

Memo 4C-2/46

Date: 18th September 1973  
From: F. H. Fröhner<sup>F</sup> and H. Potters<sup>HP</sup>  
Subject: Tables - response to Memo 4C-3/88

In the present memo we comment on the suggestions in 4C-3/88. We welcome especially those that help to simplify the rules and to improve the terminology. We also hope to clarify some points that were perhaps not explained well enough in our memos 4C-2/41 and /42.

Distribution:

Dr. S. Pearlstein (5 copies)  
Dr. J. J. Schmidt (5 " )  
Dr. V. Manokhin (5 " )

We shall discuss the various points in the order in which they occur in 4C-3/88.

1. Types of numerical data information

We did not want to get entangled in too many definitions right at the beginning of our memo. We felt that this was not necessary to explain the basic structure of an EXFOR table. We welcome the suggestion to do away with a separate flag section (see also Sect. 5 below). This makes the basic table structure even simpler:

COMMON	
independent variables + associated quantities	dependent variables + associated quantities + additional information

If the monotony rules for independent-variable columns are to be checked a more elaborate system of Dictionary 24 flags is needed than that proposed in 4C-3/88 (see Sect. 3 below).

2. Pointers

- a., b. We agree to the proposed definition of pointers provided (1) "EXFOR entry" is replaced by "EXFOR subentry" and (2) the last part beginning with "- a column with Additional Information ... " is dropped. We are against linking subentries by pointers. This requires uniqueness of pointers

throughout a whole entry. We prefer to use pointers in each subentry independently, otherwise we risk having to retransmit the whole entry if something goes wrong with the pointers. It seems doubtful whether the convenience of referring in subentry 001 to specific columns in the table(s) is worth this risk and the inconvenience for the user of a listing to follow pointers up and down throughout the whole entry. Such a reference in subentry 001 can also be made in free text without pointers.

We deliberately avoided to tie pointers basically to iso-quant. We found that definitions and rules become simpler (and conversion to and from our internal NEUDADA format or the present EXFOR format becomes easier) if pointers are defined as column labels so that one always points from iso-quant (or other keyworded information) to columns. Once this principle is accepted it is easiest to use the serial number of the column as pointer. This avoids any decision-making on the part of the compiler, no ambiguity arises and automatic assignment of pointers to columns is trivial. The counter-proposal in 4C-3/88 appears to be motivated by a desire to economize on pointers and to bring out the relationship between associated columns. We do not see a very great advantage in this. On the contrary, we should like to avoid the element of judgement involved which makes automatic assignment of pointers and their utilization for table composition and decomposition quite difficult. Therefore we prefer to stick to our original proposal - maybe with one possible modification:

One could make the assignment of pointers even simpler by numbering all columns - not just those in the dependent-variable part of the table. Incidentally this would not affect any of the examples given in 4C-2/41.

- c. We realize that our explanation of multiple pointers was deficient. The form given in 4C-3/88 is indeed what we meant. We agree to the proposed elimination of multiple pointers.

### 3. Hierarchy

This section of 4C-3/88 reveals a bad misunderstanding of the meaning of the flags proposed for Dictionary 24 in 4C-2/42. That these flags do not by themselves establish hierarchy levels should have been clear from paragraphs (b) and (c) on page 2 of 4C-2/42. Their only functions are to

permit

- (1) automatic recognition of the independent-variable columns of a data table,
- (2) automatic recognition of groups of columns belonging to the same hierarchy level,

so that monotony can be checked. Item (1) requires different flags for independent variables and for associated quantities. Item (2) requires distinction between members of different data heading families. In addition we wanted the possibility of

- (3) automatic recognition of headings that can only occur in the independent-variable part of a table,

so that their (forbidden) occurrence in the rest of the table can be checked. This requires distinction between "class 1" and "class 2" headings.

We stress again that hierarchy levels are not defined by these flags but rather by the sequence in which they occur in the COMMON and DATA sections of an EXFOR table. We can illustrate this with the examples on page 4 of 4C-3/88. The column headings encountered in a sequential scan, the flags found in Dictionary 24, and the hierarchy levels assigned would be as follows:

Example	<u>9a</u>	<u>9b</u>
Column headings	: E ANG DATA	ANG E DATA
Dictionary 24 flags	: E G b	G E b
Hierarchy levels	: 1 2	1 2

Example	<u>10a</u>	<u>10b</u>
Column headings	: E E ANG DATA DATA	ANG ANG E DATA DATA
Dictionary 24 flags	: E E G b b	G G E b b
Hierarchy levels	: 1 1 2	1 1 2

As soon as the first flag indicating a main variable is encountered (E or G in these examples) the corresponding column gets the highest hierarchy level (1) assigned. The same level is assigned to subsequent main columns with the same flag. As soon as another main-variable flag occurs the

next lower hierarchy level is assigned (2). This continues until the first blank (b) is found, indicating the beginning of the dependent-variable part of the table in which no "class 1" heading should occur.

Such a scheme would not be any burden for those centres where the hierarchy concept is not utilized. Its implementation requires merely the proposed flagging of Dictionary 24. All programming work connected with the hierarchy concept such as for monotony checking would be done only at the interested centres themselves.

#### 4. Two-dimensional tables

We agree to this section. Our answer to paragraph 4.c. is negative: Our programs do not use the keyword TABLE-NR.

#### 5. Sorting of columns in the DATA section

We accept the proposed relaxation of the rules for table structure, especially with respect to the flag columns. Our original proposal of a separate flag section aimed at minimizing the number of FLAG columns. This possibility is not excluded by the relaxation, so that the two alternatives below would both be legal:

##### Alternative 1

```

:
:
:
FLAG      (1.) ANGULAR RESOLUTION 5 DEGREES
           (2.) CROSS SECTION AVERAGED OVER 2 RUNS
           (3.) NORMALIZATION ENERGY
:
:
DATA
E          ANG      DATA      FLAG      FLAG
MEV       ADEG     B          NO-DIM    NO-DIM
1.        10.      .1         1.
2.        10.      .2         1.          2.
3.        20.      .3         3.          2.
:
:
ENDDATA

```

Alternative 2

```

:
FLAG      (1.) NORMALIZATION ENERGY
          (2.) RESOLUTION 5 DEGREES
          (3.) AVERAGE OVER 2 RUNS
:
DATA
E         FLAG      ANG      FLAG      DATA      FLAG
MEV      NO-DIM    ADEG    NO-DIM    B          NO-DIM
1.             10.     2.       .1
2.             10.     2.       .2          3.
3.           1.     20.           .3          3.
:
ENDDATA

```

As a consequence of these modified flag rules we have to add one line to the table given on page 2 of 4C-2/42:

```

:
F.Prod. |      |      |      |
:        |      |      |      |
FLAG     |  Y*  |      |  Z   |
:        |      |      |      |
TEMP     |      |      |      |
:

```

with a corresponding change in Dictionary 24.

6. Multiple iso-quant in one subentry

- a. We agree to this simplification.
- b. We interpret the first paragraph as a recommendation rather than a rigid rule. We prefer to compile EXFOR tables as similar as possible to the author's table. If he tabulated  $\sigma(n,\gamma)$  and  $\sigma(n,\alpha)$  together we do not wish to be forced to break up the table. We trust that authors normally put only such data into one and the same table that form a logical unit somehow.

On the other hand we would like to object to the use of more than one nuclide in one iso-quant vector as illustrated in Example 3c, although this will lead to a necessity to break up tables containing data for several iso-quants. We should prefer to have our proposal on "more than one nuclide in the table" (4C-2/41, Section 7.(a)) considered before new proposals are formulated. For the moment we wish

to stick to one nuclide per iso-quant vector.

7. Resonance energies

We wish to avoid the necessity of breaking up resonance parameter tables where only a part of the resonance energies is taken from other sources but the majority was measured by the author. This is a frequent case and can be dealt with by flags without breaking up the table. Therefore we propose to modify the second sentence slightly: "If all resonance energies were taken from another source, they shall be entered as an independent variable under the heading EN-RES."

8. Nomenclature

- a. We still prefer the original wording "associated columns", since not only error information but also flags and possibly other types of information are meant. The danger of confusion between "DATA heading" and "DATA column" seems rather remote to us except maybe during the carnival season or on similar occasions. "DATA heading" on top of page 6, 4C-2/41, could indeed be replaced by "data heading", but "column heading" seems less adequate for columns consisting of just one number.
- b. Agreed, we shall try to follow established conventions.
- c. The proposed version would still not be quite correct since for instance EN-ERR or ANG-RSL may occur in COMMON, referring to columns outside the dependent-variable part of the table. One could replace the paragraph beginning "Pointers of the same type ..." (page 6, 4C-2/41) by "If a value in the COMMON section is common to the whole data table or if its heading points unambiguously to a specific column (as in the case of EN-ERR, ANG-RSL etc.) the 11th column of the data heading field remains blank. If on the other hand the value is common to a column in the dependent-variable part of the table pointers of the type introduced for multiple iso-quant may have to be used in order to avoid ambiguities: 1, 2, ... 9, A, B, ... in the 11th column of the data heading field labelling values common to the corresponding columns."

9. Possible future extensions

Agreed.

10. Extension to more than 10 columns per line

At the 9th 4C Meeting in Moscow the "DATA-CONT" proposal was rejected in favor of the proposal in 4C-1/33. The consent was that the latter was adequate for data transmittal, and that legibility of the print-out was not a 4C problem but could be dealt with at the various centres individually - for instance along the lines of the "DATA-CONT" proposal. Hans Potters intends to write a simple printing subroutine which then could be distributed to interested parties.

11. Implementation

- a. We are willing to prepare manual pages, but only in draft form and with the understanding that consistency checking and updating of the manual will be done at NNCSC after 4C agreement is reached.
- b. Agreed.
- c. See Sect. 10 above.
- d. Since the old EXFOR rules on tables will be a subset of the new rules it is perhaps not so important to know when the various centres will be able to send EXFOR tables with pointers and more than 10 columns. We all must know, however, when everybody will be ready to receive such tables. Thus we propose that all centres furnish this latter information as soon as possible after the new table rules are definite.

In order to begin drafting the manual pages we need CJD's response to 4C-2/41, -2/42, -3/88 and -2/46 !