WPEC subgroup 37
Progress at first meeting in May 2013

By Robert Mills, NNL.

Background

There are new developments in the theory and measurement of fission product yields that are expected to result in new evaluated files in the next 5 years. These files are expected to include considerably more accurate yields including neutron energy dependence combined with new covariance information that will for the first time allow realistic error estimates of many engineering parameters to be determined within the calculation code rather than only being justified by comparison with limited benchmark experiments.

Scope

WPEC subgroup 37 will work on improving fission product yield evaluation methods to include both the existing and new measurement types and consider adoption of new models of fission product production replacing the current models such as the five-Gaussian and Wahl Zp models.

In addition, the new evaluation methodologies should allow the definition and evaluation of the covariance terms to improve estimations of errors in applied calculations.

Scope

The subgroup goal is to develop improved methodologies for future evaluations that are consistent with the new theoretical knowledge and experimental measurements, and include common covariance methods that will allow calculations with both improved accuracy and the generation of uncertainties on calculated engineering parameters.

To gain maximum benefit for modellers the participants need to exchange and discuss their ideas and plans so that common data formats for the improved yields and new covariance data can be developed.

Task 1

Document and compare the current methodologies used to produce the ENDF, JEFF, JENDL, ROSFOND, …

- To get the ball rolling I propose to write up a summary of the JEFF-3.1.1 evaluation based on existing reports (JEF Report 20) to describe JEFF procedure (not models or data).

- Need volunteers to write up similar summary

- Propose review of the methods, high-lighting strengths (models, data, methods, …)

In proposal, expected to take 6 months (Dec 2013)?

Task 1

Presentations

R. Mills

JEFF fission product yield evaluation methodologies

T. KAWANO

Recent FPY evaluation for ENDF

K-H Schmidt

A new theoretical approach to low-energy fission based on general laws of quantum and statistical mechanics

Task 2

Through insights amongst the subgroup participants, together with new measurements being made, the participants will strive to better understand and reconcile existing fission product yield discrepancies.

Tasks will include:

- Analyze the implications of new measurements techniques which offer a qualitative and potentially a quantitative leap forward, for updating the current evaluated files.

Task 2

- Examine the existing and planned fission product yield measurements and consider how to improve the current evaluation methodologies to gain maximum benefit from these new sources of data.

- Examine the use of the new theoretical methods to model yield distributions compared to available models and the measurements.

- Recommend areas to further investigate.

- Need volunteers

Need to include text in final report for May 2015?

Task 2

Presentations

V. Vallet   Requirements for fission products yields in decay heat studies

Nengchuan SHU Study of mass distribution for n+233U fission with semi-empirical model

H. Penttila   Fission yields measurements at IGISOL-4

V. Simutkin   Fission yield activities at Uppsala University

K-H Schmidt   New experiments on low-energy fission – Methods and results

T. KAWANO   Planned and progressing US experiments

Recommend revised fission product data formats including covariance data.

- Need common (?) concepts of what we need and how these can be generated/stored.

- Need to write up in form suitable for ENDF/SG38

- Volunteers?

Proposed by May 2014?

Task 3

Presentations
David Brown
Discussion of a potential framework for fission yields within SG38/GND format

M. Pigni
Application of Decay Data and Fission Product Yield covariance matrices in uncertainty quantification on burned fuel calculations

K-H Schmidt
A new evaluation method based on covariances from the GEF model

Working together website and email group

Website:

- http://www.oecd-nea.org/science/wpec/sg37/

(documents to be password protected)

Email list:

- wpec-sg37@oecd-nea.org

Next meeting

- May 2014?

Need to maintain effort/progress

6 monthly progress checkups? November 2013??