MEMO CP-4/181

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TO:	Distribution
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Subject:	Fission yields, for discussion at NRDC2010 Agenda 9.8

In EXFOR - reaction is defined as (SF1-SF4+ branch in SF5).
For fission yields:
SF1(*,F)SF4,SF5,FY,

      *=0 – spontaneous fission,

      *=N – neutron fission;

      SF5 branch = empty– all fission events considered,

                    = BIN – only binary fission events considered,

                    = TER – only ternary fission events considered,

                    = QTR – only quaternary fission events considered.

For fission yields - SF4 is used for ELEM/MASS or to define the element, for which the yield is given in DATA block.

Yields are given usually in units like PRT/FIS .
It means that yields are given per one fission reaction.
And for FY - reaction is defined really in SF1-SF3 +branch in SF5.
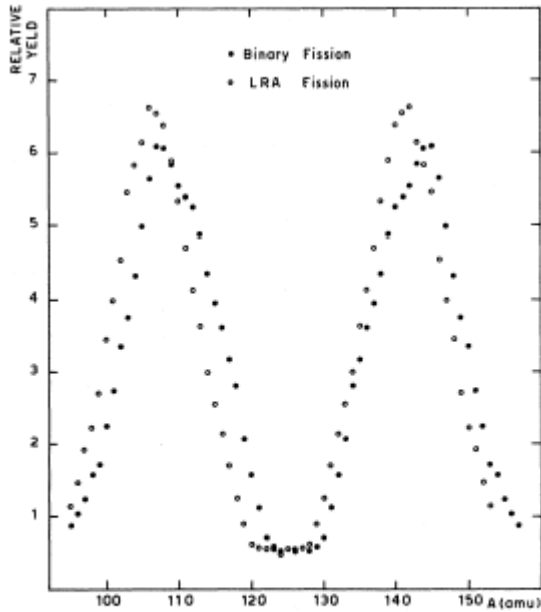
Examples:
A.

FIG. 4. Pre-neutron-emission mass distribution curves for the two fission processes. The curves are normalized to the same total yield.

J,PR/C,7,373,1973
– an example of comparison of BIN and LRA TER fission yields.
For BIN – yield for one binary reaction,
For TER –yield for one ternary reaction accompanied by LRA.

CF-252(0,F)ELEM/MASS,,TER,FY,FF
FF are defined in DATA block as ELEM1, MASS1,
Alpha is defined in COMMON as ELEM2, MASS2.
– Yields of FF <u>per one ternary spontaneous fission accompanied by alpha</u> (only accompanied by alpha events of spontaneous ternary fission are considered).

CF-252(0,F)ELEM/MASS,BIN,FY,FF
FF defined as ELEM and MASS in DATA block.
– Yields of FF <u>per one binary spontaneous fission</u> (only binary fission events are considered)

CF-252(0,F)ELEM/MASS,,FY,FF
 FF defined as ELEM and MASS in DATA block.
– Yields of FF <u>per one spontaneous fission</u> (all fission events are considered)

B.

CF-252(0,F)2-HE-4,,FY,LCP

– Yield of alpha <u>per one fission reaction</u> (value about 1.E-3)

CF-252(0,F)2-HE-4,TER,FY,LCP

– Yield of alpha <u>per one ternary fission reaction</u> (value about 0.98).

PROPOSAL:

<u>Add in LEXFOR Manual, Chapter Fission Yields</u>:

Fission yields are given for one fission reaction defined in
SF1+SF2+SF3+(branch in SF5 if needed) as:

- for all fission events – SF1(SF2,F)*,,FY,#
- for binary fission events - SF1(SF2,F)*,BIN,FY,#
- for ternary fission events - SF1(SF2,F)*,,TER,FY,#
- for quaternary fission events - SF1(SF2,F)*,QTR,FY,# ,

where   * =ELEM(and/or)MASS (preferable) or concrete isotope,

    # = FF, LF, HF or LCP.

If in SF4 the concrete isotope is given, then SF7 could be avoided.

Detailed explanation in free text (especially of normalization) is recommended.

For ternary and quaternary fission – ELEM2/MASS2, ELEM3/MASS3 have to be used in COMMON to define particle in coincidence, if such events are considered, ELEM1/MASS1 have to be used in DATA block.

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