OECD

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To: Distribution

From: P.D. Johnston   P.D.J

Subject: Monitor coding and renormalisation of
          in EXFOR

In connection with development of a program to attempt renormalisation of data in the EXFOR file to consistency with current values of neutron cross section standards, the occurrences of MONITOR codings in EXFOR have been scanned. The list of existing codings under MONITOR shows a large number of illegal codes, which considerably complicate any automatic renormalisation procedures. The number of different (correct) reactions used as MONITOR is so large that we have chosen only the 20 most popular for which renormalisation will be attempted. I enclose statistics of existing MONITOR codes in both neutron and charged particle EXFOR, a list of the codes we have chosen for automatic renormalisation, and a list of illegal MONITOR codes and their occurrences in EXFOR for retransmission.

For five monitor reactions a considerable degree of inconsistency exists in metastable state coding.

For: 13-Al-27(N,A)11-NA-24,,SIG
       27-Co-59(N,G)27-Co-60,,SIG

the residual nucleus has a short-lived metastable state, and codes with -G+M; -G,M+, -G, and no extension are effectively equivalent. Internal transition accounts for nearly all the decay (NA-24Mβ- is weak, Co-60Mβ- is 0.25%). For these reactions I propose that the recommended coding should be:

       13-Al-27(N,A)11-NA-24,,SIG   (no extension)
       27-Co-59(N,G)27-Co-60-G+M,,SIG/SUM

Unless the experiment explicitly distinguishes separate -G and -M contributions.

For: 79-Au-197(N,G)79-Au-198,,SIG

the metastable state has a comparable half life to that of the ground state (2.30 days compared with 2.696 days). Decay is by internal transition gammas only (no observed β), but the long MS half life effectively means that decay of the MS feeding the 198 Au ground state cannot in most activation experiments be separated from neutron capture populating the ground state. I cannot find any measurements of neutron capture populating the metastable state, and the cross section is almost certainly very small, hence again -G+M, -G,M+, -G and no extension are equivalent. I propose that the recommended coding should be:

       79-Au-197(N,G)79-Au-198-G+M,,SIG/SUM

For: 49-IN-115(N,G)49-IN-116,,SIG

035732

The cross sections to the ground and metastable states are comparable; however the second metastable state feeds totally the first metastable state with a short half life of 2.12 secs, and the ground state has also a short half life (13 secs). As an activation monitor the sum cross section to M1+M2 is normally used. The recommended coding should then be:

       49-IN-115(N,G)49-IN-116-M1+M2,,SIG/SUM

For: 28-Ni-58(N,P)27-Co-58,,SIG

The metastable state decays by internal transition with a half life of 9.2 hrs. Use as a monitor is only unambiguous if the metastable state is allowed to decay, when the sum cross section can be monitored using gammas following the ground state decay. The recommended coding should be:

    28-Ni-58(N,P)27-Co-58-G+M,,SIG/SUM

Care should be taken to ensure that a sufficient time elapsed between irradiation and the monitor activation measurement.

Please let me know if you agree with these recommendations. For the moment the alternative codings will all be treated as equivalent and no retransmissions of existing EXFOR entries are requested. For the future, a unique coding would be preferable.

Distribution: Dr. S. Pearlstein, NNDC, USA
                  Dr. J.J. Schmidt, IAEA, Austria
                  Dr. V.N. Manokhin, Obninsk, USSR

Wrong Code	Correct Code
13-Al-27(N,A)11-Na-24,,SIG,,,EVAL 30438(1)	13-Al-27(N,A)11-Na-24,,SIG
3-Li-6(N,T)2-He-4,,SIG,,,EVAL 30429(1) 30430(1)	3-Li-6(N,T)2-He-4,,SIG
98-Cf-252(N,F),PR,NU 30426(1)	Spontaneous?
26-Fe-56(N,P)25-Mn-56,,SIG,,,EVAL 30445(1)	26-Fe-56(N,P)25-Mn-56,,SIG
49-In-115(N,G)49-In-116,,SIG,,,EVAL 30482(2)	49-In-115(N,G)49-In-116-Mi+M2,,SIG/SUM
1-H-1,ABS 30229(4)	1-H-1,NG
1-H-1,NP,DA/DE 30057(1)	1-H-1,EL,DA/DE
(1961) 30080(1)	?
3-Li-6,NA	3-Li-6,NT

30124(	1)	30293(	1)
30328(	1)	30329(	1)
30352(	1)	30355(	1)
30357(	1)	30359(	1)
30360(	1)	30361(	1)
30369(	1)	30384(	1)
30386(	1)	30391(	1)

Wrong Code	Correct Code
5-B-0,NG 30073(1)	5-B-0,ABS
5-B-10,ABS 30137(1)	5-B-10,NA
79-Au-197,ABS 30085(1)	79-AU-197,NG

MONITOR REACTION STATISTICS.

SEQ NO	COUNT	REACTION
1	1	((25-MN-55(N,ABS),,SIG)/(5-B-0(N,ABS),,SIG))
2	1	((29-CU-63(P,2N)30-ZN-62)+(29-CU-65(P,4N)30-
3	1	((7-N-0(N,ABS),,SIG)/(5-B-0(N,ABS),,SIG))
4	1	((92-U-235(N,F),CUM,FY)/(92-U-235(N,F),CHN,F
5	1	((92-U-235(N,F),IND,FY)/(92-U-235(N,F),CHN,F
6	1	((92-U-238(N,F),,SIG)/(92-U-233(N,F),,SIG))
7	2	((94-PU-239(N,F),,SIG)/(92-U-235(N,F),,SIG))
8	1	((94-PU-240(N,F),,SIG)/(92-U-238(N,F),,SIG))
9	2	(1-D-2(D,N)2-HE-3,,DA)
10	1	(1-D-2(N,EL)1-D-2,,SIG)
11	1	(1-H-0(N,EL),,DA)
12	1	(1-H-0(N,EL),,SIG)
13	3	(1-H-0(N,TOT),,SIG)
14	2	(1-H-1(N,EL),,DA)
15	3	(1-H-1(N,EL),,SIG)
16	30	(1-H-1(N,EL)1-H-1,,DA)
17	2	(1-H-1(N,EL)1-H-1,,DA,,,EVAL)
18	1	(1-H-1(N,EL)1-H-1,,DA,,,EXP)
19	1	(1-H-1(N,EL)1-H-1,,DA,,SPA)
20	127	(1-H-1(N,EL)1-H-1,,SIG)
21	1	(1-H-1(N,EL)1-H-1,,SIG,,SPA)
22	2	(1-H-1(N,G)1-H-2,,SIG)
23	1	(1-H-1(N,G)1-H-2,,SIG,,MXW)
24	2	(1-H-1(N,G)1-H-2,,SPC)
25	1	(1-H-1(N,INL)1-H-1,,DA)
26	1	(1-H-1(N,N)1-H-1,,SIG)
27	1	(1-H-1(N,P),,SIG)
28	1	(1-H-1(N,P)0-NN-1,,DA)
29	1	(1-H-1(N,SCT),,SIG)
30	5	(1-H-1(N,SCT)1-H-1,,SIG)
31	7	(1-H-1(N,TOT),,SIG)
32	1	(1-H-1(P,EL)1-H-1,,DA)
33	3	(1-H-2(D,N)2-HE-3,,DA)
34	1	(1-H-2(D,N)2-HE-3,,DA,N,,EVAL)
35	1	(1-H-2(D,N)2-HE-3,,SIG)
36	1	(1-H-2(N,2N)1-H-1,,SIG)
37	1	(1-H-2(N,EL),,DA)
38	1	(1-H-2(N,EL)1-H-2,,DA)
39	2	(1-H-2(N,EL)1-H-2,,SIG)
40	1	(1-H-2(N,G),,SIG)
41	1	(1-H-2(N,INL)1-H-2,,DA)
42	1	(1-H-2(N,SCT),,SIG)
43	1	(1-H-2(N,THS)1-H-2,COH,AMP)
44	10	(1-H-3(D,N)2-HE-4,,DA)
45	1	(1-H-3(D,N)2-HE-4,,DA,,,EXP)
46	1	(1-H-3(D,N)2-HE-4,,DA,N,,EXP)
47	19	(1-H-3(D,N)2-HE-4,,SIG)
48	1	(1-H-3(D,N)2-HE-4,,SIG,A)
49	1	(1-H-3(P,EL)1-H-3,,DA,,,EXP)
50	2	(1-H-3(P,N)2-HE-3,,DA)
51	1	(1-H-3(P,N)2-HE-3,,DA,,,EXP)
52	1	(1-H-3(P,N)2-HE-3,,DA,N,,EXP)
53	2	(1-H-3(P,N)2-HE-3,,SIG)
54	4	(1-H-CXX(N,EL),COH,AMP)
55	1	(1-H-CXX(N,N+P),,DA,N)
56	2	(1-H-CXX(N,THS),COH,AMP)
57	1	(1-H-DXX(N,THS),COH,AMP)
58	1	((1-H-PLE(N,EL),,DA)
59	1	((1-H-PLE(N,THS),INC,SIG)
60	2	((1-T-3(D,N)2-HE-4,,SIG)

61	1	(100-FM-255(N,F),,SIG)
62	1	(11-NA-23(N,A)9-F-20,,SIG)
63	1	(11-NA-23(N,G)11-NA-24,,SIG,,MXW)
64	1	(12-MG-24(N,P)11-NA-24-G+M,,SIG/SUM)
65	1	(12-MG-24(N,P)11-NA-24-G,,SIG)
66	1	(13-AL-27(D,2N+3P)11-NA-24,M+/UND,SIG,,,EXP)
67	1	(13-AL-27(D,P+A)11-NA-24,M+,SIG)
68	3	(13-AL-27(D,P+A)11-NA-24,M+,SIG,,,EXP)
69	1	(13-AL-27(N,A),,SIG)
70	34	(13-AL-27(N,A)11-NA-24,,SIG)
71	4	(13-AL-27(N,A)11-NA-24,,SIG,,,EVAL)
72	2	(13-AL-27(N,A)11-NA-24,,SIG,,FIS)
73	4	(13-AL-27(N,A)11-NA-24-G+M,,SIG/SUM)
74	5	(13-AL-27(N,A)11-NA-24-G+M,,SIG/SUM,,FIS)
75	8	(13-AL-27(N,A)11-NA-24-G,,SIG)
76	3	(13-AL-27(N,A)11-NA-24-G,,SIG,,FIS)
77	1	(13-AL-27(N,A)11-NA-24-G,,SIG,,SPA)
78	1	(13-AL-27(N,A)11-NA-24-M,,SIG)
79	1	(13-AL-27(N,EL)13-AL-27,,SIG)
80	2	(13-AL-27(N,G)13-AL-28,,SIG)
81	1	(13-AL-27(N,G)13-AL-28,,SIG,,MXW)
82	13	(13-AL-27(N,P)12-MG-27,,SIG)
83	1	(13-AL-27(N,THS),COH,AMP)
84	2	(13-AL-27(P,N+3P)11-NA-24,CUM/UND,SIG,,,EXP)
85	9	(13-AL-27(P,N+3P)11-NA-24,M+,SIG,,,EVAL)
86	1	(13-AL-27(P,N+3P)11-NA-24,M+,SIG,,,EXP)
87	4	(13-AL-27(P,N+3P)11-NA-24,M+/UND,SIG,,,EXP)
88	1	(13-AL-27(P,X)11-NA-24)
89	1	(13-AL-27(P,X)7-N-17,,SIG,,,EXP)
90	2	(14-SI-0(N,A),,SIG)
91	1	(14-SI-0(N,A),PAR,SIG)
92	1	(14-SI-0(N,P),,SIG)
93	3	(14-SI-28(N,P)13-AL-28,,SIG)
94	1	(15-P-31(N,A)13-AL-28,,SIG)
95	5	(15-P-31(N,G)15-P-32,,SIG,,MXW)
96	2	(15-P-31(N,P)14-SI-31,,SIG)
97	1	(16-S-0(N,ABS),,SIG)
98	4	(16-S-32(N,P)15-P-32,,SIG)
99	9	(16-S-32(N,P)15-P-32,,SIG,,FIS)
100	1	(16-S-36(N,G)16-S-37,,SIG,,MXW)
101	1	(17-CL-37(N,G)17-CL-38,,SIG,,MXW)
102	1	(19-K-41(N,A)17-CL-38-G,,SIG)
103	1	(2-HE-0(N,TOT),,SIG)
104	1	(2-HE-3(N,P)1-H-3,,SIG)
105	4	(2-HE-3(N,TOT),,SIG)
106	1	(2-HE-4(N,EL)2-HE-4,,DA)
107	2	(2-HE-4(N,EL)2-HE-4,,POL/DA)
108	3	(2-HE-4(N,EL)2-HE-4,,SIG)
109	1	(2-HE-4(N,THS)2-HE-4,COH,AMP)
110	1	(2-HE-4(N,TOT),,SIG)
111	1	(20-CA-44(N,P)19-K-44,,SIG)
112	1	(22-TI-46(N,P)21-SC-46,,SIG,,FIS)
113	1	(22-TI-46(N,P)21-SC-46-G+M,,SIG/SUM,,FIS)
114	1	(22-TI-46(N,P)21-SC-46-G,,SIG,,FIS)
115	1	(22-TI-47(N,P)21-SC-47,,SIG,,FIS)
116	1	(22-TI-48(N,P)21-SC-48,,SIG)
117	1	(24-CR-53(N,G)24-CR-54,,SIG)
118	2	(25-MN-55(N,2N)25-MN-54,,SIG,,FIS)
119	1	(25-MN-55(N,G)25-MN-56,,SIG)
120	2	(25-MN-55(N,G)25-MN-56,,SIG,,MXW)
121	1	(25-MN-55(N,G)25-MN-56,,SIG,,SPA)
122	1	(26-FE-0(N,EL)26-FE-0,,SIG)
123	1	(26-FE-0(N,INL),PAR,SIG)
124	1	(26-FE-0(N,INL)26-FE-0,PAR,SIG,G)
125	1	(26-FE-54(N,P)25-MN-54,,SIG)
126	2	(26-FE-54(N,P)25-MN-54,,SIG,,FIS)

127	1	(26-FE-54(N,P)25-MN-54,,SIG,,SPA)
128	1	(26-FE-56(N,EL)26-FE-56,,SIG)
129	1	(26-FE-56(N,G)26-FE-57,PAR,DA,,AV)
130	1	(26-FE-56(N,INL)26-FE-56,,DA,G)
131	1	(26-FE-56(N,INL)26-FE-56,,SIG)
132	3	(26-FE-56(N,INL)26-FE-56,PAR,DA,G)
133	1	(26-FE-56(N,INL)26-FE-56,PAR,SIG)
134	3	(26-FE-56(N,INL)26-FE-56,PAR,SIG,G)
135	19	(26-FE-56(N,P)25-MN-56,,SIG)
136	3	(26-FE-56(N,P)25-MN-56,,SIG,,,EVAL)
137	1	(26-FE-58(N,G)26-FE-59,,SIG,,FIS)
138	1	(27-CO-59(N,G),,RI)
139	3	(27-CO-59(N,G),,SIG)
140	7	(27-CO-59(N,G)27-CO-60,,RI)
141	15	(27-CO-59(N,G)27-CO-60,,SIG)
142	3	(27-CO-59(N,G)27-CO-60,,SIG,,MXW)
143	3	(27-CO-59(N,G)27-CO-60,,SIG,,SPA)
144	6	(27-CO-59(N,G)27-CO-60-G+M,,SIG/SUM)
145	1	(27-CO-59(N,G)27-CO-60-G+M,,SIG/SUM,,MXW)
146	2	(27-CO-59(N,G)27-CO-60-G,,RI)
147	5	(27-CO-59(N,G)27-CO-60-G,,SIG)
148	1	(27-CO-59(N,G)27-CO-60-G,,SIG,,FIS)
149	1	(27-CO-59(N,THS)27-CO-59,COH,AMP)
150	1	(28-NI-0(N,EL),COH,AMP)
151	7	(28-NI-0(N,THS)28-NI-0,COH,AMP)
152	1	(28-NI-0(N,X)1-H-1,,SIG)
153	1	(28-NI-58(N,2N)28-NI-57,,SIG,,FIS)
154	1	(28-NI-58(N,P),,SIG)
155	1	(28-NI-58(N,P)27-CO-58,,SIG)
156	3	(28-NI-58(N,P)27-CO-58,,SIG,,FIS)
157	2	(28-NI-58(N,P)27-CO-58-G+M,,SIG/SUM)
158	4	(28-NI-58(N,P)27-CO-58-G+M,,SIG/SUM,,FIS)
159	2	(28-NI-58(N,P)27-CO-58-G,,SIG)
160	5	(28-NI-58(N,P)27-CO-58-G,,SIG,,FIS)
161	1	(29-CU-0(A,X)30-ZN-65,CUM,SIG,,,EXP)
162	1	(29-CU-63(A,2N)31-GA-65)
163	1	(29-CU-63(A,N+P)30-ZN-65,,SIG,,(A),EXP)
164	3	(29-CU-63(N,2N),,SIG)
165	20	(29-CU-63(N,2N)29-CU-62,,SIG)
166	1	(29-CU-63(N,2N)29-CU-62,,SIG,,,EVAL)
167	1	(29-CU-63(N,A),,SIG)
168	1	(29-CU-63(N,G),,SIG)
169	1	(29-CU-63(N,G)29-CU-64,,SIG)
170	1	(29-CU-63(N,G)29-CU-64,,SIG,,MXW)
171	1	(29-CU-63(P,2N)30-ZN-62)
172	9	(29-CU-63(P,N)30-ZN-63)
173	1	(29-CU-63(P,N)30-ZN-63,,SIG)
174	4	(29-CU-63(P,N)30-ZN-63,,SIG,,,EXP)
175	1	(29-CU-65(A,2N)31-GA-67)
176	5	(29-CU-65(N,2N)29-CU-64,,SIG)
177	1	(29-CU-65(N,2N)29-CU-64,,SIG,,,EVAL)
178	8	(29-CU-65(P,N)30-ZN-65)
179	2	(29-CU-65(P,N)30-ZN-65,,TTY,,,EXP)
180	3	(29-CU-65(P,N+P)29-CU-64)
181	1	(29-CU-65(P,N+P)29-CU-64,,SIG,,,EXP)
182	3	(29-CU-65(P,N+P)29-CU-64,UND,SIG,,,EXP)
183	1	(29-CU-65(P,N+P)29-CU-64,UND,SIG,,A,EXP)
184	4	(3-LI-6(N,A)1-H-3,,SIG)
185	3	(3-LI-6(N,A)1-H-3,,SIG,,MXW)
186	2	(3-LI-6(N,A)1-T-3,,SIG)
187	2	(3-LI-6(N,A)1-T-3,,SIG,,MXW)
188	1	(3-LI-6(N,G)3-LI-7,,SIG)
189	1	(3-LI-6(N,T),,SIG)
190	34	(3-LI-6(N,T)2-HE-4,,SIG)
191	2	(3-LI-6(N,T)2-HE-4,,SIG,,,EVAL)
192	1	(3-LI-7(P,INL)3-LI-7-M1,PAR,SIG)

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193     1     (3-LI-7(P,N)4-BE-7-M1,PAR,SIG,G)
194     1     (3-LI-7(P,N+G)4-BE-7,,SIG)
195     1     (30-ZN-0(N,G),,SPC,,MXW)
196     1     (30-ZN-64(N,P)29-CU-64,,SIG)
197     1     (31-GA-0(N,0),,RI)
198     1     (31-GA-0(N,G),,SIG)
199     1     (32-GE-76(N,INL)32-GE-76,PAR,SIG)
200     2     (33-AS-75(N,2N)33-AS-74,,SIG)
201     1     (33-AS-75(N,P)32-GE-75-G,,SIG)
202     1     (34-SE-80(N,G)34-SE-81-M,,SIG,,MXW)
203     1     (36-KR-84(N,G)36-KR-85-M,,SIG,,MXW)
204     1     (37-RB-87(N,G)37-RB-88,,SIG,,MXW)
205     1     (4-BE-9(A,N)6-C-12,PAR,DA,,,EVAL)
206     1     (4-BE-9(N,A)2-HE-6,,SIG)
207     1     (4-BE-9(N,EL)4-BE-9,,SIG)
208     2     (40-ZR-0(N,NON),,SIG)
209     1     (40-ZR-92(N,INL)40-ZR-92,PAR,SIG,G)
210     1     (40-ZR-94(N,INL)40-ZR-94,PAR,SIG,G)
211     1     (41-NB-93(N,G)41-NB-94,,SIG)
212     1     (42-MO-0(N,0),,RI)
213     1     (42-MO-92(N,P)41-NB-92-M,,SIG,,FIS)
214     1     (42-MO-98(N,G)42-MO-99,,SIG,,MXW)
215     1     (45-RH-103(N,INL)45-RH-103-M,,SIG)
216     1     (46-PD-108(N,G)46-PD-109,,SIG,,SPA)
217     1     (46-PD-108(N,G)46-PD-109-M,,SIG,,MXW)
218     1     (47-AG-0(N,0),,RI)
219     1     (48-CD-0(N,ABS),,SIG)
220     1     (48-CD-0(N,G),,SIG)
221     1     (48-CD-110(N,G)48-CD-111-M,,SIG,,MXW)
222     1     (48-CD-114(N,G)48-CD-115-M,,SIG,,MXW)
223     1     (49-IN-0(N,EL),,WID,,G)
224     1     (49-IN-115(N,G)49-IN-116,,RI)
225     1     (49-IN-115(N,G)49-IN-116,,SIG)
226     1     (49-IN-115(N,G)49-IN-116,,SIG,,,EVAL)
227     1     (49-IN-115(N,G)49-IN-116,,SPC)
228     3     (49-IN-115(N,G)49-IN-116-M,,SIG)
229     1     (49-IN-115(N,G)49-IN-116-M,,SIG,,MXW)
230     1     (49-IN-115(N,G)49-IN-116-M1+M2,,SIG/SUM,,MXW
231     6     (49-IN-115(N,INL)49-IN-115-M,,SIG)
232     1     (49-IN-115(N,INL)49-IN-115-M,,SIG,,,EVAL)
233     1     (49-IN-115(N,INL)49-IN-115-M,,SIG,,FIS)
234     1     (49-IN-119(N,INL)49-IN-119-M,,SIG)
235     1     (5-B-0(N,A),,SIG)
236     1     (5-B-0(N,A),,SIG,,MXW)
237     16    (5-B-0(N,ABS),,SIG)
238     2     (5-B-0(N,ABS),,SIG,,MXW)
239     1     (5-B-0(N,G),,SIG)
240     1     (5-B-0(N,G),,SIG,,MXW)
241     1     (5-B-0(N,G)5-B-0,,SIG,,SPA)
242     11    (5-B-10(N,A)3-LI-7,,SIG)
243     2     (5-B-10(N,A)3-LI-7,PAR,SIG)
244     2     (5-B-10(N,A)3-LI-7,PAR,SIG,G)
245     1     (5-B-10(N,A+G)3-LI-7,,SIG)
246     1     (5-B-10(N,G)5-B-11,,SIG,,MXW)
247     1     (5-B-10(N,G+A)3-LI-7,PAR,SIG)
248     1     (50-SN-118(N,A)48-CD-115,,SIG)
249     1     (51-SB-121(N,2N)51-SB-120,,SIG)
250     1     (52-TE-130(N,G)52-TE-131,M+,SIG,,MXW)
251     10    (53-I-127(N,G)53-I-128,,SIG)
252     5     (53-I-127(N,G)53-I-128,,SIG,,MXW)
253     1     (59-PR-141(N,G)59-PR-142-G+M,,SIG/SUM,,MXW)
254     4     (6-C-0(N,FL),,DA)
255     11    (6-C-0(N,EL),,SIG)
256     1     (6-C-0(N,EL),,SIG,,MXW)
257     1     (6-C-0(N,EL),COH,SIG)
258     7     (6-C-0(N,INL),,SIG,G)
```

259	1	(6-C-0(N,SCT),,SIG)
260	1	(6-C-0(N,THS),COH,AMP)
261	1	(6-C-12(8-O-16,EL)6-C-12,,DA,,,EXP)
262	1	(6-C-12(D,2N+P)6-C-11)
263	1	(6-C-12(N,A)4-BE-9,PAR,SIG)
264	1	(6-C-12(N,EL),,SIG)
265	4	(6-C-12(N,EL)6-C-12,,DA)
266	6	(6-C-12(N,EL)6-C-12,,SIG)
267	1	(6-C-12(N,INL)6-C-12,,DA)
268	5	(6-C-12(N,INL)6-C-12,,DA,G)
269	1	(6-C-12(N,INL)6-C-12,,SIG)
270	2	(6-C-12(N,N+A)4-BE-8,,SIG)
271	1	(6-C-12(N,N+P)5-B-11,PAR,SIG)
272	1	(6-C-12(N,TOT),,SIG)
273	1	(6-C-12(P,3N+3P)4-BE-7,UND,SIG,,,EXP)
274	1	(6-C-12(P,N+P)6-C-11)
275	1	(6-C-12(P,N+P)6-C-11,,SIG,,,EVAL)
276	2	(6-C-12(P,N+P)6-C-11,,SIG,,,EXP)
277	1	(6-C-12(P,N+P)6-C-11,UND,SIG,,,EXP)
278	1	(6-C-12(P,N+P)6-C-11,UND,SIG,,A,EXP)
279	1	(6-C-12(P,X)4-BE-7,CUM,SIG,,,EXP)
280	1	(6-C-12(P,X)6-C-11)
281	1	(60-ND-143(N,A)58-CE-140,,SIG)
282	1	(60-ND-143(N,A)58-CE-140,PAR,SIG,A,MXW)
283	1	(60-ND-146(N,G)60-ND-147,,SIG,,MXW)
284	1	(62-SM-147(N,0)62-SM-148,,EN)
285	1	(62-SM-147(N,A)60-ND-144,,WID)
286	1	(62-SM-149(N,A)60-ND-146,,SIG,,MXW)
287	1	(63-EU-153(N,2N)63-EU-152-M1,,SIG)
288	2	(66-DY-164(N,G)66-DY-165-G,,SIG,,MXW)
289	1	(68-ER-0(N,G),,SIG)
290	1	(7-N-0(N,EL)7-N-0,COH,SIG)
291	1	(7-N-0(N,G),,SIG)
292	3	(7-N-14(N,A)5-B-11,,SIG)
293	1	(7-N-14(N,P)6-C-14,,SIG)
294	2	(7-N-14(N,P)6-C-14,,SIG,,MXW)
295	1	(71-LU-176(N,G)71-LU-177,,SIG,,MXW)
296	1	(72-HF-180(N,G)72-HF-181,,SIG)
297	1	(73-TA-0(N,0),,RI)
298	2	(74-W-0(N,NON),,SIG)
299	1	(79-AU-197(N,0),,EN)
300	1	(79-AU-197(N,0)79-AU-198,,RI)
301	2	(79-AU-197(N,2N)79-AU-196,,SIG)
302	1	(79-AU-197(N,2N)79-AU-196-G,,SIG,,SPA)
303	1	(79-AU-197(N,4N)79-AU-194,,SIG,,SPA)
304	1	(79-AU-197(N,ABS),,SIG)
305	1	(79-AU-197(N,G),,RI)
306	7	(79-AU-197(N,G),,SIG)
307	6	(79-AU-197(N,G)79-AU-198,,RI)
308	1	(79-AU-197(N,G)79-AU-198,,RI,,RNV)
309	29	(79-AU-197(N,G)79-AU-198,,SIG)
310	3	(79-AU-197(N,G)79-AU-198,,SIG,,MXW)
311	1	(79-AU-197(N,G)79-AU-198,,SIG,,SPA)
312	1	(79-AU-197(N,G)79-AU-198,PAR,WID)
313	3	(79-AU-197(N,G)79-AU-198-G+M,,SIG/SUM)
314	9	(79-AU-197(N,G)79-AU-198-G,,SIG)
315	3	(79-AU-197(N,G)79-AU-198-G,,SIG,,AV)
316	5	(79-AU-197(N,G)79-AU-198-G,,SIG,,MXW)
317	1	(79-AU-197(N,G)79-AU-198-G,,SIG,,SPA)
318	2	(79-AU-197(N,G)79-AU-198-G,M+,SIG)
319	1	(79-AU-197(N,G)79-AU-198-M+G,,RI/SUM)
320	1	(79-AU-198(N,G)79-AU-199,,SIG,,MXW)
321	1	(8-O-16(N,A)6-C-13,,SIG)
322	1	(8-O-16(N,EL),,SIG)
323	1	(8-O-16(N,EL)8-O-16,COH,AMP)
324	1	(8-O-16(N,EL)8-O-16,COH,SIG)

325	1	(8-0-16(N,G)8-0-17,,SIG)
326	1	(8-0-16(N,P)7-N-16,,SIG)
327	3	(8-0-16(N,TOT),,SIG)
328	1	(80-HG-0(N,EL),COH,AMP)
329	1	(80-HG-0(N,THS),COH,AMP)
330	1	(81-TL-203(N,A)79-AU-200-G,,SIG)
331	5	(82-PB-0(N,EL),,SIG)
332	1	(82-PB-0(N,EL)82-PB-0,,DA)
333	1	(82-PB-0(N,EL)82-PB-0,,SIG)
334	2	(82-PB-0(N,G),,SPC)
335	1	(82-PB-0(N,INL),,DA,G)
336	1	(82-PB-0(N,SCT)82-PB-0,,SIG)
337	1	(82-PB-204(N,2N)82-PB-203,,SIG)
338	1	(82-PB-207(N,G)82-PB-208,,SIG)
339	1	(82-PB-208(N,2N)82-PB-207-M,,SIG)
340	1	(82-PB-208(N,EL)82-PB-208,,SIG).
341	1	(83-BI-209(N,EL)83-BI-209,,DA)
342	2	(83-BI-209(N,EL)83-BI-209,FA,SIG,,SPA)
343	1	(83-BI-209(N,X)0-NN-1,EM,SIG)
344	1	(9-F-19(N,G)9-F-20,,SIG)
345	1	(9-F-19(N,INL)9-F-19,,DA,G)
346	1	(9-F-19(N,INL)9-F-19,PAR,SIG)
347	1	(90-TH-232(18-AR-40,EL)90-TH-232,,DE,,,EXP)
348	2	(90-TH-232(N,F),,SIG)
349	2	(90-TH-232(N,F),,SIG,,FIS)
350	1	(90-TH-232(N,G),,SIG)
351	1	(90-TH-232(N,G)90-TH-233,,RI)
352	2	(90-TH-232(N,G)90-TH-233,,SIG)
353	2	(92-U-0(N,F),,SIG)
354	1	(92-U-0(N,F),,SIG,,SPA)
355	4	(92-U-0(N,F)42-MO-99,CUM,FY,,SPA)
356	1	(92-U-232(N,F),,SIG)
357	1	(92-U-232(N,F)42-MO-99,CUM,FY,,SPA)
358	1	(92-U-233(N,EL)92-U-233,,SIG)
359	1	(92-U-233(N,F),,NU,,,EVAL)
360	1	(92-U-233(N,F),,SIG)
361	1	(92-U-233(N,F),,SIG,,MXW)
362	1	(92-U-233(N,F),CHN,FY,,MXW)
363	1	(92-U-233(N,F),IND,FY,,MXW)
364	1	(92-U-233(N,F)38-SR-92,CUM,FY,,MXW)
365	1	(92-U-233(N,F)53-I-135,CUM,FY,,MXW)
366	1	(92-U-233(N,F)55-CS-137,IND,FY)
367	1	(92-U-233(N,F)56-BA-140,IND,FY,,MXW)
368	1	(92-U-233(N,F)57-LA-140,CUM,FY,,MXW)
369	1	(92-U-233(N,F)61-PM-151,IND,FY,,MXW)
370	1	(92-U-235(N,ABS),,ETA,,MXW)
371	2	(92-U-235(N,F),,AKE,FF,MXW)
372	1	(92-U-235(N,F),,AP,,MXW)
373	3	(92-U-235(N,F),,ARE)
374	1	(92-U-235(N,F),,DA,FF,MXW)
375	1	(92-U-235(N,F),,INT)
376	2	(92-U-235(N,F),,NU)
377	1	(92-U-235(N,F),,NU,,,EVAL)
378	1	(92-U-235(N,F),,RI)
379	1	(92-U-235(N,F),,RI,,,EVAL)
380	52	(92-U-235(N,F),,SIG)
381	1	(92-U-235(N,F),,SIG,,,EVAL)
382	1	(92-U-235(N,F),,SIG,,AV)
383	4	(92-U-235(N,F),,SIG,,MXW)
384	1	(92-U-235(N,F),,SIG,,SPA)
385	1	(92-U-235(N,F),,WID)
386	1	(92-U-235(N,F),,ZP,,MXW)
387	1	(92-U-235(N,F),BIN/TER,SIG/RAT)
388	2	(92-U-235(N,F),CHN,FY,,MXW)
389	1	(92-U-235(N,F),CUM,FY,,MXW)
390	1	(92-U-235(N,F),IND,FY,,MXW)

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391    2    (92-U-235(N,F),PR,NU)
392    1    (92-U-235(N,F),PR,NU,,MXW)
393    1    (92-U-235(N,F),TER,AKE,A,MXW)
394    1    (92-U-235(N,F),TER,AKE,FF,MXW)
395    1    (92-U-235(N,F),TER,SIG,,MXW)
396    1    (92-U-235(N,F)2-HE-4,TER,FY,,MXW)
397    1    (92-U-235(N,F)37-RB-94,CUM,FY)
398    1    (92-U-235(N,F)37-RB-98,DL,PN,,MXW)
399    2    (92-U-235(N,F)42-MO-99,CUM,FY,,SPA)
400    1    (92-U-235(N,F)44-RU-105,IND,FY,,MXW)
401    1    (92-U-235(N,F)47-AG-111,CUM,FY,,MXW)
402    1    (92-U-235(N,F)55-CS-137,CUM,FY,,MXW)
403    1    (92-U-235(N,F)55-CS-137,IND,FY)
404    1    (92-U-235(N,F)56-BA-140,CUM,FY,,MXW)
405    1    (92-U-235(N,F)56-BA-140,IND,FY,,MXW)
406    2    (92-U-235(N,F)57-LA-140,CUM,FY,,MXW)
407    1    (92-U-235(N,F)ELEM,CHG,FY,,MXW)
408    2    (92-U-235(N,F)ELEM/MASS,CUM,FY,,MXW)
409    1    (92-U-235(N,F)MASS,CHN,FY,,MXW)
410    2    (92-U-235(N,G),,SIG)
411    1    (92-U-238(N,2N)92-U-237,,SIG)
412    1    (92-U-238(N,F),,NU)
413    14   (92-U-238(N,F),,SIG)
414    2    (92-U-238(N,F),,SIG,,,EVAL)
415    1    (92-U-238(N,F)42-MO-99,CUM,FY,,SPA)
416    1    (92-U-238(N,F)56-BA-140,CHN,FY,,FIS)
417    1    (92-U-238(N,F)56-BA-140,IND,FY)
418    1    (92-U-238(N,G),,SIG)
419    1    (92-U-238(N,G)92-U-239,,RI,,RNV)
420    3    (92-U-238(N,G)92-U-239,,SIG)
421    1    (92-U-238(P,F)47-AG-111,CUM,SIG,,,EXP)
422    1    (92-U-238(P,F)49-IN-111,CUM,SIG,,,EXP)
423    2    (93-NP-237(N,F),,SIG)
424    1    (93-NP-237(N,F),,SIG,,FIS)
425    1    (93-NP-237(N,F)57-LA-140,CUM,FY,,SPA)
426    1    (93-NP-237(N,G)93-NP-238,,SIG)
427    2    (94-PU-239(N,ABS),,ALF)
428    1    (94-PU-239(N,ABS),,ALF,,MXW)
429    1    (94-PU-239(N,ABS),,SIG)
430    1    (94-PU-239(N,EL)94-PU-239,,SIG)
431    1    (94-PU-239(N,F),,NU,,,EVAL)
432    1    (94-PU-239(N,F),,NU,,MXW)
433    10   (94-PU-239(N,F),,SIG)
434    1    (94-PU-239(N,F),CHN,FY,,MXW)
435    1    (94-PU-239(N,F),IND,FY,,MXW)
436    1    (94-PU-239(N,F),TER,AKE,A,MXW)
437    1    (94-PU-239(N,F)42-MO-99,IND,FY,,MXW)
438    1    (94-PU-239(N,F)42-MO-99,IND,FY,,SPA)
439    1    (94-PU-239(N,F)55-CS-137,IND,FY)
440    1    (94-PU-239(N,F)ELEM/MASS,IND,FY,,MXW)
441    1    (94-PU-239(N,F)MASS,CHN,FY,,MXW)
442    1    (94-PU-240(N,0),,EN)
443    1    (94-PU-240(N,F)42-MO-99,,SIG)
444    1    (94-PU-240(N,F)42-MO-99,CUM,PY)
445    1    (94-PU-240(N,G)94-PU-241,,SIG)
446    1    (94-PU-241(N,ABS),,SIG)
447    1    (94-PU-241(N,F),,NU,,,EVAL)
448    1    (94-PU-241(N,F),,RI)
449    3    (94-PU-241(N,F),,SIG)
450    1    (94-PU-241(N,F)42-MO-99,CUM,FY,,MXW)
451    1    (95-AM-241(N,ABS),,SIG)
452    1    (95-AM-241(N,F),,NU)
453    1    (96-CM-244(0,F),,NU)
454    1    (96-CM-245(N,F)42-MO-99,CUM,FY,,MXW)
455    1    (98-CF-249(N,F),CUM,FY,,MXW)
456    1    (98-CF-249(N,F)41-NB-97-G,IND,FY,,MXW)
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457    1      (98-CF-249(N,F)60-ND-147,CUM,FY,,MXW)
458    1      (98-CF-251(N,F),,SIG)
459    6      (98-CF-252(0,F),,NU)
460    1      (98-CF-252(0,F),IND,FY)
461    14     (98-CF-252(0,F),PR,NU)
462    1      (98-CF-252(0,F)56-BA-140,CUM,FY)
463    1      (98-CF-252(0,F)ELEM/MASS,PR,SPC)
464    1      (98-CF-252(0,N),PR,NU)
465    1      (98-CF-252(N,F),,DE,FF)
466    1      (98-CF-252(N,F),,NU,,,EVAL)
467    1      (98-CF-252(N,F),PR,NU)
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TOTAL SUB WORK=   1226

STANDARD REACTION STATISTICS.

SEQ NO	COUNT	STANDARD REACTION
1	1	((18-AR-40,NNP)+(18-AR-40,ND))
2	1	((25-MN-55,NP)+(25-MN-55,NA))
3	7	((26-FE-56,INL,,PAR)=(26-FE-56,ING,,PAR))
4	2	((92-U-233,NF)/(92-U-235,NF))
5	1	((92-U-238,NF)/(92-U-235,NF))
6	1	((94-PU-239,NF)/(92-U-235,NF))
7	1	(1-H-0,EL)
8	2	(1-H-0,EL,DA)
9	1	(1-H-0,NG)
10	2	(1-H-0,SCT,,SPA)
11	12	(1-H-0,TOT)
12	2	(1-H-1,ABS)
13	4	(1-H-1,EL DA)
14	82	(1-H-1,EL)
15	73	(1-H-1,EL,DA)
16	1	(1-H-1,FAS)
17	2	(1-H-1,NG)
18	15	(1-H-1,NP)
19	1	(1-H-1,NP,DA)
20	1	(1-H-1,NP,DA/DE)
21	71	(1-H-1,SCT)
22	2	(1-H-1,SCT,DA)
23	5	(1-H-1,TOT)
24	1	(1-H-2,EL)
25	1	(1-H-2,EL,DA)
26	1	(1-H-2,EL,DA,,D)
27	2	(1-H-2,FAS)
28	1	(1-H-2,TOT)
29	5	(1-H-PLE,SCT)
30	1	(10-NE-0,FAS)
31	11	(11-NA-23,NG)
32	2	(11-NA-23,NG,,MXW)
33	1	(11-NA-23,NG,RI)
34	1	(11-NA-23,NP)
35	2	(12-MG-24,NP)
36	1	(12-MG-24,NP,,AV)
37	2	(12-MG-24,NP,,FIS)
38	1	(12-MG-26,NG)
39	1	(13-AL-27,ABS)
40	1	(13-AL-27,COH,AMP)
41	187	(13-AL-27,NA)
42	1	(13-AL-27,NA,,AV)
43	9	(13-AL-27,NA,,FIS)
44	3	(13-AL-27,NA,,SPA)
45	9	(13-AL-27,NG)
46	1	(13-AL-27,NG/WID,,PAR)
47	53	(13-AL-27,NP)
48	1	(13-AL-27,NP,,AV)
49	1	(13-AL-27,NP,,FIS)
50	1	(13-AL-27,TOT)
51	1	(14-SI-28,EL)
52	1	(14-SI-28,NA)
53	1	(14-SI-28,NA,,PAR)
54	2	(14-SI-28,NG,SPC)
55	16	(14-SI-28,NP)
56	1	(14-SI-30,NG)
57	1	(14-SI-30,NG,,MXW)
58	3	(15-P-31,N2N)
59	4	(15-P-31,NA)
60	2	(15-P-31,NG)

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 61    2    (15-P-31,NG,,MXW)
 62    9    (15-P-31,NP)
 63    1    (16-S-0,COH,AMP)
 64    1    (16-S-0,TOT)
 65    1    (16-S-32,NG,SPC)
 66   25    (16-S-32,NP)
 67    9    (16-S-32,NP,,FIS)
 68    4    (16-S-32,NP,,SPA)
 69    4    (17-CL-0,COH,AMP)
 70    1    (17-CL-0,NG)
 71    1    (17-CL-35,NG)
 72    1    (17-CL-37,NG)
 73    2    (17-CL-37,NP)
 74    1    (18-AR-40,NG,,MXW)
 75    1    (19-K-0,COH,AMP)
 76    3    (19-K-40,NP)
 77    4    (19-K-41,NA)
 78    1    (19-K-41,NG)
 79    1    (1961)
 80    4    (2-HE-0,TOT)
 81    1    (2-HE-3)
 82    2    (2-HE-3,NP)
 83    1    (2-HE-3,TOT)
 84    2    (2-HE-4,EL)
 85    1    (20-CA-0,EL)
 86    2    (20-CA-40,EL)
 87    1    (20-CA-44,NP)
 88    1    (20-CA-48,NG,,MXW)
 89    1    (21-SC-45,N2N,,MS)
 90    2    (21-SC-45,NA)
 91    3    (21-SC-45,NG)
 92    3    (22-TI-46,NP,,FIS)
 93    2    (22-TI-48,NP)
 94    1    (22-TI-50,NG,,MXW)
 95    1    (22-TI-50,NP)
 96    3    (23-V-0,EL)
 97    3    (23-V-0,SCT)
 98    1    (23-V-0,THS)
 99    1    (23-V-51,INL,,PAR)
100    1    (23-V-51,NA)
101    4    (23-V-51,NG)
102    2    (23-V-51,NP)
103    1    (23-V-51,SCT)
104    1    (24-CR-50,NG)
105    1    (24-CR-52,NG,SPC)
106    2    (24-CR-52,NP)
107    1    (24-CR-53,NP)
108    4    (25-MN-55,NA)
109   21    (25-MN-55,NG)
110    1    (25-MN-55,NG,,MXW)
111    2    (25-MN-55,NG,RI)
112    1    (26-FE-0,EL)
113    2    (26-FE-0,ING,,PAR)
114    1    (26-FE-0,INL)
115    3    (26-FE-0,INL,DE)
116    2    (26-FE-0,NG)
117    1    (26-FE-0,TOT)
118    1    (26-FE-54,N2N,,GND)
119    6    (26-FE-54,NP,,FIS)
120    1    (26-FE-54,NP,,SPA)
121    1    (26-FE-56,EL,DA)
122    4    (26-FE-56,ING)
123   11    (26-FE-56,ING,,PAR)
124    8    (26-FE-56,ING,DA,PAR)
125    1    (26-FE-56,INL)
126    7    (26-FE-56,INL,,PAR)
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127	123	(26-FE-56,NP)
128	1	(26-FE-56,NP,,FIS)
129	1	(26-FE-56,PEM,DA)
130	1	(26-FE-58,NG)
131	2	(27-CO-59,N2N)
132	2	(27-CO-59,NA)
133	112	(27-CO-59,NG)
134	1	(27-CO-59,NG,,MS)
135	5	(27-CO-59,NG,,MXW)
136	38	(27-CO-59,NG,RI)
137	1	(27-CO-59,NG,RI,RNV)
138	1	(27-CO-60,NG)
139	1	(28-NI-0,ABS)
140	2	(28-NI-0,COH)
141	13	(28-NI-0,COH,AMP)
142	1	(28-NI-0,EL,DA)
143	6	(28-NI-0,NG,SPC)
144	2	(28-NI-58,N2N)
145	2	(28-NI-58,N2N,,FIS)
146	6	(28-NI-58,NP)
147	13	(28-NI-58,NP,,FIS)
148	2	(28-NI-58,NP,,SPA)
149	1	(28-NI-62,NG)
150	1	(28-NI-64,NG)
151	1	(29-CU-0,EL)
152	2	(29-CU-0,GEM)
153	1	(29-CU-0,N2N)
154	3	(29-CU-0,NG)
155	1	(29-CU-0,NG,,MXW)
156	1	(29-CU-0,TOT)
157	1	(29-CU-63,ING,DA,PAR)
158	142	(29-CU-63,N2N)
159	1	(29-CU-63,NA,,FIS)
160	7	(29-CU-63,NG)
161	78	(29-CU-65,N2N)
162	5	(29-CU-65,NG)
163	2	(3-LI-0,NA)
164	1	(3-LI-6,ABS)
165	24	(3-LI-6,NA)
166	45	(3-LI-6,NT)
167	1	(3-LI-7,INL,,PAR)
168	1	(3-LI-7,NG,SPC)
169	1	(3-LI-7,NNT)
170	1	(3-LI-7,NT,DA)
171	1	(30-ZN-0,NG)
172	8	(30-ZN-64,N2N)
173	1	(30-ZN-64,NG)
174	7	(30-ZN-64,NP)
175	4	(30-ZN-66,N2N)
176	1	(30-ZN-66,NP)
177	1	(30-ZN-67,NP,,FIS)
178	1	(30-ZN-68,ING)
179	1	(30-ZN-68,NA)
180	3	(30-ZN-68,NG)
181	1	(31-GA-69,NG)
182	1	(31-GA-69,NP)
183	1	(31-GA-71,N2N)
184	2	(31-GA-71,NG)
185	8	(32-GE-70,N2N)
186	1	(32-GE-72,INL)
187	1	(32-GE-74,NG)
188	1	(32-GE-74,NG,,MXW)
189	4	(33-AS-75,N2N)
190	1	(33-AS-75,N2N,,SPA)
191	4	(33-AS-75,NA)
192	4	(33-AS-75,NG)

193	2	(33-AS-75,NP)
194	1	(34-SE-74,NG)
195	1	(34-SE-80,NG,,MS)
196	1	(34-SE-82,N2N,,MS)
197	1	(35-BR-0,COH,AMP)
198	1	(35-BR-79,N2N)
199	1	(35-BR-79,NA)
200	2	(35-BR-79,NG)
201	1	(35-BR-79,NG,,GND)
202	1	(35-BR-79,NG,,MS)
203	1	(35-BR-81,N2N,,MS)
204	1	(37-RB-87,NA)
205	1	(38-SR-86,NG,,MS)
206	1	(39-Y-89,INL,,MS)
207	4	(39-Y-89,NG)
208	1	(4-BE-9,NA)
209	1	(4-BE-9,NG)
210	1	(40-ZR-0,ING,DA,PAR)
211	1	(40-ZR-0,TOT)
212	11	(40-ZR-90,N2N)
213	1	(40-ZR-90,N2N,,MS)
214	1	(40-ZR-90,NP)
215	3	(40-ZR-94,NA)
216	4	(41-NB-93,NA)
217	1	(41-NB-93,NG)
218	1	(41-NB-93,TOT)
219	1	(42-MO-0,NG,SPC)
220	2	(42-MO-100,NG)
221	1	(42-MO-92,NP)
222	2	(42-MO-92,NP,,MS/FIS)
223	1	(42-MO-97,NG,SPC)
224	3	(42-MO-98,NG)
225	1	(44-RU-102,NG,,MXW)
226	1	(44-RU-104,NG,,MXW)
227	1	(44-RU-104,NG,SPC)
228	1	(44-RU-96,N2N)
229	1	(44-RU-96,NG)
230	1	(45-RH-103,NG)
231	2	(45-RH-103,NG,,MS)
232	1	(45-RH-103,NP)
233	1	(46-PD-108,NG)
234	1	(46-PD-108,NG,,MXW)
235	2	(46-PD-110,N2N)
236	4	(47-AG-0,NG)
237	1	(47-AG-0,TOT)
238	1	(47-AG-107,N2N)
239	1	(47-AG-107,N2N,,GND)
240	1	(47-AG-107,NA)
241	2	(47-AG-107,NG)
242	1	(47-AG-109,NG)
243	2	(47-AG-109,NG,,MS)
244	1	(48-CD-112,NP)
245	13	(49-IN-0,NG)
246	2	(49-IN-113,NG)
247	1	(49-IN-113,NG,RI,MS)
248	3	(49-IN-115,ING,,MS)
249	1	(49-IN-115,INL)
250	6	(49-IN-115,INL,,MS)
251	1	(49-IN-115,INL,,MS/FIS)
252	1	(49-IN-115,NA)
253	22	(49-IN-115,NG)
254	8	(49-IN-115,NG,,MS)
255	1	(49-IN-115,NG,,MXW)
256	1	(49-IN-115,NG,RI)
257	23	(5-B-0,ABS)
258	1	(5-B-0,ABS,,MXW)

259	3	(5-B-0,NA)
260	1	(5-B-0,NG)
261	1	(5-B-10,ABS)
262	22	(5-B-10,NA)
263	2	(50-SN-112,NG,,GND/M+)
264	1	(50-SN-120,NG,,MXW)
265	1	(50-SN-122,NG)
266	1	(50-SN-122,NG,,GND)
267	2	(50-SN-124,NG)
268	1	(51-SB-0,TOT)
269	1	(51-SB-121,N2N)
270	3	(51-SB-121,NG)
271	1	(51-SB-121,NG,,GND/MXW)
272	3	(51-SB-123,NG)
273	1	(52-TE-122,NG)
274	1	(52-TE-128,NG,,GND)
275	6	(52-TE-130,N2N)
276	1	(52-TE-130,N2N,,GND)
277	1	(53-I-127,COH,AMP)
278	69	(53-I-127,NG)
279	2	(55-CS-133,NA)
280	1	(55-CS-133,NG,,GND)
281	1	(55-CS-133,NG,,MS)
282	1	(56-BA-130,NG)
283	1	(56-BA-138,NG)
284	2	(57-LA-139,NG)
285	1	(58-CE-0,TOT)
286	1	(58-CE-140,NG)
287	4	(59-PR-141,N2N)
288	3	(59-PR-141,NG)
289	1	(59-PR-141,TOT)
290	1	(6-C-0,COH,AMP)
291	78	(6-C-0,EL)
292	1	(6-C-0,EL,AMP)
293	13	(6-C-0,EL,DA)
294	1	(6-C-0,ING,,PAR)
295	6	(6-C-0,SCT)
296	1	(6-C-0,SCT,DA)
297	1	(6-C-0,TOT)
298	3	(6-C-12,EL)
299	7	(6-C-12,EL,DA)
300	1	(6-C-12,EL,LEG)
301	2	(6-C-12,ING)
302	3	(6-C-12,ING,,PAR)
303	6	(6-C-12,ING,DA)
304	2	(6-C-12,ING,DA,PAR)
305	1	(6-C-12,INL,,PAR)
306	1	(6-C-12,INL,DA)
307	1	(6-C-12,N2N)
308	2	(6-C-12,NA)
309	1	(6-C-12,NG)
310	1	(6-C-12,NNA,DA,,N)
311	2	(6-C-12,NP)
312	3	(6-C-12,SCT)
313	4	(6-C-12,TOT)
314	1	(60-ND-0,NG)
315	1	(60-ND-0,NG,,SPA)
316	1	(60-ND-0,NG,SPC)
317	1	(60-ND-142,N2N)
318	1	(60-ND-143,NA)
319	1	(60-ND-143,NA,,PAR/MXW)
320	1	(60-ND-143,NA/WID)
321	1	(60-ND-143,NG/WID)
322	1	(60-ND-146,NG)
323	1	(60-ND-148,NG)
324	1	(60-ND-150,NG)

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325      1     (62-SM-0,NG,SPC)
326      1     (62-SM-149,NA,,PAR)
327      2     (62-SM-149,NA,,PAR/MXW)
328      1     (62-SM-149,NG)
329      1     (62-SM-152,NG)
330      1     (62-SM-154,NG)
331      1     (63-EU-0,ABS)
332      1     (63-EU-151,NG)
333      1     (63-EU-151,NG,,MS)
334      1     (64-GD-157,NG)
335      1     (66-DY-0,NG)
336      2     (66-DY-164,NG)
337      1     (67-HO-165,NG)
338      1     (67-HO-165,NG,,MS)
339      1     (69-TM-170,NG)
340      1     (7-N-0,NG,SPC)
341      2     (7-N-0,TOT)
342      1     (7-N-14,NA)
343      1     (7-N-14,NG)
344      2     (7-N-14,NG,SPC)
345      6     (7-N-14,NP)
346      1     (7-N-15,EL)
347      1     (70-YB-170,NG,SPC)
348      1     (70-YB-176,N2N)
349      1     (70-YB-176,NP)
350      1     (71-LU-175,NG)
351      1     (71-LU-176,NG,,GND/MXW)
352      1     (71-LU-176,NG,SPC)
353      1     (72-HF-0,NG)
354      1     (72-HF-180,NG)
355      1     (72-HF-180,NG,SPC,SPA)
356      8     (73-TA-0,NG)
357      1     (73-TA-0,TOT)
358      1     (73-TA-181,ING,,PAR)
359      2     (73-TA-181,NG)
360      1     (73-TA-181,NG,,GND/SPA)
361      1     (74-W-0,EL/ARE)
362      1     (74-W-184,NG)
363      2     (74-W-184,NP)
364      4     (74-W-186,NG)
365      1     (75-RE-0,ABS)
366      1     (75-RE-185,ABS)
367      2     (75-RE-185,NG)
368      1     (75-RE-187,ABS)
369      1     (75-RE-187,NA)
370      3     (75-RE-187,NG)
371      1     (75-RE-187,NG,,GND/SPA)
372      1     (76-OS-190,ING,,MS)
373      2     (76-OS-190,INL,,MS)
374     10     (76-OS-190,NA)
375      1     (77-IR-0,TOT)
376      2     (77-IR-191,NG)
377      1     (77-IR-193,NG)
378      1     (78-PT-196,NG)
379      1     (78-PT-198,N2N,,MS)
380      1     (78-PT-198,NG)
381      2     (79-AU-197,ABS)
382     11     (79-AU-197,N2N)
383      1     (79-AU-197,NF)
384      1     (79-AU-197,NF,RI)
385    162     (79-AU-197,NG)
386      2     (79-AU-197,NG,,MXW)
387     61     (79-AU-197,NG,RI)
388      7     (79-AU-197,NG,RI,RNV)
389      3     (79-AU-197,NG/PCS)
390      2     (79-AU-197,TOT)
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391	1	(8-0-0,ABS)
392	1	(8-0-0,COH)
393	6	(8-0-0,COH,AMP)
394	1	(8-0-0,EL)
395	1	(8-0-0,EL,AMP)
396	3	(8-0-0,TOT)
397	9	(8-0-16,NP)
398	1	(8-0-17,NA)
399	1	(8-0-18,NG)
400	1	(8-0-18,TOT)
401	1	(81-TL-0,TOT)
402	1	(81-TL-203,NG)
403	1	(81-TL-205,NG)
404	9	(82-PB-0,EL)
405	5	(82-PB-0,EL,DA)
406	1	(82-PB-0,NON,,PAR)
407	3	(82-PB-0,SCT)
408	1	(82-PB-0,TOT)
409	1	(82-PB-204,N2N)
410	1	(83-BI-209,NA)
411	2	(83-BI-209,NG)
412	1	(83-BI-209,SCT)
413	1	(9-F-19,COH,AMP)
414	1	(9-F-19,EL)
415	2	(9-F-19,N2N)
416	1	(9-F-19,ND)
417	1	(9-F-19,NG)
418	1	(90-TH-230,NF)
419	1	(90-TH-232,NF,LEG,REL,FF)
420	5	(90-TH-232,NG)
421	2	(90-TH-232,NG,RI)
422	2	(90-TH-232,NU)
423	1	(90-TH-232,TOT)
424	4	(92-U-0,NF)
425	1	(92-U-0,TOT)
426	1	(92-U-233,ABS)
427	2	(92-U-233,ETA)
428	8	(92-U-233,NF)
429	1	(92-U-233,NF,,MXW)
430	1	(92-U-233,NF,RI)
431	1	(92-U-233,NG)
432	4	(92-U-233,NU)
433	1	(92-U-233,NU,,PR)
434	1	(92-U-233,NU,,PR/MXW)
435	2	(92-U-233,TOT)
436	7	(92-U-235,ABS)
437	7	(92-U-235,ALF)
438	8	(92-U-235,ETA)
439	146	(92-U-235,NF)
440	1	(92-U-235,NF,,AV)
441	3	(92-U-235,NF,,MXW)
442	2	(92-U-235,NF,,SPA)
443	4	(92-U-235,NF,AKE,,FF)
444	1	(92-U-235,NF,DA,,FF)
445	1	(92-U-235,NF,DE,,FF)
446	1	(92-U-235,NF,DE,REL,FF)
447	5	(92-U-235,NF,KE,,FF)
448	1	(92-U-235,NF,MXW)
449	4	(92-U-235,NF,RI)
450	6	(92-U-235,NF,YLD,PRE)
451	2	(92-U-235,NF/ARE)
452	2	(92-U-235,NG)
453	1	(92-U-235,NG,SPC)
454	7	(92-U-235,NU)
455	1	(92-U-235,NU,,DL)
456	8	(92-U-235,NU,,PR)

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457    1      (92-U-235,NU,,PR/AV)
458    1      (92-U-235,NU,,PR/MXW)
459    1      (92-U-235,TOT)
460    1      (92-U-236,NF)
461    1      (92-U-236,NG,,MXW)
462    3      (92-U-238,ABS)
463    47     (92-U-238,NF)
464    4      (92-U-238,NG)
465    1      (92-U-238,NG/PCS)
466    1      (92-U-238,NU)
467    2      (92-U-238,NU,,DL)
468    1      (92-U-238,TOT)
469    1      (93-NP-237,ABS)
470    1      (93-NP-237,NA)
471    2      (93-NP-237,NF)
472    1      (93-NP-237,NF,DA,REL,FF)
473    4      (93-NP-237,NG)
474    1      (93-NP-237,NG,,SPA)
475    1      (93-NP-237,NG,RI)
476    1      (93-NP-238,NF,,AV)
477    2      (94-PU-238,NF)
478    1      (94-PU-238,NF/ARE)
479    2      (94-PU-239,ALF)
480    2      (94-PU-239,ETA)
481    18     (94-PU-239,NF)
482    1      (94-PU-239,NF,,AV)
483    2      (94-PU-239,NF,AKE,,FF)
484    1      (94-PU-239,NF,MXW)
485    1      (94-PU-239,NF,RI)
486    1      (94-PU-239,NF,SPC,PR)
487    1      (94-PU-239,NF,YLD,CUM)
488    2      (94-PU-239,NG)
489    1      (94-PU-239,NU)
490    1      (94-PU-239,NU,,PR/MXW)
491    1      (94-PU-240,SF)
492    1      (94-PU-240,SF/NU)
493    8      (94-PU-241,NF)
494    1      (94-PU-241,NF,AKE,,FF)
495    1      (94-PU-241,NF,RI)
496    3      (95-AM-241,NF)
497    1      (95-AM-241,NF,DA,REL,FF)
498    1      (96-CM-244,ABS)
499    1      (96-CM-244,SF/NU)
500    3      (96-CM-244,SF/NU,,PR)
501    1      (98-CF-249,NF,,SPA)
502    1      (98-CF-249,NF,RI)
503    1      (98-CF-252,NU)
504    13     (98-CF-252,SF/NU)
505    15     (98-CF-252,SF/NU,,PR)
506    1      (98-CF-252,SF/NU,,PR/MXW)
507    1      (ABSOL )
508    122    (ABSOL)
509    1      (ABSOL,STANS)
510    4      (NONE )
511    20     (NONE)
512    9      (OTHER)
513    25     (RATIO)
514    2      (SPONT)
515    16     (STANS)

TOTAL SUB WORK=    3019
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