**Nuclear Data Section**

**International Atomic Energy Agency**

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**Memo CP-D/1043**

**Date:** 17 February 2021

**To:** Distribution

**From:** R. Shimizu, N. Otsuka

**Subject: Erroneous E-LVL values**

We extracted from the EXFOR Master File all values coded under E-LVL for γ, n, d, t, 3He and α induced reaction and spontaneous fission datasets. The values do not agree within 5% with any level energy in the RIPL3 library were checked against the source articles. We found 177 items requiring corrections. Typical mistakes are

* wrong unit (e.g., KEV instead of MEV)
* wrong heading (e.g., E-LVL instead of E)
* wrong number (e.g., 3.61 MeV instead of 3.36 MeV)
* level energy not from the source article but from ENSDF etc. (LVL-NUMB must be used)
* wrong REACTION code (e.g., (HE3,A) instead of (A,INL))
* absence of EN-SEC for a level energy of other than the reaction product.

We also found use of E-LVL for a broad peak (e.g., giant resonance) for which E-EXC is more appropriate than E-LVL. But we did not include these cases in the list of errors.

Further details of the assessment are summarized in the full report appended to this memo.

**Items registered in the Feedback List**

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| --- | --- | --- |
| **Dataset #** | **Keyword** | **Suggested correction** |
| 10037.067 | REACTION | SF1, SF4: 28-NI-58 -> 28-NI-60 |
| 10130.004 | Data | E-LVL: 1.150 MeV -> 1.510 MeV |
| 10362.018 | Heading | E-LVL -> E and add SF7=G |
| 10447.003 | Data | E-LVL=0.08 MeV -> LVL-NUMB=2 |
| 10541.002 | Common | E-LVL=1.98 MeV -> LVL-NUMB=1 |
| 10706.004 | Heading | E-LVL -> E |
| 11332.004 | Data | E-LVL: 2.14 MeV -> 2.4 MeV |
| 11451.002 | Common | E-LVL: 0.8 MeV -> 0.870 MeV |
| 11451.003 | Common | E-LVL: 0.8 MeV -> 0.870 MeV |
| 11451.006 | Data | E-LVL: 0.8 MeV -> 0.870 MeV |
| 11521.005 | Heading | E-LVL -> E |
| 11527.005 | Data | E-LVL: 0.92 MeV -> 0.842 MeV+1.013 MeV |
| 11552.003 | Common | E-LVL=0.097 MeV -> LVL-NUMB=2 |
| 11686.004 | Heading | E-LVL -> E |
| 12681.005 | Data | E-LVL: 0.447 MeV -> 0.477 MeV |
| 20371.002 | Heading | E-LVL -> E and restore SF7=G |
| 20371.007 | Heading | E-LVL -> E and restore SF7=G |
| 20371.010 | Heading | E-LVL - >E and restore SF7=G |
| 20782.002 | Heading | E-LVL -> E |
| 20831.003 | Unit | E-LVL: MEV -> KEV? |
| 20935.003 | Data | E-LVL: 1.5 MeV -> 1.37+1.62 MeV? |
| 21268.002 | REACTION | Use SF3=P and SF4=12-MG-27 |
| 21638.003 | Data | E-LVL: 2.309 MeV -> 3.309 MeV, 2.448 MeV -> 3.448 MeV |
| 21672.004 | Data | E-LVL=1.071 MeV -> LVL-NUMB=1 |
| 21986.041 | Common | Delete E-LVL values and SF5=PAR. |
| 21986.042 | Data | Delete E-LVL values and SF5=PAR. |
| 21986.082 | Common | Delete E-LVL values and SF5=PAR. |
| 21986.083 | Common | Delete E-LVL values and SF5=PAR. |
| 22356.002 | Data | E-LVL: 0.771 MeV -> 0.871 MeV |
| 22532.010 | REACTION | SF1: 24-CR-52 -> 24-CR-0; SF2: SCT -> INL |
| 22532.010 | Common | E-LVL=0.56 MeV -> LVL-NUMB=1 |
| 22532.020 | REACTION | SF1: 24-CR-52 -> 24-CR-0; SF2: SCT -> INL |
| 22532.020 | Common | E-LVL=0.56 MeV -> LVL-NUMB=1 |
| 22588.008 | Data | E-LVL: 0.9 MeV -> 0.84 MeV+1.01 MeV |
| 22988.010 | Common | E-LVL: 507 keV -> 570 keV |
| 23242.007 | Common | E-LVL: 832 keV -> 835 keV |
| 30029.003 | REACTION | Use (5-B-10(N,A)3-LI-7,PAR,IPA). |
| 30029.005 | REACTION | Use (5-B-10(N,A)3-LI-7,PAR,IPA). |
| 30280.005 | REACTION | Use (3-LI-7(N,INL)3-LI-7,PAR,SIG). |
| 31683.002 | Data | E-LVL: 1.6 MeV -> 1.51 MeV+1.75 MeV |
| 40531.099 | REACTION | SF1, SF4: 30-ZN-66 -> 30-ZN-68 |
| 40531.102 | REACTION | SF1, SF4: 30-ZN-66 -> 30-ZN-68 |
| 40531.111 | Common | E-LVL: 1.309 MeV -> 1.873 MeV |
| 40531.112 | Common | E-LVL: 1.0 MeV -> 1.08 MeV |
| 40662.008 | Unit | KEV -> MEV |
| 40745.002 | Data | E-LVL: 540.8 keV -> 640.8 KeV |
| 40790.003 | Heading | E-LVL -> E-EXC |
| 40978.002 | Heading | E-LVL -> Q-VAL |
| 40828.002.1 | Heading | E-LVL -> Q-VAL |
| 40828.002.2 | Heading | E-LVL -> Q-VAL |
| 40828.008.1 | Heading | E-LVL -> Q-VAL |
| 40828.008.2 | Heading | E-LVL -> Q-VAL |
| A0107.003 | Data | E-LVL=0.1039 -> LVL-NUMB=1 |
| A0130.022 | Unit | MeV -> keV |
| A0370.005 | Data | E-LVL=1 MeV -> LVL-NUMB=1 |
| A0638.002 | Common | E-LVL: 479 keV -> 429 keV |
| A1081.002 | Common | E-LVL: 8.0 MeV -> 0 MeV |
| A1085.002 | Common | Delete E-LVL=0.45 MeV |
| A1218.003 | Common | E-LVL: 0.427 MeV -> LVL-NUMB=1 |
| A1218.004 | Common | E-LVL: 0.427 MeV -> LVL-NUMB=1 |
| A1379.008 | REACTION | SF1-SF4: Use 3-LI-7(D,HE3)2-HE-6. |
| A1425.002 | Common | E-LVL=2.6 MeV -> LVL-NUMB=1 |
| A1425.003 | Common | E-LVL=2.6 MeV -> LVL-NUMB=1 |
| A1426.008 | Data | E-LVL=2 MeV -> 2.9 MeV |
| A1458.005 | Heading | Swap EN and E-LVL |
| A1471.003 | Common | E-LVL=0.43 MeV -> LVL-NUMB=1 |
| A1543.005 | Common | E-LVL=2.04 MeV -> LVL-NUMB=1 |
| C0027.004 | Common | Delete E-LVL=7.5 MeV |
| C0189.003 | Data | E-LVL: 4.195 MeV -> 4.915 MeV |
| C0562.003 | Unit | keV -> MeV |
| C0925.016 | Data | E-LVL=3.61 MeV -> 3.36 MeV |
| C1021.005 | REACTION | SF3: X -> D; SF4: 1-H-2 -> 26-FE-55 |
| C1784.003 | Common | Delete E-LVL=473.0 keV and delete SF5=PAR. |
| C2069.052 | Common | E-LVL: 0.0048 MeV -> 0.048 MeV |
| C2335.005 | Data | Delete these data points (compiled in 004) |
| C2611.005 | Data | E-LVL: 0.058 MeV -> 0.056 MeV |
| D0325.006 | REACTION | Must be (9-F-19(A,P)10-NE-22,PAR,TTY/MLT/DA,G). |
| D0325.007 | Common | E-LVL=1.27 -> E-MIN=10.5 MeV |
| D0797.003 | Unit | E-LVL: MeV -> keV |
| D0891.002 | Data | E-LVL=151 keV -> LVL-NUMB=1 |
| D4366.006 | Unit | E-LVL: MeV -> keV |
| D5056.003 | Common | E-LVL=3.310 MeV -> 2.310 MeV |
| D6058.002 | Heading | E-LVL -> E |
| D6058.003 | Heading | E-LVL -> E |
| D6258.003 | REACTION | SF1-SF4: 13-AL-27(D,T)13-AL-26 |
| E1206.010 | Common | E-LVL=0.097 MeV -> 0.97 MeV |
| E1206.061 | REACTION | SF1-SF4: 13-AL-27(A,HE3)13-AL-28 |
| E1206.062 | REACTION | SF1-SF4: 13-AL-27(A,HE3)13-AL-28 |
| E1206.063 | REACTION | SF1-SF4: 13-AL-27(A,HE3)13-AL-28 |
| E1206.064 | REACTION | SF1-SF4: 13-AL-27(A,HE3)13-AL-28 |
| E1206.065 | REACTION | SF1-SF4: 13-AL-27(A,HE3)13-AL-28 |
| E1206.066 | REACTION | SF1-SF4: 13-AL-27(A,HE3)13-AL-28 |
| E1206.067 | REACTION | SF1-SF4: 13-AL-27(A,HE3)13-AL-28 |
| E1206.068 | REACTION | SF1-SF4: 13-AL-27(A,HE3)13-AL-28 |
| E1206.069 | REACTION | SF1-SF4: 13-AL-27(A,HE3)13-AL-28 |
| E1206.070 | REACTION | SF1-SF4: 13-AL-27(A,HE3)13-AL-28 |
| E1236.024 | Data | E-LVL=0.138 MeV -> 0.148 MeV |
| E1236.025 | Data | E-LVL=0.138 MeV -> 0.148 MeV |
| E1255.007 | Common | E-LVL=3.19 MeV -> 3.91 MeV |
| E1363.012 | Common | E-LVL=0.37 MeV -> LVL-NUMB=1 |
| E1363.015 | Common | E-LVL=0.51 MeV -> LVL-NUMB=1 |
| E1363.030 | Common | E-LVL=0.37 MeV -> LVL-NUMB=1 |
| E1363.033 | Common | E-LVL=0.51 MeV -> LVL-NUMB=1 |
| E1403.006 | Common | E-LVL: 0.82 MeV -> 0.081 MeV |
| E1415.009 | Common | E-LVL=0.504 MeV -> 0.604 MeV |
| E1415.010 | Common | E-LVL=0.567 MeV -> 0.667 MeV |
| E2264.004 | Unit | keV -> MeV |
| E2264.005 | Unit | keV -> MeV |
| E2503.009 | Unit | keV -> MeV |
| F0013.002 | Common | E-LVL=2.6 MeV -> LVL-NUMB=1 |
| F0013.004 | Common | E-LVL=2.6 MeV -> LVL-NUMB=1 |
| F0013.005 | Common | E-LVL=2.6 MeV -> LVL-NUMB=1 |
| F0016.002 | Data | E-LVL=0.304 MeV -> 2.9 MeV; 11.40 MeV -> 11.7 MeV |
| F0025.003 | EN-SEC | Add (E-LVL,4-BE-8). |
| F0092.002 | Data | E-LVL=0.72 MeV -> LVL-NUMB=1 |
| F0117.006 | Data | E-LVL: 1.7790/4.6180 MeV -> Q-VAL=-3.1819/-4.1500 MeV |
| F0132.004 | Common | E-LVL=4.429 MeV -> 2.43 MeV |
| F0132.006 | Common | E-LVL=4.429 MeV -> 2.43 MeV |
| F0153.002 | Data | E-LVL=0.72 MeV -> LVL-NUMB=1 |
| F0153.004 | Data | E-LVL=0.72 MeV -> LVL-NUMB=1 |
| F0391.003 | Heading | Swap E-LVL and EN. |
| F0429.004 | Data | E-LVL=1.02 MeV -> 0 MeV |
| F0588.004 | Common | Delete E-LVL=2.43 MeV. |
| F0728.002 | Data | E-LVL=109.89 keV -> LVL-NUMB=1 |
| F0728.003 | Data | E-LVL=109.89 keV -> LVL-NUMB=1 |
| F0728.004 | Data | E-LVL=109.89 keV -> LVL-NUMB=1 |
| F0812.006 | REACTION | SF1-SF4: Use 72-HF-179(A,T)73-TA-180 |
| F0813.005 | Data | E-LVL: 0.668 MeV -> 6.68 MeV |
| F0827.003 | Heading | E-LVL -> E-LVL-MIN and E-LVL-MAX |
| F0827.005 | Heading | E-LVL -> E-LVL-MIN and E-LVL-MAX |
| F0941.002 | Data | E-LVL=0.96 MeV -> 0.096 MeV |
| F0941.003 | Data | E-LVL: 0.96 MeV -> 0.096 MeV |
| F0966.005 | REACTION | SF1-SF4: 13-AL-27(D,A)12-MG-25 |
| F1035.004 | Data | E-LVL=1.98 MeV -> 0.87 MeV |
| F1035.005 | Data | E-LVL=1.98 MeV -> 0.87 MeV |
| F1065.010 | REACTION | SF1-SF4: 6-C-12(D,A)5-B-10 |
| F1146.007 | Unit | E-LVL: MeV -> keV |
| F1166.004 | REACTION | Must be (78-PT-194(P,D)78-PT-193,PAR,DA) |
| F1260.008 | REACTION | SF1-SF4: 14-SI-30(D,P)14-SI-31 |
| F1351.006 | Data | E-LVL=1.840 MeV -> 0.840 MeV? |
| F1406.009 | Common | E-LVL=0.5 MeV -> 0.58 MeV |
| L0036.004 | REACTION | SF1-SF4: 8-O-16(G,N)8-O-15 |
| L0036.006 | REACTION | SF1-SF4: 8-O-16(G,N)8-O-15 |
| L0194.009 | Common | E-LVL=19.3 MeV -> E-LVL=19.1 MeV |
| M0154.002 | REACTION | SF1-SF4: 5-B-11(G,X)0-G-0 |
| M0428.006 | Common | Delete E-LVL=45 keV. |
| M0428.011 | Common | E-LVL=45 keV -> 136 keV |
| M0428.012 | Common | E-LVL=45 keV -> 58 keV+138 keV |
| M0956.002 | Common | E-LVL=0.46 MeV -> 0 MeV |
| M0956.003 | Common | E-LVL=1.2 MeV -> 0 MeV |
| O0148.009 | Common | E-LVL=0.46 MeV -> 0.90 MeV |
| O0246.008 | Common | E-LVL=0.76471 MeV -> LVL-NUMB=1 |
| O1209.002 | Heading | E-LVL -> E and add SF7=G |
| O1822.002 | Heading | E-LVL -> E |
| O1822.003 | Heading | E-LVL -> E |
| O1822.004 | Heading | E-LVL -> E |
| O2154.003 | Data | E-LVL=3.205 MeV -> 3.204 MeV |
| O2158.005 | Heading | E-LVL -> E |
| O2158.006 | Heading | E-LVL -> E |
| O2158.007 | Heading | E-LVL -> E |
| O2158.008 | Heading | E-LVL -> E |
| O2158.009 | Heading | E-LVL -> E |
| O2158.010 | Heading | E-LVL -> E |
| O2285.002 | Data | E-LVL value must be multiplied by 1000. |
| O2287.003 | Unit | E-LVL: MeV -> keV |
| O2287.004 | Unit | E-LVL: MeV -> keV |
| O2287.005 | Unit | E-LVL: MeV -> keV |
| O2384.002 | Unit | E-LVL: MeV -> keV |
| O2388.003 | Heading | E-LVL -> E-EXC-CMP and add E-LVL=0 |
| O2388.004 | Heading | E-LVL -> E-EXC-CMP and add E-LVL=0 |
| O2445.004 | Common | Delete E-LVL=3 keV. |
| O2445.013 | Unit | E-LVL: MeV -> keV |
| R0015.008 | REACTION | SF1-SF4: 40-ZR-90(HE3,A)40-ZR-89 |
| T0037.002 | EN-SEC | Add (E-LVL,4-BE-8). |
| T0037.003 | EN-SEC | Add (E-LVL,4-BE-8). |
| T0263.004 | REACTION | SF1-SF4: 14-SI-28(A,P)15-P-31 |

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