Release notes for ENDF/B Development n-015_P_031 evaluation

April 26, 2017

- `checkr` Warnings:

  1. A previous error halted parsing of the current section
     MAT=1525, MF= 1, MT=451 (1): Parsing stopped

     ```
     ERROR(S) FOUND IN MAT=1525, MF= 1, MT=451
        SECTION CANNOT BE CHECKED FROM SEQUENCE NUMBER      205 TO     233
     ```

- `checkr` Errors:

  1. A variable is outside the allowed ENDF range
     MAT=1525, MF= 1, MT=451 (0): Variable range

     ```
     ERROR(S) FOUND IN MAT=1525, MF= 1, MT=451
        MOD =     1 OUT OF RANGE     0 -     0           RECORD NUMBER     205
     ```

  2. Missing a section in directory so your directory is messed up. This error will break everything else
     MAT=1525, MF= 2, MT=151 (0): Directory (b)

     ```
     ERROR(S) FOUND IN MAT=1525, MF= 2, MT=151
        SECTION  2/151 NOT IN DIRECTORY                 RECORD NUMBER     235
     ```

  3. Missing a section in directory so your directory is messed up. This error will break everything else
     MAT=1525, MF= 3, MT= 1 (0): Directory (b)

     ```
     ERROR(S) FOUND IN MAT=1525, MF= 3, MT=  1
        SECTION  3/  1 NOT IN DIRECTORY                 RECORD NUMBER     241
     ```

  4. Missing a section in directory so your directory is messed up. This error will break everything else
     MAT=1525, MF= 3, MT= 2 (0): Directory (b)

     ```
     ERROR(S) FOUND IN MAT=1525, MF= 3, MT=  2
        SECTION  3/  2 NOT IN DIRECTORY                 RECORD NUMBER     415
     ```

  5. Missing a section in directory so your directory is messed up. This error will break everything else
     MAT=1525, MF= 3, MT= 4 (0): Directory (b)

     ```
     ERROR(S) FOUND IN MAT=1525, MF= 3, MT=  4
        SECTION  3/  4 NOT IN DIRECTORY                 RECORD NUMBER     515
     ```

  6. Missing a section in directory so your directory is messed up. This error will break everything else
     MAT=1525, MF= 3, MT= 5 (0): Directory (b)

     ```
     ERROR(S) FOUND IN MAT=1525, MF= 3, MT=  5
        SECTION  3/  5 NOT IN DIRECTORY                 RECORD NUMBER     523
     ```

  7. Missing a section in directory so your directory is messed up. This error will break everything else
     MAT=1525, MF= 3, MT= 16 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=1525, MF= 3, MT= 16
   SECTION  3/ 16 NOT IN DIRECTORY                  RECORD NUMBER     582
```

8. Missing a section in directory so your directory is messed up. This error will break everything else
   MAT=1525, MF= 3, MT= 28 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=1525, MF= 3, MT= 28
   SECTION  3/ 28 NOT IN DIRECTORY                  RECORD NUMBER     590
```

9. Missing a section in directory so your directory is messed up. This error will break everything else
   MAT=1525, MF= 3, MT= 91 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=1525, MF= 3, MT= 91
   SECTION  3/ 91 NOT IN DIRECTORY                  RECORD NUMBER     596
```

10. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=1525, MF= 3, MT=102 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=1525, MF= 3, MT=102
   SECTION  3/102 NOT IN DIRECTORY                  RECORD NUMBER     604
```

11. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=1525, MF= 3, MT=103 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=1525, MF= 3, MT=103
   SECTION  3/103 NOT IN DIRECTORY                  RECORD NUMBER     673
```

12. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=1525, MF= 3, MT=107 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=1525, MF= 3, MT=107
   SECTION  3/107 NOT IN DIRECTORY                  RECORD NUMBER     688
```

13. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=1525, MF= 4, MT= 2 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=1525, MF= 4, MT=  2
   SECTION  4/  2 NOT IN DIRECTORY                  RECORD NUMBER     697
```

14. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=1525, MF= 4, MT= 16 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=1525, MF= 4, MT= 16
   SECTION  4/ 16 NOT IN DIRECTORY                  RECORD NUMBER    1503
```

15. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=1525, MF= 4, MT= 28 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=1525, MF= 4, MT= 28
   SECTION  4/ 28 NOT IN DIRECTORY                  RECORD NUMBER    1506
```

16. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=1525, MF= 4, MT= 91 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=1525, MF= 4, MT= 91
   SECTION  4/ 91 NOT IN DIRECTORY                  RECORD NUMBER    1509
```

17. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=1525, MF= 5, MT= 16 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=1525, MF= 5, MT= 16
   SECTION  5/ 16 NOT IN DIRECTORY                  RECORD NUMBER    1513
```

18. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=1525, MF= 5, MT= 28 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=1525, MF= 5, MT= 28
   SECTION  5/ 28 NOT IN DIRECTORY                  RECORD NUMBER    1584
```

19. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=1525, MF= 5, MT= 91 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=1525, MF= 5, MT= 91
   SECTION  5/ 91 NOT IN DIRECTORY                  RECORD NUMBER    1749
```

20. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=1525, MF= 6, MT= 5 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=1525, MF= 6, MT=  5
   SECTION  6/  5 NOT IN DIRECTORY                  RECORD NUMBER    1853
```

21. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=1525, MF= 8, MT=103 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=1525, MF= 8, MT=103
   SECTION  8/103 NOT IN DIRECTORY                  RECORD NUMBER   13586
```

22. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=1525, MF= 9, MT=103 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=1525, MF= 9, MT=103
   SECTION  9/103 NOT IN DIRECTORY                  RECORD NUMBER   13591
```

23. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=1525, MF=12, MT=102 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=1525, MF=12, MT=102
   SECTION 12/102 NOT IN DIRECTORY                  RECORD NUMBER   13597
```

24. Missing a gamma spectrum for continuum of gammas
    MAT=1525, MF=12, MT=102 (1): No gamma spectrum

```
ERROR(S) FOUND IN MAT=1525, MF=12, MT=102
   CONTINUUM PHOTONS REQUIRE A SECTION IN MF=15
```

25. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=1525, MF=13, MT= 3 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=1525, MF=13, MT=  3
   SECTION 13/  3 NOT IN DIRECTORY                  RECORD NUMBER   13604
```

26. Missing a gamma spectrum for continuum of gammas
    MAT=1525, MF=13, MT= 3 (1): No gamma spectrum

```
ERROR(S) FOUND IN MAT=1525, MF=13, MT=  3
   CONTINUUM PHOTONS REQUIRE A SECTION IN MF=15
```

27. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=1525, MF=14, MT= 3 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=1525, MF=14, MT=  3
   SECTION 14/  3 NOT IN DIRECTORY                  RECORD NUMBER   13631
```

28. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=1525, MF=14, MT=102 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=1525, MF=14, MT=102
   SECTION 14/102 NOT IN DIRECTORY                  RECORD NUMBER   13633
```

29. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=1525, MF=15, MT= 3 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=1525, MF=15, MT=  3
   SECTION 15/  3 NOT IN DIRECTORY                  RECORD NUMBER   13636
```

30. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=1525, MF=15, MT=102 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=1525, MF=15, MT=102
   SECTION 15/102 NOT IN DIRECTORY                  RECORD NUMBER   13744
```

- `fudge-4.0` Errors:

  1. Calculated and tabulated Q values disagree.
     reaction label 2: n[multiplicity:'2'] + P30 (Error # 0): Q mismatch

```
WARNING: Calculated and tabulated Q-values disagree: -11716380.09428406 eV vs -1.231e7 eV!
```

2. Calculated and tabulated Q values disagree.
   reaction label 3: n + H1 + Si30 (Error # 0): Q mismatch

```
WARNING: Calculated and tabulated Q-values disagree: -7210086.257164001 eV vs -7.3e6 eV!
```

3. Calculated and tabulated Q values disagree.
   reaction label 4: P32 + gamma (Error # 0): Q mismatch

```
WARNING: Calculated and tabulated Q-values disagree: 8234290.271595001 eV vs 7.93e6 eV!
```

4. Calculated and tabulated Q values disagree.
   reaction label 5: H1 + Si31_s (Error # 0): Q mismatch

```
WARNING: Calculated and tabulated Q-values disagree: -69389.48759460449 eV vs -7.1e5 eV!
```

5. Calculated and tabulated Q values disagree.
   reaction label 6: He4 + Al28_s (Error # 0): Q mismatch

```
WARNING: Calculated and tabulated Q-values disagree: -1726597.00006485 eV vs -1.94e6 eV!
```

6. Energy range of data set does not match cross section range
   production label 8: /reactionSuite/reactions/production[@label='8'] / Product: gamma / Distribution: / uncorrelated - angular - isotropic: (Error # 0): Domain mismatch (a)

```
WARNING: Domain doesn't match the cross section domain: (3300000.0 -> 150000000.0) vs (1e-05 -> 150000000.0)
```

7. Energy range of data set does not match cross section range
   production label 8: /reactionSuite/reactions/production[@label='8'] / Product: gamma / uncorrelated - energy - XYs2d: (Error # 0): Domain mismatch (a)

```
WARNING: Domain doesn't match the cross section domain: (3300000.0 -> 150000000.0) vs (1e-05 -> 150000000.0)
```

8. Energy range of data set does not match cross section range
   production label 8: /reactionSuite/reactions/production[@label='8'] / Product: gamma__a / Distribution: / uncorrelated - angular - isotropic: (Error # 0): Domain mismatch (a)

```
WARNING: Domain doesn't match the cross section domain: (2306000.0 -> 150000000.0) vs (1e-05 -> 150000000.0)
```

9. Energy range of data set does not match cross section range
   production label 8: /reactionSuite/reactions/production[@label='8'] / Product: gamma__a / uncorrelated - energy - discreteGamma: (Error # 0): Domain mismatch (a)

```
WARNING: Domain doesn't match the cross section domain: (3300000.0 -> 150000000.0) vs (1e-05 -> 150000000.0)
```

10. Energy range of data set does not match cross section range
    production label 8: /reactionSuite/reactions/production[@label='8'] / Product: gamma__b / Distribution: / uncorrelated - angular - isotropic: (Error # 0): Domain mismatch (a)

```
WARNING: Domain doesn't match the cross section domain: (1310000.0 -> 150000000.0) vs (1e-05 -> 150000000.0)
```

11. Energy range of data set does not match cross section range
    production label 8: /reactionSuite/reactions/production[@label='8'] / Product: gamma__b / uncorrelated - energy - discreteGamma: (Error # 0): Domain mismatch (a)

```
WARNING: Domain doesn't match the cross section domain: (3300000.0 -> 150000000.0) vs (1e-05 -> 150000000.0)
```

12. Multiplicity does not match sum of linked product multiplicities!
    multiplicitySum label 4: nonelastic total gamma multiplicity (Error # 0): summedMultiplicityMismatch

    ```
    WARNING: Multiplicity does not match sum of linked product multiplicities! Max diff: 10.09%
    ```

- `njoy2012` Warnings:

  1. Evaluation has no resonance parameters given
     unresr...calculation of unresolved resonance cross sections (0): No RR

     ```
     ---message from unresr---mat 1525 has no resonance parameters
                              copy as is to nout
     ```

  2. Evaluation has no resonance parameters given
     purr...probabalistic unresolved calculation (0): No RR

     ```
     ---message from purr---mat 1525 has no resonance parameters
                              copy as is to nout
     ```

  3. With the advent of the ENDF-6 format, it is possible to make evaluations that fully describe all the products of a nuclear reaction. Some carry-over evaluations from earlier ENDF/B versions also have this capability, but many do not. This message is intended to goad evaluators to improve things!
     groupr...compute self-shielded group-averaged cross-sections (0): GROUPR/conver (0)

     ```
     ---message from conver---cannot do complete particle production for mt= 16
                              only mf4/mf5 provided
     ```

  4. With the advent of the ENDF-6 format, it is possible to make evaluations that fully describe all the products of a nuclear reaction. Some carry-over evaluations from earlier ENDF/B versions also have this capability, but many do not. This message is intended to goad evaluators to improve things!
     groupr...compute self-shielded group-averaged cross-sections (1): GROUPR/conver (0)

     ```
     ---message from conver---cannot do complete particle production for mt= 28
                              only mf4/mf5 provided
     ```

  5. With the advent of the ENDF-6 format, it is possible to make evaluations that fully describe all the products of a nuclear reaction. Some carry-over evaluations from earlier ENDF/B versions also have this capability, but many do not. This message is intended to goad evaluators to improve things!
     groupr...compute self-shielded group-averaged cross-sections (2): GROUPR/conver (0)

     ```
     ---message from conver---cannot do complete particle production for mt= 91
                              only mf4/mf5 provided
     ```

  6. There is bad Kalbach parameter (r(E) or otherwise)
     check...ace consistency check (0): ACER/check energy distributions (0)

     ```
     check energy distributions
       consis: ep.gt.epmax 9.379190E-12 with q.lt.0 for (n,x) at e  1.000000E-11 -> 1.000000E-11
     ```

  7. There is bad Kalbach parameter (r(E) or otherwise)
     check...ace consistency check (1): ACER/check energy distributions (0)

```
check energy distributions
  consis:   awr.lt.180---this is probably an error.
```

8. There is bad Kalbach parameter (r(E) or otherwise)
   check...ace consistency check (2): ACER/check energy distributions (0)

```
check energy distributions
  consis: shifting eprimes greater than epmax and renorming the distribution
```

9. There is bad Kalbach parameter (r(E) or otherwise)
   check...ace consistency check (3): ACER/check energy distributions (0)

```
check energy distributions
  consis: ep.gt.epmax 2.438589E+01 with q.lt.0 for (n,x) at e  2.600000E+01 -> 2.445366E+01
```

10. There is bad Kalbach parameter (r(E) or otherwise)
    check...ace consistency check (4): ACER/check energy distributions (0)

```
check energy distributions
  consis:   awr.lt.180---this is probably an error.
```

11. There is bad Kalbach parameter (r(E) or otherwise)
    check...ace consistency check (5): ACER/check energy distributions (0)

```
check energy distributions
  consis: shifting eprimes greater than epmax and renorming the distribution
```

12. There is bad Kalbach parameter (r(E) or otherwise)
    check...ace consistency check (6): ACER/check energy distributions (0)

```
check energy distributions
  consis: ep.gt.epmax 3.751675E+01 with q.lt.0 for (n,x) at e  4.000000E+01 -> 3.752790E+01
```

13. There is bad Kalbach parameter (r(E) or otherwise)
    check...ace consistency check (7): ACER/check energy distributions (0)

```
check energy distributions
  consis:   awr.lt.180---this is probably an error.
```

14. There is bad Kalbach parameter (r(E) or otherwise)
    check...ace consistency check (8): ACER/check energy distributions (0)

```
check energy distributions
  consis: shifting eprimes greater than epmax and renorming the distribution
```

15. There is bad Kalbach parameter (r(E) or otherwise)
    check...ace consistency check (9): ACER/check energy distributions (0)

```
check energy distributions
  consis: ep.gt.epmax 7.034392E+01 with q.lt.0 for (n,x) at e  7.500000E+01 -> 7.118195E+01
```

16. There is bad Kalbach parameter (r(E) or otherwise)
    check...ace consistency check (10): ACER/check energy distributions (0)

```
check energy distributions
  consis:   awr.lt.180---this is probably an error.
```

17. There is bad Kalbach parameter (r(E) or otherwise)
    check...ace consistency check (11): ACER/check energy distributions (0)

```
check energy distributions
  consis: shifting eprimes greater than epmax and renorming the distribution
```

18. There is bad Kalbach parameter (r(E) or otherwise)
    check...ace consistency check (12): ACER/check energy distributions (0)

```
check energy distributions
  consis: ep.gt.epmax 7.503352E+01 with q.lt.0 for (n,x) at e  8.000000E+01 -> 7.505580E+01
```

19. There is bad Kalbach parameter (r(E) or otherwise)
    check...ace consistency check (13): ACER/check energy distributions (0)

```
check energy distributions
  consis:   awr.lt.180---this is probably an error.
```

20. There is bad Kalbach parameter (r(E) or otherwise)
    check...ace consistency check (14): ACER/check energy distributions (0)

```
check energy distributions
  consis: shifting eprimes greater than epmax and renorming the distribution
```

21. There is bad Kalbach parameter (r(E) or otherwise)
    check...ace consistency check (15): ACER/check energy distributions (0)

```
check energy distributions
  consis: ep.gt.epmax 8.441271E+01 with q.lt.0 for (n,x) at e  9.000000E+01 -> 8.474042E+01
```

22. There is bad Kalbach parameter (r(E) or otherwise)
    check...ace consistency check (16): ACER/check energy distributions (0)

```
check energy distributions
  consis:   awr.lt.180---this is probably an error.
```

23. There is bad Kalbach parameter (r(E) or otherwise)
    check...ace consistency check (17): ACER/check energy distributions (0)

```
check energy distributions
  consis: shifting eprimes greater than epmax and renorming the distribution
```

24. There is bad Kalbach parameter (r(E) or otherwise)
    check...ace consistency check (18): ACER/check energy distributions (0)

```
check energy distributions
  consis: ep.gt.epmax 9.379190E+01 with q.lt.0 for (n,x) at e  1.000000E+02 -> 9.442504E+01
```

25. There is bad Kalbach parameter (r(E) or otherwise)
    check...ace consistency check (19): ACER/check energy distributions (0)

```
check energy distributions
  consis:   awr.lt.180---this is probably an error.
```

26. There is bad Kalbach parameter (r(E) or otherwise)
    check...ace consistency check (20): ACER/check energy distributions (0)

```
check energy distributions
  consis: shifting eprimes greater than epmax and renorming the distribution
```

27. There is bad Kalbach parameter (r(E) or otherwise)
    check...ace consistency check (21): ACER/check energy distributions (0)

```
check energy distributions
  consis: ep.gt.epmax 1.406878E+02 with q.lt.0 for (n,x) at e  1.500000E+02 -> 1.409112E+02
```

28. There is bad Kalbach parameter (r(E) or otherwise)
    check...ace consistency check (22): ACER/check energy distributions (0)

```
check energy distributions
  consis:   awr.lt.180---this is probably an error.
```

29. There is bad Kalbach parameter (r(E) or otherwise)
    check...ace consistency check (23): ACER/check energy distributions (0)

```
check energy distributions
  consis: shifting eprimes greater than epmax and renorming the distribution
```