

# LANL Evaluations for ENDF/B-VII

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## LANL-related Issues to discuss

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- 1H file. Beta-0, with 332.0 & 332.6; New 1H Hale evaluation?
- Thermal standards. Trial 235,238U and 239Pu with thermal standards values for nu-bar. We would need ORNL work to explore versions that use standard fission, capture, etc. Should we bother?
- New 9Be and 208Pb evaluations. 9Be testing presented.
- 233U... explore use of standards nubar (lower by 0.3%). See Little talk
- 232Th. Explore use of JEFF/Maslov. See Little's talk on Mosteller data testing result for 232Th. What about the new IAEA/Herman/Leal file?
- S-alpha-beta. Bob can explain.... Should we adopt his new work? Patches needed for NJOY and MCNP. Should we use Mattes' work. Impacts LST benchmark results....
- What about the temp-dependence results that are causing confusion?
- New photonuclear actinide evaluations based on GNASH will be available for B-VII beta-1 testing, to replace Obninsk files
- Covariance data. 233U; Gd isotopes (make consistent), Rh. (Not 235,8,239...)

## Actinide Standards data: “-thmod files”.

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Phil Young made some test versions of the actinides, that use some of the Standards thermal constants: 235,238U and 239Pu.

Adopted the thermal nubar values.

(235: nubar standard is 0.05% lower; 238 is 0.3% lower, 239Pu is 0.2% higher, compared to the B-VI values).

We haven't modified ORNL fission cross sec, capture etc, since this requires ORNL resonance work. (But 233,235 fiss x/s almost identical. 239Pu resonance treatment older and doesn't hit thermal (off by 0.3%)).

Capture: Standard 235 & 233 is 0.7% higher, and 239 is 0.3% lower).

Scattering: Standard 235 is 7% lower than prelim B-VII.

## Actinide Standards data: H

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Trial H file that uses the Standards thermal capture value of 332.6 mb (instead of prelim B-VII value 332.0).

HST42-3: LARGE LOW-LEAKAGE SOLN. March 05 B-VII data: 1.00045 becomes 0.99925(12). Just over 0.1 % change.

HST9-2. Down by 0.1%

LCT-6. Down by 0.03%.

New S-alpha-beta treatment for H, same physics, better method. Needs patch of MCNP, patch of NJOY. 293.6K in MCNP, but inconsistent 296K in ENDF. New files has both consistent at 293.6K, with more alpha-beta values for better calc of total cross section above 2 eV.

HS22-3: goes UP by 0.05%. HST9-2 up by 0.06%. LCT-6 is no 0.99965(26).

## New Results for Thermal n-p Capture and Scattering... New new result from Hale! This differs from the B-VII beta 0 data tested.

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- Capture cross section forced to 332.0 mb at thermal. Gave no significant overall increase in chi-square from the high-precision measured value of 332.6 mb.
- New high-precision (NIST) measurement of n-p coherent scattering length included. Fitted cross sections now agree with this thermal measurement, and are perfectly consistent with earlier measurements of the polarized cross section and “zero-energy” scattering cross section (Houk, 1971, but *not* Dilg, 1975).
- n-p scattering cross sections are  $\leq 0.3\%$  lower than the pre-ENDF/B VII values.
  
- Question to Hale, Carlson, Lubitz et al...:
  - Should we use this new new result in standards result and in B-VII?
  - Should we use 332.0 instead of 332.6 mb at thermal? Hale, surprisingly, didn't push for 332.0!

## Beryllium: total cross section for reflection

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Trial 9Be file. MacFarlane has noted a Be-reflector bias for fast Be-reflected criticals using LLNL evaluation.

2004 work: MacFarlane made a patch with 4% lower elastic (and total) above 100 keV. Bob's new results show less bias on Be reflector thickness, for fast systems.

2005: Gerry Hale has a latest R-matrix calculation, that we have tried to use just for the total cross section. Good performance, not quite as good as Bob's trial. Should we use Gerry's result? ([See Kawano/MacFarlane figs and tables](#))

We're also studying angular distributions, to see how Gerry's new angular distributions impact the results.

# Beryllium: total cross section for reflection

