ENDF/B FISSION
PRODUCT DECAY DATA

P.F. Rose and T.W. Burrows

August 1976

INFORMATION ANALYSIS CENTER REPORT

NATIONAL NEUTRON CROSS SECTION CENTER
BROOKHAVEN NATIONAL LABORATORY
UPTON, NEW YORK 11973
ENDF/B FISSION PRODUCT DECAY DATA

P.F. Rose and T.W. Burrows

August 1976
NOTICE

This report was prepared as an account of work sponsored by the United States Government. Neither the United States nor the United States Energy Research and Development Administration, nor any of their employees, nor any of their contractors, subcontractors, or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness or usefulness of any information, apparatus, product or process disclosed, or represents that its use would not infringe privately owned rights.

Printed in the United States of America
Available from
National Technical Information Service
U.S. Department of Commerce
5285 Port Royal Road
Springfield, VA 22161
Price: Printed Copy $11.75; Microfiche $3.00

March 1977 800 copies
CONTENTS

Introduction ........................................ v
Organization ........................................ vi
Definitions ......................................... ix
References .......................................... ix

Decay Data for the Heavy Mass Isotopes

\[ A = 118 \] ........................................ 407
\[ A = 119 \] ........................................ 417
\[ A = 120 \] ........................................ 423
\[ A = 121 \] ........................................ 431
\[ A = 122 \] ........................................ 437
\[ A = 123 \] ........................................ 443
\[ A = 124 \] ........................................ 450
\[ A = 125 \] ........................................ 456
\[ A = 126 \] ........................................ 468
\[ A = 127 \] ........................................ 475
\[ A = 128 \] ........................................ 489
\[ A = 129 \] ........................................ 500
\[ A = 130 \] ........................................ 512
\[ A = 131 \] ........................................ 520
\[ A = 132 \] ........................................ 534
\[ A = 133 \] ........................................ 547
\[ A = 134 \] ........................................ 563
\[ A = 135 \] ........................................ 582
\[ A = 136 \] ........................................ 599
\[ A = 137 \] ........................................ 602
\[ A = 138 \] ........................................ 611
\[ A = 139 \] ........................................ 622
\[ A = 140 \] ........................................ 633
\[ A = 141 \] ........................................ 643
\[ A = 142 \] ........................................ 654
\[ A = 143 \] ........................................ 665
\[ A = 144 \] ........................................ 674
\[ A = 145 \] ........................................ 685
\[ A = 146 \] ........................................ 693
\[ A = 147 \] ........................................ 701
\[ A = 148 \] ........................................ 711
\[ A = 149 \] ........................................ 721
\[ A = 150 \] ........................................ 731
\[ A = 151 \] ........................................ 736
\[ A = 152 \] ........................................ 746
\[ A = 153 \] ........................................ 757
\[ A = 154 \] ........................................ 765
\[ A = 155 \] ........................................ 771
## CONTENTS

$A = 156.$ .................................................. 776
$A = 157.$ .................................................. 783
$A = 158.$ .................................................. 788
$A = 159.$ .................................................. 792
$A = 160.$ .................................................. 797
$A = 161.$ .................................................. 802
$A = 162.$ .................................................. 807
$A = 163.$ .................................................. 812
$A = 164.$ .................................................. 816
$A = 165.$ .................................................. 820
$A = 166.$ .................................................. 825
$A = 167.$ .................................................. 828
INTRODUCTION

The purpose of this publication is to provide comprehensive radioactive decay data for the fission product nuclides in a convenient book format. Such data, in a concise, easily usable form, are of value in many areas of applied science.

This publication contains selected portions of the Evaluated Nuclear Data File ENDF/B-IV \(^1\), issued in January 1975. It combines information taken from the fission product yield files (\(MT=454\)) and decay data files (\(MT=457\)) of ENDF/B-IV and from cross sections generated by the code INTER from ENDF/B-IV. Half lives, \(Q\)-values, average decay energies, branching ratios, fractional yields, and cross sections are given for the 96 \(A\)-chains comprising the fission product nuclei. Data for the light mass isotopes are contained in Volume 1, and for the heavy mass isotopes, in Volume 2. Sections on calculational techniques and assumptions, file deficiencies and omissions, and also the acknowledgments are included in Volume 1, but not in Volume 2.

ENDF/B-IV is the first version of ENDF/B to contain radioactive decay data and radioactive spectra for a wide range of nuclides. Reich et al.\(^2\) initially established the categories of decay format within which the data were organized. The responsibility for preparing the ENDF fission product file was assigned to a specially designated ad hoc group, the Decay-Heat Task Force, set up under the Fission Product Subcommittee of the Cross Section Evaluation Working Group (CSEWG).

The first publication summarizing the fission product files was that of England and Schenker.\(^3\) It is hoped that the present summary will be of additional use because of its visual, easy-to-read format. Practical limits on size and the uneven quality of data in \(MT=457\) have limited the scope of this report. Doses and ranges for the various radiations, for example, have not been included. However, the additional information produced on conversion-electron, x-ray, fluorescence, and Auger-electron yields will be useful and may reveal some of the possible weaknesses and strengths of the present decay data files. It is hoped that it will also lead to improvements in future versions of ENDF/B.

The authors anticipate that the format changes for decay data and the extended coverage of radionuclides in ENDF/B-V will allow the publication of further reports of this type which may include useful derived data on such quantities as doses. The additional information, which may be available in ENDF/B-V, would also allow the production of \(\beta\)-ray spectra as a function of \(\beta\)-energy.

ENDF/B-V will specifically allow tabulations of total and/or partial internal conversion coefficients. Multiple particle emission will be allowed by using any combination of decay modes. The source of radiation will be specified for spectral lines, and the specification of continuous spectra will be allowed.
ORGANIZATION

The fission product data have been organized by $A$-chains in order of ascending $A$ from $A = 72$ to $A = 167$. Figure 1 shows the basic arrangement of the publication and the configuration of page numbers. Each chain begins with a heading page, which is a simplified decay scheme of the chain that gives only the members, the half-lives, and the modes of decay. These generic schemes are presented in a simple flow-chart format. On looking down the page, it can be seen that the members of the chain are arranged in order of increasing $Z$ and identified by a specific type of box. The parent of the chain is represented by a parallelogram; radioactive members, by a square; and stable members, by an oval. Isomeric states are always to the left of the ground state and are offset in axial location. Only first (metastable) or second (metastable) states have been considered in the files. The decay mode is represented by a labeled arrow. If a decay changes $A$ because of α-decay or neutron emission, the chain diagram is terminated by a circle at the proper axial location. An oval is a normal chain terminator. It contains a stable ($T_{1/2} > 10^{15}$ years) or a long-lived ($T_{1/2} > 10^9$ years) member.

The heading page is followed by more detailed information on the individual members of the chain in order of increasing $Z$ and decreasing metastable state. The detailed information for each member includes the ENDF/B-IV File 1 comments and references if available and applicable to the decay data. To limit redundancy and reduce the size of this publication, certain frequently used references have been omitted. When no reference is listed for a particular data category, it can be assumed that the standard references outlined in Table 1 were used.

Following the comments is a decay scheme of the nuclide tabulating the quantities $T_{1/2}$, $Q$, branching ratio (BR), $\langle E_\gamma \rangle$, $\langle E_\beta \rangle$, and $\langle E_\alpha \rangle$. Uncertainties are given if available in the file. Independent fission yields are given, as well as thermal cross sections and resonance integrals as obtained from ENDF/B-IV. All energies listed in this publication are in keV, and all branching ratios (BR) sum to unity.

If there are spectra in the decay data file, the decay scheme is followed by tables of photon, particle, and characteristic radiation. In the photon radiation table discrete lines are normally listed, except when more than 3 lines are present in a 100-keV energy bin. In this case the photon intensity is summed within the bin, and the mean energy is an intensity-weighted value. A plot of the photon intensities shows all discrete lines.

For cases in which the multipolarities could be obtained from the file the tables also contain information on x-rays, conversion electrons, and Auger electrons. The characteristic radiation table has an arbitrary cutoff of the 20 most intense lines, or 90% of the total intensity. Associated with the photon and particle radiation tables are the appropriate average energies per decay for each type of radiation, including neutrino radiation.
Figure 1. Arrangement of publication and configuration of page numbers.
Table 1

General References for ENDF Fission Product Decay Data

Decay Data


\( Q_{BP}, AWR, Q_{\alpha}, Q_{\beta} \)


\( E_{\beta}, E_{\gamma} \)


\( T_{1/2}, \Delta T_{1/2} \)


Branching Probability

DEFINITIONS

AU
AU_K
AU_L
AU_M
AU_KM
BR
CE
CE_K
CE_L
CE_M
E
E_avg
\langle E \rangle
EC
E_{max}
I
IT
m (or n)
Q
T_{1/2}
X
n
\alpha
\beta
\beta^+
\gamma
\nu
\sigma

Auger electron
Electron emission when a K-shell vacancy is filled from the L shell
Electron emission when an L-shell vacancy is filled from the M shell
Electron emission when an M-shell vacancy is filled from the continuum
Electron emission when a K-shell vacancy is filled from the M shell
Branching ratio (\sum BR_i = 1.0)
Conversion electron
Electron emission from K shell
Electron emission from L shell
Electron emission from M shell
Energy (keV)
Average energy (keV)
Average energy per decay (keV)
Electron capture
Maximum or end-point energy (keV)
Absolute intensity (per 100 decays of parent)
Isomeric transition
Metastable, first isomeric state (or netastable, second isomeric state)
Q-value (keV)
Half-life in s (seconds), h (hours), d (days), or y (years)
X ray; definitions similar to those for the Auger electron
Neutron decay or neutron
Alpha decay or alpha particle
Beta decay or beta particle
Positron decay or positron
Gamma ray
Neutrino
Cross section (barns)

REFERENCES

$^{118}$ Rh

ENDFB-IV FILE 1 COMMENTS
45-RH-118 HLUL
EVAL-APR74 R.E.SCHENTER
DIST-NOV74

REFERENCES
HALF LIFE R SCHENTER, THEORY(9/73)

$^{118}$ Rh

$T_{1/2} = 2.293 s$
$<E_p> PER DECAY = 3478$
$<E_p> PER DECAY = 3218$

FISSION YIELDS
$^{235}$U THERMAL 1.060x10$^{-6}$
$^{235}$U FAST 4.610x10$^{-6}$
$^{239}$U FAST 1.577x10$^{-4}$
$^{239}$Pu THERMAL 1.319x10$^{-6}$

$Q$ $=$ 10230.
$BR_y$ $=$ 1.000

$^{110}$ Pd

3.14.3s

$^{118}$ Ag

$^{118}$ Pd

ENDFB-IV FILE 1 COMMENTS
46-PD-118 HEDL
EVAL-APR74 R.E.SCHENTER
DIST-NOV74

$^{110}$ Pd

$T_{1/2} = 3.14.3 s$
$<E_p> PER DECAY = 1058$
$<E_p> PER DECAY = 1206$

FISSION YIELDS
$^{235}$U THERMAL 3.486x10$^{-5}$
$^{235}$U FAST 1.436x10$^{-4}$
$^{239}$U FAST 1.687x10$^{-4}$
$^{239}$Pu THERMAL 8.420x10$^{-5}$

$Q$ $=$ 3600.
$BR_y$ $=$ 1.5000

$^{118}$ Ag

$Q$ $=$ 3850.
$BR_y$ $=$ 1.5000

$^{118}$ - 46-1
\[ ^{118}\text{Ag} \]

ENDF/B-IV FILE 1
COMMENTS
47-AG-118 M Hedl
EVAL-APR74 R.E. Schenter
DIST-NOV74
REFERENCES
HIT-F. SCHENTER, THEORY(9/73)

\[ ^{118}\text{Ag} \]

\[ T_{1/2} = 2.000 \ \text{s} \]
\[ <E_p> \ \text{PER DECAY} = 235.9 \]
\[ <E_\gamma> \ \text{PER DECAY} = 199.3 \]

FISSION YIELDS
\[ ^{235}\text{U} \ \text{THERMAL} \ 5.5250 \times 10^{-5} \]
\[ ^{235}\text{U} \ \text{FAST} \ 8.1933 \times 10^{-5} \]
\[ ^{239}\text{Pu} \ \text{THERMAL} \ 9.1637 \times 10^{-5} \]

\[ Q_p = 7250 \]
\[ BR_p = 1.000 \]

\[ 50.30 \text{m} \]

\[ 118 \text{m} \ - \ 47 \ - \ 1 \]

\[ ^{118}\text{Ag} \]

ENDF/B-IV FILE 1
COMMENTS
47-AG-118 M Hedl
EVAL-APR74 R.E. Schenter
DIST-NOV74
REFERENCES
HIT-F. SCHENTER, THEORY(9/73)

\[ ^{118}\text{Ag} \]

\[ T_{1/2} = 2.000 \ \text{s} \]
\[ <E_p> \ \text{PER DECAY} = 235.9 \]
\[ <E_\gamma> \ \text{PER DECAY} = 199.3 \]

FISSION YIELDS
\[ ^{235}\text{U} \ \text{THERMAL} \ 5.5250 \times 10^{-5} \]
\[ ^{235}\text{U} \ \text{FAST} \ 8.1933 \times 10^{-5} \]
\[ ^{239}\text{Pu} \ \text{THERMAL} \ 9.1637 \times 10^{-5} \]

\[ Q_p = 7250 \]
\[ BR_p = 1.000 \]

\[ 50.30 \text{m} \]

\[ 118 \text{m} \ - \ 47 \ - \ 1 \]
$^{118m}$Cd

ENDF/B-IV FILE 1 COMMENTS
4A-20-178 HEOL
EVAL-APR74, R.E. SCHENTER
DIST-NOV74

$^{118m}$Cd

$T_{1/2} = 50.3m$ 
\( \langle E_\gamma \rangle \) PER DECAY = 212.6 
\( \langle E_\beta \rangle \) PER DECAY = 226.8 

Fission Yields

$^{235}$U THERMAL $6.6647 \times 10^{-8}$
$^{235}$U FAST $3.1945 \times 10^{-5}$
$^{238}$U FAST $3.3097 \times 10^{-5}$
$^{239}$Pu THERMAL $6.9970 \times 10^{-5}$

$Q_{\gamma} = 800.0$
$BR_{\gamma} = 1.000$

$^{118}$In

$Q_{\beta} = 8.500$
$\langle E_\beta \rangle$ PER DECAY = 250.0

$Q_{\beta} = 250.0$
$BR_{\beta} = 1.000$

$^{118m}$In

$Q_{\gamma} = 5.000$

$^{118m}$In

$Q_{\gamma} = 5.000$

$^{118n} = 49 - 1$
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Mean Energy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>528.2</td>
<td>1</td>
<td>4.500</td>
</tr>
<tr>
<td>826.9</td>
<td>1</td>
<td>1.200</td>
</tr>
<tr>
<td>1230.</td>
<td>1</td>
<td>15.00</td>
</tr>
</tbody>
</table>

\(<E_{\text{photon}}\) PER DECAY = 218.1

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>(E_{\text{max}})</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\phi)</td>
<td>2970.3</td>
<td>1260.</td>
<td>15.00</td>
</tr>
<tr>
<td>(\beta)</td>
<td>4200.0</td>
<td>1868.6</td>
<td>85.00</td>
</tr>
</tbody>
</table>

\(<E_{\text{p}}\) PER DECAY = 1776.

\(<E_{\text{p}}\) PER DECAY = 2249.

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\phi)</td>
<td>4200.</td>
<td>85.00</td>
</tr>
<tr>
<td>(\gamma)</td>
<td>1230.</td>
<td>15.00</td>
</tr>
</tbody>
</table>
ENDF/B-IV FILE 1 COMMENTS
49-IN-118 ANC
EVAL-IE874 C.W.REICH
DIST-NDV7
FOR FILE DESCRIPTION SEE C.W.REICH, RG HELMER AND ANH PUTMAN,
ANCR-1157, ENDF/B-IV, 1974.
REFERENCE
G-1973 WAPSTRA-GOVE MASTABLE

**ln**

<table>
<thead>
<tr>
<th>$T_1/2$</th>
<th>$\tau_\alpha$</th>
<th>$\lambda_{\beta}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$6.500$</td>
<td>$629.5$</td>
<td>$2576$</td>
</tr>
</tbody>
</table>

**Fission Yields**

- $^{235}$U THERMAL: $2.7615 \times 10^{-4}$
- $^{235}$U FAST: $9.5816 \times 10^{-8}$
- $^{239}$Pu THERMAL: $4.3894 \times 10^{-7}$

$Q_{\beta} = 4200.4300$
$\beta_{\beta} = 1.000$

**On**

- STABLE OR LONG-LIVED

---

118 - 49 - 1
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Mean Energy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>208.6</td>
<td>1</td>
<td>2.391</td>
</tr>
<tr>
<td>230.0</td>
<td>1</td>
<td>1.8215</td>
</tr>
<tr>
<td>445.8</td>
<td>1</td>
<td>5.368</td>
</tr>
<tr>
<td>474.4</td>
<td>1</td>
<td>2.830</td>
</tr>
<tr>
<td>569.2</td>
<td>1</td>
<td>3.278</td>
</tr>
<tr>
<td>637.3</td>
<td>1</td>
<td>5.286</td>
</tr>
<tr>
<td>683.3</td>
<td>1</td>
<td>52.03</td>
</tr>
<tr>
<td>813.7</td>
<td>1</td>
<td>5.104</td>
</tr>
<tr>
<td>1051.</td>
<td>1</td>
<td>77.59</td>
</tr>
<tr>
<td>1097.</td>
<td>1</td>
<td>5.195</td>
</tr>
<tr>
<td>1175.</td>
<td>1</td>
<td>1.187</td>
</tr>
<tr>
<td>1230.</td>
<td>1</td>
<td>91.28</td>
</tr>
<tr>
<td>1250.</td>
<td>1</td>
<td>3.651</td>
</tr>
<tr>
<td>1504.</td>
<td>1</td>
<td>3.8215</td>
</tr>
<tr>
<td>1775.</td>
<td>1</td>
<td>4.4564</td>
</tr>
<tr>
<td>2042.</td>
<td>1</td>
<td>3.195</td>
</tr>
<tr>
<td>2325.</td>
<td>1</td>
<td>1.826</td>
</tr>
</tbody>
</table>

\( \langle \text{Photon} \rangle \text{ per decay} = 2576. \)

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>E_max</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>β-</td>
<td>1540.0</td>
<td>499.7</td>
<td>53.00</td>
</tr>
<tr>
<td>β-</td>
<td>1530.0</td>
<td>593.8</td>
<td>2.00</td>
</tr>
<tr>
<td>β-</td>
<td>1820.0</td>
<td>717.6</td>
<td>13.00</td>
</tr>
<tr>
<td>β-</td>
<td>2020.0</td>
<td>810.8</td>
<td>32.00</td>
</tr>
</tbody>
</table>

\( \langle E_p \rangle \text{ per decay} = 629.5 \)

\( \langle E_p \rangle \text{ per decay} = 994.7 \)

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy</th>
<th>1/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>γ</td>
<td>1230</td>
<td>91.28</td>
</tr>
<tr>
<td>γ</td>
<td>1051</td>
<td>77.59</td>
</tr>
<tr>
<td>δ-</td>
<td>1540</td>
<td>53.00</td>
</tr>
<tr>
<td>γ</td>
<td>683.3</td>
<td>52.03</td>
</tr>
<tr>
<td><strong>$^{118}$Sn</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>$^{118}$Sn</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>STABLE OR LONG-LIVED</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CROSS SECTIONS (BARNES)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL CROSS SECTIONS</strong></td>
<td>4.183</td>
<td></td>
</tr>
<tr>
<td>WESTCOTT G FACTOR</td>
<td>1.1258</td>
<td></td>
</tr>
<tr>
<td><strong>CAPTURE 22009/e</strong></td>
<td>8.4254x10^-2</td>
<td></td>
</tr>
<tr>
<td>WESTCOTT G FACTOR</td>
<td>9.9881x10^-1</td>
<td></td>
</tr>
<tr>
<td>RESONANCE INTEGRAL TOTAL</td>
<td>1.0770x10^-2</td>
<td></td>
</tr>
<tr>
<td>RESONANCE INTEGRAL CAPTURE</td>
<td>6.2510</td>
<td></td>
</tr>
<tr>
<td><strong>FISSION YIELDS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>$^{239}$Pu THERMAL</strong></td>
<td>1.2198x10^-9</td>
<td></td>
</tr>
</tbody>
</table>
$^{119}$ Ru

ENDF/B-IV FILE 1 COMMENTS

46-RU-119 HDL
EVAL-AP74 R.E.SCHENTER
DIST-NOV74

REFERENCES
HALF LIFE=R SCHENTER, THEORY(9/73)

$^{119}$ Ru

$T_{1/2} = 1.771 s$

$<E_x> \text{ PER DECAY} = 3075.$

$<E_y> \text{ PER DECAY} = 3490.$

$Q_x = 9640.$
$BR_x = 1.000$

$^{119}$ Rh

$T_{1/2} = 4.4475 s$

$Q_x = 8120.$
$BR_x = 1.000$

$^{119}$ Os

$Q_x = 1.712 s$

$^{119}$ Os

ENDF/B-IV FILE 1 COMMENTS

45-RH-119 HDL
EVAL-AP74 R.E.SCHENTER
DIST-NOV74

REFERENCES
HALF LIFE=R SCHENTER, THEORY(9/73)

$^{119}$ Rh

$T_{1/2} = 4.4475 s$

$<E_x> \text{ PER DECAY} = 2562.$

$<E_y> \text{ PER DECAY} = 2754.$

FISSION YIELDS

$^{235}\text{U THERMAL} = 7.2612 \times 10^{-7}$

$^{235}\text{U FAST} = 1.6913 \times 10^{-7}$

$^{234}\text{U FAST} = 1.0609 \times 10^{-5}$

$^{238}\text{Pu THERMAL} = 8.0689 \times 10^{-6}$

$Q_x = 8120.$
$BR_x = 1.000$

$^{119}$ Os
119 Pd

ENDF/B-IV FILE 1 COMMENTS
46-PD-119 HEDL EVAL-APR74 R.E.SCHENTER
DIST-NOV74

REFERENCES
HALF LIFE-R SCHENTER,THEORY(9/73)

119 Pd

T_{1/2} = 1.712 s
\langle E_p \rangle PER DECAY = 2110
\langle E_p \rangle PER DECAY = 2173

FISSION YIELDS

235U THERMAL
2.0322\times 10^{-5}

235U FAST
6.6853\times 10^{-5}

234U THERMAL
1.9108\times 10^{-4}

234U THERMAL
1.7608\times 10^{-4}

Q_{\alpha} = 6830
BR_{\alpha} = 1.000

117 Ag

6.09±1.04

119 - 46-

119 Ag

ENDF/B-IV FILE 1 COMMENTS
47-AG-119 HEDL EVAL-APR74 R.E.SCHENTER
DIST-NOV74

119 Ag

T_{1/2} = 6.041 s
\langle E_p \rangle PER DECAY = 1592
\langle E_p \rangle PER DECAY = 1588

FISSION YIELDS

235U THERMAL
6.0003\times 10^{-5}

235U FAST
1.8194\times 10^{-4}

234U FAST
1.3223\times 10^{-4}

234U THERMAL
1.4519\times 10^{-4}

Q_{\alpha} = 5190
BR_{\alpha} = 0.5000

Q_{\beta} = 3440
BR_{\beta} = 0.5000

119 - 47-

110 Ca

3.200 m

118 Cd

9.400 m
119m\textsuperscript{Cd}

ENDF/B-IV FILE 1 COMMENTS
48-CD-119M HEDL EVAL-APR74 R.E. SCHENTER
DIST-NOV74

REFERENCES
CIT-R SCHENTER, THEORY (7/73)

\begin{align*}
119m\textsuperscript{Cd} & \quad T_{1/2} = 3.200 \text{ m}.
\end{align*}

\begin{align*}
\langle E_g \rangle & \quad \text{PER DECAY} = 1.240, \\
\langle E_p \rangle & \quad \text{PER DECAY} = 1.015, \\
\end{align*}

FISSION YIELDS
\begin{align*}
235\text{U THERMAL} & \quad 1.542 \times 10^{-5} \\
235\text{U FAST} & \quad 4.3297 \times 10^{-5} \\
239\text{U FAST} & \quad 7.6493 \times 10^{-6} \\
239\text{Pu THERMAL} & \quad 1.0119 \times 10^{-5} \\
\end{align*}

\begin{align*}
Q & = 3750, \\
BR & = 0.5000 \\
\end{align*}

119m\textsuperscript{Cd}

ENDF/B-IV FILE 1 COMMENTS
48-CD-110 HEDL EVAL-APR74 R.E. SCHENTER
DIST-NOV74

\begin{align*}
119m\textsuperscript{Cd} & \quad T_{1/2} = 9.400 \text{ m}.
\end{align*}

\begin{align*}
\langle E_g \rangle & \quad \text{PER DECAY} = 940.1, \\
\langle E_p \rangle & \quad \text{PER DECAY} = 910.2, \\
\end{align*}

FISSION YIELDS
\begin{align*}
235\text{U THERMAL} & \quad 1.542 \times 10^{-5} \\
239\text{U THERMAL} & \quad 4.3297 \times 10^{-5} \\
239\text{U FAST} & \quad 7.6493 \times 10^{-6} \\
239\text{Pu THERMAL} & \quad 1.0119 \times 10^{-5} \\
\end{align*}

\begin{align*}
Q & = 3250, \\
BR & = 1.0000 \\
\end{align*}

119 - 48-1
ENDF/B-V FILE 1 COMMENTS
49-IN-119M HEU
EVAL-APR74 R.E.SCHENTER
DIST-NOV74

REFERENCES
GIT-R SCHENTER, THEORY (9/73)

\[ T_{1/2} = 18.0 \text{yr} \]
\[ \langle E_d \rangle \text{ PER DECAY } = 732.1 \]
\[ \langle E_f \rangle \text{ PER DECAY } = 693.1 \]

FISSION YIELDS

\[ ^{235}\text{U THERMAL} \quad 2.7315 \times 10^{-7} \]
\[ ^{235}\text{U FAST} \quad 7.0311 \times 10^{-7} \]
\[ ^{238}\text{U FAST} \quad 2.5408 \times 10^{-8} \]
\[ ^{239}\text{Pu THERMAL} \quad 4.1594 \times 10^{-8} \]

\[ Q_0 = 2750.0 \]
\[ BR_y = 7.9500 \]

\[ Q_{11} = 250.0 \]
\[ BR_{11} = 0.0500 \]

\[ ^{118}\text{Sn} \]
STABLE OR LONG-LIVED

\[ ^{118}\text{In} \]

\[ T_{1/2} = 2.500 \text{min} \]
\[ \langle E_d \rangle \text{ PER DECAY } = 99.3 \]
\[ \langle E_f \rangle \text{ PER DECAY } = 630.1 \]

FISSION YIELDS

\[ ^{235}\text{U THERMAL} \quad 2.7515 \times 10^{-7} \]
\[ ^{235}\text{U FAST} \quad 7.0511 \times 10^{-7} \]
\[ ^{238}\text{U FAST} \quad 2.5498 \times 10^{-8} \]
\[ ^{239}\text{Pu THERMAL} \quad 4.1594 \times 10^{-8} \]

\[ Q_0 = 2411.0 \]
\[ BR_y = 5.0500 \]

\[ Q_{11} = 250.0 \]
\[ BR_{11} = 0.9500 \]

\[ ^{119}\text{Sn} \]

\[ ^{119}\text{In} \]

\[ T_{1/2} = 1.25 \text{min} \]

\[ ^{119}\text{In} \]

\[ Q_0 = 2411.0 \]
\[ BR_y = 5.0500 \]

\[ ^{119}\text{Sn} \]
STABLE OR LONG-LIVED

119-49-1
<table>
<thead>
<tr>
<th>Isotope</th>
<th>Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>$^{118}$Sn</td>
<td>$T_{1/2} = 6708$ y, $&lt;E_y&gt; \text{ per decay} = 89.00$</td>
</tr>
<tr>
<td>$^{118}$Sn</td>
<td>Fission Yields $^{235}$U Fast $1.2802 \times 10^{-2}$</td>
</tr>
</tbody>
</table>

| $^{119}$Sn | $Q_{IF} = 89.00$ |
| $^{119}$Sn | $BR_{11} = 1.0000$ |

| $^{119}$Sn | Stable or Long-Lived |

| $^{119m}$Sn, $^{50-1}$ |

| $^{120}$Sn | Stable or Long-Lived |

| $^{120}$Sn | Cross Sections (Barns) |
| $^{120}$Sn | Total $2200$V/$s = 6.7049$ |
| $^{120}$Sn | Westcott G Factor $1.0942$ |
| $^{120}$Sn | Capture $2200$V/$s = 2.2998$ |
| $^{120}$Sn | Westcott G Factor $1.0286$ |
| $^{120}$Sn | Resonance Integral Total $9.9770 \times 10^{-1}$ |
| $^{120}$Sn | Resonance Integral Capture $3.9210$ |
| $^{120}$Sn | Fission Yields $^{235}$U Fast $1.2802 \times 10^{-2}$ |

| $^{120m}$Sn, $^{50-1}$ |
$^{120}$ Ru

44-RU-120 MHD
EVAL-ADP74 R.E. SCHENTER
DIST-NOV74

REFERENCES
HALF LIFE—R SCHENTER, THEORY (9/73)

$^{120}$ Ru

$T_{1/2} = 2.932 \times 10^7$

$\langle E_p \rangle$ PER DECAY = 2338.

$\langle E_y \rangle$ PER DECAY = 2962.

FISSION YIELDS

$^{235}U$ FAST $= 0.7394 \times 10^{-9}$

$G \rho = 7760.$

$\beta^{42} = 1.000

$^{120}$ Rh

$T_{1/2} = 1.624 \times 10^7$

$\langle E_p \rangle$ PER DECAY = 3667.

$\langle E_y \rangle$ PER DECAY = 3697.

FISSION YIELDS

$^{235}U$ THERMAL $= 2.8716 \times 10^{-2}$

$^{235}U$ FAST $= 1.1102 \times 10^{-7}$

$^{239}U$ FAST $= 2.1998 \times 10^{-4}$

$^{239}Pu$ THERMAL $= 1.6698 \times 10^{-4}$

$G \rho = 11070.$

$\beta^{42} = 1.000

$^{120}$ Pa

$T_{1/2} = 4.272 \times 10^7$

$120 - 45 - 1$
$^{129}$ Pd

ENDF/B-IV FILE 1 COMMENTS
46-PO-120 HECL EVAL-APR74 R.E.SCHENTER DIST-NOV74
REFERENCES
HALF-LIFE=R. SCHENTER, THEORY(67/73)

- $^{129}$ Pd
  - $T_{1/2} = 4.272\,\text{s}$
  - $\langle E_p \rangle_{\text{PER DECAY}} = 1237\,\text{eV}$
  - $\langle E_\gamma \rangle_{\text{PER DECAY}} = 1614\,\text{eV}$
  - FISSION YIELDS
    - $^{233}$U THERMAL $6.883 \times 10^{-6}$
    - $^{235}$U FAST $2.571 \times 10^{-5}$
    - $^{239}$U FAST $1.572 \times 10^{-5}$
    - $^{239}$Pu THERMAL $7.3196 \times 10^{-6}$

- $Q_\alpha = 6690$
  - $W_{\alpha\nu} = 1\,\text{keV}$

- $^{130}$ Ag
  - $1.34\%$

120 - 46 - 1

$^{129}$ Ag

ENDF/B-IV FILE 1 COMMENTS
47-AG-120 HECL EVAL-APR74 R.E.SCHENTER DIST-NOV74

- $^{129}$ Ag
  - $T_{1/2} = 1.34\%$
  - $\langle E_p \rangle_{\text{PER DECAY}} = 2725\,\text{eV}$
  - $\langle E_\gamma \rangle_{\text{PER DECAY}} = 2449\,\text{eV}$
  - FISSION YIELDS
    - $^{233}$U THERMAL $6.4999 \times 10^{-4}$
    - $^{235}$U FAST $1.5143 \times 10^{-6}$
    - $^{239}$U FAST $1.8164 \times 10^{-4}$
    - $^{239}$Pu THERMAL $1.014 \times 10^{-6}$

- $Q_\alpha = 8350$
  - $W_{\alpha\nu} = 1\,\text{keV}$

- $^{130}$ Cd
  - 50.80 ± 0.20 s
$^{126}$ Cd

ENDF/B-IV FILE 1 COMMENTS
48-CD-120 HEDL
EVAL-APR74 R.E. SCHENTER
DIST-NOV74

$T_{1/2} = 50.80 \pm 0.20 s$
$<E_p^2>$ PER DECAY $= 444.9$
$<E_p>$ PER DECAY $= 303.0$

FISSION YIELDS

235U THERMAL $5.486 \times 10^{-6}$
235U FAST $1.631 \times 10^{-4}$
238U THERMAL $4.926 \times 10^{-5}$
239Pu THERMAL $2.216 \times 10^{-4}$

$Q_p = 1530$
$Q_p = 1780$
$BR_p = 3000$

$^{125}$ In

2.90 $\pm 1.0 s$

$^{124}$ In

120 - 48 - 1

$^{126}$ In

ENDF/B-IV FILE 1 COMMENTS
49-IN-120M ANC
EVAL-FEB74 C.W. REICH
DIST-NOV74
FOR FILE DESCRIPTION SEE C.W. REICH, RG HELMER AND MH PUTMAN,
ANCR-1157, ENDF/B10.8/74.
REFERENCE
Q-J. KANTELE AND M. KARRAS, PHYS. REV. 135, 89 (1964)

$T_{1/2} = 2.90 \pm 1.0 s$
$<E_p^2>$ PER DECAY $= 2471$
$<E_p>$ PER DECAY $= 175.7$

FISSION YIELDS

235U THERMAL $1.310 \times 10^{-6}$
235U FAST $3.290 \times 10^{-6}$
239U THERMAL $2.149 \times 10^{-7}$
239Pu THERMAL $9.688 \times 10^{-6}$

$Q_p = 5400 \pm 600$
$BR_p = 1.000$

$^{125}$ Sn
STABLE OR LONG-LIVED

120 - 49 - 1
## Photon Radiation Table

<table>
<thead>
<tr>
<th>Mean Energy Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>172.</td>
<td>15.00</td>
</tr>
</tbody>
</table>

\( \langle E_{\text{Photon}} \rangle \) per decay = 175.7

## Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>( E_{\text{max}} )</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \beta^- )</td>
<td>4430.0</td>
<td>1979.</td>
<td>15.00</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>5600.0</td>
<td>2558.</td>
<td>85.00</td>
</tr>
</tbody>
</table>

\( \langle E_{\beta^-} \rangle \) per decay = 2471.

\( \langle E_{\beta^-} \rangle \) per decay = 2953.

## Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy</th>
<th>1/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \beta^- )</td>
<td>5600.</td>
<td>85.00</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>1172.</td>
<td>15.00</td>
</tr>
</tbody>
</table>
\[ \begin{align*} 
\text{In} & \\
49: \text{In-120} & \text{Anc} \\
\text{Eval-Feb74 C.W.Reich} & \text{Decay Data} \\
\text{Dist-Nov74} & \\
\text{For file description see K.W.Reich,GC Helmer and MH Putman.} \\
\text{ANCR-1157,ENDF/B-IV,8/74.} \\
\text{Reference} & \\
D.J. Kantele and M. Karras, \text{Phys. Rev. 135, A9 (1964).} \\
\end{align*} \]
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Mean Energy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>89.90</td>
<td>1</td>
<td>6.500</td>
</tr>
<tr>
<td>177.5</td>
<td>1</td>
<td>3.600</td>
</tr>
<tr>
<td>147.5</td>
<td>1</td>
<td>8.150</td>
</tr>
<tr>
<td>263.1</td>
<td>1</td>
<td>1.550</td>
</tr>
<tr>
<td>354.7</td>
<td>1</td>
<td>1.040</td>
</tr>
<tr>
<td>454.3</td>
<td>4</td>
<td>5.000</td>
</tr>
<tr>
<td>545.6</td>
<td>1</td>
<td>1.600</td>
</tr>
<tr>
<td>592.2</td>
<td>1</td>
<td>1.500</td>
</tr>
<tr>
<td>610.0</td>
<td>1</td>
<td>1.500</td>
</tr>
<tr>
<td>637.2</td>
<td>1</td>
<td>1.600</td>
</tr>
<tr>
<td>697.0</td>
<td>1</td>
<td>1.850</td>
</tr>
<tr>
<td>732.8</td>
<td>1</td>
<td>2.500</td>
</tr>
<tr>
<td>713.5</td>
<td>1</td>
<td>7.100</td>
</tr>
<tr>
<td>863.8</td>
<td>1</td>
<td>31.00</td>
</tr>
<tr>
<td>925.0</td>
<td>1</td>
<td>1.500</td>
</tr>
<tr>
<td>965.0</td>
<td>1</td>
<td>8.150</td>
</tr>
<tr>
<td>985.7</td>
<td>1</td>
<td>2.450</td>
</tr>
<tr>
<td>1023.</td>
<td>1</td>
<td>62.00</td>
</tr>
<tr>
<td>1103.</td>
<td>1</td>
<td>2.000</td>
</tr>
<tr>
<td>1172.</td>
<td>1</td>
<td>100.0</td>
</tr>
<tr>
<td>1184.</td>
<td>1</td>
<td>2.700</td>
</tr>
<tr>
<td>1234.</td>
<td>1</td>
<td>1.300</td>
</tr>
<tr>
<td>1245.</td>
<td>1</td>
<td>11.10</td>
</tr>
<tr>
<td>1472.</td>
<td>1</td>
<td>4.500</td>
</tr>
<tr>
<td>1886.</td>
<td>1</td>
<td>4.000</td>
</tr>
<tr>
<td>2097.</td>
<td>1</td>
<td>6.500</td>
</tr>
<tr>
<td>2097.</td>
<td>1</td>
<td>1.200</td>
</tr>
<tr>
<td>2178.</td>
<td>1</td>
<td>2.500</td>
</tr>
<tr>
<td>2267.</td>
<td>1</td>
<td>1.400</td>
</tr>
<tr>
<td>2355.</td>
<td>1</td>
<td>9.900</td>
</tr>
<tr>
<td>2420.</td>
<td>1</td>
<td>9.900</td>
</tr>
<tr>
<td>2605.</td>
<td>1</td>
<td>2.000</td>
</tr>
</tbody>
</table>

\( <\text{Photons per Decay} = 3060.\)

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>( E_{\text{Max}} )</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \gamma )</td>
<td>1500.0</td>
<td>571.2</td>
<td>7.300</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>1750.0</td>
<td>655.5</td>
<td>1.100</td>
</tr>
<tr>
<td>( \alpha^- )</td>
<td>1900.0</td>
<td>754.7</td>
<td>3.650</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>2100.0</td>
<td>848.6</td>
<td>7.000</td>
</tr>
<tr>
<td>( \alpha^- )</td>
<td>2250.0</td>
<td>919.2</td>
<td>48.00</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>2700.0</td>
<td>1134.</td>
<td>7.000</td>
</tr>
<tr>
<td>( \alpha^- )</td>
<td>3100.0</td>
<td>1328.</td>
<td>31.00</td>
</tr>
</tbody>
</table>

\( <E_{\gamma} \text{ per Decay} = 1039. \)

\( <E_{\alpha^-} \text{ per Decay} = 1459. \)
<table>
<thead>
<tr>
<th>Stable or Long-Lived</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cross Sections (Barns)</strong></td>
<td></td>
</tr>
<tr>
<td>α Total Z200MeV/s</td>
<td>4.5286</td>
</tr>
<tr>
<td>Westcott G Factor</td>
<td>1.7255</td>
</tr>
<tr>
<td>α Capture 2200MeV/s</td>
<td>1.4108 x 10^-1</td>
</tr>
<tr>
<td>Westcott G Factor</td>
<td>1.0383</td>
</tr>
<tr>
<td>Resonance Integral Total</td>
<td>8.8460 x 10^-4</td>
</tr>
<tr>
<td>Resonance Integral Capture</td>
<td>1.2950</td>
</tr>
<tr>
<td>Fission Yields</td>
<td></td>
</tr>
<tr>
<td>235U Thermal</td>
<td>1.4306 x 10^-8</td>
</tr>
<tr>
<td>235U Fast</td>
<td>3.2305 x 10^-8</td>
</tr>
<tr>
<td>239Pu Thermal</td>
<td>2.2097 x 10^-7</td>
</tr>
<tr>
<td>Isotope</td>
<td>ENDF/B-IV File 1 Comments</td>
</tr>
<tr>
<td>---------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>121 Rh</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$\langle E_g \rangle$ PER DECAY $= 5094$</td>
</tr>
<tr>
<td></td>
<td>$\langle E_f \rangle$ PER DECAY $= 3305$</td>
</tr>
<tr>
<td></td>
<td>Fission Yields</td>
</tr>
<tr>
<td></td>
<td>$^{235\text{U}}$ Thermal</td>
</tr>
<tr>
<td></td>
<td>$^{235\text{U}}$ Fast</td>
</tr>
<tr>
<td></td>
<td>$^{239\text{Pu}}$ Fast</td>
</tr>
</tbody>
</table>

$Q_{\text{f}} = 9190$

$E_{\text{in}} = 1.000$

---

<table>
<thead>
<tr>
<th>Isotope</th>
<th>ENDF/B-IV File 1 Comments</th>
<th>References</th>
<th>Half Life</th>
<th>Theory (973)</th>
</tr>
</thead>
<tbody>
<tr>
<td>121 Pd</td>
<td></td>
<td></td>
<td>0.6227s</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$\langle E_g \rangle$ PER DECAY $= 2340$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$\langle E_f \rangle$ PER DECAY $= 2619$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fission Yields</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$^{231\text{U}}$ Thermal</td>
<td></td>
<td>1.9711 x 10^{-4}</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$^{231\text{U}}$ Fast</td>
<td></td>
<td>5.8710 x 10^{-4}</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$^{233\text{U}}$ Fast</td>
<td></td>
<td>5.8848 x 10^{-3}</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$^{239\text{Pu}}$ Thermal</td>
<td></td>
<td>1.2298 x 10^{-4}</td>
<td></td>
</tr>
</tbody>
</table>

$Q_{\text{f}} = 7650$

$E_{\text{in}} = 1.000$

---

<table>
<thead>
<tr>
<th>Isotope</th>
<th>ENDF/B-IV File 1 Comments</th>
<th>References</th>
<th>Half Life</th>
<th>Theory (973)</th>
</tr>
</thead>
<tbody>
<tr>
<td>121 Ag</td>
<td></td>
<td></td>
<td>3.000s</td>
<td></td>
</tr>
</tbody>
</table>

121 - 46 - 1
\[ \text{Ag} \]

ENDF/B-V FILE 1 COMMENTS
47-AG-121 NEDL EVAL-APR74 R.E.SCHENTER
DIST-NOV74

\[ \text{Ag} \]

- \( T_\text{f} = 3.000 \text{s} \)
- \( <E> \text{ PER DECAY} = 1.879 \)
- \( <E> \text{ PER DECAY} = 1.983 \)

FISSION YIELDS
- \( ^{235}\text{U} \text{ THERMAL} \quad 3.2558 \times 10^{-5} \)
- \( ^{235}\text{U} \text{ FAST} \quad 9.3255 \times 10^{-5} \)
- \( ^{238}\text{U} \text{ FAST} \quad 1.6922 \times 10^{-4} \)
- \( ^{239}\text{Pu} \text{ THERMAL} \quad 4.4924 \times 10^{-5} \)

- \( B_{\mu} = 6210 \)
- \( B_{\mu} = 1.000 \)

\[ \text{Cd} \]

- \( 12.340 \text{ A } \)

\[ 121 = 47-1 \]

\[ \text{Cd} \]

ENDF/B-V FILE 1 COMMENTS
48-CO-121 NEDL EVAL-APR74 R.E.SCHENTER
DIST-NOV74

\[ \text{Cd} \]

- \( T_\text{f} = 12.340 \text{ A } \)
- \( <E> \text{ PER DECAY} = 1.391 \)
- \( <E> \text{ PER DECAY} = 1.604 \)

FISSION YIELDS
- \( ^{235}\text{U} \text{ THERMAL} \quad 8.1822 \times 10^{-3} \)
- \( ^{235}\text{U} \text{ FAST} \quad 2.3079 \times 10^{-4} \)
- \( ^{238}\text{U} \text{ FAST} \quad 1.1483 \times 10^{-4} \)
- \( ^{239}\text{Pu} \text{ THERMAL} \quad 2.6496 \times 10^{-4} \)

- \( B_{\mu} = 4500 \)
- \( B_{\mu} = 1.7800 \)
- \( B_{\mu} = 0.8200 \)
- \( B_{\mu} = 4750 \)

\[ 121 = 48-1 \]
121 min

ENDF/B-IV FILE 1 COMMENTS
49-IN-121 HEDL EVAL-APR76 R.E. SCHENTER DIST-NOV76
REFERENCES
DIT-A SCHENTER, THEORY(973)

T_{1/2} = 3.500 s

\langle E_x \rangle PER DECAY = 1091.

\langle E_y \rangle PER DECAY = 1012.

FISSION YIELDS

\text{\textsuperscript{235}}U THERMAL 7.973 x 10^{-3}

\text{\textsuperscript{235}}U FAST 1.542 x 10^{-3}

\text{\textsuperscript{239}}U THERMAL 1.220 x 10^{-3}

\text{\textsuperscript{239}}U THERMAL 2.669 x 10^{-3}

G_y = 3600.

BR_{g} = 1.000

1/3 Sn

26.80 h

121 min - 49 - 1

1/3 In

ENDF/B-IV FILE 1 COMMENTS
49-IN-121 HEDL EVAL-APR76 R.E. SCHENTER DIST-NOV76

T_{1/2} = 28.00 s

\langle E_x \rangle PER DECAY = 1020.

\langle E_y \rangle PER DECAY = 1012.

FISSION YIELDS

\text{\textsuperscript{235}}U THERMAL 4.212 x 10^{-4}

\text{\textsuperscript{235}}U FAST 1.162 x 10^{-3}

\text{\textsuperscript{239}}U THERMAL 1.229 x 10^{-3}

\text{\textsuperscript{239}}U THERMAL 2.666 x 10^{-3}

G_y = 3600.

BR_{g} = 1.000

1/3 Sn

26.80 h

121 - 49 - 1
\[ \frac{1}{\text{56}} \text{Mn} \]

ENDF/B-IV FILE 1 COMMENTS
50-SN-121M HEDL EVAL-APR74 R.E. SCHENTER
DIST-NOV74
REFERENCES
GUT-R SCHENTER, THEORY (8/73)

\[ \frac{1}{\text{56}} \text{Mn} \]

\( T_{1/2} = 44.97 \text{y} \)

\( \langle \varepsilon_{p} \rangle \text{ PER DECAY} = 173.9 \)

\( \langle \varepsilon_{g} \rangle \text{ PER DECAY} = 164.0 \)

FISSION YIELDS

\( 235\text{U THERMAL} \quad 5.9332 \times 10^{-1} \)

\( 239\text{U FAST} \quad 1.5102 \times 10^{-7} \)

\( 237\text{Pu THERMAL} \quad 3.4495 \times 10^{-7} \)

\( Q_{1} = 650.0 \)

\( BR_{A} = 1.000 \)

\[ \frac{1}{\text{57}} \text{Sb} \]

STABLE OR LONG-LIVED

\[ \frac{1}{\text{57}} \text{Sn} \]

ENDF/B-IV FILE 1 COMMENTS
50-SN-121M HEDL EVAL-APR74 R.E. SCHENTER
DIST-NOV74

\[ \frac{1}{\text{58}} \text{Sb} \]

\[ \frac{1}{\text{60}} \text{Sn} \]

\[ \frac{1}{\text{58}} \text{Sb} \]

STABLE OR LONG-LIVED

121 - 50 - 1

121 - 50 - 1
\[
\begin{align*}
&\text{\textbf{Sb}} \\
&\text{\textbf{STABLE OR LONG-LIVED}} \\
&\text{\textbf{CROSS SECTIONS (BARNs)}} \\
&\begin{array}{ll}
\sigma \text{ TOTAL 2200M/S} & 9.9383 \\
\text{WESTCOTT G FACTOR} & 1.0492 \\
\sigma \text{ CAPTURE 2200M/S} & 6.2626 \\
\text{WESTCOTT G FACTOR} & 1.0026 \\
\text{RESONANCE INTEGRAL TOTAL} & 3.0990 \times 10^{-4} \\
\text{RESONANCE INTEGRAL CAPTURE} & 2.0640 \times 10^{-4} \\
\end{array} \\
&\text{\textbf{FISSION YIELDS}} \\
&\begin{array}{ll}
^{235}\text{U THERMAL} & 2.2012 \times 10^{-7} \\
^{239}\text{Pu THERMAL} & 2.9096 \times 10^{-7} \\
\end{array}
\end{align*}
\]
$^{125}$ Rh

**ENDF/B-IV FILE 1 COMMENTS**

**45-RH-122**

**HEDL**

**EVAL-APR74 R.E. SCHENK**

**DIST-NOV74**

**REFERENCES**

HALF LIFE: R SCHENK, THEORY(9/73)

---

$^{125}$ Rh

- $T_{1/2} = 2.105s$
- $<E_{q}>$ PER DECAY $= 0.899$
- $<E_{y}>$ PER DECAY $= 0.072$

**FISSION YIELDS**

- $^{235}\text{U FAST} = 1.0602\times10^{-9}$
- $^{238}\text{U FAST} = 7.3293\times10^{-8}$

---

$Q_{Q} = 1.1870$

$BR_{y} = 1.000$

---

$^{125}$ Pd

- $T_{1/2} = 1.270s$

---

$^{122} - 45 - 1$

---

$^{125}$ Pd

**ENDF/B-IV FILE 1 COMMENTS**

**46-PD-122**

**HEDL**

**EVAL-APR74 R.E. SCHENK**

**DIST-NOV74**

**REFERENCES**

HALF LIFE: R SCHENK, THEORY(9/73)

---

$^{125}$ Pd

- $T_{1/2} = 1.270s$
- $<E_{q}>$ PER DECAY $= 1.663$
- $<E_{y}>$ PER DECAY $= 0.104$

**FISSION YIELDS**

- $^{235}\text{U THERMAL} = 5.0828\times10^{-7}$
- $^{235}\text{U FAST} = 1.42702\times10^{-6}$
- $^{239}\text{U FAST} = 1.9598\times10^{-5}$
- $^{239}\text{Pu THERMAL} = 2.0597\times10^{-7}$

---

$Q_{Q} = 5.770$

$BR_{y} = 1.000$

---

$^{122} - 46 - 1$
$^{126}$ Ag

ENDF/B-IV FILE 1 COMMENTS
47-AG-122 HEDL
EVAL-APR74 R.E.SCHENTER
DIST-NOV74

REFERENCES
HALF LIFE R SCHENTER, THEORY(9/73)

$^{126}$ Ag

- $T_{1/2} = 1.000 s$
- $<E_x>$ PER DECAY = 0.966
- $<E_y>$ PER DECAY = 0.912

FISSION YIELDS
$^{235}$U THERMAL $1.3120 \times 10^{-5}$
$^{235}$U FAST $5.2088 \times 10^{-4}$
$^{239}$Pu THERMAL $1.9387 \times 10^{-5}$

- $Q_x = 9170$
- $BR_x = 1.000$

- $^{125}$ Cd

- $T_{1/2} = 5.50 \times 10^4 s$
- $<E_x>$ PER DECAY = 0.669.7
- $<E_y>$ PER DECAY = 0.788.3

FISSION YIELDS
$^{235}$U THERMAL $9.4121 \times 10^{-4}$
$^{239}$U FAST $2.4675 \times 10^{-4}$
$^{235}$Pu THERMAL $2.3581 \times 10^{-4}$

- $Q_x = 2430$
- $BR_x = 1.000$

- $^{119}$ In

- $T_{1/2} = 11.04 \times 10^4 s$

122 - 47 - 1

$^{128}$ Cd

ENDF/B-IV FILE 1 COMMENTS
48-CD-122 HEDL
EVAL-APR74 R.E.SCHENTER
DIST-NOV74

$^{128}$ Cd

- $T_{1/2} = 5.50 \times 10^4 s$
- $<E_x>$ PER DECAY = 0.669.7
- $<E_y>$ PER DECAY = 0.788.3

FISSION YIELDS
$^{235}$U THERMAL $9.4121 \times 10^{-4}$
$^{239}$U FAST $2.4675 \times 10^{-4}$
$^{235}$Pu THERMAL $2.3581 \times 10^{-4}$

- $Q_x = 2430$
- $BR_x = 1.000$

- $^{119}$ In

- $T_{1/2} = 11.04 \times 10^4 s$

122 - 48 - 1
$^{122m}$ In

ENDFB-IV FILE 1 COMMENTS
49-IN-122M HEDL EVAL-APR74 R.E. SCHENTER DIST-NOV74

REFERENCES
G1-R SCHRENTER, THEORY (9/73)

$^{122m}$ In

$T_{1/2} = 1.500 s$
$<E_x> PER DECAY = 2271$
$<E_y> PER DECAY = 992$

Fission Yields
$^{235}U$ THERMAL $9.6753 \times 10^{-6}$
$^{235}U$ FAST $2.7665 \times 10^{-6}$
$^{239}Pu$ FAST $4.6496 \times 10^{-6}$
$^{239}Pu$ THERMAL $5.7292 \times 10^{-6}$

$Q_f = 7000$
$BR_y = 7.000$

$^{122}$ Sn

STABLE OR LONG-LIVED

$^{122}$m - 49-1

$^{122}$ Sn

$^{122}$m - 49-1

ENDFB-IV FILE 1 COMMENTS
49-IN-122 HEDL EVAL-APR74 R.E. SCHENTER DIST-NOV74

$T_{1/2} = 1.041 s$
$<E_x> PER DECAY = 2094$
$<E_y> PER DECAY = 1860$

Fission Yields
$^{235}U$ THERMAL $4.683 \times 10^{-6}$
$^{235}U$ FAST $2.7663 \times 10^{-6}$
$^{239}Pu$ FAST $4.6496 \times 10^{-6}$
$^{239}Pu$ THERMAL $5.7012 \times 10^{-6}$

$Q_f = 6750$
$BR_y = 7.000$

$^{122}$ Sn

STABLE OR LONG-LIVED

122 - 49-1
\[ \frac{1}{35} \text{ Sn} \]

\[ \frac{1}{35} \text{ Sn} \]

STABLE OR LONG-LIVED

CROSS SECTIONS (BARNs)

- Total Cross Section (barns) \( \rho = 4.362 \times 10^{-3} \)
- Westcott G Factor \( G_{W} = 1.124 \times 10^{-3} \)
- Capture Cross Section (barns) \( \sigma_{c} = 1.8109 \times 10^{-6} \)
- Westcott G Factor \( G_{W} = 1.028 \times 10^{-6} \)
- Resonance Integral Total \( I = 9.253 \times 10^{-11} \)
- Resonance Integral Capture \( I_{c} = 7.697 \times 10^{-11} \)

FISSION YIELDS

- \( {}^{235} \text{ U} \) Thermal \( 5.843 \times 10^{-6} \)
- \( {}^{235} \text{ U} \) Fast \( 1.670 \times 10^{-2} \)
- \( {}^{239} \text{ Pu} \) Fast \( 5.359 \times 10^{-4} \)
- \( {}^{239} \text{ Pu} \) Thermal \( 8.818 \times 10^{-6} \)

122 - 50 - 1

\[ \frac{1}{37} \text{ Sb} \]

ENDF/B-IV FILE 1 COMMENTS

51-SB-122M HEDL
EVAL-APR76 R.E.SCHENTER
DIST-NOV74

REFERENCES
GIT-C LEIDERER ET AL. TABLE OF ISOTOPES 6TH ED

\[ \frac{1}{37} \text{ Sb} \]

- \( T_{1/2} = 6.200 \text{ m} \)
- \( \langle E_{y} \rangle \) PER DECAY \( = 167.0 \text{ keV} \)

FISSION YIELDS

- \( {}^{235} \text{ Pu} \) Thermal \( 9.498 \times 10^{-9} \)

\[ \text{G} = 162.0 \]

\[ \text{BR}_{1} = 1.000 \]

65.28h

122m- 51- 1
$^{135}$ Sb

FDNF8-IV FILE 1 COMMENTS
51-SB-122 HEDL EVAL-APR74 R.E.SCHENTER
DIST-NOV74

$^{135}$ Sb

- $T_{1/2} = 65.28 \text{h}$
- $\langle \varepsilon_f \rangle \text{ PER DECAY} = 567.7$
- $\langle E_f \rangle \text{ PER DECAY} = 4460.3$

FISSION YIELDS

- $^{239}$Pu THERMAL: $8.97 \times 10^{-10}$

- $Q_{\beta}=1970.0$
- $BR_{\gamma}=.9766$
- $Q_{\beta^+}=1630.0$
- $BR_{\gamma^+}=.0300$

$^{122}$ - $^{51}$ T

$^{135}$ Te

- STABLE OR LONG-LIVED

- CROSS SECTIONS (BARNs)
  - $\sigma$ TOTAL 2200M/S: 5.7532
  - WESTCOTT G FACTOR: 2.8025
  - RESONANCE INTEGRAL TOTAL: $2.1666 \times 10^{-2}$
  - RESONANCE INTEGRAL CAPTURE: $7.4896 \times 10^{-1}$

$^{122}$ - $^{52}$ T
\[\begin{align*}
\text{\textit{123} Rh} & \\
\text{ENDF/B-IV FILE 1 COMMENTS} & \\
\text{<5-RH-123 HEDL} & \text{EVAL-APR74 R.E.SCHENTER} \\
\text{DIST-NEW74} & \\
\text{REFERENCES} & \text{SCENTER, THEORY(9/73)} \\
\hline
\text{\textit{123} Rh} & \\
\text{T}_{1/2} = 1.353 s & \\
\langle E_\gamma \rangle \text{ PER DECAY} = 3172. & \\
\langle E_\gamma \rangle \text{ PER DECAY} = 3747. & \\
\text{FISSION YIELDS} & \\
\text{238U FAST} & 9.8691 \times 10^{-9} & \\
\end{align*}\]

\[\begin{align*}
D_{\gamma} & = 10090. \\
BR_{\gamma} & = 1.000 & \\
\hline
\text{\textit{123} Pd} & \\
\text{} & \\
\hline
\text{\textit{123} Pd} & \\
\text{ENDF/B-IV FILE 1 COMMENTS} & \\
\text{46-PD-123 HEDL} & \text{EVAL-APR74 R.E.SCHENTER} \\
\text{DIST-NEW74} & \\
\text{REFERENCES} & \text{SCENTER, THEORY(9/73)} \\
\hline
\text{\textit{123} Pd} & \\
\text{T}_{1/2} = 3100 s & \\
\langle E_\gamma \rangle \text{ PER DECAY} = 2631. & \\
\langle E_\gamma \rangle \text{ PER DECAY} = 3059. & \\
\text{FISSION YIELDS} & \\
\text{235U THERMAL} & 1.1506 \times 10^{-7} & \\
\text{235U FAST} & 3.8606 \times 10^{-7} & \\
\text{234U FAST} & 6.394 \times 10^{-6} & \\
\text{239Pu THERMAL} & 3.9774 \times 10^{-6} & \\
\end{align*}\]

\[\begin{align*}
D_{\gamma} & = 5040. \\
BR_{\gamma} & = 1.000 & \\
\hline
\text{\textit{123} Ag} & \\
\text{.8627s} & \\
\end{align*}\]
\[
\begin{align*}
\text{Ag} & \\
\text{ENDF/B-IV FILE 1 COMMENTS} & \\
47-AG-123 & \\
\text{HEDL} & \\
\text{EVAL-APR74 R.E.SCHENTER} & \\
\text{DIST-NOV74} & \\
\text{REFERENCES} & \\
\text{HALF LIFE-R SCHENTER, THEORY(9/73)} & \\
\\text{T}_{1/2} & = 8.6278 \ \text{s} \\
\langle E_g \rangle & \text{ PER DECAY } = 2225 \ \text{eV} \\
\langle E_f \rangle & \text{ PER DECAY } = 2474 \ \text{eV} \\
\text{FISSION YIELDS} & \\
^{235}\text{U THERMAL} & = 9.2356 \times 10^{-4} \\
^{235}\text{U FAST} & = 2.9831 \times 10^{-5} \\
^{239}\text{Pu THERMAL} & = 8.2383 \times 10^{-6} \\
0^+ & = 7280 \ \text{eV} \\
\text{BR}_0 & = 1.000 \\
\\text{Cd} & \\
\text{ENDF/B-IV FILE 1 COMMENTS} & \\
48-CD-123 & \\
\text{HEDL} & \\
\text{EVAL-APR74 R.E.SCHENTER} & \\
\text{DIST-NOV74} & \\
\text{REFERENCES} & \\
\text{HALF LIFE-R SCHENTER, THEORY(9/73)} & \\
\\text{T}_{1/2} & = 8.404 s \\
\langle E_g \rangle & \text{ PER DECAY } = 1602 \ \text{eV} \\
\langle E_f \rangle & \text{ PER DECAY } = 1766 \ \text{eV} \\
\text{FISSION YIELDS} & \\
^{235}\text{U THERMAL} & = 4.9922 \times 10^{-5} \\
^{235}\text{U FAST} & = 3.0454 \times 10^{-4} \\
^{239}\text{Pu THERMAL} & = 2.0723 \times 10^{-4} \\
0^+ & = 5280 \ \text{eV} \\
\text{BR}_0 & = 2.300 \\
\text{In} & \\
\text{ENDF/B-IV FILE 1 COMMENTS} & \\
48-IN & \\
\text{HEDL} & \\
\text{EVAL-APR74 R.E.SCHENTER} & \\
\text{DIST-NOV74} & \\
\text{REFERENCES} & \\
\text{HALF LIFE-R SCHENTER, THEORY(9/73)} & \\
\\text{T}_{1/2} & = 48.00 \ \text{s} \\
\\text{BR}_0 & = 0.7700 \\
0^+ & = 6.000 \ \text{s} \\
\text{123 - 47 - 1} & \\
\text{123 - 48 - 1} &
\end{align*}
\]
### 123 M

ENDFB/IV FILE 1 COMMENTS
49-1N-123M HEDL EVAL-APR74 R.E.SCHENTER DIST-NOV74

**REFERENCES**
GIT-R SCHENTER, THEORY (9/73)

- **T1/2** = 48.00 s
- <E> PER DECAY = 1325
- <E> PER DECAY = 1394

**FISSION YIELDS**

| 235U THERMAL | 1.9501 x 10^-5 |
| 235U FAST | 6.1870 x 10^-5 |
| 239U THERMAL | 1.5709 x 10^-5 |
| 239PU THERMAL | 9.7086 x 10^-5 |

- Q β = 4500
- Q β = 4500
- BR β = 0.5000
- BR β = 0.5000

### 123 in

- 40.00 m
- 3.332 y

### 123 m 49-1

### 123 in

ENDFB/IV FILE 1 COMMENTS
49-1N-123 HEDL EVAL-APR74 R.E.SCHENTER DIST-NOV74

- **T1/2** = 6.000 s
- <E> PER DECAY = 1233
- <E> PER DECAY = 1399

**FISSION YIELDS**

| 235U THERMAL | 2.0441 x 10^-5 |
| 235U FAST | 6.1869 x 10^-5 |
| 239U FAST | 1.3699 x 10^-5 |
| 239Pu THERMAL | 9.7086 x 10^-5 |

- Q β = 4500
- Q β = 4500
- BR β = 0.5000
- BR β = 0.5000

### 123 - 49-1

- 40.00 m
- 3.332 y
ENDF/B-IV File 1 Comments
50-SN-123M HEDL
EVAL-APR74 R.E. SCHENTER
DIST-NOV74

References
NI-RT Schenter, Theory (9/73)

\[ {}^{123}_{50}\text{Sn} \]

- \( T_{1/2} = 40.00 \text{m} \)
- \( \langle E_p \rangle \) PER DECAY = 471.8
- \( \langle E_y \rangle \) PER DECAY = 465.3

Fission Yields
- \( {}^{233}\text{U} \) THERMAL \( 1.931 \times 10^{-6} \)
- \( {}^{235}\text{U} \) FAST \( 3.940 \times 10^{-8} \)
- \( {}^{239}\text{Pu} \) FAST \( 1.090 \times 10^{-7} \)
- \( {}^{239}\text{Pu} \) THERMAL \( 1.555 \times 10^{-5} \)

\( G_f = 1670 \)
\( B_{kg} = 1.200 \)

\[ {}^{123}_{50}\text{Sb} \]
- Stable or Long-Lived

123 - 50 - 1

\[ {}^{123}_{50}\text{Sn} \]

ENDF/B-IV File 1 Comments
50-SN-123M HEDL
EVAL-OC74 R.E. SCHENTER AND F. SCHMIDT
DIST-NOV74

- \( T_{1/2} = 2532 \text{y} \)
- \( \langle E_p \rangle \) PER DECAY = 401.2
- \( \langle E_y \rangle \) PER DECAY = 395.8

CROSS SECTIONS (BARNs)
- Total \( \sigma_{TOT} \) \( 2200 \text{m}^2 \)
- Westcott G factor \( 1.15 \%
- Capture \( \sigma_{CAP} \) \( 3.300 \times 10^{-2} \)
- Westcott G factor \( 1.0 \%
- Resonance integral total \( 9.919 \times 10^{-1} \)
- Resonance integral capture \( 2.690 \)

Fission Yields
- \( {}^{233}\text{U} \) THERMAL \( 1.709 \times 10^{-1} \)
- \( {}^{235}\text{U} \) FAST \( 5.900 \times 10^{-8} \)
- \( {}^{239}\text{Pu} \) FAST \( 1.090 \times 10^{-7} \)
- \( {}^{239}\text{Pu} \) THERMAL \( 1.555 \times 10^{-5} \)

\( G_f = 1420 \)
\( B_{kg} = 1.200 \)

- Stable or Long-Lived

123 - 50 - 1
\[\text{Sb}\]

\[\text{Sb}\]

Stable or long-lived

CROSS SECTIONS (BARNs)

- \( \sigma_{\text{TOTAL}} \): 2200\(\mu\)s
- \( \sigma_{\text{NESTCOTT G FACTOR}} \): 1.0803
- \( \sigma_{\text{CAPTURE}} \): 4.3024
- \( \sigma_{\text{NESTCOTT G FACTOR}} \): 1.0010
- \( \sigma_{\text{RESONANCE INTEGRAL TOTAL}} \): 2.5946\(\times\)10\(^{-2}\)
- \( \sigma_{\text{RESONANCE INTEGRAL CAPTURE}} \): 1.2780\(\times\)10\(^{-2}\)

Fission Yields

- \( ^{235}\text{U THERMAL} \): 5.9429\(\times\)10\(^{-4}\)
- \( ^{235}\text{U FAST} \): 1.3802\(\times\)10\(^{-3}\)
- \( ^{239}\text{Pu THERMAL} \): 1.4294\(\times\)10\(^{-3}\)

123 - 51 - 1

\[\text{Te}\]

ENDF/B-IV FILE 1 COMMENTS
52-TE-123M HEDL EVR-APR/74 R.E. SCHENTER
0101-MO174
REFERENCES
QIT-C LEDERER ET AL. TABLE OF ISOTOPES 6TH ED

\[\text{Te}\]

- \( T_{1/2} = 3277\ \text{yr} \)
- \( <\beta^+\text{ PER DECAY} > = 247.5 \)

- \( Q_{1}=247.5 \)
- \( \text{BR}_{1}=1.000 \)

\[\text{Te}\]

\( (1.999)\times10^{-11}\ \text{yr} \)

123m - 52 - 1
Te

ENDF/B-IV FILE 1 COMMENTS
52-Te-123 HEDL EVAL-OCT74 R.E.SCHENTER AND F.SCHMITTROTH
DIST-NOV74

T_{1/2} = (1.199) \times 10^{-3} \text{y}

\langle E_x \rangle \text{ PER DECAY } = 20.00

(CROSS SECTIONS (BARNs))

\sigma \text{ TOTAL } 2200 M/\text{s } 4.0969 \times 10^{-2}

\sigma \text{ WETSCOTT G F A C T O R } 1.016

\sigma \text{ CAPTURE } 2200 M/\text{s } 4.5999 \times 10^{-2}

\sigma \text{ WESTCOTT G F A C T O R } 1.0116

\text{ RESONANCE INTEGRAL TOTAL } 6.2230 \times 10^{-5}

\text{ RESONANCE INTEGRAL CAPTURE } 5.5220 \times 10^{-5}

G_{\gamma} = 50.00

B_{\gamma} = 1.000

6b

STABLE OR LONG-LIVED

---

123 - 52 - 3
124 Pd

ENDF/B-IV FILE 1 COMMENTS
46-PD-124 HECL
EVAL-APR74 R.E.SCHENTER
DIST-NOV74
REFERENCES
HALF LIFE-R SCHENTER, THEORY(9/73)

124 Pd

\[ T_{1/2} = 0.5607 \text{ s} \]
\[ \langle E^*_g \rangle \text{ PER DECAY} = 1946 \text{ keV} \]
\[ \langle E^*_f \rangle \text{ PER DECAY} = 2572 \text{ keV} \]

FISSION YIELDS
235U THERMAL 2.2612x10^-6
235U FAST 0.1773x10^-6
239U FAST 1.7098x10^-6
239Pu THERMAL 7.7389x10^-9

\[ Q_\beta = 6680 \text{ keV} \]
\[ BR_{\beta} = 1.000 \]

124 Ag

\[ T_{1/2} = 2.6855 \text{ s} \]

124 - 46 - 1

124 Ag

ENDF/B-IV FILE 1 COMMENTS
47-AG-124 HECL
EVAL-APR74 R.E.SCHENTER
DIST-NOV74
REFERENCES
HALF LIFE-R SCHENTER, THEORY(9/73)

124 Ag

\[ T_{1/2} = 2.6855 \text{ s} \]
\[ \langle E^*_g \rangle \text{ PER DECAY} = 3275 \text{ keV} \]
\[ \langle E^*_f \rangle \text{ PER DECAY} = 3358 \text{ keV} \]

FISSION YIELDS
233U THERMAL 1.4324x10^-5
235U FAST 1.4217x10^-5
239U FAST 6.0554x10^-5
239Pu THERMAL 3.3795x10^-6

\[ Q_\beta = 9970 \text{ keV} \]
\[ BR_{\beta} = 1.000 \]

124 Ibd

17.17s

124 - 47 - 1
\[ ^{114}\text{Cd} \]

ENDF/B-IV FILE 1 COMMENTS
48-CO-124 HEKL EVAL-APR76 RESCHENTER
DIST-NDV74
REFERENCES
HALF LIFE=R SCHENTER, THEORY (9/75)

\[ T_{1/2} = 17.17 \text{s} \]
\[ <E_g^+\text{ PER DECAY} = 1015 \]
\[ <E_g^-\text{ PER DECAY} = 1275 \]

FISSION YIELDS
\[ ^{235}\text{U THERMAL} = 1.0559 \times 10^{-4} \]
\[ ^{235}\text{U FAST} = 3.0340 \times 10^{-4} \]
\[ ^{238}\text{U FAST} = 3.0824 \times 10^{-4} \]
\[ ^{239}\text{Pu THERMAL} = 1.6823 \times 10^{-4} \]

\[ Q_p = 3690 \]
\[ B(R) = 1.000 \]

\[ ^{124}\text{In} \]

3.204 \times 10^4

124 – 49 – 1

\[ ^{115}\text{In} \]

ENDF/B-IV FILE 1 COMMENTS
49-IN-124 HEKL EVAL-APR76 RESCHENTER
DIST-NDV74

\[ T_{1/2} = 3.204 \text{s} \]
\[ <E_g^+\text{ PER DECAY} = 2255 \]
\[ <E_g^-\text{ PER DECAY} = 2200 \]

FISSION YIELDS
\[ ^{235}\text{U THERMAL} = 9.5362 \times 10^{-4} \]
\[ ^{235}\text{U FAST} = 2.4502 \times 10^{-4} \]
\[ ^{238}\text{U FAST} = 6.3744 \times 10^{-4} \]
\[ ^{239}\text{Pu THERMAL} = 2.8974 \times 10^{-4} \]

\[ Q_p = 7340 \]
\[ B(R) = 1.000 \]

\[ ^{116}\text{In} \]

STABLE OR LONG-LIVED

124 – 49 – 1
\[ \text{Sn} \]

\[ \text{Stable or Long-Lived} \]

Cross Sections (Barns)

- Total \( 2200 \pm 5 \)
- \( \text{Westcott G Factor} \)
- Capture \( 2200 \pm 5 \)
- \( \text{Westcott G Factor} \)
- Resonance Integral Total \( 9.747 \times 10^{-4} \)
- Resonance Integral Capture \( 7.134 \)

Fission Yields

- \( ^{235}\text{U Thermal} \) \( 1.439 \times 10^{-3} \)
- \( ^{235}\text{U Fast} \) \( 3.308 \times 10^{-3} \)
- \( ^{239}\text{Pu Thermal} \) \( 8.787 \times 10^{-5} \)

\[ \text{Sb} \]

ENDF/B-IV File 1 Comments

51-SB-124 N. HEDL Eval-APR74 R.E. SCHENTER
DIST-NOV73

References

GT-R SCHENTER, THEORY(9/73)

\[ \text{Sb} \]

- \( T_{1/2} = 20.3 \text{d} \)
- \( \langle E_d \rangle \) per decay = 250.0

\[ Q_{\alpha} = 250.0 \]

\[ \theta_{\alpha} = 1.000 \]

\[ \text{Sb} \]

\[ 96.00 \text{ms} \]

\[ 124n - 51 - 1 \]
\[^{124}\text{Sb}]^{124}\text{Sb}

ENDF/B-IV FILE 1 COMMENTS
51-SB-124 HEDL EVAL-APR74 R.E. SCHENTER
51-SB-124 HEDL EVAL-DEC74 R.E. SCHENTER AND F. SCHMITTORH
51-SB-124 HEDL EVAL-OCT74 R.E. SCHENTER
51-SB-124 HEDL EVAL-NOV74 R.E. SCHENTER

REFERENCES

\[^{124}\text{Sb} \]

\[T_{1/2} = 96.00 \text{s} \]
\[\langle \beta \rangle \text{ PER DECAY} = 10.00 \]

FISSION YIELDS

\[^{235}\text{U} \text{ THERMAL} = 2.9516 \times 10^{-8} \]
\[^{235}\text{U} \text{ FAST} = 6.6111 \times 10^{-8} \]
\[^{239}\text{Pu} \text{ THERMAL} = 4.3044 \times 10^{-7} \]

\[Q = 10.00 \]
\[BR_{17} = 1.000 \]

\[^{124}\text{Sn} \]

\[T_{1/2} = 60.20 \text{d} \]

\[^{124}\text{Sn} \]

124 = 51- 1

\[^{124}\text{Sb} \]

ENDF/B-IV FILE 1 COMMENTS
51-SB-124 HEDL EVAL-APR74 R.E. SCHENTER
51-SB-124 HEDL EVAL-DEC74 R.E. SCHENTER AND F. SCHMITTORH
51-SB-124 HEDL EVAL-OCT74 R.E. SCHENTER
51-SB-124 HEDL EVAL-NOV74 R.E. SCHENTER

REFERENCES

\[^{124}\text{Sb} \]

\[T_{1/2} = 60.20 \text{d} \]
\[\langle \beta \rangle \text{ PER DECAY} = 867.8 \]
\[\langle \gamma \rangle \text{ PER DECAY} = 945.9 \]

CROSS SECTIONS (BARNES)

\[\sigma \text{ TOTAL} = 2200 \mu \text{b} \]
\[\sigma \text{ WESTCOTT G FACTOR} = 1.1542 \]
\[\sigma \text{ WESTCOTT G FACTOR} = 10.000 \times 10^{-3} \]
\[\sigma \text{ RESONANCE INTEGRAL TOTAL} = 1.700 \times 10^{2} \]
\[\sigma \text{ RESONANCE INTEGRAL CAPTURE} = 2.400 \times 10^{1} \]

FISSION YIELDS

\[^{235}\text{U} \text{ THERMAL} = 3.2217 \times 10^{-8} \]
\[^{235}\text{U} \text{ FAST} = 6.6511 \times 10^{-8} \]
\[^{239}\text{Pu} \text{ THERMAL} = 4.3044 \times 10^{-7} \]

\[Q = 2910 \]
\[BR_{17} = 1.000 \]

\[^{124}\text{Sn} \]

\[\text{STABLE OR LONG-LIVED} \]

\[^{124} \]

124 = 51- 1
\begin{table}
\centering
\begin{tabular}{lcc}
\hline
Isotope & Stable or Long-Lived & Cross Sections (Barns) \\
\hline
$^{122}$Te & & \\
$^{122}$Te & & \\
Stable or Long-Lived & & \\
\hline
\end{tabular}
\caption{Cross Sections for $^{122}$Te}
\end{table}
$^{125}\text{Pd}$

ENDF/B-IV FILE 1 COMMENTS
46-PD-125 HEOL EVAL-APR74 R.E. SCHENCER DIST-NDV74
REFERENCES
HALF LIFE R SCHENCER, THEORY(9/73)

$^{125}\text{Pd}$

- $T_{1/2} = 1.183 \text{yr}$
- $<E_\gamma> \text{ PER DECAY} = 2851$
- $<E_\alpha> \text{ PER DECAY} = 3517$

- $Q_\beta = 9220$
- $BR_\beta = 1.000$

$^{125}\text{Ag}$

- $I_{13} = 3621\%$

$^{125} - 46 - 1$

$^{127}\text{Ag}$

ENDF/B-IV FILE 1 COMMENTS
47-AG-125 HEOL EVAL-APR74 R.E. SCHENCER DIST-NDV74
REFERENCES
HALF LIFE R SCHENCER, THEORY(9/73)

$^{127}\text{Ag}$

- $T_{1/2} = 3.825 \text{yr}$
- $<E_\gamma> \text{ PER DECAY} = 2529$
- $<E_\alpha> \text{ PER DECAY} = 2951$
- FISSION YIELDS
  - $^{235}\text{U THERMAL} = 8.9649 \times 10^{-7}$
  - $^{235}\text{U FAST} = 4.7008 \times 10^{-6}$
  - $^{239}\text{U FAST} = 3.2957 \times 10^{-6}$
  - $^{239}\text{Pu THERMAL} = 1.2698 \times 10^{-6}$

- $Q_\beta = 8190$
- $BR_\beta = 1.000$

$^{127}\text{Cd}$

- $I_{13} = 1.623\%$

$^{127} - 47 - 1$
$^{127}$Cd

ENDF/B-IV FILE 1 COMMENTS
48-C0-125 HEDL EVAL-APR74 R.E.SCHENTER
DIST-NOV74

REFERENCES
HALF LIFE - R SCHENTER, THEORY (9/73)

$^{114}$Cd

- $T_{1/2} = 1.623$ s
- $\langle E_g \rangle$ PER DECAY = 1881.
- $\langle E_f \rangle$ PER DECAY = 2159.

FISSION YIELDS

- $^{235}$U THERMAL: $5.1358 \times 10^{-5}$
- $^{235}$U FAST: $2.3360 \times 10^{-4}$
- $^{239}$Pu THERMAL: $1.4707 \times 10^{-4}$

$Q_0 = 6140.$
$BR_p = 3000.$

125 - 48 - 1

$^{114}$In

- $T_{1/2} = 12.00$ s
- $\langle E_g \rangle$ PER DECAY = 1886.
- $\langle E_f \rangle$ PER DECAY = 1764.

FISSION YIELDS

- $^{235}$U THERMAL: $5.0707 \times 10^{-4}$
- $^{235}$U FAST: $2.0299 \times 10^{-4}$
- $^{239}$Pu THERMAL: $2.7226 \times 10^{-4}$

$Q_0 = 5460.$
$BR_p = 9200.$

$^{116}$Sn

- $9.52 \pm .05$ m

125m - 49 - 1

$^{116}$Sn

- $9.65 \pm .04$ d
\[ { }^{124} \text{In} \]

ENDF/B-IV FILE 1 COMMENTS
49-IN-125 MEDL EVAL-APR74 R.E.SCHENTER DIST-NOV74

\[ { }^{124} \text{In} \]

\[ T_{1/2} = 2.33 \times 10^{-4} \text{s} \]
\[ \langle E \rangle \text{ PER DECAY} = 1700 \text{eV} \]
\[ \langle E \rangle \text{ PER DECAY} = 1700 \text{eV} \]

FISSION YIELDS
\[ 235U \text{ THERMAL} \quad 5.068 \times 10^{-5} \]
\[ 235U \text{ FAST} \quad 2.059 \times 10^{-4} \]
\[ 239Pu \text{ FAST} \quad 7.42 \times 10^{-5} \]
\[ 239Pu \text{ THERMAL} \quad 2.724 \times 10^{-4} \]

\[ Q_{\beta} = 5210 \text{keV}, \quad B(\beta) = 0.70 \]

\[ { }^{125} \text{Sn} \]

\[ 9.52 \times 10^{-4} \text{m} \]

\[ 125 - 49 - 1 \]

\[ { }^{125} \text{Sn} \]

ENDF/B-IV FILE 1 COMMENTS
50-SN-125M ANC EVAL-SEP74 C.W.REICH DIST-NOV74
FOR FILE DESCRIPTION SEE CW.REICH, RG HELMER AND MH PUTMAN,
ANCR=1157,ENDF/IV,8/74.
PREPARED FOR FILE 9/73
Q VALUE IS FROM THE 1973 REVISION OF WAPSTRA-GOVE MASS TABLES
REFERENCE NUCLEAR DATA BN 5 (9/72).
PHOTON INTENSITY UNCERTAINTIES ARE TAKEN FROM LIST OF
RELATIVE INTENSITIES.
INTERNAL CONVERSION COEFFICIENT FOR 331.9-KEV GAMMA RAY IS
AVERAGE OF PREDICTED M1 AND E2 VALUES.

\[ { }^{125} \text{Sn} \]

\[ T_{1/2} = 9.92 \times 10^{-4} \text{s} \]
\[ \langle E \rangle \text{ PER DECAY} = 798.0 \text{eV} \]
\[ \langle E \rangle \text{ PER DECAY} = 345.9 \text{eV} \]

FISSION YIELDS
\[ 235U \text{ THERMAL} \quad 3.989 \times 10^{-5} \]
\[ 235U \text{ FAST} \quad 6.461 \times 10^{-5} \]
\[ 239Pu \text{ FAST} \quad 4.979 \times 10^{-5} \]
\[ 239Pu \text{ THERMAL} \quad 1.791 \times 10^{-5} \]

\[ Q_{\beta} = 2389.2 \text{keV}, \quad B(\beta) = 1.0 \]

\[ { }^{125} \text{Sb} \]

\[ 2.73 \times 10^{-3} \text{m} \]

\[ 125m - 50 - 1 \]
### Photon Radiation Table

<table>
<thead>
<tr>
<th>MEAN ENERGY</th>
<th>LINES</th>
<th>PHOTONS/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>23.4</td>
<td>4</td>
<td>1.98</td>
</tr>
<tr>
<td>279.0</td>
<td>1</td>
<td>0.07 ± 0.05</td>
</tr>
<tr>
<td>311.0</td>
<td>1</td>
<td>0.07 ± 0.05</td>
</tr>
<tr>
<td>331.9</td>
<td>0.20</td>
<td>92.44</td>
</tr>
<tr>
<td>566.0</td>
<td>0.4</td>
<td>0.085 ± 0.009</td>
</tr>
<tr>
<td>589.6</td>
<td>0.5</td>
<td>0.20 ± 0.04</td>
</tr>
<tr>
<td>643.0</td>
<td>0.5</td>
<td>0.11 ± 0.04</td>
</tr>
<tr>
<td>662.0</td>
<td>1</td>
<td>0.0436</td>
</tr>
<tr>
<td>778.0</td>
<td>2</td>
<td>0.012 ± 0.005</td>
</tr>
<tr>
<td>840.9</td>
<td>0.5</td>
<td>0.066 ± 0.019</td>
</tr>
<tr>
<td>1017.3</td>
<td>0.5</td>
<td>0.095 ± 0.019</td>
</tr>
<tr>
<td>1059.0</td>
<td>1</td>
<td>0.19 ± 0.019</td>
</tr>
<tr>
<td>1093.0</td>
<td>1</td>
<td>0.038 ± 0.019</td>
</tr>
<tr>
<td>1111.1</td>
<td>0.6</td>
<td>0.028 ± 0.019</td>
</tr>
<tr>
<td>1224.0</td>
<td>1</td>
<td>0.01231</td>
</tr>
<tr>
<td>1305.0</td>
<td>1</td>
<td>0.009 ± 0.009</td>
</tr>
<tr>
<td>1369.0</td>
<td>0.8</td>
<td>0.019 ± 0.009</td>
</tr>
<tr>
<td>1568.8</td>
<td>0.5</td>
<td>0.095 ± 0.019</td>
</tr>
<tr>
<td>1404.0</td>
<td>0.5</td>
<td>0.068 ± 0.03</td>
</tr>
<tr>
<td>1482.9</td>
<td>0.5</td>
<td>0.078 ± 0.03</td>
</tr>
<tr>
<td>1582.0</td>
<td>1</td>
<td>0.006 ± 0.006</td>
</tr>
<tr>
<td>1615.3</td>
<td>0.5</td>
<td>0.114 ± 0.019</td>
</tr>
<tr>
<td>1634.0</td>
<td>1</td>
<td>0.019 ± 0.019</td>
</tr>
<tr>
<td>1735.6</td>
<td>0.5</td>
<td>0.028 ± 0.009</td>
</tr>
<tr>
<td>1933.5</td>
<td>0.5</td>
<td>0.079 ± 0.009</td>
</tr>
<tr>
<td>1947.0</td>
<td>1</td>
<td>0.069 ± 0.005</td>
</tr>
<tr>
<td>2113.0</td>
<td>1</td>
<td>0.0019 ± 0.0019</td>
</tr>
</tbody>
</table>

\( \langle E_{\text{photon}} \rangle \text{ per decay} = 330.4 ± 1.1 \)

### Particle Radiation Table

<table>
<thead>
<tr>
<th>TYPE</th>
<th>( E_{\text{max}} )</th>
<th>MEAN ENERGY</th>
<th>INTENSITY/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Au</td>
<td>29.5</td>
<td>6.186</td>
<td>2.764</td>
</tr>
<tr>
<td>C1</td>
<td>5.10</td>
<td>50.54</td>
<td>2.767</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>275.0</td>
<td>78.83</td>
<td>0.00200</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>441.0</td>
<td>134.7</td>
<td>0.1400</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>572.0</td>
<td>146.7</td>
<td>0.00200</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>657.0</td>
<td>212.4</td>
<td>0.0550</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>687.0</td>
<td>225.9</td>
<td>0.1500</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>984.0</td>
<td>312.8</td>
<td>0.2800</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>1039.0</td>
<td>369.1</td>
<td>0.03000</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>1450.0</td>
<td>555.9</td>
<td>0.2600</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>1745.0</td>
<td>683.0</td>
<td>0.05000</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>2056.0</td>
<td>827.7</td>
<td>93.80</td>
</tr>
</tbody>
</table>

\( \langle E_{\beta^-} \rangle \text{ per decay} = 805.4 \)
\( \langle E_{\gamma} \rangle \text{ per decay} = 1186. \)
$^{113}$ Sn

ENDF/B-IV FILE 1 COMMENTS
30-SN-125 ANC, HEDL EVAL-2EB74 C. W. REICH DECAY DATA
EVAL-GCT74 R. E. SCHENKER AND F. SCHMITTROTH
CROSS SECTION DATA
DIST-NOV74

FILE INFORMATION

MF=1 MT=457 DECAY DATA
REFERENCES
PREPARED FOR FILE 9/75
REG(ULF)
G VALUE IS FROM THE 1975 REVISION OF WAPSTRA-GOVE MASS TABLES
REFERENCE NUCLEAR DATA B7, NO. 5 (1972)
PHOTON INTENSITY UNCERTAINTIES ARE TAKEN FROM LIST OF
RELATIVE INTENSITIES.

$^{113}$ Sn

- $T_{1/2} = 9.64 + 0.04$ days
- $\langle E^2 \rangle$ PER DECAY = 836.2 MeV
- $\langle E_p \rangle$ PER DECAY = 315.3 MeV

CROSS SECTIONS (BARNs)
- TOTAL 2200MeV 5.1210
- WESCHT G FACTOR 1.0712
- a CAPTURE 2200MeV 5.5000 x 10^{-1}
- WESCHT G FACTOR 1.0000
- RESONANCE INTEGRAL TOTAL 1.1770 x 10^{-7}
- RESONANCE INTEGRAL CAPTURE 1.4830 x 10^{-7}

FISSION YIELDS
- $^{235}$U THERMAL 1.0252 x 10^{-4}
- $^{235}$U FAST 6.7340 x 10^{-5}
- $^{233}$U FAST 4.9795 x 10^{-6}
- $^{239}$Pu THERMAL 3.7958 x 10^{-4}

- $Q_o = 2363.48$
- BR$_g = 1.000$

$^{85}$ Pb

- 2.738, 0.03

125 - 50 - 1
PHOTON RADIATION TABLE

<table>
<thead>
<tr>
<th>Energy (eV)</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>76.0</td>
<td>0.3</td>
<td>0.70883</td>
</tr>
<tr>
<td>84.0</td>
<td>0.3</td>
<td>0.79742</td>
</tr>
<tr>
<td>126.3</td>
<td>1.2</td>
<td>0.312</td>
</tr>
<tr>
<td>344.7</td>
<td>0.7</td>
<td>1.57</td>
</tr>
<tr>
<td>434.1</td>
<td>0.3</td>
<td>0.018</td>
</tr>
<tr>
<td>469.7</td>
<td>0.3</td>
<td>1.53</td>
</tr>
<tr>
<td>524.3</td>
<td>0.3</td>
<td>0.00620</td>
</tr>
<tr>
<td>562.2</td>
<td>0.3</td>
<td>0.00532</td>
</tr>
<tr>
<td>652.6</td>
<td>0.3</td>
<td>0.035</td>
</tr>
<tr>
<td>684.2</td>
<td>0.3</td>
<td>0.00620</td>
</tr>
<tr>
<td>800.5</td>
<td>0.3</td>
<td>0.09</td>
</tr>
<tr>
<td>822.6</td>
<td>0.3</td>
<td>0.09</td>
</tr>
<tr>
<td>893.7</td>
<td>0.3</td>
<td>0.07</td>
</tr>
<tr>
<td>915.3</td>
<td>0.3</td>
<td>0.07</td>
</tr>
<tr>
<td>921.6</td>
<td>0.3</td>
<td>0.089</td>
</tr>
<tr>
<td>934.7</td>
<td>0.3</td>
<td>0.15</td>
</tr>
<tr>
<td>1073.6</td>
<td>0.3</td>
<td>0.15</td>
</tr>
<tr>
<td>1165.3</td>
<td>0.3</td>
<td>0.05</td>
</tr>
<tr>
<td>1207.7</td>
<td>0.3</td>
<td>0.00620</td>
</tr>
<tr>
<td>1272.1</td>
<td>0.3</td>
<td>0.22</td>
</tr>
<tr>
<td>1279.0</td>
<td>0.3</td>
<td>0.018</td>
</tr>
<tr>
<td>1349.4</td>
<td>0.3</td>
<td>0.0062</td>
</tr>
<tr>
<td>1449.3</td>
<td>0.3</td>
<td>0.48</td>
</tr>
<tr>
<td>1557.2</td>
<td>0.3</td>
<td>0.00643</td>
</tr>
<tr>
<td>1601.2</td>
<td>0.3</td>
<td>0.00532</td>
</tr>
<tr>
<td>1805.7</td>
<td>0.3</td>
<td>0.151</td>
</tr>
<tr>
<td>1889.9</td>
<td>0.3</td>
<td>0.071</td>
</tr>
<tr>
<td>1982.9</td>
<td>0.3</td>
<td>0.00554</td>
</tr>
<tr>
<td>2001.7</td>
<td>0.3</td>
<td>2.0</td>
</tr>
<tr>
<td>2200.6</td>
<td>0.3</td>
<td>0.044</td>
</tr>
<tr>
<td>2227.0</td>
<td>0.3</td>
<td>0.00177</td>
</tr>
<tr>
<td>2275.2</td>
<td>0.3</td>
<td>0.19</td>
</tr>
</tbody>
</table>

<\text{Photons}\> \text{Per Decay} = 312. \cdot 12.

PHOTON INTENSITY PLOT

CHARACTERISTIC RADIATION TABLE

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy (eV)</th>
<th>1/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>γ-</td>
<td>2363.8</td>
<td>82.50</td>
</tr>
<tr>
<td>γ-</td>
<td>1080.6</td>
<td>8.860</td>
</tr>
<tr>
<td>γ-</td>
<td>475.0</td>
<td>6.000</td>
</tr>
<tr>
<td>γ-</td>
<td>1088.9</td>
<td>4.2</td>
</tr>
</tbody>
</table>

<\text{E}_γ\> \text{Per Decay} = 856.2.
<\text{E}_γ\> \text{Per Decay} = 1214.

PARTICLE RADIATION TABLE

<table>
<thead>
<tr>
<th>Type</th>
<th>E_{\text{max}} (MeV)</th>
<th>Energy (MeV)</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>γ-</td>
<td>1016.0</td>
<td>359.4</td>
<td>3200</td>
</tr>
<tr>
<td>γ-</td>
<td>1276.0</td>
<td>471.5</td>
<td>2780</td>
</tr>
<tr>
<td>γ-</td>
<td>1298.0</td>
<td>481.1</td>
<td>4800</td>
</tr>
<tr>
<td>γ-</td>
<td>2365.0</td>
<td>972.9</td>
<td>82.50</td>
</tr>
</tbody>
</table>

<\text{E}_γ\> \text{Per Decay} = 856.2.
<\text{E}_γ\> \text{Per Decay} = 1214.
$^{125}$Sb

ENDF/B-IV FILE I COMMENTS
51-SB-125 HEML,AM EVAL-9774 R.E.SCHENTER AND F.SCHMITTROTH
CROSS SECTION DATA
EVAL-FEB74 C.W.REICH DECAY DATA
DIST-NOV74

FILE INFORMATION

MF=1 MT=477 DECAY DATA
REFERENCES
C.W.REICH, RG HELMER AND MH PUTMAN,ANCR-1157,ENDF/B-7
Q=1977 REVISION OF NAPSTRA-DOE MASS TABLE
OTHER-NUCLEAR DATA SHEETS 87, NO.5, 695 (1972).
NOTE FIRST-FORBIDDEN UNIQUE SHAPE CORRECTION CONSIDERED IN
DERIVING <E-BETA> FOR HIGHEST-ENERGY BETA TRANSITION

$^{125}$Sb

$T_{1/2} = 2.732.03\,\text{yr}$

$<E_p\text{ PER DECAY} = 86.86$

$<E_p\text{ PER DECAY} = 452.1$

CROSS SECTIONS (BARNS)

\begin{itemize}
  \item TOTAL 2200
  \item WETCOTT G FACTOR 1.1779
  \item CAPTURE 2200
  \item WETCOTT G FACTOR 10.0000
  \item RESONANCE INTEGRAL TOTAL 1.2970
  \item CAPTURE INTEGRAL TOTAL 1.3070
\end{itemize}

FISSION YIELDS

\begin{itemize}
  \item $^{238}$U THERMAL $5.9322x10^{-7}$
  \item $^{238}$U FAST $2.0622x10^{-5}$
  \item $^{239}$U FAST $1.8988x10^{-8}$
  \item $^{239}$Pu THERMAL $7.5284x10^{-4}$
\end{itemize}

\begin{align*}
  Q_f &= 621.0\pm2.0 \\
  BR_p &= 2300 \\
  BR_f &= 766.0\pm2.0
\end{align*}

$^{125}$Te

$58.0\pm1.0\text{d}$

$^{125}$Te

STARLDE OR LONG-LIVED
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Mean Energy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>20.96</td>
<td>0.0077</td>
<td>5</td>
</tr>
<tr>
<td>110.96</td>
<td>0.05</td>
<td>1</td>
</tr>
<tr>
<td>172.60</td>
<td>0.05</td>
<td>1</td>
</tr>
<tr>
<td>178.290</td>
<td>0.020</td>
<td>1</td>
</tr>
<tr>
<td>284.07</td>
<td>0.04</td>
<td>1</td>
</tr>
<tr>
<td>208.00</td>
<td>0.20</td>
<td>1</td>
</tr>
<tr>
<td>227.70</td>
<td>0.20</td>
<td>1</td>
</tr>
<tr>
<td>321.00</td>
<td>0.20</td>
<td>1</td>
</tr>
<tr>
<td>380.50</td>
<td>0.20</td>
<td>1</td>
</tr>
<tr>
<td>437.1</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>616.2</td>
<td>0.5</td>
<td>4</td>
</tr>
</tbody>
</table>

\( <E_{\text{photon}} \) per decay = 423.7

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>E&lt;sub&gt;max&lt;/sub&gt;</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>AU</td>
<td>30.2</td>
<td>6.497</td>
<td>4.923</td>
</tr>
<tr>
<td>CE</td>
<td>426.9</td>
<td>60.399</td>
<td>5.528</td>
</tr>
<tr>
<td>d-</td>
<td>94.0</td>
<td>24.76</td>
<td>13.50</td>
</tr>
<tr>
<td>p-</td>
<td>121.0</td>
<td>33.16</td>
<td>5.720</td>
</tr>
<tr>
<td>g-</td>
<td>130.0</td>
<td>34.87</td>
<td>18.10</td>
</tr>
<tr>
<td>g-</td>
<td>241.0</td>
<td>68.09</td>
<td>1.500</td>
</tr>
<tr>
<td>g-</td>
<td>302.0</td>
<td>87.54</td>
<td>40.20</td>
</tr>
<tr>
<td>g-</td>
<td>445.0</td>
<td>115.8</td>
<td>7.150</td>
</tr>
<tr>
<td>g-</td>
<td>621.0</td>
<td>194.8</td>
<td>13.50</td>
</tr>
</tbody>
</table>

\( <E_p> \) per decay = 87.33

\( <E_p> \) per decay = 200.2

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy</th>
<th>1/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>d-</td>
<td>302.0</td>
<td>40.20</td>
</tr>
<tr>
<td>p-</td>
<td>427.00</td>
<td>29.84</td>
</tr>
<tr>
<td>g-</td>
<td>130.0</td>
<td>18.10</td>
</tr>
<tr>
<td>g-</td>
<td>600.60</td>
<td>18.10</td>
</tr>
<tr>
<td>g-</td>
<td>636.00</td>
<td>11.60</td>
</tr>
<tr>
<td>g-</td>
<td>463.4</td>
<td>10.60</td>
</tr>
</tbody>
</table>

\( <E_x> \) per decay = 0.20

\( <E_x> \) per decay = 0.6
\[ ^{125}\text{Te} \]

ENDF/B-IV FILE 1 COMMENTS
52-TE-125M AND
SVAL-FEB74, C.W.REICH
DECAY DATA
DIST-NOV74
FOR FILE DESCRIPTION SEE
I.W REICH, RD HELMER AND MH PUTMAN,
ANCR-1137,ENDF-B/IV,77.
PREPARED FOR FILE 12/73
EWR

\[ ^{125}\text{Te} \]

\[ T_{1/2} = 58.0 \pm 1.0 \text{d} \]
\[ \langle E_i \rangle \text{ PER DECAY} = 143.1 \text{ keV} \]

FISSION YIELDS

\[ \text{resp} \text{ THERMAL} 7.0740 \times 10^{-9} \]

G 1T=144.79 \pm 0.04
B(1T)=1.000

\[ ^{125}\text{Te} \]

STABLE OR LONG-LIVED
**Photon Radiation Table**

<table>
<thead>
<tr>
<th>Mean Energy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>25.9215</td>
<td>0.0014</td>
<td>5 143.5</td>
</tr>
<tr>
<td>109.270</td>
<td>0.020</td>
<td>1 370</td>
</tr>
</tbody>
</table>

\[ \langle E_{\text{photon}} \rangle \text{ per decay} = 34.70 \]

**Particle Radiation Table**

<table>
<thead>
<tr>
<th>Type</th>
<th>( E_{\text{max}} )</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>AU</td>
<td>50.2</td>
<td>5.970</td>
<td>166.5</td>
</tr>
<tr>
<td>CE</td>
<td>108.3</td>
<td>50.527</td>
<td>0.014 192.2</td>
</tr>
</tbody>
</table>

\[ \langle E_{\text{n}} \rangle \text{ per decay} = 107.0 \]

**Characteristic Radiation Table**

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy</th>
<th>( I/100 \text{ Decays} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \text{Al} )</td>
<td>3.933</td>
<td>149.5</td>
</tr>
<tr>
<td>( \text{N} )</td>
<td>26.25</td>
<td>99.08</td>
</tr>
<tr>
<td>( \text{C} )</td>
<td>14.23</td>
<td>80.69</td>
</tr>
<tr>
<td>( \text{C} )</td>
<td>78.086</td>
<td>52.34</td>
</tr>
</tbody>
</table>
$^{122}$ Te

<table>
<thead>
<tr>
<th>Isotope</th>
<th>Stable or Long-Lived</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross Sections (Barns)</td>
<td></td>
</tr>
<tr>
<td>Total Capture</td>
<td>5.5117</td>
</tr>
<tr>
<td>Westcott G Factor</td>
<td>1.0937</td>
</tr>
<tr>
<td>Capture 2200 m/s</td>
<td>1.5507</td>
</tr>
<tr>
<td>Westcott G Factor</td>
<td>1.0045</td>
</tr>
<tr>
<td>Resonance Integral Total</td>
<td>1.3010 x 10^{-2}</td>
</tr>
<tr>
<td>Resonance Integral Capture</td>
<td>2.3570 x 10^{-1}</td>
</tr>
<tr>
<td>Fission Yields</td>
<td></td>
</tr>
<tr>
<td>$^{235}$U Fast</td>
<td>9.1375 x 10^{-4}</td>
</tr>
<tr>
<td>$^{239}$Pu Thermal</td>
<td>7.0790 x 10^{-9}</td>
</tr>
</tbody>
</table>
### 124 Pd

**ENDF/B-IV FILE 1 COMMENTS**

**46-PD-124**

**HEDL EVAL-APR74 R.E. SCHENTER**

**DIST-NOV74**

**REFERENCES**

**HALF LIFE R SCHENTER, THEORY (9/73)**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>T&lt;sub&gt;1/2&lt;/sub&gt;</td>
<td>2.870 s</td>
</tr>
<tr>
<td>E&lt;sub&gt;β&lt;/sub&gt; PER DECAY</td>
<td>2243.</td>
</tr>
<tr>
<td>E&lt;sub&gt;γ&lt;/sub&gt; PER DECAY</td>
<td>3590.</td>
</tr>
</tbody>
</table>

**FISSION YIELDS**

<table>
<thead>
<tr>
<th>Isotope</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>235U FAST</td>
<td>1.2392 × 10&lt;sup&gt;-9&lt;/sup&gt;</td>
</tr>
<tr>
<td>238U FAST</td>
<td>6.3794 × 10&lt;sup&gt;-8&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

| Q<sub>γ</sub> | 7620. |
| BR<sub>γ</sub> | 1.000 |

### 125 Ag

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>T&lt;sub&gt;1/2&lt;/sub&gt;</td>
<td>1.535 s</td>
</tr>
<tr>
<td>E&lt;sub&gt;β&lt;/sub&gt; PER DECAY</td>
<td>5475.</td>
</tr>
<tr>
<td>E&lt;sub&gt;γ&lt;/sub&gt; PER DECAY</td>
<td>5794.</td>
</tr>
</tbody>
</table>

**FISSION YIELDS**

<table>
<thead>
<tr>
<th>Isotope</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>235U THERMAL</td>
<td>4.0122 × 10&lt;sup&gt;-7&lt;/sup&gt;</td>
</tr>
<tr>
<td>235U FAST</td>
<td>1.4582 × 10&lt;sup&gt;-6&lt;/sup&gt;</td>
</tr>
<tr>
<td>238U FAST</td>
<td>1.3189 × 10&lt;sup&gt;-5&lt;/sup&gt;</td>
</tr>
<tr>
<td>239Pu THERMAL</td>
<td>3.0694 × 10&lt;sup&gt;-7&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

| Q<sub>γ</sub> | 10740. |
| BR<sub>γ</sub> | 1.000 |

### 126 Ag

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>T&lt;sub&gt;1/2&lt;/sub&gt;</td>
<td>3.796 s</td>
</tr>
</tbody>
</table>

| Q<sub>γ</sub> | 10940. |
| BR<sub>γ</sub> | 1.000 |

**126 - 47 - 1**
\[ ^{129}\text{Cd} \]

ENDF/B-IV FILE 1 COMMENTS
48-CO-126 HEOL
EVAL-APR74 R.E.SCHENTER
DIST-NOV74

REFERENCES
HALF-LIFE-R. SCHENTER, THEORY(9175)

\[ ^{129}\text{Cd} \]

\( T_{1/2} = 3.76\text{h} \)
\( \langle E_d \rangle \text{ PER DECAY} = 1279 \)
\( \langle E_\gamma \rangle \text{ PER DECAY} = 1681 \)

FISSION YIELDS
\( \text{\textsuperscript{235}}\text{U THERMAL} = 6.6006 \times 10^{-7} \)
\( \text{\textsuperscript{235}}\text{U FAST} = 1.8805 \times 10^{-4} \)
\( \text{\textsuperscript{239}}\text{Pu THERMAL} = 0.0097 \times 10^{-7} \)

\( \Theta_s = 4800 \)
\( \Theta_R = 1.000 \)

\[ ^{129}\text{In} \]

\( T_{1/2} = 15.530 \times 0.010s \)

\( 126 - 48 - 1 \)

\[ ^{129}\text{In} \]

ENDF/B-IV FILE 1 COMMENTS
49-IN-126 HEOL
EVAL-APR74 R.E.SCHENTER
DIST-NOV74

\[ ^{129}\text{In} \]

\( T_{1/2} = 15.530 \times 0.010s \)
\( \langle E_d \rangle \text{ PER DECAY} = 2539 \)
\( \langle E_\gamma \rangle \text{ PER DECAY} = 2793 \)

FISSION YIELDS
\( \text{\textsuperscript{235}}\text{U THERMAL} = 3.3455 \times 10^{-4} \)
\( \text{\textsuperscript{235}}\text{U FAST} = 7.3655 \times 10^{-4} \)
\( \text{\textsuperscript{239}}\text{Pu THERMAL} = 7.6957 \times 10^{-4} \)

\( \Theta_s = 8130 \)
\( \Theta_R = 1.000 \)

\[ ^{99}\text{Sn} \]

\( 99932.9 \)

\( 126 - 49 - 1 \)
\$^{113}\text{Sn} \$

ENDF/B-IV FILE 1 COMMENTS
50-SN-126 HEDL EVAL-DC74 R.E. SCHENET AND F. SCHMITTROTH OIST-NOV74 REV-JUN75

FILE INFORMATION

MF=1 MT=457 DECA Y DATA

REFERENCES

EBETA = A TOBIAS (10/72) RD/B/M2453
EBETA = A TOBIAS (10/72) RD/B/M2453
EGAMMA = A TOBIAS (10/72) RD/B/M2453

\[ T_{1/2} = 9993.2 \text{y} \]
\[ \langle E_{\beta} \rangle \text{ PER DECAY} = 70.00 \]
\[ \langle E_{\gamma} \rangle \text{ PER DECAY} = 9.80 \]

CROSS SECTIONS (BARNs)

\[ \# \text{ TOTAL Z200M/S} = 4.8990 \]
\[ \text{WESTCOTT & FACTOR} = 1.1619 \]
\[ \# \text{ CAPTURE Z200M/S} = 3.0000 \times 10^{-1} \]
\[ \text{WESTCOTT & FACTOR} = 1.0000 \]
\[ \text{RESONANCE INTEGRAL TOTAL} = 8.9260 \times 10^{-1} \]
\[ \text{RESONANCE INTEGRAL CATURE} = 1.8570 \times 10^{-1} \]

FISSION YIELDS

\[ ^{239}\text{U THERMAL} = 1.0598 \times 10^{-4} \]
\[ ^{235}\text{U FAST} = 5.0941 \times 10^{-4} \]
\[ ^{238}\text{U FAST} = 4.8655 \times 10^{-5} \]
\[ ^{239}\text{Pu THERMAL} = 1.0765 \times 10^{-3} \]

\[ B_{\beta} = 50.00 \]
\[ B_{\gamma} = 1.0000 \]

\[ 19.000 \text{m} \]

126 - 50 - 1
ENDFB-IV FILE 1 COMMENTS
51-Sb-126M HEOL
EVAL-APR74 R.E. SCHENTER
DIST-NOV74
REFERENCES
GIL-RO SCHENTER, THEORY(9/75)

126m-Sb

T_1/2 = 19.00m
< E_p > PER DECAY = 1084.
< E_y > PER DECAY = 995.2

FISSION YIELDS

235U THERMAL 3.3518 x 10^-4
235U FAST 6.2710 x 10^-8
239U THERMAL 1.1449 x 10^-7
239U THERMAL 2.9390 x 10^-3

G_y = 3980.
BR_y = .8600

126m-51-1
$^{134}$ Sb

ENDF/B-IV FILE 1 COMMENTS
51-58-126 HEOL EVAL-OCT74 R.E. SCHURING AND F. SCHMITTROTH
DIST-NOV74

FILE INFORMATION

MF=1 MT=67 DECAY DATA

REFERENCES
OBETA - A TÖBIAS(1072) RD/B/M2453
EBETA - A TÖBIAS(1072) RD/B/M2453
EGAMMA - A TÖBIAS(1072) RD/B/M2453

$^{134}$ Sb

$T_{1/2} = 32.40$ d
$<E_\beta> \text{ PER DECAY} = 358.0$
$<E_\gamma> \text{ PER DECAY} = 2670.$

CROSS SECTIONS (BARNs)
- TOTAL 2200M/S 1.039x10^{-4}
- WESTCOTT G FACTOR 1.1670
- CAPTURE 2200M/S 5.8000
- WESTCOTT G FACTOR 1.0000
- RESONANCE INTEGRAL TOTAL 1.6530x10^{-2}
- RESONANCE INTEGRAL CAPTURE 4.5680x10^{-4}

FISSION YIELDS
- $^{235}$U THERMAL 8.4946x10^{-4}
- $^{235}$U FAST 6.2712x10^{-4}
- $^{239}$U FAST 1.1499x10^{-7}
- $^{239}$PU THERMAL 2.9426x10^{-3}

$Q_\beta = 3670$
$BR_\beta = 1.000$

$^{135}$ Te

Stable or Long-lived


$^{152}$Te

$^{122}$Te

STABLE OR LONG-LIVED

CROSS SECTIONS (BARNs)

- TOTAL 2200M/S 5.1471
- WESTCOTT C FACTOR 1.0139
- CAPTURE 2200M/S 1.0531
- WESTCOTT C FACTOR 1.0072
- RESONANCE INTEGRAL TOTAL 1.1965 x 10^{-2}
- RESONANCE INTEGRAL CAPTURE 1.0596 x 10^{-1}

FISSION YIELDS

- $^{235}$U THERMAL 2.4913 x 10^{-8}
- $^{233}$U FAST 3.5906 x 10^{-8}
- $^{233}$Pu THERMAL 3.9054 x 10^{-7}

126 - 52 - 1

$^{126}$I

ENDF/B-IV FILE 1 COMMENTS
53-1-126. MISSING FROM ENDF/B IV
HALF LIFE R.L.AUBLE, NUCLEAR DATA 9, 125 (1973)

$^{126}$I

$\lambda = 13.02 x 0.07 \text{d}

FISSION YIELDS

- $^{235}$U THERMAL 9.3050 x 10^{-9}

126 - 53 - 1

$^{126}$Xe

$^{126}$Xe

STABLE OR LONG-LIVED

126 - 54 - 1
$^{107}$ Ag

ENDF/B-IV FILE 1 COMMENTS
47-AG-127 HEDL EVAL-APR74 R.E.SCHENTER
DIST-NOV74

REFERENCES
HALF LIFE= R SCHENTER, THEORY (9/73)

$^{107}$ Ag

$T_{1/2} = 20520$

$<E_x>$ PER DECAY = 2831.

$<E_x>$ PER DECAY = 3437.

$Q_x = 9120.$

$BR_x = 1.000$

$^{118}$ Cd

$T_{1/2} = 6590s$

127 - 47 - 1

$^{118}$ Cd

ENDF/B-IV FILE 1 COMMENTS
48-CO-127 HEDL EVAL-APR74 R.E.SCHENTER
DIST-NOV74

REFERENCES
HALF LIFE= R SCHENTER, THEORY (9/73)

$^{118}$ Cd

$T_{1/2} = 6590s$

$<E_x>$ PER DECAY = 2097.

$<E_x>$ PER DECAY = 2562.

FISSION YIELDS

235U THERMAL 3.368x10^-5

235U FAST 9.264x10^-5

239U FAST 3.354x10^-4

239Pu THERMAL 4.8103x10^-5

$Q_x = 6910.$

$BR_x = .5000$

$Q_x = 7160.$

$BR_x = .3000$

127 - 48 - 1
$^{115m}$In

ENDF/B-IV FILE 1 COMMENTS
49-IN-127M HEDL EVAL-APR74 R.E.SCHENTER
DIST-NOV74

REFERENCES
GT-R SCHENTER, THEORY(7/73)

$^{115m}$In

$\frac{T_1}{2} = 3.640s$
$\langle E \rangle _{\gamma} \text{ PER DECAY} = 1957.$
$\langle E \gamma \rangle \text{ PER DECAY} = 2291.$

FISSION YIELDS
$^{235U} \text{ THERMAL} \quad 2.0198 \times 10^{-4}$
$^{235U} \text{ FAST} \quad 3.1574 \times 10^{-4}$
$^{238U} \text{ FAST} \quad 3.6495 \times 10^{-4}$
$^{239Pu} \text{ THERMAL} \quad 5.1844 \times 10^{-4}$

$Q_{\gamma} = 6690.$
$BR_{\gamma} = 21.000.$

$^{126}$Sn

$2.12 \times 0.3h$

$^{126}$Sn

$^{126}$In

ENDF/B-IV FILE 1 COMMENTS
49-IN-127M HEDL EVAL-APR74 R.E.SCHENTER
DIST-NOV74

REFERENCES
DELAYED NEUTRON BRANCHING-T ENGELAND, THEORY(7/74)

$^{126}$In

$\frac{T_1}{2} = 2.00 \times 45s$
$\langle E \rangle _{\gamma} \text{ PER DECAY} = 1873.$
$\langle E \gamma \rangle \text{ PER DECAY} = 2195.$

FISSION YIELDS
$^{235U} \text{ THERMAL} \quad 2.0859 \times 10^{-4}$
$^{235U} \text{ FAST} \quad 5.173 \times 10^{-4}$
$^{238U} \text{ FAST} \quad 3.4034 \times 10^{-4}$
$^{239Pu} \text{ THERMAL} \quad 5.1845 \times 10^{-4}$

$Q_{\gamma} = 796.1$
$BR_{\gamma} = 0.00670$
$D_{\gamma} = 6640.$
$BR_{\gamma} = 0.9985$

$^{126}$Sn

$1.530 \times 0.010s$

$^{126}$Sn

127 - 49 - 1
ENDF/B-V FILE 1 COMMENTS
50-SN-127M AND EVAL-FEB74 C.W.REICH
DIST-NOV74
FOR FILE DESCRIPTION SEE C.W.REICH, RG HELMER AND MH PUTMAN,
ARCH-1117,ENDF/B-6.6/74.
REFERENCE
O-SEE V.D.S. (1972)
HALF-LIFE G.RUDSTAM ET AL., REVIEW PAPER 12, IAEA
PANEL ON FISSION-PRODUCT DATA (BOLONA, 1973), APP.B.

\[
\frac{127\text{m}n}{127\text{n}}
\]

**ENDF/B-V FILE 1 COMMENTS**

**50-SN-127M AND EVAL-FEB74 C.W.REICH**

**DIST-NOV74**

**FOR FILE DESCRIPTION SEE C.W.REICH, RG HELMER AND MH PUTMAN,**

**ARCH-1117,ENDF/B-6.6/74.**

**REFERENCE**

**O-SEE V.D.S. (1972)**

**HALF-LIFE G.RUDSTAM ET AL., REVIEW PAPER 12, IAEA**

**PANEL ON FISSION-PRODUCT DATA (BOLONA, 1973), APP.B.**

\[
\frac{127\text{m}n}{127\text{n}}
\]

\[
\frac{T_{1/2}}{127\text{m}} = 74.15 \pm 0.03 \text{m}
\]

\[
\frac{A_{127\text{m}}}{\text{PER DECAY}} = 1.134
\]

\[
\frac{\phi}{\text{PER DECAY}} = 494.0
\]

**FISSION YIELDS**

\[
\begin{align*}
235\text{U THERMAL} & = 4.183 \times 10^{-4} \\
235\text{U FAST} & = 9.308 \times 10^{-4} \\
239\text{Pu THERMAL} & = 1.289 \times 10^{-3}
\end{align*}
\]

\[
Q_{127\text{m}} = 3200 \pm 700
\]

\[
BR_{\gamma} = 1.000
\]

\[
\frac{127\text{m}n}{127\text{n}}
\]

\[
\frac{T_{1/2}}{127\text{n}} = 91.2 \pm 0.5 \text{h}
\]

**ENDF/B-V FILE 1 COMMENTS**

**50-SN-127M AND EVAL-FEB74 C.W.REICH**

**DIST-NOV74**

**FOR FILE DESCRIPTION SEE C.W.REICH, RG HELMER AND MH PUTMAN,**

**ARCH-1117,ENDF/B-6.6/74.**

**REFERENCE**

**O-SEE V.D.S. (1972)**

**HALF-LIFE G.RUDSTAM ET AL., REVIEW PAPER 12, IAEA**

**PANEL ON FISSION-PRODUCT DATA (BOLONA, 1973), APP.B.**

\[
\frac{127\text{m}n}{127\text{n}}
\]

\[
\frac{T_{1/2}}{127\text{m}} = 74.15 \pm 0.03 \text{m}
\]

\[
\frac{A_{127\text{m}}}{\text{PER DECAY}} = 1.134
\]

\[
\frac{\phi}{\text{PER DECAY}} = 494.0
\]

**FISSION YIELDS**

\[
\begin{align*}
235\text{U THERMAL} & = 4.183 \times 10^{-4} \\
235\text{U FAST} & = 9.308 \times 10^{-4} \\
239\text{Pu THERMAL} & = 1.289 \times 10^{-3}
\end{align*}
\]

\[
Q_{127\text{m}} = 3200 \pm 700
\]

\[
BR_{\gamma} = 1.000
\]

\[
\frac{127\text{m}n}{127\text{n}}
\]

\[
\frac{T_{1/2}}{127\text{n}} = 91.2 \pm 0.5 \text{h}
\]
**PHOTON RADIATION TABLE**

<table>
<thead>
<tr>
<th>MEAN ENERGY</th>
<th>LINES</th>
<th>PHOTONS/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>494.0</td>
<td>1</td>
<td>100.0</td>
</tr>
</tbody>
</table>

$\langle E_{\text{photon}} \rangle$ PER DECAY = 494.0

**PARTICLE RADIATION TABLE**

<table>
<thead>
<tr>
<th>TYPE</th>
<th>$E_{\text{max}}$</th>
<th>MEAN ENERGY</th>
<th>INTENSITY/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\gamma$</td>
<td>2700.0</td>
<td>1134.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

$\langle E_{\gamma} \rangle$ PER DECAY = 1134.0
$\langle E_{\gamma} \rangle$ PER DECAY = 1566.0

**PHOTON INTENSITY PLOT**

**CHARACTERISTIC RADIATION TABLE**

<table>
<thead>
<tr>
<th>TYPE</th>
<th>ENERGY</th>
<th>1/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\gamma$</td>
<td>494.0</td>
<td>100.0</td>
</tr>
<tr>
<td>$\beta$</td>
<td>2700.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>
127 Sn

ENDFB-IV FILE 1 COMMENTS
50-SN-127 ANC EVAF-EB74 E.W.REICH
GIST-NOVPF
FOR FILE DESCRIPTION SEE CW.REICH,AG HELMER AND MH PUTMAN,
ANCR-1157,ENDF210.8/74.
PREPARED FOR FILE 8/73
RES(GULF)
REFERENCE NUCLEAR DATA 88, NO. 2 (1972)
Q VALUE IS FROM GARVEY ET AL., R. M. P. 41, NO. 4, PART II.
THE ABSOLUTE INTENSITIES HAVE LARGE UNCERTAINTIES.
UNCERTAINTY OF 20% IN PHOTON NORMALIZATION FACTOR IS FROM
UNCERTAINTIES IN ABSOLUTE INTENSITIES. (SEE REF.) PHOTON
INTENSITY UNCERTAINTIES ARE TAKEN FROM LIST OF RELATIVE
PHOTO INTENSITIES.

<table>
<thead>
<tr>
<th>127 Sn</th>
</tr>
</thead>
<tbody>
<tr>
<td>T_{1/2} =2.12 ± 0.03h</td>
</tr>
<tr>
<td>⟨Ep⟩ PER DECAY =674.6</td>
</tr>
<tr>
<td>⟨Eγ⟩ PER DECAY =1434</td>
</tr>
<tr>
<td>FISSION YIELDS</td>
</tr>
<tr>
<td>235U THERMAL</td>
</tr>
<tr>
<td>239U FAST</td>
</tr>
<tr>
<td>239U FAST</td>
</tr>
<tr>
<td>239Pu THERMAL</td>
</tr>
<tr>
<td>G</td>
</tr>
<tr>
<td>89γ =1.000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>127 Sn</th>
</tr>
</thead>
<tbody>
<tr>
<td>91.2±0.5h</td>
</tr>
</tbody>
</table>

127 - 50 - 1
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Mean Energy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>77.2</td>
<td>2.0</td>
<td>10</td>
</tr>
<tr>
<td>154.7</td>
<td>3.0</td>
<td>16</td>
</tr>
<tr>
<td>259.6</td>
<td>1.7</td>
<td>21</td>
</tr>
<tr>
<td>366.3</td>
<td>2.3</td>
<td>12</td>
</tr>
<tr>
<td>469.1</td>
<td>3.5</td>
<td>12</td>
</tr>
<tr>
<td>551.2</td>
<td>3.0</td>
<td>14</td>
</tr>
<tr>
<td>654.2</td>
<td>1.5</td>
<td>7</td>
</tr>
<tr>
<td>74.6</td>
<td>4.7</td>
<td>6</td>
</tr>
<tr>
<td>829.4</td>
<td>2.1</td>
<td>8</td>
</tr>
<tr>
<td>974.0</td>
<td>1.8</td>
<td>7</td>
</tr>
<tr>
<td>1084.4</td>
<td>3.7</td>
<td>7</td>
</tr>
<tr>
<td>1114.8</td>
<td>1.2</td>
<td>6</td>
</tr>
<tr>
<td>1220.5</td>
<td>0.4</td>
<td>1</td>
</tr>
<tr>
<td>1237.4</td>
<td>0.4</td>
<td>1</td>
</tr>
<tr>
<td>1492.3</td>
<td>0.4</td>
<td>1</td>
</tr>
<tr>
<td>1530.3</td>
<td>0.4</td>
<td>1</td>
</tr>
<tr>
<td>1630.3</td>
<td>0.4</td>
<td>1</td>
</tr>
<tr>
<td>1568.4</td>
<td>0.4</td>
<td>1</td>
</tr>
<tr>
<td>1666.2</td>
<td>1.4</td>
<td>4</td>
</tr>
<tr>
<td>1462.7</td>
<td>0.4</td>
<td>1</td>
</tr>
<tr>
<td>1551.3</td>
<td>0.4</td>
<td>1</td>
</tr>
<tr>
<td>1586.3</td>
<td>0.4</td>
<td>1</td>
</tr>
<tr>
<td>1645.3</td>
<td>2.0</td>
<td>4</td>
</tr>
<tr>
<td>1735.5</td>
<td>3.5</td>
<td>5</td>
</tr>
<tr>
<td>1812.8</td>
<td>0.3</td>
<td>1</td>
</tr>
<tr>
<td>1857.3</td>
<td>0.3</td>
<td>1</td>
</tr>
<tr>
<td>2005.4</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>2095.3</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>2125.5</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>2504.2</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>2517.4</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>2589.5</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>2447.5</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>2670.0</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>2515.9</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>2584.9</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>3495.9</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>2805.7</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>2864.4</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>2881.1</td>
<td>0.5</td>
<td>1</td>
</tr>
</tbody>
</table>

*E_{photon} PER DECY = 1434. + 300.*

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy</th>
<th>1/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>β−</td>
<td>3090.0</td>
<td>40.00</td>
</tr>
<tr>
<td>γ</td>
<td>1194.3</td>
<td>0.4</td>
</tr>
<tr>
<td>γ</td>
<td>1095.6</td>
<td>0.4</td>
</tr>
<tr>
<td>γ</td>
<td>859.3</td>
<td>0.4</td>
</tr>
<tr>
<td>γ</td>
<td>879.2</td>
<td>0.4</td>
</tr>
<tr>
<td>γ</td>
<td>824.7</td>
<td>0.4</td>
</tr>
<tr>
<td>γ</td>
<td>590.0</td>
<td>2.7</td>
</tr>
<tr>
<td>γ</td>
<td>592.3</td>
<td>2.7</td>
</tr>
<tr>
<td>γ</td>
<td>592.3</td>
<td>2.7</td>
</tr>
<tr>
<td>γ</td>
<td>730.0</td>
<td>4.200</td>
</tr>
<tr>
<td>γ</td>
<td>2903.4</td>
<td>4.1</td>
</tr>
<tr>
<td>γ</td>
<td>490.9</td>
<td>4.4</td>
</tr>
<tr>
<td>γ</td>
<td>100.0</td>
<td>5.500</td>
</tr>
<tr>
<td>γ</td>
<td>500.0</td>
<td>3.500</td>
</tr>
<tr>
<td>γ</td>
<td>100.0</td>
<td>3.200</td>
</tr>
<tr>
<td>γ</td>
<td>1095.3</td>
<td>0.7</td>
</tr>
<tr>
<td>γ</td>
<td>583.3</td>
<td>0.4</td>
</tr>
</tbody>
</table>

*E_{photon} PER DECY = 1434. + 300.*
<table>
<thead>
<tr>
<th>TYPE</th>
<th>E&lt;sub&gt;\text{max}&lt;/sub&gt;</th>
<th>MEAN ENERGY</th>
<th>INTENSITY/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>p</td>
<td>210.0</td>
<td>68.32</td>
<td>.2900</td>
</tr>
<tr>
<td>p</td>
<td>220.0</td>
<td>61.53</td>
<td>.3700</td>
</tr>
<tr>
<td>p</td>
<td>240.0</td>
<td>47.78</td>
<td>.9700</td>
</tr>
<tr>
<td>p</td>
<td>250.0</td>
<td>70.91</td>
<td>3.0000</td>
</tr>
<tr>
<td>p</td>
<td>280.0</td>
<td>80.44</td>
<td>1.0000</td>
</tr>
<tr>
<td>p</td>
<td>300.0</td>
<td>86.89</td>
<td>8.0000</td>
</tr>
<tr>
<td>p</td>
<td>350.0</td>
<td>96.73</td>
<td>2.2000</td>
</tr>
<tr>
<td>p</td>
<td>390.0</td>
<td>116.9</td>
<td>1.5000</td>
</tr>
<tr>
<td>p</td>
<td>430.0</td>
<td>130.8</td>
<td>.7700</td>
</tr>
<tr>
<td>p</td>
<td>450.0</td>
<td>137.8</td>
<td>3.5000</td>
</tr>
<tr>
<td>p</td>
<td>460.0</td>
<td>141.4</td>
<td>.7900</td>
</tr>
<tr>
<td>p</td>
<td>500.0</td>
<td>155.7</td>
<td>8.7000</td>
</tr>
<tr>
<td>p</td>
<td>510.0</td>
<td>159.3</td>
<td>1.2000</td>
</tr>
<tr>
<td>p</td>
<td>540.0</td>
<td>170.3</td>
<td>.6200</td>
</tr>
<tr>
<td>p</td>
<td>560.0</td>
<td>177.7</td>
<td>3.2000</td>
</tr>
<tr>
<td>p</td>
<td>580.0</td>
<td>185.1</td>
<td>.90000</td>
</tr>
<tr>
<td>p</td>
<td>590.0</td>
<td>188.9</td>
<td>4.900</td>
</tr>
<tr>
<td>p</td>
<td>610.0</td>
<td>196.4</td>
<td>.4000</td>
</tr>
<tr>
<td>p</td>
<td>620.0</td>
<td>200.2</td>
<td>.79000</td>
</tr>
<tr>
<td>p</td>
<td>630.0</td>
<td>204.0</td>
<td>2.900</td>
</tr>
<tr>
<td>p</td>
<td>640.0</td>
<td>207.6</td>
<td>1.400</td>
</tr>
<tr>
<td>p</td>
<td>680.0</td>
<td>223.2</td>
<td>1.200</td>
</tr>
<tr>
<td>p</td>
<td>720.0</td>
<td>238.8</td>
<td>1.200</td>
</tr>
<tr>
<td>p</td>
<td>730.0</td>
<td>242.7</td>
<td>4.200</td>
</tr>
<tr>
<td>p</td>
<td>740.0</td>
<td>246.6</td>
<td>2.000</td>
</tr>
<tr>
<td>p</td>
<td>770.0</td>
<td>238.5</td>
<td>4.200</td>
</tr>
<tr>
<td>p</td>
<td>790.0</td>
<td>266.5</td>
<td>1.800</td>
</tr>
<tr>
<td>p</td>
<td>820.0</td>
<td>278.5</td>
<td>1.000</td>
</tr>
<tr>
<td>p</td>
<td>830.0</td>
<td>282.6</td>
<td>2.100</td>
</tr>
<tr>
<td>p</td>
<td>870.0</td>
<td>298.8</td>
<td>1.500</td>
</tr>
<tr>
<td>p</td>
<td>890.0</td>
<td>307.0</td>
<td>.90000</td>
</tr>
<tr>
<td>p</td>
<td>930.0</td>
<td>323.5</td>
<td>2.600</td>
</tr>
<tr>
<td>p</td>
<td>940.0</td>
<td>327.6</td>
<td>1.500</td>
</tr>
<tr>
<td>p</td>
<td>950.0</td>
<td>331.8</td>
<td>1.500</td>
</tr>
<tr>
<td>p</td>
<td>970.0</td>
<td>340.1</td>
<td>1.000</td>
</tr>
<tr>
<td>p</td>
<td>980.0</td>
<td>344.3</td>
<td>1.000</td>
</tr>
<tr>
<td>p</td>
<td>990.0</td>
<td>348.5</td>
<td>2.000</td>
</tr>
<tr>
<td>p</td>
<td>1000.0</td>
<td>352.7</td>
<td>3.000</td>
</tr>
<tr>
<td>p</td>
<td>1190.0</td>
<td>390.8</td>
<td>1.600</td>
</tr>
<tr>
<td>p</td>
<td>1150.0</td>
<td>416.6</td>
<td>1.200</td>
</tr>
<tr>
<td>p</td>
<td>1170.0</td>
<td>425.2</td>
<td>2.000</td>
</tr>
<tr>
<td>p</td>
<td>1380.0</td>
<td>517.5</td>
<td>3.000</td>
</tr>
<tr>
<td>p</td>
<td>1510.0</td>
<td>575.8</td>
<td>3.000</td>
</tr>
<tr>
<td>p</td>
<td>1980.0</td>
<td>797.1</td>
<td>2.000</td>
</tr>
<tr>
<td>p</td>
<td>1990.0</td>
<td>796.7</td>
<td>3.000</td>
</tr>
<tr>
<td>p</td>
<td>3090.0</td>
<td>1323.3</td>
<td>40.800</td>
</tr>
</tbody>
</table>

\[ E_p \] PER DECAY = 674.5
\[ E_p \] PER DECAY = 988.7
\( ^{127} \text{Sb} \)

ENDF/B-IV FILE 1 COMMENTS

51-SB-127 ANC
EVAL-FEB74 C.W.REICH
DIST-NDV74

FOR FILE DESCRIPTION SEE CW.REICH, RG HELMER AND RH PUTMAN,
ANCR-1157,ENDF210,8/74.

REFERENCE

G-1973 WAPSTRA-GOVE MASSTABLE

\[ T_{1/2} = 91.2 \times 10^9 \text{h} \]
\[ \langle E_x \rangle \text{ PER DECAY} = 318.1 \]
\[ \langle E_f \rangle \text{ PER DECAY} = 644.3 \]

FISSION YIELDS

\[ ^{235}\text{U THERMAL} \quad 5.122 \times 10^{-1} \]
\[ ^{239}\text{U FAST} \quad 1.311 \times 10^{-4} \]
\[ ^{239}\text{Pu FAST} \quad 3.859 \times 10^{-4} \]
\[ ^{239}\text{Pu THERMAL} \quad 4.468 \times 10^{-4} \]

\[ Q_{\alpha} = 1492.5 \text{MeV} \]
\[ BR_{\alpha} = 0.1600 \]

\[ Q_{\beta} = 1581.45 \text{MeV} \]
\[ BR_{\beta} = 0.8400 \]

\[ ^{128}\text{Se} \]
\[ 0.2984 \text{yr} \]

\[ ^{128}\text{Te} \]
\[ 9.35 \times 0.07 \text{yr} \]
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Mean Energy (keV)</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>61.0</td>
<td>1</td>
<td>1,140</td>
</tr>
<tr>
<td>134.3</td>
<td>1</td>
<td>1,240</td>
</tr>
<tr>
<td>262.1</td>
<td>4</td>
<td>10.28</td>
</tr>
<tr>
<td>310.0</td>
<td>1</td>
<td>2,480</td>
</tr>
<tr>
<td>391.8</td>
<td>1</td>
<td>6,900</td>
</tr>
<tr>
<td>462.1</td>
<td>5</td>
<td>32.48</td>
</tr>
<tr>
<td>502.8</td>
<td>1</td>
<td>7,700</td>
</tr>
<tr>
<td>543.3</td>
<td>1</td>
<td>2,760</td>
</tr>
<tr>
<td>584.2</td>
<td>1</td>
<td>3,100</td>
</tr>
<tr>
<td>677.9</td>
<td>7</td>
<td>43.63</td>
</tr>
<tr>
<td>774.4</td>
<td>4</td>
<td>16.06</td>
</tr>
<tr>
<td>877.0</td>
<td>1</td>
<td>2,000</td>
</tr>
<tr>
<td>820.6</td>
<td>1</td>
<td>6900</td>
</tr>
<tr>
<td>924.4</td>
<td>1</td>
<td>3,100</td>
</tr>
<tr>
<td>1142</td>
<td>1</td>
<td>3,400</td>
</tr>
<tr>
<td>1240</td>
<td>1</td>
<td>3,400</td>
</tr>
<tr>
<td>1378</td>
<td>1</td>
<td>6700</td>
</tr>
</tbody>
</table>

\[ <E_{\text{PHOTON}} \text{ PER DECAY} = 644.3 \]

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy (keV)</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \gamma )</td>
<td>0.0000</td>
<td>56.39</td>
<td>0.4000</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>258.0</td>
<td>73.42</td>
<td>0.9000</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>391.0</td>
<td>53.98</td>
<td>0.7000</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>426.0</td>
<td>129.4</td>
<td>9.0000</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>440.0</td>
<td>134.3</td>
<td>1.5000</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>504.0</td>
<td>157.1</td>
<td>5.6000</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>657.0</td>
<td>214.3</td>
<td>1.3000</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>795.0</td>
<td>268.5</td>
<td>7.6000</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>797.0</td>
<td>269.3</td>
<td>16.70</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>1108</td>
<td>309.7</td>
<td>6.0000</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>1240</td>
<td>359.7</td>
<td>33.50</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>990.0</td>
<td>331.8</td>
<td>4.5000</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>1075.0</td>
<td>385.7</td>
<td>3.0000</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>1108.0</td>
<td>398.5</td>
<td>21.70</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>1240.0</td>
<td>435.7</td>
<td>2.0000</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>1492.0</td>
<td>567.8</td>
<td>4.0000</td>
</tr>
</tbody>
</table>

\[ <E_{\gamma} \text{ PER DECAY} = 318.1 \]

\[ <E_{\gamma} \text{ PER DECAY} = 595.5 \]

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy (keV)</th>
<th>1/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \gamma )</td>
<td>685.7</td>
<td>34.36</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>895.0</td>
<td>33.50</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>473.0</td>
<td>24.03</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>1108</td>
<td>16.70</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>783.7</td>
<td>14.11</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>252.4</td>
<td>7.920</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>795.0</td>
<td>7.600</td>
</tr>
</tbody>
</table>

\[ <E_{\gamma} \text{ PER DECAY} = 318.1 \]

\[ <E_{\gamma} \text{ PER DECAY} = 595.5 \]
\[ ^{127}\text{Te} \]

ENDF/B-IV FILE 1 COMMENTS
52-TF-127m HEN0 PVAF-01774 H.F. SCHWITZER AND F. SCHMITTROTH
DIST-NOV74

FILE INFORMATION
MF=1 MT=657 DECAY DATA
REFERENCES
G1T-C LEDERER ET AL TABLE OF ISOTOPES 6TH ED

\[ ^{127}\text{Te} \]

- \( T_{1/2} = 2984\text{y} \)
- \( <E_2> \text{ PER DECAY} = 4.979 \)
- \( <E_3> \text{ PER DECAY} = 91.86 \)

- CROSS SECTIONS (BARNs)
  - \( \alpha \text{ TOTAL 22DOM/S} = 1.4026 \times 10^{-11} \)
  - WESTCOTT G FACTOR = 1.1529
  - \( \alpha \text{ CAPTURE 22DOM/S} = 9.4000 \)
  - WESTCOTT G FACTOR = 1.0000
  - RESONANCE INTEGRAL TOTAL = 1.2250 \times 10^{-2}
  - RESONANCE INTEGRAL CAPTURE = 4.2480 \times 10^{-11}

- FISSION YIELDS
  - \( ^{235}\text{U THERMAL} = 6.0155 \times 10^{-7} \)
  - \( ^{235}\text{U PAST} = 9.310 \times 10^{-7} \)
  - \( ^{239}\text{Pu PAST} = 3.9098 \times 10^{-9} \)
  - \( ^{239}\text{Pu THERMAL} = 4.0194 \times 10^{-9} \)

\[ Q_{\gamma} = 778.7 \quad Q_{17} = 88.70 \]
\[ B_{\gamma} = 0.02400 \quad BR_{17} = 0.0760 \]

- STABLE OR LONG-LIVED
  - 9.35% 0.075
\[ {^{127}}\text{Te} \]

END FB-IV FILE 1 COMMENTS
52-TE-127 ANC

EVAL=FEB74 C.W.REICH
DIST-NOV74

FOR FILE DESCRIPTION SEE C.W.REICH, RG HELMER AND MH PUTMAN,
ANCR-1157,ENDF/B-IV.874.

PREPARED FOR FILE 9/73

RES(GULF)

REFERENCE NUCLEAR DATA 88, NO. 2 (1972)

Q VALUE IS FROM 1973 REVISION OF THE WAPSTRA-GOYE MASS TABLES
PHOTON-INTENSITY UNCERTAINTIES ARE TAKEN FROM LIST OF RELATIVE
INTENSITIES.

\[ {^{127}}\text{Te} \]

\[ T_{1/2} = 9.35 \pm 0.07 \text{h} \]
\[ \langle E_\gamma \rangle \text{ PER DECAY} = 227.3 \]
\[ \langle E_\gamma \rangle \text{ PER DECAY} = 5.170 \]

Fission Yields

\[ ^{235}\text{U THERMAL} \quad 2.031 \times 10^{-7} \]
\[ ^{235}\text{U FAST} \quad 5.030 \times 10^{-7} \]
\[ ^{239}\text{Pu THERMAL} \quad 4.79 \times 10^{-7} \]

\[ Q = 693.45 \]
\[ BM = 1.000 \]

\[ {^{127}}\text{I} \]

STABLE OR LONG-LIVED

127 - 52 - 1
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Energy (keV)</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>57.65</td>
<td>1</td>
<td>0.56 ± 0.05</td>
</tr>
<tr>
<td>145.20</td>
<td>1</td>
<td>0.0033 ± 0.0023</td>
</tr>
<tr>
<td>172.1</td>
<td>1</td>
<td>0.00030 ± 0.00020</td>
</tr>
<tr>
<td>282.90</td>
<td>1</td>
<td>0.0582 ± 0.0021</td>
</tr>
<tr>
<td>375.0</td>
<td>1</td>
<td>0.0000 ± 0.0017</td>
</tr>
<tr>
<td>460.10</td>
<td>1</td>
<td>0.0000 ± 0.0010</td>
</tr>
<tr>
<td>618.0</td>
<td>1</td>
<td>0.0000 ± 0.0002</td>
</tr>
</tbody>
</table>

\[
\langle E_{\text{Photon}} \rangle \text{ per decay} = 5.17 ± 0.05
\]

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>(E_{\text{Max}}) (keV)</th>
<th>Mean Energy (keV)</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\gamma)</td>
<td>74.0</td>
<td>19.28</td>
<td>0.0010</td>
</tr>
<tr>
<td>(\beta)</td>
<td>275.0</td>
<td>78.85</td>
<td>1.70</td>
</tr>
<tr>
<td>(\beta)</td>
<td>318.0</td>
<td>92.78</td>
<td>0.00060</td>
</tr>
<tr>
<td>(\beta)</td>
<td>490.0</td>
<td>152.1</td>
<td>0.0700</td>
</tr>
<tr>
<td>(\beta)</td>
<td>695.0</td>
<td>290.0</td>
<td>98.80</td>
</tr>
</tbody>
</table>

\[
\langle E_{\gamma} \rangle \text{ per decay} = 227.3
\]

\[
\langle E_{\beta} \rangle \text{ per decay} = 462.9
\]

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy (keV)</th>
<th>(1/100 \text{ Decays})</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\gamma)</td>
<td>695.0</td>
<td>98.80</td>
</tr>
</tbody>
</table>
### Stable or Long-Lived

#### Cross Sections (Barns)

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>9.4030</td>
</tr>
<tr>
<td>Westcott Q Factor</td>
<td>1.04x10^-2</td>
</tr>
<tr>
<td>Capture 2200 MeV</td>
<td>6.201x10^-2</td>
</tr>
<tr>
<td>Westcott G Factor</td>
<td>1.0000</td>
</tr>
<tr>
<td>Resonance Integral Total</td>
<td>2.9210x10^-2</td>
</tr>
<tr>
<td>Resonance Integral Capture</td>
<td>1.9520x10^-2</td>
</tr>
</tbody>
</table>

#### Fission Yields

- **238Pu Thermal**: 3.6395x10^-4
127 Ag

ENDF/B-IV FILE 1 COMMENTS
47-AG-128 HECL EVAL-APR74 R.E.SCHENTER
DIST-NOVA

REFERENCES
HALF-LIFE - R SCHENTER, THEORY (9/73)

\[ T_{1/2} = 1.9024 \text{ h} \]
\[ \langle E_\beta \rangle \text{ PER DECAY} = 3627. \]
\[ \langle E_\gamma \rangle \text{ PER DECAY} = 4267. \]

FISSION YIELDS
\[ ^{235}U \text{ THERMAL} = 1.1527 \times 10^{-6} \]
\[ ^{235}U \text{ FAST} = 2.7204 \times 10^{-8} \]
\[ ^{239}U \text{ FAST} = 2.2998 \times 10^{-8} \]
\[ ^{239}Pu \text{ THERMAL} = 1.9893 \times 10^{-9} \]

\[ G_\beta = 1.9520 \]
\[ B(R_\gamma) = 1.000 \]

128 - 47 - 1

1.290 s

128 Cd

ENDF/B-IV FILE 1 COMMENTS
48-CD-128 HECL EVAL-APR74 R.E.SCHENTER
DIST-NOVA

REFERENCES
HALF-LIFE - R SCHENTER, THEORY (9/73)

\[ T_{1/2} = 1.290 \text{ s} \]
\[ \langle E_\beta \rangle \text{ PER DECAY} = 1558. \]
\[ \langle E_\gamma \rangle \text{ PER DECAY} = 2138. \]

FISSION YIELDS
\[ ^{235}U \text{ THERMAL} = 1.5909 \times 10^{-3} \]
\[ ^{235}U \text{ FAST} = 3.3255 \times 10^{-5} \]
\[ ^{239}U \text{ FAST} = 4.2219 \times 10^{-6} \]
\[ ^{239}Pu \text{ THERMAL} = 1.2098 \times 10^{-5} \]

\[ G_\beta = 5560. \]
\[ B(R_\gamma) = 1.000 \]

128 - 48 - 1

5.74 x 5%
### 128 In

<table>
<thead>
<tr>
<th>References</th>
<th>Delayed Neutron Branching - T England, Theory (2/76)</th>
</tr>
</thead>
</table>

#### Parameters:

- $T_{1/2} = 3.74.5 \text{s}$
- $<E_p> \text{ per decay} = 2804$
- $<E_x> \text{ per decay} = 3065$

#### Fission Yields:

- $^{235}\text{U thermal} = 5.5125 \times 10^{-4}$
- $^{235}\text{U fast} = 1.0558 \times 10^{-3}$
- $^{239}\text{Pu thermal} = 7.1709 \times 10^{-4}$

#### Additional Information:

$$Q_w = 1196, \quad 9070$$

$$BR_k = 0.01200, \quad BR_p = 0.9880$$

### References:

- ENDF/B-IV File 1 Comments
- HEDL Eval-APRTX R.E. Schenter
- DISE-NOVX

---

128 - 49 - 1
\( ^{128} \text{Sn} \)

ENDF/B-IV FILE 1 COMMENTS
50- SN-128 ANC
50- FEB74 C.W.REICH
DECAY DATA
DIST-NOV74
FOR FILE DESCRIPTION SEE C.W.REICH, R.G. HELMER AND MH PUTMAN,
ANCR-1157, ENDF/B-4, B374.
PREPARED FOR FILE 9/75 RES(GULF)
REFERENCE: NUCLEAR DATA B9, NO. 2 (1973)
Q VALUE IS FROM 1975 REVISION OF NAPSTRA-DOE MASS TABLES.
BETA-RAY ENERGIES WERE COMPUTED WITH THE ASSUMPTION THAT THE
482-KEV GAMMA RAY IS IN COINCIDENCE WITH A 892-KEV BETA RAY.
THE BETA-RAY INTENSITIES WERE DETERMINED FROM THE RELATIVE
GAMMA-RAY INTENSITIES GIVEN IN DECAY SCHEME AND THE GAMMA-
RAY NORMALIZATION FACTOR.
THE BETA-RAY INTENSITIES TOTAL ONLY 84.7%.
SOME OF GAMMA RAYS MAY BE FROM 98-128. ACCORDING TO REF.
GAMMA-RAY INTENSITY UNCERTAINTIES ARE TAKEN FROM LIST OF
RELATIVE INTENSITIES.

\[ \begin{align*}
  T_{1/2} &= 59.0 \pm 0.1 \text{m} \\
  \langle E_\beta \rangle \text{ PER DECAY} &= 227.2 \\
  \langle E_\gamma \rangle \text{ PER DECAY} &= 596.5 \\
  \text{FISSION YIELDS} & \\
  ^{239} \text{U THERMAL} &= 2.7576 \times 10^{-3} \\
  ^{239} \text{U FAST} &= 4.8778 \times 10^{-3} \\
  ^{238} \text{U FAST} &= 2.2269 \times 10^{-3} \\
  ^{239} \text{Pu THERMAL} &= 5.7907 \times 10^{-3} \\
\end{align*} \]

\[ G_\alpha = 1500.45 \text{B}
\]
\[ G_\beta = 1.000 \text{B} \]

\[ ^{128} \text{Sn} \]

10.40 \pm 0.20 \text{m}

128 - 50 - 1
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Mean Energy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>65.3 ± 1.7</td>
<td>4</td>
<td>45.7 ± 6.9</td>
</tr>
<tr>
<td>152.5 ± 0.4</td>
<td>1</td>
<td>7.4 ± 0.8</td>
</tr>
<tr>
<td>230.5 ± 0.4</td>
<td>1</td>
<td>6.0 ± 0.12</td>
</tr>
<tr>
<td>494.4 ± 0.4</td>
<td>1</td>
<td>2.2 ± 0.7</td>
</tr>
<tr>
<td>435.7 ± 0.4</td>
<td>1</td>
<td>6.2 ± 0.3</td>
</tr>
<tr>
<td>482.0 ± 0.4</td>
<td>1</td>
<td>6.0 ± 0.7</td>
</tr>
<tr>
<td>557.3 ± 0.4</td>
<td>1</td>
<td>18.0 ± 2.4</td>
</tr>
<tr>
<td>680.4 ± 0.4</td>
<td>1</td>
<td>13.2 ± 1.3</td>
</tr>
</tbody>
</table>

\[ \langle \text{Photons} \rangle \text{ per decay} = 597 \pm 40 \]

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>( E_{\text{Max}} )</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \gamma )</td>
<td>697.0</td>
<td>229.8</td>
<td>9.600</td>
</tr>
<tr>
<td>( \alpha )</td>
<td>745.0</td>
<td>247.6</td>
<td>38.40</td>
</tr>
<tr>
<td>( \beta )</td>
<td>818.0</td>
<td>277.7</td>
<td>36.00</td>
</tr>
</tbody>
</table>

\[ \langle E \rangle \text{ per decay} = 217.2 \]

\[ \langle E \rangle \text{ per decay} = 429.5 \]

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy</th>
<th>( 1/100 ) Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \gamma )</td>
<td>482.0 ± 0.4</td>
<td>66.0 ± 7.0</td>
</tr>
<tr>
<td>( \alpha )</td>
<td>745.0</td>
<td>38.40</td>
</tr>
<tr>
<td>( \beta )</td>
<td>818.0</td>
<td>36.00</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>557.3 ± 0.4</td>
<td>18.0 ± 2.4</td>
</tr>
</tbody>
</table>
Sb

ENDFB-IV FILE 1 COMMENTS
51-SB-12AM ANC
EVAL-FEB74 C.W.REICH
DIST-NOV74
FOR FILE DESCRIPTION SEE (C.W.REICH, R.G. HELMER AND M.H. PUTMAN,
ANCR-1157, ENDFZ10, 8/74)
PREPARED FOR FILE 9/73
UNCERTAINTIES ON Q VALUE ARE FROM THE WAPSTRA-GOVE MASS
COMPILATION.
BETA RAY INTENSITIES GIVEN IN DECAY SCHEME SUM TO 104.3%.
GAMMA-RAY INTENSITY UNCERTAINTIES ARE FROM LIST OF REALTIVE
INTENSITIES.
IN ADDITION TO GAMMA-RAY TRANSITION GIVEN, THERE IS POSSIBLY
AN ISOMERIC TRANSITION TO THE GROUND STATE OF SB-128 WITH
AN INTENSITY OF 0.05%.

T1/2 = 10.49 x 10^3 yrs
\langle E_\beta \rangle PER DECAY = 1.16 MeV
\langle E_\gamma \rangle PER DECAY = 1.0 V

FISSION YIELDS

\text{235U THERMAL} 6.391 x 10^{-5}
\text{235U FAST} 4.382 x 10^{-4}
\text{239U FAST} 3.94 x 10^{-4}
\text{239U THERMAL} 9.459 x 10^{-4}

G \beta = 4291.4 \text{ eV}
G \gamma = 3.6 \text{ eV}

STABLE OR LONG-LIVED
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Mean Energy (keV)</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>193.5</td>
<td>± 0.7</td>
<td>1</td>
</tr>
<tr>
<td>314.0</td>
<td>± 0.3</td>
<td>95.0 ± 2.0</td>
</tr>
<tr>
<td>594.10</td>
<td>± 0.10</td>
<td>3.4 ± 0.5</td>
</tr>
<tr>
<td>743.24</td>
<td>± 0.04</td>
<td>1</td>
</tr>
<tr>
<td>753.90</td>
<td>± 0.04</td>
<td>100.0 ± 0.20</td>
</tr>
<tr>
<td>787.60</td>
<td>± 0.07</td>
<td>1</td>
</tr>
<tr>
<td>846.0</td>
<td>± 0.3</td>
<td>2.5 ± 0.3</td>
</tr>
<tr>
<td>908.30</td>
<td>± 0.20</td>
<td>1</td>
</tr>
<tr>
<td>1040.9</td>
<td>± 0.3</td>
<td>1</td>
</tr>
<tr>
<td>1098.4</td>
<td>± 0.8</td>
<td>0.30 ± 0.20</td>
</tr>
<tr>
<td>1107.6</td>
<td>± 0.3</td>
<td>0.40 ± 0.20</td>
</tr>
<tr>
<td>1141.7</td>
<td>± 0.3</td>
<td>0.30 ± 0.20</td>
</tr>
<tr>
<td>1158.0</td>
<td>± 0.3</td>
<td>1.80 ± 0.30</td>
</tr>
<tr>
<td>1354.6</td>
<td>± 0.5</td>
<td>1.60 ± 0.20</td>
</tr>
<tr>
<td>1585.2</td>
<td>± 1.0</td>
<td>0.50 ± 0.20</td>
</tr>
<tr>
<td>1608.5</td>
<td>± 1.0</td>
<td>1</td>
</tr>
</tbody>
</table>

$<E_{\text{phot}}>$ per decay = 1986. ± 14.

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>E$_{\text{max}}$ (keV)</th>
<th>Mean Energy (keV)</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>1410.0</td>
<td>530.8</td>
<td>1.534</td>
</tr>
<tr>
<td>5</td>
<td>1600.0</td>
<td>616.6</td>
<td>5.932</td>
</tr>
<tr>
<td>5</td>
<td>1660.0</td>
<td>658.9</td>
<td>8.439</td>
</tr>
<tr>
<td>9</td>
<td>1850.0</td>
<td>731.5</td>
<td>4.003</td>
</tr>
<tr>
<td>9</td>
<td>2450.0</td>
<td>1014.8</td>
<td>81.52</td>
</tr>
</tbody>
</table>

$<E_p>$ per decay = 947.3

$<E_p>$ per decay = 1360.

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy (keV)</th>
<th>1/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>753.90</td>
<td>0.04</td>
</tr>
<tr>
<td>9</td>
<td>743.24</td>
<td>0.04</td>
</tr>
<tr>
<td>9</td>
<td>314.0</td>
<td>0.5</td>
</tr>
<tr>
<td>9</td>
<td>2450.0</td>
<td>0.5</td>
</tr>
</tbody>
</table>
### $^{131}$ Sb

**ENDF/B-IV FILE 1 COMMENTS**

51-SB-12A ANC EVAL-76F4 C.W. REICH

**DIST-NOV74 FOR FILE DESCRIPTION SEE CM REICH, RG HELMER AND MH PUTMAN, ANCR-1157, ENDF/B-4.8/74.

**PREPARED FOR FILE 9/73 RES(IQSF)**

**REFERENCE** NUCLEAR DATA F00, NO 2, 1973.

**UNCERTAINTIES ON D VALUE ARE FROM THE WAPSTRA-GOVE MASS COMPILATION.**

**BETA-RAY INTENSITIES (FROM DECAY SCHEME IN NUCLEAR DATA)**

**SUM TO ONLY 93,728.**

**GAMMA-RAY INTENSITY UNCERTAINTIES ARE FROM LIST OF RELATIVE INTENSITIES.**

<table>
<thead>
<tr>
<th>Decay</th>
<th>$T_{1/2}$</th>
<th>$E_\beta$</th>
<th>$E_\gamma$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$=9.00\times10^5$</td>
<td>$=18.5$</td>
<td>$=5096$</td>
</tr>
<tr>
<td><strong>FISSION YIELDS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$^{235}$U THERMAL</td>
<td>$1.1045\times10^{-4}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$^{235}$U FAST</td>
<td>$4.2845\times10^{-4}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$^{238}$U</td>
<td>$3.2356\times10^{-5}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$^{239}$Pu THERMAL</td>
<td>$9.4274\times10^{-4}$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$Q_{\gamma} = 4298.4\times100,$

$BR_{\gamma} = 1.000$

<table>
<thead>
<tr>
<th>Decay</th>
<th>$T_{1/2}$</th>
<th>$E_\beta$</th>
<th>$E_\gamma$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$=7e$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**STABLE OR LONG-LIVED**

---

128 - 51- 1
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Mean Energy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>102.8 ± 0.3</td>
<td>1</td>
<td>0.40 ± 0.08</td>
</tr>
<tr>
<td>173.4 ± 0.5</td>
<td>1</td>
<td>0.60 ± 0.12</td>
</tr>
<tr>
<td>152.6 ± 0.3</td>
<td>1</td>
<td>1.50 ± 0.10</td>
</tr>
<tr>
<td>227.2 ± 1.6</td>
<td>6</td>
<td>7.9 ± 0.4</td>
</tr>
<tr>
<td>316.6 ± 0.3</td>
<td>5</td>
<td>7.0 ± 0.3</td>
</tr>
<tr>
<td>443.3 ± 1.8</td>
<td>4</td>
<td>5.5 ± 0.4</td>
</tr>
<tr>
<td>526.5 ± 0.10</td>
<td>1</td>
<td>45.0 ± 2.3</td>
</tr>
<tr>
<td>582.9 ± 0.3</td>
<td>1</td>
<td>1.00 ± 0.20</td>
</tr>
<tr>
<td>594.3 ± 0.3</td>
<td>1</td>
<td>1.00 ± 0.20</td>
</tr>
<tr>
<td>645.0 ± 0.4</td>
<td>7</td>
<td>93. ± 3.0</td>
</tr>
<tr>
<td>748.4 ± 0.20</td>
<td>4</td>
<td>206. ± 7.0</td>
</tr>
<tr>
<td>828.9 ± 1.3</td>
<td>6</td>
<td>27.8 ± 1.6</td>
</tr>
<tr>
<td>908.8 ± 0.4</td>
<td>1</td>
<td>1.00 ± 0.20</td>
</tr>
<tr>
<td>972.3 ± 0.4</td>
<td>1</td>
<td>1.00 ± 0.20</td>
</tr>
<tr>
<td>1047.5 ± 0.4</td>
<td>1</td>
<td>3.5 ± 0.6</td>
</tr>
<tr>
<td>1078.6 ± 0.4</td>
<td>1</td>
<td>2.0 ± 0.4</td>
</tr>
<tr>
<td>1137.2 ± 0.4</td>
<td>4</td>
<td>8.8 ± 0.2</td>
</tr>
<tr>
<td>1259.5 ± 0.4</td>
<td>1</td>
<td>1.00 ± 0.20</td>
</tr>
<tr>
<td>1339.8 ± 0.4</td>
<td>1</td>
<td>1.00 ± 0.20</td>
</tr>
<tr>
<td>1378.4 ± 0.4</td>
<td>1</td>
<td>1.8 ± 0.4</td>
</tr>
<tr>
<td>1593.2 ± 0.5</td>
<td>1</td>
<td>3.9 ± 0.10</td>
</tr>
<tr>
<td>1685.7 ± 0.5</td>
<td>1</td>
<td>3.0 ± 0.10</td>
</tr>
<tr>
<td>1707.9 ± 0.5</td>
<td>1</td>
<td>3.0 ± 0.06</td>
</tr>
<tr>
<td>1785.5 ± 0.5</td>
<td>1</td>
<td>4.0 ± 0.08</td>
</tr>
</tbody>
</table>

<\(\langle E_{\text{photon}}\rangle\) per decay = 3096. ± 60.

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>g-</td>
<td>566.0</td>
<td>179.9</td>
</tr>
<tr>
<td>g-</td>
<td>700.0</td>
<td>235.9</td>
</tr>
<tr>
<td>g-</td>
<td>718.0</td>
<td>234.8</td>
</tr>
<tr>
<td>g-</td>
<td>780.0</td>
<td>262.5</td>
</tr>
<tr>
<td>g-</td>
<td>810.0</td>
<td>274.5</td>
</tr>
<tr>
<td>g-</td>
<td>870.0</td>
<td>298.8</td>
</tr>
<tr>
<td>g-</td>
<td>935.0</td>
<td>302.9</td>
</tr>
<tr>
<td>g-</td>
<td>1125.0</td>
<td>403.7</td>
</tr>
<tr>
<td>g-</td>
<td>1150.0</td>
<td>415.6</td>
</tr>
<tr>
<td>g-</td>
<td>1160.0</td>
<td>420.9</td>
</tr>
<tr>
<td>g-</td>
<td>1440.0</td>
<td>546.5</td>
</tr>
<tr>
<td>g-</td>
<td>1540.0</td>
<td>589.8</td>
</tr>
<tr>
<td>g-</td>
<td>1610.0</td>
<td>621.1</td>
</tr>
<tr>
<td>g-</td>
<td>1960.0</td>
<td>782.7</td>
</tr>
</tbody>
</table>

<\(\langle E_{\gamma}\rangle\) per decay = 418.3

<\(\langle E_{\nu}\rangle\) per decay = 709.4

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>g-</td>
<td>755.00</td>
<td>0.10</td>
</tr>
<tr>
<td>g-</td>
<td>745.30</td>
<td>0.10</td>
</tr>
<tr>
<td>g-</td>
<td>316.10</td>
<td>0.10</td>
</tr>
<tr>
<td>g-</td>
<td>726.50</td>
<td>0.10</td>
</tr>
<tr>
<td>g-</td>
<td>636.20</td>
<td>0.10</td>
</tr>
<tr>
<td>g-</td>
<td>828.70</td>
<td>0.10</td>
</tr>
<tr>
<td>g-</td>
<td>1960.0</td>
<td>7.9</td>
</tr>
<tr>
<td>g-</td>
<td>636.20</td>
<td>0.20</td>
</tr>
<tr>
<td>g-</td>
<td>889.0</td>
<td>15.60</td>
</tr>
<tr>
<td>g-</td>
<td>813.60</td>
<td>0.20</td>
</tr>
</tbody>
</table>

<\(\langle E_{\gamma}\rangle\) per decay = 19.0

<\(\langle E_{\nu}\rangle\) per decay = 19.0

<\(\langle E_{\nu}\rangle\) per decay = 19.0
\( ^{166} \text{Te} \)

**Stable or Long-Lived**

**Cross Sections (Barns)**
- \( ^{166} \text{Te} \) Total: 2200 MeV: 4.7584
- \( ^{166} \text{Te} \) Capture: 2200 MeV: 2.10\( \times 10^{-1} \)
- \( ^{166} \text{Te} \) Capture: 2200 MeV: 1.0327
- Resonance Integral Total: 9.390\( \times 10^{-1} \)
- Resonance Integral Capture: 2.4150

**Fission Yields**
- \( ^{237} \text{U} \) Thermal: 1.7810\( \times 10^{-6} \)
- \( ^{237} \text{U} \) Fast: 2.4664\( \times 10^{-3} \)
- \( ^{238} \text{U} \) Fast: 3.2997\( \times 10^{-7} \)
- \( ^{239} \text{Pu} \) Thermal: 9.3777\( \times 10^{-5} \)

---

**ENDF/B-V File 1 Comments**

53-1-128 HEDL EVAL-APR/74 R.E. SCHENTER DIST-NDV74

**References**
- Gbeta-A TOBIAS(10/72) RD/B/M2453
- GBETA-A TOBIAS(10/72) RD/B/M2453
- EGAMMA-A TOBIAS(10/72) RD/B/M2453

**\( ^{166} \text{Te} \)**
- \( t_{1/2} = 25.00 \) days
- \( \lambda = 748.0 \) days
- \( \lambda = 155.0 \) days

**Fission Yields**
- \( ^{235} \text{U} \) Thermal: 1.3207\( \times 10^{-3} \)
- \( ^{235} \text{U} \) Fast: 1.5302\( \times 10^{-8} \)
- \( ^{239} \text{Pu} \) Thermal: 1.1198\( \times 10^{-4} \)

---

\( g_{\beta} = 2070.1 \) and \( g_{\beta} = 1270.1 \)

\( Br_{\beta} = 1.9270 \) and \( Br_{\beta} = 0.0630 \)

---

**\( ^{166} \text{Te} \)**

**Stable or Long-Lived**

---

128-53-9
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>STABLE OR LONG-LIVED</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Cross Sections ( barns)**

- $\sigma$ TOTAL 220m/s: 7.8022
- WESCOTT G FACTOR: 3.5011
- $\sigma$ CAPTURE 220m/s: 3.5022
- WESCOTT G FACTOR: 1.0033
- RESONANCE INTEGRAL TOTAL: $1.7550 \times 10^{-2}$
- RESONANCE INTEGRAL CAPTURE: $1.1390 \times 10^{-1}$
- RESONANCE INTEGRAL (n,2n): $8.7420 \times 10^{-1}$
- RESONANCE INTEGRAL (n,p): $1.0420 \times 10^{-3}$
- RESONANCE INTEGRAL (n,α): $2.4610 \times 10^{-4}$

**Fission Yields**

- $^{235}$U THERMAL: $1.1200 \times 10^{-4}$
- $^{239}$Pu THERMAL: $9.4180 \times 10^{-4}$
$^{114m}$ Cd

ENDF/B-IV FILE 1 COMMENTS
48-CD-129 MEDL EVAL-APR74 R.E. SCHENTER
DIST-MOV74

REFERENCES
HALF LIFE-R SCHENTER, THEORY(1973)

$^{114m}$ Cd

$T_{1/2} = 3.377s$

$<E_p>$ PER DECAY = 7343.

$<E_x>$ PER DECAY = 3084.

FISSION YIELDS

$^{239}$U THERMAL $2.9682 \times 10^{-4}$

$^{235}$U FAST $1.7037 \times 10^{-6}$

$^{238}$U FAST $1.4033 \times 10^{-6}$

$^{239}$Pu THERMAL $2.6274 \times 10^{-6}$

$^{119}$ In

$T_{1/2} = 8.3x$ s

$^{129} - 48 - 1$

$^{114m}$ In

ENDF/B-IV FILE 1 COMMENTS
49-IN-129 MEDL EVAL-APR74 R.E. SCHENTER
DIST-MOV74

REFERENCES
DELAYED NEUTRON BRANCHING-7 ENGLAND, THEORY(1974)

$^{114}$ In

$T_{1/2} = 5.8x.3x$

$<E_p>$ PER DECAY = 2067.

$<E_x>$ PER DECAY = 2552.

FISSION YIELDS

$^{235}$U THERMAL $5.7901 \times 10^{-4}$

$^{235}$U FAST $4.9696 \times 10^{-4}$

$^{238}$U FAST $2.7130 \times 10^{-4}$

$^{239}$Pu THERMAL $4.8669 \times 10^{-4}$

$^{119}$ In

$G_{m} = 2135.$

$G_{g} = 7000.$

$G_{a} = 7310.$

$BR_{m} = 0.0500$

$BR_{g} = 0.5000$

$BR_{a} = 0.4050$

$^{119m}$ Sn

$3.7x.5x$

$^{119}$ In

$G_{m} = 2135.$

$G_{g} = 7000.$

$G_{a} = 7310.$

$BR_{m} = 0.0500$

$BR_{g} = 0.5000$

$BR_{a} = 0.4050$

$^{119}$ Sn

$3.7x.5x$

$^{129} - 49 - 1$
\begin{verbatim}
129m Sn
ENDF/B-IV FILE 1 COMMENTS
50-SN-129M HEDL
EVAL-APR74 R.E.SCHENTER
DIST-NOV74

\textit{Half-Life:}
129m Sn

\textit{Radioactivity:}
- $T_{1/2} = 2.50 \times 10^3 \text{m}
- \langle E_{\beta} \rangle \text{ PER DECAY} = 1216.
- \langle E_{\gamma} \rangle \text{ PER DECAY} = 1471.

\textit{Fission Yields:}
- $^{233}$U THERMAL $3.3082 \times 10^{-2}$
- $^{233}$U FAST $3.976 \times 10^{-2}$
- $^{239}$Pu THERMAL $4.1874 \times 10^{-4}$

\textit{G parameters:}
- \textit{q} = 4270.
- \textit{B(E2)} = 1.000

\textit{Beta Decay:}
- $Q_{\beta} = 4920.$
- $B(E2) = 1.000$

\textit{Half-Life:}
- $T_{1/2} = 7.50 \times 10^2 \text{m}$
- \langle E_{\beta} \rangle \text{ PER DECAY} = 1165.
- \langle E_{\gamma} \rangle \text{ PER DECAY} = 1385.

\textit{Fission Yields:}
- $^{233}$U THERMAL $1.8491 \times 10^{-3}$
- $^{233}$U FAST $3.1974 \times 10^{-3}$
- $^{239}$Pu THERMAL $4.1875 \times 10^{-5}$

\textit{G parameters:}
- \textit{q} = 4920.
- \textit{B(E2)} = 1.000

\textit{Half-Life:}
- $T_{1/2} = 6.0 \times 10^3 \text{m}$
- \langle E_{\beta} \rangle \text{ PER DECAY} = 6.344 \times 10^{-3}$
\end{verbatim}
129 Sb

ENDF/B-IV FILE 1 COMMENTS
51-SB-129 AND EVAL-FEB74 C.W.REICH
DOST-NOV74
FOR FILE DESCRIPTION SEE C.W. REICH, R.G. WELNER AND M.H. PUTMAN,
ANCR-1157, ENDF/B10, 8/74.
REFERENCE
Q-1973 NAPSTRA-GDVE MASSTABLE

\[ \begin{align*}
129 \text{ Sb} & \\
T_{1/2} & = 4.34 \pm 0.03 \text{h} \\
\langle E_p \rangle \text{ PER DECAY} & = 359.1 \\
\langle E_{\gamma} \rangle \text{ PER DECAY} & = 130.1 \\
\text{FISSION YIELDS} & \\
^{235}\text{U THERMAL} & = 8.753 \times 10^{-4} \\
^{235}\text{U FAST} & = 3.246 \times 10^{-5} \\
^{239}\text{Pu THERMAL} & = 8.092 \times 10^{-4} \\
^{239}\text{Pu FAST} & = 5.566 \times 10^{-5} \\
\end{align*} \]

\[ \begin{align*}
Q_{\beta} & = 2271.21 \\
\beta_{\text{max}} & = 2 \times 10^9 \\
B_{\beta_0} & = 3.76 \\
\end{align*} \]

\[ \begin{align*}
131 \text{ Te} & \\
T_{1/2} & = 70.8 \pm 1.0 \text{m} \\
\end{align*} \]
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Mean Energy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>94.90</td>
<td>1</td>
<td>2.543</td>
</tr>
<tr>
<td>170.7</td>
<td>7</td>
<td>2.464</td>
</tr>
<tr>
<td>267.5</td>
<td>6</td>
<td>2.857</td>
</tr>
<tr>
<td>313.5</td>
<td>1</td>
<td>9.015</td>
</tr>
<tr>
<td>332.3</td>
<td>1</td>
<td>2.311</td>
</tr>
<tr>
<td>354.8</td>
<td>1</td>
<td>4.464</td>
</tr>
<tr>
<td>404.8</td>
<td>1</td>
<td>1.757</td>
</tr>
<tr>
<td>434.9</td>
<td>1</td>
<td>0.9246</td>
</tr>
<tr>
<td>499.6</td>
<td>1</td>
<td>2.311</td>
</tr>
<tr>
<td>525.3</td>
<td>1</td>
<td>1.711</td>
</tr>
<tr>
<td>543.8</td>
<td>1</td>
<td>15.63</td>
</tr>
<tr>
<td>667.2</td>
<td>4</td>
<td>12.99</td>
</tr>
<tr>
<td>769.8</td>
<td>1</td>
<td>2.774</td>
</tr>
<tr>
<td>773.7</td>
<td>1</td>
<td>1.528</td>
</tr>
<tr>
<td>812.6</td>
<td>1</td>
<td>46.23</td>
</tr>
<tr>
<td>876.0</td>
<td>1</td>
<td>1.988</td>
</tr>
<tr>
<td>950.0</td>
<td>6</td>
<td>28.94</td>
</tr>
<tr>
<td>1039.0</td>
<td>1</td>
<td>13.18</td>
</tr>
<tr>
<td>1067.1</td>
<td>1</td>
<td>955.48</td>
</tr>
<tr>
<td>1134.8</td>
<td>8</td>
<td>9.959</td>
</tr>
<tr>
<td>1252.5</td>
<td>5</td>
<td>2.912</td>
</tr>
<tr>
<td>1383.1</td>
<td>1</td>
<td>2.911</td>
</tr>
<tr>
<td>1318.1</td>
<td>1</td>
<td>2.911</td>
</tr>
<tr>
<td>1527.1</td>
<td>1</td>
<td>3.968</td>
</tr>
<tr>
<td>1451.4</td>
<td>4</td>
<td>1.294</td>
</tr>
<tr>
<td>1569.5</td>
<td>5</td>
<td>1.539</td>
</tr>
<tr>
<td>1622.1</td>
<td>7</td>
<td>1.387</td>
</tr>
<tr>
<td>1656.1</td>
<td>1</td>
<td>9.246</td>
</tr>
<tr>
<td>1691.1</td>
<td>1</td>
<td>9.934</td>
</tr>
<tr>
<td>1738.1</td>
<td>1</td>
<td>5.820</td>
</tr>
<tr>
<td>1752.1</td>
<td>1</td>
<td>6.823</td>
</tr>
<tr>
<td>1780.7</td>
<td>1</td>
<td>0.1849</td>
</tr>
<tr>
<td>1842.1</td>
<td>1</td>
<td>2.321</td>
</tr>
<tr>
<td>1872.1</td>
<td>7</td>
<td>2.589</td>
</tr>
<tr>
<td>1929.4</td>
<td>4</td>
<td>3.745</td>
</tr>
<tr>
<td>2071.5</td>
<td>5</td>
<td>4.993</td>
</tr>
<tr>
<td>2115.1</td>
<td>1</td>
<td>2.311</td>
</tr>
</tbody>
</table>

< photon > per decay = 1301.

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy</th>
<th>1/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>γ -</td>
<td>812.6</td>
<td>46.23</td>
</tr>
<tr>
<td>γ -</td>
<td>603.0</td>
<td>22.50</td>
</tr>
<tr>
<td>γ -</td>
<td>914.7</td>
<td>20.02</td>
</tr>
<tr>
<td>γ -</td>
<td>847.0</td>
<td>18.80</td>
</tr>
<tr>
<td>γ -</td>
<td>143.8</td>
<td>15.63</td>
</tr>
<tr>
<td>γ -</td>
<td>1030.0</td>
<td>13.18</td>
</tr>
<tr>
<td>γ -</td>
<td>1117.1</td>
<td>13.60</td>
</tr>
<tr>
<td>γ -</td>
<td>966.6</td>
<td>7.767</td>
</tr>
<tr>
<td>γ -</td>
<td>683.1</td>
<td>6.954</td>
</tr>
<tr>
<td>γ -</td>
<td>1738.1</td>
<td>5.823</td>
</tr>
<tr>
<td>γ -</td>
<td>1786.1</td>
<td>4.800</td>
</tr>
<tr>
<td>γ -</td>
<td>1570.1</td>
<td>4.500</td>
</tr>
<tr>
<td>γ -</td>
<td>258.8</td>
<td>4.484</td>
</tr>
<tr>
<td>γ -</td>
<td>578.0</td>
<td>3.800</td>
</tr>
<tr>
<td>γ -</td>
<td>1362.1</td>
<td>3.700</td>
</tr>
</tbody>
</table>

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>E_max</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>γ -</td>
<td>64.0</td>
<td>16.59</td>
<td>0.1000</td>
</tr>
<tr>
<td>γ -</td>
<td>67.0</td>
<td>17.39</td>
<td>0.1000</td>
</tr>
<tr>
<td>γ -</td>
<td>108.0</td>
<td>28.65</td>
<td>0.0200</td>
</tr>
<tr>
<td>γ -</td>
<td>131.0</td>
<td>35.16</td>
<td>0.0600</td>
</tr>
<tr>
<td>γ -</td>
<td>194.0</td>
<td>55.67</td>
<td>0.0500</td>
</tr>
<tr>
<td>γ -</td>
<td>246.0</td>
<td>60.36</td>
<td>1.0000</td>
</tr>
<tr>
<td>γ -</td>
<td>258.0</td>
<td>75.43</td>
<td>1.2000</td>
</tr>
</tbody>
</table>

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>E_max</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>γ -</td>
<td>258.0</td>
<td>83.01</td>
<td>0.3300</td>
</tr>
<tr>
<td>γ -</td>
<td>411.0</td>
<td>124.3</td>
<td>0.5300</td>
</tr>
<tr>
<td>γ -</td>
<td>428.0</td>
<td>140.7</td>
<td>1.0000</td>
</tr>
<tr>
<td>γ -</td>
<td>487.0</td>
<td>151.0</td>
<td>18.10</td>
</tr>
<tr>
<td>γ -</td>
<td>549.0</td>
<td>173.6</td>
<td>1.1500</td>
</tr>
<tr>
<td>γ -</td>
<td>578.0</td>
<td>184.4</td>
<td>3.400</td>
</tr>
<tr>
<td>TYPE</td>
<td>$F_{\max}$</td>
<td>MEAN ENERGY</td>
<td>INTENSITY/100 DECAYS</td>
</tr>
<tr>
<td>------</td>
<td>------------</td>
<td>-------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>663.0</td>
<td>193.8</td>
<td>22.50</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>674.0</td>
<td>220.9</td>
<td>9.000</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>698.0</td>
<td>250.2</td>
<td>1.800</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>730.0</td>
<td>242.7</td>
<td>0.400</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>849.0</td>
<td>290.3</td>
<td>0.800</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>915.0</td>
<td>327.5</td>
<td>0.500</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1013.0</td>
<td>358.2</td>
<td>1.800</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1028.0</td>
<td>364.5</td>
<td>0.900</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1050.0</td>
<td>373.6</td>
<td>3.000</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1103.0</td>
<td>396.4</td>
<td>3.500</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1335.0</td>
<td>509.9</td>
<td>3.700</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1381.0</td>
<td>517.9</td>
<td>4.000</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1454.0</td>
<td>550.5</td>
<td>1.500</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1517.0</td>
<td>578.9</td>
<td>13.00</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1570.0</td>
<td>602.9</td>
<td>4.500</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1696.0</td>
<td>660.4</td>
<td>1.000</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1786.0</td>
<td>701.9</td>
<td>4.800</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1866.0</td>
<td>738.9</td>
<td>3.200</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2081.0</td>
<td>841.5</td>
<td>1.000</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2224.0</td>
<td>906.9</td>
<td>3.000</td>
</tr>
</tbody>
</table>

$\langle E_{\gamma} \rangle$ PER DECAY = 359.1

$\langle E_{\gamma} \rangle$ PER DECAY = 628.9
506

125mTe

ENDFB-VI FILE 1 COMMENTS
52-TE-129M ANC, NEDL, EVAL-FEB74 C.W.REICH DECAY DATA
EVAL-77 P. SCHWARTZ AND F. SCHMITTROTH
CROSS SECTION DATA
DIST-NOV74

FILE INFORMATION
MF=1 MT=437 DECAY DATA
REFERENCES
G-1973 NAPSTRA-GOVE MASSSTABLE

125mTe

T1/2 = 33 40 ± 0.20d

< E > PER DECAY = 214, 0

< E > PER DECAY = 29, 80

CROSS SECTIONS (BARNs)

σ TOTAL 2200M/S 5.7680

WESTCOTT G FACTOR 1.1803

σ CAPTURE 2200M/S 1.1000

WESTCOTT G FACTOR 1.0000

RESONANCE INTEGRAL TOTAL 1.2010x10^{-2}

RESONANCE INTEGRAL CAPTURE 6.0490

FISSION YIELDS

239Pu THERMAL 1.1101x10^{-4}

239Pu FAST 1.318x10^{-4}

239Pu FAST 4.9065x10^{-5}

239Pu THERMAL 3.0595x10^{-4}

Qg = 5608.46
BRg = 0.3660
Qf = 105.5
BRf = 0.6340

125m Te

1.589x10^{-7}y

70.0±1.0m
## Photon Radiation Table

<table>
<thead>
<tr>
<th>Energy (keV)</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>105.5</td>
<td>1</td>
<td>0.3024</td>
</tr>
<tr>
<td>155.6</td>
<td>1</td>
<td>0.113</td>
</tr>
<tr>
<td>672.0</td>
<td>1</td>
<td>0.0248</td>
</tr>
<tr>
<td>696.0</td>
<td>1</td>
<td>0.3108</td>
</tr>
<tr>
<td>729.4</td>
<td>5</td>
<td>0.7934</td>
</tr>
<tr>
<td>817.2</td>
<td>1</td>
<td>0.0920</td>
</tr>
<tr>
<td>844.9</td>
<td>1</td>
<td>0.0393</td>
</tr>
<tr>
<td>1023.</td>
<td>1</td>
<td>0.0194</td>
</tr>
<tr>
<td>1050.</td>
<td>1</td>
<td>0.0179</td>
</tr>
<tr>
<td>1374.</td>
<td>1</td>
<td>0.0069</td>
</tr>
<tr>
<td>1402.</td>
<td>1</td>
<td>0.0043</td>
</tr>
</tbody>
</table>

\(<\text{E}_{\text{photon}}\) per decay = 29.96

## Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>(E_{\text{max}}) (keV)</th>
<th>Mean Energy (keV)</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\pi^+)</td>
<td>706.0</td>
<td>57.30</td>
<td>11.00</td>
</tr>
<tr>
<td>(\pi^-)</td>
<td>556.0</td>
<td>176.9</td>
<td>0.0400</td>
</tr>
<tr>
<td>(\eta)</td>
<td>763.0</td>
<td>255.7</td>
<td>0.0200</td>
</tr>
<tr>
<td>(\eta)</td>
<td>839.0</td>
<td>286.2</td>
<td>0.0300</td>
</tr>
<tr>
<td>(\eta)</td>
<td>878.0</td>
<td>302.1</td>
<td>0.0200</td>
</tr>
<tr>
<td>(\eta)</td>
<td>912.0</td>
<td>316.1</td>
<td>0.0300</td>
</tr>
<tr>
<td>(\eta)</td>
<td>1608.0</td>
<td>620.2</td>
<td>32.52</td>
</tr>
</tbody>
</table>

\(<\text{E}_{\pi}\) per decay = 214.0

\(<\text{E}_{\eta}\) per decay = 344.6

## Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy (keV)</th>
<th>(1/100) Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\eta)</td>
<td>1608.0</td>
<td>32.52</td>
</tr>
<tr>
<td>Nuclide</td>
<td>Value</td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>-----------</td>
<td></td>
</tr>
<tr>
<td>T&lt;sub&gt;1/2&lt;/sub&gt;</td>
<td>1.97 × 10&lt;sup&gt;10&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>$&lt;E_2&gt;$ PER DECAY</td>
<td>533.9</td>
<td></td>
</tr>
<tr>
<td>$&lt;E_3&gt;$ PER DECAY</td>
<td>72.90</td>
<td></td>
</tr>
</tbody>
</table>

**Fission Yields**

<table>
<thead>
<tr>
<th>Nuclide</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$^{235}$U THERMAL</td>
<td>1.2250 × 10&lt;sup&gt;-4&lt;/sup&gt;</td>
</tr>
<tr>
<td>$^{235}$U FAST</td>
<td>1.3183 × 10&lt;sup&gt;-4&lt;/sup&gt;</td>
</tr>
<tr>
<td>$^{238}$U FAST</td>
<td>2.9694 × 10&lt;sup&gt;-4&lt;/sup&gt;</td>
</tr>
<tr>
<td>$^{239}$Pu THERMAL</td>
<td>3.0796 × 10&lt;sup&gt;-4&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

G<sub>x</sub> = 1502.46,

BR<sub>γ</sub> = 1.0000

<table>
<thead>
<tr>
<th>Nuclide</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1.889 \times 10^{-7}$</td>
<td></td>
</tr>
</tbody>
</table>

**Reference**

Q-1973 WAPSTRA-GOVE MASSTABLE

ENDF/B-IV FILE 1 COMMENTS

52-TE-129 ANC
EVAL-FEB74 C.W.REICH
DIST-NOV74
FOR FILE DESCRIPTION SEE C.W.REICH, RC HELMER AND MH PUTMAN,
ANCR-1157, ENDF/B-IV, 8/74.
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Mean Energy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>260.4</td>
<td>2</td>
<td>1.410</td>
</tr>
<tr>
<td>342.6</td>
<td>1</td>
<td>0.1000</td>
</tr>
<tr>
<td>542.8</td>
<td>1</td>
<td>0.04000</td>
</tr>
<tr>
<td>659.6</td>
<td>1</td>
<td>7.730</td>
</tr>
<tr>
<td>487.4</td>
<td>1</td>
<td>1.470</td>
</tr>
<tr>
<td>551.8</td>
<td>1</td>
<td>0.09000</td>
</tr>
<tr>
<td>536.7</td>
<td>1</td>
<td>1.800</td>
</tr>
<tr>
<td>559.7</td>
<td>1</td>
<td>0.01000</td>
</tr>
<tr>
<td>624.4</td>
<td>1</td>
<td>0.08000</td>
</tr>
<tr>
<td>672.0</td>
<td>1</td>
<td>0.04000</td>
</tr>
<tr>
<td>729.8</td>
<td>7</td>
<td>6.310</td>
</tr>
<tr>
<td>815.7</td>
<td>4</td>
<td>4.700</td>
</tr>
<tr>
<td>1080.1</td>
<td>5</td>
<td>6.600</td>
</tr>
<tr>
<td>1112.1</td>
<td>6</td>
<td>1.690</td>
</tr>
<tr>
<td>1253.6</td>
<td>6</td>
<td>0.90000</td>
</tr>
<tr>
<td>1402.1</td>
<td>1</td>
<td>0.01000</td>
</tr>
</tbody>
</table>

$\langle \text{Photon} \rangle \text{ Per Decay} = 72.90$

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>$E_{\text{Max}}$</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>$p^-$</td>
<td>210.0</td>
<td>53.52</td>
<td>0.01000</td>
</tr>
<tr>
<td>$p^+$</td>
<td>220.0</td>
<td>61.58</td>
<td>0.01000</td>
</tr>
<tr>
<td>$\alpha$</td>
<td>241.0</td>
<td>68.09</td>
<td>0.04000</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>298.0</td>
<td>86.24</td>
<td>0.000</td>
</tr>
<tr>
<td>$\delta$</td>
<td>390.0</td>
<td>116.9</td>
<td>1.030</td>
</tr>
<tr>
<td>$\beta^-$</td>
<td>472.0</td>
<td>220.1</td>
<td>0.24000</td>
</tr>
<tr>
<td>$\beta^+$</td>
<td>942.0</td>
<td>328.5</td>
<td>2.600</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1015.0</td>
<td>359.0</td>
<td>9.300</td>
</tr>
<tr>
<td>$\delta$</td>
<td>1224.0</td>
<td>448.7</td>
<td>6.100</td>
</tr>
<tr>
<td>$\alpha$</td>
<td>1474.0</td>
<td>559.5</td>
<td>88.50</td>
</tr>
</tbody>
</table>

$\langle E_{\text{p}} \rangle \text{ Per Decay} = 533.9$

$\langle E_{\text{p}} \rangle \text{ Per Decay} = 880.6$

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy</th>
<th>1/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\alpha$</td>
<td>1474.0</td>
<td>88.50</td>
</tr>
</tbody>
</table>
ENDF/B-IV FILE 1 COMMENTS
55- 1-129 HEDL
EVAL-DCT74 F. SCHMITTROTH AND R.E. SCHENTER
DIST-NOV74 REV-JUN75

FILE INFORMATION
MF=1 MT=457 DECAY DATA
REFERENCES
\( \beta^- \) A TOBIAS(10/72) RD/B/M2453
\( \beta^- \) A TOBIAS(10/72) RD/B/M2453
\( \gamma \) A TOBIAS(10/72) RD/B/M2453

\( T_{1/2} = 1.589 \times 10^{-7} \) yrs

\( \langle E_\beta^- \rangle \) PER DECAY = 42.40
\( \langle E_\gamma \rangle \) PER DECAY = 40.00

CROSS SECTIONS (BARNs)
- TOTAL 2200M/S 3.1543x10^-1
- WESTCOTT G. FACTOR 1.0325
- CAPTURE 2200M/S 2.7001x10^-1
- WESTCOTT G. FACTOR 1.0164
- RESONANCE INTEGRAL TOTAL 1.5239x10^-2
- RESONANCE INTEGRAL CAPTURE 3.5440x10^-1

FISSION YIELDS
- \(^{235}U\) THERMAL 1.4598x10^-7
- \(^{235}U\) FAST 6.0210x10^-7
- \(^{239}Pu\) THERMAL 4.3596x10^-9
- \(^{239}Pu\) FAST 1.9197x10^-6

\( G_{\beta^-} = 180.0 \)
\( B(R) = 1.000 \)

STABLE OR LONG-LIVED

129 - 53 - 1
$^{132}$Xe

ENDF/B-IV FILE 1 COMMENTS

54-XE-129M HEDL EVAL-APR74 S.E. SCHENTER
D1ST-ADP74

REFERENCES

KIT-C. LEDERER ET AL. TABLE OF ISOTOPES 6TH ED

$^{132}$Xe

$T_{1/2} = 8.000d$

$<E_x>$ PER DECAY = 236.0

$Q_{1}=236.0$

$BR_{1}=1.000$

$^{132}$Xe

STABLE OR LONG-LIVED

$^{129m-1}$

$^{132}$Xe

$^{132}$Xe

STABLE OR LONG-LIVED

CROSS SECTIONS (BARNS)

- $^o$ TOTAL 2200m/S
- WESTCOTT G FACTOR 3.4999
- $^o$ CAPTURE 2200m/S
- WESTCOTT G FACTOR 1.0016
- RESONANCE INTEGRAL TOTAL 4.654x10$^{-2}$
- RESONANCE INTEGRAL CAPTURE 2.556x10$^{-2}$
- RESONANCE INTEGRAL ($n,2n$) 1.0000
- RESONANCE INTEGRAL ($n,p$) 1.881x10$^{-3}$
- RESONANCE INTEGRAL ($n,a$) 6.506x10$^{-4}$

129 - 54 - 1
120 Cd

ENDF/B-IV FILE 1 COMMENTS
48-CO-130 HEOL
EVAL-APR74 R.E. SCHENTER
DIST-NOV74
REFERENCES
HALF LIFE-R SCHENTER, THEORY(9/73)

T_{1/2} = 5240 s
\langle E \rangle \text{ PER DECAY} = 1885
\langle E \rangle \text{ PER DECAY} = 2694

FISSION YIELDS
$^{235}U$ THERMAL $7.50 \times 10^{-6}$
$^{235}U$ FAST $1.2522 \times 10^{-5}$
$^{238}U$ FAST $2.9651 \times 10^{-4}$
$^{235}Pu$ THERMAL $2.4287 \times 10^{-4}$

$Q_x = 6030$
$BR_x = 1.00$

119 In

50% 20m

130 - 48 - 1

129 I

ENDF/B-IV FILE 1 COMMENTS
49-IN-130 HEOL
EVAL-APR74 R.E. SCHENTER
DIST-NOV74
REFERENCES
DELAYED NEUTRON BRANCHING-T ENGLAND, THEORY(2/74)

T_{1/2} = 50.27 s
\langle E \rangle \text{ PER DECAY} = 2891
\langle E \rangle \text{ PER DECAY} = 3433

FISSION YIELDS
$^{235}U$ THERMAL $6.8732 \times 10^{-4}$
$^{235}U$ FAST $1.0793 \times 10^{-3}$
$^{238}U$ FAST $4.6933 \times 10^{-3}$
$^{235}Pu$ THERMAL $4.8874 \times 10^{-4}$

$Q_x = 2275$
$BR_x = 0.04500$
$Q_x = 9690$
$BR_x = 0.9970$

128 In

92% 3s

130 - 49 - 1
$^{118}$ Sn

ENDFB-IV FILE 1 COMMENTS
50-SN-130 HEDL EVAL-APR74 R.E. SCHENTER
DIST-NOV74

$^{118}$ Sn

\[
\begin{align*}
T_{1/2} &= 3.70 \times 10^5 m \\
\langle E_g \rangle &\text{ PER DECAY } = 502.2 \\
\langle E_g \rangle &\text{ PER DECAY } = 686.5 \\
\text{FISSION YIELDS} \\
\begin{align*}
235\text{U THERMAL} &= 8.558 \times 10^{-3} \\
235\text{U FAST} &= 1.2217 \times 10^{-2} \\
239\text{U FAST} &= 1.602 \times 10^{-2} \\
239\text{Pu THERMAL} &= 1.939 \times 10^{-2}
\end{align*}
\]

\[
\begin{align*}
Q_p &= 1850 \\
BR_p &= 9000
\end{align*}
\]

$^{118}$ Sn

\[
\begin{align*}
Q_p &= 2100 \\
BR_p &= 1000
\end{align*}
\]

\[
\begin{align*}
37.0 \times 1.0m
\end{align*}
\]

$^{130m-1}$ Sn

ENDFB-IV FILE 1 COMMENTS
51-SN-130M ANC EVAL-PBE74 C.W. REICH
DIST-NOV74
FOR FILE DESCRIPTION SEE C.W. REICH, R. HELMER AND W. PUTMAN,
AMCR-1157, ENDFB/IV, 1974.
REFERENCE

$^{130m-1}$ Sn

\[
\begin{align*}
T_{1/2} &= 37.0 \times 1.0 m \\
\langle E_g \rangle &\text{ PER DECAY } = 1093. \\
\langle E_g \rangle &\text{ PER DECAY } = 2489.
\end{align*}
\]

\[
\begin{align*}
\text{FISSION YIELDS} \\
\begin{align*}
235\text{U THERMAL} &= 3.0525 \times 10^{-3} \\
235\text{U FAST} &= 2.7395 \times 10^{-3} \\
239\text{U FAST} &= 5.7472 \times 10^{-4} \\
239\text{Pu THERMAL} &= 5.4574 \times 10^{-3}
\end{align*}
\]

\[
\begin{align*}
Q_p &= 5900, 4300 \\
BR_p &= 1, 1000
\end{align*}
\]

\[
\begin{align*}
\text{STABLE OR LONG-LIVED}
\end{align*}
\]

$^{130m-1}$ Sn

130m- 51- 1
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Energy (keV)</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>182.0</td>
<td>1</td>
<td>79.82</td>
</tr>
<tr>
<td>287.0</td>
<td>1</td>
<td>2.392</td>
</tr>
<tr>
<td>330.4</td>
<td>1</td>
<td>71.34</td>
</tr>
<tr>
<td>469.5</td>
<td>1</td>
<td>16.39</td>
</tr>
<tr>
<td>731.2</td>
<td>1</td>
<td>17.35</td>
</tr>
<tr>
<td>793.0</td>
<td>1</td>
<td>96.40</td>
</tr>
<tr>
<td>839.5</td>
<td>1</td>
<td>96.40</td>
</tr>
<tr>
<td>992.0</td>
<td>1</td>
<td>1.923</td>
</tr>
<tr>
<td>1062.0</td>
<td>1</td>
<td>1.1446</td>
</tr>
<tr>
<td>1074.0</td>
<td>1</td>
<td>1.639</td>
</tr>
<tr>
<td>1218.0</td>
<td>1</td>
<td>2.314</td>
</tr>
<tr>
<td>1294.0</td>
<td>1</td>
<td>4.820</td>
</tr>
<tr>
<td>1423.0</td>
<td>1</td>
<td>1.832</td>
</tr>
<tr>
<td>1445.0</td>
<td>1</td>
<td>2.217</td>
</tr>
<tr>
<td>1582.0</td>
<td>1</td>
<td>2.410</td>
</tr>
<tr>
<td>1763.0</td>
<td>1</td>
<td>2.802</td>
</tr>
<tr>
<td>1949.0</td>
<td>1</td>
<td>8.676</td>
</tr>
<tr>
<td>1997.0</td>
<td>1</td>
<td>1.446</td>
</tr>
</tbody>
</table>

*<\text{photons} \text{ per decay} = 2689 >*

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Mean Energy (keV)</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\gamma$</td>
<td>1829.6</td>
<td>630.0</td>
</tr>
<tr>
<td>$\beta$</td>
<td>1704.4</td>
<td>664.3</td>
</tr>
<tr>
<td>$\alpha$</td>
<td>1840.6</td>
<td>727.1</td>
</tr>
<tr>
<td>$\beta$</td>
<td>1864.8</td>
<td>738.4</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2211.7</td>
<td>901.7</td>
</tr>
<tr>
<td>$\beta$</td>
<td>2223.9</td>
<td>906.8</td>
</tr>
<tr>
<td>$\beta$</td>
<td>2955.1</td>
<td>1278.0</td>
</tr>
<tr>
<td>$\beta$</td>
<td>2998.0</td>
<td>1278.0</td>
</tr>
</tbody>
</table>

*<\text{E}_{\beta} \text{ per decay} = 1093 >*
*<\text{E}_{\gamma} \text{ per decay} = 1517 >*

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy (keV)</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\gamma$</td>
<td>839.5</td>
<td>96.40</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>793.0</td>
<td>96.40</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>182.0</td>
<td>79.82</td>
</tr>
<tr>
<td>$\beta$</td>
<td>330.4</td>
<td>71.34</td>
</tr>
<tr>
<td>$\beta$</td>
<td>2955.0</td>
<td>50.50</td>
</tr>
</tbody>
</table>
\[ \text{Sb} \]

ENDF/B-IV FILE 1 COMMENTS
51-SB-130 ANC EURL-7774 C.W.REICH DECAY DATA
DIST-NOV74
FOR FILE DESCRIPTION SEE C.W.REICH, RG HELMER AND MH PUTMAN.
ANC-7707, ENDF/B-IV.
REFERENCE
D-1973 WAPSTRA-GOVE MASSTABLE

\[ \text{Sb} \]

\[ \begin{align*}
T_{1/2} & \text{ 6.60k.10m} \\
\langle E_d \rangle \text{ PER DECAY} & = 1267 \\
\langle E_2 \rangle \text{ PER DECAY} & = 2141 \\
\text{FISSION YIELDS} & \\
\text{235U THERMAL} & = 2.077 \times 10^{-3} \\
\text{235U FAST} & = 2.759 \times 10^{-3} \\
\text{239U FAST} & = 1.746 \times 10^{-3} \\
\text{239Pu THERMAL} & = 5.457 \times 10^{-3} \\
\end{align*} \]

\[ \begin{align*}
Q_d & = 5050 \pm 100 \\
BR_d & = 1.000 \\
\end{align*} \]

\[ \text{Te} \]

\[ \text{STABLE OR LONG-LIVED} \]
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Mean Energy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>182.0</td>
<td>1</td>
<td>53.86</td>
</tr>
<tr>
<td>349.0</td>
<td>1</td>
<td>7.82</td>
</tr>
<tr>
<td>370.0</td>
<td>1</td>
<td>2.19</td>
</tr>
<tr>
<td>469.5</td>
<td>1</td>
<td>1.91</td>
</tr>
<tr>
<td>758.0</td>
<td>1</td>
<td>4.20</td>
</tr>
<tr>
<td>793.0</td>
<td>1</td>
<td>7.65</td>
</tr>
<tr>
<td>839.5</td>
<td>1</td>
<td>95.50</td>
</tr>
<tr>
<td>902.0</td>
<td>1</td>
<td>1.91</td>
</tr>
<tr>
<td>1018.</td>
<td>1</td>
<td>23.21</td>
</tr>
<tr>
<td>1042.</td>
<td>1</td>
<td>5.57</td>
</tr>
<tr>
<td>1128.</td>
<td>1</td>
<td>4.77</td>
</tr>
<tr>
<td>1143.</td>
<td>1</td>
<td>3.63</td>
</tr>
<tr>
<td>1200.</td>
<td>1</td>
<td>2.57</td>
</tr>
<tr>
<td>1235.</td>
<td>1</td>
<td>3.53</td>
</tr>
<tr>
<td>1599.</td>
<td>1</td>
<td>2.29</td>
</tr>
<tr>
<td>1884.</td>
<td>1</td>
<td>.9330</td>
</tr>
</tbody>
</table>

\[ \langle E_{\text{photon}} \rangle \text{ per decay} = 2141. \]

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>( E_{\text{max}} )</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \alpha )</td>
<td>2268.0</td>
<td>922.7</td>
<td>32.24</td>
</tr>
<tr>
<td>( \beta )</td>
<td>2998.0</td>
<td>1233.9</td>
<td>6.60</td>
</tr>
<tr>
<td>( \beta )</td>
<td>3112.9</td>
<td>1354.4</td>
<td>7.54</td>
</tr>
<tr>
<td>( \beta )</td>
<td>3285.5</td>
<td>1418</td>
<td>9.82</td>
</tr>
<tr>
<td>( \beta )</td>
<td>3677.5</td>
<td>1508.4</td>
<td>18.40</td>
</tr>
<tr>
<td>( \beta )</td>
<td>5502.5</td>
<td>1524.5</td>
<td>1.05</td>
</tr>
</tbody>
</table>

\[ \langle E_{\text{p}} \rangle \text{ per decay} = 1261. \]
\[ \langle E_{\text{p}} \rangle \text{ per decay} = 1698. \]

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy</th>
<th>I/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \gamma )</td>
<td>850.5</td>
<td>95.50</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>799.0</td>
<td>79.63</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>182.0</td>
<td>53.86</td>
</tr>
<tr>
<td>( \mu )</td>
<td>2268.0</td>
<td>32.26</td>
</tr>
<tr>
<td>( \mu )</td>
<td>3286.0</td>
<td>29.58</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>1018.0</td>
<td>25.21</td>
</tr>
</tbody>
</table>
\[ 130m^1 \]

**ENDF/B-IV FILE 1 COMMENTS**

53- 1-130M HEDI
EVAL-APRT6 R.E.SCHENTER
DIST-NUDT

**REFERENCE**

DIST-R SCHENTER,THEORY(9/73)

---

**\[ 130m^3 \]**

\[ T_{1/2} = 8.000 \text{ sec} \]
\[ \langle E_x \rangle_{\text{PER DECAY}} = 136.7 \text{ ev} \]
\[ \langle E_\gamma \rangle_{\text{PER DECAY}} = 147.0 \text{ ev} \]

**FISSION YIELDS**

\[ \frac{\text{TOTAL}}{\text{TOTAL}} \text{ (HERALD)} \]
\[ \frac{\text{TOTAL}}{\text{TOTAL}} \text{ (HERALD)} \]
\[ \frac{\text{TOTAL}}{\text{TOTAL}} \text{ (HERALD)} \]
\[ \frac{\text{TOTAL}}{\text{TOTAL}} \text{ (HERALD)} \]

---

130m- 53- 1
<table>
<thead>
<tr>
<th>1</th>
<th>ENDF/B-IV FILE 1 COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>53- 1-130 HEDL EVAL-5174 R. E. SCHÜTZER AND F. SCHMITTROTH</td>
<td></td>
</tr>
<tr>
<td>519</td>
<td>DIST-ROV74</td>
</tr>
</tbody>
</table>

FILE INFORMATION

MF=1 MT=457 DECAY DATA

REFERENCES:
UDEL - A. TOBIAS (10/72) RD/B/M2453
EBETA - A. TOBIAS (10/72) RD/B/M2453
EGAMMA - A. TOBIAS (10/72) RD/B/M2453

<table>
<thead>
<tr>
<th>1</th>
<th>T1/2 = 12.40h</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>T1/2 PER DECAY = 295.0</td>
</tr>
<tr>
<td>1</td>
<td>T1/2 PER DECAY = 2120.</td>
</tr>
</tbody>
</table>

CROSS SECTIONS (BARNs)

<table>
<thead>
<tr>
<th>1</th>
<th>TOTAL 2200MS = 2.2692 x 10^-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>WESTCOTT G FACTOR = 1.1223</td>
</tr>
<tr>
<td>1</td>
<td>CAPTURE 2200MS = 1.8000 x 10^-1</td>
</tr>
<tr>
<td>1</td>
<td>WESTCOTT G FACTOR = 1.0000</td>
</tr>
<tr>
<td>1</td>
<td>RESONANCE INTEGRAL TOTAL = 3.8500 x 10^-2</td>
</tr>
<tr>
<td>1</td>
<td>RESONANCE INTEGRAL CAPTURE = 1.7990 x 10^-2</td>
</tr>
</tbody>
</table>

FISSION YIELDS

<table>
<thead>
<tr>
<th>1</th>
<th>235U THERMAL = 1.7209 x 10^-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>235U FAST = 3.630 x 10^-7</td>
</tr>
<tr>
<td>1</td>
<td>238U FAST = 2.3894 x 10^-4</td>
</tr>
<tr>
<td>1</td>
<td>239Pu THERMAL = 4.7095 x 10^-5</td>
</tr>
</tbody>
</table>

Qg = 2990

Bq = 1.000

<table>
<thead>
<tr>
<th>1</th>
<th>STABLE OR LONG-LIVED</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Xe</td>
</tr>
</tbody>
</table>

130 - 53- 1

<table>
<thead>
<tr>
<th>1</th>
<th>STABLE OR LONG-LIVED</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Xe</td>
</tr>
</tbody>
</table>

130 - 54- 1

CROSS SECTIONS (BARNs)

<table>
<thead>
<tr>
<th>1</th>
<th>TOTAL 2200MS = 1.0500 x 10^-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>WESTCOTT G FACTOR = 4.5211</td>
</tr>
<tr>
<td>1</td>
<td>CAPTURE 2200MS = 6.0205</td>
</tr>
<tr>
<td>1</td>
<td>WESTCOTT G FACTOR = 1.0261</td>
</tr>
<tr>
<td>1</td>
<td>RESONANCE INTEGRAL TOTAL = 1.2980 x 10^-2</td>
</tr>
<tr>
<td>1</td>
<td>RESONANCE INTEGRAL CAPTURE = 4.2740</td>
</tr>
<tr>
<td>1</td>
<td>RESONANCE INTEGRAL (N,2N) = 1.0820</td>
</tr>
<tr>
<td>1</td>
<td>RESONANCE INTEGRAL (N,0) = 3.1950 x 10^-3</td>
</tr>
<tr>
<td>1</td>
<td>RESONANCE INTEGRAL (N,a) = 1.1990 x 10^-4</td>
</tr>
</tbody>
</table>

FISSION YIELDS

| 1 | 239Pu THERMAL = 1.2198 x 10^-4 |

130 - 54- 1
### 131$^{1}$ In

**ENDF/B-IV File 1 Comments**

**References**
- Delayed Neutron Branching - T. England, Theory (2/74)

<table>
<thead>
<tr>
<th>Decay</th>
<th>Q-value</th>
<th>BR$_\gamma$</th>
</tr>
</thead>
<tbody>
<tr>
<td>131$^{1}$ In</td>
<td>3366</td>
<td>0.09500</td>
</tr>
<tr>
<td>131$^{1}$ In</td>
<td>8390</td>
<td>0.9050</td>
</tr>
</tbody>
</table>

### 131$^{1}$ Cd

**ENDF/B-IV File 1 Comments**

**References**
- Half Life - R. Schenter, Theory (4/73)

<table>
<thead>
<tr>
<th>Decay</th>
<th>Q-value</th>
<th>BR$_\gamma$</th>
</tr>
</thead>
<tbody>
<tr>
<td>131$^{1}$ Cd</td>
<td>10550</td>
<td>1.000</td>
</tr>
<tr>
<td>131$^{1}$ Cd</td>
<td>30.10x</td>
<td></td>
</tr>
</tbody>
</table>
\[ \frac{1}{31} \text{Sn} \]

**ENDF/B-IV FILE 1 COMMENTS**

50-54-131 NEOL
EVAL-APRT4 R.E. SCHENTER
DIST-KOV74

\[ T_{1/2} = 63.4 \pm 3.5 \text{ s} \]
\[ \langle E_p \rangle \text{ PER DECAY} = 1305. \]
\[ \langle E_p \rangle \text{ PER DECAY} = 1707. \]

**FISSION YIELDS**

\[
\begin{align*}
^{235}\text{U THERMAL} & : 9.753 \times 10^{-3} \\
^{235}\text{U FAST} & : 1.2857 \times 10^{-2} \\
^{238}\text{U FAST} & : 2.2162 \times 10^{-2} \\
^{239}\text{Pu THERMAL} & : 7.8002 \times 10^{-5}
\end{align*}
\]

\[
\begin{align*}
Q_p & = 4010 \\
\beta^{-} & = 1.000
\end{align*}
\]

\[ 1 \text{Sb} \]
\[ 23.00 \times 0.10 \text{ m} \]

131 - 50 - 1

\[ \frac{1}{31} \text{Sb} \]

**ENDF/B-IV FILE 1 COMMENTS**

50-58-131 ANL
EVAL-FB74 C.W. REICH
DIST-KOV74 REV-JUNTS

FOR FILE DESCRIPTION SEE CM REICH, RG HELMER AND MH PUTMAN,
ANCR-1157, ENDF/B-IV, 1974.

PREPARED FOR FILE 7174
CMR

REFERENCE 1973 REVISION OF WAPSTRA-GOVE MASS TABLE.
OTHER: J. BLACHTOF, H.N. ERLEN, C.O. CORYELL, E.S.

\[ 1 \text{Sb} \]
\[ 23.00 \times 0.10 \text{ m} \]

\[ \langle E_p \rangle \text{ PER DECAY} = 1305. \]
\[ \langle E_p \rangle \text{ PER DECAY} = 1705. \]

**FISSION YIELDS**

\[
\begin{align*}
^{235}\text{U THERMAL} & : 1.5928 \times 10^{-2} \\
^{235}\text{U FAST} & : 1.5705 \times 10^{-2} \\
^{238}\text{U FAST} & : 6.5014 \times 10^{-2} \\
^{239}\text{Pu THERMAL} & : 2.0246 \times 10^{-2}
\end{align*}
\]

\[
\begin{align*}
Q_p & = 3218. \\
\beta^{-} & = 1.000
\end{align*}
\]

\[ 131 - 51 - 1 \]
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Energy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>275.7</td>
<td>1</td>
<td>1.322</td>
</tr>
<tr>
<td>296.1</td>
<td>1</td>
<td>1.982</td>
</tr>
<tr>
<td>301.0</td>
<td>1</td>
<td>1.416</td>
</tr>
<tr>
<td>326.4</td>
<td>1</td>
<td>1.564</td>
</tr>
<tr>
<td>413.9</td>
<td>1</td>
<td>2.000</td>
</tr>
<tr>
<td>641.9</td>
<td>4</td>
<td>23.36</td>
</tr>
<tr>
<td>726.2</td>
<td>1</td>
<td>3.162</td>
</tr>
<tr>
<td>825.0</td>
<td>1</td>
<td>2.030</td>
</tr>
<tr>
<td>834.5</td>
<td>1</td>
<td>3.708</td>
</tr>
<tr>
<td>866.0</td>
<td>1</td>
<td>1.720</td>
</tr>
<tr>
<td>939.610</td>
<td>1</td>
<td>74.340</td>
</tr>
<tr>
<td>1050.0</td>
<td>1</td>
<td>2.369</td>
</tr>
<tr>
<td>1124</td>
<td>1</td>
<td>9.912</td>
</tr>
<tr>
<td>1195</td>
<td>1</td>
<td>9.449</td>
</tr>
<tr>
<td>1235</td>
<td>5</td>
<td>8.638</td>
</tr>
<tr>
<td>1311</td>
<td>4</td>
<td>2.218</td>
</tr>
<tr>
<td>1470</td>
<td>1</td>
<td>1.564</td>
</tr>
<tr>
<td>1546</td>
<td>6</td>
<td>4.201</td>
</tr>
<tr>
<td>1609</td>
<td>1</td>
<td>1.369</td>
</tr>
<tr>
<td>1722</td>
<td>1</td>
<td>2.030</td>
</tr>
<tr>
<td>1757</td>
<td>1</td>
<td>0.708</td>
</tr>
<tr>
<td>1821</td>
<td>1</td>
<td>0.912</td>
</tr>
<tr>
<td>1853</td>
<td>1</td>
<td>4.154</td>
</tr>
<tr>
<td>1957</td>
<td>4</td>
<td>2.360</td>
</tr>
<tr>
<td>2015</td>
<td>1</td>
<td>2.860</td>
</tr>
<tr>
<td>2031</td>
<td>1</td>
<td>2.960</td>
</tr>
<tr>
<td>2169</td>
<td>4</td>
<td>2.974</td>
</tr>
<tr>
<td>2216.0</td>
<td>2</td>
<td>2.200</td>
</tr>
<tr>
<td>2235</td>
<td>1</td>
<td>1.652</td>
</tr>
<tr>
<td>2354.0</td>
<td>2</td>
<td>2.030</td>
</tr>
<tr>
<td>2398</td>
<td>1</td>
<td>0.6496</td>
</tr>
<tr>
<td>2496.0</td>
<td>2</td>
<td>0.5304</td>
</tr>
<tr>
<td>2550.0</td>
<td>2</td>
<td>0.2832</td>
</tr>
<tr>
<td>2602</td>
<td>1</td>
<td>0.9912</td>
</tr>
</tbody>
</table>

<Photons> per decay = 1703.

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy</th>
<th>1/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>γ</td>
<td>943.6</td>
<td>47.20</td>
</tr>
<tr>
<td>γ</td>
<td>1224.</td>
<td>28.72</td>
</tr>
<tr>
<td>γ</td>
<td>1335.</td>
<td>25.96</td>
</tr>
<tr>
<td>γ</td>
<td>1750.</td>
<td>18.88</td>
</tr>
<tr>
<td>γ</td>
<td>1750.</td>
<td>11.30</td>
</tr>
<tr>
<td>γ</td>
<td>1750.</td>
<td>9.912</td>
</tr>
<tr>
<td>γ</td>
<td>1750.</td>
<td>7.963</td>
</tr>
<tr>
<td>γ</td>
<td>1853.</td>
<td>6.873</td>
</tr>
<tr>
<td>γ</td>
<td>1929.</td>
<td>6.873</td>
</tr>
<tr>
<td>γ</td>
<td>2132.</td>
<td>4.251</td>
</tr>
<tr>
<td>γ</td>
<td>1853.</td>
<td>4.154</td>
</tr>
<tr>
<td>γ</td>
<td>1750.</td>
<td>3.776</td>
</tr>
<tr>
<td>γ</td>
<td>1750.</td>
<td>3.398</td>
</tr>
<tr>
<td>γ</td>
<td>1750.</td>
<td>3.214</td>
</tr>
<tr>
<td>γ</td>
<td>1750.</td>
<td>3.162</td>
</tr>
<tr>
<td>γ</td>
<td>1750.</td>
<td>3.110</td>
</tr>
<tr>
<td>γ</td>
<td>1750.</td>
<td>2.926</td>
</tr>
</tbody>
</table>

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>E&lt;sub&gt;max&lt;/sub&gt;</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>γ</td>
<td>738.0</td>
<td>249.4</td>
<td>2.001</td>
</tr>
<tr>
<td>γ</td>
<td>849.0</td>
<td>290.3</td>
<td>2.074</td>
</tr>
<tr>
<td>γ</td>
<td>904.0</td>
<td>312.4</td>
<td>1.763</td>
</tr>
<tr>
<td>γ</td>
<td>1001.0</td>
<td>335.5</td>
<td>1.973</td>
</tr>
<tr>
<td>γ</td>
<td>1264.0</td>
<td>379.7</td>
<td>1.856</td>
</tr>
<tr>
<td>γ</td>
<td>1221.0</td>
<td>447.8</td>
<td>2.488</td>
</tr>
<tr>
<td>γ</td>
<td>1333.0</td>
<td>496.8</td>
<td>10.16</td>
</tr>
<tr>
<td>γ</td>
<td>1524.0</td>
<td>582.5</td>
<td>28.77</td>
</tr>
<tr>
<td>γ</td>
<td>1547.0</td>
<td>592.5</td>
<td>4.251</td>
</tr>
</tbody>
</table>

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>E&lt;sub&gt;max&lt;/sub&gt;</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>γ</td>
<td>1678.0</td>
<td>652.2</td>
<td>2.074</td>
</tr>
<tr>
<td>γ</td>
<td>1730.0</td>
<td>676.1</td>
<td>1.941</td>
</tr>
<tr>
<td>γ</td>
<td>1854.0</td>
<td>735.4</td>
<td>8294</td>
</tr>
<tr>
<td>TYPE</td>
<td>$E_{\text{MAX}}$</td>
<td>MEAN ENERGY</td>
<td>INTENSITY/100 DECAYS</td>
</tr>
<tr>
<td>------</td>
<td>----------------</td>
<td>-------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1930.0</td>
<td>768.7</td>
<td>2.696</td>
</tr>
<tr>
<td>$\alpha$</td>
<td>1933.0</td>
<td>770.1</td>
<td>2.177</td>
</tr>
<tr>
<td>$\beta$</td>
<td>2001.0</td>
<td>801.9</td>
<td>8.709</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2132.0</td>
<td>863.4</td>
<td>4.475</td>
</tr>
<tr>
<td>$\beta$</td>
<td>2192.0</td>
<td>891.8</td>
<td>4.875</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2184.0</td>
<td>973.4</td>
<td>7.369</td>
</tr>
<tr>
<td>$\beta$</td>
<td>2456.0</td>
<td>1017.7</td>
<td>7.369</td>
</tr>
<tr>
<td>$\alpha$</td>
<td>2758.0</td>
<td>1162.0</td>
<td>11.30</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>3218.0</td>
<td>1383.7</td>
<td>3.110</td>
</tr>
</tbody>
</table>

$\langle E_{\gamma} \rangle$ PER DECAY = 713.7
$\langle E_{\beta} \rangle$ PER DECAY = 1086.
ENDFB-IV FILE 1 COMMENTS
52-Te-131m ANC  E.W.REICH
QIST-1974
FOR FILE DESCRIPTION SEE C.W.REICH, RG HELMER AND MH PUTMAN,
ANCR-1177,ENDF/B-IV,8/74
REFERENCE
Q-1973 WAPSTRA-GOVE MASSABLE

\[ \begin{align*}
T_{1/2} &= 30.00h \\
\langle E^3 \rangle \text{ PER DECAY} &= 182.2 \\
\langle E^4 \rangle \text{ PER DECAY} &= 491.1 \\
\end{align*} \]

FISSION YIELDS
\[ \begin{align*}
{}^{233}\text{U THERMAL} &= 7.9999\times10^{-3} \\
{}^{233}\text{U FAST} &= 8.6639\times10^{-3} \\
{}^{239}\text{Pu THERMAL} &= 3.3059\times10^{-4} \\
{}^{239}\text{Pu FAST} &= 4.3815\times10^{-3} \\
\end{align*} \]

\[ \begin{align*}
Q_{\beta} &= 2431.94eV \\
BR_{\gamma} &= 0.8200 \\
\end{align*} \]

\[ \begin{align*}
8.0410\times10^{-20}d \\
25.00\times10^{-14} \\
\end{align*} \]
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Mean Energy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>80.90</td>
<td>1</td>
<td>5.113</td>
</tr>
<tr>
<td>138.3</td>
<td>6</td>
<td>64.79</td>
</tr>
<tr>
<td>230.9</td>
<td>6</td>
<td>23.34</td>
</tr>
<tr>
<td>337.4</td>
<td>5</td>
<td>12.89</td>
</tr>
<tr>
<td>431.1</td>
<td>4</td>
<td>10.84</td>
</tr>
<tr>
<td>586.0</td>
<td>1</td>
<td>1.059</td>
</tr>
<tr>
<td>669.0</td>
<td>1</td>
<td>1.059</td>
</tr>
<tr>
<td>665.0</td>
<td>1</td>
<td>3.294</td>
</tr>
<tr>
<td>777.3</td>
<td>5</td>
<td>65.55</td>
</tr>
<tr>
<td>832.1</td>
<td>1</td>
<td>5.863</td>
</tr>
<tr>
<td>852.1</td>
<td>1</td>
<td>22.37</td>
</tr>
<tr>
<td>910.0</td>
<td>1</td>
<td>3.726</td>
</tr>
<tr>
<td>962.0</td>
<td>1</td>
<td>5.283</td>
</tr>
<tr>
<td>1060.1</td>
<td>1</td>
<td>1.168</td>
</tr>
<tr>
<td>1126.1</td>
<td>1</td>
<td>12.78</td>
</tr>
<tr>
<td>1149.1</td>
<td>1</td>
<td>4.044</td>
</tr>
<tr>
<td>1207.1</td>
<td>1</td>
<td>10.15</td>
</tr>
<tr>
<td>1238.1</td>
<td>1</td>
<td>5.283</td>
</tr>
<tr>
<td>1315.1</td>
<td>1</td>
<td>1.059</td>
</tr>
<tr>
<td>1646.1</td>
<td>1</td>
<td>1.467</td>
</tr>
<tr>
<td>1883.1</td>
<td>1</td>
<td>5.986</td>
</tr>
<tr>
<td>2091.1</td>
<td>1</td>
<td>2.126</td>
</tr>
<tr>
<td>2168.1</td>
<td>1</td>
<td>3.196</td>
</tr>
<tr>
<td>2270.1</td>
<td>1</td>
<td>3.196</td>
</tr>
</tbody>
</table>

\[ \langle E_{\text{photon}} \rangle \text{ per decay} = 1491. \]

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>E_{max}</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>\gamma</td>
<td>101.0</td>
<td>26.70</td>
<td>0.3000</td>
</tr>
<tr>
<td>\gamma</td>
<td>188.0</td>
<td>51.86</td>
<td>4.0000</td>
</tr>
<tr>
<td>\gamma</td>
<td>301.0</td>
<td>87.22</td>
<td>5.0000</td>
</tr>
<tr>
<td>\gamma</td>
<td>419.0</td>
<td>127.0</td>
<td>10.00</td>
</tr>
<tr>
<td>\gamma</td>
<td>545.0</td>
<td>157.8</td>
<td>11.00</td>
</tr>
<tr>
<td>\gamma</td>
<td>646.0</td>
<td>143.5</td>
<td>12.00</td>
</tr>
<tr>
<td>\gamma</td>
<td>500.0</td>
<td>155.7</td>
<td>3.000</td>
</tr>
<tr>
<td>\gamma</td>
<td>629.0</td>
<td>166.3</td>
<td>13.00</td>
</tr>
<tr>
<td>\gamma</td>
<td>802.0</td>
<td>193.4</td>
<td>7.000</td>
</tr>
<tr>
<td>\gamma</td>
<td>802.0</td>
<td>271.3</td>
<td>16.00</td>
</tr>
<tr>
<td>\gamma</td>
<td>1360.0</td>
<td>511.2</td>
<td>2.0000</td>
</tr>
<tr>
<td>\gamma</td>
<td>2431.0</td>
<td>1005.0</td>
<td>5.000</td>
</tr>
</tbody>
</table>

\[ \langle E_p \rangle \text{ per decay} = 182.2 \]
\[ \langle E_\gamma \rangle \text{ per decay} = 353.0 \]
\[(^{131}_{73} \text{Tm})\]

 ENDF/B-IV FILE 1 COMMENTS
52-TE-131 ANC EVAL-PE8+4 C.W. REICH
DIST-NUV
FOR FILE DESCRIPTION SEE C.W. REICH, RG HELMER AND MH PUTMAN,
ANCR-1157, ENDF210, 8/74.
REFERENCE
G-1973 WAPSTRA-GOVE MASSABLE

\[\frac{T_{\text{1/2}}}{(\text{d})} = 25.004 \times 10^6 \overset{\text{m}}{<} \]
\[<E_\text{F}> \text{ PER DECAY} = 671.7\]
\[<E_\text{F}> \text{ PER DECAY} = 22.8\]
\[\text{FISSION YIELDS}\]
\[^{235}\text{U THERMAL} = 1.1008 \times 10^{-3}\]
\[^{235}\text{U FAST} = 1.0442 \times 10^{-3}\]
\[^{238}\text{U FAST} = 1.3705 \times 10^{-4}\]
\[^{239}\text{Pu THERMAL} = 5.875 \times 10^{-3}\]
\[\frac{Q_{\text{f}}}{(\text{MeV})} = 2249.80\]
\[Q_{\text{f}} = 1.000\]

\[\frac{A_{\text{f}}}{(\text{MeV})} = 8.0410 \times 10^{-6}\]

\[131 - 52 - 1\]
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Mean Energy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>109.8</td>
<td>1</td>
<td>0.09380</td>
</tr>
<tr>
<td>149.8</td>
<td>1</td>
<td>67.00</td>
</tr>
<tr>
<td>211.4</td>
<td>1</td>
<td>0.61690</td>
</tr>
<tr>
<td>278.3</td>
<td>1</td>
<td>1.2506</td>
</tr>
<tr>
<td>298.3</td>
<td>1</td>
<td>1.742</td>
</tr>
<tr>
<td>342.9</td>
<td>1</td>
<td>7.370</td>
</tr>
<tr>
<td>353.0</td>
<td>1</td>
<td>0.64690</td>
</tr>
<tr>
<td>384.2</td>
<td>1</td>
<td>0.9380</td>
</tr>
<tr>
<td>461.3</td>
<td>5</td>
<td>22.98</td>
</tr>
<tr>
<td>551.0</td>
<td>4</td>
<td>5.159</td>
</tr>
<tr>
<td>616.5</td>
<td>4</td>
<td>0.439</td>
</tr>
<tr>
<td>727.0</td>
<td>1</td>
<td>3.5925</td>
</tr>
<tr>
<td>860.4</td>
<td>4</td>
<td>4.922</td>
</tr>
<tr>
<td>971.5</td>
<td>4</td>
<td>7.042</td>
</tr>
<tr>
<td>1008</td>
<td>1</td>
<td>8.710</td>
</tr>
<tr>
<td>1099</td>
<td>1</td>
<td>2.077</td>
</tr>
<tr>
<td>1147</td>
<td>1</td>
<td>5.628</td>
</tr>
<tr>
<td>1278</td>
<td>1</td>
<td>1.206</td>
</tr>
<tr>
<td>1295</td>
<td>1</td>
<td>0.6365</td>
</tr>
<tr>
<td>1309</td>
<td>1</td>
<td>0.6670</td>
</tr>
<tr>
<td>1352</td>
<td>1</td>
<td>0.6030</td>
</tr>
<tr>
<td>1428</td>
<td>1</td>
<td>1.072</td>
</tr>
<tr>
<td>1501</td>
<td>1</td>
<td>1.206</td>
</tr>
<tr>
<td>1528</td>
<td>1</td>
<td>0.0580</td>
</tr>
<tr>
<td>1579</td>
<td>1</td>
<td>0.06970</td>
</tr>
<tr>
<td>1652</td>
<td>1</td>
<td>0.00670</td>
</tr>
</tbody>
</table>

\( <\text{E}_{\text{photons}} > \text{per decay} = 422.8 \)

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\gamma)</td>
<td>1360.0</td>
<td>508.6</td>
</tr>
<tr>
<td>(\beta)</td>
<td>1646.0</td>
<td>637.5</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>2099.0</td>
<td>847.9</td>
</tr>
</tbody>
</table>

\( <E_{\gamma} > \text{per decay} = 671.7 \)
\( <E_{\beta} > \text{per decay} = 1044 \).
ENDFB-IV FILE 1
COMMENTS
53-1 I-131  ANCE,Heol  EVAL-KE874  C.W.Reich  DECAY DATA
EVAL-KE874  R.E.Schenter  and  F.Schmittroth
CROSS SECTION DATA
DIST-NOV74

\[ \begin{align*}
\langle \varepsilon \rangle & \approx 8.0410 \times 10^{-2} \\
\langle \varepsilon \rangle \text{ PER DECAY} & \approx 185.5 \\
\langle \varepsilon \rangle \text{ PER DECAY} & \approx 389.3 \\
\end{align*} \]

CROSS SECTIONS (BARNES)
- TOTAL 2200M/S: 5.4160
- WESTCOTT G FACTOR: 1.1760
- CAPTURE 2200M/S: 7.0000 \times 10^{-1}
- WESTCOTT G FACTOR: 10.0000 \times 10^{-1}
- RESONANCE INTEGRAL TOTAL: 1.0280 \times 10^{-2}
- RESONANCE INTEGRAL CAPTURE: 7.9640

FISSION YIELDS
- \( ^{235}U \) THERMAL: 3.9752 \times 10^{-3}
- \( ^{235}U \) FAST: 2.1354 \times 10^{-2}
- \( ^{239}Pu \) FAST: 3.1487 \times 10^{-2}
- \( ^{239}Pu \) THERMAL: 1.2977 \times 10^{-2}

\[ \begin{align*}
\beta_f & = 776.0 \\
\beta_f & = 0.00700
\end{align*} \]

\[ \begin{align*}
\beta_f & = 0.970 \times 0.8 \\
\beta_f & = 0.9450
\end{align*} \]

\[ \begin{align*}
11.999 \pm 0.020& \text{d} \\
\text{STABLE OR LONG-LIVED}
\end{align*} \]
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Energy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>80.20</td>
<td>1</td>
<td>2.619</td>
</tr>
<tr>
<td>272.3</td>
<td>1</td>
<td>.06286</td>
</tr>
<tr>
<td>344.3</td>
<td>5</td>
<td>84.27</td>
</tr>
<tr>
<td>404.8</td>
<td>1</td>
<td>.06286</td>
</tr>
<tr>
<td>501.0</td>
<td>1</td>
<td>.3443</td>
</tr>
<tr>
<td>637.0</td>
<td>1</td>
<td>7.228</td>
</tr>
<tr>
<td>643.0</td>
<td>1</td>
<td>.1577</td>
</tr>
<tr>
<td>722.0</td>
<td>1</td>
<td>1.676</td>
</tr>
</tbody>
</table>

\[ \langle E_{\text{PHOTON}} \rangle \text{ PER DECAY} = 389.3 \]

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type, E (MeV)</th>
<th>E_max (MeV)</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \beta^- )</td>
<td>247.0</td>
<td>69.97</td>
<td>1.700</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>304.0</td>
<td>88.19</td>
<td>.6000</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>334.0</td>
<td>96.50</td>
<td>7.000</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>606.0</td>
<td>194.9</td>
<td>.8960</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>806.0</td>
<td>272.9</td>
<td>.7000</td>
</tr>
</tbody>
</table>

\[ \langle E_{\beta^-} \rangle \text{ PER DECAY} = 185.5 \]
\[ \langle E_{\beta^-} \rangle \text{ PER DECAY} = 395.9 \]

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type, Energy (MeV)</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \beta^- ) 606.0</td>
<td>89.60</td>
</tr>
<tr>
<td>( \gamma ) 564.5</td>
<td>83.81</td>
</tr>
</tbody>
</table>
$^{131m}\text{Xe}$

ENDF/B-V FILE 1 COMMENTS
54-XE-131M ANG
EVAL-FEB74 G.W.REICH
DIST-NOV74
FOR FILE DESCRIPTION SEE CN REICH, RG HELMER AND MH PUTMAN,
ANCR-1157, ENDF210, 8/74.
PREPARED FOR FILE 12/73 CWR
REFERENCE
OTHER - M.J.MARTIN, RADIOACTIVE ATOMS SUPPLEMENT 1,
OMNL-4425(1975).

$^{131m}\text{Xe}$

- $T_{1/2} = 11.990 \pm 0.020$ d
- $\lambda_{\alpha} = 3.13 \pm 0.3$ s
- $\lambda_{\beta} = 10.0 \pm 0.2$ s
- $\lambda_{\gamma} = 3.13 \pm 0.3$ s
- Fission YIELDS
  - $^{235}\text{U}$ THERMAL $7.7842 \times 10^{-9}$
  - $^{235}\text{U}$ FAST $7.4812 \times 10^{-9}$
  - $^{239}\text{Pu}$ THERMAL $8.2588 \times 10^{-9}$

Q$_{β} = 765.930 \pm 0.08$
BR$_{β} = 1.000$

$^{131m}\text{Xe}$

- STABLE OR LONG-LIVED
PHOTON RADIATION TABLE

<table>
<thead>
<tr>
<th>MEAN ENERGY</th>
<th>LINES</th>
<th>PHOTONS/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>26.1</td>
<td>7.2</td>
<td>66. ± 15.</td>
</tr>
<tr>
<td>169.930</td>
<td>0.008</td>
<td>1 2.00 ± 0.10</td>
</tr>
</tbody>
</table>

$<E_{\text{PHOTON}}>$ PER DECAY = 20. ± 4.

PARTICLE RADIATION TABLE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>$E_{\text{MAX}}$</th>
<th>MEAN ENERGY</th>
<th>INTENSITY/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>AU</td>
<td>33.4</td>
<td>6. ± 3.</td>
<td>85. ± 30.</td>
</tr>
<tr>
<td>CE</td>
<td>162.8</td>
<td>140.4 ± 6</td>
<td>100. ± 5.</td>
</tr>
</tbody>
</table>

$<E_{\mu}>$ PER DECAY = 145.8

PHOTON INTENSITY PLOT

CHARACTERISTIC RADIATION TABLE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>ENERGY</th>
<th>1/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>AU</td>
<td>4.508</td>
<td>78. ± 22.</td>
</tr>
<tr>
<td>CE</td>
<td>129.369</td>
<td>65. ± 6.</td>
</tr>
<tr>
<td>Xe</td>
<td>29.11</td>
<td>48. ± 15.</td>
</tr>
<tr>
<td>CEl</td>
<td>158.477</td>
<td>29.9 ± 1.9</td>
</tr>
<tr>
<td>Element</td>
<td>Cross Sections (Barns)</td>
<td>Fission Yields</td>
</tr>
<tr>
<td>---------</td>
<td>------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Xe</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TOTAL 2200M/S</td>
<td>235U THERMAL</td>
</tr>
<tr>
<td></td>
<td>WESTCOTT G FACTOR</td>
<td>7.7042 x 10^{-4}</td>
</tr>
<tr>
<td></td>
<td>CAPTURE 2200M/S</td>
<td>239U THERMAL</td>
</tr>
<tr>
<td></td>
<td>WESTCOTT G FACTOR</td>
<td>7.042 x 10^{-4}</td>
</tr>
<tr>
<td></td>
<td>RESONANCE INTEGRAL TOTAL</td>
<td>239U FAST</td>
</tr>
<tr>
<td></td>
<td>RESONANCE INTEGRAL CAPTURE</td>
<td>7.4812 x 10^{-4}</td>
</tr>
<tr>
<td></td>
<td>RESONANCE INTEGRAL (n,2n)</td>
<td>5.9494 x 10^{-4}</td>
</tr>
<tr>
<td></td>
<td>RESONANCE INTEGRAL (n,γ)</td>
<td>8.2588 x 10^{-4}</td>
</tr>
</tbody>
</table>

STABLE OR LONG-LIVED
\[ ^{132}_{44} \text{Cd} \]

ENDF/B-IV FILE 1 COMMENTS
48-CD-132  HEDL  EVAL-LPR74  R.E. SCHENTER
DIST-NOV74

REFERENCES
HALF LIFE-R SCHENTER, THEORY(9/73)

\[ ^{132}_{46} \text{In} \]

ENDF/B-IV FILE 1 COMMENTS
49-IN-132  HEDL  EVAL-LPR74  R.E. SCHENTER
DIST-NOV74

\[ ^{132}_{50} \text{Sn} \]

40.0 \pm 1.0 \%

\[ ^{132} \text{Cd} \]

\[ T_{1/2} = 14 \text{d} \]

\[ \langle E \rangle \text{ PER DECAY} = 2691 \text{ keV} \]

\[ \langle E \rangle \text{ PER DECAY} = 3998 \text{ keV} \]

FISSION YIELDS

\[ ^{235} \text{U THERMAL} \quad 5.225 \times 10^{-6} \]

\[ ^{235} \text{U FAST} \quad 5.7209 \times 10^{-2} \]

\[ ^{238} \text{U FAST} \quad 6.0649 \times 10^{-6} \]

\[ ^{239} \text{Pu THERMAL} \quad 1.4395 \times 10^{-3} \]

\[ Q_{\beta} = 0.380 \text{ MeV} \]

\[ BR_{\gamma} = 1.0 \]

\[ ^{132} \text{In} \]

\[ T_{1/2} = 120 \pm 0.02 \text{d} \]

\[ Q_{\beta} = 123.1 \text{ MeV} \]

\[ BR_{\gamma} = 1.0 \]

\[ ^{132} \text{Sn} \]

\[ 40.0 \pm 1.0 \% \]
\textsuperscript{113} Sn

\textbf{ENDF/B-IV FILE 1 COMMENTS}


-----------------------------------------------
\begin{center}
\begin{tabular}{|c|}
\hline
\textbf{\textit{\textsuperscript{113} Sn}} \\
\hline
\textbf{\textit{T_{1/2} = 4.00 \times 1.00}} \\
\textbf{\textit{\langle E_p \rangle_{\text{PER DECAY}} = 660.3}} \\
\textbf{\textit{\langle E_p \rangle_{\text{PER DECAY}} = 1323.9}} \\
\hline
\textbf{\textit{FISSION YIELDS}} \\
\hline
\textbf{\textit{\textsuperscript{235}U THERMAL = 5.755 \times 10^{-7}}} \\
\textbf{\textit{\textsuperscript{235}U FAST = 6.746 \times 10^{-7}}} \\
\textbf{\textit{\textsuperscript{239}U THERMAL = 2.398 \times 10^{-7}}} \\
\textbf{\textit{\textsuperscript{239}U FAST = 2.362 \times 10^{-7}}} \\
\hline
\end{tabular}
\end{center}

\begin{center}
\textbf{Q_F = 5820, A200, BRF = 1.000} \\
\end{center}

-----------------------------------------------
\begin{center}
\begin{tabular}{|c|}
\hline
\textbf{\textit{\textsuperscript{113} Sn}} \\
\hline
\textbf{\textit{\textsuperscript{113} Sn = 2.10 \times 20m}} \\
\hline
\end{tabular}
\end{center}

132 - 50 - 1
PHOTON RADIATION TABLE

<table>
<thead>
<tr>
<th>MEAN ENERGY</th>
<th>LINES</th>
<th>PHOTONS/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>38.0 ± 0.9</td>
<td>5</td>
<td>44.6 ± 1.5</td>
</tr>
<tr>
<td>246.70 ± 0.10</td>
<td>1</td>
<td>40.6 ± 1.8</td>
</tr>
<tr>
<td>340.20 ± 0.10</td>
<td>1</td>
<td>42.4 ± 1.9</td>
</tr>
<tr>
<td>528.70 ± 0.20</td>
<td>1</td>
<td>2.02 ± 0.19</td>
</tr>
<tr>
<td>548.80 ± 0.20</td>
<td>1</td>
<td>1.92 ± 0.19</td>
</tr>
<tr>
<td>651.90 ± 0.20</td>
<td>1</td>
<td>1.92 ± 0.19</td>
</tr>
<tr>
<td>898.50 ± 0.10</td>
<td>1</td>
<td>42.2 ± 1.9</td>
</tr>
<tr>
<td>992.20 ± 0.10</td>
<td>1</td>
<td>38.4 ± 1.9</td>
</tr>
<tr>
<td>1077.8 ± 0.3</td>
<td>1</td>
<td>2.02 ± 0.19</td>
</tr>
<tr>
<td>1238.80 ± 0.20</td>
<td>1</td>
<td>13.± ± 1.0</td>
</tr>
</tbody>
</table>

\[ \langle \text{E}_{\text{Photo}} \rangle \text{ PER DECAY} = 1253. \text{ µ} \text{eV} \]

PARTICLE RADIATION TABLE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>E_{\text{Max}}</th>
<th>MEAN ENERGY</th>
<th>INTENSITY/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>AU</td>
<td>27.5</td>
<td>0.627</td>
<td>26.30</td>
</tr>
<tr>
<td>CE</td>
<td>359.5</td>
<td>80.15</td>
<td>26.45</td>
</tr>
<tr>
<td>± 1695.7</td>
<td>666. ± 80.</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

\[ \langle \text{E} \rangle \text{ PER DECAY} = 584. \text{ µ} \text{eV} \]

\[ \langle \text{E} \rangle \text{ PER DECAY} = 1073. \text{ µ} \text{eV} \]

CHARACTERISTIC RADIATION TABLE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>ENERGY</th>
<th>1/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>± 1696.</td>
<td>± 200.</td>
<td>180.0</td>
</tr>
<tr>
<td>γ</td>
<td>340.20</td>
<td>± 0.10</td>
</tr>
<tr>
<td>γ</td>
<td>898.50</td>
<td>± 0.10</td>
</tr>
<tr>
<td>γ</td>
<td>246.70</td>
<td>± 0.10</td>
</tr>
<tr>
<td>γ</td>
<td>992.20</td>
<td>± 0.10</td>
</tr>
<tr>
<td>γ</td>
<td>85.50</td>
<td>± 0.10</td>
</tr>
</tbody>
</table>
**132mSb**

**ENDF/B-IV FILE 1 COMMENTS**

51-SB-152M ANC  EVAL+EB74  I.W.REICH  DECAY DATA

DIST-NDV74

FOR FILE DESCRIPTION SEE RN WEICH, RG HELMER AND MH PUTMAN.

**REFERENCE**

Q- (ASSUMED SAME AS SB-132)

<table>
<thead>
<tr>
<th>Decay Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>$T_{1/2}$</td>
</tr>
<tr>
<td>$&lt;E_x&gt;$</td>
</tr>
<tr>
<td>$&lt;E_y&gt;$</td>
</tr>
</tbody>
</table>

**Fission Yields**

<table>
<thead>
<tr>
<th>Isotope</th>
<th>Thermal</th>
<th>1.053 x 10^-7</th>
</tr>
</thead>
<tbody>
<tr>
<td>$^{239}$U</td>
<td>FAST</td>
<td>1.2184 x 10^-7</td>
</tr>
<tr>
<td>$^{238}$U</td>
<td>FAST</td>
<td>1.0583 x 10^-7</td>
</tr>
</tbody>
</table>

**G**

- $G_x$ = 6080.0
- $G_y$ = 1.000

**Te**

- 78.0 ± 0.3h
**PHOTON RADIATION TABLE**

<table>
<thead>
<tr>
<th>Mean Energy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>103.2</td>
<td>1</td>
<td>35.00</td>
</tr>
<tr>
<td>131.7</td>
<td>1</td>
<td>42.00</td>
</tr>
<tr>
<td>383.2</td>
<td>1</td>
<td>32.00</td>
</tr>
<tr>
<td>697.4</td>
<td>1</td>
<td>100.0</td>
</tr>
<tr>
<td>974.6</td>
<td>1</td>
<td>100.0</td>
</tr>
<tr>
<td>1042.1</td>
<td>1</td>
<td>14.00</td>
</tr>
</tbody>
</table>

$\langle E_{\text{ photon}} \rangle$ per decay = 2039.

**PARTICLE RADIATION TABLE**

<table>
<thead>
<tr>
<th>Type</th>
<th>$E_{\text{max}}$</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\gamma$</td>
<td>3182.0</td>
<td>156.7</td>
<td>15.60</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>3842.0</td>
<td>1690.0</td>
<td>36.20</td>
</tr>
<tr>
<td>$\beta$</td>
<td>4074.0</td>
<td>1804.0</td>
<td>48.40</td>
</tr>
</tbody>
</table>

$\langle E_{\text{p}} \rangle$ per decay = 1696.
$\langle E_{\text{c}} \rangle$ per decay = 217.

**PHOTON INTENSITY PLOT**

**CHARACTERISTIC RADIATION TABLE**

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy</th>
<th>1/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\gamma$</td>
<td>974.6</td>
<td>100.0</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>697.4</td>
<td>100.0</td>
</tr>
<tr>
<td>$\beta$</td>
<td>4074.0</td>
<td>48.40</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>131.1</td>
<td>41.00</td>
</tr>
<tr>
<td>$\beta$</td>
<td>3842.0</td>
<td>36.20</td>
</tr>
</tbody>
</table>
\textbf{5b}

ENDFB/B-IV FILE 1 COMMENTS
51-SA-172 ARC
EVAL-FEB74 I.W.REICH
DIST-MAY74
FOR FILE DESCRIPTION SEE
CW REICH, KG HELMER AND MH PUTMAN,
ANCR-1157, ENDF/B-IV, 8/74.
REFERENCE

\begin{verbatim}
51 5b

T_{1/2} = 2.104 \times 10^4
\langle E_{\beta} \rangle \text{ PER DECAY} = \sqrt{2422}
\langle E_{\gamma} \rangle \text{ PER DECAY} = 2007

FISSION YIELDS
\begin{itemize}
\item 235U THERMAL: \( \text{\scriptsize 1.058x10^{-7}} \)
\item 235U FAST: \( \text{\scriptsize 1.218x10^{-7}} \)
\item 238U FAST: \( \text{\scriptsize 1.058x10^{-7}} \)
\item 239Pu THERMAL: \( \text{\scriptsize 1.037x10^{-7}} \)
\end{itemize}

Q_{\beta} = 6080
BR_{\gamma} = 1.000

\end{verbatim}

52 Te

78.040.3h

\end{verbatim}

\vspace{1cm}

132 - 51 - 1
### PHOTON RADIATION TABLE

<table>
<thead>
<tr>
<th>Energy (keV)</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>103.2</td>
<td>1</td>
<td>10.00</td>
</tr>
<tr>
<td>644.9</td>
<td>1</td>
<td>4.100</td>
</tr>
<tr>
<td>697.4</td>
<td>1</td>
<td>69.00</td>
</tr>
<tr>
<td>974.0</td>
<td>1</td>
<td>100.0</td>
</tr>
<tr>
<td>989.3</td>
<td>1</td>
<td>26.00</td>
</tr>
<tr>
<td>1154.0</td>
<td>1</td>
<td>7.900</td>
</tr>
<tr>
<td>1152.0</td>
<td>1</td>
<td>1.000</td>
</tr>
<tr>
<td>1197.0</td>
<td>1</td>
<td>3.000</td>
</tr>
<tr>
<td>1215.0</td>
<td>1</td>
<td>2.700</td>
</tr>
<tr>
<td>1513.0</td>
<td>1</td>
<td>2.300</td>
</tr>
</tbody>
</table>

<Photons> per decay = 2006.

### PARTICLE RADIATION TABLE

<table>
<thead>
<tr>
<th>Type</th>
<th>E&lt;sub&gt;max&lt;/sub&gt; (keV)</th>
<th>Mean Energy (keV)</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>β⁻</td>
<td>3235.0</td>
<td>1395.0</td>
<td>30.55</td>
</tr>
<tr>
<td>β⁻</td>
<td>3239.0</td>
<td>1745.0</td>
<td>4.120</td>
</tr>
<tr>
<td>β⁻</td>
<td>3874.0</td>
<td>1706.0</td>
<td>5.920</td>
</tr>
<tr>
<td>β⁻</td>
<td>2802.0</td>
<td>1715.0</td>
<td>9.300</td>
</tr>
<tr>
<td>β⁻</td>
<td>4328.0</td>
<td>1929.0</td>
<td>50.11</td>
</tr>
</tbody>
</table>

<\(E_{\beta^-}\) per decay = 1722.

<\(E_{\beta^-}\) per decay = 2164.

### CHARACTERISTIC RADIATION TABLE

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy (keV)</th>
<th>1/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>γ</td>
<td>974.0</td>
<td>100.0</td>
</tr>
<tr>
<td>γ</td>
<td>697.4</td>
<td>69.00</td>
</tr>
<tr>
<td>β⁻</td>
<td>4328.0</td>
<td>50.11</td>
</tr>
<tr>
<td>β⁻</td>
<td>3235.0</td>
<td>30.55</td>
</tr>
</tbody>
</table>
\[ \frac{1}{\text{Te}} \]

ENGFR-11-V FILE 1 COMMENTS
52-TE-132 ANC.HEOL EVAL-JUL74 C.W.REICH DECAY DATA
RIH.CO74 R.E.SCHMITTROTH CROSS SECTION DATA
DIST-NOV74

FILE INFORMATION
MF=1 MT=157 DECAY DATA
REFERENCES
IN REICH, R.D HELMER AND MH PUTMAN, ANCR-1157, ENGFR210, 8/74.
Q 1973 REVISION OF WAPSTRA-GOYV MASS TABLE.
OTHER- SEE M.J. MARTIN AND P.H. BLICHERT-TOFT.

\[ T_{1/2} = 78.0 \pm 0.3 \text{h} \]
\[ <E_x> \text{ PER DECAY} = 60.05 \]
\[ <E_y> \text{ PER DECAY} = 268.6 \]

CROSS SECTIONS (BARNES)
\[ \nu TOTAL 22000\% 8.7420 \]
\[ \nu WESTCOTT G FACTOR 1.1284 \]
\[ \nu CAPTURE 22000\% 2.0000 \times 10^{-10} \]
\[ \nu WESTCOTT G FACTOR 1.0000 \]
\[ \nu RESONANCE INTEGRAL TOTAL 8.6110 \times 10^{-1} \]
\[ \nu RESONANCE INTEGRAL CAPTURE 5.6240 \times 10^{-1} \]

FISSION YIELDS
\[ \nu^{235}U \text{ THERMAL} 1.5327 \times 10^{-2} \]
\[ \nu^{235}U \text{ FAST} 1.5044 \times 10^{-2} \]
\[ \nu^{239}U \text{ FAST} 5.0068 \times 10^{-3} \]
\[ \nu^{239}Pu \text{ THERMAL} 2.7402 \times 10^{-2} \]

\[ Q_x = 505.2 \pm 15 \]
\[ BR_x = 1.000 \]

\[ \chi^2 = 2.2830 \times 0.0020 \]

152 - 52 - 1
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy (keV)</th>
<th>Mean Energy (keV)</th>
<th>Intensity (1/100 Decays)</th>
<th>Energy Intensity (1/100 Decays)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cu</td>
<td>783.76</td>
<td>60.0</td>
<td>0.10</td>
<td>1.1</td>
</tr>
<tr>
<td>Au</td>
<td>275.16</td>
<td>45.0</td>
<td>0.06</td>
<td>1.1</td>
</tr>
<tr>
<td>Ce</td>
<td>357.91</td>
<td>90.0</td>
<td>0.06</td>
<td>1.1</td>
</tr>
<tr>
<td>Cr</td>
<td>244.94</td>
<td>60.0</td>
<td>0.10</td>
<td>1.1</td>
</tr>
</tbody>
</table>

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy (keV)</th>
<th>1/100 Decays</th>
<th>1/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cu</td>
<td>783.76</td>
<td>150.0</td>
<td>500.0</td>
</tr>
<tr>
<td>Au</td>
<td>275.16</td>
<td>100.0</td>
<td>500.0</td>
</tr>
<tr>
<td>Ce</td>
<td>357.91</td>
<td>50.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Cr</td>
<td>244.94</td>
<td>50.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Mean Energy (eV): 1.0, 3.0, 5.0, 7.0, 11.0, 13.0
Mean Intensity (1/100 Decays): 2.0, 4.0, 5.0, 6.0, 7.0, 8.0,

Mean Energy Intensity (1/100 Decays): 1.0, 3.0, 5.0, 7.0, 11.0, 13.0
ENDF/B-IV FILE 1 COMMENTS
53- 1-132 ANC EVAL-DEC74 C.W.REICH DECAY DATA
DIST-NOV74
*For file description see C.W.REICH, JC HELMER AND MH PUTMAN,
ANCR-1157,ENDF/B-IV,8/74.
REFERENCE
G-1973 WAPSTRA-GUYE NASSTABLE

\[ \text{T}_{1/2} = 2.285 \times 10^{-2} \text{h} \]
\[ \langle E \rangle \text{ PER DECAY} = 52.7 \text{MeV} \]
\[ \langle E \rangle \text{ PER DECAY} = 22.8 \text{MeV} \]

FISSION YIELDS
\[ ^{235}\text{U THERMAL} = 1.695 \times 10^{-4} \]
\[ ^{235}\text{U FAST} = 3.749 \times 10^{-4} \]
\[ ^{238}\text{U FAST} = 1.224 \times 10^{-5} \]
\[ ^{239}\text{Pu THERMAL} = 1.405 \times 10^{-3} \]

\[ Q_{f} = 5580.0 \text{MeV} \]
\[ BR_{\gamma} = 1.000 \]

STABLE OR LONG-LIVED

132 - 53- 1
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Mean Energy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>147.3</td>
<td>1</td>
<td>.2089</td>
</tr>
<tr>
<td>264.3</td>
<td>1</td>
<td>2.353</td>
</tr>
<tr>
<td>284.7</td>
<td>1</td>
<td>.6158</td>
</tr>
<tr>
<td>527.7</td>
<td>4</td>
<td>22.35</td>
</tr>
<tr>
<td>668.2</td>
<td>7</td>
<td>120.2</td>
</tr>
<tr>
<td>723.3</td>
<td>1</td>
<td>5.422</td>
</tr>
<tr>
<td>729.2</td>
<td>1</td>
<td>1.483</td>
</tr>
<tr>
<td>726.5</td>
<td>1</td>
<td>8.677</td>
</tr>
<tr>
<td>113.3</td>
<td>1</td>
<td>8.491</td>
</tr>
<tr>
<td>865.9</td>
<td>1</td>
<td>1.573</td>
</tr>
<tr>
<td>877.0</td>
<td>1</td>
<td>1.023</td>
</tr>
<tr>
<td>950.0</td>
<td>4</td>
<td>21.91</td>
</tr>
<tr>
<td>1038.5</td>
<td>1</td>
<td>.6588</td>
</tr>
<tr>
<td>1136.1</td>
<td>1</td>
<td>3.581</td>
</tr>
<tr>
<td>1144.1</td>
<td>1</td>
<td>1.452</td>
</tr>
<tr>
<td>1171.1</td>
<td>1</td>
<td>1.125</td>
</tr>
<tr>
<td>1294.1</td>
<td>1</td>
<td>1.335</td>
</tr>
<tr>
<td>1299.1</td>
<td>1</td>
<td>1.637</td>
</tr>
<tr>
<td>1316.1</td>
<td>1</td>
<td>1.1637</td>
</tr>
<tr>
<td>1372.1</td>
<td>1</td>
<td>2.558</td>
</tr>
<tr>
<td>1598.1</td>
<td>1</td>
<td>7.263</td>
</tr>
<tr>
<td>1441.1</td>
<td>1</td>
<td>1.432</td>
</tr>
<tr>
<td>1479.1</td>
<td>1</td>
<td>1.759</td>
</tr>
<tr>
<td>1722.1</td>
<td>1</td>
<td>1.554</td>
</tr>
<tr>
<td>1822.1</td>
<td>1</td>
<td>1.688</td>
</tr>
<tr>
<td>2087.1</td>
<td>1</td>
<td>3.867</td>
</tr>
<tr>
<td>2172.1</td>
<td>1</td>
<td>3.785</td>
</tr>
<tr>
<td>2224.1</td>
<td>1</td>
<td>2.046</td>
</tr>
<tr>
<td>2391.1</td>
<td>1</td>
<td>1.371</td>
</tr>
<tr>
<td>2526.1</td>
<td>1</td>
<td>0.8184</td>
</tr>
</tbody>
</table>

$<E_{\text{Photo}}>$ PER DECAY = 2238.

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\alpha$</td>
<td>287.0</td>
<td>16.00</td>
</tr>
<tr>
<td>$\alpha$</td>
<td>318.5</td>
<td>8.000</td>
</tr>
<tr>
<td>$\alpha$</td>
<td>362.0</td>
<td>5.000</td>
</tr>
<tr>
<td>$\alpha$</td>
<td>393.4</td>
<td>18.00</td>
</tr>
<tr>
<td>$\alpha$</td>
<td>424.5</td>
<td>20.00</td>
</tr>
<tr>
<td>$\alpha$</td>
<td>609.4</td>
<td>9.000</td>
</tr>
<tr>
<td>$\alpha$</td>
<td>742.6</td>
<td>6.000</td>
</tr>
<tr>
<td>$\alpha$</td>
<td>914.1</td>
<td>18.00</td>
</tr>
</tbody>
</table>

$<E_{\alpha}>$ PER DECAY = 524.7

$<E_{\alpha}>$ PER DECAY = 858.5
$^{132}\text{Xe}$

- Stable or long-lived
- Cross sections (barns)
  - Total $\sigma = 4.7520$
  - Westcott $Q$ factor = 1.6123
  - Capture $\sigma = 4.190 \times 10^{-1}$
  - Westcott $Q$ factor = 1.0169
  - Resonance integral total = $1.76 \times 10^{-7}$
  - Resonance integral capture = $1.7320$
  - Resonance integral $(n,2n)$ = $1.1430$
  - Resonance integral $(n,p)$ = $1.2709 \times 10^{-3}$
  - Resonance integral $(n,\alpha)$ = $5.630 \times 10^{-5}$

- Fission yields
  - $^{235}\text{U}$ thermal = $8.3545 \times 10^{-7}$
  - $^{235}\text{U}$ fast = $8.1015 \times 10^{-7}$
  - $^{239}\text{U}$ fast = $5.3595 \times 10^{-9}$
  - $^{239}\text{Pu}$ thermal = $8.9387 \times 10^{-6}$

$^{132} \text{Cs}$

- ENDF/B-IV FILE 1 COMMENTS
  - 55-C9-132 Missing from ENDF/B IV
  - Half life: N.A. MIDDLETON and C.P. BROUME,
  - Nuclear Data 17, 223 (1976)

- $^{132} \text{Cs}$
  - $T_{1/2} = 6.475 \times 0.010$

- Fission yields
  - $^{239}\text{Pu}$ thermal = $1.2298 \times 10^{-9}$

$^{132} \text{Ba}$

- Stable or long-lived

$^{132} \text{Ba}$
\(^{113}\) In

ENDF/B-IV FILE 1 COMMENTS
49-1N-133 HEDL
EVAL-APR74 R.E. SCHENTER
DIST-NOV74
REFERENCES
HALF-LIFE R. SCHENTER, THEORY (9/73)

\(^{113}\) In

\[ T_{1/2} = 1.119 \times 10^5 \]
\[ \langle E_p \rangle \text{ PER DECAY} = 3557 \]
\[ \langle E_y \rangle \text{ PER DECAY} = 4455 \]

FISSION YIELDS
\[ ^{235}\text{U} \text{THERMAL} \]
\[ 3.82 \times 10^{-5} \]
\[ ^{235}\text{U} \text{FAST} \]
\[ 4.56 \times 10^{-9} \]
\[ ^{239}\text{Pu} \text{THERMAL} \]
\[ 3.24 \times 10^{-7} \]

\[ Q_y = 11740 \]
\[ \text{BR}_y = 1.000 \]

\(^{113}\) Sn

\[ T_{1/2} = 1.47 \times 10^4 \]

\[^{113}\text{Sn} \]

\(^{113}\) Sn

ENDF/B-IV FILE 1 COMMENTS
50-SN-133 HEDL
EVAL-APR74 R.E. SCHENTER
DIST-NOV74
REFERENCES
DELAYED NEUTRON BRANCHING-T. ENGLAND, THEORY (2/74)

\[^{113}\text{Sn} \]

\[ T_{1/2} = 1.47 \times 10^4 \]
\[ \langle E_p \rangle \text{ PER DECAY} = 280 \]
\[ \langle E_y \rangle \text{ PER DECAY} = 286 \]

FISSION YIELDS
\[ ^{239}\text{Pu} \text{THERMAL} \]
\[ 3.67 \times 10^{-5} \]
\[ ^{239}\text{Pu} \text{FAST} \]
\[ 1.22 \times 10^{-8} \]
\[ ^{239}\text{Pu} \text{THERMAL} \]
\[ 5.65 \times 10^{-4} \]

\[ Q_y = 125.9 \]
\[ \text{BR}_y = 0.00021 \]

\[^{113}\text{Sn} \]

\[^{115}\text{Sn} \]

\[ 40.0 \pm 1.0 \]

\[^{115}\text{Sn} \]

\[^{115}\text{Sn} \]

\[ 2.40 \pm 0.20 \]

133 - 50 - 1
\[ \text{\text{\textfrac{133}{51}} Sb} \]

\text{ENDF/B-IV FILE 1 COMMENTS}

\text{51-SB-133 ANC EVAL-FEB74 C.W.REICH DECAY DATA}

\text{U1D = NUY/A}

\text{FDR FILE DESCRIPTION SEE CW REICH, RG HELMER AND MH PUTNAM,}
\text{ANCR-1157, ENDF/B-IV.74.}

\text{REFERENCE}

\begin{itemize}
  \item \( T_{1/2} = 2.40 \pm 0.20 \) \text{y}
  \item \( \langle E_\gamma \rangle \text{ PER DECAY} = 337.1 \text{KeV} \)
  \item \( \langle E_\beta \rangle \text{ PER DECAY} = 3163 \text{KeV} \)
  \item \text{FISSION YIELDS}
    \begin{itemize}
      \item \( 231U \text{ THERMAL} \quad 2.0827 \times 10^{-2} \)
      \item \( 231U \text{ FAST} \quad 2.1128 \times 10^{-2} \)
      \item \( 234U \text{ THERMAL} \quad 3.6397 \times 10^{-2} \)
      \item \( 234U \text{ FAST} \quad 1.0564 \times 10^{-2} \)
    \end{itemize}
  \end{itemize}

\[ Q_\beta = 3616, \quad Q_\gamma = 3950.0 \pm 30. \]

\text{BR}_\beta = 0.9776

\begin{itemize}
  \item \( \text{\textfrac{133}{51}} Tm \)
    \begin{itemize}
      \item \( 55.4 \pm 0.4 \) \text{m}
    \end{itemize}
  \item \( \text{\textfrac{133}{51}} Te \)
    \begin{itemize}
      \item \( 12.1 \pm 0.3 \) \text{m}
    \end{itemize}
\end{itemize}
**PHOTON RADIATION TABLE**

<table>
<thead>
<tr>
<th>MEAN ENERGY</th>
<th>LINES</th>
<th>PHOTONS/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>121.4</td>
<td>1</td>
<td>3.429</td>
</tr>
<tr>
<td>308.9</td>
<td>1</td>
<td>4.851</td>
</tr>
<tr>
<td>354.4</td>
<td>1</td>
<td>2.499</td>
</tr>
<tr>
<td>423.5</td>
<td>1</td>
<td>9.310</td>
</tr>
<tr>
<td>437.2</td>
<td>1</td>
<td>2.167</td>
</tr>
<tr>
<td>496.9</td>
<td>1</td>
<td>1.715</td>
</tr>
<tr>
<td>540.0</td>
<td>1</td>
<td>1.470</td>
</tr>
<tr>
<td>650.1</td>
<td>5</td>
<td>9.065</td>
</tr>
<tr>
<td>810.0</td>
<td>1</td>
<td>29.46</td>
</tr>
<tr>
<td>838.5</td>
<td>1</td>
<td>13.57</td>
</tr>
<tr>
<td>881.0</td>
<td>1</td>
<td>3.920</td>
</tr>
<tr>
<td>1025.1</td>
<td>1</td>
<td>4.116</td>
</tr>
<tr>
<td>1066.1</td>
<td>1</td>
<td>2.401</td>
</tr>
<tr>
<td>1096.1</td>
<td>1</td>
<td>6.60</td>
</tr>
<tr>
<td>1114.1</td>
<td>1</td>
<td>5.557</td>
</tr>
<tr>
<td>1168.1</td>
<td>1</td>
<td>2.069</td>
</tr>
<tr>
<td>1184.1</td>
<td>1</td>
<td>2.548</td>
</tr>
<tr>
<td>1218.1</td>
<td>1</td>
<td>8.820</td>
</tr>
<tr>
<td>1282.1</td>
<td>1</td>
<td>5.396</td>
</tr>
<tr>
<td>1271.1</td>
<td>1</td>
<td>2.891</td>
</tr>
<tr>
<td>1305.1</td>
<td>1</td>
<td>3.877</td>
</tr>
<tr>
<td>1334.1</td>
<td>1</td>
<td>1.421</td>
</tr>
<tr>
<td>1459.1</td>
<td>6</td>
<td>9.016</td>
</tr>
<tr>
<td>1533.1</td>
<td>1</td>
<td>8.820</td>
</tr>
<tr>
<td>1534.1</td>
<td>1</td>
<td>3.625</td>
</tr>
<tr>
<td>1580.1</td>
<td>1</td>
<td>1.519</td>
</tr>
<tr>
<td>1639.1</td>
<td>6</td>
<td>8.232</td>
</tr>
<tr>
<td>1740.1</td>
<td>4</td>
<td>11.86</td>
</tr>
<tr>
<td>1877.1</td>
<td>1</td>
<td>1.392</td>
</tr>
<tr>
<td>1895.1</td>
<td>1</td>
<td>2.499</td>
</tr>
<tr>
<td>1945.1</td>
<td>1</td>
<td>2.069</td>
</tr>
<tr>
<td>1984.1</td>
<td>1</td>
<td>1.519</td>
</tr>
<tr>
<td>1976.1</td>
<td>1</td>
<td>1.322</td>
</tr>
<tr>
<td>2020.1</td>
<td>1</td>
<td>5.950</td>
</tr>
<tr>
<td>2132.1</td>
<td>1</td>
<td>1.421</td>
</tr>
<tr>
<td>2279.1</td>
<td>1</td>
<td>1.813</td>
</tr>
<tr>
<td>2288.1</td>
<td>1</td>
<td>1.160</td>
</tr>
<tr>
<td>2339.1</td>
<td>1</td>
<td>3.381</td>
</tr>
<tr>
<td>2417.1</td>
<td>1</td>
<td>9.555</td>
</tr>
<tr>
<td>2444.1</td>
<td>1</td>
<td>2.499</td>
</tr>
<tr>
<td>2580.1</td>
<td>1</td>
<td>5.058</td>
</tr>
<tr>
<td>2586.1</td>
<td>1</td>
<td>3.920</td>
</tr>
<tr>
<td>2650.1</td>
<td>1</td>
<td>3.920</td>
</tr>
<tr>
<td>2724.1</td>
<td>1</td>
<td>5.880</td>
</tr>
<tr>
<td>2752.1</td>
<td>1</td>
<td>14.45</td>
</tr>
<tr>
<td>2793.1</td>
<td>1</td>
<td>5.880</td>
</tr>
<tr>
<td>3025.1</td>
<td>1</td>
<td>1.127</td>
</tr>
<tr>
<td>3523.1</td>
<td>1</td>
<td>5.880</td>
</tr>
</tbody>
</table>

<Photon> per decay = 3162.
<table>
<thead>
<tr>
<th>TYPE</th>
<th>$E_{\text{max}}$</th>
<th>MEAN ENERGY</th>
<th>INTENSITY/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\pi^-$</td>
<td>427.0</td>
<td>129.7</td>
<td>2.310</td>
</tr>
<tr>
<td>$\pi^-$</td>
<td>525.0</td>
<td>164.1</td>
<td>3.740</td>
</tr>
<tr>
<td>$\pi^-$</td>
<td>805.0</td>
<td>271.7</td>
<td>7.950</td>
</tr>
<tr>
<td>$\pi^-$</td>
<td>925.0</td>
<td>321.4</td>
<td>3.190</td>
</tr>
<tr>
<td>$\pi^-$</td>
<td>1198.0</td>
<td>437.4</td>
<td>1.980</td>
</tr>
<tr>
<td>$\pi^-$</td>
<td>1370.0</td>
<td>555.0</td>
<td>36.50</td>
</tr>
<tr>
<td>$\pi^-$</td>
<td>1534.0</td>
<td>586.6</td>
<td>44.10</td>
</tr>
<tr>
<td>$\pi^-$</td>
<td>1671.0</td>
<td>619.0</td>
<td>10.70</td>
</tr>
<tr>
<td>$\pi^-$</td>
<td>1973.0</td>
<td>738.8</td>
<td>6.250</td>
</tr>
<tr>
<td>$\pi^-$</td>
<td>2037.0</td>
<td>818.8</td>
<td>7.580</td>
</tr>
<tr>
<td>$\pi^-$</td>
<td>2222.0</td>
<td>954.9</td>
<td>1.320</td>
</tr>
<tr>
<td>$\pi^-$</td>
<td>2350.0</td>
<td>957.2</td>
<td>5.730</td>
</tr>
<tr>
<td>$\pi^-$</td>
<td>2416.0</td>
<td>998.7</td>
<td>1.430</td>
</tr>
</tbody>
</table>

$\langle E_\gamma \rangle$ PER DECAY = 537.1
$\langle E_\gamma \rangle$ PER DECAY = 872.6
**Te**

ENDF/B-IV FILE 1 COMMENTS
52-TE-133M ANC
EVAL-76 C.W.REICH
DIST-NOVEL
FOR FILE DESCRIPTION SEE CW REICH, RG HELMER AND MH PUTMAN,
AMCR-1157. ENDF/B-IV.8/74.
REFERENCE
G-1973 WAPSTRA-GOVE MASSSTABLE

---

\[ T_{1/2} = 55.4 \pm 0.6 \text{m} \]
\[ \langle E \rangle \text{ PER DECAY} = 552.1 \]
\[ \langle E \rangle \text{ PER DECAY} = 1866 \]

**FISSION YIELDS**

- \( 235U \text{ THERMAL} \quad 3.017 \times 10^{-2} \)
- \( 235U \text{ FAST} \quad 1.954 \times 10^{-2} \)
- \( 234U \text{ FAST} \quad 7.527 \times 10^{-3} \)
- \( 236U \text{ THERMAL} \quad 2.267 \times 10^{-2} \)

\[ Q_{f} = 372, \pm 110 \]
\[ 299 \quad 1.6769 \]

\[ 20.80 \times 10^{-10} \]

---

133n-52-1
PHOTON RADIATION TABLE

<table>
<thead>
<tr>
<th>MEAN ENERGY</th>
<th>LINES</th>
<th>PHOTONS/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>91.14</td>
<td>4</td>
<td>13.74</td>
</tr>
<tr>
<td>170.7</td>
<td>4</td>
<td>17.70</td>
</tr>
<tr>
<td>214.0</td>
<td>1</td>
<td>3.084</td>
</tr>
<tr>
<td>261.8</td>
<td>1</td>
<td>16.82</td>
</tr>
<tr>
<td>285.7</td>
<td>1</td>
<td>9.546</td>
</tr>
<tr>
<td>334.5</td>
<td>1</td>
<td>15.05</td>
</tr>
<tr>
<td>344.2</td>
<td>1</td>
<td>2.430</td>
</tr>
<tr>
<td>356.5</td>
<td>1</td>
<td>1.589</td>
</tr>
<tr>
<td>445.9</td>
<td>4</td>
<td>7.010</td>
</tr>
<tr>
<td>574.2</td>
<td>1</td>
<td>2.523</td>
</tr>
<tr>
<td>647.3</td>
<td>1</td>
<td>31.50</td>
</tr>
<tr>
<td>844.4</td>
<td>1</td>
<td>20.94</td>
</tr>
<tr>
<td>885.4</td>
<td>1</td>
<td>6.075</td>
</tr>
<tr>
<td>913.0</td>
<td>1</td>
<td>93.46</td>
</tr>
<tr>
<td>979.0</td>
<td>1</td>
<td>10.19</td>
</tr>
<tr>
<td>1027.1</td>
<td>1</td>
<td>1.122</td>
</tr>
<tr>
<td>1030.1</td>
<td>1</td>
<td>1.402</td>
</tr>
<tr>
<td>1083.1</td>
<td>1</td>
<td>6.168</td>
</tr>
<tr>
<td>2025.1</td>
<td>1</td>
<td>3.351</td>
</tr>
<tr>
<td>2028.1</td>
<td>1</td>
<td>2.243</td>
</tr>
<tr>
<td>2050.1</td>
<td>1</td>
<td>1.122</td>
</tr>
</tbody>
</table>

\(<\text{photons per decay} = 1866.\)

PARTICLE RADIATION TABLE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>EMAX</th>
<th>MEAN ENERGY</th>
<th>INTENSITY/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\gamma)</td>
<td>1500.0</td>
<td>482.0</td>
<td>60.90</td>
</tr>
<tr>
<td>(\gamma)</td>
<td>2400.0</td>
<td>990.5</td>
<td>26.10</td>
</tr>
</tbody>
</table>

\(<E_\gamma \text{ per decay} = 552.1\)  
\(<E_p \text{ per decay} = 866.0\)

PHOTON INTENSITY PLOT

CHARACTERISTIC RADIATION TABLE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>ENERGY</th>
<th>1/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\gamma)</td>
<td>933.0</td>
<td>93.46</td>
</tr>
<tr>
<td>(\gamma)</td>
<td>1500.0</td>
<td>60.90</td>
</tr>
<tr>
<td>(\gamma)</td>
<td>2400.0</td>
<td>26.10</td>
</tr>
<tr>
<td>(\gamma)</td>
<td>261.8</td>
<td>16.82</td>
</tr>
<tr>
<td>(\gamma)</td>
<td>334.5</td>
<td>15.05</td>
</tr>
</tbody>
</table>
$^{132}$Te

ENDF/B-IV FILE 1 COMMENTS
52-TE-133 ANC
EVAL-JU74 C.W.REICH
DIST-NOV74

FOR FILE DISCRIPITON SEE CN REICH, RG HELMER AND MH PUTMAN.
ANCR-1157, ENDF/B-IV.

PREPARED FOR FILE 6/74

CWR
REFERENCE 0-1975 REVISION OF WAPSTRA-GOEKE MASS TABLE.

\[
\begin{align*}
T_{1/2} & = 12.5 \times 10^{-3} s \\
\langle E_2 \rangle \, \text{PER DEAY} & = 826.0 \\
\langle E_3 \rangle \, \text{PER DEAY} & = 983.2 \\
\end{align*}
\]

\[
\begin{align*}
\text{FISSION YIELDS} & \\
233U \, \text{THERMAL} & = 1.229 \times 10^{-3} \\
233U \, \text{FAST} & = 1.951 \times 10^{-7} \\
234U \, \text{FAST} & = 7.371 \times 10^{-8} \\
234U \, \text{THERMAL} & = 2.26 \times 10^{-5} \\
\end{align*}
\]

\[
\begin{align*}
Q & = 2960 \times 100 \\
BG & = 1.000 \\
\end{align*}
\]

\[
\begin{align*}
\text{1/2} & = 20.8 \times 10^{-3} \\
\text{1/3} & = 1.0 \\
\text{1/4} & = 20.8 \times 10^{-3} \\
\end{align*}
\]

\[
\begin{align*}
133 & - 52 - 1
\end{align*}
\]
PHOTON RADIATION TABLE

<table>
<thead>
<tr>
<th>MEAN ENERGY</th>
<th>LINES</th>
<th>PHOTONS/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>311.99</td>
<td>± 0.08</td>
<td>72.00</td>
</tr>
<tr>
<td>384.6</td>
<td>± 0.5</td>
<td>1.280</td>
</tr>
<tr>
<td>407.63</td>
<td>± 0.07</td>
<td>1.280</td>
</tr>
<tr>
<td>674.72</td>
<td>± 0.13</td>
<td>1.280</td>
</tr>
<tr>
<td>546.4</td>
<td>± 0.6</td>
<td>1.280</td>
</tr>
<tr>
<td>587.1</td>
<td>± 0.3</td>
<td>1.280</td>
</tr>
<tr>
<td>633.0</td>
<td>± 0.7</td>
<td>1.280</td>
</tr>
<tr>
<td>719.03</td>
<td>± 0.10</td>
<td>1.280</td>
</tr>
<tr>
<td>786.77</td>
<td>± 0.10</td>
<td>1.280</td>
</tr>
<tr>
<td>844.39</td>
<td>± 0.07</td>
<td>1.280</td>
</tr>
<tr>
<td>930.67</td>
<td>± 0.3</td>
<td>1.280</td>
</tr>
<tr>
<td>1000.77</td>
<td>± 0.1</td>
<td>1.280</td>
</tr>
<tr>
<td>1021.07</td>
<td>± 0.15</td>
<td>1.280</td>
</tr>
<tr>
<td>1061.8</td>
<td>± 0.8</td>
<td>1.280</td>
</tr>
<tr>
<td>1253.29</td>
<td>± 0.2</td>
<td>1.280</td>
</tr>
<tr>
<td>1313.5</td>
<td>± 0.8</td>
<td>1.280</td>
</tr>
<tr>
<td>1333.23</td>
<td>± 0.12</td>
<td>1.280</td>
</tr>
<tr>
<td>1405.77</td>
<td>± 0.2</td>
<td>1.280</td>
</tr>
<tr>
<td>1474.0</td>
<td>± 1.0</td>
<td>1.280</td>
</tr>
<tr>
<td>1717.65</td>
<td>± 0.15</td>
<td>1.280</td>
</tr>
<tr>
<td>1825.1</td>
<td>± 1.0</td>
<td>1.280</td>
</tr>
<tr>
<td>1881.3</td>
<td>± 0.4</td>
<td>1.280</td>
</tr>
<tr>
<td>2136.5</td>
<td>± 1.2</td>
<td>1.280</td>
</tr>
<tr>
<td>2228.0</td>
<td>± 1.5</td>
<td>1.280</td>
</tr>
<tr>
<td>2540.6</td>
<td>± 1.5</td>
<td>1.280</td>
</tr>
</tbody>
</table>

\[ \langle \text{E}_{\text{photon}} \rangle \text{ PER DECAY} = 983.2 \]

PHOTON INTENSITY PLOT

CHARACTERISTIC RADIATION TABLE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>ENERGY</th>
<th>1/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>g-</td>
<td>311.99</td>
<td>± 0.08</td>
</tr>
<tr>
<td>g-</td>
<td>384.6</td>
<td>± 0.5</td>
</tr>
<tr>
<td>g-</td>
<td>407.63</td>
<td>± 0.07</td>
</tr>
<tr>
<td>g-</td>
<td>674.72</td>
<td>± 0.13</td>
</tr>
<tr>
<td>g-</td>
<td>546.4</td>
<td>± 0.6</td>
</tr>
<tr>
<td>g-</td>
<td>587.1</td>
<td>± 0.3</td>
</tr>
<tr>
<td>g-</td>
<td>633.0</td>
<td>± 0.7</td>
</tr>
<tr>
<td>g-</td>
<td>719.03</td>
<td>± 0.10</td>
</tr>
<tr>
<td>g-</td>
<td>786.77</td>
<td>± 0.10</td>
</tr>
<tr>
<td>g-</td>
<td>844.39</td>
<td>± 0.07</td>
</tr>
<tr>
<td>g-</td>
<td>930.67</td>
<td>± 0.3</td>
</tr>
<tr>
<td>g-</td>
<td>1000.77</td>
<td>± 0.1</td>
</tr>
<tr>
<td>g-</td>
<td>1021.07</td>
<td>± 0.15</td>
</tr>
<tr>
<td>g-</td>
<td>1061.8</td>
<td>± 0.8</td>
</tr>
<tr>
<td>g-</td>
<td>1253.29</td>
<td>± 0.2</td>
</tr>
<tr>
<td>g-</td>
<td>1313.5</td>
<td>± 0.8</td>
</tr>
<tr>
<td>g-</td>
<td>1333.23</td>
<td>± 0.12</td>
</tr>
<tr>
<td>g-</td>
<td>1405.77</td>
<td>± 0.2</td>
</tr>
<tr>
<td>g-</td>
<td>1474.0</td>
<td>± 1.0</td>
</tr>
<tr>
<td>g-</td>
<td>1717.65</td>
<td>± 0.15</td>
</tr>
<tr>
<td>g-</td>
<td>1825.1</td>
<td>± 1.0</td>
</tr>
<tr>
<td>g-</td>
<td>1881.3</td>
<td>± 0.4</td>
</tr>
<tr>
<td>g-</td>
<td>2136.5</td>
<td>± 1.2</td>
</tr>
<tr>
<td>g-</td>
<td>2228.0</td>
<td>± 1.5</td>
</tr>
<tr>
<td>g-</td>
<td>2540.6</td>
<td>± 1.5</td>
</tr>
</tbody>
</table>

\[ \langle \text{E}_{\text{m}} \rangle \text{ PER DECAY} = 820.0 \]
\[ \langle \text{E}_{\text{d}} \rangle \text{ PER DECAY} = 1211. \]
## ENDF/B-IV File 1 Comments

### 1-133

**EDL**

**REFERENCES**

* DIT-SCHENTER, THEORY (973)*

<table>
<thead>
<tr>
<th>Surface</th>
<th>Mass</th>
<th>Half-Life</th>
<th>Decay Scheme</th>
</tr>
</thead>
<tbody>
<tr>
<td>235U</td>
<td>9000</td>
<td>100</td>
<td>T1/2 = 250.0</td>
</tr>
<tr>
<td>239U</td>
<td>200</td>
<td>100</td>
<td>( \sigma = 3 \times 10^{-3} )</td>
</tr>
<tr>
<td>239U</td>
<td>8000</td>
<td>100</td>
<td>( \sigma = 2 \times 10^{-3} )</td>
</tr>
<tr>
<td>237U</td>
<td>600</td>
<td>100</td>
<td>( \sigma = 1 \times 10^{-3} )</td>
</tr>
</tbody>
</table>

### 1-133

**ANC**

**REFERENCES**

* WAPSTRA-GOVE MASSTABLE

<table>
<thead>
<tr>
<th>Surface</th>
<th>Mass</th>
<th>Half-Life</th>
<th>Decay Scheme</th>
</tr>
</thead>
<tbody>
<tr>
<td>235U</td>
<td>1527.5</td>
<td>30</td>
<td>( Q \beta = 1760.5 )</td>
</tr>
<tr>
<td>235U</td>
<td>9400</td>
<td>100</td>
<td>BR( \beta ) = 0.46</td>
</tr>
<tr>
<td>239U</td>
<td>54</td>
<td>50</td>
<td>5.290 e-010d</td>
</tr>
</tbody>
</table>

### 1-133

**ANC**

**REFERENCES**

* DIT-SCHENTER, THEORY (973)*

<table>
<thead>
<tr>
<th>Surface</th>
<th>Mass</th>
<th>Half-Life</th>
<th>Decay Scheme</th>
</tr>
</thead>
<tbody>
<tr>
<td>235U</td>
<td>1527.5</td>
<td>30</td>
<td>( Q \beta = 1760.5 )</td>
</tr>
<tr>
<td>235U</td>
<td>9400</td>
<td>100</td>
<td>BR( \beta ) = 0.46</td>
</tr>
<tr>
<td>239U</td>
<td>54</td>
<td>50</td>
<td>5.290 e-010d</td>
</tr>
</tbody>
</table>
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Mean Energy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>262.5</td>
<td>1</td>
<td>0.3641</td>
</tr>
<tr>
<td>422.8</td>
<td>1</td>
<td>0.2952</td>
</tr>
<tr>
<td>510.5</td>
<td>1</td>
<td>0.1968</td>
</tr>
<tr>
<td>529.9</td>
<td>1</td>
<td>0.3310</td>
</tr>
<tr>
<td>618.0</td>
<td>1</td>
<td>0.6790</td>
</tr>
<tr>
<td>706.7</td>
<td>1</td>
<td>1.476</td>
</tr>
<tr>
<td>784.5</td>
<td>1</td>
<td>0.3428</td>
</tr>
<tr>
<td>820.5</td>
<td>1</td>
<td>1.1279</td>
</tr>
<tr>
<td>856.3</td>
<td>1</td>
<td>1.181</td>
</tr>
<tr>
<td>875.5</td>
<td>1</td>
<td>0.3559</td>
</tr>
<tr>
<td>1053.0</td>
<td>1</td>
<td>0.4822</td>
</tr>
<tr>
<td>1237.0</td>
<td>1</td>
<td>0.1476</td>
</tr>
<tr>
<td>1298.0</td>
<td>1</td>
<td>0.2165</td>
</tr>
</tbody>
</table>

\[ \langle \text{Photons} \rangle \text{ per decay} = 598.9 \]

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>E_max</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\alpha$</td>
<td>574.0</td>
<td>114.5</td>
<td>5.500</td>
</tr>
<tr>
<td>$\beta$</td>
<td>410.0</td>
<td>123.8</td>
<td>3.500</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>460.0</td>
<td>141.4</td>
<td>3.700</td>
</tr>
<tr>
<td>$\alpha$</td>
<td>707.0</td>
<td>233.7</td>
<td>5.500</td>
</tr>
<tr>
<td>$\beta$</td>
<td>500.0</td>
<td>307.0</td>
<td>2.300</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1230.0</td>
<td>451.3</td>
<td>85.40</td>
</tr>
<tr>
<td>$\alpha$</td>
<td>1540.0</td>
<td>589.3</td>
<td>1.400</td>
</tr>
</tbody>
</table>

\[ \langle E_m \rangle \text{ per decay} = 417.2 \]

\[ \langle E_\gamma \rangle \text{ per decay} = 728.7 \]

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy</th>
<th>1/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\gamma$</td>
<td>529.9</td>
<td>87.58</td>
</tr>
<tr>
<td>$\beta$</td>
<td>1230.0</td>
<td>85.40</td>
</tr>
</tbody>
</table>
**133m-Xe**

ENDF/B-IV FILE 1 COMMENTS
54-XE-133M ANC EVAL=FEB74 C.W.REICH
DIST-NOV74 FOR FILE DESCRIPTION SEE CW REICH, RG HELMER AND MH PUTMAN,
ANL-1177, ENDF/B-74.
PREPARED FOR FILE 12/75 CWR
REFERENCE OTHER - M.J. MARTIN, RADIOACTIVE ATOMS-SUPPLEMENT 1
ORNL-4923(1973).

\[ T_{1/2} = 54 \pm 5 \text{ h} \]
\[ \langle E, 3 \rangle \text{ PER DECAY} = 232.7 \]

FISSION YIELDS
- $^{235}$U THERMAL $1.920 \times 10^{-5}$
- $^{235}$U FAST $6.397 \times 10^{-5}$
- $^{239}$U THERMAL $1.220 \times 10^{-5}$
- $^{239}$Pu THERMAL $3.387 \times 10^{-4}$

\[ Q_{1f} = 232.9 \pm 0.5 \]
\[ BR_{1f} = 1.000 \]

- \[ 133 \]
- \[ 5.290 \times 10^{0} \]

133m- 54- 1
PHOTON RADIATION TABLE

MEAN ENERGY LIKES PHOTONS/100 DECAYS
26.4 ± 1.3 4 65. ± 15.
232.9 ± 0.3 1 10.3 ± 0.3

〈E<sub>photon</sub>〉 PER DECAY = 41. ± 6.

PARTICLE RADIATION TABLE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>E&lt;sub&gt;max&lt;/sub&gt;</th>
<th>MEAN ENERGY</th>
<th>INTENSITY/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>AU</td>
<td>33.4</td>
<td>7. ± 3</td>
<td>80. ± 30</td>
</tr>
<tr>
<td>CE</td>
<td>231.8</td>
<td>206.9 ± 0.5</td>
<td>90. ± 5</td>
</tr>
</tbody>
</table>

〈E<sub>p</sub>〉 PER DECAY = 191.4

PHOTON INTENSITY PLOT

CHARACTERISTIC RADIATION TABLE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>ENERGY</th>
<th>1/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>AU</td>
<td>4.308</td>
<td>70. ± 20</td>
</tr>
<tr>
<td>CE</td>
<td>498.3</td>
<td>60. ± 5</td>
</tr>
<tr>
<td>Xe</td>
<td>29.11</td>
<td>40. ± 15</td>
</tr>
<tr>
<td>CE&lt;sub&gt;L&lt;/sub&gt;</td>
<td>227.4 ± 0.5</td>
<td>20. ± 1.5</td>
</tr>
</tbody>
</table>
$^{134}$ Xe

ENDF/B-V FILE 1 COMMENTS
5A-XE-133 MC, WDL, EVAL-724, C.W. REICH, DECAY DATA
EVAL-DEC74 R.E. SCHENTER AND F. SCHMITTROTH
CROSS SECTION DATA
DIST-NOV74

FILE INFORMATION
MF=1 MT=457 DECAY DATA

REFERENCES
D-1973 REVISION OF WAPSTRA-GOVE MASS TABLE.
OTHER- M.J. MARTIN RADIOACTIVE ATOMS SUPPLEMENT 1,
ORNL-4923 (1973).

$^{134}$ Xe

$T_{1/2} = 5.200 \times 10^{10}$

$\langle E_{\gamma} \rangle$ PER DECAY $= 101.9$

$\langle E_{\gamma} \rangle$ PER DECAY $= 81.44$

CROSS SECTIONS (BARNES)

- TOTAL $2200$ M/S
- WESTCOTT G. FACTOR $= 1.0000$
- WIECZOREK G. FACTOR $= 1.000$
- RESONANCE INTEGRAL TOTAL $= 6.2170 \times 10^{-2}$
- RESONANCE INTEGRAL CAPTURE $= 3.5280 \times 10^{-2}$

FISSION YIELDS

233U THERMAL $= 6.5355 \times 10^{-6}$
239U FAST $= 1.4902 \times 10^{-9}$
233U THERMAL $= 5.7395 \times 10^{-6}$
239PU THERMAL $= 9.4444 \times 10^{-6}$

$G \gamma = 427.43$
$BR_{\gamma} = 1.000$

$^{133}$ Xe

STABLE OR LONG-LIVED

133 - 54 - 1
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Mean Energy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>6</td>
<td>34</td>
</tr>
<tr>
<td>160.63</td>
<td>3.04</td>
<td>1</td>
</tr>
<tr>
<td>221.0</td>
<td>1</td>
<td>.050</td>
</tr>
<tr>
<td>302.0</td>
<td>1</td>
<td>.0050</td>
</tr>
</tbody>
</table>

$$\langle \text{Photons} \rangle \text{ per decay} = 17. \times 80.$$

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>E&lt;sub&gt;max&lt;/sub&gt;</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>Au</td>
<td>34.8</td>
<td>12.</td>
<td>3.</td>
</tr>
<tr>
<td>Ce</td>
<td>155.4</td>
<td>.9</td>
<td>28.5</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>266.0</td>
<td>160.</td>
<td>1</td>
</tr>
<tr>
<td>$\beta^-$</td>
<td>346.0</td>
<td>100.</td>
<td>99.36</td>
</tr>
</tbody>
</table>

$$\langle E_p \rangle \text{ per decay} = 117. \times 100.$$

$$\langle E_\beta^- \rangle \text{ per decay} = 243.6 \times 0.3.$$

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy</th>
<th>1/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\gamma$</td>
<td>346.</td>
<td>3.</td>
</tr>
<tr>
<td>Ce</td>
<td>45.012</td>
<td>0.005</td>
</tr>
<tr>
<td>Au</td>
<td>6.496</td>
<td>19.</td>
</tr>
<tr>
<td>Stable or Long-Lived</td>
<td>Cross Sections (Barns)</td>
<td></td>
</tr>
<tr>
<td>---------------------</td>
<td>------------------------</td>
<td></td>
</tr>
<tr>
<td>a Total 2200M/S</td>
<td>$3.437 \times 10^{-1}$</td>
<td></td>
</tr>
<tr>
<td>c Westcott G Factor</td>
<td>1.0199</td>
<td></td>
</tr>
<tr>
<td>a Capture 2200M/S</td>
<td>$2.9514 \times 10^{-1}$</td>
<td></td>
</tr>
<tr>
<td>c Westcott G Factor</td>
<td>1.0022</td>
<td></td>
</tr>
<tr>
<td>Resonance Integral Total</td>
<td>$5.4450 \times 10^{6}$</td>
<td></td>
</tr>
<tr>
<td>Resonance Integral Capture</td>
<td>$3.8030 \times 10^{7}$</td>
<td></td>
</tr>
<tr>
<td>Resonance Integral $(n,2n)$</td>
<td>1.0510</td>
<td></td>
</tr>
<tr>
<td>Resonance Integral $(n,p)$</td>
<td>$1.2720 \times 10^{-2}$</td>
<td></td>
</tr>
<tr>
<td>Resonance Integral $(n,a)$</td>
<td>$9.5210 \times 10^{-4}$</td>
<td></td>
</tr>
</tbody>
</table>

**Fission Yields**

- $^{235}$U Thermal: $5.0828 \times 10^{-7}$
- $^{235}$U Fast: $5.7209 \times 10^{-9}$
- $^{239}$Pu Thermal: $1.6098 \times 10^{-7}$
\[ { }^{127} \text{In} \]

ENDF/B-IV FILE 1 COMMENTS
49-IN-134  HEAL  EVAL=APR74  R.E.SCHENTER
DIST-NOV74

REFERENCES
HALF LIFE=R  SCHENTER,THEORY(9/73)

\[ { }^{127} \text{In} \]

\( T_{1/2} = 0.07754 \text{d} \)
\( \langle \epsilon_p \rangle \text{ PER DECAY} = 0.012 \)
\( \langle \epsilon_\gamma \rangle \text{ PER DECAY} = 0.137 \)

Fission YIELDS
\( { }^{235}\text{U} \text{ THERMAL} 5.6131 \times 10^{-7} \)
\( { }^{235}\text{U} \text{ FAST} 1.3303 \times 10^{-5} \)
\( { }^{238}\text{U} \text{ FAST} 1.2580 \times 10^{-7} \)
\( { }^{239}\text{Pu} \text{ THERMAL} 6.6591 \times 10^{-7} \)

\[ Q = 13760 \]
\[ \text{BR}_\gamma = 1.000 \]

\[ { }^{128} \text{Sn} \]

\( T_{1/2} = 8.6475 \text{d} \)
\( \langle \epsilon_p \rangle \text{ PER DECAY} = 0.011 \)
\( \langle \epsilon_\gamma \rangle \text{ PER DECAY} = 0.2471 \)

Fission YIELDS
\( { }^{235}\text{U} \text{ THERMAL} 1.0232 \times 10^{-4} \)
\( { }^{235}\text{U} \text{ FAST} 2.3859 \times 10^{-4} \)
\( { }^{238}\text{U} \text{ FAST} 3.4727 \times 10^{-5} \)
\( { }^{239}\text{Pu} \text{ THERMAL} 2.9066 \times 10^{-5} \)

\[ Q = 6070 \]
\[ \text{BR}_\gamma = 1.000 \]

\[ { }^{130} \text{Sn} \]

\( T_{1/2} = 0.3 \text{d} \)

\[ { }^{134} \text{Sn} \]

\[ 134 - 49 - 1 \]

50-SN-134  HEAL  EVAL=APR74  R.E.SCHENTER
DIST-NOV74

REFERENCES
HALF LIFE=R  SCHENTER,THEORY(9/73)

\[ { }^{134} \text{Sn} \]

\( T_{1/2} = 0.3 \text{d} \)
\( \langle \epsilon_p \rangle \text{ PER DECAY} = 0.011 \)
\( \langle \epsilon_\gamma \rangle \text{ PER DECAY} = 0.2471 \)

Fission YIELDS
\( { }^{235}\text{U} \text{ THERMAL} 1.0232 \times 10^{-4} \)
\( { }^{235}\text{U} \text{ FAST} 2.3859 \times 10^{-4} \)
\( { }^{238}\text{U} \text{ FAST} 3.4727 \times 10^{-5} \)
\( { }^{239}\text{Pu} \text{ THERMAL} 2.9066 \times 10^{-5} \)

\[ Q = 6070 \]
\[ \text{BR}_\gamma = 1.000 \]

\[ { }^{134} \text{Sn} \]

\( T_{1/2} = 0.3 \text{d} \)

\[ { }^{134} \text{Sn} \]

\[ 134 - 50 - 1 \]
1**Sb

ENDF/B-IV FILE 1 COMMENTS
51-5B-134M ANC EVAL = FEB 74 C.W.REICH DIST = NOV 74
FOR FILE DESCRIPTION SEE C.E. REICH, R. HELMER AND M. PUTMAN,
ANER-1157, ENDF/B IV 8/73 DRG(SRL)
REFERENCE - A. KERK, ET AL., NUCL. PHYS. A195, 177(1972)
HALF-LIFE - G. RUDSTAM ET AL., REVIEW PAPER 12, IAEA
PANEL ON FISSION-PRODUCT DATA (BOLZENA, 1973), APP. B.
DELAYED-NEUTRON BRANCHING TAKEN FROM L. TOMLINSON, AT. AND
NUCL. DATA TABLES 12, NO. 2, 179 (1973), NO D VALUE IS
LISTED HERE FOR THE ASSOCIATED NEUTRON DECAY MODE.

<table>
<thead>
<tr>
<th>Isotope</th>
<th>T1/2 (s)</th>
<th>(Eγ) PER DECAY</th>
<th>(Eγ) PER DECAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1**Sb</td>
<td>10.7±0.3</td>
<td>295±</td>
<td>204±</td>
</tr>
</tbody>
</table>

FISSION YIELDS

<table>
<thead>
<tr>
<th>Uranium</th>
<th>Thermal</th>
<th>Fast</th>
</tr>
</thead>
<tbody>
<tr>
<td>235 U</td>
<td>2.286×10^-3</td>
<td>4.7457×10^-3</td>
</tr>
<tr>
<td>235 U</td>
<td>1.4926×10^-3</td>
<td>1.9325×10^-3</td>
</tr>
</tbody>
</table>

BRN = .00080±.00020

<table>
<thead>
<tr>
<th>Isotope</th>
<th>131m</th>
</tr>
</thead>
<tbody>
<tr>
<td>131m</td>
<td>2.40±.20m</td>
</tr>
<tr>
<td>131m</td>
<td>42.6±1.0m</td>
</tr>
</tbody>
</table>

134n = 51 1
\[ 1/2 \] Sb

ENOD/F/D IV FILE 1 COMMENTS
51-SB-134 ANC EVAL-FEB74 C.W.REICH DECAY DATA
DUE-KOV76
FOR FILE DESCRIPTION SEE C.W.REICH, RG HELMER AND MH PUTMAN,
ANIR-1557, ENOD/F/D IV.

REFERENCE - A.KERK, ET AL., NUCL. PHYS. A195, 177(1972)

\[ 1/2 \] Sb

\[ T_{1/2} = 0.3 \times 10^5 \] s

\[ \langle E_2 \rangle \text{ PER DECAY} = 3952 \] eV

FISSION YIELDS

\begin{align*}
235\text{U THERMAL} &= 2.2865 \times 10^{-3} \\
235\text{U FAST} &= 4.7435 \times 10^{-3} \\
239\text{Pu THERMAL} &= 1.5513 \times 10^{-3} \\
239\text{Pu FAST} &= 1.6023 \times 10^{-3}
\end{align*}

\[ Q_A = 8490 \pm 300 \] MeV

\[ B(E2) = 1.000 \]

\[ 1/2 \] Te

\[ 42.0 \pm 1.0 \text{m} \]

134 - 51 - 1
### PARTICLE RADIATION TABLE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>$E_{\text{max}}$</th>
<th>MEAN ENERGY</th>
<th>INTENSITY/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\gamma$</td>
<td>8400.0</td>
<td>3952.</td>
<td>180. 100.0</td>
</tr>
</tbody>
</table>

$\langle C_\gamma \rangle$ PER DECAY = 3952.  180.  100.0

$\langle C_\gamma \rangle$ PER DECAY = 4448.  160.  100.0

---

### CHARACTERISTIC RADIATION TABLE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>ENERGY</th>
<th>1/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\gamma$</td>
<td>8400.0</td>
<td>300. 100.0</td>
</tr>
</tbody>
</table>

---

\[ \text{Page} \]
134 52

\[ \frac{1}{2} \text{ Te} \]

**ENDF/B-VI FILE 1 COMMENTS**
52-TE-134 ANC EVAL-JUL74 C.W.REICH DECAY DATA
DIST-NOV74
FOR FILE DESCRIPTION SEE C.W.REICH, RG HELMER AND MH PUTMAN,
ANCR-1157, ENDF/B10, 8/74.
PREPARED FOR FILE 6/74
CWR
REFERENES
- Q - SEE 1973 REVISION OF WAPSTRA-GOYE MASS TABLE.
- OTHER - V. BERG, K. FRANKSON AND C.E. BEMIS, ARKIV
  FYSIK 87, 201 (1968).
  V. BERG AND A. HOELGLUND, NUCLEAR PHYSICS
  A175, 405 (1971).

\[ T_{1/2} = 42.0 \times 1.0 \text{m} \]
\[ \langle E_f \rangle \text{ PER DECAY} = 152.1 \]
\[ \langle E_u \rangle \text{ PER DECAY} = 825.0 \]

**Fission Yields**
- \[ ^{235} \text{U THERMAL} = 6.369 \times 10^{-2} \]
- \[ ^{235} \text{U FAST} = 5.3599 \times 10^{-2} \]
- \[ ^{239} \text{U FAST} = 3.7516 \times 10^{-2} \]
- \[ ^{239} \text{Pu THERMAL} = 3.5988 \times 10^{-2} \]

\[ Q_f = 1400 \]
\[ BR_f = 1.000 \]

\[ 134 - 52 - \]
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Mean Energy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.3</td>
<td>3</td>
<td>25</td>
</tr>
<tr>
<td>101.4</td>
<td>0.8</td>
<td>40</td>
</tr>
<tr>
<td>131.3</td>
<td>0.3</td>
<td>27</td>
</tr>
<tr>
<td>184.10</td>
<td>0.20</td>
<td>14</td>
</tr>
<tr>
<td>256.8</td>
<td>1.6</td>
<td>47</td>
</tr>
<tr>
<td>434.8</td>
<td>0.8</td>
<td>17</td>
</tr>
<tr>
<td>450.7</td>
<td>1.0</td>
<td>8.8</td>
</tr>
<tr>
<td>466.4</td>
<td>1.0</td>
<td>4.3</td>
</tr>
<tr>
<td>565.6</td>
<td>0.8</td>
<td>19</td>
</tr>
<tr>
<td>655.9</td>
<td>0.3</td>
<td>1.6</td>
</tr>
<tr>
<td>712.5</td>
<td>1.0</td>
<td>5.1</td>
</tr>
<tr>
<td>742.0</td>
<td>1.0</td>
<td>14.2</td>
</tr>
<tr>
<td>766.7</td>
<td>1.0</td>
<td>26.7</td>
</tr>
<tr>
<td>925.2</td>
<td>0.5</td>
<td>1.2</td>
</tr>
</tbody>
</table>

\[ \langle \varepsilon_{\text{phot}} \rangle \text{ PER DECAY} = 761. \approx 24. \]

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>Au</td>
<td>32.1</td>
<td>13.7</td>
<td>24. \approx 6.</td>
</tr>
<tr>
<td>Ce</td>
<td>277.0</td>
<td>98.4</td>
<td>20.5 \approx 1.5</td>
</tr>
<tr>
<td>p</td>
<td>294.0</td>
<td>84.95</td>
<td>11.50</td>
</tr>
<tr>
<td>p</td>
<td>477.0</td>
<td>147.4</td>
<td>46.00</td>
</tr>
<tr>
<td>p</td>
<td>553.0</td>
<td>175.1</td>
<td>42.55</td>
</tr>
</tbody>
</table>

\[ \langle \varepsilon_{\text{p}} \rangle \text{ PER DECAY} = 174.9 \]

\[ \langle \varepsilon_{\text{n}} \rangle \text{ PER DECAY} = 356.4 \]

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy</th>
<th>1/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>p</td>
<td>477.0</td>
<td>46.40</td>
</tr>
<tr>
<td>p</td>
<td>553.0</td>
<td>42.55</td>
</tr>
<tr>
<td>γ</td>
<td>766.7</td>
<td>26.7 \approx 1.6</td>
</tr>
<tr>
<td>γ</td>
<td>210.8</td>
<td>20.4 \approx 1.5</td>
</tr>
<tr>
<td>γ</td>
<td>565.6</td>
<td>19.2 \approx 1.6</td>
</tr>
<tr>
<td>γ</td>
<td>278.1</td>
<td>19.2 \approx 1.5</td>
</tr>
<tr>
<td>γ</td>
<td>434.8</td>
<td>17.5 \approx 1.3</td>
</tr>
<tr>
<td>Au</td>
<td>4.116</td>
<td>15. \approx 5.</td>
</tr>
<tr>
<td>γ</td>
<td>742.0</td>
<td>14.1 \approx 1.6</td>
</tr>
<tr>
<td>γ</td>
<td>184.10</td>
<td>14.1 \approx 1.5</td>
</tr>
<tr>
<td>Xe</td>
<td>27.98</td>
<td>12. \approx 4.</td>
</tr>
</tbody>
</table>

\[ \text{PHOTON INTENSITY PLOT} \]
ENDF/B-IV FILE 1 COMMENTS
53- 1-134m AND
EVAL-FEB74 C.W.REICH
D187-NOV74
FOR FILE DESCRIPTION SEE CW REICH, RG HELMER AND MH PUTMAN,
ANCR-1157,ENDF/70,8/74.

.........
...{i}...
......
...{i}...
......

\[ T_{1/2} = 3.60 \times 10^6 \text{m} \]

\[ <E_y> \text{ PER DECAY} = 315.7 \]

FISSION YIELDS

\[
\begin{array}{ll}
235\text{U} \text{ THERMAL} & 4.262\times10^{-8} \\
239\text{Pu} \text{ FAST} & 6.165\times10^{-7} \\
239\text{Pu} \text{ FAST} & 9.618\times10^{-4} \\
239\text{Pu} \text{ THERMAL} & 1.132\times10^{-2} \\
\end{array}
\]

\[
Q_{fr} = 315.7 \\
BR_{1\gamma} = 1.000 \\
\]

.........
...

52.60 \times 0.20 m

.........

134m- 53- 1
ENDF/B-IV FILE 1 COMMENTS
53- 1:134 AND EVAL-FFB74 R.W.REICH
DECAY DATA
DIST-80V74
FOR FILE DESCRIPTION SEE R.W.REICH, RG HELMER AND MH PUTMAN,
ANCR-1137, ENDF/B10.8/74.
REFERENCE
D-1973 WPSTRA-DOVE MASSTABLE

\[
\begin{align*}
\frac{T_{1/2}}{m} &= 52.60 \pm 0.20 \\
\langle E_p \rangle \text{ PER DECAY} &= 690.9 \\
\langle E_y \rangle \text{ PER DECAY} &= 2993. \\
\text{FISSION YIELDS} & \\
^{239}U \text{ THERMAL} &= 4.2859 \times 10^{-5} \\
^{239}J \text{ FAST} &= 6.1667 \times 10^{-5} \\
^{239}K \text{ FAST} &= 9.6185 \times 10^{-4} \\
^{239}PU \text{ THERMAL} &= 2.2733 \times 10^{-2} \\
\end{align*}
\]

\[
\begin{align*}
G_{\beta} &= 4.1350 \times 10^{-1} \\
\beta^0 &= 1.000 \\
\end{align*}
\]

\[
\begin{align*}
\text{Xe} & \quad \text{STABLE OR LONG-LIVED} \\
\end{align*}
\]
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Energy (keV)</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>144.2</td>
<td>4</td>
<td>6.827</td>
</tr>
<tr>
<td>220.9</td>
<td>1</td>
<td>7.2862</td>
</tr>
<tr>
<td>235.3</td>
<td>1</td>
<td>2.420</td>
</tr>
<tr>
<td>279.0</td>
<td>1</td>
<td>1.526</td>
</tr>
<tr>
<td>311.0</td>
<td>1</td>
<td>0.9560</td>
</tr>
<tr>
<td>319.8</td>
<td>1</td>
<td>0.579</td>
</tr>
<tr>
<td>330.5</td>
<td>1</td>
<td>0.306</td>
</tr>
<tr>
<td>426.0</td>
<td>5</td>
<td>14.88</td>
</tr>
<tr>
<td>566.9</td>
<td>5</td>
<td>21.88</td>
</tr>
<tr>
<td>627.6</td>
<td>1</td>
<td>10.56</td>
</tr>
<tr>
<td>627.8</td>
<td>1</td>
<td>2.108</td>
</tr>
<tr>
<td>677.4</td>
<td>1</td>
<td>7.479</td>
</tr>
<tr>
<td>756.0</td>
<td>4</td>
<td>7.088</td>
</tr>
<tr>
<td>861.6</td>
<td>5</td>
<td>168.0</td>
</tr>
<tr>
<td>948.0</td>
<td>1</td>
<td>3.835</td>
</tr>
<tr>
<td>966.6</td>
<td>1</td>
<td>2.767</td>
</tr>
<tr>
<td>974.6</td>
<td>1</td>
<td>4.732</td>
</tr>
<tr>
<td>1045.0</td>
<td>1</td>
<td>2.213</td>
</tr>
<tr>
<td>1075.0</td>
<td>5</td>
<td>10.30</td>
</tr>
<tr>
<td>1135.5</td>
<td>1</td>
<td>3.475</td>
</tr>
<tr>
<td>1270.6</td>
<td>1</td>
<td>1.136</td>
</tr>
<tr>
<td>1337.0</td>
<td>1</td>
<td>2.926</td>
</tr>
<tr>
<td>1354.1</td>
<td>1</td>
<td>3.530</td>
</tr>
<tr>
<td>1430.1</td>
<td>1</td>
<td>1.622</td>
</tr>
<tr>
<td>1445.8</td>
<td>1</td>
<td>2.690</td>
</tr>
<tr>
<td>1471.1</td>
<td>1</td>
<td>7.939</td>
</tr>
<tr>
<td>1543.4</td>
<td>3</td>
<td>3.152</td>
</tr>
<tr>
<td>1618.5</td>
<td>4</td>
<td>1.534</td>
</tr>
<tr>
<td>1741.6</td>
<td>1</td>
<td>2.862</td>
</tr>
<tr>
<td>1806.0</td>
<td>1</td>
<td>5.752</td>
</tr>
<tr>
<td>1870.2</td>
<td>1</td>
<td>0.05724</td>
</tr>
<tr>
<td>1928.0</td>
<td>1</td>
<td>1.908</td>
</tr>
<tr>
<td>2021.5</td>
<td>1</td>
<td>2.099</td>
</tr>
<tr>
<td>2161.7</td>
<td>1</td>
<td>2.194</td>
</tr>
<tr>
<td>2262.7</td>
<td>1</td>
<td>0.05724</td>
</tr>
<tr>
<td>2312.1</td>
<td>1</td>
<td>2.099</td>
</tr>
<tr>
<td>2409.2</td>
<td>1</td>
<td>0.09546</td>
</tr>
<tr>
<td>2453.2</td>
<td>1</td>
<td>0.04770</td>
</tr>
<tr>
<td>2467.2</td>
<td>1</td>
<td>1.145</td>
</tr>
<tr>
<td>2513.5</td>
<td>1</td>
<td>0.05724</td>
</tr>
<tr>
<td>2629.2</td>
<td>1</td>
<td>0.04770</td>
</tr>
<tr>
<td>2646.8</td>
<td>1</td>
<td>0.01903</td>
</tr>
</tbody>
</table>

<sub>E_\text{photon}\right> \text{ per decay} = 2593.<sub>\right>

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy (keV)</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>γ</td>
<td>846.9</td>
<td>95.49</td>
</tr>
<tr>
<td>γ</td>
<td>884.1</td>
<td>64.99</td>
</tr>
<tr>
<td>α-</td>
<td>1280</td>
<td>21.65</td>
</tr>
<tr>
<td>α-</td>
<td>1560</td>
<td>16.09</td>
</tr>
<tr>
<td>α-</td>
<td>1073</td>
<td>14.91</td>
</tr>
<tr>
<td>α-</td>
<td>2420</td>
<td>14.72</td>
</tr>
<tr>
<td>β</td>
<td>595.2</td>
<td>10.95</td>
</tr>
<tr>
<td>β</td>
<td>1800</td>
<td>10.69</td>
</tr>
<tr>
<td>β</td>
<td>621.6</td>
<td>10.58</td>
</tr>
<tr>
<td>β</td>
<td>2538</td>
<td>8.680</td>
</tr>
<tr>
<td>β</td>
<td>7500</td>
<td>8.520</td>
</tr>
<tr>
<td>β</td>
<td>1137</td>
<td>5.128</td>
</tr>
<tr>
<td>β</td>
<td>540.7</td>
<td>7.518</td>
</tr>
<tr>
<td>β</td>
<td>677.4</td>
<td>7.479</td>
</tr>
<tr>
<td>β</td>
<td>405.3</td>
<td>7.355</td>
</tr>
</tbody>
</table>

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>E_{\text{max}} (keV)</th>
<th>Mean Energy (keV)</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>α-</td>
<td>660.0</td>
<td>215.3</td>
<td>.02000</td>
</tr>
<tr>
<td>α-</td>
<td>676.0</td>
<td>219.3</td>
<td>.06900</td>
</tr>
<tr>
<td>α-</td>
<td>780.0</td>
<td>262.1</td>
<td>1.650</td>
</tr>
<tr>
<td>α-</td>
<td>790.0</td>
<td>266.3</td>
<td>2.750</td>
</tr>
<tr>
<td>β</td>
<td>840.0</td>
<td>286.6</td>
<td>1.160</td>
</tr>
<tr>
<td>β</td>
<td>850.0</td>
<td>290.7</td>
<td>.05000</td>
</tr>
<tr>
<td>TYPE</td>
<td>$E_{\text{max}}$</td>
<td>Mean Energy</td>
<td>Intensity/100 Decays</td>
</tr>
<tr>
<td>------</td>
<td>------------------</td>
<td>-------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>$\beta^-$</td>
<td>830.0</td>
<td>307.0</td>
<td>0.9000</td>
</tr>
<tr>
<td>$\beta^-$</td>
<td>1070.0</td>
<td>382.3</td>
<td>1.190</td>
</tr>
<tr>
<td>$\beta^-$</td>
<td>1280.0</td>
<td>473.2</td>
<td>2.660</td>
</tr>
<tr>
<td>$\beta^-$</td>
<td>1280.0</td>
<td>517.5</td>
<td>3.370</td>
</tr>
<tr>
<td>$\beta^-$</td>
<td>1500.0</td>
<td>571.2</td>
<td>3.520</td>
</tr>
<tr>
<td>$\beta^-$</td>
<td>1560.0</td>
<td>598.4</td>
<td>6.09</td>
</tr>
<tr>
<td>$\beta^-$</td>
<td>1600.0</td>
<td>616.6</td>
<td>5.470</td>
</tr>
<tr>
<td>$\beta^-$</td>
<td>1740.0</td>
<td>680.7</td>
<td>6.120</td>
</tr>
<tr>
<td>$\beta^-$</td>
<td>1800.0</td>
<td>708.3</td>
<td>10.69</td>
</tr>
<tr>
<td>$\beta^-$</td>
<td>1850.0</td>
<td>731.5</td>
<td>1.650</td>
</tr>
<tr>
<td>$\beta^-$</td>
<td>1880.0</td>
<td>745.4</td>
<td>2.700</td>
</tr>
<tr>
<td>$\beta^-$</td>
<td>2014.0</td>
<td>808.0</td>
<td>5.800</td>
</tr>
<tr>
<td>$\beta^-$</td>
<td>2230.0</td>
<td>909.7</td>
<td>3.950</td>
</tr>
<tr>
<td>$\beta^-$</td>
<td>2420.0</td>
<td>1000</td>
<td>14.72</td>
</tr>
<tr>
<td>$\beta^-$</td>
<td>2538.0</td>
<td>1056</td>
<td>8.680</td>
</tr>
</tbody>
</table>

$\langle E_{\beta} \rangle$ per decay = 690.9

$\langle E_{\beta} \rangle$ per decay = 1064.
\( {^{134}}\text{Xe} \)

ENDF/B-IV FILE 1 COMMENTS
S4-XE-134M HEDL
EVAL-APR74 R.E. SCHENKER
DIST-NOV74
REFERENCES
GIT-R SCHENKER, THEORY (9/73)

\( {^{134}}\text{Xe} \)

- \( T_{1/2} = 2.900 \) s
- \( \langle E \rangle \text{ PER DECAY} = 2000 \)

FISSION YIELDS
- \( \text{235U THERMAL} \) 2.9595 x 10^{-4} \n- \( \text{235U FAST} \) 2.0767 x 10^{-4} \n- \( \text{238U FAST} \) 6.0994 x 10^{-5} \n- \( \text{239Pu THERMAL} \) 9.5646 x 10^{-4} \n
\( Q_{f} = 2000 \)

\( \text{BR}_{f} = 1 \times 10^{-3} \)

\( {^{136}}\text{Xe} \)

STABLE OR LONG-LIVED

134n-34-1

\( {^{131}}\text{Xe} \)

STABLE OR LONG-LIVED

CROSS SECTIONS (BARNs)
- \( \sigma \text{ TOTAL } 2200 \) μb
- \( \sigma \text{ WESTCOTT G FACTOR } 1.4447 \)
- \( \sigma \text{ CAPTURE } 2200 \) μb
- \( \sigma \text{ WESTCOTT G FACTOR } 6.7548 \)
- \( \text{RESONANCE INTEGRAL TOTAL} 1.1300 \times 10^{-2} \)
- \( \text{RESONANCE INTEGRAL CAPTURE} 1.5820 \)
- \( \text{RESONANCE INTEGRAL (N,2N)} 1.2000 \)
- \( \text{RESONANCE INTEGRAL (N,P)} 1.6110 \times 10^{-3} \)
- \( \text{RESONANCE INTEGRAL (N,e)} 3.7640 \times 10^{-5} \)

FISSION YIELDS
- \( \text{235U THERMAL} \) 2.5640 x 10^{-4} \n- \( \text{235U FAST} \) 2.0769 x 10^{-4} \n- \( \text{238U FAST} \) 6.1094 x 10^{-6} \n- \( \text{239Pu THERMAL} \) 9.5664 x 10^{-4} \n
134 - 54 - 1
\( \frac{1}{3} \) Cs

ENDFB-B-IV FILE 1 COMMENTS
55-CS-134M ANC
EVAL-FEB74 C.W. REICH
DIST-NOV74
FOR FILE DESCRIPTION SEE C.W. REICH, R.G. HEIMER AND M.H. PUTMAN,
ANCR-1157, ENDF/B-III.

\( \frac{1}{3} \) Cs

\( T_{1/2} \approx 2.900 \times 10^4 \) h
\( \langle E_f \rangle \) PER DECAY = 537.6 keV

FISSION YIELDS

\( ^{235}\text{U THERMAL} \quad 2.557 \times 10^{-7} \)
\( ^{235}\text{U FAST} \quad 0.0105 \times 10^{-7} \)
\( ^{239}\text{Pu THERMAL} \quad 2.309 \times 10^{-8} \)

\( Q_{fi} = 137.6 \) MeV
\( BR_{1/2} = 1.000 \)

\( \frac{1}{3} \) Cs

\( 2.900 \times 10^4 \) yr

134m- 55- 1
PHOTON RADIATION TABLE

<table>
<thead>
<tr>
<th>MEAN ENERGY</th>
<th>LINES</th>
<th>PHOTONS/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.59</td>
<td>1</td>
<td>99.20</td>
</tr>
<tr>
<td>127.1</td>
<td>1</td>
<td>99.20</td>
</tr>
<tr>
<td>137.4</td>
<td>1</td>
<td>99.20</td>
</tr>
</tbody>
</table>

\[<\text{PHOTON}> \text{ PER DECAY} = 137.6\]

CHARACTERISTIC RADIATION TABLE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>ENERGY</th>
<th>1/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>?</td>
<td>127.1</td>
<td>99.20</td>
</tr>
<tr>
<td>?</td>
<td>10.50</td>
<td>99.20</td>
</tr>
</tbody>
</table>

PHOTON INTENSITY PLOT


\textbf{Cs}

\textbf{ENDF/B-IV FILE 1 COMMENTS}

\textbf{55-CS-134} \textbf{ARCH.HELOL} \textbf{EVAL=FB74} \textbf{C.W.REICH} \textbf{DELAY DATA}
\textbf{EVAL=OC74} \textbf{R.E.SCHENTER AND F.SCHMITTROTH}
\textbf{CROSS SECTION DATA}
\textbf{DIST-NDV74}

\textbf{FILE INFORMATION}

\textbf{MF=1 MT=47 DECAY DATA}
\textbf{REFERENCES}

\textbf{C.W.REICH, R.G.HELMER AND M.H.PUTMAN, ANCR-1157, ENDF/210, 8/74,}
\textbf{O-1973 WAPSTRA-GDVE MASSTABLE}

\begin{itemize}
\item $T_{1/2}=2.060\times10^9$
\item $\langle E_d \rangle$ \textbf{PER DECAY}=161.3
\item $\langle E_y \rangle$ \textbf{PER DECAY}=2150.
\end{itemize}

\begin{itemize}
\item \textbf{CROSS SECTIONS (BARNs)}
\item TOTAL 2200M/S 1.4479x10^{-2}
\item WESTCOTT G FACTOR 1.0309
\item CAPTURE 2200M/S 1.4000x10^{-2}
\item WESTCOTT G FACTOR 1.0000
\item RESONANCE INTEGRAL TOTAL 4.0620x10^{-2}
\item RESONANCE INTEGRAL CAPTURE 2.1120x10^{-2}
\end{itemize}

\begin{itemize}
\item Fission Yields
\item $^{235}U$ THERMAL 1.6025x10^{-7}
\item $^{235}U$ FAST 1.8303x10^{-7}
\item $^{239}Pu$ THERMAL 2.2997x10^{-4}
\end{itemize}

\begin{itemize}
\item $Q_x=2058.5\pm0.4$
\item $BR_x=1.000$
\end{itemize}

\begin{itemize}
\item \textbf{S} \textbf{No}
\item \textbf{STABLE OR LONG-LIVED}
\end{itemize}

\textbf{134 - 55 - 1}
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Energy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>475.3</td>
<td>1</td>
<td>1.400</td>
</tr>
<tr>
<td>561.0</td>
<td>1</td>
<td>8.000</td>
</tr>
<tr>
<td>569.3</td>
<td>1</td>
<td>14.80</td>
</tr>
<tr>
<td>604.7</td>
<td>1</td>
<td>96.00</td>
</tr>
<tr>
<td>795.8</td>
<td>1</td>
<td>88.00</td>
</tr>
<tr>
<td>802.2</td>
<td>1</td>
<td>9.000</td>
</tr>
<tr>
<td>1038</td>
<td>1</td>
<td>1.100</td>
</tr>
<tr>
<td>1168</td>
<td>1</td>
<td>1.900</td>
</tr>
<tr>
<td>1365</td>
<td>1</td>
<td>3.300</td>
</tr>
</tbody>
</table>

<Photon> PER DECAY = 1580.

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>$E_{max}$</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\beta$</td>
<td>89.0</td>
<td>23.38</td>
<td>28.00</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>604.7</td>
<td>123.8</td>
<td>1.000</td>
</tr>
<tr>
<td>$\delta$</td>
<td>662.0</td>
<td>216.2</td>
<td>71.00</td>
</tr>
</tbody>
</table>

$<E_{\beta}>$ PER DECAY = 161.3  
$<E_{\gamma}>$ PER DECAY = 337.7

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy</th>
<th>$I/100$ Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\gamma$</td>
<td>604.7</td>
<td>98.00</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>795.8</td>
<td>88.00</td>
</tr>
<tr>
<td>$\delta$</td>
<td>662.0</td>
<td>71.00</td>
</tr>
<tr>
<td>Decay</td>
<td>Stable or Long-lived</td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>---------------------</td>
<td></td>
</tr>
</tbody>
</table>

**CROSS SECTIONS (BARNs)**
- \( \alpha \) TOTAL 2200M/S \( 6.53 \times 10^{-1} \)
- WESTCOTT G FACTOR \( 1.0819 \)
- \( \beta \) CAPTURE 2200M/S \( 2.1587 \)
- WESTCOTT G FACTOR \( 1.0033 \)
- RESONANCE INTEGRAL TOTAL \( 2.6350 \times 10^{-2} \)
- RESONANCE INTEGRAL CAPTURE \( 2.3926 \times 10^{-1} \)

**Fission Yields**
- \(^{235}\text{Pu} \) THERMAL \( 7.1298 \times 10^{-9} \)
\[ \frac{133}{62} \text{ Sn} \]

ENDF/B-IV FILE 1 COMMENTS
50-SN-133 HECL EVAL-APR74 R.E. SCHENTER
DIST-NOV74

REFERENCES
HALF LIFE-R SCHENTER, THEORY(9/73)

\[ \frac{133}{62} \text{ Sn} \]

\[ T_{1/2} = 2.2011 \text{s} \]
\[ \langle E_x \rangle \text{ PER DECAY} = 2837 \text{eV} \]
\[ \langle E_y \rangle \text{ PER DECAY} = 3304 \text{eV} \]

FISSION YIELDS

\[ ^{235}\text{U THERMAL} = 1.2366 \times 10^{-5} \]
\[ ^{235}\text{U FAST} = 1.2364 \times 10^{-5} \]
\[ ^{238}\text{U THERMAL} = 4.2703 \times 10^{-6} \]
\[ ^{239}\text{Pu THERMAL} = 1.0774 \times 10^{-6} \]

\[ Q_m = 8080 \text{eV} \]
\[ \text{BR}_m = 1.00 \]

\[ \frac{133}{75} \text{ Sb} \]

\[ 135 - 50 - 1 \]

\[ \frac{135}{75} \text{ Sb} \]

ENDF/B-IV FILE 1 COMMENTS
51-SB-135 HECL EVAL-APR74 R.E. SCHENTER
DIST-NOV74

REFERENCES
DELAYED NEUTRON BRANCHING: L TOMLINSON, ADANDT, 12.79(9/73)

\[ \frac{135}{75} \text{ Sb} \]

\[ T_{1/2} = 31.700 \times 0.020 \text{ s} \]
\[ \langle E_x \rangle \text{ PER DECAY} = 2064 \text{eV} \]
\[ \langle E_y \rangle \text{ PER DECAY} = 2808 \text{eV} \]

FISSION YIELDS

\[ ^{235}\text{U THERMAL} = 1.9760 \times 10^{-3} \]
\[ ^{235}\text{U FAST} = 1.8766 \times 10^{-3} \]
\[ ^{238}\text{U FAST} = 1.2135 \times 10^{-4} \]
\[ ^{239}\text{Pu THERMAL} = 4.0970 \times 10^{-4} \]

\[ Q_m = 3655 \text{eV} \]
\[ \text{BR}_m = 0.880 \times 0.020 \]

\[ \frac{135}{75} \text{ Ta} \]

\[ 18.0 \pm 1.0 \text{ s} \]

\[ \frac{135}{75} \text{ Sb} \]

\[ 0.85 \pm 0.10 \text{ s} \]

\[ \frac{135}{75} \text{ Ta} \]

\[ 18.0 \pm 1.0 \text{ s} \]
$^{132}$ Te

ENDFB-IV FILE 1 COMMENTS
52-TE-135 HWDL
EVAL-APR74 R.E.SCHEATER
0187-NOV74

$^{132}$ Te

$T_{1/2} = 18.0\times 1.0a$

$\langle E_\gamma \rangle$ PER DECAY = 1.025.

$\langle E_\gamma \rangle$ PER DECAY = 2.177.

FISSION YIELDS

$^{235}\text{U THERMAL} = 3.976\times 10^{-2}$

$^{235}\text{U FAST} = 3.4132\times 10^{-2}$

$^{239}\text{U FAST} = 4.5855\times 10^{-2}$

$^{239}\text{Pu THERMAL} = 1.7589\times 10^{-2}$

$Q_g = 5920$

$BM_g = 1.000$

$^{133}$ I

$6.585\times 0.003h$

135 - 52 - 1
53-1-135 ANC, HEOL EVAL-FEB74 C.W. REICH DECAY DATA
EVAL-OCT74 R.E. SCHONER AND F. SCHRJITTROTH
CROSS SECTION DATA
DIST-NOV74

FILE INFORMATION
MF=1 MT=457 DECAY DATA
REFERENCES
G-1975 MAPETRA-GOVE MASSTABLE.
BRANCHING RATIO FOR DECAY TO XE-135m IS TAKEN FROM

\[ \tau_{1/2} = 6.585 \times 10^{-3} \text{h} \]
\[ \langle E_\gamma \rangle \text{ PER DECAY} = 993.7 \]
\[ \langle E_\gamma \rangle \text{ PER DECAY} = 1456 \]

CROSS SECTIONS (BARNs)
- TOTAL 2200m/s
  - WESTCOTT G FACTOR
    - CAPTURE 2200m/s
    - WESTCOTT G FACTOR
    - RESONANCE INTEGRAL TOTAL
    - RESONANCE INTEGRAL CAPTURE
- FISSION YIELDS
  - \( ^{239} \text{U} \) THERMAL
  - \( ^{239} \text{U} \) FAST
  - \( ^{239} \text{Pu} \) THERMAL

\[ Q_n = 2780.3 \times 10^{-3} \]
\[ Bn = 9.14 \times 10^{-4} \]
\[ Bk = 5.2715 \times 10^{-4} \]

15.30 \( \alpha \) 0.10h
9.170 \( \alpha \) 0.10h

135 - 53 - 1
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Mean Energy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>154.2</td>
<td>1</td>
<td>.4000</td>
</tr>
<tr>
<td>220.4</td>
<td>1</td>
<td>1.760</td>
</tr>
<tr>
<td>229.7</td>
<td>1</td>
<td>.2000</td>
</tr>
<tr>
<td>288.4</td>
<td>1</td>
<td>3.200</td>
</tr>
<tr>
<td>420.2</td>
<td>7</td>
<td>5.408</td>
</tr>
<tr>
<td>546.6</td>
<td>1</td>
<td>6.720</td>
</tr>
<tr>
<td>707.9</td>
<td>1</td>
<td>.6800</td>
</tr>
<tr>
<td>836.9</td>
<td>1</td>
<td>6.400</td>
</tr>
<tr>
<td>972.3</td>
<td>1</td>
<td>2.160</td>
</tr>
<tr>
<td>1039.</td>
<td>1</td>
<td>8.000</td>
</tr>
<tr>
<td>1132.</td>
<td>1</td>
<td>27.35</td>
</tr>
<tr>
<td>1245.</td>
<td>1</td>
<td>.8160</td>
</tr>
<tr>
<td>1261.</td>
<td>1</td>
<td>27.92</td>
</tr>
<tr>
<td>1368.</td>
<td>1</td>
<td>.6320</td>
</tr>
<tr>
<td>1387.</td>
<td>1</td>
<td>.5760</td>
</tr>
<tr>
<td>1458.</td>
<td>1</td>
<td>8.000</td>
</tr>
<tr>
<td>1501.</td>
<td>1</td>
<td>.9020</td>
</tr>
<tr>
<td>1567.</td>
<td>1</td>
<td>1.232</td>
</tr>
<tr>
<td>1678.</td>
<td>1</td>
<td>9.440</td>
</tr>
<tr>
<td>1707.</td>
<td>1</td>
<td>3.360</td>
</tr>
<tr>
<td>1791.</td>
<td>1</td>
<td>7.520</td>
</tr>
<tr>
<td>1851.</td>
<td>1</td>
<td>.5600</td>
</tr>
<tr>
<td>1927.</td>
<td>1</td>
<td>.2960</td>
</tr>
<tr>
<td>2045.</td>
<td>1</td>
<td>.7200</td>
</tr>
</tbody>
</table>

\(\text{E}_{\text{Photon}}\) per decay = 1156.

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>(E_{\text{max}})</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\gamma)</td>
<td>260.0</td>
<td>74.86</td>
<td>8.0000</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>320.0</td>
<td>93.43</td>
<td>1.000</td>
</tr>
<tr>
<td>(\beta)</td>
<td>106.8</td>
<td>110.1</td>
<td>1.100</td>
</tr>
<tr>
<td>(\beta)</td>
<td>144.9</td>
<td>5.000</td>
<td></td>
</tr>
<tr>
<td>(\beta)</td>
<td>155.7</td>
<td>3.000</td>
<td></td>
</tr>
<tr>
<td>(\beta)</td>
<td>170.3</td>
<td>0.3000</td>
<td></td>
</tr>
<tr>
<td>(\beta)</td>
<td>165.8</td>
<td>0.5000</td>
<td></td>
</tr>
<tr>
<td>(\beta)</td>
<td>200.2</td>
<td>0.0000</td>
<td></td>
</tr>
<tr>
<td>(\beta)</td>
<td>207.8</td>
<td>1.400</td>
<td></td>
</tr>
<tr>
<td>(\beta)</td>
<td>223.2</td>
<td>1.100</td>
<td></td>
</tr>
<tr>
<td>(\beta)</td>
<td>254.5</td>
<td>6.900</td>
<td></td>
</tr>
<tr>
<td>(\beta)</td>
<td>267.5</td>
<td>0.0000</td>
<td></td>
</tr>
<tr>
<td>(\beta)</td>
<td>270.5</td>
<td>0.0000</td>
<td></td>
</tr>
<tr>
<td>(\beta)</td>
<td>286.6</td>
<td>0.0000</td>
<td></td>
</tr>
<tr>
<td>(\beta)</td>
<td>277.6</td>
<td>9.800</td>
<td></td>
</tr>
<tr>
<td>(\beta)</td>
<td>255.8</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>(\beta)</td>
<td>361.1</td>
<td>4.500</td>
<td></td>
</tr>
<tr>
<td>(\beta)</td>
<td>372.8</td>
<td>20.90</td>
<td></td>
</tr>
<tr>
<td>(\beta)</td>
<td>420.9</td>
<td>7.600</td>
<td></td>
</tr>
</tbody>
</table>

\(<E_{\beta}>\) per decay = 393.7

\(<E_{\gamma}>\) per decay = 690.8

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy</th>
<th>(\text{I/100 Decays})</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\gamma)</td>
<td>1261.</td>
<td>27.92</td>
</tr>
<tr>
<td>(\beta)</td>
<td>1172.</td>
<td>24.20</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>1132.</td>
<td>21.44</td>
</tr>
<tr>
<td>(\beta)</td>
<td>1050.</td>
<td>20.90</td>
</tr>
<tr>
<td>(\beta)</td>
<td>940.0</td>
<td>9.880</td>
</tr>
<tr>
<td>(\beta)</td>
<td>1078.</td>
<td>9.440</td>
</tr>
<tr>
<td>(\gamma)</td>
<td>1476.</td>
<td>8.000</td>
</tr>
<tr>
<td>(\gamma)</td>
<td>1039.</td>
<td>8.000</td>
</tr>
<tr>
<td>(\gamma)</td>
<td>1270.</td>
<td>8.000</td>
</tr>
<tr>
<td>(\gamma)</td>
<td>1160.</td>
<td>7.600</td>
</tr>
<tr>
<td>(\gamma)</td>
<td>1791.</td>
<td>7.520</td>
</tr>
<tr>
<td>(\gamma)</td>
<td>760.0</td>
<td>6.900</td>
</tr>
<tr>
<td>(\gamma)</td>
<td>546.6</td>
<td>6.720</td>
</tr>
<tr>
<td>(\gamma)</td>
<td>836.9</td>
<td>6.400</td>
</tr>
</tbody>
</table>

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>(E_{\text{max}})</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\gamma)</td>
<td>1270.0</td>
<td>488.8</td>
<td>8.000</td>
</tr>
<tr>
<td>(\beta)</td>
<td>1240.0</td>
<td>473.2</td>
<td>.03000</td>
</tr>
<tr>
<td>(\beta)</td>
<td>1470.0</td>
<td>557.7</td>
<td>24.20</td>
</tr>
<tr>
<td>(\beta)</td>
<td>1640.0</td>
<td>636.6</td>
<td>2.100</td>
</tr>
<tr>
<td>(\beta)</td>
<td>2700.0</td>
<td>1095.5</td>
<td>1.100</td>
</tr>
</tbody>
</table>

\(<E_{\beta}>\) per decay = 393.7

\(<E_{\gamma}>\) per decay = 690.8
\[ ^{135m}\text{Xe} \]

ENDF/B-IV FILE 1 COMMENTS
54-XE-135M ANC
EVAL-FEB74 C.W.REICH
DIST-WOYLY
FOR FILE DESCRIPTION SEE C.W.REICH, RG HELMER AND MH PUTMAN,
ANCR-1157,ENDFZ10,8/74

REFERENCE
OTHER- M.J.MARTIN, RADIOACTIVE ATOMS-SUPPLEMENT 1,
ORNL-4923 (1973).

\[ T_{1/2} = 15.30 \pm 0.10 \, \text{m} \]
\[ <E_\gamma> \text{ PER DECAY} = 526.8 \]

FISSION YIELDS
\[ ^{239}_{92}\text{U} \text{ THERMAL} = 1.64 \times 10^{-3} \]
\[ ^{239}_{93}\text{Np} \text{ THERMAL} = 6.79 \times 10^{-3} \]

\[ Q_{f} = 326.62 \pm 0.03 \]  
\[ Q_{g} = 4.00 \]

\[ ^{135m}\text{Xe} \]
\[ 9.17 \pm 0.01 \, \text{h} \]

\[ 135m - 54 - 1 \]
PHOTON RADIATION TABLE

<table>
<thead>
<tr>
<th>MEAN ENERGY</th>
<th>LINES</th>
<th>PHOTONS/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>26.7</td>
<td>1.0</td>
<td>4</td>
</tr>
<tr>
<td>526.62</td>
<td>0.03</td>
<td>1</td>
</tr>
</tbody>
</table>

\( \langle E_{\text{photon}} \rangle \) PER DECAY = 432. ± 3.

PARTICLE RADIATION TABLE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>( E_{\text{max}} )</th>
<th>MEAN ENERGY</th>
<th>INTENSITY/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC</td>
<td>55.4</td>
<td>16.8 ± 2.3</td>
<td>24 ± 6</td>
</tr>
<tr>
<td>CE</td>
<td>579.5</td>
<td>497.64 ± 0.18</td>
<td>18.8 ± 0.5</td>
</tr>
</tbody>
</table>

\( \langle E_e \rangle \) PER DECAY = 97.30

PHOTON INTENSITY PLOT

CHARACTERISTIC RADIATION TABLE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>ENERGY</th>
<th>1/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \gamma )</td>
<td>526.62</td>
<td>87.2 ± 0.5</td>
</tr>
<tr>
<td>CE</td>
<td>492.06</td>
<td>15.3 ± 0.5</td>
</tr>
<tr>
<td>AC</td>
<td>4.308</td>
<td>15 ± 5</td>
</tr>
</tbody>
</table>
$^{133}$ Xe

ENDF/B-IV FILE 1 COMMENTS
54-XE-135 BNW EVAL-JUN67 B.R.LEONARD, JR. AND K.B.STEWART
PRI.COM.JUNE,1967 DIST-NOV74 REV-JUN75
Radioactive Decay Data EVAL-F.W. Reich(ANC)

References
U
1975 revision of Wapstra-Gove tables
Other R.J. Martin Radioactive Atom-Supplement 1
ORNL-4923(1973)

$^{133}$ Xe

$\frac{1}{2} T_{1/2} = 9.170 \pm .010$ h
$\langle E_d \rangle$ PER DECAY $= 306.9$ keV
$\langle E_{\gamma} \rangle$ PER DECAY $= 261.4$ keV

CROSS SECTIONS (BARNs)
$\sigma_{TOTAL}$ 2200/M/S 3.9320 x 10$^{-b}$
$\sigma_{CAPTURE}$ 2200/M/S 2.6363 x 10$^{-b}$
$\sigma_{CAPTURE}$ 2200/M/S 1.1616 x 10$^{-b}$

RESONANCE INTEGRAL TOTAL 1.2870 x 10$^{-4}$
RESONANCE INTEGRAL CAPTURE 7.6400 x 10$^{-3}$

FISSION YIELDS
235U THERMAL 9.3199 x 10$^{-4}$
239U FAST 1.1522 x 10$^{-2}$
239Pu FAST 8.5732 x 10$^{-3}$
239Pu THERMAL 4.7575 x 10$^{-3}$

$Q_f = 1158.1$ M.E.
BR$_{y} = 1.000$

$^{133}$ Cs

2.298 x 10$^{-8}$ y
PHOTON RADIATION TABLE

<table>
<thead>
<tr>
<th>MEAN ENERGY</th>
<th>LINES</th>
<th>PHOTONS/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>28.4</td>
<td>0.9</td>
<td>4</td>
</tr>
<tr>
<td>158.20</td>
<td>0.20</td>
<td>1</td>
</tr>
<tr>
<td>199.9</td>
<td>0.7</td>
<td>1</td>
</tr>
<tr>
<td>249.741</td>
<td>0.010</td>
<td>1</td>
</tr>
<tr>
<td>358.3</td>
<td>0.3</td>
<td>1</td>
</tr>
<tr>
<td>375.1</td>
<td>1.0</td>
<td>1</td>
</tr>
<tr>
<td>407.9</td>
<td>0.3</td>
<td>1</td>
</tr>
<tr>
<td>455.4</td>
<td>0.4</td>
<td>1</td>
</tr>
<tr>
<td>731.9</td>
<td>0.4</td>
<td>1</td>
</tr>
<tr>
<td>871.6</td>
<td>0.4</td>
<td>1</td>
</tr>
</tbody>
</table>

\[ \langle E_{\text{photon}} \rangle \text{ PER DECAY} = 231.7 \pm 1.1 \]

PARTICLE RADIATION TABLE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>( E_{\text{MAX}} )</th>
<th>MEAN ENERGY</th>
<th>INTENSITY/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Au</td>
<td>34.8 \pm 28.4</td>
<td>2.1</td>
<td>13.2 \pm 1.8</td>
</tr>
<tr>
<td>Ce</td>
<td>248.5 \pm 219.7</td>
<td>0.4</td>
<td>6.0 \pm 0.3</td>
</tr>
<tr>
<td>( \pi^- )</td>
<td>95.0 \pm 25.0</td>
<td>2.3</td>
<td>0.02 \pm 0.002</td>
</tr>
<tr>
<td>( \mu^- )</td>
<td>176.0 \pm 48.0</td>
<td>3.0</td>
<td>0.56 \pm 0.010</td>
</tr>
<tr>
<td>( \nu^- )</td>
<td>549.0 \pm 174.0</td>
<td>6.0</td>
<td>2.80 \pm 0.20</td>
</tr>
<tr>
<td>( \nu^+ )</td>
<td>750.0 \pm 251.0</td>
<td>8.0</td>
<td>0.50 \pm 0.010</td>
</tr>
<tr>
<td>( \nu^0 )</td>
<td>908.0 \pm 374.0</td>
<td>10.0</td>
<td>0.46 \pm 0.020</td>
</tr>
</tbody>
</table>

\[ \langle E_{\pi^-} \rangle \text{ PER DECAY} = 326. \pm 9. \]
\[ \langle E_{\nu^-} \rangle \text{ PER DECAY} = 586.5 \pm 1.4 \]

CHARACTERISTIC RADIATION TABLE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>ENERGY</th>
<th>( 1/100 ) DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \pi^- )</td>
<td>908. \pm 9.</td>
<td>94.60 \pm 0.20</td>
</tr>
<tr>
<td>( \nu^- )</td>
<td>249.741 \pm 0.010</td>
<td>84.59 \pm 0.25</td>
</tr>
</tbody>
</table>
ENDF/B-IV FILE 1 COMMENTS
55-CS-135M HEDL EVAL-AHH74 R.E.SCHENTER
DIST-NOV74

REFERENCES
GIT-C LEDERER ET AL TABLE OF ISOTOPES 6TH ED

\[ \frac{1}{3} \text{Cs} \]

\[ T_{1/2} = 53.0 \text{m} \]
\[ \langle E_a \rangle \text{ PER DECAY} = 1621 \]

FISSION YIELDS
\[ ^{235}\text{U THERMAL} \quad 6.055 \times 10^{-8} \]
\[ ^{235}\text{U FAST} \quad 4.590 \times 10^{-8} \]
\[ ^{238}\text{U FAST} \quad 2.689 \times 10^{-8} \]
\[ ^{239}\text{Pu THERMAL} \quad 3.708 \times 10^{-8} \]

\[ Q_{1/2} = 1621 \]
\[ \beta_{1/2} = 1.000 \]

\[ \frac{1}{3} \text{Cs} \]
\[ 2.298 \times 10^{-6} \gamma \]

\[ 133m \quad 55 \quad 1 \]

\[ \frac{1}{3} \text{Cs} \]

ENDF/B-IV FILE 1 COMMENTS
55-CS-135 HEDL EVAL-OCT74 F.SCHMITTROTH AND R.E.SCHENTER
DIST-NOV74

\[ \frac{1}{3} \text{Cs} \]

\[ T_{1/2} = 2.298 \times 10^{-6} \gamma \]
\[ \langle E_a \rangle \text{ PER DECAY} = 69.40 \]
\[ \langle E_\gamma \rangle \text{ PER DECAY} = 1.000 \]

CROSS SECTIONS (BARNs)
\[ \alpha \quad \text{TOTAL 2200m/SEC} \quad 1.351 \times 10^{-1} \]
\[ \text{WESTCOTT Q FACTOR} \quad 1.1426 \]
\[ \epsilon \quad \text{CAPTURE 2200m/SEC} \quad 8.3700 \]
\[ \text{WESTCOTT Q FACTOR} \quad 9.9991 \times 10^{-1} \]
\[ \text{RESONANCE INTEGRAL TOTAL} \quad 1.9450 \times 10^{-2} \]
\[ \text{RESONANCE INTEGRAL CAPTURE} \quad 6.1849 \times 10^{-1} \]

FISSION YIELDS
\[ ^{235}\text{U THERMAL} \quad 8.3145 \times 10^{-6} \]
\[ ^{235}\text{U FAST} \quad 4.3612 \times 10^{-6} \]
\[ ^{238}\text{U FAST} \quad 6.0997 \times 10^{-6} \]
\[ ^{239}\text{Pu THERMAL} \quad 4.2254 \times 10^{-7} \]

\[ Q_{1/2} = 209.0 \]
\[ \beta_{1/2} = 1.000 \]

\[ \frac{1}{3} \text{Ba} \]

STABLE OR LONG-LIVED

\[ 135 \quad 55 \quad 1 \]
$^{135}$Ba

$^{136}$Ba

$^{137}$Ba

$^{138}$Ba

ENDF/B-IV FILE 1 COMMENTS
56-BA-135H HEOL EVAL-APR74 W.E.SCHENTER DIST-NOV74

REFERENCES
KIT-9 LEEDER ET AL TABLE OF ISOTOPES 6TH ED

$^{135}$Ba

$\tau_{1/2} = 28.70$ h
$<\bar{E}_f>$ PER DECAY = 268.0

FISSION YIELDS
$^{233}$U THERMAL $2.3613 \times 10^{-5}$
$^{233}$U FAST $1.6503 \times 10^{-9}$
$^{239}$Pu THERMAL $3.6995 \times 10^{-8}$

$Q_{fi}$ = 268.0
BR$_{1+}$ = 1.000

$^{136}$Ba

STABLE OR LONG-LIVED

$^{137}$Ba

$^{138}$Ba

STABLE OR LONG-LIVED

CROSS SECTIONS (BARNs)
- $\sigma$ TOTAL 2200/M/S $9.3066$
- WESTCOTT S FACTOR $1.0486$
- $\sigma$ CAPTURE 2200/M/S $5.8171$
- WESTCOTT S FACTOR $1.0007$
- RESONANCE INTEGRAL TOTAL $2.8490 \times 10^{12}$
- RESONANCE INTEGRAL CAPTURE $1.0060 \times 10^{12}$

FISSION YIELDS
$^{237}$U THERMAL $2.2412 \times 10^{-9}$
$^{233}$U FAST $3.0106 \times 10^{-9}$
$^{239}$Pu THERMAL $3.8404 \times 10^{-8}$

135 - 56 - 1
$^{115}$ Sn

ENDF/B-IV FILE 1 COMMENTS
50-SN-136 HEDL
EVAL-APR74 R.E.SCHENTER
DIST-NOV74
REFERENCES
HALF LIFE-R SCHENTER,THEORY(9/73)

$^{115}$ Sn

$T_{1/2} = 4.4730$.
$\langle E_p \rangle$ PER DECAY =1927.
$\langle E_x \rangle$ PER DECAY =2972.

FISSION YIELDS
$^{235}$U THERMAL 5.3929x10$^{-7}$
$^{235}$U FAST 5.8609x10$^{-7}$
$^{238}$U FAST 5.0435x10$^{-5}$
$^{239}$Pu THERMAL 3.9649x10$^{-8}$

$Q_{\gamma} = 60950.$
$BR_{\gamma} = 1.000$

$^{115}$ Sb

$^{115}$ Sb

$T_{1/2} = 2313s$.
$\langle E_p \rangle$ PER DECAY =2888.
$\langle E_x \rangle$ PER DECAY =3688.

FISSION YIELDS
$^{235}$U THERMAL 2.4099x10$^{-4}$
$^{235}$U FAST 2.9721x10$^{-4}$
$^{238}$U FAST 3.8616x10$^{-5}$
$^{239}$Pu THERMAL 5.2882x10$^{-5}$

$Q_{\gamma} = 9440.$
$BR_{\gamma} = 1.000$

$^{115}$ Te

$^{115}$ Te

$21.0s$.

$^{136}$ - 50- 1

$^{136}$ - 51- 1
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Mean Energy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>197.5</td>
<td>1</td>
<td>85.00</td>
</tr>
<tr>
<td>370.5</td>
<td>1</td>
<td>10.00</td>
</tr>
<tr>
<td>381.5</td>
<td>1</td>
<td>98.00</td>
</tr>
<tr>
<td>1313.6</td>
<td>1</td>
<td>100.0</td>
</tr>
</tbody>
</table>

\(<E_{\text{photon}}\) per decay = 1925.

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>(E_{\text{max}})</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\beta)</td>
<td>4000.0</td>
<td>1768.</td>
<td>20.00</td>
</tr>
<tr>
<td>(\beta)</td>
<td>4000.0</td>
<td>1965.</td>
<td>66.00</td>
</tr>
<tr>
<td>(\beta)</td>
<td>4600.0</td>
<td>2065.</td>
<td>14.00</td>
</tr>
</tbody>
</table>

\(<E_\beta\) per decay = 1939.
\(<E_\beta\) per decay = 2409.

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy</th>
<th>(I/100) Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\gamma)</td>
<td>1313.6</td>
<td>100.0</td>
</tr>
<tr>
<td>(\gamma)</td>
<td>381.5</td>
<td>98.00</td>
</tr>
<tr>
<td>(\gamma)</td>
<td>197.5</td>
<td>85.00</td>
</tr>
<tr>
<td>(\beta)</td>
<td>4400.0</td>
<td>66.00</td>
</tr>
<tr>
<td>Nuclide</td>
<td>Yields</td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>--------</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- \( T_1/2 = 83.4 \mu s \)
- \( \langle E_p \rangle \) PER DECAY = 181.1
- \( \langle E_y \rangle \) PER DECAY = 2213
- FISSION YIELDS
  - \( ^{239}U \) THERMAL: 1.127 x 10^{-2}
  - \( ^{235}U \) FAST: 1.064 x 10^{-2}
  - \( ^{232}Th \) FAST: 7.908 x 10^{-3}
  - \( ^{239}Pu \) THERMAL: 1.86 x 10^{-2}

- \( Q_f = 6300 \pm 200 \)
- \( BR_p = 1.000 \)

- Xe
- STABLE OR LONG-LIVED
### Photon Radiation Table

<table>
<thead>
<tr>
<th>MEAN ENERGY</th>
<th>LINES</th>
<th>PHOTONS/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>219.5</td>
<td>1</td>
<td>1.326</td>
</tr>
<tr>
<td>345.5</td>
<td>1</td>
<td>3.677</td>
</tr>
<tr>
<td>434.0</td>
<td>1</td>
<td>0.944</td>
</tr>
<tr>
<td>976.0</td>
<td>1</td>
<td>3.977</td>
</tr>
<tr>
<td>1373.</td>
<td>1</td>
<td>6.229</td>
</tr>
<tr>
<td>1321.</td>
<td>1</td>
<td>29.17</td>
</tr>
<tr>
<td>1536.</td>
<td>1</td>
<td>2.632</td>
</tr>
<tr>
<td>1966.</td>
<td>1</td>
<td>5.315</td>
</tr>
<tr>
<td>2269.</td>
<td>1</td>
<td>11.95</td>
</tr>
<tr>
<td>2415.</td>
<td>1</td>
<td>7.292</td>
</tr>
<tr>
<td>2555.</td>
<td>1</td>
<td>7.955</td>
</tr>
<tr>
<td>2869.</td>
<td>1</td>
<td>4.840</td>
</tr>
</tbody>
</table>

\( \langle E_{\text{Photon}} \rangle \text{ PER DECAY} = 2213. \)

### Particle Radiation Table

<table>
<thead>
<tr>
<th>TYPE</th>
<th>E(_{\text{MAX}})</th>
<th>MEAN ENERGY</th>
<th>INTENSITY/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \gamma )</td>
<td>3000.0</td>
<td>1279.</td>
<td>3.000</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>3400.0</td>
<td>1474.</td>
<td>10.00</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>3700.0</td>
<td>1626.</td>
<td>40.00</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>3900.0</td>
<td>1719.</td>
<td>6.500</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>4000.0</td>
<td>1768.</td>
<td>11.50</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>5000.0</td>
<td>2267.</td>
<td>28.00</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>6500.0</td>
<td>2906.</td>
<td>1.000</td>
</tr>
</tbody>
</table>

\( \langle E_{\beta^-} \rangle \text{ PER DECAY} = 1811. \)

\( \langle E_{\gamma} \rangle \text{ PER DECAY} = 2275. \)

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>TYPE</th>
<th>ENERGY</th>
<th>1/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \gamma )</td>
<td>1315.</td>
<td>66.29</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>3700.</td>
<td>40.00</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>1321.</td>
<td>29.17</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>1000.</td>
<td>28.00</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>2269.</td>
<td>11.95</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>4000.</td>
<td>11.50</td>
</tr>
</tbody>
</table>
\( ^{136}Xe \)

STABLE OR LONG-LIVED

CROSS SECTIONS (BARNES)
- Total \( 2200 \text{mb/s} \) \( 4.4605 \)
- Westcott G Factor \( 1.3351 \)
- Capture \( 2200 \text{mb/s} \) \( 1.6000 \times 10^{-1} \)
- Westcott G Factor \( 1.0000 \)
- Resonance Integral Total \( 1.2660 \times 10^{-2} \)
- Resonance Integral Capture \( 1.2360 \times 10^{-1} \)
- Resonance Integral \( (N,2N) \) \( 1.0660 \)
- Resonance Integral \( (K,\gamma) \) \( 9.9930 \times 10^{-5} \)
- Resonance Integral \( (N,x) \) \( 3.1450 \times 10^{-1} \)

FISSION YIELDS
- \( ^{231}U \) Thermal \( 1.2475 \times 10^{-2} \)
- \( ^{231}U \) Fast \( 1.1485 \times 10^{-2} \)
- \( ^{238}U \) Fast \( 1.0123 \times 10^{-3} \)
- \( ^{239}Pu \) Thermal \( 2.5592 \times 10^{-2} \)

136 - 54 - 1

\( \frac{1}{2} \) Cs

ENDFB/8-IV FILE 1 COMMENTS
55-CS-136 ARC,HEUL, EVAL-FCB/74,C.W.REICH, DECAY DATA
EVAL-DL74 R.E.SCHENTER AND F.SCHMITTROTH
DIST-NOV74

FILE INFORMATION
MF=1 MT=457 DECAY DATA
REFERENCES
C.W.REICH, R.G.HELNER AND M.H.PUTMAN, ANCR-1157,ENDF/8-IV,
Q=1975 MAPSTRA-GOICE MASSTABLE

\( \frac{1}{2} \) Cs

\( T_{1/2} = 13.0000 \times 0.020d \)
\( \langle E_0 \rangle \text{ PER DECAY} = 119.2 \)
\( \langle E_\gamma \rangle \text{ PER DECAY} = 215.7 \)

CROSS SECTIONS (BARNES)
- Total \( 2200 \text{mb/s} \) \( 5.1453 \)
- Westcott G Factor \( 1.0961 \)
- Capture \( 2200 \text{mb/s} \) \( 1.3018 \)
- Westcott G Factor \( 1.0008 \)
- Resonance Integral Total \( 2.4700 \times 10^{-2} \)
- Resonance Integral Capture \( 2.9920 \times 10^{-1} \)

FISSION YIELDS
- \( ^{235}U \) Thermal \( 5.5307 \times 10^{-5} \)
- \( ^{235}U \) Fast \( 1.5627 \times 10^{-4} \)
- \( ^{238}U \) Fast \( 8.2324 \times 10^{-6} \)
- \( ^{239}Pu \) Thermal \( 1.0539 \times 10^{-3} \)

\( Q = 508.3 \)
\( Q_\gamma = 1000 \)
\( Q_{\beta} = 2674, 5 \pm 2.0 \)

\( \frac{1}{2} \) Ba

STABLE OR LONG-LIVED

136 - 55 - 1
**PHOTON RADIATION TABLE**

<table>
<thead>
<tr>
<th>MEAN ENERGY</th>
<th>LINES</th>
<th>PHOTONS/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>66.90</td>
<td>1</td>
<td>15.70</td>
</tr>
<tr>
<td>86.43</td>
<td>1</td>
<td>5.800</td>
</tr>
<tr>
<td>166.6</td>
<td>1</td>
<td>20.99</td>
</tr>
<tr>
<td>273.8</td>
<td>1</td>
<td>12.50</td>
</tr>
<tr>
<td>319.9</td>
<td>1</td>
<td>6.000</td>
</tr>
<tr>
<td>340.6</td>
<td>1</td>
<td>4.50</td>
</tr>
<tr>
<td>507.2</td>
<td>1</td>
<td>1.000</td>
</tr>
<tr>
<td>818.5</td>
<td>1</td>
<td>100.0</td>
</tr>
<tr>
<td>1048.</td>
<td>1</td>
<td>80.50</td>
</tr>
<tr>
<td>1235.</td>
<td>1</td>
<td>19.70</td>
</tr>
</tbody>
</table>

<\text{Photon}> \text{ PER DECAY} = 2137.

**PARTICLE RADIATION TABLE**

<table>
<thead>
<tr>
<th>TYPE</th>
<th>E_{\text{MAX}}</th>
<th>MEAN ENERGY</th>
<th>INTENSITY/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>\gamma</td>
<td>568.0</td>
<td>109.5</td>
<td>91.00</td>
</tr>
<tr>
<td>\beta-</td>
<td>513.0</td>
<td>162.2</td>
<td>2.000</td>
</tr>
<tr>
<td>\beta-</td>
<td>708.0</td>
<td>234.1</td>
<td>7.000</td>
</tr>
</tbody>
</table>

<\text{E}_{\beta}> \text{ PER DECAY} = 119.2

<\text{E}_{\gamma}> \text{ PER DECAY} = 275.6

**PHOTON INTENSITY PLOT**

**CHARACTERISTIC RADIATION TABLE**

<table>
<thead>
<tr>
<th>TYPE</th>
<th>ENERGY</th>
<th>1/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>\gamma</td>
<td>818.5</td>
<td>100.0</td>
</tr>
<tr>
<td>\beta-</td>
<td>368.0</td>
<td>91.00</td>
</tr>
<tr>
<td>\gamma</td>
<td>1048</td>
<td>80.50</td>
</tr>
<tr>
<td>\gamma</td>
<td>340.6</td>
<td>44.50</td>
</tr>
<tr>
<td>Isotope</td>
<td>T&lt;sub&gt;1/2&lt;/sub&gt; (s)</td>
<td>Q&lt;sub&gt;1&lt;/sub&gt; (MeV)</td>
</tr>
<tr>
<td>---------</td>
<td>------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>136Ba</td>
<td>3080</td>
<td>1.7</td>
</tr>
<tr>
<td>138Ba</td>
<td>3080</td>
<td>1.7</td>
</tr>
<tr>
<td>136Ba</td>
<td>3080</td>
<td>1.7</td>
</tr>
</tbody>
</table>

Cross Sections (Barns):
- Total Cross Section: 5.1952 barns
- Capture Cross Section: 4.1044 x 10<sup>-2</sup> barns
- Resonance Integral Capture: 1.963 barns

Fission Yields:
- Thermal: 7.1239 x 10<sup>-3</sup>
- Fast: 1.5963 x 10<sup>-7</sup>
- Pu Thermal: 2.249 x 10<sup>-8</sup>
\[ \text{T}_{1/2} = 2.837 \text{ s} \]
\[ \langle E_p \rangle \text{ PER DECAY} = 2644 \text{ eV} \]
\[ \langle E_y \rangle \text{ PER DECAY} = 3405 \text{ keV} \]

Fission Yields:
- \[ ^{235}U \] Thermal: 2.0311 x 10^{-3}
- \[ ^{235}U \] Fast: 2.8252 x 10^{-3}
- \[ ^{238}U \] Fast: 9.4072 x 10^{-3}
- \[ ^{239}Pu \] Thermal: 3.469 x 10^{-4}

\[ G_{y} = 8400 \]
\[ B_{y} = 1.000 \]

\[ \text{T}_{1/2} = 3.5 \times 10^{-5} \text{ s} \]

137 - 51 - 1

\[ \text{T}_{1/2} = 3.5 \times 10^{-5} \text{ s} \]
\[ \langle E_p \rangle \text{ PER DECAY} = 781 \text{ eV} \]
\[ \langle E_y \rangle \text{ PER DECAY} = 2512 \text{ keV} \]

Fission Yields:
- \[ ^{235}U \] Thermal: 4.089 x 10^{-3}
- \[ ^{235}U \] Fast: 5.059 x 10^{-2}
- \[ ^{238}U \] Fast: 2.60 x 10^{-2}
- \[ ^{239}Pu \] Thermal: 1.613 x 10^{-3}

\[ G_{y} = 785.7 \]
\[ B_{y} = .005 \times 0.005 \]
\[ G_{y} = 6480 \]
\[ B_{y} = .9995 \]

21.0% ± 1.0%

24.6 x 10^{-2}
ENDFB/IV FILE 1 COMMENTS
55 - 1  137 HEU
EVAL-APR74 R.E. SCHENTER
DIST-NDIV
REFERENCES
DELAYED NEUTRON BRANCHING - L. TOMLINSON, ADANDT, 12, 179 (1973)

\[ \frac{1}{2} \]

\[ T_{1/2} = 24.60 \times 10^{-2} \]
\[ \langle E_n \rangle \text{ PER DECAY} = 1515.5 \]
\[ \langle E_{\gamma} \rangle \text{ PER DECAY} = 2029 \]

FISSION YIELDS
\[ 235 \text{U THERMAL} \quad 2.8518 \times 10^{-2} \]
\[ 235 \text{U FAST} \quad 2.7894 \times 10^{-2} \]
\[ 239 \text{Pu THERMAL} \quad 1.9531 \times 10^{-2} \]

\[ Q_{\gamma} = 1306 \]
\[ B_{\gamma} = 0.054 \pm 0.013 \]
\[ Q_{\beta} = 5770 \]
\[ B_{\beta} = 0.960 \]

\[ \frac{1}{2} \]

\[ T_{1/2} = 5.840 \times 10^{-2} \text{m} \]
\[ \beta^+ = 3.8 \times 10^{-3} \]

\[ 137 - 53 \]

ENDFB/IV FILE 1 COMMENTS
54 - XE-137 ANC
EVAL-FEB74 C. W. REICHH
DECAY DATA
DIST-NDIV
FOR FILE DESCRIPTION SEE C.W. REICH, RO HELLMER AND MH PUTMAN,
ANC-1177, ENDF210.8/74.
PREPARED FOR FILE 127/73
CNR
REFERENCE G - 1973 REVISION OF WAPSTRA-GOVA MASS TABLE
OTHER - M.J. MARTIN, RADIOACTIVE ATOMS-SUPPLEMENT 1.
ORNL-4923 (1973).

\[ \frac{1}{2} \]

\[ T_{1/2} = 3.840 \times 10^{-2} \]
\[ \langle E_n \rangle \text{ PER DECAY} = 1841 \]
\[ \langle E_{\gamma} \rangle \text{ PER DECAY} = 195.3 \]

FISSION YIELDS
\[ 235 \text{U THERMAL} \quad 2.8969 \times 10^{-2} \]
\[ 235 \text{U FAST} \quad 2.6598 \times 10^{-2} \]
\[ 239 \text{Pu FAST} \quad 5.0884 \times 10^{-2} \]
\[ 239 \text{Pu THERMAL} \quad 3.7946 \times 10^{-2} \]

\[ Q_{\gamma} = 4 \times 10^{4.742.42} \]
\[ B_{\gamma} = 1.000 \]

\[ \frac{1}{2} \]

\[ \beta^+ = 30.10 \times 10^{-3} \text{m} \]

\[ 137 - 54 - 1 \]
## PHOTON RADIATION TABLE

<table>
<thead>
<tr>
<th>MEAN ENERGY</th>
<th>LINES</th>
<th>PHOTONS/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>223.5</td>
<td>1.0</td>
<td>0.02</td>
</tr>
<tr>
<td>394.0</td>
<td>1.0</td>
<td>0.18</td>
</tr>
<tr>
<td>655.0</td>
<td>0.005</td>
<td>0.02</td>
</tr>
<tr>
<td>846.0</td>
<td>1.0</td>
<td>0.09</td>
</tr>
<tr>
<td>934.0</td>
<td>1.0</td>
<td>0.07</td>
</tr>
<tr>
<td>962.0</td>
<td>1.0</td>
<td>0.05</td>
</tr>
<tr>
<td>1068.0</td>
<td>1.0</td>
<td>0.05</td>
</tr>
<tr>
<td>1145</td>
<td>1.0</td>
<td>0.05</td>
</tr>
<tr>
<td>1275.0</td>
<td>1.0</td>
<td>0.03</td>
</tr>
<tr>
<td>1578.0</td>
<td>1.0</td>
<td>0.01</td>
</tr>
<tr>
<td>1675.0</td>
<td>1.0</td>
<td>0.01</td>
</tr>
<tr>
<td>1668.0</td>
<td>1.0</td>
<td>0.00</td>
</tr>
<tr>
<td>1784.0</td>
<td>1.0</td>
<td>0.00</td>
</tr>
<tr>
<td>1978.0</td>
<td>1.0</td>
<td>0.00</td>
</tr>
<tr>
<td>2394.0</td>
<td>1.0</td>
<td>0.00</td>
</tr>
<tr>
<td>2852.0</td>
<td>1.0</td>
<td>0.00</td>
</tr>
</tbody>
</table>

\[ \langle n_{\text{PHOTON}} \rangle \text{ PER DECAY} = 192. \times 30. \]

## PARTICLE RADIATION TABLE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>E\text{MAX}</th>
<th>MEAN ENERGY</th>
<th>INTENSITY/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>AU</td>
<td>34.3</td>
<td>33.6</td>
<td>0.4</td>
</tr>
<tr>
<td>CE</td>
<td>454.2</td>
<td>424.2</td>
<td>1.2</td>
</tr>
<tr>
<td>a-</td>
<td>1495.0</td>
<td>459.2</td>
<td>0.04</td>
</tr>
<tr>
<td>a-</td>
<td>2276.0</td>
<td>932.2</td>
<td>0.17</td>
</tr>
<tr>
<td>a-</td>
<td>2429.0</td>
<td>1004.2</td>
<td>0.05</td>
</tr>
<tr>
<td>a-</td>
<td>2583.0</td>
<td>1068.2</td>
<td>0.05</td>
</tr>
<tr>
<td>a-</td>
<td>2771.0</td>
<td>1168.2</td>
<td>0.03</td>
</tr>
<tr>
<td>a-</td>
<td>3365.0</td>
<td>1657.2</td>
<td>0.07</td>
</tr>
<tr>
<td>a-</td>
<td>3498.0</td>
<td>1522.2</td>
<td>0.09</td>
</tr>
<tr>
<td>a-</td>
<td>3892.0</td>
<td>1715.2</td>
<td>0.1</td>
</tr>
<tr>
<td>a-</td>
<td>4587.0</td>
<td>1938.2</td>
<td>0.06</td>
</tr>
</tbody>
</table>

\[ \langle E_\gamma \rangle \text{ PER DECAY} = 1845. \times 90. \]
\[ \langle E_\beta \rangle \text{ PER DECAY} = 2306. \times 100. \]

## CHARACTERISTIC RADIATION TABLE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>ENERGY</th>
<th>1/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>a-</td>
<td>4347.2</td>
<td>24</td>
</tr>
<tr>
<td>a-</td>
<td>495.38</td>
<td>0.10</td>
</tr>
<tr>
<td>a-</td>
<td>3892.2</td>
<td>24</td>
</tr>
</tbody>
</table>

\[ \langle E_\gamma \rangle \text{ PER DECAY} = 1845. \times 90. \]
\[ \langle E_\beta \rangle \text{ PER DECAY} = 2306. \times 100. \]
Cs

ENDF/B-IV FILE 1 COMMENTS
55-CS-137 HEIDIANC EVAL-OC74 F.SCHMITTROTH AND R.E.SCHENTER
CROSS SECTION DATA
EVAL-OC74 C.W.REICH DECAY DATA
DIST-NOV74

FILE INFORMATION
MF=1 MT=457 DECAY DATA
REFERENCES
C.W.REICH, RG HELMER AND MH PUTMAN, ANCR-1157, ENDF210, 8/74.
Q-1973 REVISION OF MAPSTRA-Gove MASS TABLES
OTHER- M.J.MARTIN, RADIOACTIVE ATOMS-SUPPLEMENT 1,

\[ T_{1/2} = 30.1040 \text{ y} \]
\[ \langle E_a \rangle \text{ PER DECAY} = 174.4 \]

CROSS SECTIONS (BARNS)
- TOTAL 2260 M/FS
- WESTCOTT C FACTOR 1.1455
- \(\alpha\) CAPTURE 2200 M/FS
- WESTCOTT G FACTOR 1.0000
- RESONANCE INTEGRAL TOTAL 1.1190 \times 10^{-2}
- RESONANCE INTEGRAL CAPTURE 4.8570 \times 10^{-3}

FISSION YIELDS
- \(^{235}\text{U}\) THERMAL 1.0842 \times 10^{-3}
- \(^{235}\text{U}\) FAST 2.2214 \times 10^{-5}
- \(^{239}\text{Pu}\) FAST 1.9886 \times 10^{-4}
- \(^{239}\text{Pu} THERMAL\) 7.8172 \times 10^{-3}

\[ Q_{\alpha} = 511.6 \pm 0.9 \text{ MeV} \]
\[ Q_{\alpha} = 511.7 \pm 0.9 \text{ MeV} \]

\[ B_{\alpha} = 0.944 \pm 0.003 \]
\[ B_{\alpha} = 0.944 \pm 0.003 \]

\[ Z = 2.550 \pm 0.0020 \text{ MeV} \]

\[ Z = \text{STABLE OR LONG-LIVED} \]

137 - 55 - 1
$^{137}$Ba

CNOF/85 FILE 1 COMMENTS
56-BA-137M ANC EVAL-FEB74 C.N.REICH
DECAY DATA DIST-NOV74
FOR FILE DESCRIPTION SEE C.N.REICH,RC HEMMER AND MH PUTMAN,
ANCR-1157,ENDF/B10.8/74.
PREPARED FOR FILE 12/73 CWR
REFERENCE
OTHER- M.J.MARTIN, RADIOACTIVE ATOMS-SUPPLEMENT 1,
ORNL-4923 (1973).

$^{137}$Ba

- $T_{1/2} = 2.5500\pm 0.0020$ m
- $Q_{f} = 661.645\pm 0.009$
- $BR_{t} = 1.000$
- $^{137}$Ba
- STABLE OR LONG-LIVED
**Photon Radiation Table**

<table>
<thead>
<tr>
<th>MEAN ENERGY</th>
<th>LINES</th>
<th>PHOTONS/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>29.1</td>
<td>0.9</td>
<td>8.3 ± 1.9</td>
</tr>
<tr>
<td>661.645</td>
<td>0.009</td>
<td>90.0 ± 0.4</td>
</tr>
</tbody>
</table>

\(<E_{\text{photon}}\> \text{ PER DECAY} = 598. \pm 3.\)

**Particle Radiation Table**

<table>
<thead>
<tr>
<th>TYPE</th>
<th>E&lt;sub&gt;x&lt;/sub&gt;</th>
<th>MEAN ENERGY</th>
<th>INTENSITY/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>AU</td>
<td>38.1</td>
<td>20.8 ± 2.4</td>
<td>17. ± 3.</td>
</tr>
<tr>
<td>CE</td>
<td>660.4</td>
<td>629.85 ± 0.06</td>
<td>10.08 ± 0.08</td>
</tr>
</tbody>
</table>

\(<E_{e}\> \text{ PER DECAY} = 67.00\)

**Characteristic Radiation Table**

<table>
<thead>
<tr>
<th>TYPE</th>
<th>ENERGY</th>
<th>1/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>661.645</td>
<td>0.009</td>
</tr>
<tr>
<td>CE&lt;sub&gt;K&lt;/sub&gt;</td>
<td>624.204</td>
<td>0.009</td>
</tr>
</tbody>
</table>
$^{137}$ Ba

$^{136}$ Ba

STABLE OR LONG-LIVED

CROSS SECTIONS (BARNES)

- $^a$ TOTAL 2200M/S 9.6467
- WESTCOTT G FACTOR 1.0704
- $^a$ CAPTURE 2200M/S 5.1029
- WESTCOTT G FACTOR 1.0186
- RESONANCE INTEGRAL TOTAL 1.2340x10^{-7}
- RESONANCE INTEGRAL CAPTURE 5.0110

FISSION YIELDS

- $^{235}U$ THERMAL 2.5114x10^{-6}
- $^{235}U$ FAST 1.8803x10^{-6}
- $^{239}Np$ FAST 8.2792x10^{-9}
- $^{239}Pu$ THERMAL 1.3538x10^{-9}

$^{137} - 56 - 1$

$^{137}$ La

ENDF/B-IV FILE 1 COMMENTS
57-LA-137 MISSING FROM ENDF/B IV
HALF LIFE ORNL ENDF/B FILES

- $^{137}$ La

T$_{1/2}$ = 60000.420000 yr

FISSION YIELDS

- $^{239}Pu$ THERMAL 0.5093x10^{-9}

$^{137} - 57 - 1$
\[ \text{Sb} \]

\text{ENDF/B-IV FILE 1 COMMENTS}

\text{Sb}

\begin{align*}
T_{1/2} & = 1304 s \\
\langle \varepsilon_\gamma \rangle \text{ PER DECAY} & = 3221 \text{ eV} \\
\langle \varepsilon_p \rangle \text{ PER DECAY} & = 4228 \text{ eV} \\
\text{FISSION YIELDS} \\
^{237}U \text{ THERMAL} & = 1.2707 \times 10^{-5} \\
^{237}U \text{ FAST} & = 1.7205 \times 10^{-5} \\
^{238}U \text{ FAST} & = 1.4256 \times 10^{-5} \\
^{239}Pu \text{ THERMAL} & = 1.7297 \times 10^{-5} \\
\end{align*}

\begin{align*}
G_\gamma & = 10670 \text{ eV} \\
B_{\gamma} & = 1.000 \text{ MeV} \\
\end{align*}

\[ \text{Te} \]

\begin{align*}
T_{1/2} & = 1640 s \\
\langle \varepsilon_\gamma \rangle \text{ PER DECAY} & = 1410 \text{ eV} \\
\langle \varepsilon_p \rangle \text{ PER DECAY} & = 2178 \text{ eV} \\
\text{FISSION YIELDS} \\
^{235}U \text{ THERMAL} & = 8.3256 \times 10^{-4} \\
^{237}U \text{ FAST} & = 1.0272 \times 10^{-1} \\
^{238}U \text{ FAST} & = 1.7131 \times 10^{-2} \\
^{239}Pu \text{ THERMAL} & = 2.5126 \times 10^{-6} \\
\end{align*}

\begin{align*}
G_\gamma & = 5340 \text{ eV} \\
B_{\gamma} & = 1.000 \text{ MeV} \\
\end{align*}

\[ \text{F} \]

\begin{align*}
T_{1/2} & = 6.50 \times 10^4 \text{ s} \\
\end{align*}

\[ \text{Te} \]

\text{ENDF/B-IV FILE 1 COMMENTS}

\text{Te}

\text{ENDF/B-IV FILE 1 COMMENTS}

\text{F}

\text{ENDF/B-IV FILE 1 COMMENTS}
<table>
<thead>
<tr>
<th>Isotope</th>
<th>Decay Data</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>134 I</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENDF/B-IV FILE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>53-1-138</td>
<td>HEDL</td>
<td></td>
</tr>
<tr>
<td></td>
<td>EVAL-APR74</td>
<td></td>
</tr>
<tr>
<td></td>
<td>R.E. SCHENTER</td>
<td></td>
</tr>
<tr>
<td>DIST-NOV74</td>
<td>REV-JUN75</td>
<td></td>
</tr>
<tr>
<td>REFERENCES</td>
<td>D. L. TOMLINSON, ADAMT, 12, 1799 (57/73)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$T_{1/2}$</td>
<td>6.50 x 10^6</td>
<td></td>
</tr>
<tr>
<td>$\langle E_\gamma \rangle_{\text{PER DECAY}}$</td>
<td>2722</td>
<td></td>
</tr>
<tr>
<td>$\langle E_\beta \rangle_{\text{PER DECAY}}$</td>
<td>2701</td>
<td></td>
</tr>
<tr>
<td>FISSION YIELDS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$^{235}$U THERMAL</td>
<td>1.5572 x 10^{-2}</td>
<td></td>
</tr>
<tr>
<td>$^{235}$U FAST</td>
<td>1.6767 x 10^{-2}</td>
<td></td>
</tr>
<tr>
<td>$^{239}$U FAST</td>
<td>3.1692 x 10^{-2}</td>
<td></td>
</tr>
<tr>
<td>$^{239}$Pu THERMAL</td>
<td>7.4891 x 10^{-2}</td>
<td></td>
</tr>
<tr>
<td>$Q_\beta$</td>
<td>1926</td>
<td>$Q_\beta$</td>
</tr>
<tr>
<td>$BR_\beta$</td>
<td>0.0294 x 0.005</td>
<td>$BR_\beta$</td>
</tr>
<tr>
<td>136 Xe</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$^{136}$Xe</td>
<td>2.64 x 10^4</td>
<td></td>
</tr>
<tr>
<td>136 Xe</td>
<td>14.2 x 10^3</td>
<td></td>
</tr>
<tr>
<td>136 Xe</td>
<td>136-1</td>
<td></td>
</tr>
<tr>
<td>ENDF/B-IV FILE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>54-XE-138</td>
<td>ANC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>EVAL-FEB74</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C. W. REICH</td>
<td></td>
</tr>
<tr>
<td>DIST-NOV74</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FOR FILE DESCRIPTION SEE C. W. REICH, R.G. HELMER, AND M.H. PUTMAN, ANL-1157, ENDF216, 8/73.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PREPARED FOR FILE 8/73</td>
<td>CWR</td>
<td></td>
</tr>
<tr>
<td>REFERENCES</td>
<td>D. L. TOMLINSON, AEC REPORT 15-T-549 (NOV., 1972)</td>
<td></td>
</tr>
<tr>
<td>OTHER</td>
<td>G. H. CARLSON, AEC REPORT 15-T-549 (NOV., 1972)</td>
<td></td>
</tr>
<tr>
<td>133 Xe</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$T_{1/2}$</td>
<td>8.24 x 10^3</td>
<td></td>
</tr>
<tr>
<td>$\langle E_\gamma \rangle_{\text{PER DECAY}}$</td>
<td>657.7</td>
<td></td>
</tr>
<tr>
<td>$\langle E_\beta \rangle_{\text{PER DECAY}}$</td>
<td>1195</td>
<td></td>
</tr>
<tr>
<td>FISSION YIELDS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$^{233}$U THERMAL</td>
<td>4.0095 x 10^{-2}</td>
<td></td>
</tr>
<tr>
<td>$^{233}$U FAST</td>
<td>4.2712 x 10^{-2}</td>
<td></td>
</tr>
<tr>
<td>$^{239}$U FAST</td>
<td>1.5138 x 10^{-2}</td>
<td></td>
</tr>
<tr>
<td>$^{239}$Pu THERMAL</td>
<td>4.0146 x 10^{-2}</td>
<td></td>
</tr>
<tr>
<td>$Q_\beta$</td>
<td>2850 x 0.80</td>
<td>$Q_\beta$</td>
</tr>
<tr>
<td>$BR_\beta$</td>
<td>21.000</td>
<td>$BR_\beta$</td>
</tr>
<tr>
<td>134 Cs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>134 Cs</td>
<td>32.20 x 10^6</td>
<td></td>
</tr>
<tr>
<td>138 - 54-1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**PHOTON RADIATION TABLE**

<table>
<thead>
<tr>
<th>MEAN ENERGY</th>
<th>LINES</th>
<th>PHOTONS/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>137.20</td>
<td>a 0.20</td>
<td>1 0.09 a 0.03</td>
</tr>
<tr>
<td>153.75</td>
<td>a 0.03</td>
<td>1 4.9 a 3</td>
</tr>
<tr>
<td>256.08</td>
<td>a 0.12</td>
<td>4 32.6 a 1.7</td>
</tr>
<tr>
<td>305.35</td>
<td>a 0.22</td>
<td>3 6.6 a 3</td>
</tr>
<tr>
<td>401.56</td>
<td>a 0.05</td>
<td>1 2.03 a 1.2</td>
</tr>
<tr>
<td>442.7</td>
<td>a 0.9</td>
<td>10 1.38 a 0.4</td>
</tr>
<tr>
<td>671.4</td>
<td>a 1.8</td>
<td>8 0.44 a 0.3</td>
</tr>
<tr>
<td>756.6</td>
<td>a 3.7</td>
<td>7 1.21 a 0.5</td>
</tr>
<tr>
<td>956.7</td>
<td>a 0.8</td>
<td>8 1.91 a 0.2</td>
</tr>
<tr>
<td>1076.36</td>
<td>a 0.22</td>
<td>1 0.09 a 0.17</td>
</tr>
<tr>
<td>1095.87</td>
<td>a 0.09</td>
<td>1 0.39 a 0.03</td>
</tr>
<tr>
<td>1098.77</td>
<td>a 0.11</td>
<td>1 0.25 a 0.08</td>
</tr>
<tr>
<td>1127.9</td>
<td>a 1.9</td>
<td>8 2.78 a 0.17</td>
</tr>
<tr>
<td>1204.5</td>
<td>a 0.4</td>
<td>1 0.09 a 0.14</td>
</tr>
<tr>
<td>1218.7</td>
<td>a 0.5</td>
<td>1 0.39 a 0.017</td>
</tr>
<tr>
<td>1228.3</td>
<td>a 0.4</td>
<td>1 0.06 a 0.019</td>
</tr>
<tr>
<td>1357.6</td>
<td>a 3.5</td>
<td>5 0.5 a 0.04</td>
</tr>
<tr>
<td>1473.2</td>
<td>a 0.3</td>
<td>1 0.07 a 0.013</td>
</tr>
<tr>
<td>1548.9</td>
<td>a 0.4</td>
<td>1 0.91 a 0.021</td>
</tr>
<tr>
<td>1571.84</td>
<td>a 0.16</td>
<td>1 0.29 a 0.03</td>
</tr>
<tr>
<td>1578.1</td>
<td>a 0.5</td>
<td>1 0.95 a 0.020</td>
</tr>
<tr>
<td>1614.37</td>
<td>a 0.18</td>
<td>1 0.26 a 0.03</td>
</tr>
<tr>
<td>1644.5</td>
<td>a 0.3</td>
<td>1 0.07 a 0.015</td>
</tr>
<tr>
<td>1768.26</td>
<td>a 0.15</td>
<td>1 18.3 ± 1.0</td>
</tr>
<tr>
<td>1785.4</td>
<td>a 0.6</td>
<td>1 0.04 a 0.016</td>
</tr>
<tr>
<td>1799.4</td>
<td>a 0.6</td>
<td>1 0.08 a 0.015</td>
</tr>
<tr>
<td>1812.5</td>
<td>a 0.18</td>
<td>1 0.19 a 0.02</td>
</tr>
<tr>
<td>1850.86</td>
<td>a 0.13</td>
<td>1 0.16 a 0.08</td>
</tr>
<tr>
<td>1868.3</td>
<td>a 0.3</td>
<td>1 0.04 a 0.014</td>
</tr>
<tr>
<td>1935.3</td>
<td>a 0.14</td>
<td>7 0.3 ± 0.04</td>
</tr>
<tr>
<td>2037.2</td>
<td>a 0.3</td>
<td>4 21.1 ± 0.8</td>
</tr>
<tr>
<td>2325.26</td>
<td>a 0.15</td>
<td>1 2.5 a 0.14</td>
</tr>
<tr>
<td>2356.6</td>
<td>a 0.5</td>
<td>1 0.04 a 0.013</td>
</tr>
<tr>
<td>2521.00</td>
<td>a 0.16</td>
<td>1 0.72 a 0.04</td>
</tr>
<tr>
<td>2526.9</td>
<td>a 0.3</td>
<td>1 0.05 a 0.012</td>
</tr>
<tr>
<td>2475.26</td>
<td>a 0.16</td>
<td>1 0.15 a 0.022</td>
</tr>
<tr>
<td>2492.61</td>
<td>a 0.24</td>
<td>1 0.99 a 0.008</td>
</tr>
<tr>
<td>2497.56</td>
<td>a 0.17</td>
<td>1 0.19 a 0.013</td>
</tr>
</tbody>
</table>

<ε<sub>photo</sub>> PER DECAY = 1195 a 24.

---

**PHOTON INTENSITY PLOT**

---

**CHARACTERISTIC RADIATION TABLE**

<table>
<thead>
<tr>
<th>TYPE</th>
<th>ENERGY</th>
<th>1/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>alpha</td>
<td>604 a 80</td>
<td>35.60</td>
</tr>
<tr>
<td>alpha</td>
<td>258.31 a 0.05</td>
<td>28.9 a 1.7</td>
</tr>
<tr>
<td>alpha</td>
<td>2815 a 80</td>
<td>20.00</td>
</tr>
<tr>
<td>gamma</td>
<td>454.49 a 0.05</td>
<td>19.1 ± 1.0</td>
</tr>
<tr>
<td>gamma</td>
<td>1768.26 a 0.13</td>
<td>18.3 ± 1.0</td>
</tr>
<tr>
<td>gamma</td>
<td>2580. a 80</td>
<td>18.30</td>
</tr>
<tr>
<td>gamma</td>
<td>2015.82 a 0.14</td>
<td>13.5 ± 0.7</td>
</tr>
<tr>
<td>gamma</td>
<td>2418. a 80</td>
<td>11.30</td>
</tr>
<tr>
<td>gamma</td>
<td>587. a 80</td>
<td>10.40</td>
</tr>
<tr>
<td>Type</td>
<td>E_max</td>
<td>Mean Energy</td>
</tr>
<tr>
<td>------</td>
<td>-------</td>
<td>-------------</td>
</tr>
<tr>
<td>β-</td>
<td>320.0</td>
<td>94.5</td>
</tr>
<tr>
<td>β-</td>
<td>340.0</td>
<td>120.1</td>
</tr>
<tr>
<td>β-</td>
<td>493.0</td>
<td>153.7</td>
</tr>
<tr>
<td>β-</td>
<td>567.0</td>
<td>180.8</td>
</tr>
<tr>
<td>β-</td>
<td>804.0</td>
<td>272.2</td>
</tr>
<tr>
<td>β-</td>
<td>808.0</td>
<td>276.9</td>
</tr>
<tr>
<td>β-</td>
<td>1807.0</td>
<td>485.5</td>
</tr>
<tr>
<td>β-</td>
<td>1638.0</td>
<td>552.5</td>
</tr>
<tr>
<td>β-</td>
<td>1625.0</td>
<td>564.9</td>
</tr>
<tr>
<td>β-</td>
<td>1878.0</td>
<td>745.4</td>
</tr>
<tr>
<td>β-</td>
<td>2274.0</td>
<td>931.6</td>
</tr>
<tr>
<td>β-</td>
<td>2280.0</td>
<td>936.8</td>
</tr>
<tr>
<td>β-</td>
<td>2416.0</td>
<td>999.0</td>
</tr>
<tr>
<td>β-</td>
<td>2819.0</td>
<td>1190.0</td>
</tr>
</tbody>
</table>

$\langle E_p \rangle$ per Decay = 657.7

$\langle E_p \rangle$ per Decay = 993.6
$^{134m}$Cs

ENDOF/B-IV FILE 1 COMMENTS
55-CS-138m ANC
EVAL-FEB74 C.W.REICH
DIST-NOV74
FOR FILE DESCRIPTION SEE CW REICH, RG HELMER AND MH PUTMAN,
ANCR-1157,ENDF/B-IV.74.
REFERENCE
G.H. CARLSON, IS-T-549 (1972)

$^{134m}$Cs

- $T_{1/2} = 2.90 \times 10^5$ s
- $\langle E_p \rangle$ PER DECAY = 1147.
- $\langle E_x \rangle$ PER DECAY = 2100.

- FISSION YIELDS
  - $^{235}$U THERMAL $2.5224 \times 10^{-5}$
  - $^{235}$U FAST $2.1472 \times 10^{-3}$
  - $^{239}$U THERMAL $1.0567 \times 10^{-3}$
  - $^{239}$Pu THERMAL $4.1018 \times 10^{-5}$

- $Q = 5360.470$
- $BR_e = 1.000$

$^{134}$Ba

- STABLE OR LONG-LIVED

$^{138m}$- 55 - 1
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Mean Energy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>79.90</td>
<td>1</td>
<td>2.000</td>
</tr>
<tr>
<td>107.5</td>
<td>1</td>
<td>1.000</td>
</tr>
<tr>
<td>112.5</td>
<td>1</td>
<td>8.000</td>
</tr>
<tr>
<td>191.7</td>
<td>1</td>
<td>80.00</td>
</tr>
<tr>
<td>212.0</td>
<td>1</td>
<td>2.800</td>
</tr>
<tr>
<td>324.5</td>
<td>1</td>
<td>6.200</td>
</tr>
<tr>
<td>516.2</td>
<td>1</td>
<td>3.200</td>
</tr>
<tr>
<td>1436.2</td>
<td>1</td>
<td>100.0</td>
</tr>
</tbody>
</table>

\[\langle E_{\text{photon}} \rangle \text{ per decay} = 2100.\]

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\beta^+)</td>
<td>2606.0</td>
<td>1089.0</td>
</tr>
<tr>
<td>(\beta^-)</td>
<td>2739.0</td>
<td>1153.0</td>
</tr>
</tbody>
</table>

\[\langle E_\beta \rangle \text{ per decay} = 1147.\]
\[\langle E_\beta \rangle \text{ per decay} = 1579.\]

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy</th>
<th>1/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\gamma)</td>
<td>1436.2</td>
<td>100.0</td>
</tr>
<tr>
<td>(\gamma)</td>
<td>463.0</td>
<td>98.50</td>
</tr>
<tr>
<td>(\beta^-)</td>
<td>2739.0</td>
<td>90.48</td>
</tr>
<tr>
<td>(\gamma)</td>
<td>191.7</td>
<td>86.80</td>
</tr>
</tbody>
</table>
# $^{137}$ Cs

ENDF/B-IV FILE 1 COMMENTS
55-CS-158 ANC
EVAL-FEB74 C.W.REICH
DIST-NOV74
FOR FILE DESCRIPTION SEE C.W.REICH, RG HELMER AND MH PUTMAN,
ANCR-1157, ENDF/B-IV, 8/74.
PREPARED FOR FILE 6/75 CHR
REFERENCES
G - G.H. CARLSON, AEC REPORT IS-7-549 (NOV., 1972)
OTHER - G.H. CARLSON, AEC REPORT IS-7-549 (NOV., 1972)

<table>
<thead>
<tr>
<th>Decay Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\text{T}_{1/2} = 32.20 \pm 0.10 \text{m}$</td>
</tr>
<tr>
<td>$&lt;E_p&gt;$ PER DECAY = 1292.</td>
</tr>
<tr>
<td>$&lt;E_p&gt;$ PER DECAY = 2329.</td>
</tr>
<tr>
<td>Fission Yields</td>
</tr>
<tr>
<td>$^{235}\text{U}$ THERMAL</td>
</tr>
<tr>
<td>$^{235}\text{U}$ FAST</td>
</tr>
<tr>
<td>$^{239}\text{Pu}$ FAST</td>
</tr>
<tr>
<td>$^{239}\text{Pu}$ THERMAL</td>
</tr>
</tbody>
</table>

| $Q_p = 5280 \pm 70$ |
| $BR_{\gamma} = 1.000$ |

---

<table>
<thead>
<tr>
<th>Stable or Long-Lived</th>
</tr>
</thead>
</table>

---

138 - 55 - 1
# Photon Radiation Table

<table>
<thead>
<tr>
<th>MEAN ENERGY</th>
<th>LINES</th>
<th>PHOTONS/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>3339.01</td>
<td>0.25</td>
<td>1.181 ± 0.011</td>
</tr>
<tr>
<td>3352.6</td>
<td>0.3</td>
<td>0.42 ± 0.003</td>
</tr>
<tr>
<td>3360.98</td>
<td>0.25</td>
<td>0.273 ± 0.016</td>
</tr>
<tr>
<td>3437.5</td>
<td>0.6</td>
<td>0.13 ± 0.004</td>
</tr>
<tr>
<td>3442.6</td>
<td>0.5</td>
<td>0.16 ± 0.004</td>
</tr>
<tr>
<td>3643.3</td>
<td>0.6</td>
<td>0.02 ± 0.004</td>
</tr>
<tr>
<td>3692.5</td>
<td>0.8</td>
<td>0.0067 ± 0.0023</td>
</tr>
<tr>
<td>3935.2</td>
<td>0.5</td>
<td>0.022 ± 0.004</td>
</tr>
<tr>
<td>4680.1</td>
<td>0.5</td>
<td>0.0225 ± 0.0023</td>
</tr>
</tbody>
</table>

$<\text{photons}>\,\text{PER DECAY} \approx 2329.3 \times 70.$

# Particle Radiation Table

<table>
<thead>
<tr>
<th>TYPE</th>
<th>$E_{\text{MAX}}$</th>
<th>MEAN ENERGY</th>
<th>INTENSITY/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\gamma$</td>
<td>1941.0</td>
<td>774.</td>
<td>40.</td>
</tr>
<tr>
<td>$\beta$</td>
<td>2023.0</td>
<td>812.</td>
<td>40.</td>
</tr>
<tr>
<td>$\beta$</td>
<td>2033.0</td>
<td>819.</td>
<td>40.</td>
</tr>
<tr>
<td>$\beta$</td>
<td>2117.0</td>
<td>856.</td>
<td>40.</td>
</tr>
<tr>
<td>$\beta$</td>
<td>2231.0</td>
<td>919.</td>
<td>40.</td>
</tr>
<tr>
<td>$\beta$</td>
<td>2289.0</td>
<td>938.</td>
<td>40.</td>
</tr>
<tr>
<td>$\beta$</td>
<td>2344.0</td>
<td>966.</td>
<td>40.</td>
</tr>
<tr>
<td>$\beta$</td>
<td>2429.0</td>
<td>1004.</td>
<td>40.</td>
</tr>
<tr>
<td>$\beta$</td>
<td>2501.0</td>
<td>1039.</td>
<td>40.</td>
</tr>
<tr>
<td>$\beta$</td>
<td>2641.0</td>
<td>1108.</td>
<td>40.</td>
</tr>
<tr>
<td>$\beta$</td>
<td>2697.0</td>
<td>1135.</td>
<td>40.</td>
</tr>
<tr>
<td>$\beta$</td>
<td>2835.0</td>
<td>1190.</td>
<td>50.</td>
</tr>
<tr>
<td>$\beta$</td>
<td>2865.0</td>
<td>1214.</td>
<td>50.</td>
</tr>
<tr>
<td>$\beta$</td>
<td>2975.0</td>
<td>1266.</td>
<td>50.</td>
</tr>
<tr>
<td>$\beta$</td>
<td>3063.0</td>
<td>1310.</td>
<td>50.</td>
</tr>
<tr>
<td>$\beta$</td>
<td>3382.0</td>
<td>1465.</td>
<td>50.</td>
</tr>
<tr>
<td>$\beta$</td>
<td>3843.0</td>
<td>1692.</td>
<td>60.</td>
</tr>
</tbody>
</table>

$<E_{\text{p}}>\,\text{PER DECAY} \approx 1362.3$

$<E_{\text{p}}>\,\text{PER DECAY} \approx 1701.$
<table>
<thead>
<tr>
<th>Element</th>
<th>Decay</th>
<th>Cross Sections (Barns)</th>
<th>Fission Yields</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ba</strong></td>
<td>Stable or Long-Lived</td>
<td>4.7492</td>
<td>235U THERMAL 7.735x10^-5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.1245</td>
<td>235U FAST 5.835x10^-5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.5086x10^-1</td>
<td>235U FAST 4.459x10^-7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.0252</td>
<td>239Pu THERMAL 2.422x10^-4</td>
</tr>
</tbody>
</table>

138 - 56 - 1

<table>
<thead>
<tr>
<th>Element</th>
<th>Decay</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>La</td>
<td>Stable or Long-Lived</td>
<td>ENDF/B-IV FILE 1 COMMENTS 57-LA-138 HEDL EVAL-APR74 R.E. SCHENTER D1ST-NOWFA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>T_{1/2} = 1.049x10^{11}y</td>
</tr>
<tr>
<td></td>
<td></td>
<td>\langle \varepsilon_y \rangle PER DECAY = 840.0</td>
</tr>
</tbody>
</table>

138 - 57 - 1

<table>
<thead>
<tr>
<th>Element</th>
<th>Decay</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ce</td>
<td>Stable or Long-Lived</td>
<td>Q_{y} = 1010.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BN_{y} = 3008</td>
</tr>
</tbody>
</table>

138 - 58 - 1

<table>
<thead>
<tr>
<th>Element</th>
<th>Decay</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ce</td>
<td>Stable or Long-Lived</td>
<td>Q_{y} = 1780.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BN_{y} = 7800</td>
</tr>
</tbody>
</table>
$^{121}$ Sb

ENDF/B-IV FILE 1 COMMENTS
51-58-139 HECL
EVAL-APR74 R.E.SCHENTER
DIST-NOV74
REFERENCES
HALF LIFE - R SCHENTER, THEORY(9/73)

$^{121}$ Sb

$T_{1/2} = 1.719h$

$<E_p>$ PER DECAY = 2284

$<E_y>$ PER DECAY = 3843

FISSION YIELDS

$^{235}$U THERMAL 5.8932$x$10$^{-4}$

$^{235}$U FAST 5.7849$x$10$^{-4}$

$^{238}$U FAST 1.1189$x$10$^{-5}$

$^{239}$Pu THERMAL 7.8289$x$10$^{-6}$

$^{122}$ Te

ENDF/B-IV FILE 1 COMMENTS
52-TE-139 HECL
EVAL-APR74 R.E.SCHENTER
DIST-NOV74
REFERENCES
HALF LIFE - R SCHENTER, THEORY(9/73)

$^{122}$ Te

$T_{1/2} = 4.237s$

$<E_p>$ PER DECAY = 214.5

$<E_y>$ PER DECAY = 3105

FISSION YIELDS

$^{235}$U THERMAL 1.3223$x$10$^{-4}$

$^{235}$U FAST 1.1643$x$10$^{-4}$

$^{238}$U FAST 2.9431$x$10$^{-5}$

$^{239}$Pu THERMAL 3.215$x$10$^{-5}$

$^{123}$ I

$T_{1/2} = 7610$

$BR_p = 1.000$

$2.40$x$10^{-5}$

$^{129}$ 51 - 1

$^{129}$ 52 - 1
### 139 - 53 - 1

**ENDFB-IV FILE 1 COMMENTS**

**REFERENCES**

- DELAYED NEUTRON BRANCHING: L. TOMLINSON, AGARD-12, 179(9/75)

- **$T_{1/2}$** = 2.446 s, 10 s
- $\langle E_\gamma \rangle$ PER DECAY = 1751
- $\langle E_v \rangle$ PER DECAY = 24/3

- FISSION YIELDS:
  - $^{235}U$ THERMAL = 7.422 x 10^-3
  - $^{235}U$ FAST = 5.835 x 10^-3
  - $^{239}U$ THERMAL = 3.20 x 10^-3

- $Q_{\gamma}$ = 2456
- $BR_{\gamma}$ = 1.18 x 0.03
- $BR_{\gamma}$ = 0.990

#### $^{139}Xe$

- $T_{1/2}$ = 6.56 x 10 s
- $\langle E_\gamma \rangle$ PER DECAY = 1787
- $\langle E_v \rangle$ PER DECAY = 927

- FISSION YIELDS:
  - $^{235}U$ THERMAL = 4.066 x 10^-2
  - $^{235}U$ FAST = 4.932 x 10^-2
  - $^{239}U$ THERMAL = 3.058 x 10^-2
  - $^{239}U$ THERMAL = 2.952 x 10^-2

- $Q_{\gamma}$ = 4880
- $BR_{\gamma}$ = 1.000

#### $^{139}Cs$

- $T_{1/2}$ = 9.3 x 10 m

---

**ENDFB-IV FILE 1 COMMENTS**

**REFERENCES**

- HALF-LIFE: G. ROSTAM ET AL., REVIEW PAPER 12, IAEA
- PANEL ON FISSION-PRODUCT DATA (BOLOGNA, 1973), APP. B.
  - M. A. LEE, THESIS, IOWA STATE UNIVERSITY (1973)
  - OTHER: M. A. LEE, THESIS, IOWA STATE UNIVERSITY (1973)
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Mean Energy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>55.7</td>
<td>± 0.3</td>
<td>7</td>
</tr>
<tr>
<td>70.0</td>
<td>± 0.4</td>
<td>1</td>
</tr>
<tr>
<td>172.69</td>
<td>± 0.19</td>
<td>4</td>
</tr>
<tr>
<td>245.0</td>
<td>± 1.2</td>
<td>4</td>
</tr>
<tr>
<td>368.5</td>
<td>± 0.4</td>
<td>7</td>
</tr>
<tr>
<td>478.5</td>
<td>± 1.0</td>
<td>6</td>
</tr>
<tr>
<td>531.5</td>
<td>± 1.1</td>
<td>8</td>
</tr>
<tr>
<td>620.4</td>
<td>± 0.4</td>
<td>9</td>
</tr>
<tr>
<td>755.2</td>
<td>± 1.3</td>
<td>13</td>
</tr>
<tr>
<td>839.1</td>
<td>± 1.9</td>
<td>9</td>
</tr>
<tr>
<td>967.9</td>
<td>± 2.3</td>
<td>12</td>
</tr>
<tr>
<td>1037.0</td>
<td>± 2.2</td>
<td>8</td>
</tr>
<tr>
<td>1152.0</td>
<td>± 1.3</td>
<td>9</td>
</tr>
<tr>
<td>1254.4</td>
<td>± 1.7</td>
<td>11</td>
</tr>
<tr>
<td>1553.8</td>
<td>± 1.2</td>
<td>8</td>
</tr>
<tr>
<td>1446.8</td>
<td>± 1.9</td>
<td>9</td>
</tr>
<tr>
<td>1335.7</td>
<td>± 1.2</td>
<td>9</td>
</tr>
<tr>
<td>1667.9</td>
<td>± 1.3</td>
<td>3</td>
</tr>
<tr>
<td>1768.1</td>
<td>± 1.8</td>
<td>8</td>
</tr>
<tr>
<td>1861.0</td>
<td>± 1.5</td>
<td>10</td>
</tr>
<tr>
<td>1963.0</td>
<td>± 1.6</td>
<td>9</td>
</tr>
<tr>
<td>2062.9</td>
<td>± 1.3</td>
<td>8</td>
</tr>
<tr>
<td>2159.4</td>
<td>± 1.5</td>
<td>8</td>
</tr>
<tr>
<td>2256.6</td>
<td>± 3.0</td>
<td>6</td>
</tr>
<tr>
<td>2304.97</td>
<td>± 0.16</td>
<td>1</td>
</tr>
<tr>
<td>2328.80</td>
<td>± 0.29</td>
<td>1</td>
</tr>
<tr>
<td>2356.97</td>
<td>± 0.22</td>
<td>1</td>
</tr>
<tr>
<td>2423.6</td>
<td>± 2.0</td>
<td>6</td>
</tr>
<tr>
<td>2545.6</td>
<td>± 4.5</td>
<td>5</td>
</tr>
<tr>
<td>2660.0</td>
<td>± 1.2</td>
<td>5</td>
</tr>
<tr>
<td>2485.0</td>
<td>± 2.0</td>
<td>5</td>
</tr>
<tr>
<td>2931.7</td>
<td>± 2.3</td>
<td>4</td>
</tr>
<tr>
<td>3028.5</td>
<td>± 0.4</td>
<td>1</td>
</tr>
<tr>
<td>3143.5</td>
<td>± 3.5</td>
<td>5</td>
</tr>
<tr>
<td>3214.8</td>
<td>± 0.5</td>
<td>1</td>
</tr>
<tr>
<td>3375.51</td>
<td>± 0.19</td>
<td>1</td>
</tr>
<tr>
<td>3424.8</td>
<td>± 0.5</td>
<td>1</td>
</tr>
<tr>
<td>3504.7</td>
<td>± 0.3</td>
<td>1</td>
</tr>
</tbody>
</table>

**Photons/Per Decay = 928. ± 11.**

### Photon Intensity Plot

![Photon Intensity Plot](image)

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy</th>
<th>1/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>γ</td>
<td>218.59</td>
<td>± 0.03</td>
</tr>
<tr>
<td>γ-</td>
<td>4880.4</td>
<td>± 60</td>
</tr>
<tr>
<td>γ-</td>
<td>2986.53</td>
<td>± 0.07</td>
</tr>
<tr>
<td>γ-</td>
<td>4365</td>
<td>± 20.8</td>
</tr>
<tr>
<td>γ-</td>
<td>174.97</td>
<td>± 0.04</td>
</tr>
<tr>
<td>γ-</td>
<td>4486.5</td>
<td>± 60</td>
</tr>
<tr>
<td>γ-</td>
<td>289.78</td>
<td>± 0.07</td>
</tr>
<tr>
<td>γ-</td>
<td>387.4</td>
<td>± 8.4</td>
</tr>
<tr>
<td>γ-</td>
<td>393.5</td>
<td>± 0.06</td>
</tr>
<tr>
<td>γ-</td>
<td>612.82</td>
<td>± 0.04</td>
</tr>
<tr>
<td>γ-</td>
<td>788.04</td>
<td>± 0.08</td>
</tr>
<tr>
<td>γ-</td>
<td>225.38</td>
<td>± 0.07</td>
</tr>
<tr>
<td>γ-</td>
<td>4590.4</td>
<td>± 60</td>
</tr>
<tr>
<td>γ-</td>
<td>4656.1</td>
<td>± 60</td>
</tr>
<tr>
<td>γ-</td>
<td>4164.0</td>
<td>± 60</td>
</tr>
<tr>
<td>γ-</td>
<td>2694.4</td>
<td>± 20.0</td>
</tr>
<tr>
<td>γ-</td>
<td>723.84</td>
<td>± 0.06</td>
</tr>
<tr>
<td>TYPE</td>
<td>E_{max}</td>
<td>MEAN ENERGY</td>
</tr>
<tr>
<td>------</td>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>a-</td>
<td>593.0</td>
<td>185.</td>
</tr>
<tr>
<td>a-</td>
<td>963.0</td>
<td>213.</td>
</tr>
<tr>
<td>a-</td>
<td>972.0</td>
<td>241.</td>
</tr>
<tr>
<td>a-</td>
<td>1065.0</td>
<td>280.</td>
</tr>
<tr>
<td>a-</td>
<td>1375.0</td>
<td>355.</td>
</tr>
<tr>
<td>a-</td>
<td>1505.0</td>
<td>473.</td>
</tr>
<tr>
<td>a-</td>
<td>1507.0</td>
<td>574.</td>
</tr>
<tr>
<td>a-</td>
<td>1724.0</td>
<td>673.</td>
</tr>
<tr>
<td>a-</td>
<td>1733.0</td>
<td>677.</td>
</tr>
<tr>
<td>a-</td>
<td>1750.0</td>
<td>685.</td>
</tr>
<tr>
<td>a-</td>
<td>1790.0</td>
<td>755.</td>
</tr>
<tr>
<td>a-</td>
<td>1912.0</td>
<td>760.</td>
</tr>
<tr>
<td>a-</td>
<td>1944.0</td>
<td>775.</td>
</tr>
<tr>
<td>a-</td>
<td>2028.0</td>
<td>815.</td>
</tr>
</tbody>
</table>

\[<E_{\gamma}>\ PER\ DECAY = 1787. \quad = 160.\]

\[<E_{\gamma}>\ PER\ DECAY = 2246. \quad = 190.\]
\[ \frac{1}{\beta} \text{ Cs} \]

ENDF/B-IV FILE 1 COMMENTS
55-CS-139 ANE EVAL-FEB74 T.W.REICH
DIST-NOV74
FOR FILE DESCRIPTION SEE CW REICH, RG HELMER AND MH PUTMAN,
ANCR-1157,ENDF/B-IV.
PREPARED FOR FILE 12/73
CWR
REFERENCE
OTHER- M.A. LEE, THESIS, IOWA STATE UNIVERSITY (1975)

\[ \begin{align*}
T_{1/2} &= 29.30 \pm 0.10 \text{ m} \\
\langle \varepsilon_p \rangle \text{ PER DECAY} &= 2766 \\
\langle \varepsilon_x \rangle \text{ PER DECAY} &= 310.8 \\
\text{FISSION YIELDS} \\
\text{235U THERMAL} &= 1.550 \times 10^{-2} \\
\text{235U FAST} &= 1.648 \times 10^{-3} \\
\text{239U FAST} &= 3.654 \times 10^{-3} \\
\text{239Pu THERMAL} &= 1.950 \times 10^{-2} \\
\end{align*} \]

\[ Q_{\beta} = 4289.0 \pm 70. \]
\[ B_{\beta} = 1.000 \]

\[ \frac{1}{\beta} \text{ Ba} \]

\[ \begin{align*}
88.30 &\pm 0.20 \\
\end{align*} \]

139 - 55 - 1
PHOTON RADIATION TABLE

<table>
<thead>
<tr>
<th>MEAN ENERGY</th>
<th>LINES</th>
<th>PHOTONS/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>188.88</td>
<td>0.20</td>
<td>0.0079 ± 0.0018</td>
</tr>
<tr>
<td>196.51</td>
<td>0.15</td>
<td>0.0088 ± 0.0018</td>
</tr>
<tr>
<td>242.5</td>
<td>1.3</td>
<td>0.088 ± 0.005</td>
</tr>
<tr>
<td>366.2</td>
<td>2.1</td>
<td>0.032 ± 0.006</td>
</tr>
<tr>
<td>445.2</td>
<td>0.8</td>
<td>0.257 ± 0.011</td>
</tr>
<tr>
<td>548.2</td>
<td>0.8</td>
<td>0.581 ± 0.021</td>
</tr>
<tr>
<td>609.8</td>
<td>0.19</td>
<td>1.91 ± 0.08</td>
</tr>
<tr>
<td>751.6</td>
<td>1.0</td>
<td>3.60 ± 0.012</td>
</tr>
<tr>
<td>851.3</td>
<td>1.3</td>
<td>2.46 ± 0.011</td>
</tr>
<tr>
<td>936.5</td>
<td>0.6</td>
<td>4.73 ± 0.017</td>
</tr>
<tr>
<td>1072.7</td>
<td>1.2</td>
<td>1.31 ± 0.011</td>
</tr>
<tr>
<td>1165.5</td>
<td>1.3</td>
<td>1.20 ± 0.016</td>
</tr>
<tr>
<td>1282.8</td>
<td>0.06</td>
<td>0.74 ± 0.04</td>
</tr>
<tr>
<td>1317.5</td>
<td>0.6</td>
<td>0.81 ± 0.03</td>
</tr>
<tr>
<td>1421.5</td>
<td>0.4</td>
<td>0.19 ± 0.04</td>
</tr>
<tr>
<td>1514.2</td>
<td>1.6</td>
<td>2.12 ± 0.012</td>
</tr>
<tr>
<td>1662.9</td>
<td>0.9</td>
<td>3.14 ± 0.04</td>
</tr>
<tr>
<td>1729.9</td>
<td>1.1</td>
<td>2.38 ± 0.011</td>
</tr>
<tr>
<td>1878.0</td>
<td>0.6</td>
<td>0.60 ± 0.003</td>
</tr>
<tr>
<td>1930.7</td>
<td>0.7</td>
<td>4.33 ± 0.016</td>
</tr>
<tr>
<td>2049.</td>
<td>4.1</td>
<td>0.40 ± 0.06</td>
</tr>
<tr>
<td>2126.3</td>
<td>0.8</td>
<td>0.97 ± 0.04</td>
</tr>
<tr>
<td>2234.2</td>
<td>2.1</td>
<td>0.061 ± 0.006</td>
</tr>
<tr>
<td>2356.3</td>
<td>0.5</td>
<td>0.92 ± 0.03</td>
</tr>
<tr>
<td>2418.9</td>
<td>0.4</td>
<td>0.92 ± 0.03</td>
</tr>
<tr>
<td>2422.16</td>
<td>0.18</td>
<td>0.039 ± 0.004</td>
</tr>
<tr>
<td>2524.47</td>
<td>0.22</td>
<td>0.008 ± 0.004</td>
</tr>
<tr>
<td>2530.9</td>
<td>0.5</td>
<td>0.83 ± 0.020</td>
</tr>
<tr>
<td>2331.8</td>
<td>0.07</td>
<td>0.13 ± 0.03</td>
</tr>
<tr>
<td>2605.75</td>
<td>0.8</td>
<td>0.247 ± 0.014</td>
</tr>
<tr>
<td>2669.52</td>
<td>0.07</td>
<td>0.169 ± 0.009</td>
</tr>
<tr>
<td>2673.95</td>
<td>0.18</td>
<td>0.356 ± 0.004</td>
</tr>
<tr>
<td>2723.24</td>
<td>0.13</td>
<td>0.090 ± 0.003</td>
</tr>
<tr>
<td>2836.68</td>
<td>0.16</td>
<td>0.028 ± 0.003</td>
</tr>
<tr>
<td>2847.63</td>
<td>0.08</td>
<td>0.101 ± 0.006</td>
</tr>
<tr>
<td>2978.99</td>
<td>0.24</td>
<td>0.051 ± 0.008</td>
</tr>
<tr>
<td>2997.22</td>
<td>0.09</td>
<td>0.087 ± 0.005</td>
</tr>
<tr>
<td>3067.29</td>
<td>0.16</td>
<td>0.050 ± 0.005</td>
</tr>
<tr>
<td>5096.4</td>
<td>0.4</td>
<td>0.0065 ± 0.0019</td>
</tr>
<tr>
<td>5171.55</td>
<td>0.23</td>
<td>0.0181 ± 0.0025</td>
</tr>
<tr>
<td>5279.0</td>
<td>0.3</td>
<td>0.0103 ± 0.0018</td>
</tr>
<tr>
<td>5306.4</td>
<td>0.15</td>
<td>0.051 ± 0.005</td>
</tr>
<tr>
<td>5364.23</td>
<td>0.11</td>
<td>0.040 ± 0.004</td>
</tr>
<tr>
<td>5487.77</td>
<td>0.15</td>
<td>0.110 ± 0.007</td>
</tr>
<tr>
<td>5464.52</td>
<td>0.09</td>
<td>0.110 ± 0.007</td>
</tr>
<tr>
<td>5695.70</td>
<td>0.12</td>
<td>0.220 ± 0.0025</td>
</tr>
<tr>
<td>5665.61</td>
<td>0.08</td>
<td>0.138 ± 0.008</td>
</tr>
<tr>
<td>5764.27</td>
<td>0.15</td>
<td>0.0264 ± 0.0025</td>
</tr>
<tr>
<td>5768.16</td>
<td>0.11</td>
<td>0.046 ± 0.005</td>
</tr>
<tr>
<td>5848.58</td>
<td>1.2</td>
<td>0.057 ± 0.003</td>
</tr>
<tr>
<td>5912.52</td>
<td>0.21</td>
<td>0.0122 ± 0.0016</td>
</tr>
</tbody>
</table>

PHOTON INTENSITY PLOT

CHARACTERISTIC RADIATION TABLE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>ENERGY</th>
<th>1/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>γ</td>
<td>4290</td>
<td>70.0 ± 0.16</td>
</tr>
<tr>
<td></td>
<td>1285.23</td>
<td>0.005 ± 0.001</td>
</tr>
</tbody>
</table>

PARTICLE RADIATION TABLE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>EMAX</th>
<th>MEAN ENERGY</th>
<th>INTENSITY/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>γ</td>
<td>339.0</td>
<td>100.0 ± 21.0</td>
<td>0.000 ± 0.010</td>
</tr>
<tr>
<td></td>
<td>378.0</td>
<td>115.5 ± 21.0</td>
<td>0.030 ± 0.010</td>
</tr>
<tr>
<td></td>
<td>402.0</td>
<td>123.6 ± 21.0</td>
<td>0.030 ± 0.010</td>
</tr>
<tr>
<td></td>
<td>430.0</td>
<td>133.4 ± 22.0</td>
<td>0.030 ± 0.010</td>
</tr>
<tr>
<td></td>
<td>470.0</td>
<td>145.0 ± 22.0</td>
<td>0.050 ± 0.010</td>
</tr>
<tr>
<td></td>
<td>521.0</td>
<td>163.0 ± 22.0</td>
<td>0.070 ± 0.010</td>
</tr>
<tr>
<td></td>
<td>555.0</td>
<td>176.0 ± 23.0</td>
<td>0.020 ± 0.010</td>
</tr>
<tr>
<td></td>
<td>586.0</td>
<td>186.0 ± 23.0</td>
<td>0.040 ± 0.010</td>
</tr>
<tr>
<td></td>
<td>615.0</td>
<td>198.0 ± 23.0</td>
<td>0.050 ± 0.010</td>
</tr>
<tr>
<td></td>
<td>634.0</td>
<td>205.0 ± 23.0</td>
<td>0.150 ± 0.010</td>
</tr>
<tr>
<td></td>
<td>644.0</td>
<td>209.0 ± 24.0</td>
<td>0.040 ± 0.010</td>
</tr>
<tr>
<td></td>
<td>668.0</td>
<td>219.0 ± 24.0</td>
<td>0.070 ± 0.010</td>
</tr>
<tr>
<td></td>
<td>696.0</td>
<td>235.0 ± 25.0</td>
<td>0.160 ± 0.010</td>
</tr>
<tr>
<td></td>
<td>720.0</td>
<td>242.0 ± 30.0</td>
<td>0.200 ± 0.010</td>
</tr>
<tr>
<td></td>
<td>734.20</td>
<td>250.0 ± 30.0</td>
<td>0.200 ± 0.010</td>
</tr>
<tr>
<td></td>
<td>796.0</td>
<td>322.0 ± 30.0</td>
<td>0.100 ± 0.010</td>
</tr>
<tr>
<td></td>
<td>824.0</td>
<td>361.0 ± 30.0</td>
<td>0.300 ± 0.010</td>
</tr>
<tr>
<td></td>
<td>1118.4</td>
<td>405.0 ± 30.0</td>
<td>0.300 ± 0.010</td>
</tr>
</tbody>
</table>
### PHOTON RADIATION TABLE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>$\gamma$</th>
<th>MEAN ENERGY</th>
<th>LINES</th>
<th>PHOTONS/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\gamma$</td>
<td>1158.0</td>
<td>411.</td>
<td>± 30</td>
<td>.100 ± .010</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1293.0</td>
<td>479.</td>
<td>± 30</td>
<td>.130 ± .010</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1296.0</td>
<td>480.</td>
<td>± 30</td>
<td>.130 ± .010</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1442.0</td>
<td>545.</td>
<td>± 30</td>
<td>.120 ± .010</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1641.0</td>
<td>635.</td>
<td>± 30</td>
<td>.24 ± .04</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1684.0</td>
<td>655.</td>
<td>± 30</td>
<td>.570 ± .020</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1758.0</td>
<td>689.</td>
<td>± 30</td>
<td>.34 ± .03</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1760.0</td>
<td>690.</td>
<td>± 30</td>
<td>.80 ± .020</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1766.0</td>
<td>693.</td>
<td>± 30</td>
<td>.050 ± .010</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1828.0</td>
<td>721.</td>
<td>± 40</td>
<td>.080 ± .010</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1900.0</td>
<td>759.</td>
<td>± 40</td>
<td>.150 ± .010</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1914.0</td>
<td>761.</td>
<td>± 40</td>
<td>.090 ± .010</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1940.0</td>
<td>773.</td>
<td>± 40</td>
<td>.27 ± .04</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1985.0</td>
<td>794.</td>
<td>± 40</td>
<td>.060 ± .010</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2040.0</td>
<td>820.</td>
<td>± 40</td>
<td>.050 ± .010</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2090.0</td>
<td>830.</td>
<td>± 40</td>
<td>.070 ± .010</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2071.0</td>
<td>831.</td>
<td>± 40</td>
<td>.100 ± .010</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2116.0</td>
<td>856.</td>
<td>± 40</td>
<td>.260 ± .010</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2123.0</td>
<td>859.</td>
<td>± 40</td>
<td>.020 ± .010</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2133.0</td>
<td>864.</td>
<td>± 40</td>
<td>.040 ± .010</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2179.0</td>
<td>886.</td>
<td>± 40</td>
<td>.77 ± .04</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2190.0</td>
<td>891.</td>
<td>± 40</td>
<td>.050 ± .010</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2200.0</td>
<td>896.</td>
<td>± 40</td>
<td>.120 ± .010</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2211.0</td>
<td>901.</td>
<td>± 40</td>
<td>.020 ± .010</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2232.0</td>
<td>920.</td>
<td>± 40</td>
<td>.230 ± .010</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2269.0</td>
<td>928.</td>
<td>± 40</td>
<td>.16 ± .04</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2292.0</td>
<td>939.</td>
<td>± 40</td>
<td>.090 ± .010</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2341.0</td>
<td>962.</td>
<td>± 40</td>
<td>.280 ± .020</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2356.0</td>
<td>976.</td>
<td>± 40</td>
<td>.290 ± .020</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2402.0</td>
<td>991.</td>
<td>± 40</td>
<td>.300 ± .010</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2413.0</td>
<td>997.</td>
<td>± 40</td>
<td>.360 ± .020</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2439.0</td>
<td>1009.</td>
<td>± 40</td>
<td>.140 ± .010</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2472.0</td>
<td>1023.</td>
<td>± 40</td>
<td>.200 ± .020</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2541.0</td>
<td>1058.</td>
<td>± 40</td>
<td>.030 ± .010</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2591.0</td>
<td>1082.</td>
<td>± 40</td>
<td>.110 ± .010</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2609.0</td>
<td>1090.</td>
<td>± 40</td>
<td>.41 ± .03</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2669.0</td>
<td>1119.</td>
<td>± 40</td>
<td>.390 ± .020</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2751.0</td>
<td>1159.</td>
<td>± 50</td>
<td>.060 ± .010</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2869.0</td>
<td>1216.</td>
<td>± 50</td>
<td>.29 ± .05</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2982.0</td>
<td>1270.</td>
<td>± 50</td>
<td>.250 ± .020</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>3007.0</td>
<td>1283.</td>
<td>± 50</td>
<td>.64 ± .4</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>3208.0</td>
<td>1388.</td>
<td>± 50</td>
<td>.040 ± .010</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>4290.0</td>
<td>1910.</td>
<td>± 70</td>
<td>.34 ± .6</td>
</tr>
</tbody>
</table>

<\gamma> PER DECAY = 1764. ± 120.
<\gamma> PER DECAY = 2223. ± 140.

### PARTICLE RADIATION TABLE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>MEAN ENERGY</th>
<th>INTENSITY/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\gamma$</td>
<td>1158.0</td>
<td>± 30</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1293.0</td>
<td>± 30</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1296.0</td>
<td>± 30</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1442.0</td>
<td>± 30</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1641.0</td>
<td>± 30</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1684.0</td>
<td>± 30</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1758.0</td>
<td>± 30</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1760.0</td>
<td>± 30</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1766.0</td>
<td>± 30</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1828.0</td>
<td>± 40</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1900.0</td>
<td>± 40</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1914.0</td>
<td>± 40</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1940.0</td>
<td>± 40</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1985.0</td>
<td>± 40</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2040.0</td>
<td>± 40</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2090.0</td>
<td>± 40</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2071.0</td>
<td>± 40</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2116.0</td>
<td>± 40</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2123.0</td>
<td>± 40</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2133.0</td>
<td>± 40</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2179.0</td>
<td>± 40</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2190.0</td>
<td>± 40</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2200.0</td>
<td>± 40</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2211.0</td>
<td>± 40</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2232.0</td>
<td>± 40</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2269.0</td>
<td>± 40</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2292.0</td>
<td>± 40</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2341.0</td>
<td>± 40</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2356.0</td>
<td>± 40</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2402.0</td>
<td>± 40</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2413.0</td>
<td>± 40</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2439.0</td>
<td>± 40</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2472.0</td>
<td>± 40</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2541.0</td>
<td>± 40</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2591.0</td>
<td>± 40</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2609.0</td>
<td>± 40</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2669.0</td>
<td>± 40</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2751.0</td>
<td>± 40</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2869.0</td>
<td>± 40</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>2982.0</td>
<td>± 40</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>3007.0</td>
<td>± 40</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>3208.0</td>
<td>± 40</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>4290.0</td>
<td>± 70</td>
</tr>
</tbody>
</table>

<\gamma> PER DECAY = 1764. ± 120.
<\gamma> PER DECAY = 2223. ± 140.
139 Ba

ENDF/B-IV FILE 1 COMMENTS

56-BA-139 ANC EVAL-JUL-74 C.W.REICH

DECAY DATA

DIST-NOV-74

FOR FILE DESCRIPTION SEE C.W.REICH, RG HELMER AND MH PUTMAN,

AANR-1157-ENDF20.8/74.

PREPARED FOR FILE 7/74 CWR

REFERENCE G-1973 REVISION OF HAPSTRA-GOVE MASS TABLE.

OTHER- G. BERZINS, M.E. BUNKER AND J.W. STARNER.


T1/2 = 88.30 ± 0.20 Me

<Ep> PER DECAY = 897.3

<Ex> PER DECAY = 52.29

FISSION YIELDS

\[ 235\text{U THERMAL} \quad 6.8032 \times 10^{-4} \]

\[ 235\text{U FAST} \quad 5.1135 \times 10^{-5} \]

\[ 239\text{Pu THERMAL} \quad 3.7210 \times 10^{-4} \]

\[ G_p = 2254.4 \times 17. \]

\[ B_{Ky} = 1.000 \]

139 La

STABLE OR LONG-LIVED

139 - 56 - 1
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Mean Energy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>30.37</td>
<td>4</td>
<td>3.415</td>
</tr>
<tr>
<td>1.05</td>
<td>1</td>
<td>18.05</td>
</tr>
<tr>
<td>1.052.9</td>
<td>0.5</td>
<td>.00037</td>
</tr>
<tr>
<td>1.090.9</td>
<td>0.3</td>
<td>.00918</td>
</tr>
<tr>
<td>1.248.03</td>
<td>0.25</td>
<td>.06540</td>
</tr>
<tr>
<td>1.321.4</td>
<td>0.3</td>
<td>.02627</td>
</tr>
<tr>
<td>1.420.5</td>
<td>0.3</td>
<td>.3050</td>
</tr>
<tr>
<td>1.476.6</td>
<td>0.5</td>
<td>.00188</td>
</tr>
<tr>
<td>1.555.4</td>
<td>0.3</td>
<td>.00692</td>
</tr>
<tr>
<td>1.601.4</td>
<td>1.0</td>
<td>.00025</td>
</tr>
<tr>
<td>1.633.4</td>
<td>0.2</td>
<td>.00271</td>
</tr>
<tr>
<td>1.691.2</td>
<td>1.0</td>
<td>.00528</td>
</tr>
<tr>
<td>1.770.7</td>
<td>0.6</td>
<td>.00053</td>
</tr>
<tr>
<td>1.896.0</td>
<td>1.0</td>
<td>.0066</td>
</tr>
<tr>
<td>1.924.0</td>
<td>1.0</td>
<td>.00012</td>
</tr>
<tr>
<td>2.061.0</td>
<td>1.0</td>
<td>.00015</td>
</tr>
</tbody>
</table>

\(<E_{\text{photon}}\) PER DECY = 36.50

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>E_{\text{max}}</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>Au</td>
<td>37.5</td>
<td>27.40</td>
<td>12.10</td>
</tr>
<tr>
<td>CE</td>
<td>164.4</td>
<td>125.4</td>
<td>4.511</td>
</tr>
<tr>
<td>p-</td>
<td>195.0</td>
<td>53.37</td>
<td>.00021</td>
</tr>
<tr>
<td>p-</td>
<td>291.0</td>
<td>83.98</td>
<td>.00009</td>
</tr>
<tr>
<td>p-</td>
<td>332.0</td>
<td>97.40</td>
<td>.00017</td>
</tr>
<tr>
<td>p-</td>
<td>397.0</td>
<td>119.4</td>
<td>.00027</td>
</tr>
<tr>
<td>p-</td>
<td>486.0</td>
<td>150.7</td>
<td>.00045</td>
</tr>
<tr>
<td>p-</td>
<td>492.0</td>
<td>152.8</td>
<td>.00290</td>
</tr>
<tr>
<td>p-</td>
<td>679.0</td>
<td>221.6</td>
<td>.00013</td>
</tr>
<tr>
<td>p-</td>
<td>694.0</td>
<td>229.4</td>
<td>.00039</td>
</tr>
<tr>
<td>p-</td>
<td>715.0</td>
<td>238.0</td>
<td>.00047</td>
</tr>
<tr>
<td>p-</td>
<td>777.0</td>
<td>261.3</td>
<td>.00980</td>
</tr>
<tr>
<td>p-</td>
<td>835.0</td>
<td>284.2</td>
<td>.00030</td>
</tr>
<tr>
<td>p-</td>
<td>872.0</td>
<td>299.6</td>
<td>.00380</td>
</tr>
<tr>
<td>p-</td>
<td>944.0</td>
<td>351.4</td>
<td>.01000</td>
</tr>
<tr>
<td>p-</td>
<td>1035.0</td>
<td>367.4</td>
<td>.00500</td>
</tr>
<tr>
<td>p-</td>
<td>2086.0</td>
<td>842.7</td>
<td>27.20</td>
</tr>
<tr>
<td>p-</td>
<td>2256.0</td>
<td>921.1</td>
<td>72.40</td>
</tr>
</tbody>
</table>

\(<E_p\) PER DECY = 906.7
\(<E_p\) PER DECY = 1300.
### $^{139}$La

**Stable or Long-Lived**

**Cross Sections (Barns)**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total 2200 MeV</td>
<td>$2.1454 \times 10^{-1}$</td>
</tr>
<tr>
<td>Westcott G Factor</td>
<td>1.0740</td>
</tr>
<tr>
<td>Capture 2200 MeV</td>
<td>0.0920</td>
</tr>
<tr>
<td>Westcott G Factor</td>
<td>0.3965 x 10^-1</td>
</tr>
<tr>
<td>Resonance Integral Total</td>
<td>1.2706 x 10^4</td>
</tr>
<tr>
<td>Resonance Integral Capture</td>
<td>1.2340 x 10^4</td>
</tr>
</tbody>
</table>

**Fission Yields**

<table>
<thead>
<tr>
<th>Isotope</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$^{235}$U Thermal</td>
<td>7.8042 x 10^-7</td>
</tr>
<tr>
<td>$^{235}$U Fast</td>
<td>5.8809 x 10^-7</td>
</tr>
<tr>
<td>$^{239}$Pu Fast</td>
<td>1.6098 x 10^-7</td>
</tr>
<tr>
<td>$^{239}$Pu Thermal</td>
<td>3.4893 x 10^-7</td>
</tr>
</tbody>
</table>
ETB

ENDF/B-IV FILE 1 COMMENTS
52-TE-140 HECL
EVAL-APR74 R.E. SCHENTER
DIST-NOV74
REFERENCES
HALF-LIFE-R. SCHENTER, THEORY(9/73)

\[ T_{1/2} = 75.198 \]
\[ \langle E_d \rangle \text{ PER DECAY} = 1630. \]
\[ \langle E_f \rangle \text{ PER DECAY} = 2613. \]

FISSION YIELDS

\[ \text{\( ^{235}U \) THERMAL} \quad 1.7344 \times 10^{-5} \]
\[ \text{\( ^{235}U \) FAST} \quad 9.1015 \times 10^{-6} \]
\[ \text{\( ^{238}U \) FAST} \quad 4.5996 \times 10^{-4} \]
\[ \text{\( ^{239}Pu \) THERMAL} \quad 1.6038 \times 10^{-6} \]

\[ \theta _{g} = 6100. \]
\[ \theta _{t} = 500. \]

\[ 140 - 52-1 \]

ETB

ENDF/B-IV FILE 1 COMMENTS
53-1-140 HECL
EVAL-APR74 R.E. SCHENTER
DIST-NOV74
REFERENCES
DELAYED NEUTRON BRANCHING-L. TOMLINSON, ADANDT, 12, 379(9/73)

\[ T_{1/2} = 38.4 \times 10^{-4} \]
\[ \langle E_d \rangle \text{ PER DECAY} = 2087. \]
\[ \langle E_f \rangle \text{ PER DECAY} = 2932. \]

FISSION YIELDS

\[ \text{\( ^{233}U \) THERMAL} \quad 2.254 \times 10^{-1} \]
\[ \text{\( ^{235}U \) FAST} \quad 1.4479 \times 10^{-3} \]
\[ \text{\( ^{235}U \) FAST} \quad 1.1013 \times 10^{-2} \]
\[ \text{\( ^{239}Pu \) THERMAL} \quad 4.9415 \times 10^{-4} \]

\[ G_\mu = 3656. \]
\[ \theta _{t} = 2058. \]
\[ \text{BR}_\mu = 0.32 \times 10^{-1} \]
\[ \text{BR}_g = 0.600 \]

\[ 140 - 53-1 \]
$^{140}$ Xe
ENDFB/IV FILE 1 COMMENTS
54-XE-140 WEOL
EVAL-APR76 H.E. SCHENTER
DIST-NDV74

\begin{align*}
T_{1/2} &= 13.60 \times 10^4 s \\
\langle E_g \rangle \text{ PER DECAY} &= 1360.7 \\
\langle E_x \rangle \text{ PER DECAY} &= 1362. \\
\text{FISSION YIELDS} & \\
^{235}U \text{ THERMAL} &= 3.4698 \times 10^{-2} \\
^{235}U \text{ FAST} &= 2.5725 \times 10^{-2} \\
^{239}Pu \text{ THERMAL} &= 1.7466 \times 10^{-2} \\
\end{align*}

G $\alpha$ = 5110.0,
BR $\alpha$ = 1.000.

$^{140}$ Cs

$^{140}$ Cs
ENDFB/IV FILE 1 COMMENTS
55-CS-140 ANEC
EVAL-FeB76 C.W. REICH
DIST-NDV74
FOR FILE DESCRIPTION SEE C.W. REICH. RG HELMER AND MH PUTMAN,
ANER-1157,ENDF210,8/74.
PREPARED FOR FILE 9/73
CWR
REFERENCE
OTHER (INCL. O) - F. SCHUSSLER ET AL., NUCL. PHYS.

\begin{align*}
T_{1/2} &= 63.84 \times 10^3 s \\
\langle E_g \rangle \text{ PER DECAY} &= 1931.1 \\
\langle E_x \rangle \text{ PER DECAY} &= 1931. \\
\text{FISSION YIELDS} & \\
^{235}U \text{ THERMAL} &= 2.1829 \times 10^{-2} \\
^{239}Pu \text{ FAST} &= 2.5458 \times 10^{-2} \\
^{239}Pu \text{ THERMAL} &= 2.9135 \times 10^{-2} \\
\end{align*}

G $\alpha$ = 6300.4100,
BR $\alpha$ = 1.000.

$^{140}$ Ba

$^{140}$ Ba

140 - 55 - 1
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Mean Energy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>528.2</td>
<td>1</td>
<td>4,263</td>
</tr>
<tr>
<td>604.6</td>
<td>4</td>
<td>35.33</td>
</tr>
<tr>
<td>744.2</td>
<td>4</td>
<td>1.124</td>
</tr>
<tr>
<td>820.7</td>
<td>1</td>
<td>2.066</td>
</tr>
<tr>
<td>875.5</td>
<td>1</td>
<td>3.0760</td>
</tr>
<tr>
<td>902.9</td>
<td>1</td>
<td>1.460</td>
</tr>
<tr>
<td>905.9</td>
<td>1</td>
<td>3.480</td>
</tr>
<tr>
<td>908.5</td>
<td>1</td>
<td>11.65</td>
</tr>
<tr>
<td>910.0</td>
<td>1</td>
<td>9.774</td>
</tr>
<tr>
<td>1021.</td>
<td>3</td>
<td>2.701</td>
</tr>
<tr>
<td>1135.</td>
<td>4</td>
<td>3.482</td>
</tr>
<tr>
<td>1213.</td>
<td>6</td>
<td>9.354</td>
</tr>
<tr>
<td>1367.</td>
<td>3</td>
<td>2.322</td>
</tr>
<tr>
<td>1428.</td>
<td>4</td>
<td>1.781</td>
</tr>
<tr>
<td>1514.</td>
<td>1</td>
<td>1.095</td>
</tr>
<tr>
<td>1518.</td>
<td>1</td>
<td>1.095</td>
</tr>
<tr>
<td>1536.</td>
<td>1</td>
<td>6.132</td>
</tr>
<tr>
<td>1628.</td>
<td>7</td>
<td>5.693</td>
</tr>
<tr>
<td>1753.</td>
<td>8</td>
<td>3.752</td>
</tr>
<tr>
<td>1854.</td>
<td>4</td>
<td>5.105</td>
</tr>
<tr>
<td>1925.</td>
<td>3</td>
<td>1.986</td>
</tr>
<tr>
<td>2035.</td>
<td>6</td>
<td>1.759</td>
</tr>
<tr>
<td>2122.</td>
<td>6</td>
<td>5.504</td>
</tr>
<tr>
<td>2251.</td>
<td>4</td>
<td>6.539</td>
</tr>
<tr>
<td>2333.</td>
<td>6</td>
<td>5.679</td>
</tr>
<tr>
<td>2445.</td>
<td>6</td>
<td>2.810</td>
</tr>
<tr>
<td>2516.</td>
<td>1</td>
<td>3.212</td>
</tr>
<tr>
<td>2528.</td>
<td>1</td>
<td>4.000</td>
</tr>
<tr>
<td>2654.</td>
<td>1</td>
<td>0.04380</td>
</tr>
<tr>
<td>2664.</td>
<td>1</td>
<td>0.05840</td>
</tr>
<tr>
<td>2675.</td>
<td>1</td>
<td>0.09490</td>
</tr>
<tr>
<td>2705.</td>
<td>1</td>
<td>0.7708</td>
</tr>
<tr>
<td>2705.</td>
<td>1</td>
<td>0.1241</td>
</tr>
<tr>
<td>2789.</td>
<td>1</td>
<td>0.0951</td>
</tr>
<tr>
<td>2850.</td>
<td>1</td>
<td>0.7665</td>
</tr>
<tr>
<td>2875.</td>
<td>1</td>
<td>0.4891</td>
</tr>
<tr>
<td>2971.</td>
<td>1</td>
<td>0.1825</td>
</tr>
<tr>
<td>3000.</td>
<td>1</td>
<td>1.146</td>
</tr>
<tr>
<td>3069.</td>
<td>1</td>
<td>1.1241</td>
</tr>
<tr>
<td>3133.</td>
<td>4</td>
<td>1.373</td>
</tr>
<tr>
<td>3225.</td>
<td>4</td>
<td>1.7864</td>
</tr>
<tr>
<td>3317.</td>
<td>1</td>
<td>0.92920</td>
</tr>
<tr>
<td>3342.</td>
<td>1</td>
<td>1.3650</td>
</tr>
<tr>
<td>3372.</td>
<td>1</td>
<td>0.6716</td>
</tr>
<tr>
<td>3440.</td>
<td>4</td>
<td>1.348</td>
</tr>
<tr>
<td>3526.</td>
<td>1</td>
<td>1.241</td>
</tr>
<tr>
<td>3546.</td>
<td>1</td>
<td>0.1040</td>
</tr>
<tr>
<td>3565.</td>
<td>1</td>
<td>1.241</td>
</tr>
<tr>
<td>3625.</td>
<td>4</td>
<td>0.4526</td>
</tr>
</tbody>
</table>

### Photon Intensity Plot

![Photon Intensity Plot](image)

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy</th>
<th>I/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>γ</td>
<td>602.3</td>
<td>73.02</td>
</tr>
<tr>
<td>β</td>
<td>5698</td>
<td>28.02</td>
</tr>
<tr>
<td>β</td>
<td>6300</td>
<td>14.02</td>
</tr>
<tr>
<td>γ</td>
<td>100</td>
<td>71.61</td>
</tr>
<tr>
<td>β</td>
<td>3507</td>
<td>9.600</td>
</tr>
<tr>
<td>β</td>
<td>4790</td>
<td>8.010</td>
</tr>
<tr>
<td>γ</td>
<td>1201</td>
<td>5.935</td>
</tr>
<tr>
<td>β</td>
<td>2643</td>
<td>5.910</td>
</tr>
<tr>
<td>γ</td>
<td>2351</td>
<td>4.750</td>
</tr>
<tr>
<td>γ</td>
<td>258.2</td>
<td>4.233</td>
</tr>
<tr>
<td>γ</td>
<td>1854</td>
<td>4.740</td>
</tr>
<tr>
<td>γ</td>
<td>2523</td>
<td>4.010</td>
</tr>
<tr>
<td>β</td>
<td>3777</td>
<td>4.000</td>
</tr>
<tr>
<td>β</td>
<td>3595</td>
<td>3.910</td>
</tr>
<tr>
<td>γ</td>
<td>2238</td>
<td>3.715</td>
</tr>
<tr>
<td>γ</td>
<td>2102</td>
<td>3.738</td>
</tr>
<tr>
<td>β</td>
<td>2326</td>
<td>3.190</td>
</tr>
<tr>
<td>γ</td>
<td>1635</td>
<td>3.098</td>
</tr>
<tr>
<td>β</td>
<td>4062</td>
<td>3.010</td>
</tr>
<tr>
<td>γ</td>
<td>1130</td>
<td>2.913</td>
</tr>
</tbody>
</table>
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Mean Energy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>3757</td>
<td>1</td>
<td>.1374</td>
</tr>
<tr>
<td>3786</td>
<td>1</td>
<td>.05840</td>
</tr>
<tr>
<td>3794</td>
<td>1</td>
<td>.2482</td>
</tr>
<tr>
<td>3844</td>
<td>1</td>
<td>.03650</td>
</tr>
<tr>
<td>3919</td>
<td>1</td>
<td>.3650</td>
</tr>
<tr>
<td>3945</td>
<td>1</td>
<td>.01160</td>
</tr>
<tr>
<td>4064</td>
<td>1</td>
<td>.02920</td>
</tr>
<tr>
<td>4076</td>
<td>1</td>
<td>.05840</td>
</tr>
<tr>
<td>4129</td>
<td>1</td>
<td>.06570</td>
</tr>
<tr>
<td>4171</td>
<td>1</td>
<td>.02190</td>
</tr>
<tr>
<td>4213</td>
<td>1</td>
<td>.07300</td>
</tr>
<tr>
<td>4250</td>
<td>1</td>
<td>.027190</td>
</tr>
<tr>
<td>4381</td>
<td>1</td>
<td>.04380</td>
</tr>
<tr>
<td>4405</td>
<td>1</td>
<td>.02190</td>
</tr>
<tr>
<td>4417</td>
<td>1</td>
<td>.05840</td>
</tr>
<tr>
<td>4595</td>
<td>1</td>
<td>.1971</td>
</tr>
<tr>
<td>4787</td>
<td>1</td>
<td>.02920</td>
</tr>
<tr>
<td>4815</td>
<td>1</td>
<td>.02920</td>
</tr>
<tr>
<td>4987</td>
<td>1</td>
<td>.02920</td>
</tr>
</tbody>
</table>

\[<E_{\text{photon}} \text{ per decay} = 2131.\]

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>(E_{\text{max}})</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\alpha)</td>
<td>3.44 eV</td>
<td>288.</td>
<td>40.</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>870.0</td>
<td>299.</td>
<td>40.</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>911.0</td>
<td>316.</td>
<td>40.</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>931.0</td>
<td>324.</td>
<td>40.</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>970.0</td>
<td>340.</td>
<td>40.</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>994.0</td>
<td>350.</td>
<td>40.</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>1118.0</td>
<td>403.</td>
<td>40.</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>1237.0</td>
<td>432.</td>
<td>40.</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>1281.0</td>
<td>474.</td>
<td>40.</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>1317.0</td>
<td>490.</td>
<td>40.</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>1376.0</td>
<td>514.</td>
<td>40.</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>1466.0</td>
<td>565.</td>
<td>40.</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>1486.0</td>
<td>597.</td>
<td>40.</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>1911.0</td>
<td>760.</td>
<td>50.</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>1940.0</td>
<td>773.</td>
<td>50.</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>2220.0</td>
<td>905.</td>
<td>50.</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>2268.0</td>
<td>928.</td>
<td>50.</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>2296.0</td>
<td>941.</td>
<td>50.</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>2326.0</td>
<td>955.</td>
<td>50.</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>2355.0</td>
<td>969.</td>
<td>50.</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>2416.0</td>
<td>997.</td>
<td>50.</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>2448.0</td>
<td>1013.</td>
<td>50.</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>2643.0</td>
<td>1107.</td>
<td>50.</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>2697.0</td>
<td>1133.</td>
<td>50.</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>2844.0</td>
<td>1206.</td>
<td>60.</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>3312.0</td>
<td>1367.</td>
<td>60.</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>3367.0</td>
<td>1408.</td>
<td>60.</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>3425.0</td>
<td>1446.</td>
<td>60.</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>3429.0</td>
<td>1446.</td>
<td>60.</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>3511.0</td>
<td>1528.</td>
<td>60.</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>3595.0</td>
<td>1569.</td>
<td>60.</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>3777.0</td>
<td>1658.</td>
<td>70.</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>3870.0</td>
<td>1704.</td>
<td>70.</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>4062.0</td>
<td>1798.</td>
<td>70.</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>4470.0</td>
<td>2002.</td>
<td>70.</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>4792.0</td>
<td>2157.</td>
<td>80.</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>5693.0</td>
<td>2467.</td>
<td>90.</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>6338.0</td>
<td>2906.</td>
<td>100.</td>
</tr>
</tbody>
</table>

\[<E_\alpha \text{ per decay} = 2131.\]
\[<E_\gamma \text{ per decay} = 2302.\]
$^{140}$ Ba

ENDF/B-IV FILE 1 COMMENTS
56-BA-140 ANC,HEDL EVAL-JUL74 D.M. REICH DECAY DATA
EVAL-DCT74 R.E. SCHENTER AND F. SCHMITTROTH CROSS SECTION DATA
DIST-NOV74

$^{140}$ Ba

- $T_{\frac{1}{2}} = 12.790 \times 0.010$
- $\langle E_\gamma \rangle$ PER DECAY = 280.3
- $\langle E_\gamma \rangle$ PER DECAY = 216.9

- CROSS SECTIONS (BARNES)
- $\sigma$ TOTAL 2200M/S = 6.5390
- WESTCOTT G FACTOR = 1.1816
- $\sigma$ CAPTURE 2200M/S = 1.6000
- WESTCOTT G FACTOR = 9.9915 \times 10^{-1}
- RESONANCE INTEGRAL TOTAL = 1.2890 \times 10^2
- RESONANCE INTEGRAL CAPTURE = 1.2760 \times 10^1

- FISSION YIELDS
- $^{235}$U THERMAL = 4.2771 \times 10^{-8}
- $^{239}$U THERMAL = 4.6998 \times 10^{-7}
- $^{235}$U THERMAL = 1.2110 \times 10^{-5}
- $^{239}$PU THERMAL = 8.2119 \times 10^{-7}

- $Q_\gamma = 1035 \times 1.10$
- $BR_\gamma = 1.000$

$^{140}$ La

- $\frac{1}{2} \beta = 0.39 \times 0.020$
- $40 \times 0.020$

140 - 56 - 1
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Mean Energy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>23.2 ± 1.5</td>
<td>6</td>
<td>4.4 ± 0.9</td>
</tr>
<tr>
<td>118.9 ± 0.1</td>
<td>1</td>
<td>0.048 ± 0.005</td>
</tr>
<tr>
<td>132.7 ± 0.1</td>
<td>1</td>
<td>0.068 ± 0.005</td>
</tr>
<tr>
<td>162.9 ± 0.1</td>
<td>1</td>
<td>5.5 ± 0.3</td>
</tr>
<tr>
<td>304.8 ± 0.1</td>
<td>1</td>
<td>4.2 ± 0.3</td>
</tr>
<tr>
<td>423.6 ± 0.1</td>
<td>1</td>
<td>2.0 ± 0.2</td>
</tr>
<tr>
<td>537.3 ± 0.1</td>
<td>1</td>
<td>2.10 ± 0.20</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>25.5 ± 1.2</td>
</tr>
</tbody>
</table>

\(<E_{\text{PHOTON}}\) PER DECAY = 172. ± 7.

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>E_max</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>AU</td>
<td>37.6</td>
<td>18.1 ± 2.0</td>
<td>21. ± 5</td>
</tr>
<tr>
<td>CE</td>
<td>536.0</td>
<td>42.0 ± 2.1</td>
<td>14.51 ± 0.21</td>
</tr>
<tr>
<td>β-</td>
<td>454.0</td>
<td>159.2 ± 2.0</td>
<td>24.0 ± 2.0</td>
</tr>
<tr>
<td>β-</td>
<td>564.0</td>
<td>180.6 ± 1.0</td>
<td>19.1 ± 0.4</td>
</tr>
<tr>
<td>β-</td>
<td>872.0</td>
<td>299.6 ± 2.6</td>
<td>2.6 ± 0.4</td>
</tr>
<tr>
<td>β+</td>
<td>991.0</td>
<td>345.9 ± 2.0</td>
<td>44.0 ± 2.0</td>
</tr>
<tr>
<td>β+</td>
<td>1655.0</td>
<td>554.8 ± 1.0</td>
<td>17.0 ± 2.0</td>
</tr>
</tbody>
</table>

\(<E_p>\) PER DECAY = 290.3
\(<E_{\text{C}}>\) PER DECAY = 535.4

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy</th>
<th>1/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kα</td>
<td>0.91</td>
<td>66.0 ± 2.0</td>
</tr>
<tr>
<td>Kβ</td>
<td>454.0</td>
<td>24.0 ± 2.0</td>
</tr>
<tr>
<td>Kγ</td>
<td>537.38</td>
<td>23.5 ± 1.2</td>
</tr>
<tr>
<td>Lα</td>
<td>1005.2</td>
<td>22.0 ± 2.0</td>
</tr>
<tr>
<td>Al</td>
<td>4.905</td>
<td>22.0 ± 2.0</td>
</tr>
<tr>
<td>CeL</td>
<td>23.69</td>
<td>11.17 ± 0.18</td>
</tr>
<tr>
<td>Decay Data</td>
<td>ENDF/B-IV File</td>
<td>Comments</td>
</tr>
<tr>
<td>------------</td>
<td>----------------</td>
<td>----------</td>
</tr>
<tr>
<td>MF=1 57 3 57</td>
<td>ANC, HEID</td>
<td>EVAL-NE874, C.N. REICH DECAY DATA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EVAL-ODE74, R.E. SCHENTER AND F. SCHMIDTROTH CROSS SECTION DATA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DIST-NOV74</td>
</tr>
</tbody>
</table>

**References**
- G.W. WAPSTRA-GOVE MASSSTABLE

---

### §4 La

- $T_{1/2} = 40.20(4) 0.020$
- $<E> \text{ PER DECAY} = 517.0$
- $<E> \text{ PER DECAY} = 2205.$

#### CROSS SECTIONS (BARNES)
- $\alpha$ TOTAL 22000/15 7.6300
- WESTCOTT G FACTOR 1.1808
- $\alpha$ CAPTURE 22000/15 2.7000
- WESTCOTT G FACTOR 1.0000
- RESONANCE INTEGRAL TOTAL $1.2 \times 10^{-2}$
- RESONANCE INTEGRAL CAPTURE $6.5090 \times 10^{-1}$

#### FISSION YIELDS
- $^{240}U$ THERMAL $5.67(1) \times 10^{-5}$
- $^{240}U$ FAST $8.09(3) \times 10^{-5}$
- $^{238}U$ FAST $6.06(4) \times 10^{-8}$
- $^{241}Pu$ THERMAL $2.45(3) \times 10^{-4}$

---

$Q = 3770.8 \pm 2.0$
$B(E2) = 1.000$

---

### §4 Ca

- STABLE OR LONG-LIVED
### PHOTON RADIATION TABLE

<table>
<thead>
<tr>
<th>MEAN ENERGY</th>
<th>LINES</th>
<th>PHOTONS/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>63.92</td>
<td>1</td>
<td>0.6495</td>
</tr>
<tr>
<td>103.4</td>
<td>1</td>
<td>0.2277</td>
</tr>
<tr>
<td>127.1</td>
<td>1</td>
<td>0.1343</td>
</tr>
<tr>
<td>172.3</td>
<td>1</td>
<td>0.1049</td>
</tr>
<tr>
<td>242.0</td>
<td>1</td>
<td>0.3762</td>
</tr>
<tr>
<td>266.5</td>
<td>1</td>
<td>0.4732</td>
</tr>
<tr>
<td>328.0</td>
<td>1</td>
<td>1.178</td>
</tr>
<tr>
<td>432.6</td>
<td>1</td>
<td>2.574</td>
</tr>
<tr>
<td>447.1</td>
<td>1</td>
<td>1.412</td>
</tr>
<tr>
<td>711.7</td>
<td>1</td>
<td>3.065</td>
</tr>
<tr>
<td>815.8</td>
<td>1</td>
<td>20.10</td>
</tr>
<tr>
<td>867.9</td>
<td>1</td>
<td>4.653</td>
</tr>
<tr>
<td>919.6</td>
<td>1</td>
<td>2.277</td>
</tr>
<tr>
<td>925.2</td>
<td>1</td>
<td>6.079</td>
</tr>
<tr>
<td>1196.</td>
<td>1</td>
<td>95.53</td>
</tr>
<tr>
<td>2348.</td>
<td>1</td>
<td>7.524</td>
</tr>
<tr>
<td>2932.</td>
<td>1</td>
<td>2.976</td>
</tr>
<tr>
<td>2547.</td>
<td>1</td>
<td>0.09900</td>
</tr>
<tr>
<td>2898.</td>
<td>1</td>
<td>0.0540</td>
</tr>
<tr>
<td>3119.</td>
<td>1</td>
<td>0.01980</td>
</tr>
</tbody>
</table>

\[ \langle \text{Photon\ Per\ Decay} \rangle = 2205. \]

### PARTICLE RADIATION TABLE

<table>
<thead>
<tr>
<th>TYPE ( \beta^- )</th>
<th>MEAN ENERGY</th>
<th>INTENSITY/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \beta^- )</td>
<td>665.0</td>
<td>141.4</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>670.0</td>
<td>219.8</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>870.0</td>
<td>298.8</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>985.0</td>
<td>346.4</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>1344.0</td>
<td>457.4</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>1558.0</td>
<td>597.7</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>1688.0</td>
<td>658.7</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>2174.0</td>
<td>883.2</td>
</tr>
</tbody>
</table>

\[ \langle E_p \rangle \text{ Per\ Decay} = 517.0 \]

\[ \langle E_\beta^- \rangle \text{ Per\ Decay} = 855.3 \]

### CHARACTERISTIC RADIATION TABLE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>ENERGY</th>
<th>I/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \gamma )</td>
<td>1196.0</td>
<td>95.53</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>1358.0</td>
<td>42.00</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>487.1</td>
<td>41.18</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>815.8</td>
<td>20.10</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>328.0</td>
<td>17.82</td>
</tr>
</tbody>
</table>

\[ \langle E_\gamma \rangle \text{ Per\ Decay} = 517.0 \]

\[ \langle E_\gamma \rangle \text{ Per\ Decay} = 855.3 \]
### $^{138}$Ce

**STARLP DR : DONG-1 IVFD**

**CROSS SECTIONS (BARNs)**

- TOTAL 2200M/S: 5.5000
- WESTCOTT G FACTOR: $1.1715 	imes 10^{-1}$
- CAPTURE 2200M/S: $5.7000 	imes 10^{-1}$
- WESTCOTT G FACTOR: $10.0000 	imes 10^{-1}$
- RESONANCE INTEGRAL TOTAL: $1.1150 	imes 10^{-4}$
- RESONANCE INTEGRAL CAPTURE: $4.6570 	imes 10^{-1}$

**FISSION YIELDS**

- $^{235}$U THERMAL: $6.7337 	imes 10^{-2}$
- $^{235}$U FAST: $1.9503 	imes 10^{-4}$
- $^{238}$U THERMAL: $1.0099 	imes 10^{-4}$
- $^{239}$Pu THERMAL: $4.5094 	imes 10^{-7}$
<table>
<thead>
<tr>
<th><strong>141</strong> Te</th>
</tr>
</thead>
<tbody>
<tr>
<td>FNDF:8-IV FILE 1 COMMENTS</td>
</tr>
<tr>
<td>52-TE-141 HECL</td>
</tr>
<tr>
<td>REFERENCES</td>
</tr>
<tr>
<td>HALF LIFE R SCHENTER, THEORY(9/73)</td>
</tr>
<tr>
<td>[ \frac{T_1}{2} = 2.338s ]</td>
</tr>
<tr>
<td>[ \langle E_\beta \rangle \text{ PER DECAY} = 2.410 ]</td>
</tr>
<tr>
<td>[ \langle E_\gamma \rangle \text{ PER DECAY} = 3.600 ]</td>
</tr>
<tr>
<td>FISSION YIELDS</td>
</tr>
<tr>
<td>[ ^{234}U \text{ THERMAL} = 4.4975 \times 10^{-7} ]</td>
</tr>
<tr>
<td>[ ^{234}U \text{ FAST} = 2.1786 \times 10^{-7} ]</td>
</tr>
<tr>
<td>[ ^{238}U \text{ FAST} = 2.347 \times 10^{-5} ]</td>
</tr>
<tr>
<td>[ ^{239}Pu \text{ THERMAL} = 3.1595 \times 10^{-8} ]</td>
</tr>
</tbody>
</table>

| D $\mu = 8420$, B $\gamma = 1.000$ |

| 141 - 52 - 1 |

<table>
<thead>
<tr>
<th><strong>131</strong> I</th>
</tr>
</thead>
<tbody>
<tr>
<td>FNDF:8-IV FILE 1 COMMENTS</td>
</tr>
<tr>
<td>53- I-141 HECL</td>
</tr>
<tr>
<td>REFERENCES</td>
</tr>
<tr>
<td>DELAYED NEUTRON BRANCHING T ENGLAND, THEORY(2/74)</td>
</tr>
<tr>
<td>[ \frac{T_1}{2} = 40.10s ]</td>
</tr>
<tr>
<td>[ \langle E_\beta \rangle \text{ PER DECAY} = 1948 ]</td>
</tr>
<tr>
<td>[ \langle E_\gamma \rangle \text{ PER DECAY} = 2886 ]</td>
</tr>
<tr>
<td>FISSION YIELDS</td>
</tr>
<tr>
<td>[ ^{234}U \text{ THERMAL} = 3.5029 \times 10^{-4} ]</td>
</tr>
<tr>
<td>[ ^{234}U \text{ FAST} = 1.5319 \times 10^{-4} ]</td>
</tr>
<tr>
<td>[ ^{238}U \text{ FAST} = 2.7565 \times 10^{-3} ]</td>
</tr>
<tr>
<td>[ ^{239}Pu \text{ THERMAL} = 4.7531 \times 10^{-2} ]</td>
</tr>
</tbody>
</table>

| D $\mu = 3896$, B $\gamma = 1.1200$ | D $\mu = 7420$, B $\gamma = 1.8300$ |

| 141 - 53 - 1 |
\[ \text{Xe} \]

ENDF/\textit{IV} FILE 1 COMMENTS
S4-XE-141
HEDL
EVAL-APR74 R.E. SCHENKER
DIST-NDV74
REFERENCES
DELAYED NEUTRON BRANCHING-L TOMLINSON, ADAMS, 12, 379 (9/73)

\[ \text{\scalebox{0.8}{Xe}} \]

\[ \text{\scalebox{0.8}{Xe}} \]

\[ T_{1/2} \approx 1.720 \times 0.10 \text{s} \]

\[ \langle E^* \rangle \text{ PER DECAY} = 1571 \]

\[ \langle E^* \rangle \text{ PER DECAY} = 2.270 \]

FISSION YIELDS

\[ ^{235}\text{U} \text{ THERMAL} \quad 1.927 \times 10^{-2} \]

\[ ^{233}\text{U} \text{ FAST} \quad 9.142 \times 10^{-3} \]

\[ ^{238}\text{U} \text{ FAST} \quad 2.828 \times 10^{-2} \]

\[ ^{238}\text{Pu} \text{ THERMAL} \quad 4.406 \times 10^{-3} \]

\[ Q_m = 0.0100 \]

\[ \text{BR}_m = 0.00054 \times 0.0009 \]

\[ Q_g = 5.090 \]

\[ \text{BR}_g = 0.9995 \]

\[ \text{\scalebox{0.8}{Cs}} \]

\[ \text{\scalebox{0.8}{Cs}} \]

\[ 13.66 \pm 0.10 \text{s} \]

\[ 25.04 \pm 0.3 \text{s} \]

\[ \text{\scalebox{0.8}{Cs}} \]

\[ \text{\scalebox{0.8}{Cs}} \]

\[ Q_m = 2.25 \]

\[ \text{BR}_m = 0.00073 \times 0.0011 \]

\[ Q_g = 5.060 \]

\[ \text{BR}_g = 0.9995 \]

\[ \text{\scalebox{0.8}{Ba}} \]

\[ \text{\scalebox{0.8}{Ba}} \]

\[ 63.8 \pm 0.7 \text{s} \]

\[ 18.3 \pm 0.10 \text{m} \]
\( ^{141} \text{Ba} \)

ENDF/B-IV FILE 1 COMMENTS
56 DA 141 AND EVAL-PERT C.W.REICH
DIST-NOV74
FOR FILE DESCRIPTION SEE CW REICH, RG HELMER AND MH PUTMAN,
ANER-1157,ENDF/B10.8//C.
PREPARED FOR FILE 7/73 CWR
REFERENCES 0-1973 REVISION OF WAPSTRA-GOVE MASS TABLE.
OTHER - W.L. TALBENT, PRIV. COMM. (1973).

\[ T_{1/2} = 18.30 \times 10^9 \text{m} \]
\[ <E_p^*> \text{ PER DECAY} = 945.5 \]
\[ <E_p> \text{ PER DECAY} = 887.9 \]

FISSION YIELDS
\[ ^{235} \text{U} \text{ THERMAL} \quad 1.447 \times 10^{-4} \]
\[ ^{235} \text{U} \text{ FAST} \quad 1.502 \times 10^{-2} \]
\[ ^{239} \text{Pu} \text{ FAST} \quad 9.633 \times 10^{-4} \]
\[ ^{239} \text{Pu} \text{ THERMAL} \quad 2.065 \times 10^{-2} \]

\[ Q_p = 3030.456 \text{MeV} \]
\[ Q_p = 1.000 \]

\[ ^{141} \text{La} \]
\[ 3.87 \pm 0.05 \text{h} \]

141 - 5b - 1
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Mean Energy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>188.36 a</td>
<td>5</td>
<td>0.16</td>
</tr>
<tr>
<td>276.79</td>
<td>4</td>
<td>0.09</td>
</tr>
<tr>
<td>321.8</td>
<td>2</td>
<td>0.7</td>
</tr>
<tr>
<td>462.17</td>
<td>2</td>
<td>0.16</td>
</tr>
<tr>
<td>544.7</td>
<td>3</td>
<td>0.6</td>
</tr>
<tr>
<td>644.1</td>
<td>1</td>
<td>0.7</td>
</tr>
<tr>
<td>738.8</td>
<td>3</td>
<td>0.2</td>
</tr>
<tr>
<td>856.8</td>
<td>4</td>
<td>0.8</td>
</tr>
<tr>
<td>952.6</td>
<td>4</td>
<td>0.6</td>
</tr>
<tr>
<td>1049.7</td>
<td>4</td>
<td>0.5</td>
</tr>
<tr>
<td>1160.8</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>1197.4</td>
<td>4</td>
<td>0.08</td>
</tr>
<tr>
<td>1261.8</td>
<td>3</td>
<td>0.4</td>
</tr>
<tr>
<td>1336.7</td>
<td>3</td>
<td>0.2</td>
</tr>
<tr>
<td>1405.39</td>
<td>2</td>
<td>0.05</td>
</tr>
<tr>
<td>1456.24</td>
<td>2</td>
<td>0.06</td>
</tr>
<tr>
<td>1458.56</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td>1588.7</td>
<td>4</td>
<td>0.2</td>
</tr>
<tr>
<td>1667.2</td>
<td>2</td>
<td>0.4</td>
</tr>
<tr>
<td>1757.5</td>
<td>2</td>
<td>0.1</td>
</tr>
<tr>
<td>1820.7</td>
<td>3</td>
<td>0.00</td>
</tr>
<tr>
<td>1860.4</td>
<td>4</td>
<td>0.03</td>
</tr>
<tr>
<td>1877.3</td>
<td>4</td>
<td>1.1</td>
</tr>
<tr>
<td>1912.7</td>
<td>2</td>
<td>0.3</td>
</tr>
<tr>
<td>1918.6</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>1990.3</td>
<td>2</td>
<td>0.00</td>
</tr>
<tr>
<td>2026.56</td>
<td>2</td>
<td>0.02</td>
</tr>
<tr>
<td>2058.8</td>
<td>1</td>
<td>0.04</td>
</tr>
<tr>
<td>2080.9</td>
<td>1</td>
<td>0.09</td>
</tr>
<tr>
<td>2150.5</td>
<td>1</td>
<td>0.04</td>
</tr>
<tr>
<td>2217.2</td>
<td>1</td>
<td>0.01</td>
</tr>
<tr>
<td>2278.9</td>
<td>1</td>
<td>0.02</td>
</tr>
<tr>
<td>2469.0</td>
<td>3</td>
<td>0.1</td>
</tr>
</tbody>
</table>

\(<\text{Photons}>\text{ PER DECAY = 888.} = 11.\)

### Particle Radiation Table

#### Type Energy Intensity/100 Decays

<table>
<thead>
<tr>
<th>Type</th>
<th>$\bar{E}_{\text{max}}$</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>541.0</td>
<td>178.5</td>
<td>0.0000</td>
</tr>
<tr>
<td>a</td>
<td>589.0</td>
<td>188.5</td>
<td>0.0000</td>
</tr>
<tr>
<td>a</td>
<td>644.0</td>
<td>209.5</td>
<td>0.0000</td>
</tr>
<tr>
<td>a</td>
<td>654.5</td>
<td>215.5</td>
<td>0.0000</td>
</tr>
<tr>
<td>a</td>
<td>813.0</td>
<td>276.5</td>
<td>0.0000</td>
</tr>
<tr>
<td>a</td>
<td>850.0</td>
<td>291.5</td>
<td>0.0000</td>
</tr>
<tr>
<td>a</td>
<td>1104.0</td>
<td>337.5</td>
<td>0.0000</td>
</tr>
<tr>
<td>a</td>
<td>1157.0</td>
<td>420.5</td>
<td>0.0000</td>
</tr>
<tr>
<td>a</td>
<td>1186.0</td>
<td>432.5</td>
<td>0.0000</td>
</tr>
<tr>
<td>a</td>
<td>1289.0</td>
<td>477.6</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>$\bar{E}_{\text{max}}$</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\gamma$</td>
<td>190.22</td>
<td>0.08</td>
<td>49.0</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>304.54</td>
<td>0.08</td>
<td>26.6</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>276.99</td>
<td>0.08</td>
<td>24.6</td>
</tr>
<tr>
<td>$\beta$</td>
<td>238.5</td>
<td>0.50</td>
<td>24.00</td>
</tr>
<tr>
<td>$\beta$</td>
<td>256.3</td>
<td>0.50</td>
<td>19.00</td>
</tr>
<tr>
<td>$\beta$</td>
<td>543.71</td>
<td>0.08</td>
<td>15.1</td>
</tr>
<tr>
<td>$\beta$</td>
<td>2107.7</td>
<td>0.51</td>
<td>13.00</td>
</tr>
<tr>
<td>$\beta$</td>
<td>2840.7</td>
<td>0.50</td>
<td>12.00</td>
</tr>
<tr>
<td>$\beta$</td>
<td>1528.7</td>
<td>0.50</td>
<td>6.300</td>
</tr>
<tr>
<td>$\beta$</td>
<td>667.78</td>
<td>0.08</td>
<td>6.0</td>
</tr>
<tr>
<td>$\beta$</td>
<td>676.26</td>
<td>0.08</td>
<td>5.8</td>
</tr>
<tr>
<td>$\beta$</td>
<td>462.75</td>
<td>0.08</td>
<td>5.1</td>
</tr>
<tr>
<td>$\beta$</td>
<td>457.58</td>
<td>0.08</td>
<td>5.1</td>
</tr>
<tr>
<td>$\beta$</td>
<td>1197.47</td>
<td>0.08</td>
<td>4.9</td>
</tr>
<tr>
<td>$\beta$</td>
<td>739.10</td>
<td>0.08</td>
<td>4.54</td>
</tr>
</tbody>
</table>

#### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>$\bar{E}_{\text{max}}$</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\gamma$</td>
<td>1402.0</td>
<td>527</td>
<td>2.3000</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1464.0</td>
<td>555</td>
<td>2.3000</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1528.0</td>
<td>584</td>
<td>6.3000</td>
</tr>
<tr>
<td>$\beta$</td>
<td>1604.0</td>
<td>618</td>
<td>3.0000</td>
</tr>
<tr>
<td>$\beta$</td>
<td>1811.0</td>
<td>727</td>
<td>3.0000</td>
</tr>
<tr>
<td>$\beta$</td>
<td>1858.0</td>
<td>755</td>
<td>1.5000</td>
</tr>
<tr>
<td>TYPE</td>
<td>E\text{max}</td>
<td>MEAN ENERGY</td>
<td>INTENSITY/100 DECAYS</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
<td>-------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>#1</td>
<td>1964.0</td>
<td>785.</td>
<td>3.600</td>
</tr>
<tr>
<td>#2</td>
<td>1991.0</td>
<td>797.</td>
<td>1.000</td>
</tr>
<tr>
<td>#3</td>
<td>2088.0</td>
<td>819.</td>
<td>2.000</td>
</tr>
<tr>
<td>#4</td>
<td>2101.0</td>
<td>849.</td>
<td>13.00</td>
</tr>
<tr>
<td>#5</td>
<td>2198.0</td>
<td>899.</td>
<td>2.100</td>
</tr>
<tr>
<td>#6</td>
<td>2204.0</td>
<td>897.</td>
<td>5.000</td>
</tr>
<tr>
<td>#7</td>
<td>2344.0</td>
<td>964.</td>
<td>1.000</td>
</tr>
<tr>
<td>#8</td>
<td>2381.0</td>
<td>987.</td>
<td>24.00</td>
</tr>
<tr>
<td>#9</td>
<td>2430.0</td>
<td>1014.</td>
<td>2.000</td>
</tr>
<tr>
<td>#10</td>
<td>2563.0</td>
<td>1068.</td>
<td>19.00</td>
</tr>
<tr>
<td>#11</td>
<td>2726.0</td>
<td>1147.</td>
<td>1.600</td>
</tr>
<tr>
<td>#12</td>
<td>2840.0</td>
<td>1202.</td>
<td>12.00</td>
</tr>
<tr>
<td>#13</td>
<td>3080.0</td>
<td>1294.</td>
<td>2.000</td>
</tr>
</tbody>
</table>

\langle E_\text{e} \rangle \text{ PER DECAY} = 913.5
\langle E_\text{e} \rangle \text{ PER DECAY} = 1328.
### $\frac{1}{3}$) La

ENDF/B-IV FILE 1 COMMENTS

57-LA-141 AND Eval-FEB74 C.W. REICH

DECAY DATA

DIST-NOV74

FOR FILE DESCRIPTION SEE CW REICH, RG HELMER AND MH PUTMAN,

AUTH-11/73, ENDF/B-IV/74

PREPARED FOR FILE 7/73

CWR

REFERENCES 0-1973 REVISION OF WAPSTRA-GOVE MASS TABLE

OTHER - W.L. TALBERT, PRIV. COMM. (1973)

<table>
<thead>
<tr>
<th>Decay Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$T_{1/2}$</td>
<td>3.87 ± 0.03h</td>
</tr>
<tr>
<td>$\langle E_x \rangle_{\text{per decay}}$</td>
<td>989.0</td>
</tr>
<tr>
<td>$\langle E_y \rangle_{\text{per decay}}$</td>
<td>32.81</td>
</tr>
</tbody>
</table>

### Fission Yields

<table>
<thead>
<tr>
<th>Isotope</th>
<th>Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>$^{235}$u THERMAL</td>
<td>$1.076 \times 10^{-4}$</td>
</tr>
<tr>
<td>$^{235}$u FAST</td>
<td>$1.51 \times 10^{-4}$</td>
</tr>
<tr>
<td>$^{234}$u FAST</td>
<td>$3.23 \times 10^{-6}$</td>
</tr>
<tr>
<td>$^{239}$Pu THERMAL</td>
<td>$3.916 \times 10^{-4}$</td>
</tr>
</tbody>
</table>

### Other

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$Q_{f}$</td>
<td>$2430.0 \pm 30$</td>
</tr>
<tr>
<td>$BR_{\gamma}$</td>
<td>$1.500$</td>
</tr>
</tbody>
</table>

### $\frac{1}{4}$) Ce

| Value | $32.550 \pm 0.020\sigma$ |

141 - 57 - 1
**PHOTON RADIATION TABLE**

<table>
<thead>
<tr>
<th>MEAN ENERGY</th>
<th>LINES</th>
<th>PHOTONS/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>324.6</td>
<td>± 0.4</td>
<td>± 1.0</td>
</tr>
<tr>
<td>435.0</td>
<td>± 0.8</td>
<td>± 1.0</td>
</tr>
<tr>
<td>475.0</td>
<td>± 0.6</td>
<td>± 1.0</td>
</tr>
<tr>
<td>571.4</td>
<td>± 0.4</td>
<td>± 0.6</td>
</tr>
<tr>
<td>662.05</td>
<td>± 0.06</td>
<td>± 0.01</td>
</tr>
<tr>
<td>676.8</td>
<td>± 0.3</td>
<td>± 0.01</td>
</tr>
<tr>
<td>694.9</td>
<td>± 0.7</td>
<td>± 0.01</td>
</tr>
<tr>
<td>710.39</td>
<td>± 0.24</td>
<td>± 0.01</td>
</tr>
<tr>
<td>843.8</td>
<td>± 0.4</td>
<td>± 0.01</td>
</tr>
<tr>
<td>853.0</td>
<td>± 0.3</td>
<td>± 0.01</td>
</tr>
<tr>
<td>864.0</td>
<td>± 0.9</td>
<td>± 0.01</td>
</tr>
<tr>
<td>1354.52</td>
<td>± 0.09</td>
<td>± 2.01</td>
</tr>
<tr>
<td>1468.65</td>
<td>± 0.16</td>
<td>± 0.061</td>
</tr>
<tr>
<td>1497.03</td>
<td>± 0.12</td>
<td>± 0.0222</td>
</tr>
<tr>
<td>1512.08</td>
<td>± 0.15</td>
<td>± 0.0112</td>
</tr>
<tr>
<td>1604.76</td>
<td>± 0.15</td>
<td>± 0.0010</td>
</tr>
<tr>
<td>1693.31</td>
<td>± 0.11</td>
<td>± 0.0046</td>
</tr>
<tr>
<td>1739.01</td>
<td>± 0.11</td>
<td>± 0.0019</td>
</tr>
<tr>
<td>1943.7</td>
<td>± 0.3</td>
<td>± 0.0041</td>
</tr>
<tr>
<td>2030.19</td>
<td>± 0.18</td>
<td>± 0.0063</td>
</tr>
<tr>
<td>2049.2</td>
<td>± 0.3</td>
<td>± 0.0028</td>
</tr>
<tr>
<td>2171.1</td>
<td>± 0.3</td>
<td>± 0.0025</td>
</tr>
<tr>
<td>2173.9</td>
<td>± 0.3</td>
<td>± 0.0021</td>
</tr>
<tr>
<td>2207.36</td>
<td>± 0.22</td>
<td>± 0.0096</td>
</tr>
<tr>
<td>2317.70</td>
<td>± 0.16</td>
<td>± 0.0051</td>
</tr>
</tbody>
</table>

\[<E_{\text{Photon}}\text{ PER DECAY} = 32.8 \pm 1.5\]

**PHOTON INTENSITY PLOT**

**CHARACTERISTIC RADIATION TABLE**

<table>
<thead>
<tr>
<th>TYPE</th>
<th>ENERGY</th>
<th>1/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>2430</td>
<td>30. 97.70</td>
</tr>
</tbody>
</table>

**PARTICLE RADIATION TABLE**

<table>
<thead>
<tr>
<th>TYPE</th>
<th>MEAN ENERGY</th>
<th>INTENSITY/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>101.8</td>
<td>± 8. 0.0066</td>
</tr>
<tr>
<td>a</td>
<td>163.0</td>
<td>± 4. 0.0610</td>
</tr>
<tr>
<td>a</td>
<td>223.0</td>
<td>± 9. 0.0170</td>
</tr>
<tr>
<td>a</td>
<td>256.0</td>
<td>± 9. 0.3550</td>
</tr>
<tr>
<td>a</td>
<td>259.0</td>
<td>± 9. 0.0250</td>
</tr>
<tr>
<td>a</td>
<td>381.0</td>
<td>± 10. 0.0420</td>
</tr>
<tr>
<td>a</td>
<td>400.0</td>
<td>± 10. 0.0630</td>
</tr>
<tr>
<td>a</td>
<td>486.0</td>
<td>± 10. 0.0054</td>
</tr>
<tr>
<td>a</td>
<td>651.0</td>
<td>± 12. 0.0180</td>
</tr>
<tr>
<td>a</td>
<td>737.0</td>
<td>± 12. 0.0920</td>
</tr>
<tr>
<td>a</td>
<td>804.0</td>
<td>± 13. 0.0040</td>
</tr>
<tr>
<td>a</td>
<td>943.0</td>
<td>± 14. 0.0160</td>
</tr>
<tr>
<td>a</td>
<td>1061.0</td>
<td>± 16. 0.0045</td>
</tr>
<tr>
<td>a</td>
<td>1076.0</td>
<td>± 16. 2.000</td>
</tr>
<tr>
<td>a</td>
<td>1187.0</td>
<td>± 17. 0.00150</td>
</tr>
<tr>
<td>a</td>
<td>1295.0</td>
<td>± 18. 0.0070</td>
</tr>
<tr>
<td>a</td>
<td>1765.0</td>
<td>± 24. 0.00370</td>
</tr>
<tr>
<td>a</td>
<td>2430.0</td>
<td>± 30. 97.70</td>
</tr>
</tbody>
</table>

\[<E_p\text{ PER DECAY} = 989.9\]
\[<E_e\text{ PER DECAY} = 1407.\]
<table>
<thead>
<tr>
<th>Decay Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>$^{141}$Ce</td>
</tr>
</tbody>
</table>

ENDF/B-IV FILE 1

Comments

58-CE-141 ANC,HEDL EVAL-FEB74 C.W.REICH DECAY DATA
EVAL-OCT74 R.E.SCHENTER AND F.SCHMITTROTH CROSS SECTION DATA
DIST-KOV74

$^{141}$Ce

- \( T_{1/2} = 32.53 \times 10^{-5} \) days
- \( \langle E_\gamma \rangle \) PER DECAY = 159.5 keV
- \( \langle E_\beta \rangle \) PER DECAY = 71.70 keV

CROSS SECTIONS (BARNES)

- TOTAL 22000
  - WESTCOTT G FACTOR = 3.5953 x 10^{-4}
  - CAPTURE 22000
  - WESTCOTT G FACTOR = 2.9000 x 10^{-1}
  - RESONANCE INTEGRAL TOTAL = 2.31 x 10^{-1}
  - RESONANCE INTEGRAL CAPTURE = 2.00 x 10^{-1}

FISSION YIELDS

- 235U THERMAL = 2.311 x 10^{-7}
- 235U FAST = 2.234 x 10^{-7}
- 239Pu THERMAL = 8.798 x 10^{-7}


<table>
<thead>
<tr>
<th>Decay</th>
<th>Q-value</th>
<th>BR</th>
</tr>
</thead>
<tbody>
<tr>
<td>$^{141}$Pr</td>
<td>580.94 eV</td>
<td>1.00</td>
</tr>
</tbody>
</table>

STABLE OR LONG-LIVED

141 - 58-7
<table>
<thead>
<tr>
<th>Cross Sections (Barns)</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \sigma \text{ TOTAL 2200m/s} )</td>
</tr>
<tr>
<td>( \sigma \text{ CAPTURE 2200m/s} )</td>
</tr>
<tr>
<td>( \text{WESTCOTT G FACTOR} )</td>
</tr>
<tr>
<td>( \text{WESTCOTT G FACTOR} )</td>
</tr>
<tr>
<td>( \text{RESONANCE INTEGRAL TOTAL} )</td>
</tr>
<tr>
<td>( \text{RESONANCE INTEGRAL CAPTURE} )</td>
</tr>
<tr>
<td>( \text{RESONANCE INTEGRAL (N,2N)} )</td>
</tr>
<tr>
<td>( \text{RESONANCE INTEGRAL (N,P)} )</td>
</tr>
<tr>
<td>( \text{RESONANCE INTEGRAL (N,\alpha)} )</td>
</tr>
</tbody>
</table>
\( ^{125} \text{Te} \)

ENDF/B-IV FILE 1 COMMENTS
52-TE-142
HEDL
EVAL-APR74 R.E.SCHENTER
DIST-NOV74
REFERENCES
HALF-LIFE: R.SCHENTER, THEORY(9/73)

\[ T_{1/2} = 4913 \text{s} \]
\[ \langle E \rangle \text{ PER DECAY} = 1740 \text{eV} \]
\[ \langle E \rangle \text{ PER DECAY} = 2890 \text{eV} \]

FISSION YIELDS

\[ \begin{array}{ll}
235U \text{ THERMAL} & 7.2339 \times 10^{-9} \\
235U \text{ FAST} & 1.3902 \times 10^{-8} \\
238U \text{ FAST} & 3.0097 \times 10^{-6}
\end{array} \]

\[ Q_\sigma = 6640 \text{eV} \]
\[ BR_{\sigma} = 1.000 \]

\( ^{131} \text{I} \)

\[ T_{1/2} = 1.960 \text{s} \]
\[ \langle E \rangle \text{ PER DECAY} = 2904 \text{eV} \]
\[ \langle E \rangle \text{ PER DECAY} = 3992 \text{eV} \]

FISSION YIELDS

\[ \begin{array}{ll}
235U \text{ THERMAL} & 2.2092 \times 10^{-5} \\
233U \text{ FAST} & 2.4454 \times 10^{-5} \\
238U \text{ FAST} & 7.2382 \times 10^{-5} \\
239Pu \text{ THERMAL} & 2.4697 \times 10^{-6}
\end{array} \]

\[ Q_\sigma = 9740 \text{eV} \]
\[ BR_{\sigma} = 1.000 \]

\( ^{129} \text{Xe} \)

\[ 1.2204 \pm 0.020 \text{s} \]

142 - 52-1

\( ^{133} \text{I} \)

ENDF/B-IV FILE 1 COMMENTS
53-1-142
HEDL
EVAL-APR74 R.E.SCHENTER
DIST-NOV74
REFERENCES
HALF-LIFE: R.SCHENTER, THEORY(9/73)

\[ T_{1/2} = 1.960 \text{s} \]
\[ \langle E \rangle \text{ PER DECAY} = 2904 \text{eV} \]
\[ \langle E \rangle \text{ PER DECAY} = 3992 \text{eV} \]

FISSION YIELDS

\[ \begin{array}{ll}
235U \text{ THERMAL} & 2.2092 \times 10^{-5} \\
233U \text{ FAST} & 2.4454 \times 10^{-5} \\
238U \text{ FAST} & 7.2382 \times 10^{-5} \\
239Pu \text{ THERMAL} & 2.4697 \times 10^{-6}
\end{array} \]

\[ Q_\sigma = 9740 \text{eV} \]
\[ BR_{\sigma} = 1.000 \]

142 - 53-1
\(^{142}\) Xe

ENDF/B-IV FILE 1 COMMENTS
54-XE-142 MEDL EVAL-APR74 R.E.SCHENTER
DIST-NDV74
REFERENCES
DELAYED NEUTRON BRANCHING-L TOMLINSON, ADANDT, 12, 79(9/73)

\(^{142}\) Xe

\(T_{1/2} \approx 1.220 \times 10^{-6}\)
\(\langle E_x \rangle \) PER DECAY = 1097.
\(\langle E_y \rangle \) PER DECAY = 1765.

FISSION YIELDS
\(^{235}\)U THERMAL 3.7118 \times 10^{-7}
\(^{235}\)U FAST 4.5004 \times 10^{-3}
\(^{239}\)U THERMAL 2.0687 \times 10^{-2}
\(^{239}\)PU THERMAL 8.3739 \times 10^{-4}

\(Q_x = 605.1\)
\(BR_x = 0.991 \times 0.0009\)
\(BR_x = 0.9949\)

\(^{142}\) Cs

ENDF/B-IV FILE 1 COMMENTS
55-CS-142 MEDL EVAL-APR74 R.E.SCHENTER
DIST-NDV74
REFERENCES
DELAYED NEUTRON BRANCHING-L TOMLINSON, ADANDT, 12, 79(9/73)

\(^{142}\) Cs

\(T_{1/2} \approx 1.704 \times 10^{-6}\)
\(\langle E_x \rangle \) PER DECAY = 2045.
\(\langle E_y \rangle \) PER DECAY = 2545.

FISSION YIELDS
\(^{235}\)U THERMAL 2.4542 \times 10^{-2}
\(^{235}\)U FAST 2.5217 \times 10^{-2}
\(^{239}\)U FAST 2.1866 \times 10^{-2}
\(^{239}\)PU THERMAL 1.2824 \times 10^{-4}

\(Q_x = 1126\)
\(BR_x = 0.0021 \times 0.0006\)
\(BR_x = 0.9979\)

\(^{142}\) Ba

\(25.0 \times 0.3\)

\(^{142}\) Xe

142 - 54 - 1

142 - 55 - 1
\[ ^{142} \text{Ba} \]

ENDF/B-IV FILE 1 COMMENTS
56-Ba-142 ANC
EVAL-FEB74 C.W.REICH
DECAY DATA
DIST-NOV74
FOR FILE DESCRIPTION SEE CW REICH, RG HELMER AND MN PUTMAN,
ANER-1197,ENDF/B-IV,8/74.
PREPARED FOR FILE 8/73 CWR
REFERENCES 0-1975 REVISION OF MAPSTRA-GOVE MASS TABLES
OTHER - J.T. LARSEN ET AL. PHYS. REV. C 5,1372 (1971)

\[
\begin{align*}
&\gamma \text{142 Ba} \\
&\begin{align*}
&\gamma_{\text{142}} = 10.70 \times 10^{-10} \\
&\langle E_{\gamma} \rangle \text{ PER DECAY} = 428.3 \\
&\langle E_{\gamma} \rangle \text{ PER DECAY} = 1013. \\
&\text{FISSION YIELDS} \\
&\text{239U THERMAL} = 3.0015 \times 10^{-2} \\
&\text{239U FAST} = 2.4004 \times 10^{-2} \\
&\text{239Np FAST} = 6.0019 \times 10^{-3} \\
&\text{239Pu THERMAL} = 3.2657 \times 10^{-2} \\
\end{align*}
\end{align*}
\]

\[
\begin{align*}
&\text{Q}_{\gamma} = 2200, \pm 100, \\
&\text{BR}_{\gamma} = 1.050
\end{align*}
\]

\[
\begin{align*}
&\gamma \text{142 Ba} \\
&\gamma_{\text{142}} = 92.4 \times 0.3
\end{align*}
\]

142 - 56 - 1
\(^{142}\)La

**ENDF/B-IV FILE 1 COMMENTS**

97-1A-142 ANC CUAL-FERTIG C.W REICH

**DECAY DATA**

DIST-KDV74

FOR FILE DESCRIPTION SEE IW REICH, K.G HEMMER AND MH PUTMAN,
ANC-1157, ENDF/B-6.8/74.

PREPARED FOR FILE B/73 CUR

REFERENCES D-1973 REVISION OF WAPSTRA-GOVE MASS TABLE,
OTHER - J. T. LARSEN ET AL., PHYS. REV. C 3, 1372 (1971)

\[ ^{142}_{\text{La}} \]

- \( T_{\text{1/2}} = 92.4 \times 10^{-3} \text{m} \)
- \( \langle E_x \rangle \text{ PER DECAY} = 947.0 \text{MeV} \)
- \( \langle E_y \rangle \text{ PER DECAY} = 2565. \text{MeV} \)

**FISSION YIELDS**

- \( 235\text{U THERMAL} \quad 1.0127 \times 10^{-3} \)
- \( 235\text{U FAST} \quad 8.4538 \times 10^{-4} \)
- \( 239\text{U FAST} \quad 2.4658 \times 10^{-5} \)
- \( 239\text{Pu THERMAL} \quad 1.8211 \times 10^{-2} \)

\[ Q_{\gamma} = 5517.4 \text{MeV} \]

\[ \text{BR}_{\gamma} = 1.000 \]

**\(^{142}_{\text{Ce}}\)**

- \( \frac{t}{t_{1/2}} = 1.049 \times 10^{11} \text{y} \)

142 - 57 - 1
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Energy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>3314.70</td>
<td>± 0.20</td>
<td>1.27 ± 0.20</td>
</tr>
<tr>
<td>3334.2</td>
<td>± 0.7</td>
<td>0.05 ± 0.05</td>
</tr>
<tr>
<td>3464.8</td>
<td>± 7</td>
<td>0.74 ± 0.19</td>
</tr>
<tr>
<td>3612.10</td>
<td>± 0.20</td>
<td>1.83 ± 0.20</td>
</tr>
<tr>
<td>3652.70</td>
<td>± 0.20</td>
<td>1.08 ± 0.20</td>
</tr>
<tr>
<td>3729.10</td>
<td>± 0.20</td>
<td>1.29 ± 0.10</td>
</tr>
<tr>
<td>3768.3</td>
<td>± 0.8</td>
<td>0.05 ± 0.05</td>
</tr>
<tr>
<td>3805.4</td>
<td>± 0.1</td>
<td>0.25 ± 0.10</td>
</tr>
<tr>
<td>3975.60</td>
<td>± 0.20</td>
<td>0.05 ± 0.05</td>
</tr>
<tr>
<td>4045.2</td>
<td>± 0.3</td>
<td>0.05 ± 0.05</td>
</tr>
</tbody>
</table>

\[ \langle E_{\text{photon}} \rangle \text{ PER DECAY } = 2585. \approx 70. \]

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>( E_{\text{max}} )</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \gamma )</td>
<td>474.0</td>
<td>146.</td>
<td>5</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>798.0</td>
<td>270.</td>
<td>8</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>600.0</td>
<td>270.</td>
<td>8</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>542.0</td>
<td>287.</td>
<td>9</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>844.0</td>
<td>315.</td>
<td>9</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>904.0</td>
<td>315.</td>
<td>10</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>1047.0</td>
<td>377.</td>
<td>10</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>1097.0</td>
<td>377.</td>
<td>12</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>1776.0</td>
<td>697.</td>
<td>12</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>1821.0</td>
<td>718.</td>
<td>22</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>1850.0</td>
<td>752.</td>
<td>22</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>1974.0</td>
<td>789.</td>
<td>24</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>2119.0</td>
<td>857.</td>
<td>30</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>2153.0</td>
<td>873.</td>
<td>30</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>2350.0</td>
<td>957.</td>
<td>30</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>2515.0</td>
<td>1046.</td>
<td>30</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>2664.0</td>
<td>1213.</td>
<td>40</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>2981.0</td>
<td>1270.</td>
<td>40</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>3876.0</td>
<td>1777.</td>
<td>50</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>4517.0</td>
<td>2022.</td>
<td>60</td>
</tr>
</tbody>
</table>

\[ \langle E_{\gamma} \rangle \text{ PER DECAY } = 947.0 \]

\[ \langle E_{\beta^-} \rangle \text{ PER DECAY } = 1335. \]
### $^{134}$ Ce

<table>
<thead>
<tr>
<th>Remarks</th>
<th>ENDF/B-IV File</th>
<th>Comments</th>
<th>58-CE-142 HEOL</th>
<th>EVAL-DEC74 F. SCHMITTROTH AND R. E. SCHENTER</th>
<th>DIST-NOV74</th>
</tr>
</thead>
</table>

**$^{134}$ Ce**

- $T_{1/2} = 3.044 \times 10^{14} \text{ yr}$
- $\langle E_a \rangle$ PER DECAY = 1445

**Cross Sections (Barns)**
- $\sigma$ TOTAL 2200/5: 5.9270
- WESTCOTT $G$ FACTOR: 1.1791
- $\sigma$ CAPTURE 2200/5: 9.3000 $\times 10^{-7}$
- WESTCOTT $G$ FACTOR: 1.0000
- RESONANCE INTEGRAL TOTAL: 1.3850 $\times 10^{27}$
- RESONANCE INTEGRAL CAPTURE: 8.5110 $\times 10^{-7}$

**Fission Yields**
- $^{235}$U THERMAL: 6.8448 $\times 10^{-6}$
- $^{233}$U FAST: 3.5660 $\times 10^{-4}$
- $^{233}$U FAST: 1.5000 $\times 10^{-4}$
- $^{239}$Pu THERMAL: 1.4000 $\times 10^{-3}$

\[ Q_{\alpha} = 1641 \text{ eV} \]
\[ B_{\alpha} = 1.000 \]

### $^{138}$ Ba

- Stable or Long-Lived

---

142 - 58 - 1
15 Pr

ENDF/B-IV FILE 1 COMMENTS
59-PR-142M HENL EAVL-MPR74 R.E. SCHENTER
DIST-DEC74
REFERENCES
DIT-R SCHENTER, Theory (9/73)

\[ T_{1/2} = 54.60 \text{m} \]
\[ \langle E_g \rangle \text{ PER DECAY} = 250.0 \]

FISSION YIELDS
\[ 239\text{Pu THERMAL} = 1.3098 \times 10^{-4} \]

\[ Q = 250.0 \]
\[ B_{\gamma 1} = 1.000 \]

\[ 15 \text{ Pr} \]

19.16h

\[ 142m - 59 - 1 \]

15 Pr

ENDF/B-IV FILE 1 COMMENTS
59-PR-142 HENL EAVL-MPR74 R.E. SCHENTER AND F.SCHMITTROTH
DIST-DEC74

FILE INFORMATION
MF=1 MT=457 DECAY DATA
REFERENCES
\[ \beta^-A \text{ TOBIAS(10/72) RD/B/M2453} \]
\[ \beta^+A \text{ TOBIAS(10/72) RD/B/M2453} \]
\[ \gamma \text{ Regeration(10/72) RD/B/M2453} \]

\[ T_{1/2} = 19.16h \]
\[ \langle E_g \rangle \text{ PER DECAY} = 807.0 \]
\[ \langle E_f \rangle \text{ PER DECAY} = 58.20 \]

CROSS SECTIONS (BARNES)
\[ \sigma \text{ TOTAL} = 22000\text{B} \]
\[ \text{WESTCOTT G FACTOR} = 1.145 \]
\[ \sigma \text{ CAPTURE} = 20000\text{B} \]
\[ \text{WESTCOTT G FACTOR} = 1.0000 \]
\[ \text{RESONANCE INTEGRAL TOTAL} = 5.3790 \times 10^{-2} \]
\[ \text{RESONANCE INTEGRAL CAPTURE} = 1.4480 \times 10^{-2} \]

FISSION YIELDS
\[ 239\text{Pu THERMAL} = 1.3198 \times 10^{-4} \]

\[ Q = 2960 \]
\[ B_{\gamma 1} = 1.000 \]

\[ 142 - 59 - 1 \]

\[ 140 \text{ Nd} \]

STABLE OR LONG-LIVED

142 - 59 - 1
<table>
<thead>
<tr>
<th>Decay</th>
<th>Mean Lifetime</th>
<th>Cross Sections (Barns)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Total 2700 m/s 2.326 x 10^-1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fast Capture 1.04 x 10^-1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Capture 1.87 x 10^-1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fast Capture 1.028 x 10^-1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Resonance Integral Total 9.151 x 10^-2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Resonance Integral Capture 9.159</td>
</tr>
</tbody>
</table>

**Stable or Long-Lived**
ENDF/B-IV FILE 1 COMMENTS
53- 1-143 HEDL  EVAL-APR74  R.E.SCHENTER
DIST-NOV74

REFERENCES
HALF-LIFE-R SCHENTER, THEORY (9/73)

\[ T_{1/2} = 3.328\text{s} \]

\[ \langle E_p \rangle \text{ PER DECAY} = 2260 \]

\[ \langle E_y \rangle \text{ PER DECAY} = 3311 \]

Fission Yields:

\[ ^{235}\text{U THERMAL} \quad 8.9313 \times 10^{-7} \]
\[ ^{235}\text{U FAST} \quad 1.0335 \times 10^{-4} \]
\[ ^{239}\text{Pu THERMAL} \quad 1.223 \times 10^{-7} \]

\[ Q_x = 7760 \quad \text{BR}_{x} = 1.000 \]

\[ ^{136}Xe \]

\[ T_{1/2} = 3000\text{s} \]

\[ \langle E_p \rangle \text{ PER DECAY} = 1799 \]

\[ \langle E_y \rangle \text{ PER DECAY} = 2689 \]

Fission Yields:

\[ ^{235}\text{U THERMAL} \quad 5.0999 \times 10^{-4} \]
\[ ^{235}\text{U FAST} \quad 0.0259 \times 10^{-4} \]
\[ ^{239}\text{Pu THERMAL} \quad 1.2244 \times 10^{-5} \]

\[ Q_x = 1056 \quad \text{BR}_{x} = 0.01100 \]

\[ Q_y = 6650 \quad \text{BR}_{y} = 0.9890 \]

\[ ^{136}Xe \]

\[ 1.220\pm 0.020 \text{s} \]

\[ ^{136}Es \]

\[ 1.70\pm 0.10 \text{s} \]

143 - 53 - 1
\[
{ }^{135} \text{Cs} \\
\text{ENDF/B-IV FILE 1 COMMENTS} \\
55-CS-143 HEDL EVAL-APR74 R.E. SCHENTER \\
DIST-NOVA74 \\
\text{REFERENCES} \\
\text{DELAYED NEUTRON BRANCHING-L TOMLINSON, AGANDT, 12, 179(975)} \\
\]

\[
\begin{align*}
{T_{1/2}} & = 22.70 \times 10^3 \text{s} \\
\langle E_p \rangle \text{ PER DECAY} & = 7564 \text{ ev} \\
\langle E_y \rangle \text{ PER DECAY} & = 2709 \text{ ev} \\
\text{FISSION YIELDS} \\
{}^{235} \text{U THERMAL} & = 1.498 \times 10^{-2} \\
{}^{235} \text{U FAST} & = 1.2778 \times 10^{-2} \\
{}^{239} \text{U FAST} & = 2.2957 \times 10^{-2} \\
{}^{235} \text{Pu THERMAL} & = 5.9175 \times 10^{-3} \\
\end{align*}
\]

\[
{ }^{135} \text{Cs} \\
\begin{align*}
Q_p & = 1465 \text{ ev} \\
\text{BR}_p & = 0.0115 \times 0.0025 \\
Q_y & = 5730 \text{ ev} \\
\text{BR}_y & = 0.9887 \\
\end{align*}
\]

\[
\begin{align*}
{ }^{135} & \text{Cs} \\
1.70 \times 10^3 \text{s} \\
\end{align*}
\]

\[
{ }^{135} \text{Ba} \\
\begin{align*}
T_{1/2} & = 13.64 \times 10^3 \text{s} \\
\langle E_p \rangle \text{ PER DECAY} & = 1089 \text{ ev} \\
\langle E_y \rangle \text{ PER DECAY} & = 1570 \text{ ev} \\
\text{FISSION YIELDS} \\
{}^{237} \text{U THERMAL} & = 3.763 \times 10^{-2} \\
{}^{237} \text{U FAST} & = 3.967 \times 10^{-2} \\
{}^{239} \text{U FAST} & = 2.1243 \times 10^{-2} \\
{}^{239} \text{Pu THERMAL} & = 5.3494 \times 10^{-2} \\
\end{align*}
\]

\[
{ }^{135} \text{Ba} \\
\begin{align*}
Q_p & = 4260 \text{ ev} \\
\text{BR}_p & = 1.000 \\
Q_y & = 14.0 \times 1.0 \\
\end{align*}
\]

143 - 56 - 1
ENDF/B-IV FILE 1 COMMENTS
57-LA-143 HEDL EVAL-AD97A R.E.SCHERTER
DIST-NOV74

\[ T_{1/2} = 14.0 \text{ d}, \quad \Gamma_p \text{ PER DECAY} = 831.3 \]
\[ \Gamma_\gamma \text{ PER DECAY} = 1141 \]

FISSION YIELDS
\[ ^{235}\text{U THERMAL} = 6.279 \times 10^{-3} \]
\[ ^{235}\text{U FAST} = 4.073 \times 10^{-3} \]
\[ ^{238}\text{U FAST} = 2.809 \times 10^{-4} \]
\[ ^{239}\text{Pu THERMAL} = 5.944 \times 10^{-3} \]

\[ Q_\gamma = 3300 \]
\[ BR_p = 1.000 \]

\[ 33.00 \text{ d.o.20h} \]

143 - 57 - 1
$^{143}$ Ce

ENDF/B-IV FILE 1 COMMENTS
58-CE-143 ANC, MENDL EVAL JUL74 C.W. REICH DECAY DATA
EVAL OCT74 R.E. SCHENTER AND T. SCHMITTROTH
CROSS SECTION DATA
DIST-NOV74
REFERENCES
C.W. REICH, R.G. HELNER AND M. PUTMAN, ANCR-1157, ENDF/B-IV, 8/74.
0: 1973 REVISION OF WAPETKA-GOVE MASS TABLE.
OTHER: M.A. LUDINGTON, D.E. RAESIDE, J.J. REIDY AND

\[ T_{1/2} = 3.00 \times 10^3 \text{ s} \]
\[ \langle E_p \rangle \text{ PER DECAY} = 19.3 \]
\[ \langle E_\gamma \rangle \text{ PER DECAY} = 293.8 \]

CROSS SECTIONS (BARNs)
- 0 TOTAL 22000/
- WESTCOTT G FACTOR 6.739
- 0 CAPTURE 22000/
- WESTCOTT G FACTOR 10.0000\times 10^{-1}
- RESONANCE INTEGRAL TOTAL 3.1180\times 10^{12}
- RESONANCE INTEGRAL CAPTURE 4.1480\times 10^{11}

FISSION YIELDS
- $^{235}$U THERMAL 3.183\times 10^{-4}
- $^{239}$U FAST 4.9998\times 10^{-7}
- $^{239}$U FAST 1.1432\times 10^{-6}
- $^{239}$Pu THERMAL 1.3132\times 10^{-4}

\[ Q_f = 1444.5 \text{ eV} \]
\[ Q_{BR} = 9.000 \]

$^{143}$ Pr

13.560\times 0.020d
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Mean Energy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>34.0 ± 0.3</td>
<td>3</td>
<td>13.38 ± 0.15</td>
</tr>
<tr>
<td>139.67 ± 0.20</td>
<td>1</td>
<td>1.70 ± 0.03</td>
</tr>
<tr>
<td>231.56 ± 0.03</td>
<td>1</td>
<td>1.74 ± 0.18</td>
</tr>
<tr>
<td>293.262 ± 0.021</td>
<td>1</td>
<td>38.85 ± 0.3</td>
</tr>
<tr>
<td>350.39 ± 0.05</td>
<td>1</td>
<td>3.2 ± 0.3</td>
</tr>
<tr>
<td>371.1 ± 0.4</td>
<td>1</td>
<td>0.201 ± 0.006</td>
</tr>
<tr>
<td>389.69 ± 0.18</td>
<td>1</td>
<td>0.299 ± 0.008</td>
</tr>
<tr>
<td>485.7 ± 0.9</td>
<td>4</td>
<td>2.17 ± 0.21</td>
</tr>
<tr>
<td>555.86 ± 0.21</td>
<td>1</td>
<td>0.025 ± 0.008</td>
</tr>
<tr>
<td>537.28 ± 0.15</td>
<td>1</td>
<td>2.4 ± 0.04</td>
</tr>
<tr>
<td>664.55 ± 0.10</td>
<td>1</td>
<td>5.2 ± 0.5</td>
</tr>
<tr>
<td>721.96 ± 0.11</td>
<td>1</td>
<td>5.0 ± 0.5</td>
</tr>
<tr>
<td>791.5 ± 0.3</td>
<td>1</td>
<td>0.97 ± 0.004</td>
</tr>
<tr>
<td>870.3 ± 0.9</td>
<td>4</td>
<td>0.97 ± 0.08</td>
</tr>
<tr>
<td>937.8 ± 0.3</td>
<td>1</td>
<td>0.01 ± 0.006</td>
</tr>
<tr>
<td>1025.8 ± 3.4</td>
<td>4</td>
<td>0.126 ± 0.015</td>
</tr>
<tr>
<td>1102.98 ± 0.18</td>
<td>1</td>
<td>0.36 ± 0.05</td>
</tr>
<tr>
<td>1224.6 ± 0.4</td>
<td>1</td>
<td>0.012 ± 0.004</td>
</tr>
<tr>
<td>1359.9 ± 0.8</td>
<td>1</td>
<td>0.0037 ± 0.0012</td>
</tr>
</tbody>
</table>

< Photon > per decay = 2315

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Particle</th>
<th>Type</th>
<th>E_max</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE</td>
<td>349.1</td>
<td>70.99</td>
<td>± 0.005</td>
<td>12.91</td>
</tr>
<tr>
<td>p-</td>
<td>46.0</td>
<td>11.81</td>
<td></td>
<td>0.0000</td>
</tr>
<tr>
<td>p+</td>
<td>62.0</td>
<td>16.05</td>
<td></td>
<td>0.0000</td>
</tr>
<tr>
<td>p</td>
<td>284.0</td>
<td>81.72</td>
<td></td>
<td>0.3900</td>
</tr>
<tr>
<td>p</td>
<td>384.0</td>
<td>116.9</td>
<td></td>
<td>0.1000</td>
</tr>
<tr>
<td>p</td>
<td>506.0</td>
<td>157.9</td>
<td></td>
<td>1.2400</td>
</tr>
<tr>
<td>p</td>
<td>592.0</td>
<td>208.1</td>
<td></td>
<td>0.0000</td>
</tr>
<tr>
<td>p</td>
<td>722.0</td>
<td>270.3</td>
<td></td>
<td>0.0040</td>
</tr>
<tr>
<td>p</td>
<td>1093.0</td>
<td>392.1</td>
<td></td>
<td>2.50</td>
</tr>
<tr>
<td>p</td>
<td>1387.0</td>
<td>526.6</td>
<td></td>
<td>46.70</td>
</tr>
</tbody>
</table>

< E > per decay = 429.1

< E_p > per decay = 732.1

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy</th>
<th>I/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>p-</td>
<td>1093.0</td>
<td>46.70</td>
</tr>
<tr>
<td>p+</td>
<td>1387.0</td>
<td>39.10</td>
</tr>
<tr>
<td>p</td>
<td>293.262</td>
<td>0.021</td>
</tr>
<tr>
<td>p</td>
<td>722.0</td>
<td>38.85</td>
</tr>
<tr>
<td>p</td>
<td>722.0</td>
<td>12.50</td>
</tr>
<tr>
<td>p</td>
<td>5.524</td>
<td>9.341</td>
</tr>
</tbody>
</table>

< E > per decay = 429.1

< E_p > per decay = 732.1
113 Pr

ENDF/B-IV FILE 1

COMMENTS
59-PR-143

ANC, HEOL
EVAL-DEC74
C.W. REICH
DECAY DATA
EVAL-DEC74
R.E. SCHONER AND F. SCHMIDTROTH
CROSS SECTION DATA
DIST-DEC74

FILE INFORMATION

MF=1 MT=457 DECAY DATA
REFERENCES
C.W. REICH, RD HELMER AND MH PUTMAN, ANCR-1157, ENDF/B-IV, 8/74,
Q-1973 MAPSTRA-GOVE MASTABLE

----------

113 Pr

\( T_{1/2} = 13.58 \times 10^8 \text{ s} \)

\( \langle \beta \rangle \text{ per decay} = 323.9 \text{ keV} \)

CROSS SECTIONS (BARNs)

\( \sigma \text{ TOTAL} 2200 \text{ b} \)

\( \sigma \text{ WASTED FACTOR} 1.053 \times 10^2 \)

\( \sigma \text{ CAPTURE} 2200 \text{ b} \)

\( \sigma \text{ WASTED FACTOR} 8.98 \times 10^3 \)

\( \text{ RESONANCE INTEGRAL TOTAL} 6.392 \times 10^2 \)

\( \text{ RESONANCE INTEGRAL CAPTURE} 1.893 \times 10^2 \)

FISSION YIELDS

\( ^{235}\text{U} \text{ THERMAL} 2.73 \times 10^{-4} \)

\( ^{233}\text{U} \text{ FAST} 3.64 \times 10^{-4} \)

\( ^{239}\text{Pu} \text{ THERMAL} 9.40 \times 10^{-4} \)

----------

\( G_\beta = 931.2 \times 2.0 \)

\( \text{B.R.} = 1.000 \)

----------

129 Nd

STABLE OR LONG-LIVED

----------

143-59-1
<table>
<thead>
<tr>
<th>TYPE</th>
<th>E_{max}</th>
<th>MEAN ENERGY</th>
<th>INTENSITY/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>β-</td>
<td>931.0</td>
<td>323.9</td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;E_{p}&gt; per decay = 323.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;E_{p}&gt; per decay = 607.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**CHARACTERISTIC RADIATION TABLE**

<table>
<thead>
<tr>
<th>TYPE</th>
<th>ENERGY</th>
<th>1/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>β-</td>
<td>931.0</td>
<td>100.0</td>
</tr>
<tr>
<td>$^{143}\text{Nd}$</td>
<td>$^{144}\text{Nd}$</td>
<td></td>
</tr>
<tr>
<td>----------------</td>
<td>----------------</td>
<td></td>
</tr>
<tr>
<td>STABLE OR LONG-LIVED</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**CROSS SECTIONS (BARNs)**

<table>
<thead>
<tr>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>o TOTAL 2200 m/s</td>
<td>$3.939 \times 10^{-2}$</td>
</tr>
<tr>
<td>WESTCOTT G FACTOR</td>
<td>$1.0182$</td>
</tr>
<tr>
<td>o CAPTURE 2200 m/s</td>
<td>$3.2308 \times 10^{-7}$</td>
</tr>
<tr>
<td>WESTCOTT G FACTOR</td>
<td>$9.9666 \times 10^{-1}$</td>
</tr>
<tr>
<td>RESONANCE INTEGRAL TOTAL</td>
<td>$8.2550 \times 10^{-2}$</td>
</tr>
<tr>
<td>RESONANCE INTEGRAL CAPTURE</td>
<td>$1.3130 \times 10^{-7}$</td>
</tr>
<tr>
<td>RESONANCE INTEGRAL (N,p)</td>
<td>$1.9090$</td>
</tr>
<tr>
<td>RESONANCE INTEGRAL (N,a)</td>
<td>$5.9230 \times 10^{-3}$</td>
</tr>
</tbody>
</table>
ENDFB/IV FILE 1 COMMENTS

53 - 1 - 144 HEDL

EVAL-APR74 R.E.SCHENTER
DIST-NOV74

REFERENCES
HALF LIFE - R SCHENTER, THEORY (9/73)

-----

\[ \frac{T_{1/2}}{t} = 1327 \]
\[ \langle E_p \rangle \text{ PER DECAY} = 3014. \]
\[ \langle E_{\gamma} \rangle \text{ PER DECAY} = 4203. \]

FISSION YIELDS

\[ ^{235}\text{U THERMAL} = 3.1965 \times 10^{-8} \]
\[ ^{235}\text{U FAST} = 5.0710 \times 10^{-8} \]
\[ ^{239}\text{Pu THERMAL} = 3.4308 \times 10^{-9} \]

\[ Q_{f} = 10230. \]
\[ B_{f} = 1.000 \]

-----

\[ ^{131}\text{Xe} \]

\[ 1.000 \]

144 - 53 - 1

-----

\[ ^{131}\text{Xe} \]

ENDFB/IV FILE 1 COMMENTS

54 - XE - 144 HEDL

EVAL-APR74 R.E.SCHENTER
DIST-NOV74

-----

\[ \frac{T_{1/2}}{t} = 1200 \]
\[ \langle E_p \rangle \text{ PER DECAY} = 1201. \]
\[ \langle E_{\gamma} \rangle \text{ PER DECAY} = 2004. \]

FISSION YIELDS

\[ ^{235}\text{U THERMAL} = 6.0381 \times 10^{-5} \]
\[ ^{235}\text{U FAST} = 1.0524 \times 10^{-4} \]
\[ ^{239}\text{Pu THERMAL} = 1.3425 \times 10^{-5} \]

\[ Q_{f} = 4670. \]
\[ B_{f} = 1.000 \]

-----

\[ ^{144}\text{Cs} \]

\[ 1.02 \times 0.04 \]

144 - 54 - 1
\texttt{\textdaggerleft Cs}

\texttt{ENDFB/IV FILE 1 COMMENTS}

55-CS-144 HECL EVAL-APR74 R.E.SCHENTER
DIST-NOV74

\texttt{REFERENCES}
DELAYED NEUTRON BRANCHING-L TOMLINSON,ADANOT,12,179(973)

\texttt{\textdagger Cs}

\texttt{T_{1/2} = 1.628 \pm 0.049}
\texttt{<E_p> PER DECAY = 2350.}
\texttt{<E_y> PER DECAY = 3041.}

\texttt{FISSION YIELDS}
\texttt{235U THERMAL \: 2.8172 \times 10^{-3}}
\texttt{235U FAST \: 5.2572 \times 10^{-3}}
\texttt{239PU THERMAL \: 1.5957 \times 10^{-3}}

\texttt{Q_{\beta} = 1885.}
\texttt{BR_{\beta} = 0.010 \pm 0.023}
\texttt{BR_{\gamma} = 0.9890}

\texttt{\textdagger Bam}

\texttt{1.70 \pm 0.30s}

\texttt{\textdaggerleft Ba}

\texttt{11.0 \pm 1.0s}

\texttt{144 - 55-1}

\texttt{\textdaggerleft BA}

\texttt{ENDFB/IV FILE 1 COMMENTS}

56-BA-144 HECL EVAL-APR74 R.E.SCHENTER
DIST-NOV74

\texttt{\textdagger Ba}

\texttt{T_{1/2} = 11.0 \pm 1.0s}
\texttt{<E_p> PER DECAY = 647.9}
\texttt{<E_y> PER DECAY = 1046.}

\texttt{FISSION YIELDS}
\texttt{235U THERMAL \: 3.9817 \times 10^{-2}}
\texttt{235U FAST \: 3.6465 \times 10^{-2}}
\texttt{239Pu THERMAL \: 2.4088 \times 10^{-2}}

\texttt{Q_{\beta} = 2690.}
\texttt{BR_{\beta} = 1.00}

\texttt{\textdagger Lam}

\texttt{40.0 \pm 1.0s}

\texttt{144 - 56-1}
\[ \text{La} \]

57-LA-144 HEAD

FISsON YIELDs

\[ \begin{align*}
\text{\$i^\text{th}} \text{U} & \text{ THERMAL} \quad 1.124 \times 10^{-2} \\
\text{\$i^\text{th}} \text{U} & \text{ FAST} \quad 1.04 \times 10^{-2} \\
\text{\$i^\text{th}} \text{Pu} & \text{ THERMAL} \quad 1.193 \times 10^{-2} \\
\end{align*} \]

\[ \begin{align*}
Q_{\text{f}} & = 5600, \\
S_{\text{f}} & = 1.000 \\
\end{align*} \]

\[ \begin{align*}
\text{\$i^\text{th}} \text{Cm} & = \quad 0.005 \\
\text{\$i^\text{th}} \text{Cm} & = \quad 0.005 \\
\end{align*} \]
## 144 Ce

**ENDF/B-IV FILE 1**

**COMMENTS**

58-Ce=144 HEOL.ARC EVAL-UC74 F.SCHMITTROTH AND R.E.SCHENTER CROSS SECTION DATA

**FILE INFORMATION**

MF=1 MT=457 DECAY DATA

**REFERENCES**


- 1975 REVISION OF ANPSTR-AOGE MASS TABLE.

OTHER:


### 134 Ce

- $T_1/2 = 4,778\times 10^9$ yr
- $\langle E_p \rangle$ PER DECAY = 82.96 ev
- $\langle E_{\gamma} \rangle$ PER DECAY = 28.87 ev

### CROSS SECTIONS (Barns)

- $\sigma_{\text{TOTAL}}$ 2200 MeV 6.024 barn
- WETSCOTT 1.1701
- $\sigma_{\text{CAPTURE}}$ 2200 MeV 1.1701
- WETSCOTT 0.9992x10^(-1)
- RESONANCE INTEGRAL TOTAL 1.3620x10^(-2)
- RESONANCE INTEGRAL CAPTURE 2.0680

### FISSION YIELDS

- $^{235}\text{U}$ THERMAL $6.316\times 10^{-4}$
- $^{235}\text{U}$ FAST $4.3025\times 10^{-4}$
- $^{239}\text{Pu}$ THERMAL $8.3692\times 10^{-4}$
- $^{239}\text{Pu}$ FAST $8.2492\times 10^{-4}$

### Other

- $Q_{\beta} = 256.5\pm1.5$
- $Q_{\beta} = 315.5\pm1.5$
- $BR_{\beta} = 0.01200$
- $BR_{\beta} = 0.0880$

### 144 Pr

- $7.20\pm0.23$ m
- $17.28\pm0.03$ m
### Photon Radiation Table

<table>
<thead>
<tr>
<th>MEAN ENERGY</th>
<th>LINES</th>
<th>PHOTONS/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>65.5 ± 4.5</td>
<td>5</td>
<td>2.3 ± 0.5</td>
</tr>
<tr>
<td>135.53 ± 0.03</td>
<td>1</td>
<td>10.8 ± 0.6</td>
</tr>
</tbody>
</table>

\( \langle E_{\text{PHOTON}} \rangle \) PER DECAY = 16.0 ± 0.9

### Particle Radiation Table

<table>
<thead>
<tr>
<th>TYPE</th>
<th>( E_{\text{MAX}} )</th>
<th>MEAN ENERGY</th>
<th>INTENSITY/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \beta^- )</td>
<td>182.0 ± 50.1</td>
<td>± 1.6</td>
<td>19.4 ± 0.7</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>236.0 ± 65.4</td>
<td>± 1.9</td>
<td>12.8 ± 0.10</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>316.0 ± 92.0</td>
<td>± 2.0</td>
<td>4.2 ± 0.3</td>
</tr>
</tbody>
</table>

\( \langle E_{\beta} \rangle \) PER DECAY = 83.0 ± 2.3

\( \langle E_{\gamma} \rangle \) PER DECAY = 204.0 ± 1.9

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>TYPE</th>
<th>ENERGY</th>
<th>1/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \beta^- )</td>
<td>316.0 ± 1.5</td>
<td>76.3 ± 0.7</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>182.0 ± 1.5</td>
<td>19.4 ± 0.7</td>
</tr>
</tbody>
</table>
ENDFB-IV FILE 1 COMMENTS
59-PR-144M ANC  EVAL-FEB74 C.W.REICH  DIST-DEC74
FOR FILE DESCRIPTION SEE C.W.REICH,RG HELMER AND MH PUTMAN,
AMCR-1157,ENDF210,8/74.
REFERENCE
G-1973 WAPSTRA-GOVE MASSABLE

\[ {}^{139}\text{Pr} \]
\[ T_{1/2} = 7.20 \times 10^5 \text{y} \]
\[ <E_β^+> \text{ PER DECAY} = 3.000 \]
\[ <E_β^-> \text{ PER DECAY} = 59.73 \]

FISSION YIELDS
\[ {}^{235}\text{U} \text{ THERMAL} \]
\[ 5.48 \times 10^{-5} \%
\[ {}^{235}\text{U} \text{ FAST} \]
\[ 2.40 \times 10^{-5} \%
\[ {}^{239}\text{Pu} \text{ THERMAL} \]
\[ 8.45 \times 10^{-5} \%

\[ Q_x = 3056.43 \text{MeV} \]
\[ B(R_{	ext{f}}) = 0.00050 \]
\[ Q_1 = 19.00 \text{MeV} \]
\[ B(R_{	ext{f}}) = 0.9995 \]

\[ {}^{139}\text{Nd} \]
\[ 2.09 \times 10^{15} \text{y} \]

\[ {}^{139}\text{Pr} \]
\[ 17.28 \times 10^{15} \text{y} \]
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Mean Energy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>59.00</td>
<td>1</td>
<td>99.96</td>
</tr>
<tr>
<td>696.4</td>
<td>1</td>
<td>0.0000</td>
</tr>
<tr>
<td>833.8</td>
<td>1</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

\[^{<E_{\text{phot}}}>\text{ per decay} = 59.73\]

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\gamma$</td>
<td>1545.0</td>
<td>59.7</td>
</tr>
</tbody>
</table>

\[^{<E_{\text{\gamma}}}>\text{ per decay} = .2953\]

\[^{<E_{\text{\gamma}}}>\text{ per decay} = .4762\]

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy</th>
<th>1/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\gamma$</td>
<td>59.00</td>
<td>99.95</td>
</tr>
</tbody>
</table>
$^{155}$ Pr

ENDF/B-IV FILE 1 COMMENTS
59-DR-144 ANC 59-DR-144 ANC
EVAL-JUL74 C.W.REICH 59-DR-144 ANC
DIST-0674 59-DR-144 ANC
FOR FILE DESCRIPTION SEE CN REICH, RG WELMER AND MH PUTMAN,
ANC-V-1757,ENDF/B-5.874.
PREPARED FOR FILE 7/76 CWR
REFERENCE D- 1973 REVISION OF WAPSTRA-GOVE MASS TABLE.
OTHER- M.J. MARTIN AND P.H. BLICHERT-TOFT,NUCLEAR
DATA TABLES A 8, NOS.1-2 (1970)

$^{155}$ Pr

\[
T_{1/2} = 17.28 \times 0.03 \text{m}
\]
\[
\langle E_x \rangle \text{ PER DECAY} = 1263.
\]
\[
\langle E_y \rangle \text{ PER DECAY} = 31.01
\]

\[
\text{E155Y YIELDS}
\]
\[
235\text{U THERMAL} 6.8537 \times 10^{-7}
\]
\[
235\text{U FAST} 1.2535 \times 10^{-6}
\]
\[
239\text{Pu THERMAL} 5.0995 \times 10^{-8}
\]
\[
239\text{Pu THERMAL} 2.2597 \times 10^{-6}
\]

\[
Q_{\alpha} = 2997.3 \times 3.
\]
\[
BR_{\alpha} = 1.000
\]

$^{156}$ Pr

\[
Q_{\beta} = 2.099 \times 10^{17}
\]

144 - 59-1
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Mean Energy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>696.48</td>
<td>0.09</td>
<td>1</td>
</tr>
<tr>
<td>1489.14</td>
<td>0.07</td>
<td>1</td>
</tr>
<tr>
<td>2185.72</td>
<td>0.05</td>
<td>1</td>
</tr>
</tbody>
</table>

\[ \langle E_{\text{photon}} \rangle \text{ per decay} = 31.0 \pm 0.8 \]

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>( E_{\text{max}} )</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \gamma )</td>
<td>410.0</td>
<td>275.</td>
<td>0.8</td>
</tr>
<tr>
<td>( \beta )</td>
<td>2000.0</td>
<td>943.</td>
<td>30</td>
</tr>
<tr>
<td>( \beta )</td>
<td>2996.0</td>
<td>1277.</td>
<td>40</td>
</tr>
</tbody>
</table>

\[ \langle E_{\text{p}} \rangle \text{ per decay} = 1263. \pm 40 \]

\[ \langle E_{\text{\beta}} \rangle \text{ per decay} = 1792.2 \pm 1.4 \]

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy</th>
<th>( I/100 \text{ Decays} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \beta )</td>
<td>2996.</td>
<td>3.</td>
</tr>
</tbody>
</table>

\[ 97.75 \pm 0.06 \]
### 144 Nd

**ENDF/B-IV FILE 1 COMMENTS**
60-ND-164  HEDL  EVAL-01774  R.E.SCHENTER AND F.SCHMIDT
01ST-DEC74

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>T_{1/2}</td>
<td>=2.099x10^{-1}</td>
</tr>
<tr>
<td>\langle E_0 \rangle</td>
<td>PER DECAY =1907</td>
</tr>
</tbody>
</table>

**CROSS SECTIONS (BARNs)**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL 2200M/S</td>
<td>9.6317x10^{-1}</td>
</tr>
<tr>
<td>WESTCOTT G FACTOR</td>
<td>1.6652</td>
</tr>
<tr>
<td>CAPTURE 2200M/S</td>
<td>3.8670</td>
</tr>
<tr>
<td>WESTCOTT G FACTOR</td>
<td>1.0004</td>
</tr>
<tr>
<td>RESONANCE INTEGRAL TOTAL</td>
<td>6.3800x10^{-2}</td>
</tr>
<tr>
<td>RESONANCE INTEGRAL CAPTURE</td>
<td>5.6270</td>
</tr>
</tbody>
</table>

**FISSION YIELDS**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>233U THERMAL</td>
<td>0.6252x10^{-6}</td>
</tr>
<tr>
<td>233U FAST</td>
<td>2.2304x10^{-6}</td>
</tr>
<tr>
<td>239U FAST</td>
<td>2.2898x10^{-7}</td>
</tr>
</tbody>
</table>

Q_m =1894,
B_{2m} =1.000

- 118 Em
- STABLE OR LONG-LIVED

144 - 60- 1
ENDF/B-IV FILE 1 COMMENTS
55-1-145 HEDL EVAL-APR74 R.E.SCHENTER
DIST-NOV74

REFERENCES
HALF LIFE-R. SCHENTER, THEORY(9/75)

\[ T_{1/2} = 1.867 \text{s} \]
\[ \langle E_A \rangle \text{ PER DECAY} = 2423. \]
\[ \langle E_f \rangle \text{ PER DECAY} = 3795. \]

\[ Q_p = 8660. \]
\[ BR_p = 21.900 \]

\[ X_e = 0.9009 \]

145 - 55-1

ENDF/B-IV FILE 1 COMMENTS
54-XE-145 HEDL EVAL-APR74 R.E.SCHENTER
DIST-NOV74

\[ T_{1/2} = 9000 \text{s} \]
\[ \langle E_A \rangle \text{ PER DECAY} = 1986. \]
\[ \langle E_f \rangle \text{ PER DECAY} = 3050. \]

FISSION YIELDS
\[ 235^{\text{Th}} \text{ THERMAL} \quad 8.044 \times 10^{-7} \]
\[ 235^{\text{Th}} \text{ FAST} \quad 6.511 \times 10^{-8} \]
\[ 239^{\text{Pu}} \text{ FAST} \quad 2.155 \times 10^{-4} \]
\[ 239^{\text{Pu}} \text{ THERMAL} \quad 1.3998 \times 10^{-4} \]

\[ Q_p = 77140. \]
\[ BR_p = 1.000 \]

\[ X_e = 0.58 \times 0.03 \]

145 - 54-1
\[ {}^{133} \text{Cs} \]

ENDF/B-IV FILE 1 COMMENTS
55-CS-145 HEDL EVAL-APR74 R.E.SCHENTER
DIST-70V74

REFERENCES
DELAYED NEUTRON BRANCHING-T ENGLAND.THEORY(12/74)

\[
T_{1/2} = 56.05 \text{s.} \quad \langle \frac{\Gamma}{\nu} \rangle \text{ PER DECAY} = 1647. \quad \langle \frac{\Gamma}{\nu} \rangle \text{ PER DECAY} = 2381.
\]

FISSION YIELDS
\[
235\text{U THERMAL} \quad 6.7025 \times 10^{-4} \\
235\text{U FAST} \quad 1.0034 \times 10^{-3} \\
239\text{Pu THERMAL} \quad 5.6111 \times 10^{-5} \\
239\text{Pu THERMAL} \quad 3.9199 \times 10^{-4}
\]

\[ G_p = 2236. \quad B_K^p = 0.94600 \]

\[ 145 - 55 - 1 \]

\[ {}^{144} \text{Ba} \]

ENDF/B-IV FILE 1 COMMENTS
56-BA-145 HEDL EVAL-APR74 R.E.SCHENTER
DIST-70V74

\[
T_{1/2} = 6.2x.4s \quad \langle \frac{\Gamma}{\nu} \rangle \text{ PER DECAY} = 1287. \quad \langle \frac{\Gamma}{\nu} \rangle \text{ PER DECAY} = 1922.
\]

FISSION YIELDS
\[
235\text{U THERMAL} \quad 1.9107 \times 10^{-2} \\
239\text{U FAST} \quad 1.9772 \times 10^{-2} \\
239\text{Pu FAST} \quad 2.9170 \times 10^{-2} \\
239\text{Pu THERMAL} \quad 1.2886 \times 10^{-2}
\]

\[ G_p = 4950. \quad B_K^p = 1.000 \]

\[ 145 - 56 - 1 \]
\[^{79}\text{La}}\]

ENDFB/IV FILE 1 COMMENTS
57-LA-145 HEQL
EVAL-APR74 R.E.SCHENTER
DIST-NOV74

\[^{79}\text{La}}\]

\(T_{1/2} = 29.0 \pm 1.0 \text{s}\)
\(<E_p> \text{ PER DECAY } = 1058\text{ MeV}\)
\(<E_x> \text{ PER DECAY } = 1520\text{ MeV}\)

FISSION YIELDS

\(^{235}\text{U THERMAL } 1.7197 \times 10^{-2}\)
\(^{235}\text{U FAST } 1.4846 \times 10^{-2}\)
\(^{239}\text{U FAST } 4.889 \times 10^{-3}\)
\(^{239}\text{Pu THERMAL } 1.4456 \times 10^{-2}\)

\(Q_p = 4150\)
\(B_{Qp} = 1.000\)

\[^{60}\text{Co}}\]

3.3 ± 3s

\[^{145} = 57-1\]

\[^{79}\text{Ce}}\]

ENDFB/IV FILE 1 COMMENTS
58-CE-145 ANC
EVAL-FEB74 F.W.REICH
DIST-NOV74
FOR FILE DESCRIPTION SEE F.W.REICH, A.C.HLEM, AND M.H.PUTMAN,
ANCR-1157,ENDF/IV,8/74.
REFERENCE 1973 WAPSTRA-Gove MASS TABLE

\[^{79}\text{Ce}}\]

\(T_{1/2} = 53.4 \pm 3\text{m}\)
\(<E_p> \text{ PER DECAY } = 629.9\text{ MeV}\)
\(<E_x> \text{ PER DECAY } = 746.9\text{ MeV}\)

FISSION YIELDS

\(^{235}\text{U THERMAL } 2.3457 \times 10^{-1}\)
\(^{235}\text{U FAST } 1.8528 \times 10^{-3}\)
\(^{239}\text{U FAST } 9.8791 \times 10^{-1}\)
\(^{239}\text{Pu THERMAL } 3.1066 \times 10^{-3}\)

\(Q_p = 2400 \pm 100\)
\(B_{Qp} = 1.000\)

\[^{145} = 58-1\]
ENDF/B-IV FILE 1 COMMENTS
59-PR-145 ANC
EVAL-FEB74 C.W.REICH
DIST-DEC74
FOR FILE DESCRIPTION SEE CM.REICH,RG HELMER AND MH PUTMAN,
ANCR-1157,ENDF210.8/74.
REFERENCE Q-1973 WAPSTRA-GYE MAStABLE

\begin{verbatim}
\frac{1}{2} \text{Pr}
\end{verbatim}

\begin{verbatim}
59-PR-145 ANC
EVAL-FEB74 C.W.REICH
DIST-DEC74
FOR FILE DESCRIPTION SEE CM.REICH,RG HELMER AND MH PUTMAN,
ANCR-1157,ENDF210.8/74.
REFERENCE Q-1973 WAPSTRA-GYE MAStABLE
\end{verbatim}
PHOTON RADIATION TABLE

<table>
<thead>
<tr>
<th>MEAN ENERGY</th>
<th>LINES</th>
<th>PHOTONS/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>72.00</td>
<td>1</td>
<td>0.2270</td>
</tr>
<tr>
<td>675.7</td>
<td>1</td>
<td>0.4000</td>
</tr>
<tr>
<td>748.9</td>
<td>1</td>
<td>0.3775</td>
</tr>
<tr>
<td>970.4</td>
<td>1</td>
<td>0.1820</td>
</tr>
<tr>
<td>1033.0</td>
<td>1</td>
<td>0.1308</td>
</tr>
<tr>
<td>1161.0</td>
<td>1</td>
<td>0.1416</td>
</tr>
<tr>
<td>1462.0</td>
<td>1</td>
<td>0.2247</td>
</tr>
</tbody>
</table>

\( \langle E_{\text{photon}} \rangle \text{ PER DECAY} = 13.78 \)

PARTICLE RADIATION TABLE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>( E_{\text{max}} )</th>
<th>MEAN ENERGY</th>
<th>INTENSITY/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \beta^- )</td>
<td>-410.0</td>
<td>133.8</td>
<td>0.4000</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>-640.0</td>
<td>207.8</td>
<td>0.1500</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>-1050.0</td>
<td>375.8</td>
<td>0.9400</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>-1750.0</td>
<td>676.1</td>
<td>0.2600</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>-1805.0</td>
<td>710.7</td>
<td>98.30</td>
</tr>
</tbody>
</table>

\( \langle E_{\text{p}} \rangle \text{ PER DECAY} = 704.7 \)

\( \langle E_{\text{e}} \rangle \text{ PER DECAY} = 1087.7 \)

CHARACTERISTIC RADIATION TABLE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>ENERGY</th>
<th>1/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \beta^- )</td>
<td>1805</td>
<td>98.30</td>
</tr>
<tr>
<td><strong>Nd</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>64 Nd</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>STABLE OR LONG-LIVED</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CROSS SECTIONS (Barns)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma$ TOTAL 2200M/S</td>
<td>$4.2895 \times 10^{-1}$</td>
<td></td>
</tr>
<tr>
<td>WESTCOTT G FACTOR</td>
<td>1.0035</td>
<td></td>
</tr>
<tr>
<td>$\sigma$ CAPTURE 2200M/S</td>
<td>$4.2003 \times 10^{-1}$</td>
<td></td>
</tr>
<tr>
<td>WESTCOTT G FACTOR</td>
<td>1.0009</td>
<td></td>
</tr>
<tr>
<td>RESONANCE INTEGRAL TOTAL</td>
<td>$8.2700 \times 10^{-2}$</td>
<td></td>
</tr>
<tr>
<td>RESONANCE INTEGRAL CAPTURE</td>
<td>$2.3730 \times 10^{-2}$</td>
<td></td>
</tr>
<tr>
<td>RESONANCE INTEGRAL (N,2n)</td>
<td>1.7870</td>
<td></td>
</tr>
<tr>
<td>RESONANCE INTEGRAL (N,p)</td>
<td>$2.0670 \times 10^{-3}$</td>
<td></td>
</tr>
<tr>
<td>RESONANCE INTEGRAL (n,$\alpha$)</td>
<td>$5.6670 \times 10^{-3}$</td>
<td></td>
</tr>
<tr>
<td><strong>FISSION YIELDS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$^{235}$U THERMAL</td>
<td>$4.0622 \times 10^{-9}$</td>
<td></td>
</tr>
<tr>
<td>$^{235}$U FAST</td>
<td>$2.8504 \times 10^{-9}$</td>
<td></td>
</tr>
<tr>
<td>$^{239}$Pu THERMAL</td>
<td>$1.1798 \times 10^{-8}$</td>
<td></td>
</tr>
</tbody>
</table>
$^{136}\text{Xe}$

**ENDF/B-IV FILE 1 COMMENTS**

**FILE NAME** 54-XE-146 HEDL EVAL-APR74 R.E.SCHENTER D107-NOV74

**REFERENCES**

HALF LIFES-R. SCHENTER, THEORY(9/73)

<table>
<thead>
<tr>
<th>$^{136}\text{Xe}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$T_{1/2}$ = 937.2 s</td>
</tr>
<tr>
<td>$\langle E\rangle$ PER DECAY = 144.9 MeV</td>
</tr>
<tr>
<td>$\langle E\rangle$ PER DECAY = 250.4 MeV</td>
</tr>
</tbody>
</table>

**FISSION YIELDS**

<table>
<thead>
<tr>
<th>$^{235}\text{U}$ THERMAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1.220 \times 10^{-7}$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>$^{235}\text{U}$ FAST</th>
</tr>
</thead>
<tbody>
<tr>
<td>$2.510 \times 10^{-7}$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>$^{239}\text{Pu}$ THERMAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>$5.790 \times 10^{-8}$</td>
</tr>
</tbody>
</table>

$Q_e$ = 5570 MeV, $BR_g$ = 1.000

$^{138}\text{Cs}$

<table>
<thead>
<tr>
<th>$^{138}\text{Cs}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$T_{1/2}$ = 190.4 s</td>
</tr>
<tr>
<td>$\langle E\rangle$ PER DECAY = 247.8 MeV</td>
</tr>
<tr>
<td>$\langle E\rangle$ PER DECAY = 332.1 MeV</td>
</tr>
</tbody>
</table>

**FISSION YIELDS**

<table>
<thead>
<tr>
<th>$^{235}\text{U}$ THERMAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>$7.430 \times 10^{-5}$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>$^{235}\text{U}$ FAST</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1.210 \times 10^{-4}$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>$^{239}\text{Pu}$ THERMAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>$5.180 \times 10^{-5}$</td>
</tr>
</tbody>
</table>

$Q_e$ = 2086 MeV, $BR_e$ = 0.93900

$^{137}\text{Cs}$

<table>
<thead>
<tr>
<th>$^{137}\text{Cs}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$T_{1/2}$ = 56.8 s</td>
</tr>
</tbody>
</table>

$Q_e$ = 8540 MeV, $BR_e$ = 0.9610

$^{138}\text{Ba}$

<table>
<thead>
<tr>
<th>$^{138}\text{Ba}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$T_{1/2}$ = 2.204 s</td>
</tr>
</tbody>
</table>

146 - 56 - 1
\[ \frac{1}{2} \text{ Bu} \]

ENDF/B-IV FILE 1 COMMENTS
56-BA-146 HEDL
EVAL-APR74 R.E. SCHENTER
DIST-NOV74

\[ T_{1/2} = 2.20 \times 20 \text{s} \]
\[ \langle E_d \rangle \text{ PER DECAY} = 724.5 \]
\[ \langle E_y \rangle \text{ PER DECAY} = 1216. \]

FISSION YIELDS

\[ ^{235}\text{U} \text{ THERMAL} \quad 6.554 \times 10^{-5} \]
\[ ^{235}\text{U} \text{ FAST} \quad 7.742 \times 10^{-3} \]
\[ ^{239}\text{Pu} \text{ THERMAL} \quad 3.887 \times 10^{-3} \]

\[ Q = 2970 \]
\[ BR_{\mu} = 1.000 \]

\[ \frac{1}{2} \text{ Ia} \]

8.33 x 34

146 - 56 - 1

\[ \frac{1}{2} \text{ Ia} \]

ENDF/B-IV FILE 1 COMMENTS
57-LA-146 HEDL
EVAL-APR74 R.E. SCHENTER
DIST-NOV74

\[ T_{1/2} = 8.33 \times 33 \text{s} \]
\[ \langle E_d \rangle \text{ PER DECAY} = 1768. \]
\[ \langle E_y \rangle \text{ PER DECAY} = 2358. \]

FISSION YIELDS

\[ ^{235}\text{U} \text{ THERMAL} \quad 1.630 \times 10^{-2} \]
\[ ^{235}\text{U} \text{ FAST} \quad 1.557 \times 10^{-2} \]
\[ ^{239}\text{Pu} \text{ THERMAL} \quad 1.334 \times 10^{-2} \]

\[ Q = 6450. \]
\[ BR_{\mu} = 1.000 \]

\[ \frac{1}{2} \text{ K} \]

146 - 57 - 1
$^{146}$ Ce

ENDF/B-IV FILE 1 COMMENTS
58-CE-146 AND
EVAL-FTD74 C.W.REICH
DIST-NOV74
FOR FILE DESCRIPTION SEE
C.W.REICH, RG HELMER AND MH PUTMAN,
ANCR-1757, ENDF210, 8/74.
REFERENCE
0-1973 WAPSTRA-DOWE MASSABLE

\begin{tabular}{ll}
& \\
$T_{1/2}$ & $14.2 \pm 0.8 $s \\
$<E_{v}>$ PER DECAY & 242.7 eV \\
$<E_{r}>$ PER DECAY & 514.3 eV \\
FISSION YIELDS & \\
$^{235}U$ THERMAL & $6.9024 \times 10^{-4}$ \\
$^{235}U$ FAST & $5.4735 \times 10^{-4}$ \\
$^{239}U$ FAST & $7.0310 \times 10^{-4}$ \\
$^{239}Pu$ THERMAL & $7.9466 \times 10^{-4}$ \\
\end{tabular}

\[ G_{1} = 1040.260 \]
$B_{Y} = 1.000$ \\
$^{146}$ Pr \\
$24.2 \pm 0.20$ m
### PHOTON RADIATION TABLE

<table>
<thead>
<tr>
<th>MEAN ENERGY</th>
<th>LINES</th>
<th>PHOTONS/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>86.80</td>
<td>1</td>
<td>1.176</td>
</tr>
<tr>
<td>98.30</td>
<td>1</td>
<td>1.756</td>
</tr>
<tr>
<td>100.9</td>
<td>1</td>
<td>1.400</td>
</tr>
<tr>
<td>133.5</td>
<td>1</td>
<td>7.840</td>
</tr>
<tr>
<td>142.0</td>
<td>1</td>
<td>5.496</td>
</tr>
<tr>
<td>231.1</td>
<td>4</td>
<td>43.51</td>
</tr>
<tr>
<td>317.0</td>
<td>1</td>
<td>50.00</td>
</tr>
<tr>
<td>351.5</td>
<td>1</td>
<td>.3920</td>
</tr>
<tr>
<td>413.4</td>
<td>1</td>
<td>1.430</td>
</tr>
<tr>
<td>468.0</td>
<td>1</td>
<td>.6720</td>
</tr>
<tr>
<td>503.0</td>
<td>1</td>
<td>1.232</td>
</tr>
</tbody>
</table>

\[ \langle E_{\text{PHOTON}} \rangle \text{ PER DECAY} = 514.5 \]

### PARTICLE RADIATION TABLE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>( E_{\text{MAX}} )</th>
<th>MEAN ENERGY</th>
<th>INTENSITY/100 DECAYS</th>
</tr>
</thead>
</table>
\[ \langle E_{\Delta} \rangle \text{ PER DECAY} = 242.7 \]
\[ \langle E_{\beta} \rangle \text{ PER DECAY} = 487.3 \]

### CHARACTERISTIC RADIATION TABLE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>ENERGY</th>
<th>I/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \beta )</td>
<td>730.0</td>
<td>100.0</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>317.0</td>
<td>56.00</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>218.6</td>
<td>23.52</td>
</tr>
</tbody>
</table>
\[ \begin{array}{l}
\text{\textsuperscript{146} Pr} \\
\text{ENDF/B-IV FILE 1 COMMENTS} \\
\text{59-PR-146 ANC EVAL-FEB74 D.W.REICH} \\
\text{DECAY DATA} \\
\text{DIST-DEC74} \\
\text{FOR FILE DISCISSION SEE CN REICH, RG HELMER AND MH PUTMAN,} \\
\text{ANCR-1557,ENDF/B-IV.} \\
\text{REFERENCE} \\
\text{O-1973 WAPstra-Gove MASSSTABLE}
\end{array} \]

\[ \begin{array}{l}
\text{\textsuperscript{146} Pr} \\
\text{T_{1/2} =24.20\pm 0.20\text{d}} \\
\text{\langle E_q \rangle \text{ PER DECAY } =927.9} \\
\text{\langle E_{\gamma} \rangle \text{ PER DECAY } =1635.} \\
\text{FISSION YIELDS} \\
\text{\textsuperscript{235}U THERMAL} =8.778\times 10^{-3} \\
\text{\textsuperscript{235}U FAST} =6.845\times 10^{-3} \\
\text{\textsuperscript{239}Pu THERMAL} =1.489\times 10^{-4} \\
\text{\textsuperscript{239}Pu FAST} =1.659\times 10^{-4} \\
\text{G_{0}} =4080.\times 100. \\
\text{BR_{\gamma} =1.000} \\
\text{\textsuperscript{146} No} \\
\text{STABLE OR LONG-LIVED}
\end{array} \]
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Mean Energy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>453.9</td>
<td>1</td>
<td>88.00</td>
</tr>
<tr>
<td>562.7</td>
<td>1</td>
<td>4944</td>
</tr>
<tr>
<td>589.7</td>
<td>1</td>
<td>7216</td>
</tr>
<tr>
<td>601.2</td>
<td>1</td>
<td>5397</td>
</tr>
<tr>
<td>735.6</td>
<td>1</td>
<td>14.40</td>
</tr>
<tr>
<td>789.0</td>
<td>1</td>
<td>12.16</td>
</tr>
<tr>
<td>922.2</td>
<td>1</td>
<td>4.796</td>
</tr>
<tr>
<td>1017.1</td>
<td>1</td>
<td>2.244</td>
</tr>
<tr>
<td>1084.2</td>
<td>1</td>
<td>1.578</td>
</tr>
<tr>
<td>1282.1</td>
<td>1</td>
<td>0.816</td>
</tr>
<tr>
<td>1365.1</td>
<td>4</td>
<td>12.19</td>
</tr>
<tr>
<td>1453.1</td>
<td>1</td>
<td>4.221</td>
</tr>
<tr>
<td>1472.1</td>
<td>1</td>
<td>2.244</td>
</tr>
<tr>
<td>1520.0</td>
<td>1</td>
<td>32.00</td>
</tr>
<tr>
<td>1691.0</td>
<td>1</td>
<td>1.276</td>
</tr>
<tr>
<td>2176.0</td>
<td>1</td>
<td>0.8008</td>
</tr>
<tr>
<td>2228.0</td>
<td>1</td>
<td>1.118</td>
</tr>
<tr>
<td>2256.4</td>
<td>1</td>
<td>2.244</td>
</tr>
<tr>
<td>2356.0</td>
<td>1</td>
<td>1.443</td>
</tr>
</tbody>
</table>

<\(\langle E_{\text{photon}}\rangle\) per decay = 1635.

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>a-</td>
<td>283.0</td>
<td>75.6</td>
<td>1.830</td>
</tr>
<tr>
<td>a-</td>
<td>433.0</td>
<td>131.8</td>
<td>1.830</td>
</tr>
<tr>
<td>a-</td>
<td>803.0</td>
<td>271.7</td>
<td>1.830</td>
</tr>
<tr>
<td>a-</td>
<td>1047.0</td>
<td>372.5</td>
<td>4.900</td>
</tr>
<tr>
<td>a-</td>
<td>1403.0</td>
<td>527.7</td>
<td>1.830</td>
</tr>
<tr>
<td>a-</td>
<td>1587.0</td>
<td>601.6</td>
<td>7.340</td>
</tr>
<tr>
<td>a-</td>
<td>1827.0</td>
<td>720.0</td>
<td>4.771</td>
</tr>
<tr>
<td>a-</td>
<td>2077.0</td>
<td>837.5</td>
<td>4.771</td>
</tr>
<tr>
<td>a-</td>
<td>2397.0</td>
<td>989.1</td>
<td>1.830</td>
</tr>
<tr>
<td>a-</td>
<td>2727.0</td>
<td>1147.0</td>
<td>5.500</td>
</tr>
<tr>
<td>a-</td>
<td>3627.0</td>
<td>1595.0</td>
<td>21.10</td>
</tr>
</tbody>
</table>

<\(\langle E_p\rangle\) per decay = 927.9
<\(\langle E_e\rangle\) per decay = 1322.

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy</th>
<th>1/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>a-</td>
<td>453.9</td>
<td>88.00</td>
</tr>
<tr>
<td>a-</td>
<td>2077.0</td>
<td>47.71</td>
</tr>
<tr>
<td>a-</td>
<td>1587.0</td>
<td>32.00</td>
</tr>
<tr>
<td>a-</td>
<td>3627.0</td>
<td>21.10</td>
</tr>
<tr>
<td>a-</td>
<td>1378.0</td>
<td>14.40</td>
</tr>
<tr>
<td>a-</td>
<td>735.6</td>
<td>14.40</td>
</tr>
<tr>
<td>a-</td>
<td>1378.0</td>
<td>8.958</td>
</tr>
</tbody>
</table>

<\(\langle E_x\rangle\) per decay = 927.9
<\(\langle E_x\rangle\) per decay = 1322.
$^{154}$Nd

STABLE OR LONG-LIVED

CROSS SECTIONS (BARNs)

- TOTAL $2.900 \times 10^3$
- WESTCOTT G FACTOR 1.0729
- CAPTURE 2200M/S 1.4006
- WESTCOTT G FACTOR 1.0047
- RESONANCE INTEGRAL TOTAL 2.0820 $\times 10^{-2}$
- RESONANCE INTEGRAL CAPTURE 3.3160
- RESONANCE INTEGRAL $(N,2N)$ 1.2650
- RESONANCE INTEGRAL $(N,P)$ 1.0000 $\times 10^{-3}$
- RESONANCE INTEGRAL $(N,\alpha)$ 1.5880 $\times 10^{-3}$

EMISSION YIELDS

- $^{239}$U THERMAL 1.3007 $\times 10^{-7}$
- $^{239}$U FAST 8.0633 $\times 10^{-8}$
- $^{239}$Pu THERMAL 5.959 $\times 10^{-7}$
\( ^{132} \text{Xe} \)

ENDF/B-IV FILE 1 COMMENTS
54-XE-147 HEDL EVAL-APR74 R.E.SCHENTER DIST-NOV74
REFERENCES
HALF LIFE-R SCHENTER, THEORY (9/73)

\[ T_{1/2} = 5.26 \text{h} \]
\[ \langle E_x \rangle \text{ PER DECAY} = 2384 \]
\[ \langle E_x \rangle \text{ PER DECAY} = 3532 \]

FISSION YIELDS
235U THERMAL \( 2.4357 \times 10^{-8} \)
235U FAST \( 1.6517 \times 10^{-9} \)
239U FAST \( 1.3564 \times 10^{-9} \)

\[ Q_x = 7900 \]
\[ Q_{\text{Th}} = 1.000 \]

\[ ^{132} \text{Cs} \]
\[ 0.5579 \]

147 - 54 - 1

\( ^{133} \text{Cs} \)

ENDF/B-IV FILE 1 COMMENTS
55-CS-147 HEDL EVAL-APR74 R.E.SCHENTER DIST-NOV74
REFERENCES
HALF LIFE-R SCHENTER, THEORY (9/73)

\[ T_{1/2} = 0.5579 \text{h} \]
\[ \langle E_x \rangle \text{ PER DECAY} = 1963 \]
\[ \langle E_x \rangle \text{ PER DECAY} = 2944 \]

FISSION YIELDS
235U THERMAL \( 6.0016 \times 10^{-4} \)
235U FAST \( 5.3603 \times 10^{-4} \)
239U FAST \( 3.9075 \times 10^{-4} \)
239Pu THERMAL \( 2.1440 \times 10^{-6} \)

\[ Q_x = 6970 \]
\[ Q_{\text{Th}} = 1.000 \]

\[ ^{134} \text{Ba} \]
\[ 2.222 \]

147 - 55 - 1
$^{132}$ Ba

ENDF/B-IV FILE 1 COMMENTS
56-BA-147 HECL EVAL-APR74 R.E.SCHENTER
DIST-NOV74
REFERENCES
HALF LIFE-R SCHENTER,THEORY(9/73)

$^{132}$ Ba

$T_{1/2} = 2.2271$

$\langle E_{x} \rangle$ PER DECAY $= 1441.$

$\langle E_{y} \rangle$ PER DECAY $= 2271.$

FISSION YIELDS

$^{235}$U THERMAL $= 2.753 \times 10^{-3}$

$^{235}$U FAST $= 1.429 \times 10^{-3}$

$^{239}$U THERMAL $= 1.017 \times 10^{-2}$

$^{239}$Pu THERMAL $= 6.952 \times 10^{-4}$

$Q_{f} = 5440.$

$BR_{g} = 1.000$

$^{133}$ La

10.00%

147 - 56 - 1

$^{133}$ La

ENDF/B-IV FILE 1 COMMENTS
57-LA-147 HECL EVAL-APR74 R.E.SCHENTER
DIST-NOV74

$^{133}$ La

$T_{1/2} = 10.000$.

$\langle E_{x} \rangle$ PER DECAY $= 1151.$

$\langle E_{y} \rangle$ PER DECAY $= 1774.$

FISSION YIELDS

$^{235}$U THERMAL $= 9.503 \times 10^{-3}$

$^{235}$U FAST $= 9.504 \times 10^{-3}$

$^{239}$U THERMAL $= 1.300 \times 10^{-2}$

$^{239}$Pu THERMAL $= 1.813 \times 10^{-2}$

$Q_{f} = 4460.$

$BR_{g} = 1.000$

$^{134}$ Ke

70.44.5

147 - 57 - 1
147 Ce

ENDF/B-IV FILE 1 COMMENTS
58-CE-147 HEOL
EVAL-APR74 R.E.SCHENTER
DIST-DEC74

T1/2 = 70.24 a

<\prod_e> PER DECAY = 851.8

<\prod_e> PER DECAY = 1271.

FISSION YIELDS

233U THERMAL = 1.1515 x 10^-2

235U FAST = 1.2274 x 10^-2

238U FAST = 2.0964 x 10^-3

239Pu THERMAL = 1.2057 x 10^-2

Q F = 3450,
BR F = 1.000

1/2 Pr

12.0 x 0.5

147 - 58 - 1

147 Pr

ENDF/B-IV FILE 1 COMMENTS
59-PR-147 ANC
EVAL-FEB74 C.W.REICH
DIST-DEC74
FOR FILE DESCRIPTION SEE C.W.REICH,RG HELMER AND MH PUTMAN.
ANCR-1157,ENDF210,8/74.
REFERENCE
Q-1973 WAPSTRA-GOVE MASTABLE

T1/2 = 32.0 x 0.5

<\prod_e> PER DECAY = 748.0

<\prod_e> PER DECAY = 820.1

FISSION YIELDS

233U THERMAL = 5.5197 x 10^-4

235U FAST = 4.2602 x 10^-4

238U FAST = 2.0808 x 10^-3

239Pu THERMAL = 7.8475 x 10^-4

Q F = 2700 x 2000,
BR F = 1.000

1/2 Nd

10.990 + 0.020

147 - 59 - 1
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Energy (keV)</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>77.22</td>
<td>1</td>
<td>15.56</td>
</tr>
<tr>
<td>126.2</td>
<td>1</td>
<td>9.076</td>
</tr>
<tr>
<td>186.4</td>
<td>1</td>
<td>1.361</td>
</tr>
<tr>
<td>326.0</td>
<td>4</td>
<td>32.87</td>
</tr>
<tr>
<td>415.4</td>
<td>1</td>
<td>1.491</td>
</tr>
<tr>
<td>467.5</td>
<td>1</td>
<td>2.139</td>
</tr>
<tr>
<td>477.7</td>
<td>1</td>
<td>6.875</td>
</tr>
<tr>
<td>554.3</td>
<td>1</td>
<td>9.600</td>
</tr>
<tr>
<td>577.4</td>
<td>1</td>
<td>20.10</td>
</tr>
<tr>
<td>640.9</td>
<td>1</td>
<td>21.33</td>
</tr>
<tr>
<td>918.6</td>
<td>1</td>
<td>7.585</td>
</tr>
<tr>
<td>954.0</td>
<td>1</td>
<td>3.760</td>
</tr>
<tr>
<td>996.4</td>
<td>1</td>
<td>1.813</td>
</tr>
<tr>
<td>1132</td>
<td>1</td>
<td>2.982</td>
</tr>
<tr>
<td>1182</td>
<td>1</td>
<td>2.600</td>
</tr>
<tr>
<td>1260</td>
<td>1</td>
<td>7.779</td>
</tr>
<tr>
<td>1300</td>
<td>1</td>
<td>5.769</td>
</tr>
</tbody>
</table>

\[ \langle E_{\text{photon}} \rangle \text{ PER DECAY} = 820.1 \]

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Decay</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \gamma )</td>
<td>1000.0</td>
<td>352.7</td>
<td>5.000</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>1450.0</td>
<td>548.7</td>
<td>30.50</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>2100.0</td>
<td>848.4</td>
<td>60.00</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>2700.0</td>
<td>1154.3</td>
<td>5.000</td>
</tr>
</tbody>
</table>

\[ \langle E_{p} \rangle \text{ PER DECAY} = 748.0 \]
\[ \langle E_{p} \rangle \text{ PER DECAY} = 1152. \]

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy</th>
<th>I/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \alpha )</td>
<td>2100</td>
<td>60.00</td>
</tr>
<tr>
<td>( \alpha )</td>
<td>1450</td>
<td>30.00</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>640.9</td>
<td>21.33</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>577.4</td>
<td>20.10</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>374.4</td>
<td>18.15</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>77.22</td>
<td>15.56</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>554.3</td>
<td>9.400</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>128.2</td>
<td>9.076</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>1260</td>
<td>7.779</td>
</tr>
</tbody>
</table>
$^{147}$ Nd

ENDF/B-IV FILE 1 COMMENTS
60-90-147 ANC, HEDL, Eval-FEB-74, C.W. Reich, DECAY DATA
EVAL-DEC74, R.E. Schenter and F. Schmittroth
CROSS SECTION DATA
DIST-DEC74

FILE INFORMATION
MF=1, MT=457, DECAY DATA
REFERENCES
C.W. Reich, R.G. Helmer and M.H. Putman, ANCR-1157, ENDF/B-10, 8/74,
G-1975 WAPSTRA-GOVE MASSABLE

$^{146}$ Nd

- $T_{1/2} = 10.990 \times 10^3$ yr
- $<E_x>$ PER DECAY = 241.7 MeV
- $<E_y>$ PER DECAY = 118.7 MeV

CROSS SECTIONS (BARN)
- TOTAL 22000 $\pm 6$
- WESTCOTT G FACTOR 1.0950
- CAPTURE 22000 $\pm 6$
- WESTCOTT G FACTOR 1.0800
- RESONANCE INTEGRAL TOTAL $1.2070 \times 10^{-3}$
- RESONANCE INTEGRAL CAPTURE $6.4830 \times 10^{-7}$

FISSION YIELDS
- $^{235}U$ THERMAL $3.9617 \times 10^{-4}$
- $^{235}U$ FAST $2.0305 \times 10^{-4}$
- $^{239}Pu$ THERMAL $4.2966 \times 10^{-4}$
- $^{239}Pu$ THERMAL $6.4891 \times 10^{-8}$

$Q_f = 94.3$ MeV

$\beta^+ = 1.000$

$1.5 \beta^-$

$2.6230 \beta$, $0.005\beta$
PHOTON RADIATION TABLE

<table>
<thead>
<tr>
<th>MEAN ENERGY</th>
<th>LINES</th>
<th>PHOTONS/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>91.10</td>
<td>1</td>
<td>28.00</td>
</tr>
<tr>
<td>120.4</td>
<td>1</td>
<td>.6300</td>
</tr>
<tr>
<td>197.0</td>
<td>1</td>
<td>.6048</td>
</tr>
<tr>
<td>275.4</td>
<td>1</td>
<td>.4872</td>
</tr>
<tr>
<td>319.5</td>
<td>1</td>
<td>1.946</td>
</tr>
<tr>
<td>598.1</td>
<td>1</td>
<td>.6300</td>
</tr>
<tr>
<td>610.9</td>
<td>1</td>
<td>.6732</td>
</tr>
<tr>
<td>439.7</td>
<td>1</td>
<td>1.039</td>
</tr>
<tr>
<td>530.8</td>
<td>1</td>
<td>13.35</td>
</tr>
<tr>
<td>686.1</td>
<td>1</td>
<td>.7112</td>
</tr>
</tbody>
</table>

$\langle E_{\text{PHOTON}} \rangle \text{ PER DECAY} = 118.7$

PARTICLE RADIATION TABLE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>$E_{\text{MAX}}$</th>
<th>MEAN ENERGY</th>
<th>INTENSITY/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>p-</td>
<td>207.0</td>
<td>57.61</td>
<td>2.000</td>
</tr>
<tr>
<td>p-</td>
<td>361.0</td>
<td>107.7</td>
<td>16.50</td>
</tr>
<tr>
<td>p-</td>
<td>404.0</td>
<td>121.8</td>
<td>.6900</td>
</tr>
<tr>
<td>p-</td>
<td>483.0</td>
<td>149.6</td>
<td>.5000</td>
</tr>
<tr>
<td>p-</td>
<td>805.0</td>
<td>271.7</td>
<td>81.00</td>
</tr>
<tr>
<td>p-</td>
<td>894.0</td>
<td>308.7</td>
<td>.5000</td>
</tr>
</tbody>
</table>

$\langle E_p \rangle \text{ PER DECAY} = 241.7$

$\langle E_p \rangle \text{ PER DECAY} = 481.0$

PHOTON INTENSITY PLOT

CHARACTERISTIC RADIATION TABLE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>ENERGY</th>
<th>I/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>p-</td>
<td>303.0</td>
<td>81.00</td>
</tr>
<tr>
<td>p-</td>
<td>91.10</td>
<td>28.00</td>
</tr>
<tr>
<td>p-</td>
<td>361.0</td>
<td>16.00</td>
</tr>
</tbody>
</table>
ENDF/B-IV FILE 1 COMMENTS
61-PR-147 KEOL, BNL EVAL-KOV74 R. SCHENTER AND A. PRINCE
CROSS SECTION DATA
EVAL-FEB74 C. W. REICH DECAY DATA
DIST-DEC74

FILE INFORMATION
MF=1 MT=457 DECAY DATA
REFERENCES
G-1973 WAPTRA-COVE MASSTABLE

T1/2 = 2.6230 ± 0.0003 y
< E0 > PER DECAY = 763.00 keV
< Eγ > PER DECAY = 5.1000 MeV

CROSS SECTIONS (BARNs)
o TOTAL 2200 MeV 1.8923 x 10^-2
o WESTCOTT G. FACTOR 9.9750 x 10^-1
o CAPTURE 2200 MeV 1.3198 x 10^-2
o RESONANCE INTEGRAL TOTAL 3.8870 x 10^-3
o RESONANCE INTEGRAL CAPTURE 2.2700 x 10^-3
o RESONANCE INTEGRAL (N, 2n) 1.3166
o RESONANCE INTEGRAL (N, n) 2.5660 x 10^-1
o RESONANCE INTEGRAL (n, a) 2.4050 x 10^-3

FISSION YIELDS
235U FAST 1.8703 x 10^-9
235U THERMAL 2.2197 x 10^-9

Q0 = 204.5 ± 0.4
8h = 1.000

147 - 61- 1
PHOTON RADIATION TABLE

MEAN ENERGY  LINES  PHOTONS/100 DECAYS
121.7  1  0.0000

$\langle E_{\text{phot}} \rangle \text{ PER DECAY} = 0.09736$

PARTICLE RADIATION TABLE

TYPE  $E_{\text{max}}$  MEAN ENERGY  INTENSITY/100 DECAYS
$\beta-$  103.6  27.23  0.0000
$\beta-$  224.7  63.03  99.92

$\langle E_{\gamma} \rangle \text{ PER DECAY} = 63.00$

$\langle E_{\alpha} \rangle \text{ PER DECAY} = 161.6$

PHOTON INTENSITY PLOT

CHARACTERISTIC RADIATION TABLE

TYPE  ENERGY  1/100 DECAYS
$\beta-$  224.7  99.92
### 147 Sm

#### ENDF/B-IV File 1 Comments
62-SM-147 HEDL, BNL EVAL-NOV74 R.E. SCHENTER AND A. PRINCE
DIST-DEC74

MS-1 WT-447 DECAY DATA

**REFERENCES**

### 147 Sm

- $\tau_{1/2} = (1.069) \times 10^{11}$
- $\langle E_B \rangle$ PER DECAY $= 2330$

### Cross Sections (Barns)

<table>
<thead>
<tr>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Capture</td>
<td>$6.4915 \times 10^{-1}$</td>
</tr>
<tr>
<td>WESTCOTT G. Factor Capture</td>
<td>$9.9356 \times 10^{-1}$</td>
</tr>
<tr>
<td>Capture Capture</td>
<td>$6.4024 \times 10^{-1}$</td>
</tr>
<tr>
<td>WESTCOTT G. Factor Capture</td>
<td>$9.9356 \times 10^{-1}$</td>
</tr>
<tr>
<td>RESONANCE INTEGRAL TOTAL</td>
<td>$1.6470 \times 10^{-3}$</td>
</tr>
<tr>
<td>RESONANCE INTEGRAL Capture</td>
<td>$7.4820 \times 10^{-2}$</td>
</tr>
<tr>
<td>RESONANCE INTEGRAL (n,2n)</td>
<td>$1.7645$</td>
</tr>
<tr>
<td>RESONANCE INTEGRAL (n,p)</td>
<td>$4.3943 \times 10^{-3}$</td>
</tr>
<tr>
<td>RESONANCE INTEGRAL (n,α)</td>
<td>$6.8315 \times 10^{-3}$</td>
</tr>
</tbody>
</table>

### $Q_n$

- $2314$
- $BR_{\alpha} = 1.000$

### Stable

- 147 No
- Stable or Long-Lived
### Cs

**ENDF/B-IV FILE**

- **55-35-144**
- **HDL**
- **EVAL-APR74 R.E.SCHENTER**
- **DIST-NOV74**

**REFERENCES**

- **HALF LIFE**
  - **R. SCHENTER, THEORY (9/73)**

---

### Cs

- **$T_{1/2} = 2.016$ $h$**
- **$\langle E_\gamma \rangle$ PER DECAY $= 2724$**
- **$\langle E_\beta \rangle$ PER DECAY $= 3343$**

**Fission Yields**

- $^{233}U$ THERMAL $= 1.7599 \times 10^{-7}$
- $^{233}U$ FAST $= 2.2304 \times 10^{-5}$
- $^{239}Pu$ THERMAL $= 6.6697 \times 10^{-4}$

- $G_s = 9290$
- $BR_{\gamma} = 1.000$

---

### Ba

- **$I \gamma = 5.9014$**
# 138 Ba

ENDF/B-IV FILE 1 COMMENTS
56-BA-148 HEDL
EVAL-APR74 R.E.SCHENTER
DIST-NOV74

REFERENCES
HALF LIFE - SCHENTER, THEORY (9/75)

<table>
<thead>
<tr>
<th>Decay &amp; Energy</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>T_1/2</td>
<td>5.901</td>
</tr>
<tr>
<td>&lt;E_d&gt; PER DECAY</td>
<td>955.9</td>
</tr>
<tr>
<td>1.75 PER DECAY</td>
<td>1164.</td>
</tr>
</tbody>
</table>

FISSION YIELDS
<table>
<thead>
<tr>
<th>Iso &amp; Decay</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>235U THERMAL</td>
<td>1.4031 x 10^-4</td>
</tr>
<tr>
<td>235U FAST</td>
<td>1.7354 x 10^-4</td>
</tr>
<tr>
<td>239U FAST</td>
<td>3.2712 x 10^-5</td>
</tr>
<tr>
<td>239Pu THERMAL</td>
<td>8.1468 x 10^-5</td>
</tr>
</tbody>
</table>

G, = 3870;
BR, = 1.000

<table>
<thead>
<tr>
<th>Isotope &amp; Decay</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>137 La</td>
<td>1.30 x 10^5</td>
</tr>
</tbody>
</table>

148 - 56-1

# 136 La

ENDF/B-IV FILE 1 COMMENTS
57-LA-148 HEDL
EVAL-APR74 R.E.SCHENTER
DIST-NOV74

<table>
<thead>
<tr>
<th>Decay &amp; Energy</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>T_1/2</td>
<td>1.30 x 10^4</td>
</tr>
<tr>
<td>&lt;E_d&gt; PER DECAY</td>
<td>1934</td>
</tr>
<tr>
<td>&lt;E_0&gt; PER DECAY</td>
<td>2667</td>
</tr>
</tbody>
</table>

FISSION YIELDS
<table>
<thead>
<tr>
<th>Iso &amp; Decay</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>235U THERMAL</td>
<td>3.4015 x 10^-3</td>
</tr>
<tr>
<td>235U FAST</td>
<td>3.6267 x 10^-3</td>
</tr>
<tr>
<td>239U FAST</td>
<td>1.1784 x 10^-2</td>
</tr>
<tr>
<td>239Pu THERMAL</td>
<td>2.5870 x 10^-3</td>
</tr>
</tbody>
</table>

G, = 6930;
BR, = 1.000

<table>
<thead>
<tr>
<th>Isotope &amp; Decay</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>133 Co</td>
<td>43. x 10^4</td>
</tr>
</tbody>
</table>

148 - 57-1
$^{144}$ Ce

ENDF/B-IV FILE 1 COMMENTS

58-CE-148 HEDL

EVAL-APR74 R.E. SCHENTER

DIST-DEC74

\[ T_{1/2} = 4.3 \times 10^4 \text{ a} \]
\[ \langle E_x \rangle \text{ PER DECAY} = 286.9 \]
\[ \langle E_y \rangle \text{ PER DECAY} = 619.6 \]

FISSION YIELDS

$^{235}$U THERMAL \(1.7702 \times 10^{-2}\)

$^{235}$U FAST \(1.512 \times 10^{-2}\)

$^{239}$U FAST \(7.3468 \times 10^{-3}\)

$^{239}$Pu THERMAL \(1.1970 \times 10^{-2}\)

\[ Q_x = 1590 \]
\[ B_R = 1.000 \]

$^{144}$ Pr

ENDF/B-IV FILE 1 COMMENTS

59-PR-148 ANL

EVAL-FEB74 C.W. REICH

DIST-DEC74

FOR FILE DESCRIPTION SEE C.W. REICH, RG HELMER AND MH PUTMAN.

ANCR-1157, ENDF/B-10, 8/74.

REFERENCE


\[ T_{1/2} = 2.00 \times 10^4 \text{ a} \]
\[ \langle E_x \rangle \text{ PER DECAY} = 2044 \]
\[ \langle E_y \rangle \text{ PER DECAY} = 300.0 \]

FISSION YIELDS

$^{235}$U THERMAL \(1.6224 \times 10^{-2}\)

$^{235}$U FAST \(1.4791 \times 10^{-2}\)

$^{239}$U FAST \(1.6104 \times 10^{-4}\)

$^{239}$Pu THERMAL \(2.4457 \times 10^{-3}\)

\[ Q_x = 4800 \]
\[ B_R = 1.000 \]

$^{144}$ Nd

STABLE OR LONG-LIVED

548 - 59 - 1
PHOTON RADIATION TABLE

MEAN ENERGY   LINES   PHOTONS/100 DECAYS
300.0         1       100.0

<\text{PHOTON}> PER DECAY = 300.0

PARTICLE RADIATION TABLE

\begin{tabular}{ccc}
\text{TYPE} & E_{\text{max}} & \text{MEAN ENERGY} & \text{INTENSITY/100 DECAYS} \\
\hline
\text{\text{-}} & 4560.0 & 2044. & 100.0 \\
\end{tabular}

<\text{E}_\text{p}> PER DECAY = 2044.

<\text{E}_\text{p}> PER DECAY = 2716.

CHARACTERISTIC RADIATION TABLE

\begin{tabular}{ccc}
\text{TYPE} & \text{ENERGY} & I/100 DECAYS \\
\hline
\text{\tau} & 500.0 & 100.0 \\
\text{\beta} & 4560.0 & 100.0 \\
\end{tabular}
$^{148}$ Nd

**STABLE OR LONG-LIVED**

**CROSS SECTIONS (BARNs)**
- Total 2200M/s: 2.2025
- Westcott G Factor: 9.8281 x 10^{-1}
- Capture 2200M/s: 2.5077
- Westcott G Factor: 1.0022
- Resonance Integral Total: 6.240 x 10^{11}
- Resonance Integral Capture: 2.060 x 10^{11}
- Resonance Integral (n,2n): 1.2100
- Resonance Integral (n,p): 5.132 x 10^{11}
- Resonance Integral (n,α): 8.390 x 10^{11}

**FISSION YIELDS**
- $^{235}$U Thermal: 1.132 x 10^{-5}
- $^{235}$U Fast: 2.598 x 10^{-5}
- $^{234}$U Fast: 4.099 x 10^{-6}
- $^{238}$Pu Thermal: 6.0 x 10^{-6}

148 - 60 - 1

$^{61}$ Pm

ENDF/B-IV FILE 1 COMMENTS
61-PM-148M ANC:HEDL EVAL-76B+ C.W.REICH DECAY DATA
EVAL-DCT74 R.I.SCHENZLER AND F.SCHMITTROTH CROSS SECTION DATA

**FILE INFORMATION**

MF=1 NT=657 DECAY DATA
REFERENCES
D. V. WAPSTRA AND G. J. GOY, NASSABLE

$^{61}$ Pm

- $T_{1/2}$: 41.30 ± 0.10 d
- $\langle E_x \rangle$ PER DECAY: 147.4 MeV
- $\langle E_f \rangle$ PER DECAY: 2009 MeV

**FISSION YIELDS**
- $^{235}$U Thermal: 7.494 x 10^{-8}
- $^{235}$U Fast: 5.700 x 10^{-8}
- $^{238}$Pu Thermal: 2.089 x 10^{-8}

$G_x$: 2602 ± 70
$BR_x$: 9.400
$BR_{1f}$: 0.06000

$^{78}$ Sm
- $T_{1/2}$: 7.995 x 10^{13} y

$^{148}$ Sm
- $T_{1/2}$: 5.370 x 10^{9} y

148 - 60 - 1
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Mean Energy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>98.50</td>
<td>1</td>
<td>10.10</td>
</tr>
<tr>
<td>189.5</td>
<td>1</td>
<td>1.500</td>
</tr>
<tr>
<td>288.0</td>
<td>1</td>
<td>13.20</td>
</tr>
<tr>
<td>311.7</td>
<td>1</td>
<td>4.000</td>
</tr>
<tr>
<td>414.1</td>
<td>1</td>
<td>18.40</td>
</tr>
<tr>
<td>432.7</td>
<td>1</td>
<td>5.700</td>
</tr>
<tr>
<td>501.1</td>
<td>1</td>
<td>6.800</td>
</tr>
<tr>
<td>550.1</td>
<td>1</td>
<td>95.40</td>
</tr>
<tr>
<td>599.5</td>
<td>1</td>
<td>12.50</td>
</tr>
<tr>
<td>611.7</td>
<td>1</td>
<td>5.500</td>
</tr>
<tr>
<td>629.9</td>
<td>1</td>
<td>89.80</td>
</tr>
<tr>
<td>725.6</td>
<td>1</td>
<td>32.50</td>
</tr>
<tr>
<td>914.9</td>
<td>1</td>
<td>18.70</td>
</tr>
<tr>
<td>1014.1</td>
<td>1</td>
<td>20.20</td>
</tr>
</tbody>
</table>

\[E_{\text{Photon}}\] per decay = 2009.

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\alpha)</td>
<td>397.0</td>
<td>119.4</td>
</tr>
<tr>
<td>(\beta)</td>
<td>495.0</td>
<td>153.9</td>
</tr>
<tr>
<td>(\gamma)</td>
<td>683.0</td>
<td>224.3</td>
</tr>
<tr>
<td>(\delta)</td>
<td>1019.0</td>
<td>360.7</td>
</tr>
</tbody>
</table>

\[E_{\alpha}\] per decay = 147.4

\[E_{\beta}\] per decay = 321.7

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\gamma)</td>
<td>550.1</td>
<td>95.40</td>
</tr>
<tr>
<td>(\beta)</td>
<td>629.9</td>
<td>89.80</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>397.0</td>
<td>51.00</td>
</tr>
<tr>
<td>(\gamma)</td>
<td>725.6</td>
<td>32.50</td>
</tr>
<tr>
<td>(\delta)</td>
<td>683.0</td>
<td>23.00</td>
</tr>
<tr>
<td>(\gamma)</td>
<td>1014.1</td>
<td>20.20</td>
</tr>
<tr>
<td>(\gamma)</td>
<td>914.9</td>
<td>18.70</td>
</tr>
</tbody>
</table>
ENDF/B-IV FILE 1 COMMENTS
61-PM-148 A.N.C. HELDL EVAL-FEB74 C.W. REICH DECAY DATA
EVAL-OCT74 R.E. SCHENTER and F. SCHMITTSTUTZ
CROSS SECTION DATA
DIST-DEC74

FILE INFORMATION
MF=1 MT=457 DECAY DATA
REFERENCES
C.W. REICH, R.G. HELMER, and N.H. PUTMAN, ANCR-1157, ENDF/B-74,
Q-1973 NAPSTRA-GOVE MASSTABLE

---------

\( ^{148} \text{Pm} \)

\( T^{\text{1/2}} _{1/2} = 5.370 \times 10^7 \text{d} \)

\( <E_\gamma> \) PER DECAY \( <744.3 \text{ MeV} > \)

\( <E_\beta> \) PER DECAY \( <630.4 \text{ MeV} > \)

CROSS SECTIONS (BARNS)

\( \chi _{\text{TOT}} \) 2200M/S \( 1.059 \times 10^4 \text{ b} \)

\( \chi _{\text{CAPT}} \) 2200M/S \( 1.062 \times 10^4 \text{ b} \)

\( \chi _{\text{FIS}} \) 2200M/S \( 1.477 \times 10^4 \text{ b} \)

\( \chi _{\text{CONS}} \) 2200M/S \( 1.391 \times 10^3 \text{ b} \)

\( \chi _{\text{INT}} \) \( 3.630 \times 10^3 \text{ b} \)

FISSION YIELDS

\( ^{238} \text{U THERMAL} \) \( 5.76 \times 10^8 \)

\( ^{235} \text{U FAST} \) \( 5.70 \times 10^9 \)

\( ^{239} \text{Pu THERMAL} \) \( 2.0 \times 10^8 \)

---------

\( Q_{\text{f}} = 2405 \pm 10 \text{ MeV} \)

\( B(A) = -1.00 \)

---------

\( ^{148} \text{Sm} \)

\( 7.995 \times 10^{13} \text{s}^{-1} \)

---------

148 - 61 -
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Mean Energy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>550.7</td>
<td>1</td>
<td>25.70</td>
</tr>
<tr>
<td>611.1</td>
<td>1</td>
<td>1.210</td>
</tr>
<tr>
<td>914.9</td>
<td>1</td>
<td>13.70</td>
</tr>
<tr>
<td>1465.0</td>
<td>1</td>
<td>24.30</td>
</tr>
</tbody>
</table>

\(<E_{\text{photon}}\) per decay = 630.4

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>$E_{\text{max}}$</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\beta$</td>
<td>1020.0</td>
<td>361.1</td>
<td>37.00</td>
</tr>
<tr>
<td>$\beta$</td>
<td>1022.0</td>
<td>765.0</td>
<td>15.00</td>
</tr>
<tr>
<td>$\beta$</td>
<td>2467.0</td>
<td>1022.</td>
<td>50.00</td>
</tr>
</tbody>
</table>

\(<E_{\beta}\) per decay = 744.3
\(<E_{\beta}\) per decay = 1116.

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy</th>
<th>1/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\beta$</td>
<td>2467.0</td>
<td>50.00</td>
</tr>
<tr>
<td>$\beta$</td>
<td>1020.0</td>
<td>37.00</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>550.1</td>
<td>25.70</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>1465.0</td>
<td>24.30</td>
</tr>
</tbody>
</table>
\[ \text{\textsuperscript{144} Sn} \]

ENDF/B-V FILE 1 COMMENTS
62-5M-148 HEU1 EVAL-OCT74 R.E.SCHENTER AND F.SCHMITTROTH
DIST-DEC74

\[ \text{T}_{1/2} = 7.995 \times 10^{11} \text{y} \]
\[ \langle E_p \rangle \text{ PER DECAY} = 2018. \]

CROSS SECTIONS (BARNES)
- TOTAL 2200M/S 7.8160
- JESTCOTT G FACTOR 1.1813
- CAPTURE 2200M/S 2.7000
- JESTCOTT G FACTOR 1.0000
- RESONANCE INTEGRAL TOTAL 4.0460 \times 10^{17}
- RESONANCE INTEGRAL CAPTURE 2.7640 \times 10^{11}

- \[ \text{G}_{Q} = 2005. \]
- \[ \text{BR}_{\gamma} = 1.000. \]

\[ \text{\textsuperscript{144} Nd} \]
- \[ \text{STABLE OR LONG-LIVED} \]
$^{137}$ Cs

ENDFB/IV FILE 1 COMMENTS
55-C0-149 HEDL EVAL-APR74 R.E.SCHENTER
DIST-NOV74
REFERENCES
HALF LIFE-R SCHENTER, THEORY(9/73)

$^{137}$ Cs

\[ T_{1/2} = 2.782 \text{ s} \]
\[ \langle \epsilon_\gamma \rangle \text{ PER DECAY} = 2259 \]
\[ \langle \epsilon_\beta \rangle \text{ PER DECAY} = 3483 \]

$Q_x = 7989$
$BR_\beta = 1.000$

$^{134}$ Ba

$^{140}$ Ba

ENDFB/IV FILE 1 COMMENTS
56-BA-149 HEDL EVAL-APR74 R.E.SCHENTER
DIST-NOV74
REFERENCES
HALF LIFE-R SCHENTER, THEORY(9/73)

$^{134}$ Ba

\[ T_{1/2} = 9.175 \text{ s} \]
\[ \langle \epsilon_\gamma \rangle \text{ PER DECAY} = 1642 \]
\[ \langle \epsilon_\beta \rangle \text{ PER DECAY} = 2666 \]

FISSION YIELDS

\[ ^{235}U \text{ THERMAL} \quad 0.0149 \times 10^{-6} \]
\[ ^{235}U \text{ FAST} \quad 1.1282 \times 10^{-5} \]
\[ ^{239}U \text{ FAST} \quad 5.2590 \times 10^{-4} \]
\[ ^{239}Pu \text{ THERMAL} \quad 5.2692 \times 10^{-6} \]

$Q_x = 6200$
$BR_\beta = 1.000$

$^{139}$ La

$^{149}$ - 56 - 1
\textbf{\textsuperscript{149}La}

ENDF/B-IV FILE 1 COMMENTS
57-LA-149 NEDL EVAL-APR76 R.E.SCHENTER
DIST-NOV74

REFERENCES
HALF LIFE-R SCHENTER, THEORY(9/73)

\begin{align*}
\tau_{1/2} & = 2.8846s \\
\langle E_\alpha \rangle \text{ PER DECAY} & = 1400.0 \\
\langle E_\gamma \rangle \text{ PER DECAY} & = 2182.
\end{align*}

FISSION YIELDS
\begin{align*}
\text{\textsuperscript{235}U THERMAL} & = 6.9429\times 10^{-4} \\
\text{\textsuperscript{235}U FAST} & = 7.7188\times 10^{-4} \\
\text{\textsuperscript{238}U FAST} & = 5.8342\times 10^{-4} \\
\text{\textsuperscript{239}Pu THERMAL} & = 5.4112\times 10^{-4}
\end{align*}

\begin{align*}
G_\alpha & = 5360.0 \\
BR_\alpha & = 1.000
\end{align*}

\textbf{\textsuperscript{149}Ce}

ENDF/B-IV FILE 1 COMMENTS
58-CE-149 NEDL EVAL-APR76 R.E.SCHENTER
DIST-DEC74

\begin{align*}
\tau_{1/2} & = 1.00\pm 0.06s \\
\langle E_\alpha \rangle \text{ PER DECAY} & = 989.5 \\
\langle E_\gamma \rangle \text{ PER DECAY} & = 1524.
\end{align*}

FISSION YIELDS
\begin{align*}
\text{\textsuperscript{235}U THERMAL} & = 7.1023\times 10^{-3} \\
\text{\textsuperscript{235}U FAST} & = 7.1597\times 10^{-3} \\
\text{\textsuperscript{238}U FAST} & = 1.0526\times 10^{-2} \\
\text{\textsuperscript{239}Pu THERMAL} & = 7.1668\times 10^{-3}
\end{align*}

\begin{align*}
G_\alpha & = 3930.0 \\
BR_\alpha & = 1.000
\end{align*}

\textbf{\textsuperscript{149}Pr}

\begin{align*}
\tau_{1/2} & = 2.308\pm 0.20m
\end{align*}
$^{149}$ Pr
ENDF/B-V FILE 1 COMMENTS
59-PR-149 ANC EVAL-Fe874 C.W.REICH DECAY DATA
DIST-DEC74
FOR FILE DESCRIPTION SEE C.W.REICH, RG HELMER AND MH PUTMAN,
ANCR-1157, ENDF-210, B74.
REFERENCE
Q-1973 WAPSTRA-GOVE MAStABLE

$^{149}$ Pr

\[ \frac{\alpha}{\beta} = \frac{2.30 \pm 0.20}{1} \]

\[ \langle E_{\alpha} \rangle \text{ PER DECAY} = 1158 \]

\[ \langle E_{\beta} \rangle \text{ PER DECAY} = 231.5 \]

FISSION YIELDS

- $^{235}$U THERMAL: $2.4970 \times 10^{-3}$
- $^{235}$U FAST: $2.8184 \times 10^{-4}$
- $^{239}$Pu THERMAL: $4.5878 \times 10^{-3}$

$Q_{\alpha}$ = $3000 \pm 200$
$B(\alpha,\gamma)$ = $1.000$

$^{148}$ Nd

- $1.770 \pm 0.007$

149 - 59 - 1
**PHOTON RADIATION TABLE**

<table>
<thead>
<tr>
<th>MEAN ENERGY</th>
<th>LINES</th>
<th>PHOTONS/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>91.0</td>
<td>1</td>
<td>2.500</td>
</tr>
<tr>
<td>110.0</td>
<td>1</td>
<td>18.00</td>
</tr>
<tr>
<td>139.0</td>
<td>1</td>
<td>10.00</td>
</tr>
<tr>
<td>165.0</td>
<td>1</td>
<td>16.00</td>
</tr>
<tr>
<td>332.0</td>
<td>1</td>
<td>10.00</td>
</tr>
<tr>
<td>363.0</td>
<td>1</td>
<td>6.000</td>
</tr>
<tr>
<td>431.0</td>
<td>1</td>
<td>8.000</td>
</tr>
<tr>
<td>578.0</td>
<td>1</td>
<td>8.000</td>
</tr>
<tr>
<td>737.0</td>
<td>1</td>
<td>7.000</td>
</tr>
</tbody>
</table>

\( \langle E_{\text{photon}} \rangle \text{ PER DECAY} = 251.3 \)

**PARTICLE RADIATION TABLE**

<table>
<thead>
<tr>
<th>TYPE</th>
<th>( E_{\text{max}} )</th>
<th>MEAN ENERGY</th>
<th>INTENSITY/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \beta^- )</td>
<td>2440.0</td>
<td>1010.0</td>
<td>45.00</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>3000.0</td>
<td>1279.0</td>
<td>55.00</td>
</tr>
</tbody>
</table>

\( \langle E_{\beta^-} \rangle \text{ PER DECAY} = 3158 \).
\( \langle E_{\beta^-} \rangle \text{ PER DECAY} = 1590 \).

**PHOTON INTENSITY PLOT**

**CHARACTERISTIC RADIATION TABLE**

<table>
<thead>
<tr>
<th>TYPE</th>
<th>ENERGY</th>
<th>1/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \beta^- )</td>
<td>3000.0</td>
<td>55.00</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>2440.0</td>
<td>45.00</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>110.0</td>
<td>18.00</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>165.0</td>
<td>16.00</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>332.0</td>
<td>10.00</td>
</tr>
<tr>
<td>Decay Data</td>
<td>Comments</td>
<td></td>
</tr>
<tr>
<td>------------</td>
<td>----------</td>
<td></td>
</tr>
<tr>
<td>149 Nd</td>
<td></td>
<td></td>
</tr>
<tr>
<td>149 Nd</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T_{1/2} = 1.730 ± 0.007 h</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;E_{p} &gt; PER DECAY = 474.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;E_{γ} &gt; PER DECAY = 535.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FISSION YIELDS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>233U THERMAL</td>
<td>1.846 x 10^{-4}</td>
<td></td>
</tr>
<tr>
<td>233U FAST</td>
<td>1.492 x 10^{-4}</td>
<td></td>
</tr>
<tr>
<td>234U FAST</td>
<td>6.670 x 10^{-8}</td>
<td></td>
</tr>
<tr>
<td>239Pu THERMAL</td>
<td>3.103 x 10^{-8}</td>
<td></td>
</tr>
<tr>
<td>G_{γ} = 1680 ± 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BR_{p} = 1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>134Pm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>55.10 ± 0.06 h</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
$^{149}$ Sm

ENDF/B-IV FILE 1 COMMENTS
61-PM-119 ANC,NEDL EVAL-1974 C.W.REICH DECAY DATA
EVAL-0CT74 R.E.SCHENTER AND F.SMITHROTH
CROSS SECTION DATA
DIST-DEC74

FILE INFORMATION
ME=1 MT=457 DECAY DATA
REFERENCES
C.W.REICH,RG HELMER AND MH PUTMAN,ANCR-1157,ENDF210,6/74.
G-1973 NAPSTRA-DOVE MASSTABLE

$^{149}$ Sm

\[ T_{1/2} = 55.10 \times 0.06 \text{ h} \]
\[ \langle E \rangle \text{ PER DECAY} = 0.3766 \text{ MeV} \]
\[ \langle E \rangle \text{ PER DECAY} = 1.42 \times 10^{-2} \text{ MeV} \]

CROSS SECTIONS (BARNs)
- Total 2200M/S \( 1.4051 \times 10^3 \text{ barns} \)
- Westcott G Factor \( 1.0015 \text{ barns} \)
- Westcott G Factor \( 1.4000 \times 10^3 \text{ barns} \)
- Resonance Integral Total \( 1.0820 \times 10^3 \text{ barns} \)
- Resonance Integral Capture \( 8.0040 \times 10^2 \text{ barns} \)

FISSION YIELDS
- $^{235}$U Thermal \( 5.1917 \times 10^{-7} \)
- $^{235}$U Fast \( 2.3104 \times 10^{-7} \)
- $^{238}$U Fast \( 1.4459 \times 10^{-9} \)
- $^{239}$Pu Thermal \( 1.0998 \times 10^{-6} \)

\[ Q_f = 1077.4 \pm 2.0 \text{ MeV} \]
\[ Q_f = 1.036 \]

$^{149}$ Sm

\[ 9.993 \times 10^{15} \gamma \]
### Photon Radiation Table

<table>
<thead>
<tr>
<th>MeanEnergy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>263.0</td>
<td>1</td>
<td>.01000</td>
</tr>
<tr>
<td>276.0</td>
<td>1</td>
<td>.05600</td>
</tr>
<tr>
<td>286.0</td>
<td>1</td>
<td>3.870</td>
</tr>
<tr>
<td>375.5</td>
<td>1</td>
<td>.1400</td>
</tr>
<tr>
<td>614.0</td>
<td>1</td>
<td>.02000</td>
</tr>
<tr>
<td>849.0</td>
<td>5</td>
<td>.2500</td>
</tr>
</tbody>
</table>

$\langle E_{\text{Photon}} \rangle$ per decay = 14.23

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>$f_{\text{Max}}$</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\beta$</td>
<td>100.0</td>
<td>52.46</td>
<td>.1000</td>
</tr>
<tr>
<td>$\beta$</td>
<td>200.0</td>
<td>67.78</td>
<td>.08000</td>
</tr>
<tr>
<td>$\beta$</td>
<td>300.0</td>
<td>83.08</td>
<td>.06000</td>
</tr>
<tr>
<td>$\beta$</td>
<td>400.0</td>
<td>97.64</td>
<td>.04000</td>
</tr>
<tr>
<td>$\beta$</td>
<td>500.0</td>
<td>110.0</td>
<td>.02000</td>
</tr>
<tr>
<td>$\beta$</td>
<td>600.0</td>
<td>122.0</td>
<td>.00000</td>
</tr>
<tr>
<td>$\beta$</td>
<td>700.0</td>
<td>133.0</td>
<td>.02000</td>
</tr>
<tr>
<td>$\beta$</td>
<td>800.0</td>
<td>143.0</td>
<td>.00000</td>
</tr>
<tr>
<td>$\beta$</td>
<td>900.0</td>
<td>153.0</td>
<td>.02000</td>
</tr>
<tr>
<td>$\beta$</td>
<td>1000.0</td>
<td>163.0</td>
<td>.00000</td>
</tr>
</tbody>
</table>

$\langle E_{\beta} \rangle$ per decay = 376.6

$\langle E_{\beta} \rangle$ per decay = 679.2

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy</th>
<th>$1/100$ Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\beta$</td>
<td>1070.0</td>
<td>96.00</td>
</tr>
</tbody>
</table>

$\langle E_{\beta} \rangle$ per decay = 679.2
ENDF/B-IV FILE I COMMENTS

62-GM-140 BNWL EVAL-JUN67 B.R.LEONARD, JR. AND K.B.STEWART
PRL.COM.JUNE, 1967 D1ST-DEC74
DECAY DATA ADDED FOR ENDF/B VERSION-IV
DATA MODIFIED JUNE, 1970 TO CONFORM TO ENDF/B-IV FORMATS
SAMARIUM-149 EVALUATION BY B.R.LEONARD AND K.B.STEWART REF.1
JUNE, 1967

REF:1   GENERAL INFORMATION
MT=451 ATOMIC MASS = 149.9690  I= 3.3  REF.2
MT=453 BRANCHING RATIOS  MT=103 REF.2
MT=457 RADIOACTIVE DECAY DATA (EVAL-JAN74 R.SCHENTER-HECL)

\[ T_{1/2} = 9.993 \times 10^{-7} \text{s} \]
\[ <E_d> \text{ PER DECAY} = 1908 \text{eV} \]
CROSS SECTIONS (BARNES)
- TOTAL 2200M/S  \(4.135 \times 10^{-4}\)
- WESTCOTT G FACTOR  \(1.6411\)
- CAPTURE 2200M/S  \(6.119 \times 10^{-4}\)
- WESTCOTT G FACTOR  \(1.6381\)
- RESONANCE INTEGRAL TOTAL  \(3.7969 \times 10^{-5}\)
- RESONANCE INTEGRAL CAPTURE  \(3.135 \times 10^{-5}\)
- RESONANCE INTEGRAL \((n,n')\)  \(1.3630\)
- RESONANCE INTEGRAL \((n,\gamma)\)  \(1.4720 \times 10^{-2}\)
- RESONANCE INTEGRAL \((\gamma,n)\)  \(1.4720 \times 10^{-2}\)

\[ Q_{\alpha} = 189\text{keV} \]
\[ BR_{\alpha} = 1.000 \]

\[ ^{149}_{62}\text{Nd} \]

STABLE OR LONG-LIVED

149 - 62 - 1
133 Cs
ENDF/B-IV FILE 1 COMMENTS
55-CS-130 WEKL EVAL-APR74 R.E.SCHENTER
REFERENCES
HALF LIFE-R SCHENTER, THEORY(9/73)

\[ T_{1/2} = 1.224\text{y} \]
\[ \langle E_g \rangle \text{ PER DECAY} = 2919. \]
\[ \langle E_x \rangle \text{ PER DECAY} = 342. \]
FISSION YIELDS
\[ 233U \text{ FAST} \quad 3.0097\times10^{-8} \]

\[ Q_{\gamma} = 10180. \]
\[ BR_{\gamma} = 1.000 \]

134 Ba

\[ 1.797\% \]

150 - 55 - 1

135 Ba
ENDF/B-IV FILE 1 COMMENTS
56-BA-150 WEKL EVAL-APR74 R.E.SCHENTER
REFERENCES
HALF LIFE-R SCHENTER, THEORY(9/73)

\[ T_{1/2} = 1.797\text{y} \]
\[ \langle E_g \rangle \text{ PER DECAY} = 5218. \]
\[ \langle E_x \rangle \text{ PER DECAY} = 2195. \]
FISSION YIELDS
\[ 235U \text{ THERMAL} \quad 4.0622\times10^{-7} \]
\[ 235U \text{ FAST} \quad 6.2110\times10^{-7} \]
\[ 237U \text{ FAST} \quad 4.5326\times10^{-7} \]
\[ 239Pu \text{ THERMAL} \quad 2.3997\times10^{-7} \]

\[ Q_{\gamma} = 6470. \]
\[ BR_{\gamma} = 1.000 \]

135 La

\[ 6489\% \]

150 - 56 - 1
1\% La

ENDF/B-1V  FILE 1  COMMENTS
57-LA-150  HEML  EVAL-APR74  R.E.SCHENTER
DIST-NOV74

REFERENCES
HALF.LIFE-R.SCHENTER, THEORY(9/73)

```
{La}
---

T_{1/2} = 7.6485s

\langle E_p \rangle_{PER.DEACY} = 2143.

\langle E_\gamma \rangle_{PER.DEACY} = 3128.

FISSION YIELDS

\begin{align*}
{235U} & : \text{thermal} & 4.7885 \times 10^{-5} \\
{235U} & : \text{fast} & 1.2888 \times 10^{-5} \\
{239Pu} & : \text{thermal} & 3.8488 \times 10^{-5} \\
\end{align*}

---

\[Q_p = 7680,\]
\[W_{\beta} = 1.000\]

```

\[
\frac{\text{1\% Ce}}{\text{1.00\%}}
\]

150 - 57 - 1

1\% Ce

ENDF/B-1V  FILE 1  COMMENTS
58-CE-150  HEML  EVAL-APR74  R.E.SCHENTER
DIST-DEC74

```
{Ce}
---

T_{1/2} = 1.00\%6.

\langle E_p \rangle_{PER.DEACY} = 2551.9

\langle E_\gamma \rangle_{PER.DEACY} = 9677.

FISSION YIELDS

\begin{align*}
{239U} & : \text{thermal} & 2.8204 \times 10^{-7} \\
{235U} & : \text{fast} & 3.2343 \times 10^{-5} \\
{239Pu} & : \text{fast} & 9.6180 \times 10^{-7} \\
{239Pu} & : \text{thermal} & 3.4846 \times 10^{-5} \\
\end{align*}

---

\[Q_p = 2360,\]
\[W_{\beta} = 1.000\]

```

\[
\frac{\text{1\% Pr}}{\text{12.4\%}}
\]

150 - 58 - 1
\( ^{134} \text{Pr} \)

\[ T_{1/2} = 12.4 \times 10^{-4} \text{s} \]

\( \langle E_d \rangle \text{ PER DECAY} = 1355 \)

\( \langle E_f \rangle \text{ PER DECAY} = 1858 \)

**Fission Yields**

- \(^{235}\text{U THERMAL}\) 3.0023 x 10^{-5}
- \(^{235}\text{U FAST}\) 3.0261 x 10^{-7}
- \(^{239}\text{U FAST}\) 2.1420 x 10^{-3}
- \(^{239}\text{Pu THERMAL}\) 9.0877 x 10^{-3}

\( Q_k = 5090 \)

\( B_{k,n} = 1.000 \)

\( ^{144} \text{Nd} \)

STABLE OR LONG-LIVED

150 - 59-1

\( ^{148} \text{Nd} \)

STABLE OR LONG-LIVED

**Cross Sections (Barns)**

- TOTAL 2290M/S 5.0516
- WESTCOTT G FACTOR 1.0987
- CAPTURE 2290M/S 2.0515
- WESTCOTT G FACTOR 1.0032
- RESONANCE INTEGRAL TOTAL 2.375 x 10^{22}
- RESONANCE INTEGRAL CAPTURE 1.866 x 10^{18}
- RESONANCE INTEGRAL \((N,2N)\) 1.1840
- RESONANCE INTEGRAL \((N,p)\) 3.4100 x 10^{-6}
- RESONANCE INTEGRAL \((n,n)\) 4.0830 x 10^{-6}

**Fission Yields**

- \(^{239}\text{U THERMAL}\) 5.4100 x 10^{-4}
- \(^{239}\text{U FAST}\) 4.7961 x 10^{-6}
- \(^{239}\text{Pu FAST}\) 2.0193 x 10^{-5}
- \(^{239}\text{Pu THERMAL}\) 1.2853 x 10^{-3}

150 - 60-1
**150 Pm**

ENDF/B-IV FILE 1 COMMENTS
61-PM-150 HEU
EVAL-APR74 R.E.SCHENTER
DIST-OEC74

REFERENCES
OBETA-A TOBIAS(10/72) RD/B/M2453
EBETA-A TOBIAS(10/72) RD/B/M2453
Egamma-A TOBIAS(10/72) RD/B/M2453

- **T1/2** 2.680h
- \( \langle E_f \rangle \) PER DECAY = 735.0
- \( \langle E_y \rangle \) PER DECAY = 1310.

**FISSION YIELDS**
- \(^{239}U\) THERMAL 5.4129x10^{-4}
- \(^{239}U\) FAST 2.2864x10^{-4}
- \(^{239}Pu\) THERMAL 1.7008x10^{-3}

\[ Q_{f} = 3430, \]
\[ BR_{f} = 1.000. \]

**61 Sm**

STABLE OR LONG-LIVED

**150 - 61 - 1**

**150 Sm**

STABLE OR LONG-LIVED

**CROSS SECTIONS (BARNS)**
- \( \sigma \) TOTAL 2390m/s 1.099x10^{-2}
- WESTCOTT G FACTOR 1.0016
- \( \sigma \) CAPTURE 2390m/s 1.920x10^{-2}
- WESTCOTT G FACTOR 9.956x10^{-3}
- RESONANCE INTEGRAL TOTAL 8.094x10^{-2}
- RESONANCE INTEGRAL CAPTURE 3.209x10^{-2}

**FISSION YIELDS**
- \(^{239}U\) THERMAL 3.0216x10^{-4}
- \(^{239}U\) FAST 1.3026x10^{-4}
- \(^{239}Pu\) THERMAL 8.8087x10^{-4}

**150 - 62 - 1**
\[ 1^{111}\ Ba \]

ENDFB/IV file 1 Comments

\( 56-\text{BA-}151 \)

HEDL

EVAL-APR74 R.E. SCHENTER

DIST-NOV74

REFERENCES

HALF LIFE: R. SCHENTER, THEORY (9/73)

\[ T_{1/2} = 4.856 \text{ s} \]

\[ \langle E_f \rangle \text{ PER DECAY} = 187.3 \]

\[ \langle E_r \rangle \text{ PER DECAY} = 3204. \]

\[ Q_{\beta^-} = 7060. \]

\[ BR_{\beta^-} = 1.000 \]

\[ 151\ -\ 56-\ 1 \]

\[ 1^{133}\ La \]

ENDFB/IV file 1 Comments

\( 57-\text{LA-}151 \)

HEDL

EVAL-APR74 R.E. SCHENTER

DIST-NOV74

REFERENCES

HALF LIFE: R. SCHENTER, THEORY (9/73)

\[ T_{1/2} = 9.936 \text{ s} \]

\[ \langle E_f \rangle \text{ PER DECAY} = 1681. \]

\[ \langle E_r \rangle \text{ PER DECAY} = 2720. \]

FISSION YIELDS

\[ \text{\text{235U THERMAL}} = \text{8.3045 x 10^{-6}} \]

\[ \text{\text{235U FAST}} = \text{1.3722 x 10^{-9}} \]

\[ \text{\text{238U FAST}} = \text{5.2437 x 10^{-9}} \]

\[ \text{\text{239Pu THERMAL}} = \text{6.7390 x 10^{-6}} \]

\[ Q_{\beta^+} = 6650. \]

\[ BR_{\beta^+} = 1.000 \]

\[ 151\ -\ 57-\ 1 \]
\[ \begin{align*}
{^{138}}\text{Ce} \\
\text{ENDF/B-IV FILE 1 COMMENTS} \\
98-CE-151 HEDL EVAL-APR74 R.E. SCHENTER \\
DIST-DEC74
\end{align*} \]

\[ T_{1/2} = 1.00\times10^3 \]
\[ \langle E_\beta \rangle \text{ PER DECAY} = 1178 \]
\[ \langle E_\gamma \rangle \text{ PER DECAY} = 1920 \]

\[ \text{FISSION YIELDS} \]
\[ {^{235}}\text{U THERMAL} \quad 7.273\times10^{-4} \]
\[ {^{235}}\text{U FAST} \quad 9.8278\times10^{-4} \]
\[ {^{238}}\text{U FAST} \quad 5.0184\times10^{-3} \]
\[ {^{239}}\text{Pu THERMAL} \quad 9.0299\times10^{-4} \]

\[ Q_{\beta} = 4480 \]
\[ BR_{\beta} = 1.000 \]

\[ \begin{align*}
{^{141}}\text{Pr} \\
\text{ENDF/B-IV FILE 1 COMMENTS} \\
59-PR-151 HEDL EVAL-APR74 R.E. SCHENTER \\
DIST-DEC74
\end{align*} \]

\[ T_{1/2} = 4.08\times10^{3} \]
\[ \langle E_\beta \rangle \text{ PER DECAY} = 928.2 \]
\[ \langle E_\gamma \rangle \text{ PER DECAY} = 1649 \]

\[ \text{FISSION YIELDS} \]
\[ {^{235}}\text{U THERMAL} \quad 2.2259\times10^{-3} \]
\[ {^{235}}\text{U FAST} \quad 2.3655\times10^{-3} \]
\[ {^{238}}\text{U FAST} \quad 2.8971\times10^{-3} \]
\[ {^{239}}\text{Pu THERMAL} \quad 3.8049\times10^{-3} \]

\[ Q_{\beta} = 3740 \]
\[ BR_{\beta} = 1.000 \]

\[ \begin{align*}
{^{151}}\text{Nd} \\
\text{ENDF/B-IV FILE 1 COMMENTS} \\
59-PR-151 HEDL EVAL-APR74 R.E. SCHENTER \\
DIST-DEC74
\end{align*} \]

\[ 12.40\times10^{-3} \]

\[ 131 - 59 - 1 \]
\[ \text{Nd}^{144} \]

ENDF/B-IV FILE 1 COMMENTS
60-90-151 ANC
EVAL-FEB74 C.W.REICH
DIST-DEC74
FOR FILE DESCRIPTION SEE C.W.REICH, RG HELMER AND MH PUTMAN,
ANCR-1157, ENDF/B-IV, 1974.
PREPARED FOR FILE 10/73
CMHR
REFERENCE
O - 1973 REVISION OF WAPSTRA-GOVE MASS TABLE
OTHER - M.A.SMITH, JR., ET AL., TO BE PUBLISHED AND
PRIVATE COMMUNICATION (SEPT., 1973)

\[ \text{Nd}^{144} \]

\begin{align*}
T_{1/2} &= 12.40 \times 10^3 \\
\langle E_p \rangle \text{ PER DECAY} &= 664.2 \\
\langle E_x \rangle \text{ PER DECAY} &= 839.3 \\
\text{Fission Yields} & \\
235U \text{ THERMAL} &= 1.222 \times 10^{-4} \\
235U \text{ FAST} &= 9.928 \times 10^{-4} \\
239P HE \text{ FAST} &= 2.947 \times 10^{-4} \\
239P U \text{ THERMAL} &= 2.985 \times 10^{-4} \\
\end{align*}

\[ \text{Br}^0_3 \times 10^{-13} \]

\[ \text{Br}^0_3 = 1.000 \]

\[ \text{Pm}^{147} \]

\begin{align*}
T_{1/2} &= 24.00 \times 10^3 \\
\end{align*}
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Energy (MeV)</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>39.3</td>
<td>0.008</td>
</tr>
<tr>
<td>132.39</td>
<td>0.008</td>
</tr>
<tr>
<td>255.2</td>
<td>0.008</td>
</tr>
<tr>
<td>324.55</td>
<td>0.012</td>
</tr>
<tr>
<td>424.56</td>
<td>0.016</td>
</tr>
<tr>
<td>562.17</td>
<td>0.019</td>
</tr>
<tr>
<td>664.06</td>
<td>0.021</td>
</tr>
<tr>
<td>760.32</td>
<td>0.025</td>
</tr>
<tr>
<td>850.99</td>
<td>0.029</td>
</tr>
<tr>
<td>939.34</td>
<td>0.033</td>
</tr>
<tr>
<td>1033.79</td>
<td>0.036</td>
</tr>
<tr>
<td>1184.25</td>
<td>0.04</td>
</tr>
<tr>
<td>1259.54</td>
<td>0.045</td>
</tr>
<tr>
<td>1342.30</td>
<td>0.05</td>
</tr>
<tr>
<td>1467.31</td>
<td>0.055</td>
</tr>
<tr>
<td>1556.86</td>
<td>0.06</td>
</tr>
<tr>
<td>1630.59</td>
<td>0.065</td>
</tr>
<tr>
<td>1755.41</td>
<td>0.07</td>
</tr>
<tr>
<td>1855.28</td>
<td>0.075</td>
</tr>
<tr>
<td>1918.76</td>
<td>0.08</td>
</tr>
<tr>
<td>2010.35</td>
<td>0.09</td>
</tr>
<tr>
<td>2108.23</td>
<td>0.1</td>
</tr>
<tr>
<td>2025.8</td>
<td>0.2</td>
</tr>
<tr>
<td>2705.76</td>
<td>0.3</td>
</tr>
<tr>
<td>2721.90</td>
<td>0.5</td>
</tr>
</tbody>
</table>

$<E_{\text{photon}}>$ per decay = 792.0

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>E$_{\text{max}}$ (MeV)</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>Au</td>
<td>20.0</td>
<td>11.26</td>
</tr>
<tr>
<td>C</td>
<td>421.9</td>
<td>104.35</td>
</tr>
<tr>
<td>N</td>
<td>350.0</td>
<td>105.0</td>
</tr>
<tr>
<td>P</td>
<td>247.0</td>
<td>130.0</td>
</tr>
<tr>
<td>O</td>
<td>449.0</td>
<td>136.0</td>
</tr>
<tr>
<td>Cl</td>
<td>458.0</td>
<td>141.0</td>
</tr>
<tr>
<td>Ar</td>
<td>474.0</td>
<td>145.0</td>
</tr>
<tr>
<td>K</td>
<td>530.0</td>
<td>168.0</td>
</tr>
<tr>
<td>Ca</td>
<td>568.0</td>
<td>180.0</td>
</tr>
<tr>
<td>Sr</td>
<td>577.0</td>
<td>184.0</td>
</tr>
<tr>
<td>Y</td>
<td>595.0</td>
<td>191.0</td>
</tr>
<tr>
<td>Lu</td>
<td>615.0</td>
<td>198.0</td>
</tr>
<tr>
<td>Th</td>
<td>620.0</td>
<td>200.0</td>
</tr>
<tr>
<td>Ra</td>
<td>659.0</td>
<td>215.0</td>
</tr>
<tr>
<td>Am</td>
<td>663.0</td>
<td>217.0</td>
</tr>
<tr>
<td>Cm</td>
<td>675.0</td>
<td>221.0</td>
</tr>
<tr>
<td>Bk</td>
<td>694.0</td>
<td>229.0</td>
</tr>
</tbody>
</table>

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy (MeV)</th>
<th>1/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>γ−</td>
<td>116.76</td>
<td>0.08</td>
</tr>
<tr>
<td>γ−</td>
<td>295.70</td>
<td>0.05</td>
</tr>
<tr>
<td>γ−</td>
<td>315.93</td>
<td>0.05</td>
</tr>
<tr>
<td>γ−</td>
<td>1418.50</td>
<td>0.05</td>
</tr>
<tr>
<td>γ−</td>
<td>1180.88</td>
<td>0.04</td>
</tr>
<tr>
<td>Au</td>
<td>5.778</td>
<td>3.0</td>
</tr>
<tr>
<td>N</td>
<td>255.70</td>
<td>0.05</td>
</tr>
<tr>
<td>P</td>
<td>1612.30</td>
<td>0.05</td>
</tr>
<tr>
<td>Cl</td>
<td>1965.50</td>
<td>0.05</td>
</tr>
<tr>
<td>Ar</td>
<td>1793.50</td>
<td>0.05</td>
</tr>
<tr>
<td>K</td>
<td>1860.50</td>
<td>0.05</td>
</tr>
<tr>
<td>Ca</td>
<td>1897.50</td>
<td>0.05</td>
</tr>
<tr>
<td>Sr</td>
<td>71.58</td>
<td>0.05</td>
</tr>
<tr>
<td>Y</td>
<td>214.4</td>
<td>0.05</td>
</tr>
<tr>
<td>Lu</td>
<td>1122.6</td>
<td>0.07</td>
</tr>
<tr>
<td>Th</td>
<td>1929.0</td>
<td>0.15</td>
</tr>
<tr>
<td>Am</td>
<td>2390.0</td>
<td>0.50</td>
</tr>
<tr>
<td>Cm</td>
<td>2450.0</td>
<td>1.00</td>
</tr>
<tr>
<td>Bk</td>
<td>2500.0</td>
<td>2.00</td>
</tr>
</tbody>
</table>

### Photon Intensity Plot

![Photon Intensity Plot](image)
### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>E&lt;sub&gt;max&lt;/sub&gt;</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>γ</td>
<td>699.0</td>
<td>231.</td>
<td>8.</td>
</tr>
<tr>
<td>γ</td>
<td>728.0</td>
<td>242.</td>
<td>8.</td>
</tr>
<tr>
<td>γ</td>
<td>737.0</td>
<td>245.</td>
<td>9.</td>
</tr>
<tr>
<td>γ</td>
<td>810.0</td>
<td>278.</td>
<td>9.</td>
</tr>
<tr>
<td>γ</td>
<td>829.0</td>
<td>282.</td>
<td>10.</td>
</tr>
<tr>
<td>γ</td>
<td>837.0</td>
<td>285.</td>
<td>10.</td>
</tr>
<tr>
<td>γ</td>
<td>851.0</td>
<td>291.</td>
<td>10.</td>
</tr>
<tr>
<td>γ</td>
<td>870.0</td>
<td>299.</td>
<td>10.</td>
</tr>
<tr>
<td>γ</td>
<td>1024.0</td>
<td>363.</td>
<td>12.</td>
</tr>
<tr>
<td>γ</td>
<td>1044.0</td>
<td>371.</td>
<td>12.</td>
</tr>
<tr>
<td>γ</td>
<td>1074.0</td>
<td>384.</td>
<td>12.</td>
</tr>
<tr>
<td>γ</td>
<td>1138.0</td>
<td>411.</td>
<td>13.</td>
</tr>
<tr>
<td>γ</td>
<td>1171.0</td>
<td>432.</td>
<td>14.</td>
</tr>
<tr>
<td>γ</td>
<td>1268.0</td>
<td>468.</td>
<td>15.</td>
</tr>
<tr>
<td>γ</td>
<td>1286.0</td>
<td>476.</td>
<td>15.</td>
</tr>
<tr>
<td>γ</td>
<td>1336.0</td>
<td>495.</td>
<td>16.</td>
</tr>
<tr>
<td>γ</td>
<td>1371.0</td>
<td>515.</td>
<td>16.</td>
</tr>
<tr>
<td>γ</td>
<td>1402.0</td>
<td>527.</td>
<td>17.</td>
</tr>
<tr>
<td>γ</td>
<td>1439.0</td>
<td>544.</td>
<td>17.</td>
</tr>
<tr>
<td>γ</td>
<td>1479.0</td>
<td>562.</td>
<td>18.</td>
</tr>
<tr>
<td>γ</td>
<td>1555.0</td>
<td>596.</td>
<td>19.</td>
</tr>
<tr>
<td>γ</td>
<td>1571.0</td>
<td>603.</td>
<td>19.</td>
</tr>
<tr>
<td>γ</td>
<td>1594.0</td>
<td>614.</td>
<td>19.</td>
</tr>
<tr>
<td>γ</td>
<td>1614.0</td>
<td>624.</td>
<td>19.</td>
</tr>
<tr>
<td>γ</td>
<td>1628.0</td>
<td>629.</td>
<td>20.</td>
</tr>
<tr>
<td>γ</td>
<td>1659.0</td>
<td>645.</td>
<td>20.</td>
</tr>
<tr>
<td>γ</td>
<td>1669.0</td>
<td>660.</td>
<td>20.</td>
</tr>
<tr>
<td>γ</td>
<td>1713.0</td>
<td>668.</td>
<td>21.</td>
</tr>
<tr>
<td>γ</td>
<td>1722.0</td>
<td>672.</td>
<td>21.</td>
</tr>
<tr>
<td>γ</td>
<td>1727.0</td>
<td>675.</td>
<td>21.</td>
</tr>
<tr>
<td>γ</td>
<td>1795.0</td>
<td>706.</td>
<td>22.</td>
</tr>
<tr>
<td>γ</td>
<td>1872.0</td>
<td>742.</td>
<td>23.</td>
</tr>
<tr>
<td>γ</td>
<td>1892.0</td>
<td>751.</td>
<td>23.</td>
</tr>
<tr>
<td>γ</td>
<td>1929.0</td>
<td>768.</td>
<td>24.</td>
</tr>
<tr>
<td>γ</td>
<td>1937.0</td>
<td>777.</td>
<td>24.</td>
</tr>
<tr>
<td>γ</td>
<td>1945.0</td>
<td>776.</td>
<td>24.</td>
</tr>
<tr>
<td>γ</td>
<td>1961.0</td>
<td>785.</td>
<td>24.</td>
</tr>
<tr>
<td>γ</td>
<td>2042.0</td>
<td>821.</td>
<td>30.</td>
</tr>
<tr>
<td>γ</td>
<td>2144.0</td>
<td>869.</td>
<td>30.</td>
</tr>
<tr>
<td>γ</td>
<td>2213.0</td>
<td>902.</td>
<td>30.</td>
</tr>
<tr>
<td>γ</td>
<td>2294.0</td>
<td>940.</td>
<td>30.</td>
</tr>
<tr>
<td>γ</td>
<td>2352.0</td>
<td>968.</td>
<td>30.</td>
</tr>
</tbody>
</table>

<sup>E<sub><sup>γ</sup></sub> per decay = 650.0</sup>  
<sup>E<sub><sup>e</sup></sub> per decay = 1897</sup>
$^{115}\text{Pm}$

ENDF/B-IV FILE 1 COMMENTS
61-PM-151 ANC,HEDL EVAL-FILE74 C.W.REICH DECAY_DATA
EVAL-DET74 R.E.SCHENTER AND F.SCHMIDTROTH
CROSS SECTION DATA
DIST-DEC74

FILE INFORMATION
MF=1 MT=457 DECAY DATA
REFERENCES
C.W.REICH, R.G.HELMER AND M.H.PUTMAN,ANCR-1157,ENDF2.0,8/74.
0-1973 WAPSTRA-GOVE MASSTABLE

$^{115}\text{Pm}$

$T_{1/2}=28.40\times10^4\text{yr}$

$<E^3>_\text{PER DECAY}=311.8$

$<E^2>_\text{PER DECAY}=309.6$

CROSS SECTIONS (BARNS)

$\sigma_{\text{TOTAL}}=7.0519\times10^{-2}$

$\sigma_{\text{WESTCOTT}}=1.0038$

$\sigma_{\text{CAPTURE}}=7.0000\times10^{-2}$

$\sigma_{\text{WESTCOTT}}=1.0030$

$\sigma_{\text{RESONANCE INTEGRAL TOTAL}}=2.3420\times10^{-3}$

$\sigma_{\text{RESONANCE INTEGRAL CAPTURE}}=2.0830\times10^{-3}$

FISSION YIELDS

$^{235}\text{U} \text{ THERMAL}=1.8090\times10^{-3}$

$^{235}\text{U} \text{ FAST}=1.4012\times10^{-3}$

$^{239}\text{Pu} \text{ THERMAL}=8.2592\times10^{-4}$

$^{239}\text{Pu} \text{ THERMAL}=7.1900\times10^{-5}$

$Q_{\beta}=1188.4\times10^4$

$BR_{\beta}=1.000$

$^{115}\text{Sn}$

$92.94\gamma$
### Photon Radiation Table

<table>
<thead>
<tr>
<th>MEAN ENERGY</th>
<th>LINES</th>
<th>PHOTONS/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>148.3</td>
<td>9</td>
<td>26.20</td>
</tr>
<tr>
<td>251.3</td>
<td>11</td>
<td>18.12</td>
</tr>
<tr>
<td>340.6</td>
<td>8</td>
<td>29.42</td>
</tr>
<tr>
<td>444.6</td>
<td>5</td>
<td>6.500</td>
</tr>
<tr>
<td>546.0</td>
<td>1</td>
<td>2.000</td>
</tr>
<tr>
<td>566.9</td>
<td>1</td>
<td>0.3700</td>
</tr>
<tr>
<td>676.9</td>
<td>4</td>
<td>3.620</td>
</tr>
<tr>
<td>784.5</td>
<td>5</td>
<td>7.520</td>
</tr>
<tr>
<td>808.1</td>
<td>1</td>
<td>0.6000</td>
</tr>
<tr>
<td>817.9</td>
<td>1</td>
<td>0.2900</td>
</tr>
<tr>
<td>846.9</td>
<td>1</td>
<td>0.3100</td>
</tr>
<tr>
<td>946.9</td>
<td>1</td>
<td>0.3600</td>
</tr>
<tr>
<td>955.9</td>
<td>1</td>
<td>0.1600</td>
</tr>
</tbody>
</table>

\[<E_{\text{photon}}> \text{ PER DECAY} = 309.6\]

### Particle Radiation Table

<table>
<thead>
<tr>
<th>TYPE</th>
<th>( E_{\text{max}} )</th>
<th>MEAN ENERGY</th>
<th>INTENSITY/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \beta^- )</td>
<td>256.0</td>
<td>66.53</td>
<td>1.000</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>367.0</td>
<td>109.1</td>
<td>5.000</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>415.0</td>
<td>129.6</td>
<td>1.600</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>448.0</td>
<td>137.1</td>
<td>3.000</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>544.0</td>
<td>248.2</td>
<td>7.000</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>594.5</td>
<td>268.3</td>
<td>1.000</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>845.1</td>
<td>288.7</td>
<td>44.00</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>866.1</td>
<td>297.2</td>
<td>5.000</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>981.0</td>
<td>344.7</td>
<td>2.000</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>1022.0</td>
<td>362.0</td>
<td>7.000</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>1085.2</td>
<td>388.8</td>
<td>5.000</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>1122.0</td>
<td>404.5</td>
<td>12.00</td>
</tr>
<tr>
<td>( \beta^- )</td>
<td>1190.0</td>
<td>433.9</td>
<td>10.00</td>
</tr>
</tbody>
</table>

\[<E_p> \text{ PER DECAY} = 371.8\]

\[<E_n> \text{ PER DECAY} = 585.9\]

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>TYPE</th>
<th>ENERGY</th>
<th>1/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \alpha )</td>
<td>865.1</td>
<td>44.00</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>389.9</td>
<td>24.00</td>
</tr>
<tr>
<td>( \alpha )</td>
<td>1122.0</td>
<td>24.00</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>1190.0</td>
<td>10.00</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>1678</td>
<td>9.000</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>275.1</td>
<td>7.450</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>1022.0</td>
<td>7.000</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>797.0</td>
<td>7.000</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>1085</td>
<td>5.000</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>367.0</td>
<td>5.000</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>177.0</td>
<td>4.800</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>717.8</td>
<td>4.400</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>445.5</td>
<td>4.300</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>240.0</td>
<td>3.900</td>
</tr>
</tbody>
</table>
$^{142}$ Sm

ENDF/B-IV FILE 7 COMMENTS
62-54-151 HEDL,BNL EVAL-NOV74 R.E. SCHENTER AND A. PRINCE
DIST-DEC74

$^{144}$ Sm

$\frac{1}{2} = 92.94\text{yr}$

$\langle E_x \rangle$ PER DECAY = 19.50

$\langle E_y \rangle$ PER DECAY = 4000

CROSS SECTIONS (BARNES)

$\sigma$ TOTAL 2200M/s $\quad 1.5025 \times 10^{-5}$

$\sigma$ CAPTURE 2200M/s $\quad 9.2570 \times 10^{-3}$

$\sigma$ CAPTURE G FACTOR $\quad 2.5025 \times 10^{-4}$

$\sigma$ CAPTURE G FACTOR $\quad 9.3570 \times 10^{-4}$

$\sigma$ RESONANCE INTEGRAL TOTAL $\quad 3.7620 \times 10^{-3}$

$\sigma$ RESONANCE INTEGRAL CAPTURE $\quad 3.4050 \times 10^{-3}$

$\sigma$ RESONANCE INTEGRAL $\langle N,Z \rangle$ $\quad 1.9400$

$\sigma$ RESONANCE INTEGRAL $\langle N,P \rangle$ $\quad 1.9270 \times 10^{-4}$

$\sigma$ RESONANCE INTEGRAL $\langle N,a \rangle$ $\quad 1.9670 \times 10^{-4}$

FISSION YIELDS

$^{235}$U THERMAL $\quad 5.9722 \times 10^{-4}$

$^{235}$U FAST $\quad 2.2004 \times 10^{-6}$

$^{239}$Pu THERMAL $\quad 2.6196 \times 10^{-7}$

$Q_0 = 76.00$

$Q_0 = 1.000$

$^{151}$ Eu

STABLE OR LONG-LIVED

151 - 62 - 1
\[ ^{131} \text{Eu} \]

**STABLE OR LONG-LIVED**

<table>
<thead>
<tr>
<th>CROSS SECTIONS (BARNES)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>( \sigma ) TOTAL 2200 MeV</td>
<td>9.2515 x 10^{-1}</td>
</tr>
<tr>
<td>WESTCOTT G FACTOR</td>
<td>8.266 x 10^{-1}</td>
</tr>
<tr>
<td>( \sigma ) CAPTURE 2200 MeV</td>
<td>9.3681 x 10^{-3}</td>
</tr>
<tr>
<td>WESTCOTT G FACTOR</td>
<td>8.926 x 10^{-3}</td>
</tr>
<tr>
<td>RESONANCE INTEGRAL TOTAL</td>
<td>5.496 x 10^{-3}</td>
</tr>
<tr>
<td>RESONANCE INTEGRAL CAPTURE</td>
<td>3.264 x 10^{-3}</td>
</tr>
<tr>
<td>RESONANCE INTEGRAL (N,2n)</td>
<td>3.584</td>
</tr>
<tr>
<td>RESONANCE INTEGRAL (N,P)</td>
<td>1.716 x 10^{-2}</td>
</tr>
<tr>
<td>RESONANCE INTEGRAL (N,n)</td>
<td>6.603 x 10^{-3}</td>
</tr>
</tbody>
</table>

**FISSION YIELDS**

| \( ^{235} \text{U} \) THERMAL | 5.713 x 10^{-7} |
$^{132}$ Ba

ENDF/B-IV FILE 1 COMMENTS
56-BA-152 HECL EVAL-APR74 R.E.SCHENTER
DIST-NOV74
REFERENCES
HALF LIFE-R SCHENTER,THEORY(9/73)

$T_{1/2} = 7588 s$
$<E_p> PER DECAY = 1466$
$<E_x> PER DECAY = 2728$

FISSION YIELDS
$^{239}U$ FAST $1.4599x10^{-7}$

$Q_e = 5770$
$BR_p = 1.000$

$^{132}$ La

$T_{1/2} = 30094 s$
$<E_p> PER DECAY = 2389$
$<E_x> PER DECAY = 3683$

FISSION YIELDS
$^{239}U$ THERMAL $4.7226x10^{-7}$
$^{235}U$ FAST $6.9111x10^{-7}$
$^{239}Pu$ FAST $5.0165x10^{-7}$
$^{237}Pu$ THERMAL $2.6896x10^{-7}$

$Q_e = 4570$
$BR_p = 1.000$

$^{132}$ Ce

152 - 56 - 1
\[ ^{134} \text{Ce} \]

ENDF/B-IV FILE 1 COMMENTS
58-CE-152 HEDL EVAL-APR74 R.E.SCHENTER
DIST-DEC74
REFERENCES
HALF LIFE-R SCHENTER, THEORY(9/73)

\[ ^{134} \text{Ce} \]

\[ T_{1/2} = 14.03 \text{s} \]

\[ \langle E_e \rangle \text{ PER DECAY} = 793.7 \]

\[ \langle E_\gamma \rangle \text{ PER DECAY} = 1443. \]

FISSION YIELDS

\[ ^{235} \text{U THERMAL} \quad 1.110 \times 10^{-4} \]

\[ ^{235} \text{U FAST} \quad 1.701 \times 10^{-4} \]

\[ ^{239} \text{Pu THERMAL} \quad 1.501 \times 10^{-4} \]

\[ Q_p = 3350. \]

\[ B(R) = 1.000 \]

\[ ^{134} \text{Pr} \]

\[ T_{1/2} = 8.318 \text{s} \]

\[ \langle E_e \rangle \text{ PER DECAY} = 1023. \]

\[ \langle E_\gamma \rangle \text{ PER DECAY} = 2363. \]

FISSION YIELDS

\[ ^{235} \text{U THERMAL} \quad 1.064 \times 10^{-3} \]

\[ ^{235} \text{U FAST} \quad 1.239 \times 10^{-3} \]

\[ ^{239} \text{Pu THERMAL} \quad 2.825 \times 10^{-3} \]

\[ Q_p = 6100. \]

\[ B(R) = 1.000 \]

\[ ^{133} \text{Nd} \]

\[ T_{1/2} = 11.50 \times 10^{-3} \text{ m} \]

152 - 58 - 1

152 - 59 - 1
\[ ^{126}\text{Nd} \]

ENDF/B-IV FILE 1 COMMENTS
60-ND-152 HECL
EVAL-APR74 R.E.SCHENTER
DIST-DEC74

\[ \frac{126}{78}\text{Nd} \]

- \( T_{1/2} = 11.50 \times 10^{-4} \) m
- \( \langle E_x \rangle \text{ PER DECAY} = 203.0 \)
- \( \langle E_y \rangle \text{ PER DECAY} = 559.2 \)

FISSION YIELDS

- \( ^{235}\text{U} \text{ THERMAL} = 1.4391 \times 10^{-2} \)
- \( ^{235}\text{U} \text{ FAST} = 1.5088 \times 10^{-3} \)
- \( ^{239}\text{Pu} \text{ THERMAL} = 5.7576 \times 10^{-3} \)

\( Q_{\nu} = 920.0 \)
\( B_{\nu} = 1.000 \)

\[ \text{---} \]

\[ ^{126}\text{Pm} \]

- \( \frac{126}{63}\text{Pm} \)
- \( 4.10 \times 10^{-7} \) m

\[ 152 = 60 - 1 \]

\[ ^{127}\text{Pm} \]

ENDF/B-IV FILE 1 COMMENTS
61-PH-152N HECL
EVAL-APR74 R.E.SCHENTER
DIST-DEC74

REFERENCES
DIT-R SCHENTER, THEORY(9/73)

- \( T_{1/2} = 18.000 \) m
- \( \langle E_x \rangle \text{ PER DECAY} = 808.7 \)
- \( \langle E_y \rangle \text{ PER DECAY} = 1115.1 \)

\( Q_{\nu} = 3959.0 \)
\( B_{\nu} = 0.8000 \)

- \( \frac{127}{63}\text{Pm} \)
- \( 7.5 \times 10^{-8} \) m

STABLE OR LONG-LIVED

\[ 152n = 61 - 1 \]
ENDFB-IV FILE 1 COMMENTS
61-PM-172N AEC
EVAL-EB74 C.W. REICH
DIST-DEC74
FOR FILE DESCRIPTION SEE C.W. REICH, RG HELMER AND MH PUTMAN,
ANCR-1157,ENDFB10.8/74.
PREPARED FOR FILE 9/73
RESGULF
REFERENCE W. DANIELS AND D. HOFFMAN, PHYS. REV. C4, 919 (1971)
Gamma-ray data are taken from Table II of Ref.
Gamma-ray intensity uncertainties include statistical
uncertainties and a 5% uncertainty in relative efficiencies.
The uncertainty of 1% in absolute efficiency is not include
in uncertainties. The absolute gamma-ray intensities were
determined on the basis of no beta rays feeding the
ground state of Sm-152. (The latter was assumed because of
spin considerations.)
The beta-rays are poorly known, and discrepancies in the
decay scheme do not allow the accurate statement of
intensities. The energies of beta rays with possible
significant intensities, according to Ref., are given below.

\[^{152m}_{94}Pm\]

- \(T_{1/2} = 7.5 \pm 0.6 \text{ min}\)
- \(\langle E \rangle_{\beta} \text{ per decay} = 19.5 \text{ keV}\)
- \(\langle E \rangle_{\gamma} \text{ per decay} = 1287 \text{ keV}\)

- Fission Yields
  - \(^{235}\text{U} \text{ thermal}\) \(3.6890 \times 10^{-3}\)
  - \(^{235}\text{U} \text{ fast}\) \(3.4816 \times 10^{-4}\)
  - \(^{239}\text{Pu} \text{ fast}\) \(2.0988 \times 10^{-4}\)
  - \(^{239}\text{Pu} \text{ thermal}\) \(1.5935 \times 10^{-4}\)

\(Q_{\beta} = 3600 \pm 100,\)

\(Q_{\beta} = 3600,\)

\(\text{BR}_{\beta} = 1.000\)

- \(^{152m}_{94}Sm\)
- \(^{152m}_{94}Sm\) Stable or long-lived

152m-61-7
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Photon Line</th>
<th>Mean Energy (keV)</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>121.80</td>
<td>± 0.10</td>
<td>1</td>
<td>94.40</td>
</tr>
<tr>
<td>137.0</td>
<td>± 1.0</td>
<td>1</td>
<td>1664</td>
</tr>
<tr>
<td>231.0</td>
<td>± 1.0</td>
<td>1</td>
<td>1.227</td>
</tr>
<tr>
<td>244.70</td>
<td>± 0.10</td>
<td>1</td>
<td>50.3</td>
</tr>
<tr>
<td>340.2</td>
<td>± 0.20</td>
<td>1</td>
<td>28.7</td>
</tr>
<tr>
<td>561.50</td>
<td>± 0.20</td>
<td>1</td>
<td>2832</td>
</tr>
<tr>
<td>422.00</td>
<td>± 0.20</td>
<td>1</td>
<td>1.3 ± 0.3</td>
</tr>
<tr>
<td>656.2</td>
<td>± 0.3</td>
<td>1</td>
<td>2.7 ± 0.3</td>
</tr>
<tr>
<td>949.0</td>
<td>± 0.3</td>
<td>1</td>
<td>1.6 ± 0.3</td>
</tr>
<tr>
<td>696.50</td>
<td>± 0.20</td>
<td>1</td>
<td>2.35 ± 0.19</td>
</tr>
<tr>
<td>781.1</td>
<td>± 0.3</td>
<td>1</td>
<td>3.3 ± 0.4</td>
</tr>
<tr>
<td>812.4</td>
<td>± 1.9</td>
<td>1</td>
<td>10.1 ± 0.9</td>
</tr>
<tr>
<td>901.0</td>
<td>± 1.0</td>
<td>1</td>
<td>1.6 ± 0.4</td>
</tr>
<tr>
<td>920.0</td>
<td>± 0.3</td>
<td>1</td>
<td>2.5 ± 0.5</td>
</tr>
<tr>
<td>942.0</td>
<td>± 0.3</td>
<td>1</td>
<td>7.6 ± 0.9</td>
</tr>
<tr>
<td>1084.4</td>
<td>± 3</td>
<td>3</td>
<td>28. ± 3.</td>
</tr>
<tr>
<td>1192.2</td>
<td>± 0.4</td>
<td>1</td>
<td>3.2 ± 0.8</td>
</tr>
<tr>
<td>1194.0</td>
<td>± 1.0</td>
<td>1</td>
<td>1.7 ± 0.6</td>
</tr>
<tr>
<td>1239.0</td>
<td>± 12</td>
<td>4</td>
<td>3.5 ± 1.6</td>
</tr>
<tr>
<td>1321.2</td>
<td>± 0.3</td>
<td>1</td>
<td>1.510</td>
</tr>
<tr>
<td>1389.0</td>
<td>± 1.0</td>
<td>1</td>
<td>0.5 ± 0.3</td>
</tr>
<tr>
<td>1406.2</td>
<td>± 0.5</td>
<td>1</td>
<td>0.5 ± 0.3</td>
</tr>
<tr>
<td>1437.5</td>
<td>± 0.3</td>
<td>1</td>
<td>15.2 ± 1.6</td>
</tr>
</tbody>
</table>

**<\text{Ep}_\gamma\text{> PER DECAY} = 1287.7**

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>E\text{max} (keV)</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>γ-</td>
<td>1796.0</td>
<td>706.5</td>
<td>42.00</td>
</tr>
<tr>
<td>γ-</td>
<td>1423.0</td>
<td>719.0</td>
<td>4.400</td>
</tr>
<tr>
<td>γ-</td>
<td>2020.0</td>
<td>870.8</td>
<td>2.900</td>
</tr>
<tr>
<td>γ-</td>
<td>2228.0</td>
<td>906.8</td>
<td>2.400</td>
</tr>
<tr>
<td>γ-</td>
<td>2366.0</td>
<td>974.3</td>
<td>4.700</td>
</tr>
</tbody>
</table>

**<\text{Ep}_\gamma\text{> PER DECAY} = 490.5**

**<\text{Ep}_\gamma\text{> PER DECAY} = 638.3**

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy (keV)</th>
<th>1/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>γ-</td>
<td>121.80</td>
<td>94.40</td>
</tr>
<tr>
<td>γ-</td>
<td>244.70</td>
<td>59.3</td>
</tr>
<tr>
<td>γ-</td>
<td>340.2</td>
<td>28.2</td>
</tr>
<tr>
<td>γ-</td>
<td>1097.60</td>
<td>22.2</td>
</tr>
</tbody>
</table>

**<\text{Ep}_\gamma\text{> PER DECAY} = 490.5**

**<\text{Ep}_\gamma\text{> PER DECAY} = 638.3**
ENDF/B-IV FILE 1 COMMENTS
61-PM-152 ANC EVAL-EDF74 C.H. REICH DECAY DATA
QIST-DEC74
FOR FILE DESCRIPTION SEE C.H. REICH, RG HELMER AND MH PUTMAN,
ANCR-1157,ENDF210,8/74.

PREPARED FOR FILE 9/74 RES(GULF)
REFERENCE W. DANIELS AND D. HOFFMAN, PHYS. REV. CA, 9/7 (1971)

GAMMA-RAY DATA ARE TAKEN FROM TABLE II OF REF. AND
ADDITIONAL GAMMA RAYS IN FIG. 7 OF REF. BETA-RAY DATA ARE
FROM FIG. 7.

IT IS NOT CLEAR IF THE 4.1-M ACTIVITY OR THE 7.5-M
ACTIVITY IS THE GROUND STATE. THE DATA GIVEN HERE ARE FOR
THE 4.1-M ACTIVITY.

PHOTON INTENSITY UNCERTAINTIES INCLUDE 10% UNCERTAINTY IN
ABSOLUTE EFFICIENCY CALIBRATION, 5% UNCERTAINTY IN RELATIVE
EFFICIENCY, AND THE STATISTICS.

\[ \text{\textbf{Pm}} \]

\[ T_{1/2} = 4.104 \times 0.07 \text{m} \]

\[ \langle E_{\gamma} \rangle \text{ PER DECAY} = 1439 \text{ keV} \]

\[ \langle E, \beta \rangle \text{ PER DECAY} = 288.1 \text{ keV} \]

\[ \text{FISSION YIELDS} \]

\[ \begin{align*}
235 \text{U THERMAL} & = 3.689 \times 10^{-5} \\
235 \text{U FAST} & = 3.488 \times 10^{-5} \\
239 \text{Pu THERMAL} & = 1.593 \times 10^{-4} \\
239 \text{Pu FAST} & = 2.699 \times 10^{-5}
\end{align*} \]

\[ \text{G}\alpha = 3600 \times 200 \]  

\[ BR = 1.000 \]

\[ \text{\textbf{Sn}} \]

\[ T_{1/2} = 115 \text{ m} \]

\[ \text{STABLE OR LONG-LIVED} \]
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Mean Energy</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>121.10</td>
<td>0.10</td>
</tr>
<tr>
<td>244.70</td>
<td>0.10</td>
</tr>
<tr>
<td>252.9</td>
<td>1.10</td>
</tr>
<tr>
<td>329.3</td>
<td>4.00</td>
</tr>
<tr>
<td>444.1</td>
<td>2.00</td>
</tr>
<tr>
<td>483.9</td>
<td>1.00</td>
</tr>
<tr>
<td>543.9</td>
<td>1.00</td>
</tr>
<tr>
<td>625.0</td>
<td>1.00</td>
</tr>
<tr>
<td>680.3</td>
<td>0.30</td>
</tr>
<tr>
<td>696.10</td>
<td>0.20</td>
</tr>
<tr>
<td>855.1</td>
<td>2.20</td>
</tr>
<tr>
<td>920.0</td>
<td>0.30</td>
</tr>
<tr>
<td>926.1</td>
<td>0.40</td>
</tr>
<tr>
<td>962.0</td>
<td>0.80</td>
</tr>
<tr>
<td>1081.0</td>
<td>1.10</td>
</tr>
<tr>
<td>1085.9</td>
<td>0.40</td>
</tr>
<tr>
<td>1171.0</td>
<td>1.00</td>
</tr>
<tr>
<td>1293.0</td>
<td>1.00</td>
</tr>
<tr>
<td>1298.6</td>
<td>1.00</td>
</tr>
<tr>
<td>1321.0</td>
<td>0.50</td>
</tr>
<tr>
<td>1389.6</td>
<td>0.10</td>
</tr>
<tr>
<td>1457.1</td>
<td>0.30</td>
</tr>
</tbody>
</table>

**<E> per decay = 288.1**

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>γ</td>
<td>288.9</td>
<td>845.2</td>
</tr>
<tr>
<td>γ</td>
<td>297.0</td>
<td>875.2</td>
</tr>
<tr>
<td>γ</td>
<td>2002.0</td>
<td>945.9</td>
</tr>
<tr>
<td>γ</td>
<td>2070.0</td>
<td>946.2</td>
</tr>
<tr>
<td>γ</td>
<td>2758.0</td>
<td>1046.8</td>
</tr>
<tr>
<td>γ</td>
<td>2836.5</td>
<td>1104.0</td>
</tr>
<tr>
<td>γ</td>
<td>2890.0</td>
<td>1177.0</td>
</tr>
<tr>
<td>γ</td>
<td>3278.2</td>
<td>1512.0</td>
</tr>
<tr>
<td>γ</td>
<td>3400.0</td>
<td>1571.0</td>
</tr>
</tbody>
</table>

**<E> per decay = 1459.**

**<E> per decay = 1880.**
### $^{112}_{49}$Sn

- **Stable or Long-Lived**

#### Cross Sections (Barns)
- $\sigma_{\text{total}}$ (2200 MeV) $= 2.0825 \times 10^{-2}$
- $\sigma_{\text{capture}}$ (2200 MeV) $= 2.0610 \times 10^{-2}$
- $\sigma_{\text{elastic}}$ (2200 MeV) $= 1.0049$
- $\sigma_{\text{nucleus}}$ (total) $= 8.7810 \times 10^{-3}$
- $\sigma_{\text{nucleus}}$ (capture) $= 2.9960 \times 10^{-3}$
- $\sigma_{\text{nucleus}}$ ($\langle n, 2n \rangle$) $= 1.1590$
- $\sigma_{\text{nucleus}}$ ($\langle n, p \rangle$) $= 8.2360 \times 10^{-4}$
- $\sigma_{\text{nucleus}}$ ($\langle n, \gamma \rangle$) $= 8.1360 \times 10^{-4}$

#### Fission Yields
- $^{235}\text{U}$ thermal $= 4.7025 \times 10^{-2}$
- $^{235}\text{U}$ fast $= 3.4000 \times 10^{-2}$
- $^{234}\text{U}$ fast $= 4.4790 \times 10^{-3}$
- $^{239}\text{Pu}$ thermal $= 3.3295 \times 10^{-4}$

### $^{153}_{70}$Eu

**ENDF/B-VI File 1 Comments**
- 63-EU-152
- HEDL
- Eval-APR74: R.E. Schenter
- DIST-DEC74
- Reference:
  - QT & LEGERER ET AL., TABLE OF ISOTOPES 6TH ED

#### $^{153}_{70}$Eu
- $T_{1/2} = 96.00m$
- $\langle E_g \rangle$ per decay $= 97.80$

#### $^{153}_{70}$Eu
- $Q_{1/2} = 97.80$
- $Q_{3/2} = 1.000$

#### $^{153}_{77}$Eu
- $12.99y$

### 152n - 63 - 1
$^{152}$Eu

ENDF/B-IV FILE 1 COMMENTS
63-EU-152 M HECL
EVAL-APR74 R.E.SCHENTER
DIST-DEC74

REFERENCES
G.I.-C. LEDEMER ET AL TABLE OF ISOTOPES 6TH ED

$^{152}$Eu

$T_{1/2}$ = 8.200h

$<E_r>$ PER DECAY = 433.6

$<E_y>$ PER DECAY = 579.2

$Q_{M} = 1870$, $Q_{a} = 1900$

$B(E2) = .7700$, $B(M1) = .2300$

$1.099 \times 10^{-14}$ γ

STABLE OR LONG-LIVED

152a - 63 - 1

$^{152}$Eu

ENDF/B-IV FILE 1 COMMENTS
63-EU-152 BNL
EVAL-DEC75 M.TAKANASHI
DIST-DEC74 REV-JUN-75

MF=1, MT=457 RADIOACTIVE DECAY DATA SECTION EVALUATED BY R.SCHENTER (HECL) FOR ENDF/B-IV FISSION PROD. FILE

$^{152}$Eu

$T_{1/2} = 12.99\gamma$

$<E_r>$ PER DECAY = 425.5

$<E_y>$ PER DECAY = 518.3

CROSS SECTIONS (BARNs)

- TOTAL 2200m/s 2.3183 \times 10^{-3}
- CAPTURE 2200m/s 2.3129 \times 10^{-3}
- WESTCOTT G FACTOR 8.19282 \times 10^{-1}
- RESONANCE INTEGRAL TOTAL 3.9400 \times 10^{-3}
- RESONANCE INTEGRAL CAPTURE 1.6920 \times 10^{-3}
- RESONANCE INTEGRAL (N,2N) 1.6220
- RESONANCE INTEGRAL (N,p) 1.8570 \times 10^{-2}
- RESONANCE INTEGRAL (N,\alpha) 6.3760 \times 10^{-3}

$Q_{M} = 1820$, $Q_{a} = 1850$

$B(E2) = .7200$, $B(M1) = .2800$

$1.099 \times 10^{-14}$ γ

STABLE OR LONG-LIVED

152 - 63 - 1
\( ^{152} \text{Gd} \)

ENDF/B-IV FILE 1 COMMENTS
64-GD-192  HEDL
EVAL-APR74  R.E.SCHENTER
DIST-DEC74

\( \frac{1}{2} \) Gd

\( T_{1/2} = 1.099 \times 10^{14} \text{yr} \)

\( \langle E_a \rangle \text{ PER DECAY} = 2234 \)

\( G_a = 2234 \)

\( \text{BR}_a = 1.000 \)

\( ^{152} \text{Sm} \)

\( \text{STABLE OR LONG-LIVED} \)
\[ \frac{\alpha}{2} \text{ Lo} \]

ENDFB-IV FILE 1 COMMENTS
57-1A-133 HEDL EVAL-APR74 R.E.SCHENTER
DIST-NOV74

REFERENCES
HALF LIFE-R SCHENTER, THEORY(9773)

\[ \frac{\alpha}{2} \text{ Ce} \]

ENDFB-IV FILE 1 COMMENTS
58-CE-153 HEDL EVAL-APR74 R.E.SCHENTER
DIST-DEC74

REFERENCES
HALF LIFE-R SCHENTER, THEORY(9773)

\[ \frac{\alpha}{2} \text{ Pr} \]

ENDFB-IV FILE 1 COMMENTS
58-CE-153 HEDL EVAL-APR74 R.E.SCHENTER
DIST-DEC74

REFERENCES
HALF LIFE-R SCHENTER, THEORY(9773)

\[ Q_{\beta} = 7280, \]
\[ BR_{\beta} = 1.000 \]

\[ \text{153} \text{ - 57- 1} \]

\[ \text{153} \text{ - 58- 1} \]
$^{133}$ Pr

ENDF/B-IV FILE 1 COMMENTS
59-PR-153 Hedl Eval-APR74 R.E. Schenter
DIST-DEC74
REFERENCES
HALF LIFE-R SCHENTER, THEORY(9/73)

$^{133}$ Pr

- $T_{1/2} = 7.743s$
- $\langle E_g \rangle$ PER DECAY = 1199
- $\langle E_x \rangle$ PER DECAY = 1943
- FISSION YIELDS
  - $^{235}U$ THERMAL = 2.9993 x 10^{-4}
  - $^{235}U$ FAST = 4.1216 x 10^{-4}
  - $^{239}U$ FAST = 2.1957 x 10^{-4}
  - $^{239}Pu$ THERMAL = 4.5229 x 10^{-4}

- $Q_p = 3320$
- $BR_p = 1.000$

$^{155}$ Nd

- $T_{1/2} = 67.54s$

153 - 59 - 1

$^{155}$ Nd

ENDF/B-IV FILE 1 COMMENTS
60-ND-153 Hedl Eval-APR74 R.E. Schenter
DIST-DEC74
REFERENCES
HALF LIFE-R SCHENTER, THEORY(9/73)

$^{155}$ Nd

- $T_{1/2} = 67.54s$
- $\langle E_g \rangle$ PER DECAY = 791.9
- $\langle E_x \rangle$ PER DECAY = 1297
- FISSION YIELDS
  - $^{235}U$ THERMAL = 1.1453 x 10^{-3}
  - $^{235}U$ FAST = 1.3728 x 10^{-3}
  - $^{239}U$ FAST = 1.2551 x 10^{-3}
  - $^{239}Pu$ THERMAL = 2.6243 x 10^{-3}

- $Q_p = 3320$
- $BR_p = 1.000$

$^{156}$ Pm

- $5.40s$ 20m

153 - 60 - 1
153

Pu

ENDF/B-IV FILE 1 COMMENTS
61-PM-113 ANC

PREPARED FOR FILE 8/73

REFERENCES
Q. 1973 REVISION OF WAPSTRA-GEVE MASS TABLES
OTHER: L.A.KRÖGER AND C.W.REICH, NUCL. DATA SHEETS

153

Pu

T_{1/2} = 5.40x.20m

<\beta^-> PER DECAY = 672.6

<\beta^+> PER DECAY = 77.4

Fission Yields

\239\text{U} THERMAL 1.002x10^{-4}

\239\text{U} FAST 1.943x10^{-4}

\239\text{Pu} THERMAL 2.374x10^{-5}

\239\text{Pu} THERMAL 6.170x10^{-6}

G_f = 1300.0x10^0.

\beta_d = 1.000

5\text{m}

46.70x0.10h

153 - 61 - 1
PHOTON RADIATION TABLE

<table>
<thead>
<tr>
<th>MEAN ENERGY</th>
<th>LINES</th>
<th>PHOTONS/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>38.0</td>
<td>± 0.7</td>
<td>8</td>
</tr>
<tr>
<td>136.7</td>
<td>± 0.9</td>
<td>6</td>
</tr>
</tbody>
</table>

\[ \langle E_{\text{PHOTON}} \rangle \text{ PER DECAY} = 39.76 \]

PARTICLE RADIATION TABLE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>F_{\text{max}}</th>
<th>MEAN ENERGY</th>
<th>INTENSITY/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Au</td>
<td>45.1</td>
<td>10.51</td>
<td>5.819</td>
</tr>
<tr>
<td>CE</td>
<td>181.3</td>
<td>68.40 ± 0.11</td>
<td>23.26</td>
</tr>
<tr>
<td>γ-</td>
<td>1673.0</td>
<td>650.</td>
<td>40. 8.200</td>
</tr>
<tr>
<td>γ-</td>
<td>1709.0</td>
<td>666.</td>
<td>40. 3.000</td>
</tr>
<tr>
<td>γ-</td>
<td>1764.0</td>
<td>692.</td>
<td>40. 5.000</td>
</tr>
</tbody>
</table>

\[ \langle E_{\gamma} \rangle \text{ PER DECAY} = 884.5 \]

\[ \langle E_{\gamma} \rangle \text{ PER DECAY} = 16950 \]

PHOTON INTENSITY PLOT

CHARACTERISTIC RADIATION TABLE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>ENERGY</th>
<th>I/100 DECAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>γ-</td>
<td>1764.</td>
<td>55.00</td>
</tr>
<tr>
<td>γ-</td>
<td>1673.</td>
<td>34.00</td>
</tr>
<tr>
<td>γ</td>
<td>155.90</td>
<td>0.20</td>
</tr>
<tr>
<td>γ</td>
<td>127.3</td>
<td>0.3</td>
</tr>
<tr>
<td>Cm</td>
<td>34.18</td>
<td>0.20</td>
</tr>
<tr>
<td>γ-</td>
<td>1618.</td>
<td>8.200</td>
</tr>
</tbody>
</table>
\(^{113}\) Sn

ENDF/B-IV FILE 1 COMMENTS
62-SM-153 ANC,HEUL EVAL-69B74 C.W.REICH DECAY DATA
EVAL-69T74 O.E.SCHENKER AND F.SCHMITTROTH
CROSS SECTION DATA
DIST-DEC74

FILE INFORMATION

.

\(\text{MT}=657\) DECAY DATA

\text{REFERENCES}
C.W.REICH, RG HELMER AND MN PUTMAN, ANCR-1157, ENDF210.8/74.
PREPARED FOR FILE 8/74

\text{REFERENCES}
Q. 1975 REVISION OF WAPSTRA-GDVE NUCLEI PARAMETERS
OTHER

\[\frac{1}{2} T_{1/2} = 46.70 \text{ keV} \]
\[\langle E_d \rangle \text{ PER DECAY} = 230.7 \]
\[\langle E_f \rangle \text{ PER DECAY} = 104.5 \]

CROSS SECTIONS (BARNs)

\(\text{TOTAL} \) \(2200\times10^{-4} \)
\(\text{WESTCOTT G FACTOR} \) \(1.0135 \)
\(\text{CAPTURE} \) \(2900\times10^{-2} \)
\(\text{WESTCOTT G FACTOR} \) \(1.0001 \)
\(\text{RESONANCE INTEGRAL TOTAL} \) \(6.1590\times10^{-3} \)
\(\text{RESONANCE INTEGRAL CAPTURE} \) \(2.8640\times10^{-3} \)

FISSION YIELDS

\(\text{U}^{233} \) THERMAL \(3.2117\times10^{-4} \)
\(\text{U}^{233} \) FAST \(3.7606\times10^{-6} \)
\(\text{U}^{238} \) FAST \(6.2294\times10^{-4} \)
\(\text{Pu}^{239} \) THERMAL \(2.1407\times10^{-5} \)

\[Q_f = 2809.94 \]
\[\sigma_R = 1.00 \]

\(^{153}\) Eu

STABLE OR LONG-LIVED

153 - 62 - 1
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Energy (keV)</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>37.80</td>
<td>13</td>
<td>15.27 ± 0.03</td>
</tr>
<tr>
<td>103.71</td>
<td>10</td>
<td>10.57 ± 0.22</td>
</tr>
<tr>
<td>165.0</td>
<td>3</td>
<td>0.0070</td>
</tr>
<tr>
<td>458.3</td>
<td>1</td>
<td>0.0312 ± 0.0020</td>
</tr>
<tr>
<td>540.2</td>
<td>16</td>
<td>0.134 ± 0.008</td>
</tr>
<tr>
<td>613.9</td>
<td>13</td>
<td>0.0212 ± 0.0016</td>
</tr>
<tr>
<td>721.1</td>
<td>6</td>
<td>0.00031 ± 0.00004</td>
</tr>
</tbody>
</table>

<sub>E_{photon} per decay = 17.86 ± 0.24</sub>

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>E_{max} (keV)</th>
<th>Mean Energy (keV)</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>AU</td>
<td>44.7</td>
<td>8.799</td>
<td>17.22</td>
</tr>
<tr>
<td>CE</td>
<td>101.4</td>
<td>69.5816 ± 0.0111</td>
<td>22.65</td>
</tr>
<tr>
<td>$\pi^-$</td>
<td>90.0</td>
<td>23.7 ± 1.2</td>
<td>0.00180</td>
</tr>
<tr>
<td>$\pi^+$</td>
<td>102.0</td>
<td>27.0 ± 1.2</td>
<td>0.02300</td>
</tr>
<tr>
<td>$\mu^-$</td>
<td>174.4</td>
<td>30.4 ± 1.3</td>
<td>0.02500</td>
</tr>
<tr>
<td>$\mu^+$</td>
<td>172.1</td>
<td>47.1 ± 1.7</td>
<td>0.06900</td>
</tr>
<tr>
<td>$\nu$</td>
<td>174.0</td>
<td>47.7 ± 1.7</td>
<td>0.06600</td>
</tr>
<tr>
<td>z</td>
<td>538.9</td>
<td>170. ± 5.</td>
<td>0.01300</td>
</tr>
<tr>
<td>$\delta$</td>
<td>635.7</td>
<td>206. ± 6.</td>
<td>33.70</td>
</tr>
<tr>
<td>$\delta'$</td>
<td>657.0</td>
<td>214. ± 7.</td>
<td>39.90</td>
</tr>
<tr>
<td>$\tau$</td>
<td>769.4</td>
<td>233. ± 7.</td>
<td>43.60</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>711.2</td>
<td>235. ± 7.</td>
<td>58.60</td>
</tr>
<tr>
<td>$\beta^-$</td>
<td>808.6</td>
<td>274. ± 8.</td>
<td>21.00</td>
</tr>
</tbody>
</table>

<sub><E_x> per decay = 248.0, <E_y> per decay = 467.5</sub>

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy (keV)</th>
<th>1/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\pi^-$</td>
<td>703. ± 4.</td>
<td>43.60</td>
</tr>
<tr>
<td>$\pi^+$</td>
<td>656. ± 4.</td>
<td>35.70</td>
</tr>
<tr>
<td>$\mu^+$</td>
<td>809. ± 4.</td>
<td>21.00</td>
</tr>
<tr>
<td>AU</td>
<td>6252</td>
<td>15.95</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>103.179</td>
<td>10.48 ± 0.22</td>
</tr>
</tbody>
</table>
\[ ^{153}\text{Eu} \]

\[ ^{153}\text{Eu} \]

STABLE OR LONG-LIVED

CROSS SECTIONS (BARNs)

- Total 22096/s: 4.3735 \times 10^{-2}
- Westcott G Factor: 9.8289 \times 10^{-1}
- Capture 22096/s: 4.3735 \times 10^{-2}
- Westcott G Factor: 9.8289 \times 10^{-1}
- Resonance Integral Total: 1.8220 \times 10^{-3}
- Resonance Integral Capture: 1.5690 \times 10^{-3}
- Resonance Integral (n,2n): 1.5690 \times 10^{-3}
- Resonance Integral (n,p): 5.0610 \times 10^{-3}
- Resonance Integral (n,\alpha): 1.1570 \times 10^{-2}

FISSION YIELDS

- \( ^{239}\text{U} \) thermal: 6.8837 \times 10^{-7}
- \( ^{239}\text{U} \) fast: 7.6033 \times 10^{-9}
- \( ^{239}\text{Pu} \) thermal: 1.9397 \times 10^{-8}

153 - 63 - 1

\[ ^{152}\text{Gd} \]

\[ ^{152}\text{Gd} \]

ENDF/B-IV FILE 1 COMMENTS

64-GD-153 HEDL EVAL-APR74 W.E. SCHENTER DIST-DEC74

\[ ^{154}\text{Gd} \]

\[ ^{154}\text{Gd} \]

\[ T_{1/2} = 0.5917 \] yr
\( \langle E_\gamma \rangle \) PER DECAY =120.0

\[ Q_{\gamma} = 240.0 \]
\[ \beta_{\text{max}} = 1.000 \]

153 - 64 - 1

\[ ^{153}\text{Eu} \]

STABLE OR LONG-LIVED
\[
\frac{1}{2}^{139}\text{La}
\]

ENDF/B-IV FILE 1 COMMENTS
57-LA-134 HEDL EVAL-APR74 R.E.SCHENTER
DIST-NOV74
REFERENCES
HALF LIFE - R SCHENTER, THEORY(9/73)

\[
\frac{1}{2}^{139}\text{La}
\]

\( T_{1/2} = 1.755 \text{y} \)
\( \langle E_x \rangle \text{ PER DECAY} = 7.26 \text{MeV} \)
\( \langle E_y \rangle \text{ PER DECAY} = 4.208 \text{MeV} \)

FISSION YIELDS
\[ ^{239}\text{U} \text{FAST} \quad 3.0897 \times 10^{-7} \]

\[
\frac{1}{2}^{140}\text{Ce}
\]

\( Q_y = 9.460 \text{MeV} \)
\( \text{BR}_y = 1.000 \)

\[
\frac{1}{2}^{140}\text{Ce}
\]

ENDF/B-IV FILE 1 COMMENTS
58-CE-154 HEDL EVAL-APR74 R.E.SCHENTER
DIST-OCT74
REFERENCES
HALF LIFE - R SCHENTER, THEORY(9/73)

\[
\frac{1}{2}^{140}\text{Ce}
\]

\( T_{1/2} = 3.591 \text{y} \)
\( \langle E_x \rangle \text{ PER DECAY} = 10.25 \text{MeV} \)
\( \langle E_y \rangle \text{ PER DECAY} = 1.926 \text{MeV} \)

FISSION YIELDS
\[ ^{239}\text{U} \text{THERMAL} \quad 7.8543 \times 10^{-7} \]
\[ ^{239}\text{U} \text{FAST} \quad 9.976 \times 10^{-7} \]
\[ ^{239}\text{Pu} \text{THERMAL} \quad 6.5971 \times 10^{-7} \]

\[
\frac{1}{2}^{141}\text{Pr}
\]

\( Q_y = 6.270 \text{MeV} \)
\( \text{BR}_y = 1.000 \)

\[
\frac{1}{2}^{141}\text{Pr}
\]

154 - 58 - 1
\[ $^{197}$ Pr \]

ENDF/B-IV FILE 1 COMMENTS
59-PR-154 HEDL EVAL-APR74 R.E. SCHENTER DIST-DEC74
REFERENCES
HALF LIFE - R SCHENTER, THEORY (9/73)

\[ \frac{T_{1/2}}{\text{THERMAL}} = 1.30 \times 10^{-5} \]
\[ \langle E \rangle \text{ PER DECAY} = 1837 \]
\[ \langle E \rangle \text{ PER DECAY} = 2866 \]

FISSION YIELDS
\[ 235\text{U THERMAL} \quad 5.3919 \times 10^{-5} \]
\[ 235\text{U FAST} \quad 6.6321 \times 10^{-5} \]
\[ 239\text{Pu THERMAL} \quad 8.9537 \times 10^{-5} \]

\[ Q_{f} = 6980 \]
\[ \text{BR}_{\gamma} = 1.000 \]

\[ $^{144}$ Nd \]

\[ T_{1/2} = 7.735 \text{d} \]
\[ \langle E \rangle \text{ PER DECAY} = 380.4 \]
\[ \langle E \rangle \text{ PER DECAY} = 698.6 \]

FISSION YIELDS
\[ 235\text{U THERMAL} \quad 4.9838 \times 10^{-4} \]
\[ 239\text{Pu FAST} \quad 5.9282 \times 10^{-4} \]
\[ 239\text{Pu THERMAL} \quad 1.7436 \times 10^{-3} \]

\[ Q_{f} = 1700 \]
\[ \text{BR}_{\gamma} = 1.000 \]

\[ $^{154}$ Sm \]

\[ T_{1/2} = 2.80 \times 10^{4} \text{d} \]

REFERENCES
HALF LIFE - R SCHENTER, THEORY (9/73)

\[ ^{154} \text{Sm} \]

\[ 60-ND-154 HEDL EVAL-APR74 R.E. SCHENTER DIST-DEC74 \]
154Pm

ENDF/B-IV FILE 1 COMMENTS
61-PM-154M HEUL EVAL-APR74 R.E.SCHENTER
DIST-DEC74

REFERENCES
DIT-R SCHENTER, THEORY: 9/73

154Pm

T1/2 = 1.800m
"Eg" PER DECAY = 1034.
"Eg" PER DECAY = 1522.

FISSION YIELDS
235U THERMAL  9.1760 x 10^-5
235U FAST  1.7676 x 10^-4
239U FAST  3.6277 x 10^-5
239Pu THERMAL  9.1300 x 10^-4

Qg = 4530.
BRg = 9.4000
BRi = 250.0
RI = 1.000

22 Sm

STABLE OR LONG-LIVED

154 - 61-1

154Pm

ENDF/B-IV FILE 1 COMMENTS
61-PM-154 M HEUL EVAL-APR74 R.E.SCHENTER
DIST-DEC74

REFERENCES
Q-BETA - A TOBIAS (10/72) RD/B/M2453
Q-BETA - A TOBIAS (10/72) RD/B/M2453
Q-ALPHA - A TOBIAS (10/72) RD/B/M2453

154Pm

T1/2 = 2.80 x 20m
"Eg" PER DECAY = 7600.0
"Eg" PER DECAY = 1885.

FISSION YIELDS
235U THERMAL  9.1870 x 10^-5
235U FAST  1.0673 x 10^-4
239U FAST  3.6277 x 10^-5
239Pu THERMAL  5.1283 x 10^-4

Qg = -3900.
BRg = 1.000

22 Sm

STABLE OR LONG-LIVED

154 - 61-1
### $^{154}$ Sm

#### Stable or Long-Lived

**CROSS SECTIONS (BARNs)**
- Total 2200 m/s: 8.7572
- Westcott G Factor: 1.0417
- Capture 2200 m/s: 5.3052
- Westcott G Factor: 1.0015
- Resonance Integral Total: 2.6060 x 10^7
- Resonance Integral Capture: 3.3950 x 10^7

**Fission Yields**
- $^{235}$U Thermal: 1.049 x 10^8
- $^{235}$U Fast: 1.1852 x 10^8
- $^{239}$Pu Fast: 5.1795 x 10^7
- $^{239}$Pu Thermal: 1.1209 x 10^8

### $^{154}$ Eu

**ENDF/B-V File**

**No Comments**

**63 EU-154**

**BNL EVAL-DEC75, H. TAKAHASHI DIST-DEC75 REV-JUN75**

**MF=1, MT=457**

**Radioactive Decay Data Section**

**Evaluated by**
- R. SCHWERTER (MEDL) for ENDF/B-V Fiss. Prod. File
- DBETA - A. TIBIAS(10/72) LD/B/M2453
- EGAMMA - A. TIBIAS(10/72) LD/B/M2453

#### $^{154}$ Eu

- $T_{1/2} = 8.59$ y
- $<E_\gamma>$ per Decay: 247.0
- $<E_\gamma>$ per Decay: 1250

**CROSS SECTIONS (BARNs)**
- Total 2200 m/s: 8.3785 x 10^3
- Westcott G Factor: 8.8978 x 10^3
- Capture 2200 m/s: 1.5062 x 10^3
- Westcott G Factor: 8.9873 x 10^3
- Resonance Integral Total: 2.7800 x 10^4
- Resonance Integral Capture: 2.5570 x 10^4
- Resonance Integral (N, 2n): 1.5870
- Resonance Integral (N, p): 5.8910 x 10^4
- Resonance Integral (N, e): 1.7720 x 10^4

**Fission Yields**
- $^{235}$U Thermal: 1.6309 x 10^8
- $^{235}$U Fast: 1.7903 x 10^8
- $^{239}$Pu Thermal: 3.5395 x 10^7

### $^{154}$ Gd

**Stable or Long-Lived**

### $^{154}$ - 65- 1
\[ 1^{14} \text{Gd} \]

<table>
<thead>
<tr>
<th>Stable or Long-Lived</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CROSS SECTIONS (Barns)</td>
<td></td>
</tr>
<tr>
<td>( # ) TOTAL 2200M/S</td>
<td>8.8444 \times 10^{-1}</td>
</tr>
<tr>
<td>NESTCOTT G FACTOR</td>
<td>1.0059</td>
</tr>
<tr>
<td>( # ) CAPTURE 2200M/S</td>
<td>8.3001 \times 10^{-1}</td>
</tr>
<tr>
<td>NESTCOTT G FACTOR</td>
<td>1.0009</td>
</tr>
<tr>
<td>RESONANCE INTEGRAL TOTAL</td>
<td>5.6666 \times 10^{2}</td>
</tr>
<tr>
<td>RESONANCE INTEGRAL CAPTURE</td>
<td>2.4780 \times 10^{1}</td>
</tr>
</tbody>
</table>
\[ 133 \mathrm{La} \]

\[ \begin{aligned}
&\text{ENDF/B-IV FILE 1 COMMENTS} \\
&\text{57-LA-155 HEDL EVAL-APR74 R.E.SCHENTER DIST-NOV74} \\
&\text{REFERENCES} \\
&\text{HALF LIFE - R SCHENTER, THEORY (9/73)} \\
&\end{aligned} \]

\[ \begin{aligned}
&\frac{1}{2} T_{1/2} = 2.215 \text{s} \\
&\langle E\beta \rangle \text{ PER DECAY } = 2240. \\
&\langle E\gamma \rangle \text{ PER DECAY } = 3881. \\
&\end{aligned} \]

\[ \begin{aligned}
G_{\beta} = 850. \\
BR_{\beta} = 1.000 \\
\end{aligned} \]

\[ \begin{aligned}
&155 - 57 - 1 \\
&\end{aligned} \]

\[ 133 \mathrm{Ce} \]

\[ \begin{aligned}
&\text{ENDF/B-IV FILE 1 COMMENTS} \\
&\text{98-CE-155 HEDL EVAL-APR74 R.E.SCHENTER DIST-DEC74} \\
&\text{REFERENCES} \\
&\text{HALF LIFE - R SCHENTER, THEORY (9/73)} \\
&\end{aligned} \]

\[ \begin{aligned}
&\frac{1}{2} T_{1/2} = 2.728 \text{s} \\
&\langle E\beta \rangle \text{ PER DECAY } = 1641. \\
&\langle E\gamma \rangle \text{ PER DECAY } = 2930. \\
&\text{FISSION YIELDS} \\
&235\mathrm{U} \text{ THERMAL } = 3.251 \times 10^{-4} \\
&235\mathrm{U} \text{ FAST } = 3.936 \times 10^{-4} \\
&238\mathrm{U} \text{ FAST } = 1.306 \times 10^{-4} \\
&239\mathrm{Pu} \text{ THERMAL } = 2.397 \times 10^{-4} \\
&\end{aligned} \]

\[ \begin{aligned}
G_{\beta} = 6660. \\
BR_{\beta} = 1.000 \\
\end{aligned} \]

\[ \begin{aligned}
&155 - 98 - 1 \\
&\end{aligned} \]
\[ ^{139} \text{Pr} \]

ENDF/B-IV FILE 1 COMMENTS
59-PR-155  HEPL  EVAL-APR74  R.E. SCHENTER
DIST-DEC74

REFERENCES
HALF LIFE - R. SCHENTER, THEORY(7/73)

\[ \begin{align*}
\lambda &= 1.891 \text{s}^{-1} \\
\langle E \rangle \text{ PER DECAY} &= 1447 \text{ keV} \\
\langle E \rangle \text{ PER DECAY} &= 2437 \text{ keV}
\end{align*} \]

FISSION YIELDS
\[ \begin{align*}
^{235} \text{U THERMAL} &= 6.523 \times 10^{-5} \\
^{235} \text{U FAST} &= 9.171 \times 10^{-6} \\
^{238} \text{U FAST} &= 2.140 \times 10^{-7} \\
^{239} \text{Pu THERMAL} &= 1.849 \times 10^{-3}
\end{align*} \]

\[ \begin{align*}
Q(x) &= 36.90 \\
B\beta &= 1.000
\end{align*} \]

\[ ^{140} \text{Nd} \]

ENDF/B-IV FILE 1 COMMENTS
60-ND-155  HEPL  EVAL-APR74  R.E. SCHENTER
DIST-DEC74

REFERENCES
HALF LIFE - R. SCHENTER, THEORY(7/73)

\[ \begin{align*}
\lambda &= 26.06 \text{s}^{-1} \\
\langle E \rangle \text{ PER DECAY} &= 934.9 \\
\langle E \rangle \text{ PER DECAY} &= 1619 \text{ keV}
\end{align*} \]

FISSION YIELDS
\[ \begin{align*}
^{235} \text{U THERMAL} &= 1.599 \times 10^{-4} \\
^{235} \text{U FAST} &= 2.563 \times 10^{-4} \\
^{238} \text{U FAST} &= 9.112 \times 10^{-4} \\
^{239} \text{Pu THERMAL} &= 5.205 \times 10^{-4}
\end{align*} \]

\[ \begin{align*}
Q(x) &= 39.20 \\
B\beta &= 1.000
\end{align*} \]
\[ \text{1} \frac{3}{4} \text{ Pm} \]

**ENDF/B-IV FILE 1 COMMENTS**

**61-PM-155**

**HEDL**

**EVAL-APR74 R.E. SCHENTER**

**DIST-OEC74**

**REFERENCES**

**HALF LIFE: R. SCHENTER, THEORY (9/73)**

\[ T_{1/2} = 36.56 \text{s} \]

\[ \langle E_y \rangle \text{ PER DECAY} = 747.4 \]

\[ \langle E_y \rangle \text{ PER DECAY} = 727.8 \]

**FISSION YIELDS**

\[ \text{235U THERMAL} \quad 1.405 \times 10^{-4} \]

\[ \text{235U FAST} \quad 2.649 \times 10^{-5} \]

\[ \text{239U THERMAL} \quad 1.196 \times 10^{-5} \]

\[ \text{239Pu THERMAL} \quad 0.0078 \times 10^{-4} \]

\[ \text{D}_{\gamma} = 3378 \]

\[ \text{BR}_{\gamma} = 1.000 \]

\[ \frac{1}{2} \text{ Sm} \]

\[ 22.20 \text{m} \]

155 - 61- 1

\[ \frac{1}{5} \text{ Sm} \]

**ENDF/B-IV FILE 1 COMMENTS**

**62-SM-151**

**HEDL**

**EVAL-APR74 R.E. SCHENTER**

**DIST-OEC74**

\[ T_{1/2} = 22.20 \text{m} \]

\[ \langle E_y \rangle \text{ PER DECAY} = 371.8 \]

\[ \langle E_y \rangle \text{ PER DECAY} = 611.9 \]

**FISSION YIELDS**

\[ \text{235U THERMAL} \quad 2.260 \times 10^{-5} \]

\[ \text{235U FAST} \quad 4.657 \times 10^{-5} \]

\[ \text{239U FAST} \quad 2.149 \times 10^{-5} \]

\[ \text{239Pu THERMAL} \quad 2.726 \times 10^{-4} \]

\[ \text{D}_{\gamma} = 1650 \]

\[ \text{BR}_{\gamma} = 1.000 \]

\[ \frac{1}{2} \text{ Eu} \]

\[ 4.797 \gamma \]

155 - 62- 1
$^{151}$ Eu

ENDF/B-IV FILE 1 COMMENTS
63-EU-151 WEDL,RLW, EVAN-DIV74 R.E.SCHENTER AND A.PRINCE
DIST-DEC74

$^{151}$ Eu

\[ T_{\gamma} = 4.797 \text{y} \]
\[ \langle E_\gamma \rangle \text{ PER DECAY } = 54.53 \]
\[ \langle E_\gamma \rangle \text{ PER DECAY } = 87.35 \]

CROSS SECTIONS (BARNS)

- TOTAL 2200M/S \[ 4.043 \times 10^{18} \]
- WESTCOTT G FACTOR \[ 1.0006 \]
- WESTCOTT G FACTOR \[ 1.0001 \]
- RESONANCE INTEGRAL TOTAL \[ 2.309 \times 10^{13} \]
- RESONANCE INTEGRAL CAPTURE \[ 1.856 \times 10^{13} \]
- RESONANCE INTEGRAL (N,2N) \[ 1.3380 \]
- RESONANCE INTEGRAL (N,\gamma) \[ 1.068 \times 10^{13} \]
- RESONANCE INTEGRAL (N,\alpha) \[ 9.756 \times 10^{10} \]

FISSION YIELDS

- $^{235}$U THERMAL \[ 1.005 \times 10^{-8} \]
- $^{239}$U FAST \[ 2.4 \times 10^{-7} \]
- $^{239}$Pu THERMAL \[ 2.669 \times 10^{-6} \]

\[ Q_{\beta} = 250.0 \]
\[ \beta^{+} = 1.000 \]

$^{155}$ Gd

STABLE OR LONG-LIVED

$^{155}$ - 63 - 1

$^{155}$ Gd

STABLE OR LONG-LIVED

CROSS SECTIONS (BARNS)

- TOTAL 2200M/S \[ 6.113 \times 10^{14} \]
- WESTCOTT G FACTOR \[ 8.429 \times 10^{-11} \]
- WESTCOTT G FACTOR \[ 8.423 \times 10^{-11} \]
- WESTCOTT G FACTOR \[ 8.423 \times 10^{-11} \]
- RESONANCE INTEGRAL TOTAL \[ 1.102 \times 10^{13} \]
- RESONANCE INTEGRAL CAPTURE \[ 1.577 \times 10^{13} \]

FISSION YIELDS

- $^{239}$Pu THERMAL \[ 2.629 \times 10^{-8} \]

$^{155}$ - 64 - 1
1\% Ce

ENDF/B-IV FILE 1 COMMENTS
58-CE-156 HECL
EVAL-APR74 R.E.SCHENTER
DIST-DEC74
REFERENCES
HALF LIFE-R SCHENTER,THEORY(9/73)

\[ T_{1/2} = 1.162 s \]
\[ \langle E_g \rangle \text{ PER DECAY} = 1305 \text{ eV} \]
\[ \langle E_\gamma \rangle \text{ PER DECAY} = 2528 \text{ eV} \]

FISSION YIELDS
\[ ^{239}U \text{ FAST} \quad 1.0302 \times 10^{-9} \]
\[ ^{235}U \text{ FAST} \quad 1.5194 \times 10^{-9} \]
\[ ^{239}Pu \text{ THERMAL} \quad 1.2298 \times 10^{-9} \]

\[ Q_{\beta} = 5340 \text{ keV} \]
\[ BR_{\beta} = 1.00 \]

1\% Pr

\[ T_{1/2} = 5104 \text{ s} \]
\[ \langle E_g \rangle \text{ PER DECAY} = 2314 \text{ eV} \]
\[ \langle E_\gamma \rangle \text{ PER DECAY} = 3395 \text{ eV} \]

FISSION YIELDS
\[ ^{239}U \text{ THERMAL} \quad 4.8326 \times 10^{-7} \]
\[ ^{235}U \text{ FAST} \quad 6.8811 \times 10^{-7} \]
\[ ^{239}Pu \text{ FAST} \quad 6.7434 \times 10^{-5} \]
\[ ^{239}Pu \text{ THERMAL} \quad 1.3598 \times 10^{-6} \]

\[ Q_{\beta} = 7880 \text{ keV} \]
\[ BR_{\beta} = 1.00 \]

1\% Nd

156 - 59 - 1
\[ \frac{128}{10} \text{ Nd} \]

ENDFB/IV FILE 1 COMMENTS
60-NO-156 HEDL
EVAL-ADP74 R.E.SCHENTER
DIST-DEC74
REFERENCES
HALF LIFE=R SCHENTER, THEORY(9/73)

\[ T_{1/2} = 58.49 \text{ m} \]
\[ \langle E \rangle \text{ PER DECAY} = 594.4 \]
\[ \langle E \rangle \text{ PER DECAY} = 1130. \]

FISSION YIELDS
\[ ^{235}\text{U THERMAL} \times 3.728 \times 10^{-1} \]
\[ ^{235}\text{U FAST} \times 5.078 \times 10^{-1} \]
\[ ^{239}\text{U FAST} \times 4.7919 \times 10^{-1} \]
\[ ^{239}\text{Pu THERMAL} \times 1.6874 \times 10^{-1} \]

\[ Q_p = 2620, \]
\[ B(R) = 1.000 \]

\[ \frac{124}{10} \text{ Pm} \]
\[ T_{1/2} = 13.10 \text{ s} \]

\[ \frac{156}{60-1} \]

\[ \frac{124}{10} \text{ Pm} \]

ENDFB/IV FILE 1 COMMENTS
61-PM-156 HEDL
EVAL-ADP74 R.E.SCHENTER
DIST-DEC74
REFERENCES
HALF LIFE=R SCHENTER, THEORY(9/73)

\[ T_{1/2} = 13.10 \text{ s} \]
\[ \langle E \rangle \text{ PER DECAY} = 1266. \]
\[ \langle E \rangle \text{ PER DECAY} = 1949. \]

FISSION YIELDS
\[ ^{235}\text{U THERMAL} \times 7.2359 \times 10^{-1} \]
\[ ^{239}\text{U FAST} \times 1.3244 \times 10^{-4} \]
\[ ^{239}\text{Pu FAST} \times 1.3738 \times 10^{-4} \]
\[ ^{239}\text{Pu THERMAL} \times 6.1883 \times 10^{-4} \]

\[ Q_p = 5000, \]
\[ B(R) = 1.000 \]

\[ \frac{124}{10} \text{ Sm} \]
\[ \tau = 9.400 \text{h} \]

156 - 67 - 1
\begin{verbatim}
ENDFB-IV FILE 1 COMMENTS
62-SM-156 HEALY-APR74 R.E.SCHENTER D1ST-DEC74

\textbf{156 Sm}

\textbf{78 Sm}

\begin{itemize}
  \item $T_{1/2} = 9.400$ h
  \item $\langle E_x \rangle$ PER DECAY = 149.5
  \item $\langle E_y \rangle$ PER DECAY = 277.8
  \item FISSION YIELDS
    \begin{itemize}
      \item $^{235}$U THERMAL = 2.9176$\times$10$^{-5}$
      \item $^{235}$U FAST = 5.8570$\times$10$^{-5}$
      \item $^{238}$U FAST = 5.8193$\times$10$^{-7}$
      \item $^{239}$Pu THERMAL = 4.0844$\times$10$^{-4}$
    \end{itemize}
\end{itemize}

\begin{itemize}
  \item $\alpha = 0.000$
  \item $\delta = 1.000$
\end{itemize}

\textbf{156 Eu}

\begin{itemize}
  \item $\lambda = 15.72$ d
\end{itemize}
\end{verbatim}
---

### \(^{155}\)Eu

**FILE INFORMATION**

- **MF=1**
- **MT=457**
- **DECAY DATA**

**REFERENCES**

- C.W. Reich, R.G. Helmer, and M.H. Putman, ANCR-1157, ENDF/B-V, 8/74.
- G-1975 WAPSTRA-GOVE MASSABLE

---

### Cross Sections (Barns)

<table>
<thead>
<tr>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total 220M/s</td>
<td>4.8730x10^-2</td>
</tr>
<tr>
<td>Westcott G Factor</td>
<td>1.0061</td>
</tr>
<tr>
<td>Capture 220M/s</td>
<td>4.8200x10^-2</td>
</tr>
<tr>
<td>Westcott Q Factor</td>
<td>1.0005</td>
</tr>
<tr>
<td>Resonance Integral Total</td>
<td>1.6770x10^-3</td>
</tr>
<tr>
<td>Resonance Integral Capture</td>
<td>1.4920x10^-4</td>
</tr>
</tbody>
</table>

### Fission Yields

- \(^{235}\)U Thermal: 3.8221x10^-7
- \(^{235}\)U Fast: 7.8233x10^-7
- \(^{239}\)Pu Thermal: 6.794x10^-6
- \(^{239}\)Pu Fast: 4.486x10^-6

---

\[ Q_e = 2453.49 \]
\[ B(E2) = 1.000 \]

---

### \(^{157}\)Gd

Stable or Long-lived

---

156 - 63 - 1
### Photon Radiation Table

<table>
<thead>
<tr>
<th>Mean Energy</th>
<th>Lines</th>
<th>Photons/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>88.80</td>
<td>1</td>
<td>11.40</td>
</tr>
<tr>
<td>102.7</td>
<td>1</td>
<td>6.800</td>
</tr>
<tr>
<td>199.2</td>
<td>1</td>
<td>6.700</td>
</tr>
<tr>
<td>434.3</td>
<td>1</td>
<td>2.400</td>
</tr>
<tr>
<td>490.0</td>
<td>1</td>
<td>2.000</td>
</tr>
<tr>
<td>511.5</td>
<td>1</td>
<td>2.000</td>
</tr>
<tr>
<td>599.3</td>
<td>1</td>
<td>2.360</td>
</tr>
<tr>
<td>644.1</td>
<td>1</td>
<td>6.900</td>
</tr>
<tr>
<td>709.7</td>
<td>1</td>
<td>1.040</td>
</tr>
<tr>
<td>723.5</td>
<td>1</td>
<td>6.190</td>
</tr>
<tr>
<td>820.5</td>
<td>4</td>
<td>13.06</td>
</tr>
<tr>
<td>940.0</td>
<td>4</td>
<td>5.020</td>
</tr>
<tr>
<td>1049.0</td>
<td>4</td>
<td>12.95</td>
</tr>
<tr>
<td>1155.0</td>
<td>4</td>
<td>13.37</td>
</tr>
<tr>
<td>1243.0</td>
<td>3</td>
<td>20.39</td>
</tr>
<tr>
<td>1367.0</td>
<td>1</td>
<td>1.830</td>
</tr>
<tr>
<td>1682.0</td>
<td>1</td>
<td>2.200</td>
</tr>
<tr>
<td>1977.0</td>
<td>1</td>
<td>1.620</td>
</tr>
<tr>
<td>1998.0</td>
<td>1</td>
<td>2.000</td>
</tr>
<tr>
<td>1966.0</td>
<td>1</td>
<td>4.000</td>
</tr>
<tr>
<td>2027.0</td>
<td>1</td>
<td>3.500</td>
</tr>
<tr>
<td>2098.0</td>
<td>1</td>
<td>4.100</td>
</tr>
<tr>
<td>2181.0</td>
<td>1</td>
<td>2.500</td>
</tr>
<tr>
<td>2187.0</td>
<td>1</td>
<td>3.600</td>
</tr>
<tr>
<td>2270.0</td>
<td>1</td>
<td>1.070</td>
</tr>
</tbody>
</table>

\(<\text{Photons per Decay} = 1318.\)  

### Particle Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>(E_{\text{max}})</th>
<th>Mean Energy</th>
<th>Intensity/100 Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\alpha)</td>
<td>244.0</td>
<td>69.03</td>
<td>8.000</td>
</tr>
<tr>
<td>(\beta)</td>
<td>260.4</td>
<td>75.19</td>
<td>9.000</td>
</tr>
<tr>
<td>(\beta)</td>
<td>266.3</td>
<td>76.06</td>
<td>2.200</td>
</tr>
<tr>
<td>(\beta)</td>
<td>420.6</td>
<td>127.5</td>
<td>8.000</td>
</tr>
<tr>
<td>(\beta)</td>
<td>481.3</td>
<td>140.9</td>
<td>35.00</td>
</tr>
<tr>
<td>(\beta)</td>
<td>1080.7</td>
<td>386.9</td>
<td>2.300</td>
</tr>
<tr>
<td>(\beta)</td>
<td>1204.7</td>
<td>440.3</td>
<td>1.300</td>
</tr>
<tr>
<td>(\beta)</td>
<td>1278.0</td>
<td>472.3</td>
<td>6.000</td>
</tr>
<tr>
<td>(\beta)</td>
<td>2447.0</td>
<td>1613</td>
<td>31.00</td>
</tr>
</tbody>
</table>

\(<E_\beta> \text{ per decay} = 430.2\)  
\(<E_\gamma> \text{ per decay} = 686.9\)

### Characteristic Radiation Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Energy</th>
<th>(1/100) Decays</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\alpha)</td>
<td>681.3</td>
<td>35.00</td>
</tr>
<tr>
<td>(\beta)</td>
<td>2447.0</td>
<td>31.00</td>
</tr>
<tr>
<td>(\gamma)</td>
<td>1154</td>
<td>12.50</td>
</tr>
<tr>
<td>(\gamma)</td>
<td>86.80</td>
<td>11.40</td>
</tr>
<tr>
<td>(\gamma)</td>
<td>811.7</td>
<td>10.80</td>
</tr>
<tr>
<td>(\gamma)</td>
<td>1231.0</td>
<td>9.000</td>
</tr>
<tr>
<td>(\beta)</td>
<td>1242.0</td>
<td>7.430</td>
</tr>
<tr>
<td>(\gamma)</td>
<td>646.1</td>
<td>6.900</td>
</tr>
<tr>
<td>(\gamma)</td>
<td>1079.0</td>
<td>6.500</td>
</tr>
<tr>
<td>(\gamma)</td>
<td>723.3</td>
<td>6.190</td>
</tr>
<tr>
<td>(\beta)</td>
<td>1278.0</td>
<td>6.000</td>
</tr>
<tr>
<td>Isotope</td>
<td>154 Gd</td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>--------</td>
<td></td>
</tr>
</tbody>
</table>

**STABLE OR LONG-LIVED**

<table>
<thead>
<tr>
<th>CROSS SECTIONS (BARNs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL 2200m/s</td>
</tr>
<tr>
<td>WESTCOTT G. FACTOR</td>
</tr>
<tr>
<td>CAPTURE 2200m/s</td>
</tr>
<tr>
<td>WESTCOTT G. FACTOR</td>
</tr>
<tr>
<td>RESONANCE INTEGRAL TOTAL</td>
</tr>
<tr>
<td>RESONANCE INTEGRAL CAPTURE</td>
</tr>
</tbody>
</table>

**FISSION YIELDS**

<table>
<thead>
<tr>
<th>Isotope</th>
<th>YIELD</th>
</tr>
</thead>
<tbody>
<tr>
<td>233U FAST</td>
<td>1.8553E-1</td>
</tr>
<tr>
<td>239Pu THERMAL</td>
<td>2.5556E-3</td>
</tr>
</tbody>
</table>
\( ^{136} \text{Ce} \)

ENDF/B-IV FILE 1 COMMENTS
5A-CE-157 WEDL EVAL-APR74 R.E.SCHENTER
DIST-DEC74
REFERENCES
HALF LIFE = SCHENTER, THEORY(977)

\( ^{136} \text{Ce} \)

\( T_{1/2} = 361.7 \text{s} \)
\( \langle E_d \rangle \text{ PER DECAY} = 190.1 \text{MeV} \)
\( \langle E_y \rangle \text{ PER DECAY} = 3452 \text{MeV} \)

FISSION YIELDS
\( ^{235} \text{U} \text{ FAST} \quad 1.0899 \times 10^{-7} \)

\( Q_d = 7310 \)
\( \text{BR}_d = 51 \times 10^{-1} \)

\( ^{137} \text{Pr} \)

\( T_{1/2} = 677.4 \text{d} \)
\( \langle E_d \rangle \text{ PER DECAY} = 1745 \text{MeV} \)
\( \langle E_y \rangle \text{ PER DECAY} = 3042 \text{MeV} \)

FISSION YIELDS
\( ^{235} \text{U} \text{ THERMAL} \quad 2.6574 \times 10^{-4} \)
\( ^{235} \text{U} \text{ FAST} \quad 6.2530 \times 10^{-8} \)
\( ^{239} \text{Pu} \text{ THERMAL} \quad 1.698 \times 10^{-7} \)

\( Q_d = 6780 \)
\( \text{BR}_d = 51 \times 10^{-1} \)

\( ^{157} \text{Nd} \)

4.149s

157 - 59 - 1
\[ ^{157} \text{Nd} \]

ENDF/B-IV FILE 1 COMMENTS
60-ND-157 HEDL EVAL-APR82 R.E. SCHENTER
DIST-DEC74
REFERENCES
HALF LIFE-R SCHENTER, THEORY(9/73)

\[ ^{156} \text{Nd} \]

- \[ T_{1/2} \approx 54.149 \text{s} \]
- \[ \langle E_g \rangle \text{ PER DECAY} = 1158 \text{ eV} \]
- \[ \langle E_f \rangle \text{ PER DECAY} = 2087 \text{ eV} \]

FISSION YIELDS
- \[ ^{235} \text{U THERMAL} \] \[ 5.032\times10^{-4} \]
- \[ ^{235} \text{U FAST} \] \[ 1.218\times10^{-5} \]
- \[ ^{238} \text{U FAST} \] \[ 2.168\times10^{-4} \]
- \[ ^{239} \text{Pu THERMAL} \] \[ 3.432\times10^{-5} \]

\[ Q_{g} = 6810 \text{ eV} \]
\[ B\gamma = 1.000 \]

\[ ^{155} \text{Pm} \]

- \[ T_{1/2} \approx 68.029 \text{s} \]

\[ ^{157} \text{Pm} \]

ENDF/B-IV FILE 1 COMMENTS
61-PM-157 HEDL EVAL-APR82 R.E. SCHENTER
DIST-DEC74
REFERENCES
HALF LIFE-R SCHENTER, THEORY(9/73)

\[ ^{155} \text{Pm} \]

- \[ T_{1/2} \approx 68.029 \text{s} \]
- \[ \langle E_g \rangle \text{ PER DECAY} = 977.2 \text{ eV} \]
- \[ \langle E_f \rangle \text{ PER DECAY} = 1649 \text{ eV} \]

FISSION YIELDS
- \[ ^{235} \text{U THERMAL} \] \[ 2.915\times10^{-5} \]
- \[ ^{235} \text{U FAST} \] \[ 7.194\times10^{-5} \]
- \[ ^{239} \text{Pu FAST} \] \[ 1.326\times10^{-4} \]
- \[ ^{239} \text{Pu THERMAL} \] \[ 2.931\times10^{-4} \]

\[ Q_{g} = 4040 \text{ eV} \]
\[ B\gamma = 1.000 \]

\[ ^{155} \text{Sm} \]

- \[ T_{1/2} \approx 18.0 \text{s} \]

\[ ^{157} \text{Sm} \]

- \[ T_{1/2} \] \[ \approx 61 \text{ s} \]
152
62
Sm

ENDF/B-IV FILE 1 COMMENTS
62-SM-157 HEDL EVAL-APR74 R.E.SCHENTER
DIST-OCT74

152 Sm

T_{1/2} = 8.0 a, 5m
\langle E_{x} \rangle \text{ PER DECAY} = 553.7
\langle E_{y} \rangle \text{ PER DECAY} = 967.8

FISSION YIELDS

235 U THERMAL \quad 2.952 \times 10^{-3}

235 U FAST \quad 7.194 \times 10^{-7}

239 Pu THERMAL \quad 4.1295 \times 10^{-4}

Q \# = 2460,
BR \# = 1.000

153
63
Eu

15.20h

151\textsuperscript{-} 62\textsuperscript{+} 1

153
63
Eu

ENDF/B-IV FILE 1 COMMENTS
63-EU-157 HEDL EVAL-DCT74 R.E.SCHENTER AND F.SCHMITROTH
DIST-OCT74

153 Eu

T_{1/2} = 15.20h
\langle E_{x} \rangle \text{ PER DECAY} = 280.9
\langle E_{y} \rangle \text{ PER DECAY} = 470.7

CROSS SECTIONS (BARNs)

\sigma \text{ TOTAL 2200M/S} \quad 1.9532 \times 10^{2}

WESTCOTT G FACTOR \quad 1.0128

\sigma \text{ CAPTURE 2200M/S} \quad 1.9009 \times 10^{7}

WESTCOTT G FACTOR \quad 9.9923 \times 10^{7}

RESONANCE INTEGRAL TOTAL \quad 1.5248 \times 10^{7}

RESONANCE INTEGRAL CAPTURE \quad 1.3020 \times 10^{7}

FISSION YIELDS

235 U THERMAL \quad 1.0306 \times 10^{-8}

239 Pu THERMAL \quad 2.2407 \times 10^{-3}

Q \# = 1270,
BR \# = 1.000

157 - 63 - 1

152
64
Gd

STABLE OR LONG-LIVED

157 - 63 - 1
\[ ^{157} \text{Gd} \]

\[ ^{157} \text{Gd} \]

STABLE OR LONG-LIVED

CROSS SECTIONS (BARNs)

- TOTAL 2200m/s: 2.559 x 10^{-5}
- WESTCOTT G FACTOR: 8.504 x 10^{-1}
- CAPTURE 2200m/s: 2.546 x 10^{-5}
- WESTCOTT G FACTOR: 8.505 x 10^{-1}
- RESONANCE INTEGRAL TOTAL: 1.348 x 10^{-2}
- RESONANCE INTEGRAL (CAPTURE): 9.973 x 10^{-2}

FISSION YIELDS

- \(^{235}\text{U}\) THERMAL: 4.532 x 10^{-8}
- \(^{235}\text{U}\) FAST: 1.192 x 10^{-8}
- \(^{239}\text{Pu}\) THERMAL: 1.309 x 10^{-7}
\[ ^{158} \text{Nd} \]

\[ ^{158} \text{Pr} \]

**ENDF/B-IV FILE 1**

50-PR-158  HELD  EVAL-APR74 R.E.SCHENTER  
DIST-DEC74

**REFERENCES**

HALF LIFE-R SCHENTER, THEORY (9/73)

\[ ^{158} \text{Pr} \]

\[ T_{1/2} = 2.629 \text{y} \]

\[ \langle E \rangle \text{ PER DECAY} = 2395 \]

\[ \langle E_p \rangle \text{ PER DECAY} = 5923 \]

**Fission Yields**

\[ ^{235}\text{U THERMAL} = 1.0606 \times 10^{-9} \]

\[ ^{239}\text{U FAST} = 2.1103 \times 10^{-9} \]

\[ ^{240}\text{Pu THERMAL} = 5.8792 \times 10^{-9} \]

**\[ \text{Q}_{\beta} = 8730 \]

**\[ BR_{\gamma} = 1.000 \]

\[ ^{158} \text{Nd} \]

\[ 7.889\% \]

**\[ ^{158} \text{Nd} \]

\[ 59 \ 1 \]

**\[ ^{158} \text{Nd} \]

**ENDF/B-IV FILE 1**

60-ND-158  HELD  EVAL-APR74 R.E.SCHENTER  
DIST-DEC74

**REFERENCES**

HALF LIFE-R SCHENTER, THEORY (9/73)

\[ ^{158} \text{Nd} \]

\[ T_{1/2} = 7.889\text{y} \]

\[ \langle E \rangle \text{ PER DECAY} = 835\text{keV} \]

\[ \langle E_p \rangle \text{ PER DECAY} = 168\text{keV} \]

**Fission Yields**

\[ ^{235}\text{U THERMAL} = 3.7851 \times 10^{-7} \]

\[ ^{239}\text{U FAST} = 1.2902 \times 10^{-6} \]

\[ ^{240}\text{Pu THERMAL} = 4.4494 \times 10^{-6} \]

**\[ \text{Q}_{\beta} = 3720 \]

**\[ BR_{\gamma} = 1.000 \]

\[ ^{158} \text{Pr} \]

\[ 3.801\% \]

**\[ ^{158} \text{Pr} \]

**\[ ^{158} \text{Nd} \]

158 - 60 - 1
\[ \text{\^{154} Pm} \]

ENDF/B-IV FILE 1 COMMENTS
HEOL EVAL-APR74 R.E.SCHENTER
DIST-DEC74

REFERENCES
HALF LIFE-R SCHENTER, THEORY(9/73)

\[ \text{\^{154} Pm} \]

\[ T_{1/2} = 3.80 \times 10^6 \text{ yr} \]
\[ \langle E_\gamma \rangle \text{ PER DECAY} = 1591 \text{ keV} \]
\[ \langle E_\beta \rangle \text{ PER DECAY} = 2554 \text{ keV} \]

FISSION YIELDS
\[ ^{235}\text{U THERMAL} \quad 8.7247 \times 10^{-6} \]
\[ ^{235}\text{U FAST} \quad 2.1703 \times 10^{-5} \]
\[ ^{239}\text{Pu THERMAL} \quad 9.0477 \times 10^{-5} \]

\[ Q_{\beta} = 1622.0 \text{ MeV} \]
\[ Q_{\gamma} = 1.00 \text{ MeV} \]

\[ \text{\^{154} Sm} \]

\[ T_{1/2} = 3.97 \text{ m} \]
\[ \langle E_\gamma \rangle \text{ PER DECAY} = 241.5 \text{ keV} \]
\[ \langle E_\beta \rangle \text{ PER DECAY} = 165.2 \text{ keV} \]

FISSION YIELDS
\[ ^{235}\text{U THERMAL} \quad 2.0941 \times 10^{-1} \]
\[ ^{235}\text{U FAST} \quad 5.6359 \times 10^{-5} \]
\[ ^{239}\text{Pu THERMAL} \quad 2.7889 \times 10^{-4} \]

\[ Q_{\beta} = 1130 \text{ MeV} \]
\[ Q_{\gamma} = 1.00 \text{ MeV} \]

\[ \text{\^{154} Eu} \]

\[ 45.90 \text{ m} \]

158 - 61 - 1

158 - 62 - 1
\[ \text{ENDF/B-IV FILE 1 COMMENTS} \]

\[ \text{63-EU-198 HEDL EVAL-APR/74 R.E.SCHENTER DIST-DEC74} \]

\[
\begin{align*}
\text{\textsuperscript{152}Eu} & \\
\text{T}_{1/2} & = 45.90 \text{m} \\
\langle E_p \rangle \text{ PER DECAY} & = 824.9 \\
\langle E_y \rangle \text{ PER DECAY} & = 1305. \\
\text{FISSION YIELDS} & \\
\text{\textsuperscript{235}U THERMAL} & = 1.94 \times 10^{-6} \\
\text{\textsuperscript{235}U FAST} & = 5.910 \times 10^{-4} \\
\text{\textsuperscript{238}U FAST} & = 1.999 \times 10^{-6} \\
\text{\textsuperscript{239}Pu THERMAL} & = 5.3035 \times 10^{-3} \\
\end{align*}
\]

\[
\begin{align*}
Q_p & = 3500. \\
BR_y & = 1.000. \\
\end{align*}
\]

\[
\text{\textsuperscript{155}Gd} \\
\text{STABLE OR LONG-LIVED} \\

\text{158 - 63 - 1} \\
\text{\textsuperscript{156}Gd} \\
\text{\textsuperscript{154}Gd} \\
\text{STABLE OR LONG-LIVED} \\
\text{CROSS SECTIONS (BARNs)} \\
\text{\textsuperscript{\textit{\&}} TOTAL 2200/M/S} & = 5.8151 \\
\text{\textsuperscript{\textit{\&}} CAPTURE 2200/M/S} & = 1.9740 \\
\text{\textsuperscript{\textit{\&}} WESTCOTT G FACTOR} & = 2.014 \times 10^{-2} \\
\text{\textit{\&} WESTCOTT G FACTOR} & = 2.27 \times 10^{-1} \\
\text{\textit{\&} RESONANCE INTEGRAL TOTAL} & = 2.2350 \times 10^{-6} \\
\text{\textit{\&} RESONANCE INTEGRAL CAPTURE} & = 6.300 \times 10^{-7} \\
\text{FISSION YIELDS} & \\
\text{\textsuperscript{235}U THERMAL} & = 2.4513 \times 10^{-4} \\
\text{\textsuperscript{235}U FAST} & = 8.2513 \times 10^{-4} \\
\text{\textsuperscript{239}Pu THERMAL} & = 5.9891 \times 10^{-7} \\
\end{align*}
\]
$^{133}\text{Pr}$

ENDFB/IV-IV FILE 1 COMMENTS
59-PR-159 HEDL EVAL-APR74 R.E. SCHENTER DIST-DEC74
REFERENCES
HALF LIFE = R SCHENTER, THEORY(9/73)

$^{133}\text{Pr}$

- $T_{1/2} = 3.1414$ s
- $E_x$ PER DECAY $= 7045$
- $E_y$ PER DECAY $= 5683$
- FISSION YIELDS
  - $^{238}\text{U}$ FAST $= 5.499\times 10^{-8}$

- $Q_x = 7850$
- $BR_x = 1.000$

$^{150}\text{Nd}$

- $1.408$ s

$^{150}\text{Nd}$

- $T_{1/2} = 1.408$ s
- $E_x$ PER DECAY $= 1307$
- $E_y$ PER DECAY $= 2561$
- FISSION YIELDS
  - $^{235}\text{U}$ THERMAL $= 2.9016\times 10^{-8}$
  - $^{235}\text{U}$ FAST $= 4.4007\times 10^{-8}$
  - $^{238}\text{U}$ FAST $= 8.2392\times 10^{-8}$
  - $^{239}\text{Pu}$ THERMAL $= 3.7996\times 10^{-7}$

- $Q_x = 5660$
- $BR_x = 1.000$

$^{138}\text{Pm}$

- $4.230$ s

$^{159} = 60 - 1$
184 Pm
ENDF/B-IV FILE 1 COMMENTS
61-PM-159 HEDL EVAL-APR74 R.E.SCHENTER
DIST-DEC74
REFERENCES
HALF LIFE-R SCHENTER, THEORY(9/73)

\[ T_{1/2} = 2.230 s \]
\[ \langle E_g \rangle \text{ PER DECAY} = 1257 \text{ eV} \]
\[ \langle E_f \rangle \text{ PER DECAY} = 2199 \text{ eV} \]

FISSION YIELDS
\[ 239\text{U THERMAL} \quad 1.2607 \times 10^{-6} \]
\[ 239\text{U FAST} \quad 2.5104 \times 10^{-6} \]
\[ 239\text{Pu THERMAL} \quad 5.8386 \times 10^{-7} \]
\[ 239\text{Pu THERMAL} \quad 1.8437 \times 10^{-7} \]

\[ Q_f = 5130 \text{ eV} \]
\[ BM_2 = 1.000 \]

159 Sm

\[ T_{1/2} = 2.78 \text{ h} \]
\[ \langle E_g \rangle \text{ PER DECAY} = 701.1 \text{ eV} \]
\[ \langle E_f \rangle \text{ PER DECAY} = 1276 \text{ eV} \]

FISSION YIELDS
\[ 239\text{U THERMAL} \quad 7.1839 \times 10^{-4} \]
\[ 239\text{U FAST} \quad 2.0853 \times 10^{-3} \]
\[ 239\text{Pu THERMAL} \quad 2.9487 \times 10^{-4} \]
\[ 239\text{Pu THERMAL} \quad 1.4527 \times 10^{-4} \]

\[ Q_f = 3040 \text{ eV} \]
\[ BM_2 = 1.000 \]

159 Eu

\[ T_{1/2} = 18.1 \text{ h} \]

159 - 61- 1

159 Sm
ENDF/B-IV FILE 3 COMMENTS
62-SM-159 HEDL EVAL-APR74 R.E.SCHENTER
DIST-DEC74
REFERENCES
HALF LIFE-R SCHENTER, THEORY(9/73)

159 - 62- 1
\( ^{159} \text{Eu} \)

ENDFB/IV FILE 1 COMMENTS
65-EU-159 Hedl EVAL-APR74 R.E. Schenter
DIST-DEC74

\( ^{159} \text{Eu} \)

\( T_{1/2} = 11.3 \text{yr} \)
\( \langle E_y \rangle \text{ PER DECAY} = 576.4 \)
\( \langle E_y \rangle \text{ PER DECAY} = 1005 \)

FISSION YIELDS

\( ^{239} \text{U THERMAL} \quad 1.861 \times 10^{-6} \)
\( ^{239} \text{U FAST} \quad 6.747 \times 10^{-7} \)
\( ^{239} \text{Pu THERMAL} \quad 5.809 \times 10^{-7} \)
\( ^{239} \text{Pu THERMAL} \quad 4.609 \times 10^{-5} \)

\( Q_{y} = 2570 \)
\( BR_{y} = 1.000 \)

\( ^{154} \text{Gd} \)

18.60h

159 - 63-1

\( ^{154} \text{Gd} \)

ENDFB/IV FILE 1 COMMENTS
64-GD-159 Hedl EVAL-APR74 R.E. Schenter
DIST-DEC74

\( ^{154} \text{Gd} \)

\( T_{1/2} = 18.60 \text{h} \)
\( \langle E_y \rangle \text{ PER DECAY} = 199.7 \)
\( \langle E_y \rangle \text{ PER DECAY} = 351.3 \)

FISSION YIELDS

\( ^{235} \text{U THERMAL} \quad 6.475 \times 10^{-6} \)
\( ^{235} \text{U FAST} \quad 5.440 \times 10^{-7} \)
\( ^{238} \text{Pu THERMAL} \quad 5.199 \times 10^{-9} \)
\( ^{239} \text{Pu THERMAL} \quad 2.229 \times 10^{-9} \)

\( Q_{y} = 940.0 \)
\( BR_{y} = 7.000 \)

\( ^{154} \text{Tb} \)

STABLE OR LONG-LIVED

159 - 64-1
$^{129}$ Tb

$^{130}$ Tb

STABLE OR LONG-LIVED

CROSS SECTIONS (BARNs)

- TOTAL 2200M/S $2.9704 \times 10^{-1}$
- WESTCOTT G FACTOR $2.3505 \times 10^{-1}$
- CAPTURE 2200M/S $1.0019$
- WESTCOTT G FACTOR $4.5820 \times 10^{-2}$
- RESONANCE INTEGRAL TOTAL $8.2906 \times 10^{-2}$
- RESONANCE INTEGRAL CAPTURE $2.8996 \times 10^{-9}$

FISSION YIELDS

- $^{239}$pu THERMAL $2.8996 \times 10^{-9}$


\[ ^{144} \text{Nd} \]

ENDF/B-IV FILE 1 COMMENTS
60-ND-160 HECL
EVAL-APR74 R.E.SCHENTER
DIST-DEC74
REFERENCES
HALF-LIFE-R SCHENTER, THEORY (9/75)

\[ ^{144} \text{Nd} \]

- \( T_{1/2} = 2.21 \text{h} \)
- \( \langle E \rangle \text{PER DECAY} = 1114 \).
- \( \langle E \rangle \text{PER DECAY} = 2258 \).
- FISSION YIELDS
  - \( ^{235} \text{U THERMAL} = 7.464 \times 10^{-4} \)
  - \( ^{235} \text{U FAST} = 2.352 \times 10^{-4} \)
  - \( ^{238} \text{U FAST} = 8.299 \times 10^{-7} \)
  - \( ^{239} \text{Pu THERMAL} = 2.009 \times 10^{-4} \)

\[ Q_{\beta} = 4780 \]
\[ BR_{\beta} = 1 \]

\[ ^{160} \text{Pm} \]

- \( T_{1/2} = 9.963 \text{s} \)
- \( \langle E \rangle \text{PER DECAY} = 1854 \).
- \( \langle E \rangle \text{PER DECAY} = 3359 \).
- FISSION YIELDS
  - \( ^{235} \text{U THERMAL} = 3.712 \times 10^{-7} \)
  - \( ^{235} \text{U FAST} = 1.550 \times 10^{-4} \)
  - \( ^{238} \text{U FAST} = 9.499 \times 10^{-6} \)
  - \( ^{239} \text{Pu THERMAL} = 2.929 \times 10^{-4} \)

\[ Q_{\beta} = 7080 \]
\[ BR_{\beta} = 1 \]

\[ ^{160} \text{Sm} \]

- \( T_{1/2} = 5.819 \text{y} \)

\[ 160 - 61 - 1 \]
\[ { }_{162}^{77} \text{Sm} \]

ENDF/B-IV FILE 1 COMMENTS
62-SM-160 HECL EVAL-APR74 R.E.SCHENTER
DIST-DEC74

REFERENCES
HALF LIFE-R SCHENTER,THEORY(6/73)

\[ T_{1/2} = 5.819 \text{m} \]
\[ \langle E_a \rangle \text{ PER DECAY} = 598.3 \]
\[ \langle E_x \rangle \text{ PER DECAY} = 1193. \]

FISSION YIELDS

\[ \text{\textsuperscript{235}U THERMAL} \quad 2.6014 \times 10^{-6} \]
\[ \text{\textsuperscript{235}U FAST} \quad 9.8216 \times 10^{-4} \]
\[ \text{\textsuperscript{239}Pu THERMAL} \quad 5.3532 \times 10^{-5} \]

\[ Q_a = 2760. \]
\[ \text{BR}_x = 1.000 \]

\[ { }_{158}^{78} \text{Eu} \]

51.\%10.4 \%

160 - 62 - 1

\[ { }_{159}^{79} \text{Eu} \]

ENDF/B-IV FILE 1 COMMENTS
63-EU-160 HECL EVAL-APR74 R.E.SCHENTER
DIST-DEC74

\[ T_{1/2} = 51.\%10.4 \%
\[ \langle E_a \rangle \text{ PER DECAY} = 455.2 \]
\[ \langle E_x \rangle \text{ PER DECAY} = 1413. \]

FISSION YIELDS

\[ \text{\textsuperscript{235}U THERMAL} \quad 7.3240 \times 10^{-7} \]
\[ \text{\textsuperscript{239}Pu THERMAL} \quad 3.6785 \times 10^{-5} \]

\[ Q_a = 3590. \]
\[ \text{BR}_x = 1.000 \]

\[ { }^{60} \text{Ga} \]

STABLE OR LONG-LIVED

160 - 63 - 1


---


---

---
<table>
<thead>
<tr>
<th>Decay</th>
<th>Stable OR Long-Lived</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross Sections (Barns)</td>
<td></td>
</tr>
<tr>
<td>Total 2301m/s</td>
<td>6.2980 x 10^{-1}</td>
</tr>
<tr>
<td>Westcott G Factor</td>
<td>1.0122</td>
</tr>
<tr>
<td>Capture 2301m/s</td>
<td>6.1034 x 10^{-1}</td>
</tr>
<tr>
<td>Westcott G Factor</td>
<td>1.0087</td>
</tr>
<tr>
<td>Resonance Integral Total</td>
<td>2.3530 x 10^{-1}</td>
</tr>
<tr>
<td>Resonance Integral Capture</td>
<td>1.6770 x 10^{-1}</td>
</tr>
</tbody>
</table>
\[ \frac{\text{Nd}}{27} \]

ENDF/B-IV FILE 1 COMMENTS
50-ND-161 HEDL EVAL-APR74 R.E.SCHENTER
DIST-DEC74
REFERENCES
HALF LIFE=R SCHENTER, THEORY(9/73)

\[ \text{\frac{1}{2}} \text{Nd} \]

\[ T_{1/2} = 3538 \text{s} \]
\[ \langle E \rangle_{\text{PER DECAY}} = 1656 \text{MeV} \]
\[ \langle E \rangle_{\text{PER DECAY}} = 3272 \text{MeV} \]

FISSION YIELDS

239U FAST
\[ 2.9492 \times 10^{-8} \]

\[ Q_{\text{GR}} = 6750 \text{MeV} \]
\[ Q_{\text{GR}} = 1.000 \text{MeV} \]

161 - 60 - 1

\[ \frac{\text{Pm}}{161} \]

ENDF/B-IV FILE 1 COMMENTS
51-PM-161 HEDL EVAL-APR74 R.E.SCHENTER
DIST-DEC74
REFERENCES
HALF LIFE=R SCHENTER, THEORY(9/73)

\[ \text{\frac{1}{2}} \text{Pm} \]

\[ T_{1/2} = 1.188 \text{s} \]
\[ \langle E \rangle_{\text{PER DECAY}} = 1538 \text{MeV} \]
\[ \langle E \rangle_{\text{PER DECAY}} = 2750 \text{MeV} \]

FISSION YIELDS

235U THERMAL
\[ 3.3093 \times 10^{-9} \]

235U FAST
\[ 2.8604 \times 10^{-5} \]

239U FAST
\[ 2.5298 \times 10^{-6} \]

239Pu THERMAL
\[ 3.3595 \times 10^{-7} \]

\[ Q_{\text{GR}} = 6200 \text{MeV} \]
\[ Q_{\text{GR}} = 1.000 \text{MeV} \]

161 - 61 - 1
$^{161}\text{Sm}$

ENDF/B-IV FILE 1 COMMENTS
62-SM-161 HEDL
EVAL-APR74 R.E.SCHENERT
DIST-DEC74

REFERENCES
HALF-LIFE-R.SCHENERT, THEORY(9/73)


$^{161}\text{Sm}$

- $T_{1/2} = 92.86s$
- $\langle E_p \rangle$ PER DECAY = 962.9
- $\langle E_y \rangle$ PER DECAY = 1783.

FISSION YIELDS
- $^{235}\text{U} \text{ THERMAL} = 2.7215 \times 10^{-7}$
- $^{235}\text{U} \text{ FAST} = 1.2502 \times 10^{-6}$
- $^{239}\text{Pu} \text{ FAST} = 1.0014 \times 10^{-5}$
- $^{239}\text{Pu} \text{ THERMAL} = 1.5838 \times 10^{-3}$

$G_p = 54120.$
$BR_p = 1.000$


$^{151}\text{Eu}$

- 42.06s

$^{161} - 62 - 1$

$^{161}\text{Eu}$

ENDF/B-IV FILE 1 COMMENTS
63-EU-161 HEDL
EVAL-APR74 R.E.SCHENERT
DIST-DEC74

REFERENCES
HALF-LIFE-R.SCHENERT, THEORY(9/73)


$^{151}\text{Eu}$

- $T_{1/2} = 42.06s$
- $\langle E_p \rangle$ PER DECAY = 739.0
- $\langle E_y \rangle$ PER DECAY = 1538.

FISSION YIELDS
- $^{235}\text{U} \text{ THERMAL} = 4.6325 \times 10^{-7}$
- $^{235}\text{U} \text{ FAST} = 2.1594 \times 10^{-6}$
- $^{239}\text{Pu} \text{ FAST} = 1.7798 \times 10^{-6}$
- $^{239}\text{Pu} \text{ THERMAL} = 2.6186 \times 10^{-5}$

$G_p = 3250.$
$BR_p = 1.000$


$^{84}\text{Ga}$

- 3.700m

$^{161} - 63 - 1$
### 161 Gd

<table>
<thead>
<tr>
<th>Neutron Life Time</th>
<th>( \langle E_p \rangle ) PER DECAY</th>
<th>( \langle E_y \rangle ) PER DECAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.700 m</td>
<td>431.1</td>
<td>792.9</td>
</tr>
</tbody>
</table>

**Fission Yields**

<table>
<thead>
<tr>
<th>Isotope</th>
<th>Thermal Yield</th>
<th>Fast Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>( ^{235}\text{U} )</td>
<td>( 1.3607 \times 10^{-4} )</td>
<td>( 6.4811 \times 10^{-8} )</td>
</tr>
<tr>
<td>( ^{235}\text{U} )</td>
<td>( 6.2866 \times 10^{-4} )</td>
<td>( 3.0589 \times 10^{-8} )</td>
</tr>
</tbody>
</table>

**Q Value**

- \( Q_p = 2010 \) eV
- \( BR_y = 1.000 \)

### 161 Td

- 6.920 d

### 161 Tb

**Q Value**

- \( Q_p = 580.0 \) eV
- \( BR_y = 1.000 \)
1.61 Dy

- STABLE OR LONG-LIVED

- CROSS SECTIONS (Barns)
  - TOTAL \(2200\) m/s: \(6.944 \times 10^{-2}\)
  - WESTCOTT G FACTOR: \(9.9653 \times 10^{-1}\)
  - CAPTURE \(2200\) m/s: 0.0000
  - WESTCOTT G FACTOR: 0.0000
  - RESONANCE INTEGRAL TOTAL: \(1.5980 \times 10^{-3}\)
162 \text{ Pm} \\ 

<table>
<thead>
<tr>
<th>\text{Fission Yields}</th>
<th>\text{Br}_{\text{g}} = 1.000</th>
</tr>
</thead>
<tbody>
<tr>
<td>235U Fast</td>
<td>2.1183 \times 10^{-9}</td>
</tr>
<tr>
<td>239U Fast</td>
<td>3.5492 \times 10^{-6}</td>
</tr>
<tr>
<td>239Pu Thermal</td>
<td>4.5394 \times 10^{-9}</td>
</tr>
</tbody>
</table>

\text{Q}_{\text{g}} = 1460

162 \text{ Sm} \\ 

<table>
<thead>
<tr>
<th>\text{Fission Yields}</th>
<th>\text{Br}_{\text{g}} = 1.959</th>
</tr>
</thead>
<tbody>
<tr>
<td>235U Thermal</td>
<td>3.1817 \times 10^{-8}</td>
</tr>
<tr>
<td>239U Fast</td>
<td>3.0805 \times 10^{-7}</td>
</tr>
<tr>
<td>239U Fast</td>
<td>2.1992 \times 10^{-6}</td>
</tr>
<tr>
<td>239Pu Thermal</td>
<td>1.2198 \times 10^{-6}</td>
</tr>
</tbody>
</table>

\text{Q}_{\text{g}} = 3240

162 \text{ Eu} \\ 

<table>
<thead>
<tr>
<th>\text{Fission Yields}</th>
<th>\text{Br}_{\text{g}} = 1.497n</th>
</tr>
</thead>
</table>

162 - 61 - 1

162 - 62 - 1
$^{147}\text{Eu}$

ENDF/B-Iv FILE 1

**REFERENCES**
HALF LIFE: R. Schenter, Theory (9/73)

$^{147}\text{Eu}$

- $T_{1/2} = 4.497$ m
- $\langle E_y \rangle$ PER DECAY: $1266$
- $\langle E_y \rangle$ PER DECAY: $2103$

**FISSION YIELDS**

<table>
<thead>
<tr>
<th>NUCLEUS</th>
<th>THERMAL</th>
<th>FAST</th>
<th>PU THERMAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>$^{235}\text{U}$</td>
<td>$1.4208 \times 10^{-7}$</td>
<td>$1.6020 \times 10^{-6}$</td>
<td>$9.6286 \times 10^{-6}$</td>
</tr>
</tbody>
</table>

$Q_p = 5100$
$BR_p = 1.000$

---

$^{152}\text{Gd}$

- $T_{1/2} = 10.00$ m
- $\langle E_y \rangle$ PER DECAY: $202.6$
- $\langle E_y \rangle$ PER DECAY: $410.4$

**FISSION YIELDS**

<table>
<thead>
<tr>
<th>NUCLEUS</th>
<th>THERMAL</th>
<th>FAST</th>
<th>PU THERMAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>$^{233}\text{U}$</td>
<td>$1.9960 \times 10^{-7}$</td>
<td>$1.1002 \times 10^{-6}$</td>
<td>$1.2946 \times 10^{-6}$</td>
</tr>
</tbody>
</table>

$Q_p = 750.0$
$BR_p = 0.0200$

---

$^{158}\text{Tb}$
- $T_{1/2} = 2.230$ m

$^{164}\text{Tb}$
- $T_{1/2} = 7.470$ m

---

162 - 64 - 1
$^{182}$Ta

ENDF/B-IV FILE 1 COMMENTS
65-TB-142M HEDL  EVAL-APR74  R.E.SCHENTER
DIST-DEC74

REFERENCES
G.R SCHENTER,THEORY (9/73)

$^{182}$Ta

$T_{1/2} = 2.230 \text{h}$
$<E_p> \text{ PER DECAY} = 2686.0$
$<E_x> \text{ PER DECAY} = 1146.$

FISSION YIELDS

$^{235}U \text{ THERMAL} = 1.492 \times 10^{-8}$
$^{235}U \text{ FAST} = 1.5392 \times 10^{-8}$
$^{239}Pu \text{ THERMAL} = 3.195 \times 10^{-7}$

$Q_e = 3060.$
$BR_p = 1.00$


$^{162}$Dy

STABLE OR LONG-LIVED

$^{162}$Dy

$^{162}$Dy

ENDF/B-IV FILE 1 COMMENTS
65-TB-142M HEDL  EVAL-APR74  R.E.SCHENTER
DIST-DEC74

$^{162}$Tb

$T_{1/2} = 7.470 \text{m}$
$<E_p> \text{ PER DECAY} = 629.9$
$<E_x> \text{ PER DECAY} = 1052.$

FISSION YIELDS

$^{235}U \text{ THERMAL} = 1.582 \times 10^{-9}$
$^{235}U \text{ FAST} = 1.5392 \times 10^{-8}$
$^{239}Pu \text{ THERMAL} = 3.149 \times 10^{-7}$

$Q_e = 2310.$
$BR_p = 1.00$


<table>
<thead>
<tr>
<th><strong>186 Dy</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stable or Long-Lived</strong></td>
</tr>
<tr>
<td><strong>Cross Sections (Barns)</strong></td>
</tr>
<tr>
<td>- Total 2200 m/s: (1.9789 \times 10^{-2})</td>
</tr>
<tr>
<td>- Total G Factor: 1.0041</td>
</tr>
<tr>
<td>- Capture 2200 m/s: (1.9914 \times 10^{-2})</td>
</tr>
<tr>
<td>- Capture G Factor: 1.0050</td>
</tr>
<tr>
<td>- Resonance Integral Total: (3.0306 \times 10^{-9})</td>
</tr>
<tr>
<td>- Resonance Integral Capture: (2.7850 \times 10^{-9})</td>
</tr>
<tr>
<td><strong>Fission Yields</strong></td>
</tr>
<tr>
<td>- (^{238}\text{Pu Thermal}): (3.8944 \times 10^{-9})</td>
</tr>
<tr>
<td>169 Sm</td>
</tr>
<tr>
<td>---------</td>
</tr>
<tr>
<td>$T_{1/2} = 2.567$ d</td>
</tr>
<tr>
<td>$Q_e = 1208$</td>
</tr>
<tr>
<td>$E_{y}$ PER DECAY = $2372$.</td>
</tr>
<tr>
<td>FISSON YIELDS</td>
</tr>
<tr>
<td>$^{239}$U THERMAL $2.441 	imes 10^{-9}$</td>
</tr>
<tr>
<td>$^{235}$U FAST $1.4702 	imes 10^{-8}$</td>
</tr>
<tr>
<td>$^{238}$U FAST $2.4898 	imes 10^{-7}$</td>
</tr>
<tr>
<td>$^{239}$Pu THERMAL $8.538 	imes 10^{-8}$</td>
</tr>
<tr>
<td>$Q_{g} = 5200$</td>
</tr>
<tr>
<td>$BR_{g} = 1.000$</td>
</tr>
<tr>
<td>163 - 62 - 1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>169 Eu</th>
</tr>
</thead>
<tbody>
<tr>
<td>$T_{1/2} = 14.445$ s</td>
</tr>
<tr>
<td>$Q_{e} = 1040$</td>
</tr>
<tr>
<td>$E_{y}$ PER DECAY = $1962$.</td>
</tr>
<tr>
<td>FISSON YIELDS</td>
</tr>
<tr>
<td>$^{239}$U THERMAL $2.557 	imes 10^{-9}$</td>
</tr>
<tr>
<td>$^{235}$U FAST $1.8803 	imes 10^{-7}$</td>
</tr>
<tr>
<td>$^{238}$U FAST $6.2994 	imes 10^{-7}$</td>
</tr>
<tr>
<td>$^{239}$Pu THERMAL $1.9697 	imes 10^{-4}$</td>
</tr>
<tr>
<td>$Q_{g} = 4540$</td>
</tr>
<tr>
<td>$BR_{g} = 1.000$</td>
</tr>
<tr>
<td>163 - 63 - 1</td>
</tr>
</tbody>
</table>
162 Gd

ENDF/B-IV FILE 1 COMMENTS
64-GD-163 HDR
EVAL-APR74 R.E. SCHENTER
DIST-DEC74

REFERENCES
HALF LIFE-R SCHENTER, THEORY(9/73)

T½ = 92.77s
〈Eγ〉 PER DECAY = 380.1
〈Eγ〉 PER DECAY = 1087.

FISSION YIELDS
235U THERMAL 6.133×10⁻⁴
235U FAST 3.800×10⁻⁷
239Pu THERMAL 6.749×10⁻⁴

Qγ = 2630;
BRγ = 1.000.

163 Tb

T½ = 19.50m

163 - 64 - 1

163 Tb

ENDF/B-IV FILE 1 COMMENTS
65-TB-163 HDR
EVAL-APR74 R.E. SCHENTER
DIST-DEC74

T½ = 19.50m
〈Eγ〉 PER DECAY = 358.4
〈Eγ〉 PER DECAY = 639.3

FISSION YIELDS
235U THERMAL 4.782×10⁻⁹
235U FAST 3.080×10⁻⁶
239Pu THERMAL 9.3187×10⁻⁹

Qγ = 1680;
BRγ = 1.000.

163 Dy

STABLE OR LONG-LIVED

163 - 65 - 1
\begin{tabular}{|c|c|}
\hline
\textbf{Isotope} & \textbf{Z} \\
\hline
\textbf{\(^{165}\text{Dy}\)} & \textbf{66} \\
\hline
\textbf{\(^{166}\text{Dy}\)} & \textbf{66} \\
\hline
\textbf{STABLE OR LONG-LIVED} & \\
\hline
\textbf{CROSS SECTIONS (BARNs)} & \\
\hline
\textbf{\(g\) TOTAL \(2200\text{M/S}\)} & \(1.3524 \times 10^{-2}\) \\
\hline
\textbf{WESTCOTT G FACTOR} & \(1.0042\) \\
\hline
\textbf{\(g\) CAPTURE \(2200\text{M/S}\)} & \(1.3442 \times 10^{-2}\) \\
\hline
\textbf{WESTCOTT G FACTOR} & \(1.0027\) \\
\hline
\textbf{RESONANCE INTEGRAL TOTAL} & \(1.8140 \times 10^{-3}\) \\
\hline
\textbf{RESONANCE INTEGRAL CAPTURE} & \(1.4670 \times 10^{-3}\) \\
\hline
\textbf{FISSION YIELDS} & \\
\hline
\textbf{\(^{239}\text{Pu\, THERMAL}\)} & \(1.7897 \times 10^{-3}\) \\
\hline
\end{tabular}
\[ ^{144} \text{Sm} \]

\[ ^{146} \text{Sm} \]

ENDF/B-IV FILE 1 COMMENTS
62-SM-164 HEDL EVAL-APR74 R.E. SCHENTER DIST-DEC74
REFERENCES
HALF LIFE R SCHENTER, THEORY (9/73)

\[ T_{1/2} = 24.74 \text{s} \]
\[ \langle E_2 \rangle \text{ PER DECAY} = 940.8 \]
\[ \langle E_3 \rangle \text{ PER DECAY} = 1997 \]

FISSION YIELDS
\[ ^{234} \text{U} \text{ FAST} = 2.3398 \times 10^{-8} \]
\[ ^{235} \text{Pu} \text{ THERMAL} = 3.9094 \times 10^{-9} \]

\[ Q = 6220 \]
\[ BR_\gamma = 1.000 \]


\[ ^{153} \text{Eu} \]

\[ T_{1/2} = 2.170 \text{s} \]

\[ \text{REFERENCES} \]

HALF LIFE R SCHENTER, THEORY (9/73)

\[ ^{154} \text{Eu} \]

\[ T_{1/2} = 2.170 \text{s} \]
\[ \langle E_2 \rangle \text{ PER DECAY} = 1578 \]
\[ \langle E_3 \rangle \text{ PER DECAY} = 2852 \]

FISSION YIELDS
\[ ^{235} \text{U} \text{ THERMAL} = 3.7020 \times 10^{-9} \]
\[ ^{235} \text{U} \text{ FAST} = 5.3005 \times 10^{-9} \]
\[ ^{238} \text{U} \text{ FAST} = 1.6098 \times 10^{-7} \]
\[ ^{239} \text{Pu} \text{ THERMAL} = 2.6948 \times 10^{-7} \]

\[ Q = 6500 \]
\[ BR_\gamma = 1.000 \]


\[ ^{154} \text{Gd} \]

\[ T_{1/2} = 21.69 \text{m} \]


164 - 63 - 1
$^{164}$ Gd

$^{164}$ Gd

$\text{T}_{1/2} = 21.6 \text{ yr}$

$\langle E_g \rangle$ PER DECAY $= 3 \times 10^{-7}$

$\langle E_r \rangle$ PER DECAY $= 727.3$

FISSION YIELDS

$^{235}$U THERMAL $= 4.60 \times 10^{-7}$

$^{235}$U FAST $= 1.703 \times 10^{-7}$

$^{238}$U FAST $= 2.84 \times 10^{-7}$

$^{239}$Pu THERMAL $= 2.45 \times 10^{-6}$

$Q_x = 1660$

$\text{BR}_x = 1.000$

$^{164}$ Tb

$\text{T}_{1/2} = 3.000 \text{ yr}$

$^{164} - 64 - 1$

$^{164}$ Tb

$\text{T}_{1/2} = 5.000 \text{ yr}$

$\langle E_g \rangle$ PER DECAY $= 872.3$

$\langle E_r \rangle$ PER DECAY $= 1490$

FISSION YIELDS

$^{235}$U THERMAL $= 4.17 \times 10^{-9}$

$^{235}$U FAST $= 3.87 \times 10^{-8}$

$^{238}$U FAST $= 8.11 \times 10^{-9}$

$^{239}$Pu THERMAL $= 8.98 \times 10^{-7}$

$Q_x = 3290$

$\text{BR}_x = 1.000$

$^{164}$ Dy

$\text{STABLE OR LONG-LIVED}$

$^{164} - 65 - 1$
\[ ^{149} \text{Dy} \]

---

\[ ^{149} \text{Dy} \]

STABLE OR LONG-LIVED

CROSS SECTIONS (BARNES)

- \( \sigma \) TOTAL 220 MeV/S: \( 2.9090 \times 10^{-5} \)
- WESTCOTT G FACTOR: \( 1.0031 \)
- \( \sigma \) CAPTURE 220 MeV/S: \( 2.5200 \times 10^{-3} \)
- WESTCOTT G FACTOR: \( 9.8765 \times 10^{-1} \)
- RESONANCE INTEGRAL TOTAL: \( 1.0366 \times 10^{-3} \)
- RESONANCE INTEGRAL CAPTURE: \( 3.5850 \times 10^{-2} \)
- RESONANCE INTEGRAL \( (N,2\alpha) \): \( 1.2240 \)
- RESONANCE INTEGRAL \( (N,P) \): \( 1.0130 \times 10^{-3} \)
- RESONANCE INTEGRAL \( (N,a) \): \( 4.5110 \times 10^{-3} \)

FISSION YIELDS

- \( ^{235} \text{U} \) FAST: \( 1.2402 \times 10^{-4} \)
- \( ^{239} \text{Pu} \) THERMAL: \( 5.1693 \times 10^{-8} \)
\[ ^{165} \text{Sm} \]  
ENDFB/IV-1V FILE 1 COMMENTS
62-SM-165  HEIDL  EVAL-APR74  R.E.SCHENTER  
DIST-DEC74
REFERENCES
HALF LIFE-R  SCHENTER, THEORY(9/73)

\[ T_{1/2} = 5.9274 \text{d} \]
\[ \langle E_f \rangle \text{ PER DECAY} = 1658. \]
\[ \langle E_t \rangle \text{ PER DECAY} = 2949. \]

FISSION YIELDS

\[ 233U \text{ FAST} \]
\[ 1.6598 \times 10^{-9} \]

\[ G_f = 6160. \]
\[ B(R) = 1.000 \]

165 - 62 - 1

---

\[ ^{165} \text{Eu} \]  
ENDFB/IV-1V FILE 1 COMMENTS
65-EU-165  HEIDL  EVAL-APR74  R.E.SCHENTER  
DIST-DEC74
REFERENCES
HALF LIFE-R  SCHENTER, THEORY(9/73)

\[ T_{1/2} = 32.5648 \text{d} \]
\[ \langle E_f \rangle \text{ PER DECAY} = 5287. \]
\[ \langle E_t \rangle \text{ PER DECAY} = 2494. \]

FISSION YIELDS

\[ 233U \text{ FAST} \]
\[ 3.8106 \times 10^{-9} \]
\[ 234U \text{ FAST} \]
\[ 3.2697 \times 10^{-9} \]
\[ 239U \text{ THERMAL} \]
\[ 2.3599 \times 10^{-9} \]

\[ G_f = 5510. \]
\[ B(R) = 1.000 \]

165 - 63 - 1
**162 Gd**

ENDFB/IV:FILE 1 COMMENTS

64-GD-165 HEWL EVAL-APR76 R.E. SCHENTER DIST-DEC74

REFERENCES

HALF-LIFE:R SCHENTER, THEORY (9/73)

- $T_{1/2} = 1.670$ m
- $\langle E_d \rangle$ PER DECAY = 777.6
- $\langle E_d \rangle$ PER DECAY = 1549.

FISSION YIELDS

- $^{235}$U THERMAL $8.698 \times 10^{-4}$
- $^{235}$U FAST $5.609 \times 10^{-6}$
- $^{239}$U FAST $0.889 \times 10^{-4}$
- $^{239}$Pu THERMAL $6.459 \times 10^{-7}$

- $Q_f = 3552$
- $BR_f = 1.000$

**$\frac{1}{2}$ Tb**

- $T_{1/2} = 32.75$ s
- $\langle E_d \rangle$ PER DECAY = 585.6
- $\langle E_d \rangle$ PER DECAY = 1717.

FISSION YIELDS

- $^{235}$U THERMAL $4.552 \times 10^{-9}$
- $^{235}$U FAST $1.201 \times 10^{-4}$
- $^{239}$U FAST $1.199 \times 10^{-4}$
- $^{239}$Pu THERMAL $6.219 \times 10^{-7}$

- $Q_f = 2652$
- $BR_f = 0.5000$

**$\frac{1}{2}$ Dy**

- $T_{1/2} = 75.36$ s

**165 - 65 - 1**

**$\frac{1}{2}$ Tb**

ENDFB/IV:FILE 1 COMMENTS

65-TB-165 HEWL EVAL-APR76 R.E. SCHENTER DIST-DEC74

REFERENCES

HALF-LIFE:R SCHENTER, THEORY (9/73)

- $T_{1/2} = 32.75$ s
- $\langle E_d \rangle$ PER DECAY = 585.6
- $\langle E_d \rangle$ PER DECAY = 1717.

FISSION YIELDS

- $^{235}$U THERMAL $4.552 \times 10^{-9}$
- $^{235}$U FAST $1.201 \times 10^{-4}$
- $^{239}$U FAST $1.199 \times 10^{-4}$
- $^{239}$Pu THERMAL $6.219 \times 10^{-7}$

- $Q_f = 2760$
- $BR_f = 0.5000$

**$\frac{1}{2}$ Dy**

- $T_{1/2} = 2.350$ h

**165 - 65 - 1**
\[ ^{165}\text{Dy} \]

ENDF/B-IV FILE 1 COMMENTS
66-DY-165M HECL EVAL-APR74 R.E.SCHENTER
DIST-DEC74

REFERENCES
GIT-R SCHENTER, THEORY (9/73)

\[ ^{165}\text{Dy} \]

\[ T_{1/2} = 32.00 \text{s} \]
\[ \langle E_{x} \rangle \text{ PER DECAY} = 250.0 \]

\[ G_{0T} = 250.0 \]
\[ BR_{1} = 1.000 \]

\[ ^{165}\text{Dy} \]

\[ T_{1/2} = 75.36 \text{s} \]

165n- 66- 1

\[ ^{165}\text{Dy} \]

ENDF/B-IV FILE 1 COMMENTS
66-DY-165M HECL EVAL-APR74 R.E.SCHENTER
DIST-DEC74

REFERENCES
GIT-C LEDERER ET AL TABLE OF ISOTOPES 6TH ED

\[ ^{165}\text{Dy} \]

\[ T_{1/2} = 75.36 \text{s} \]
\[ \langle E_{x} \rangle \text{ PER DECAY} = 7.300 \]
\[ \langle E_{y} \rangle \text{ PER DECAY} = 779.1 \]

FISSION YIELDS

235U Fast 1.502 x 10^{-9}
239Pu Thermal 5.049 x 10^{-9}

\[ G_{0} = 1408. \]
\[ BR_{0} = 0.02500 \]

\[ G_{0T} = 108.0 \]
\[ BR_{1T} = 0.9750 \]

\[ ^{165}\text{Ho} \]

STABLE OR LONG-LIVED

\[ ^{168}\text{Dy} \]

\[ 2.350 \text{n} \]

165n- 66- 1
\textbf{\textit{\textbf{165 Dy}}}\
\textbf{ENDF/B-IV FILE 1 COMMENTS}\
\textbf{66-OY-165 HEQL} \textbf{EVAL-APR74 R.E.SCHENTER DIGI-DEC74}\
\hline
\textbf{165 Dy}\
\hline
$\lambda_{1/2} = 2.350 $h \\
$\langle E_a \rangle$ PER DECAY $= 269.6$ \\
$\langle E_f \rangle$ PER DECAY $= 511.4$ \\
\hline
\textbf{FISSION YIELDS}\
\textbf{$^{235}U$ FAST} $1.5902 \times 10^{-9}$ \\
\textbf{$^{239}U$ THERMAL} $5.0493 \times 10^{-8}$ \\
\hline
\textbf{$Q_f = 1300$} \\
$K_g = 1.000$ \\
\hline
\textbf{\textit{\textbf{184} Ho}}\
\textbf{STABLE OR LONG-LIVED}\
\hline
\textbf{165 - 67 - 1}\
\hline
\textbf{\textit{\textbf{184} Ho}}\
\textbf{STABLE OR LONG-LIVED}\
\hline
\textbf{CROSS SECTIONS (BARNs)}\
\hline
- \textbf{TOTAL 2200M/s} $6.9544 \times 10^{-1}$ \\
- \textbf{WESTCOTT \& FACTOR} 1.0010 \\
- \textbf{CAPTURE 2200M/s} $6.6512 \times 10^{-1}$ \\
- \textbf{WESTCOTT \& FACTOR} 1.0019 \\
- \textbf{RESONANCE INTEGRAL TOTAL} $1.7540 \times 10^{-1}$ \\
- \textbf{RESONANCE INTEGRAL CAPTURE} $7.621 \times 10^{-2}$ \\
\hline
\textbf{165 - 67 - 1}
\[ ^{166}\text{Dy} \]

ENDF/B-IV FILE 1 COMMENTS
66-DY-166 HEDL EVAL-APR74 R.E.SCHENTER
DIST-DEC74

REFERENCES
\( \begin{align*}
\text{BETA} & : \text{A TOSTIAS(10/72) RD/B/M243} \\
\text{EBETA} & : \text{A TOSTIAS(10/72) RD/B/M243} \\
\text{EY} & : \text{A TOSTIAS(10/72) RD/B/M243}
\end{align*} \)

\[ \begin{align*}
T_{1/2} & = 81.5 \text{h} \\
\langle E \rangle & \text{ PER DECAY } = 117.5 \\
\langle E \rangle & \text{ PER DECAY } = 80.0 \\
\text{FISSION YIELDS} & \\
\text{235U FAST} & = 7.711 \times 10^{-9} \\
\text{239Pu THERMAL} & = 1.639 \times 10^{-9}
\end{align*} \]

\[ D_{\gamma} = 481.0 \]
\[ \text{BR}_{\gamma} = 1.000 \]

\[ \begin{align*}
\begin{array}{l}
^{166}\text{Ho} \\
\text{ENDF/B-IV FILE 1 COMMENTS} \\
67-HO-166M HEDL EVAL-APR74 R.E.SCHENTER \\
DIST-DEC74
\end{array}
\end{align*} \]

REFERENCES
\( \text{QIT-R SCHRENTER, THEORY(9/73)} \)

\[ \begin{align*}
T_{1/2} & = 1199.7 \text{y} \\
\langle E \rangle & \text{ PER DECAY } = 442.7 \\
\langle E \rangle & \text{ PER DECAY } = 787.3 \\
\text{FISSION YIELDS} & \\
\text{235U THERMAL} & = 1.2198 \times 10^{-9}
\end{align*} \]

\[ D_{\gamma} = 2090.0 \]
\[ \text{BR}_{\gamma} = 1.000 \]

\[ \begin{align*}
\begin{array}{l}
^{166}\text{Er} \\
\text{STABLE OR LONG-LIVED}
\end{array}
\end{align*} \]

166a-67-1
166 Ho

ENDF/B-V FILE 1 COMMENTS
67-HD-166 HEDL EVAL-APR/4 R.E.SCHENTER
11ST-DEC/4

$^{166}$ Ho

$T_{1/2} = 26.80$ h
$<E_x>_{PEAK} = 389.7
$<E_x>_{PEAK} = 693.1

FISSION YIELDS

$^{239}$Pu THERMAL: $1.2195 \times 10^{-4}$

$Q_x = 114.0$
$BR_x = 1.000$

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

$^{166}$ Er

STABLE OR LONG-LIVED

$166 - 67 - 1$

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

$^{166}$ Er

STABLE OR LONG-LIVED

CROSS SECTIONS (BARNs)

- $\sigma$ TOTAL ZEEMAX $5.8562 \times 10^{-1}$
- WESTCOTT G FACTOR $1.0129$
- $\sigma$ CAPTURE ZEEMAX 5.4994 $\times 10^{-1}$
- WESTCOTT G FACTOR 5.0011
- RESONANCE INTEGRAL TOTAL 5.7890 $\times 10^{-2}$
- RESONANCE INTEGRAL CAPTURE 7.4000 $\times 10^{-2}$

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

$166 - 68 - 1$