

FOURTH BIENNIAL REPORT OF THE ACTIVITIES OF THE
EUROPEAN AMERICAN NUCLEAR DATA COMMITTEE

by

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1. INTRODUCTION

This report describes the activities of the EUROPEAN AMERICAN NUCLEAR DATA COMMITTEE over the period January 1966 to January 1968.

During the period the members of the Committee were:

- G.C. Hanna, AECL, Chalk River, Canada (Chairman)
- W.W. Havens, Jr., Columbia University USA (Executive Secretary)
- R. Batchelor, AWRE, Aldermaston, UK
- K. H. Beckurts, KFK, Karlsruhe, Germany
- E. Bretscher,^x AERE, Harwell, UK
- R. Joly, CEA, Saclay, France
- G.A. Kolstad, USAEC, Washington, USA
- T. Momota, JAERI, Tokai-mura, Japan
- M. Néve de Mévergnies, CEN, Mol, Belgium
- E. Rae,^{*} AERE, Harwell, UK
- H.B. Smets, ENEA, Paris, France
- A.B. Smith, Argonne, USA
- J. Spaepen, Euratom, Geel, Belgium
- H. Starfelt, Studsvik, Sweden
- J.S. Story, AEE, Winfrith, UK
- R.F. Taschek, LASL, USA
- P. Weinzierl, Seibersdorf, Austria (Corresponding Secretary)

* Dr. Rae replaced Dr. Bretscher after the ninth meeting.

Two meetings were held, the first at Ascot, UK from 18 - 20 April 1966, and the second at Istanbul, Turkey, from 20 - 24 February 1967.

2. NUCLEAR DATA

The amount of nuclear data available and the number of requests for new measurements both continue to grow. Investigating this somewhat paradoxical situation has been EANDC's central activity during the past two years.

It has been established, first, that the Request Lists are indeed closely scrutinized and that they do represent a careful statement of the data that are required in the various countries originating the requests. Second, considerable efforts by EANDC members over a period of about a year (between the ninth and tenth meetings), followed by Committee discussions, have resulted in a thorough review of the items on the Combined Request List. This review, EANDC-76 concludes that:

- (1) When reasonable allowance is made for delays in transmission of information and for non-acceptance of claimed accuracies, very few requests have already been satisfied.
- (2) In certain areas, especially elastic and inelastic scattering and threshold reactions, extensive effort using existing techniques will satisfy a large fraction of the requests.
- (3) There are many requests for measurements, e.g. on fissile nuclei in the resonance neutron region, where existing techniques should be almost adequate but where seriously discrepant results for resonance parameters are being obtained.
- (4) Substantial improvements in technique are necessary to satisfy the accuracies requested for measurements of capture cross-sections, especially of fissile nuclei, in all neutron energy ranges.
- (5) A number of requests for measurements of very high accuracy require either a real breakthrough in technique or an immense effort (or both). These requests are now being re-examined by their originators.

Regarding new techniques, it is expected that the development of the nuclear-explosion method, combined when appropriate with a short flight path, will be of great value

particularly for measurements on short-lived nuclei.

Some progress has been made in establishing "international task forces" to overview specialized areas and to make important specific measurements. The inelastic scattering group has been set up and is co-ordinating encouraging measurement activities, and a group on capture cross-sections has been organized.

Although much effort involving large facilities and elaborate equipment is called for, the EANDC has recognized that small laboratories can make a valuable contribution to the nuclear cross-section measurement programme, and has recommended that the information given in the compilation of requests be increased to aid scientists in small laboratories to select a measurement they can make. The role of small laboratories was discussed in Istanbul, in connection with the Tenth Meeting, at a meeting attended by several Turkish physicists.

3. STANDARDS

The Standards Subcommittee of EANDC under Dr. Spaepen's chairmanship has continued to be very active; it now holds a one-day meeting immediately preceding each EANDC meeting and then makes a report to the main Committee.

In the low energy region the main problems are still fission cross-sections, especially that of ^{239}Pu which is being tackled at CBNM, Geel, and \bar{U} for ^{252}Cf . In spite of further \bar{U} measurements during the last two years the low result from the Harwell boron-pile measurement has neither been explained away nor superseded by a more accurate measurement; EANDC is trying to stimulate further work, especially in the U.S.

At higher energies, the $^{10}\text{B}(n,\alpha)$ cross-section is still the best standard cross-section up to 100 keV but more work is required, and is proceeding on ^{10}B , ^6Li , and ^1H . The subcommittee has devoted much attention to the problems encountered above ~ 1 keV neutron energy and has concluded that it is desirable to make many measurements by different methods to avoid possible systematic errors. It has

emphasized the need for fission cross-section measurements, the value of photoneutron sources for accurate determination at a few spot energies, and the use of "calibrating response" neutron detectors.

Compilation of standard cross-sections have been made at CBNM (for ^{10}B) and LASL (see EANDC(US)96), and work has been started in Japan on the evaluation of the total cross-sections of carbon.

The subcommittee report on isotopic standards and reference substances (EANDC(B) 68"A") has been circulated, and an announcement regarding the standard boron available from CBNM and NBS has been sent to a number of scientific journals. A questionnaire on the possible need for a stock of enriched ^{10}B and ^6Li standards has been circulated.

4. SAMPLES

EANDC considers requests by measurers for samples of special materials not readily available in their own countries but usually available from the USAEC. EANDC evaluates these requests, both at its meetings and between meetings by correspondence, and agrees on whether or not to endorse them. The USAEC has provided a document EANDC(US) 101"A" which specifies the procedures to be adopted and the conditions necessary for the loan of samples.

EANDC has set up a standing subcommittee (J. Spaepen, Chairman) on isotope separation, and a report on the Future Needs and Availability of Separated Isotopes (EANDC 73"A") has been circulated.

The USAEC has devoted considerable effort towards the provision of large samples of very high purity ^{240}Pu and ^{241}Pu and work is continuing on ^{241}Pu and measurements have been made at CBNM, Harwell and CEN Saclay.

5. COMPILATION AND EVALUATION

There are four major Nuclear Data Centres whose job it is to compile neutron cross-section data and to make them available to users. These four centres are: The National Neutron Cross-Section Centre at Brookhaven, the ENEA Neutron Data Compilation Centre at Saclay, the IAEA

Nuclear Data Unit at Vienna, and the Nuclear Information Centre at Obninsk. The EANDC, which recommended the setting up of the Saclay Centre, is concerned primarily with the relations between the Brookhaven and Saclay Centres. Data are being encoded on an increasing scale at both centres and are being regularly exchanged on a routine basis. Nevertheless, substantial technical difficulties remain; for example there is no agreement yet on the successor to the present SCISRS storage and retrieval system, which was designed for in-house use at Brookhaven and which has not yet been fully implemented on the much smaller computer of the Saclay centre.

The EANDC-EACRP Joint Subcommittee on Evaluation was set up in 1966 as a successor to the EANDC Evaluation Study Group. This sub-committee met three times during the period under review, twice during 1966 in Paris with J.S. Story as chairman. The subcommittee has examined the whole field of evaluation activities and made a number of recommendations; it has reported on evaluations in progress, has listed the evaluations most urgently needed and made some progress in formulating the requirements that will have to be satisfied by nuclear data storage and retrieval systems. These formal activities of the subcommittee have probably not yet had any great influence on work already in progress amongst the various evaluation groups. However, the period under review has seen a remarkable increase in exchanges of evaluated data, and an important role has been played by the sub-committee in providing a meeting place for representatives of the principal evaluation groups and of the BNL and ENEA compilation centres.

6. RELATIONS WITH OTHER ORGANISATIONS

EANDC and EACRP send observers to each others' meetings for all agenda items; other observers may be invited to EANDC meetings for all agenda items; other observers may be invited to EANDC meetings for specific topics, and observers from IAEA have attended for most of the agenda items at all recent EANDC meetings. There is some overlap in the activities of EANDC and the IAEA's International

Nuclear Data Committee (INDC), and about half the EANDC members attend INDC meetings. Since the IAEA established the INDC as a continuous existence in 1969, the EANDC believes that it would be wise to see how the INDC develops before considering the handing over of activities that are presently duplicated, and therefore foresees no immediate change in EANDC operation. The EANDC, and its individual members, continue to provide the INDC with scientific documents and other forms of assistance with a view to helping INDC to further increase its usefulness.

7. CONFERENCES

In 1966 the EANDC recommended that a symposium on very high intensity neutron sources be held during 1966, and urged the participation of the EACRP in developing the arrangements and programme. This seminar, sponsored by the USAEC, ENEA and the Los Alamos Scientific Laboratory, and organised by EANDC and EACRP, was held at Santa Fé, USA, 19 - 23 September 1966. The proceedings are published as USAEC document CONF-660925. Following the seminar several officers of the seminar and members of the EANDC and EACRP met in order to prepare a report EANDC-63"U" on the conclusions that could be drawn regarding the use and future needs of intense neutron sources.

The EANDC is not proposing any further conferences at the present time. There is some feeling in the Committee that there are too many conferences already, but also that EANDC could usefully sponsor small conferences on very specialized topics in the nuclear data field.

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[The following text is extremely faint and largely illegible. It appears to be a list of reports or a table of contents, with several columns of text. Some words are difficult to discern but may include names of individuals or organizations, such as "M. J. ...", "R. ...", "J. ...", "S. ...", "D. ...", "G. ...", "H. ...", "I. ...", "K. ...", "L. ...", "M. ...", "N. ...", "O. ...", "P. ...", "Q. ...", "R. ...", "S. ...", "T. ...", "U. ...", "V. ...", "W. ...", "X. ...", "Y. ...", "Z. ...".]