Status of the JEF project

Contribution to the 4th meeting of the IEC
JAERI, Japan, 28th and 29th May 1992

Following the JEF Working Group meetings in December 1991, it was found that the relatively frequent updates of the JEF-2 files had caused confusion in the user community on what version of the files had been used in the benchmark calculations. In order to confidently compare results of calculations performed with JEF-2 data, it was agreed to re-distribute the complete JEF-2.2 library in January 1992 with the following administrative modifications to the files: The version (NVER) and modification (NMOD) flags in the beginning of each evaluated file would be set to 22 and 0 (zero) respectively, indicating version 2.2 rev. 0 of the JEF library. This version of the file will form the basis for the benchmark testing of the general purpose library.

Benchmark Testing of the JEF-2 General Purpose Library

The main efforts are at present devoted to the processing and benchmark testing of the JEF-2.2 data. Major problems, delaying the benchmark testing considerable, had been encountered in the processing of the new ENDF-6 format and it had been decided to set up an NJOY User Group (se below) to discuss these problems. Nevertheless, first preliminary results, giving feedback to evaluators, were presented at the JEF meetings in 1991. Apart from calculations of the simple critical experiments, such as JEZEBEL and GODIVA etc., performed at many sites, results were presented, at the last meeting, from the following laboratories:

- Saclay, France (validation of thermal systems and of Th-232 and U-233),
- Cadarache, France (ERASME experiment, Fission product validation, Thermal data, Integral experiment data base etc.),
- Karlsruhe, Germany (PWR burn-up calculations),
- Würenlingen, Switzerland (NEACRP LMFBR benchmark),
- Bologna, Italy (PCA-Replica shielding benchmark),
- Studsvik, Sweden (KRITZ experiments).

The results are generally satisfactory. For the fast reactor range the performance of JEF-2.2 is comparable to that of adjusted libraries presently in use. However, ^{238}U inelastic and the structural material data need more benchmarking to draw firm conclusions.

Minor actinide data from JEF-2.2 are being used at CEA, France and ECN, Holland, for transmutation studies. Uncertainty analysis is presently envisaged.

New Evaluations

^{99}Tc and ^{129}I are being revised at ECN, Holland (a paper has been presented at the adjacent NEANSC Specialists' Meeting on Fission Product Nuclear Data, 25th-27th May 1992, JAERI, Japan). In the framework of the JEF-2.2 benchmarking, CEA Cadarache, France,

has produced covariance matrices for a large number of isotopes on a 15 group energy scheme.

Status of the JEF-2 Special Purpose Libraries

The JEF-2.2 thermal scattering law data have been evaluated and compiled by IKE Stuttgart, both in $S(\alpha,\beta)$ and point-wise form. Data for UO2 and Be have recently been added to the library. The JEF-2.2 thermal library also contains cold moderator data for Hydrogen and Deuterium, e.g. both $S(\alpha,\beta)$ and point-wise data for orto- and para-phases of these elements.

The evaluation of the JEF-2 Fission Yield data for 39 different fissioning systems was completed in January 1991.

The JEF-2.2 Radioactive Decay Data have been updated and distributed for testing in February 1992. The file contains more than 2300 isotopes. The full documentation, including a computer code for PCs, developed at Birmingham, UK, containing the JEF-2.2 gamma and alpha radiation data, will be distributed later in 1992.

NJOY User Group

A first meeting of the JEF sponsored NJOY User Group had been held at the NEA Data Bank on 20th September 1991. 16 participants had discussed experience in the use of the code and exchanged information on errors detected in the file. It had been agreed that all JEF related feedback on the code should be channelled through the coordinator, E. Sartori, NEA Data Bank.

Following a thorough discussion on ways to administrate the use of and suggested updates to the NJOY processing code, it was decided to adopt a set of general procedures, of which could be mentioned:

- The User Group should discuss with the author, R. MacFarlane, in order to try to coordinate with him the release of new official versions of the code.
- The User Group should exchange information on a three to four month cycle, either in meetings or by electronic mail (Newsletter).

An NJOY seminar, with the participation of R. MacFarlane was held at the NEA Data Bank on 7th and 8th April 1992. The 9th April 1992 was devoted to an NJOY User Group meeting together with the author of the code. The first two days were mainly devoted to the formal presentation of the latest development to the program and to user feedback and extensions to the code. The last day was dedicated to identifying the "physics" modifications to the code that had been included after the version 89.62, which is the official version for the processing of JEF-2.. It was concluded that these updates do not affect nuclides processed correctly with NJOY-89.62, but only those for which problems had been identified. The User Group recommends that the next frozen version of the code (NJOY-91.38) be adopted for future processing.

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