<p style="text-align:center">MEMO CP-A/139</p>

<p style="text-align:right">08-May-2003</p>

To: **Distribution**
From: **F.E. Chukreev**
Subject**: I. Addition to Dictionaries 13, 30 and 36**
            II. PY and TTY codes.

I.

1.   Please note the following Dictionary 13 addition:
ETA   Eta meson
        Sorry, but I forgot to include the addition in CP-A/137

2.   Please note the following Dictionary 30 addition:
TCC   total charge changing

3.   Please note the following Dictionary 36 addition:

```
,PY/DA,,TT     PY (Differential product yield d/dA for thick
                target)
               (Differential product yield for thick target
               with respect to the angle of the outgoing
               particle)
Data unit for the code:
PRT/INC/SR partcles/inc.projectile/steradian 1/A
```

II

```
I would like to take your attention for one discrepant. Dictionary 32 says:
```
PY   *Product yield*
        To be used in cases where neither SIG nor TTY applies.
        Degradation of primary projectile energy within target
        does not extend below reaction threshold. Data are thus
        sensitive to target thickness and beam profile and are
        not always reproducible

```
LEXFOR contains definition of Thick Target Yield^
```
Thick-target yield: measured on a target whose thickness is such that the incident Ьеат

is completely stopped within the target. Therefore, the energy of the interacting particle is

a function of its depth within the target.

The thick target yield is given by

$$Y_{thick} = \int_{0}^{E} \sigma(E')\left[\frac{dE}{dx}(E')\right]^{-1} dE'$$

where **E** is the incident particle energy and **E'** is the energy at a given depth in the target.

Stopping Power: S = -dE/dX, where X = thickness in g/cm^2..

According to definition of PY (Dictionary 32)

Product Yield must be given by

$$Y_{product} = \int_{E_2}^{E_1} \sigma(E') \left[\frac{dE}{dx}(E') \right]^{-1} dE'$$

Where E_1-is the incident particle energy and E_2 is the final particle energy.

Both the yields have same dimensions. The yields can be presented either as MUCI/MUAHR (KBQ/MUAHR, MUCI/MUA etc) or as PRD/INC and another similar data units.

Today we must use **PY** code with data units from PRD/INC "family" only, but **TTY** code with data units from MUCI/MUAHR "family"only.

Authors of experimental investigations do not know EXFOR rule and they do not distinguish **PY** and **TTY**. For example, S.Croft in NIM/A,307,353,1991 gives thick target yield in "gamma/microCoulomb" data unit, which was recalculated to **PRT/INC** by compiler. Second example: G.F.Steyn et al in ARI,41,315,1990 gives thin target yield in "KBQ/MUAHR". We were forced to recalculate the data to **PRD/INC** too.

Therefore I would like to propose to discuss the problem during to nearest Technical Meeting and permit to use same data units for **PY** and **TTY.** If using of similar data units for **PY** and **TTY** will not be accepted, then **PY** definition in Dictionary 32 must be changed.

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