MEMORANDUM 4C-2/26

From: H. Potters

Subject: LEXFOR and EXFOR manuals

27th March 1972

Although we realise that we are rather late with our comments, for which we apologise, they might possibly have some impact on the next revision of LEXFOR and the manual.

A. General remarks

1. We would like to express our opinion that the division of a future integrated EXFOR manual into a systematic and a lexicographic part would be a very useful and practical step.

2. More cross-referencing, specially between the two parts, is desirable.

3. We would like the LEXFOR part to be less prescriptive and more descriptive and informative, e.g. we would like to have a description of analysis and method codes which are not obvious.

4. Compulsory keywords

It transpires that the fact that some keywords are compulsory and others are not leads to the bad habit of leaving them out even in cases where they should be in (e.g. ANALYSIS for resonance parameters). That is one of the reasons why we do not like the concept of compulsory keywords as a coder's concept. That a keyword is compulsory should mean that the programmer has to provide a warning for the coder, who should check whether he did not forget important information, that is all. This check is by no means complete, and the coder should use his initiative. So please, no more rules such as: for resonance parameters ANALYSIS is compulsory: EXFOR is already complicated enough.

A still more serious reason is that compulsory keywords (as well as obligations to put in coded information always) gave rise to nonsensical codes like OTHER, RATIO and in many applications, NONE, to a stupid repetition of the same information (e.g. the REACTOR-example under measurement techniques) or to pure nonsense because one has to put something in and does not know what. This illness of EXFOR (let us call it compulsorialitis) should disappear as soon as possible.

B. Remarks on the prologomenon of LEXFOR (memo 4C-3/41)

1. PART-DET and keyword sequence

We agree with the free order of keywords. This does not, however, mean a random order: there should be some understandable logic in the order chosen.

2. Sum rules

Please continue to use both: formulae and verbal explanation.

3. Threshold

NNCSC may split the data sets if they wish: we do not do so, and we do not wish to undertake any commitment in this respect.

4. Quantum numbers

See memo 4C-2/21, point 7.

C. Remarks on LEXFOR (memo 4C-3/41)

1. Absorption

What to code in the case of fissile nuclides at thermal energies: ABS or NG + NF? We prefer the latter as far as possible as it gives the maximum information. CCDN follows the rule that codes bearing the most complete information should prevail.

2. Activation

The above-mentioned rule (point C.1) is prescribed for activation cross-section. However, what is measured in this case is

$$\sum_{i = \text{isotopes}} a_i \, \sigma_i \neq \sum_{i = \text{isotopes}} \sigma_i$$

where a_i are the abundances in the sample. This gives rise to the need for a quantity modifier, A, meaning: times isotopic abundance and pointing to SAMPLE for the values of a_i. Should we carry out such a proposal, or should we use ACT in order to warn people that they have not a simple cross-section sum here? In the latter case the sentence under Sum-reactions should be cancelled.
(See also Memo 4C-2/25, point 3)

3. ANALYSIS

Why does the dictionary of Analysis (23) contain codes such as Shell model (SHELL)? Optical model (OPTM) and Hauser-Feshbach calculations (H-F)? Some explanation is required in what cases to use these codes. These calculations are mostly used to draw theoretical conclusions from the data and so give information belonging to COMMENT.

4. Angle (5th line from top)

"E.g. the angle between two outgoing particles". In that case by definition the correlation (COR) is measured and "no specification is needed".

5. Centre-of-mass system

DATA-CM can be obsoleted because by definition the -CM label is already given to at least one of the variables.

6. CINDA-quantities (page 2)

SF/NU: There is neither target nucleus nor compound nucleus.

7. CMPD-QUANT

"1 - 5 character code" is no longer true because of the new dictionary.

8. DATA

Leave out the Note (see earlier memos and point C.15 of this memo).

9. Differential (example for relative angular distributions 2)

ARB-UNITS is confusing and not true: it is a ratio, so NO-DIM should be used in this case. As STANDARD (RATIO) is going to be dropped (we agree on that), the remark should be added to the ISO-QUANT where it belongs and should be: RATIO over value at .... degrees. Alternatively, we can code: ((Z-S-A, EL,DA)/(Z-SA,EL,DA)), or according to the CJD proposal (4C-4/16), (Z-S-A,EL,DA,RSD), both with the same remark. The CJD proposal should then be amended in order to read "AT 90 DEG" as "at a certain angle". We vote for the latter proposal. What do the other centres think about it?

Example 3: ((Z-S-A,EL,DA)/(Z-S-A,EL); drop (RATIO).

10. Dirty: Example 1

No! We should not tell the author that he has done a bad job. In future CCDN will not use the DRT modifier at all. Incomplete definitions of quantities have to be completed anyway in free text. The information conveyed by DRT is zero.

11. Emission cross-sections

Sum-rules: NEM ..... $+\bar{\nu}(n,F)+....$

12. Errors

(a) We cannot give more details than the author.

(b) If the author gives extensive details in a good accessible paper, we will point to the references.

(c) Asymmetric instead of unsymmetric, because it is a measure for the asymmetry.

(d) Paragraph (a), Numerical values

Under EN-ERR = (last line of that paragraph) ".... to be mixed up with energy resolution ...".

13. Excitation function

Add: E-EXC, to be used in case of a pseudo continuum of indistinguishable levels. Otherwise, use E-LVL.

14. FLAG

Paragraph (a) Data-heading: "numerical values" should be "integer values". Or should we leave the way open to use flags as 2.3 ?

15. Free text

Drop the paragraph starting "Standard values, parameters ...". See 6th Four-Centre Meeting, Paris, 1970, point 22: "It was agreed that certain freedom for the compiler should be conserved, as to the best place for subsidiary numerical information which does not itself form part of the data set". See also earlier memos.

16. Inelastic scattering

Examples:

ING: $\geq$ INL instead of $>$ INL.

INL,,PAR: Sum rule $\sum_{\text{levels}}$ is missing.

17. Measurement techniques

(a) METHOD, second paragraph.

This states in fact that METHOD is the "wastepaper basket" for all information on experimental techniques which cannot be put under the other keywords. We ask the question, why is METHOD then a slashed keyword?

(b) In order to avoid duplication of information (thermal reactor, for example), could we not leave out slashed keywords if the information is already contained in another slashed keyword? All these repetitions are time-consuming for the compiler and annoying for the user.

(c) We would like to encourage centres to investigate what use they are going to make of the coded information under these keywords: the search in dictionaries is quite time-consuming. This is all very well as long as it is useful. At CCDN severe doubts exist about the usefulness of being able to retrieve on most of these items for any user community. A more detailed memo on this point will follow.

18. Metastable states

If the modifier MS is given in the ISO-QUANT and the half-life of the metastable state is not given, then the data are not defined. Often there are more metastable states and the numbering M1, M2, etc. is not fixed as more metastable states can be discovered as time proceeds. There are even nuclides (e.g. Ta-178 and Re-102) where it is not completely certain which of the half-lives have to be ascribed to the groundstate (Nuklidkarte, der Bundesministerium fuer Wissenschaftliche Forschung, Bonn, 1968). The only sure way to identify uniquely the residual nucleus is to give the half-life always when the MS modifier has been used and in some cases even for the GND modifier. CCDN will give the half-life always in the DATA if the MS or GND modifiers are used.

19. Nonelastic

Why does NNCSC disagree with the Note?

20. NUC-QUANT

Paragraph 3, TMP, should be TEM.

21. Quantum numbers

(a) Why for parity is it said: "or of a nuclear level" and not for the spin J ?

(b) Paragraph (b): This sentence is not correct. What is decisive is (1) whether the author assigned the quantum numbers himself on the basis of his analysis, or (2) whether he took them from another reference and used them as a parameter in his analysis. CCDN will take alternative (b) (ISO-QUANT) in the first case and alternative (a) (heading) in the second. In the (many) ambiguous cases we choose (b).

22. Ratios

The last line should read EL,DA,RS.

23. RESID-NUC

In most cases this is redundant information (just as PART-DET) and can be derived from the ISO-QUANT. Also, the information -M1, -M2 and G can be extracted from the ISO-QUANT (MS,GND), and the numbering of metastable states does not convey sensible information (see C.18). We would not propose to drop RESID-NUC but would recommend restricted use, as CCDN will do in the future.

24. Scattering

Paragraph INL: second line, $Q \neq 0$ instead of $Q = 0$.

25. Spectrum average

Line 2 from bottom:

1. MeV for fission spectra and fast reactor spectra.

26. Standard

(a) See earlier statement on standard in DATA and COMMON.

(b) Drop the paragraph "Insufficient Information".

27. STATUS

Point 5). final paragraph: (OUTDT) means normalisation out of date, regardless of whether the normalisation is from the author or not; change wording.

Point 6). Replace "from SCISRS-I" by "from old data". We use it too and NEUDADA is not quite identical with SCISRS-I because of the conversion and our own changes which we made to the file.

D. Remarks on Chapter VIII of the EXFOR manual (memo 4C-3/40)

1. VIII.2

STANDARD has to go into the slashed category.

2. VIII.6

The paragraph commencing "The dictionary ...": drop "area, country and".

3. VIII.12 (subfield 1)

(a) Point 1: drop second paragraph.

(b) Point 3: the isotope compiled is the target nucleus (see also NUC-QUANT for LDP, TEM, SCO and SF).

(c) Add a part describing NUC-QUANT and CMPD-QUANT.

4. VIII.13

Add a sentence to enclose the total ISO-QUANT combination in parentheses.

5. VIII.16

Are 3rd and 4th subfield in STANDARD not allowed? If this is the case, state so explicitly: if not, add STANDARD. We see a limitation as an extra rule, so we vote for the second possibility provided it is left to the discretion of the compiler to make use of it or not.

6. VIII.17

Point 1, last paragraph:

DRT and REL modifier.

7. VIII.18

(a) STANDARD/

(b) Drop the last paragraph.

8. VIII.19

Note on unresolved energy levels should read: "Unresolved energy levels should be entered as follows". (drop first sentence).

E. Remark on Memo -X4-4'

D.8.1 List of monoisotopic elements:

73-TA-181 is not strictly monoisotopic.

If we include this we have to include also nuclies such as 1-H-1, 8-O-16, 57-LA-239, and maybe 7-N-14. It is not advisable to include 2-HE-4 due to the high neutron cross section of 1-HE-3. We get ambiguous cases. The "cleanest" solution is to remove TA from the list. We would like to propose this, although we have no strong feelings about it. Alternatively, we have certainly to put some of the above-mentioned nuclides in.

Distribution

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