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======================================================================= Activate
                                                                        Activate
     PROGRAM ACTIVATE                                                   Activate
     ================                                                   Activate
     VERS. 2000-1 (APRIL 2000)   *INITIAL VERSION.                      Activate
     VERS. 2002-1 (MAY 2002)     *OPTIONAL INPUT PARAMETERS             Activate
     VERS. 2004-1 (JAN. 2004)    *CORRECTED ERROR - FIRST RECORD AFTER  Activate
                                  MF=10 WAS MISSING.                    Activate
                                 *ADDED INCLUDE TO DEFINE COMMON        Activate
                                 *INCREASED MAX. POINTS FROM 100,000    Activate
                                  TO 1,000,000.                         Activate
     VERS. 2007-1 (JAN. 2007)    *CHECKED AGAINST ALL ENDF/B-VII        Activate
     VERS. 2007-2 (DEC. 2007)    *72 CHARACTER FILE NAMES.              Activate
     VERS. 2010-1 (Apr. 2010)    *General update based on user feedback Activate
     VERS. 2012-1 (Aug. 2012)    *Added CODENAME                        Activate
                                 *Added ERROR stop                      Activate
                                 *32 and 64 bit Compatible              Activate
     VERS. 2015-1 (Jan. 2015)    *Corrected ERROR for missing or extra  Activate
                                  SEND and MEND lines.                  Activate
                                 *Changed MF=8 pointer from MF=9 to 10. Activate
                                 *INCREASED MAX. POINTS to 3,000,000.   Activate
                                 *Added Consistency checks, e.g.,       Activate
                                  Any MT in MF=9 requires data in MF=3. Activate
                                 *Extended OUT9 - OUT10 is not used.    Activate
                                 *Only processes ONE ENDF Tape - this   Activate
                                  restriction is necessary to insure    Activate
                                  compatibility with ALL PREPRO codes.  Activate
                                 *Changed to current ENDF sequence      Activate
                                  number convention, e.g., reset number Activate
                                  for each section (MAT/MF/MT).         Activate
                                 *Replaced ALL 3 way IF statements.     Activate
     VERS. 2017-1 (May  2017)    *Increased MAX. POINTS to 6,000,000.   Activate
                                 *Do not create MF=10 for any MT that   Activate
                                  already has MF=10 data = copy MF=10   Activate
                                  data in its original form.            Activate
                                 *Message for every MF=7 output,        Activate
                                  whether created or copied from input. Activate
     VERS. 2018-1 (Jan. 2018)    *Updated based on user feedback.       Activate
                                 *Added on-line output for ALL ENDERROR Activate
                                                                        Activate
     Acknowledgement 2015                                               Activate
     --------------------                                               Activate
     Currently almost all improvements to this code are based upon      Activate
     feedback from code users who report problems. This feedback        Activate
     benefits ALL users of this code, and ALL users are encouraged      Activate
     to report problems.                                                Activate
                                                                        Activate
     Improvements on the 2015 version of this code based on user        Activate
     feedback, including IMPORTANT feedback from Andrej Trkov, up       Activate
     to and including Feb. 2015.                                        Activate
                                                                        Activate
     OWNED, MAINTAINED AND DISTRIBUTED BY                               Activate
     ------------------------------------                               Activate
     THE NUCLEAR DATA SECTION                                           Activate
     INTERNATIONAL ATOMIC ENERGY AGENCY                                 Activate
     P.O. BOX 100                                                       Activate
     A-1400, VIENNA, AUSTRIA                                            Activate
     EUROPE                                                             Activate
                                                                        Activate
     ORIGINALLY WRITTEN BY                                              Activate
     ---------------------------------                                  Activate
     Dermott E. Cullen                                                  Activate
                                                                        Activate
     PRESENT CONTACT INFORMATION                                        Activate
     ---------------------------                                        Activate
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Website RedCullen1.net/HOMEPAGE.NEW Activate
Activate
Activate
AUTHORS MESSAGE Activate
--- Activate
THE REPORT DESCRIBED ABOVE IS THE LATEST PUBLISHED DOCUMENTATION Activate
FOR THIS PROGRAM. HOWEVER, THE COMMENTS BELOW SHOULD BE CONSIDERED Activate
THE LATEST DOCUMENTATION INCLUDING ALL RECENT IMPROVEMENTS. PLEASE Activate
READ ALL OF THESE COMMENTS BEFORE IMPLEMENTATION. Activate
Activate
AT THE PRESENT TIME WE ARE ATTEMPTING TO DEVELOP A SET OF COMPUTER Activate
INDEPENDENT PROGRAMS THAT CAN EASILY BE IMPLEMENTED ON ANY ONE Activate
OF A WIDE VARIETY OF COMPUTERS. IN ORDER TO ASSIST IN THIS PROJECT Activate
IT WOULD BE APPECIATED IF YOU WOULD NOTIFY THE AUTHOR OF ANY Activate
COMPILER DIAGNOSTICS, OPERATING PROBLEMS OR SUGGESTIONS ON HOW TO Activate
IMPROVE THIS PROGRAM. HOPEFULLY, IN THIS WAY FUTURE VERSIONS OF Activate
THIS PROGRAM WILL BE COMPLETELY COMPATIBLE FOR USE ON YOUR Activate
COMPUTER. Activate
Activate
PURPOSE Activate
--- Activate
THIS PROGRAM IS DESIGNED TO CREATE FILE 10 ACTIVATION CROSS Activate
SECTIONS BY COMBINING FILE 3 CROSS SECTIONS AND FILE 9 MULTIPLIERS Activate
Activate
IN THE FOLLOWING DISCUSSION FOR SIMPLICITY THE ENDF TERMINOLOGY Activate
---ENDF TAPE---WILL BE USED. IN FACT THE ACTUAL MEDIUM MAY BE Activate
TAPE, CARDS, DISK OR ANY OTHER MEDIUM. Activate
Activate
ASSUMPTIONS Activate
--- Activate
IT IS ASSUMED THAT THE FILE 3 AND 9 DATA HAVE BEEN LINEARIZED Activate
BEFORE THIS CODE IS USED - FILE 3 AND 9 DATA CAN BE LINEARIZED Activate
USING PROGRAM LINEAR. Activate
Activate
IT IS ASSUMED THAT THE FILE 9 MULTIPLIERS ARE FAIRLY SMOOTH VERSUS Activate
ENERGY, AND THAT THE ACTIVATION CROSS SECTIONS FOR FILE 10 CAN BE Activate
DEFINED AT EXACTLY THE SAME ENERGIES AS THE FILE 3 CROSS SECTIONS, Activate
AND THAT THESE NEED MERELY BE MULTIPLIED BY THE FILE 9 TO DEFINE Activate
THE FILE 10 ACTIVATION CROSS SECTIONS. Activate
Activate
ENDF FORMAT Activate
--- Activate
THIS PROGRAM ONLY USES THE ENDF BCD OR CARD IMAGE FORMAT (AS Activate
OPPOSED TO THE BINARY FORMAT) AND CAN HANDLE DATA IN ANY VERSION Activate
OF THE ENDF FORMAT (I.E., ENDF-1, 2, 3, 4, 5 OR 6 FORMAT). Activate
Activate
IT IS ASSUMED THAT THE DATA IS CORRECTLY CODED IN THE ENDF Activate
FORMAT AND NO ERROR CHECKING IS PERFORMED. IN PARTICULAR IT IS Activate
ASSUMED THAT THE MAT, MF AND MT ON EACH LINE IS CORRECT. SEQUENCE Activate
NUMBERS (COLUMNS 76-80) ARE IGNORED ON INPUT, BUT WILL BE Activate
CORRECTLY OUTPUT ON ALL LINES. THE FORMAT OF SECTION MF=1, MT=451 Activate
AND ALL SECTIONS OF MF=3 MUST BE CORRECT. THE PROGRAM COPIES ALL Activate
OTHER SECTION OF DATA AS HOLLERITH AND AS SUCH IS INSENSITIVE TO Activate
THE CORRECTNESS OR INCORRECTNESS OF ALL OTHER SECTIONS. Activate
Activate
OUTPUT FORMAT Activate
--- Activate
ALL ENERGIES WILL BE OUTPUT IN F (INSTEAD OF E) FORMAT IN ORDER Activate
TO ALLOW ENERGIES TO BE WRITTEN WITH UP TO 9 DIGITS OF ACCURACY. Activate
COMPARISON OF THE NORMAL ENDF CONVENTION OF 6 DIGITS TO THE 9 Activate
DIGIT OUTPUT FROM THIS PROGRAM DEMONSTRATED THAT FAILURE TO USE Activate
THE 9 DIGIT OUTPUT CAN LEAD TO LARGE ERRORS IN THE DATA DUE TO Activate
TRUNCATION OF ENERGIES TO 6 DIGITS DURING OUTPUT. Activate
Activate
CONTENTS OF OUTPUT Activate
--- Activate
ENTIRE EVALUATIONS ARE OUTPUT, NOT JUST THE PROCESSED DATA, E.G., Activate
ANGULAR AND ENERGY DISTRIBUTIONS ARE ALSO INCLUDED. Activate
Activate
DOCUMENTATION Activate
--- Activate

THE FACT THAT THIS PROGRAM HAS OPERATED ON THE DATA IS DOCUMENTED Activate
BY THE ADDITION OF 3 COMMENT LINES AT THE END OF EACH HOLLERITH Activate
SECTION IN THE FORM Activate
Activate
********** PROGRAM ACTIVATE (2018-1) ********** Activate
FILE 10 ACTIVATION CROSS SECTIONS HAVE BEEN DEFINED BY COMBINING Activate
FILE 3 CROSS SECTIONS AND FILE 9 MULTIPLIERS. FILE 9 DELETED. Activate
Activate
THE ORDER OF SIMILAR COMMENTS (FROM RECENT, SIGMA1 AND GROUPIE) Activate
REPRESENTS A COMPLETE HISTORY OF ALL OPERATIONS PERFORMED ON Activate
THE DATA BY THESE PROGRAMS. Activate
Activate
THESE COMMENT LINES ARE ONLY ADDED TO EXISTING HOLLERITH SECTIONS, Activate
I.E., THIS PROGRAM WILL NOT CREATE A HOLLERITH SECTION. THE FORMAT Activate
OF THE HOLLERITH SECTION IN ENDF-5 DIFFERS FROM THE THAT OF Activate
EARLIER VERSIONS OF ENDF. BY READING AN EXISTING MF=1, MT=451 Activate
IT IS POSSIBLE FOR THIS PROGRAM TO DETERMINE WHICH VERSION OF Activate
THE ENDF FORMAT THE DATA IS IN. WITHOUT HAVING A SECTION OF Activate
MF=1, MT=451 PRESENT IT IS IMPOSSIBLE FOR THIS PROGRAM TO Activate
DETERMINE WHICH VERSION OF THE ENDF FORMAT THE DATA IS IN, AND Activate
AS SUCH IT IS IMPOSSIBLE FOR THE PROGRAM TO DETERMINE WHAT FORMAT Activate
SHOULD BE USED TO CREATE A HOLLERITH SECTION. Activate
Activate
REACTION INDEX Activate
-------------- Activate
THIS PROGRAM DOES NOT USE THE REACTION INDEX WHICH IS GIVEN IN Activate
SECTION MF=1, MT=451 OF EACH EVALUATION. Activate
Activate
THIS PROGRAM DOES NOT UPDATE THE REACTION INDEX IN MF=1, MT=451. Activate
THIS CONVENTION HAS BEEN ADOPTED BECAUSE MOST USERS DO NOT Activate
REQUIRE A CORRECT REACTION INDEX FOR THEIR APPLICATIONS AND IT WAS Activate
NOT CONSIDERED WORTHWHILE TO INCLUDE THE OVERHEAD OF CONSTRUCTING Activate
A CORRECT REACTION INDEX IN THIS PROGRAM. HOWEVER, IF YOU REQUIRE Activate
A REACTION INDEX FOR YOUR APPLICATIONS, AFTER RUNNING THIS PROGRAM Activate
YOU MAY USE PROGRAM DICTIN TO CREATE A CORRECT REACTION INDEX. Activate
Activate
SECTION SIZE Activate
------------ Activate
SECTIONS OF MF=9 MULTIPLIERS ARE LIMITED TO A MAXIMUM OF 3,000,000 Activate
ENERGY POINTS. Activate
Activate
THERE IS NO LIMIT ON THE NUMBER OF ENERGY POINTS IN MF=3 AND 10 Activate
TABLES = THIS DATA IS READ AS CHARACTERS, ONE LINE AT A TIME. Activate
Activate
SELECTION OF DATA Activate
----------------- Activate
THE PROGRAM PROCESSES ALL ENDF DATA ON ONE ENDF TAPE. Activate
Activate
2015 - IT NOW ONLY DOES ONE ENDF TAPE. Activate
Activate
PROGRAM OPERATION Activate
----------------- Activate
PASS #1 Activate
------- Activate
THE ENTIRE MAT IS COPIED TO A SCRATCH FILE IN THE ENDF ASCII Activate
FORMAT AND WHILE COPYING IT TO SCRATCH MF=3, 9, AND 10 ARE ALSO Activate
COPIED TO SEPERATE SCRATCH FILES, I.E., THERE ARE A TOTAL OF 4 Activate
SCRATCH FILES - SEE THEIR DEFINITIONS BELOW. Activate
Activate
PASS #2 Activate
------- Activate
IF NO MF=9 MULTIPLIERS ARE FOUND DURING PASS #1, THE ENTIRE MAT Activate
IS COPIED FROM SCRATCH TO THE OUTPUT FILE, WITHOUT ANY CHECKS. Activate
Activate
IF MF=9 MULTIPLIERS ARE FOUND THEY ARE USED WITH MF=3 CROSS Activate
SECTIONS TO CREATE MF=10 ACTIVATION CROSS SECTIONS. Activate
Activate
FOR ANY SECTION OF MF=10 DATA FOR WHICH NO MF=9 MULTIPLIERS ARE Activate
FOUND, THE ORIGINAL MF=10 IS OUTPUT. Activate
Activate
FOR CONSISTENCY ALL MF=9 MULTIPLIERS ARE DELETED, I.E., THEY ARE Activate

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    NOT INCLUDED IN THE OUTPUT.                                          Activate
                                                                         Activate
    KEEP EVALUATED DATA POINTS                                           Activate
    --------------------------                                           Activate
    THE FILE 10 OUTPUT WILL BE AT EXACTLY THE SAME ENERGY POINTS AS      Activate
    THE FILE 3 CROSS SECTIONS USED TO DEFINE THE FILE 10 ACTIVATION      Activate
    CROSS SECTIONS.                                                      Activate
                                                                         Activate
    INPUT FILES                                                          Activate
    -----------                                                          Activate
    UNIT  DESCRIPTION                                                    Activate
    ----  -----------                                                    Activate
       2  INPUT LINES (BCD - 80 CHARACTERS/RECORD)                       Activate
      10  ORIGINAL ENDF DATA (BCD - 80 CHARACTERS/RECORD)                Activate
                                                                         Activate
    OUTPUT FILES                                                         Activate
    ------------                                                         Activate
    UNIT  DESCRIPTION                                                    Activate
    ----  -----------                                                    Activate
       3  OUTPUT REPORT (BCD - 120 CHARACTERS/RECORD)                    Activate
      11  FINAL ENDF DATA (BCD - 80 CHARACTERS/RECORD)                   Activate
                                                                         Activate
    SCRATCH FILES                                                        Activate
    -------------                                                        Activate
    UNIT  DESCRIPTION                                                    Activate
    ----  -----------                                                    Activate
      12  SCRATCH FILE FOR ALL MAT (BCD - 80 CHARACTERS/RECORD)          Activate
      14  SCRATCH FILE FOR MF=3 DATA (BCD - 80 CHARACTERS/RECORD)        Activate
      15  SCRATCH FILE FOR MF=9 DATA (BCD - 80 CHARACTERS/RECORD)        Activate
      16  SCRATCH FILE FOR MF=10 DATA (BCD - 80 CHARACTERS/RECORD)       Activate
                                                                         Activate
    OPTIONAL STANDARD FILE NAMES (SEE SUBROUTINE FILEIO)                 Activate
    ----------------------------------------------------                 Activate
    UNIT  FILE NAME                                                      Activate
    ----  ----------                                                     Activate
      2   ACTIVATE.INP                                                   Activate
      3   ACTIVATE.LST                                                   Activate
     10   ENDFB.IN                                                       Activate
     11   ENDFB.OUT                                                      Activate
     12   (SCRATCH)                                                      Activate
     14   (SCRATCH)                                                      Activate
     15   (SCRATCH)                                                      Activate
                                                                         Activate
    INPUT PARAMETERS                                                     Activate
    ----------------                                                     Activate
                                                                         Activate
    LINE  COLS.  DESCRIPTION                                             Activate
    ----  -----  -----------                                             Activate
       1   1-72  ENDF INPUT DATA FILENAME                                Activate
                 (STANDARD OPTION = ENDFB.IN)                            Activate
       2   1-72  ENDF OUTPUT DATA FILENAME                               Activate
                 (STANDARD OPTION = ENDFB.OUT)                           Activate
                                                                         Activate
    ONE PAIR OF INPUT LINES MAY BE USED, TO PROCESS ANY ENDF TAPE.       Activate
                                                                         Activate
    2015 - NOW ONLY DOES ONE ENDF TAPE.                                  Activate
                                                                         Activate
    EXAMPLE INPUT NO. 1                                                  Activate
    -------------------                                                  Activate
    PROCESS ENDF TAPE NAMED ACTIVATE.IN AND NAME THE OUTPUT FILE         Activate
    ACTIVATE.OUT.                                                        Activate
                                                                         Activate
    IN THIS CASE THE FOLLOWING 2 INPUT LINES ARE REQUIRED                Activate
                                                                         Activate
ACTIVATE.IN                                                              Activate
ACTIVATE.OUT                                                             Activate
                                                                         Activate
    EXAMPLE INPUT NO. 2                                                  Activate
    -------------------                                                  Activate
    SAME AS THE ABOVE CASE, EXCEPT THAT IN THIS CASE THE ORIGINAL        Activate
    TAPE IS IN A DIRECTORY NAMED \ENDFB6\ORIGINAL, AND THE               Activate
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    RESULTS WILL BE WRITTEN INTO A DIRECTORY NAMED \ENDFB6\ACTIVATE.   Activate
                                                                       Activate
    IN THIS CASE THE FOLLOWING 6 INPUT LINES ARE REQUIRED              Activate
                                                                       Activate
\ENDFB6\ORIGINAL\ACTIVATE.IN                                          Activate
\ENDFB6\ACTIVATE\ACTIVATE.OUT                                          Activate
                                                                       Activate
    EXAMPLE INPUT NO. 3                                                Activate
    ------------------                                                 Activate
    IF THERE IS NO ACTIVATE.INP FILE, OR THE FILENAMES ARE BLANK       Activate
    THIS CODE WILL USE THE DEFAULT NAMES,                              Activate
                                                                       Activate
ENDFB.IN                                                               Activate
ENDFB.OUT                                                              Activate
                                                                       Activate
======================================================================= Activate
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