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SUMMARY RECORD OF THE THIRD MEETING OF NUCLEAR REACTION DATA CENTRES

PARIS, FRANCE
19th-23rd June 1978

Compiled by
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FOREWORD

The Third Consultants' meeting of Nuclear Reaction Data Centres was held by the IAEA at the OECD, Paris, France from 19th to 23rd June, 1978.

This Third "NRDC Meeting" combined the 14th "Four Centres Meeting" (Consultants' meeting of the Four Neutron Nuclear Data Centres) and the Fourth "CPND Meeting" (Consultants' meeting on Charged Particle Nuclear Data Compilation). The preceeding meeting in this series was held in Kiev, USSR, 11th to 16th April, 1977, and was reported in INDC(NDS)-90.

3rd Consultants' Meeting of Nuclear Reaction

Data Centres (3rd NRDC Meeting)

Paris, 19-23 June, 1978

List of Participants

CJD	(USSR Centro po Jadernym Dannym) V. Manokhin V. Bychov
CAJad	(Kurchatov Atomic Energy Institute, USSR) Yu. I. Grigor'yan
NEADB	(OECD, Nuclear Energy Agency Data Bank, Saclay, France) J. Rosén N. Tubbs P.D. Johnston (Scientific Secretary) D. Johnson W.W. Osterhage
NNDC	(U.S. National Nuclear Data Centre, Brookhaven, U.S.A.) S. Pearlstein V. McLane
NDS	(IAEA Nuclear Data Section, Vienna, Austria) J.J. Schmidt (Chairman) H.D. Lemmel
KaChaPaG	(Karlsruhe Charged Particle Group, Federal Republic of Germany) H. Muenzel H. Klewe
FIS	(Zentralstelle für AtomKernenergie-Dokumentation (ZAED) C/o Fachinformationszentrum Energie, Physik, Mathematik Nuclear Research Centre, Karlsruhe, Federal Republic of Germany) H. Behrens

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AGENDA

1. Opening, election of Chairman, adoption of the Agenda.
2. Brief status reports of the participating centres.
3. Review of Actions from the previous meeting
 - (i) relevant to all (NND + CPND) participating centres.
 - (ii) relevant only to the 4 neutron nuclear data centres.
4. Data Centre activities in Data Base Management Systems.
5. Customer services.
6. Nuclear Data flagging in INIS.
7. Photonuclear Data.
8. EXFOR
 - (i) The EXFOR Manual
 - (ii) Technical discussions.
9. Charged Particle Nuclear Data.
10. Centre Heads discussions.
11. Coordination of future meetings.
12. Future computing developments.
13. CINDA.
14. WREND.
15. Evaluated Data files.
16. Exchange of Experimental Data.
17. Miscellaneous.

Minutes

1. Opening

The meeting was opened by Mr Rosén, Head of the OECD Nuclear Energy Agency Data Bank. The participants were welcomed and introduced to new staff of the Data Bank, in particular Dr Tubbs who recently succeeded Dr Derrien as the Deputy Head of the Data Bank responsible for nuclear data services. Mr Schmidt was elected as Chairman for the meeting.

The tentative agenda was adopted with some rearrangement to allow all items involving both Neutron Nuclear Data and Charged Particle Nuclear Data to be dealt with during the first three days of the meeting.

2. Brief Status Reports of the Centres

(a) CAJad

The status report of the Centre for data on structure of the atomic nucleus and on nuclear reactions at the Kurchatov Institute was presented by Mr Yu. I. Grigor'yan (Appendix 1). One full-time worker is now involved in preparation of compilations of charged particle reaction data in the Generalized EXFOR format. Twelve papers have been compiled in this format, however, others have been held back pending clarification of some coding rules, in particular for charged particle induced fission and new heavy elements.

(b) CJD

The status report for CJD presented by Mr Manokhin is given in Appendix 2. Four EXFOR transmission tapes containing the compilation of 54 works have been sent in the past year. The generalised EXFOR format is now used and new PL/1 checking programs on the EC-1030 computer have been developed.

CINDA revision work has continued for Area 4 entries in particular the assignment of laboratory codes to entries with the CCP Code. Coverage before 1969 has been checked and EXFOR index lines are now prepared.

Format discrepancies have been revised in the SOKRATOR file, and new evaluations will also be transmitted in ENDF/B format.

Evaluation for threshold reactions to 20 MeV for $Z > 20$ is in progress and will be published in "Nuclear Constants". Fission and capture cross sections evaluations of Am-241 are also in progress.

Change to an EC-1035 computer will start in 1980, however this machine is compatible with IBM and the present EC-1030 computer.

(c) NEA-Data Bank

The status report of the OECD Nuclear Energy Agency Data Bank was presented by Dr N. Tubbs (Appendix 3). The Data Bank has now taken over the combined operations of the CCDN and CPL. Nuclear Data services have continued with the transmission of 10 tapes of compiled neutron data in EXFOR, the implementation of new programs for checking Generalized

EXFOR, and CINDA revision for Area 2. About 200 requests for data have been received, equally divided between experimental and evaluated data.

Conversion of all neutron data operations to a Data Base Management System on a PDP 11/70 computer is on schedule, with highest priority given to the implementation of the CINDA file. It is hoped that this change will allow more efficient use of the available manpower at the Centre for neutron data compilation.

This report was supplemented by Dr Hannum, Deputy Director of NEA, who stressed the well-defined mission of the NEA within the OECD to focus on the needs of member countries in the area of nuclear energy. For the Data Bank activities priority is given to neutron data and reactor codes. Although no significant change is foreseen in the next 2 years, there is a need for flexibility to accommodate changes in emphasis following the present INFCE study. In the longer term extension of the activities to new areas will be considered.

(d) NDS

The status report of IAEA, NDS was presented by Mr H. Lemmel (Appendix 4). After a full staff complement in 1977, two vacancies now exist which present some difficulty with the programme of work for 1978. The CINDA revision for Area 3 was finished at the end of 1977, and some Area 4 EXFOR compilations have been indexed.

Good contact with authors has allowed compilation of neutron data to include recent revisions by authors. The 70,000 series from SCISRS has been completely revised and retransmitted in the normal 30,000 series.

Some evaluations not included in the major files have been compiled and transmitted in the EXFOR Vien file. No plans exist to systematically compile other than neutron data, however, some neutron producing reactions may be compiled.

An active part has been taken in the discussions of recent proposals for the EXFOR format, but the Centre has no wish for further changes requiring major program revisions.

Additional activities, presented by Mr J.J. Schmidt, included sponsored Specialists' meetings, Mass chain evaluation sharing and evaluation of Actinide decay data. Service to developing countries is becoming more important and on the recommendation of INDC, a new post was created with the task of improving these services.

Atomic and Molecular data work has continued with the publication of a quarterly bulletin and preparation of a CINDA type index.

(e) NNDC

The status report of the U.S. National Nuclear Data Center was presented by Dr S. Pearlstein (Appendix 5).

A new DEC-1091 computer will be installed in 1978, however, compatibility with the existing machine will minimise conversion work.

Additional staff has been made available for the extensive review of the CINDA file for Area 1 by increasing Z number. Work is on schedule for completion at the end of 1978. Six EXFOR tapes have been transmitted and all pre-1970 data has now been converted and transmitted in the 10,000 series.

The general purpose evaluated file ENDF/B-V is nearly complete : final testing is under way prior to release.

For Charged Particle Data, the bibliographic file will be issued as BNL-NCS-50640, and some work has begun on evaluation of the T(d,n) reaction.

A revised version of the Berman Photonuclear Reaction library will be distributed in EXFOR during 1978.

(f) KaChaPaG

The report of the Karlsruhe Charged Particle Group was presented by Professor H. Muenzel (Appendix 6). There are now data for 800 reactions available on the KaChaPaG file, however, concern was expressed that more groups were not engaged in compilation of Charged Particle data. A proposed layout of a printed version of the file was presented, to be published in co-operation with the Fachinformationszentrum, Karlsruhe.

(g) FIS

ZAED is now a part of the newly created Fachinformationszentrum Energie, Physik, Mathematic, Karlsruhe. The status report was presented by Dr H. Behrens (Appendix 7). Lists of new and published compilations relevant to nuclear physics are included in the status report.

ZAED participates in the shared nuclear structure evaluations for the ENSDF file, and will co-operate with KaChaPaG in distribution of the printed version of the Charged Particle compilation file.

(h) AERE Harwell

The status report was presented by Mr H. Lemmel on behalf of Dr G. Dearnaley (Appendix 8). Work is in progress on a user oriented graphical compilation of selected differential cross section data for material scientists. A report will be prepared in 1979.

(i) Japanese Study Group

This status report was presented by Mr H. Lemmel on behalf of Dr Tanaka, who was unable to attend the meeting. A data format NRDF-2 has been implemented, and is to some extent compatible with EXFOR.

The meeting requested that this format should be distributed, and recommended that conversion to EXFOR should be made for transmission of data to other nuclear data centres.

3. Review of Actions from the Previous Meeting

(i) Actions relevant to all participating Centres

Actions not completed are carried over into the current list of actions where the meeting considered that they were still relevant. Such actions are given with the numbering from INDC(NDS)-90 in parenthesis. The list of continuing actions is given on page 18 and that of 'prompt' actions on page 20.

(ii) Actions of interest only to the 4 Neutron Nuclear Data Centres

These actions, discussed separately in the meeting are incorporated, where continued, into the current list, again with old numbering in parenthesis.

4. Data Centre Activities in Data Base Management Systems

(i) NEA-DB. A report was presented by Dr Tubbs on both the NEA Study on the use of Generalised data base management systems for scientific data (presented at the CODATA meeting, Sicily, 1978); and on the progress at the Data Bank in the implementation of IDMS for the neutron data files and CINDA.

Following the first design of the schema, which expressed all possible logical relations, about 45% of the logic has been removed from the schema structure to improve performance. The importance of optimum specification of the Data Base schema was stressed in view of the considerable re-loading times resulting from later changes. CINDA implementation is well advanced, with a structure more favourable to rapid updating. The numerical data section will replace the functions of the NEUDADA file, but conversion to a computational format on retrieval, similar to that obtained from NEUDADA will be included.

In the discussion that followed, the importance of allowing flexibility to accommodate future changes was stressed together with the dangers of accepting restrictions imposed by the software system.

(ii) NNDC. A report on experience with DBMS-10, version IV on the PDP-10 was given by Mrs McLane. Version V is currently being implemented with added features and improved design and access. Summaries of the main features of the systems used are given below :

ADLIS - A mailing address list system. Main design feature is to separate name and address of addressee so that an address is only entered once for many addressees, thereby saving space and number of changes required for a single address correction. Retrieval still primitive, that is each entry is searched to see if it satisfies retrieval criteria.

CINDUP - An interactive system to aid the CINDA clean-up activity. It is essentially an editing program designed to perform the editing operations required for the CINDA clean-up. The reference lines are organized into sets representing a CINDA block. Blocks may be modified as well as reference data within a reference line. At the end of an update run a clean listing is produced which permits easy visual inspection.

ENDF - A file management and retrieval system for ENDF/B-V. Described in detail in "Generalized Data Management Systems and Scientific Information" p.232, published by OECD. Special features include use of DBMS only as an index to the data. Access to ENDF is via the section which consists generally of large numbers of records always accessed sequentially. Hence, the data itself is stored in random access files.

RECREP - A system to manage storage and retrieval of the Recent References file. This system is now under developments. This is NNDC's first large scale DBMS data base. Its major feature will be the use of inverted indexes maintained within the DBMS (not supported by DBMS-10) to handle a large variety of retrieval types.

?? - A system in conceptual stage to handle the neutron and charged particle CINDA files. Will probably use same techniques as RECREP but will test alternate methods for implementation of these techniques.

(iii) NDS. A report on experience with the ADABAS system was given by Mr H. Lemmel. Possible conversion of the EXFOR index file to ADABAS has been abandoned, partly because of instability in the available software, and because this file was considered too complex for the Data Base system. An attempt will be made to gain experience with smaller files for evaluated data, half-lives and retrieval requests.

(iv) CJD. A USSR system is available (OKA) and will be investigated for implementation on the EC-1030 and EC-1035 computers with the EXFOR data base.

(v) FIS. Dr Behrens reported that a Data Base Management System (LRIPS) is in use at ZAED for bibliographic files.

In the discussion that followed, it was considered that implementation of Data Base Systems, while allowing an easier change from 'Batch' processing to 'on-line' working, would not lead at the moment to easier exchange of programs as the present lack of universal conversions still leaves each application dependent on the particular version of software used. Each centre was asked to provide short reports on their experience with Data Base Management Systems (Action 30).

5. Customer Services

(i) Charged Particle Nuclear Data

In response to a request from INDC, discussion centred on identifying established needs for Charged Particle compilations. Four principal fields where a need has been expressed were identified :

- (a) Isotope production. For medical applications, and analysis of accelerator activations.
- (b) Activation analysis, trace element analysis.
- (c) Basic research.

- (d) Certain specific reactions, e.g., for neutron production, fusion, etc.

In the first two fields, integral cross section data is more important, but in the future differential data may be needed, particularly for fusion needs.

The users of Charged Particle data were considered to be more widely spread than for neutron data, and printed handbooks are more used than direct retrievals from computer files. A printed version of the KaChaPaG master file of EXFOR compilations will be prepared in collaboration with FIS-ZAED. Graphical presentation is also under consideration for experimental data combined with curves from systematics and improved nuclear model calculations.

Complete coverage of available literature was considered important, but even for the restricted field of integral data, this is a problem with only the Centres KaChaPaG and CAJad, and on a more limited basis NNDC, compiling data in EXFOR. Individual physicists should be encouraged to participate in the compilation in collaboration with one of the data centres : negotiations for such collaboration are under way between KaChaPaG, NDS and an Argentinian physicist.

Distribution of the report of the Panel on Reference Nuclear Data, held with NNDC in October, 1977 was requested (Action 31). This Panel discussed primarily the results of a survey on nuclear data needs and priorities, and a "Source List of Nuclear Data Bibliographies, Compilations and Evaluations" produced by NNDC.

(ii) Computation formats for Neutron Nuclear Data

(a) NNDC. A description of the computational format for resonance parameters used in the preparation of the BNL-325 publication was presented by Mrs McLane. This single line, fixed field format is used to group data for similar energies as a first step in the evaluation of resonance parameters by physicists.

A separate computational format for smooth cross sections is under development.

(b) CJD. A computation format for cross sections is in use and is described in a recent issue of Nuclear Constants. The conversion program from EXFOR was developed for the old computer and will be re-written and implemented on the EC computer without any changes in the format.

(c) NEA-DB. A new computation format will be developed, very similar to the NEUDADA format, as an optional output format for data retrieved from EXFOR in the Data Base on the PDP 11/70 computer.

All Centres were requested to communicate any new developments and plans for computation formats to the other Centres. (Action 33).

(iii) Future Developments

Data extending to higher neutron energies will be required following the introduction of intense Li(d,n) sources. Accelerator breeding will also generate a need for spallation cross sections and neutron data up to 50 or 60 MeV.

6. Nuclear Data Flagging in INIS

The Memo. CP-D/67 and consultant's report describing data flagging techniques, classification schemes and recommendations for INIS was briefly discussed. Major countries will begin data flagging in November, 1978, and some smaller countries have already started. It was felt that some improvement in the selectivity of INIS retrievals would result from the improvements in the thesaurus of keywords, particularly for integral charged particle data.

A number of comparative studies on coverage in INIS and other systems were proposed. Professor Muenzel at KaChaPaG will make available to the other centres the results of cross checking between INIS and the CPND file (Action 34), and similar studies at NNDC for INIS and "Recent References" and at NDS for INIS and CINDA were encouraged.

7. Photonuclear Data

Development of a new centre at Moscow University for compilation of photonuclear data was described by Mr V. Bychov. The EXFOR format will be used although the interests of the centre may be more academic than applied. Mr V. Bychov was asked to inform the other centres about further development of this centre, once it has obtained a more official status. (Action 35).

Photonuclear data is compiled at the U.S. National Bureau of Standards under the direction of Dr Fuller, but not in the EXFOR format. Conversion of the Berman Photonuclear library from LLL at NNDC was discussed by Dr S. Pearlstein. A new version of this library will be transmitted to the other centres by NNDC. (Action 36).

For compilation of photonuclear data by the existing NND and CPND Centres, it was agreed that photonuclear compilations should not be included in the same entry as other data, but that photonuclear entries should be transmitted in the same EXFOR series, with series numbers of 7,000 or greater. Photonuclear compilations should also be transmitted in separate files to other data on transmission tapes.

8. EXFOR

(i) The EXFOR Manual

The EXFOR Manual maintained by NNDC has been transferred to a "word processor" on the PDP 10 computer to facilitate changes. Mr H. Lemmel was concerned that changes to the manual during the past year had not been made sufficiently quickly and accurately, however, some of these problems may have arisen from interpretation of the many Memos. exchanged during the year. As a result of discussions in the full meeting and between Centre Heads, the following conclusions were reached :

The meeting agreed that there should be one official manual, with NNDC responsible for updating and distribution.

NNDC will review changes proposed during the last year and agreed at this meeting. After receipt of the draft minutes in August, the manual will be updated and sent to Mr H. Lemmel at NDS by the end of September, 1978 for new changes to be checked. Comments on recent changes and noticed discrepancies with the NDS version of the manual will be returned to NNDC by the end of October.

A final version of the manual will be distributed to all Centres by NNDC by the end of November, 1978.

The meeting recognised the effort and involvement of Mr Lemmel with the EXFOR Manual, and Professor Muenzel expressed the wish that this concern should be continued in collaboration with NNDC.

(ii) Technical Discussions

A subgroup was formed to review outstanding proposals for changes in the EXFOR rules and formats. The conclusions and actions arising from these discussions were reviewed by the full meeting and are given below :

(a) Variable Product Nucleus Formalism

Use of the variable product nucleus formalism (CP-D/63) was agreed for two specified reaction processes, X and F. (Appendix 12). NNDC was requested to distribute LEXFOR and EXFOR Manual proposals for variable product nucleus (Action 43).

All Centres were requested to consider and respond to the proposed extension of the variable product nucleus formalism to the new process codes XN and YP proposed by KaChPaG for reaction yields as a function of the number of emitted neutrons or protons.

(b) Decay Flags and the Heading ISOMER

The subgroup approved the wording to the proposed (Memo. X4-78/3) LEXFOR entry on "Decay-Data".

"Decay Data for Variable Product Nuclei

These strings are linked to the relevant nuclei in the Data Table by means of "decay flags". (See pages VI., VIII ... and LEXFOR "flags"), in particular when decay-data are given for parent or daughter nuclides of the nuclei given in the data table."

The subgroup approved the use of the heading ISOMER.

(c) Spallation

The use of the code SPL for spallation in the branch field, SF5, of the reaction string was approved. This should be used when a measured cross section is analytically separated into a spallation component and another, for example, fission, component.

It was decided that SPL should not be used as a reaction process code (SF3) as no measurements have yet been identified to be uniquely a spallation mechanism.

It was felt that Spallation could be included in the LEXFOR Manual under the "Reaction Process" heading. Mr H. Lemmel was asked to review this proposal and send comments to NNDC by the 10th of September, 1978. (Action 52).

(d) Multiple Monitors

The proposal for use of multiple monitors was accepted (Memo. D/56); however, NNDC was requested to submit the proposed manual entries, together with coding examples by September, 1978.

(e) Proposed New Branch Codes UND and (DEF)

Introduction of two new branch codes (SF5) into the reaction string was discussed. The code UND, an abbreviation of Undefined, would be used where many reaction channels are open and only the residual nucleus is identified. In this situation the reaction process would be coded as the number of emitted protons and neutrons (XN + YP) with the code UND in the branch field.

The code (DEF) would be used for reactions for which the author specifies a reaction process but the compiler considers that this process is not the only one open with the available energy. The code (DEF) would imply that doubt existed about the definition of the reaction process given by the author and used in SF3.

Proposals for EXFOR and LEXFOR entries on the use of UND and (DEF) from KaChaPaG are given in Appendix 13. All Centres are requested to review these proposals and reply to KaChaPaG by 10th September, 1978 (Action 42). For the present, these codes would only be used for compilation of Charged Particle data, where high energies allow many reaction mechanisms to compete.

(f) Free Text in Compilations

In connection with the preparation of a printed version of the KaChaPaG file, Mr H. Klewe requested that comments in free text added by the compiler should be easily distinguishable from information taken from the authors' publications. Such an instruction already exists in the LEXFOR entry under the heading "COMMENT", and Dr Klewe was asked to prepare a similar addition to the LEXFOR entry "Free Text". (Action 45).

(g) Proposed New Process Codes XN and YP

Proposals are given in Appendix 12 for the introduction of two new process codes and associated data headings. The codes XN and YP would be used for data tables giving production cross sections of nuclei as a function of the number of neutrons (X) or protons (Y) emitted in the reaction. These codes would be used with the variable product nucleus formalism and the new data headings X and Y. All Centres are asked to consider this proposal from KaChaPaG. (Action 50).

(h) Combination of Particle and Process Codes

All Centres are asked to submit comments on the Memo. D/64 referring to the combination of particle and process codes by the 10th of September, 1978. (Action 46).

(i) Transliteration of the Cyrillic Alphabet

The meeting confirmed the continued use of the transliteration scheme for Cyrillic characters as given in LEXFOR under Author. This scheme corresponds to the official USSR scheme except for the interpretation of the hard sign which will become ' instead of ', a character unavailable for EXFOR.

(j) Dictionaries

The meeting approved the format of dictionary 27, proposed in Memo. D/61, but considered that some experience in the use of this dictionary was needed before more comments could be submitted on the detailed content. Dictionary 27 should be implemented and transmitted with the next dictionary update by NDS. (Action 53).

The format of dictionary 41, for the ISOQUANT/REACTION correspondence was approved. NNDC was requested to send a new updated ISOQUANT/REACTION dictionary to NDS to include changes following Memo. C/36.

All Centres were requested to submit comments on the proposals in Memo. C/20 concerning the addition of extra fields to some dictionaries by the 10th of September, 1978. (Action 47).

9. Charged Particle Nuclear Data

(a) CPND Bibliography

A new edition of the NNDC Charged Particle bibliography, similar to CINDA, has been prepared and will be distributed as BNL-NCS-50640. NNDC was requested to send a magnetic tape of the updated file to the Centres CJD, CAJad, NDS and KaChaPaG. (Action 37). Centres were reminded to send to NNDC the list with names on their distributions for this publication. (Action 27).

(b) Experiences with Transmission Tapes

The meeting endorsed the procedure whereby all Charged Particle compilations are formally transmitted only to KaChaPaG, rather than to all Data Centres. Tapes received at KaChaPaG are merged into the master file, and copies of the master file will continue to be distributed every 6 months (November and May) to the other Centres.

Flagging of alterations in compilations was discussed separately between NNDC and KaChaPaG.

It was agreed that each Centre should specify explicitly if they do NOT want any information in their compilations to be included in the printed version of the master file to be prepared by KaChaPaG. This principle was agreed on a general basis for all publications produced by one of the data centres, however, other centres should be informed of proposed publications.

(c) Evaluations of CPND

(i) NNDC. Some compilation of Charged Particle data will be undertaken at NNDC in support of evaluation of the T(d,n) reaction. Formats for this evaluation are under discussion, but the evaluation will include a full range of data and covariance matrixes.

10. Centre Heads Discussions

Discussions covered a general review of the situation of the data centres, in particular the recent changes at the NEA Data Bank. In response to common difficulties with staffing levels, a number of new developments were welcomed: participation of physicists in compilation

work at CJD; preparation of simplified EXFOR coding rules at NDS; and distribution by the NEA-Data Bank of a pre-compilation form to involve physicists in data compilation.

(a) EXFOR Protocol

A revision to Section H3 of the EXFOR protocol was agreed, to require positive agreement from the six Centres NNDC, CJD, NDS, NEA-DB, CAJad and KaChaPaG before further changes are implemented in the EXFOR rules. The revised section H of the Protocol is given in Appendix 10 together with Section A for which the only change concerned the name of the NEA-Data Bank. The revised Protocol will be re-issued by NNDC with the EXFOR Manual. (Action 76).

(b) CINDA Protocol

A proposed CINDA Protocol was accepted with only minor changes. This protocol will be issued by NEA-DB as part of the CINDA coding manual. (Action 77). Protocol (Appendix 11).

(c) Funding of Future NRDC Meetings

The IAEA will provide expenses for one participant from CJD and NNDC to attend the next meeting. NEA and IAEA will finance the Centre Head and one other staff member from NEA-DB and NDS respectively.

(d) The Next NRDC Meeting

Because of budget uncertainties three alternative sites and dates were proposed :

- (1) 15th-19th October, 1979 at NNDC.
These dates are adjacent to the proposed Knoxville meeting on nuclear data.
- (2) At KaChaPaG later in 1979.
- (3) In association with the Leningrad meeting on Reactor Dosimetry in 1979.

11. Co-ordination of Future Meetings

(a) Shielding

A working group was held in Paris in November, 1977 by NEA to review progress in benchmark analysis of integral nuclear data for Fe Shielding. A further working group will be held in the autumn of 1978 in preparation for a fuller meeting in 1979. IAEA requested that Dr J. Dunn should be invited to participate in the forthcoming meetings.

(b) Transactinide Nuclear Data

A meeting is planned by IAEA, with NEANDC cosponsorship, for May, 1979 at Cadarache, France. An NEANDC Specialists' meeting on the higher Pu and Am isotopes will be held at the Brookhaven National Laboratory, U.S.A. from 20th to 22nd November, 1978, a summary of which will be presented at the broader based Cadarache meeting in May, 1979.

(c) Fission Product Cross Section Data

An NEANDC Specialists' meeting is planned for late summer 1979, probably at Bologna and with Dr Coceva as the local organiser.

(d) Capture Cross Sections of Fissionable Isotopes

An NEANDC Specialists' meeting is planned for the summer of 1980, probably at the Argonne National Laboratory, U.S.A.

(e) Physics and Chemistry of Fission

This meeting, organised by the Physics section of IAEA, will be held at Jülich in January/February, 1979. NDS was asked to inform CJD of the exact date of the meeting.

The NEA Data Bank will distribute a full list of proposed NEANDC Specialists' meetings to all data Centres (Action 24). All Centres were requested to give high priority to the compilation of data relevant to the proposed meetings.

NDS were requested to send an invitation to the USSR State Committee and the RIGA Institute of Physics to the Reactor Dosimetry Data Meeting to be organised by NDS in 1979.

The meeting agreed that when Centre staff attend Specialists' meetings, they should collect papers relevant to other Centres' interests and make copies available to the other Centres. Distribution of the proceedings of NEACRP/NEANDC Specialists' meetings will be discussed with these Committees.

12. Future Computing Developments

Rapid data transmission between data centres using telephone links was discussed in the light of recent developments in the establishment of a network for INIS. Preliminary investigation will be made of the possible transmission of nuclear data between Moscow and Vienna.

The first stage in making the data files more widely accessible was seen as implementation of remote access links at major meetings. No plans exist to make the data files available through a distribution network.

13. CINDA

All Centres reported that their schedules for the file revision in preparation for publication of the archival volume will be kept. Because of the increased workload at the NEA Data Bank in processing the revisions, all Centres were requested to send file updates at regular intervals such that the bulk of revisions can be processed before the end of 1978 (Action 65). NDS will revise the existing old "second line" entries for Areas 3 and 4. (Actions 63+64).

(a) Archival Volume

Every effort will be made to keep to the proposed publication date in April, 1979, since a delay of more than a few weeks would cause a clash with the publication schedule for INIS.

The meeting agreed that the publication should consist of an archival volume with a "cut-off" date at the end of 1976 together with a supplementary volume to cover references after that date.

The NEA Data Bank will retrieve and send to NDS present file statistics so that a price estimate can be made with the best possible prediction of the numbers of pages involved. A tentative price of \$115 to include three supplements (1979/1980) payable in 2 equal yearly amounts by NEA and NNDC was considered acceptable. This price is based on figures of page numbers, inflation and exchange rate as quoted in 4C-3/223 and is subject to changes in these figures. A separate price will be quoted for subsequent supplements in 1981, 1982.

All Centres were asked to send to NDS proposals for the title of the CINDA archival issue before 31st December, 1978.

In view of the new extensive use of the "no book flag" suppressing entries from publication, it was considered necessary that a paragraph should be added to the introduction to CINDA explaining the availability on file retrieval of all entries, including those considered of primarily historical interest and suppressed from the book.

NDS was requested to investigate the book dictionaries for discrepancies in the explanations of conference codes in relation to report specifications.

(b) Un-named Heavy Elements

Following discussion of the coding of articles concerning super heavy elements and heavy elements with Z of 105 or greater, NDS was charged to reconsider the naming of new heavy elements and, in particular, to remove Hahnium from the dictionary as the name of the element Z = 105. Until new elements have received internationally agreed names the Data Bank was asked to reconsider the implementation of the coding proposed in Memo. CP-D/55; i.e., 07 270 for Z = 107; A = 270. A decision on the coding of super heavy elements as a separate category was deferred until the next meeting. (Actions 67,68,69).

(c) CINDA Exchange Formats

The change of computer and file management system at the Data Bank will necessitate a change in the exchange formats used for CINDA transmissions between Centres. The Data Bank was asked to send a proposal for new exchange formats to NNDC and NDS (Booktape) by the end of December, 1978.

(d) Duplicate Checking

The Data Bank will investigate the possibility of implementing a duplicate checking program so that a list of duplicates in LAB, ZAQ, REF can be sent to the other Centres for correction before publication of the archival volume of CINDA. (Action 72).

14. WREND A

The proposed schedule for publication of the next issue of WREND A in April, 1979 was presented by NDS and accepted by the other Centres. NDS will send retrievals from the WREND A file for each country of Area 2 to the Data Bank as soon as possible. These will be distributed by the Data Bank for revision, and the revised lists returned to NDS in the agreed format by January, 1979. The WREND A retrieval for the USSR will be sent by NDS to Dr Manokhin of CJD.

15. Evaluated Data Files

(a) SOKRATOR

In the course of conversion to the EC computer, discrepancies in format have been corrected. The corrected file will be sent to the other three neutron data centres together with the final documentation of the format, including definitions of new quantity numbers. (Action 92). New evaluations of Pu-241 and Pu-242 will be included, but will also be transmitted in the ENDF/B-IV format, as an exchange format.

Further evaluation of transactinide, Cm and Am data will be done, with Am-241 planned later this year.

(b) UKNDL

New versions of several isotope evaluations are expected to be available during the next year. A full list of the evaluations with version characters held at the Data Bank will be sent to NDS (Action 93), and the indexing in CINDA will be reviewed.

(c) ENDF/B-V

Final integral testing is under way prior to release in Autumn 1978. Processing codes for manipulation will be distributed to data centres together with documentation before release of the library.

A number of changes have been made to the file structure since ENDF/B-IV. Format changes are trivial with an additional card in File 1 to indicate the modification number of the data. Decay Data formats have been considerably revised with new files added. Error files will be included (File 33 →) where available.

(d) Data Uncertainty Covariances

Although only ENDF/B-V currently includes error files, the meeting recognised the importance of data covariance information and recommended that such information should be included in data compilations when available. NNDC were asked to develop a format for data covariance matrices in EXFOR.

(e) Exchange of Evaluated Data

The proposed use by CJD of the ENDF/B-IV format as an exchange format for new evaluations was welcomed. Universal use of the ENDF format was not considered possible because of the large numbers of computer codes using UKNDL and KEDAK formats and the short comings of interface programs.

A proposal for a generalised evaluation format based on the ENDF format was presented by NNDC and all Centres were asked to comment on this proposal as soon as possible.

(f) Processed Group Set Data

The meeting welcomed in this discussion, the participation of Dr E. Sartori, the IAEA representative at the NEA Data Bank, responsible for computer program services to non-OECD countries.

Clarification of the availability and rules for distribution of group set data was needed particularly when derived from the ENDF file. For group sets condensed directly from the ENDF file the same restrictions on distribution as for ENDF apply, and case by case authorisation will continue to be made. The 50 group set for coarse applications has less restriction than large group sets, and requests, particularly for specialised applications are not discouraged. The standard (i.e., U-235) data is available as test data for codes. Dr Pearlstein was asked to clarify the situation concerning distribution of the ESIS Eurlib 3 and 4 group set libraries based on ENDF 3 and 4. Dr Pearlstein requested that a greater symmetry between the U.S. and European effort in making design libraries available should be encouraged.

A Hungarian code exists to reduce to common format group sets, evaluations in the LLL, KEDAK and UKNDL libraries. Some further standardisation and documentation is still needed, particularly concerning the thermal group cross sections. (Action 87).

16. Exchange of Experimental Data

(a) EXFOR Tapes

CJD. Four tapes have been prepared in the last year and another three are in preparation this year. 9-track tapes will be used in the future. CJD were asked to re-transmit the corrected versions of entries 40095 and 40257, and to inform other Centres of any serious errors found in transmitted data.

NEA-DB. Ten tapes have been sent during the past year, usually with a particular topical emphasis. However, about 400 works have been identified which await compilation. It is hoped that new, faster software will in the long term enable more compilations to be exchanged, but no significant reduction in the backlog is expected in the next year.

NNDC. New compilations are transmitted once a month as they are completed. This work is nearly up to date.

NDS. Tapes received are now of good quality. Compilation of new work is expected to be less complete this year than last year.

(b) Pre-1970 Data

Both NDS and NNDC have finished conversion of the 70,000 and 50,000 series data into the EXFOR format. CJD expects to analyse and convert 30 of the more important data sets from the 80,000 series this year. At the NEA Data Bank the large quantity of recent works will allow little conversion of the remaining 60,000 series this year.

(c) Raw Data

It was agreed that large volume 'raw' data should not be transmitted, but that an EXFOR comment compilation with "No data" option should be exchanged with a reference to the tape on which the data is stored.

17. Miscellaneous

A number of items such as requests for exchange of specific data files, etc., have been included in the list of actions but not in the Minutes.

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

Photonuclear Data

Compilations of Photonuclear data should not be in the same EXFOR entry as NND and CPND. Data should be transmitted on separate files on transmission tapes, with series numbers of 7,000 or greater in the normal EXFOR series.

CPND

All Charged Particle compilations should be formally transmitted only to KaChaPaG. KaChaPaG will update the master file and distribute copies every six months to the other centres.

CINDA

All Centres should try to keep to the March deadline for publication of the Archival volume of CINDA. The period after December, 1978 should be reserved for final revisions to the file only.

EXFOR

There should only be one EXFOR manual. NNDC will continue to be responsible for maintaining and updating the manual and will distribute a full version at the end of 1978 after review of recent changes by NDS.

The option for retransmission of only part of a subwork where large quantities of data are involved was dropped. In future complete subworks must be retransmitted.

CONTINUING ACTIONS RELEVANT TO ALL CENTRES

(numbering for continued actions from INDC(NDS)-90 is given in parenthesis)

1. All Centres (18) Review the EXFOR Lab. dictionary and provide NDS with information and cross-references about related Lab. codes for inclusion in the dictionary.
2. All Centres (33) Inform other Centres about documentation of evaluations, and about evaluations and comparison of available evaluations in progress within the Centre's area.
3. All Centres (34) Try to obtain feedback from users about the status and quality of evaluated data files.
4. All Centres (37) Provide other Centres with information about types of data rarely or never requested.
5. NNDC, NEADB
NDS (47) Send to CJD tapes with a short dummy file at the beginning. 9track, 800 bpi. with 100 dummy records.
6. All Centres (54) Send suggestions for reports to be referred to in the LEXFOR manual to NNDC.
7. All Centres (56) Notify the other Centres of the existence of specialised compilations in any format.
8. NDS (56)(ii) Inform interested Centres of any significant changes in EXFOR.
9. All Centres (57) Requests from other Centres should be acknowledged promptly, giving a detailed status, including "no data available" if applicable.
10. All Centres (58) Inform other Centres when initiating a data review or special purpose compilation, so that appropriate data may be transmitted with priority.
11. KaChaPaG
CAJad (60) Agree on the scope of data handbooks to be published and compile relevant data with high priority.
12. All Centres When centre staff attend specialists' meetings, collect and distribute papers relevant to other Centres' interests.

CONTINUING ACTIONS FOR NEUTRON NUCLEAR DATA CENTRES ONLY

- | | | | |
|-----|-------------|------|---|
| 13. | All Centres | (3) | Advise CINDA-indexers to include in the comments "NDG" whenever appropriate. |
| 14. | All Centres | (9) | Satisfy the standing data requests of data reviewers of INDC and NEANDC technical sub-committees. |
| 15. | NDS | (6) | Make sure that the INDC and NEANDC sub-committee Chairmen send the list of reviewers and topics to the 4 NND Centres. |
| 16. | CJD | | Continue with the CINDA cleanup of USSR entries. |
| 17. | CJD | (14) | Provide complete and regular coverage for USSR preprints and Lab. reports. |
| 18. | NEADB | (24) | Transmit CINDA manual update pages following new 4C agreements. |
| 19. | NDS | (25) | Send 10 copies every 6 months of the updated lab. and ref. dictionaries to NEADB for the external CINDA indexers. |
| 20. | NEADB | (46) | Send regularly the EXFOR statistics to the other Centres. |
| 21. | All Centres | (51) | Each Centre should try to make completeness checks on those data considered important by the Centre, and report the results to the other Centres. |
| 22. | All Centres | (52) | Provide lists of references they would like compiled for current topical work. |
| 23. | All Centres | | Give high priority to compilation of data relevant to proposed Specialists' meetings. |

PROMPT ACTIONS

Relevant to all Participating Centres

- | | | | |
|-----|---------------------|------|--|
| 24. | All Centres | | Provide a list of their intended meetings, and other meetings that they know are planned before the end of 1980. |
| 25. | All Centres | | Send to NNDC comments on the proposed Generalised Evaluation format, distributed at the 4-C meeting. |
| 26. | NDS | | Make the RDF format available to the other Centres. |
| 27. | NEADB | (62) | Send to NNDC a list with names, and the total number of copies of the CPND bibliography required for their area. |
| 28. | NDS | (80) | Send to CAJad programs and documentation on the checking of the coding under REFERENCE. |
| 29. | CAJad | (85) | Prepare a LEXFOR entry defining data for which Monitor is not relevant. |
| 30. | NEADB
CJD
NDS | | Provide to the other Centres short reports on their experiences in development of Data Base Management Systems. |
| 31. | NNDC | | Distribute the report of the Panel on Reference Nuclear Data. |
| 32. | NDS | | Distribute a letter recommending the use of EXFOR as the compilation format for independent compilations. |
| 33. | NNDC | | Communicate new developments and plans for computation formats and EXFOR data computation programs. |
| 34. | KaChaPaG | | Make the results of INIS cross checking for CPND available to the other Centres when available. |
| 35. | CAJad | | Inform the other Centres of the development of the Moscow University Photonuclear Data Centre, when it has obtained a more official status, and stimulate the use of the EXFOR format. |
| 36. | NNDC | | Transmit the new Berman library to the other Centres. |
| 37. | NNDC | | Distribute on magnetic tape the updated CPND bibliography to the Centres : - CAJad, CJD, NDS, KaChaPaG. |
| 38. | All Centres | | Provide comments on the proposed published form of the KaChaPaG file. |
| 39. | CAJad
KaChaPaG | | Review the 4C Protocol and comment on the possible extension to other Centres (Appendix 10). |

PROMPT ACTIONS (Cont/d)

- | | | |
|-----|---------|---|
| 40. | NDS | Check if NNDC is on the distribution list for the A+M data bulletin. |
| 41. | Behrens | Add all Centres to the mailing list for the Conference listing produced at FIS. |

ACTIONS TAKEN OVER FROM THE EXFOR SUBGROUP DISCUSSIONS

42. All Centres Review by 10th September, 1978 the proposed EXFOR and LEXFOR entries on the use of UND and (DEF) as branch codes in the reaction string. (Appendix 12).
43. NNDC Distribute LEXFOR and EXFOR manual proposals for the variable Product Nucleus formalism.
44. NNDC Submit a proposed manual entry for multiple monitors, together with coding examples within one month.
45. KaChaPaG Draft an addition to the LEXFOR "Free Text" entry on the lines of the entry under "COMMENT" to specify that compilers' comments should be distinguishable from comments taken from the Author's text.
46. All Centres Submit comments on Memo. D/64 concerning the combination of particle and process codes, by the 10th September, 1978.
47. All Centres Submit comments on the proposals in Memo. C/20 concerning additions to EXFOR dictionaries by the 10th September, 1978.
48. NNDC Transmit a new ISOQUANT/REACTION dictionary to NDS. Update the EXFOR manual to take account of changes made following Memo. C/36.
49. NNDC Send to NDS and CJD the Ryder experimental fission product data file.
50. All Centres Consider and respond to the extension of the variable product nucleus formalism to the new process codes XN and YP described in the minutes.
51. All Centres Consider the proposal from KaChaPaG for the addition of new process codes XN and YP together with the data headings.
52. NDS Review the proposed Spallation LEXFOR entry concerning its possible inclusion under "Reaction process" by the 10th September, 1978.
53. NDS Implement dictionary 27 and transmit with the next dictionary update.
54. CJD
 NNDC Inform KaChaPaG when they can accept high density tapes.
55. All Centres. Review the EXFOR pages 8D1 and 8D2 and the LEXFOR entry concerning Fission, dated June 1978, and send comments to NNDC by 10th September, 1978.

PROMPT ACTIONS CONCERNING NEUTRON NUCLEAR DATA CENTRES ONLY

CINDA

56. All Centres (28) Retransmit all entries for CINDA with the neutron as a target and index relevant EXFOR data.
57. NEADB Send the CINDA profile for INIS retrievals to NNDC and CJD.
58. All Centres Review existing CINDA blocks for agreement between CINDA and EXFOR for main references and energy ranges.
59. NNDC Block and index in CINDA data converted from the 50,000 series.
60. NEA-DB Inform the other Centres of changes in the treatment of "mainlines" in CINDA following implementation of the Data Base.
61. NEADB Check the manual rules for removal of data index lines in CINDA for superseded data.
62. NDS Prepare an introduction to the CINDA archival volume with a paragraph on the use of "No Book Flags", and the availability of these entries from file retrievals. Send a draft to the other Centres so that it can be reviewed before 31st December, 1978.
63. NEADB Send a retrieval from CINDA of the remaining Z-"second line" references in Area 4 to NDS for correction.
64. NDS Correct "second line" entries for Area 4 for the CINDA archival volume.
65. All Centres Send to NEADB the bulk of CINDA revisions at regular intervals before the end of 1978.
66. NDS Investigate the CINDA book dictionaries for discrepancies in conference codes and explanations, in particular in relation to report cross references.
67. NDS Include discussion of the treatment in CINDA of Superheavy elements at the next 4C meeting.
68. NEADB Reconsider the proposal in CPD/55 for coding of unnamed new heavy elements as 07 270 for Z=107, A=270.
69. NDS Investigate the naming of new heavy elements, Z=105 and higher. Remove Hahnium from the dictionaries and keep in touch with international agreements on the naming of elements.

CINDA (Cont/d)

70. NEADB Distribute by the end of December, 1978, proposals for exchange formats to be used for CINDA transmissions to NNDC and for the book tape to NDS.
71. NNDC Delete the LEXFOR entry on CINDA quantities in the EXFOR manual.
72. NEADB Investigate the possibility of implementing a duplicate check program, so that a list of duplicates in CINDA, in LAB ZAQ reference, might be sent to the other Centres for correction before the publication of the archival volume of CINDA.
73. NEADB Retrieve present file statistics for an archival volume cutoff date of 1976 and send these statistics to NDS before the end of September, 1978 so that price estimates can be made.
74. NDS Send to NEADB and NNDC by the 15th of October, 1978, the price estimate for the Archival Volume and Supplements of CINDA in 1979/1980.
75. All Centres Send to NDS proposals for the CINDA archival volume title before 31st December, 1978.

PROTOCOL CHANGES

76. NNDC Reissue the revised 4C protocol following the changes agreed at this meeting (Appendix 10).
77. NEADB Issue the agreed CINDA protocol as part of the CINDA Manual (Appendix 11).

WREND A

78. NDS Provide information on the WREND A formats to NEADB as soon as possible.
79. NDS Send WREND A retrievals by country to NEADB for distribution and revision.
80. NDS Send WREND A retrieval for Area 4 to Dr Manokhin, CJD.

MISCELLANEOUS

81. NNDC Check that the other Centres have been informed of the foreign distribution of the NNDC Newsletter.
82. NEADB Distribute the list and descriptions of proposed NEANDC Specialists' meetings to all Centres.

MISCELLANEOUS (Cont/d)

83. NEADB Distribute the NEACRP/NEANDC high priority request list at the appropriate time.
84. NDS Send an invitation to the State Committee (USSR) to attend the reactor dosimetry data meeting in 1979, with copies of the invitation to CJD and the RIGA Institute of Physics.
85. NEADB
NDS
NNDC Observe the developments of the INFCE Study and review consequences for data services.
86. CJD
NDS Investigate the possibility of a trial transmission of nuclear data by telephone line from Moscow to Vienna, when such a link is established for INIS.
87. CJD Contact Dr Majorov at the Kurchatov Institute concerning documentation of thermal group cross sections, and send this documentation (FEDGROUP) to NDS.
88. NDS Arrange translation of the thermal group cross section documentation and publication as an INDC report.
89. All Centres Include in data compilations information on data covariances when available.
90. NNDC Report on the informal US Specialists' meeting on U-235(n,f) and fission spectra.
91. CJD Inform the other Centres of errors found in transmitted CJD tapes.
92. CJD Send the corrected SOKRATOR files to other Centres together with documentation of the format, including definitions of new quantity numbers.
93. NEADB Send an index of the NEADB version of UKNDL to NDS with version characters.
94. Sol Pearlstein Clarify the situation concerning distribution of ESIS EURLIB 3 and 4 group set libraries.
95. All Centres Send to NDS information concerning new references to compilations and evaluations on fission product nuclear data, for inclusion in the fission product compilation list.
96. NEADB Discuss with NEACRP/NEANDC the distribution of proceedings of their Specialists' meetings to the other data centres.

MISCELLANEOUS (Cont/d)

- 97. NNDC Send to the other Centres the updated ENDF/B5 fission product nuclear data library.
- 98. NDC Inform CJD about the date of the Physics and Chemistry of fission conference in 1979.

APPENDIXES TO THE
MINUTES OF THE 3RD NRDC MEETING

1. The Activity on the "Generalised EXFOR" format
Kurchatov Atomic Energy Institute report for Data Centres meeting.
2. CJD Progress Report.
3. NEA Data Bank Progress Report.
4. NDS Status Report to the NRDC Meeting.
5. Progress Report of the National Nuclear Data Centre.
6. Karlsruhe Charged Particle Group, KaChaPaG, Status Report.
7. Status Report, Zentralstelle für Atomkernenergie-Dokumentation (ZAED).
8. AERE, Harwell, Status Report.
9. Status Report of the Japanese Study Group.
10. Revised EXFOR Protocol.
11. CINDA Protocol.
12. Proposed EXFOR and LEXFOR entries on the use of UND and (DEF) as
new branch codes.

I.V.Kurchatov

ATOMIC ENERGY INSTITUTE

CENTRE FOR DATA ON STRUCTURE OF THE ATOMIC NUCLEUS AND ON

NUCLEAR REACTIONS

USSR STATE COMMITTEE ON ATOMIC ENERGY

THE ACTIVITY ON THE "GENERALIZED EXFOR" FORMAT

(REPORT FOR DATA CENTRES MEETING ON THE DATA OF NUCLEAR REACTIONS)

PARIS , 1978.

Yu.I.Grigor'yan, N.V.Timofeeva, F.E.Chukreev

Moscow, 1978

THE ACTIVITY ON THE "GENERALIZED EXFOR"
FORMAT

The Centre for data on structure of the atomic nucleus and on nuclear reactions (USSR State Committee on Atomic Energy) has the same scheme as earlier, except for next modification: there were 3 workers last year which spend part of their time preparing on nuclear reactions with charged particles (CPND) in the "generalized EXFOR" format, but at the time being we have one full-time worker for that job.

1.CPND. Since the previous meeting in April 1977 (Kiev), the Centre's main activities in the CPND field were being next ones: first, a preparation of the numerical material in the "g. EXFOR" format; second-preparation and modification of the corresponding software; third-corrections of those ENTRYs that were recorded earlier on the TRANS A000 with the accordance to alterations some "g. EXFOR" rules and the remarks of our colleagues.

As earlier, along with preparing of material we send a draft of the prepared ENTRY to the authors for careful checking and to get their approvement (APRVD code). Although this procedure takes a lot of time it proved to be very useful, because a reliability of data is growing. Besides, the responsibility of the authors for their scientific results is growing, too. In a number of cases we succeeded in correcting of some misprints in the publications by the help of that checking.

We have conceived now of what kind difficulties might arise with the charged particles nuclear data. We have already gained some experience, and our aim now is increasing of quantity of the compiled publications. At the time we have 12 papers in the "G.EXFOR" format. We hold back from compiling of some experiments

until are not stated completely some EXFOR rules. Furthermore, the set of rules is not yet full enough for compiling of any experiment on CPND (for example, on fission).

2. Heavy elements. In the MEMO CP-C/26 the question about designation in the "G.EXFOR" format of those heavy elements which have not got yet chemical symbol was being discussed. It is rather complicated problem to come to an agreement at the international scale about common names of new elements. Perhaps, a lot of time will pass till its complete solution. Moreover, there are countervailing opinions on the facts of a discoveries either elements. All this concerns in full degree of 105th element and so we are the opinion that those heavy elements, beginning from 105-th, should be designated in the accordance with next rules: Z - ~~xx~~. For example, 105-~~xx~~. Different isotopes of certain element may be written as: 105-~~xx~~-265, 105-~~xx~~-266, and so on.

3. Types of publications. As in the last year our opinion is that it is necessary to distinguish two different types of publication of the JINR (Dubna) in the "g. EXFOR" format - they are "preprint" and "communications". They should be designated JINR and CJINR respectively. It makes convenient to find quickly original publication and it is useful because text of the communication is not being placed in scientific journals.

4. Actions. Touching upon item N83 of the actions (Kiev meeting April, 1977) we can say that there is state standard in the USSR on the transliterating cyrillic characters by latin ones. Last year we have sent MEMO CP-A/2 to the all centres, in which we've given the table with transliteration rules. We hope that all Centres will use it in future.

5. Answers on requests. During 1977 Centre had received 100 requests on the CPND. The number of requests was less than in 1976, since on a good deal of claims answers were given.

6. Compilations. We would like to discuss: which centre must compile those soviet papers that were published as preprints in the USSR and then sent abroad for publishing in foreign periodic journals.

7. Dictionaries. We want to bring forward the proposal about expansion of the dictionary 17. The SF1 field of the "REL-REF" keyword is reserved for an indication of a reason-why information about literary resources (Dictionary 17), which is useful for analysis of a compiling paper, is needed. The "C" code from Dictionary 17 means critical remarks of the authors of the compiling paper towards other works. It is reasonable to put into Dictionary 17 new code, for example "K", to indicate critical remarks towards compiling paper.

CJD progress report

1. This report covers the period of April 1977 - May 1978. During this period CJD has transmitted the tapes 4029 - 4032 with 54 works. TRANS 4033 with 20 works has been prepared for transmission. Other 50 works are in process of compiling and putting on magnetic tapes. TRANS 4032 is the first one with entries compiled in Generalized EXFOR.

2. During the period under review the EXFOR programmes in PL/1 for the EC-1030 computer are developed. Now we have the programmes which enable:

- to form EXFOR entries and make up transmission tapes,
- to check information and insert corrections,
- to retrieve entries and subentries,
- to do index for EXFOR tape and so on.

The checking program has been put into operation recently. That is why the tapes 4029 - 4032 have been transmitted without checking.

3. Since the last 4-centres meeting the CJD has completed the work connected with the CINDA Improvement Program. A lot of the "CCP" codes have been replaced by the appropriate lab-codes. In the nearest future before issue of "archival" CINDA-79 the work on replacement of the "CCP" codes will be continued. The USSR literature coverage for the period before 1969 has been checked (see Action 34). Starting with the tape 4030 CJD began to prepare for the EXFOR transmission tapes the corresponding EXFOR index lines for CINDA. The work on improving the blocking of CINDA entries referring to the same experiment is in progress. The efforts are also undertaken to improve the CINDA coverage of the USSR preprints.

4. Some efforts were undertaken by CJD to remove discrepancies taking place in the SOKRATOR format structure different files of our evaluated neutron data library. All the files have been analyzed from the point of view of a format structure. Now the necessary corrections are being made.

5. The evaluation of the (n,p) , (n,α) , $(n,2n)$ cross-sections in the energy range from a threshold up to 20 MeV for nuclei with $Z \geq 20$ is in progress now in CJD.

The evaluation results in the form of excitation function curves and the tables of cross-sections at the neutron energy of 14,5 MeV will be published in the collection "Nuclear Constants". In future it is planned to put all these data on a magnetic tape. The CJD together with the Konshin's laboratory participates in the evaluation of neutron fission and capture cross-sections for ^{241}Am .

6. During the period after the last 4 centres Meeting the following editions have been published: Proceedings of all-Union Conference on Neutron Physics (Kiev, 1977), "Nuclear Constants". No. 24, 25, 26, 27 collections, of abstracts "Nuclear Physics Researches in USSR" No. 24, 25.

7. From April 1977 up to now the CJD has answered the 110 requests on nuclear data.

NEA DATA BANK PROGRESS REPORT
TO THE 14TH FOUR-CENTRES MEETING

NUCLEAR DATA ACTIVITIES

INTRODUCTION

The most important development over the past year has been the creation of the Data Bank to continue the functions of CCDN and the Ispra Computer Program Library (CPL). The long uncertainty about the future of this project was finally resolved in January of this year, and now that the dust has settled we have been able to proceed with the conversion of CCDN activities to the new computer environment; in parallel, CPL staff have now moved to Saclay and set up their program testing and customer service activities based largely on the CDC 7600 and IBM 360/91 computers on the Saclay site.

Despite the period of uncertainty, and the subsequent changes, compilation of neutron data and CINDA revision work has continued at a high level. However over the past 2 years we have acquired a better knowledge of the amount of data needing to be compiled, and it seems important to increase the manpower effectively devoted to compilation, and the efficiency of the compilation process, if we are to do more than keep our heads above water. We cannot realistically predict an increase in our compilation output (10 EXFOR tapes and 24,000 CINDA entries, mostly corrections, during the last year) until the conversion to the new computer system is complete: we hope that after the conversion the benefits of simpler and more maintainable software and interactive use of the new PDP 11/70 will make themselves visible.

CINDA

Work has concentrated on improvements to the Area 2 file in preparation for the archival volume, and in setting up the coverage file (completed in November, 1977). A number of smaller evaluation files have been added to the Data Bank's collection, and indexed in CINDA over the past year. We have not had the effort available to re-index pre-1970 data from Area 2 not yet transmitted in EXFOR.

EXPERIMENTAL DATA

Anton Schofield has completed and tested his augmented EXFOR check program, so that we are now able to send and receive data coded under the generalized reaction formalism. At the same time we have started to implement simpler (and shorter) in-house testing and administration procedures for production of outgoing EXFOR tapes, which will then be adapted to run on the 370/168 computer rather than the small in-house machine, and should reduce the time to process these data.

Ten EXFOR tapes (2034 to 2043) have been sent out during the year, most of them covering a particular topic. Thus the last four tapes contain data from Cierjacks' group in Karlsruhe, and there were two tapes of resonance parameters, one on (n, α) reactions and one containing fission data from Saclay. We expect to continue compiling in this way until we can find the manpower to make an attack over the whole breadth of the data available.

EVALUATED DATA

We have received four new files in the past year, all with fission product cross-section data (plus some data for actinides in JENDL/1). The files JENDL-1, JPND and CNEN-CEA are in ENDF/B-IV format while RCN-2 is in

KEDAK format. We hope to receive revised versions of the KEDAK and UKNDL files later in the year, while a number of our customers have been making requests for advance information on ENDF/B-V, including the programs to read the file, so as to be ready to use these data when they are released.

CUSTOMER SERVICE

About 200 requests were received during the year. A fuller analysis made by Hervé Derrien of 103 requests received in the first 19 weeks of 1978 showed significantly equal numbers of requests for experimental and evaluated data (80% together) and showed that several laboratories were using the Data Bank as a data source in building up their own major files for evaluation work. He also noticed the number and diversity of requests from French customers, due perhaps both to ease of access and to good personal contacts with French laboratories.

COMPUTER USE

1. Current problems

The in-house IBM 370/125 computer was already very near saturation for one-shift working at the end of 1977, and in order not to build up a backlog we have been obliged to work Saturdays, evenings and early mornings, and occasional nights. We expect this problem to be eased by late autumn this year, when we hope to transfer some of the utility work (tape copying, etc.) to the PDP 11/70, and much of the EXFOR computing to the Saclay 370/168. By presorting the CINDA batches containing file corrections we have been able to reduce running time, and now expect that we shall be able to handle the CINDA workflow without too much difficulty or delay.

2. Conversion of CCDN data handling operations

In designing the new Data Base applications, we have been particularly anxious to avoid duplicating those procedures inherited from the CCDN which with hindsight we wished had been organized differently. In the recent past CCDN was in a position where three physicists were occupied in maintaining EXFOR programs or those linking EXFOR and NEUDADA, handling heavy EXFOR checking procedures, or merging data into NEUDADA so that we could provide data to our customers in computational format.

Our aim is to produce simpler programs grouped round the Data Base Management System, to ensure that these programs are more easily maintainable and better documented than in the past, and, probably after the initial two-year period, to use the full interactive capabilities of the PDP 11/70 as we have time to write the necessary programs. The Data Base schema has been pared down during a period of extensive discussion among the future users and the programmers, in order to reduce the time taken to program it and to improve physical performance.

In order to reduce the possible effect of delays in data base programming, we have assigned priorities to the different data base functions in order of their importance in every-day use and the difficulty of transforming existing programs from the 370/125 to run on the 370/168. We intend to test all EXFOR tapes on the 370/168. Thus our priorities are :

- (1) Implementation of all CINDA operations on the data base.
- (2) Testing and transformation of incoming and outgoing EXFOR tapes on the Saclay 370/168.
- (3) Loading, update and retrieval programs for storing EXFOR data on the data base and retrieving it in a computational format similar to that of NEUDADA.

In addition, there is a cloud of smaller and simpler programs for maintaining evaluated data files, producing listings in various formats for the various files, etc., which must be reproduced for the PDP 11 or transferred to the 370/168.

We have adopted structured programming conventions for all the work on the data base : the effect of this is to lengthen thinking time and to reduce coding time and hopefully the number of bugs in the new programs. We believe that we are fairly well on schedule : detailed analysis and specification of all CINDA loading and update programs is complete, and about 1/3 of the coding work is done. We hope to complete the simplified EXFOR production chain and install it on the 370/168 by mid-July. We have completed a re-analysis of the data part of the schema, and are now mapping out the programming details.

NDS STATUS REPORT
TO THE NRDC MEETING

No typed report is available; A draft was circulated at the time of oral presentation.

Progress Report
of
National Nuclear Data Center
to the

Third Nuclear Reaction Data Centers Meeting
Paris, France
June 19-23, 1978

I. General

In the past year one additional position for a nuclear structure evaluator was created. Our EXFOR compiler, Gail Thompson, left. She was replaced temporarily, but the position is now open. The new center computer has been ordered with installation expected in the fall of this year. The computer will be a DEC-1091 with a KL-10 processor, 256K internal memory, internal channels, 4 RP06 disk drives with a total storage capacity of 160 MEGA words, a new high speed tape system consisting of one 7-track and two 9-track drives, and two chain printers with upper and lower case capabilities.

II. WRENDA

No work has been carried on in this area in the past year. Work is now beginning on the biennial revision to the US Request List. Publication of the revised list is planned for April 1979.

III. CINDA

In addition to our normal CINDA compilation activity, for the past six months the center has provided additional support at about 1.5 man level to help complete the review of all area 1 CINDA entries. So far 52 elements have been completed and corrections sent to NEADB for updating the master file.

Special CINDA indexes were prepared for the 1977 Standards Conference at NBS, the Symposium on Neutron Cross Sections from 10-40 MeV held at BNL and the 1978 DOE-NDC Status Reports.

IV. EXFOR

In the past year (June 1977 through May 1978) six transmission tapes (TRANS 1059-1064) have been sent out containing 77 new entries and numerous corrected entries. Seventy-six new entries have been compiled.

The pre-1970 area 1 data has been checked against the original data sources for completeness and accuracy. Missing data has been added and errors have been corrected. These have been sent out as TRANS 1065-1086.

A check of CSISRS versus CINDA has been done in connection with the upcoming publication of BNL-325, Vol. 1 (Thermals and Resonance Parameters). "Important" missing references have been noted and are in the process of being compiled.

V. Evaluated Data Neutron Data

The General Purpose File for ENDF/B-V is nearly complete. All materials have passed extensive computer checking and review by experienced evaluators. The file is now being tested against benchmark experiments before being approved for release.

Several Special Purpose Files are now being prepared for Actinide data (to contain materials with only partial evaluations), Dosimetry, Gas Production, Activation and Fission Product data. These files are scheduled for completion by the end of 1978.

Work is in progress toward defining a more general ENDF format to easily handle non-neutron projectile as well as additional reaction properties. The format has been defined and data compiled in that format to test its practicability.

VI. Charged Particle Nuclear Data

CPND Bibliography:

The current bibliography file is three times the size of the file one year ago.

The 1978 edition of BNL-NCS-50640 is in press and should be issued this month. There have been some minor changes in format and in the detail in which reactions are presented which we hope will be useful.

McGowan-Milner Data File:

No work has been done on this file since December. The index of this file is 80% completed (e.g. brought up to CPND bibliography standards). Work will continue on a time available basis.

CPND Evaluation Effort:

Work has begun on evaluating the $T(d,n)$ reaction up to a zero-degree primary neutron energy of 40 MeV. Special care will be taken in evaluating secondary energy and angular distribution.

VII. Photonuclear Reaction Data

The Berman photonuclear data library previously converted to EXFOR and distributed by NNDC has been upgraded to conform to current EXFOR specifications. The latest version of the Berman library should be available to us in June 1978. Any revisions and all new data will be converted and distributed by NNDC during 1978.

VIII. Customer Services

The request service statistics for the period 1 January 1977 to 1 January 1978 are attached.

A computation format for resonance parameters has been developed and is being used in connection with the evaluation for the upcoming BNL-325, Vol. I.

The program to produce expanded listing from data in the EXFOR format has been completed and is in general use.

IX. Publications

During the past year the center has published the proceedings of the Symposium on Neutron Cross Sections from 10-40 MeV and the 1978 DOE Nuclear Data Committee Status Reports.

With the work on ENDF/B-V coming to a close, we plan to issue during the next 12 months, the Formats and Procedures Manual (ENDF-102), and the ENDF/B Summary Documentation (ENDF-201). We also plan to re-issue the Fission Product Decay Data Publication (ENDF-243).

Evaluations of the data for BNL-325, Vol. I will begin in June with publication planned in about one year. Data missing from EXFOR is being requested from the data centers.

Request Statistics

TABLE 1A

1 Jan. 1977 to 31 Dec. 1977

Area 1

N u m b e r o f r e q u e s t s f o r d a t a

<u>Country Origin</u>	<u>Experimental</u>	<u>Evaluated</u>	<u>Bibliographic</u>	<u>Codes</u>	<u>Documents</u>	<u>Total</u>
USA	143	245	20	13	172	593
Canada	2	6	0	1	3	12
Total	145	251	20	14	175	605

Request Statistics

TABLE 1B

1 Jan. 1977 to 31 Dec. 1977

Area 1

N u m b e r o f r e q u e s t s f o r d a t a

<u>Originating Organization</u>	<u>Experimental</u>	<u>Evaluated</u>	<u>Bibliographic</u>	<u>Codes</u>	<u>Documents</u>	<u>Total</u>	<u>Total Previous Year</u>
Government Labs.	103	137	15	8	71	334	292
University	15	26	2	2	54	99	113
Industry	25	82	3	3	47	160	112
Other	2	6	0	1	3	12	59
Total	145	251	20	14	175	605	576

Request Statistics

TABLE 1C

1 Jan. 1977 to 31 Dec. 1977

Area 1

N u m b e r o f r e q u e s t s f o r d a t a

<u>Request Disposition</u>	<u>Experimental</u>	<u>Evaluated</u>	<u>Bibliographic</u>	<u>Codes</u>	<u>Documents</u>	<u>Total</u>	<u>Total Previous Year</u>
Fulfilled	145	251	20	14	175	605	576
Partially Fulfilled	0	0	0	0	0	0	0
Unfulfilled	0	0	0	0	0	0	0
Standing	0	0	0	0	0	0	0
Total	145	251	20	14	175	605	576

Data Dissemination

TABLE II

1 Jan. 1977 to 31 Dec. 1977

Area 1

<u>Data Type</u>			<u>Amount</u>
Experimental	23,060	Data Sets	containing 1,682,310
	0	CHARGE PARTICLE REQUESTS	
	0	NUCLEAR STRUCTURE & RADIOACTIVE DECAY REQUESTS	
Evaluated			
	10	REQUESTS	
(OTHER NUCLEAR STRUCTURE, RADIOACTIVE DELAY, CHARGE PARTICLE)			
	4810	DATA FILES	
(ENDF ENDF/A, ENDF/B-I-VI PRELIMINARY ENDF/B-V PRE-PROCESSED DATA)			
Bibliographic	434	CINDA Entries	
	4	CHARGE PARTICLE REQUESTS	
	5	NUCLEAR STRUCTURE & RADIOACTIVE DECAY REQUESTS	
Codes	128	codes	
Documents	261	documents	
Miscellaneous	11	Requests	

TABLE III

ZQA REQUEST STATISTICS

1 JAN. 1977 TO 31 DEC. 1977

AREA 1

ELEMENT	TOTAL (TOT)	ELAS. SCAT. (EL)	INEL. SCAT (INL)	OTHER SCAT. (C/S)	RES. PAR. (RES)	GAMMA & NEUTRON EMISSION (NG)	CHARGED PARTICLE EMISSION (NX)	FISSION (NF)	OTHERS	TOTAL REQUESTS
1-H	13	11	0	0	0	10	0	0	7	41
2-He	8	6	0	1	4	4	3	0	2	28
3-Li	10	10	3	0	12	7	17	0	3	62
4-Be	4	0	0	0	5	2	0	0	1	12
5-B	11	7	5	0	21	15	15	0	16	90
6-C	9	11	1	0	17	7	1	0	2	48
7-N	6	3	0	0	16	4	8	0	1	38
8-O	5	3	0	0	16	6	6	0	0	36
9-F	2	2	0	0	8	7	2	0	0	21
10-Ne	9	6	2	2	22	4	3	0	1	49
11-Na	2	1	1	4	4	19	6	0	7	44
12-Mg	8	11	5	6	26	32	13	0	6	107
13-Al	3	3	2	5	0	11	25	5	3	57
14-Si	1	2	0	0	0	9	0	0	4	16
15-P	1	0	0	0	0	2	0	0	1	4
16-S	2	3	2	0	0	5	3	0	2	17
17-Cl	0	0	0	0	0	6	3	0	1	10
18-Ar	1	1	0	1	0	5	1	0	1	10
19-K	1	1	0	0	0	6	3	0	4	15
20-Ca	2	4	0	0	5	14	1	0	2	28
21-Sc	2	2	0	0	6	6	0	0	0	16
22-Ti	19	17	3	20	52	40	32	0	2	185
23-V	5	8	0	0	10	8	3	0	2	36
24-Cr	19	29	11	5	33	45	14	1	13	170
25-Mn	4	5	3	4	24	26	25	3	8	102
26-Fe	15	17	10	21	63	36	74	0	19	255
27-Co	4	4	3	4	13	15	15	2	3	63
28-Ni	22	23	6	12	78	50	37	0	4	232

TABLE III (CONT.)

ELEMENT	TOTAL (TOT)	ELAS. SCAT. (EL)	INEL. SCAT. (INL)	OTHER SCAT. (C/S)	RES. PAR. (RES)	GAMMA & NEUTRON EMISSION (NG)	CHARGED PARTICLE EMISSION (NX)	FISSION (NF)	OTHERS	TOTAL REQUEST
29-Cu	8	10	6	4	35	36	26	0	6	131
30-Zn	11	6	0	0	17	20	4	0	1	59
31-Ga	1	0	0	0	0	8	0	0	1	10
32-Ge	1	2	0	0	0	10	3	0	5	21
33-As	1	1	0	0	0	2	0	0	0	4
34-Se	0	2	0	0	0	14	0	0	3	19
35-Br	1	0	0	0	0	6	0	0	3	10
36-Kr	1	1	0	1	0	12	0	0	1	16
37-Rb	0	0	0	0	0	8	0	0	0	8
38-Sr	0	1	0	0	0	10	0	0	1	12
39-Y	2	3	0	0	5	6	0	0	1	17
40-Zr	3	3	0	0	0	16	1	0	4	27
41-Nb	3	3	0	0	0	7	0	0	1	14
42-Mo	13	9	6	3	26	40	18	1	6	122
43-Tc	1	0	0	1	0	2	1	0	1	6
44-Ru	0	0	0	0	0	18	4	0	0	22
45-Rh	0	0	0	0	0	4	1	0	1	6
46-Pd	1	0	0	0	0	10	0	0	0	11
47-Ag	2	3	0	0	0	11	0	0	3	19
48-Cd	6	2	0	4	0	15	0	0	1	28
49-In	1	2	4	0	0	10	0	0	2	19
50-Sn	5	2	0	0	0	9	1	0	0	17
51-Sb	1	1	0	0	0	8	0	0	0	10
52-Te	1	0	1	0	0	18	0	0	0	20
53-I	1	2	0	0	0	15	0	0	2	20
54-Xe	8	9	0	2	18	45	5	0	1	88
55-Cs	1	2	0	0	0	8	0	0	3	14
56-Ba	1	1	0	0	0	18	0	0	6	26
57-La	2	3	2	1	1	8	0	0	0	17
58-Ce	1	4	0	3	0	15	0	0	0	23
59-Pr	1	1	0	1	0	5	0	0	1	9
60-Nd	2	5	0	4	0	16	2	0	5	34

TABLE III (CONT.)

ELEMENT	TOTAL (TOT)	ELAS. SCAT. (EL)	INEL. SCAT. (INL)	OTHER SCAT. (C/S)	RES. PAR. (RES)	GAMMA & NEUTRON EMISSION (NG)	CHARGED PARTICLE EMISSION (NX)	FISSION (NF)	OTHERS	TOTAL REQUESTS
61-Pm	2	0	1	0	0	10	0	0	1	14
62-Sm	6	3	0	0	0	22	2	0	6	39
63-Eu	7	5	0	3	0	26	8	12	6	67
64-Gd	3	0	1	0	0	25	10	0	3	42
65-Tb	1	0	0	0	0	2	0	0	0	3
66-Dy	5	0	0	4	0	18	5	0	4	36
67-Ho	1	0	0	1	0	2	2	0	0	6
68-Er	7	8	0	0	0	13	5	0	0	33
69-Tm	2	1	0	1	3	8	1	0	0	16
70-Yb	7	0	0	1	0	16	7	0	0	31
71-Lu	3	0	0	1	0	6	2	0	0	12
72-Hf	7	1	0	6	0	15	2	0	6	37
73-Ta	2	1	0	0	0	6	1	0	1	11
74-W	1	1	0	0	0	12	0	0	1	15
75-Re	3	1	0	0	0	6	0	0	1	11
76-Os	2	0	1	0	0	13	6	0	1	23
77-Ir	3	0	0	0	0	1	1	0	0	5
78-Pt	1	0	0	0	0	9	2	0	1	13
79-Au	2	2	0	0	1	17	1	1	3	27
80-Hg	1	1	0	0	0	8	0	0	0	10
81-Te	0	0	0	0	0	6	1	0	1	8
82-Pb	7	11	8	0	5	45	3	0	5	84
83-Bi	3	4	0	0	0	5	1	0	1	14
88-Ra	1	0	0	0	0	6	0	2	1	10
89-Ac	0	0	0	0	0	2	0	1	0	3
90-Th	14	8	5	9	10	43	0	22	6	117
91-Pa	5	2	0	0	2	12	0	3	0	24
92-U-000	4	4	1	0	1	2	0	0	2	14
92-U-230	0	0	0	0	0	0	0	1	0	1
92-U-231	0	0	0	0	0	0	0	1	0	1
92-U-232	2	0	0	0	0	3	0	3	2	10
92-U-233	5	2	0	2	12	7	2	23	6	59

TABLE III (CONT.)

ELEMENT	TOTAL (TOT)	ELAS. SCAT. (EL)	INEL. SCAT. (INL)	OTHER SCAT. (C/S)	RES. PAR. (RES)	GAMMA & NEUTRON EMISSION (NG)	CHARGED PARTICLE EMISSION (NX)	FISSION (NF)	OTHERS	TOTAL REQUESTS
92-U-234	2	0	0	0	0	4	0	5	1	12
92-U-235	8	4	2	0	23	9	1	71	10	128
92-U-236	2	0	0	0	0	5	0	2	1	10
92-U-237	0	0	0	0	0	2	1	1	1	5
92-U-238	5	4	3	0	0	13	1	22	2	50
92-U-oz1	1	0	0	0	0	0	0	0	1	2
92-U-239	0	0	0	0	0	0	0	0	1	1
93-Np	5	2	0	0	2	8	0	12	0	29
94-Pu-000	0	0	0	0	0	0	0	0	0	0
94-Pu-238	2	0	0	0	0	3	0	8	1	14
94-Pu-239	4	1	0	0	1	5	0	17	3	31
94-Pu-240	2	0	0	0	0	5	0	9	2	18
94-Pu-241	3	0	0	0	0	6	0	9	2	20
94-Pu-242	2	0	0	0	0	3	0	7	1	13
94-Pu-243	0	0	0	0	0	3	0	1	0	4
94-Pu-244	0	0	0	0	0	3	0	2	0	5
94-Pu-245	0	0	0	0	0	3	0	0	0	3
95-Am	5	1	0	0	0	14	0	7	4	31
96-Cm	4	0	0	0	0	25	0	19	6	54
97-Bk	0	0	0	0	0	3	0	2	1	6
98-Cf	0	0	0	0	0	16	0	8	5	29
99-Es	0	0	0	0	0	6	0	1	1	8
100-Fm	0	0	0	0	0	0	0	2	0	2
TOTAL	420	335	98	163	707	1200	643	124	232	3922

Karlsruhe Charged Particle Group

KACHAPAG

Status report June 1978

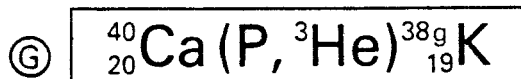
The routine compilation of integral charged particle reaction data (ICPND) was continued and there are now data for about 800 reactions available on the KACHAPAG-file. The reactions of protons with Cu are nearly completely covered. Two transmission tapes were sent out according to schedule, i.e. November and May. With one of the tapes we had trouble due to a mistake in the computer program. However, altogether our data handling organisation was greatly improved due to some new programs provided by NDS. We also appreciate very much the help we received from NDS during the implementation of the program at Karlsruhe.

It should be mentioned that the only entry with ICPND we received since the last conference was a test compilation prepared by NDS/IAEA. We are very much concerned about this fact and we should discuss how we could increase the number of groups actively engaged in data compilation. One way might be to provide interested people with fellowships so that they may acquaint themselves with EXFOR and the compilation procedures for ICPND and then act as a starting nucleus in their home country for the build up of a compiling group.

The number of Memos, new pages for the EXFOR-Manual etc. we received in the year since the last meeting was again quite large. One major problem could unfortunately not be resolved, but we hope that we can find a solution for the "Variable End-product"-compilation rules here at the Meeting in Paris. Only in the case of fission there seems to be general agreement on the applicability of the VPN-formalism. In all other cases especially for reactions with higher projectile energies different approaches exist. However, it is nice that the Neutron Data Center are also engaged in this high energy side of the problem.

The lay out of the printed version of the KACHAPAG-file was discussed very thoroughly. It was decided to publish the data on a collection of loose sheets. Each of the sheets will in general contain the information given in one Subentry. A preliminary lay out of such a sheet is attached to this report. The data are ordered according to the accession number. A separate, annually updated Index register will also be provided, in which the reactions are ordered according to (i) target nucleus, (ii) endproduct, and (iii) reaction type. A list with the authors is also given. The file will be published in cooperation with the Fachinformationszentrum 4, Karlsruhe (formerly ZAED, Karlsruhe).

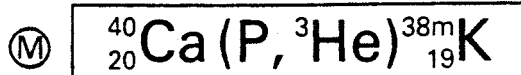
According to our experience data for about 400 reactions will be added each year to the KACHAPAG-file, which will correspond to one volume of the printed version. We hope that all necessary handling programs for preparing the printing plates directly from the file will be available by the end of the year. The additions of the file can then be published without much delay. After the growth of the file and the preparation of the printed version is secured, we will take up again our investigations about how to obtain evaluated and recommended values for excitation functions and thick target yields.



EXPERIMENTAL CROSS-SECTION

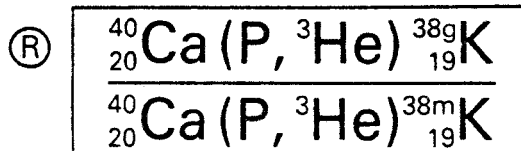
+ PRECURSOR

THE CONTRIBUTION FROM $20\text{-CA-40}(\text{P}, \text{N}+2\text{P})$ 19-K-38-G IS ASSUMED TO BE SMALL AS WAS STATED BY THE AUTHORS.



EXPERIMENTAL CROSS-SECTION

THE CONTRIBUTION FROM $20\text{-CA-40}(\text{P}, \text{N}+2\text{P})$ 19-K-38-M IS ASSUMED TO BE SMALL AS WAS STATED BY THE AUTHORS.



EXPERIMENTAL CROSS-SECTION RATIO

EXPERIMENTAL CROSS-SECTION
+ PRECURSOR

EXPERIMENTAL CROSS-SECTION

Ⓜ DATA DEPENDENT FROM VALUES ON SHEET 62.003

P

 ${}^{40}_{20}\text{Ca}$ ${}^{38}_{19}\text{K}$

562.003

BIBLIOGRAPHY:

TITLE: (P, HE-3) AND (P, T) CROSS-SECTION MEASUREMENTS
 AUTHOR: G. H. MCCORMICK, H. G. BLOSSER, B. L. COHEN, E. NEWMAN
 INSTITUTE: OAK RIDGE NATIONAL LAB., TENN., UNITED STATES OF AMERICA
 REFERENCE: J. INORG. NUCL. CHEM. 2, 269, 56

EXPERIMENT AND ANALYSIS:

FACILITY: CYCLOTRON (OAK RIDGE NATIONAL LAB., TENN., UNITED STATES OF AMERICA)
 IRRADIATION WITH INTERNAL BEAM: CHEMICAL SEPARATION
 BEAM CURRENT WAS MEASURED USING A MONITOR FOR WHICH NO FURTHER DETAILS WERE GIVEN

SAMPLE: SEPARATED CA-40 TARGET OF 5 MG/CM² * 2 THICKNESS

DETECTOR: GEIGER-MUELLER COUNTER

RADIATION DET.: Ⓒ $19\text{-K-38-G}, \beta^+$
 Ⓜ $19\text{-K-38-M}, \beta^+$

DECAY-DATA: Ⓒ $19\text{-K-38-G}, T_{1/2}: 7.7 \text{ MIN}, \beta^+: 2.79 \text{ MEV}, 73.1\%$
 $\gamma: 735.1 \text{ KEV}, 21\%$
 Ⓜ $19\text{-K-38-M}, T_{1/2}: 930 \text{ MSEC}, \beta^+: 5.0 \text{ MEV}, 100\%$

MONITOR: $20\text{-CA-44}(\text{P}, \text{HE } 3) \text{ } 19\text{-K-42}$ EXPERIMENTAL CROSS-SECTION

REFERENCE: C. COLLE + PHYS. REV. C1, 327 (1969), SEE SUBENTRY B 0057004.

- DEC.-DATA: $19\text{-K-42}, T_{1/2}: 12.5 \text{ HR}, \beta^+: - \text{ MEV}, 100\%$

ANALYSIS: THE RESIDUAL NUCLEI WERE IDENTIFIED FROM A GRAPHICAL ANALYSIS OF THE COMPLEX DECAY-CURVE

ADDITIONAL INFORMATION:

COMMENT: THE MAIN PURPOSE OF THIS WORK WAS A TEST OF THE ORDER OF MAGNITUDE OF THE CROSS-SECTIONS FOR A COMPARISON TO THEORY.

RELATED REF.: CRITICAL REMARCS BY COLLE + PHYS. REV. C 1 479 (1969)
 IN THIS REFERENCE A CORRECTION FACTOR OF 1.015 IS RECOMMENDED DUE TO A CHANGE IN THE β^+ ABUNDANCE

ADDITIONAL RESULTS: COMPARISON TO THEORY
 TOTAL REACTION CROSS-SECTIONS WERE CALCULATED AND COMPARED TO THEORETICAL PREDICTIONS

ERROR ANALYSIS:

NO INFORMATION ON APPARATIVE OR SYSTEMATICAL ERRORS IS GIVEN
 ONLY STATISTICAL ERRORS ARE QUOTED

P
40 20 Ca
38 19 K

562.003

E _{lab}	$\sigma \cdot \textcircled{G}$ (⁴⁰ Ca(P, ³ He) ³⁸ K)	$\sigma \cdot \textcircled{M}$ (⁴⁰ Ca(P, ³ He) ³⁹ K)	RATIO $\cdot \textcircled{R}$	FOOTNOTE	MISCELLANEOUS
[MEV]	[MB]	[MB]	[NO-DIM]		[MEV]
21.0	1.5 ± 0.2	0.3 ± 0.01	5.0 ± 1.		20.2
22.0	2.7 ± 0.3	0.6 ± 0.02	4.5 ± 1.		21.3
23.0	3.8 ± 1.0	1.2 ± 0.1	3.1 ± 0.8		22.3
25.5	10.1 ± 2.0	2.9 ± 0.9	3.1 ± 0.8		25.1
30.	15.	4.	4.	1.	29.

DATA OBTAINED FROM A CURVE

* ATTENTION, SEE PREVIOUS PAGE FOR SPECIFICATION OF QUANTITY
 $\textcircled{G} \textcircled{M} \textcircled{R}$ SEE CORRELATED INFORMATION EQUALLY MARKED IN THE SECTIONS ABOVE
 1. THE CROSS SECTION GIVEN IS AN UPPER LIMIT
 + CENTER OF MASS ENERGIES

Entered: 77/12/18

14.6.78

S t a t u s r e p o r t

Zentralstelle für Atomkernenergie-Dokumentation (ZAED)

Federal Republic of Germany

H. Behrens

In the meantime the FACHINFORMATIONSZENTRUM, ENERGIE, PHYSIK, MATHEMETIK (with seat at the Nuclear Research Center Karlsruhe) has been founded, of which the ZAED, amongst other institutions is a part. As activities and tasks are taken over by the Fachinformationszentrum the name ZAED will be dropped gradually.

1. Horizontal Compilations and Evaluations

One of the major objectives of the ZAED is to issue at regular intervals data compilations (and evaluation) for subfields of physics not fully covered yet. A certain number of the items already published are of relevance to nuclear physics. A complete list is enclosed with this statement.

2. Bibliography of Existing Data Compilations

ZAED publishes a bibliography at regular intervals. This publication gives a worldwide survey of all existing physics data compilations. Two issues have been published so far and one is in print:

Physikdaten/Physics Data 3-1, 1976
with the bibliographic data of about 1,450 compilations

Physikdaten/Physics Data 3-2, 1977
with the bibliographic data of about 500 compilations

in print:
Physikdaten/Physics Data 3-3, 1978
with the bibliographic data of about 350 compilations

3. New data compilations

New data compilations are planned for the following topics:

- Internal conversion coefficients
- Neutron cross sections for some reference materials
- Neutron cross sections of fission products
- Data of hadronic atoms
- Pion-nucleon scattering data (continuation)
- Nucleon-nucleon scattering data

4. Evaluated Nuclear Structure Data File

ZAED participates on a collaborative basis in the establishment of the Evaluated Nuclear Structure Data File (ENSDF) which contains the nuclear structure and decay data of all isotopes. ZAED is responsible for the evaluation of the data for the isotopes in the mass region $A = 81-100$.

5. CPND Activities

As far as the topic of this meeting is concerned, ZAED acts as a distribution center for charged particle reaction data. Besides, we cooperate with the Institut für Radiochemie of the Karlsruhe Nuclear Research Center in the preparation of a publication containing integral charged particle reaction data, i.e. a printed version in computer-driven composition of the KACHAPAG file.

PHYSIKDATEN/PHYSICS DATA

Already published:

Price/Preis
plus postage/zuzügl. Porto *

- 1-1 (1975): **Survey Index of Pion-Nucleon Scattering Data.** —
By K. H. Augenstein, G. Höhler, E. Pietarinen and H. M. Staudenmaier.
56 pages. Superseded by No. 1-2 (1977).
- 1-2 (1977): **Survey Index of Pion-Nucleon Scattering Data.** 5,— DM
By K. H. Augenstein, G. Höhler, E. Pietarinen and H. M. Staudenmaier.
64 pages.
- 2-1 (1976): **Stopping Cross Sections of Elements with $Z = 2$ to 87 for Li Ions with Energies between 80 keV and 840 keV.** 3,50 DM
By W. Neuwirth, W. Pietsch and U. Hauser. 6 pages.
A compilation of experimental and calculated stopping cross sections.
- 3-1 (1976): **Datensammlungen in der Physik. Data Compilations in Physics.** 14,— DM
By H. Behrens and G. Ebel. 206 pages.
A bibliography of about 1450 existing tables and compilations from all fields of physics.
- 3-2 (1977): **Datensammlungen in der Physik. Data Compilations in Physics.** 7,— DM
By H. Behrens and G. Ebel. 106 pages.
Supplement to No. 3-1 containing about 550 further references to tables and compilations.
- 4-1 (1976): **Compilation of Coupling Constants and Low-Energy Parameters. 1976 Edition.** 6,— DM
M. M. Nagels, J. J. de Swart, H. Nielsen, C. C. Oades, J. L. Petersen, B. Tromborg, G. Gustafson, A. C. Irving, C. Jarlskog, W. Pfeil, H. Pilkuhn, F. Steiner and L. Tauscher. 90 pages. Reprinted from Nuclear Physics B.
A compilation of coupling constants and other parameters which characterize the interactions of elementary particles at low energies.
- 5-1 (1976): **Gases and Carbon in Metals (Thermodynamics, Kinetics and Properties).** 9,50 DM
Part I: Alkali Metals, Alkaline Earth Metals, Light Metals (Li, Na, K, Rb, Cs, Ca, Sr, Ba, Be, Mg, Al).
By E. Fromm, H. Jehn and G. Hörz. 26 pages.
- 5-2 (1977): **Gases and Carbon in Metals (Thermodynamics, Kinetics and Properties).** 9,50 DM
Part II: Group IIB to VB Metals (Zn, Cd, Ga, In, Tl, Ge, Si, Sn, Pb, Bi).
By E. Fromm, H. Jehn and G. Hörz. 58 pages.
- 6-1 (1976): **Shapes of Beta Spectra.** 4,50 DM
By H. Behrens and L. Szybisz. 43 pages.
A compilation of all measured beta spectrum shape factors.
- 7-1 (1977): **Compilation of Pion Photoproduction Data** 19,— DM
By D. Menze, W. Pfeil and R. Wilcke. 306 pages.
Tables of differential and integrated cross sections, recoil nucleon polarizations, and polarized photon and polarized target asymmetries for photon energies up to 18 GeV.
- 8-1 (1977): **Optical Properties of some Insulators in the Vacuum Ultraviolet Region.** 16,— DM
By R. P. Haelbich, M. Iwan and E. E. Koch. 186 pages.
Tables of available optical properties and curves of absorption spectra for alkali halides and rare gas solids in the wave length range 2000 to 2 Å.
- 9-1 (1977): **Bibliography of Microwave Spectroscopy 1945-1975.** 18,— DM
By B. Starck, R. Mütter, C. Spreter, K. Kettmann, A. Boggs, M. Botskor and M. Jones.

* Im Inland kommen zu den angegebenen Preisen 6% Mehrwertsteuer.

Status Report to
the Third NRDC Meeting

Paris, 19th-23rd June, 1978

AERE HARWELL, United Kingdom

The following report was received by telex with apologies for absence from Dr G. Dearnaley, AERE Harwell, U.K.

Joint work at Harwell and Manchester University Physics Department is in progress on graphical compilation of published differential cross section data for selected reactions and incident energies. Partial funding is obtained from the Electrical Power Research Institute, Paolo Alto, U.S.A. The intention is that this compilation should be used by materials scientists and corrosion scientists, etc. Most of the data is not available in numerical form. The work follows a strictly user-oriented approach and a report should be completed in 1979.

Status Report
of
Japanese Study Group
to
the Third Consultants' Meeting of NRDC
Paris, 19-23 June, 1978

1. NRDF-2, an storage and retrieval system for CPND, has been implemented on a medium scale computer system. Single CPND in NRDF-2 consists of three parts, i.e, bibliographic information, experimental condition and numerical data. They are called "BIB section", "EXP section" and "DATA section", respectively. NRDF-2 has flexibility in accepting many types of structure of data.
2. Data entry format for NRDF-2 has been designed. Data sheets based upon the format (see Appendix) and manuals for data entry are distributed among domestic nuclear physicist in order to collect CPND produced in Japan.
3. The format is compatible with EXFOR to a certain extent as mentioned in Status Report of Japanese Study Group to the second NRDC meeting at Kiev, 1977.
4. The Study Group will compile the amount of 10MB of CPND produced in Japan by March, 1979 (the end of Japanese fiscal year 1978).
5. Nuclear Physics Committee of Japan decided to promote foundation of a nuclear data center for organized nuclear data activities in Japan. The committee is a non-governmental organization mostly

consisting of domestic experimental nuclear physicists.

The committee, although it is non-governmental organization, has been active for more than twenty years so that there is a firmly established custom that excutions of all nation-wide projects concerning nuclear physics research should be done in cooperation with the committee.

6. Research Center for Nuclear Physics (RCNP) of OSAKA University has made a decision to demand due personels in charge of nuclear data activity, to the government. However, it should be realized that increase in number of personels of governmental organizations is strictly supressed in Japan at present. The requirement of the personels by RCNP is the first step of preparations needed for the foundation of the nuclear data center of Japan.
7. The letter of Mr. Glubrecht from IAEA 25th April, 1977, was definitely effective to the promotion of the foundation of the nuclear data center of Japan.
8. Many efforts are being made to continue nuclear data activity after March, 1979.

REVISED EXFOR PROTOCOL

(Section H)

H. CHANGES AND REVISIONS OF EXFOR

1. No changes in the structure of EXFOR will be allowed without Four Centre agreement.
2. If any one of the four Centres proposes an alteration which would result in changes of the EXFOR structure and content, it will be the responsibility of the Centre originating such proposal to obtain four centre agreement, following the procedure outlined in Paragraph H.3 below.
3. The following procedure should be followed by each of the four Centres in obtaining the agreement to every one of its proposals to change or revise EXFOR within the context of Paragraph H.2 above; all communications with regard to such proposals shall be in the form of Four-Centre Memos.
 - (a) The initial proposal should be disseminated to all Four Centres.
 - (b) In the case where there is discussion on a proposal, the initiating Centre shall then collect and digest all comments, suggestions and counter proposals.
 - (c) In this review, the initiating Centre shall consider such facts which would affect the EXFOR data base and associated computer codes.
 - (d) The initiating Centre shall then distribute a technical evaluation of alternatives to the other three Centres.
 - (e) After receiving the response to this technical evaluation, the initiating Centre shall :
 - (i) In the case of positive agreement of the six effectively participating Centres (CAJad, KaChaPaG + 4 Centres), submit the proposed alteration to the Centre responsible for the EXFOR Manual updating.
 - (ii) Otherwise, submit it for inclusion in the agenda of the next Four-Centre meeting.
4. Proposals for changes to be considered at Four-Centre meetings should be sent out one month prior to the meeting date to allow centre personnel time to review them.
5. Whenever decisions are made which require Manual changes, the new updates are to be prepared and sent out at most by one month after the draft minutes are received. The proposed changes should be written into the minutes in such a way that they can be inserted directly into the Manual if they are accepted.
6. The Centre responsible for the updating of the Manual is the NNDC. Within one month after a decision has been made, this Centre shall be responsible for producing a sufficient number of copies of the updated pages and distributing them in accordance with an established EXFOR distribution list.

H. CHANGES AND REVISIONS OF EXFOR (Cont/d)

7. The Centre responsible for updating the Manual may introduce changes for the purpose of editing. However, proposed Manual wordings submitted in 4C Memos. are entered in the Manual unchanged, unless an objection is expressed in due time. This Centre is also responsible for maintaining the internal consistency of the Manual; that means, e.g., to check whether an agreed proposal entails changes (cross references, etc.) in other parts of the Manual.
8. A change on a Manual page, as compared to its previous version, is marked by a vertical line in the left-hand margin. The date of the latest revision to that page is given in the lower right-hand corner.
9. Further details on changes and revisions to EXFOR are laid down in the EXFOR Manual.

PROTOCOL FOR CINDA

1. Definitions

The CINDA Manual, comprising the currently agreed CINDA codes, definitions and formats for neutron physics bibliographic entries to the CINDA file.

CINDA. Computer Index to Neutron Data

A computer file of bibliographic references to neutron physics publications and data files.

2. Four-Centre Commitment

The NEA Data Bank will be responsible for all maintenance and updating of the main CINDA file.

(a) Each Centre will provide new CINDA entries for neutron physics publications and data files within its service area, to be included in the main computer file at the NEA Data Bank as quickly as possible.

(b) Each Centre will be responsible for the blocking and correction of all CINDA entries referring to work done within its service area.

(c) The NEA Data Bank will provide a tape of agreed format of all modifications to the main CINDA file to NNDC at agreed intervals. The Data Bank will also provide to other Centres copies of the full updated master file under bilateral agreements in agreed formats.

(d) NDS will be responsible for the printing and publication of the CINDA Book and Supplements from a tape of agreed format provided by the NEA Data Bank every six months.

(e) The NEA Data Bank will be responsible for the preparation, correction and distribution of the CINDA coding manual after agreement between all four Centres on the substance of any changes.

(f) Proposals for changes should be submitted to all Centres via 4-Centre Memo. The NEA Data Bank will transmit approved changes to all Centres simultaneously in the form of photocopies to be included in the Manual.

3. CINDA Dictionaries

All additions and modifications to the CINDA dictionaries should conform within the limitations of format to the EXFOR equivalents. All proposed alterations should be circulated to the 4-Centres for approval.

CHARGED

Information

PARTICLE

GROUP

KERNFORSCHUNGSZENTRUM · D-7500 KARLSRUHE · POSTFACH 3640 · TELEX 7826-484

Memo CP-B/25

27.6.1978

- Subjects: 1. Proposed EXFOR and LEXFOR entries on undefined/defined reaction channels (action of 3rd NRDC-Meeting, Paris)
2. Proposed addition on 'comments by the compiler' under LEXFOR 'Free Text' and 'Comments' (action of 3rd NRDC-Meeting, Paris)
3. Reply to CP-D/64 (Combination of particle and process codes in REACTION SF3).

1a) Proposed Manual Addition to Page VIII. REACTION.3 (to insert before the 'Examples of SF3 coding')

If SF5 contains the branch code 'UND' (undefined), the particle codes given in SF3 represent only the sum of emitted nucleons, implying that the product nucleus coded in SF4 has been formed via different reaction channels.

The code '(DEF)' in SF5 denotes that it is not evident from the publication, whether the reaction channel is undefined or defined.

For details see in LEXFOR under 'Particles'.

Note: This is used presently only for charged particle reaction data .

1b) Proposed LEXFOR Addition under 'Particles'

5. Undefined/Defined Reaction Channels

In some cases a given residual nucleus may be produced by more than one reaction channel, e.g. (P,A) and (P,2N+2P), but only the residual nucleus has been investigated. If it is clear that more than one channel contributes (e.g. for energies well above the threshold for (P,2N+2P), the branch code 'UND' (undefined reaction channel) should be given in REACTION SF5; then, the particles coded in SF3 denote only the sum of emitted nucleons. The reaction is coded either as given by the author or by giving only the emitted nucleons e.g. (Z-S-A(P,2N+2P)Z'-S'-A',UND,SIG).

Where it is not clear whether the reaction channel is undefined or defined, the reaction is coded as specified by the author with the code '(DEF)' in SF5, e.g. (Z-S-A(P,A)Z'-S'-A', (DEF), SIG) or
(Z-S-A(P, 2N+2P)Z'-S'-A', (DEF), SIG)

In cases where the reaction channel is unambiguously defined either by measuring the outgoing particles or due to theoretical considerations, the reaction is written as specified by the author and no special code is given in SF5; the codes 'UND' and '(DEF)' are not used.

Free text comments should explain any reasons not explicitly given in the publication, by which the reaction is proved to be defined.

Note: For the present, this is used only for charged particle data.

1c) Proposed Dictionary Additions (Dict. 31)

UND Reaction channel undefined, outgoing particles represent only sum of emitted nucleons.

(DEF) Uncertain from reference whether reaction channel is defined or whether outgoing particles represent only sum of emitted nucleons.

Corresponding entries in Dict. 36, as data occur.

We would like to point out that missing codes 'UND' or '(DEF)' give a positive definition of the reaction coded, stating it to be defined with respect to the reaction channel and the outgoing particles coded in SF3. Editing programs should take into account this fact.

Furthermore, we would like to draw attention to the fact that we have introduced a slight modification into the proposal as drafted at the Paris meeting: In case of undefined reactions we would prefer not to exclude the possibility to code the reaction as given by the author.

Finally, as requested at the Paris Meeting we want to give some references which demonstrate the usual procedure of the authors of charged particle data to quote only one reaction channel, even if clearly more than one contribute to the data:

- 1) W.W. Bowman, M. Blann: Nucl. Phys. A131 (1969) 513
- 2) D.R. Sachdev, N.T. Porile, L. Yaffe: Can. Journ. Chem. 45 (1967) 1149

2a) Proposed LEXFOR Addition under "Free Text"

(to insert, e.g., before the last section: 'The language of')

"Any free text comments not originating with the author must be clearly labelled e.g. '(COMMENT BY THE COMPILER)', and unambiguously separated from authors comments, e.g., by including it between quotation marks or by inserting a blank line between authors and compilers comments."

2b) Proposed LEXFOR Addition under "Comment"

(to insert after: "...clearly labelled, e.g., "COMMENT BY THE COMPILER ...")

"and unambiguously separated from authors comments, e.g. by including it between quotation marks or by inserting a blank line between author's and compiler's comments."

3. Combination of Particle and Process Codes in REACTION SF3 as proposed in CP-D/64 (action of 3rd NRDC-Meeting)

We agree to the manual changes proposed in CP-D/64, but would suggest a slight modification. From the proposed wordings and examples one could eventually conclude that a combination of particles and processes is restricted to partial and especially sequential reactions.

However, such combinations must be possible obviously for total reactions like (P,A+X) where the α -particle is detected and several other outgoing particles are unspecified.

We would like, therefore, to propose the following (or similar) addition to the sect. "SF3.Process" under VIII. REACTION:

f) for total reactions, any sum of a) and b). This refers to cases where e.g. besides several unspecified outgoing particles one has been explicitly identified and the reaction product is defined or to cases which can be treated in the variable product nucleus formalism (see below).

Examples: (Z-S-A(P,A+X)Z'-S'-A',UND,SIG)
(Z-S-A(P,A+XN+YP)ELEM/MASS,UND,SIG)

REPORTS DISTRIBUTED AT THE MEETING

1. Outline of the Proposed CPND Bibliography Storage, Update and Retrieval System (NNDC)
2. CINDUP - Documentation of the NNDC CINDA Update Program
C.L. Dunford
3. NDS Request Statistics for 1976
4. Proposal for a Generalised ENDF Format - C.L. Dunford, NNDC
5. DATA Indexing in INIS
A consultant's report by V. Gadjokov