

**Nuclear Data Section  
International Atomic Energy Agency  
P.O.Box 100, A-1400 Vienna, Austria**

**Memo CP-D/599**

**Date:** 20 December 2009  
**To:** Distribution  
**From:** N. Otsuka, V. McLane, O. Schwerer, S. Dunaeva  
**Subject:** **Fission quantity coding**

Coding rule of REACTION for fission quantities was discussed in October at NDS to keep consistency in the database without complicated coding rules. Our conclusions are summarized below. List of proposed corrections for (1) will be distributed later.

**(1) Yield of given fission product/particle (Unit family: FY)**

Fragment/particle will be always coded in SF4 (not in SF7) except neutron.

**Example:**

(--- (-, F) , PR, NU)	Multiplicity of prompt fission neutron
(--- (-, F) 0-G-0, , FY)	Fission yield of $\gamma$
(--- (-, F) 2-HE-4, TER, FY)	Ternary fission yield of $\alpha$
(--- (-, F) 42-MO-99, , FY)	Fission yield of $^{99}\text{Mo}$
(--- (-, F) MASS, CHN/SEC, FY)	Secondary fission yield for mass chain $A$
(--- (-, F) ELEM/MASS, PRE, FY)	Primary fission yield of $(Z,A)$
(--- (-, F) ELEM/MASS, PR, NU)	Multiplicity of prompt fission neutron emitted with fragment $(Z,A)$
(--- (-, F) ELEM/MASS, , FY, G)	Fission yield of $\gamma$ emitted with fragment $(Z,A)$

**(2) Average kinetic energy of given product/particle**

Fragment/particle will be always coded in SF4 (not in SF7) with KE in SF6. The same rule is also applied to KEP (most probable kinetic energy) and KEM (Temperature of Maxwellian distribution). If data are for reaction product (SF4), SF7 should be omitted. Otherwise it is specified in SF7.

**Example ( $E_k$ : kinetic energy):**

(--- (-, F) 0-NN-1, PR, KE)	Average $E_k$ of prompt neutron
(--- (-, F) 0-G-0, , KE)	Average $E_k$ of gamma in fission
(--- (-, F) 2-HE-4, TER, KE)	Average $E_k$ of $\alpha$ in ternary fission
(--- (-, F) 42-MO-99, , KE)	Average $E_k$ of fission fragment $^{99}\text{Mo}$
(--- (-, F) MASS, SEC, KE)	Average $E_k$ of secondary fission

(--- (-, F) ELEM/MASS, PRE, KE)	fragment for mass chain $A$
(--- (-, F) ELEM/MASS, PR, KE, N)	Average $E_k$ of fission fragment ( $Z, A$ )
(--- (-, F) ELEM/MASS, , KE, G)	Average $E_k$ of prompt fission neutron emitted in fission with fragment ( $Z, A$ )
(--- (N, F) ELEM/MASS, PRE, KE, LF+HF)	Average $E_k$ of $\gamma$ emitted in fission with fragment ( $Z, A$ )
(--- (-, N) 4-BE-8, , KE, N)	Average total $E_k$ of light and heavy fission fragment ( $Z, A$ )
	Average $E_k$ of neutron

### (3) Average kinetic energy of a group of fission product/particles

AKE in SF6 is always accompanied by \*F (FF, LF or HF) in SF7.

#### Example ( $E_k$ : kinetic energy):

(--- (-, F) , , AKE, FF)	Average $E_k$ of fission fragment
(--- (-, F) , , AKE, LF)	Average $E_k$ of light fission fragment
(--- (-, F) , , AKE, HF)	Average $E_k$ of heavy fission fragment
(--- (-, F) , , AKE, LF+HF)	Average total $E_k$ of light and heavy fission fragment

### (4) Most probable mass and charge

AP or AZ in SF6 is accompanied by \*F (FF, LF or HF) in SF7 if SF4 is empty.

#### Example:

(--- (-, F) , , AP, LF)	Most probable mass of light fission fragment
(--- (-, F) , , AZ, HF)	Most probable charge of heavy fission fragment
(--- (-, F) ELEM, , AP)	Most probable mass of fission fragment $Z$
(--- (-, F) MASS, , AZ)	Most probable charge of fission fragment $A$

### (5) Complicated fission quantities with two or more objects in SF7

SF5-SF8 will be coded with MSC in SF8 to reduce complicated and rarely used fission quantity codes in dictionary 236 when two or more codes separated by slashes are in SF7 and PAR or CRL are also relevant.

#### Example:

- Average neutron kinetic energy as a function of total kinetic energy of fission fragments (--- (0, F) , PAR, AKE, N/FF) (14065.007)
- Average neutron kinetic energy as a function of total kinetic energy and mass of fission fragments (--- (0, F) MASS, PAR, AKE, N/FF) (14065.008, 14065.010)

### **Dictionary 236 (Quantities)**

Here alternative new quantity codes are proposed only for major obsolete codes.

, KE, FF	(Obsolete, <u>21 entries</u> )
, KE	(New code, proposed in Memo CP-D/598)
PR, AKE, N	(Obsolete, <u>45 entries</u> )
PR, KE	Kinetic energy averaged for prompt particle specified
SEC, KE, FF	(Obsolete, 6 entries)
TER, KE, FF	(Obsolete, 3 entries)
TER, DA/KE, *	(Obsolete, 1 entry)
PR, KE/CRL, N/HF	(Obsolete, 1 entry)
PR, KE/CRL, N/LF	(Obsolete, 1 entry)
PRE, DA/KE, FF	(Obsolete, 1 entry)
, DA/KE, FF	(Obsolete, 1 entry)
, AKE	(Obsolete, 8 entries)
, AKE, *	(Obsolete, <u>61 entries</u> )
, AKE, *F	Kinetic energy averaged for fragment specified
, AKE, *, RES	(Obsolete, 1 entry)
SPL, AKE	(Obsolete, 1 entry)
TER, AKE, LCP	(Obsolete, 5 entries)
TER, AKE, *	(Obsolete, <u>29 entries</u> )
TER, AKE, *F	Kinetic energy averaged for fragment specified in ternary fission
DL, AKE, N	(Obsolete, 1 entry)
DL/GRP, AKE, N	(Obsolete, 2 entries)
, DL/GRP, KE	(New code, proposed in Memo CP-D/598)
DL/PAR, AKE, N	(Obsolete, 1 entry)
FIS, AKE	(Obsolete, 0 entry)
PAR, AKE, G	(Obsolete, 0 entry)
PAR, AKE, N	(Obsolete, 2 entries)
PAR, KE	(New code, proposed in Memo CP-D/598)
PAR/PRE, AKE	(Obsolete, 1 entry)
PAR, AKE, G/N	(Obsolete, 1 entry)
PR/PAR, AKE, N	(Obsolete, 1 entry)
PR, AKE/DE, N/FF	(Obsolete, 1 entry)
IND, AKE/DA	(Obsolete, 1 entry)
, AKE/DA, *	(Obsolete, 4 entries)
PR, AKE/DA, N	(Obsolete, 1 entry)
PRE/TER, AKE/CRL, A/FF	(Obsolete, 1 entry)
, KEM, N	(Obsolete, 0 entry)
PR, KEM, N	(Obsolete, 7 entries)
PR, KEP, FF	(Obsolete, 0 entry)
PR, KEP, HF	(Obsolete, 0 entry)
PR, KEP, LF	(Obsolete, 0 entry)
PRE/TER, KEP/CRL, A/FF	(Obsolete, 0 entry)



**Proposed corrections for averaged kinetic energy and most probable kinetic energy, mass and charge (KE, AKE, KEP, KEM, AP, AZ)**  
**(The original articles were not checked by NDS. Responsible centre should check if proposed corrections are right before the correction.**  
**“TKE” in remark means the given quantity is assumed as “total kinetic energy” according to the free text under REACTION.)**

<b>Subentry</b>	<b>Current REACTION</b>	<b>should be</b>	<b>Remark</b>
10517.007	94-PU-239(N,F),,ZP	94-PU-239(N,F)MASS,,ZP	
10612.008	98-CF-252(0,F),,AKE,N	98-CF-252(0,F)0-NN-1,,KE	1356
10614.008	98-CF-252(0,F),,AKE,N	98-CF-252(0,F)0-NN-1,,KE	
13800.003	92-U-235(N,F),DL/GRP,AKE,N	92-U-235(N,F)0-NN-1,DL/GRP,KE	1356
13936.002	92-U-238(N,F),PAR,AKE,N	92-U-238(N,F)0-NN-1,PAR,KE	1356
13936.003	92-U-238(N,F),,AKE,N	92-U-238(N,F)0-NN-1,KE	
13964.004	92-U-238(N,F),PR/PAR,AKE,N	92-U-238(N,F)0-NN-1,PR/PAR,KE	
13964.005	92-U-238(N,F),PR/PAR,AKE,N	92-U-238(N,F)0-NN-1,PR/PAR,KE	
14065.003	98-CF-252(0,F)MASS,,AKE,N	98-CF-252(0,F)MASS,,KE,N	
14065.007	98-CF-252(0,F),PAR,AKE,N/FF	98-CF-252(0,F)0-NN-1,,KE,,MSC	
14065.008	98-CF-252(0,F)MASS,PAR,AKE,N/FF	98-CF-252(0,F)MASS,,KE,N,,MSC	
14065.010	98-CF-252(0,F)MASS,PAR,AKE,N/FF	98-CF-252(0,F)MASS,KE,N,,MSC	
14096.002	92-U-233(N,F),PR,AKE,N,,DERIV	92-U-233(N,F)0-NN-1,PR,KE,,DERIV	
14096.003	92-U-235(N,F),PR,AKE,N,,DERIV	92-U-235(N,F)0-NN-1,PR,KE,,DERIV	
14096.004	94-PU-239(N,F),PR,AKE,N,,DERIV	94-PU-239(N,F)0-NN-1,PR,KE,,DERIV	
14986.005	94-PU-240(N,F),PR,AKE,N,,DERIV	94-PU-240(N,F)0-NN-1,PR,KE,,DERIV	
14096.006	94-PU-240(N,F),PR,AKE,N,,DERIV	94-PU-240(N,F)0-NN-1,PR,KE,,DERIV	
14097.002	92-U-233(N,F),PR,AKE,N	92-U-233(N,F)0-NN-1,PR,KE	
14098.002	92-U-235(N,F),PR,AKE,N	92-U-235(N,F)0-NN-1,PR,KE	
14098.003	(94-PU-239(N,F),PR,AKE,N)/ (92-U-235(N,F),PR,AKE,N)	(94-PU-239(N,F)0-NN-1,PR,KE)/ (92-U-235(N,F)0-NN-1,PR,KE)	
14099.002	92-U-235(N,F),PR,AKE,N	92-U-235(N,F)0-NN-1,PR,KE	
14100.002	96-CM-244(0,F),PR,AKE,N	96-CM-244(0,F)0-NN-1,PR,KE	
14101.002	98-CF-252(0,F)MASS,,AKE,FF	98-CF-252(0,F)MASS,,KE	

14101.003	98-CF-252(0,F)MASS,,KE/CRL,LF/HF	98-CF-252(0,F)MASS,,KE,LF+HF	
14215.002	92-U-238(N,F),PR,AKE,N	92-U-238(N,F)0-NN-1,PR,KE	
14215.004	93-NP-237(N,F),PR,AKE,N	93-NP-237(N,F)0-NN-1,PR,KE	
20137.021	92-U-238(N,F),,AKE/DA,N	92-U-238(N,F)0-NN-1,,KE/DA	
20137.022	92-U-238(N,F),,AKE/DA,N	92-U-238(N,F)0-NN-1,,KE/DA	
20137.023	92-U-238(N,F),,AKE,N	92-U-238(N,F)0-NN-1,,KE	
20175.002	92-U-235(N,F),PR,AKE,N	92-U-235(N,F)0-NN-1,PR,KE	
20385.002	92-U-235(N,F),PR,AKE,N	92-U-235(N,F)0-NN-1,PR,KE	
20392.003	94-PU-239(N,F),PR,AKE,N	94-PU-239(N,F)0-NN-1,PR,KE	
20394.007	92-U-235(N,F),PR,AKE,N	92-U-235(N,F)0-NN-1,PR,KE	
20401.002	98-CF-252(0,F),PR,AKE,N	98-CF-252(0,F)0-NN-1,PR,KE	
20575.002	92-U-235(N,F),,AKE,N	92-U-235(N,F)0-NN-1,,KE	
20575.005	94-PU-239(N,F),,AKE,N	94-PU-239(N,F)0-NN-1,,KE	
20575.007	98-CF-252(0,F),,AKE,N	98-CF-252(0,F)0-NN-1,,KE	
20576.002	94-PU-239(N,F),PR,AKE,N	94-PU-239(N,F)0-NN-1,PR,KE	
20616.002	92-U-235(N,F),PAR,AKE,N	92-U-235(N,F)0-NN-1,PAR,KE	
20616.004	94-PU-239(N,F),PAR,AKE,N	94-PU-239(N,F)0-NN-1,PAR,KE	
20616.006	98-CF-252(0,F),PAR,AKE,N	98-CF-252(0,F)0-NN-1,PAR,KE	
20996.002	92-U-235(N,F),PR,AKE,N	92-U-235(N,F)0-NN-1,PR,KE	
20997.002	92-U-235(N,F),PR,AKE,N	92-U-235(N,F)0-NN-1,PR,KE	
20997.005	94-PU-239(N,F),PR,AKE,N	94-PU-239(N,F)0-NN-1,PR,KE	
21310.003	90-TH-232(N,F),,AP	90-TH-232(N,F),PRE,AP,HF	
21313.013	91-PA-231(N,F)MASS,SEC,KE,FF,MXW	91-PA-231(N,F)MASS,SEC,KE,,MXW	
21313.014	92-U-235(N,F)MASS,SEC,KE,FF,MXW	92-U-235(N,F)MASS,SEC,KE,,MXW	
21319.013	91-PA-231(N,F)MASS,SEC,KE,FF,MXW	91-PA-231(N,F)MASS,PRV,KE,,MXW	
21319.014	92-U-235(N,F)MASS,SEC,KE,FF,MXW	92-U-235(N,F)MASS,PRV,KE,,MXW	
21543.016	93-NP-237(N,F)MASS,SEC,KE,FF,MXW	93-NP-237(N,F)MASS,PRV,KE,,MXW	
21543.017	92-U-235(N,F)MASS,SEC,KE,FF,MXW	92-U-235(N,F)MASS,PRV,KE,,MXW	
21544.009	94-PU-239(N,F)MASS,SEC,KE,FF,MXW	94-PU-239(N,F)MASS,PRV,KE,,MXW	

21545.015	95-AM-241(N,F)MASS,SEC,KE,FF,MXW	95-AM-241(N,F)MASS,PRV,KE,,MXW	
21545.016	95-AM-243(N,F)MASS,SEC,KE,FF,MXW	95-AM-243(N,F)MASS,PRV,KE,,MXW	
21545.017	95-AM-241(N,F)MASS,SEC,KE,LF+HF,MXW	95-AM-241(N,F)MASS,PRV,KE,LF+HF,MXW	
21545.018	95-AM-243(N,F)MASS,SEC,KE,LF+HF,MXW	95-AM-243(N,F)MASS,PRV,KE,LF+HF,MXW	
21546.002	92-U-235(N,F),PR,AKE,N	92-U-235(N,F)0-NN-1,PR,KE	
21546.003	92-U-238(N,F),PR,AKE,N	92-U-238(N,F)0-NN-1,PR,KE	
21661.002	93-NP-237(N,F)MASS,,KE,FF	93-NP-237(N,F)MASS,,KE	
21661.003	93-NP-237(N,F)MASS,,KE,,FF	93-NP-237(N,F)MASS,,KE	
21661.006	93-NP-237(N,F)MASS,PRE,KE,LF	93-NP-237(N,F)MASS,PRE,KE	
21661.007	93-NP-237(N,F)MASS,PRE,KE,HF	93-NP-237(N,F)MASS,PRE,KE	
21661.008	93-NP-237(N,F)MASS,PRE,KE,LF	93-NP-237(N,F)MASS,PRE,KE	
21661.009	93-NP-237(N,F)MASS,PRE,KE,HF	93-NP-237(N,F)MASS,PRE,KE	
21699.002	98-CF-252(0,F),TER,AKE,A	98-CF-252(0,F)2-HE-4,TER,KE	
21699.003	98-CF-252(0,F),TER,AKE,T	98-CF-252(0,F)1-H-3,TER,KE	
21705.008	92-U-235(N,F),TER,AKE,P,MXW	92-U-235(N,F)1-H-1,TER,KE,,MXW	
21705.009	92-U-235(N,F),TER,AKE,D,MXW	92-U-235(N,F)1-H-2,TER,KE,,MXW	
21705.010	92-U-235(N,F),TER,AKE,T,MXW	92-U-235(N,F)1-H-3,TER,KE,,MXW	
21705.011	92-U-235(N,F),TER,AKE,A,MXW	92-U-235(N,F)2-HE-4,TER,KE,,MXW	
21705.012	92-U-235(N,F),TER,AKE,HE6,MXW	92-U-235(N,F)2-HE-6,TER,KE,,MXW	
21705.016	92-U-235(N,F),TER,AKE,LCP,MXW	92-U-235(N,F)2-HE-8,TER,KE,,MXW	
21724.002	92-U-233(N,F),TER,AKE,A,MXW	92-U-233(N,F)2-HE-4,TER,KE,,MXW	
21724.006	92-U-238(N,A)90-TH-235,,AKE,,MXW	92-U-238(N,A)90-TH-235,,KE,,MXW	
21752.005	93-NP-237(N,F),TER,AKE,A	93-NP-237(N,F)2-HE-4,TER,KE	
21752.006	92-U-235(N,F),TER,AKE,A	92-U-235(N,F)2-HE-4,TER,KE	
21752.013.1	93-NP-237(N,F)MASS,,KE,FF,MXW	93-NP-237(N,F)MASS,,KE,MXW	
21752.013.2	92-U-235(N,F)MASS,,KE,FF,MXW	92-U-235(N,F)MASS,,KE,,MXW	
21752.014.1	93-NP-237(N,F)MASS,,AKE,FF,MXW	93-NP-237(N,F)MASS,,KE,LF+HF,MXW	TKE
21752.014.2	92-U-235(N,F)MASS,,AKE,FF,MXW	93-NP-237(N,F)MASS,,KE,LF+HF,MXW	TKE
21760.002	90-TH-232(N,F),PR,KEM,N	90-TH-232(N,F)0-NN-1,PR,KEM	

21834.006	92-U-235(N,F)MASS,,KE,FF	92-U-235(N,F)MASS,,KE	
21834.007	92-U-235(N,F)MASS,,KE,FF	92-U-235(N,F)MASS,,KE	
21834.016	93-NP-237(N,F)MASS,,KE,FF	93-NP-237(N,F)MASS,,KE	
21834.017	93-NP-237(N,F)MASS,,KE,FF	93-NP-237(N,F)MASS,,KE	
21995.010	94-PU-239(N,F)MASS,PRE,KE,FF,MXW	94-PU-239(N,F)MASS,PRE,KE,,MXW	
21995.037	94-PU-240(0,F)MASS,PRE,KE,FF	94-PU-240(0,F)MASS,PRE,KE	
21995.038	94-PU-239(N,F)MASS,RE,KE,FF,MXW	94-PU-239(N,F)MASS,PRE,KE,,MXW	
21995.039	94-PU-240(0,F)MASS,PRE,KE,FF	94-PU-240(0,F)MASS,PRE,KE	
22005.006	92-U-233(N,F),TER,AKE,T,MXW	92-U-233(N,F)1-H-3,TER,KE,,MXW	
22005.007	92-U-235(N,F),TER,AKE,T,MXW	92-U-235(N,F)1-H-3,TER,KE,,MXW	
22005.008	94-PU-239(N,F),TER,AKE,T,MXW	94-PU-239(N,F)1-H-3,TER,KE,,MXW	
22005.009	94-PU-241(N,F),TER,AKE,T,MXW	94-PU-241(N,F)1-H-3,TER,KE,,MXW	
22005.010	92-U-233(N,F),,TER,AKE,A,MXW	92-U-233(N,F)2-HE-4,TER,KE,,MXW	
22005.011	92-U-233(N,F),,TER,AKE,A,MXW	92-U-233(N,F)2-HE-4,TER,KE,,MXW	
22005.012	92-U-235(N,F),,TER,AKE,A,MXW	92-U-235(N,F)2-HE-4,TER,KE,,MXW	
22005.013	94-PU-239(N,F),,TER,AKE,A,MXW	94-PU-239(N,F)2-HE-4,TER,KE,,MXW	
22005.014	94-PU-239(N,F),,TER,AKE,A,MXW	94-PU-239(N,F)2-HE-4,TER,KE,,MXW	
22005.015	94-PU-241(N,F),,TER,AKE,A,MXW	94-PU-241(N,F)2-HE-4,TER,KE,,MXW	
22151.004	92-U-235(N,F)ELEM/MASS,SEC,KE,FF,MXW	92-U-235(N,F)ELEM/MASS,SEC,KE,,MXW	
22152.010	92-U-235(N,F)MASS,PRE,KE/CRL,LF/HF,MXW	92-U-235(N,F)MASS,PRE,KE,LF+HF,MXW	
22296.006	98-CF-249(N,F)MASS,AKE,LF	98-CF-249(N,F)MASS,,KE	
22402.006	92-U-238(N,F)MASS,PRE,KE,FF	92-U-238(N,F)MASS,PRE,KE	
22432.006	94-PU-238(0,F),TER,AKE,A	94-PU-238(0,F)2-HE-4,TER,KE	
22432.007	94-PU-240(0,F),TER,AKE,A	94-PU-240(0,F)2-HE-4,TER,KE	
22432.008	94-PU-242(0,F),TER,AKE,A	94-PU-242(0,F)2-HE-4,TER,KE	
22432.009	94-PU-244(0,F),TER,AKE,A	94-PU-244(0,F)2-HE-4,TER,KE	
22464.012.1	92-U-235(N,F),PR,KE/CRL,N/LF,MXW	92-U-235(N,F)0-NN-1,PR,KE,,MSC	
22464.012.2	92-U-235(N,F),PR,KE/CRL,N/HF,MXW	92-U-235(N,F)0-NN-1,PR,KE,,MSC	
22470.004	93-NP-237(N,F)MASS,PRE,KE,FF	93-NP-237(N,F)MASS,PRE,KE	



22477.002	92-U-233(N,F),PR,KEM,N	92-U-233(N,F)0-NN-1,PR,KEM	
22477.003	92-U-233(N,F),PR,AKE,N	92-U-233(N,F)0-NN-1,PR,KE	
22477.004	92-U-238(N,F),PR,KEM,N	92-U-238(N,F)0-NN-1,PR,KEM	
22477.005	92-U-238(N,F),PR,AKE,N	92-U-238(N,F)0-NN-1,PR,KE	
22477.006	90-TH-232(N,F),PR,KEM,N	90-TH-232(N,F)0-NN-1,PR,KEM	
22477.007	90-TH-232(N,F),PR,AKE,N	90-TH-232(N,F)0-NN-1,PR,KE	
22481.002	93-NP-237(N,F),PR,KEM,N	93-NP-237(N,F)0-NN-1,PR,KEM	
22481.003.1	93-NP-237(N,F),PR,AKE,N	93-NP-237(N,F)0-NN-1,PR,KE	
22481.003.2	93-NP-237(N,F),PR,AKE,N	93-NP-237(N,F)0-NN-1,PR,KE	
22650.003	94-PU-239(N,F)MASS,PRE,KE,FF,MXW	94-PU-239(N,F)MASS,PRE,KE,,MXW	
22650.009	94-PU-239(N,F)MASS,PRE,KE,FF,MXW	94-PU-239(N,F)MASS,PRE,KE,,MXW	
22650.013	94-PU-239(N,F)MASS,PRE,KE,FF,MXW	94-PU-239(N,F)MASS,PRE,KE,,MXW	
22660.004	92-U-233(N,F)MASS,PR,AKE/DE,N/FF,MXW	92-U-233(N,F)MASS,PR,KE/DE,N/FF,MXW	
22668.005	92-U-233(N,F),PR,KEM,N	92-U-233(N,F)0-NN-1,PR,KEM	
22688.006	92-U-238(N,F),PR,KEM,N	92-U-238(N,F)0-NN-1,PR,KEM	
22688.007	90-TH-232(N,F),PR,KEM,N	90-TH-232(N,F)0-NN-1,PR,KEM	
22690.003	94-PU-239(N,F),PRE,AP	94-PU-239(N,F),PRE,AP,FF	
22734.003	90-TH-229(N,F)ELEM/MASS,TER,KE,FF,MXW	90-TH-229(N,F)ELEM/MASS,TER,KE,,MXW	
22734.005	94-PU-239(N,F)ELEM/MASS,TER,KE,FF,MXW	94-PU-239(N,F)ELEM/MASS,TER,KE,,MXW	
22756.006	92-U-235(N,F),,AKE/DA,N,MXW	92-U-235(N,F)0-NN-1,,KE/DA,,MXW/MS	
22840.003	96-CM-245(N,F)MASS,PRE,KE,FF,MXW	96-CM-245(N,F)MASS,PRE,KE,,MXW	
22840.005	96-CM-245(N,F)MASS,,ZP,LF,MXW	96-CM-245(N,F)MASS,,ZP,,MXW	
22849.002	92-U-233(N,F)MASS,PRE,KE,FF,MXW	92-U-233(N,F)MASS,PRE,KE,,MXW	
22859.002	98-CF-249(N,F)ELEM/MASS,TER,KE,FF,MXW	98-CF-249(N,F)ELEM/MASS,TER,KE,,MXW	
22896.002	92-U-235(N,F),TER,AKE,A	92-U-235(N,F)2-HE-4,TER,KE	
22896.003.1	92-U-235(N,F),TER,AKE,A	92-U-235(N,F)2-HE-4,TER,KE	
22896.003.2	92-U-235(N,F),TER,AKE,A	92-U-235(N,F)2-HE-4,TER,KE	
22896.003.3	92-U-235(N,F),TER,AKE,A	92-U-235(N,F)2-HE-4,TER,KE	
22896.004.1	92-U-235(N,F),TER,AKE,A	92-U-235(N,F)2-HE-4,TER,KE	

22896.004.2	92-U-235(N,F),TER,AKE,A	92-U-235(N,F)2-HE-4,TER,KE	
22896.005	98-CF-252(0,F),TER,AKE,A	98-CF-252(0,F)2-HE-4,TER,KE	
22896.006.1	98-CF-252(0,F),TER,AKE,A	98-CF-252(0,F)2-HE-4,TER,KE	
22896.006.2	98-CF-252(0,F),TER,AKE,A	98-CF-252(0,F)2-HE-4,TER,KE	
22896.006.3	98-CF-252(0,F),TER,AKE,A	98-CF-252(0,F)2-HE-4,TER,KE	
22896.007.1	98-CF-252(0,F),TER,AKE,A	98-CF-252(0,F)2-HE-4,TER,KE	
22896.007.2	98-CF-252(0,F),TER,AKE,A	98-CF-252(0,F)2-HE-4,TER,KE	
22899.002	98-CF-251(N,F)ELEM/MASS,TER,KE,FF,MXW	98-CF-251(N,F)ELEM/MASS,TER,KE,,MXW	
22985.002	94-PU-239(N,F)MASS,,KE,FF,MXW	94-PU-239(N,F)MASS,,KE,,MXW	
22985.003	92-U-235(N,F)MASS,,KE,FF,MXW	92-U-235(N,F)MASS,,KE,,MXW	
23012.005	94-PU-239(N,F)MASS,PRE,KE/CRL,LF/HF,MXW	94-PU-239(N,F)MASS,PRE,KE,LF+HF,MXW	TKE
23012.006	94-PU-239(N,F)MASS,PRE,KE,FF,MXW	94-PU-239(N,F)MASS,PRE,KE,,MXW	
23014.002	92-U-233(N,F)MASS,PRE,KE/CRL,LF/HF,MXW	92-U-233(N,F)MASS,PRE,KE,LF+HF,MXW	TKE
23014.003	92-U-235(N,F)MASS,PRE,KE/CRL,LF/HF,MXW	92-U-235(N,F)MASS,PRE,KE,LF+HF,MXW	TKE
23014.004	92-U-233(N,F)MASS,PRE,KE,FF,MXW	92-U-233(N,F)MASS,PRE,KE,,MXW	
23014.005	92-U-235(N,F)MASS,PRE,KE,FF,MXW	92-U-235(N,F)MASS,PRE,KE,,MXW	
23026.007.1	96-CM-243(N,F),TER,AKE,A,SPA	96-CM-243(N,F)2-HE-4,TER,KE,,SPA	
23026.007.2	96-CM-243(N,F),TER,AKE,T,SPA	96-CM-243(N,F)1-H-3,TER,KE,,SPA	
23026.008.1	96-CM-245(N,F),TER,AKE,A,SPA	96-CM-245(N,F)2-HE-4,TER,KE,,SPA	
23026.008.2	96-CM-245(N,F),TER,AKE,T,SPA	96-CM-245(N,F)1-H-3,TER,KE,,SPA	
23026.009.1	96-CM-247(N,F),TER,AKE,A,SPA	96-CM-247(N,F)2-HE-4,TER,KE,,SPA	
23026.009.2	96-CM-247(N,F),TER,AKE,T,SPA	96-CM-247(N,F)1-H-3,TER,KE,SPA	
23026.010.1	96-CM-244(0,F),TER,AKE,A	96-CM-244(0,F)2-HE-4,TER,KE	
23026.010.2	96-CM-244(0,F),TER,AKE,T	96-CM-244(0,F)1-H-3,TER,KE	
23026.011.1	96-CM-246(0,F),TER,AKE,A	96-CM-246(0,F)2-HE-4,TER,KE	
23026.011.2	96-CM-246(0,F),TER,AKE,T	96-CM-246(0,F)1-H-3,TER,KE	
23026.012.1	96-CM-248(0,F),TER,AKE,A	96-CM-248(0,F)2-HE-4,TER,KE	
23026.012.2	96-CM-248(0,F),TER,AKE,T	96-CM-248(0,F)1-H-3,TER,KE	
23048.002.2	96-CM-244(0,F),TER,AKE,T	96-CM-244(0,F)1-H-3,TER,KE	

23048.003.2	96-CM-243(0,F),TER,AKE,T	96-CM-243(0,F)1-H-3,TER,KE	
23048.004.2	96-CM-251(0,F),TER,AKE,T	96-CM-251(0,F)1-H-3,TER,KE	
23048.005.2	96-CM-249(0,F),TER,AKE,T	96-CM-249(0,F)1-H-3,TER,KE	
23054.007.1	92-U-238(N,F),PRE,AP,,MSC	92-U-238(N,F),PRE,AP,FF,MSC	
23054.007.2	92-U-238(N,F),PRE,AP,,MSC	92-U-238(N,F),PRE,AP,FF,MSC	
23054.010	92-U-238(N,F)MASS,PRE,KE,FF	92-U-238(N,F)MASS,PRE,KE	
23054.011	92-U-238(N,F)MASS,SEC,KE,FF	92-U-238(N,F)MASS,SEC,KE	
23056.002	92-U-235(N,F),PR,AKE/DA,N	92-U-235(N,F)0-NN-1,PR,KE/DA	
23056.003	92-U-235(N,F),PR,AKE/DA,N	92-U-235(N,F)0-NN-1,PR,KE/DA	
23056.004	92-U-235(N,F),PR,AKE/DA,N	92-U-235(N,F)0-NN-1,PR,KE/DA	
23056.005	92-U-235(N,F),PR,AKE/DA,N	92-U-235(N,F)0-NN-1,PR,KE/DA	
30093.002	(92-U-235(N,F),BIN,AKE,FF)- (92-U-235(N,F),TER,AKE,FF)	(92-U-235(N,F),,AKE,FF)- (92-U-235(N,F),TER,AKE,FF)	
30270.004	92-U-235(N,F),TER,AKE,A,MXW	92-U-235(N,F)2-HE-4,TER,KE,,MXW	
30270.005	92-U-235(N,F),TER,AKE,A,SPA	92-U-235(N,F)2-HE-4,TER,KE,,SPA	
30272.004.1	92-U-235(N,F),TER,KEP,A,MXW	92-U-235(N,F)2-HE-4,TER,KEP,,MXW	
30272.004.2	92-U-235(N,F),TER,AKE,A,MXW	92-U-235(N,F)2-HE-4,TER,KE,,MXW	
30278.003	92-U-235(N,F),TER,AKE,A,MXW	92-U-235(N,F)2-HE-4,TER,KE,,MXW	
30279.005.1	92-U-235(N,F),TER,KEP,A,MXW	92-U-235(N,F)2-HE-4,TER,KEP,,MXW	
30279.005.2	92-U-235(N,F),TER,AKE,A,MXW	92-U-235(N,F)2-HE-4,TER,KE,,MXW	
30279.005.3	92-U-235(N,F),TER,AKE,A,MXW	92-U-235(N,F)2-HE-4,TER,KE,,MXW	
30279.005.4	92-U-235(N,F),TER,AKE,A,MXW	92-U-235(N,F)2-HE-4,TER,KE,,MXW	
30307.002.1	93-NP-237(N,F)ELEM/MASS,,KE,FF,SPA	93-NP-237(N,F)ELEM/MASS,,KE,,SPA	
30307.002.2	93-NP-237(N,F)ELEM/MASS,,KE,FF,SPA	93-NP-237(N,F)ELEM/MASS,,KE,,SPA	
30320.005	94-PU-239(N,F)ELEM/MASS,TER,AKE,FF	94-PU-239(N,F)ELEM/MASS,TER,KE	
30497.002	92-U-235(N,F),TER,AKE,A	92-U-235(N,F)2-HE-4,TER,KE	
30498.002	94-PU-239(N,F),TER,AKE,A	94-PU-239(N,F)2-HE-4,TER,KE	
30499.002	92-U-235(N,F)2-HE-4,TER,AKE,FF,MXW	92-U-235(N,F)2-HE-4,TER,AKE,LF,MXW/MSC 92-U-235(N,F)2-HE-4,TER,AKE,HF,MXW/MSC	

		92-U-235(N,F)2-HE-4,TER,AKE,LF+HF,MXW/MSC	
30499.003	92-U-235(N,F)2-HE-4,TER,AKE,A,MXW	92-U-235(N,F)2-HE-4,TER,KE,,MXW	
30499.004	92-U-235(N,F),BIN,AKE,FF,MXW	92-U-235(N,F),,AKE,LF,MXW 92-U-235(N,F),,AKE,HF,MXW 92-U-235(N,F),,AKE,LF+HF,MXW	
30505.003	92-U-235(N,F)2-HE-4,TER,DA/KE,A,MXW	92-U-235(N,F)2-HE-4,TER,KE/DA,,MXW	
30509.002	92-U-235(N,F)2-HE-4,TER,AKE,A	92-U-235(N,F)2-HE-4,TER,KE	
30521.003.L	92-U-235(N,F)ELEM/MASS,TER,AKE,LCP,MXW	92-U-235(N,F)ELEM/MASS,TER,KE,,MXW/MSC	
30521.003.H	92-U-235(N,F)ELEM/MASS,TER,AKE,LCP,MXW	92-U-235(N,F)ELEM/MASS,TER,KE,,MXW/MSC	
30521.004.1	92-U-235(N,F)ELEM/MASS,TER,AKE,LF,MXW	92-U-235(N,F)ELEM/MASS,TER,KE,,MXW/MSC	
30521.004.2	92-U-235(N,F)ELEM/MASS,TER,AKE,HF,MXW	92-U-235(N,F)ELEM/MASS,TER,KE,,MXW/MSC	
30521.005.1	92-U-235(N,F)ELEM/MASS,TER,AKE,LF,MXW	92-U-235(N,F)ELEM/MASS,TER,KE,,MXW/MSC	
30521.005.2	92-U-235(N,F)ELEM/MASS,TER,AKE,HF,MXW	92-U-235(N,F)ELEM/MASS,TER,KE,,MXW/MSC	
30526.003	92-U-235(N,F)ELEM/MASS,TER,AKE,FF,MXW	92-U-235(N,F)ELEM/MASS,TER,KE,,MXW	
30541.002	92-U-235(N,F),DL/GRP,AKE,N	92-U-235(N,F)0-NN-1,DL/GRP,KE	
30541.003	92-U-235(N,F),DL,AKE,N	92-U-235(N,F)0-NN-1,DL,KE	
30619.002	98-CF-252(0,F),,AKE,N	98-CF-252(0,F)0-NN-1,,KE	
30667.003	98-CF-252(0,F),,AKE,N	98-CF-252(0,F)0-NN-1,,KE	
30713.002	98-CF-252(0,F),,KE,FF	98-CF-252(0,F),,AKE,FF	
30822.009	24-CR-52(N,INL)24-CR-52,PAR,AKE,G/N	24-CR-52(N,INL)24-CR-52,,KE,G,MSC	
30916.003.1	98-CF-252(0,F)MASS,TER,AKE,A	98-CF-252(0,F)MASS,TER,KE,A	
30916.003.2	98-CF-252(0,F)MASS,TER,KEP,A	98-CF-252(0,F)MASS,TER,KEP,A	
30916.005.1	98-CF-252(0,F),PRE/TER,AKE/CRL,A/FF	98-CF-252(0,F)2-HE-4,TER,KE,,MSC	
30916.005.2	98-CF-252(0,F),PRE/TER,KEP/CRL,A/FF	98-CF-252(0,F)2-HE-4,TER,KEP,,MSC	
30916.007	98-CF-252(0,F)MASS,PRE/TER,KE/CRL,FF/A	98-CF-252(0,F)MASS,PRE/TER,KE,,MSC	
31403.002	92-U-238(N,F),PR,AKE,N	92-U-238(N,F)0-NN-1,PR,KE	
31405.002	98-CF-252(N,F),PR,AKE,N	98-CF-252(N,F)0-NN-1,PR,KE	
31440.002	98-CF-252(0,F),PR,AKE,N	98-CF-252(0,F)0-NN-1,PR,KE	
31443.002	92-U-238(N,F),PR,AKE,N	92-U-238(N,F)0-NN-1,PR,KE	

31685.003.1	92-U-235(N,F)MASS,,KE,FF,MXW	92-U-235(N,F)MASS,,KE,,MXW	
31685.003.2	92-U-235(N,F)MASS,,KE,FF,MXW	92-U-235(N,F)MASS,,KE,,MXW	
32510.002	98-CF-252(0,F),PR,AKE,N	98-CF-252(0,F)0-NN-1,PR,KE	
32587.003	92-U-235(N,F),PR,AKE,N,MXW	92-U-235(N,F)0-NN-1,PR,KE,,MXW	
40011.002	92-U-235(N,F),,KE,FF,REL	92-U-235(N,F),,AKE,FF,REL	
40011.003	92-U-235(N,F),,KE,FF,REL	92-U-235(N,F),,AKE,FF,REL	
40017.009	92-U-235(N,F),,KE,FF	92-U-235(N,F),,AKE,FF	
40017.010	92-U-235(N,F),,KE,FF	92-U-235(N,F),,AKE,FF	
40017.011	92-U-235(N,F),,KE,FF	92-U-235(N,F),,AKE,FF	
40017.012	92-U-235(N,F),,KE,FF	92-U-235(N,F),,AKE,FF	
40017.013	92-U-235(N,F),,KE,FF	92-U-235(N,F),,AKE,FF	
40017.014	92-U-235(N,F),,KE,FF	92-U-235(N,F),,AKE,FF	
40017.015	92-U-235(N,F),,KE,FF	92-U-235(N,F),,AKE,FF	
40064.008	95-AM-242-M1(N,F),PR,AKE,N	95-AM-242-M1(N,F)0-NN-1,PR,KE	
40064.009	96-CM-244(0,F),PR,AKE,N	96-CM-244(0,F)0-NN-1,PR,KE	
40064.010	96-CM-245(0,F),PR,AKE,N	96-CM-245(0,F)0-NN-1,PR,KE	
40064.011	98-CF-252(0,F),PR,AKE,N	98-CF-252(0,F)0-NN-1,PR,KE	
40064.012	90-TH-229(N,F),PR,AKE,N	90-TH-229(N,F)0-NN-1,PR,KE	
40064.013	94-PU-238(N,F),PR,AKE,N	94-PU-238(N,F)0-NN-1,PR,KE	
40106.004	92-U-233(N,F),,KE,FF	92-U-233(N,F),,AKE,FF,MSC	
40112.007	92-U-233(N,F),,KE,FF	92-U-233(N,F)MASS,,KE	
40112.008	92-U-233(N,F),,KE,FF	92-U-233(N,F)MASS,,KE	
40112.009	92-U-233(N,F),,KE,FF	92-U-233(N,F)MASS,,KE	
40112.013	94-PU-239(N,F),,KE,FF	94-PU-239(N,F)MASS,,KE	
40112.014	94-PU-239(N,F),,KE,FF	94-PU-239(N,F)MASS,,KE	
40112.015	94-PU-239(N,F),,KE,FF	94-PU-239(N,F)MASS,,KE	
40125.003.2	98-CF-249(N,F),,AKE,FF/ 98-CF-252(N,0),,AKE,FF	98-CF-249(N,F),,AKE,FF/ 98-CF-252(0,F),,AKE,FF	
40172.007	93-NP-237(N,F),,KE,FF	93-NP-237(N,F)MASS,,KE	

40172.008	93-NP-237(N,F),,KE,FF	93-NP-237(N,F)MASS,,KE	
40172.009	93-NP-237(N,F),,KE,FF	93-NP-237(N,F)MASS,,KE	
40172.010	93-NP-237(N,F),,KE,FF	93-NP-237(N,F)MASS,,KE	
40172.011	93-NP-237(N,F),,KE,FF	93-NP-237(N,F)MASS,,KE	
40173.008	90-TH-232(N,F)MASS,,AKE,FF	90-TH-232(N,F)MASS,,KE	
40173.009	90-TH-232(N,F)MASS,,AKE,FF	90-TH-232(N,F)MASS,,KE	
40173.010	90-TH-232(N,F)MASS,,AKE,FF	90-TH-232(N,F)MASS,,KE	
40173.011	90-TH-232(N,F)MASS,,AKE,FF	90-TH-232(N,F)MASS,,KE	
40173.012	90-TH-232(N,F)MASS,,AKE,FF	90-TH-232(N,F)MASS,,KE	
40173.013	90-TH-232(N,F)MASS,,AKE,FF	90-TH-232(N,F)MASS,,KE	
40194.002	94-PU-242(0,F)MASS,PRE,KE,FF	94-PU-242(0,F)MASS,PRE,KE	
40194.003	94-PU-241(N,F)MASS,PRE,KE,FF,MXW	94-PU-241(N,F)MASS,PRE,KE,,MXW	
40200.003	92-U-235(N,F)MASS,PRE,KE,FF,MXW	92-U-235(N,F)MASS,PRE,KE,,MXW	
40232.003	98-CF-252(0,F)MASS,,AKE,FF	98-CF-252(0,F)MASS,,KE	
40234.003	92-U-235(N,F),,KE,FF	92-U-235(N,F),,AKE,FF	
40235.017	92-U-235(N,F),,KE,FF	92-U-235(N,F)MASS,,KE	
40235.018	92-U-235(N,F),,KE,FF	92-U-235(N,F)MASS,,KE	
40235.019	92-U-235(N,F),,KE,FF	92-U-235(N,F)MASS,,KE	
40235.020	92-U-235(N,F),,KE,FF	92-U-235(N,F)MASS,,KE	
40235.021	92-U-235(N,F),,KE,FF	92-U-235(N,F)MASS,,KE	
40235.022	92-U-235(N,F),,KE,FF	92-U-235(N,F)MASS,,KE	
40235.023	92-U-235(N,F),,KE,FF	92-U-235(N,F)MASS,,KE	
40235.024	92-U-235(N,F),,KE,FF	92-U-235(N,F)MASS,,KE	
40235.025	92-U-235(N,F),,KE,FF	92-U-235(N,F)MASS,,KE	
40235.026	92-U-235(N,F),,KE,FF	92-U-235(N,F)MASS,,KE	
40235.027	92-U-235(N,F),,KE,FF	92-U-235(N,F)MASS,,KE	
40235.028	92-U-235(N,F),,KE,FF	92-U-235(N,F)MASS,,KE	
40235.029	92-U-235(N,F),,KE,FF	92-U-235(N,F)MASS,,KE	
40235.030	92-U-235(N,F),,KE,FF	92-U-235(N,F)MASS,,KE	

40240.003.1	92-U-238(N,F),,AKE,FF	92-U-238(N,F),,AKE/DA,FF	
40240.003.2	92-U-238(N,F),,AP	92-U-238(N,F),,AP/DA,FF	
40281.002	92-U-233(N,F),,AKE,FF	92-U-233(N,F),,AKE,FF,MSC	or react ratio
40281.003	92-U-235(N,F),,AKE,FF	92-U-235(N,F),,AKE,FF,MSC	or reaction ratio
40281.005	94-PU-239(N,F),,AKE,FF	94-PU-239(N,F),,AKE,FF,MSC	or reaction ratio
40281.007	94-PU-241(N,F),,AKE,FF	94-PU-241(N,F),,AKE,FF,MSC	or reaction ratio
40283.002	92-U-235(N,F),,AKE,FF	92-U-235(N,F),,AKE,FF,MSC	
40283.003	92-U-235(N,F),,AKE,FF	92-U-235(N,F)MASS,,KE,FF	
40284.010	94-PU-242(0,F),,KE,FF	94-PU-242(0,F)MASS,,KE	
40284.011	94-PU-241(N,F),,KE,FF	94-PU-241(N,F)MASS,,KE	
40284.012	94-PU-241(N,F),,KE,FF	94-PU-241(N,F)MASS,,KE	
40284.015	94-PU-242(N,F),,KE,FF	94-PU-242(N,F)MASS,,KE	
40284.016	94-PU-242(N,F),,KE,FF	94-PU-242(N,F)MASS,,KE	
40297.002	96-CM-244(N,F),PR,AKE,N	96-CM-244(N,F)0-NN-1,PR,KE	
40297.003	96-CM-243(N,F),PR,AKE,N	96-CM-243(N,F)0-NN-1,PR,KE	
40297.004	96-CM-246(N,F),PR,AKE,N	96-CM-246(N,F)0-NN-1,PR,KE	
40297.005	96-CM-245(N,F),PR,AKE,N	96-CM-245(N,F)0-NN-1,PR,KE	
40297.006	96-CM-248(N,F),PR,AKE,N	96-CM-248(N,F)0-NN-1,PR,KE	
40297.007	96-CM-247(N,F),PR,AKE,N	96-CM-247(N,F)0-NN-1,PR,KE	
40398.002	92-U-233(N,F),,KE,FF	92-U-233(N,F)MASS,,KE	
40472.002	98-CF-252(0,F),PR,KEM,N	98-CF-252(0,F)0-NN-1,PR,KEM	
40500.002	92-U-233(N,F),PR,KEM,N	92-U-233(N,F)0-NN-1,PR,KEM	
40500.003	92-U-233(N,F),PR,AKE,N	92-U-233(N,F)0-NN-1,PR,KE	
40500.004	92-U-235(N,F),PR,KEM,N	92-U-235(N,F)0-NN-1,PR,KEM	
40500.005	92-U-235(N,F),PR,AKE,N	92-U-235(N,F)0-NN-1,PR,KE	

40500.006	94-PU-239(N,F),PR,KEM,N	94-PU-239(N,F)0-NN-1,PR,KEM	
40500.007	94-PU-239(N,F),PR,AKE,N	94-PU-239(N,F)0-NN-1,PR,KE	
40527.004.1	92-U-233(N,F)MASS,TER,AKE,FF	92-U-233(N,F)MASS,TER,KE,,MSC	
40527.004.2	92-U-233(N,F)MASS,TER,AKE,FF	92-U-233(N,F)MASS,TER,KE,,MSC	
40527.004.3	92-U-233(N,F)MASS,BIN,AKE,FF	92-U-233(N,F)MASS,,KE	
40527.005.1	92-U-235(N,F)MASS,TER,AKE,FF	92-U-235(N,F)MASS,TER,KE,,MSC	
40527.005.2	92-U-235(N,F)MASS,TER,AKE,FF	92-U-235(N,F)MASS,TER,KE,,MSC	
40527.005.3	92-U-235(N,F)MASS,BIN,AKE,FF	92-U-235(N,F)MASS,,KE	
40838.002	(92-U-233(N,F),PR,AKE,N)- (98-CF-252(0,F),PR,AKE,N)	(92-U-233(N,F)0-NN-1,PR,KE)- (98-CF-252(0,F)0-NN-1,PR,KE)	
40838.003	(92-U-235(N,F),PR,AKE,N)- (98-CF-252(0,F),PR,AKE,N)	(92-U-235(N,F)0-NN-1,PR,KE)- (98-CF-252(0,F)0-NN-1,PR,KE)	
40838.004	(94-PU-239(N,F),PR,AKE,N)- (98-CF-252(0,F),PR,AKE,N)	(94-PU-239(N,F)0-NN-1,PR,KE)- (98-CF-252(0,F)0-NN-1,PR,KE)	
40873.003	92-U-233(N,F),PR,AKE,N	92-U-233(N,F)0-NN-1,PR,KE	
40873.005	92-U-235(N,F),PR,AKE,N	92-U-235(N,F)0-NN-1,PR,KE	
40873.007	94-PU-239(N,F),PR,AKE,N	94-PU-239(N,F)0-NN-1,PR,KE	
40913.004	92-U-234(N,F),PRE,DA/KE,FF	92-U-234(N,F),PRE,AKE/DA,FF	
40930.003	98-CF-252(0,F),PR,AKE,N	98-CF-252(0,F)0-NN-1,PR,KE	
40930.005	92-U-233(N,F),PR,AKE,N,MXW	92-U-233(N,F)0-NN-1,PR,KE,,MXW	
40930.007	92-U-235(N,F),PR,AKE,N,MXW	92-U-235(N,F)0-NN-1,PR,KE,,MXW	
40930.009	94-PU-239(N,F),PR,AKE,N,MXW	94-PU-239(N,F)0-NN-1,PR,KE,,MXW	
41010.002	92-U-235(N,F),DL/PAR,AKE,N	92-U-235(N,F)0-NN-1,DL/GRP,KE	
41030.002	98-CF-252(0,F),TER,AKE,T	98-CF-252(0,F)1-H-3,TER/PAR,KE	
41030.003	98-CF-252(0,F),TER,AKE,A	98-CF-252(0,F)2-HE-4,TER/PAR,KE	
41030.004	98-CF-252(0,F)2-HE-3,TER,AKE,LCP	98-CF-252(0,F)2-HE-3,TER/PAR,KE	
41030.007	98-CF-252(0,F),TER,AKE,FF	98-CF-252(0,F),TER,AKE,FF,MSC	
41042.010	92-U-238-M(0,F)2-HE-4,TER,AKE,A	92-U-238-M(0,F)2-HE-4,TER,KE	
41061.006	92-U-238-M(0,F)2-HE-4,TER,AKE,A	92-U-238-M(0,F)2-HE-4,TER,KE	



41061.009	92-U-238(N,F)2-HE-4,TER,AKE,A	92-U-238(N,F)2-HE-4,TER,KE	
41066.013	92-U-235(N,F),PR,AKE,N	92-U-235(N,F)0-NN-1,PR,KE	
41066.014	92-U-238(N,F),PR,AKE,N	92-U-238(N,F)0-NN-1,PR,KE	
41094.002	92-U-235(N,F),PR,AKE,N	92-U-235(N,F)0-NN-1,PR,KE	
41109.007	92-U-235(N,F)MASS,PRE,AKE,FF,MXW	92-U-235(N,F)MASS,PRE,KE,,MXW	
41110.002	90-TH-232(N,F),PR,AKE,N	90-TH-232(N,F)0-NN-1,PR,KE	
41110.003	92-U-235(N,F),PR,AKE,N,,DERIV	92-U-235(N,F)0-NN-1,PR,KE,,DERIV	
41110.004	92-U-238(N,F),PR,AKE,N	92-U-238(N,F)0-NN-1,PR,KE	
41113.002	96-CM-248(0,F),PR,AKE,N	96-CM-248(0,F)0-NN-1,PR,KE	
41132.002	93-NP-237(N,F),PR,AKE,N	93-NP-237(N,F)0-NN-1,PR,KE	
41162.002	92-U-235(N,F),PR,AKE,N	92-U-235(N,F)0-NN-1,PR,KE	
41171.002	93-NP-237(N,F),PR,AKE,N	93-NP-237(N,F)0-NN-1,PR,KE	
41238.002	90-TH-232(N,F),PR,AKE,N	90-TH-232(N,F)0-NN-1,PR,KE	
41238.003	92-U-235(N,F),PR,AKE,N	92-U-235(N,F)0-NN-1,PR,KE	
41238.004	92-U-238(N,F),PR,AKE,N	92-U-238(N,F)0-NN-1,PR,KE	
41238.005	93-NP-237(N,F),PR,AKE,N	93-NP-237(N,F)0-NN-1,PR,KE	
41238.006	94-PU-239(N,F),PR,AKE,N	94-PU-239(N,F)0-NN-1,PR,KE	
41308.004	96-CM-248(0,F)ELEM/MASS,,AKE	96-CM-248(0,F)ELEM/MASS,,KE	
41310.003	96-CM-248(0,F)ELEM/MASS,TER,AKE,LCP	96-CM-248(0,F)ELEM/MASS,TER,KE 96-CM-248(0,F)ELEM,TER,KE	
41340.002	96-CM-244(0,F),PR,AKE,N	96-CM-244(0,F)0-NN-1,PR,KE	
41421.004	94-PU-240(0,F),PR,AKE,N	94-PU-240(0,F)0-NN-1,PR,KE	
41421.005	94-PU-242(0,F),PR,AKE,N	94-PU-242(0,F)0-NN-1,PR,KE	
41421.006	94-PU-240(0,F),PR,KEM,N	94-PU-240(0,F)0-NN-1,PR,KEM	
41421.007	94-PU-242(0,F),PR,KEM,N	94-PU-242(0,F)0-NN-1,PR,KEM	
41425.008	98-CF-252(0,F),,AKE	98-CF-252(0,F),,AKE,FF	
41425.009	98-CM-248(0,F),,AKE	98-CM-248(0,F),,AKE,FF	
41425.010	96-CM-242(0,F),,AKE	96-CM-242(0,F),,AKE,FF	
41425.011	98-CF-252(0,F),,AP	98-CF-252(0,F),,AP,FF	

41425.012	96-CM-248(0,F),,AP	96-CM-248(0,F),,AP,FF	
41425.013	96-CM-244(0,F),,AP	96-CM-244(0,F),,AP,FF	
41446.002	90-TH-232(N,F),PR,AKE,N	90-TH-232(N,F)0-NN-1,PR,KE	
41447.002	92-U-238(N,F),PR,AKE,N	92-U-238(N,F)0-NN-1,PR,KE	
41450.002	92-U-238(N,F),PR,AKE,N	92-U-238(N,F)0-NN-1,PR,KE	
41461.002	92-U-238(N,F),PR,AKE,N	92-U-238(N,F)0-NN-1,PR,KE	
41464.007	98-CF-252(0,F)ELEM,TER,AKE,LCP	98-CF-252(0,F)ELEM,TER,KE	
41483.002	92-U-238(N,F),BIN,AKE,FF	92-U-238(N,F),,AKE,FF	
41496.004	95-AM-242-M(N,F)MASS,,AKE	95-AM-242-M(N,F)MASS,,KE	
41496.005	92-U-235(N,F)MASS,,AKE	92-U-235(N,F)MASS,,KE	
41502.008	92-U-235(N,F)MASS,PR,AKE,N	92-U-235(N,F)MASS,PR,KE,N	
41502.009	94-PU-239(N,F)MASS,PR,AKE,N	94-PU-239(N,F)MASS,PR,KE,N	
41502.010	94-PU-239(N,F)MASS,PR,AKE,N	94-PU-239(N,F)MASS,PR,KE,N	
41516.009	92-U-235(N,F),PR,AKE,N	92-U-235(N,F)0-NN-1,PR,KE,,MSC	
A0023.005	79-AU-197(18-AR-40,X)ELEM,IND,AKE/DA	79-AU-197(18-AR-40,X)ELEM,IND,KE/DA	
A0095.125.E	82-PB-208(92-U-238,F),,AKE	82-PB-208(92-U-238,F),,AKE,FF	
C0608.003	92-U-238(A,INL+F)MASS,PAR/PRE,AKE	92-U-238(A,INL+F)MASS,PAR/PRE,KE	
D0150.004	90-TH-232(6-C-12,F),,AP	90-TH-232(6-C-12,F),,AP,FF	
D0273.006	1-H-2(D,X)0-NN-1,,AKE/DA,N	1-H-2(D,X)0-NN-1,,KE/DA	
D0273.007	1-H-2(P,X)0-NN-1,,AKE/DA,N	1-H-2(P,X)0-NN-1,,KE/DA	
E1659.005	90-TH-232(P,F)MASS,PRE,AKE,FF	90-TH-232(P,F)MASS,PRE,KE,LF+HF	TKE
E1659.006	90-TH-232(P,F)MASS,PRE,AKE,FF	90-TH-232(P,F)MASS,PRE,KE,LF+HF	TKE
E1659.007	90-TH-232(P,F)MASS,PRE,AKE,FF	90-TH-232(P,F)MASS,PRE,KE,LF+HF	TKE
E1905.003	90-TH-232(P,F)MASS,PRE,KE,FF	90-TH-232(P,F)MASS,PRE,KE,LF+HF	TKE
E1974.003	96-CM-248(P,F)MASS,PRE,KE/CRL,LF/HF	96-CM-248(P,F)MASS,PRE,KE,LF+HF	TKE
E2085.005	4-BE-9(18-AR-40,X)ELEM/MASS,,KE,,FF,MSC	4-BE-9(18-AR-40,X)ELEM/MASS,,KE	
E2085.006	73-TA-181(18-AR-40,X)ELEM/MASS,,KE,FF,MSC	73-TA-181(18-AR-40,X)ELEM/MASS,,KE	
E2089.002.1	92-U-238(P,F)MASS,PRE,KE,FF	92-U-238(P,F)MASS,PRE,KE	
E2089.002.2	92-U-238(P,F)MASS,PRE,KE/CRL,LF/HF	92-U-238(P,F)MASS,PRE,KE,LF+HF	

L0078.011	83-BI-209(G,F)MASS,,KE,FF,BRA	83-BI-209(G,F)MASS,,KE,,BRA	
L0101.002	92-U-238(G,F)MASS,,KE/CRL,LF/HF,BRA	92-U-238(G,F)MASS,,KE,LF+HF,BRA	TKE
L0101.003	83-BI-209(G,F)MASS,,KE,FF,BRA	83-BI-209(G,F)MASS,,KE,LF+HF,BRA	TKE
L0101.004	79-AU-197(G,F)MASS,,KE,FF,BRA	79-AU-197(G,F)MASS,,KE,LF+HF,BRA	
L0105.006	94-PU-240(G,F)MASS,PRE,AKE,FF,BRS	94-PU-240(G,F)MASS,PRE,KE,,BRS	
L0106.006	94-PU-244(G,F)MASS,PRE,AKE,FF,BRS	94-PU-244(G,F)MASS,PRE,KE,,BRS	
M0135.003	92-U-238(G,F),PRE,KE,FF,BRS/REL,EXP	92-U-238(G,F),PRE,AKE,LF+HF,BRS/REL	MSC?
M0135.004	92-U-238(G,F),PRE,KE,FF,BRS/REL,EXP	92-U-238(G,F),PRE,AKE,LF+HF,BRS/REL	MSC?
M0135.005	92-U-238(G,F),PRE,KE,FF,BRS/REL,EXP	92-U-238(G,F),PRE,AKE,LF+HF,BRS/REL	MSC?
M0135.006	92-U-238(G,F),PRE,KE,FF,BRS/REL,EXP	92-U-238(G,F),PRE,AKE,LF+HF,BRS/REL	MSC?
M0135.007	92-U-238(G,F),PRE,KE,FF,BRS/REL,EXP	92-U-238(G,F),PRE,AKE,LF+HF,BRS/REL	MSC?
M0135.008	92-U-238(G,F),PRE,KE,FF,BRS/REL,EXP	92-U-238(G,F),PRE,AKE,LF+HF,BRS/REL	MSC?
M0135.009	92-U-238(G,F),PRE,KE,FF,BRS/REL,EXP	92-U-238(G,F),PRE,AKE,LF+HF,BRS/REL	MSC?
M0135.010	92-U-238(G,F),PRE,KE,FF,BRS/REL,EXP	92-U-238(G,F),PRE,AKE,LF+HF,BRS/REL	MSC?
M0135.011	92-U-238(G,F),PRE,KE,FF,BRS/REL,EXP	92-U-238(G,F),PRE,AKE,LF+HF,BRS/REL	MSC?
M0171.002	92-U-238(G,F)MASS,,DA/KE,,FF,BRS,EXP	92-U-238(G,F)MASS,,KE/DA,,BRS	
M0171.003	92-U-238(G,F)MASS,,DA/KE,,FF,BRS,EXP	92-U-238(G,F)MASS,,KE/DA,,BRS	
M0171.004	92-U-238(G,F)MASS,,DA/KE,,FF,BRS,EXP	92-U-238(G,F)MASS,,KE/DA,,BRS	
M0171.005	92-U-238(G,F)MASS,,DA/KE,,FF,BRS,EXP	92-U-238(G,F)MASS,,KE/DA,,BRS	
M0171.006	92-U-238(G,F)MASS,,DA/KE,,FF,BRS,EXP	92-U-238(G,F)MASS,,KE/DA,,BRS	
M0352.002	39-Y-89(G,X)0-NN-1,,AKE,,BRA,EXP	39-Y-89(G,X)0-NN-1,,KE,,BRA	
M0352.003	34-SE-76(G,X)0-NN-1,,AKE,,BRA,EXP	34-SE-76(G,X)0-NN-1,,KE,,BRA	
O0374.002	83-BI-209(P,F),,KE,FF,REL,EXP	83-BI-209(P,F),,AKE,FF,REL	
O0374.003	79-AU-197(P,F),,KE,FF,REL,EXP	79-AU-197(P,F),,AKE,FF,REL	
O0374.004	74-W-0(P,F),,KE,FF,REL,EXP	74-W-0(P,F),,AKE,FF,REL	
O0374.005	70-YB-0(P,F),,KE,FF,REL,EXP	70-YB-0(P,F),,AKE,FF,REL	
O0374.010	83-BI-209(P,F)MASS,,KE,FF,EXP	83-BI-209(P,F)MASS,,KE	
O0374.011	79-AU-197(P,F),MASS,,KE,FF,REL,EXP	79-AU-197(P,F)MASS,,KE,,REL	
O0374.012	74-W-0(P,F)MASS,,KE,FF,REL,EXP	74-W-0(P,F)MASS,,KE,,REL	

O0374.013	70-YB-0(P,F)MASS,,KE,FF,REL,EXP	70-YB-0(P,F)MASS,,KE,,REL	
O0572.006.Z	92-U-233(P,F),,ZP	92-U-233(P,Z),,ZP,FF	
O0710.002	92-U-238(P,F)MASS,,AKE/DA,FF	92-U-238(P,F)MASS,,KE/DA	
O0710.003	92-U-238(P,F)MASS,,AKE/DA,FF	92-U-238(P,F)MASS,,KE/DA	
O0710.004	83-BI-209(P,F)MASS,,AKE/DA,FF	83-BI-209(P,F)MASS,,KE/DA	
O0833.003	1-H-1(82-PB-208,F)ELEM,,AKE,FF	1-H-1(82-PB-208,F)ELEM,,KE	
O0833.004	1-H-1(82-PB-208,X)ELEM,,AKE	1-H-1(82-PB-208,X)ELEM,,KE	
O0833.005	1-H-1(82-PB-208,X)MASS,,AKE	1-H-1(82-PB-208,X)MASS,,KE	
O0921.005	1-H-2(82-PB-208,F)ELEM,FIS,AKE,FF	1-H-2(82-PB-208,F)ELEM,,KE	
O0921.006	1-H-2(82-PB-208,X)ELEM,SPL,AKE	1-H-2(82-PB-208,X)ELEM,,KE	
O0921.007	1-H-2(82-PB-208,X)MASS,SPL,AKE	1-H-2(82-PB-208,X)MASS,,KE	
O1302.003	1-H-1(92-U-238,F)ELEM,,AKE,FF	1-H-1(92-U-238,F)ELEM,,KE	
O1303.003	1-H-1(92-U-238,F)ELEM,,AKE,FF	1-H-1(92-U-238,F)ELEM,,KE	
O1452.004	94-PU-242(P,F)MASS,PRE,AKE,FF	94-PU-242(P,F)MASS,PRE,KE	
O1589.002	1-H-1(54-XE-136,X)MASS,,AKE	1-H-1(54-XE-136,X)MASS,,KE	
S0008.008	3-LI-7(D,N)4-BE-8,,AKE,N	3-LI-7(D,N)4-BE-8,,KE,N	
T0283.003	92-U-235(P,F)MASS,,AKE,FF	92-U-235(P,F)MASS,,KE	

**Nuclear Data Section  
International Atomic Energy Agency  
P.O.Box 100, A-1400 Vienna, Austria**

**Memo CP-D/600 (Rev.)**

**Date:** 31 December 2009  
**To:** Distribution  
**From:** N. Otsuka  
**Subject:** Ternary to binary light charged particle yield ratio  
**Reference:** CP-N/44, 4C-4/114, CP-D/599

Ternary alpha and triton emission probabilities in neutron-induced and spontaneous fission have measured by C. Wagemans and their colleagues. In EXFOR, 5 articles [1-6] are considered as the sources of numerical data. They have denoted ternary (long-range) alpha and triton emission probabilities in fission by  $LRA/B$  and  $t/B$ , and they has been coded as

--- (-, F), TER/BIN, FY/RAT, A  
--- (-, F), TER/BIN, FY/RAT, T

. However, Dr. O. Serot (CEA Cadarache) explains the definition of the probability as

“Counting rate of Ternary alphas particles (or tritons) emitted during fission,  $LRA$  (or  $t$ ), divided by counting rate of all fission events (Binary + Ternary fissions,  $B$ )”

, even though  $B$  in their notation denotes “Binary fission”. Therefore their data should be coded with

--- (-, F) 2-HE-4, TER, FY  
--- (-, F) 1-H-3, TER, FY

for  $LRA/B$  and  $t/B$ , respectively.

Because there is no other subentry coded with TER/BIN, FY/RAT the following update of dictionary is also proposed:

**Dictionary 236 (Quantities)**

TER/BIN, FY/RAT, T (Obsolete)  
TER/BIN, FY/RAT, A (Obsolete)

**Reference**

- [1] P. D'Hondt *et al.*, Nucl. Phys. **A346** (1980) 461 (EXFOR 21705)
- [2] S. Pommee *et al.*, Nucl. Phys. **A587** (1995)1 (EXFOR 22308)
- [3] C. Wagemans *et al.*, Nucl. Phys. **A742**(2004)291 (EXFOR 22896)
- [4] O. Serot *et al.*, Proc. Int. Nat. Conf. Nucl. Data for Sci. and Technol. p857 (2004) (EXFOR 22900)
- [5] S. Vermote *et al.*, Nucl. Phys. **A806** (2008)1 (EXFOR 23026)
- [6] O. Serot *et al.*, Proc. Int. Nat. Conf. Nucl. Data for Sci. and Technol. P479 (2007) (EXFOR 23048)

### List of data compiled with “TER/BIN,FY/RAT” in EXFOR

( $10^{-3}$  and  $10^{-4}$  should be multiplied to alpha and triton emission data, respectively).

- Bold font means we need additional correction.

- 22896:  $^{257}\text{Fm}$ (SF) data in Table 2 of [3] is missing and should be added.

- 22900: 007-018, 028-044 are not from experiments, but from empirical formula.

Subentry	SF1	SF2-3	SF4-SF9 (proposed)	Data
<b>21705 (Data source [1])</b>				
21705.013	92-U-235	N,F	2-HE-4,TER,FY,,MXW	<b>1.696+-0.027</b>
<b>22308 (Data source [2])</b>				
22308.002	92-U-235	N,F	2-HE-4,TER,FY	(60 points)
<b>22896 (Data source [3])</b>				
22896.008	1 90-TH-229	N,F	2-HE-4,TER,FY,,MXW	2.05+-0.09
22896.008	2 90-TH-229	N,F	2-HE-4,TER,FY,,MXW	2.17+-0.10
22896.009	1 91-PA-231	N,F	2-HE-4,TER,FY,,MXW	1.67+-0.11
22896.009	2 91-PA-231	N,F	2-HE-4,TER,FY,,MXW	1.77+-0.12
22896.010	1 92-U-233	N,F	2-HE-4,TER,FY,,MXW	1.99+-0.07
22896.010	2 92-U-233	N,F	2-HE-4,TER,FY,,MXW	2.11+-0.07
22896.011	1 92-U-235	N,F	2-HE-4,TER,FY,,MXW	1.60+-0.05
22896.011	2 92-U-235	N,F	2-HE-4,TER,FY,,MXW	1.70+-0.05
22896.012	1 93-NP-237	N,F	2-HE-4,TER,FY,,MXW	1.94+-0.17
22896.012	2 93-NP-237	N,F	2-HE-4,TER,FY,,MXW	2.06+-0.18
22896.013	1 94-PU-239	N,F	2-HE-4,TER,FY,,MXW	2.07+-0.08
22896.013	2 94-PU-239	N,F	2-HE-4,TER,FY,,MXW	2.19+-0.09
22896.014	1 94-PU-241	N,F	2-HE-4,TER,FY,,MXW	1.75+-0.06
22896.014	2 94-PU-241	N,F	2-HE-4,TER,FY,,MXW	1.86+-0.07
22896.015	1 95-AM-241	N,F	2-HE-4,TER,FY,,MXW	2.24+-0.09
22896.015	2 95-AM-241	N,F	2-HE-4,TER,FY,,MXW	2.37+-0.09
22896.016	1 95-AM-243	N,F	2-HE-4,TER,FY,,MXW	1.72+-0.10
22896.016	2 95-AM-243	N,F	2-HE-4,TER,FY,,MXW	1.82+-0.10
22896.017	1 96-CM-245	N,F	2-HE-4,TER,FY,,MXW	2.15+-0.15
22896.017	2 96-CM-245	N,F	2-HE-4,TER,FY,,MXW	2.28+-0.16
22896.018	1 96-CM-247	N,F	2-HE-4,TER,FY,,MXW	1.85+-0.10
22896.018	2 96-CM-247	N,F	2-HE-4,TER,FY,,MXW	1.96+-0.11
22896.019	1 94-PU-238	0,F	2-HE-4,TER,FY	2.76+-0.13
22896.019	2 94-PU-238	0,F	2-HE-4,TER,FY	2.93+-0.14
22896.020	1 94-PU-240	0,F	2-HE-4,TER,FY	2.51+-0.14
22896.020	2 94-PU-240	0,F	2-HE-4,TER,FY	2.66+-0.15
22896.021	1 94-PU-242	0,F	2-HE-4,TER,FY	2.17+-0.07
22896.021	2 94-PU-242	0,F	2-HE-4,TER,FY	2.30+-0.08
22896.022	1 94-PU-244	0,F	2-HE-4,TER,FY	1.71+-0.09
22896.022	2 94-PU-244	0,F	2-HE-4,TER,FY	1.81+-0.10
22896.023	1 96-CM-242	0,F	2-HE-4,TER,FY	3.34+-0.26
22896.023	2 96-CM-242	0,F	2-HE-4,TER,FY	3.54+-0.28
22896.024	1 96-CM-244	0,F	2-HE-4,TER,FY	2.73+-0.20
22896.024	2 96-CM-244	0,F	2-HE-4,TER,FY	2.89+-0.21
22896.025	1 96-CM-246	0,F	2-HE-4,TER,FY	2.49+-0.12
22896.025	2 96-CM-246	0,F	2-HE-4,TER,FY	2.64+-0.13
22896.026	1 96-CM-248	0,F	2-HE-4,TER,FY	2.30+-0.10
22896.026	2 96-CM-248	0,F	2-HE-4,TER,FY	2.44+-0.11

22896.027	1	98-CF-250	0,F	2-HE-4,TER,FY	3.65+-0.28
22896.027	2	98-CF-250	0,F	2-HE-4,TER,FY	3.87+-0.30
22896.028	1	98-CF-252	0,F	2-HE-4,TER,FY	3.06+-0.11
22896.028	2	98-CF-252	0,F	2-HE-4,TER,FY	3.24+-0.12
22896.029	1	<b>100-FM-256</b>	0,F	2-HE-4,TER,FY	4.24+-0.59
22896.029	2	<b>100-FM-256</b>	0,F	2-HE-4,TER,FY	4.49+-0.63

**22900 (Data source [4])**

22900.002		96-CM-246	0,F	1-H-3,TER,FY	1.72+-0.24
22900.003		96-CM-248	0,F	1-H-3,TER,FY	1.79+-0.07
22900.004		98-CF-250	0,F	1-H-3,TER,FY	<b>2.70+-0.50</b>
22900.005		98-CF-252	0,F	1-H-3,TER,FY	2.43+-0.17
22900.006		100-FM-256	0,F	1-H-3,TER,FY	<b>3.90+-0.50</b>
22900.007		94-PU-238	0,F	Delete?	1.37+-0.08
22900.008		94-PU-240	0,F	Delete?	1.34+-0.08
22900.009		94-PU-242	0,F	Delete?	1.31+-0.08
22900.010		94-PU-244	0,F	Delete?	1.29+-0.08
22900.011		96-CM-242	0,F	Delete?	1.92+-0.12
22900.012		96-CM-244	0,F	Delete ?	1.86+-0.11
22900.013		96-CM-246	0,F	Delete ?	1.8+-0.11
22900.014		96-CM-248	0,F	Delete ?	<b>1.74+-0.10</b>
22900.015		98-CF-250	0,F	Delete ?	<b>2.60+-0.16</b>
22900.016		98-CF-252	0,F	Delete ?	2.54+-0.15
22900.017		100-FM-256	0,F	Delete ?	<b>3.36+-0.20</b>
22900.018		100-FM-257	0,F	Delete ?	<b>3.33+-0.20</b>
22900.019		90-TH-229	N,F	1-H-3,TER,FY,,MXW	0.85+-0.15
22900.020		92-U-233	N,F	1-H-3,TER,FY,,MXW	1.14+-0.05
22900.021		92-U-235	N,F	1-H-3,TER,FY,,MXW	1.08+-0.04
22900.022		94-PU-239	N,F	1-H-3,TER,FY,,MXW	1.42+-0.07
22900.023		94-PU-241	N,F	1-H-3,TER,FY,,MXW	1.41+-0.06
22900.024		95-AM-241	N,F	1-H-3,TER,FY,,MXW	<b>1.65+-0.10</b>
22900.025		96-CM-245	N,F	1-H-3,TER,FY,,MXW	<b>1.85+-0.10</b>
22900.026		96-CM-247	N,F	1-H-3,TER,FY,,MXW	1.84+-0.11
22900.027		98-CF-251	N,F	1-H-3,TER,FY,,MXW	<b>2.35+-0.40</b>
22900.028		90-TH-229	N,F	Delete ?	0.78+-0.07
22900.029		91-PA-231	N,F	Delete ?	0.93+-0.08
22900.030		92-U-233	N,F	Delete ?	<b>1.12+-0.10</b>
22900.031		92-U-235	N,F	Delete ?	<b>1.09+-0.10</b>
22900.032		93-NP-237	N,F	Delete ?	1.25+-0.11
22900.033		93-NP-238	N,F	Delete ?	1.25+-0.11
22900.034		94-PU-238	N,F	Delete ?	1.44+-0.13
22900.035		94-PU-239	N,F	Delete ?	1.44+-0.13
22900.036		94-PU-241	N,F	Delete ?	1.41+-0.13
22900.037		95-AM-241	N,F	Delete ?	<b>1.60+-0.14</b>
22900.038		95-AM-242-M	N,F	Delete ?	<b>1.60+-0.14</b>
22900.039		95-AM-243	N,F	Delete ?	1.57+-0.14
22900.040		96-CM-243	N,F	Delete ?	1.96+-0.18
22900.041		96-CM-244	N,F	Delete ?	1.91+-0.17
22900.042		96-CM-245	N,F	Delete ?	1.89+-0.17
22900.043		96-CM-247	N,F	Delete ?	1.83+-0.16
22900.044		98-CF-251	N,F	Delete ?	2.63+-0.24

22900.045	93-NP-238	N,F	2-HE-4,TER,FY,,MXW	1.86+-0.19
22900.046	94-PU-238	N,F	2-HE-4,TER,FY,,MXW	2.42+-0.24
22900.047	95-AM-242-M	N,F	2-HE-4,TER,FY,,MXW	<b>2.10+-0.21</b>
22900.048	96-CM-243	N,F	2-HE-4,TER,FY,,MXW	2.58+-0.26
22900.049	96-CM-244	N,F	2-HE-4,TER,FY,,MXW	2.42+-0.24
22900.050	98-CF-251	N,F	2-HE-4,TER,FY,,MXW	2.88+-0.14

### 23026 (Data source [5])

23026.013	1 96-CM-243	N,F	2-HE-4,TER,FY,,SPA	2.43+-0.08
23026.013	2 96-CM-243	N,F	1-H-3,TER,FY,SPA	1.96+-0.25
23026.014	1 96-CM-245	N,F	2-HE-4,TER,FY,,SPA	2.15+-0.12
23026.014	2 96-CM-245	N,F	1-H-3,TER,FY,SPA	1.85+-0.21
23026.015	1 96-CM-247	N,F	2-HE-4,TER,FY,,SPA	<b>1.85+-0.10</b>
23026.015	2 96-CM-247	N,F	1-H-3,TER,FY,SPA	<b>1.85+-0.20</b>
23026.016	1 96-CM-244	0,F	2-HE-4,TER,FY	3.16+-0.09
23026.016	2 96-CM-244	0,F	1-H-3,TER,FY	1.98+-0.24
23026.017	1 96-CM-246	0,F	2-HE-4,TER,FY	2.49+-0.12
23026.017	2 96-CM-246	0,F	1-H-3,TER,FY	1.72+-0.24
23026.018	1 96-CM-248	0,F	2-HE-4,TER,FY	2.30+-0.10
23026.018	2 96-CM-248	0,F	1-H-3,TER,FY	1.79+-0.21

### 23048 (Data source [6])

23048.002	1 96-CM-244	0,F	1-H-3,TER,FY	1.91+-0.41
23048.003	1 96-CM-243	N,F	1-H-3,TER,FY,SPA	1.77+-0.39
23048.004	1 98-CF-251	N,F	1-H-3,TER,FY,,SPA	2.37+-0.58
23048.005	1 98-CF-249	N,F	1-H-3,TER,FY,SPA	2.20+-0.35

### Distribution:

blokhin@ippe.ru  
 chiba@earth.sgu.ac.jp  
 claes.nordborg@oecd.org  
 emmeric.dupont@oecd.org  
 ganesan@barc.gov.in  
 gezg@ciae.ac.cn  
 henriksson@near.fr  
 hongwei@ciae.ac.cn  
 jhchang@kaeri.re.kr  
 kaltchenko@kinr.kiev.ua  
 katakura.junichi@jaea.go.jp  
 kato@nucl.sci.hokudai.ac.jp  
 kirarlyb@atomki.hu  
 l.vrapcjenjak@iaea.org  
 manuel.bossant@oecd.org  
 manokhin@ippe.ru  
 mmarina@ippe.ru  
 mwherman@bnl.gov  
 nicolas.soppera@oecd.org  
 nklimova@kinr.kiev.ua

n.otsuka@iaea.org  
 nrdc@jcprg.org  
 oblozinsky@bnl.gov  
 ogritzay@kinr.kiev.ua  
 otto.schwerer@aon.at  
 pronyaev@ippe.ru  
 r.forrest@iaea.org  
 samaev@obninsk.ru  
 s.babykina@polyn.kiae.su  
 scyang@kaeri.re.kr  
 s.dunaeva@iaea.org  
 stakacs@atomki.hu  
 stanislav.hlavac@savba.sk  
 taova@expd.vniief.ru  
 tarkanyi@atomki.hu  
 varlamov@depni.sinp.msu.ru  
 vlasov@kinr.kiev.ua  
 vmclane@optonline.net  
 v.zerkin@iaea.org  
 yolee@kaeri.re.kr

cc:



**Nuclear Data Section  
International Atomic Energy Agency  
P.O.Box 100, A-1400 Vienna, Austria**

**Memo CP-D/613**

**Date:** 19 February 2010  
**To:** Distribution  
**From:** N. Otsuka, S. Dunaeva, M. Mikhaylyukova  
**Subject:** **Differential light charged-particle fission yield**  
**Reference:** CP-D/605

In addition to fission yield listed in Memo CP-D/605, there are also differential light charged-particle fission yield data coded with particle codes in the SF7 field. See the table in the last page. They are coded with DA, DE or DA/DE in SF6, namely treated as differential *cross sections*.

Quantity codes	Unit family	Unit code (example)
TER, DA, *	DA	MB/SR
TER, DE, *	DE	MB/MEV
TER, DA/DE, *	DAE	MB/SR/MEV

These three distributions are however always given in arbitrary unit in EXFOR (REL in SF8), and may be regarded as differential fission “yields” rather than differential fission “cross section”. In addition, the concept of “cross section” is not applicable for spontaneous fission. Use of the following quantity codes with REL in SF8 is more suitable:

Quantity codes	Unit family	Unit code (example)
TER, FY/DA, *	FYDA	PRT/FIS/SR
TER, FY/DE, *	FYDE	PT/FIS/MEV
TER, FY/DA/DE, *	FYAE	P/FS/MEVSR

The following 2 new quantity codes are proposed for correction of the subentries shown in the last page:

**Dictionary 236 (Quantities)**

TER, FY/DA      Differential fission yield with respect to angle in ternary fission  
 TER, FY/DA/DE      Double differential fission yield in ternary fission

Below parameter codes are summarized for fission fragment yield and neutron multiplicity.

**Summary of SF6 for various fission yield**

Unit Family	FY	FYDA	FYDE	FYAE
Fission fragment yield	FY	FY/DA	FY/DE	FY/DA/DE
Fission neutron multiplicity	NU	NU/DA	NU/DE	NU/DA/DE

**Proposed corrections for light charged particle differential yield**

(Responsible centre should check if proposed corrections are right before the correction. REL has to be explained obligatory in free text)

<b>Subentry</b>	<b>Current REACTION</b>	<b>Should be</b>
14055.002	102-NO-256 (0, F) , TER, DE, A, REL	102-NO-256 (0, F) 2-HE-4, TER, FY/DE, , REL
14055.003	88-RA-214 (0, F) , TER, DE, A, REL	88-RA-214 (0, F) 2-HE-4, TER, FY/DE, , REL
14066.002	98-CF-252 (0, F) , TER, DA, A, REL	98-CF-252 (0, F) 2-HE-4, TER, FY/DA, , REL
14066.003	98-CF-252 (0, F) , TER, DA/DE, A, REL	98-CF-252 (0, F) 2-HE-4, TER, FY/DA/DE, , REL
14066.004	98-CF-252 (0, F) , TER, DE, A, REL	98-CF-252 (0, F) 2-HE-4, TER, FY/DE, , REL
14066.005	98-CF-252 (0, F) , TER, DA/DE, A, REL	98-CF-252 (0, F) 2-HE-4, TER, FY/DA/DE, , REL
14066.006	98-CF-252 (0, F) , TER, DA/DE, A, REL	98-CF-252 (0, F) 2-HE-4, TER, FY/DA/DE, , REL
30270.002	92-U-235 (N, F) , TER, DE, A, MXW/REL	92-U-235 (N, F) 2-HE-4, TER, FY/DE, , MXW/REL
30270.003	92-U-235 (N, F) , TER, DE, A, SPA/REL	92-U-235 (N, F) 2-HE-4, TER, FY/DE, , SPA/REL
30272.003	92-U-235 (N, F) , TER, DE, A, MXW/REL	92-U-235 (N, F) 2-HE-4, TER, FY/DE, , MXW/REL
30278.002	92-U-235 (N, F) , TER, DE, A, MXW/REL	92-U-235 (N, F) 2-HE-4, TER, FY/DE, , MXW/REL
30279.002	92-U-235 (N, F) , TER, DA/DE, A, MXW/REL	92-U-235 (N, F) 2-HE-4, TER, FY/DA/DE, , MXW/REL
30279.003	92-U-235 (N, F) , TER, DA/DE, A, MXW/REL	92-U-235 (N, F) 2-HE-4, TER, FY/DA/DE, , MXW/REL
30319.002	92-U-235 (N, F) , TER, DA/DE, A, REL/MXW	92-U-235 (N, F) 2-HE-4, TER, FY/DA/DE, , MXW/REL
30320.002, .003	94-PU-239 (N, F) ELEM/MASS, TER, DE ARB-UNITS	94-PU-239 (N, F) ELEM/MASS, TER, FY/DE
30505.002	92-U-235 (N, F) 2-HE-4, TER, DA, A, REL/MXW	92-U-235 (N, F) 2-HE-4, TER, FY/DA, , MXW/REL
41442.004	98-CF-252 (0, F) , TER, DE, A, REL	98-CF-252 (0, F) 2-HE-4, TER, FY/DE, , REL