

New Subgroup Preliminary Proposals for Activities

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- **What follows are proposals for participation, activities, and schedule. Please, make comments and further propositions.**
- **Participation, as specified in the mandate:**
 - The data projects will identify appropriate participants from their community. There is the need of an enlarged participation (i.e. with a wider participation of evaluators, nuclear data experimentalists, reactor core designers)

Proposal

- **Working method**

- Review issues and summarize findings on methodologies used to provide feedback to evaluated data files (e.g. reactor physics experiment accuracies, adjustment methodologies etc.).
- Select and define test cases for application. Test cases should be selected among existing or ongoing international projects for large scale adjustments. The type of data that should be made available (in principle adjustment results, sensitivity coefficients, integral experiment information) will be defined on a case by case basis.
- Based on obtained results, recommend a general methodology and practices for providing feedback to evaluators both on nuclear data and on associated covariance data, based on specific examples.
- Actual feedback will be provided to evaluation projects (e.g. CIELO initiative) on the specific examples indicated in the previous point.

Activities

- **Starting activities proposed:**
 - Define measures to assess the reliability and robustness of an adjustment
 - Establish requisites to assure the quantitative validity of the covariance data
 - Identify criteria to alert for inconsistency between differential and integral data
 - Define consistent approaches to use both adjusted data and a-posteriori covariance data to improve quantitatively nuclear data files (complement CIELO effort)
 - ?

Criteria

- **Criteria before (a priori) adjustment:**

- **AM** (by INL):

$$AM = U^{ND} + U^{C/E} - |Q|$$

- χ (by JAEA, ORNL)

$$\chi = \frac{|Q|}{\sqrt{U^{ND^2} + U^{C/E^2}}}$$

- **I** (by JAEA)

$$I = \frac{U^{ND}}{U^{C/E}}$$

- Contribution by experiment to χ^2 before adjustment (by INL)
- Also **EM** (Experiment Merit), and **TAM** (Theoretical Adjustment Margin) defined in SG33 deliverable
- ?

Criteria (cont.)

- **Criteria after (a posteriori) adjustment:**
 - D_I (Cook's distance by CEA):

$$D_I = (\sigma_p^I - \sigma_p)^T (M_{\sigma'})^{-1} (\sigma_p^I - \sigma_p)$$

- χ^2 filtering (by ORNL):

$$\Delta\chi_i^2 = [\mathbf{d}^T \mathbf{C}_{dd}^{-1} \mathbf{d}] - [\mathbf{d}_{\neq i}^T (\mathbf{C}_{dd}^{\neq i})^{-1} \mathbf{d}_{\neq i}]$$

- Contribution by experiment to χ^2 after adjustment (by INL), or diagonal χ^2 (by ORNL)
- Quantities on target systems and experiments (by INL): **UR** (Uncertainty Reduction factor) and **AR** (Assimilated Representativity factor):

$$UR = \frac{\Delta R_0}{\Delta R'_0} \quad r_{RE}^A = \sqrt{1 - \frac{1}{UR^2}}$$

- ?

Nuclear Data Improvements

- **Subjects:**

- Define criteria and methodology. One has to be absolutely sure that all possible players (isotopes, reactions, energy range) have been taken into account
- Possible isotopes of interest (according to CIELO priorities): ^{235}U , ^{238}U , ^{239}Pu , ^{56}Fe , ^{16}O ?
- Energy range: Fast (Epithermal?, Thermal?)
- Available large adjustments: JAEA, US, CEA?, ?
 Comparison of a) major lessons learned; b) domain of validity; c) impact of choice of experiments; d) impact of choice of covariance data; e) how designer requirements are met; f) feedback to basic nuclear data files; g) convergence of files from adjustments
- Need of targeted adjustments (e. g. ^{56}Fe , ^{238}U inelastic, etc.)?
- Nuclear parameters adjustments instead of multigroup (already partially done at: BNL/INL, CEA, NRG, ORNL)
- ?

Schedule

- Kick off meeting next November during JEFF week.
- Two meetings a year (WPEC and JEFF weeks). This has worked very well for SG26 and SG33.
- **Time-Schedule and Deliverables**

It is anticipated that the experts of this SG could complete and document the indicated activities within 3 years:

- May-June 2013: Review and approval of subgroup proposal by WPEC and NSC
- May-June 2013: Initiate subgroup activities
- Fall 2013: Actual kick-off workshop/meeting
- November, 2014: Draft report of subgroup activities on methodologies and preliminary results of test cases analysis
- November, 2015: Preliminary feedback to evaluation projects
- June 2016: Final report