

# Status of MCNP B-VII.0 Library

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# Characteristics of Neutron Library (ENDF70)

- 392 isotopes (all except for incomplete Be-7)
- 5 temperatures (293.6, 600, 900, 1200, and 2500 degrees K)
- Metastable ZAID =  $(1000*Z)+(400+A)$ 
  - e.g., 27058 / 27458
- Verification
  - NJOY error messages / consistency checks
  - 11 checking codes
  - Cross-section plotting
- NJOY99.248
  - Several NJOY updates over past year were driven by issues discovered during processing (thanks Skip and Bob!)
- 8.8 GB uncompressed

# Evaluation Issues Uncovered During Processing (1)

- H-1: gamma energy from radiative capture changed from 2.2233 to 2.2246 MeV
- Sc-45: MF13/MT3 thresholds with non-zero cross section; neutron angular distributions for several reactions in wrong frame
- Y-89: Negative cross sections for MT91 from 1.7 to 4.5 MeV
- Zr-96 and Mo-97: Values for r in Kalbach distribution outside allowed range (9.99999 instead of 0.99999)
- U-233: error in exponent for delayed neutron nu $\bar{\nu}$  above 9 MeV

# Evaluation Issues Uncovered During Processing (2)

- Am-242G: no neutron angular distribution for MT18
- Am-242M: zero cross sections for inelastic between 50 and 65 keV
- O-16: values for MT801 that suddenly jump from  $10^{-3}$  to  $10^{-10}$  barns (and back and forth....)
- Energy-balance issues for several evaluations
- Unresolved resonance issues for several evaluations (e.g., Ta-181)
- Note MacFarlane/Cullen concerns re: secondary energy distributions from fission – inadequate EPRIME grid at high secondary energies

# Status of MCNP Libraries

- Final QA, testing, and documentation in process
  - Note interesting results from Mosteller comparing NNDC, T16, and “official” MCNP libraries for relatively small criticality suite:
    - $> \frac{1}{2}$  of comparisons differ by  $> 1\sigma$
- Distribution (with MCNP5 1.50) to RSICC
  - FY08 Q1
- Will definitely include:
  - Neutrons
  - Protons
- May include:
  - $S(\alpha, \beta)$
  - Photonuclear
- Will not include:
  - Photoatomic
  - Other Charged Particles (D, T, He-3 incident)