お知らせ（その Ⅱ ）

ORNLのDr. R. L. Macklinからの連絡
（中性子捕獲断面積データの修正について）

September 24, 1980

TO: Users of Our Stable Isotope Neutron
Capture Cross Section Data

FROM: R. L. Macklin and R. R. Winters

A computer coding error in the subroutine correcting for small changes in $\sigma(n,\gamma)$ detector efficiency dating from 1972 has been found. The effect of the error was to "correct" the monitor file twice rather than the yield and error files called for. These time of flight files were defined and dimensioned in a statement COMMON A, with the monitor file referred to first. In the subroutine EFFCOR (see Figure 1.) the dimensions were set to 1 to avoid possible use of duplicate core memory and in the expectation that the dimension would be reset to the full 19000* of the calling program before execution. Not only does this not work but the error is not noticed by the compilers or link-editors we have used.

As the yield (and error) were to be corrected to standard sample size and pulse height using a periodic 4.4 MeV gamma ray check, the factor differed from unity in about half of the runs, namely those where a detector gain drift was detected or a small sample was used. Unfortunately, for those runs the net correction to the erroneously processed cross section data now requires the cube of the intended yield file correction. Table 1. gives the factors required to correct published average capture cross section data derived from the 40.12 m ORELA flight path 7 detector and processed at ORNL between 1972 and mid-November 1979 when an error was first detected in Osmium runs though not understood. Where individual resonances were resolved and parametrized it is the capture area A_γ or equivalently $g\Gamma_\gamma\Gamma_n/\Gamma$ that requires the correction. In the cases requiring the largest corrections (^{108,110}Pd for example) the resonance self-protection and Doppler broadening corrections may also be changed significantly and the data will need to be refitted. The ORELA capture yield data processed at Lucas Heights, Australia may also suffer from the same coding error but is not included in Table I.

We are deeply grateful to Charlotte E. Morrison of the ORNL Computer Sciences Division for locating the source of the error in our data processing codes.

We are asked to emphasize that the coding error discussed here is unique to Flight Path 7, 40.12 m neutron capture data processing and not other ORELA data.

RLM:b

*The first several time of flight channels fall outside the energy range used.

Compiled 04/21/72 23.08.44

update F.lo 01 & RRW.SUBS 04/21/72 23.09

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      SUBROUTINE EFFCOR
C
C  EFFCOR CORRECTS THE TED EFFICIENCY FOR GAIN SHIFTS( RELATIVE TO
C  STANDARD SETTING FOR PU-BE HALF-HEIGHT IN CHANNEL 118) AND FOR
C  SAMPLE SIZE EFFECTS (RELATIVE TO STANDARD SAMPLE SIZE HGT=5.22CM).
C
      COMMON/A/AMON(1),TOF(1),GWT(1),GSQ(1)
      COMMON/I/IW,NOCH,MONTOR,GROUP,HGT,IPH
C
C  CORRECTION FOR TED GAIN SHIFTS
C  IPH IS CHANNEL NO. OF PU-BE HALF-HEIGHT IN SEL DOUBLE-PRECISION
C  CHANNEL NOS.
C  GCOR IS TED EFFICIENCY CORRECTION FOR GAIN SHIFT.
C  GCOR CALCULATED USING POWER-LAW FIT FOR GAIN SENSITIVITY.
C
      GCOR=1.0
      IF(IPH.EQ.0.OR.IPH.EQ.118)GO TO 20
      GCOR=(118.0/FLOAT(IPH))**1.387
      WRITE(51,1000)IPH
 1000 FORMAT(' CORRECTION FOR GAIN-SHIFT SENSITIVITY MADE FOR PU-BE HALF
     *-HT. = ',I3)
C
   20 CONTINUE
C
C  TED EFFICIENCY CORRECTION FOR SAMPLE HEIGHT.
C  TED GEOMETRICAL EFFICENCY FOR SAMPLE HGT = 2.61CM IS 1.017 TIMES THAT
C  FOR THE STD. SAMPLE.
C
      SCOR=1.0
      IF(HGT.GT.4.0)GO TO 30
      SCOR=1.017
      WRITE(51,2000)HGT
 2000 FORMAT(' CORRECTION FOR NON-STANDARD SAMPLE HEIGHT MADE FOR HGT= '
     *,F6.3)
   30 TCOR=GCOR/SCOR
      IF(TCOR.EQ.1.0)GO TO 50
      DO 40 I=1,NOCH
      GWT(I)=GWT(I)*TCOR
   40 GSQ(I)=GSQ(I)*TCOR
   50 CONTINUE
      RETURN
      END
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Neutron Capture Cross Sections Requiring

Corrections to Reported Data

Isotope	Factor[a]	Ref.	Isotope	Factor[a]	Ref.
12 Mg 24	0.9325	1	45 Rh 103	0.9507	12,13
12 Mg 25	0.9325	1	46 Pd 104	0.7999	13,14
12 Mg 26	0.9325	1	46 Pd 105	1.1131	13,14
16 S 32	1.1131	2	46 Pd 106	0.7734	13,14
16 S 33	0.9850	3	46 Pd 108	0.7480	13,14
23 V 51	1.0360	4	46 Pd 110	0.7480	13,14
25 Mn 55	0.9507	5	65 Tb 159	1.0737	15
29 Cu 63	0.9507	6	67 Ho 165	1.1131	16
29 Cu 65	0.9507	6	69 Tm 169	1.0737	17
30 Zn 64	0.9850	7	76 Os 186[b]	c	18
30 Zn 66	0.9507	8	76 Os 187[b]	c	18
30 Zn 68	0.9507	8	76 Os 188[b]	c	18
41 Nb 93	1.0737	9	79 Au 197[b]	1.0001	19
42 Mo 92	0.9507	10	81 Tl 203	0.9507	20
42 Mo 100	0.9507	11	82 Pb 206	1.0360	21
44 Ru 100	0.9850	12,13	82 Pb 207	0.9655	22
44 Ru 101	0.9850	12,13	83 Bi 209	1.0360	23
44 Ru 102	0.9850	12,13	90 Th 232	1.1131	24
44 Ru 104	0.9850	12,13			

[a]While the correction factor by which the published data should be multiplied is known precisely, the data uncertainties are generally several percent.

[b]Average of more than one run under different conditions.

[c]Precise results from reprocessing the several enriched osmium sample runs and unscrambling the isotopic mixtures are not available at this time.

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