=====					Sigmal
	PROGRAM	SIGMA	.1		Sigmal Sigmal
			=		Sigmal
	VERSION	73-1	(MARCH 1973)		Sigmal
	VERSION	76-1	(FEBRUARY 1976)	Sigmal
	VERSION	76-2	(OCTOBER 1976)		Sigmal
	VERSION	77-1	(JANUARY 1977)		Sigmal
	VERSION	78-1	(JULY 1978)		Sigmal
	VERSION	79-1	(JULY 1979)	CDC-7600 AND CRAY-1 VERSION.	Sigmal
	VERSION	80-1	(MAY 1980)	IBM, CDC AND CRAY VERSION	Sigmal
	VERSION	80-2	(DECEMBER 1980) IMPROVED BASED ON USER COMMENTS.	Sigma1
	VERSTON	81-1	(MARCH 1981)	DOUBLE PRECISION IBM VERSION	Sigma1
	VERSTON	81-2	(AUGUST 1981)	TMPROVED TEM SPEED AND STABILITY	Sigma1
	VERSTON	82-1	(JANUARY 1982)	TMPROVED COMPUTER COMPATIBILITY	Sigma1
	VERSTON	83-1	(JANUARY 1983)	*MAJOR RE-DESIGN.	Sigma1
			(,	*PAGE STZE INCREASED - 1002 TO 2004.	Sigma1
				*FI.TMINATED COMPLITER DEPENDENT CODING	Sigmal
				*NEW MORE COMPATTRIE I/O UNIT NUMBER	Sigmal
				*ADDED STANDARD ALLOWARLE ERROR OPTION	Sigmal
				(CUDDENTLY 0 1 DED_CENT)	Sigmal
				*UNDESOLVED DESONANCE DECTON CODIED	Sigmal
				*1/V FYTENSION OF CROSS SECTIONS	Sigmal
				OUTCIDE OF TABULATED ENERGY DANCE AND	Sigma1
				TITO UNDEGOLVED ENERGY DANCE	Sigmal
	VEDATON	0 2 2	(0000000 1002)	TNDOURD DIGED ON HEED CONVENES	Sigmai
	VERSION	03-2	(UCIUBER 1903)	*IMPROVED BASED ON USER COMMENTS.	Sigmal
	VERSION	04-1	(APKIL 1904)	*DADWIAL EVALUATION WDEATMENW	Sigmal
	VEDCION	0E 1	(ADDTT 100E)	*ITEDATE TO CONVEDCENCE (UCING THE CAME	Sigmal
	VERSION	02-T	(APRIL 1905)	"ILERALE TO CONVERGENCE (USING THE SAME	Sigmai
				ENERGY GRID FOR HOT CROSS SECTION AS	Sigmal
				TNACCUDATE)	Sigmal
				INACCURATE).	Sigmai
				*UDDATED FOD FNDE/B VI FODMATC	Sigma1
				* OPDATED FOR ENDF/B-VI FORMATS.	Sigmal
				ACCURACY OF ENERGY	Sigmal
				*DOUDLE DECISION THENT OF ENERGY	Sigma1
				(DECUIDED FOR NARROW DECONANCES)	Sigma1
	VEDGTON	95-2		*EOPTDAN_77/H VEDGION	Sigmal
	VERSION	05-2	(AUGUSI 1905) (TANTIADY 1096)	* FORIKAN-/// VERSION	Sigma1
	VERSION	00-1 00_1	(UANUARI 1900)	*ODTION INTEDNALLY DEFINE ALL I/O	Sigmal
	VERSION	00-T	(0011 1988)	ETTE NAMEC (CEE CURROUTINE ETTELO	Sigma1
				FILE NAMES (SEE, SUBROUTINE FILETO	Sigma1
				TOR DETAILS	Sigmal
	VEDGTON	90_1	(TANIIADV 1090)	*DEVENDED DASED ON USER COMMENTS.	Sigmal
	VERSION	09-1	(UANUARI 1909)	TNCHOR DECORAM WILL NOT DO ANYTUINC	Sigmal
				CDARY	Sigma1
				CRAZI.	Sigmai
				*UPDATED TO USE NEW PROGRAM CONVERT	Sigmal
				KEIWORDS.	Sigmal
				CONTENETONS	Sigma1
	VEDCTON	00 1	(TITNE 1000)	CONVENTIONS.	Sigma1
	VERSION	90-1	(00NE 1990)	*ADDED FORTAN CAVE OPTION	Sigma1
				*ADDED FORIRAN SAVE OPIION	Sigmai
				*NEW MORE CONSISTENT ENERGY OUTPUT	Sigmal
	VEDATON	01 1	(TIT V 1001)	ROUTINES	Sigmal
	VERSION	91-1	(10071 1991)	WARNINGINPUT PARAMETER FORMAT	Sigmal
				HAS BEEN CHANGED - SEE BELOW FOR	Sigma1
				TELETES.	Sigma1
				AUTOTIC ENERGY PARTICLE PROJECTILES	orame1
				LEACE AG LADGE AG TADUE ENERGY DAVGE	Sigma1
				THAT AT LARGE AT INFUT ENERGY KANGE.	orame1
				THO INTERCOLVED ENERGY DANCE	aigmai
	VEDCTOR	0.2 1	(TANTIADY 1000)	FROM UNKESOLVED ENERGY RANGE.	Sigmal
	VERSION	92-1	(UANUARI 1992)	CECTIONS ADE ALWAYS VEDE (NOT TUTNES)	aigmai
				SECILONS ARE ALWAYS KEPT (NOT THINNED)	Sigmai
				"MI=19 (FIRST CHANCE FISSION) TREATED	sigmal
				INE SAME AS FISSION.	sigmai
				TNTEDECT - TO MICH CHOIS SECTION OF	Sigmal
				INTEREDI - IO ALLOW SMALL CRUSS	sigma1
				TORATIONS NEAR INCONCUCTOR NEAR INCONCUCTORS	Sigma1
				INDRIDD FROFDRUI.	STAWAT

			a
		*ALL ENERGIES INTERNALLY ROUNDED PRIOR	Sigmal
		TO CALCULATIONS.	sigmal
		*COMPLETELY CONSISTENT 1/O AND ROUNDING	Sigmal
		ROUTINES - TO MINIMIZE COMPUTER	Sigmal
	(DEPENDENCE.	sigmal
VERSION 92-2	(JOLY 1992)	*CORRECTED BUG ASSOCIATED WITH	Sigmal
		THRESHOLD REACTIONS.	Sigmal
		*UNRESOLVED REGION COPIED WITHOUT	Sigmal
		THINNING (IT SHOULD BE EXACTLY THE	Sigmal
		SAME AT ALL TEMPERATURES).	Sigmal
		WEDE NOT BRONDENED	Sigma1
VEDGION 02 1	(ADDIT 1002)	*INGREAGED DAGE GIVE FROM 2004	Sigmal
VERSION 93-1	(APRIL 1993)	AINCREASED PAGE SIZE FROM 2004	Sigmal
VERATON 04 1	(TANTIADY 1004)	TO 24000 ENERGY PONTS.	Sigmal
VERSION 94-1	(JANUARY 1994)	*VARIABLE ENDF/B DATA FILENAMES	Sigmal
		TO ALLOW ACCESS TO FILE STRUCTURES	Sigmal
		(WARNING - INPUT PARAMETER FORMAT	Sigmai
		HAS BEEN CHANGED)	Sigmal
		*CLOSE ALL FILES BEFORE TERMINATING	Sigmal
VEDGTON OC 1	(TANTIADY 100C)	(SEE, SUBROUTINE ENDIT)	Sigmal
VERSION 96-1	(JANUARI 1996)	*COMPLETE RE-WRITE	Sigmal
		*IMPROVED COMPUTER INDEPENDENCE	Sigmal
		ALL DOUBLE PRECISION	sigmal
		*ON SCREEN OUTPUT	Sigmal
		*UNIFORM TREATMENT OF ENDF/B 1/O	Sigmal
		*IMPROVED OUTPUT PRECISION	Sigmal
		*DEFINED SCRATCH FILE NAMES	Sigmal
VEDGTON 07 1	(ADDIT 1007)	*ALWAYS INCLUDE THERMAL VALUE	Sigmal
VERSION 97-1	(APRIL 1997)	*OPTIONALLY SET NEGATIVE CROSS	Sigmai
		SECTIONS = 0 ON INPUT AND	Sigmal
		OUTPUT.	Sigmal
		*INCREASED PAGE SIZE FROM 24000	Sigmal
	(10.00)	TO 60000 ENERGY POINTS.	Sigmal
VERSION 99-1	(MARCH 1999)	*CORRECTED CHARACTER TO FLOATING	Sigmal
		POINT READ FOR MORE DIGITS	Sigmal
		*UPDATED TEST FOR ENDF/B FORMAT	sigmal
		VERSION BASED ON RECENT FORMAT CHANGE	Sigmal
		*TREAT LOW ENERGY INITIAL CROSS	Sigmal
		SECTIONS AS LOG-LOG INTERPOLABLE	Sigmal
		*CONSTANT (RATHER THAN 1/V) EXTENSION	Sigmal
		TO HIGHER ENERGY.	sigmal
		*UPDATED CONSTANTS BASED ON CSEWG	sigmal
		SUBCOMMITTEE RECOMMENDATIONS	Sigmal
		SUBCOMMITTEE RECOMMENDATIONS *GENERAL IMPROVEMENTS BASED ON	Sigmal Sigmal
WEDGTON 00 2	(SUBCOMMITTEE RECOMMENDATIONS *GENERAL IMPROVEMENTS BASED ON USER FEEDBACK	Sigmal Sigmal Sigmal
VERSION 99-2	(JUNE 1999)	SUBCOMMITTEE RECOMMENDATIONS *GENERAL IMPROVEMENTS BASED ON USER FEEDBACK *EXTENDED RANGE OF INTEGRALS FROM 4	Sigmal Sigmal Sigmal Sigmal
VERSION 99-2	(JUNE 1999)	SUBCOMMITTEE RECOMMENDATIONS *GENERAL IMPROVEMENTS BASED ON USER FEEDBACK *EXTENDED RANGE OF INTEGRALS FROM 4 TO 5 UNITS ON EACH SIDE OF ENERGY	Sigmal Sigmal Sigmal Sigmal Sigmal
VERSION 99-2	(JUNE 1999)	SUBCOMMITTEE RECOMMENDATIONS *GENERAL IMPROVEMENTS BASED ON USER FEEDBACK *EXTENDED RANGE OF INTEGRALS FROM 4 TO 5 UNITS ON EACH SIDE OF ENERGY POINT TO ALLOW FOR LARGER VARIATION	Sigmal Sigmal Sigmal Sigmal Sigmal
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VERSION 99-2 VERSION 99-3 VERS. 2000-1 VERS. 2002-1 VERS. 2004-1	(JUNE 1999) (OCTOBER 1999) (FEBRUARY 2000 (MAY 2002) (JAN 2004)	SUBCOMMITTEE RECOMMENDATIONS *GENERAL IMPROVEMENTS BASED ON USER FEEDBACK *EXTENDED RANGE OF INTEGRALS FROM 4 TO 5 UNITS ON EACH SIDE OF ENERGY POINT TO ALLOW FOR LARGER VARIATION IN THE LOCAL CROSS SECTION *ASSUME ENDF/B-VI, NOT V, IF MISSING MF=1, MT-451.)*IMPROVED ERFC FUNCTION DEFINITION. I THANK BOB MACFARLANE (LANL) FOR SUPPLYING A MORE ACCURATE ERFC FUNCTION.)*CORRECTED LOW ENERGY INTERPOLATION FOR NON-POSITIVE CROSS SECTIONS *GENERAL IMPROVEMENTS BASED ON USER FEEDBACK *OPTIONAL INPUT PARAMETERS *OPTIONALLY IGNORE UNDESCIVED DECION	Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal
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VERSION 99-2 VERSION 99-3 VERS. 2000-1 VERS. 2002-1 VERS. 2004-1	(JUNE 1999) (OCTOBER 1999) (FEBRUARY 2000 (MAY 2002) (JAN. 2004)	SUBCOMMITTEE RECOMMENDATIONS *GENERAL IMPROVEMENTS BASED ON USER FEEDBACK *EXTENDED RANGE OF INTEGRALS FROM 4 TO 5 UNITS ON EACH SIDE OF ENERGY POINT TO ALLOW FOR LARGER VARIATION IN THE LOCAL CROSS SECTION *ASSUME ENDF/B-VI, NOT V, IF MISSING MF=1, MT-451.)*IMPROVED ERFC FUNCTION DEFINITION. I THANK BOB MACFARLANE (LANL) FOR SUPPLYING A MORE ACCURATE ERFC FUNCTION.)*CORRECTED LOW ENERGY INTERPOLATION FOR NON-POSITIVE CROSS SECTIONS *GENERAL IMPROVEMENTS BASED ON USER FEEDBACK *OPTIONAL INPUT PARAMETERS *OPTIONALLY IGNORE UNRESOLVED REGION *CORRECTED PROBLEM AT THE RESOLVED/ UNRESOLVED ENERGY BOUNDARY. *CORRECTED HIGH ENERGY CONSTANT CROSS	Sigmal Sigmal
VERSION 99-2 VERSION 99-3 VERS. 2000-1 VERS. 2002-1 VERS. 2004-1	(JUNE 1999) (OCTOBER 1999) (FEBRUARY 2000 (MAY 2002) (JAN. 2004)	SUBCOMMITTEE RECOMMENDATIONS *GENERAL IMPROVEMENTS BASED ON USER FEEDBACK *EXTENDED RANGE OF INTEGRALS FROM 4 TO 5 UNITS ON EACH SIDE OF ENERGY POINT TO ALLOW FOR LARGER VARIATION IN THE LOCAL CROSS SECTION *ASSUME ENDF/B-VI, NOT V, IF MISSING MF=1, MT-451.)*IMPROVED ERFC FUNCTION DEFINITION. I THANK BOB MACFARLANE (LANL) FOR SUPPLYING A MORE ACCURATE ERFC FUNCTION.)*CORRECTED LOW ENERGY INTERPOLATION FOR NON-POSITIVE CROSS SECTIONS *GENERAL IMPROVEMENTS BASED ON USER FEEDBACK *OPTIONAL INPUT PARAMETERS *OPTIONALLY IGNORE UNRESOLVED REGION *CORRECTED PROBLEM AT THE RESOLVED/ UNRESOLVED ENERGY BOUNDARY. *CORRECTED HIGH ENERGY CONSTANT CROSS SECTION EXTENSION.	Sigmal Sigmal
VERSION 99-2 VERSION 99-3 VERS. 2000-1 VERS. 2002-1 VERS. 2004-1	(JUNE 1999) (OCTOBER 1999) (FEBRUARY 2000 (MAY 2002) (JAN. 2004)	SUBCOMMITTEE RECOMMENDATIONS *GENERAL IMPROVEMENTS BASED ON USER FEEDBACK *EXTENDED RANGE OF INTEGRALS FROM 4 TO 5 UNITS ON EACH SIDE OF ENERGY POINT TO ALLOW FOR LARGER VARIATION IN THE LOCAL CROSS SECTION *ASSUME ENDF/B-VI, NOT V, IF MISSING MF=1, MT-451.)*IMPROVED ERFC FUNCTION DEFINITION. I THANK BOB MACFARLANE (LANL) FOR SUPPLYING A MORE ACCURATE ERFC FUNCTION.)*CORRECTED LOW ENERGY INTERPOLATION FOR NON-POSITIVE CROSS SECTIONS *GENERAL IMPROVEMENTS BASED ON USER FEEDBACK *OPTIONALL INPUT PARAMETERS *OPTIONALLY IGNORE UNRESOLVED REGION *CORRECTED PROBLEM AT THE RESOLVED/ UNRESOLVED ENERGY BOUNDARY. *CORRECTED HIGH ENERGY CONSTANT CROSS SECTION EXTENSION.	Sigmal Sigmal
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VERSION 99-2 VERSION 99-3 VERS. 2000-1 VERS. 2002-1 VERS. 2004-1	(JUNE 1999) (OCTOBER 1999) (FEBRUARY 2000 (MAY 2002) (JAN. 2004)	SUBCOMMITTEE RECOMMENDATIONS *GENERAL IMPROVEMENTS BASED ON USER FEEDBACK *EXTENDED RANGE OF INTEGRALS FROM 4 TO 5 UNITS ON EACH SIDE OF ENERGY POINT TO ALLOW FOR LARGER VARIATION IN THE LOCAL CROSS SECTION *ASSUME ENDF/B-VI, NOT V, IF MISSING MF=1, MT-451.)*IMPROVED ERFC FUNCTION DEFINITION. I THANK BOB MACFARLANE (LANL) FOR SUPPLYING A MORE ACCURATE ERFC FUNCTION.)*CORRECTED LOW ENERGY INTERPOLATION FOR NON-POSITIVE CROSS SECTIONS *GENERAL IMPROVEMENTS BASED ON USER FEEDBACK *OPTIONAL INPUT PARAMETERS *OPTIONAL INPUT PARAMETERS *OPTIONALLY IGNORE UNRESOLVED REGION *CORRECTED PROBLEM AT THE RESOLVED/ UNRESOLVED ENERGY BOUNDARY. *CORRECTED HIGH ENERGY CONSTANT CROSS SECTION EXTENSION. *TIGHTER CRITERIA FOR INITIAL ENERGY POINT SPACING *TEMPERATURE DEPENDENT ENERGY POINT	Sigmal Sigmal
VERSION 99-2 VERSION 99-3 VERS. 2000-1 VERS. 2002-1 VERS. 2004-1	(JUNE 1999) (OCTOBER 1999) (FEBRUARY 2000 (MAY 2002) (JAN. 2004)	SUBCOMMITTEE RECOMMENDATIONS *GENERAL IMPROVEMENTS BASED ON USER FEEDBACK *EXTENDED RANGE OF INTEGRALS FROM 4 TO 5 UNITS ON EACH SIDE OF ENERGY POINT TO ALLOW FOR LARGER VARIATION IN THE LOCAL CROSS SECTION *ASSUME ENDF/B-VI, NOT V, IF MISSING MF=1, MT-451.)*IMPROVED ERFC FUNCTION DEFINITION. I THANK BOB MACFARLANE (LANL) FOR SUPPLYING A MORE ACCURATE ERFC FUNCTION.)*CORRECTED LOW ENERGY INTERPOLATION FOR NON-POSITIVE CROSS SECTIONS *GENERAL IMPROVEMENTS BASED ON USER FEEDBACK *OPTIONAL INPUT PARAMETERS *OPTIONALLY IGNORE UNRESOLVED REGION *CORRECTED PROBLEM AT THE RESOLVED/ UNRESOLVED ENERGY BOUNDARY. *CORRECTED HIGH ENERGY CONSTANT CROSS SECTION EXTENSION. *TIGHTER CRITERIA FOR INITIAL ENERGY POINT SPACING *TEMPERATURE DEPENDENT ENERGY POINT SPACING.	Sigmal Sigmal
VERSION 99-2 VERSION 99-3 VERS. 2000-1 VERS. 2002-1 VERS. 2004-1	(JUNE 1999) (OCTOBER 1999) (FEBRUARY 2000 (MAY 2002) (JAN. 2004)	SUBCOMMITTEE RECOMMENDATIONS *GENERAL IMPROVEMENTS BASED ON USER FEEDBACK *EXTENDED RANGE OF INTEGRALS FROM 4 TO 5 UNITS ON EACH SIDE OF ENERGY POINT TO ALLOW FOR LARGER VARIATION IN THE LOCAL CROSS SECTION *ASSUME ENDF/B-VI, NOT V, IF MISSING MF=1, MT-451.)*IMPROVED ERFC FUNCTION DEFINITION. I THANK BOB MACFARLANE (LANL) FOR SUPPLYING A MORE ACCURATE ERFC FUNCTION.)*CORRECTED LOW ENERGY INTERPOLATION FOR NON-POSITIVE CROSS SECTIONS *GENERAL IMPROVEMENTS BASED ON USER FEEDBACK *OPTIONAL INPUT PARAMETERS *OPTIONALLY IGNORE UNRESOLVED REGION *CORRECTED HIGH ENERGY CONSTANT CROSS SECTION EXTENSION. *TIGHTER CRITERIA FOR INITIAL ENERGY POINT SPACING *TEMPERATURE DEPENDENT ENERGY POINT SPACING.	Sigmal Sigmal
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FOLLOWING UNRESOLVED PARAMETERS Sigmal Sigmal Acknowledgement 2004 Sigma1 ------Sigmal Currently almost all improvements to this code are based upon Sigmal feedback from code users who report problems. This feedback Sigmal benefits ALL users of this code, and ALL users are encouraged Sigma1 to report problems. Sigma1 Sigma1 Improvements on the 2004 version of this code based on user Sigmal feedback including, Sigma1 1) Bret Beck - reported a problem at the resolved/unresolved Sigmal energy boundary. Sigmal 2) S. Ganesan - reported a problem for small temperature changes. Sigma1 Sigmal OWNED, MAINTAINED AND DISTRIBUTED BY Sigma1 Sigmal THE NUCLEAR DATA SECTION Sigmal INTERNATIONAL ATOMIC ENERGY AGENCY Sigmal P.O. BOX 100 Sigmal A-1400, VIENNA, AUSTRIA Sigma1 EUROPE Sigmal Sigma1 ORIGINALLY WRITTEN BY Sigmal Sigmal -----DERMOTT E. CULLEN Sigmal UNIVERSITY OF CALIFORNIA Sigmal LAWRENCE LIVERMORE NATIONAL LABORATORY Sigma1 L-159 Sigmal Sigmal P.O. BOX 808 LIVERMORE, CA 94550 Sigma1 Sigma1 U.S.A. TELEPHONE 925-423-7359 Sigmal E. MAIL CULLEN1@LLNL.GOV Sigmal WEBSITE HTTP://WWW.LLNL.GOV/CULLEN1 Sigma1 Sigmal AUTHORS MESSAGE Sigma1 Sigmal THE REPORT DESCRIBED ABOVE IS THE LATEST PUBLISHED DOCUMENTATION Sigma1 FOR THIS PROGRAM. HOWEVER, THE COMMENTS BELOW SHOULD BE CONSIDERED Sigma1 THE LATEST DOCUMENTATION INCLUDING ALL RECENT IMPROVEMENTS. PLEASE Sigma1 READ ALL OF THESE COMMENTS BEFORE IMPLEMENTATION, PARTICULARLY Sigma1 THE COMMENTS CONCERNING MACHINE DEPENDENT CODING. Sigma1 Sigma1 AT THE PRESENT TIME WE ARE ATTEMPTING TO DEVELOP A SET OF COMPUTER Sigmal INDEPENDENT PROGRAMS THAT CAN EASILY BE IMPLEMENTED ON ANY ONE Sigma1 OF A WIDE VARIETY OF COMPUTERS. IN ORDER TO ASSIST IN THIS PROJECT Sigmal IT WOULD BE APPECIATED IF YOU WOULD NOTIFY THE AUTHOR OF ANY Sigma1 COMPILER DIAGNOSTICS, OPERATING PROBLEMS OR SUGGESTIONS ON HOW TO Sigmal IMPROVE THIS PROGRAM. HOPEFULLY, IN THIS WAY FUTURE VERSIONS OF Sigmal THIS PROGRAM WILL BE COMPLETELY COMPATIBLE FOR USE ON YOUR Sigma1 COMPUTER. Sigmal Sigmal PURPOSE Sigmal Sigma1 THIS PROGRAM IS DESIGNED TO DOPPLER BROADEN NEUTRON INDUCED Sigmal CROSS SECTIONS. EACH SECTION OF CROSS SECTIONS (FILE 3) IS READ Sigma1 FROM THE ENDF/B FORMAT. THE DATA IS DOPPLER BROADENED, THINNED Sigma1 AND OUTPUT IN THE ENDF/B FORMAT. Sigmal Sigma1 IN THE FOLLOWING DISCUSSION FOR SIMPLICITY THE ENDF/B TERMINOLOGY Sigmal ---ENDF/B TAPE---WILL BE USED. IN FACT THE ACTUAL MEDIUM MAY BE Sigma1 TAPE, CARDS, DISK OR ANY OTHER MEDIUM. Sigmal Sigmal ENDF/B FORMAT Sigma1 Sigmal THIS PROGRAM ONLY USES THE ENDF/B BCD OR CARD IMAGE FORMAT (AS Sigma1 OPPOSED TO THE BINARY FORMAT) AND CAN HANDLE DATA IN ANY VERSION Sigmal OF THE ENDF/B FORMAT (I.E., ENDF/B-I, II, III, IV OR V FORMAT). Sigma1 Sigmal IT IS ASSUMED THAT THE DATA IS CORRECTLY CODED IN THE ENDF/B Sigmal

```
FORMAT AND NO ERROR CHECKING IS PERFORMED. IN PARTICULAR IT IS
                                                                   Sigma1
ASSUMED THAT THE MAT, MF AND MT ON EACH CARD IS CORRECT. SEQUENCE
                                                                  Sigmal
NUMBERS (COLUMNS 76-80) ARE IGNORED ON INPUT, BUT WILL BE
                                                                   Sigmal
CORRECTLY OUTPUT ON ALL CARDS. THE FORMAT OF SECTION MF=1, MT=451
                                                                   Sigmal
AND ALL SECTIONS OF MF=3 MUST BE CORRECT. THE PROGRAM COPIES ALL
                                                                   Sigmal
OTHER SECTION OF DATA AS HOLLERITH AND AS SUCH IS INSENSITIVE TO
                                                                   Sigma1
THE CORRECTNESS OR INCORRECTNESS OF ALL OTHER SECTIONS.
                                                                   Sigma1
                                                                   Sigmal
ALL CROSS SECTIONS THAT ARE USED BY THIS PROGRAM MUST BE TABULATED Sigma1
AND LINEARLY INTERPOLABLE IN ENERGY AND CROSS SECTION (ENDF/B
                                                                   Sigma1
INTERPOLATION LAW 2). FILE 3 CROSS SECTIONS MAY BE MADE LINEARLY
                                                                   Sigmal
INTERPOLABLE BY USING PROGRAM LINEAR (UCRL-50400, VOL.17, PART A).
                                                                  Sigmal
FILE 2 RESONANCE PARAMETERS MAY BE USED TO RECONSTRUCT ENERGY
                                                                   Sigmal
DEPENDENT CROSS SECTIONS AND ADD IN FILE 3 BACKGROUND CROSS
                                                                   Sigma1
SECTIONS TO DEFINE LINEARLY INTERPOLABLE CROSS SECTIONS BY USING
                                                                   Sigmal
PROGRAM RECENT (UCRL-50400, VOL. 17, PART C). IF THIS PROGRAM
                                                                   Sigmal
FINDS THAT THE FILE 3 CROSS SECTIONS ARE NOT LINEARLY INTERPOLABLE Sigmal
THIS PROGRAM WILL TERMINATE EXECUTION.
                                                                   Sigma1
                                                                   Sigmal
UNRESOLVED RESONANCE REGION
                                                                   Sigma1
                                                                   Sigma1
IN THE UNRESOLVED RESONANCE REGION IT IS NOT POSSIBLE TO EXACTLY
                                                                   Sigmal
DEFINE THE ENERGY DEPENDENCE OF THE CROSS SECTIONS. THE AVERAGE
                                                                   Sigma1
WIDTHS AND SPACINGS GIVEN IN ENDF/B ARE ONLY ADEQUATE TO DEFINE
                                                                   Sigma1
AVERAGE VALUES OF THE CROSS SECTIONS. THEREFORE ALL CROSS SECTIONS Sigmal
IN THE ENDF/B FORMAT FOR THE UNRESOLVED REGION ARE REALLY AVERAGE
                                                                   Sigma1
VALUES WHICH CANNOT BE DOPPLER BROADENED USING THE SIGMA1 METHOD
                                                                   Sigma1
(WHICH REQUIRES TABULATED, LINEARLY INTERPOLABLE, ENERGY DEPENDENT Sigma1
CROSS SECTIONS.
                                                                   Sigmal
                                                                   Sigma1
THEREFORE,
                                                                   Sigma1
(1) ALL TABULATED POINTS WITHIN THE UNRESOLVED RESONANCE REGION
                                                                   Sigma1
WILL BE COPIED, WITHOUT MODIFICATION OR BROADENING. ADOPTION OF
                                                                   Sigmal
THIS CONVENTION WILL ALLOW SUBSEQUENT PROGRAMS TO PROPERLY DEFINE
                                                                   Sigmal
SELF-SHIELDED, DOPPLER BROADENED CROSS SECTIONS IN THE UNRESOLVED
                                                                  Sigma1
RESONANCE REGION.
                                                                   Sigma1
                                                                  Sigma1
(2) CROSS SECTIONS WILL BE EXTENDED AS 1/V ABOVE THE UPPER ENERGY
LIMIT OF THE RESOLVED RESONANCE REGION AND BELOW THE LOWER ENERGY
                                                                   Sigma1
LIMIT OF THE CONTINUUUM REGION (I.E. INTO THE UNRESOLVED
                                                                   Sigma1
RESONANCE REGION). THIS CONVENTION WILL GUARANTEE A SMOOTH
                                                                   Sigma1
BEHAVIOR CLOSE TO THE UNRESOLVED RESONANCE REGION BOUNDARIES.
                                                                   Sigmal
                                                                   Sigma1
OUTPUT FORMAT
                                                                   Sigmal
                                                                   Sigma1
  -----
IN THIS VERSION OF SIGMA1 ALL FILE 3 ENERGIES WILL BE OUTPUT IN
                                                                   Sigmal
F (INSTEAD OF E) FORMAT IN ORDER TO ALLOW ENERGIES TO BE WRITTEN
                                                                   Sigma1
WITH UP TO 9 DIGITS OF ACCURACY. IN PREVIOUS VERSIONS THIS WAS AN
                                                                   Sigma1
OUTPUT OPTION. HOWEVER USE OF THIS OPTION TO COMPARE THE RESULTS
                                                                   Sigmal
OF ENERGIES WRITTEN IN THE NORMAL ENDF/B CONVENTION OF 6 DIGITS
                                                                   Sigmal
TO THE 9 DIGIT OUTPUT FROM THIS PROGRAM DEMONSTRATED THAT FAILURE
                                                                   Sigma1
TO USE THE 9 DIGIT OUTPUT CAN LEAD TO LARGE ERRORS IN THE DATA
                                                                   Sigmal
JUST DUE TO TRANSLATION OF THE ENERGIES TO THE ENDF/B FORMAT.
                                                                   Sigma1
                                                                   Sigmal
CONTENTS OF OUTPUT
                                                                   Sigma1
                                                                   Sigma1
-----
ENTIRE EVALUATIONS ARE OUTPUT, NOT JUST THE BROADENED FILE 3
                                                                   Sigmal
CROSS SECTIONS, E.G. ANGULAR AND ENERGY DISTRIBUTIONS ARE ALSO
                                                                   Sigmal
INCLUDED.
                                                                   Sigmal
                                                                   Sigma1
DOCUMENTATION
                                                                   Sigma1
                                                                   Sigmal
_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
THE FACT THAT THIS PROGRAM HAS OPERATED ON THE DATA IS DOCUMENTED
                                                                   Sigma1
BY THE ADDITION OF THREE COMMENTS CARDS AT THE END OF EACH
                                                                   Sigmal
HOLLERITH SECTION IN THE FORM
                                                                   Sigmal
                                                                   Sigma1
Sigmal
DATA DOPPLER BROADENED TO 300.0 KELVIN AND
                                                                   Sigma1
DATA THINNED TO WITHIN AN ACCURACY OF 0.1 PER-CENT
                                                                   Sigmal
                                                                   Sigma1
THE ORDER OF ALL SIMILAR COMMENTS (FROM LINEAR, RECENT AND GROUPY)
                                                                   Sigma1
REPRESENTS A COMPLETE HISTORY OF ALL OPERATIONS PERFORMED ON
                                                                   Sigmal
```

THE DATA.	Sigmal
THESE COMMENT CARDS ARE ONLY ADDED TO EXISTING HOLLERITH SECTIONS, I.E., THIS PROGRAM WILL NOT CREATE A HOLLERITH SECTION. THE FORMAT OF THE HOLLERITH SECTION IN ENDF/B-V DIFFERS FROM THE THAT OF EARLIER VERSIONS OF ENDF/B. BY READING AN EXISTING MF=1, MT=451 IT IS POSSIBLE FOR THIS PROGRAM TO DETERMINE WHICH VERSION OF THE ENDF/B FORMAT THE DATA IS IN. WITHOUT HAVING A SECTION OF MF=1, MT=451 PRESENT IT IS IMPOSSIBLE FOR THIS PROGRAM TO DETERMINE WHICH VERSION OF THE ENDF/B FORMAT THE DATA IS IN, AND	Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal
AS SUCH IT IS IMPOSSIBLE FOR THE PROGRAM TO DETERMINE WHAT FORMAT SHOULD BE USED TO CREATE A HOLLERITH SECTION.	Sigmal Sigmal Sigmal
	Sigmal
THIS PROGRAM DOES NOT USE THE REACTION INDEX WHICH IS GIVEN IN SECTION MF=1, MT=451 OF EACH EVALUATION.	Sigmal Sigmal Sigmal
THIS PROGRAM DOES NOT UPDATE THE REACTION INDEX IN MF=1, MT=451. THIS CONVENTION HAS BEEN ADOPTED BECAUSE MOST USERS DO NOT REQUIRE A CORRECT REACTION INDEX FOR THEIR APPLICATIONS AND IT WAS NOT CONSIDERED WORTHWHILE TO INCLUDE THE OVERHEAD OF CONSTRUCTING A CORRECT REACTION INDEX IN THIS PROGRAM. HOWEVER, IF YOU REQUIRE A REACTION INDEX FOR YOUR APPLICATIONS, AFTER RUNNING THIS PROGRAM YOU MAY USE PROGRAM DICTIN TO CREATE A CORRECT REACTION INDEX.	Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal
SECTION SIZE	Sigmal
SINCE THIS PROGRAM USES A LOGICAL PAGING SYSTEM THERE IS NO LIMIT TO THE NUMBER OF POINTS IN ANY SECTION, E.G., THE TOTAL CROSS SECTION MAY BE REPRESENTED BY 200,000 DATA POINTS.	Sigmal Sigmal Sigmal Sigmal
SELECTION OF DATA	Sigmal
THE PROGRAM SELECTS MATERIALS TO BE BROADENED BASED EITHER ON MAT (ENDF/B MAT NO.) OR ZA. THE PROGRAM ALLOWS UP TO 100 MAT OR ZA RANGES TO BE SPECIFIED. THE PROGRAM WILL ASSUME THAT THE ENDF/B TAPE IS IN EITHER MAT OR ZA ORDER, WHICHEVER CRITERIA IS USED TO SELECT MATERIALS, AND WILL TERMINATE WHEN A MAT OR ZA IS FOUND THAT IS ABOVE THE RANGE OF ALL REQUESTS.	Sigmal Sigmal Sigmal Sigmal Sigmal
ENERGY GRID OF BROADENED DATA	Sigmal Sigmal
THE ENERGY GRID FOR THE DOPPLER BROADENED CROSS SECTIONS IS SELECTED TO INSURE THAT THE BROADENED DATA IS LINEAR-LINEAR INTERPOLABLE. AS SUCH THE ENERGY GRID FOR THE BROADENED DATA MAY NOT BE THE SAME AS THE ENERGY GRID FOR THE ORIGINAL UNBROADENED DATA. GENERALLY AFTER BROADENING THERE WILL BE FEWER DATA POINTS IN THE RESONANCE REGION, BUT AT LOW ENERGY THERE MAY BE MORE POINTS, DUE TO THE 1/V LOW ENERGY EFFECT CREATED BY DOPPLER BROADENING.	Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal
EFFECTIVE TEMERATURE INCREASE	Sigmal
IF THE ORIGINAL DATA IS NOT AT ZERO KELVIN THE PROGRAM WILL BROADEN THE DATA BY THE EFFECTIVE TEMPERATURE DIFFENCE TO THE FINAL TEMPERATURE. IF THE DATA IS ALREADY AT A TEMPERATURE THAT IS HIGHER THAN THE FINAL TEMPERATURE DOPPLER BROADENING IS NATURALLY NOT PERFORMED AND THE TEMPERATURE IN THE SECTION IS LEFT AT ITS ORIGINAL VALUE.	Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal
MULTIPLE FINAL TEMPERATURES	Sigma1
THE PRESENT VERSION ONLY DOPPLER BROADENS TO ONE FINAL TEMPERATURE (IF THERE IS SUFFICIENT INTEREST EXPRESSED BY USERS FUTURE VERSION MAY BROADEN TO MULTIPLE TEMPERATURES. PLEASE CONTACT THE AUTHOR IF YOU ARE INTERESTED IN A MULTIPLE TEMPERATURE OPTION).	Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal
PROGRAM OPERATION	Sigmal Sigmal

```
EACH SECTION OF FILE 3 DATA IS CONSIDERED SEPERATELY. THE DATA
                                                                  Sigmal
IS READ AND DOPPLER BROADENED A PAGE AT A TIME (ONE PAGE IS
                                                                  Sigmal
60000 DATA POINTS). UP TO THREE PAGES OF DATA MAY BE IN THE CORE
                                                                  Sigma1
AT ANY GIVEN TIME, THE PAGE BEING BROADENED, THE PAGE BELOW IT
                                                                  Sigmal
IN ENERGY AND THE PAGE ABOVE IT IN ENERGY. AFTER A PAGE HAS BEEN
                                                                  Sigmal
BROADENED IT IS THINNED, IF THE ENTIRE SECTION CONTAINS ONLY
                                                                  Sigma1
ONE PAGE OR LESS, IT WILL STILL BE CORE RESIDENT AND WILL BE
                                                                  Sigma1
WRITTEN DIRECTLY FROM CORE TO THE OUTPUT TAPE. IF THE BROADENED,
                                                                  Sigmal
THINNED SECTION IS LARGER THAN A PAGE, AFTER A PAGE HAS BEEN
                                                                  Sigma1
BROADENED AND THINNED IT IS WRITTEN TO A SCRATCH FILE. AFTER THE
                                                                  Sigmal
ENTIRE SECTION HAS BEEN BROADENED AND THINNED THE DATA IS READ
                                                                  Sigmal
FROM SCRATCH TO CORE, ONE PAGE AT A TIME, THE OUTPUT TO THE OUTPUT Sigmal
                                                                  Sigma1
TAPE.
                                                                  Sigmal
ALLOWABLE ERROR
                                                                  Sigmal
-----
                                                                  Sigmal
AFTER DOPPLER BROADENING THE CROSS SECTION IN THE RESONANCE REGION Sigmal
WILL GENERALLY BE MUCH SMOOTHER THAN THE UNBROADENED DATA AND CAN
                                                                 Sigma1
BE REPRESENTED TO THE SAME ACCURACY BY A SMALLER NUMBER OF ENERGY
                                                                  Sigma1
POINTS. THEREFORE AFTER DOPPLER BROADENING THE DATA CAN BE THINNED Sigmal
WITH ESSENTIALLY NO LOSE OF INFORMATION.
                                                                  Sigma1
                                                                  Sigmal
THE ALLOWABLE ERROR MAY BE ENERGY INDEPENDENT (CONSTANT) OR ENERGY Sigma1
DEPENDENT. THE ALLOWABLE ERROR IS DESCRIBED BY A TABULATED
                                                                  Sigmal
FUNCTION OF UP TO 20 (ENERGY, ERROR) PAIRS AND LINEAR INTERPOLATION Sigma1
BETWEEN TABULATED POINTS. IF ONLY ONE TABULATED POINT IS GIVEN THE Sigmal
ERROR WILL BE CONSIDERED CONSTANT OVER THE ENTIRE ENERGY RANGE.
                                                                  Sigma1
WITH THIS ENERGY DEPENDENT ERROR ONE MAY OPTIMIZE THE OUTPUT FOR
                                                                  Sigmal
ANY GIVEN APPLICATION BY USING A SMALL ERROR IN THE ENERGY RANGE
                                                                  Sigmal
OF INTEREST AND A LESS STRINGENT ERROR IN OTHER ENERGY RANGES.
                                                                  Sigma1
                                                                  Sigmal
                                                                  Sigma1
INPUT FILES
_____
                                                                  Sigmal
UNIT DESCRIPTION
                                                                  Sigma1
____
     _____
                                                                  Sigmal
  2 INPUT CARDS (BCD - 80 CHARACTERS/RECORD)
                                                                  Sigmal
 10 ORIGINAL ENDF/B DATA (BCD - 80 CHARACTERS/RECORD)
                                                                  Sigmal
                                                                  Sigmal
OUTPUT FILES
                                                                  Sigmal
_____
                                                                  Sigma1
UNIT DESCRIPTION
                                                                  Sigmal
----
     _____
                                                                  Sigma1
  3 OUTPUT REPORT (BCD - 120 CHARACTERS/RECORD)
                                                                  Sigmal
  11 FINAL ENDF/B DATA (BCD - 80 CHARACTERS/RECORD)
                                                                  Sigmal
                                                                  Sigmal
SCRATCH FILES
                                                                  Sigma1
-----
                                                                  Sigmal
UNIT DESCRIPTION
                                                                  Sigmal
     _____
                                                                  Sigmal
----
 12 SCRATCH FILE FOR BROADENED DATA
                                                                  Sigmal
      (BINARY - 180000 WORDS/RECORD - DOUBLE PRECISION/
                                                                  Sigmal
                42000 WORDS/RECORD - SINLGE PRECISION)
                                                                  Sigmal
                                                                  Sigma1
OPTIONAL STANDARD FILE NAMES (SEE SUBROUTINE FILEIO)
                                                                  Sigmal
                                                                  Sigma1
UNIT FILE NAME
                                                                  Sigmal
                                                                  Sigmal
     -----
_ _ _ _
 2
     SIGMA1.INP
                                                                  Sigmal
  3
     SIGMA1.LST
                                                                  Sigmal
10
     ENDFB.IN
                                                                  Sigma1
    ENDFB.OUT
11
                                                                  Sigmal
12
     (SCRATCH)
                                                                  Sigma1
                                                                  Sigmal
INPUT CARDS
                                                                  Sigmal
_____
                                                                  Sigmal
CARD COLS. DESCRIPTION
                                                                  Sigmal
----
            _____
                                                                  Sigma1
  1 1-11 SELECTION CRITERIA (0=MAT, 1=ZA)
                                                                  Sigmal
     12-22 MONITOR MODE SELECTOR
                                                                  Sigma1
            = 0 - NORMAL OPERATION
                                                                  Sigma1
            = 1 - MONITOR PROGRESS OF DOPPLER BROADENING OF DATA. Sigmal
```

			EACH TIME A PAGE OF DATA POINTS IS WRITTEN TO	Sigmal
			THE SCRATCH FILE PRINT OUT THE TOTAL NUMBER OF	Sigmal
			POINTS ON SCRATCH AND THE LOWER AND UPPER	Sigmal
			ENERGY LIMITS OF THE PAGE (THIS OPTION MAY BE	Sigmal
			USED IN ORDER TO MONITOR THE EXECUTION SPEED	Sigmai
		••• ••	VELVIN TEMPERATURE	Sigmal
		23-33	KELVIN IEMPERATURE	Sigma1
		34-44	(DEFAILT VALUE - 1 OF 10 BADNS)	Sigmal
		45-55	NEGATIVE CROSS SECTION TREATMENT	Sigmal
		15 55	= 0 - 0.K.	Sigmal
			= 1 - SET = 0	Sigma1
		56-66	UNRESOLVED RESONANCE REGION TREATMENT	Sigmal
			= 0 - COPY (NO BROADENING)	Sigmal
			= 1 - IGNORE (BROADEN)	Sigmal
	2	1-60	ENDF/B INPUT DATA FILENAME	Sigmal
			(STANDARD OPTION = ENDFB.IN)	Sigmal
	3	1-60	ENDF/B OUTPUT DATA FILENAME	Sigmal
			(STANDARD OPTION = ENDFB.OUT)	Sigmal
	4-N	1-11	LOWER MAT OR ZA LIMIT	Sigmal
		12-22	UPPER MAT OR ZA LIMIT	Sigmal
			UP TO 100 MAT OR ZA RANGES MAY BE SPECIFIED, ONE	Sigmal
			RANGE PER CARD. THE LIST OF RANGES IS TERMINATED BY	Sigmal
			A BLANK CARD. IF THE UPPER LIMIT IS LESS THAN THE	Sigmal
			LOWER LIMIT THE UPPER LIMIT WILL BE SET EQUAL TO THE	Sigmal
			LOWER LIMIT. IF THE FIRST REQUEST CARD IS BLANK IT	Sigmal
			WILL TERMINATE THE LIST OF REQUESTS AND CAUSE ALL	Sigmal
			DATA TO BE RETRIEVED (SEE EXAMPLE INPUT).	Sigmal
	VARY	1-11	ENERGY FOR ERROR LAW	Sigmal
		12-22	ERROR FOR ERROR LAW	Sigmal
			THE ACCEPTABLE LINEARIZING ERROR CAN BE GIVEN AS AN	Sigmal
			ENERGY DEPENDENT FUNCTION SPECIFIED BY UP TO 20	Sigmal
			(ENERGY, ERROR) PAIRS AND LINEAR INTERPOLATION	Sigmal
			TABULATE POINTS. ENERGIES MUST BE IN ASCENDING ORDER.	Sigmal
			THE ERROR LAW IS TERMINATED BY A BLANK CARD. IF THE	Sigmal
			FIRST ERROR LAW CARD IS BLANK IT WILL TERMINATE THE	Sigmal
			FIRST ERROR LAW CARD IS BLANK IT WILL TERMINATE THE ERROR LAW AND THE ERROR WILL BE TREATED AS ENERGY INDEPENDENT FOUND TO ZEPO WHICH INDICATES THAT THE	Sigmal Sigmal
			FIRST ERROR LAW CARD IS BLANK IT WILL TERMINATE THE ERROR LAW AND THE ERROR WILL BE TREATED AS ENERGY INDEPENDENT, EQUAL TO ZERO, WHICH INDICATES THAT THE BEDADENED DATA SHOULD NOT BE THINNED	Sigmal Sigmal Sigmal
			FIRST ERROR LAW CARD IS BLANK IT WILL TERMINATE THE ERROR LAW AND THE ERROR WILL BE TREATED AS ENERGY INDEPENDENT, EQUAL TO ZERO, WHICH INDICATES THAT THE BROADENED DATA SHOULD NOT BE THINNED.	Sigmal Sigmal Sigmal Sigmal
T	ZXAMPI	.E INPIP	FIRST ERROR LAW CARD IS BLANK IT WILL TERMINATE THE ERROR LAW AND THE ERROR WILL BE TREATED AS ENERGY INDEPENDENT, EQUAL TO ZERO, WHICH INDICATES THAT THE BROADENED DATA SHOULD NOT BE THINNED.	Sigmal Sigmal Sigmal Sigmal Sigmal
I	EXAMPI	LE INPU	FIRST ERROR LAW CARD IS BLANK IT WILL TERMINATE THE ERROR LAW AND THE ERROR WILL BE TREATED AS ENERGY INDEPENDENT, EQUAL TO ZERO, WHICH INDICATES THAT THE BROADENED DATA SHOULD NOT BE THINNED.	Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal
I -	EXAMPI	LE INPU	FIRST ERROR LAW CARD IS BLANK IT WILL TERMINATE THE ERROR LAW AND THE ERROR WILL BE TREATED AS ENERGY INDEPENDENT, EQUAL TO ZERO, WHICH INDICATES THAT THE BROADENED DATA SHOULD NOT BE THINNED.	Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal
- - -	EXAMPI BROADI	LE INPU SN ALL U	FIRST ERROR LAW CARD IS BLANK IT WILL TERMINATE THE ERROR LAW AND THE ERROR WILL BE TREATED AS ENERGY INDEPENDENT, EQUAL TO ZERO, WHICH INDICATES THAT THE BROADENED DATA SHOULD NOT BE THINNED. IF NO. 1	Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal
 - 	EXAMPI BROADI TO 1	LE INPU EN ALL I LOO EV I KEV VARI	FIRST ERROR LAW CARD IS BLANK IT WILL TERMINATE THE ERROR LAW AND THE ERROR WILL BE TREATED AS ENERGY INDEPENDENT, EQUAL TO ZERO, WHICH INDICATES THAT THE BROADENED DATA SHOULD NOT BE THINNED. IF NO. 1 JURANIUM ISOTOPES AND THORIUM-232 TO 300 KELVIN. FROM IHIN OUTPUT DATA TO 0.1 PER-CENT ACCURACY. FROM 100 EV Y THE ERROR BETWEEN 0.1 AND 1 PER-CENT. ABOVE 1 KEV	Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal
- - - (2 7	EXAMPI SROADI TO 1 FO 1 F JSE 1	LE INPU EN ALL I LOO EV I KEV VARI PER-CEI	FIRST ERROR LAW CARD IS BLANK IT WILL TERMINATE THE ERROR LAW AND THE ERROR WILL BE TREATED AS ENERGY INDEPENDENT, EQUAL TO ZERO, WHICH INDICATES THAT THE BROADENED DATA SHOULD NOT BE THINNED. T NO. 1 JRANIUM ISOTOPES AND THORIUM-232 TO 300 KELVIN. FROM THIN OUTPUT DATA TO 0.1 PER-CENT ACCURACY. FROM 100 EV Y THE ERROR BETWEEN 0.1 AND 1 PER-CENT. ABOVE 1 KEV NT ACCURACY.	Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal
 - 	EXAMPI BROADI) TO 1 FO 1 F JSE 1	LE INPU EN ALL U LOO EV S KEV VAR PER-CEI	FIRST ERROR LAW CARD IS BLANK IT WILL TERMINATE THE ERROR LAW AND THE ERROR WILL BE TREATED AS ENERGY INDEPENDENT, EQUAL TO ZERO, WHICH INDICATES THAT THE BROADENED DATA SHOULD NOT BE THINNED. T NO. 1 JRANIUM ISOTOPES AND THORIUM-232 TO 300 KELVIN. FROM THIN OUTPUT DATA TO 0.1 PER-CENT ACCURACY. FROM 100 EV Y THE ERROR BETWEEN 0.1 AND 1 PER-CENT. ABOVE 1 KEV NT ACCURACY.	Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal Sigmal
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	(0.0 ALLOWABLE ERROR, TERMINATE ERROR LAW)	Sigmal
	(RETRIEVE ALL DATA, TERMINATE REQUEST LIST)	Sigmal
\ENDFB6\SIGMA1\ZA092	238	Sigmal
\ENDFB6\RECENT\ZA092	238	Sigmal
	3.00000+ 2 1.00000-30	Sigmal
		Sigmal
THE FOLLOWING 5 (CARDS ARE REQUIRED	Sigmal
		Sigmal
DATA TO \ENDFB\S	IGMA1\ZA092238	Sigmal
READ ENDF/B DATA	FROM \ENDFB6\RECENT\ZA092238 AND WRITE ENDF/B	Sigmal
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1.0E-10).		Sigmal
INTEREST TO BE 1	.0E-30 BARNS (INSTEAD OF THE DEFAULT VALUE OF	Sigmal
THE SAME AS ABOV	E, ONLY DEFINE THE MINIMUM CROSS SECTION OF	Sigmal
		Sigmal
EXAMPLE INPUT NO	. 3	Sigmal
	,	Sigmal
	(0.0 ALLOWABLE ERROR, TERMINATE ERROR LAW)	Sigmal
	(RETRIEVE ALL DATA, TERMINATE REQUEST LIST)	Sigmal
	(USE STANDARD FILENAME = ENDFB.OUT)	Sigmal
	(USE STANDARD FILENAME = ENDFB.IN)	Sigma1
	3.00000+ 2	Sigmal
THE FOLLOWING 5	CANDO AND ADQUIND	Sigma1
THE FOLLOWING 5	ARDS ARE REQUIRED	Sigmal
THEN USE STANDARD	J'FILENAMES.	Sigmal
THEN USE STANDAR	FTLENAMES	Simal