

**CHECKR, FIZCON, PSYCHE and STANEF:
Some problems and solutions**

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Abstract

A few FORTRAN-updates of the ENDF-6 utility codes CHECKR, FIZCON, PSYCHE and STANEF are suggested.

I. INTRODUCTION

The ENDF-6 utility codes CHECKR, FIZCON, PSYCHE and STANEF, version 6.10 [1], are important tools for the checking and handling of evaluated data files. These codes will be part of future QA procedures for data evaluation [2]. It is therefore important to keep track of the quality and possible problems of these codes. During our work on the EFF-3.0 evaluation for ^{56}Fe , we have found a few problems that seem to arise for rather large data files.

We stress here that problems occur only when certain ENDF6-rules are transgressed. If the first checking program CHECKR gives no error message at all, an ENDF6-file will very likely pass FIZCON and PSYCHE without any problems. This is in line with the documentation of C. Dunford [1] which clearly states that when executing FIZCON and PSYCHE, it is assumed that the data file successfully passed CHECKR.

However, there may be cases where a user *knows* he/she violates an ENDF6-rule (for example by exceeding the maximum number of energy points), but still wants a complete check of the ENDF6-file by FIZCON and PSYCHE. This may be required when the next step is processing by NJOY, which is usually less restrictive on numerical limits of the ENDF6-format. In these cases, some of the checking programs crash upon execution (usually because array boundaries are exceeded).

We hope that the following suggestions will be part of the next update of the ENDF6 checking programs. The subroutine and line number is given, followed by the new FORTRAN line.

II. CHECKR

So far, no problems in CHECKR have been found.

III. FIZCON

FIZCON may crash when the number of energy points exceeds the ENDF6-limit of 10,000. The following corrections solve this problem:

```
coedif.12 : common/totals/xt(50000),yt(50000),ntot,yint(50000),coefs(4,3)
conv.9    : common/totals/xt(50000),yt(50000),ntot,yint(50000),coefs(4,3)
stoco.12  : common/totals/xt(50000),yt(50000),ntot,yint(50000),coefs(4,3)
stor.9    : common/totals/xt(50000),yt(50000),ntot,yint(50000),coefs(4,3)
sum452.15 : common/totals/xt(50000),yt(50000),ntot,yint(50000),coefs(4,3)
sumf3.15  : common/totals/xt(50000),yt(50000),ntot,yint(50000),coefs(4,3)
sumf3.230 : do 310 i=1,50000
sumgam.15 : common/totals/xt(50000),yt(50000),ntot,yint(50000),coefs(4,3)
sumpar.14 : common/totals/xt(50000),yt(50000),ntot,yint(50000),coefs(4,3)
tsttot.15 : common/totals/xt(50000),yt(50000),ntot,yint(50000),coefs(4,3)
```

IV. PSYCHE

PSYCHE may crash when the number of energy points exceeds the ENDF6-limit of 10,000. The following corrections solve this problem:

```
ckf12.16 : common/scrach/egrid(5000),ebav(5000),yld(5000),dummy(5000)
ckf13.16 : common/scrach/egrid(5000),ebav(5000),sig3(5000),yld(5000)
ckf15.16 : common/scrach/egrid(5000),aebar(5000),eint(5000),pkint(5000)
ckf4.21  : common/scrach/en(5000),wlt(5000),stot(5000),sel(5000)
ckf5.21  : common/scrach/egrid(5000),aebar(5000),eint(5000),pkint(5000)
ckf6.22  : common/scrach/egrid(5000),aebar(5000),eint(5000),pkint(5000)
ckng.20  : common/scrach/xn(5000),yn(5000),ynu(5000),dum1(5000)
testur.18: common/scrach/consa(500),sfa(500),dummy(19000)
```

V. STANEF

When the number of lines exceeds 100,000, STANEF writes ***** in columns 76-80 of an ENDF6-file. The following corrections cause STANEF to restart with a 0 after line number 99,999:

```
cant.42   : nseq = mod(nseq + 1, 100000)
cant1.49  : nseq = mod(nseq + 1, 100000)
cant2.31  : nseq = mod(nseq + 1, 100000)
cont.29   : nseq = mod(nseq + 1, 100000)
cont.36   : 30 nseq = mod(nseq + 1, 100000)
copyfl.29 : nseq = mod(nseq + 1, 100000)
copyma.27: if(mat.ge.0) nseq = mod(nseq + 1, 100000)
file1.104 : 42 nseq = mod(nseq + 1, 100000)
file1.150 : nseq = mod(nseq + 1, 100000)
file1.175 : nseq = mod(nseq + 1, 100000)
textr.23  : nseq = mod(nseq + 1, 100000)
```

1. C.L. Dunford, "ENDF Utility Codes Release 6.10", Brookhaven National Laboratory 1996. (WWW-address: <http://www.dne.bnl.gov/nndcscr/endl/>)
2. M. Konieczny and J. Rodens, "Quality plan for the assembly and maintenance of the JEFF library", JEF/DOC-582 (1996).