Japanese Nuclear Data Committee

I. History and Aims

The Japanese Nuclear Data Committee was set up in February 1963 as an ad-hoc committee of the Atomic Energy Society of Japan, and in April 1964 the management of the Committee was succeeded by the Japan Atomic Energy Research Institute which has financial support mainly from the government.

The Committee is composed of 20 members and under the Committee there are several working groups. All participants are staffs of universities, companies and other institutions in the country and there is no person at present who works for the Committee on the full-time basis.

The concern of the Committee lies in the nuclear data pertinent to reactor physics and technology, and aims initially proposed are:

1) theoretical calculations on nuclear cross sections
2) survey and compilation of nuclear data
3) circulation of information within the country on nuclear data which are received by the Committee
4) exchange of information among foreign compilation centers of nuclear data.

II. Activities

What has been done by the Committee for these two years since 1963 is mainly preparation of code programs for calculations of cross sections. Subjects of these programs are shown below. (p.3)

The Committee has also done some sorts of compilations, the

subjects of which are shown at the end of this report. But, pursuit of the aims(2), (3) and (4), mentioned above, is difficult to be done unless the Committee has a working unit. The Committee is, therefore, endeavoring to obtain budgetary support for establishing a "data center," although the scope of the center envisaged is rather small.

As for the international cooperation in the field of nuclear data compilation, this Committee has been in close relationship with the International Atomic Energy Agency, particularly with its International Nuclear Data Scientific Working Group. Teruo Momota, who is now in charge of the chairmanship of the Committee attended the INDSWG meetings for three times since its first meeting as a nominated participant of the Japanese government. He, as a Reader personally requested, has also been making collaboration with the CINDA program, and several members of the Committee has been giving him good assistance.

With regard to affiliation with Saclay Neutron Data Compilation Centre, ENEA, the Committee has been endeavoring to obtain budgetary support from the government. This was unsuccessful for the fiscal year of 1965.

Many of the members of the Committee are deeply concerned with cross section libraries for reactor calculations. The Committee had some discussions on the problems of improving libraries and has decided to include this among its aims.

1. Preparation of computer programs

Since 1963, the Committee has organized working groups which are mainly occupied with computer program preparations for calculating fast-neutron reaction cross sections and scattering cross sections

of thermal neutrons in molecular and crystalline media. The programming system of these codes is FORTRAN II or IV. Followings are brief description of each program.

(1) For analysing fast-neutron reaction cross sections

(i) ELIESE-1 and ELIESE-2 These are used for calculating elastic and inelastic scattering cross sections in terms of optical model and of Hauser-Feshbach's method in compound nuclear process. Therefore the standpoint of ELIESE programs is similar to that of ABACUS-2 prepared by BNL. The ELIESE-2 is slightly different from ELIESE-1 by adding a sub-routine for automatic parameter search or by changing the output format, etc.

(ii) STEVE-1 This is a program for analysing scattering and reaction cross sections by means of statistical evaporation model. It is possible to calculate the 1- to 3-particle emission processes by this program.

(2) For calculations of thermal-neutron scattering cross sections

(i) A program based on free-gas model The scattering law $S(\alpha,\beta)$ can be calculated. This is quite convenient in comparing it with experimental data.

(ii) A program based on Nelkin model The program is useful for calculating the scattering cross section from light water. The $S(\alpha, \beta)$ can be calculated.

(iii) UNCLE This has been prepared by modifying the SUMMIT code made by General Atomics, U.S. with permission to the modification. It is used for calculating the inelastic scattering cross sections from crystalline media. The $S(\alpha, \beta)$ can be calculated.

(iv) A program based on Egelstaff-Schofield model The program was prepared before a similar code LEAP prepared in Harwell has become available. The $S(\alpha,\beta)$ can be calculated.

The programs mentioned above have been completed under a project of Japanese Government, and the Committee is now waiting for having their approval of distribution of these programs to foreign countries.

2. Compilation activities

It is one of the final goal of the Committee to establish a function of compilation activities. Scanning of journals and assembling and classifying of data have been studied by each working group in order to use for calculations with prepared computer programs. However, the most serious problem for the Committee is whether or not the compilation activity of the Committee has any significance beside those of centers at BNL and Saclay. In the present stage, it is felt that the activities of data center in Japan may be effective for domestic circulation of data and are necessary for liaison with foreign compilation groups.

The preliminary documents made by some members of the Committee working groups are described briefly as follows.

(1) Nuclear data measuring facilities in Japan (May 1965) and Nuclear data measuring activities in Japan (May 1965)

It is noted that a number of particle accelerators have been omitted though these can be used for research in the field of neutron physics, since the present research projects of these machines are not directly related to nuclear data measurements. If the neutron emitting reactions such as (p,n) or (r ,n) reactions were regarded as "Nuclear Data", more information should be added to

the present documents.

(2) Survey of nuclear data for heavy nuclides (heavier than Th-232) required and currently available (1963) This was prepared in an early stage as a first trial to make such kind of report in hope of this be of some use and help to researchers in the country. This is of preliminary nature in every respect.

(3) Survey of paper on neutron cross sections for $Z \geqslant 93$ This was performed in 1963. Abstracts of relevant papers which appeared in well-known journals or report series from 1958 to 1963 were made and edited. (JAERI-4032(1965)). The experimental method, energy range, values and accuracy are quoted for each paper.

(4) Collection of neutron resonance parameters (1964) Scanning of journals and report series has been exercised in making this report. The neutron cross sections and resonance parameters for nuclides of whole mass number region were collected from papers which appeared mainly in 1963 publications. This, however, is a kind of inter-laboratory memorandum which may be used until new BNL work become available to researchers in the country.

All above-mentioned reports except for No. (1) are written in Japanese, since these are quite tentative. It is not yet decided by the Committee whether activities making such reports as Nos. (3) and (4) should be continued and be completed in future.