

Memo CP-D/123

19 March 1984

To: Distribution

From: H.D. Lemmel *Lemmel*

Subject: Minutes 1983 NRDC Meeting

Please find attached the Draft Minutes of the Oct. 1983 NRDC Meeting. Page numbers and other details are still to be finalized. Compare also Memo CP-D/122 with the Conclusions, Actions and Recommendations to be appended to the Minutes.

Please see on pages 1 and 11 the list of Status Reports and Working Papers to be included. Only some of the working papers seem to be suitable for inclusion in the minutes. If you need a copy of the one or other, let me know. Attached to the present Memo are the Status Reports by CJD, CAJaD, CDfE, TUD, of which there were perhaps not enough copies at the meeting, or which were translated or typed only subsequent to the meeting.

If you wish to submit corrections, additions, etc. to the minutes and actions, fast action (in contrast to the delay from my side) would be appreciated. Suggested deadline: 13 April. If you cannot meet this deadline, send a telex.

Clearance: *J. Schmidt*
J.

Distribution:

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cc. USSR State Committee

Draft

INDC(NDS)-154
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Report on the
7th IAEA CONSULTANTS' MEETING OF
NUCLEAR REACTION DATA CENTERS

Obninsk and Moscow, USSR
17 - 21 October 1983

Including
the 18th FOUR-CENTERS MEETING
of the NEUTRON DATA CENTERS
and
the 8th MEETING ON CHARGED PARTICLE NUCLEAR DATA COMPILATION

Abstract

This report summarizes the 1983 coordination meeting of the national and regional nuclear reaction data centers, convened by the IAEA at regular intervals. The main topics are

- the international exchange of nuclear reaction data by means of the "EXFOR" system,
- the further development of this system,
- the sharing of the workload for speedy and reliable data compilation,
- the exchange of specialized and evaluated data libraries,
- the role of ENDF/B as an international format for the exchange of evaluated data,

with the goal of rendering data center services to data users in IAEA member states by means of computer retrievals and printed materials.

Edited by

H.D. Lemmel

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Status reports

SR1	NNDC
SR2	NEA-DB
SR3	NDS
SR4	CJD
SR5	CAJaD
SR6	CDFE
SR7	TUD
SR8	RIKEN
SR9	Study Group
SR10	LIJaF

Working Papers (compare also p. 11)

WP3	Actions and recom. from 13th INDC Meeting
WP6	EXFOR: Frequent and/or important errors
WP7	NNDC: Status of neutron data exchange
WP9	CINDA matters of area 4
WP14	Importance for compilation of selected CPND and PhND
WP18	Neutron data publications at NNDC

GLOSSARY OF ABBREVIATIONS

BNL	Brookhaven National Laboratory, Upton, N.Y., USA
CAJaD	Center for Nuclear Structure and Reaction Data, Kurchatov Institute, Moscow, USSR
CDFE	Centr Dannykh Fotojad. Eksp., Moscow State University, USSR
CINDA	A specialized bibliography and data index on neutron nuclear data operated jointly by NNDC, NEA-DB, NDS and CJD
CJD	USSR Nuclear Data Center at F.E.I., Obninsk, USSR
CPL	Computer Program Library of NEA-DB
CPND	Charged-particle nuclear reaction data
CRP	Coordinated Research Programme of the IAEA Nuclear Data Section
CSEWG	US Cross-Section Evaluation Working Group
CSISRS	Cross-Section Information Storage and Retrieval System, the EXFOR-compatible internal system of NNDC
DOE	US Department of Energy
DOE-NDC	Nuclear Data Committee of DOE
ENDF	US Evaluated Nuclear Data File
ENSDF	Evaluated Nuclear Structure Data File
EXFOR	Format for the international exchange of nuclear reaction data
FEI	Fiziko-energeticheskij Institut, Obninsk, USSR
FIZ	Information Center of the Fed. Rep. of Germany for energy, physics, mathematics, Karlsruhe, Fed. Rep. of Germany
GKAE	USSR State Committee on Atomic Energy, Moscow, USSR
IAEA	International Atomic Energy Agency
INDC	International Nuclear Data Committee
INDL	The IAEA Nuclear Data Library for evaluated neutron reaction data
INIS	International Nuclear Information System

IRDF The International Reactor Dosimetry File, maintained by the IAEA/NDS

JEF The Joint Evaluated File of neutron data, a collaboration of European NEA member countries and Japan

KACHAPAG Charged Particle Nuclear Data Group, Karlsruhe, Fed. Rep. of Germany

LANL Los Alamos National Laboratory, Los Alamos, N.M., USA

LEXFOR Part of the EXFOR manual containing physics information for compilers

LIJaF Leningrad Nuclear Physics Inst., Gatchina

LMFBR Liquid-Metal Fast Breeder Reactor

NDS IAEA Nuclear Data Section, Vienna, Austria

NEA Nuclear Energy Agency of the OECD, Paris, France

NEACRP Nuclear Energy Agency Committee on Reactor Physics

NEA-DB NEA Data Bank, Saclay, France

NEANDC Nuclear Data Committee of the OECD Nuclear Energy Agency

NEUDADA Neutron Data Direct Access. Earlier data file of NEA, now included in EXFOR

NND Neutron Nuclear Data

NNDC National Nuclear Data Center, Brookhaven National Laboratory, USA

NNDEN Neutron Nuclear Data Evaluation Newsletter

NRDC the Nuclear Reaction Data Centers

NSDD Nuclear structure and decay data

NSR Nuclear structure references, a bibliographic system

OECD Organization for Economic Cooperation and Development, Paris, France

ORNL Oak Ridge National Laboratory, Oak Ridge, Tenn., USA

PhDC Photonuclear Data Center, Washington, USA

PhND Photonuclear data

RIKEN Nuclear Data Group, RIKEN Inst. of Phys. and Chem. Res.,
Wako-Shi, Saitama, Japan

SGIP Study Group for Information Processing, Sapporo, Japan

SOKRATOR USSR evaluated neutron data library (and format), now
included in INDL

SR Status report of centers to this meeting

TP Topical paper presented at this meeting

TRANS Name of transmission tapes for data exchange in the EXFOR
system

TUD Technical University, Dresden, German Democratic Republic

WP Working paper presented at this meeting

WRENDA World Request List for Nuclear Data

The network of Nuclear Reaction Data Centers

National and regional nuclear reaction data centers, co-ordinated by the International Atomic Energy Agency, co-operate in the compilation, exchange and dissemination of nuclear reaction data, in order to meet the requirements of nuclear data users in all countries. A brief summary of the data centers network is given below.

The nuclear reaction data centers:

NNDC	- US National Nuclear Data Center, Brookhaven, USA
NEA-DB	- OECD/NEA Nuclear Data Bank, Saclay, France
NDS	- IAEA Nuclear Data Section
CJD	- USSR Centr po Jadernym Dannym (= Nuclear Data Centre), Obninsk, USSR
CAJaD	- USSR Centr po Dannym o Stroenii Atomnogo Jadra i Jadernykh Reakcih (= Nuclear Structure and Nuclear Reaction Data Centre), Moscow, USSR
CDFE	- Centr Dannyykh Fotojad. Eksp. (= Centre for Experimental Photonuclear Data), Moscow, USSR
RIKEN	- Nuclear Data Group, RIKEN Inst. of Phys. and Chem. Res., Wako-Shi, Japan
KACHAPAG	- Karlsruhe Charged Particle Group, Karlsruhe, FRG*)
FIZ	- Fachinformationszentrum Karlsruhe, FRG
SGIP	- Study Group for Information Processing, Sapporo, Japan
PhDC	- Photonuclear Data Center, Washington, USA

These data centres cooperate on the following projects:

1. Neutron Nuclear Data

- 1.a Bibliography and Data Index "CINDA":
Input prepared by NEA-DB, NNDC, NDS, CJD
Handbooks published by IAEA
- 1.b Experimental data exchanged in EXFOR format:
Input prepared by NNDC, NEA-DB, NDS, CJD
- 1.c Data Handbooks based on EXFOR published by NNDC
- 1.d Evaluated data exchanged in ENDF/B format:
NNDC, NEA-DB, NDS, CJD and others
- 1.e Computer retrieval services upon request of customers:
NNDC, NEA-DB, NDS, CJD
- 1.f WRENDA: compilation of requested data that are known with insufficient accuracy. Compiled by NNDC, NEA-DB, NDS, CJD, published by IAEA

2. Charged Particle Nuclear Data (including heavy-ion reaction data)

- 2.a Bibliography and Data Index published by NNDC*)
- 2.b Numerical data exchanged in EXFOR format:
Input prepared by KACHAPAG*), CAJaD, RIKEN, NDS, NNDC, SGIP
- 2.c Data Handbooks based on EXFOR published by FIZ/KACHAPAG*)
- 2.d Computer retrieval services upon request of customers:
NNDC, NEA-DB, NDS, CAJaD

3. Photonuclear Data

- 3.a Numerical data exchanged in EXFOR format:
Input prepared by CDFE, NNDC(PhDC), NDS
- 3.b Bibliography published by CDFE
- 3.c Computer retrieval services upon request of customers:
NNDC, NEA-DB, NDS, CDFE

*) Discontinued in 1982. Since then CAJaD has started to compile also European and US data.

LIST OF PARTICIPANTS

CJD: V. Manokhin (Centre head)
A. Blokhin
A. Ignatjuk

CAJaD: F. Chukreev (Centre head)
G. Zhuravleva
V. Vukolov
A. Ignatochkin

CDFE: B. Ishkhanov (Centre head)
V. Varlamov
V. Surgutanov

FEI: A.I. Abramov

NNDC: C.L. Dunford (Acting Centre head)
V. McLane

NEA-DB: N. Tubbs

NDS: J.J. Schmidt (Centre head, Chairman)
H.D. Lemmel (Scientific Secretary)

RIKEN: A. Hashizume

TUD: D. Hermsdorf

LIJaF: I. Kondurov

Part-time participants:

GKAE: Yu. Klimov

FEI: B. Kuzminov
M. Nikolaev
A. Tsybulja
A. Lebedev
N. Zvonov



WP1

7th IAEA Consultants' Meeting of the
NUCLEAR REACTION DATA CENTRES (NRDC)

Obninsk/Moscow, USSR, 17-21 October 1983

AGENDA

Note: "WP" = working papers, see page
"SR" status reports, see appendices

1. Introduction

- 1.1 Introduction of meeting participants
- 1.2 Election of Chairman
- 1.3 Opening of the meeting, announcements, schedule
- 1.4 Adoption of Agenda WP1

2. General items

- 2.1 Brief status reports of participants

- SR1: NNDC
- SR2: NEA-DB
- SR3: NDS
- SR4: CJD
- SR5: CAJaD
- SR6: CDFE
- SR7: TUD
- SR8: RIKEN
- SR9: SG

- 2.2 Review of actions and recommendations from previous meeting WP2
- 2.3 Review of actions and recommendations from the 13th INDC Meeting WP3

3. Policy discussions

- 3.1 Commitments and cooperation of the Data Centres WP4
- 3.2 Data needs and priorities
- 3.3 Scope and activities of Data Centres
- 3.4 Priorities of CPND and PhND compilation: WP14
Who compiles what Need for recommended data WP3
- 3.5 Continuation of the CPND bibliography
- 3.6 Additional Data Centres to join the data centre cooperation
- 3.7 Date and place of next NRDC Meeting
- 3.8 USSR publications, see WP16
- 3.9 Planned meetings

4. EXFOR

- | | | |
|-----|--|-------------|
| 4.1 | New proposals for coding rules | <u>WP5</u> |
| 4.2 | Mistakes in TRANS tapes | <u>WP6</u> |
| 4.3 | Compilation of proton resonance data
(= Recommendation by the BNL Level Density
Meeting, endorsed by INDC) | <u>WP3</u> |
| 4.4 | Technical matters on charged-particle nuclear
data and photonuclear data | |
| 4.5 | EXFOR customer services | |
| 4.6 | Distribution of CP-Memos, TRANS-tapes,
Dictionary tapes, Dictionary listings | <u>WP10</u> |

5. Evaluated data

- | | | |
|-----|---|---------------------------------|
| 5.1 | Status of ENDF/B formatted data compilations
and related computer codes | |
| 5.2 | Advantages and disadvantages of the ENDF/B format.
New proposals | <u>WP8, WP19</u>
<u>WP20</u> |
| 5.3 | Need for an extended ENDF/B format
- to include high-energy neutron data
- to include CPND, e.g. neutron-source reactions | |
| 5.4 | Proposed IAEA Specialists' Meeting on ENDF/B format
in 1984, definition of meeting program | <u>WP3</u> |
| 5.5 | Other evaluated data | |

6. Special matters on neutron data

- | | | |
|-----|---|------------------|
| 6.1 | CINDA: New Supplement Format | <u>WP12</u> |
| 6.2 | CINDA: 5-years archival issue | <u>WPII, WP3</u> |
| 6.3 | CINDA rules | |
| 6.4 | Area 4 CINDA compilation | <u>WP9</u> |
| 6.5 | WRENDA | <u>WP3</u> |
| 6.6 | Completeness of neutron data in EXFOR | <u>WP7, WP15</u> |
| 6.7 | TRANS 4046-4048 | <u>WPI3</u> |
| 6.8 | Conversion of EXFOR 3 series to EXFOR 4 series
(compare Memo 4C-4/38 of 19.8.83 giving a
correspondence list) | |
| 6.9 | ISO-QUANT to REACTION conversion | |

7. Topical discussions

8. Conclusions and Recommendations, Actions

LIST OF WORKING PAPERS

- WP1 Proposed Agenda, see page 9.
- WP2 Actions from previous meeting, see report INDC(NDS)-141.
- WP3 Actions and recommendations from the 13th INDC Meeting, concerning the NRDC Network. Appendix
- WP4 The NRDC Network, see page 5.
- WP5 Pending EXFOR proposals, not appended. See EXFOR conclusions page
- WP6 EXFOR: Frequent and/or important mistakes where improvement of check programs is recommended. See appendix.
- WP7*) Completeness of neutron data in EXFOR. See appendix.
- WP8 1983 Minutes ENDF/B Formats Subcommittee, not appended. See planned meeting on ENDF/B format.
- WP9*) CINDA matters of area 4. See appendix.
- WP10 Distribution of CP-Memos, EXFOR TRANS tapes, Dictionary tapes, Dictionary Listings. See EXFOR Manual p. 9.6 to 9.9
- WP11*) CINDA 5-years archival issue, see Memo 4C-3/259 which is not appended.
- WP12*) CINDA: New format of Supplement book, see Memo 4C-3/266 which is not appended.
- WP13*) TRANS 4046-4048, not appended.
- WP14 Importance for compilation of selected CPND and PhND. See appendix.
- WP15*) Pending EXFOR retransmission. See Memo 4C-3/268 which is not appended.
- WP16 USSR publications. Not appended, contents included in Minutes.
- WP17 Memo CP-C/102 on LEXFOR: Errors. Not appended.
- WP18 Neutron Data Publications at NNDC. See appendix.
- WP19*) D. Hermsdorf, TUD: Recommendations for the use of formatting rules in ENDF/B. See Memo 4C-3/269 which is not appended.
- WP20*) D. Hermsdorf, TUD: Remarks on data of nuclear reactions induced by fast neutrons and their representation in the format ENDF/B. See Memo 4C-3/270 which is not appended.

*) Of interest to the 4 neutron data centres only

MEETING SCHEDULE

Monday and Tuesday plenary sessions at Obninsk. Part of Tuesday subgroups:

- Center heads: agenda item 3
- Technical staff: agenda item 4

Wednesday morning: Topical discussions (agenda item 8), and plenary session.

Wednesday afternoon: visit to CJD

Thursday and Friday visits and sessions at CDFE, Moscow State University, and CAJAD, Kurchatov Institute

MINUTES

(Note: The minutes are sorted by agenda items. The actual discussions may have been in different sequence.)

1. Introduction

J.J. Schmidt opened the meeting. He requested a minute of silence honouring the late Prof. L.N. Usachev and commemorated his merits for the international co-operation in the field of nuclear data.

B. Kuzminov welcomed the participants on behalf of the Fiziko-Energeticheskij Institute which celebrated the 30th anniversary of nuclear power in the USSR. He stressed the continuing importance of the nuclear data programme of the IAEA noticing still increasing requirements for more precise nuclear data not only in the field of nuclear energy but more and more also in non-energy applications.

V.N. Manokhin expressed the pleasure of the Centr po Jadernym Dannym for having the opportunity to host the meeting together with the two centers in Moscow. He introduced the meeting participants.

J.J. Schmidt was elected as chairman. The agenda was adopted with few modifications.

2. General items

2.1 Status reports

The participants presented the status reports given in the appendix. Some items arising in the discussions were included in these minutes under the appropriate agenda items in order to avoid duplication. Some additional items of interest follow:

CJD has a staff of 36, thereof 14 computer staff.

At TUD about 10 data requests per year are received from customers within the GDR. These requests are satisfied with the data files maintained at TUD.

CDFE receives per year about 300 requests for bibliographic information and 18 requests for numerical data.

I. Kondurov, Gatchina, gave a brief report on his NSDD activities. They finished the A=134 mass chain evaluation, A=133 and 180 are in progress. They contribute to and distribute ENSDF information. They are working on a special file for nuclear activation analysis.

CAJaD (see SR5) extended the compilation work to CPND from various countries. This was highly appreciated by the participants.

N. Tubbs (see SR2) emphasized the extended co-operation of the NEA-DB with non-OECD countries by extension of the evaluation newsletter NN DEN and by increased services of the Computer Program Library (CPL). He requested that there should be more input from non-OECD countries to the CPL.

In connection with the NDS report (SR3), it was requested to disseminate regularly early information on IAEA Meetings.

2.2 The meeting reviewed the actions and recommendations from the previous meeting, see INDC(NDS)-141. Some continuing actions were included in the new list of actions given on pages of this document.

2.3 J.J. Schmidt reviewed some actions and recommendations resulting from the 13th INDC Meeting. In particular he announced the Agency's Advisory Group Meeting on Nuclear Standard Reference Data to be held in Geel, Belgium, in November 1984.

3. Policy discussions

Part of this agenda item was dealt with in a Discussion of Center Heads.

The main topics of the center heads' discussions concerned

- completeness and correctness of CINDA in order to publish in spring 1984 a high quality archival issue CINDA-B, requiring in particular an intensified workplan at CJD,
- speed and completeness of the EXFOR data transmission where some significant delays had been encountered,
- importance to improve the exchange and speedy release of evaluated data and of related computer codes.

Resulting actions and recommendations are given on page . Additional parts of this agenda item were discussed in plenary, as follows.

3.4 Priorities of CPND and PhND compilation

a) CPND

J.J. Schmidt reported on an action requested by the INDC (see WP3 item 4) to analyze the user needs for compilations of CPND. This information is required by the INDC in order to estimate the impact to data users caused by the closing down of KaChaPaG.

The meeting considered the data needs for CPND and Photonuclear data as listed in INDC(NDS)-141 pages 75-77 (see WP14). All participants

(except NEA-DB having no mandate for CPND) were asked to report to J.J. Schmidt as soon as possible about

- priorities of data needs
- encountered completeness resp. incompleteness of existing data files
- estimate of resulting compilation workload required and whether this can be done by the existing centers or not.

See action _____.

F. Chukreev replied that of the items listed in WP14

- CPND for radioisotope production
- CPND for fusion, and
- CPND for neutron production

are considered as most important. He expresses concern that CPND compilation finds insufficient support in most countries, but that he is prepared to continue CPND compilation with widened scope as much as possible with the staff available. This is much appreciated by the meeting participants.

A. Hashizume reported that he is prepared to start Exfor compilation at RIKEN of CPND for the production of about 20 radioisotopes that he considers as most important. In addition, data for unwanted parallel RI production are needed to be compiled. After compilation of experimental data he plans data evaluation and to provide evaluated CPND in Exfor format. In contrast to the Study Group covering also differential data, RIKEN is interested in cross-sections and thick-target yields as function of projectile energy.

See actions 7.4 - 7.6.

F. Chukreev pointed out that there are some papers containing CPND and NND which should be compiled together by the same Exfor compiler. CAJaD has sent to CJD a tape with some neutron Exfor entries compiled from such papers. Action 6.6. It was agreed that for the time being CPND and NND compiled from the same paper, should not be transmitted in the same entry. Internally, of course, each center is free to decide what to do in addition to the agreed Exfor data transmission.

H. Lemmel reported about NDS activities on CPND compilation. Efforts to find a new CPND center in replacement of KaChaPaG had concentrated on FRG and Japan. A group at Cologne, FRG, had shown much interest but could not find financial support. More successful were the contacts with Japan. The meeting highly welcomed the participation of the RIKEN group and the presence of Dr. Hashizume at this meeting.

A. Ignatjuk stresses the importance of having proton-resonance data to be analyzed with NEA-DB computer codes used for neutron resonances. N. Tubbs confirms, but he is not sure whether there are enough proton-resonance data and sufficiently reliable data. (action 7.7)

F. Chukreev said that, according to a continuing action from previous meetings, (d,pf) and (t,df) data as required for neutron data evaluation, are compiled by CJD and CAJaD in co-operation. He was disappointed that there is no compilation manpower for these type of data in the other service areas, although these data are considered as important.

b.) PhND

See actions 8.1 - 8.8.

The 1979 Berman library could not be obtained by NNDC.

CDFE had no problems with the use of EXFOR for PhND. It was found regrettable that CDFE is the only center so far to compile PhND in a systematic manner. The main interest of CDFE is photon activation analysis, including photon activation cross-sections and spectra of secondary photons for identification of elements/isotopes. According to the data requests received from USSR institutes and universities, there is interest in data on (γ,γ') , (γ,n) , (γ,p) , (γ,α) .

3.5 CPND bibliography

C. Dunford says that NNDC presently reviews the possibility of continuing the CPND Bibliography. It would be a supplement to the one discontinued in 1982 but produced in a different way: the "Nuclear Structure Reference" system has tags recently introduced by which retrievals for the bibliography of integral CPND are made possible. The meeting participants confirm that the Bibliography of integral CPND is an essential basis for the EXFOR compilation and encourage NNDC to continue. (Action 7.8)

3.7 Date and place of next NRDC Meeting

Continuing NRDC Meetings in intervals of 18 months, the next meeting would be in spring 1985 in Paris.

It was felt however, that for the technical staff 18 months intervals are too long, and a meeting in Sept. 1984 in Vienna would be desirable. For center heads, who occasionally meet on other occasions, 2 year intervals may be sufficient.

See actions 1.12 - 1.14.

If the technical meeting is not possible, the old schedule should be maintained.

3.8 USSR publications

F. Chukreev reports that he has distributed the proceedings of all the ATI-Union Conferences since 1977. I. Kondurov is organizer of

these conferences. In view of the difficulties to obtain these proceedings in the Western countries, NDS and NNDC should send requests for proceedings to I. Kondurov. (Action 1.2)

It was noted that in USSR publications often the institute of the authors was missing, and CJD was asked to approach editors. (Action 1.3)

3.9 Planned meetings

See actions 1.9 - 1.11.

The next international nuclear data conference will be in Santa Fe, USA, 13-17 May 1985. M.K. Mehta, NDS, will be on the Advisory Committee to take care about participation from non-OECD countries.

N. Tubbs announces

a NEANDC meeting on analysis codes for data reduction from transmission data, at a date not yet fixed

a NEACRP meeting on the treatment of the resonance region in reactor calculations, perhaps in Jan. 1984

The NEANDC meeting in Tokyo, March 1984

in 1985 a meeting on optical model codes, the emphasis being influenced by JEF benchmarks.

F. Chukreev announces the annual nuclear spectroscopy conference in Alma Ata, April 1984.

V. Manokhin announces that the first volume of the 1983 Kiev conferences will be published in Nov. 1983, the last volume in March 1984.

4. EXFOR

See EXFOR Conclusions page . . .
EXFOR Actions page . . .
and WP6 page . . .

4.3 Proton resonance data

The compilation in Exfor of proton resonance data had been recommended by the IAEA Advisory Group Meeting on Basic and Applied Problems of Nuclear Level Densities, BNL 11-15 April 1983 (see BNL-NCS-51694 p.25), for the purpose of obtaining level-density information required for neutron data evaluation. The 4 Centers had been urged to compile these proton resonance parameters so that they become accessible with similar ease and completeness as has been achieved for neutron resonance parameters in recent years.

This recommendation had been endorsed by the INDC at its 13th meeting, May 1983.

The neutron data centers, though presently not compiling such data, took note of this recommendation (see Exfor Conclusion no. 4.11).

The same level-densities meeting also requested compilation of (α, n) and (p, n) data for heavy nuclei (A above 70) and (p, α) and (α, p) data for higher nuclei, also energy and angular differential data of (p, n) and (α, n) reactions (see BNL-NCS-51694 p. 28-31), for the purpose of obtaining level-density information for neutron data evaluation.

5. Evaluated data

5.1 Status of ENDF/B formatted evaluations and related computer codes

V. Manokhin and A. Blokhin report on the progress on checking and correcting the Dresden silicon evaluation. CJD has implemented the code FIZCON and is implementing at Minsk and Dresden. On iron there is no newer version than that available at NDS. NDS should send to CJD the most up-to-date versions of the codes CHECKER, FIZCON, PSYCHE.

C. Dunford reports that NNDC, though working on a CDC computer, tests the IBM version of the codes CHECKER, FIZCON, PSYCHE. They have a plotting code which could eventually be supplied for VERSATECH.

N. Tubbs reports on the JEF activities at the NEA Data Bank, see status report SR2.

CJD has FORTRAN4. FORTRAN77, which is quite different, is not available, so that CJD must modify codes received in FORTRAN77.

5.2 - 5.4 ENDF format

M. Nikolaev reported that the ENDF/B format was recognized as a good format, and that the USSR changed over from SOKRATOR format to ENDF/B format. Of the encountered difficulties many are pointed out in the format documentation ENDF-102 but without conclusions how to solve them. The main difficulty they had is the rule that the boundary between the resolved and unresolved resonance region must be the same for all l -states. They would prefer a formalism giving first the data for $l=0$, then for $l=1$ etc, though there would be other difficulties. As an interim solution they created artificial data for $l=1$. They have also used, artificially, three MAT numbers for U-238 s-wave, U-238 p-wave, and U-238 d-wave as separate "isotopes" of same abundance.

C. Dunford replied that this problem is solved in the US by introducing an artificial background cross-section to account for the missing p-wave part.

M. Nikolaev reported that Konshin recommends to use Reich-Moore parameters. C. Dunford replies that the format exists in ENDF/B but that, according to present procedure, this format should not be used because of the lack of corresponding computer codes. Whenever such codes become available, there will be a new situation.

It was concluded that, before introducing new format or procedures in ENDF/B, an estimate is required, how much more accurate data calculations would be. If an improved accuracy is not demonstrated, evaluators should be asked to bring their evaluations as accurately as possible into the agreed ENDF/B format.

D. Hermsdorf presented two papers on

- Recommendations for the use of formatting rules in ENDF/B
- Remarks on data of nuclear reactions induced by fast neutrons and their representation in the format ENDF/B.

Based on his experiences with the silicon evaluation he noted in particular:

- multiparticle reactions have insufficient possibilities in ENDF/B-5
- neutron-emission data cannot easily be coded in ENDF/B
- for angular distributions of fast neutrons, the rules of file 6 should be re-activated to store energy-dependent Legendre coefficients
- charged-particles spectra from neutron-induced reactions are needed
- the ENDF/B formats and procedures manual requires editorial improvements

He requested an information system for news on the ENDF/B format and on related computer codes.

M. Nikolaev noted the following deficiencies:

- for U-238 more open channels are required in the unresolved energy region
- there seem to be some problems with the condition that all partial cross-sections must add up to the total cross-section throughout all energies
- the rules must be laid down for calculating the thermal cross-sections from the resonance-parameters

N. Tubbs reported that not all options of the ENDF/B format are used for JEF. Of JEF parallel files are kept of pointwise data and resonance-parameter data.

F. Chukreev stated that it would be useful to include in ENDF/B charged-particle reaction data in particular neutron-source data.

C. Dunford reported that the US Cross-Section Evaluation Working Group (CSEWG) will meet in May 1984 to decide upon ENDF/B format modifications to be adopted for ENDF/B-6. Changes will be adopted not on theoretical needs but only on the basis of strong arguments. Any change adopted has serious consequences in the ENDF/B computer codes.

M. Nikolaev agreed that the range of data to be included in ENDF/B should not be too wide. Reactor calculations should remain the primary purpose. ENDF/B is not really an exchange format but a format for data input into computer codes.

The meeting supported the INDC recommendation to have a specialists' meeting on the ENDF/B format. This meeting should be held in Vienna in the first week of April. Proposals should be submitted as early as possible so that they can be reviewed in time before the meeting.

5.5 Other evaluated data

J.J. Schmidt reported that the ARAMAKO file was used in many countries. NDS will send to CJD the ARAMAKO distribution list in order to stimulate the release of a more recent version of it. (Action 1.5)

6. Special matters on neutron data

6.1 - 6.4 CINDA

The improved format of the Supplement book (4C-3/266) was approved.

The schedule for the new archival issue CINDA-B (4C-3/259) was confirmed. The cutoff date between CINDA-A and CINDA-B will be optimized by NEA-DB.

On Cinda rules see CINDA conclusions and actions, page .

For area 4 Cinda matters see appendix, WP9.

6.5 WRENDA

WRENDA 83/84 is in print. Further issues will be published in cycles of 4 years.

6.6 - 6.9 Neutron data in EXFOR

See actions 6.1 - 6.11.

During the past year lack of manpower did not permit many completeness checks. A survey made by NNDC, see appendix WP7, indicated areas where completeness of compilation and speed of data transmission still require improvements. Attention is drawn to the graphical cross-section atlas for $\sigma(E)$ planned by NNDC, see action 6.1.

7. Topical Discussions

7.1 A. Ignatjuk: Level density models for nuclear data evaluations.

The Fermi-gas model being no longer sufficient, one must consider at least three effects: Shell effects, superconductivity effects, collective effects.

CJD will distribute the paper to meeting participants. (Action 1.4)

- 7.2 B. Kuzminov reported on recent nuclear data measurements for fast reactors and the evaluation of the experiments.

Measurements were done on the following facilities: 14-MeV neutron generators, 2.5 MeV cascade accelerator, 2 x 5 MeV Tandem accelerator, 5-MeV Van-de-Graaff, 2.5 MeV Van-de-Graaf.

- 7.3 A.I. Abramov reported on the measurements of (gamma,n) cross-sections on the microton.

- 7.4 A. Blokhin and A. Ignatjuk reported on comparisons of evaluations from different libraries.

C J D PROGRESS REPORT

1. Since May 1982 CJD has transmitted into other centres the magnetic tapes with TRANS 4044 - 4048 containing 52 new entries and 14 corrected entries. The total number of the transmitted entries is 582.

2. In 1982 the work on putting into operation the programmes checking EXFOR format has been completed. The programmes were received from Nuclear Data Section and adapted to the computer EC 1033. That required to do some changes in programmes because of differences in programming languages and computers, to write additional subroutines. The TRANS 4046 - 4048 have been checked using the programmes mentioned. The checking programmes gave us possibility to begin the checking and correction of the whole area 4 EXFOR library. For the time being the entries with code REACTION are in process of correction.

3. In CJD the following programmes were put into operation and are used for the work with data files in ENDF/B format: CHECKER-5, FIZCON, PSYCHE, CRECT, DICTION, MERGER, PRINF, PRINTE, SUMRIZ, CATALOG, RESEND, (LINEAR + RECENT), GROUPIE, SIGMA 1, INTER.

A short report about the functions of these programmes will be published in the nearest issue of "Jadernye konstanty"

The programmes for the production of group constants GRUCON (FEI), NJOY and RECENT are also put into operation and the comparison of the results obtained by means of these programmes was made. The essential differences in results are not discovered.

4. The CINDA on magnetic tape is used to retrieve information. The program was written for this purpose.

5. In FEI the work on the evaluation of fission product capture cross section has been completed (for about 30 isotopes). The results of this work are presented to the Conference on Neutron Physics, in Kiev (1983), and also published (Partially) in "Jadernye Konstanty" (1, (50), 1983).

The reevaluation of the cross sections for natural Cr and Cr isotopes was done. The data are in process of putting on magnetic tape and checking. We suppose to complete this work early next year.

The results of the evaluation of neutron inelastic scattering cross sections of Cr and the comparison of these results with the ENDF/B data are published in "Jadernye konstanty" (4 (48), 1982).

CJD continues the work on the analysis of available evaluated nuclear data files. The objective of this activity is to develop proposals for improving files and to give recommendations on the use of files in evaluated data libraries. The great attention was paid to analysis of data files for the actinide and fission product isotopes, some structural materials and dosimetry reaction data. The results of this analysis should be useful for development of international evaluated data libraries.

6. Developing evaluation methods CJD paid a great attention to the method of simultaneous description of level density, fission cross section and excitation functions of (n, xn) - reactions. The direct process contribution to the spectra of neutron inelastic scattering was thoroughly investigated.

7. The WRENDA - 81/82 requests from USSR have been revised and approved for the next edition. CJD supposes that the more certain definition of required accuracy should be made in all WRENDA requests as it was done in Usachev's requests.

8. After the last meeting the collections VANT, series "Jadernye Constanty" NN 46 - 53 and the Handbook "The threshold reaction cross sections induced by neutrons" (Energoizdat, 1982) were published.

SURVEY OF WORK BY CAJaD ^{*/} ON THE COLLECTION AND DISSEMINATION OF
CHARGED PARTICLE NUCLEAR DATA

(Brief report to the Seventh Conference of CPND Centres)

G.M. Zhuravleva, N.V. Timofeeva,
and F.E. Chukreev

This review covers the period from May 1982 to October 1983.

1. Over this period CAJaD prepared and fed into the nuclear data center network magnetic tapes A008, A009 and A010 containing numerical data from 57 publications both by Soviet and foreign scientists.
2. The vast majority of these 57 publications dealt with the measurement of reactions of importance to controlled thermonuclear fusion and the preparation of radioisotopes.
3. The changeover to the compilation of both Soviet and foreign research data presented CAJaD with new problems that had not existed before. As you know, when compiling Soviet research data we aim at acquainting the authors of the articles with the prepared compilation and at pointing out inaccuracies that are both the fault of the compiler or the authors themselves and the publishers. When preparing data from Soviet authors for magnetic tape recordings we try to ask the authors for further details of the experiment and to clarify its accuracy. Almost all our attempts to obtain information of this kind from foreign groups have proved fruitless. Our requests go unanswered. The only group which has replied to us is Michel's group at Cologne University.
4. Broadening of the scope of our compilation activities has brought to light another fact that is new to us - we have discovered that a large number of different measurement units are used in articles by foreign authors. For example, for thin targets use is made of the normal cross-section (m barns or μ barns); yields ($\text{Ci}/\mu\text{a}\cdot\text{h}\cdot\text{g}/\text{cm}^2$) and ($\text{Ci}/\mu\text{a}\cdot\text{h}\cdot\text{MeV}$) and so on. This variation in unit systems not only hampers the work of making recordings on magnetic tape, but what is more important, it creates difficulties in subsequently applying the data in practice. The Nuclear Data Section would do well to take upon itself

*/ USSR Nuclear Structure and Nuclear Reaction Data Center.

the task of addressing the editors of the relevant journals and the referees and drawing their attention to the unnecessary "variety" of units of measurement. The Section's authority is quite considerable and its proposals are always given attention, so it is to be hoped that this initiative on its part would be valuable.

5. Over the period under consideration CAJaD answered roughly 80 nuclear data inquiries.

(signed)

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CDFE INFORMATION.

V.V.Varlamov, B.S.Ishkhanov, V.V.Surgutanov, A.P.Chernyaev.

Since early in 1982 till mid 1983 the Centre for Photonuclear Experiments Data of the Institute of Nuclear Physics of Moscow State University (CDFE) has carried out the following tasks:

1. The magnetic tape MOO3 including EXFOR-data from 20 papers of Soviet authors has been prepared and handed over to the IAEA funds (through CAJaD of the USSR State Committee on the Use of Atomic Energy).

2. The Index "Photonuclear Data 1976-1980", containing systematized information on experimental photonuclear papers published during these 5 years in the periodic scientific journals in the USSR and abroad, has been completed.

3. A regular issue of the annual CDFE Information Bulletin N 5 "Photonuclear Data - 1981" has been published and distributed, the preparation for publication of Bulletin N 6 "Photonuclear Data - 1982" completed.

4. Within the framework of the program of preparation of thematic reviews of photonuclear data, the Information Review on the photofission of heavy nuclei has been prepared; the Review examines the present-day situation with the yields and cross sections for the reactions of photo- and electrofission, the angular, energy, mass, and charge distributions of fission fragments, the characteristics of fission neutrons, the properties of spontaneously fissioning isomers.

Digital data from 165 papers published during 1952 - 1982 in the USSR and abroad have been tabulated and recorded on the magnetic tape in the EXFOR.

5. In collaboration with the Centre for Nuclear Data of the Leningrad Institute of Nuclear Physics of the USSR Academy of Sciences, the software for operation with international file of bibliographic information on nuclear structure NSR has been adapted to the Unified Series computer of CDFE.

6. The software has been developed for operation with the data recorded in the formats: EXFOR, ENSDF, NSR, and BIB (the internal format of CDFE).

7. A magnetic tape has been prepared which contains data on the characteristics of radionuclides produced in the photonuclear reactions. It is intended for the automatic information provision

for studies in the field of the γ -activation analysis. The tape contains the information on the energies of γ -transitions, types of reactions in which radionuclides are formed, their halflives, etc. The adopted format and the developed software make it possible to find, from certain given parameters (or ranges of their variation) other parameters, thus significantly facilitating the identification of experimental γ -spectra and raising the efficiency of the elemental and multielemental analyses.

8. In the last period CDFE has met about 300 requests for bibliographic information, information bulletins issued by the Centre and about 80 requests for digital data recorded in the various formats.

Status Report 1983 of activities in NRD done at
Technical University of Dresden, Section of Physics (TUD)

In TUD Neutron Nuclear Data are treated for the purposes of

- (i) dissemination within GDR
- (ii) evaluation in co-operation with FEI Obninsk, USSR
- (iii) compilation of experimental data measured in GDR

Summarizing all activities in these fields, the following has been done

- (i) - assistance for customers of NND within GDR (about 10 requests/year)
 - implementation of ENDF/B processing codes (LINEAR, RECENT, GROUPI) originated by D.E. Cullen
- (ii) - evaluation of Si has been finished; methods and results are published in reports INDC(GDR)-20/L and 22/L respectively
 - numerical data are available on magnetic tape
 - start of evaluation of NND for Pb; first results are published in a contribution to the Kiev Conference, 1983
 - implementation of ENDF/B checking codes (CHECKR, FIZCON)
- (iii) - compilation of NND for Nb and Bi in EXFOR acc. No. 32001 (ca. 1800 records) was finished and sent to the IAEA NDS.

Experiences obtained in formatting in ENDF/B have been summarized in a paper presented to the 7th NRDC Meeting. Using different computer codes in nuclear theory and NND processing, the participation in computer code comparisons is in progress or planned. In November, the results of a new pre-equilibrium model code AMAPRE will be sent to NEA-DB initiating this comparison (P. Nagel, H. Gruppelaar).

In addition, some activities done for NSDD and CPND in the Central Institute of Isotopes and Radiation Research, Leipzig, have to be mentioned. The Information Centre of the CIIRR has the main task to support customers to find relevant data.

All activities on Nuclear Data in GDR were published in abstract form in the progress report to the INDC printed as INDC(GDR)-23/G.

Progress Report on Nuclear Data Activities
of the Data Centre of the
Leningrad Nuclear Physics Institute

I. Kondurov

The Data Centre of LNPI is not involved directly in compilation or evaluation of reaction data. The main direction of the activity is nuclear structure data. The Centre continues to produce keyword references of Soviet papers on nuclear structure and reactor data to be included in the NSR file. 250 references have been included in the file and published, about 500 are ready to be sent.

A-chain evaluation: A=134 is being published in Nuclear Data Sheets, A=133 is being prepared to be sent to Brookhaven.

Close to the subject of this meeting is a work done by the Centre on neutron activation analysis data. We have a programme that extracts decay data sets of all radiative nuclei produced in γ -reactions and their daughter nuclei from ENSDF. Then one can calculate a short list of γ -rays of this decays taking into account the conditions of irradiation, delaying and measuring of γ -radiation. This list can be used when analysing measured spectra manually or automatically.