Proposal for Data Adjustment Method Evaluation

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WPEC Subgroup 33

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Goals

- **Assess if in a multigroup nuclear data adjustment we end up with the same (similar) set of isotope cross sections when a common shared set of integral experiments is used and different data adjustment methodologies are used.**

- **Assess the impact of using different starting cross section libraries and/or different covariance matrices.**

- **Assess if the attained reduced uncertainties on a target design for a set of integral parameters of interest is consistent among the different solutions.**

Premises

- **Each participant will use his own nuclear data library (e. g. ENDF/B-VII, JEFF 3.2, JENDL 3.3, BROND-3, etc.)**

- **Hopefully, a common multigroup structure can be agreed and adopted for performing the data adjustment. Initial proposition: 33 groups of AFCI (GNEP, ERANOS).**

- **Each participant will use his own covariance matrix. If not available, a common set of covariances can be adopted or provided (to be discussed).**

- **Proposed list of isotopes to be adjusted: B10?, O16, Na23, Fe56, Cr52, Ni58, U235, U238, Pu239, Pu240, Pu241?,..**

Premises (cont.)

- **Proposed list of reactions to be adjusted: fission, nubar, capture, elastic (group integrated, not matrix), inelastic (group integrated, not matrix)**

- **Proposed list of experiments (openly available):**
  - **GODIVA: critical mass, spectral indices (F8/F5, F9/F5)**
  - **JEZEBEL: critical mass. spectral indices (F8/F5, F9/F5)**
  - **ZPR6 6A: critical mass**
  - **ZPR6 7: critical mass, critical mass high Pu240 content, spectral indices at center (TBD), sodium void (one configuration), control rods (one configuration)**
    - **?**

- **Proposed target design where uncertainty have to be reduced: ABR (oxide fuel) or ?**

- **Proposed list of integral parameters which uncertainty has to be calculated: K_{eff}, power peak, sodium void, Doppler, control rod reactivity, ?**

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Comparison of Results

- At the end of the exercise each participant will provide a set of multigroup adjusted infinite dilution (because we are dealing with fast reactors, self-shielding effects are considered second order) cross sections and possibly the new associated covariance matrix.

- The old and new covariance matrix should be used for computing the initial and reduced uncertainty on the target design for the integral parameters of interest

- A volunteer participant, using these cross sections, sensitivity coefficients, and the provided covariance matrix can assess differences and their impact on the experimental integral parameters.

- If, hopefully, consensus is reached, feedback could be provided to the different evaluator teams (ENDF, JEFF, JENDL, BROND) on which isotope, reaction, and energy range needs to be improved.

Methodology:

JAEA/Takeda
Obninsk/ Manturov
CEA: Standard and "parameters"/CdSJ
ANL
INL: Standard and "consistent"
NRG: Total MC
China

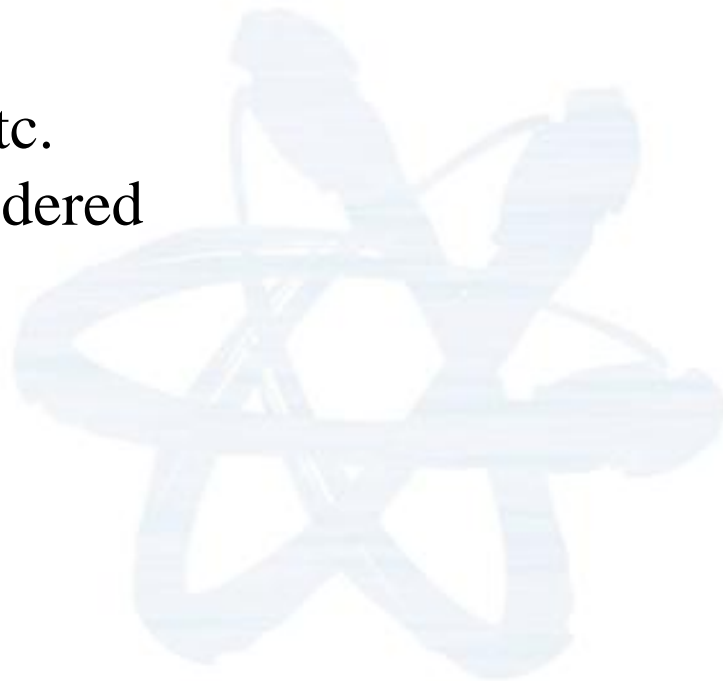Critical Summary to be made by: G.Palmiotti, M.Ishikawa (?), C. de Saint-Jean

•Papers on each methodology to be provided by 15 January 2010
•Summary by June 2010

Test Adjustment Exercise:

Provide comments by August 30, 2009 on

- Integral exp
- Group structure
- Reference system etc.
- Isotopes to be considered