**======================================================================= 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**

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 **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 (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**

 **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**