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Report on the IAEA Technical Meeting of the International Network of Nuclear Reaction Data Centres

Japan Nuclear Reaction Data Centre,
Hokkaido University, Sapporo, Japan
20 - 23 April 2010

Prepared by

R. Forrest, S. Dunaeva, N. Otsuka

July 2010

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Abstract

This report summarizes the IAEA Technical Meeting of the International Network of Nuclear Reaction Data Centres (biennial Data Centre Heads Meeting), held at the Japan Nuclear Reaction Data Centre, Hokkaido University, Sapporo, Japan, from 20 - 23 April 2010. The meeting was attended by 27 participants from 12 cooperating data centres of seven Member States and two International Organizations. The report contains a summary of the meeting, the conclusions and actions, the lists of working papers and presentations presented at the meeting.

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THE INTERNATIONAL NETWORK OF NUCLEAR REACTION DATA CENTRES

National, regional and specialized nuclear reaction data centres, coordinated by the International Atomic Energy Agency, cooperate in the compilation, exchange and dissemination of nuclear reaction data in order to meet the requirements of nuclear data users in all countries. At present, the following data centres participate in the network:

NNDC	US National Nuclear Data Center, Brookhaven, USA
NEA-DB	OECD/NEA Nuclear Data Bank, Issy-les-Moulineaux, France
NDS	IAEA Nuclear Data Section
CJD	Centr Jadernykh Dannykh (= Nuclear Data Centre), Obninsk, Russia
CAJAD	Russian Nuclear Structure and Reaction Data Centre, Moscow, Russia
CDFE	Centr Dannykh Fotojadernykh Eksperimentov (= Centre for Photonuclear Experiments Data), Moscow, Russia
CNDC	China Nuclear Data Center, Beijing, China
JAEA	Nuclear Data Center of the Japan Atomic Energy Agency (formerly Japan Atomic Energy Research Institute, JAERI), Tokai-Mura, Japan
JCPRG	Japan Nuclear Reaction Data Centre, Hokkaido University, Sapporo, Japan
ATOMKI	ATOMKI Charged-Particle Nuclear Reaction Data Group, Debrecen, Hungary
UKRNDC	Ukrainian Nuclear Data Center, Institute for Nuclear Research, Kyiv, Ukraine
CNPD	Center of Nuclear Physics Data, Russian Federal Nuclear Center, RFNC- VNIIEF, Sarov, Russia
KAERI/NDEL	Nuclear Data Evaluation Laboratory, Korea Atomic Energy Research Institute, Yuseong, Daejeon, Republic of Korea
BARC	Bhabha Atomic Research Centre, Trombay, Mumbai, India

A detailed description of the objectives of the network and the contributions of each Centre to these activities are given in INDC(NDS)-401 (Rev.4), "Nuclear Reaction Data Centres Network".

PREVIOUS NRDC MEETINGS

Sapporo, 20-23 April 2010	Centre Heads + Tech.	INDC(NDS)-0573
Vienna, 25-26 May 2009	Technical	INDC(NDS)-0558
Obninsk+Moscow 22-25 Sept. 2008	Centre Heads + Tech.	INDC(NDS)-0536
Vienna, 8-10 October 2007	Technical	INDC(NDS)-0519
Vienna, 25-28 September 2006	Centre Heads + Tech.	INDC(NDS)-0503
Vienna, 12-14 October 2005	Technical	INDC(NDS)-0480
Brookhaven, 4-7 October 2004	Centre Heads + Tech.	INDC(NDS)-464
Vienna, 17-19 June 2003	Technical	INDC(NDS)-446
Paris, 27-30 May 2002	Centre Heads + Tech.	INDC(NDS)-434
Vienna, 28-30 May 2001	Technical	INDC(NDS)-427
Obninsk, 15-19 May 2000	Centre Heads + Tech.	INDC(NDS)-418
Vienna, 18-20 May 1999	Technical	INDC(NDS)-407
Vienna, 11-15 May 1998	Centre Heads + Tech.	INDC(NDS)-383
Vienna, 26-28 May 1997	Technical	INDC(NDS)-374
Brookhaven, 3-7 June 1996	Center Heads + Tech.	INDC(NDS)-360
Vienna, 2-4 May 1995	Technical	INDC(NDS)-343
Paris, 25-27 April 1994	Center Heads + Tech.	INDC(NDS)-308
Vienna, 1-3 Sept 1992	Technical	INDC(NDS)-279
Obninsk, 7-11 Oct 1991	Center Heads + Tech.	INDC(NDS)-0262
Vienna, 13-15 Nov 1990	Technical	Memo CP-D/210
Vienna, 2-4 Oct 1989	Centre Heads + Tech.	Memo CP-D/200
Vienna, 4-6 Oct 1988	Technical	Memo CP-D/190
Brookhaven, 27-29 Oct 1987	Center Heads + Tech.	INDC(NDS)-204
Vienna, 7-9 Oct 1986	Technical	Memo CP-D/159
Saclay, 9-11 Oct 1985	Center Heads + Tech. = 8 th NRDC Meeting	INDC(NDS)-178
Vienna, 19-21 Sept 1984	Technical	Memo CP-D/131
Obninsk+Moscow, 17-21 Oct 1983	7 th NRDC Meeting	INDC(NDS)-154
Vienna, 3-7 May 1982	6 th NRDC Meeting	INDC(NDS)-141
Brookhaven, 29.9 - 2.10.1980	5 th NRDC Meeting	INDC(NDS)-125
Karlsruhe, 8-13 Oct 1979	4 th NRDC Meeting	INDC(NDS)-110
Paris, 19-23 June 1978	3 rd NRDC Meeting	INDC(NDS)-99
Kiev, 11-16 April 1977	2 nd NRDC Meeting = 3 rd CPND + 13th 4-C	INDC(NDS)-90
Vienna, 28-30 April 1976	2 nd CPND Meeting	INDC(NDS)-77
Vienna, 26-27 April 1976	12 th 4C-Meeting	INDC(NDS)-78
Vienna, 8-12 Sept 1975	CPND Meeting	INDC(NDS)-69+71
Brookhaven, 10-14 March 1975	11 th 4C-Meeting	INDC(NDS)-68
Paris, 6-10 May 1974	10 th 4C Meeting	INDC(NDS)-58
Vienna, 24-26 April 1974	CPND + PhotoND	INDC(NDS)-59+61
Moscow/Obninsk, 4-8 June 1973	9 th 4C Meeting	INDC(NDS)-54
Vienna, 16-20 Oct 1972	8 th 4C Meeting	INDC(NDS)-51
Brookhaven, 25-29 Oct 1971	7 th 4C Meeting	INDC(NDS)-41
Paris, 5-9 Oct 1970	6 th 4C Meeting	INDC(NDS)-28
Moscow, 17-21 Nov 1969	5 th 4C Meeting	INDC(NDS)-16

LIST OF ACRONYMS

ATOMKI	Nuclear Research Institute, Debrecen, Hungary
BARC	Bhabha Atomic Research Centre, Mumbai, India
BibTeX	Program for formatting reference lists for LaTeX
BNL	Brookhaven National Laboratory, Upton, New York, USA
BROND-2	Russian evaluated neutron reaction data library, version 2
C4	Computational format for EXFOR data
CAJAD	Center for Nuclear Structure and Reaction Data, Kurchatov Institute, Moscow, Russia
CDFE	Centr Dannykh Fotojad. Eksp., Moscow State University, Russia
CENDL-3	Chinese Evaluated Neutron reaction Data Library, version 3
CHEX	EXFOR check program (originating from NNDC)
CINDA	A specialized bibliography and data index on nuclear reaction data operated by the NRDC
CJD	Russian Nuclear Data Center at FEI, Obninsk, Russia
CNDC	China Nuclear Data Center, Beijing, China
CNPD	Center of Nuclear Physics Data at RFNC-VNIIEF, Sarov, Russia
CP...	Numbering code for memos exchanged within the NRDC
CPND	Charged-particle nuclear reaction data
CRP	Coordinated Research Project (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
DOI	Digital Object Identifier, e.g. for bibliographic references
EFF	European evaluated nuclear data File for Fusion applications
EMPIRE	A code system for nuclear reaction model calculations
ENDF-6	International format for evaluated data exchange, version 6
ENDF/B-VII	US Evaluated Nuclear Data File/B, version 7
ENDVER	ENDF File Verification support package
ENSDF	Evaluated Nuclear Structure Data File
EVA	Retrieval interface for evaluated data used at NEA-DB
EXFOR	Format for the international exchange of nuclear reaction data
FEI	Fiziko-Energeticheskij Institut, Obninsk, Russia
FENDL	Evaluated nuclear data file for fusion applications, developed by IAEA-NDS – Fusion Evaluated Nuclear Data Library

GSYS	Data digitizing system by JCPRG
IAEA	International Atomic Energy Agency
IBANDL	Ion Beam Analysis Nuclear Data Library maintained at IAEA
INDC	International Nuclear Data Committee
IPPE	Institute of Physics and Power Engineering, Obninsk, Russia
IRDF	International Reactor Dosimetry File, maintained by the IAEA-NDS
JAEA	Japan Atomic Energy Agency (from 1 October 2005)
JAERI	Japan Atomic Energy Research Institute (until 30 September 2005)
JANIS	Java Nuclear Information System of NEA-DB
JCPRG	Japan Nuclear Reaction Data Centre (formerly Japan Charged-Particle Nuclear Reaction Data Group), Sapporo, Japan
JEF	Joint Evaluated File of neutron data, a collaboration of European NEA member countries and Japan
JEFF	Joint Evaluated Fission and Fusion Project coordinated by NEA-DB
JENDL-4	Japanese Evaluated Nuclear Data Library, version 4
KAERI/NDEL	Korea Atomic Energy Research Institute, Nuclear Data Evaluation Laboratory
KINR	Kiev Institute of Nuclear Research
LEXFOR	Part of the EXFOR manual containing physics information for compilers
MIRD	Medical Internal Radiation Dose, a database derived from ENSDF
NDS	IAEA Nuclear Data Section, Vienna, Austria
NDS	Nuclear Data Sheets
NEA	Nuclear Energy Agency of the OECD, Issy-les-Moulineaux, France
NEA-DB	NEA Data Bank, Issy-les-Moulineaux, France
NEANDC	NEA Nuclear Data Committee
NND	Neutron Nuclear Data
NNDC	National Nuclear Data Center, Brookhaven National Laboratory, USA
NNDEN	Neutron Nuclear Data Evaluation Newsletter
NRDC	Nuclear Reaction Data Centres
NRDF	Japanese Nuclear Reaction Data File
NSDD	Nuclear Structure and Decay Data
NSC	Nuclear Science Committee of the NEA
NSR	Nuclear structure references, a bibliographic system
NuDat	Database of Nuclear Structure and Decay Data based on ENSDF
OECD	Organization for Economic Cooperation and Development, Paris, France

ORDER	EXFOR program for addition of record identification and bookkeeping information
PGAA	IAEA database for Prompt Gamma Activation Analysis
PhND	Photonuclear data
RIKEN	Nuclear Data Group, RIKEN Institute of Physics and Chemistry Research, Wako-Shi, Saitama, Japan
RIPL	IAEA Reference Input Parameter Library for reaction calculations
RNAL	IAEA Reference Neutron Activation Library
R33	Format used by ion beam analysis community for storing experimental cross-sections
TRANS	Name of transmission tapes for data exchange in the EXFOR system
UKRNDC	Ukraine Nuclear Data Center at KINR, Kyiv, Ukraine
VNIIEF	Russian Federal Nuclear Center, Sarov, Russia
WPEC	Working Party on international nuclear data Evaluation Cooperation
WPEC-SG30	WPEC Subgroup 30 on "Improvement of accessibility and quality of the EXFOR database"
XTRACT	EXFOR indexing program
X4TOC4	Conversion program from EXFOR to computational format "C4"
ZCHEX	Current version of CHEX, updated and maintained by NDS
4C...	Numbering code of memos exchanged among the four Neutron Data Centres

1. Introduction

The IAEA Technical Meeting on the Coordination of the International Network of Nuclear Reaction Data Centres was held in Hokkaido University, Sapporo, Japan, 20 - 23 April 2010. Twenty-seven participants from twelve cooperating data centres in China, India, Japan, Republic of Korea, the Russian Federation, Ukraine, USA, NEA and IAEA attended the meeting.

Meetings of this network are held annually, with full meetings, involving Centre heads and technical staff, every two years (last full meeting was held in September 2008 at CJD, Obninsk, Russia). Main topics of the present meeting were approval of all changes in the NRDC Protocol and the Network Agreement, new staff at several data Centres, intensified quality control of EXFOR DB, as well as improved checking and correction procedures using feedback and taking into account the needs of data evaluators. Forty-six working papers were presented at the meeting. The results of the discussions were summarized in 32 Conclusions and 63 Actions (see pages 25-31).

2. Brief Summary

Dr. R. Forrest, Head of the IAEA Nuclear Data Section, opened the meeting on behalf of the IAEA. Dr. K. Kato welcomed the participants on behalf of Japan Nuclear Reaction Data Centre.

Forrest was elected Chairman. Travel disruption in Europe as a result of the volcanic ash cloud caused the meeting to begin one day later than scheduled, i.e. Wednesday, 21 April, and unfortunately also prevented representatives from two Nuclear Data Centres (CDFE (Russia) and ATOMKI (Hungary)) from attending. However, by removing some presentations and reducing time on others, it proved possible to cover all important business during the available time. The most important questions were discussed on Thursday, 22 April. The Agenda was amended to reflect the reduced time for the meeting and presence of participants.

Participants agreed to omit progress report presentations and begin the meeting with technical questions.

The actions of the previous meeting were reviewed. Those not yet completed, as well as those of continuing relevance, were included in the new List of Actions. All actions with “Standing” status, i.e., actions of importance for the general maintenance of EXFOR which are explicitly stated, will be included in the NRDC Network document or Protocol of Cooperation.

Most of the proposals were approved after discussion. A special notation, with description, was written in “Conclusions and Actions” in each case where the proposal was not approved.

Following a trial period of one year (2009) of NNDC being responsible for the compilation of four journals published in the USA, NRDC decided to return to the previous rule based on compilation responsibilities according to the geographical location where each measurement was performed. Furthermore, participants discussed advantages and disadvantages of journal compilation responsibility, e.g., Dr. A. Makinaga presented two different compilations of experimental data (see “My experience about EXFOR~ How NRDC treated our data?”).

NRDC confirmed its acceptance of the new edition of the Protocol and Network document. According to this Protocol corrections should be completed by Centres within two months of the NRDC2010 meeting.

It was agreed that compilation of CINDA will be done only by automatic extraction from EXFOR, and that Centres no longer have a responsibility to carry out manual compilation; however manual compilation can be done if manpower effort is available.

Various statistics were presented at the meeting, including tests of EXFOR DB quality, new list of EXFOR Outliers, status of new article compilation, etc.

Dr. S. Dunaeva reported that the response of EXFOR compilers to her weekly updates of the “EXFOR compilation status webpage” was good, with comments on preliminary EXFOR batches sent by several Centres.

On the last day of the meeting, presentations of some progress reports were made highlighting the general, as well as the staffing situation of the Centres, their compilation activities, data services, other nuclear data activities of interest to the Network, and relevant publications.

A new version of EXFOR-Editor software was presented by G. Pikulina and the meeting acknowledged the excellent progress made on it. New Editor options have been introduced, namely spell checking, using codes with status “EXT” (extinct), check Entry through NEA DB program checker, etc. A full presentation of this software will be made at the EXFOR-Editor Workshop to be held in August 2010.

Additionally, a new version of the digitizing program GSYG (v.2.4) was presented by Dr. R. Suzuki.

3. Highlights of Conclusions

From the thirty-two conclusions and sixty-two actions, the following are highlighted:

1. An EXFOR workshop will be held in Vienna, Austria in August 2010.
2. The next Technical Meeting of the NRDC will be held in Vienna, Austria, 23 - 24 May 2011, followed by an EXFOR Workshop.
3. NRDC agreed that EXFOR Workshops in National Centres are very useful and should be supported.
4. KAERI will be responsible for the compilation of neutron, charged-particle and photon induced reaction data. Entries will be submitted through NDS.
5. The trial during 2009 of NNDC taking responsibility for all entries in four journals was not found to give significant benefits, rather several disadvantages arose; it was agreed to revert to the standard geographical responsibilities for compilation.
6. Compilation of CINDA will be done only by automatic extraction from EXFOR, and Centres no longer have a responsibility to carry out manual compilation; however this can be done if manpower effort is available.
7. The importance of the ‘DOI’ labels (Digital Object Identifier) in providing bibliographic information was recognised. This information will be included in the EXFOR output system.
8. The EXFOR correction system designed by V. Zerkin (IAEA-NDS) was endorsed and further work on it encouraged.

9. The software (editors and digitisers) were reviewed, continuing development was encouraged and sharing of software agreed.

A detailed summary of the Conclusions and Actions can be found in Annex C, and the lists of working papers and specific presentations can be accessed on http://www-nds.iaea.org/nrdc/nrdc_2010/.

At the conclusion of the meeting Dr. Kato was thanked for hosting the meeting (the first time that an NRDC meeting has been held in Japan) and making the meeting so successful.



**Technical Meeting of the
International Network of Nuclear Reaction Data Centres**

20-23 April, 2010, Sapporo, JAPAN

AGENDA

Working time: 09.00 - 18.00

Breakfast: 07.30 - 08.30

Lunch: 13.00 - 14.00

Coffee break: 10.30 - 10.50

15.30 - 15.50

Dinner: 19.00 - 20.00

Monday, 19 April 2010

18.00 - Reception (Seminar room of JCPRG)

Tuesday, 20 April 2010

09.00 - 10.00 Registration (Conference site)

Wednesday, 21 April 2010

Plenary: 09:00 - 13.00

1. Opening Items

- | | | | | |
|-----|---|--------|--|------------|
| 1.1 | Welcome address from JCPRG | 10 min | | K. Kato |
| 1.2 | Introduction from NDS | 10 min | | R. Forrest |
| 1.3 | Opening, election of chairperson,
adoption of the agenda,
announcements | 10 min | | R. Forrest |

2. EXFOR Technical

- | | | | | |
|-----|--|--------|-----------|---|
| 2.1 | Action from the last meeting
(A27-A38, A43-A44, A46, A48-A50) | 10 min | | |
| 2.2 | X4Map and X4Archive
(Memo CP-D/632) | 10 min | WP2010-24 | V. Zerkin |
| 2.3 | Analysis number of Entries with
NODATA (Action A35, A48) | 10 min | WP2010-25 | M. Mikhaylyukova,
A. Blokhin,
V. Pronyaev |
| 2.4 | Trivial correction to AUTHOR and | 10 min | WP2010-26 | E. Dupont, |

	TITLE (Actions A43, A44)			S. Dunaeva
2.5	Authors' e-mail addresses list (Memo 4C-4/178)	10 min	WP2010-27	M. Mikhaylyukova, A. Blokhin
2.6	HISTORY lines list (Memo 4C-4/179)	10 min	WP2010-28	M. Mikhaylyukova, A. Blokhin
2.7	STATUS lines list (Memo 4C-4/177)	10 min	WP2010-29	M. Mikhaylyukova, A. Blokhin
2.8	Inclusion of possible options to an Entry (Memo CP-C/388)	10 min	WP2010-30	O. Schwerer, S. Dunaeva
2.9	Fission quantity coding (Memo CP-D/598, 599, 600, 613)	10 min	WP2010-31	N. Otsuka
2.10	Clarification of usage of MLT and PY in LEXFOR (Memo CP-D/619)	10 min	WP2010-32	N. Otsuka
2.11	Updated of LEXFOR "General Quantity Modifiers" (Memo CP-D/621)	10 min	WP2010-33	N. Otsuka
2.12	DERIV for data measured by indirect reaction (Memo CP-D/582)	10 min	WP2010-34	N. Otsuka

Plenary: 14:00 – 17:00

2. EXFOR Technical (cont'd)

2.13	REACTION for inverse kinematics (Memo CP-D/622)	10 min	WP2010-35	N. Otsuka
2.14	Atomic interaction part of photo- nuclear reaction data (Memo CP-D/629)	10 min	WP2010-36	N. Otsuka
2.15	Use of reaction combination (Memo CP-D/614)	10 min	WP2010-37	N. Otsuka, S. Dunaeva
2.16	Heading for relative energy (Memo CP-D/611)	10 min	WP2010-38	N. Otsuka
2.17	Prompt fission neutron spectrum coding (Memo CP-D/635)	10 min	WP2010-39	N. Otsuka
2.18	Final and intermediate reaction products (Memo CP-C/389)	10 min	WP2010-40	O. Schwerer
2.19	Other business			

3. EXFOR/CINDA Dictionary

3.1	Action from the last meeting (A23, A39-A40, A42, A47)	10 min	WP2010-01	
3.2	Status of Dict.25 investigation (Action A23)	10 min	WP2010-20	S. Hlavač, N. Otsuka

4. Manuals

4.1.	Action from the last meeting (Actions A41, A45, A51)	10 min	WP2010-01	
4.2	New LEXFOR entry – Fusion (Memo CP-D/626)	10 min	WP2010-13	N. Otsuka

5. CINDA

5.1	Action from the last meeting (A24-26)	10 min	WP2010-01	
5.2	Import from NSR to CINDA; export from EXFOR to CINDA	10 min	WP2010-22	V. Zerkin
5.3	Status of new compilation and procedure for creation CINDA reference (creation CINDA line or EXFOR-dummy, which will be converted to CINDA-line and EXFOR can be kept on our Website) (Action A35)	15 min	WP2010-23	S. Dunaeva, N. Otsuka
5.4	Future NRDC Cooperation on CINDA (Memo 4C-3/394)	10 min	WP2010-21	N. Otsuka E. Dupont

17.30 -20.00 Banquet (Restaurant at the Site)

Thursday, 22 April 2010

Plenary: 9:00 – 13.00

6. General

6.1	Action from the last meeting (A1-A22)	10 min	WP2010-01	S. Dunaeva
6.2	Approval of revised NRDC Protocol (Rev.Feb.2010)	20 min	WP2010-02	NDS
6.3	Approval of revised NRDC Network document (Rev.Feb.2010)	20 min	WP2010-03	NDS
6.4	Other business			

7. EXFOR General

7.1	Responsibility and scope			
7.1.1	Advantages and disadvantages of compilation on the basis of full journal contents (Actions A16, A17)			S. Hlavač, M. Herman
7.1.2	My experience about EXFOR ~How NRDC treated our data?~	10 min	WP2010-44	A. Makinaga
7.1.3	CJD's decision about advantages and disadvantages of compilation on the basis of full journal contents (Actions A16, A17)	10 min	WP2010-43	M. Mikhaylyukova, A. Blokhin
7.1.4	Advantages and disadvantages of compilation on the basis of full journal contents. Retrospective statistics of publication compilation(Action A16, A17)	10 min	WP2010-14	S. Dunaeva, N. Otsuka
7.1.5	Status of scanned journals	10 min	WP2010-15	S. Dunaeva, N. Otsuka
7.1.6	Future of compilation of neutron-	20 min	WP2010-16	S. Dunaeva,

	induced reactions, charged-particle induced reactions (scope, progress in future)			N. Otsuka
7.1.7	Resonance parameters compilation for charged-particle induced reaction data (Memo CP-D/632)	10 min	WP2010-17	N. Otsuka O. Schwerer

Plenary: 14:00 – 18.00**7 EXFOR General (cont'd)**

7.2	Compilation and transmission statistics			
7.2.1.	Transmission statistics		WP2010-04	S. Dunaeva
7.2.2	Statistics of checking preliminary files	10 min	WP2010-05	S. Dunaeva
7.2.3	Status of new articles compilation (Action A2)	10 min	WP2010-06	S. Dunaeva, N. Otsuka
7.2.4	Status of ND2007 articles compilation (Action A5)	10 min	WP2010-07	S. Dunaeva
7.2.5	Status of efforts of old entries retransmission (Action A6)	10 min	WP2010-08	S. Dunaeva
7.3	Quality control			
7.3.1	EXFOR DB errors report	10 min	WP2010-09	V. Zerkin
7.3.2	EXFOR Outliers (Memo CP-D/623, Action A19)	10 min	WP2010-10	E. Dupont, N. Otsuka
7.3.3	Automatic test of EXFOR with TALYS (Memo CP-D/627, 633)	10 min	WP2010-11	E. Dupont, N. Otsuka
7.3.4	Responsibility of nontrivial corrections (example: ENTRYs L0092, L0104, L0120, L0133 corrections)	10 min	WP2010-12	S. Dunaeva, V. Varlamov

8. EXFOR for users

8.1	Regular export from EXFOR to C4	10 min	WP2010-18	V. Zerkin
8.2	EXFOR output correction system	10 min	WP2010-19	V. Zerkin

Friday, 23 April 2010
Drafting of conclusions

Plenary: 9:00 – 12.00

9.

9.1	Nuclear Reaction Data File for Astrophysics in JCPRG	15 min	WP2010-45	K. Kato
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10. EXFOR Software

10.1	Action from the last meeting (A52-A58)	10 min	WP2010-01	
10.2	Tools for compilation webpage (Action A53)	10 min	WP2010-41	N. Otsuka
10.3	EXFOR Editor (Action A56)	20 min	WP2010-42	S. Taova, G. Pikulina
10.4	Development of graph digitizing system (GSYS)	20 min	WP2010-46	R. Suzuki
10.5	Other software			

11. Closing Items

11.1	Review of actions and conclusions
11.2	Date and place of next NRDC meeting

12.00 - Excursion

**Technical Meeting of the
International Network of Nuclear Reaction Data Centres**

20-23 April, 2010, Sapporo, Japan

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CONCLUSIONS AND ACTIONS

Conclusions

General

- C1 It is important to have an EXFOR Workshop for compilers in addition to the technical NRDC-meeting. An EXFOR Workshop will be held in Vienna, Austria, at end of August, 2010.
- C2 The next technical NRDC meeting will be held in Vienna, Austria, 23-24 May 2011.
- C3 An EXFOR Workshop will be held in Vienna, Austria, 25-27 May 2011
- C4 The next full NRDC meeting will be held in Paris, France, during the second quarter of 2012.
- C5 NRDC confirmed new editions of the Protocol and Network Documents. Corrections can be made by Centres in the two months following the NRDC-2010 meeting
- C6 NRDC agreed that EXFOR Workshops in National Centres are very useful and should be supported.

EXFOR, General

- C7 KAERI will be responsible for the compilation of neutron, charged-particle and photon induced reaction data. Entries will be submitted through NDS.
- C8 It was emphasized that delays in checking preliminary TRANS files must be reduced to one month.
- C9 The changed scope of compilation during 2009 has shown:
 1. Improved completeness through scanning of journals by two Centres (NNDC and NDS);
 2. No improvement in reducing the delay in compilation;
 3. Creation of a certain number of duplication pairs in the database leading to conflicts.
- C10 NRDC agreed to return to compilation responsibility by geographical area.
- C11 Statistics of new article compilation was satisfactory; however the time for compilation should be reduced further.
- C12 In cases of no well defined responsibility, NDS will distribute articles for compilation if there is more than three months delay in allocation.

CINDA

- C13 Old agreement on CINDA compilation (WP2003-25, item 2) was cancelled. Centres willing to be responsible for CINDA entries will send their entries to NDS (WP2010-21).
- C14 Centres agreed to continue production of CINDA through automatic export from EXFOR and NSR databases, possibly using EXFOR “dummy” Entry (WP2010-22, 23).
- C15 Theoretical works and reviews will be accepted in future CINDA transmissions.

EXFOR, Technical

- C16 NRDC concluded that it is impossible to keep a list of authors' e-mail addresses up-to-date. However, NRDC agreed, where possible, to help each other in finding particular authors' e-mail addresses. See also A46.
- C17 NRDC agreed to keep only E-RL for relative energy since it doesn't depend on the frame of reference.
- C18 NRDC concluded that adding a compiler's name in HISTORY is not obligatory. Regardless of the compiler's name, the Centre is responsible for the compilation.
- C19 NRDC agreed that, while there are many optional codes that can be used in an Entry, a compiler only needs to include them in the Entry if he/she thinks it is important for the description of the particular experiment.
- C20 The proposal on fission quantity coding has now been accepted. (Memo CP-D/599).
- C21 The proposal on clarification of usage of MLT and PY in LEXFOR has now been accepted (Memo CP-D/619).
- C22 The proposal on update of LEXFOR "General Quantity Modifiers" has now been accepted (Memo CP-D/621).
- C23 The proposal on data type DERIV for data measured by indirect reactions such as surrogates has now been accepted (Memo CP-D/582).
- C24 The proposal on reaction coding of the fields SF1-SF2 has now been accepted (Memo CP-D/607).
- C25 The proposal on adding examples in LEXFOR concerning usage of reaction combinations has now been accepted (Memo CP-D/614).
- C26 The proposal on correction of units and quantity codes in prompt fission neutron spectra has now been accepted (Memo CP-D/635).
- C27 NRDC agreed that it is important to add actual reference information under STATUS of compilation. This rule will be added into LEXFOR.
- C28 Concerning suggested addition to LEXFOR "Reaction Product" (WP2010-40), NRDC agreed that intermediate nuclides unstable against prompt particle decay will be coded when the states are exclusively identified by the experiment (See also A56).
- C29 The proposal of a new evaporation residue production cross section quantity is now accepted. The draft for LEXFOR chapter on fusion is also accepted (Memo CP-D/626).
- C30 If DOI is found through Internet, it can be included in new entries, starting with symbol "#" in a new line after the relevant reference. (Memo CP-D/604) (Moved from Action)
- C31 Obsolete code SIG/SUM (Memo 4C-4/175 rev) will be changed to SIG in retransmission. (Moved from Action)

EXFOR Software

- C32 It was emphasized that compilation tools are available for downloading from the NRDC Webpage.

*Actions***General**

- | | | |
|----|--------|---|
| A1 | Otsuka | Correct titles of EXFOR Manuals to agree with the contents. |
| A2 | Otsuka | Add all standing actions to the NRDC Protocol. |
| A3 | All | Send all corrections that have to be made in Protocol (WP2010-02) and Network documents (WP2010-03) within one month. |

EXFOR General

- | | | |
|-----|---|--|
| A4 | All | (Standing Action) All Centres should give highest priority to compiling new publications. |
| A5 | All | Give high priority to compilation of papers from the ND2010 (Jeju, Korea) conference. |
| A6 | Otsuka | Discuss with Organizers of ND2010 possibility of getting data from authors at the same time as acceptance of paper for publication in proceedings |
| A7 | Otsuka | Add flag on the NRDC web page “List of corrections” for important corrections. See also A8. |
| A8 | Otsuka,
Mikhaylyukova,
Schwerer,
Dupont,
Furutachi,
Babykina,
Taova | Complete all important corrections (flagged) within three months. See also A7. |
| A9 | Herman,
Otsuka, Zerkin | Find algorithm of automatic DOI number creation and issue Memo. |
| A10 | Zerkin | Investigate possible problems of automatic adding of DOI number to original EXFOR Entries and create software if appropriate. |
| A11 | All | (Standing Action) Scan national journals and send results to NDS. See also first proposal of WP2010-14. |
| A12 | NDS | (Continuing Action) Develop sensible means of communication of numerical data between authors and NRDC for the major journals. |
| A13 | All | (Continuing Action) Make efforts to change all remaining upper case entries to lower case. On retransmission, the old entries should be checked and any other necessary corrections must be made. |
| A14 | Zerkin | (Continuing Action) Further develop EXFOR+ (interpreted/extended EXFOR format). |
| A15 | Zerkin | Issue documentation for C4 and XC4 formats. |
| A16 | Otsuka | (Continuing Action) Update Dictionaries every four months. |
| A17 | Zerkin | (Continuing Action) Every four months produce an EXFOR distribution with (a) full Dictionary distribution; (b) EXFOR in C4 and XC4 format; (c) Dictionaries in MS Access; (d) X4Map and X4Archive. |

- A18 Zerkin (Continuing Action) Generate and distribute list of errors to NRDC after every new EXFOR/CINDA dictionary transmission.
- A19 All (Continuing Action) Correct errors within the Centre's area (see also list in WP2010-09 to 11); all mistakes from such lists (produced according to Memo CP-D/623, 627 and 633) should be corrected in the next transmission.
- A20 Zerkin (Continuing Action) Include DOI in EXFOR DB as defined in WP2009-25.
- A21 Zerkin (Continuing Action) Regularly export full EXFOR to XC4.
- A22 Zerkin (Continuing Action) Add hyperlink on the main EXFOR page to the EXFOR User Manual.
- A23 Otsuka (Continuing Action) Send list of errors, based on analysis of the list formulated by OECD-NEA WPEC subgroup 30, to responsible Centres.
- A24 Dupont (Standing Action) Distribute JANIS-TRANS Checker Log list on every preliminary TRANS-file.
- A25 Otsuka, Gritzay Asses the way to store numerical data of incident particle spectra used in generation of averaged quantity data compiled in EXFOR.
- A26 Hlavac Delete duplication from area 1, C and L according to the third proposal in the WP2010-14.

Common EXFOR/CINDA dictionaries

- A27 Hlavac, Otsuka (Continuing Action) Investigate Dictionary 25 for differences in labels and units (e.g.: MUB, MU-B and MICRO-B used for 'µb'), with the aim of achieving consistency.

CINDA

- A28 Dupont (Continuing Action) Search for experimental and mixed entries in which the target is coded by MNY, and replace with individual isotope/compound entries as outlined in WP2008-36.
- A29 Dupont (Continuing Action) Correct errors detected during CINDA loading procedure, as described in WP2008-36.
- A30 Dupont (Continuing Action) Correct all CINDA lines, as described in WP2009-30.
- A31 Zerkin Regular export from EXFOR DB to CINDA.
- A32 Zerkin Regular export from NSR to CINDA.
- A33 All Add CINDA lines manually on voluntary basis.
- A34 All (Standing Action) Create "dummy" EXFOR file if it is impossible to find experimental data.
- A35 Zerkin Prepare tools for creating CINDA file from EXFOR "dummy" Entries.
- A36 Zerkin Periodically update the CINDA master file and distribute it to other Centres.

EXFOR Technical

- A37 Otsuka (Continuing Action) Review the various types of gamma spectra in EXFOR, as well as the related quantities and units.
- A38 Otsuka Make code E-RL-CM obsolete.
- A39 All (Standing Action) When coming across report codes in Dictionary 6, which differ significantly from what is shown on the report cover, submit additional explanation to NDS for inclusion.
- A40 All (Standing Action) Run CHEX in TRANS mode (not DATA mode) when checking new entries or TRANS files, to make sure that all important errors are found.
- A41 All (Continuing Action) Check error lists available on the NRDC Webpage, and correct as soon as possible (see also WP2009-02, WP2010-09).
- A42 NDS (Standing Action) Assess the need for undertaking both trivial and non-trivial compilation corrections, and inform responsible Centres.
- A43 Zerkin (Continuing Action) Development of a new database encompassing correction factors and relevant comments for suspect/erroneous data (X4-evaluated) presented in WP2010-19; keep NRDC informed about conclusions of discussions on new database.
- A44 Otsuka (Standing Action) Add this action to EXFOR Manual: "Use alteration flags in col. 11 of ENTRY and SUBENT lines in retransmission (also optional for all corrected lines in col. 80)".
- A45 All According to the list of Entries with NODATA one of the following corrections has to be made:
- (a) Restore numerical data from old EXFOR backup in retransmission if data were not superseded before in this Entry;
 - (b) Delete Subentry, or the whole Entry, if it is real duplication in reference and data, as well as adding a comment in HISTORY;
 - (c) Add SPSDD under STATUS when it is applicable;
 - (d) Digitize numerical data if the quality of the figures is enough for digitization, if SPSDD not applicable, and if the article was published before 2000;
 - (e) Add UNOBT and comment if it is impossible to digitize the data and the article was published before 2000;
 - (f) Try to find numerical data if the article was published later than 2000.
- A46 All (Continuing Action) If an author's e-mail address is impossible to find through Internet, try to find it with the help of NRDC collaboration. See also C16.
- A47 Otsuka Add phrase in LEXFOR Manual concerning the particular source of the data:
"...The actual source from which the numerical values given in the data set were taken must be entered in free text under STATUS only as the well defined reference as it is

- coded in REFERENCE lines*” (WP2010-29).
- A48 Pikulina Add to EXFOR-Editor automatic addition of reference information under STATUS keyword.
- A49 All According to the list in WP2010-31, make corrections for averaged kinetic energy and most probable kinetic energy, mass and charge (KE, AKE, KEP, KEM, AP, AZ) after checking original articles.
- A50 Otsuka (Continuing Action) Make all corrections and additions in LEXFOR Manual according to the adopted NRDC-2010 decision (WP2010-13, WP2010-29, WP2010-31 to 39).
- A51 Otsuka (Continuing Action) Prepare final version of Memo “Uncertainty propagation in TOF-data”.
- A52 Otsuka (Continuing Action) Correct LEXFOR and EXFOR formats Manuals according to WP2009-17 for the keyword INSTITUTE.
- A53 Dupont (Continuing Action) Send list of incorrect authors’ names and titles to NRDC participants.
- A54 Dupont (Continuing Action) Prepare full list of recommendations for spelling of nuclides and mathematical expressions in free text of EXFOR entries.
- A55 Otsuka Distribute list of Entries with obsolete code SIG/SUM (Memo 4C-4/175 rev) still existing in EXFOR DB.
- A56 Otsuka Provide update of LEXFOR entry “Light-nuclei neutron reactions” (See also C28).

EXFOR software

- A57 All (Standing Action) Inform each other about EXFOR-related software being used and/or developed.
- A58 All (Standing Action) Provide feedback on the digitizing software GSYS to JCPRG.
- A59 All (Standing Action) Provide feedback to NDS on the existing CHEX version (on bugs as well as desired additions).
- A60 Sarov (Continuing Action) Continue development and testing of the EXFOR-Editor in cooperation with NDS and other data Centres, taking into account compilers’ remarks.
- A61 Pikulina Develop the EXFOR-Editor software to create “dummy” Entry.
- A62 All (Continuing Action) Provide feedback on the JANIS – TRANS Checker code to NEA DB.

Evaluated data libraries

- A63 Katakura Notify other centres when JENDL-4.0 is released.

LIST OF WORKING PAPERS

Number	Title	From
WP2010-01	Conclusions and action of the 2009 NRDC Meeting	
WP2010-02	Update of NRDC Protocol (Rev. Apr. 2010)	S. Dunaeva, N. Otsuka
WP2010-02rev	(WP2010-02 corrected during the meeting)	S. Dunaeva, N. Otsuka
WP2010-03	Update of NRDC Network Document (Rev. Apr. 2010)	S. Dunaeva, N. Otsuka
WP2010-03rev	(WP2010-03 corrected during the meeting)	S. Dunaeva, N. Otsuka
WP2010-04	New and revised entries / subentries since the 2009 NRDC meeting	S. Dunaeva
WP2010-05	Statistics of checking preliminary files	S. Dunaeva
WP2010-06	Status of new articles compilation	S. Dunaeva, N. Otsuka
WP2010-07	Status of ND2007 articles compilation	S. Dunaeva
WP2010-08	Status: retransmission of old entries (Action A6)	S. Dunaeva
WP2010-09	EXFOR Updating Error report	V. Zerkin
WP2010-10	EXFOR Outliers (Parts 4 and 5) (Memo CP-D/623)	N. Otsuka, E. Dupont
WP2010-11	Automatic test of EXFOR with TALYS (Memo CP-D/627, CP-D/633)	N. Otsuka, E. Dupont
WP2010-12	ENTRYs L0092, L0104, L0120, L0133 corrections	S. Dunaeva
WP2010-13	New LEXFOR entry - Fusion (Memo CP-D/626)	N. Otsuka
WP2010-14	Results of compilation on the basis of full journal contents (Actions A16, A17)	S. Dunaeva
WP2010-15	Status of scanned journals	S. Dunaeva
WP2010-16	Future of compilation of neutron-induced reactions, charged-particle induced reactions (scope, progress in future)	S. Dunaeva, N. Otsuka
WP2010-17	Resonance parameters in CPND entries	N. Otsuka
WP2010-18	Regular export from EXFOR to C4	V. Zerkin
WP2010-19	Corrections of experimental data given in computational formats	V. Zerkin

ANNEX D

WP2010-20	Proposal to unify some unit symbols in EXFOR Dictionary 25	S. Hlavac, N. Otsuka
WP2010-21	Future NRDC Cooperation on CINDA (Memo 4C-3/394)	N. Otsuka, E. Dupont
WP2010-22	Automatic import information from NSR to CINDA	V. Zerkin
WP2010-23	Status of new compilation and procedure for creation CINDA reference	S. Dunaeva
WP2010-24	X4Map and X4Archive (Memo CP-D/634)	V. Zerkin
WP2010-25	Statistics for Subents with NODATA (Memo 4C-4/180)	M. Mikhaylyukova
WP2010-26	Proposals related to the EXFOR keyword AUTHOR (Memo CP-N/080)	C. Nordborg
WP2010-27	Authors' e-mail addresses list (Memo 4C/4-178)	M.Mikhaylyukova
WP2010-28	HISTORY lines (Memo 4C-4/179)	M.Mikhaylyukova
WP2010-29	STATUS lines (Memo 4C-4/177)	M.Mikhaylyukova
WP2010-30	Inclusion of possible options to an Entry (Memo CP-C/388)	O. Schwerer
WP2010-31	Fission quantity coding (Memo CP-D/599 , CP-D/600 , CP-D/613)	N. Otsuka
WP2010-32	Clarification of usage of MLT and PY in LEXFOR (CP-D/619)	N. Otsuka
WP2010-33	Updated of LEXFOR "General Quantity Modifiers" (Memo CP-D/621)	N. Otsuka
WP2010-34	Data type (SF9) for data measured by indirect reaction (Memo CP-D/582)	N. Otsuka
WP2010-35	Reaction Coding (SF1-SF2) (Memo CP-D/607 , CP-D/622)	N. Otsuka
WP2010-36	Total cross section in photo-nuclear reaction data (Memo CP-D/629)	N. Otsuka
WP2010-37	Use of REACTION combination (Memo CP-D/614)	N. Otsuka
WP2010-38	E-RL-CM: Relative energy in center-of-mass system? (Memo CP-D/611)	N. Otsuka
WP2010-39	Prompt fission neutron spectra (Memo CP-D/635)	N. Otsuka
WP2010-40	Final and intermediate reaction products (Memo CP-C/389)	O. Schwerer
WP2010-41	Tools for compilation webpage (Action A53)	N. Otsuka
WP2010-42	EXFOR-Editor Development	G. Pikulina, S. Taova
WP2010-43	Actions A16, A17 of NRDC2009 (Memo 4C-4/182rev)	M.Mikhaylyukova

ANNEX D

WP2010-44	My experience about EXFOR	A. Makinaga
WP2010-45	NRDF/A Nuclear Reaction Data Files for Astrophysics	K. Kato
WP2010-46	New version of JCPRG digitizer (GSYS2.4) (Memo CP-E/145)	R. Suzuki

LIST OF SPECIFIC PRESENTATIONS

TITLE	Author
NNDC Progress Report	M. Herman
NDS Introduction	R.A. Forrest
IAEA Nuclear Data Section Progress Report	S. Dunaeva
Progress Report on China Nuclear Data Center	Ge Zhigang
A Status Report on EXFOR Compilation Activities in India and on Formation of Nuclear Data Physics Centre of India (NDPCI)	S. Ganesan
Ukrainian Nuclear Data Centre Progress Report	O. Gritzay
EXFOR "testing"	E. Dupont
My experience about EXFOR - How NRDC treated our data? -	A. Makinaga
Duplications in Japanese Data Caused by Compilation on the Basis of Full Journal Contents	N. Furutachi
NRDF/A - Nuclear Reaction Data File for Astrophysics in JCPRG	K. Kato
NNDC Report to NRDC on EXFOR Activities	S. Hlavac, O. Schwerer, P. Oblozinsky
NNDC Report to NRDC on Compilation Scope	S. Hlavac
Development of Graph Digitizing System GSYS2.4 (CP-E/145)	R. Suzuki
Presentation at NRDC 2010 meeting	N. Otsuka

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