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**Memo CP-C/246**

**DATE:** March 2, 1998  
**TO:** Distribution  
**FROM:** V.McLane  
**SUBJECT:** Delayed neutron yields; neutron groups and units

**Delayed Neutron Groups**

The present REACTION coding for delayed-neutron yields for neutrons from given half-life groups uses the code PAR in SF5 (branch), and is an exception to the rule that when the branch code PAR appears in SF5, a secondary energy must be coded in the data.

I propose to introduce a new branch code GRP for use with these data; GRP would replace PAR in SF5.

The group would be identified by half-life, if given, or by group number, or decay constant.

**Units for neutron yield**

The units for delayed neutron yield should be similar to other yields. I propose the addition of the unit code N/FIS for absolute values of  $y$ .

**Dictionary Updates**

The following dictionary updates are required. A LEXFOR Manual update is attached.

**Add to Dictionary 24 (Headings)**

DCNST	Decay constant	1/T
DCNST-ERR	Error in decay constant	1/T
GRP-NUM	Group number	NO

**Add to Dictionary 25 (Units)**

N/FIS	Neutrons per fission	YLD
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**Add to Dictionary 31 (Branch)**

GRP	22 For a given half-life group
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**Add to Dictionary 36 (Quantity)**

DL/GRP,NU	G * YLD Yield of delayed neutrons for a given half-life group
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## LEXFOR Entry

### Definitions and codes of quantities for data to be compiled in EXFOR

**Total average delayed fission neutron yield:** ( $v_d = v_t - v_p$ )

**REACTION Coding:** NU in SF6 (parameter) and DL in SF5 (Branch)

a.) Absolute delayed neutron yield

Units: neutrons per fission (data-unit heading: N/FIS)

*Example:* (.....(N,F),DL,NU)

b.) Delayed neutron fraction ( $v_d / v_t$ ): coded as a ratio with the units NO-DIM:

*Example:* ((.....(N,F) ,DL,NU)/(...(N,F),,NU))

### **Partial delayed fission neutron yields**

There are two main types of measurements:

a.) **Delayed neutron Groups:** coded using the average half-life of the group (heading HL), the decay constant (heading DCNST), or the group number (heading GRP-NUM) as an independent variable.

**REACTION Coding:** (.....(N,F),DL/GRP,NU)

- Relative abundance (or relative group yield): coded as the ratio with units NO-DIM. (The values for the six groups sum up to 1).
- Absolute group yield: coded with units N/FIS (neutrons per fission) or PC/FIS (neutrons per 100 fissions).

b.) **Yield of delayed fission neutrons associated with an individual precursor:** Coded with the precursor nucleus as an independent variable given under the data headings ELEMENT and MASS, usually with units PC/FIS, as above.

**REACTION Coding:** (.....(N,F)ELEM/MASS,DL,NU)

### **Delayed-Neutron Energy Spectrum for a Given Neutron Group**

**REACTION Coding:** (.....(N,F),DL/GRP,DE,N)

Data are coded using the average half-life of the neutron group and the delayed neutron energy or energy range as independent variables.

The data may be given:

a) in percent - the data unit PC/FIS is used.

b) as a relative measurement - the quantity modifier REL and data units ARB-UNITS are used.

For the preceding quantities, the nucleus to be entered is the *target nucleus before* the absorption of the incident particle.