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Cc: SCHWERER, Otto
Subject: Memo CP-D/306

Please find in the attachment Memo Cp-D/306 containing the summary, actions and conclusions of the past NRDC meeting.

Memo CP-D/306

Date: 7 June 1999
From: O. Schwerer, M. Lammer, V.G. Pronyaev

Subject: Summary, Actions and Conclusions of the 1999 Technical NRDC Meeting

Please find in the attachment a brief meeting summary and the list of conclusions and actions of the technical NRDC meeting held in Vienna from 18 to 20 May 1999. Also attached are the revised Working Papers 12 and 16.

The actions and conclusions were sorted by topics and therefore renumbered. Please send any corrections or additions by e-mail, to reach NDS not later than 30 June 1999.

The complete meeting report, which will contain the final content of the present memo, all progress reports and selected working papers, will be published as INDC(NDS) report.

To prepare the electronic version of this report we are asking you to send us - as far as not yet done - the electronic version of your progress report and any working paper presented during the meeting (see also Action A5 of this meeting).

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Consultants' Meeting on Co-ordination of Nuclear Reaction Data Centers (Technical Aspects)
Vienna, 18 - 20 May 1999

Summary of presentations and discussions

The Meeting was opened by D.W. Muir, Head of the Nuclear Data Section. He welcomed the participants and gave a brief overview of the directions of the development of the services which may be provided by the NRDC network, especially to the users with a poor access to Internet. After self-introduction of the participants (see list in Annex) V.G. Pronyaev was elected as the meeting chairman. Agenda was adopted with minor changes (see final Agenda in Annex). Recommendations of the International Nuclear Data Committee Meeting (11 to 14 May 1999, IAEA, Vienna) were presented by D.W. Muir and participants' reports about activities in the cooperating Nuclear Data Centers were presented (see Attachment). It was admitted that, though the DEC Alpha computer continues to be the platform for on-line access to the major network databases, PC user oriented programming work is going to be more and more important.

General actions from last 1998 NRDC Meeting were reviewed.

The development of CINDA database on CD-ROM was presented by M. Kellett. It was decided, that because no drawbacks on trial version were reported it can be distributed to the users. December 1998 version of EXFOR database on CD-ROM was presented by O. Schwerer. Some deficiencies found in the previous (January 1998) version were removed. The need for a freely available ENDF database on CD-ROM with a user interface comparable to the present Web version was recognized by participants.

CINDA related matters were discussed. The implementation of actions of last meeting was reviewed (see WP 1). New theoretical quantities for CINDA (see WP 5) were considered. It was decided, that because NSR database is under complete revision and better flexibility in the search of nuclear structure related theoretical quantities will be achieved, compilation of bibliographical data for these quantities will be done under NSR. The report of an ad-hoc working group on CINDA-2000 was endorsed (see WP12 Rev.). A new working group will work out the format details of the new CINDA (now called CINDA 2001) and submit a progress report to the NRDC Meeting in 2000.

Technical matters of EXFOR/CINDA dictionary system and general EXFOR topics were discussed (see WP 1, 2, 7, 8, 9 and 10). It was admitted that mainly due to different criteria for adding imperfect entries to the master file, these files differ from each other in different centers. The convergence to identical master files is desirable. Report of Working Group on new quantities for fission yield data (see WP 16 Rev.) was endorsed by participants. Big work done by V. McLane on revision of EXFOR Manual and EXFOR Basics manual was highly appreciated by participants. A complete revision of the 'LEXFOR' part of the manual (containing the physics definitions for the compiled quantities) will follow.

The activity in compilation of neutron, charged particle and photonuclear reaction data in different centers was considered. Some centers had not contributed in the EXFOR

compilation work since the last Meeting mainly due to the changes in the staff. The efforts to renew this work in the CNDC and NEA-DB were welcomed by participants.

Work on development of evaluated data libraries was briefly reviewed. It was reported that JEF-3 Library is in the checking and testing phase, preparation of CENDL-3 Library is in the progress since 1996, Release 5 of ENDF/B-VI Library was disseminated in September 1998, new package of preprocessing programs PREPRO99 was released by D.E. Cullen in February 1999. There are large ongoing activities on the evaluation of neutron cross sections for JENDL in JAERI and for BROND-3 in CJD, Obninsk.

Big attention of the participants was devoted to the common program development and user services. The presentation started with a demonstration session where V. Zerkin showed his multiplatform graphical package DINAMO+ZVVIEW which allows to use interactive graphics of reaction cross section data retrieved from ENDF and EXFOR with polynomial fit of the experimental data. S. Dunaeva presented the WindowsNT platform package SABA which is used as a tool for evaluation and graphical presentation of charged particle reaction cross sections of light isotopes. B. Kinsey demonstrated the extended interactive possibilities of the BNL-325 type plotting available now through Web access to the EXFOR database. Y. Ohbayashi demonstrated the possibility to use a visualized object oriented 'Intelligent Pad' system for presentation and treatment of nuclear data. After discussions participants agreed that coordination of program development work should be improved by regular information exchange on results of the work planned in different centers. The proposal for regular electronic publication of the Nuclear Data Program Development Newsletter was supported by the participants.

The list of Actions and Conclusions of the Meeting was reviewed and approved by the participants (see pp.   ).

It was decided that the next full NRDC Meeting will be hosted by the CJD, Institute of Physics and Power Engineering, Obninsk, Russia, 15 to 19 May 2000 (date tentative).

CONCLUSIONS

General

C1   The meeting agrees on Word7/95 as exchange format for text documents.

Conclusions and informational statements on CINDA

Info1   New version of CD-CINDA will be released by NEA-DB approx. September 99. It will include the updated database with the current software (no new feedback was received)

Info2   Since the new version of CINDA format and programs will not be ready in 2000, it was decided to use from now on the term "CINDA-2001" instead of "CINDA-2000".

C2   (Reference: WP6, items 1, 2) Decisions, to permit in CINDA additional (low Z) targets for fission reactions and natural elements as targets for 'nearly monoisotopic' elements, are postponed to CINDA-2001.

C3   (Reference: WP6, item 3) for data obtained via Internet, the reference type W (= private communication) should be used (see manual)

C4   (Reference: WP6, item 5) New abbreviations to be used for CINDA comments will not be added to Table 5 of the CINDA book, but most of them may be used anyway.

C5   The proposals of the Working Group on CINDA-2001 were approved with minor amendments (see WP12 Rev.) (See also Action A9.)

Info3   CINDA-2001 format proposal (WP3): the following major changes are considered: no reader code; allow 2 work types; second comment record; allow range of subentry numbers for EXFOR index lines

EXFOR

Conclusions on general EXFOR items

C6   (Reference: WP6, item 4) The addition of '@' to the list of allowed characters in EXFOR is approved.

C7   From now on all TRANS files will be put as preliminary files in the NDS open area, subdirectory [TRANS.PRELIM]. All centres should be notified by e-mail of any new TRANS tape. All centres

are encouraged to submit their comments to the originating centre within 3 weeks. The originating centre should then transmit the corrected version as soon as possible to the [TRANS] directory.

Conclusions on items related to the Y2K conversion

C8   Not the whole library will be retransmitted with the 4 digit year code. However, all future transmissions have to have the year coded in 4 digits throughout the EXFOR entry. All centres are strongly encouraged to modify their retrieval codes to always display 4 digit year so as not to confuse users. Furthermore, the centres are encouraged to gradually retransmit their complete area in the new date format.

C9   It is agreed that in references it is not necessary to pad by zeros if month and/or day are not known.

Conclusion on EXFOR programs

C10   It would be useful to have a stand alone version of the computation format program. McLane will do it when time allows.

Conclusions on the dictionary system, new dictionary codes and coding rules

C11   We are allowing the introduction of upper and lower case in future dictionary additions.

C12   The author names may be coded in upper and lower case.

C13   The pending proposals for new EXFOR quantities collected in WP8 were approved with the following exceptions / modifications:
- Item 1 (CP-C/246): see conclusion C17, WP16 Rev.
- Item 3 (CP-C/249): quantity PRE,AKE,LF/HF is replaced by PRE,KE/CRL,LF/HF (see WP16 Rev.)
- Item 5 (CP-D/301, 4C-4/83): Not approved, see Action A43
- Item 7 (4C-4/87): The quantity EM,DA/DE,,LEG/RSL is approved; the formula in the code expansion is modified to contain the secondary energy E':
  $$4PI/SIG(E)*D2\text{-}SIG/D\text{-}OMEGA/DE' = (1+SUM(2L+1)A(E',L)P(L)))$$
- Item 8 (4C-4/91): For the alternative proposals for Dict. 36, the codes given in the reply by V. McLane are approved: PAR,DA,G,LEG/RS and PAR,POL,G and DA,FF,LEG/RS. Consequently, the codes ,DA/DE,G,LEG/RS and ,POL/DE,G and ,DA,FF,LEG/FCT/RES were not approved.

5

-              Item 10: No change of rules needed because the proposed use of derived headings is possible already within the current rules.
-              Item 11: see conclusion C15
-              Item 12: The code ,POL/DA,,AZI is not approved because (according to V. McLane) the proposal was withdrawn prior to the meeting.

C14   The "straightforward" dictionary updates collected in WP9 were noted including the following deviations from the original proposals:
-              Dict.3, 1USADAL   not introduced, replaced by 1USADLS
-              Dict. 22, PGAG   replaced by PGAC (typographical error)
-              Dict. 27, 21-SC-45: the new code needed is 21-SC-41.

C15   'q' (lower case) is adopted as the data heading for the wave number of transferred momentum.

C16   Whenever a non-trivial addition is proposed for Dict. 36, a corresponding LEXFOR entry should be submitted. This LEXFOR entry should mention the independent variables and (class of) units to be used. NDS should reject proposals without LEXFOR entries.

C17   The report of the working group on fission yields (WP16 Rev.) with the amendments is approved.

C18   The proposal of WP7 on self-indication is adopted with the following change: the new code SIF goes to SF6 rather than SF8. (See also Action A40.)

C19   Nuclear temperature (kT) must be given in energy units.

CPND

C20   The new T-series is introduced following the proposal in WP4 (=Memo CP-C/248) and the responsible centre is NNDC.

ACTIONS

General Actions

A1   Proniaev   Send official letter to KAERI and Sarov inviting them to join network

A2   NDS   (Old A3 continuing) Send CINDA DBMS backups to VNIIEF, and the same for ENDF (DBMS backup and text libraries).

A3   Lammer   Investigate the possibility to include the program package for calculation of fission yield distributions by A.C.Wahl, respectively the PC version of it, in the NDS data collection.

A4   NEA-DB   (Old A36 continuing) Send ORACLE design specification developed at NEA for CINDA and EXFOR to NNDC, NDS, CJD and CDFE.

A5   all   Send their progress reports and some working papers (if inclusion is desired) in Word to Schwerer within one month after this NRDC meeting.

CINDA

A6   NEA-DB, Manokhin   (Old A38 continuing) Specify to NDS the number of copies needed for CINDA99 by 14 June 1999.

A7   Manokhin   (Old A39 continuing) Send addresses of recipients of CINDA books to NDS by 14 June 1999 (so that part of the books and questionnaires can be mailed directly from Vienna).

A8   NNDC   Investigate whether appropriate descriptors for optical model parameters, deformation parameters and other theoretical quantities already covered in CINDA, can be added as searchable descriptors in NSR. (Replacing proposal of WP5)

A9   Lammer   (From WP12, last paragraph) Look at the old CINDA quantity codes and the EXFOR reaction codes that will be used for CINDA2001 and check for a 1:1 correspondence for the conversion. Look also into the possibility of the automatic addition of a quantity code in the conversion process.

A10   Lammer   Update page I.8 of CINDA book (on online access) and send proposal to CINDA centres for checking

EXFOR/CINDA Dictionary System

A11 Schwerer   (Old A19 continuing) Check old actions 7-13 of the 1997 NRDC meeting after receipt of the new dictionaries and programs from NNDC.

A12 McLane   (Old A21 continuing) Submit proposal for modification of Dict.27 use flags before the next meeting. *(Compare also the following Action)*

A13 all   Consider radical reform of current Dictionary 27.

A14 Schwerer   (Old A22 continuing) When adding new dictionary codes, take care of flags and numerical equivalents in consultation with V. McLane.

A15 McLane   Send new DAN2X4 and new DANIEL dictionary memos to NDS

A16 Schwerer   Make dictionary transmission as soon as possible after receiving DAN2X4

A17 Schwerer   Make dictionary transmissions 4 times per year.

A18 all   Think about using archive dictionaries instead of EXFOR (TRANS) dictionaries

EXFOR, general

A19 McLane   (Reference: WP6, item 6) Add list of EXFOR areas to EXFOR
    Proniaev   Manual, appendix P and the network document

A20 all   Proof-read the EXFOR Basics Manual and send corrections back to McLane by e-mail.

A21 McLane   (Old A42 continuing) Add example entries (or one brief complete entry) to the EXFOR Basics Manual.

A22 NDS   (Old A47 continuing) Send incremental EXFOR updates (TRANS) to CNDC.

A23 McLane   Send Schwerer a list of the last transmission files on the library sent to CNDC.

A24 McLane   (Old A48 continuing) Make a benchmark test of TEST-EXF.

A25 McLane   (Old A49 continuing) If time becomes available, investigate the possibility of including separate index lines for the ELEM/MASS formalism

| A26 | McLane | (Old A50 continuing) Correct EXFOR processing codes to properly treat cases where KT is given instead of an average incident particle energy (factor 3/2). |
| A27 | all | Check and retransmit all entries included in the list of pending retransmissions by V.McLane. |

EXFOR coding rules and new dictionary codes

A28	all	Review entries of their area given in WP11 for legal or illegal use of He-5 as reaction product.
A29	McLane	(Old A57 modified) Provide LEXFOR entry for particle correlation measurements.
A30	McLane	(Old A58 continuing) Update LEXFOR page on thick target yields taking into account the conclusion #29 of the 1997 NRDC meeting (Memos CP-C/224 and CP-C/233 with the modification that "thick target yield per unit time" is coded TTY,,DT instead of TTT).
A31	McLane	(Old A59 continuing) Check existing codes for fission quantities for possible overlap with the case of Memo CP-C/209 and existing EXFOR entries for necessary revisions.
A32	Lammer	(old A62 modified) Review the LEXFOR entry on fission yields and send proposals for revisions to McLane.
A33	McLane	Update the LEXFOR entry on fission yields according to Lammer's proposals.
A34	McLane	(Old A66 continuing) Submit LEXFOR entry on the use of RCL and RSD in SF7.
A35	Kellett	(Old A68 continuing) Retransmit subentry 20220.007 using the new REACTION (PAR,DA/CRL,G/N) introduced at the 1998 NRDC meeting and check whether correction of DATA headings is necessary.
A36	McLane	(Old A69 continuing) Provide more information on the proposal containing "PN" (prompt neutrons) in SF7 (Memo CP-C/235).
A37	Kellett	(Old A70 continuing) Check the incorrect report code mentioned in 4C-3/389 and retransmit entry 22357.
A38	McLane	(Old A71 continuing) Propose clarification of the definition of gamma-ray abundance in LEXFOR.
A39	Maev	Prepare a LEXFOR entry and a new proposal for coding rules for the data to be compiled in EXFOR entry 41303.

A40 Maev	To send a modified LEXFOR entry on self-indication to McLane.
A41 McLane	Add the statement of conclusion C19 (on units for nuclear temperature kT) to the corresponding LEXFOR entry.
A42 McLane	Check all references concerning particle correlations and propose codes and coding rules.
A43 NDS+CJD	Reconsider the coding proposals of Memos CP-D/301 and 4C-4/83.

Neutron data

A44 NEA-DB	(Old A76 continuing) Look into the status of the EXFOR 6000 series.

CPND

A45 CAJaD	(Old A78 continuing) Investigate whether the Landolt-Börnstein CPND compilation can be made available to the CPND centres in computerized form.
A46 NDS	(Old A80 continuing) Distribute the corrected area B file after completion of the corrections by CAJaD.
A47 NDS	Communicate with centres which have not sent any input to CPND EXFOR for more than one year.
A48 all concerned	Study Chukreev's list of duplications (WP13) and take necessary actions.
A49 all CPND	Go through the list in WP17 and compile publications of their responsibility with high priority and communicate the accession number to ATOMKI.

Software development

A50 all concerned	All centres using NNDC programs should check the NNDC open area 'FOURCS' for program updates.
A51 all	Send information on planned or ongoing new developments in the area of program development and user services in WORD format to NDS. NDS will collate this information and distribute it as a quarterly NRDC user services and software development report.

Graphics software

A52 Zerkin,NNDC	Investigate various options for including graphics on the EXFOR CD-ROM

A53 NDS   Investigate possibility to organize a workshop on nuclear reaction data plotting

A54 Zerkin+NNDC Investigate the possibility of coupling Zerkin's 'ZV VIEW' with the NNDC web retrieval system.

Evaluated data libraries

A55 all concerned (Old A85 modified): Compile and maintain a list of known errors and deficiencies in the evaluated data libraries for which they are responsible and make this list available to the users of the online service.

A56 all concerned (Old A86 continuing) Document the parameters being used for producing pointwise cross sections including the code name, version number and input deck.

A57 all concerned (Old A87 continuing) All centers responsible for evaluated data libraries should try to make the documentation available online.

Report from a working group session on Monday afternoon

1) Working Group for CINDA2001

It is proposed to establish a working group with the sole responsibility for the format and dictionaries for CINDA2001. The proposed composition of the working group is: Vicki McLane, Mark Kellett, Meinhart Lammer and Stanislav Maev. The working group will submit a progress report to the next NRDC meeting in 2000.

2) Conversion of the current CINDA file into CINDA2001

First convert EXFOR entries into CINDA2001 (including the EXFOR index line(s) and all references enlisted in the EXFOR entry), as the reaction and quantity codes can be directly obtained from the corresponding EXFOR codes. Then identify the corresponding block in the CINDA file, assign the block number and convert the remaining entries for references in that block which are not contained in the EXFOR entry.

Then convert all remaining CINDA entries with no corresponding EXFOR entry. The conversion will be automatic with a table of old CINDA quantity codes and corresponding CINDA2001 reaction codes. Therefore there will generally only be a reaction code but no (or only one) quantity code,

Action on Lammer: Look at the old CINDA quantity codes and the EXFOR reaction codes that will be used for CINDA2001 and check for a 1:1 correspondence for the conversion. Look also into the possibility of the automatic addition of a quantity code in the conversion process.

Report of the Working Group on Fission Yields

(Changes to the proposed text are underlined)

Memo CP-C/246, *Subject:* Delayed neutron yields; neutron groups and units.

The following significant changes in coding rules are proposed in Memo CP-C/246:
- the branch code PAR (SF5) should not be used; instead, the code GRP should be used;
- the delayed neutron group yields should be given preferably with the decay constant or half-life; only if neither are given in the publication, the group number should be coded;

The proposed coding rules and additions to dictionaries 24 and 31 were adopted with the following modification:
Instead of the proposed units N/FIS (Dict.25), the more general code 'PART/FIS' (=outgoing particle per fission) was adopted.

Accordingly, the following changes to the proposed wording of the LEXFOR entry were adopted:

a) **Delayed neutron Groups:** coded using the average half-life of the group(heading HL), the decay constant (heading DCNST), or the group number (heading GRP-NUM) as an independent variable. The group number should only be used if no information on the half-life or decay constant is given.

   REACTION Coding: (....(N,F),DL/GRP,NU)
- .....
- Absolute group yield: coded with units PART/FIS (outgoing particles per fission) or PC/FIS (neutron per 100 fissions).

Memo CP-D/298, *Subject:* EXFOR coding of "mass yields"

The explanation and use was adopted;
the new code **SF5=MAS** and all associated new dictionary entries were approved

Memo 4C-4/82 (reference: EXFOR40420)

1.: The code PR,NU,FF was adopted as proposed.

1a: Among the proposed codes, PR,NU/DE,FF was adopted for prompt neutrons emitted by fission fragments as function of fragment mass and kinetic energy.

2.: The code PRE,FY/DE was adopted as proposed.

Total kinetic energies of fragment pairs (reference: EXFOR41109):

Whenever data for fragment pairs are given, the parameter (SF6) CRL should be used. Hence the total kinetic energy of a fragment pair (i.e. the sum of kinetic energies of both fragments) should be coded as: PRE,KE/CRL,LF/HF (ref.: subentry 41109007).

The data can be given as function of the light or the heavy fragment mass or both. If the mass of one fragment is given, it is sufficient to use just 'MASS' in the data table, or MASS1 and MASS2 is to be used for the masses of both fragments. Along these lines, ELEM or ELEM1 and ELEM2 are to be used, if the product (pair) is identified.

EXFOR41303:

ACTION on Maev: to read the article carefully and write an explanation of the physics behind it when/before coding these polarization data in EXFOR and proposing new codes.