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INDC

INTERNATIONAL NUCLEAR DATA COMMITTEE

REPORT ON THE SIXTH FOUR-CENTRE MEETING

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REPORT ON THE SIXTH FOUR-CENTRE MEETING

The Sixth Four-Centre Meeting was held in Paris, 5 - 9 October. No representative from CJD (Obninsk) could be present, which was much regretted, since the intention was to formulate decisions binding to all four centres and taking account of their interest and knowledge. All the decisions and recommendations made during the meeting as contained in the appended minutes have meanwhile been approved by all four centres.

A large number of details of the exchange format, EXFOR, were subject for discussion. The first trial tapes had been exchanged prior to the meeting. In the light of the limited experiences from this first trial exchange, the meeting decided upon a number of "last-minute" changes to be implemented immediately in the routine exchange of experimental data.

As the main theme of the meeting was the recent initiation of EXFOR exchange, little was discussed this time of other items. The forthcoming publication of CINDA in Vienna, published reports of the centres, distribution lists, and correspondence with experimenters outside a centre's service area were subjects which were touched upon briefly.

It was announced that the NNCSC intends to invite the next Four-Centre Meeting to be held at Brookhaven or in New York.

Appended are the following documents of the meeting:

4CM/VI/1	Agenda as modified at the meeting
4CM/VI/MIN	Minutes of the meeting
4CM/VI/2	CCDN progress report
4CM/VI/3	Protocol for cooperation between the four centres (as of 5 October 1970)

The following documents were also discussed, and are available on request:

4CM/VI/4	Proposal for a chemical compound notation (Legrand, CCDN)
4CM/VI/5	Status of dictionary 14 (Lemmel, NDS)

SIXTH FOUR-CENTRE MEETING

5 - 9 October 1970

Paris

A G E N D A

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- a. Introductory remarks and election of chairman
- b. Consideration and adoption of agenda - Meeting organization

2. Short Reports from Centres3. Exchange Format

- a. Review of EXFOR implementation schedule and cooperative agreement: comments, suggestions of changes or improvements of exchange mechanics.
- b. Data transmissions: computer checking programs. Correction and revision of transmitted data.
- c. Compilation aspects: problems, questions and proposals, considerations of general data scope.
- d. Dictionaries: proposed additions. Dictionary 14. Discussion and formulation of fission products and compound nucleus quantities descriptions.
- e. Specific changes to the EXFOR manual.
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SIXTH FOUR-CENTRE MEETING

Paris, 5-9 October 1970

S U M M A R Y M I N U T E S

Organisation and announcements

(1a) Introductory remarks and election of chairman

1. The meeting elected for chairman Mr. A. Lorenz and for secretaries Mr. N. Tubbs and Mr. L. Hjärne.

(1b) Consideration and adoption of agenda-meeting organisation

2. The revised agenda as given in document 4CM/VI/1 was adopted.

3. The meeting noted that it had been called as a four-centre meeting, and decided to continue as such. In view of the absence of some of the centre personnel, it was decided that meeting decisions should be considered as generally adopted unless contradicted by telex within a fortnight of receipt of draft minutes.

4. Concerning observers from outside the four centres: their participation in discussions at four-centre meetings should be agreed well in advance and confined to specific agenda items.

5. As regards agenda items 4a and 4d, it was decided that CINDA discussions at the present meeting should be limited to its effect on data compilation activities, and to the forthcoming publication of CINDA in Vienna.

Short reports from centres

6. Brief progress reports were presented for NNCSC, CCDN, and NDS. The CCDN report is given in document 4CM/VI/2. The NDS report was based upon INDC(NDS)-23/G.

Exchange format

- (3a) Review of EXFOR implementation schedule and cooperative agreement: comments, suggestion of changes or improvements of exchange mechanics.

7. In order to allow the exchange of smaller amounts of data than a whole work it was decided that paragraph D1 of the "Protocol" (document 4CM/VI/3) should be changed to say that "In the event of partial corrections or revisions of an EXFOR entry, at least the subwork containing the correction shall be transmitted by the originating centre to the other three centres. Where the number of subworks within a work is changed the whole work should be re-transmitted. Future meetings should consider ways to reduce the amount of information transmitted when correcting or revising a given sub-entry." The X-4 manual should be revised as appropriate to take account of this and should also specify that in the case of the transmission of a changed sub-work only, nevertheless the appropriate ENTRY and ENENTRY cards should be included.

[Note by the meeting secretary: In accordance with the ultimate paragraph of document 4CM/VI/3, "the expressed approval of the head of each of the four data centres" is required before the change of the document can come into effect.]

[Such approval has so far been expressed from NNCSC and NDS]

8. Some reply (for example by telex) to 4-centre memos must arrive within 3 weeks of dispatch. By default suggestions in the memo will be taken as acceptable to the other centres.

[Note by the meeting secretary: It would seem that an appropriate change of paragraph H 3, sub-paragraph (b) of the "Protocol" is required for this decision to come into effect.]

[A new draft of the full document is being prepared.]

9. Wherever possible proposals affecting the content of the X-4 manual should contain proposals for specific wording to be inserted in the manual.

10. Mr. Goldberg pointed out that the procedure for deciding on "inconsequential" dictionary modifications could give rise to problems, but felt that with good will the procedure of document 4CM/VI/3 could be made to work, and wished to withdraw his objections.

11. One copy only of dictionary update sheets need be sent to the other three centres. These sheets must be sent out with a maximum delay of seven days from receipt of entry. Full dictionaries should be sent out by NDS at maximum intervals of three months, but additional full versions should be sent out following any major changes. (The EXFOR manual should be revised accordingly.) Care should be taken to supply as full

background information as possible for changes (e.g. reference to experiment in which a new detector is used). It was also agreed (see para. 54) to include the format of the dictionary up-date cards in the EXFOR manual following VII.I.

- (3b) Data Transmissions: Computer checking programs.
Correction and revision of transmitted data.

12. Current checking procedure for EXFOR tapes at the three centres was discussed. Only NDS have a specific tape checking program, which now contains most checks agreed as essential (categories 1 and 2) at the programmers' workshop. At CCDN and NNCSC checking is for the most part an automatic consequence of entry into or translation from their data systems, and at CCDN is carried out to about the same level as at NDS.

13. It was agreed that sending out the output of checking programmes with exchange tapes should be suspended. This decision might be re-considered when checking procedures are fully developed. On the other hand, errors found in tapes received should be notified to the originating centre for correction and re-submission.

14. It was proposed to postpone discussion of the current exchange tapes until participants had had time to examine the listings more carefully.

- (3c) Compilation aspects: Problems, questions and proposals, considerations of general data scope.

15. On page D.2.11 of the X-4 manual the relevant paragraph shall be changed to read:

COMMENT

Free text comments such as

Miscellaneous information which cannot logically be entered under other available keywords.

Authors' statements about the data, e.g. whether they agree with theory or with other data.

Compiler's or evaluator's comments.

Note: Any information which does not originate with the author must be clearly labelled, e.g. "COMMENT BY THE COMPILER. . ."

NNCSC agreed to keep a check on the functioning of this category, in case it should be necessary to propose a further one, such as MISCELLANEOUS.

16. The categorization of keywords (as described in pages D.2.2 - D.2.2b in the EXFOR manual) was discussed at length. It was decided to retain the system for the present, with the revisions outlined in the following paragraphs.

17. When the various keywords of dictionary 2 had been discussed, the result was that each keyword remaining in the second category would be what in the present manual (page D.2.2) is labelled "exception". Therefore the appropriate paragraph was changed to read:

"Category 2 is to consist of Title, Facility, Neutron Source, Method and Error Analysis. If information associated with the keyword is pertinent but not given or not available then the keyword must be included with a statement to this effect (e.g. NO INFORMATION AVAILABLE). Only in such cases as the keyword is really not pertinent may it be omitted (e.g. Facility for a spontaneous fission measurement, Error Analysis in the case of spin or parity, Title in the case of a private communication and Particle Detected in the case of certain types of deduced data)."

18. The keyword TABLE-NR was moved from category 2 (/) to category 3 (+).

19. The keyword RESID-NUC was moved from category 4 (not tagged) to category 3 (+), and the relevant paragraph of page D.2.9 of the manual should be changed to read:

"The residual nucleus involved is coded following the same rules as those for the target nucleus under ISO-QUANT followed by free text description of this residual nucleus and pertinent information regarding its characteristics".

20. The keyword PART-DET was moved from category 3(+) to category 2(/). This decision, and the use made by NNCSC of the information coded will be reviewed at the next meeting.

21. The maximum number of slashes (/) within an isoquant subfield will remain at one until it proves necessary to increase it.

22. It was agreed that certain freedom for the compiler should be conserved, as to the best place for subsidiary numerical information which does not itself form part of the data set.

23. The NDS proposal of Memo 4C-3/28 was accepted with one minor modification. Thus, the paragraph "(4) Codes and Free Text" on page IV.2 in the EXFOR manual should now read as follows:

"Free text following the codes must be completely self-explanatory, and the codes must not be considered as part of the free text. The code is a retrievable abstract of the free text. The entering center should provide all free text associated with each code. The coded information serves only as a means for retrieval and not for output expansion. This implies that any coded information must be followed by free text repeating or specifying further the coded information.

The only exceptions to this rule are information associated with the keywords INSTITUTE, REFERENCE and IS~~Ø~~-/CMPD-/NUC-QUANT, where the coded information should not be repeated in the free text. This means, one should not, for example, include the full name of the institute following the 7-character code; however, any additional information may follow in free text.

Obviously, the keywords AUTHOR, EXP-YEAR, HISTORY, ERR-ANALYS, FLAG, TABLE-NR are cases to which the above rules do not apply.

The free text must be clear English sentences and no codes are permitted within the free text.

24. The items 1-4 of Memo 4C-3/25 were agreed upon. Thus on page 1.4 in the EXFOR manual the following changes shall be made in the portion beginning "A sub-work will be defined as:"

- item (1) should read:

(1) Having a single IS~~Ø~~-QUANT (or, of course, CMPD- or NUC-QUANT) or one of the permitted combinations."

- item (6) (new) should read:

(6) For some data the data-table does not have an independent variable X but only the function Y. (Examples: spontaneous nu-bar; resonance-energies without resonance-parameters; etc.)

- item (7) (new) should read:

(7) If the function Y is given for a single value of the variable X, and if this value of X is common for all sub-works in a given work, then X may be entered in the COMMON portion of the first sub-work. The following sub-works may then contain under DATA the value of Y only.

- The remaining part of the paragraph is deleted. (In other words, after item (7), given above, will follow the paragraph "Permitted character set")

- (3d) Dictionaries: proposed additions. Dictionary 14. Discussion and formulation of fission product and compound nucleus quantities description.

25. Dictionary 2 should be changed as follows:

TABLE-NR should be + not / (see paragraph 18)
RESID-NUC should be + not blank (see paragraph 19)
PART-DET should be / not + (see paragraph 20)
NUC-QUANT should be added (see paragraph 41)
MISC-COL should be added in category 4 (see para.47)
and the relevant text changes should be made.

26. More than one institution may be entered for a given work. The institution to be entered first is in general the one containing the facility. Exceptions are:

- (a) If an itinerant group uses the facility of another institution, the institution of the itinerant group should be given first;
- (b) In an ambiguous case, the compiler may enter first that institution from which one is most likely to obtain further information on the experiment.

In cases where the institutions involved belong to different service areas, the above rules shall determine the centre responsible, but the centres involved must inform each other of their intention to code the work in order to avoid duplications.

27. Dictionaries 3 - 7. NDS should be responsible for checking that dictionaries 3,5,6 and 7 remain as far as possible consistent between EXFOR and CINDA. NDS agreed to remove a number of institute codes from dictionary 3, in accordance with a request from CCDN.

28. Dictionary 9. The preliminary CCDN proposal (document 4CM/VI/4) was presented and it was agreed that other centres would look into this and give their opinion. Points made in discussion were the need to keep the classification simple, to look at existing chemical notation schemes in chemical information projects, and the desirability of filling in blank spaces within the abbreviations chosen.

29. Dictionaries 10 - 14. The document on the status of dictionary 14 (4CM/VI/5) was the subject of some discussion. Mr. Goldberg pointed out that the past reluctance on the part of the NNCS to agree to dictionary 14 was not due to any disagreement on principles. The reason was rather that they felt that they needed more time to consider the detailed content of the dictionary, in view of the more cumbersome change procedure, once the dictionary is finally adopted.

30. In dictionary 12, the explanation for MS and GND should be changed to respectively:

PARTIAL CROSS SECTION POPULATING A METASTABLE STATE

and:

PARTIAL CROSS SECTION POPULATING THE GROUND STATE WHENEVER A METASTABLE STATE EXISTS FOR THE RESIDUAL NUCLEUS.

The following addition in dictionary 14 was agreed:

ND,,GND B (PARTL.(N,D)CS.POPULATING THE GROUND STATE
OF THE RESIDUAL NUCLEUS

ND,,MS B (PARTL.(N,D)CS.POPULATING A METASTABLE STA-
TE OF THE RESIDUAL NUCLEUS

and corresponding definition changes were agreed for the other similar entries in dictionary 14:

N2N,,GND and N2N,,MS
NP,,GND and NP,,MS
NA,,GND and NA,,MS

31. RTW and RNT will be removed from dictionary 11, as the quantities concerned can be expressed in a way more consistent with the ISO-QUANT formalism.

32. It was agreed to retain CN and DI in dictionary 12. It should be pointed out that careful explanation in free text is required whenever these modifiers are used.

33. The mnemonic CS was eliminated from dictionary 10, and /CS shall be removed in all places in dictionary 14.

34. RBT and TER shall be left in dictionary 12 for the time being. The hope was expressed that the general problem of classification of quantities related to the fission process can be reviewed in the near future; with the participation of CJD. In the meantime, extensive information in free text must be supplied with entries using these quantities. Centres were invited to submit proposals for the next meeting.

35. The multiplication factors for expansions should remain in dictionary 12, where the expansion

$$\frac{\sigma}{4\pi} \sum_l a_l P_l \quad \text{corresponds to RS}$$

and

$$\frac{\sigma}{4\pi} \sum_l (2l+1) a_l P_l \quad \text{corresponds to RSL}$$

36. ARE shall be added to dictionary 10.

37. NA,LEG and NA,COS shall be added to dictionary 14.

38. YLD and REL shall be added to dictionary 12. Additions to dictionary 14 of yield quantities will be made as the need arises. REL can be given in any quantity code without corresponding entry in dict.14(cf.DRT) and should always be given with ARB-UNITS.

39. The NNCSC suggestion N3A for dictionary 10 was withdrawn; Mr. Goldberg pointed out in this context that the so-called two-lightest-particle rule will have to be reviewed again at some future time.

40. RAD and SF shall be added to dictionary 10, with corresponding entries σ_L/RAD and SF/NU , respectively in dictionary 14. SF should be used with the new NUC-QUANT, as in next paragraph.

41. A new keyword NUC-QUANT, to be used in the same way as $1S\phi$ -QUANT and COMP-QUANT will be added to dictionary 2. It will be used when the nucleus of interest is not the target nucleus, and at present will only appear in conjunction with SCO, LDP, PEM, SF. The first field should contain the nucleus to which the data is pertinent. The three QUANT keywords are mutually exclusive.

42. For Adler-Adler coefficients the abbreviations ANU, AGF and AHF should be added to dictionary 10. The corresponding data heading is MU-ADLER. The dimensions of the data are B^*EV^*RT-EV for AGF and AHF, and EV for ANU. The corresponding dictionary 14 entries are ANU,RES, AGF,RES, AHF,RES. The energy limits EN-MIN and EN-MAX of the fit should be entered in Common Data.

43. BA, FA, COH and INC shall be removed from dictionary 11, as well as the corresponding PHS entries with modifiers BA,FA,COH,INC and AKP from dictionary 14. Instead, BAS (instead of BA), FAS (instead of FA), COH and INC shall be entered into the scattering sections of dictionaries 10 and 14. COH,AMP and INC,AKP shall also be added in the scattering section of dictionary 14. The remaining

Three THS quantities THS, DA THS, DA, RS and THS, DA/DE shall remain in dictionary 14.

44. The additions to dictionary 14 proposed on page 3 of 4CM/VI/5 were agreed: EL, DA,,D , EL, DA,,HE3 , N2N, DA,,P , NP, DA,,T , NNP, DA,,D , NNP, DA, PAR, P .

45. The general point was agreed that any proposals for new quantity terms should be supported by the expansion and a full explanation of its use and limits, with a reference if possible, and a list of corresponding dictionary 14 entries.

46. Dictionary 16. The code SCSRS shall be added to the STATUS dictionary, to provide a flag for data which have been translated from SCISRS. The meaning of this code is: status information is complete due to automatic conversion from SCISRS. The code is in-exempt from the rule concerning codes and free text. NNCS should review the status codes in dictionary 16, in case further categories are needed.

47. Dictionary 24. It was decided to add:

ANG1
ANG2
+EN-RSL
-EN-RSL
MISC
NUMBER-CM
DATA-CM

The meaning of MISC should be given in free text under the keyword MISC-COL, which should be added in category 4 of dictionary 2. NUMBER-CM will be used when a fit has been deduced from an angular distribution in which the angles are given in the centre-of-mass system.

[Note by the meeting secretary: The wording of the last sentence of para.47 was agreed at the meeting, and was retained for these minutes. Care should be taken when revising the EXFOR manual, to make this point quite clear. NUMBER-CM should presumably be used also when the fit is made on lab. system data, and multiple scattering corrections and c.m. conversion are made afterwards on the coefficients. One example is the Legendre fit by MAGGIE at Harwell.]

[The formulation of the last sentence will be: "NUMBER-CM will be used when a fit refers to the centre-of-mass system, independently of whether it has been made from an angular distribution in the centre-of-mass system or it has first been made from an angular distribution in the laboratory system and then converted to the centre-of-mass system".]

48. An angle given in degrees and minutes must be entered in two separate columns with the data heading ANG repeated.

49. Mr. Lemmel's proposals for the treatment of EN-DUMMY were accepted for application to reactor spectra, fission spectra and well-moderated thermal spectra. Therefore the following addition to dictionary 24 was agreed:

"EN-DUMMY DUMMY ENERGY. To be used as the numerical equivalent of an incident neutron spectrum where no numerical energy value is given by the author".

A LEXFOR entry would recommend the use of:

- 0.0253 eV for Maxwellian and pile thermal spectra
- 1. MEV for fission spectra
- No dummy entry for spontaneous fission

50. Dictionary 25. NO-DIM and ARB-UNITS shall be written with this spelling. The proposal to enter degrees and minutes of an angle in the same column was not accepted.

51. It was agreed that NDS should send out a full revised edition of the dictionaries when the fortnight's grace after this meeting has expired.

52. When referencing a document which has more than one identification number, all these numbers shall be included within one set of parantheses, each one being in parantheses connected by an = sign. Cf. next paragraph.

53. Point 6 of Memo 4C-1/15 was agreed. The separator should appear last of any line, with the first bracket of the next unit first on the following line, e.g.

((.....)/
(.....)).

Same rules apply for multiple references as in paragraph 52.

54. It was agreed to include the format of the dictionary update cards in the EXFOR manual (see also para.11) following page VII.I.

(3f) Compilers manual

55. The present compilers manual was considered to be a good start. A manual should be maintained but be kept for internal use only (though this need not exclude giving copies to liaison officers) at present. NDS will be responsible for the drafting of another version of the manual to be considered by the four centres before the next four-centre meeting. Various suggestions were made concerning presentation, and NDS should consider these and any other suggestions or criticism, to reach Mr. Lemmel by the beginning of December.

56. Suggestions for additions to the manual should be accompanied by adequate explanation and documentation to help in preparing manual entries. Concerning the coding of resonance parameters derived from different multilevel fitting methods, NNCSC will look into this and produce suggestions if necessary as to how to code such material.

(3g) Systematic transformation of old data into EXFOR.

57. Data transformation from old files into EXFOR was described in statements from each centre:

CCDN The transformation is being done on a geographical basis, using liaison officers to help supply the additional information needed. It is thus difficult to superimpose any

priorities concerning isotopes or quantities. New information is added "by hand" to entries before EXFOR transmission: this gradual upgrading is possible because NEUDADA is not being replaced by a new data storage system.

NNCSC Material is being translated largely automatically to an intermediate CSISRS compatible file ("SCISRS 1 $\frac{1}{2}$ "). Selected important data sets will be improved for inclusion in CSISRS. It is not yet decided when the whole intermediate file will be included.

NDS Data sets from NDS area are being converted by hand from DASTAR (or other data files, if not in DASTAR). Priorities have been assigned on the basis of isotopes. Highest priority being given to those isotopes most needed for reactors and shielding. It is expected that conversion of first priority data sets will be completed by the end of 1970.

In order to assist centres with the transformation of data, NDS agreed to send to CCDN and NNCSC all DASTAR data-sets from their respective areas, and NNCSC agreed to send to the NDS a bib-listing of all data-sets from area - 3 in SCISRS. NDS has already received from CCDN data from area - 3 in NEUDADA. CJD have already requested from NDS all DASTAR sets from area - 4.

58. The problem of how to transmit old data in EXFOR format, but outside the normal transmission, was discussed. The immediate need for this concerns the content of SCISRS from outside the NNCSC service area. NDS is, for example, very interested in receiving the content of "SCISRS 1 $\frac{1}{2}$ " for its service area. Generally, all transmissions, which are not part of the regular EXFOR data, must be on separate tapes, and to facilitate the processing of such tapes, a specific series of accession numbers should be used.

59. It was therefore agreed to change, in the EXFOR manual, on page II.2, the explanation to the first digit of the accession number to read as follows:

0 To be used for other purposes than normal transmissions.

60. It is expected that any old data, which is converted and brought up to EXFOR standard, be sent out as soon as possible within the framework of the regular transmissions.

(3h) Exchange and formats of evaluated data

61. There appear to be no objections for the use of EXFOR format for the storage of data outside the EXFOR agreement, for centres' internal use only.

Data Index

(4a) CINDA publication: status and schedule

62. CCDN will send material for the foreword of CINDA ready for photographing. NDS will prepare dictionaries for the appendices, with help from CCDN. The deadline set for receipt of the CINDA tape and other material at IAEA is 31 December 1970.

(4b) What kind of data index is needed?

63. The responsibility of informing their users of the contents of their own files rests with individual centres. This refers to "current-awareness" information as well as "retro-spective" information, as reflected in the Newsletters planned by NNCSC and published in the past by CCDN, respectively.

64. It is recommended to CINDA operators that EXFOR data accession numbers should be included in the CINDA file and in the book, and that they should consider how much further information about the data can reasonably be included.

65. The following note can be appended to the recommendation in the preceding paragraph: The group felt that the centres' data files constitute a publication medium of importance equal to that of other publications referenced in CINDA.

(4d) Coordination with CINDA

66. If CINDA were to carry data accession numbers, CCDN would be willing to make the CINDA entries.

Coordination of Four Centre Functions and Activities

(5a) Delineation of responsibilities of mutual interest

67. It was agreed that centres corresponding with experimentalists in laboratories outside their service area about data within the EXFOR scope should keep the centre serving that area fully informed.

68. The three centres present agreed on periodic exchange of their distribution lists for documents.

(5b) Unification of document distribution

69. It was agreed that each centre should send one copy of all documents it publishes to the other three centres (in addition to any personal copies). See also paragraph 67.

(5f) Publicity for EXFOR

70. It was felt that a common four-centre article should be produced at some time in the future when really appreciable quantities of data from all centres have passed through EXFOR exchange.

Conclusion

(6b) Date and place of next meeting

71. Mr. Goldberg announced that it was the intention of the NNCSC to invite the next four-centre meeting to be held at Brookhaven or in New York. The date of that meeting should be arranged between NDS and NNCSC.

Concluding Remark

72. The absence of any representation from CJD Obninsk at the meeting was much regretted since the intention was to formulate decisions binding on all four centres and taking account of their special interest and knowledge.

Developments at CCDN
since the Moscow four-center meeting

General

CCDN's activities have not changed, and responsibilities in the different areas are distributed as follows :

Experimental data

Dr. Okamoto	Compilation of current data
Dr. Potters	Relations with other centers (In particular preparation and translation of EXFOR tapes) large data sets
Dr. Schett	Answering requests, correcting the Neudada file, relations with liaison officers in "our" laboratories

CINDA

Dr. Tubbs
Mme Legrand
Dr. Schofield 1/2 time

Evaluations

Dr. Valente

Renda

Dr. Liskien

In the year from July 1969 to July 1970 the Center answered 231 requests (from all files combined, but mostly for data) of which 27 had been forwarded through IAEA from laboratories in the USSR and in their service area.

Data compilation. Our workload has been appreciably increased by participation in EXFOR : permanent effects are the need for more detailed coding of data, and the running of translation operations to and from NEUDADA, while there has also been a transient increase of work in helping to get EXFOR exchange going. Fortunately we have more manpower available : Dr. Okamoto from JAERI has joined the data group, while a clerical grade post is reasonably near budget approval for an assistant to take over administration of data flow in and out of the file and to do some routine coding. By analogy with CINDA readers, liaison officers have been found in several important laboratories, and have already given considerable help in the file cleaning operations now in progress, and in collecting uncoded data from their laboratories.

The data stored at CCDN has been split in two, and corrections are being made to the file of data originating in OECD countries. More than 100,000 new data points were added to this CCDN file during the year, but this increase is partly compensated by duplicates thrown out. We are now checking large data sets and adding EXFOR comments, and have sent out other data to liaison officers for circulation and checking in their laboratories. When this material is entered we will concentrate on upgrading the data entered into NEUDADA since October 1968 but not yet fully available to NNCSC because of format difficulties.

Our translation programmes from NEUDADA to EXFOR have been improved, and we have produced a first exchange tape of about 38,500 data points from a mixture of large and small data sets. We can translate the other way through the general TONDADA programme, but will probably prefer to write a special programme as soon as time allows.

CINDA. We are working to develop machine comparability between CINDA and the data files. As a first stage we are writing programmes to allow "one-off" comparison of the files: we then want to rewrite the CINDA system under direct access, with the intention of allowing continuous comparison against the index to NEUDADA. Progress so far has been rather modest.

Otherwise CINDA operations have continued as normal. The output from a main library check programme has been circulated to the other CINDA centres, who we hope will correct the entries from their service areas.

Evaluations. Major revisions have recently been received for the UK, ENDF/B and KEDAK files, and a revised list of evaluated data available will shortly be published as a newsletter. In addition, the major part of CCDN's 10th Newsletter was given over to the Bologna evaluation of capture cross-sections for fission products.

Renda. The CCDN did the computing, and much of the revision work, for the new EANDC RENDA list published in February 1970. At the same time some improvements were made to the programmes: it is a pity that the UK and USA computerisation of their contributions did not use the same format; this would have saved a lot of work.

1 July 1970

PROTOCOL FOR COOPERATION BETWEEN
NATIONAL NEUTRON CROSS SECTION CENTER, ENEA NEUTRON DATA COMPILATION CENTRE,
IAEA NUCLEAR DATA SECTION AND CENTR PO JADERNYM DANNYM
FOR THE SYSTEMATIC EXCHANGE OF NEUTRON DATA INFORMATION

A. DEFINITIONS

1. Neutron Data Information in the context of this protocol is defined to mean measured microscopic experimental data which have resulted from neutron physics experiments, and their associated bibliographic and physical descriptive information.
2. The Exchange Format, or EXFOR, is a computer-compatible set of agreed upon definitions and conventions, designed for the transmission of neutron data information between neutron data centres.
3. The EXFOR Manual, comprising the currently agreed set of EXFOR definitions, conventions, formats and codes, is designed to serve as the basis and guide for the description and coding of neutron data information in EXFOR and for data transmission between neutron data centres.
4. EXFOR data is defined as all neutron data information coded and exchanged in EXFOR.
5. Service Areas of the Four Centres

The responsibility for the collection, compilation and dissemination of neutron data information is shared among the four major neutron data compilation centres, each being responsible for a defined service area. The four centres and their respective service areas are:

- a) The National Neutron Cross Section Center (NNCSC), at the Brookhaven National Laboratory, services the USA and Canada.
- b) The ENEA Neutron Data Compilation Centre (NDCC), at Saclay (France), services the non-American member states of the OECD, that is Western Europe and Japan.

- c) the USSR Centre for Nuclear Data (CND) at Obninsk (USSR) services the USSR.
- d) the IAEA Nuclear Data Section (NDS) in Vienna, services IAEA Member States not included in the service areas of the above three centres, that is countries in Eastern Europe, Asia, Africa, South and Central America, and Australia and New Zealand.

B. FOUR-CENTRE COMMITMENT

- 1. Within the scope of this protocol each centre is expected to compile the data measured in its service area as fast and as thoroughly as possible.
- 2. The four centres agree that "new" data should be coded in EXFOR (where new is defined as data collected by the centres at the time of, or after, formal transmission of data is initiated). This does not preclude the transformation of "old" data into EXFOR.
- 3. Each centre may compile data measured outside its service area. Regular transmissions of EXFOR data from anyone centre shall include data only from its own service area.

C. IMPLEMENTATION OF EXFOR

- 1. Implementation schedule
 - a) The routine transmission of data tapes in the Exchange Format will start on 1 July 1970.
 - b) After this date EXFOR data tapes will be exchanged regularly between the four centres at a maximum interval of three months, with the possibility to transmit timely data at more frequent intervals. If deemed necessary, a stricter, or less rigid schedule could be agreed upon at any time in the future.
- 2. Method of data transmission
 - a) EXFOR data will be transmitted in accordance with the conventions laid down in the EXFOR Manual.

- b) Only the character set specified in the EXFOR Manual is permitted.
- c) The working language of EXFOR shall be English, and all free text comments within all EXFOR entries shall be English.

3. Scope of transmitted data

- a) The general scope of EXFOR data will be all experimental microscopic neutron data.
- b) Modifications to the general scope of EXFOR data can be adopted only as a result of an agreement between the four centres.

D. CORRECTIONS, REVISIONS AND DELETIONS OF TRANSMITTED EXFOR ENTRIES

1. Corrections or revisions

In the event of partial corrections or revisions of an EXFOR entry, the complete work shall be re-transmitted by the originating centre to the other three centres. Specific procedures to correct or revise transmitted data, if deemed necessary, could be considered at one of the next Four Centre Meetings.

2. Deletions

EXFOR works (data sets) can only be deleted from EXFOR with the expressed approval of the author except in the case of duplicate entries. The accession number of the deleted work should not be used for another work.

3. Accession numbers use

Once transmitted, no accession or sub-accession number should be re-used for another work or sub-work.

E. EXFOR DICTIONARIES

1. Updating of Dictionaries

- a) To prevent duplications and conflicts, the NDS is responsible for the coordination and the updating of the EXFOR dictionaries.

- b) Alterations (meaning additions, corrections or deletions) in EXFOR dictionaries can be consequential, which would entail changes in transmitted data, and thus require Four-Centre approval, and changes which could be termed inconsequential and would not entail changes in transmitted data or Four-Centre approval. Without exception, all changes to Dictionaries 1,2, 4, 10, 11, 12, 14, 16 and 24 are consequential and require Four-Centre approval.
- c) Consequential Dictionary Alterations
Alterations of EXFOR dictionary entries which entail changes to data already transmitted cannot be implemented without specific Four-Centre approval.
- d) Inconsequential Dictionary Alterations
Proposals for alterations of EXFOR dictionary entries which do not entail changes to data already transmitted, and which do not fall in the Dictionary list given in E.1.b. above, should be submitted by the centres to NDS together with their mnemonic terms and definitions by telex or airmail. Within one week of their receipt, the NDS shall transmit the approved dictionary entries to all centres simultaneously, in the form of photocopies of the input forms used for the NDS dictionary update program.
- e) In their function to update EXFOR dictionaries, the NDS is given some latitude in reformulating the definition, but must not change the meaning without the approval of the originating centre. In questionable cases NDS shall consult with the other three centres for their opinions. It is the responsibility of each Centre to update its own sets of Dictionaries.

2. Routine Transmission of Dictionaries

- a) The NDS will transmit changed dictionaries to the other three centres every three months, as part of the routine EXFOR transmissions.
- b) The keywords "DICTION", "ENDDICTION" and "NODICTION", will be used by the NDS for transmission of changed dictionaries whether they are part of a data transmission or not, other centres will not use these keywords.

F. COMPILERS' MANUAL

In addition to the EXFOR Manual, the Four Centres shall collaborate in the formulation of an EXFOR Compilers' Manual whose primary function will be that of a collection of EXFOR compilers instructions. Specifically, it will include expansions of the definitions of physics terms, their nomenclature and interrelations, and general guidelines for EXFOR compilation.

G. EXFOR COMMUNICATIONS BETWEEN CENTRES

Two forms of documents are used for the proper distribution and referencing of all documentation on EXFOR.

1. Four-Centre Memos for the communication of proposals, programming details and other general considerations which touch upon the over-all aspect of EXFOR. This series of memoranda are numbered as follows:

Memo-4C-n/m

(where n is the centre identification number, and m the chronological memo number within the centre).

2. Exchange Format Memos for the transmittal of updating EXFOR Manual pages. This series of memoranda is issued by the NNCSC only, to each of the other three centres, and is numbered as follows:

Memo-X4-m

(where m is the chronological memo number).

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 (meaning addition, correction or deletion) in Section I through VII of the EXFOR Manual and of Dictionary 1 and 2 of Appendix D to the EXFOR Manual, 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, and to submit the proposed change to the centre responsible for the updating of the EXFOR Manual.

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 proposal shall be in the form of Four-Centre Memos.
 - a) The initial proposal should be disseminated to all four centres.
 - b) 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 general agreement, submit the proposed alteration to the centre responsible for the EXFOR Manual updating.
 - (ii) In the case of non-agreement, either retract the proposal, or submit it for inclusion in the agenda of the next Four-Centre Meeting.
4. The centre responsible for the updating of the EXFOR Manual is the NNCSC. This centre shall be responsible for producing the updated pages in sufficient number of copies and distributing them in accordance with an established EXFOR distribution list.

I. CHANGES AND REVISIONS OF THIS PROTOCOL

Any change to this protocol which is deemed necessary shall come into effect only with the expressed approval of the head of each of the four data centres.