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Memo CP-D/639

Date: 10 May 2010
To: Distribution
From: N. Otsuka, S. Dunaeva
Subject: **Remarks on MONITOR coding**

Monitor information helps users who want to renormalize EXFOR data with the latest monitor values, therefore coded information for monitor should be more complete and accurate, and compiler should pay more attention to it, especially inspecting old entries.

Below are two examples of problems pointed out by V. Zerkin (developing EXFOR correction system, see WP2010-19). Proposed corrections are indicated by **bold** fonts.

11675.026

Corrections are necessary for

- Correction of monitor reaction (capture to fission);
- Addition of cross reference (headings);
- Addition of uncertainty in monitor value for $^{197}\text{Au}(n,\gamma)^{198}\text{Au}$;

etc.

```
SUBENT      11675001    20091005
...
DETECTOR    (NAICR) NaI crystal
             (FISCH) For thermal and fast neutrons
MONITOR     ((MONIT1)92-U-235(N,F)92-U-236,,SIG)
MONIT-REF   ((MONIT1),W.D.ALLEN+,B,PR.NUC.EN.,2,1,1958)
...
EN-NRM      MONIT1
EV          B
  0.0253    584.
...
SUBENT      11675026    20091005
...
REACTION    (79-AU-197(N,G)79-AU-198,,SIG)
DECAY-DATA  (79-AU-198,2.70D)
MONITOR     ((MONIT2)79-AU-197(N,G)79-AU-198,,SIG)
MONIT-REF  ((MONIT2),F.T.Gould+,J,PR,100,1248,1955)
ERR-ANALYS (ERR-1) Uncertainty in measured thermal cross
section
...
MONIT2      MONIT2-ERR ERR-1
B           B PER-CENT
  99.       2.0 7.
ENDCOMMON   3
DATA        2      21
EN          DATA
MEV         B
  1.45     -01 3.20 -01
```

30449.001

Correction is needed for incident energy for normalization under EN-NRM.

A correction factor $114.03/115.4 = 0.988$ was obtained by K. Zolotarev (CJD) on the basis of the current EXFOR 30449.001 (115.4 mb @ 14.6 MeV) and his evaluation [1] (114.03 mb @ 14.6 MeV). However this should be $115.48/115.4 = 1.001$, because 115.4 mb is the data at 14.5 MeV where his evaluation gives 115.48 mb

The neutron energy for monitor (14.5 MeV) is within resolution (0.3 MeV) of incident neutron energy (14.6 MeV). However the above example asks us to give the incident energy for monitor cross section separately under EN-NRM if it is different from EN.

```
SUBENT          30449001    20090311
...
MONITOR        ((MONIT1)13-AL-27(N,P)12-MG-27,,SIG)
                75 +- 8 mb at 14.5MeV.
                ((MONIT2)13-AL-27(N,A)11-NA-24,,SIG)
                115.4+-1.4 mb at 14.5MeV
MONIT-REF      ((MONIT1),M.Bormann+,R,IAEA-156,87,1974)
                ((MONIT2)20111003,H.Vonach+,J,ZP,237,155,1970)
...
EN             EN-RSL      MONIT1      MONIT1-ERR MONIT2      MONIT2-ERR
EN-NRM
MEV           MEV         MB          MB          MB          MB
MEV
1.4600E+01  3.0000E-01  7.5000E+01  8.0000E+00  1.1540E+02  1.4000E+00
14.5
```

Heading Field of MONITOR, MONIT-REF, DECAY-MON

EXFOR Formats Manual explains coding rule of heading field under keywords MONITOR and MONIT-REF as follows:

MONITOR

Heading Field. Contains the data heading of the field in which the monitor value is given. The heading may be omitted, in which case its parenthesis is omitted.

MONIT-REF

Heading Field: Data heading of the field in which the standard value is given. The heading may be omitted, in which case, its parentheses is also omitted.

DECAY-MON

Heading field. Contains the data heading of the field in which the monitor value is given. The heading may be omitted, in which case its parenthesis is omitted.

But the heading field must be present when data headings MONIT1, MONIT2 etc. are used. Therefore the following change in the rule for MONITOR, MONIT-REF and DECAY-MON.

Heading Field: Contains the data heading of the field in which the monitor value is given. Must be present when the data headings MONIT1, MONIT2, *etc.*, are used in the data set. Otherwise its presence is optional.

Reference

[1] K. I. Zolotarev, INDC(NDS)-0546, 2009.

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