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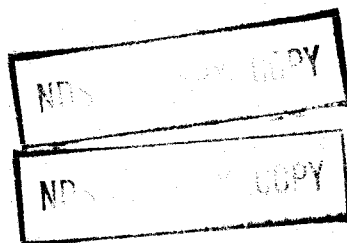
REPORT ON THE NEUTRON NUCLEAR DATA ACTIVITIES

IN THE NETHERLANDS IN THE PERIOD 1985/1986

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NUCLEAR DATA EVALUATION ACTIVITIES IN THE NETHERLANDS 1985/1986

(Contribution to the INDC-meeting, October 1987, Beijing)

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1. Fission-product nuclear data

The nuclear-data activities in 1986/1987 were directed towards the forthcoming second version of the Joint Evaluated File (JEF-2). Some new evaluations have been made for Ru-101 [1], I-129 [2] and Ru-102 (to be reported). In addition an effort was made - in cooperation with the NEA Data Bank - to update the thermal cross-sections, resonance integrals and the cross-sections in the resolved-resonance range. This range was in many cases extended towards higher energies. The results will be included in JEF-2.

In the MeV range some work has been performed to improve the inelastic scattering cross-sections by studying the effect of direct components obtained from DWBA or coupled-channels calculations [3,4]. It appears that the inelastic scattering cross-sections at low incident energies are systematically underpredicted in the current evaluations due to the neglect of direct components. Corrections are needed in particular for the even-mass isotopes of Ru, Pd, Nd and Sm.

With respect to the lumped fission product cross-sections the radiative capture cross-section is relatively well-known. Therefore it is important to study other sources of errors in the calculated reactivity effect of fission products in fast power reactors at the end of cycle. Possible error sources are the neglect of direct effects in inelastic neutron scattering cross-sections (see above) and the leakage of gaseous products or the migration of volatile products out of the core of a fast reactor. The last-mentioned problems have been studied in cooperation with CEA-Cadarache [5]. Recently, attempts have been made to develop a simple model to describe these effects, using phenomenological parameters which have been fitted to experimental results obtained in the French PHENIX reactor.

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2. Activation file for fusion reactors

Under contract with JRC-Ispra the US activation and transmutation file REAC [1] has been updated. The new file is called REAC-ECN and contains all stable (non-fissile) nuclides and nuclides with a half-life greater than 1 day [2]. Recently, additional work has been performed to further update the data file by introducing new systematics of cross-sections [3] and isomer ratios [4]. The second version of the REAC-ECN file will contain better evaluations of cross-sections of activation reactions producing long-lived nuclides or isomers. This work is in good progress.

References

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3. European Fusion File (EFF)

The aim of this project is to achieve an evaluated nuclear data file for neutronics calculations for blanket and shielding engineering. The project is part of the European Fusion Technology Programme of the European Community, to which several laboratories contribute. The file management and maintenance is performed at ECN-Petten.

A first version of the file (EFF-1) has been distributed in March 1986 to European laboratories. Status reports are given in Refs. [1-3]. The main contribution of ECN-Petten consists of a revision of the lead double-differential cross-sections [3] in the new MF6 format of ENDF-VI.

The calculation of multi-group cross-sections and transfer matrices was organised. Several European groups have made contributions. The ECN-Petten contribution consists of processed lead data using a recently developed code that treats double-differential cross-sections in the above-mentioned new format [4]. This code and a preliminary version of the multi-group constants library GEFF-1 has been distributed to European laboratories.

Recently, the requirements for EFF-2 have been defined, see also Ref. [3]. At ECN-Petten some work on the re-evaluation of nuclear data for the Ni-isotopes was initiated. Furthermore, a first version of a separate activation file (EAF) has been made.

An essential part of the new evaluations is based upon calculations with nuclear-model codes. Some contributions to pre-equilibrium nuclear-model theory and codes are listed in Refs. [6-16].

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