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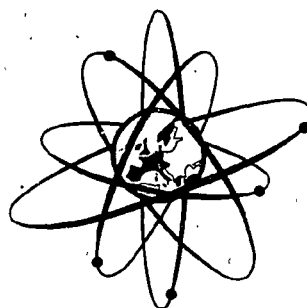


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SECOND BIENNIAL REPORT OF THE ACTIVITIES OF THE EUROPEAN AMERICAN NUCLEAR DATA COMMITTEE

J. SPAEPEN and R. BATCHELOR

March 1964



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EUROPEAN NUCLEAR ENERGY AGENCY

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

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

by

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March 1964

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

This report briefly describes the activities of the EUROPEAN AMERICAN NUCLEAR DATA COMMITTEE over the period January 1962 to January 1964.

Three regular meetings were held during this period, the first at Casaccia and Ispra, Italy, from 5th to 10th April 1962, the second at Chalk River, Canada from 4th to 8th February 1963 and the third at Athens, Greece from 11th to 15th November 1963. A symposium on neutron flux measurements in the 1-100 keV region was held under EANDC auspices from 10th to 13th September 1963 at Oxford, England.

The Tripartite Nuclear Cross-Sections Committee was finally dissolved during 1963 and all its activities have now been handed over to the EANDC.

The following important facts pertaining to the principal fields of EANDC activity may be highlighted.

1. Nuclear Data

As in the previous period EANDC has devoted much time and effort to the problem of meeting requests for nuclear data measurements and the status of work in progress to satisfy these requests. Special attention has been paid to the philosophy underlying the requests and to ensuring that the accuracies required are substantiated. Reactor physicists and other requestors, stimulated by local data committees, have produced several valuable documents in this respect.

The priority definitions, according to which requests are grouped, have been revised. Lists of requests, covering the whole EANDC-area, have been issued for the three existing categories of priority.

Details of the measurement programmes are regularly described in regional progress reports. During the period under review this information was increased considerably in bulk, particularly from the Euratom and OR areas. Experiments are in progress to meet most of the requests for nuclear data measurements

with priority I. The number of facilities for measuring data, particularly those pertaining to the resonance and fast region, is increasing. The compilation of existing facilities (doc. EANDC 11), is being kept up to date and discussion of new and modified equipment has been made a standing agenda item for each committee meeting.

EANDC has recognised that difficult problems have to be faced to satisfy the requests for data on fissile isotopes in the resonance region. During this two year period the Committee has discussed many of these problems and has urged that special consideration be given to these data. It is particularly concerned about the state of capture cross-section and α -data, which presently fall far short of the requested accuracies.

EANDC has also discussed other specialised topics and as a result has made the following statements.

- (a) There is now considerable confidence in the 2200 m/sec parameters of U^{235} and effort should now be concentrated on Pu^{239} .
- (b) The $\sigma(E)$ values for U^{235} are now adequate for reactor needs. For other uranium isotopes and for Pu^{239} the data now available are almost sufficient but more effort is required on Pu^{240} and Pu^{241} .
- (c) Probably enough data now exist to satisfy the requests for U^{238} (n,n) and U^{238} (n,n') up to 4 MeV incident energy.

2. Data Compilation

EANDC has been well aware of the fact that work in the data compilation and processing area especially as far as evaluation is concerned, is poorly coordinated and considerably less systematic than that in the measurement field. The Committee also clearly realised the necessity to improve the situation quickly if the full value is to be obtained from the experimental work.

EANDC therefore asked two study groups one for the North-American continent and one for Europe each composed of experts in the compilation field, to make recommendations on compilation services required and how these services could most

efficiently be provided. The groups exchanged information and arrived at the main conclusion, which was supported by EANDC, that two centres should be set up for the compilation of experimental data, one in USA and one in Europe. The centres should be closely linked, with frequent and complete sharing of the information received. Procedure for recording and reporting data should be common.

It was also recommended that a group participating actively and significantly in the preparation of "digested" data and operating as a public service, be established in the United States.

These recommendations were passed for consideration to ENEA, which then convened a group of experts to make a specific proposal concerning the European Compilation Centre. This proposal was agreed in November 1963 and the ENEA Neutron Data Compilation Centre has now been established at CEN, Saclay, France.

EANDC has also promoted compilation activity in specialised fields of interest to nuclear energy e.g. neutron induced threshold reactions.

3. Nuclear Standards

EANDC has been kept informed of the activities of Euratom's Central Bureau for Nuclear Measurements, Geel, Belgium, in the field of isotopic standards.

After this laboratory had thoroughly investigated the existing stocks of standard boron, laboratories in the EANDC-area have been advised to draw reference boron only from the stocks at CBNM, Geel, or NBS, Washington, both stocks being identical in composition. Depleted uranium and plutonium isotopic standards in the range of interest for burn-up studies are under preparation. The help of other laboratories for intercomparison of samples was ascertained through EANDC. A programme, in collaboration with Savannah River and Chalk River, to improve the situation for standardising heavy water has been started. Other laboratories expressed interest in the programme and will probably join it.

4. Targets and samples used in the conduct of research and measurement

(a) Production of Special Isotopes

EANDC has been informed on the stocks of separated isotopes held in the USA and the UK and the methods of procurement of these isotopes. It has also been told of the irradiation and separation programme for the production of larger quantities of the plutonium isotopes presently in progress in the USA. It is anticipated that this stock will satisfy the most urgent needs for data measurements within the EANDC area. However, EANDC advised that further irradiations be made in order to meet continuing demands. It has now been informed that a further 3 kg of plutonium is being irradiated in the USA and that Canada has under consideration the irradiation of 2 kg.

At each meeting EANDC considers the sample requests of the various organisations from the technical point of view and makes appropriate recommendations for supply.

(b) Target and Sample Preparation

Because the supply of separated plutonium isotopes is limited, EANDC has formed a sub-committee to make recommendations on the fabrication of these samples for experimental use. Special attention is being paid to standardisation of sample dimensions in order to make them interchangeable between laboratories.

Resulting from EANDC action, experts on target and foil preparation from ORNL (USA), AERE (UK) and CBNM (Euratom) met for technical discussions at Geel. It became apparent that the laboratories operated in a complementary fashion; ORNL provides a routine service and did not assay whereas CBNM avoids routine production and concentrates on the manufacture and accurate assay of special foils. AERE operates between these two extremes. Arrangements have been made to keep the three groups in further contact.

5. Symposia

During the period under review a round-the-table discussion was sponsored by EANDC on the subject of neutron flux measurements in the 1-100 keV region. This meeting, organised by

AWRE, Aldermaston, was held in Oxford, 10th - 13th September, 1963 and proved very successful in formulating recommendations for measurements of standard cross-sections suitable for flux measurements. A watch-dog sub-committee has been formed to encourage action on these recommendations.

Two other conferences have been suggested by EANDC and their organisation has been started: one on "The Automatic Acquisition and Handling of Nuclear Data" (Karlsruhe, July 13th - 17th, 1964) and one on "The Study of Nuclear Structure with Neutrons" (Mol, July 12th - 16th, 1965).

6. Miscellaneous actions

(a) The original EANDC proposal to study the possibilities of doing beam source experiments resulted in the publication of six articles in a special issue called "Tailored neutron beams" of Reactor Science and Technology, Journal of Nuclear Energy, Parts A and B, July 1963.

(b) The needs, within the EANDC area, for beryllium single crystals have been canvassed and negotiations are in progress for the production of such crystals in Europe.

(c) EANDC has fostered the exchange of personnel which has led to a fruitful stay of several scientists in laboratories, outside their own country.

7. Relations with other organisations

(a) EANDC is kept informed on the activities of EACRP by its ENEA member. Some documents are exchanged and the others are available on request. Furthermore, in the future EANDC and EACRP will nominate an observer from their members to attend the other committee meeting.

(b) EANDC discussed the suggestions of IAEA in the field of nuclear data compilation and advised against a proposal for indexing put forward by a special IAEA panel. IAEA has also been kept informed of the EANDC recommendations about the steps to be taken in the compilation field. An IAEA observer has been admitted to limited parts of an EANDC-meeting.

EANDC also took note of the efforts of IAEA to establish a world wide data committee and the majority of its members participated in preliminary discussions of a working

group, set up in Vienna to try to establish such a committee. Such a worldwide committee would open up exchanges of nuclear information on an organised basis between the countries of the West and the East, and also including India, Japan and possibly others.

8. General Comments

It can now be stated that EANDC is running smoothly and is geared well to its overall task of promoting collaboration and exchange in the field of basic nuclear data. Due to its efforts experimental teams now have a clearer picture of the reactor programme requirements for data and it is apparent that a determined effort is being made to meet these obligations.

EANDC is also facing up to the growing problem of ensuring that data are compiled and evaluated in a coordinated way. If the expense and effort of measuring data are not to be wasted it will need to follow this aspect with vigour and enthusiasm. A good start has been made, however.

During this period many formal documents have been exchanged between the participating groups, partly with secretarial help from ENEA. These documents have proved to be very valuable to organisations active and interested in the data field. This willingness on the part of organisations and individual scientists to provide information to the Committee and to act on its suggestions is believed to be the main reason for the successful operation during the past two years.

APPENDIX I

Members of the European-American Nuclear Data Committee
from January, 1962 to December, 1963

- J. Spaepen (Chairman)
Bureau Central de Mesures Nucléaires, Euratom, Geel, Belgium
- R. Batchelor (Executive Secretary)
Atomic Weapons Research Establishment, Aldermaston, U.K.
- H. Goldstein (Corresponding Secretary)
Columbia University, U.S.A.
- K.H. Beckurts
Karlsruhe, Germany
- E. Bretscher
Atomic Energy Research Establishment, Harwell, U.K.
- ¹G.C. Hanna
Atomic Energy of Canada Limited, Canada
- W. Havens
Columbia University, U.S.A.
- R. Joly
Centre d'Etudes Nucléaires, Saclay, France
- O. Kofoed-Hansen
Risø, Denmark
- G.A. Kolstad
U.S. Atomic Energy Commission, U.S.A.
- M. Nève de Mévergnies
Mol, Belgium
- ²H.B. Smets
ENEA, Paris, France
- J.S. Story
Atomic Energy Establishment, Winfrith, U.K.
- R.F. Taschek
Los Alamos Scientific Laboratory, U.S.A.
- ³P. Weinzierl
Seibersdorf, Austria

1. Replaced C.H. Westcott, A.E.C.L., Canada - 1963
2. Replaced R.P. Perret, ENEA, Paris, France - 1963
3. Replaced R. Meier, E.I.R., Würenlingen, Switzerland - 1962