



ENDF/B-VII.0 deficiencies

Mike Herman

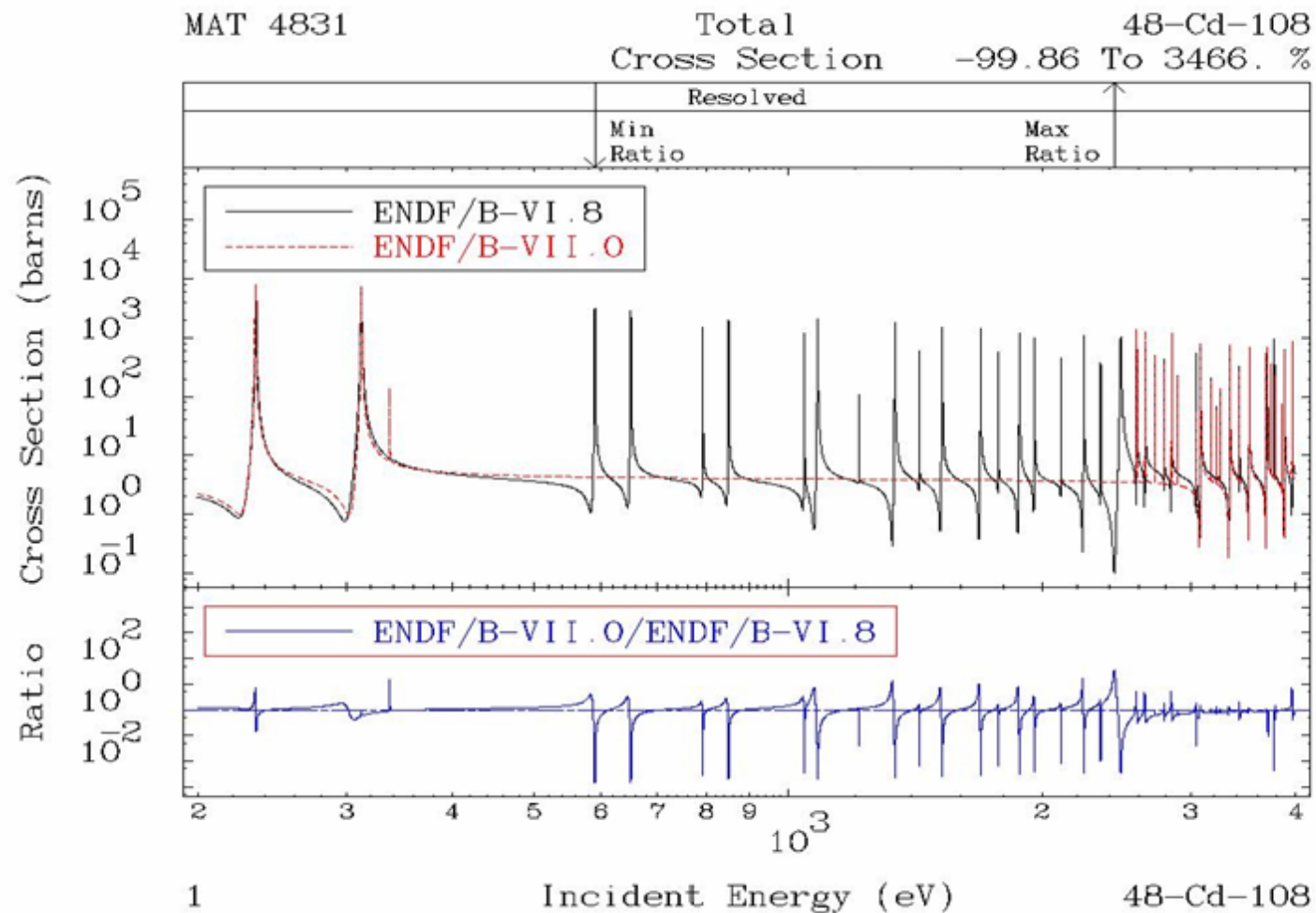
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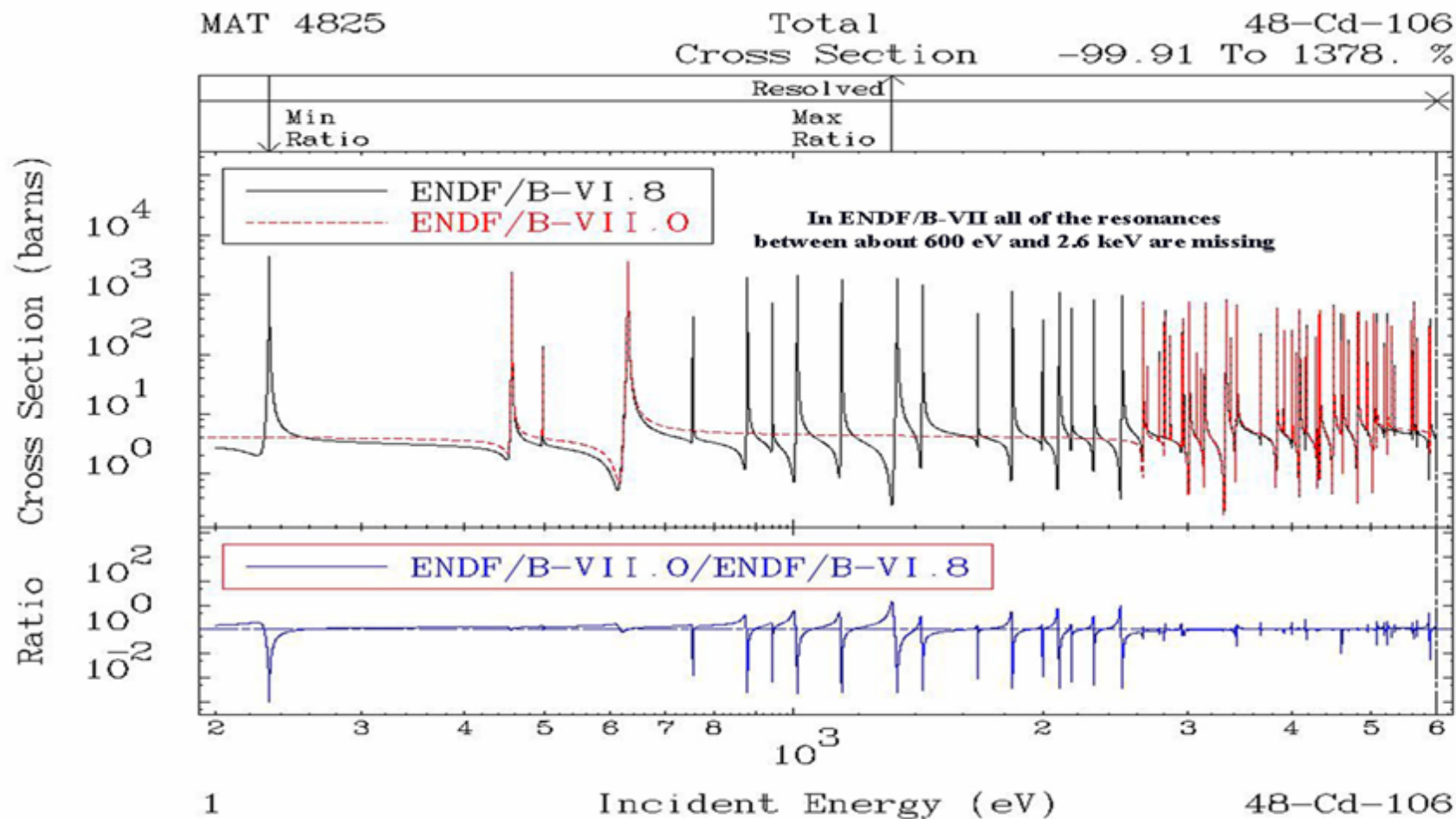
General observations

- ❑ The data are NOT C compatible - e.g., 1.234567+6 is read as 1.234567 (D. Cullen)
- ❑ MF/MT=1/451 comment lines are miscounted (D. Cullen)
- ❑ Atomic weights are not consistent through each evaluation (D. Cullen)
- ❑ In some materials groups of resonances are missing compared to VI.8 (D. Cullen)

Missing resonances in Cd-108



Missing resonances in Cd-106



Gaps in RRR (Mughabghab)

Known Energy Gaps for Nuclei between Zinc and Yb

Nucleus	Energy Gap(eV)	ENDFVI.8	ENDFVII.0
Cd-106	879-2647	fictitious resonances	gap*
Cd-108	337-2590	fictitious resonances	gap*
Ru-100	229-2679	1b cross section	gap*
Ru-101	1035-2660	URR	URR
Ru-104	1964-2700	1b cross section	fictitious resonances
Pd-104	2038-2760	smooth cross section	fictitious resonances
Pd-105	2053-2630	URR	URR
Pd-106	1839-2598	1b cross section	gap*
Te-123	1998-2672	URR	URR
Ho-165	1720-2591	URR	URR

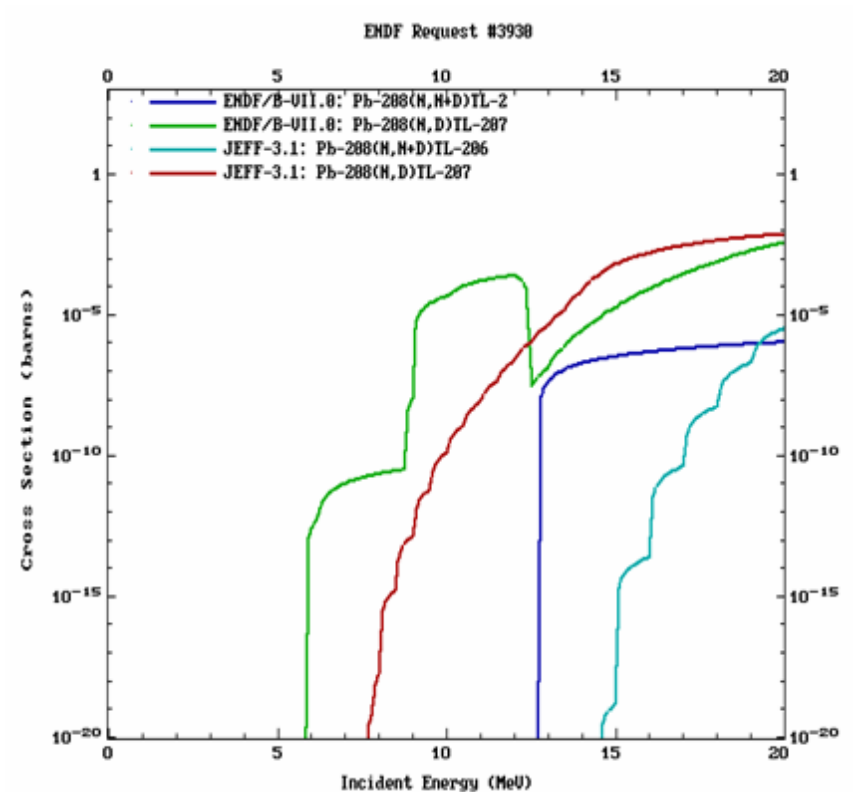
* require improvements in next ENDF release.

Cd-113 thermal cross section

- ENDF/B-VII.0 indicates 20615 b based on the precise measurement of Meadows and Whaling (NSE, 9,132,1962) for natural Cd.
According to post-Atlas measurements, as well as integral data, Mughabghab finds thermal capture cross section of Cd-113 to be 19800 b.
This evaluation is included in ENDF/A (S. Mughabghab)

More problems

- In the ENDF-6 manual MAT=28 and 76 are reserved for Be₂C and UC. In ENDF/B-VII.0 thermal scattering files they are used for **O** in **BeO** and **U** in **UO₂** (Otsuka Naohiko).
- The values of the **Pb-208(n,d)** cross section between 8 and 12 MeV look strange (D. Smith)



still more ...

- ❑ Both **Pu-241** and **Am-241** do not indicate they are in a metastable state or any other kind of "flagged" isotope but both have extra digits in their ZA identifiers (.01 past the expected integer value). The incorrect ZA is propagated throughout the entire file (first line of each section). I believe this to be a typo in both cases (Morgan White).
- ❑ My evaluation of **$3\text{H}(\text{d},\text{n})4\text{He}$** extends above 7 MeV, but **$2\text{H}(\text{d},\text{n})3\text{He}$** stops at 5 MeV and **$3\text{H}(\text{p},\text{n})3\text{He}$** at 12 MeV. My **d-D** evaluation should even be better than the **d-T** evaluation included in ENDF/B-VII.0 and it covers energies up to 39.8 MeV. My p-T evaluation goes to 32.8 MeV (Manfred Drosig)

and ...

- Proton files for **Ca-40** (MAT=2025) and **Cu-63** (MAT=2925) contain cross-sections up to 150 MeV in MF=3 and data up to 250 MeV in MF=6 (A. Konobeev).
- The NJOY output for **Cm-242** shows a "hole" in delayed neutron data in the CCCR module output (A. Aronson)
- Bob M and Red C discovered that the prompt fission spectra for **235,8-U** and **239-Pu**, are represented a bit too coarsely for emissions above 10 MeV. Fixed file exists in LANL but fission spectra might be totally revised for VII.1

and...

- For **Y-89** the inelastic continuum cross section is present below its threshold of 4.5 MeV and is negative at several of the points (Chris J Dean).
- **Eu-153** afflicted with several negative pdf's for the secondary neutron energy distribution from MF=6 MT=91, specifically at incident energies of 16 MeV and above (Holly Trelue, Bob M)
- **Tc-99** and **Pu-239** the energy dependent URR resonance parameter data do not span the specified URR energy range (Skip Kahler)
- **Np-237** thermal value is 161.7 b – new experiments give 180-+5 b while Atlas recommends 175.9-+2.9 b (S.Mughabghab)

finally!

- H-3(n,2n) cross sections in ENDF/B-VII.0 are much lower than VI.8 and JEFF-3.1/A. The latter looks more credible as it fits the only available experimental value at 14.06 MeV (46.8 ± 4.9 mb Report AWRE-O-47/69, 1969). (S. Ganesan)
I have no problem with going back to something like the earlier (n,2n) values in the VII.1 release (Gerry Hale).
- U-233 in ENDF/B-VII.0 – some delayed nu-bars (MF/MT=1/455) are off by an order of magnitude (D. Cullen)
Simple typo
- **242-Am** does not have angular distribution data (MF=4, MT=18) for the prompt fission neutrons (Skip Kahler)