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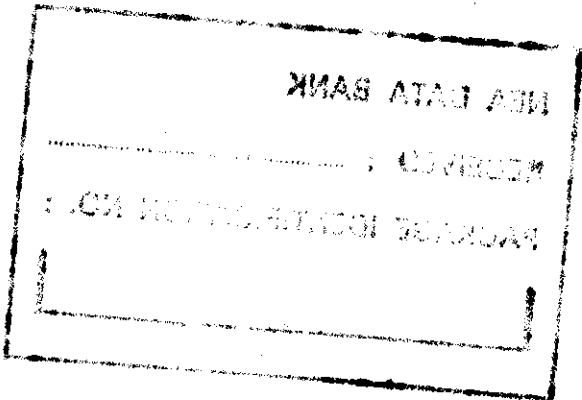
EIGHTH BI-MEETING REPORT ON THE ACTIVITIES  
OF THE NEA-NDC

S.W. Cierjacks, M.G. Sowerby

June 1978

NEA DATA BANK
RECEIVED : 1978
PACKAGE IDENTIFICATION NO. :
78/3

NUCLEAR ENERGY AGENCY NUCLEAR DATA COMMITTEE



## I. INTRODUCTORY REMARKS

This activity report covers the three-year period of the past chairmanship from January 1975 to December 1977. That period was the first of a future "bi-meeting" term of three years (replacing the former "biannual" term due to the enlarged meeting interval from one to one-and-a-half year) and the first of a continuous existence of NEA-NDC under its new name. Although suggesting formally a new counting of future "bi-meeting" reports we deliberately continued here with the previous numeration in order to demonstrate actual continuity of the pertinent work with that of the former European-American Nuclear Data Committee (EANDC). During the above period the 18th and 19th meeting of the Committee were held at Harwell (7-11 March 1975) and at Stockholm (20-24 September 1976).

In this report it is intended to concentrate on general aspects of the restructuring of NEA-NDC and on milestone achievements reached during the past three years. A complete description of activities, accomplishments and events during the bi-meeting period can be found in the corresponding Summary Records (NEANDC-103 "A" and NEANDC 108 "A") and the numerous Committee documents published between 1975 and 1977. In this sense, the report will contain some personal views on the present importance and usefulness of the NEA-NDC and on future expectations for its work.

## II. BRIEF DESCRIPTION OF THE RESTRUCTURING OF THE COMMITTEE

Initiated by a memorandum of a then U.S. member in 1973 (see NEANDC-101 "U", App. 1) and continued by several contributions from various sides, an extensive discussion on the scope, the structure and the future of the Committee had come to a decisive point at the beginning of the bi-meeting period covered in this report. The two crucial problems in relation with a long-term continuation of the Committee's work appeared to be (1) a decreasing demand of nuclear data needs in the previously solely covered field of conceptual fission reactor design and test studies, and (2) an increasing overlap of this work with other international committees, especially with INDC.

With respect to the first problem it was argued that a continuous preoccupation of the Committee with fission reactor data (almost all for fast breeder reactors) would likely lead to its short-term demise. This judgment resulted from the view that the conceptual development of fission systems had largely passed because they seemed to be in an advanced engineering development stage and in large-scale demonstration. Although only partly true from the present point of view, which must take into account the whole fuel cycle, that argument was largely valid before 1975 when the major consideration was given to questions of core design.

In connection with the second problem, major criticism came from the fact that there appeared to be no clear borderlines between the responsibilities of NEA-NDC and INDC. The most obvious overlap of work appeared at that time to be in the regions of policy questions and in the duplication of some technical activities, for instance the establishment of two independent information bases in the area of "Standards" and "Cross-Section Discrepancies".

For this reason the NEA-NDC agreed already at its 17th Meeting in Tokyo to undertake a complete review of its activities and an entirely new assessment of its role. Such an inspection was aiming to examine whether sufficient benefits would continue to accrue from its work in the future; thus justifying the further existence of the Committee. In addition, it was intended to investigate its particular role in comparison to other international bodies.

Under these premises and on the basis of extensive preparatory work of the Committee before and during the 18th Meeting, the plenum adopted at Harwell

a role of predominantly technical character for the NEA-NDC. Questions of broad policies in the international exchange of nuclear information were transferred to INDC, whose geographical area and scope were wider and whose task was to advise the Director General of IAEA on various policy aspects. Also adopted was a broadening of the Committee's scope by accepting responsibility for long-term needs in major fission- and fusion-based power programs (in contrast to the previous short-term goals of systems development) with particular attention to data pertinent to problems in economy, safety and environment or to applications in medicine and industry.

Modernizing its scope on this basis, the Committee defined for its future work the following six fundamental tasks:

1. To coordinate research programs of member states on measurements and on techniques and equipment on an international basis.
2. To sponsor and encourage the production, and publication in appropriate form, of extensive technical reviews of subjects within its scope.
3. To sponsor technical workshops in order to review critical areas where international collaboration would be profitable.
4. To sponsor technical meetings and conferences in liaison with NEA to further the objectives of the Committee.
5. To recommend and arrange pooling and exchange of equipment and personnel.
6. To coordinate evaluation efforts within the OECD area.

Since the Harwell Meeting, a continuous transition toward its new functions in a widened and expanded data field occurred and was chiefly finalized at the end of the present bi-meeting period. As the most outstanding facts demonstrating this development one should mention here the organization of three very efficient specialists meeting in the period between 1975-1977, the preparations for a first Western European Nuclear Data Conference in 1978 at Harwell in liaison with NEA, and the various arrangements for the production and publication of a "NEA-NDC (OECD)-Series on Neutron Physics and Nuclear Data in Science and Technology".

After the 18th Meeting, the NEA-NDC has also rearranged its relations with other international committees. In order to avoid overlap with INDC a common technical information base in the area of "Standards" and "Discrepancies" was established. In connection with the assignment of national responsibilities

instead of individual responsibilities a reduced redundancy and an improved technical effectiveness was achieved. Mainly in view of the time required for improved technical achievements, NEA-NDC proposed an extension of meeting intervals for both NEA-NDC and INDC from twelve to eighteen months with the meetings staggered at approximately nine months' intervals. It has turned out in the meantime that the new arrangements with INDC have eliminated much of the redundancy in the activities and thereby also reduced the problems of dual membership.

In the same context the communications between NEA-NDC and NEA-CRP could be essentially strengthened and improved. The main manifestation of this change can be found in the joint meeting of members from both Committees in early 1977 at Paris on topics of mutual interest (chiefly European priority I requests), the close cooperation of NEA-NDC and NEA-CRP in the preparation of the 1978 Harwell Conference, and the joint efforts for the production of the first few volumes of books for the OECD Series on Neutron Physics and Nuclear Data in Science and Technology, for which especially a proper treatment of the data needs was a vital prerequisite.

The general discussions on the relations of NEA-NDC with other international committees influenced also the concentration of the international work into a small number of committees with clearly defined responsibilities. This applies in particular to the demise of the Joint European Nuclear Data and Reactor Physics Committee (JENDRPC) shortly after the 18th NEA-NDC Meeting in 1975. In this case NEA-NDC discussions had clearly shown that JENDRPC functions could also effectively be taken over by occasional joint meetings of NEA-NDC and NEA-CRP representatives. In the same context it appeared that coordination and cooperation with the OR-countries (where OR stands for Other Regions, i.e. European OECD-countries not belonging to the European Economic Community) could also be fostered within the existing scheme of NEA-NDC with two OR members and by arranging for a more frequent rotation of membership and a more liberal invitation of observers from this region. It was, thus, mainly on the basis of these arguments that the OR-group with own regular annual meetings decided its termination in 1977.

### III. MILESTONES OF WORK

The most important event during the past bi-meeting period was the establishment of the NEANDC-OECD Series on Neutron Physics and Nuclear Data in Science and Technology. This series with its already identified twenty topics for different volumes is going to become a major undertaking of the Committee during its next, third, decade of existence. Early activities originated logically from the new option of the Committee to produce and publish major technical reviews of subjects within its scope (task 2). It was initiated by two proposals from the chairman and the French NEA-NDC member, Dr. Michaudon, which were sent to the Committee for consideration in early 1976. Already at the 19th Meeting in Stockholm the general proposal, to have a NEA-NDC Series on Neutron Physics and Nuclear Data, was approved by the Committee and it was decided that such a series should be published commercially. A further important step was the commitment of Pergamon Press in January 1977 to publish the Series. Before, a careful inquiry by the publisher among a large number of exposed individuals in science, technology, administration and industry in all major countries of the world had impressively revealed the urgent need for such a series of textbooks. Presently, work is underway to produce the first four volumes on (1) Radiative Neutron Capture, (2) Fission Cross Sections, (3) Neutron Sources, and (4) Neutron Detectors. The most benefit can be expected from this work by presenting the total information, today only partly available in widely disseminated reports and documents of quite different character, in a uniform, comprehensive, and didactic manner. It is hardly possible to emphasize too much the value of such an enterprise of a Committee like NEA-NDC, having the high expertise necessary for this kind of work.

In connection with task 3 the most obvious events were the holding of two Specialist Meetings, on Fast Fission Cross Sections of  $^{233}\text{U}$ ,  $^{235}\text{U}$ ,  $^{238}\text{U}$ , and  $^{239}\text{Pu}$  at Argonne (28-30 June 1976) and on Neutron Data of Structural Materials for Fast Reactors at Geel (5-8 December 1977), and the organization of a Symposium Expert Session on the  $^6\text{Li}(n,\alpha)$  Standard at Gaithersburg (28 March 1977). These most successful and valuable meetings provided the necessary working interchange between measurers of microscopic and integral data, data evaluators, compilers, and users. In addition, a complete assessment of the respective status of the data bases was performed and published for these areas. The most advanced and pioneering documentation of this kind was certainly that from the Argonne meeting. Apart from the submitted contributions, working group reports and unabridged reproduction of discussions in the Proceedings, also

all important intercomparisons of data and evaluations were documented. The output of this meeting can, therefore, be considered as a standard review for the next few years of the status of fast fission cross sections of the major fissile and fertile materials.

Another important activity of NEA-NDC concerned the arrangements for the first Western European Nuclear Data Conference to be held at Harwell in the fall of 1978. With this first NEA-sponsored conference in an intended chain of future meetings of the same kind, an important step has been taken to coordinate and reorganize the previous scheme of regional and worldwide nuclear data conferences. In the past, conference series were organized independently on a regional basis in the United States as Conferences on Neutron (Nuclear) Cross Sections and Technology in a 3-4 years' sequence, in the Soviet Union as All Union Conferences on Neutron Physics on a two-years cycle, and on a worldwide basis by IAEA as Conferences on Nuclear Data for Reactors on a 3-5 years' cycle. In the newly suggested scheme, regional data conferences might be held in a three-years' cycle with annual meetings organized alternately in the USA, USSR, and Western Europe. At the same time IAEA abandoned its own conference series in favor of cosponsoring alternately one of the three regional meetings. In addition, a permanent cooperation with IAEA for all regional conferences is planned to enable the scientists from developing countries to participate by funding from IAEA.

In the area of nomenclature NEA-NDC could use its influence in retaining the barn as a standard unit for cross sections. In this field the Council of Ministers of the European Economic Community had issued in 1976 a Directive to cease the authorization of the use of the barn effective from Dec. 31, 1979. Furthermore, several regional standards organizations had taken an essentially similar position. Recognizing the serious consequences for the existing data banks and their present and long standing worldwide exchange scheme of an abrupt elimination of the barn, the Committee in cooperation with INDC and IAEA was able to achieve by its intervention a reversal of the ECC Directive and a reconsideration of the problem by the Comité Consultatif des Unités of BIMP.

During a first joint meeting of NEA-NDC and NEA-CRP representatives in spring 1977, a European priority I request list was drafted, starting with contributions from France, Germany and the United Kingdom. The list, which had subsequently been complemented by the other European countries, was submitted to



NEA-NDC before the end of 1977. In connection with the submission, the Committee had been invited to continuously scrutinize it and to coordinate measurement and evaluation efforts, to insure that all requests receive the necessary urgent attention. In the meantime this task is going to become a general responsibility of NEA-NDC, not only for the European, but also for the Japanese and the American priority I requests.

More than fifty scientific technical reports were submitted and published during the last three years. The documents provide a rather complete overview of the technical activities and the critical areas in which international collaboration was experienced.

Of great interest and importance were also the two Topical Conferences held during the 18th and 19th Meeting at Harwell on "Capture Cross Section Measurements" and at Studsvik on "Integral and Differential Afterheat Measurements". Both of these events were examples of important and valuable professional contacts between Committee members and staff personnel in the host countries. Contacts of this kind should continue to keep Committee members informed on the personal and instrumental potential of the various nuclear data groups and to encourage new nuclear data activities in host laboratories.

Over the last two Meetings of the NEA-NDC the functioning of six subcommittees had proven to be very advantageous. Especially such important subjects as "Standards and Discrepancies", "Isotopes", "Technical Activities" and "NEA-NDC Series" are clearly best served by continuous observation by a standing subcommittee. But also temporary problems such as "Conservation of the Barn" or special coordination efforts on "Measurements and Evaluations" can efficiently be treated by small groups on an ad-hoc basis. Organizing the work along these lines, continuous progress was made since the restructuring to shift NEA-NDC's operations increasingly towards broad technical discussions of major nuclear data subjects. Thus, during the Harwell Meeting technical sessions were held on "Thermal Data for the Main Fissile Materials", "Activation Detector Cross Sections" and "Fission Product Nuclear Data". Respective technical items at the Stockholm Meeting were "Fission Neutron Spectra", "Fission Product Yield and Decay Data", "Decay Heat Data Requirements", "Nuclear Data for Shielding", "Safety of Liquid Metal Fast Reactors" and "Data Needs for Burnup Calculations".

In the administrative area several firming-up actions were taken in order to adjust NEA-NDC regulations to some changed general conditions. Among others, the composition of the European EC-delegation was ultimately rearranged, mainly in order to better reflect the distribution of nuclear data activities in its region. In connection with an optimum representation of the interests of Benelux- and OR-countries, the Committee voted for a more frequent rotation of members representing these regions and for a more liberal invitation of observers. Corresponding amendments in the Terms of Reference of the NEA-NDC were proposed together with the necessary changes in the scope caused by the restructuring of the Committee.

#### IV. ASPECTS FOR THE FUTURE

During the past bi-meeting period the NEA-NDC has successfully finalized its necessary restructuring and modernization and has now achieved a new maturity in the international nuclear data field. It has carefully expanded its scope to include nuclear data activities in the area of controlled-fusion reactor programs, medical and industrial applications, and to nuclear data pertinent to safety, economics and environment. In addition, the NEA-NDC continues to provide the leadership in the coordination of nuclear data activities for the fission reactor field in the OECD area. Moreover the NEA-NDC can presently best supply the often needed physical understanding of nuclear data requirements for various applied purposes. This understanding of major physical principles and processes is essential in those cases where important nuclear information is not obtainable experimentally and where reliable numbers must be obtained from theoretical estimates.

The position of NEA-NDC in the area of reviewing and publishing the relevant knowledge of applied aspects in neutron physics, nuclear science, medicine and industry by its own series of textbooks will be unique. With this task NEA-NDC will fulfill a clearly defined worldwide need for a widespread community of potential readers by using its expertise in this field. The present undertaking might easily become a major fraction of the Committee's activity during the whole third decade of its existence.

In relation to its recent delineations and its arrangements with INDC the work of NEA-NDC has received a high degree of complementarity. By avoiding largely undesirable duplication of efforts in all fields of mutual interest, both committees have even been able to start new programs, such as for instance the activities on atomic and molecular data (A & M data) in INDC and the OECD textbook series in NEA-NDC. In contrast, past experience has clearly shown that such relations as they were developed between OECD countries by NEA-NDC in all areas of nuclear cooperation can definitely not be formed within the INDC framework. Relations between European, American and Japanese laboratories have always been much closer than those between a laboratory in the OECD region and laboratories in the remainder of the world. Even in the field of technical information exchange, the required close liaison between the involved individuals needed to conduct such eminently successful workshops as the 1976 Argonne and the 1977 Geel Specialists' Meetings can definitely not be provided by INDC.

In view of the above facts one can be highly optimistic for the future of a NEA-NDC responsible for close collaboration of OECD countries on technical activities in the nuclear data field. Of course, the Committee should from time to time review its activities and assess its role to check whether its work is still fully aligned with the major nuclear programs in OECD-member states. A reasonable period for such reviews seems to be four years.

With the beginning of 1978 the chairmanship and the scientific secretariate was handed over to Dr. Chrien and Dr. Coceva. It was with great confidence and best wishes that we have turned over the responsibility to them.

Before closing, the chairman on behalf of the Committee would like to thank Dr. W. Cross very much for his readiness to chair - despite his own handicap - the 18th NEA-NDC Meeting in Harwell after the chairman's sudden illness in March 1975.