NEANDC-101 "U"

SEVENTH BIENNIAL REPORT ON THE ACTIVITIES OF THE EUROPEAN-AMERICAN NUCLEAR DATA COMMITTEE

J S Story and H Conde

March 1975

NUCLEAR ENERGY AGENCY NUCLEAR DATA COMMITTEE
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NUCLEAR ENERGY AGENCY
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Note: On 24th April 1974, the OECD's Steering Committee for Nuclear Energy approved a new name proposed for the EANDC : Nuclear Energy Agency Nuclear Data Committee (NEANDC), and for the EACRP : Nuclear Energy Agency Committee on Reactor Physics (NEACRP).

SEVENTH BIENNIAL REPORT ON THE ACTIVITIES OF THE EANDC

By J S Story & H Conde

1 INTRODUCTION

This report summarises the activities of the European-American Nuclear Data Committee over the period of just over 2 years from November 1971 to the conclusion of the 17th meeting in March 1974.

Two meetings were held during this period, the 16th meeting in Paris from 27 November to 1 December 1972, and the 17th meeting in Tokyo from 24 to 29 March 1974. The rather long interval between the two meetings came about as a result of a decision to shift the INDC meetings to the autumn and the EANDC meetings to the spring (the INDC is the International Nuclear Data Committee of the International Atomic Energy Agency).

2 MEMBERSHIP

During this period the members of the Committee were:-

J S Story	AEE Winfrith, UK (Chairman)
H Conde	FOA, Stockholm, Sweden (Scientific Secretary)
A H W Aten	BCMN, Geel, C.E.C. (until mid-1973)
R Batchelor	BCMN, Geel, C.E.C. (from Jan 1974)
V Benzi*	CNEN, Bologna, Italy
K H Böckhoff**	BCMN, Geel, C.E.C.
S Cierjacks	KFK, Karlsruhe, Germany
R E Chrien	BNL, Brookhaven, USA
W G Cross	AECL, Chalk River, Canada
W W Havens	Columbia U., New York, USA (up to mid 1973)
T Hürlimann	EIR, Würenlingen, Switzerland
H Jackson	ANL, Argonne, USA (from Jan 1974)
R Joly*	CEA, Saclay, France
G A Kolstad	AEC, Washington, USA (up to mid 1973)
H Motz	LASL, Los Alamos, USA (from Jan 1974)
P Ribon**	CEA, Saclay, France
G L Rogosa	AEC, Washington, USA (from Jan 1974)
J A G Rosen	NEA, Paris, France
J L Rowlands*	AEE, Winfrith, UK
A B Smith	ANL, Argonne, USA (up to mid 1973)
M G Sowerby	AERE, Harwell, UK
K Tsukada	JAERI, Tokai-mura, Japan

It is evident that there have been many important changes in the membership of the Committee for the last two meetings.

At the 16th meeting Cierjacks replaced Fröhner, both from Karlsruhe; Benzi from Bologna replaced Neve de Mevergnies from Mol; and Royen was the new Secretary replacing Potter, both from the NEA. For the 17th meeting Batchelor replaced Aten, both from Geel; Rogosa replaced Kolstad, from the USAEC; Motz from Los Alamos replaced Havens of Columbia University; and Jackson replaced Smith, both from Argonne.

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* Unable to attend the 17th meeting of the Committee

** Ad hoc members at the 17th meeting: Böckhoff attended in place of Batchelor, and Ribon in place of Joly.

Partly in consequence of opening a nuclear physics laboratory at Bruyères-le-Châtel with a large part of its programme devoted to neutron data measurements, the French have expressed a need for another member on the Committee.

In assent, the Committee proposed that - apart from the changes discussed in Section 3 below - the membership of the EURATOM group should be increased by one.

3 NAME AND TERMS OF REFERENCE OF THE COMMITTEE

Because of the accession of Japan the original, and now well-known name of European-American Nuclear Data Committee no longer reflects the geographical distribution of membership. The Committee agreed that the name should in future become the Nuclear Energy Agency Nuclear Data Committee (NEANDC). A similar change has been made in the name of the European-American Committee on Reactor Physics (now NEACRP).

Because of the accession of Denmark and the UK to EURATOM some minor changes in the existing terms of reference of the Committee are proposed, in the specification of membership, and in the rotation of the Chair. The rather large turnover of Committee members during the period under review has also suggested that a rather less rigid formulation may be desirable for rotation of the chairmanship, to ensure adequate continuity of policies.

4 FUTURE OF THE COMMITTEE

A summary of the past history of the Committee and questions as to its future role are very clearly presented in the Sixth Biennial Report (EANDC-91U) by Havens and Cross.

To summarise the matter very briefly, the EANDC has been mainly concerned with neutron cross section data for fission reactors; production of such data is now at the flood; storage and dissemination of these data are well-organised; compilation of evaluated data files is steadily improving. The INDC has taken over an appreciable part of the work initiated within the EANDC, though its discussions are perhaps less open and intimate; the IAEA appears to have greater resources for convention of Panels, and for large scale meetings. There cannot be very much left, it is suggested, for the NEANDC to do in this particular field of endeavour - it must diversify or perish.

During the 16th meeting of the Committee in November 1972, the American members described a restructuring of the US Nuclear Data Committee with the establishment of 14 subcommittees; some of these have the function of reviewing in depth particular areas of nuclear data measurement (standards, gamma-ray production, fission, and so on), while other subcommittees are concerned with identification of data requirements for specified newer fields of application (fusion reactors, bio-medical applications, safeguards research, industrial and environmental applications).

In a note on "The Future Scope, Structure and Outlook of the EANDC" presented to the Committee at this same meeting Kolstad argues, to put it briefly, that hitherto the EANDC had confined its attentions to:

(1) The nuclear data required for near term design and development of fission reactor systems, primarily for fast breeder reactors.

He urged that the Committee broaden its outlook in response to:

(2) The long term nuclear data requirements of a major fission nuclear power industry (particularly for data pertinent to economics - safety - the environment).

(3) Data requirements for fusion reactor design and development. (The very high cost of even a zero power fusion system would enhance the importance and value of accurate and reliable basic data)

(4) Data required for bio-medical applications (including the diagnostic and therapeutic use of stable and active isotopes - in-vivo power generation - deep particle therapy using fast neutrons and mesons).

(5) Need for renewed emphasis on the physical content of nuclear data.

It was perhaps unfortunate that Kolstad's memorandum was not available for consideration by Committee members prior to their meeting, but it still repays reflection and we reproduce it in full as appendix 1. Kolstad's arguments are no doubt at once exaggerated and over-simplified, and it would be easy to rebut them item by item. Instead we should be grateful to Kolstad for his timely warning of the need for early survey of a wider scene.

There was indeed some positive response to Kolstad's representations, both during the November 1972 meeting and subsequently. The general conclusion of the Committee was that the necessary first step would be for members to report these proposals to their own local data committees.

In response the UKNDC, for example, has been reformed with a subcommittee structure along the lines of the USNDC to explore more thoroughly local nuclear data requirements for fusion and bio-medical applications. Some considerable time will elapse before these subcommittees are able to present definitive conclusions. The UKNDC was of opinion that changes in the structure and activities of the EANDC should not be rushed but should evolve from new needs identified by the local data committees.

There had been a considerable change in the US membership of the EANDC when discussion of the future of the Committee was resumed during the 17th meeting in March 1974. During this meeting the wider question was emphasised, already present in Kolstad's memorandum, whether indeed there is any residual role for the EANDC that could not now be just as well discharged by the INDC. As was recorded by Havens & Cross in the "6th Biennial Report on the Activities of the EANDC" (EANDC-91U, Nov 1972) there has grown up a considerable overlap in activities of the two committees.

The Committee decided to undertake a review of its goals and continuing usefulness for submission to the NEA Steering Committee in about 2 years time: this would require preparatory work during the next (18th) meeting. In addition there should be exploration of ways to reduce the overlap of functions with the INDC, for example by a separation of interests, or by longer time intervals between meetings. It was agreed also that, if a continuing role is found for the Committee, periodical reviews should be undertaken, as for EACRP, on about a 4 year time span.

So the 16th and 17th meetings have seen oscillation between proposals for wide-ranging expansion of EANDC activities and for its abrupt termination. Since then there have been profound politico-economic changes in the world about us, and sharp re-emphasis of the vital importance of fission power. Some limitations of the EANDC's usefulness have been recorded above; we may perhaps be allowed the reflection that, over the years, the EANDC has established itself as a close knit and effective international committee, and it has a good working agreement with the sister EACRP. One should think very carefully before destroying this instrument; destruction is easy.

The EANDC hitherto has led the way, mapping out the route followed by the INDC. Indeed members of the Regional Subcommittee felt they obtained vital support and feedback from the EANDC, but not very much from the INDC. On the technical side one can foresee a period of about 2 years before all the measurements, now planned or in progress in the OECD area, for the main reference standards and the main fissile isotopes, have been completed and properly evaluated. Until this has been done almost none* of the main data requirements for fast fission reactors will have been satisfied, even within the limited accuracy presently attainable. To assure the successful conclusion of these activities appears as the minimal future role of the Committee.

5 SPECIAL SAMPLES

From its foundation the Committee has shown the most lively interest in availability of special samples for neutron nuclear data measurements - particularly enriched samples of stable isotopes, and of highly enriched and very highly enriched fissile and fertile materials. These samples are very expensive and the great majority are of American origin. But for the availability of many such samples, on loan or at favourable rentals, many of the neutron nuclear data measurements carried out in the other countries of the OECD area could never have been attempted. The EANDC has played a role in examining requests for sample loans, and advising the USAEC of the relevance of the proposed measurements to nuclear data required for nuclear power developments - as listed in RENDA (REquest List for Neutron DAta Measurements).

When the possible demise of the EANDC was suggested much concern was felt as to the future availability of loan samples from the USAEC Research Pool. Rogosa made a thoughtful re-statement to the Committee of the responsibilities and powers of the USAEC regarding enriched isotopes, making it clear that for other countries the EANDC is not the only channel for loan sample requests. AEC policy in relation to use of loan samples for fundamental research was in process of review.

After this the Committee reviewed and revised its mechanism for handling enriched sample requests. The earlier classification of loan requests was abolished, whether or not the proposed measurements relate to data requirements listed in WRENDA.** Instead of referring a sample request to all members of the Committee, the Chairman would select 2 or more members to act as referees as to the competence of the experimenter and the soundness of the experiment. If the reviews were favourable he would pass the request and the reviews to the USAEC. The question of loan fees and the waiver of loan fees remains the responsibility of the USAEC officials.

The Oak Ridge isotope enrichment programme is kept under review by the USNDC, but any additional information by the EANDC on future needs would be welcomed.

A sample loan scheme has also been initiated by Harwell, which keeps a record of samples in the Harwell isotope stock, and also of samples available on loan at other European laboratories. Loans are arranged bilaterally.

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* With $\bar{\nu}$ (E) as the likely exception.

** World REquest List for Neutron DAta Measurements.

6 NUCLEAR DATA NEEDS

As was reported by Havens & Cross in the last Biennial Report, responsibility for the production and distribution of the RENDA request list for nuclear data measurements has now been transferred entirely to the IAEA. This document had already become too lengthy to give the Committee a clear view of the main short term and longer term data requirements. To surmount this problem it is proposed that Members ask their local data committees to advise the EANDC of any special discrepancies and data requirements. These were first reviewed by the "Standards and Discrepancies Subcommittee" for the 17th meeting in March 1974, and for interest we reproduce their first draft discrepancy list as Appendix 2. There is very great emphasis on the production of improved and reliable neutron reaction data for U235, U238 and Pu239, and not only for fast reactors; the thermal region data, previously thought to be adequate, are beginning to attract some doubts. It would be quite wrong of course to suppose these were the only nuclear data requirements for fission reactors.

Nuclear data requirements for safeguards techniques have been identified by the USNDC and by the Japanese Nuclear Data Committee. A number of requests pertinent to fusion reactor development have been identified by a subcommittee of the USNDC, but in other countries the requirements are still under review. Much the same may be said at this time of nuclear data requirements for bio-medical applications.

Following a recommendation of the EACRP it was agreed that fission-product yield data should be of concern to the EANDC, and it was recommended that requests for fission-product yield measurements should be included in local request lists and in WRENDA. In this context it may be mentioned that a computer file of experimental fission yield data has been established by E A C Crouch at Harwell (AERE-R6642 (1970) and -R7207 (1972)). At the request of the EANDC this library and its interrogation programme have been copied to the CCDN at Saclay (OECD/NEA Neutron Data Compilation Centre).

Request lists have contained, for some time past, a number of requests for improved data for activation detector cross sections, many of them asking for quite high accuracy. The Committee has asked the EACRP to comment on the validity of these requests and on the accuracy required.

7 PROGRESS WITH NUCLEAR DATA MEASUREMENTS

As the years have passed the EANDC members have come to appreciate more-and-more that, when accurate and reliable data are required, measurements must be undertaken by several different laboratories and with as much exchange of ideas and of results as is practicable.

Throughout the period covered by this biennial report there has continued a very strong interest in neutron cross section standards and flux measurements, a field of work much stimulated by the symposium held at ANL in October 1970 (as was emphasised by Havens & Cross in the preceding biennial report), and later reviewed by a Panel convened by the IAEA in Vienna in November 1972. Since the early years of the EANDC very striking improvements have been effected in the accuracy and reliability of the neutron standards of prime concern for fission reactors, but it seems clear that 2 or 3 years of further work lie ahead before the residual discrepancies have been resolved, together with those of some of the other principal items listed in appendix 2.

There has been, and continues, a great outpouring of new data on neutron resonance cross sections. One may point on the one hand to growing realisation of the importance of capture cross section measurements with separated isotopes for a full knowledge of the complex structure of s-, p- and d-wave resonances in the "structural" materials such as iron. On the other hand, considering the number and power of the neutron sources now in use, one must wonder if adequate attention has yet been paid to the problems of data analysis.

Evidence has been noted of a significant reduction, outside the USA, in measurements on elastic and inelastic scattering in the fast neutron region, though there is increasing sophistication in theoretical analyses of the data. It is not clear at present whether the reduced experimental activity corresponds to reduced demand from the nuclear reactor technologists, - this question may need closer investigation when the more thoroughly revised 1975 edition of WRENDA comes available -, however the Committee concluded that a fair amount of work is in progress to meet the important requests for improved inelastic scattering data for U238 and the main structural materials.

8 DATA EVALUATION

From small beginnings the scale and scope of nuclear data evaluation has now become a widely recognised activity. Consequently the EANDC-EACRP Joint Sub-committee on Evaluation was now felt to have served its turn and was finally abolished, the two parent Committees agreeing that its place should be taken by a series of Specialists' meetings to enable evaluators and experimenters to explore specific data problems in depth. Considering the well-established structure of the American Cross Section Evaluation Working Group (CSEWG) it was felt these meetings should be held mainly in Europe to encourage collaboration between European evaluators.

Three such meetings were held during the period of this review:

(i) At Harwell in January 1972, on the evaluation of U235, U238 and ^{P}u239 cross sections, reported in EANDC-90L.

(ii) At Bologna in June 1972, on evaluation formats and format conversions, reported in EACRP-L-81 (Ed. G C Panini).

(iii) At Karlsruhe in May 1973, on the capture cross sections of structural materials (Fe, Cr and Ni). Much new material was presented at this meeting, which is reported in NEANDC-98U (also NEACRP-U-61).

A fourth specialist meeting, on the resonance parameters of fertile nuclei and 239Pu, was held at Saclay in May 1974, and of course falls outside the period of this review; however it seems clear that the principle and usefulness of these specialist meetings is now well-established.

It has been the custom for many years past to associate an informal "topical discussion" of about $\frac{1}{2}$ day's duration as an appendage to the Committee meetings, and it seems appropriate to classify both the "topical discussions" held during the period under review amongst the group of specialist evaluation meetings.

First was the topical conference, on " $\bar{\nu}$, the average number of emitted neutrons in fission", held at Saclay on 29 November 1972 on the occasion of the 16th meeting of the EANDC. Ten papers were presented at this conference, and are collected in EANDC(E)-154U.

On the special occasion of the 17th EANDC meeting, the Committee's first meeting in Japan, a more extended topical discussion was organised, jointly by JAERI and the Japanese Nuclear Data Committee, on the "Critique of nuclear models and their validity". This seminar lasted for a whole day during which 18 papers were presented: the proceedings have been published as NEANDC(J)-38L.

9 RELATIONS OF THE EANDC WITH OTHER ORGANISATIONS

The exchange of observers attending the full meetings was continued during this period. T Hürlimann was the EANDC Observer at the 15th meeting of the EACRP at Zürich in July 1972, and A B Smith at the 16th EACRP meeting at ANL in June 1974. In the opposite direction M Bustraan came as EACRP Observer to the 16th EANDC meeting in Paris in November 1972, and J Hirota at the 17th meeting in Tokyo in March 1974. As IAEA Observer, J J Schmidt, head of the Nuclear Data Section, attended the 16th EANDC meeting for most agenda items, but was unable to come to the 17th meeting in Tokyo because of the expense since the INDC was to convene in Australia later in the year.

In addition to these exchanges, useful as they are, the EANDC members are now receiving the complete "Summary Records" of EACRP meetings, while the Committee is also very well informed of the IAEA activities both through document distributions and by the considerable overlap in membership of the EANDC and INDC.

Prof. Alissy and Dr Huynh of the BIPM (Bureau International des Poids et Mesures) attended one session of the 16th EANDC meeting to inform the Committee of the international intercomparisons of fast neutron fluxes which have been initiated by the BIPM in close co-operation with the National Bureau of Standards.

Another activity which may be mentioned here is the proposal for the OECD/NEA Computer Program Library to collect and implement a number of the more important codes for nuclear model calculations and data analysis. As a first step V Benzi has assembled a general list of such programmes, from information provided by EANDC members; the latest edition was distributed as NEANDC-97U (Jan 1974).

APPENDIX I

United States

ATOMIC ENERGY COMMISSION

Washington DC 20545

EANDC Members

FUTURE, SCOPE, STRUCTURE AND OUTLOOK OF THE EANDC

For more than a decade the EANDC[a] has, in principle, been "concerned primarily with the measurement of nuclear cross sections and other basic data of general relevance to nuclear energy programs" within the OECD community[b]. In fact, the Committee has largely confined its attention to data required for the conceptual design and test of fission reactor systems (primarily fast breeders, FBR). Within this narrow scope, the accomplishments of the Committee have been outstanding due largely to unique technical associations and common interests[c]. The Committee orientation has been proper as near term projections of energy needs throughout the OECD community indicate a major reliance on FBR power sources[d]. The conceptual development of fission systems is now largely passed and they are in advanced engineering development and large scale demonstration. As a consequence, immediate data needs are reduced and/or more specifically engineering oriented and the Committee should give attention to broadening its scope in accord with a full and proper interpretation of the Terms of Reference[b].

The Committee should be responsive to the long term needs of a major fission-based power industry (as contrasted to near-term goals of systems development) with particular attention to data pertinent to economics, safety and the environment. The long term economic importance of precise data to this major industry will be enormous and the socio-political impact of such matters as safety cannot be over estimated. Some of these long range data needs are demanding of physical understanding and support of requisite and more basic studies is conservatively within the general research overhead of what must become a major industry.

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a/ Herein EANDC denotes the European American Nuclear Data Committee; referred to in the text as the Committee

b/ Terms of Reference: Scope

The Committee shall be concerned primarily with the measurements of nuclear cross sections and other basic nuclear data of general relevance to nuclear energy programs, other peaceful applications of nuclear science and the pre-commercial development of laboratory instruments and techniques related thereto. The responsibilities of the Committee shall include the following:

c/ See Physics Today, 20 No. 5 (1967)

d/ See for example: Outlook for Energy in the United States to 1985, Chase Manhattan Bank (1972).

The exact fusion (CTR) mechanism is in doubt but the goal of self-sustaining system is being approached and must be achieved. The practical device will require an enormous technical development with the massive use of nuclear data in a region that is now nearly a void. This future need has not been recognised by the committee or even by some of its parent agencies. The macroscopic engineering approach to CTR neutronics is not an encouraging course as the CTR-ZPR assembly is a far more costly and less viable tool than its fission counterpart. The CTR data base is so limited as to make contemporary, critical and conceptual decisions of dubious merit. Throughout the OECD community there is a growing need for CTR data and its provision is a responsibility of the Committee.

Medical applications of nuclear science are rapidly expanding including: diagnostic and therapeutic use of stable and active isotopes, in vivo power generation, and deep particle therapy using fast neutrons and mesons[e/]. Technology and instrumentation developed in a physical context are finding widespread medical applications, even including large particle accelerators. In a number of aspects of medical practice, the requisite nuclear data is grossly deficient and this deficiency is the more critical as the margin for error is often small. Health care is a major, social and economic issue throughout the OECD community, and indeed the world, and nuclear medicine is an important part thereof. The Committee should take leadership in the provision of the requisite data.

From an initial physical basis, nuclear data has taken an increasingly explicit engineering orientation. A consequence is a default of physical understanding and this is now restrictive as such is required for meeting many long-term data needs (eg fission products and processes, higher energy phenomena, statistics of level densities, etc). Technology and facilities provided for data acquisition are not properly related to basic studies and the professional association between pure and applied research is weakened. Even the compilation of information is fragmented between pure and applied needs. There is a need for a renewed emphasis on the physical content of nuclear data and the Committee is a suitable mechanism for stimulating physical understanding of nuclear data.

The above broadened scope indicates a restructuring of the present Committee within the constraints of continuity of function and fiscal resources. Membership should be broadened from the present narrow fission-reactor base to include technical competence, interests and responsibilities associated with a full scope of nuclear data needs. Individuals with requisite breadth and competence will be difficult to find and the transition in membership should not unduly enlarge the Committee nor destroy the present effective working relationships. Organisational artifices such as subcommittee structures are not attractive due to the geographic distribution of personnel. Thus, the requirements of widened scope are probably best achieved by restructuring the Committee membership into "executive" and "technical" groupings. The former group, of limited size, can provide the overall continuity and guidance; the latter, composed of non-tenured members, can furnish the detailed technical base for in-depth consideration of specific data areas. The appointment of "technical" members need not be on a

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e/ See for example, L. Rosen, Nuclear News 56 Sept. (1972)

continuing basis but rather for specific technical contribution at a specific meeting or for an ad hoc problem. Technical discussions should be in-depth, preferably in the form of a several-day symposium associated with the Committee meeting and selected to take maximum advantage of the regional technical interests and resources. Symposium proceedings should be of such a quality as to provide technical guidance in selected data areas for a number of years f/. These technical in-depth reviews are not feasible on an annual basis but are practical in a biennial cycle that could be correlated with the terms of the Committee executive officers. In the "off" years, Committee attendance and function could be restricted to "executive" members and planning sessions.

The above restructuring is viable with the good technical and personal rapport established within the EANDC (it is not nearly as practicable in a more fragmented and political climate, eg, the INDC). Success will require strong and enthusiastic support of the sponsoring agencies and of the local data committees. At least one of the latter (USNDC) has taken steps to widen its scope along the lines suggested above.

A continued Committee pre-occupation with fission-reactor data (primarily FBR) will likely lead to its demise. If so, the termination should be planned and executed in a timely manner with transfer of such functions as possible to the INDC. This action would be a default of the formally stated Committee Scope and unresponsive to widening and expanding data needs within the OECD community. The alternative is a proper and broad interpretation of the Scope and restructuring such as suggested above. The transition is not trivial and has not been proven successful in other international contexts. If it can succeed the future outlook of the Committee is good.

George A. Kolstad
for US Members to the EANDC

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f/ The EANDC Symposium on Neutron Standards and Flux Normalisation is an illustrative example.

APPENDIX II

Draft Discrepancy List prepared by the Subcommittee on Standards and Discrepancies

At the suggestion of the Chairman of the EANDC the subcommittee attempted to define a list of Discrepancies and/or needs that could be considered in more detail by the full committee. Two lists were submitted for consideration, a draft discrepancy list from the USA and a list of important data requirements from the UK, (EANDC(UK)155A). From these the subcommittee drew up the following list of important data which require further measurement, the list is not presented in order of importance.

(a) σ_{nF} 235U, from 100 eV to 16 MeV

(b) $\sigma_{n\gamma}$ 238U, from 1 keV to 1 MeV

(c) Resolved and unresolved resonance parameters for 238U

(d) Inelastic scattering of 238U, particularly the excitation of the 45 keV state and above the fission barrier

(e) 238U fission cross section including its average value in a fission neutron spectrum

(f) Shape of 235U fission neutron spectrum

(g) $\bar{\nu}$ for 252Cf

(h) Thermal data for 235U and other fissionable materials

(i) Energy dependence of η (E) and/or the absorption cross section for 235U below 1 eV

(j) 239Pu fission cross section, particularly from 15 to 100 keV

(k) 233U fission cross section, from 100 keV to 10 MeV

(l) Delayed neutron yield for 238U, for incident neutrons of 2 to 3 MeV

(m) $\sigma_{n,t\alpha}$ 6Li, from 100 keV to 3 MeV

(n) $\sigma_{n,\alpha}$ and $\sigma_{n,\alpha\gamma}$ 10B, from 100 keV to 1 MeV

(o) Capture cross section data for structural materials, from 1 keV to 1 MeV

(p) $\sigma_{n,p}$ for 58Ni, from 2 to 4 MeV

(q) $\Gamma\gamma$ for the 2.85keV Na resonance

(r) Half-lives for 239Pu and 241Pu

(s) $\bar{\nu}$ (E) particularly for 235U and possibly 239Pu, from the keV region to 15 MeV.

General Comments

The Subcommittee makes the following comments.

Many discrepancies occur because people disseminate data which are not complete. There are advantages and disadvantages in letting people know the present position but the Subcommittee feels that for 'accurate' standards the procedure should be discouraged.

For some sets of data there are a number of versions at the data Centres and this can lead to confusion. The problem is one of communication and we recommend that steps be taken to improve the situation.

There is a tendency for people to assume that the most recent measurements, which are often insufficiently documented, are correct. This is an extreme assumption which is often incorrect and we urge people, particularly evaluators, to be more cautious.

The report of the 1972 Panel meeting of the IAEA on Standards is not yet available. This is a great pity as it inhibits the discussion and evaluation of these data.

M G SOWERBY
Subcommittee Chairman

May, 1974

APPENDIX III

LIST OF EANDC DOCUMENTS ISSUED SINCE THE FIFTEENTH EANDC MEETING (October 1971)

EANDC-

Committee Papers

88A — Summary record of the 6th meeting of the EACRP/EANDC Joint Sub-Committee on Evaluation, in Vienna on 29 August, 1971; J S Story (EACRP-176A, Sept. 1971)

89A — Summary record of the fifteenth meeting of the Committee, in Lisbon, 11 - 15 October 1971; W G Cross

89U — Summary record (Technical) of the fifteenth meeting of the Committee; W G Cross

90L — Report on the Evaluation Working Group meeting held on 26 - 28 January 1972 at AERE Harwell UK, to discuss the evaluation of U235, U238 and Pu239 cross sections; B H Patrick and M G Sowerby (Sept. 1972)

91U — Sixth biennial report on the activities of the EANDC; W W Havens Jr. & W G Cross (Nov. 1972)

91A — Summary record of the sixteenth meeting of the EANDC, in Paris, 27 Nov - 1 Dec 1972; H Condé

92U — Summary record (Technical) of the sixteenth meeting of the EANDC, in Paris, 27 Nov - 1 Dec 1972; H Condé

93U — Distribution list for EANDC documents; July 1973

Revision 1 - Sept. 1973
Revision 2 - Oct. 1973
Revision 3 - Nov. 1973
Revision 4 - Feb. 1974

Canadian Documents

(CAN)46L — Canadian progress report to the EANDC; Sept 1971 to Nov 1972; compiled by W G Cross, (Nov 1972)

(CAN)47L — Canadian report to the EANDC, Dec 1972 to Mar 1974; compiled by W G Cross, (Mar 1974)

Euratom Documents

(E)143L — An evaluation for cross sections of the reaction of $D(d,n)^3He$; H Liskien & A Paulsen, (1971)

(E)144L — An evaluation for cross sections of the reaction $T(d,n)^4He$; A Paulsen & H Liskien, (1972)

APPENDIX III (contd)

(E)145AL Der totale Wirkungsquerschnitt von ^{54}Fe im keV-Energie Bereich; H Beer, R R Spencer, F H Fröhner & M Cho, (KFK-1516, April 1972).

(E)146AL The total neutron cross sections of ^{50}Cr, ^{52}Cr, ^{62}Ni and ^{64}Ni in the energy region 10 - 300 keV; R R Spencer, H Beer & F H Fröhner; (KFK-1517, Nov 1972).

(E)147AL The total neutron cross section of Boron 10 between 90 and 420 keV; R R Spencer, H Beer and F H Fröhner (KFK-1518, Apr 1973).

(E)148U Etude de la section efficace ^{6}Li $(n,\alpha)T$ dans la gamme d'énergie comprise entre 20 keV et 1700 keV; E Fort & J P Marquette, (Jan 1972).

(E)149 Diffusion élastique des neutrons sur ^{40}Ca entre 1.2 MeV et 2.83 MeV; D Abramson, A Arnaud, J C Bluet, G Filippi, C Lavelaine and C Le Rigoleur, (Feb 1971).

(E)150U Progress report on nuclear data research in the Euratom Community for the period 1 January to 31 December 1971 (May 1972) & supplement (Oct 1972).

(E)151U Evaluation of neutron data for ^{235}U above the resolved resonance region for KEDAK; B Schatz, (KFK-1629 , June 1973).

(E)152L An evaluation for cross sections of the reaction $T(p,n)^{3}He$; H Liskien & A Paulsen (1972).

(E)153L Differential cross sections for the reactions $^{3}He(n,p)T$ and ^{3}He $(n,d)D$; A Paulsen and H Liskien, (1972).

(E)154U $\bar{\nu}$ the average number of emitted neutrons in fission (contributions to the EANDC topical conference held on 29 November 1972 at Saclay, France on the occasion of the 16th meeting of the EANDC); edited by P Ribon, (March 1973).

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