**=======================================================================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 feedbackACTIVATE**

 **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 numberACTIVATE**

 **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 ENDERRORACTIVATE**

 **VERS. 2020-1 (Mar. 2020) \*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**

 **\*Added Target Isomer State ACTIVATE**

 **VERS. 2021-1 (Jan. 2021) \*Updated for FORTRAN 2018 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**

 **1466 Hudson Way ACTIVATE**

 **Livermore, CA 94550 ACTIVATE**

 **U.S.A. ACTIVATE**

 **Telephone 925-443-1911 ACTIVATE**

 **E. Mail RedCullen1@Comcast.net ACTIVATE**

 **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 CONSIDEREDACTIVATE**

 **THE LATEST DOCUMENTATION INCLUDING ALL RECENT IMPROVEMENTS. PLEASEACTIVATE**

 **READ ALL OF THESE COMMENTS BEFORE IMPLEMENTATION. ACTIVATE**

 **ACTIVATE**

 **AT THE PRESENT TIME WE ARE ATTEMPTING TO DEVELOP A SET OF COMPUTERACTIVATE**

 **INDEPENDENT PROGRAMS THAT CAN EASILY BE IMPLEMENTED ON ANY ONE ACTIVATE**

 **OF A WIDE VARIETY OF COMPUTERS. IN ORDER TO ASSIST IN THIS PROJECTACTIVATE**

 **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 MULTIPLIERSACTIVATE**

 **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 VERSUSACTIVATE**

 **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 (2021-1) \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* 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 FORMATACTIVATE**

 **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 WASACTIVATE**

 **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 PROGRAMACTIVATE**

 **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 3,000,000ACTIVATE**

 **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**