**Status of the JEFF project**

**Report to the WPEC meeting, Antwerp, April 8-9, 2005**

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**General**

The objective of the Joint Evaluated Fission and Fusion (JEFF) file project of the OECD/NEA is to develop and promote the use of high quality evaluated nuclear data sets in standard formats for a wide range of scientific and industrial applications. The JEFF project assesses the needs for nuclear data improvements and addresses those needs by suggesting and initiating the necessary measurements, evaluations and benchmarking efforts. It is a collaborative effort between NEA Data Bank member countries. In practice, mainly European countries participate in the project, since the OECD-members USA (ENDF/B) and Japan (JENDL) have their own data file projects. The JEFF-3 project aims to provide users with an extensive set of data for a wide range of applications: existing reactors and fuel cycles, innovative reactor concepts (GEN-IV), fusion, transmutation of radioactive waste, medical applications, and various non-energy related industrial applications are envisaged to benefit from JEFF. The European Fusion File (EFF), the European Activation File (EAF), and the Fission Product and Decay Data Files contribute to this initiative.

**Organisation**

The JEFF Scientific Coordination Group (SCG), whose members are nominated by the Nuclear Science Committee Executive Group, has responsibility for the overall management of the project. The technical activities are organised in different Working Groups. The current organisation of JEFF is as follows:

- Chair : Arjan Koning, NRG
- Working Group chairs:
    - Experimental activities : Peter Rullhusen, IRMM
    - Radioactive Decay and Fission Yield data: Olivier Bersillon, CEA/DAM
    - Fusion data (EFF group) : Robin Forrest, UKAEA
- Secretariat :Yolanda Rugama, Hans Henriksson, NEA Data Bank

JEFF meetings are generally held twice per year. It consists of a general (plenary) session that deals with evaluations, processing and benchmarking. In addition, there are parallel sessions for the Working Groups and a meeting for the SCG.

**Recent developments**

**A. General**

At the NEA, Ali Nouri and Mark Kellett have been replaced by Yolanda Rugama, responsible for JEFF as NEA Data Bank representative, and Hans Henriksson, who is active as EFF secretary.

**B. Highlights from the JEFF meetings**

The JEFF meeting of November 24-26, 2004 took place at the NEA Headquarters in Paris, with 45 participants. A central issue at this JEFF meeting was the upcoming release of the JEFF-3.1 library in May 2005. Some highlights of the meeting are given below.

**1. Evaluations**

Improved evaluations for the Ti isotopes (Vienna, EFF), the W-isotopes (FZK, Vienna, EFF), the Ca, Sc, Fe, Ge, Pb and Bi isotopes (NRG), U-238, Tc-99, Rh-103 and I-127,129 (CEA) were finalized. With the exception of W (which will be finalized later this year) these evaluations are now part of the next release JEFF-3.1.

Various isotopic evaluations required minor format changes or addition of "dummy" sections in the file to enable proper processing by NJOY-99.90. Among the problem cases were Be-9, Th-232, U-232, Am-241, but all the JEFF-3.1 evaluations are now in a state that applied libraries can be produced.

New thermal scattering data was produced by CEA (Ca in CaH2) and UT Stuttgart (H in H2O, H in HZrx, graphite).

It was decided to upgrade the decay constants for all actinides in JEFF-3.1 to an 8-group structure, as recommended by WPEC SG6. J. Rowlands has provided a precise recipe for the adoption of the delayed neutron yields, relative abundances and spectra. In JEFF-3.0, only U-238 and Pu-239 have 8 groups, the others 6. The other world libraries have 6 groups for all nuclides. All 8 group data have been implemented by Rugama (NEA).

**2. Validation and benchmarking**

Following the release of JEFF-3.0 in April 2002, various benchmark tests have confirmed the expected performance improvements over JEF-2.2. However, they have also confirmed that the reactivity of small low-enriched Uranium systems is underestimated by about 500 pcm with JEFF-3.0. Possible reasons for this underestimation have been identified as U-238 inelastic scattering and a slight overestimation of the U-238 capture cross section. A new U-238 evaluation has been constructed (CEA) which results in a significant improvement of k-eff values. Very extensive automated benchmarking tests have been set up, which probes the current quality of the new data file. These include MCNP (NRG), TRIPOLI (CEA) and APOLLO (CEA) criticality calculations for an unprecedented set of benchmark cases. The JEFF-3.1 library can be immediately tested with this scheme, and in the workshop on GEN-IV adjacent to this meeting several of the improvements will be presented. WPEC SG22 ("ueval") has contributed significantly to these improvements. Additional validation is now possible with a Monte Carlo approach to calculating the effective delayed neutron fractions (NRG), and improved thermal scattering data (UT Stuttgart).

A large collection of testing results is expected at the JEFF meeting of May 2-4, 2005: CEA, NRG, SERCO and VTT (Finland) agreed to perform extensive benchmarks.

More specific validations were performed for (a) Fe-56 (CEA), with an overestimation of the fission rate by JEFF-3.1 for the MASURCA/CIRANO facility. Too large elastic scattering is probably the problem, (b) Am-241 (CEA), where 4 different integral experiments indicate an overestimation of the capture cross section.

### 3. Activation data and codes

The JEFF-3.0/A library (a translation of EAF-2003 into the ENDF-6 format) contains activation data for 774 target nuclei in the energy range below 20 MeV. Some 12,617 excitation functions are included. The ENDF utility codes were used to check the library, which was also processed, using NJOY-99.65+. The data are stored in MF3, 8,9,10.
Meanwhile, work on EAF-2005 has progressed. In this library, the upper energy limit is extended to 60 MeV. Use has been made of the TALYS code to generate the data above 20 MeV and, for various reactions, data below 20 MeV as well. The new SAFEPAQ-II code (EASY + FISPACT) is able to use these new data. A new activation validation study was performed.

### 4. Decay data and fission yields

Work on the decay data and fission yield file for JEFF-3.1 has finished. CEA has devoted a special person (M. Kellett) to this task, in order to deliver a complete and well-validated decay data file for JEFF by May 2005. A very complete decay data library has emerged, containing a total of 3851 isotopes that have been checked to a rather large extent. Consistency checks on decay energy balance showed a very good agreement. Updates to previous version of the decay data file were possible with new evaluations from the UK (Winfrith) and with the release of NUBASE2003. Also, new decay data evaluated files were produced at LNHB (CEA Saclay). The current version of the decay data file is now ready for extensive validation. The major remaining physical problem is the incorrect splitting between beta and gamma energies. Decay heat benchmarks are being set up at BNFL, UKAEA and CEA/Cadarache.
The fission yield library UKFY3.5 produces better results for decay heat calculations, though for PWR decay heat data there is some overprediction, which might however originate from model deficiencies. An ND2004 paper by Mills describes these tests in detail.
A special website for the decay data and fission yield library has been set up at the NEA Data Bank: http://www.nea.fr/html/dbdata/projects/decay/index.html

### 5. Experiments

The experimental Working Group now works under a clear mandate that connects the experimental activities to the user requests from JEFF. After each JEFF meeting the participants agree on a short list of high-priority requests for nuclear data. The current list is:

- (n,gamma) on Hf isotopes between 1 and 100 eV, with 2% accuracy, for naval reactor studies
- thermal U-235 fission spectrum (discrepancies exist)
- Pu-239(n,gamma) and Pu-239(n,f) between 0.01 and 0.5 eV, with 2% accuracy
- Am-241,242m(n,gamma) in the resonance range
- Gd-155,157(n,gamma) at thermal energies, with 2% accuracy
- U-238(n,gamma)
- O-16(n,alpha) between 2 and 7 MeV

Ongoing experimental activities (as reported by Peter Rullhusen, IRMM) are:

- inelastic scattering on Cr-52, Pb and Bi-209 with the (n,n'g) technique (Geel)
- Activation cross sections for Zr, Ni-58 and Cr-50 (Geel)
- Capture and transmission: Pb-206, Bi-209, Rh-103, Th-232, U-236, U-238, Pu-240, Pu,242 (Geel)
- Bi-209 capture branching ratio
- B-10(n,alpha) angular distributions
- Pa-231(n,f)

**6. Fusion (EFF)**

Important ongoing evaluations for EFF were already mentioned under 1. (Evaluations). Experiments for the Test Blanket Module (TBM) are being performed in Italy. Two breeder blanket concepts for ITER are being considered: the helium cooled pebble bed (HCPB) and the helium-cooled lithium-lead (HCLL) blanket. A collaboration between JAERI, ENEA and TUD has resulted in a choice for HCPB. The associated MCNP models have been constructed and calculations have been carried out for the neutron spectrum, background and shielding optimisation, total tritium production, nuclear heating, etc.. Additional computational analyses have been performed with DORT and SUSD3D (Kodeli), in particular for the sensitivity of the detector response and Li-6 production to nuclear data.
Decay heat measurements were performed (Pillon) to validate the activation file EAF-2003 for Ta.

**The release of JEFF-3.1**

The release of the JEFF-3.1 library is foreseen for May 2005. There is a request from the (French) nuclear industry to start validating the new JEFF library in the fall of 2005. The starter file for JEFF-3.1, first assembled in November 2004, has undergone two successive changes, resulting in the JEFF3.1T3 library that was made available March 11 2005 for extensive testing in Europe. At the time of this WPEC meeting, various institutes in Europe are running JEFF-3.1T3 through their benchmark collections. The official release will take place at the next JEFF meeting, May 2-4 2005. The general-purpose neutron data file contains:

1. New data files for neutrons:
   - Ca-40, 42, 43, 44, 46, 48     (0-200 MeV, NRG)
   - Sc-45                          (0-200 MeV, NRG)
   - Ti-46, 47, 48, 49, 50         (0-20 MeV, IRK Vienna)
   - Fe-54, 56, 57, 58             (0-200 MeV, NRG)
   - Ge-70, 72, 73, 74, 76         (0-200 MeV, NRG)
   - Tc-99                         (0-200 MeV, CEA/Saclay/Cad, NRG)
   - Rh-103                        (0-20 MeV, CEA/Cad)
   - I-127, 129                    (0-20 MeV, CEA/Cad)
   - Hf-174,176,177,178,179,180 (0-20 MeV, CEA/Cad)
   - W-182, 183, 184, 186          (0-20 MeV, IRK Vienna, end of 2005  )
   - Pb-204, 206, 207, 208         (0-200 MeV, NRG)
   - Bi-209                        (0-200 MeV, NRG)
   - U-236, 237                     (0-30  MeV, CEA/BRC)
   - U-238                         (0-30 MeV, CEA/CAD/BRC)
   - Am-241                        (thermal, CEA)

2. Update of source evaluations of JEFF-3.0 (e.g. JENDL-3.2 → JENDL-3.3)
3. Alternative choices for source evaluations from other libraries if there is a clear indication to change them.
4. Decay time constants for all actinides in JEFF-3.1 in an 8-group structure, as recommended by WPEC SG6. The other world libraries have 6 groups for all nuclides.
5. Various small changes to correct format errors and to ensure proper NJOY-processing.

The total contents of the neutron library can be found in the document (appendix) "Contents of General Purpose Library JEFF-3.1".

New thermal scattering data for a whole range of materials is provided.

The development of the decay data and fission yields file for JEFF-3.1 has gone in parallel with that of the general-purpose file. A lot of effort, especially from CEA and BNFL, has been invested to produce these complete libraries. The final data libraries will also be released in May 2005.

The release also contains a proton library, containing the 26 isotopes that were also evaluated up to 200 MeV for neutrons (NRG).

Finally, the JEFF-3.1/A activation file is equal to EAF-2003 in ENDF-6 format.

# Contents of General Purpose Library JEFF-3.1

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# Introduction

This document contains the selection of isotopes for the JEFF-3.1 neutron general purpose file. A preliminary version of this paper was released as JEF/DOC-1049.

The contents of the JEFF-3.0T starter file were proposed in 1996 in a document by John Rowlands [row96]. For each nuclide for which evaluations, in any data library, were available, he proposed a best evaluation for JEFF-3.0, keeping in mind the most important application of each nuclide. According to John Rowlands, "the judgement about "best" is based on the date of the evaluation and its completeness". The resulting selection was then discussed at the JEFF meeting and after several changes the JEFF-3.0T starter file was ready. What followed was a few years of solving format problems, testing and benchmarking, leading to the release of JEFF-3.0 in April 2002. We are now facing a similar situation for the JEFF-3.1 data library, although the selection work, and problem solving, is not as hard as it was for JEFF-3.0. In most cases, the reasons outlined in [row96] to prefer one evaluation over the other are still valid. In other cases, new evaluations have appeared, and the choice was reconsidered. This document contains a table with the data file for each isotope in JEFF-3.1. The current version of the library, JEFF-3.1T3, is now being tested by the JEFF community and should be very close to the final official JEFF-3.1 file (only small remaining corrections with no effect on benchmarking are allowed). For the selection process, basically 4 rules are put into practice:

1. Include new European evaluations that have emerged since the release of JEFF-3.0.

2. As the default upgrade, adopt newer versions of evaluations that have been selected for JEFF-3.0: if for JEFF-3.0 an isotope was selected from e.g. JENDL-3.2, then adopt JENDL-3.3 for the same isotope in JEFF-3.1 (provided the JENDL-3.3 evaluation is an improvement!).

3. Choose source evaluations for JEFF-3.1 other than those of JEFF-3.0 if there are reasons to do so. This would overrule 2.

4. There are still 17 evaluated isotopes in other libraries that are not included in JEFF-3.0 (e.g. Nb-94,Fm-255). Adopt them.

The current versions of the available data libraries in the world, JEFF-3.0, ENDF/B-VI.8, ENDF/B-VIIb0 (preliminary version), JENDL-3.3, EFF-2.4, EFF-3.0, BROND-2.2, and CENDL-2.1 have been scanned to come to the choice detailed in the table below. As an additional guide, and to anticipate possible problems, use has been made of the following references:

row96 J. Rowlands, Proposed selection of data for JEFF-3, JEF/DOC-657; see also JEF/DOC-664.695,741

dui02 M.C. Duijvestijn and A. Hogenbirk, MCNP libraries: Contents of the JEFF-3.0, ENDF/B-VI.8. and JENDL-3.3 based neutron cross-section libraries for MCNP, NRG report 02.50466 (2002)

fis03 U. Fischer, Nuclear data for design analyses of the test blanket modules in ITER: Review and recommendations for EFF/JEFF evaluations, EFF-DOC-852 (2003).

sub04 J.C. Sublet et al, JEFF-3.0 feedbacks and preJEFF-3.1 proposals, JEF/DOC-1011

kon04 A.J. Koning, resonance list for TALYS, unpublished. Contains for each nuclide the best evaluation for the resonance range only, and not for the whole file (which is always a compromise) as in Rowlands' list. This is a personal choice of course.

bou04 O. Bouland, Motivation for new measurements on Am isotopes, JEF/DOC-1001.

nou04 A. Nouri "The JEFF-3.0 library", JEFF Report 19, in preparation.

The table below displays the resulting selection for the 381 materials (374 nuclides and 7 elements) that are included in JEFF-3.1.

Before discussing the table, a few comments are in order.

1. Processing problems as reported in [dui02] and [sub04] are taken into account.

2. From As (Z=33) to Er (Z=65), the choice is often accompanied by a '?' and the comment "More recent evaluations available". This generally concerns fission products. We still use JEFF-3.0 for these, although other evaluations (usually JENDL-3.3) are much more complete and more recent. Many of the FP evaluations of JEFF-3.0 (often equal to ENDF/B-V, which are based on ENDF/B-V) are however validated or even post-adjusted to various integral experiments (e.g. reactivity worth) such as STEK. Note that for a few FP's (e.g. Cs-133), detailed studies by CEA Cadarache have already led to clear recommendations, as indicated in the table below. A helpful WPEC study of fission product evaluations, SG21, gives guidance for the best choice per isotope, but the actual implementation of all the recommended libraries from SG21 (which often contains new resonance parameters from Mughabghab) comes too late for JEFF-3.1. We do note that SG21 proposes 84 evaluations which need no further work at all: they can simply be adopted as the best existing FP evaluation, at least when judged by microscopical data. See www.nndc.bnl.gov/sg21/ for all the details. In JEF/DOC-664, John Rowlands suggested to choose either JEF-2.2 or JENDL-3.2 for whole groups of FP nuclei, and not to make the choice per individual isotope. We will again have the opportunity to make a choice for JEFF-3.2.

3. The goal is to have the JEFF-3.1 library released at the JEFF meeting of May 2-4 2005.

# Explanation of the table

The first column 'Isotope' lists all isotopes included in JEFF-3.1T3. Note that it includes, as a sort of warning, the stable isotopes that do not exist in JEFF-3.1T3, nor in any other library, such as e.g. the Ne and Yb isotopes.

The second column 'JEFF-3.0' specifies the source of the evaluation adopted in JEFF-3.0. This is basically equal to "Rowlands' list" [row96].

The third column 'JEFF-3.1T3' specifies the recommendation for the evaluation adopted in JEFF-3.1. If this column contains 'JEFF-3.0' there is thus no change.

The fourth column 'S' specifies whether an isotope is a stable nuclide (S) or not (blank).

The fifth column 'E' specifies the maximum energy of the evaluation in MeV.

The sixth column 'Comments' gives a short justification for the upgrade for JEFF-3.1.

The seventh column 'Other' contains a '*' if a different source library than that of JEFF-3.0 is proposed (rule 3 above), an 'n' if the isotope did not exist in JEFF-3.0 (rule 4) and an 'N' if a new evaluation for JEFF-3.1 is made (rule 1).

The eight column '?' contains a '?' if the choice was (heavily) under discussion.

| Isotope | JEFF-3.0 | JEFF-3.1T3 | S | E | Comments | Other | ? |
|---|---|---|---|---|---|---|---|
| H -001 | ENDF/B-VI DIST-SEP91 | ENDF/B-VI.8 | S | 150 | Extension to 150 MeV Thermal capture cross section revised | | |
| H -002 | ENDF/B-VI.3 | ENDF/B-VI.8 | S | 150 | Extension to 150 MeV New evaluation | | |
| H -003 | CENDL-2 | JEFF-3.0 | S | 20 | - | | |
| He-003 | ENDF/B-VI.3 | JEFF-3.0 | S | 20 | - | | |
| He-004 | JENDL-3.2 | JENDL-3.3 | S | 20 | T-matrix deleted | | |
| Li-006 | ENDF/B-VI.3 | JEFF-3.0 | S | 20 | - | | |
| Li-007 | EFF-2.4 | JEFF-3.0 | S | 20 | | | |
| Be-009 | EFF-3.0 | EFF-3.0 MOD6 | S | 20 | Recent revision (Sublet) included | | |
| B -010 | ENDF/B-VI.3 | JEFF-3.0 | S | 20 | - | | |
| B -011 | ENDF/B-VI.3 | ENDF/B-VI.8 | S | 20 | Minor threshold revision compared to ENDF/B-VI.3 | | |
| C -000 | ENDF/B-VI.3 | ENDF/B-VI.8 | S | 150 | Extension to 150 MeV | | |
| N -014 | ENDF/B-VI.3 | ENDF/B-VI.8 | S | 150 | Gamma-ray spectra corrected Extension to 150 MeV | | |
| N -015 | ENDF/B-VI.3 | JEFF-3.0 | S | 20 | - | | |
| O -016 | JEF-2.2 | ENDF/B-VI.8 | S | 150 | Well validated, many new gamma data New R-matrix, extension to 150 MeV | * | |
| O -017 | JEF-2.2 | JEFF-3.0 | S | 20 | - | | |
| O -018 | - | - | S | - | - | | |
| F -019 | ENDF/B-VI.3 | ENDF/B-VIIb0 | S | 20 | Gamma production added negative probabilities removed New resonance evaluation | | |
| Ne-020 | - | - | S | - | - | | |
| Ne-021 | - | - | S | - | - | | |
| Ne-022 | - | - | S | - | - | | |
| Na-022 | JEF-2.2 | JEFF-3.0 | | 20 | MF5 correction included for JEFF-3.1 | | |
| Na-023 | JEF-2.2 | JEFF-3.0 | S | 20 | New JENDL-3.3 evaluation available | | ? |

| Isotope | JEFF-3.0 | JEFF-3.1T3 | S | E | Comments | Other | ? |
|---|---|---|---|---|---|---|---|
| Mg-024 | JENDL-3.2:Mg-000 | JENDL-3.3 | S | 20 | Isotopic evaluation | | |
| Mg-025 | JENDL-3.2:Mg-000 | JENDL-3.3 | S | 20 | Isotopic evaluation | | |
| Mg-026 | JENDL-3.2:Mg-000 | JENDL-3.3 | S | 20 | Isotopic evaluation | | |
| Al-027 | ENDF/B-VI DIST-AUG99 + mod. | JEFF-3.0 | S | 150 | - | | |
| Si-028 | EFF-3.0 | JEFF-3.0 | S | 20 | - | | |
| Si-029 | JENDL-3.2 | JENDL-3.3 | S | 20 | Processing problems for ENDF/B-VI | | ? |
| Si-030 | JENDL-3.2 | JENDL-3.3 | S | 20 | Processing problems for ENF/DB-VI | | ? |
| P -031 | JENDL-3.2 | JENDL-3.3 | S | 20 | New calculated MT1,2 MT103 from JENDL-DF99 | | |
| S -032 | JENDL-3.2:S -000 | JENDL-3.3 | S | 20 | Isotopic evaluation | | |
| S -033 | JENDL-3.2:S -000 | JENDL-3.3 | S | 20 | Isotopic evaluation | | |
| S -034 | JENDL-3.2:S -000 | JENDL-3.3 | S | 20 | Isotopic evaluation | | |
| S -036 | JENDL-3.2:S -000 | JENDL-3.3 | S | 20 | Isotopic evaluation | | |
| Cl-035 | JEF-2.2:Cl-000 | ENDF/B-VIIb0 | S | 20 | Recent isotopic evaluation New resonance parameters (ORNL) | * | |
| Cl-037 | JEF-2.2:Cl-000 | ENDF/B-VIIb0 | S | 20 | Recent isotopic evaluation New resonance parameters (ORNL) | * | |
| Ar-036 | JEF-2.2 | JEFF-3.0 | S | 20 | MF5 correction included for JEFF-3.1 | | |
| Ar-038 | JEF-2.2 | JEFF-3.0 | S | 20 | MF5 correction included for JEFF-3.1 | | |
| Ar-040 | JEF-2.2 | JENDL-3.3 | S | 20 | New resonance data More complete | * | |
| K -039 | JENDL-3.2:K -000 | JENDL-3.3 | S | 20 | Isotopic evaluation Gamma production added | | |
| K -040 | JENDL-3.2:K -000 | JENDL-3.3 | S | 20 | Isotopic evaluation Gamma production added | | |
| K -041 | JENDL-3.2:K -000 | JENDL-3.3 | S | 20 | Isotopic evaluation Gamma production added | | |
| Ca-040 | JENDL-3.2:Ca-000 | New evaluation | S | 200 | NRG-2004 | N | |
| Ca-042 | JENDL-3.2:Ca-000 | New evaluation | S | 200 | NRG-2004 | N | |
| Ca-043 | JENDL-3.2:Ca-000 | New evaluation | S | 200 | NRG-2004 | N | |
| Ca-044 | JENDL-3.2:Ca-000 | New evaluation | S | 200 | NRG-2004 | N | |
| Ca-046 | JENDL-3.2:Ca-000 | New evaluation | S | 200 | NRG-2004 | N | |
| Ca-048 | JENDL-3.2:Ca-000 | New evaluation | S | 200 | NRG-2004 | N | |
| Sc-045 | ENDF/B-VI.3 | New evaluation | S | 200 | NRG-2004 | N | |

| Isotope | JEFF-3.0 | JEFF-3.1T3 | S | E | Comments | Other | ? |
|---|---|---|---|---|---|---|---|
| Ti-046 | JENDL-3.2:Ti-000 | New evaluation | S | 20 | IRK Vienna | N | |
| Ti-047 | JENDL-3.2:Ti-000 | New evaluation | S | 20 | IRK Vienna | N | |
| Ti-048 | JENDL-3.2:Ti-000 | New evaluation | S | 20 | IRK Vienna | N | |
| Ti-049 | JENDL-3.2:Ti-000 | New evaluation | S | 20 | IRK Vienna | N | |
| Ti-050 | JENDL-3.2:Ti-000 | New evaluation | S | 20 | IRK Vienna | N | |
| V -000 | EFF-3.0 | JEFF-3.0 | S | 20 | - | | |
| Cr-050 | ENDF/B-VI.3 | JEFF-3.0 | S | 20 | Not updated since ENDF/B-VI.8 | | ? |
| | | | | | has Emax=150 (inconsistent with Cr-52) | | |
| Cr-052 | EFF-3.0 | EFF-3.05 | S | 20 | Modifications for continuum spectrum | | |
| Cr-053 | ENDF/B-VI.3 | JEFF-3.0 | S | 20 | Not updated since ENDF/B-VI.8 | | ? |
| | | | | | has Emax=150 (inconsistent with Cr-52) | | |
| Cr-054 | ENDF/B-VI.3 | JEFF-3.0 | S | 20 | Not updated since ENDF/B-VI.8 | | ? |
| | | | | | has Emax=150 (inconsistent with Cr-52) | | |
| Mn-055 | JENDL-3.2 | JENDL-3.3 | S | 20 | MF4,5 replaced by MF6 from JENDL-FF | | |
| | | | | | Photon production added | | |
| Fe-054 | ENDF/B-VI.3 | New evaluation | S | 200 | NRG-2004 | N | |
| Fe-056 | EFF-3.1 | New evaluation | S | 200 | EFF-3.1 ( < 20 MeV) + NRG-2004 | N | |
| Fe-057 | JEF-2.2 | New evaluation | S | 200 | NRG-2004 | N | |
| Fe-058 | JEF-2.2 | New evaluation | S | 200 | NRG-2004 + Moxon/Trkov res. data | N | |
| Co-058 | JEF-2.2 | JEFF-3.0 | | 20 | MF5 correction included for JEFF-3.1 | | |
| Co-058m | JEF-2.2 | JEFF-3.0 | | 20 | MF5 correction included for JEFF-3.1 | | |
| Co-059 | ENDF/B-VI.3 | JEFF-3.0 | S | 20 | - | | |
| Ni-058 | EFF-3.1 | JEFF-3.0+corr. | S | 20 | - | | |
| Ni-059 | JEF-2.2 | JEFF-3.0+corr. | | 20 | MF5 correction included for JEFF-3.1 | | |
| Ni-060 | EFF-3.1 | JEFF-3.0+corr. | S | 20 | Processing problem solved by Sublet | | ? |
| Ni-061 | ENDF/B-VI.3 | ENDF/B-VI.8 | S | 20 | Ni-61,62,64 now up to 150 MeV | | ? |
| Ni-062 | ENDF/B-VI.3 | ENDF/B-VI.8 | S | 20 | - | | |
| Ni-064 | ENDF/B-VI.3 | ENDF/B-VI.8 | S | 20 | - | | |
| Cu-063 | ENDF/B-VI.3 | ENDF/B-VI.8 | S | 150 | Extension to 150 MeV | | |
| | | | | | Gamma-ray spectrum updated | | |
| Cu-065 | ENDF/B-VI.3 | ENDF/B-VI.8 | S | 150 | Extension to 150 MeV | | |
| | | | | | Gamma-ray spectrum updated | | |

| Isotope | JEFF-3.0 | JEFF-3.1T3 | S | E | Comments | Other | ? |
|---|---|---|---|---|---|---|---|
| Zn-000 | BROND-2.2 | JEFF-3.0 | S | 20 | - | | |
| Ga-000 | JENDL-3.2 | JEFF-3.0 | S | 20 | JENDL-3.3 isotopic evaluations exist, | | |
| | + JEF-2.2 | | | | but without gamma production | | |
| Ge-070 | JEF-2.2 | New evaluation | S | 200 | NRG-2004 | N | |
| Ge-072 | JEF-2.2 | New evaluation | S | 200 | NRG-2004 | N | |
| Ge-073 | JEF-2.2 | New evaluation | S | 200 | NRG-2004 | N | |
| Ge-074 | JEF-2.2 | New evaluation | S | 200 | NRG-2004 | N | |
| Ge-076 | JEF-2.2 | New evaluation | S | 200 | NRG-2004 | N | |
| As-075 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Se-074 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Se-076 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Se-077 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Se-078 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Se-079 | JENDL-3.2 | JENDL-3.3 | | 20 | T-matrix deleted | | |
| Se-080 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Se-082 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Br-079 | JEF-2.2 | JEFF-3.0 | S | 20 | - | | |
| Br-081 | JEF-2.2 | JEFF-3.0 | S | 20 | - | | |
| Kr-078 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Kr-080 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Kr-082 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Kr-083 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Kr-084 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Kr-085 | JEF-2.2 | JEFF-3.0 | | 20 | More recent evaluations available | | ? |
| Kr-086 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Rb-085 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Rb-086 | JEF-2.2 | JEFF-3.0 | | 20 | - | | |
| Rb-087 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Sr-084 | JEF-2.2 | JEFF-3.0 | S | 20 | - | | |
| Sr-086 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Sr-087 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Sr-088 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Sr-089 | JEF-2.2 | JEFF-3.0 | | 20 | More recent evaluations available | | ? |
| Sr-090 | JEF-2.2 | JEFF-3.0 | | 20 | More recent evaluations available | | ? |
| Y -089 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Y -090 | JEF-2.2 | JEFF-3.0 | | 20 | - | | |
| Y -091 | JEF-2.2 | JEFF-3.0 | | 20 | More recent evaluations available | | ? |

| Isotope | JEFF-3.0 | JEFF-3.1T3 | S | E | Comments | Other | ? |
|---|---|---|---|---|---|---|---|
| Zr-090 | JENDL-3.2 | JENDL-3.3 | S | 20 | MF4,5 replaced by MF6 from JENDL-FF | | |
| | | | | | Photon prod. added, MT1,2,102 revised | | |
| Zr-091 | JENDL-3.2 | JENDL-3.3 | S | 20 | MF4,5 replaced by MF6 from JENDL-FF | | |
| | | | | | Photon prod. added, MT1,2,102 revised | | |
| Zr-092 | JENDL-3.2 | JENDL-3.3 | S | 20 | MF4,5 replaced by MF6 from JENDL-FF | | |
| | | | | | Photon prod. added, MT1,2,102 revised | | |
| Zr-093 | JEF-2.2 | JEFF-3.0 | | 20 | More complete JENDL-3.3 available | | ? |
| Zr-094 | JENDL-3.2 | JENDL-3.3 | S | 20 | MF4,5 replaced by MF6 from JENDL-FF | | |
| | | | | | Photon prod. added, MT1,2,102 revised | | |
| Zr-095 | JEF-2.2 | JEFF-3.0 | | 20 | More complete JENDL-3.3 available | | ? |
| Zr-096 | JENDL-3.2 | JENDL-3.3 | S | 20 | MF4,5 replaced by MF6 from JENDL-FF | | |
| | | | | | Photon prod. added, MT1,2,102 revised | | |
| Nb-093 | ENDF/B-VI.3 | ENDF/B-VI.8 | S | 150 | Extension to 150 MeV | | |
| Nb-094 | - | JENDL-3.3 | | 20 | More complete than ENDF/B-V (JEF-2.2) | n | |
| Nb-095 | - | JENDL-3.3 | | 20 | More complete than ENDF/B-V (JEF-2.2) | n | |
| Mo-092 | JENDL-3.2 | JENDL-3.3 | S | 20 | T-matrix deleted | | |
| | | | | | Gamma production data added | | |
| Mo-094 | JENDL-3.2 | JENDL-3.3 | S | 20 | T-matrix deleted | | |
| | | | | | Gamma production data added | | ? |
| Mo-095 | JENDL-3.2 | ENDF/B-VIIb0 | S | 20 | Best resonance integral | * | |
| | | | | | (Santamarina) | | |
| Mo-096 | JENDL-3.2 | JENDL-3.3 | S | 20 | T-matrix deleted | | |
| | | | | | Gamma production data added | | |
| Mo-097 | JENDL-3.2 | JENDL-3.3 | S | 20 | T-matrix deleted | | |
| | | | | | Gamma production data added | | |
| Mo-098 | JENDL-3.2 | JENDL-3.3 | S | 20 | T-matrix deleted | | |
| | | | | | Gamma production data added | | |
| Mo-099 | JEF-2.2 | JENDL-3.3 | S | 20 | Much more complete evaluation | * | |
| | | | | | Consistent with other isotopes | | |
| Mo-100 | JENDL-3.2 | JENDL-3.3 | S | 20 | T-matrix deleted | | |
| | | | | | Gamma production data added | | |

| Isotope | JEFF-3.0 | JEFF-3.1T3 | S | E | Comments | Other | ? |
|---|---|---|---|---|---|---|---|
| Tc-099 | JENDL-3.2 | New evaluation | | 20 | CEA/NRG evaluation | N | ? |
| Ru-096 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Ru-098 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Ru-099 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Ru-100 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Ru-101 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Ru-102 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Ru-103 | JEF-2.2 | JEFF-3.0 | | 20 | More recent evaluations available | | ? |
| Ru-104 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Ru-105 | JEF-2.2 | JEFF-3.0 | | 20 | More recent evaluations available | | ? |
| Ru-106 | JEF-2.2 | JEFF-3.0 | | 20 | More recent evaluations available | | ? |
| Rh-103 | ENDF/B-VI.8 | New evaluation | S | 20 | CEA | N | |
| Rh-105 | JEF-2.2 | JEFF-3.0 | | 20 | More recent evaluations available | | ? |
| Pd-102 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Pd-104 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Pd-105 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Pd-106 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Pd-107 | JEF-2.2 | JEFF-3.0 | | 20 | More recent evaluations available | | ? |
| Pd-108 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Pd-110 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Ag-107 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Ag-109 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Ag-110m | - | JENDL-3.3 | | 20 | - | n | |
| Ag-111 | JEF-2.2 | JEFF-3.0 | | 20 | - | | |

| Isotope | JEFF-3.0 | JEFF-3.1T3 | S | E | Comments | Other | ? |
|---|---|---|---|---|---|---|---|
| Cd-106 | ENDF/B-VI.4 | JEFF-3.0 | S | 20 | - | | |
| Cd-108 | ENDF/B-VI.4 | JEFF-3.0 | S | 20 | - | | |
| Cd-110 | ENDF/B-VI.4 | JEFF-3.0 | S | 20 | - | | |
| Cd-111 | ENDF/B-VI.4 | JEFF-3.0 | S | 20 | - | | |
| Cd-112 | ENDF/B-VI.4 | JEFF-3.0 | S | 20 | - | | |
| Cd-113 | ENDF/B-VI.4 | JEFF-3.0 | S | 20 | - | | |
| Cd-114 | ENDF/B-VI.4 | JEFF-3.0 | S | 20 | - | | |
| Cd-115m | ENDF/B-VI.4 | JEFF-3.0 | | 20 | - | | |
| Cd-116 | ENDF/B-VI.4 | JEFF-3.0 | S | 20 | - | | |
| In-113 | JENDL-3.2 | JENDL-3.3 | S | 20 | T-matrix deleted | | |
| | | | | | Small adjustments | | |
| In-115 | JENDL-3.2 | JENDL-3.3 | S | 20 | T-matrix deleted | | |
| | | | | | Small adjustments | | |
| Sn-112 | EFF-2.4 = JENDL-3 | JENDL-3.3 | S | 20 | T-matrix deleted | | |
| | | | | | New energy distributions | | |
| Sn-114 | EFF-2.4 = JENDL-3 | JENDL-3.3 | S | 20 | T-matrix deleted | | |
| | | | | | New energy distributions | | |
| Sn-115 | EFF-2.4 = JENDL-3 | JENDL-3.3 | S | 20 | T-matrix deleted | | |
| | | | | | New energy distributions | | |
| Sn-116 | EFF-2.4 = JENDL-3 | JENDL-3.3 | S | 20 | T-matrix deleted | | |
| | | | | | New energy distributions | | |
| Sn-117 | EFF-2.4 = JENDL-3 | JENDL-3.3 | S | 20 | T-matrix deleted | | |
| | | | | | New energy distributions | | |
| Sn-118 | EFF-2.4 = JENDL-3 | JENDL-3.3 | S | 20 | T-matrix deleted | | |
| | | | | | New energy distributions | | |
| Sn-119 | EFF-2.4 = JENDL-3 | JENDL-3.3 | S | 20 | T-matrix deleted | | |
| | | | | | New energy distributions | | |
| Sn-120 | EFF-2.4 = JENDL-3 | JENDL-3.3 | S | 20 | T-matrix deleted | | |
| | | | | | New energy distributions | | |
| Sn-122 | EFF-2.4 = JENDL-3 | JENDL-3.3 | S | 20 | T-matrix deleted | | |
| | | | | | New energy distributions | | |
| Sn-123 | JEF-2.2 | JEFF-3.0 | | 20 | More recent evaluations available | | ? |
| Sn-124 | EFF-2.4 = JENDL-3 | JENDL-3.3 | S | 20 | T-matrix deleted | | |
| | | | | | New energy distributions | | |
| Sn-125 | JEF-2.2 | JEFF-3.0 | | 20 | More recent evaluations available | | ? |
| Sn-126 | JEF-2.2 | JEFF-3.0 | | 20 | - | | |

| Isotope | JEFF-3.0 | JEFF-3.1T3 | S | E | Comments | Other | ? |
|---|---|---|---|---|---|---|---|
| Sb-121 | JENDL-3.2 | JENDL-3.3 | S | 20 | MF4,5 replaced by MF6 from JENDL-FF, T-matrix deleted | | |
| Sb-123 | JENDL-3.2 | JENDL-3.3 | S | 20 | MF4,5 replaced by MF6 from JENDL-FF, T-matrix deleted | | |
| Sb-124 | JEF-2.2 | JEFF-3.0 | | 20 | More recent evaluations available | | ? |
| Sb-125 | JEF-2.2 | JEFF-3.0 | | 20 | More recent evaluations available | | ? |
| Sb-126 | JEF-2.2 | JEFF-3.0 | | 20 | More recent evaluations available | | ? |
| Te-120 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Te-122 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Te-123 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Te-124 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Te-125 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Te-126 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Te-127m | JEF-2.2 | JEFF-3.0 | | 20 | More recent evaluations available | | ? |
| Te-128 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Te-129m | JEF-2.2 | JEFF-3.0 | | 20 | More recent evaluations available | | ? |
| Te-130 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Te-132 | JEF-2.2 | JEFF-3.0 | | 20 | More recent evaluations available | | ? |
| I -127 | JEF-2.2 | New evaluation | S | 20 | CEA evaluation | N | |
| I -129 | JEF-2.2 | New evaluation | | 20 | CEA evaluation | N | |
| I -130 | JEF-2.2 | JEFF-3.0 | | 20 | - | | |
| I -131 | JEF-2.2 | JEFF-3.0 | | 20 | More recent evaluations available | | ? |
| I -135 | JEF-2.2 | JEFF-3.0 | | 20 | - | | |
| Xe-124 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Xe-126 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Xe-128 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Xe-129 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Xe-130 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Xe-131 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Xe-132 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Xe-133 | JEF-2.2 | JEFF-3.0 | | 20 | More recent evaluations available | | ? |
| Xe-134 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Xe-135 | JEF-2.2 | JEFF-3.0 | | 20 | More recent evaluations available | | ? |
| Xe-136 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Cs-133 | ENDF/B-VI.7 | JEFF-3.0 | S | 20 | Recomm. Serot et al JEF/DOC-874 | | |
| Cs-134 | JEF-2.2 | JEFF-3.0 | | 20 | More recent evaluations available | | ? |
| Cs-135 | JEF-2.2 | JEFF-3.0 | | 20 | More recent evaluations available | | ? |
| Cs-136 | JEF-2.2 | JEFF-3.0 | | 20 | More recent evaluations available | | ? |
| Cs-137 | JEF-2.2 | JEFF-3.0 | | 20 | More recent evaluations available | | ? |

| Isotope | JEFF-3.0 | JEFF-3.1T3 | S | E | Comments | Other | ? |
|---|---|---|---|---|---|---|---|
| Ba-130 | JENDL-3.2 | JENDL-3.3 | S | 20 | T-matrix deleted | | |
| | | | | | Small adjustments | | |
| Ba-132 | JENDL-3.2 | JENDL-3.3 | S | 20 | T-matrix deleted | | |
| | | | | | Small adjustments | | |
| Ba-134 | JENDL-3.2 | JENDL-3.3 | S | 20 | T-matrix deleted | | |
| | | | | | Small adjustments | | |
| Ba-135 | JENDL-3.2 | JENDL-3.3 | S | 20 | T-matrix deleted | | |
| | | | | | Small adjustments | | |
| Ba-136 | JENDL-3.2 | JENDL-3.3 | S | 20 | T-matrix deleted | | |
| | | | | | Small adjustments | | |
| Ba-137 | JENDL-3.2 | JENDL-3.3 | S | 20 | T-matrix deleted | | |
| | | | | | Small adjustments | | |
| Ba-138 | JENDL-3.2 | JENDL-3.3 | S | 20 | T-matrix deleted | | |
| | | | | | Small adjustments | | |
| Ba-140 | JEF-2.2 | JEFF-3.0 | | 20 | More recent evaluations available | | ? |
| La-138 | JENDL-3.2 | JENDL-3.3 | S | 20 | T-matrix deleted | | |
| | | | | | Small adjustments | | |
| La-139 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| La-140 | JEF-2.2 | JEFF-3.0 | | 20 | - | | |
| Ce-136 | - | - | S | - | - | | |
| Ce-138 | - | - | S | - | - | | |
| Ce-140 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Ce-141 | JEF-2.2 | JEFF-3.0 | | 20 | More recent evaluations available | | ? |
| Ce-142 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Ce-143 | JEF-2.2 | JEFF-3.0 | | 20 | - | | |
| Ce-144 | JEF-2.2 | JEFF-3.0 | | 20 | More recent evaluations available | | ? |
| Pr-141 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Pr-142 | JEF-2.2 | JEFF-3.0 | | 20 | - | | |
| Pr-143 | JEF-2.2 | JEFF-3.0 | | 20 | More recent evaluations available | | ? |

| Isotope | JEFF-3.0 | JEFF-3.1T3 | S | E | Comments | Other | ? |
|---|---|---|---|---|---|---|---|
| Nd-142 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Nd-143 | JEF-2.2 | JEFF-3.0 | S | 20 | Recommended by Chabert et al JEF/DOC-885 | | ? |
| Nd-144 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Nd-145 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Nd-146 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Nd-147 | JEF-2.2 | JEFF-3.0 | | 20 | More recent evaluations available | | ? |
| Nd-148 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Nd-150 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Pm-147 | JEF-2.2 | JEFF-3.0 | | 20 | More recent evaluations available | | ? |
| Pm-148 | JEF-2.2 | JEFF-3.0 | | 20 | More recent evaluations available | | ? |
| Pm-148m | JEF-2.2 | JEFF-3.0 | | 20 | More recent evaluations available | | ? |
| Pm-149 | JEF-2.2 | JEFF-3.0 | | 20 | More recent evaluations available | | ? |
| Pm-151 | JEF-2.2 | JEFF-3.0 | | 20 | - | | |
| Sm-144 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Sm-147 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Sm-148 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Sm-149 | JEF-2.2 | JEFF-3.0 | S | 20 | Recommended by Chabert et al JEF/DOC-885 | | ? |
| Sm-150 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Sm-151 | JEF-2.2 | JEFF-3.0 | | 20 | More recent evaluations available | | ? |
| Sm-152 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Sm-153 | JEF-2.2 | JEFF-3.0 | | 20 | More recent evaluations available | | ? |
| Sm-154 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Eu-151 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Eu-152 | JENDL-3.2 | JEFF-3.0 | | 20 | Corrections of JEFF-3.0 not in JENDL-3.3 Recommended by Serot et al JEF/DOC-912 | | |
| Eu-153 | JENDL-3.2 | JEFF-3.0 | S | 20 | Corrections of JEFF-3.0 not in JENDL-3.3 Recommended by Serot et al JEF/DOC-912 | | |
| Eu-154 | ENDF/B-VI.7 | JEFF-3.0 | | 20 | Recommended by Chabert et al JEF/DOC-885 | | |
| Eu-155 | ENDF/B-VI.7 | JEFF-3.0 | | 20 | Recommended by Chabert et al JEF/DOC-885 | | |
| Eu-156 | JEF-2.2 | JEFF-3.0 | | 20 | More recent evaluations available | | ? |
| Eu-157 | JEF-2.2 | JEFF-3.0 | | 20 | More recent evaluations available | | ? |

| Isotope | JEFF-3.0 | JEFF-3.1T3 | S | E | Comments | Other | ? |
|---|---|---|---|---|---|---|---|
| Gd-152 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Gd-154 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Gd-155 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Gd-156 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Gd-157 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Gd-158 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Gd-160 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Tb-159 | JEF-2.2 | JEFF-3.0 | S | 20 | More recent evaluations available | | ? |
| Tb-160 | JEF-2.2 | JEFF-3.0 | | 20 | - | | |
| Dy-156 | - | - | S | - | - | | |
| Dy-158 | - | - | S | - | - | | |
| Dy-160 | JEF-2.2 | JEFF-3.0 | S | 20 | Processing problems for ENDF/B-VI.8 | * | ? |
| Dy-161 | JEF-2.2 | ENDF/B-VI.8 | S | 20 | Low energy data revised by Wright | * | ? |
| Dy-162 | JEF-2.2 | ENDF/B-VI.8 | S | 20 | Low energy data revised by Wright | * | ? |
| Dy-163 | JEF-2.2 | ENDF/B-VI.8 | S | 20 | Low energy data revised by Wright | * | ? |
| Dy-164 | JEF-2.2 | ENDF/B-VI.8 | S | 20 | Low energy data revised by Wright | * | ? |
| Ho-165 | ENDF/B-VI.4 | ENDF/B-VI.8 | S | 30 | Corrected total and neutron width and Emax | | |
| Er-162 | BROND-2.2 | JENDL-3.3 | S | 20 | New evaluation (2000), more complete New resonance parameters, Mughabghab 1984 | * | |
| Er-164 | BROND-2.2 | JENDL-3.3 | S | 20 | New evaluation (2000), more complete New resonance parameters, Mughabghab 1984 | * | |
| Er-166 | BROND-2.2 | JENDL-3.3 | S | 20 | New evaluation (2000), more complete New resonance parameters, Mughabghab 1984 | * | |
| Er-167 | BROND-2.2 | JENDL-3.3 | S | 20 | New evaluation (2000), more complete New resonance parameters, Mughabghab 1984 | * | |
| Er-168 | BROND-2.2 | JENDL-3.3 | S | 20 | New evaluation (2000), more complete New resonance parameters, Mughabghab 1984 | * | |
| Er-170 | BROND-2.2 | JENDL-3.3 | S | 20 | New evaluation (2000), more complete New resonance parameters, Mughabghab 1984 | * | |
| Tm-169 | - | - | S | - | - | | |

| Isotope | JEFF-3.0 | JEFF-3.1T3 | S | E | Comments | Other | ? |
|---------|----------|------------|---|---|----------|-------|---|
| Yb-168 | - | - | S | - | - | | |
| Yb-170 | - | - | S | - | - | | |
| Yb-171 | - | - | S | - | - | | |
| Yb-172 | - | - | S | - | - | | |
| Yb-173 | - | - | S | - | - | | |
| Yb-174 | - | - | S | - | - | | |
| Yb-176 | - | - | S | - | - | | |
| Lu-175 | JEF-2.2 | ENDF/B-VI.8 | S | 20 | New evaluation from R.Q. Wright (1998): MLBW, Mugh. 1984 instead of SLBW (1967) | * | |
| Lu-176 | JEF-2.2 | ENDF/B-VI.8 | S | 20 | New evaluation from R.Q. Wright (1998): MLBW, Mugh. 1984 instead of SLBW (1967) | * | |
| Hf-174 | JENDL-3.2 | New evaluation | S | 20 | CEA/RPI (JENDL-3.3 revised) | N | |
| Hf-176 | JENDL-3.2 | New evaluation | S | 20 | CEA/RPI (JENDL-3.3 revised) | N | |
| Hf-177 | JENDL-3.2 | New evaluation | S | 20 | CEA/RPI (JENDL-3.3 revised) | N | |
| Hf-178 | JENDL-3.2 | New evaluation | S | 20 | CEA/RPI (JENDL-3.3 revised) | N | |
| Hf-179 | JENDL-3.2 | New evaluation | S | 20 | CEA/RPI (JENDL-3.3 revised) | N | |
| Hf-180 | JENDL-3.2 | New evaluation | S | 20 | CEA/RPI (JENDL-3.3 revised) | N | |

| Isotope | JEFF-3.0 | JEFF-3.1T3 | S | E | Comments | Other | ? |
|---------|----------|------------|---|---|----------|-------|---|
| Ta-180 | - | - | S | - | - | | |
| Ta-181 | JENDL-3.2 | JENDL-3.3 | S | 20 | MT1,2,107 revised | | |
| Ta-182 | JEF-2.2 | JEFF-3.0 | | 20 | - | | |
| W -180 | - | - | S | - | - | | |
| W -182 | JENDL-3.2 | JENDL-3.3 | S | 20 | MF4,5 repl. by MF6 (JENDL-FF) Photon prod. added, MT2 revised | | |
| W -183 | JENDL-3.2 | JENDL-3.3 | S | 20 | MF4,5 repl. by MF6 (JENDL-FF) Photon prod. added, MT2 revised | | |
| W -184 | JENDL-3.2 | JENDL-3.3 | S | 20 | MF4,5 repl. by MF6 (JENDL-FF) Photon prod. added, MT2 revised | | |
| W -186 | JENDL-3.2 | JENDL-3.3 | S | 20 | MF4,5 repl. by MF6 (JENDL-FF) Photon prod. added, MT2 revised | | |
| Re-185 | ENDF/B-VI.4 | JEFF-3.0 | S | 20 | = ENDF/B-VI.8 | | |
| Re-187 | ENDF/B-VI.4 | JEFF-3.0 | S | 20 | = ENDF/B-VI.8 | | |
| Os-000 | BROND-2.2 | JEFF-3.0 + corr. | S | 20 | Decay scheme modified | | |
| Ir-191 | BROND-2.2 for Ir-000 | ENDF/B-VI.8 | S | 20 | Newer isotopic evaluation (1995) partly based on BROND-2.2 | * | |
| Ir-193 | BROND-2.2 for Ir-000 | ENDF/B-VI.8 | S | 20 | Newer isotopic evaluation (1995) partly based on BROND-2.2 | * | |
| Pt-000 | ENDL-78 REV L | JEFF-3.0 + corr. | S | 20 | MF4 skeleton added | | |
| Au-197 | ENDF/B-VI (1984) | JEFF-3.0 | S | 20 | = ENDF/B-VI.8 | | |
| Hg-196 | CENDL for Hg-000 | JENDL-3.3 | S | 20 | Isotopic evaluation | * | |
| Hg-198 | CENDL for Hg-000 | JENDL-3.3 | S | 20 | Isotopic evaluation | * | |
| Hg-199 | CENDL for Hg-000 | JENDL-3.3 | S | 20 | Isotopic evaluation | * | |
| Hg-200 | CENDL for Hg-000 | JENDL-3.3 | S | 20 | Isotopic evaluation | * | |
| Hg-201 | CENDL for Hg-000 | JENDL-3.3 | S | 20 | Isotopic evaluation | * | |
| Hg-202 | CENDL for Hg-000 | JENDL-3.3 | S | 20 | Isotopic evaluation | * | |
| Hg-204 | CENDL for Hg-000 | JENDL-3.3 | S | 20 | Isotopic evaluation | * | |
| Tl-000 | CENDL + modification | JEFF-3.0 | S | 20 | - | | |
| Pb-204 | JENDL-3.2 | New evaluation | S | 200 | NRG-2004 | N | |
| Pb-206 | JENDL-3.2 | New evaluation | S | 200 | NRG-2004 | N | |
| Pb-207 | JENDL-3.2 | New evaluation | S | 200 | NRG-2004 | N | |
| Pb-208 | JENDL-3.2 | New evaluation | S | 200 | NRG-2004 | N | |
| Bi-209 | ENDF/B-VI.4 | New evaluation | S | 200 | NRG-2004 | N | |

| Isotope | JEFF-3.0 | JEFF-3.1T3 | S | E | Comments | Other | ? |
|---|---|---|---|---|---|---|---|
| Ra-223 | - | JENDL-3.3 | | 20 | - | n | |
| Ra-224 | - | JENDL-3.3 | | 20 | - | n | |
| Ra-225 | - | JENDL-3.3 | | 20 | - | n | |
| Ra-226 | - | JENDL-3.3 | | 20 | - | n | |
| Ac-225 | - | JENDL-3.3 | | 20 | - | n | |
| Ac-226 | - | JENDL-3.3 | | 20 | - | n | |
| Ac-227 | - | JENDL-3.3 | | 20 | - | n | |
| Th-227 | JENDL-3.2 | JENDL-3.3 | | 20 | T-matrix deleted, small adj. 8 time groups | | |
| Th-228 | JENDL-3.2 | JENDL-3.3 | | 20 | T-matrix deleted Small adjustments | | |
| Th-229 | JENDL-3.2 + modifications | JEFF-3.0 | | 20 | 8 time groups | | |
| Th-230 | JEF-2.2 | JEFF-3.0 | | 20 | - | | |
| Th-232 | JENDL-3.2+ENDF/B-VI.4 | Maslov, Minsk | S | 20 | + revisions, 8 time groups | * | |
| Th-233 | JENDL-3.2 | JENDL-3.3 | | 20 | T-matrix deleted Small adjustments | | |
| Th-234 | JENDL-3.2 | JENDL-3.3 | | 20 | T-matrix deleted Small adjustments | | |
| Pa-231 | JEF-2.2 | JEFF-3.0 | | 20 | 8 time groups | | |
| Pa-232 | - | ENDF/B-VI.8 | | 20 | More recent res parameters than JENDL-3.3 | n | |
| Pa-233 | JEF-2.2 | JEFF-3.0 | | 20 | - | | |
| U -232 | JEF-2.2+ENDF/B-VI.4 | JEFF-3.0 | | 20 | 8 time groups | | |
| U -233 | JENDL-3.2+ENDF/B-VI.4 +modifications | JENDL-3.3+ENDF/B-VI.4 | | 20 | +NRG correction, fuel cycle 8 time groups | * | |
| U -234 | JEF-2.2+ENDL-78 | Maslov, Minsk | S | 20 | fuel cycle feedback 8 time groups | * | |
| U -235 | ENDF/B-VI.6+ + modifications | JEFF-3.0 | S | 30 | New evaluation of CEA under study, 8 time groups | | |
| U -236 | JENDL-3.2+ENDF/B-VI.4 | New evaluation | | 30 | CEA, 8 time groups | N | |
| U -237 | JENDL-3.2+JEF-2.2 + modifications | New evaluation | | 30 | CEA, 8 time groups | N | |
| U -238 | JEF-2.2+JENDL-3.2 +ENDF/B-VI.4+modific. | New evaluation | S | 30 | CEA, 8 time groups | N | |

| Isotope | JEFF-3.0 | JEFF-3.1T3 | S | E | Comments | Other | ? |
|---|---|---|---|---|---|---|---|
| Np-235 | - | JENDL-3.3 | | 20 | - | n | |
| Np-236 | JENDL-3.2 | JENDL-3.3 | | 20 | T-matrix deleted<br>Small adjustments | | |
| Np-237 | ENDF/B-VI.4+JEF-2.2<br>+ modifications | JEFF-3.0 | | 20 | Possible new evaluation<br>from CEA, 8 time groups | | ? |
| Np-238 | JEF-2.2+ENDF/B-VI.4 | JEFF-3.0 | | 20 | 8 time groups | | |
| Np-239 | ENDF/B-VI.4+JENDL-3.2<br>+ modifications | JEFF-3.0 | | 20 | - | | |
| Pu-236 | JEF-2.2 | JENDL-3.3 | | 20 | Newer resonance eval.<br>Wait for ENDF/B-VII | | ? |
| Pu-237 | JEF-2.2 | JEFF-3.0 | | 20 | - | | |
| Pu-238 | JENDL-3.2+BROND-2.2<br>+ENDF/B-VI+modific. | JEFF-3.0 | | 20 | 8 time groups | | |
| Pu-239 | JEFF-3.0 | JEFF-3.0 updated | | 30 | 8 time groups | | |
| Pu-240 | JEFF-3.0 | New evaluation | | 30 | CEA, 8 time groups | | ? |
| Pu-241 | JENDL-3.2+modific. | JEFF-3.0 | | 20 | 8 time groups | | |
| Pu-242 | JEFF-3.0 | JEFF-3.0 | | 20 | 8 time groups | | |
| Pu-243 | JEF-2.2 | JEFF-3.0 | | 20 | - | | |
| Pu-244 | JEF-2.2 | JEFF-3.0 | | 20 | - | | |
| Pu-246 | - | JENDL-3.3 | | 20 | - | n | |
| Am-241 | JEF-2.2<br>+modifications | New evaluation | | 20 | CEA, JENDL-3.3 revised,<br>new RR, 8 time groups | N | |
| Am-242g | ENDF/B-VI.2+ENDL-78 | JENDL-3.3 | | 20 | Proposed by O. Bouland | * | |
| Am-242m | JEF-2.2+ENDF/B-VI<br>+modifications | JENDL-3.3 | | 20 | Proposed by O. Bouland<br>8 time groups | * | |
| Am-243 | JEF-2.2<br>+modifications | JENDL-3.3 | | 20 | Proposed by O. Bouland<br>8 time groups | * | |
| Am-244 | JENDL-3.2 | JENDL-3.3 | | 20 | T-matrix deleted<br>Small adjustments | | |
| Am-244m | JENDL-3.2 | JENDL-3.3 | | 20 | T-matrix deleted<br>Small adjustments | | |

| Isotope | JEFF-3.0 | JEFF-3.1T3 | S | E | Comments | Other | ? |
|---|---|---|---|---|---|---|---|
| Cm-240 | - | JENDL-3.3 | | 20 | - | n | |
| Cm-241 | JEF-2.2 +modifications | JEFF-3.0 | | 20 | - | | |
| Cm-242 | JEF-2.2+JENDL-3.2 +ENDF/B-VI+modific. | JEFF-3.0 | | 20 | 8 time groups | | |
| Cm-243 | JEF-2.2+JENDL-3.2 +ENDF/B-VI+modific. | JEFF-3.0 | | 20 | 8 time groups | | |
| Cm-244 | JEF-2.2 +modifications | ENDF/B-VI.8 | | 20 | Proposed by J.C. Sublet 8 time groups | * | |
| Cm-245 | JENDL-3.2 | JENDL-3.3 | | 20 | New evaluation, though CEA/Cad has comments, 8 time groups | | ? |
| Cm-246 | JEFF-3.0 | JEFF-3.0 | | 20 | 8 time groups | | |
| Cm-247 | JENDL-3.2+JEF-2.2 + modifications | JEFF-3.0 | | 20 | - | | |
| Cm-248 | JENDL-3.2+JEF-2.2 + modifications | JEFF-3.0 | | 20 | 8 time groups | | |
| Cm-249 | JENDL-3.2 | JENDL-3.3 | | 20 | New evaluation | | |
| Cm-250 | JENDL-3.2 | JENDL-3.3 | | 20 | New evaluation | | |
| Bk-247 | - | JENDL-3.3 | | 20 | - | n | |
| Bk-249 | ENDF/B-VI.4 + JEF-2.2 | JENDL-3.3 | | 20 | Performs better (J.C. Sublet) | | |
| Bk-250 | JENDL-3.2 + modification | JEFF-3.0 | | 20 | - | | |
| Cf-249 | ENDF/B-VI.4 + JEF-2.2 | JENDL-3.3 | | 20 | Processing problems for JEFF-3.0 and ENDF/B-VI.8, 8 time groups | | |
| Cf-250 | JEF-2.2 | JENDL-3.3 | | 20 | Performs better (J.C. Sublet) | | |
| Cf-251 | JEF-2.2 | JEFF-3.0 | | 20 | 8 time groups | | |
| Cf-252 | JEF-2.2 | JEFF-3.0 | | 20 | - | | |
| Cf-254 | JENDL-3.2 + modification | JEFF-3.0 | | 20 | - | | |
| Es-253 | - | JEF-2.2 | | 20 | More recent than ENDF/B-V | n | |
| Es-254 | JENDL-3.2 | JENDL-3.3 | | 20 | T-matrix deleted, 8 time groups | | |
| Es-255 | JENDL-3.2 | JENDL-3.3 | | 20 | T-matrix deleted | | |
| Fm-255 | - | JENDL-3.3 | | 20 | - | n | |