======================================================================= Fixup

 Fixup

 PROGRAM FIXUP Fixup

 ============= Fixup

 VERSION 84-1 (NOVEMBER 1984) Fixup

 VERSION 86-1 (JANUARY 1986) \*IMPROVED BASED ON USER COMMENTS Fixup

 \*FORTRAN-77/H VERSION Fixup

 VERSION 86-2 (JUNE 1986) \*ALLOW CREATION OF SECTIONS OF CROSS Fixup

 SECTIONS WHICH ARE NOT PRESENT IN Fixup

 THE ORIGINAL EVALUATION Fixup

 VERSION 88-1 (JULY 1988) \*OPTION...INTERNALLY DEFINE ALL I/O Fixup

 FILE NAMES (SEE, SUBROUTINE FILEIO Fixup

 FOR DETAILS). Fixup

 \*IMPROVED BASED ON USER COMMENTS. Fixup

 VERSION 89-1 (JANUARY 1989) \*PSYCHOANALYZED BY PROGRAM FREUD TO Fixup

 INSURE PROGRAM WILL NOT DO ANYTHING Fixup

 CRAZY. Fixup

 \*UPDATED TO USE NEW PROGRAM CONVERT Fixup

 KEYWORDS. Fixup

 \*ADDED LIVERMORE CIVIC COMPILER Fixup

 CONVENTIONS. Fixup

 VERSION 89-2 (MARCH 1989) \*ADDED ENDF-6 SUMMATION RULES AND Fixup

 DEFINED MF AND MT NUMBERS. PROGRAM Fixup

 WILL NOW USE MF=1, MT=451 TO DEFINE Fixup

 THE ENDF FORMAT OF THE DATA (E.G., Fixup

 ENDF-6 OR EARLIER) AND USE THE Fixup

 CORRECT SUMMATION RULES FOR EACH Fixup

 VERSION OF THE ENDF FORMAT. IF Fixup

 MF=1, MT=451 IS NOT PRESENT PROGRAM Fixup

 WILL USE ENDF-6 SUMMATION Fixup

 CONVENTIONS AS A DEFAULT. Fixup

 VERSION 90-1 (JUNE 1990) \*UPDATED BASED ON USER COMMENTS Fixup

 \*ADDED PHOTON INTERACTION, MF=23 Fixup

 VERSION 91-1 (JUNE 1991) \*ADDED FORTRAN SAVE OPTION Fixup

 \*NEW MORE CONSISTENT ENERGY OUTPUT Fixup

 ROUTINE Fixup

 VERSION 92-1 (JANUARY 1992) \*ADDED OPTION TO CALCULATE RATIOS, Fixup

 E.G., CAPTURE/FISSION AND PRODUCTS, Fixup

 NU-BAR\*FISSION - AND OUTPUT THE Fixup

 RESULTS IN THE ENDF FORMAT (SEE, Fixup

 BELOW - CREATING RATIOS AND PRODUCTS) Fixup

 \*ALLOW TOTAL NU-BAR (MF=1, MT=452) TO Fixup

 BE USED IN DEFINING RATIOS OR Fixup

 PRODUCTS. Fixup

 \*ALLOW ALL CROSS SECTIONS TO BE PUT Fixup

 ON A UNIFORM ENERGY GRID. Fixup

 \*NOTE, CHANGE IN INPUT FORMAT FOR Fixup

 RANGES OF MT NUMBERS Fixup

 \*COMPLETELY CONSISTENT I/O ROUTINES - Fixup

 TO MINIMIZE COMPUTER DEPENDENCE. Fixup

 VERSION 93-1 (JULY 1993) \*CORRECTED ALGORITHM TO CREATE UNIFORM Fixup

 ENERGY GRID. Fixup

 VERSION 94-1 (JANUARY 1993) \*VARIABLE ENDF/B DATA FILENAMES Fixup

 TO ALLOW ACCESS TO FILE STRUCTURES Fixup

 (WARNING - INPUT PARAMETER FORMAT Fixup

 HAS BEEN CHANGED) Fixup

 \*INCREASED PAGE SIZE FROM 1002 TO Fixup

 12000 DATA POINTS. Fixup

 \*CLOSE ALL FILES BEFORE TERMINATING Fixup

 (SEE, SUBROUTINE ENDIT) Fixup

 VERSION 96-1 (JANUARY 1996) \*COMPLETE RE-WRITE Fixup

 \*IMPROVED COMPUTER INDEPENDENCE Fixup

 \*ALL DOUBLE PRECISION Fixup

 \*ON SCREEN OUTPUT Fixup

 \*UNIFORM TREATMENT OF ENDF I/O Fixup

 \*IMPROVED OUTPUT PRECISION Fixup

 \*DEFINED SCRATCH FILE NAMES Fixup

 \*INCREASED PAGE SIZE FROM 12000 TO Fixup

 36000 DATA POINTS. Fixup

 VERSION 99-1 (MARCH 1999) \*CORRECTED CHARACTER TO FLOATING Fixup

 POINT READ FOR MORE DIGITS Fixup

 \*UPDATED TEST FOR ENDF FORMAT Fixup

 VERSION BASED ON RECENT FORMAT CHANGE Fixup

 \*GENERAL IMPROVEMENTS BASED ON Fixup

 USER FEEDBACK Fixup

 VERSION 99-2 (JUNE 1999) \*ASSUME ENDF-6, NOT 5, IF MISSING Fixup

 MF=1, MT-451. Fixup

 \*FIXED CREATION OF SECTIONS Fixup

 VERS. 2000-1 (FEBRUARY 2000)\*GENERAL IMPROVEMENTS BASED ON Fixup

 USER FEEDBACK Fixup

 VERS. 2002-1 (MAY 2002) \*OPTIONAL INPUT PARAMETERS Fixup

 \*SUMMATION RULES ARE DEFINED BASED Fixup

 ON CONTENTS OF TABLES. Fixup

 VERS. 2004-1 (JAN. 2004) \*GENERAL UPDATE BASED ON USER FEEDBACK Fixup

 \*INCREASED PAGE SIZE FROM 36000 TO Fixup

 60000 DATA POINTS. Fixup

 VERS. 2005-1 (JAN. 2005) \*UPDATED MT CREATION TO ALLOW MAT =0 Fixup

 INDICATING CREATE FOR ALL MATS. Fixup

 VERS. 2007-1 (JAN. 2007) \*CHECKED AGAINST ALL ENDF/B-VII DATA Fixup

 \*INCREASED PAGE SIZE FROM 60,000 TO Fixup

 600,000 DATA POINTS. Fixup

 VERS. 2007-2 (OCT. 2007) \*ADDED MT=16 AS SUM MT=875 THRU 891 Fixup

 \*72 CHARACTER FILE NAMES Fixup

 VERS. 2010-1 (Apr. 2010) \*Defining cross sections by summation Fixup

 to now mandatory - either build-in Fixup

 rules or by user input. Fixup

 VERS. 2011-1 (March 2011) \*Added new MT # to allowed and Fixup

 summation rules. Fixup

 VERS. 2012-1 (Aug. 2012) \*Corrected definition of MT=3 to avoid Fixup

 double counting of MT=18. Fixup

 \*Extended incident particle list to Fixup

 include photon (ZA = 0). Fixup

 \*Added CODENAME Fixup

 \*32 and 64 bit Compatible Fixup

 \*Added ERROR stops. Fixup

 VERS. 2015-1 (Jan. 2015) \*Extended OUT9. Fixup

 \*Replaced ALL 3 way IF Statements Fixup

 Fixup

 OWNED, MAINTAINED AND DISTRIBUTED BY Fixup

 ------------------------------------ Fixup

 THE NUCLEAR DATA SECTION Fixup

 INTERNATIONAL ATOMIC ENERGY AGENCY Fixup

 P.O. BOX 100 Fixup

 A-1400, VIENNA, AUSTRIA Fixup

 EUROPE Fixup

 Fixup

 ORIGINALLY WRITTEN BY Fixup

 ------------------------------------ Fixup

 Dermott E. Cullen Fixup

 Fixup

 PRESENT CONTACT INFORMATION Fixup

 --------------------------- Fixup

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 Fixup

 PURPOSE Fixup

 ======= Fixup

 THIS PROGRAM IS DESIGNED TO READ EVALUATED DATA IN THE ENDF Fixup

 FORMAT, PERFORM CORRECTIONS AND OUTPUT THE RESULT IN THE ENDF Fixup

 FORMAT. TWO TYPES OF CORRECTIONS ARE POSSIBLE (1) AUTOMATIC AND Fixup

 (2) OPTIONAL (BASED ON USER INPUT) CORRECTIONS. Fixup

 Fixup

 ONE OF THE MOST IMPORTANT FUNCTIONS OF THIS PROGRAM IS TO Fixup

 RE-DEFINE ALL REDUNDANT CROSS SECTIONS (E.G. TOTAL) TO BE EXACTLY Fixup

 EQUAL TO THE SUM OF ITS PARTS. THIS PROCEDURE ELIMINATES THE Fixup

 PROBLEM WITH MANY ENDF EVALUATIONS, WHERE DUE TO THE USE OF Fixup

 NON-LINEAR INTERPOLATION LAWS THE TOTAL MAY BE EQUAL TO THE SUM Fixup

 OF ITS PARTS AT ALL TABULATED ENERGIES, BUT BASED ON THE Fixup

 INTERPOLATION LAWS IT CAN BE QUITE DIFFERENT AT ENERGIES BETWEEN Fixup

 TABULATED ENERGIES. Fixup

 Fixup

 AUTOMATIC CHECKS/CORRECTIONS Fixup

 ============================ Fixup

 (1) CHECK THAT MAT/MF/MT DOES NOT CHANGE UNLESS A MEND/FEND/SEND Fixup

 LINE IS READ. IF MAT/MF/MT CHANGES A WARNING MESSAGE IS Fixup

 PRINTED BUT NO CORRECTIVE ACTION IS TAKEN. Fixup

 (2) ALL LINES WITHIN A GIVEN MAT WILL BE SEQUENTIALLY NUMBERED Fixup

 ON OUTPUT. Fixup

 Fixup

 OPTIONAL CHECKS/CORRECTIONS Fixup

 =========================== Fixup

 THE FOLLOWING NUMBERS CORRESPOND TO THE INPUT DATA OPTION COLUMNS Fixup

 (SEE THE DESCRIPTION OF THE INPUT BELOW) Fixup

 Fixup

 (1) CORRECT ZA AND AWR IN ALL SECTIONS. CHECK TO INSURE THAT THE Fixup

 C1 AND C2 VALUES (ZA AND AWR) ARE THE SAME IN ALL SECTIONS. Fixup

 THE C1 AND C2 OF THE FIRST SECTION READ ARE ASSUMED TO BE Fixup

 CORRECT AND ARE USED FOR COMPARISON. IF THE C1 AND/OR C2 OF Fixup

 THE FIRST SECTION ARE NOT POSITIVE AN ERROR MESSAGE IS OUTPUT Fixup

 AND THE MATERIAL IS COPIED WITHOUT CHANGE. Fixup

 NOTE....TO CHANGE THE ZA AND/OR AWR OF ANY MATERIAL IT IS Fixup

 MERELY NECESSARY TO CHANGE THE ZA AND/OR AWR IN THE FIRST Fixup

 SECTION OF THE MATERIAL AND USE THIS OPTION TO AUTOMATICALLY Fixup

 CHANGE ALL OTHER SECTIONS. Fixup

 (2) CORRECT CROSS SECTION (MF=3) THRESHOLDS. THE Q-VALUE AND AWR Fixup

 ARE USED TO DERIVE THE REACTION THRESHOLD USING THE RELATION, Fixup

 Fixup

 E-THRESHOLD = -(Q-VALUE)\*(AWRE+1.0)/AWRE Fixup

 Fixup

 IF THE THRESHOLD IS POSITIVE THE CROSS SECTION IS CHECKED TO Fixup

 INSURE THAT THE FIRST TABULATED POINT IS AT THE THRESHOLD AND Fixup

 HAS A ZERO CROSS SECTION. IF NOT, THE CROSS SECTION WILL BE Fixup

 CHANGED. Fixup

 (A) IF THE FIRST TABULATED POINT IS ABOVE THE THRESHOLD AND Fixup

 HAS A ZERO CROSS SECTION, THE POINT IS DELETED AND A POINT Fixup

 IS INSERTED AT THE THRESHOLD. Fixup

 (B) IF THE FIRST TABULATED POINT IS ABOVE THE THRESHOLD AND Fixup

 HAS A NON-ZERO CROSS SECTION, A POINT WITH ZERO CROSS Fixup

 SECTION IS INSERTED AT THE THRESHOLD. Fixup

 (C) IF THE FIRST TABULATED POINT IS BELOW THE THRESHOLD AND Fixup

 HAS A NON-ZERO CROSS SECTION, ALL POINTS BELOW THE Fixup

 THRESHOLD ARE DELETED AND A POINT WITH ZERO CROSS SECTION Fixup

 IS INSERTED AT THE THRESHOLD. Fixup

 (3) EXTEND ALL CROSS SECTIONS (MF=3) TO 20 MEV. IF THE TABULATED Fixup

 CROSS SECTION ENDS BELOW 20 MEV IT WILL BE EXTENDED TO 20 MEV Fixup

 AS EITHER ZERO (IMOPS(3)=1) OR CONSTANT (IMOPS(3)=2) EQUAL Fixup

 TO THE LAST TABULATED VALUE. Fixup

 (4) ALLOW REACTION (MF=3, ANY MT) DELETION. ALL SPECIFIED Fixup

 REACTIONS WILL BE DELETED WHEN THE DATA IS READ FROM THE Fixup

 INPUT ENDF DATA FILE AND WILL NOT BE IN THE OUTPUT ENDF Fixup

 DATA FILE. WARNING DELETED REACTIONS MAY NOT BE USED TO DEFINE Fixup

 ANY RECONSTRUCTED REACTIONS (I.E. REACTIONS DEFINED BY SUMMING Fixup

 OTHER REACTIONS). SINCE DELETED REACTIONS ARE DELETED DURING Fixup

 READING IT IS AS IF THEY NEVER EXISTED AND IF ANY DELETED Fixup

 REACTION IS REQUIRED LATER TO DEFINE ANY SUM AN ERROR WILL Fixup

 RESULT. THE USER MAY SPECIFY THAT THE DELETION RULES ARE TO BE Fixup

 READ FROM INPUT (IMOPS(4)=1) OR THAT THE BUILT IN SUMMATION Fixup

 RULES ARE TO BE USED (MOPS(4)=2). AT THE PRESENT TIME THE Fixup

 BUILT-IN DELETION RULES ARE THAT NO SECTIONS SHOULD BE DELETED Fixup

 (THE USER MAY OVERRIDE THIS CONVENTION BY INPUT). Fixup

 (5) ALLOW REACTION (MF=3, ANY MT) RECONSTRUCTION BY SUMMING OTHER Fixup

 REACTIONS. IN ORDER TO OPTIMIZE THE RUNNING TIME OF THIS Fixup

 PROGRAM CARE SHOULD BE EXERCISED TO MINIMIZE THE NUMBER OF Fixup

 TIMES THAT EACH CONTRIBUTING CROSS SECTION MUST BE USED. Fixup

 THE USED MAY SPECIFY THAT THE SUMMATION RULES ARE TO BE READ Fixup

 AS INPUT (IMOPS(5)=1) OR THAT THE BUILT IN SUMMATION RULES Fixup

 ARE TO BE USED (IMOPS(5)=2). THE BUILT IN SUMMATION RULES ARE Fixup

 DESIGNED TO USE ENDF CONVENTIONS AND TO MINIMIZE THE NUMBER Fixup

 OF TIMES THAT EACH CROSS SECTION IS USED. Fixup

 (6) INSURE THAT ALL CROSS SECTIONS ARE NON-NEGATIVE (I.E. ARE Fixup

 ZERO OR POSITIVE). DURING READING ALL NEGATIVE CROSS SECTIONS Fixup

 WILL BE SET EQUAL TO ZERO AND TREATED AS SUCH DURING ALL Fixup

 SUBSEQUENT SUMMATIONS AND ENDF OUTPUT. Fixup

 NOTE...THIS OPTION SHOULD NEVER BE USED WITH DATA CONTAINING Fixup

 BACKGROUND CROSS SECTIONS WHICH MAY BE NEGATIVE. ONLY AFTER Fixup

 THE RESONANCE CONTRIBUTION HAS BEEN ADDED TO THE BACKGROUND Fixup

 TO DEFINE THE ACTUAL CROSS SECTION IS IT VALID TO ELIMINATE Fixup

 NEGATIVE CROSS SECTIONS. Fixup

 NOTE...THIS OPTION MAY BE USED TO DELETE NEGATIVE ELASTIC Fixup

 CROSS SECTIONS THAT MAY RESULT FROM RECONSTRUCTING CROSS Fixup

 SECTIONS FROM SINGLE LEVEL BREIT-WIGNER PARAMETERS. IF THE Fixup

 TOTAL CROSS SECTION IS THEN RECONSTRUCTED USING THE CORRECTED Fixup

 ELASTIC CROSS SECTION THE TOTAL WILL BE POSITIVE DUE TO THE Fixup

 CONTRIBUTIONS OF CAPTURE AND FISSION (THUS AVOIDING NUMERICAL Fixup

 INSTABILITY PROBLEMS DURING SELF-SHIELDING CALCULATIONS). Fixup

 (7) WITHIN EACH SECTION OF CROSS SECTIONS DELETE ENERGIES THAT Fixup

 ARE NOT IN ASCENDING ENERGY ORDER (ENERGY REPETITION IS O.K.) Fixup

 (8) WITHIN EACH SECTION OF CROSS SECTIONS ELIMINATE DUPLICATE Fixup

 POINTS (SUCCESSIVE POINTS WITH THE SAME ENERGY-CROSS SECTION). Fixup

 (9) TEST THAT ALL SECTIONS ARE IN ASCENDING MAT/MF/MT ORDER. Fixup

 IF NOT, NO CORRECTIVE ACTION WILL BE TAKEN, ONLY AN ERROR Fixup

 MESSAGE WILL BE OUTPUT. Fixup

 (10) CHECK MF/MT FOR EACH SECTION TO INSURE THAT THEY ARE DEFINED Fixup

 IN THE ENDF FORMAR MANUAL. IF THEY ARE NOT DEFINED AN ERROR Fixup

 MESSAGE IS PRINTED, BUT NO CORRECTIVE ACTION IS TAKEN. Fixup

 (11) ALLOW SECTIONS WHICH ARE NOT PRESENT IN THE ORIGINAL (INPUT) Fixup

 EVALUATION TO BE CREATED. NORMALLY THIS PROGRAM WILL ONLY Fixup

 RECONSTRUCT AND OUTPUT SECTIONS IF THE SECTION IS PRESENT Fixup

 IN THE ORIGINAL EVALUATION. THIS PROCEDURE IS FOLLOWED BECAUSE Fixup

 NORMALLY THE PROGRAM DOES NOT KNOW HOW TO DEFINE THE CONTENTS Fixup

 OF THE FIRST TWO LINES OF THE SECTION (E.G., Q-VALUE, Fixup

 TEMPERATURE, INITIAL AND FINAL STATES). THIS OPTION MAY BE Fixup

 USED TO ALLOW THE PROGRAM TO READ AND SAVE A TABLE DEFINING Fixup

 THE CONTENTS OF THE FIRST TWO LINES OF EACH SECTION TO BE Fixup

 CREATED. Fixup

 NOTE...IF A SECTION IS PRESENT ANY COMMAND TO CREATE IT WILL Fixup

 BE IGNORED. Fixup

 (12)ALLOW ENERGY POINTS TO BE INSERTED. THE PROGRAM CAN READ UP Fixup

 TO 50, ENERGIES, MAT, MT AND USE LINEAR INTERPOLATION TO Fixup

 INSERT ENERGY POINTS INTO TABLES AS THEY ARE READ, E.G., Fixup

 INSERT AN ENERGY POINT AT THERMAL ENERGY (0.0253 EV). IF Fixup

 AN MAT AND/OR MT IS ZERO THIS IMPLIES = ALL - INSERT THE Fixup

 ENERGY IN ALL TABLES. Fixup

 (13)PUT ALLOW CROSS SECTIONS ON A UNIFORM ENERGY GRID = EACH Fixup

 SECTION (MT) OF CROSS SECTIONS WILL INCLUDE ALL ENERGIES Fixup

 WHICH APPEAR IN AT LEAST ONE SECTION OF DATA. PARAMETERS Fixup

 (MT=251 THROUGH 255) ARE NOT INCLUDED IN THE UNIFORM ENERGY Fixup

 GRID. Fixup

 (14)DELETE SECTION IF CROSS SECTION = 0 AT ALL ENERGIES. THIS Fixup

 SOUNDS LIKE AN ABSURD OPTION, BUT IS REQUIRED BECAUSE SUCH Fixup

 SECTIONS EXIST IN ENDF/B-VI DATA. Fixup

 Fixup

 CREATING RATIOS AND PRODUCTS Fixup

 ============================ Fixup

 IN ORDER TO CREATE RATIOS AND PRODUCTS = NEW MT NUMBERS, YOU MUST Fixup

 DO TWO THINGS, Fixup

 Fixup

 1) DEFINE EACH NEW MT NUMBER AS A RATIO OR PRODUCT OF TWO MT Fixup

 NUMBERS. Fixup

 Fixup

 2) USE THE CREATE MT NUMBER OPTION AND INPUT THE FIRST TWO LINES Fixup

 OF THE SECTION Fixup

 Fixup

 WARNING - UNLESS YOU DO BOTH OF THESE YOU WILL NOT OBTAIN OUTPUT Fixup

 IN THE ENDF FORMAT. Fixup

 Fixup

 TWO SPECIAL MT NUMBERS HAVE BEEN DEFINED BY CSEWG INVOLVING Fixup

 RATIOS AND PRODUCTS, Fixup

 Fixup

 ALPHA (MT=254)= CAPTURE (MT=102)/FISSION (MT=18) Fixup

 Fixup

 ETA (MT=255) = NU-BAR (MT=452)\*FISSION (MT=18)/ABSORPTION (MT=27) Fixup

 Fixup

 ABSORPTION (MT=27) = FISSION (MT=18) + SUM (MT=102 THROUGH 116) Fixup

 Fixup

 AS YET THERE IS NO STANDARD DEFINITION OF MT NUMBERS FOR RATIO Fixup

 OR PRODUCT DATA. YOU ARE FREE TO USE ANY MT NUMBERS NORMALLY NOT Fixup

 USED IN THE ENDF. HOWEVER, IT WILL THEN BE YOUR RESPONSIBILITY Fixup

 TO PROPERLY INTERPRET THE RESULTS, I.E., NOBODY ELSE WILL HAVE Fixup

 ANY IDEA HOW TO INTERPRET A TABLE OF DATA ASSOCIATED WITH THE MT Fixup

 NUMBERS YOU HAVE USED. Fixup

 Fixup

 THIS PROGRAM CAN BE ONLY DIRECTLY DEFINE RATIOS AND PRODUCTS Fixup

 USING TWO MT NUMBERS = BINARY OPERATIONS, E.G., DEFINE THE CAPTURE Fixup

 TO FISSION RATIO, OR DEFINE THE PRODUCT NU-BAR\*FISSION. Fixup

 Fixup

 THIS PROGRAM CANNOT DIRECTLY DEFINE RATIO OR PRODUCT OF A SUM OF Fixup

 SECTIONS TO THE SUM OF ANOTHER SET OF SECTIONS. HOWEVER, THIS CAN Fixup

 BE DONE INDIRECTLY BY FIRST DEFINING A DUMMY MT NUMBER (ANY MT Fixup

 NUMBER NOT NORMALLY USED IN ENDF) TO BE A SUM OF SECTIONS AND Fixup

 A SECOND DUMMY MT NUMBER TO BE A SECOND SUM OF SECTIONS. YOU CAN Fixup

 THEN DEFINE RATIO OR PRODUCT YOU REQUIRE TO BE THE RATIO OF THESE Fixup

 TWO DUMMY MT NUMBERS. Fixup

 Fixup

 FOR EXAMPLE, TO DEFINE ETA, Fixup

 1) FIRST DEFINE (MT=27) = (MT=27) + (SUM OF MT=102 THROUGH 116) Fixup

 2) NEXT DEFINE (MT=333) = (MT=452)\*(MT=18) Fixup

 3) LAST DEFINE (MT=255) = (MT=333)/(MT=27) Fixup

 DO NOT FORGET TO TURN ON THE CREATE SECTION OPTION (ON THE FIRST Fixup

 INPUT LINE) AND INPUT THE FIRST TWO LINES OF SECTION MT=255 - Fixup

 OTHERWISE YOU WILL NOT GET ANY ENDF FORMATTED OUTPUT. Fixup

 Fixup

 THE ONLY SPECIAL CONVENTIONS USED BY THIS PROGRAM IN CALCULATING Fixup

 RATIOS ARE WHEN THE DENOMINATOR OF THE RATIO IS ZERO. IN THIS Fixup

 CASE IF THE NUMERATOR IS ALSO ZERO THE RATIO IS DEFINED TO BE ONE. Fixup

 IN THIS CASE IF THE NUMERATOR IS NOT ZERO THE RATIO IS DEFINED Fixup

 TO BE ZERO. Fixup

 Fixup

 ENDF FORMAT Fixup

 =========== Fixup

 THIS PROGRAM MAY BE USED WITH DATA IN ANY VERSION OF THE ENDF Fixup

 FORMAT (I.E. ENDF-1, 2, 3, 4, 5 OR 6 FORMAT). SINCE A Fixup

 PAGING SYSTEM IS USED STORE CROSS SECTION TABLES ON SCRATCH FILES Fixup

 THERE IS NO LIMIT TO THE SIZE OF TABLES (E.G. THE TOTAL CROSS Fixup

 SECTION MAY BE REPRESENTED BY 200,000 TABULATED POINTS). Fixup

 Fixup

 WARNING Fixup

 ======= Fixup

 (1) FOR EACH SECTION OF CROSS SECTIONS (I.E. EACH MT, MF=3) IN Fixup

 THE ORIGINAL EVALUATION (I.E. ENDF/B DATA READ) ONE SECTION Fixup

 OF DATA WILL BE OUTPUT, UNLESS THE SECTION HAS BEEN DELETED. Fixup

 THIS INCLUDES ANY SECTIONS WHICH ARE NOT PRESENT IN THE Fixup

 ORIGINAL EVALUATION, BUT THE USER INDICATES (BY INPUT) SHOULD Fixup

 BE CREATED. Fixup

 Fixup

 THE PROGRAM WILL NOT OUTPUT ANY SECTION RECONSTRUCTED BY Fixup

 SUMMATION UNLESS THE CORRESPONDING SECTION (MT NUMBER) IS Fixup

 PRESENT IN THE ORIGINAL EVALUATION OR USER INPUT INDICATES Fixup

 SHOULD BE CREATED AND OUTPUT. THIS IS (A) BECAUSE THE Fixup

 PROGRAM CANNOT DEFINE THE PARAMETERS TO APPEAR ON THE FIRST Fixup

 TWO LINES OF THE SECTION, (B) TO AVOID OUTPUTTING TOO MUCH Fixup

 DATA WHICH THE USER MAY NOT BE INTERESTED IN. Fixup

 Fixup

 (2) FOR ANY SECTIONS THAT DO NOT APPEAR IN THE ORIGINAL DATA THE Fixup

 USER MAY SPECIFY THAT THEY BE DEFINED BY SUMMATION. ANY SUCH Fixup

 SECTION MAY BE USED BE DEFINE SUBSEQUENT SUMS, BUT THE SECTION Fixup

 ITSELF WILL NOT BE OUTPUT (E.G. GENERALLY MT=27 AND 101 ARE Fixup

 NOT PRESENT IN EVALUATIONS. HOWEVER, THE BUILT-IN SUMMATION Fixup

 RULES OF THIS PROGRAM USES THE ENDF SUMMATION RULES TO Fixup

 DEFINE MT=27 AND 101, WHICH IN TURN ARE USED TO DEFINE THE Fixup

 NON-ELASTIC CROSS SECTION, MT=3. SECTIONS MT=27 AND 101 ARE Fixup

 NOT OUTPUT). Fixup

 Fixup

 (3) ALL DATA IN FILE 3 AND 23 MUST BE LINEARLY INTERPOLABLE. IF Fixup

 THE DATA IS NOT LINEARLY INTERPOLABLE THIS PROGRAM WILL Fixup

 TERMINATE. Fixup

 Fixup

 PROGRAM OPERATION Fixup

 ================= Fixup

 ALL MAT NUMBER ON AN ENDF TAPE ARE PROCESSED. EACH MAT IS Fixup

 TREATED SEPARATELY. WITHIN EACH MAT, EACH SECTION BEFORE MF=3 Fixup

 IS READ, CHECKED/CORRECTED (BASED ON INPUT OPTIONS) AND OUTPUT. Fixup

 WHEN MF=3 IS LOCATED ALL CROSS SECTIONS ARE READ, SECTIONS TO BE Fixup

 DELETED ARE DELETED, SECTIONS WHICH ARE NOT PRESENTED AND USER Fixup

 INPUT INDICATES SHOULD BE CREATED ARE CREATE, SECTIONS TO BE KEPT Fixup

 ARE CHECKED/CORRECTED (BASED ON INPUT OPTIONS) AND WRITTEN TO A Fixup

 SCRATCH FILE. NEXT, IF THE USER SPECIFIES THAT THEY SHOULD, Fixup

 SECTIONS ARE RECONSTRUCTED. FINALLY ALL CROSS SECTIONS (OLD AND Fixup

 NEW) ARE OUTPUT. WITHIN THE SAME MAT, EACH SECTION AFTER MF=3 IS Fixup

 READ, CHECKED/CORRECTED (BASED ON INPUT OPTIONS) AND OUTPUT. Fixup

 Fixup

 MF=3 Fixup

 ==== Fixup

 THE TREATMENT OF THE CROSS SECTIONS REQUIRES UP TO 4 PASSES FOR Fixup

 CROSS SECTIONS. IN THE PROGRAM THEY CORRESPOND TO SUBROUTINES Fixup

 PASS1, PASS2, PASS3 AND PASS4. THE ORIGINAL AND FINAL ENDF DATA Fixup

 FILES, 5 SCRATCH FILES AND 3 IN CORE ARRAYS ARE USED. OPERATIONS Fixup

 PERFORMED DURING EACH PASS ARE, Fixup

 Fixup

 PASS1 Fixup

 ===== Fixup

 READ ALL CROSS SECTIONS FROM ITAPE. DELETED ANY SECTIONS. CREATE Fixup

 ANY SECTIONS. CHECK/CORRECT THEM AND WRITE THEM TO SCRATCH FILE. Fixup

 DATA IS READ INTO ARRAY A, TRANSFERRED TO ARRAY C (AFTER EDITING) Fixup

 AND OUTPUT TO ISCRC FROM ARRAY C. Fixup

 ITAPE - UNIT ORIGINAL ENDF DATA IS READ FROM. Fixup

 ISCRC - SCRATCH UNIT THAT EDITED DATA IS WRITTEN ON. Fixup

 TABA - ARRAY INTO WHICH ORIGINAL DATA IS READ. Fixup

 TABC - ARRAY INTO WHICH EDITED DATA IS TRANSFERRED TO AND Fixup

 FROM WHICH IT IS WRITTEN TO ISCRC. Fixup

 Fixup

 PASS2 Fixup

 ===== Fixup

 IF A UNIFORM ENERGY GRID IS REQUESTED IT IS CREATED DURING THIS Fixup

 PASS. FIRST ALL OF THE CROSS SECTIONS FROM PASS1 ARE READ AND A Fixup

 UNIFORM ENERGY GRID IS CREATED = ALL ENERGIES THAT ARE INCLUDED Fixup

 IN AT LEAST ONE SECTION (MT) OF CROSS SECTIONS. Fixup

 ISCRA - SCRATCH UNIT CONTAINING UNIFORM ENERGY GRID. Fixup

 ISCRB - SCRATCH UNIT CONTAINING UNIFORM ENERGY GRID. Fixup

 ISCRC - SCRATCH UNIT THAT EDITED DATA IS READ FROM. Fixup

 TABA - ARRAY CONTAINING UNIFORM ENERGY GRID. Fixup

 TABB - ARRAY CONTAINING UNIFORM ENERGY GRID. Fixup

 TABC - ARRAY CONTAINING EDITED DATA. Fixup

 Fixup

 THE UNIFORM ENERGY GRID ENDS UP ON ISCRB. NEXT EACH SECTION OF Fixup

 CROSS SECTIONS FROM PASS1 IS READ FROM ISCRC, INTERPOLATED TO Fixup

 THE UNIFORM ENERGY GRID AND OUTPUT TO ISCRA. FINALLY ISCRA AND Fixup

 ISCRC ARE SWITCH, SO THAT AT THE END OF THIS PASS THE DATA WILL Fixup

 AGAIN BE ON ISCRC (EXACTLY AS AT THE END OF PASS1), WITH UPDATED Fixup

 POINT COUNTS. Fixup

 ISCRA - SCRATCH UNIT THAT UNIFORM ENERGY GRID DATA IS WRITTEN ON. Fixup

 ISCRB - SCRATCH UNIT CONTAINING UNIFORM ENERGY GRID. Fixup

 ISCRC - SCRATCH UNIT THAT EDITED DATA IS READ FROM. Fixup

 TABA - ARRAY CONTAINING UNIFORM ENERGY GRID DATA. Fixup

 TABB - ARRAY CONTAINING UNIFORM ENERGY GRID. Fixup

 TABC - ARRAY CONTAINING EDITED DATA. Fixup

 Fixup

 PASS3 Fixup

 ===== Fixup

 SUMMATION CROSS SECTIONS ARE DEFINED BY READING DATA FROM ISCRC Fixup

 AND MERGING THEM ONTO ISCRA. THE FIRST SECTION THAT CONTRIBUTES Fixup

 TO A SUM IS MERELY COPIED FROM C TO A. IF MORE SECTIONS WILL Fixup

 CONTRIBUTE TO THE SUM THE DATA IN A IS TRANSFERRED TO B, A Fixup

 SECTION OF DATA FROM C IS ADDED TO THE DATA IN B AND STORED IN Fixup

 A. THE CYLE OF ADDED C AND B TO A, FOLLOWED BY MOVING A TO B Fixup

 IS CONTINUED UNTIL ALL CONTRIBUTING SECTIONS HAVE BEEN ADDED. Fixup

 THE SUM IS THEN COPIED FROM A TO D. IF NEWLY CONSTRUCTED SECTION Fixup

 IS REQUIRED FOR ANY LATER SUMMUATIONS IT IS ALSO COPIED TO E. Fixup

 THE CYCLE OF ADDED SECTIONS FROM C AND B TO A IS REPEATED FOR Fixup

 EACH REQUIRED SUMMATION REACTION. IN ADDITION TO SECTIONS FROM Fixup

 C, AFTER THE FIRST SUMMATION SECTIONS MAY ALSO BE ADDED TO A Fixup

 FROM E (THE CONTRIBUTION OF NEW RECONSTRUCTED CROSS SECTIONS). Fixup

 WHEN ALL REQUIRED SECTIONS HAVE BEEN RECONSTRUCTED THE NEW Fixup

 SECTIONS WILL BE ON E AND THE ORIGINAL SECTIONS ON C. Fixup

 ISCRC - SCRATCH FILE FROM WHICH ORIGINAL DATA IS READ. Fixup

 ISCRA - SCRATCH FILE ONTO WHICH SUM FOR ONE SECTION IS WRITTEN. Fixup

 ISCRD - SCRATCH FILE ONTO WHICH ALL SUM CROSS SECTIONS ARE Fixup

 WRITTEN. Fixup

 ISCRE - SCRATCH FILE ONTO WHICH ALL SUM CROSS SECTIONS WHICH Fixup

 ARE REQUIRED FOR LATER SUMS ARE WRITTEN. Fixup

 ISCRB - UTILITY SCRATCH FILE USED TO CREATE SUM CROSS SECTIONS. Fixup

 TABA - ARRAY INTO WHICH SUMS ARE WRITTEN. Fixup

 TABB - ARRAY INTO WHICH PARTIAL SUMS ARE WRITTEN. Fixup

 TABC - ARRAY INTO WHICH ORIGINAL DATA IS READ. Fixup

 Fixup

 PASS4 Fixup

 ===== Fixup

 CROSS SECTIONS ARE READ FROM ISCRC (ORIGINAL) AND ISCRD (NEW) Fixup

 AND ARE WRITTEN IN THE ENDF FORMAT ON OTAPE. THE BEGINNING OF Fixup

 EACH SECTION OF ORIGINAL DATA IS READ FROM ISCRC (TO DEFINE Fixup

 SECTION HEADER INFORMATION). IF THIS MT HAS NOT BEEN RECOSTRUCTED Fixup

 ON ISCRD THE ORIGINAL SECTION IS OUTPUT. IF THE SECTION HAS BEEN Fixup

 RECONSTRUCTED THE ORIGINAL SECTION IS SKIPPED AND THE NEW SECTION Fixup

 IS OUTPUT. Fixup

 OTAPE - OUTPUT DATA IN THE ENDF FORMAT. Fixup

 ISCRC - SCRATCH FILE FROM WHICH ORIGINAL DATA IS READ. Fixup

 ISCRD - SCRATCH FILE FROM WHICH NEW DATA IS READ. Fixup

 TABC - ARRAY INTO WHICH CROSS SECTIONS ARE READ FROM SCRATCH Fixup

 AND WRITTEN TO OTAPE Fixup

 Fixup

 I/O FILE DEFINITIONS Fixup

 ==================== Fixup

 UNIT DESCRIPTION Fixup

 ==== =========== Fixup

 2 INPUT PARAMETERS. Fixup

 3 OUTPUT REPORT. Fixup

 10 ORIGINAL DATA IN THE ENDF FORMAT. Fixup

 11 FINAL DATA IN THE ENDF FORMAT. Fixup

 12 SCRATCH FILE Fixup

 14 SCRATCH FILE Fixup

 15 SCRATCH FILE Fixup

 16 SCRATCH FILE Fixup

 17 SCRATCH FILE Fixup

 Fixup

 OPTIONAL STANDARD FILE NAMES (SEE SUBROUTINE FILIO1 AND FILIO2) Fixup

 =============================================================== Fixup

 UNIT FILE NAME FORMAT Fixup

 ==== ========== ====== Fixup

 2 FIXUP.INP BCD Fixup

 3 FIXUP.LST BCD Fixup

 10 ENDFB.IN BCD Fixup

 11 ENDFB.OUT BCD Fixup

 12-17 (SCRATCH) BINARY Fixup

 Fixup

 INPUT LINES Fixup

 =========== Fixup

 LINE COLUMNS FORMAT DESCRIPTION Fixup

 ==== ======= ====== =========== Fixup

 1 1-14 14I1 INPUT OPTIONS AS DESCRIBED ABOVE. Fixup

 EACH COLUMN OF THE INPUT LINE CONTROLS Fixup

 ONE OF THE TESTS/CORRECTIONS DESCRIBED Fixup

 ABOVE. TESTS/CORRECTION 1-14 (NOT ALL Fixup

 IMPLEMENTED YET) CORRESPOND TO COLUMNS Fixup

 1-14 OF THIS INPUT LINE AND ARE TREATED Fixup

 AS FOLLOWS, Fixup

 = 0 - DO NOT PERFORM TEST/CORRECTION. Fixup

 = 1 - PERFORM TEST/CORRECTION. Fixup

 FOR MT EXCLUSION FROM THRESHOLD TESTS Fixup

 (COLUMN 2), DELETION (COLUMN 4), OR Fixup

 SUMMATION (COLUMN 5) THE INPUT OPTION Fixup

 MAY BE, Fixup

 = 1 - READ RULES FROM INPUT Fixup

 = 2 - USE BUILT-IN RULES Fixup

 2 1-72 A72 ENDF INPUT DATA FILENAME Fixup

 (STANDARD OPTION = ENDFB.IN) Fixup

 3 1-72 A72 ENDF OUTPUT DATA FILENAME Fixup

 (STANDARD OPTION = ENDFB.OUT) Fixup

 4-M 1-5 FREE CHARACTER (S,D,T,R,\*) FOLLOWED BY BLANK OR Fixup

 FORM MT NUMBER Fixup

 - THE ALLOWED CHARACTERS ARE, Fixup

 - S OR BLANK = SUM (OR DIFFERENCES) Fixup

 - D = DELETE Fixup

 - T = NO THRESHOLD ENERGY CORRECTIONS Fixup

 - R = RATIO Fixup

 - \* = PRODUCT Fixup

 6-72 FREE UP TO 10 LOWER AND UPPER MT RANGES WHICH Fixup

 FORM WILL BE USED TO DEFINE THE RECONSTRUCTED Fixup

 CROSS SECTION OR TO DEFINE MT RANGES WHICH Fixup

 ARE EXCLUDED FROM THRESHOLD TESTS. Fixup

 Fixup

 EACH MT NUMBER IS DEFINED BY A CONTINUOUS Fixup

 STRING OF DIGITS, POSSIBILITY PRECEEDED BY Fixup

 A - (MINUS SIGN). EACH MT NUMBER MUST BE Fixup

 BLANK OR OTHERWISE (NOT A DIGIT) DELIMITED. Fixup

 Fixup

 COLUMNS 6-72 MAY CONTAIN STRINGS OF DIGITS Fixup

 THE FIRST DIGIT STRING OF EACH PAIR MAY BE Fixup

 PRECEEDED BY A - (MINUS SIGN). Fixup

 Fixup

 EACH LINE WILL BE INTERPRETED AS FOLLOWS, Fixup

 Fixup

 \*SUMMATION (OR DIFFERENCES) Fixup

 -------------------------- Fixup

 COLUMNS 1-5 = S OR BLANK FOLLOWED BY THE Fixup

 MT NUMBER TO BE DEFINED BY SUMMATION Fixup

 Fixup

 COLUMNS 6-72 = UP TO 10 MT RANGE (PAIRS OF Fixup

 MT NUMBERS) TO BE USED TO DEFINED THE SUM. Fixup

 IF THE FIRST MT NUMBER OF A PAIR IS Fixup

 NEGATIVE THE RANGE OF MT NUMBERS IS Fixup

 SUBTRACTED - AT LEAST ONE RANGE MUST BE Fixup

 SPECIFIED. Fixup

 Fixup

 \*DELETIONS Fixup

 --------- Fixup

 COLUMNS 1-5 = D FOLLOWED BY BLANKS Fixup

 Fixup

 COLUMNS 6-72 CONTAIN UP TO 10 MT RANGE Fixup

 (PAIRS OF MT NUMBERS), EACH RANGE DEFINING Fixup

 A RANGE OF MT NUMBERS TO BE DELETED - AT Fixup

 LEAST ONE RANGE MUST BE SPECIFIED. Fixup

 Fixup

 \*EXCLUSION FROM THRESHOLD TESTS Fixup

 ------------------------------ Fixup

 COLUMNS 1=5 = T FOLLOWED BY BLANKS Fixup

 Fixup

 COLUMNS 6-72 CONTAIN UP TO 10 MT RANGE Fixup

 (PAIRS OF MT NUMBERS), EACH RANGE DEFINING Fixup

 A RANGE OF MT NUMBERS WHOSE THRESHOLD Fixup

 ENERGY WILL NOT BE CHECKED - AT LEAST ONE Fixup

 RANGE MUST BE SPECIFIED. Fixup

 Fixup

 \*RATIO Fixup

 ----- Fixup

 COLUMNS 1-5 = R FOLLOWED BY THE MT NUMBER Fixup

 TO BE DEFINED BY A RATIO Fixup

 Fixup

 COLUMNS 6-72 CONTAINS 2 MT NUMBERS TO BE Fixup

 USED TO DEFINE THE RATIO. Fixup

 Fixup

 \*PRODUCT Fixup

 ----- Fixup

 COLUMNS 1-5 = \* FOLLOWED BY THE MT NUMBER Fixup

 TO BE DEFINED BY A PRODUCT Fixup

 Fixup

 COLUMNS 6-72 CONTAINS 2 MT NUMBERS TO BE Fixup

 USED TO DEFINE THE PRODUCT. Fixup

 Fixup

 CONVENTIONS Fixup

 ----------- Fixup

 \*UP TO 20 DELETIONS AND 20 SUMMATIONS OR Fixup

 RATIOS OR PRODUCTS MAY BE SPECIFIED. Fixup

 \*ONLY 1 EXCLUSION FROM THRESHOLD TESTS Fixup

 MAY BE SPECIFIED (THE 1 LINE MAY CONTAIN Fixup

 UP TO 10 MT RANGES TO EXCLUDE FROM TESTS). Fixup

 \*INPUT IS TERMINATED BY INPUTTNG 0 OR Fixup

 BLANK IN COLUMNS 1-72 (I.E. THE LAST Fixup

 INPUT LINE MUST BE BLANK). Fixup

 \*THE UPPER LIMIT OF EACH RANGE MUST BE AT Fixup

 LEAST AS BIG AS THE LOWER LIMIT (IN Fixup

 ABSOLUTE VALUE). Fixup

 \*FOR RECONSTRUCTION POSITIVE MT RANGES WILL Fixup

 BE ADDED TO THE SUM AND NEGATIVE MT RANGES Fixup

 WILL BE SUBTRACTED. Fixup

 \*IF INPUT OPTION 2 (FIRST INPUT LINE) IS Fixup

 0 THRESHOLD EXCLUSION IS NOT ALLOWED. Fixup

 \*IF INPUT OPTION 4 (FIRST INPUT LINE) IS Fixup

 0 DELETIONS ARE NOT ALLOWED. Fixup

 \*IF INPUT OPTION 5 (FIRST INPUT LINE) IS Fixup

 0 SUMMATIONS AND RATIOS ARE NOT ALLOWED. Fixup

 N-K IF THE USER SPECIFIES THAT SECTIONS WHICH Fixup

 ARE NOT PRESENT IN THE ORIGINAL EVALUATION Fixup

 MAY BE CREATED, TWO LINES MUST BE INPUT FOR Fixup

 EACH SECTION TO BE CREATED. THE TWO LINES Fixup

 DEFINE (C1, C2, L1 AND L2) FOR EACH OF THE Fixup

 FIRST TWO LINES OF THE SECTION TO BE Fixup

 CREATED. THE FIRST LINE ALSO DEFINES (MAT Fixup

 AND MT). (N1, N2) ARE ALWAYS ZERO ON THE Fixup

 FIRST LINE AND WILL BE CALCULATED BY THE Fixup

 PROGRAM FOR THE SECOND LINE. Fixup

 FIRST 1-11 E11.4 ZA OF SECTION TO BE CREATED Fixup

 LINE 12-22 E11.4 AWRE OF SECTION TO BE CREATED Fixup

 23-33 I11 L1 OF SECTION TO BE CREATED Fixup

 34-44 I11 L2 OF SECTION TO BE CREATED Fixup

 45-48 I4 MAT OF SECTION TO BE CREATED Fixup

 49-51 I3 MT OF SECTION TO BE CREATED Fixup

 SECOND 1-11 E11.4 C1 OF SECTION TO BE CREATED Fixup

 LINE 12-22 E11.4 C2 OF SECTION TO BE CREATED Fixup

 23-33 I11 L1 OF SECTION TO BE CREATED Fixup

 34-44 I11 L2 OF SECTION TO BE CREATED Fixup

 \*PAIRS OF LINES MAY BE IN ANY MAT/MT ORDER Fixup

 (E.G., THEY NEED NOT BE IN ASCENDING Fixup

 MAT/MT ORDER). Fixup

 \*UP TO 50 PAIRS OF LINES MAY BE USED TO Fixup

 DEFINE SECTIONS TO BE CREATED. THE LIST Fixup

 IS TERMINATED WHEN THE FIRST LINE OF A Fixup

 PAIR CONTAINS A ZERO (OR BLANK) MAT AND/OR Fixup

 MT. Fixup

 M-N IF THE USER SPECIFIES THAT ENERGIES WHICH Fixup

 ARE NOT PRESENT IN THE ORIGINAL EVALUATION Fixup

 MAY BE INSERTED, ONE LINE MUST BE INPUT FOR Fixup

 EACH ENERGY TO BE INSERTED. Fixup

 1-11 E11.4 ENERGY TO BE INSERTED Fixup

 12-15 I4 MAT IN WHICH TO INSERT ENERGY = 0 = ALL Fixup

 16-18 I3 MT IN WHICH TO INSERT ENERGY = 0 = ALL Fixup

 \*UP TO 50 (ENERGY, MAT, MT) LINES MAY BE Fixup

 USED. THE LIST IS TERMINATED BY A BLANK Fixup

 LINE. Fixup

 \*INPUT MAY BE IN ANY (ENERGY, MAT, MT) Fixup

 ORDER. Fixup

 \*ENERGY POINTS CAN ONLY BE INSERTED WITHIN Fixup

 THE ORIGINAL ENERGY RANGE OF A SECTION - Fixup

 THIS OPTION CANNOT BE USED TO EXTEND THE Fixup

 CROSS SECTION EITHER BELOW OR ABOVE THE Fixup

 ORIGINAL TABULATED ENERGY RANGE. Fixup

 Fixup

 EXAMPLE INPUT NO. 1 Fixup

 =================== Fixup

 (1) USE OPTIONS 1-11 (ALL OPTIONS, EXCEPT INSERT ENERGY POINTS) Fixup

 (2) DELETE MT=900 (FOR EXAMPLE PURPOSES ONLY) Fixup

 (3) DEFINE THE FOLLOWING MT NUMBERS TO BE RECONSTRUCTED, Fixup

 (MT= 4) = THE SUM OF MT= 51 THROUGH 91 Fixup

 (MT=103) = THE SUM OF MT=700 THROUGH 718 (NOT 719) Fixup

 (MT=104) = THE SUM OF MT=720 THROUGH 738 (NOT 739) Fixup

 (MT=105) = THE SUM OF MT=740 THROUGH 758 (NOT 759) Fixup

 (MT=106) = THE SUM OF MT=760 THROUGH 778 (NOT 779) Fixup

 (MT=107) = THE SUM OF MT=780 THROUGH 798 (NOT 799) Fixup

 NEW (MT= 16) = THE SUM OF MT=875 THROUGH 891 Fixup

 (MT=101) = THE SUM OF MT=102 THROUGH 114 Fixup

 (MT= 18) = (MT=19) + (MT=20 AND 21) + (MT=38) Fixup

 (IF TOTAL FISSION, MT=18, IS NOT PRESENT, DEFINE Fixup

 IT BY SUMMING FIRST, SECOND, ETC. CHANCE - NOTE Fixup

 THAT THIS MUST BE DONE IN THIS ORDER, SINCE THE Fixup

 NEXT SUM INVOLVES USING MT=18. Fixup

 (MT= 27) = THE SUM OF MT= 18 AND 101 Fixup

 (MT=101 RECONSTRUCTED ABOVE USED IN SUM). Fixup

 (MT= 3) = THE SUM OF (MT=4)+(MT=6-9)+(MT=16-17)+(MT=22-37)+ Fixup

 (MT=41-45) Fixup

 (MT=4 AND 27 RECONSTRUCTED ABOVE USED IN SUM). Fixup

 (MT= 19) = (MT=18) - (MT=20 AND 21) - (MT=38) Fixup

 (DEFINE FIRST CHANGE FISSION BY SUBTRACTION TO Fixup

 ALLOW RESONANCE CONTRIBUTION FROM MT=18 TO BE Fixup

 INCLUDED IN MT=19). Fixup

 (MT= 1) = THE SUM OF MT=2 AND 3 Fixup

 (MT=3 RECONSTRUCTED ABOVE USED IN SUM). Fixup

 (4) THRESHOLD ENERGIES OF THE FOLLOWING MT NUMBERS WILL NOT BE Fixup

 TESTED OR CORRECTED. Fixup

 MT=1, 4, 18, 19, 91, 103 THROUGH 114. Fixup

 (5) DEFINE MT=254 TO BE THE CAPTURE TO FISSION RATIO (MT=102/18) Fixup

 (6) CREATE MAT=1300/MT=254 - NOTE, THIS IS NECESSARY IN ORDER TO Fixup

 HAVE THE CAPTURE TO FISSION RATIO OUTPUT IN THE ENDF FORMAT Fixup

 Fixup

 NOTE, ON THE FOLLOWING INPUT LINES THE CHARACTERS = ( ) + , HAVE Fixup

 BEEN USED ONLY TO MAKE THE INPUT MORE READABLE - THESE CHARACTERS Fixup

 WILL BE SKIPPED BY THE PROGRAM IN READING INPUT - THE RESULTS Fixup

 WOULD BE THE SAME IF THESE CHARACTERS WERE OMITTED, AS LONG AS Fixup

 ALL OF THE MT NUMBERS ARE DELIMITED, I.E., THERE IS AT LEAST ONE Fixup

 NON-DIGITAL CHARACTER BETWEEN MT NUMBERS. NOTE, THAT - (MINUS Fixup

 SIGN) IS IMPORTANT AND IS USED DURING INPUT TO DEFINE MT RANGES Fixup

 WHICH SHOULD BE SUBTRACTED, E.,G., SEE THE DEFINITION OF MT=19. Fixup

 Fixup

 READ FILE /ENDFB6/K300/LEAD.IN AND WRITE /ENDFB6/K300/LEAD.OUT Fixup

 Fixup

 THE FOLLOWING 21 INPUT LINES ARE REQUIRED. Fixup

 Fixup

 11111111111 Fixup

 /ENDFB6/K300/LEAD.IN Fixup

 /ENDFB6/K300/LEAD.OUT Fixup

 D900 Fixup

 4=( 51, 91) Fixup

 103=(700,718) Fixup

 104=(720,738) Fixup

 105=(740,758) Fixup

 106=(760,778) Fixup

 107=(780,798) Fixup

 16=(875,891) Fixup

 101=(102,114) Fixup

 18=( 19, 19)+( 20, 21)+( 38, 38) Fixup

 27=( 18, 18)+(101,101) Fixup

 3=( 4, 4)+( 6, 9)+( 16, 17)+( 22, 37)+( 41, 45) Fixup

 19=( 18, 18)-( 20, 21)-( 38, 38) Fixup

 1=( 2, 3) Fixup

 T ( 1, 1)+( 4, 4)+( 18, 18)+( 91, 91)+(103,114) Fixup

 R254=(102/ 18) Fixup

 (BLANK LINE TO TERMINATE SUMMATION/DELETION RULES) Fixup

 2.00400+ 3 0.00000+ 0 0 01300254 Fixup

 0.00000+ 0 0.00000+ 0 0 0 Fixup

 (BLANK LINE TO TERMINATE SECTION CREATION RULES) Fixup

 Fixup

 NOTE, THE DELETION AND THRESHOLD EXCLUSION LINES MAY APPEAR IN Fixup

 IN ANY ORDER. HOWEVER, SUMMATION AND RATIO RULES MUST APPEAR IN Fixup

 THE ORDER IN WHICH YOU WANT THEM TO BE EXECUTED - E.G., THE Fixup

 ABOVE INPUT WILL FIRST RECONSTRUCT MT=4, WHICH CAN THEN BE USED Fixup

 TO CONTRIBUTE TO THE FOLLOWING SUM TO DEFINE MT=3, WHICH IN TURN Fixup

 CAN THEN BE USED TO CONTRIBUTE TO THE FOLLOWING SUM TO DEFINE Fixup

 MT=1. IF THE ORDER OF THE INPUT LINES IS CHANGED SUCH THAT MT=3 Fixup

 IS RECONSTRUCTED BEFORE MT=4, THE ORIGINAL MT=4 WILL BE USED IN Fixup

 THE SUMMATION TO DEFINE MT=3. THE SAME RULES APPLY TO CALCULATING Fixup

 RATIOS, IF EITHER THE NUMERATOR OR DENOMINATOR IS TO BE DEFINED Fixup

 BY SUMMATION, THIS SHOULD BE DONE BEFORE DEFINING THE RATIO BY Fixup

 INPUT PARAMETERS. Fixup

 Fixup

 EXAMPLE INPUT NO. 2 Fixup

 =================== Fixup

 (1) USE OPTIONS 1-11 (ALL OPTIONS, EXCEPT INSERT ENERGY POINTS) Fixup

 (2) USE BUILT-IN TABLES FOR SUMMATION/DELETION/THRESHOLD EXCLUSION Fixup

 (THIS ONLY REQUIRES COLUMNS 2, 4 AND 5 TO BE SET =2 ON THE Fixup

 FIRST INPUT LINE. THE BUILT-IN RULES EXACTLY CORRESPOND TO Fixup

 THE INPUT ABOVE UNDER EXAMPLE NO. 1, EXCEPT THAT NO MT NUMBERS Fixup

 WILL BE DELETED. Fixup

 (3) IF NOT PRESENT, CREATE MAT=1300/MT=1 Fixup

 Fixup

 USE THE STANDARD FILE NAMES ENDFB.IN AND ENDFB.OUT (THIS CAN BE Fixup

 DONE BY LEAVING THE SECOND AND THIRD INPUT LINES BLANK). Fixup

 Fixup

 THE FOLLOWING 6 INPUT LINES ARE REQUIRED. Fixup

 Fixup

 12122111111 Fixup

 Fixup

 Fixup

 2.00400+ 3 0.00000+ 0 0 01300 1 Fixup

 0.00000+ 0 0.00000+ 0 0 0 Fixup

 (BLANK LINE TO TERMINATE SECTION CREATION RULES) Fixup

 Fixup

 EXAMPLE INPUT NO. 3 Fixup

 =================== Fixup

 (1) USE OPTIONS 1-10 (ALL OPTIONS PRESENTLY IMPLEMENTED, EXCEPT Fixup

 DO NOT ALLOW SECTION CREATION AND INSERT ENERGY POINTS). Fixup

 (2) USE BUILT-IN TABLES FOR SUMMATION/DELETION/THRESHOLD EXCLUSION Fixup

 (THIS ONLY REQUIRES COLUMNS 2, 4 AND 5 TO BE SET =2 ON THE Fixup

 FIRST INPUT LINE. THE BUILT-IN RULES EXACTLY CORRESPOND TO Fixup

 THE INPUT ABOVE UNDER EXAMPLE NO. 1, EXCEPT THAT NO MT NUMBERS Fixup

 WILL BE DELETED. Fixup

 (3) DO NOT CREATE ANY SECTIONS. Fixup

 Fixup

 READ FILE /ENDFB6/K300/LEAD.IN AND WRITE /ENDFB6/K300/LEAD.OUT Fixup

 Fixup

 THE FOLLOWING 3 INPUT LINES ARE REQUIRED. Fixup

 Fixup

 1212211111 Fixup

 /ENDFB6/K300/LEAD.IN Fixup

 /ENDFB6/K300/LEAD.OUT Fixup

 Fixup

 EXAMPLE INPUT NO. 4 Fixup

 =================== Fixup

 SAME AS EXAMPLE NO. 3, ABOVE, EXCEPT INSERT AN ENERGY POINT AT Fixup

 THERMAL FOR ALL REACTIONS WHICH SPAN THE THERMAL ENERGY RANGE. Fixup

 Fixup

 USE THE STANDARD FILE NAMES ENDFB.IN AND ENDFB.OUT (THIS CAN BE Fixup

 DONE BY LEAVING THE SECOND AND THIRD INPUT LINES BLANK). Fixup

 Fixup

 THE FOLLOWING 5 INPUT LINES ARE REQUIRED. Fixup

 Fixup

 121221111101 Fixup

 Fixup

 Fixup

 2.53000- 2 0 0 Fixup

 (BLANK LINE TO TERMINATE ENERGY INSERTS) Fixup

 Fixup

 WARNING Fixup

 ======= Fixup

 ALTHOUGH THIS PROGRAM IS DESIGNED TO ALLOW REACTIONS TO BE DEFINED Fixup

 BY ADDING OR SUBTRACTING REACTIONS THE USER SHOULD ALWAYS TRY TO Fixup

 DEFINE REACTIONS BY SUMMING TO AVOID NEGATIVE CROSS SECTIONS. FOR Fixup

 EXAMPLE, IT IS POSSIBLE TO CALCULATE MT=3 AND DEFINE MT=1 AS THE Fixup

 SUM OF MT=2 AND 3 (THE RECOMMENDED APPROACH AS USED IN THE ABOVE Fixup

 INPUT). ALTERATIVELY IT IS POSSIBLE TO CALCULATE MT=1 AND DEFINE Fixup

 MT=3 AS MT=1 MINUS MT=2 (THIS APPROACH IS NOT RECOMMENDED). Fixup

 Fixup

 THE ONLY BUILT-IN SUMMATION RULE THAT USES SUBTRACTION IS THE Fixup

 CALCULATION OF THE FIRST CHANGE FISSION (MT=19) AS THE TOTAL Fixup

 FISSION (MT=18) MINUS THE SECOND, THIRD AND FOURTH CHANGE FISSION Fixup

 (MT=20, 21, 38). THIS HAS BEEN DONE TO ALLOW THE RESONANCE Fixup

 CONTRIBUTION, CALCULATED BY MANY CODES AND INCLUDED IN MT=18, Fixup

 TO BE CONSISTENTLY INCLUDED IN THE FIRST CHANCE FISSION. Fixup

 Fixup

 ======================================================================= Fixup