**Nuclear Data Section**

**International Atomic Energy Agency**

**P.O.Box 100, A-1400 Vienna, Austria**

**Memo CP-D/978**

**Date:** 26 April 2019

**To:** Distribution

**From:** N. Otsuka

**Subject: NRDC2019 - Conclusions and Actions**

Drafts of Conclusions and Actions of the 2019 NRDC meeting are appended to this memo. Please give your comments by the end of May if any.

The following major changes were introduced as per comments from participants:

* **C11**: The following conclusion was added:

“NRDC recognizes regular extension of CINDA database by information imported from NSR database provided by NNDC (thanks to B. Pritychenko) as very useful and important for NRDC community especially for search of data missing in EXFOR. NRDC kindly asks NNDC to continue supplying NSR database to NDS for regular CINDA extension.”

* **C17**: The following conclusion (agreed in the meeting) was added:

“Redundant information should be included only when there is a good reason specific to the entry. Furthermore, the length of a BIB section should not be increased when neither additional information nor a better explanation is offered - this makes the entry less user friendly. (c.f. CP-C/393=WP2019-27)”

* **A54**: The following action to Okumura was added:

“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.”

* **A79**: The following action to Zerkin and Sublet was added:

“Exclude evaluated, calculated and recommended data in the default setting of the NDS EXFOR web retrieval search system.”

Some names were deleted/added from/to the following actions:

* **A12**: Pritychenko added. (“Export EXFOR and NSR to CINDA, and distribute it to other Centres every month.”)
* **A41**: Fleming, Tada, Taova and Varlamov deleted. (“Revise illegal REACTION codes (SF2=SF3) listed in CP-D/960=WP2019-31.”)
* **A44**: Fleming deleted. (“Replace the report code with conference code in EXFOR 13224~~, 20371, 20787 and 23251~~ (CP-D/968=WP2019-34)”.

Addition of fission product yield articles to the Article Allocation List (**A25** and **A26**) will be done very soon.

**Conclusions and Actions of the NRDC 2019 Meeting**

**(Draft Ver. 2019-04-23)**

**Conclusions**

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| **General** |
| C1 | The next full NRDC meeting will be held in Vienna, Austria between 18 and 22 May 2020 (4 or 5 days) N.B. 1 July 2020 is the 50th Anniversary of the first EXFOR exchange). |
| C2 | The next technical NRDC meeting will be held in Vienna, Austria in the 2nd quarter of 2021. |
| C3 | The next EXFOR compilation workshop will be held in Vienna, Austria in the 4th quarter of 2020. |
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| **EXFOR Statistics and Coverage** |
| C4 | NNDC will scan each issue of IMP/E, and provide the results to NDS. |
| **Manuals and Dictionary** |
| C5 | Revision of EXFOR Formats Manual “SAMPLE” and LEXFOR “Sums” (CP-D/964 =WP2019-08) was approved after replacing “412 keV gamma” with “412 keV prompt gamma”. |
| C6 | Revision of LEXFOR “Polarization” (CP-D/970=WP2019-09) was approved. |
| C7 | Addition of LEXFOR “Kerma factors” (4C-4/219=WP2019=10) was approved. |
| C8 | Revision of LEXFOR “Institute” (CP-D/976=WP2019-11) was approved after the elimination of the sentence “The sequence of the institutes should be the same as in the primary reference.”. |
| C9 | Two new dictionaries (Dictionaries 114 and 115) are ready for testing by retrieval systems. |
| C10 | New codes (TER,FY,,RES; CI/ASECMEV; ISP,SIG; ,DA,,RS/TMP) proposed by NEA Data Bank (CP-N/146, 147 and 149) were approved. |
| **CINDA** |
| C11 | NRDC recognizes regular extension of CINDA database by information imported from NSR database provided by NNDC (thanks to B. Pritychenko) as very useful and important for NRDC community especially for search of data missing in EXFOR. NRDC kindly asks NNDC to continue supplying NSR database to NDS for regular CINDA extension. |
| **EXFOR Compilation Needs** |
| C12 | Completeness of fission product yields in EXFOR was checked by two independent methods – (1) checking of EXFOR against NSR (CP-C/464, 465 and 466=WP2019-19), and (2) checking of EXFOR against citation lists of evaluation summary by Mills for UKFY and England & Rider for ENDF (WP2019-20). |
| C13 | New keyword SUPPL-INF (supplemental information) and relevant update of manuals (EXFOR Formats Manual “REACTION” and “SUPPL-INF” as well as LEXFOR “Supplemental information”) were approved. Note that only two keywords SUPPL-INF and HISTORY are allowed in the BIB section providing the supplemental information. |
| C14 | The ENDF library community needs an experimental atomic reaction database for validation purposes. |
| **EXFOR Quality Control** |
| C15 | Volume numbers of VMU (Vestnik Moskovskogo Universiteta – Seriya III, Fizika I Astronomiya) are absent for the issues published in 1948 to 1969 and 1996 to the present. |
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| **EXFOR Coding Rule** |
| C16 | Revisions of the EXFOR Formats Manual and LEXFOR proposed by Memo CP-C/393=WP2019-27 were approved. |
| C17 | Redundant information should be included only when there is a good reason specific to the entry. Furthermore, the length of a BIB section should not be increased when neither additional information nor a better explanation is offered - this makes the entry less user friendly. (c.f. CP-C/393=WP2019-27) |
| C18 | Revision of LEXFOR “Independent and cumulative data” proposed in Memo CP-D/977 Rev. (= WP2019-29 Rev.) was approved. |
| C19 | The branch code IND will be used only when SF6=FY. |
| C20 | Revisions of LEXFOR “Data type” and “Delayed fission neutrons” proposed in Memo 4C-3/414 Rev.=WP2019-30 were approved. |
| C21 | The code coded in REACTION SF2 cannot be repeated in REACTION SF3 (c.f. CP-D/960=WP2019-31). |
| C22 | The expansion of the status code NCHKD will be “authenticity not confirmed”. The code is used only when there is no other status code applicable (e.g., NDD, SCSRS). However, the data tabulated or plotted by other than the experimentalist will not be compiled in the future. Revision of LEXFOR “Status” proposed by Memo CP-D/973=WP2019-32 was approved. |
| C23 | Revision of LEXFOR “Ratios” and “Fractional” as well as dictionary updates proposed in Memo CP-D/974=WP2019-33 were approved. |
| C24 | Conference proceedings published in CEA-CONF, CONF, NBS-SPEC-PUB or STI/PUB report should be coded with the conference code. |
| C25 | EXFOR 41224 will be merged into EXFOR 41202 after deletion of 41224.002 (4C-4/222=WP2019-35). |
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| **Tools for Compilation and Dissemination** |
| C26 | The CNPD EXFOR-Editor has a new function to assemble EXFOR entries to prepare a TRANS tape. |
| C27 | The EXFOR leaflet was edited by CNPD, which has been printed by CNDC and distributed via the NRDC. |
| C28 | Compilers are encouraged to inform the NSR compiler(s) if EXFOR entries are deleted or modified in such a way that affects the NSR database. |
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**Actions**

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| **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 three months. |
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| **Manuals and Dictionaries** |
| A4 | Otsuka | (Continuing action) Update Dictionaries every four months. |
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| A5 | Otsuka | (Continuing action) Revise the EXFOR Formats Manual for1. “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),
3. “LEVEL-PROP” (CP-D/882=WP2016-30),
4. “ERR-ANALYS” (CP-D/894 Rev.=WP2016-32),
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).
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| A6 | Otsuka | (Continuing action) Revise LEXFOR for1. "Thermal Neutron Scattering" (4C-3/403 =WP2016-08),
2. “Fission Yields” (CP-D/895=WP2016-09),
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,
18. “Status” (CP-D/973=WP2019-32),
19. “Ratios” (CP-D/974=WP2019-33),
20. “Fission yields” (CP-D/974=WP2019-33).
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| A7 | ZerkinFleming | (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) and verify their potential use in JANIS. |
| A8 | Otsuka | Propose a revised NRDC Protocol Appendix B “Scanning responsibility” for elimination of journals assigned to a centre but also scanned by NDS (c.f. WP2019-05). |
| A9 | ZerkinOtsuka | Propose a numbering scheme for compound codes defined in Dictionary 209. |
| A10 | Otsuka | Check if we can make the process code EC (electron capture) obsolete. |
| A11 | Otsuka | Update Dictionary 34, 37 and 236 as suggested CP-D/974=WP2019-33. |
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| **CINDA** |
| A12 | ZerkinPritychenko | (Continuing action) Export EXFOR and NSR to CINDA, and distribute it to other Centres every month. |
| A13 | ZerkinSublet | Keep NRDC informed about the situation about import of NSR to CINDA. |
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| **EXFOR Compilation Needs****(**Underlined items are registered inthe Article Allocation List.) |
| A14 | Fleming | (Continuing action) Compile with priority the articles cited in the NACRE II (an update and extension of European Compilation of Reaction Rates for Astrophysics) listed in Tables 1 and 2 of CP-D/833. |
| A15 | Pritychenko | (Continuing action) Compile with priority articles related to the neutron dosimetry cross sections listed in the second table of CP-D/838. |
| A16 | Pritychenko | (Continuing action) Compile the thermal neutron-induced reaction data cited in Mughabghab’s “Atlas of Neutron Resonances” and listed in 4C-3/395. |
| A17 | Pritychenko | (Continuing action) Compile with priority prompt fission neutron multiplicities listed in CP-D/871. |
| A18 | FlemingPritychenko | (Continuing action) Compile articles presented in Reactor Dosimetry Symposia listed in 4C-3/400=WP2016-16. |
| A19 | FlemingPritychenko | (Continuing action) Compile thermal neutron scattering data listed in 4C-3/404= WP2016-19. |
| A20 | Pritychenko | (Continuing action) Compile Pn values adopted in Rudstam’s review (4C-3/410=WP2018-20). |
| A21 | PritychenkoTada | (Continuing action) Compile with priority the 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 | PritychenkoTaova | (Continuing action) Compile with priority the articles related to ion beam analysis application listed in CP-D/832 Rev. |
| A23 | PritychenkoTadaTaova | (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 | PritychenkoTada | (Continuing action) Compile with priority the neutron source spectra listed in CP-D/700 (Rev.3). |
| A25 | DeviFlemingGritzayMikhailiukovaOkumuraPritychenkoTadaVarlamovWang | 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 | FlemingDeviMikhailiukovaWangOkumuraPritychenko | 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 | Compile deuteron-induced reaction data compiled by the Frascati group and listed in CP-D/758. |
| A28 | Gritzay | Compile articles published in the “Nuclear Spectroscopy and Structure” (Nucleus) conference proceedings and listed in CP-D/881. |
| A29 | GritzayOkumuraTaova | Compile articles published in JEL and listed in CP-D/952. |
| A30 | Gritzay | 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) Compile 238U(n,f) cross sections in Table 4.6 of Zchariah W. Miller’s thesis (Univ. of Kentucky, 2015). |
| A33 | FlemingSublet | (Continuing action) Receive the experimental fission product yield data collected by Robert Mills. Identify the numerical data sets missing in EXFOR once they are received. |
| A34 | 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. |
| A35 | 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.) |
| A36 | Varlamov | (Continuing action) Correct reference code for VMU, and add its English translation (MUPB) under REFERENCE in M0293.001 as listed in CP-F/015=WP2018-26. |
| A37 | Mikhailiukova | (Continuing action) Add English translation information of Russian journals (KSF, FCY, ZET, ZTF) under REFERENCE as listed in Memo CP-D/957=WP2018-24. |
| A38 | MikhailiukovaVarlamov | (Continuing action) Correct reference codes including the year of publication in the volume number field listed in Memo 4C-4/216. (N.B. CJD reported progress in correction in Memo 4C-4/218). |
| A39 | FlemingMikhailiukovaPritychenko | Revise REACTION codes coded with SF6=POL and SF8=ASY listed in Memo CP-D/970=WP2019-09. |
| A40 | FlemingPritychenkoVarlamov | Revise reference codes under REFERENCE and listed in Tables 1 and 2 of Memo CP-N/148=WP2019-25. |
| A41 | Pritychenko | Revise illegal REACTION codes (SF2=SF3) listed in CP-D/960=WP2019-31. |
| A42 | Okumura | Revise EXFOR entries having STATUS=NCHKD listed in CP-D/973=WP2019-32. |
| A43 | Mikhailiukova | Check if TABLE can replace NCHKD by checking the source articles for 15 entries listed in CP-D/973=WP2019-32. |
| A44 | Pritychenko | Replace the report code with conference code in EXFOR 13224 (CP-D/968=WP2019-34). |
| A45 | Mikhailiukova | Merge EXFOR 41224 into EXFOR 41202 after deletion of 41224.002 (4C-4/222=WP2019-35). |
| A46 | Fleming | (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 1H, 16O, 56Fe, 235U, 238U and 239Pu. |
| A47 | FlemingOtsuka | (Continuing action) Check the n-p scattering data set in EXFOR 22207.002 (G. Fink) against G. Fink’s thesis (e.g., reference frame – lab or c.m.). |
| A48 | Fleming | (Continuing action) Provide a report on mistakes in bibliographies and spells on each preliminary tape. |
| A49 | OtsukaPritychenko | (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.
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| A50 | Otsuka | (Continuing action) Submit a revised Memo CP-D/933 by addition of the remark to each subentry from Takács. |
| A51 | FlemingOtsukaTadaTaova | (Continuing action) Following A45, revise the REACTION codes of the thick target considering the changes proposed in Appendix of CP-D/933=WP2017-28 once the originating centre receives extraction of Revised Memo CP-D/933 from Otsuka. Revised entries must be assembled in a preliminary tape without including other entries to make trace of corrections at NDS easier. |
| A52 | Soppera | (Continuing action) Provide JANIS Import Log created from the EXFOR Master File to Otsuka on a regular basis. |
| A53 | Otsuka | (Continuing action) Assess the JANIS Import Log provided by Soppera as above, and register important errors to the EXFOR Feedback System. |
| A54 | Okumura | 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. |
| **EXFOR Coding Rule** |
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| **Tools for Compilation and Dissemination** |
| A55 | 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. |
| A56 | Pikulina | (Continuing action) Continue development and testing of the EXFOR-Editor and InpGraph in cooperation with NDS and other data Centres. |
| A57 | All | (Continuing action) Provide Pikulina feedback on EXFOR-Editor and InpGraph. |
| A58 | Kimura | (Continuing action) Continue development and testing of GSYS in cooperation with NDS and other centres. |
| A59 | All | (Continuing action) Provide Kimura feedback on GSYS. |
| A60 | Soppera | (Continuing action) Continue development and testing of the JANIS TRANS Checker in cooperation with NDS and the other centres. |
| A61 | All | (Continuing action) Provide Soppera feedback on JANIS TRANS Checker. |
| A62 | Bhattacharyya | (Continuing action) Keep centres informed about the progress in development of the EXFOR-I editor. |
| A63 | Nayak | (Continuing action) Monitor progress in development of the EXFOR-I editor. |
| A64 | Otsuka | (Continuing action) Provide EXFOR News every month and consider updates to the IAEA NDS website. |
| A65 | Otsuka | (Continuing action) Support update of the Japanese editor (HENDEL) as time permits. |
| A66 | Zerkin | (Continuing action) Update ZCHEX based on comments from compilers. |
| A67 | 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. |
| A68 | Zerkin | (Continuing action) Develop and distribute the program package including a standalone platform independent program to generate X4+ from a standalone EXFOR entry. |
| A69 | All | (Continuing action) Consider to use the X4+ format for author approval, and also send feedback to Zerkin. |
| A70 | Zerkin | (Continuing action) Continue development of the EXFOR upload web tool. |
| A71 | 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. |
| A72 | 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. |
| A73 | MikhailiukovaDunaevaZerkin | (Continuing action) Clarify the requirements for the introduction of flags to indicate articles published in conference proceedings where the data are not available from the authors on the EXFOR Compilation Control System web page. |
| A74 | ZerkinOkumura | (Continuing action) Consider translation of fission yields in EXFOR to a C4-like format in consultation with experts in the field. |
| A75 | ZerkinPritychenko | (Continuing action) Continue translation from EXFOR to NSR. |
| A76 | JinKimuraPikulinaZerkin | (Continuing action) Study problems in 2D calibration of original pictures, and process of approval of results of digitizing using plotting facilities. |
| A77 | FlemingOkumuraPritychenko | (Continuing action) Finalize and submit EXFOR entries including covariance data provided by Zerkin (WP2017-Z3). |
| A78 | All | (Standing action) Provide Zerkin a list of name aliases to improve the search of EXFOR entries by the author name (WP2014-53). |
| A79 | ZerkinSublet | Exclude evaluated, calculated and recommended data in the default setting of the NDS EXFOR web retrieval search system. |

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