

WPEC Format Proposals - 2003

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Overview

The list of proposals for ENDF format modifications is a collection of contributions from WPEC members. Whenever possible, the name of the Project and the proposer (or a person closely associated with the proposal) is given. The purpose of the proposal is briefly described, followed by a reference to the affected ENDF file sections and the ENDF formats manual.

1. *Energy-dependent decay constants*

Proposer:

Dr. Tsuneo NAKAGAWA (nakagawa@ndc.tokai.jaeri.go.jp)

Reference:

None.

Purpose:

Allow energy-dependent decay constants (Λ) and abundances (α) in the delayed neutron data section.

Affected ENDF File/Section:

MF1, MT455

Formats Manual changes:

1.3.1 Formats

Section (MF1, MT455)

[add new symbols]

LDG Indicates the presence of decay constants and abundances of temporal groups:

LDG=-1, no data given for the temporal groups.

LDG= 0, only energy-independent decay constants are given.

LDG= 1, energy-dependent decay constants are given.

LDG= 2, energy-dependent decay constants and abundances are given. If the delayed neutron spectra (MF5, MT455) are given, the abundances of temporal groups are given in both:(MF1, MT455) and (MF5, MT455) and they must be the same.

NE Number of incident neutron energy points for the decay constants and abundances.

[MAT, 1, 455/ ZA, AWR, LDG, LNU, 0, 0] HEAD

time constants section (if LDG \geq 0)

delayed neutron yields section

[MAT, 1, 455/ 0.0, 0.0, 0, 0, 0, 0] SEND

Format of the time constants section:

LDG=-1

No record is needed.

LDG=0 (energy-independent decay constants)

[MAT, 1, 455/ 0.0, 0.0, 0, 0, NNF, 0/

Lambda₁, Lambda₂, ... Lambda_{NNF}] LIST

LDG=1 (energy dependent decay constants)

[MAT, 1, 455/ 0.0, 0.0, 0, 0, NR, NE/Eint] TAB2

[MAT, 1, 455/ 0.0, E₁, 0, 0, NNF, 0/

Lambda₁(E₁), Lambda₂(E₁), ... Lambda_{NNF}(E₁)] LIST₁

.....
.....

[MAT, 1, 455/ 0.0, E_{NE}, 0, 0, NNF, 0/

Lambda₁(E_{NE}), Lambda₂(E_{NE}), ... Lambda_{NNF}(E_{NE})] LIST_{NE}

LDG=2 (energy-dependent decay constants and abundances)

[MAT, 1, 455/ 0.0, 0.0, 0, 0, NR, NE/Eint] TAB2

[MAT, 1, 455/ 0.0, E₁, 0, 0, NNF*2, 0/

Lambda₁(E₁), Alpha₁(E₁), Lambda₂(E₁), Alpha₂(E₁),

... Lambda_{NNF}(E₁), Alpha_{NNF}(E₁)] LIST₁

.....
.....

[MAT, 1, 455/ 0.0, E_{NE}, 0, 0, NNF*2, 0/

Lambda₁(E_{NE}), Alpha₁(E_{NE}), Lambda₂(E_{NE}), Alpha₂(E_{NE}),

... Lambda_{NNF}(E_{NE}), Alpha_{NNF}(E_{NE})] LIST_{NE}

Format of the delayed neutron yields section:

LNU=2 (table)

[MAT, 1, 455/ 0.0, 0.0, 0, 0, NR, NP/ Eint / nu-d(E)] TAB1

LNU=1 (polynomial expansion)

[MAT, 1, 455/ 0.0, 0.0, 0, 0, 1, 0/ nu-d] LIST

2. Increase the limits on parameters

Proposer:

Mr. Kazuaki KOSAKO (kosako@sae.co.jp)

Reference:

None.

Purpose:

Increase the limits of the number of angular points for tabulated probability distributions NP in MF4 and the number of reaction products NK in MF6.

Affected ENDF File/Section:

MF4, MF6

Formats Manual changes:

4.2 Formats

In the description of parameter NP increase the limit from (NP≤101) to (NP≤201).

6.2 Formats

In the description of parameter NK increase the limit NK≤1000 to NK≤2000.

APPENDIX G

Change the limits in column “Max” for variables:

File 4, NP, Max=201

File 6, NK, Max=2000

3. Expand the options of the LCT flag

Proposer:

Mr. Kazuaki KOSAKO (kosako@sae.co.jp)

Reference:

None.

Purpose:

Expand the interpretation of the LCT flag in MF6.

Affected ENDF File/Section:

MF6

Formats Manual changes:

Expand the meaning of the LCT flag

LCT=4 center-of-mass system used for energy and angle for all particles.

4. Clarify the convention for NLIB parameter

Proposer:

Andrej Trkov (A.Trkov@iaea.org)

Reference:

IAEA-NDS-76 Rev.6, April 2001

Purpose:

Clarify the convention for assigning the NLIB number.

Affected ENDF File/Section:

MF1, Appendix I

Formats Manual changes:

0.3.1 Library organisation

Add a sentence at the end of the first paragraph:

"For further details see the description of File 1."

1.1 Descriptive Data and Directory (MT=451)

Change the text describing the NLIB parameter:

"Library parameter (for example, NLIB=0 for ENDF/B library). For a full list of currently assigned NLIB numbers see Appendix I)."

APPENDIX I

Insert new appendix with content similar to page NDS 2, which is listed in the Appendix of this document.

5. Citation instructions

Proposer:

Andrej Trkov (A.Trkov@iaea.org)

Reference:

IAEA-NDS-76 Rev.6, April 2001

Purpose:

Add citation instructions.

Affected ENDF File/Section:

None.

Formats Manual changes:

0. ENDF-6 PREFACE

Insert somewhere in this section the text from page NDS 3, which is listed in the Appendix of this document.

6. New format for unresolved resonance representation

Proposer:

Natalia Janeva (pripesho@inrne.bas.bg)

Reference:

A.A.Lukyanov, private communication

N.Koyumdjieva, N.Janeva and A.A.Lukyanov, *Z. Phys.*, **A 353** 31 (1995)

N.Koyumdjieva, N.Janeva and K.Volev, *NSE* **137(2)** 194 (2001)

Purpose:

Include a new method based on Reich-Moore formalism for calculation of neutron cross-sections and their functionals (cross-section moments, self-shielding factors etc.). Only one new parameter LNEW is introduced to flag the use of a different set of equations, but the layout of the actual parameters is unchanged.

Affected ENDF File/Section:

Section (MF2, MT151), Appendix D.2.1

Formats Manual changes:

2.3.1.Formats

Add a new symbol named LNEW in the structure of subsections:

```
LNEW  Flag for alternative unresolved resonance representation.  
      LNEW=0 SLBW resonance representation  
      LNEW=1 Reich-More representation (valid with LSSF=0 only)
```

- A. LFW=0 (fission widths not given)
 LRF=1 (all parameters are energy-independent)
 The structure of a subsection is:
 [MAT, 2,151/ SPI, AP, LSSF, LNEW, NLS, 0] CONT

- C. LFW=1 or 1 (does not depend on LFW)
 LRF=2 (all energy-dependent parameters)
 The structure of a subsection is:
 [MAT, 2,151/ SPI, AP, LSSF, LNEW, NLS, 0] CONT

D.2. THE UNRESOLVED RESONANCE REGION: LRU=2, LRF=1 OR 2

The write-up will be provided.

Appendix

The ENDF-6 formats manual distributed by the IAEA-NDS as “IAEA-NDS-076 Rev.6 (Version April 2001)” is identical to the version available on the web, except that it is preceded by a brief table of contents and two additional pages, listed below.

For the international use of the ENDF format, the **NLIB** identifier was introduced (see pages 0.4 and 1.1) to identify the data library. The presently recognized NLIB numbers are given in the table below. For introducing additional NLIB numbers, contact the IAEA Nuclear Data Section.

NLIB codes

- 0 ENDF/B
- 1 ENDF/A
- 2 JEF
- 3 EFF
- 4 ENDF/B high energy library
- 5 CENDL
- 6 JENDL
- 31 INDL/V
- 32 INDL/A
- 33 FENDL/E, FENDL/C, FENDL/D
FENDL/E (neutrons, full evaluations)
FENDL/C (charged particles, fusion reactions)
FENDL/D (decay data)
- 34 IRDF
same as FENDL/DS (neutron dosimetry)
- 35 BROND-NDS
- 36 INGDB-90
(geophysics data)
- 37 FENDL/A
(neutron activation)
- 38 SPALDOS
- 41 BROND (Original version)

This list will be updated as EXFOR Dictionary no. 43.

**Reference Guidelines for
ENDF formatted data files**

When quoting ENDF formatted data in a publication this should be done in the following way:

- Quoting a single evaluation ("MAT"):

"A.B. Author et al.: Evaluated neutron reaction data file for U-235, data library ENDF/B-VI MAT 1234 MOD 2 dated Jan. 1992. - Description of evaluation: A.B. Author et al., report ABC-123 (1992). - See also P.F. Rose, ENDF/B-VI Summary Documentation, report BNL-NCS-17541 (ENDF-201), Oct. 1991."

- Quoting an entire data library:

"NEA Data Bank, Evaluated Data Library JEF-2 in the version distributed (date). - Documentation of the library in NEA report JEF-234 (1992)."

or:

"N.P. Kocherov et al., The International Reactor Dosimetry File IRDF-90, data library by the IAEA Nuclear Data Section (distr. 1991), documented in report IAEA-NDS-141 Rev.0 (Aug.1990)."

Please note that an evaluated data set is uniquely identified by:

- library name
- version of the library
- MAT number
- modification (MOD number) if the evaluation has been revised
- date of evaluation; or date of revision; or date of the release of the library.

In addition to identifying the data set, the authors of the evaluation (and/or the editor of the library) should be quoted. Also the bibliographic reference should be given in which the evaluation (and/or the data library) is documented.

Note: The correct spelling is

- ENDF-6 for the format, which is described in the present Manual;
- ENDF/B-VI for the US data library, which is in ENDF-6 format.

The Manual is still not free from misprints. Please send your comments and corrections to the Nuclear Data Section at one of the addresses given on the cover. They will be taken into account in later revisions of the Manual.