Memo 4C-3/122

To: Distribution   HDL   13 May 1975

From: K. Okamoto + M. Lammer + H.D. Lemmel

Subject: Fission-Yield Standards

In the enclosure we submit a proposed Lexfor entry on Fission-Yield Standards, which gives several examples of how to code such standards in Exfor.

Comments are welcome.
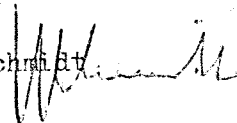

Attachment

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4C-3/122
1975-5-13

Fission-Yield Standards

1.) Often yields of some specific nuclei are given in arbitrary units. Add the REL modifier to the iso-quant and give the unit ARB-UNITS.

2.) Yields of some specific nuclei (58-CE-144,60-ND-147,etc.) may be given relative to the yield of another nucleus (42-MO-99). This can be entered as:

ELEMENT	MASS	DATA
NO-DIM	NO-DIM	ARB-UNITS
42.	99.	1.
58.	144.	0.977
60.	147.	0.423
etc.		

3.) Same as 2.) above, but a reference value for the yield of 42-MO-99 is assumed:

```
ISO-QUANT    (92-U-235,NF,YLD,CUM)
STANDARD     (92-U-235,NF,YLD,CUM)
...
...
DATA
```

ELEMENT	MASS	DATA	STANDARD
NO-DIM	NO-DIM	NUC/100F	NUC/100F
42.	99.		6.14
58.	144.	5.2	
60.	147.	2.45	
etc.			

4.) Same as 3.) above, but U-238 yield data in a fission spectrum are given relative to a U-235 yield in a thermal spectrum.

```
ISO-QUANT    (92-U-238,NF,YLD,CUM/FIS)
STANDARD     (92-U-235,NF,YLD,CUM/MXW)
...
...
DATA
```

EN-DUMMY	ELEMENT	MASS	DATA	STANDARD
EV	NO-DIM	NO-DIM	NUC/100F	NUC/100F
0.0253	42.	99.		6.14
2.0E+6	42.	99.	6.2	
2.0E+6	58.	144.	4.2	
2.0E+6	60.	147.	2.75	
etc.				

5.) The R value is given. (compare in Lexfor under Fission-Yield-Methods).

$$R = \frac{(\text{Activity Ce-144 from fast U-238}) * (\text{Activity Mo-99 from thermal U-235})}{(\text{Activity Ce-144 from thermal U-235}) * (\text{Activity Mo-99 from fast U-238})}$$

R is measured in order to determine the Ce-144 yield from fast U-238 assuming the other three yields as known, i.e.

(Yield Ce-144 from fast U-238) =

$$= R * (\text{Yield Ce-144 from thermal U-235}) * \frac{(\text{Yield Mo-99 from fast U-238})}{(\text{Yield Mo-99 from thermal U-235})}$$

First solution:

```
ISO-QUANT    (92-U-238,NF,YLD,CUM/FIS/FCT)
COMMENT      UNDER DATA THE R-VALUE IS GIVEN WHICH IS DEFINED AS ...
...
...
DATA
```

	ELEMENT	MASS	DATA
EN-DUMMY	NO-DIM	NO-DIM	NO-DIM
2.0E+6	58.	144.	1.234

<u>Second solution:</u>

```
ISO-QUANT      (92-U-238,NF,YLD,CUM/FIS)
STANDARD     1 (92-U-235,NF,YLD,CUM/MXW)
             2 (92-U-238,NF,YLD,CUM/FIS)
METHOD         R-VALUE METHOD.  R-VALUE OBTAINED WAS ....
...
...
DATA
```

EN-DUMMY EV	ELEMENT NO-DIM	MASS NO-DIM	DATA NUC/100F	STAND 1 NUC/100F	STAND 2 NUC/100F
0.0253	42.	99.		6.14	
0.0253	58.	144.		5.2	
2.E+6	42.	99.			6.2
2.E+6	58.	144.	3.6		

Note: In some of these cases blank fields under DATA cannot be avoided.
We realize that this is not desirable, but we cannot offer a
better solution.