```
======================================================================= 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
                             *Updated based on user feedback.           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
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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

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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 (2017-1) *****************     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
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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
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
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   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
```