**=======================================================================SPECTRA**

 **SPECTRA**

 **PROGRAM SPECTRA SPECTRA**

 **=============== SPECTRA**

 **An extension of LINEAR to linearize ALl MF=5 spectra. SPECTRA**

 **2012/05/28 - Added MF=15 neutron induced, photon spectra. SPECTRA**

 **2021/01/26 - MF=6 Still NOT Implemented SPECTRA**

 **SPECTRA**

 **First released in 2010 - Earlier below dates refer to LINEAR. SPECTRA**

 **SPECTRA**

 **VERSION 74-1 (MAY 1974) SPECTRA**

 **VERSION 75-1 (APRIL 1975) SPECTRA**

 **VERSION 76-2 (OCTOBER 1976) SPECTRA**

 **VERSION 77-1 (JANUARY 1977) SPECTRA**

 **VERSION 78-1 (JULY 1978) SPECTRA**

 **VERSION 79-1 (JULY 1979) CDC-7600 AND CRAY-1 VERSION. SPECTRA**

 **VERSION 80-1 (MAY 1980) IBM, CDC AND CRAY VERSION. SPECTRA**

 **VERSION 80-2 (DECEMBER 1980) SPECTRA**

 **VERSION 81-1 (MARCH 1981) SPECTRA**

 **VERSION 82-1 (JANUARY 1982) IMPROVED COMPUTER COMPATIBILITY. SPECTRA**

 **VERSION 83-1 (JANUARY 1983) \*MAJOR RE-DESIGN. SPECTRA**

 **\*PAGE SIZE INCREASED - 1002 TO 3006. SPECTRA**

 **\*ELIMINATED COMPUTER DEPENDENT CODING.SPECTRA**

 **\*NEW, MORE COMPATIBLE I/O UNIT NUMBER.SPECTRA**

 **\*ADDED OPTION TO KEEP ALL ORIGINAL SPECTRA**

 **ENERGY POINTS FROM EVALUATION. SPECTRA**

 **\*ADDED STANDARD ALLOWABLE ERROR OPTIONSPECTRA**

 **(CURRENTLY 0.1 PER-CENT). SPECTRA**

 **VERSION 83-2 (OCTOBER 1983) IMPROVED BASED ON USER COMMENTS. SPECTRA**

 **VERSION 84-1 (APRIL 1984) IMPROVED BASED ON USER COMMENTS. SPECTRA**

 **VERSION 84-2 (JUNE 1984) \*UPDATED FOR ENDF/B-VI FORMATS. SPECTRA**

 **\*SPECIAL I/O ROUTINES TO GUARANTEE SPECTRA**

 **ACCURACY OF ENERGY. SPECTRA**

 **\*DOUBLE PRECISION TREATMENT OF ENERGY SPECTRA**

 **(REQUIRED FOR NARROW RESONANCES). SPECTRA**

 **VERSION 85-1 (AUGUST 1985) \*FORTRAN-77/H VERSION SPECTRA**

 **VERSION 86-1 (JANUARY 1986)\*ENDF/B-VI FORMAT SPECTRA**

 **VERSION 87-1 (JANUARY 1987)\*DOUBLE PRECISION TREATMENT OF CROSS SPECTRA**

 **SECTION SPECTRA**

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

 **FILE NAMES (SEE, SUBROUTINE FILEIO SPECTRA**

 **FOR DETAILS). SPECTRA**

 **\*IMPROVED BASED ON USER COMMENTS. SPECTRA**

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

 **INSURE PROGRAM WILL NOT DO ANYTHING SPECTRA**

 **CRAZY. SPECTRA**

 **\*UPDATED TO USE NEW PROGRAM CONVERT SPECTRA**

 **KEYWORDS. SPECTRA**

 **\*ADDED LIVERMORE CIVIC COMPILER SPECTRA**

 **CONVENTIONS. SPECTRA**

 **VERSION 90-1 (JUNE 1990) \*EXTENDED TO LINEARIZE PHOTON SPECTRA**

 **INTERACTION DATA, MF=23 AND 27 SPECTRA**

 **\*ADDED FORTRAN SAVE OPTION SPECTRA**

 **\*UPDATED BASED ON USER COMMENTS. SPECTRA**

 **\*NEW MORE CONSISTENT ENERGY OUTPUT SPECTRA**

 **ROUTINE. SPECTRA**

 **\*WARNING...INPUT PARAMETER FORMAT SPECTRA**

 **HAS BEEN CHANGED...SEE DESCRIPTION SPECTRA**

 **BELOW. SPECTRA**

 **VERSION 91-1 (JULY 1991) \*ADDED INTERPOLATION LAW 6 - ONLY USED SPECTRA**

 **FOR CHARGED PARTICLE CROSS SECTIONS SPECTRA**

 **FOR COULOMB PENETRABILITIES. SPECTRA**

 **VERSION 92-1 (JANUARY 1992)\*ADDED NU-BAR (TOTAL, DELAYED, PROMPT) SPECTRA**

 **POLYNOMIAL OR TABULATED ALL CONVERTED SPECTRA**

 **TO LINEARLY INTERPOLABLE SPECTRA**

 **\*INCREASED PAGE SIZE FROM 3006 TO 5010 SPECTRA**

 **POINTS. SPECTRA**

 **\*ALL ENERGIES INTERNALLY ROUNDED PRIOR SPECTRA**

 **TO CALCULATIONS. SPECTRA**

 **\*COMPLETELY CONSISTENT I/O AND ROUNDINGSPECTRA**

 **ROUTINES - TO MINIMIZE COMPUTER SPECTRA**

 **DEPENDENCE. SPECTRA**

 **VERSION 92-2 (JULY 1992) \*CORRECTED CONVERSION OF NU-BAR FROM SPECTRA**

 **POLYNOMIAL TO TABULATED - COPY SPECTRA**

 **SPONTANEOUS NU-BAR (BY DEFINITION SPECTRA**

 **THE SPONTANEOUS NU-BAR IS NOT AN SPECTRA**

 **ENERGY DEPENDENT QUANTITY). SPECTRA**

 **VERSION 93-1 (MARCH 1993) \*UPDATED FOR USE WITH LAHEY COMPILER SPECTRA**

 **ON IBM-PCS. SPECTRA**

 **\*INCREASED PAGE SIZE FROM 5010 TO SPECTRA**

 **30000 POINTS SPECTRA**

 **VERSION 94-1 (JANUARY 1994)\*VARIABLE ENDF/B DATA FILENAMES SPECTRA**

 **TO ALLOW ACCESS TO FILE STRUCTURES SPECTRA**

 **(WARNING - INPUT PARAMETER FORMAT SPECTRA**

 **HAS BEEN CHANGED) SPECTRA**

 **\*CLOSE ALL FILES BEFORE TERMINATING SPECTRA**

 **(SEE, SUBROUTINE ENDIT) SPECTRA**

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

 **\*IMPROVED COMPUTER INDEPENDENCE SPECTRA**

 **\*ALL DOUBLE PRECISION SPECTRA**

 **\*ON SCREEN OUTPUT SPECTRA**

 **\*UNIFORM TREATMENT OF ENDF/B I/O SPECTRA**

 **\*IMPROVED OUTPUT PRECISION SPECTRA**

 **\*DEFINED SCRATCH FILE NAMES SPECTRA**

 **\*ALWAYS INCLUDE THERMAL VALUE SPECTRA**

 **\*INCREASED PAGE SIZE FROM 30000 TO SPECTRA**

 **60000 POINTS SPECTRA**

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

 **POINT READ FOR MORE DIGITS SPECTRA**

 **\*UPDATED TEST FOR ENDF/B FORMAT SPECTRA**

 **VERSION BASED ON RECENT FORMAT CHANGESPECTRA**

 **\*GENERAL IMPROVEMENTS BASED ON SPECTRA**

 **USER FEEDBACK SPECTRA**

 **VERSION 99-2 (JUNE 1999) \*ASSUME ENDF/B-VI, NOT V, IF MISSING SPECTRA**

 **MF=1, MT-451. SPECTRA**

 **VERS. 2000-1 (FEBRUARY 2000)\*ADDED MF = 9 AND 10 LINEARIZATION SPECTRA**

 **\*GENERAL IMPROVEMENTS BASED ON SPECTRA**

 **USER FEEDBACK SPECTRA**

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

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

 **VERS. 2005-1 (JAN. 2005) \*ALWAYS KEEP ORIGINAL TABULATED SPECTRA**

 **NU-BAR POINTS. SPECTRA**

 **VERS. 2006-1 (FEB. 2006) \*CORRECTED INT=6 NEAR THRESHOLD SPECTRA**

 **\*NO SUBDIVIDE BELOW MINIMUM XCMIN SPECTRA**

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

 **\*INCREASED PAGE SIZE FROM 60,000 TO SPECTRA**

 **600,000 POINTS SPECTRA**

 **VERS. 2010-1 (JUNE 2010) \*ADDED MF = 5 - MF = 6 STILL PLANNED. SPECTRA**

 **\*72 CHARACTER FILE NAMES. SPECTRA**

 **\*ONLY PROCESS MF=5 - SKIP ALL OTHERS SPECTRA**

 **TO PREVENT CONFLICT WITH LINEAR SPECTRA**

 **THINNING. SPECTRA**

 **VERS. 2012-1 (Aug. 2012) \*Added MF=15, neutron induced photon SPECTRA**

 **spectra. SPECTRA**

 **\*Added CODENAME SPECTRA**

 **\*32 and 64 bit Compatible SPECTRA**

 **\*Added ERROR stop SPECTRA**

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

 **\*Replaced ALL 3 way IF Statements. SPECTRA**

 **\*Corrected MF=15 Data - it was adding SPECTRA**

 **SEND between sub-sections. SPECTRA**

 **\*Deleted unused parts, e.g., NUBAR. SPECTRA**

 **VERS. 2017-1 (May 2017) \*Increased page size to 3,000,000 SPECTRA**

 **\*Updated based on user feedback SPECTRA**

 **\*Changed DGAMMA to REDGAMMA to avoid SPECTRA**

 **conflict with possble RESERVED NAME SPECTRA**

 **\*All floating input parameters changedSPECTRA**

 **to character input + IN9 conversion. SPECTRA**

 **VERS. 2018-1 (Jan. 2018) \*On-line output for ALL ENDERROR SPECTRA**

 **VERS. 2019-1 (June 2019) \*Additional Interpolation Law Tests SPECTRA**

 **\*Check Maximum Tabulated Energy to SPECTRA**

 **insure it is the same for all MTs - SPECTRA**

 **if not, print WARNING messages. SPECTRA**

 **\*Corrected END Histogram linearized - SPECTRA**

 **Previously deleted last point - ERRORSPECTRA**

 **to assume this has Y=0 - now keep SPECTRA**

 **point, but insure Y = 0. SPECTRA**

 **VERS. 2020-1 (Mar. 2020) \*Added Target Isomer State SPECTRA**

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

 **VERS. 2023-1 (Feb. 2023) \*Decreased page size from 3,000,000 SPECTRA**

 **to 120,000 SPECTRA**

 **SPECTRA**

 **OWNED, MAINTAINED AND DISTRIBUTED BY SPECTRA**

 **------------------------------------ SPECTRA**

 **THE NUCLEAR DATA SECTION SPECTRA**

 **INTERNATIONAL ATOMIC ENERGY AGENCY SPECTRA**

 **P.O. BOX 100 SPECTRA**

 **A-1400, VIENNA, AUSTRIA SPECTRA**

 **EUROPE SPECTRA**

 **SPECTRA**

 **ORIGINALLY WRITTEN BY SPECTRA**

 **------------------------------------ SPECTRA**

 **Dermott E. Cullen SPECTRA**

 **SPECTRA**

 **PRESENT CONTACT INFORMATION SPECTRA**

 **--------------------------- SPECTRA**

 **Dermott E. Cullen SPECTRA**

 **1466 Hudson Way SPECTRA**

 **Livermore, CA 94550 SPECTRA**

 **U.S.A. SPECTRA**

 **Telephone 925-443-1911 SPECTRA**

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

 **Website RedCullen1.net/HOMEPAGE.NEW SPECTRA**

 **SPECTRA**

 **AUTHORS MESSAGE SPECTRA**

 **--------------- SPECTRA**

 **THE REPORT DESCRIBED ABOVE IS THE LATEST PUBLISHED DOCUMENTATION SPECTRA**

 **FOR THIS PROGRAM. HOWEVER, THE COMMENTS BELOW SHOULD BE CONSIDEREDSPECTRA**

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

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

 **SPECTRA**

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

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

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

 **IT WOULD BE APPECIATED IF YOU WOULD NOTIFY THE AUTHOR OF ANY SPECTRA**

 **COMPILER DIAGNOSTICS, OPERATING PROBLEMS OR SUGGESTIONS ON HOW TO SPECTRA**

 **IMPROVE THIS PROGRAM. HOPEFULLY, IN THIS WAY FUTURE VERSIONS OF SPECTRA**

 **THIS PROGRAM WILL BE COMPLETELY COMPATIBLE FOR USE ON YOUR SPECTRA**

 **COMPUTER. SPECTRA**

 **SPECTRA**

 **PURPOSE SPECTRA**

 **------- SPECTRA**

 **THIS PROGRAM IS DESIGNED TO CONVERT ENDF/B FILE 3, 23 AND 27 DATA SPECTRA**

 **TO LINEAR-LINEAR INTERPOLABLE FORM. ANY SECTION THAT IS ALREADY SPECTRA**

 **LINEAR-LINEAR INTERPOLABLE WILL BE THINNED. SPECTRA**

 **SPECTRA**

 **IN THE FOLLOWING DISCUSSION FOR SIMPLICITY THE ENDF/B TERMINOLOGY SPECTRA**

 **---ENDF/B TAPE---WILL BE USED. IN FACT THE ACTUAL MEDIUM MAY BE SPECTRA**

 **TAPE, CARDS, DISK OR ANY OTHER MEDIUM. SPECTRA**

 **SPECTRA**

 **ENDF/B FORMAT SPECTRA**

 **------------- SPECTRA**

 **THIS PROGRAM ONLY USES THE ENDF/B BCD OR CARD IMAGE FORMAT (AS SPECTRA**

 **OPPOSED TO THE BINARY FORMAT) AND CAN HANDLE DATA IN ANY VERSION SPECTRA**

 **OF THE ENDF/B FORMAT (I.E., ENDF/B-I, II,III, IV, V OR VI FORMAT).SPECTRA**

 **SPECTRA**

 **IT IS ASSUMED THAT THE DATA IS CORRECTLY CODED IN THE ENDF/B SPECTRA**

 **FORMAT AND NO ERROR CHECKING IS PERFORMED. IN PARTICULAR IT IS SPECTRA**

 **ASSUMED THAT THE MAT, MF AND MT ON EACH LINE IS CORRECT. SEQUENCE SPECTRA**

 **NUMBERS (COLUMNS 76-80) ARE IGNORED ON INPUT, BUT WILL BE SPECTRA**

 **CORRECTLY OUTPUT ON ALL LINES. THE FORMAT OF SECTION MF=1, MT=451 SPECTRA**

 **AND ALL SECTIONS OF MF=3 MUST BE CORRECT. THE PROGRAM COPIES ALL SPECTRA**

 **OTHER SECTION OF DATA AS HOLLERITH AND AS SUCH IS INSENSITIVE TO SPECTRA**

 **THE CORRECTNESS OR INCORRECTNESS OF ALL OTHER SECTIONS. SPECTRA**

 **SPECTRA**

 **OUTPUT FORMAT SPECTRA**

 **------------- SPECTRA**

 **IN THIS VERSION OF LINEAR ALL ENERGIES WILL BE OUTPUT IN SPECTRA**

 **F (INSTEAD OF E) FORMAT IN ORDER TO ALLOW ENERGIES TO BE WRITTEN SPECTRA**

 **WITH UP TO 9 DIGITS OF ACCURACY. IN PREVIOUS VERSIONS THIS WAS AN SPECTRA**

 **OUTPUT OPTION. HOWEVER USE OF THIS OPTION TO COMPARE THE RESULTS SPECTRA**

 **OF ENERGIES WRITTEN IN THE NORMAL ENDF/B CONVENTION OF 6 DIGITS SPECTRA**

 **TO THE 9 DIGIT OUTPUT FROM THIS PROGRAM DEMONSTRATED THAT FAILURE SPECTRA**

 **TO USE THE 9 DIGIT OUTPUT CAN LEAD TO LARGE ERRORS IN THE DATA SPECTRA**

 **DUE TO TRUNCATION OF ENERGIES TO 6 DIGITS DURING OUTPUT. SPECTRA**

 **SPECTRA**

 **CONTENTS OF OUTPUT SPECTRA**

 **------------------ SPECTRA**

 **ENTIRE EVALUATIONS ARE OUTPUT, NOT JUST THE LINEARIZED DATA SPECTRA**

 **CROSS SECTIONS, E.G. ANGULAR AND ENERGY DISTRIBUTIONS ARE ALSO SPECTRA**

 **INCLUDED. SPECTRA**

 **SPECTRA**

 **DOCUMENTATION SPECTRA**

 **------------- SPECTRA**

 **THE FACT THAT THIS PROGRAM HAS OPERATED ON THE DATA IS DOCUMENTED SPECTRA**

 **BY THE ADDITION OF 3 COMMENT LINES AT THE END OF EACH HOLLERITH SPECTRA**

 **SECTION IN THE FORM SPECTRA**

 **SPECTRA**

 **\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* PROGRAM SPECTRA (2023-1) \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* SPECTRA**

 **FOR ALL DATA GREATER THAN 1.00000-10 IN ABSOLUTE VALUE SPECTRA**

 **DATA LINEARIZED TO WITHIN AN ACCURACY OF 0.1 PER-CENT SPECTRA**

 **SPECTRA**

 **THE ORDER OF SIMILAR COMMENTS (FROM RECENT, SIGMA1 AND GROUPIE) SPECTRA**

 **REPRESENTS A COMPLETE HISTORY OF ALL OPERATIONS PERFORMED ON SPECTRA**

 **THE DATA BY THESE PROGRAMS. SPECTRA**

 **SPECTRA**

 **THESE COMMENT LINES ARE ONLY ADDED TO EXISTING HOLLERITH SECTIONS,SPECTRA**

 **I.E., THIS PROGRAM WILL NOT CREATE A HOLLERITH SECTION. THE FORMATSPECTRA**

 **OF THE HOLLERITH SECTION IN ENDF/B-V DIFFERS FROM THE THAT OF SPECTRA**

 **EARLIER VERSIONS OF ENDF/B. BY READING AN EXISTING MF=1, MT=451 SPECTRA**

 **IT IS POSSIBLE FOR THIS PROGRAM TO DETERMINE WHICH VERSION OF SPECTRA**

 **THE ENDF/B FORMAT THE DATA IS IN. WITHOUT HAVING A SECTION OF SPECTRA**

 **MF=1, MT=451 PRESENT IT IS IMPOSSIBLE FOR THIS PROGRAM TO SPECTRA**

 **DETERMINE WHICH VERSION OF THE ENDF/B FORMAT THE DATA IS IN, AND SPECTRA**

 **AS SUCH IT IS IMPOSSIBLE FOR THE PROGRAM TO DETERMINE WHAT FORMAT SPECTRA**

 **SHOULD BE USED TO CREATE A HOLLERITH SECTION. SPECTRA**

 **SPECTRA**

 **REACTION INDEX SPECTRA**

 **-------------- SPECTRA**

 **THIS PROGRAM DOES NOT USE THE REACTION INDEX WHICH IS GIVEN IN SPECTRA**

 **SECTION MF=1, MT=451 OF EACH EVALUATION. SPECTRA**

 **SPECTRA**

 **THIS PROGRAM DOES NOT UPDATE THE REACTION INDEX IN MF=1, MT=451. SPECTRA**

 **THIS CONVENTION HAS BEEN ADOPTED BECAUSE MOST USERS DO NOT SPECTRA**

 **REQUIRE A CORRECT REACTION INDEX FOR THEIR APPLICATIONS AND IT WASSPECTRA**

 **NOT CONSIDERED WORTHWHILE TO INCLUDE THE OVERHEAD OF CONSTRUCTING SPECTRA**

 **A CORRECT REACTION INDEX IN THIS PROGRAM. HOWEVER, IF YOU REQUIRE SPECTRA**

 **A REACTION INDEX FOR YOUR APPLICATIONS, AFTER RUNNING THIS PROGRAMSPECTRA**

 **YOU MAY USE PROGRAM DICTIN TO CREATE A CORRECT REACTION INDEX. SPECTRA**

 **SPECTRA**

 **SECTION SIZE SPECTRA**

 **------------ SPECTRA**

 **SINCE THIS PROGRAM USES A LOGICAL PAGING SYSTEM THERE IS NO LIMIT SPECTRA**

 **TO THE NUMBER OF POINTS IN ANY SECTION, E.G., THE TOTAL CROSS SPECTRA**

 **SECTION MAY BE REPRESENTED BY 200,000 DATA POINTS. SPECTRA**

 **SPECTRA**

 **FOR ANY LINEARIZED SECTION THAT CONTAINS 60000 OR FEWER POINTS SPECTRA**

 **THE ENTIRE OPERATION WILL BE PERFORMED IN CORE AND THE LINEARIZED SPECTRA**

 **DATA WILL BE OUTPUT DIRECTLY TO THE ENDF/B FORMAT. FOR ANY SECTIONSPECTRA**

 **THAT CONTAINS MORE POINTS THE DATA WILL BE LINEARIZED A PAGE AT A SPECTRA**

 **TIME (1 PAGE = 60000 POINTS) AND OUTPUT TO SCRATCH. AFTER THE SPECTRA**

 **ENTIRE SECTION HAS BEEN LINEARIZED THE DATA WILL BE READ BACK FROMSPECTRA**

 **SCRATCH AND OUTPUT TO THE ENDF/B FORMAT. SPECTRA**

 **SPECTRA**

 **SELECTION OF DATA SPECTRA**

 **----------------- SPECTRA**

 **THE PROGRAM SELECTS DATA TO BE LINEARIZED BASED EITHER ON EITHER SPECTRA**

 **MAT (ENDF/B MAT NO.) OR ZA AS WELL AS MF AND MT NUMBERS. THIS SPECTRA**

 **PROGRAM ALLOWS UP TO 100 MAT/MF/MT OR ZA/MF/MT RANGES TO BE SPECTRA**

 **SPECIFIED BY INPUT PARAMETERS. THE PROGRAM WILL ASSUME THAT THE SPECTRA**

 **ENDF/B TAPE IS IN MAT ORDER, REGARDLESS OF THE CRITERIA USED SPECTRA**

 **TO RETRIEVE MATERIALS. IF RETRIEVAL IS BY MAT RANGE THE PROGRAM SPECTRA**

 **WILL TERMINATE WHEN A MAT IS FOUND THAT IS ABOVE ALL REQUESTED SPECTRA**

 **MAT RANGES. IF RETRIEVAL IS BY ZA RANGE THE PROGRAM WILL SEARCH SPECTRA**

 **THE ENTIRE ENDF/B TAPE. SPECTRA**

 **SPECTRA**

 **PROGRAM OPERATION SPECTRA**

 **----------------- SPECTRA**

 **EACH SECTION OF DATA IS CONSIDERED SEPARATELY. EACH SECTION OF SPECTRA**

 **ENDF/B DATA TO LINEARIZE IS REPRESENTED BY A TABLE OF ENERGY SPECTRA**

 **VS. CROSS SECTION AND ANY ONE OF FIVE ALLOWABLE INTERPOLATION LAWSSPECTRA**

 **BETWEEN ANY TWO TABULATED POINTS. THIS PROGRAM WILL REPLACE EACH SPECTRA**

 **SECTION OF DATA CROSS SECTIONS BY A NEW TABLE OF ENERGY VS. SPECTRA**

 **CROSS SECTION IN WHICH THE INTERPOLATION LAW IS ALWAYS LINEAR IN SPECTRA**

 **ENERGY AND CROSS SECTION BETWEEN ANY TWO TABULATED POINTS. SPECTRA**

 **SPECTRA**

 **DATA IS READ AND LINEARIZED A PAGE AT A TIME (ONE PAGE CONTAINS SPECTRA**

 **60000 DATA POINTS). IF THE FINAL LINEARIZED SECTION CONTAINS TWO SPECTRA**

 **PAGES OR LESS, DATA POINTS IT WILL BE ENTIRELY CORE RESIDENT SPECTRA**

 **AFTER IT HAS BEEN LINEARIZED AND WILL BE WRITTEN DIRECTLY FROM SPECTRA**

 **CORE TO THE OUTPUT TAPE. IF THE LINEARIZED SECTION IS LARGER THAN SPECTRA**

 **TWO PAGES, AFTER EACH PAGE IS LINEARIZED IT WILL BE WRITTEN TO SPECTRA**

 **SCRATCH. AFTER THE ENTIRE SECTION HAS BEEN LINEARIZED IT WILL SPECTRA**

 **BE READ BACK FROM SCRATCH, TWO PAGES AT A TIME, AND WRITTEN TO SPECTRA**

 **THE OUTPUT TAPE. SPECTRA**

 **SPECTRA**

 **KEEP EVALUATED DATA POINTS SPECTRA**

 **-------------------------- SPECTRA**

 **SOMETIMES IT IS CONVENIENT TO KEEP ALL ENERGY POINTS WHICH WERE SPECTRA**

 **PRESENT IN THE ORIGINAL EVALUATION AND TO MERELY SUPPLEMENT THESE SPECTRA**

 **POINTS WITH ADDITIONAL ENERGY POINTS IN ORDER TO LINEARIZE THE SPECTRA**

 **CROSS SECTIONS. FOR EXAMPLE, IT IS OFTEN CONVENIENT TO KEEP THE SPECTRA**

 **THERMAL VALUE (AT 0.0253 EV) OR THE VALUE AT 14.1 MEV. SPECTRA**

 **SPECTRA**

 **THE CURRENT VERSION OF THIS PROGRAM WILL ALLOW THE USER TO KEEP SPECTRA**

 **ALL ORIGINAL EVALUATED DATA POINTS BY SPECIFYING 1 IN COLUMNS SPECTRA**

 **34-44 OF THE FIRST INPUT LINE. THIS WILL TURN OFF THE BACKWARD SPECTRA**

 **THINNING (SEE UCRL-50400, VOL. 17, PART A FOR EXPLANATION) AND SPECTRA**

 **RESULT IN ALL ORIGINAL ENERGY POINTS BEING KEPT. CAUTION SHOULD SPECTRA**

 **BE EXERCISED IN USING THIS OPTION SINCE IT CAN RESULT IN A SPECTRA**

 **CONSIDERABLE INCREASE IN THE NUMBER OF DATA POINTS OUTPUT BY SPECTRA**

 **THIS CODE. SPECTRA**

 **SPECTRA**

 **FOR ALL USERS WHO ARE NOT INTERESTED IN THIS OPTIONS NO CHANGES SPECTRA**

 **ARE REQUIRED IN THE INPUT TO THIS PROGRAM, I. E. IF COLUMNS SPECTRA**

 **34-44 ARE BLANK (AS FOR ALL PREVIOUS VERSIONS OF THIS CODE) THE SPECTRA**

 **PROGRAM WILL OPERATE EXACTLY AS IT DID BEFORE. SPECTRA**

 **SPECTRA**

 **ALLOWABLE ERROR SPECTRA**

 **--------------- SPECTRA**

 **ALLOWABLE ERROR MUST ALWAYS BE SPECIFIED IN THE INPUT TO THIS SPECTRA**

 **PROGRAM AS A FRACTION, NOT A PER-CENT. FOR EXAMPLE, INPUT THE SPECTRA**

 **ALLOWABLE FRACTIONAL ERROR 0.001 IN ORDER TO OBTAIN DATA THAT IS SPECTRA**

 **ACCURATE TO WITHIN 0.1 PER-CENT. SPECTRA**

 **SPECTRA**

 **THE CONVERSION OF THE DATA FROM THE GENERAL INTERPOLATION FORM TO SPECTRA**

 **LINARLY INTERPOLABLE FORM CANNOT BE PERFORMED EXACTLY. HOWEVER, ITSPECTRA**

 **CAN BE PERFORMED TO VIRTUALLY ANY REQUIRED ACCURACY AND MOST SPECTRA**

 **IMPORTANTLY CAN BE PERFORMED TO A TOLERANCE THAT IS SMALL COMPAREDSPECTRA**

 **TO THE UNCERTAINTY IN THE CROSS SECTIONS THEMSELVES. AS SUCH THE SPECTRA**

 **CONVERSION OF CROSS SECTIONS TO LINEARLY INTERPOLABLE FORM CAN BE SPECTRA**

 **PERFORMED WITH ESSENTIALLY NO LOSE OF INFORMATION. SPECTRA**

 **SPECTRA**

 **THE ALLOWABLE ERROR MAY BE ENERGY INDEPENDENT (CONSTANT) OR ENERGYSPECTRA**

 **DEPENDENT. THE ALLOWABLE ERROR IS DESCRIBED BY A TABULATED SPECTRA**

 **FUNCTION OF UP TO 20 (ENERGY,ERROR) PAIRS AND LINEAR INTERPOLATIONSPECTRA**

 **BETWEEN TABULATED POINTS. IF ONLY ONE TABULATED POINT IS GIVEN THESPECTRA**

 **ERROR WILL BE CONSIDERED CONSTANT OVER THE ENTIRE ENERGY RANGE. SPECTRA**

 **WITH THIS ENERGY DEPENDENT ERROR ONE MAY OPTIMIZE THE OUTPUT FOR SPECTRA**

 **ANY GIVEN APPLICATION BY USING A SMALL ERROR IN THE ENERGY RANGE SPECTRA**

 **OF INTEREST AND A LESS STRINGENT ERROR IN OTHER ENERGY RANGES. SPECTRA**

 **SPECTRA**

 **DEFAULT ALLOWABLE ERROR SPECTRA**

 **----------------------- SPECTRA**

 **IN ORDER TO INSURE CONVERGENCE OF THE LINEARIZING ALGORITHM THE SPECTRA**

 **ALLOWABLE ERROR MUST BE POSITIVE. IF THE USER INPUTS AN ERROR SPECTRA**

 **THAT IS NOT POSITIVE IT WILL AUTOMATICALLY BE SET TO THE DEFAULT SPECTRA**

 **VALUE (CURRENTLY 0.001, CORRESPONDING TO 0.1 PER-CENT) AND SPECTRA**

 **INDICATED AS SUCH IN THE OUTPUT LISTING. SPECTRA**

 **SPECTRA**

 **COULOMB PENETRABILITY (INTERPOLATION LAW = 6) SPECTRA**

 **-------------------------------------------- SPECTRA**

 **INTRODUCED FOR ENDF/B-VI. THIS IS DEFINED AS, SPECTRA**

 **SPECTRA**

 **SIG(E) = C1\*EXP(-C2/SQRT(E - T)) SPECTRA**

 **SPECTRA**

 **THIS PROGRAM ONLY CONSIDERS EXOTHERMIC REACTIONS - T = 0 SPECTRA**

 **SPECTRA**

 **SIG(E) = C1\*EXP(-C2/SQRT(E)) SPECTRA**

 **SPECTRA**

 **WARNING...THIS INTERPOLATION LAW SHOULD ONLY BE USED FOR REACTIONSSPECTRA**

 **WHICH HAVE A POSITIVE Q-VALUE (EXOTHERMIC REACTIONS), SPECTRA**

 **SINCE HERE WE ONLY CONSIDER T = 0.0 IN THE FORMALISM. SPECTRA**

 **IN ALL OTHER CASES A WARNING MESSAGE WILL BE PRINTED. SPECTRA**

 **SPECTRA**

 **INPUT FILES SPECTRA**

 **----------- SPECTRA**

 **UNIT DESCRIPTION SPECTRA**

 **---- ----------- SPECTRA**

 **2 INPUT LINES (BCD - 80 CHARACTERS/RECORD) SPECTRA**

 **10 ORIGINAL ENDF/B DATA (BCD - 80 CHARACTERS/RECORD) SPECTRA**

 **SPECTRA**

 **OUTPUT FILES SPECTRA**

 **------------ SPECTRA**

 **UNIT DESCRIPTION SPECTRA**

 **---- ----------- SPECTRA**

 **3 OUTPUT REPORT (BCD - 120 CHARACTERS/RECORD) SPECTRA**

 **11 FINAL ENDF/B DATA (BCD - 80 CHARACTERS/RECORD) SPECTRA**

 **SPECTRA**

 **SCRATCH FILES SPECTRA**

 **------------- SPECTRA**

 **UNIT DESCRIPTION SPECTRA**

 **---- ----------- SPECTRA**

 **12 SCRATCH FILE (BINARY - 180000 WORDS/RECORD SPECTRA**

 **SPECTRA**

 **OPTIONAL STANDARD FILE NAMES (SEE SUBROUTINE FILEIO) SPECTRA**

 **---------------------------------------------------- SPECTRA**

 **UNIT FILE NAME SPECTRA**

 **---- ---------- SPECTRA**

 **2 SPECTRA.INP SPECTRA**

 **3 SPECTRA.LST SPECTRA**

 **10 ENDFB.IN SPECTRA**

 **11 ENDFB.OUT SPECTRA**

 **12 (SCRATCH) SPECTRA**

 **SPECTRA**

 **SPECTRA**

 **INPUT PARAMETERS SPECTRA**

 **---------------- SPECTRA**

 **FOR VERSIONS EARLIER THAN 90-1 THIS PROGRAM ONLY ALLOWED THE USER SPECTRA**

 **TO SPECIFY BY INPUT PARAMETERS WHICH MATERIALS (MAT) TO PROCESS. SPECTRA**

 **FOR EACH REQUESTED MATERIAL NEUTRON INTERACTION CROSS SECTIONS SPECTRA**

 **(MF=3) WOULD BE LINEARIZED AND THE REMAINDER OF THE MATERIAL SPECTRA**

 **WOULD BE COPIED. SPECTRA**

 **SPECTRA**

 **FOR VERSIONS 90-1 AND LATER THIS PROGRAM WILL ALLOW THE USER TO SPECTRA**

 **TO SPECIFY BY INPUT PARAMETERS EXACTLY WHAT SECTIONS OF DATA SPECTRA**

 **TO PROCESS. FOR EACH SECTION OF DATA, SPECIFIED BY MAT, MF, MT SPECTRA**

 **RANGES, SECTIONS OF MF=3, 23 AND 27 WILL BE LINEARIZED AND ALL SPECTRA**

 **OTHER REQUESTED SECTIONS WILL BE COPIED. ALL SECTIONS WHICH ARE SPECTRA**

 **NOT EXPLICITLY REQUESTED WILL BE SKIPPED AND WILL NOT APPEAR ON SPECTRA**

 **ENDF/B FILE OUTPUT BY THIS PROGRAM. SPECTRA**

 **SPECTRA**

 **WITH THIS NEW PROCEDURE YOU CAN MINIMIZE THE SIZE OF THE ENDF/B SPECTRA**

 **FILE OUTPUT BY THIS PROGRAM, E.G., IF YOU ONLY WANT NEUTRON SPECTRA**

 **CROSS SECTIONS FOR SUBSEQUENT PROCESSING YOU NEED ONLY REQUEST SPECTRA**

 **ONLY MF=3 DATA. SPECTRA**

 **SPECTRA**

 **HOWEVER, YOU MUST UNDERSTAND THAT ONLY THOSE SECTIONS WHICH YOU SPECTRA**

 **EXPLICITLY REQUEST WILL APPEAR ON THE ENDF/B FILE OUTPUT BY SPECTRA**

 **THIS PROGRAM. FOR EXAMPLE, IF YOU WISH TO DOCUMENT EXACTLY SPECTRA**

 **HOW YOU LINEARIZED THE DATA BY INCLUDING COMMENTS IN MF=1, MT=451 SPECTRA**

 **THEN YOU MUST EXPLICITLY REQUEST THAT MF=1, MT=451 BE PROCESSED SPECTRA**

 **FOR EACH MATERIAL THAT YOU REQUEST. SIMILAR IF YOU WANT THE SPECTRA**

 **ENTIRE EVALUATION YOU MUST REQUEST ALL MF AND MT TO BE OUTPUT. SPECTRA**

 **SPECTRA**

 **LINE COLS. DESCRIPTION SPECTRA**

 **---- ----- ----------- SPECTRA**

 **1 1-11 SELECTION CRITERIA (0=MAT, 1=ZA) SPECTRA**

 **12-22 MONITOR MODE SELECTOR SPECTRA**

 **= 0 - NORMAL OPERATION SPECTRA**

 **= 1 - MONITOR PROGRESS OF LINEARIZING OF THE DATA. SPECTRA**

 **EACH TIME A PAGE OF DATA POINTS IS WRITTEN TO SPECTRA**

 **THE SCRATCH FILE PRINT OUT THE TOTAL NUMBER OF SPECTRA**

 **POINTS ON SCRATCH AND THE LOWER AND UPPER SPECTRA**

 **ENERGY LIMITS OF THE PAGE (THIS OPTION MAY BE SPECTRA**

 **USED IN ORDER TO MONITOR THE EXECUTION SPEED SPECTRA**

 **OF LONG RUNNING JOBS). SPECTRA**

 **23-33 MINIMUM CROSS SECTION OF INTEREST (BARNS). SPECTRA**

 **(IF 0.0 OR LESS IS INPUT THE PROGRAM WILL SPECTRA**

 **USE 1.0E-10). ENERGY INTERVALS WILL NOT BE SPECTRA**

 **SUB-DIVIDED IF THE ABSOLUTE VALUE OF THE CROSS SPECTRA**

 **SECTION WITHIN THE INTERVAL IS LESS THAN THIS VALUE. SPECTRA**

 **AN EXCEPTION TO THIS RULE IS NEAR THRESHOLDS ENERGY SPECTRA**

 **INTERVALS WILL BE SUB-DIVIDED UNTIL CONVERGENCE SPECTRA**

 **REGARDLESS OF THE MAGNITUDE OF THE CROSS SECTION. SPECTRA**

 **34-44 KEEP ORIGINAL EVALUATED DATA POINTS. SPECTRA**

 **= 0 - NO. SPECTRA**

 **= 1 - YES - ADDITIONAL POINTS MAY BE ADDED IN ORDER SPECTRA**

 **TO LINEARIZE DATA, BUT ALL ORIGINAL SPECTRA**

 **DATA POINTS WILL BE INCLUDED IN THE SPECTRA**

 **RESULTS. SPECTRA**

 **2 1-72 ENDF/B INPUT DATA FILENAME SPECTRA**

 **(STANDARD OPTION = ENDFB.IN) SPECTRA**

 **3 1-72 ENDF/B OUTPUT DATA FILENAME SPECTRA**

 **(STANDARD OPTION = ENDFB.OUT) SPECTRA**

 **4-N 1- 6 LOWER MAT OR ZA LIMIT SPECTRA**

 **7- 8 LOWER MF LIMIT SPECTRA**

 **9-11 LOWER MT LIMIT SPECTRA**

 **12-17 UPPER MAT OR ZA LIMIT SPECTRA**

 **18-19 UPPER MF LIMIT SPECTRA**

 **20-22 UPPER MT LIMIT SPECTRA**

 **UP TO 100 RANGES MAY BE SPECIFIED, ONLY ONE RANGE SPECTRA**

 **PER LINE. THE LIST OF RANGES IS TERMINATED BY A SPECTRA**

 **BLANK LINE. IF THE UPPER MAT LIMIT OF ANY REQUEST SPECTRA**

 **IS LESS THAN THE LOW LIMIT IT WILL BE SET EQUAL TO SPECTRA**

 **THE LOWER LIMIT. IF THE UPPER LIMIT IS STILL ZERO SPECTRA**

 **IT WILL BE SET EQUAL TO 999999. IF THE UPPER MF OR SPECTRA**

 **MT LIMIT IS ZERO IT WILL BE SET TO 99 OR 999 SPECTRA**

 **RESPECTIVELY. SPECTRA**

 **VARY 1-11 ENERGY FOR ERROR LAW SPECTRA**

 **12-22 ALLOWABLE FRACTIONAL ERROR FOR ERROR LAW. SPECTRA**

 **THE ACCEPTABLE LINEARIZING ERROR MAY BE SPECIFIED TO SPECTRA**

 **BE EITHER ENERGY INDEPENDENT (DEFINED BY A SINGLE SPECTRA**

 **ERROR), OR ENERGY DEPENDENT (DEFINED BY UP TO 20 SPECTRA**

 **ENERGY, ERROR PAIRS). FOR THE ENERGY DEPENDENT CASE SPECTRA**

 **LINEAR INTERPOLATION WILL BE USED TO DEFINE THE ERRORSPECTRA**

 **AT ENERGIES BETWEEN THOSE AT WHICH IT IS TABULATED. SPECTRA**

 **IN ALL CASES THE ERROR LAW IS TERMINATED BY A BLANK SPECTRA**

 **LINE. IF ONLY ONE ENERGY, ERROR PAIR IS GIVEN THE SPECTRA**

 **THE LAW WILL BE CONSIDERED TO BE ENERGY INDEPENDENT. SPECTRA**

 **IF MORE THAN ONE PAIR IS GIVEN IT WILL BE CONSIDERED SPECTRA**

 **TO BE ENERGY DEPENDENT (NOTE, ENERGY INDEPENDENT SPECTRA**

 **FORM WILL RUN FASTER THAN THE EQUIVALENT ENERGY SPECTRA**

 **DEPENDENT FORM). FOR AN ENERGY DEPENDENT ERROR LAW SPECTRA**

 **ALL ENERGIES MUST BE ASCENDING ENERGY ORDER. FOR SPECTRA**

 **CONVERGENCE OF THE LINEARIZING ALGORITHM ALL ERRORS SPECTRA**

 **MUST BE POSITIVE. IF AN ALLOWABLE ERROR IS NOT SPECTRA**

 **POSITIVE IT WILL BE SET EQUAL TO THE STANDARD OPTION SPECTRA**

 **(CURRENTLY 0.001, CORRESPONDING TO 0.1 PER-CENT). SPECTRA**

 **IF THE FIRST ERROR LINE IS BLANK IT WILL TERMINATE SPECTRA**

 **THE ERROR LAW AND THE ERROR WILL BE TREATED AS SPECTRA**

 **ENERGY INDEPENDENT, EQUAL TO THE STANDARD OPTION SPECTRA**

 **(CURRENTLY 0.1 PER-CENT). (SEE EXAMPLE INPUT 4). SPECTRA**

 **SPECTRA**

 **EXAMPLE INPUT NO. 1 SPECTRA**

 **------------------- SPECTRA**

 **RETRIEVE DATA BY ZA IN ORDER TO FIND ALL URANIUM ISOTOPES AND SPECTRA**

 **THORIUM 232. RETRIEVE ALL NEUTRON INTERACTION CROSS SECTIONS SPECTRA**

 **(MF=3). ALL ENERGY INTERVALS IN WHICH THE CROSS SECTION IS SPECTRA**

 **AT LEAST 1 MICRO-BARN (1.0E-06 BARNS) WILL BE SUBDIVIDED. SPECTRA**

 **BACKWARD THINNING WILL BE PERFORMED. FROM 0 TO 100 EV LINEARIZE SPECTRA**

 **TO WITHIN 0.1 PER-CENT ACCURACY. FROM 100 EV TO 1 KEV VARY SPECTRA**

 **ACCURACY BETWEEN 0.1 AND 1.0 PER-CENT. ABOVE 1 KEV USE 1 SPECTRA**

 **PER-CENT ACCURACY. SPECTRA**

 **SPECTRA**

 **EXPLICITLY SPECIFY THE STANDARD FILENAMES. SPECTRA**

 **SPECTRA**

 **IN THIS CASE THE FOLLOWING 11 INPUT LINES ARE REQUIRED SPECTRA**

 **SPECTRA**

 **1 0 1.00000- 6 0 SPECTRA**

 **ENDFB.IN SPECTRA**

 **ENDFB.OUT SPECTRA**

 **92000 3 0 92999 3999 SPECTRA**

 **90232 3 0 0 3 0 (UPPER LIMIT AUTOMATICALLY SET TO 90232 3999)SPECTRA**

 **(END OF REQUEST LIST) SPECTRA**

 **0.00000+ 0 1.00000-03 SPECTRA**

 **1.00000+ 2 1.00000-03 SPECTRA**

 **1.00000+ 3 1.00000-02 SPECTRA**

 **1.00000+ 9 1.00000-02 SPECTRA**

 **(END OF ERROR LAW) SPECTRA**

 **SPECTRA**

 **EXAMPLE INPUT NO. 2 SPECTRA**

 **------------------- SPECTRA**

 **SAME AS THE ABOVE CASE, EXCEPT LINEARIZE ALL DATA TO WITHIN THE SPECTRA**

 **STANDARD ACCURACY (CURRENTLY 0.1 PER-CENT). IN ORDER TO USE THE SPECTRA**

 **STANDARD ACCURACY YOU NEED NOT SPECIFY ANY ERROR LAW AT ALL. IN SPECTRA**

 **THIS CASE INCLUDE THE HOLLERITH SECTION, MF=1, MT=451, FOR EACH SPECTRA**

 **MATERIAL. SPECTRA**

 **SPECTRA**

 **LEAVE THE DEFINITION OF THE FILENAMES BLANK - THE PROGRAM WILL SPECTRA**

 **THEN USE STANDARD FILENAMES. SPECTRA**

 **SPECTRA**

 **IN THIS CASE THE FOLLOWING 9 INPUT LINES ARE REQUIRED SPECTRA**

 **SPECTRA**

 **1 0 1.00000- 6 0 SPECTRA**

 **(USE DEFAULT FILENAME = ENDFB.IN) SPECTRA**

 **(USE DEFAULT FILENAME = ENDFB.OUT) SPECTRA**

 **92000 1451 92999 1451 SPECTRA**

 **92000 3 0 92999 3999 SPECTRA**

 **90232 1451 0 1451 SPECTRA**

 **90232 3 0 0 3 0 (UPPER LIMIT AUTOMATICALLY SET TO 90232 3999)SPECTRA**

 **(END OF REQUEST LIST) SPECTRA**

 **(0.1 PER-CENT ERROR, END OF ERROR LAW) SPECTRA**

 **SPECTRA**

 **EXAMPLE INPUT NO. 3 SPECTRA**

 **------------------- SPECTRA**

 **LINEARIZE ALL MATERIALS ON AN ENDF/B TAPE TO WITHIN AN ACCURACY SPECTRA**

 **OF 0.5 PER-CENT (0.005 AS A FRACTION). IN THIS CASE YOU NEED NOT SPECTRA**

 **SPECIFY THE MAT, MF, MT RANGES. SPECTRA**

 **SPECTRA**

 **READ THE ENDF/B DATA FROM \ENDFB6\ZA092238 AND WRITE THE ENDF/B SPECTRA**

 **DATA TO \ENDFB6\LINEAR\ZA092238. SPECTRA**

 **SPECTRA**

 **IN THIS CASE THE FOLLOWING 6 INPUT LINES ARE REQUIRED SPECTRA**

 **SPECTRA**

 **(MAT, 1.0E-10 BARNS, THIN)SPECTRA**

 **\ENDFB6\ZA092238 SPECTRA**

 **\ENDFB6\LINEAR\ZA092238 SPECTRA**

 **(RETRIEVE ALL DATA, END REQUEST LIST) SPECTRA**

 **5.00000-03 SPECTRA**

 **(END OF ERROR LAW) SPECTRA**

 **SPECTRA**

 **NOTE THAT IN THIS CASE IF THE INPUT HAD SPECIFIED AN EQUIVALENT SPECTRA**

 **ENERGY DEPENDENT ERROR LAW BY GIVING A NUMBER OF ENERGY POINTS SPECTRA**

 **AT EACH OF WHICH THE ERROR IS 0.5 PER-CENT THE PROGRAM WOULD TAKE SPECTRA**

 **LONGER TO RUN (I.E., ONLY USE AN ENERGY DEPENDENT ERROR LAW WHEN SPECTRA**

 **IT IS NECESSARY). SPECTRA**

 **SPECTRA**

 **EXAMPLE INPUT NO. 4 SPECTRA**

 **------------------- SPECTRA**

 **IN ORDER TO LINEARIZE ALL MATERIALS ON AN ENDF/B TAPE TO THE SPECTRA**

 **STANDARD OPTION OF 0.1 PER-CENT IT IS ADEQUATE TO INPUT A SET SPECTRA**

 **OF COMPLETELY BLANK LINES WHICH WILL AUTOMATICALLY INVOKE ALL SPECTRA**

 **OF THE STANDARD OPTIONS. SPECTRA**

 **SPECTRA**

 **LEAVE THE DEFINITION OF THE FILENAMES BLANK - THE PROGRAM WILL SPECTRA**

 **THEN USE STANDARD FILENAMES. SPECTRA**

 **SPECTRA**

 **IN THIS CASE THE FOLLOWING THREE INPUT LINES ARE REQUIRED SPECTRA**

 **SPECTRA**

 **(MAT, 1.0E-10 BARNS, THIN)SPECTRA**

 **(USE DEFAULT FILENAME = ENDFB.IN) SPECTRA**

 **(USE DEFAULT FILENAME = ENDFB.OUT) SPECTRA**

 **(RETRIEVE ALL DATA, END REQUEST LIST) SPECTRA**

 **(0.1 PER-CENT ERROR, END OF ERROR LAW) SPECTRA**

 **SPECTRA**

 **=======================================================================SPECTRA**