

WPEC sub-group 33

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Title

"Methods and issues for the combined use of integral experiments and covariance data"

Justification for a Subgroup

As a result of the work performed in the WPEC Subgroup 26 on "Nuclear Data Needs for Advanced Reactor Systems" many target accuracies for different reactions, isotopes, and energy ranges have been defined in order to satisfy design requirement uncertainty for many integral neutronic parameters. Many of these target accuracies are very tight and not likely to be achieved with current experimental measurement techniques. It has been suggested that a combined use of integral experiments and differential information (e.g., measurements, evaluation, uncertainty data) would make possible to provide designers with improved nuclear data that would be able to meet design target accuracies. Since there is no general consensus on "a best method," as different approaches and practices are currently in use for performing data adjustments (or assimilation), WPEC can offer the frame for an international activity aiming to a better understanding of the different approaches.

Subgroup Monitor

R.D. McKnight, ANL (ENDF)

Subgroup Coordinator

M. Salvatores, ANL&INL

Subgroup Participants (Proposal, to be revised, updated etc)

G. Palmiotti, INL (ENDF); Won Sik Yang, ANL (ENDF); P. Oblozinsky, BNL (ENDF); R. Little, LANL (ENDF); M. Dunn, ORNL (ENDF); M. Ishikawa, JAEA (JENDL); K. Shibata, JAEA (JENDL); R. Jacqmin, CEA (JEFF); C. De Saint Jean, CEA (JEFF); I. Kodeli, NEA Data Bank

(Note: Above names are placeholders. The data projects will identify appropriate participants from their community)

Definition of the project and proposed activities

It is proposed as a mandate for this new WPEC subgroup to study methods and issues of the combined use of integral experiments and covariance data, with the objective of recommending a set of best and consistent practices in order to improve evaluated nuclear data files. Indication should be provided on how to best exploit existing integral experiments, define new ones if needed, provide trends and feedback to nuclear data evaluators and measurers. Participation of evaluators (to account for feedback to the files) and a close link to related activities like those coordinated by the WPNCS expert group on Uncertainty Analysis for Criticality Safety Assessment (UACSA) should be clearly established.

Relevance to Evaluated Data Files

Resource to advance the quality of Evaluated Data Files to meet accuracy requirements of Advance Reactor Systems

Working method

1. *Review current methods and practices, including feedback from past work.
Consider innovative approaches, as well as the methods used in non-nuclear fields when applicable.
Pre-select candidate methods for testing. Summarize findings.*
2. *Define test cases and input data to be used in the evaluation of the pre-selected methods.
For the purpose of assessing the relative merits of different approaches, the participants should agree to define*
 - a) *the set input parameters to be adjusted, along with a priori uncertainties and correlations,*
 - b) *a set of relevant (possibly simplified) integral experiments, with their associated uncertainties and correlations, and*
 - c) *the type of performance parameters, where uncertainties have to be reduced.*

The integral experiments will be calculated, along with the necessary sensitivity coefficients, according to the type of parameters to be adjusted.

The tests should allow to compare the robustness of the methods e.g. for extrapolation, etc.
3. *On the basis of the test results and analysis, recommend a general methodology for data assimilation and for assessing the needs for additional experiments.*

Time-Schedule and Deliverables

It is anticipated that the experts of this SG could complete and document the activities (mandate) listed above within about 2 years.

<u>Date</u>	<u>Deliverables</u>
• <i>January, 2009</i>	<i>Review of subgroup proposal by NSC bureau; Initiate subgroup activities.</i>
• <i>June, 2011</i>	<i>Present draft report of subgroup activities; WPEC consideration of potential implementation of subgroup recommendations.</i>