```
======================================================================== 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
     VERS. 2019-1 (June 2019)    *Additional Interpolation Law Tesrs     Activate
                                 *Checked consistency of Maximum         Activate
                                  tabulated energy for MF=3 and 9 data   Activate
                                  to be compbined - print WARNING if     Activate
                                  inconsistent.                          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
     Dermott E. Cullen                                                   Activate
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AUTHORS MESSAGE

THE REPORT DESCRIBED ABOVE IS THE LATEST PUBLISHED DOCUMENTATION FOR THIS PROGRAM. HOWEVER, THE COMMENTS BELOW SHOULD BE CONSIDERED THE LATEST DOCUMENTATION INCLUDING ALL RECENT IMPROVEMENTS. PLEASE READ ALL OF THESE COMMENTS BEFORE IMPLEMENTATION.

AT THE PRESENT TIME WE ARE ATTEMPTING TO DEVELOP A SET OF COMPUTER INDEPENDENT PROGRAMS THAT CAN EASILY BE IMPLEMENTED ON ANY ONE OF A WIDE VARIETY OF COMPUTERS. IN ORDER TO ASSIST IN THIS PROJECT IT WOULD BE APPECIATED IF YOU WOULD NOTIFY THE AUTHOR OF ANY COMPILER DIAGNOSTICS, OPERATING PROBLEMS OR SUGGESTIONS ON HOW TO IMPROVE THIS PROGRAM. HOPEFULLY, IN THIS WAY FUTURE VERSIONS OF THIS PROGRAM WILL BE COMPLETELY COMPATIBLE FOR USE ON YOUR COMPUTER.

PURPOSE

THIS PROGRAM IS DESIGNED TO CREATE FILE 10 ACTIVATION CROSS SECTIONS BY COMBINING FILE 3 CROSS SECTIONS AND FILE 9 MULTIPLIERS

IN THE FOLLOWING DISCUSSION FOR SIMPLICITY THE ENDF TERMINOLOGY ---ENDF TAPE---WILL BE USED. IN FACT THE ACTUAL MEDIUM MAY BE TAPE, CARDS, DISK OR ANY OTHER MEDIUM.

ASSUMPTIONS

IT IS ASSUMED THAT THE FILE 3 AND 9 DATA HAVE BEEN LINEARIZED BEFORE THIS CODE IS USED - FILE 3 AND 9 DATA CAN BE LINEARIZED USING PROGRAM LINEAR.

IT IS ASSUMED THAT THE FILE 9 MULTIPLIERS ARE FAIRLY SMOOTH VERSUS ENERGY, AND THAT THE ACTIVATION CROSS SECTIONS FOR FILE 10 CAN BE DEFINED AT EXACTLY THE SAME ENERGIES AS THE FILE 3 CROSS SECTIONS, AND THAT THESE NEED MERELY BE MULTIPLIED BY THE FILE 9 TO DEFINE THE FILE 10 ACTIVATION CROSS SECTIONS.

ENDF FORMAT

THIS PROGRAM ONLY USES THE ENDF BCD OR CARD IMAGE FORMAT (AS OPPOSED TO THE BINARY FORMAT) AND CAN HANDLE DATA IN ANY VERSION OF THE ENDF FORMAT (I.E., ENDF-1, 2, 3, 4, 5 OR 6 FORMAT).

IT IS ASSUMED THAT THE DATA IS CORRECTLY CODED IN THE ENDF FORMAT AND NO ERROR CHECKING IS PERFORMED. IN PARTICULAR IT IS ASSUMED THAT THE MAT, MF AND MT ON EACH LINE IS CORRECT. SEQUENCE NUMBERS (COLUMNS 76-80) ARE IGNORED ON INPUT, BUT WILL BE CORRECTLY OUTPUT ON ALL LINES. THE FORMAT OF SECTION MF=1, MT=451 AND ALL SECTIONS OF MF=3 MUST BE CORRECT. THE PROGRAM COPIES ALL OTHER SECTION OF DATA AS HOLLERITH AND AS SUCH IS INSENSITIVE TO THE CORRECTNESS OR INCORRECTNESS OF ALL OTHER SECTIONS.

OUTPUT FORMAT

ALL ENERGIES WILL BE OUTPUT IN F (INSTEAD OF E) FORMAT IN ORDER TO ALLOW ENERGIES TO BE WRITTEN WITH UP TO 9 DIGITS OF ACCURACY. COMPARISON OF THE NORMAL ENDF CONVENTION OF 6 DIGITS TO THE 9 DIGIT OUTPUT FROM THIS PROGRAM DEMONSTRATED THAT FAILURE TO USE THE 9 DIGIT OUTPUT CAN LEAD TO LARGE ERRORS IN THE DATA DUE TO TRUNCATION OF ENERGIES TO 6 DIGITS DURING OUTPUT.

CONTENTS OF OUTPUT

```
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 (2019-1) ****************       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
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                                                                        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
    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
    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
```