Conclusions and Actions of the NRDC 2023 Meeting

Conclusions

General

C1 The next technical NRDC meeting will be held in Vienna, Austria from 14 to 17 May 2024.

C2 The next full NRDC meeting will be held in Paris, France in the second quarter of 2025.

C3 The next EXFOR compilation workshop will be held in Vienna, Austria in the fourth quarter of 2024.

C4 The NRDC supports reviewing and updating the Network Document (INDC(NDS)-0401).

EXFOR General

C5 The NRDC supports releasing the EXFOR Master Files, Dictionaries and their documentation as Open Data, with Document Object Identifiers (DOI) and an acceptable open data license (CC-BY-4.0 or similar). Each released Master File would then require its own DOI and internet landing page. This distribution should be made retroactively ca. 2015 onward and should not include NRDC working materials such as preliminary and final trans tapes, and backup files.

C6 The NDS open and backup areas require authentication and must be accessible to the NRDC participants only.

C7 The preliminary tape will not be deleted but kept on the NDS open area even after its finalization.

C8 The NRDC supports releasing all EXFOR codes and their documentation as Open Source necessary to support the use of EXFOR data (especially the EXFOR Master Files) by the broader community.

C9 Regarding staff changes in NDS, NRDC recommends sharing EXFOR software source codes and their documentation developed by Zerkin between NRDC centres.

C10 The basic compilation responsibility (Appendix C of NRDC Protocol) of JAEA will be compilation of the neutron data measured at JAEA or measured in Japan in cooperation with JAEA Nuclear Data Center. They will be compiled in area 2 and submitted through NEA DB.

EXFOR Statistics and Coverage

C11 The Network finalized 351 new entries since the NRDC 2022 meeting (11 months).

C12 The originating centre should (1) update the N2 field of TRANS (date of transmission) just before submission to the NDS open area, and (2) announce release of a new final tape without delay.

Manuals and Dictionary

C13 The revised NRDC Protocol Appendix B (Scanning responsibility) proposed in CP-D/1078 = WP2023-07 was approved.

C14 The revised LEXFOR "Scattering" proposed in 4C-3/0421 = WP2023-08 was approved.

C15 The new format of Dictionary 227 (Nuclides) proposed in CP-D/1067 = WP2023-09 was approved.

C16 Addition and deletion of the institute codes proposed in CP-D/1080 = WP2023-10 was approved.

C17 Revised EXFOR/CINDA Dictionary Manual proposed in CP-D/1081 = WP2023-11 was approved.

C18 The reference type code K (abstract of journal) should not be used since it may introduce inconsistency with the entries which data were compiled from journal abstracts with the reference type code J.

EXFOR Quality Control

C19 The keyword ERR-ANALYS must be present with coded information when error fields associated to the dependent variable (e.g., DATA-ERR, ERR-S, ERR-1) are given. Otherwise, presence is optional as proposed in CP-D/1082 = WP2023-22.

EXFOR Coding Rule

C20 The revised EXFOR Formats Manual and LEXFOR for the keyword STATUS proposed in CP-D/1053 and CP-D/1055 (Rev.) = WP2023-23 were approved. Use of the reference code field is optional.

C21 The headings ERR-HL and ERR-IDD may be used only when they are propagated to the total uncertainty (ERR-T) and their propagated partial %-uncertainties are not available for coding under ERR-1 etc. as proposed in CP-D/1038 = WP2023-24.

C22 Use of the multiple reaction formalism is not limited to the quantities having the same independent variables. The vector common formalism is no longer necessary, and it will be abolished. The cumulative and chain fission product yields may be compiled together in the same subentry by using the formalism as proposed in CP-D/1056 = WP2023-25. The use of the multiple reaction formalism is limited to the cases listed in LEXFOR "Multiple Reaction Formalism".

C23 The coding rules of REACTION SF4-SF7 for the cascade gammas not following quasi-metastable state production (,PAR/L-,DA,G) and for the cascade gammas following quasi-metastable state production (-L,PAR,DA,DG) proposed in CP-D/1057 (Rev.) = WP2023-26 were approved.

C24 Use of fixed decimal point numbers other than integers under the heading FLAG and DECAY-FLAG proposed in CP-D/1069 = WP2023-27 was not approved.

C25 The data type field (SF9) is always omitted under the keyword MONITOR and ASSUMED as proposed in CP-D/1071 = WP2023-28.

C26 Cross sections for reactions induced by secondary particles are not for compilation as proposed in CP-D/1072 = WP2023-29.

C27 Revision of LEXFOR "Activation" (restriction for use of the method code ACTIV) proposed in CP-D/1076 = WP2023-30 was approved.

C28 Legendre coefficients of 0th order and higher orders must be compiled together as a single dataset as proposed in 4C-4/0233 (Rev.) = WP2023-31.

Tools for Compilation and Dissemination

C29 NRDC supports proposal of Zerkin to distribute X4Pro database with X5 as a product of NRDC recommended for users' community. Implementing must include sharing NDS source code and documentation producing X4Pro within NRDC.

C30 NRDC recommends continuing the functioning of Web EXFOR-CINDA-ENDF-IBANDL Retrieval system including MyExfor on NDS and Mirror sites. Standalone version of this system would be also useful.

C31 NRDC recommends continuing maintenance and extension of EXFOR-NSR PDF database at NDS.

C32 NRDC encourages development of other software systems which interact with the EXFOR data.

Actions

General

A1	Centre Heads	Send to Otsuka revised description of the centre in the Network Document (INDC(NDS)-0401) by end of 2023.

EXFOR General

A2	Marian	Follow-up on the effort of the IAEA to mint DOIs. When this becomes available at the IAEA, facilitate the set-up of a procedure to obtain DOIs for the EXFOR Master versions, in line with the IAEA workflows
A3	Marian	Follow up with the IAEA Legal department the NRDC's decision of releasing all the NRDC products under the CC-BY-4.0 license.
A4	Koning	Inform centre heads of final license proposed by the IAEA for distribution of files.

EXFOR Statistics and Coverage

A5	All	(Standing action) Give the highest priority to compilation of new articles.
A6	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.

Manuals and Dictionaries

A7	Otsuka	(Continuing action) Update Dictionaries every six months.
A8	Zerkin Otsuka	(Continuing action) Propose a numbering scheme for compound codes defined in Dictionary 209.
A9	Otsuka	Revise NRDC Protocol Appendix B according to CP-D/1078 = WP2023-07 and Appendix C according to Conclusion 10 (neutron data by JAEA).
A10	Otsuka	Revise EXFOR Formats Manual for 1) CP-D/1053 = WP2023-23 (STATUS) 2) CP-D/1056 = WP2023-25 (Multiple reaction formalism) 3) CP-D/1069 = WP2023-27 (DECAY-DATA and FLAG) 4) CP-D/1071 = WP2023-28 (ASSUMED and MONITOR)

A11	Otsuka	Revise LEXFOR for 1) 4C-3/0421 = WP2023-08 (Scattering) 2) 4C-4/0233 = WP2023-31 (Fitting coefficients) 3) CP-D/1038 = WP2023-24 (Error) 4) CP-D/1055(Rev.) = WP2023-23 (Status) 5) CP-D/1072 = WP2023-29 (Production and emission cross sections) 6) CP-D/1076 = WP2023-30 (Activation)
A12	Otsuka	Revise EXFOR/CINDA Dictionary Manual according to 1) CP-D/1067 = WP2023-09 (Dictionary 227) 2) CP-D/1081 = WP2023-11 (full review)
A13	Otsuka	Revise Dictionary 3 according to CP-D/1080 = WP2023-10.
A14	Otsuka	Delete the code K (abstract of journal) in Dictionary 4 (reference type).
A15	Otsuka	Add the codes L- and PAR/L-,DA,G to Dictionary 31 (branches) and 236 (quantities), respectively.
A16	Devi	Summarize the coding suggested in CP-D/1073 = WP2023-26 for LEXFOR "Partial reactions".

CINDA

A17	Zerkin	(Continuing action) Export EXFOR to CINDA, and distribute it to other Centres.
A18	NNDC	Create meta schema for bibliographic data encompassing CINDA, EXFOR, NSR, Atlas and ENSDF. Report to NRDC for next actions.

EXFOR Compilation Needs

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

A19	Foligno Pritychenko	Compile with priority the articles listed in WP2023-16 to respond to the requests from EXFOR users.
A20	Pritychenko	(Continuing action) Compile with priority the neutron source spectra listed in CP-D/0700 (Rev.3).
A21	Pritychenko	(Continuing action) Compile with priority R.G.Lanier+,R,UCAR-10062-89,71,1989 listed in CP-D/0725 Rev. (~WP2012-19).
A22	Pritychenko Nomura Taova	(Continuing action) Compile with priority the light charged-particle induced isotope production cross sections listed in CP-D/0757 = WP2013-12.

A23	Pritychenko	(Continuing action) Compile with priority T.Mo+,J,NP/A,198,153,1972 listed in CP-D/0832 Rev.
A24	Pritychenko	(Continuing action) Compile with priority W.G. Alberts+,R,NUREG/CP-0029,433,1982 in CP-D/0838 = WP2014-21.
A25	Pritychenko	(Continuing action) Compile the thermal neutron-induced reaction data cited in Mughabghab's "Atlas of Neutron Resonances" and listed in 4C-3/0395 = WP2014-19.
A26	Pritychenko	(Continuing action) Compile F. Bischoff,R,RPI-328-87,146,1966 listed in 4C-3/0404 = WP2016-19.
A27	Pritychenko	(Continuing action) Compile P.L.Reeder+,J,PR/C,15,2108,1977 listed in 4C-3/0410 = WP2018-20.
A28	Pritychenko	(Continuing action) Compile deuteron-induced reaction data compiled by the Frascati group and listed in CP-D/0758.
A29	Foligno Pritychenko Nomura Varlamov	(Continuing action) Compile articles reporting experimental fission product yields and listed in CP-C/464, 465, 466 and CP-D/0979. Inform Devi if an article in the lists is not for EXFOR compilation. Transmit EXFOR entries relevant to these lists separately from other EXFOR entries.
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 Brown	(Continuing action) Perform EXFOR completeness checking for the list of articles (4C-3/0401, 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.

EXFOR Quality Control

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

A33	Pritychenko Nomura Taova	Resolve the duplications listed in WP2023-18.
A34	Pritychenko	Revise the datasets of neutron elastic scattering including inelastic scattering contribution as proposed in 4C-3/0420(Rev2).

A35	Pritychenko	(Continuing action) Replace REACTION SF3=A with EL in C0753.002 (CP-D/0960 = WP2019-31).
A36	Pritychenko	(Continuing action) Revise entries involving several variable atomic and/or mass numbers listed in CP-D/0984 in WP2021-31.
A37	Pritychenko	(Continuing action) Revise DECAY-DATA and DECAY-MON records including EC (electron capture) listed in CP-D/0989 = WP2021-07.
A38	Pritychenko	(Continuing action) Replace EL and INL in REACTION SF3 of 12373.008 with SCT (Memo CP-D/0991 = WP2021-26).
A39	Pritychenko	(Continuing action) Revise entries relevant to 511 keV gamma emission listed in CP-D/1005 = WP2021-33.
A40	Nomura	(Continuing action) 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.
A41	Pritychenko Nomura	(Continuing action) 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).
A42	Pritychenko	(Continuing action) Replace X with an appropriate code or code combination REACTION SF3 of entries listed in CP-D/1017 = WP2022-24.
A43	Nomura	(Continuing action) Replace the extra heading DATA with an appropriate one as listed in CP-D/1027 = WP2022-28.
A44	Nomura	(Continuing action) Replace ‚INT„BRA with ‚INT„BRS in K2191.007-010 as listed in CP-D/1037 = WP2022-16.
A45	Pritychenko	(Continuing action) Replace TABLE with SCSRS or update the free text unless the numerical data are published in source articles as listed in CP-D/1041 = WP2022-27.
A46	Pritychenko Nomura	(Continuing action) Revise entries relevant to assessment of suspicious E-LVL values as listed in CP-D/1043 = WP2022-26.
A47	Devi Pritychenko Nomura Taova Varlamov	Correct the isomeric flags in REACTION and DECAY-DATA listed in CP-D/1052Rev. = WP2023-19.

A48	Devi Foligno Pritychenko Nomura Taova Varlamov	Resolve with priority the repetition of data headings listed in CP-D/1070 = WP2023-20.
A49	Foligno Mikhailiukova Pritychenko	Replace NO-DIM with the correct unit for the absolute eta values listed in CP-D/1082(Rev.) = WP2023-22.
A50	Foligno Pritychenko	(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.
A51	Foligno	(Continuing action) Provide a report on mistakes in bibliographies and spells on each preliminary tape.
A52	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.
A53	Soppera	(Continuing action) Provide JANIS Import Log created from the EXFOR Master File to Otsuka on a regular basis.
A54	Otsuka	(Continuing action) Assess the JANIS Import Log provided by Soppera as above and register important errors to the EXFOR Feedback System.
A55	Otsuka	(Continuing action) Review the neutron quasi-elastic scattering cross sections for natural target nuclides and total scattering cross sections similar to the review summarized in Memo 4C-3/0420=WP2022-29.

EXFOR Coding Rule

A56	Takács Otsuka	(Continuing action) Check presence of the cross sections compiled as total (=ground state plus metastable state) independent production cross sections but deviation of the measured values from the actual total cross sections may be non-negligible.
A57	Varlamov Otsuka	(Continuing action) Review the usage of (G,TOT), (G,ABS), (G,SCT) and (G,N) for the cross sections declared as “absorption cross sections” or “total cross sections” by the authors.

A58	Zerkin	Provide a list of subentries coded with the Vector Common Formalism.
A59	Otsuka Pritychenko	Propose how to keep the $^{209}Bi(p,x)^{211}At$ cross sections in EXFOR listed in CP-D/1072=WP2023-29.

Tools for Compilation and Dissemination

A60	Foligno	(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.
A61	Pikulina	(Continuing action) Continue development and testing of the EXFOR-Editor and InpGraph in cooperation with NDS and other data Centres.
A62	All	(Continuing action) Provide Pikulina feedback on EXFOR-Editor and InpGraph.
A63	Suzuki	(Continuing action) Continue development and testing of GSYS in cooperation with NDS and other centres.
A64	All	(Continuing action) Provide Suzuki feedback on GSYS.
A65	Soppera	(Continuing action) Continue development and testing of the JANIS TRANS Checker in cooperation with NDS and the other centres.
A66	All	(Continuing action) Provide Soppera feedback on JANIS TRANS Checker.
A67	Otsuka	(Continuing action) Provide EXFOR News every month and consider updates to the IAEA NDS website.
A68	Otsuka	(Continuing action) Support update of the Japanese editor (HENDEL) as time permits.
A69	Zerkin	(Continuing action) Update ZCHEX based on comments from compilers.
A70	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.
A71	Zerkin	(Continuing action) Develop and distribute the program package including a standalone platform independent program to generate X4+ from a standalone EXFOR entry.

A72	All	(Continuing action) Consider using the X4+ format for author approval, and also send feedback to Zerkin.
A73	Zerkin	(Continuing action) Continue development of the EXFOR upload web tool MyExfor. Prepare standalone version of Web EXFOR CINDA-ENDF-IBANDL retrieval system with MyExfor working without Internet (c.f. Conclusion 30)
A74	Zerkin	(Continuing action) Produce: (a) EXFOR Master File with Dictionary-236 and X4Map after every database update, and (b) Dictionaries in MS Access after every Dictionaries update (see also A4).
A75	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.
A76	Zerkin	To start public distribution of X4Pro database and package.
A77	Zerkin Pritychenko	(Continuing action) Continue joint development of the EXFOR and NSR databases.
A78	Jin Suzuki Pikulina Zerkin	(Continuing action) Study problems in 2D calibration of original pictures, and process of approval of results of digitizing using plotting facilities.
A79	Foligno Pritychenko	(Continuing action) Finalize and submit EXFOR entries including covariance data provided by Zerkin (WP2017-Z3).
A80	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).
A81	Pritychenko Zerkin Otsuka	(Continuing action) 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.
A82	Zerkin Pritychenko	(Continuing action) Collaborate with the IAEA INIS Unit for technical matching of the pdf databases maintained by NDS and the Unit.
A83	Zerkin Mikhailiukova	(Continuing action) Arrange a letter to IPPE for opening public access from the NDS web retrieval system to IPPE reports.

A84	Zerkin	(Continuing action) Prepare a manual describing the EXFOR database related tools available on the NDS web site.
A85	Pritychenko	(Continuing action) To investigate NNDC library for missing private communication relevant to EXFOR compilation.
A86	Zerkin Vrapcenjak	Maintain and extend (as needed) the EXFOR-NSR PDF database.
A87	Vrapcenjak	(Continuing action) Collect articles coded under REFERNECE of newly submitted preliminary tapes but missing in the NDS article collection.
A88	All	(Continuing action) Collaborate with Vrapcenjak for collection of articles coded under REFERENCE of newly submitted preliminary tapes but missing in the NDS article collection.
A89	All	Analyze X5 structure/hierarchy and contents, contact Zerkin with questions and proposals.
A90	Zerkin	Take into account proposals on structure of X4Pro and X4+1(=X5).
A91	Otsuka Zerkin	Prepare distribution EXFOR-Master File and Dictionaries (from 2005 onward). Prepare and distribute among NRDC members a software generating next Master File using previous Master File and TRANS file providing possibility for every NRDC Data Centre to maintain and reproduce Master File locally.
A92	Otsuka	Prepare EXFOR Master landing page(s). Landing page should include data license, corresponding EXFOR Dictionaries and links to documentation.
A93	Zerkin	Prepare software package producing Dictionaries in MS-Access used in EXFOR Editor for Sarov group
A94	Zerkin, Pikulina Taova	Setup software package (A93) in Sarov and start producing Dictionaries in MS-Access used in EXFOR Editor
A95	Marian Otsuka Zerkin	Implement authentication of the NDS open and backup areas and provide access to the NDS participants.