).

$E_n \pm \Delta E_n$ (MeV)	$\nu_p \pm \Delta\nu_p$ (n/fission)	$R \pm \Delta R$ (MeV/MeV)	$E_\gamma \pm \Delta E_\gamma$ (MeV)
1.14 ± 0.24	2.706 ± 0.021	0.972 ± 0.006	6.862 ± 0.042
1.73 ± 0.19	2.759 ± 0.020	0.975 ± 0.005	6.884 ± 0.035
2.30 ± 0.16	2.842 ± 0.022	0.985 ± 0.006	6.954 ± 0.042
2.85 ± 0.14	2.932 ± 0.220	0.981 ± 0.006	6.926 ± 0.042
3.38 ± 0.13	3.015 ± 0.025	1.007 ± 0.006	7.109 ± 0.042
3.91 ± 0.12	3.084 ± 0.024	1.027 ± 0.006	7.251 ± 0.042
4.43 ± 0.11	3.193 ± 0.025	1.031 ± 0.007	7.279 ± 0.049
4.95 ± 0.10	3.272 ± 0.025	1.041 ± 0.007	7.349 ± 0.049
5.47 ± 0.09	3.368 ± 0.025	1.049 ± 0.007	7.406 ± 0.049
5.99 ± 0.09	3.437 ± 0.025	1.048 ± 0.007	7.399 ± 0.049
6.03 ± 0.34	3.451 ± 0.023	1.040 ± 0.007	7.342 ± 0.049
6.50 ± 0.08	3.536 ± 0.028	1.056 ± 0.008	7.455 ± 0.056
6.61 ± 0.29	3.560 ± 0.022	1.044 ± 0.006	7.371 ± 0.042
7.17 ± 0.25	3.621 ± 0.021	1.047 ± 0.006	7.392 ± 0.042
7.71 ± 0.23	3.708 ± 0.022	1.052 ± 0.005	7.427 ± 0.035
8.23 ± 0.21	3.785 ± 0.023	1.058 ± 0.006	7.469 ± 0.042
8.75 ± 0.19	3.882 ± 0.025	1.064 ± 0.005	7.512 ± 0.035
9.26 ± 0.17	3.988 ± 0.025	1.084 ± 0.005	7.653 ± 0.035
9.77 ± 0.16	4.029 ± 0.032	1.098 ± 0.007	7.752 ± 0.049
10.27 ± 0.15	4.121 ± 0.029	1.078 ± 0.006	7.611 ± 0.042
10.76 ± 0.14	4.179 ± 0.028	1.107 ± 0.005	7.815 ± 0.035
11.26 ± 0.14	4.287 ± 0.032	1.111 ± 0.006	7.844 ± 0.042
11.75 ± 0.13	4.364 ± 0.039	1.125 ± 0.006	7.943 ± 0.042
12.24 ± 0.12	4.418 ± 0.032	1.142 ± 0.006	8.063 ± 0.042
12.72 ± 0.12	4.469 ± 0.034	1.146 ± 0.006	8.091 ± 0.042
13.21 ± 0.11	4.524 ± 0.031	1.179 ± 0.005	8.324 ± 0.035
13.69 ± 0.11	4.586 ± 0.033	1.179 ± 0.006	8.324 ± 0.042
14.18 ± 0.10	4.655 ± 0.037	1.180 ± 0.007	8.331 ± 0.049
14.66 ± 0.10	4.702 ± 0.047	1.210 ± 0.009	8.543 ± 0.064

G Tabulated Prompt Fission Gamma-ray Spectra Data

The data used to make the prompt fission gamma-ray spectra plots (Figs. 25 and 26) was generated from a variety of sources. Attempts were made to contact the authors to get the data first-hand, but because this data spans over six decades this proved to be difficult. Where the data was already tabulated, the data was copied into the plotting software, matplotlib [52], and reproduced. When the authors responded to the inquiries, the data was transferred digitally and was reproduced with no loss of information. However, when inquiries were not answered, data from many graphs was painstakingly scraped using GetData Graph Digitizer [53], with the possibility for loss of information. This loss of information is expected to be negligible when visualized, but could be realized in a tabular format. To obviate the hassle of data scraping from the plots in this report, the data used to generate the prompt fission gamma-ray spectra is tabulated below.

Table headers indicate what the data is, followed by their legend entry in Figs. 25 and 26, then followed by the location of the original data. The data can be visualized many ways: a continuous line, a discontinuous step, or points. It is left to the reader on how best to visualize the data, but it may be wise to follow the precedent set by the original curators of the data. That being said, the energy values on the abscissa of the PFGS plots are referred to as 'Energy Bins' in the tables below, even though some data sets represent pointwise values. The values are given in increasing order from left to right with 10 values per line.

G.1 ^{235}U Prompt Fission Gamma-ray Spectra Data Tables

Energy Bins - Char. Flux									
1.000E-02	2.000E-02	3.000E-02	4.500E-02	6.000E-02	8.000E-02	1.000E-01	1.500E-01	2.000E-01	3.000E-01
4.000E-01	4.500E-01	5.000E-01	5.250E-01	6.000E-01	7.000E-01	8.000E-01	9.000E-01	1.000E+00	1.125E+00
1.200E+00	1.330E+00	1.500E+00	1.660E+00	1.875E+00	2.000E+00	2.333E+00	2.500E+00	2.666E+00	3.000E+00
3.500E+00	4.000E+00	4.500E+00	5.000E+00	5.500E+00	6.000E+00	6.500E+00	7.000E+00	7.500E+00	8.000E+00
9.000E+00	1.000E+01	1.200E+01	1.400E+01	1.700E+01	2.000E+01	3.000E+01			
Spectra Values - Char. Flux									
0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.982E+00	1.147E+01	7.759E+00
5.222E+00	5.619E+00	6.374E+00	6.374E+00	5.632E+00	4.150E+00	3.702E+00	3.272E+00	3.049E+00	2.786E+00
2.786E+00	1.668E+00	1.599E+00	1.082E+00	9.789E-01	7.422E-01	6.235E-01	4.658E-01	4.202E-01	3.527E-01
2.531E-01	1.566E-01	9.904E-02	6.507E-02	2.635E-02	1.789E-02	1.253E-02	0.000E+00	0.000E+00	0.000E+00
0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00			

Energy Bins - Stetcu - $\alpha = 1.7$ in Figure 8 of Stetcu, *et al.* [39]									
9.286E-02	9.518E-02	9.756E-02	1.000E-01	1.025E-01	1.051E-01	1.077E-01	1.104E-01	1.131E-01	1.160E-01
1.189E-01	1.218E-01	1.249E-01	1.280E-01	1.312E-01	1.345E-01	1.379E-01	1.413E-01	1.448E-01	1.484E-01
1.522E-01	1.560E-01	1.599E-01	1.639E-01	1.680E-01	1.722E-01	1.765E-01	1.809E-01	1.854E-01	1.900E-01
1.948E-01	1.996E-01	2.046E-01	2.098E-01	2.150E-01	2.204E-01	2.259E-01	2.315E-01	2.373E-01	2.432E-01
2.493E-01	2.556E-01	2.620E-01	2.685E-01	2.752E-01	2.821E-01	2.892E-01	2.964E-01	3.038E-01	3.114E-01

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3.192E-01	3.271E-01	3.353E-01	3.437E-01	3.523E-01	3.611E-01	3.701E-01	3.794E-01	3.889E-01	3.986E-01
4.086E-01	4.188E-01	4.293E-01	4.400E-01	4.510E-01	4.622E-01	4.738E-01	4.857E-01	4.978E-01	5.102E-01
5.230E-01	5.361E-01	5.495E-01	5.632E-01	5.773E-01	5.917E-01	6.065E-01	6.217E-01	6.372E-01	6.532E-01
6.695E-01	6.862E-01	7.034E-01	7.210E-01	7.390E-01	7.575E-01	7.764E-01	7.958E-01	8.157E-01	8.361E-01
8.570E-01	8.784E-01	9.004E-01	9.229E-01	9.460E-01	9.696E-01	9.939E-01	1.019E+00	1.044E+00	1.070E+00
1.097E+00	1.125E+00	1.153E+00	1.181E+00	1.211E+00	1.241E+00	1.272E+00	1.304E+00	1.337E+00	1.370E+00
1.404E+00	1.439E+00	1.475E+00	1.512E+00	1.550E+00	1.589E+00	1.629E+00	1.669E+00	1.711E+00	1.754E+00
1.798E+00	1.843E+00	1.889E+00	1.936E+00	1.984E+00	2.034E+00	2.085E+00	2.137E+00	2.190E+00	2.245E+00
2.301E+00	2.359E+00	2.418E+00	2.478E+00	2.540E+00	2.603E+00	2.669E+00	2.735E+00	2.804E+00	2.874E+00
2.946E+00	3.019E+00	3.095E+00	3.172E+00	3.251E+00	3.333E+00	3.416E+00	3.501E+00	3.589E+00	3.679E+00
3.771E+00	3.865E+00	3.962E+00	4.061E+00	4.162E+00	4.266E+00	4.373E+00	4.482E+00	4.594E+00	4.709E+00
4.827E+00	4.947E+00	5.071E+00	5.198E+00	5.328E+00	5.461E+00	5.598E+00	5.737E+00	5.881E+00	6.028E+00
6.179E+00	6.333E+00	6.491E+00	6.654E+00	6.820E+00	6.990E+00	7.165E+00	7.344E+00	7.528E+00	7.716E+00
7.909E+00	8.107E+00	8.309E+00	8.517E+00	8.730E+00	8.948E+00	9.172E+00	9.401E+00	9.636E+00	9.877E+00

Spectra Values - Stetcu - $\alpha = 1.7$ in Figure 8 of Stetcu, *et al.* [39]

0.000E+00	0.000E+00	5.785E+00	1.134E+01	1.527E+01	8.455E+00	8.879E+00	8.580E+00	6.852E+00	1.122E+01
1.146E+01	1.117E+01	1.366E+01	9.752E+00	1.050E+01	1.095E+01	1.614E+01	1.139E+01	1.150E+01	8.931E+00
8.004E+00	1.131E+01	1.099E+01	8.178E+00	8.044E+00	5.651E+00	5.313E+00	8.204E+00	9.767E+00	8.147E+00
1.063E+01	9.914E+00	9.983E+00	1.200E+01	9.114E+00	7.210E+00	6.452E+00	7.355E+00	8.098E+00	7.955E+00
7.276E+00	6.738E+00	7.114E+00	6.355E+00	6.698E+00	8.172E+00	8.477E+00	7.275E+00	6.981E+00	5.857E+00
5.997E+00	5.739E+00	7.079E+00	7.799E+00	9.399E+00	9.682E+00	7.877E+00	7.511E+00	7.231E+00	6.616E+00
6.373E+00	6.138E+00	5.476E+00	5.252E+00	5.471E+00	7.283E+00	8.899E+00	8.320E+00	5.995E+00	4.948E+00
5.168E+00	4.287E+00	4.837E+00	6.035E+00	6.934E+00	7.137E+00	4.956E+00	4.333E+00	4.254E+00	3.597E+00
4.079E+00	4.406E+00	4.412E+00	4.070E+00	3.602E+00	3.056E+00	3.286E+00	3.811E+00	3.759E+00	3.378E+00
3.134E+00	2.607E+00	2.485E+00	2.565E+00	2.838E+00	2.779E+00	2.667E+00	2.472E+00	2.405E+00	2.549E+00
2.930E+00	2.951E+00	2.764E+00	2.588E+00	2.588E+00	2.547E+00	2.254E+00	1.915E+00	1.815E+00	1.566E+00
1.505E+00	1.458E+00	1.398E+00	1.372E+00	1.295E+00	1.340E+00	1.310E+00	1.231E+00	1.201E+00	1.096E+00
1.018E+00	9.428E-01	9.006E-01	9.169E-01	8.530E-01	8.292E-01	7.703E-01	7.029E-01	6.420E-01	6.173E-01
5.754E-01	5.435E-01	5.103E-01	4.663E-01	4.464E-01	4.143E-01	3.904E-01	3.531E-01	3.342E-01	3.104E-01
2.791E-01	2.554E-01	2.363E-01	2.139E-01	1.932E-01	1.792E-01	1.639E-01	1.496E-01	1.345E-01	1.201E-01
1.088E-01	1.001E-01	8.922E-02	8.007E-02	7.034E-02	6.302E-02	5.772E-02	4.831E-02	4.301E-02	3.740E-02
3.214E-02	2.731E-02	2.393E-02	2.160E-02	1.806E-02	1.462E-02	1.244E-02	1.089E-02	8.875E-03	6.639E-03
5.288E-03	3.928E-03	3.082E-03	2.037E-03	1.827E-03	1.266E-03	9.233E-04	6.963E-04	4.960E-04	3.787E-04
2.001E-04	1.302E-04	7.810E-05	6.670E-05	6.510E-05	4.540E-05	4.420E-05	2.590E-05	2.110E-05	4.110E-06

Energy Bins - Litaize - Private Communication [44]. Updates Figure 3 of Litaize, *et al.* [37]

1.025E-01	1.075E-01	1.125E-01	1.175E-01	1.225E-01	1.275E-01	1.325E-01	1.375E-01	1.425E-01	1.475E-01
1.525E-01	1.575E-01	1.625E-01	1.675E-01	1.725E-01	1.775E-01	1.825E-01	1.875E-01	1.925E-01	1.975E-01
2.025E-01	2.075E-01	2.125E-01	2.175E-01	2.225E-01	2.275E-01	2.325E-01	2.375E-01	2.425E-01	2.475E-01
2.525E-01	2.575E-01	2.625E-01	2.675E-01	2.725E-01	2.775E-01	2.825E-01	2.875E-01	2.925E-01	2.975E-01
3.025E-01	3.075E-01	3.125E-01	3.175E-01	3.225E-01	3.275E-01	3.325E-01	3.375E-01	3.425E-01	3.475E-01
3.525E-01	3.575E-01	3.625E-01	3.675E-01	3.725E-01	3.775E-01	3.825E-01	3.875E-01	3.925E-01	3.975E-01
4.025E-01	4.075E-01	4.125E-01	4.175E-01	4.225E-01	4.275E-01	4.325E-01	4.375E-01	4.425E-01	4.475E-01
4.525E-01	4.575E-01	4.625E-01	4.675E-01	4.725E-01	4.775E-01	4.825E-01	4.875E-01	4.925E-01	4.975E-01
5.025E-01	5.075E-01	5.125E-01	5.175E-01	5.225E-01	5.275E-01	5.325E-01	5.375E-01	5.425E-01	5.475E-01
5.525E-01	5.575E-01	5.625E-01	5.675E-01	5.725E-01	5.775E-01	5.825E-01	5.875E-01	5.925E-01	5.975E-01

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6.025E-01	6.075E-01	6.125E-01	6.175E-01	6.225E-01	6.275E-01	6.325E-01	6.375E-01	6.425E-01	6.475E-01
6.525E-01	6.575E-01	6.625E-01	6.675E-01	6.725E-01	6.775E-01	6.825E-01	6.875E-01	6.925E-01	6.975E-01
7.025E-01	7.075E-01	7.125E-01	7.175E-01	7.225E-01	7.275E-01	7.325E-01	7.375E-01	7.425E-01	7.475E-01
7.525E-01	7.575E-01	7.625E-01	7.675E-01	7.725E-01	7.775E-01	7.825E-01	7.875E-01	7.925E-01	7.975E-01
8.025E-01	8.075E-01	8.125E-01	8.175E-01	8.225E-01	8.275E-01	8.325E-01	8.375E-01	8.425E-01	8.475E-01
8.525E-01	8.575E-01	8.625E-01	8.675E-01	8.725E-01	8.775E-01	8.825E-01	8.875E-01	8.925E-01	8.975E-01
9.025E-01	9.075E-01	9.125E-01	9.175E-01	9.225E-01	9.275E-01	9.325E-01	9.375E-01	9.425E-01	9.475E-01
9.525E-01	9.575E-01	9.625E-01	9.675E-01	9.725E-01	9.775E-01	9.825E-01	9.875E-01	9.925E-01	9.975E-01
1.002E+00	1.008E+00	1.012E+00	1.018E+00	1.022E+00	1.028E+00	1.032E+00	1.038E+00	1.042E+00	1.048E+00
1.052E+00	1.058E+00	1.062E+00	1.067E+00	1.073E+00	1.077E+00	1.083E+00	1.087E+00	1.093E+00	1.097E+00
1.103E+00	1.107E+00	1.113E+00	1.117E+00	1.123E+00	1.127E+00	1.133E+00	1.137E+00	1.143E+00	1.147E+00
1.153E+00	1.157E+00	1.163E+00	1.167E+00	1.173E+00	1.177E+00	1.183E+00	1.188E+00	1.192E+00	1.198E+00
1.202E+00	1.208E+00	1.212E+00	1.218E+00	1.222E+00	1.228E+00	1.232E+00	1.238E+00	1.242E+00	1.248E+00
1.252E+00	1.258E+00	1.262E+00	1.268E+00	1.272E+00	1.278E+00	1.282E+00	1.288E+00	1.292E+00	1.298E+00
1.302E+00	1.308E+00	1.312E+00	1.317E+00	1.323E+00	1.327E+00	1.333E+00	1.337E+00	1.343E+00	1.347E+00
1.353E+00	1.357E+00	1.363E+00	1.367E+00	1.373E+00	1.377E+00	1.383E+00	1.387E+00	1.393E+00	1.397E+00
1.403E+00	1.407E+00	1.436E+00	1.494E+00	1.579E+00	1.652E+00	1.692E+00	1.760E+00	1.840E+00	1.896E+00
1.947E+00	2.012E+00	2.106E+00	2.192E+00	2.248E+00	2.296E+00	2.340E+00	2.393E+00	2.452E+00	2.506E+00
2.562E+00	2.611E+00	2.652E+00	2.713E+00	2.767E+00	2.807E+00	2.893E+00	3.007E+00	3.114E+00	3.224E+00
3.335E+00	3.442E+00	3.544E+00	3.651E+00	3.766E+00	3.877E+00	3.981E+00	4.083E+00	4.183E+00	4.285E+00
4.413E+00	4.574E+00	4.740E+00	4.904E+00	5.068E+00	5.221E+00	5.371E+00	5.533E+00	5.700E+00	5.864E+00
6.038E+00	6.248E+00	6.494E+00	6.756E+00	7.060E+00	7.330E+00	7.480E+00	7.765E+00	8.500E+00	9.500E+00
1.050E+01	1.150E+01	1.250E+01	1.350E+01	1.500E+01	1.700E+01	1.900E+01			

Spectra Values - Litaize - Private Communication [44]. Updates Figure 3 of Litaize, *et al.* [37]

6.592E+00	5.400E+00	6.260E+00	8.939E+00	8.357E+00	7.101E+00	6.254E+00	7.987E+00	9.019E+00	8.876E+00
7.125E+00	8.033E+00	7.978E+00	6.917E+00	5.723E+00	5.933E+00	6.732E+00	7.429E+00	8.420E+00	1.052E+01
1.051E+01	9.559E+00	1.014E+01	9.428E+00	7.907E+00	6.287E+00	5.944E+00	6.128E+00	6.832E+00	7.006E+00
7.192E+00	7.178E+00	6.796E+00	6.022E+00	5.444E+00	6.286E+00	6.705E+00	8.294E+00	8.587E+00	8.473E+00
7.881E+00	7.028E+00	5.935E+00	5.419E+00	6.696E+00	7.138E+00	7.652E+00	9.336E+00	8.774E+00	9.159E+00
1.025E+01	9.530E+00	9.723E+00	1.023E+01	7.840E+00	7.838E+00	7.914E+00	8.150E+00	7.348E+00	7.467E+00
7.416E+00	7.401E+00	7.526E+00	7.142E+00	7.335E+00	7.296E+00	7.407E+00	6.663E+00	7.042E+00	6.785E+00
6.507E+00	6.587E+00	7.405E+00	9.012E+00	1.004E+01	1.020E+01	1.051E+01	1.046E+01	9.948E+00	9.631E+00
7.512E+00	6.907E+00	6.401E+00	6.463E+00	6.127E+00	5.820E+00	5.728E+00	5.959E+00	6.336E+00	6.489E+00
6.902E+00	6.981E+00	7.036E+00	7.630E+00	8.655E+00	8.329E+00	8.564E+00	8.579E+00	8.703E+00	8.954E+00
8.942E+00	8.235E+00	7.378E+00	7.281E+00	7.049E+00	6.596E+00	6.115E+00	6.454E+00	6.444E+00	6.251E+00
5.889E+00	5.493E+00	5.504E+00	6.127E+00	6.728E+00	7.099E+00	7.119E+00	7.065E+00	6.844E+00	6.975E+00
7.185E+00	7.716E+00	7.253E+00	6.736E+00	6.667E+00	6.874E+00	6.692E+00	6.940E+00	6.719E+00	6.043E+00
5.686E+00	4.979E+00	4.911E+00	4.638E+00	4.410E+00	4.376E+00	4.554E+00	4.441E+00	4.416E+00	4.472E+00
4.788E+00	4.705E+00	4.686E+00	4.493E+00	4.706E+00	4.767E+00	4.863E+00	4.767E+00	4.889E+00	4.967E+00
4.800E+00	4.290E+00	4.315E+00	4.263E+00	4.339E+00	3.854E+00	3.385E+00	3.188E+00	3.054E+00	2.997E+00
3.021E+00	2.971E+00	2.979E+00	2.927E+00	2.814E+00	2.904E+00	2.852E+00	2.946E+00	3.115E+00	3.167E+00
3.281E+00	3.194E+00	3.061E+00	3.054E+00	2.976E+00	2.977E+00	3.013E+00	3.012E+00	2.977E+00	2.959E+00
2.901E+00	2.862E+00	2.870E+00	2.815E+00	2.812E+00	2.711E+00	2.647E+00	2.571E+00	2.645E+00	2.648E+00
2.610E+00	2.590E+00	2.507E+00	2.499E+00	2.600E+00	2.775E+00	2.686E+00	2.684E+00	2.667E+00	2.777E+00
2.820E+00	2.779E+00	2.780E+00	2.730E+00	2.708E+00	2.740E+00	2.688E+00	2.685E+00	2.593E+00	2.614E+00
2.334E+00	2.381E+00	2.298E+00	2.432E+00	2.379E+00	2.303E+00	2.235E+00	2.289E+00	2.396E+00	2.287E+00
2.267E+00	2.287E+00	2.280E+00	2.244E+00	2.189E+00	2.165E+00	2.117E+00	2.292E+00	2.265E+00	2.314E+00
2.345E+00	2.411E+00	2.275E+00	2.240E+00	2.293E+00	2.151E+00	1.983E+00	2.023E+00	1.940E+00	1.934E+00
1.968E+00	1.963E+00	1.943E+00	1.917E+00	1.904E+00	1.817E+00	1.815E+00	1.816E+00	1.784E+00	1.770E+00
1.863E+00	1.755E+00	1.698E+00	1.700E+00	1.597E+00	1.529E+00	1.496E+00	1.530E+00	1.586E+00	1.583E+00
1.511E+00	1.466E+00	1.403E+00	1.295E+00	1.167E+00	1.135E+00	1.066E+00	9.487E-01	8.470E-01	7.854E-01

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7.521E-01	6.935E-01	6.394E-01	5.854E-01	6.054E-01	5.963E-01	5.950E-01	5.612E-01	4.907E-01	4.567E-01
4.263E-01	4.010E-01	3.854E-01	3.725E-01	3.606E-01	3.549E-01	3.188E-01	2.705E-01	2.430E-01	2.230E-01
2.011E-01	1.753E-01	1.509E-01	1.324E-01	1.147E-01	1.053E-01	9.156E-02	8.747E-02	8.245E-02	7.583E-02
6.402E-02	4.623E-02	3.733E-02	3.180E-02	2.379E-02	2.035E-02	1.642E-02	1.268E-02	1.055E-02	7.720E-03
6.081E-03	4.440E-03	2.319E-03	1.452E-03	9.084E-04	3.973E-04	2.820E-04	1.305E-04	2.560E-05	5.120E-06
2.560E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00			

1-sided standard deviation of Spectra Values - Litaize - Private Communication [44]. Updates Figure 3 of Litaize, *et al.* [37]

5.800E-02	5.250E-02	5.650E-02	6.740E-02	6.520E-02	6.010E-02	5.650E-02	6.380E-02	6.770E-02	6.720E-02
6.020E-02	6.390E-02	6.370E-02	5.940E-02	5.400E-02	5.500E-02	5.860E-02	6.150E-02	6.550E-02	7.310E-02
7.310E-02	6.970E-02	7.180E-02	6.930E-02	6.350E-02	5.660E-02	5.500E-02	5.590E-02	5.900E-02	5.970E-02
6.050E-02	6.050E-02	5.880E-02	5.540E-02	5.270E-02	5.660E-02	5.840E-02	6.500E-02	6.610E-02	6.570E-02
6.330E-02	5.980E-02	5.500E-02	5.260E-02	5.840E-02	6.030E-02	6.240E-02	6.890E-02	6.680E-02	6.830E-02
7.220E-02	6.960E-02	7.030E-02	7.210E-02	6.320E-02	6.320E-02	6.350E-02	6.440E-02	6.120E-02	6.170E-02
6.150E-02	6.140E-02	6.190E-02	6.030E-02	6.110E-02	6.100E-02	6.140E-02	5.830E-02	5.990E-02	5.880E-02
5.760E-02	5.790E-02	6.140E-02	6.770E-02	7.140E-02	7.200E-02	7.310E-02	7.290E-02	7.110E-02	7.000E-02
6.190E-02	5.930E-02	5.710E-02	5.740E-02	5.590E-02	5.450E-02	5.400E-02	5.510E-02	5.680E-02	5.750E-02
5.930E-02	5.960E-02	5.990E-02	6.230E-02	6.640E-02	6.510E-02	6.600E-02	6.610E-02	6.660E-02	6.750E-02
6.750E-02	6.470E-02	6.130E-02	6.090E-02	5.990E-02	5.800E-02	5.580E-02	5.730E-02	5.730E-02	5.640E-02
5.480E-02	5.290E-02	5.300E-02	5.590E-02	5.850E-02	6.010E-02	6.020E-02	6.000E-02	5.910E-02	5.960E-02
6.050E-02	6.270E-02	6.080E-02	5.860E-02	5.830E-02	5.920E-02	5.840E-02	5.950E-02	5.850E-02	5.550E-02
5.380E-02	5.040E-02	5.010E-02	4.860E-02	4.740E-02	4.730E-02	4.820E-02	4.760E-02	4.750E-02	4.780E-02
4.940E-02	4.900E-02	4.890E-02	4.790E-02	4.900E-02	4.930E-02	4.980E-02	4.930E-02	4.990E-02	5.030E-02
4.950E-02	4.680E-02	4.690E-02	4.660E-02	4.710E-02	4.440E-02	4.160E-02	4.030E-02	3.950E-02	3.910E-02
3.930E-02	3.900E-02	3.900E-02	3.870E-02	3.790E-02	3.850E-02	3.820E-02	3.880E-02	3.990E-02	4.020E-02
4.090E-02	4.040E-02	3.950E-02	3.950E-02	3.900E-02	3.900E-02	3.920E-02	3.920E-02	3.900E-02	3.890E-02
3.850E-02	3.820E-02	3.830E-02	3.790E-02	3.790E-02	3.720E-02	3.680E-02	3.620E-02	3.680E-02	3.680E-02
3.650E-02	3.640E-02	3.580E-02	3.570E-02	3.640E-02	3.770E-02	3.700E-02	3.700E-02	3.690E-02	3.770E-02
3.800E-02	3.770E-02	3.770E-02	3.730E-02	3.720E-02	3.740E-02	3.710E-02	3.700E-02	3.640E-02	3.650E-02
3.450E-02	3.490E-02	3.430E-02	3.520E-02	3.490E-02	3.430E-02	3.380E-02	3.420E-02	3.500E-02	3.420E-02
3.400E-02	3.420E-02	3.410E-02	3.390E-02	3.340E-02	3.330E-02	3.290E-02	3.420E-02	3.400E-02	3.440E-02
3.460E-02	3.510E-02	3.410E-02	3.380E-02	3.420E-02	3.320E-02	3.180E-02	3.210E-02	3.150E-02	3.140E-02
3.170E-02	3.170E-02	3.150E-02	3.130E-02	3.120E-02	3.050E-02	3.050E-02	3.050E-02	3.020E-02	3.010E-02
3.090E-02	2.990E-02	2.950E-02	2.950E-02	2.860E-02	2.800E-02	2.770E-02	2.800E-02	2.850E-02	2.840E-02
2.780E-02	2.740E-02	8.240E-03	7.170E-03	5.290E-03	8.350E-03	8.430E-03	4.930E-03	5.960E-03	6.260E-03
6.130E-03	4.700E-03	3.870E-03	4.840E-03	5.680E-03	5.640E-03	6.050E-03	4.740E-03	4.810E-03	4.640E-03
4.360E-03	4.970E-03	4.870E-03	3.450E-03	5.670E-03	4.210E-03	2.590E-03	2.560E-03	2.390E-03	2.260E-03
2.140E-03	2.090E-03	1.940E-03	1.740E-03	1.580E-03	1.600E-03	1.510E-03	1.480E-03	1.460E-03	1.360E-03
1.040E-03	8.280E-04	7.730E-04	6.940E-04	6.180E-04	5.950E-04	5.240E-04	4.380E-04	4.030E-04	3.480E-04
2.900E-04	2.210E-04	1.510E-04	1.180E-04	8.260E-05	7.140E-05	8.500E-05	2.660E-05	8.090E-06	3.620E-06
2.560E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00			

Energy Bins - Verbeke - Eq. 11 of Verbeke, Hagmann, and Wright [26]

1.000E-01	1.100E-01	1.200E-01	1.300E-01	1.400E-01	1.500E-01	1.600E-01	1.700E-01	1.800E-01	1.900E-01
2.000E-01	2.100E-01	2.200E-01	2.300E-01	2.400E-01	2.500E-01	2.600E-01	2.700E-01	2.800E-01	2.900E-01
3.000E-01	3.100E-01	3.200E-01	3.300E-01	3.400E-01	3.500E-01	3.600E-01	3.700E-01	3.800E-01	3.900E-01
4.000E-01	4.100E-01	4.200E-01	4.300E-01	4.400E-01	4.500E-01	4.600E-01	4.700E-01	4.800E-01	4.900E-01
5.000E-01	5.100E-01	5.200E-01	5.300E-01	5.400E-01	5.500E-01	5.600E-01	5.700E-01	5.800E-01	5.900E-01
6.000E-01	6.100E-01	6.200E-01	6.300E-01	6.400E-01	6.500E-01	6.600E-01	6.700E-01	6.800E-01	6.900E-01

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7.000E-01	7.100E-01	7.200E-01	7.300E-01	7.400E-01	7.500E-01	7.600E-01	7.700E-01	7.800E-01	7.900E-01
8.000E-01	8.100E-01	8.200E-01	8.300E-01	8.400E-01	8.500E-01	8.600E-01	8.700E-01	8.800E-01	8.900E-01
9.000E-01	9.100E-01	9.200E-01	9.300E-01	9.400E-01	9.500E-01	9.600E-01	9.700E-01	9.800E-01	9.900E-01
1.000E+00	1.010E+00	1.020E+00	1.030E+00	1.040E+00	1.050E+00	1.060E+00	1.070E+00	1.080E+00	1.090E+00
1.100E+00	1.110E+00	1.120E+00	1.130E+00	1.140E+00	1.150E+00	1.160E+00	1.170E+00	1.180E+00	1.190E+00
1.200E+00	1.210E+00	1.220E+00	1.230E+00	1.240E+00	1.250E+00	1.260E+00	1.270E+00	1.280E+00	1.290E+00
1.300E+00	1.310E+00	1.320E+00	1.330E+00	1.340E+00	1.350E+00	1.360E+00	1.370E+00	1.380E+00	1.390E+00
1.400E+00	1.410E+00	1.420E+00	1.430E+00	1.440E+00	1.450E+00	1.460E+00	1.470E+00	1.480E+00	1.490E+00
1.500E+00	1.510E+00	1.520E+00	1.530E+00	1.540E+00	1.550E+00	1.560E+00	1.570E+00	1.580E+00	1.590E+00
1.600E+00	1.610E+00	1.620E+00	1.630E+00	1.640E+00	1.650E+00	1.660E+00	1.670E+00	1.680E+00	1.690E+00
1.700E+00	1.710E+00	1.720E+00	1.730E+00	1.740E+00	1.750E+00	1.760E+00	1.770E+00	1.780E+00	1.790E+00
1.800E+00	1.810E+00	1.820E+00	1.830E+00	1.840E+00	1.850E+00	1.860E+00	1.870E+00	1.880E+00	1.890E+00
1.900E+00	1.910E+00	1.920E+00	1.930E+00	1.940E+00	1.950E+00	1.960E+00	1.970E+00	1.980E+00	1.990E+00
2.000E+00	2.010E+00	2.020E+00	2.030E+00	2.040E+00	2.050E+00	2.060E+00	2.070E+00	2.080E+00	2.090E+00
2.100E+00	2.110E+00	2.120E+00	2.130E+00	2.140E+00	2.150E+00	2.160E+00	2.170E+00	2.180E+00	2.190E+00
2.200E+00	2.210E+00	2.220E+00	2.230E+00	2.240E+00	2.250E+00	2.260E+00	2.270E+00	2.280E+00	2.290E+00
2.300E+00	2.310E+00	2.320E+00	2.330E+00	2.340E+00	2.350E+00	2.360E+00	2.370E+00	2.380E+00	2.390E+00
2.400E+00	2.410E+00	2.420E+00	2.430E+00	2.440E+00	2.450E+00	2.460E+00	2.470E+00	2.480E+00	2.490E+00
2.500E+00	2.510E+00	2.520E+00	2.530E+00	2.540E+00	2.550E+00	2.560E+00	2.570E+00	2.580E+00	2.590E+00
2.600E+00	2.610E+00	2.620E+00	2.630E+00	2.640E+00	2.650E+00	2.660E+00	2.670E+00	2.680E+00	2.690E+00
2.700E+00	2.710E+00	2.720E+00	2.730E+00	2.740E+00	2.750E+00	2.760E+00	2.770E+00	2.780E+00	2.790E+00
2.800E+00	2.810E+00	2.820E+00	2.830E+00	2.840E+00	2.850E+00	2.860E+00	2.870E+00	2.880E+00	2.890E+00
2.900E+00	2.910E+00	2.920E+00	2.930E+00	2.940E+00	2.950E+00	2.960E+00	2.970E+00	2.980E+00	2.990E+00
3.000E+00	3.010E+00	3.020E+00	3.030E+00	3.040E+00	3.050E+00	3.060E+00	3.070E+00	3.080E+00	3.090E+00
3.100E+00	3.110E+00	3.120E+00	3.130E+00	3.140E+00	3.150E+00	3.160E+00	3.170E+00	3.180E+00	3.190E+00
3.200E+00	3.210E+00	3.220E+00	3.230E+00	3.240E+00	3.250E+00	3.260E+00	3.270E+00	3.280E+00	3.290E+00
3.300E+00	3.310E+00	3.320E+00	3.330E+00	3.340E+00	3.350E+00	3.360E+00	3.370E+00	3.380E+00	3.390E+00
3.400E+00	3.410E+00	3.420E+00	3.430E+00	3.440E+00	3.450E+00	3.460E+00	3.470E+00	3.480E+00	3.490E+00
3.500E+00	3.510E+00	3.520E+00	3.530E+00	3.540E+00	3.550E+00	3.560E+00	3.570E+00	3.580E+00	3.590E+00
3.600E+00	3.610E+00	3.620E+00	3.630E+00	3.640E+00	3.650E+00	3.660E+00	3.670E+00	3.680E+00	3.690E+00
3.700E+00	3.710E+00	3.720E+00	3.730E+00	3.740E+00	3.750E+00	3.760E+00	3.770E+00	3.780E+00	3.790E+00
3.800E+00	3.810E+00	3.820E+00	3.830E+00	3.840E+00	3.850E+00	3.860E+00	3.870E+00	3.880E+00	3.890E+00
3.900E+00	3.910E+00	3.920E+00	3.930E+00	3.940E+00	3.950E+00	3.960E+00	3.970E+00	3.980E+00	3.990E+00
4.000E+00	4.010E+00	4.020E+00	4.030E+00	4.040E+00	4.050E+00	4.060E+00	4.070E+00	4.080E+00	4.090E+00
4.100E+00	4.110E+00	4.120E+00	4.130E+00	4.140E+00	4.150E+00	4.160E+00	4.170E+00	4.180E+00	4.190E+00
4.200E+00	4.210E+00	4.220E+00	4.230E+00	4.240E+00	4.250E+00	4.260E+00	4.270E+00	4.280E+00	4.290E+00
4.300E+00	4.310E+00	4.320E+00	4.330E+00	4.340E+00	4.350E+00	4.360E+00	4.370E+00	4.380E+00	4.390E+00
4.400E+00	4.410E+00	4.420E+00	4.430E+00	4.440E+00	4.450E+00	4.460E+00	4.470E+00	4.480E+00	4.490E+00
4.500E+00	4.510E+00	4.520E+00	4.530E+00	4.540E+00	4.550E+00	4.560E+00	4.570E+00	4.580E+00	4.590E+00
4.600E+00	4.610E+00	4.620E+00	4.630E+00	4.640E+00	4.650E+00	4.660E+00	4.670E+00	4.680E+00	4.690E+00
4.700E+00	4.710E+00	4.720E+00	4.730E+00	4.740E+00	4.750E+00	4.760E+00	4.770E+00	4.780E+00	4.790E+00
4.800E+00	4.810E+00	4.820E+00	4.830E+00	4.840E+00	4.850E+00	4.860E+00	4.870E+00	4.880E+00	4.890E+00
4.900E+00	4.910E+00	4.920E+00	4.930E+00	4.940E+00	4.950E+00	4.960E+00	4.970E+00	4.980E+00	4.990E+00
5.000E+00	5.010E+00	5.020E+00	5.030E+00	5.040E+00	5.050E+00	5.060E+00	5.070E+00	5.080E+00	5.090E+00
5.100E+00	5.110E+00	5.120E+00	5.130E+00	5.140E+00	5.150E+00	5.160E+00	5.170E+00	5.180E+00	5.190E+00
5.200E+00	5.210E+00	5.220E+00	5.230E+00	5.240E+00	5.250E+00	5.260E+00	5.270E+00	5.280E+00	5.290E+00
5.300E+00	5.310E+00	5.320E+00	5.330E+00	5.340E+00	5.350E+00	5.360E+00	5.370E+00	5.380E+00	5.390E+00
5.400E+00	5.410E+00	5.420E+00	5.430E+00	5.440E+00	5.450E+00	5.460E+00	5.470E+00	5.480E+00	5.490E+00
5.500E+00	5.510E+00	5.520E+00	5.530E+00	5.540E+00	5.550E+00	5.560E+00	5.570E+00	5.580E+00	5.590E+00
5.600E+00	5.610E+00	5.620E+00	5.630E+00	5.640E+00	5.650E+00	5.660E+00	5.670E+00	5.680E+00	5.690E+00
5.700E+00	5.710E+00	5.720E+00	5.730E+00	5.740E+00	5.750E+00	5.760E+00	5.770E+00	5.780E+00	5.790E+00
5.800E+00	5.810E+00	5.820E+00	5.830E+00	5.840E+00	5.850E+00	5.860E+00	5.870E+00	5.880E+00	5.890E+00

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5.900E+00	5.910E+00	5.920E+00	5.930E+00	5.940E+00	5.950E+00	5.960E+00	5.970E+00	5.980E+00	5.990E+00
6.000E+00	6.010E+00	6.020E+00	6.030E+00	6.040E+00	6.050E+00	6.060E+00	6.070E+00	6.080E+00	6.090E+00
6.100E+00	6.110E+00	6.120E+00	6.130E+00	6.140E+00	6.150E+00	6.160E+00	6.170E+00	6.180E+00	6.190E+00
6.200E+00	6.210E+00	6.220E+00	6.230E+00	6.240E+00	6.250E+00	6.260E+00	6.270E+00	6.280E+00	6.290E+00
6.300E+00	6.310E+00	6.320E+00	6.330E+00	6.340E+00	6.350E+00	6.360E+00	6.370E+00	6.380E+00	6.390E+00
6.400E+00	6.410E+00	6.420E+00	6.430E+00	6.440E+00	6.450E+00	6.460E+00	6.470E+00	6.480E+00	6.490E+00
6.500E+00	6.510E+00	6.520E+00	6.530E+00	6.540E+00	6.550E+00	6.560E+00	6.570E+00	6.580E+00	6.590E+00
6.600E+00	6.610E+00	6.620E+00	6.630E+00	6.640E+00	6.650E+00	6.660E+00	6.670E+00	6.680E+00	6.690E+00
6.700E+00	6.710E+00	6.720E+00	6.730E+00	6.740E+00	6.750E+00	6.760E+00	6.770E+00	6.780E+00	6.790E+00
6.800E+00	6.810E+00	6.820E+00	6.830E+00	6.840E+00	6.850E+00	6.860E+00	6.870E+00	6.880E+00	6.890E+00
6.900E+00	6.910E+00	6.920E+00	6.930E+00	6.940E+00	6.950E+00	6.960E+00	6.970E+00	6.980E+00	6.990E+00
7.000E+00	7.010E+00	7.020E+00	7.030E+00	7.040E+00	7.050E+00	7.060E+00	7.070E+00	7.080E+00	7.090E+00
7.100E+00	7.110E+00	7.120E+00	7.130E+00	7.140E+00	7.150E+00	7.160E+00	7.170E+00	7.180E+00	7.190E+00
7.200E+00	7.210E+00	7.220E+00	7.230E+00	7.240E+00	7.250E+00	7.260E+00	7.270E+00	7.280E+00	7.290E+00
7.300E+00	7.310E+00	7.320E+00	7.330E+00	7.340E+00	7.350E+00	7.360E+00	7.370E+00	7.380E+00	7.390E+00
7.400E+00	7.410E+00	7.420E+00	7.430E+00	7.440E+00	7.450E+00	7.460E+00	7.470E+00	7.480E+00	7.490E+00
7.500E+00	7.510E+00	7.520E+00	7.530E+00	7.540E+00	7.550E+00	7.560E+00	7.570E+00	7.580E+00	7.590E+00
7.600E+00	7.610E+00	7.620E+00	7.630E+00	7.640E+00	7.650E+00	7.660E+00	7.670E+00	7.680E+00	7.690E+00
7.700E+00	7.710E+00	7.720E+00	7.730E+00	7.740E+00	7.750E+00	7.760E+00	7.770E+00	7.780E+00	7.790E+00
7.800E+00	7.810E+00	7.820E+00	7.830E+00	7.840E+00	7.850E+00	7.860E+00	7.870E+00	7.880E+00	7.890E+00
7.900E+00	7.910E+00	7.920E+00	7.930E+00	7.940E+00	7.950E+00	7.960E+00	7.970E+00	7.980E+00	7.990E+00
8.000E+00									

Spectra Values - Verbeke - Eq. 11 of Verbeke, Hagmann, and Wright [26]

6.744E-01	1.143E+00	1.626E+00	2.126E+00	2.641E+00	3.173E+00	3.723E+00	4.289E+00	4.873E+00	5.476E+00
6.097E+00	6.737E+00	7.397E+00	8.077E+00	8.777E+00	9.499E+00	1.024E+01	1.101E+01	1.180E+01	1.261E+01
1.344E+01	1.314E+01	1.284E+01	1.255E+01	1.226E+01	1.198E+01	1.171E+01	1.144E+01	1.118E+01	1.093E+01
1.068E+01	1.044E+01	1.020E+01	9.968E+00	9.742E+00	9.520E+00	9.304E+00	9.092E+00	8.885E+00	8.683E+00
8.486E+00	8.293E+00	8.104E+00	7.920E+00	7.740E+00	7.564E+00	7.392E+00	7.224E+00	7.060E+00	6.899E+00
6.742E+00	6.589E+00	6.439E+00	6.293E+00	6.150E+00	6.010E+00	5.873E+00	5.740E+00	5.609E+00	5.482E+00
5.357E+00	5.235E+00	5.116E+00	5.000E+00	4.886E+00	4.775E+00	4.666E+00	4.560E+00	4.457E+00	4.355E+00
4.256E+00	4.160E+00	4.065E+00	3.973E+00	3.882E+00	3.794E+00	3.708E+00	3.623E+00	3.541E+00	3.460E+00
3.382E+00	3.305E+00	3.230E+00	3.156E+00	3.085E+00	3.014E+00	2.946E+00	2.879E+00	2.813E+00	2.749E+00
2.687E+00	2.634E+00	2.605E+00	2.577E+00	2.548E+00	2.520E+00	2.493E+00	2.466E+00	2.439E+00	2.412E+00
2.386E+00	2.359E+00	2.334E+00	2.308E+00	2.283E+00	2.258E+00	2.233E+00	2.209E+00	2.185E+00	2.161E+00
2.137E+00	2.114E+00	2.091E+00	2.068E+00	2.045E+00	2.023E+00	2.001E+00	1.979E+00	1.957E+00	1.936E+00
1.914E+00	1.894E+00	1.873E+00	1.852E+00	1.832E+00	1.812E+00	1.792E+00	1.773E+00	1.753E+00	1.734E+00
1.715E+00	1.696E+00	1.678E+00	1.659E+00	1.641E+00	1.623E+00	1.606E+00	1.588E+00	1.571E+00	1.553E+00
1.536E+00	1.520E+00	1.503E+00	1.487E+00	1.470E+00	1.454E+00	1.438E+00	1.423E+00	1.407E+00	1.392E+00
1.376E+00	1.361E+00	1.346E+00	1.332E+00	1.317E+00	1.303E+00	1.288E+00	1.274E+00	1.260E+00	1.247E+00
1.233E+00	1.220E+00	1.206E+00	1.193E+00	1.180E+00	1.167E+00	1.154E+00	1.142E+00	1.129E+00	1.117E+00
1.105E+00	1.092E+00	1.081E+00	1.069E+00	1.057E+00	1.045E+00	1.034E+00	1.023E+00	1.012E+00	1.000E+00
9.895E-01	9.787E-01	9.680E-01	9.574E-01	9.469E-01	9.365E-01	9.263E-01	9.162E-01	9.061E-01	8.962E-01
8.864E-01	8.767E-01	8.671E-01	8.577E-01	8.483E-01	8.390E-01	8.298E-01	8.207E-01	8.118E-01	8.029E-01
7.941E-01	7.854E-01	7.768E-01	7.683E-01	7.599E-01	7.516E-01	7.434E-01	7.352E-01	7.272E-01	7.192E-01
7.114E-01	7.036E-01	6.959E-01	6.883E-01	6.808E-01	6.733E-01	6.659E-01	6.587E-01	6.514E-01	6.443E-01
6.373E-01	6.303E-01	6.234E-01	6.166E-01	6.098E-01	6.032E-01	5.966E-01	5.900E-01	5.836E-01	5.772E-01
5.709E-01	5.646E-01	5.585E-01	5.524E-01	5.463E-01	5.403E-01	5.344E-01	5.286E-01	5.228E-01	5.171E-01
5.114E-01	5.058E-01	5.003E-01	4.948E-01	4.894E-01	4.841E-01	4.788E-01	4.735E-01	4.683E-01	4.632E-01
4.582E-01	4.531E-01	4.482E-01	4.433E-01	4.384E-01	4.336E-01	4.289E-01	4.242E-01	4.196E-01	4.150E-01
4.104E-01	4.059E-01	4.015E-01	3.971E-01	3.928E-01	3.885E-01	3.842E-01	3.800E-01	3.759E-01	3.717E-01
3.677E-01	3.637E-01	3.597E-01	3.557E-01	3.518E-01	3.480E-01	3.442E-01	3.404E-01	3.367E-01	3.330E-01

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3.294E-01	3.258E-01	3.222E-01	3.187E-01	3.152E-01	3.117E-01	3.083E-01	3.050E-01	3.016E-01	2.983E-01
2.951E-01	2.918E-01	2.886E-01	2.855E-01	2.824E-01	2.793E-01	2.762E-01	2.732E-01	2.702E-01	2.673E-01
2.643E-01	2.614E-01	2.586E-01	2.557E-01	2.530E-01	2.502E-01	2.474E-01	2.447E-01	2.421E-01	2.394E-01
2.368E-01	2.342E-01	2.316E-01	2.291E-01	2.266E-01	2.241E-01	2.217E-01	2.192E-01	2.168E-01	2.145E-01
2.121E-01	2.098E-01	2.075E-01	2.052E-01	2.030E-01	2.008E-01	1.986E-01	1.964E-01	1.943E-01	1.921E-01
1.900E-01	1.880E-01	1.859E-01	1.839E-01	1.819E-01	1.799E-01	1.779E-01	1.759E-01	1.740E-01	1.721E-01
1.702E-01	1.684E-01	1.665E-01	1.647E-01	1.629E-01	1.611E-01	1.594E-01	1.576E-01	1.559E-01	1.542E-01
1.525E-01	1.508E-01	1.492E-01	1.476E-01	1.459E-01	1.443E-01	1.428E-01	1.412E-01	1.397E-01	1.381E-01
1.366E-01	1.351E-01	1.336E-01	1.322E-01	1.307E-01	1.293E-01	1.279E-01	1.265E-01	1.251E-01	1.237E-01
1.224E-01	1.210E-01	1.197E-01	1.184E-01	1.171E-01	1.158E-01	1.146E-01	1.133E-01	1.121E-01	1.109E-01
1.096E-01	1.084E-01	1.073E-01	1.061E-01	1.049E-01	1.038E-01	1.026E-01	1.015E-01	1.004E-01	9.931E-02
9.822E-02	9.714E-02	9.608E-02	9.503E-02	9.399E-02	9.296E-02	9.195E-02	9.094E-02	8.994E-02	8.896E-02
8.799E-02	8.703E-02	8.607E-02	8.513E-02	8.420E-02	8.328E-02	8.237E-02	8.147E-02	8.058E-02	7.969E-02
7.882E-02	7.796E-02	7.711E-02	7.626E-02	7.543E-02	7.460E-02	7.379E-02	7.298E-02	7.218E-02	7.139E-02
7.061E-02	6.984E-02	6.908E-02	6.832E-02	6.757E-02	6.683E-02	6.610E-02	6.538E-02	6.466E-02	6.396E-02
6.326E-02	6.256E-02	6.188E-02	6.120E-02	6.053E-02	5.987E-02	5.922E-02	5.857E-02	5.793E-02	5.729E-02
5.667E-02	5.605E-02	5.543E-02	5.483E-02	5.423E-02	5.363E-02	5.305E-02	5.247E-02	5.189E-02	5.133E-02
5.076E-02	5.021E-02	4.966E-02	4.912E-02	4.858E-02	4.805E-02	4.752E-02	4.700E-02	4.649E-02	4.598E-02
4.548E-02	4.498E-02	4.449E-02	4.400E-02	4.352E-02	4.304E-02	4.257E-02	4.211E-02	4.165E-02	4.119E-02
4.074E-02	4.029E-02	3.985E-02	3.942E-02	3.899E-02	3.856E-02	3.814E-02	3.772E-02	3.731E-02	3.690E-02
3.650E-02	3.610E-02	3.570E-02	3.531E-02	3.492E-02	3.454E-02	3.416E-02	3.379E-02	3.342E-02	3.306E-02
3.269E-02	3.234E-02	3.198E-02	3.163E-02	3.129E-02	3.094E-02	3.061E-02	3.027E-02	2.994E-02	2.961E-02
2.929E-02	2.897E-02	2.865E-02	2.834E-02	2.803E-02	2.772E-02	2.742E-02	2.712E-02	2.682E-02	2.653E-02
2.624E-02	2.595E-02	2.567E-02	2.539E-02	2.511E-02	2.483E-02	2.456E-02	2.429E-02	2.403E-02	2.376E-02
2.350E-02	2.325E-02	2.299E-02	2.274E-02	2.249E-02	2.225E-02	2.200E-02	2.176E-02	2.152E-02	2.129E-02
2.106E-02	2.083E-02	2.060E-02	2.037E-02	2.015E-02	1.993E-02	1.971E-02	1.950E-02	1.928E-02	1.907E-02
1.886E-02	1.866E-02	1.845E-02	1.825E-02	1.805E-02	1.785E-02	1.766E-02	1.746E-02	1.727E-02	1.708E-02
1.690E-02	1.671E-02	1.653E-02	1.635E-02	1.617E-02	1.599E-02	1.582E-02	1.565E-02	1.547E-02	1.531E-02
1.514E-02	1.497E-02	1.481E-02	1.465E-02	1.449E-02	1.433E-02	1.417E-02	1.402E-02	1.386E-02	1.371E-02
1.356E-02	1.341E-02	1.327E-02	1.312E-02	1.298E-02	1.284E-02	1.269E-02	1.256E-02	1.242E-02	1.228E-02
1.215E-02	1.202E-02	1.188E-02	1.175E-02	1.163E-02	1.150E-02	1.137E-02	1.125E-02	1.113E-02	1.100E-02
1.088E-02	1.076E-02	1.065E-02	1.053E-02	1.041E-02	1.030E-02	1.019E-02	1.008E-02	9.966E-03	9.857E-03
9.749E-03	9.643E-03	9.537E-03	9.433E-03	9.330E-03	9.228E-03	9.127E-03	9.027E-03	8.928E-03	8.830E-03
8.734E-03	8.638E-03	8.544E-03	8.450E-03	8.358E-03	8.266E-03	8.176E-03	8.087E-03	7.998E-03	7.911E-03
7.824E-03	7.738E-03	7.654E-03	7.570E-03	7.487E-03	7.405E-03	7.324E-03	7.244E-03	7.165E-03	7.087E-03
7.009E-03	6.932E-03	6.856E-03	6.781E-03	6.707E-03	6.634E-03	6.561E-03	6.490E-03	6.419E-03	6.348E-03
6.279E-03	6.210E-03	6.142E-03	6.075E-03	6.009E-03	5.943E-03	5.878E-03	5.814E-03	5.750E-03	5.687E-03
5.625E-03	5.563E-03	5.502E-03	5.442E-03	5.383E-03	5.324E-03	5.266E-03	5.208E-03	5.151E-03	5.095E-03
5.039E-03	4.984E-03	4.929E-03	4.875E-03	4.822E-03	4.769E-03	4.717E-03	4.666E-03	4.614E-03	4.564E-03
4.514E-03	4.465E-03	4.416E-03	4.368E-03	4.320E-03	4.272E-03	4.226E-03	4.180E-03	4.134E-03	4.089E-03
4.044E-03	4.000E-03	3.956E-03	3.913E-03	3.870E-03	3.827E-03	3.786E-03	3.744E-03	3.703E-03	3.663E-03
3.623E-03	3.583E-03	3.544E-03	3.505E-03	3.467E-03	3.429E-03	3.391E-03	3.354E-03	3.317E-03	3.281E-03
3.245E-03	3.210E-03	3.175E-03	3.140E-03	3.106E-03	3.072E-03	3.038E-03	3.005E-03	2.972E-03	2.939E-03
2.907E-03	2.875E-03	2.844E-03	2.813E-03	2.782E-03	2.752E-03	2.722E-03	2.692E-03	2.662E-03	2.633E-03
2.604E-03	2.576E-03	2.548E-03	2.520E-03	2.492E-03	2.465E-03	2.438E-03	2.411E-03	2.385E-03	2.359E-03
2.333E-03	2.308E-03	2.282E-03	2.257E-03	2.233E-03	2.208E-03	2.184E-03	2.160E-03	2.137E-03	2.113E-03
2.090E-03	2.067E-03	2.045E-03	2.022E-03	2.000E-03	1.978E-03	1.957E-03	1.935E-03	1.914E-03	1.893E-03
1.872E-03	1.852E-03	1.832E-03	1.812E-03	1.792E-03	1.772E-03	1.753E-03	1.734E-03	1.715E-03	1.696E-03
1.677E-03	1.659E-03	1.641E-03	1.623E-03	1.605E-03	1.588E-03	1.570E-03	1.553E-03	1.536E-03	1.519E-03
1.503E-03	1.486E-03	1.470E-03	1.454E-03	1.438E-03	1.422E-03	1.407E-03	1.391E-03	1.376E-03	1.361E-03
1.346E-03	1.331E-03	1.317E-03	1.302E-03	1.288E-03	1.274E-03	1.260E-03	1.246E-03	1.233E-03	1.219E-03
1.206E-03									

Energy Bins - ENDF/B-VII.1 - MF=15 MT=18 MAT=9228 [4]									
0.000E+00	5.000E-02	1.000E-01	1.500E-01	1.630E-01	1.780E-01	2.000E-01	2.120E-01	2.250E-01	2.450E-01
2.650E-01	3.000E-01	3.250E-01	3.500E-01	3.650E-01	4.000E-01	4.300E-01	4.500E-01	4.850E-01	5.000E-01
5.250E-01	5.450E-01	5.750E-01	6.050E-01	6.250E-01	6.500E-01	6.700E-01	6.830E-01	7.000E-01	7.500E-01
8.000E-01	9.000E-01	1.000E+00	1.100E+00	1.200E+00	1.250E+00	1.350E+00	1.500E+00	1.750E+00	2.000E+00
2.250E+00	2.500E+00	2.750E+00	3.000E+00	3.250E+00	3.500E+00	3.750E+00	4.000E+00	4.250E+00	4.500E+00
4.750E+00	5.000E+00	5.250E+00	5.500E+00	5.750E+00	6.000E+00	6.250E+00	6.500E+00	6.750E+00	7.000E+00
7.500E+00	7.750E+00	8.000E+00	8.100E+00						
Spectra Values - ENDF/B-VII.1 - MF=15 MT=18 MAT=9228 [4]									
9.979E-01	1.667E+00	2.784E+00	4.700E+00	4.999E+00	4.311E+00	6.077E+00	7.783E+00	5.937E+00	4.290E+00
2.894E+00	4.819E+00	5.757E+00	7.254E+00	7.504E+00	6.615E+00	5.927E+00	6.226E+00	7.015E+00	6.755E+00
5.807E+00	5.158E+00	6.166E+00	6.715E+00	6.077E+00	5.129E+00	5.458E+00	5.628E+00	5.059E+00	4.909E+00
4.669E+00	3.592E+00	2.963E+00	2.524E+00	2.404E+00	2.305E+00	1.986E+00	1.417E+00	9.077E-01	6.582E-01
5.187E-01	4.130E-01	3.171E-01	2.417E-01	1.748E-01	1.388E-01	1.099E-01	8.950E-02	6.582E-02	4.630E-02
3.573E-02	2.967E-02	2.502E-02	2.128E-02	1.818E-02	1.529E-02	1.240E-02	1.001E-02	7.752E-03	6.060E-03
2.960E-03	8.456E-04	7.050E-05	0.000E+00						

Energy Bins - Regnier - Regnier in Figure 2 of Oberstedt, *et al.* [33]									
5.740E-02	5.900E-02	5.980E-02	6.220E-02	6.220E-02	6.450E-02	6.530E-02	7.250E-02	7.250E-02	7.250E-02
7.330E-02	7.410E-02	7.490E-02	7.490E-02	7.570E-02	7.570E-02	7.650E-02	7.810E-02	7.890E-02	7.890E-02
7.890E-02	7.890E-02	7.890E-02	7.970E-02	7.970E-02	7.970E-02	7.970E-02	7.970E-02	8.760E-02	8.760E-02
8.760E-02	8.760E-02	8.840E-02	8.840E-02	8.920E-02	8.920E-02	8.920E-02	9.000E-02	9.080E-02	9.480E-02
9.640E-02	9.640E-02	9.640E-02	9.720E-02	9.720E-02	9.720E-02	9.800E-02	1.000E-01	1.010E-01	1.030E-01
1.030E-01	1.030E-01	1.060E-01	1.060E-01	1.070E-01	1.070E-01	1.080E-01	1.090E-01	1.090E-01	1.100E-01
1.110E-01	1.120E-01	1.120E-01	1.120E-01	1.130E-01	1.130E-01	1.140E-01	1.150E-01	1.150E-01	1.150E-01
1.150E-01	1.150E-01	1.160E-01	1.170E-01	1.170E-01	1.180E-01	1.180E-01	1.190E-01	1.190E-01	1.190E-01
1.220E-01	1.230E-01	1.230E-01	1.250E-01	1.250E-01	1.260E-01	1.260E-01	1.270E-01	1.270E-01	1.300E-01
1.310E-01	1.310E-01	1.320E-01	1.340E-01	1.350E-01	1.350E-01	1.360E-01	1.370E-01	1.370E-01	1.380E-01
1.390E-01	1.420E-01	1.470E-01	1.470E-01	1.490E-01	1.490E-01	1.500E-01	1.500E-01	1.510E-01	1.510E-01
1.530E-01	1.530E-01	1.550E-01	1.550E-01	1.580E-01	1.600E-01	1.630E-01	1.650E-01	1.660E-01	1.680E-01
1.700E-01	1.700E-01	1.710E-01	1.710E-01	1.720E-01	1.730E-01	1.760E-01	1.770E-01	1.820E-01	1.820E-01
1.820E-01	1.830E-01	1.830E-01	1.840E-01	1.880E-01	1.900E-01	1.920E-01	1.940E-01	1.940E-01	1.940E-01
1.950E-01	1.950E-01	1.970E-01	2.000E-01	2.110E-01	2.140E-01	2.170E-01	2.180E-01	2.180E-01	2.200E-01
2.200E-01	2.210E-01	2.220E-01	2.230E-01	2.230E-01	2.240E-01	2.250E-01	2.250E-01	2.260E-01	2.290E-01
2.330E-01	2.350E-01	2.370E-01	2.390E-01	2.410E-01	2.450E-01	2.600E-01	2.640E-01	2.670E-01	2.710E-01
2.750E-01	2.780E-01	2.800E-01	2.820E-01	2.870E-01	2.960E-01	2.980E-01	3.000E-01	3.070E-01	3.120E-01
3.130E-01	3.180E-01	3.210E-01	3.220E-01	3.240E-01	3.320E-01	3.320E-01	3.330E-01	3.350E-01	3.350E-01
3.360E-01	3.410E-01	3.440E-01	3.490E-01	3.560E-01	3.580E-01	3.610E-01	3.630E-01	3.690E-01	3.710E-01
3.720E-01	3.730E-01	3.750E-01	3.750E-01	3.810E-01	3.870E-01	3.940E-01	3.950E-01	4.200E-01	4.270E-01
4.310E-01	4.390E-01	4.410E-01	4.540E-01	4.620E-01	4.650E-01	4.650E-01	4.660E-01	4.670E-01	4.680E-01
4.690E-01	4.690E-01	4.700E-01	4.810E-01	4.850E-01	4.880E-01	4.920E-01	4.930E-01	4.960E-01	4.960E-01
4.970E-01	4.990E-01	5.010E-01	5.020E-01	5.040E-01	5.040E-01	5.050E-01	5.070E-01	5.090E-01	5.120E-01
5.130E-01	5.280E-01	5.310E-01	5.340E-01	5.420E-01	5.450E-01	5.480E-01	5.510E-01	5.520E-01	5.610E-01
5.630E-01	5.710E-01	5.780E-01	5.790E-01	5.860E-01	5.940E-01	6.030E-01	6.060E-01	6.130E-01	6.200E-01
6.220E-01	6.260E-01	6.290E-01	6.370E-01	6.450E-01	6.500E-01	6.660E-01	6.710E-01	6.810E-01	6.990E-01
7.080E-01	7.120E-01	7.330E-01	7.380E-01	7.390E-01	7.430E-01	7.450E-01	7.470E-01	7.510E-01	7.530E-01

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7.550E-01	7.590E-01	7.600E-01	7.690E-01	8.610E-01	8.700E-01	8.750E-01	9.040E-01	9.280E-01	9.380E-01
9.520E-01	9.620E-01	9.760E-01	9.950E-01	1.010E+00	1.030E+00	1.050E+00	1.060E+00	1.070E+00	1.090E+00
1.190E+00	1.210E+00	1.220E+00	1.240E+00	1.240E+00	1.280E+00	1.310E+00	1.320E+00	1.340E+00	1.360E+00
1.360E+00	1.380E+00	1.390E+00	1.410E+00	1.420E+00	1.450E+00	1.470E+00	1.490E+00	1.630E+00	1.650E+00
1.660E+00	1.680E+00	1.750E+00	1.760E+00	1.780E+00	1.800E+00	1.820E+00	1.840E+00	1.840E+00	1.870E+00
1.890E+00	1.920E+00	1.950E+00	1.970E+00	1.990E+00	2.130E+00	2.160E+00	2.180E+00	2.210E+00	2.270E+00
2.280E+00	2.300E+00	2.320E+00	2.340E+00	2.360E+00	2.370E+00	2.380E+00	2.400E+00	2.400E+00	2.420E+00
2.430E+00	2.430E+00	2.450E+00	2.470E+00	2.480E+00	2.500E+00	2.510E+00	2.660E+00	2.680E+00	2.700E+00
2.720E+00	2.780E+00	2.800E+00	2.820E+00	2.840E+00	2.860E+00	2.880E+00	2.890E+00	2.900E+00	2.910E+00
2.930E+00	2.950E+00	2.960E+00	2.970E+00	2.980E+00	3.000E+00	3.020E+00	3.040E+00	3.190E+00	3.210E+00
3.230E+00	3.250E+00	3.320E+00	3.340E+00	3.360E+00	3.380E+00	3.400E+00	3.420E+00	3.430E+00	3.440E+00
3.460E+00	3.480E+00	3.500E+00	3.520E+00	3.540E+00	3.570E+00	3.720E+00	3.740E+00	3.750E+00	3.770E+00
3.850E+00	3.870E+00	3.880E+00	3.900E+00	3.920E+00	3.940E+00	3.960E+00	3.980E+00	4.000E+00	4.020E+00
4.040E+00	4.060E+00	4.080E+00	4.100E+00	4.240E+00	4.250E+00	4.270E+00	4.280E+00	4.310E+00	4.380E+00
4.400E+00	4.410E+00	4.420E+00	4.430E+00	4.440E+00	4.460E+00	4.470E+00	4.490E+00	4.500E+00	4.510E+00
4.530E+00	4.550E+00	4.570E+00	4.580E+00	4.600E+00	4.750E+00	4.760E+00	4.780E+00	4.790E+00	4.810E+00
4.880E+00	4.900E+00	4.910E+00	4.930E+00	4.950E+00	4.970E+00	4.980E+00	4.990E+00	5.000E+00	5.020E+00
5.050E+00	5.060E+00	5.080E+00	5.090E+00	5.110E+00	5.120E+00	5.270E+00	5.290E+00	5.310E+00	5.330E+00
5.410E+00	5.430E+00	5.450E+00	5.470E+00						

Spectra Values - Regnier - Regnier in Figure 2 of Oberstedt, *et al.* [33]

4.140E+00	4.320E+00	4.180E+00	4.240E+00	4.080E+00	4.140E+00	4.040E+00	4.040E+00	4.180E+00	4.340E+00
4.970E+00	5.230E+00	5.560E+00	5.760E+00	5.920E+00	6.180E+00	6.400E+00	5.800E+00	5.680E+00	5.580E+00
5.210E+00	5.050E+00	4.890E+00	4.710E+00	4.590E+00	4.460E+00	4.340E+00	4.160E+00	4.480E+00	4.630E+00
4.730E+00	5.050E+00	5.230E+00	5.370E+00	5.540E+00	5.660E+00	5.780E+00	5.900E+00	6.000E+00	6.460E+00
6.570E+00	6.650E+00	7.010E+00	7.170E+00	7.350E+00	7.520E+00	7.740E+00	6.990E+00	6.870E+00	7.250E+00
7.410E+00	7.580E+00	7.580E+00	7.430E+00	7.270E+00	7.130E+00	6.970E+00	6.300E+00	6.120E+00	5.700E+00
5.470E+00	5.820E+00	6.080E+00	6.200E+00	6.810E+00	6.930E+00	7.050E+00	7.390E+00	7.600E+00	7.820E+00
8.020E+00	8.240E+00	8.460E+00	9.090E+00	9.290E+00	9.640E+00	9.860E+00	1.000E+01	1.030E+01	1.050E+01
9.680E+00	9.520E+00	9.410E+00	9.130E+00	8.970E+00	8.710E+00	8.480E+00	8.240E+00	8.100E+00	7.450E+00
7.190E+00	6.830E+00	6.590E+00	6.280E+00	6.630E+00	7.270E+00	7.490E+00	7.860E+00	8.510E+00	8.160E+00
8.670E+00	8.870E+00	8.340E+00	8.140E+00	7.760E+00	7.540E+00	7.370E+00	7.130E+00	6.970E+00	6.730E+00
7.150E+00	7.390E+00	7.700E+00	7.940E+00	8.100E+00	8.160E+00	8.020E+00	7.860E+00	7.720E+00	7.130E+00
6.910E+00	6.590E+00	6.340E+00	6.120E+00	5.780E+00	5.900E+00	5.700E+00	5.840E+00	6.460E+00	6.750E+00
7.050E+00	7.210E+00	7.390E+00	7.640E+00	7.800E+00	8.080E+00	8.710E+00	8.970E+00	9.270E+00	9.430E+00
9.640E+00	9.840E+00	1.000E+01	9.800E+00	9.410E+00	9.660E+00	9.410E+00	9.190E+00	9.010E+00	8.830E+00
8.610E+00	8.380E+00	7.760E+00	7.450E+00	7.170E+00	6.930E+00	6.670E+00	6.400E+00	6.140E+00	5.540E+00
5.370E+00	5.680E+00	5.960E+00	6.220E+00	6.460E+00	6.790E+00	6.530E+00	6.240E+00	5.920E+00	5.330E+00
5.740E+00	6.320E+00	6.630E+00	6.870E+00	8.020E+00	7.800E+00	7.450E+00	7.210E+00	6.160E+00	5.520E+00
5.270E+00	5.270E+00	5.450E+00	5.860E+00	6.340E+00	6.890E+00	7.190E+00	7.470E+00	7.800E+00	8.140E+00
8.590E+00	8.180E+00	7.960E+00	9.010E+00	8.790E+00	9.010E+00	9.270E+00	9.390E+00	8.890E+00	8.420E+00
7.880E+00	7.600E+00	7.290E+00	7.170E+00	7.050E+00	7.190E+00	6.690E+00	6.690E+00	6.460E+00	6.480E+00
6.420E+00	6.140E+00	6.020E+00	5.940E+00	6.460E+00	7.110E+00	7.370E+00	7.660E+00	7.840E+00	8.100E+00
8.320E+00	8.590E+00	8.710E+00	9.330E+00	9.370E+00	9.170E+00	8.850E+00	8.610E+00	8.360E+00	8.120E+00
7.940E+00	7.780E+00	7.230E+00	6.970E+00	6.670E+00	6.440E+00	6.220E+00	6.020E+00	5.860E+00	5.640E+00
5.560E+00	4.990E+00	4.950E+00	5.130E+00	5.470E+00	5.640E+00	5.800E+00	5.960E+00	6.120E+00	6.280E+00
6.530E+00	7.170E+00	7.210E+00	7.270E+00	7.580E+00	7.920E+00	8.040E+00	7.600E+00	7.030E+00	6.950E+00
6.810E+00	6.480E+00	6.360E+00	6.340E+00	6.160E+00	5.660E+00	5.430E+00	5.680E+00	5.860E+00	5.880E+00
6.300E+00	6.160E+00	5.840E+00	5.840E+00	5.680E+00	5.370E+00	5.230E+00	5.050E+00	4.850E+00	4.670E+00
4.480E+00	4.320E+00	4.310E+00	4.070E+00	3.620E+00	3.370E+00	3.180E+00	2.670E+00	2.610E+00	2.760E+00
2.900E+00	2.730E+00	2.700E+00	2.610E+00	2.520E+00	2.430E+00	2.370E+00	2.370E+00	2.460E+00	2.520E+00
2.140E+00	2.140E+00	2.060E+00	2.090E+00	2.140E+00	1.990E+00	1.900E+00	1.820E+00	1.750E+00	1.730E+00

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1.630E+00	1.540E+00	1.520E+00	1.450E+00	1.390E+00	1.390E+00	1.340E+00	1.310E+00	1.160E+00	1.160E+00
1.120E+00	1.100E+00	9.660E-01	9.320E-01	9.320E-01	9.210E-01	8.900E-01	8.790E-01	8.390E-01	8.390E-01
8.100E-01	8.010E-01	7.820E-01	7.640E-01	7.470E-01	6.270E-01	6.120E-01	6.120E-01	6.120E-01	6.340E-01
6.340E-01	6.270E-01	6.270E-01	6.270E-01	6.270E-01	6.120E-01	5.980E-01	5.840E-01	5.640E-01	5.510E-01
5.320E-01	5.140E-01	5.080E-01	4.960E-01	4.840E-01	4.730E-01	4.620E-01	3.660E-01	3.660E-01	3.660E-01
3.660E-01	3.660E-01	3.620E-01	3.530E-01	3.450E-01	3.370E-01	3.260E-01	3.180E-01	3.040E-01	2.930E-01
2.830E-01	2.760E-01	2.700E-01	2.610E-01	2.520E-01	2.520E-01	2.520E-01	2.460E-01	2.160E-01	2.110E-01
2.090E-01	2.060E-01	1.900E-01	1.860E-01	1.820E-01	1.790E-01	1.730E-01	1.690E-01	1.630E-01	1.600E-01
1.560E-01	1.520E-01	1.490E-01	1.450E-01	1.420E-01	1.370E-01	1.110E-01	1.090E-01	1.060E-01	1.040E-01
9.540E-02	9.320E-02	9.110E-02	8.900E-02	8.790E-02	8.590E-02	8.390E-02	8.200E-02	8.010E-02	7.820E-02
7.640E-02	7.470E-02	7.380E-02	7.380E-02	6.880E-02	6.720E-02	6.640E-02	6.490E-02	6.410E-02	5.980E-02
5.840E-02	5.570E-02	5.380E-02	5.200E-02	4.960E-02	4.730E-02	4.570E-02	4.410E-02	4.260E-02	4.110E-02
4.020E-02	3.830E-02	3.750E-02	3.660E-02	3.580E-02	2.930E-02	2.860E-02	2.800E-02	2.730E-02	2.700E-02
2.350E-02	2.290E-02	2.290E-02	2.290E-02	2.290E-02	2.210E-02	2.140E-02	2.060E-02	1.990E-02	1.970E-02
1.970E-02	1.970E-02	1.920E-02	1.880E-02	1.840E-02	1.770E-02	1.420E-02	1.390E-02	1.340E-02	1.280E-02
1.160E-02	1.110E-02	1.070E-02	1.020E-02						

Energy Bins - Verbinski - Figure 6 of Verbinski, Weber, and Sund [5]									
1.310E-01	1.409E-01	1.609E-01	1.610E-01	1.762E-01	1.911E-01	2.058E-01	2.156E-01	2.260E-01	2.313E-01
2.465E-01	2.667E-01	2.768E-01	2.816E-01	2.965E-01	3.066E-01	3.266E-01	3.414E-01	3.564E-01	3.714E-01
3.917E-01	4.119E-01	4.371E-01	4.521E-01	4.670E-01	4.921E-01	5.073E-01	5.275E-01	5.377E-01	5.478E-01
5.728E-01	5.777E-01	5.928E-01	6.179E-01	6.382E-01	6.484E-01	6.634E-01	6.834E-01	7.179E-01	7.681E-01
8.436E-01	8.444E-01	8.697E-01	9.199E-01	9.702E-01	1.046E+00	1.121E+00	1.196E+00	1.271E+00	1.322E+00
1.347E+00	1.423E+00	1.448E+00	1.524E+00	1.549E+00	1.600E+00	1.650E+00	1.750E+00	1.851E+00	1.976E+00
2.052E+00	2.152E+00	2.252E+00	2.352E+00	2.453E+00	2.553E+00	2.653E+00	2.753E+00	2.804E+00	2.954E+00
3.030E+00	3.155E+00	3.231E+00	3.331E+00	3.481E+00	3.557E+00	3.682E+00	3.732E+00	3.857E+00	3.982E+00
4.058E+00	4.183E+00	4.259E+00	4.385E+00	4.535E+00	4.761E+00	5.062E+00	5.337E+00	5.637E+00	5.937E+00
6.338E+00	6.865E+00	7.392E+00	7.775E+00						
Spectra Values - Verbinski - Figure 6 of Verbinski, Weber, and Sund [5]									
4.190E+00	4.961E+00	5.600E+00	4.965E+00	4.511E+00	5.215E+00	7.137E+00	8.868E+00	6.644E+00	5.223E+00
4.861E+00	4.313E+00	4.314E+00	4.986E+00	5.905E+00	5.495E+00	6.354E+00	8.090E+00	8.291E+00	8.705E+00
7.911E+00	7.189E+00	6.535E+00	7.028E+00	7.932E+00	8.133E+00	7.390E+00	6.879E+00	6.402E+00	6.103E+00
6.410E+00	7.232E+00	7.235E+00	7.242E+00	6.425E+00	5.698E+00	5.982E+00	6.282E+00	5.847E+00	5.573E+00
4.942E+00	4.276E+00	3.979E+00	3.792E+00	3.528E+00	3.128E+00	2.911E+00	2.774E+00	2.581E+00	2.344E+00
2.129E+00	1.888E+00	1.674E+00	1.484E+00	1.381E+00	1.224E+00	1.139E+00	1.010E+00	8.956E-01	7.753E-01
6.711E-01	6.096E-01	5.811E-01	5.278E-01	4.912E-01	4.355E-01	3.862E-01	3.681E-01	3.264E-01	2.965E-01
2.506E-01	2.169E-01	1.970E-01	1.747E-01	1.587E-01	1.442E-01	1.374E-01	1.248E-01	1.134E-01	1.030E-01
9.584E-02	8.499E-02	7.357E-02	5.784E-02	4.772E-02	3.663E-02	3.097E-02	2.556E-02	2.109E-02	1.741E-02
1.244E-02	7.693E-03	4.218E-03	8.405E-04						
1-sided standard deviation of Spectra Values - Verbinski - Figure 6 of Verbinski, Weber, and Sund [5]									
0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.895E-02	1.815E-02	2.449E-02	2.220E-02
2.535E-02	2.777E-02	1.477E-02	2.717E-02	2.031E-02	2.242E-02	1.390E-02	1.598E-02	1.763E-02	1.891E-02
1.491E-02	1.806E-02	1.351E-02	1.229E-02	7.424E-03	7.789E-03	5.689E-03	4.695E-03	5.107E-03	5.283E-03
3.775E-03	3.086E-03	3.485E-03	2.903E-03						

Energy Bins - Maienschein - Figure 2 of Maienschein, Peelle, Zobel, and Love [12]									
2.941E-01	3.180E-01	3.665E-01	3.911E-01	4.159E-01	4.323E-01	4.567E-01	4.812E-01	4.976E-01	5.140E-01
5.549E-01	6.118E-01	6.201E-01	6.283E-01	6.448E-01	6.773E-01	7.263E-01	7.427E-01	7.673E-01	7.916E-01
7.996E-01	8.242E-01	8.325E-01	8.733E-01	8.980E-01	9.060E-01	9.305E-01	9.469E-01	1.004E+00	1.028E+00
1.069E+00	1.094E+00	1.126E+00	1.175E+00	1.224E+00	1.264E+00	1.297E+00	1.354E+00	1.411E+00	1.452E+00
1.493E+00	1.534E+00	1.559E+00	1.591E+00	1.624E+00	1.697E+00	1.803E+00	1.827E+00	1.900E+00	1.941E+00
2.047E+00	2.072E+00	2.120E+00	2.186E+00	2.194E+00	2.275E+00	2.324E+00	2.348E+00	2.414E+00	2.439E+00
2.560E+00	2.691E+00	2.821E+00	2.935E+00	3.066E+00	3.188E+00	3.319E+00	3.449E+00	3.571E+00	3.701E+00
3.823E+00	4.002E+00	4.198E+00	4.402E+00	4.621E+00	4.826E+00	5.038E+00	5.232E+00	5.444E+00	5.656E+00
5.868E+00	6.153E+00	6.529E+00	6.912E+00	7.293E+00					
Spectra Values - Maienschein - Figure 2 of Maienschein, Peelle, Zobel, and Love [12]									
9.638E+00	1.236E+01	1.419E+01	1.306E+01	1.062E+01	1.005E+01	9.778E+00	9.513E+00	8.758E+00	8.062E+00
7.122E+00	7.124E+00	6.558E+00	6.292E+00	5.714E+00	5.714E+00	5.118E+00	4.844E+00	4.398E+00	4.585E+00
4.713E+00	4.339E+00	3.886E+00	3.678E+00	3.117E+00	3.340E+00	3.249E+00	2.910E+00	3.033E+00	2.793E+00
2.643E+00	2.501E+00	2.367E+00	2.335E+00	2.435E+00	2.304E+00	2.273E+00	1.927E+00	1.901E+00	1.423E+00
1.223E+00	1.328E+00	9.944E-01	1.111E+00	1.037E+00	1.241E+00	9.037E-01	1.066E+00	9.552E-01	8.556E-01
8.326E-01	7.155E-01	8.214E-01	5.584E-01	6.499E-01	7.062E-01	5.287E-01	6.502E-01	5.745E-01	4.126E-01
4.423E-01	4.073E-01	3.179E-01	2.622E-01	2.517E-01	1.911E-01	1.620E-01	1.534E-01	1.165E-01	1.600E-01
1.118E-01	1.002E-01	8.736E-02	6.108E-02	5.865E-02	3.155E-02	1.769E-02	3.074E-02	2.467E-02	2.503E-02
1.423E-02	1.051E-02	3.591E-03	3.546E-03	6.080E-03					
1-sided standard deviation of Energy Bins - Maienschein - Figure 2 of Maienschein, Peelle, Zobel, and Love [12]									
0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.285E-02	5.691E-02	0.000E+00	0.000E+00	0.000E+00
3.658E-02	5.691E-02	3.252E-02	3.658E-02	5.285E-02	0.000E+00	4.878E-02	0.000E+00	0.000E+00	5.285E-02
5.691E-02	5.691E-02	6.504E-02	0.000E+00	5.691E-02	4.878E-02	0.000E+00	0.000E+00	5.691E-02	6.504E-02
6.504E-02	0.000E+00	8.943E-02	9.349E-02	9.756E-02	1.016E-01	8.941E-02	1.057E-01	1.098E-01	1.016E-01
1.138E-01	1.789E-01	1.911E-01	1.870E-01	1.992E-01					
1-sided standard deviation of Spectra Values - Maienschein - Figure 2 of Maienschein, Peelle, Zobel, and Love [12]									
0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.445E-02	7.177E-02	0.000E+00	0.000E+00	0.000E+00
4.469E-02	6.585E-02	4.534E-02	5.139E-02	4.329E-02	0.000E+00	3.987E-02	0.000E+00	0.000E+00	3.111E-02
3.664E-02	3.114E-02	2.743E-02	0.000E+00	1.797E-02	1.758E-02	0.000E+00	0.000E+00	9.516E-03	1.120E-02
1.052E-02	0.000E+00	7.138E-03	5.520E-03	6.035E-03	3.631E-03	2.309E-03	3.773E-03	3.028E-03	3.369E-03
2.137E-03	1.455E-03	5.888E-04	5.609E-04	9.486E-04					

Energy Bins - Becker - MCHF, $R_T(A)$, B(T,A,β) in Figure 14 of Becker, *et al.*									
2.360E-02	2.370E-02	3.953E-02	5.534E-02	1.107E-01	1.423E-01	1.660E-01	2.250E-01	2.688E-01	4.506E-01
5.534E-01	6.482E-01	7.510E-01	8.450E-01	9.486E-01	1.051E+00	1.447E+00	1.850E+00	2.245E+00	2.648E+00
3.051E+00	3.447E+00	3.850E+00	4.245E+00	4.648E+00	5.051E+00	5.455E+00	5.850E+00	6.253E+00	6.650E+00
7.051E+00	7.447E+00	7.850E+00	8.245E+00	9.050E+00	9.447E+00				
Spectra Values - Becker - MCHF, $R_T(A)$, B(T,A,β) in Figure 14 of Becker, *et al.*									
3.030E+01	3.031E+01	2.250E+01	1.473E+01	1.670E+01	1.568E+01	1.128E+01	7.267E+00	7.738E+00	6.511E+00
6.019E+00	5.065E+00	4.609E+00	2.970E+00	3.315E+00	2.365E+00	1.323E+00	7.881E-01	4.999E-01	3.484E-01
1.692E-01	9.540E-02	6.244E-02	3.690E-02	2.782E-02	2.215E-02	6.115E-03	3.971E-03	1.512E-03	1.313E-03
6.789E-04	3.121E-04	2.486E-04	1.000E-05	1.246E-04	0.000E+00				

Energy Bins - Jandel - From [29, 35, 36], reported as PM in Figure 8 of [39].									
3.000E-03	6.900E-03	8.900E-03	1.080E-02	1.380E-02	1.670E-02	2.060E-02	2.350E-02	2.650E-02	3.040E-02
3.330E-02	3.720E-02	4.120E-02	4.410E-02	4.800E-02	5.190E-02	5.580E-02	5.980E-02	6.460E-02	6.860E-02
7.250E-02	7.740E-02	8.230E-02	8.720E-02	9.210E-02	9.690E-02	1.009E-01	1.058E-01	1.126E-01	1.175E-01
1.234E-01	1.283E-01	1.351E-01	1.400E-01	1.469E-01	1.527E-01	1.596E-01	1.664E-01	1.733E-01	1.801E-01
1.870E-01	1.948E-01	2.017E-01	2.095E-01	2.173E-01	2.261E-01	2.339E-01	2.428E-01	2.516E-01	2.604E-01
2.701E-01	2.780E-01	2.887E-01	2.985E-01	3.093E-01	3.191E-01	3.298E-01	3.415E-01	3.523E-01	3.640E-01
3.758E-01	3.885E-01	4.002E-01	4.139E-01	4.266E-01	4.530E-01	4.814E-01	5.097E-01	5.273E-01	5.410E-01
5.596E-01	5.753E-01	5.919E-01	6.095E-01	6.280E-01	6.466E-01	6.662E-01	6.847E-01	7.043E-01	7.248E-01
7.454E-01	7.669E-01	7.884E-01	8.108E-01	8.343E-01	8.578E-01	8.812E-01	9.057E-01	9.321E-01	9.575E-01
9.849E-01	1.011E+00	1.040E+00	1.068E+00	1.098E+00	1.128E+00	1.160E+00	1.190E+00	1.222E+00	1.256E+00
1.289E+00	1.325E+00	1.360E+00	1.397E+00	1.436E+00	1.348E+00	1.517E+00	1.563E+00	1.600E+00	1.644E+00
1.688E+00	1.737E+00	1.776E+00	1.827E+00	1.868E+00	1.922E+00	1.971E+00	2.029E+00	2.078E+00	2.134E+00
2.185E+00	2.244E+00	2.302E+00	2.361E+00	2.420E+00	2.488E+00	2.551E+00	2.612E+00	2.683E+00	2.749E+00
2.824E+00	2.900E+00	2.976E+00	3.049E+00	3.132E+00	3.210E+00	3.293E+00	3.376E+00	3.463E+00	3.551E+00
3.639E+00	3.737E+00	3.829E+00	3.927E+00	4.029E+00	4.132E+00	4.239E+00	4.346E+00	4.459E+00	4.571E+00
4.688E+00	4.807E+00	4.927E+00	5.054E+00	5.185E+00	5.317E+00	5.449E+00	5.590E+00	5.732E+00	
Spectra Values - Jandel - From [29, 35, 36], reported as PM in Figure 8 of [39].									
6.533E-01	8.929E-01	9.445E-01	9.960E-01	1.065E+00	1.090E+00	1.116E+00	1.185E+00	1.228E+00	1.271E+00
1.322E+00	1.374E+00	1.425E+00	1.477E+00	1.545E+00	1.597E+00	1.666E+00	1.700E+00	1.752E+00	1.837E+00
1.889E+00	1.949E+00	2.026E+00	2.112E+00	2.181E+00	2.232E+00	2.318E+00	2.395E+00	2.464E+00	2.533E+00
2.627E+00	2.705E+00	2.782E+00	2.842E+00	2.928E+00	2.997E+00	3.048E+00	3.108E+00	3.211E+00	3.306E+00
3.383E+00	3.486E+00	3.555E+00	3.632E+00	3.709E+00	3.778E+00	3.838E+00	3.915E+00	3.984E+00	4.053E+00
4.113E+00	4.181E+00	4.233E+00	4.302E+00	4.413E+00	4.439E+00	4.473E+00	4.516E+00	4.559E+00	4.585E+00
4.628E+00	4.645E+00	4.662E+00	4.705E+00	4.722E+00	4.714E+00	4.748E+00	4.697E+00	4.654E+00	4.628E+00
4.576E+00	4.533E+00	4.499E+00	4.422E+00	4.362E+00	4.293E+00	4.224E+00	4.173E+00	4.087E+00	3.984E+00
3.898E+00	3.804E+00	3.709E+00	3.615E+00	3.520E+00	3.417E+00	3.331E+00	3.203E+00	3.100E+00	2.988E+00
2.851E+00	2.756E+00	2.653E+00	2.516E+00	2.404E+00	2.327E+00	2.181E+00	2.095E+00	2.001E+00	1.898E+00
1.803E+00	1.691E+00	1.580E+00	1.494E+00	1.425E+00	1.348E+00	1.099E+00	1.053E+00	1.019E+00	9.349E-01
9.003E-01	8.485E-01	7.954E-01	7.456E-01	6.914E-01	6.622E-01	6.075E-01	5.819E-01	5.455E-01	5.225E-01
4.767E-01	4.640E-01	4.212E-01	4.034E-01	3.822E-01	3.469E-01	3.359E-01	3.115E-01	2.920E-01	2.707E-01
2.593E-01	2.341E-01	2.230E-01	2.024E-01	1.928E-01	1.722E-01	1.614E-01	1.465E-01	1.358E-01	1.246E-01
1.095E-01	9.992E-02	9.019E-02	8.230E-02	7.310E-02	6.528E-02	5.674E-02	5.122E-02	4.429E-02	3.871E-02
3.205E-02	2.909E-02	2.502E-02	2.083E-02	1.791E-02	1.508E-02	1.248E-02	1.062E-02	8.891E-03	

Energy Bins - Francis - Figure 2.8 on page 23 of [11]									
1.015E-01	2.094E-01	3.214E-01	4.054E-01	5.030E-01	5.871E-01	6.994E-01	8.115E-01	9.099E-01	1.008E+00
1.120E+00	1.204E+00	1.317E+00	1.415E+00	1.513E+00	1.611E+00	1.737E+00	1.821E+00	1.905E+00	2.016E+00
2.101E+00	2.199E+00	2.310E+00	2.408E+00	2.520E+00	2.604E+00	2.702E+00	2.800E+00	2.884E+00	2.996E+00
3.108E+00	3.205E+00	3.303E+00	3.429E+00	3.513E+00	3.597E+00	3.708E+00	3.806E+00	3.917E+00	4.001E+00
4.113E+00	4.196E+00	4.308E+00	4.419E+00	4.531E+00	4.601E+00	4.698E+00	4.810E+00	4.921E+00	5.005E+00
5.116E+00	5.228E+00	5.326E+00	5.423E+00	5.507E+00	5.591E+00	5.716E+00	5.828E+00	5.953E+00	6.023E+00
6.121E+00	6.232E+00	6.316E+00	6.428E+00	6.540E+00	6.623E+00	6.707E+00	6.819E+00	6.903E+00	7.015E+00
7.127E+00	7.225E+00	7.323E+00	7.436E+00	7.521E+00	7.592E+00				
Spectra Values - Francis - Figure 2.8 on page 23 of [11]									
1.286E+00	6.170E+00	5.435E+00	4.911E+00	4.522E+00	4.060E+00	3.465E+00	2.994E+00	2.571E+00	2.208E+00
1.983E+00	1.758E+00	1.481E+00	1.280E+00	1.127E+00	9.931E-01	8.973E-01	8.005E-01	7.232E-01	6.535E-01
5.867E-01	5.201E-01	4.610E-01	4.166E-01	3.646E-01	3.253E-01	2.939E-01	2.689E-01	2.384E-01	2.100E-01
1.897E-01	1.747E-01	1.569E-01	1.400E-01	1.289E-01	1.187E-01	1.079E-01	9.751E-02	9.037E-02	8.322E-02
7.712E-02	7.193E-02	6.624E-02	6.023E-02	5.511E-02	5.173E-02	4.733E-02	4.415E-02	4.066E-02	3.768E-02
3.448E-02	3.135E-02	2.905E-02	2.676E-02	2.495E-02	2.357E-02	2.157E-02	1.949E-02	1.806E-02	1.674E-02
1.512E-02	1.384E-02	1.266E-02	1.144E-02	1.008E-02	9.399E-03	8.601E-03	7.625E-03	7.021E-03	6.224E-03
5.379E-03	4.649E-03	4.069E-03	3.429E-03	2.835E-03	2.227E-03				

Energy Bins - Peelle - Figure 5 of Peelle and Maienschein [17]									
6.215E-02	6.227E-02	6.236E-02	6.246E-02	6.255E-02	6.266E-02	7.093E-02	7.101E-02	7.931E-02	8.760E-02
8.770E-02	9.598E-02	9.610E-02	9.621E-02	1.045E-01	1.046E-01	1.129E-01	1.212E-01	1.213E-01	1.542E-01
1.706E-01	1.951E-01	1.952E-01	2.199E-01	2.200E-01	2.361E-01	2.362E-01	2.525E-01	2.771E-01	2.853E-01
2.854E-01	3.019E-01	3.265E-01	3.348E-01	3.513E-01	3.596E-01	3.760E-01	3.924E-01	4.088E-01	4.252E-01
4.498E-01	4.663E-01	4.910E-01	5.155E-01	5.401E-01	5.648E-01	5.731E-01	5.978E-01	6.306E-01	6.469E-01
7.372E-01	7.454E-01	8.356E-01	9.258E-01	1.032E+00	1.164E+00	1.271E+00	1.467E+00	1.574E+00	1.697E+00
1.845E+00	1.919E+00	2.017E+00	2.017E+00	2.050E+00	2.173E+00	2.263E+00	2.403E+00	2.493E+00	2.616E+00
2.723E+00	2.805E+00	2.854E+00	2.920E+00	2.961E+00	3.166E+00	3.330E+00	3.404E+00	3.494E+00	3.552E+00
3.659E+00	3.790E+00	3.930E+00	4.061E+00	4.192E+00	4.348E+00	4.479E+00	4.635E+00	4.791E+00	4.947E+00
5.103E+00	5.267E+00	5.867E+00	6.220E+00	6.589E+00	6.958E+00	7.573E+00	8.000E+00		
Spectra Values - Peelle - Figure 5 of Peelle and Maienschein [17]									
6.844E-01	8.084E-01	9.201E-01	1.057E+00	1.192E+00	1.395E+00	1.502E+00	1.678E+00	1.910E+00	2.135E+00
2.430E+00	2.665E+00	3.177E+00	3.684E+00	4.311E+00	4.906E+00	5.689E+00	6.298E+00	6.844E+00	7.179E+00
6.781E+00	5.827E+00	6.781E+00	7.370E+00	7.656E+00	5.167E+00	5.684E+00	4.952E+00	4.538E+00	4.816E+00
5.139E+00	5.689E+00	5.849E+00	6.535E+00	7.337E+00	8.010E+00	7.796E+00	7.408E+00	7.202E+00	6.628E+00
6.783E+00	7.405E+00	7.653E+00	6.420E+00	6.044E+00	6.417E+00	7.475E+00	7.799E+00	7.579E+00	6.127E+00
5.757E+00	5.433E+00	4.516E+00	3.752E+00	3.163E+00	2.609E+00	2.595E+00	1.573E+00	1.278E+00	1.058E+00
1.072E+00	8.920E-01	8.389E-01	8.799E-01	7.757E-01	6.485E-01	6.425E-01	5.266E-01	5.116E-01	4.728E-01
4.232E-01	3.770E-01	3.423E-01	2.992E-01	2.691E-01	1.995E-01	1.931E-01	1.852E-01	1.610E-01	1.354E-01
1.305E-01	1.347E-01	1.171E-01	1.055E-01	8.299E-02	7.236E-02	5.316E-02	4.891E-02	3.220E-02	2.377E-02
2.212E-02	2.443E-02	1.393E-02	1.088E-02	6.965E-03	6.141E-03	1.141E-03	1.058E-03		

Energy Bins - Oberstedt - LaBr3 Q489 in Figure 2 of Oberstedt, *et al.* [33]

9.700E-02	1.000E-01	1.010E-01	1.020E-01	1.030E-01	1.040E-01	1.050E-01	1.060E-01	1.070E-01	1.080E-01
1.090E-01	1.100E-01	1.110E-01	1.120E-01	1.130E-01	1.140E-01	1.150E-01	1.160E-01	1.170E-01	1.180E-01
1.190E-01	1.200E-01	1.210E-01	1.220E-01	1.230E-01	1.240E-01	1.250E-01	1.260E-01	1.270E-01	1.280E-01
1.290E-01	1.300E-01	1.310E-01	1.320E-01	1.330E-01	1.340E-01	1.350E-01	1.360E-01	1.370E-01	1.380E-01
1.390E-01	1.400E-01	1.410E-01	1.420E-01	1.430E-01	1.440E-01	1.450E-01	1.460E-01	1.470E-01	1.480E-01
1.490E-01	1.500E-01	1.510E-01	1.520E-01	1.530E-01	1.540E-01	1.550E-01	1.560E-01	1.570E-01	1.580E-01
1.590E-01	1.600E-01	1.610E-01	1.620E-01	1.630E-01	1.640E-01	1.650E-01	1.660E-01	1.670E-01	1.680E-01
1.690E-01	1.700E-01	1.710E-01	1.720E-01	1.730E-01	1.740E-01	1.750E-01	1.760E-01	1.770E-01	1.780E-01
1.790E-01	1.800E-01	1.810E-01	1.820E-01	1.830E-01	1.840E-01	1.850E-01	1.860E-01	1.870E-01	1.880E-01
1.890E-01	1.900E-01	1.910E-01	1.920E-01	1.930E-01	1.940E-01	1.950E-01	1.960E-01	1.970E-01	1.980E-01
1.990E-01	2.000E-01	2.010E-01	2.020E-01	2.030E-01	2.040E-01	2.050E-01	2.060E-01	2.070E-01	2.080E-01
2.090E-01	2.100E-01	2.110E-01	2.120E-01	2.130E-01	2.140E-01	2.150E-01	2.160E-01	2.170E-01	2.180E-01
2.190E-01	2.200E-01	2.210E-01	2.220E-01	2.230E-01	2.240E-01	2.250E-01	2.260E-01	2.270E-01	2.280E-01
2.290E-01	2.300E-01	2.310E-01	2.320E-01	2.330E-01	2.340E-01	2.350E-01	2.360E-01	2.370E-01	2.380E-01
2.390E-01	2.400E-01	2.410E-01	2.420E-01	2.430E-01	2.440E-01	2.450E-01	2.460E-01	2.470E-01	2.480E-01
2.490E-01	2.500E-01	2.510E-01	2.520E-01	2.530E-01	2.540E-01	2.550E-01	2.560E-01	2.570E-01	2.580E-01
2.590E-01	2.600E-01	2.610E-01	2.620E-01	2.630E-01	2.640E-01	2.650E-01	2.660E-01	2.670E-01	2.680E-01
2.690E-01	2.700E-01	2.710E-01	2.720E-01	2.730E-01	2.740E-01	2.750E-01	2.760E-01	2.770E-01	2.780E-01
2.790E-01	2.800E-01	2.810E-01	2.820E-01	2.830E-01	2.840E-01	2.850E-01	2.860E-01	2.870E-01	2.880E-01
2.890E-01	2.900E-01	2.910E-01	2.920E-01	2.930E-01	2.940E-01	2.950E-01	2.960E-01	2.970E-01	2.980E-01
2.990E-01	3.000E-01	3.010E-01	3.020E-01	3.030E-01	3.040E-01	3.050E-01	3.060E-01	3.070E-01	3.080E-01
3.090E-01	3.100E-01	3.110E-01	3.120E-01	3.130E-01	3.140E-01	3.150E-01	3.160E-01	3.170E-01	3.180E-01
3.190E-01	3.200E-01	3.210E-01	3.220E-01	3.230E-01	3.240E-01	3.250E-01	3.260E-01	3.270E-01	3.280E-01
3.290E-01	3.300E-01	3.310E-01	3.320E-01	3.330E-01	3.340E-01	3.350E-01	3.360E-01	3.370E-01	3.380E-01
3.390E-01	3.400E-01	3.410E-01	3.420E-01	3.430E-01	3.440E-01	3.450E-01	3.460E-01	3.470E-01	3.480E-01
3.490E-01	3.500E-01	3.510E-01	3.520E-01	3.530E-01	3.540E-01	3.550E-01	3.560E-01	3.570E-01	3.580E-01
3.590E-01	3.600E-01	3.610E-01	3.620E-01	3.630E-01	3.640E-01	3.650E-01	3.660E-01	3.670E-01	3.680E-01
3.690E-01	3.700E-01	3.710E-01	3.720E-01	3.730E-01	3.740E-01	3.750E-01	3.760E-01	3.770E-01	3.780E-01
3.790E-01	3.800E-01	3.810E-01	3.820E-01	3.830E-01	3.840E-01	3.850E-01	3.860E-01	3.870E-01	3.880E-01
3.890E-01	3.900E-01	3.910E-01	3.920E-01	3.930E-01	3.940E-01	3.950E-01	3.960E-01	3.970E-01	3.980E-01
3.990E-01	4.000E-01	4.010E-01	4.020E-01	4.030E-01	4.040E-01	4.050E-01	4.060E-01	4.070E-01	4.080E-01
4.090E-01	4.100E-01	4.110E-01	4.120E-01	4.130E-01	4.140E-01	4.150E-01	4.160E-01	4.170E-01	4.180E-01
4.190E-01	4.200E-01	4.210E-01	4.220E-01	4.230E-01	4.240E-01	4.250E-01	4.260E-01	4.270E-01	4.280E-01
4.290E-01	4.300E-01	4.310E-01	4.320E-01	4.330E-01	4.340E-01	4.350E-01	4.360E-01	4.370E-01	4.380E-01
4.390E-01	4.400E-01	4.410E-01	4.420E-01	4.430E-01	4.440E-01	4.450E-01	4.460E-01	4.470E-01	4.480E-01
4.490E-01	4.500E-01	4.510E-01	4.520E-01	4.530E-01	4.540E-01	4.550E-01	4.560E-01	4.570E-01	4.580E-01
4.590E-01	4.600E-01	4.610E-01	4.620E-01	4.630E-01	4.640E-01	4.650E-01	4.660E-01	4.670E-01	4.680E-01
4.690E-01	4.700E-01	4.710E-01	4.720E-01	4.730E-01	4.740E-01	4.750E-01	4.760E-01	4.770E-01	4.780E-01
4.790E-01	4.800E-01	4.810E-01	4.820E-01	4.830E-01	4.840E-01	4.850E-01	4.860E-01	4.870E-01	4.880E-01
4.890E-01	4.900E-01	4.910E-01	4.920E-01	4.930E-01	4.940E-01	4.950E-01	4.960E-01	4.970E-01	4.980E-01
4.990E-01	5.000E-01	5.010E-01	5.020E-01	5.030E-01	5.040E-01	5.050E-01	5.060E-01	5.070E-01	5.080E-01
5.090E-01	5.100E-01	5.110E-01	5.120E-01	5.130E-01	5.140E-01	5.150E-01	5.160E-01	5.170E-01	5.180E-01
5.190E-01	5.200E-01	5.210E-01	5.220E-01	5.230E-01	5.240E-01	5.250E-01	5.260E-01	5.270E-01	5.280E-01
5.290E-01	5.300E-01	5.310E-01	5.320E-01	5.330E-01	5.340E-01	5.350E-01	5.360E-01	5.370E-01	5.380E-01
5.390E-01	5.400E-01	5.410E-01	5.420E-01	5.430E-01	5.440E-01	5.450E-01	5.460E-01	5.470E-01	5.480E-01
5.490E-01	5.500E-01	5.510E-01	5.520E-01	5.530E-01	5.540E-01	5.550E-01	5.560E-01	5.570E-01	5.580E-01
5.590E-01	5.600E-01	5.610E-01	5.620E-01	5.630E-01	5.640E-01	5.650E-01	5.660E-01	5.670E-01	5.680E-01
5.690E-01	5.700E-01	5.710E-01	5.720E-01	5.730E-01	5.740E-01	5.750E-01	5.760E-01	5.770E-01	5.780E-01
5.790E-01	5.800E-01	5.810E-01	5.820E-01	5.830E-01	5.840E-01	5.850E-01	5.860E-01	5.870E-01	5.880E-01
5.890E-01	5.900E-01	5.910E-01	5.920E-01	5.930E-01	5.940E-01	5.950E-01	5.960E-01	5.970E-01	5.980E-01
5.990E-01	6.000E-01	6.010E-01	6.020E-01	6.030E-01	6.040E-01	6.050E-01	6.060E-01	6.070E-01	6.080E-01

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6.090E-01	6.100E-01	6.110E-01	6.120E-01	6.130E-01	6.140E-01	6.150E-01	6.160E-01	6.170E-01	6.180E-01
6.190E-01	6.200E-01	6.210E-01	6.220E-01	6.230E-01	6.240E-01	6.250E-01	6.260E-01	6.270E-01	6.280E-01
6.290E-01	6.300E-01	6.310E-01	6.320E-01	6.330E-01	6.340E-01	6.350E-01	6.360E-01	6.370E-01	6.380E-01
6.390E-01	6.400E-01	6.410E-01	6.420E-01	6.430E-01	6.440E-01	6.450E-01	6.460E-01	6.470E-01	6.480E-01
6.490E-01	6.500E-01	6.510E-01	6.520E-01	6.530E-01	6.540E-01	6.550E-01	6.560E-01	6.570E-01	6.580E-01
6.590E-01	6.600E-01	6.610E-01	6.620E-01	6.630E-01	6.640E-01	6.650E-01	6.660E-01	6.670E-01	6.680E-01
6.690E-01	6.700E-01	6.710E-01	6.720E-01	6.730E-01	6.740E-01	6.750E-01	6.760E-01	6.770E-01	6.780E-01
6.790E-01	6.800E-01	6.810E-01	6.820E-01	6.830E-01	6.840E-01	6.850E-01	6.860E-01	6.870E-01	6.880E-01
6.890E-01	6.900E-01	6.910E-01	6.920E-01	6.930E-01	6.940E-01	6.950E-01	6.960E-01	6.970E-01	6.980E-01
6.990E-01	7.000E-01	7.010E-01	7.020E-01	7.030E-01	7.040E-01	7.050E-01	7.060E-01	7.070E-01	7.080E-01
7.090E-01	7.100E-01	7.110E-01	7.120E-01	7.130E-01	7.140E-01	7.150E-01	7.160E-01	7.170E-01	7.180E-01
7.190E-01	7.200E-01	7.210E-01	7.220E-01	7.230E-01	7.240E-01	7.250E-01	7.260E-01	7.270E-01	7.280E-01
7.290E-01	7.300E-01	7.310E-01	7.320E-01	7.330E-01	7.340E-01	7.350E-01	7.360E-01	7.370E-01	7.380E-01
7.390E-01	7.400E-01	7.410E-01	7.420E-01	7.430E-01	7.440E-01	7.450E-01	7.460E-01	7.470E-01	7.480E-01
7.490E-01	7.500E-01	7.510E-01	7.520E-01	7.530E-01	7.540E-01	7.550E-01	7.560E-01	7.570E-01	7.580E-01
7.590E-01	7.600E-01	7.610E-01	7.620E-01	7.630E-01	7.640E-01	7.650E-01	7.660E-01	7.670E-01	7.680E-01
7.690E-01	7.700E-01	7.710E-01	7.720E-01	7.730E-01	7.740E-01	7.750E-01	7.760E-01	7.770E-01	7.780E-01
7.790E-01	7.800E-01	7.810E-01	7.820E-01	7.830E-01	7.840E-01	7.850E-01	7.860E-01	7.870E-01	7.880E-01
7.890E-01	7.900E-01	7.910E-01	7.920E-01	7.930E-01	7.940E-01	7.950E-01	7.960E-01	7.970E-01	7.980E-01
7.990E-01	8.000E-01	8.010E-01	8.020E-01	8.030E-01	8.040E-01	8.050E-01	8.060E-01	8.070E-01	8.080E-01
8.090E-01	8.100E-01	8.110E-01	8.120E-01	8.130E-01	8.140E-01	8.150E-01	8.160E-01	8.170E-01	8.180E-01
8.190E-01	8.200E-01	8.210E-01	8.220E-01	8.230E-01	8.240E-01	8.250E-01	8.260E-01	8.270E-01	8.280E-01
8.290E-01	8.300E-01	8.310E-01	8.320E-01	8.330E-01	8.340E-01	8.350E-01	8.360E-01	8.370E-01	8.380E-01
8.390E-01	8.400E-01	8.410E-01	8.420E-01	8.430E-01	8.440E-01	8.450E-01	8.460E-01	8.470E-01	8.480E-01
8.490E-01	8.500E-01	8.510E-01	8.520E-01	8.530E-01	8.540E-01	8.550E-01	8.560E-01	8.570E-01	8.580E-01
8.590E-01	8.600E-01	8.610E-01	8.620E-01	8.630E-01	8.640E-01	8.650E-01	8.660E-01	8.670E-01	8.680E-01
8.690E-01	8.700E-01	8.710E-01	8.720E-01	8.730E-01	8.740E-01	8.750E-01	8.760E-01	8.770E-01	8.780E-01
8.790E-01	8.800E-01	8.810E-01	8.820E-01	8.830E-01	8.840E-01	8.850E-01	8.860E-01	8.870E-01	8.880E-01
8.890E-01	8.900E-01	8.910E-01	8.920E-01	8.930E-01	8.940E-01	8.950E-01	8.960E-01	8.970E-01	8.980E-01
8.990E-01	9.000E-01	9.010E-01	9.020E-01	9.030E-01	9.040E-01	9.050E-01	9.060E-01	9.070E-01	9.080E-01
9.090E-01	9.100E-01	9.110E-01	9.120E-01	9.130E-01	9.140E-01	9.150E-01	9.160E-01	9.170E-01	9.180E-01
9.190E-01	9.200E-01	9.210E-01	9.220E-01	9.230E-01	9.240E-01	9.250E-01	9.260E-01	9.270E-01	9.280E-01
9.290E-01	9.300E-01	9.310E-01	9.320E-01	9.330E-01	9.340E-01	9.350E-01	9.360E-01	9.370E-01	9.380E-01
9.390E-01	9.400E-01	9.410E-01	9.420E-01	9.430E-01	9.440E-01	9.450E-01	9.460E-01	9.470E-01	9.480E-01
9.490E-01	9.500E-01	9.510E-01	9.520E-01	9.530E-01	9.540E-01	9.550E-01	9.560E-01	9.570E-01	9.580E-01
9.590E-01	9.600E-01	9.610E-01	9.620E-01	9.630E-01	9.640E-01	9.650E-01	9.660E-01	9.670E-01	9.680E-01
9.690E-01	9.700E-01	9.710E-01	9.720E-01	9.730E-01	9.740E-01	9.750E-01	9.760E-01	9.770E-01	9.780E-01
9.790E-01	9.800E-01	9.810E-01	9.820E-01	9.830E-01	9.840E-01	9.850E-01	9.860E-01	9.870E-01	9.880E-01
9.890E-01	9.900E-01	9.910E-01	9.920E-01	9.930E-01	9.940E-01	9.950E-01	9.960E-01	9.970E-01	9.980E-01
9.990E-01	1.000E+00	1.001E+00	1.002E+00	1.003E+00	1.004E+00	1.005E+00	1.006E+00	1.007E+00	1.008E+00
1.009E+00	1.010E+00	1.011E+00	1.012E+00	1.013E+00	1.014E+00	1.015E+00	1.016E+00	1.017E+00	1.018E+00
1.019E+00	1.020E+00	1.021E+00	1.022E+00	1.023E+00	1.024E+00	1.025E+00	1.026E+00	1.027E+00	1.028E+00
1.029E+00	1.030E+00	1.031E+00	1.032E+00	1.033E+00	1.034E+00	1.035E+00	1.036E+00	1.037E+00	1.038E+00
1.039E+00	1.040E+00	1.041E+00	1.042E+00	1.043E+00	1.044E+00	1.045E+00	1.046E+00	1.047E+00	1.048E+00
1.049E+00	1.050E+00	1.051E+00	1.052E+00	1.053E+00	1.054E+00	1.055E+00	1.056E+00	1.057E+00	1.058E+00
1.059E+00	1.060E+00	1.061E+00	1.062E+00	1.063E+00	1.064E+00	1.065E+00	1.066E+00	1.067E+00	1.068E+00
1.069E+00	1.070E+00	1.071E+00	1.072E+00	1.073E+00	1.074E+00	1.075E+00	1.076E+00	1.077E+00	1.078E+00
1.079E+00	1.080E+00	1.081E+00	1.082E+00	1.083E+00	1.084E+00	1.085E+00	1.086E+00	1.087E+00	1.088E+00
1.089E+00	1.090E+00	1.091E+00	1.092E+00	1.093E+00	1.094E+00	1.095E+00	1.096E+00	1.097E+00	1.098E+00
1.099E+00	1.100E+00	1.101E+00	1.102E+00	1.103E+00	1.104E+00	1.105E+00	1.106E+00	1.107E+00	1.108E+00
1.109E+00	1.110E+00	1.111E+00	1.112E+00	1.113E+00	1.114E+00	1.115E+00	1.116E+00	1.117E+00	1.118E+00
1.119E+00	1.120E+00	1.121E+00	1.122E+00	1.123E+00	1.124E+00	1.125E+00	1.126E+00	1.127E+00	1.128E+00

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1.129E+00	1.130E+00	1.131E+00	1.132E+00	1.133E+00	1.134E+00	1.135E+00	1.136E+00	1.137E+00	1.138E+00
1.139E+00	1.140E+00	1.141E+00	1.142E+00	1.143E+00	1.144E+00	1.145E+00	1.146E+00	1.147E+00	1.148E+00
1.149E+00	1.150E+00	1.151E+00	1.152E+00	1.153E+00	1.154E+00	1.155E+00	1.156E+00	1.157E+00	1.158E+00
1.159E+00	1.160E+00	1.161E+00	1.162E+00	1.163E+00	1.164E+00	1.165E+00	1.166E+00	1.167E+00	1.168E+00
1.169E+00	1.170E+00	1.171E+00	1.172E+00	1.173E+00	1.174E+00	1.175E+00	1.176E+00	1.177E+00	1.178E+00
1.179E+00	1.180E+00	1.181E+00	1.182E+00	1.183E+00	1.184E+00	1.185E+00	1.186E+00	1.187E+00	1.188E+00
1.189E+00	1.190E+00	1.191E+00	1.192E+00	1.193E+00	1.194E+00	1.195E+00	1.196E+00	1.197E+00	1.198E+00
1.199E+00	1.200E+00	1.201E+00	1.202E+00	1.203E+00	1.204E+00	1.205E+00	1.206E+00	1.207E+00	1.208E+00
1.209E+00	1.210E+00	1.211E+00	1.212E+00	1.213E+00	1.214E+00	1.215E+00	1.216E+00	1.217E+00	1.218E+00
1.219E+00	1.220E+00	1.221E+00	1.222E+00	1.223E+00	1.224E+00	1.225E+00	1.226E+00	1.227E+00	1.228E+00
1.229E+00	1.230E+00	1.231E+00	1.232E+00	1.233E+00	1.234E+00	1.235E+00	1.236E+00	1.237E+00	1.238E+00
1.239E+00	1.240E+00	1.241E+00	1.242E+00	1.243E+00	1.244E+00	1.245E+00	1.246E+00	1.247E+00	1.248E+00
1.249E+00	1.250E+00	1.251E+00	1.252E+00	1.253E+00	1.254E+00	1.255E+00	1.256E+00	1.257E+00	1.258E+00
1.259E+00	1.260E+00	1.261E+00	1.262E+00	1.263E+00	1.264E+00	1.265E+00	1.266E+00	1.267E+00	1.268E+00
1.269E+00	1.270E+00	1.271E+00	1.272E+00	1.273E+00	1.274E+00	1.275E+00	1.276E+00	1.277E+00	1.278E+00
1.279E+00	1.280E+00	1.281E+00	1.282E+00	1.283E+00	1.284E+00	1.285E+00	1.286E+00	1.287E+00	1.288E+00
1.289E+00	1.290E+00	1.291E+00	1.292E+00	1.293E+00	1.294E+00	1.295E+00	1.296E+00	1.297E+00	1.298E+00
1.299E+00	1.300E+00	1.301E+00	1.302E+00	1.303E+00	1.304E+00	1.305E+00	1.306E+00	1.307E+00	1.308E+00
1.309E+00	1.310E+00	1.311E+00	1.312E+00	1.313E+00	1.314E+00	1.315E+00	1.316E+00	1.317E+00	1.318E+00
1.319E+00	1.320E+00	1.321E+00	1.322E+00	1.323E+00	1.324E+00	1.325E+00	1.326E+00	1.327E+00	1.328E+00
1.329E+00	1.330E+00	1.331E+00	1.332E+00	1.333E+00	1.334E+00	1.335E+00	1.336E+00	1.337E+00	1.338E+00
1.339E+00	1.340E+00	1.341E+00	1.342E+00	1.343E+00	1.344E+00	1.345E+00	1.346E+00	1.347E+00	1.348E+00
1.349E+00	1.350E+00	1.351E+00	1.352E+00	1.353E+00	1.354E+00	1.355E+00	1.356E+00	1.357E+00	1.358E+00
1.359E+00	1.360E+00	1.361E+00	1.362E+00	1.363E+00	1.364E+00	1.365E+00	1.366E+00	1.367E+00	1.368E+00
1.369E+00	1.370E+00	1.371E+00	1.372E+00	1.373E+00	1.374E+00	1.375E+00	1.376E+00	1.377E+00	1.378E+00
1.379E+00	1.380E+00	1.381E+00	1.382E+00	1.383E+00	1.384E+00	1.385E+00	1.386E+00	1.387E+00	1.388E+00
1.389E+00	1.390E+00	1.391E+00	1.392E+00	1.393E+00	1.394E+00	1.395E+00	1.396E+00	1.397E+00	1.398E+00
1.399E+00	1.400E+00	1.401E+00	1.402E+00	1.403E+00	1.404E+00	1.405E+00	1.406E+00	1.407E+00	1.408E+00
1.409E+00	1.410E+00	1.411E+00	1.412E+00	1.413E+00	1.414E+00	1.415E+00	1.416E+00	1.417E+00	1.418E+00
1.419E+00	1.420E+00	1.421E+00	1.422E+00	1.423E+00	1.424E+00	1.425E+00	1.426E+00	1.427E+00	1.428E+00
1.429E+00	1.430E+00	1.431E+00	1.432E+00	1.433E+00	1.434E+00	1.435E+00	1.436E+00	1.437E+00	1.438E+00
1.439E+00	1.440E+00	1.441E+00	1.442E+00	1.443E+00	1.444E+00	1.445E+00	1.446E+00	1.447E+00	1.448E+00
1.449E+00	1.450E+00	1.451E+00	1.452E+00	1.453E+00	1.454E+00	1.455E+00	1.456E+00	1.457E+00	1.458E+00
1.459E+00	1.460E+00	1.461E+00	1.462E+00	1.463E+00	1.464E+00	1.465E+00	1.466E+00	1.467E+00	1.468E+00
1.469E+00	1.470E+00	1.471E+00	1.472E+00	1.473E+00	1.474E+00	1.475E+00	1.476E+00	1.477E+00	1.478E+00
1.479E+00	1.480E+00	1.481E+00	1.482E+00	1.483E+00	1.484E+00	1.485E+00	1.486E+00	1.487E+00	1.488E+00
1.489E+00	1.490E+00	1.491E+00	1.492E+00	1.493E+00	1.494E+00	1.495E+00	1.496E+00	1.497E+00	1.498E+00
1.499E+00	1.500E+00	1.501E+00	1.502E+00	1.503E+00	1.504E+00	1.505E+00	1.506E+00	1.507E+00	1.508E+00
1.509E+00	1.510E+00	1.511E+00	1.512E+00	1.513E+00	1.514E+00	1.515E+00	1.516E+00	1.517E+00	1.518E+00
1.519E+00	1.520E+00	1.521E+00	1.522E+00	1.523E+00	1.524E+00	1.525E+00	1.526E+00	1.527E+00	1.528E+00
1.529E+00	1.530E+00	1.531E+00	1.532E+00	1.533E+00	1.534E+00	1.535E+00	1.536E+00	1.537E+00	1.538E+00
1.539E+00	1.540E+00	1.541E+00	1.542E+00	1.543E+00	1.544E+00	1.545E+00	1.546E+00	1.547E+00	1.548E+00
1.549E+00	1.550E+00	1.551E+00	1.552E+00	1.553E+00	1.554E+00	1.555E+00	1.556E+00	1.557E+00	1.558E+00
1.559E+00	1.560E+00	1.561E+00	1.562E+00	1.563E+00	1.564E+00	1.565E+00	1.566E+00	1.567E+00	1.568E+00
1.569E+00	1.570E+00	1.571E+00	1.572E+00	1.573E+00	1.574E+00	1.575E+00	1.576E+00	1.577E+00	1.578E+00
1.579E+00	1.580E+00	1.581E+00	1.582E+00	1.583E+00	1.584E+00	1.585E+00	1.586E+00	1.587E+00	1.588E+00
1.589E+00	1.590E+00	1.591E+00	1.592E+00	1.593E+00	1.594E+00	1.595E+00	1.596E+00	1.597E+00	1.598E+00
1.599E+00	1.600E+00	1.601E+00	1.602E+00	1.603E+00	1.604E+00	1.605E+00	1.606E+00	1.607E+00	1.608E+00
1.609E+00	1.610E+00	1.611E+00	1.612E+00	1.613E+00	1.614E+00	1.615E+00	1.616E+00	1.617E+00	1.618E+00
1.619E+00	1.620E+00	1.621E+00	1.622E+00	1.623E+00	1.624E+00	1.625E+00	1.626E+00	1.627E+00	1.628E+00
1.629E+00	1.630E+00	1.631E+00	1.632E+00	1.633E+00	1.634E+00	1.635E+00	1.636E+00	1.637E+00	1.638E+00
1.639E+00	1.640E+00	1.641E+00	1.642E+00	1.643E+00	1.644E+00	1.645E+00	1.646E+00	1.647E+00	1.648E+00

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1.649E+00	1.650E+00	1.651E+00	1.652E+00	1.653E+00	1.654E+00	1.655E+00	1.656E+00	1.657E+00	1.658E+00
1.659E+00	1.660E+00	1.661E+00	1.662E+00	1.663E+00	1.664E+00	1.665E+00	1.666E+00	1.667E+00	1.668E+00
1.669E+00	1.670E+00	1.671E+00	1.672E+00	1.673E+00	1.674E+00	1.675E+00	1.676E+00	1.677E+00	1.678E+00
1.679E+00	1.680E+00	1.681E+00	1.682E+00	1.683E+00	1.684E+00	1.685E+00	1.686E+00	1.687E+00	1.688E+00
1.689E+00	1.690E+00	1.691E+00	1.692E+00	1.693E+00	1.694E+00	1.695E+00	1.696E+00	1.697E+00	1.698E+00
1.699E+00	1.700E+00	1.701E+00	1.702E+00	1.703E+00	1.704E+00	1.705E+00	1.706E+00	1.707E+00	1.708E+00
1.709E+00	1.710E+00	1.711E+00	1.712E+00	1.713E+00	1.714E+00	1.715E+00	1.716E+00	1.717E+00	1.718E+00
1.719E+00	1.720E+00	1.721E+00	1.722E+00	1.723E+00	1.724E+00	1.725E+00	1.726E+00	1.727E+00	1.728E+00
1.729E+00	1.730E+00	1.731E+00	1.732E+00	1.733E+00	1.734E+00	1.735E+00	1.736E+00	1.737E+00	1.738E+00
1.739E+00	1.740E+00	1.741E+00	1.742E+00	1.743E+00	1.744E+00	1.745E+00	1.746E+00	1.747E+00	1.748E+00
1.749E+00	1.750E+00	1.751E+00	1.752E+00	1.753E+00	1.754E+00	1.755E+00	1.756E+00	1.757E+00	1.758E+00
1.759E+00	1.760E+00	1.761E+00	1.762E+00	1.763E+00	1.764E+00	1.765E+00	1.766E+00	1.767E+00	1.768E+00
1.769E+00	1.770E+00	1.771E+00	1.772E+00	1.773E+00	1.774E+00	1.775E+00	1.776E+00	1.777E+00	1.778E+00
1.779E+00	1.780E+00	1.781E+00	1.782E+00	1.783E+00	1.784E+00	1.785E+00	1.786E+00	1.787E+00	1.788E+00
1.789E+00	1.790E+00	1.791E+00	1.792E+00	1.793E+00	1.794E+00	1.795E+00	1.796E+00	1.797E+00	1.798E+00
1.799E+00	1.800E+00	1.801E+00	1.802E+00	1.803E+00	1.804E+00	1.805E+00	1.806E+00	1.807E+00	1.808E+00
1.809E+00	1.810E+00	1.811E+00	1.812E+00	1.813E+00	1.814E+00	1.815E+00	1.816E+00	1.817E+00	1.818E+00
1.819E+00	1.820E+00	1.821E+00	1.822E+00	1.823E+00	1.824E+00	1.825E+00	1.826E+00	1.827E+00	1.828E+00
1.829E+00	1.830E+00	1.831E+00	1.832E+00	1.833E+00	1.834E+00	1.835E+00	1.836E+00	1.837E+00	1.838E+00
1.839E+00	1.840E+00	1.841E+00	1.842E+00	1.843E+00	1.844E+00	1.845E+00	1.846E+00	1.847E+00	1.848E+00
1.849E+00	1.850E+00	1.851E+00	1.852E+00	1.853E+00	1.854E+00	1.855E+00	1.856E+00	1.857E+00	1.858E+00
1.859E+00	1.860E+00	1.861E+00	1.862E+00	1.863E+00	1.864E+00	1.865E+00	1.866E+00	1.867E+00	1.868E+00
1.869E+00	1.870E+00	1.871E+00	1.872E+00	1.873E+00	1.874E+00	1.875E+00	1.876E+00	1.877E+00	1.878E+00
1.879E+00	1.880E+00	1.881E+00	1.882E+00	1.883E+00	1.884E+00	1.885E+00	1.886E+00	1.887E+00	1.888E+00
1.889E+00	1.890E+00	1.891E+00	1.892E+00	1.893E+00	1.894E+00	1.895E+00	1.896E+00	1.897E+00	1.898E+00
1.899E+00	1.900E+00	1.901E+00	1.902E+00	1.903E+00	1.904E+00	1.905E+00	1.906E+00	1.907E+00	1.908E+00
1.909E+00	1.910E+00	1.911E+00	1.912E+00	1.913E+00	1.914E+00	1.915E+00	1.916E+00	1.917E+00	1.918E+00
1.919E+00	1.920E+00	1.921E+00	1.922E+00	1.923E+00	1.924E+00	1.925E+00	1.926E+00	1.927E+00	1.928E+00
1.929E+00	1.930E+00	1.931E+00	1.932E+00	1.933E+00	1.934E+00	1.935E+00	1.936E+00	1.937E+00	1.938E+00
1.939E+00	1.940E+00	1.941E+00	1.942E+00	1.943E+00	1.944E+00	1.945E+00	1.946E+00	1.947E+00	1.948E+00
1.949E+00	1.950E+00	1.951E+00	1.952E+00	1.953E+00	1.954E+00	1.955E+00	1.956E+00	1.957E+00	1.958E+00
1.959E+00	1.960E+00	1.961E+00	1.962E+00	1.963E+00	1.964E+00	1.965E+00	1.966E+00	1.967E+00	1.968E+00
1.969E+00	1.970E+00	1.971E+00	1.972E+00	1.973E+00	1.974E+00	1.975E+00	1.976E+00	1.977E+00	1.978E+00
1.979E+00	1.980E+00	1.981E+00	1.982E+00	1.983E+00	1.984E+00	1.985E+00	1.986E+00	1.987E+00	1.988E+00
1.989E+00	1.990E+00	1.991E+00	1.992E+00	1.993E+00	1.994E+00	1.995E+00	1.996E+00	1.997E+00	1.998E+00
1.999E+00	2.000E+00	2.001E+00	2.002E+00	2.003E+00	2.004E+00	2.005E+00	2.006E+00	2.007E+00	2.008E+00
2.009E+00	2.010E+00	2.011E+00	2.012E+00	2.013E+00	2.014E+00	2.015E+00	2.016E+00	2.017E+00	2.018E+00
2.019E+00	2.020E+00	2.021E+00	2.022E+00	2.023E+00	2.024E+00	2.025E+00	2.026E+00	2.027E+00	2.028E+00
2.029E+00	2.030E+00	2.031E+00	2.032E+00	2.033E+00	2.034E+00	2.035E+00	2.036E+00	2.037E+00	2.038E+00
2.039E+00	2.040E+00	2.041E+00	2.042E+00	2.043E+00	2.044E+00	2.045E+00	2.046E+00	2.047E+00	2.048E+00
2.049E+00	2.050E+00	2.051E+00	2.052E+00	2.053E+00	2.054E+00	2.055E+00	2.056E+00	2.057E+00	2.058E+00
2.059E+00	2.060E+00	2.061E+00	2.062E+00	2.063E+00	2.064E+00	2.065E+00	2.066E+00	2.067E+00	2.068E+00
2.069E+00	2.070E+00	2.071E+00	2.072E+00	2.073E+00	2.074E+00	2.075E+00	2.076E+00	2.077E+00	2.078E+00
2.079E+00	2.080E+00	2.081E+00	2.082E+00	2.083E+00	2.084E+00	2.085E+00	2.086E+00	2.087E+00	2.088E+00
2.089E+00	2.090E+00	2.091E+00	2.092E+00	2.093E+00	2.094E+00	2.095E+00	2.096E+00	2.097E+00	2.098E+00
2.099E+00	2.100E+00	2.101E+00	2.102E+00	2.103E+00	2.104E+00	2.105E+00	2.106E+00	2.107E+00	2.108E+00
2.109E+00	2.110E+00	2.111E+00	2.112E+00	2.113E+00	2.114E+00	2.115E+00	2.116E+00	2.117E+00	2.118E+00
2.119E+00	2.120E+00	2.121E+00	2.122E+00	2.123E+00	2.124E+00	2.125E+00	2.126E+00	2.127E+00	2.128E+00
2.129E+00	2.130E+00	2.131E+00	2.132E+00	2.133E+00	2.134E+00	2.135E+00	2.136E+00	2.137E+00	2.138E+00
2.139E+00	2.140E+00	2.141E+00	2.142E+00	2.143E+00	2.144E+00	2.145E+00	2.146E+00	2.147E+00	2.148E+00
2.149E+00	2.150E+00	2.151E+00	2.152E+00	2.153E+00	2.154E+00	2.155E+00	2.156E+00	2.157E+00	2.158E+00
2.159E+00	2.160E+00	2.161E+00	2.162E+00	2.163E+00	2.164E+00	2.165E+00	2.166E+00	2.167E+00	2.168E+00

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2.169E+00	2.170E+00	2.171E+00	2.172E+00	2.173E+00	2.174E+00	2.175E+00	2.176E+00	2.177E+00	2.178E+00
2.179E+00	2.180E+00	2.181E+00	2.182E+00	2.183E+00	2.184E+00	2.185E+00	2.186E+00	2.187E+00	2.188E+00
2.189E+00	2.190E+00	2.191E+00	2.192E+00	2.193E+00	2.194E+00	2.195E+00	2.196E+00	2.197E+00	2.198E+00
2.199E+00	2.200E+00	2.201E+00	2.202E+00	2.203E+00	2.204E+00	2.205E+00	2.206E+00	2.207E+00	2.208E+00
2.209E+00	2.210E+00	2.211E+00	2.212E+00	2.213E+00	2.214E+00	2.215E+00	2.216E+00	2.217E+00	2.218E+00
2.219E+00	2.220E+00	2.221E+00	2.222E+00	2.223E+00	2.224E+00	2.225E+00	2.226E+00	2.227E+00	2.228E+00
2.229E+00	2.230E+00	2.231E+00	2.232E+00	2.233E+00	2.234E+00	2.235E+00	2.236E+00	2.237E+00	2.238E+00
2.239E+00	2.240E+00	2.241E+00	2.242E+00	2.243E+00	2.244E+00	2.245E+00	2.246E+00	2.247E+00	2.248E+00
2.249E+00	2.250E+00	2.251E+00	2.252E+00	2.253E+00	2.254E+00	2.255E+00	2.256E+00	2.257E+00	2.258E+00
2.259E+00	2.260E+00	2.261E+00	2.262E+00	2.263E+00	2.264E+00	2.265E+00	2.266E+00	2.267E+00	2.268E+00
2.269E+00	2.270E+00	2.271E+00	2.272E+00	2.273E+00	2.274E+00	2.275E+00	2.276E+00	2.277E+00	2.278E+00
2.279E+00	2.280E+00	2.281E+00	2.282E+00	2.283E+00	2.284E+00	2.285E+00	2.286E+00	2.287E+00	2.288E+00
2.289E+00	2.290E+00	2.291E+00	2.292E+00	2.293E+00	2.294E+00	2.295E+00	2.296E+00	2.297E+00	2.298E+00
2.299E+00	2.300E+00	2.301E+00	2.302E+00	2.303E+00	2.304E+00	2.305E+00	2.306E+00	2.307E+00	2.308E+00
2.309E+00	2.310E+00	2.311E+00	2.312E+00	2.313E+00	2.314E+00	2.315E+00	2.316E+00	2.317E+00	2.318E+00
2.319E+00	2.320E+00	2.321E+00	2.322E+00	2.323E+00	2.324E+00	2.325E+00	2.326E+00	2.327E+00	2.328E+00
2.329E+00	2.330E+00	2.331E+00	2.332E+00	2.333E+00	2.334E+00	2.335E+00	2.336E+00	2.337E+00	2.338E+00
2.339E+00	2.340E+00	2.341E+00	2.342E+00	2.343E+00	2.344E+00	2.345E+00	2.346E+00	2.347E+00	2.348E+00
2.349E+00	2.350E+00	2.351E+00	2.352E+00	2.353E+00	2.354E+00	2.355E+00	2.356E+00	2.357E+00	2.358E+00
2.359E+00	2.360E+00	2.361E+00	2.362E+00	2.363E+00	2.364E+00	2.365E+00	2.366E+00	2.367E+00	2.368E+00
2.369E+00	2.370E+00	2.371E+00	2.372E+00	2.373E+00	2.374E+00	2.375E+00	2.376E+00	2.377E+00	2.378E+00
2.379E+00	2.380E+00	2.381E+00	2.382E+00	2.383E+00	2.384E+00	2.385E+00	2.386E+00	2.387E+00	2.388E+00
2.389E+00	2.390E+00	2.391E+00	2.392E+00	2.393E+00	2.394E+00	2.395E+00	2.396E+00	2.397E+00	2.398E+00
2.399E+00	2.400E+00	2.401E+00	2.402E+00	2.403E+00	2.404E+00	2.405E+00	2.406E+00	2.407E+00	2.408E+00
2.409E+00	2.410E+00	2.411E+00	2.412E+00	2.413E+00	2.414E+00	2.415E+00	2.416E+00	2.417E+00	2.418E+00
2.419E+00	2.420E+00	2.421E+00	2.422E+00	2.423E+00	2.424E+00	2.425E+00	2.426E+00	2.427E+00	2.428E+00
2.429E+00	2.430E+00	2.431E+00	2.432E+00	2.433E+00	2.434E+00	2.435E+00	2.436E+00	2.437E+00	2.438E+00
2.439E+00	2.440E+00	2.441E+00	2.442E+00	2.443E+00	2.444E+00	2.445E+00	2.446E+00	2.447E+00	2.448E+00
2.449E+00	2.450E+00	2.451E+00	2.452E+00	2.453E+00	2.454E+00	2.455E+00	2.456E+00	2.457E+00	2.458E+00
2.459E+00	2.460E+00	2.461E+00	2.462E+00	2.463E+00	2.464E+00	2.465E+00	2.466E+00	2.467E+00	2.468E+00
2.469E+00	2.470E+00	2.471E+00	2.472E+00	2.473E+00	2.474E+00	2.475E+00	2.476E+00	2.477E+00	2.478E+00
2.479E+00	2.480E+00	2.481E+00	2.482E+00	2.483E+00	2.484E+00	2.485E+00	2.486E+00	2.487E+00	2.488E+00
2.489E+00	2.490E+00	2.491E+00	2.492E+00	2.493E+00	2.494E+00	2.495E+00	2.496E+00	2.497E+00	2.498E+00
2.499E+00	2.500E+00	2.501E+00	2.502E+00	2.503E+00	2.504E+00	2.505E+00	2.506E+00	2.507E+00	2.508E+00
2.509E+00	2.510E+00	2.511E+00	2.512E+00	2.513E+00	2.514E+00	2.515E+00	2.516E+00	2.517E+00	2.518E+00
2.519E+00	2.520E+00	2.521E+00	2.522E+00	2.523E+00	2.524E+00	2.525E+00	2.526E+00	2.527E+00	2.528E+00
2.529E+00	2.530E+00	2.531E+00	2.532E+00	2.533E+00	2.534E+00	2.535E+00	2.536E+00	2.537E+00	2.538E+00
2.539E+00	2.540E+00	2.541E+00	2.542E+00	2.543E+00	2.544E+00	2.545E+00	2.546E+00	2.547E+00	2.548E+00
2.549E+00	2.550E+00	2.551E+00	2.552E+00	2.553E+00	2.554E+00	2.555E+00	2.556E+00	2.557E+00	2.558E+00
2.559E+00	2.560E+00	2.561E+00	2.562E+00	2.563E+00	2.564E+00	2.565E+00	2.566E+00	2.567E+00	2.568E+00
2.569E+00	2.570E+00	2.571E+00	2.572E+00	2.573E+00	2.574E+00	2.575E+00	2.576E+00	2.577E+00	2.578E+00
2.579E+00	2.580E+00	2.581E+00	2.582E+00	2.583E+00	2.584E+00	2.585E+00	2.586E+00	2.587E+00	2.588E+00
2.589E+00	2.590E+00	2.591E+00	2.592E+00	2.593E+00	2.594E+00	2.595E+00	2.596E+00	2.597E+00	2.598E+00
2.599E+00	2.600E+00	2.601E+00	2.602E+00	2.603E+00	2.604E+00	2.605E+00	2.606E+00	2.607E+00	2.608E+00
2.609E+00	2.610E+00	2.611E+00	2.612E+00	2.613E+00	2.614E+00	2.615E+00	2.616E+00	2.617E+00	2.618E+00
2.619E+00	2.620E+00	2.621E+00	2.622E+00	2.623E+00	2.624E+00	2.625E+00	2.626E+00	2.627E+00	2.628E+00
2.629E+00	2.630E+00	2.631E+00	2.632E+00	2.633E+00	2.634E+00	2.635E+00	2.636E+00	2.637E+00	2.638E+00
2.639E+00	2.640E+00	2.641E+00	2.642E+00	2.643E+00	2.644E+00	2.645E+00	2.646E+00	2.647E+00	2.648E+00
2.649E+00	2.650E+00	2.651E+00	2.652E+00	2.653E+00	2.654E+00	2.655E+00	2.656E+00	2.657E+00	2.658E+00
2.659E+00	2.660E+00	2.661E+00	2.662E+00	2.663E+00	2.664E+00	2.665E+00	2.666E+00	2.667E+00	2.668E+00
2.669E+00	2.670E+00	2.671E+00	2.672E+00	2.673E+00	2.674E+00	2.675E+00	2.676E+00	2.677E+00	2.678E+00
2.679E+00	2.680E+00	2.681E+00	2.682E+00	2.683E+00	2.684E+00	2.685E+00	2.686E+00	2.687E+00	2.688E+00

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2.689E+00	2.690E+00	2.691E+00	2.692E+00	2.693E+00	2.694E+00	2.695E+00	2.696E+00	2.697E+00	2.698E+00
2.699E+00	2.700E+00	2.701E+00	2.702E+00	2.703E+00	2.704E+00	2.705E+00	2.706E+00	2.707E+00	2.708E+00
2.709E+00	2.710E+00	2.711E+00	2.712E+00	2.713E+00	2.714E+00	2.715E+00	2.716E+00	2.717E+00	2.718E+00
2.719E+00	2.720E+00	2.721E+00	2.722E+00	2.723E+00	2.724E+00	2.725E+00	2.726E+00	2.727E+00	2.728E+00
2.729E+00	2.730E+00	2.731E+00	2.732E+00	2.733E+00	2.734E+00	2.735E+00	2.736E+00	2.737E+00	2.738E+00
2.739E+00	2.740E+00	2.741E+00	2.742E+00	2.743E+00	2.744E+00	2.745E+00	2.746E+00	2.747E+00	2.748E+00
2.749E+00	2.750E+00	2.751E+00	2.752E+00	2.753E+00	2.754E+00	2.755E+00	2.756E+00	2.757E+00	2.758E+00
2.759E+00	2.760E+00	2.761E+00	2.762E+00	2.763E+00	2.764E+00	2.765E+00	2.766E+00	2.767E+00	2.768E+00
2.769E+00	2.770E+00	2.771E+00	2.772E+00	2.773E+00	2.774E+00	2.775E+00	2.776E+00	2.777E+00	2.778E+00
2.779E+00	2.780E+00	2.781E+00	2.782E+00	2.783E+00	2.784E+00	2.785E+00	2.786E+00	2.787E+00	2.788E+00
2.789E+00	2.790E+00	2.791E+00	2.792E+00	2.793E+00	2.794E+00	2.795E+00	2.796E+00	2.797E+00	2.798E+00
2.799E+00	2.800E+00	2.801E+00	2.802E+00	2.803E+00	2.804E+00	2.805E+00	2.806E+00	2.807E+00	2.808E+00
2.809E+00	2.810E+00	2.811E+00	2.812E+00	2.813E+00	2.814E+00	2.815E+00	2.816E+00	2.817E+00	2.818E+00
2.819E+00	2.820E+00	2.821E+00	2.822E+00	2.823E+00	2.824E+00	2.825E+00	2.826E+00	2.827E+00	2.828E+00
2.829E+00	2.830E+00	2.831E+00	2.832E+00	2.833E+00	2.834E+00	2.835E+00	2.836E+00	2.837E+00	2.838E+00
2.839E+00	2.840E+00	2.841E+00	2.842E+00	2.843E+00	2.844E+00	2.845E+00	2.846E+00	2.847E+00	2.848E+00
2.849E+00	2.850E+00	2.851E+00	2.852E+00	2.853E+00	2.854E+00	2.855E+00	2.856E+00	2.857E+00	2.858E+00
2.859E+00	2.860E+00	2.861E+00	2.862E+00	2.863E+00	2.864E+00	2.865E+00	2.866E+00	2.867E+00	2.868E+00
2.869E+00	2.870E+00	2.871E+00	2.872E+00	2.873E+00	2.874E+00	2.875E+00	2.876E+00	2.877E+00	2.878E+00
2.879E+00	2.880E+00	2.881E+00	2.882E+00	2.883E+00	2.884E+00	2.885E+00	2.886E+00	2.887E+00	2.888E+00
2.889E+00	2.890E+00	2.891E+00	2.892E+00	2.893E+00	2.894E+00	2.895E+00	2.896E+00	2.897E+00	2.898E+00
2.899E+00	2.900E+00	2.901E+00	2.902E+00	2.903E+00	2.904E+00	2.905E+00	2.906E+00	2.907E+00	2.908E+00
2.909E+00	2.910E+00	2.911E+00	2.912E+00	2.913E+00	2.914E+00	2.915E+00	2.916E+00	2.917E+00	2.918E+00
2.919E+00	2.920E+00	2.921E+00	2.922E+00	2.923E+00	2.924E+00	2.925E+00	2.926E+00	2.927E+00	2.928E+00
2.929E+00	2.930E+00	2.931E+00	2.932E+00	2.933E+00	2.934E+00	2.935E+00	2.936E+00	2.937E+00	2.938E+00
2.939E+00	2.940E+00	2.941E+00	2.942E+00	2.943E+00	2.944E+00	2.945E+00	2.946E+00	2.947E+00	2.948E+00
2.949E+00	2.950E+00	2.951E+00	2.952E+00	2.953E+00	2.954E+00	2.955E+00	2.956E+00	2.957E+00	2.958E+00
2.959E+00	2.960E+00	2.961E+00	2.962E+00	2.963E+00	2.964E+00	2.965E+00	2.966E+00	2.967E+00	2.968E+00
2.969E+00	2.970E+00	2.971E+00	2.972E+00	2.973E+00	2.974E+00	2.975E+00	2.976E+00	2.977E+00	2.978E+00
2.979E+00	2.980E+00	2.981E+00	2.982E+00	2.983E+00	2.984E+00	2.985E+00	2.986E+00	2.987E+00	2.988E+00
2.989E+00	2.990E+00	2.991E+00	2.992E+00	2.993E+00	2.994E+00	2.995E+00	2.996E+00	2.997E+00	2.998E+00
2.999E+00	3.000E+00	3.001E+00	3.002E+00	3.003E+00	3.004E+00	3.005E+00	3.006E+00	3.007E+00	3.008E+00
3.009E+00	3.010E+00	3.011E+00	3.012E+00	3.013E+00	3.014E+00	3.015E+00	3.016E+00	3.017E+00	3.018E+00
3.019E+00	3.020E+00	3.021E+00	3.022E+00	3.023E+00	3.024E+00	3.025E+00	3.026E+00	3.027E+00	3.028E+00
3.029E+00	3.030E+00	3.031E+00	3.032E+00	3.033E+00	3.034E+00	3.035E+00	3.036E+00	3.037E+00	3.038E+00
3.039E+00	3.040E+00	3.041E+00	3.042E+00	3.043E+00	3.044E+00	3.045E+00	3.046E+00	3.047E+00	3.048E+00
3.049E+00	3.050E+00	3.051E+00	3.052E+00	3.053E+00	3.054E+00	3.055E+00	3.056E+00	3.057E+00	3.058E+00
3.059E+00	3.060E+00	3.061E+00	3.062E+00	3.063E+00	3.064E+00	3.065E+00	3.066E+00	3.067E+00	3.068E+00
3.069E+00	3.070E+00	3.071E+00	3.072E+00	3.073E+00	3.074E+00	3.075E+00	3.076E+00	3.077E+00	3.078E+00
3.079E+00	3.080E+00	3.081E+00	3.082E+00	3.083E+00	3.084E+00	3.085E+00	3.086E+00	3.087E+00	3.088E+00
3.089E+00	3.090E+00	3.091E+00	3.092E+00	3.093E+00	3.094E+00	3.095E+00	3.096E+00	3.097E+00	3.098E+00
3.099E+00	3.100E+00	3.101E+00	3.102E+00	3.103E+00	3.104E+00	3.105E+00	3.106E+00	3.107E+00	3.108E+00
3.109E+00	3.110E+00	3.111E+00	3.112E+00	3.113E+00	3.114E+00	3.115E+00	3.116E+00	3.117E+00	3.118E+00
3.119E+00	3.120E+00	3.121E+00	3.122E+00	3.123E+00	3.124E+00	3.125E+00	3.126E+00	3.127E+00	3.128E+00
3.129E+00	3.130E+00	3.131E+00	3.132E+00	3.133E+00	3.134E+00	3.135E+00	3.136E+00	3.137E+00	3.138E+00
3.139E+00	3.140E+00	3.141E+00	3.142E+00	3.143E+00	3.144E+00	3.145E+00	3.146E+00	3.147E+00	3.148E+00
3.149E+00	3.150E+00	3.151E+00	3.152E+00	3.153E+00	3.154E+00	3.155E+00	3.156E+00	3.157E+00	3.158E+00
3.159E+00	3.160E+00	3.161E+00	3.162E+00	3.163E+00	3.164E+00	3.165E+00	3.166E+00	3.167E+00	3.168E+00
3.169E+00	3.170E+00	3.171E+00	3.172E+00	3.173E+00	3.174E+00	3.175E+00	3.176E+00	3.177E+00	3.178E+00
3.179E+00	3.180E+00	3.181E+00	3.182E+00	3.183E+00	3.184E+00	3.185E+00	3.186E+00	3.187E+00	3.188E+00
3.189E+00	3.190E+00	3.191E+00	3.192E+00	3.193E+00	3.194E+00	3.195E+00	3.196E+00	3.197E+00	3.198E+00
3.199E+00	3.200E+00	3.201E+00	3.202E+00	3.203E+00	3.204E+00	3.205E+00	3.206E+00	3.207E+00	3.208E+00

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3.209E+00	3.210E+00	3.211E+00	3.212E+00	3.213E+00	3.214E+00	3.215E+00	3.216E+00	3.217E+00	3.218E+00
3.219E+00	3.220E+00	3.221E+00	3.222E+00	3.223E+00	3.224E+00	3.225E+00	3.226E+00	3.227E+00	3.228E+00
3.229E+00	3.230E+00	3.231E+00	3.232E+00	3.233E+00	3.234E+00	3.235E+00	3.236E+00	3.237E+00	3.238E+00
3.239E+00	3.240E+00	3.241E+00	3.242E+00	3.243E+00	3.244E+00	3.245E+00	3.246E+00	3.247E+00	3.248E+00
3.249E+00	3.250E+00	3.251E+00	3.252E+00	3.253E+00	3.254E+00	3.255E+00	3.256E+00	3.257E+00	3.258E+00
3.259E+00	3.260E+00	3.261E+00	3.262E+00	3.263E+00	3.264E+00	3.265E+00	3.266E+00	3.267E+00	3.268E+00
3.269E+00	3.270E+00	3.271E+00	3.272E+00	3.273E+00	3.274E+00	3.275E+00	3.276E+00	3.277E+00	3.278E+00
3.279E+00	3.280E+00	3.281E+00	3.282E+00	3.283E+00	3.284E+00	3.285E+00	3.286E+00	3.287E+00	3.288E+00
3.289E+00	3.290E+00	3.291E+00	3.292E+00	3.293E+00	3.294E+00	3.295E+00	3.296E+00	3.297E+00	3.298E+00
3.299E+00	3.300E+00	3.301E+00	3.302E+00	3.303E+00	3.304E+00	3.305E+00	3.306E+00	3.307E+00	3.308E+00
3.309E+00	3.310E+00	3.311E+00	3.312E+00	3.313E+00	3.314E+00	3.315E+00	3.316E+00	3.317E+00	3.318E+00
3.319E+00	3.320E+00	3.321E+00	3.322E+00	3.323E+00	3.324E+00	3.325E+00	3.326E+00	3.327E+00	3.328E+00
3.329E+00	3.330E+00	3.331E+00	3.332E+00	3.333E+00	3.334E+00	3.335E+00	3.336E+00	3.337E+00	3.338E+00
3.339E+00	3.340E+00	3.341E+00	3.342E+00	3.343E+00	3.344E+00	3.345E+00	3.346E+00	3.347E+00	3.348E+00
3.349E+00	3.350E+00	3.351E+00	3.352E+00	3.353E+00	3.354E+00	3.355E+00	3.356E+00	3.357E+00	3.358E+00
3.359E+00	3.360E+00	3.361E+00	3.362E+00	3.363E+00	3.364E+00	3.365E+00	3.366E+00	3.367E+00	3.368E+00
3.369E+00	3.370E+00	3.371E+00	3.372E+00	3.373E+00	3.374E+00	3.375E+00	3.376E+00	3.377E+00	3.378E+00
3.379E+00	3.380E+00	3.381E+00	3.382E+00	3.383E+00	3.384E+00	3.385E+00	3.386E+00	3.387E+00	3.388E+00
3.389E+00	3.390E+00	3.391E+00	3.392E+00	3.393E+00	3.394E+00	3.395E+00	3.396E+00	3.397E+00	3.398E+00
3.399E+00	3.400E+00	3.401E+00	3.402E+00	3.403E+00	3.404E+00	3.405E+00	3.406E+00	3.407E+00	3.408E+00
3.409E+00	3.410E+00	3.411E+00	3.412E+00	3.413E+00	3.414E+00	3.415E+00	3.416E+00	3.417E+00	3.418E+00
3.419E+00	3.420E+00	3.421E+00	3.422E+00	3.423E+00	3.424E+00	3.425E+00	3.426E+00	3.427E+00	3.428E+00
3.429E+00	3.430E+00	3.431E+00	3.432E+00	3.433E+00	3.434E+00	3.435E+00	3.436E+00	3.437E+00	3.438E+00
3.439E+00	3.440E+00	3.441E+00	3.442E+00	3.443E+00	3.444E+00	3.445E+00	3.446E+00	3.447E+00	3.448E+00
3.449E+00	3.450E+00	3.451E+00	3.452E+00	3.453E+00	3.454E+00	3.455E+00	3.456E+00	3.457E+00	3.458E+00
3.459E+00	3.460E+00	3.461E+00	3.462E+00	3.463E+00	3.464E+00	3.465E+00	3.466E+00	3.467E+00	3.468E+00
3.469E+00	3.470E+00	3.471E+00	3.472E+00	3.473E+00	3.474E+00	3.475E+00	3.476E+00	3.477E+00	3.478E+00
3.479E+00	3.480E+00	3.481E+00	3.482E+00	3.483E+00	3.484E+00	3.485E+00	3.486E+00	3.487E+00	3.488E+00
3.489E+00	3.490E+00	3.491E+00	3.492E+00	3.493E+00	3.494E+00	3.495E+00	3.496E+00	3.497E+00	3.498E+00
3.499E+00	3.500E+00	3.501E+00	3.502E+00	3.503E+00	3.504E+00	3.505E+00	3.506E+00	3.507E+00	3.508E+00
3.509E+00	3.510E+00	3.511E+00	3.512E+00	3.513E+00	3.514E+00	3.515E+00	3.516E+00	3.517E+00	3.518E+00
3.519E+00	3.520E+00	3.521E+00	3.522E+00	3.523E+00	3.524E+00	3.525E+00	3.526E+00	3.527E+00	3.528E+00
3.529E+00	3.530E+00	3.531E+00	3.532E+00	3.533E+00	3.534E+00	3.535E+00	3.536E+00	3.537E+00	3.538E+00
3.539E+00	3.540E+00	3.541E+00	3.542E+00	3.543E+00	3.544E+00	3.545E+00	3.546E+00	3.547E+00	3.548E+00
3.549E+00	3.550E+00	3.551E+00	3.552E+00	3.553E+00	3.554E+00	3.555E+00	3.556E+00	3.557E+00	3.558E+00
3.559E+00	3.560E+00	3.561E+00	3.562E+00	3.563E+00	3.564E+00	3.565E+00	3.566E+00	3.567E+00	3.568E+00
3.569E+00	3.570E+00	3.571E+00	3.572E+00	3.573E+00	3.574E+00	3.575E+00	3.576E+00	3.577E+00	3.578E+00
3.579E+00	3.580E+00	3.581E+00	3.582E+00	3.583E+00	3.584E+00	3.585E+00	3.586E+00	3.587E+00	3.588E+00
3.589E+00	3.590E+00	3.591E+00	3.592E+00	3.593E+00	3.594E+00	3.595E+00	3.596E+00	3.597E+00	3.598E+00
3.599E+00	3.600E+00	3.601E+00	3.602E+00	3.603E+00	3.604E+00	3.605E+00	3.606E+00	3.607E+00	3.608E+00
3.609E+00	3.610E+00	3.611E+00	3.612E+00	3.613E+00	3.614E+00	3.615E+00	3.616E+00	3.617E+00	3.618E+00
3.619E+00	3.620E+00	3.621E+00	3.622E+00	3.623E+00	3.624E+00	3.625E+00	3.626E+00	3.627E+00	3.628E+00
3.629E+00	3.630E+00	3.631E+00	3.632E+00	3.633E+00	3.634E+00	3.635E+00	3.636E+00	3.637E+00	3.638E+00
3.639E+00	3.640E+00	3.641E+00	3.642E+00	3.643E+00	3.644E+00	3.645E+00	3.646E+00	3.647E+00	3.648E+00
3.649E+00	3.650E+00	3.651E+00	3.652E+00	3.653E+00	3.654E+00	3.655E+00	3.656E+00	3.657E+00	3.658E+00
3.659E+00	3.660E+00	3.661E+00	3.662E+00	3.663E+00	3.664E+00	3.665E+00	3.666E+00	3.667E+00	3.668E+00
3.669E+00	3.670E+00	3.671E+00	3.672E+00	3.673E+00	3.674E+00	3.675E+00	3.676E+00	3.677E+00	3.678E+00
3.679E+00	3.680E+00	3.681E+00	3.682E+00	3.683E+00	3.684E+00	3.685E+00	3.686E+00	3.687E+00	3.688E+00
3.689E+00	3.690E+00	3.691E+00	3.692E+00	3.693E+00	3.694E+00	3.695E+00	3.696E+00	3.697E+00	3.698E+00
3.699E+00	3.700E+00	3.701E+00	3.702E+00	3.703E+00	3.704E+00	3.705E+00	3.706E+00	3.707E+00	3.708E+00
3.709E+00	3.710E+00	3.711E+00	3.712E+00	3.713E+00	3.714E+00	3.715E+00	3.716E+00	3.717E+00	3.718E+00
3.719E+00	3.720E+00	3.721E+00	3.722E+00	3.723E+00	3.724E+00	3.725E+00	3.726E+00	3.727E+00	3.728E+00

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3.729E+00	3.730E+00	3.731E+00	3.732E+00	3.733E+00	3.734E+00	3.735E+00	3.736E+00	3.737E+00	3.738E+00
3.739E+00	3.740E+00	3.741E+00	3.742E+00	3.743E+00	3.744E+00	3.745E+00	3.746E+00	3.747E+00	3.748E+00
3.749E+00	3.750E+00	3.751E+00	3.752E+00	3.753E+00	3.754E+00	3.755E+00	3.756E+00	3.757E+00	3.758E+00
3.759E+00	3.760E+00	3.761E+00	3.762E+00	3.763E+00	3.764E+00	3.765E+00	3.766E+00	3.767E+00	3.768E+00
3.769E+00	3.770E+00	3.771E+00	3.772E+00	3.773E+00	3.774E+00	3.775E+00	3.776E+00	3.777E+00	3.778E+00
3.779E+00	3.780E+00	3.781E+00	3.782E+00	3.783E+00	3.784E+00	3.785E+00	3.786E+00	3.787E+00	3.788E+00
3.789E+00	3.790E+00	3.791E+00	3.792E+00	3.793E+00	3.794E+00	3.795E+00	3.796E+00	3.797E+00	3.798E+00
3.799E+00	3.800E+00	3.801E+00	3.802E+00	3.803E+00	3.804E+00	3.805E+00	3.806E+00	3.807E+00	3.808E+00
3.809E+00	3.810E+00	3.811E+00	3.812E+00	3.813E+00	3.814E+00	3.815E+00	3.816E+00	3.817E+00	3.818E+00
3.819E+00	3.820E+00	3.821E+00	3.822E+00	3.823E+00	3.824E+00	3.825E+00	3.826E+00	3.827E+00	3.828E+00
3.829E+00	3.830E+00	3.831E+00	3.832E+00	3.833E+00	3.834E+00	3.835E+00	3.836E+00	3.837E+00	3.838E+00
3.839E+00	3.840E+00	3.841E+00	3.842E+00	3.843E+00	3.844E+00	3.845E+00	3.846E+00	3.847E+00	3.848E+00
3.849E+00	3.850E+00	3.851E+00	3.852E+00	3.853E+00	3.854E+00	3.855E+00	3.856E+00	3.857E+00	3.858E+00
3.859E+00	3.860E+00	3.861E+00	3.862E+00	3.863E+00	3.864E+00	3.865E+00	3.866E+00	3.867E+00	3.868E+00
3.869E+00	3.870E+00	3.871E+00	3.872E+00	3.873E+00	3.874E+00	3.875E+00	3.876E+00	3.877E+00	3.878E+00
3.879E+00	3.880E+00	3.881E+00	3.882E+00	3.883E+00	3.884E+00	3.885E+00	3.886E+00	3.887E+00	3.888E+00
3.889E+00	3.890E+00	3.891E+00	3.892E+00	3.893E+00	3.894E+00	3.895E+00	3.896E+00	3.897E+00	3.898E+00
3.899E+00	3.900E+00	3.901E+00	3.902E+00	3.903E+00	3.904E+00	3.905E+00	3.906E+00	3.907E+00	3.908E+00
3.909E+00	3.910E+00	3.911E+00	3.912E+00	3.913E+00	3.914E+00	3.915E+00	3.916E+00	3.917E+00	3.918E+00
3.919E+00	3.920E+00	3.921E+00	3.922E+00	3.923E+00	3.924E+00	3.925E+00	3.926E+00	3.927E+00	3.928E+00
3.929E+00	3.930E+00	3.931E+00	3.932E+00	3.933E+00	3.934E+00	3.935E+00	3.936E+00	3.937E+00	3.938E+00
3.939E+00	3.940E+00	3.941E+00	3.942E+00	3.943E+00	3.944E+00	3.945E+00	3.946E+00	3.947E+00	3.948E+00
3.949E+00	3.950E+00	3.951E+00	3.952E+00	3.953E+00	3.954E+00	3.955E+00	3.956E+00	3.957E+00	3.958E+00
3.959E+00	3.960E+00	3.961E+00	3.962E+00	3.963E+00	3.964E+00	3.965E+00	3.966E+00	3.967E+00	3.968E+00
3.969E+00	3.970E+00	3.971E+00	3.972E+00	3.973E+00	3.974E+00	3.975E+00	3.976E+00	3.977E+00	3.978E+00
3.979E+00	3.980E+00	3.981E+00	3.982E+00	3.983E+00	3.984E+00	3.985E+00	3.986E+00	3.987E+00	3.988E+00
3.989E+00	3.990E+00	3.991E+00	3.992E+00	3.993E+00	3.994E+00	3.995E+00	3.996E+00	3.997E+00	3.998E+00
3.999E+00	4.000E+00	4.001E+00	4.002E+00	4.003E+00	4.004E+00	4.005E+00	4.006E+00	4.007E+00	4.008E+00
4.009E+00	4.010E+00	4.011E+00	4.012E+00	4.013E+00	4.014E+00	4.015E+00	4.016E+00	4.017E+00	4.018E+00
4.019E+00	4.020E+00	4.021E+00	4.022E+00	4.023E+00	4.024E+00	4.025E+00	4.026E+00	4.027E+00	4.028E+00
4.029E+00	4.030E+00	4.031E+00	4.032E+00	4.033E+00	4.034E+00	4.035E+00	4.036E+00	4.037E+00	4.038E+00
4.039E+00	4.040E+00	4.041E+00	4.042E+00	4.043E+00	4.044E+00	4.045E+00	4.046E+00	4.047E+00	4.048E+00
4.049E+00	4.050E+00	4.051E+00	4.052E+00	4.053E+00	4.054E+00	4.055E+00	4.056E+00	4.057E+00	4.058E+00
4.059E+00	4.060E+00	4.061E+00	4.062E+00	4.063E+00	4.064E+00	4.065E+00	4.066E+00	4.067E+00	4.068E+00
4.069E+00	4.070E+00	4.071E+00	4.072E+00	4.073E+00	4.074E+00	4.075E+00	4.076E+00	4.077E+00	4.078E+00
4.079E+00	4.080E+00	4.081E+00	4.082E+00	4.083E+00	4.084E+00	4.085E+00	4.086E+00	4.087E+00	4.088E+00
4.089E+00	4.090E+00	4.091E+00	4.092E+00	4.093E+00	4.094E+00	4.095E+00	4.096E+00	4.097E+00	4.098E+00
4.099E+00	4.100E+00	4.101E+00	4.102E+00	4.103E+00	4.104E+00	4.105E+00	4.106E+00	4.107E+00	4.108E+00
4.109E+00	4.110E+00	4.111E+00	4.112E+00	4.113E+00	4.114E+00	4.115E+00	4.116E+00	4.117E+00	4.118E+00
4.119E+00	4.120E+00	4.121E+00	4.122E+00	4.123E+00	4.124E+00	4.125E+00	4.126E+00	4.127E+00	4.128E+00
4.129E+00	4.130E+00	4.131E+00	4.132E+00	4.133E+00	4.134E+00	4.135E+00	4.136E+00	4.137E+00	4.138E+00
4.139E+00	4.140E+00	4.141E+00	4.142E+00	4.143E+00	4.144E+00	4.145E+00	4.146E+00	4.147E+00	4.148E+00
4.149E+00	4.150E+00	4.151E+00	4.152E+00	4.153E+00	4.154E+00	4.155E+00	4.156E+00	4.157E+00	4.158E+00
4.159E+00	4.160E+00	4.161E+00	4.162E+00	4.163E+00	4.164E+00	4.165E+00	4.166E+00	4.167E+00	4.168E+00
4.169E+00	4.170E+00	4.171E+00	4.172E+00	4.173E+00	4.174E+00	4.175E+00	4.176E+00	4.177E+00	4.178E+00
4.179E+00	4.180E+00	4.181E+00	4.182E+00	4.183E+00	4.184E+00	4.185E+00	4.186E+00	4.187E+00	4.188E+00
4.189E+00	4.190E+00	4.191E+00	4.192E+00	4.193E+00	4.194E+00	4.195E+00	4.196E+00	4.197E+00	4.198E+00
4.199E+00	4.200E+00	4.201E+00	4.202E+00	4.203E+00	4.204E+00	4.205E+00	4.206E+00	4.207E+00	4.208E+00
4.209E+00	4.210E+00	4.211E+00	4.212E+00	4.213E+00	4.214E+00	4.215E+00	4.216E+00	4.217E+00	4.218E+00
4.219E+00	4.220E+00	4.221E+00	4.222E+00	4.223E+00	4.224E+00	4.225E+00	4.226E+00	4.227E+00	4.228E+00
4.229E+00	4.230E+00	4.231E+00	4.232E+00	4.233E+00	4.234E+00	4.235E+00	4.236E+00	4.237E+00	4.238E+00
4.239E+00	4.240E+00	4.241E+00	4.242E+00	4.243E+00	4.244E+00	4.245E+00	4.246E+00	4.247E+00	4.248E+00

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4.249E+00	4.250E+00	4.251E+00	4.252E+00	4.253E+00	4.254E+00	4.255E+00	4.256E+00	4.257E+00	4.258E+00
4.259E+00	4.260E+00	4.261E+00	4.262E+00	4.263E+00	4.264E+00	4.265E+00	4.266E+00	4.267E+00	4.268E+00
4.269E+00	4.270E+00	4.271E+00	4.272E+00	4.273E+00	4.274E+00	4.275E+00	4.276E+00	4.277E+00	4.278E+00
4.279E+00	4.280E+00	4.281E+00	4.282E+00	4.283E+00	4.284E+00	4.285E+00	4.286E+00	4.287E+00	4.288E+00
4.289E+00	4.290E+00	4.291E+00	4.292E+00	4.293E+00	4.294E+00	4.295E+00	4.296E+00	4.297E+00	4.298E+00
4.299E+00	4.300E+00	4.301E+00	4.302E+00	4.303E+00	4.304E+00	4.305E+00	4.306E+00	4.307E+00	4.308E+00
4.309E+00	4.310E+00	4.311E+00	4.312E+00	4.313E+00	4.314E+00	4.315E+00	4.316E+00	4.317E+00	4.318E+00
4.319E+00	4.320E+00	4.321E+00	4.322E+00	4.323E+00	4.324E+00	4.325E+00	4.326E+00	4.327E+00	4.328E+00
4.329E+00	4.330E+00	4.331E+00	4.332E+00	4.333E+00	4.334E+00	4.335E+00	4.336E+00	4.337E+00	4.338E+00
4.339E+00	4.340E+00	4.341E+00	4.342E+00	4.343E+00	4.344E+00	4.345E+00	4.346E+00	4.347E+00	4.348E+00
4.349E+00	4.350E+00	4.351E+00	4.352E+00	4.353E+00	4.354E+00	4.355E+00	4.356E+00	4.357E+00	4.358E+00
4.359E+00	4.360E+00	4.361E+00	4.362E+00	4.363E+00	4.364E+00	4.365E+00	4.366E+00	4.367E+00	4.368E+00
4.369E+00	4.370E+00	4.371E+00	4.372E+00	4.373E+00	4.374E+00	4.375E+00	4.376E+00	4.377E+00	4.378E+00
4.379E+00	4.380E+00	4.381E+00	4.382E+00	4.383E+00	4.384E+00	4.385E+00	4.386E+00	4.387E+00	4.388E+00
4.389E+00	4.390E+00	4.391E+00	4.392E+00	4.393E+00	4.394E+00	4.395E+00	4.396E+00	4.397E+00	4.398E+00
4.399E+00	4.400E+00	4.401E+00	4.402E+00	4.403E+00	4.404E+00	4.405E+00	4.406E+00	4.407E+00	4.408E+00
4.409E+00	4.410E+00	4.411E+00	4.412E+00	4.413E+00	4.414E+00	4.415E+00	4.416E+00	4.417E+00	4.418E+00
4.419E+00	4.420E+00	4.421E+00	4.422E+00	4.423E+00	4.424E+00	4.425E+00	4.426E+00	4.427E+00	4.428E+00
4.429E+00	4.430E+00	4.431E+00	4.432E+00	4.433E+00	4.434E+00	4.435E+00	4.436E+00	4.437E+00	4.438E+00
4.439E+00	4.440E+00	4.441E+00	4.442E+00	4.443E+00	4.444E+00	4.445E+00	4.446E+00	4.447E+00	4.448E+00
4.449E+00	4.450E+00	4.451E+00	4.452E+00	4.453E+00	4.454E+00	4.455E+00	4.456E+00	4.457E+00	4.458E+00
4.459E+00	4.460E+00	4.461E+00	4.462E+00	4.463E+00	4.464E+00	4.465E+00	4.466E+00	4.467E+00	4.468E+00
4.469E+00	4.470E+00	4.471E+00	4.472E+00	4.473E+00	4.474E+00	4.475E+00	4.476E+00	4.477E+00	4.478E+00
4.479E+00	4.480E+00	4.481E+00	4.482E+00	4.483E+00	4.484E+00	4.485E+00	4.486E+00	4.487E+00	4.488E+00
4.489E+00	4.490E+00	4.491E+00	4.492E+00	4.493E+00	4.494E+00	4.495E+00	4.496E+00	4.497E+00	4.498E+00
4.499E+00	4.500E+00	4.501E+00	4.502E+00	4.503E+00	4.504E+00	4.505E+00	4.506E+00	4.507E+00	4.508E+00
4.509E+00	4.510E+00	4.511E+00	4.512E+00	4.513E+00	4.514E+00	4.515E+00	4.516E+00	4.517E+00	4.518E+00
4.519E+00	4.520E+00	4.521E+00	4.522E+00	4.523E+00	4.524E+00	4.525E+00	4.526E+00	4.527E+00	4.528E+00
4.529E+00	4.530E+00	4.531E+00	4.532E+00	4.533E+00	4.534E+00	4.535E+00	4.536E+00	4.537E+00	4.538E+00
4.539E+00	4.540E+00	4.541E+00	4.542E+00	4.543E+00	4.544E+00	4.545E+00	4.546E+00	4.547E+00	4.548E+00
4.549E+00	4.550E+00	4.551E+00	4.552E+00	4.553E+00	4.554E+00	4.555E+00	4.556E+00	4.557E+00	4.558E+00
4.559E+00	4.560E+00	4.561E+00	4.562E+00	4.563E+00	4.564E+00	4.565E+00	4.566E+00	4.567E+00	4.568E+00
4.569E+00	4.570E+00	4.571E+00	4.572E+00	4.573E+00	4.574E+00	4.575E+00	4.576E+00	4.577E+00	4.578E+00
4.579E+00	4.580E+00	4.581E+00	4.582E+00	4.583E+00	4.584E+00	4.585E+00	4.586E+00	4.587E+00	4.588E+00
4.589E+00	4.590E+00	4.591E+00	4.592E+00	4.593E+00	4.594E+00	4.595E+00	4.596E+00	4.597E+00	4.598E+00
4.599E+00	4.600E+00	4.601E+00	4.602E+00	4.603E+00	4.604E+00	4.605E+00	4.606E+00	4.607E+00	4.608E+00
4.609E+00	4.610E+00	4.611E+00	4.612E+00	4.613E+00	4.614E+00	4.615E+00	4.616E+00	4.617E+00	4.618E+00
4.619E+00	4.620E+00	4.621E+00	4.622E+00	4.623E+00	4.624E+00	4.625E+00	4.626E+00	4.627E+00	4.628E+00
4.629E+00	4.630E+00	4.631E+00	4.632E+00	4.633E+00	4.634E+00	4.635E+00	4.636E+00	4.637E+00	4.638E+00
4.639E+00	4.640E+00	4.641E+00	4.642E+00	4.643E+00	4.644E+00	4.645E+00	4.646E+00	4.647E+00	4.648E+00
4.649E+00	4.650E+00	4.651E+00	4.652E+00	4.653E+00	4.654E+00	4.655E+00	4.656E+00	4.657E+00	4.658E+00
4.659E+00	4.660E+00	4.661E+00	4.662E+00	4.663E+00	4.664E+00	4.665E+00	4.666E+00	4.667E+00	4.668E+00
4.669E+00	4.670E+00	4.671E+00	4.672E+00	4.673E+00	4.674E+00	4.675E+00	4.676E+00	4.677E+00	4.678E+00
4.679E+00	4.680E+00	4.681E+00	4.682E+00	4.683E+00	4.684E+00	4.685E+00	4.686E+00	4.687E+00	4.688E+00
4.689E+00	4.690E+00	4.691E+00	4.692E+00	4.693E+00	4.694E+00	4.695E+00	4.696E+00	4.697E+00	4.698E+00
4.699E+00	4.700E+00	4.701E+00	4.702E+00	4.703E+00	4.704E+00	4.705E+00	4.706E+00	4.707E+00	4.708E+00
4.709E+00	4.710E+00	4.711E+00	4.712E+00	4.713E+00	4.714E+00	4.715E+00	4.716E+00	4.717E+00	4.718E+00
4.719E+00	4.720E+00	4.721E+00	4.722E+00	4.723E+00	4.724E+00	4.725E+00	4.726E+00	4.727E+00	4.728E+00
4.729E+00	4.730E+00	4.731E+00	4.732E+00	4.733E+00	4.734E+00	4.735E+00	4.736E+00	4.737E+00	4.738E+00
4.739E+00	4.740E+00	4.741E+00	4.742E+00	4.743E+00	4.744E+00	4.745E+00	4.746E+00	4.747E+00	4.748E+00
4.749E+00	4.750E+00	4.751E+00	4.752E+00	4.753E+00	4.754E+00	4.755E+00	4.756E+00	4.757E+00	4.758E+00
4.759E+00	4.760E+00	4.761E+00	4.762E+00	4.763E+00	4.764E+00	4.765E+00	4.766E+00	4.767E+00	4.768E+00

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4.769E+00	4.770E+00	4.771E+00	4.772E+00	4.773E+00	4.774E+00	4.775E+00	4.776E+00	4.777E+00	4.778E+00
4.779E+00	4.780E+00	4.781E+00	4.782E+00	4.783E+00	4.784E+00	4.785E+00	4.786E+00	4.787E+00	4.788E+00
4.789E+00	4.790E+00	4.791E+00	4.792E+00	4.793E+00	4.794E+00	4.795E+00	4.796E+00	4.797E+00	4.798E+00
4.799E+00	4.800E+00	4.801E+00	4.802E+00	4.803E+00	4.804E+00	4.805E+00	4.806E+00	4.807E+00	4.808E+00
4.809E+00	4.810E+00	4.811E+00	4.812E+00	4.813E+00	4.814E+00	4.815E+00	4.816E+00	4.817E+00	4.818E+00
4.819E+00	4.820E+00	4.821E+00	4.822E+00	4.823E+00	4.824E+00	4.825E+00	4.826E+00	4.827E+00	4.828E+00
4.829E+00	4.830E+00	4.831E+00	4.832E+00	4.833E+00	4.834E+00	4.835E+00	4.836E+00	4.837E+00	4.838E+00
4.839E+00	4.840E+00	4.841E+00	4.842E+00	4.843E+00	4.844E+00	4.845E+00	4.846E+00	4.847E+00	4.848E+00
4.849E+00	4.850E+00	4.851E+00	4.852E+00	4.853E+00	4.854E+00	4.855E+00	4.856E+00	4.857E+00	4.858E+00
4.859E+00	4.860E+00	4.861E+00	4.862E+00	4.863E+00	4.864E+00	4.865E+00	4.866E+00	4.867E+00	4.868E+00
4.869E+00	4.870E+00	4.871E+00	4.872E+00	4.873E+00	4.874E+00	4.875E+00	4.876E+00	4.877E+00	4.878E+00
4.879E+00	4.880E+00	4.881E+00	4.882E+00	4.883E+00	4.884E+00	4.885E+00	4.886E+00	4.887E+00	4.888E+00
4.889E+00	4.890E+00	4.891E+00	4.892E+00	4.893E+00	4.894E+00	4.895E+00	4.896E+00	4.897E+00	4.898E+00
4.899E+00	4.900E+00	4.901E+00	4.902E+00	4.903E+00	4.904E+00	4.905E+00	4.906E+00	4.907E+00	4.908E+00
4.909E+00	4.910E+00	4.911E+00	4.912E+00	4.913E+00	4.914E+00	4.915E+00	4.916E+00	4.917E+00	4.918E+00
4.919E+00	4.920E+00	4.921E+00	4.922E+00	4.923E+00	4.924E+00	4.925E+00	4.926E+00	4.927E+00	4.928E+00
4.929E+00	4.930E+00	4.931E+00	4.932E+00	4.933E+00	4.934E+00	4.935E+00	4.936E+00	4.937E+00	4.938E+00
4.939E+00	4.940E+00	4.941E+00	4.942E+00	4.943E+00	4.944E+00	4.945E+00	4.946E+00	4.947E+00	4.948E+00
4.949E+00	4.950E+00	4.951E+00	4.952E+00	4.953E+00	4.954E+00	4.955E+00	4.956E+00	4.957E+00	4.958E+00
4.959E+00	4.960E+00	4.961E+00	4.962E+00	4.963E+00	4.964E+00	4.965E+00	4.966E+00	4.967E+00	4.968E+00
4.969E+00	4.970E+00	4.971E+00	4.972E+00	4.973E+00	4.974E+00	4.975E+00	4.976E+00	4.977E+00	4.978E+00
4.979E+00	4.980E+00	4.981E+00	4.982E+00	4.983E+00	4.984E+00	4.985E+00	4.986E+00	4.987E+00	4.988E+00
4.989E+00	4.990E+00	4.991E+00	4.992E+00	4.993E+00	4.994E+00	4.995E+00	4.996E+00	4.997E+00	4.998E+00
4.999E+00	5.000E+00	5.001E+00	5.002E+00	5.003E+00	5.004E+00	5.005E+00	5.006E+00	5.007E+00	5.008E+00
5.009E+00	5.010E+00	5.011E+00	5.012E+00	5.013E+00	5.014E+00	5.015E+00	5.016E+00	5.017E+00	5.018E+00
5.019E+00	5.020E+00	5.021E+00	5.022E+00	5.023E+00	5.024E+00	5.025E+00	5.026E+00	5.027E+00	5.028E+00
5.029E+00	5.030E+00	5.031E+00	5.032E+00	5.033E+00	5.034E+00	5.035E+00	5.036E+00	5.037E+00	5.038E+00
5.039E+00	5.040E+00	5.041E+00	5.042E+00	5.043E+00	5.044E+00	5.045E+00	5.046E+00	5.047E+00	5.048E+00
5.049E+00	5.050E+00	5.051E+00	5.052E+00	5.053E+00	5.054E+00	5.055E+00	5.056E+00	5.057E+00	5.058E+00
5.059E+00	5.060E+00	5.061E+00	5.062E+00	5.063E+00	5.064E+00	5.065E+00	5.066E+00	5.067E+00	5.068E+00
5.069E+00	5.070E+00	5.071E+00	5.072E+00	5.073E+00	5.074E+00	5.075E+00	5.076E+00	5.077E+00	5.078E+00
5.079E+00	5.080E+00	5.081E+00	5.082E+00	5.083E+00	5.084E+00	5.085E+00	5.086E+00	5.087E+00	5.088E+00
5.089E+00	5.090E+00	5.091E+00	5.092E+00	5.093E+00	5.094E+00	5.095E+00	5.096E+00	5.097E+00	5.098E+00
5.099E+00	5.100E+00	5.101E+00	5.102E+00	5.103E+00	5.104E+00	5.105E+00	5.106E+00	5.107E+00	5.108E+00
5.109E+00	5.110E+00	5.111E+00	5.112E+00	5.113E+00	5.114E+00	5.115E+00	5.116E+00	5.117E+00	5.118E+00
5.119E+00	5.120E+00	5.121E+00	5.122E+00	5.123E+00	5.124E+00	5.125E+00	5.126E+00	5.127E+00	5.128E+00
5.129E+00	5.130E+00	5.131E+00	5.132E+00	5.133E+00	5.134E+00	5.135E+00	5.136E+00	5.137E+00	5.138E+00
5.139E+00	5.140E+00	5.141E+00	5.142E+00	5.143E+00	5.144E+00	5.145E+00	5.146E+00	5.147E+00	5.148E+00
5.149E+00	5.150E+00	5.151E+00	5.152E+00	5.153E+00	5.154E+00	5.155E+00	5.156E+00	5.157E+00	5.158E+00
5.159E+00	5.160E+00	5.161E+00	5.162E+00	5.163E+00	5.164E+00	5.165E+00	5.166E+00	5.167E+00	5.168E+00
5.169E+00	5.170E+00	5.171E+00	5.172E+00	5.173E+00	5.174E+00	5.175E+00	5.176E+00	5.177E+00	5.178E+00
5.179E+00	5.180E+00	5.181E+00	5.182E+00	5.183E+00	5.184E+00	5.185E+00	5.186E+00	5.187E+00	5.188E+00
5.189E+00	5.190E+00	5.191E+00	5.192E+00	5.193E+00	5.194E+00	5.195E+00	5.196E+00	5.197E+00	5.198E+00
5.199E+00	5.200E+00	5.201E+00	5.202E+00	5.203E+00	5.204E+00	5.205E+00	5.206E+00	5.207E+00	5.208E+00
5.209E+00	5.210E+00	5.211E+00	5.212E+00	5.213E+00	5.214E+00	5.215E+00	5.216E+00	5.217E+00	5.218E+00
5.219E+00	5.220E+00	5.221E+00	5.222E+00	5.223E+00	5.224E+00	5.225E+00	5.226E+00	5.227E+00	5.228E+00
5.229E+00	5.230E+00	5.231E+00	5.232E+00	5.233E+00	5.234E+00	5.235E+00	5.236E+00	5.237E+00	5.238E+00
5.239E+00	5.240E+00	5.241E+00	5.242E+00	5.243E+00	5.244E+00	5.245E+00	5.246E+00	5.247E+00	5.248E+00
5.249E+00	5.250E+00	5.251E+00	5.252E+00	5.253E+00	5.254E+00	5.255E+00	5.256E+00	5.257E+00	5.258E+00
5.259E+00	5.260E+00	5.261E+00	5.262E+00	5.263E+00	5.264E+00	5.265E+00	5.266E+00	5.267E+00	5.268E+00
5.269E+00	5.270E+00	5.271E+00	5.272E+00	5.273E+00	5.274E+00	5.275E+00	5.276E+00	5.277E+00	5.278E+00
5.279E+00	5.280E+00	5.281E+00	5.282E+00	5.283E+00	5.284E+00	5.285E+00	5.286E+00	5.287E+00	5.288E+00

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5.289E+00	5.290E+00	5.291E+00	5.292E+00	5.293E+00	5.294E+00	5.295E+00	5.296E+00	5.297E+00	5.298E+00
5.299E+00	5.300E+00	5.301E+00	5.302E+00	5.303E+00	5.304E+00	5.305E+00	5.306E+00	5.307E+00	5.308E+00
5.309E+00	5.310E+00	5.311E+00	5.312E+00	5.313E+00	5.314E+00	5.315E+00	5.316E+00	5.317E+00	5.318E+00
5.319E+00	5.320E+00	5.321E+00	5.322E+00	5.323E+00	5.324E+00	5.325E+00	5.326E+00	5.327E+00	5.328E+00
5.329E+00	5.330E+00	5.331E+00	5.332E+00	5.333E+00	5.334E+00	5.335E+00	5.336E+00	5.337E+00	5.338E+00
5.339E+00	5.340E+00	5.341E+00	5.342E+00	5.343E+00	5.344E+00	5.345E+00	5.346E+00	5.347E+00	5.348E+00
5.349E+00	5.350E+00	5.351E+00	5.352E+00	5.353E+00	5.354E+00	5.355E+00	5.356E+00	5.357E+00	5.358E+00
5.359E+00	5.360E+00	5.361E+00	5.362E+00	5.363E+00	5.364E+00	5.365E+00	5.366E+00	5.367E+00	5.368E+00
5.369E+00	5.370E+00	5.371E+00	5.372E+00	5.373E+00	5.374E+00	5.375E+00	5.376E+00	5.377E+00	5.378E+00
5.379E+00	5.380E+00	5.381E+00	5.382E+00	5.383E+00	5.384E+00	5.385E+00	5.386E+00	5.387E+00	5.388E+00
5.389E+00	5.390E+00	5.391E+00	5.392E+00	5.393E+00	5.394E+00	5.395E+00	5.396E+00	5.397E+00	5.398E+00
5.399E+00	5.400E+00	5.401E+00	5.402E+00	5.403E+00	5.404E+00	5.405E+00	5.406E+00	5.407E+00	5.408E+00
5.409E+00	5.410E+00	5.411E+00	5.412E+00	5.413E+00	5.414E+00	5.415E+00	5.416E+00	5.417E+00	5.418E+00
5.419E+00	5.420E+00	5.421E+00	5.422E+00	5.423E+00	5.424E+00	5.425E+00	5.426E+00	5.427E+00	5.428E+00
5.429E+00	5.430E+00	5.431E+00	5.432E+00	5.433E+00	5.434E+00	5.435E+00	5.436E+00	5.437E+00	5.438E+00
5.439E+00	5.440E+00	5.441E+00	5.442E+00	5.443E+00	5.444E+00	5.445E+00	5.446E+00	5.447E+00	5.448E+00
5.449E+00	5.450E+00	5.451E+00	5.452E+00	5.453E+00	5.454E+00	5.455E+00	5.456E+00	5.457E+00	5.458E+00
5.459E+00	5.460E+00	5.461E+00	5.462E+00	5.463E+00	5.464E+00	5.465E+00	5.466E+00	5.467E+00	5.468E+00
5.469E+00	5.470E+00	5.471E+00	5.472E+00	5.473E+00	5.474E+00	5.475E+00	5.476E+00	5.477E+00	5.478E+00
5.479E+00	5.480E+00	5.481E+00	5.482E+00	5.483E+00	5.484E+00	5.485E+00	5.486E+00	5.487E+00	5.488E+00
5.489E+00	5.490E+00	5.491E+00	5.492E+00	5.493E+00	5.494E+00	5.495E+00	5.496E+00	5.497E+00	5.498E+00
5.499E+00	5.500E+00	5.501E+00	5.502E+00	5.503E+00	5.504E+00	5.505E+00	5.506E+00	5.507E+00	5.508E+00
5.509E+00	5.510E+00	5.511E+00	5.512E+00	5.513E+00	5.514E+00	5.515E+00	5.516E+00	5.517E+00	5.518E+00
5.519E+00	5.520E+00	5.521E+00	5.522E+00	5.523E+00	5.524E+00	5.525E+00	5.526E+00	5.527E+00	5.528E+00
5.529E+00	5.530E+00	5.531E+00	5.532E+00	5.533E+00	5.534E+00	5.535E+00	5.536E+00	5.537E+00	5.538E+00
5.539E+00	5.540E+00	5.541E+00	5.542E+00	5.543E+00	5.544E+00	5.545E+00	5.546E+00	5.547E+00	5.548E+00
5.549E+00	5.550E+00	5.551E+00	5.552E+00	5.553E+00	5.554E+00	5.555E+00	5.556E+00	5.557E+00	5.558E+00
5.559E+00	5.560E+00	5.561E+00	5.562E+00	5.563E+00	5.564E+00	5.565E+00	5.566E+00	5.567E+00	5.568E+00
5.569E+00	5.570E+00	5.571E+00	5.572E+00	5.573E+00	5.574E+00	5.575E+00	5.576E+00	5.577E+00	5.578E+00
5.579E+00	5.580E+00	5.581E+00	5.582E+00	5.583E+00	5.584E+00	5.585E+00	5.586E+00	5.587E+00	5.588E+00
5.589E+00	5.590E+00	5.591E+00	5.592E+00	5.593E+00	5.594E+00	5.595E+00	5.596E+00	5.597E+00	5.598E+00
5.599E+00	5.600E+00	5.601E+00	5.602E+00	5.603E+00	5.604E+00	5.605E+00	5.606E+00	5.607E+00	5.608E+00
5.609E+00	5.610E+00	5.611E+00	5.612E+00	5.613E+00	5.614E+00	5.615E+00	5.616E+00	5.617E+00	5.618E+00
5.619E+00	5.620E+00	5.621E+00	5.622E+00	5.623E+00	5.624E+00	5.625E+00	5.626E+00	5.627E+00	5.628E+00
5.629E+00	5.630E+00	5.631E+00	5.632E+00	5.633E+00	5.634E+00	5.635E+00	5.636E+00	5.637E+00	5.638E+00
5.639E+00	5.640E+00	5.641E+00	5.642E+00	5.643E+00	5.644E+00	5.645E+00	5.646E+00	5.647E+00	5.648E+00
5.649E+00	5.650E+00	5.651E+00	5.652E+00	5.653E+00	5.654E+00	5.655E+00	5.656E+00	5.657E+00	5.658E+00
5.659E+00	5.660E+00	5.661E+00	5.662E+00	5.663E+00	5.664E+00	5.665E+00	5.666E+00	5.667E+00	5.668E+00
5.669E+00	5.670E+00	5.671E+00	5.672E+00	5.673E+00	5.674E+00	5.675E+00	5.676E+00	5.677E+00	5.678E+00
5.679E+00	5.680E+00	5.681E+00	5.682E+00	5.683E+00	5.684E+00	5.685E+00	5.686E+00	5.687E+00	5.688E+00
5.689E+00	5.690E+00	5.691E+00	5.692E+00	5.693E+00	5.694E+00	5.695E+00	5.696E+00	5.697E+00	5.698E+00
5.699E+00	5.700E+00	5.701E+00	5.702E+00	5.703E+00	5.704E+00	5.705E+00	5.706E+00	5.707E+00	5.708E+00
5.709E+00	5.710E+00	5.711E+00	5.712E+00	5.713E+00	5.714E+00	5.715E+00	5.716E+00	5.717E+00	5.718E+00
5.719E+00	5.720E+00	5.721E+00	5.722E+00	5.723E+00	5.724E+00	5.725E+00	5.726E+00	5.727E+00	5.728E+00
5.729E+00	5.730E+00	5.731E+00	5.732E+00	5.733E+00	5.734E+00	5.735E+00	5.736E+00	5.737E+00	5.738E+00
5.739E+00	5.740E+00	5.741E+00	5.742E+00	5.743E+00	5.744E+00	5.745E+00	5.746E+00	5.747E+00	5.748E+00
5.749E+00	5.750E+00	5.751E+00	5.752E+00	5.753E+00	5.754E+00	5.755E+00	5.756E+00	5.757E+00	5.758E+00
5.759E+00	5.760E+00	5.761E+00	5.762E+00	5.763E+00	5.764E+00	5.765E+00	5.766E+00	5.767E+00	5.768E+00
5.769E+00	5.770E+00	5.771E+00	5.772E+00	5.773E+00	5.774E+00	5.775E+00	5.776E+00	5.777E+00	5.778E+00
5.779E+00	5.780E+00	5.781E+00	5.782E+00	5.783E+00	5.784E+00	5.785E+00	5.786E+00	5.787E+00	5.788E+00
5.789E+00	5.790E+00	5.791E+00	5.792E+00	5.793E+00	5.794E+00	5.795E+00	5.796E+00	5.797E+00	5.798E+00
5.799E+00	5.800E+00	5.801E+00	5.802E+00	5.803E+00	5.804E+00	5.805E+00	5.806E+00	5.807E+00	5.808E+00

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5.809E+00	5.810E+00	5.811E+00	5.812E+00	5.813E+00	5.814E+00	5.815E+00	5.816E+00	5.817E+00	5.818E+00
5.819E+00	5.820E+00	5.821E+00	5.822E+00	5.823E+00	5.824E+00	5.825E+00	5.826E+00	5.827E+00	5.828E+00
5.829E+00	5.830E+00	5.831E+00	5.832E+00	5.833E+00	5.834E+00	5.835E+00	5.836E+00	5.837E+00	5.838E+00
5.839E+00	5.840E+00	5.841E+00	5.842E+00	5.843E+00	5.844E+00	5.845E+00	5.846E+00	5.847E+00	5.848E+00
5.849E+00	5.850E+00	5.851E+00	5.852E+00	5.853E+00	5.854E+00	5.855E+00	5.856E+00	5.857E+00	5.858E+00
5.859E+00	5.860E+00	5.861E+00	5.862E+00	5.863E+00	5.864E+00	5.865E+00	5.866E+00	5.867E+00	5.868E+00
5.869E+00	5.870E+00	5.871E+00	5.872E+00	5.873E+00	5.874E+00	5.875E+00	5.876E+00	5.877E+00	5.878E+00
5.879E+00	5.880E+00	5.881E+00	5.882E+00	5.883E+00	5.884E+00	5.885E+00	5.886E+00	5.887E+00	5.888E+00
5.889E+00	5.890E+00	5.891E+00	5.892E+00	5.893E+00	5.894E+00	5.895E+00	5.896E+00	5.897E+00	5.898E+00
5.899E+00	5.900E+00	5.901E+00	5.902E+00	5.903E+00	5.904E+00	5.905E+00	5.906E+00	5.907E+00	5.908E+00
5.909E+00	5.910E+00	5.911E+00	5.912E+00	5.913E+00	5.914E+00	5.915E+00	5.916E+00	5.917E+00	5.918E+00
5.919E+00	5.920E+00	5.921E+00	5.922E+00	5.923E+00	5.924E+00	5.925E+00	5.926E+00	5.927E+00	5.928E+00
5.929E+00	5.930E+00	5.931E+00	5.932E+00	5.933E+00	5.934E+00	5.935E+00	5.936E+00	5.937E+00	5.938E+00
5.939E+00	5.940E+00	5.941E+00	5.942E+00	5.943E+00	5.944E+00	5.945E+00	5.946E+00	5.947E+00	5.948E+00
5.949E+00	5.950E+00	5.951E+00	5.952E+00	5.953E+00	5.954E+00	5.955E+00	5.956E+00	5.957E+00	5.958E+00
5.959E+00	5.960E+00	5.961E+00	5.962E+00	5.963E+00	5.964E+00	5.965E+00	5.966E+00	5.967E+00	5.968E+00
5.969E+00	5.970E+00	5.971E+00	5.972E+00	5.973E+00	5.974E+00	5.975E+00	5.976E+00	5.977E+00	5.978E+00
5.979E+00	5.980E+00	5.981E+00	5.982E+00	5.983E+00	5.984E+00	5.985E+00	5.986E+00	5.987E+00	5.988E+00
5.989E+00	5.990E+00	5.991E+00	5.992E+00	5.993E+00	5.994E+00	5.995E+00	5.996E+00	5.997E+00	5.998E+00
5.999E+00	6.000E+00	6.001E+00	6.002E+00	6.003E+00	6.004E+00	6.005E+00	6.006E+00	6.007E+00	6.008E+00
6.009E+00	6.010E+00	6.011E+00	6.012E+00	6.013E+00	6.014E+00	6.015E+00	6.016E+00	6.017E+00	6.018E+00
6.019E+00	6.020E+00	6.021E+00	6.022E+00	6.023E+00	6.024E+00	6.025E+00	6.026E+00	6.027E+00	6.028E+00
6.029E+00	6.030E+00	6.031E+00	6.032E+00	6.033E+00	6.034E+00	6.035E+00	6.036E+00	6.037E+00	6.038E+00
6.039E+00	6.040E+00	6.041E+00	6.042E+00	6.043E+00	6.044E+00	6.045E+00	6.046E+00	6.047E+00	6.048E+00
6.049E+00	6.050E+00	6.051E+00	6.052E+00	6.053E+00	6.054E+00	6.055E+00	6.056E+00	6.057E+00	6.058E+00
6.059E+00	6.060E+00	6.061E+00	6.062E+00	6.063E+00	6.064E+00	6.065E+00	6.066E+00	6.067E+00	6.068E+00
6.069E+00	6.070E+00	6.071E+00	6.072E+00	6.073E+00	6.074E+00	6.075E+00	6.076E+00	6.077E+00	6.078E+00
6.079E+00	6.080E+00	6.081E+00	6.082E+00	6.083E+00	6.084E+00	6.085E+00	6.086E+00	6.087E+00	6.088E+00
6.089E+00	6.090E+00	6.091E+00	6.092E+00	6.093E+00	6.094E+00	6.095E+00	6.096E+00	6.097E+00	6.098E+00
6.099E+00	6.100E+00	6.101E+00	6.102E+00	6.103E+00	6.104E+00	6.105E+00	6.106E+00	6.107E+00	6.108E+00
6.109E+00	6.110E+00	6.111E+00	6.112E+00	6.113E+00	6.114E+00	6.115E+00	6.116E+00	6.117E+00	6.118E+00
6.119E+00	6.120E+00	6.121E+00	6.122E+00	6.123E+00	6.124E+00	6.125E+00	6.126E+00	6.127E+00	6.128E+00
6.129E+00	6.130E+00	6.131E+00	6.132E+00	6.133E+00	6.134E+00	6.135E+00	6.136E+00	6.137E+00	6.138E+00
6.139E+00	6.140E+00	6.141E+00	6.142E+00	6.143E+00	6.144E+00	6.145E+00	6.146E+00	6.147E+00	6.148E+00
6.149E+00	6.150E+00	6.151E+00	6.152E+00	6.153E+00	6.154E+00	6.155E+00	6.156E+00	6.157E+00	6.158E+00
6.159E+00	6.160E+00	6.161E+00	6.162E+00	6.163E+00	6.164E+00	6.165E+00	6.166E+00	6.167E+00	6.168E+00
6.169E+00	6.170E+00	6.171E+00	6.172E+00	6.173E+00	6.174E+00	6.175E+00	6.176E+00	6.177E+00	6.178E+00
6.179E+00	6.180E+00	6.181E+00	6.182E+00	6.183E+00	6.184E+00	6.185E+00	6.186E+00	6.187E+00	6.188E+00
6.189E+00	6.190E+00	6.191E+00	6.192E+00	6.193E+00	6.194E+00	6.195E+00	6.196E+00	6.197E+00	6.198E+00
6.199E+00	6.200E+00	6.201E+00	6.202E+00	6.203E+00	6.204E+00	6.205E+00	6.206E+00	6.207E+00	6.208E+00
6.209E+00	6.210E+00	6.211E+00	6.212E+00	6.213E+00	6.214E+00	6.215E+00	6.216E+00	6.217E+00	6.218E+00
6.219E+00	6.220E+00	6.221E+00	6.222E+00	6.223E+00	6.224E+00	6.225E+00	6.226E+00	6.227E+00	6.228E+00
6.229E+00	6.230E+00	6.231E+00	6.232E+00	6.233E+00	6.234E+00	6.235E+00	6.236E+00	6.237E+00	6.238E+00
6.239E+00	6.240E+00	6.241E+00	6.242E+00	6.243E+00	6.244E+00	6.245E+00	6.246E+00	6.247E+00	6.248E+00
6.249E+00	6.250E+00	6.251E+00	6.252E+00	6.253E+00	6.254E+00	6.255E+00	6.256E+00	6.257E+00	6.258E+00
6.259E+00	6.260E+00	6.261E+00	6.262E+00	6.263E+00	6.264E+00	6.265E+00	6.266E+00	6.267E+00	6.268E+00
6.269E+00	6.270E+00	6.271E+00	6.272E+00	6.273E+00	6.274E+00	6.275E+00	6.276E+00	6.277E+00	6.278E+00
6.279E+00	6.280E+00	6.281E+00	6.282E+00	6.283E+00	6.284E+00	6.285E+00	6.286E+00	6.287E+00	6.288E+00
6.289E+00	6.290E+00	6.291E+00	6.292E+00	6.293E+00	6.294E+00	6.295E+00	6.296E+00	6.297E+00	6.298E+00
6.299E+00	6.300E+00	6.301E+00	6.302E+00	6.303E+00	6.304E+00	6.305E+00	6.306E+00	6.307E+00	6.308E+00
6.309E+00	6.310E+00	6.311E+00	6.312E+00	6.313E+00	6.314E+00	6.315E+00	6.316E+00	6.317E+00	6.318E+00
6.319E+00	6.320E+00	6.321E+00	6.322E+00	6.323E+00	6.324E+00	6.325E+00	6.326E+00	6.327E+00	6.328E+00

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6.329E+00	6.330E+00	6.331E+00	6.332E+00	6.333E+00	6.334E+00	6.335E+00	6.336E+00	6.337E+00	6.338E+00
6.339E+00	6.340E+00	6.341E+00	6.342E+00	6.343E+00	6.344E+00	6.345E+00	6.346E+00	6.347E+00	6.348E+00
6.349E+00	6.350E+00	6.351E+00	6.352E+00	6.353E+00	6.354E+00	6.355E+00	6.356E+00	6.357E+00	6.358E+00
6.359E+00	6.360E+00	6.361E+00	6.362E+00	6.363E+00	6.364E+00	6.365E+00	6.366E+00	6.367E+00	6.368E+00
6.369E+00	6.370E+00	6.371E+00	6.372E+00	6.373E+00	6.374E+00	6.375E+00	6.376E+00	6.377E+00	6.378E+00
6.379E+00	6.380E+00	6.381E+00	6.382E+00	6.383E+00	6.384E+00	6.385E+00	6.386E+00	6.387E+00	6.388E+00
6.389E+00	6.390E+00	6.391E+00	6.392E+00	6.393E+00	6.394E+00	6.395E+00	6.396E+00	6.397E+00	6.398E+00
6.399E+00	6.400E+00	6.401E+00	6.402E+00	6.403E+00	6.404E+00	6.405E+00	6.406E+00	6.407E+00	6.408E+00
6.409E+00	6.410E+00	6.411E+00	6.412E+00	6.413E+00	6.414E+00	6.415E+00	6.416E+00	6.417E+00	6.418E+00
6.419E+00	6.420E+00	6.421E+00	6.422E+00	6.423E+00	6.424E+00	6.425E+00	6.426E+00	6.427E+00	6.428E+00
6.429E+00	6.430E+00	6.431E+00	6.432E+00	6.433E+00	6.434E+00	6.435E+00	6.436E+00	6.437E+00	6.438E+00
6.439E+00	6.440E+00	6.441E+00	6.442E+00	6.443E+00	6.444E+00	6.445E+00	6.446E+00	6.447E+00	6.448E+00
6.449E+00	6.450E+00	6.451E+00	6.452E+00	6.453E+00	6.454E+00	6.455E+00	6.456E+00	6.457E+00	6.458E+00
6.459E+00	6.460E+00	6.461E+00	6.462E+00	6.463E+00	6.464E+00	6.465E+00	6.466E+00	6.467E+00	6.468E+00
6.469E+00	6.470E+00	6.471E+00	6.472E+00	6.473E+00	6.474E+00	6.475E+00	6.476E+00	6.477E+00	6.478E+00
6.479E+00	6.480E+00	6.481E+00	6.482E+00	6.483E+00	6.484E+00	6.485E+00	6.486E+00	6.487E+00	6.488E+00
6.489E+00	6.490E+00	6.491E+00	6.492E+00	6.493E+00	6.494E+00	6.495E+00	6.496E+00	6.497E+00	6.498E+00
6.499E+00	6.500E+00	6.501E+00	6.502E+00	6.503E+00	6.504E+00	6.505E+00	6.506E+00	6.507E+00	6.508E+00
6.509E+00	6.510E+00	6.511E+00	6.512E+00	6.513E+00	6.514E+00	6.515E+00	6.516E+00	6.517E+00	6.518E+00
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6.529E+00	6.530E+00	6.531E+00	6.532E+00	6.533E+00	6.534E+00	6.535E+00	6.536E+00	6.537E+00	6.538E+00
6.539E+00	6.540E+00	6.541E+00	6.542E+00	6.543E+00	6.544E+00	6.545E+00	6.546E+00	6.547E+00	6.548E+00
6.549E+00	6.550E+00	6.551E+00	6.552E+00	6.553E+00	6.554E+00	6.555E+00	6.556E+00	6.557E+00	6.558E+00
6.559E+00	6.560E+00	6.561E+00	6.562E+00	6.563E+00	6.564E+00	6.565E+00	6.566E+00	6.567E+00	6.568E+00
6.569E+00	6.570E+00	6.571E+00	6.572E+00	6.573E+00	6.574E+00	6.575E+00	6.576E+00	6.577E+00	6.578E+00
6.579E+00	6.580E+00	6.581E+00	6.582E+00	6.583E+00	6.584E+00	6.585E+00	6.586E+00	6.587E+00	6.588E+00
6.589E+00	6.590E+00	6.591E+00	6.592E+00	6.593E+00	6.594E+00	6.595E+00	6.596E+00	6.597E+00	6.598E+00
6.599E+00	6.600E+00	6.601E+00	6.602E+00	6.603E+00	6.604E+00	6.605E+00	6.606E+00	6.607E+00	6.608E+00
6.609E+00	6.610E+00	6.611E+00	6.612E+00	6.613E+00	6.614E+00	6.615E+00	6.616E+00	6.617E+00	6.618E+00
6.619E+00	6.620E+00	6.621E+00	6.622E+00	6.623E+00	6.624E+00	6.625E+00	6.626E+00	6.627E+00	6.628E+00
6.629E+00	6.630E+00	6.631E+00	6.632E+00	6.633E+00	6.634E+00	6.635E+00	6.636E+00	6.637E+00	6.638E+00
6.639E+00	6.640E+00	6.641E+00	6.642E+00	6.643E+00	6.644E+00	6.645E+00	6.646E+00	6.647E+00	6.648E+00
6.649E+00	6.650E+00	6.651E+00	6.652E+00	6.653E+00	6.654E+00	6.655E+00	6.656E+00	6.657E+00	6.658E+00
6.659E+00	6.660E+00	6.661E+00	6.662E+00	6.663E+00	6.664E+00	6.665E+00	6.666E+00	6.667E+00	6.668E+00
6.669E+00	6.670E+00	6.671E+00	6.672E+00	6.673E+00	6.674E+00	6.675E+00	6.676E+00	6.677E+00	6.678E+00
6.679E+00	6.680E+00	6.681E+00	6.682E+00	6.683E+00	6.684E+00	6.685E+00	6.686E+00	6.687E+00	6.688E+00
6.689E+00	6.690E+00	6.691E+00	6.692E+00	6.693E+00	6.694E+00	6.695E+00	6.696E+00	6.697E+00	6.698E+00
6.699E+00	6.700E+00	6.701E+00	6.702E+00	6.703E+00	6.704E+00	6.705E+00	6.706E+00	6.707E+00	6.708E+00
6.709E+00	6.710E+00	6.711E+00	6.712E+00	6.713E+00	6.714E+00	6.715E+00	6.716E+00	6.717E+00	6.718E+00
6.719E+00	6.720E+00	6.721E+00	6.722E+00	6.723E+00	6.724E+00	6.725E+00	6.726E+00	6.727E+00	6.728E+00
6.729E+00	6.730E+00	6.731E+00	6.732E+00	6.733E+00	6.734E+00	6.735E+00	6.736E+00	6.737E+00	6.738E+00
6.739E+00	6.740E+00	6.741E+00	6.742E+00	6.743E+00	6.744E+00	6.745E+00	6.746E+00	6.747E+00	6.748E+00
6.749E+00	6.750E+00	6.751E+00	6.752E+00	6.753E+00	6.754E+00	6.755E+00	6.756E+00	6.757E+00	6.758E+00
6.759E+00	6.760E+00	6.761E+00	6.762E+00	6.763E+00	6.764E+00	6.765E+00	6.766E+00	6.767E+00	6.768E+00
6.769E+00	6.770E+00	6.771E+00	6.772E+00	6.773E+00	6.774E+00	6.775E+00	6.776E+00	6.777E+00	6.778E+00
6.779E+00	6.780E+00	6.781E+00	6.782E+00	6.783E+00	6.784E+00	6.785E+00	6.786E+00	6.787E+00	6.788E+00
6.789E+00	6.790E+00	6.791E+00	6.792E+00	6.793E+00	6.794E+00	6.795E+00	6.796E+00	6.797E+00	6.798E+00
6.799E+00	6.800E+00	6.801E+00	6.802E+00	6.803E+00	6.804E+00	6.805E+00	6.806E+00	6.807E+00	6.808E+00
6.809E+00	6.810E+00	6.811E+00	6.812E+00	6.813E+00	6.814E+00	6.815E+00	6.816E+00	6.817E+00	6.818E+00
6.819E+00	6.820E+00	6.821E+00	6.822E+00	6.823E+00	6.824E+00	6.825E+00	6.826E+00	6.827E+00	6.828E+00
6.829E+00	6.830E+00	6.831E+00	6.832E+00	6.833E+00	6.834E+00	6.835E+00	6.836E+00	6.837E+00	6.838E+00
6.839E+00	6.840E+00	6.841E+00	6.842E+00	6.843E+00	6.844E+00	6.845E+00	6.846E+00	6.847E+00	6.848E+00

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6.849E+00 6.850E+00 6.851E+00 6.852E+00 6.853E+00 6.854E+00 6.855E+00 6.856E+00 6.857E+00 6.858E+00
6.859E+00 6.860E+00 6.861E+00 6.862E+00 6.863E+00 6.864E+00 6.865E+00 6.866E+00 6.867E+00 6.868E+00
6.869E+00 6.870E+00 6.871E+00 6.872E+00 6.873E+00 6.874E+00 6.875E+00 6.876E+00 6.877E+00 6.878E+00
6.879E+00 6.880E+00 6.881E+00 6.882E+00 6.883E+00 6.884E+00 6.885E+00 6.886E+00 6.887E+00 6.888E+00
6.889E+00 6.890E+00 6.891E+00 6.892E+00 6.893E+00 6.894E+00 6.895E+00 6.896E+00 6.897E+00 6.898E+00
6.899E+00 6.900E+00 6.901E+00 6.902E+00 6.903E+00 6.904E+00 6.905E+00 6.906E+00 6.907E+00 6.908E+00
6.909E+00 6.910E+00 6.911E+00 6.912E+00 6.913E+00 6.914E+00 6.915E+00 6.916E+00 6.917E+00 6.918E+00
6.919E+00 6.920E+00 6.921E+00 6.922E+00 6.923E+00 6.924E+00 6.925E+00 6.926E+00 6.927E+00 6.928E+00
6.929E+00 6.930E+00 6.931E+00 6.932E+00 6.933E+00 6.934E+00 6.935E+00 6.936E+00 6.937E+00 6.938E+00
6.939E+00 6.940E+00 6.941E+00 6.942E+00 6.943E+00 6.944E+00 6.945E+00 6.946E+00 6.947E+00 6.948E+00
6.949E+00 6.950E+00 6.951E+00 6.952E+00 6.953E+00 6.954E+00 6.955E+00 6.956E+00 6.957E+00 6.958E+00
6.959E+00 6.960E+00 6.961E+00 6.962E+00 6.963E+00 6.964E+00 6.965E+00 6.966E+00 6.967E+00 6.968E+00
6.969E+00

Spectra Values - Oberstedt - LaBr3 Q489 in Figure 2 of Oberstedt, *et al.* [33]

0.000E+00 8.820E+00 9.010E+00 9.200E+00 9.369E+00 9.538E+00 9.706E+00 9.905E+00 1.010E+01 1.015E+01
1.019E+01 1.024E+01 1.030E+01 1.036E+01 9.779E+00 9.200E+00 8.621E+00 8.854E+00 9.087E+00 9.320E+00
9.971E+00 1.062E+01 1.127E+01 1.155E+01 1.183E+01 1.211E+01 1.264E+01 1.317E+01 1.370E+01 1.344E+01
1.317E+01 1.290E+01 1.293E+01 1.297E+01 1.301E+01 1.327E+01 1.353E+01 1.379E+01 1.371E+01 1.364E+01
1.356E+01 1.348E+01 1.345E+01 1.342E+01 1.340E+01 1.341E+01 1.343E+01 1.345E+01 1.347E+01 1.324E+01
1.301E+01 1.278E+01 1.256E+01 1.234E+01 1.211E+01 1.189E+01 1.225E+01 1.262E+01 1.298E+01 1.308E+01
1.319E+01 1.329E+01 1.340E+01 1.379E+01 1.418E+01 1.458E+01 1.481E+01 1.504E+01 1.527E+01 1.550E+01
1.523E+01 1.496E+01 1.470E+01 1.338E+01 1.206E+01 1.074E+01 9.417E+00 9.044E+00 8.672E+00 8.299E+00
7.927E+00 8.476E+00 9.025E+00 9.573E+00 1.012E+01 1.044E+01 1.076E+01 1.108E+01 1.140E+01 1.138E+01
1.137E+01 1.135E+01 1.134E+01 1.174E+01 1.215E+01 1.256E+01 1.297E+01 1.302E+01 1.308E+01 1.313E+01
1.319E+01 1.334E+01 1.350E+01 1.366E+01 1.382E+01 1.397E+01 1.411E+01 1.426E+01 1.441E+01 1.456E+01
1.430E+01 1.403E+01 1.377E+01 1.351E+01 1.348E+01 1.344E+01 1.341E+01 1.338E+01 1.335E+01 1.323E+01
1.312E+01 1.301E+01 1.289E+01 1.254E+01 1.218E+01 1.182E+01 1.146E+01 1.110E+01 1.071E+01 1.031E+01
9.923E+00 9.532E+00 9.508E+00 9.485E+00 9.462E+00 9.439E+00 9.415E+00 9.563E+00 9.710E+00 9.858E+00
1.001E+01 9.849E+00 9.693E+00 9.537E+00 9.381E+00 9.225E+00 9.295E+00 9.365E+00 9.436E+00 9.506E+00
9.577E+00 9.702E+00 9.827E+00 9.951E+00 1.008E+01 1.020E+01 1.016E+01 1.011E+01 1.006E+01 1.002E+01
9.973E+00 9.780E+00 9.588E+00 9.396E+00 9.204E+00 9.012E+00 8.741E+00 8.470E+00 8.199E+00 7.928E+00
7.657E+00 7.418E+00 7.179E+00 6.939E+00 6.700E+00 6.461E+00 6.313E+00 6.164E+00 6.016E+00 5.868E+00
5.719E+00 5.543E+00 5.366E+00 5.189E+00 5.012E+00 4.835E+00 4.658E+00 4.315E+00 3.972E+00 3.629E+00
3.285E+00 2.942E+00 3.479E+00 4.016E+00 4.553E+00 5.090E+00 5.627E+00 6.164E+00 6.492E+00 6.821E+00
7.149E+00 7.477E+00 7.805E+00 7.852E+00 7.899E+00 7.947E+00 7.994E+00 8.041E+00 8.088E+00 8.202E+00
8.317E+00 8.431E+00 8.545E+00 8.659E+00 8.315E+00 7.972E+00 7.628E+00 7.284E+00 6.941E+00 6.597E+00
6.559E+00 6.521E+00 6.484E+00 6.446E+00 6.408E+00 6.492E+00 6.577E+00 6.661E+00 6.745E+00 6.829E+00
6.914E+00 7.167E+00 7.421E+00 7.675E+00 7.929E+00 8.182E+00 8.436E+00 8.570E+00 8.705E+00 8.839E+00
8.974E+00 9.108E+00 9.242E+00 9.293E+00 9.344E+00 9.395E+00 9.446E+00 9.497E+00 9.548E+00 9.549E+00
9.549E+00 9.550E+00 9.551E+00 9.552E+00 9.553E+00 9.355E+00 9.158E+00 8.961E+00 8.764E+00 8.567E+00
8.370E+00 8.372E+00 8.374E+00 8.376E+00 8.378E+00 8.380E+00 8.382E+00 8.385E+00 8.592E+00 8.800E+00
9.008E+00 9.216E+00 9.423E+00 9.631E+00 9.731E+00 9.831E+00 9.931E+00 1.003E+01 1.013E+01 1.023E+01
1.008E+01 9.921E+00 9.765E+00 9.610E+00 9.455E+00 9.300E+00 9.126E+00 8.952E+00 8.778E+00 8.604E+00
8.430E+00 8.256E+00 8.082E+00 7.995E+00 7.908E+00 7.821E+00 7.734E+00 7.647E+00 7.561E+00 7.523E+00
7.486E+00 7.448E+00 7.411E+00 7.373E+00 7.336E+00 7.298E+00 7.228E+00 7.158E+00 7.089E+00 7.019E+00
6.949E+00 6.879E+00 6.813E+00 6.746E+00 6.680E+00 6.614E+00 6.547E+00 6.481E+00 6.415E+00 6.471E+00
6.528E+00 6.584E+00 6.641E+00 6.697E+00 6.753E+00 6.810E+00 6.818E+00 6.826E+00 6.834E+00 6.842E+00
6.851E+00 6.859E+00 6.867E+00 6.857E+00 6.848E+00 6.838E+00 6.828E+00 6.819E+00 6.809E+00 6.799E+00
6.808E+00 6.817E+00 6.826E+00 6.836E+00 6.845E+00 6.854E+00 6.863E+00 6.795E+00 6.726E+00 6.658E+00
6.590E+00 6.522E+00 6.453E+00 6.385E+00 6.430E+00 6.476E+00 6.521E+00 6.566E+00 6.612E+00 6.657E+00
6.702E+00 6.664E+00 6.625E+00 6.586E+00 6.547E+00 6.509E+00 6.470E+00 6.431E+00 6.459E+00 6.488E+00

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6.516E+00	6.545E+00	6.573E+00	6.601E+00	6.630E+00	6.658E+00	6.767E+00	6.876E+00	6.985E+00	7.095E+00
7.204E+00	7.313E+00	7.422E+00	7.589E+00	7.756E+00	7.923E+00	8.090E+00	8.257E+00	8.424E+00	8.591E+00
8.565E+00	8.539E+00	8.513E+00	8.487E+00	8.461E+00	8.436E+00	8.410E+00	8.406E+00	8.401E+00	8.397E+00
8.393E+00	8.389E+00	8.385E+00	8.380E+00	8.376E+00	8.270E+00	8.163E+00	8.057E+00	7.951E+00	7.844E+00
7.738E+00	7.632E+00	7.554E+00	7.476E+00	7.399E+00	7.321E+00	7.244E+00	7.166E+00	7.089E+00	7.011E+00
7.003E+00	6.995E+00	6.987E+00	6.979E+00	6.970E+00	6.962E+00	6.954E+00	6.946E+00	6.883E+00	6.819E+00
6.756E+00	6.692E+00	6.629E+00	6.566E+00	6.502E+00	6.439E+00	6.184E+00	5.930E+00	5.676E+00	5.421E+00
5.167E+00	4.913E+00	4.658E+00	4.404E+00	4.378E+00	4.352E+00	4.325E+00	4.299E+00	4.273E+00	4.247E+00
4.221E+00	4.195E+00	4.186E+00	4.178E+00	4.169E+00	4.160E+00	4.152E+00	4.143E+00	4.134E+00	4.223E+00
4.312E+00	4.401E+00	4.490E+00	4.578E+00	4.667E+00	4.756E+00	4.845E+00	4.934E+00	4.980E+00	5.027E+00
5.073E+00	5.120E+00	5.167E+00	5.213E+00	5.260E+00	5.306E+00	5.318E+00	5.331E+00	5.343E+00	5.355E+00
5.367E+00	5.379E+00	5.391E+00	5.403E+00	5.390E+00	5.377E+00	5.363E+00	5.350E+00	5.337E+00	5.324E+00
5.310E+00	5.297E+00	5.524E+00	5.751E+00	5.978E+00	6.205E+00	6.432E+00	6.659E+00	6.886E+00	7.113E+00
7.340E+00	7.384E+00	7.429E+00	7.473E+00	7.517E+00	7.561E+00	7.606E+00	7.650E+00	7.694E+00	7.590E+00
7.486E+00	7.383E+00	7.279E+00	7.175E+00	7.071E+00	6.967E+00	6.863E+00	6.760E+00	6.705E+00	6.650E+00
6.595E+00	6.540E+00	6.485E+00	6.430E+00	6.375E+00	6.320E+00	6.207E+00	6.093E+00	5.980E+00	5.867E+00
5.753E+00	5.640E+00	5.527E+00	5.414E+00	5.300E+00	5.255E+00	5.210E+00	5.165E+00	5.120E+00	5.075E+00
5.030E+00	4.985E+00	4.940E+00	4.912E+00	4.883E+00	4.854E+00	4.825E+00	4.796E+00	4.767E+00	4.738E+00
4.709E+00	4.680E+00	4.764E+00	4.848E+00	4.932E+00	5.016E+00	5.100E+00	5.184E+00	5.268E+00	5.352E+00
5.436E+00	5.331E+00	5.226E+00	5.121E+00	5.016E+00	4.911E+00	4.806E+00	4.701E+00	4.596E+00	4.491E+00
4.494E+00	4.497E+00	4.499E+00	4.502E+00	4.505E+00	4.508E+00	4.510E+00	4.513E+00	4.516E+00	4.500E+00
4.485E+00	4.469E+00	4.453E+00	4.438E+00	4.422E+00	4.406E+00	4.391E+00	4.375E+00	4.397E+00	4.419E+00
4.442E+00	4.464E+00	4.486E+00	4.508E+00	4.530E+00	4.552E+00	4.575E+00	4.663E+00	4.752E+00	4.841E+00
4.929E+00	5.018E+00	5.106E+00	5.195E+00	5.284E+00	5.372E+00	5.351E+00	5.330E+00	5.308E+00	5.287E+00
5.265E+00	5.244E+00	5.222E+00	5.201E+00	5.180E+00	5.179E+00	5.178E+00	5.177E+00	5.176E+00	5.175E+00
5.174E+00	5.173E+00	5.172E+00	5.171E+00	5.170E+00	5.169E+00	5.167E+00	5.166E+00	5.165E+00	5.163E+00
5.162E+00	5.161E+00	5.160E+00	5.158E+00	5.134E+00	5.111E+00	5.087E+00	5.063E+00	5.039E+00	5.015E+00
4.991E+00	4.967E+00	4.943E+00	4.919E+00	4.905E+00	4.890E+00	4.876E+00	4.862E+00	4.847E+00	4.833E+00
4.819E+00	4.804E+00	4.790E+00	4.779E+00	4.768E+00	4.757E+00	4.746E+00	4.735E+00	4.724E+00	4.713E+00
4.702E+00	4.691E+00	4.681E+00	4.688E+00	4.696E+00	4.703E+00	4.711E+00	4.718E+00	4.726E+00	4.733E+00
4.741E+00	4.748E+00	4.632E+00	4.515E+00	4.398E+00	4.281E+00	4.164E+00	4.047E+00	3.931E+00	3.814E+00
3.697E+00	3.580E+00	3.580E+00	3.580E+00	3.580E+00	3.580E+00	3.580E+00	3.580E+00	3.580E+00	3.580E+00
3.580E+00	3.580E+00	3.557E+00	3.534E+00	3.510E+00	3.487E+00	3.464E+00	3.441E+00	3.418E+00	3.394E+00
3.371E+00	3.348E+00	3.364E+00	3.380E+00	3.396E+00	3.411E+00	3.427E+00	3.443E+00	3.459E+00	3.475E+00
3.491E+00	3.506E+00	3.502E+00	3.498E+00	3.494E+00	3.489E+00	3.485E+00	3.481E+00	3.476E+00	3.472E+00
3.468E+00	3.464E+00	3.512E+00	3.560E+00	3.608E+00	3.656E+00	3.704E+00	3.752E+00	3.800E+00	3.849E+00
3.897E+00	3.945E+00	3.956E+00	3.968E+00	3.979E+00	3.991E+00	4.002E+00	4.014E+00	4.026E+00	4.037E+00
4.049E+00	4.060E+00	4.015E+00	3.971E+00	3.926E+00	3.882E+00	3.837E+00	3.792E+00	3.748E+00	3.703E+00
3.658E+00	3.614E+00	3.609E+00	3.605E+00	3.600E+00	3.596E+00	3.591E+00	3.587E+00	3.582E+00	3.578E+00
3.573E+00	3.569E+00	3.565E+00	3.581E+00	3.598E+00	3.615E+00	3.632E+00	3.649E+00	3.666E+00	3.682E+00
3.699E+00	3.716E+00	3.733E+00	3.744E+00	3.756E+00	3.768E+00	3.779E+00	3.791E+00	3.802E+00	3.814E+00
3.826E+00	3.837E+00	3.849E+00	3.860E+00	3.804E+00	3.747E+00	3.690E+00	3.633E+00	3.577E+00	3.520E+00
3.463E+00	3.406E+00	3.350E+00	3.293E+00	3.247E+00	3.202E+00	3.156E+00	3.110E+00	3.065E+00	3.019E+00
2.973E+00	2.928E+00	2.882E+00	2.836E+00	2.790E+00	2.776E+00	2.761E+00	2.746E+00	2.732E+00	2.717E+00
2.702E+00	2.688E+00	2.673E+00	2.658E+00	2.644E+00	2.647E+00	2.651E+00	2.655E+00	2.658E+00	2.662E+00
2.666E+00	2.670E+00	2.673E+00	2.677E+00	2.681E+00	2.684E+00	2.686E+00	2.688E+00	2.690E+00	2.692E+00
2.695E+00	2.697E+00	2.699E+00	2.701E+00	2.703E+00	2.705E+00	2.692E+00	2.679E+00	2.666E+00	2.653E+00
2.640E+00	2.627E+00	2.614E+00	2.601E+00	2.588E+00	2.575E+00	2.562E+00	2.580E+00	2.598E+00	2.616E+00
2.634E+00	2.652E+00	2.669E+00	2.687E+00	2.705E+00	2.723E+00	2.741E+00	2.759E+00	2.763E+00	2.768E+00
2.772E+00	2.777E+00	2.781E+00	2.786E+00	2.790E+00	2.795E+00	2.799E+00	2.804E+00	2.808E+00	2.805E+00
2.801E+00	2.798E+00	2.795E+00	2.791E+00	2.788E+00	2.784E+00	2.781E+00	2.777E+00	2.774E+00	2.771E+00
2.765E+00	2.758E+00	2.752E+00	2.746E+00	2.740E+00	2.734E+00	2.728E+00	2.722E+00	2.716E+00	2.710E+00

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2.704E+00	2.698E+00	2.724E+00	2.749E+00	2.775E+00	2.800E+00	2.826E+00	2.852E+00	2.877E+00	2.903E+00
2.929E+00	2.954E+00	2.980E+00	2.966E+00	2.952E+00	2.938E+00	2.924E+00	2.910E+00	2.896E+00	2.882E+00
2.868E+00	2.854E+00	2.840E+00	2.826E+00	2.818E+00	2.810E+00	2.801E+00	2.793E+00	2.785E+00	2.777E+00
2.769E+00	2.761E+00	2.753E+00	2.745E+00	2.737E+00	2.733E+00	2.729E+00	2.724E+00	2.720E+00	2.716E+00
2.712E+00	2.708E+00	2.704E+00	2.700E+00	2.696E+00	2.692E+00	2.688E+00	2.672E+00	2.657E+00	2.642E+00
2.626E+00	2.611E+00	2.596E+00	2.580E+00	2.565E+00	2.550E+00	2.534E+00	2.519E+00	2.498E+00	2.478E+00
2.457E+00	2.436E+00	2.415E+00	2.395E+00	2.374E+00	2.353E+00	2.333E+00	2.312E+00	2.291E+00	2.270E+00
2.249E+00	2.228E+00	2.207E+00	2.185E+00	2.164E+00	2.143E+00	2.122E+00	2.101E+00	2.079E+00	2.058E+00
2.037E+00	2.016E+00	2.006E+00	1.997E+00	1.988E+00	1.979E+00	1.970E+00	1.960E+00	1.951E+00	1.942E+00
1.933E+00	1.924E+00	1.914E+00	1.905E+00	1.909E+00	1.914E+00	1.918E+00	1.922E+00	1.927E+00	1.931E+00
1.935E+00	1.940E+00	1.944E+00	1.948E+00	1.953E+00	1.961E+00	1.970E+00	1.979E+00	1.988E+00	1.997E+00
2.006E+00	2.015E+00	2.024E+00	2.033E+00	2.042E+00	2.051E+00	2.059E+00	2.086E+00	2.113E+00	2.140E+00
2.167E+00	2.194E+00	2.221E+00	2.248E+00	2.275E+00	2.302E+00	2.329E+00	2.356E+00	2.383E+00	2.397E+00
2.412E+00	2.426E+00	2.441E+00	2.455E+00	2.470E+00	2.485E+00	2.499E+00	2.514E+00	2.528E+00	2.543E+00
2.557E+00	2.539E+00	2.520E+00	2.502E+00	2.483E+00	2.465E+00	2.446E+00	2.428E+00	2.409E+00	2.391E+00
2.372E+00	2.353E+00	2.335E+00	2.324E+00	2.313E+00	2.302E+00	2.292E+00	2.281E+00	2.270E+00	2.259E+00
2.248E+00	2.237E+00	2.227E+00	2.216E+00	2.205E+00	2.194E+00	2.196E+00	2.198E+00	2.200E+00	2.202E+00
2.205E+00	2.207E+00	2.209E+00	2.211E+00	2.213E+00	2.215E+00	2.217E+00	2.219E+00	2.258E+00	2.296E+00
2.335E+00	2.374E+00	2.412E+00	2.451E+00	2.489E+00	2.528E+00	2.567E+00	2.605E+00	2.644E+00	2.682E+00
2.667E+00	2.651E+00	2.635E+00	2.619E+00	2.603E+00	2.587E+00	2.571E+00	2.556E+00	2.540E+00	2.524E+00
2.508E+00	2.492E+00	2.491E+00	2.491E+00	2.490E+00	2.489E+00	2.488E+00	2.488E+00	2.487E+00	2.486E+00
2.485E+00	2.485E+00	2.484E+00	2.483E+00	2.482E+00	2.496E+00	2.510E+00	2.524E+00	2.538E+00	2.552E+00
2.566E+00	2.580E+00	2.593E+00	2.607E+00	2.621E+00	2.635E+00	2.649E+00	2.620E+00	2.590E+00	2.561E+00
2.531E+00	2.502E+00	2.472E+00	2.443E+00	2.413E+00	2.384E+00	2.354E+00	2.325E+00	2.295E+00	2.266E+00
2.295E+00	2.325E+00	2.355E+00	2.385E+00	2.414E+00	2.444E+00	2.474E+00	2.504E+00	2.533E+00	2.563E+00
2.593E+00	2.622E+00	2.652E+00	2.651E+00	2.649E+00	2.648E+00	2.646E+00	2.645E+00	2.643E+00	2.641E+00
2.640E+00	2.638E+00	2.637E+00	2.635E+00	2.634E+00	2.632E+00	2.628E+00	2.624E+00	2.620E+00	2.616E+00
2.611E+00	2.607E+00	2.603E+00	2.599E+00	2.595E+00	2.591E+00	2.587E+00	2.582E+00	2.582E+00	2.581E+00
2.580E+00	2.579E+00	2.578E+00	2.577E+00	2.577E+00	2.576E+00	2.575E+00	2.574E+00	2.573E+00	2.572E+00
2.572E+00	2.570E+00	2.568E+00	2.566E+00	2.564E+00	2.562E+00	2.560E+00	2.558E+00	2.557E+00	2.555E+00
2.553E+00	2.551E+00	2.549E+00	2.547E+00	2.556E+00	2.565E+00	2.574E+00	2.583E+00	2.592E+00	2.601E+00
2.609E+00	2.618E+00	2.627E+00	2.636E+00	2.645E+00	2.654E+00	2.663E+00	2.659E+00	2.656E+00	2.652E+00
2.649E+00	2.645E+00	2.642E+00	2.639E+00	2.635E+00	2.632E+00	2.628E+00	2.625E+00	2.621E+00	2.618E+00
2.622E+00	2.627E+00	2.631E+00	2.635E+00	2.640E+00	2.644E+00	2.648E+00	2.653E+00	2.657E+00	2.661E+00
2.666E+00	2.670E+00	2.674E+00	2.679E+00	2.661E+00	2.644E+00	2.626E+00	2.609E+00	2.591E+00	2.574E+00
2.556E+00	2.539E+00	2.521E+00	2.504E+00	2.486E+00	2.469E+00	2.451E+00	2.455E+00	2.459E+00	2.463E+00
2.467E+00	2.471E+00	2.475E+00	2.478E+00	2.482E+00	2.486E+00	2.490E+00	2.494E+00	2.498E+00	2.502E+00
2.469E+00	2.435E+00	2.402E+00	2.369E+00	2.336E+00	2.302E+00	2.269E+00	2.236E+00	2.203E+00	2.169E+00
2.136E+00	2.103E+00	2.070E+00	2.066E+00	2.061E+00	2.057E+00	2.053E+00	2.049E+00	2.045E+00	2.040E+00
2.036E+00	2.032E+00	2.028E+00	2.024E+00	2.019E+00	2.015E+00	2.011E+00	2.017E+00	2.024E+00	2.030E+00
2.037E+00	2.043E+00	2.049E+00	2.056E+00	2.062E+00	2.068E+00	2.075E+00	2.081E+00	2.088E+00	2.094E+00
2.067E+00	2.040E+00	2.014E+00	1.987E+00	1.960E+00	1.933E+00	1.906E+00	1.879E+00	1.853E+00	1.826E+00
1.799E+00	1.772E+00	1.745E+00	1.719E+00	1.717E+00	1.716E+00	1.715E+00	1.713E+00	1.712E+00	1.711E+00
1.710E+00	1.708E+00	1.707E+00	1.706E+00	1.705E+00	1.703E+00	1.702E+00	1.701E+00	1.710E+00	1.718E+00
1.727E+00	1.736E+00	1.745E+00	1.753E+00	1.762E+00	1.771E+00	1.780E+00	1.789E+00	1.797E+00	1.806E+00
1.815E+00	1.824E+00	1.813E+00	1.802E+00	1.791E+00	1.780E+00	1.769E+00	1.758E+00	1.747E+00	1.737E+00
1.726E+00	1.715E+00	1.704E+00	1.693E+00	1.682E+00	1.671E+00	1.659E+00	1.648E+00	1.636E+00	1.625E+00
1.613E+00	1.602E+00	1.590E+00	1.579E+00	1.567E+00	1.556E+00	1.544E+00	1.533E+00	1.521E+00	1.521E+00
1.520E+00	1.519E+00	1.519E+00	1.518E+00	1.517E+00	1.516E+00	1.516E+00	1.515E+00	1.514E+00	1.514E+00
1.513E+00	1.512E+00	1.512E+00	1.521E+00	1.530E+00	1.539E+00	1.548E+00	1.557E+00	1.566E+00	1.575E+00
1.584E+00	1.593E+00	1.602E+00	1.612E+00	1.621E+00	1.630E+00	1.639E+00	1.643E+00	1.647E+00	1.650E+00
1.654E+00	1.658E+00	1.662E+00	1.666E+00	1.669E+00	1.673E+00	1.677E+00	1.681E+00	1.685E+00	1.689E+00

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1.692E+00	1.694E+00	1.696E+00	1.698E+00	1.700E+00	1.702E+00	1.704E+00	1.706E+00	1.708E+00	1.710E+00
1.711E+00	1.713E+00	1.715E+00	1.717E+00	1.719E+00	1.721E+00	1.698E+00	1.674E+00	1.651E+00	1.628E+00
1.605E+00	1.581E+00	1.558E+00	1.535E+00	1.512E+00	1.488E+00	1.465E+00	1.442E+00	1.419E+00	1.396E+00
1.395E+00	1.395E+00	1.395E+00	1.395E+00	1.395E+00	1.395E+00	1.395E+00	1.395E+00	1.395E+00	1.395E+00
1.395E+00	1.395E+00	1.395E+00	1.395E+00	1.395E+00	1.393E+00	1.391E+00	1.389E+00	1.387E+00	1.385E+00
1.384E+00	1.382E+00	1.380E+00	1.378E+00	1.376E+00	1.374E+00	1.373E+00	1.371E+00	1.369E+00	1.371E+00
1.373E+00	1.376E+00	1.378E+00	1.380E+00	1.383E+00	1.385E+00	1.387E+00	1.390E+00	1.392E+00	1.394E+00
1.396E+00	1.399E+00	1.401E+00	1.403E+00	1.403E+00	1.403E+00	1.403E+00	1.403E+00	1.403E+00	1.403E+00
1.403E+00	1.403E+00	1.403E+00	1.403E+00	1.402E+00	1.402E+00	1.402E+00	1.402E+00	1.384E+00	1.365E+00
1.347E+00	1.329E+00	1.310E+00	1.292E+00	1.273E+00	1.255E+00	1.236E+00	1.218E+00	1.200E+00	1.181E+00
1.163E+00	1.144E+00	1.126E+00	1.133E+00	1.141E+00	1.148E+00	1.155E+00	1.163E+00	1.170E+00	1.177E+00
1.185E+00	1.192E+00	1.199E+00	1.207E+00	1.214E+00	1.221E+00	1.229E+00	1.220E+00	1.212E+00	1.204E+00
1.196E+00	1.188E+00	1.180E+00	1.171E+00	1.163E+00	1.155E+00	1.147E+00	1.139E+00	1.131E+00	1.123E+00
1.114E+00	1.106E+00	1.108E+00	1.110E+00	1.111E+00	1.113E+00	1.115E+00	1.117E+00	1.118E+00	1.120E+00
1.122E+00	1.124E+00	1.125E+00	1.127E+00	1.129E+00	1.130E+00	1.132E+00	1.131E+00	1.131E+00	1.130E+00
1.129E+00	1.129E+00	1.128E+00	1.127E+00	1.126E+00	1.126E+00	1.125E+00	1.124E+00	1.123E+00	1.123E+00
1.122E+00	1.121E+00	1.122E+00	1.122E+00	1.123E+00	1.124E+00	1.124E+00	1.125E+00	1.125E+00	1.126E+00
1.126E+00	1.127E+00	1.128E+00	1.128E+00	1.129E+00	1.129E+00	1.130E+00	1.124E+00	1.119E+00	1.113E+00
1.108E+00	1.103E+00	1.097E+00	1.092E+00	1.086E+00	1.081E+00	1.075E+00	1.070E+00	1.064E+00	1.059E+00
1.053E+00	1.048E+00	1.055E+00	1.063E+00	1.070E+00	1.078E+00	1.085E+00	1.092E+00	1.100E+00	1.107E+00
1.115E+00	1.122E+00	1.129E+00	1.137E+00	1.144E+00	1.152E+00	1.159E+00	1.141E+00	1.123E+00	1.104E+00
1.086E+00	1.068E+00	1.050E+00	1.032E+00	1.013E+00	9.951E-01	9.769E-01	9.587E-01	9.404E-01	9.222E-01
9.040E-01	8.858E-01	8.676E-01	8.697E-01	8.718E-01	8.739E-01	8.760E-01	8.781E-01	8.802E-01	8.823E-01
8.844E-01	8.865E-01	8.886E-01	8.907E-01	8.928E-01	8.949E-01	8.970E-01	8.991E-01	8.985E-01	8.979E-01
8.973E-01	8.968E-01	8.962E-01	8.956E-01	8.950E-01	8.945E-01	8.939E-01	8.933E-01	8.927E-01	8.921E-01
8.916E-01	8.910E-01	8.904E-01	8.809E-01	8.715E-01	8.620E-01	8.526E-01	8.431E-01	8.336E-01	8.242E-01
8.147E-01	8.052E-01	7.958E-01	7.863E-01	7.769E-01	7.674E-01	7.579E-01	7.485E-01	7.476E-01	7.467E-01
7.459E-01	7.450E-01	7.441E-01	7.432E-01	7.424E-01	7.415E-01	7.406E-01	7.397E-01	7.389E-01	7.380E-01
7.371E-01	7.362E-01	7.354E-01	7.345E-01	7.383E-01	7.421E-01	7.459E-01	7.497E-01	7.535E-01	7.573E-01
7.611E-01	7.649E-01	7.687E-01	7.725E-01	7.763E-01	7.801E-01	7.839E-01	7.877E-01	7.915E-01	7.953E-01
7.970E-01	7.988E-01	8.005E-01	8.022E-01	8.039E-01	8.057E-01	8.074E-01	8.091E-01	8.109E-01	8.126E-01
8.143E-01	8.160E-01	8.178E-01	8.195E-01	8.212E-01	8.230E-01	8.173E-01	8.116E-01	8.059E-01	8.002E-01
7.945E-01	7.888E-01	7.831E-01	7.774E-01	7.717E-01	7.660E-01	7.603E-01	7.546E-01	7.489E-01	7.432E-01
7.375E-01	7.399E-01	7.423E-01	7.447E-01	7.471E-01	7.495E-01	7.519E-01	7.543E-01	7.567E-01	7.591E-01
7.614E-01	7.638E-01	7.662E-01	7.686E-01	7.710E-01	7.734E-01	7.758E-01	7.740E-01	7.721E-01	7.703E-01
7.685E-01	7.666E-01	7.648E-01	7.629E-01	7.611E-01	7.593E-01	7.574E-01	7.556E-01	7.537E-01	7.519E-01
7.501E-01	7.482E-01	7.464E-01	7.465E-01	7.466E-01	7.466E-01	7.467E-01	7.468E-01	7.469E-01	7.470E-01
7.471E-01	7.471E-01	7.472E-01	7.473E-01	7.474E-01	7.475E-01	7.476E-01	7.477E-01	7.477E-01	7.541E-01
7.605E-01	7.668E-01	7.732E-01	7.795E-01	7.859E-01	7.922E-01	7.986E-01	8.050E-01	8.113E-01	8.177E-01
8.240E-01	8.304E-01	8.367E-01	8.431E-01	8.495E-01	8.428E-01	8.362E-01	8.295E-01	8.229E-01	8.163E-01
8.096E-01	8.030E-01	7.963E-01	7.897E-01	7.831E-01	7.764E-01	7.698E-01	7.631E-01	7.565E-01	7.499E-01
7.432E-01	7.441E-01	7.449E-01	7.458E-01	7.466E-01	7.475E-01	7.483E-01	7.492E-01	7.500E-01	7.509E-01
7.517E-01	7.526E-01	7.534E-01	7.543E-01	7.551E-01	7.560E-01	7.568E-01	7.551E-01	7.534E-01	7.517E-01
7.500E-01	7.483E-01	7.466E-01	7.449E-01	7.432E-01	7.415E-01	7.398E-01	7.381E-01	7.364E-01	7.347E-01
7.330E-01	7.313E-01	7.295E-01	7.278E-01	7.282E-01	7.286E-01	7.290E-01	7.293E-01	7.297E-01	7.301E-01
7.304E-01	7.308E-01	7.312E-01	7.315E-01	7.319E-01	7.323E-01	7.327E-01	7.330E-01	7.334E-01	7.338E-01
7.336E-01	7.334E-01	7.332E-01	7.331E-01	7.329E-01	7.327E-01	7.325E-01	7.324E-01	7.322E-01	7.320E-01
7.318E-01	7.316E-01	7.315E-01	7.313E-01	7.311E-01	7.309E-01	7.308E-01	7.372E-01	7.437E-01	7.502E-01
7.566E-01	7.631E-01	7.696E-01	7.760E-01	7.825E-01	7.890E-01	7.955E-01	8.019E-01	8.084E-01	8.149E-01
8.213E-01	8.278E-01	8.343E-01	8.297E-01	8.252E-01	8.206E-01	8.160E-01	8.115E-01	8.069E-01	8.024E-01
7.978E-01	7.933E-01	7.887E-01	7.841E-01	7.796E-01	7.750E-01	7.705E-01	7.659E-01	7.614E-01	7.568E-01
7.522E-01	7.477E-01	7.431E-01	7.386E-01	7.340E-01	7.295E-01	7.249E-01	7.203E-01	7.158E-01	7.112E-01

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7.067E-01	7.021E-01	6.976E-01	6.930E-01	6.884E-01	6.839E-01	6.834E-01	6.829E-01	6.824E-01	6.818E-01
6.813E-01	6.808E-01	6.803E-01	6.798E-01	6.793E-01	6.788E-01	6.783E-01	6.778E-01	6.773E-01	6.767E-01
6.762E-01	6.757E-01	6.752E-01	6.747E-01	6.742E-01	6.737E-01	6.732E-01	6.727E-01	6.722E-01	6.716E-01
6.711E-01	6.706E-01	6.701E-01	6.696E-01	6.691E-01	6.686E-01	6.681E-01	6.676E-01	6.670E-01	6.665E-01
6.656E-01	6.646E-01	6.636E-01	6.626E-01	6.616E-01	6.606E-01	6.597E-01	6.587E-01	6.577E-01	6.567E-01
6.557E-01	6.548E-01	6.538E-01	6.528E-01	6.518E-01	6.508E-01	6.498E-01	6.489E-01	6.479E-01	6.469E-01
6.459E-01	6.449E-01	6.440E-01	6.430E-01	6.420E-01	6.410E-01	6.400E-01	6.390E-01	6.381E-01	6.371E-01
6.361E-01	6.351E-01	6.341E-01	6.335E-01	6.330E-01	6.324E-01	6.318E-01	6.312E-01	6.306E-01	6.300E-01
6.294E-01	6.288E-01	6.283E-01	6.277E-01	6.271E-01	6.265E-01	6.259E-01	6.253E-01	6.247E-01	6.241E-01
6.236E-01	6.230E-01	6.224E-01	6.218E-01	6.212E-01	6.206E-01	6.200E-01	6.194E-01	6.189E-01	6.183E-01
6.177E-01	6.171E-01	6.165E-01	6.159E-01	6.153E-01	6.147E-01	6.142E-01	6.136E-01	6.130E-01	6.124E-01
6.119E-01	6.113E-01	6.107E-01	6.101E-01	6.096E-01	6.090E-01	6.084E-01	6.079E-01	6.073E-01	6.067E-01
6.061E-01	6.056E-01	6.050E-01	6.044E-01	6.039E-01	6.033E-01	6.027E-01	6.021E-01	6.016E-01	6.010E-01
6.004E-01	5.999E-01	5.993E-01	5.987E-01	5.982E-01	5.976E-01	5.970E-01	5.964E-01	5.959E-01	5.953E-01
5.947E-01	5.942E-01	5.934E-01	5.927E-01	5.920E-01	5.913E-01	5.905E-01	5.898E-01	5.891E-01	5.884E-01
5.877E-01	5.869E-01	5.862E-01	5.855E-01	5.848E-01	5.840E-01	5.833E-01	5.826E-01	5.819E-01	5.812E-01
5.804E-01	5.797E-01	5.790E-01	5.783E-01	5.775E-01	5.768E-01	5.761E-01	5.754E-01	5.746E-01	5.739E-01
5.732E-01	5.725E-01	5.718E-01	5.710E-01	5.703E-01	5.696E-01	5.689E-01	5.686E-01	5.683E-01	5.681E-01
5.678E-01	5.676E-01	5.673E-01	5.670E-01	5.668E-01	5.665E-01	5.662E-01	5.660E-01	5.657E-01	5.655E-01
5.652E-01	5.649E-01	5.647E-01	5.644E-01	5.641E-01	5.639E-01	5.636E-01	5.633E-01	5.631E-01	5.628E-01
5.626E-01	5.623E-01	5.620E-01	5.618E-01	5.615E-01	5.612E-01	5.610E-01	5.607E-01	5.605E-01	5.602E-01
5.599E-01	5.597E-01	5.591E-01	5.586E-01	5.581E-01	5.576E-01	5.571E-01	5.565E-01	5.560E-01	5.555E-01
5.550E-01	5.544E-01	5.539E-01	5.534E-01	5.529E-01	5.524E-01	5.518E-01	5.513E-01	5.508E-01	5.503E-01
5.498E-01	5.492E-01	5.487E-01	5.482E-01	5.477E-01	5.471E-01	5.466E-01	5.461E-01	5.456E-01	5.451E-01
5.445E-01	5.440E-01	5.435E-01	5.430E-01	5.425E-01	5.419E-01	5.414E-01	5.407E-01	5.399E-01	5.392E-01
5.385E-01	5.377E-01	5.370E-01	5.362E-01	5.355E-01	5.348E-01	5.340E-01	5.333E-01	5.325E-01	5.318E-01
5.311E-01	5.303E-01	5.296E-01	5.288E-01	5.281E-01	5.274E-01	5.266E-01	5.259E-01	5.251E-01	5.244E-01
5.237E-01	5.229E-01	5.222E-01	5.214E-01	5.207E-01	5.200E-01	5.192E-01	5.185E-01	5.177E-01	5.170E-01
5.163E-01	5.155E-01	5.148E-01	5.143E-01	5.139E-01	5.134E-01	5.130E-01	5.125E-01	5.121E-01	5.116E-01
5.112E-01	5.107E-01	5.103E-01	5.098E-01	5.094E-01	5.089E-01	5.085E-01	5.080E-01	5.076E-01	5.071E-01
5.067E-01	5.062E-01	5.058E-01	5.053E-01	5.049E-01	5.044E-01	5.040E-01	5.035E-01	5.031E-01	5.026E-01
5.021E-01	5.017E-01	5.012E-01	5.008E-01	5.003E-01	4.999E-01	4.994E-01	4.990E-01	4.985E-01	4.982E-01
4.978E-01	4.974E-01	4.970E-01	4.966E-01	4.962E-01	4.958E-01	4.955E-01	4.951E-01	4.947E-01	4.943E-01
4.939E-01	4.935E-01	4.932E-01	4.928E-01	4.924E-01	4.920E-01	4.916E-01	4.912E-01	4.909E-01	4.905E-01
4.901E-01	4.897E-01	4.893E-01	4.889E-01	4.885E-01	4.882E-01	4.878E-01	4.874E-01	4.870E-01	4.866E-01
4.862E-01	4.859E-01	4.855E-01	4.851E-01	4.847E-01	4.842E-01	4.837E-01	4.832E-01	4.827E-01	4.822E-01
4.816E-01	4.811E-01	4.806E-01	4.801E-01	4.796E-01	4.791E-01	4.786E-01	4.781E-01	4.776E-01	4.771E-01
4.765E-01	4.760E-01	4.755E-01	4.750E-01	4.745E-01	4.740E-01	4.735E-01	4.730E-01	4.725E-01	4.720E-01
4.714E-01	4.709E-01	4.704E-01	4.699E-01	4.694E-01	4.689E-01	4.684E-01	4.679E-01	4.674E-01	4.669E-01
4.663E-01	4.656E-01	4.649E-01	4.642E-01	4.635E-01	4.628E-01	4.621E-01	4.614E-01	4.607E-01	4.600E-01
4.593E-01	4.586E-01	4.579E-01	4.572E-01	4.565E-01	4.558E-01	4.551E-01	4.544E-01	4.537E-01	4.530E-01
4.523E-01	4.516E-01	4.509E-01	4.502E-01	4.495E-01	4.488E-01	4.481E-01	4.474E-01	4.467E-01	4.460E-01
4.453E-01	4.446E-01	4.439E-01	4.432E-01	4.425E-01	4.418E-01	4.411E-01	4.404E-01	4.398E-01	4.392E-01
4.386E-01	4.380E-01	4.374E-01	4.368E-01	4.362E-01	4.356E-01	4.350E-01	4.344E-01	4.338E-01	4.332E-01
4.326E-01	4.320E-01	4.314E-01	4.308E-01	4.303E-01	4.297E-01	4.291E-01	4.285E-01	4.279E-01	4.273E-01
4.267E-01	4.261E-01	4.255E-01	4.249E-01	4.243E-01	4.237E-01	4.231E-01	4.225E-01	4.219E-01	4.213E-01
4.207E-01	4.201E-01	4.195E-01	4.189E-01	4.183E-01	4.186E-01	4.189E-01	4.192E-01	4.194E-01	4.197E-01
4.200E-01	4.203E-01	4.206E-01	4.208E-01	4.211E-01	4.214E-01	4.217E-01	4.219E-01	4.222E-01	4.225E-01
4.228E-01	4.231E-01	4.233E-01	4.236E-01	4.239E-01	4.242E-01	4.245E-01	4.247E-01	4.250E-01	4.253E-01
4.256E-01	4.259E-01	4.261E-01	4.264E-01	4.267E-01	4.270E-01	4.272E-01	4.275E-01	4.278E-01	4.281E-01
4.284E-01	4.286E-01	4.289E-01	4.286E-01	4.284E-01	4.281E-01	4.278E-01	4.275E-01	4.272E-01	4.270E-01
4.267E-01	4.264E-01	4.261E-01	4.259E-01	4.256E-01	4.253E-01	4.250E-01	4.247E-01	4.245E-01	4.242E-01

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4.239E-01	4.236E-01	4.233E-01	4.231E-01	4.228E-01	4.225E-01	4.222E-01	4.219E-01	4.217E-01	4.214E-01
4.211E-01	4.208E-01	4.205E-01	4.203E-01	4.200E-01	4.197E-01	4.194E-01	4.191E-01	4.189E-01	4.186E-01
4.183E-01	4.180E-01	4.177E-01	4.173E-01	4.170E-01	4.167E-01	4.163E-01	4.160E-01	4.157E-01	4.154E-01
4.150E-01	4.147E-01	4.144E-01	4.140E-01	4.137E-01	4.134E-01	4.131E-01	4.127E-01	4.124E-01	4.121E-01
4.118E-01	4.114E-01	4.111E-01	4.108E-01	4.104E-01	4.101E-01	4.098E-01	4.095E-01	4.091E-01	4.088E-01
4.085E-01	4.082E-01	4.078E-01	4.075E-01	4.072E-01	4.068E-01	4.065E-01	4.062E-01	4.059E-01	4.053E-01
4.047E-01	4.041E-01	4.035E-01	4.030E-01	4.024E-01	4.018E-01	4.012E-01	4.006E-01	4.000E-01	3.995E-01
3.989E-01	3.983E-01	3.977E-01	3.971E-01	3.966E-01	3.960E-01	3.954E-01	3.948E-01	3.942E-01	3.936E-01
3.931E-01	3.925E-01	3.919E-01	3.913E-01	3.907E-01	3.901E-01	3.896E-01	3.890E-01	3.884E-01	3.878E-01
3.872E-01	3.867E-01	3.861E-01	3.855E-01	3.849E-01	3.843E-01	3.837E-01	3.832E-01	3.827E-01	3.822E-01
3.817E-01	3.812E-01	3.807E-01	3.802E-01	3.797E-01	3.792E-01	3.787E-01	3.782E-01	3.777E-01	3.772E-01
3.767E-01	3.762E-01	3.757E-01	3.752E-01	3.747E-01	3.742E-01	3.737E-01	3.732E-01	3.727E-01	3.722E-01
3.717E-01	3.712E-01	3.707E-01	3.702E-01	3.697E-01	3.692E-01	3.687E-01	3.682E-01	3.677E-01	3.672E-01
3.667E-01	3.662E-01	3.657E-01	3.652E-01	3.647E-01	3.642E-01	3.639E-01	3.637E-01	3.635E-01	3.632E-01
3.630E-01	3.628E-01	3.625E-01	3.623E-01	3.621E-01	3.618E-01	3.616E-01	3.614E-01	3.612E-01	3.609E-01
3.607E-01	3.605E-01	3.602E-01	3.600E-01	3.598E-01	3.595E-01	3.593E-01	3.591E-01	3.588E-01	3.586E-01
3.584E-01	3.581E-01	3.579E-01	3.577E-01	3.574E-01	3.572E-01	3.570E-01	3.567E-01	3.565E-01	3.563E-01
3.560E-01	3.558E-01	3.556E-01	3.554E-01	3.551E-01	3.549E-01	3.546E-01	3.544E-01	3.541E-01	3.538E-01
3.536E-01	3.533E-01	3.531E-01	3.528E-01	3.526E-01	3.523E-01	3.521E-01	3.518E-01	3.516E-01	3.513E-01
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3.485E-01	3.483E-01	3.480E-01	3.478E-01	3.475E-01	3.472E-01	3.470E-01	3.467E-01	3.465E-01	3.462E-01
3.460E-01	3.457E-01	3.455E-01	3.452E-01	3.448E-01	3.443E-01	3.439E-01	3.435E-01	3.430E-01	3.426E-01
3.422E-01	3.417E-01	3.413E-01	3.409E-01	3.404E-01	3.400E-01	3.396E-01	3.392E-01	3.387E-01	3.383E-01
3.379E-01	3.374E-01	3.370E-01	3.366E-01	3.361E-01	3.357E-01	3.353E-01	3.348E-01	3.344E-01	3.340E-01
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3.292E-01	3.288E-01	3.283E-01	3.280E-01	3.276E-01	3.272E-01	3.268E-01	3.265E-01	3.261E-01	3.257E-01
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3.216E-01	3.213E-01	3.209E-01	3.205E-01	3.201E-01	3.198E-01	3.194E-01	3.190E-01	3.186E-01	3.183E-01
3.179E-01	3.175E-01	3.172E-01	3.168E-01	3.164E-01	3.160E-01	3.157E-01	3.153E-01	3.149E-01	3.146E-01
3.142E-01	3.138E-01	3.134E-01	3.131E-01	3.127E-01	3.123E-01	3.119E-01	3.115E-01	3.111E-01	3.108E-01
3.104E-01	3.100E-01	3.096E-01	3.092E-01	3.088E-01	3.085E-01	3.081E-01	3.077E-01	3.073E-01	3.069E-01
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2.953E-01	2.950E-01	2.946E-01	2.943E-01	2.939E-01	2.936E-01	2.932E-01	2.929E-01	2.925E-01	2.922E-01
2.918E-01	2.915E-01	2.911E-01	2.908E-01	2.904E-01	2.901E-01	2.897E-01	2.894E-01	2.890E-01	2.887E-01
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2.848E-01	2.845E-01	2.841E-01	2.838E-01	2.836E-01	2.834E-01	2.832E-01	2.830E-01	2.828E-01	2.826E-01
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2.803E-01	2.801E-01	2.799E-01	2.797E-01	2.795E-01	2.793E-01	2.791E-01	2.789E-01	2.786E-01	2.784E-01
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2.525E-01	2.520E-01	2.515E-01	2.510E-01	2.505E-01	2.500E-01	2.495E-01	2.490E-01	2.485E-01	2.480E-01
2.475E-01	2.470E-01	2.465E-01	2.460E-01	2.455E-01	2.450E-01	2.445E-01	2.440E-01	2.436E-01	2.431E-01
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2.298E-01	2.295E-01	2.292E-01	2.289E-01	2.286E-01	2.283E-01	2.280E-01	2.277E-01	2.274E-01	2.271E-01

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2.207E-01	2.204E-01	2.201E-01	2.198E-01	2.195E-01	2.193E-01	2.192E-01	2.190E-01	2.188E-01	2.187E-01
2.185E-01	2.183E-01	2.182E-01	2.180E-01	2.178E-01	2.177E-01	2.175E-01	2.173E-01	2.171E-01	2.170E-01
2.168E-01	2.166E-01	2.165E-01	2.163E-01	2.161E-01	2.160E-01	2.158E-01	2.156E-01	2.155E-01	2.153E-01
2.151E-01	2.150E-01	2.148E-01	2.146E-01	2.144E-01	2.143E-01	2.141E-01	2.139E-01	2.138E-01	2.136E-01
2.134E-01	2.133E-01	2.131E-01	2.129E-01	2.128E-01	2.126E-01	2.124E-01	2.123E-01	2.121E-01	2.119E-01
2.116E-01	2.114E-01	2.111E-01	2.108E-01	2.106E-01	2.103E-01	2.100E-01	2.098E-01	2.095E-01	2.092E-01
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2.063E-01	2.060E-01	2.058E-01	2.055E-01	2.052E-01	2.050E-01	2.047E-01	2.044E-01	2.042E-01	2.039E-01
2.036E-01	2.034E-01	2.031E-01	2.028E-01	2.026E-01	2.023E-01	2.020E-01	2.018E-01	2.015E-01	2.012E-01
2.010E-01	2.007E-01	2.004E-01	2.002E-01	1.999E-01	1.998E-01	1.996E-01	1.995E-01	1.994E-01	1.993E-01
1.991E-01	1.990E-01	1.989E-01	1.988E-01	1.986E-01	1.985E-01	1.984E-01	1.982E-01	1.981E-01	1.980E-01
1.979E-01	1.977E-01	1.976E-01	1.975E-01	1.974E-01	1.972E-01	1.971E-01	1.970E-01	1.969E-01	1.967E-01
1.966E-01	1.965E-01	1.963E-01	1.962E-01	1.961E-01	1.960E-01	1.958E-01	1.957E-01	1.956E-01	1.955E-01
1.953E-01	1.952E-01	1.951E-01	1.949E-01	1.948E-01	1.947E-01	1.946E-01	1.944E-01	1.943E-01	1.942E-01
1.941E-01	1.938E-01	1.935E-01	1.933E-01	1.930E-01	1.928E-01	1.925E-01	1.923E-01	1.920E-01	1.918E-01
1.915E-01	1.912E-01	1.910E-01	1.907E-01	1.905E-01	1.902E-01	1.900E-01	1.897E-01	1.894E-01	1.892E-01
1.889E-01	1.887E-01	1.884E-01	1.882E-01	1.879E-01	1.876E-01	1.874E-01	1.871E-01	1.869E-01	1.866E-01
1.864E-01	1.861E-01	1.859E-01	1.856E-01	1.853E-01	1.851E-01	1.848E-01	1.846E-01	1.843E-01	1.841E-01
1.838E-01	1.835E-01	1.833E-01	1.830E-01	1.828E-01	1.825E-01	1.823E-01	1.821E-01	1.819E-01	1.817E-01
1.816E-01	1.814E-01	1.812E-01	1.810E-01	1.809E-01	1.807E-01	1.805E-01	1.803E-01	1.802E-01	1.800E-01
1.798E-01	1.796E-01	1.795E-01	1.793E-01	1.791E-01	1.789E-01	1.788E-01	1.786E-01	1.784E-01	1.782E-01
1.780E-01	1.779E-01	1.777E-01	1.775E-01	1.773E-01	1.772E-01	1.770E-01	1.768E-01	1.766E-01	1.765E-01
1.763E-01	1.761E-01	1.759E-01	1.758E-01	1.756E-01	1.754E-01	1.752E-01	1.751E-01	1.749E-01	1.747E-01
1.745E-01	1.744E-01	1.742E-01	1.740E-01	1.738E-01	1.737E-01	1.735E-01	1.733E-01	1.731E-01	1.730E-01
1.728E-01	1.726E-01	1.725E-01	1.723E-01	1.721E-01	1.719E-01	1.718E-01	1.716E-01	1.714E-01	1.712E-01
1.711E-01	1.709E-01	1.707E-01	1.706E-01	1.704E-01	1.702E-01	1.700E-01	1.699E-01	1.697E-01	1.695E-01
1.693E-01	1.692E-01	1.690E-01	1.688E-01	1.686E-01	1.685E-01	1.683E-01	1.681E-01	1.680E-01	1.678E-01
1.676E-01	1.674E-01	1.673E-01	1.671E-01	1.669E-01	1.667E-01	1.666E-01	1.664E-01	1.662E-01	1.661E-01
1.659E-01	1.657E-01	1.656E-01	1.654E-01	1.652E-01	1.651E-01	1.649E-01	1.648E-01	1.646E-01	1.644E-01
1.643E-01	1.641E-01	1.640E-01	1.638E-01	1.636E-01	1.635E-01	1.633E-01	1.632E-01	1.630E-01	1.628E-01
1.627E-01	1.625E-01	1.624E-01	1.622E-01	1.620E-01	1.619E-01	1.617E-01	1.616E-01	1.614E-01	1.612E-01
1.611E-01	1.609E-01	1.608E-01	1.606E-01	1.605E-01	1.603E-01	1.601E-01	1.600E-01	1.598E-01	1.597E-01
1.595E-01	1.593E-01	1.592E-01	1.590E-01	1.589E-01	1.587E-01	1.585E-01	1.584E-01	1.582E-01	1.580E-01
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1.405E-01	1.403E-01	1.400E-01	1.398E-01	1.395E-01	1.393E-01	1.391E-01	1.388E-01	1.386E-01	1.383E-01
1.381E-01	1.378E-01	1.376E-01	1.378E-01	1.380E-01	1.382E-01	1.384E-01	1.387E-01	1.389E-01	1.391E-01
1.393E-01	1.395E-01	1.397E-01	1.400E-01	1.402E-01	1.404E-01	1.406E-01	1.408E-01	1.410E-01	1.412E-01
1.415E-01	1.417E-01	1.419E-01	1.421E-01	1.423E-01	1.425E-01	1.427E-01	1.430E-01	1.432E-01	1.434E-01
1.436E-01	1.438E-01	1.440E-01	1.443E-01	1.445E-01	1.447E-01	1.449E-01	1.451E-01	1.453E-01	1.455E-01
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1.479E-01	1.477E-01	1.475E-01	1.474E-01	1.472E-01	1.470E-01	1.468E-01	1.466E-01	1.464E-01	1.463E-01
1.461E-01	1.459E-01	1.457E-01	1.455E-01	1.453E-01	1.452E-01	1.450E-01	1.448E-01	1.446E-01	1.444E-01
1.442E-01	1.441E-01	1.439E-01	1.437E-01	1.435E-01	1.433E-01	1.431E-01	1.430E-01	1.428E-01	1.426E-01

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1.360E-01	1.358E-01	1.357E-01	1.355E-01	1.354E-01	1.353E-01	1.351E-01	1.350E-01	1.348E-01	1.347E-01
1.345E-01	1.344E-01	1.343E-01	1.341E-01	1.340E-01	1.338E-01	1.337E-01	1.335E-01	1.334E-01	1.333E-01
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1.270E-01	1.268E-01	1.266E-01	1.265E-01	1.263E-01	1.262E-01	1.260E-01	1.259E-01	1.257E-01	1.255E-01
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1.229E-01	1.228E-01	1.227E-01	1.226E-01	1.225E-01	1.224E-01	1.222E-01	1.221E-01	1.220E-01	1.219E-01
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1.207E-01	1.206E-01	1.205E-01	1.204E-01	1.203E-01	1.201E-01	1.200E-01	1.199E-01	1.198E-01	1.197E-01
1.196E-01	1.195E-01	1.194E-01	1.193E-01	1.191E-01	1.190E-01	1.188E-01	1.187E-01	1.185E-01	1.183E-01
1.181E-01	1.179E-01	1.177E-01	1.175E-01	1.173E-01	1.171E-01	1.170E-01	1.168E-01	1.166E-01	1.164E-01
1.162E-01	1.160E-01	1.158E-01	1.156E-01	1.154E-01	1.153E-01	1.151E-01	1.149E-01	1.147E-01	1.145E-01
1.143E-01	1.141E-01	1.139E-01	1.137E-01	1.135E-01	1.134E-01	1.132E-01	1.130E-01	1.128E-01	1.126E-01
1.124E-01	1.122E-01	1.120E-01	1.118E-01	1.117E-01	1.115E-01	1.113E-01	1.111E-01	1.109E-01	1.107E-01
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1.092E-01	1.091E-01	1.090E-01	1.090E-01	1.089E-01	1.088E-01	1.087E-01	1.087E-01	1.086E-01	1.085E-01
1.084E-01	1.083E-01	1.083E-01	1.082E-01	1.081E-01	1.080E-01	1.080E-01	1.079E-01	1.078E-01	1.077E-01
1.077E-01	1.076E-01	1.075E-01	1.074E-01	1.073E-01	1.073E-01	1.072E-01	1.071E-01	1.070E-01	1.070E-01
1.069E-01	1.068E-01	1.067E-01	1.067E-01	1.066E-01	1.065E-01	1.064E-01	1.064E-01	1.063E-01	1.062E-01
1.061E-01	1.060E-01	1.060E-01	1.059E-01	1.058E-01	1.057E-01	1.056E-01	1.055E-01	1.054E-01	1.052E-01
1.051E-01	1.050E-01	1.049E-01	1.047E-01	1.046E-01	1.045E-01	1.044E-01	1.042E-01	1.041E-01	1.040E-01
1.039E-01	1.037E-01	1.036E-01	1.035E-01	1.034E-01	1.032E-01	1.031E-01	1.030E-01	1.029E-01	1.028E-01
1.026E-01	1.025E-01	1.024E-01	1.023E-01	1.021E-01	1.020E-01	1.019E-01	1.018E-01	1.016E-01	1.015E-01
1.014E-01	1.013E-01	1.011E-01	1.010E-01	1.009E-01	1.008E-01	1.006E-01	1.005E-01	1.004E-01	1.003E-01
1.001E-01	1.000E-01	9.989E-02	9.976E-02	9.964E-02	9.951E-02	9.941E-02	9.930E-02	9.919E-02	9.908E-02
9.897E-02	9.887E-02	9.876E-02	9.865E-02	9.854E-02	9.843E-02	9.832E-02	9.822E-02	9.811E-02	9.800E-02
9.789E-02	9.778E-02	9.767E-02	9.757E-02	9.746E-02	9.735E-02	9.724E-02	9.713E-02	9.703E-02	9.692E-02
9.681E-02	9.670E-02	9.659E-02	9.648E-02	9.638E-02	9.627E-02	9.616E-02	9.605E-02	9.594E-02	9.584E-02
9.573E-02	9.562E-02	9.551E-02	9.540E-02	9.529E-02	9.519E-02	9.508E-02	9.497E-02	9.486E-02	9.475E-02
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9.370E-02	9.363E-02	9.356E-02	9.349E-02	9.341E-02	9.334E-02	9.327E-02	9.320E-02	9.312E-02	9.305E-02
9.298E-02	9.291E-02	9.283E-02	9.276E-02	9.269E-02	9.261E-02	9.254E-02	9.247E-02	9.240E-02	9.232E-02
9.225E-02	9.218E-02	9.211E-02	9.203E-02	9.196E-02	9.189E-02	9.181E-02	9.174E-02	9.167E-02	9.160E-02
9.152E-02	9.145E-02	9.138E-02	9.131E-02	9.123E-02	9.116E-02	9.109E-02	9.102E-02	9.094E-02	9.087E-02
9.080E-02	9.072E-02	9.065E-02	9.058E-02	9.051E-02	9.043E-02	9.036E-02	9.029E-02	9.018E-02	9.006E-02
8.995E-02	8.984E-02	8.973E-02	8.962E-02	8.950E-02	8.939E-02	8.928E-02	8.917E-02	8.906E-02	8.894E-02
8.883E-02	8.872E-02	8.861E-02	8.850E-02	8.838E-02	8.827E-02	8.816E-02	8.805E-02	8.794E-02	8.782E-02
8.771E-02	8.760E-02	8.749E-02	8.737E-02	8.726E-02	8.715E-02	8.704E-02	8.693E-02	8.681E-02	8.670E-02
8.659E-02	8.648E-02	8.637E-02	8.625E-02	8.614E-02	8.603E-02	8.592E-02	8.581E-02	8.569E-02	8.558E-02
8.547E-02	8.536E-02	8.525E-02	8.513E-02	8.502E-02	8.491E-02	8.480E-02	8.468E-02	8.457E-02	8.449E-02
8.440E-02	8.432E-02	8.424E-02	8.415E-02	8.407E-02	8.398E-02	8.390E-02	8.382E-02	8.373E-02	8.365E-02
8.356E-02	8.348E-02	8.340E-02	8.331E-02	8.323E-02	8.314E-02	8.306E-02	8.298E-02	8.289E-02	8.281E-02
8.272E-02	8.264E-02	8.256E-02	8.247E-02	8.239E-02	8.230E-02	8.222E-02	8.214E-02	8.205E-02	8.197E-02
8.188E-02	8.180E-02	8.172E-02	8.163E-02	8.155E-02	8.146E-02	8.138E-02	8.130E-02	8.121E-02	8.113E-02
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7.877E-02	7.870E-02	7.862E-02	7.855E-02	7.848E-02	7.841E-02	7.834E-02	7.827E-02	7.819E-02	7.812E-02
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7.595E-02	7.589E-02	7.582E-02	7.576E-02	7.569E-02	7.563E-02	7.556E-02	7.550E-02	7.543E-02	7.537E-02
7.530E-02	7.524E-02	7.517E-02	7.511E-02	7.504E-02	7.498E-02	7.491E-02	7.485E-02	7.478E-02	7.472E-02
7.465E-02	7.459E-02	7.452E-02	7.446E-02	7.439E-02	7.433E-02	7.426E-02	7.420E-02	7.413E-02	7.407E-02
7.400E-02	7.394E-02	7.387E-02	7.381E-02	7.375E-02	7.368E-02	7.362E-02	7.355E-02	7.349E-02	7.342E-02
7.336E-02	7.329E-02	7.323E-02	7.316E-02	7.310E-02	7.297E-02	7.285E-02	7.272E-02	7.259E-02	7.247E-02
7.234E-02	7.222E-02	7.209E-02	7.197E-02	7.184E-02	7.172E-02	7.159E-02	7.147E-02	7.134E-02	7.122E-02
7.109E-02	7.096E-02	7.084E-02	7.071E-02	7.059E-02	7.046E-02	7.034E-02	7.021E-02	7.009E-02	6.996E-02
6.984E-02	6.971E-02	6.959E-02	6.946E-02	6.934E-02	6.921E-02	6.908E-02	6.896E-02	6.883E-02	6.871E-02
6.858E-02	6.846E-02	6.833E-02	6.821E-02	6.808E-02	6.796E-02	6.783E-02	6.771E-02	6.758E-02	6.745E-02
6.733E-02	6.720E-02	6.708E-02	6.695E-02	6.683E-02	6.670E-02	6.658E-02	6.645E-02	6.639E-02	6.632E-02
6.626E-02	6.620E-02	6.613E-02	6.607E-02	6.601E-02	6.594E-02	6.588E-02	6.581E-02	6.575E-02	6.569E-02
6.562E-02	6.556E-02	6.550E-02	6.543E-02	6.537E-02	6.530E-02	6.524E-02	6.518E-02	6.511E-02	6.505E-02
6.499E-02	6.492E-02	6.486E-02	6.479E-02	6.473E-02	6.467E-02	6.460E-02	6.454E-02	6.448E-02	6.441E-02
6.435E-02	6.428E-02	6.422E-02	6.416E-02	6.409E-02	6.403E-02	6.397E-02	6.390E-02	6.384E-02	6.377E-02
6.371E-02	6.365E-02	6.358E-02	6.352E-02	6.346E-02	6.339E-02	6.333E-02	6.326E-02	6.320E-02	6.314E-02
6.307E-02	6.297E-02	6.287E-02	6.277E-02	6.267E-02	6.257E-02	6.247E-02	6.237E-02	6.227E-02	6.217E-02
6.207E-02	6.197E-02	6.187E-02	6.177E-02	6.167E-02	6.157E-02	6.147E-02	6.137E-02	6.127E-02	6.117E-02
6.107E-02	6.097E-02	6.087E-02	6.077E-02	6.067E-02	6.057E-02	6.047E-02	6.037E-02	6.027E-02	6.017E-02
6.007E-02	5.997E-02	5.987E-02	5.977E-02	5.967E-02	5.957E-02	5.947E-02	5.937E-02	5.927E-02	5.917E-02
5.907E-02	5.897E-02	5.887E-02	5.877E-02	5.867E-02	5.857E-02	5.847E-02	5.837E-02	5.827E-02	5.817E-02
5.807E-02	5.797E-02	5.787E-02	5.777E-02	5.770E-02	5.764E-02	5.758E-02	5.752E-02	5.746E-02	5.740E-02
5.734E-02	5.728E-02	5.722E-02	5.716E-02	5.710E-02	5.704E-02	5.698E-02	5.692E-02	5.686E-02	5.679E-02
5.673E-02	5.667E-02	5.661E-02	5.655E-02	5.649E-02	5.643E-02	5.637E-02	5.631E-02	5.625E-02	5.619E-02
5.613E-02	5.607E-02	5.601E-02	5.595E-02	5.588E-02	5.582E-02	5.576E-02	5.570E-02	5.564E-02	5.558E-02
5.552E-02	5.546E-02	5.540E-02	5.534E-02	5.528E-02	5.522E-02	5.516E-02	5.510E-02	5.504E-02	5.497E-02
5.491E-02	5.485E-02	5.479E-02	5.473E-02	5.467E-02	5.461E-02	5.455E-02	5.449E-02	5.444E-02	5.440E-02
5.435E-02	5.431E-02	5.426E-02	5.422E-02	5.417E-02	5.413E-02	5.408E-02	5.403E-02	5.399E-02	5.394E-02
5.390E-02	5.385E-02	5.381E-02	5.376E-02	5.372E-02	5.367E-02	5.362E-02	5.358E-02	5.353E-02	5.349E-02
5.344E-02	5.340E-02	5.335E-02	5.331E-02	5.326E-02	5.321E-02	5.317E-02	5.312E-02	5.308E-02	5.303E-02
5.299E-02	5.294E-02	5.290E-02	5.285E-02	5.281E-02	5.276E-02	5.271E-02	5.267E-02	5.262E-02	5.258E-02
5.253E-02	5.249E-02	5.244E-02	5.240E-02	5.235E-02	5.230E-02	5.226E-02	5.221E-02	5.217E-02	5.212E-02
5.208E-02	5.203E-02	5.198E-02	5.194E-02	5.189E-02	5.184E-02	5.179E-02	5.175E-02	5.170E-02	5.165E-02
5.160E-02	5.155E-02	5.151E-02	5.146E-02	5.141E-02	5.136E-02	5.132E-02	5.127E-02	5.122E-02	5.117E-02
5.113E-02	5.108E-02	5.103E-02	5.098E-02	5.094E-02	5.089E-02	5.084E-02	5.079E-02	5.075E-02	5.070E-02
5.065E-02	5.060E-02	5.056E-02	5.051E-02	5.046E-02	5.041E-02	5.036E-02	5.032E-02	5.027E-02	5.022E-02
5.017E-02	5.013E-02	5.008E-02	5.003E-02	4.998E-02	4.994E-02	4.989E-02	4.984E-02	4.979E-02	4.975E-02
4.970E-02	4.965E-02	4.960E-02	4.956E-02	4.951E-02	4.946E-02	4.940E-02	4.934E-02	4.927E-02	4.921E-02
4.915E-02	4.909E-02	4.902E-02	4.896E-02	4.890E-02	4.884E-02	4.878E-02	4.871E-02	4.865E-02	4.859E-02
4.853E-02	4.846E-02	4.840E-02	4.834E-02	4.828E-02	4.822E-02	4.815E-02	4.809E-02	4.803E-02	4.797E-02
4.791E-02	4.784E-02	4.778E-02	4.772E-02	4.766E-02	4.759E-02	4.753E-02	4.747E-02	4.741E-02	4.735E-02
4.728E-02	4.722E-02	4.716E-02	4.710E-02	4.703E-02	4.697E-02	4.691E-02	4.685E-02	4.679E-02	4.672E-02
4.666E-02	4.660E-02	4.654E-02	4.647E-02	4.641E-02	4.635E-02	4.629E-02	4.623E-02	4.616E-02	4.610E-02
4.604E-02	4.598E-02	4.593E-02	4.587E-02	4.581E-02	4.575E-02	4.569E-02	4.563E-02	4.558E-02	4.552E-02
4.546E-02	4.540E-02	4.534E-02	4.528E-02	4.523E-02	4.517E-02	4.511E-02	4.505E-02	4.499E-02	4.493E-02
4.487E-02	4.482E-02	4.476E-02	4.470E-02	4.464E-02	4.458E-02	4.452E-02	4.447E-02	4.441E-02	4.435E-02
4.429E-02	4.423E-02	4.417E-02	4.412E-02	4.406E-02	4.400E-02	4.394E-02	4.388E-02	4.382E-02	4.377E-02

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4.312E-02	4.306E-02	4.301E-02	4.295E-02	4.289E-02	4.285E-02	4.281E-02	4.277E-02	4.273E-02	4.269E-02
4.266E-02	4.262E-02	4.258E-02	4.254E-02	4.250E-02	4.246E-02	4.242E-02	4.238E-02	4.234E-02	4.230E-02
4.226E-02	4.223E-02	4.219E-02	4.215E-02	4.211E-02	4.207E-02	4.203E-02	4.199E-02	4.195E-02	4.191E-02
4.187E-02	4.184E-02	4.180E-02	4.176E-02	4.172E-02	4.168E-02	4.164E-02	4.160E-02	4.156E-02	4.152E-02
4.148E-02	4.145E-02	4.141E-02	4.137E-02	4.133E-02	4.129E-02	4.125E-02	4.121E-02	4.117E-02	4.113E-02
4.109E-02	4.106E-02	4.102E-02	4.098E-02	4.094E-02	4.090E-02	4.086E-02	4.082E-02	4.078E-02	4.074E-02
4.070E-02	4.073E-02	4.076E-02	4.078E-02	4.081E-02	4.083E-02	4.086E-02	4.089E-02	4.091E-02	4.094E-02
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4.123E-02	4.125E-02	4.128E-02	4.130E-02	4.133E-02	4.136E-02	4.138E-02	4.141E-02	4.143E-02	4.146E-02
4.149E-02	4.151E-02	4.154E-02	4.156E-02	4.159E-02	4.162E-02	4.164E-02	4.167E-02	4.170E-02	4.172E-02
4.175E-02	4.177E-02	4.180E-02	4.183E-02	4.185E-02	4.188E-02	4.190E-02	4.193E-02	4.196E-02	4.198E-02
4.201E-02	4.203E-02	4.206E-02	4.209E-02	4.211E-02	4.214E-02	4.209E-02	4.205E-02	4.201E-02	4.196E-02
4.192E-02	4.187E-02	4.183E-02	4.179E-02	4.174E-02	4.170E-02	4.166E-02	4.161E-02	4.157E-02	4.152E-02
4.148E-02	4.144E-02	4.139E-02	4.135E-02	4.130E-02	4.126E-02	4.122E-02	4.117E-02	4.113E-02	4.108E-02
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4.060E-02	4.056E-02	4.051E-02	4.047E-02	4.043E-02	4.038E-02	4.034E-02	4.029E-02	4.025E-02	4.021E-02
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3.972E-02	3.968E-02	3.963E-02	3.957E-02	3.952E-02	3.947E-02	3.941E-02	3.936E-02	3.931E-02	3.925E-02
3.920E-02	3.915E-02	3.909E-02	3.904E-02	3.899E-02	3.893E-02	3.888E-02	3.882E-02	3.877E-02	3.872E-02
3.866E-02	3.861E-02	3.856E-02	3.850E-02	3.845E-02	3.840E-02	3.834E-02	3.829E-02	3.824E-02	3.818E-02
3.813E-02	3.808E-02	3.802E-02	3.797E-02	3.792E-02	3.786E-02	3.781E-02	3.776E-02	3.770E-02	3.765E-02
3.759E-02	3.754E-02	3.749E-02	3.743E-02	3.738E-02	3.733E-02	3.727E-02	3.722E-02	3.717E-02	3.711E-02
3.706E-02	3.701E-02	3.695E-02	3.690E-02	3.685E-02	3.679E-02	3.674E-02	3.669E-02	3.673E-02	3.678E-02
3.683E-02	3.688E-02	3.693E-02	3.697E-02	3.702E-02	3.707E-02	3.712E-02	3.717E-02	3.722E-02	3.726E-02
3.731E-02	3.736E-02	3.741E-02	3.746E-02	3.750E-02	3.755E-02	3.760E-02	3.765E-02	3.770E-02	3.775E-02
3.779E-02	3.784E-02	3.789E-02	3.794E-02	3.799E-02	3.803E-02	3.808E-02	3.813E-02	3.818E-02	3.823E-02
3.827E-02	3.832E-02	3.837E-02	3.842E-02	3.847E-02	3.852E-02	3.856E-02	3.861E-02	3.866E-02	3.871E-02
3.876E-02	3.880E-02	3.885E-02	3.890E-02	3.895E-02	3.900E-02	3.905E-02	3.909E-02	3.914E-02	3.919E-02
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3.913E-02	3.908E-02	3.902E-02	3.897E-02	3.892E-02	3.887E-02	3.882E-02	3.877E-02	3.872E-02	3.867E-02
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3.811E-02	3.806E-02	3.801E-02	3.796E-02	3.791E-02	3.786E-02	3.781E-02	3.776E-02	3.771E-02	3.766E-02
3.760E-02	3.755E-02	3.750E-02	3.745E-02	3.740E-02	3.735E-02	3.730E-02	3.725E-02	3.720E-02	3.715E-02
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3.627E-02	3.624E-02	3.621E-02	3.618E-02	3.615E-02	3.612E-02	3.609E-02	3.606E-02	3.603E-02	3.600E-02
3.597E-02	3.594E-02	3.591E-02	3.588E-02	3.585E-02	3.582E-02	3.579E-02	3.576E-02	3.573E-02	3.570E-02
3.567E-02	3.564E-02	3.561E-02	3.559E-02	3.556E-02	3.553E-02	3.550E-02	3.547E-02	3.544E-02	3.541E-02
3.538E-02	3.535E-02	3.532E-02	3.529E-02	3.526E-02	3.523E-02	3.520E-02	3.517E-02	3.514E-02	3.511E-02
3.508E-02	3.505E-02	3.502E-02	3.499E-02	3.496E-02	3.493E-02	3.490E-02	3.487E-02	3.484E-02	3.487E-02
3.491E-02	3.494E-02	3.497E-02	3.500E-02	3.504E-02	3.507E-02	3.510E-02	3.514E-02	3.517E-02	3.520E-02
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3.557E-02	3.560E-02	3.563E-02	3.567E-02	3.570E-02	3.573E-02	3.577E-02	3.580E-02	3.583E-02	3.587E-02
3.590E-02	3.593E-02	3.596E-02	3.600E-02	3.603E-02	3.606E-02	3.610E-02	3.613E-02	3.616E-02	3.620E-02
3.623E-02	3.626E-02	3.630E-02	3.633E-02	3.636E-02	3.640E-02	3.643E-02	3.646E-02	3.649E-02	3.653E-02
3.656E-02	3.659E-02	3.663E-02	3.666E-02	3.669E-02	3.673E-02	3.668E-02	3.663E-02	3.658E-02	3.653E-02
3.648E-02	3.643E-02	3.638E-02	3.634E-02	3.629E-02	3.624E-02	3.619E-02	3.614E-02	3.609E-02	3.604E-02
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3.551E-02	3.546E-02	3.541E-02	3.536E-02	3.531E-02	3.526E-02	3.521E-02	3.516E-02	3.512E-02	3.507E-02
3.502E-02	3.497E-02	3.492E-02	3.487E-02	3.482E-02	3.477E-02	3.473E-02	3.468E-02	3.463E-02	3.458E-02
3.453E-02	3.448E-02	3.443E-02	3.438E-02	3.434E-02	3.429E-02	3.424E-02	3.419E-02	3.414E-02	3.409E-02

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3.254E-02	3.250E-02	3.247E-02	3.243E-02	3.239E-02	3.236E-02	3.232E-02	3.228E-02	3.225E-02	3.221E-02
3.217E-02	3.214E-02	3.210E-02	3.206E-02	3.203E-02	3.199E-02	3.195E-02	3.192E-02	3.188E-02	3.184E-02
3.181E-02	3.177E-02	3.177E-02	3.178E-02	3.178E-02	3.179E-02	3.179E-02	3.179E-02	3.180E-02	3.180E-02
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3.130E-02	3.127E-02	3.123E-02	3.120E-02	3.116E-02	3.113E-02	3.109E-02	3.106E-02	3.102E-02	3.098E-02
3.095E-02	3.091E-02	3.088E-02	3.084E-02	3.081E-02	3.077E-02	3.074E-02	3.070E-02	3.067E-02	3.063E-02
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2.859E-02	2.856E-02	2.853E-02	2.849E-02	2.846E-02	2.843E-02	2.840E-02	2.836E-02	2.833E-02	2.830E-02
2.826E-02	2.823E-02	2.820E-02	2.817E-02	2.813E-02	2.810E-02	2.807E-02	2.804E-02	2.800E-02	2.796E-02
2.792E-02	2.787E-02	2.783E-02	2.779E-02	2.775E-02	2.770E-02	2.766E-02	2.762E-02	2.757E-02	2.753E-02
2.749E-02	2.744E-02	2.740E-02	2.736E-02	2.732E-02	2.727E-02	2.723E-02	2.719E-02	2.714E-02	2.710E-02
2.706E-02	2.701E-02	2.697E-02	2.693E-02	2.689E-02	2.684E-02	2.680E-02	2.676E-02	2.671E-02	2.667E-02
2.663E-02	2.658E-02	2.654E-02	2.650E-02	2.646E-02	2.641E-02	2.637E-02	2.633E-02	2.628E-02	2.624E-02
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2.480E-02	2.478E-02	2.476E-02	2.474E-02	2.472E-02	2.470E-02	2.468E-02	2.466E-02	2.463E-02	2.461E-02
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8.504E-03	8.483E-03	8.462E-03	8.442E-03	8.421E-03	8.400E-03	8.379E-03	8.358E-03	8.338E-03	8.317E-03
8.296E-03	8.275E-03	8.255E-03	8.234E-03	8.213E-03	8.192E-03	8.171E-03	8.151E-03	8.130E-03	8.109E-03
8.088E-03	8.067E-03	8.047E-03	8.026E-03	8.010E-03	7.995E-03	7.979E-03	7.963E-03	7.948E-03	7.932E-03
7.916E-03	7.901E-03	7.885E-03	7.869E-03	7.854E-03	7.838E-03	7.823E-03	7.807E-03	7.791E-03	7.776E-03
7.760E-03	7.744E-03	7.729E-03	7.713E-03	7.697E-03	7.682E-03	7.666E-03	7.651E-03	7.635E-03	7.619E-03
7.604E-03	7.588E-03	7.572E-03	7.557E-03	7.541E-03	7.525E-03	7.510E-03	7.494E-03	7.479E-03	7.463E-03
7.447E-03	7.432E-03	7.416E-03	7.400E-03	7.385E-03	7.369E-03	7.353E-03	7.338E-03	7.322E-03	7.307E-03
7.291E-03	7.275E-03	7.260E-03	7.244E-03	7.228E-03	7.213E-03	7.197E-03	7.181E-03	7.166E-03	7.150E-03
7.135E-03	7.119E-03	7.103E-03	7.088E-03	7.072E-03	7.056E-03	7.041E-03	7.025E-03	7.009E-03	6.994E-03
6.990E-03	6.985E-03	6.981E-03	6.977E-03	6.972E-03	6.968E-03	6.964E-03	6.959E-03	6.955E-03	6.951E-03
6.946E-03	6.942E-03	6.938E-03	6.933E-03	6.929E-03	6.925E-03	6.920E-03	6.916E-03	6.912E-03	6.907E-03
6.903E-03	6.899E-03	6.894E-03	6.890E-03	6.886E-03	6.881E-03	6.877E-03	6.873E-03	6.869E-03	6.864E-03
6.860E-03	6.856E-03	6.851E-03	6.847E-03	6.843E-03	6.838E-03	6.834E-03	6.830E-03	6.825E-03	6.821E-03
6.817E-03	6.812E-03	6.808E-03	6.804E-03	6.799E-03	6.795E-03	6.791E-03	6.786E-03	6.782E-03	6.778E-03
6.773E-03	6.769E-03	6.765E-03	6.761E-03	6.756E-03	6.752E-03	6.748E-03	6.743E-03	6.739E-03	6.735E-03
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6.622E-03	6.616E-03	6.611E-03	6.605E-03	6.599E-03	6.593E-03	6.588E-03	6.582E-03	6.576E-03	6.570E-03
6.565E-03	6.559E-03	6.553E-03	6.547E-03	6.542E-03	6.536E-03	6.530E-03	6.524E-03	6.518E-03	6.513E-03
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6.449E-03	6.444E-03	6.438E-03	6.432E-03	6.426E-03	6.420E-03	6.415E-03	6.409E-03	6.403E-03	6.397E-03
6.392E-03	6.386E-03	6.380E-03	6.374E-03	6.369E-03	6.363E-03	6.357E-03	6.351E-03	6.346E-03	6.340E-03
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4.973E-03	4.938E-03	4.903E-03	4.868E-03	4.834E-03	4.799E-03	4.764E-03	4.729E-03	4.695E-03	4.660E-03
4.625E-03	4.590E-03	4.556E-03	4.521E-03	4.486E-03	4.451E-03	4.417E-03	4.382E-03	4.347E-03	4.312E-03
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3.226E-03	3.190E-03	3.155E-03	3.120E-03	3.085E-03	3.050E-03	3.015E-03	2.979E-03	2.944E-03	2.909E-03
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2.522E-03	2.487E-03	2.452E-03	2.417E-03	2.381E-03	2.346E-03	2.311E-03	2.276E-03	2.241E-03	2.206E-03
2.170E-03	2.135E-03	2.100E-03	2.065E-03	2.030E-03	1.994E-03	1.959E-03	1.924E-03	1.889E-03	1.854E-03
1.819E-03	1.783E-03	1.748E-03	1.713E-03	1.678E-03	1.643E-03	1.618E-03	1.594E-03	1.569E-03	1.545E-03
1.520E-03	1.496E-03	1.471E-03	1.447E-03	1.422E-03	1.398E-03	1.373E-03	1.349E-03	1.324E-03	1.299E-03
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7.846E-04	7.601E-04	7.356E-04	7.110E-04	6.865E-04	6.620E-04	6.375E-04	6.130E-04	5.884E-04	5.639E-04
5.394E-04	5.149E-04	4.904E-04	4.659E-04	4.413E-04	4.168E-04	3.923E-04	3.678E-04	3.433E-04	3.187E-04
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