https://doi.org/10.61092/iaea.bxa3-1435

IAEA
International Atomic Energy Agency

INDC(NDS)-0829
Distr. G+NC

INDC International Nuclear Data Committee

Summary Report of the Technical Meeting on

International Network of Nuclear Reaction Data Centres

(Virtual Event)

4 – 7 May 2021

Prepared by

Naohiko Otuka
IAEA Nuclear Data Section, Vienna, Austria

and

Boris Pritychenko
Brookhaven National Laboratory, Upton, USA

June 2021

IAEA Nuclear Data Section, Vienna International Centre, A-1400 Vienna, Austria

Selected INDC documents may be downloaded in electronic form from
http://nds.iaea.org/publications/
or sent as an e-mail attachment.
Requests for hardcopy or e-mail transmittal should be directed to
nds.contact-point@iaea.org
or to:

Nuclear Data Section
International Atomic Energy Agency
Vienna International Centre
PO Box 100
A-1400 Vienna
Austria

Produced by the IAEA in Austria
June 2021

INDC (NDS)-0829
Distr. G+NC

Summary Report of the Technical Meeting on

International Network of Nuclear Reaction Data Centres

(Virtual Event)

4 – 7 May 2021

Prepared by

Naohiko Otuka
IAEA Nuclear Data Section, Vienna, Austria

and

Boris Pritychenko
Brookhaven National Laboratory, Upton, USA

June 2021

Abstract

This report summarizes the IAEA Technical Meeting on the International Network of Nuclear Reaction Data Centres held as a video meeting from 4 to 7 May 2021. The meeting was attended by 29 participants representing 13 cooperative Centres from eight Member States (China, Hungary, India, Japan, Korea, Russia, Ukraine and USA) and two International Organisations (NEA, IAEA) as well as a participant from Kazakhstan. A summary of the meeting is given in this report along with the conclusions and actions.

Technical Meeting on International Network of Nuclear Reaction Data Centres
4 – 7 May 2021

TABLE OF CONTENTS

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, Boulogne-Billancourt, 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	Charged-Particle Nuclear Reaction 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	Nuclear Data Center, Korea Atomic Energy Research Institute, Daejeon, Republic of Korea
CDFE	Centre for Photonuclear Experiments Data, Moscow State University, Moscow, Russia
CNPD	Centre of Nuclear Physics Data, Institute of Nuclear and Radiation Physics, Russian Federal Nuclear Center –All-Russia Research Institute of Experimental Physics, 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.6), "International Network of Nuclear Reaction Data Centres".

PREVIOUS NRDC MEETINGS

Virtual, 4-7 May 2021	Technical	INDC(NDS)-0829
Vienna, 9-12 April 2019	Technical	INDC(NDS)-0792
Bahadurgarh, 1-4 May 2018	Centre Heads + Technical	INDC(NDS)-0762
Vienna, 23-26 May 2017	Technical	INDC(NDS)-0736
Beijing, 7-10 June 2016	Centre Heads + Technical	INDC(NDS)-0718
Vienna, 21-23 April 2015	Technical	INDC(NDS)-0686
Smolenice, 6-9 May 2014	Centre Heads + Technical	INDC(NDS)-0661
Vienna, 23-25 April 2013	Technical	INDC(NDS)-0633
Paris, 16-19 April 2012	Centre Heads + Technical	INDC(NDS)-0618
Vienna, 23-24 May 2011	Technical	INDC(NDS)-0593
Sapporo, 20-23 April 2010	Centre Heads + Technical	INDC(NDS)-0573
Vienna, 25-26 May 2009	Technical	INDC(NDS)-0558
Obninsk+Moscow 22-25 Sept. 2008	Centre Heads + Technical	INDC(NDS)-0536
Vienna, 8-10 October 2007	Technical	INDC(NDS)-0519
Vienna, 25-28 September 2006	Centre Heads + Technical	INDC(NDS)-0503
Vienna, 12-14 October 2005	Technical	INDC(NDS)-0480
Brookhaven, 4-7 October 2004	Centre Heads + Technical	INDC(NDS)-464
Vienna, 17-19 June 2003	Technical	INDC(NDS)-446
Paris, 27-30 May 2002	Centre Heads + Technical	INDC(NDS)-434
Vienna, 28-30 May 2001	Technical	INDC(NDS)-427
Obninsk, 15-19 May 2000	Centre Heads + Technical	INDC(NDS)-418
Vienna, 18-20 May 1999	Technical	INDC(NDS)-407
Vienna, 11-15 May 1998	Centre Heads + Technical	INDC(NDS)-383
Vienna, 26-28 May 1997	Technical	INDC(NDS)-374
Brookhaven, 3-7 June 1996	Center Heads + Technical	INDC(NDS)-360
Vienna, 2-4 May 1995	Technical	INDC(NDS)-343
Paris, 25-27 April 1994	Center Heads + Technical	INDC(NDS)-308
Vienna, 1-3 Sept 1992	Technical	INDC(NDS)-279
Obninsk, 7-11 Oct 1991	Center Heads + Technical	INDC(NDS)-0262
Vienna, 13-15 Nov 1990	Technical	Memo CP-D/210
Vienna, 2-4 Oct 1989	Centre Heads + Technical	Memo CP-D/200
Vienna, 4-6 Oct 1988	Technical	Memo CP-D/190
Brookhaven, 27-29 Oct 1987	Center Heads + Technical	INDC(NDS)-204
Vienna, 7-9 Oct 1986	Technical	Memo CP-D/159
Saclay, 9-11 Oct 1985	Center Heads + Technical = 8th NRDC Meeting	INDC(NDS)-178
Vienna, 19-21 Sept 1984	Technical	Memo CP-D/131
Obninsk+Moscow, 17-21 Oct 1983	7th NRDC Meeting	INDC(NDS)-154
Vienna, 3-7 May 1982	6th NRDC Meeting	INDC(NDS)-141
Brookhaven, 29.9 - 2.10.1980	5th NRDC Meeting	INDC(NDS)-125
Karlsruhe, 8-13 Oct 1979	4th NRDC Meeting	INDC(NDS)-110
Paris, 19-23 June 1978	3rd NRDC Meeting	INDC(NDS)-99
Kiev, 11-16 April 1977	2nd NRDC Meeting = 3rd CPND + 13th 4-C	INDC(NDS)-90
Vienna, 28-30 April 1976	2nd CPND Meeting	INDC(NDS)-77
Vienna, 26-27 April 1976	12th 4C-Meeting	INDC(NDS)-78
Vienna, 8-12 Sept 1975	CPND Meeting	INDC(NDS)-69+71
Brookhaven, 10-14 March 1975	11th 4C-Meeting	INDC(NDS)-68
Paris, 6-10 May 1974	10th 4C Meeting	INDC(NDS)-58
Vienna, 24-26 April 1974	CPND + PhotoND	INDC(NDS)-59+61
Moscow/Obninsk, 4-8 June 1973	9th 4C Meeting	INDC(NDS)-54
Vienna, 16-20 Oct 1972	8th 4C Meeting	INDC(NDS)-51
Brookhaven, 25-29 Oct 1971	7th 4C Meeting	INDC(NDS)-41
Paris, 5-9 Oct 1970	6th 4C Meeting	INDC(NDS)-28
Moscow, 17-21 Nov 1969	5th 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, *e.g.* for bibliographic references
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
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
IRDFF	International Reactor Dosimetry and Fusion File, maintained by the IAEA-NDS
JAEA	Japan Atomic Energy Agency

JANIS	Java Nuclear Information System of NEA-DB
JCPRG	Nuclear Reaction Data Centre, Hokkaido University, Sapporo, Japan
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
KNDC	Nuclear Data Center, KAERI, Daejeon, Korea
KINR	Kyiv Institute of Nuclear Research
LEXFOR	Part of the EXFOR manual containing physics information for compilers
MBDAV	Management Board for the Development, Application and Validation of Nuclear Data and Codes
NDS	IAEA Nuclear Data Section, Vienna, Austria
NEA	OECD Nuclear Energy Agency, Boulogne-Billancourt, France
NEA-DB	OECD/NEA Data Bank, Boulogne-Billancourt, 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
TALYS	A code system for nuclear reaction model calculations
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
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 as a video meeting from 4 to 7 May 2021. The meeting was attended by 29 participants representing 13 cooperative Centres from eight Member States (China, Hungary, India, Japan, Korea, Russia, Ukraine and USA) and two International Organisations (NEA, IAEA) as well as one participant from Kazakhstan (see **Appendix A**). Meetings of this network are held annually, with full meetings involving Centre Heads and technical staff every two years. (The last full meeting was planned to be held in May 2020 at the IAEA Headquarters, Vienna, Austria, but it was postponed due to COVID-19.)

Main topics of the present meeting were various statistics, manuals and dictionaries, compilation needs, quality control, coding rules as well as software and dissemination (see **Appendix B**). The results of the discussions were summarized in 46 conclusions and 79 actions (see **Appendix C**).

2. Brief Summary

2.1 Opening

A. Koning, Head of the IAEA Nuclear Data Section welcomed the participants. B. Pritychenko was elected as the chairperson, and the agenda was adopted.

2.2 Progress Reports

Progress reports from all 13 attending Centres were presented by **S. Taova**, **V. Varlamov, S. Takács**, **A. Koning**, **M. Mikhailiukova**, **O. Gritzay**, **T. Tada**, **D.H. Kim**, **V. Devi**, **D. Foligno**, **Ge Zhigang, O. Iwamoto** and **A. Sonzogni**, who highlighted the staffing, compilation, dissemination and other nuclear data related activities of interest to the network. See progress reports P2021-01 to P2021-10 (**Appendix D**) for further details.

2.3 EXFOR General

N. Otsuka presented the statistics of transmissions, journal scanning and preliminary tape checking. He reported that 1227 new entries and 2314 revised entries have been newly finalized since the last (2019) NRDC meeting.

N. Otsuka reported that the CNDC, CNPD, NDS, NNDC and UkrNDC are regularly scanning 52 journals. He asked these centres to inform NDS the result of journal scan for every issue even if there is no article for EXFOR compilation.

2.4 Manuals and Dictionaries

B. Pritychenko proposed a new code SFASS (Spontaneous fission assembly) to enable indication of the location of the spontaneous fission experiment under the keyword FACILITY. The participants agreed to introduce a "dummy" facility code for this purpose, and left the choice of the dummy code to O. Schwerer and N. Otsuka. (*Note*: They decided to introduce a new facility code LCEXP with "location of experiment" as its expansion.)

N. Otsuka proposed new rules for the order of particle codes when a parameter code for differentiation is repeated twice (*e.g.*, DA/DA). The participants concluded that (1) a particle combination must appear after the slash (*e.g.*, DA/DA,N/N+FF rather than DA/DA,N+FF/N); (2) the heavier particle must appear after the lighter particle (*e.g.*, DA/DA,N/P rather than DA/DA,P/N). He also proposed a new keyword ANG-SEC (secondary angle), and it was approved.

N. Otsuka proposed compilation of data for electromagnetic fission induced by Coulomb excitation of a heavy-ion projectile as photofission data. **B. Pritychenko** responded it should be treated as charged-particle induced fission data, and the participants concluded the REACTION spell of such data must be discussed further. **S. Taova** reminded that we sometimes compile low-energy charged-particle induced reaction data determined indirectly by Coulomb excitation experiments (*e.g.*, compilation of ^{7}Be(p,γ)^{8}B data derived from a Pb(^{8}B,p+^{7}Be) Coulomb breakup experiment).

2.5 CINDA

V. Zerkin reported that (1) regular automatic updates using the EXFOR and NSR databases have been frozen since December 2018 because NSR database is no longer available; (2) CINDA database maintenance was migrated from Windows to Linux; (3) Import from EXFOR was performed once (2020-08-28) for testing the new maintenance system.

2.6 EXFOR Compilation Needs

B. Pritychenko reported the UC Berkley group published in Nuclear Instruments and Methods in Physics Research A (NIMA) the gamma production cross sections derived from the gamma intensities measured in Baghdad and Moscow. As the UC Berkeley work was published in a peer-reviewed journal, the participants agreed compilation of the derived cross sections in EXFOR as long as it follows the instruction in LEXFOR “Data type”.

Wang Jimin reported that CNDC performed retroactive scanning of articles for EXFOR compilation for the Chinese journals “Atomic Energy Science and Technology” (CST), “Nuclear Physics Review” (CNPR), and its predecessor “Trends in Nuclear Physics” (CTNP).

2.7 EXFOR Quality Control

B. Pritychenko reported that the gold capture cross section revised by the international evaluation of neutron cross section standards (A. Carlson et al.) is 5-7% different from the value adopted as a reference by the Karlsruhe group lead by F. Käppeler, and the revised activation cross sections measured by the group were published as INDC(GER)-0053 for update of the relevant EXFOR entries.

V. Zerkin informed the participants that the NDS EXFOR Web retrieval system is ready to provide access to the entries in preliminary transmission. The participants found that this new function would be useful for detailed comparison of the entry revised in the preliminary tape with the version in EXFOR Master File etc. if the access is restricted to the compilers.

B. Pritychenko suggested NDS and NEA DB investigation of how many duplicates we have in EXFOR and implement check for duplicate tests during preliminary/final transmission checks. The participants concluded that the compilers should check presence of the article (1) before compilation (*e.g.*, by using the NDS “Coding and checking EXFOR Reference-codes”), and also (2) during finalization of the preliminary tape (*e.g.*, by using the NDS “EXFOR Database Update Error Report”).

2.8 EXFOR Coding Rule

S. Dunaeva proposed clarification of the rules on data source indication under STATUS. The participants confirmed that the (1) data source must be indicated under STATUS of each data subentry when the data of the entry are from several sources (*e.g.*, tables, figures), (2) the table or figure number under STATUS must be followed by the reference when there are two or more references under REFERENCE, and it is also recommended to do it even if the entry has only one reference.

N. Otsuka proposed clarification of the radiation type code (DG or AR) and intensity value (γ intensity or γ-γ coincidence (β^+) intensity) for the data determined by detection of the 511 keV annihilation gammas. The participants concluded that the (1) decay data will be always coded with AR, and (2) the γ intensity will be coded, namely the γ-γ coincidence intensity given by authors must be doubled by the compiler.

N. Otsuka suggested clarification of the coding rule of REACTION SF3 for the (1) order of the process code F or X combined with a particle code, and (2) coding of inelastic scattering followed by another process/particle code. The participants concluded that (1) F must not be followed by another code, (2) X must not follow another code, and (3) the particle code must be used instead of INL when inelastic scattering is followed by another process (*e.g.*, N+F rather than INL+F).

2.9 Tools for Compilation and Dissemination

G. Pikulina reported that the new version of the CNPD EXFOR-Editor (ExfData Ver. 4.01) supports the new keyword SUPPL-INF (supplemental information) and preparation of a TRANS tape from a set of EXFOR entries.

V. Zerkin presented recent developments of EXFOR-CINDA-ENDF-IBANDL database retrieval system as well as other online and offline data services emphasizing that the new technologies for data dissemination such as JSON, SQLite and API. He also proposed formulation of the NRDC offline EXFOR distribution policy.

B. Pritychenko reported that DOE suggested development of DOI (digital object identifier) for nuclear data sets, emphasized that DOI assignment to EXFOR would increase the value of the database and proposed the meeting participants to start working on it.

2.10 Other Business

A. Lewis informed that the (1) templates of expected measurement uncertainties will soon be submitted for many neutron-induced observable measurements, and (2) WPEC SG50 is planning to develop a database with a stringent and parsable format that will be able to store "subjective" corrections on EXFOR data.

T. Zholdybayev reported that the Almaty group made the cross sections tabulated in three preprints published by the Institute of Nuclear Physics in Almaty in 1970, 1990 and 1991 computer readable, and accommodated them in existing and new EXFOR entries.

2.11 Closing

N. Otsuka proposed the dates and places for the next full NRDC meeting (Vienna, Austria, 13 to 17 June 2022, 4 or 5 days) and for the next technical NRDC meeting (Vienna, 2nd quarter of 2023), and they were approved.

B. Pritychenko called an adjournment of the meeting, and the participants thanked for his chairmanship under the tight scheduling.

Appendix A

LIST OF PARTICIPANTS

AUSTRIA

Otto **Schwerer**
Gumpendorfer Str. 9/18
1060 Vienna
Tel: +43 1 586 1351
Email: otto.schwerer@aon.at

CHINA, People's Republic of

Zhigang **Ge**
China Nuclear Data Center
China Institute of Atomic Energy
P.O.Box 275-41
Beijing 102413
Tel.: +86 10 69357275
Fax: +36 10 69358119
E-mail: gezg@ciae.ac.cn

CHINA, People's Republic of

Jimin **Wang**
China Nuclear Data Center
China Institute of Atomic Energy
P.O.Box 275-41
Beijing 102413
Tel.: +86 10 69357275
Fax: +36 10 69358119
E-mail: jmwang@ciae.ac.cn

HUNGARY

Sandor **Takacs**
Institute for Nuclear Research
Bem ter 18/c
P.O. Box 51
Debrecen, 4026
Tel.: +36 52 509251
E-mail: stakacs@atomki.hu

INDIA

Vidya **Devi**
Department of Applied Sciences
IET Bhaddal Technical Campus
Bhaddal, PO- Mianpur
Ropar, Punjab
Tel:
Email: vidyathakur@yahoo.co.in

JAPAN

Osamu **Iwamoto**
Japan Atomic Energy Agency (JAEA)
Shirakata 2-4
Naka-gun
319-1195 Tokai-mura
Ibaraki
Tel: +81 29 282 5480
Email: iwamoto.osamu@jaea.go.jp

JAPAN

Masaaki **Kimura**
Department of Physics
Hokkaido University
Kita10-jo Nishi 8-chome
Kita-ku Sapporo-shi
060-0810 Sapporo
Tel: +81 11 706 2689
Email: masaaki@nucl.sci.hokudai.ac.jp

JAPAN

Tetsuaki **Tada**
Department of Physics
Hokkaido University
Kita10-jo Nishi 8-chome
Kita-ku Sapporo-shi
060-0810 Sapporo
Tel: +81 11 706 4487
Email: tada@nucl.sci.hokudai.ac.jp

KAZAKHSTAN, Republic of

Timur **Zholdybayev**
Institute of Nuclear Physics
Ibragimov St. 1
050032 Almaty
Tel: +7 727 3866800
Email: zholdybayev@inp.kz

KOREA, Republic of

Do Heon **Kim**
Nuclear Data Center
Korea Atomic Energy Research Institute
Daedeok-daero 989-111
Yuseong-gu
Daejeon
Tel.: +82 42 868 8651
Fax: +82 42 868 2636
Email: kimdh@kaeri.re.kr

KOREA, Republic of

Sung Chul **Yang**
Nuclear Data Center
Korea Atomic Energy Research Institute
Daedeok-daero 989-111
Yuseong-gu
Daejeon
Tel: +82 42 8684813
Fax: +82 42 8682636
Email: scyang@kaeri.re.kr

RUSSIAN FEDERATION

Svetlana **Dunaeva**
c/o Alexander Dunaev
Proezd Shokalskogo
d.31, korp.1,kv.65
Moscow
Tel:
Email: sv.dunaeva@gmail.com

RUSSIAN FEDERATION

Marina **Mikhailiukova**
Institute for Physics and Power Engineering
Ploshad Bondarenko 1
249033 Obninsk
Tel: +7 48439 98986
Fax: + 7 48439 68225
Email: mmarina@ippe.ru

RUSSIAN FEDERATION

Galina **Pikulina**
Russia Federal Nuclear Center
All Russia Scientific Research
Institute of Experimental Physics
607188, Sarov
Nizhnii Novgorod Region
Tel.: +7 83130 28986
Fax: +7 83130 27800
E-mail: pikulina@expd.vniief.ru

RUSSIAN FEDERATION

Svetlana **Selyankina**
Russia Federal Nuclear Center
All Russia Scientific Research
Institute of Experimental Physics
607188, Sarov
Nizhnii Novgorod Region
Tel.: +7 83130 28986
Fax: +7 83130 27800
E-mail: selyankina@expd.vniief.ru

RUSSIAN FEDERATION

Sophiya **Taova**
Russian Federal Nuclear Center
All Russia Scientific Research Institute
of Experimental Physics
607188, Sarov
Nizhnii Novgorod Region
Tel.: +7 83130 28986
Fax: +7 83130 27800
E-mail: taova@expd.vniief.ru

RUSSIAN FEDERATION

Vladimir **Varlamov**
Skobeltsyn Institute of Nuclear Physics
Lomonosov Moscow State University
GSP-1, Leninskie Gory
119234 Moscow
Tel.: +7 495 939 3483
Fax: +7 495 939 0896
E-mail: varlamov@depni.sinp.msu.ru

SLOVAKIA

Stanislav **Hlavac**
Department of Nuclear Physics
Institute of Physics SAS
Dubravska cesta 9
84511 Bratislava 45
Tel.: +421 2 59410535
E-mail: hlavac@savba.sk

UKRAINE

Olena **Gritzay**
Ukrainian **Nuclear** Data Center
Institute for Nuclear Research
Prospekt Nauky 47
03680 Kyiv
Tel.: +380 44 525 3987
Fax: +380 44 525 4463
Email: ogritzay@ukr.net

USA

Amanda **Lewis**
Naval Nuclear Laboratory
Knolls Atomic Power Laboratory
P.O. Box 1072
2401 River Road
12309 Niskayuna, NY
Tel:
Email: lewisa8@rpi.edu

USA

Denise **Neudecker**
T2, MS B283
Los Alamos National Laboratory
Los Alamos, NM
Tel: + 1 505 665 3354
Email: dneudecker@lanl.gov

USA

Boris **Pritychenko**
National Nuclear Data Center
Brookhaven National Laboratory
P.O. Box 5000
Upton, NY
Tel: + 1 631-344-5091
Email: pritychenko@bnl.gov

USA

Alejandro **Sonzogni**
Brookhaven National Laboratory
P.O. Box 5000
Upton, NY
Tel: + 1 631 344 5334
Fax: +1 631 344 2806
Email: sonzogni@bnl.gov

OECD

Michael **Fleming**
OECD Nuclear Energy Agency Data Bank
46 quai Alphonse le Gallo
92100 Boulogne-Billancourt
Tel.: +33 1 73 21 28 22
Fax.:
Email: michael.fleming@oecd-nea.org

OECD

Daniela **Foligno**
OECD Nuclear Energy Agency Data Bank
46 quai Alphonse le Gallo
92100 Boulogne-Billancourt
Tel.: +33 1 73 21 28 32
Fax.:
Email: daniela.foligno@oecd-nea.org

OECD

Nicolas **Soppera**
OECD Nuclear Energy Agency Data Bank
46 quai Alphonse le Gallo
92100 Boulogne-Billancourt
Tel.: +33 1 73 21 28 87
Fax.:
Email: nicolas.soppera@oecd.org

IAEA

Arjan **Koning**
Nuclear Data Section
Division of Physical and Chemical Sciences
Tel.: +43 1 2600 21709
Fax: +43 1 2600 7 21709
E-mail: a.koning.@iaea.org

IAEA

Naohiko **Otsuka** (Scientific Secretary)
Nuclear Data Section
Division of Physical and Chemical Sciences
Tel.: +43 1 2600 21715
Fax: +43 1 2600 7 21715
E-mail: n.otsuka@iaea.org

IAEA

Viktor **Zerkin**
Nuclear Data Section
Division of Physical and Chemical Sciences
Tel.: +43 1 2600 21714
Fax: +43 1 2600 7 21714
E-mail: v.zerkin@iaea.org

Appendix B

AGENDA

Tuesday, 4 May 2021

12:00 – 15:00 (CET)

1.	**Opening Items**			
1.1	Welcome address	10 min		A. Koning
1.2	Announcement	5 min		C. Monfero
1.3	Election of chairperson, adoption of the agenda, announcements	5 min		N. Otsuka
2.	**Progress Reports**			
2.1	CNPD (Sarov, Russia)	10 min	P2021-01	S. Taova
2.2	CDFE ((Moscow, Russia)	10 min	P2021-02	V. Varlamov
2.3	ATOMKI (Debrecen, Hungary)	10 min	P2021-03	S. Takács
2.4	NDS (Vienna, Austria)	10 min	P2021-04	A. Koning
2.5	CJD (Obninsk, Russia)	10 min	P2021-05	M. Mikhailiukova
2.6	UkrNDC (Kyiv, Ukraine)	10 min	P2021-06	O. Gritzay
2.7	JCPRG (Sapporo, Japan)	10 min	P2021-07	T.Tada
2.8	KNDC (Daejeon, Korea)	10 min	P2021-08	D.H. Kim
2.9	NDPCI (Mumbai, India)	10 min	P2021-09	V. Devi
2.10	NEA DB (Paris, France)	10 min	P2021-10	D. Foligno
2.11	CNDC (Beijing, China)	10 min		Ge Zhigang
2.12	JAEA (Tokai, Japan)	10 min		O. Iwamoto
2.13	NNDC (Upton, USA)	10 min		A Sonzogni
3.	**EXFOR Statistics and Coverage**			
3.1	Transmission statistics since the last NRDC meeting	10 min	WP2021-02	N. Otsuka
3.2	Status of new article compilation (A1)	10 min	WP2021-03	N. Otsuka
3.3	Time interval between submission of preliminary and final tapes	10 min	WP2021-04	N. Otsuka

180 min

Wednesday, 5 May 2021

12:00 – 15:00 (CET)

3.	**EXFOR Statistics and Coverage (Cont)**			
3.4	New publications scanned by NRDC	10 min	WP2021-05	N. Otsuka
3.5	Progress in correction of items on Feedback List (A2)	10 min	WP2021-06	N. Otsuka
3.6	Extensions in EXFOR Compilation Web pages statistics	10 min		V. Zerkin
3.7	Other actions (A3)	5 min	WP2021-01	Chairperson
4	**Manuals and Dictionaries**			
4.1	Usage of particle code EC - electron capture (CP-D/0989, A10)	10 min	WP2021-07	N. Otsuka
4.2	Revisions of EXFOR Formats Manual (CP-D/1011)	10 min	WP2021-08	N. Soppera
4.3	Spontaneous fission assembly (SFASS) code (CP-C/0476, CP-D/1013)	20 min	WP2021-09	B. Pritychenko N. Otsuka
4.4	Combination of particle codes and their order in REACTION SF7 (CP-D/1014)	30 min	WP2021-10	N. Otsuka
4.5	AMP – Scattering amplitude or length? (4C-3/0416)	10 min	WP2021-11	N. Otsuka
4.6	Presence of keyword ANALYSIS when REACTION SF9=DERIV (CP-D/0982)	5 min	WP2021-12	N. Otsuka
4.7	Fission product yield measured by Coulomb excitation of heavy-ion beam (CP-D/0996)	10 min	WP2021-13	N. Otsuka
4.8	Revision of LEXFOR “Scattering” (partial scattering) (CP-D/1002)	5 min	WP2021-14	N. Otsuka
4.9	LEXFOR “Fitting Coefficients” – LEG/RS0 and LEG/RSD (CP-D/1007)	5 min	WP2021-15	N. Otsuka
4.10	Using for a bound dineutron in REACTION SF3=n2	20 min	WP2021-16	O.Gritzay
4.11	Other actions (A4-A9, A11)	10 min	WP2021-01	Chairperson

170 min

Thursday, 6 May 2021

12:00 – 15:00 (CET)

5	**CINDA**			
5.1	Status of CINDA database (A12)	10 min	WP2021-17	V. Zerkin
5.2	Other actions (A13)	5 min	WP2021-01	Chairperson
6	**EXFOR Compilation Needs**			
6.1	Compilation of articles with priority (A14-A15, A17, A21-A24)	10 min	WP2021-18	N. Otsuka
6.2	Compilation of articles from completeness checking (A16, A18-A20, A27-A29)	10 min	WP2021-19	N. Otsuka
6.3	Progress in compilation of fission product yields (A25-A26)	5 min	WP2021-20	N. Otsuka
6.4	Compilation of Baghdad Atlas data (CP-C/0489, 4C-3/0418)	10 min	WP2021-21	B, Pritychenko, N. Otsuka
6.5	Retroactive scanning of articles published in CST, CTNP and CNPR (CP-S/0005, CP-S/0006)	10 min	WP2021-22	Jimin Wang
6.6	Other actions (A30, A31-A35)	10 min	WP2021-01	Chairperson
7.	**EXFOR Quality Control**			
7.1	Pending corrections (A36-A45)	5 min	WP2021-23	N. Otsuka
7.2	Correction of capture data from the ORELA 40 m flight station (4C-3/0407 Rev., A49)	5 min	WP2021-24	N. Otsuka
7.3	Review of REACTION codes for thick target radioisotope yields (CP-D/0990, A50-A51)	10 min	WP2021-25	S. Takács
7.4	Partial elastic scattering? - REACTION SF3=EL and SF5=*PAR* (CP-D/0991)	5 min	WP2021-26	N. Otsuka
7.5	Present status of Karlsruhe cross sections (CP-C/472)	10 min	WP2021-27	B. Pritychenko
7.6	Access to PRELIM data via EXFOR Web retrieval system	10 min		V. Zerkin
7.7	Other actions (A46-A48, A52-A54)	10 min		Chairperson
8.	**EXFOR Coding Rule**			
8.1	Isomeric flag of Nb-102, Tc-102, Rh-108, Sb-128, Sb-132 (CP-D/1009)	10 min	WP2021-28	N. Otsuka
8.2	Low energy neutron cross section per hydrogen atom (4C-3/0415Rev.)	10 min	WP2021-29	N. Otsuka

8.3	Reaction products that are unstable against prompt particle decay - Proposal for new branch code ISP (CP-D/0646, CP-D/0995)	10 min	WP2021-30	N. Otsuka
8.4	Data set with several variable nuclei (CP-D/984, CP-D1012)	10 min	WP2021-31	N. Otsuka
		180 min		

Appendix C

CONCLUSIONS AND ACTIONS

Conclusions

General

C1 The next full NRDC meeting will be held in Vienna, Austria between 13 and 17 June 2022 (4 or 5 days).

C2 The next technical NRDC meeting will be held in Vienna, Austria in the 2nd quarter of 2023.

C3 The next EXFOR compilation workshop will be held in Vienna, Austria in the 4th quarter of 2022.

EXFOR Statistics and Coverage

C4 The Network finalized 1227 new entries after the NRDC 2019 meeting (448 new entries between NRDC 2018 and 2019 meetings, and 521 new entries between NRDC 2017 and 2018 meetings).

C5 The participants reviewed a revised NRDC Protocol Appendix B in WP021-05. CNPD will continue scan of PAN in addition to BAS.

C6 The centres should inform NDS the result of journal scan for every issue even if there is no article for EXFOR compilation.

C7 Exclusion of a problematic entry from the final tape is a good solution to avoid delay in finalization of the other entries transmitted in the same preliminary tape.

Manuals and Dictionary

C8 The particle code EC (electron capture) will be used when
(1) detection of electron capture activity is mentioned by the author without further specification of the radiation type (e.g., X-ray, Auger electron), or
(2) the electron capture branching ratio is assumed by the author to determine the quantity measured.
(See also CP-D/989 = WP2021-07).

C9 Revisions of EXFOR Formats Manual in page 6.2 “Nuclide and compound symbol other than an elemental symbol”, page 7.11 “Trailing comma in code field of ERR-ANALYS” and page 7.2 “Presence of keywords” (CP-D/1011=WP2021-08) were approved. (Addendum: Two revisions were added to the memo and distributed as Memo CP-D/1011(Rev.) on 10 May 2021 without a comment from centres.)

C10 A dummy facility code LCEXP (Location of experiment) will be added in Dictionary 18 (Facility). This code will be used to provide credit the facility hosting institution only when (1) the location of the experiment is coded in the Institute Field of FACILITY, (2) two or more codes are under INSTITUTE, and (3) no other facility code applies. The compilers are also reminded that there may still be cases where the keyword FACILITY need (should?) not to be used at all (e.g., with SF9=CALC, CRCTD, DEROT, EVAL).

C11 When the REACTION SF6 indicates differentiation by the same parameter twice,
(1) a particle combination must appear after the slash (e.g., DA/DA,N/N+FF rather than DA/DA,N+FF/N);
(2) the heavier particle must appear after the lighter particle (e.g., DA/DA,N/P rather than DA/DA,P/N)
as proposed in CP-D/1014=WP2021-10.

C12 Revisions of EXFOR Formats Manual Chapter 6 “REACTION specification” and LEXFOR “Differential data” (CP-D/1014=WP2021-10) were approved. N.B. “lightest” is understood as “lowest Z, then the lowest A”.

C13 Addition of the new information identifier ANG-SEC (secondary angle) and its description in the EXFOR Formats Manual proposed in CP-D/1014=WP2021-10 were approved.

C14 The code AMP (parameter and new CINDA code) and L (reaction type and web quantity) will be expanded to “scattering length”. The scattering amplitude will be compiled with ,AMP,,MSC as proposed in 4C-3/416=WP2021-11.

C15 Revisions of LEXFOR “Data type” and EXFOR Formats Manual Chapter 7 “ANALYSIS” proposed in CP-D/982=WP2021-12 were approved.

C16 REACTION spelling for the quantities measured by Coulomb excitation require further discussion.

C17 Addition to LEXFOR “Scattering” (partial scattering) proposed in CP-D/1002=WP2021-14 was approved.

C18 The upper limit of the level energy of the reaction product for partial scattering can be coded only when the upper limit is mentioned by the author.

C19 Revision of the LEXFOR “Fitting coefficients” (LEG/RS0 and LEG/RSD) proposed in CP-D/1007=WP2021-15 was approved.

C20 An addition of particle code (e.g., N2) or nuclide code (e.g., 0-NN-2) is not done for compilation of the experimental works introduced in WP2021-16.

C21 A new heading E-EXC-C-ER (Error in excitation energy of initial compound nucleus) proposed in CP-D/991=WP2021-26 was approved.

C22 The name of the subfield for the observed radiation per decay will be renamed from “Abundance” to “Intensity”. (See also CP-D/1005=WP2021-33).

C23 Addition to LEXFOR “Decay data” proposed in CP-D/1005=WP2021-33 was approved.

EXFOR Compilation Needs

C24 The gamma spectra measured in Baghdad and Moscow and published in “Baghdad Atlas” (GAMMAATLAS) will be kept in area 3 and 4 entries. NNDC may compile the gamma production cross sections derived from the measured gamma spectra by UC Berkley for area 1 as the “data derived by other than the author” following the instruction in LEXFOR “Data type”. The derivation is documented in A.M.Hurst et al., Nucl. Instrum. Meth. Phys. Res. A995(2021)165095. See also CP-C/0489 and 4C-3/0418 (=WP2021-21).

C25 Retroactive scanning was done by CNDC for the articles published in CST (Vol.1. No.1 to Vol. 54 No.8), CTNP (Vol. 1 No.1 to Vol.13 No.4) and CNPR (Vol.14 No.1 to Vol.37 No.2) as summarized in Memo CP-S/005=WP2021-22.

C26 All volumes of three Chinese journals (CST, CNPR and CTNP) were scanned by CNDC. All EXFOR related articles from this literature survey are summarized in CP-S/005 an 006 (=WP2021-22) and also added in the Article Allocation List.

C27 Institute of Nuclear Physics (Almaty) made the cross sections tabulated in three preprints published by the institute in 1970, 1990 and 1991 computer readable. Digitized data in seven area F entries were replaced with the tabulated data, and five area D entries were created from the tabulated data.

EXFOR Quality Control

C28 The thick target yields compiled in EXFOR A0092.009 will be deleted (See also CP-D/0990=WP2021-25).

C29 The data heading E-EXC-C-ER (Error in excitation energy of initial compound nucleus) proposed in Memo CP-D/991=WP2021-26 was approved.

C30 The activation cross sections measured by the Karlsruhe renormalized with a new gold standard cross section are published as INDC(GER)-053 and the relevant EXFOR entries must be updated. See also CP-C/472=WP2021-27.

C31 Inclusion of preliminary entries (i.e., entries in preliminary tapes) in databases would be useful (*e.g.*, for detailed comparison of the entry revised in the preliminary tape with the version in EXFOR Master File). The access to the preliminary entries must be restricted (*e.g.*, by password protection).

C32 The subentry coded with STATUS=UNOBT may be deleted if the dataset is not suitable for digitization or optical character recognition (OCR) data recovery, and the source article was published before 2000.

C33 Compilers should check presence of the article (1) before compilation (e.g., by using the NDS "Coding and checking EXFOR Reference-codes"), and also (2) during finalization of the preliminary tape (e.g., by using the NDS "EXFOR Database Update Error Report").

EXFOR Coding Rule

C34 The isomeric flags of ^{102}Nb, ^{102}Tc, ^{108}Rh, ^{128}Sb and ^{132}Sb proposed in CP-D/1009(Rev.)=WP2021-28 (taken from ENSDF/NUBASE) were approved.

C35 The cross section of hydrogen in hydride molecule will be compiled with ,SIG,,HYD. A new modifier HYD (hydrogen part of the quantity) was approved. See also 4C-3/415 (Rev.)=WP2021-29.

C36 Addition to LEXFOR "Thermal-neutron scattering" proposed in 4C-3/415 (Rev.)=WP2021-29 was approved.

C37 Revision of LEXFOR by addition of the "General rule for compilation of reaction products" and "Reaction products that are unstable against prompt particle decay" in CP-D/646=WP2021-30 was approved. N.B. "unstable intermediate nucleus" is understood as a nucleus unstable against decay by emission of a light nuclide (e.g., n, p, d, t, h).

C38 Revisions of LEXFOR "Fission yields" and "Reaction product" proposed in CP-D/984=WP2021-31 were approved.

C39 Compilers should provide the source information under keyword STATUS. This must be done in the data subentries when the data in the entry are not from the same table or figure. This conclusion does not require retransmission of existing entries due to deviation from these rules. See also CP-D/1010 and CP-C/0490 (=WP2021-32).

C40 Data source must be indicated under STATUS of each data subentry (not in the common subentry) when the data of the entry are from several sources (e.g., tables, figures).

C41 The table or figure number under STATUS must be followed by the reference (e.g., "J. Nucl. Phys. 12(2021)345") when there are two or more references under REFERENCE. Addition of reference is also recommended for an entry having a single reference. However, retransmission due to absence of the reference is not requested. The table/figure number and reference will be in free text.

C42 The detection of 511 keV annihilation gamma-rays will be always coded with the particle code AR. If authors report the gamma-gamma coincidence intensity (i.e., β^+ intensity), the intensity value multiplied by two will be coded with mentioning it in free text. See also CP-D/1005=WP2021-33.

C43 (1) A process * followed by fission will be coded by *+F in REACTION SF3 without SEQ in REACTION SF5. (2) A process * following inelastic scattering will be coded by the code of the inelastically scattered particle rather than INL (e.g., N+F instead of INL+F). (3) The process code X will appear in the form of X+* and not *+X. See also Memo CP-D/993 (Rev.)=WP2021-34.

Tools for Compilation and Dissemination

C44 The new version of CNPD EXFOR-Editor (ExfData Ver. 4.01) supports the new keyword SUPPL-INF (supplemental information) and preparation of a TRANS tape from a set of EXFOR entries. See also WP2021-35.

C45 The participants were reminded that the NRDC expressed its desire in the NRDC 1996 meeting that products "repackaging" data originally compiled by network accurately reflect the data taken from network sources and that those sources receive proper credit and reference as to version and date of the database from which the information was extracted (c.f. INDC(NDS)-360 p.14).

Other Business

C46 The participants were informed by the WPEC SG50 coordinators and monitor that (1) templates of expected measurement uncertainties will soon be submitted for many neutron-induced observable measurements, and (2) WPEC SG50 is planning to develop a database with a stringent and parsable format that will be able to store "subjective" corrections on EXFOR data.

Actions

EXFOR Statistics and Coverage

A1	All	(Standing action) Give the highest priority to compilation of new articles.
A2	All	(Standing action) Correct erroneous entries listed on the EXFOR Feedback List according to the indicated priorities. All urgent corrections must be done by the next meeting.
A3	Otsuka	(Continuing action) Send transmission statistics and correction statistics to centres every four months.

Manuals and Dictionaries

A4	Otsuka	(Continuing action) Update Dictionaries every six months.
A5	Otsuka	(Continuing action) Revise the EXFOR Formats Manual for (1) "DECAY-DATA" and "RAD-DET" (CP-D/874=WP2016-28), (2) "Reaction specification" (CP-D/880 Rev.=WP2016-29, CP-D/896=WP2016-33, CP-N/143=WP2018-12, CP-D/1014=WP2021-10, CP-D/993(Rev.)=WP2021-34), (3) "LEVEL-PROP" (CP-D/882=WP2016-30), (4) "ERR-ANALYS" (CP-D/894 Rev.=WP2016-32, CP-D/1011=WP2021-08), (5) "FACILITY" (CP-D/899=WP2016-34), (6) "REFERENCE" (CP-C/452=WP2017-08, CP-D/920=WP2017-33, CP-D/953Rev=WP2018-08, NRDC2018 Conclusion 4), (7) "STATUS" (CP-D/915=WP2017-09), (8) "INC-SPECT" (CP-D/932=WP2017-31), (9) BIB Section (CP-D/942=WP2018-09), (10) "SAMPLE" (CP-D/964=WP2019-08), (11) "REACTION" and "SUPPL-INF" (CP-D/965 Rev.=WP2019-21). (12) "DECAY-DATA", "PART-DET" and "RAD-DET" (CP-C/393=WP2019-27), (13) "Coding of nuclides and compounds" (CP-D/1011=WP2021-08), (14) "Presence of keyword" (CP-D/1011=WP2021-08). (15) "ANG-SEC" (CP-D/1014=WP2021-10), (16) "ANALYSIS" (CP-D/982=WP2021-12).

A6	Otsuka	(Continuing action) Revise LEXFOR for (1) "Thermal Neutron Scattering" (4C-3/403 =WP2016-08, 4C-3/415(Rev.)=WP2021-29), (2) “Fission Yields” (CP-D/895=WP2016-09, CP-D/974=WP2019-33, CP-D/984=WP2021-31), (3) “Thick- and thin-target yields” (CP-D/893=WP2016-31), (4) “Isomeric flags” (CP-D/896=WP2016-33), (5) “Status” (CP-D/904=WP2016-35, CP-C/443=WP2016-36), (6) “Sample” (CP-D/928=WP2017-35), (7) “Multilevel Resonance Parameters” (CP-D/953Rev=WP2018-08), (8) “Reference” (CP-D/953Rev=WP2018-08), (9) “Thermonuclear reaction rate” (CP-D/956=WP2018-11), (10) “Sums” (CP-D/964=WP2019-08), (11) “Polarization” (CP-D/970=WP2019-09), (12) “Kerma factor” (4C-4/219=WP2019-10), (13) “Institute” (CP-D/976=WP2019-11), (14) “Supplemental information” (CP-D/965 Rev.=WP2019-21). (15) “Decay data” and “Outgoing particles” (CP-C/393=WP2019-27), (16) “Independent and Cumulative data” (CP-D/977 Rev.=WP2019-29 Rev.), (17) “Data type” and “Delayed fission neutrons” (4C-3/414 Rev.=WP2019-30 but removing SF5=IND, CP-D/982=WP2021-12), (18) “Status” (CP-D/973=WP2019-32), (19) “Ratios” (CP-D/974=WP2019-33), (20) “Differential data” (CP-C/1014=WP2021-10), (21) “Scattering” (CP-D/1002=WP2021-14), (22) “Fitting coefficients” (CP-D/1007=WP2021-15), (23) ““Light-Nuclei Reactions (Z ≤6)” (CP-D/646=WP2021-30), (24) “Reaction product” (CP-D/984=WP2021-31), (25) “Fission” (CP-D/993(Rev.)=WP2021-34), (26) “Outgoing particles” (CP-D/993(Rev.)=WP2021-34).
A7	Zerkin	(Continuing action) Summarize the role of family flags (also known as family codes, c.f. EXFOR Formats Manual Chapter 6) in ZCHEX (c.f. WP2017-11).
A8	Otsuka	(Continuing action) Propose a revised NRDC Protocol Appendix B “Scanning responsibility” for elimination of journals assigned to a centre but also scanned by NDS (c.f. WP2021-05).
A9	Zerkin Otsuka	(Continuing action) Propose a numbering scheme for compound codes defined in Dictionary 209.
A10	Otsuka	Add the usage of the particle code EC (electron capture) in Dictionary 33 according to Conclusion 8.

A11	Otsuka	Update Dictionaries 2 and 236 as proposed in CP-D/1014=WP2021-10 (Combination of particle codes and their order in REACTION SF7)..
A12	Otsuka	Update Dictionaries 32, 45, 113, 213 and 236 as proposed in 4C-3/416=WP2021-11. (scattering length).
A13	Otsuka	Update Dictionary 34 and 236 as proposed in 4C-3/415 (Rev.)=WP2021-29 (cross section of hydrogen in hydride molecule).

CINDA

A14	Zerkin	(Continuing action) Export EXFOR to CINDA, and distribute it to other Centres every month.
A15	Zerkin Sublet	Keep NRDC informed about the situation about import of NSR to CINDA.

EXFOR Compilation Needs

(Underlined items are registered in the Article Allocation List.)

A16	Pritychenko	(Continuing action) Compile with priority W.G. Alberts+,R,NUREG/CP-0029,433,1982 (neutron dosimetry cross sections) listed in the second table of CP-D/838.
A17	Pritychenko	(Continuing action) Compile the thermal neutron-induced reaction data cited in Mughabghab's "Atlas of Neutron Resonances" and listed in 4C-3/395.
A18	Foligno	(Continuing action) Compile G.N.Kim+,C,2002BRUSS,,613,2002 in 4C-3/400=WP2016-16.
A19	Pritychenko	(Continuing action) Compile F. Bischoff,R,RPI-328-87,146,1966 (thermal neutron scattering data) listed in 4C-3/404= WP2016-19.
A20	Pritychenko	(Continuing action) Compile P.L.Reeder+,J,PR/C,15,2108,1977 (Pn values adopted in Rudstam's review) listed in 4C-3/410=WP2018-20.
A21	Pritychenko	(Continuing action) Compile with priority R.G.Lanier+,R,UCAR-10062-89,71,1989 (proton-induced isotope production cross sections)—listed in CP-D/725 Rev. (~WP2012-19). Notify Okumura if the assigned centre does not compile the high energy (E > 1 GeV) data in the list.

A22	Pritychenko	(Continuing action) Compile with priority T.Mo+,J,NP/A,198,153,1972 (ion beam analysis application) listed in CP-D/832 Rev.
A23	Pritychenko Tada Taova	(Continuing action) Compile with priority the light charged-particle induced isotope production cross sections listed in CP-D/757. Notify Okumura if the assigned centre does not compile the high energy (E > 1 GeV) data in the list.
A24	Pritychenko Tada	(Continuing action) Compile with priority the neutron source spectra listed in CP-D/700 (Rev.3).
A25	Foligno Gritzay Okumura Pritychenko Tada Varlamov	(Continuing action) Compile articles reporting experimental fission product yields and listed in CP-C/464, 465 and 466. Inform Okumura if an article in the lists is not for EXFOR compilation. Transmit EXFOR entries relevant to these lists (and WP2019-20) separately from other EXFOR entries.
A26	Foligno Mikhailiukova Okumura Pritychenko	(Continuing action) Compile articles reporting experimental fission product yields and listed in WP2019-20. Inform Okumura if an article in the list is not for EXFOR compilation. New and revised EXFOR entries relevant to these lists must be transmitted separately from other EXFOR entries. Transmit EXFOR entries relevant to this list (and CP-C/464, 465 and 466) separately from other EXFOR entries.
A27	Pritychenko	(Continuing action) Compile deuteron-induced reaction data compiled by the Frascati group and listed in CP-D/758.
A28	Gritzay	(Continuing action) Compile B.A.Nemashkalo+,C,88BAKU,,593, 1988 published in the “Nuclear Spectroscopy and Structure” (Nucleus) conference proceedings and listed in CP-D/881 with J,SNP,55,69,1992.
A29	Zholdybayev	(Continuing action) Compile A.D.Duisebaev+,J,JEL,19,280,1974 listed in CP-D/952.
A30	Gritzay	(Continuing action) Compile data measured with filtered neutrons measured at the KINR research reactor with numerical neutron spectra.
A31	Pritychenko	(Continuing action) Monitor availability of P.E. Koehler’s time-of-flight spectra on DVDs received from ORELA in 2015 for EXFOR compilation.

A32 Pritychenko (Continuing action) Perform EXFOR completeness checking for the list of articles (4C-3/401, articles cited in S. Mughabghab's "Atlas of Neutron Resonances") to identify articles missing in EXFOR, and assign responsibility of compilation of the identified articles to centres by a memo.

A33 Zholdybayev (Continuing action) Scan domestic publications (*e.g.*, journals, laboratory reports) to identify articles for EXFOR compilation.

EXFOR Quality Control
(Underlined items are registered in the EXFOR Feedback List.)

A34 Pritychenko (Continuing action) Replace J,PR/C,65,014004,2001 with J,PR/C,65,014004,2002 in 13782.001 (Memo CP-N/148=WP2019-25).

A35 Pritychenko (Continuing action) Replace REACTION SF3=A with EL in C0753.002 (CP-D/960=WP2019-31).

A36 Okumura (Continuing action) Revise EXFOR entries having STATUS=NCHKD listed in CP-D/973=WP2019-32.

A37 Foligno (Continuing action) Consider addition of numerical data which are not superseded (SPSDD) and suitable for digitization, but still unobtainable (UNOBT) for neutron-induced reaction data published in old literature for ^{1}H, ^{16}O, ^{56}Fe, ^{235}U, ^{238}U and ^{239}Pu.

A38 Foligno (Continuing action) Provide a report on mistakes in bibliographies and spells on each preliminary tape.

A39 Pritychenko (Continuing action) Revise EXFOR entries compiling data sets from ORELA 40 m flight station listed in the Appendix of 4C-3/407=WP2017-30 by addition of

1) the corrigendum under REFERENCE of the common subentry,
2) STATUS=OUTDT to each data subentry with the correction factor in free text.

A40 Taova Delete A0092.009. (Thick target yields without a clear definition.)

A41 Soppera (Continuing action) Provide JANIS Import Log created from the EXFOR Master File to Otsuka on a regular basis.

A42 Otsuka (Continuing action) Assess the JANIS Import Log provided by Soppera as above, and register important errors to the EXFOR Feedback System.

A43	Okumura	(Continuing action) Check if the usage of REACTION SF5=CUM/M- and (CUM)/M- in the EXFOR Master is consistent with CP-D/977 Rev.=WP2019-29 Rev.
A44	Okumura Pritychenko	Revise DECAY-DATA and DECAY-MON records including EC (electron capture) listed in CP-D/0989=WP2021-07.
A45	Foligno Okumura Pritychenko Tada Taova Wang	Revise REACTION SF3 and SF7 listed in Appendices 1, 2 and 3 of CP-D/1014=WP2021-10 (Combination of particle codes and their order in REACTION SF7).
A46	Foligno Mikhailiukova Pritychenko Taova Varlamov	Revise REACTION SF8 listed in Memo CP-D/1007=WP2021-15 (LEXFOR "Fitting Coefficients").
A47	Okumura Pritychenko	Revise REACTION code etc listed in Memo CP-D/991=WP2021-26 (Partial elastic scattering?)
A48	Foligno Pritychenko	Revise entries compiling activation cross sections from Karlsruhe based on INDC(GER)-0053. Use REACTION SF8=SPA with KT-DUMMY=25 keV for quasi-Maxwellian spectrum averaged cross section. See also CP-C/472=WP2021-27.
A49	Foligno Okumura Pritychenko Tada	Revise entries involving isomers of Nb-102, Tc-102, Rh-108, Sb-128 and Sb-132 according to Appendix of Memo CP-D/1009 (Rev.)=WP2021-28.
A50	Foligno Mikhailiukova Pritychenko	Revise entries involving several variable atomic and/or mass numbers listed in CP-D/0984 in WP2021-31.
A51	Foligno Mikhailiukova Pritychenko	Revise entries having repetition of ELEMENT and/or MASS listed in CP-D/1012 in WP2021-31.
A52	Foligno Okumura Pritychenko	Revise entries relevant to 511 keV gamma emission listed in CP-D/1005=WP2021-33.
A53	Foligno Okumura Pritychenko Varlamov Wang	Revise REACTION codes listed in CP-D/0993(Rev.)=WP2021-34 (Combination of process and other codes in REACTION SF3).

Tools for Compilation and Dissemination

A54	Fleming	(Continuing action) Make available on the NEA Data Bank web site the EANDC and NEANDC reports compiled in EXFOR and not available as INDC reports.
A55	Pikulina	(Continuing action) Continue development and testing of the EXFOR-Editor and InpGraph in cooperation with NDS and other data Centres.
A56	All	(Continuing action) Provide Pikulina feedback on EXFOR-Editor and InpGraph.
A57	Kimura	(Continuing action) Continue development and testing of GSYS in cooperation with NDS and other centres.
A58	All	(Continuing action) Provide Kimura feedback on GSYS.
A59	Soppera	(Continuing action) Continue development and testing of the JANIS TRANS Checker in cooperation with NDS and the other centres.
A60	All	(Continuing action) Provide Soppera feedback on JANIS TRANS Checker.
A61	Bhattacharyya	(Continuing action) Keep centres informed about the progress in development of the EXFOR-I editor.
A62	Nayak	(Continuing action) Monitor progress in development of the EXFOR-I editor.
A63	Otsuka	(Continuing action) Provide EXFOR News every month and consider updates to the IAEA NDS website.
A64	Otsuka	(Continuing action) Support update of the Japanese editor (HENDEL) as time permits.
A65	Zerkin	(Continuing action) Update ZCHEX based on comments from compilers.
A66	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.
A67	Zerkin	(Continuing action) Develop and distribute the program package including a standalone platform independent program to generate X4+ from a standalone EXFOR entry.

A68	All	(Continuing action) Consider to use the X4+ format for author approval, and also send feedback to Zerkin.
A69	Zerkin	(Continuing action) Continue development of the EXFOR upload web tool.
A70	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.
A71	Zerkin	(Continuing action) Continue development of the additional database encompassing correction factors and relevant comments for suspect/erroneous data (X4-evaluated) presented in WP2010-19; keep NRDC informed about results, impact and usage statistics of the database.
A72	Zerkin Pritychenko	(Continuing action) Continue translation from EXFOR to NSR.
A73	Jin Kimura Pikulina Zerkin	(Continuing action) Study problems in 2D calibration of original pictures, and process of approval of results of digitizing using plotting facilities.
A74	Fleming Okumura Pritychenko	(Continuing action) Finalize and submit EXFOR entries including covariance data provided by Zerkin (WP2017-Z3).
A75	Pritychenko	(Standing action) Provide NSR database to Zerkin with the name aliases to improve the search of EXFOR entries by the author name (WP2014-53).
A76	All	Preparing for NRDC-2022 discussion about policy (methods/formats) of off-line dissemination of EXFOR data by NRDC members to external users' communities and conditions/requirements for further re-distribution (Zerkin's presentation-3).
A77	All	Investigate possibility for opening public Web access to lab reports of the institutes of EXFOR-Area responsibility.
A78	Zerkin	Submit a memo explaining how to use EXFOR Database Update Error Report and other tools to avoid duplication.
A79	Pritychenko Zerkin Otsuka	Investigate assignment of Digital Object Identifiers (DOI) for EXFOR data sets using DataCite and one of EXFOR formats. Start a pilot project and produce several DOI for EXFOR data sets. Report results at the next NRDC meeting in 2022.

Appendix D

LIST OF PROGRESS REPORTS

Number	Title	Presented by
P2021-01	Technical paper for the NRDC Meeting, IAEA, May 4-7, 2021	S. Taova
P2021-02	Progress report on the CDFE photonuclear data compilation and evaluation activities for 2019/2021	V.V. Varlamov
P2021-03	Progress report NRDC-2021 Technical Meeting	S. Takács
P2021-04	IAEA Nuclear Data Section: Progress report for period 2019-2021	A. Koning
P2021-05	Progress report for NRDC2021 Virtual Technical Meeting	M. Mikhailiukova
P2021-06	Ukrainian Nuclear Data Centre: Progress report for period 2019-2021	O. Gritzay
P2021-07	Japan Nuclear Reaction Data Centre (JCPRG) Progress report	T. Tada
P2021-08	Korea Nuclear Data Center (KNDC) Progress report for period 2019-2021	D.H. Kim
P2021-09	NDPCI Progress report: Nuclear data activities in India 2020-2021	V. Devi
P2021-10	Progress Report 2019-2021	D. Foligno

Note: These progress reports are available online: http://nds.iaea.org/nrdc/nrdc_2021/.

Appendix E

LIST OF WORKING PAPERS

Number	Title	Presented by
WP2021-01	Conclusions and action of the 2019 NRDC Meeting	
WP2021-02	Transmission statistics since the last NRDC meeting	N. Otsuka
WP2021-03	Status of new article compilation (A1)	N. Otsuka
WP2021-04	Time interval between submission of preliminary and final tapes	N. Otsuka
WP2021-05	New publications scanned by NRDC	N. Otsuka
WP2021-06	Progress in correction of items on Feedback List (A2)	N. Otsuka
WP2021-07	Usage of particle code EC - electron capture (CP-D/0989, A10)	N. Otsuka
WP2021-08	Revisions of EXFOR Formats Manual (CP-D/1011)	N. Soppera
WP2021-09	Spontaneous fission assembly (SFASS) code (CP-C/0476, CP-D/1013)	B. Pritychenko
WP2021-10	Combination of particle codes and their order in REACTION SF7 (CP-D/1014)	N. Otsuka
WP2021-11	AMP - Scattering amplitude or scattering length? (4C-3/0416)	N. Otsuka
WP2021-12	Presence of keyword ANALYSIS when REACTION SF9=DERIV (CP-D/0982)	N. Otsuka
WP2021-13	Fission product yield measured by Coulomb excitation of heavy-ion beam (CP-D/0996)	N. Otsuka
WP2021-14	Revision of LEXFOR "Scattering" (partial scattering) (CP-D/1002)	N. Otsuka
WP2021-15	LEXFOR "Fitting Coefficients" - LEG/RS0 and LEG/RSD (CP-D/1007)	N. Otsuka
WP2021-16	Using for a bound dineutron in REACTION SF3=n2	O. Gritzay
WP2021-17	Status of CINDA database (A12)	V. Zerkin
WP2021-18	Compilation of articles with priority (A14-A15,A17,A21-A24)	N. Otsuka
WP2021-19	Compilation of articles from completeness checking (A16,A18-A20,A27-A29)	N. Otsuka
WP2021-20	Progress in compilation of fission product yields (A25-A26)	N. Otsuka

WP2021-21	Compilation of Baghdad Atlas data (CP-C/0489,4C-3/0418)	B. Pritychenko, N. Otsuka
WP2021-22	Retroactive scanning of articles published in CST, CTNP and CNPR (CP-S/0005, CP-S/0006)	Jimin Wang
WP2021-23	Pending corrections (A36-A45)	N. Otsuka
WP2021-24	Correction of capture data from the ORELA 40 m flight station (4C-3/0407rev., A49)	N. Otsuka
WP2021-25	Review of REACTION codes for thick target radioisotope yields (CP-D/0990, A50-A51)	S. Takacs
WP2021-26	Partial elastic scattering? - REACTION SF3=EL and SF5=*PAR* (CP-D/0991)	N. Otsuka
WP2021-27	Present status of Karlsruhe cross sections (CP-C/0472)	B. Pritychenko
WP2021-28	Isomeric flag of Nb-102, Tc-102, Rh-108, Sb-128, Sb-132 (CP-D/1009rev)	N. Otsuka
WP2021-29	Low energy neutron cross section per hydrogen atom (4C-3/0415rev)	N. Otsuka
WP2021-30	Reaction products that are unstable against prompt particle decay, Proposal for new branch code ISP (CP-D/0646, CP-D/0995)	N. Otsuka
WP2021-31	Data set with several variable nuclei (CP-D/0984 CP-D/1012)	N. Otsuka
WP2021-32	Data source indication under STATUS (CP-D/1010,CP-C/0490)	S. Dunaeva, O. Schwerer
WP2021-33	DECAY-DATA: Coding of 511 keV annihilation decay data (CP-D/1005)	N. Otsuka
WP2021-34	Combination of process and other codes in REACTION SF3 (CP-D/0993rev)	N. Otsuka
WP2021-35	Development of service software package for experimental nuclear data	G. Pikulina
WP2021-36	Compilation of experimental nuclear reaction data measured in Central Asia region	T. Zholdybayev

Note: These working papers are available online: http://nds.iaea.org/nrdc/nrdc_2021/.

Appendix F

LIST OF PRESENTATIONS

TITLE	Presented by
Center of Nuclear Physics Data	S. Taova
Progress report on the CDFE photonuclear data compilation and evaluation activity for 2019/2021	V. Varlamov
Report of Nuclear Data Section	A. Koning
Progress Report Virtual Technical Meeting NRDC2021 4-7 May 2021 held by NDS, IAEA	M. Mikhailiukova
Ukrainian Nuclear Data Centre:Progress Report for period 2019-2021	O. Gritzay
JCPRG Progress Report 2019-2021	T. Tada
Korea Nuclear Data Center Progress Report for 2019-2021	D.H. Kim
Progress Report Nuclear Data Centre of INDIA from 2020-2021	V. Devi
NEA Data Bank Progress Report 2019-2021	D. Foligno
2019/20 Status Report of China Nuclear Data Center	Ge Zhigang
Progress Report of Nuclear Data Center of Japan Atomic Energy Agency for FY 2018-2020	O. Iwamoto
National Nuclear Data Center Report	A. Sonzogni
News in EXFOR statistics for compilers	V. Zerkin
Revisions of EXFOR Formats Manual	N. Soppera
NRDC Memo CP-C/476: Spontaneous Fission Assembly (SFASS) Code, Update of Dictionary 18	B. Pritychenko
Retroactive scanning of articles published in CST, CTNP and CNPR	Wang Jimin
NRDC Memo CP-C/472: Present status of Karlsruhe cross sections	B. Pritychenko
Access to PRELIM data via EXFOR Web retrieval system	V. Zerkin
News in EXFOR-ENDF-PDF databases and tools	V. Zerkin
Digital Object Identifier (DOI) in EXFOR	B. Pritychenko

Compilation of experimental nuclear reaction data measured in Central Asia region	T. Zholdybayev
Measurement uncertainty templates and WPEC SG50	A. Lewis
An EXFOR compilation web tool (http://www.jcprg.org/exfor/tool/)	N. Otsuka

Note: These presentations are available online: http://nds.iaea.org/nrdc/nrdc_2021/.

Nuclear Data Section
International Atomic Energy Agency
Vienna International Centre, P.O. Box 100
A-1400 Vienna
Austria

e-mail: nds.contact-point@iaea.org
fax: (43-1) 26007
telephone: (43-1) 2600-21710
Web: http://nds.iaea.org/