

INDC International Nuclear Data Committee

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

IAEA Headquarters, Vienna, Austria

23 – 25 April 2013

Prepared by

Naohiko Otsuka
IAEA Nuclear Data Section, Vienna, Austria

July 2013

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Produced by the IAEA in Austria
July 2013

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Abstract

This report summarizes the IAEA Technical Meeting on the International Network of Nuclear Reaction Data Centres, held at the IAEA Headquarters in Vienna, Austria from 23 to 25 April 2013. The meeting was attended by 24 participants representing 13 cooperative centres from 8 Member States and 2 International Organisations. A summary of the meeting is given in this report along with the conclusions and actions.

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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 National Laboratory, Upton, USA
NEA-DB	OECD/NEA Data Bank, Issy-les-Moulineaux, France
NDS	IAEA Nuclear Data Section, Vienna, Austria
CJD	Russian Nuclear Data Centre, Institute of Physics and Power Engineering, Obninsk, Russia
CNDC	China Nuclear Data Centre, China Institute of Atomic Energy, Beijing, China
ATOMKI	Nuclear Data Group, Institute for Nuclear Research (ATOMKI), Debrecen, Hungary
NDPCI	Nuclear Data Physics Centre of India, Bhabha Atomic Research Centre, Trombay, Mumbai, India
JAEA/NDC	Nuclear Data Center, Japan Atomic Energy Agency, Tokai-mura, Japan
JCPRG	Nuclear Reaction Data Centre, Hokkaido University, Sapporo, Japan
KNDC	Korea Nuclear Data Center, Korea Atomic Energy Research Institute, Daejeon, Republic of Korea
CAJaD	Russian Nuclear Structure and Reaction Data Centre, Moscow, Russia
CDFE	Centre for Photonuclear Experiments Data, Moscow State University, Moscow, Russia
CNPD	Centre of Nuclear Physics Data, Russian Federal Nuclear Center - VNIIEF, Sarov, Russia
UkrNDC	Ukrainian Nuclear Data Centre, Institute for Nuclear Research, Kyiv, Ukraine

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.5), "International Network of Nuclear Reaction Data Centres".

PREVIOUS NRDC MEETINGS

Vienna, 23-25 April 2013	Technical	INDC(NDS)-0633
Paris, 16-19 April 2012	Centre Heads + Tech.	INDC(NDS)-0618
Vienna, 23-24 May 2011	Technical	INDC(NDS)-0593
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, Trombay, Mumbai, India
BNL	Brookhaven National Laboratory, Upton, New York, USA
BROND	Russian Evaluated Neutron Reaction Data Library
C4	Computational format for EXFOR data
CAJaD	Centre for Nuclear Structure and Reaction Data, Kurchatov Institute, Moscow, Russia
CDFE	Centr Dannykh Fotojad. Eksp., Moscow State University, Russia
CENDL	Chinese Evaluated Neutron reaction Data Library
CHEX	EXFOR check program (originating from NNDC)
CIAE	Chinese Institute of Atomic Energy, Beijing, China
CINDA	A specialized bibliography and data index on nuclear reaction data operated by NRDC
CJD	Russian Nuclear Data Centre, IPPE, Obninsk, Russia
CNDC	China Nuclear Data Centre, CIAE, Beijing, China
CNPD	Centre 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
DOI	Digital Object Identifier, <i>e.g.</i> for bibliographic references
EFF	European Fusion File, coordinated by NEA-DB
EMPIRE	A code system for nuclear reaction model calculations
ENDF-6	International format for evaluated data exchange, version 6
ENDF/B	US Evaluated Nuclear Data File/B
ENSDF	Evaluated Nuclear Structure Data File
EXFOR	Format for the international exchange of nuclear reaction data
FENDL	Fusion Evaluated Nuclear Data Library, maintained at IAEA-NDS
GSYS	Data digitizing system by JCPRG
IAEA	International Atomic Energy Agency, Vienna, Austria
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	Nuclear Reaction Data Centre, Hokkaido University, Sapporo, Japan
JEF	Joint Evaluated File, coordinated by NEA-DB
JEFF	Joint Evaluated Fission and Fusion File, coordinated by NEA-DB
JENDL	Japanese Evaluated Nuclear Data Library
KAERI	Korea Atomic Energy Research Institute, Daejeon, Korea
KAERI/NDC	Nuclear Data Center, KAERI, Daejeon, Korea
KINR	Kyiv Institute of Nuclear Research
LEXFOR	Part of the EXFOR manual containing physics information for compilers
NDS	IAEA Nuclear Data Section, Vienna, Austria
NEA	OECD Nuclear Energy Agency, Issy-les-Moulineaux, France
NEA-DB	OECD/NEA Data Bank, Issy-les-Moulineaux, France
NEANDC	OECD/NEA Nuclear Data Committee
NNDC	National Nuclear Data Center, Brookhaven National Laboratory, USA
NRDC	International Network of Nuclear Reaction Data Centres
NRDF	Japanese Nuclear Reaction Data File
NSDD	International Network of Nuclear Structure and Decay Data Evaluators
NSC	OECD/NEA Nuclear Science Committee
NSR	Nuclear Science References, a bibliographic system
OECD	Organization for Economic Cooperation and Development, Paris, France
ORDER	EXFOR program for addition of record identification
PhND	Photonuclear data
RIKEN	Institute of Physics and Chemistry Research, Wako-Shi, Saitama, Japan
TRANS	Name of transmission tapes for data exchange in the EXFOR system
UKRNDC	Ukraine Nuclear Data Centre at KINR, Kyiv, Ukraine
VNIIEF	Russian Federal Nuclear Centre, Sarov, Russia
WPEC	Working Party on International Nuclear Data Evaluation Co-operation
WPEC-SG30	WPEC Subgroup 30 on “Quality Improvement 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

MEETING SUMMARY

1. INTRODUCTION

The IAEA Technical Meeting on the International Network of Nuclear Reaction Data Centres was held at the IAEA Headquarters in Vienna, Austria from 23 to 25 April 2013. The meeting was attended by 24 participants (Appendix A) representing 13 cooperative Centres from 8 Member States (China, Hungary, India, Japan, Korea, Russia, Ukraine, USA) and 2 International Organisations (NEA, IAEA). 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 April 2012 at the OECD Nuclear Energy Agency, Issy-Les-Moulineaux, France).

Main topics of the present meeting were EXFOR transmission statistics, EXFOR coverage and quality control, needs of EXFOR users, EXFOR/CINDA dictionaries, update of coding rules as well as improved tools for compilation and dissemination (see Appendix B).

Totally 36 working papers were presented at the meeting. The results of the discussions were summarized in 25 conclusions and 76 actions (see Appendix C).

2. Brief Summary

2.1 Opening

R.A. Forrest, Head of the IAEA Nuclear Data Section, opened the meeting on behalf of the Agency, and introduced two new participants, B. Lalremruata and B. Pritychenko. Forrest mentioned that EXFOR compilation has been extremely important over the entire history of the Nuclear Data Section. He noted that the Network is still finding many experimental data for addition to EXFOR (*e.g.*, old papers, new quantities), and has an important future for further improvement of EXFOR. He also introduced the activity of the WPEC Subgroup 38 “Beyond the ENDF format: A modern nuclear database structure” in the relation with possible application of XML to EXFOR in future.

O. Schwerer was elected as the chairman, and the agenda was adopted without change. Progress reports from all thirteen attending Centres were presented, highlighting the staffing situation of the Centres, their compilation activities, data services, other nuclear data activities of interest to the network, and relevant publications. See also progress reports P2013-01 to P2013-12 indexed in Appendix D for further details.

2.2 EXFOR (General)

V. Semkova reported the statistics of transmissions, currently scanned journals and preliminary tape checking performed by Centres. She reported that 706 entries (155 from neutron induced reaction, 485 from charged-particle induced reaction, 66 from photon-nuclear reaction) have been newly finalized since the last NRDC meeting in addition to 1557 retransmitted entries.

V. Zerkin presented the time evolution (1970 – 2012) of the number of experimental works in EXFOR for each projectile type (neutron, charged-particle and photon) and originating Centre.

N. Otsuka reported his analysis on delay in compilation (= time of transmission – time of publication) for eight selected journals published in 2012. His analysis showed that the delay is 5.6

months in average, which is similar to the result of a similar analysis reported in the last NRDC meeting for articles published in 2011 (5.7 months).

N. Otsuka also reported the current status of coding mistakes registered to the EXFOR Feedback List citing the recommendation from the 29th INDC Meeting WG 2: “Correction of mistakes in EXFOR should be made in a timely manner by all NRDC members.”, and reminded the participants to make important corrections in a timely manner. He also introduced a similar recommendation on duplication of data sets in EXFOR entries from the 29th INDC Meeting WG 2: “The working group is satisfied with the checking procedure but would like to recommend that the issue about cleaning the existing duplications be included on the agenda of the next NRDC meeting.”, and asked Centres to make an effort to resolve all known duplications as soon as possible.

S. Simakov informed participants about conclusions and recommendations from the 28th (May 2010) and 29th (May 2012) INDC Meetings. The latter in particular acknowledged the significant advances in the EXFOR data retrieval, visualization, renormalisation and covariance matrix generation. The Committee appreciated the large task of scanning of all the INDC series documents, original papers as well as laboratory reports, and implementation of access to them from the EXFOR retrieval system (with password protection as appropriate). On the other hand, the Committee expressed several concerns, and recommended to clean the existing duplications and to correct mistakes in EXFOR in a timely manner by NRDC. The Committee also stated that “experimental data explicitly declared as ‘preliminary’ should not be compiled in EXFOR. The IAEA will request the authors to send their experimental data; however, if the authors are reluctant to do so, the IAEA should consider just creating a CINDA entry, but no EXFOR entry.” These recommendations were intensively discussed during this NRDC Meeting.

E. Dupont introduced assignment of a quality score to each EXFOR data set by calculation of a deviation factor showing deviation of the experimental data from the corresponding evaluated data, and proposed addition of a flag to each EXFOR data set by using a specific keyword (*e.g.*, QLTY-FLAG). The participants concluded that this information should be available for Centres in another way (*e.g.*, as a supplemental file to the EXFOR Master File).

2.3 Manuals and Dictionaries

N. Otsuka reported that he sent a questionnaire about usage of (1) dictionaries in various formats (archive, backup, trans) and (2) some out-of-date dictionaries (*e.g.*, old quantity dictionary #36), and received answers from 14 compilers and 4 software engineers. The participants concluded that (1) the three types of dictionaries are still in use; (2) dictionaries 9 to 14, 27, 36, 42, 44, 124 to 125, and 136 will not be included in future dictionary transmission.

V. Zerkin reported the possibility of automatic change in prefixes in the EXFOR Master File following the Conclusion 6 of the last NRDC meeting: “Unification of prefixes in unit codes proposed in WP2012-09 and change of prefixes MICRO- to MU- in dictionary 25 were approved”. He mentioned that such automatic change is technically possible, but there are about 5000 data sets affected by this automatic change without any clear advantage for users in comparison with the existing EXFOR entries. The participants supported his opinion, and decided to withdraw the Conclusion 6 of the last NRDC meeting.

V. Zerkin also presented a summary of the new coding rule for covariance matrices for inclusion to Appendix B of the EXFOR Formats Manual. The participants were asked to provide their comments on the summary document to him.

2.4 CINDA

V. Zerkin reported that the CINDA Master File was updated twice since the last NRDC meeting (June 2012 and January 2013) including imports from the EXFOR and NSR databases. It was agreed that the NSR database contents will be regularly imported to the CINDA Master File and transmitted to other Centres.

2.5 EXFOR Compilation

V. Semkova reported the progress in compilation of (1) neutron source spectra, (2) proton-induced reaction cross section and (3) proton-induced isotope production cross sections, which Centres have been requested to compile with a high priority. The participants recognized that a number of articles reporting neutron source spectra and proton-induced isotope production cross sections are still missing in EXFOR although progress was seen in compilation of these data. The participants recommended a high priority in completion of these compilations considering their importance for EXFOR users.

N. Otsuka presented the current status of EXFOR for light charged-particle ($Z \leq 4$) induced isotope production cross section data tabulated in Landolt-Börnstein compilation (sub-volumes 13-F, G, H and I). He reported that (a) 453 articles were found in EXFOR; (b) 185 articles must be compiled in new entries; (c) 10 articles can be compiled in new entries (high energy data); (d) 32 articles are missing in EXFOR but the same experimental works are compiled in EXFOR from other articles. He also mentioned that some isotope production cross sections are important in the relation with the IAEA CRP on “Nuclear Data for Charged-Particle Monitor Reactions and Medical Isotope Production Reactions” (c.f. report INDC(NDS)-0630).

N. Otsuka summarized the status of various corrections requested at the last NRDC meeting, and reported that information about the English translations of Atomnaya Energiya and Yadernaya Fizika is still missing in 380 entries from area 4. Additionally he proposed addition of English translation of Yadernye Konstanty published as INDC(CCP) reports to relevant entries.

N. Otsuka reported the analysis of JANIS Import Log which is provided from N. Soppera (NEA DB) for each EXFOR Master File update. He reported that the number of “error” (undefined code, format error) entries has decreased from 104 (28 March 2012) to 45 (15 April 2013).

N. Otsuka mentioned that the production thick target yield (unsaturated thick target yield) cannot be well defined without irradiation time information. The participants agreed to add the irradiation time under the new heading `TIME-IRR`. He also reported that the participants of the 1st Research Coordination Meeting on “Nuclear Data for Charged-Particle Monitor Reactions and Medical Isotope Production Reactions” (3 – 7 December, 2012) asked him to consult regarding inclusion of timing information (*i.e.*, irradiation time, cooling time, measurement time) to EXFOR entries for future corrections of activation cross sections caused by revision of half-lives. The participants concluded that it is not realistic to receive full timing information from the authors for inclusion to the EXFOR entry as coded information, but also decided to keep timing information in free text under the keyword `METHOD` when available.

O. Schwerer presented the coding rule for the particle multiplicity distribution (probability for N particle emission). He proposed use of the branch code `NUM` in the `REACTION SF5` field without `NPART` in the `REACTION SF4` field, and his proposal was accepted.

M. Mikhaylyukova reported the inconsistency of the manuals for the headings specifying the unresolved resonance region (`EN-MIN` and `EN-MAX` are asked by LEXFOR while `EN-RES-MIN` and `EN-RES-MAX` are required by the resonance flags of the dictionary 236). The participants concluded that only `EN-RES-MIN` and `EN-RES-MAX` must be used in future.

N. Otsuka proposed a new parameter code which will indicate that both fission fragments are specified in the common or data section (*e.g.*, under the headings `ELEM1`, `ELEM2`, `MASS1` and `MASS2`). **O. Schwerer** proposed to use of a new branch code `CRN` instead of a more generic (existing) branch code `CRL`, and it was approved.

N. Otsuka reported that α (alpha) is sometimes coded as the outgoing particle instead of T (triton) when the width $\Gamma_{\alpha} = \Gamma_{\text{T}}$ is given for ${}^6\text{Li}(n,\alpha)$. In order to maintain consistency in EXFOR, he proposed to add a sentence “In resonance parameters, the reaction product (*i.e.*, the heaviest of the products) is not coded.” to LEXFOR, and it was approved.

N. Otsuka introduced a question on distinction between partial reaction and isomer production (*e.g.*, ${}^{115}\text{In}(n,n'){}^{115\text{m}}\text{In}$). He proposed several revisions in manuals (*e.g.*, exclusion of production of an isomeric state fed from higher levels to the isomeric state from the definition of the partial reaction in LEXFOR “Partial Reactions”). The participants concluded that NDS will make a final decision considering comments on the proposal from the participants.

N. Otsuka reported that the thick target production yields per incident projectile (*e.g.*, 1 proton) and per induced charge (*e.g.*, 1 μC) have been expressed by very different quantity codes (`,PY`, `,TT` and `,TTY/PY`), and proposed to use the same quantity code or more similar codes. **O. Schwerer** replied that it is still better to differentiate them by two quantity codes because they have different dimensions. He proposed to use similar but different quantity codes `,PY`, `,TT` and `,PY`, `,CH/TT` for yields per projectile and per induced charge, respectively, and it was approved.

S. Charisopoulos (Harissopoulos) reported inconvenience in comparison between theoretical and experimental cross sections for the low-energy charged-particle induced reaction cross sections measured with a thick sample, and the initial projectile energy (beam energy) is coded under the heading `EN` (energy of incident projectile, laboratory system) or `EN-CM` (incident projectile energy relative to target) without considering degradation of the projectile energy in the sample. The participants concluded that more appropriate expression (*e.g.*, projectile energy at the entrance and exit of the sample material, effective interaction energy) must be adopted instead of the initial projectile energy for such cases. See also a review of the definitions of the effective interaction energy in A. Lemut, *Eur. Phys. J. A* **36**(2008)233.

2.6 Software and Dissemination

M. Verpelli presented the LiveChart of Nuclides developed and maintained by the IAEA Nuclear Data Section.

S. Simakov has proposed to establish a link from EXFOR entries (*e.g.*, `REACTION`, `DECAY-DATA`) to the LiveChart of Nuclides in the NDS EXFOR web retrieval system as a pilot case, since it will allow convenient checking and comparison of nuclear structure information stored in EXFOR (*e.g.*, parameters of excitation levels, gamma transition, decay modes) with the reference nuclear structure database ENSDF.

V. Semkova presented the IAEA Consultants’ Meeting on “Benchmark of Digitization Software” held from 12 to 14 November 2012. She reported that (1) data sets digitized by three different digitization tools were submitted by 14 EXFOR compilers; (2) deviation of the digitized data from authors’ data were analysed during the meeting; (3) representation of digitized data and uncertainty of digitization were discussed as well. She introduced recommendations from the Consultants’ meeting to software developers, EXFOR compilers and NRDC coordinator. (c.f. report INDC(NDS)-0629).

M. Mikhaylyukova reported her attempt to estimate the digitization error. She digitized experimental data which were taken from literature by authors for comparison with their new result. She estimated the digitization error from the difference between data digitized from the figure and data extracted from EXFOR. The participants decided to encourage compilers to estimate errors in digitization following her procedure.

G. Pikulina reported development of compilation tools in Sarov to input and edit experimental data for EXFOR compilation. She reported that their digitization tool and editor are being improved so that they will become more useful for both beginners and experts of EXFOR compilation. She also reported that the EXFOR Editor 2.3 has been developed taking into account comments from users, and a new version will be made available on the CNPD web site. She also mentioned that “light” versions of the digitization tool and editor are under development.

V. Zerkin discussed two data points characterized by the same set of independent variables. He reported that there are three major cases: (1) data points differentiated by additional variable (*e.g.*, flag); (2) data points reported as raw data (*e.g.*, RAW in REACTION SF8); (3) data points digitized from figures with bad quality etc. He informed that these three cases are indicated by special flags for each relevant EXFOR data set on the NDS EXFOR web retrieval system. He also mentioned that some parameters (*e.g.*, sample thickness) must be treated as independent variables rather than additional variables in dictionary 24.

V. Zerkin demonstrated various new features of the NDS EXFOR web retrieval system. He reported that the users can specify data digitized from figures as well as data compiled from tables as a search condition.

V. Zerkin also presented a new EXFOR output format C5M which gives partial uncertainties and correlation matrix for each EXFOR data set. He reported that a new tool to convert EXFOR data sets to the C5M format has been developed based on the web tool to construct a covariance matrix from uncertainties coded in EXFOR, and EXFOR users can perform this conversion on the NDS EXFOR web retrieval system for cross sections and cross section ratios. He reported that the full EXFOR was converted to C5M for testing in the GANDR package.

2.7 Closing

S. Charisopoulos (Harissopoulos) expressed his concern about alpha capture cross sections digitized from conference proceedings published in 2009, and compiled in an EXFOR entry without communication with the authors.

N. Otsuka also reported that the CERN n_TOF Collaboration recognizes that preliminary data published in conference proceedings are not ready for EXFOR compilation, and also noted a recommendation from the 28th INDC Meeting WG 2: “Concerning CINDA/EXFOR, it is recommended that experimental data explicitly declared as ‘preliminary’ should not be compiled in EXFOR. The IAEA will request the authors to send their experimental data; however, if the authors are reluctant to do so, the IAEA should consider just creating a CINDA entry, but no EXFOR entry”. The participants concluded that (1) an EXFOR entry should not be created from the data published in conference proceedings within 5 years when the authors are reluctant to provide numerical data for EXFOR compilation; (2) new EXFOR entries must be sent to the author for proof-reading.

B. Pritychenko expressed his opinions on the further direction of EXFOR based on his experience of compilation and interaction with users. He mentioned that there are still many data missing in EXFOR (*e.g.*, charged-particle induced reaction data, data not received from the authors neither digitized by the compiler), and various approaches must be taken to improve the situation

(completeness checking, digitization). He emphasized that the compilation effort must be evaluated not only by the number of new entries but also by the number of revised entries which contents were essentially improved (*re-compilation*), and the participants supported this opinion in order to encourage such an effort by compilers. Following this presentation, E. Dupont also proposed to perform EXFOR completeness checking for articles cited in the Atlas of Neutron Resonance by S. Mughabghab, and the participants from the four Neutron Centres agreed to perform it.

M. Aikawa introduced Asian collaboration in nuclear reaction data compilation under the framework of the Asia-Africa Science Platform Program (AASPP) of the Japan Society for the Promotion of Science (2010-2013). He reported that the collaboration was coordinated by the four Asian Centres (CNDC, JCPRG, KNDC, NDPCI), and they have organized three workshops in Sapporo (2010), Beijing (2011) and Pohang (2012).

N. Otsuka proposed the plans for the next (full) NRDC meeting (Smolenice, Slovakia, 6 -9 May, 2014), the next technical NRDC meeting (Vienna, Austria, the 2nd quarter of 2015) as well as the EXFOR compilation workshop (Vienna, Austria, 26 – 30 August, 2013), and they were approved. He also presented the venue of the next NRDC meeting in Smolenice on behalf of S. Hlavač.

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AGENDA

Tuesday, 23 April 2013

Plenary: 9:30 – 13:00

1. Opening Items

- | | | | | | |
|-----|--|-------|--|--|--------------|
| 1.1 | Welcome address | 5 min | | | R.A. Forrest |
| 1.2 | Election of chairperson, adoption of the agenda, announcements | 5 min | | | N. Otsuka |

2. Progress Reports

- | | | | | | |
|------|----------------------------|--------|--------------------------|--|------------------|
| 2.1 | CDFE (Moscow, Russia) | 10 min | P2013-01 | | V. Varlamov |
| 2.2 | ATOMKI (Debrecen, Hungary) | 10 min | P2013-02 | | S. Takács |
| 2.3 | NEA DB (Paris, France) | 10 min | P2013-03 | | E. Dupont |
| 2.4 | CAJaD (Moscow, Russia) | 10 min | P2013-04 | | S. Babykina |
| 2.5 | NDPCI (India) | 10 min | P2013-05 | | B. Lalremruata |
| 2.6 | UkrNDC (Kyiv, Ukraine) | 10 min | P2013-06 | | O. Gritzay |
| 2.7 | CNPD (Sarov, Russia) | 10 min | P2013-07 | | S. Taova |
| 2.8 | NDS (Vienna, Austria) | 10 min | P2013-08 | | S.P. Simakov |
| 2.9 | JCPRG (Sapporo, Japan) | 10 min | P2013-09 | | M. Aikawa |
| 2.10 | CNDC (Beijing, China) | 10 min | P2013-10 | | Ge Zhigang |
| 2.11 | CJD (Obninsk, Russia) | 10 min | P2013-11 | | M. Mikhaylyukova |
| 2.12 | KNDC (Daejeon, Korea) | 10 min | P2013-12 | | S.C. Yang |
| 2.13 | NNDC (Upton, USA) | 10 min | | | B. Pritychenko |

140 min

Plenary: 14:00 – 18:00

3. EXFOR General

- | | | | | | |
|-----|--|--------|---------------------------|--|-------------|
| 3.1 | Transmission statistics | 10 min | WP2013-02 | | V. Semkova |
| 3.2 | Some statistics of EXFOR compilation | 10 min | WP2013-03 | | V. Zerkin |
| 3.3 | Scanning of new publications | 10 min | WP2013-04 | | V. Semkova |
| 3.4 | Statistics of new article compilation (A1) | 10 min | WP2013-05 | | N. Otsuka |
| 3.5 | Corrections of entries in feedback list (A3) | 10 min | WP2013-06 | | N. Otsuka |
| 3.6 | Preliminary tape checking by centres | 10 min | WP2013-07 | | V. Semkova |
| 3.7 | NRDC presentation in ND2013 (A8) | 10 min | WP2013-08 | | N. Otsuka |
| 3.8 | Other actions (A2, A4, A5-A7) | 10 min | WP2013-01 | | Chairperson |

4. Manuals and Dictionary

- | | | | | | |
|-----|---|--------|---------------------------|--|-----------|
| 4.1 | Questionnaire on dictionary (A18) | 10 min | WP2013-09 | | N. Otsuka |
| 4.2 | Extension of EXFOR Formats Manual (A14) | 10 min | WP2013-35 | | V. Zerkin |

4.3	Other actions (A9-A13, A15-A17, A19-A20)	10 min	WP2013-01	Chairperson
5	CINDA			
5.1	Transmission statistics (A24)	10 min	WP2013-10	V. Zerkin
5.2	Other actions (A21-A23, A25)	10 min	WP2013-01	Chairperson
6	EXFOR Compilation			
6.1	Compilation of articles with a priority (A26-A29)	10 min	WP2013-11	V. Semkova
6.2	Isotope production cross sections in Landolt-Börnstein compilation (A30, CP-D/757)	10 min	WP2013-12	N. Otsuka
6.3	Monitor reactions and medical isotope production reactions (1 st RCM on Nuclear Data for Charged-particle Monitor Reactions and Medical Isotope Production)	10 min	WP2013-13	N. Otsuka
6.4	Corrections requested in the last meetings (A33, A35, A37, A38, A50)	10 min	WP2013-14	N. Otsuka
6.5	English translation of Yad. Konst.	10 min	WP2013-15	N. Otsuka
6.6	Extraction from JANIS Import Log (A41-43)	10 min	WP2013-16	N. Otsuka
6.7	Duplication of EXFOR entries	10 min	WP2013-17	N. Otsuka
6.8	Other actions (A31-A32, A34, A36, A39-A40, A44-A46, A47-A49, A51-A56)	10 min	WP2013-01	Chairperson

210 min

Social event: 19:00 –

“[Heuriger Zimmermann](#)” (Armbrustergasse 5, 1190 Wien, Bus 38A from U4 Heiligenstadt)

Wednesday, 24 April 2013

Plenary: 9:00 – 13:00

6	EXFOR Compilation (cont)			
6.9	Recommendations from INDC Meetings (May 2010, May 2012)	10 min	WP2013-18	S.P. Simakov
6.10	Quality scoring for EXFOR	20 min	WP2013-19	E. Dupont
6.11	Probability for emitting N particles (CP-C/406)	15 min	WP2013-20	O. Schwerer
6.12	Heading for averaged resonance parameter energy range (CP-D/763)	20 min	WP2013-21	M. Mikhalyukova
6.13	CRL (correlation) for detection of fission fragments in coincidence (CP-D/748)	15 min	WP2013-22	N. Otsuka
6.14	Prompt fission cross section (CP-D/767)	10 min	WP2013-23	N. Otsuka
6.15	Resonance parameter for light-	10 min	WP2013-24	N. Otsuka

	nuclei reaction (CP-D/774)			
6.16	Partial reaction and isomer production (CP-D/781 Rev., CP-C/417)	10 min	WP2013-25	N. Otsuka, O. Schwerer
6.17	LEXFOR “Independent and Cumulative Data” (CP-D/783 Rev.)	15 min	WP2013-26	N. Otsuka
6.18	Irradiation time for production thick target yield (CP-D/784)	15 min	WP2013-27	N. Otsuka
6.19	Thick target production yield in charged-particle induced reaction (CP-D/785)	20 min	WP2013-28	N. Otsuka

160 min

Plenary: 14:00 – 18:00

7 Software and Dissemination

7.1	LiveChart of Nuclides	20 min		M. Verpelli
7.2	CM on “Benchmarking of Digitization Software” (November 2012)	30 min	WP2013-29	V. Semkova
7.3	Estimation of digitized data error	20 min	WP2013-30	M. Mikhaylyukova
7.4	Development of software to input and edit experimental data in EXFOR format (A72, A74)	20 min	WP2013-31	G. Pikulina
7.5	Developments of the EXFOR database: possible new formats	10 min	WP2013-32	V. Zerkin
7.6	Indication in EXFOR database and Web interface the full coincidence of values of independent variables of different data points in one dataset.	15 min	WP2013-34	V. Zerkin
7.7	New features of EXFOR Web Retrieval System	15 min		V. Zerkin
7.8	Converting EXFOR data to C5M – computational format with correlation matrices	10 min	WP2013-36	V. Zerkin
7.9	Other actions (A57-A65, A67-A71, A73)	10 min	WP2013-01	Chairperson

150 min

Thursday, 25 April 2013

Plenary: 9:00 – 18:00

8 Closing

- | | | | | |
|-----|--|--------|---------------------------|------------------|
| 8.1 | Expression of incident energy in charged-particle induced reaction | 10 min | | S. Charisopoulos |
| 8.2 | EXFOR, the nuclear physics perspective | 30 min | | B. Pritychenko |
| 8.3 | Asian collaboration on nuclear reaction data compilation | 10 min | WP2013-33 | M. Aikawa |
| 8.4 | Other business | | | |
| 8.5 | Date and place of next meeting | 10 min | | N. Otsuka |
| 8.6 | Review of actions and conclusions | 60 min | | Chairperson |

120 min

CONCLUSIONS AND ACTIONS

Conclusions

General

- C1 The next full NRDC meeting will be held in Smolenice, Slovakia from 6 to 9 May 2014.
- C2 The next technical NRDC meeting will be held in Vienna, Austria in the 2nd quarter of 2015.

EXFOR General

- C3 The next EXFOR Compilation Workshop will be held in Vienna, Austria from 27 to 30 August of 2013.
- C4 Compilation performance should be evaluated not only by the number of new entries but also by the number of retransmitted entries where essential revisions are made.
- C5 Centres are encouraged to perform EXFOR completeness checking for citation lists where a specific type of experimental works are systematically collected. (*e.g.*, the citation list of Z.Y. Bao *et al.*, At. Data Nucl. Data Tables **76** (2000) 70 for $kT=30$ Maxwellian spectrum averaged cross sections).
- C6 Compilers were reminded that new entries must be sent to the author for their proof-read. The status code `APRVD` can be applied only when the author agrees with dissemination of the EXFOR entry.
- C7 When authors are reluctant to provide numerical data reported in conference proceedings published within 5 years, an EXFOR entry should not be created for this experimental work.
- C8 Compilers were reminded that duplication of the same experimental data in EXFOR entries must be resolved in a timely manner.
- C9 Compilers were reminded that errors in EXFOR entries must be corrected in a timely manner.
- C10 Quality flags (*e.g.*, deviation from existing experimental data and/or evaluated data expressed by Michel's f-factor, c.f. WP2013-19) can be useful for EXFOR users, and should be made available for all centres (*e.g.*, as a supplemental file to the EXFOR Master File).

Manuals and Dictionaries

- C11 Three types of dictionaries (archive, backup and trans) are in use by compilers (WP2013-09).
- C12 Dictionary 9-14, 27, 36, 42, 44, 124-125 and 136 are no longer updated, and will not be included in future dictionary transmission. Explanation of codes defined in these dictionaries are available in old dictionaries (Dictionary transmission 9105 or before). If needs arise, they will be added to regular dictionary transmission again.
- C13 The Conclusion 6 of the NRDC 2012 Meeting (unification of prefixes in unit codes) was cancelled.

CINDA

- C14 The CINDA library are updated by an automatic way by NDS, and regularly transmitted to other centres.
- C15 The contents of the NSR databases will be regularly imported to the CINDA Master File.

EXFOR Compilation

- C16 Timing information (*e.g.*, irradiation time, cooling time, and measuring time) in activation measurements must be kept in free text under the keyword `METHOD`. Note that these times are not always constants of the experimental work (WP2013-13).
- C17 Proposal on the coding rule for probability of N particles emission (WP2013-20) was approved. All such data must have `SF5=NUM` without `SF4=NPART`.
- C18 Headings `EN-RES-MIN` and `EN-RES-MAX` will be used instead of `EN-MIN` and `EN-MAX` for unresolved resonance parameters (WP2013-21).
- C19 When two fragments are specified under headings (`ELEM1` and/or `MASS1`) and (`ELEM2` and/or `MASS2`), they will be coded with a new branch code `CRN` (correlation). If they are for ternary fission, `TER` is combined with `CRN` by a slash (WP2013-22).
- C20 Proposal on the coding rule for light-nuclei reaction (WP2013-24) was approved. The heaviest product will not be coded in `REACTION` for resonance parameters.
- C21 Irradiation time will be coded under the heading `TIME-IRR` when the production (unsaturated) thick target yield is coded (WP2013-27).
- C22 Proposal on the coding rule for the thick target production yield (WP2013-28) was approved. A new branch code `CH` (per electric charge) will be used when the yields are given per a constant electric charge.

- C23 When the beam energy is significantly decreased in the target material (*e.g.*, proton capture cross section measurements), the compiler should try to code appropriate expression of the incident energy (*e.g.*, incident energy at the entrance and exit of the sample material, mean energy with energy resolution) instead of the beam energy.

Software and Dissemination

- C24 ZCHEX should be maintained and developed as a NRDC checking code that must be used by compilers.
- C25 Compilers are encouraged to estimate errors in digitization following the procedure proposed in WP2013-30 to examine the accuracy of their digitization.

Actions

EXFOR General

- | | | |
|----|-------------------|--|
| A1 | All | (Standing action) Give the highest priority to compilation of new articles. |
| A2 | Semkova | Introduce a flag to EXFOR Compilation Control System to indicate articles which are published in conference proceedings and data are not available from the authors. |
| A3 | Semkova | Send an alert message for each new journal issue to the centre responsible for scanning of the journal defined in Appendix B of the NRDC Protocol (Scanning Responsibility). |
| A4 | Semkova | Consider revision of the NRDC Protocol Appendix B based on the capability of each centre. |
| A5 | Semkova | (Continuing action) Add the first author name to the EXFOR Compilation Control System as time permits. |
| A6 | All | (Continuing action) Correct erroneous entries listed on the EXFOR Feedback System on the NRDC web page according to the indicated priorities. All urgent corrections must be done by the next meeting. |
| A7 | Centre Heads | (Continuing action) Nominate participants from the centre to the EXFOR working group coordinated by Zerkin, which will discuss the opportunity to use XML as a new exchange format. |
| A8 | Otsuka
Semkova | (Continuing action) Prepare a questionnaire about the usages of compilation tools, and send it to centres. |

- A9 All (Continuing action) Respond to the questionnaire mentioned above.
- A10 All Send feedback to the NRDC paper presented at the ND2013 Conference (WP2013-08) to Otsuka by the end of May 2013.

Manuals and Dictionaries

- A11 Centre Heads (Continuing action) Send comments on the Network document to Otsuka by the end of December 2013 to prepare the next update to be reviewed and signed at the NRDC 2014 Meeting.
- A12 Otsuka (Continuing action) Update the Network document following the comments from Centre Heads.
- A13 Otsuka (Continuing action) Update the NRDC Protocol Appendix B (Scanning Responsibility) following the new scanning responsibilities of NNDC and CJD (Conclusion 4 and 5 of NRDC 2012).
- A14 Otsuka (Continuing action) Revise LEXFOR for (a) TOF covariance (WP2011-27); (b) new branch code `ISP` (WP2011-29); (c) specific temperatures for prompt fission neutron spectrum averaged quantities (WP2011-30); (d) compilation of prompt fission neutron quantities (WP2011-31); (e) nuclear resonance fluorescence (WP2012-11); (f) additional reference compiled in another entry (WP2012-12); (g) probability for N particles emission (WP2013-20); (h) heading of energy range for unresolved resonance parameters (WP2013-21); (i) resonance parameters for light-nuclei reaction (WP2013-24); (j) partial reaction, reaction product, isomeric state (WP2013-25=CP-D/781rev + CP-C/417 item 3); (k) independent and cumulative data (WP2013-26); (l) irradiation time (WP2013-27); (m) thick target production yield (WP2013-28).
- A15 Otsuka Consider a new LEXFOR chapter to keep selected recommendations from the Consultants Meeting on “Benchmarking of Digitization Software” (Report INDC(NDS)-0629).
- A16 Otsuka (Continuing action) Revise the EXFOR Formats Manual for (a) short nuclide codes in `REACTION SF7` (WP2011-28); (b) the keyword `ERR-ANALYS` (Conclusion 15 of NRDC 2012); (c) the keyword `SAMPLE` (Conclusion 17 of NRDC 2012); (d) reaction products (WP2013-24).

- A17 Otsuka (Continuing action) Revise the NRDC Protocol according to the Conclusion 20 of NRDC 2012 (exchange of software and co-operation in software development) and Conclusion 7 of NRDC 2013(compilation of data in recent conference proceedings).
- A18 Otsuka (Continuing action) Consider revision of the NRDC Protocol for submission of transmission tapes specialized for corrections.
- A19 Otsuka (Continuing action) Update Dictionaries every four months.
- A20 Otsuka Add a new branch code `CRN` (correlation) to dictionary 31 (WP2013-22).
- A21 Otsuka Make the quantity code `PR, SIG` (prompt fission cross section) obsolete (WP2013-23).
- A22 Otsuka Add the new heading code `TIME-IRRD` to dictionary 24 (WP2013-27).
- A23 Otsuka Include the new modifier code `CH` (per electric charge) to dictionary 34 (WP2013-28).
- A24 All Provide feedback on the draft of EXFOR Formats manual on the new covariance format (WP2013-35) to Zerkin.
- A25 Otsuka (Continuing Action) Assess the correlation properties of uncertainties given under the heading `ERR-1, ERR-2` etc. in the existing entries.

CINDA

- A26 Zerkin (Continuing action) Periodically export EXFOR and NSR to CINDA.
- A27 Zerkin (Continuing action) Periodically update the CINDA Master File and distribute it to other Centres.

EXFOR Compilation

- A28 Aikawa
Pritychenko
Taova (Continuing action) Compile neutron source spectra listed in Table 2 of WP2013-11.
- A29 Gritzay Consider compilation of neutron spectra published in last 10 years.

- A30 Hlavač (Continuing action) Compile proton-induced reaction cross section in R.D. Albert *et al.*, J, Phys. Rev. Lett. **6**(1961)13 (CP-D/717(Rev.2) = WP2012-18).
- A31 Aikawa
Babykina
Dupont
Pritychenko
Takács (Continuing action) Compile proton-induced isotope production cross sections listed in CP-D/725 (=WP2012-19). Notify Semkova if the assigned centre does not compile high energy ($E > 1$ GeV) data.
- A32 Aikawa
Babykina
Dupont
Lalremruata
Pritychenko
Semkova
Taova Compile light charged-particle induced isotope production cross sections listed in CP-D/757 (=WP2013-12). Notify Semkova if the assigned centre does not compile high energy ($E > 1$ GeV) data.
- A33 Otsuka Extract articles reporting reactions to be studied by the IAEA CRP on “Nuclear Data for Charged-particle Monitor Reactions and Medical Isotope Production Reactions” (INDC(NDS)-0630 Tables 1 to 5 = WP2013-13) from WP2012-19 and WP2013-12 for compilation with a priority.
- A34 Dupont
Otsuka
Pritychenko (Continuing action) Assess the articles reporting keV neutron capture cross section entries listed in WP2012-31, and add these articles with necessary revisions.
- A35 Otsuka Formulate completeness checking against the citation lists in S. Mughabghab’s “Atlas of Neutron Resonances”, and assign responsibility of the checking to four neutron centres.
- A36 Dupont
Mikhaylyukova
Otsuka
Pritychenko Perform completeness checking described as above.
- A37 Pritychenko
Semkova (Continuing action) Assess neutron cross section data useful for standard evaluation listed in WP2011-15, and compile them when appropriate.
- A38 Dupont
Taova (Continuing action) Correct entries for data sets which are partial for secondary energies listed in CP-D/718 (=WP2012-22, also registered to the EXFOR Feedback System).
- A39 Dupont
Mikhaylyukova
Pritychenko (Continuing action) Correct entries using the keyword `INC-SOURCE` for spontaneous fission as listed in WP2012-35, and move information to another keyword or subentry when necessary.
- A40 Aikawa
Babykina Resolve intra-centre duplication listed in CP-D/751 (= first table of WP2013-17).

- A41 Aikawa
Babykina
Dupont
Otsuka
Pritychenko
Taova Resolve inter-centre duplication listed in CP-D/762 (= second table of WP2013-17).
- A42 Babykina
Dupont Resolve the duplication pairs in entries listed in the item 3a of WP2013-17 and Memo CP-D/797.
- A43 Otsuka Summarize the duplication pairs in entries listed in the item 3b of WP2013-17.
- A44 Mikhaylyukova (Continuing action) Add English translation information of Atomnaya Energiya under the keyword REFERENCE as listed in WP2011-26 (also registered to the EXFOR Feedback System).
- A45 Babykina
Mikhaylyukova
Taova (Continuing action) Add English translation information of Yadernaya Fizika under the keyword REFERENCE as listed in WP2012-24 (also registered to the EXFOR Feedback System).
- A46 Babykina
Dupont
Mikhaylyukova
Otsuka
Pritychenko
Taova
Varlamov Add English translation information of Yadernye Konstanty under the keyword REFERENCE as listed in Tables 1 and 2 of CP-D/777(=WP2013-15, also registered to the EXFOR Feedback System). Also do it for Table 3 as time permits.
- A47 Babykina (Continuing action) Provide a list of English translation information of Russian journals (*e.g.*, Izvestiya Rossiiskoi Akademii Nauk, Seriya Fizicheskaya).
- A48 Dupont (Continuing action) Provide NDS a list of erroneous and suspicious outliers by using the new statistical approach being developed (WP2011-17, WP2013-19) when available.
- A49 Dupont (Continuing action) Provide JANIS–TRANS Checker Log list on every preliminary TRANS-file.
- A50 Soppera (Continuing action) Provide JANIS Import Log created from the EXFOR Master File to Otsuka on a regular basis.
- A51 Otsuka (Continuing action) Assess the JANIS Import Log provided by Soppera as above, and register important errors to the EXFOR Feedback System.
- A52 All (Continuing action) Revise remaining upper case entries and other necessary corrections as time permits (WP2012-20).

- A53 All (Continuing action) According to the list of Entries with `NODATA` one of the following corrections has to be made (see “Guide for EXFOR Compilers”): (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 more than 10 years ago; (e) add `UNOBT` and comment if it is impossible to digitize the data and the article was published more than 10 years ago; (f) try to find numerical data if the article was published less than 10 years ago.
- A54 All Provide feedback on (1) distinction between partial reaction and isomer production proposed in WP2013-25, and (2) the usage of branch codes for activation cross sections (*e.g.*, `IND`, `CUM`, `M+`, `M-`) proposed in WP2013-26 by the end of May 2013.
- A55 Otsuka Make final decision on Action 53.

Software and Dissemination

- A56 Dupont Provide a sample file of quality scores (WP2013-19) to Zerkin.
- A57 Zerkin
Dupont Assess procedure for inclusion of the quality scores mentioned above to regular distribution with the EXFOR Master File.
- A58 NEA DB (Continuing action) Continue development and testing of the JANIS –TRANS Checker in cooperation with NDS and the other centres.
- A59 All (Continuing action) Provide feedback to NDS on the existing ZCHEX version (on bugs as well as desired additions.). Bugs must be reported with sample entries which are checked and not checked properly by ZCHEX.
- A60 Zerkin (Continuing action) Update ZCHEX based on comments from compilers (*e.g.*, WP2011-36) as time permits.
- A61 Zerkin (Continuing action) Continue development of the EXFOR upload web tool.
- A62 Otsuka (Continuing action) Provide EXFOR News for every EXFOR Master File.

- A63 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.
- A64 Zerkin (Continuing action) Continue development of X4+ (interpreted / extended EXFOR format).
- A65 All (Continuing action) Consider to use the X4+ format for author approval, and also send feedback to Zerkin.
- A66 Pikulina
Zerkin (Continuing action) Integrate the X4+ converter code into the EXFOR-Editor.
- A67 Zerkin Assess possibility for creation and distribution of a program package including a standalone platform independent program to generate X4+ from a standalone EXFOR entry.
- A68 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.
- A69 Zerkin
Pritychenko Assess possibility of translation from EXFOR to NSR.
- A70 Zerkin (Continuing Action) Prepare coding of covariance data for all EXFOR Entries having authors' covariances, and offer them to compilers according to Areas for finalizing and submitting to the database.
- A71 Zerkin Distribute a list of data sets where repetition of value is detected in an independent variable.
- A72 JCPRG (Continuing Action) Continue development and testing of GSYS in cooperation with NDS and other centres.
- A73 All (Continuing Action) Provide JCPRG feedback on GSYS.
- A74 Taova Resolve too low relative (%) digitization error evaluated by InpGraph as recommended in INDC(NDS)-0629.
- A75 CNPD (Continuing Action) Continue development and testing of the EXFOR-Editor and InpGraph in cooperation with NDS and other data Centres, taking into account compilers' remarks.
- A76 All (Continuing Action) Provide CNPD feedback on EXFOR-Editor and InpGraph.

LIST OF PROGRESS REPORTS

Number	Title	Presented by
P2013-01	The CDFE 2012/2013 progress report: photonuclear data compilation and evaluation activity	V.V. Varlamov
P2013-02	Progress Report: Nuclear Reaction Data Group at ATOMKI	S. Takács
P2013-03	NEA Data Bank Progress Report 2012-2013	E. Dupont
P2013-04	Activity of CAJAD for the IAEA Meeting: Vienna, Austria 23-25 April 2013	S. Babykina
P2013-05	A brief progress report on EXFOR compilations by Nuclear Data Physics Centre of India	B. Lalremruata
P2013-06	Ukrainian Nuclear Data Centre Progress Report, 2012/13	O. Gritzay
P2013-07	Center of Nuclear Physics Data (CNPD), RFNC-VNIIEF: Technical paper for the NRDC Meeting, Vienna, April 23-25, 2013	S. Taova
P2013-08	IAEA Nuclear Data Section: Progress report for period 2012/13	S.P. Simakov
P2013-09	Japan Nuclear Reaction Data Centre (JCPRG) Progress Report	M. Aikawa
P2013-10	2012/13 Status report of China Nuclear Data Center	Ge Zhigang
P2013-11	CJD progress report: NRDC Technical Meeting (23 - 25 April 2013, Vienna)	M. Mikhaylyukova
P2013-12	Nuclear Data Center (NDC) of Korea Atomic Energy Research Institute (KAERI): Progress report to the IAEA Technical Meeting of Nuclear Reaction Data Centers (NRDC), 23 - 25 April, 2013	S.C. Yang

Note: These progress reports are available online: http://www-nds.iaea.org/nrdc/nrdc_2013/.

LIST OF WORKING PAPERS

Number	Title	From
WP2013-01	Conclusions and action of the 2012 NRDC Meeting	
WP2013-02	New and revised entries / subentries since the 2012 NRDC meeting	V. Semkova
WP2013-03	Some statistics of EXFOR compilation	V. Zerkin
WP2013-04	Scanning of new publications	V. Semkova
WP2013-05	Status of New Articles for EXFOR Compilation (A7)	N. Otsuka
WP2013-06	Corrections of entries in Feedback List (A3)	N. Otsuka
WP2013-07	Statistics of checking the preliminary files	V. Semkova
WP2013-08	Toward More Complete and Accurate Experimental Nuclear Reaction Data Library (EXFOR) - International Collaboration Between Nuclear Reaction Data Centres (NRDC)	N. Otsuka
WP2013-09	Questionnaire on dictionary (A18)	N. Otsuka
WP2013-10	CINDA transmission statistics	V. Zerkin
WP2013-11	Compilation of articles with a priority (A26-A29)	V. Semkova
WP2013-12	Isotope production cross sections in Landolt-Börnstein compilation (A30, CP-D/757)	N. Otsuka
WP2013-13	Monitor reactions and medical isotope production reactions	N. Otsuka
WP2013-14	Corrections requested in the last meeting (A33,A35-A38,A50)	N. Otsuka
WP2013-15	English translation of Yad. Konst. (CP-D/777)	N. Otsuka
WP2013-16	Analysis of JANIS Import Log (A41,42,A43)	N. Otsuka
WP2013-17	Duplication of EXFOR Entries (CP-D/751, CP-D/762)	N. Otsuka
WP2013-18	Recommendation from the 28th and 29th INDC Meetings	S.P. Simakov
WP2013-19	Proposal to introduce a "Quality Score" in EXFOR	E. Dupont
WP2013-20	Probability for emitting N particles: Proposal for new coding (CP-C/406)	O. Schwerer

WP2013-21	Heading for averaged resonance parameter energy range (CP-D/763)	M. Mikhaylyukova
WP2013-22	CRL (correlation) for detection of fission fragments in coincidence (CP-D/748)	N. Otsuka
WP2013-23	Prompt fission cross section (PR,SIG) (CP-D/767)	N. Otsuka
WP2013-24	Resonance parameter for light-nuclei reaction (REACTION SF3) (CP-D/774)	N. Otsuka
WP2013-25	Partial reaction and isomer production (CP-D/781rev, CP-C/417)	N. Otsuka, O. Schwerer
WP2013-26	LEXFOR "Independent and cumulative data" (CP-D/783rev)	N. Otsuka
WP2013-27	Irradiation time for production thick target yield (CP-D/784)	N. Otsuka
WP2013-28	Thick target production yield in charged-particle induced reaction (CP-D/785)	N. Otsuka
WP2013-29	CM on "Benchmarking of Digitization Software" (November 2012)	V. Semkova
WP2013-30	Estimation of digitized data error	M. Mikhaylyukova
WP2013-31	Development of software to input and edit experimental data in EXFOR format	G. Pikulina
WP2013-32	Developments of the EXFOR database: possible new formats	V. Zerkin
WP2013-33	Asian collaboration on nuclear reaction data compilation	M. Aikawa
WP2013-34	Indication in EXFOR database and Web interface the full coincidence of values of independent variables of different data points in one dataset	V. Zerkin
WP2013-35	Extension of EXFOR Formats Manual	V. Zerkin
WP2013-36	Converting EXFOR data to C5M - computational format with correlation matrices	V. Zerkin

Note: These working papers are available online: http://www-nds.iaea.org/nrdc/nrdc_2013/ .

LIST OF PRESENTATIONS

TITLE	Presented by
NEA Data Bank Progress Report 2012-2013	E. Dupont
A brief progress report on EXFOR compilations by Nuclear Data Physics Centre of India (NDPCI)	B. Lalremruata
Ukrainian Nuclear Data Centre Progress Report	O. Gritzay
Center of Nuclear Physics Data	S.M. Taova
Activity Report	M. Aikawa
2012/13 Status Report of China Nuclear Data Center	Ge Zhigang
Russian Nuclear Data Center (CJD, IPPE, Obninsk)	M. Mikhaylyukova
Area #1 EXFOR Report 2013	B. Pritychenko
New and revised entries/subentries since the 2012 NRDC meeting	V. Semkova
Scanning of new publications	V. Semkova
Statistics of checking the preliminary files	V. Semkova
Compilation of articles with priority (Action A26-A29)	V. Semkova
EXFOR checking and quality scores	E. Dupont
Development of software package to input and edit experimental data in EXFOR format	G. Pikulina
(no title)	S. Charisopoulos
EXFOR, the nuclear physics perspective	B. Pritychenko
Asian collaboration on nuclear reaction data compilation	M. Aikawa
NRDC 2014 Smolenice castle 6-9 May 2014	S. Hlavač

Note: These presentations are available online: http://www-nds.iaea.org/nrdc/nrdc_2013/ .

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