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Fast Breeder Reactor
Static Physics Methods
Development and Analysis Project
Volume 2 — Listing of FARED and
RETAP Programs

Babcock & Wilcox

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Static Physics Methods
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Volume 2 — Listing of FARED and
RETAP Programs

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1. INTRODUCTION

The RETAP microgroup library generation and update program comprises eight primary overlays and requires 3916 source cards. The core storage required for compilation and execution on the CDC-6600 computer is 113,000₈ words. The source program is listed completely in section 3.

Section 2 contains a listing of the FARED program source deck. This program is overlaid with three primary overlays and 13 secondary overlays. The program has 15,386 source cards and requires 142,300₈ words of core storage for compilation and execution.


```

OVERLAY (RIM,J,0)
PROGRAM FAREO (INPUT=1001,OUTPUT=1001,TAPE11=INPUT,TAPE6=OUTPUT,
XTAPE1=1001,TAPE2=1001,TAPE3=1001,TAPE4=1001,TAPE5=1001,TAPE7=1001,
XTAPE8=1001,TAPE9=1001,TAPE10=1001,TAPE12=1001,TAPE13=1001,TAPE14=1
X001,TAPE15=1001,TAPE16=1001,TAPE17=1001,TAPE19=1001)
C -
COMMON  NCRD,      NPRT,      LIB,      NERG,      NRR
COMMON  NUR,       NXSEC,     NINP,     NBCD,      NSFX
COMMON  NBAB,      NRR1,      NURI,     NBGXS,     NSPEC
COMMON  NAJFX,     NMAC,      NGCON,    NSCR,      NBURN
COMMON  NGE0,      NMGR,      NGRS,     NDSG,      NPTS
COMMON  NOB,       NOZ,       NOBM,     NOZH,      NUCL
COMMON  POW,       R0IM,      RAD1,     RADO,      COVIN
COMMON  MAXIT,     EXOPT,     IDCHA,   IBOP,      JBOP
COMMON  NFLXOP,    NBSQ,      NWMR,     NWZMR,     NWBR
COMMON  NSOPA,     NSOPM,     TIME,     PT,       QACC
COMMON  HMACC,     QACB,      HMACB
COMMON  SPARES(38)
COMMON  IFLAG,     IV,        IFLG,     IWORU(18)
COMMON  IBLANK,    IZERO,     IPLUS,    IMINUS,    IASTER
COMMON  LCHAR,     NWOD,      BLANKS
COMMON  IZP(20),   KOM(5000)
C -
C - DEFINITION OF COMMON VARIABLES
C - NCRD - UNIT 11 - INPUT FILE
C - NPRT - UNIT 6 - OUTPUT FILE
C - LIB - UNIT 7 - LIBRARY DATA FILE GENERATED BY THE RETAP PROGRAM
C - NERG - UNIT 1 - ABBREVIATED LIBRARY FILES
C -
C - CONTENTS FILE 1 GROUP ENERGY STRUCTURE
C - FILE 2 DEPLETION CHAIN DATA
C - FILE 6 REGA SOURCE SPECTRUM
C - FILE 7 FISSION PRODUCT DATA
C - NRR - UNIT 2 - ABBREV. LIB. FILE 3 - RESOLVED RESONANCE DATA
C - NUR - UNIT 3 - ABBREV. LIB. FILE 4 - UNRESOLVED RESONANCE DATA
C - NXSEC- UNIT 4 - ABBREV. LIB. FILE 5 - GROUP X-SECT AND TRANS. MAT
C - NINP - UNIT 5 - TEMPORARY STORAGE FILE OF INPUT REACTOR SPECS
C - NBCD - UNIT 8 - STORAGE OF POLYGROUP STRUCTURE AND BLK--CELL DATA
C - NSFX - UNIT 9 - STORAGE OF POINT-ZONE SOURCE FILE
C - NBAB - UNIT 10 - STORAGE TRANS BUCKLING, INNER ,OUTER BOUND COND
C - NRR1 - UNIT 12 - SCRATCH FILE FOR CALCULATED RESOLVED RES X-SECTS
C - NURI - UNIT 13 - SCRATCH FILE FOR CALC UNRESOLVED RES X-SECTS
C - NBGXS- UNIT 14 - BROAD GROUP MICROSCOPIC X-SECT
C - NSPEC- UNIT 15 - FISSION SPECTRUM, ENERGY FLUX AND CURRENT
C - NAJFX- UNIT 16 - STORAGE OF CALCULATED ADJOINT FLUXES
C - NMAC - UNIT 17 - BROAD GROUP MACROSCOPIC X-SEC
C - NSCR - UNIT 19 - GENERAL SCRATCH FILE
C - NGE0 - GEOMETRY FLAG -- 1,2,3 FOR SLAB,CYLINDER,SPHERE
C - NMGR - NO OF POLYGROUPS
C - NGRS - NO OF MICROGROUPS
C - NDSG - NO OF DOWNSCATTERING POLYGROUPS

```

C -	NPTS - NO OF MESH POINTS IN FLUX CALCULATION	FARED	00052
C -	NOB - NO OF BLOCKS SPECIFIED	FARED	00053
C -	NOZ - NO OF ZONES SPECIFIED	FARED	00054
C -	NOBM - NO OF BULK MATERIALS SPECIFIED	FARED	00055
C -	NOZM - NO OF ZONE MATERIALS SPECIFIED	FARED	00056
C -	NUCL - NO OF UNIQUE NUCLIDES IDENTIFIED IN REACTOR SPECIFICATION	FARED	00057
C -	POW - POWER	FARED	00058
C -	RUIM - REACTOR DIMENSION	FARED	00059
C -	RAUI - RADIUS OF INTERNAL BOUNDARY	FARED	00060
C -	RADO - RADIUS OF EXTERNAL BOUNDARY	FARED	00061
C -	COVIN- CONVERGENCE CRITERION	FARED	00062
C -	MAXIT- MAXIMUM NO OF ITERATIONS IN FLUX CAL	FARED	00063
C -	EXOPT- FLUX EXTRAPOLATION FACTOR	FARED	00064
C -	IDCHA- DEPLETION CHAIN IDENTIFICATION	FARED	00065
C -	IBOP - INNER BOUNDARY CONDITION OPTION	FARED	00066
C -	JBOP - OUTER BOUNDARY CONDITION OPTION	FARED	00067
C -	NFLXOP-FLUX CONVERGENCE OPTION	FARED	00068
C -	NBSQ - INPUT BLOCK BUCKLING OPTION	FARED	00069
C -	NWBM-	FARED	00070
C -	NWZMR-	FARED	00071
C -	NWBR -	FARED	00072
C -	NSOPA-	FARED	00073
C -	NSOPM-	FARED	00074
C -	TIME - TIME IN DAYS	FARED	00075
C -	PT -	FARED	00076
C -	QACC - OUT OF PILE ACCUMULATION OF INTEGRATED POWER FOR CORE	FARED	00077
C -	HMACC- OUT OF PILE ACCUMULATION OF HEAVY MASS FOR CORE	FARED	00078
C -	QACB - OUT OF PILE ACCUMULATION OF INTEGRATED POWER FOR BLANKET	FARED	00079
C -	HMACB- OUT OF PILE ACCUMULATION OF HEAVY MASS FOR BLANKET	FARED	00080
C -	SPARES-UNASSIGNED LOCATIONS	FARED	00081
C -	IFLAG- COUNTER FOR NUMBER OF ERROR CONDITIONS IN PROCESSING INPUT	FARED	00082
C -	IV - INPUT NUMERIC DATA IN FIELD READ BY CRAMIN	FARED	00083
C -	IFLG - FLAG INDICATING TYPE OF FIELD READ BY CRAMIN	FARED	00084
C -	IWORD- INPUT ALPHABETIC DATA IN FIELD READ BY CRAMIN	FARED	00085
C -	IBLANK-INTEGER EQUIVALENT OF CHARACTER BLANK	FARED	00086
C -	IZERO- INTEGER EQUIVALENT OF CHARACTER ZERO (0)	FARED	00087
C -	IPLUS- INTEGER EQUIVALENT OF CHARACTER PLUS SIGN (+)	FARED	00088
C -	IMINUS-INTEGER EQUIVALENT OF CHARACTER MINUS SIGN (-)	FARED	00089
C -	IASTER-INTEGER EQUIVALENT OF CHARACTER ASTERISK (*)	FARED	00090
C -	ICHAR- NUMBER OF BCD CHARACTERS/WORD FOR YOUR MACHINE	FARED	00091
C -	NWOD - NUMBER OF WORDS REQUIRED TO STORE 72 CHARACTERS YOUR MACH.	FARED	00092
C -	BLANKS-WORD CONTAIN ICHAR BLANKS	FARED	00093
C -	IZP - POINTER ARRAY FOR ACCESSING ZONE DEPENDENT DATA IN KOM	FARED	00094
C -	IZP(I) = N WHERE THE NTH LOCATION OF KOM CONTAINS THE	FARED	00095
C -	FIRST ITEM OF DATA FOR ZONE NUMBER I	FARED	00096
C -	KOM - STORAGE ARRAY FOR ZONE PARAMETERS -	FARED	00097
C -	STORAGE FOR FIRST ZONE IS ARRANGED AS FOLLOWS	FARED	00098
C -	KOM(1) ZONE IDENTIFICATION	FARED	00099
C -	KOM(2) OUTER RADIUS OF ZONE	FARED	00100
C -	KOM(3) NUMBER OF MESH INTERVALS IN ZONE	FARED	00101

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C -      KOM(4)  ZONE TYPE - 1,2,3 FOR CORE,BLANKET,REFLECTOR  FARED  00102
C -      KOM(5)  BLOCK IDENTIFICATION IN WHICH THIS ZONE IS LOC FARED  00103
C -      KOM(6)  NUMBER OF NUCLIDES IN THE ZONE                FARED  00104
C -      KOM(7)  VOLUME OF ZONE                                FARED  00105
C -      KOM(8)  UNASSIGNED                                     FARED  00106
C -      KOM(9)  UNASSIGNED                                     FARED  00107
C -      KOM(10) UNASSIGNED                                      FARED  00108
C -      .                                                    FARED  00109
C -      .                                                    FARED  00110
C -      .                                                    FARED  00111
C -      .                                                    FARED  00112
C -      KOM(10I+1) ID OF ITH NUCLIDE                          FARED  00113
C -      KOM(10I+2) ZONE MAT ID CONTAINING ITH NUCLIDE        FARED  00114
C -      KOM(10I+3) NUCLIDE TYPE, DEPLETION CHAIN INDEX, AND  FARED  00115
C -                  BULK MATERIAL ID FOR ITH NUCLIDE         FARED  00116
C -                  WORD IS STORED AS 1000JJ*N+100J*0+B      FARED  00117
C -                  WHERE  N IS NUCLIDE TYPE FLAG            FARED  00118
C -                  0 IS DEPLETION CHAIN INDEX               FARED  00119
C -                  B IS BULK MATERIAL ID                    FARED  00120
C -      KOM(10I+4) CELL INDEX OF ITH NUCLIDE                 FARED  00121
C -      KOM(10I+5) HEAVY                                       FARED  00122
C -      KOM(10I+6)                                             FARED  00123
C -      KOM(10I+7) CURRENT HOMOGENEOUS NUMBER DENSITY        FARED  00124
C -      KOM(10I+8) INITIAL HOMOGENEOUS NUMBER DENSITY        FARED  00125
C -      KOM(10I+9) ZONE MATERIAL FRACTION                     FARED  00126
C -      KOM(10I+10) BULK MATERIAL FRACTION                    FARED  00127
C -      .                                                    FARED  00128
C -      .                                                    FARED  00129
C -      .                                                    FARED  00130
C -      SEQUENCE KOM(10I+1) - KOM(10I+10) IS REPEATED FOR EACH NUCLIDE FARED  00131
C -      ZONE 2 STORAGE IS SIMILARLY ARRANGED BEGINNING IN LOC KOM(IZP(2)) FARED  00132
C -      DATA BLANK /4H *+-/                                     FARED  00133
C -      DATA ZERO  /1H0/                                       FARED  00134
C -      DATA BLANK /4H *+-/                                     FARED  00135
C -      DATA ZERO  /1H0/                                       FARED  00136
C -      VARIABLE RIM IS THE FILE NAME FROM WHICH OVERLAYS ARE LOADED FARED  00137
C -      DATA RIM/3LRIM/                                         FARED  00138
C -      CALL LPINT (BLANK,1,IBLANK)                             FARED  00139
C -      CALL LPINT (BLANK,2,IASTER)                             FARED  00140
C -      CALL LPINT (BLANK,3,IPLUS)                             FARED  00141
C -      CALL LPINT (BLANK,4,IMINUS)                             FARED  00142
C -      CALL LPINT (ZERO,1,IZERO)                               FARED  00143
C -      CALL LPINT (ZERO,1,IZERO)                               FARED  00144
C -      CALL LPINT (ZERO,1,IZERO)                               FARED  00145
C -      CALL LPINT (ZERO,1,IZERO)                               FARED  00146
C -      * * * * *                                               FARED  00147
C -      ICHAR IS A MACHINE DEPENDENT PARAMETER                 FARED  00148
C -      ICHAR SHOULD BE CHANGED TO REFLECT THE NUMBER OF BCD CHARACTERS FARED  00149
C -      WHICH CAN BE CONTAINED IN 1 MACHINE WORD               FARED  00150
C -      ICHAR=10                                                FARED  00151

```

C -	*****	FARED	00152
C -		FARED	00153
C -		FARED	00154
	NWOD = (72 + ICHAR-1)/ICAR	FARED	00155
	DO 2 I = 1,ICAR	FARED	00156
	CALL INTALP(BLANKS,I,IBLANK)	FARED	00157
2	CONTINUE	FARED	00158
C -		FARED	00159
C -	ASSIGN INPUT AND OUTPUT UNITS (CARD READER AND PRINTER)	FARED	00160
C -		FARED	00161
	NCRD = 11	FARED	00162
	NPRT = 6	FARED	00163
	IFLG = 10	FARED	00164
	CALL OVERLAY (RIM,1,0)	FARED	00165
C -		FARED	00166
C -	READ AND INTERPRET A PRIMARY DIRECTIVE	FARED	00167
C -		FARED	00168
5	CALL CRAMIN (IV,IFLG,IWORD)	FARED	00169
6	IF (IFLG .NE. 0) GO TO 110	FARED	00170
	CALL SCAN (40HCONFIGURATION*REGA*RAIM*FUELMGMT*FINIS**,IWORD(1),L)	FARED	00171
	GO TO (10, 20, 30, 10, 90,100),L	FARED	00172
10	CALL OVERLAY(RIM,1,0)	FARED	00173
	GO TO 6	FARED	00174
20	CALL OVERLAY(RIM,2,0)	FARED	00175
	GO TO 6	FARED	00176
30	CALL OVERLAY(RIM,3,0)	FARED	00177
	GO TO 6	FARED	00178
90	WRITE (NPRT,95)	FARED	00179
95	FORMAT (1H1,37H CALCULATION TERMINATED BY DIRECTIVE.)	FARED	00180
	STOP 1	FARED	00181
100	WRITE (NPRT,105) IWORD(1)	FARED	00182
105	FORMAT (1H1,20H DIRECTIVE READ IS -,A4,80H-AND IS NOT AN ACCEPTABL	FARED	00183
	XE PRIMARY DIRECTIVE. CALCULATION TERMINATED ABNORMALLY.)	FARED	00184
108	CONTINUE	FARED	00185
	STOP 2	FARED	00186
110	IF (IFLG .EQ. -3) GO TO 5	FARED	00187
	WRITE (NPRT,115)	FARED	00188
115	FORMAT(1H1,102H PRIMARY DIRECTIVE EXPECTED - DATA FIELD NOT IN PRE	FARED	00189
	XSCRIBED FORMAT. CALCULATION TERMINATED ABNORMALLY.)	FARED	00190
	GO TO 108	FARED	00191
	END	FARED	00192

T2	SA6	B3	PASS IT BACK	FARED	00243
	EQ	LPINT	RETURN	FARED	00244
	BX1	X0*X1	MASK OUT OUR OLD CHARACTER	FARED	00245
	IX5	X4-X2	RETURN WORD TO WAY IT WAS	FARED	00246
	S87	X5	BACK SHIFT COUNT	FARED	00247
	BX6	X3+X1	ADD IN NEW ONE	FARED	00248
	LX6	X0,B7	SHIFT WORD BACK INTO POSITION	FARED	00249
	SA6	A1	PASS IT BACK	FARED	00250
	EQ	INTALP	RETURN	FARED	00251
	END			FARED	00252

C -	SUBROUTINE SCAN (HOLL,W,I)						FARED	00253
C -	HOLL IS A HOLLERITH ARRAY OF WORDS SEPARATED BY ASTERISKS (*)						FARED	00254
C -	A DOUBLE ASTERISK (**) INDICATES THE END OF THE ARRAY. I IS SET						FARED	00255
C -	TO J WHERE W IS IDENTICAL TO THE JTH MEMBER OF THE ARRAY. IF NO						FARED	00256
C -	IDENTITY IS FOUND, I IS SET TO 1 MORE THAN THE NUMBER OF MEMEBERS						FARED	00257
C -	IN THE ARRAY						FARED	00258
C -	COMMON	NCRD,	NPRT,	LIB,	NERG,	NRR	FARED	00259
	COMMON	NUR,	NXSEC,	NINP,	NBCD,	NSFX	FARED	00260
	COMMON	NBAB,	NRRI,	NURI,	NBGXS,	NSPEC	FARED	00261
	COMMON	NAJFX,	NMAC,	NGCON,	NSCR,	NBURN	FARED	00262
	COMMON	NGEO,	NMGR,	NGRS,	NDSG,	NPTS	FARED	00263
	COMMON	NOB,	NOZ,	NOBH,	NOZM,	NUCL	FARED	00264
	COMMON	POW,	RDIM,	RADI,	RADO,	COVIN	FARED	00265
	COMMON	MAXIT,	EXOFT,	IOCHA,	IBOP,	JBOP	FARED	00266
	COMMON	NFLXOP,	NBSQ,	NWBMR,	NWZMR,	NWBR	FARED	00267
	COMMON	NSOPA,	NSOPM,	TIME,	PT,	QACC	FARED	00268
	COMMON	HMACC,	QACB,	HMACB			FARED	00269
	COMMON	SPARES(38)					FARED	00270
	COMMON	IFLAG,	IV,	IFLG,	IWORD(18)		FARED	00271
	COMMON	IBLANK,	IZERO,	IPLUS,	IMINUS,	IASTER	FARED	00272
	COMMON	ICHAR,	NWOD,	BLANKS			FARED	00273
	COMMON	IZP(2J),	KOM(5000)				FARED	00274
C -							FARED	00275
C -	** SEE PROGRAM FARED FOR A DESCRIPTION OF BLANK COMMON VARIABLES						FARED	00276
C -							FARED	00277
	DIMENSION HOLL(1)						FARED	00278
	JLAST=-1						FARED	00279
	J=1						FARED	00280
	I=J						FARED	00281
8	I=I+1						FARED	00282
	WORD = BLANKS						FARED	00283
	K=J						FARED	00284
6	CALL LPINT (HOLL(1),J,NCH)						FARED	00285
	J=J+1						FARED	00286
	IF (NCH - IASTER) 1,2,1						FARED	00287
1	IF (NCH - IBLANK) 9,6,9						FARED	00288
9	K=K+1						FARED	00289
	IF (K - ICHAR) 5,5,6						FARED	00290
5	CALL INTALP (WORD,K,NCH)						FARED	00291
	GO TO 6						FARED	00292
2	IF (J-JLAST-1) 7,7,3						FARED	00293
7	RETURN						FARED	00294
3	JLAST=J						FARED	00295
	CALL RECOG (WORD,W,L)						FARED	00296
	IF (L) 8,8,7						FARED	00297
	END						FARED	00298
							FARED	00299

	SUBROUTINE RECOG (A,M,I)						FARED	00300
C -	THE HOLLERITH WORDS IN A AND M ARE COMPARED FOR FIRST ICHAR						FARED	00301
C -	CHARACTER POSITIONS. IF A AND M ARE THE SAME I IS SET EQUAL TO 0						FARED	00302
C -	OTHERWISE I IS SET EQUAL TO 1						FARED	00303
C -	COMMON	WCRD,	MPRT,	LIB,	NERG,	NRR	FARED	00304
	COMMON	NUR,	NXSEC,	NINP,	NBCD,	NSFX	FARED	00305
	COMMON	NBAG,	NRRI,	NURI,	NBGXS,	NSPEC	FARED	00306
	COMMON	NAJFX,	NMAC,	NGCON,	NSCR,	NBURN	FARED	00307
	COMMON	NGEO,	NMGR,	NGRS,	NDSG,	NPTS	FARED	00308
	COMMON	NOB,	NOZ,	NOBH,	NOZH,	NUCL	FARED	00309
	COMMON	POW,	ROIN,	RADI,	RADO,	COVIN	FARED	00310
	COMMON	MAXIT,	EXOPT,	IOCHA,	IBOP,	JBOP	FARED	00311
	COMMON	NFLXOP,	NBSQ,	NWHR,	NWZHR,	NWBR	FARED	00312
	COMMON	NSOPA,	NSOPH,	TIME,	PT,	QACC	FARED	00313
	COMMON	HNACC,	QACB,	HMACH			FARED	00314
	COMMON	SPARES(38)					FARED	00315
	COMMON	IFLAG,	IV,	IFLG,	IWORD(18)		FARED	00316
	COMMON	IBLANK,	IZERO,	IPLUS,	IMINUS,	IASTER	FARED	00317
	COMMON	ICHAR,	NWOD,	BLANKS			FARED	00318
	COMMON	IZP(20),	KOM(5000)				FARED	00319
C -							FARED	00320
C -	** SEE PROGRAM FARED FOR A DESCRIPTION OF BLANK COMMON VARIABLES						FARED	00321
C -							FARED	00322
	I=0						FARED	00323
	DO 1 J = 1, ICHAR						FARED	00324
	CALL LPINT (A,J,NCH1)						FARED	00325
	CALL LPINT (M,J,NCH2)						FARED	00326
	IF(NCH1-NCH2) 2,1,2						FARED	00327
1	CONTINUE						FARED	00328
	I=1						FARED	00329
2	RETURN						FARED	00330
	END						FARED	00331
							FARED	00332

```

SUBROUTINE GRAMIN (V,N,W)
C - GRAMIN IS A GENERALIZED FORMAT FREE INPUT ROUTINE. IT READS A FARED J0333
C - DATA CARD INTO A BUFFER FOR ALPHANUMERIC INFORMATION AND PUTS FARED J0334
C - ALPHABETIC INFORMATION IN W AND NUMERIC INFORMATION IN V. GRAMIN FARED J0335
C - PROCESSES A FIELD OF INFORMATION AT A TIME WHERE A FIELD IS FARED J0336
C - TERMINATED BY A BLANK OR COLUMN 72 OF THE CARD. FARED J0337
C - THE TYPE INDICATOR N IS SET SUCH THAT FARED J0338
C - N = 0 IF A WORD ONLY IS READ FARED J0339
C - N = 1 IF A FLOATING POINT NUMBER IS READ FARED J0340
C - N = 2 IF A WORD AND FLOATING POINT NUMBER IS READ FARED J0341
C - N = -1 IF AN INTEGER IS READ FARED J0342
C - N = -2 IF A WORD AND INTEGER ARE READ FARED J0343
C - N = -3 IF A HOLLERITH ARRAY IS READ FARED J0344
C - A HOLLERITH ARRAY IS IDENTIFIED BY A $ CHARACTER IN COLUMN 1. THE FARED J0345
C - CHARACTER * SIGNALS A PREMATURE END OF CARD AND SCANNING RESUMES FARED J0346
C - AT THE BEGINNING OF THE NEXT CARD FARED J0347
C - FARED J0348
C - FARED J0349
COMMON NCRD, NPRT, LIB, NERG, NRR FARED J0350
COMMON NUR, NXSEC, NINP, NBCD, NSFX FARED J0351
COMMON NBAB, NRR1, NURI, NBGXS, NSPEC FARED J0352
COMMON NAJFX, NMAG, NGCON, NSCR, NBURN FARED J0353
COMMON NGE0, NMGR, NGRS, NOSG, NPTS FARED J0354
COMMON NOB, NOZ, NOBM, NOZH, NUCL FARED J0355
COMMON POW, R0IM, RADI, RADO, COVIN FARED J0356
COMMON MAXIT, EXOPT, IDCHA, IBOP, JBOP FARED J0357
COMMON NFIYOP, NRSQ, NWMR, NMZMR, NWBR FARED J0358
COMMON NSOP, NSOPM, TIME, PT, QACC FARED J0359
COMMON HMACC, QACB, HMACH FARED J0360
COMMON SPARES(38) FARED J0361
COMMON IFLAG, IV, IFLG, IWORD(18) FARED J0362
COMMON IBLANK, IZERO, IPLUS, IMINUS, IASTER FARED J0363
COMMON ICHAR, NWOD, BLANKS FARED J0364
COMMON IZP(20), KOM(5000) FARED J0365
C - FARED J0366
C - ** SEE PROGRAM FARED FOR A DESCRIPTION OF BLANK COMMON VARIABLES FARED J0367
C - FARED J0368
C - DIMENSION IALPH(80),I(80),W(1) FARED J0369
C - EQUIVALENCE (IA,A) FARED J0370
C - DATA JC0L/0/ FARED J0371
C - DATA NCD /0/ FARED J0372
C FARED J0373
C-ICAR IS NUMBER OF CHARACTERS/WORD FOR MACHINE INDEPENDENCE FARED J0374
C FARED J0375
10 IF (JC0L.NE.0) GO TO 13 FARED J0376
12 CALL CARD (IALPH,I) FARED J0377
   NCU=NCD+1 FARED J0378
   WRITE(NPRT,73) IALPH, NCD FARED J0379
   JCUL=0 FARED J0380
13 A=J.. FARED J0381
   NR=0 FARED J0382

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C		FARED	00433
29	IF (IAA) 32,32,60	FARED	00434
30	IF (IAA) 32,32,31	FARED	00435
31	IF (NR) 15,15,32	FARED	00436
32	IF (NT) 33,33,34	FARED	00437
33	IF (NW) 15,15,42	FARED	00438
34	IF (NP) 35,37,37	FARED	00439
35	NPP=IABS(NP)	FARED	00440
	AAA=1.0	FARED	00441
	DO 36 KK=1,NPP	FARED	00442
36	AAA=10.J*AAA	FARED	00443
	A=A/AAA	FARED	00444
	NP=0	FARED	00445
	GO TO 34	FARED	00446
C		FARED	00447
37	IF (NS) 38,39,39	FARED	00448
38	A=-A	FARED	00449
39	IF (NE) 66,40,67	FARED	00450
40	IF (NP) 42,42,41	FARED	00451
41	IA=A+SIGN(0.001,A)	FARED	00452
	N=-1	FARED	00453
42	V=A	FARED	00454
	IF (MU.EQ.U.AND.N.GT.U) V=V/10.**NKK	FARED	00455
	IF (NW) 44,44,43	FARED	00456
43	N=N+N	FARED	00457
44	RETURN	FARED	00458
C		FARED	00459
45	IF (NS) 15,46,15	FARED	00460
46	NS=1	FARED	00461
	GO TO 15	FARED	00462
C		FARED	00463
47	IF (NS) 15,48,15	FARED	00464
48	NS=-1	FARED	00465
	GO TO 15	FARED	00466
C		FARED	00467
49	IF (NP) 15,15,50	FARED	00468
50	IF (IAA) 51,51,62	FARED	00469
51	NP=0	FARED	00470
	N=1	FARED	00471
	MU=1	FARED	00472
	GO TO 15	FARED	00473
C		FARED	00474
52	IF (IAA) 53,53,60	FARED	00475
53	IF (NNN) 54,54,55	FARED	00476
54	JCOL=JCOL-1	FARED	00477
	GO TO 40	FARED	00478
C		FARED	00479
55	IF (NW.GE.ICHAR) GO TO 15	FARED	00480
C		FARED	00481
C	STORE LETTER IN W	FARED	00482

C	NW=NW+1	FARED	00483
	CALL INTALP (W,NW,K)	FARED	00484
	GO TO 15	FARED	00485
C		FARED	00486
C	THIS SEGMENT STORES THE W ARRAY.	FARED	00487
C		FARED	00488
56	N=-3	FARED	00489
	GO TO 15	FARED	00490
57	NT=1	FARED	00491
	JCOL=0	FARED	00492
	DO 58 J=1,NWOD	FARED	00493
	DO 58 K=1,ICHAR	FARED	00494
	NT=NT+1	FARED	00495
	CALL INTALP (W(J),K,I(NT))	FARED	00496
	IF (NT.EQ.71) RETURN	FARED	00497
58	CONTINUE	FARED	00498
	RETURN	FARED	00499
59	IF (IAA) 63,63,60	FARED	00500
60	IF (NR) 62,62,61	FARED	00501
61	JCOL=JCOL-1	FARED	00502
	GO TO 32	FARED	00503
C		FARED	00504
62	JCOL=NNNN-1	FARED	00505
	A=FRAC	FARED	00506
	NE=0	FARED	00507
	NP=MODE	FARED	00508
	GO TO 4J	FARED	00509
C		FARED	00510
63	IF (NT) 52,52,54	FARED	00511
64	NU=1	FARED	00512
	NKK=NK	FARED	00513
	IF (NE) 15,65,15	FARED	00514
65	NE=-1	FARED	00515
	NNNN=JCOL	FARED	00516
	IAA=1	FARED	00517
	GO TO 32	FARED	00518
C		FARED	00519
66	FRAC=A	FARED	00520
	NE=1	FARED	00521
	A=J..J	FARED	00522
	NT=0	FARED	00523
	NS=0	FARED	00524
	MODE=NP	FARED	00525
	NP=1	FARED	00526
	GO TO 15	FARED	00527
C		FARED	00528
67	FACTOR=1.0	FARED	00529
	NEXP=A+SIGN(0.001,A)	FARED	00530
	IF (NEXP) 69,60,69	FARED	00531
		FARED	00532

68	A=FRAC	FARED	00533
	GO TO 42	FARED	00534
C		FARED	00535
69	NEXPP=IABS(NEXP)	FARED	00536
	DO 7 J L=1,NEXPP	FARED	00537
	FACTOR=FACTOR*10.0	FARED	00538
70	CONTINUE	FARED	00539
	N=1	FARED	00540
	IF (NEXP) 71,72,72	FARED	00541
71	A=FRAC/FACTOR	FARED	00542
	GO TO 42	FARED	00543
C		FARED	00544
72	A=FRAC*FACTOR	FARED	00545
	GO TO 42	FARED	00546
C		FARED	00547
73	FORMAT(1X,2H>>,72A1,2H<<,2X,8A1,3X,17H*** DATA CARD NO.,I6,4H.***)	FARED	00548
	END	FARED	00549

	SUBROUTINE CARD (IALPH,IINT)						FARED	00550
C -	USED BY GRAMIN. CARD READS A DATA CARD UNDER AN A DESCRIPTOR INTO						FARED	00551
C -	IALPH AND CONVERTS EACH CHARACTER OF THE CARD TO AN INTEGER AND						FARED	00552
C -	STORES THE INTEGER EQUIVALENTS IN IINT						FARED	00553
C -							FARED	00554
	COMMON	NCRD,	NPRT,	LIB,	NERG,	NRR	FARED	00555
	COMMON	NUK,	NXSEC,	NINP,	NBCD,	NSFX	FARED	00556
	COMMON	NBAB,	NRRI,	NURI,	NBGXS,	NSPEC	FARED	00557
	COMMON	NAJFX,	NMAC,	NGCON,	NSCR,	NBURN	FARED	00558
	COMMON	NGEO,	NMGR,	NGRS,	NDSG,	NPTS	FARED	00559
	COMMON	NOB,	NOZ,	NOBM,	NOZM,	NUCL	FARED	00560
	COMMON	POW,	RUIM,	RADI,	RADO,	COVIN	FARED	00561
	COMMON	MAXIT,	EXOPT,	IDCHA,	IBOP,	JBOP	FARED	00562
	COMMON	NFLXOP,	NBSQ,	NWBMR,	NWZMR,	NWBR	FARED	00563
	COMMON	NSOPA,	NSOPM,	TIME,	PT,	QACC	FARED	00564
	COMMON	HMACC,	QACB,	HMACB			FARED	00565
	COMMON	SPARES(38)					FARED	00566
	COMMON	IFLAG,	IV,	IFLG,	IWORD(18)		FARED	00567
	COMMON	IBLANK,	IZERO,	IPLUS,	IMINUS,	IASTER	FARED	00568
	COMMON	ICAR,	NMOD,	BLANKS			FARED	00569
	COMMON	IZP(20), KOM(5000)					FARED	00570
C -							FARED	00571
C -	** SEE PROGRAM FARED FOR A DESCRIPTION OF BLANK COMMON VARIABLES						FARED	00572
C -							FARED	00573
	DIMENSION IALPH(1),IINT(1)						FARED	00574
	READ(NCRD,990) (IALPH(IC),IC=1,80)						FARED	00575
990	FORMAT(8,A1)						FARED	00576
	DO 2 I=1,80						FARED	00577
C	TRANSFER CHARACTER FROM A1 TO INTEGER FORM						FARED	00578
	CALL LPINT (IALPH(I),1,IINT(I))						FARED	00579
2	CONTINUE						FARED	00580
	RETURN						FARED	00581
	END						FARED	00582

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SUBROUTINE CONVL(ID,NAME1,NAME2)
C - CONVL CONVERTS THE NUMERIC NUCLIDE IDENTIFICATION TO AN ALPHA-
C - NUMERIC NUCLIDE IDENTIFICATION AND STORES THE FIRST 4 CHARACTERS
C - IN NAME1 AND THE REMAINING CHARACTERS OR BLANKS IN NAME2
C -
COMMON NCRD, NPRT, LIB, NERG, NRR
COMMON NUR, NXSEC, NINP, NBCD, NSFX
COMMON NBAB, NRR1, NURI, NBGXS, NSPEC
COMMON NAJFX, NMAG, NGCON, NSCR, NBURN
COMMON NGE0, NMGR, NGRS, NDSG, NPTS
COMMON NOB, NOZ, NOBM, NOZM, NUCL
COMMON POW, ROIM, RAD1, RADO, COVIN
COMMON MAXIF, EXOPT, IDCHA, IBOP, JBOP
COMMON NFLXUP, NBSQ, NWMR, NWZMR, NWBR
COMMON NSOPA, NSOPM, TIME, PT, QACC
COMMON HMACC, QACB, HMACB
COMMON SPARES(38)
COMMON IFLAG, IV, IFLG, IWORD(18)
COMMON IBLANK, IZER0, IPLUS, IMINUS, IASTER
COMMON ICHAR, NW00, BLANKS
COMMON IZP(2J), KOM(5600)
EQUIVALENCE (BLANKS,NBLANK)
C -
C - ** SEE PROGRAM FARED FOR A DESCRIPTION OF BLANK COMMON VARIABLES
C -
DIMENSION IDS(99),LET(26),IDD(3),NAM(2)
DATA (IDS(I),I=1,99)/2HH, 2HHE, 2HLI, 2HBE, 2HB, 2HC, 2HN, 2HO
X, 2HF, 2HNE, 2HNA, 2HMG, 2HAL, 2HSI, 2HP, 2HS, 2HCL, 2HA, 2HK
X, 2HCA, 2HSC, 2HTI, 2HV, 2HCR, 2HMN, 2HFE, 2HCO, 2HNI, 2HCU, 2HZN
X, 2HGA, 2HGE, 2HAS, 2HSE, 2HBR, 2HKB, 2HRB, 2HSR, 2HY, 2HZR, 2HCB
X, 2HMO, 2HTC, 2HRU, 2HRH, 2HPD, 2HAG, 2HCD, 2HIN, 2HSN, 2HSB, 2HTE
X, 2HI, 2HXE, 2HCS, 2HBA, 2HLA, 2HCE, 2HPR, 2HND, 2HPM, 2HSM, 2HEU
X, 2HGD, 2HTB, 2HDY, 2HMO, 2HER, 2HTM, 2HYB, 2HLU, 2HHF, 2HTA, 2HW
X, 2HRE, 2HOS, 2HIR, 2HPT, 2HAU, 2HHG, 2HTL, 2HPB, 2HBI, 2HPO, 2HAT
X, 2HRN, 2HSS, 2HRA, 2HAC, 2HTH, 2HPA, 2HU, 2HNP, 2HPU, 2HAM, 2HCM
X, 2HBK, 2HCF, 2HFP/
DATA (LET(I),I=1,26)/1HA,1HB,1HC,1HD,1HE,1HF,1HG,1HH,1HI,1HJ,1HK,
X1HL,1HM,1HN,1HO,1HP,1HQ,1HR,1HS,1HT,1HU,1HV,1HW,1HX,1HY,1HZ/
MOD = ID/100000
IS = (ID - 100000*MOD)/1000
NAT = ID - 100000*MOD - 1000*IS
IDD(1) = NAT/100
IDD(2) = (NAT - 100*IDD(1))/10
IDD(3) = NAT - 100*IDD(1) - 10*IDD(2)
NAM(1) = IDS(IS)
NAM(2) = NBLANK
CALL LPINT (NAM,2,ICH)
I = 3
IF (ICH .EQ. IBLANK) I = 2
IWD=1

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```

FARED 00583
FARED 00584
FARED 00585
FARED 00586
FARED 00587
FARED 00588
FARED 00589
FARED 00590
FARED 00591
FARED 00592
FARED 00593
FARED 00594
FARED 00595
FARED 00596
FARED 00597
FARED 00598
FARED 00599
FARED 00600
FARED 00601
FARED 00602
FARED 00603
FARED 00604
FARED 00605
FARED 00606
FARED 00607
FARED 00608
FARED 00609
FARED 00610
FARED 00611
FARED 00612
FARED 00613
FARED 00614
FARED 00615
FARED 00616
FARED 00617
FARED 00618
FARED 00619
FARED 00620
FARED 00621
FARED 00622
FARED 00623
FARED 00624
FARED 00625
FARED 00626
FARED 00627
FARED 00628
FARED 00629
FARED 00630
FARED 00631
FARED 00632

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```

      DO 30 J = 1,3
      DO 10 K = 1,J
      IF (IDD(K) .NE. 0) GO TO 20
10  CONTINUE
      GO TO 30
20  IDD(J)=IDD(J)+IZERO
      IF (I.LE.4) GO TO 21
      IWD=2
      I=1
21  CALL INTALP(NAM(IWD),I,IDD(J))
      I = I + 1
30  CONTINUE
      IF (MOD .EQ. 0) GO TO 40
      MODD = LET(MOD)
      CALL LPINT(MODD,1,ICH)
      IF (I .LE. 4) GO TO 35
      I = 1
      IWD = 2
35  CONTINUE
      CALL INTALP(NAM(IWD),I,ICH)
40  NAME1=NAM(1)
      NAME2=NAM(2)
      RETURN
      END

```

```

FARED 00633
FARED 00634
FARED 00635
FARED 00636
FARED 00637
FARED 00638
FARED 00639
FARED 00640
FARED 00641
FARED 00642
FARED 00643
FARED 00644
FARED 00645
FARED 00646
FARED 00647
FARED 00648
FARED 00649
FARED 00650
FARED 00651
FARED 00652
FARED 00653
FARED 00654
FARED 00655
FARED 00656

```

C SUBROUTINE REOF(NTAP)
 SEARCH FOR AN END OF FILE ON NTAP
2 READ(NTAP)
 IF(EOF,NTAP) 3,2
3 RETURN
 END

FARED 00657
FARED 00658
FARED 00659
FARED 00660
FARED 00661
FARED 00662

	OVERLAY(RIM,1,0)		FARED	00663
	PROGRAM INPUT		FARED	00664
C -	INPUT IS THE MAIN CONTROL FOR OVERLAY(1,0). IT DIRECTS CONTROL TO		FARED	00665
C -	THE CONFIGURATION INPUT ROUTINES OR THE FUELMGMT ROUTINES. UPON		FARED	00666
C -	RETURN A CHECK IS MADE FOR THE DETECTION OF ANY POSSIBLE ERROR		FARED	00667
C -	CONDITIONS AND TERMINATES THE CALCULATION IF ONE OR MORE ERROR		FARED	00668
C -	CONDITIONS HAVE BEEN DETECTED		FARED	00669
			FARED	00670
	COMMON NCRD, NPRT, LIB, NERG, NRR		FARED	00671
	COMMON NUR, NXSEC, NINP, NBCD, NSFV		FARED	00672
	COMMON NBAB, NRR1, NURI, NBGXS, NSPEC		FARED	00673
	COMMON NAJFX, NMAC, NGCON, NSCR, NBURN		FARED	00674
	COMMON NGEO, NMGR, NGRS, NDSG, NPTS		FARED	00675
	COMMON NOB, NOZ, NOBM, NOZM, NUCL		FARED	00676
	COMMON POW, RDIM, RAD1, RADO, COVIN		FARED	00677
	COMMON MAXIT, EXOPT, IDCHA, IBOP, JBOP		FARED	00678
	COMMON NFLXOP, NBSQ, NWBMR, NWZMR, NWBR		FARED	00679
	COMMON NSOPA, NSOPM, TIME, PT, QACC		FARED	00680
	COMMON HMACC, QACB, HMACB		FARED	00681
	COMMON SPARES(38)		FARED	00682
	COMMON IFLAG, IV, IFLG, IWORD(18)		FARED	00683
	COMMON IBLANK, IZERO, IPLUS, IMINUS, IASTER		FARED	00684
	COMMON ICHAR, NWOD, BLANKS		FARED	00685
	COMMON IZP(20), KOM(5000)		FARED	00686
C -			FARED	00687
C -	** SEE PROGRAM FARED FOR A DESCRIPTION OF BLANK COMMON VARIABLES		FARED	00688
C -			FARED	00689
	IF (IFLG .NE. 10) GO TO 5		FARED	00690
	CALL HEAD		FARED	00691
	RETURN		FARED	00692
5	IFLAG = 0		FARED	00693
	CALL SCAN (24HCONFIGURATION*FUELMGMT**,IWORD(1),L)		FARED	00694
	GO TO (10,20,50),L		FARED	00695
10	CALL C1NP		FARED	00696
	GO TO 30		FARED	00697
20	CALL FUELM		FARED	00698
30	CONTINUE		FARED	00699
	IF (IFLAG .EQ. 0) RETURN		FARED	00700
	WRITE (NPRT,40) IFLAG		FARED	00701
40	FORMAT (1H1/////1H ,20X,25HJOB TERMINATED ABNORMALLY/		FARED	00702
X	1H ,20X,15,26H POSSIBLE ERRORS DETECTED)		FARED	00703
	STOP 1234		FARED	00704
50	WRITE (NPRT,60)		FARED	00705
60	FORMAT (37H0INPUT SUBROUTINE ENTERED ERRONEOUSLY)		FARED	00706
	IFLAG = IFLAG + 1		FARED	00707
	GO TO 30		FARED	00708
	END		FARED	00709

SUBROUTINE HEAD						FARED	00710
COMMON	NGRD,	NPRT,	LIB,	NERG,	NRR	FARED	00711
COMMON	NUR,	NXSEC,	NINP,	NBCD,	NSFX	FARED	00712
COMMON	NBAB,	NRRI,	NURI,	NBGXS,	NSPEC	FARED	00713
COMMON	NAJFX,	NMAC,	NGCON,	NSCR,	NBURN	FARED	00714
COMMON	NGEO,	NMGR,	NGRS,	NDSG,	NPTS	FARED	00715
COMMON	NOB,	NOZ,	NOBM,	NOZM,	NUCL	FARED	00716
COMMON	POW,	ROIM,	RAOI,	RADO,	COVIN	FARED	00717
COMMON	MAXIT,	EXOPT,	IOCHA,	IBOP,	JBOP	FARED	00718
COMMON	NFLXOP,	NBSQ,	NWBMR,	NWZMR,	NWBR	FARED	00719
COMMON	NSOPA,	NSOPM,	TIME,	PT,	QACC	FARED	00720
COMMON	HMACC,	QACB,	HMACB			FARED	00721
COMMON	SPARES(38)					FARED	00722
COMMON	IFLAG,	IV,	IFLG,	IWORD(18)		FARED	00723
COMMON	IBLANK,	IZERO,	IPLUS,	IMINUS,	IASTER	FARED	00724
COMMON	ICHAR,	NWOD,	BLANKS			FARED	00725
COMMON	IZP(20),	KOM(5000)				FARED	00726
WRITE	(NPRT,100)					FARED	00727
WRITE	(NPRT,101)					FARED	00728
WRITE	(NPRT,102)					FARED	00729
WRITE	(NPRT,103)					FARED	00730
WRITE	(NPRT,104)					FARED	00731
WRITE	(NPRT,105)					FARED	00732
WRITE	(NPRT,106)					FARED	00733
WRITE	(NPRT,107)					FARED	00734
WRITE	(NPRT,108)					FARED	00735
WRITE	(NPRT,109)					FARED	00736
WRITE	(NPRT,110)					FARED	00737
WRITE	(NPRT,111)					FARED	00738
WRITE	(NPRT,112)					FARED	00739
WRITE	(NPRT,113)					FARED	00740
WRITE	(NPRT,114)					FARED	00741
WRITE	(NPRT,115)					FARED	00742
WRITE	(NPRT,116)					FARED	00743
WRITE	(NPRT,117)					FARED	00744
WRITE	(NPRT,118)					FARED	00745
WRITE	(NPRT,119)					FARED	00746
WRITE	(NPRT,120)					FARED	00747
WRITE	(NPRT,121)					FARED	00748
WRITE	(NPRT,122)					FARED	00749
WRITE	(NPRT,123)					FARED	00750
WRITE	(NPRT,124)					FARED	00751
WRITE	(NPRT,125)					FARED	00752
WRITE	(NPRT,126)					FARED	00753
WRITE	(NPRT,127)					FARED	00754
WRITE	(NPRT,128)					FARED	00755
WRITE	(NPRT,129)					FARED	00756
WRITE	(NPRT,130)					FARED	00757
WRITE	(NPRT,131)					FARED	00758
WRITE	(NPRT,142)					FARED	00759

WRITE (NPRT,146)	FARED	00760
WRITE (NPRT,155)	FARED	00761
RETURN	FARED	00762
100 FORMAT (1H1/,1H ,5X,37(3H *))	FARED	00763
101 FORMAT (1H0,5X,1H*,107X,1H*)	FARED	00764
102 FORMAT (1H0,5X,1H*,3JX,	FARED	00765
X47HFFFFFFF A RRRRRR EEEEEEE 000000 ,	FARED	00766
X30X,1H*)	FARED	00767
103 FORMAT (1H ,5X,1X,30X,	FARED	00768
X47HF A A R R E D D,	FARED	00769
X30X,1X)	FARED	00770
104 FORMAT (1H ,5X,1H*,10X,6H*****,14X,	FARED	00771
X47HF A A R R E D D,	FARED	00772
X14X,6H*****,10X,1H*)	FARED	00773
105 FORMAT (1H ,5X,1X,7X,12H*****,11X,	FARED	00774
X47HFFFF AAAAA RRRRRR EEEE D D,	FARED	00775
X11X,12H*****,7X,1X)	FARED	00776
106 FORMAT (1H ,5X,1H*,5X,15H*****,10X,	FARED	00777
X47HF A A R R E D D,	FARED	00778
X10X,15H*****,5X,1H*)	FARED	00779
107 FORMAT (1H ,5X,1X,4X,7H*****,8X,2H**,9X,	FARED	00780
X47HF A A R R E D D,	FARED	00781
X9X,2H**,8X,7H*****,4X,1X)	FARED	00782
108 FORMAT (1H ,5X,1H*,4X,5H*****,21X,	FARED	00783
X47HF A A R R EEEEEEE 000000 ,	FARED	00784
X21X,5H*****,4X,1H*)	FARED	00785
109 FORMAT (1H ,9X,4H*****,93X,4H*****)	FARED	00786
110 FORMAT (1H ,5X,1H*,3X,3H*****,95X,3H*****,3X,1H*)	FARED	00787
111 FORMAT (1H ,8X,4H*****,95X,4H*****)	FARED	00788
112 FORMAT (1H ,5X,1H*,2X,3H*****,8X,83HA ONE-DIMENSIONAL MULTIGROUP FAS	FARED	00789
XT REACTOR PHYSICS ANALYSIS AND FUEL MANAGEMENT CODE,6X,3H*****,2X,1H	FARED	00790
X*)	FARED	00791
113 FORMAT (1H ,8X,3H*****,97X,3H*****)	FARED	00792
114 FORMAT (1H ,5X,1H*,2X,2H*****,99X,2H*****,2X,1H*)	FARED	00793
115 FORMAT (1H ,8X,2H*****,22X,48HDEVELOPED FOR THE U. S. ATOMIC ENERGY C	FARED	00794
XOMMISSION,29X,2H**)	FARED	00795
116 FORMAT (1H ,5X,1H*,2X,2H*****,99X,2H*****,2X,1H*)	FARED	00796
117 FORMAT (1H , 9X,1H*,27X,36HUNDER AEC CONTRACT NO. AT(30-1)-3867,36	FARED	00797
XX,1H*)	FARED	00798
118 FORMAT (1H ,5X,1H*,3X,1H*,99X,1H*,3X,1H*)	FARED	00799
119 FORMAT (1H ,9X,2H*****,97X,2H*****)	FARED	00800
120 FORMAT (1H ,5X,1H*,4X,1H*,97X,1H*,4X,1H*)	FARED	00801
121 FORMAT (1H ,10X,1H*,21X,13HDEVELOPED BY,63X,1H*)	FARED	00802
122 FORMAT (1H ,5X,1H*,4X,1H*,97X,1H*,4X,1H*)	FARED	00803
123 FORMAT (1H ,11X,1H*,28X,30HTHE BABCOCK AND WILCOX COMPANY,37X,1H*)	FARED	00804
124 FORMAT (1H ,5X,1H*,5X,1H*,95X,1H*,5X,1H*)	FARED	00805
125 FORMAT (1H ,12X,1H*,27X,35HNUCLEAR POWER GENERATION DEPARTMENT.	FARED	00806
X51X,1H*)	FARED	00807
126 FORMAT (1H ,5X,1H*,6X,1H*,93X,1H*,6X,1H*)	FARED	00808
127 FORMAT (1H ,4JX,14HLYNCHBURG, VA.)	FARED	00809

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128 FORMAT (1H ,5X,1H*,7X,1H*,91X,1H*,7X,1H*) FARED 00810
129 FORMAT (1H0,5X,1H*,8X,1H*,89X,1H*,8X,1H*) FARED 00811
130 FORMAT (1H ,23X,13HLEGAL NOTICE:1H ,5X,1H*,9X,1H*,87X,1H*,9X,1H*/ FARED 00812
X1H ,16X,1H*,6X,76H THIS PROGRAM WAS PREPARED AS AN ACCOUNT OF G FARED 00813
XOVERNMENT SPONSORED WORK. ,3X,1H*/ FARED 00814
X1H ,5X,1H*,17X,76HNEITHER THE UNITED STATES, NOR THE COMMISSION, N FARED 00815
XOR ANY PERSON ACTING ON ,14X,1H*/ FARED 00816
X1H ,23X,25HBEHALF OF THE COMMISSION:1H ,5X,1H*,107X,1H*) FARED 00817
136 FORMAT (1H ,23X,76H A. MAKES ANY WARRANTY OR REPRESENTATION, E FARED 00818
XXPRESSED OR IMPLIED, WITH / FARED 00819
X1H ,5X,1H*,17X,76HRESPECT TO THE ACCURACY, COMPLETENESS, OR USEFUL FARED 00820
XNESS OF THE INFORMATION ,14X,1H*/ FARED 00821
X1H ,23X,76HCONTAINED IN THIS PROGRAM, OR THAT THE USE OF ANY INFOR FARED 00822
XMATION, APPARATUS, / FARED 00823
X1H ,5X,1H*,17X,76HMETHOD, OR PROCESS DISCLOSED IN THIS PROGRAM MAY FARED 00824
X NOT INFRINGE PRIVATELY ,14X,1H*/ FARED 00825
X1H ,23X,16HOWNED RIGHTS: OR1H ,5X,1H*,107X,1H*) FARED 00826
142 FORMAT (1H ,23X,76H B. ASSUMES ANY LIABILITIES WITH RESPECT TO FARED 00827
X THE USE OF, OR FOR DAMAGES / FARED 00828
X1H ,5X,1H*,17X,76HRESULTING FROM THE USE OF ANY INFORMATION, APPAR FARED 00829
XATUS, METHOD, OR PROCESS ,14X,1H*/ FARED 00830
X1H ,23X,26HDISCLOSED IN THIS PROGRAM./1H ,5X,1H*,107X,1H*) FARED 00831
146 FORMAT (1H ,23X,74H AS USED IN THE ABOVE (PERSON ACTING ON BEHA FARED 00832
XLF OF THE COMMISSION) / FARED 00833
X1H ,5X,1H*,17X,76HINCLUDES ANY EMPLOYEE OR CONTRACTOR OF THE COMMI FARED 00834
XSSION, OR EMPLOYEE OF SUCH ,14X,1H*/ FARED 00835
X1H ,23X,78HCONTRACTOR, TO THE EXTENT THAT SUCH EMPLOYEE OR CONTRAC FARED 00836
XTOR OF THE COMMISSION, / FARED 00837
X1H ,5X,1H*,17X,77HOR EMPLOYEE OF SUCH CONTRACTOR, PREPARES, DESSEM FARED 00838
XINATES, OR PROVIDES ACCESS TO,13X,1H*/ FARED 00839
X1H ,23X,76HANY INFORMATION PURSUANT TO HIS EMPLOYMENT OR CONTRACT FARED 00840
XWITH THE COMMISSION, / FARED 00841
X1H ,5X,1H*,17X,39HOR HIS EMPLOYMENT WITH SUCH CONTRACTOR.,51X,1H*) FARED 00842
155 FORMAT (1H0,5X,37(3H *)/1H1//) FARED 00843
END FARED 00844

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	SUBROUTINE IDNUM(NUM,LET1,LET2,V,N,W)	FARED	00845
C	THIS SUBROUTINE CONVERTS A NUCLIDE ID INTO AN INTEGER AND STORES	FARED	00846
C	THE ALPHANUMERIC EQUIVALENT INTO TWO WORDS-LET1 AND LET2.	FARED	00847
C	IF THE SUBROUTINE IS UNABLE TO PERFORM SUCH A CONVERSION, THE	FARED	00848
C	FLAG, NUMBER, AND WORD COMBINATION ARE LEFT IN V,N,W SO THAT THE	FARED	00849
C	EFFECT IS A GRAMIN CALL.	FARED	00850
C	CAUTION---A SUCCESSION OF NON-NUCLIDE WORD-NUMBER PAIRS CAN CAUSE	FARED	00851
C	A LOOP IF THIS SUBROUTINE IS CONTINUOUSLY CALLED WITHOUT	FARED	00852
C	EXTERNALLY CALLING GRAMIN OR RESETTING THE N-FLAG.	FARED	00853
C -		FARED	00854
	COMMON NCRD, NPRT, LIB, NERG, NRR	FARED	00855
	COMMON NUR, NXSEC, NINP, NBCD, NSFX	FARED	00856
	COMMON NBAB, NRRI, NURI, NBGXS, NSPEC	FARED	00857
	COMMON NAJFX, NMAG, NGCON, NSCR, NBURN	FARED	00858
	COMMON NCEO, NMGR, NGRS, NDSG, NPTS	FARED	00859
	COMMON NOB, NOZ, NOBM, NOZH, NUCL	FARED	00860
	COMMON POW, ROIM, RAD, RAD, COVIN	FARED	00861
	COMMON MAXII, EXOPT, IOCHA, IBOP, JBOP	FARED	00862
	COMMON NFLXOP, NBSQ, NWBMR, NWZMR, NWBR	FARED	00863
	COMMON NSOPA, NSOPM, TIME, PT, QACC	FARED	00864
	COMMON HMACC, QACB, HMACB	FARED	00865
	COMMON SPARES(38)	FARED	00866
	COMMON IFLAG, IV, IFLG, IWORD(18)	FARED	00867
	COMMON IBLANK, IZERO, IPLUS, IMINUS, IASTER	FARED	00868
	COMMON ICHAR, NWOD, BLANKS	FARED	00869
	COMMON IZP(2J), KOM(5000)	FARED	00870
C -		FARED	00871
C -	** SEE PROGRAM FARED FOR A DESCRIPTION OF BLANK COMMON VARIABLES	FARED	00872
C -		FARED	00873
	DIMENSION I(3),LT(2),W(1)	FARED	00874
	EQUIVALENCE(U,IW),(X,IVV)	FARED	00875
	DO 5 J=1,ICHR	FARED	00876
	CALL INTALP(LT(1),J,IBL)	FARED	00877
	CALL INTALP(LT(2),J,IBL)	FARED	00878
5	CONTINUE	FARED	00879
	IF(N.NE.-2) CALL GRAMIN(V,N,W)	FARED	00880
	LN=1	FARED	00881
	LL=0	FARED	00882
	NUM=J	FARED	00883
	IF(N.NE.-2) GO TO 100	FARED	00884
	U=W(1)	FARED	00885
	CALL SCAN (28JHH*HE*LI*BE*B*O*F*NE*NA*MG*AL*SI*P*S*CL*A*K*CA*S	FARED	00886
	1C*TI*V*CR*MN*FE*CO*NI*CU*ZN*GA*GE*AS*SE*BR*KR*RB*SR*Y*ZR*CB*MO*TC*	FARED	00887
	2RU*RH*PD*AG*CD*IN*SN*SB*TE*I*XE*CS*BA*LA*CE*PR*ND*PM*SM*EU*GO*TB*O	FARED	00888
	3Y*HO*ER*TH*YB*L*U*HF*TA*W*RE*OS*IR*PT*AU*HG*TL*PB*BI*PO*AT*RN*SS*RA	FARED	00889
	4*AC*TH*PA*U*NP*PU*AM*CM*BK*CF*FP*,U,L)	FARED	00890
	IF(L.GT.99) RETURN	FARED	00891
	LT(1)=IW	FARED	00892
	X=V	FARED	00893
	NUM=L*1000+IVV	FARED	00894

NU=NUM	FARED	00895
CALL LPINT(U,2,ICH)	FARED	00896
NSTR=2	FARED	00897
IF(ICH.NE.IBL) NSTR=3	FARED	00898
I(1)=IVV/100	FARED	00899
I(2)=(IVV/10)-I(1)*10	FARED	00900
I(3)=IVV-(I(1)*100)-(I(2)*10)	FARED	00901
I(1)=I(1)+IZERO	FARED	00902
I(2)=I(2)+IZERO	FARED	00903
I(3)=I(3)+IZERO	FARED	00904
LL=NSTR	FARED	00905
IF(IVV.GE.0) LLL=3	FARED	00906
IF(IVV.GE.10) LLL=2	FARED	00907
IF(IVV.GE.100) LLL=1	FARED	00908
INDEX=1	FARED	00909
IT=1	FARED	00910
DO 10 JL=LLL,3	FARED	00911
NL=JL	FARED	00912
CALL INTALP(LT(INDEX),LL,I(JL))	FARED	00913
LL=LL+1	FARED	00914
IF(LL-5) 10,9,9	FARED	00915
9 LL=1	FARED	00916
INDEX=2	FARED	00917
10 CONTINUE	FARED	00918
CALL CRAMIN(V,N,W)	FARED	00919
X=V	FARED	00920
U=W(1)	FARED	00921
IF(N.NE.0) GO TO 100	FARED	00922
CALL SCAN (53HA*B*C*D*E*F*G*H*I*J*K*L*M*N*O*P*Q*R*S*T*U*V*W*X*Y*Z*	FARED	00923
1*,U,L)	FARED	00924
IF(L.GT.26) GO TO 100	FARED	00925
CALL LPINT(U,1,IWO)	FARED	00926
NUM=NUM+ L*10**5	FARED	00927
NU=NUM	FARED	00928
CALL INTALP(LT(INDEX),LL,IWO)	FARED	00929
CALL CRAMIN(V,N,W)	FARED	00930
100 LET1=LT(1)	FARED	00931
LET2=LT(2)	FARED	00932
RETURN	FARED	00933
END	FARED	00934

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SUBROUTINE ISORT (ID)
C-ISORT IS A SUBROUTINE WHICH ORDERS THE LIST OF ISOTOPE IDENTIFICATION
C  NUMBERS READ BY INPUT TO THIS POINT.  DUPLICATE ENTRIES ARE
C  THROWN OUT AS WELL AS ANY ENTRY EQUAL TO NUMBER IN ID
C  ORDERING IS PERFORMED ON THE INTEGER IDENTIFICATION OF ISOTOPES
C -
COMMON  NCRD,      NPRT,      LIB,      NERG,      NRR
COMMON  NUR,       NXSEC,     NINP,     NBCD,      NSFX
COMMON  NBAB,      NRR1,      NURI,     NBGXS,     NSPEC
COMMON  NAJFX,     NMAC,      NGCON,    NSCR,      NBURN
COMMON  NGE0,      NMGR,      NGRS,     NDSG,      NPTS
COMMON  NOB,       NOZ,       NOBM,     NOZM,      NUCL
COMMON  POW,       RDIM,      RAD1,     RADO,      COVIN
COMMON  MAXIT,     EXOPT,     IDCHA,    IBOP,      JBOP
COMMON  NFLXOP,    NBSQ,      NWMR,     NWZMR,     NWBR
COMMON  NSOPA,     NSOPM,     TIME,    PT,        QACC
COMMON  HMACC,     QACB,      HMACB
COMMON  SPARES(38)
COMMON  IFLAG,     IV,        IFLG,     IWORD(18)
COMMON  IBLANK,    IZERO,     IPLUS,    IMINUS,    IASTER
COMMON  ICHAR,     NWOD,      BLANKS
COMMON  IZP(2J),  KOM(5000)
COMMON /ISOTID/  NISOT,NIST,NIMAX,ISOT(8J)
C -
C - ** SEE PROGRAM FARED FOR A DESCRIPTION OF BLANK COMMON VARIABLES
C - DEFINITION OF VARIABLES IN COMMON BLOCK /ISOTID/
C-   NISOT - NUMBER OF NUCLIDE IDS ENTERED IN ARRAY ISOT
C-   NIST  - POINTER IN ISOT WHERE NEXT NUCLIDE ID CAN BE STORED
C-   NIMAX - MAXIMUM NUMBER OF NUCLIDE IDS WHICH MAY BE STORED
C-   ISOT  - ARRAY IN WHICH NUCLIDE IDS ARE STORED
C -
C -   IDD = ID
C -   IF (NIST .GT. NIMAX) GO TO 10
C -   IF (IDD .EQ. 0) GO TO 10
C -
C -   ADD NUCLIDE ID TO LIST
C -
C -   ISOT(NIST) = IDD
C -   IDD = 0
C -   NIST = NIST + 1
C -   NISOT = NISOT + 1
C -
C -   ARRANGE NUCLIDE IDS IN ASCENDING ORDER
C -
10  I = 1
20  IF (I+1 .GE. NIST) GO TO 90
30  IF (ISOT(I) - ISOT(I+1)) 4J,50,8J
40  I = I + 1
GO TO 2J
50  IF (I+1 .EQ. NIST-1) GO TO 65

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FARED 00935
FARED 00936
FARED 00937
FARED 00938
FARED 00939
FARED 00940
FARED 00941
FARED 00942
FARED 00943
FARED 00944
FARED 00945
FARED 00946
FARED 00947
FARED 00948
FARED 00949
FARED 00950
FARED 00951
FARED 00952
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FARED 00961
FARED 00962
FARED 00963
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FARED 00965
FARED 00966
FARED 00967
FARED 00968
FARED 00969
FARED 00970
FARED 00971
FARED 00972
FARED 00973
FARED 00974
FARED 00975
FARED 00976
FARED 00977
FARED 00978
FARED 00979
FARED 00980
FARED 00981
FARED 00982
FARED 00983
FARED 00984

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C -		FARED	00985
C -	REMOVE DUPLICATE ID	FARED	00986
C -		FARED	00987
	K = I + 1	FARED	00988
	L = NIST - 2	FARED	00989
	DO 60 J = K,L	FARED	00990
60	ISOT(J) = ISOT(J+1)	FARED	00991
65	IF (IOO .EQ. J) GO TO 70	FARED	00992
	ISOT(NIST-1) = IOO	FARED	00993
	IOO = 0	FARED	00994
	GO TO 20	FARED	00995
70	NIST = NIST - 1	FARED	00996
	NISOT = NISOT - 1	FARED	00997
	GO TO 20	FARED	00998
C -		FARED	00999
C -	REVERSE ORDER OF NUCLIDE IDS	FARED	01000
C -		FARED	01001
80	ITEM = ISOT(I)	FARED	01002
	ISOT(I) = ISOT(I+1)	FARED	01003
	ISOT(I+1) = ITEM	FARED	01004
	IF (I .EQ. 1) GO TO 40	FARED	01005
	I = I - 1	FARED	01006
	GO TO 30	FARED	01007
90	IF (IOO .EQ. 0) GO TO 110	FARED	01008
	WRITE (NPRT,100)	FARED	01009
100	FORMAT (29H0***** POSSIBLE INPUT ERROR./	FARED	01010
X	1H ,10X,33HNUCLIDE ID STORAGE TABLE OVERFLOW)	FARED	01011
110	CONTINUE	FARED	01012
	RETURN	FARED	01013
	END	FARED	01014

	SUBROUTINE CINP	FAREQ	01015
C-	CINP IS THE CONTROLLING ROUTINE FOR INPUT OF THE DATA FOLLOWING A	FAREQ	01016
C-	CONFIGURATION DIRECTIVE. CINP WILL RECOGNIZE AS SECONDARY DIRECT-	FAREQ	01017
C-	IVES THE WORDS GDATA, BULK, ZONE, BLOCK, CELL, INNER, OUTER, POLYG	FAREQ	01018
C-	, SOURCE, ZSOURCE, PTSOURCE, BUCK, ZBUCK, GBUCK AND ISSUE CALLS TO	FAREQ	01019
C-	APPROPRIATE SUBROUTINES FOR PROCESSING THE ASSOCIATED DATA. WHEN	FAREQ	01020
C-	CINP ENCOUNTERS A DIRECTIVE WHICH IS UNRECOGNIZED, A SERIES OF	FAREQ	01021
C-	SUBROUTINES ARE CALL TO WRAP-UP THE INPUT DATA.	FAREQ	01022
		FAREQ	01023
	COMMON NCRD, NPRT, LIB, NERG, NRR	FAREQ	01024
	COMMON NUR, NXSEC, NINP, NBCD, NSFX	FAREQ	01025
	COMMON N8AB, NRR1, NURI, NBGXS, NSPEC	FAREQ	01026
	COMMON NAJFX, NMAC, NGCON, NSCR, NBURN	FAREQ	01027
	COMMON NCEO, NMGR, NGRS, NDSG, NPTS	FAREQ	01028
	COMMON NOB, NOZ, NOBM, NOZM, NUCL	FAREQ	01029
	COMMON POW, ROIM, RAD1, RADO, COVIN	FAREQ	01030
	COMMON MAXIT, EXOPT, IOCHA, IBOP, JBOP	FAREQ	01031
	COMMON NFLXOP, NBSQ, NWBMR, NWZMR, NWBR	FAREQ	01032
	COMMON NSOPA, NSOPM, TIME, PT, QACC	FAREQ	01033
	COMMON HMACC, QACB, HMACH	FAREQ	01034
	COMMON SPARES(38)	FAREQ	01035
	COMMON IFLAG, IV, IFLG, IWORD(18)	FAREQ	01036
	COMMON IBLANK, IZERO, IPLUS, IMINUS, IASTER	FAREQ	01037
	COMMON ICHAR, NWOD, BLANKS	FAREQ	01038
	COMMON IZP(20), KOM(5000)	FAREQ	01039
	COMMON /ISOTID/ NISOT, NIST, NIMAX, ISOT(80)	FAREQ	01040
	COMMON /CONS/ ICON(20), INPS(15)	FAREQ	01041
	COMMON /BULK/ NBMAT, NBST, NBMAX, IBMAT(3000)	FAREQ	01042
	COMMON /ZON/ IZON, IZST, IZMAX, IZONE(200), IOZ(21), IZAD(21)	FAREQ	01043
	COMMON /ZONEM/ NZMAT, NZST, NZMAX, IZMAT(400)	FAREQ	01044
	COMMON /BLK/ NBLK, NBKST, NBKMAX, IOB(10,2), IBLK(100)	FAREQ	01045
	COMMON /CELL/ NCEL, ICEL(40,7)	FAREQ	01046
	COMMON /INBD/ NIBD, B0IN(30)	FAREQ	01047
	COMMON /OUTBD/ NOBD, B0OUT(30)	FAREQ	01048
	COMMON /POLY/ NGROUP, IBDS(30)	FAREQ	01049
	COMMON /STOR/ IDCH, NLIST, NAST, NOPB, NBCK, NOPS, NSOUR, ILIST(30),	FAREQ	01050
X	MATX(30,30), BUCKL(600), PTSOUR(150), ZSOUR(20),	FAREQ	01051
X	EXTEND(5000)	FAREQ	01052
	COMMON /ENERGY/ NGRP1, EGRP(101)	FAREQ	01053
	EQUIVALENCE (IBMAT, BMAT)	FAREQ	01054
	EQUIVALENCE (IZMAT, ZMAT)	FAREQ	01055
	EQUIVALENCE (ICON, CON)	FAREQ	01056
	DIMENSION BMAT(3000)	FAREQ	01057
	DIMENSION ZMAT(400)	FAREQ	01058
	DIMENSION CON(20)	FAREQ	01059
C -		FAREQ	01060
C -	** SEE PROGRAM FAREQ FOR A DESCRIPTION OF BLANK COMMON VARIABLES	FAREQ	01061
C -	** SEE SUBROUTINE ISORT FOR A DESCRIPTION OF COMMON BLOCK /ISOTID/	FAREQ	01062
C -	** SEE SUBROUTINE CONST FOR A DESCRIPTION OF COMMON BLOCK /CONS/	FAREQ	01063
C -	** SEE SUBROUTINE BULKH FOR A DESCRIPTION OF COMMON BLOCK /BULK/	FAREQ	01064

C - ** SEE SUBROUTINE ZONES	FOR A DESCRIPTION OF COMMON BLOCK /ZON/	FARED	01065
C - ** SEE SUBROUTINE BULKH	FOR A DESCRIPTION OF COMMON BLOCK /ZONEH/	FARED	01066
C - ** SEE SUBROUTINE BLOCK	FOR A DESCRIPTION OF COMMON BLOCK /BLK/	FARED	01067
C - ** SEE SUBROUTINE CELLS	FOR A DESCRIPTION OF COMMON BLOCK /CELL/	FARED	01068
C - ** SEE SUBROUTINE RDCH	FOR A DESCRIPTION OF COMMON BLOCK /STOR/	FARED	01069
C -	DEFINITION OF VARIABLES IN COMMON BLOCK /INBD/	FARED	01070
C -	NIID - NUMBER OF INPUT WORDS STORED IN ARRAY BDIN	FARED	01071
C -	BDIN(I) - INNER BOUNDARY CONDITION TO BE APPLIED TO THE ITH GR.	FARED	01072
C -	THIS INPUT IS REQUIRED ONLY FOR OPTIONS 3, 4	FARED	01073
C -		FARED	01074
C -	DEFINITION OF VARIABLES IN COMMON BLOCK /OUTBD/	FARED	01075
C -	NOID - NUMBER OF INPUT WORDS STORED IN ARRAY BDOUT	FARED	01076
C -	BDOUT(I) - OUTER BOUNDARY CONDITION TO BE APPLIED TO THE ITH GR.	FARED	01077
C -	THIS INPUT IS REQUIRED ONLY FOR OPTIONS 3, 4	FARED	01078
C -		FARED	01079
C -	DEFINITION OF VARIABLES IN COMMON BLOCK /POLY/	FARED	01080
C -	NGROUP - NUMBER OF BROAD GROUPS OR NUMBER OF INPUT WORDS STORED	FARED	01081
C -	IN ARRAY IBDS	FARED	01082
C -	IBDS(I) - THE NUMBER OF THE MICROGROUP WHOSE LOWER ENERGY BOUND	FARED	01083
C -	FORMS THE LOWER ENERGY BOUND OF THE ITH BROADGROUP	FARED	01084
C -		FARED	01085
C -	DEFINITION OF VARIABLES IN COMMON BLOCK NERGY/	FARED	01086
C -	NGRP1 - NUMBER OF MICROGROUPS + 1	FARED	01087
C -	EGRP(1) - UPPER ENERGY BOUND FOR 1ST MICROGROUP	FARED	01088
C -	EGRP(I) - UPPER ENERGY BOUND FOR ITH MICROGROUP WHICH IS THE	FARED	01089
C -		FARED	01090
C -	LOWER ENERGY BOUND FOR THE (I-1)ST MICROGROUP	FARED	01091
C -	EGRP(NGRP1) - LOWER ENERGY BOUND FOR THE LAST MICROGROUP	FARED	01092
C -		FARED	01093
C -	DATA MFILE /4HFILE/	FARED	01094
C -	CALL INIT	FARED	01095
C -		FARED	01096
C -	READ MICROGROUP ENERGY GROUP STRUCTURE FROM FILE 1 OF LIBRARY	FARED	01097
C -		FARED	01098
C -	REWIND LIB	FARED	01099
C -	READ (LIB) MFILE,JF,NHED,NGRP	FARED	01100
C -	IF (EOF,LIB) 800,5	FARED	01101
5	IF (MFILE.NE.MFILE) GO TO 810	FARED	01102
C -	IF (JF.NE.1) GO TO 810	FARED	01103
C -	READ (LIB)	FARED	01104
C -	IF (EOF,LIB) 800,6	FARED	01105
6	IF (NGRP.LE.0) GO TO 815	FARED	01106
C -	NGRP1 = NGRP + 1	FARED	01107
C -	READ (LIB) (EGRP(I),I = 1,NGRP1)	FARED	01108
C -	IF (EOF,LIB) 800,7	FARED	01109
7	CONTINUE	FARED	01110
C -	NMGR = NGRP	FARED	01111
15	CALL CRAMIN (IV,IFLG,IWORD)	FARED	01112
C -		FARED	01113
C -	READ AND INTERPRET DATA DIRECTIVE	FARED	01114

C-		FARED	01115
20	IF (IFLG .NE. 0) GO TO 780	FARED	01116
	CALL SCAN (87HGOATA*BULK*ZONE*BLOCK*CELL*INNER*OUTER*POLYG*SOURCE	FARED	01117
	X*ZSOURCE*PTSOURCE*BUCK*ZBUCK*GBUCK**,INORD(1),L)	FARED	01118
	GO TO (40, 50, 60, 70, 80, 90,100,110,140,140,140,150,150,150,	FARED	01119
	X 170),L	FARED	01120
C-		FARED	01121
C-	CALL APPROPRIATE SUBROUTINE TO PROCESS INPUT DATA	FARED	01122
C-		FARED	01123
40	CALL CONST	FARED	01124
	GO TO 160	FARED	01125
50	CALL BULKM	FARED	01126
	GO TO 160	FARED	01127
60	CALL ZONES	FARED	01128
	GO TO 160	FARED	01129
70	CALL BLOCK	FARED	01130
	GO TO 160	FARED	01131
80	CALL CELLS	FARED	01132
	GO TO 160	FARED	01133
90	CALL BOUD (NI80,BDIN)	FARED	01134
	GO TO 160	FARED	01135
100	CALL BOUD (NO80,BDOUT)	FARED	01136
	GO TO 160	FARED	01137
110	CALL IBUD (NGROUP,IBOS)	FARED	01138
	GO TO 160	FARED	01139
140	LL = L - 8	FARED	01140
	CALL SOURCE(LL)	FARED	01141
	L = 9	FARED	01142
	GO TO 160	FARED	01143
150	LL = L - 11	FARED	01144
	CALL BUCK(LL)	FARED	01145
	L = 10	FARED	01146
C-		FARED	01147
C-	SET FLAG INDICATOR FOR PROCESSED INPUT	FARED	01148
C-		FARED	01149
160	INPS(L) = 1	FARED	01150
	GO TO 20	FARED	01151
170	CONTINUE	FARED	01152
	IF (INPS(1) .NE. 0) GO TO 210	FARED	01153
	WRITE (NPRT,200)	FARED	01154
200	FORMAT (1H0,21H***** POSSIBLE ERROR)	FARED	01155
	WRITE (NPRT,201)	FARED	01156
201	FORMAT (1H ,10X,43H A GDATA DIRECTIVE HAS NEVER BEEN PROCESSED)	FARED	01157
	IFLAG = IFLAG + 1	FARED	01158
210	IF (INPS(2) .NE. 0) GO TO 220	FARED	01159
	WRITE (NPRT,200)	FARED	01160
	WRITE (NPRT,211)	FARED	01161
211	FORMAT (1H ,10X,42H A BULK DIRECTIVE HAS NEVER BEEN PROCESSED)	FARED	01162
	IFLAG = IFLAG + 1	FARED	01163
220	IF (INPS(3) .NE. 0) GO TO 230	FARED	01164

	WRITE (NPRT,200)	FARED	01165
	WRITE (NPRT,221)	FARED	01166
221	FORMAT (1H ,10X,42H A ZONE DIRECTIVE HAS NEVER BEEN PROCESSED)	FARED	01167
	IFLAG = IFLAG + 1	FARED	01168
230	IF (INPS(4) .NE. 0) GO TO 240	FARED	01169
	WRITE (NPRT,200)	FARED	01170
	WRITE (NPRT,231)	FARED	01171
231	FORMAT (1H ,10X,43H A BLOCK DIRECTIVE HAS NEVER BEEN PROCESSED)	FARED	01172
	IFLAG = IFLAG + 1	FARED	01173
240	IF (INPS(8) .NE. 0) GO TO 250	FARED	01174
	WRITE (NPRT,200)	FARED	01175
	WRITE (NPRT,241)	FARED	01176
241	FORMAT (1H ,10X,43H A POLYG DIRECTIVE HAS NEVER BEEN PROCESSED)	FARED	01177
	IFLAG = IFLAG + 1	FARED	01178
250	IF (IFLAG .NE. 0) GO TO 350	FARED	01179
	IF (NISOT .NE. 0) GO TO 260	FARED	01180
	WRITE (NPRT,200)	FARED	01181
	WRITE (NPRT,251)	FARED	01182
251	FORMAT (1H ,10X,37H NUMBER OF NUCLIDES SPECIFIED IS ZERO)	FARED	01183
	IFLAG = IFLAG + 1	FARED	01184
260	IF (NBMAT .NE. 0) GO TO 270	FARED	01185
	WRITE (NPRT,200)	FARED	01186
	WRITE (NPRT,261)	FARED	01187
261	FORMAT (1H ,10X,43H NUMBER OF BULK MATERIALS SPECIFIED IS ZERO)	FARED	01188
	IFLAG = IFLAG + 1	FARED	01189
270	IF (NZMAT .NE. 0) GO TO 280	FARED	01190
	WRITE (NPRT,200)	FARED	01191
	WRITE (NPRT,271)	FARED	01192
271	FORMAT (1H ,10X,43H NUMBER OF ZONE MATERIALS SPECIFIED IS ZERO)	FARED	01193
	IFLAG = IFLAG + 1	FARED	01194
280	IF (IZON .NE. 0) GO TO 290	FARED	01195
	WRITE (NPRT,200)	FARED	01196
	WRITE (NPRT,281)	FARED	01197
281	FORMAT (1H ,10X,34H NUMBER OF ZONES SPECIFIED IS ZERO)	FARED	01198
	IFLAG = IFLAG + 1	FARED	01199
290	IF (NBLK .NE. 0) GO TO 300	FARED	01200
	WRITE (NPRT,200)	FARED	01201
	WRITE (NPRT,291)	FARED	01202
291	FORMAT (1H ,10X,35H NUMBER OF BLOCKS SPECIFIED IS ZERO)	FARED	01203
	IFLAG = IFLAG + 1	FARED	01204
300	IF (IFLAG .NE. 0) GO TO 350	FARED	01205
C-		FARED	01206
C-	WRAPUP PROCESSING OF INPUT DATA	FARED	01207
C-		FARED	01208
	CALL CCAST	FARED	01209
	CALL COMOUT	FARED	01210
	CALL PINPUT	FARED	01211
	CALL CELLOUT	FARED	01212
	CALL INOUT	FARED	01213
	CALL SOUROUT	FARED	01214

CALL BUCKOUT	FARED	01215
CALL LIBCOP	FARED	01216
350 CONTINUE	FARED	01217
RETURN	FARED	01218
780 IF (IFLG .EQ. -3) GO TO 15	FARED	01219
WRITE (NPRT,781)	FARED	01220
781 FORMAT (29H0***** POSSIBLE INPUT ERROR./	FARED	01221
X1H ,10X,53H DATA IDENTIFIER EXPECTED BUT FIELD IS NOT WORD ONLY.)	FARED	01222
IFLAG = IFLAG + 1	FARED	01223
GO TO 15	FARED	01224
800 WRITE (NPRT,801)	FARED	01225
801 FORMAT (1H0,38H*****LIBRARY TAPE ERROR*****)	FARED	01226
WRITE (NPRT,802)	FARED	01227
802 FORMAT (1H ,10X,23HPREATURE EOF ON FILE 1)	FARED	01228
803 IFLAG = IFLAG + 1	FARED	01229
GO TO 7	FARED	01230
810 WRITE (NPRT,801)	FARED	01231
WRITE (NPRT,811)	FARED	01232
811 FORMAT (1H ,10X,41HIDENTIFICATION RECORD ON FILE 1 INCORRECT)	FARED	01233
GO TO 803	FARED	01234
815 WRITE (NPRT,801)	FARED	01235
WRITE (NPRT,816)	FARED	01236
816 FORMAT (1H ,10X,73HNUMBER OF ENERGY GROUPS SPECIFIED ON FILE 1 IS	FARED	01237
XLESS THAN OR EQUQL TO ZERO)	FARED	01238
GO TO 803	FARED	01239
END	FARED	01240

SUBROUTINE INIT						FARED	01241
C-	INIT IS A SUBROUTINE FOR SETTING COUNTERS, OPTIONS AND EXTERNAL					FARED	01242
C-	FILE UNIT ASSIGNMENTS					FARED	01243
C -						FARED	01244
	COMMON	NCRD,	NPRT,	LIB,	NERG,	NRR	FARED 01245
	COMMON	NUR,	NXSEC,	NINP,	NBCD,	NSFX	FARED 01246
	COMMON	NBAB,	NRRI,	NURJ,	NBGXS,	NSPEC	FARED 01247
	COMMON	NAJFX,	NMAC,	NGCON,	NSCR,	NBURN	FARED 01248
	COMMON	NGEO,	NMGR,	NGRS,	NDSG,	NPTS	FARED 01249
	COMMON	NOB,	NOZ,	NOBM,	NOZM,	NUCL	FARED 01250
	COMMON	POW,	ROIM,	RAOI,	RADO,	COVIN	FARED 01251
	COMMON	MAXIT,	EXOPT,	IDCHA,	IBOP,	JBOP	FARED 01252
	COMMON	NFLXOP,	NBSQ,	NWBMR,	NWZMR,	NWBR	FARED 01253
	COMMON	NSOPA,	NSUPM,	TIME,	PT,	QACC	FARED 01254
	COMMON	HMACC,	QACB,	HMACB			FARED 01255
	COMMON	SPARES(38)					FARED 01256
	COMMON	IFLAG,	IV,	IFLG,	IWORD(16)		FARED 01257
	COMMON	IBLANK,	IZERO,	IPLUS,	IMINUS,	IASTER	FARED 01258
	COMMON	ICHAR,	NWOD,	BLANKS			FARED 01259
	COMMON	IZP(20), KOM(5000)					FARED 01260
	COMMON	/ISOTID/	NISOT,NIST,NIMAX,ISOT(80)				FARED 01261
	COMMON	/CONS/	ICON(20),INPS(15)				FARED 01262
	COMMON	/BULK/	NBMAT,NBST,NBMAX,IBMAT(3000)				FARED 01263
	COMMON	/ZON/	IZON,IZST,IZMAX,IZONE(200),IOZ(21),IZA0(21)				FARED 01264
	COMMON	/ZONEM/	NZMAT,NZST,NZMAX,IZMAT(400)				FARED 01265
	COMMON	/BLK/	NBLK,NBKST,NBKMAX,IDB(10,2),IBLK(100)				FARED 01266
	COMMON	/CELL/	NCEL,ICEL(40,7)				FARED 01267
	COMMON	/INBD/	NIBD,30IN(30)				FARED 01268
	COMMON	/OUTBD/	NOBD,30OUT(30)				FARED 01269
	COMMON	/POLY/	NGROUP,IBUS(30)				FARED 01270
	COMMON	/STOR/	IDCH,NLIST,NAST,NOPB,NBCK,NOPS,NSOUR,ILIST(30),				FARED 01271
X			MATX(30,30),BUCKL(600),PTSOUR(150),ZSOUR(20),				FARED 01272
X			EXTEND(5000)				FARED 01273
		EQUIVALENCE (IBMAT,BMAT)					FARED 01274
		EQUIVALENCE (IZMAT,ZMAT)					FARED 01275
		EQUIVALENCE (ICON,CON)					FARED 01276
		DIMENSION BMAT(3000)					FARED 01277
		DIMENSION ZMAT(400)					FARED 01278
		DIMENSION CON(20)					FARED 01279
C -							FARED 01280
C -	**	SEE PROGRAM FARED FOR A DESCRIPTION OF BLANK COMMON VARIABLES					FARED 01281
C -	**	SEE SUBROUTINE ISORT FOR A DESCRIPTION OF COMMON BLOCK /ISOTID/					FARED 01282
C -	**	SEE SUBROUTINE CONST FOR A DESCRIPTION OF COMMON BLOCK /CONS/					FARED 01283
C -	**	SEE SUBROUTINE BULKM FOR A DESCRIPTION OF COMMON BLOCK /BULK/					FARED 01284
C -	**	SEE SUBROUTINE ZONES FOR A DESCRIPTION OF COMMON BLOCK /ZON/					FARED 01285
C -	**	SEE SUBROUTINE BULKM FOR A DESCRIPTION OF COMMON BLOCK /ZONEM/					FARED 01286
C -	**	SEE SUBROUTINE BLOCK FOR A DESCRIPTION OF COMMON BLOCK /BLK/					FARED 01287
C -	**	SEE SUBROUTINE CELLS FOR A DESCRIPTION OF COMMON BLOCK /CELL/					FARED 01288
C -	**	SEE SUBROUTINE CINP FOR A DESCRIPTION OF COMMON BLOCK /INBD/					FARED 01289
C -	**	SEE SUBROUTINE CINP FOR A DESCRIPTION OF COMMON BLOCK /OUTBD/					FARED 01290

C - ** SEE SUBROUTINE CINP
 C - ** SEE SUBROUTINE RUCH
 C -

FOR A DESCRIPTION OF COMMON BLOCK /POLY/
 FOR A DESCRIPTION OF COMMON BLOCK /STOR/

LIB = 7
 NERG = 1
 NRR = 2
 NUR = 3
 NXSEC = 4
 NINP = 5
 NBUD = 8
 NSFX = 9
 NBAB = 10
 NRR1 = 12
 NURI = 13
 NBGXS = 14
 NSPEC = 15
 NAJFX = 16
 NMAC = 17
 NSCR = 19
 NIBD = 0
 NOBD = 0
 NGROUP = 0
 NOPS = 0
 NOPB = 0
 NBMAT = 0
 NBST = 1
 NBMAX = 3000
 NZMAT = 0
 NZST = 1
 NZMAX = 400
 NISOT = 0
 NIST = 1
 NIMAX = 80
 IZON = 0
 IZST = 1
 IZMAX = 200
 NBLK = 0
 NBKST = 1
 NBKMAX = 100
 NCEL = 0
 IFLAG = 0
 QACC = 0.0
 HMACC = 0.0
 QACB = 0.0
 HMACH = 0.0
 TIME = 0.0
 DO 10 I = 1,15
 10 INP3(I) = 0
 RETURN
 END

FARED 01291
 FARED 01292
 FARED 01293
 FARED 01294
 FARED 01295
 FARED 01296
 FARED 01297
 FARED 01298
 FARED 01299
 FARED 01300
 FARED 01301
 FARED 01302
 FARED 01303
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 FARED 01333
 FARED 01334
 FARED 01335
 FARED 01336
 FARED 01337
 FARED 01338
 FARED 01339
 FARED 01340

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SUBROUTINE CONST
C- CONST IS A SUBROUTINE FOR READING AND STORING IN THE ARRAY ICON FARED 01341
C- THE DATA GIVEN FOLLOWING THE SECONDARY DIRECTIVE GDATA. IF THE FARED 01342
C- USE OF DEFAULT VALUES IS INDICATED, CONST WILL SET THOSE VALUES. FARED 01343
C- FARED 01344
COMMON NCRD, NPRT, LIB, NERG, NRR FARED 01345
COMMON NUR, NXSEC, NINP, NRCO, NSFX FARED 01346
COMMON NBA3, NRR1, NURI, NBGXS, NSPEC FARED 01347
COMMON NAJFX, NMAC, NGCON, NSCR, NBURN FARED 01348
COMMON NCEO, NMGR, NGRS, NOSG, NPTS FARED 01349
COMMON NOB, NOZ, NOBH, NOZM, NUCL FARED 01350
COMMON POW, RUIM, RADI, RA00, COVIN FARED 01351
COMMON MAXIT, EXOPT, IDCHA, IBOP, JBOP FARED 01352
COMMON NFLXOP, NBSQ, NWMR, NWZMR, NWBR FARED 01353
COMMON NSOPA, NSOPM, TIME, PT, QACC FARED 01354
COMMON HMACC, QACB, HMACB FARED 01355
COMMON SPARES(38) FARED 01356
COMMON IFLAG, IV, IFLG, IWORD(18) FARED 01357
COMMON IBLANK, IZERO, IPLUS, IMINUS, IASTER FARED 01358
COMMON ICHAR, NWOD, BLANKS FARED 01359
COMMON IZP(20), KOM(5000) FARED 01360
COMMON /ISOTID/ NISOT, NISF, NIMAX, ISOT(80) FARED 01361
COMMON /CONS/ ICON(20), INPS(15) FARED 01362
COMMON /BLK/ NBMAT, NBST, NBMAX, IBMAT(3000) FARED 01363
COMMON /ZON/ IZON, IZST, IZMAX, IZONE(200), IDZ(21), IZAD(21) FARED 01364
COMMON /ZONEM/ NZMAT, NZST, NZMAX, IZMAT(400) FARED 01365
COMMON /BLK/ NBLK, NBKST, NBKMAX, IDB(10,2), IBLK(100) FARED 01366
COMMON /CELL/ NCEL, ICEL(40,7) FARED 01367
COMMON /INBD/ NIBD, BDIN(30) FARED 01368
COMMON /OUTBD/ NOBD, BDOUT(30) FARED 01369
COMMON /POLY/ NGROUP, IBDS(30) FARED 01370
COMMON /STOR/ IDCH, NLIST, NAST, NOPB, NBCK, NOPS, NSOUR, ILIST(30), FARED 01371
X MATX(30,30), BUCKL(600), PTSOUR(150), ZSOUR(20), FARED 01372
X EXTEND(5000) FARED 01373
EQUIVALENCE (IBMAT,BMAT) FARED 01374
EQUIVALENCE (IZMAT,ZMAT) FARED 01375
EQUIVALENCE (ICON,CON) FARED 01376
DIMENSION BMAT(3000) FARED 01377
DIMENSION ZMAT(400) FARED 01378
DIMENSION CON(20) FARED 01379
C- FARED 01380
C- FARED 01381
C- ** SEE PROGRAM FARED FOR A DESCRIPTION OF BLANK COMMON VARIABLES FARED 01382
C- ** SEE SUBROUTINE ISORT FOR A DESCRIPTION OF COMMON BLOCK /ISOTID/ FARED 01383
C- DEFINITION OF VARIABLES IN COMMON BLOCK /CONS/ FARED 01384
C- ICON(1) - REACTOR GEOMETRY - 1 = SLAB, 2 = CYLINDER, 3 = SPHERE FARED 01385
C- ICON(2) - NUMBER OF BROAD GROUPS FARED 01386
C- ICON(3) - NUMBER OF DOWNSCATTERING BROAD GROUPS FARED 01387
C- ICON(4) - REACTOR POWER FARED 01388
C- ICON(5) - REACTOR DIMENSION - AREA(SLAB), HEIGHT(CYL), 0.0(SPH) FARED 01389
C- ICON(6) - DEPLETION OPTION =0 FOR NO DEP., NON-ZERO CHAIN IDENT FARED 01390

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C-	ICON(7) = INNER BOUNDARY CONDITION OPTION	FARED	01391
C-	ICON(8) = OUTER BOUNDARY CONDITION OPTION	FARED	01392
C-	ICON(9) = CONVERGENCE OPTION	FARED	01393
C-	ICON(10) = OUTER CONVERGENCE CRITERION	FARED	01394
C-	ICON(11) = MAX NUMBER OF INNER ITERATIONS PERMITTED	FARED	01395
C-	ICON(12) = INNER RADIUS OF REACTOR	FARED	01396
C-	ICON(13) = EXTRAPOLATION FACTOR	FARED	01397
C-	ICON(14) = ICON(19) UNDEFINED	FARED	01398
C-	ICON(20) = INPUT FLAG - SET TO 1 FOR CONGIG, 2 FOR FUELMGMT DIR.	FARED	01399
C-	INPS(I) = FLAGS INDICATING THE PRESENCE (1) OR THE ABSENCE (.)	FARED	01400
C-	OF INPUT DATA UNDER THE VARIOUS DATA DIRECTIVES	FARED	01401
C-	INPS(1) = GDATA	FARED	01402
C-	INPS(2) = BULK	FARED	01403
C-	INPS(3) = ZONE	FARED	01404
C-	INPS(4) = BLOCK	FARED	01405
C-	INPS(5) = CELL	FARED	01406
C-	INPS(6) = INNER	FARED	01407
C-	INPS(7) = OUTER	FARED	01408
C-	INPS(8) = POLYG	FARED	01409
C-	INPS(9) = SOURCE,ZSOURCE,PTSOU	FARED	01410
C-	INPS(10) = BUCK,ZBUCK,GBUCK	FARED	01411
C-	** SEE SUBROUTINE BULKM FOR A DESCRIPTION OF COMMON BLOCK /BULK/	FARED	01412
C-	** SEE SUBROUTINE ZONES FOR A DESCRIPTION OF COMMON BLOCK /ZON/	FARED	01413
C-	** SEE SUBROUTINE BULKM FOR A DESCRIPTION OF COMMON BLOCK /ZONEM/	FARED	01414
C-	** SEE SUBROUTINE BLOCK FOR A DESCRIPTION OF COMMON BLOCK /BLK/	FARED	01415
C-	** SEE SUBROUTINE CELLS FOR A DESCRIPTION OF COMMON BLOCK /CELL/	FARED	01416
C-	** SEE SUBROUTINE CINP FOR A DESCRIPTION OF COMMON BLOCK /INBD/	FARED	01417
C-	** SEE SUBROUTINE CINP FOR A DESCRIPTION OF COMMON BLOCK /OUTBD/	FARED	01418
C-	** SEE SUBROUTINE CINP FOR A DESCRIPTION OF COMMON BLOCK /POLY/	FARED	01419
C-	** SEE SUBROUTINE ROCH FOR A DESCRIPTION OF COMMON BLOCK /STOR/	FARED	01420
C-	REWIND LIB	FARED	01421
C-	DO 5 I = 1,6	FARED	01422
C-	PRESET DEFAULT VALUES IN THE EVENT DATA IS OMITTED	FARED	01423
C-	5 ICON(I) = 0	FARED	01424
	ICON(7) = 1	FARED	01425
	ICON(8) = 2	FARED	01426
	ICON(9) = 1	FARED	01427
	CON(10) = 0.0001	FARED	01428
	ICON(11) = 40	FARED	01429
	CON(12) = 0.0	FARED	01430
	CON(13) = 0.2	FARED	01431
	ICON(20) = 1	FARED	01432
C-	DO LOOP SET TO READ ALL CONSTANTS AND NEXT DATA IDENTIFIER	FARED	01433
C-	DO 50 I = 1,15	FARED	01434
	10 CALL GRAMIN (IV,IFLG,IMORD)	FARED	01435
	N = IFLG + 4	FARED	01436
	GO TO (10,100, 30, 20, 40,100),N	FARED	01437
C-	WORD FORMAT	FARED	01438
C-		FARED	01439
		FARED	01440

20 IF (I.NE. 1) GO TO 60	FARED 01441
CALL SCAN (13HSLB*CYL*SPH**,IWORD,L)	FARED 01442
IF (L.EQ. 4) GO TO 110	FARED 01443
ICON(I) = L	FARED 01444
GO TO 50	FARED 01445
C -	FARED 01446
C INTEGER FORMAT	FARED 01447
C -	FARED 01448
30 GO TO (120, 41, 41,120,120, 41, 41, 41, 41,120, 41,120,120),I	FARED 01449
C -	FARED 01450
C FLOATING FORMAT	FARED 01451
C -	FARED 01452
40 GO TO (130,130,130, 41, 41,130,130,130,130, 41,130, 41, 41),I	FARED 01453
41 ICON(I) = IV	FARED 01454
50 CONTINUE	FARED 01455
CALL CRAMIN (IV,IFLG,IWORD)	FARED 01456
60 IF (ICON(6).NE. 0) CALL RUCH	FARED 01457
IF (ICON(1) - 2) 66, 62, 64	FARED 01458
62 CON(5) = 3.14159 * CON(5)	FARED 01459
GO TO 66	FARED 01460
64 CON(5) = 3.14159*4.0/3.0	FARED 01461
66 CONTINUE	FARED 01462
RETURN	FARED 01463
100 WRITE (NPRT,105)	FARED 01464
105 FORMAT (44H***** POSSIBLE INPUT ERROR IN GENERAL DATA)	FARED 01465
WRITE (NPRT,106)	FARED 01466
106 FORMAT (10X,48H ILLEGAL WORD-NUMBER FIELD READ -- FIELD IGNORED)	FARED 01467
107 IFLAG = IFLAG + 1	FARED 01468
GO TO 10	FARED 01469
110 WRITE (NPRT,105)	FARED 01470
WRITE (NPRT,115)	FARED 01471
115 FORMAT (10X,45H WORD IN FIRST FIELD IS NOT SLB OR CYL OR SPH)	FARED 01472
IFLG = IFLAG + 1	FARED 01473
GO TO 60	FARED 01474
120 WRITE (NPRT,105)	FARED 01475
WRITE (NPRT,125) I	FARED 01476
125 FORMAT (10X,11H DATA FIELD,I5,16H IS NOT INTEGER)	FARED 01477
126 IFLAG = IFLAG + 1	FARED 01478
GO TO 41	FARED 01479
130 WRITE (NPRT,105)	FARED 01480
WRITE (NPRT,135) I	FARED 01481
135 FORMAT (10X,11H DATA FIELD,I5,17H IS NOT FLOATING)	FARED 01482
GO TO 126	FARED 01483
END	FARED 01484

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SUBROUTINE EXPISO (IBM)
C- EXPISO IS A SUBROUTINE TO EXPAND THE NUCLIDE LIST OF A BULK MAT. FARED 01485
C- IN SPECIFYING BULK MATERIALS, IT IS NOT REQUIRED THAT NUCLIDES FARED 01486
C- WHOSE INITIAL ATOM CONCENTRATIONS ARE ZERO BE GIVEN AS PART OF THE FARED 01487
C- BULK MATERIAL SPECIFICATION. IN CASES WHERE DEPLETION STUDIES ARE FARED 01488
C- TO BE PERFORMED, EXPISO EXPANDS THE NUCLIDE LIST ASSOCIATED WITH FARED 01489
C- THE DEPLETION CHAIN ID ON THE GOATA CARD. IBM IS THE INDEX OF THE FARED 01490
C- FIRST WORD OF STORAGE IN IBMAT FOR THE BULK MATERIAL TO BE EXPAND. FARED 01491
C- FARED 01492
COMMON NCRO, NPRT, LIB, NERG, NRR FARED 01493
COMMON NUR, NXSEC, NINP, NBCD, NSFX FARED 01494
COMMON NBAB, NRR1, NURI, NBGXS, NSPEC FARED 01495
COMMON NAJFX, NMAC, NGCON, NSCR, NBURN FARED 01496
COMMON NCEO, NMGR, NGRS, NDSG, NPTS FARED 01497
COMMON NOB, NOZ, NOBM, NOZH, NUCL FARED 01498
COMMON POW, RDI, RADI, RADO, COVIN FARED 01499
COMMON MAXIT, EXOPT, IOCHA, IBOP, JBOP FARED 01500
COMMON NFLXOP, NBSQ, NWBMR, NWZMR, NWBR FARED 01501
COMMON NSOPA, NSUPM, TIME, PT, QACC FARED 01502
COMMON HMACC, QACB, HMACH FARED 01503
COMMON SPARES(38) FARED 01504
COMMON IFLAG, IV, IFLG, IWORD(18) FARED 01505
COMMON IBLANK, IZERO, IPLUS, IMINUS, IASTER FARED 01506
COMMON ICHAR, NWOD, BLANKS FARED 01507
COMMON IZP(20), KOM(5000) FARED 01508
COMMON /ISOTID/ NISOT,NIST,NIMAX,ISOT(80) FARED 01509
COMMON /CONS/ ICON(20),INPS(15) FARED 01510
COMMON /BULK/ NBMAT,NBST,NBMAX,IBMAT(3000) FARED 01511
COMMON /STOR/ IOCH,NLIST,NAST,NOPB,NBCK,NOPS,NSOUR,IList(30), FARED 01512
X MATX(30,30),BUCKL(600),PTSOUR(150),ZSOUR(20), FARED 01513
X EXTEND(5000) FARED 01514
EQUIVALENCE (IBMAT,BMAT) FARED 01515
DIMENSION BMAT(3000) FARED 01516
C - FARED 01517
C - ** SEE PROGRAM FARED FOR A DESCRIPTION OF BLANK COMMON VARIABLES FARED 01518
C - ** SEE SUBROUTINE ISORT FOR A DESCRIPTION OF COMMON BLOCK /ISOTID/ FARED 01519
C - ** SEE SUBROUTINE CONST FOR A DESCRIPTION OF COMMON BLOCK /CONS/ FARED 01520
C - ** SEE SUBROUTINE BULKM FOR A DESCRIPTION OF COMMON BLOCK /BULK/ FARED 01521
C - ** SEE SUBROUTINE ROCH FOR A DESCRIPTION OF COMMON BLOCK /STOR/ FARED 01522
C - FARED 01523
IF (INPS(1) .EQ. 0) GO TO 160 FARED 01524
C- FARED 01525
C- SET CHAIN LIST INDEX FOR EACH NUCLIDE SPECIFIED IN THE BULK FARED 01526
C- MATERIAL. IF NUCLIDE IS NON-DEPLETABLE, CHAIN LIST INDEX = 0 FARED 01527
C- FARED 01528
N1 = IBM + 3 FARED 01529
N2 = N1 + 4*(IBMAT(IBM+2) -1) FARED 01530
DO 20 I = N1,N2,4 FARED 01531
IBMAT(I+3) = 0 FARED 01532
DO 10 J = 1,NLIST FARED 01533
FARED 01534

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IF (IBMAT(I) .EQ. ILIST(J)) IBMAT(I+3) = J	FAREQ	01535
10 CONTINUE	FAREQ	01536
20 CONTINUE	FAREQ	01537
IF (IBMAT(IBM+2) .LT. 2) GO TO 55	FAREQ	01538
C- SORT NUCLIDES OF BULK MATERIAL ACCORDING TO CHAIN LIST INDEX	FAREQ	01539
C- I = N1	FAREQ	01540
30 IF (IBMAT(I+3) .GT. IBMAT(I+7)) GO TO 40	FAREQ	01541
35 I = I + 4	FAREQ	01542
IF (I+4 .LE. N2) GO TO 30	FAREQ	01543
GO TO 55	FAREQ	01544
40 J1 = I + 3	FAREQ	01545
DO 50 J = I, J1	FAREQ	01546
ITEMP = IBMAT(J)	FAREQ	01547
IBMAT(J) = IBMAT(J+4)	FAREQ	01548
50 IBMAT(J+4) = ITEMP	FAREQ	01549
IF (I .EQ. N1) GO TO 30	FAREQ	01550
I = I + 4	FAREQ	01551
GO TO 30	FAREQ	01552
C- COMPARE LIST OF NUCLIDE IN BULK MATERIAL AGAINST NUCLIDE LIST IN	FAREQ	01553
C- DEPLETION CHAIN BY CHAIN LIST INDEX FOR POSSIBLE EXPANSION OF	FAREQ	01554
C- BULK MATERIAL NUCLIDE LIST	FAREQ	01555
55 DO 150 I = 1, NLIST	FAREQ	01556
J = N1	FAREQ	01557
60 IF (IBMAT(J+3) .NE. J) GO TO 70	FAREQ	01558
65 IF (J+4 .GT. N2) GO TO 150	FAREQ	01559
J = J + 4	FAREQ	01560
GO TO 60	FAREQ	01561
70 IF (IBMAT(J+3) .GT. I) GO TO 65	FAREQ	01562
IF (IBMAT(J+3) .EQ. I) GO TO 150	FAREQ	01563
K = IBMAT(J+3)	FAREQ	01564
IF (MATX(I, K) .EQ. J) GO TO 65	FAREQ	01565
J2 = J + 4	FAREQ	01566
IF (J2 .GT. N2) GO TO 76	FAREQ	01567
DO 75 J1 = J2, N2, 4	FAREQ	01568
IF (I .EQ. IBMAT(J1+3)) GO TO 150	FAREQ	01569
75 CONTINUE	FAREQ	01570
C- NUCLIDE ID IN ILIST(I) IS CANDIDATE FOR EXPANDING B.M. LIST	FAREQ	01571
C- ISF = 1	FAREQ	01572
IF (NBST+3 .GT. NBMAX) GO TO 100	FAREQ	01573
30 IF (NIST .GT. NIMAX) GO TO 90	FAREQ	01574
DO 82 J1 = N1, N2, 4	FAREQ	01575
IF (IBMAT(J1) .EQ. ILIST(I)) GO TO 150	FAREQ	01576
82 CONTINUE	FAREQ	01577
IBMAT(N2+4) = ILIST(I)	FAREQ	01578
	FAREQ	01579
	FAREQ	01580
	FAREQ	01581
	FAREQ	01582
	FAREQ	01583
	FAREQ	01584

BMAT (N2+5) = 0.0	FARED 01585
IBMAT(N2+6) = J	FARED 01586
IBMAT(N2+7) = I	FARED 01587
IBMAT(IBM+2) = IBMAT(IBM+2) + 1	FARED 01588
NBST = NBST + 4	FARED 01589
N2 = N2 + 4	FARED 01590
ISOT(NIST) = ILIST(I)	FARED 01591
NIST = NIST + 1	FARED 01592
NISOT = NISOT + 1	FARED 01593
GO TO 150	FARED 01594
90 IF (ISF .NE. 0) GO TO 120	FARED 01595
CALL ISORT(IBMAT(J))	FARED 01596
ISF = 1	FARED 01597
GO TO 80	FARED 01598
100 WRITE (NPRT,105)	FARED 01599
105 FORMAT (29H0***** POSSIBLE INPUT ERROR.)	FARED 01600
WRITE (NPRT,110)	FARED 01601
110 FORMAT (1H ,10X,46HBULK MATERIAL STORAGE TABLE OVERFLOW IN EXPAND)	FARED 01602
115 IFLAG = IFLAG + 1	FARED 01603
GO TO 150	FARED 01604
120 WRITE (NPRT,105)	FARED 01605
WRITE (NPRT,125)	FARED 01606
125 FORMAT (1H ,10X,46HISOTOPE STORAGE TABLE OVERFLOW IN EXPAND)	FARED 01607
GO TO 115	FARED 01608
150 CONTINUE	FARED 01609
160 CONTINUE	FARED 01610
RETURN	FARED 01611
END	FARED 01612

	SUBROUTINE RDCH	FARED	J1613
C-	SUBROUTINE RDCH SEARCHES FILE TWO OF LIBRARY TAPE FOR THE	FARED	J1614
C-	DEPLETION CHAIN IDENTIFIED IN ICON(6) AND READS ALL THE ASSOCIATED	FARED	J1615
C-	DATA. CHAIN ID IS STORED IN IDCH, CHAIN NUCLIDE LIST IS STORED	FARED	J1616
C-	IN ILIST, DEPLETION MATRIX IS STORED IN MATX	FARED	J1617
C-		FARED	J1618
	COMMON NCRD, NPRT, LIB, NERG, NRR	FARED	J1619
	COMMON NUR, NXSEC, NINP, NBCD, NSFX	FARED	J1620
	COMMON NBAB, NRR1, NURI, NBGXS, NSPEC	FARED	J1621
	COMMON NAJFX, NMAC, NGCON, NSCR, NBURN	FARED	J1622
	COMMON NGE0, NMGR, NGRS, NOSG, NPTS	FARED	J1623
	COMMON NOB, NOZ, NOBM, NOZM, NUCL	FARED	J1624
	COMMON POW, RDIM, RADI, RADO, COVIN	FARED	J1625
	COMMON MAXIT, EXOPT, IDCHA, IBOP, JBOP	FARED	J1626
	COMMON NFLXOP, NBSQ, NWBMR, NWZMR, NWBR	FARED	J1627
	COMMON NSOPA, NSOPM, TIME, PT, QACC	FARED	J1628
	COMMON HMACC, QACB, HMACH	FARED	J1629
	COMMON SPARES(38)	FARED	J1630
	COMMON IFLAG, IV, IFLG, IWORD(16)	FARED	J1631
	COMMON IBLANK, IZERO, IPLUS, IMINUS, IASTER	FARED	J1632
	COMMON ICHAR, NWOU, BLANKS	FARED	J1633
	COMMON IZP(2J), KOM(5000)	FARED	J1634
	COMMON /CONS/ ICON(20),INPS(15)	FARED	J1635
	COMMON /ZONEM/ NZMAT,NZST,NZMAX,IZMAT(400)	FARED	J1636
	COMMON /BLK/ NBLK,NBKST,NBKMAX,IDB(10,2),IBLK(100)	FARED	J1637
	COMMON /STOR/ IDCH,NLIST,NAST,NOPB,NBCK,NOPS,NSOUR,ILIST(50),	FARED	J1638
X	MATX(30,30),BUCKL(600),PTSOUR(150),ZSOUR(20),	FARED	J1639
X	EXTEND(5000)	FARED	J1640
	EQUIVALENCE (IZMAT,ZMAT)	FARED	J1641
	EQUIVALENCE (ICON,CON)	FARED	J1642
	DIMENSION ZMAT(400)	FARED	J1643
	DIMENSION CON(20)	FARED	J1644
C-		FARED	J1645
C-	DESCRIPTION OF VARIABLES IN COMMON BLOCK /STOR/	FARED	J1646
C-	IDCH - DEPLETION CHAIN ID	FARED	J1647
C-	NLIST- NUMBER OF NUCLIDES IN DEPLETION CHAIN	FARED	J1648
C-	NOPB - INDICATOR FOR BUCKLING OPTION CHOSEN	FARED	J1649
C-	NBCK - NUMBER OF ITEMS OF DATA READ TO SPECIFY TRANSVERSE BUCK.	FARED	J1650
C-	NOPS - INDICATOR FOR SOURCE OPTION CHOSEN	FARED	J1651
C-	NSOUR- NUMBER OF ITEMS OF DATA READ TO SPECIFY STARTING SOURCE.	FARED	J1652
C-	MATX - ARRAY TO CONTAIN DEPLETION MATRIX	FARED	J1653
C-	ILIST- ARRAY FOR STORAGE OF DEPLETION CHAIN NUCLIDE LIST	FARED	J1654
C-	BUCKL- ARRAY FOR STORAGE OF TRANSVERSE BUCKLING	FARED	J1655
C-	PTSOUR- ARRAY FOR STORAGE OF POINT STARTING SOURCE	FARED	J1656
C-	ZSOUR- ARRAY FOR STORAGE OF ZONE DEPENDENT STARTING SOURCE	FARED	J1657
C - **	SEE PROGRAM FARED FOR A DESCRIPTION OF BLANK COMMON VARIABLES	FARED	J1658
C - **	SEE SUBROUTINE CONST FOR A DESCRIPTION OF COMMON BLOCK /CONS/	FARED	J1659
C - **	SEE SUBROUTINE BULKM FOR A DESCRIPTION OF COMMON BLOCK /ZONEM/	FARED	J1660
C - **	SEE SUBROUTINE BLOCK FOR A DESCRIPTION OF COMMON BLOCK /BLK/	FARED	J1661
C -		FARED	J1662

DATA IFILE /4HFILE/	FARED	01663
10 READ (LIB)	FARED	01664
C-	FARED	01665
C- SEARCH FOR FILE TWO	FARED	01666
C-	FARED	01667
IF (EOF,LIB) 15,10	FARED	01668
15 READ (LIB) (MATX(I),I=1,4)	FARED	01669
IF (EOF,LIB) 130,16	FARED	01670
16 IF (MATX(1) .NE. IFILE) GO TO 10	FARED	01671
IF (MATX(2) - 2) 10,20,100	FARED	01672
20 NCHN = MATX(3)	FARED	01673
C-	FARED	01674
C- READ DEPLETION CHAIN DIRECTORY AND SEARCH FOR PRESENCE OF PROPER	FARED	01675
C- DEPLETION CHAIN	FARED	01676
C-	FARED	01677
READ (LIB) ((MATX(I,J),I=1,3),J=1,NCHN)	FARED	01678
IF (EOF,LIB) 130,25	FARED	01679
25 DO 30 I = 1,NCHN	FARED	01680
IN= I	FARED	01681
IF (ICON(6) .EQ. MATX(1,I)) GO TO 40	FARED	01682
30 CONTINUE	FARED	01683
GO TO 120	FARED	01684
C-	FARED	01685
C- CHAIN IS FOUND IN DIRECTORY SO SPACE OUT FILE TO PROPER RECORD	FARED	01686
C-	FARED	01687
40 IDCH = MATX(1,IN)	FARED	01688
NLIST = MATX(2,IN)	FARED	01689
NAST = MATX(3,IN)	FARED	01690
NREC = 2*(IN-1)	FARED	01691
IF (NREC .EQ. 0) GO TO 60	FARED	01692
DO 50 J = 1,NREC	FARED	01693
50 READ(LIB)	FARED	01694
C-	FARED	01695
C- READ AND STORE THE CHAIN NUCLIDE LIST AND DEPLETION MATRIX	FARED	01696
C-	FARED	01697
60 CONTINUE	FARED	01698
READ (LIB) M, (ILIST(I),I=1,NLIST)	FARED	01699
IF (IDCH .NE. M) GO TO 120	FARED	01700
READ (LIB) ((MATX(I,J),J=1,I),I=1,NLIST)	FARED	01701
IF (EOF,LIB) 130,70	FARED	01702
70 CONTINUE	FARED	01703
RETURN	FARED	01704
100 WRITE (NPRT,105)	FARED	01705
105 FORMAT (31HJ***** LIBRARY DATA TAPE ERROR)	FARED	01706
WRITE (NPRT,110)	FARED	01707
110 FORMAT (1H ,10X,26HFILE TWO NOT FOUND ON TAPE)	FARED	01708
111 IFLAG = IFLAG + 1	FARED	01709
GO TO 70	FARED	01710
120 WRITE (NPRT,105)	FARED	01711
WRITE (NPRT,125) ICON(6)	FARED	01712

125	FORMAT (1H ,10X,28HDEPLETION CHAIN SPECIFIED IS,I5,17H	NOT IN THE	FARED	01713
	X LIST)		FARED	01714
	GO TO 111		FARED	01715
130	WRITE (NPRT,135)		FARED	01716
	WRITE (NPRT,135)		FARED	01717
135	FORMAT (1H ,10X,23HPREATURE EOF ON FILE 2)		FARED	01718
	GO TO 111		FARED	01719
	END		FARED	01720

	SUBROUTINE BULKM						FARED	01721
C-	BULKM SUBROUTINE READS AND STORES THE INPUT REQUIRED FOR THE						FARED	01722
C-	SPECIFICATION OF BULK MATERIALS. RECOGNITION OF THE DIRECTIVE						FARED	01723
C-	BULK CAUSES THIS SUBROUTINE TO BE CALLED						FARED	01724
C -							FARED	01725
	COMMON	NCRO,	NPRT,	LIB,	NERG,	NRR	FARED	01726
	COMMON	NUR,	NXSEC,	NINP,	NBCD,	NSFX	FARED	01727
	COMMON	NBAB,	NRR1,	NURI,	NBGXS,	NSPEC	FARED	01728
	COMMON	NAJFX,	NMAC,	NGCON,	NSCR,	NBURN	FARED	01729
	COMMON	NGEO,	NMGR,	NGRS,	NDSG,	NPTS	FARED	01730
	COMMON	NOB,	NOZ,	NOBM,	NOZM,	NUCL	FARED	01731
	COMMON	POW,	RDIM,	RADI,	RADO,	COVIN	FARED	01732
	COMMON	MAXIT,	EXOPT,	IDCHA,	IBOP,	JBOP	FARED	01733
	COMMON	NFLXOP,	NBSQ,	NWBMR,	NWZMR,	NWBR	FARED	01734
	COMMON	NSOPA,	NSOPM,	TIME,	PT,	QACC	FARED	01735
	COMMON	HMACC,	QACB,	HMACB			FARED	01736
	COMMON	SPARES(38)					FARED	01737
	COMMON	IFLAG,	IV,	IFLG,	IWORD(18)		FARED	01738
	COMMON	IBLANK,	IZERO,	IPLUS,	IMINUS,	IASTER	FARED	01739
	COMMON	ICHAR,	NWOD,	BLANKS			FARED	01740
	COMMON	IZP(20), KOM(5000)					FARED	01741
	COMMON /ISOTID/	NISOT,NIST,NIMAX,ISOT(80)					FARED	01742
	COMMON /CONS/	ICON(20),INPS(15)					FARED	01743
	COMMON /BULK/	NBMAT,NBST,NBMAX,IBMAT(3000)					FARED	01744
	COMMON /ZON/	IZON,IZST,IZMAX,IZONE(200),IOZ(21),IZAD(21)					FARED	01745
	COMMON /ZONEM/	NZMAT,NZST,NZMAX,IZMAT(400)					FARED	01746
	EQUIVALENCE (IBMAT,BMAT)						FARED	01747
	EQUIVALENCE (IZMAT,ZMAT)						FARED	01748
	EQUIVALENCE (ICON,CON)						FARED	01749
	DIMENSION BMAT(3000)						FARED	01750
	DIMENSION ZMAT(400)						FARED	01751
	DIMENSION CON(20)						FARED	01752
C -							FARED	01753
C-	DESCRIPTION OF VARIABLES IN COMMON BLOCK /BULK/						FARED	01754
C-	NBMAT -	NUMBER OF BULK MATERIALS CURRENTLY DESCRIBED					FARED	01755
C-	NBST -	INDEX OF THE NEXT AVAILABLE STORAGE LOCATION IN IBMAT					FARED	01756
C-	NBMAX -	NUMBER OF STORAGE LOCATIONS ASSIGNED TO ARRAY I3MAT					FARED	01757
C-	IBMAT -	ARRAY FOR STORAGE OF DATA DESCRIBING BULK MATERIALS					FARED	01758
C-	(1) -	IDENTIFICATION OF 1ST BULK MATERIAL					FARED	01759
C-	(2) -	CELL INDEX OF 1ST BULK MATERIAL					FARED	01760
C-	(3) -	NUMBER OF NUCLIDES IN 1ST BULK MATERIAL					FARED	01761
C-	(4) -	ID OF 1ST NUCLIDE IN 1ST BULK MATERIAL					FARED	01762
C-	(5) -	HET. DENSITY OF 1ST NUCLIDE IN 1ST BULK MATERIAL					FARED	01763
C-	(6) -	TYPE OF 1ST NUCLIDE IN 1ST BULK MATERIAL					FARED	01764
C-	(7) -	DEPLETION INDEX OF 1ST NUCLIDE IN 1ST BULK MATERIAL					FARED	01765
C-	(8) -	ID OF 2ND NUCLIDE IN 1ST BULK MATERIAL					FARED	01766
C-	(9) -	HET. DENSITY OF 2ND NUCLIDE IN 1ST BULK MATERIAL					FARED	01767
C-	(10) -	TYPE OF 2ND NUCLIDE IN 1ST BULK MATERIAL					FARED	01768
C-	(11) -	DEPLETION INDEX OF 2ND NUCLIDE IN 1ST BULK MATERIAL					FARED	01769
C-	.						FARED	01770

C-	.		FARED	01771
C-	(4I)-	ID OF ITH NUCLIDE IN 1ST BULK MATERIAL	FARED	01772
C-	(4I+1)-	HET. DENSITY OF ITH NUCLIDE IN 1ST BULK MATERIAL	FARED	01773
C-	.		FARED	01774
C-	.		FARED	01775
C-	.		FARED	01776
C-	(4J+4)-	ID OF 2ND BULK MATERIAL (FOR J NUCLIDES IN 1ST BM)	FARED	01777
C-	.		FARED	01778
C-	.		FARED	01779
C-	.		FARED	01780
C-	DESCRIPTION OF VARIABLES IN COMMON BLOCK /ZONEM/		FARED	01781
C-	NZMAT -	NUMBER OF ZONE MATERIALS CURRENTLY DESCRIBED	FARED	01782
C-	NZST -	INDEX OF THE NEXT AVAILABLE STORAGE LOCATION IN IZMAT	FARED	01783
C-	NZMAX -	NUMBER OF STORAGE LOCATIONS ASSIGNED TO ARRAY IZMAT	FARED	01784
C-	IZMAT -	ARRAY FOR STORAGE OF DATA DESCRIBING ZONE MATERIALS	FARED	01785
C-	(1)-	ID OF 1ST ZONE MATERIAL	FARED	01786
C-	(2)-	V.F. OF BULK MAT. IDENTIFYING 1ST ZONE MATERIAL	FARED	01787
C-	(3)-	ID OF BULK MAT. IDENTIFYING 1ST ZONE MATERIAL	FARED	01788
C-	(4)-	INDEX OF DATA STORAGE IN IZMAT OF BULK MAT.	FARED	01789
C-	.	IDENTIFYING 1ST ZONE MATERIAL	FARED	01790
C-	.		FARED	01791
C-	.		FARED	01792
C-	(4(I-1)+1)-	ID OF ITH ZONE MATERIAL	FARED	01793
C-	(4(I-1)+2)-	V.F. OF B.M. IDENTIFYING ITH Z.M.	FARED	01794
C-	(4(I-1)+3)-	ID OF B.M. IDENTIFYING ITH Z.M.	FARED	01795
C-	(4(I-1)+4)-	INDEX OF DATA STORAGE ITH ZONE MAT.	FARED	01796
C-	.		FARED	01797
C-	.		FARED	01798
C-	** SEE PROGRAM FARED FOR A DESCRIPTION OF BLANK COMMON VARIABLES		FARED	01799
C-	** SEE SUBROUTINE ISORT FOR A DESCRIPTION OF COMMON BLOCK /ISORT/		FARED	01800
C-	** SEE SUBROUTINE CONST FOR A DESCRIPTION OF COMMON BLOCK /CONS/		FARED	01801
C-	** SEE SUBROUTINE ZONES FOR A DESCRIPTION OF COMMON BLOCK /ZON/		FARED	01802
C-			FARED	01803
C-	TEST FOR BULK MATERIAL IDENTIFIER		FARED	01804
C-			FARED	01805
	1	CALL CRAMIN (IV,IFLG,IWORD)	FARED	01806
		N = IFLG + 4	FARED	01807
		GO TO (230, 5,230,230,231,230),N	FARED	01808
	5	IDM = N8ST	FARED	01809
		CALL SCAN (4HBM**,IWORD(1),L)	FARED	01810
		IF (L.NE. 1)GO TO 100	FARED	01811
		IF (NBMAT.EQ. J) GO TO 10	FARED	01812
		J = 1	FARED	01813
C-			FARED	01814
C-	TEST FOR DUPLICATE BULK MATERIAL		FARED	01815
C-			FARED	01816
		DO 9 I = 1,NBMAT	FARED	01817
		IF (IBMAT(J).NE. IV) GO TO 9	FARED	01818
		WRITE (NPRT,105)	FARED	01819
		WRITE (NPRT, 8) IV	FARED	01820

8	FORMAT (1H ,10X,38H DUPLICATE DESCRIPTION OF BULK MATERIAL,I5)	FARED	01821
	IFLAG = IFLAG + 1	FARED	01822
C-		FARED	01823
C-	SET STORAGE FOR BULK MATERIAL BEING DEFINED	FARED	01824
C-		FARED	01825
9	J = J + 3+4*(IBMAT(J+2))	FARED	01826
10	IBMAT(IBM) = IV	FARED	01827
	IBMAT(IBM+1) = 0	FARED	01828
	IBMAT(IBM+2) = 0	FARED	01829
	ITYPE = 0	FARED	01830
	NBMAT = NBMAT + 1	FARED	01831
30	NBST = NBST + 3	FARED	01832
C-		FARED	01833
C-	READ IN ISOTOPE IDENTIFICATION AND NUMBER DENSITY	FARED	01834
C-		FARED	01835
32	IFLG = 0	FARED	01836
	ISF = 0	FARED	01837
	CALL IDNUM (IO,LET1,LET2,IV,IFLG,IWORD)	FARED	01838
	IF (IFLG .EQ. 3) CALL GRAMIN (IV,IFLG,IWORD)	FARED	01839
	IF (IO .EQ. 0) GO TO 5J	FARED	01840
	N = IFLG + 4	FARED	01841
	GO TO(150,160,150,150, 40,150),N	FARED	01842
C-		FARED	01843
C-	STORE NUCLIDE DATE FOR BULK MATERIAL BEING DEFINED	FARED	01844
C-		FARED	01845
40	IF (NBST+3 .GT. NBMAX) GO TO 170	FARED	01846
42	IF (NIST+1 .GT. NIMAX) GO TO 180	FARED	01847
	IBMAT(NBST) = IO	FARED	01848
	IBMAT(NBST+1) = IV	FARED	01849
	IBMAT(NBST+2) = ITYPE	FARED	01850
	IBMAT(NBST+3) = 0	FARED	01851
	IBMAT(IBM+2) = IBMAT(IBM+2) + 1	FARED	01852
	ISOT(NIST) = IO	FARED	01853
	NIST = NIST + 1	FARED	01854
	NISOT = NISOT + 1	FARED	01855
	NBST = NBST + 4	FARED	01856
	GO TO 32	FARED	01857
50	N = IFLG + 4	FARED	01858
	GO TO(200,210, 90, 95, 60,200),N	FARED	01859
60	IVF = IV	FARED	01860
C-		FARED	01861
C-	EXPAND NUCLIDE LIST OF BULK MATERIAL JUST DEFINED FOR DEPLETION	FARED	01862
C-		FARED	01863
	IF (ICON(6) .NE. 0) CALL EXPISO(IBM)	FARED	01864
65	CALL GRAMIN (IV,IFLG,IWORD)	FARED	01865
	N = IFLG + 4	FARED	01866
	GO TO(120, 70,120,120, 60,120),N	FARED	01867
70	CALL SCAN (7H ZM*BM**,IWORD(1),L)	FARED	01868
	GO TO(80, 5,120),L	FARED	01869
80	IF (NZST + 4 .GT. NZMAX) GO TO 220	FARED	01870

	IF (NZMAT .EQ. 0) GO TO 86	FARED	01871
C-		FARED	01872
C-	STORE ZONE MATERIAL DATA DEFINITION	FARED	01873
C-		FARED	01874
	J = 1	FARED	01875
	DO 85 I = 1, NZMAT	FARED	01876
	IF (IZMAT(J) .NE. IV) GO TO 85	FARED	01877
	WRITE (NPRT, 105)	FARED	01878
	WRITE (NPRT, 84) IV	FARED	01879
84	FORMAT (1H, 10X, 38H DUPLICATE DESCRIPTION OF ZONE MATERIAL, I5)	FARED	01880
85	J = J + 4	FARED	01881
86	IZMAT(NZST) = IV	FARED	01882
	IZMAT(NZST+1) = IVF	FARED	01883
	IZMAT(NZST+2) = IBMAT(1BM)	FARED	01884
	IZMAT(NZST+3) = IBM	FARED	01885
	NZST = NZST + 4	FARED	01886
	NZMAT = NZMAT + 1	FARED	01887
	GO TO 85	FARED	01888
90	IBMAT(1BM+1) = IV	FARED	01889
	GO TO 32	FARED	01890
C-		FARED	01891
C-	SET NUCLIDE TYPE	FARED	01892
C-		FARED	01893
95	CALL SCAN (18H MIX*FUEL*DILUENT**, IWORD(1), L)	FARED	01894
	IF (L .EQ. 4) GO TO 200	FARED	01895
	ITYPE = L - 1	FARED	01896
	GO TO 32	FARED	01897
100	WRITE (NPRT, 105)	FARED	01898
105	FORMAT (29H0***** POSSIBLE INPUT ERROR.)	FARED	01899
	WRITE (NPRT, 110)	FARED	01900
110	FORMAT (1H, 10X, 37H BULK SUBROUTINE ENTERED ERRONEOUSLY.)	FARED	01901
115	IFLAG = IFLAG + 1	FARED	01902
120	CONTINUE	FARED	01903
	GO TO 300	FARED	01904
150	WRITE (NPRT, 105)	FARED	01905
	WRITE (NPRT, 155)	FARED	01906
155	FORMAT (1H, 10X, 64H ISOTOPE NUMBER DENSITY EXPECTED BUT FIELD IS NOT FLOATING POINT.)	FARED	01907
	GO TO 115	FARED	01908
160	WRITE (NPRT, 105)	FARED	01909
	WRITE (NPRT, 155)	FARED	01910
	WRITE (NPRT, 165) LET1, LET2	FARED	01911
165	FORMAT (1H, 10X, 22H NUCLIDE IDENTIFIED AS ,A4,A2,9H IGNORED.)	FARED	01912
166	IFLAG = IFLAG + 1	FARED	01913
	GO TO 32	FARED	01914
170	WRITE (NPRT, 105)	FARED	01915
	WRITE (NPRT, 175)	FARED	01916
175	FORMAT (1H, 10X, 52H BULK MATERIAL STORAGE TABLE OVERFLOW. BULK MATERIAL, I3, 9H IGNORED.)	FARED	01917
	GO TO 166	FARED	01918
		FARED	01919
		FARED	01920

180	IF (ISF .NE. 0) GO TO 190	FARED	01921
	CALL ISORT (ID)	FARED	01922
	ISF = 1	FARED	01923
	GO TO 42	FARED	01924
190	WRITE (NPRT,105)	FARED	01925
	WRITE (NPRT,195) LET1,LET2	FARED	01926
195	FORMAT (1H ,10X,54HNUCLIDE STORAGE TABLE OVERFLOW. NUCLIDE IDENTIF	FARED	01927
	XIED AS ,A4,A2,13H NOT ENTERED.)	FARED	01928
	XIED AS ,A6,13H NOT ENTERED.)	FARED	01929
	IFLAG = IFLAG + 1	FARED	01930
	GO TO 30	FARED	01931
200	WRITE (NPRT,105)	FARED	01932
	WRITE (NPRT,205)	FARED	01933
205	FORMAT (1H ,10X,57HVOLUME FRACTION EXPECTED BUT FIELD IS NOT FLOAT	FARED	01934
	XING POINT.)	FARED	01935
	GO TO 115	FARED	01936
210	WRITE (NPRT,105)	FARED	01937
	WRITE (NPRT,205)	FARED	01938
	WRITE (NPRT,215)	FARED	01939
215	FORMAT (1H ,10X,34HPROBABLY A BAD ISOTOPE IDENTIFIER.)	FARED	01940
	GO TO 166	FARED	01941
220	WRITE (NPRT,105)	FARED	01942
	WRITE (NPRT,225)	FARED	01943
225	FORMAT (1H ,10X,61HZONE MATERIAL STORAGE TABLE OVERFLOW. MATERIAL	FARED	01944
	XIDENTIFIED AS ,I3,13H NOT ENTERED.)	FARED	01945
	IFLAG = IFLAG + 1	FARED	01946
	GO TO 65	FARED	01947
230	WRITE (NPRT,105)	FARED	01948
	WRITE (NPRT,235)	FARED	01949
235	FORMAT (1H ,10X,68HBULK MATERIAL IDENTIFICATION EXPECTED BUT FIELD	FARED	01950
	X IS NOT WORD-INTEGER.)	FARED	01951
	IFLAG = IFLAG + 1	FARED	01952
	GO TO 1	FARED	01953
300	CONTINUE	FARED	01954
	ID = 0	FARED	01955
	CALL ISORT (ID)	FARED	01956
	RETURN	FARED	01957
	END	FARED	01958

	SUBROUTINE ZONES						FARED	01959
C-	ZONES SUBROUTINE READS AND STORES THE INPUT REQUIRED FOR THE -						FARED	01960
C-	SPECIFICATION OF ZONE PARAMETERS. RECOGNITION OF THE DIRECTIVE						FARED	01961
C-	ZONE CAUSES THIS SUBROUTINE TO BE CALLED.						FARED	01962
C -							FARED	01963
	COMMON	NCRD,	NPRT,	LIB,	NERC,	NRR	FARED	01964
	COMMON	NUR,	NXSEC,	NINP,	NBCD,	NSFX	FARED	01965
	COMMON	NBAH,	NRRI,	NURI,	NBGXS,	NSPEC	FARED	01966
	COMMON	NAJFX,	NMAC,	NGCON,	NSCR,	NBURN	FARED	01967
	COMMON	NGEO,	NMGR,	NGRS,	NDSG,	NPTS	FARED	01968
	COMMON	NOB,	NOZ,	NOBM,	NOZM,	NUCL	FARED	01969
	COMMON	POW,	RDIM,	RADI,	RADO,	COVIN	FARED	01970
	COMMON	MAXIT,	EXOPT,	IDCHA,	IBOP,	JBOP	FARED	01971
	COMMON	NFLXOP,	NBSQ,	NWBMR,	NWZMR,	NWBR	FARED	01972
	COMMON	NSOPA,	NSOPM,	TIME,	PT,	QACC	FARED	01973
	COMMON	HMACC,	QACB,	HMACB			FARED	01974
	COMMON	SPARES(38)					FARED	01975
	COMMON	IFLAG,	IV,	IFLG,	IWORD(18)		FARED	01976
	COMMON	IBLANK,	IZERO,	IPLUS,	IMINUS,	IASTER	FARED	01977
	COMMON	ICHAR,	NWOD,	BLANKS			FARED	01978
	COMMON	IZP(20), KUM(5000)					FARED	01979
	COMMON /ISOTID/	NISOT,NIST,NIMAX,ISOT(80)					FARED	01980
	COMMON /CONS/	ICON(20),INPS(15)					FARED	01981
	COMMON /BULK/	NBMAT,NBST,NBMAX,IBMAT(3000)					FARED	01982
	COMMON /ZON/	IZON,IZST,IZMAX,IZONE(200),IDZ(21),IZAD(21)					FARED	01983
	COMMON /ZONEM/	NZMAT,NZST,NZMAX,IZMAT(400)					FARED	01984
	EQUIVALENCE (IBMAT,BMAT)						FARED	01985
	EQUIVALENCE (IZMAT,ZMAT)						FARED	01986
	EQUIVALENCE (ICON,CON)						FARED	01987
	DIMENSION BMAT(3000)						FARED	01988
	DIMENSION ZMAT(400)						FARED	01989
	DIMENSION CON(20)						FARED	01990
C -							FARED	01991
C-	DESCRIPTION OF VARIABLES IN COMMON BLOCK /ZON/						FARED	01992
C-	IZON	- NUMBER OF ZONES DESCRIBED					FARED	01993
C-	IZST	- INDEX OF NEXT AVAILABLE STORAGE LOCATION IN IZONE					FARED	01994
C-	IZMAX	- NUMBER OF STORAGE LOCATIONS ASSIGNED TO ARRAY IZONE					FARED	01995
C-	IZONE	- ARRAY FOR STORAGE OF DATA DESCRIBING ZONES					FARED	01996
C-	(1)-	ID OF 1ST ZONE					FARED	01997
C-	(2)-	OUTER RADIUS OF 1ST ZONE					FARED	01998
C-	(3)-	NUMBER OF MESH INTERVALS IN 1ST ZONE					FARED	01999
C-	(4)-	TYPE OF 1ST ZONE (CORE,BLANKET,REFLECTOR)					FARED	02000
C-	(5)-	ID OF 1ST ZONE MATERIAL IN 1ST ZONE					FARED	02001
C-	(6)-	V.F. OF 1ST ZONE MATERIAL IN 1ST ZONE					FARED	02002
C-	(7)-	ID OF 2ND ZONE MATERIAL IN 1ST ZONE					FARED	02003
C-	(8)-	V.F. OF 2ND ZONE MATERIAL					FARED	02004
C-	.						FARED	02005
C-	.						FARED	02006
C-	.						FARED	02007
C-	(2J+5) -	ID OF 2ND ZONE (IF J IS NO. ZONE MAT IN 1ST ZONE)					FARED	02008

C-	.	FARED	02009
C-	.	FARED	02010
C-	.	FARED	02011
C-	IDZ - ARRAY FOR STORAGE OF ZONE ID	FARED	02012
C-	IDZ(I) - ID OF ITH ZONE	FARED	02013
C-	IZAD - ARRAY FOR STORAGE INDEX OF ZONE DATA IN IZONE	FARED	02014
C-	IZAD(I) - INDEX FOR DATA FOR ITH ZONE	FARED	02015
C-	** SEE PROGRAM FARED FOR A DESCRIPTION OF BLANK COMMON VARIABLES	FARED	02016
C-	** SEE SUBROUTINE ISORT FOR A DESCRIPTION OF COMMON BLOCK /ISORTID/	FARED	02017
C-	** SEE SUBROUTINE CONST FOR A DESCRIPTION OF COMMON BLOCK /CONS/	FARED	02018
C-	** SEE SUBROUTINE BULKM FOR A DESCRIPTION OF COMMON BLOCK /BULK/	FARED	02019
C-	** SEE SUBROUTINE BULKM FOR A DESCRIPTION OF COMMON BLOCK /ZONEM/	FARED	02020
C-		FARED	02021
	5 CALL CRAMIN (IV,IFLG,IWORD)	FARED	02022
	N = IFLG + 4	FARED	02023
	GO TO (5, 6,100,100,100,100),N	FARED	02024
	6 CALL SCAN (3HZ**,IWORD(1),L)	FARED	02025
	IF (L.NE. 1) GO TO 110	FARED	02026
	8 IF (IZON.EQ. J) GO TO 13	FARED	02027
C-		FARED	02028
C-	TEST FOR DUPLICATE ZONE ID	FARED	02029
C-		FARED	02030
	DO 12 I = 1,IZON	FARED	02031
	IF (IDZ(I).NE. IV) GO TO 12	FARED	02032
	WRITE (NPRT,105)	FARED	02033
	WRITE (NPRT, 11) IV	FARED	02034
	11 FORMAT (1H,10X,29H DUPLICATE DESCRIPTION OF ZONE,I5)	FARED	02035
	IFLAG = IFLAG + 1	FARED	02036
	12 CONTINUE	FARED	02037
	13 IZON = IZON + 1	FARED	02038
	IF (IZON.GT. 50) GO TO 120	FARED	02039
	IDZ(IZON) = IV	FARED	02040
	IZAD(IZON) = IZST	FARED	02041
	IF (IZST+4.GT. IZMAX) GO TO 130	FARED	02042
	IZONE(IZST) = IV	FARED	02043
C-		FARED	02044
C-	READ ZONE TYPE	FARED	02045
C-		FARED	02046
	14 CALL CRAMIN (IV,IFLG,IWORD)	FARED	02047
	N = IFLG + 4	FARED	02048
	GO TO (14,180,180, 15,180,180),N	FARED	02049
	15 CALL SCAN (24HCORE*BLANKET*REFLECTOR**,IWORD(1),L)	FARED	02050
	GO TO (16, 16, 16,190),L	FARED	02051
	16 IZONE(IZST+3) = L	FARED	02052
C-		FARED	02053
C-	READ OUTER RADIUS OF ZONE	FARED	02054
C-		FARED	02055
	18 CALL CRAMIN (IV,IFLG,IWORD)	FARED	02056
	N = IFLG + 4	FARED	02057
	GO TO (18,140,140,140, 20,140),N	FARED	02058

20	IZONE(IZST+1) = IV	FARED	02059
C-		FARED	02060
C-	READ NUMBER OF MESH INTERVALS IN ZONE	FARED	02061
C		FARED	02062
21	CALL CRAMIN (IV,IFLG,IWORD)	FARED	02063
	N = IFLG + 4	FARED	02064
	GO TO (21,150, 30,150,150,150),N	FARED	02065
30	IZONE(IZST+2) = IV	FARED	02066
	IZST = IZST + 4	FARED	02067
	VOL = 0.0	FARED	02068
C-		FARED	02069
C-	READ ZONE MATERIAL VOL. FRACTION	FARED	02070
C-		FARED	02071
35	CALL CRAMIN (IV,IFLG,IWORD)	FARED	02072
	N = IFLG + 4	FARED	02073
	GO TO (35, 50,160, 65, 40,160),N	FARED	02074
40	IVOL = IV	FARED	02075
	GO TO 35	FARED	02076
50	CALL SCAN (6HZ*ZM**,IWORD(1),L)	FARED	02077
	GO TO (8, 60,170),L	FARED	02078
C-		FARED	02079
C-	STORE ZONE MATERIAL ID	FARED	02080
C-		FARED	02081
60	IF (IZST + 2 .GT. IZMAX) GO TO 130	FARED	02082
	IZONE(IZST) = IV	FARED	02083
	IZONE(IZST + 1) = IVOL	FARED	02084
	IZST = IZST + 2	FARED	02085
	GO TO 35	FARED	02086
65	CONTINUE	FARED	02087
	RETURN	FARED	02088
100	WRITE (NPRT,105)	FARED	02089
105	FORMAT(29H0***** POSSIBLE INPUT ERROR.)	FARED	02090
	WRITE (NPRT,106)	FARED	02091
106	FORMAT(1H ,10X,65H ZONE IDENTIFICATION EXPECTED BUT FIELD IS NOT W	FARED	02092
	XORD-INTEGER TYPE.)	FARED	02093
107	IFLAG = IFLAG + 1	FARED	02094
	GO TO (5, 5, 5, 65, 5, 5),N	FARED	02095
110	WRITE (NPRT,105)	FARED	02096
	WRITE (NPRT,115)	FARED	02097
115	FORMAT(1H ,10X,47H ZONE IDENTIFICATION EXPECTED BUT WORD IS NOT Z)	FARED	02098
116	IFLAG = IFLAG + 1	FARED	02099
	GO TO 5	FARED	02100
120	WRITE (NPRT,105)	FARED	02101
	WRITE (NPRT,125)	FARED	02102
125	FORMAT(1H ,10X,45H NUMBER OF ZONES DESCRIBED IS GREATER THAN 50)	FARED	02103
	GO TO 116	FARED	02104
130	WRITE (NPRT,105)	FARED	02105
	WRITE (NPRT,135)	FARED	02106
135	FORMAT(1H ,10X,29H ZONE STORAGE TABLE OVERFLOW.)	FARED	02107
	GO TO 116	FARED	02108

140	WRITE (NPRT,105)	FARED	02109
	WRITE (NPRT,145)	FARED	02110
145	FORMAT(1H,10X,63H OUTER RADIUS BOUND OF ZONE EXPECTED BUT FIELD	FARED	02111
	XIS NOT FLOATING)	FARED	02112
	IFLAG = IFLAG + 1	FARED	02113
	GO TO (18, 18, 18, 65,146, 18),N	FARED	02114
146	IZONE(IZST + 1) = 0	FARED	02115
	GO TO 30	FARED	02116
150	WRITE (NPRT,105)	FARED	02117
	WRITE (NPRT,155)	FARED	02118
155	FORMAT(1H,10X,55H NO OF MESH INTERVALS EXPECTED BUT FIELD IS NOT	FARED	02119
	XINTEGER)	FARED	02120
	IFLAG = IFLAG + 1	FARED	02121
	GO TO (21, 21, 21, 65, 21, 21),N	FARED	02122
160	WRITE (NPRT,105)	FARED	02123
	WRITE (NPRT,165)	FARED	02124
165	FORMAT(1H,10X,90H IMPROPER FIELD - VOLUME FRACTION, OR ZONE ID, 0	FARED	02125
	XR ZONE MATERIAL ID, OR DIRECTIVE EXPECTED.)	FARED	02126
	IFLAG = IFLAG + 1	FARED	02127
	GO TO 35	FARED	02128
170	WRITE (NPRT,105)	FARED	02129
	WRITE (NPRT,175)	FARED	02130
175	FORMAT(1H,10X,61H WORD-INTEGER FIELD READ BUT NOT ZONE ID OR ZONE	FARED	02131
	X MATERIAL ID)	FARED	02132
	IFLAG = IFLAG + 1	FARED	02133
	GO TO 35	FARED	02134
180	WRITE (NPRT,105)	FARED	02135
	WRITE (NPRT,185)	FARED	02136
185	FORMAT (1H,10X,52HZONE TYPE INDICATOR EXPECTED BUT FIELD IS NOT A	FARED	02137
	X WORD)	FARED	02138
	IFLAG = IFLAG + 1	FARED	02139
	GO TO 14	FARED	02140
190	WRITE (NPRT,105)	FARED	02141
	WRITE (NPRT,195)	FARED	02142
195	FORMAT (1H,10X,60HZONE TYPE INDICATOR EXPECTED BUT WORD IS NOT CO	FARED	02143
	XRE OR BLANKET)	FARED	02144
	GO TO 107	FARED	02145
	END	FARED	02146

	SUBROUTINE BLOCK	FARED	02147
C-	BLOCK SUBROUTINE READS AND STORES THE INPUT DATA REQUIRED FOR THE	FARED	02148
C-	SPECIFICATION OF BLOCK PARAMETERS. RECOGNITION OF THE DIRECTIVE	FARED	02149
C-	BLOCK CAUSES THIS SUBROUTINE TO BE CALLED.	FARED	02150
C -		FARED	02151
	COMMON NCRD, NPRT, LIB, NERG, NRR	FARED	02152
	COMMON NUR, NXSEC, NINP, NBCD, NSFX	FARED	02153
	COMMON NBAR, NRR1, NURI, NBGXS, NSPEC	FARED	02154
	COMMON NAJFX, NMAC, NGCON, NSCR, NBURN	FARED	02155
	COMMON NCEO, NMGR, NGRS, NDSG, NPTS	FARED	02156
	COMMON NOB, NOZ, NOBM, NOZM, NUCL	FARED	02157
	COMMON POW, ROIM, RADI, RADO, COVIN	FARED	02158
	COMMON MAXIT, EXOPT, IDCHA, IBOP, JBOP	FARED	02159
	COMMON NFLXOP, NBSQ, NWMR, NWZMR, NWBR	FARED	02160
	COMMON NSOPA, NSOPM, TIME, PT, QACC	FARED	02161
	COMMON HMACC, QACB, HMACB	FARED	02162
	COMMON SPARES(38)	FARED	02163
	COMMON IFLAG, IV, IFLG, IWORD(18)	FARED	02164
	COMMON IBLANK, IZERO, IPLUS, IMINUS, IASTER	FARED	02165
	COMMON ICHAR, NWOD, BLANKS	FARED	02166
	COMMON IZP(20), KOM(5000)	FARED	02167
	COMMON /BLK/ NBLK,NBKST,NBKMAX,IDB(10,2),IBLK(100)	FARED	02168
C -		FARED	02169
C-	DESCRIPTION OF VARIABLES IN COMMON BLOCK /BLK/	FARED	02170
C-	NBLK - NUMBER OF BLOCKS CURRENTLY DEFINED	FARED	02171
C-	NBKST - INDEX OF NEXT AVAILABLE STORAGE LOCATION IN IBLK	FARED	02172
C-	NBKMAX - NUMBER OF STORAGE LOCATIONS ASSIGNED TO ARRAY IBLK	FARED	02173
C-	IDB - ARRAY FOR THE STORAGE OF BLOCK IDENTIFICATION AND	FARED	02174
C-	INDEX FOR BLOCK PARAMETER STORAGE IN IBLK	FARED	02175
C-	(1,1) - ID OF 1TH BLOCK	FARED	02176
C-	(1,2) - INDEX FOR STORAGE OF DATA FOR 1TH BLOCK	FARED	02177
C-	IBLK - ARRAY FOR STORAGE OF BLOCK DATA	FARED	02178
C-	(1) - ID OF 1ST BLOCK	FARED	02179
C-	(2) - BUCKLING IN 1ST BLOCK	FARED	02180
C-	(3) - SOURCE SPECTRUM ID OF 1ST BLOCK	FARED	02181
C-	(4) - TEMPERATURE OF 1ST BLOCK	FARED	02182
C-	(5) - NUMBER OF ZONES IN 1ST BLOCK	FARED	02183
C-	(6) - NUMBER OF CELLS IN 1ST BLOCK	FARED	02184
C-	(7) - ID OF 1ST ZONE IN 1ST BLOCK	FARED	02185
C-	.	FARED	02186
C-	.	FARED	02187
C-	(M+6) - ID OF MTH ZONE IN 1ST BLOCK	FARED	02188
C-	(M+7) - ID OF 1ST CELL IN 1ST BLOCK	FARED	02189
C-	.	FARED	02190
C-	.	FARED	02191
C-	(M+N+6) - ID OF NTH CELL IN 1ST BLOCK	FARED	02192
C-	(M+N+7) - ID OF 2ND BLOCK (M ZONES AND N CELLS IN 1ST BLOCK)	FARED	02193
C-	.	FARED	02194
C-	.	FARED	02195
C -	** SEE PROGRAM FARED FOR A DESCRIPTION OF BLANK COMMON VARIABLES	FARED	02196

C-		FARED	02197
C-	READ BLOCK IDENTIFIER AND BLOCK DATA	FARED	02198
C-		FARED	02199
10	CALL CRAMIN (IV,IFLG,IWORD)	FARED	02200
	N = IFLG + 4	FARED	02201
	GO TO (10, 20, 65,100, 60,200), N	FARED	02202
20	CALL SCAN (7H8*Z*C**,IWORD(1),L)	FARED	02203
	GO TO (30, 40, 50,210),L	FARED	02204
30	IF (NBLK .EQ. 0) GO TO 35	FARED	02205
C-		FARED	02206
C-	TEST FOR DUPLICATE BLOCK IDENTIFIER	FARED	02207
C-		FARED	02208
	DO 34 I = 1,NBLK	FARED	02209
	IF (IDB(I,1) .NE. IV) GO TO 34	FARED	02210
	WRITE (NPRT,205)	FARED	02211
	WRITE (NPRT, 32) IV	FARED	02212
32	FORMAT (1H ,10X,30H DUPLICATE DESCRIPTION OF BLOCK,15)	FARED	02213
	IFLAG = IFLAG + 1	FARED	02214
34	CONTINUE	FARED	02215
35	NBLK = NBLK + 1	FARED	02216
	IF (NBLK .GT. 10) GO TO 220	FARED	02217
	IDB(NBLK,1) = IV	FARED	02218
	IDB(NBLK,2) = NBKST	FARED	02219
	IBG = NBKST	FARED	02220
	IF (NBKST + 6 .GT. NBKMAX) GO TO 230	FARED	02221
	NBKST = NBKST + 6	FARED	02222
	IBLK(IBG) = IV	FARED	02223
	IBLK(IBG+1) = 1	FARED	02224
	IBLK(IBG+3) = 0	FARED	02225
	IBLK(IBG+4) = 0	FARED	02226
	IBLK(IBG+5) = 0	FARED	02227
	GO TO 10	FARED	02228
C-		FARED	02229
C-	PROCESS ZONE IDENTIFIER	FARED	02230
C-		FARED	02231
40	IF (NBKST + 1 .GT. NBKMAX) GO TO 230	FARED	02232
	IBLK(IBG+4) = IBLK(IBG+4) + 1	FARED	02233
45	IBLK(NBKST) = IV	FARED	02234
	NBKST = NBKST + 1	FARED	02235
	GO TO 10	FARED	02236
C-		FARED	02237
C-	PROCESS CELL IDENTIFIER	FARED	02238
C-		FARED	02239
50	IF (NBKST + 1 .GT. NBKMAX) GO TO 230	FARED	02240
	IBLK(IBG+5) = IBLK(IBG+5) + 1	FARED	02241
	GO TO 45	FARED	02242
60	IF (IBLK(IBG+1) .NE. 1) GO TO 62	FARED	02243
C-		FARED	02244
C-	STORE BUCKLING	FARED	02245
C-		FARED	02246

IBLK(IBG+1) = IV	FARED	02247
GO TO 1J	FARED	02248
C- STORE TEMPERATURE	FARED	02249
C- STORE TEMPERATURE	FARED	02250
C- STORE TEMPERATURE	FARED	02251
62 IBLK(IBG+3) = IV	FARED	02252
GO TO 1J	FARED	02253
C- STORE SOURCE SPECTRUM ID	FARED	02254
C- STORE SOURCE SPECTRUM ID	FARED	02255
C- STORE SOURCE SPECTRUM ID	FARED	02256
65 IBLK(IBG+2) = IV	FARED	02257
GO TO 1J	FARED	02258
130 CONTINUE	FARED	02259
140 RETURN	FARED	02260
200 WRITE (NPRT,205)	FARED	02261
205 FORMAT (29H0***** POSSIBLE INPUT ERROR.)	FARED	02262
WRITE (NPRT,206)	FARED	02263
206 FORMAT (1H,10X,45H DATA FIELD IS WORD-FLOATING AND IS ILLEGAL)	FARED	02264
207 IFLAG = IFLAG + 1	FARED	02265
GO TO 10	FARED	02266
210 WRITE (NPRT,205)	FARED	02267
WRITE (NPRT,215)	FARED	02268
215 FORMAT (1H,10X,52H WORD-INTEGER FIELD READ BUT WORD IS NOT B OR C	FARED	02269
X OR Z)	FARED	02270
GO TO 207	FARED	02271
220 WRITE (NPRT,205)	FARED	02272
WRITE (NPRT,225)	FARED	02273
225 FORMAT (1H,10X,47H NUMBER OF BLOCKS SPECIFIED EXCEEDS LIMIT OF 10	FARED	02274
X)	FARED	02275
GO TO 207	FARED	02276
230 WRITE (NPRT,205)	FARED	02277
WRITE (NPRT,235)	FARED	02278
235 FORMAT (1H,10X,34H BLOCK DATA STORAGE TABLE OVERFLOW)	FARED	02279
GO TO 207	FARED	02280
240 WRITE (NPRT,245)	FARED	02281
245 FORMAT (1H1,10X,35H NUMBER OF BLOCKS SPECIFIED IS ZERO)	FARED	02282
GO TO 140	FARED	02283
END	FARED	02284

SUBROUTINE CELLS		FARED	02285
C-	CELLS SUBROUTINE READS AND STORES THE INPUT REQUIRED FOR THE	FARED	02286
C-	SPECIFICATION OF CELL PARAMETERS. RECOGNITION OF THE DIRECTIVE	FARED	02287
C-	CELL CAUSES THIS SUBROUTINE TO BE CALLED	FARED	02288
C -		FARED	02289
	COMMON NCRD, NPRT, LIB, NERG, NRR	FARED	02290
	COMMON NUR, NXSEC, NINP, NBCD, NSFV	FARED	02291
	COMMON NBAB, NRR1, NURI, NBGXS, NSPEC	FARED	02292
	COMMON NAJFX, NMAC, NGCON, NSCR, NBURN	FARED	02293
	COMMON NCEO, NMGR, NGRS, NDSG, NPTS	FARED	02294
	COMMON NOB, NOZ, NOBM, NOZM, NUCL	FARED	02295
	COMMON POW, RDIH, RADI, RADO, COVIN	FARED	02296
	COMMON MAXIT, EXOPT, IOCHA, IBOP, JBOP	FARED	02297
	COMMON NFLXOP, NBSQ, NWBMR, NWZMR, NWBR	FARED	02298
	COMMON NSOPA, NSOPM, TIME, PT, QACC	FARED	02299
	COMMON HMACC, QACB, HMACB	FARED	02300
	COMMON SPARES(38)	FARED	02301
	COMMON IFLAG, IV, IFLG, IWORD(18)	FARED	02302
	COMMON IBLANK, IZERO, IPLUS, IMINUS, IASTER	FARED	02303
	COMMON ICHAR, NWOD, BLANKS	FARED	02304
	COMMON IZP(20), KOM(5000)	FARED	02305
	COMMON /CELL/ NCEL,ICEL(40,7)	FARED	02306
C -		FARED	02307
C-	DESCRIPTION OF VARIABLES IN COMMON BLOCK /CELL/	FARED	02308
C-	NCEL - NUMBER OF CELLS DEFINED	FARED	02309
C-	ICEL - ARRAY FOR STORAGE OF CELL DATA	FARED	02310
C-	(I,1) - ID OF ITH CELL	FARED	02311
C-	(I,2) - MIX INDEX OF ITH CELL	FARED	02312
C-	(I,3) - LATTICE TYPE OF ITH CELL	FARED	02313
C-	(I,4) - LUMPSIZE OF ITH CELL	FARED	02314
C-	(I,5) - PITCH OF ITH CELL	FARED	02315
C-	(I,6) - FUEL TEMPERATURE OF ITH CELL	FARED	02316
C-	(I,7) - MACRO X-SECT OF OUTER REGION OF ITH CELL	FARED	02317
C -	** SEE PROGRAM FARED FOR A DESCRIPTION OF BLANK COMMON VARIABLES	FARED	02318
C-		FARED	02319
C-	READ CELL IDENTIFIER	FARED	02320
C-		FARED	02321
10	CALL CRAMIN (IV,IFLG,IWORD)	FARED	02322
	N = IFLG + 4	FARED	02323
	GO TO (10, 20,200,100,200,200),N	FARED	02324
20	CALL SCAN*(3HC**,IWORD(1),L)	FARED	02325
	IF (L.NE. 1) GO TO 210	FARED	02326
	IF (NCEL.EQ. 0) GO TO 28	FARED	02327
C-		FARED	02328
C-	TEST FOR DUPLICATE CELL IDENTIFIER	FARED	02329
C		FARED	02330
	DO 25 I = 1,NCEL	FARED	02331
	IF (ICEL(I,1).NE. IV) GO TO 25	FARED	02332
	WRITE (NPRT,205)	FARED	02333
	WRITE (NPRT, 22) IV	FARED	02334

22	FORMAT (1H,10X,29HDOUBLE DESCRIPTION OF CELL,I5)	FARED	02335
	IFLAG = IFLAG + 1	FARED	02336
25	CONTINUE	FARED	02337
28	NCEL = NCEL + 1	FARED	02338
	ICEL(NCEL,1) = IV	FARED	02339
C-		FARED	02340
C-	PROCESS REMAINING CELL PARAMETERS	FARED	02341
C-		FARED	02342
	DO 70 I = 1,6	FARED	02343
30	CALL GRAMIN (IV,IFLG,IWORD)	FARED	02344
	N = IFLG + 4	FARED	02345
	GO TO (30,220,40,50,60,220),N	FARED	02346
40	IF (I.NE.1) GO TO 230	FARED	02347
	GO TO 70	FARED	02348
50	IF (I.NE.2) GO TO 240	FARED	02349
	CALL SCAN (17HCYL*SQ*HEX*SLAB**,IWORD(1),L)	FARED	02350
	IF (L.EQ.5) GO TO 250	FARED	02351
	IF (L.EQ.1) L = L + 1	FARED	02352
	IV = L - 2	FARED	02353
	GO TO 70	FARED	02354
60	IF (I.LT.3) GO TO 260	FARED	02355
70	ICEL(NCEL,I+1) = IV	FARED	02356
	GO TO 10	FARED	02357
100	CONTINUE	FARED	02358
116	RETURN	FARED	02359
200	WRITE (NPRT,205)	FARED	02360
205	FORMAT (29H0***** POSSIBLE INPUT ERROR.)	FARED	02361
	WRITE (NPRT,206)	FARED	02362
206	FORMAT (1H,10X,51HILLEGAL FORMAT FOR CELL IDENTIFICATION OR DIREC	FARED	02363
	XTIVE)	FARED	02364
207	IFLAG = IFLAG + 1	FARED	02365
	GO TO 10	FARED	02366
210	WRITE (NPRT,205)	FARED	02367
	WRITE (NPRT,215)	FARED	02368
215	FORMAT (1H,10X,46HWORD-INTEGGER READ FOR CELL ID BUT WORD IS NOTC)	FARED	02369
	GO TO 207	FARED	02370
220	WRITE (NPRT,205)	FARED	02371
	WRITE (NPRT,225)	FARED	02372
225	FORMAT (1H,10X,77HDATA ITEM FOR CELL IN AN UNACCEPTABLE FORMAT OF	FARED	02373
	X WORD-INTEGGER OR WORD-FLOATING)	FARED	02374
226	IFLAG = IFLAG + 1	FARED	02375
	GO TO 70	FARED	02376
230	WRITE (NPRT,205)	FARED	02377
	WRITE (NPRT,235)	FARED	02378
235	FORMAT (1H,10X,57HDATA ITEM IN INTEGER FORMAT BUT NOT FIRST OF TH	FARED	02379
	XE SEQUENCE)	FARED	02380
	GO TO 220	FARED	02381
240	WRITE (NPRT,205)	FARED	02382
	WRITE (NPRT,245)	FARED	02383
245	FORMAT (1H,10X,55HDATA ITEM IN WORD FORMAT BUT NOT SECOND OF THE	FARED	02384

XSEQUENCE)	FARED	02385
GO TO 226	FARED	02386
250 WRITE (NPRT,205)	FARED	02387
WRITE (NPRT,255)	FARED	02388
255 FORMAT (1H ,10X,62HWORD READ FOR LATTICE TYPE BUT IS NOT CYL OR SQ	FARED	02389
1 OR HEX OR SLAB)	FARED	02390
GO TO 226	FARED	02391
260 WRITE (NPRT,205)	FARED	02392
WRITE (NPRT,265)	FARED	02393
265 FORMAT (1H ,10X,46HFLOATING DATA READ BEFORE THIRD OF THE SEQUENC)	FARED	02394
GO TO 226	FARED	02395
270 WRITE (NPRT,205)	FARED	02396
WRITE (NPRT,275)	FARED	02397
275 FORMAT (1H ,10X,46HNO CELLS DESCRIBED FOLLOWING THE DIRECTIVECELL)	FARED	02398
IFLAG = IFLAG +1	FARED	02399
GO TO 116	FARED	02400
END	FARED	02401

	SUBROUTINE BOUD (NW,BDS)	FARED	02402
C-	BOUD SUBROUTINE READS A STRING OF FLOATING POINT DATA ITEMS AND	FARED	02403
C-	STORES THEM CONSECUTIVELY IN BDS. NW IS THE COUNT OF THE NUMBER	FARED	02404
C-	OF ITEMS READ AND STORED. READING IS TERMINATED WHEN ANY ALPHA-	FARED	02405
C-	BETIC DATA IS ENCOUNTERED	FARED	02406
C -		FARED	02407
	COMMON NCRD, NPRT, LIB, NERG, NRR	FARED	02408
	COMMON NUR, NXSEC, NINP, NBCD, NSFX	FARED	02409
	COMMON NBAB, NRRI, NURI, NBGXS, NSPEC	FARED	02410
	COMMON NAJFX, NMAC, NGCON, NSCR, NBURN	FARED	02411
	COMMON NCEO, NMGR, NGRS, NDSG, NPTS	FARED	02412
	COMMON NOB, NOZ, NOBM, NOZM, NUCL	FARED	02413
	COMMON POW, RDIM, RADI, RADO, COVIN	FARED	02414
	COMMON MAXIT, EXOPT, IDCHA, IBOP, JROP	FARED	02415
	COMMON NFLXUP, NBSQ, NWBMR, NWZMR, NWBR	FARED	02416
	COMMON NSOPA, NSOPM, TIME, PT, QACC	FARED	02417
	COMMON HMACC, QACB, HMACB	FARED	02418
	COMMON SPARES(38)	FARED	02419
	COMMON IFLAG, IV, IFLG, IWORD(16)	FARED	02420
	COMMON IBLANK, IZERO, IPLUS, IMINUS, IASTER	FARED	02421
	COMMON ICHAR, NWOD, BLANKS	FARED	02422
	COMMON IZP(20), KOM(5000)	FARED	02423
	EQUIVALENCE (IV,V)	FARED	02424
C -		FARED	02425
C -	** SEE PROGRAM FARED FOR A DESCRIPTION OF BLANK COMMON VARIABLES	FARED	02426
C -		FARED	02427
	DIMENSION BUS(1)	FARED	02428
	NW = 0	FARED	02429
10	CALL CRAMIN (IV,IFLG,IWORD)	FARED	02430
	N = IFLG + 4	FARED	02431
	GO TO (10, 30, 40, 30, 20, 30),N	FARED	02432
20	NW = NW + 1	FARED	02433
	BDS(NW) = V	FARED	02434
	GO TO 10	FARED	02435
30	CONTINUE	FARED	02436
	RETURN	FARED	02437
40	WRITE (NPRT, 41)	FARED	02438
+1	FORMAT (29H0***** POSSIBLE INPUT ERROR./1H ,10X,50H DATA ITEM IN	FARED	02439
	XFLOATING ARRAY IS IN INTEGER FORMAT.)	FARED	02440
	IFLAG = IFLAG +1	FARED	02441
	GO TO 10	FARED	02442
	END	FARED	02443

	SUBROUTINE IBOUD (NW,NB)	FARED	02444
C -	IBOUD SUBROUTINE READS A STRING OF INTEGER DATA ITEMS AND STORES	FARED	02445
C -	THEM CONSECUTIVELY IN NB. NW IS THE COUNT OF THE NUMBER OF ITEMS	FARED	02446
C -	READ AND STORED. READING IS TERMINATED WHEN ANY ALPHABETIC DATA	FARED	02447
C -	IS ENCOUNTERED	FARED	02448
C -		FARED	02449
	COMMON NCRO, NPRT, LIB, NERG, NRR	FARED	02450
	COMMON NUR, NXSEC, NINP, NBCD, NSFX	FARED	02451
	COMMON NBAB, NRRI, NURI, NBGXS, NSPEC	FARED	02452
	COMMON NAJFX, NMAC, NGCON, NSCR, NBURN	FARED	02453
	COMMON NCEO, NMGR, NGRS, NDSG, NPTS	FARED	02454
	COMMON NOB, NOZ, NOBM, NOZM, NUCL	FARED	02455
	COMMON POW, RDIM, RAD1, RADO, COVIN	FARED	02456
	COMMON MAXIT, EXUPT, IOCHA, IBOP, JBOP	FARED	02457
	COMMON NFLXOP, NBSQ, NW3MR, NWZMR, NWBR	FARED	02458
	COMMON NSOPA, NSOPM, TIME, PT, QACC	FARED	02459
	COMMON HMA00, QACB, HMA0B	FARED	02460
	COMMON SPARES(38)	FARED	02461
	COMMON IFLAG, IV, IFLG, IWORD(18)	FARED	02462
	COMMON IBLANK, IZERO, IPLUS, IMINUS, IASTER	FARED	02463
	COMMON ICHAR, NWOD, BLANKS	FARED	02464
	COMMON IZP(2J), KOM(5000)	FARED	02465
C -		FARED	02466
C -	** SEE PROGRAM FARED FOR A DESCRIPTION OF BLANK COMMON VARIABLES	FARED	02467
C -		FARED	02468
	DIMENSION NB(1)	FARED	02469
	NW = 0	FARED	02470
10	CALL CRAMIN (IV,IFLG,IWORD)	FARED	02471
	N = IFLG + 4	FARED	02472
	GO TO (10, 30, 20, 30, 40, 30),N	FARED	02473
20	NW = NW + 1	FARED	02474
	NB(NW) = IV	FARED	02475
	GO TO 10	FARED	02476
30	CONTINUE	FARED	02477
	RETURN	FARED	02478
40	WRITE (NPRT,41)	FARED	02479
41	FORMAT (29H0***** POSSIBLE INPUT ERROR./1H ,10X,50H DATA ITEM IN	FARED	02480
	XINTEGER ARRAY IS IN FLOATING FORMAT.)	FARED	02481
	IFLAG = IFLAG + 1	FARED	02482
	GO TO 10	FARED	02483
	END	FARED	02484

	SUBROUTINE SOURCE(K)	FARED	02485
C -	SOURCE SUBROUTINE CAUSES THE DATA REQUIRED TO SPECIFY THE STARTING	FARED	02486
C -	SOURCE TO BE READ AND STORED. K IS THE INDEX FOR THE OPTION	FARED	02487
C -	CHOSEN. K = 1,2,3 DEPENDING ON WHETHER THE DIRECTIVE READ IS	FARED	02488
C -	SOURCE, ZSOURCE, PTSOURCE RESPECTIVELY.	FARED	02489
C -		FARED	02490
	COMMON /STOR/ IOCH,NLIST,NAST,NOPB,NBCK,NOPS,NSOUR,ILIST(30),	FARED	02491
	X MATX(30,30),BUCKL(600),PTSOUR(150),ZSOUR(20),	FARED	02492
	X EXTEND(5000)	FARED	02493
C -		FARED	02494
C -	** SEE SUBROUTINE RDCH FOR A DESCRIPTION OF COMMON BLOCK /STOR/	FARED	02495
C -		FARED	02496
	NOPS = K	FARED	02497
	CALL BOUD (NSOUR,PTSOUR)	FARED	02498
	RETURN	FARED	02499
	END	FARED	02500

	SUBROUTINE BUCKT(K)	FARED	02501
C -	BUCKT SUBROUTINE CAUSES THE DATA REQUIRED TO SPECIFY THE TRANS-	FARED	02502
C -	VERSE BUCKLING TO BE READ AND STORED. K IS THE INDEX OF THE	FARED	02503
C -	OPTION CHOSEN. K=1,2,3 DEPENDING ON WHETHER THE DIRECTIVE READ IS	FARED	02504
C -	BUCK, ZBUCK, OR GBUCK RESPECTIVELY.	FARED	02505
C -		FARED	02506
	COMMON /STOR/ IDCH,NLIST,NAST,NOPB,NBCK,NOPS,NSOUR,ILIST(30),	FARED	02507
	X MATX(30,30),BUCKL(600),PTSOUR(150),ZSOUR(20),	FARED	02508
	X EXTEND(5000)	FARED	02509
C -		FARED	02510
C -	** SEE SUBROUTINE RDCH FOR A DESCRIPTION OF COMMON BLOCK /STOR/	FARED	02511
C -		FARED	02512
	NOPB = K	FARED	02513
	CALL B0UD (NBCK,BUCKL)	FARED	02514
	RETURN	FARED	02515
	END	FARED	02516

	SUBROUTINE CKAST	FARED	02517
C-	CKAST SUBROUTINE SETS THE STORAGE OF THE BLANK COMMON ARRAY KOM.	FARED	02518
C-	KOM CONTAINS ZONE PARAMETERS AND NUCLIDES IN THE ZONE PARAMETERS.	FARED	02519
C-	THE ZONES ARE ORDERED ACCORDING TO THEIR SPECIFIED OUTER RADIUS	FARED	02520
C-	AND NUMBERED CONSECUTIVELY. THE NUMBER OF LOCATIONS REQUIRED FOR	FARED	02521
C-	THE STORAGE OF THE ZONE DATA IS $10*(N(I)+1)$ WHERE $N(I)$ IS THE	FARED	02522
C-	NUMBER OF NUCLIDES IN THE ITH ZONE. IZP IS AN ARRAY OF INDICES	FARED	02523
C-	WHICH POINT TO THE FIRST STORAGE LOCATION OF THE RESPECTIVE ZONES.	FARED	02524
	COMMON NCRD, NPRT, LIB, NERG, NRR	FARED	02525
	COMMON NUR, NXSEC, NINP, NBCD, NSFX	FARED	02526
	COMMON NBAB, NRR1, NURI, NRGXS, NSPEC	FARED	02527
	COMMON NAJFX, NMAC, NGCON, NSCR, NBURN	FARED	02528
	COMMON NGE0, NMGR, NGRS, NDSG, NPTS	FARED	02529
	COMMON NOB, NOZ, NOBM, NOZM, NUCL	FARED	02530
	COMMON POW, ROIM, RAD1, RADO, COVIN	FARED	02531
	COMMON MAXIT, EXOPT, IOCHA, IBOP, JBOP	FARED	02532
	COMMON NFLXOP, NBSQ, NWBMR, NWZMR, NWBR	FARED	02533
	COMMON NSOPA, NSOPM, TIME, PT, QACC	FARED	02534
	COMMON HMAcc, QACB, HMAcB	FARED	02535
	COMMON SPAREs(38)	FARED	02536
	COMMON IFLAG, IV, IFLG, IWORD(18)	FARED	02537
	COMMON IBLANK, IZERO, IPLUS, IMINUS, IASTER	FARED	02538
	COMMON ICHAR, NWOD, BLANKS	FARED	02539
	COMMON IZP(20), KOM(5000)	FARED	02540
	COMMON /CONS/ ICON(20), INPS(15)	FARED	02541
	COMMON /BULK/ NBMAT, NBST, NBMAX, IBMAT(3000)	FARED	02542
	COMMON /ZON/ IZON, IZST, IZMAX, IZONE(200), IDZ(21), IZAD(21)	FARED	02543
	COMMON /ZONEM/ NZMAT, NZST, NZMAX, IZMAT(400)	FARED	02544
	COMMON /BLK/ NBLK, NBKST, NBKMAX, IDB(10,2), IBLK(100)	FARED	02545
	COMMON /HEAVY/ NHE, IDHM(100), HMASS(100)	FARED	02546
	EQUIVALENCE (IBMAT, BMAT)	FARED	02547
	EQUIVALENCE (IZMAT, ZMAT)	FARED	02548
	EQUIVALENCE (ICON, CON)	FARED	02549
	EQUIVALENCE (IZONE, ZONE)	FARED	02550
	EQUIVALENCE (KOM, COM)	FARED	02551
	DIMENSION BMAT(3000)	FARED	02552
	DIMENSION ZMAT(400)	FARED	02553
	DIMENSION CON(20)	FARED	02554
	DIMENSION ZONE(200)	FARED	02555
	DIMENSION COM(5000)	FARED	02556
C -		FARED	02557
C-	DESCRIPTION OF VARIABLES IN COMMON BLOCK /HEAVY/	FARED	02558
C-	NHE - NUMBER OF NUCLIDE FOR WHICH A HEAVY MASS IS STORED	FARED	02559
C-	IDHM(I)- ID NUMBER OF ITH NUCLIDE WITH HEAVY MASS IN HMASS(I)	FARED	02560
C-	HMASS(I)-HEAVY MASS OF ITH NUCLIDE WHOSE ID IS IN IDHM(I)	FARED	02561
C -	** SEE PROGRAM FARED FOR A DESCRIPTION OF BLANK COMMON VARIABLES	FARED	02562
C -	** SEE SUBROUTINE CONST FOR A DESCRIPTION OF COMMON BLOCK /CONS/	FARED	02563
C -	** SEE SUBROUTINE BULKM FOR A DESCRIPTION OF COMMON BLOCK /BULK/	FARED	02564
C -	** SEE SUBROUTINE ZONES FOR A DESCRIPTION OF COMMON BLOCK /ZON/	FARED	02565
C -	** SEE SUBROUTINE BULKM FOR A DESCRIPTION OF COMMON BLOCK /ZONEM/	FARED	02566

C - ** SEE SUBROUTINE BLOCK FOR A DESCRIPTION OF COMMON BLOCK /BLK/	FARED 02567
C - DATA MFILE /4HFILE/	FARED 02568
C- SEARCH FOR LABEL BLOCK OF FILE 7 ON LIBRARY TAPE	FARED 02569
C- 1 CALL REOF (LIB)	FARED 02570
READ (LIB) NFILE,JF,NHE, DUM	FARED 02571
IF (EOF,LIB) 230, 2	FARED 02572
2 IF (NFILE.NE. MFILE) GO TO 220	FARED 02573
IF (JF.LT. 7) GO TO 1	FARED 02574
IF (JF.GT. 7) GO TO 220	FARED 02575
C- READ IN LIST OF NUCLIDE ID NUMBERS AND CORRESPONDING HEAVY MASS	FARED 02576
C- READ (LIB) (IDHM(I),DUM,DUM,DUM,DUM,DUM,DUM,HMASS(I),DUM,DUM,	FARED 02577
X I = 1,NHE)	FARED 02578
IF (EOF,LIB) 230, 3	FARED 02579
3 REWIND LIB	FARED 02580
C- ORDER ZONE STORAGE ACCORDING TO THE OUTER RADIUS	FARED 02581
C- K = 1	FARED 02582
IR = 0	FARED 02583
RAD2 = CUN(12)	FARED 02584
5 RAD1 = RAD2	FARED 02585
RAD2 = 1.0E10	FARED 02586
IPP = 0	FARED 02587
C- OF THE UNSTORED ZONES FIND THE ONE WITH SMALLEST OUTER RADIUS	FARED 02588
C- DO 40 I = 1,IZON	FARED 02589
IP = IZAD(I)	FARED 02590
IF (RAD1 - ZONE(IP+1)) 10,40,40	FARED 02591
10 IF (ZONE(IP+1) - RAD2) 20,40,40	FARED 02592
20 IOZN = IOZ(I)	FARED 02593
RAD2 = ZONE(IP+1)	FARED 02594
IPP = IZAD(I)	FARED 02595
IPR = IZAD(I+1)	FARED 02596
IF (I.EQ. IZON) IPR = IZST	FARED 02597
40 CONTINUE	FARED 02598
IF (IPP.EQ. 0) GO TO 200	FARED 02599
IR = IR + 1	FARED 02600
C- STORE ZONE PARAMETER IN FIRST 10 LOCATIONS OF ZONE STORAGE	FARED 02601
C- IZP(IR) = K	FARED 02602
IKM = K	FARED 02603
KOM(K) = IOZN	FARED 02604
KOM(K+1) = RAD2	FARED 02605
	FARED 02606
	FARED 02607
	FARED 02608
	FARED 02609
	FARED 02610
	FARED 02611
	FARED 02612
	FARED 02613
	FARED 02614
	FARED 02615
	FARED 02616

KOM(K+2) = IZONE(IPP+2)	FARED	J2617
KOM(K+3) = IZONE(IPP+3)	FARED	J2618
KOM(K+4) = 0	FARED	J2619
KOM(K+5) = 0	FARED	J2620
COM(K+6) = CON(5)*(RAD2**ICON(1) - RAD1**ICON(1))	FARED	J2621
KOM(K+7) = 0	FARED	J2622
KOM(K+8) = 0	FARED	J2623
KOM(K+9) = 0	FARED	J2624
C	FARED	J2625
C FIND BLOCK TO WHICH THE ZONE BELONGS	FARED	J2626
C	FARED	J2627
DO 80 I = 1,NBLK	FARED	J2628
IB = IBLK(I,2)	FARED	J2629
IBZ=IBLK(IB+4)	FARED	J2630
DO 50 J = 1,IBZ	FARED	J2631
IBJ = IB + J + 5	FARED	J2632
IF (IBLK(IBJ) .EQ. IDZN) GO TO 70	FARED	J2633
50 CONTINUE	FARED	J2634
60 CONTINUE	FARED	J2635
GO TO 110	FARED	J2636
70 KOM(K+4) = IBLK(IB)	FARED	J2637
71 K = K + 10	FARED	J2638
IF = IPP + 4	FARED	J2639
C-	FARED	J2640
C- FIND DATA OF ZONE MATERIALS WHICH MAKEUP THE ZONE	FARED	J2641
C-	FARED	J2642
75 KZID = IZONE(IP)	FARED	J2643
VF = ZONE(IP+1)	FARED	J2644
DO 80 I = 1,NZMAT	FARED	J2645
II = 4*(I-1)+1	FARED	J2646
IF (KZID .EQ. IZMAT(II))GO TO 90	FARED	J2647
80 CONTINUE	FARED	J2648
GO TO 120	FARED	J2649
90 VFB = ZMAT(II+1)	FARED	J2650
IDBULK = IZMAT(II+2)	FARED	J2651
KK = IZMAT(II + 3)	FARED	J2652
INDXC = IBMAT(KK+1)	FARED	J2653
NUCL = IBMAT(KK+2)	FARED	J2654
KK = KK + 3	FARED	J2655
C-	FARED	J2656
C- STORE NUCLIDE PARAMETERS FOR CURRENT ZONE MATERIAL AND CURRENT	FARED	J2657
C- ZONE. TEN LOCATIONS ARE REQUIRED FOR EACH NUCLIDE	FARED	J2658
C-	FARED	J2659
DO 100 I = 1,NUCL	FARED	J2660
KOM(K) = IBMAT(KK)	FARED	J2661
KOM(K+1) = KZID	FARED	J2662
KOM(K+2) = 10000*IBMAT(KK+2) + 1000*IBMAT(KK+3) + IDBULK	FARED	J2663
KOM(K+3) = INDC	FARED	J2664
COM(K+4) = 0.0	FARED	J2665
COM(K+5) = 0.0	FARED	J2666

COM(K+6) = BMAT(KK+1)*VF*VFB	FARED	J2667
KOM(K+7) = KOM(K+6)	FARED	J2668
COM(K+8) = VF	FARED	J2669
COM(K+9) = VFB	FARED	J2670
IAT1 = KOM(K)/100000	FARED	J2671
IAT2 = (KOM(K) - IAT1*100000)/1000	FARED	J2672
IF (IAT2 .LT. 99) GO TO 97	FARED	J2673
IF (IAT2 .GT. 98) GO TO 97	FARED	J2674
92 DO 95 J = 1,NHE	FARED	J2675
IF (KOM(K) .EQ. IDHM(J)) GO TO 96	FARED	J2676
95 CONTINUE	FARED	J2677
GO TO 21J	FARED	J2678
96 COM(K+5) = HMASS(J)*COM(K+7)	FARED	J2679
97 CONTINUE	FARED	J2680
KK = KK + 4	FARED	J2681
K = K + 10	FARED	J2682
100 KOM(IKM+5) = KOM(IKM+5) + 1	FARED	J2683
IP = IP + 2	FARED	J2684
IF (IPR .GT. IP) GO TO 75	FARED	J2685
GO TO 5	FARED	J2686
110 WRITE (NPRT,115)	FARED	J2687
115 FORMAT (29HJ***** POSSIBLE INPUT ERROR.)	FARED	J2688
WRITE (NPRT,116) I0ZN	FARED	J2689
116 FORMAT (1H ,10X,19H ZONE IDENTIFIED AS,I5,27H NOT DESCRIBED IN ANY	FARED	J2690
X BLOCK)	FARED	J2691
117 IFLAG = IFLAG + 1	FARED	J2692
KOM(K) = -100	FARED	J2693
GO TO 71	FARED	J2694
120 WRITE (NPRT,115)	FARED	J2695
WRITE (NPRT,125) KZID	FARED	J2696
125 FORMAT (1H ,10X,25H ZONE MATERIAL IDENTIFIED,I5,12H NOT DEFINED)	FARED	J2697
IFLAG = IFLAG + 1	FARED	J2698
GO TO 97	FARED	J2699
C-	FARED	J2700
C- ORDER NUCLIDE STORAGE IN ALL ZONES ACCORDING TO NUCLIDE ID AND	FARED	J2701
C- ZONE MATERIAL ID	FARED	J2702
C-	FARED	J2703
200 CALL ZSORT	FARED	J2704
RETURN	FARED	J2705
210 WRITE (NPRT,215) KOM(K)	FARED	J2706
215 FORMAT (25HJ*****POSSIBLE ERROR*****/	FARED	J2707
X 1H ,10X,22HHEAVY MASS FOR NUCLIDE,I8,20H NOT FOUND IN FILE 7)	FARED	J2708
IFLAG = IFLAG + 1	FARED	J2709
GO TO 97	FARED	J2710
220 WRITE (NPRT,225)	FARED	J2711
225 FORMAT (1H0,26H ***** LIBRARY ERROR *****/	FARED	J2712
X 1H ,10X,33H FILE 7 NOT FOUND ON LIBRARY TAPE)	FARED	J2713
226 IFLAG = IFLAG + 1	FARED	J2714
GO TO 3	FARED	J2715
230 WRITE (NPRT,235)	FARED	J2716

235 FORMAT (1H0,26H ***** LIBRARY ERROR *****/
X 1H , 10X,32H PREMATURE EOF IN READING FILE 7)
GO TO 226
END

FAREQ J2717
FAREQ J2718
FAREQ J2719
FAREQ J2720

K2 = K + 9	FARED	02771
DO 20 K3 = K1,K2	FARED	02772
ITEM = KOM(K3)	FARED	02773
KOM(K3) = KOM(K3+10)	FARED	02774
20 KOM(K3+10) = ITEM	FARED	02775
IF (K.EQ. J) GO TO 30	FARED	02776
K = K - 10	FARED	02777
GO TO 10	FARED	02778
30 K = K + 10	FARED	02779
C-	FARED	02780
C- NUCLIDES ARE ORDERED SO MOVE DOWN LIST TO NEXT SET OF TWO	FARED	02781
C-	FARED	02782
GO TO 10	FARED	02783
40 CONTINUE	FARED	02784
IF (IT.NE. J) GO TO 50	FARED	02785
IT = 1	FARED	02786
GO TO 5	FARED	02787
50 CONTINUE	FARED	02788
RETURN	FARED	02789
END	FARED	02790

C-	SUBROUTINE PINPUT						FARED	02791
C-	PINPUT SUBROUTINE PRINT A SUMMARY OF ALL INPUT DATA PROCESSED BY						FARED	02792
C-	THE VARIOUS INPUT ROUTINES						FARED	02793
C-	COMMON	NCRD,	NPRT,	LIB,	NERG,	NRR	FARED	02794
	COMMON	NUR,	NXSEC,	NINP,	NBCD,	NSFX	FARED	02795
	COMMON	NBAB,	NRRI,	NURI,	NBGXS,	NSPEC	FARED	02796
	COMMON	NAJFX,	NMAC,	NGCON,	NSCR,	NBURN	FARED	02797
	COMMON	NGEO,	NMGR,	NGRS,	NDSG,	NPTS	FARED	02798
	COMMON	NOB,	NOZ,	NOBM,	NOZM,	NUCL	FARED	02799
	COMMON	POW,	RDIM,	RADI,	RADO,	COVIN	FARED	02800
	COMMON	MAXIT,	EXOPT,	IDCHA,	IBOP,	JBOP	FARED	02801
	COMMON	NFLXOP,	NBSQ,	NWBMR,	NWZMR,	NWBR	FARED	02802
	COMMON	NSOPA,	NSOPM,	TIME,	PT,	QACC	FARED	02803
	COMMON	HMACC,	QACB,	HMACB			FARED	02804
	COMMON	SPARES(38)					FARED	02805
	COMMON	IFLAG,	IV,	IFLG,	IWORD(18)		FARED	02806
	COMMON	IBLANK,	IZERO,	IPLUS,	IMINUS,	IASTER	FARED	02807
	COMMON	ICHAR,	NWOD,	BLANKS			FARED	02808
	COMMON	IZP(20),	KOM(5000)				FARED	02809
	COMMON	/ISOTID/	NISOT,NIST,NIMAX,ISOT(80)				FARED	02810
	COMMON	/CONS/	ICON(20),INPS(15)				FARED	02811
	COMMON	/BULK/	NBMAT,NBST,NBMAX,IBMAT(3000)				FARED	02812
	COMMON	/ZON/	IZON,IZST,IZMAX,IZONE(200),IDZ(21),IZAD(21)				FARED	02813
	COMMON	/ZONEM/	NZMAT,NZST,NZMAX,IZMAT(400)				FARED	02814
	COMMON	/BLK/	NBLK,NBKST,NBKMAX,IOB(10,2),IBLK(100)				FARED	02815
	COMMON	/CELL/	NCEL,ICEL(40,7)				FARED	02816
	COMMON	/INBD/	NIBD,BDIN(30)				FARED	02817
	COMMON	/OUTBD/	NOBD,BDOUT(30)				FARED	02818
	COMMON	/POLY/	NGROUP,IBDS(30)				FARED	02819
	COMMON	/STOR/	IOCH,NLIST,NAST,NOPB,NBCK,NOPS,NSOUR,ILIST(30),				FARED	02820
X			MATX(30,30),BUCKL(600),PTSOUR(150),ZSOUR(20),				FARED	02821
X			EXTEND(5000)				FARED	02822
	COMMON	/ENERGY/	NGRP1,EGRP(101)				FARED	02823
		EQUIVALENCE (IZMAT,ZMAT)				FARED	02824	
		EQUIVALENCE (IZONE,ZONE)				FARED	02825	
		EQUIVALENCE (KOM,COM)				FARED	02826	
		DIMENSION ZMAT(400)				FARED	02827	
		DIMENSION ZONE(200)				FARED	02828	
		DIMENSION COM(5000)				FARED	02829	
C-							FARED	02830
C-	**	SEE PROGRAM FARED FOR A DESCRIPTION OF BLANK COMMON VARIABLES					FARED	02831
C-	**	SEE SUBROUTINE ISORT FOR A DESCRIPTION OF COMMON BLOCK /ISOTID/					FARED	02832
C-	**	SEE SUBROUTINE CONST FOR A DESCRIPTION OF COMMON BLOCK /CONS/					FARED	02833
C-	**	SEE SUBROUTINE BULKM FOR A DESCRIPTION OF COMMON BLOCK /BULK/					FARED	02834
C-	**	SEE SUBROUTINE ZONES FOR A DESCRIPTION OF COMMON BLOCK /ZON/					FARED	02835
C-	**	SEE SUBROUTINE BULKM FOR A DESCRIPTION OF COMMON BLOCK /ZONEM/					FARED	02836
C-	**	SEE SUBROUTINE BLOCK FOR A DESCRIPTION OF COMMON BLOCK /BLK/					FARED	02837
C-	**	SEE SUBROUTINE CELLS FOR A DESCRIPTION OF COMMON BLOCK /CELL/					FARED	02838
C-	**	SEE SUBROUTINE CINP FOR A DESCRIPTION OF COMMON BLOCK /INBD/					FARED	02839
							FARED	02840

C	- **	SEE SUBROUTINE CINP	FOR A DESCRIPTION OF COMMON BLOCK /OUTBD/	FARED	J2841
C	- **	SEE SUBROUTINE CINP	FOR A DESCRIPTION OF COMMON BLOCK /POLY/	FARED	02842
C	- **	SEE SUBROUTINE CINP	FOR A DESCRIPTION OF COMMON BLOCK /ENERGY/	FARED	02843
C	- **	SEE SUBROUTINE ROCH	FOR A DESCRIPTION OF COMMON BLOCK /STOR/	FARED	02844
C	-			FARED	02845

DIMENSION	ITY(15),JTY(15)		FARED	02846
DATA	(ITY(I),I=1,15) /4H MIX ,4H FUEL,4H OILU,4H CYL ,4H HEX ,4H SLAB,		FARED	02847
X	4H CORE,4H BLAN,4H REFL,4H SLAB,4H CYLI,4H SPHE,4H(CM*,4H(CM),4H /		FARED	02848
DATA	(JTY(I),I=1,15) /4H ,4H ,4H ENT ,4H ,4H ,4H ,		FARED	02849
X	4H ,4H KET ,4H ECT ,4H ,4H NDER,4H RE ,4H*2),4H ,4H /		FARED	02850
DATA	GR /4H GROU/		FAREU	02851
DATA	GRR /4H P/		FARED	02852
IND = ICON	(20)		FARFC	02853

C-		FARED	02854
C-	TEST GEOMETRY TO FIX REACTOR DIMENSION	FARED	02855
C-		FARED	02856

	GO TO (5, 7, 9),NGEO	FARED	J2857
5	RRIM = RUIM	FARED	J2858
	GO TO 1u	FARED	J2859
7	RRIM = RDIM/3.14159	FARED	Q2860
	GO TO 1u	FARED	J2861
9	RRIM = 1.u	FARED	J2862

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10 CONTINUE                                FARED  02863
    WRITE (NPRT,11)                        FARED  02864
11 FORMAT ('H1///')                       FARLO  02865

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X      1H,25X,55H***** SUMMARY OF REACTOR SPECIFICATIONS FUL FARED J2866
XLOWING *****//) FARED 02867
        60,10,1,20,25,40) IND FARED 02868

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20	WRITE (NPRT,21)	FARED	02869
21	FORMAT (1H,25X,5H*****,20X,5HINPUT,20X,5H*****)	FARED	02870

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30      GO TO 50                                     FAREU 02871
31      WRITE (NPRT,31)                               FAREU 02872
32      FORMAT (1H ,25X,5H***** ,15X,15HFUEL MANAGEMENT,15X,5H***** ) FAREU 02873

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32 IF (TIME) 32,50,32 FAREO 02874
32 WRITE (NPRT,33) TIME FAREO 02875
33 FORMAT (1H0/,1H ,32X,41H* * * * * FAREO 02876

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X*/1H ,32X,1H*,39X,1H*/1H ,32X,1H*,11X,4HTIME,F8.1,5H DAYS,11X,1H*/	FARED	02877
X 1H ,32X,1H*,39X,1H*/1H ,32X,41H* * * * * * * * * * * * * *	FARED	02878
X * * *	FARED	02879

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GO TO 50
WRITE (NPRT,41)
FORMAT (1H,25X,5H*****,18X,8HRECOVERY,19X,5H*****)

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C-		FARED	J2883
C-	PRINT SUMMARY OF GENERAL REACTOR PARAMETERS	FARED	J2884
C-		FARED	J2885

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50 WRITE (NPRT,51) FARED U2886
51 FORMAT (1H0/,1H ,4X,20HGENERAL PARAMETERS -///) FARED U2887
      WRITE (NPRT,52) ITX(NGEO+9),ITX(NGEO+9),NMGR,NGRS,NOSG,IOCHA,IOBP, FARED U2888

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[illegible]

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52  FORMAT (1H ,8X,37HGEOMETRIC SHAPE OF REACTOR.....,5X,2A4/
X 1H ,8X,37HNUMBER OF MULTIGROUPS.....,I6/
X 1H ,8X,37HNUMBER OF POLYGROUPS.....,I6/
X 1H ,8X,37HNUMBER OF DOWNSCATTERING POLYGROUPS...,I6/
X 1H ,8X,37HDEPLETION CHAIN ID.....,I6/
X 1H ,8X,37HINNER BOUNDARY CONDITION OPTION.....,I6/
X 1H ,8X,37HOUTER BOUNDARY CONDITION OPTION.....,I6/
X 1H ,8X,37HCONVERGENCE OPTION.....,I6/
X 1H ,8X,37HCONVERGENCE CRITERION.....,E16.5/
X 1H ,8X,37HMAX NUMBER OF ITERATION.....,I6/
X 1H ,8X,37HREACTOR DIMENSION.....,E16.5,2X,2A4/
X 1H ,8X,37HINNER RADIUS OF REACTOR.....,E16.5,6H (CM)/
X 1H ,8X,37HOUTER RADIUS OF REACTOR.....,E16.5,6H (CM)/
X 1H ,8X,37HEXTRAPOLATION FACTOR.....,E16.5/
X 1H ,8X,37HREACTOR POWER.....,E16.5,
X 14H (MEGA-WATTS) //)
WRITE (NPRT,53) NUCL,NOBM,NOZH,NOZ,NOB,NCEL,NPTS
53  FORMAT (1H ,8X,37HNUMBER OF ACTIVE NUCLIDES.....,I6/
X 1H ,8X,37HNUMBER OF BULK MATERIALS DESCRIBED...,I6/
X 1H ,8X,37HNUMBER OF ZONE MATERIALS DESCRIBED...,I6/
X 1H ,8X,37HNUMBER OF ZONES DESCRIBED.....,I6/
X 1H ,8X,37HNUMBER OF BLOCKS DESCRIBED.....,I6/
X 1H ,8X,37HNUMBER OF CELLS DESCRIBED.....,I6/
X 1H ,8X,37HNUMBER OF MESH POINTS.....,I6/)
IF (IND .EQ. 2) GO TO 435
56  CONTINUE
C-
C- PRINT SUMMARY OF NUCLIDES BEING CONSIDERED IN THIS STUDY
C-
WRITE (NPRT,54) NUCL
54  FORMAT (1H1////,1H ,4X,42HNUCLIDES INCLUDED IN REACTOR SPECIFICATI
XON,18X,I5////,1H ,20X, 8HALPHA-ID,16X,10HNUMERIC-ID)
DO 60 I = 1,NUCL
CALL CONVL (ISOT(I),NAME1,NAME2)
WRITE (NPRT,55) NAME1,NAME2,ISOT(I)
55  FORMAT (1H ,21X,A4,A2,18X,I7)
60  CONTINUE
C-
C- PRINT SUMMARY OF DEPLETION CHAIN USED FOR DEPLETION STUDIES ONLY
C-
C-
C- PRINT SUMMARY OF BULK MATERIALS SPECIFIED
C-
IF (IND .EQ. 1 .AND. IDCHA .NE. 0) CALL CHNPR
WRITE (NPRT,61) NOBM
61  FORMAT (1H1////1H ,4X,48HBULK MATERIALS INCLUDED IN REACTOR SPECIF
XICATION,12X,I5////)
II = I
LINE = 13
DO 80 I = 1,NOBM

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FARED 02891
FARED 02892
FARED 02893
FARED 02894
FARED 02895
FARED 02896
FARED 02897
FARED 02898
FARED 02899
FARED 02900
FARED 02901
FARED 02902
FARED 02903
FARED 02904
FARED 02905
FARED 02906
FARED 02907
FARED 02908
FARED 02909
FARED 02910
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FARED 02929
FARED 02930
FARED 02931
FARED 02932
FARED 02933
FARED 02934
FARED 02935
FARED 02936
FARED 02937
FARED 02938
FARED 02939
FARED 02940

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III = II+2	FARED	02941
LINE = LINE + IBMAT(II+2) + 5	FARED	02942
IF (LINE .LT. 63) GO TO 66	FARED	02943
WRITE (NPRT,65)	FARED	02944
65 FORMAT (1H1)	FARED	02945
LINE = IBMAT(II+2) + 10	FARED	02946
66 CONTINUE	FARED	02947
WRITE (NPRT,62) (IBMAT(K),K= II,III)	FARED	02948
62 FORMAT (1H ,8X,13HBULK MATERIAL,15,3X,29HWITH DESIGNATED CELL INDE	FARED	02949
XX OF,15,3X, 8HCONTAINS, 15,3X, 8HNUCLIDES///	FARED	02950
X1H ,28X,10HNUCLIDE ID,6X,12HLUMP DENSITY,4X,12HNUCLIDE TYPE,4X,	FARED	02951
X11HCHAIN INDEX/1H ,43X,15H(ATOMS/8ARN-CM))	FARED	02952
MM = IBMAT(II+2)	FARED	02953
II = II + 3	FARED	02954
DO 70 L = 1,MM	FARED	02955
CALL CONVL (IBMAT(II),NAME1,NAME2)	FARED	02956
N = IBMAT(II+2) + 1	FARED	02957
WRITE (NPRT,64)NAME1,NAME2,IBMAT(II+1),ITY(N),JTY(N),IBMAT(II+3)	FARED	02958
64 FORMAT (1H ,30X,A4,A2,E20.5,7X,2A4,10X,I2)	FARED	02959
70 II = II+4	FARED	02960
WRITE (NPRT,71)	FARED	02961
71 FORMAT (1H0//)	FARED	02962
LINE = LINE + 4	FARED	02963
66 CONTINUE	FARED	02964
C- PRINT SUMMARY OF ZONE MATERIALS SPECIFIED	FARED	02965
C- WRITE (NPRT,81) NOZM	FARED	02966
81 FORMAT (1H1////,1H ,+X,48HZONE MATERIALS INCLUDED IN REACTOR SPECI	FARED	02968
IFICATION,12X,15////1H ,12X,11HZONE MAT ID,5X,11HIDENT OF BM,5X,11HB	FARED	02969
XM FRACTION)	FARED	02970
DO 90 I = 1,NOZM	FARED	02971
J = +(I-1) + 1	FARED	02972
WRITE (NPRT,83) IZMAT(J),IZMAT(J+2),IZMAT(J+1)	FARED	02973
83 FORMAT (1H ,12X,I6,12X,I6,F17.5)	FARED	02974
90 CONTINUE	FARED	02975
C- PRINT SUMMARY OF CELLS SPECIFIED	FARED	02976
C- WRITE (NPRT,91) NCEL	FARED	02977
91 FORMAT (1H1////,1H ,4X,39HCELLS INCLUDED IN REACTOR SPECIFICATION,	FARED	02978
X 21X,I5//)	FARED	02979
IF (NCEL .EQ. 0) GO TO 100	FARED	02980
WRITE (NPRT, 98)	FARED	02981
98 FORMAT (1H ,12X,7HCELL ID,5X,10HCELL INDEX,6X,12HLATTICE TYPE,4X,	FARED	02982
X 9HLUMP SIZE,7X,5HPITCH,11X,9HFUEL TEMP,7X,12HMACRO X-SECT/	FARED	02983
X 1H ,58X,4H(CM),9X,4H(CM),13X,7H(DEG K),12X,6H(1/CM))	FARED	02984
DO 99 I = 1,NCEL	FARED	02985
N = ICEL(I,3) + 4	FARED	02986
WRITE (NPRT,93) ICEL(I,1),ICEL(I,2),ITY(N),JTY(N), (ICEL(I,J),	FARED	02987
	FARED	02988
	FARED	02989
	FARED	02990

X	J=4,7)	FARED	02991
93	FORMAT (1H ,12X,I4,8X,I4,16X,2A4,1X,4E16.5)	FARED	02992
99	CONTINUE	FARED	02993
100	CONTINUE	FARED	02994
C-		FARED	02995
C-	PRINT SUMMARY OF ZONES SPECIFIED	FARED	02996
C-		FARED	02997
	WRITE (NPRT,101) NOZ	FARED	02998
101	FORMAT(1H1////,1H ,4X,39HZONES INCLUDED IN REACTOR SPECIFICATION,	FARED	02999
X	21X,I5//)	FARED	03000
	LINE = 10	FARED	03001
	DO 140 I = 1,NOZ	FARED	03002
	J1 = IZAD(I)	FARED	03003
	IF (I .EQ. NOZ) GO TO 110	FARED	03004
	J2 = IZAD(I +1) - 1	FARED	03005
	GO TO 120	FARED	03006
110	J2 = IZST - 1	FARED	03007
120	J = IZONE(J1+3)	FARED	03008
	LINE = LINE + 14 + (J2+1 - J1 - 4)/2	FARED	03009
	IF (LINE .LT. 60) GO TO 115	FARED	03010
	WRITE (NPRT,65)	FARED	03011
	LINE = (J2 + 1 - J1 - 4)/2 + 24	FARED	03012
115	CONTINUE	FARED	03013
	WRITE (NPRT,121) IZONE(J1),IZONE(J1+1),IZONE(J1+2),ITY(J+6),	FARED	03014
X	JTY(J+6)	FARED	03015
121	FORMAT (1H ////1H ,8X, 7HZONE ID,26X,I5/	FARED	03016
X	1H ,8X,12HOUTER RADIUS,21X,E15.5, 6H (CM)/	FARED	03017
X	1H ,8X,24HNUMBER OF MESH INTERVALS,9X,I5/	FARED	03018
X	1H ,8X, 9HZONE TYPE,28X,2A4//)	FARED	03019
	J1 = J1 + 4	FARED	03020
	IF (J1 .GT. J2) GO TO 140	FARED	03021
	WRITE (NPRT,122)	FARED	03022
122	FORMAT (1H ,12X,23HZONE MATERIALS INCLUDED//	FARED	03023
X	1H ,16X,11HZONE MAT ID,5X, 7HZM FRAC,9X,11HBULK MAT ID,5X,	FARED	03024
X	7HBM FRAC,9X,9HZM VOLUME/1H ,81X,7H(CM**3))	FARED	03025
	DO 128 K = J1,J2,2	FARED	03026
	DO 123 L = 1,NOZM	FARED	03027
	L1 = 4*(L-1) + 1	FARED	03028
	IF (IZONE(K) .EQ. IZMAT(L1)) GO TO 124	FARED	03029
123	CONTINUE	FARED	03030
	GO TO 129	FARED	03031
124	DO 125 M = 1,NOZ	FARED	03032
	IP = IZP(M)	FARED	03033
	IF (IZONE(J1-4) .EQ. KOM(IP)) GO TO 126	FARED	03034
125	CONTINUE	FARED	03035
	GO TO 129	FARED	03036
126	ZMVOL = COM(IP+6)*ZONE(K+1)*ZMAT(L1+1)	FARED	03037
	WRITE (NPRT,127) IZONE(K),IZONE(K+1),IZMAT(L1+2),IZMAT(L1+1),ZMVOL	FARED	03038
127	FORMAT (1H ,19X,I5,F14.5,13X,I5,F14.5,E20.5)	FARED	03039
128	CONTINUE	FARED	03040

GO TO 140	FARED	03041
129 WRITE (NPRT,131)	FARED	03042
131 FORMAT (1H ///1H ,8X,36HERROR DETECTED IN ZONE SPECIFICATION)	FARED	03043
IFLAG = IFLAG + 1	FARED	03044
140 CONTINUE	FARED	03045
C-	FARED	03046
C- PRINT SUMMARY OF BLOCKS SPECIFIED	FARED	03047
C-	FARED	03048
WRITE (NPRT,150) NOB	FARED	03049
150 FORMAT (1H1////,1H ,4X,40HBLOCKS INCLUDED IN REACTOR SPECIFICATION	FARED	03050
X,20X,I5)	FARED	03051
LINE = 9	FARED	03052
DO 160 I = 1,NOB	FARED	03053
J = IOB(I,2)	FARED	03054
J1 = J + 6	FARED	03055
J2 = J1 + IBLK(J+4) - 1	FARED	03056
J3 = J2 + 1	FARED	03057
J4 = J3 + IBLK(J+5) - 1	FARED	03058
LINE = LINE + 9	FARED	03059
IF (LINE .LT. 60) GO TO 151	FARED	03060
WRITE (NPRT,65)	FARED	03061
LINE = 13	FARED	03062
151 CONTINUE	FARED	03063
WRITE (NPRT,152) IOB(I,1),IBLK(J+1),IBLK(J+2),IBLK(J+3),(IBLK(K),	FARED	03064
X K = J1,J2)	FARED	03065
152 FORMAT (1H ///,1H ,8X,20HBLOCK IDENTIFICATION,17X,I5/	FARED	03066
X 1H ,16X,14HBLOCK BUCKLING, 18X,E15.5,11H (1/CM**2)/	FARED	03067
X 1H ,16X,19HFISSION SPECTRUM ID, 13X,I5/	FARED	03068
X 1H ,16X,15HHOMOGENOUS TEMP,17X,E15.5, 9H (DEG K)/	FARED	03069
X 1H ,16X,14HZONES INCLUDED, 18X,I0I5)	FARED	03070
IF (IBLK(J+5) .EQ. 0) GO TO 160	FARED	03071
WRITE (NPRT,154) (IBLK(K),K=J3,J4)	FARED	03072
154 FORMAT (1H ,16X,14HCELLS INCLUDED,18X,5I5)	FARED	03073
160 CONTINUE	FARED	03074
C	FARED	03075
C PRINT SUMMARY OF ZONE AND NUCLIDE DEPENDENT PARAMETERS	FARED	03076
C	FARED	03077
WRITE (NPRT,161)	FARED	03078
161 FORMAT (1H1,1H ,4X,36HSUMMARY OF ZONE DEPENDENT PARAMETERS)	FARED	03079
LINE = 5	FARED	03080
DO 170 I = 1,NOZ	FARED	03081
J = IZP(I)	FARED	03082
K = KOM(J+3)	FARED	03083
LINE = LINE + KOM(J+5) + 17	FARED	03084
IF (LINE .LT. 60) GO TO 162	FARED	03085
WRITE (NPRT,65)	FARED	03086
LINE = KOM(J+5) + 21	FARED	03087
162 CONTINUE	FARED	03088
WRITE (NPRT,163) I,ITY(K+6),JTY(K+6),KOM(J),KOM(J+4),KOM(J+2),	FARED	03089
X KOM(J+5),KOM(J+1),KOM(J+6)	FARED	03090

163	FORMAT (1H //,1H ,8X,11HZONE NUMBER,28X,I5/	FARED	03091
X	1H ,12X, 9HZONE TYPE,30X,2A4/	FARED	03092
X	1H ,12X,19HZONE IDENTIFICATION,16X,I5/	FARED	03093
X	1H ,12X,20HBLOCK IDENTIFICATION,15X,I5/	FARED	03094
X	1H ,12X,20HNO OF MESH INTERVALS,15X,I5/	FARED	03095
X	1H ,12X,23HNO OF NUCLIDES INCLUDED,12X,I5/	FARED	03096
X	1H ,12X,12HOUTER RADIUS,23X,E15.5, 6H (CM)/	FARED	03097
X	1H ,12X, 6HVOLUME,29X,E15.5, 9H (CM**3)////	FARED	03098
X1H	,16X,7HNUCLIDE,3X,8HZONE MAT,2X,8HBULK MAT,2X,4HCELL,6X,7HNUCLI	FARED	03099
XDE,3X,5HCHAIN,5X,7HCURRENT,7X,7HINITIAL,7X,8HZONE MAT,2X,8HBULK MA		FARED	03100
XT/1H ,18X,2HID,9X,2HID,8X,2HID,5X,5HINDEX,6X,4HTYPE,5X,5HINDEX,5X,		FARED	03101
X7HDENSITY,7X,7HDENSITY,9X,4HV.F.,6X,4HV.F./1H ,79X,15H(ATOMS/BARN-		FARED	03102
XCM))		FARED	03103
NUC = KOM(J+5)		FARED	03104
DO 170 L = 1,NUC		FARED	03105
J = J + 10		FARED	03106
J1 = J + 9		FARED	03107
CALL CONVL (KOM(J),NAME1,NAME2)		FARED	03108
KOM1 = KOM(J+2)/100000		FARED	03109
KOM2 = (KOM(J+2) - KOM1*100000)/1000		FARED	03110
KOM3 = KOM(J+2) - KOM1*100000 - KOM2*1000		FARED	03111
WRITE (NPRT,165) NAME1,NAME2,KOM(J+1),KOM3,KOM(J+3),ITY(KOM1+1),		FARED	03112
X JTY(KOM1+1),KOM2,KOM(J+6),KOM(J+7),KOM(J+8),KOM(J+9)		FARED	03113
165 FORMAT (1H ,16X,A4,A2,I9,I10,I9,6X,2A4,I6,3X,2E14.5,2F10.5)		FARED	03114
170 CONTINUE		FARED	03115
C-		FARED	03116
C- TEST IND AND SKIP REMAINING PRINTOUT FOR FUELMGMT DIRECTIVE		FARED	03117
C-		FARED	03118
IF (IND .NE. 1) GO TO 440		FARED	03119
C-		FARED	03120
C- PRINT SUMMARY OF ENERGY BOUNDS FOR POLYGROUP STRUCTURE THIS STUDY		FARED	03121
C-		FARED	03122
WRITE (NPRT,200) NGRS		FARED	03123
200 FORMAT (1H1,////1H ,4X,53HPOLYGROUP STRUCTURE INCLUDED IN REACTOR		FARED	03124
XSPECIFICATION,12X,I5, 7H-GROUPS////		FARED	03125
X1H ,33X,5HUPPER,15X,5HLOWER,15X,5HUPPER,15X,5HLOWER/		FARED	03126
X1H ,12X,9HPOLYGROUP,10X,10HMICROGROUP,9X,10HMICROGROUP,9X,12HENERG		FARED	03127
XY BOUND,8X,12HENERGY BOUND/1H ,73X,4H(EV),16X,4H(EV))		FARED	03128
IEND = 1		FARED	03129
DO 210 I = 1,NGRS		FARED	03130
IBEG = IEND		FARED	03131
IEND = IBDS(I)		FARED	03132
WRITE (NPRT,201) I,IBEG,IEND,EGRP(IBEG),EGRP(IEND)		FARED	03133
201 FORMAT (1H ,12X,I5,15X,I5,14X,I5,4X,2E20.5)		FARED	03134
210 CONTINUE		FARED	03135
C-		FARED	03136
C- TEST IF STARTING SOURCE HAS BEEN SPECIFIED AND PRINT APPROPRIATE		FARED	03137
C- SUMMARY		FARED	03138
C-		FARED	03139
WRITE (NPRT,211)		FARED	03140

211	FORMAT (1H1////)	FARED	03141
	IF (INPS(9) .NE. 0) GO TO 218	FARED	03142
	WRITE (NPRT,215)	FARED	03143
215	FORMAT (1H ,49H***** POSSIBLE ERROR ***** - SOURCE NOT SPECIFIED//	FARED	03144
X	1H ,10X,26HDEFAULT CONJITIONS ASSUMED/	FARED	03145
X	1H ,10X,2JHOPTION SET TO SOURCE/	FARED	03146
X	1H ,10X,42H1.0 IS SOURCE VALUE AT EVERY MESH POINT)	FARED	03147
	NOPS = 1	FARED	03148
	NSOUR = 1	FARED	03149
	PTSOUR(1) = 1.0	FARED	03150
	INPS(9) = 1	FARED	03151
	GO TO 280	FARED	03152
218	IF (NOPS .LE. 0) GO TO 270	FARED	03153
	IF (NSOUR .LE. 0) GO TO 270	FARED	03154
	IF (NOPS .GT. 3) GO TO 270	FARED	03155
	GO TO (220,230,240),NOPS	FARED	03156
220	IF (NSOUR .NE. 1) GO TO 270	FARED	03157
	WRITE (NPRT,221) PTSOUR(1)	FARED	03158
221	FORMAT (1H ,4X,39HSTARTING SOURCE OPTION CHOSEN IS SOURCE//	FARED	03159
X	1H ,E20.5,41H IS THE SOURCE VALUE AT EVERY MESH POINT)	FARED	03160
	GO TO 280	FARED	03161
230	IF (NSOUR .NE. NOZ) GO TO 270	FARED	03162
	WRITE (NPRT,231) (I,PTSOUR(I),I=1,NOZ)	FARED	03163
231	FORMAT (1H ,4X,40HSTARTING SOURCE OPTION CHOSEN IS ZSOURCE//	FARED	03164
X	1H ,8X,4HZONE,16X,0HSOURCE/ (1H ,8X,I4,E27.5))	FARED	03165
	GO TO 280	FARED	03166
240	IF (NSOUR .NE. NPTS + NOZ - 1) GO TO 270	FARED	03167
	WRITE (NPRT,241)	FARED	03168
241	FORMAT (1H ,4X,41HSTARTING SOURCE OPTION CHOSEN IS PTSOURCE//	FARED	03169
X	1H ,8X, 6HPOINT NO,12X,6HSOURCE)	FARED	03170
	N = 0	FARED	03171
	II = 0	FARED	03172
	DO 200 J = 1,NOZ	FARED	03173
	I = II + 1	FARED	03174
	IP = IZP(J)	FARED	03175
	II = I + KOM(J+2)	FARED	03176
	DO 250 K = I,II	FARED	03177
	WRITE (NPRT,244) N,PTSOUR(K)	FARED	03178
244	FORMAT (1H ,8X,I4,E27.5)	FARED	03179
250	N = N + 1	FARED	03180
	IF (J .EQ. NOZ) GO TO 260	FARED	03181
	WRITE (NPRT,252)	FARED	03182
252	FORMAT (1H0,8X,21H* * * INTERFACE * * *)	FARED	03183
	N = N - 1	FARED	03184
260	CONTINUE	FARED	03185
	GO TO 280	FARED	03186
270	WRITE (NPRT,272)	FARED	03187
272	FORMAT (1H ////1H ,8X,38HERROR DETECTED IN SOURCE SPECIFICATION)	FARED	03188
280	CONTINUE	FARED	03189
C-		FARED	03190

C-	TEST IF BUCKLING HAS BEEN SPECIFIED AND PRINT APPROPRIATE SUMMARY	FARED	03191
C-	IF (INPS(10) .NE. 0) GO TO 285	FARED	03192
	WRITE (NPRT,284)	FARED	03193
284	FORMAT (1H ,51H***** POSSIBLE ERROR ***** - BUCKLING NOT SPECIFIED	FARED	03194
	X// 1H ,10X,26HDEFAULT CONDITIONS ASSUMED/	FARED	03195
	X 1H ,10X,18HOPTION SET TO BUCK/	FARED	03196
	X 1H ,10X,52H0.0 IS BUCKLING VALUE FOR ALL ZONES IN ALL GROUP	FARED	03197
	XS)	FARED	03198
	INPS(10) = 1	FARED	03199
	NOPB = 1	FARED	03200
	NBCK = 1	FARED	03201
	BUCKL(1) = 0.0	FARED	03202
	GO TO 340	FARED	03203
285	IF (NOPB .LE. 0) GO TO 330	FARED	03204
	IF (NOPB .GE. 4) GO TO 330	FARED	03205
	IF (NBCK .LE. 0) GO TO 330	FARED	03206
	GO TO (290,300,310),NOPB	FARED	03207
290	IF (NBCK .NE. 1) GO TO 330	FARED	03208
	WRITE (NPRT,292) BUCKL(1)	FARED	03209
292	FORMAT (1H ////1H ,4X,41HTRANSVERSE BUCKLING OPTION CHOSEN IS BUCK	FARED	03210
	X// 1H ,E20.5,52H IS THE BUCKLING VALUE FOR ALL ZONES	FARED	03211
	XIN EVERY GROUP)	FARED	03212
	GO TO 340	FARED	03213
300	IF (NBCK .NE. NOZ) GO TO 330	FARED	03214
	WRITE (NPRT,302) (I,BUCKL(I),I= 1,NOZ)	FARED	03215
302	FORMAT (1H ////1H ,8X,4HZONE,16X,8HBUCKLING/ (1H ,8X,I4,E27.5))	FARED	03216
	GO TO 340	FARED	03217
310	IF (NBCK .NE. NGRS*NOZ) GO TO 330	FARED	03218
	WRITE (NPRT,312)	FARED	03219
312	FORMAT(1H ////1H ,4X,42HTRANSVERSE BUCKLING OPTION CHOSEN IS GBUCK	FARED	03220
	X// 1H ,8X,25HBUCKLING VALUES SPECIFIED)	FARED	03221
	NT = (NGRS-1)/6 + 1	FARED	03222
	DO 320 I = 1,NT	FARED	03223
	N1 = 6*(I-1) + 1	FARED	03224
	N2 = N1 + 5	FARED	03225
	IF (N2 .GT. NGRS) N2 = NGRS	FARED	03226
	WRITE(NPRT,314) ((GR,GRR,K),K=N1,N2)	FARED	03227
314	FORMAT (1H ////1H ,12X,4HZONE,5X,6(A4,A1,I3,8X))	FARED	03228
	J2 = N1	FARED	03229
	J2 = N2	FARED	03230
	DO 320 J = 1,NOZ	FARED	03231
	WRITE (NPRT,316) J,(BUCKL(K),K = J1,J2)	FARED	03232
316	FORMAT (1H ,8X,I4,6E16.5)	FARED	03233
	J1 = J1 + NGRS	FARED	03234
	J2 = J2 + NGRS	FARED	03235
320	CONTINUE	FARED	03236
	GO TO 340	FARED	03237
330	WRITE (NPRT,332)	FARED	03238
332	FORMAT (1H ////1H ,8X,40HERROR DETECTED IN BUCKLING SPECIFICATION)	FARED	03239
		FARED	03240

340	CONTINUE	FARED	03241
	IF (IBOP .LE. 0) GO TO 400	FARED	03242
	IF (IBOP .GT. 5) GO TO 400	FARED	03243
C-		FARED	03244
C-	PRINT SUMMARY OF INNER BOUNDARY CONDITION SPECIFIED	FARED	03245
C-		FARED	03246
	WRITE (NPRT,382) IBOP	FARED	03247
382	FORMAT (1H ////1H ,4X,31H INNER BOUNDARY CONDITION OPTION,I5)	FARED	03248
	GO TO (410,410,390,390,410),IBOP	FARED	03249
390	IF (INPS(6) .EQ. 0) GO TO 400	FARED	03250
	IF (NIBD .NE. NGRS) GO TO 400	FARED	03251
	WRITE (NPRT,392) (I,BDIN(I),I=1,NGRS)	FARED	03252
392	FORMAT (1H ////1H ,8X,5H GROUP,4X,9H CONDITION/(1H ,8X,I4,E16.5))	FARED	03253
	GO TO 410	FARED	03254
400	WRITE (NPRT,402)	FARED	03255
402	FORMAT (1H ////1H ,8X,46H ERROR DETECTED IN INNER BOUNDARY SPECIFIC	FARED	03256
	XATION)	FARED	03257
410	CONTINUE	FARED	03258
	IF (JBOP .LE. 0) GO TO 430	FARED	03259
	IF (JBOP .GT. 5) GO TO 430	FARED	03260
C-		FARED	03261
C-	PRINT SUMMARY OF OUTER BOUNDARY CONDITION SPECIFIED	FARED	03262
C-		FARED	03263
	WRITE (NPRT,412) JBOP	FARED	03264
412	FORMAT (1H ////1H ,4X,31H OUTER BOUNDARY CONDITION OPTION,I5)	FARED	03265
	GO TO (440,440,420,420,440),JBOP	FARED	03266
420	IF (INPS(7) .EQ. 0) GO TO 430	FARED	03267
	IF (NOBD .NE. NGRS) GO TO 430	FARED	03268
	WRITE (NPRT,422) (I,BDOUT(I),I=1,NGRS)	FARED	03269
422	FORMAT (1H ////1H ,8X,5H GROUP,4X,9H CONDITION/(1H ,8X,I4,E16.5))	FARED	03270
	GO TO 440	FARED	03271
430	WRITE (NPRT,432)	FARED	03272
432	FORMAT (1H ////1H ,8X,46H ERROR DETECTED IN OUTER BOUNDARY SPECIFIC	FARED	03273
	XATION)	FARED	03274
	GO TO 440	FARED	03275
435	CORE = 0.0	FARED	03276
	BLAN = 0.0	FARED	03277
	IF (HMACC) 4352,4352,4351	FARED	03278
4351	CORE = QACC/HMACC	FARED	03279
4352	IF (HMACB) 4354,4354,4353	FARED	03280
4353	BLAN = QACB/HMACB	FARED	03281
4354	CONTINUE	FARED	03282
	WRITE (NPRT,436) CORE,BLAN	FARED	03283
436	FORMAT (1H ////1H ,8X,33(2H*)/	FARED	03284
	X1H ,8X,1H*,63X,1H*/	FARED	03285
	X1H ,8X,1H*,3X,33H DISCHARGED AVERAGE CORE BURNUP,E14.5,	FARED	03286
	X 14H MWD/TONNE */	FARED	03287
	X1H ,8X,1H*,3X,33H DISCHARGED AVERAGE BLANKET BURNUP,E14.5,	FARED	03288
	X 14H MWD/TONNE */	FARED	03289
		FARED	03290

X1H ,8X,1H*,63X,1H*/
X1H ,8X,33(2H*))
GO TO 56
440 CONTINUE
WRITE (NPRT, 445)
445 FORMAT (1H1)
RETURN
END

FARED 03291
FARED 03292
FARED 03293
FARED 03294
FARED 03295
FARED 03296
FARED 03297
FARED 03298

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SUBROUTINE CHNPR
C - SUBROUTINE CHNPR PRINTS A SUMMARY OF THE NUCLIDES AND NUCLEAR
C - REACTIONS WHICH MAKE UP THE DEPLETION CHAIN CHOSEN FOR THIS STUDY
C -
COMMON NCRD, NPRT, LIB, NERG, NRR
COMMON NUR, NXSEC, NINP, NBCD, NSFX
COMMON NBAB, NRR1, NURI, NBGXS, NSPEC
COMMON NAJFX, NMAR, NGCON, NSCR, NBURN
COMMON NGE0, NMGR, NGRS, NDSG, NPTS
COMMON NOB, NOZ, NOBM, NOZM, NUCL
COMMON POW, RDI1, RAD1, RADO, COVIN
COMMON MAXIT, EXOPT, IOCHA, IBOP, JBOP
COMMON NFLXOP, NBSQ, NWBR, NWZMR, NWBR
COMMON NSOP, NSOPM, TIME, PT, QACC
COMMON HMACC, QACB, HMAR
COMMON SPARES(38)
COMMON IFLAG, IV, IFLG, IWORD(18)
COMMON IBLANK, IZERO, IPLUS, IMINUS, IASTER
COMMON ICHAR, NWOD, BLANKS
COMMON IZP(20), KOM(5000)
COMMON /STOR/ IOCH,NLIST,NAST,NOPB,NBCK,NOPS,NSOUR,ILIST(30),
X MATX(30,30),BUCKL(600),PTSOUR(150),ZSOUR(20),
X EXTEND(5000)
C -
C - ** SEE PROGRAM FARED FOR A DESCRIPTION OF BLANK COMMON VARIABLES
C - ** SEE SUBROUTINE ROCH FOR A DESCRIPTION OF COMMON BLOCK /STOR/
C -
DIMENSION MDC(30,30)
DIMENSION NCID(30)
EQUIVALENCE (MDC(1,1),MATX(1,1)),(NCID(1),ILIST(1)),(NC,NLIST)
EQUIVALENCE (NPR,NPRT)
DIMENSION IFORM(4,3),IFRM(5,4),IFOR(12),IFR(20),IPT(40)
EQUIVALENCE (IFORM(1,1),IFOR(1)),(IFRM(1,1),IFR(1))
DATA IFOR /4HFISS,4HILE,4H,4H,
1 4HNON-,4HFISS,4HIONA,4HBLE,
2 4HFISS,4HIONA,4HBLE,4H /
DATA IFR/ 4HFISS,4HION,4H,4H,4H,
1 4HCAPT,4HURE,4H,4H,4H,
2 4HRADI,4HOACT,4HIVE,4HDECA,4HY,
3 4HN,2N,4H,4H,4H,4H /
WRITE(NPR,5)
5 FORMAT(1H1)
NUMB=0
IPT(NC)=1
NCC=NC-1
DO 75 J=1,NCC
II=J+1
IPT(J)=1
DO 75 I=II,NC
IF(NCID(J).NE.NCID(I)) GO TO 75
FARED 03299
FARED 03300
FARED 03301
FARED 03302
FARED 03303
FARED 03304
FARED 03305
FARED 03306
FARED 03307
FARED 03308
FARED 03309
FARED 03310
FARED 03311
FARED 03312
FARED 03313
FARED 03314
FARED 03315
FARED 03316
FARED 03317
FARED 03318
FARED 03319
FARED 03320
FARED 03321
FARED 03322
FARED 03323
FARED 03324
FARED 03325
FARED 03326
FARED 03327
FARED 03328
FARED 03329
FARED 03330
FARED 03331
FARED 03332
FARED 03333
FARED 03334
FARED 03335
FARED 03336
FARED 03337
FARED 03338
FARED 03339
FARED 03340
FARED 03341
FARED 03342
FARED 03343
FARED 03344
FARED 03345
FARED 03346
FARED 03347
FARED 03348

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NUMB=NUMB+1	FARED	03349
IPT(J)=0	FARED	03350
75 CONTINUE	FARED	03351
NUMB= NC-NUMB	FARED	03352
WRITE(NPR,3) IDCH,NUMB	FARED	03353
3 FORMAT(////,50X,5H*** ,10HCHAIN ID =,I4,5H ***,//52X,8HCONTAINS,	FARED	03354
1 I3,9H ISOTOPES ///)	FARED	03355
IPG=11	FARED	03356
DO 80 J=1,NC	FARED	03357
IF(IPT(J).EQ.0) GO TO 80	FARED	03358
CALL CONVL(NCID(J),IX,IY)	FARED	03359
NUMB=MDC(J,J) +2	FARED	03360
WRITE(NPR,6) IX,IY, (IFORM(I,NUMB),I=1,4)	FARED	03361
6 FORMAT(/32X,1H*,A4,A2,1H*,12X,4A4)	FARED	03362
IPG=IPG+2	FARED	03363
IF(IPG.LT.55) GO TO 71	FARED	03364
IPG=0	FARED	03365
WRITE(NPR,5)	FARED	03366
71 CONTINUE	FARED	03367
IF(J.EQ.1) GO TO 79	FARED	03368
JJ=J-1	FARED	03369
IFLA=0	FARED	03370
DO 76 I=1,JJ	FARED	03371
IF(MDC(J,I).EQ.0) GO TO 76	FARED	03372
IF(IFLA .EQ.0) WRITE(NPR,7)	FARED	03373
7 FORMAT(1H+,77X,6HPARENT,5X,13HREACTION TYPE)	FARED	03374
IFLA=1	FARED	03375
CALL CONVL(NCID(I),IX,IY)	FARED	03376
N=MDC(J,I)	FARED	03377
IPG=IPG+1	FARED	03378
IF(IPG.LT.55) GO TO 78	FARED	03379
IPG=0	FARED	03380
WRITE(NPR,5)	FARED	03381
78 CONTINUE	FARED	03382
WRITE(NPR,8) IX,IY, (IFRM(II,N),II=1,5)	FARED	03383
8 FORMAT(78X,A4,A2,5X,5A4)	FARED	03384
76 CONTINUE	FARED	03385
IF(IFLA .NE.0) GO TO 80	FARED	03386
79 WRITE(NPR,9)	FARED	03387
9 FORMAT(1H+,77X,10HNO PARENTS)	FARED	03388
80 CONTINUE	FARED	03389
RETURN	FARED	03390
END	FARED	03391

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SUBROUTINE LIBCOP
C- LIBCOP SUBROUTINE MAKES A PASS THROUGH THE LIBRARY DATA TAPE AND FARED 03392
C- CREATES ABBREVIATED VERSIONS OF EACH OF ITS DATA FILES. THE FARED 03393
C- ABBREVIATED FILES CONTAIN ONLY DATA REQUIRED TO SATISFY THE FARED 03394
C- REQUIREMENTS OF THE CURRENT CASE. FILES 1 (MICROGROUP ENERGY FARED 03395
C- BOUNDS), 2 (DEPLETION CHAINS), 6 (FISSION SOURCE), AND 7 (DEPLE- FARED 03396
C- TION DATA) WITH ALL UNREQUIRED DATA DELETED ARE STACKED ON ONE I/O FARED 03397
C- DEVICE. FILE 3 (RESOLVED RESONANCE DATA, 4 (UNRESOLVED RESONANCE FARED 03398
C- DATA) AND 5 (GROUP CROSS SECTIONS AND TRANSFER MATRICES) ARE EACH FARED 03399
C- PLACED ON A SEPARATE I/O DEVICE WITH UNREQUIRED DATA DELETED. FARED 03400
C- FARED 03401
C- FARED 03402
COMMON NCRO, NPRT, LIB, NERG, NRR FARED 03403
COMMON NUR, NXSEC, NINP, NBCD, NSFX FARED 03404
COMMON NBAB, NRRI, NURI, NBGXS, NSPEC FARED 03405
COMMON NAJFX, NMAG, NGRCON, NSCR, NBURN FARED 03406
COMMON NGLO, NMGR, NGRS, NDSG, NPTS FARED 03407
COMMON NOB, NOZ, NOBM, NOZM, NUCL FARED 03408
COMMON POW, RDIH, RADI, RADO, COVIN FARED 03409
COMMON MAXIT, EXOPT, IDCHA, IBOP, JBOP FARED 03410
COMMON NFLXOP, NBSQ, NMBMR, NWZMR, NWBR FARED 03411
COMMON NSOPA, NSOPM, TIME, PT, QACC FARED 03412
COMMON HMACC, QACB, HMACB FARED 03413
COMMON SPARES(38) FARED 03414
COMMON IFLAG, IV, IFLG, IWORD(18) FARED 03415
COMMON IBLANK, IZERO, IPLUS, IMINUS, IASTER FARED 03416
COMMON ICHAR, NWOD, BLANKS FARED 03417
COMMON IZP(20), KOM(5000) FARED 03418
COMMON /ISOTID/ NISOT, NIST, NIMAX, ISOT(80) FARED 03419
COMMON /CONS/ ICON(20), INPS(15) FARED 03420
COMMON /BLK/ NBLK, NBKST, NBKMAX, IOB(10,2), IBLK(100) FARED 03421
COMMON /STOR/ IDCH, NLIST, NAST, NOPB, NBCK, NOPS, NSOUR, ILIST(30), FARED 03422
X MATX(30,30), BUCKL(600), PTSOUR(150), ZSOUR(20), FARED 03423
X EXTEND(5000) FARED 03424
C- FARED 03425
C- ** SEE PROGRAM FARED FOR A DESCRIPTION OF BLANK COMMON VARIABLES FARED 03426
C- ** SEE SUBROUTINE ISORT FOR A DESCRIPTION OF COMMON BLOCK /ISOTID/ FARED 03427
C- ** SEE SUBROUTINE CONST FOR A DESCRIPTION OF COMMON BLOCK /CONS/ FARED 03428
C- ** SEE SUBROUTINE BLOCK FOR A DESCRIPTION OF COMMON BLOCK /BLK/ FARED 03429
C- ** SEE SUBROUTINE RDCH FOR A DESCRIPTION OF COMMON BLOCK /STOR/ FARED 03430
C- FARED 03431
DATA MFILE /4HFILE/ FARED 03432
REWIND LIO FARED 03433
REWIND NERG FARED 03434
REWIND NRR FARED 03435
REWIND NUR FARED 03436
REWIND NXSEC FARED 03437
COPY FILE 1 FARED 03438
C- FARED 03439
JFIL = 1 FARED 03440
C- FARED 03441

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READ (LIB) NFILE,JF,NHED,NGRP	FARED 03442
IF (EOF,LIB) 800,5	FARED 03443
5 IF (NFILE.NE. MFILE) GO TO 810	FARED 03444
IF (JF.NE. JFIL) GO TO 810	FARED 03445
WRITE (NERG) NFILE,JF,NZERO,NGRP	FARED 03446
READ (LIB) (MATX(I),I=1,10)	FARED 03447
IF (EOF,LIB) 800,6	FARED 03448
6 WRITE (NERG) (MATX(I),I=1,10)	FARED 03449
IF (NGRP.LE. 0) GO TO 815	FARED 03450
NG = NGRP + 1	FARED 03451
READ (LIB) (MATX(I),I=1,NG)	FARED 03452
IF (EOF,LIB) 800,7	FARED 03453
7 WRITE (NERG) (MATX(I),I=1,NG)	FARED 03454
ENDFILE NERG	FARED 03455
C -	FARED 03456
COPY FILE 2	FARED 03457
C -	FARED 03458
JFIL = 2	FARED 03459
NZERO = 0	FARED 03460
IF (ICON(6).EQ. 0) GO TO 30	FARED 03461
CALL RDCH	FARED 03462
JF = 2	FARED 03463
NHED = 1	FARED 03464
WRITE (NERG) NFILE,JF,NHED,NZERO	FARED 03465
WRITE (NERG) IOCH,NLIST,NAST	FARED 03466
WRITE (NERG) IOCH,(ILIST(I),I=1,NLIST)	FARED 03467
WRITE (NERG) ((MATX(I,K),K=1,I),I=1,NLIST)	FARED 03468
GO TO 40	FARED 03469
30 JF = 2	FARED 03470
NHED = 0	FARED 03471
WRITE (NERG) NFILE,JF,NHED,NZERO	FARED 03472
35 READ (LIB)	FARED 03473
IF (EOF,LIB) 40,35	FARED 03474
40 READ (LIB)	FARED 03475
IF (EOF,LIB) 50,40	FARED 03476
50 ENDFILE NERG	FARED 03477
C -	FARED 03478
COPY FILE 3	FARED 03479
C -	FARED 03480
C - READ FILE 3 LABEL	FARED 03481
C -	FARED 03482
JFIL = 3	FARED 03483
READ (LIB) NFILE,JF,NHED,DUM	FARED 03484
IF (EOF,LIB) 800,70	FARED 03485
70 IF (NFILE.NE. MFILE) GO TO 810	FARED 03486
IF (JF.NE. JFIL) GO TO 810	FARED 03487
II = 8*NHED	FARED 03488
C -	FARED 03489
C - READ FILE 3 DIRECTORY	FARED 03490
C -	FARED 03491

READ (LIB) (MATX(I),I=1,I1)	FARED	03492
IF (EOF,LIB) 800, 75	FARED	03493
75 ISOT(NIST) = MATX(I1-7) + 1	FARED	03494
J = 1	FARED	03495
C- GENERATE DIRECTORY OF ACTIVE NUCLIDES	FARED	03496
C- DO 110 I = 1,I1,8	FARED	03497
80 IF (MATX(I) .NE. ISOT(J))GO TO 90	FARED	03498
J = J + 1	FARED	03499
GO TO 110	FARED	03500
90 IF (MATX(I) .GT. ISOT(J)) GO TO 840	FARED	03501
MATX(I) = -MATX(I)	FARED	03502
NHED = NHED - 1	FARED	03503
GO TO 110	FARED	03504
100 J = J + 1	FARED	03505
GO TO 80	FARED	03506
110 CONTINUE	FARED	03507
C- WRITE UPDATED FILE 3 LABEL	FARED	03508
C- WRITE (NRR) NFILE,JF,NHED,DUM	FARED	03509
IF (NHED .GT. J) GO TO 112	FARED	03510
IF (NHED .LT. J) GO TO 820	FARED	03511
GO TO 170	FARED	03512
112 I2 = I1 + 1	FARED	03513
IFROM = 1	FARED	03514
ITO = I2	FARED	03515
DO 130 I = 1,NHED	FARED	03516
115 IF (MATX(IFROM) .GT. 0) GO TO 120	FARED	03517
IFROM = IFROM + 8	FARED	03518
GO TO 115	FARED	03519
120 I3 = IFROM + 7	FARED	03520
DO 125 J = IFROM,I3	FARED	03521
MATX(ITO) = MATX(J)	FARED	03522
125 ITO = ITO + 1	FARED	03523
130 IFROM = IFROM + 8	FARED	03524
ITO = ITO - 1	FARED	03525
IF (ITO .LE. I2) GO TO 820	FARED	03526
C- WRITE ABBREVIATED FILE 3 DIRECTORY	FARED	03527
C- WRITE (NRR) (MATX(I),I=I2,ITO)	FARED	03528
DO 160 I = 1,I1,8	FARED	03529
IF (MATX(I+3) .EQ. 0) GO TO 160	FARED	03530
IF (MATX(I) .GT. 0) GO TO 140	FARED	03531
READ (LIB)	FARED	03532
IF (EOF,LIB) 800,160	FARED	03533
C- SKIP DATA FOR NUCLIDE NOT INCLUDED IN THIS STUDY - FILE 3	FARED	03534
C-	FARED	03535
	FARED	03536
	FARED	03537
	FARED	03538
	FARED	03539
	FARED	03540
	FARED	03541

C-		FARED	03542
140	I4 = 3 + 6*MATX(I+3) + 2*(MATX(I+4) + MATX(I+5))	FARED	03543
	15 = I2 + I4 - 1	FARED	03544
C-		FARED	03545
C-	COPY DATA FOR ACTIVE NUCLIDE - FILE 3	FARED	03546
C-		FARED	03547
	READ (LIB) (MATX(J),J = I2,I5)	FARED	03548
	IF (EOF,LIB) 800,150	FARED	03549
150	IF (MATX(I) .NE. MATX(I2)) GO TO 160	FARED	03550
	WRITE (NRR) (MATX(J),J = I2,I5)	FARED	03551
160	CONTINUE	FARED	03552
170	READ(LIB)	FARED	03553
	IF (EOF,LIB) 180,170	FARED	03554
180	ENDFILE NRR	FARED	03555
C -		FARED	03556
COPY FILE 4		FARED	03557
C -		FARED	03558
	JFIL = 4	FARED	03559
C-		FARED	03560
C-	READ LABEL FILE 4	FARED	03561
C-		FARED	03562
	READ (LIB) NFILE,JF,NHED,DUM	FARED	03563
	IF (EOF,LIB) 800,200	FARED	03564
200	IF (NFILE .NE. MFILE) GO TO 810	FARED	03565
	IF (JF .NE. JFIL) GO TO 810	FARED	03566
	I1 = 11*NHED	FARED	03567
C-		FARED	03568
C-	READ NUCLIDE DIRECTORY FILE 4	FARED	03569
C-		FARED	03570
	READ (LIB) (MATX(I),I=1,I1)	FARED	03571
	IF (EOF,LIB) 800,210	FARED	03572
210	ISOT(NIST) = MATX(I1-10) + 1	FARED	03573
	J = 1	FARED	03574
C-		FARED	03575
C-	MARK INACTIVE NUCLIDES FILE 4 WITH NEGATIVE SIGN	FARED	03576
C-		FARED	03577
	DO 250 I = 1,I1,11	FARED	03578
220	IF (MATX(I) .NE. ISOT(J)) GO TO 230	FARED	03579
	J = J + 1	FARED	03580
	GO TO 250	FARED	03581
230	IF (MATX(I) .GT. ISOT(J)) GO TO 840	FARED	03582
	MATX(I) = -MATX(I)	FARED	03583
	NHED = NHED - 1	FARED	03584
	GO TO 250	FARED	03585
240	J = J + 1	FARED	03586
	GO TO 220	FARED	03587
250	CONTINUE	FARED	03588
	WRITE (NUR) NFILE,JF,NHED,DUM	FARED	03589
C-		FARED	03590
C-	WRITE UPDATED LABEL FILE 4	FARED	03591

C-	IF (NHED .GT. 0) GO TO 260	FARED	03592
	IF (NHED .LT. 0) GO TO 820	FARED	03593
	GO TO 380	FARED	03594
C-		FARED	03595
C-	GENERATE NEW DIRECTORY FOR FILE 4	FARED	03596
C-		FARED	03597
260	I2 = I1 + 1	FARED	03598
	IFROM = 1	FARED	03599
	ITO = I2	FARED	03600
	DO 300 I = 1, NHED	FARED	03601
270	IF (MATX(IFROM) .GT. 0) GO TO 280	FARED	03602
	IFROM = IFROM + 11	FARED	03603
	GO TO 270	FARED	03604
280	I3 = IFROM + 10	FARED	03605
	DO 290 J = IFROM, I3	FARED	03606
	MATX(ITO) = MATX(J)	FARED	03607
290	ITO = ITO + 1	FARED	03608
300	IFROM = IFROM + 11	FARED	03609
	ITO = ITO - 1	FARED	03610
	IF (ITO .LE. I2) GO TO 820	FARED	03611
C-		FARED	03612
C-	WRITE UPDATED DIRECTORY FILE 4	FARED	03613
C-		FARED	03614
	WRITE (NUR) (MATX(I), I=I2, ITO)	FARED	03615
	DO 370 I = 1, I1, 11	FARED	03616
	I4 = MATX(I+3) + MATX(I+4)	FARED	03617
	IF (I4 .EQ. 0) GO TO 370	FARED	03618
310	IF (MATX(I) .GT. 0) GO TO 330	FARED	03619
	I5 = I4 + 1	FARED	03620
C-		FARED	03621
C-	SKIP DATA FOR INACTIVE NUCLIDE FILE 4	FARED	03622
C-		FARED	03623
	DO 320 J = 1, I5	FARED	03624
	READ(LIB)	FARED	03625
	IF (EOF, LIB) 800, 320	FARED	03626
320	CONTINUE	FARED	03627
	GO TO 370	FARED	03628
330	I5 = 6*I4 + I2	FARED	03629
C-		FARED	03630
C-	COPY DATA FOR ACTIVE NUCLIDE FILE 4	FARED	03631
C-		FARED	03632
	READ(LIB) (MATX(K), K = I2, I5)	FARED	03633
	IF (EOF, LIB) 800, 340	FARED	03634
340	WRITE(NUR) (MATX(K), K= I2, I5)	FARED	03635
	DO 360 L = 1, I4	FARED	03636
	L1 = I2 + 6*(L-1) + 1	FARED	03637
	L2 = 2*(MATX(L1) + MATX(L1+1))	FARED	03638
	L3 = I5 + 1	FARED	03639
	L4 = I5 + L2	FARED	03640
		FARED	03641

IF (L2 .EQ. 0) GO TO 360	FAREQ 03642
READ(LIB) (MATX(K),K = L3,L4)	FAREQ 03643
IF (EOF,LIB) 800,350	FAREQ 03644
350 WRITE(NUR) (MATX(K),K = L3,L4)	FAREQ 03645
360 CONTINUE	FAREQ 03646
370 CONTINUE	FAREQ 03647
380 READ (LIB)	FAREQ 03648
IF (EOF,LIB) 390,380	FAREQ 03649
390 ENDFILE NUR	FAREQ 03650
C -	FAREQ 03651
COPY FILE 5	FAREQ 03652
C -	FAREQ 03653
C- READ LABEL FILE 5	FAREQ 03654
C-	FAREQ 03655
JFIL = 5	FAREQ 03656
C-	FAREQ 03657
READ (LIB) NFILE,JF,NHED,NGRP	FAREQ 03658
IF (EOF,LIB) 800,400	FAREQ 03659
400 IF (NFILE .NE. MFILE) GO TO 810	FAREQ 03660
IF (JF .NE. JFIL) GO TO 810	FAREQ 03661
I1 = 13*NHED	FAREQ 03662
C-	FAREQ 03663
C- READ NUCLIDE DIRECTORY FILE 5	FAREQ 03664
C-	FAREQ 03665
READ (LIB) (MATX(I),I = 1, I1)	FAREQ 03666
IF (EOF,LIB) 800,410	FAREQ 03667
410 ISOT(NIST) = MATX(I1-12) + 1	FAREQ 03668
J = 1	FAREQ 03669
C-	FAREQ 03670
C- MARK INACTIVE NUCLIDES FILE 5 WITH NEGATIVE SIGN	FAREQ 03671
C-	FAREQ 03672
DO 450 I = 1,I1,13	FAREQ 03673
420 IF (MATX(I) .NE. ISOT(J)) GO TO 430	FAREQ 03674
J = J + 1	FAREQ 03675
GO TO 450	FAREQ 03676
430 IF (MATX(I) .GT. ISOT(J)) GO TO 840	FAREQ 03677
MATX(I) = -MATX(I)	FAREQ 03678
NHED = NHED-1	FAREQ 03679
GO TO 450	FAREQ 03680
440 J = J + 1	FAREQ 03681
GO TO 420	FAREQ 03682
450 CONTINUE	FAREQ 03683
C-	FAREQ 03684
C- WRITE UPDATED LABEL FILE 5	FAREQ 03685
C-	FAREQ 03686
WRITE (NXSEC) NFILE,JF,NHED,NGRP	FAREQ 03687
IF (NHED .GT. 0) GO TO 460	FAREQ 03688
GO TO 820	FAREQ 03689
460 I2 = I1+1	FAREQ 03690
IFROM = 1	FAREQ 03691

C-	ITO = I2	FARED	03692
C-	GENERATE NEW DIRECTORY FILE 5	FARED	03693
C-		FARED	03694
	DO 500 I = 1,NHED	FARED	03695
470	IF (MATX(IFROM).GT. 0) GO TO 480	FARED	03696
	IFROM = IFROM + 13	FARED	03697
	GO TO 470	FARED	03698
480	I3 = IFROM + 12	FARED	03699
	DO 490 J = IFROM,I3	FARED	03700
	MATX(ITO) = MATX(J)	FARED	03701
490	ITO = ITO + 1	FARED	03702
500	IFROM = IFROM + 13	FARED	03703
	ITO = ITO - 1	FARED	03704
	IF (ITO .LE. I2) GO TO 820	FARED	03705
C-		FARED	03706
C-	WRITE UPDATED DIRECTORY FILE 5	FARED	03707
C-		FARED	03708
	WRITE (NXSEC) (MATX(I),I = I2,ITO)	FARED	03709
	DO 580 I = 1,I1,I3	FARED	03710
510	IF (MATX(I) .GT. 0) GO TO 530	FARED	03711
	J1 = MATX(I+12)	FARED	03712
	IF (J1 .EQ. 0) GO TO 580	FARED	03713
C-		FARED	03714
C-	SKIP DATA FOR INACTIVE NUCLIDE FILE 5	FARED	03715
C-		FARED	03716
	DO 520 J = 1,J1	FARED	03717
	READ (LIB)	FARED	03718
	IF (EOF,LIB) 800,520	FARED	03719
520	CONTINUE	FARED	03720
	GO TO 580	FARED	03721
530	IF (MATX(I+12) .EQ. 0) GO TO 580	FARED	03722
	IF (MATX(I+7) .EQ. 0) GO TO 580	FARED	03723
	J1 = MATX(I+7)*NGRP + 1	FARED	03724
	J2 = I1 + J1	FARED	03725
C-		FARED	03726
C-	COPY DATA FOR ACTIVE NUCLIDE FILE 5	FARED	03727
C-		FARED	03728
	READ (LIB) (MATX(K), K = I2,J2)	FARED	03729
	IF (EOF,LIB) 800,540	FARED	03730
540	WRITE (NXSEC) (MATX(K),K =I2,J2)	FARED	03731
	IF (MATX(I+9) .EQ. 0) GO TO 560	FARED	03732
	J1 = MATX(I+9) + 1	FARED	03733
	J2 = I1 + J1	FARED	03734
	READ (LIB) (MATX(K), K=I2,J2)	FARED	03735
	IF (EOF,LIB) 800,550	FARED	03736
550	WRITE (NXSEC) (MATX(K),K=I2,J2)	FARED	03737
560	IF (MATX(I+11) .EQ. 0) GO TO 580	FARED	03738
	J1 = MATX(I+11)	FARED	03739
	J2 = I1 + J1	FARED	03740
		FARED	03741

READ (LIB) (MATX(K),K=I2,J2)	FARED 03742
IF (EOF,LIB) 800,570	FARED 03743
570 WRITE (NXSEC) (MATX(K),K=I2,J2)	FARED 03744
580 CONTINUE	FARED 03745
590 READ (LIB)	FARED 03746
IF (EOF,LIB) 600,590	FARED 03747
600 ENDFILE NXSEC	FARED 03748
C -	FARED 03749
COPY FILE 6	FARED 03750
C -	FARED 03751
JFIL = 6	FARED 03752
C -	FARED 03753
C - READ LABEL FILE 6	FARED 03754
C -	FARED 03755
READ (LIB) NFILE,JF,NHED,NGRP	FARED 03756
IF (EOF,LIB) 800,610	FARED 03757
610 IF (NFILE.NE. MFILE) GO TO 810	FARED 03758
IF (JF.NE. JFIL) GO TO 810	FARED 03759
I1 = NHED	FARED 03760
C -	FARED 03761
C - READ DIRECTORY OF SOURCE SPECTRUMS FILE 6	FARED 03762
C -	FARED 03763
READ (LIB) (MATX(I),I=1,I1)	FARED 03764
IF (EOF,LIB) 810,615	FARED 03765
615 I1 = NHED	FARED 03766
I2 = I1 + 1	FARED 03767
ITO = I2	FARED 03768
C -	FARED 03769
C - GENERATE NEW DIRECTORY FOR ACTIVE SOURCE SPECTRUMS FILE 6	FARED 03770
C -	FARED 03771
DO 640 I = 1,I1	FARED 03772
DO 620 K = 1,NBLK	FARED 03773
J1 = IDB(K,2)	FARED 03774
IF (MATX(I).EQ. IBLK(J1+2)) GO TO 630	FARED 03775
620 CONTINUE	FARED 03776
MATX(I) = -MATX(I)	FARED 03777
NHED = NHED - 1	FARED 03778
GO TO 640	FARED 03779
630 MATX(ITO) = MATX(I)	FARED 03780
ITO = ITO + 1	FARED 03781
640 CONTINUE	FARED 03782
IF (NHED.LE. 0) GO TO 830	FARED 03783
J2 = ITO - 1	FARED 03784
C -	FARED 03785
C - WRITE UPDATED LABEL AND DIRECTORY FILE 6	FARED 03786
C -	FARED 03787
WRITE (NERG) NFILE,JF,NHED,NGRP	FARED 03788
WRITE (NERG) (MATX(I),I = I2,J2)	FARED 03789
J2 = I1 + NGRP+1 + 72/ICAR	FARED 03790
DO 670 I = 1,I1	FARED 03791

C- IF (MATX(I) .GT. 0) GO TO 650	FARED 03792
C- SKIP INACTIVE SOURCE SPECTRUM FILE 6	FARED 03793
C- READ (LIB)	FARED 03794
IF (EOF,LIB) 800,670	FARED 03795
C- COPY ACTIVE SOURCE SPECTRUM FILE 6	FARED 03796
C- 650 READ (LIB) (MATX(K),K=I2,J2)	FARED 03797
IF (EOF,LIB) 800,660	FARED 03798
660 WRITE (NERG) (MATX(K),K=I2,J2)	FARED 03799
670 CONTINUE	FARED 03800
680 READ (LIB)	FARED 03801
IF (EOF,LIB) 690,680	FARED 03802
690 ENDFILE NERG	FARED 03803
C- COPY FILE 7	FARED 03804
C- JFIL = 7	FARED 03805
C- READ LABEL FILE 7	FARED 03806
C- READ (LIB) NFILE,JF,NHED,NGRP	FARED 03807
IF (EOF,LIB) 800,700	FARED 03808
700 IF (NFILE .NE. MFILE) GO TO 810	FARED 03809
IF (JF .NE. 7) GO TO 810	FARED 03810
I1 = 10*NHED	FARED 03811
C- READ DIRECTORY FILE 7	FARED 03812
C- READ (LIB) (MATX(I),I=1,I1)	FARED 03813
IF (EOF,LIB) 800,710	FARED 03814
710 ISOT(NIST) = MATX(I1-9)+1	FARED 03815
C- MARK INACTIVE NUCLIDES FILE 7	FARED 03816
C- J = 1	FARED 03817
DO 750 I = 1,I1,10	FARED 03818
720 IF (MATX(I) .NE. ISOT(J)) GO TO 730	FARED 03819
J = J + 1	FARED 03820
GO TO 750	FARED 03821
730 IF (MATX(I) .GT. ISOT(J)) GO TO 840	FARED 03822
MATX(I) = -MATX(I)	FARED 03823
NHED = NHED-1	FARED 03824
GO TO 750	FARED 03825
740 J = J + 1	FARED 03826
GO TO 720	FARED 03827
750 CONTINUE	FARED 03828
C-	FARED 03829
	FARED 03830
	FARED 03831
	FARED 03832
	FARED 03833
	FARED 03834
	FARED 03835
	FARED 03836
	FARED 03837
	FARED 03838
	FARED 03839
	FARED 03840
	FARED 03841

C -	WRITE UPDATED LABEL FILE 7	FAREQ	03842
C -	WRITE (NERG) NFILE,JF,NHED,NGRP	FAREQ	03843
	IF (NHED .LE. 0) GO TO 820	FAREQ	03844
C -		FAREQ	03845
C -	GENERATE NEW DIRECTORY FILE 7	FAREQ	03846
C -		FAREQ	03847
755	I2 = I1 + 1	FAREQ	03848
	IFROM = 1	FAREQ	03849
	ITO = I2	FAREQ	03850
	DO 780 I = 1,NHED	FAREQ	03851
760	IF (MATX(IFROM) .GT. 0) GO TO 765	FAREQ	03852
	IFROM = IFROM + 10	FAREQ	03853
	GO TO 760	FAREQ	03854
765	I3 = IFROM + 9	FAREQ	03855
	DO 770 J = IFROM,I3	FAREQ	03856
	MATX(ITO) = MATX(J)	FAREQ	03857
770	ITO = ITO + 1	FAREQ	03858
780	IFROM = IFROM + 10	FAREQ	03859
	ITO = ITO - 1	FAREQ	03860
	IF (ITO .LE. I2) GO TO 820	FAREQ	03861
C -		FAREQ	03862
C -	WRITE UPDATED DIRECTORY FILE 7	FAREQ	03863
C -		FAREQ	03864
	WRITE (NERG) (MATX(I), I = I2,ITO)	FAREQ	03865
	DO 950 I = 1,I1,10	FAREQ	03866
	IF (MATX(I) .GT. 0) GO TO 910	FAREQ	03867
	IF (MATX(I+4) .EQ. 0) GO TO 900	FAREQ	03868
C -		FAREQ	03869
C -	SKIP DATA FOR INACTIVE NUCLIDE FILE 7	FAREQ	03870
C -		FAREQ	03871
	READ (LIB)	FAREQ	03872
	IF (EOF,LIB) 800,900	FAREQ	03873
900	IF (MATX(I+5) .EQ. 0) GO TO 950	FAREQ	03874
	READ (LIB)	FAREQ	03875
	IF (EOF,LIB) 800,950	FAREQ	03876
910	IF (MATX(I+4) .EQ. 0) GO TO 930	FAREQ	03877
	J1 = 2*MATX(I+4) + 1	FAREQ	03878
	J2 = ITO + 1	FAREQ	03879
	J3 = ITO + J1	FAREQ	03880
C -		FAREQ	03881
C -	COPY DATA FOR ACTIVE NUCLIDE FILE 7	FAREQ	03882
C -		FAREQ	03883
	READ (LIB) (MATX(K),K = J2,J3)	FAREQ	03884
	IF (EOF,LIB) 800,920	FAREQ	03885
920	WRITE (NERG) (MATX(K),K = J2,J3)	FAREQ	03886
930	IF (MATX(I+5) .EQ. 0) GO TO 950	FAREQ	03887
	J1 = 2*MATX(I+5) + NGRP + 1	FAREQ	03888
	J2 = ITO + 1	FAREQ	03889
	J3 = ITO + J1	FAREQ	03890
		FAREQ	03891

	READ (LIB) (MATX(K),K = J2,J3)	FARED	03892
	IF (EOF,LIB) 800,940	FARED	03893
940	WRITE (NERG) (MATX(K),K= J2,J3)	FARED	03894
950	CONTINUE	FARED	03895
790	CONTINUE	FARED	03896
	ENDFILE NERG	FARED	03897
	ENDFILE NERG	FARED	03898
C -		FARED	03899
C -	REWIND ALL LIBRARY DATA FILES	FARED	03900
C -		FARED	03901
	REWIND LIB	FARED	03902
	REWIND NERG	FARED	03903
	REWIND NRR	FARED	03904
	REWIND NUR	FARED	03905
	REWIND NXSEC	FARED	03906
	RETURN	FARED	03907
800	WRITE (NPRT,801)	FARED	03908
801	FORMAT (1H0,43H*****LIBRARY TAPE COPY ERROR*****)	FARED	03909
	WRITE (NPRT,802) JFIL	FARED	03910
802	FORMAT (1H ,10X,35HPREATURE EOF WHILE PROCESSING FILE,I5)	FARED	03911
803	IFLAG = IFLAG + 1	FARED	03912
	GO TO 790	FARED	03913
810	WRITE (NPRT,801)	FARED	03914
	WRITE (NPRT,811) JFIL	FARED	03915
811	FORMAT (1H ,10X,29HIDENTIFICATION RECORD OF FILE,I5,13H INCORRECT)	FARED	03916
	GO TO 803	FARED	03917
815	WRITE (NPRT,801)	FARED	03918
	WRITE (NPRT,816)	FARED	03919
816	FORMAT (1H ,10X,70HNUMBER OF ENERGY GROUPS SPECIFIED IN FILE 1 IS	FARED	03920
	XLESS THAN OR EQUAL ZERO)	FARED	03921
	GO TO 803	FARED	03922
820	WRITE (NPRT,801)	FARED	03923
	WRITE (NPRT,821) JFIL	FARED	03924
821	FORMAT (1H ,10X,26HNUMBER OF NUCLIDES IN FILE,I5,12H LESS THAN 0)	FARED	03925
	GO TO 803	FARED	03926
830	WRITE (NPRT,801)	FARED	03927
	WRITE (NPRT,831)	FARED	03928
831	FORMAT(1H ,10X,45HNUMBER OF FISSION SOURCES IN FILE 6 IS .LE. 0)	FARED	03929
	GO TO 803	FARED	03930
840	WRITE (NPRT,801)	FARED	03931
	WRITE (NPRT,841) ISOT(J), JFIL	FARED	03932
841	FORMAT (1H ,10X,7HNUCLIDE,I7,30H NOT FOUND ON LIBRARY IN FILE,I5)	FARED	03933
	IFLAG = IFLAG + 1	FARED	03934
	GO TO (790,790,100,240,440,790,740),JFIL	FARED	03935
	END	FARED	03936

	SUBROUTINE CELLOUT	FARED	03937
C-	CELLOUT SUBROUTINE CREATES A FILE OF DATA FROM INPUT WHICH IS	FARED	03938
C-	REQUIRED FOR THE ENERGY SPECTRUM CALCULATION. THE FILE INCLUDES	FARED	03939
C-	THE POLYGROUP STRUCTURE AND A BLOCK DESCRIPTION OF THE ZONES AND	FARED	03940
C-	CELLS WHICH MAKE UP A BLOCK	FARED	03941
C -		FARED	03942
	COMMON NCRD, NPRT, LIB, NERG, NRR	FARED	03943
	COMMON NUR, NXSEC, NINP, NBCD, NSFX	FARED	03944
	COMMON NBAB, NRRI, NURI, NBGXS, NSPEC	FARED	03945
	COMMON NAJFX, NMAC, NGCON, NSCR, NBURN	FARED	03946
	COMMON NGE0, NMGR, NGRS, NDSG, NPTS	FARED	03947
	COMMON NOB, NOZ, NOBM, NOZM, NUCL	FARED	03948
	COMMON POW, RDIM, RADI, RADO, COVIN	FARED	03949
	COMMON MAXIT, EXOPT, IDCHA, IBOP, JBOP	FARED	03950
	COMMON NFLXOP, NBSQ, NWBMR, NWZMR, NWBR	FARED	03951
	COMMON NSOPA, NSOPM, TIME, PT, QACC	FARED	03952
	COMMON HMAcc, QACB, HMAcB	FARED	03953
	COMMON SPARE(38)	FARED	03954
	COMMON IFLAG, IV, IFLG, IWORD(18)	FARED	03955
	COMMON IBLANK, IZERO, IPLUS, IMINUS, IASTER	FARED	03956
	COMMON ICHAR, NWOD, BLANKS	FARED	03957
	COMMON IZP(20), KOM(5000)	FARED	03958
	COMMON /BLK/ NBLK,NBKST,NBKMAX,IOB(10,2),IBLK(100)	FARED	03959
	COMMON /CELL/ NCEL,ICEL(40,7)	FARED	03960
	COMMON /POLY/ NGROUP,IBDS(30)	FARED	03961
C -		FARED	03962
C -	** SEE PROGRAM FARED FOR A DESCRIPTION OF BLANK COMMON VARIABLES	FARED	03963
C -	** SEE SUBROUTINE BLOCK FOR A DESCRIPTION OF COMMON BLOCK /BLK/	FARED	03964
C -	** SEE SUBROUTINE CELLS FOR A DESCRIPTION OF COMMON BLOCK /CELL/	FARED	03965
C -	** SEE SUBROUTINE CINP FOR A DESCRIPTION OF COMMON BLOCK /POLY/	FARED	03966
C -		FARED	03967
	EQUIVALENCE (MCEL(1),CEL(1))	FARED	03968
	DIMENSION MCEL(47), CEL(47)	FARED	03969
	DATA PGID /4HPOLY/	FARED	03970
	DATA BID /4HBLOC/	FARED	03971
	REWIND NBCD	FARED	03972
C-		FARED	03973
C-	WRITE OUT GROUP STRUCTURE	FARED	03974
C-		FARED	03975
	WRITE (NBCD) PGID,NGROUP	FARED	03976
	WRITE (NBCD) (IBDS(I),I = 1,NGROUP)	FARED	03977
C-		FARED	03978
C-	WRITE OUT ID RECORD AND ONE RECORD FOR EACH BLOCK	FARED	03979
C-		FARED	03980
	WRITE (NBCD) BID,NBLK	FARED	03981
	DO 140 I = 1,NBLK	FARED	03982
	J = IOB(I,2)	FARED	03983
	MCEL(1) = IBLK(J)	FARED	03984
	MCEL(2) = IBLK(J+1)	FARED	03985
	MCEL(3) = IBLK(J+3)	FARED	03986

MCEL(5) = IBLK(J+4)	FARED 03987
MCEL(6) = IBLK(J+5)	FARED 03988
MCEL(7) = IBLK(J+2)	FARED 03989
IF (MCEL(3)) 10, 10, 30	FARED 03990
10 IF (MCEL(6)) 20, 20, 30	FARED 03991
20 MCEL(4) = 0	FARED 03992
GO TO 40	FARED 03993
30 MCEL(4) = 1	FARED 03994
40 J1 = 8	FARED 03995
J2 = J1 + MCEL(5) - 1	FARED 03996
J3 = J + 6	FARED 03997
DO 50 K = J1, J2	FARED 03998
MCEL(K) = IBLK(J3)	FARED 03999
50 J3 = J3 + 1	FARED 04000
IF (MCEL(6) .EQ. 0) GO TO 80	FARED 04001
IF (MCEL(6) .GT. 2) GO TO 90	FARED 04002
J1 = 28	FARED 04003
J2 = 28 + 10*MCEL(6) - 1	FARED 04004
DO 75 K = J1, J2, 10	FARED 04005
MCEL(K) = IBLK(J3)	FARED 04006
DO 60 L = 1, MCEL	FARED 04007
IF (ICEL(L,1) .EQ. MCEL(K)) GO TO 70	FARED 04008
60 CONTINUE	FARED 04009
GO TO 110	FARED 04010
70 MCEL(K) = ICEL(L,1)	FARED 04011
MCEL(K+1) = ICEL(L,2)	FARED 04012
MCEL(K+2) = ICEL(L,3)	FARED 04013
MCEL(K+3) = ICEL(L,3)	FARED 04014
MCEL(K+4) = ICEL(L,4)	FARED 04015
MCEL(K+5) = ICEL(L,5)	FARED 04016
MCEL(K+6) = ICEL(L,6)	FARED 04017
MCEL(K+7) = ICEL(L,7)	FARED 04018
MCEL(K+8) = 0	FARED 04019
MCEL(K+9) = J	FARED 04020
75 J3 = J3 + 1	FARED 04021
80 WRITE (N8CD) (MCEL(N), N=1,47)	FARED 04022
GO TO 130	FARED 04023
90 WRITE (NPRT,100) IDB(I,1)	FARED 04024
100 FORMAT (35H1*****POSSIBLE ERROR*****/	FARED 04025
X 10X, 0H BLOCK,I5,33H HAS MORE THAN 2 CELLS DESCRIBED)	FARED 04026
IFLAG = IFLAG + 1	FARED 04027
GO TO 80	FARED 04028
110 WRITE (NPRT,120) MCEL(K), IDB(I,1)	FARED 04029
120 FORMAT (35H1*****POSSIBLE ERROR*****/	FARED 04030
X 10X, 9H CELL,I5, 9H IN BLOCK,I5,23H NOT DESCRIBED IN INPUT)	FARED 04031
IFLAG = IFLAG + 1	FARED 04032
GO TO 80	FARED 04033
130 CONTINUE	FARED 04034
140 CONTINUE	FARED 04035
REWIND N8CD	FARED 04036

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SUBROUTINE COMOUT
C -
C- COMOUT SUBROUTINE SETS THE CASE CONSTANTS STORED IN BLANK COMMON
COMMON NCRD, NPRT, LIB, NERG, NRR
COMMON NUR, NXSEC, NINP, NBCD, NSF X
COMMON NBAB, NRR1, NURI, NBGXS, NSPEC
COMMON NAJFX, NMAC, NGCON, NSCR, NBURN
COMMON NCEO, NMGR, NGRS, NDSG, NPTS
COMMON NOB, NOZ, NOBM, NOZM, NUCL
COMMON POW, ROIM, RAD1, RADO, COVIN
COMMON MAXIT, EXOPT, IOCHA, IBOP, JBOP
COMMON NFLXOP, NBSQ, NWMR, NWZMR, NWBR
COMMON NSOPA, NSOPM, TIME, PT, QACC
COMMON HMACC, QACB, HMACB
COMMON SPARES(38)
COMMON IFLAG, IV, IFLG, IWORD(18)
COMMON IBLANK, IZERO, IPLUS, IMINUS, IASTER
COMMON ICHAR, NWOD, BLANKS
COMMON IZP(2J), KOM(50JJ)
COMMON /ISOTID/ NISOT, NIST, NIMAX, ISOT(80)
COMMON /CONS/ ICON(20), INPS(15)
COMMON /BULK/ NBMAT, NBST, NBMAX, IBMAT(3000)
COMMON /ZON/ IZON, IZST, IZMAX, IZONE(200), IDZ(21), IZAD(21)
COMMON /ZONEM/ NZMAT, NZST, NZMAX, IZMAT(400)
COMMON /BLK/ NBLK, NBKST, NBKMAX, IDB(10,2), IBLK(100)
COMMON /ENERGY/ NGRP1, EGRP(101)
EQUIVALENCE (ICON,CON)
EQUIVALENCE (KOM,COM)
DIMENSION CON(20)
DIMENSION COM(5000)
C -
C - ** SEE PROGRAM FARED FOR A DESCRIPTION OF BLANK COMMON VARIABLES
C - ** SEE SUBROUTINE ISORT FOR A DESCRIPTION OF COMMON BLOCK /ISOTID/
C - ** SEE SUBROUTINE CONST FOR A DESCRIPTION OF COMMON BLOCK /CONS/
C - ** SEE SUBROUTINE BULKM FOR A DESCRIPTION OF COMMON BLOCK /BULK/
C - ** SEE SUBROUTINE ZONES FOR A DESCRIPTION OF COMMON BLOCK /ZON/
C - ** SEE SUBROUTINE BULKM FOR A DESCRIPTION OF COMMON BLOCK /ZONEM/
C - ** SEE SUBROUTINE BLOCK FOR A DESCRIPTION OF COMMON BLOCK /BLK/
C - ** SEE SUBROUTINE CINP FOR A DESCRIPTION OF COMMON BLOCK /ENERGY/
C -
NGEO = ICON(1)
NGRS = ICON(2)
NDSG = ICON(3)
NOB = NBLK
NOZ = IZON
NOBM= NBMAT
NOZM= NZMAT
NUCL= NISOT
POW = CON(4)
ROIM= CON(5)

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FARED 04039
FARED 04040
FARED 04041
FARED 04042
FARED 04043
FARED 04044
FARED 04045
FARED 04046
FARED 04047
FARED 04048
FARED 04049
FARED 04050
FARED 04051
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FARED 04083
FARED 04084
FARED 04085
FARED 04086
FARED 04087
FARED 04088

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RADI= CON(12)
J = IZP(N0Z)
RAUO= COM(J+1)
COVIN=CON(10)
MAXIT = ICON(11)
EXOPT= CON(13)
IDCHA= ICON(6)
IBOP = ICON(7)
JBOP=ICON(8)
NFLXOP = ICON(9)
NBSQ = NOPB
NSOPA = 0
NSOPM = 0
NPTS = 1
DO 10 I = 1,N0Z
J = IZP(I)
10 NPTS = NPTS + KOM(J+2)
RETURN
END

```

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FARCO 04089
FARCO 04090
FARCO 04091
FARCO 04092
FARCO 04093
FARCO 04094
FARCO 04095
FARCO 04096
FARCO 04097
FARCO 04098
FARCO 04099
FARCO 04100
FARCO 04101
FARCO 04102
FARCO 04103
FARCO 04104
FARCO 04105
FARCO 04106
FARCO 04107

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	SUBROUTINE BUCKOUT	FARED	04108
C-	BUCKOUT SUBROUTINE CREATES A FILE OF DATA FROM INPUT WHICH IS	FARED	04109
C-	REQUIRED FOR THE SOLUTION OF THE NEUTRON DIFFUSION EQUATIONS. THE	FARED	04110
C-	FILE INCLUDES THE TRANSVERSE BUCKLING EXPANDED BY GROUPS AND ZONES	FARED	04111
C-	AND THE INNER AND OUTER BOUNDARY CONDITIONS WHEN APPLICABLE.	FARED	04112
C -		FARED	04113
	COMMON NCRD, NPRT, LIB, NERG, NRR	FARED	04114
	COMMON NUR, NXSEC, NINP, NBCD, NSFX	FARED	04115
	COMMON NBAB, NRRI, NURI, NBGXS, NSPEC	FARED	04116
	COMMON NAJFX, NMAC, NGCON, NSCR, NBURN	FARED	04117
	COMMON NGEO, NMGR, NGRS, NDSG, NPTS	FARED	04118
	COMMON NOB, NOZ, NOBM, NOZM, NUCL	FARED	04119
	COMMON POW, RDIH, RADI, RADO, COVIN	FARED	04120
	COMMON MAXIT, EXOPT, IDCHA, IBOP, JBOP	FARED	04121
	COMMON NFLXOP, NBSQ, NWBMR, NWZMR, NWBR	FARED	04122
	COMMON NSOPA, NSOPM, TIME, PT, QACC	FARED	04123
	COMMON HMACC, QACB, HMACH	FARED	04124
	COMMON SPARES(38)	FARED	04125
	COMMON IFLAG, IV, IFLG, IWORD(18)	FARED	04126
	COMMON IBLANK, IZERO, IPLUS, IMINUS, IASTER	FARED	04127
	COMMON ICHAR, NWOD, BLANKS	FARED	04128
	COMMON IZP(2J), KOM(5000)	FARED	04129
	COMMON /INBD/ NIBD,BDIN(30)	FARED	04130
	COMMON /OUTBD/ NOBD,BDOUT(30)	FARED	04131
	COMMON /STOR/ IDCH,NLIST,NAST,NOPB,NBCK,NOPS,NSOUR,ILIST(30),	FARED	04132
X	MATX(30,30),BUCKL(600),PTSOUR(150),ZSOUR(20),	FARED	04133
X	EXTEND(5000)	FARED	04134
	EQUIVALENCE (MATX,ZATX)	FARED	04135
	DIMENSION ZATX(30,30)	FARED	04136
C -		FARED	04137
C -	** SEE PROGRAM FARED FOR A DESCRIPTION OF BLANK COMMON VARIABLES	FARED	04138
C -	** SEE SUBROUTINE CINP FOR A DESCRIPTION OF COMMON BLOCK /INBD/	FARED	04139
C -	** SEE SUBROUTINE CINP FOR A DESCRIPTION OF COMMON BLOCK /OUTBD/	FARED	04140
C -	** SEE SUBROUTINE RUCH FOR A DESCRIPTION OF COMMON BLOCK /STOR/	FARED	04141
C -		FARED	04142
	REWIND NBAB	FARED	04143
C-		FARED	04144
C-	CHECK BUCKLING OPTION FOR ACCEPTABLE VALUE	FARED	04145
C-		FARED	04146
	IF (NOPB .LT. 1) GO TO 300	FARED	04147
	IF (NOPB .GT. 3) GO TO 300	FARED	04148
	GO TO (10, 30, 50),NOPB	FARED	04149
C-		FARED	04150
C-	BUCKLING OPTION IS BUCK - EXPAND SUCH THAT THE BUCKLING IN ALL	FARED	04151
C-	GROUPS AND ALL ZONES IS THE SINGLE VALUE GIVEN IN INPUT	FARED	04152
C-		FARED	04153
10	IF (NBCK .NE. 1) GO TO 330	FARED	04154
	DO 20 I = 1,NGRS	FARED	04155
	DO 20 J = 1,NOZ	FARED	04156
20	ZATX(I,J) = BUCKL(1)	FARED	04157

GO TO 70	FARED 04158
C- BUCKLING OPTION IS ZBUCK - EXPAND SUCH THAT THE BUCKLING IN ALL	FARED 04159
C- GROUPS FOR EACH ZONE IS THE VALUE GIVEN FOR THE RESPECTIVE ZONES	FARED 04160
C-	FARED 04161
30 IF (NBCK .NE. NOZ) GO TO 350	FARED 04162
DO 40 I = 1,NGRS	FARED 04163
DO 40 J = 1,NOZ	FARED 04164
40 ZATX(I,J) = BUCKL(J)	FARED 04165
GO TO 70	FARED 04166
C-	FARED 04167
C- BUCKLING OPTION IS ZBUCK - STORE INPUT VALUES BY GROUPS AND ZONES	FARED 04168
C-	FARED 04169
50 IF (NBCK .NE. NOZ*NGRS) GO TO 370	FARED 04170
DO 60 J = 1,NOZ	FARED 04171
K = NGRS*(J-1) + 1	FARED 04172
DO 60 I = 1,NGRS	FARED 04173
ZATX(I,J) = BUCKL(K)	FARED 04174
60 K = K + 1	FARED 04175
70 CONTINUE	FARED 04176
C-	FARED 04177
C- WRITE OUT EXPANDED TRANSVERSE BUCKLING	FARED 04178
C-	FARED 04179
WRITE (NBAB) ((ZATX(I,J),I=1,NGRS),J=1,NOZ)	FARED 04180
C-	FARED 04181
C- CHECK INNER BOUNDARY CONDITION OPTION AND WRITE OUT IF NECESSARY	FARED 04182
C-	FARED 04183
IF (IBOP .EQ. 3) GO TO 200	FARED 04184
IF (IBOP .NE. 4) GO TO 210	FARED 04185
200 IF (NIBU .NE. NGRS) GO TO 390	FARED 04186
WRITE (NBAB) (BDIN(I),I = 1,NIBU)	FARED 04187
C-	FARED 04188
C- CHECK OUTER BOUNDARY CONDITION OPTION AND WRITE OUT IF NECESSARY	FARED 04189
C-	FARED 04190
210 IF (JBOP .EQ. 3) GO TO 220	FARED 04191
IF (JBOP .NE. 4) GO TO 225	FARED 04192
220 IF (NOBU .NE. NGRS) GO TO 410	FARED 04193
WRITE (NBAB) (BDOUT(I),I=1,NOBU)	FARED 04194
225 CONTINUE	FARED 04195
REWIND NBAB	FARED 04196
230 CONTINUE	FARED 04197
RETURN	FARED 04198
300 WRITE (NPRT,310)	FARED 04199
310 FORMAT (37H ***** POSSIBLE ERROR *****)	FARED 04200
WRITE (NPRT,320)	FARED 04201
320 FORMAT (47H BUCKLING OPTION IS NOT BUCK OR ZBUCK OR GBUCK)	FARED 04202
325 IFLAG = IFLAG + 1	FARED 04203
GO TO 230	FARED 04204
330 WRITE (NPRT,310)	FARED 04205
WRITE (NPRT,340)	FARED 04206
	FARED 04207

340	FORMAT (52H BUCKLING OPTION IS BUCK BUT ONLY ONE VALUE NOT READ)	FARED	04208
	GO TO 325	FARED	04209
350	WRITE (NPRT,310)	FARED	04210
	WRITE (NPRT,360)	FARED	04211
360	FORMAT (75H BUCKLING OPTION IS ZBUCK BUT NUMBER INPUT VALUES NOT	FARED	04212
	XSAME AS NUM OF ZONES)	FARED	04213
	GO TO 325	FARED	04214
370	WRITE (NPRT,310)	FARED	04215
	WRITE (NPRT,380)	FARED	04216
380	FORMAT (90H BUCKLING OPTION IS GBUCK BUT NUMBER INPUT VALUES NOT	FARED	04217
	XSAME AS PRODUCT OF GROUPS AND ZONES)	FARED	04218
	GO TO 325	FARED	04219
390	WRITE (NPRT,310)	FARED	04220
	WRITE (NPRT,400) IBOP	FARED	04221
400	FORMAT (22H INNER BOUND OPTION IS,I5,51H BUT NO OF INPUT VALUES	FARED	04222
	XNOT EQUAL TO NO OF GROUPS)	FARED	04223
	GO TO 325	FARED	04224
410	WRITE (NPRT,310)	FARED	04225
	WRITE (NPRT,420) JBOP	FARED	04226
420	FORMAT (22H OUTER BOUND OPTION IS,I5,51H BUT NO OF INPUT VALUES	FARED	04227
	XNOT EQUAL TO NO OF GROUPS)	FARED	04228
	GO TO 325	FARED	04229
	END	FARED	04230

	SUBROUTINE SOUROUT	FARED	04231
C-	SOUROUT SUBROUTINE CREATES A FILE OF DATA FROM INPUT WHICH IS	FARED	04232
C-	REQUIRED FOR THE SOLUTION OF THE NEUTRON DIFFUSION EQUATIONS. THE	FARED	04233
C-	FILE INCLUDES THE STARTING SOURCE EXPANDED BY POINTS AND ZONES.	FARED	04234
C -		FARED	04235
	COMMON NCRD, NPRT, LIB, NERG, NRR	FARED	04236
	COMMON NUR, NXSEC, NINP, NBCD, NSFX	FARED	04237
	COMMON NBAB, NRR1, NURI, NBGXS, NSPEC	FARED	04238
	COMMON NAJFX, NMAC, NGCON, NSCR, NBURN	FARED	04239
	COMMON NCEO, NMGR, NGRS, NDSG, NPTS	FARED	04240
	COMMON NOB, NOZ, NOBH, NOZH, NUCL	FARED	04241
	COMMON POW, ROIM, RADI, RADO, COVIN	FARED	04242
	COMMON MAXIT, EXOPT, IDCHA, IBOP, JBOP	FARED	04243
	COMMON NFLXOP, NBSQ, NWBMR, NWZMR, NWBR	FARED	04244
	COMMON NSOPA, NSOPM, TIME, PT, QACC	FARED	04245
	COMMON HMACC, QACB, HMACB	FARED	04246
	COMMON SPARES(38)	FARED	04247
	COMMON IFLAG, IV, IFLG, IWORD(18)	FARED	04248
	COMMON IBLANK, IZERO, IPLUS, IMINUS, IASTER	FARED	04249
	COMMON ICHAR, NWOD, BLANKS	FARED	04250
	COMMON IZP(20), KOM(5000)	FARED	04251
	COMMON /STOR/ IDCH,NLIST,NAST,NOPB,NBCK,NOPS,NSOUR,ILIST(30),	FARED	04252
X	MATX(30,30),BUCKL(600),PTSOUR(150),ZSOUR(20),	FARED	04253
X	EXTEND(5000)	FARED	04254
	EQUIVALENCE (MATX,ZATX)	FARED	04255
	DIMENSION ZATX(30,30)	FARED	04256
C -		FARED	04257
C -	** SEE PROGRAM FARED FOR A DESCRIPTION OF BLANK COMMON VARIABLES	FARED	04258
C -	** SEE SUBROUTINE RDCH FOR A DESCRIPTION OF COMMON BLOCK /STOR/	FARED	04259
C -		FARED	04260
	DATA SID /4HSOUR/	FARED	04261
	REWIND NSFX	FARED	04262
C-		FARED	04263
C-	TEST SOURCE OPTION	FARED	04264
C-		FARED	04265
	L = NOPS	FARED	04266
	IF (L .EQ. 0) GO TO 200	FARED	04267
	GO TO (10, 30,100),L	FARED	04268
C-		FARED	04269
C-	SOURCE OPTION IS SOURCE - EXPAND SOURCE ZONE VALUES FROM THE	FARED	04270
C-	SINGLE INPUT VALUE	FARED	04271
C-		FARED	04272
10	DO 20 I = 1,NOZ	FARED	04273
20	ZATX(I) = PTSOUR(1)	FARED	04274
	GO TO 50	FARED	04275
C-		FARED	04276
C-	SOURCE OPTION IS ZSOURCE - STORE ZONE SOURCE VALUES	FARED	04277
C-		FARED	04278
30	IF (NSOUR .NE. NOZ) GO TO 230	FARED	04279
	DO 40 I = 1,NOZ	FARED	04280

40	ZATX(I) = PTSOUR(I)	FARED	04281
C-		FARED	04282
C-	EXPAND SOURCE OVER MESHPOINTS FROM ZONE VALUES FOR	FARED	04283
C-	SOURCE OPTIONS -SOURCE AND ZSOURCE-.	FARED	04284
C-		FARED	04285
50	J1 = 101	FARED	04286
	MATX(10J) = MATX(1)	FARED	04287
	DO 70 I = 1,NOZ	FARED	04288
	J2 = IZP(I)	FARED	04289
	J3 = J1 + KOM(J2+2) - 1	FARED	04290
	DO 60 K = J1,J3	FARED	04291
60	MATX(K) = MATX(I)	FARED	04292
70	J1 = J3 + 1	FARED	04293
C-		FARED	04294
C-	SET SOURCE INTERFACE VALUES FOR OPTIONS -SOURCE AND ZSOURCE-.	FARED	04295
C-		FARED	04296
	IF (NOZ .EQ. 1) GO TO 130	FARED	04297
	DO 80 I = 2,NOZ	FARED	04298
80	MATX(I-1) = MATX(I)	FARED	04299
	GO TO 130	FARED	04300
C-		FARED	04301
C-	STORE SOURCE VALUES FOR MESHPOINTS AND INTERFACES FOR PTSOURCE OPT	FARED	04302
C-		FARED	04303
100	IF (NSOUR .NE. NPTS + NOZ - 1) GO TO 250	FARED	04304
	J1 = 101	FARED	04305
	K1 = 2	FARED	04306
	ZATX(10J) = PTSOUR(1)	FARED	04307
	DO 120 J = 1,NOZ	FARED	04308
	K2 = IZP(J)	FARED	04309
	J2 = J1 + KOM(K2) - 1	FARED	04310
	DO 110 K = J1,J2	FARED	04311
	ZATX(K) = PTSOUR(K1)	FARED	04312
110	K1 = K1 + 1	FARED	04313
	ZATX(J) = PTSOUR(K1)	FARED	04314
	K1 = K1 + 1	FARED	04315
120	J1 = J2 + 1	FARED	04316
	ZATX(NOZ) = 0.0	FARED	04317
C-		FARED	04318
C-	WRITE OUT EXPANDED SOURCE FILE	FARED	04319
C-		FARED	04320
130	CONTINUE	FARED	04321
	WRITE (NSFX) SID,NPTS,NOZ,NGRS	FARED	04322
	J3 = NPTS + 99	FARED	04323
	WRITE (NSFX) (MATX(I),I=10J,J3)	FARED	04324
	WRITE (NSFX) (MATX(I),I= 1,NOZ)	FARED	04325
150	REWIND NSFX	FARED	04326
	RETURN	FARED	04327
200	WRITE (NPRT,21J)	FARED	04328
210	FORMAT (43H ***** POSSIBLE INPUT ERROR *****)	FARED	04329
	WRITE (NPRT,22J)	FARED	04330

220	FORMAT (31H SOURCE OPTION NOT SPECIFIED)	FARED	04331
225	IFLAG = IFLAG + 1	FARED	04332
	GO TO 163	FARED	04333
230	WRITE (NPRT,210)	FARED	04334
	WRITE (NPRT,240)	FARED	04335
240	FORMAT (75H NO OF SOURCE VALUES IUPUT WITH ZSOURCE OPTION NOT EQUA	FARED	04336
	XL TO NUMBER OF ZONGS)	FARED	04337
	GO TO 225	FARED	04338
250	WRITE (NPRT,210)	FARED	04339
	WRITE (NPRT,260)	FARED	04340
260	FORMAT(106H NO OF SOURCE VALUES INPUT WITH PTSOURCE OPTION NOT EQU	FARED	04341
	XAL TO NUMBER OF POINT IN MESH + NO. OF ZONES LESS 1)	FARED	04342
	GO TO 225	FARED	04343
	END	FARED	04344

	SUBROUTINE INOUT		FARED	04345
C -	INOUT SUBROUTINE CREATES A FILE OF THE INPUT DATA FOR POSSIBLE		FARED	04346
C -	LATER USE IN FUELMANAGEMENT CALCULATIONS		FARED	04347
C -			FARED	04348
	COMMON NCRD, NPRT, LIB, NERG, NRR		FARED	04349
	COMMON NUR, NXSEC, NINP, NBCD, NSFX		FARED	04350
	COMMON NBAB, NRR1, NURI, NBGXS, NSPEC		FARED	04351
	COMMON NAJFX, NMAC, NGCON, NSCR, NBURN		FARED	04352
	COMMON NCEO, NMGR, NGRS, NDSG, NPTS		FARED	04353
	COMMON NOB, NOZ, NOBM, NOZM, NUCL		FARED	04354
	COMMON POW, ROIM, RADI, RADO, COVIN		FARED	04355
	COMMON MAXIT, EXOPT, IOCHA, IBOP, JBOP		FARED	04356
	COMMON NFLXOP, NBSQ, NWMHR, NWZMR, NWBR		FARED	04357
	COMMON NSOPA, NSOPM, TIME, PT, QACC		FARED	04358
	COMMON HMACC, QACB, HMACB		FARED	04359
	COMMON SPARES(38)		FARED	04360
	COMMON IFLAG, IV, IFLG, IWORD(18)		FARED	04361
	COMMON IBLANK, IZERO, IPLUS, IMINUS, IASTER		FARED	04362
	COMMON ICHAR, NWOD, BLANKS		FARED	04363
	COMMON IZP(20), KOM(5000)		FARED	04364
	COMMON /ISOTID/ NISOT, NIST, NIMAX, ISOT(80)		FARED	04365
	COMMON /CONS/ ICON(20), INPS(15)		FARED	04366
	COMMON /BLK/ NBMAT, NBST, NBMAX, IBMAT(3000)		FARED	04367
	COMMON /ZON/ IZON, IZST, IZMAX, IZONE(200), IOZ(21), IZAD(21)		FARED	04368
	COMMON /ZONEM/ NZMAT, NZST, NZMAX, IZMAT(400)		FARED	04369
	COMMON /BLK/ NBLK, NBKST, NBKMAX, IOB(10,2), IBLK(100)		FARED	04370
	COMMON /CELL/ NCEL, ICEL(40,7)		FARED	04371
	COMMON /INBD/ NIBD, BDIN(30)		FARED	04372
	COMMON /OUTBD/ NOBD, BDOUT(30)		FARED	04373
	COMMON /POLY/ NGROUP, IBDS(30)		FARED	04374
	COMMON /STOR/ IOCH, NLIST, NAST, NOPB, NBCK, NOPS, NSOUR, ILIST(30),		FARED	04375
X	MATX(30,30), BUCKL(600), PTSOUR(150), ZSOUR(20),		FARED	04376
X	EXTEND(5000)		FARED	04377
			FARED	04378
C -	** SEE PROGRAM FARED FOR A DESCRIPTION OF BLANK COMMON VARIABLES		FARED	04379
C -	** SEE SUBROUTINE ISORT FOR A DESCRIPTION OF COMMON BLOCK /ISOTID/		FARED	04380
C -	** SEE SUBROUTINE CONST FOR A DESCRIPTION OF COMMON BLOCK /CONS/		FARED	04381
C -	** SEE SUBROUTINE BULKH FOR A DESCRIPTION OF COMMON BLOCK /BLK/		FARED	04382
C -	** SEE SUBROUTINE ZONES FOR A DESCRIPTION OF COMMON BLOCK /ZON/		FARED	04383
C -	** SEE SUBROUTINE BULKH FOR A DESCRIPTION OF COMMON BLOCK /ZONEM/		FARED	04384
C -	** SEE SUBROUTINE BLOCK FOR A DESCRIPTION OF COMMON BLOCK /BLK/		FARED	04385
C -	** SEE SUBROUTINE CELLS FOR A DESCRIPTION OF COMMON BLOCK /CELL/		FARED	04386
C -	** SEE SUBROUTINE CINP FOR A DESCRIPTION OF COMMON BLOCK /INBD/		FARED	04387
C -	** SEE SUBROUTINE CINP FOR A DESCRIPTION OF COMMON BLOCK /OUTBD/		FARED	04388
C -	** SEE SUBROUTINE CINP FOR A DESCRIPTION OF COMMON BLOCK /POLY/		FARED	04389
C -	** SEE SUBROUTINE ROCH FOR A DESCRIPTION OF COMMON BLOCK /STOR/		FARED	04390
C -			FARED	04391
	REWIND NINP		FARED	04392
	WRITE(NINP) (ICON(I), I = 1,20), (INPS(I), I=1,15)		FARED	04393
	WRITE(NINP) NBMAT, NBST, NBMAX, (IBMAT(I), I=1, NBMAX)		FARED	04394

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WRITE(NINP) IZON,IZST,IZMAX,(IZONE(I),I=1,IZMAX),
X  (IOZ(I),I=1,IZON),(IZAD(I),I=1,IZON)
WRITE(NINP) NISOT,NIST,NIMAX,(ISOT(I),I= 1,NIMAX)
WRITE(NINP) NZMAT,NZST,NZMAX,(IZMAT(I),I=1,NZMAX)
WRITE(NINP) NBLK,NBKST,NBKMAX,((IOB(I,J),I=1,NBLK),J=1,2),
X  (IBLK(I),I=1,NBKMAX)
WRITE(NINP) NCEL,((ICEL(I,J),I=1,NCEL),J=1,7)
REWIND NINP
RETURN
END

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FARED 04395
FARED 04396
FARED 04397
FARED 04398
FARED 04399
FARED 04400
FARED 04401
FARED 04402
FARED 04403
FARED 04404

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SUBROUTINE FUELM		FARED	04405
C -	FUELM SUBROUTINE IS THE CONTROLLING ROUTINE WHEN A FUELMGMT	FARED	04406
C -	DIRECTIVE HAS BEEN READ. IT RESTORES IN MEMORY THE INPUT PRE-	FARED	04407
C -	VIOUSLY READ AND INTERPRETS THE DATA DIRECTIVES BULK AND MOVE.	FARED	04408
C -	WHEN ALL FUEL MOVEMENT IS ACCOMPLISHED FUELM CAUSES THE UPDATED	FARED	04409
C -	INPUT TO BE WRITTEN ON AN EXTERNAL FILE, BLANK COMMON TO BE	FARED	04410
C -	UPDATED AND SUMMARY OF THE CURRENT INPUT TO BE PRINTED.	FARED	04411
C -		FARED	04412
	COMMON NCRD, NPRT, LIB, NERG, NRR	FARED	04413
	COMMON NUR, NXSEC, NINP, NBCD, NSFX	FARED	04414
	COMMON NBAB, NRR1, NURI, NBGXS, NSPEC	FARED	04415
	COMMON NAJFX, NMAC, NGCON, NSCR, NBURN	FARED	04416
	COMMON NCEO, NMGR, NGRS, NDSG, NPTS	FARED	04417
	COMMON NOB, NOZ, NOBH, NOZH, NUCL	FARED	04418
	COMMON POW, RDI, RAOI, RADO, COVIN	FARED	04419
	COMMON MAXIT, EXOPT, IDCHA, IBOP, JBOP	FARED	04420
	COMMON NFLXOP, NBSQ, NWBMR, NWZHR, NWBR	FARED	04421
	COMMON NSUPA, NSOPM, TIME, PT, QACC	FARED	04422
	COMMON HMACC, QACB, HMACB	FARED	04423
	COMMON SPARES(38)	FARED	04424
	COMMON IFLAG, IV, IFLG, IWORD(18)	FARED	04425
	COMMON IBLANK, IZERO, IPLUS, IMINUS, IASTER	FARED	04426
	COMMON ICHAR, NWOD, BLANKS	FARED	04427
	COMMON IZP(20), KOM(5000)	FARED	04428
	COMMON /ISOTID/ NISOT, NIST, NIMAX, ISOT(80)	FARED	04429
	COMMON /CONS/ ICON(20), INPS(15)	FARED	04430
	COMMON /BULK/ NBMAT, NBST, NBMAX, IBMAT(3000)	FARED	04431
	COMMON /ZON/ IZON, IZST, IZMAX, IZONE(200), IDZ(21), IZAD(21)	FARED	04432
	COMMON /ZONEM/ NZMAT, NZST, NZMAX, IZMAT(400)	FARED	04433
	COMMON /BLK/ NBLK, NBKST, NBKMAX, IDB(10,2), IBLK(100)	FARED	04434
	COMMON /CELL/ NCEL, ICEL(40,7)	FARED	04435
	COMMON /INBD/ NI8D, BDIN(30)	FARED	04436
	COMMON /OUTBD/ NO8D, BDOUT(30)	FARED	04437
	COMMON /POLY/ NGROUP, IBDS(30)	FARED	04438
	COMMON /STOR/ IDCH, NLIST, NAST, NOPB, NBCK, NOPS, NSOUR, ILIST(30),	FARED	04439
X	MATX(30,30), BUCKL(600), PTSOUR(150), ZSOUR(20),	FARED	04440
X	EXTEND(5000)	FARED	04441
	COMMON /HEAVY/ NHE, IDHM(100), HMASS(100)	FARED	04442
	EQUIVALENCE (KOM,COM)	FARED	04443
	DIMENSION COM(5000)	FARED	04444
C -		FARED	04445
C -	** SEE PROGRAM FARED FOR A DESCRIPTION OF BLANK COMMON VARIABLES	FARED	04446
C -	** SEE SUBROUTINE ISORT FOR A DESCRIPTION OF COMMON BLOCK /ISOTID/	FARED	04447
C -	** SEE SUBROUTINE CONST FOR A DESCRIPTION OF COMMON BLOCK /CONS/	FARED	04448
C -	** SEE SUBROUTINE BULKM FOR A DESCRIPTION OF COMMON BLOCK /BULK/	FARED	04449
C -	** SEE SUBROUTINE ZONES FOR A DESCRIPTION OF COMMON BLOCK /ZON/	FARED	04450
C -	** SEE SUBROUTINE BULKM FOR A DESCRIPTION OF COMMON BLOCK /ZONEM/	FARED	04451
C -	** SEE SUBROUTINE BLOCK FOR A DESCRIPTION OF COMMON BLOCK /BLK/	FARED	04452
C -	** SEE SUBROUTINE CELLS FOR A DESCRIPTION OF COMMON BLOCK /CELL/	FARED	04453
C -	** SEE SUBROUTINE CINP FOR A DESCRIPTION OF COMMON BLOCK /INBD/	FARED	04454

C - ** SEE SUBROUTINE CINP	FOR A DESCRIPTION OF COMMON BLOCK /OUTBD/	FARED	04455
C - ** SEE SUBROUTINE CKAST	FOR A DESCRIPTION OF COMMON BLOCK /HEAVY/	FARED	04456
C - ** SEE SUBROUTINE CINP	FOR A DESCRIPTION OF COMMON BLOCK /POLY/	FARED	04457
C - ** SEE SUBROUTINE RDCH	FOR A DESCRIPTION OF COMMON BLOCK /STOR/	FARED	04458
C -		FARED	04459
	DATA MFILE /4HFILE/	FARED	04460
	DIMENSION VL(20)	FARED	04461
	REWIND NINP	FARED	04462
	REWIND NERG	FARED	04463
C-		FARED	04464
C-	RESTORE INPUT IN LABELLED COMMON IN MEMORY	FARED	04465
C-		FARED	04466
	READ (NINP) (ICON(I), I = 1, 20), (INPS(I), I = 1, 15)	FARED	04467
	READ (NINP) NBMAT, NBST, NBMAX, (IBMAT(I), I = 1, NBMAX)	FARED	04468
	READ (NINP) IZON, IZST, IZMAX, (IZONE(I), I = 1, IZMAX),	FARED	04469
	X (IDZ(I), I = 1, IZON), (IZAO(I), I = 1, IZON)	FARED	04470
	READ (NINP) NISOT, NIST, NIMAX, (ISOT(I), I = 1, NIMAX)	FARED	04471
	READ (NINP) NZMAT, NZST, NZMAX, (IZMAT(I), I = 1, NZMAX)	FARED	04472
	READ (NINP) NBLK, NBKST, NBKMAX, ((IDB(I, J), I = 1, NBLK), J = 1, 2),	FARED	04473
	X (IBLK(I), I = 1, NBKMAX)	FARED	04474
	READ (NINP) NCEL, ((ICEL(I, J), I = 1, NCEL), J = 1, 7)	FARED	04475
	ICON(20) = 2	FARED	04476
C-		FARED	04477
C-	RESTORE IN MEMORY THE DEPLETION CHAIN MATRIX FOR EXPANSION OF	FARED	04478
C-	NUCLIDE LIST FOR BULKM DIRECTIVE	FARED	04479
C-		FARED	04480
	NAN = NISOT	FARED	04481
	CALL REOF (NERG)	FARED	04482
	READ (NERG) NFILE, JF, NHED, NZERO	FARED	04483
	IF (EOF, NERG) 200, 10	FARED	04484
10	IF (NFILE .NE. MFILE) GO TO 220	FARED	04485
	IF (JF .NE. 2) GO TO 220	FARED	04486
	IF (NHED .NE. 1) GO TO 240	FARED	04487
	READ (NERG) IDCH, NLIST, NAST	FARED	04488
	IF (EOF, NERG) 200, 20	FARED	04489
20	READ (NERG) IDCH, (ILIST(I), I = 1, NLIST)	FARED	04490
	IF (EOF, NERG) 200, 30	FARED	04491
30	READ (NERG) ((MATX(I, J), J = 1, I), I = 1, NLIST)	FARED	04492
	IF (EOF, NERG) 200, 40	FARED	04493
C-		FARED	04494
C-	READ INTO MEMORY NUCLIDE HEAVY MASS DATA	FARED	04495
C-		FARED	04496
40	CALL REOF (NERG)	FARED	04497
	CALL REOF (NERG)	FARED	04498
	READ (NERG) NFILE, JF, NHE, DUM	FARED	04499
	IF (EOF, NERG) 200, 50	FARED	04500
50	IF (NFILE .NE. MFILE) GO TO 220	FARED	04501
	IF (JF .NE. 7) GO TO 220	FARED	04502
	READ (NERG) (IDHM(I), DUM, DUM, DUM, DUM, DUM, DUM, DUM, HMASS(I), DUM, DUM,	FARED	04503
	X I = 1, NHE)	FARED	04504

IF (EOF, NERG) 200,60	FARED	04505
60 CONTINUE	FARED	04506
C- INITIALIZE CHANGE IN VOLUME OF ALL ZONES	FARED	04507
C- DO 150 I = 1, IZON	FARED	04508
150 VL(I) = J.0	FARED	04509
C- READ AND INTERPRET A DIRECTIVE	FARED	04510
C- CALL CRAMIN(IV, IFLG, IWORD)	FARED	04511
110 IF (IFLG .NE. J) GO TO 155	FARED	04512
CALL SCAN (11HBULK*MOVE**, IWORD(1), L)	FARED	04513
GO TO (120, 130, 140), L	FARED	04514
120 CALL BULKM	FARED	04515
GO TO 110	FARED	04516
130 CALL MOVE(VL)	FARED	04517
GO TO 110	FARED	04518
C- TEST ALL ZONES FOR CONSERVATION OF VOLUME FOLLOWING FUEL MOVEMENT	FARED	04519
C- DO 140 I = 1, IZON	FARED	04520
IP = IZP(I)	FARED	04521
DV = VL(1)/CON(IP+6)	FARED	04522
IF (ABS(DV) - 0.001) 150, 150, 160	FARED	04523
150 CONTINUE	FARED	04524
160 CONTINUE	FARED	04525
C- WRAPUP FUELMGMT DIRECTIVE	FARED	04526
C- CALL ZSORT	FARED	04527
CALL COMOUT	FARED	04528
CALL PINPUT	FARED	04529
CALL INOUT	FARED	04530
IF (NAN .EQ. NISOT) GO TO 360	FARED	04531
CALL LIBCOP	FARED	04532
360 CONTINUE	FARED	04533
RETURN	FARED	04534
160 WRITE (NPRT, 170) (I, VL(I), I=1, IZON)	FARED	04535
170 FORMAT (29H0***** POSSIBLE INPUT ERROR./1H ,10X,41H CONSERVATION	FARED	04536
XOF VOLUME ERROR IN FUELMGMT//1H ,20X,4HZONE,6X,11HVOL. CHANGE/	FARED	04537
X (20X,I+,E18.5))	FARED	04538
180 IFLAG = IFLAG + 1	FARED	04539
GO TO 155	FARED	04540
200 WRITE (NPRT, 210) JF	FARED	04541
210 FORMAT (27H0*****POSSIBLE ERROR*****/ 1H ,10X,21HPREMATRE EOF 0	FARED	04542
XN FILE,15)	FARED	04543
GO TO 180	FARED	04544
220 WRITE (NPRT, 230) JF	FARED	04545
230 FORMAT (27H0*****POSSIBLE ERROR*****/ 1H ,10X,29HIMPROPER HEADER	FARED	04546
	FARED	04547
	FARED	04548
	FARED	04549
	FARED	04550
	FARED	04551
	FARED	04552
	FARED	04553
	FARED	04554

	X LABEL ON FILE,IS)		FARED	04555
	GO TO 18J		FARED	04556
24J	WRITE (NPRT,25J)		FARED	04557
25J	FORMAT (27HJ*****POSSIBLE ERROR*****/ 1H ,10X,45HNUMBER OF DEPLE		FARED	04558
	XTION CHAINS ON FILE 2, IS NOT 1)		FARED	04559
	GO TO 18J		FARED	04560
	END		FARED	04561

	SUBROUTINE MOVE(VL)						FARED	04562
C-	MOVE SUBROUTINE READS IN AND PROCESSES THE DATA REQUIRED TO						FARED	04563
C-	SPECIFY A FUEL MOVEMENT. IN ADDITION, MOVE ACCOMPLISHES						FARED	04564
C-	1. UPDATE OF INPUT PARAMETERS ASSOCIATED WITH BULK MATERIALS,						FARED	04565
C-	ZONE MATERIALS, AND ZONES.						FARED	04566
C-	2. CREATES NEW BULK MATERIAL SPECIFICATIONS WHEN NECESSARY.						FARED	04567
C-	3. MAKES CURRENT THE STORAGE OF ZONE AND NUCLIDE DATA IN						FARED	04568
C-	BLANK COMMON						FARED	04569
C-	4. PERFORMS A CONSERVATION OF VOLUME CHECK ON THE BASIS OF THE						FARED	04570
C-	MOVES SPECIFIED. CHANGES ARE COMPUTED AND STORED IN VL						FARED	04571
C-	5. PROVIDES FOR A CONTINUING RECORD OF ACCUMULATED BURNUP.						FARED	04572
C -							FARED	04573
	COMMON	NCRD,	NPRT,	LIB,	NERG,	NRR	FARED	04574
	COMMON	NUR,	NXSEC,	NINP,	NBCD,	NSFX	FARED	04575
	COMMON	NBAB,	NRRI,	NURI,	NBGXS,	NSPEC	FARED	04576
	COMMON	NAJFX,	NMAC,	NGCON,	NSCR,	NBURN	FARED	04577
	COMMON	NGEO,	NMGR,	NGRS,	NDSG,	NPTS	FARED	04578
	COMMON	NOB,	NOZ,	NOBH,	NOZM,	NUCL	FARED	04579
	COMMON	POW,	ROIM,	RADI,	RADO,	COVIN	FARED	04580
	COMMON	MAXIT,	EXOPT,	IOCHA,	IBOP,	JBOP	FARED	04581
	COMMON	NFLXUP,	NBSQ,	NWBMR,	NWZMR,	NWBR	FARED	04582
	COMMON	NSOPA,	NSOPM,	TIME,	PT,	QACC	FARED	04583
	COMMON	HMACC,	QACB,	HMACB			FARED	04584
	COMMON	SPARES(38)					FARED	04585
	COMMON	IFLAG,	IV,	IFLG,	IWORD(18)		FARED	04586
	COMMON	IBLANK,	IZERO,	IPLUS,	IMINUS,	IASTER	FARED	04587
	COMMON	ICHAR,	NWOD,	BLANKS			FARED	04588
	COMMON	IZP(2J),	KOM(5000)				FARED	04589
	COMMON /BULK/	NBMAT,NBST,NBMAX,IBMAT(3000)					FARED	04590
	COMMON /ZON/	IZON,IZST,IZMAX,IZONE(200),IOZ(21),IZAD(21)					FARED	04591
	COMMON /ZONEM/	NZMAT,NZST,NZMAX,IZMAT(400)					FARED	04592
	COMMON /HEAVY/	NHE,IDHM(100),HMASS(100)					FARED	04593
	EQUIVALENCE (IBMAT,BMAT)						FARED	04594
	EQUIVALENCE (IZMAT,ZMAT)						FARED	04595
	EQUIVALENCE (IZONE,ZONE)						FARED	04596
	EQUIVALENCE (KOM,COM)						FARED	04597
	DIMENSION BMAT(3000)						FARED	04598
	DIMENSION ZMAT(400)						FARED	04599
	DIMENSION ZONE(200)						FARED	04600
	DIMENSION COM(5000)						FARED	04601
C -							FARED	04602
C -	** SEE PROGRAM FARED FOR A DESCRIPTION OF BLANK COMMON VARIABLES						FARED	04603
C -	** SEE SUBROUTINE BULKM FOR A DESCRIPTION OF COMMON BLOCK /BULK/						FARED	04604
C -	** SEE SUBROUTINE ZONES FOR A DESCRIPTION OF COMMON BLOCK /ZON/						FARED	04605
C -	** SEE SUBROUTINE BULKM FOR A DESCRIPTION OF COMMON BLOCK /ZONEM/						FARED	04606
C -	** SEE SUBROUTINE CKAAT FOR A DESCRIPTION OF COMMON BLOCK /HEAVY/						FARED	04607
C -							FARED	04608
	DIMENSION IOM(4J), Q(4J), HM(4J)						FARED	04609
	DIMENSION VL(1), ISTO(1J), STO(10), KZID(10), KRAC(10)						FARED	04610
	DIMENSION FRAC(10), KZMT(1J)						FARED	04611

C-	EQUIVALENCE (ISTO,STO), (FRAC,KRAC)	FARED	04612
C-	FIND NEXT BULK MATERIAL ID TO BE ASSIGNED	FARED	04613
C-		FARED	04614
	NBMID = 0	FARED	04615
	I = 1	FARED	04616
	DO 5 J = 1,NBMAT	FARED	04617
	IF (NBMID .LT. IBMAT(I)) NBMID = IBMAT(I)	FARED	04618
5	I = I + 4*IBMAT(I+2) + 3	FARED	04619
	IF (NBMID .LT. 500) NBMID = 499	FARED	04620
	NBMID = NBMID + 1	FARED	04621
C-		FARED	04622
C-	READ ZONE MATERIAL ID TO BE EFFECTED BY MOVEMENT OF FUEL	FARED	04623
C-		FARED	04624
10	CALL CRAMIN(IV,IFLG,IWORD)	FARED	04625
15	IF (IFLG .NE. -2) GO TO 250	FARED	04626
	CALL SCAN (4HZM**,IWORD(1),L)	FARED	04627
	IF (L .NE. 1) GO TO 300	FARED	04628
	IZT = IV	FARED	04629
	NMS = 0	FARED	04630
C-		FARED	04631
C-	READ DATA SEQUENCE FOR MOVEMENT OF FUEL	FARED	04632
C-		FARED	04633
20	CALL CRAMIN(IV,IFLG,IWORD)	FARED	04634
	IF (IFLG .EQ. 1) GO TO 30	FARED	04635
	IF (IFLG .NE. -2) GO TO 70	FARED	04636
	CALL SCAN (6HZ*ZM**,IWORD(1),L)	FARED	04637
	GO TO (25, 70, 70),L	FARED	04638
25	KZID(NMS+1) = IV	FARED	04639
	CALL CRAMIN(IV,IFLG,IWORD)	FARED	04640
	IF (IFLG .NE. 1) GO TO 340	FARED	04641
	GO TO 40	FARED	04642
30	KZID(NMS+1) = 0	FARED	04643
40	KRAC(NMS+1) = IV	FARED	04644
	CALL CRAMIN(IV,IFLG,IWORD)	FARED	04645
	IF (IFLG .EQ. -2) GO TO 50	FARED	04646
	IF (IFLG .NE. 0) GO TO 360	FARED	04647
	CALL SCAN (8HIN*OUT**,IWORD(1),L)	FARED	04648
	GO TO (45, 45,360),L	FARED	04649
45	KZMT(NMS+1) = L-3	FARED	04650
	GO TO 60	FARED	04651
50	CALL SCAN (4HZM**,IWORD(1),L)	FARED	04652
	IF (L .NE. 1) GO TO 360	FARED	04653
	KZMT(NMS+1) = IV	FARED	04654
60	NMS = NMS + 1	FARED	04655
	GO TO 20	FARED	04656
C -		FARED	04657
C-	DETERMINE IF NEW BULK MATERIAL IS TO BE FORMED	FARED	04658
C -		FARED	04659
70	IF (NMS .EQ. 0) GO TO 250	FARED	04660
		FARED	04661

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      IF (NMS .NE. 1) GO TO 80
      IF (KZMT(NMS) .EQ. -2) GO TO 220
C -
C-CREATE NEW BULK MATERIAL
C -
      80  DO 90 I = 1,NZMAT
          J = 4*(I-1) + 1
          IF (IZT .EQ. IZMAT(J)) GO TO 100
      90  CONTINUE
          GO TO 400
      100 IPZM = J
          IPBM = IZMAT(J+3)
          DO 130 I = 1,IZON
              J = IZAU(I)
              IF (I .EQ. IZON) GO TO 110
              J2 = IZAD(I+1) - 1
              GO TO 120
      110 J2 = IZST - 1
      120 J1 = J+4
          DO 130 K = J1,J2,2
              IF (IZT .EQ. IZONE(K)) GO TO 135
      130 CONTINUE
          GO TO 440
      135 IPZMZ = K
          VFZ = ZONE(K+1)
          VFF = VFZ*ZMAT(IPZM+1)
          IDZOT = IDZ(I)
C -
C-DELETE ZONE MATERIAL IZT FROM ZONE IDENTIFIED AS IDZOT
C -
          J3 = IZST - 3
          IF (J3 .LT. K) GO TO 160
          DO 140 L = K,J3
      140 IZONE(L) = IZONE(L+2)
          IF (I .EQ. IZON) GO TO 160
          I = I + 1
          DO 150 M = I,IZON
      150 IZAD(M) = IZAD(M) - 2
      160 IZST = IZST - 2
C -
C-FIND ZONE NUMBER WHOSE ID IS IDZOT
C -
          DO 170 I = 1,IZON
              IP = IZP(I)
              IF (KOM(IP) .EQ. IDZOT) GO TO 180
      170 CONTINUE
          GO TO 380
      180 IDZOT = I
          IF (NMS .NE. 1) GO TO 185
          IF (KZMT(NMS) .EQ. -1) GO TO 215

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FARED 04662
FARED 04663
FARED 04664
FARED 04665
FARED 04666
FARED 04667
FARED 04668
FARED 04669
FARED 04670
FARED 04671
FARED 04672
FARED 04673
FARED 04674
FARED 04675
FARED 04676
FARED 04677
FARED 04678
FARED 04679
FARED 04680
FARED 04681
FARED 04682
FARED 04683
FARED 04684
FARED 04685
FARED 04686
FARED 04687
FARED 04688
FARED 04689
FARED 04690
FARED 04691
FARED 04692
FARED 04693
FARED 04694
FARED 04695
FARED 04696
FARED 04697
FARED 04698
FARED 04699
FARED 04700
FARED 04701
FARED 04702
FARED 04703
FARED 04704
FARED 04705
FARED 04706
FARED 04707
FARED 04708
FARED 04709
FARED 04710
FARED 04711

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185	IPP = IP + 10*(KOM(IP+5)+1) - 1	FARED	04712
	NB = 4*IBMAT(IPBM+2) + 3	FARED	04713
	IF (NBST + NB .GE. NBMAX) GO TO 480	FARED	04714
C-		FARED	04715
C-	STORE DATA FOR NEW BULK MATERIAL JUST CREATED	FARED	04716
C-		FARED	04717
	IBM = NBST	FARED	04718
	IBMAT(NBST) = NBMD	FARED	04719
	IBMAT(NBST+1) = IBMAT(IPBM+1)	FARED	04720
	IBMAT(NBST+2) = IBMAT(IPBM+2)	FARED	04721
	NONU = IBMAT(NBST+2)	FARED	04722
	DO 210 I = 1, NONU	FARED	04723
	J = NBST + 4*(I-1) + 3	FARED	04724
	K = IPBM + 4*(I-1) + 3	FARED	04725
	IP1 = IP + 10	FARED	04726
	DO 190 L = IP1, IPP, 10	FARED	04727
	IF (KOM(L+1) .NE. IZT) GO TO 190	FARED	04728
	IF (KOM(L) .EQ. IBMAT(K)) GO TO 200	FARED	04729
190	CONTINUE	FARED	04730
	GO TO 400	FARED	04731
200	IBMAT(J) = IBMAT(K)	FARED	04732
	BMAT(J+1) = COM(L+6)/VFF	FARED	04733
	IBMAT(J+2)=IBMAT(K+2)	FARED	04734
210	IBMAT(J+3)=IBMAT(K+3)	FARED	04735
	NBST = NBST + NB	FARED	04736
	NBMA1 = NBMAT + 1	FARED	04737
	NBMD=NBMID+1	FARED	04738
C-		FARED	04739
C-	DELETE FROM BLANK COMMON ALL DATA FOR ZONE MATERIAL IZT IN ZONE	FARED	04740
C-	NOZOT	FARED	04741
C-		FARED	04742
215	DV = COM(IP+6)*VFF	FARED	04743
	VL(NOZOT) = VL(NOZOT) - DV	FARED	04744
	CALL DELET (NOZOT,IZT,IDM,Q,HM)	FARED	04745
	GO TO 600	FARED	04746
220	DO 230 I = 1,NZMAT	FARED	04747
	II = 4*(I-1) + 1	FARED	04748
	IF (IZMAT(II) .EQ. IZT) GO TO 240	FARED	04749
230	CONTINUE	FARED	04750
	GO TO 400	FARED	04751
240	IZM = II	FARED	04752
	IBM = IZMAT(IZM+3)	FARED	04753
	NONU =IBMAT(IBM+2)	FARED	04754
600	SUM = 0.0	FARED	04755
	DO 720 I = 1,NMS	FARED	04756
	SUM = SUM + FRAC(I)	FARED	04757
	IP = IZP(NOZOT)	FARED	04758
	IF (KZMT(I) .NE. -1) GO TO 608	FARED	04759
C-		FARED	04760
C-	COMPUTE CUMULATIVE BURNUP FOR ZONE MATERIAL REMOVED	FARED	04761

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C-      DO 605 J = 1,NONU
        QAC = 9.658E-14*FRAC(I)*Q(J)
        HMAc = FRAC(I)*HM(J)
        IF (KOM(IP+3) .EQ. 2) GO TO 602
        IF (KOM(IP+3) .NE. 1) GO TO 605
        QACC = QACC + QAC
        HMAcC = HMAcC + HMAc
        GO TO 605
602  QACB = QACB + QAC
        HMAcB = HMAcB + HMAc
605  CONTINUE
        GO TO 720
608  CONTINUE
        DO 610 J = 1,IZON
          IR = IZP(J)
          IF (KOM(IR) .EQ. KZID(I)) GO TO 620
610  CONTINUE
          GO TO 380
620  NDZIN = J
          IF (KZMT(I) .EQ. -2) GO TO 630
          RVOL = COM(IP+6)/COM(IR+6)
C-
C-      CREATE ZONE MATERIAL STORAGE FOR FUEL MOVED IN
C-
        IF (NZST+4 .GT. NZMAX) GO TO 460
        IZMAT(NZST) = KZMT(I)
        IZMAT(NZST+1) = IZMAT(IPZM+1)
        IZMAT(NZST+2) = IZMAT(IBM)
        IZMAT(NZST+3) = IBM
        NZMAT = NZMAT + 1
        IZM = NZST
        NZST = NZST+4
        VOLF = RVOL*FRAC(I)*VFZ
        VOLFF = RVOL*FRAC(I)*VFF
        GO TO 640
630  VOLF = FRAC(I)
        VOLFF = VOLFF*ZMAT(IZM+1)
        SUM = 1.0
C-
C-INSERT ZONE MATERIAL IZMAT(IZM) INTO ZONE KZTD(I)
C-
640  IF (IZST + 2 .GT. IZMAX) GO TO 520
        DO 650 J = 1,IZON
          IF (IDZ(J) .EQ. KZID(I)) GO TO 660
650  CONTINUE
          GO TO 380
660  IF (J .EQ. IZON) GO TO 690
          NIN = IZAD(J+1)
          JJ = IZST

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FARED 04762
FARED 04763
FARED 04764
FARED 04765
FARED 04766
FARED 04767
FARED 04768
FARED 04769
FARED 04770
FARED 04771
FARED 04772
FARED 04773
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FARED 04797
FARED 04798
FARED 04799
FARED 04800
FARED 04801
FARED 04802
FARED 04803
FARED 04804
FARED 04805
FARED 04806
FARED 04807
FARED 04808
FARED 04809
FARED 04810
FARED 04811

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670	IZONE(JJ+2) = IZONE(JJ)	FARED	04812
	JJ = JJ-1	FARED	04813
	IF (JJ .GE. NIN) GO TO 670	FARED	04814
	JJ = J+1	FARED	04815
	DO 680 KK = JJ, IZON	FARED	04816
680	IZAD(KK) = IZAD(KK) + 2	FARED	04817
	GO TO 700	FARED	04818
690	NIN = IZST	FARED	04819
700	IZONE(NIN) = KZMT(I)	FARED	04820
	IF (KZMT(I) .NE. -2) GO TO 705	FARED	04821
	IZONE(NIN) = IZT	FARED	04822
705	ZONE(NIN+1) = VOLFF	FARED	04823
	IZST = IZST + 2	FARED	04824
	CALL MAKER (NOZIN, NONU)	FARED	04825
	IP = IZP(NOZOT)	FARED	04826
	DO 710 K = 1, NONU	FARED	04827
	KK = IBM + 4*(K-1) + 3	FARED	04828
	ISTO(1) = IBMAT(KK)	FARED	04829
	ISTO(2) = IZMAT(IZM)	FARED	04830
	ISTO(3) = 100000*IBMAT(KK+2) + 1000*IBMAT(KK+3) + IBMAT(IBM)	FARED	04831
	ISTO(4) = IBMAT(IBM+1)	FARED	04832
	STO(9) = VOLFF	FARED	04833
	ISTO(10) = IZMAT(IZM+1)	FARED	04834
	STO(7) = BMAT(KK+1)*STO(9)*STO(10)	FARED	04835
	ISTO(8) = ISTO(7)	FARED	04836
	IF (KZMT(I) .EQ. -2) GO TO 706	FARED	04837
	DO 711 J = 1, NONU	FARED	04838
	IF (ISTO(1) .EQ. IDM(J)) GO TO 712	FARED	04839
711	CONTINUE	FARED	04840
	GO TO 540	FARED	04841
712	STO(5) = Q(J)*FRAC(I)/COM(IR+6)	FARED	04842
	STO(6) = HM(J)*FRAC(I)/COM(IR+6)	FARED	04843
	GO TO 710	FARED	04844
706	STO(5) = 0.0	FARED	04845
	STO(6) = 0.0	FARED	04846
	IAT1 = ISTO(1)/100000	FARED	04847
	IAT2 = (ISTO(1) - 100000*IAT1)/1000	FARED	04848
	IF (IAT2 .LT. 90) GO TO 709	FARED	04849
	IF (IAT2 .GT. 98) GO TO 709	FARED	04850
	DO 707 J = 1, NHE	FARED	04851
	IF (ISTO(1) .EQ. IDHM(J)) GO TO 708	FARED	04852
707	CONTINUE	FARED	04853
	GO TO 540	FARED	04854
708	STO(6) = HMASS(J)*STO(8)	FARED	04855
709	CONTINUE	FARED	04856
710	CALL INSERT(ISTO, NOZIN)	FARED	04857
	IR = IZP(NOZIN)	FARED	04858
	DV = VOLFF*COM(IR+6)	FARED	04859
	VL(NOZIN) = VL(NOZIN) + DV	FARED	04860
720	CONTINUE	FARED	04861

IF (ABS(SUM-1.0) - 0.001) 15, 15, 500	FARED	04862
250 CONTINUE	FARED	04863
RETURN	FARED	04864
310 WRITE (NPRT,310)	FARED	04865
310 FORMAT (29H0***** POSSIBLE INPUT ERROR.)	FARED	04006
WRITE (NPRT,320)	FARED	04867
320 FORMAT (1H,10X,64H WORD-INTEGER SHOULD IDENTIFY A ZONE MATERIAL	FARED	04868
XFOR FUEL MOVEMENT)	FARED	04869
330 IFLAG = IFLAG + 1	FARED	04870
GO TO 250	FARED	04871
340 WRITE (NPRT,310)	FARED	04872
WRITE (NPRT,350)	FARED	04873
350 FORMAT (1H,10X,46H FLOATING FIELD EXPECTED IN FUEL MOVE SEQUENCE)	FARED	04874
GO TO 330	FARED	04875
360 WRITE (NPRT,310)	FARED	04876
WRITE (NPRT,370)	FARED	04877
370 FORMAT (1H,10X,75H FIELD IN FUEL MOVE SEQUENCE NOT A ZONE MATERIAL	FARED	04878
X IDENTIFICATION OR IN OR OUT)	FARED	04879
GO TO 330	FARED	04880
380 WRITE (NPRT,310)	FARED	04881
WRITE (NPRT,390) KZIU(NMS)	FARED	04882
390 FORMAT (1H,10X,24H ZONE IDENTIFIED AS ZONE,15,36H IN FUEL MOVE I	FARED	04883
XS NOT AN ACTIVE ZONE)	FARED	04884
GO TO 330	FARED	04885
400 WRITE (NPRT,310)	FARED	04886
WRITE (NPRT,410) IZT	FARED	04887
410 FORMAT (1H,10X,14H ZONE MATERIAL,15,36H IS NOT IN ZONE MATERIAL	FARED	04888
XLIST)	FARED	04889
GO TO 330	FARED	04890
420 WRITE (NPRT,310)	FARED	04891
WRITE (NPRT,430)	FARED	04892
430 FORMAT (1H,10X,35H BULK MATERIAL IDENTIFICATION ERROR)	FARED	04893
GO TO 330	FARED	04894
440 WRITE (NPRT,310)	FARED	04895
WRITE (NPRT,450) IZT	FARED	04896
450 FORMAT (1H,10X,14H ZONE MATERIAL,15,24H NOT ACTIVE IN ANY ZONE)	FARED	04897
GO TO 330	FARED	04898
460 WRITE (NPRT,310)	FARED	04899
WRITE (NPRT,470)	FARED	04900
470 FORMAT (1H,10X,44H ZONE MATERIAL STORAGE OVERFLOW IN FUEL MOVE)	FARED	04901
GO TO 330	FARED	04902
480 WRITE (NPRT,310)	FARED	04903
WRITE (NPRT,490)	FARED	04904
490 FORMAT (1H,10X,44H BULK MATERIAL STORAGE OVERFLOW IN FUEL MOVE)	FARED	04905
GO TO 330	FARED	04906
500 WRITE (NPRT,310)	FARED	04907
WRITE (NPRT,510) IZT	FARED	04908
510 FORMAT (1H,10X,26H FRACTION OF ZONE MATERIAL,15,21H REPLACED IS	FARED	04909
XNOT 1.0)	FARED	04910
GO TO 330	FARED	04911

520	WRITE (NPRT,310)		
	WRITE (NPRT,530)	FARED	04912
530	FORMAT (1H ,10X,35H ZONE STORAGE OVERFLOW IN FUEL MOVE)	FARED	04913
	GO TO 330	FARED	04914
540	WRITE (NPRT,550) ISTO(1)	FARED	04915
550	FORMAT (22H0***** POSSIBLE ERROR/ 1H ,10X,21HHEAVY MASS FOR NUCL	FARED	04916
	XDE,I10,16H CANNOT BE FOUND////)	FARED	04917
	GO TO 709	FARED	04918
	END	FARED	04919
		FARED	04920

	SUBROUTINE DELET (NZ,NZM,IDM,Q,HM)						FARED	04921
C-	DELET SUBROUTINE DELETES FROM BLANK COMMON ALL DATA PERTAINING TO						FARED	04922
C-	NUCLIDES IN ZONE MATERIAL NZM AND ZONE NZ. IN ADDITION THE ARRAYS						FARED	04923
C-	IDM, Q, AND HM ARE CREATED WHERE						FARED	04924
C-	IDM IS THE NUCLIDE IDS OF NUCLIDES DELETED FROM STORAGE						FARED	04925
C-	Q IS THE ACCUMULATED BURNUP OF THE NUCLIDES DELETED						FARED	04926
C-	HM IS THE HEAVY MASS OF THE NUCLIDES DELETED						FARED	04927
C -							FARED	04928
	COMMON	NCRD,	NPRT,	LIB,	NERG,	NRR	FARED	04929
	COMMON	NUR,	NXSEC,	NINP,	NBCD,	NSFX	FARED	04930
	COMMON	NBAB,	NRRI,	NURI,	NBGXS,	NSPEC	FARED	04931
	COMMON	NAJFX,	NMAC,	NGCON,	NSCR,	NBURN	FARED	04932
	COMMON	NGEO,	NMGR,	NGRS,	NDSG,	NPTS	FARED	04933
	COMMON	NOB,	NOZ,	NOBM,	NOZM,	NUCL	FARED	04934
	COMMON	POW,	RDIM,	RADI,	RADO,	COVIN	FARED	04935
	COMMON	MAXIT,	EXOPT,	IDCHA,	IBOP,	JBOP	FARED	04936
	COMMON	NFLXOP,	NBSQ,	NWBMR,	NWZMR,	NWBR	FARED	04937
	COMMON	NSOPA,	NSOPM,	TIME,	PT,	QACC	FARED	04938
	COMMON	HMACC,	QACB,	HMACB			FARED	04939
	COMMON	SPARES(38)					FARED	04940
	COMMON	IFLAG,	IV,	IFLG,	IWORD(18)		FARED	04941
	COMMON	IBLANK,	IZERO,	IPLUS,	IMINUS,	IASTER	FARED	04942
	COMMON	ICHAR,	NWOD,	BLANKS			FARED	04943
	COMMON	IZP(20), KOM(5000)					FARED	04944
	COMMON /ZON/	IZON,IZST,IZMAX,IZONE(200),IDZ(21),IZAD(21)					FARED	04945
	EQUIVALENCE (KOM,COM)						FARED	04946
	DIMENSION COM(5000)						FARED	04947
C -							FARED	04948
C -	** SEE PROGRAM FARED FOR A DESCRIPTION OF BLANK COMMON VARIABLES						FARED	04949
C -	** SEE SUBROUTINE ZONES FOR A DESCRIPTION OF COMMON BLOCK /ZON/						FARED	04950
C -							FARED	04951
	DIMENSION IDM(1), Q(1), HM(1)						FARED	04952
	IP = IZP(IZON)						FARED	04953
	ILAST = IP + 10*(KOM(IP+5)+1) - 1						FARED	04954
	IF (NZ .EQ. IZON) GO TO 10						FARED	04955
	IFIR = IZP(NZ+1)						FARED	04956
	GO TO 20						FARED	04957
10	IFIR = ILAST + 1						FARED	04958
20	IQ = IZP(NZ)						FARED	04959
	I = IQ + 10						FARED	04960
	IED = IFIR-1						FARED	04961
	NUC = 0						FARED	04962
25	IF (KOM(I+1) .NE. NZM) GO TO 40						FARED	04963
	NUCC = NUC/10 + 1						FARED	04964
	IDM(NUCC) = KOM(I)						FARED	04965
	Q(NUCC) = COM(I+4)*COM(IQ+6)						FARED	04966
	HM(NUCC) = COM(I+5)*COM(IQ+6)						FARED	04967
	JJ = IED - 10						FARED	04968
	IF (I .GT. JJ) GO TO 35						FARED	04969
	DO 30 J = I,JJ						FARED	04970

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30 KOM(J) = KOM(J+10)
35 IED = JJ
   NUC = NUC + 10
   KOM(IQ+5) = KOM(IQ+5) - 1
   GO TO 50
40 I = I + 10
50 IF (I .LT. IED) GO TO 25
   IF (IFIR .GT. ILAST) GO TO 80
   DO 60 I = IFIR, ILAST
   J = I - NUC
60 KOM(J) = KOM(I)
   K = NZ+1
   DO 70 L = K, IZON
70 IZP(L) = IZP(L) - NUC
80 CONTINUE
   RETURN
   END

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FARED 04971
FARED 04972
FARED 04973
FARED 04974
FARED 04975
FARED 04976
FARED 04977
FARED 04978
FARED 04979
FARED 04980
FARED 04981
FARED 04982
FARED 04983
FARED 04984
FARED 04985
FARED 04986
FARED 04987

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	SUBROUTINE MAKER (NZ,N)		FARED	04988
C-	MAKER SUBROUTINE MAKES ADJUSTMENTS ON BLANK COMMON TO ALLOW FOR		FARED	04989
C-	THE STORAGE OF DATA FOR N NUCLIDES IN ZONE NZ		FARED	04990
C -			FARED	04991
	COMMON NCRD, NPRT, LIB, NERG, NRR		FARED	04992
	COMMON NUR, NXSEC, NINP, NBCD, NSFX		FARED	04993
	COMMON NBAB, NRR1, NURI, NBGXS, NSPEC		FARED	04994
	COMMON NAJFX, NMAC, NGCON, NSCR, NBURN		FARED	04995
	COMMON NGEQ, NMGR, NGRS, NDSG, NPTS		FARED	04996
	COMMON NOB, NOZ, NOBM, NOZM, NUCL		FARED	04997
	COMMON POW, RDIM, RAD1, RADO, COVIN		FARED	04998
	COMMON MAXIT, EXOPT, IDCHA, IBOP, JBOP		FARED	04999
	COMMON NFLXOP, NBSQ, NWMR, NWZMR, NWBR		FARED	05000
	COMMON NSUPA, NSOPM, TIME, PT, QACC		FARED	05001
	COMMON HMACC, QACB, HMACB		FARED	05002
	COMMON SPARES(38)		FARED	05003
	COMMON IFLAG, IV, IFLG, IWORD(18)		FARED	05004
	COMMON IBLANK, IZERO, IPLUS, IMINUS, IASTER		FARED	05005
	COMMON ICHAR, NWOD, BLANKS		FARED	05006
	COMMON IZP(20), KOM(5000)		FARED	05007
	COMMON /ZON/ IZON,IZST,IZMAX,IZONE(200),IDZ(21),IZAD(21)		FARED	05008
C -			FARED	05009
C -	** SEE PROGRAM FARED FOR A DESCRIPTION OF BLANK COMMON VARIABLES		FARED	05010
C -	** SEE SUBROUTINE ZONES FOR A DESCRIPTION OF COMMON BLOCK /ZON/		FARED	05011
C -			FARED	05012
	NN = 10*N		FARED	05013
	IP = IZP(IZON)		FARED	05014
	IQ = IP + 10*(KOM(IP+5)+1)-1		FARED	05015
	IQQ = IQ+NN		FARED	05016
	IF (IQQ .GT. 2000) GO TO 9		FARED	05017
	IF (NZ .GE. IZON) GO TO 85		FARED	05018
	IR = IZP(NZ+1)		FARED	05019
	J = IQ		FARED	05020
	K = IQQ		FARED	05021
10	KOM(K) = KOM(J)		FARED	05022
	K = K-1		FARED	05023
	J = J-1		FARED	05024
	IF (J .GE. IR) GO TO 10		FARED	05025
	IS = NZ+1		FARED	05026
	DO 20 I = IS,IZON		FARED	05027
20	IZP(I) = IZP(I) + NN		FARED	05028
85	CONTINUE		FARED	05029
	RETURN		FARED	05030
90	WRITE (NPRT,100)		FARED	05031
100	FORMAT (29H0***** POSSIBLE INPUT ERROR.)		FARED	05032
	WRITE (NPRT,110)		FARED	05033
110	FORMAT (1H,10X,37H COMMON STORAGE OVERFLOW IN FUEL MOVE)		FARED	05034
120	IFLAG = IFLAG + 1		FARED	05035
	GO TO 85		FARED	05036
	END		FARED	05037

	SUBROUTINE INSERT (NSTOR,NZ)							
C-	INSERT SUBROUTINE STORES IN ZONE NZ THE DATA WHICH DESCRIBES A						FARED	05038
C-	NUCLIDE. THE DATA IS FOUND IN NSTOR						FARED	05039
C-							FARED	05040
	COMMON	NCRD,	NPRT,	LIB,	NERG,	NRR	FARED	05041
	COMMON	NUR,	NXSEC,	NINP,	NBCD,	NSFX	FARED	05042
	COMMON	NBAB,	NRR1,	NURI,	NBGXS,	NSPEC	FARED	05043
	COMMON	NAJFX,	NMAC,	NGCON,	NSCR,	NBURN	FARED	05044
	COMMON	NGEO,	NMGR,	NGRS,	NDSG,	NPTS	FARED	05045
	COMMON	NOB,	NOZ,	NOBM,	NOZM,	NUCL	FARED	05046
	COMMON	POW,	ROIM,	RADI,	RADO,	COVIN	FARED	05047
	COMMON	MAXIT,	EXOPT,	IDCHA,	IBOP,	JBOP	FARED	05048
	COMMON	NFLXOP,	NBSQ,	NWBMR,	NWZMR,	NWBR	FARED	05049
	COMMON	NSOPA,	NSOPM,	TIME,	PT,	QACC	FARED	05050
	COMMON	HMACC,	QACB,	HMACB			FARED	05051
	COMMON	SPARES(38)					FARED	05052
	COMMON	IFLAG,	IV,	IFLG,	IWORD(18)		FARED	05053
	COMMON	IBLANK,	IZERO,	IPLUS,	IMINUS,	IASTER	FARED	05054
	COMMON	ICHAR,	NWOD,	BLANKS			FARED	05055
	COMMON	IZP(20), KOM(5000)					FARED	05056
	COMMON /ZON/	IZON,IZST,IZMAX,IZONE(200),IOZ(21),IZAD(21)					FARED	05057
C-							FARED	05058
C-	** SEE PROGRAM FARED FOR A DESCRIPTION OF BLANK COMMON VARIABLES						FARED	05059
C-	** SEE SUBROUTINE ZONES FOR A DESCRIPTION OF COMMON BLOCK /ZON/						FARED	05060
C-							FARED	05061
	DIMENSION NSTOR(1)						FARED	05062
	IP = IZP(NZ)						FARED	05063
	IQ = IP + 10*(KOM(IP+5)+1)-1						FARED	05064
	IR = IQ+10						FARED	05065
	I = IP+10						FARED	05066
5	IF (NSTOR(1) .GT. KOM(I))GO TO 40						FARED	05067
	IF (NSTOR(1) .LT. KOM(I))GO TO 10						FARED	05068
	IF (NSTOR(2) .GT. KOM(I+1))GO TO 40						FARED	05069
10	J = IQ						FARED	05070
20	KOM(J+10) = KOM(J)						FARED	05071
	J = J-1						FARED	05072
	IF (J .GE. I) GO TO 20						FARED	05073
25	J = I						FARED	05074
	DO 30 K = 1,10						FARED	05075
	KOM(J) = NSTOR(K)						FARED	05076
30	J = J+1						FARED	05077
	KOM(IP+5) = KOM(IP+5)+1						FARED	05078
	RETURN						FARED	05079
40	I = I+10						FARED	05080
	IF (I .LT. IQ) GO TO 5						FARED	05081
	GO TO 25						FARED	05082
	END						FARED	05083
							FARED	05084

	OVERLAY(RIM,2,0)	FARED	05085
	PROGRAM REGA	FARED	05086
C		FARED	05087
C		FARED	05088
C	USING BLOCK INFORMATION PLACED ON TAPE8 BY PROGRAM FARED,	FARED	05089
C	THIS PROGRAM CALCULATES THE HOMOGENEOUS BLOCK COMPOSITIONS	FARED	05090
C	AND PERFORMS THE COMPOSITION AVERAGING NECESSARY TO FORM	FARED	05091
C	THE CELL TYPE 1 AND 2 HETEROGENEOUS COMPOSITIONS.THIS	FARED	05092
C	INFORMATION IS PLACED ON TAPE19 FOR USE BY THE SECONDARY	FARED	05093
C	OVERLAYS.	FARED	05094
C		FARED	05095
C		FARED	05096
	COMMON NTAP(20),NFLAG(100),NPOINT(20),ZONE(2000)	FARED	05097
	COMMON /REGA1/ BK(47),JGB(31),JGDS,NRJG	FARED	05098
	COMMON /REGA2/ AK(30),AM(30),ANHET(30),ELR(30),GE(101),ICOMP(30),	FARED	05099
	1INRG(30),IND2,NBGO,NGE,NEL,R(30),RODD,SPIN(30),T(2),V	FARED	05100
	COMMON /REGA12/ SCC(30),SFF(30),SCT(100),SFT(100),DSIG	FARED	05101
	COMMON /REGA3/ NF1,NF2	FARED	05102
	DIMENSION AMHOM(30),BNHET1(15),BNHET2(15),BNHOM(30),HI(30),HO(30),	FARED	05103
	1ICOMP1(15),ICOMP2(15),ICOMP3(30),IDC1(4),IDC2(4),IDCK(3),IDZ(20),	FARED	05104
	2IWORD(10),IZON(2000),KCIND(30),KRE(15),VTX1(6),VTX2(6),ZM1(100),	FARED	05105
	3ZM2(100)	FARED	05106
	EQUIVALENCE (BK(1),IDB), (BK(2),JB), (BK(3),HFT), (BK(4),IR), (BK(	FARED	05107
	15),NZONE), (BK(6),NCELL), (BK(7),NS), (BK(8),IDZ(1)), (BK(28),IUC1	FARED	05108
	2(1)), (BK(32),VTX1(1)), (BK(38),IDC2(1)), (BK(42),VTX2(1)), (ANHET	FARED	05109
	3,AMHOM), (ZONE,IZON)	FARED	05110
	EQUIVALENCE (IFLG,NFLAG(74)), (IV,NFLAG(73)), (IWORD(1),NFLAG(75))	FARED	05111
	INTEGER EBOY,ZM1,ZM2,ZMIU	FARED	05112
	RIM=JLRIM	FARED	05113
	NBK=NFLAG(6)	FARED	05114
	IDCK(1)=ZHSQ	FARED	05115
	IDCK(2)=3HHEX	FARED	05116
	IDCK(3)=4HSLAB	FARED	05117
	NF1=0	FARED	05118
	NF2=0	FARED	05119
1	CALL CRAMIN (IV,IFLG,IWORD)	FARED	05120
	IF (IFLG.NE.0) GO TO 2	FARED	05121
	CALL SCAN (1/HREGRES*REGMICRO**,IWORD(1),L)	FARED	05122
	IF (L.NE.2.AND.L.NE.1) GO TO 3	FARED	05123
	IF (L.EQ.1) NF1=1	FARED	05124
	IF (L.EQ.2) NF2=1	FARED	05125
	GO TO 1	FARED	05126
C		FARED	05127
2	IF (IFLG+3.EQ.0) GO TO 1	FARED	05128
3	CONTINUE	FARED	05129
	NTAPE=555	FARED	05130
	EBOY=NTAP(4)	FARED	05131
	REWIND EBOY	FARED	05132
	IB=NTAP(19)	FARED	05133
	REWIND IB	FARED	05134

IP=NTAP(9)	FARED	05135
IO=NTAP(15)	FARED	05136
REWIND IP	FARED	05137
REWIND IO	FARED	05138
NTAP5=NTAP(5)	FARED	05139
NTAP6=NTAP(6)	FARED	05140
NTAP7=NTAP(7)	FARED	05141
NTAP12=NTAP(12)	FARED	05142
NTAP13=NTAP(13)	FARED	05143
NTAP14=NTAP(14)	FARED	05144
REWIND NTAP5	FARED	05145
REWIND NTAP6	FARED	05146
REWIND NTAP7	FARED	05147
REWIND NTAP12	FARED	05148
REWIND NTAP13	FARED	05149
REWIND NTAP14	FARED	05150
IF (NF1.GT.0) IO=NTAP(2)	FARED	05151
NGE=NFLAG(2)	FARED	05152
NRJG=NFLAG(3)	FARED	05153
JGDS=NFLAG(4)	FARED	05154
LEY = 4HPOLY	FARED	05155
READ (IP) ID,INRJG	FARED	05156
IF (IU.NE.LEY) GO TO 70	FARED	05157
READ (IP) (JGB(J),J=1,INRJG)	FARED	05158
J=INRJG+1	FARED	05159
JGB(J)=0	FARED	05160
READ (IP)	FARED	05161
WRITE (IB) NTAPE,NBK	FARED	05162
DO 51 LB=1,NBK	FARED	05163
ICOMP3(1)=0	FARED	05164
WRITE (IO,52) LB	FARED	05165
TPB1=0.0	FARED	05166
TPB2=0.0	FARED	05167
VB=0.0	FARED	05168
DO 4 J=1,3J	FARED	05169
ICOMP3(J)=0	FARED	05170
KCIND(J)=0	FARED	05171
BNHOM(J)=0.0	FARED	05172
IF (J.GT.15) GO TO 4	FARED	05173
BNHET1(J)=0.0	FARED	05174
BNHET2(J)=0.0	FARED	05175
ICOMP1(J)=0	FARED	05176
ICOMP2(J)=0	FARED	05177
4 CONTINUE	FARED	05178
1 READ (IP) IDB,BB,HFT,IR,NZONE,NCELL,NS,(IDZ(K),K=1,20),(IDC1(K)	FARED	05179
,K=1,4),(VIX1(K),K=1,6),(IDC2(K),K=1,4),(VTX2(K),K=1,6)	FARED	05180
WRITE (IB) IDB,IR,BB,NS	FARED	05181
IF (NCELL-1) 7,5,5	FARED	05182
5 WRITE (IO,56)	FARED	05183
WRITE (IO,57)	FARED	05184

	WRITE (IO,53)	FARED	05185
	K=IDC1(4)+1	FARED	05186
	WRITE (IO,54) IDC1(1),IDC1(2),IDCK(K),VTX1(1),VTX1(2),VTX1(3),V	FARED	05187
1	TX1(4)	FARED	05188
	IF (NCELL.EQ.1) GO TO 6	FARED	05189
	K=IDC2(4)+1	FARED	05190
	WRITE (IO,54) IDC2(1),IDC2(2),IDCK(K),VTX2(1),VTX2(2),VTX2(3),V	FARED	05191
1	TX2(4)	FARED	05192
6	CONTINUE	FARED	05193
	WRITE (IO,55) IDC1(1)	FARED	05194
	WRITE (IO,58)	FARED	05195
7	CONTINUE	FARED	05196
	IH1=1	FARED	05197
	IH2=1	FARED	05198
	IH=1	FARED	05199
	NIH3=0	FARED	05200
	KCOMP3=J	FARED	05201
	DO 45 J=1,NZONE	FARED	05202
	L=IDZ(J)	FARED	05203
	KCOMP2=J	FARED	05204
	KCOMP1=J	FARED	05205
	KNID=0	FARED	05206
	KIH3=0	FARED	05207
	IHJ=0	FARED	05208
	KIH=1	FARED	05209
	IX=0	FARED	05210
	MSET=0	FARED	05211
	NSET=0	FARED	05212
	IRS=0	FARED	05213
	KF=NFLAG(7)	FARED	05214
	KKJN=0	FARED	05215
	KKJM=0	FARED	05216
	NC1=0	FARED	05217
	NC2=0	FARED	05218
	KC1=0	FARED	05219
	KC2=0	FARED	05220
	DO 8 K=1,KF	FARED	05221
	LL=NPOINT(L)	FARED	05222
	IF (L.EQ.IZON(LL)) GO TO 9	FARED	05223
8	CONTINUE	FARED	05224
	IO=NTAP(2)	FARED	05225
	WRITE (IO,59)	FARED	05226
	STOP 7777	FARED	05227
9	N=13	FARED	05228
	NN=IZON(LL+5)	FARED	05229
	MZ1=0	FARED	05230
	MZ2=0	FARED	05231
	ZVOL=ZONE (LL+6)	FARED	05232
	ANHOM=0.0	FARED	05233
	ANHET1=0.0	FARED	05234

	ANHET2=0.0	FARED	05235
	DO 44 M=1,NN	FARED	05236
	MM=LL+N	FARED	05237
IX=0		FARED	05238
	NID=IZON(MM-3)	FARED	05239
	NNID=IZON(MM+7)	FARED	05240
	ZMID=IZON(MM-2)	FARED	05241
	IF (IH.EQ.1.AND.KCOMP3.EQ.0) GO TO 24	FARED	05242
	IHK=IH-1	FARED	05243
	IHL=J	FARED	05244
10	IF (IHK.EQ.0) IHK=1	FARED	05245
	DO 15 L=1,IHK	FARED	05246
	IF (IHL-1) 11,12,13	FARED	05247
11	IHJ=ICOMP3(L)	FARED	05248
	KIH3=L	FARED	05249
	GO TO 14	FARED	05250
C		FARED	05251
12	IHJ=ICOMP1(L)	FARED	05252
	KIH1=L	FARED	05253
	GO TO 14	FARED	05254
C		FARED	05255
13	IHJ=ICOMP2(L)	FARED	05256
	KIH2=L	FARED	05257
14	IF (IZON(MM-3).EQ.IHJ) GO TO 18	FARED	05258
15	CONTINUE	FARED	05259
	L=IHK+1	FARED	05260
	IF (IHL-1) 19,16,17	FARED	05261
16	ICOMP1(L)=IZON(MM-3)	FARED	05262
	KIH1=L	FARED	05263
	KKJN=J	FARED	05264
	NC1=1	FARED	05265
	GO TO 27	FARED	05266
C		FARED	05267
17	ICOMP2(L)=IZON(MM-3)	FARED	05268
	KIH2=L	FARED	05269
	KKJN=J	FARED	05270
	NC2=1	FARED	05271
	GO TO 27	FARED	05272
C		FARED	05273
18	MSET=1	FARED	05274
	IF (NCELL.EQ.0) GO TO 27	FARED	05275
	IF (IZON(MM).EQ.0) GO TO 27	FARED	05276
	IF (IX.NE.1) GO TO 63	FARED	05277
	IX=0	FARED	05278
	NSET=1	FARED	05279
	GO TO 27	FARED	05280
63	KIH3=1	FARED	05281
	GO TO 27	FARED	05282
C		FARED	05283
19	ICOMP3(L)=IZON(MM-3)	FARED	05284

	IF (KCIND(L).NE.J.AND.IZON(MM).NE.KCIND(L)) GO TO 201	FARED	05285
	KCIND(L)=IZON(MM)	FARED	05286
202	CONTINUE	FARED	05287
	KIH3=L	FARED	05288
	KKJM=J	FARED	05289
	IF (NCELL.EQ.J) GO TO 27	FARED	05290
21	IF (IZON(MM)-1) 27,21,23	FARED	05291
21	IF (IH1.EQ.1.AND.KCOMP1.EQ.0) GO TO 25	FARED	05292
	IHL=1	FARED	05293
	IHK=IH1-1	FARED	05294
22	IX=1	FARED	05295
	GO TO 10	FARED	05296
C		FARED	05297
23	IF (IH2.EQ.1.AND.KCOMP2.EQ.0) GO TO 26	FARED	05298
	IHL=2	FARED	05299
	IHK=IH2-1	FARED	05300
	GO TO 22	FARED	05301
C		FARED	05302
24	ICOMP3(IH)=IZON(MM-3)	FARED	05303
	IF (KCIND(IH).NE.C.AND.IZON(MM).NE.KCIND(IH)) GO TO 241	FARED	05304
	KCIND(IH)=IZON(MM)	FARED	05305
242	CONTINUE	FARED	05306
	KIH3=1	FARED	05307
	KCOMP3=ICOMP3(1)	FARED	05308
	KKJM=J	FARED	05309
	IF (NCELL.EQ.J) GO TO 27	FARED	05310
	IF (IZON(MM)-1) 27,25,26	FARED	05311
25	ICOMP1(IH1)=IZON(MM-3)	FARED	05312
	KCOMP1=ICOMP1(1)	FARED	05313
	KIH1=1	FARED	05314
	MSET=J	FARED	05315
	KKJN=J	FARED	05316
	NC1=1	FARED	05317
	IF (NIH3.EQ.1) MSET=1	FARED	05318
	GO TO 27	FARED	05319
241	IF (IZON(MM).EQ.0) GO TO 242	FARED	05320
	KCIND(IH)=3	FARED	05321
	GO TO 242	FARED	05322
201	IF (IZON(MM).EQ.J) GO TO 202	FARED	05323
	KCIND(L)=3	FARED	05324
	GO TO 202	FARED	05325
C		FARED	05326
26	ICOMP2(IH2)=IZON(MM-3)	FARED	05327
	KCOMP2=ICOMP2(1)	FARED	05328
	KIH2=1	FARED	05329
	KKJN=J	FARED	05330
	NC2=1	FARED	05331
	MSET=J	FARED	05332
	IF (NIH3.EQ.1) MSET=1	FARED	05333
27	IF (NID.EQ.NNID.AND.M.NE.NN) GO TO 37	FARED	05334

IF (MSET.EQ.1.AND.KKJM.EQ.J) MSET=0	FARED	05335
IF (NSET.EQ.1.AND.KKJN.EQ.J) NSET=0	FARED	05336
IF (NID.NE.IZON(MM-13).OR.M.EQ.1) GO TO 271	FARED	05337
IF (IZON(MM).EQ.1) KC1=1	FARED	05338
IF (IZON(MM).EQ.2) KC2=1	FARED	05339
271 CONTINUE	FARED	05340
ANHOM=ANHOM+ZONE(MM+3)	FARED	05341
ZNHOM=ANHOM*ZVOL	FARED	05342
ANHOM=0.0	FARED	05343
BNHOM(KIH3)=BNHOM(KIH3)+ZNHOM	FARED	05344
IF (NCELL.LE.0) GO TO 30	FARED	05345
IF (IZON(MM).EQ.1) GO TO 28	FARED	05346
IF (IZON(MM).EQ.2) GO TO 29	FARED	05347
IF (KC1.EQ.1) GO TO 281	FARED	05348
IF (KC2.EQ.1) GO TO 291	FARED	05349
GO TO 30	FARED	05350
28 ANHET1=ANHET1+ZONE(MM+3)/ZONE(MM+6)	FARED	05351
281 CONTINUE	FARED	05352
KKC1=KC1	FARED	05353
KC1=0	FARED	05354
ZNHET1=ANHET1*ZVOL	FARED	05355
ANHET1=0.0	FARED	05356
BNHET1(KIH1)=BNHET1(KIH1)+ZNHET1	FARED	05357
IF (KC2.EQ.1) GO TO 291	FARED	05358
GO TO 30	FARED	05359
C	FARED	05360
29 ANHET2=ANHET2+ZONE(MM+3)/ZONE(MM+6)	FARED	05361
291 CONTINUE	FARED	05362
KKC2=KC2	FARED	05363
KC2=0	FARED	05364
ZNHET2=ANHET2*ZVOL	FARED	05365
ANHET2=0.0	FARED	05366
BNHET2(KIH2)=BNHET2(KIH2)+ZNHET2	FARED	05367
IF (KC1.EQ.1) GO TO 281	FARED	05368
30 IF (M.GT.NN) GO TO 36	FARED	05369
IF (MSET.NE.0) GO TO 33	FARED	05370
IH=IH+1	FARED	05371
KKJM=0	FARED	05372
GO TO 34	FARED	05373
C	FARED	05374
31 CONTINUE	FARED	05375
IF (NC1.EQ.1) GO TO 32	FARED	05376
IF (NC2.EQ.1) GO TO 35	FARED	05377
GO TO 36	FARED	05378
32 IH1=IH1+1	FARED	05379
KKJN=0	FARED	05380
NC1=0	FARED	05381
KC1=0	FARED	05382
IF (NC2.EQ.1) GO TO 35	FARED	05383
GO TO 36	FARED	05384

C			FARED	05385
33	MSET=J		FARED	05386
	NIH3=J		FAREC	05387
	IF (IZON(MM).EQ.0) GO TO 36		FARED	05388
34	IF (NSET.EQ.0) GO TO 31		FARED	05389
	NSET=J		FARED	05390
	GO TO 36		FARED	05391
C			FARED	05392
35	IH2=IH2+1		FARED	05393
	KKJN=J		FARED	05394
	NC2=J		FARED	05395
	KC2=J		FARED	05396
36	IF (NCELL.EQ.J) GO TO 43		FARED	05397
	GO TO 40		FARED	05398
C			FARED	05399
37	ANHOM=ANHOM+ZONE(MM+3)		FARED	05400
	IF (NCELL.EQ.J) GO TO 43		FARED	05401
	IF (IZON(MM)-1) 40,38,39		FARED	05402
38	ANHET1=ANHET1+ZONE(MM+3)/ZONE(MM+6)		FARED	05403
	KC1=1		FARED	05404
	GO TO 40		FARED	05405
C			FARED	05406
39	ANHET2=ANHET2+ZONE(MM+3)/ZONE(MM+6)		FARED	05407
	KC2=1		FARED	05408
40	IF (IZON(MM).EQ.0.AND.KKC1.EQ.1.OR.KKC2.EQ.1) GO TO 411		FARED	05409
	IF (IZON(MM)-1) 431,41,42		FARED	05410
41	CALL BTNP(MZ1,ZM1,VFZ1,ZONE,M,NN,MM,ZMID)		FARED	05411
	IF (M.NE.NN) GO TO 43		FARED	05412
	TPB1=VFZ1*ZVOL+TPB1		FARED	05413
	IF (NCELL.EQ.2.AND.IZON(MM).LE.1) TPB2=VFZ2*ZVOL+TPB2		FARED	05414
	GO TO 43		FARED	05415
411	IF (M.NE.NN) GO TO 43		FARED	05416
	IF (KKC1.NE.1) GO TO 412		FARED	05417
	KKC1=J		FARED	05418
	TPB1=VFZ1*ZVOL+TPB1		FARED	05419
412	IF (KKC2.NE.1) GO TO 43		FARED	05420
	KKC2=J		FARED	05421
	TPB2=VFZ2*ZVOL+TPB2		FARED	05422
	GO TO 43		FARED	05423
C			FARED	05424
431	IF (M.NE.NN) GO TO 43		FARED	05425
	TPB1=VFZ1*ZVOL+TPB1		FARED	05426
	IF (NCELL.EQ.2) TPB2=VFZ2*ZVOL+TPB2		FARED	05427
	GO TO 43		FARED	05428
42	CALL BTNP(MZ2,ZM2,VFZ2,ZONE,M,NN,MM,ZMID)		FARED	05429
	IF (M.NE.NN) GO TO 43		FARED	05430
	TPB2=VFZ2*ZVOL+TPB2		FARED	05431
	TPB1=VFZ1*ZVOL+TPB1		FARED	05432
43	N=N+1J		FARED	05433
44	CONTINUE		FARED	05434

	VB=ZVOL+VB	FARED	05435
45	CONTINUE	FARED	05436
	NEL3=IH-1	FARED	05437
	CALL ARRAN(1,NEL3,ICOMP3,BNHOM,KCIND)	FARED	05438
	DO 46 L=1,NEL3	FARED	05439
	CALL CONVL(ICOMP3(L),HO(L),HI(L))	FARED	05440
46	BNHOM(L)=BNHOM(L)/VB	FARED	05441
	IRS=IRS+IR	FARED	05442
	V=0.0	FARED	05443
	RODD=0.0	FARED	05444
	SIG=0.0	FARED	05445
	IND2=3	FARED	05446
	IF (NCELL.LE.0) GO TO 49	FARED	05447
	NEL1=IH1-1	FARED	05448
	CALL ARRAN(0,NEL1,ICOMP1,BNHET1,KCIND)	FARED	05449
	DO 47 L=1,NEL1	FARED	05450
	CALL CONVL(ICOMP1(L),HO(L),HI(L))	FARED	05451
47	BNHET1(L)=BNHET1(L)/TPB1	FARED	05452
	INDC1=IDC1(4)	FARED	05453
	V1=VTX1(2)*VTX1(2)*4./(VTX1(1)*VTX1(1)*3.1415927)-1.	FARED	05454
	IF (INDC1.EQ.1) V1=.866J25*(V1+1.0)-1.0	FARED	05455
	IF (INDC1.EQ.2) V1=(VTX1(2)-VTX1(1))/VTX1(1)	FARED	05456
	RODD1=VTX1(1)	FARED	05457
	IF (NCELL.LT.2) GO TO 49	FARED	05458
	INDC2=IDC2(4)	FARED	05459
	V2=VTX2(2)*VTX2(2)*4./(VTX2(1)*VTX2(1)*3.1415927)-1.	FARED	05460
	IF (INDC2.EQ.1) V2=.866J25*(V2+1.0)-1.0	FARED	05461
	IF (INDC2.EQ.2) V2=(VTX2(2)-VTX2(1))/VTX2(1)	FARED	05462
	RODD2=VTX2(1)	FARED	05463
	NEL2=IH2-1	FARED	05464
49	WRITE (IB) IDB,IND2,NCELL,NEL3,(ICOMP3(I),I=1,NEL3),(BNHOM(I),I	FARED	05465
1	=1,NEL3),HF1,(KCIND(I),I=1,NEL3)	FARED	05466
	IF (NCELL.EQ.0) GO TO 50	FARED	05467
	WRITE (IB) NEL1,INDC1,RODD1,V1,BK(34),BK(35),(ICOMP1(I),I=1,NEL	FARED	05468
1	1),(BNHET1(I),I=1,NEL1)	FARED	05469
	WRITE (IO,62) (HO(I),HI(I),BNHET1(I),I=1,NEL1)	FARED	05470
	IF (NCELL.NE.2) GO TO 51	FARED	05471
	CALL ARRAN(0,NEL2,ICOMP2,BNHET2,KCIND)	FARED	05472
	DO 48 L=1,NEL2	FARED	05473
	BNHET2(L)=BNHET2(L)/TPB2	FARED	05474
	CALL CONVL(ICOMP2(L),HO(L),HI(L))	FARED	05475
48	CONTINUE	FARED	05476
	WRITE (IB) NEL2,INDC2,RODD2,V2,BK(44),BK(45),(ICOMP2(I),I=1,NEL	FARED	05477
1	2),(BNHET2(I),I=1,NEL2)	FARED	05478
	WRITE (IO,55) IDC2(1)	FARED	05479
	WRITE (IO,58)	FARED	05480
	WRITE (IO,62) (HO(I),HI(I),BNHET2(I),I=1,NEL2)	FARED	05481
	GO TO 51	FARED	05482
C		FARED	05483
50	WRITE (IO,60)	FARED	05484

	WRITE (IO,61)	FARED	05485
	WRITE(IO,62) (HO(I),HI(I),BNHOM(I),I=1,NEL3)	FARED	05486
51	IH=1	FARED	05487
	END FILE IB	FARED	05488
	REWIND IB	FARED	05489
	READ (EBOY) FILE1,JF,NHED,NGE	FARED	05490
	NBGO=NGE+1	FARED	05491
	READ (EBOY)	FARED	05492
	READ (EBOY) (GE(I),I=1,NBGO)	FARED	05493
	CALL OVERLAY(RIM,2,1)	FARED	05494
	CALL OVERLAY(RIM,2,2)	FARED	05495
	CALL OVERLAY(RIM,2,3)	FARED	05496
	RETURN	FARED	05497
C		FARED	05498
70	IO=NTAP(2)	FARED	05499
	WRITE(IO,71)	FARED	05500
71	FORMAT(1H0,16H SUBROUTINE PREGA,4X,21H INPUT ID IS INCORRECT)	FARED	05501
	STOP 1003	FARED	05502
52	FORMAT (1H1,5JX,17H REGA BLOCK NUMBER,I5)	FARED	05503
53	FORMAT (1H ,42X,14H SLAB THICKNESS)	FARED	05504
54	FORMAT(1H0,I5,7X,I5,12X,A4,7X,4E16.6)	FARED	05505
55	FORMAT (1H0,5JX,16H CELL COMPOSITION,I2)	FARED	05506
56	FORMAT (1H0,9H CELL I.D.,3X,10H CELL INDEX,3X,12H LATTICE TYPE,5X,12H	FARED	05507
	1 ROD DIAMETER,5X,13H LATTICE PITCH,6X,10H FUEL TEMP.,7X,9H MODERATOR)	FARED	05508
57	FORMAT (1H ,46X,2HOR,47X,9HX-SECTION)	FARED	05509
58	FORMAT (1H0,12H NUCLIDE I.D.,4X,16H LUMP NO. DENSITY)	FARED	05510
59	FORMAT (1H0,38H ZONE NUMBER IS NOT IN BLOCK INPUT DATA)	FARED	05511
60	FORMAT (1H0,5JX,23H HOMOGENEOUS COMPOSITION)	FARED	05512
61	FORMAT (1H0,12H NUCLIDE I.D.,4X,17H HOMO. NO. DENSITY)	FARED	05513
	62 FORMAT(1H0,6X,A4,A2,4X,E16.6)	FARED	05514
	END	FARED	05515

	SUBROUTINE BTNP (MZ,ZM,VFZM,ZONE,M,NN,MM,ZMID)	FARED	05516
	DIMENSION ZM(1), ZONE(1)	FARED	05517
	INTEGER ZM,ZMID	FARED	05518
C		FARED	05519
C	THIS SUBROUTINE SUMS ZONE MATERIAL MIXING FRACTIONS IN	FARED	05520
C	THE BLOCK WHOSE ASSOCIATED BULK MATERIAL CARRIES A CELL	FARED	05521
C	INDEX OF 1 OR 2. THE SUM IS USED IN FORMING THE HETERO-	FARED	05522
C	GENEOUS COMPOSITION OF THE AVERAGE LUMP.	FARED	05523
C		FARED	05524
	IF (MZ.NE.0) GO TO 4	FARED	05525
	ZM(1)=ZMID	FARED	05526
	VFZM=0.0	FARED	05527
1	VFZM=ZONE(MM+5)+VFZM	FARED	05528
	MZ=MZ+1	FARED	05529
	IF (MZ.GT.100) GO TO 6	FARED	05530
3	RETURN	FARED	05531
4	DO 5 LM=1,MZ	FARED	05532
	IF (ZMID.EQ.ZM(LM)) GO TO 3	FARED	05533
	ML=LM+1	FARED	05534
5	CONTINUE	FARED	05535
	ZM(ML)=ZMID	FARED	05536
	GO TO 1	FARED	05537
C		FARED	05538
6	WRITE (10,7)	FARED	05539
	STOP 7776	FARED	05540
C		FARED	05541
7	FORMAT(1H0,51HNUMBER OF ZONE MATERIALS EXCEED 100 SUBROUTINE BTNP)	FARED	05542
	END	FARED	05543

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SUBROUTINE ARRAN(N,NEL,ICOMP,ON,KCIND)
DIMENSION ICOMP(1),ON(1),KCIND(1)
IF (NEL.LE.1) RETURN
K=1
NELL=NEL-1
DO 1 J=1,NELL
K=K+1
DO 1 I=K,NEL
IF (ICOMP(J).LE.ICOMP(I)) GO TO 1
IEMP=ICOMP(J)
TEMP=ON(J)
IF (N.EQ.1) KEMP=KCIND(J)
ICOMP(J)=ICOMP(I)
ON(J)=ON(I)
IF (N.EQ.1) KCIND(J)=KCIND(I)
ICOMP(I)=IEMP
ON(I)=TEMP
IF (N.EQ.1) KCIND(I)=KEMP
1 CONTINUE
RETURN
END

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FARED 05544
FARED 05545
FARED 05546
FARED 05547
FARED 05548
FARED 05549
FARED 05550
FARED 05551
FARED 05552
FARED 05553
FARED 05554
FARED 05555
FARED 05556
FARED 05557
FARED 05558
FARED 05559
FARED 05560
FARED 05561
FARED 05562
FARED 05563
FARED 05564

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C C C C C C C C	<p>OVERLAY(RIM,2,1) PROGRAM STRIP</p> <p>THIS PROGRAM INITIATES COMPUTATION OF EFFECTIVE RESOLVED RESONANCE CROSS SECTIONS FOR EACH BLOCK MIXTURE OR CELL TYPE. FILE 3 RETAP DATA IS OBTAINED FROM TAPE2(PREPARED BY PRO- GRAM FARED) AND BLOCK COMPOSITION DATA IS OBTAINED FROM TAPE19.</p> <p>COMMON NTAP(20),NFLAG(100),NPOINT(20),ZONE(2000) COMMON /REGA2/ AK(30),AM(30),ANHET(30),ELR(30),GE(101),ICOMP(30), 1INRG(30),IND2,NBGO,NGE,NEL,R(30),RODD,SPIN(30),T(2),V COMMON /REGA12/ UNC1,UNC2,SCT,SFT,DSIG COMMON /REGA3/ NF1,NF2 DIMENSION ABN(500),AF(30),AJ(500),AN(100),ANHOM(30),D(30), 1DELCO(100),DELFO(100),DN1(30),E111(2),ECORA(100),ECORB(100), 2EZERO(500),G(500),GAMG(500),GAMF(500),GAMN(500),GG(500),GF(500), 3GN(500),HI(30),HO(30),IDE(30),IDR(100),INDRS(30),KCIND(30), 4LEULU(30),LIDR(100),LK(30),LLDR(30),LLIDR(30),LTIDR(100),MK(30), 5NE(30),NECOR(100),NECORF(100),NPE(30),NPE1(30),NPEE1(30),NPKS(100) 6,NRE(30),NRE1(30),NUS(30),PE(100),RCAP(100),RE(500),RFIS(100), 7SGP(30),SLJCF(7,100,2),TEULU(30),W(30),WR(100),ZE(100),ZF(500) EQUIVALENCE (IDE,ICOMP), (AF,AM), (RE,EZERO), (GN,GAMN), (GG,GAMG) 1, (GF,GAMF), (DELCO,RCAP), (DELFO,RFIS), (PE,ECORA), (ZE,ECORB), (ZF 2,ABN), (G,AJ), (ANHOM,ANHET) INTEGER EMBRYO NSUR=NTAP(12) REWIND NSUR IO=NTAP(15) IF (NF1.GT.0) IO=NTAP(2) IP=NTAP(9) IB=NTAP(19) EMBRYO=NTAP(5) DO 1 I=1,31 INRG(I)=0 1 CONTINUE REWIND IB KKK=555 KRES=5 READ (IB) LEY,NB IF (LEY.NE.KKK) GO TO 60 DO 37 NI88=1,NB JFUEL=1 NZ=0 READ (EMBRYO) FILE3,JF,NRRN,MUM 3 READ (EMBRYO) (IDR(I),LIDR(I),LTIDR(I),NPKS(I),NECOR(I),NECORF(I), 1AN(I),WR(I),I=1,NRRN) READ (IB) IUB,IR,BB,IDZ</p>	<p>FARED 05565 FARED 05566 FARED 05567 FARED 05568 FARED 05569 FARED 05570 FARED 05571 FARED 05572 FARED 05573 FARED 05574 FARED 05575 FARED 05576 FARED 05577 FARED 05578 FARED 05579 FARED 05580 FARED 05581 FARED 05582 FARED 05583 FARED 05584 FARED 05585 FARED 05586 FARED 05587 FARED 05588 FARED 05589 FARED 05590 FARED 05591 FARED 05592 FARED 05593 FARED 05594 FARED 05595 FARED 05596 FARED 05597 FARED 05598 FARED 05599 FARED 05600 FARED 05601 FARED 05602 FARED 05603 FARED 05604 FARED 05605 FARED 05606 FARED 05607 FARED 05608 FARED 05609 FARED 05610 FARED 05611 FARED 05612 FARED 05613 FARED 05614</p>
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	READ (IB) ID8,IND2,NCELL,NEL,(ICOMP(I),I=1,NEL),(ANHOM(I),I=1,N	FARED	05615
	1EL),T(1),(KCIND(I),I=1,NEL)	FARED	05616
	DO 4 I=1,NEL	FARED	05617
	DO 2 J=1,NRRN	FARED	05618
	IF (ICOMP(I).EQ.IDR(J)) GO TO 3	FARED	05619
2	CONTINUE	FARED	05620
	STOP 3333	FARED	05621
3	NUS(I)=NPKS(J)	FARED	05622
4	CONTINUE	FARED	05623
	DSIG=0.0	FARED	05624
	V=0.0	FARED	05625
	RODD=0.0	FARED	05626
	IF (IR.EQ.0) GO TO 36	FARED	05627
	WRITE (NSUR) IDTAP,ID8	FARED	05628
	WRITE (NSUR) (NUS(I),I=1,NEL)	FARED	05629
	IF (NCELL.LE.0) GO TO 6	FARED	05630
	READ (IB) NEL,IND2,RODD,V,T(1),DSIG,(ICOMP(I),I=1,NEL),(ANHET(I	FARED	05631
1	),I=1,NEL)	FARED	05632
	NZ=NZ+1	FARED	05633
	GO TO 6	FARED	05634
C		FARED	05635
5	CONTINUE	FARED	05636
	JFUEL=JFUEL+1	FARED	05637
	READ(EMBRYO)	FARED	05638
	READ(EMBRYO)	FARED	05639
	READ (IB) NEL,IND2,RODD,V,T(1),DSIG,(ICOMP(I),I=1,NEL),(ANHET(I	FARED	05640
1	),I=1,NEL)	FARED	05641
	NZ=0	FARED	05642
6	CONTINUE	FARED	05643
	IF(NCELL.NE.0) WRITE (IO,41) NIBB,JFUEL	FARED	05644
	IF(NCELL.EQ.0) WRITE (IO,43) NIBB	FARED	05645
	DO 9 I=1,NEL	FARED	05646
	DO 7 J=1,NRRN	FARED	05647
	IF (ICOMP(I).EQ.IDR(J)) GO TO 8	FARED	05648
7	CONTINUE	FARED	05649
8	LLIDR(I)=LIDR(J)	FARED	05650
	LLUR(I)=LTIDR(J)	FARED	05651
9	CONTINUE	FARED	05652
	DO 10 I=1,5	FARED	05653
	DO 10 J=1,NGE	FARED	05654
	SLJCF(I,J,1)=0.0	FARED	05655
	SLJCF(I,J,2)=0.0	FARED	05656
10	CONTINUE	FARED	05657
	DO 14 I=1,NEL	FARED	05658
	MK(I)=0	FARED	05659
	INDRS(I)=0	FARED	05660
	DO 13 J=1,NRRN	FARED	05661
	IF (ICOMP(I).EQ.IDR(J)) GO TO 11	FARED	05662
	IF (NPKS(J).NE.0) GO TO 12	FARED	05663
	IF (J.NE.NRRN) GO TO 13	FARED	05664

	WRITE (IO,42) ICOMP(I)	FARED	05665
	GO TO 14	FARED	05666
C		FARED	05667
11	NRE(I)=NPKS(J)	FARED	05668
	NPE(I)=NECOR(J)	FARED	05669
	NE(I)=NECORF(J)	FARED	05670
	W(I)=WR(J)	FARED	05671
	AM(I)=AN(J)	FARED	05672
	SGP(I)=W(I)*W(I)*12.5663706	FARED	05673
	IF (NRE(I).NE.0) MK(I)=MK(I)+1	FARED	05674
	GO TO 14	FARED	05675
C		FARED	05676
12	MK(I)=MK(I)+1	FARED	05677
13	CONTINUE	FARED	05678
14	CONTINUE	FARED	05679
	NPKSL=0	FARED	05680
	NECL=0	FARED	05681
	NEFL=0	FARED	05682
	JJ=1	FARED	05683
	KI=1	FARED	05684
	NPKL=1	FARED	05685
	NRNU=0	FARED	05686
	DO 28 K=1,NEL	FARED	05687
	LK(K)=0	FARED	05688
	IF (MK(K).LE.0.OR.NRE(K).EQ.0) GO TO 15	FARED	05689
	GO TO 16	FARED	05690
C		FARED	05691
15	TEUL(K)=0.0	FARED	05692
	GO TO 28	FARED	05693
C		FARED	05694
16	MKK=MK(K)-1	FARED	05695
	IF (K.NE.1.AND.MK(K-1).NE.0) MKK=MKK-MK(K-1)	FARED	05696
	IF (MKK.EQ.0) GO TO 18	FARED	05697
	DO 17 L=1,MKK	FARED	05698
	READ (EMBRYO)	FARED	05699
17	CONTINUE	FARED	05700
18	NPKSL=NRE(K)+NPKSL	FARED	05701
	NECL=NPE(K)+NECL	FARED	05702
	NEFL=NE(K)+NEFL	FARED	05703
	IF (NEFL.NE.0.AND.NECL.NE.0) GO TO 19	FARED	05704
	IF (NEFL.EQ.0.AND.NECL.EQ.0) GO TO 20	FARED	05705
	IF (NEFL.EQ.0) GO TO 21	FARED	05706
	READ (EMBRYO) IRD,AMI,SPINI,(EZERO(IL),AJ(IL),GAMN(IL),GAMG(	FARED	05707
1	IL),GAMF(IL),ABN(IL),IL=NPKL,NPKSL),(ECORB(IK),RFIS(IK),IK=K	FARED	05708
2	I,NEFL)	FARED	05709
	GO TO 22	FARED	05710
C		FARED	05711
19	READ (EMBRYO) IRD,AMI,SPINI,(EZERO(IL),AJ(IL),GAMN(IL),GAMG(	FARED	05712
1	IL),GAMF(IL),ABN(IL),IL=NPKL,NPKSL),(ECORA(J),RCAP(J),J=JJ,N	FARED	05713
2	ECL),(ECORB(IK),RFIS(IK),IK=KI,NEFL)	FARED	05714

C		GO TO 22	FARED	05715
20		READ (EMBRYO) IRD,AMI,SPINI,(EZERO(IL),AJ(IL),GAMN(IL),GAMG(	FARED	05716
	1	IL),GAMF(IL),ABN(IL),IL=NPKL,NPKSL)	FARED	05717
		GO TO 22	FARED	05718
C			FARED	05719
21		READ (EMBRYO) IRD,AMI,SPINI,(EZERO(IL),AJ(IL),GAMN(IL),GAMG(	FARED	05720
	1	IL),GAMF(IL),ABN(IL),IL=NPKL,NPKSL),(ECORA(J),RCAP(J),J=JJ,N	FARED	05721
	2	ECL)	FARED	05722
22		CONTINUE	FARED	05723
		D(K)=SPINI	FARED	05724
		SPIN(K)=AMI	FARED	05725
		ELR(K)=EZERO(NPKSL)	FARED	05726
		NRNU=NRNU+1	FARED	05727
		DO 23 LL=NPKL,NPKSL	FARED	05728
		G(LL)=.5*((2.*AJ(LL)+1.0)/(2.*AMI+1.))	FARED	05729
		GAMN(LL)=GAMN(LL)/SQRT(EZERO(LL))	FARED	05730
23		CONTINUE	FARED	05731
		JJ=NECL+1	FARED	05732
		KI=NEFL+1	FARED	05733
		NPKL=NPKSL+1	FARED	05734
		DO 27 LM=2,NBGO	FARED	05735
		LMM=LM-1	FARED	05736
		IF (ELR(K).LE.GE(LMM).AND.ELR(K).GT.GE(LM)) GO TO 24	FARED	05737
		GO TO 27	FARED	05738
C			FARED	05739
24		ECR=ELR(K)+D(K)/2.0	FARED	05740
		IF (ECR-GE(LMM)) 25,26,26	FARED	05741
25		TEULJ(K)=ECR	FARED	05742
		GO TO 28	FARED	05743
C			FARED	05744
26		TEULJ(K)=GE(LMM)	FARED	05745
		GO TO 28	FARED	05746
C			FARED	05747
27		CONTINUE	FARED	05748
28		CONTINUE	FARED	05749
		K=1	FARED	05750
		NELL=NEL-1	FARED	05751
		DO 29 I=1,NEL	FARED	05752
29		LEULO(I)=I	FARED	05753
		IF(NEL.EQ.1) GO TO 2J1	FARED	05754
		DO 30 J=1,NELL	FARED	05755
		K=K+1	FARED	05756
		DO 30 I=K,NEL	FARED	05757
		IF (TEULO(J).GE.TEULJ(I)) GO TO 30	FARED	05758
		TEMP=TEULJ(J)	FARED	05759
		L=LEULO(J)	FARED	05760
		TEULO(J)=TEULJ(I)	FARED	05761
		LEULO(J)=LEULO(I)	FARED	05762
		TEULO(I)=TEMP	FARED	05763
			FARED	05764

30	LEUL0(I)=L	FARED	05765
	CONTINUE	FARED	05766
201	CONTINUE	FARED	05767
	NPE1(1)=0	FARED	05768
	NPEE1(1)=0	FARED	05769
	NRE1(1)=0	FARED	05770
	DO 31 L=1,NEL	FARED	05771
	IF (L.EQ.1) GO TO 31	FARED	05772
	NPE1(L)=NPE1(L-1)+NPE(L-1)	FARED	05773
	NRE1(L)=NRE1(L-1)+NRE(L-1)	FARED	05774
	NPEE1(L)=NPEE1(L-1)+NE(L-1)	FARED	05775
31	CONTINUE	FARED	05776
	WRITE (IO,39)	FARED	05777
	NDENL=0	FARED	05778
	DO 35 L=1,NEL	FARED	05779
	CALL CONVL(IDE(L),HO(L),HI(L))	FARED	05780
	NDENL=NDENL+1	FARED	05781
	DN1(L)=ANHOM(NDENL)	FARED	05782
34	WRITE (IO,40) HO(L),HI(L),DN1(L),SGP(L),AF(L),NRE(L)	FARED	05783
35	CONTINUE	FARED	05784
	CALL TRIP (TEUL0,LK,LEUL0,NRE1,IND2,NGE,NEL,IDE,NRE,NPE,RODD,V,	FARED	05785
	1NE,AF,SGP,RE,GN,GG,GF,ZF,G,PE,DELC,DELF,NPEE1,T,NPE1,DN1,INDRS,ZE,	FARED	05786
	2GE,INRG,SLJCF,IDB,OSIG,LLIDR,LLDR,SPIN,ELR)	FARED	05787
36	REHIND EMBRYO	FARED	05788
	IF (NZ.EQ.0) GO TO 37	FARED	05789
	IF (NZ.EQ.1.AND.NCELL.GT.1) GO TO 5	FARED	05790
37	CONTINUE	FARED	05791
	RETURN	FARED	05792
C		FARED	05793
60	IO=NTAP(2)	FARED	05794
	WRITE (IO,61)	FARED	05795
61	FORMAT(1H0,13HPROGRAM STRIP,4X,26HFILE IB LABEL IS INCORRECT)	FARED	05796
	STOP 1004	FARED	05797
39	FORMAT(1H0,7HELEMENT,9X,14HNUMBER DENSITY,14X,7HSIGMA P,9X,4HMASS,	FARED	05798
	11X,9HNUMBER OF/1H ,18X,4HFUEL,20X,6H(BARN),10X,5H(AMU),9X,10HRESO	FARED	05799
	2NANCES)	FARED	05800
40	FORMAT(1H ,A4,A2,6X,E16.6,10X,2E16.6,4X,I5)	FARED	05801
41	FORMAT (1H1,40X,36HRESOLVED RESONANCE RESULTS FOR BLOCK,I3,2X,4HCE	FARED	05802
	1LL,I2)	FARED	05803
42	FORMAT (1H0,8HNUCLIDE=,I6,3X,9HNOT FOUND)	FARED	05804
43	FORMAT(1H1,40X,36HRESOLVED RESONANCE RESULTS FOR BLOCK,I3)	FARED	05805
	END	FARED	05806

	SUBROUTINE XSEC (M,SGS,SGC,SGF,EAV,SQRE,II,NRE1,RELMF,GR,IND5,IND6	FARED	05807
	1,KRES,INRG,T,SGP,RE,GN,GG,GF,ZF,NRE)	FARED	05808
C		FARED	05809
C	THIS SUBROUTINE PERFORMS THE BREIT-WIGNER POINT CROSS	FARED	05810
C	SECTION CALCULATION AT E=EAV,SUMMING CONTRIBUTIONS FROM	FARED	05811
C	THE FIRST KRES=5 PEAKS ABOVE AND BELOW E.M IS THE NUCLIQE	FARED	05812
C	INDEX.	FARED	05813
C		FARED	05814
	DIMENSION II(1),NRE1(1),RELMF(1),GR(1),INRG(1),T(1),	FARED	05815
	1 SGP(1), RE(1), GN(1), GG(1), GF(1), ZF(1), NRE(1)	FARED	05816
	IIM=II(M)	FARED	05817
	NRE2=NRE1(M)+IIM	FARED	05818
	IFIRST=NRE1(M)+MAX(1,IIM-KRES+1)	FARED	05819
	ILAST=NRE1(M)+MIN(0,NRE(M),IIM+KRES)	FARED	05820
	TR=T(1)	FARED	05821
	IF (INRG(M).NE.0) TR=T(2)	FARED	05822
	DOPPL=SQRT(3.446824E-4*TR*EAV/RELMF(M))	FARED	05823
	CA=1.	FARED	05824
	IF (IND5.EQ.1) CA=(1.+1./RELMF(M))**2	FARED	05825
	CS=2.6038E6*CA	FARED	05826
	SGS=J.	FARED	05827
	SGC=J.	FARED	05828
	SGF=J.	FARED	05829
	IO=6	FARED	05830
	DO 3 I=IFIRST,ILAST	FARED	05831
	GT=SQRE*GN(I)+GG(I)+GF(I)	FARED	05832
	IF (DOPPL.GT.0.) GO TO 1	FARED	05833
	X=2./GT*(EAV-RE(I))	FARED	05834
	PSI=1./(1.+X**2)	FARED	05835
	CHI=X*PSI	FARED	05836
	GO TO 2.	FARED	05837
C		FARED	05838
1	REZ=(EAV-RE(I))/DOPPL	FARED	05839
	AIMZ=GT/2./DOPPL	FARED	05840
	CALL WANL (REZ,AIMZ,REW,AIMW)	FARED	05841
	PSI=1.772453851*AIMZ*REW	FARED	05842
	CHI=1.772453851*AIMZ*AIMW	FARED	05843
2	CG=CS*GN(I)/GT**2*GR(I)	FARED	05844
	SN0=CG*GN(I)	FARED	05845
	SGC=SGC+CG*GG(I)/SQRE*PSI*ZF(I)	FARED	05846
	SGF=SGF+CG*GF(I)/SQRE*PSI*ZF(I)	FARED	05847
	SGS=SGS+SN0*PSI*ZF(I)	FARED	05848
	IF (IND6.EQ.1) SGS=SGS+2.*SQRT(GR(I)*SN0*SGP(M))*CHI	FARED	05849
3	CONTINUE	FARED	05850
	RETURN	FARED	05851
	END	FARED	05852

C	SUBROUTINE WANL (X,Y,U,V)	FARED	05853
C		FARED	05854
C	WANL COMPUTES THE REAL AND IMAGINARY PARTS OF THE COMPLEX	FARED	05855
C	PROBABILITY INTEGRAL.IT IS AN IMPROVED VERSION OF THE	FARED	05856
C	ROUTINE DEVELOPED BY THACHER AND O SHEA.	FARED	05857
C		FARED	05858
	DIMENSION A(12,2), B(12,2), ABT(11), AT(11), ABA(11), AA(11)	FARED	05859
	DATA (A(I),I=1,12),(B(I),I=1,12)/.0001354280714,.0001646905962,.00	FARED	05860
	102045830617,.0002609611853,.0003443545717,.0004752903052,.00069834	FARED	05861
	202779,.0001126194067,.0002119093028,.0005442176871,.0004444444444,1.128	FARED	05862
	3379167,.0004948045522,.0005963029219,.0007326007326,.0009216589861	FARED	05863
	4,.0001194743130,.0001610305958,.000288329519,.0003508771930,.000606060	FARED	05864
	56061,.001298701299,.004761904762,-.3333333333/	FARED	05865
	DATA (A(I),I=13,24),(B(I),I=13,24)/-462.,-380.,-306.,-240.,-182.,-	FARED	05866
	1132.,-90.,-56.,-30.,-12.,-2.,1.128379167,-45.,-41.,-37.,-33.,-29.,	FARED	05867
	2-25.,-21.,-17.,-13.,-9.,-5.,-1./	FARED	05868
	DATA (ABT(I),I=2,11),(AT(I),I=2,11),(ABA(I),I=1,10),(AA(I),I=1,10)	FARED	05869
	1/1.14,1.14,1.28,1.40,1.56,1.54,1.64,1.74,1.91,2.08,.102,.435,1.08,	FARED	05870
	22.02,3.24,4.75,6.56,8.65,11.0,13.7,1.00,1.11,1.46,2.45,2.75,3.50,4	FARED	05871
	3.14,4.79,5.45,6.24,380.,36.0,18.7,16.2,14.6,14.0,13.4,12.9,12.6,12	FARED	05872
	4.4/	FARED	05873
	IF (Y.GE.U.) GO TO 1	FARED	05874
	STOP 3331	FARED	05875
1	XSQ=X*X	FARED	05876
	YSQ=Y*Y	FARED	05877
	ZSQ=XSQ-YSQ	FARED	05878
	ZSQI=2.*X*Y	FARED	05879
	DO 2 I=1,4	FARED	05880
	IF (XSQ+ABA(I)*YSQ.LT.AA(I)) GO TO 2	FARED	05881
	N=I	FARED	05882
	GO TO 7	FARED	05883
C		FARED	05884
2	CONTINUE	FARED	05885
	IF (Y.LT..8.0R.XSQ+ABA(10)*YSQ.LT.AA(10)) GO TO 3	FARED	05886
	GO TO 5	FARED	05887
C		FARED	05888
3	DO 4 I=2,11	FARED	05889
	IF (XSQ+ABT(I)*YSQ.GE.AT(I)) GO TO 4	FARED	05890
	N=I	FARED	05891
	GO TO 8	FARED	05892
C		FARED	05893
4	CONTINUE	FARED	05894
	N=12	FARED	05895
	GO TO 8	FARED	05896
C		FARED	05897
5	DO 6 I=5,9	FARED	05898
	IF (XSQ+ABA(I)*YSQ.LT.AA(I)) GO TO 6	FARED	05899
	N=I	FARED	05900
	GO TO 7	FARED	05901
C		FARED	05902

6	CONTINUE	FARED	05903
	N=10	FARED	05904
7	K=2	FARED	05905
	ANUR=ZSQR+ZSQR	FARED	05906
	ANUI=ZSQI+ZSQI	FARED	05907
	GO TO 9	FARED	05908
C		FARED	05909
8	K=1	FARED	05910
	ZSQ=.5/(ZSQR**2+ZSQI**2)	FARED	05911
	IF (ZSQR.EQ.0.0.AND.ZSQI.EQ.0.0) ZSQ=0.0	FARED	05912
	ANUR=-ZSQR*ZSQ	FARED	05913
	ANUI=ZSQI*ZSQ	FARED	05914
9	Z1R=0.	FARED	05915
	Z1I=0.	FARED	05916
	N1=13-N	FARED	05917
	DO 10 M=N1,12	FARED	05918
	RE=ANUR+B(M,K)+Z1R	FARED	05919
	AI=ANUI+Z1I	FARED	05920
	Z1SQ=A(M,K)/(RE**2+AI**2)	FARED	05921
	IF (RE.EQ.0.0.AND.AI.EQ.0.0) Z1SQ=0.0	FARED	05922
	Z1R=RE*Z1SQ	FARED	05923
10	Z1I=-AI*Z1SQ	FARED	05924
	U=-Z1R*Y-Z1I*X	FARED	05925
	V=Z1R*X-Z1I*Y	FARED	05926
	IF (K.EQ.2) RETURN	FARED	05927
	EX=EXP(-ZSQR)	FARED	05928
	U1=EX*COS(ZSQI)+ANUR*U-ANUI*V	FARED	05929
	V=-EX*SIN(ZSQI)+ANUR*V+ANUI*U	FARED	05930
	U=U1	FARED	05931
	RETURN	FARED	05932
	END	FARED	05933

C	FUNCTION GT (N,M,RELMF, INGR,T,RE,GN,GG,GF)	FARED	05934
C	THIS FUNCTION COMPUTES THE TOTAL DOPPLER-BROADENED WIDTH	FARED	05935
C	OF A RESONANCE PEAK USING THE RECIPE DESCRIBED IN SECTION	FARED	05936
C	3.3 OF THE MANUAL.	FARED	05937
C		FARED	05938
	DIMENSION RELMF(1), INGR(1), T(1), RE(1), GN(1), GG(1), GF(1)	FARED	05939
	RE1=ABS(RE(N))	FARED	05940
	GNAT=SQRT(RE1)*GN(N)+GG(N)+GF(N)	FARED	05941
	GNATSQ=GNAT**2	FARED	05942
	TR=T(1)	FARED	05943
	IF (INGR(M).NE.0) TR=T(2)	FARED	05944
	GDOPSQ=.95546E-3*TR/RELMF(M)*RE1	FARED	05945
	IF (GNATSQ.GE.GDOPSQ*6.25) GO TO 1	FARED	05946
	GDOP=SQRT(GDOPSQ)	FARED	05947
	GT=GDOP+.53*GNAT+.095*GNATSQ/GDOP	FARED	05948
	RETURN	FARED	05949
1	GT=GNAT+GDOPSQ/GNAT	FARED	05950
	RETURN	FARED	05951
	END	FARED	05952
		FARED	05953

C	FUNCTION DANCEF (N,M,V,D,SIG)	FARED	05954
C		FARED	05955
C	CALCULATION FOR DANC OFF CORRECTION	FARED	05956
C	N INDICATES GEOMETRY	FARED	05957
C	N=0 CYLINDRICAL SQUARE	FARED	05958
C	N=1 CYLINDRICAL HEXAGON	FARED	05959
C	N=2 SLAB	FARED	05960
C	T IS SHORTEST SURFACE TO SURFACE DISTANCE BETWEEN ADJACENT LUMPS	FARED	05961
C	M IS FLAG SET TO ZERO FIRST TIME CALLED BY STRIP	FARED	05962
C	D IS PIN DIAMETER FOR CYL. OR SLAB THICKNESS	FARED	05963
C	V IS VOLUME RATIO OUTER/PIN	FARED	05964
C	SIG IS TOTAL MACROSCOPIC CROSS SECTION OF OUTER REGION	FARED	05965
C	STOP 2222 , 3333 INDICATE ERROR SQRT OF NEGATIVE NUMBER	FARED	05966
C		FARED	05967
	IF (M) 6,1,6	FARED	05968
1	IF (N-1) 2,2,4	FARED	05969
2	CHORD=D*V	FARED	05970
	VHS=V+1.0	FARED	05971
	IF (VHS) 13,3,3	FARED	05972
3	DISH=.906899683*VHS	FARED	05973
	DISS=.785398163*VHS	FARED	05974
	TH=D*(SQRT(DISH)-1.0)	FARED	05975
	TS=D*(SQRT(DISS)-1.0)	FARED	05976
	TAUH=TH/CHORD	FARED	05977
	TAUS=TS/CHORD	FARED	05978
	GO TO 5	FARED	05979
C		FARED	05980
4	T=D*V	FARED	05981
5	M=1	FARED	05982
6	IF (N-1) 7,8,10	FARED	05983
7	T=TS	FARED	05984
	BETA=5.67	FARED	05985
	TAU=TAUS	FARED	05986
	GO TO 9	FARED	05987
C		FARED	05988
8	T=TH	FARED	05989
	BETA=2.125	FARED	05990
	TAU=TAUH	FARED	05991
9	DTAU=SIG*CHORD/(7.0+BETA*SIG*CHORD)	FARED	05992
	TSIG=T*SIG	FARED	05993
	DANCEF=1.0/(EXP(TSIG)*(1.5+(1.0-TAU-DTAU)*SIG*CHORD))	FARED	05994
	GO TO 12	FARED	05995
C		FARED	05996
10	TSIG=T*SIG	FARED	05997
	ARG=TSIG/(1.0+TSIG)	FARED	05998
	IF (ARG) 14,11,11	FARED	05999
11	DEN=1.0/(1.0+TSIG*(1.0-.6443*SQRT(ARG)))	FARED	06000
	EX=1.0/(EXP(TSIG)*(TSIG+3.0-DEN))	FARED	06001
	DANCEF=2.0*EX	FARED	06002
12	RETURN	FARED	06003

13 STOP 2222
14 STOP 3333
END

FARED 06004
FARED 06005
FARED 06006

C	FUNCTION P11 (X,C,EAV,IND2)	FARED	06007
C		FARED	06008
C	FUNCTION P11 COMPUTES THE LATTICE LUMP-TO-LUMP COLLISION	FARED	06009
C	PROBABILITY ASSUMING FLAT SOURCE DISTRIBUTION.	FARED	06010
		FARED	06011
	COMMON NTAP(20)	FARED	06012
	DIMENSION PCA(201)	FARED	06013
	DATA PCA(1),PCA(2)/.0,.02561/	FARED	06014
	DATA (PCA(I),I=3,179)/.04967,.07248,.09421,.11498,.13487,.15396,.1	FARED	06015
	17231,.16996,.20697,.22336,.23918,.25446,.26923,.28351,.29733,.3107	FARED	06016
	20,.32366,.33621,.34838,.36119,.37164,.38276,.39356,.40405,.41424,.4	FARED	06017
	342414,.43377,.44314,.45225,.46112,.46975,.47816,.48634,.49432,.502	FARED	06018
	409,.50966,.51704,.52424,.53126,.53811,.54479,.55131,.55767,.56389,	FARED	06019
	5.56996,.57588,.58167,.58733,.59285,.59826,.60384,.60870,.61375,.61	FARED	06020
	6869,.62352,.62825,.63287,.63740,.64183,.64616,.65041,.65457,.65864	FARED	06021
	7,.66263,.66694,.67038,.67413,.67781,.68142,.68495,.68842,.69182,.6	FARED	06022
	89516,.69843,.70164,.70479,.70788,.71091,.71389,.71681,.71968,.7225	FARED	06023
	90,.72526,.72798,.73065,.73327,.73585,.73838,.74087,.74331,.74572,.7	FARED	06024
	*74808,.75040,.75269,.75493,.75714,.75931,.76145,.76355,.76562,.767	FARED	06025
	*65,.76966,.77163,.77357,.77548,.77736,.77921,.78103,.78282,.78459,	FARED	06026
	*.78633,.78805,.78974,.79140,.79304,.79465,.79624,.79781,.79936,.80	FARED	06027
	*.80188,.80339,.80487,.80632,.80777,.80918,.81058,.81196,.81333,.81467	FARED	06028
	*.81590,.81730,.81869,.82007,.82143,.82278,.82412,.82544,.82675,.82805	FARED	06029
	*2616,.82732,.82867,.82999,.83130,.83261,.83391,.83520,.83649,.83777	FARED	06030
	*.83904,.84031,.84157,.84281,.84404,.84525,.84645,.84764,.84882,.85000	FARED	06031
	*84593,.84685,.84776,.84866,.84955,.85043,.85130,.85216,.85301,.853	FARED	06032
	*85,.85468,.85550,.85632,.85712,.85792,.85870,.85948,.86025,.86101,	FARED	06033
	*.86177/	FARED	06034
	DATA (PCA(I),I=180,201)/.86251,.86325,.86398,.86471,.86542,.86613,	FARED	06035
	1.86683,.86752,.86821,.86889,.86956,.87023,.87089,.87154,.87219,.87	FARED	06036
	2283,.87346,.87409,.87471,.87533,.87594,.87654/	FARED	06037
	IF (X.GE.0.) GO TO 1	FARED	06038
	IO=NTAP(2)	FARED	06039
	PRINT 6, EAV	FARED	06040
	STOP 3	FARED	06041
1	IF (IND2.LE.1) GO TO 3	FARED	06042
	X=2.*X	FARED	06043
	IF (X.GE.0.1) GO TO 2	FARED	06044
	PC=X/2.*(1.9227843351+X/6.-ALOG(X))	FARED	06045
	GO TO 5	FARED	06046
C		FARED	06047
2	PC=1.-(.5-EXP(-X)/(X-3.-1./((1.+X*(1.-.6443*SQRT(X/(1.+X)))))))/X	FARED	06048
	GO TO 5	FARED	06049
C		FARED	06050
3	IF (X.GE.4.) GO TO 4	FARED	06051
	N=50.*X+1.	FARED	06052
	PC=PCA(N+1)-(FLOAT(N)-50.*X)*(PCA(N+1)-PCA(N))	FARED	06053
	GO TO 5	FARED	06054
C		FARED	06055
4	PC=1.-.5/X+3./32./X**3	FARED	06056

5	P11=1.-(1.-PC)/(1.-C*(1.-2.*X*(1.-PC)))*(1.-C)	FARED	06057
	RETURN	FARED	06058
C		FARED	06059
6	FORMAT (//64H0***** CALCULATION STOPPED FOR A NEGATIVE CROSS	FARED	06060
	1 SECTION AT1PE12.5,4H EV/1H1)	FARED	06061
	END	FARED	06062


```

153 CONTINUE
154 CONTINUE
DO 1 L=1,NEL
  JLKM(L)=0
  KLKM(L)=0
1 CONTINUE
IF (IND2.EQ.3) INREP=1
C
C      NO. PEAKS CONTRIBUTING TO BREIT-WIGNER CROSS SECTION PER
C      RESONANCE NUCLIDE AT POINT E IS 5.
C
KRES=5
C
C      LAB TO CM CONVERSION CORRECTION INCLUDED IN B-W FORMALISM
C
IND5=1
C
C      INTERFERENCE SCATTERING IGNORED
C
IND6=0
S1=0.
S2=0.
C=J.
IND4=1
SREJ=SQRT(TEULJ(1))
SRE2=SREJ
LINEK=0
DO 7 L=1,NEL
  DE1(L)=0.0
  DE2(L)=0.0
  LINR(L)=0
  GO TO 3
C
2 RELMF(L)=AF(L)/AMUN
  IF (RELMF(L).GT.1.0) GO TO 4
  ALF(L)=0.0
  XI=1.0
  GO TO 5
C
3 IF (NRE(L).EQ.0) GO TO 2
  INR=INR+1
  LINR(L)=INR
  INDRS(L)=1
  GO TO 2
C
4 ALF(L)=((RELMF(L)-1.0)/(RELMF(L)+1.0))**2
  FLNA(L)=-ALOG(ALF(L))
  XI=1.-ALF(L)/(1.-ALF(L))*FLNA(L)
5 CONTINUE
SL1=0.

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FARED 06113
FARED 06114
FARED 06115
FARED 06116
FARED 06117
FARED 06118
FARED 06119
FARED 06120
FARED 06121
FARED 06122
FARED 06123
FARED 06124
FARED 06125
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FARED 06148
FARED 06149
FARED 06150
FARED 06151
FARED 06152
FARED 06153
FARED 06154
FARED 06155
FARED 06156
FARED 06157
FARED 06158
FARED 06159
FARED 06160
FARED 06161
FARED 06162

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	SL1=XI*SGP(L)*DN1(L)	FARED	06163
	S1=S1+SL1	FARED	06164
	7 CONTINUE	FARED	06165
C		FARED	06166
C	COMPUTE MINIMUM ALFA AMONG NUCLIDES IN LUMP OR MIXTURE.	FARED	06167
C		FARED	06168
	S=S1	FARED	06169
11	ALMIN=ALF(1)	FARED	06170
	IF (NEL.EQ.1) GO TO 13	FARED	06171
	DO 12 L=2,NEL	FARED	06172
	IF (ALF(L).LT.ALMIN) ALMIN=ALF(L)	FARED	06173
12	CONTINUE	FARED	06174
13	HSQ=H**2	FARED	06175
	MM=0	FARED	06176
	INDC=1	FARED	06177
	SRT2=DSIG	FARED	06178
C		FARED	06179
C	SKIP DANC OFF CALCULATION FOR HOMOGENEOUS MIXTURE OR WHEN	FARED	06180
C	ISOLATED PIN TREATMENT DESIRED.	FARED	06181
C		FARED	06182
	IF (IND2.EQ.3.OR.V.GE.1.E+9) GO TO 15	FARED	06183
	INDC=0	FARED	06184
	C=DANCF(IND2,MM,V,RODD,SRT2)	FARED	06185
15	SRT2=0.0	FARED	06186
	E111=TEUL0(1)	FARED	06187
	DO 16 I=1,NGE	FARED	06188
	IF (TEUL0(1).EQ.GE(I)) GO TO 17	FARED	06189
	IF (TEUL0(1).LT.GE(I).AND.TEUL0(1).GT.GE(I+1)) GO TO 18	FARED	06190
16	CONTINUE	FARED	06191
	GO TO 19	FARED	06192
C		FARED	06193
C	SET LK=1 IF UPPER BOUND OF RESOLVED RANGE CORRESPONDS TO	FARED	06194
C	MICROGROUP BOUND.SET LK=-1 IF NOT.	FARED	06195
C		FARED	06196
17	LK(1)=1	FARED	06197
	KK=I+1	FARED	06198
	GO TO 19	FARED	06199
C		FARED	06200
18	LK(1)=-1	FARED	06201
	KK=I+1	FARED	06202
C		FARED	06203
C	DETERMINE GROUP WIDTHS TO BE USED IN FINE-GROUP BOUNDARY	FARED	06204
C	CALCULATIONS(BETA*TOTAL DOPPLER WIDTH OR D).	FARED	06205
C		FARED	06206
19	IF(NEL.GT.1) GO TO 191	FARED	06207
	K=2	FARED	06208
	TEUL0(2)=0.0	FARED	06209
	GO TO 162	FARED	06210
191	DO 101 K=2,NEL	FARED	06211
	IF (TEUL0(K).NE.TEUL0(K-1)) GO TO 162	FARED	06212

	LK(K)=LK(K-1)	FARED	06213.
161	CONTINUE	FARED	06214
162	DO 27 M=1,NEL	FARED	06215
	NREM=NRE(M)	FARED	06216
	I1=0	FARED	06217
	IF (NREM.NE.0) GO TO 20	FARED	06218
	INDR(M)=2	FARED	06219
	GO TO 27	FARED	06220
C		FARED	06221
20	NRE2=NRE1(M)	FARED	06222
	DO 21 I=1,NREM	FARED	06223
	IF (RE(NRE2+1).GE.E111) GO TO 22	FARED	06224
	NRE2=NRE2+1	FARED	06225
21	I1=I1+1	FARED	06226
22	IF (I1.EQ.NREM) GO TO 23	FARED	06227
	GTOT1=GT(NRE2+1,M,RELMF,INRG,T,RE,GN,GG,GF)	FARED	06228
	DE1(M)=ZETA*GTOT1	FARED	06229
	RE1=RE(NRE2+1)	FARED	06230
	DE2(M)=(BETJ*HSQ+BINF*RE1**2)/(HSQ+RE1**2)*GTOT1	FARED	06231
	IF (I1.EQ.0) GO TO 24	FARED	06232
23	GTOT2=GT(NRE2,M,RELMF,INRG,T,RE,GN,GG,GF)	FARED	06233
	DL1(M)=ZETA*GTOT2	FARED	06234
	RE2=RE(NRE2)	FARED	06235
	DL2(M)=(BETJ*HSQ+BINF*RE2**2)/(HSQ+RE2**2)*GTOT2	FARED	06236
24	IF (I1.LT.NREM.AND.RE1-DE1(M).LT.E111) GO TO 25	FARED	06237
	DE1(M)=DL1(M)	FARED	06238
	DE2(M)=DL2(M)	FARED	06239
	INDR(M)=2	FARED	06240
	IF (RE2+DE1(M).GE.E111) INDOR(M)=3	FARED	06241
	GO TO 27	FARED	06242
C		FARED	06243
25	IF (I1.GT.0.AND.RE2+DL1(M).GE.E111) GO TO 26	FARED	06244
	INDR(M)=0	FARED	06245
	GO TO 27	FARED	06246
C		FARED	06247
26	INDOR(M)=1	FARED	06248
	IF (DL2(M).GT.DE2(M)) GO TO 27	FARED	06249
	DE1(M)=DL1(M)	FARED	06250
	DE2(M)=DL2(M)	FARED	06251
	INDOR(M)=3	FARED	06252
27	II(M)=I1	FARED	06253
	DO 28 L=1,NEL	FARED	06254
	JPP(L)=NE(L)	FARED	06255
28	JP(L)=NPE(L)	FARED	06256
	REPRM=1.	FARED	06257
	ABST=0.0	FARED	06258
	DO 29 L=1,NEL	FARED	06259
	BP1(L)=0.	FARED	06260
	NR(L)=1	FARED	06261
	FIK1(L)=0.0	FARED	06262

	FIK2(L)=0.0	FARED	06263
	FIAY(L)=0.0	FARED	06264
	UNC1(L)=0.	FARED	06265
	UNF1(L)=0.	FARED	06266
	RIFT1(L)=0.0	FARED	06267
	RICT1(L)=0.0	FARED	06268
29	CONTINUE	FARED	06269
	R1=0	FARED	06270
	RR=0	FARED	06271
	LASTR=RR	FARED	06272
	R=RR	FARED	06273
	GO TO 107	FARED	06274
C		FARED	06275
30	A1=0.	FARED	06276
	A2=0.	FARED	06277
	B2=0.	FARED	06278
	B1=0.	FARED	06279
	E1=E(R-1)	FARED	06280
	SRE1=SRE2	FARED	06281
C		FARED	06282
C	BEGIN CALCULATION OF LOWER FINE-GROUP BOUND.	FARED	06283
C		FARED	06284
	ET=AMAX1(E1-(0.0*HSQ+DINF*E1**2)/(HSQ+E1**2),GE(KK),TEUL0(K))	FARED	06285
	DO 31 M=1,NEL	FARED	06286
	IF (INDR(M).EQ.2) GO TO 31	FARED	06287
	ET=AMAX1(ET,E1-DE2(M))	FARED	06288
31	CONTINUE	FARED	06289
	DO 32 M=1,NEL	FARED	06290
	IF (II(M).EQ.0.OR.INDR(M).EQ.1.OR.INDR(M).EQ.3) GO TO 32	FARED	06291
	NRE2=NRE1(M)+II(M)	FARED	06292
	IF (ET.GE.RE(NRE2)+DL1(M)) GO TO 32	FARED	06293
	ET=AMAX1(ET,AMIN1(RE(NRE2)+DL1(M),E1-DL2(M)))	FARED	06294
32	CONTINUE	FARED	06295
	DO 38 M=1,NEL	FARED	06296
	IF (II(M).EQ.0.AND.INDR(M).EQ.2) GO TO 38	FARED	06297
	NRE2=NRE1(M)+II(M)	FARED	06298
	IF (INDR(M).GT.1.OR.ET.GT.RE(NRE2+1)-DE1(M)) GO TO 34	FARED	06299
	INDR(M)=INDR(M)+2	FARED	06300
33	DE1(M)=DL1(M)	FARED	06301
	DE2(M)=DL2(M)	FARED	06302
34	IF (II(M).EQ.0) GO TO 38	FARED	06303
	IF (INDR(M).EQ.1.OR.INDR(M).EQ.3) GO TO 36	FARED	06304
	IF (ET.GT.RE(NRE2)+DL1(M)) GO TO 38	FARED	06305
	IF (INDR(M).EQ.2) GO TO 37	FARED	06306
	IF (DL2(M).LE.DE2(M)) GO TO 35	FARED	06307
	INDR(M)=1	FARED	06308
	GO TO 38	FARED	06309
C		FARED	06310
35	INDR(M)=3	FARED	06311
	GO TO 33	FARED	06312

C		FARED	06313
36	IF (ET.GT.RE(NRE2)) GO TO 38	FARED	06314
	II(M)=II(M)-1	FARED	06315
	INDR(M)=0	FARED	06316
	DE1(M)=DL1(M)	FARED	06317
	DE2(M)=DL2(M)	FARED	06318
	IF (II(M).EQ.0) GO TO 38	FARED	06319
	GTOT=GT(NRE2-1,M,RELMF,INRG,T,RE,GN,GG,GF)	FARED	06320
	DL1(M)=ZETA*GTOT	FARED	06321
	RESQ=RE(NRE2-1)**2	FARED	06322
	DL2(M)=(BETJ*HSQ+8INF*RESQ)/(HSQ+RESQ)*GTOT	FARED	06323
	IF (ET.GT.RE(NRE2-1)+DL1(M)) GO TO 38	FARED	06324
	INDR(M)=1	FARED	06325
	IF (DL2(M).GT.DE2(M)) GO TO 38	FARED	06326
	DE1(M)=DL1(M)	FARED	06327
	DE2(M)=DL2(M)	FARED	06328
37	INDR(M)=3	FARED	06329
38	CONTINUE	FARED	06330
	E(R)=ET	FARED	06331
	E2=ET	FARED	06332
C		FARED	06333
C	IF A TEUL0 HAS BEEN ENCOUNTERED AND IT DOES NOT CORRESPOND	FARED	06334
C	TO A MICROGROUP BOUND,SET LK=-1.	FARED	06335
C		FARED	06336
	IF (K.GT.NEL.OR.TEULJ(K).EQ.0.0) GO TO 40	FARED	06337
	IF (ET.GT.TEULJ(K)) GO TO 40	FARED	06338
	IF (TEULJ(K).EQ.GE(KK)) GO TO 40	FARED	06339
	LK(K)=-1	FARED	06340
250	IF (TEULJ(K).NE.TEULJ(K-1)) GO TO 240	FARED	06341
	LK(K)=LK(K-1)	FARED	06342
	K=K+1	FARED	06343
	KP=KP+1	FARED	06344
	GO TO 250	FARED	06345
240	K=K+1	FARED	06346
40	SRE2=SQRT(E2)	FARED	06347
	DER=E1-E2	FARED	06348
	LR=0	FARED	06349
	FLN(R)=ALOG(E1/E2)	FARED	06350
	FIAR=FLN(R)/DER	FARED	06351
	EAV=(E1+E2)/2.	FARED	06352
	SQRE=SQRT(EAV)	FARED	06353
	SRT1=0.	FARED	06354
	SRT2=J.	FARED	06355
C		FARED	06356
C	BEGIN FINE-GROUP FLUX CALCULATION.	FARED	06357
C		FARED	06358
	DO 66 L=1,NEL	FARED	06359
	AL=ALF(L)	FARED	06360
	ACOMP=1.-AL	FARED	06361
	SGFRE(L)=0.	FARED	06362

	SGSR=SGP(L)	FARED	06363
	SGCRE(L)=0.0	FARED	06364
C		FARED	06365
C	COMPUTE POINT CORRECTIONS TO BREIT-WIGNER FORMALISM.	FARED	06366
C		FARED	06367
41	IF (JP(L).EQ.0) GO TO 43	FARED	06368
	NPE2=NPE1(L)+JP(L)	FARED	06369
	IF (EAV.GE.PE(NPE2)) GO TO 42	FARED	06370
	JP(L)=JP(L)-1	FARED	06371
	GO TO 41	FARED	06372
C		FARED	06373
42	IF (JP(L).EQ.NPE(L)) GO TO 43	FARED	06374
	FRAC=(EAV-PE(NPE2))/(PE(NPE2+1)-PE(NPE2))	FARED	06375
	SGCRE(L)=SGCRE(L)+DELC(NPE2)+(DELC(NPE2+1)-DELC(NPE2))*FRAC	FARED	06376
43	IF (JPP(L).EQ.0) GO TO 45	FARED	06377
	NPEE2=NPEE1(L)+JPP(L)	FARED	06378
	IF (EAV.GE.ZE(NPEE2)) GO TO 44	FARED	06379
	JPP(L)=JPP(L)-1	FARED	06380
	GO TO 43	FARED	06381
C		FARED	06382
44	IF (JPP(L).EQ.NE(L)) GO TO 45	FARED	06383
	FRAC=(EAV-ZE(NPEE2+1)-ZE(NPEE2))	FARED	06384
	SGFRE(L)=DELF(NPEE2)*(1.-FRAC)+DELF(NPEE2+1)*FRAC	FARED	06385
45	IF (NRE(L).EQ.0) GO TO 46	FARED	06386
C		FARED	06387
C	COMPUTE BREIT-WIGNER CAPTURE,FISSION,AND SCATTERING CROSS	FARED	06388
C	SECTIONS.	FARED	06389
C		FARED	06390
	CALL XSEC (L,SS,SC,SF,EAV,SQRE,II,NRE1,RELMF,G,IND5,IND6,KRES,I	FARED	06391
1	NRG,T,SGP,RE,GN,GG,GF,ZF,NRE)	FARED	06392
	SGSR=SGP(L)+SS	FARED	06393
	SGCRE(L)=SC+SGCRE(L)	FARED	06394
	SGFRE(L)=SF+SGFRE(L)	FARED	06395
46	CONTINUE	FARED	06396
	SGR=SGSR+SGCRE(L)+SGFRE(L)	FARED	06397
	IF (INRG(L).NE.1) SRT1=SRT1+SGR*DN1(L)	FARED	06398
	IF (INDRS(L).EQ.0) GO TO 47	FARED	06399
	LR=LR+1	FARED	06400
	SGS(R,LR)=SGSR	FARED	06401
47	IF (INDRS(L).EQ.L.AND.SGSR.LT.1.E-5) GO TO 66	FARED	06402
	IF (INDRS(L).EQ.G.AND.DN1(L).LE.1.E-5) GO TO 66	FARED	06403
C		FARED	06404
48	IF (INREP.EQ.0.AND.RODD.EQ.0.) GO TO 66	FARED	06405
	IF (A1*E1.LE.E2) GO TO 49	FARED	06406
	DA=(E1-E2*FLNA(L)/ACOMP)*SGSR	FARED	06407
	GO TO 56	FARED	06408
C		FARED	06409
49	DA=(DER-E2*FLN(R))*SGSR/ACOMP	FARED	06410
50	IF (INRG(L).NE.1) A1=A1+DA*DN1(L)	FARED	06411
	IF (R.EQ.1) GO TO 57	FARED	06412

	NF=NR(L)	FARED	06413
	IF (NF.EQ.R-1) GO TO 52	FARED	06414
	NL=R-2	FARED	06415
	IF (ALMIN.LT.0.9.OR.IND2.NE.3) GO TO 3901	FARED	06416
C		FARED	06417
C	THE FOLLOWING 8 CARDS CONTAINS CODING WHICH PROTECTS AGAINST	FARED	06418
C	LOSS OF SIGNIFICANCE WHEN A HOMOGENEOUS COMPOSITION CONTAINS	FARED	06419
C	ONLY HIGH MASS SCATTERERS (EG., STEEL + U238).	FARED	06420
C		FARED	06421
	SROY1(L)=0.	FARED	06422
	DO 3900 NROY=NF,NL	FARED	06423
	IF (INDRS(L).EQ.1) SGSR=SGS(NROY,LR)	FARED	06424
	IF (INRG(L).NE.1) SROY1(L)=FI1(NROY)*SGSR*DN1(L)*FLN(NROY)+SROY1(L)	FARED	06425
3900	CONTINUE	FARED	06426
	IF (SROY1(L).EQ.0.) GO TO 3901	FARED	06427
	IF (((SROY1(L)-BP1(L))/SROY1(L)).LT.1.0E-6) GO TO 3901	FARED	06428
	BP1(L)=SROY1(L)	FARED	06429
3901	CONTINUE	FARED	06430
C		FARED	06431
C		FARED	06432
C		FARED	06433
C		FARED	06434
	DO 51 N=NF,NL	FARED	06435
	IF (AL*E(N-1).LE.E2) GO TO 52	FARED	06436
	IF (INDRS(L).EQ.1) SGSR=SGS(N,LR)	FARED	06437
	IF (INRG(L).NE.1) BP1(L)=BP1(L)-FI1(N)*SGSR*DN1(L)*FLN(N)	FARED	06438
51	NR(L)=N+1	FARED	06439
52	IF (AL*E(R-2).LE.E2) GO TO 53	FARED	06440
	NR(L)=R	FARED	06441
	SROY1(L)=0.	FARED	06442
	BP1(L)=0.	FARED	06443
	GO TO 55	FARED	06444
C		FARED	06445
53	IF (INDRS(L).EQ.1) SGSR=SGS(R-1,LR)	FARED	06446
	BP1(L)=BP1(L)+FI1(R-1)*SGSR*DN1(L)*FLN(R-1)	FARED	06447
	B1=B1+DER*BP1(L)/ACOMP	FARED	06448
55	N=NR(L)-1	FARED	06449
56	IF (N.GT.0) GO TO 60	FARED	06450
57	IF (AL*E111.LE.E2) GO TO 58	FARED	06451
	DB=SGP(L)*REPRM/ACOMP*(E1/E111-AL*(1.+ALOG(E1/AL/E111)))	FARED	06452
	GO TO 59	FARED	06453
C		FARED	06454
58	DB=SGP(L)*REPRM/ACOMP*(DER/E111-AL*FLN(R))	FARED	06455
59	IF (INRG(L).NE.1) B1=B1+DN1(L)*DB	FARED	06456
	GO TO 66	FARED	06457
C		FARED	06458
60	IF (INDRS(L).EQ.1) SGSR=SGS(N,LR)	FARED	06459
	IF (AL*E(N).GT.E2) GO TO 62	FARED	06460
	IF (AL*E(N-1).GT.E1) GO TO 61	FARED	06461
	DB=SGSR/ACOMP*(E1*FLN(N)+E2*(1.-ALOG(E2/AL/E(N)))-AL*E(N-1))	FARED	06462

	GO TO 63	FARED	06463
C		FARED	06464
61	DB=SGSR/ACOMP*(E2*FLN(R)-DER*(1.-ALOG(E1/AL/E(N))))	FARED	06465
	GO TO 65	FARED	06466
C		FARED	06467
62	IF (AL*E(N-1).GT.E1) GO TO 64	FARED	06468
	DB=SGSR/ACOMP*(E1*FLN(N)-AL*(E(N-1)-E(N)))	FARED	06469
63	IF (INRG(L).NE.1) B1=B1+FI1(N)*DN1(L)*DB	FARED	06470
	N=N-1	FARED	06471
	GO TO 56	FARED	06472
C		FARED	06473
64	DB=SGSR/ACOMP*(E1*(ALOG(E1/AL/E(N))-1.)+AL*E(N))	FARED	06474
65	IF (INRG(L).NE.1) B1=B1+FI1(N)*DN1(L)*DB	FARED	06475
66	CONTINUE	FARED	06476
	IF (IND2.NE.3) GO TO 71	FARED	06477
	FI1(R)=B1/(SRT1*DER-A1)	FARED	06478
	GO TO 73	FARED	06479
71	PC11=P11(SRT1*RODD*.5,C,EAV,IND2)	FARED	06480
	PC12=1.-PC11	FARED	06481
	FI1(R)=(PC11*B1+SRT1*PC12*FLN(R))/(SRT1*DER-PC11*A1)	FARED	06482
73	CONTINUE	FARED	06483
	DO 83 L=1,NEL	FARED	06484
	DO 75 M=1,NEL	FARED	06485
	IF (LEUL(M).EQ.L) GO TO 76	FARED	06486
75	CONTINUE	FARED	06487
76	IF (LK(M).NE.0) GO TO 77	FARED	06488
	SGCRE(L)=0.0	FARED	06489
	SGFRE(L)=0.0	FARED	06490
77	DFI=DER*FI1(R)	FARED	06491
	RICK1(L)=RICK1(L)+DFI*SGCRE(L)	FARED	06492
	RIFK1(L)=RIFK1(L)+DFI*SGFRE(L)	FARED	06493
	IF (IND2.EQ.3.OR.RODD.NE.0.) ABST=ABST+DFI*DN1(L)*(SGCRE(L)+SGF	FARED	06494
	RE(L))	FARED	06495
79	DO 89 M=1,NEL	FARED	06496
	IF (LEUL(M).EQ.L) GO TO 81	FARED	06497
80	CONTINUE	FARED	06498
81	IF (LK(M).EQ.0) GO TO 82	FARED	06499
	FIK1(L)=FIK1(L)+DER*FI1(R)	FARED	06500
	FIK2(L)=FIK2(L)+DER*FIAR	FARED	06501
	GO TO 83	FARED	06502
C		FARED	06503
82	FIK1(L)=0.0	FARED	06504
	FIK2(L)=0.0	FARED	06505
83	CONTINUE	FARED	06506
	IF (R.EQ.RMAXH) REPRMT=1.-ABST/S	FARED	06507
	R2=R+R1	FARED	06508
	IF (LINEK.GT.54) GO TO 86	FARED	06509
84	CONTINUE	FARED	06510
	IF (NF1.LE.0) GO TO 160	FARED	06511
	LINEK=LINEK+1	FARED	06512

	WRITE (IO,127) R2,E2,DER,FI1(R),FIAR,FIAR	FARED	06513
160	CONTINUE	FARED	06514
C		FARED	06515
C	HAS A MICROGROUP BOUND BEEN ENCOUNTERED? IF SO,BEGIN EFFEC-	FARED	06516
C	TIVE RESONANCE CROSS SECTION CALCULATIONS.	FARED	06517
C		FARED	06518
	IF (E2.EQ.GE(KK)) GO TO 96	FARED	06519
C		FARED	06520
C	BEGIN CYCLING PREVIOUS FINE-GROUP SCATTERING SOURCES WHEN	FARED	06521
C	THE SGS(N,LR) ARRAY IS FILLED(IE.,WHEN N=RMAX).	FARED	06522
C		FARED	06523
85	IF (R.EQ.RMAX) GO TO 87	FARED	06524
	R=R+1	FARED	06525
	GO TO 30	FARED	06526
C		FARED	06527
86	LINEK=0	FARED	06528
	WRITE (IO,126) GE(KK-1),KKT	FARED	06529
	WRITE (IO,116)	FARED	06530
	GO TO 84	FARED	06531
C		FARED	06532
87	IF (RODD.EQ.0..AND.INREP.EQ.0) GO TO 88	FARED	06533
	J=R-1	FARED	06534
	GO TO 89	FARED	06535
C		FARED	06536
88	J=RMAX-10	FARED	06537
	GO TO 93	FARED	06538
C		FARED	06539
89	IF (ALMIN*E(J).GE.E(R)) GO TO 93	FARED	06540
	IF (J.EQ.10) GO TO 90	FARED	06541
	J=J-1	FARED	06542
	GO TO 89	FARED	06543
C		FARED	06544
90	J=RMAXH	FARED	06545
	LOWR=RMAX+R1	FARED	06546
	J1=J+R1	FARED	06547
	WRITE (IO,128) LOWR,E(R)	FARED	06548
	EALPH=E(R)/ALMIN	FARED	06549
	WRITE (IO,129) J1,E(J),LOWR,EALPH	FARED	06550
	IF (INREP.EQ.1) REPRM=REPRMT	FARED	06551
	LR=J	FARED	06552
	DO 92 L=1,NEL	FARED	06553
	IF (INDRS(L).EQ.1) LR=LR+1	FARED	06554
	IF (ALF(L)*E(J).GE.E2) GO TO 92	FARED	06555
	SGSR=SGP(L)	FARED	06556
	SROY1(L)=0.	FARED	06557
	BP1(L)=0.	FARED	06558
	NF=J+1	FARED	06559
	NL=R-1	FARED	06560
	NR(L)=NF	FARED	06561
	DO 91 N=NF,NL	FARED	06562

	IF (INORS(L).EQ.1) SGSR=SGS(N,LR)	FARED	06563
	IF (INRG(L).NE.1) BP1(L)=BP1(L)+FI1(N)*SGSR*DN1(L)*FLN(N)	FARED	06564
91	CONTINUE	FARED	06565
92	CONTINUE	FARED	06566
93	K1=R1+J	FARED	06567
	RR=RMAX-J	FARED	06568
	E111=E(J)	FARED	06569
	SREU=SQRT(E111(1))	FARED	06570
	DO 94 L=1,NEL	FARED	06571
94	NR(L)=NR(L)-J	FARED	06572
	DO 95 J1=1,RR	FARED	06573
	J2=J1+J	FARED	06574
	E(J1)=E(J2)	FARED	06575
	FI1(J1)=FI1(J2)	FARED	06576
	FLN(J1)=FLN(J2)	FARED	06577
	LR=0	FARED	06578
	DO 95 L=1,NEL	FARED	06579
	IF (INORS(L).EQ.0) GO TO 95	FARED	06580
	LR=LR+1	FARED	06581
	SGS(J1,LR)=SGS(J2,LR)	FARED	06582
95	CONTINUE	FARED	06583
	R=RR+1	FARED	06584
	GO TO 33	FARED	06585
C		FARED	06586
C		FARED	06587
C	START CALCULATION OF EFFECTIVE RESONANCE CROSS SECTIONS.	FARED	06588
C		FARED	06589
96	DO 105 L=1,NEL	FARED	06590
	FI1V(L)=(FIK1(L)+FIK2(L)*V)/(1.+V)	FARED	06591
	IF (FI1V(L).NE.0.) GO TO 97	FARED	06592
	CAPK1(L)=0.0	FARED	06593
	FISK1(L)=0.0	FARED	06594
	GO TO 98	FARED	06595
C		FARED	06596
97	CAPK1(L)=RICK1(L)/FI1V(L)	FARED	06597
	FISK1(L)=RIFK1(L)/FI1V(L)	FARED	06598
	RIFT1(L)=RIFK1(L)+RIFT1(L)	FARED	06599
	RICT1(L)=RICK1(L)+RICT1(L)	FARED	06600
98	IF (NRE(L).EQ.0) GO TO 99	FARED	06601
	MN=LINR(L)	FARED	06602
	SLJCF(MN,KK-1,1)=CAPK1(L)	FARED	06603
	SLJCF(MN,KK-1,2)=FISK1(L)	FARED	06604
99	DO 100 M=1,NEL	FARED	06605
	IF (LEUL(M).EQ.L) GO TO 101	FARED	06606
100	CONTINUE	FARED	06607
101	KEU=M	FARED	06608
C		FARED	06609
C	STORE PARTIAL GROUP CROSS SECTIONS WHEN TEUL0 DOES NOT	FARED	06610
C	CORRESPOND TO A GROUP BOUND.	FARED	06611
C		FARED	06612

IF(LK(KEU).GE.0) GO TO 105	FARED 06613
UNC1(L)=CAPK1(L)	FARED 06614
UNF1(L)=FISK1(L)	FARED 06615
KLKM(L)=1	FARED 06616
JLKM(L)=KEU	FARED 06617
IF(NRE(L).EQ.0) GO TO 102	FARED 06618
SLJCF(MN, KK-1, 1)=0.0	FARED 06619
SLJCF(MN, KK-1, 2)=0.0	FARED 06620
102 LK(KEU)=1	FARED 06621
105 CONTINUE	FARED 06622
WRITE(IO, 131)	FARED 06623
WRITE(IO, 130)	FARED 06624
NF3=1	FARED 06625
LINEK=0	FARED 06626
DO 150 L=1, NEL	FARED 06627
IF(INDRS(L).NE.1) GO TO 150	FARED 06628
1060 WRITE(IO, 114) JFUEL, LLIDR(L), LLDR(L), CAPK1(L), FISK1(L), RICK1(L), RI	FARED 06629
1FK1(L), RICT1(L), RIFT1(L)	FARED 06630
150 CONTINUE	FARED 06631
DO 151 L=1, NEL	FARED 06632
JZ=JLKM(L)	FARED 06633
IF(KLKM(L).EQ.1) WRITE(IO, 115) LLIDR(L), LLDR(L), TEUL0(JZ)	FARED 06634
JLKM(L)=0	FARED 06635
151 KLKM(L)=0	FARED 06636
RTOT=R+R1	FARED 06637
KK1=KK-1	FARED 06638
NRG=RTOT-LASTR	FARED 06639
IF(KK.EQ.NGE+1) GO TO 111	FARED 06640
IF(TEUL0(K).NE.GE(KK)) GO TO 200	FARED 06641
IF(KP.EQ.0) GO TO 280	FARED 06642
DO 281 I=1, KP	FARED 06643
LA=K+1-I	FARED 06644
LK(LA)=1	FARED 06645
281 CONTINUE	FARED 06646
KP=0	FARED 06647
K=K+1	FARED 06648
GO TO 200	FARED 06649
280 LK(K)=1	FARED 06650
K=K+1	FARED 06651
200 CONTINUE	FARED 06652
KK=KK+1	FARED 06653
LASTR=RTOT	FARED 06654
107 DO 108 L=1, NEL	FARED 06655
FIK1(L)=0.	FARED 06656
FIK2(L)=0.	FARED 06657
RICK1(L)=0.	FARED 06658
RIFK1(L)=0.	FARED 06659
108 CONTINUE	FARED 06660
KKT=KK-1	FARED 06661
IF(NF1.LE.0) GO TO 85	FARED 06662

IF(NF3.NE.0) GO TO 109	FARED	06663
WRITE (IO,126) TEULU(1),KKT	FARED	06664
GO TO 110	FARED	06665
C	FARED	06666
109 CONTINUE	FARED	06667
IF(NF1.LE.0) GO TO 85	FARED	06668
WRITE (IO,126) GE(KK-1),KKT	FARED	06669
110 WRITE (IO,116)	FARED	06670
GO TO 85	FARED	06671
C	FARED	06672
1110WRITE(NSUR) (UNC1(MC),UNF1(MC),MC=1,NEL), (NRE(MC),AF(MC),SPIN(MC),	FARED	06673
1ELR(MC),MC=1,NEL)	FARED	06674
DO 113 MC=1,NEL	FARED	06675
IF (NRE(MC).EQ.0) GO TO 113	FARED	06676
MN=LINR(MC)	FARED	06677
DO 112 MP=1,NGE	FARED	06678
WRITE (NSUR) SLJCF(MN,MP,1),SLJCF(MN,MP,2)	FARED	06679
112 CONTINUE	FARED	06680
113 CONTINUE	FARED	06681
RETURN	FARED	06682
C	FARED	06683
114 FORMAT (1H ,I6,8X,A4,A2,5X,6E16.6)	FARED	06684
115 FORMAT(1H0,13H*** AVG. FOR ,2A4,4X17HAPPLIES ONLY FROM,E16.6,3X,3	FARED	06685
13HTO LOWER BROAD GROUP BOUND****)	FARED	06686
116 FORMAT (1H0,5HGROUP,8X,11HLOWER LIMIT,7X,9HWIDTH(EV),7X,5HFLUX1,11	FARED	06687
1X,5HFLUX2,9X,11HASYMPT.FLUX)	FARED	06688
1260FORMAT(1H1,/37H RESULTS OF NARROW GROUPS STARTING AT,E12.5,22H E	FARED	06689
1V. BROAD GROUP,I4)	FARED	06690
127 FORMAT (1H ,I5,3X,5E16.6)	FARED	06691
128 FORMAT (78HNOT ENOUGH MEMORY LOCATIONS FOR COMPLETE CYCLING. FOR	FARED	06692
1 CALCULATIONS BELOW E(I5,4H) =1PE10.4,20H EV ASYMPTOTIC FLUX)	FARED	06693
129 FORMAT (23H DISTRIBUTION ABOVE E(I5,4H) =1PE10.4,21H EV WAS ASS	FARED	06694
1UMED. E(I5,21H)/(SMALLEST ALPHA) =E10.4,3H EV//)	FARED	06695
130 FORMAT (1H ,6HREGION,7X,7HELEMENT,9X,7HCAPTURE,9X,7HFISSION,9X,7HC	FARED	06696
1APTURE,9X,7HFISSION,9X,7HCAPTURE,9X,7HFISSION)	FARED	06697
131 FORMAT (1H0,33X,13HCROSS SECTION,17X,18HRESONANCE INTEGRAL,10X,29H	FARED	06698
1CUMULATIVE RESONANCE INTEGRAL)	FARED	06699
END	FARED	06700

OVERLAY(RIM,2,2)	FARED	06701
PROGRAM UNRES	FARED	06702
	FARED	06703
	FARED	06704
PROGRAM UNRES PROVIDES EFFECTIVE CAPTURE AND FISSION CROSS	FARED	06705
SECTIONS IN THE UNRESOLVED RESONANCE RANGE USING BLOCK DATA ON	FARED	06706
TAPE 19, FILE 4 RETAP DATA PLACED ON TAPE 6 BY FARED, AND DATA FROM	FARED	06707
COMMON. UNRES COMBINES THE RESOLVED AND UNRESOLVED CONTRIBUTIONS	FARED	06708
AND PLACES THE TOTAL RESONANCE MICRO GROUP CAPTURE AND FISSION	FARED	06709
CROSS SECTIONS FOR EACH BLOCK ON TAPE 12 FOR USE BY OVERLAY(2,3)	FARED	06710
	FARED	06711
COMMON NTAP(20), NFLAG(100), NPOINT(20), ZONE(2000)	FARED	06712
COMMON /REGA2/ AK(30), AM(30), ANHET(30), ELR(30), GE(101), ICOMP(30),	FARED	06713
11NRG(30), IND2, NBGO, NGE, NEL, R(30), RODD, SPIN(30), T(2), V	FARED	06714
COMMON /REGA12/ SCC(30), SFF(30), SCT(100), SFT(100), DSIG	FARED	06715
COMMON /REGA3/ NF1, NF2	FARED	06716
DIMENSION AHHT(30), ANHOM(30), BJ(30), CS(52), D(30), E0(50), E1(50),	FARED	06717
1ECK(30), ECUR(30), EFF(100), EFN(100), FS(52), GG(30), GF(100), GNZ(100),	FARED	06718
2IDU(30), KCIND(30), KRE(15), LID(30), LINR(30), LLID(30), LLTID(30),	FARED	06719
3LTID(30), M(30), MU(30), N(30), NEF(30), NJS0(30), NJS1(30), NRE(30),	FARED	06720
4NRN(30), NUS(30), QK(30), SC(100), SF(100), SIGB(30), SIGC(52), SIGF(52),	FARED	06721
5SLJCF(7, 100, 2), UNC1(30), UNC2(30), W(30)	FARED	06722
EQUIVALENCE (SCC, UNC1), (SFF, UNC2), (ANHOM, ANHET)	FARED	06723
EQUIVALENCE (HFT, T(1))	FARED	06724
INTEGER EMBRYO	FARED	06725
EMBRYO=NTAP(6)	FARED	06726
NCOR=NTAP(13)	FARED	06727
NSUR=NTAP(12)	FARED	06728
NAIM=NTAP(14)	FARED	06729
IB=NTAP(19)	FARED	06730
IO=NTAP(15)	FARED	06731
IF(NF1.GT.0) IO=NTAP(2)	FARED	06732
IDNCOR=888	FARED	06733
REWIND IB	FARED	06734
REWIND NSUR	FARED	06735
REWIND EMBRYO	FARED	06736
REWIND NCOR	FARED	06737
REWIND NAIM	FARED	06738
READ (IB) LEY, NB	FARED	06739
IF (LEY.NE.555) GO TO 60	FARED	06740
DO 40 NI38=1, NB	FARED	06741
NZ=0	FARED	06742
INZ=1	FARED	06743
NCOR=NTAP(13)	FARED	06744
IW=1	FARED	06745
1 DO 2 I=1, 7	FARED	06746
DO 2 J=1, NGE	FARED	06747
SLJCF(I, J, 1)=0.0	FARED	06748
SLJCF(I, J, 2)=0.0	FARED	06749
	FARED	06750

2	CONTINUE	FARED	06751
	IF (NZ.GT.0) GO TO 4	FARED	06752
	READ (EMBRYO) FILE4,JF,NURN,MUM	FARED	06753
	UREAD(EMBRYO) (IDU(I),LID(I),LTID(I),NJS0(I),NJS1(I),ECUR(I),ECK(I)	FARED	06754
	1,M(I),N(I),R(I),QK(I),I=1,NURN)	FARED	06755
	READ (IB) ID8,IR,88,NS	FARED	06756
	READ (IB) ID8,IND2,NCELL,NEL,(ICOMP(I),I=1,NEL),(ANHOM(I),I=1,N	FARED	06757
	1EL),HFT,(KCIND(I),I=1,NEL)	FARED	06758
	DSIG=0.0	FARED	06759
	IF (IR.EQ.0) GO TO 39	FARED	06760
	IF (NCELL.GT.0) WRITE(IO,47) NIB8,INZ	FARED	06761
	IF (NCELL.EQ.0) WRITE(IO,59) NIB8	FARED	06762
	59 FORMAT(1H1,33X,38HUNRESOLVED RESONANCE RESULTS FOR BLOCK,I2)	FARED	06763
	READ (NSUR) IDTAP,IDBLK	FARED	06764
	READ (NSUR) (NUS(I),I=1,NEL)	FARED	06765
	WRITE (NCOR) IDNCOR,IDBLK	FARED	06766
	WRITE (NCOR) (NUS(I),I=1,NEL)	FARED	06767
	IF (NCELL.LE.0) GO TO 5	FARED	06768
	READ (IB) NEL,IND2,RODD,V,T(1),DSIG,(ICOMP(I),I=1,NEL),(ANHET(I	FARED	06769
	1),I=1,NEL)	FARED	06770
	NZ=NZ+1	FARED	06771
	GO TO 5	FARED	06772
C		FARED	06773
3	NCOR=NTAP(14)	FARED	06774
	INZ=INZ+1	FARED	06775
	IF (NZ.EQ.2) GO TO 40	FARED	06776
	IF (NCELL.EQ.3) WRITE(IO,59) NIB8	FARED	06777
	IF (NCELL.LT.3) WRITE(IO,47) NIB8,INZ	FARED	06778
	GO TO 1	FARED	06779
C		FARED	06780
4	CONTINUE	FARED	06781
	READ(EMBRYO)	FARED	06782
	READ(EMBRYO)	FARED	06783
	READ (IB) NEL,IND2,RODD,V,T(1),DSIG,(ICOMP(I),I=1,NEL),(ANHET(I	FARED	06784
	1),I=1,NEL)	FARED	06785
	NZ=NZ+1	FARED	06786
5	CONTINUE	FARED	06787
	DO 8 I=1,NEL	FARED	06788
	DO 6 J=1,NURN	FARED	06789
	IF (ICOMP(I).EQ.IDU(J)) GO TO 7	FARED	06790
6	CONTINUE	FARED	06791
	GO TO 8	FARED	06792
7	LLID(I)=LID(J)	FARED	06793
	LLTID(I)=LTID(J)	FARED	06794
8	CONTINUE	FARED	06795
	INR=0	FARED	06796
	UREAD(NSUR) (UNC1(MC),UNC2(MC),MC=1,NEL),(NRE(MC),AM(MC),SPIN(MC),E	FARED	06797
	1LR(MC),MC=1,NEL)	FARED	06798
	DO 12 MC=1,NEL	FARED	06799
	IF (NRE(MC).EQ.0) GO TO 9	FARED	06800

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      GO TO 10
C
      9 LINR(MC)=0
      GO TO 12
C
10      INR=INR+1
      LINR(MC)=INR
      MN=INR
      DO 11 MP=1,NGE
          READ (NSUR) SLJCF(MN,MP,1),SLJCF(MN,MP,2)
11      CONTINUE
12      CONTINUE
      KKZ=0
      MN=0
      DO 14 J K=1,NEL
          DO 14 I=1,NURN
              IF (ICOMP(K).EQ.IDU(I)) GO TO 13
              GO TO 14
C
13      W(K)=R(I)
      AK(K)=QK(I)
      GO TO 140
14      CONTINUE
140     CONTINUE
      DO 35 K=1,NEL
          KZ=0
          DO 16 I=1,NURN
              IF (ICOMP(K).EQ.IDU(I)) GO TO 17
              IF (NJS0(I).EQ.0.AND.NJS1(I).EQ.0) GO TO 16
              KZ=KZ+1
              IF (KZ.LE.KKZ) GO TO 16
              NRQ=NJS0(I)+NJS1(I)
              READ (EMBRYO)
              DO 15 L=1,NRQ
                  READ (EMBRYO)
15          CONTINUE
              KKZ=KZ
16      CONTINUE
      GO TO 35
C
17 IF (NJS0(I).NE.0.OR.NJS1(I).NE.0) GO TO 71
      IF (NRE(K).GT.0) MN=MN+1
      GO TO 35
71 CONTINUE
      NRQ=NJS0(I)+NJS1(I)
      KKZ=KKZ+1
      MX=0
      IF (MX.NE.0) GO TO 18
      MX=1
18      MI=M(I)

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FARED 06801
FARED 06802
FARED 06803
FARED 06804
FARED 06805
FARED 06806
FARED 06807
FARED 06808
FARED 06809
FARED 06810
FARED 06811
FARED 06812
FARED 06813
FARED 06814
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FARED 06817
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FARED 06838
FARED 06839
FARED 06840
FARED 06841
FARED 06842
FARED 06843
FARED 06844
FARED 06845
FARED 06846
FARED 06847
FARED 06848
FARED 06849
FARED 06850

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	NI=N(I)	FARED	06851
	AKI=AK(K)	FARED	06852
	AMI=AM(K)	FARED	06853
	NJSOI=NJSJ(I)	FARED	06854
	NJS1I=NJS1(I)	FARED	06855
	ECKI=ECK(I)	FARED	06856
	ELRI=ELR(K)	FARED	06857
	EUCR=ECUR(I)	FARED	06858
	DO 20 J=1,NGE	FARED	06859
	IF (ELR(K).LT.GE(J).AND.ELR(K).GE.GE(J+1)) GO TO 19	FARED	06860
	GO TO 20	FARED	06861
C		FARED	06862
19	EJ1=GE(J)	FARED	06863
	EJ0=GE(J+1)	FARED	06864
	IBG=J	FARED	06865
	GO TO 21	FARED	06866
C		FARED	06867
20	CONTINUE	FARED	06868
21	CONTINUE	FARED	06869
	READ (EMBRYO) IDUKIK,(NRN(J),NEF(J),MU(J),BU(J),GG(J),D(J),J	FARED	06870
	=1,NRQ)	FARED	06871
1	IF (IDUKIK.NE.ICOMP(K)) GO TO 63	FARED	06872
	NRJ=1	FARED	06873
	NEJ=1	FARED	06874
	NRNK=0	FARED	06875
	NEFK=J	FARED	06876
	DO 25 L=1,NRQ	FARED	06877
	NRNK=NRNK+NRN(L)	FARED	06878
	NEFK=NEFK+NEF(L)	FARED	06879
	IF (NEF(L)) 23,22,23	FARED	06880
22	READ (EMBRYO) (EFN(J),GNZ(J),J=NRJ,NRNK)	FARED	06881
	GO TO 24	FARED	06882
C		FARED	06883
23	READ (EMBRYO) (EFN(J),GNZ(J),J=NRJ,NRNK),(EFF(J),GF(J),J=	FARED	06884
	NEJ,NEFK)	FARED	06885
24	NRJ=NRNK+1	FARED	06886
	NEJ=NEFK+1	FARED	06887
25	CONTINUE	FARED	06888
	DU=D(1)	FARED	06889
	NIS=NJSJ(I)-1	FARED	06890
	IF (NIS) 26,29,27	FARED	06891
26	IO=NIAP(2)	FARED	06892
	WRITE(IO,62)	FARED	06893
62	FORMAT(1H0,13HPROGRAM UNRES,4X,17HNJSG IS INCORRECT)	FARED	06894
	STOP 1006	FARED	06895
27	DO 28 L=1,NIS	FARED	06896
	UD=AMIN1(UD,D(L+1))	FARED	06897
28	CONTINUE	FARED	06898
C		FARED	06899
C	ESTABLISH ENERGY RANGE	FARED	06900

C			FARED	06901
29	MEND=IO		FARED	06902
	CALL EER (EJ1,EUCR,ELRI,EUL0,EUL1,DD,NJS1I,ECKI,MEND,GE,NGE)		FARED	06903
C			FARED	06904
C	DETERMINE ENERGY POINTS AT WHICH UNRESOLVED RESONANCE CROSS		FARED	06905
C	SECTIONS ARE TO BE COMPUTED		FARED	06906
C			FARED	06907
	CALL DEPGC (EUL0,EUL1,EUCR,MI,NI,DELU0,DELU1,ECKI,E1,E0,NJS1		FARED	06908
1	I)		FARED	06909
	NIL=M(I)		FARED	06910
	NIL=N(I)		FARED	06911
	IF (IW.GT.1) WRITE (IO,58)		FARED	06912
	IW=IW+1		FARED	06913
	IF (RODD) 30,31,30		FARED	06914
30	CALL ESIGB (W,RODD,ANHET,NEL,K,INRG,SIGB,IND2,V,USIG,IO)		FARED	06915
	GO TO 32		FARED	06916
C			FARED	06917
31	CALL ESIGB (W,RODD,ANHOM,NEL,K,INRG,SIGB,IND2,V,USIG,IO)		FARED	06918
32	WRITE (IO,49) LLID(K),LLTID(K)		FARED	06919
	WRITE (IO,51)		FARED	06920
	WRITE (IO,52)		FARED	06921
	CALL ECCLJ (MI,NI,E0,E1,K,MU,BJ,GG,D,EFN,GNZ,EFF,GF,SIGB,AKI		FARED	06922
1	,AMI,NRN,NEF,NJS1I,NJS1I,ECKI,EUL0,EUL1,SPIN,SIGC,SIGF,CS,FS		FARED	06923
2	,T,IO)		FARED	06924
	MNI=M(I)+N(I)+2		FARED	06925
	CALL BGACS (SFF,SCC,E0,E1,SF,SC,CS,FS,MI,NJS1I,EUL0,EUL1,IBG		FARED	06926
1	,NEF,GE,EUCR,NJS1I,NJS1I,NI,NGE,K,IO)		FARED	06927
	WRITE (IO,50) LLID(K),LLTID(K)		FARED	06928
	WRITE (IO,53)		FARED	06929
	MN=MN+1		FARED	06930
	DO 33 J=1,NGE		FARED	06931
	SLJCF(MN,J,1)=SLJCF(MN,J,1)+SC(J)		FARED	06932
	SLJCF(MN,J,2)=SLJCF(MN,J,2)+SF(J)		FARED	06933
33	CONTINUE		FARED	06934
	NGEE=(NGE+1)/2		FARED	06935
	DO 34 II=1,NGEE		FARED	06936
	IJ=II+NGEE		FARED	06937
34	WRITE (IO,54) II,SC(II),SF(II),IJ,SC(IJ),SF(IJ)		FARED	06938
35	CONTINUE		FARED	06939
	WRITE (IO,55)		FARED	06940
	WRITE (IO,56)		FARED	06941
	WRITE (NCOR) (NRE(MC),MC=1,NEL)		FARED	06942
	DO 36 MN=1,INR		FARED	06943
	WRITE (NCOR) (SLJCF(MN,J,1),SLJCF(MN,J,2),J=1,NGE)		FARED	06944
36	CONTINUE		FARED	06945
	IN=1		FARED	06946
	DO 38 MN=1,NEL		FARED	06947
	IF (NRE(MN).EQ.0) GO TO 38		FARED	06948
	IF (IN.GT.1) WRITE (IO,58)		FARED	06949
	WRITE (IO,57) LLID(MN),LLTID(MN)		FARED	06950

	NI=N(I)	FARED	06851
	AKI=AK(K)	FARED	06852
	AMI=AM(K)	FARED	06853
	NJS0I=NJS0(I)	FARED	06854
	NJS1I=NJS1(I)	FARED	06855
	ECKI=ECK(I)	FARED	06856
	ELRI=ELR(K)	FARED	06857
	EUCR=ECUR(I)	FARED	06858
	DO 20 J=1,NGE	FARED	06859
	IF (ELR(K).LT.GE(J).AND.ELR(K).GE.GE(J+1)) GO TO 19	FARED	06860
	GO TO 20	FARED	06861
C		FARED	06862
19	EJ1=GE(J)	FARED	06863
	EJ0=GE(J+1)	FARED	06864
	IBG=J	FARED	06865
	GO TO 21	FARED	06866
C		FARED	06867
20	CONTINUE	FARED	06868
21	CONTINUE	FARED	06869
	READ (EMBRYO) IDUKIK,(NRN(J),NEF(J),MU(J),BJ(J),GG(J),D(J),J	FARED	06870
	=1,NRQ)	FARED	06871
1	IF (IDUKIK.NE.ICOMP(K)) GO TO 63	FARED	06872
	NRJ=1	FARED	06873
	NEJ=1	FARED	06874
	NRNK=0	FARED	06875
	NEFK=0	FARED	06876
	DO 25 L=1,NRQ	FARED	06877
	NRNK=NRNK+NRN(L)	FARED	06878
	NEFK=NEFK+NEF(L)	FARED	06879
	IF (NEF(L)) 23,22,23	FARED	06880
22	READ (EMBRYO) (EFN(J),GNZ(J),J=NRJ,NRNK)	FARED	06881
	GO TO 24	FARED	06882
C		FARED	06883
23	READ (EMBRYO) (EFN(J),GNZ(J),J=NRJ,NRNK),(EFF(J),GF(J),J=	FARED	06884
	NEJ,NEFK)	FARED	06885
24	NRJ=NRNK+1	FARED	06886
	NEJ=NEFK+1	FARED	06887
25	CONTINUE	FARED	06888
	DU=D(1)	FARED	06889
	NIS=NJSJ(I)-1	FARED	06890
	IF (NIS) 26,29,27	FARED	06891
26	IO=NIAP(2)	FARED	06892
	WRITE(IO,62)	FARED	06893
62	FORMAT(1H0,13HPROGRAM UNRES,4X,17HNJS0 IS INCORRECT)	FARED	06894
	STOP 1006	FARED	06895
27	DO 28 L=1,NIS	FARED	06896
	UD=AMIN1(UD,D(L+1))	FARED	06897
28	CONTINUE	FARED	06898
C		FARED	06899
C	ESTABLISH ENERGY RANGE	FARED	06900

C		FARED	06901
29	MEND=IO	FARED	06902
C	CALL EER (EJ1,EUCR,ELRI,EUL0,EUL1,DO,NJS1I,ECKI,MEND,GE,NGE)	FARED	06903
C		FARED	06904
C	DETERMINE ENERGY POINTS AT WHICH UNRESOLVED RESONANCE CROSS	FARED	06905
C	SECTIONS ARE TO BE COMPUTED	FARED	06906
C		FARED	06907
	CALL DEPFC (EUL0,EUL1,EUCR,MI,NI,DELU0,DELU1,ECKI,E1,E0,NJS1	FARED	06908
1	I)	FARED	06909
	NIL=M(I)	FARED	06910
	NIL=N(I)	FARED	06911
	IF (IW.GT.1) WRITE (IO,58)	FARED	06912
	IW=IW+1	FARED	06913
	IF (RODD) 30,31,30	FARED	06914
30	CALL ESIGB (W,RODD,ANHET,NEL,K,INRG,SIGB,IND2,V,USIG,IO)	FARED	06915
	GO TO 32	FARED	06916
C		FARED	06917
31	CALL ESIGB (W,RODD,ANHOM,NEL,K,INRG,SIGB,IND2,V,USIG,IO)	FARED	06918
32	WRITE (IO,49) LLID(K),LLTID(K)	FARED	06919
	WRITE (IO,51)	FARED	06920
	WRITE (IO,52)	FARED	06921
	CALL ECSLJ (MI,NI,E0,E1,K,MU,BJ,GG,D,EFN,GNZ,EFF,GF,SIGB,AKI	FARED	06922
1	,AMI,NRN,NEF,NJS1I,NJS1I,ECKI,EUL0,EUL1,SPIN,SIGC,SIGF,CS,FS	FARED	06923
2	,T,IO)	FARED	06924
	MNI=M(I)+N(I)+2	FARED	06925
	CALL BGACS (SFF,SCC,E0,E1,SF,SC,CS,FS,MI,NJS1I,EUL0,EUL1,IBG	FARED	06926
1	,NEF,GE,EUCR,NJS1I,NJS1I,NI,NGE,K,IO)	FARED	06927
	WRITE (IO,50) LLID(K),LLTID(K)	FARED	06928
	WRITE (IO,53)	FARED	06929
	MN=MN+1	FARED	06930
	DO 33 J=1,NGE	FARED	06931
	SLJCF(MN,J,1)=SLJCF(MN,J,1)+SC(J)	FARED	06932
	SLJCF(MN,J,2)=SLJCF(MN,J,2)+SF(J)	FARED	06933
33	CONTINUE	FARED	06934
	NGEE=(NGE+1)/2	FARED	06935
	DO 34 II=1,NGEE	FARED	06936
	IJ=II+NGEE	FARED	06937
34	WRITE (IO,54) II,SC(II),SF(II),IJ,SC(IJ),SF(IJ)	FARED	06938
35	CONTINUE	FARED	06939
	WRITE (IO,55)	FARED	06940
	WRITE (IO,56)	FARED	06941
	WRITE (NCOR) (NRE(MC),MC=1,NEL)	FARED	06942
	DO 36 MN=1,INR	FARED	06943
	WRITE (NCOR) (SLJCF(MN,J,1),SLJCF(MN,J,2),J=1,NGE)	FARED	06944
36	CONTINUE	FARED	06945
	IN=1	FARED	06946
	DO 38 MN=1,NEL	FARED	06947
	IF (NRE(MN).EQ.0) GO TO 38	FARED	06948
	IF (IN.GT.1) WRITE (IO,58)	FARED	06949
	WRITE (IO,57) LLID(MN),LLTID(MN)	FARED	06950

	WRITE (IO,53)	FARED	J6951
	DO 37 II=1,NGEE	FARED	J6952
	IJ=II+NGEE	FARED	J6953
	WRITE (IO,54) II,SLJCF(IN,II,1),SLJCF(IN,II,2),IJ,SLJCF(I	FARED	J6954
1	N,IJ,1),SLJCF(IN,IJ,2)	FARED	J6955
37	CONTINUE	FARED	J6956
	IN=IN+1	FARED	J6957
38	CONTINUE	FARED	J6958
39	REWIND EMBRYO	FARED	J6959
	IF (NZ.EQ.J) GO TO 40	FARED	J6960
	IF (NZ.EQ.1.AND.NCELL.GT.1) GO TO 3	FARED	J6961
40	CONTINUE	FARED	J6962
	REWIND NCOR	FARED	J6963
	REWIND NSUR	FARED	J6964
	REWIND NAIM	FARED	J6965
	REWIND IB	FARED	J6966
	NCOR=NTAP(13)	FARED	J6967
	REWIND NCOR	FARED	J6968
	READ (IB) LBY,NB	FARED	J6969
	DO 46 NIUB=1,NB	FARED	J6970
	READ (IB) IDB,IR,BB,NS	FARED	J6971
	READ (IB) IDB,IND2,NCELL,NEL,(ICOMP(I),I=1,NEL),(ANHOM(I),I=1,N	FARED	J6972
1	EL),HFT,(KCIND(I),I=1,NEL)	FARED	J6973
	IF (IR.EQ.J) GO TO 46	FARED	J6974
	NCOR=NTAP(13)	FARED	J6975
	READ (NCOR) IUNCOR,IDBLK	FARED	J6976
	WRITE (NSUR) IDNCOR,IDBLK	FARED	J6977
	READ (NCOR) (NUS(I),I=1,NEL)	FARED	J6978
	WRITE (NSUR) (NUS(I),I=1,NEL)	FARED	J6979
	IF (NCELL.GT.1) GO TO 42	FARED	J6980
	IF (NCELL.EQ.1) READ (IB) NEL	FARED	J6981
	READ (NCOR) (NRE(MC),MC=1,NEL)	FARED	J6982
	DO 41 L=1,NEL	FARED	J6983
	IF (NRE(L).EQ.J) GO TO 41	FARED	J6984
	READ (NCOR) (SLJCF(L,J,1),SLJCF(L,J,2),J=1,NGE)	FARED	J6985
	WRITE (NSUR) (SLJCF(L,J,1),SLJCF(L,J,2),J=1,NGE)	FARED	J6986
41	CONTINUE	FARED	J6987
	GO TO 46	FARED	J6988
C		FARED	J6989
42	CONTINUE	FARED	J6990
	READ (IB) NEL1	FARED	J6991
	READ (NCOR) (NRE(MC),MC=1,NEL1)	FARED	J6992
	NCOR=NTAP(14)	FARED	J6993
	READ (IB) NEL2	FARED	J6994
	READ (NCOR) (KRE(MC),MC=1,NEL2)	FARED	J6995
	NR1=J	FARED	J6996
	NR2=J	FARED	J6997
	DO 45 L=1,NEL	FARED	J6998
	IF (KCIND(L).EQ.J) GO TO 45	FARED	J6999
	IF (KCIND(L).GT.1) GO TO 44	FARED	J7000

421	NR1=NR1+1	FARED	07001
	IF (NRE (NR1).EQ.3) GO TO 45	FARED	07002
	NCOR=NTAP(13)	FARED	07003
43	READ (NCOR) (SLJCF(L,J,1),SLJCF(L,J,2),J=1,NGE)	FARED	07004
	WRITE (NSUR) (SLJCF(L,J,1),SLJCF(L,J,2),J=1,NGE)	FARED	07005
	IF (KCIND(L).EQ.3.AND.NCOR.NE.NTAP(13)) GO TO 421	FARED	07006
	GO TO 45	FARED	07007
C		FARED	07008
44	NR2=NR2+1	FARED	07009
	IF (KRE (NR2).EQ.3) GO TO 45	FARED	07010
	NR2=NR2+1	FARED	07011
	GO TO 43	FARED	07012
C		FARED	07013
45	CONTINUE	FARED	07014
46	CONTINUE	FARED	07015
	REWIND NCOR	FARED	07016
	REWIND NSUR	FARED	07017
	REWIND NAIM	FARED	07018
	REWIND IB	FARED	07019
	NCOK=NTAP(13)	FARED	07020
	REWIND NCOK	FARED	07021
	RETURN	FARED	07022
C		FARED	07023
60	IO=NTAP(2)	FARED	07024
	WRITE (IO,61)	FARED	07025
61	FORMAT(1H0,13HPROGRAM UNRES,4X,26HFILE IB LABEL IS INCORRECT)	FARED	07026
	STOP 1005	FARED	07027
63	IO=NTAP(2)	FARED	07028
	WRITE (IO,64)	FARED	07029
64	FORMAT(1H0,13HPROGRAM UNRES,4X,16HNUCLIDE ID ERROR)	FARED	07030
	STOP 1007	FARED	07031
47	FORMAT(1H1,33X,38HUNRESOLVED RESONANCE RESULTS FOR BLOCK,I2,2X,4HC	FARED	07032
	1ELL,I2)	FARED	07033
49	FORMAT (1H0,29HPOINTWISE CROSS SECTIONS FOR ,A4,A2)	FARED	07034
50	FORMAT (1H1,52HEFFECTIVE UNRESOLVED BROAD GROUP CROSS SECTIONS FOR	FARED	07035
	1 A4,A2)	FARED	07036
51	FORMAT (1H0,7X,6HENERGY,8X,7HLS-STATE,6X,7HJS-STATE,10X,7HCAPTURE,9X	FARED	07037
	1,7HFISSION,16X,9HAJDN/AJDF)	FARED	07038
52	FORMAT (1H ,50X,9HX-SECTION,7X,9HX-SECTION)	FARED	07039
53	FORMAT (1H0,6X,11HBROAD GROUP,8X,7HCAPTURE,9X,7HFISSION,19X,11HBRO	FARED	07040
	1AD GROUP,8X,7HCAPTURE,9X,7HFISSION)	FARED	07041
54	FORMAT (1H ,2(10X,I3,8X,2E16.6,8X))	FARED	07042
55	FORMAT (1H1,46X,28HTOTAL RESONANCE CONTRIBUTION)	FARED	07043
56	FORMAT (1H ,50X,21HRESOLVED + UNRESOLVED)	FARED	07044
57	FORMAT (1H0,41HEFFECTIVE BROAD GROUP CROSS SECTIONS FOR ,A4,A2)	FARED	07045
58	FORMAT (1H1)	FARED	07046
	END	FARED	07047

	SUBROUTINE EER (EJ1,EUCR,ELR,EUL0,EUL1,D,N,ECK,MEND,BG,NBG)	FARED	07048
	DIMENSION BG(1)	FARED	07049
C		FARED	07050
C	SUBROUTINE EER IS CALLED BY UNRES TO ESTABLISH, FOR EACH	FARED	07051
C	RESONANCE NUCLIDE, THE ENERGY RANGES OVER WHICH THE L=0 AND L=1	FARED	07052
C	CALCULATIONS ARE TO BE PERFORMED.	FARED	07053
C	N NUMBER OF J STATES FOR L=1	FARED	07054
C		FARED	07055
	ECR=ELR+D/2.0	FARED	07056
	IF (ECR-EJ1) 1,2,2	FARED	07057
1	EUL0=ECR	FARED	07058
	GO TO 3	FARED	07059
C		FARED	07060
2	EUL0=EJ1	FARED	07061
3	IF (N) 6,6,4	FARED	07062
4	IF (ECK) 5,6,7	FARED	07063
5	EUL1=EUL0	FARED	07064
	GO TO 8	FARED	07065
C		FARED	07066
6	EUL1=0.0	FARED	07067
	GO TO 8	FARED	07068
C		FARED	07069
7	CALL EERB (ECK,BG,NBG,J,EUL1,MEND)	FARED	07070
8	ECT=EUCR	FARED	07071
	CALL EERB (ECT,BG,NBG,1,EUCR,MEND)	FARED	07072
	RETURN	FARED	07073
	END	FARED	07074

	SUBROUTINE EERB (EPT,BG,NBG,K,ENER,M)	FAREQ	07075
	DIMENSION BG(1)	FAREQ	07076
C		FAREQ	07077
C	CALLED BY SUBROUTINE EER	FAREQ	07078
C	SUBROUTINE EERB CHECKS THE ASSIGNMENT OF EUL1 AND EUCR AND,	FAREQ	07079
C	IF NECESSARY, REASSIGNS THEM TO THE NEAREST ENERGY BOUND	FAREQ	07080
C	K=J FOR EUL1 AND K=1 FOR EUCR	FAREQ	07081
C		FAREQ	07082
	IO=M	FAREQ	07083
	NOBG=NBG+1	FAREQ	07084
	DO 3 I=1,NOBG	FAREQ	07085
	IF (EPT.EQ.BG(I)) GO TO 7	FAREQ	07086
	IF (EPT.GT.BG(I+1).AND.EPT.LT.BG(I)) GO TO 1	FAREQ	07087
	GO TO 3	FAREQ	07088
C		FAREQ	07089
1	IF ((EPT-BG(I+1)).GT.(BG(I)-EPT).OR.(EPT-BG(I+1)).EQ.(BG(I)-EPT	FAREQ	07090
1	)) GO TO 2	FAREQ	07091
	ENER=BG(I+1)	FAREQ	07092
	GO TO 8	FAREQ	07093
C		FAREQ	07094
2	ENER=BG(I)	FAREQ	07095
	GO TO 8	FAREQ	07096
C		FAREQ	07097
3	CONTINUE	FAREQ	07098
	IF (K) 5,4,5	FAREQ	07099
4	ENER=BG(NBG+1)	FAREQ	07100
	GO TO 6	FAREQ	07101
C		FAREQ	07102
5	ENER=BG(1)	FAREQ	07103
6	M=1	FAREQ	07104
	GO TO 8	FAREQ	07105
C		FAREQ	07106
7	ENER=BG(I)	FAREQ	07107
8	RETURN	FAREQ	07108
	END	FAREQ	07109

	SUBROUTINE DEPC (EUL0,EUL1,EUCR,M,N,DELU0,DELU1,ECK,E1,E0,NJS1)	FARED	07110
	DIMENSION E0(1), E1(1)	FARED	07111
C		FARED	07112
C	THIS SUBROUTINE IS CALLED BY UNRES TO CALCULATE THE ENERGY	FARED	07113
C	POINTS AT WHICH THE L=0 AND L=1 CALCULATIONS ARE TO BE PERFORMED.	FARED	07114
C		FARED	07115
	NN=N+1	FARED	07116
	IF (NJS1) 1,3,1	FARED	07117
1	CALL DEP (N,EUCR,EUL1,E1,E0,DELU1,1)	FARED	07118
	IF (EUL0.NE.EUL1) GO TO 3	FARED	07119
	IF (N.NE.M) GO TO 3	FARED	07120
	DO 2 I=1,NN	FARED	07121
2	E0(I)=E1(I)	FARED	07122
	DELU0=DELU1	FARED	07123
	GO TO 4	FARED	07124
C		FARED	07125
3	CALL DEP (M,EUCR,EUL0,E1,E0,DELU0,0)	FARED	07126
4	RETURN	FARED	07127
	END	FARED	07128

```

SUBROUTINE DEP (K,EUCR,EUL,E1,E0,DELX,M)
DIMENSION E1(1), E0(1)
C
C   CALLED BY DEPGC TO DETERMINE ENERGY POINTS
C
  KK=K+1
  AK=K
  DELX=1.0/AK*ALOG(EUCR/EUL)
  IF (M) 1,2,1
1  E1(KK)=EUL
  E1(1)=EUCR
  GO TO 3
C
2  E0(1)=EUCR
  E0(KK)=EUL
3  KK=KK-1
  IF (KK.EQ.1) GO TO 6
  IF (M) 5,4,5
4  E0(KK)=E0(KK+1)*EXP(DELX)
  GO TO 3
C
5  E1(KK)=E1(KK+1)*EXP(DELX)
  GO TO 3
C
6  RETURN
  END

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FARED 07129
FARED 07130
FARED 07131
FARED 07132
FARED 07133
FARED 07134
FARED 07135
FARED 07136
FARED 07137
FARED 07138
FARED 07139
FARED 07140
FARED 07141
FARED 07142
FARED 07143
FARED 07144
FARED 07145
FARED 07146
FARED 07147
FARED 07148
FARED 07149
FARED 07150
FARED 07151
FARED 07152
FARED 07153
FARED 07154

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	SUBROUTINE ESIGB (RADI,RODD,AHHT,NMAT,M,MM,SIGB,NG,V,DSIG,IO)	FARED	07155
	DIMENSION AHHT(1), SIGB(1), MM(1), RADI(1)	FARED	07156
C		FARED	07157
C	ESIGB IS CALLED BY UNRES FOR THE CALCULATION OF THE EFFECTIVE	FARED	07158
C	SCATTERING CROSS SECTION PER ABSORBER NUCLIDE	FARED	07159
C		FARED	07160
	SIG=DSIG	FARED	07161
	SIGI=0.0	FARED	07162
	DO 6 I=1,NMAT	FARED	07163
	IF (I-M) 1,4,1	FARED	07164
1	IF (RODD) 2,3,2	FARED	07165
2	IF (MM(I)) 5,3,5	FARED	07166
3	SIGI=12.5663706*RADI(I)*RADI(I)*AHHT(I)+SIGI	FARED	07167
	GO TO 6	FARED	07168
C		FARED	07169
4	SIGM=12.5663706*RADI(I)*RADI(I)	FARED	07170
	IF (AHHT(I).EQ.0.0) GOTO 9	FARED	07171
	ATHH=1.0/AHHT(I)	FARED	07172
	GO TO 6	FARED	07173
	9 ATHH=1.0E+50	FARED	07174
	GO TO 6	FARED	07175
C		FARED	07176
5	SIG=12.5663706*RADI(I)*RADI(I)*AHHT(I)+SIG	FARED	07177
6	CONTINUE	FARED	07178
	IF (RODD) 7,8,7	FARED	07179
	7 IF (V.LT.1.E+9) GO TO 71	FARED	07180
	C=0.0	FARED	07181
	GO TO 72	FARED	07182
71	C=DANCE(NG,U,V,RODD,SIG)	FARED	07183
72	CONTINUE	FARED	07184
	BARL=RODD	FARED	07185
	SIGB(M)=SIGM+ATHH*SIGI+1.35*(1.0-C)*ATHH/(BARL*(1.0+.35*C))	FARED	07186
	RETURN	FARED	07187
8	SIGB(M)=SIGM+ATHH*SIGI	FARED	07188
	RETURN	FARED	07189
	END	FARED	07190

C	SUBROUTINE LOOK (A,B,ARG,NEPJS,I,OUT,LO)	FARED	07191
C	INTERPOLATION TABLE FOR FARED	FARED	07192
C	NEPJS IS NUMBER OF ENERGY POINTS FOR EACH STATE I WHERE I GOES	FARED	07193
C	FROM ONE TO NJS0+NJS1 (NUMBER OF STATES FOR L=0 + NUMBER OF STATES	FARED	07194
C	FOR L=1)	FARED	07195
C	A IS PARAMETER FOR ENERGY POINTS	FARED	07196
C	B IS EITHER FISSION WIDTH OR NEUTRON WIDTH	FARED	07197
C	ARG IS THE ENERGY POINT ARGUMENT	FARED	07198
C	CALLED BY ECCLJ	FARED	07199
C		FARED	07200
C	DIMENSION A(1), B(1), NEPJS(1)	FARED	07201
	II=I-1	FARED	07202
	IX=0	FARED	07203
	IF (II) 1,3,1	FARED	07204
1	DO 2 K=1,II	FARED	07205
2	IX=NEPJS(K)+IX	FARED	07206
3	J=IX+1	FARED	07207
	IY=IX+1	FARED	07208
	JJ=J	FARED	07209
	K=IX+NEPJS(I)	FARED	07210
	IF (A(J)-ARG) 4,4,10	FARED	07211
4	DO 5 J=IY,K	FARED	07212
	JJ=J	FARED	07213
	IF (A(J)-ARG) 5,8,7	FARED	07214
5	CONTINUE	FARED	07215
6	CONTINUE	FARED	07216
	OUT=B(JJ)	FARED	07217
	GO TO 9	FARED	07218
C		FARED	07219
7	OUT=B(J-1)+(B(J)-B(J-1))*(ARG-A(J-1))/(A(J)-A(J-1))	FARED	07220
	GO TO 9	FARED	07221
C		FARED	07222
8	OUT=B(J)	FARED	07223
9	RETURN	FARED	07224
10	IF (A(J)-A(J+1)) 6,11,11	FARED	07225
11	DO 12 J=IY,K	FARED	07226
	JJ=J	FARED	07227
	IF (ARG-A(J)) 12,8,7	FARED	07228
12	CONTINUE	FARED	07229
	GO TO 6	FARED	07230
C		FARED	07231
	END	FARED	07232
		FARED	07233

C	FUNCTION DANCE (N,M,V,D,SIG)	FARED	07234
C	CALCULATION FOR DANCEFF CORRECTION	FARED	07235
C	N INDICATES GEOMETRY	FARED	07236
C	N=0 CYLINDRICAL SQUARE	FARED	07237
C	N=1 CYLINDRICAL HEXAGON	FARED	07238
C	N=2 SLAB	FARED	07239
C	T IS SHORTEST SURFACE TO SURFACE DISTANCE BETWEEN ADJACENT LUMPS	FARED	07240
C	M IS FLAG SET TO ZERO FIRST TIME CALLED BY STRIP	FARED	07241
C	U IS PIN DIAMETER FOR CYL. OR SLAB THICKNESS	FARED	07242
C	V IS VOLUME RATIO OUTER/PIN	FARED	07243
C	SIG IS TOTAL MACROSCOPIC CROSS SECTION OF OUTER REGION	FARED	07244
C	STOP 2222 , 3333 INDICATE ERROR SQRT OF NEGATIVE NUMBER	FARED	07245
C		FARED	07246
	IF (M) 6,1,6	FARED	07247
1	IF (N-1) 2,2,4	FARED	07248
2	CHORD=0*V	FARED	07249
	VHS=V+1.0	FARED	07250
	IF (VHS) 13,3,3	FARED	07251
3	DISH=.906899683*VHS	FARED	07252
	DISS=.785398163*VHS	FARED	07253
	TH=0*(SQRT(DISH)-1.0)	FARED	07254
	TS=0*(SQRT(DISS)-1.0)	FARED	07255
	TAUH=TH/CHORD	FARED	07256
	TAUS=TS/CHORD	FARED	07257
	GO TO 5	FARED	07258
C		FARED	07259
4	T=0*V	FARED	07260
5	M=1	FARED	07261
6	IF (N-1) 7,8,10	FARED	07262
7	T=TS	FARED	07263
	BETA=5.67	FARED	07264
	TAU=TAUS	FARED	07265
	GO TO 9	FARED	07266
C		FARED	07267
8	T=TH	FARED	07268
	BETA=2.125	FARED	07269
	TAU=TAUH	FARED	07270
9	DTAU=SIG*CHORD/(7.0+BETA*SIG*CHORD)	FARED	07271
	TSIG=T*SIG	FARED	07272
	DANCE=1.0/(EXP(TSIG)*(1.0+(1.0-TAU-DTAU)*SIG*CHORD))	FARED	07273
	GO TO 12	FARED	07274
C		FARED	07275
10	TSIG=T*SIG	FARED	07276
	ARG=TSIG/(1.0+TSIG)	FARED	07277
	IF (ARG) 14,11,11	FARED	07278
11	DEN=1.0/(1.0+TSIG*(1.0-.64+3*SQRT(ARG)))	FARED	07279
	EX=1.0/(EXP(TSIG)*(TSIG+3.0-DEN))	FARED	07280
	DANCE=2.0*EX	FARED	07281
12	RETURN	FARED	07282
		FARED	07283

13 STOP 2222
14 STOP 3333
END

FARED 07284
FARED 07285
FARED 07286

	SUBROUTINE JAVDS(GG,GF,GNU,E,SB,G,DEL,AJNF,GJNF,NDOFF,D,AJDN)	FARED	07287
	DIMENSION X(10),Y(10),Z(10),W(10)	FARED	07288
C		FARED	07289
C	JAVDS PERFORMS THE AVERAGING OVER (HI-SQUARED DISTRIBUTIONS USING THE GREEBLER-HUTCHINS QUADRATURE TECHNIQUE	FARED	07290
C		FARED	07291
	DATA (X(I),I=1,10),(Z(I),I=1,10)/0.00525,0.03717,0.10313,0.20784,0.135986,0.57430,0.87937,1.33487,2.10534,4.39286,0.05176,0.16310,0.228842,0.43177,0.59922,0.80057,1.05324,1.39304,1.91629,3.30259/	FARED	07292
	SRE=SQR(E)	FARED	07293
	CBT=SB/2.6038E6*SRE/G	FARED	07294
	AJDN=0.0	FARED	07295
	AJNF=0.	FARED	07296
	GJNF=0.	FARED	07297
	IF(NDOFF.EQ.1)GO TO 2	FARED	07298
	DO 1 I=1,10	FARED	07299
	Y(I)=Z(I)	FARED	07300
1	W(I)=X(I)	FARED	07301
	GO TO 4	FARED	07302
C		FARED	07303
2	DO 3 I=1,10	FARED	07304
	W(I)=X(I)	FARED	07305
3	Y(I)=X(I)	FARED	07306
4	DO 7 NF=1,10	FARED	07307
	GFY=Y(NF)*GF	FARED	07308
	AJNF=AJNF+AJN	FARED	07309
	DO 6 NN=1,10	FARED	07310
	GNX=W(NN)*GNU	FARED	07311
	GAM=GG+GFY+GNX*SRE	FARED	07312
	BT=CBT*GAM/GNX	FARED	07313
	IF (DEL.GT.0.) GO TO 5	FARED	07314
	AJ=1.5707963/SQRT(BT*(BT+1.))	FARED	07315
	GO TO 10	FARED	07316
C		FARED	07317
5	AJ=FJINT(GAM/DEL,BT)	FARED	07318
10	AJN=AJN+AJ	FARED	07319
	AJDN=AJDN+GAM*AJ	FARED	07320
6	CONTINUE	FARED	07321
	IF (GF.EQ.0.) GO TO 8	FARED	07322
	AJNF=AJNF+AJN	FARED	07323
	GJNF=GJNF+Y(NF)*AJN	FARED	07324
7	CONTINUE	FARED	07325
	AJDN=1.0-AJDN/D*0.01	FARED	07326
	AJNF=0.01*AJNF/AJDN	FARED	07327
	GJNF=0.01*GJNF*GF/AJDN	FARED	07328
	RETURN	FARED	07329
8	AJDN=1.0-AJDN/D*0.1	FARED	07330
	AJNF=0.1*AJN/AJDN	FARED	07331
	RETURN	FARED	07332
	END	FARED	07333
		FARED	07334
		FARED	07335
		FARED	07336

C
C
C
C

FUNCTION FJINT (TH,8T)

FUNCTION FJINT CALCULATES VALUES FOR THE DOPPLER BROADENING
FUNCTION

DIMENSION ALOGJ (32,26)

DATA SR2,PIH,SRP/1.414213562,1.570796327,1.772453851/

DATA (ALOGJ(I),I=1,128)/8.3326,8.2634,8.1814,8.0844,7.9688,7.8285,
17.6546,7.4382,7.1719,6.8519,6.4802,6.0638,5.6127,5.1368,4.6444,4.1
2413,3.6316,3.1178,2.6016,2.0839,1.5654,1.0463,0.5269,0.0073,-0.512
34,-1.0322,-1.5520,-2.0718,-2.5917,-3.1116,-3.6313,-4.1512,8.0300,7
4.9664,7.8926,7.8054,7.7024,7.5792,7.4285,7.2414,7.0089,6.7248,6.38
570,5.9994,5.5702,5.1098,4.6276,4.1311,3.6254,3.1141,2.5994,2.0826,
61.5646,1.0458,0.5266,0.0071,-0.5125,-1.0322,-1.5520,-2.0718,-2.591
77,-3.1116,-3.6313,-4.1512,7.7282,7.6671,7.5993,7.5204,7.4278,7.318
83,7.1866,7.0246,6.8231,6.5739,6.2717,5.9166,5.5140,5.0732,4.6046,4
9.1169,3.6168,3.1089,2.5963,2.0808,1.5655,1.0452,0.5262,0.0069,-0.5
*120,-1.0323,-1.5520,-2.0718,-2.5917,-3.1116,-3.6313,-4.1512,7.4321
*7.3690,7.3039,7.2312,7.1470,7.0485,6.9319,6.7908,6.6164,6.3996,6.
*1329,5.8127,5.4408,5.0243,4.5731,4.0972,3.6047,3.1016,2.5919,2.078
*1.1.5619,1.0442,0.5257,0.0066,-0.5128,-1.0324,-1.5521,-2.0719,-2.5
*917,-3.1115,-3.6313,-4.1512/
DATA (ALOGJ(I),I=129,256)/7.1486,7.0776,7.0102,6.9402,6.8622,6.772
13,6.6675,6.5430,6.3914,6.2036,5.9706,5.6861,5.3480,4.9601,4.5308,4
2.0703,3.5880,3.0914,2.5857,2.0744,1.5597,1.0429,0.5249,0.0061,-0.5
3131,-1.0326,-1.5522,-2.0719,-2.5917,-3.1116,-3.6313,-4.1512,6.8873
4.6.8010,6.7246,6.6519,6.5763,6.4924,6.3964,6.2847,6.1513,5.9882,5.
57858,5.5359,5.2333,4.8777,4.4748,4.0339,3.5651,3.0773,2.5771,2.069
62,1.5566,1.0411,0.5238,0.0054,-0.5135,-1.0328,-1.5524,-2.0720,-2.5
7918,-3.1116,-3.6314,-4.1512,6.6608,6.5503,6.4562,6.3731,6.2941,6.2
8123,6.1220,6.0194,5.8999,5.7567,5.5809,5.3630,5.0955,4.7746,4.4022
9,3.9853,3.5339,3.0578,2.5652,2.0621,1.5522,1.0384,0.5222,0.0045,-0
*5141,-1.0331,-1.5525,-2.0721,-2.5918,-3.1116,-3.6314,-4.1512,6.48
*19,6.3386,6.2175,6.1145,6.0236,5.9373,5.8483,5.7510,5.6412,5.5131,
*5.3509,5.1692,4.9348,4.6492,4.3102,3.9217,3.4920,3.0311,2.5486,2.0
*519,1.5461,1.0348,0.5200,0.0032,-0.5148,-1.0336,-1.5528,-2.0723,-2
*5919,-3.1117,-3.6314,-4.1512/
DATA (ALOGJ(I),I=257,384)/6.3575,6.1774,6.0218,5.8893,5.7763,5.676
13,5.5816,5.4847,5.3798,5.2618,5.1241,4.9577,4.7529,4.5012,4.1971,3
2.8404,3.4367,2.9952,2.5260,2.0380,1.5377,1.0297,0.5170,0.0014,-0.5
3159,-1.0343,-1.5532,-2.0725,-2.5921,-3.1118,-3.6315,-4.1513,6.2829
4.6.0702,5.8786,5.7107,5.5602,5.4419,5.3317,5.2276,5.1219,5.0086,4.
58815,4.7328,4.5529,4.3319,4.0620,3.7393,3.3655,2.9475,2.4954,2.018
68,1.5259,1.0226,0.5127,-0.0012,-0.5175,-1.0352,-1.5538,-2.0729,-2.
75923,-3.1119,-3.6315,-4.1513,6.2437,6.0084,5.7874,5.5852,5.4052,5.
82483,5.1120,4.9904,4.8758,4.7604,4.6376,4.5002,4.3391,4.1443,3.906
90,3.6173,3.2760,2.8857,2.4546,1.9929,1.5098,1.0127,0.5067,-0.0047,
*-0.5196,-1.0365,-1.5545,-2.0733,-2.5925,-3.1120,-3.6316,-4.1514,6.
*2248,5.9768,5.7367,5.5085,5.2968,5.1054,4.9359,4.7868,4.6530,4.526
*8,4.4007,4.2672,4.1180,3.9431,3.7319,3.4752,3.1672,2.8075,2.4015,1

FARED 07337
FARED 07338
FARED 07339
FARED 07340
FARED 07341
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FARED 07359
FARED 07360
FARED 07361
FARED 07362
FARED 07363
FARED 07364
FARED 07365
FARED 07366
FARED 07367
FARED 07368
FARED 07369
FARED 07370
FARED 07371
FARED 07372
FARED 07373
FARED 07374
FARED 07375
FARED 07376
FARED 07377
FARED 07378
FARED 07379
FARED 07380
FARED 07381
FARED 07382
FARED 07383
FARED 07384
FARED 07385
FARED 07386

*.9583,1.4881,0.9993,0.4986,-0.0097,-0.5225,-1.0382,-1.5556,-2.0740 FARED 07387
 *, -2.5929,-3.1123,-3.6318,-4.1514/ FARED 07388
 DATA (ALOGJ(I),I=385,512)/6.2160,5.9617,5.7113,5.4673,5.2332,5.013 FARED 07389
 11,4.8109,4.6291,4.4669,4.3200,4.1814,4.0434,3.8978,3.7352,3.5447,3 FARED 07390
 2.3157,3.0395,2.7117,2.3340,1.9132,1.4591,0.9812,0.4875,-0.0164,-0. FARED 07391
 35266,-1.0407,-1.5570,-2.0748,-2.5934,-3.1126,-3.6319,-4.1515,6.211 FARED 07392
 49,5.9546,5.6992,5.4469,5.1998,4.9607,4.7333,4.5214,4.3278,4.1524,3 FARED 07393
 5.9920,3.8401,3.6889,3.5296,3.3518,3.1440,2.8956,2.5988,2.2511,1.05 FARED 07394
 659,1.4213,0.9572,0.4726,-0.0255,-0.5321,-1.0440,-1.5590,-2.0760,-2 FARED 07395
 7.5942,-3.1130,-3.6322,-4.1517,6.2099,5.9513,5.6935,5.4372,5.1835,4 FARED 07396
 8.9338,4.6906,4.4570,4.2365,4.0319,3.8437,3.6694,3.5034,3.3378,3.16 FARED 07397
 936,2.9681,2.7410,2.4716,2.1533,1.7856,1.3735,0.9262,0.4530,-0.0375 FARED 07398
 *, -0.5394,-1.0484,-1.5617,-2.0776,-2.5951,-3.1136,-3.6325,-4.1519,6 FARED 07399
 *.2090,5.9497,5.6908,5.4326,5.1757,4.9207,4.6690,4.4225,4.1837,3.95 FARED 07400
 *.56,3.7410,3.5406,3.3525,3.1717,2.9902,2.7983,2.5840,2.3357,2.0436, FARED 07401
 *.1703,1.3154,0.8873,0.4281,-0.0531,-0.5490,-1.0542,-1.5652,-2.079 FARED 07402
 *.7,-2.5964,-3.1144,-3.6330,-4.1522/ FARED 07403
 DATA (ALOGJ(I),I=513,640)/6.2085,5.9489,5.6895,5.4304,5.1719,4.914 FARED 07404
 14,4.6584,4.4051,4.1558,3.9127,3.6782,3.4546,3.2427,3.0411,2.8449,2 FARED 07405
 2.6463,2.4352,2.1995,1.9277,1.6114,1.2480,0.8407,0.3975,-0.0726,-0. FARED 07406
 35610,-1.0615,-1.5696,-2.0824,-2.5980,-3.1153,-3.6335,-4.1525,6.208 FARED 07407
 43,5.9485,5.6888,5.4293,5.1701,4.9113,4.6533,4.3966,4.1419,3.8904,3 FARED 07408
 5.6436,3.4036,3.1720,2.9495,2.7345,2.5225,2.3055,2.0732,1.8137,1.51 FARED 07409
 663,1.1746,0.7879,0.3617,-0.0958,-0.5756,-1.0705,-1.5751,-2.0857,-2 FARED 07410
 7.6000,-3.1166,-3.6342,-4.1529,6.2082,5.9483,5.6885,5.4288,5.1692,4 FARED 07411
 8.9096,4.6508,4.3924,4.1350,3.8792,3.6258,3.3760,3.1311,2.8923,2.65 FARED 07412
 999,2.4318,2.2034,1.9667,1.7111,1.4254,1.1004,0.7321,0.3225,-0.1219 FARED 07413
 *, -0.5923,-1.0803,-1.5815,-2.0896,-2.6024,-3.1180,-3.6351,-4.1534,6 FARED 07414
 *.2081,5.9482,5.6883,5.4285,5.1687,4.9091,4.6496,4.3904,4.1317,3.87 FARED 07415
 *.37,3.6168,3.3617,3.1092,2.8599,2.6145,2.3725,2.1313,1.8858,1.6275, FARED 07416
 *.13463,1.0321,0.6780,0.2829,-0.1490,-0.6101,-1.0922,-1.5885,-2.093 FARED 07417
 *.9,-2.6050,-3.1196,-3.6360,-4.1539/ FARED 07418
 DATA (ALOGJ(I),I=641,768)/6.2081,5.9482,5.6883,5.4284,5.1685,4.908 FARED 07419
 17,4.6490,4.3894,4.1300,3.8709,3.6124,3.3546,3.0979,2.8427,2.5893,2 FARED 07420
 2.3374,2.0856,1.8307,1.5665,1.2847,0.9754,0.6306,0.2465,-0.1748,-0. FARED 07421
 36274,-1.1033,-1.5954,-2.0932,-2.6076,-3.1212,-3.6369,-4.1545,6.208 FARED 07422
 41,5.9481,5.6882,5.4283,5.1684,4.9085,4.6487,4.3889,4.1291,3.8695,3 FARED 07423
 5.6101,3.3510,3.0922,2.8339,2.5760,2.3181,2.0592,1.7969,1.5266,1.24 FARED 07424
 616,0.9333,0.5934,0.2167,-0.1968,-0.6424,-1.1131,-1.6016,-2.1020,-2 FARED 07425
 7.6099,-3.1226,-3.6378,-4.1550,6.2080,5.9481,5.6882,5.4283,5.1685,4 FARED 07426
 8.9084,4.6485,4.3886,4.1287,3.8688,3.6090,3.3491,3.0893,2.8293,2.56 FARED 07427
 991,2.3079,2.0448,1.7777,1.5028,1.2145,0.9053,0.5674,0.1950,-0.2133 FARED 07428
 *, -0.6541,-1.1208,-1.6064,-2.1049,-2.6116,-3.1235,-3.6385,-4.1554,6 FARED 07429
 *.2080,5.9481,5.6882,5.4282,5.1683,4.9084,4.6484,4.3885,4.1285,3.86 FARED 07430
 *.85,3.6084,3.3482,3.0878,2.8270,2.5655,2.3026,2.0372,1.7673,1.4895, FARED 07431
 *.1988,0.8885,0.5511,0.1809,-0.2243,-0.6619,-1.1259,-1.6095,-2.106 FARED 07432
 *.7,-2.6126,-3.1239,-3.6390,-4.1557/ FARED 07433
 DATA (ALOGJ(I),I=769,832)/6.2080,5.9481,5.6882,5.4282,5.1683,4.908 FARED 07434
 14,4.6484,4.3884,4.1284,3.8683,3.6081,3.3478,3.0871,2.8259,2.5637,2 FARED 07435
 2.2999,2.0333,1.7618,1.4824,1.1903,0.8792,0.5420,0.1729,-0.2306,-0. FARED 07436

	36665,-1.1291,-1.6118,-2.1081,-2.6135,-3.1246,-3.6393,-4.1559,6.208	FAREQ	07437
	43,5.9481,5.6882,5.4282,5.1683,4.9083,4.6484,4.3884,4.1283,3.8682,3	FAREQ	07438
	5.6080,3.3475,3.0867,2.8253,2.5628,2.2985,2.0312,1.7589,1.4785,1.18	FAREQ	07439
	654,0.8735,0.5361,0.1673,-0.2354,-0.6701,-1.1317,-1.6134,-2.1092,-2	FAREQ	07440
	7.6142,-3.1250,-3.6395,-4.1561/	FAREQ	07441
	IF (BT.GE.500.) GO TO 3	FAREQ	07442
	IF (BT.GE.59.31) GO TO 1	FAREQ	07443
	IF (TH.GE.4.09) GO TO 2	FAREQ	07444
	AK=ALOG(1.E5*BT)/.69314718055	FAREQ	07445
	AL=ALOG(1.E3*TH)/.69314718055	FAREQ	07446
	AKD=AK/.75+1.	FAREQ	07447
	ALD=2.*AL+1.	FAREQ	07448
	K=MAX1(2.,AKD+1.)	FAREQ	07449
	L=MAX1(2.,ALD+1.)	FAREQ	07450
	P=FLOAT(K)-AKD	FAREQ	07451
	Q=FLOAT(L)-ALD	FAREQ	07452
	P2=P*2	FAREQ	07453
	Q2=Q*2	FAREQ	07454
	PQ=P*Q	FAREQ	07455
	TPQ=PQ+PQ	FAREQ	07456
	FJINI=EXP(.5*((Q2-Q)*ALOGJ(K,L+1)+(P2-P)*ALOGJ(K+1,L)+(P2-TPQ+P)*A	FAREQ	07457
	LOGJ(K-1,L)+(Q2-TPQ+Q)*ALOGJ(K,L-1)+(1.+PQ-P2-Q2)*ALOGJ(K,L)+PQ*A	FAREQ	07458
	2LOGJ(K-1,L-1))	FAREQ	07459
	RETURN	FAREQ	07460
1	AIMZ=TH/SR2	FAREQ	07461
	CALL WANL (J.,AIMZ,REW,AIMW)	FAREQ	07462
	FJINT=PIH/BT*(1.-SRP/2.*AIMZ/BT*REW)	FAREQ	07463
	RETURN	FAREQ	07464
2	SRB=SQRT(BT*(BT+1.))	FAREQ	07465
	FJINT=PIH/SRB+8.*PIH/TH**2*BT*((BT**2+1.5*BT+.375)/(BT+1.)/SRB-1.)	FAREQ	07466
	RETURN	FAREQ	07467
3	FJINT=PIH/BT	FAREQ	07468
	RETURN	FAREQ	07469
	END	FAREQ	07470

C	SUBROUTINE WANL (X,Y,U,V)	FARED	07471
C		FARED	07472
C	WANL COMPUTES THE REAL AND IMAGINARY PARTS OF THE COMPLEX	FARED	07473
C	PROBABILITY INTEGRAL.IT IS AN IMPROVED VERSION OF THE	FARED	07474
C	ROUTINE DEVELOPED BY THACHER AND O SHEA.	FARED	07475
		FARED	07476
	DIMENSION A(12,2), B(12,2), ABT(11), AT(11), ABA(11), AA(11)	FARED	07477
	DATA (A(I),I=1,12),(B(I),I=1,12)/.0001354280714,.0001646905962,.00	FARED	07478
	102045830617,.0002609611853,.0003443545717,.0004752903052,.00069834	FARED	07479
	202779,.001126194867,.002119093028,.005442176871,.04444444444,1.128	FARED	07480
	3379167,.0004948045522,.0005963029219,.0007326007326,.0009216589861	FARED	07481
	4,.001194743139,.001610305958,.002288329519,.003508771930,.00606060	FARED	07482
	56061,.001298701299,.04761904762,-.3333333333/	FARED	07483
	DATA (A(I),I=13,24),(B(I),I=13,24)/-462.,-380.,-306.,-240.,-182.,-	FARED	07484
	1132.,-90.,-56.,-30.,-12.,-2.,1.128379167,-45.,-41.,-37.,-33.,-29.,	FARED	07485
	2-25.,-21.,-17.,-13.,-9.,-5.,-1./	FARED	07486
	DATA (ABT(I),I=2,11),(AT(I),I=2,11),(ABA(I),I=1,10),(AA(I),I=1,10)	FARED	07487
	1/1.14,1.14,1.28,1.40,1.56,1.54,1.64,1.74,1.91,2.08,.102,.435,1.06,	FARED	07488
	22.02,3.24,4.75,6.56,8.65,11.0,13.7,1.00,1.11,1.46,2.45,2.75,3.50,4	FARED	07489
	3.14,4.79,5.45,6.24,380.,36.0,18.7,16.2,14.6,14.0,13.4,12.9,12.6,12	FARED	07490
	4.4/	FARED	07491
	IF (Y.GE.0.) GO TO 1	FARED	07492
	STOP 2221	FARED	07493
1	XSQ=X*X	FARED	07494
	YSQ=Y*Y	FARED	07495
	ZSQ=XSQ-YSQ	FARED	07496
	ZSQI=2.*X*Y	FARED	07497
	DO 2 I=1,4	FARED	07498
	IF (XSQ+ABA(I)*YSQ.LT.AA(I)) GO TO 2	FARED	07499
	N=I	FARED	07500
	GO TO 7	FARED	07501
C		FARED	07502
2	CONTINUE	FARED	07503
	IF (Y.LT..8.OR.XSQ+ABA(10)*YSQ.LT.AA(10)) GO TO 3	FARED	07504
	GO TO 5	FARED	07505
C		FARED	07506
3	DO 4 I=2,11	FARED	07507
	IF (XSQ+ABT(I)*YSQ.GE.AT(I)) GO TO 4	FARED	07508
	N=I	FARED	07509
	GO TO 8	FARED	07510
C		FARED	07511
4	CONTINUE	FARED	07512
	N=12	FARED	07513
	GO TO 8	FARED	07514
C		FARED	07515
5	DO 6 I=5,9	FARED	07516
	IF (XSQ+ABA(I)*YSQ.LT.AA(I)) GO TO 6	FARED	07517
	N=I	FARED	07518
	GO TO 7	FARED	07519
C		FARED	07520

6	CONTINUE	FARED	07521
	N=10	FARED	07522
7	K=2	FARED	07523
	ANUR=ZSQR+ZSQR	FARED	07524
	ANUI=ZSQI+ZSQI	FARED	07525
	GO TO 9	FARED	07526
C		FARED	07527
8	K=1	FARED	07528
	ZSQ=.5/(ZSQR**2+ZSQI**2)	FARED	07529
	ANUR=-ZSQR*ZSQ	FARED	07530
	ANUI=ZSQI*ZSQ	FARED	07531
9	Z1R=0.	FARED	07532
	Z1I=0.	FARED	07533
	N1=13-N	FARED	07534
	DO 1J M=N1,12	FARED	07535
	RE=ANUR+B(M,K)+Z1R	FARED	07536
	AI=ANUI+Z1I	FARED	07537
	Z1SQ=A(M,K)/(RE**2+AI**2)	FARED	07538
	Z1R=RE*Z1SQ	FARED	07539
10	Z1I=-AI*Z1SQ	FARED	07540
	U=-Z1R*Y-Z1I*X	FARED	07541
	V=Z1R*X-Z1I*Y	FARED	07542
	IF (K.EQ.2) RETURN	FARED	07543
	EX=EXP(-ZSQR)	FARED	07544
	U1=EX*COS(ZSQI)+ANUR*U-ANUI*V	FARED	07545
	V=-EX*SIN(ZSQI)+ANUR*V+ANUI*U	FARED	07546
	U=U1	FARED	07547
	RETURN	FARED	07548
	END	FARED	07549

	SUBROUTINE ECCLJ (M,N,E0,E1,NMAT,MU,BJ,GG,D,EFN,GNZ,EFF,GF,SB,AK,A	FARED	07550
	1M,NRN,NEF,NJS0,NJS1,ECK,EUL0,EUL1,SPIN,SIGC,SIGF,SC,SF,T,IO)	FARED	07551
	DIMENSION E1(1), MU(1), BJ(1), GG(1), D(1), EFN(1), GNZ(1), EFF(1)	FARED	07552
	1, GF(1), SB(1), NRN(1), NEF(1), SIGC(1), SIGF(1), SC(1), SF(1), E0	FARED	07553
	2(1), SPIN(1)	FARED	07554
	DIMENSION T(1)	FARED	07555
C		FARED	07556
C	ECCLJ IS CALLED BY UNRES TO EVALUATE UNRESOLVED RESONANCE	FARED	07557
C	CROSS SECTIONS AT EACH ENERGY POINT FOR EACH L,J SEQUENCE.	FARED	07558
C		FARED	07559
	MJ1=J	FARED	07560
	NSUM=0	FARED	07561
	IF (NJS1) 2,1,2	FARED	07562
1	MJ=M+1	FARED	07563
	MJ1=J	FARED	07564
	II=1	FARED	07565
	NSUM=NJS0	FARED	07566
	LJ=1	FARED	07567
	GO TO 3	FARED	07568
C		FARED	07569
2	MJ1=1	FARED	07570
	II=NJS0+1	FARED	07571
	NSUM=NJS0+NJS1	FARED	07572
	LJ=M+2	FARED	07573
	MJ=M+N+2	FARED	07574
3	L=MJ1+1	FARED	07575
	J=0	FARED	07576
	DO 15 K=LJ,MJ	FARED	07577
	J=J+1	FARED	07578
	SC(K)=0.0	FARED	07579
	SF(K)=0.0	FARED	07580
	DO 15 I=II,NSUM	FARED	07581
	SD=SB(NMAT)/D(I)	FARED	07582
	SGD=SU*GG(I)	FARED	07583
	IF (MJ1) 5,4,5	FARED	07584
4	E=Eu(J)	FARED	07585
	GO TO 6	FARED	07586
C		FARED	07587
5	E=E1(J)	FARED	07588
6	CALL LOOK (EFN,GNZ,E,NRN,I,GNZI)	FARED	07589
	V=1.0	FARED	07590
	NDOFF=1	FARED	07591
	IF (MU(I).GT.1) NDOFF=2	FARED	07592
	UM=MU(I)	FARED	07593
	IF (MJ1.EQ.0) UM=1.0	FARED	07594
	G=.5*(2.0*BJ(I)+1.0)/(2.0*SPIN(NMAT)+1.0)	FARED	07595
	AMR=AM/1.008665	FARED	07596
	DEL=SQRT(.00034445*E*T(1)/AMR)	FARED	07597
	IF (MJ1) 7,8,7	FARED	07598
7	XX=AK*AK*E	FARED	07599

	V=XX/(1.0+XX)	FARED	07600
8	GNO=GNZI*V*UM	FARED	07601
	IF (NEF(I)) 10,9,10	FARED	07602
9	GFF=0.0	FARED	07603
	GO TO 11	FARED	07604
C		FARED	07605
10	CALL LOOK (EFF,GF,E,NEF,I,GFF,IO)	FARED	07606
11	CONTINUE	FARED	07607
	CALL JAVUS(GG(I),GFF,GNO,E,SB(NMAT),G,DEL,AJNF,GJNF,NDOFF,D(I),AJD	FARED	07608
	1N)	FARED	07609
	IF (AJUN.LT.0.0) GO TO 30	FARED	07610
	SIGC(I)=AJNF*SGD	FARED	07611
	SC(K)=SC(K)+SIGC(I)	FARED	07612
	IF (NEF(I)) 12,13,12	FARED	07613
12	SIGF(I)=GJNF*SD	FARED	07614
	SF(K)=SF(K)+SIGF(I)	FARED	07615
	GO TO 14	FARED	07616
C		FARED	07617
13	SIGF(I)=0.0	FARED	07618
14	WRITE (IO,18) E,MJ1,BJ(I),SIGC(I),SIGF(I),AJDN	FARED	07619
15	CONTINUE	FARED	07620
	IF (ECK) 16,17,16	FARED	07621
16	IF (MJ1) 1,17,1	FARED	07622
17	RETURN	FARED	07623
C		FARED	07624
18	FORMAT(1H ,E16.6,I9,3X,3E16.6,6X,E16.6)	FARED	07625
30	PRINT 31,I,GG(I),GFF,GNO,E,SB(NMAT),G,DEL,AJNF,NDOFF,D(I),AJDN	FARED	07626
31	FORMAT(1H0,5HEC5LJ,3X,I5,5E16.6/1H0,6E16.6)	FARED	07627
	STOP 11	FARED	07628
	END	FARED	07629

	SUBROUTINE BGACS (SFF,SCC,E0,E1,SF,SC,SIGC,SIGF,M,NLL,EUL0,EUL1,IB	FARED	07630
	IG,NEF,GE,EUCR,NJS0,NJS1,N,NGE,IZ,IO)	FARED	07631
	DIMENSION EJ(1), E1(1), SF(1), SC(1), SIGC(1), SIGF(1), NEF(1), SC	FARED	07632
	10(50), SF0(50), GE(1)	FARED	07633
	DIMENSION SCC(1), SFF(1)	FARED	07634
C		FARED	07635
C	SUBROUTINE BGACS CALCULATES THE AVERAGE UNRESOLVED GROSS	FARED	07636
C	SECTIONS FOR EACH MICROGROUP ASSUMING LINEAR-LOG VARIATION BETWEEN	FARED	07637
C	THE CROSS SECTIONS FROM ECSLJ AND A 1/E FLUX VARIATION WITHIN THE	FARED	07638
C	GROUP.	FARED	07639
C	LSW=J	FARED	07640
	I=1	FARED	07641
	DO 2 IL=1,NJS0	FARED	07642
	IF (NEF(IL)) 2,1,2	FARED	07643
1	CONTINUE	FARED	07644
	NEFL=J	FARED	07645
	GO TO 3	FARED	07646
C		FARED	07647
2	NEFL=1	FARED	07648
3	IF (EUCR.EQ.6E(I)) GO TO 4	FARED	07649
	I=I+1	FARED	07650
	GO TO 3	FARED	07651
C		FARED	07652
4	KE=I-1	FARED	07653
	K=IBG	FARED	07654
	DO 5 J=1,50	FARED	07655
	SC0(J)=0.0	FARED	07656
5	SF0(J)=0.0	FARED	07657
	MK=M+1	FARED	07658
	NL=0	FARED	07659
	L=0	FARED	07660
	IF (NLL.NE.J) L=1	FARED	07661
	DELV=ALOG(EJ(1)/EJ(2))	FARED	07662
	EUL=EULJ	FARED	07663
	LLL=J	FARED	07664
	LL=0	FARED	07665
6	DO 7 J=1,NGE	FARED	07666
	SC(J)=0.0	FARED	07667
7	SF(J)=0.0	FARED	07668
	IBGL=IBG+1-I	FARED	07669
	SIGCEN=SIGC(MK)	FARED	07670
	SIGFEN=SIGF(MK)	FARED	07671
	DO 35 J=1,IBGL	FARED	07672
	EJ1=GE(K)	FARED	07673
	EJ2=GE(K+1)	FARED	07674
	DELU=ALOG(EJ1/EJ2)	FARED	07675
8	IF (NL) 9,10,9	FARED	07676
9	E=E1(NK)	FARED	07677
	IF (NK.NE.1) EL=E1(NK-1)	FARED	07678
		FARED	07679

	EE=E1(NK-1)	FARED	07680
	GO TO 13	FARED	07681
C		FARED	07682
10	E=E0(MK)	FARED	07683
	IF (MK.NE.1) EL=E0(MK-1)	FARED	07684
	EE=EJ(MK-1)	FARED	07685
	IF (J-1) 13,11,13	FARED	07686
11	IF (EUL-EJ0) 12,13,12	FARED	07687
12	LL=1	FARED	07688
13	IF (NEFL) 14,15,14	FARED	07689
14	ANF=(SIGF(MK-1)-SIGF(MK))/DELV	FARED	07690
15	ANC=(SIGC(MK-1)-SIGC(MK))/DELV	FARED	07691
	EM=E	FARED	07692
	EM1=EJ1	FARED	07693
	IF (EE.LT.EJ1) EM1=EE	FARED	07694
	IF (EJ0.GT.E.OR.EJ0.EQ.E) EM=EJ0	FARED	07695
	EN=EE	FARED	07696
	IF (EN-EJ1) 19,19,16	FARED	07697
16	IF (NEFL) 17,18,17	FARED	07698
17	SFJA=SIGF(MK)+ANF*ALOG(EJ1/E)	FARED	07699
18	SCJA=SIGC(MK)+ANC*ALOG(EJ1/E)	FARED	07700
	EE=EJ1	FARED	07701
	GO TO 22	FARED	07702
C		FARED	07703
19	IF (NEFL) 20,21,20	FARED	07704
20	SFJA=SIGF(MK)+ANF*ALOG(EM1/E)	FARED	07705
21	SCJA=SIGC(MK)+ANC*ALOG(EM1/E)	FARED	07706
22	DELW=ALOG(EM1/EM)	FARED	07707
	IF (NEFL) 23,24,23	FARED	07708
23	SF(K)=SF(K)+(SIGFEN-ANF*ALOG(EM))*DELW+ANF/2.0*(ALOG(EM1)*ALOG(EM1)-ALOG(EM)*ALOG(EM))	FARED	07709
1		FARED	07710
24	SC(K)=SC(K)+(SIGCEN-ANC*ALOG(EM))*DELW+ANC/2.0*(ALOG(EM1)*ALOG(EM1)-ALOG(EM)*ALOG(EM))	FARED	07711
1		FARED	07712
	SIGCEN=SCJA	FARED	07713
	SIGFEN=SFJA	FARED	07714
	IF (EN-EJ1) 25,26,26	FARED	07715
25	MK=MK-1	FARED	07716
	NK=NK-1	FARED	07717
	GO TO 8	FARED	07718
C		FARED	07719
26	IF (LL-1) 30,27,30	FARED	07720
27	IF (NEFL) 28,29,28	FARED	07721
28	SF(K)=1.0/DELU*(SF(K)+SFF(IZ)*ALOG(EUL0/EJ0))	FARED	07722
29	SC(K)=1.0/DELU*(SC(K)+SCC(IZ)*ALOG(EUL0/EJ0))	FARED	07723
	LL=0	FARED	07724
	GO TO 33	FARED	07725
C		FARED	07726
30	IF (NEFL) 31,32,31	FARED	07727
31	SF(K)=1.0/DELU*SFF(K)	FARED	07728
32	SC(K)=1.0/DELU*SC(K)	FARED	07729

33	K=K-1	FARED	07730
	IF (EJ1.GE.EN) GO TO 34	FARED	07731
	GO TO 35	FARED	07732
C		FARED	07733
34	MK=MK-1	FARED	07734
	NK=NK-1	FARED	07735
35	CONTINUE	FARED	07736
	IF (L-1) 45,36,45	FARED	07737
36	IF (LSW) 37,39,37	FARED	07738
37	LSW=J	FARED	07739
	DO 38 J=1,IBG	FARED	07740
	SC(J)=SC(J)+SC0(J)	FARED	07741
	SF(J)=SF(J)+SF0(J)	FARED	07742
38	CONTINUE	FARED	07743
	GO TO 45	FARED	07744
C		FARED	07745
39	DO 40 J=1,IBG	FARED	07746
	SF0(J)=SF(J)	FARED	07747
40	SC0(J)=SC(J)	FARED	07748
	LSW=1	FARED	07749
	DO 41 J=1,NGE	FARED	07750
	IF (EUL1.LT.GE(J).AND.EUL1.GE.GE(J+1)) GO TO 42	FARED	07751
41	CONTINUE	FARED	07752
42	K=J	FARED	07753
	IBG=J	FARED	07754
	MK=M+N+2	FARED	07755
	NK=N+1	FARED	07756
	NL=1	FARED	07757
	DELV=ALOG(E1(1)/E1(2))	FARED	07758
	EUL=EUL1	FARED	07759
	LL=0	FARED	07760
	LLL=J	FARED	07761
	NSUM=NJSJ+NJS1	FARED	07762
	NSJ0=NJS0+1	FARED	07763
	DO 44 IL=NSJ0,NSUM	FARED	07764
	IF (NEF(IL)) 44,43,44	FARED	07765
43	CONTINUE	FARED	07766
	NEFL=J	FARED	07767
	GO TO 6	FARED	07768
C		FARED	07769
44	NEFL=1	FARED	07770
	GO TO 6	FARED	07771
C		FARED	07772
45	RETURN	FARED	07773
	END	FARED	07774

OVERLAY(RIM,2,3)	FARED	07775
PROGRAM BGMCS	FARED	07776
	FARED	07777
	FARED	07778
	FARED	07779
THIS PROGRAM PERFORMS THE FUNDAMENTAL-MODE SPECTRUM	FARED	07780
CALCULATION IN 100 GROUPS OR LESS FOR EACH BLOCK COMPOSITION USING	FARED	07781
BLOCK DATA FROM TAPE19, MICROGROUP CROSS SECTION AND TRANSFER	FARED	07782
MATRIX DATA FROM FILE 5 OF THE RETAP LIBRARY(PLACED ON TAPE 4 BY	FARED	07783
FARED), AND RESONANCE CAPTURE AND FISSION CROSS SECTION DATA PLACED	FARED	07784
ON TAPE 13 BY UNRES.BGMCS ALSO PERFORMS THE CROSS SECTION COLLAPSE	FARED	07785
CALCULATION TO FORM POLYGROUP CROSS SECTION SETS FOR EACH BLOCK	FARED	07786
	FARED	07787
COMMON NTAP(20), NFLAG(100), NPOINT(20), ZONE(2000)	FARED	07788
COMMON /REGA2/ AK(30), AM(30), ANHET(30), ELR(30), GE(101), ICOMP(30),	FARED	07789
1 INRG(30), IND2, NBGO, NGE, NEL, R(30), RODD, SPIN(30), T(2), V	FARED	07790
COMMON /REGA1/ BK(47), JG8(31), JGDS, NRJG	FARED	07791
COMMON /REGA3/ NF1, NF2	FARED	07792
DIMENSION AMP(100), ANHOM(30), ALIST(18), BNHOM(30), CHI(30), CORC(100)	FARED	07793
1, CORF(100), CSECT(1600), DELC(30,30), FC(30,30), FNUC(30,30), IDC1(4),	FARED	07794
2 IDC2(4), IDZ(20), IZON(2000), HI(30), HO(30), KA(5), KCIND(30), N2N(30),	FARED	07795
3 NCAP(30), NDEL(30), NFIS(30), NFNU(30), NSID(20), NTR(30), NUR(30),	FARED	07796
4 PHI(100), RCORR(30), S(100), S2NC(30,30), SAJ(30), SC(30,30), SIG2N(30),	FARED	07797
5 SIGLC(30), SIGLF(30), SIGNU(30), SIGTR(30), SLJCF(7,100,2), SOI(30),	FARED	07798
6 SRCORR(30), SSIG2N(30), SSIGLC(30), SSIGLF(30), SSIGNU(30), SSIGTR(30),	FARED	07799
7 STRC(30,30), STRS(30,15), TRS(30,15), VTX1(6), VTX2(6), XTR0(5150),	FARED	07800
8 XTR1(5150)	FARED	07801
EQUIVALENCE (BK(1), IDB), (BK(6), NCELL), (BK(7), NS), (BK(8), IDZ(1)),	FARED	07802
1 (BK(28), IDC1(1)), (BK(32), VTX1(1)), (BK(38), IDC2(1)), (BK(42), VTX2(1))	FARED	07803
2), (ANHET, ANHOM), (ZONE, IZON), (ICHAR, NFLAG(98))	FARED	07804
INTEGER AIM, SUBE, EBOY, EBOY1	FARED	07805
ICHARS=72/ICHAR	FARED	07806
IE1=2HJ+	FARED	07807
MX=NTAP(13)	FARED	07808
REWIND MX	FARED	07809
IO=NTAP(15)	FARED	07810
IF (NF2.GT.0) IO=NTAP(2)	FARED	07811
EBOY=NTAP(4)	FARED	07812
EBOY1=NTAP(7)	FARED	07813
NCOR=NTAP(12)	FARED	07814
AIM=NTAP(14)	FARED	07815
SUBE=NTAP(19)	FARED	07816
NGRP=NGE	FARED	07817
DO 1 I=1, NGE	FARED	07818
PHI(I)=0.0	FARED	07819
AMP(I)=0.0	FARED	07820
CORC(I)=0.0	FARED	07821
1 CORF(I)=0.0	FARED	07822
KTAPE=555	FARED	07823
DO 2 I=1, 30	FARED	07824

	DO 2 J=1,15	FARED	07825
	TRS(I,J)=0.0	FAREC	07826
	STRS(I,J)=0.0	FARED	07827
2	CONTINUE	FARED	07828
	DO 111 I=1,1600	FARED	07829
111	CSECT(I)=0.0	FARED	07830
	IB=1	FARED	07831
	MTAPE=666	FARED	07832
	READ (SUBE) NTAPE,NB	FARED	07833
	WRITE (AIM) MTAPE,NB,NRJG,JGUS	FARED	07834
	KQ=0	FARED	07835
	IF (KTAPE.NE.MTAPE) GO TO 34	FARED	07836
3	READ (SUBE) IDB,NRI,B,NS	FARED	07837
	CALL REOF (EBOY)	FARED	07838
	CALL REOF (EBOY)	FARED	07839
	READ (EBOY) NFILE,N6,NSOU,NDUM	FARED	07840
	READ (EBOY) (NSID(J),J=1,NSOU)	FARED	07841
	DO 4 J=1,NSOU	FARED	07842
	IF (NS.EQ.NSID(J)) GO TO 5	FARED	07843
4	CONTINUE	FARED	07844
5	READ(EBOY) KSOU,(ALIST(J),J=1,ICHARS),(S(J),J=1,NGE)	FARED	07845
	REWIND EBOY	FARED	07846
	READ (SUBE) IDJP,IND2,NCELL,NEL,(ICOMP(I),I=1,NEL),(BNHOM(I),I=1,N	FARED	07847
	IEL),T(1),(KCIND(I),I=1,NEL)	FARED	07848
	IF (NRI.NE.1) GO TO 7	FARED	07849
	READ (NCOR) INDCOR,IDBLK	FARED	07850
	READ (NCOR) (NUR(MC),MC=1,NEL)	FARED	07851
	DO 6 LMC=1,NEL	FARED	07852
	IF (NUR(LMC).EQ.0) GO TO 6	FARED	07853
	READ (NCOR) (SLJCF(LMC,J,1),SLJCF(LMC,J,2),J=1,NGE)	FARED	07854
6	CONTINUE	FARED	07855
7	CONTINUE	FARED	07856
	WRITE(IO,36)	FARED	07857
	WRITE (IO,37) IB	FARED	07858
	WRITE (IO,38) IB	FARED	07859
	WRITE (IO,39)	FARED	07860
	KN=0	FARED	07861
	K=1	FARED	07862
	KC=1	FARED	07863
	DO 9 N=1,NEL	FARED	07864
	CALL CONVL(ICOMP(N),HO(N),HI(N))	FARED	07865
	SIGLC(N)=0.0	FARED	07866
	SIGLF(N)=0.0	FARED	07867
	RCORR(N)=0.0	FARED	07868
	SIGNU(N)=0.0	FARED	07869
	SIGTR(N)=0.0	FARED	07870
	SIG2N(N)=0.0	FARED	07871
	SSIGLC(N)=0.0	FARED	07872
	SSIGLF(N)=0.0	FARED	07873
	SSIGTR(N)=0.0	FARED	07874

	SSIG2N(N)=0.0	FARED	07875
	SSIGNU(N)=0.0	FARED	07876
9	SRCORR(N)=0.0	FARED	07877
	WRITE(IO,40) (HO(I),HI(I),BNHOM(I),I=1,NEL)	FARED	07878
	DO 10 I=1,NRJG	FARED	07879
11	CHI(I)=0.0	FARED	07880
	OI=0.0	FARED	07881
	AJ=0.0	FARED	07882
	JP=1	FARED	07883
	DO 22 J=1,NGRP	FARED	07884
	C1=0.0	FARED	07885
	C3=0.0	FARED	07886
	C4=0.0	FARED	07887
	C5=0.0	FARED	07888
	STJ=0.0	FARED	07889
	CHI(JP)=CHI(JP)+S(J)	FARED	07890
	DO 12 N=1,NEL	FARED	07891
	NID=ICOMP(N)	FARED	07892
	NUN=N	FARED	07893
	CALL MATFIL (CSECT,CORC,CORF,ICAP,IFIS,IFNU,IN2N,IEP,XTR0,XT	FARED	07894
1	R1,NDS,NTS,KC,NID,NGE,KA,NRI,NUN,NUR,NCOR,EBOY1,IO,SLJCF)	FARED	07895
	IF (J.NE.1) GO TO 11	FARED	07896
	NCAP(N)=KA(1)	FARED	07897
	NFIS(N)=KA(2)	FARED	07898
	NFNU(N)=KA(3)	FARED	07899
	N2N(N)=KA(4)	FARED	07900
	NDEL(N)=KA(5)	FARED	07901
	NTR(N)=NDS	FARED	07902
11	CONTINUE	FARED	07903
	CALL CIJ (XTR0,XTR1,ICAP,IFIS,IN2N,IEP,NGRP,CSECT,8,NDS,NTS,C1,C2,	FARED	07904
	103,C4,C5,PHI,AMP,J,CORC,CORF,SIGLC(N),SIGLF(N),RCORR(N),SIG2N(N),S	FARED	07905
	2IGNU(N),SIGTR(N),BNHOM(N),STJ,IO,NUN,NEL)	FARED	07906
	IF (J.GT.JGB(NRJG)) GO TO 12	FARED	07907
	IF (NTR(N).LE.0) GO TO 12	FARED	07908
	CALL TRMAX (JGB,JGUS,XTR0,K,TRS,J,NUN,NDS,NGRP)	FARED	07909
12	CONTINUE	FARED	07910
	REWIND EBOY1	FARED	07911
	KU=1	FARED	07912
	AMP(J)=(C2*(S(J)+C3)+3.*C1*C5)/(C2*C2+3.*C1*C4)	FARED	07913
	PHI(J)=-3.*(C5-C4*AMP(J))/C2	FARED	07914
	OI=OI+PHI(J)	FARED	07915
	AJ=AJ+AMP(J)	FARED	07916
	IF (J.GT.JGB(NRJG)) GO TO 22	FARED	07917
	DO 21 N=1,NEL	FARED	07918
	SSIGLC(N)=SIGLC(N)*PHI(J)+SSIGLC(N)	FARED	07919
	SSIGLF(N)=SIGLF(N)*PHI(J)+SSIGLF(N)	FARED	07920
	SRCORR(N)=RCORR(N)*PHI(J)+SRCORR(N)	FARED	07921
	SSIGNU(N)=SIGNU(N)*PHI(J)+SSIGNU(N)	FARED	07922
	SSIGTR(N)=SIGTR(N)*AMP(J)+SSIGTR(N)	FARED	07923
	SSIG2N(N)=SIG2N(N)*PHI(J)+SSIG2N(N)	FARED	07924

	IF(NTR(N)) 13,13,14	FARED	07925
13	IF (J.EQ.JGB(K).AND.N.EQ.NEL) GO TO 15	FARED	07926
	GO TO 21	FARED	07927
C		FARED	07928
14	CONTINUE	FARED	07929
	CALL TRAMAT (JGDS,JGB,TRS,K,J,N,PHI,STRS,LSW,LR)	FARED	07930
	GO TO 13	FARED	07931
C		FARED	07932
15	DO 16 M=1,NEL	FARED	07933
	SC(M,JP)=SSIGLC(M)/OI	FARED	07934
	FC(M,JP)=SSIGLF(M)/OI	FARED	07935
	FNUC(M,JP)=0.0	FARED	07936
	IF (FC(M,JP).NE.0.0) FNUC(M,JP)=SSIGNU(M)/(OI*FC(M,JP))	FARED	07937
	DELC(M,JP)=SRCORR(M)/OI	FARED	07938
	S2NC(M,JP)=SSIG2N(M)/OI	FARED	07939
	STRC(M,JP)=SSIGTR(M)/AJ	FARED	07940
	IF(N2N(M).EQ.1) NOEL(M)=1	FARED	07941
16	CONTINUE	FARED	07942
	IF (KN.NE.0) GO TO 17	FARED	07943
	WRITE (AIM) IDB,NEL,(ICOMP(I),NCAP(I),NFIS(I),N2N(I),NOEL(I)	FARED	07944
1	,NTR(I),I=1,NEL)	FARED	07945
	KN=1	FARED	07946
17	DO 19 I=1,NEL	FARED	07947
	IF (NTR(I).LE.0.OR.K.EQ.NRJG) GO TO 19	FARED	07948
	MINJ=MIN0(K+JGDS,NRJG)	FARED	07949
	MINK=MINJ-K	FARED	07950
	WRITE (AIM) ICOMP(I),I,MINK,K,(STRS(I,JK),JK=1,MINK)	FARED	07951
	WRITE (MX) I,MINK,(STRS(I,JK),JK=1,MINK)	FARED	07952
	DO 18 JZ=1,JGDS	FARED	07953
18	STRS(I,JZ)=0.0	FARED	07954
19	CONTINUE	FARED	07955
	SOI(K)=OI	FARED	07956
	SAJ(K)=AJ	FARED	07957
	K=K+1	FARED	07958
	JP=JP+1	FARED	07959
	OI=0.0	FARED	07960
	AJ=0.0	FARED	07961
	DO 20 I=1,NEL	FARED	07962
	SSIGLC(I)=0.0	FARED	07963
	SSIGLF(I)=0.0	FARED	07964
	SSIGTR(I)=0.0	FARED	07965
	SSIGNU(I)=0.0	FARED	07966
	SRCORR(I)=0.0	FARED	07967
	SSIG2N(I)=0.0	FARED	07968
20	CONTINUE	FARED	07969
21	CONTINUE	FARED	07970
22	CONTINUE	FARED	07971
	WRITE (IO,41)	FARED	07972
	WRITE (IO,42)	FARED	07973
	NGEE=(NGE+1)/2	FARED	07974

	DO 23 II=1,NGEE	FARED	07975
	IJ=II+NGEE	FARED	07976
23	WRITE (IO,43) II,PHI(II),AMP(II),IJ,PHI(IJ),AMP(IJ)	FARED	07977
	WRITE (IO,44)	FARED	07978
	WRITE (IO,45)	FARED	07979
	WRITE (IO,46) (II,SOI(II),SAJ(II),CHI(II),II=1,NRJG)	FARED	07980
	WRITE (AIM) (CHI(I),I=1,NRJG)	FARED	07981
	NELL=0	FARED	07982
	DO 24 N=1,NEL	FARED	07983
	WRITE (AIM) (STRC(N,JP),JP=1,NRJG)	FARED	07984
	IF (NCAP(N).EQ.0) GO TO 24	FARED	07985
	WRITE (AIM) (SC(N,JP),JP=1,NRJG)	FARED	07986
24	IF (NFIS(N).EQ.0) GO TO 25	FARED	07987
	WRITE (AIM) (FC(N,JP),JP=1,NRJG), (FNUC(N,JP),JP=1,NRJG)	FARED	07988
25	IF (N2N(N).EQ.0) GO TO 26	FARED	07989
	WRITE (AIM) (S2NC(N,JP),JP=1,NRJG)	FARED	07990
26	IF (NDEL(N).EQ.0) GO TO 27	FARED	07991
	WRITE (AIM) (DELC(N,JP),JP=1,NRJG)	FARED	07992
27	CONTINUE	FARED	07993
	IF (NTR(N).GT.0) NELL=NELL+1	FARED	07994
	WRITE (IO,47) HO(N),HI(N)	FARED	07995
	WRITE (IO,48)	FARED	07996
	WRITE (IO,49) (JP,SC(N,JP),FC(N,JP),STRC(N,JP),S2NC(N,JP),FNUC(N,JP),DELC(N,JP),JP=1,NRJG)	FARED	07997
28	CONTINUE	FARED	07998
	NELL=NELL-1	FARED	07999
	REWIND MX	FARED	08000
	DO 33 IA=1,NEL	FARED	08001
	IF (NTR(IA).LE.0) GO TO 33	FARED	08002
	WRITE (IO,50) HO(IA),HI(IA)	FARED	08003
	IAI=IA-1	FARED	08004
	IX=MIN0(6,JGDS)	FARED	08005
	WRITE (IO,52) (IE1,IE,IE=1,IX)	FARED	08006
52	FORMAT(1H0,2X,*J*,6(13X,A2,I1))	FARED	08007
	IF (IAI.LT.1) GO TO 30	FARED	08008
	DO 29 IE=1,IAI	FARED	08009
29	READ (MX)	FARED	08010
30	DO 32 IC=1,NRJG	FARED	08011
	IF (IC.EQ.NRJG) GO TO 32	FARED	08012
	READ (MX) ID,MINK,(STRS(IC,JP),JP=1,MINK)	FARED	08013
	WRITE (IO,51) IC,(STRS(IC,JP),JP=1,MINK)	FARED	08014
	IF (NELL.EQ.3.OR.IC.EQ.NRJG-1) GO TO 32	FARED	08015
	DO 31 IE=1,NELL	FARED	08016
31	READ (MX)	FARED	08017
32	CONTINUE	FARED	08018
	REWIND MX	FARED	08019
33	CONTINUE	FARED	08020
	IB=IB+1	FARED	08021
	IF (NCELL.GE.1) READ (SUBE) NEL1,INOC1	FARED	08022
	IF (NCELL.EQ.2) READ (SUBE) NEL2,INOC2	FARED	08023
		FARED	08024

	REWIND EBOY	FARED	08025
	IF (IB.LE.NB) GO TO 3	FARED	08026
	END FILE AIM	FARED	08027
	REWIND AIM	FARED	08028
	RETURN	FARED	08029
34	STOP 1003	FARED	08030
C		FARED	08031
	36 FORMAT (1H1,41X,37H-CROSS SECTION AVERAGING CALCULATION-)	FARED	08032
	37 FORMAT (1H0,55X,5HBLOCK,I3)	FARED	08033
38	FORMAT (1H0,6H BLOCK,I3,3X,11HCOMPOSITION)	FARED	08034
39	FORMAT (1H0,8H NUCLIDE,4X,3HNO./1H ,12X,7HDENSITY)	FARED	08035
	40 FORMAT(1H ,2X,A4,A2,E16.6)	FARED	08036
	41 FORMAT (1H1,48X,25HFUNDAMENTAL MODE SPECTRUM)	FARED	08037
	42 FORMAT (1H0,13X,5HGROUP,11X,4HFLUX,11X,7HCURRENT,24X,5HGROUP,11X,4	FARED	08038
	1HFLUX,11X,7HCURRENT)	FARED	08039
43	FORMAT (1H,2(14X,I3,4X,2E16.6,9X))	FARED	08040
	44 FORMAT (1H1,53X,34HBROAD GROUP AVERAGE CROSS SECTIONS)	FARED	08041
	45 FORMAT (1H0,6H BROAD,10X,4HFLUX,12X,7HCURRENT,10X,6HSOURCE/1H ,6H	FARED	08042
	1GROUP)	FARED	08043
	46 FORMAT (1H ,14,4X,3E16.6)	FARED	08044
	47 FORMAT(1H1,42X,32H-MICROSCOPIC CROSS SECTIONS FOR ,A4,A2,1H-)	FARED	08045
48	FORMAT (1H0,4X,5HBROAD,11X,7HCAPTURE,9X,7HFISSION,9X,9HTRANSPORT,7	FARED	08046
	1X,6H(N,2N),10X,7HNEUTRON,9X,7HREMOVAL/1H ,4X,5HGROUP,75X,7HFISSION	FARED	08047
	2,9X,10HCCORRECTION)	FARED	08048
	49 FORMAT (1H ,4X,I3,9X,6E16.6)	FARED	08049
	50 FORMAT(1H1,20HTRANSFER MATRIX FOR ,A4,A2)	FARED	08050
	51 FORMAT (1H0,I3,5X,6E16.6/2(1H ,8X,6E16.6/))	FARED	08051
	END	FARED	08052

	SUBROUTINE MATFIL (CSECT,CORC,CORF,ICAP,IFIS,IFNU,IN2N,IEP,XTR0,XT	FARED	08053
	1R1,KDS,KTS,KC,NID,NGRP,KA,NRI,NRN,NUR,NCOR,EBOY,IO,SLJCF)	FARED	08054
	COMMON NTAP(20)	FARED	08055
	DIMENSION CSECT(1), XTR0(1), XTR1(1), CORC(1), CORF(1), NUR(1), KA	FARED	08056
	1(1)	FARED	08057
	DIMENSION NUID(100), NCAP(100), NFIS(100), N2N(100), NXB(100), NXC	FARED	08058
	1(100), NDS(100), NDX(100), NTS(100), NTX(100), NRS(100), JA(5)	FARED	08059
	DIMENSION SLJCF(7,100,2)	FARED	08060
C		FARED	08061
C	MATFIL READS THE RETAP FILE 5 DATA FROM TAPE 4 AND PLACES	FARED	08062
C	MICROGROUP CROSS SECTION DATA IN ARRAY CSECT AND MATRIX DATA IN	FARED	08063
C	ARRAYS XTR0 AND XTR1.	FARED	08064
C		FARED	08065
	INTEGER EBOY	FARED	08066
	IF (KC.EQ.0) GO TO 1	FARED	08067
	READ (EBOY) FILES,JF,NNU,MUM	FARED	08068
	READ(EBOY) (NUID(I),MUID,MUID1,NCAP(I),NFIS(I),N2N(I),NXB(I),NXC(I	FARED	08069
	1),NDS(I),NDX(I),NTS(I),NTX(I),NRS(I),I=1,NNU)	FARED	08070
	NR=0	FARED	08071
	NR=0	FARED	08072
	KC=0	FARED	08073
1	DO 2 I=1,NNU	FARED	08074
	IF (NID.EQ.NUID(I)) GO TO 3	FARED	08075
2	CONTINUE	FARED	08076
	IO=NTAP(2)	FARED	08077
	WRITE (IO,17)	FARED	08078
	STOP 1002	FARED	08079
3	L=I	FARED	08080
	NWORD=NXC(L)*NGRP	FARED	08081
	IF (L.EQ.1) GO TO 6	FARED	08082
	LR=L-NR-1	FARED	08083
	IF (LR.EQ.0) GO TO 7	FARED	08084
	LL=0	FARED	08085
	DO 4 I=1,LR	FARED	08086
	LI=I+NR	FARED	08087
	LN=L+1	FARED	08088
	LL=LL+NRS(LI)	FARED	08089
4	CONTINUE	FARED	08090
	DO 5 I=1,LL	FARED	08091
5	READ (EBOY)	FARED	08092
	GO TO 7	FARED	08093
C		FARED	08094
6	NR=1	FARED	08095
	GO TO 8	FARED	08096
C		FARED	08097
7	NR=L	FARED	08098
8	DO 9 I=1,NGRP	FARED	08099
	II=I+400	FARED	08100
9	CSECT(II)=0.0	FARED	08101
	KA(1)=NCAP(L)	FARED	08102

KA(2)=NFIS(L)	FARED	08103
KA(3)=NFIS(L)	FARED	08104
KA(4)=N2N(L)	FARED	08105
KA(5)=NXB(L)	FARED	08106
NW=401	FARED	08107
KL=0	FARED	08108
DO 11 I=1,5	FARED	08109
IF (KA(I).EQ.0) GO TO 13	FARED	08110
JA(I)=1+KL*NGRP	FARED	08111
KL=KL+1	FARED	08112
GO TO 11	FARED	08113
C	FARED	08114
10 JA(I)=401	FARED	08115
11 CONTINUE	FARED	08116
ICAP=JA(1)	FARED	08117
IFIS=JA(2)	FARED	08118
IFNU=JA(3)	FARED	08119
IN2N=JA(4)	FARED	08120
IEP=JA(5)	FARED	08121
KDS=NDS(L)	FARED	08122
KTS=NTS(L)	FARED	08123
KDX=NDX(L)	FARED	08124
KTX=NTX(L)	FARED	08125
READ (EBOY) IDD, (CSECT(I), I=1, NWORU)	FARED	08126
IF (KDS.LT.0) GO TO 12	FARED	08127
READ (EBOY) IDX, (XTRJ(I), I=1, KDX)	FARED	08128
IF (KTS.LT.0) GO TO 12	FARED	08129
READ (EBOY) (XTR1(I), I=1, KTX)	FARED	08130
12 IF (NRI.EQ.0) GO TO 15	FARED	08131
IF (NUR(NRN).EQ.0) GO TO 15	FARED	08132
DO 13 K=1,NGRP	FARED	08133
CORC(K)=SLJCF(NRN,K,1)	FARED	08134
13 CORF(K)=SLJCF(NRN,K,2)	FARED	08135
14 RETURN	FARED	08136
15 DO 16 K=1,NGRP	FARED	08137
CORC(K)=0.0	FARED	08138
CORF(K)=0.0	FARED	08139
16 CONTINUE	FARED	08140
GO TO 14	FARED	08141
C	FARED	08142
C	FARED	08143
17 FORMAT (1H0,38HNU IS NOT IN FILE 5 SUBROUTINE MATFIL)	FARED	08144
END	FARED	08145

	SUBROUTINE CIJ (XTRJ,XTR1,KCAP,KFIS,KN2N,KEP,NGRP,CSECT,B,NDS,NTS,	FARED	08146
	1C1,C2,C3,C4,C5,PHI,AMP,J,CORC,CORF,CS,FS,DEL,S2N,U,STR,ON,STJ,IO,N	FARED	08147
	2UN,NEL)	FARED	08148
	COMMON NTAP(20)	FARED	08149
	DIMENSION XTRJ(1), XTR1(1), CSECT(1), PHI(1), AMP(1), CORC(1), COR	FARED	08150
	1F(1)	FARED	08151
C		FARED	08152
C	ROUTINE CIJ CALLED BY BGMCS DETERMINES COEFFICIENTS C1,C2,C3,C4,	FARED	08153
C	C5 FOR FLUX AND CURRENT EQUATIONS FOR EACH MICRO GROUP J	FARED	08154
C		FARED	08155
	IF (B.GT. 0.0) C2 = SQRT(B)	FARED	08156
	IF (B.EQ. 0.0) C2 = SQRT(1.0E-20)	FARED	08157
	IF (B.LT. 0.0) C2 = -SQRT(ABS(B))	FARED	08158
	ICAP=KCAP+J-1	FARED	08159
	IFIS=KFIS+J-1	FARED	08160
	IEP=KEP+J-1	FARED	08161
	IN2N=KN2N+J-1	FARED	08162
	IF (NUN.NE.1) GO TO 1	FARED	08163
	SIGII=0.0	FARED	08164
1	CONTINUE	FARED	08165
	IF (NDS) 3,3,2	FARED	08166
2	CALL ZSIG (XTRJ,NDS,J,SIGII,SIGJK,NGRP)	FARED	08167
	GO TO 4	FARED	08168
C		FARED	08169
3	SIGII=0.0	FARED	08170
	SIGJK=0.0	FARED	08171
4	SIGT=CSECT(ICAP)+CSECT(IFIS)+CSECT(IEP)-CSECT(IN2N)+SIGJK+CORC(J)+	FARED	08172
	1CORF(J)	FARED	08173
	STJ=STJ+DN*SIGT	FARED	08174
	CS=CORC(J)+CSECT(ICAP)	FARED	08175
	FS=CORF(J)+CSECT(IFIS)	FARED	08176
	DEL=CSECT(IEP)-CSECT(IN2N)	FARED	08177
	S2N=CSECT(IN2N)	FARED	08178
	IU=IFIS+NGRP	FARED	08179
	U=CSECT(IU)*FS	FARED	08180
	IF (NUN.NE.NEL) GO TO 10	FARED	08181
	BB=ABS(B)	FARED	08182
	Y=SQRT(BB)/STJ	FARED	08183
	IF (B) 8,5,6	FARED	08184
5	G=1.0	FARED	08185
	GO TO 10	FARED	08186
C		FARED	08187
6	IF (Y.GE.1.) GO TO 7	FARED	08188
	G=1.+4.*Y*Y/15.	FARED	08189
	GO TO 10	FARED	08190
C		FARED	08191
7	G=Y*ATAN(Y)/(3.*(1.-ATAN(Y)/Y))	FARED	08192
	GO TO 10	FARED	08193
C		FARED	08194
8	IF (Y*Y.LT.1.0.AND.Y*Y.GE.0.0) GO TO 9	FARED	08195

	IO=NTAP(2)	FARED	08196
	WRITE(IO,20)	FARED	08197
20	FORMAT(1H0,14H SUBROUTINE CIJ,4X,17HY IS OUT OF RANGE,2X,29HP1 APPR	FARED	08198
	10XIMATION WILL BE USED)	FARED	08199
	G=1.0	FARED	08200
	GO TO 10	FARED	08201
9	Y2=Y*Y	FARED	08202
	Y4=Y2*Y2	FARED	08203
	Y6=Y2*Y4	FARED	08204
	G=(1.+Y2/3.+Y4/5.+Y6/7.)/(1.+3.*Y2/5.+3.*Y4/7.+3.*Y6/9.)	FARED	08205
10	C1=C1+DN*(SIGT-SIGII)	FARED	08206
	IF (NTS) 12,12,11	FARED	08207
11	CALL ZSIG (XTR1,NTS,J,SIGII,SIGJK,NGRP)	FARED	08208
	GO TO 13	FARED	08209
C		FARED	08210
12	SIGII=0.0	FARED	08211
	SIGJK=0.0	FARED	08212
13	SIGIT=SIGIT+SIGII*DN	FARED	08213
	STR=SIGT-SIGJK	FARED	08214
	IF (J-1) 15,14,15	FARED	08215
14	C3=J.0	FARED	08216
	C5=0.0	FARED	08217
	GO TO 19	FARED	08218
C		FARED	08219
15	IF (NDS) 17,19,16	FARED	08220
16	CALL SSIJ (J,XTR0,PHI,NDS,ON,C,NGRP,IO)	FARED	08221
	C3=C3+C	FARED	08222
17	IF (NTS) 19,19,18	FARED	08223
18	CALL SSIJ (J,XTR1,AMP,NTS,ON,C,NGRP,IO)	FARED	08224
	C5=C5+C	FARED	08225
19	IF (NUN.EQ.NEL) C4=G*STJ-SIGIT	FARED	08226
	RETURN	FARED	08227
	END	FARED	08228

	SUBROUTINE TRMAX (JGB,JGDS,XTR0,KK,TRS,K,L,NDS,NGRP)	FARED	08229
	DIMENSION JGB(1), XTR0(1), TRS(30,15)	FARED	08230
C		FARED	08231
C	THIS ROUTINE CALLED BY BGMCS.SUMS SIGMA(K TO J) FOR ALL J IN	FARED	08232
C	POLYGROUP JJ AND FOR EACH K IN POLYGROUP KK.	FARED	08233
C		FARED	08234
	I=KK	FARED	08235
	SKJ=0.0	FARED	08236
	LL=1	FARED	08237
	IX=JGB(I)+1	FARED	08238
	ID=(K-1)*(NDS+1)+IX-K+1	FARED	08239
	IF (K+NDS-1.GT.NGRP+1) GO TO 6	FARED	08240
	N=NDS	FARED	08241
	IF (K+N.LT.IX) GO TO 3	FARED	08242
1	CONTINUE	FARED	08243
	DO 4 MM=1,JGDS	FARED	08244
	IF (JGB(I+1).EQ.0) GO TO 5	FARED	08245
	JD=JGB(I+1)-JGB(I)	FARED	08246
	DO 2 NM=1,JD	FARED	08247
	IF -(K+NDS.LT.IX)-GO TO 3	FARED	08248
	SKJ=XTR0(ID)+SKJ	FARED	08249
	ID=ID+1	FARED	08250
	IX=IX+1	FARED	08251
2	CONTINUE	FARED	08252
3	TRS(L,LL)=SKJ	FARED	08253
	LL=LL+1	FARED	08254
	I=I+1	FARED	08255
	SKJ=0.0	FARED	08256
	IF (JGB(I+1).EQ.0) GO TO 5	FARED	08257
4	CONTINUE	FARED	08258
5	RETURN	FARED	08259
6	L=M=K+NDS-2-NGRP	FARED	08260
	N=L	FARED	08261
	NM=0	FARED	08262
	DO 7 NX=1,L	FARED	08263
	NM=N+NX	FARED	08264
7	CONTINUE	FARED	08265
	ID=ID-NM	FARED	08266
	GO TO 1	FARED	08267
C		FARED	08268
	END	FARED	08269

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SUBROUTINE ZSIG (X,NDS,M,SIGII,SIGJK,NGRP)
DIMENSION X(1), SIGII(1), SIGJK(1)

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C
C      ZSIG RETURNS THE DIAGONAL ELEMENT SIGMA(K TO K) AND THE SUM
C      OF SIGMA(K TO J) FOR ALL J GREATER THAN OR EQUAL TO K FOR THE
C      ISOTROPIC MATRIX.

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      K=1
      L=NDS
      DO 3 I=1,NGRP
        IF (I.GT.(NGRP-(NDS-1))) L=L-1
        IF (I.NE.M) GO TO 2
        SIGII=X(K)
        IF (NDS.EQ.J) GO TO 4
        SIGJK=X(K)
        DO 1 J=1,L
          KJ=K+J
1      SIGJK=SIGJK+X(KJ)
        IF (I.EQ.M) GO TO 4
2      K=K+L+1
3      CONTINUE
4      RETURN
      END

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FARED 08270
FARED 08271
FARED 08272
FARED 08273
FARED 08274
FARED 08275
FARED 08276
FARED 08277
FARED 08278
FARED 08279
FARED 08280
FARED 08281
FARED 08282
FARED 08283
FARED 08284
FARED 08285
FARED 08286
FARED 08287
FARED 08288
FARED 08289
FARED 08290
FARED 08291
FARED 08292

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	SUBROUTINE SSIJ (J,XTR,PHJ,NDS,DN,C,NGRP,IO)	FARED	08293
	COMMON NTAP(2J)	FARED	08294
	DIMENSION XTR(1), PHJ(1)	FARED	08295
C		FARED	08296
C	SUBROUTINE SSIJ CALCULATES C(3,J) AND C(5,J) FOR SUBROUTINE CIJ	FARED	08297
C		FARED	08298
	C=0.0	FARED	08299
	JNDS=(J-1)*(NDS+1)+1-NDS	FARED	08300
	N=NDS	FARED	08301
	IF (NDS.GE.J) N=J-1	FARED	08302
	KJ=J-1	FARED	08303
	LJ=J	FARED	08304
	DO 4 K=1,N	FARED	08305
	IF (LJ+NDS-1.LE.NGRP+1) GO TO 3	FARED	08306
	IF (K.GT.1) GO TO 2	FARED	08307
	L=LJ+NDS-(NGRP+2)	FARED	08308
	MM=0	FARED	08309
	DO 1 I=1,L	FARED	08310
	MM=MM+I	FARED	08311
1	CONTINUE	FARED	08312
	JX=NDS-L	FARED	08313
	JNDS=JNDS-MM+L	FARED	08314
	GO TO 3	FARED	08315
C		FARED	08316
2	JNDS=JNDS-(JX+K-1)	FARED	08317
3	CONTINUE	FARED	08318
	C=C+DN*PHJ(KJ)*XTR(JNDS)	FARED	08319
	KJ=KJ-1	FARED	08320
	LJ=LJ-1	FARED	08321
	IF (LJ+NDS-1.LE.NGRP+1) JNDS=JNDS-NDS	FARED	08322
	IF (JNDS.LE.0.AND.K.LT.N) GO TO 5	FARED	08323
4	CONTINUE	FARED	08324
	RETURN	FARED	08325
5	IO=NTAP(2)	FARED	08326
	WRITE(IO,6) J,NDS	FARED	08327
	STOP 7777	FARED	08328
C		FARED	08329
6	FORMAT (1HG,48HDOWN SCATTER OUT OF RANGE OF XTR1 OR XTR2 MATRIX,5X	FARED	08330
	1,6HGROUP=,I3,4X,4HNDS=I3,5X,12HROUTINE SSIJ)	FARED	08331
	END	FARED	08332

	SUBROUTINE TRAMAT (JGDS,JGB,TRS,KK,K,L,PHI,STRS,LSW,LR)	FARED	08333
	DIMENSION JGB(1), PHI(1), TRS(30,15), STRS(30,15)	FARED	08334
C		FARED	08335
C	THIS ROUTINE CALLED BY BGMCS SUMS RESULTS OF SUBROUTINE TRMAX FOR	FARED	08336
C	EACH POLY GROUP KK	FARED	08337
C		FARED	08338
	LSW=0	FARED	08339
	LL=1	FARED	08340
	I=KK	FARED	08341
	LR=0	FARED	08342
	IF (K.NE.JGB(I)) GO TO 4	FARED	08343
	ROTA=0.0	FARED	08344
	IF (L.NE.1) GO TO 1	FARED	08345
	N=1	FARED	08346
	GO TO 2	FARED	08347
C		FARED	08348
1	N=JGB(I-1)+1	FARED	08349
2	M=JGB(I)	FARED	08350
	DO 3 LI=N,M	FARED	08351
	ROTA=PHI(LI)+ROTA	FARED	08352
3	CONTINUE	FARED	08353
	LSW=1	FARED	08354
4	DO 6 MM=1,JGDS	FARED	08355
	IF (JGB(I+1).EQ.0) GO TO 7	FARED	08356
	STRS(L,LL)=TRS(L,LL)*PHI(K)+STRS(L,LL)	FARED	08357
	IF (LSW.NE.1) GO TO 5	FARED	08358
	STRS(L,LL)=STRS(L,LL)/ROTA	FARED	08359
	TRs(L,LL)=0.0	FARED	08360
5	LL=LL+1	FARED	08361
	I=I+1	FARED	08362
	LR=LR+1	FARED	08363
6	CONTINUE	FARED	08364
7	RETURN	FARED	08365
	END	FARED	08366

OVERLAY(RIM,3,0)
PROGRAM RAIN

THIS PROGRAM PROVIDES THE SEQUENCING CONTROL FOR ALL
CRITICALITY, DEPLETION AND EDIT CALCULATIONS.

COMMON NTAPE(20)	FARED	08367
COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZH,NN,POW,RO,RIN,RUT,CIN,MI	FARED	08368
1CT,THE,IDDC,NIB,NOB,NCV,NBUCK,NBHM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	08369
COMMON NSPARES(42)	FARED	08370
COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	08371
10,BLANKS	FARED	08372
COMMON NPOINT(20),ZONE(5000)	FARED	08373
DIMENSION NZONE(2000)	FARED	08374
EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	08375
COMMON/MIS/CHI(20,30),DELTA(20),BETA(20)	FARED	08376
COMMON/8K/BUCK2(20,30)	FARED	08377
COMMON/FLX/PHI(150,30),APHI(20,30)	FARED	08378
COMMON/ACA/AC3(20,30),AC4(20,30),AC5(20,30),AC6(5,30),DUM(1050)	FARED	08379
COMMON/MAC1/VUSIG(20,30),DIF(20,30),TRANS(4000),SIGT(20,30),SIGA(2	FARED	08380
10,30),S2N(20,30)	FARED	08381
COMMON/ACB/AC2(150)	FARED	08382
COMMON /SCH/IZ(20),X(3),AK(3),RL(20,2),KBR,NZS,IA,IB,ITT,NCVS	FARED	08383
COMMON/PSRH/ IZP(20),IZPS(20),RFZM(20),RPS(20),NZPS,NZRS,NPCVS,IT	FARED	08384
1TO,IAO,IBO,AKOUT(3),XOUT(3),REF1	FARED	08385
COMMON/PSH/ IZDUM(20),RPDUM(20)	FARED	08386
EQUIVALENCE (IKL(1),AC1(1)),(IKM(1),AC2(1)),(IKN(1),AC10(1))	FARED	08387
COMMON/GE0/DELR(20),R(150),RI(150),LB(20)	FARED	08388
COMMON/PARS/NSR,ICT,IGO,ICT2,N100,IFLX,COUT,MIC12,EIGEN,EIGEN1,P,	FARED	08389
1PIM,IST,IAFLX	FARED	08390
COMMON/PUN/PDEN(150),PDENP(20)	FARED	08391
COMMON/OM/OMEGA(30),OMEG1(30)	FARED	08392
COMMON/SO/SOU(150),SOUP(150),SOM(20),SOP(20),SOPP(30)	FARED	08393
COMMON/TEST/IDATA(2),FDATA(2),ITEST(4),IMID(20),FMIN(20),NZMT(20),	FARED	08394
1IZM(20,20),IBZ(20),NTEST,EMIN,BMAX(20),NBZ,NTNL	FARED	08395
COMMON/DPEDIT/NEDIT,ITED(10)	FARED	08396
COMMON/DEP/IDZON(20),NID(20),KZON,MODE,KBPT,NEL,MAJT,MINT,MJTE	FARED	08397
COMMON/IBR/IFB,BN(20),BD(20)	FARED	08398
INTEGER S01,T1	FARED	08399
NT19=NTAPE(19)	FARED	08400
REWIND NT19	FARED	08401
ENDFILE NT19	FARED	08402
DATA RIM/3LRIM/	FARED	08403
M6=NTAPE(2)	FARED	08404
IFB=0	FARED	08405
NTEST=0	FARED	08406
NEDIT=0	FARED	08407
MICT2=20	FARED	08408
	FARED	08409
	FARED	08410
	FARED	08411
	FARED	08412
	FARED	08413
	FARED	08414
	FARED	08415
	FARED	08416

IFLX=J	FARED 08417
IAFLX=0	FARED 08418
IGO=0	FARED 08419
IST=0	FARED 08420
NSR=0	FARED 08421
C	FARED 08422
C READ A RAIN DIRECTIVE.	FARED 08423
C	FARED 08424
1 CALL GRAMIN(V,N,W)	FARED 08425
2 CONTINUE	FARED 08426
IF (IGO.EQ.1 .OR. IGO.EQ.2) CALL MODCOM	FARED 08427
IORT=IW	FARED 08428
IF (N.NE.0) GO TO 5000	FARED 08429
CALL SCAN(34HDEplete*SEARCH*FLUX*EDIT*ADJOINT**,IORT,IGO)	FARED 08430
GO TO (1000,2000,3000,4000,3000,5000),IGO	FARED 08431
5000 CONTINUE	FARED 08432
C	FARED 08433
C PERFORM A REAL OR ADJOINT FLUX-EIGENVALUE CALCULATION.	FARED 08434
C	FARED 08435
IF (IGO.NE.5) IFLX=1	FARED 08436
IAFLX=0	FARED 08437
IF (IGO.EQ.5) IAFLX=1	FARED 08438
CALL KFLUX	FARED 08439
IF (IGO.EQ.5) CALL INVERT	FARED 08440
GO TO (1000,2000,1,4000,1,5000),IGO	FARED 08441
1000 CONTINUE	FARED 08442
C	FARED 08443
C PERFORM A DEPLETION CALCULATION WITH TESTS AND EDITS AFTER	FARED 08444
C EACH MAJOR DEPLETION PERIOD.	FARED 08445
C	FARED 08446
MJTE=0	FARED 08447
IF (IST.EQ.0.OR.IFLX.EQ.0) CALL KFLUX	FARED 08448
1005 CONTINUE	FARED 08449
IF (MJTE.GE.MAJT.AND.MJTE.NE.0) GO TO 1021	FARED 08450
CALL OVERLAY(RIM,3,8)	FARED 08451
IF (NTEST.LT.0) GO TO 2	FARED 08452
1006 CONTINUE	FARED 08453
CALL OVERLAY(RIM,3,1)	FARED 08454
CALL OMCAL	FARED 08455
CALL CROCA	FARED 08456
CALL OVERLAY(RIM,3,2)	FARED 08457
CALL OVERLAY(RIM,3,3)	FARED 08458
CALL ETIM	FARED 08459
IF (NTEST.NE.0.AND.NSR.NE.0) GO TO 3005	FARED 08460
1015 IF (NEUIT.NE.0) CALL OVERLAY(RIM,3,10)	FARED 08461
IF (NTEST.NE.0) CALL OVERLAY(RIM,3,9)	FARED 08462
IF (NTEST.LT.0) GO TO 2	FARED 08463
GO TO 1005	FARED 08464
1021 CONTINUE	FARED 08465
WRITE(M6,1020)	FARED 08466

1020	FORMAT(3(/),64X,9H* * * *,//,55X,26H*** DEPLETION COMPLETE ***	FARED	08467
	15(/))	FARED	08468
1050	CONTINUE	FARED	08469
	GO TO 2	FARED	08470
C		FARED	08471
C	PERFORM EDIT CALCULATIONS.	FARED	08472
C		FARED	08473
4000	CONTINUE	FARED	08474
	IF(IFLX.EQ.0) CALL KFLUX	FARED	08475
	CALL KEDIT	FARED	08476
	GO TO 2	FARED	08477
2000	CONTINUE	FARED	08478
C		FARED	08479
C	PERFORM A CRITICALITY SEARCH CALCULATION.	FARED	08480
C		FARED	08481
	ISTD=IST	FARED	08482
	IF(IST.EQ.0.OR.IFLX.EQ.0) CALL KFLUX	FARED	08483
	IF(ISTD.EQ.0) CALL ETIM	FARED	08484
	NCVS=0	FARED	08485
3005	CALL OVERLAY(RIM,3,4)	FARED	08486
	NTEST=IABS(NTEST)	FARED	08487
	IF(NSR.GT.6) STOP 5	FARED	08488
	IF(NCVS.EQ.2) GO TO 3500	FARED	08489
	IF(NCVS.EQ.1.AND.IGD.EQ.1) GO TO 1015	FARED	08490
	IF(NCVS.EQ.1) GO TO 3300	FARED	08491
3320	CONTINUE	FARED	08492
	IF(NSR.GE.4) CALL OVERLAY(RIM,3,1)	FARED	08493
	IF(NSR.NE.1) CALL OMCAL	FARED	08494
	IF(NSR.EQ.1.OR.NSR.GE.4) CALL CROCA	FARED	08495
	CALL OVERLAY(RIM,3,2)	FARED	08496
	CALL OVERLAY(RIM,3,3)	FARED	08497
	GO TO 3005	FARED	08498
C		FARED	08499
C	CRITICALITY SEARCH HAS NOT CONVERGED.	FARED	08500
C		FARED	08501
3500	WRITE(M6,3501)	FARED	08502
3501	FORMAT(55X,27H*** CONVERGENCE FAILURE *** /)	FARED	08503
	GO TO 3600	FARED	08504
C		FARED	08505
C	CRITICALITY SEARCH HAS CONVERGED.	FARED	08506
C		FARED	08507
3600	CONTINUE	FARED	08508
	NSA=NEDIT	FARED	08509
	NSB=ITED(1)	FARED	08510
	NSC=ITED(2)	FARED	08511
	NEDIT=2	FARED	08512
	ITED(1)=2	FARED	08513
	ITED(2)=3	FARED	08514
	CALL OVERLAY(RIM,3,10)	FARED	08515
	NEDIT=NSA	FARED	08516

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      ITED(1)=NSB
      ITED(2)=NSC
      NSR=0
      NCVS=0
3600  CONTINUE
      GO TO 2
5000  CONTINUE
C
C      A DIRECTIVE WHICH DOES NOT SPECIFY A RAIN CALCULATION HAS
C      BEEN READ.
C
      RETURN
      END

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FARED 08517
FARED 08518
FARED 08519
FARED 08520
FARED 08521
FARED 08522
FARED 08523
FARED 08524
FARED 08525
FARED 08526
FARED 08527
FARED 08528
FARED 08529

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C	SUBROUTINE KFLUX	FARED	08530
C		FARED	08531
C		FARED	08532
C	THIS SUBROUTINE CONTROLS THE REAL AND ADJOINT	FARED	08533
C	FLUX CALCULATIONS.	FARED	08534
C		FARED	08535
C	COMMON NTAPE(20)	FARED	08536
	COMMON DPEDIT/NEDIT,ITED(10)	FARED	08537
C	OVERLAY FILE LOCATION	FARED	08538
	COMMON/PARS/NSR,ICT,IGO,ICT2,N100,IFLX,COUT,MICT2,EIGEN,EIGEN1,P,	FARED	08539
	1PIM,IST,IAFLX	FARED	08540
	NPR=NTAPE(2)	FARED	08541
	RIM=3LRIM	FARED	08542
	WRITE(NPR,4)	FARED	08543
	4 FORMAT(1H1,20(/))	FARED	08544
	IF(IGO.EQ.5) GO TO 10	FARED	08545
	WRITE(NPR,5)	FARED	08546
	5 FORMAT(1H 55X25H*****56X1H*23X1H*56X25H* R	FARED	08547
	1EAL FLUX CALCULATION */56X1H*23X1H*56X25H*****	FARED	08548
	2*//)	FARED	08549
	IFLX=1	FARED	08550
	GO TO 10	FARED	08551
	10 WRITE(NPR,11)	FARED	08552
	11 FORMAT(1H 53X28H*****54X1H*26X1H*54X28H*	FARED	08553
	1ADJOINT FLUX CALCULATION */54X1H*26X1H*54X28H*****	FARED	08554
	2*****//)	FARED	08555
	15 CONTINUE	FARED	08556
	IF(IST.NE.0) GO TO 1	FARED	08557
	IST=1	FARED	08558
	CALL OVERLAY(RIM,3,6)	FARED	08559
	1 CALL OVERLAY(RIM,3,1)	FARED	08560
	CALL OMICAL	FARED	08561
	CALL CROCA	FARED	08562
	IF(IGO.NE.5) GO TO 2	FARED	08563
	CALL INVERT	FARED	08564
	IAFLX=1	FARED	08565
	2 CONTINUE	FARED	08566
	CALL OVERLAY(RIM,3,2)	FARED	08567
	CALL OVERLAY(RIM,3,3)	FARED	08568
	IF(IGO.EQ.2.OR.IGO.EQ.4) RETURN	FARED	08569
	ISTORA=NEDIT	FARED	08570
	ISTORB=ITED(1)	FARED	08571
	ISTORC=ITED(2)	FARED	08572
	ITED(1)=2	FARED	08573
	ITED(2)=3	FARED	08574
	NEDIT=2	FARED	08575
	IF(IGO.EQ.5) ITED(1)=7	FARED	08576
	CALL OVERLAY(RIM,3,10)	FARED	08577
	NEDIT=ISTORA	FARED	08578
		FARED	08579

ITED(1)=ISTORB
ITED(2)=ISTORC
RETURN
END

FARED 08580
FARED 08581
FARED 08582
FARED 08583

	SUBROUTINE ETIM	FARED	08584
C-		FARED	08585
C-	THIS SUBROUTINE PRINTS OUT THE PRESENT TIME AND EIGEN WITH A	FARED	08586
C-	VARIABLE FORMAT TO REFLECT THE VALUE CIN	FARED	08587
C-		FARED	08588
	COMMON NTAPE(20)	FARED	08589
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RO,RIN,RUT,CIN,MI	FARED	08590
	ICT,THE,I00C,NIB,NOB,NCV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	08591
	COMMON/PARS/NSR,ICT,IGO,ICT2,N100,IFLX,COUT,MICT2,EIGEN,EIGEN1,P,	FARED	08592
	1PIH,IST	FARED	08593
	DIMENSION FA(4),FB(10),FC(10),FD(3),FRMA(4),FRMB(10),FRMC(10),FRMD	FARED	08594
	1(3)	FARED	08595
	DATA(FA=4H(00X,4H1H*J,4H0X1H,4H*))	FARED	08596
	DATA(FB=4H(00X,4H1H*2,4HX13H,4HTIME,4H (DA,4HYS) ,4H:F7.,4H2,00,	FARED	08597
	1 4HX1H*,4H))	FARED	08598
	DATA(FC=4H(00X,4H1H*2,4HX13H,4HEIGE,4HINVAL,4HUE ,4H: E0,4H0.00,	FARED	08599
	1 4H,2X1,4HH*))	FARED	08600
	DATA(FD=4H(00X,4H4J(1,4HA1)))	FARED	08601
	DATA IASX/1H*/	FARED	08602
	NPR=NTAPE(2)	FARED	08603
	ICPP=136	FARED	08604
C-	DETERMINE SIZE OF CIN	FARED	08605
	CHK=CIN	FARED	08606
	DO 5 I=1,14	FARED	08607
	ISZ=I	FARED	08608
	IF(CHK.GE..99999) GO TO 6	FARED	08609
	CHK=CHK*10.	FARED	08610
	5 CONTINUE	FARED	08611
	6 CONTINUE	FARED	08612
C-	DETERMINE SIZE OF SPACERS	FARED	08613
	ISZA=ISZ+7	FARED	08614
	MX=ISZA+19	FARED	08615
	ISP=(ICPP-MX)/2	FARED	08616
	ISPB=MX-24	FARED	08617
	ISPA=MX-2	FARED	08618
C-	SET UP FORMATS	FARED	08619
	CALL FORM(16,FA,FRMA)	FARED	08620
	CALL FORM(40,FC,FRMC)	FARED	08621
	CALL FORM(12,FD,FRMD)	FARED	08622
C-	SET UP SPACEING	FARED	08623
	CALL MASH(ISP,ISA,ISB)	FARED	08624
	CALL INTALP(FRMA(1),2,ISA)	FARED	08625
	CALL INTALP(FRMA(1),3,ISB)	FARED	08626
	CALL INTALP(FRMC(1),2,ISA)	FARED	08627
	CALL INTALP(FRMC(1),3,ISB)	FARED	08628
	CALL INTALP(FRMD(1),2,ISA)	FARED	08629
	CALL INTALP(FRMD(1),3,ISB)	FARED	08630
	IF(TIME.EQ.J.J) GO TO 8	FARED	08631
	CALL FORM(40,FB,FRMB)	FARED	08632
	CALL INTALP(FRMB(1),2,ISA)	FARED	08633

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CALL INTALP(FRMB(1),3,ISB)
CALL MASH(ISPB,ISA,ISB)
CALL INTALP(FRMB(1),31,ISA)
CALL INTALP(FRMB(1),32,ISB)
8 CONTINUE
CALL MASH(ISPA,ISA,ISB)
CALL INTALP(FRMA(1),8,ISA)
CALL INTALP(FRMA(1),9,ISB)
CALL MASH(ISZ,IS1,IS2)
CALL INTALP(FRMC(1),31,IS1)
CALL INTALP(FRMC(1),32,IS2)
CALL MASH(ISZA,IS1,IS2)
CALL INTALP(FRMC(1),28,IS1)
CALL INTALP(FRMC(1),29,IS2)
C- PRINT OUT RESULTS
WRITE(NPR,10)
10 FORMAT(10(/))
WRITE(NPR,FRMD) (IASX,I=1,MX)
WRITE(NPR,FRMA)
IF(TIME.EQ.0.0) GO TO 15
WRITE(NPR,FRMB) TIME
WRITE(NPR,FRMA)
15 WRITE(NPR,FRMC) EIGEN
WRITE(NPR,FRMA)
WRITE(NPR,FRMD) (IASX,I=1,MX)
WRITE(NPR,10)
RETURN
END

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FARED 08634
FARED 08635
FARED 08636
FARED 08637
FARED 08638
FARED 08639
FARED 08640
FARED 08641
FARED 08642
FARED 08643
FARED 08644
FARED 08645
FARED 08646
FARED 08647
FARED 08648
FARED 08649
FARED 08650
FARED 08651
FARED 08652
FARED 08653
FARED 08654
FARED 08655
FARED 08656
FARED 08657
FARED 08658
FARED 08659
FARED 08660
FARED 08661

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C	SUBROUTINE INVERT	FARED	08662
C		FARED	08663
C	THIS SUBROUTINE INVERTS THE MACROSCOPIC CROSS SECTIONS	FARED	08664
C	FOR THE ADJOINT FLUX CALCULATION.	FARED	08665
C		FARED	08666
C		FARED	08667
	COMMON NTAPE(20)	FARED	08668
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,SKP(93)	FARED	08669
	COMMON NPOINT(20),ZONE(5000)	FARED	08670
	COMMON/MAC1/VUSIG(20,30),DIF(20,30),TRANS(4000),SIGT(20,30),SIGA(2	FARED	08671
	0,30)	FARED	08672
	COMMON/MIS/CHI(20,30),DELTA(20),BETA(20)	FARED	08673
	L1=MAG+1	FARED	08674
	L2=MAG/2	FARED	08675
	DO 100 I=1,L2	FARED	08676
	J=L1-I	FARED	08677
	DO 100 KZ=1,NZ	FARED	08678
	DUM1=SIGT(KZ,I)	FARED	08679
	DUM2=VUSIG(KZ,I)	FARED	08680
	DUM3=CHI(KZ,I)	FARED	08681
	DUM4=DIF(KZ,I)	FARED	08682
	SIGT(KZ,I)=SIGT(KZ,J)	FARED	08683
	VUSIG(KZ,I)=VUSIG(KZ,J)	FARED	08684
	VUSIG(KZ,I)=CHI(KZ,J)	FARED	08685
	CHI(KZ,I)=VUSIG(KZ,J)	FARED	08686
	SIGT(KZ,J)=DUM1	FARED	08687
	VUSIG(KZ,J)=DUM3	FARED	08688
	CHI(KZ,J)=DUM2	FARED	08689
	DIF(KZ,J)=DUM4	FARED	08690
100	CONTINUE	FARED	08691
	ICK=2*L2	FARED	08692
	IF(ICK.EQ.MAG) GO TO 150	FARED	08693
	L3=L2+1	FARED	08694
	DO 120 I=1,NZ	FARED	08695
	DUM5=CHI(I,L3)	FARED	08696
	CHI(I,L3)=VUSIG(I,L3)	FARED	08697
	VUSIG(I,L3)=DUM5	FARED	08698
120	CONTINUE	FARED	08699
150	CONTINUE	FARED	08700
	DO 201 J=1,NOS	FARED	08701
	DO 200 I=1,MAG	FARED	08702
	IDUM=MAG-I-J+1	FARED	08703
	IF(IDUM.LE.I) GO TO 201	FARED	08704
	DO 200 K=1,NZ	FARED	08705
	JDUM2=IXTR(K,J,IDUM)	FARED	08706
	JDUM1=IXTR(K,J,I)	FARED	08707
	TEMP=TRANS(JDUM1)	FARED	08708
	TRANS(JDUM1)=TRANS(JDUM2)	FARED	08709
	TRANS(JDUM2)=TEMP	FARED	08710
		FARED	08711

200 CONTINUE
201 CONTINUE
RETURN
END

FARED 08712
FARED 08713
FARED 08714
FARED 08715

C	SUBROUTINE KEDIT	FARED	08716
C		FARED	08717
C	THIS SUBROUTINE CONTROLS THE EDIT CALCULATIONS SPECIFIED	FARED	08718
C	BY AN EDIT DIRECTIVE.	FARED	08719
C		FARED	08720
C		FARED	08721
	COMMON NTAPE(20)	FARED	08722
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RD,RIN,RUT,CIN,MI	FARED	08723
	1CT,THE,IIDC,NIB,NOB,NOV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	08724
	COMMON NSPARES(42)	FARED	08725
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	08726
	10,BLANKS	FARED	08727
	COMMON NPOINT(20),ZONE(5000)	FARED	08728
	COMMON DPEDIT/NEDIT,ITED(10)	FARED	08729
	COMMON TEST/IDATA(2),FOATA(2)	FARED	08730
	COMMON DEP/IDZON(20),NIQ(20),KZON,MODE,KBPT,NEL,MAJT,MINT,MJTE	FARED	08731
	COMMON IFR/IFB,BN(20),BD(20)	FARED	08732
	COMMON/PARS/NSR,ICT,IGO,ICT2,N100,IFLX,COUT,MICT2,EIGEN,EIGEN1,P,	FARED	08733
	1PIH,ISI,IAFLX	FARED	08734
	EQUIVALENCE (IW,W(1))	FARED	08735
	DIMENSION LTEM(10)	FARED	08736
	DATA RIM/3LRIM/	FARED	08737
	NPR=NTAPE(2)	FARED	08738
	WRITE(NPR,30)	FARED	08739
	30 FORMAT(1H120(/),61X15H*****/61X1H*13X1H*/61X15H* E D I	FARED	08740
	1 T */61X1H*13X1H*/61X15H*****////)	FARED	08741
	NTEM=NEDIT	FARED	08742
	IF(NEDIT.LE.0) GO TO 2	FARED	08743
	DO 1 I=1,NEDIT	FARED	08744
	1 LTEM(I)=ITED(I)	FARED	08745
	2 CONTINUE	FARED	08746
	NEDIT=0	FARED	08747
	CALL GRAMIN(V,N,W)	FARED	08748
	5 CALL SCAN(93HZONEMAT*EDMACRO*EDFLUX*RATES*BALANCE*REACTOR*PERT*VPE	FARED	08749
	1RT*ZPERT*ZVPERT*RPERT*BPRT*XPRT*LIFE**,IW,IED)	FARED	08750
	GO TO (10,10,10,10,10,9,100,100,100,100,100,100,100,100,500),IED	FARED	08751
	9 CONTINUE	FARED	08752
	IF(IFB.NE.0.OR.IIDC.EQ.0) GO TO 10	FARED	08753
	MTEM=NEDIT	FARED	08754
	NEDIT=0	FARED	08755
	FOATA(1)=0.0	FARED	08756
	MINT=1	FARED	08757
	MAJT=1	FARED	08758
	MJTE=1	FARED	08759
	CALL OVERLAY(RIM,3,8)	FARED	08760
	NEDIT=MTEM	FARED	08761
	10 CONTINUE	FARED	08762
C		FARED	08763
C	PERFORM ZONEMAT, EDMACRO, EDFLUX, RATES, BALANCE AND	FARED	08764
		FARED	08765

C	REACTOR EDIT CALCULATIONS.	FARED	08766
C		FARED	08767
	NEDIT=NEDIT+1	FARED	08768
	ITED(NEDIT)=IED	FARED	08769
15	CALL GRAMIN(V,N,W)	FARED	08770
	CALL SCAN(46HZONEMAT*EDMACRO*EDFLUX*RATES*BALANCE*REACTOR**,IW,LD)	FARED	08771
	IF(LD.GT.6) GO TO 20	FARED	08772
	IF(LD.NE.6) GO TO 16	FARED	08773
	IF(IFB.EQ.0.AND.IDDC.NE.0) GO TO 9	FARED	08774
16	CONTINUE	FARED	08775
	IF(NEDIT.EQ.10) GO TO 15	FARED	08776
	NEDIT=NEDIT+1	FARED	08777
	ITED(NEDIT)=LD	FARED	08778
	GO TO 15	FARED	08779
20	CALL OVERLAY(RIM,3,10)	FARED	08780
	GO TO 5	FARED	08781
C		FARED	08782
C	PERFORM PERTURBATION AND LIFE EDIT CALCULATIONS.	FARED	08783
C		FARED	08784
100	CONTINUE	FARED	08785
	IF(IAFLX.NE.J) GO TO 150	FARED	08786
	ITEM=IGO	FARED	08787
	IGO=5	FARED	08788
	CALL KFLUX	FARED	08789
	IGO=ITEM	FARED	08790
150	CONTINUE	FARED	08791
	CALL OVERLAY(RIM,3,11)	FARED	08792
	GO TO 5	FARED	08793
500	NEDIT=NITEM	FARED	08794
	IF(NEDIT.LE.0) RETURN	FARED	08795
	DO 501 J=1,NEDIT	FARED	08796
501	ITED(J)=ITEM(J)	FARED	08797
	RETURN	FARED	08798
	END	FARED	08799

	SUBROUTINE FORM(NCR,LDATA,LFORM)	FARED	08800
C		FARED	08801
C		FARED	08802
C	THIS SUBROUTINE TRANSFERS NCR CHARACTERS FROM ARRAY LDATA	FARED	08803
C	TO ARRAY LFORM TO BUILD A VARIABLE FORMAT STATEMENT OF	FARED	08804
C	ICHR CHARACTERS PER WORD.	FARED	08805
C		FARED	08806
C		FARED	08807
	COMMON NTAP(20),NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RO,RIN,	FARED	08808
	1RUT,CIN,MICT,THE,IUDC,NIB,NOB,NCV,NBUCK,NWBM,NWZM,NWB,NSO,TIME,PT,	FARED	08809
	2NSPARES(42),	FARED	08810
	3IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHR,NWOD,BLANK	FARED	08811
	DIMENSION LDATA(1),LFORM(1)	FARED	08812
	ICR=4	FARED	08813
	MCR=0	FARED	08814
	NWP=1	FARED	08815
	DO 100 IC=1,NCR	FARED	08816
	MCR=MCR+1	FARED	08817
	IF (MCR.LE.ICR) GO TO 50	FARED	08818
	MCR=1	FARED	08819
	NWP=NWP+1	FARED	08820
50	CONTINUE	FARED	08821
	CALL LPINT(LDATA(NWP),MCR,ITEM)	FARED	08822
	CALL INTALP(LFORM(1),IC,ITEM)	FARED	08823
100	CONTINUE	FARED	08824
	RETURN	FARED	08825
	END	FARED	08826

C	SUBROUTINE MASH(NUM,IONE,ITWO)	FARED	08827
C		FARED	08828
C		FARED	08829
C	THIS SUBROUTINE RETURNS IN IONE THE CHARACTER REPRESENTATION	FARED	08830
C	OF THE FIRST DIGIT OF NUM. THE SECOND DIGIT REPRESENTATION	FARED	08831
C	IS RETURNED IN ITWO. NUM MUST BE LESS THAN 100. IZERO IS	FARED	08832
C	ADDED TO INSURE MACHINE INDEPENDENCE.	FARED	08833
C		FARED	08834
C		FARED	08835
	COMMON NTAPE(2J)	FARED	08836
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RO,RIN,RUT,CIN,MI	FARED	08837
	1CT,THE,IDDC,NIB,NOB,NCV,NBUCK,NBWM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	08838
	COMMON NSPARES(42)	FARED	08839
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	08840
	10,BLANKS	FARED	08841
	COMMON NPOINT(20),ZONE(5000)	FARED	08842
	DIMENSION NZONE(2000)	FARED	08843
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	08844
	IONE=NUM/10	FARED	08845
	ITWO=NUM - (10*IONE)	FARED	08846
	IONE=IONE+IZERO	FARED	08847
	ITWO=ITWO+IZERO	FARED	08848
	RETURN	FARED	08849
	END	FARED	08850

C	SUBROUTINE IDNUM(NUM,LET1,LET2,V,N,W)	FARED	08851
C		FARED	08852
C		FARED	08853
C	THIS SUBROUTINE CONVERTS A NUCLIDE ID INTO AN INTEGER AND	FARED	08854
C	STORES THE ALPHANUMERIC EQUIVALENT INTO TWO WORDS - LET1	FARED	08855
C	AND LET2. IF THE SUBROUTINE IS UNABLE TO PERFORM SUCH A	FARED	08856
C	CONVERSION, THE FLAG,NUMBER AND WORD COMBINATION ARE STORED	FARED	08857
C	IN V,N,W SO THAT THE EFFECT IS A CALL TO SUBROUTINE	FARED	08858
C	GRAMIN. CAUTION --- A SEQUENCE OF NON-NUCLIDE WORD-NUMBER	FARED	08859
C	PAIRS CAN CAUSE A LOOP IF THIS SUBROUTINE IS CONTINUOUSLY	FARED	08860
C	CALLED WITHOUT EXTERNALLY CALLING SUBROUTINE GRAMIN OR	FARED	08861
C	RESETTING THE N-FLAG.	FARED	08862
C		FARED	08863
C		FARED	08864
	COMMON NTAPE(2J),NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RO,RIN,	FARED	08865
	IRUT,CIN,MICT,THE,IDOC,NIB,NOB,NCV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIM	FARED	08866
	ZE,PT,NSPARES(42),	FARED	08867
	SIFLAG,IXX(2J),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWOD,BLANK	FARED	08868
	DIMENSION W(18)	FARED	08869
	DIMENSION I(3),LT(2)	FARED	08870
	EQUIVALENCE(U,IW),(X,IV)	FARED	08871
	DO 5 J=1,ICHAR	FARED	08872
	CALL INTALP(LT(1),J,IBLANK)	FARED	08873
	CALL INTALP(LT(2),J,IBLANK)	FARED	08874
5	CONTINUE	FARED	08875
	IF(N.NE.-2) CALL GRAMIN(V,N,W)	FARED	08876
	LN=1	FARED	08877
	LL=0	FARED	08878
	NUM=0	FARED	08879
	IF(N.NE.-2) GO TO 100	FARED	08880
	U=W(1)	FARED	08881
	CALL SCAN(28JHH*HE*LI*BE*B*C*N*O*F*NE*NA*MG*AL*SI*P*S*CL*A*K*CA*S	FARED	08882
	10*TI*V*CR*MN*FE*CO*NI*CU*ZN*GA*GE*AS*SE*BR*KR*RB*SR*Y*ZR*CB*MO*TC*	FARED	08883
	2RU*RH*PD*AG*CD*IN*SN*SJ*TE*I*XE*CS*BA*LA*CE*PR*ND*PM*SM*EU*GU*TB*O	FARED	08884
	3Y*HO*ER*TM*YB*LU*HF*TA*W*RE*OS*IR*PT*AU*HG*TL*PB*BI*PO*AT*RN*SS*KA	FARED	08885
	4*AC*TH*PA*U*NP*PU*AM*CM*BK*CF*FP*,U,L)	FARED	08886
	IF(L.GT.99) RETURN	FARED	08887
	LT(1)=IW	FARED	08888
	X=V	FARED	08889
	NUM=L*1000+IV	FARED	08890
	NU=NUM	FARED	08891
	CALL LPINT(U,2,ICH)	FARED	08892
	NSTR=2	FARED	08893
	IF(ICH.NE.IBLANK) NSTR=3	FARED	08894
	I(1)=IV/100	FARED	08895
	I(2)=(IV/10)-I(1)*10	FARED	08896
	I(3)=IV-(I(1)*100)-(I(2)*10)	FARED	08897
	I(1)=I(1)+IZERO	FARED	08898
	I(2)=I(2)+IZERO	FARED	08899
	I(3)=I(3)+IZERO	FARED	08900

LL=NSTR	FARED	08901
IF(IV.GE.0) LLL=3	FARED	08902
IF(IV.GE.10) LLL=2	FARED	08903
IF(IV.GE.100) LLL=1	FARED	08904
INDEX=1	FARED	08905
IT=1	FARED	08906
DO 10 JL=LLL,3	FARED	08907
NL=JL	FARED	08908
CALL INTALP(LT(INDEX),LL,I(JL))	FARED	08909
LL=LL+1	FARED	08910
IF(LL-5) 10,9,9	FARED	08911
9 LL=1	FARED	08912
INDEX=2	FARED	08913
10 CONTINUE	FARED	08914
CALL CRAMIN(V,N,W)	FARED	08915
X=V	FARED	08916
U=W	FARED	08917
IF(N.NE.0) GO TO 100	FARED	08918
CALL SCAN(55HA*8*C*D*E*F*G*H*I*J*K*L*M*N*O*P*Q*R*S*T*U*V*W*X*Y*Z*	FARED	08919
1*,U,L)	FARED	08920
IF(L.GT.26) GO TO 100	FARED	08921
CALL LPINT(U,1,IWO)	FARED	08922
NUM=NUM+ L*10**5	FARED	08923
NU=NUM	FARED	08924
CALL INTALP(LT(INDEX),LL,IWO)	FARED	08925
CALL CRAMIN(V,N,W)	FARED	08926
100 LET1=LT(1)	FARED	08927
LET2=LT(2)	FARED	08928
RETURN	FARED	08929
END	FARED	08930

C	FUNCTION RINTG(DARG,NIZON)	FARED	08931
C		FARED	08932
C	THIS FUNCTION VOLUME INTEGRATES THE POINT DATA IN THE ARRAY	FARED	08933
C	DARG OVER THE REACTOR ZONE NIZONE.	FARED	08934
C		FARED	08935
C		FARED	08936
C		FARED	08937
	COMMON NTAPE(20)	FARED	08938
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZH,NN,POW,RO,RIN,RUT,CIN,MI	FARED	08939
	ACT,THE,IDDC,NIB,NOB,NCV,NBUCK,NWBM,NWZH,NWB,NSOU,NSO,TIME,PT	FARED	08940
	COMMON NSPARES(42)	FARED	08941
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	08942
	IO,BLANKS	FARED	08943
	COMMON NPOINT(20),ZONE(5000)	FARED	08944
	DIMENSION NZONE(2000)	FARED	08945
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	08946
	COMMON GEO/DELR(20),R(150),RI(150),LB(20)	FARED	08947
	DIMENSION DARG(150)	FARED	08948
	RINTG=0.0	FARED	08949
	IIN=1	FARED	08950
	IF(NIZON.NE.1) IIN=LB(NIZON-1)	FARED	08951
	IOUT=LB(NIZON)	FARED	08952
	IPTS=IOUT-IIN+1	FARED	08953
	RINTG=0.5*DELR(NIZON)*(DARG(1)*RI(IIN)+DARG(IPTS)*RI(IOUT))	FARED	08954
	IPTS1=IPTS-1	FARED	08955
	DO 1J I=2,IPTS1	FARED	08956
	RINTG=RINTG+DELR(NIZON)*DARG(I)*RI(IIN+I-1)	FARED	08957
1J	CONTINUE	FARED	08958
	IF(NGO.NE.3) GO TO 20	FARED	08959
	RINTG=RINTG+(DELR(NIZON)**2.0)*(DARG(1)*RI(IIN)-DARG(IPTS)*RI(IOUT))	FARED	08960
	1/6.0	FARED	08961
2J	CONTINUE	FARED	08962
	P=FLOAT(NGO)	FARED	08963
	RINTG=P*RO*RINTG	FARED	08964
	RETURN	FARED	08965
	END	FARED	08966

C	SUBROUTINE MOOCOM	FARED	08967
C		FARED	08968
C		FARED	08969
C	THIS SUBROUTINE SETS THE INITIAL HOMOGENEOUS NUCLIDE	FARED	08970
C	CONCENTRATIONS EQUAL TO THE CURRENT CONCENTRATIONS.	FARED	08971
C		FARED	08972
C		FARED	08973
	COMMON NTAPE(20)	FARED	08974
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RD,RIN,RUT,CIN,MI	FARED	08975
	1CT,THE,IJDC,NIB,NOB,NCV,NBUCK,NWBM,NWZH,NWB,NSOU,NSO,TIME,PT	FARED	08976
	COMMON NSPARES(42)	FARED	08977
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	08978
	10,BLANKS	FARED	08979
	COMMON NPOINT(20),ZONE(5000)	FARED	08980
	DIMENSION NZONE(2000)	FARED	08981
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	08982
	DO 100 IZ=1,NZ	FARED	08983
	IX=NPOINT(IZ)	FARED	08984
	NUC=NZONE(IX+5)	FARED	08985
	DO 100 IN=1,NUC	FARED	08986
	IY=16+IX+(IN-1)*10	FARED	08987
	ZONE(IY+1)=ZONE(IY)	FARED	08988
100	CONTINUE	FARED	08989
	RETURN	FARED	08990
	END	FARED	08991

C	FUNCTION ISTR(K,I,J)	FARED	08992
C		FARED	08993
C		FARED	08994
C	THIS FUNCTION RETURNS THE LOCATION IN THE TRANS ARRAY OF THE	FARED	08995
C	1-TH DOWNSCATTER FOR GROUP J AND ZONE K.	FARED	08996
C		FARED	08997
		FARED	08998
	COMMON NTAPE(2J)	FARED	08999
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RO,RIN,RUT,CIN,MI	FARED	09000
	ICT,THE,IODC,NIB,NOB,NCV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	09001
	COMMON NSPARES(42)	FARED	09002
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NMO	FARED	09003
	10,BLANKS	FARED	09004
	COMMON NPOINT(2J),ZONE(500J)	FARED	09005
	DIMENSION NZONE(200J)	FARED	09006
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	09007
	DATA KIP/0/	FARED	09008
	IF(KIP.NE.0) GO TO 5	FARED	09009
	KIP=1	FARED	09010
	NAG=MAG-1	FARED	09011
	N1=(NAG*MAG)/2	FARED	09012
	N2=((NAG-NDS)*(MAG-NDS))/2	FARED	09013
	N3=MAG-NDS	FARED	09014
	NL=N1-N2	FARED	09015
5	CONTINUE	FARED	09016
	K2=MAX0(N3-J,0)	FARED	09017
	M3=(K2*(K2+1)-((MAG-J)*(MAG-J+1)))/2	FARED	09018
	ISTR=K*NL+M3+I	FARED	09019
	RETURN	FARED	09020
	END	FARED	09021

C	FUNCTION CONCENT(NUID,IZO)	FARED	09022
C		FARED	09023
C		FARED	09024
C	THIS FUNCTION RETURNS THE TOTAL CONCENTRATION OF NUCLIDE NUID	FARED	09025
C	IN ZONE IZO.	FARED	09026
C		FARED	09027
C		FARED	09028
	COMMON NTAPE(23)	FARED	09029
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RO,RIN,RUT,CIN,MI	FARED	09030
	ICT,THE,IDDC,NIB,NOB,NCV,NBUCK,NWBH,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	09031
	COMMON NSPARES(42)	FARED	09032
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	09033
	10,BLANKS	FARED	09034
	COMMON NPOINT(20),ZONE(500)	FARED	09035
	DIMENSION NZONE(2000)	FARED	09036
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	09037
	L1=10	FARED	09038
	L2=10	FARED	09039
	CONCENT=.0	FARED	09040
	NFOND=0	FARED	09041
	IPL=NPOINT(IZO)	FARED	09042
	NU=NZONE(IPL+5)	FARED	09043
	DO 400 K=1,NU	FARED	09044
	NL=L2*(K-1)+IPL+L1	FARED	09045
	NLID=NZONE(NL)	FARED	09046
	IF(NLID.NE.NUID) GO TO 390	FARED	09047
	JD=NL+6	FARED	09048
	CONCENT=ZONE(JD)+CONCENT	FARED	09049
	NFOND=1	FARED	09050
	GO TO 400	FARED	09051
390	IF(NFOND.NE.0) RETURN	FARED	09052
400	CONTINUE	FARED	09053
	RETURN	FARED	09054
	END	FARED	09055

C	SUBROUTINE ZOLIST(ISOID,NBKL,KZON,IDZON)	FARED	09056
C		FARED	09057
C	THIS SUBROUTINE RETURNS IN ARRAY IDZON A LIST OF THE ZONES	FARED	09058
C	IN WHICH NUCLIDE ISOID OF BLOCK NBKL IS PRESENT. KZON IS	FARED	09059
C	THE NUMBER OF SUCH ZONES.	FARED	09060
C		FARED	09061
C		FARED	09062
C		FARED	09063
	COMMON NTAPE(20)	FARED	09064
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RO,RIN,RUT,CIN,MI	FARED	09065
	1CT,THE,IDDC,NIB,NOB,NCV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	09066
	COMMON NSPARES(42)	FARED	09067
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	09068
	10,BLANKS	FARED	09069
	COMMON NPOINT(20),ZONE(5000)	FARED	09070
	DIMENSION NZONE(2000)	FARED	09071
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	09072
	DIMENSION IDZON(20)	FARED	09073
	KZON=0	FARED	09074
	K1=10	FARED	09075
	K2=10	FARED	09076
	DO 500 J=1,NZ	FARED	09077
	IPT=NPOINT(J)-1	FARED	09078
	I8K=NZONE(IPT+5)	FARED	09079
	IF(I8K.NE.NBKL) GO TO 500	FARED	09080
	NU=NZONE(IPT+6)	FARED	09081
	DO 400 K=1,NU	FARED	09082
	NXT=K2*(K-1)+K1+IPT+1	FARED	09083
	NID=NZONE(NXT)	FARED	09084
	IF(NID.NE.ISOID) GO TO 400	FARED	09085
	KZON=KZON+1	FARED	09086
	IDZON(KZON)=J	FARED	09087
	GO TO 500	FARED	09088
400	CONTINUE	FARED	09089
500	CONTINUE	FARED	09090
	RETURN	FARED	09091
	END	FARED	09092

	SUBROUTINE ZOLO(IDB,KZO,IZO)	FARED	09093
C		FARED	09094
C		FARED	09095
C	THIS SUBROUTINE RETURNS IN ARRAY IZO A LIST OF THE ZONES	FARED	09096
C	WHICH BELONG IN BLOCK IDB. KZO IS THE NUMBER OF SUCH ZONES.	FARED	09097
C		FARED	09098
C		FARED	09099
	COMMON NTAPE(20)	FARED	09100
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RO,RIN,RUT,CIN,MI	FARED	09101
	ICT,THE,IDDC,NIB,NOB,NCV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	09102
	COMMON NSPARES(42)	FARED	09103
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	09104
	ID,BLANKS	FARED	09105
	COMMON NPOINT(20),ZONE(5000)	FARED	09106
	DIMENSION NZONE(2000)	FARED	09107
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	09108
	DIMENSION IZO(20)	FARED	09109
	NPR=NTAPE(2)	FARED	09110
	K1=10	FARED	09111
	K2=10	FARED	09112
	KZO=J	FARED	09113
	IF(IDB.GT.NB) GO TO 400	FARED	09114
	DO 100 K=1,NZ	FARED	09115
	IX=NPOINT(K)	FARED	09116
	IY=NPOINT(K)+4	FARED	09117
	IF(NZONE(IY).NE.IDB) GO TO 100	FARED	09118
	KZO=KZO+1	FARED	09119
	IZO(KZO)=NZONE(IX)	FARED	09120
100	CONTINUE	FARED	09121
	RETURN	FARED	09122
400	CONTINUE	FARED	09123
	WRITE(NPR,401)	FARED	09124
401	FORMAT(20X68H'FATAL ERROR***BLOCK ID IS GREATER THAN POSSIBLE NUMBE	FARED	09125
	1R OF BLOCKS /34X16H'DETECTED BY ZOLO)	FARED	09126
	STOP 13	FARED	09127
	END	FARED	09128

C	SUBROUTINE CROCA	FARED	09129
C		FARED	09130
C		FARED	09131
C	THIS SUBROUTINE CALCULATES THE TOTAL REMOVAL CROSS SECTIONS.	FARED	09132
C		FARED	09133
C		FARED	09134
	COMMON NTAPE(20)	FARED	09135
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RO,RIN,RUT,CIN,MI	FARED	09136
	1CT,THE,IDDC,NIB,NOB,NCV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	09137
	COMMON NSPARES(42)	FARED	09138
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	09139
	1D,BLANKS	FARED	09140
	COMMON NPOINT(20),ZONE(5000)	FARED	09141
	DIMENSION NZONE(2000)	FARED	09142
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	09143
	COMMON/MAC1/VUSIG(20,30),DIF(20,30),TRANS(4000),SIGT(20,30),SIGA(2	FARED	09144
	10,30)	FARED	09145
	COMMON/ACA/SC(30),FC(30),FNVC(30),S2NC(30),DELC(30),STR(30),SVU(30	FARED	09146
	1),SSA(30),SST(30),NFIS(20),N2N(20),CH(30),IDZON(20),IDZO(20),ICOMP	FARED	09147
	2(20),NCAP(20),NDEL(20),NTR(20),SGF(20,30),DEL(20,30),S2N(20,30)	FARED	09148
	COMMON/ACB/AC2(150)	FARED	09149
	COMMON/BK/BUCK2(20,30)	FARED	09150
	COMMON/MIS/CHI(20,30),DELTA(20),BETA(20)	FARED	09151
	COMMON/FLX/PHI(150,30),APHI(20,30)	FARED	09152
	COMMON/GEO/DELR(20),R(150),RI(150),LB(20)	FARED	09153
	COMMON/PARS/NSR,ICT,IGO,ICT2,N100,IFLX,COUT,MICT2,EIGEN,EIGEN1,P,	FARED	09154
	1PIH,IST	FARED	09155
	COMMON/OM/OMEGA(30),OMEG1(30)	FARED	09156
	COMMON/SO/SOU(150),SOP(150),SOM(20),SOP(20),SOPP(30)	FARED	09157
	M6=NTAPE(2)	FARED	09158
	DO 7 J=1,MAG	FARED	09159
	DO 65 I=1,NZ	FARED	09160
	SUM=0.	FARED	09161
	IF(J.EQ.MAG) GO TO 56	FARED	09162
	LB3=MIN0(NDS,MAG-J)	FARED	09163
30	DO 35 K=1,LB3	FARED	09164
	IX=IXTR(I,K,J)	FARED	09165
	SUM=SUM+TRANS(IX)	FARED	09166
35	CONTINUE	FARED	09167
56	CON1=0.	FARED	09168
	IF(NGO.GT.2) GO TO 60	FARED	09169
	CON1=DIF(I,J)*BUCK2(I,J)	FARED	09170
60	SIGT(I,J)=CON1+SUM+SIGA(I,J)	FARED	09171
C		FARED	09172
C	CHECK REMOVAL CROSS SECTIONS FOR NEGATIVE VALUES.	FARED	09173
C		FARED	09174
	IF(SIGT(I,J).GE.0.) GO TO 65	FARED	09175
	ST=SUM+SIGA(I,J)	FARED	09176
	IF(ST.GE.0.) GO TO 62	FARED	09177
	WRITE(M6,61) I,J	FARED	09178

61	FORMAT(2JX51HFATAL ERROR***NEGATIVE TOTAL CROSS SECTION FOR ZONE	I3	FARED	09179
	1,10H AND GROUP	I3/34X17H	DETECTED BY CROCA)	FARED 09180
	STOP		FARED	09181
62	BUCK2(I,J)=-(SUM+SIGA(I,J))/DIF(I,J)		FARED	09182
	SIGT(I,J)=0.		FARED	09183
	WRITE(M6,63) I,J,BUCK2(I,J)		FARED	09184
63	FORMAT(/,29H TRANSVERSE BUCKLING FOR ZONE,I3,10H AND GROUP,I3,8H S		FARED	09185
	1ET TO ,E12.5)		FARED	09186
65	CONTINUE		FARED	09187
70	CONTINUE		FARED	09188
	RETURN		FARED	09189
	END		FARED	09190

C	SUBROUTINE OMCAL	FARED	09191
C		FARED	09192
C		FARED	09193
C	THIS SUBROUTINE CALCULATES THE BOUNDARY EXTRAPOLATION LENGTHS.	FARED	09194
C		FARED	09195
C		FARED	09196
	COMMON NTAPE(20)	FARED	09197
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RO,RIN,RUT,CIN,MI	FARED	09198
	ICT,THE,IUDC,NIB,NOB,NCV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	09199
	COMMON NSPARES(42)	FARED	09200
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	09201
	10,BLANKS	FARED	09202
	COMMON NPOINT(20),ZONE(5000)	FARED	09203
	DIMENSION NZONE(2000)	FARED	09204
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	09205
	COMMON/BK/BUCK2(20,30)	FARED	09206
	COMMON/MIS/CHI(20,30),DELTA(20),BETA(20)	FARED	09207
	COMMON/ACB/AC2(150)	FARED	09208
	COMMON/MAC1/VUSIG(20,30),DIF(20,30),TRANS(4000),SIGT(20,30),SIGA(2	FARED	09209
	10,30)	FARED	09210
	COMMON/FLX/PHI(150,30),APHI(20,30)	FARED	09211
	COMMON/GEO/DELR(20),R(150),RI(150),LB(20)	FARED	09212
	COMMON/PARS/NSR,ICT,IGO,ICT2,N100,IFLX,COUT,MICT2,EIGEN,EIGEN1,P,	FARED	09213
	1PIM,1ST	FARED	09214
	COMMON/OM/OMEGA(30),OMEG1(30)	FARED	09215
	COMMON/SO/SOU(150),SOUP(150),SOM(20),SOP(20),SOPP(30)	FARED	09216
	M6=NTAPE(2)	FARED	09217
	N100=0	FARED	09218
	IF(NIB.LT.1.OR.NIB.GT.5) GO TO 500	FARED	09219
	IF(NO8.LT.1.OR.NO8.GT.5) GO TO 510	FARED	09220
C		FARED	09221
C	CALCULATE THE INNER BOUNDARY EXTRAPOLATION LENGTHS.	FARED	09222
C		FARED	09223
	GO TO (300,300,210,300,220),NIB	FARED	09224
210	DO 20 I=1,MAG	FARED	09225
	IF(OMEGA(I).LT.0.)GO TO 20	FARED	09226
15	N100=1	FARED	09227
	WRITE(M6,16)	FARED	09228
16	FORMAT(20X42HERROR***VALUE FOR OMEGA IS NON-NEGATIVE /)	FARED	09229
20	CONTINUE	FARED	09230
	GO TO 300	FARED	09231
220	GO TO (40,45,44),NGO	FARED	09232
40	DO 42 I=1,MAG	FARED	09233
	OMEGA(I)=-DIF(1,I)*2.131338	FARED	09234
42	CONTINUE	FARED	09235
	GO TO 300	FARED	09236
44	CON3=1.0/R(1)	FARED	09237
	GO TO 46	FARED	09238
45	CON3=1.0/(2.0*R(1))	FARED	09239
46	IF(R(1).EQ.0.) CON3=0.0	FARED	09240

DO 50 I=1,MAG	FARED 09241
CON1=3.0*DIF(1,I)	FARED 09242
CON2=CON3*CON1	FARED 09243
OMEGA(I)=-CON1*(0.710446+1.080417*CON2)/(1.0+0.8103127*CON2)	FARED 09244
50 CONTINUE	FARED 09245
C	FARED 09246
C CALCULATE THE OUTER BOUNDARY EXTRAPOLATION LENGTHS.	FARED 09247
C	FARED 09248
300 GO TO (400,400,310,400,320),NOB	FARED 09249
310 DO 75 I=1,MAG	FARED 09250
IF(OMEGA(I).GT.0.) GO TO 75	FARED 09251
70 N100=1	FARED 09252
WRITE(M6,71)	FARED 09253
71 FORMAT(2JX45HERROR***VALUE FOR OMEGA1 IS NOT POSITIVE /)	FARED 09254
75 CONTINUE	FARED 09255
GO TO 400	FARED 09256
320 GO TO (95,105,104),NGO	FARED 09257
95 DO 100 I=1,MAG	FARED 09258
OMEGA1(I)=DIF(NZ,I)*2.131338	FARED 09259
100 CONTINUE	FARED 09260
GO TO 400	FARED 09261
104 CON1=1.0/R(NPTS)	FARED 09262
GO TO 100	FARED 09263
105 CON1=1.0/(2.*R(NPTS))	FARED 09264
106 DO 110 I=1,MAG	FARED 09265
CON2=3.*DIF(NZ,I)	FARED 09266
CON3=CON2*CON1	FARED 09267
OMEGA1(I)=CON2*0.710446/(1.0+0.710446*CON3)	FARED 09268
110 CONTINUE	FARED 09269
400 CONTINUE	FARED 09270
IF(N100.EQ.0) RETURN	FARED 09271
WRITE(M6,401)	FARED 09272
401 FORMAT(28X27HPROBLEM DETERMINATED BY OMCAL /)	FARED 09273
STOP	FARED 09274
500 CONTINUE	FARED 09275
WRITE(M6,501)	FARED 09276
501 FORMAT(2JX33HFATAL ERROR***NIB IS OUT OF RANGE /34X17HDETECTED BY	FARED 09277
1 OMCAL)	FARED 09278
STOP	FARED 09279
510 CONTINUE	FARED 09280
WRITE(M6,511)	FARED 09281
511 FORMAT(2JX33HFATAL ERROR***NOB IS OUT OF RANGE /34X17HDETECTED BY	FARED 09282
1 OMCAL)	FARED 09283
STOP	FARED 09284
END	FARED 09285

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OVERLAY(RIM,S,1)	FARED	09286
PROGRAM MACRO	FARED	09287
	FARED	09288
	FARED	09289
THIS PROGRAM CALCULATES THE MACROSCOPIC CROSS SECTIONS FOR	FARED	09290
EACH ZONE.	FARED	09291
	FARED	09292
	FARED	09293
COMMON NTAPE(20)	FARED	09294
COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RO,RIN,RUT,CIN,MI	FARED	09295
1CT,THE,IUDC,NIB,NOB,NCV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	09296
COMMON NSPARES(42)	FARED	09297
COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	09298
ID,BLANKS	FARED	09299
COMMON NPOINT(20),ZONE(5000)	FARED	09300
DIMENSION NZONE(2000)	FARED	09301
EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	09302
COMMON/MAC1/VUSIG(20,30),DIF(20,30),TRANS(4000),SIGT(20,30),SIGA(2	FARED	09303
0,30),S2N(20,30)	FARED	09304
COMMON/ACA/SC(30),FC(30),FNVC(30),S2NC(30),DELC(30),STR(30),SVU(30	FARED	09305
1),SSA(30),SST(30),NFIS(20),N2N(20),CH(30),IDZON(20),IDZO(20),ICOMP	FARED	09306
2(20),NCAP(20),NDEL(20),NTR(20),SGF(20,30),DEL(20,30)	FARED	09307
COMMON/ACB/SP(30)	FARED	09308
COMMON/BK/BUCK2(20,30)	FARED	09309
COMMON/MIS/CHI(20,30),DELTA(20),BETA(20)	FARED	09310
COMMON/FLX/PHI(150,30),APHI(20,30)	FARED	09311
COMMON/GEO/DELR(20),R(150),RI(150),LB(20)	FARED	09312
COMMON/PARS/NSR,ICT,IGO,ICT2,N10J,IFLX,COUT,MICT2,EIGEN,EIGEN1,P,	FARED	09313
1PIM,ISI	FARED	09314
COMMON/OM/OMEGA(30),OMEG1(30)	FARED	09315
COMMON/SO/SOU(150),SOUP(150),SOM(20),SOP(20),SOPP(30)	FARED	09316
DIMENSION SA(30)	FARED	09317
DIMENSION IZO(20)	FARED	09318
DATA MT,IPLT/666,4HDPXS/	FARED	09319
IUPLT=NTAPE(19)	FARED	09320
M6=NTAPE(2)	FARED	09321
MAC=NTAPE(14)	FARED	09322
REWIND IDPLT	FARED	09323
READ(IDPLT) IDTAP	FARED	09324
IF(EOF,IDPLT) 2,1	FARED	09325
1 IF(IDTAP.NE.IPLT) GO TO 2	FARED	09326
IUPLT=-IUPLT	FARED	09327
2 CONTINUE	FARED	09328
MC=NTAPE(17)	FARED	09329
NTID=5LMACRO	FARED	09330
NTS=.	FARED	09331
DO 6 I=1,NZ	FARED	09332
DO 6 K=1,MAG	FARED	09333
UIF(I,K)=0.	FARED	09334
VUSIG(I,K)=0.	FARED	09335

SGF(I,K)=0.0	FARED	09336
SIGA(I,K)=0.	FARED	09337
DEL(I,K)=0.	FARED	09338
S2N(I,K)=0.	FARED	09339
6 CONTINUE	FARED	09340
NMEL=IXTR(NZ,1,MAG-1)	FARED	09341
DO 7 I=1,NMEL	FARED	09342
7 TRANS(I)=0.0	FARED	09343
NTIME=0	FARED	09344
700 CONTINUE	FARED	09345
C	FARED	09346
C READ MICROSCOPIC CROSS SECTIONS FOR EACH BLOCK FROM NTAP(14).	FARED	09347
C	FARED	09348
REWIND MAC	FARED	09349
READ(MAC) MTP,NBK,MAGK,NDSK	FARED	09350
IF(MTP.NE.MT.OR.NB.NE.NBK.OR.MAGK.NE.MAG.OR.NDSK.NE.NDS) GO TO	FARED	09351
11008	FARED	09352
IF(IDPLT.LT.0) GO TO 701	FARED	09353
REWIND IDPLT	FARED	09354
WRITE(IDPLT) IPLT,NB,MAG,MT	FARED	09355
701 CONTINUE	FARED	09356
DO 600 MMK=1,NB	FARED	09357
READ(MAC) IUB,NEL,(ICOMP(I),NCAP(I),NFIS(I),N2N(I),NDEL(I),NTR(I),	FARED	09358
I=1,NEL)	FARED	09359
MAGM1=MAG-1	FARED	09360
DO 155 KK=1,MAGM1	FARED	09361
DO 155 II=1,NEL	FARED	09362
IF(NTR(II).LE.0) GO TO 155	FARED	09363
LR=MIN0(NDS,MAG-KK)	FARED	09364
READ(MAC) ICOM,IT,MINJ,KT,(STR(JP),JP=1,LR)	FARED	09365
CALL ZOLIST(ICOM,IUB,KZON,IDZON)	FARED	09366
IF(KZON.EQ.0) GO TO 155	FARED	09367
DO 257 J=1,KZON	FARED	09368
CONCM=CONCENT(ICOM,IDZON(J))	FARED	09369
DO 257 IJ=1,LR	FARED	09370
IX=IXTR(IDZON(J),IJ,KT)	FARED	09371
TRANS(IX)=CONCM*STR(IJ)+TRANS(IX)	FARED	09372
257 CONTINUE	FARED	09373
155 CONTINUE	FARED	09374
READ(MAC) (CH(I),I=1,MAG)	FARED	09375
CALL ZOLO(IDB,KZO,IZO)	FARED	09376
IF(IDPLT.GT.0) WRITE(IDPLT) IDB,NEL,KZO,(IZO(I),I=1,KZO)	FARED	09377
DO 350 MK=1,KZO	FARED	09378
IZ=IZO(MK)	FARED	09379
DO 350 I=1,MAG	FARED	09380
CHI(IZ,I)=CH(I)	FARED	09381
350 CONTINUE	FARED	09382
DO 450 NL=1,NEL	FARED	09383
CALL ZOLIST(ICOMP(NL),IUB,KZON,IDZON)	FARED	09384
DO 420 LSET=1,MAG	FARED	09385

SC(LSET)=0.	FARED	09386
FC(LSET)=0.	FARED	09387
SA(LSET)=0.0	FARED	09388
SP(LSET)=0.0	FARED	09389
FNVC(LSET)=0.	FARED	09390
S2NC(LSET)=0.	FARED	09391
DELC(LSET)=0.	FARED	09392
420 CONTINUE	FARED	09393
READ(MAC) (STR(J),J=1,MAG)	FARED	09394
IF(NCAP(NL).NE.0) READ(MAC) (SC(I),I=1,MAG)	FARED	09395
IF(NFIS(NL).NE.J) READ(MAC) ((FC(I),I=1,MAG),(FNVC(J),J=1,MAG))	FARED	09396
IF(N2N(NL).NE.J) READ(MAC) (S2NC(I),I=1,MAG)	FARED	09397
IF(NDEL(NL).NE.J) READ(MAC) (DELC(I),I=1,MAG)	FARED	09398
C	FARED	09399
C CALCULATE MACROSCOPIC CROSS SECTIONS.	FARED	09400
C	FARED	09401
IF(KZON.EQ.0) GO TO 441	FARED	09402
DO 440 MZ=1,KZON	FARED	09403
IZ=IDZON(MZ)	FARED	09404
CONCM=CONCENT(ICOMP(NL),IZ)	FARED	09405
DO 440 MG=1,MAG	FARED	09406
SGF(IZ,MG)=CONCM*FC(MG)+SGF(IZ,MG)	FARED	09407
SA(MG)=SC(MG)+FC(MG)+DELC(MG)	FARED	09408
SIGA(IZ,MG)=CONCM*SA(MG)+SIGA(IZ,MG)	FARED	09409
SA(MG)=SA(MG)+2*S2NC(MG)	FARED	09410
VUSIG(IZ,MG)=CONCM*(FC(MG)*FNVC(MG))+VUSIG(IZ,MG)	FARED	09411
DIF(IZ,MG)=CONCM*STR(MG)+DIF(IZ,MG)	FARED	09412
DEL(IZ,MG)=CONCM*DELC(MG)+DEL(IZ,MG)	FARED	09413
S2N(IZ,MG)=CONCM*S2NC(MG)+S2N(IZ,MG)	FARED	09414
440 CONTINUE	FARED	09415
441 CONTINUE	FARED	09416
IF(IDPLT.LT.0) GO TO 450	FARED	09417
CALL PXS(MMK,NL,ICOMP(NL))	FARED	09418
WRITE(IDPLT)ICOMP(NL),(SC(I),I=1,MAG),(FC(J),J=1,MAG),(SA(K),K=1,	FARED	09419
1MAG),(S2NC(L),L=1,MAG),(SP(M),M=1,MAG)	FARED	09420
450 CONTINUE	FARED	09421
600 CONTINUE	FARED	09422
IF(IDPLT.GT.0) ENDFILE IDPLT	FARED	09423
C	FARED	09424
C WRITE MACROSCOPIC CROSS SECTIONS ON NTAPE(17).	FARED	09425
C	FARED	09426
REWIND MC	FARED	09427
WRITE(MC) NTID,NTS,NZ,MAG	FARED	09428
WRITE(MC) ((SGF(I,J),I=1,NZ),J=1,MAG)	FARED	09429
WRITE(MC) ((SIGA(I,J),I=1,NZ),J=1,MAG)	FARED	09430
WRITE(MC) ((VUSIG(I,J),I=1,NZ),J=1,MAG)	FARED	09431
WRITE(MC) ((DIF(I,J),I=1,NZ),J=1,MAG)	FARED	09432
WRITE(MC) ((DEL(I,J),I=1,NZ),J=1,MAG)	FARED	09433
WRITE(MC) ((S2N(I,J),I=1,NZ),J=1,MAG)	FARED	09434
WRITE(MC) NMEL,(TRANS(I),I=1,NMEL)	FARED	09435

C	ENDFILE MC	FARED	09436
C	COMPUTE DIFFUSION COEFFICIENTS AND CHECK FOR NON-POSITIVE	FARED	09437
C	VALUES.	FARED	09438
C		FARED	09439
	DO1502I=1,NZ	FARED	09440
	DO1502K=1,MAG	FARED	09441
	IF(DIF(I,K).GT.0) GO TO 1502	FARED	09442
325	N100=1	FARED	09443
	WRITE(M6,326) I,J	FARED	09444
326	FORMAT(3JH ERROR,DIFF. COEFF. ZERO GP.-,I3,4HREG.,I3)	FARED	09445
1502	DIF(I,K)=1./(3.*DIF(I,K))	FARED	09446
	RETURN	FARED	09447
1008	IF(NTIME.GT.2) GO TO 1010	FARED	09448
	REWIND MAC	FARED	09449
	NTIME=NTIME+1	FARED	09450
	GO TO 730	FARED	09451
1010	WRITE(M6,1011)	FARED	09452
1011	FORMAT(46H IDS DO NOT MATCH ON MICROSCOPIC LIBRARY TAPE /)	FARED	09453
	STOP	FARED	09454
	END	FARED	09455
		FARED	09456

C	SUBROUTINE PXS(MK,NL,ICMP)	FARED	09457
C		FARED	09458
C	THIS SUBROUTINE CALCULATES THE MICROSCOPIC POWER CROSS	FARED	09459
C	SECTIONS FOR NUCLIDE ICMP WHICH IS THE NL-TH NUCLIDE IN	FARED	09460
C	BLOCK MK.	FARED	09461
C		FARED	09462
C		FARED	09463
C		FARED	09464
	COMMON NTAPE(20)	FARED	09465
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RO,RIN,RUT,CIN,MI	FARED	09466
	1CT,THE,IUDC,NI3,NOB,NCV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	09467
	COMMON NSPARES(42)	FARED	09468
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	09469
	1D,BLANKS	FARED	09470
	COMMON NPOINT(20),ZONE(5000)	FARED	09471
	DIMENSION NZONE(2000)	FARED	09472
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	09473
	COMMON/ACA/SC(30),FC(30),FNVC(30),S2NC(30),DELC(30),STR(30)	FARED	09474
	COMMON/ACB/SP(30),NLIST(40),EPF(40),EPC(40)	FARED	09475
	DATA FILE/4HFILE/	FARED	09476
	NTIM=0	FARED	09477
	IF(MK.NE.1.OR.NL.NE.1) GO TO 500	FARED	09478
	ITAP=NTAPE(4)	FARED	09479
	REWIND ITAP	FARED	09480
	DO 2 I=1,3	FARED	09481
	CALL REOF(ITAP)	FARED	09482
	2 CONTINUE	FARED	09483
	3 READ(ITAP) FI,JF,NNU,NGP	FARED	09484
	IF(EOF,ITAP) 4,5	FARED	09485
	4 IF(NTIM.NE.0) GO TO 900	FARED	09486
	NTIM=1	FARED	09487
	REWIND ITAP	FARED	09488
	GO TO 3	FARED	09489
	5 IF(FI.NE.FILE) GO TO 4	FARED	09490
	6 IF(JF-7) 7,100,4	FARED	09491
	7 CALL REOF(ITAP)	FARED	09492
	GO TO 3	FARED	09493
100	CONTINUE	FARED	09494
	READ(ITAP) (NLIST(I),(NON,J=1,7),EPC(I),EPF(I),I=1,NNU)	FARED	09495
500	CONTINUE	FARED	09496
	DO 101 K=1,NNU	FARED	09497
	IF(NLIST(K).EQ.ICMP) GO TO 105	FARED	09498
101	CONTINUE	FARED	09499
	DO 102 J=1,MAG	FARED	09500
102	SP(J)=0,J	FARED	09501
	GO TO 600	FARED	09502
105	CONTINUE	FARED	09503
	DO 110 J=1,MAG	FARED	09504
	SP(J)=FC(J)*EPF(K)+SC(J)*EPC(K)	FARED	09505
110	CONTINUE	FARED	09506

000 RETURN		FARED	09507
900 NPR=NTAPE(2)		FARED	09508
WRITE(NPR,901)		FARED	09509
901 FORMAT(//////,45H *** IMPROPER TAPE HEADING FOR LIBRARY *** //)		FARED	09510
STOP 313		FARED	09511
END		FARED	09512

	OVERLAY(RIM,3,2)	FARED	09513
	PROGRAM CONS	FARED	09514
C		FARED	09515
C		FARED	09516
C	THIS PROGRAM CALCULATES THE COEFFICIENTS USED IN THE	FARED	09517
C	SOLUTION OF THE NEUTRON DIFFUSION EQUATIONS.	FARED	09518
C		FARED	09519
	COMMON NTAPE(20)	FARED	09520
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RO,RIN,RUT,CIN,MI	FARED	09521
	1CT,THE,IDOC,NIB,NOB,NCV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	09522
	COMMON NSPARES(42)	FARED	09523
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	09524
	1U,BLANKS	FARED	09525
	COMMON NPOINT(20),ZONE(5000)	FARED	09526
	DIMENSION NZONE(2000)	FARED	09527
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	09528
	COMMON/ACA/AC3(20,30),AC4(20,30),AC5(20,30),AC6(5,30)	FARED	09529
	COMMON/BK/BUCK2(20,30)	FARED	09530
	COMMON/MIS/CHI(20,30),DELTA(20),BETA(20)	FARED	09531
	COMMON/ACB/AC2(150)	FARED	09532
	COMMON/MAC1/VUSIG(20,30),DIF(20,30),TRANS(4000),SIGT(20,30)	FARED	09533
	COMMON/FLX/PHI(150,30),APHI(20,30)	FARED	09534
	COMMON/GEO/DELR(20),R(150),RI(150),LB(20)	FARED	09535
	COMMON/PARS/NSR,ICT,IGO,ICT2,N100,IFLX,COUT,MICT2,EIGEN,EIGEN1,P,	FARED	09536
	1PI4,IST	FARED	09537
	COMMON/O4/OMEGA(30),OMEG1(30)	FARED	09538
	COMMON/SO/SOU(150),SOUP(150),SOM(20),SOP(20),SOPP(30)	FARED	09539
	DIMENSION FLP(150)	FARED	09540
	EQUIVALENCE (FLP(1),APHI(1,1))	FARED	09541
	DIMENSION AC1(150),AC10(150)	FARED	09542
	NM1=NPTS-1	FARED	09543
	NM1=NZ-1	FARED	09544
	LB1=2*(NGO-1)	FARED	09545
	PI4=3.14159265*FLOAT(LB1)	FARED	09546
	IF(LB1.NE.0) GO TO 1	FARED	09547
	PIM=1.0	FARED	09548
	IF(N18.EQ.1) PIM=2.0	FARED	09549
	LB3=2	FARED	09550
	RI(1)=1.0	FARED	09551
	GOTO 14	FARED	09552
	1 PIM=3.14159265*FLOAT(LB1)	FARED	09553
	LB3=1	FARED	09554
14	DO 15 I=LBS,NPTS	FARED	09555
15	RI(I)=R(I)**P	FARED	09556
	LB1=1	FARED	09557
	DO 120 I=2,NM1	FARED	09558
	FAC2=P*DELR(LB1)/R(I)	FARED	09559
	FLP(I)=1.0/(1.0+.5*FAC2)	FARED	09560
	IF(I.LT.LB(LB1)) GOTO 120	FARED	09561
		FARED	09562

FAC2=P*DELR(LB1+1)/R(I)	FARED	09563
AC2(LB1)=1.0-.5*FAC2	FARED	09564
LB1=LB1+1	FARED	09565
120 CONTINUE	FARED	09566
121 DO 123 J=1,MAG	FARED	09567
DO 122 I=1,MM1	FARED	09568
AC5(I,J)=(DIF(I+1,J)*DELR(I))/(DIF(I,J)*DELR(I+1))	FARED	09569
122 CONTINUE	FARED	09570
123 CONTINUE	FARED	09571
125 DO 135 J=1,MAG	FARED	09572
DO 130 I=1,NZ	FARED	09573
AC3(I,J)=(DELR(I)**2)/DIF(I,J)	FARED	09574
AC4(I,J)=AC3(I,J)*SIGT(I,J)	FARED	09575
130 CONTINUE	FARED	09576
135 CONTINUE	FARED	09577
GO TO (140,150,155,165,155),NIB	FARED	09578
140 IF (R(1)) 141,141,142	FARED	09579
141 P2=2.0*(1.0+P)	FARED	09580
GO TO 143	FARED	09581
142 P2=2.0	FARED	09582
143 DO 145 J=1,MAG	FARED	09583
AC6(1,J)=AC3(1,J)/P2	FARED	09584
AC6(2,J)=SIGT(1,J)*AC6(1,J)	FARED	09585
145 CONTINUE	FARED	09586
GO TO 175	FARED	09587
150 DO 154 J=1,MAG	FARED	09588
AC6(1,J)=AC4(1,J)*FLP(2)-P*DELR(1)*FLP(2)/R(2)+1.	FARED	09589
AC6(2,J)=AC3(1,J)*FLP(2)	FARED	09590
154 CONTINUE	FARED	09591
GO TO 175	FARED	09592
155 IF (R(1)) 156,156,157	FARED	09593
156 CON=1.0	FARED	09594
GO TO 158	FARED	09595
157 CON=1.0/(1.0+P*DELR(1)/(2.0*R(1)))	FARED	09596
158 DO 160 J=1,MAG	FARED	09597
AC6(1,J)=(AC3(1,J)*CON)/2.0	FARED	09598
AC6(2,J)=AC6(1,J)*(SIGT(1,J)-(2.0*DIF(1,J))/(DELR(1)*OMEGA(J)))	FARED	09599
160 CONTINUE	FARED	09600
GO TO 175	FARED	09601
165 DO 170 J=1,MAG	FARED	09602
AC6(1,J)=AC3(1,J)*FLP(2)	FARED	09603
AC6(2,J)=(P*DELR(1)*FLP(2)/R(2)+1.0)*OMEGA(J)	FARED	09604
AC6(3,J)=AC4(1,J)*FLP(2)-P*DELR(1)*FLP(2)/R(2)+1.	FARED	09605
170 CONTINUE	FARED	09606
175 NM2=NPTS-2	FARED	09607
GO TO (176,500,176,500,176),NOB	FARED	09608
176 CON=1.0-P*DELR(NZ)/(2.0*R(NPTS))	FARED	09609
DO 177 J=1,MAG	FARED	09610
AC6(4,J)=AC3(NZ,J)/(2.0*CON)	FARED	09611
AC6(5,J)=AC6(4,J)*SIGT(NZ,J)	FARED	09612

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177 CONTINUE
   IF(NOB-2) 500,500,185
180 CON=DEL R(NZ)/CON
   DO 185 J=1,MAG
   AC6(S,J)=AC6(S,J)+CON/OMEG1(J)
185 CONTINUE
500 RETURN
   END

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FARED 09613
FARED 09614
FARED 09615
FARED 09616
FARED 09617
FARED 09618
FARED 09619
FARED 09620

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	OVERLAY(RIM,3,3)	FARED	09621
	PROGRAM FLUX	FARED	09622
C		FARED	09623
C		FARED	09624
C	THIS PROGRAM CALCULATES THE SYSTEM EIGENVALUE AND THE REAL	FARED	09625
C	OR ADJOINT FLUX DISTRIBUTIONS.	FARED	09626
C		FARED	09627
	COMMON NTAPE(20)	FARED	09628
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RD,RIN,RUT,CIN,MI	FARED	09629
	ICT,THE,IDDC,NIB,NOB,NCV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	09630
	COMMON NSPARES(42)	FARED	09631
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	09632
	10,3LANKS	FARED	09633
	COMMON NPOINT(20),ZONE(5000)	FARED	09634
	DIMENSION NZONE(2000)	FARED	09635
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	09636
	COMMON/ACA/AC3(20,30),AC4(20,30),AC5(20,30),AC6(5,30)	FARED	09637
	COMMON/BK/BUCK2(20,30)	FARED	09638
	COMMON/MIS/ CHI(20,30)	FARED	09639
	COMMON/ACB/AC2(150)	FARED	09640
	COMMON/MAC1/VUSIG(20,30),DIF(20,30),TRANS(4000),SIGT(20,30)	FARED	09641
	COMMON/FLX/PHI(150,30),APHI(20,30)	FARED	09642
	COMMON/GEO/DCLR(20),R(150),RI(150),LB(20)	FARED	09643
	COMMON/PARS/NSR,ICT,IGO,ICT2,N100,IFLX,COUT,MICT2,EIGEN,EIGEN1,P,	FARED	09644
	1PIM,IST	FARED	09645
	COMMON/OM/OMEGA(30),OMEG1(30)	FARED	09646
	COMMON/SO/SOU(150),SOUP(150),SOM(20),SOP(20),SOPP(30)	FARED	09647
	DIMENSION DELTA(150),BETA(150)	FARED	09648
	DIMENSION FL(150),THET(150),FLP(150)	FARED	09649
	EQUIVALENCE (FLP(1),APHI(1,1))	FARED	09650
	DIMENSION D(150),OP(20),G1P(20),AC8(150)	FARED	09651
	DIMENSION AC9(150)	FARED	09652
	DIMENSION DARG(150)	FARED	09653
	M6=NTAPE(2)	FARED	09654
	DO 700 I=1,NPTS	FARED	09655
	DO 700 J=1,MAG	FARED	09656
700	PHI(1,J)=0.0	FARED	09657
	NM1=NPTS-1	FARED	09658
	NM2=NPTS-2	FARED	09659
	NM1=NZ-1	FARED	09660
	ICT4=0	FARED	09661
	SOP(NZ)=0.0	FARED	09662
	SOPP(NZ)=0.0	FARED	09663
	ICT=0	FARED	09664
	EIGEN=0.0	FARED	09665
	EIGEN1=1.0 E100	FARED	09666
1	CONTINUE	FARED	09667
	LOB=2	FARED	09668
C		FARED	09669
		FARED	09670

C	START THE FLUX-EIGENVALUE CALCULATION.	FARED	09671
C		FARED	09672
	DO 160 I=1,MAG	FARED	09673
C		FARED	09674
C	CALCULATE THE TOTAL NEUTRON SOURCE INTO EACH ENERGY GROUP.	FARED	09675
C		FARED	09676
	LB2=MAX0(I-NDS,1)	FARED	09677
	LB3=I-1	FARED	09678
	K8=1	FARED	09679
	SUMS=J.	FARED	09680
	DO 40 J=1,NPTS	FARED	09681
	SUM=0.	FARED	09682
	IF(I.EQ.1) GO TO 36	FARED	09683
	DO35 K=LB2,LB3	FARED	09684
	IX=IXTR(K8,I-K,K)	FARED	09685
35	SUM=SUM+TRANS(IX)*PHI(J,K)	FARED	09686
36	U(J)=SUM+CHI(K8,I)*SOU(J)	FARED	09687
	IF(J.LT.LB(K8).OR.K8.EQ.NZ) GO TO 40	FARED	09688
	SUMB=0.	FARED	09689
	K8=K8+1	FARED	09690
	IF(I.EQ.1) GO TO 24	FARED	09691
	DO23 K=LB2,LB3	FARED	09692
	IX=IXTR(K8,I-K,K)	FARED	09693
23	SUMB=SUMB+TRANS(IX)*PHI(J,K)	FARED	09694
24	UP(K8-1)=SUMB+CHI(K8,I)*SOP(K8-1)	FARED	09695
40	CONTINUE	FARED	09696
C		FARED	09697
C	COMPUTE FLUX COEFFICIENTS AT INNER BOUNDARY ACCORDING TO SPECIFIED	FARED	09698
C	BOUNDARY CONDITION.	FARED	09699
C		FARED	09700
	55 GO TO(60,65,70,56,70),NIB	FARED	09701
	56 SM=AC6(1,I)*D(2)	FARED	09702
	BETA(2)=AC6(2,I)+SM	FARED	09703
	DELTA(3)=AC6(3,I)	FARED	09704
	LOB=3	FARED	09705
	GO TO 75	FARED	09706
60	BETA(1)=0(1)*AC6(1,I)	FARED	09707
	DELTA(2)=AC6(2,I)	FARED	09708
	GO TO 75	FARED	09709
65	BETA(2)=AC6(2,I)*D(2)	FARED	09710
	DELTA(3)=AC6(1,I)	FARED	09711
	LOB=3	FARED	09712
	GO TO 75	FARED	09713
70	BETA(1)=AC6(1,I)*D(1)	FARED	09714
	DELTA(2)=AC6(2,I)	FARED	09715
C		FARED	09716
C	COMPUTE FLUX COEFFICIENTS AT EACH INTERIOR MESH POINT.	FARED	09717
C		FARED	09718
	75 I6=LB(1)	FARED	09719
	I7=1	FARED	09720

DO 90 J=L08,NM1	FARED 09721
CL=P*DEL R(I7)*FLP(J)/R(J)	FARED 09722
SL=1.0-CL	FARED 09723
CON1=1.0/(1.0+DELTA(J))	FARED 09724
IF (J-I6) 80,85,80	FARED 09725
80 SM=AC3(I7,I)*D(J)*FLP(J)	FARED 09726
CK=AC4(I7,I)*FLP(J)-CL	FARED 09727
BETA(J)=SL*CON1*BETA(J-1)+SM	FARED 09728
DELTA(J+1)=CK+CON1*(DELTA(J)+CL)	FARED 09729
GO TO 90	FARED 09730
85 GAM=AC5(I7,I)	FARED 09731
GAM1=2.0*CON1	FARED 09732
CON2=.5*AC2(I7)/GAM	FARED 09733
BETA(J)=CON2*FLP(J)*(GAM1*BETA(J-1)+AC3(I7,I)*D(J))	FARED 09734
1+.5*AC3(I7+1,I)*DP(I7)	FARED 09735
DELTA(J+1)=CON2*(AC4(I7,I)*FLP(J)-CL+2.0-GAM1*FLP(J))+	FARED 09736
1.5*AC4(I7+1,I)	FARED 09737
I7=I7+1	FARED 09738
I6=LB(I7)	FARED 09739
90 CONTINUE	FARED 09740
C	FARED 09741
C COMPUTE FLUX AT OUTER BOUNDARY ACCORDING TO SPECIFIED	FARED 09742
C BOUNDARY CONDITION.	FARED 09743
C	FARED 09744
120 GO TO (130,125,130,122,130),NOB	FARED 09745
122 PHI(NPTS,I)=OMEGA(I)	FARED 09746
GO TO 140	FARED 09747
125 PHI(NPTS,I)=0.0	FARED 09748
GO TO 140	FARED 09749
130 CON1= 1.0+DELTA(N)	FARED 09750
PHI(NPTS,I)=(AC6(4,I)*D(NPTS)+BETA(NM1)/CON1)/(AC6(5,I)+DELTA(NPTS	FARED 09751
1)/CON1)	FARED 09752
GO TO 140	FARED 09753
C	FARED 09754
C COMPUTE FLUXES FOR GROUP I STARTING WITH THE NEXT TO LAST	FARED 09755
C MESH POINT.	FARED 09756
C	FARED 09757
140 DO 145 J=1,NM2	FARED 09758
I20=NPTS-J	FARED 09759
PHI(I20,I)=(PHI(I20+1,I)+BETA(I20))/(1.0+DELTA(I20+1))	FARED 09760
145 CONTINUE	FARED 09761
146 GO TO (155,150,155,158,155),NIB	FARED 09762
150 PHI(1,I)=0.0	FARED 09763
GO TO 160	FARED 09764
155 PHI(1,I)=(PHI(2,I)+BETA(1))/(1.0+DELTA(2))	FARED 09765
GO TO 160	FARED 09766
158 PHI(1,I)=OMEGA(I)	FARED 09767
160 CONTINUE	FARED 09768
C	FARED 09769
C CALCULATE NEW FISSION SOURCE AT EACH MESH POINT.	FARED 09770

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C
M80=1
DO 200 I=1,NPTS
SOUP(I)=0.
DO 201 J=1,MAG
SOUP(I)=SOUP(I)+VUSIG(M80,J)*PHI(I,J)
201 CONTINUE
BETA(I)=SOUP(I)*RI(I)
IF(I.LT.LB(M80).OR.I.EQ.NPTS) GO TO 200
SOPP(M80)=0.
DO 202 J=1,MAG
202 SOPP(M80)=SOPP(M80)+VUSIG(M80+1,J)*PHI(I,J)
DELTA(M80)=SOPP(M80)*RI(I)
M80=M80+1
200 CONTINUE
C
C COMPUTE THE SYSTEM EIGENVALUE.
C
M80=1
LB2=2
LB3=LB(1)
EIGEN=0.
206 SUM=0.
DO 203 I=LB2,LB3
IF(I.GT.LB2.OR.I.LE.2) GO TO 204
SUM=SUM+DELTA(M80)+BETA(I)
M80=M80+1
GO TO 203
204 SUM=SUM+BETA(I-1)+BETA(I)
203 CONTINUE
IF(NGO.LE.2) GO TO 209
SUM=SUM-(DELR(M80)*BETA(LB3))/(3.0*R(LB3))
IF(R(LB2-1).EQ.0.0) GO TO 209
IF(M80.GT.1) GO TO 208
SUM=SUM-(BETA(LB2-1)/R(LB2-1))
GO TO 209
208 SUM=SUM-(DELTA(M80-1)/R(LB2-1))
209 CONTINUE
AC9(M80)=.5*SUM*DELR(M80)*PIM
EIGEN=EIGEN+AC9(M80)
IF(M80.EQ.NZ) GO TO 205
LB2=LB3+1
LB3=LB(M80+1)
GO TO 206
C
C PERFORM THE INNER CONVERGENCE TEST AND RENORMALIZE THE
C FISSION SOURCE.
C
205 ICT=ICT+1
DO 402 I=1,NPTS

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FARED 09771
FARED 09772
FARED 09773
FARED 09774
FARED 09775
FARED 09776
FARED 09777
FARED 09778
FARED 09779
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FARED 09810
FARED 09811
FARED 09812
FARED 09813
FARED 09814
FARED 09815
FARED 09816
FARED 09817
FARED 09818
FARED 09819
FARED 09820

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402	SOUP(I)=SOUP(I)/EIGEN	FARED	09821
	DO 403 I=1,MM1	FARED	09822
403	SOPP(I)=SOPP(I)/EIGEN	FARED	09823
	ERR=ABSF((EIGEN-EIGEN1)/EIGEN)	FARED	09824
	IF(ERR.GT.CIN) GO TO 411	FARED	09825
	IF(NCV.NE.2) GO TO 410	FARED	09826
	TEST1=0.0	FARED	09827
	TEST2=1.0 E200	FARED	09828
	DO 407 I=1,NPTS	FARED	09829
	IF(SOU(I).EQ.0.0) GO TO 407	FARED	09830
	FAC=SOUP(I)/SOU(I)	FARED	09831
	IF(FAC.GT.TEST1) TEST1=FAC	FARED	09832
	IF(FAC.LT.TEST2) TEST2=FAC	FARED	09833
407	CONTINUE	FARED	09834
	DO 408 I=1,MM1	FARED	09835
	IF(SOP(I).EQ.0.0) GO TO 408	FARED	09836
	FAC=SOPP(I)/SOP(I)	FARED	09837
	IF(FAC.GT.TEST1) TEST1=FAC	FARED	09838
	IF(FAC.LT.TEST2) TEST2=FAC	FARED	09839
408	CONTINUE	FARED	09840
	ERR=(TEST1-TEST2)/TEST1	FARED	09841
	IF(ERR.GT.CIN) GO TO 411	FARED	09842
410	N100=1	FARED	09843
	GO TO 2000	FARED	09844
411	IF(ICT.LE.2) GO TO 421	FARED	09845
	IF(ICT.LE.MICT) GO TO 412	FARED	09846
	WRITE (M0,1000)	FARED	09847
1000	FORMAT(2X44HFATAL ERROR***INNER ITERATION LIMIT EX CEDED /34X16H	FARED	09848
	1DETECTED BY FLUX)	FARED	09849
	N100=2	FARED	09850
	GO TO 2000	FARED	09851
412	FAC=THE*(1.0-EXP(-0.5*FLOAT(ICT-2)))	FARED	09852
	FAC1=1.0+FAC	FARED	09853
	DO 416 I=1,NPTS	FARED	09854
	SOU(I)=SOUP(I)*FAC1-AC8(I)*FAC	FARED	09855
	IF(SOU(I).LT.0.0) SOU(I)=0.0	FARED	09856
416	AC8(I)=SOUP(I)	FARED	09857
	DO 417 I=1,MM1	FARED	09858
	SOP(I)=SOPP(I)*FAC1-G1P(I)*FAC	FARED	09859
	IF(SOP(I).LT.0.0) SOP(I)=0.0	FARED	09860
417	G1P(I)=SOP(I)	FARED	09861
418	EIGEN1=EIGEN	FARED	09862
	GO TO 1	FARED	09863
421	DO 422 I=1,NPTS	FARED	09864
	AC8(I)=SOUP(I)	FARED	09865
422	SOU(I)=AC8(I)	FARED	09866
	DO 423 I=1,MM1	FARED	09867
	G1P(I)=SOPP(I)	FARED	09868
423	SOP(I)=G1P(I)	FARED	09869
	GO TO 418	FARED	09870

C
C NORMALIZE THE FLUX DISTRIBUTIONS AND WRITE THE FISSION
C SOURCE, FLUXES AND ZONE-AVERAGED FLUXES ON NTAP(10).
C NTAP(16) IS USED FOR THE ADJOINT FLUXES.
C

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2000 CONTINUE
  ISOR=NTAPE(10)
  IF(N100.EQ.2) ISOR=NTAPE(19)
  REWIND ISOR
  CALL AVFLX
  IF(I60.EQ.5) GO TO 3010
  PT=POWER(FUN)
  POWN=POW/PT
  DO 2376 I=1,NPTS
  DO 2376 J=1,MAG
2376  PHI(I,J)=POWN*PHI(I,J)
  DO 2394 I=1,NPTS
2394  SOUP(I)=POWN*SOUP(I)
  DO 2397 I=1,NZ
2397  SOPP(I)=POWN*SOPP(I)
  DO 2005 I=1,NZ
  DO 2005 J=1,MAG
  APhi(I,J)=POWN*APhi(I,J)
2005 CONTINUE
  WRITE(ISOR) SRID,NPTS,MAG,NZ
  WRITE(ISOR) (SOUP(I),I=1,NPTS)
  WRITE(ISOR) (SOPP(I),I=1,NZ)
  WRITE(ISOR) ((APhi(I,J),J=1,MAG),I=1,NZ)
  WRITE(ISOR) ((PHI(I,J),J=1,MAG),I=1,NPTS)
  ENDFILE ISOR
  ISOR=NTAPE(10)
  GO TO 3050
3010  IASOR=NTAPE(16)
  REWIND IASOR
  IF(1FLX.NE.0) GO TO 4300
  DO 4290 I=1,NPTS
4290  SOU(I)=1.0
  DO 4291 I=1,NZ
4291  SOP(I)=1.0
  GO TO 4310
4300  READ(ISOR) SRID,NPTS,MAG,NZ
  READ(ISOR) (SOU(I),I=1,NPTS)
  READ(ISOR) (SOP(I),I=1,NZ)
  REWIND ISOR
4310  POWN=0.0
  DO 4320 I=1,NZ
  IIN=1
  IF(I.NE.1) IIN=LB(I-1)
  IOUT=LB(I)
  IPTS=IOUT-IIN+1

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FARED 09871
FARED 09872
FARED 09873
FARED 09874
FARED 09875
FARED 09876
FARED 09877
FARED 09878
FARED 09879
FARED 09880
FARED 09881
FARED 09882
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FARED 09909
FARED 09910
FARED 09911
FARED 09912
FARED 09913
FARED 09914
FARED 09915
FARED 09916
FARED 09917
FARED 09918
FARED 09919
FARED 09920

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	DARG(1)=SOUP(1)*SOU(1)	FARED	09921
	IF(I.NE.1) DARG(1)=SOPP(I-1)*SOP(I-1)	FARED	09922
	DO 4315 K=2,IPTS	FARED	09923
	DARG(K)=SOUP(IIN+K-1)*SOU(IIN+K-1)	FARED	09924
4315	CONTINUE	FARED	09925
	POWN=POWN+RINTG(DARG,I)	FARED	09926
4320	CONTINUE	FARED	09927
	DO 4325 I=1,NPTS	FARED	09928
4325	SOUP(I)=SOUP(I)/POWN	FARED	09929
	DO 4330 I=1,NZ	FARED	09930
4330	SOPP(I)=SOPP(I)/POWN	FARED	09931
	DO 4350 I=1,MAG	FARED	09932
	IDUM=MAG-I+1	FARED	09933
	DO 4335 K=1,NPTS	FARED	09934
	DUM1=PHI(K,I)/POWN	FARED	09935
	PHI(K,I)=PHI(K,IDUM)/POWN	FARED	09936
4335	PHI(K,IDUM)=DUM1	FARED	09937
	DO 4340 K=1,NZ	FARED	09938
	DUM1=APHI(K,I)/POWN	FARED	09939
	APHI(K,I)=APHI(K,IDUM)/POWN	FARED	09940
4340	APHI(K,IDUM)=DUM1	FARED	09941
	IF(IDUM-I-1) 4355,4355,4350	FARED	09942
4350	CONTINUE	FARED	09943
4355	CONTINUE	FARED	09944
	WRITE(IASOR) SRID,NPTS,MAG,NZ	FARED	09945
	WRITE(IASOR) (SOUP(I),I=1,NPTS)	FARED	09946
	WRITE(IASOR) (SOPP(I),I=1,NZ)	FARED	09947
	WRITE(IASOR) ((APHI(I,J),J=1,MAG),I=1,NZ)	FARED	09948
	WRITE(IASOR) ((PHI(I,J),J=1,MAG),I=1,NPTS)	FARED	09949
	ENDFILE IASOR	FARED	09950
	REWIND IASOR	FARED	09951
3050	CONTINUE	FARED	09952
	RETURN	FARED	09953
	END	FARED	09954

C	SUBROUTINE AVFLX	FAREQ	09955
C		FAREQ	09956
C		FAREQ	09957
C	THIS SUBROUTINE COMPUTES THE ZONE-AVERAGED FLUXES.	FAREQ	09958
C		FAREQ	09959
C		FAREQ	09960
	COMMON NTAPE(20)	FAREQ	09961
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RO,RIN,RUT,CIN,MI	FAREQ	09962
	ICT,THE,IODC,NIB,NOB,NCV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FAREQ	09963
	COMMON NSPARES(42)	FAREQ	09964
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FAREQ	09965
	10,BLANKS	FAREQ	09966
	COMMON NPOINT(20),ZONE(5000)	FAREQ	09967
	DIMENSION NZONE(2000)	FAREQ	09968
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FAREQ	09969
	COMMON/PARS/NSR,ICT,IGO,ICT2,N10J,IFLX,COUT,MICT2,EIGEN,EIGEN1,P,	FAREQ	09970
	1PIM,IST	FAREQ	09971
	COMMON/FLX/PHI(150,30),APHI(20,30)	FAREQ	09972
	M6=NTAPE(2)	FAREQ	09973
	IP=P	FAREQ	09974
	IDX=1	FAREQ	09975
	DO 500 IZ=1,NZ	FAREQ	09976
	IX=NPOINT(IZ)	FAREQ	09977
	IF(IZ.GT.1) GO TO 5	FAREQ	09978
	R1=RIN	FAREQ	09979
	GO TO 10	FAREQ	09980
	5 CONTINUE	FAREQ	09981
	R1=R2	FAREQ	09982
	10 NIT=NZONE(IX+2)	FAREQ	09983
	R2=ZONE(IX+1)	FAREQ	09984
	IDY=NZONE(IX+2)+IDX	FAREQ	09985
	FNIT=NIT	FAREQ	09986
	DR=(R2-R1)/FNIT	FAREQ	09987
	FAC=(P+1.)/((R2**NGO)-(R1**NGO))	FAREQ	09988
	DO 100 J=1,MAG	FAREQ	09989
	APH=TRAP(IDX,IDY,J,DR,R1,R2)	FAREQ	09990
	APHI(IZ,J)=FAC*APH	FAREQ	09991
	100 CONTINUE	FAREQ	09992
	IDX>IDY	FAREQ	09993
	500 CONTINUE	FAREQ	09994
	RETURN	FAREQ	09995
	END	FAREQ	09996

C	FUNCTION TRAP(IDX,IDY,NG,DR,R1,R2)	FARED	09997
C		FARED	09998
C		FARED	09999
C	THIS FUNCTION INTEGRATES THE FLUX DISTRIBUTIONS FOR A	FARED	10000
C	SPECIFIED ZONE.	FARED	10001
C		FARED	10002
	COMMON NTAPE(20)	FARED	10003
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RD,RIN,RUT,CIN,MI	FARED	10004
	1CT,THE,IODC,NIB,NOB,NCV,NBUCK,NWBM,NWZH,NWB,NSOU,NSO,TIME,PT	FARED	10005
	COMMON NSPARES(42)	FARED	10006
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	10007
	10,BLANKS	FARED	10008
	COMMON NPOINT(20),ZONE(5000)	FARED	10009
	DIMENSION NZONE(2000)	FARED	10010
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	10011
	COMMON/PARS/NSR,ICT,IGO,ICT2,N100,IFLX,COUT,MICT2,EIGEN,EIGEN1,P,	FARED	10012
	1PIM,ISI	FARED	10013
	COMMON/FLX/PHI(150,30),APHI(20,30)	FARED	10014
	IP=P	FARED	10015
	IXP1=IDX+1	FARED	10016
	IYM1=IDY-1	FARED	10017
	APH=(R2**IP)*PHI(IDY,NG)	FARED	10018
	IF(R1.NE.0.) APH=APH+(R1**IP)*PHI(IDX,NG)	FARED	10019
	IF(R1.LE.0.) AND IP.EQ.0) APH=APH+PHI(IDX,NG)	FARED	10020
	APH=APH/2.	FARED	10021
	RR=R1	FARED	10022
	DO 50 IPT=IXP1,IYM1	FARED	10023
	RR=RR+DR	FARED	10024
	APH=APH+ (RR**IP)*PHI(IPT,NG)	FARED	10025
50	CONTINUE	FARED	10026
	TRAP=UR*APH	FARED	10027
	IF(IP.NE.2) RETURN	FARED	10028
C		FARED	10029
C	CORRECTION TERM FOR SPHERICAL GEOMETRY.	FARED	10030
C		FARED	10031
	TRAP=TRAP-((R2*PHI(IDY,NG)-R1*PHI(IDX,NG))*(DR**2)/6.)	FARED	10032
	RETURN	FARED	10033
	END	FARED	10034
		FARED	10035

C	FUNCTION POWER(FUN)	FARED	10036
C		FARED	10037
C		FARED	10038
C	THIS FUNCTION CALCULATES THE TOTAL SOURCE-NORMALIZED	FARED	10039
C	REACTOR POWER AND NORMALIZES THE POWER DISTRIBUTION	FARED	10040
C	TO YIELD THE DESIRED TOTAL REACTOR POWER.	FARED	10041
C		FARED	10042
C		FARED	10043
	COMMON NTAPE(20)	FARED	10044
	COMMON NGO,MIG,MAG,NOS,NPTS,NB,NZ,NBM,NZM,NN,POW,RD,RIN,RUT,CIN,MI	FARED	10045
	1CT,THE,1DDC,NIB,NOB,NCV,NBUCK,NWBM,NWZH,NWB,NSOU,NSO,TIME,PT	FARED	10046
	COMMON NSPARES(42)	FARED	10047
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	10048
	10,BLANKS	FARED	10049
	COMMON NPOINT(20),ZONE(5000)	FARED	10050
	DIMENSION NZONE(2000)	FARED	10051
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	10052
	COMMON/ACA/SP(30),IDZON(20)	FARED	10053
	COMMON/PUN/PDEN(150),PDENP(20)	FARED	10054
	COMMON/FLX/PHI(150,30),APHI(20,30)	FARED	10055
	COMMON/GEO/DELR(20),R(150),RI(150),LB(20)	FARED	10056
	DATA MDP,CN/4HDPXS,1.6E-19/	FARED	10057
	PT=0.0	FARED	10058
	LTAPE=NTAPE(19)	FARED	10059
	REWIND LTAPE	FARED	10060
	READ(LTAPE) ICTAPE,IBK,IGK,DUM	FARED	10061
	IF(ICTAPE.NE.MDP) GO TO 900	FARED	10062
	IF(IGK.NE.NB.OR.IGK.NE.MAG) GO TO 910	FARED	10063
C		FARED	10064
C	COMPUTE THE TOTAL FISSION SOURCE-NORMALIZED REACTOR POWER.	FARED	10065
		FARED	10066
	DO 50 I=1,NZ	FARED	10067
	50 PDENP(I)=0.0	FARED	10068
	DO 60 I=1,NPTS	FARED	10069
	60 PDEN(I)=0.0	FARED	10070
	DO 100 IB=1,NB	FARED	10071
	READ(LTAPE) IDB,NEL,KZON,(IDZON(I),I=1,KZON)	FARED	10072
	IF(EOF,LTAPE) 920,61	FARED	10073
	61 CONTINUE	FARED	10074
	DO 99 IL=1,NEL	FARED	10075
	READ(LTAPE) NK,((SP(I),I=1,MAG),J=1,5)	FARED	10076
	IF(EOF,LTAPE) 920,62	FARED	10077
	62 CONTINUE	FARED	10078
	DO 98 IZ=1,KZON	FARED	10079
	IXZ=IDZON(IZ)	FARED	10080
	IX1=NPOINT(IXZ)	FARED	10081
	VOL=ZONE(IX1*6)	FARED	10082
	CON=CONCENT(NK,IXZ)	FARED	10083
	SUM1=0.0	FARED	10084
	DO 97 IG=1,MAG	FARED	10085

SUM1=SUM1+SP(IG)*APHI(IXZ,IG)	FARED	10086
97 CONTINUE	FARED	10087
IRST=1	FARED	10088
IF(IXZ.NE.1) IRST=LB(IXZ-1)	FARED	10089
LAST=LB(IXZ)	FARED	10090
DO 95 LP=IRST, LAST	FARED	10091
SUM3=0.0	FARED	10092
DO 93 IG=1, MAG	FARED	10093
SUM3=SUM3+SP(IG)*PHI(LP,IG)	FARED	10094
93 CONTINUE	FARED	10095
IF(LP.EQ.IRST.AND.IRST.NE.1) GO TO 94	FARED	10096
PDEN(LP)=PDEN(LP)+CON*SUM3	FARED	10097
GO TO 95	FARED	10098
94 CONTINUE	FARED	10099
PDENP(IXZ-1)=PDENP(IXZ-1)+CON*SUM3	FARED	10100
95 CONTINUE	FARED	10101
PT=PT+VOL*CON*SUM1	FARED	10102
98 CONTINUE	FARED	10103
99 CONTINUE	FARED	10104
100 CONTINUE	FARED	10105
C	FARED	10106
C NORMALIZE THE POWER DISTRIBUTION TO YIELD THE DESIRED	FARED	10107
C TOTAL REACTOR POWER	FARED	10108
C	FARED	10109
POWER=PT*CN	FARED	10110
FAC1=POW/PT*1000000	FARED	10111
DO 105 I=1, NZ	FARED	10112
105 PDENP(I)=PDENP(I)*FAC1	FARED	10113
FAC2=POW/POWER	FARED	10114
DO 107 I=1, NPTS	FARED	10115
PDEN(I)=PDEN(I)*FAC1	FARED	10116
107 CONTINUE	FARED	10117
RETURN	FARED	10118
900 CONTINUE	FARED	10119
NPR=NTAPE(2)	FARED	10120
WRITE(NPR,901)	FARED	10121
901 FORMAT(20X38H THE TAPE ID DOES NOT MATCH FOR TAPE 19 ///)	FARED	10122
STOP 30304	FARED	10123
910 CONTINUE	FARED	10124
NPR=NTAPE(2)	FARED	10125
WRITE(NPR,911)	FARED	10126
911 FORMAT(20X35H TAPE PARAMETERS DO NOT MATCH COMMON ///)	FARED	10127
STOP 333	FARED	10128
920 CONTINUE	FARED	10129
NPR=NTAPE(2)	FARED	10130
WRITE(NPR,921) LTAPE	FARED	10131
921 FORMAT(20X30HPREATURE END OF FILE ON TAPE 13///)	FARED	10132
STOP 334	FARED	10133
END	FARED	10134

C	OVERLAY(RIM,3,4)	FARED	10135
C	PROGRAM SEARCH	FARED	10136
C		FARED	10137
C	THIS PROGRAM READS THE DATA PERTAINING TO THE CRITICALITY	FARED	10138
C	SEARCHES AND CONTROLS THE ITERATIVE PROCEDURE.	FARED	10139
C		FARED	10140
		FARED	10141
		FARED	10142
	COMMON NTAPE(20)	FARED	10143
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RO,RIN,RUT,CIN,MI	FARED	10144
	ICT,THE,IDDC,NIB,NOB,NCV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	10145
	COMMON NSPARES(42)	FARED	10146
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	10147
	10,BLANKS	FARED	10148
	COMMON NPOINT(20),ZONE(500)	FARED	10149
	DIMENSION NZONE(2000)	FARED	10150
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	10151
	COMMON/FLX/PHI(150,30),APHI(20,30)	FARED	10152
	COMMON/GE0/DELR(20),R(150),RI(150),LB(20)	FARED	10153
	COMMON/OM/OMEGA(30),OMEG1(30)	FARED	10154
	COMMON/SO/SOU(150),SOUP(150),SOM(20),SOP(20),SOPP(30)	FARED	10155
	COMMON/MIS/CHI(20,30),DELTA(20),BETA(20)	FARED	10156
	COMMON/ACB/AC2(150)	FARED	10157
	COMMON/MAC1/VUSIG(20,30),DIF(20,30),TRANS(4000),SIGT(20,30)	FARED	10158
	COMMON/PARS/NSR,ICT,IGO,ICT2,N100,IFLX,COUT,MICT2,EIGEN,EIGEN1,P,	FARED	10159
	1PIM,IST	FARED	10160
	COMMON /SCH/IZ(20),X(3),AK(3),RL(20,2),KBR,NZS,IA,IB,ITT,NCVS	FARED	10161
	COMMON/PSRH/ IZP(20),IZPS(20),RFZM(20),RPS(20),NZPS,NZRS,NPCVS,IT	FARED	10162
	1TO,IAO,IBO,AKOUT(3),XOUT(3),REF1	FARED	10163
	DIMENSION IZP(20),RF(20)	FARED	10164
	EQUIVALENCE (RL(1,1),IZP(1)),(RL(1,2),RF(1))	FARED	10165
	COMMON/PSH/ IZDUM(20),RPDUM(20)	FARED	10166
	REAL KBR	FARED	10167
	NCVS=0	FARED	10168
	M6=NTAPE(2)	FARED	10169
	IF(NSR.NE.0) GO TO 200	FARED	10170
C		FARED	10171
C	INITIALIZE THE SEARCH PARAMETERS.	FARED	10172
C		FARED	10173
	ITT=0	FARED	10174
	MICT2=20	FARED	10175
	ICT2=0	FARED	10176
	IA=2	FARED	10177
	IB=1	FARED	10178
	ITTO=0	FARED	10179
	IAO=2	FARED	10180
	IBO=1	FARED	10181
	NFD=NZF=0	FARED	10182
	NCVS=0	FARED	10183
	NZS=0	FARED	10184

	NZRS=0	FARED	10185
	NZPS=0	FARED	10186
	REF1=0.0	FARED	10187
	NPCVS=0	FARED	10188
	DO 13 I=1,3	FARED	10189
	AKOUT(I)=0.0	FARED	10190
13	XOUT(I)=0.0	FARED	10191
	CALL GRAMIN(V,N,W)	FARED	10192
	IF(N.NE.0) GO TO 150	FARED	10193
	IRR=IW	FARED	10194
	CALL SCAN(62HBUCKLING*VDIMENSION*FDIMENSION*COMPOSITION*AVEPOWER*M	FARED	10195
	AXPOWER**,IRR,NSR)	FARED	10196
	GO TO (20,20,20,40,2000,2000,180),NSR	FARED	10197
20	CONTINUE	FARED	10198
C		FARED	10199
C	READ INPUT DATA FOR THE VDIMENSION, FDIMENSION AND	FARED	10200
C	BUCKLING SEARCHES.	FARED	10201
C		FARED	10202
21	CALL GRAMIN(V,N,W)	FARED	10203
	IF(N.NE.-2) GO TO 30	FARED	10204
	CALL SCAN(3HZ**,IW,IER)	FARED	10205
	IF(IER.NE.1) GO TO 25	FARED	10206
	NZS=NZS+1	FARED	10207
	IZP(NZS)=IV	FARED	10208
	GO TO 21	FARED	10209
25	IF(NZS.EQ.0) GO TO 130	FARED	10210
	GO TO 21	FARED	10211
30	IF(N.NE.1) GO TO 145	FARED	10212
	KBR=V	FARED	10213
	CALL GRAMIN(V,N,W)	FARED	10214
	IF(N.NE.1) GO TO 148	FARED	10215
	COUT=V	FARED	10216
	CALL GRAMIN(V,N,W)	FARED	10217
	IF(N.NE.-1) GO TO 35	FARED	10218
	MICZ=IV	FARED	10219
	CALL GRAMIN(V,N,W)	FARED	10220
35	CONTINUE	FARED	10221
	GO TO (26,26,26,60,2100,2100),NSR	FARED	10222
26	IF(NZS.NE.0) GO TO 50	FARED	10223
	DO 31 I=1,NZ	FARED	10224
31	IZ(I)=I	FARED	10225
	NZS=NZ	FARED	10226
	GO TO 55	FARED	10227
50	DO 51 I=1,NZS	FARED	10228
	DO 51 J=1,NZ	FARED	10229
	JSV=J	FARED	10230
	IX=NPOINT(J)	FARED	10231
	IF(IZP(I).EQ.NZONE(IX)) GO TO 52	FARED	10232
51	CONTINUE	FARED	10233
	NFO=NFO+1	FARED	10234

WRITE(M6,56) IZP(I)	FARED	10235
56 FORMAT(//,20X, 9H*** ZONE ,I2,33H IS NOT LISTED AS A REACTOR ZONE.	FARED	10236
1 //)	FARED	10237
IF(NFD.EQ.NZS) GO TO 155	FARED	10238
GO TO 53	FARED	10239
52 IF(JSV.EQ.NZ.AND.NSR.EQ.3) GO TO 57	FARED	10240
NZF=NZF+1	FARED	10241
IZ(NZF)=JSV	FARED	10242
GO TO 53	FARED	10243
57 WRITE(M6,257)	FARED	10244
257 FORMAT(20X,82H*** THE LAST ZONE MAY NOT BE A SEARCH ZONE IN A FIXE	FARED	10245
10 DIMENSION SEARCH-IGNORED ***)	FARED	10246
53 CONTINUE	FARED	10247
NZS=NZS-NFD	FARED	10248
IF(NZS.EQ.NZF) GO TO 55	FARED	10249
WRITE(M6,54)	FARED	10250
54 FORMAT(20X,7HSTOP 2 ,//)	FARED	10251
STOP	FARED	10252
55 CONTINUE	FARED	10253
CALL SDAPR	FARED	10254
IX=NPOINT(1)+1	FARED	10255
RL(1,IA)=ZONE(IX)-RIN	FARED	10256
RL(1,IB)=RL(1,IA)	FARED	10257
DO 58 J=2,NZ	FARED	10258
IX=NPOINT(J)+1	FARED	10259
IY=NPOINT(J-1)+1	FARED	10260
RL(J,IA)=ZONE(IX)-ZONE(IY)	FARED	10261
RL(J,IB)=RL(J,IA)	FARED	10262
58 CONTINUE	FARED	10263
GO TO 20J	FARED	10264
40 CONTINUE	FARED	10265
C	FARED	10266
C READ INPUT DATA FOR A COMPOSITION SEARCH.	FARED	10267
C	FARED	10268
41 CALL GRAMIN(V,N,W)	FARED	10269
42 IF(N.NE.-2) GO TO 30	FARED	10270
CALL SCAN(4HZM**,IW,IER)	FARED	10271
IF(IER.NE.1) GO TO 43	FARED	10272
NZS=NZS+1	FARED	10273
IZ(NZS)=IV	FARED	10274
CALL GRAMIN(V,N,W)	FARED	10275
IF(N.NE.2) GO TO 49	FARED	10276
CALL SCAN(3HR**,IW,IER)	FARED	10277
IF(IER.NE.1) GO TO 45	FARED	10278
RF(NZS)=V	FARED	10279
GO TO 41	FARED	10280
43 IF(NZS.EQ.0) GO TO 133	FARED	10281
GO TO 41	FARED	10282
49 RF(NZS)=J.	FARED	10283
GO TO 42	FARED	10284

45	RF(NZS)=0.	FARED	10285
	GO TO 41	FARED	10286
2000	CONTINUE	FARED	10287
C		FARED	10288
C	READ INPUT DATA FOR THE AVEPOWER AND MAXPOWER SEARCHES.	FARED	10289
C		FARED	10290
2001	CALL GRAMIN(V,N,W)	FARED	10291
2002	IF(N.NE.-2) GO TO 30	FARED	10292
2021	CALL SCAN(3HZ**,IW,IER)	FARED	10293
	IF(IER.NE.1) GO TO 2003	FARED	10294
2022	NZPS=NZPS+1	FARED	10295
	IZPS(NZPS)=IV	FARED	10296
	CALL GRAMIN(V,N,W)	FARED	10297
	IF(N.NE.2) GO TO 2004	FARED	10298
	CALL SCAN(3HP**,IW,IER)	FARED	10299
	IF(IER.NE.1) GO TO 2005	FARED	10300
	RPS(NZPS)=V	FARED	10301
	GO TO 2006	FARED	10302
2003	IF(NZPS.EQ.0) GO TO 133	FARED	10303
	GO TO 2020	FARED	10304
2004	RPS(NZPS)=1.0	FARED	10305
	GO TO 2007	FARED	10306
2005	RPS(NZPS)=1.0	FARED	10307
	GO TO 2006	FARED	10308
2006	CALL GRAMIN(V,N,W)	FARED	10309
2007	IF(N.NE.-2) GO TO 30	FARED	10310
2020	CALL SCAN(4HZM**,IW,IER)	FARED	10311
	IF(IER.NE.1) GO TO 2008	FARED	10312
	NZRS=NZRS+1	FARED	10313
	IOZP(NZRS)=IV	FARED	10314
	CALL GRAMIN(V,N,W)	FARED	10315
	IF(N.NE.2) GO TO 2009	FARED	10316
	CALL SCAN(3HR**,IW,IER)	FARED	10317
	IF(IER.NE.1) GO TO 2010	FARED	10318
	RFZM(NZRS)=V	FARED	10319
	GO TO 2006	FARED	10320
2008	IF(NZRS.EQ.0) GO TO 133	FARED	10321
	GO TO 2023	FARED	10322
2009	RFZM(NZRS)=0.	FARED	10323
	GO TO 2007	FARED	10324
2010	RFZM(NZRS)=0.	FARED	10325
	GO TO 2006	FARED	10326
2023	CALL SCAN(3HZ**,IW,IER)	FARED	10327
	IF(IER.NE.1) GO TO 133	FARED	10328
	GO TO 2022	FARED	10329
60	CONTINUE	FARED	10330
	CALL SDAPR	FARED	10331
	GO TO 200	FARED	10332
2100	DUHRPS=RPS(1)	FARED	10333
	DO 2105 I=1,NZPS	FARED	10334

	RPS(I)=RPS(I)/DUMRPS	FARED	10335
	IZDUM(I)=IZPS(I)	FARED	10336
	KPDUM(I)=RPS(I)	FARED	10337
2105	CONTINUE	FARED	10338
	NPCVS=0	FARED	10339
	DO 2110 J=1,NZRS	FARED	10340
	IZ(J)=IDZP(J)	FARED	10341
2110	RF(J)=RFZM(J)	FARED	10342
	NZS=NZRS	FARED	10343
	CALL SDAPR	FARED	10344
200	CONTINUE	FARED	10345
C		FARED	10346
C	PERFORM ONE OUTER ITERATION OF THE CRITICALITY SEARCH.	FARED	10347
C		FARED	10348
	IF(NSR.GE.5.AND.NPCVS.EQ.0) GO TO 4000	FARED	10349
	IF(NSR.LE.4) GO TO 2600	FARED	10350
	ITT=ITTO	FARED	10351
	IA=IA0	FARED	10352
	IB=IB0	FARED	10353
	DO 6005 J=1,J	FARED	10354
	X(J)=XOUT(J)	FARED	10355
6005	AK(J)=AKOUT(J)	FARED	10356
	NZS=J	FARED	10357
	DO 6025 J=1,NZ	FARED	10358
	IDUM1=NPOINT(J)	FARED	10359
	IDUM2=NZONE(IDUM1)	FARED	10360
	IF(IDUM2.EQ.IZPS(1)) GO TO 6030	FARED	10361
6025	CONTINUE	FARED	10362
	WRITE (M6,1155)	FARED	10363
	GO TO 19J	FARED	10364
6030	IDUM3=NZONE(IDUM1+5)	FARED	10365
	DO 6045 JJ=1,NZRS	FARED	10366
	DO 6035 J=1,IDUM3	FARED	10367
	IDUM4=IDUM1+10*J+1	FARED	10368
	IDUM5=NZONE(IDUM4)	FARED	10369
	IF(IDUM5.EQ.IDZP(JJ)) GO TO 6040	FARED	10370
6035	CONTINUE	FARED	10371
	GO TO 6045	FARED	10372
6040	NZS=NZS+1	FARED	10373
	IZ(NZS)=IDZP(JJ)	FARED	10374
	RF(NZS)=RFZM(JJ)	FARED	10375
6045	CONTINUE	FARED	10376
2600	AK(IB)=EIGEN	FARED	10377
	TEST=ABS((EIGEN-KBR)/KBR)	FARED	10378
	IF(TEST.GT.COUT) GO TO 205	FARED	10379
	NCVS=1	FARED	10380
	GO TO 355	FARED	10381
205	ITT=ITT+1	FARED	10382
	IF(ITT.GT.MICT2) GO TO 195	FARED	10383
	IB=IA	FARED	10384

IA=IABS(IA-3)	FARED	10385
IF(ITT.GT.1) GO TO 210	FARED	10386
X(IA)=0.1	FARED	10387
X(IB)=0.0	FARED	10388
IF(NSR.NE.1.AND.KBR.GT.EIGEN.OR.NSR.EQ.1.AND.KBR.LT.EIGEN)X(IA)=	FARED	10389
1-X(IA)	FARED	10390
GO TO 215	FARED	10391
210 X(IA)=X(IB)+((X(IB)-X(IA))*(KBR-AK(IA))/(AK(IA)-AK(IB)))	FARED	10392
215 CONTINUE	FARED	10393
GO TO (301,302,303,304,304,304),NSR	FARED	10394
301 CALL BUCK	FARED	10395
GO TO 350	FARED	10396
304 CALL COMP	FARED	10397
GO TO 350	FARED	10398
302 CALL VOIM	FARED	10399
GO TO 350	FARED	10400
303 CALL FDIM	FARED	10401
350 CONTINUE	FARED	10402
IF(NSR.LE.4) GO TO 6100	FARED	10403
NPCVS=0	FARED	10404
ITTO=ITT	FARED	10405
IAO=IA	FARED	10406
IBO=IB	FARED	10407
DO 6075 J=1,3	FARED	10408
AKOUT(J)=AK(J)	FARED	10409
6075 XOUT(J)=X(J)	FARED	10410
6100 CONTINUE	FARED	10411
RETURN	FARED	10412
355 CONTINUE	FARED	10413
IF(NSR.LE.4) GO TO 6120	FARED	10414
NZS=NZRS	FARED	10415
DO 6110 J=1,NZRS	FARED	10416
IZ(J)=I0ZP(J)	FARED	10417
6110 RF(J)=RFZM(J)	FARED	10418
6120 CONTINUE	FARED	10419
CALL VDATA	FARED	10420
RETURN	FARED	10421
C	FARED	10422
C PERFORM THE INNER ITERATIONS FOR THE AVEPOWER AND MAXPOWER	FARED	10423
C CRITICALITY SEARCHES.	FARED	10424
C	FARED	10425
4000 IPXS=J	FARED	10426
IF(NSR.EQ.5) PREF=PAVE(IZPS(1),IPXS)	FARED	10427
IF(NSR.EQ.6) PREF=PMAX(IZPS(1),IPXS)	FARED	10428
ITDUM=1	FARED	10429
IDUM1=IZPS(1)	FARED	10430
IDUM2=NPOINT(IDUM1)	FARED	10431
VOL=ZONE(IDUM2+6)	FARED	10432
SUM1=PREF*VOL	FARED	10433
SUM2=VOL	FARED	10434

DO 4010 K=2,NZPS	FARED	10435
IPXS=J	FARED	10436
IF(NSR.EQ.5) PDUM=PAVE(IZPS(K),IPXS)	FARED	10437
IF(NSR.EQ.6) PDUM=PMAX(IZPS(K),IPXS)	FARED	10438
IDUM1=IZPS(K)	FARED	10439
IDUM2=NPOINT(IDUM1)	FARED	10440
VOL=ZONE(IDUM2+6)	FARED	10441
SUM1=SUM1+PDUM*VOL	FARED	10442
SUM2=SUM2+RPS(K)*VOL	FARED	10443
TEST=ABS((PDUM-RPS(K)*PREF)/PREF)	FARED	10444
IF(TEST.GT.0.01) ITDUM=0	FARED	10445
4010 CONTINUE	FARED	10446
PREF=SUM1/SUM2	FARED	10447
IF(ICT2.GE.1) PREF=0.5*(PREF+REF1)	FARED	10448
REF1=PREF	FARED	10449
IF(ITDUM.NE.1) GO TO 4020	FARED	10450
NPCVS=1	FARED	10451
GO TO 200	FARED	10452
4020 DO 4100 K=2,NZPS	FARED	10453
IPXS=0	FARED	10454
ITT=0	FARED	10455
IA=2	FARED	10456
IB=1	FARED	10457
NZS=J	FARED	10458
DO 4025 J=1,NZ	FARED	10459
IDUM1=NPOINT(J)	FARED	10460
IDUM2=ZONE(IDUM1)	FARED	10461
IF(IDUM2.EQ.IZPS(K)) GO TO 4030	FARED	10462
4025 CONTINUE	FARED	10463
WRITE (M6,1155)	FARED	10464
GO TO 190	FARED	10465
4030 IDUM3=ZONE(IDUM1+5)	FARED	10466
DO 4045 JJ=1,NZRS	FARED	10467
DO 4035 J=1,IDUM3	FARED	10468
IDUM4=IDUM1+10*J+1	FARED	10469
IDUM5=ZONE(IDUM4)	FARED	10470
IF(IDUM5.EQ.IDZP(JJ)) GO TO 4040	FARED	10471
4035 CONTINUE	FARED	10472
GO TO 4045	FARED	10473
4040 NZS=NZS+1	FARED	10474
IZ(NZS)=IDZP(JJ)	FARED	10475
RF(NZS)=RFZM(JJ)	FARED	10476
4045 CONTINUE	FARED	10477
IF(NZS.NE.0) GO TO 4050	FARED	10478
WRITE (M6,1130)	FARED	10479
GO TO 190	FARED	10480
4050 PBAR=PREF*RPS(K)	FARED	10481
4055 IF(NSR.EQ.5) AK(IB)=PAVE(IZPS(K),IPXS)	FARED	10482
IF(NSR.EQ.6) AK(IB)=PMAX(IZPS(K),IPXS)	FARED	10483
IF(ITT.GT.0) GO TO 4060	FARED	10484

TEST=ABS((AK(IB)-PBAR)/PBAR)	FARED	10485
IF(TEST.LE.COUT) GO TO 409J	FARED	10486
GO TO 4065	FARED	10487
4060 TEST=ABS((X(IA)-X(IB))/(1.J+X(IB)))	FARED	10488
IF(TEST.GT.COUT) GO TO 4065	FARED	10489
GO TO 4090	FARED	10490
4065 ITT=ITT+1	FARED	10491
IB=IA	FARED	10492
IA=IABS(IA-3)	FARED	10493
IF(ITT.GT.1) GO TO 4070	FARED	10494
X(IA)=0.1	FARED	10495
X(IB)=0.0	FARED	10496
GO TO 4075	FARED	10497
4070 X(IA)=X(IB)+((X(IB)-X(IA))*(PBAR-AK(IA))/(AK(IA)-AK(IB)))	FARED	10498
4075 CALL COMP	FARED	10499
IPXS=1	FARED	10500
GO TO 4055	FARED	10501
4090 CONTINUE	FARED	10502
4100 CONTINUE	FARED	10503
RETURN	FARED	10504
C	FARED	10505
C ERROR MESSAGES FOR CRITICALITY SEARCHES.	FARED	10506
C	FARED	10507
150 WRITE(M6,1150)	FARED	10508
1150 FORMAT(20X,53H*** A SEARCH DIRECTIVE WAS EXPECTED BUT NOT FOUND **	FARED	10509
1*/)	FARED	10510
GO TO 190	FARED	10511
155 CONTINUE	FARED	10512
WRITE(M6,1155)	FARED	10513
1155 FORMAT(20X,43H*** NONE OF THE SEARCH ZONES WERE FOUND ***)	FARED	10514
GO TO 190	FARED	10515
160 WRITE(M6,1160)	FARED	10516
1160 FORMAT(20X,32H*** ILLEGAL SEARCH DIRECTIVE ***)	FARED	10517
GO TO 190	FARED	10518
133 WRITE(M6,1133)	FARED	10519
1133 FORMAT(20X,33H*** ZONES FOR SEARCH EXPECTED *** /)	FARED	10520
GO TO 190	FARED	10521
145 WRITE(M6,1145)	FARED	10522
1145 FORMAT(20X,38H*** EIGENVALUE FOR SEARCH EXPECTED *** /)	FARED	10523
GO TO 190	FARED	10524
148 WRITE(M6,1148)	FARED	10525
1148 FORMAT(20X,37H*** COVERAGE PARAMETER EXPECTED *** /)	FARED	10526
GO TO 190	FARED	10527
130 WRITE(M6,1130)	FARED	10528
1130 FORMAT(20X,30H*** ZONE MATERIAL EXPECTED *** /)	FARED	10529
GO TO 190	FARED	10530
195 WRITE(M6,1195)	FARED	10531
1195 FORMAT(5(/),64X,9H* * * *,//57X,25HITERATION LIMIT EXCEEDED /)	FARED	10532
NCVS=2	FARED	10533
RETURN	FARED	10534

C	SUBROUTINE FOIM	FARED	10538
C		FARED	10539
C		FARED	10540
C	THIS SUBROUTINE MODIFIES THE ZONE WIDTHS FOR A FIXED	FARED	10541
C	DIMENSION SEARCH.	FARED	10542
C		FARED	10543
	COMMON NTAPE(20)	FARED	10544
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RO,RIN,RUT,CIN,MI	FARED	10545
	1CT,THE,IDDC,NIB,NOB,NCV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	10546
	COMMON NSPARES(42)	FARED	10547
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	10548
	10,BLANKS	FARED	10549
	COMMON NPOINT(20),ZONE(500)	FARED	10550
	DIMENSION NZONE(200)	FARED	10551
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	10552
	COMMON /SCH/IZ(20),X(3),AK(3),RL(2),2),KBR,NZS,IA,IB,ITT,NCVS	FARED	10553
	DIMENSION IZP(20),RF(20)	FARED	10554
	EQUIVALENCE (RL(1,1),IZP(1)),(RL(1,2),RF(1))	FARED	10555
	REAL KBR	FARED	10556
	M6=NTAPE(2)	FARED	10557
	NEG=J	FARED	10558
	1 FACA=(X(IA)-X(IB))/(1.+X(IA))	FARED	10559
	FAC=(1.+X(IA))/(1.+X(IB))	FARED	10560
	DO 100 I=1,NZS	FARED	10561
	IL=IZ(I)	FARED	10562
	RL(IL,IA)=FAC*RL(IL,IB)	FARED	10563
100	CONTINUE	FARED	10564
	SUM=0.0	FARED	10565
	LF=0	FARED	10566
	DO 200 I=1,NZ	FARED	10567
	DO 201 K=1,NZS	FARED	10568
	IF(I.EQ.IZ(K)) GO TO 202	FARED	10569
201	CONTINUE	FARED	10570
	IF(LF.EQ.0) GO TO 210	FARED	10571
	RL(I,IA)=RL(I,IB)-(SUM*FACA)	FARED	10572
	IF(ITT.EQ.1) XMAX=RL(I,IB)/SUM	FARED	10573
	IF(RL(I,IA).LT.0.) GO TO 300	FARED	10574
	LF=1	FARED	10575
	SUM=0.0	FARED	10576
	GO TO 210	FARED	10577
202	SUM=SUM+RL(I,IA)	FARED	10578
	LF=1	FARED	10579
210	CONTINUE	FARED	10580
200	CONTINUE	FARED	10581
	CALL CALDM	FARED	10582
	RETURN	FARED	10583
300	CONTINUE	FARED	10584
	IF(NEG.GT.10) GO TO 310	FARED	10585
	NEG=NEG+1	FARED	10586
		FARED	10587

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      IF (NEG.LT.2) XL=XMAX
      XL=AMIN1(XL,XMAX)
      X(IA)=XL
      GO TO 1
S10  WRITE(M6,311) I
S11  FORMAT(20X,25H*** NEGATIVE WIDTH, ZONE ,I2,4H ***/)
      STOP
      END

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FARED 10588
FARED 10589
FARED 10590
FARED 10591
FARED 10592
FARED 10593
FARED 10594
FARED 10595

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C	SUBROUTINE VDIM	FARED	10596
C		FARED	10597
C		FARED	10598
C	THIS SUBROUTINE MODIFIES THE ZONE WIDTHS FOR A VARIABLE	FARED	10599
C	DIMENSION SEARCH.	FARED	10600
C		FARED	10601
C		FARED	10602
	COMMON NTAPE(20)	FARED	10603
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RD,RIN,RUT,CIN,MI	FARED	10604
	1CT,THE,I00C,NIB,N0B,NCV,NBUCK,NWBH,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	10605
	COMMON NSPARES(42)	FARED	10606
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	10607
	1D,BLANKS	FARED	10608
	COMMON NPOINT(20),ZONE(5000)	FARED	10609
	DIMENSION NZONE(2000)	FARED	10610
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	10611
	COMMON /SCH/IZ(20),X(3),AK(3),RL(20,2),KBR,NZS,IA,IB,ITT,NCVS	FARED	10612
	DIMENSION IZP(20),RF(20)	FARED	10613
	EQUIVALENCE (RL(1,1),IZP(1)),(RL(1,2),RF(1))	FARED	10614
	REAL KBR	FARED	10615
	1 FAC=(1.+X(IA))/(1.+X(IB))	FARED	10616
	IF(FAC.LT.0.) GO TO 200	FARED	10617
	DO 100 I=1,NZS	FARED	10618
	LZ=IZ(I)	FARED	10619
	RL(LZ,IA)=FAC*RL(LZ,IB)	FARED	10620
100	CONTINUE	FARED	10621
	CALL CALDM	FARED	10622
	RETURN	FARED	10623
200	STOP	FARED	10624
	END	FARED	10625

C	SUBROUTINE COMP	FARED	10626
C		FARED	10627
C		FARED	10628
C	THIS SUBROUTINE ADJUSTS THE NUCLIDE CONCENTRATIONS FOR	FARED	10629
C	COMPOSITION, AVEPOWER AND MAXPOWER SEARCHES.	FARED	10630
C		FARED	10631
		FARED	10632
	COMMON NTAPE(20)	FARED	10633
	COMMON NGO,MIG,MAG,NOS,NPTS,NB,NZ,NBM,NZM,NN,POW,RO,RIN,RUT,CIN,MI	FARED	10634
	1CT,THE,IUDC,NIB,NOB,NCV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	10635
	COMMON NSPARES(42)	FARED	10636
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	10637
	10,BLANKS	FARED	10638
	COMMON NPOINT(20),ZONE(5000)	FARED	10639
	DIMENSION NZONE(2000)	FARED	10640
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	10641
	COMMON /SCH/IZ(20),X(3),AK(3),RL(20,2),KBR,NZS,IA,IB,ITT,NCVS	FARED	10642
	DIMENSION IZP(20),RF(20)	FARED	10643
	EQUIVALENCE (RL(1,1),IZP(1)),(RL(1,2),RF(1))	FARED	10644
	REAL KBR	FARED	10645
	XN=X(IA)	FARED	10646
	XNM1=X(IB)	FARED	10647
	DO 500 IZN=1,NZ	FARED	10648
	IX=NPOINT(IZN)	FARED	10649
	NUL=NZONE(IX+5)	FARED	10650
	DO 490 IN=1,NUL	FARED	10651
	IX2=IX+10+(10*(IN-1))	FARED	10652
	ITP=NZONE(IX2+1)	FARED	10653
	DO 20 L=1,NZS	FARED	10654
	IL=L	FARED	10655
	IF(ITP.EQ.IZ(L)) GO TO 21	FARED	10656
20	CONTINUE	FARED	10657
	GO TO 490	FARED	10658
21	CONTINUE	FARED	10659
	LTP=(NZONE(IX2+2)/100000)+1	FARED	10660
	GO TO (490,40,60),LTP	FARED	10661
40	ZONE(IX2+6)=ZONE(IX2+6)*(1+XN)/(1+XNM1)	FARED	10662
	GO TO 490	FARED	10663
60	IF(RF(IL).EQ.J.) GO TO 490	FARED	10664
	ZONE(IX2+6)=ZONE(IX2+6)*(1-XN*RF(IL))/(1-XNM1*RF(IL))	FARED	10665
490	CONTINUE	FARED	10666
500	CONTINUE	FARED	10667
	RETURN	FARED	10668
	END	FARED	10669

C	SUBROUTINE BUCK	FARED	10670
C		FARED	10671
C		FARED	10672
C	THIS SUBROUTINE MODIFIES THE TRANSVERSE BUCKLING FOR A	FARED	10673
C	BUCKLING SEARCH.	FARED	10674
C		FARED	10675
C		FARED	10676
	COMMON NTAPE(20)	FARED	10677
	COMMON NGO,MIG,MAG,NOS,NPTS,NB,NZ,NBM,NZM,NN,POW,RO,RIN,RUT,CIN,MI	FARED	10678
	1CT,THE,IDDC,NIB,NOB,NCV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	10679
	COMMON NSPARES(42)	FARED	10680
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	10681
	10,BLANKS	FARED	10682
	COMMON NPOINT(20),ZONE(5000)	FARED	10683
	DIMENSION NZONE(2000)	FARED	10684
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	10685
	COMMON /SCH/IZ(20),X(3),AK(3),RL(20,2),KBR,NZS,IA,IB,ITT,NCVS	FARED	10686
	DIMENSION IZP(20),RF(20)	FARED	10687
	EQUIVALENCE (RL(1,1),IZP(1)),(RL(1,2),RF(1))	FARED	10688
	REAL KBR	FARED	10689
	COMMON/BK/BUCK2(20,30)	FARED	10690
	FAC=(1.+X(IA))/(1.+X(IB))	FARED	10691
	DO 100 I=1,NZS	FARED	10692
	IZO=IZ(I)	FARED	10693
	DO 100 J=1,MAG	FARED	10694
	BUCK2(IZO,J)=BUCK2(IZO,J)*FAC	FARED	10695
100	CONTINUE	FARED	10696
	RETURN	FARED	10697
	END	FARED	10698

C	SUBROUTINE CALDM	FARED	10699
C		FARED	10700
C	THIS SUBROUTINE COMPUTES THE MODIFIED OUTER ZONE RADII	FARED	10701
C	FOR F0DIMENSION AND VDIMENSION SEARCHES.	FARED	10702
C		FARED	10703
C		FARED	10704
C		FARED	10705
	COMMON NTAPE(20)	FARED	10706
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RO,RIN,RUT,CIN,MI	FARED	10707
	ICT,THE,IDDC,NIB,NOB,NCV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	10708
	COMMON NSPARES(42)	FARED	10709
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	10710
	10,BLANKS	FARED	10711
	COMMON NPOINT(20),ZONE(5000)	FARED	10712
	DIMENSION NZONE(2000)	FARED	10713
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	10714
	COMMON/GE0/DELR(20),R(150),RI(150),LB(20)	FARED	10715
	COMMON/SCH/IZ(20),X(3),AK(3),RL(20,2),KBR,NZS,IA,IB,ITT,NCVS	FARED	10716
	DIMENSION IZP(20),RF(20)	FARED	10717
	EQUIVALENCE (RL(1,1),IZP(1)),(RL(1,2),RF(1))	FARED	10718
	REAL KBR	FARED	10719
	IX=NPOINT(1)+1	FARED	10720
	ZONE(IX)=RIN+RL(1,IA)	FARED	10721
	ZONE(IX+5)=RD*(ZONE(IX)**NGO-RIN**NGO)	FARED	10722
	ZW=NZONE(IX+1)	FARED	10723
	DELR(1)=RL(1,IA)/ZW	FARED	10724
	IF(NZ.EQ.1) GO TO 200	FARED	10725
	DO 100 I=2,NZ	FARED	10726
	IX=NPOINT(I)+1	FARED	10727
	IY=NPOINT(I-1)+1	FARED	10728
	ZONE(IX)=ZONE(IY)+RL(I,IA)	FARED	10729
	ZONE(IX+5)=RD*(ZONE(IX)**NGO-ZONE(IY)**NGO)	FARED	10730
	ZW=NZONE(IX+1)	FARED	10731
	DELR(I)=RL(I,IA)/ZW	FARED	10732
100	CONTINUE	FARED	10733
200	CONTINUE	FARED	10734
	LB1=2	FARED	10735
	DO 266 I=1,NZ	FARED	10736
	LB2=LB(I)	FARED	10737
	DO 265 J=LB1,LB2	FARED	10738
	R(J)=R(J-1)+DELR(I)	FARED	10739
265	CONTINUE	FARED	10740
	LB1=LB2+1	FARED	10741
266	CONTINUE	FARED	10742
	RETURN	FARED	10743
	END	FARED	10744

C	SUBROUTINE SOAPR	FARED	10745
C		FARED	10746
C		FARED	10747
C	THIS SUBROUTINE PRINTS A DESCRIPTION OF EACH PARTICULAR	FARED	10748
C	CRITICALITY SEARCH.	FARED	10749
C		FARED	10750
	COMMON NTAPE(20)	FARED	10751
	COMMON NGO,MIG,MAG,NUS,NPTS,NB,NZ,NBM,NZM,NN,POW,RD,RIN,RUF,CIN,MI	FARED	10752
	1CT,THE,1DDC,NIB,NOB,NCV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	10753
	COMMON NSPARES(42)	FARED	10754
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	10755
	10,BLANKS	FARED	10756
	COMMON NPOINT(20),ZONE(5000)	FARED	10757
	DIMENSION NZONE(2000)	FARED	10758
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	10759
	COMMON/SCH/IZ(20),X(3),AK(3),RL(20,2),KBR,NZS,IA,IB,ITT,NCVS	FARED	10760
	COMMON/PARS/NSR,IC1,IGO,ICT2,N100,IFLX,COUT,MICT2,EIGEN,EIGEN1,P,	FARED	10761
	1PIM,IST	FARED	10762
	COMMON/PSRH/ IDZP(20),IZPS(20),RFZM(20),RPS(20),NZPS,NZRS,NPCVS,1T	FARED	10763
	1TO,IA0,IB0,AKOUT(3),XOUT(3)	FARED	10764
	DIMENSION IZP(20),RF(20)	FARED	10765
	EQUIVALENCE (RL(1,1),IZP(1)),(RL(1,2),RF(1))	FARED	10766
	REAL KBR	FARED	10767
	M6=NTAPE(2)	FARED	10768
	IF(NSR.LT.4) GO TO 5	FARED	10769
	DO 4 I=1,NZS	FARED	10770
4	IZP(I)=IZ(I)	FARED	10771
5	CONTINUE	FARED	10772
	WRITE(M6,9)	FARED	10773
9	FORMAT(1H1)	FARED	10774
	WRITE(M6,10)	FARED	10775
10	FORMAT(60X,17H*****/,60X,1H*,15X,1H*/,60X,17H* S E A	FARED	10776
	1R C H */,60X,1H*,15X,1H*/,60X,17H*****/)	FARED	10777
	GO TO (11,12,13,14,100,105),NSR	FARED	10778
100	WRITE (M6,101)	FARED	10779
101	FORMAT (45X,57HTYPE OF SEARCH AVERAGE ZONE POWER D	FARED	10780
	DENSITY//)	FARED	10781
	GO TO 110	FARED	10782
105	WRITE (M6,106)	FARED	10783
106	FORMAT (45X,57HTYPE OF SEARCH MAXIMUM ZONE POWER D	FARED	10784
	DENSITY//)	FARED	10785
110	WRITE (M6,111) NZPS	FARED	10786
111	FORMAT (45X,24HNUMBER OF SEARCH ZONES =,I3//)	FARED	10787
	WRITE (M6,112)	FARED	10788
112	FORMAT (45X,55H SEARCH ZONES POWER PARAMETERS	FARED	10789
	1 (P//)	FARED	10790
	DO 114 I=1,NZPS	FARED	10791
	WRITE (M6,113) IZPS(I),RPS(I)	FARED	10792
113	FORMAT (55X,I2,26X,E12.5)	FARED	10793
		FARED	10794

114	CONTINUE		FARED	10795
	WRITE (M6,115) NZRS		FARED	10796
115	FORMAT (1H0,44X,33HNUMBER OF SEARCH ZONE MATERIALS =,I3//)		FARED	10797
	WRITE (M6,116)		FARED	10798
116	FORMAT (45X,57H SEARCH ZONE MATERIALS FUEL/DILUENT RATIO		FARED	10799
	105 (R)//		FARED	10800
	DO 118 I=1,NZRS		FARED	10801
	WRITE (M6,117) IDZP(I),RFZM(I)		FARED	10802
117	FORMAT (58X,12,24X,c12.5)		FARED	10803
118	CONTINUE		FARED	10804
	WRITE (M6,119) KBR		FARED	10805
119	FORMAT (1H0,44X,20HEIGENVALUE DESIRED =,E12.5//)		FARED	10806
	WRITE (M6,120) COUNT		FARED	10807
120	FORMAT (45X,25HCONVERGENCE CRITERION =E12.5)		FARED	10808
	GO TO 50		FARED	10809
11	WRITE (M6,21)		FARED	10810
21	FORMAT (45X,57H TYPE OF SEARCH = BUCKLING)		FARED	10811
	GO TO 15		FARED	10812
12	WRITE (M6,22)		FARED	10813
22	FORMAT (45X,47H TYPE OF SEARCH = VARIABLE DIMENSION)		FARED	10814
	GO TO 15		FARED	10815
13	WRITE (M6,23)		FARED	10816
23	FORMAT (45X,44H TYPE OF SEARCH = FIXED DIMENSION)		FARED	10817
	GO TO 15		FARED	10818
14	WRITE (M6,24)		FARED	10819
24	FORMAT (45X,40H TYPE OF SEARCH = COMPOSITION)		FARED	10820
15	CONTINUE		FARED	10821
	IF (NSR.EQ.4) GO TO 16		FARED	10822
	WRITE (M6,25) NZS		FARED	10823
25	FORMAT (45X,29HNUMBER OF SEARCH ZONES = ,I2)		FARED	10824
	GO TO 17		FARED	10825
16	WRITE (M6,26) NZS		FARED	10826
26	FORMAT (45X,29HNUMBER OF SEARCH MATERIALS = ,I2)		FARED	10827
17	WRITE (M6,27) KBR,COUT		FARED	10828
27	FORMAT (45X,29HEIGENVALUE DESIRED = ,E12.5/,45X,29HCONVERGE		FARED	10829
	INCE CRITERION = ,E12.5)		FARED	10830
	IF (NSR.EQ.4) GO TO 34		FARED	10831
	WRITE (M6,28)		FARED	10832
28	FORMAT (45X,29HSEARCH ZONE IDS =)		FARED	10833
	GO TO 33		FARED	10834
34	WRITE (M6,48)		FARED	10835
48	FORMAT (45X,29HSEARCH MATERIAL IDS =)		FARED	10836
33	WRITE (M6,29) IZP(1)		FARED	10837
29	FORMAT (1H+,75X,I2)		FARED	10838
	IF (NZS.EQ.1) GO TO 35		FARED	10839
	MX=MIN0 (NZS,6)		FARED	10840
	WRITE (M6,30) (IZP(I),I=2,MX)		FARED	10841
30	FORMAT (1H+,75X,6 (1H,,I2))		FARED	10842
31	IF (MX.LE.NZ) GO TO 35		FARED	10843
	M1=MX+1		FARED	10844

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      WRITE(M6,32)(IZP(I),I=M1,NZS)
32  FORMAT(74X,I2,5(1H,,I2)/)
35  CONTINUE
      IF(NSR.NE.4) GO TO 50
      WRITE(M6,45)
45  FORMAT(1H0,56X,23HFUEL/DILUENT RATIOS (R) )
      WRITE(M6,46) (IZP(I),RF(I),I=1,NZS)
46  FORMAT(52X,14HZONE MATERIAL ,I2, 5H, R= ,E12.5)
50  RETURN
      END

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FARED  10845
FARED  10846
FARED  10847
FARED  10848
FARED  10849
FARED  10850
FARED  10851
FARED  10852
FARED  10853
FARED  10854

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C	FUNCTION PAVE(NSZON,IPXS)	FARED	10855
C		FARED	10856
C		FARED	10857
C	THIS FUNCTION COMPUTES THE AVERAGE POWER DENSITY IN ZONE NSZON.	FARED	10858
C		FARED	10859
C		FARED	10860
	COMMON NTAPE(20)	FARED	10861
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RO,RIN,RUT,CIN,MI	FARED	10862
	ICT,THE,IUOC,NIB,NOB,NCV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	10863
	COMMON NSPARES(42)	FARED	10864
	COMMON IFLAG,IV,N,M(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	10865
	ID,BLANKS	FARED	10866
	COMMON NPOINT(20),ZONE(5000)	FARED	10867
	DIMENSION NZONE(2000)	FARED	10868
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,M(1))	FARED	10869
	DIMENSION IDZON(20)	FARED	10870
	COMMON/FLX/PHI(150,30),APHI(20,30)	FARED	10871
	COMMON/ACA/SPX(40,30),NK(40),NEL	FARED	10872
	LTAPE=NTAPE(19)	FARED	10873
	M6=NTAPE(2)	FARED	10874
	CN=1.603 E-13	FARED	10875
	PAVE=0.0	FARED	10876
	IF(IPXS.NE.0) GO TO 55	FARED	10877
	REWIND LTAPE	FARED	10878
	READ (LTAPE) IDTAPE,IBK,IGK,DUM	FARED	10879
	DO 40 IBK=1,NB	FARED	10880
	READ (LTAPE) IOB,NEL,KZON,(IDZON(I),I=1,KZON)	FARED	10881
	DO 35 IL=1,NEL	FARED	10882
35	READ (LTAPE) NK(IL),((SPX(IL,J),J=1,MAG),JJ=1,5)	FARED	10883
	DO 30 KK=1,KZON	FARED	10884
	IF(NSZON.EQ.IDZON(KK)) GO TO 50	FARED	10885
30	CONTINUE	FARED	10886
40	CONTINUE	FARED	10887
	WRITE (M6,42)	FARED	10888
42	FORMAT (1H0,15HILLEGAL ZONE ID)	FARED	10889
	STOP	FARED	10890
50	REWIND LTAPE	FARED	10891
55	DO 60 IL=1,NEL	FARED	10892
	CON=CONCENT(NK(IL),NSZON)	FARED	10893
	SUM1=0.0	FARED	10894
	DO 58 IG=1,MAG	FARED	10895
	SUM1=SUM1+SPX(IL,IG)*APHI(NSZON,IG)	FARED	10896
58	CONTINUE	FARED	10897
60	PAVE=PAVE+CON*SUM1	FARED	10898
	PAVE=CN*PAVE	FARED	10899
	RETURN	FARED	10900
	END	FARED	10901

C	FUNCTION PMAX(NSZON,IPXS)	FARED	10902
C		FARED	10903
C		FARED	10904
C	THIS FUNCTION COMPUTES THE MAXIMUM POWER DENSITY IN ZONE NSZON.	FARED	10905
C		FARED	10906
		FARED	10907
	COMMON NTAPE(20)	FARED	10908
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RO,RIN,RUT,CIN,MI	FARED	10909
	1CT,THE,1DDC,NIB,NOB,NCV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	10910
	COMMON NSPARES(42)	FARED	10911
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	10912
	10,BLANKS	FARED	10913
	COMMON NPOINT(20),ZONE(5000)	FARED	10914
	DIMENSION NZONE(2000)	FARED	10915
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	10916
	DIMENSION IOZON(20)	FARED	10917
	COMMON/ACA/SPXK(600),SPX(40,30),NK(40),NEL,NSIN,NSOUT	FARED	10918
	COMMON/GE0/ DELR(20),R(150),RI(150),LB(20)	FARED	10919
	COMMON/FLX/PHI(150,30),APHI(20,30)	FARED	10920
	PMAX=0.0	FARED	10921
	CN=1.603 E-13	FARED	10922
	M6=NTAPE(2)	FARED	10923
	LTAPE=NTAPE(19)	FARED	10924
	IF(IPXS.NE.J) GO TO 55	FARED	10925
	REWIND LTAPE	FARED	10926
	READ (LTAPE) IDTAPE,IBK,IGK,DUM	FARED	10927
	DO 40 IBK=1,NB	FARED	10928
	READ (LTAPE) IDB,NEL,KZON,(IOZON(I),I=1,KZON)	FARED	10929
	DO 35 IL=1,NEL	FARED	10930
35	READ (LTAPE) NK(IL),(SPX(IL,J),J=1,MAG),JJ=1,5)	FARED	10931
	DO 36 KK=1,KZON	FARED	10932
	IF(NSZON.EQ.IOZON(KK)) GO TO 50	FARED	10933
36	CONTINUE	FARED	10934
40	CONTINUE	FARED	10935
	WRITE (M6,42)	FARED	10936
42	FORMAT (1H0,15HILLEGAL ZONE ID)	FARED	10937
	STOP	FARED	10938
50	REWIND LTAPE	FARED	10939
	NSIN=1	FARED	10940
	IF(NSZON.EQ.1) GO TO 51	FARED	10941
	NSIN=LB(NSZON-1)	FARED	10942
51	NSOUT=LB(NSZON)	FARED	10943
55	DO 100 K=NSIN,NSOUT	FARED	10944
	DUM=0.0	FARED	10945
	DO 60 IL=1,NEL	FARED	10946
	CON=CONCENT(NK(IL),NSZON)	FARED	10947
	DO 60 I=1,MAG	FARED	10948
	DUM=DUM+PHI(K,I)*SPX(IL,I)*CON	FARED	10949
60	CONTINUE	FARED	10950
	IF(DUM.GT.PMAX) PMAX=DUM	FARED	10951

100 CONTINUE
P_{MAX}=C_N*P_{MAX}
RETURN
END

FAREQ 10952
FAREQ 10953
FAREQ 10954
FAREQ 10955

C	SUBROUTINE VDATA	FARED	10956
C		FARED	10957
C	THIS SUBROUTINE PRINTS THE RESULTS OF A CRITICALITY SEARCH.	FARED	10958
C		FARED	10959
C		FARED	10960
	COMMON NTAPE(20)	FARED	10961
	COMMON NGO,MIG,MAG,NUS,NPTS,NB,NZ,NBH,NZM,NN,POW,RO,RIN,RUT,CIN,MI	FARED	10962
	ICT,THE,IUDC,NIB,NOB,NCV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	10963
	COMMON NSPARES(42)	FARED	10964
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	10965
	10,BLANKS	FARED	10966
	COMMON NPOINT(20),ZONE(5000)	FARED	10967
	DIMENSION NZONE(2000)	FARED	10968
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	10969
	COMMON/SCH/IZ(20),X(3),AK(3),RL(20,2),KBR,NZS,IA,IB,ITT,NCVS	FARED	10970
	COMMON/PARS/NSR,ICT,IGU,ICT2,N100,IFLX,COUT,MICT2,EIGEN,EIGEN1,P,	FARED	10971
	1PIM,IST	FARED	10972
	COMMON/BK/BUCK2(20,30)	FARED	10973
	DIMENSION IF5(26),NSRF(26,6)	FARED	10974
	DIMENSION IFN(9),LFM(8),IVU(7),LVD(7),RAD(20),IDC(20),NZID(20)	FARED	10975
	DIMENSION IFA(9),LFA(8),IVA(7),LVA(7)	FARED	10976
	DIMENSION IPT(6)	FARED	10977
	DATA(IPT=78,88,85,81,91,91)	FARED	10978
	DATA(IFA=4H(62X,4H8HBU,4HCKLI,4HNG/3,4HGX6(,4H6HGR,4HQUP,4HI2,6,	FARED	10979
	1 4HX)/))	FARED	10980
	DATA(LFA=4H(12X,4H5HZO,4HNE I,4H2,7X,4H6(2X,4HE12.,4H5)))	FARED	10981
	DATA(IVA=4H(38X,4H3(4H,4HZONE,4H7X6H,4HRAOI,4HUS5X,4H)))	FARED	10982
	DATA IBL,ISZ/2H ,2HSZ/	FARED	10983
	DATA(LVA=4H(38X,4H3(1X,4HI2,1,4HXA2,,4H2XE1,4H2.5,,4H2X)))	FARED	10984
	DATA NSRF/4H(/2,4HGX46,4HH***,4H BUC,4HKL1N,4HG SE,4HARCH,4H COM,	FARED	10985
	1 4HPLET,4HE ON,4H ITE,4HRATI,4HON N,4HO. I,4H2,14,4HH, E,4HIGEN,	FARED	10986
	2 4HVALU,4HE =,,4HE12.,4H5,4H,4H ***,4H//) ,4H ,4H ,4H ,	FARED	10987
	3 4H(/2,4HGX56,4HH***,4H VAR,4HIABL,4HE DI,4HMENS,4HION ,4HSEAR,	FARED	10988
	4 4HCH C,4HOMPL,4HETE ,4HON I,4HTERA,4HTION,4H NO.,4H I2,,4H14H,,	FARED	10989
	5 4H EIG,4HENVA,4HLUE ,4H=E1,4H2.5,,4H4H *,4H**//,4H) ,4H(/2,	FARED	10990
	6 4HGX53,4HH***,4H FIX,4HED O,4HIMEN,4HSION,4H SEA,4HRCR ,4HCOMP,	FARED	10991
	7 4HLETE,4H ON ,4HITER,4HATIO,4HNN NO,4H. I2,4H,14H,4H, EI,4HGENV,	FARED	10992
	8 4HALUE,4H =,E,4H12.5,4H,4H ,4H**//,4H//) ,4H ,4H(/2,4HGX49,	FARED	10993
	9 4HH***,4H COM,4HPOSI,4HTION,4H SEA,4HRCR ,4HCOMP,4HLETE,4H ON ,	FARED	10994
	X 4HITER,4HATIO,4HNN NO,4H. I2,4H,14H,4H, EI,4HGENV,4HALUE,4H =,E,	FARED	10995
	1 4H12.5,4H,4H ,4H**//,4H//) ,4H ,4H ,4H(/2,4HGX59,4HH***,	FARED	10996
	2 4H AVE,4HRAGE,4H POW,4HER D,4HENSI,4HTY S,4HEARC,4HH CO,4HMPLE,	FARED	10997
	3 4HTE O,4HNN IT,4HERAT,4HION ,4HNO. ,4HI2,1,4H4H, ,4HEIGE,4HNNVAL,	FARED	10998
	4 4HUE =,4H,E12,4H.5,4,4HH **,4H*//),4H(/2,4HGX59,4HH***,4H MAX,	FARED	10999
	5 4HIMUM,4H POW,4HER D,4HENSI,4HTY S,4HEARC,4HH CO,4HMPLE,4HTE O,	FARED	11000
	6 4HNN IT,4HERAT,4HTION ,4HNO. ,4HI2,1,4H4H, ,4HEIGE,4HNNVAL,4HUE =,	FARED	11001
	7 4H,E12,4H.5,4,4HH **,4H*//)/	FARED	11002
	NPR=NTAPE(2)	FARED	11003
	CALL FORM(104,NSRF(1,NSR),IF5)	FARED	11004
		FARED	11005

```

ICPP=136
IPA=IPT(NSR)
IPB=IPA+1
IPC=IPA+3
C- DETERMINE SIZE OF COUT
CHK=COU1
DO 5 I=1,9
ISZ=I
IF(CHK.GE..99999) GO TO 6
5 CHK=1J.*CHK
6 CONTINUE
ISZA=ISZ+7
ISK=(ICPP-IPA)/2
CALL MASH(ISK,ISA,ISB)
CALL INTALP(IF5(1),4,ISA)
CALL INTALP(IF5(1),5,ISB)
CALL MASH(ISZA,ISA,ISB)
CALL INTALP(IF5(1),IPA,ISA)
CALL INTALP(IF5(1),IPB,ISB)
CALL MASH(ISZ,ISA,ISB)
CALL INTALP(IF5(1),IPC,ISB)
WRITE(NPR,9)
9 FORMAT(///,64X,9H* * * * *)
WRITE(NPR,IF5) ITT,EIGEN
2 FORMAT(3(/))
ITT=0
GO TO (1J,10J,20J,30J,30J,30J),NSR
10 CONTINUE
CALL FORM(36,IFA,IFN)
CALL FORM(28,LFA,LFM)
NPG=MAG/6
IK= MAG-NPG*6
IF(IK.NE.0) NPG=NPG+1
MIN=1
DO 3J IP=1,NPG
MAX=MIN*(MAG,6*IP)
IF(IP.NE.NPG) GO TO 12
IF(IP.NE.NPG.OR.IK.EQ.J) GO TO 12
ISET=(136-14-14*IK)/2
CALL MASH(ISET,ITM,ITM2)
CALL INTALP(LFM(1),2,ITM)
CALL INTALP(LFM(1),3,ITM2)
ISET=ISET+18
CALL MASH(ISET,ITM,ITM2)
CALL INTALP(IFN(1),19,IK+IZERO)
CALL INTALP(IFN(1),16,ITM)
CALL INTALP(IFN(1),17,ITM2)
12 CONTINUE
WRITE(NPR,IFN(1))(J,J=MIN,MAX)
DO 15 LZ=1,NZ

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FARED 11006
FARED 11007
FARED 11008
FARED 11009
FARED 11010
FARED 11011
FARED 11012
FARED 11013
FARED 11014
FARED 11015
FARED 11016
FARED 11017
FARED 11018
FARED 11019
FARED 11020
FARED 11021
FARED 11022
FARED 11023
FARED 11024
FARED 11025
FARED 11026
FARED 11027
FARED 11028
FARED 11029
FARED 11030
FARED 11031
FARED 11032
FARED 11033
FARED 11034
FARED 11035
FARED 11036
FARED 11037
FARED 11038
FARED 11039
FARED 11040
FARED 11041
FARED 11042
FARED 11043
FARED 11044
FARED 11045
FARED 11046
FARED 11047
FARED 11048
FARED 11049
FARED 11050
FARED 11051
FARED 11052
FARED 11053
FARED 11054
FARED 11055

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WRITE(NPR,LFM(1)) LZ, (BUCK2(LZ,I),I=MIN,MAX)	FARED	11056
15 CONTINUE	FARED	11057
MIN=MAX+1	FARED	11058
WRITE(NPR,2)	FARED	11059
30 CONTINUE	FARED	11060
GO TO 1000	FARED	11061
100 CONTINUE	FARED	11062
WRITE(NPR,101)	FARED	11063
101 FORMAT(59X,18HVARIABLE DIMENSION /)	FARED	11064
102 CONTINUE	FARED	11065
CALL FORM(28,IVA,IVD)	FARED	11066
CALL FORM(28,LVA,LVD)	FARED	11067
DO 110 LZ=1,NZ	FARED	11068
IX=NPOINT(LZ)	FARED	11069
NZID(LZ)=NZONE(IX)	FARED	11070
RAD(LZ)=ZONE(IX+1)	FARED	11071
DO 108 IS=1,NZS	FARED	11072
IF (IZ(IS) .EQ. LZ) GO TO 109	FARED	11073
108 CONTINUE	FARED	11074
IDC(LZ)=IBL	FARED	11075
GO TO 110	FARED	11076
109 IDC(LZ)=ISZ	FARED	11077
110 CONTINUE	FARED	11078
IF (NZ.GE.3) GO TO 114	FARED	11079
NCL=72-NZ*13	FARED	11080
CALL MASH(NCL,NCL1,NCL2)	FARED	11081
CALL INTALP(IVD(1),2,NCL1)	FARED	11082
CALL INTALP(IVD(1),3,NCL2)	FARED	11083
CALL INTALP(LVD(1),2,NCL1)	FARED	11084
CALL INTALP(LVD(1),3,NCL2)	FARED	11085
NCL=IZ+IZERO	FARED	11086
CALL INTALP(IVD(1),5,NCL)	FARED	11087
114 WRITE(NPR,IVD)	FARED	11088
WRITE(NPR,LVD) (NZID(J),IDC(J),RAD(J), J=1,NZ)	FARED	11089
GO TO 1000	FARED	11090
200 CONTINUE	FARED	11091
WRITE(NPR,201)	FARED	11092
201 FORMAT(60X15HFIXED DIMENSION /)	FARED	11093
GO TO 1002	FARED	11094
300 CONTINUE	FARED	11095
WRITE(NPR,301)	FARED	11096
301 FORMAT(61X14HCONCENTRATIONS //28X4HZONE14X13HZONE MATERIAL14X7HNUC	FARED	11097
11IDE14X13HCONCENTRATION/)	FARED	11098
302 FORMAT(29X,I2,20XIS,19XA4,A2,15XE12.5)	FARED	11099
303 FORMAT(51XI3,19XA4,A2,15XE12.5)	FARED	11100
DO 320 LZ=1,NZ	FARED	11101
LSO=1	FARED	11102
IX=NPOINT(LZ)	FARED	11103
IZID=NZONE(IX)	FARED	11104
NISO=NZONE(IX+5)	FARED	11105

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      DO 320 ISO=1,NISO
      IY=1J+IX+10*(ISO-1)
      IMID=NZONE(IY+1)
      DO 310 ISM=1,NZS
      IF(IMID.EQ.IZ(ISM)) GO TO 312
310  CONTINUE
      GO TO 320
312  CONTINUE
      IF(LSO.EQ.1) GO TO 317
      CALL CONVL(NZONE(IY),IDA,IDB)
      WRITE(NPR,303) IMID,IDA,IDB,ZONE(IY+6)
      GO TO 320
317  CONTINUE
      LSO=0
      CALL CONVL(NZONE(IY),IDA,IDB)
      WRITE(NPR,302) IZID,IMID,IDA,IDB,ZONE(IY+6)
320  CONTINUE
1000 CONTINUE
      RETURN
      END

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FARED  11106
FARED  11107
FARED  11108
FARED  11109
FARED  11110
FARED  11111
FARED  11112
FARED  11113
FARED  11114
FARED  11115
FARED  11116
FARED  11117
FARED  11118
FARED  11119
FARED  11120
FARED  11121
FARED  11122
FARED  11123
FARED  11124
FARED  11125

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	OVERLAY(RIM,3,6)	FARED	11126
	PROGRAM SETUP	FARED	11127
C		FARED	11128
C		FARED	11129
C	THIS PROGRAM COMPUTES VARIOUS GEOMETRIC PARAMETERS AND	FARED	11130
C	PERFORMS CONSISTANCY CHECKS.	FARED	11131
C		FARED	11132
C		FARED	11133
	COMMON NTAPE(20)	FARED	11134
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RO,RIN,RUT,CIN,MI	FARED	11135
	1CT,THE,IODC,NIB,NOB,NCV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	11136
	COMMON NSPARES(42)	FARED	11137
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	11138
	10,BLANKS	FARED	11139
	COMMON NPOINT(20),ZONE(5000)	FARED	11140
	DIMENSION NZONE(2000)	FARED	11141
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	11142
	COMMON/MAC1/VUSIG(20,30),DIF(20,30),TRANS(4000),SIGT(20,30)	FARED	11143
	COMMON/ACA/SC(30),FC(30),FNVC(30),S2NC(30),UCLC(30),STR(30),SVU(30)	FARED	11144
	1),SSA(30),SST(30),NFIS(20),N2N(20),CH(30),IDZON(20),IDZO(20),ICOMP	FARED	11145
	2(20),NCAP(20),NDEL(20),NTR(20),SGF(20,30),DEL(20,30),S2N(20,30)	FARED	11146
	COMMON/ACB/AC2(150)	FARED	11147
	COMMON/BJK/BUCK2(20,30)	FARED	11148
	COMMON/MIS/CHI(20,30),DELTA(20),BETA(20)	FARED	11149
	COMMON/FLX/PHI(150,30),APHI(20,30)	FARED	11150
	COMMON/GE0/UELR(20),R(150),RI(150),LB(20)	FARED	11151
	COMMON/PARS/NSR,ICT,IGO,ICT2,N100,IFLX,COUT,MICT2,EIGEN,EIGEN1,P,	FARED	11152
	1PIM,IST	FARED	11153
	COMMON/OM/OMEGA(30),OMEG1(30)	FARED	11154
	COMMON/SO/SOU(150),SOUP(150),SOM(20),SUP(20),SOPP(30)	FARED	11155
	DIMENSION ROUT(20),NINT(20)	FARED	11156
	INTEGER S01	FARED	11157
	S01=NTAPE(10)	FARED	11158
	M6=NTAPE(2)	FARED	11159
	INPUT=NTAPE(11)	FARED	11160
	N100=0	FARED	11161
	DO 720 I=1,NPTS	FARED	11162
	DO 720 J=1,MAG	FARED	11163
	PHI(1,J)=0.0	FARED	11164
720	CONTINUE	FARED	11165
	DO 700 I=1,NZ	FARED	11166
	IX=NPOINT(I)	FARED	11167
	ROUT(I)=ZONE(IX+1)	FARED	11168
	NINT(I)=NZONE(IX+2)	FARED	11169
700	CONTINUE	FARED	11170
31	K(1)=RIN	FARED	11171
	IF(NGO.NE.0) GO TO 501	FARED	11172
	WRITE(M6,1000)	FARED	11173
1000	FORMAT(1H1,23H GEOMETRY NOT SPECIFIED)	FARED	11174
	N100=1	FARED	11175

501 CONTINUE	FAREQ	11176
LB1=1	FAREQ	11177
TEMP=R(1)	FAREQ	11178
DO 400 I=1,NZ	FAREQ	11179
LB1=LB1+NINT(I)	FAREQ	11180
LB(I)=LB1	FAREQ	11181
DEL R(I)=(ROUT(1)-TEMP)/(FLOAT(NINT(I)))	FAREQ	11182
400 TEMP=ROUT(I)	FAREQ	11183
IF(LB(NZ).EQ.NPTS) GO TO 256	FAREQ	11184
WRITE(M6,1005)	FAREQ	11185
1005 FORMAT(87H SPACING OF POINTS AND THE TOTAL NUMBER OF POINTS DOES N	FAREQ	11186
OT MATCH GIVEN NUMBER OF POINTS //)	FAREQ	11187
256 LB1=2	FAREQ	11188
DO 265 I=1,NZ	FAREQ	11189
LB2=LB(I)	FAREQ	11190
DO 295 J=LB1,LB2	FAREQ	11191
R(J)=R(J-1)+DEL R(I)	FAREQ	11192
295 CONTINUE	FAREQ	11193
LB1=LB2+1	FAREQ	11194
IF (DEL R(I)) 260,260,265	FAREQ	11195
260 WRITE(M6,261)	FAREQ	11196
261 FORMAT(34H ERROR,ZERO VALUE FOR DELTA R)	FAREQ	11197
N100=1	FAREQ	11198
265 CONTINUE	FAREQ	11199
IF(NZ.LE.20) GO TO 34	FAREQ	11200
32 N100=1	FAREQ	11201
WRITE(M6,33)	FAREQ	11202
33 FORMAT(40H ERROR,NUMBER OF REGIONS IS TOO LARGE)	FAREQ	11203
34 CONTINUE	FAREQ	11204
NM1=NPTS-1	FAREQ	11205
MM1=NZ-1	FAREQ	11206
IF (MM1) 56,56,57	FAREQ	11207
56 MM1=1	FAREQ	11208
LB(2)=1001	FAREQ	11209
57 DO 65 I=1,MM1	FAREQ	11210
LB2=LB(I)+1	FAREQ	11211
IF (LB(I+1)-LB2) 60,60,65	FAREQ	11212
60 WRITE(M6,62)	FAREQ	11213
62 FORMAT(78H ERROR,NOT THREE POINTS IN REGION OR INTERFACE NUMBERS N	FAREQ	11214
OT IN ASCENDING ORDER)	FAREQ	11215
N100=1	FAREQ	11216
65 CONTINUE	FAREQ	11217
IF(NPTS.LE.150) GO TO 85	FAREQ	11218
81 N100=1	FAREQ	11219
WRITE(M6,82)	FAREQ	11220
82 FORMAT(38H ERROR,NUMBER OF POINTS IS TOO LARGE)	FAREQ	11221
85 IF(MAG.LE.30) GO TO 90	FAREQ	11222
86 N100=1	FAREQ	11223
WRITE(M6,87)	FAREQ	11224
87 FORMAT(39H ERROR,NUMBER OF GROUPS IS TOO LARGE)	FAREQ	11225

90 IF (NDS-15) 100,100,91	FAREQ	11226
91 N100=1	FAREQ	11227
WRITE(M6,92)	FAREQ	11228
92 FORMAT(55H ERROR,NUMBER OF GROUPS FOR DOWNSCATTERING IS TOO LARGE)	FAREQ	11229
100 CONTINUE	FAREQ	11230
GO TO(105,110,115),NGO	FAREQ	11231
105 P=.0	FAREQ	11232
GO TO 120	FAREQ	11233
110 P=1.0	FAREQ	11234
GO TO 120	FAREQ	11235
115 P=2.0	FAREQ	11236
120 IF (M1CT) 140,140,128	FAREQ	11237
128 IF (CIN-.000000001) 129,132,132	FAREQ	11238
129 WRITE(M6,130)	FAREQ	11239
130 FORMAT(45H ERROR,VALUE OF EPSILON1 IS TOO SMALL)	FAREQ	11240
N100=1	FAREQ	11241
132 CONTINUE	FAREQ	11242
140 R(1)=RIN	FAREQ	11243
IF (N1B.NE.3.AND.N1B.NE.5) GO TO 180	FAREQ	11244
IF (NGO.EQ.1) GO TO 180	FAREQ	11245
IF (R(1).GT.0.) GO TO 180	FAREQ	11246
175 WRITE(M6,176)	FAREQ	11247
176 FORMAT(63H ERROR,R(1) MUST BE POSITIVE IF EXTRAPOLATED BOUNDARY IS	FAREQ	11248
X USED)	FAREQ	11249
N100=1	FAREQ	11250
180 CONTINUE	FAREQ	11251
REWIND INPUT	FAREQ	11252
READ(INPUT) ((BUCK2(I,J),J=1,MAG),I=1,NZ)	FAREQ	11253
DO 3 J=1,MAG	FAREQ	11254
3 OMEGA(J)=OMEG1(J)=0.	FAREQ	11255
IF (N1B.EQ.3.OR.N1B.EQ.4) READ(INPUT) (OMEGA(I),I=1,MAG)	FAREQ	11256
IF (NOB.EQ.3.OR.NOB.EQ.4) READ(INPUT) (OMEG1(I),I=1,MAG)	FAREQ	11257
211 CONTINUE	FAREQ	11258
IF (N100.NE.0) STOP 306J	FAREQ	11259
REWIND S01	FAREQ	11260
READ(S01)	FAREQ	11261
READ(S01) (SOU(I),I=1,NPTS)	FAREQ	11262
READ(S01) (SOP(I),I=1,NZ)	FAREQ	11263
DO 3JJ I=1,NPTS	FAREQ	11264
IF (SOU(I).GT.0.0) GO TO 35J	FAREQ	11265
306 CONTINUE	FAREQ	11266
WRITE(M6,301)	FAREQ	11267
301 FORMAT(20X,56HERROR*** SOURCE MUST BE NON-ZERO FOR AT LEAST ONE PO	FAREQ	11268
XINT //)	FAREQ	11269
STOP 306J	FAREQ	11270
350 RETURN	FAREQ	11271
END	FAREQ	11272

OVERLAY (RIM,3,10)	FARED	11273
PROGRAM REDEP	FARED	11274
	FARED	11275
	FARED	11276
THIS PROGRAM READS THE DEPLETION INPUT DATA AND PERFORMS	FARED	11277
ONE MAJOR DEPLETION PERIOD INCLUDING TESTS AND EDITS.	FARED	11278
	FARED	11279
	FARED	11280
COMMON NTAPE(20)	FARED	11281
COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RO,RIN,RUT,CIN,MI	FARED	11282
ICT,THE,IUDC,NIB,NOB,NCV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	11283
COMMON NSPARES(42)	FARED	11284
COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	11285
10,BLANKS	FARED	11286
COMMON NPOINT(20),ZONE(5000)	FARED	11287
DIMENSION NZONE(2000)	FARED	11288
EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	11289
DIMENSION DM(100)	FARED	11290
COMMON/SCH/IZ(20),X(3),BK(3),RL(20,2),KBR,NZS,IA,IB,ITT,NCVS	FARED	11291
COMMON/TEST/IDATA(2),FDATA(2),ITEST(4),INID(20),FMIN(20),NZMT(20),	FARED	11292
1IZM(20,20),IBZ(20),NTEST,EMIN,BMAX(20),NBZ,NTNL	FARED	11293
COMMON/FLX/SP(30,100),NUID(100),LXPT(20),KZN(20),NLN(20),NNO(39),	FARED	11294
1INC,NID(40),ICHN(820),ICY(40),FP(400),APHI(20,30)	FARED	11295
COMMON/MAC1/ SC(30,100),SA(30,100),IDZN(20,20)	FARED	11296
COMMON/MAC2/SF(30,100)	FARED	11297
COMMON/ACA/S2N(30,100)	FARED	11298
COMMON/PARS/NSR,ICT,IGO,ICT2,N100,IFLX,COUT,MICT2,EIGEN,EIGEN1,P,	FARED	11299
1PIM,ISI	FARED	11300
DIMENSION RF(20)	FARED	11301
DIMENSION LTAB(20,2)	FARED	11302
EQUIVALENCE (LTAB(1,1),SC(1,1))	FARED	11303
EQUIVALENCE (RF(1),RL(1,2))	FARED	11304
EQUIVALENCE (TSTR,FDATA(1))	FARED	11305
COMMON/DEP/IDZON(20),NIQ(20),KZON,MODE,KBPT,NEL,MAJT,MINT,MJTE	FARED	11306
COMMON/19R/IFB,BN(20),30(20)	FARED	11307
COMMON/UPEDIT/NEDIT,ITEO(10)	FARED	11308
DATA KA,KB/ 2,1/	FARED	11309
REAL KBR	FARED	11310
INTEGER TEM2,TEM1	FARED	11311
NPR=NTAPE(2)	FARED	11312
ITT=0	FARED	11313
IFLT=0	FARED	11314
INT=0	FARED	11315
MODE=1	FARED	11316
K1=10	FARED	11317
K2=10	FARED	11318
DATA KIPIO/999/	FARED	11319
TEM1=NEDIT	FARED	11320
TEM2=NTEST	FARED	11321
IF (HJTE.NE.0) GO TO 200	FARED	11322

C		FARED	11323
C	READ DATA DEFINING THE DEPLETION SEQUENCE.	FARED	11324
C		FARED	11325
	NEUIT=0	FARED	11326
	NTEST=0	FARED	11327
10	CALL CRAMIN(V,N,W)	FARED	11328
	KIND=N+4	FARED	11329
	GO TO (2000,2000,31,32,33,2000),KIND	FARED	11330
31	INT=INT+1	FARED	11331
	IF(INT.GT.2) GO TO 10	FARED	11332
	IDATA(INT)=IV	FARED	11333
	GO TO 10	FARED	11334
32	CALL SCAN(72H*TIME*TEST*SETEDIT*SETTEST*ZONEMAT*EDMACRO*EDFLUX*RATE	FARED	11335
	1S*BALANCE*REACTOR**,IW,ITY)	FARED	11336
	GO TO(34,45,74,73,70,70,70,70,70,80),ITY	FARED	11337
34	IFLT=IFLT+1	FARED	11338
	TSTR=TIME	FARED	11339
	GO TO 10	FARED	11340
33	IFLT=IFLT+1	FARED	11341
	IF(IFLT.GT.2) GO TO 10	FARED	11342
	FUATA(IFLT)=V	FARED	11343
	GO TO 10	FARED	11344
C		FARED	11345
C	A TEST DIRECTIVE HAS BEEN READ.	FARED	11346
C		FARED	11347
45	CONTINUE	FARED	11348
	NTEST=0	FARED	11349
	NZS=0	FARED	11350
50	CALL CRAMIN(V,N,W)	FARED	11351
49	CALL SCAN(36HCONTROL*IMINIMUM*BMAXIMUM*KMINIMUM**,IW,LTY)	FARED	11352
	GO TO(61,62,63,64,80),LTY	FARED	11353
C		FARED	11354
C	READ INPUT DATA FOR CONTROL TEST.	FARED	11355
C		FARED	11356
61	IF(NTEST.GT.3) GO TO 50	FARED	11357
	NTEST=NTEST+1	FARED	11358
	ITEST(NTEST)=LTY	FARED	11359
	NSR=4	FARED	11360
	ITT=0	FARED	11361
51	CALL CRAMIN(V,N,W)	FARED	11362
52	IF(N.NE.-2) GO TO 57	FARED	11363
	CALL SCAN(4HZM**,IW,IER)	FARED	11364
	IF(IER.NE.1) GO TO 53	FARED	11365
	NZS=NZS+1	FARED	11366
	IZ(NZS)=IV	FARED	11367
	CALL CRAMIN(V,N,W)	FARED	11368
	IF(N.NE.2) GO TO 59	FARED	11369
	CALL SCAN(3HR**,IW,IER)	FARED	11370
	IF(IER.NE.1) GO TO 55	FARED	11371
	RF(NZS)=V	FARED	11372

```

      GO TO 51
53 IF(NZS.EQ.0) GO TO 2033
      GO TO 51
59 RF(NZS)=0.
      GO TO 52
55 RF(NZS)=0.
      GO TO 51
57 IF(N.NE.1) GO TO 2045
      KBR=V
      CALL CRAMIN(V,N,W)
      IF(N.NE.1) GO TO 2048
      COUT=V
      ITT=3
      IA=2
      IB=1
      NCVS=0
      CALL CRAMIN(V,N,W)
      IF(N.NE.-1) GO TO 58
      MICT2=IV
      GO TO 50
58 MICT2=2J
      GO TO 49
C
C      READ INPUT DATA FOR IMINIMUM TEST.
C
62 IF(NTEST.GT.3) GO TO 50
      NTEST=NTEST+1
      ITTEST(NTEST)=LTYP
      NTNL=0
      NXT=1
      NEXT=1
      CALL CRAMIN(V,N,W)
      IF(N.NE.-2) GO TO 2061
65 CALL IDNUM(NUM,LTA,LTB,V,N,W)
      IF(NUM.EQ.0) GO TO 2061
      NTM1=NTNL
      NTNL = NTNL + 1
      NZMT(NTNL)=0
      IMID(NTNL)=NUM
      LTAB(NTNL,1)=LTA
      LTAB(NTNL,2)=LTB
      IF(N.EQ.-2) GO TO 65
      IF(N.NE.1) GO TO 2060
      FMIN(NTNL)=V
      IF(NEXT.EQ.NTNL) GO TO 67
      DO 66 I=NEXT,NTM1
66 FMIN(I)=V
67 NEXT=NTNL+1
      CALL CRAMIN(V,N,W)
      IF(N.NE.-2) GO TO 2062

```

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FARED 11373
FARED 11374
FARED 11375
FARED 11376
FARED 11377
FARED 11378
FARED 11379
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FARED 11415
FARED 11416
FARED 11417
FARED 11418
FARED 11419
FARED 11420
FARED 11421
FARED 11422

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68	CALL SCAN(4HZM**,IW,ITI)	FARED	11423
	IF(ITI.NE.1) GO TO 65	FARED	11424
	NZMT(NTNL)=NZMT(NTNL)+1	FARED	11425
	NMT=NZMT(NTNL)	FARED	11426
	IZM(NTNL,NMT)=IV	FARED	11427
	IF(NXT.EQ.NTNL) GO TO 71	FARED	11428
	DO 69 J=NXT,NTM1	FARED	11429
	NZMT(J)=NMT	FARED	11430
69	IZM(J,NMT)=IV	FARED	11431
71	NXT=NTNL+1	FARED	11432
	CALL GRAMIN(V,N,W)	FARED	11433
	IF(N.EQ.3) GO TO 49	FARED	11434
	IF(N.EQ.-2) GO TO 68	FARED	11435
	GO TO 2J62	FARED	11436
C		FARED	11437
C	READ INPUT DATA FOR BMAXIMUM TEST.	FARED	11438
C		FARED	11439
63	IF(NTEST.GT.3) GO TO 5J	FARED	11440
	NTEST=NTEST+1	FARED	11441
	ITEST(NTEST)=LTY	FARED	11442
	CALL GRAMIN(V,N,W)	FARED	11443
	IF(N.NE.1) GO TO 2J66	FARED	11444
	BMAX(1)=V	FARED	11445
	LAST=1	FARED	11446
	NBZ=J	FARED	11447
82	CALL GRAMIN(V,N,W)	FARED	11448
	LGO=N+4	FARED	11449
	GO TO (2J63,85,2J63,49,83,2J63,2J63),LGO	FARED	11450
85	CONTINUE	FARED	11451
	CALL SCAN(4HZM**,IW,LTY)	FARED	11452
	IF(LTY.NE.1) GO TO 2J64	FARED	11453
	NBZ=NBZ+1	FARED	11454
	IZ(NBZ)=IV	FARED	11455
	IF(NBZ.EQ.LAST) GO TO 82	FARED	11456
	BMAX(NBZ)=BMAX(NBZ-1)	FARED	11457
	GO TO 82	FARED	11458
83	CONTINUE	FARED	11459
	LAST=NBZ+1	FARED	11460
	BMAX(LAST)=V	FARED	11461
	GO TO 82	FARED	11462
C		FARED	11463
C	READ INPUT DATA FOR KMINIMUM TEST.	FARED	11464
C		FARED	11465
64	IF(NTEST.GT.3) GO TO 5J	FARED	11466
	NTEST=NTEST+1	FARED	11467
	ITEST(NTEST)=LTY	FARED	11468
	CALL GRAMIN(V,N,W)	FARED	11469
	IF(N.NE.1) GO TO 2J65	FARED	11470
	EMIN=V	FARED	11471
	GO TO 5J	FARED	11472

C		FARED	11473
C	SEQUENCE EDIT CALCULATIONS DURING DEPLETION.	FARED	11474
C		FARED	11475
	70 CONTINUE	FARED	11476
	IF(NEDIT.GT.10) GO TO 10	FARED	11477
	NEDIT=NEDIT+1	FARED	11478
	LTY=ITY-4	FARED	11479
	ITED(NEDIT)=LTY	FARED	11480
	GO TO 10	FARED	11481
	74 CONTINUE	FARED	11482
	NEUIT=TEM1	FARED	11483
	GO TO 10	FARED	11484
	73 CONTINUE	FARED	11485
	NTEST=TEM2	FARED	11486
	IF(NINL.LE.0) GO TO 10	FARED	11487
	DO 75 I=1,NINL	FARED	11488
	75 CALL CONVL(IMID(I),LTAB(I,1),LTAB(I,2))	FARED	11489
	GO TO 10	FARED	11490
	80 CONTINUE	FARED	11491
	TIME=TSTR	FARED	11492
	MAJT=IDATA(1)	FARED	11493
	MINT=IDATA(2)	FARED	11494
	FDATA(1)=FDATA(2)/(FLOAT(MINT))	FARED	11495
	IF(TEM2.LT.0) RETURN	FARED	11496
	CALL DEPLPR	FARED	11497
	200 CONTINUE	FARED	11498
	IF(TEM2.LT.0) RETURN	FARED	11499
	CALL PREP	FARED	11500
C		FARED	11501
C	SET FOR BREEDING RATIO	FARED	11502
C		FARED	11503
	IFB=0	FARED	11504
	DO 9 I=1,NZ	FARED	11505
	BN(I)=0.0	FARED	11506
	9 BD(I)=0.0	FARED	11507
C		FARED	11508
	MJTE=MJTE+1	FARED	11509
	MODE=1	FARED	11510
C		FARED	11511
C	PERFORM DEPLETION CALCULATION FOR ONE MAJOR DEPLETION PERIOD.	FARED	11512
C		FARED	11513
	DO 800 ITIM=1,MINT	FARED	11514
	IF(ITIM.EQ.MINT) IFB=1	FARED	11515
	3 CONTINUE	FARED	11516
	DO 1000 IB=1,NB	FARED	11517
	CALL XSECT(IB,ITIM)	FARED	11518
	DO 900 LZ=1,KZON	FARED	11519
	IX4=IDZON(LZ)	FARED	11520
	IX2=NPOINT(IX4)	FARED	11521
	NISO=NZONE(IX2+5)	FARED	11522

DO 600 MSK=1,NISO	FARED	11523
600 DM(MSK)=-1.0	FARED	11524
DO 700 LC=1,NC	FARED	11525
IFD=0	FARED	11526
DO 650 KL=1,NISO	FARED	11527
IX3=(KL-1)*K2+K1+IX2	FARED	11528
ID=NZONE(IX3)	FARED	11529
IF(ID.EQ.NID(LC)) GO TO 655	FARED	11530
IF(IFD.NE.0) GO TO 700	FARED	11531
GO TO 650	FARED	11532
655 IFD=1	FARED	11533
AK=COEF(IX3,IX4,LC)	FARED	11534
Q=FQ(IX2,IX3,IX4,DM,LC)	FARED	11535
DM(KL)=FNL(AK,Q,IX3)	FARED	11536
650 CONTINUE	FARED	11537
700 CONTINUE	FARED	11538
CALL STORM(DM,IX2)	FARED	11539
900 CONTINUE	FARED	11540
CALL NORMX(IB)	FARED	11541
1000 CONTINUE	FARED	11542
TIME=TIME+FOATA(1)	FARED	11543
800 CONTINUE	FARED	11544
RETURN	FARED	11545
2000 CONTINUE	FARED	11546
WRITE(NPR,2001)	FARED	11547
2001 FORMAT(20X31HINPUT ERROR***DETECTED BY REDEP)	FARED	11548
WRITE(NPR,2002)	FARED	11549
2002 FORMAT(34X41HIMPROPER DATA FOR DEPLETION SPECIFICATION/)	FARED	11550
GO TO 2080	FARED	11551
2003 CONTINUE	FARED	11552
WRITE(NPR,2001)	FARED	11553
WRITE(NPR,2133)	FARED	11554
2133 FORMAT(34X51HNO SEARCH ZONES ARE GIVEN FOR A CONTROLLED DEPLETION/)	FARED	11555
GO TO 2080	FARED	11556
2045 CONTINUE	FARED	11557
WRITE(NPR,2001)	FARED	11558
WRITE(NPR,2145)	FARED	11559
2145 FORMAT(34X50HK-EFFECTIVE IS NOT GIVEN FOR A CONTROLLED DEPLETION /)	FARED	11560
GO TO 2080	FARED	11561
2048 CONTINUE	FARED	11562
WRITE(NPR,2001)	FARED	11563
WRITE(NPR,2148)	FARED	11564
2148 FORMAT(34X62HA CONVERGENCE CRITERION IS NOT GIVEN FOR A CONTROLLED	FARED	11565
DEPLETION /)	FARED	11566
GO TO 2080	FARED	11567
2060 CONTINUE	FARED	11568
WRITE(NPR,2001)	FARED	11569
WRITE(NPR,2160) LTA,LTB	FARED	11570
2160 FORMAT(34X41HA MINIMUM CONCENTRATION IS NOT GIVEN FOR A4A2)	FARED	11571
GO TO 2080	FARED	11572

2061	WRITE(NPR,2001)	FARED	11573
	WRITE(NPR,2161)	FARED	11574
2161	FORMAT(34X31HNUCLIDE EXPECTED AFTER IMINIMUM /)	FARED	11575
	GO TO 2080	FARED	11576
2062	WRITE(NPR,2001)	FARED	11577
	WRITE(NPR,2162)	FARED	11578
2162	FORMAT(34X,40HIMPROPER DATA FOR IMINIMUM SPECIFICATION /)	FARED	11579
	GO TO 2080	FARED	11580
2063	CONTINUE	FARED	11581
	WRITE(NPR,2001)	FARED	11582
	WRITE(NPR,2163)	FARED	11583
2163	FORMAT(34X46HIMPROPER DATA FOR MAXIMUM BURNUP SPECIFICATION/)	FARED	11584
	GO TO 2080	FARED	11585
2064	CONTINUE	FARED	11586
	WRITE(NPR,2001)	FARED	11587
	WRITE(NPR,2164)	FARED	11588
2164	FORMAT(34X56HZONE MATERIAL DESIGNATION EXPECTED FOR BURNUP.PARAMET	FARED	11589
	1ERS /)	FARED	11590
	GO TO 2080	FARED	11591
2065	CONTINUE	FARED	11592
	WRITE(NPR,2001)	FARED	11593
	WRITE(NPR,2165)	FARED	11594
2165	FORMAT(34X38HK-MINIMUM VALUE EXPECTED FOR DEPLETION /)	FARED	11595
	GO TO 2080	FARED	11596
2066	CONTINUE	FARED	11597
	WRITE(NPR,2001)	FARED	11598
	WRITE(NPR,2166)	FARED	11599
2166	FORMAT(34X31HA MAXIMUM BURNUP VALUE EXPECTED/)	FARED	11600
2080	CONTINUE	FARED	11601
	STOP 3100	FARED	11602
	END	FARED	11603

C	SUBROUTINE DEPLPR	FARED	11634
C		FARED	11605
C	THIS SUBROUTINE PRINTS A DESCRIPTION OF THE DEPLETION SEQUENCE.	FARED	11606
C		FARED	11607
C		FARED	11608
		FARED	11609
	COMMON NTAPE(20)	FARED	11610
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RO,RIN,RUT,CIN,	FARED	11611
	IMICT,THE,IDDC,NIB,NOB,NCB,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	11612
	COMMON/SCH/ IZ(20),X(3),BK(3),RL(20,2),KBR,NZS,IA,IB,ITT,NCVS	FARED	11613
	COMMON/TEST/IDATA(2),FDATA(2),ITEST(4),IMID(20),FMIN(20),NZMT(20),	FARED	11614
	1 IZM(20,20),IBZ(20),NTEST,EMIN,BMAX(20),NBZ,NTNL	FARED	11615
	COMMON/PARS/ NSR,ICT,ICT1,ICT2,N100,NTRY,COUT	FARED	11616
	COMMON/MAC1/ LTAB(20,2)	FARED	11617
	COMMON/DEP/ IDZON(20),NIQ(20),KZON,MODE,KBPT,NEL,MAJT,MINT,MJTE	FARED	11618
	COMMON/DPEDIT/ NEDIT,ITED(10)	FARED	11619
	DIMENSION LFORM(42),IFORM(7,6)	FARED	11620
	EQUIVALENCE (LFORM(1),IFORM(1,1))	FARED	11621
	DATA LFORM/4HZONE,4H MAT,4HERIA,4HL ,4H ,4H ,4H ,	FARED	11622
1	4HMACR,4HOSGO,4HPIC ,4HCROS,4HS-SE,4HCTIO,4HNS ,	FARED	11623
2	4HFLUX,4H AND,4H POW,4HER O,4HISTR,4HIBUT,4HIONS,	FARED	11624
3	4HREAC,4HTION,4H RAT,4HES ,4H ,4H ,4H ,	FARED	11625
4	4HNEUT,4HROX ,4HBALA,4HNCE ,4H ,4H ,4H ,	FARED	11626
5	4HREAC,4HTOR ,4H ,4H ,4H ,4H ,4H ,	FARED	11627
	DIMENSION RF(20)	FARED	11628
	EQUIVALENCE (RF(1),RL(1,2))	FARED	11629
	REAL KBR	FARED	11630
	NPR=NTAPE(2)	FARED	11631
	TSTR=FDATA(2)*MAJT + TIME	FARED	11632
	WRITE(NPR,1)	FARED	11633
1	FORMAT(1H1,///53X,23H*****//53X,1H*,21X,1H*,/53X,	FARED	11634
	123H* D E P L E T I O N */53X,1H*,21X,1H*/53X,23H*****	FARED	11635
	2*****//)	FARED	11636
	WRITE(NPR,2) TIME,FDATA(2),FDATA(1),MAJT,MINT,TSTR	FARED	11637
2	FORMAT(42X,20HSTARTING TIME (DAYS),22X,1H=,F7.2/42X,43HLENGTH OF E	FARED	11638
	1ACH MAJOR TIME STEP (DAYS) =F7.2/42X,43HLENGTH OF EACH MINOR T	FARED	11639
	2IME STEP (DAYS) =F7.2/42X,26HNUMBER OF MAJOR TIME STEPS,16X,	FARED	11640
	31H=,I2,/42X,43HNUMBER OF MINOR TIME STEPS IN EACH MAJOR =,I2,/	FARED	11641
4	42X,31HDEPLETION ENDS WHEN TIME (DAYS),11X,1H=,F7.2//)	FARED	11642
	IF(NEDIT.EQ.0 .AND. NTEST.EQ.0) RETURN	FARED	11643
	WRITE(NPR,3)	FARED	11644
3	FORMAT(25X,42HAT THE END OF EACH MAJOR DEPLETION PERIOD:/)	FARED	11645
	IF(NTEST.EQ.0 .OR. NSR.EQ.0) GO TO 100	FARED	11646
	WRITE(NPR,4) KBR,COUT,(IZ(I),RF(I), I=1,NZS)	FARED	11647
4	FORMAT(32X,38H A COMPOSITION SEARCH WILL BE PERFORMED, /42X,	FARED	11648
	1 44HVALUE OF THE K-EFFECTIVE TO BE ACHIEVED IS ,E12.5,/ 42X,	FARED	11649
	244HCONVERGENCE CRITERION TO TERMINATE SEARCH IS,E12.5,/48X,	FARED	11650
	3 13HZONE MATERIAL,6X,13HFUEL/DILUENT RATIO/(54X,I2,14X,E12.5))	FARED	11651
	WRITE(NPR,7)	FARED	11652
100	IF(NEDIT.EQ.0) GO TO 200	FARED	11653

WRITE(NPR,5)	FARED	11654
5 FORMAT(32X,37H THE FOLLOWING EDITS WILL BE PERFORMED)	FARED	11655
DO 150 J=1,NEDIT	FARED	11656
I=ITED(J)	FARED	11657
150 WRITE(NPR,6) (IFORM(KK,I),KK=1,7)	FARED	11658
6 FORMAT(42X,7A4)	FARED	11659
WRITE(NPR,7)	FARED	11660
7 FORMAT(/)	FARED	11661
200 IF(NTEST.EQ.J) GO TO 300	FARED	11662
WRITE(NPR,8)	FARED	11663
8 FORMAT(32X,40H THE FOLLOWING CONDITIONS WILL BE CHECKED)	FARED	11664
DO 250 J=1,NTEST	FARED	11665
I=ITEST(J)	FARED	11666
GO TO (250,210,220,230),I	FARED	11667
210 WRITE(NPR,9)	FARED	11668
9 FORMAT(42X,8HIMINIMUM,3H---,21HISOTOPE CONCENTRATION/53X,7HNUCLIDE	FARED	11669
15X,13HZONE MATERIAL,5X,13HMINIMUM CONC./81X,17H(NUCLEI/BARM-CM.))	FARED	11670
DO 215 K=1,NTNL	FARED	11671
KK=NZMT(K)	FARED	11672
IF(KK.EQ.0) GO TO 212	FARED	11673
WRITE(NPR,10) LTAB(K,1),LTAB(K,2),IZM(K,1),FMIN(K)	FARED	11674
10 FORMAT(54X,A4,A2,10X,I2,11X,E12.5)	FARED	11675
IF(KK.LE.1) GO TO 215	FARED	11676
WRITE(NPR,11) (IZM(K,KI),FMIN(K),KI=2,KK)	FARED	11677
11 FORMAT(73X,I2,11X,E12.5)	FARED	11678
GO TO 215	FARED	11679
212 WRITE(NPR,16) LTAB(K,1),LTAB(K,2),FMIN(K)	FARED	11680
16 FORMAT(54X,A4,A2,6X,11HUNSPECIFIED,6X,E12.5)	FARED	11681
215 CONTINUE	FARED	11682
WRITE(NPR,7)	FARED	11683
GO TO 250	FARED	11684
220 WRITE(NPR,12)	FARED	11685
12 FORMAT(42X,8HBMAXIMUM,3H---,6HBURNUP/53X,13HZONE MATERIAL,10X,	FARED	11686
1 14HMAXIMUM BURNUP/ 77X,11H(MWD/TONNE))	FARED	11687
WRITE(NPR,13) (IBZ(KI),BMAX(KI),KI=1,NBZ)	FARED	11688
13 FORMAT(58X,I2,17X,E12.5)	FARED	11689
WRITE(NPR,7)	FARED	11690
GO TO 250	FARED	11691
230 WRITE(NPR,14) EMIN	FARED	11692
14 FORMAT(42X,8HKMINIMUM,3H---,36HMINIMUM VALUE OF THE K-EFFECTIVE OF	FARED	11693
1 E12.5/)	FARED	11694
1 E12.5 //)	FARED	11695
250 CONTINUE	FARED	11696
300 WRITE(NPR,15)	FARED	11697
15 FORMAT(1H1)	FARED	11698
RETURN	FARED	11699
END	FARED	11700

C	FUNCTION FNL(AK,Q,IX3)	FARED	11701
C		FARED	11702
C		FARED	11703
C	THIS FUNCTION COMPUTES THE DEPLETED CONCENTRATION OF A	FARED	11704
C	SPECIFIED NUCLIDE AFTER A MINOR TIME STEP.	FARED	11705
C		FARED	11706
C		FARED	11707
	COMMON NTAPE(20)	FARED	11708
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RO,RIN,RUT,CIN,MI	FARED	11709
	1CT,THE,IDDC,NIB,NOB,NCV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	11710
	COMMON NSPARES(42)	FARED	11711
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	11712
	10,BLANKS	FARED	11713
	COMMON NPOINT(20),ZONE(5000)	FARED	11714
	DIMENSION NZONE(2000)	FARED	11715
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	11716
	COMMON/TEST/IDATA(2),FDATA(2),ITEST(4),IMID(20),FMIN(20),NZMT(20),	FARED	11717
	1IZM(20,20),IBZ(20),NTEST	FARED	11718
	EQUIVALENCE (DT,FDATA(1))	FARED	11719
	DATA FAC1,FAC2/ 86400.,2.0E+24/	FARED	11720
	DN=ZONE(IX3+6)	FARED	11721
	F1=(FAC2-AK*FAC1*DT)*DN	FARED	11722
	F2=Q*FAC1*DT	FARED	11723
	F3=(FAC2+AK*FAC1*DT)	FARED	11724
	FNL=(F1+F2)/F3	FARED	11725
	RETURN	FARED	11726
	END	FARED	11727

C	FUNCTION COEF(IX3,IX4,LC)	FARED	11728
C		FARED	11729
C		FARED	11730
C	THIS FUNCTION COMPUTES THE AVERAGE DESTRUCTION RATE FOR	FARED	11731
C	A SPECIFIED NUCLIDE DURING A MINOR TIME STEP.	FARED	11732
C		FARED	11733
C		FARED	11734
	COMMON NTAPE(20)	FARED	11735
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RO,RIN,RUT,CIN,MI	FARED	11736
	1CT,THE,IODC,NIB,NOB,NCV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	11737
	COMMON NSPARES(42)	FARED	11738
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	11739
	10,BLANKS	FARED	11740
	COMMON NPOINT(20),ZONE(5000)	FARED	11741
	UIMENSION NZONE(2000)	FARED	11742
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	11743
	COMMON/FLX/SP(30,100),NUID(100),LXPT(20),KZN(20),NLN(20),NNO(39),	FARED	11744
	1NC,NID(40),ICHN(820),ICY(40),FP(400),APHI(20,30)	FARED	11745
	COMMON/MAC1/ SC(30,100),SA(30,100),IDZN(20,20)	FARED	11746
	COMMON/MAC2/SF(30,100)	FARED	11747
	COMMON/ACA/S2N(30,100)	FARED	11748
	COMMON/DEP/IDZON(20),NOD(20),KZON,MODE,KBPT,NEL,MAJT,MINT,MJTE	FARED	11749
	COMMON/TEST/IDATA(2),FDATA(2)	FARED	11750
	COMMON/IBR/IFB,BN(20),BD(20)	FARED	11751
	DATA FAC/1.E+24/	FARED	11752
	NG=MAG	FARED	11753
	DECAY=0.0	FARED	11754
	COEF=0.0	FARED	11755
	SUM=0.0	FARED	11756
	ID=NZONE(IX3)	FARED	11757
	IF(LC.EQ.NC) GO TO 10	FARED	11758
	LCA=LC+1	FARED	11759
	DO 9 ICK=LCA,NC	FARED	11760
	9 IF(ID.EQ.NID(ICK)) GO TO 151	FARED	11761
	10 CONTINUE	FARED	11762
	IDK=(ID/1000)-((ID/100000)*100)	FARED	11763
	IF(IDK.EQ.99) GO TO 150	FARED	11764
	IY=ICY(LC)	FARED	11765
	IF(IY.EQ.0) GO TO 21	FARED	11766
	DECAY=FP(IY+2)	FARED	11767
	21 CONTINUE	FARED	11768
	DO 30 K=1,NEL	FARED	11769
	IXK=K+KBPT-1	FARED	11770
	IF(NUID(IXK).EQ.ID) GO TO 31	FARED	11771
	30 CONTINUE	FARED	11772
	GO TO 200	FARED	11773
	31 CONTINUE	FARED	11774
	DO 100 J=1,NG	FARED	11775
	SUM=(SA(J,IXK)*APHI(IX4,J))+SUM	FARED	11776
	100 CONTINUE	FARED	11777

COEF=DECAY*FAC+SUM	FARED	11778
150 CONTINUE	FARED	11779
IFISP=LC*(LC+1)/2	FARED	11780
IFIS=ICHN(IFISP)	FARED	11781
IF(IFIS.GE.0) GO TO 151	FARED	11782
LX2=NPOINT(IX4)+8	FARED	11783
ZONE(LX2)=ZONE(LX2)+COEF*FDATA(1)*ZONE(IX3+6)	FARED	11784
IF(IFB.EQ.0) GO TO 151	FARED	11785
BD(IX4)=BD(IX4)+COEF*ZONE(IX3+6)	FARED	11786
151 RETURN	FARED	11787
200 NPR=NTAPE(2)	FARED	11788
CALL CONVL(ID,IDA,IDB)	FARED	11789
WRITE(NPR,201) IDA,IDB,IX4	FARED	11790
201 FORMAT(20X10H** NUCLEIDEA4A2,8H OF ZONE12,27HHAS NO CROSS-SECTION S	FARED	11791
1ET ** //)	FARED	11792
GO TO 150	FARED	11793
END	FARED	11794

C	FUNCTION FQ(IX2,IX3,IX4,DM,NDR)	FARED	11795
C		FARED	11796
C		FARED	11797
C	THIS FUNCTION COMPUTES THE AVERAGE PRODUCTION RATE OF A	FARED	11798
C	SPECIFIED NUCLIDE DURING A MINOR TIME STEP.	FARED	11799
C		FARED	11800
		FARED	11801
	COMMON NTAPE(20)	FARED	11802
	COMMON NGO,MIG,MAG,NOS,NPTS,NB,NZ,NBM,NZM,NN,POW,RD,RIN,RUT,CIN,MI	FARED	11803
	ICT,THE,IUDC,NIB,NOB,NCV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	11804
	COMMON NSPARES(42)	FARED	11805
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	11806
	10,BLANKS	FARED	11807
	COMMON NPOINT(20),ZONE(5000)	FARED	11808
	DIMENSION NZONE(2000)	FARED	11809
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	11810
	DIMENSION DM(22)	FARED	11811
	COMMON/FLX/SP(30,100),NUID(100),LXPT(20),KZN(20),NLN(20),NNO(39),	FARED	11812
	INC,NID(40),ICHN(820),ICY(40),FP(400),APHI(20,30)	FARED	11813
	COMMON/MAC1/ SC(30,100),SA(30,100),IDZN(20,20)	FARED	11814
	COMMON/MAC2/SF(30,100)	FARED	11815
	COMMON/ACA/S2N(30,100)	FARED	11816
	COMMON/DEP/IDZON(20),NL D(20),KZON,MODE,KBPT,NEL,MAJT,MINT,MJTE	FARED	11817
	COMMON/TEST/IDATA(2),FDATA(2)	FARED	11818
	COMMON/IBR/IFB,BN(20),BD(20)	FARED	11819
	DIMENSION IFP(400)	FARED	11820
	EQUIVALENCE (IFP,FP)	FARED	11821
	NPR=NTAPE(2)	FARED	11822
	Q=J.J	FARED	11823
	NST=NDR-1	FARED	11824
	IX5=(NST*(NST+1))/2	FARED	11825
	IFIS=ICHN(IX5+NDR)	FARED	11826
	IF(IFIS.EQ.0) ZONE(IX3+4)=J.0	FARED	11827
	IF(NDR.LT.2) GO TO 1001	FARED	11828
	NISO=NZONE(IX2+5)	FARED	11829
	DO 1000 JP=1,NST	FARED	11830
	IR=ICHN(IX5+JP)	FARED	11831
	IF(IR.LE.0) GO TO 1000	FARED	11832
	IF(IR.GT.4) GO TO 2010	FARED	11833
	IRRX=0	FARED	11834
	DO 10 I=1,NEL	FARED	11835
	IM=I+KBPT-1	FARED	11836
	IF(NUID(IM).EQ.NID(JP)) GO TO 11	FARED	11837
10	CONTINUE	FARED	11838
	IRRX=1	FARED	11839
11	CONTINUE	FARED	11840
	I1=1	FARED	11841
9	DO 12 I=I1,NISO	FARED	11842
	IY3=I	FARED	11843
	IY2=(I-1)*10+10+IX2	FARED	11844

IF(NZONE(IY2).EQ.NID(JP)) GO TO 13	FARED	11845
12 CONTINUE	FARED	11846
GO TO 1000	FARED	11847
13 CONTINUE	FARED	11848
IF(IRRX.NE.J) STOP 3104	FARED	11849
I1=IY3+1	FARED	11850
IF(NZONE(IX3+1).NE.NZONE(IY2+1)) GO TO 9	FARED	11851
DUM=DM(IY3)+ZONE(IY2+6)	FARED	11852
GO TO (100,200,300,400),IR	FARED	11853
C	FARED	11854
C THE NUCLIDE IS A FISSION PRODUCT.	FARED	11855
C	FARED	11856
100 CONTINUE	FARED	11857
SUM=J.	FARED	11858
DO 50 J=1,MAG	FARED	11859
SUM=SUM+APHI(IX4,J)*SF(J,IM)	FARED	11860
50 CONTINUE	FARED	11861
IFPX=ICY(JP)	FARED	11862
IF(IFPX.LE.0) GO TO 2000	FARED	11863
NFP=IFP(IFPX+1)	FARED	11864
IF(NFP.EQ.0) GO TO 2000	FARED	11865
NS=IFPX+4	FARED	11866
NT=(2*NFP)+IFPX+2	FARED	11867
DO 55 JF=NS,NT,2	FARED	11868
MFY=JF+1	FARED	11869
IF(IFP(JF).EQ.NID(NDR)) GO TO 56	FARED	11870
55 CONTINUE	FARED	11871
GO TO 2005	FARED	11872
56 GAM=FP(MFY)	FARED	11873
Q=GAM*DUM*SUM+Q	FARED	11874
GO TO 1000	FARED	11875
200 CONTINUE	FARED	11876
C	FARED	11877
C THE NUCLIDE IS PRODUCED BY NEUTRON CAPTURE.	FARED	11878
C	FARED	11879
SUM=J.	FARED	11880
DO 210 J=1,MAG	FARED	11881
SUM=SUM+APHI(IX4,J)*SC(J,IM)	FARED	11882
210 CONTINUE	FARED	11883
Q=Q+SUM*DUM	FARED	11884
GO TO 1000	FARED	11885
C	FARED	11886
C THE NUCLIDE IS PRODUCED BY RADIOACTIVE DECAY.	FARED	11887
C	FARED	11888
300 IL=ICY(JP)	FARED	11889
FLAM=FP(IL+2)	FARED	11890
Q=Q+2.*FLAM*ZONE(IY2+6)	FARED	11891
GO TO 1000	FARED	11892
C	FARED	11893
C THE NUCLIDE IS PRODUCED BY AN (N,2N) REACTION.	FARED	11894

C		FARED	11895
400	CONTINUE	FARED	11896
	SUM=0.	FARED	11897
	DO 420 J=1,MAG	FARED	11898
	SUM=SUM+APHI(IX4,J)*S2N(J,IM)	FARED	11899
420	CONTINUE	FARED	11900
	ISR=JP+1	FARED	11901
	DUM2=DUM	FARED	11902
	DO 430 J=ISR,NC	FARED	11903
	IF(NID(J).NE.NID(JP)) GO TO 430	FARED	11904
	DUM2=2.*ZONE(IY2+6)	FARED	11905
	GO TO 431	FARED	11906
430	CONTINUE	FARED	11907
431	CONTINUE	FARED	11908
	Q=Q+SUM*DUM2	FARED	11909
1000	CONTINUE	FARED	11910
1001	CONTINUE	FARED	11911
	FQ=Q	FARED	11912
	IF(IFIS.GE.0) GO TO 1050	FARED	11913
	ZONE(IX2+7)=ZONE(IX2+7)+Q*FOATA(1)/2.	FARED	11914
	IF(IFB.EQ.0) GO TO 1050	FARED	11915
	BN(IX4)=BN(IX4)+Q/2.	FARED	11916
1050	RETURN	FARED	11917
2000	CALL CONVL(NID(NDR),NAMA,NAMB)	FARED	11918
	WRITE(NPR,2001) NAMA,NAMB	FARED	11919
2001	FORMAT(20X48HFILES TWO AND SEVEN DO NOT AGREE ON THE FP A4A2 //)	FARED	11920
	STOP 31003	FARED	11921
2010	WRITE(NPR,2011) IR	FARED	11922
2011	FORMAT(20X, 3H**X,I3,31H IS AN ILLEGAL CHAIN INDEX *** //)	FARED	11923
	STOP	FARED	11924
2005	CALL CONVL(NID(NDR),NAMA,NAMB)	FARED	11925
	WRITE(NPR,2006) NAMA,NAMB	FARED	11926
2006	FORMAT(20XA4A2,30H COULD NOT BE FOUND IN FP LIST /)	FARED	11927
	STOP 31003	FARED	11928
	END	FARED	11929

C	SUBROUTINE STORM(DM,IX2)	FARED	11930
C		FARED	11931
C		FARED	11932
C	THIS SUBROUTINE STORES THE NEW NUCLIDE CONCENTRATIONS	FARED	11933
C	IN COMMON AFTER A MINOR TIME STEP.	FARED	11934
C		FARED	11935
		FARED	11936
	COMMON NTAPE(20)	FARED	11937
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZH,NN,POW,RO,RIN,RUT,CIN,MI	FARED	11938
	1GT,THE,IUDD,NIB,NOB,NCV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	11939
	COMMON NSPARES(42)	FARED	11940
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	11941
	10,BLANKS	FARED	11942
	COMMON NPOINT(20),ZONE(5000)	FARED	11943
	DIMENSION NZONE(2000)	FARED	11944
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	11945
	DIMENSION DM(20)	FARED	11946
	K1=10	FARED	11947
	K2=10	FARED	11948
	NI=NZONE(IX2+5)	FARED	11949
	DO 100 I=1,NI	FARED	11950
	IF(DM(I).LT.0.0) GO TO 100	FARED	11951
	IX=(I-1)*K2+K1+IX2	FARED	11952
	ZONE(IX+6)=DM(I)	FARED	11953
100	CONTINUE	FARED	11954
	RETURN	FARED	11955
	END	FARED	11956

C	SUBROUTINE PREP	FARED	11957
C		FARED	11958
C	THIS SUBROUTINE INITIALIZES VARIOUS POINTERS AND ARRAYS	FARED	11959
C	FOR A DEPLETION SEQUENCE.	FARED	11960
C		FARED	11961
C		FARED	11962
C		FARED	11963
	COMMON NTAPE(20)	FARED	11964
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RO,RIN,RUT,CIN,MI	FARED	11965
	1CT,THE,IODC,NI8,NO8,NCV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	11966
	COMMON NSPARES(42)	FARED	11967
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	11968
	10,BLANKS	FARED	11969
	COMMON NPOINT(20),ZONE(5000)	FARED	11970
	DIMENSION NZONE(2000)	FARED	11971
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	11972
	COMMON/FLX/NFP(100),DCY(100),LFP(20),FPY(20),LCHAIN(100),NOC(100)	FARED	11973
	1,LID(100),FMAS(100),FMPC(100),FMPF(100),FILL(2359),NC,NID(40),ICHN	FARED	11974
	2(820),ICY(40),FP(400),APHI(20,30)	FARED	11975
	COMMON/MAC1/LXPT(20),NUID(100),SC(30,100),SP(30,100)	FARED	11976
	DIMENSION IFP(40)	FARED	11977
	DIMENSION IYC(40)	FARED	11978
	EQUIVALENCE (FP,IFP),(IYC(1),ICHN(1))	FARED	11979
	EQUIVALENCE (FILL(1),NDN(1))	FARED	11980
	DIMENSION NDN(100)	FARED	11981
	COMMON/DEP/IDZON(20),NLID(20),KZON,MODE,KBPT,NEL,MAJT,MINT,MJTE	FARED	11982
	DATA ZERO,CON1/1.E-100,.6025 /	FARED	11983
	NPR=NTAPE(2)	FARED	11984
C		FARED	11985
C	READ THE FISSION PRODUCT DATA FROM RETAP FILE 7.	FARED	11986
C		FARED	11987
	MXFP=400	FARED	11988
	NTM=J	FARED	11989
	ITAP=NTAPE(4)	FARED	11990
	REWIND ITAP	FARED	11991
	100 READ(ITAP) FI,JF,NNU,NGP	FARED	11992
	IF(EOF,ITAP) 104,101	FARED	11993
	101 CALL SCAN(6HFILE**,FI,IFIL)	FARED	11994
	GO TO (102,104),IFIL	FARED	11995
	102 IF(JF-7) 103,200,105	FARED	11996
	103 CALL REOF(ITAP)	FARED	11997
	GO TO 100	FARED	11998
	104 IF(NIM.NE.0) GO TO 900	FARED	11999
	NTM=1	FARED	12000
	REWIND ITAP	FARED	12001
	GO TO 100	FARED	12002
	105 IF(NTM.NE.0) GO TO 910	FARED	12003
	NTM=1	FARED	12004
	REWIND ITAP	FARED	12005
	GO TO 100	FARED	12006

200	CONTINUE	FARED	12007
	IX=J	FARED	12008
	READ(ITAP) (LID(I),LAD,LBD,NFL,NFP(I),NON(I),DCY(I),FMAS(I),FMPC(I	FARED	12009
	1),FMPF(I),I=1,NNU)	FARED	12010
	IX2=J	FARED	12011
	DO 300 IC=1,NNU	FARED	12012
	IF (IX2.GE.400) GO TO 920	FARED	12013
	IX2=IX2+1	FARED	12014
	IYC(IC)=IX2	FARED	12015
	IFP (IX2)=LID(IC)	FARED	12016
	IFP (IX2+1)=NFP(IC)	FARED	12017
	FP (IX2+2)=DCY(IC)	FARED	12018
	FP (IX2+3)=FMAS(IC)	FARED	12019
	IX2=IX2+3	FARED	12020
	IF (NFP(IC).EQ.0) GO TO 290	FARED	12021
	NP=NFP(IC)	FARED	12022
	READ(ITAP) LAD, (LFP(I),FPY(I),I=1,NP)	FARED	12023
	DO 320 IK=1,NP	FARED	12024
	IX2=IX2+1	FARED	12025
	IFP (IX2)=LFP(IK)	FARED	12026
	IX2=IX2+1	FARED	12027
320	FP (IX2)=FPY(IK)	FARED	12028
290	IF (NON(IC).NE.0) READ(ITAP) LAD	FARED	12029
300	CONTINUE	FARED	12030
C		FARED	12031
C	READ THE DECAY CHAIN DATA FROM RETAP FILE 2.	FARED	12032
C		FARED	12033
	NTM2=J	FARED	12034
	REWIND ITAP	FARED	12035
400	READ(ITAP) FJ,JF,NSC,MUM	FARED	12036
	IF (EOF,ITAP) 403,401	FARED	12037
401	IF (JF-2) 402,450,403	FARED	12038
402	CALL REOF(ITAP)	FARED	12039
	GO TO 400	FARED	12040
403	NTM2=NTM2+1	FARED	12041
	IF (NTM2.GT.2) GO TO 499	FARED	12042
	REWIND ITAP	FARED	12043
	GO TO 400	FARED	12044
450	CONTINUE	FARED	12045
	READ(ITAP) (LCHAIN(I),NOC(I),DUM,I=1,NSC)	FARED	12046
	DO 410 J=1,NSC	FARED	12047
	MTX=(NOC(J)*(NOC(J)+1))/2	FARED	12048
	NC=NOC(J)	FARED	12049
	READ(ITAP) LCHAIN(J),(NID(I),I=1,NC)	FARED	12050
	IF (LCHAIN(J).EQ.IDDC) GO TO 412	FARED	12051
	READ(ITAP)	FARED	12052
410	CONTINUE	FARED	12053
	GO TO 496	FARED	12054
412	CONTINUE	FARED	12055
	DO 415 I=1,NC	FARED	12056

DO 414 J=1, NNU	FARED 12057
IF (NID(I).EQ.LID(J)) GO TO 413	FARED 12058
414 CONTINUE	FARED 12059
ICY(I)=J	FARED 12060
GO TO 415	FARED 12061
413 ICY(I)=IYC(J)	FARED 12062
415 CONTINUE	FARED 12063
READ(ITAP) (ICHN(I), I=1, MTX)	FARED 12064
C	FARED 12065
C READ AVERAGE FLUX ARRAY FROM NTAP(10).	FARED 12066
C	FARED 12067
ISOR=NTAPE(10)	FARED 12068
REWIND ISOR	FARED 12069
READ(ISOR) SRID, NPTSK, MAGK, NZK	FARED 12070
READ(ISOR)	FARED 12071
READ(ISOR)	FARED 12072
READ(ISOR) ((APHI(I, J), J=1, MAG), I=1, NZ)	FARED 12073
RETURN	FARED 12074
C	FARED 12075
C ERROR MESSAGES FOR DEPLETION CALCULATION.	FARED 12076
C	FARED 12077
496 CONTINUE	FARED 12078
WRITE(NPR, 497) IDDC	FARED 12079
497 FORMAT(20X, 6HCHAIN , I3, 19H COULD NOT BE FOUND , //)	FARED 12080
GO TO 1000	FARED 12081
499 CONTINUE	FARED 12082
WRITE(NPR, 498)	FARED 12083
498 FORMAT(20X, 27HFILE TWO COULD NOT BE FOUND //)	FARED 12084
GO TO 1000	FARED 12085
900 CONTINUE	FARED 12086
WRITE(NPR, 901)	FARED 12087
901 FORMAT(20X, 37HIMPROPER TAPE STRUCTURE FOR TAPE FOUR //)	FARED 12088
GO TO 1000	FARED 12089
910 CONTINUE	FARED 12090
WRITE(NPR, 911)	FARED 12091
911 FORMAT(20X, 29HFILE SEVEN COULD NOT BE FOUND //)	FARED 12092
GO TO 1000	FARED 12093
920 CONTINUE	FARED 12094
WRITE(NPR, 921)	FARED 12095
921 FORMAT(20X, 69HTHE MAXIMUM STORAGE AVAILABLE FOR FISSION PRODUCTS HAS BEEN EXCEEDED)	FARED 12096
GO TO 1000	FARED 12097
1000 STOP 3106	FARED 12098
END	FARED 12099
	FARED 12100

C	SUBROUTINE NORMX(IB)	FARED	12101
C		FARED	12102
C	THIS SUBROUTINE RENORMALIZES THE AVERAGE FLUXES AFTER	FARED	12103
C	A MINOR TIME STEP.	FARED	12104
C		FARED	12105
C		FARED	12106
		FARED	12107
	COMMON NTAPE(20)	FARED	12108
	COMMON NTAPE, MIG, MAG, NDS, NPTS, NB, NZ, NBM, NZM, NN, POW, RO, RIN, RUT, CIN, MI	FARED	12109
	1CT, THE, IUDC, NIB, NOB, NCV, NBUCK, NWBM, NWZM, NWB, NSOU, NSO, TIME, PT	FARED	12110
	COMMON NSPARES(42)	FARED	12111
	COMMON IFLAG, IV, N, W(18), IBLANK, IZERO, IPLUS, IMINUS, IASTER, ICHAR, NWO	FARED	12112
	1D, BLANKS	FARED	12113
	COMMON NPOINT(20), ZONE(5000)	FARED	12114
	DIMENSION NZONE(2000)	FARED	12115
	EQUIVALENCE (NZONE, ZONE), (V, IV), (IW, W(1))	FARED	12116
	COMMON/FLX/SP(30,100), NUID(100), LXPT(20), KZN(20), NLN(20), NNO(39),	FARED	12117
	1NC, NND(40), ICHN(820), ICY(40), FP(400), APHI(20,30)	FARED	12118
	COMMON/DEP/IDZON(20), NIQ(20), KZON, MODE, KBPT, NEL, MAJT, MINT, MJTE	FARED	12119
	COMMON/TEST/IDATA(2), FDATA(2), ITEST(4), IMID(20), FMIN(20), NZMT(20),	FARED	12120
	1IZM(20,20), IBZ(20), NTEST, EMIN, BMAX(20), NBZ, NTNL	FARED	12121
	DATA CONST, IST/1.603E-19, 0/	FARED	12122
	1F(IB.EQ.1) PT=J.0	FARED	12123
C		FARED	12124
C	CALCULATE TOTAL FISSION SOURCH-NORMALIZED REACTOR POWER.	FARED	12125
C		FARED	12126
	DO 100 IZ=1, KZON	FARED	12127
	IX2=IDZON(IZ)	FARED	12128
	IX1=NPOINT(IX2)	FARED	12129
	VOL=ZONE(IX1+6)	FARED	12130
	SUM2=0.0	FARED	12131
	NISO=NZONE(IX1+5)	FARED	12132
	ISO1=0	FARED	12133
	LPT=0	FARED	12134
	DO 90 INL=1, NISO	FARED	12135
	IY=10+IX1+(INL-1)*10	FARED	12136
	ID=NZONE(IY)	FARED	12137
	IF(ID.EQ.ISO1) GO TO 83	FARED	12138
	DO 82 IN=1, NEL	FARED	12139
	LPT=KBPT+IN-1	FARED	12140
	IF(NUID(LPT).EQ.ID) GO TO 83	FARED	12141
	82 CONTINUE	FARED	12142
	81 NPR=NTAPE(2)	FARED	12143
	WRITE(NPR,300)	FARED	12144
	300 FORMAT(20X20HX-SEC ERROR IN NORMX//)	FARED	12145
	STOP 100/	FARED	12146
	83 CONTINUE	FARED	12147
	ISO1=ID	FARED	12148
	CON=ZONE(IY+6)	FARED	12149
	IF(LPT.LE.0) GO TO 81	FARED	12150

SUM1=0.0	FARED	12151
DO 80 IG=1,MAG	FARED	12152
SUM1=SUM1+(SP(IG,LPT)*APHI(IX2,IG))	FARED	12153
80 CONTINUE	FARED	12154
ZONE(IY+4)=SUM1*CON*FDATA(1)+ZONE(IY+4)	FARED	12155
SUM2=SUM2+(SUM1*CON)	FARED	12156
90 CONTINUE	FARED	12157
PT=PT+(VOL*SUM2)	FARED	12158
100 CONTINUE	FARED	12159
C	FARED	12160
C RENORMALIZE ZONE-AVERAGED FLUXES TO ACHIEVE THE DESIRED	FARED	12161
C TOTAL REACTOR POWER.	FARED	12162
C	FARED	12163
IF(IB.NE.NB) RETURN	FARED	12164
IF(PT.EQ.0.0) RETURN	FARED	12165
PT=CONST*PT	FARED	12166
FAC=POW/PT	FARED	12167
DO 200 I=1,NZ	FARED	12168
DO 200 J=1,MAG	FARED	12169
APHI(I,J)=FAC*APHI(I,J)	FARED	12170
200 CONTINUE	FARED	12171
RETURN	FARED	12172
END	FARED	12173

C	SUBROUTINE XSECT(IB,ITIM)	FARED	12174
C		FARED	12175
C		FARED	12176
C	THIS SUBROUTINE READS THE MICROSCOPIC CROSS SECTIONS	FARED	12177
C	FOR THE DEPLETION CALCULATION. THE CROSS SECTIONS FOR	FARED	12178
C	EACH NUCLIDE ARE NORMALLY STORED IN CORE. HOWEVER, IF	FARED	12179
C	THE TOTAL NUMBER OF NUCLIDES EXCEEDS 100, THE CROSS	FARED	12180
C	SECTIONS WILL BE READ DIRECTLY FROM NTAPE(19) FOR	FARED	12181
C	EACH MINOR TIME STEP.	FARED	12182
C		FARED	12183
C		FARED	12184
C	COMMON NTAPE(23)	FARED	12185
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RD,RIN,RUT,CIN,MI	FARED	12186
	1CT,THE,IODC,NID,NOB,NCV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	12187
	COMMON NSPARES(42)	FARED	12188
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	12189
	1D,BLANKS	FARED	12190
	COMMON NPOINT(20),ZONE(5000)	FARED	12191
	DIMENSION NZONE(2000)	FARED	12192
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IH,W(1))	FARED	12193
	COMMON/DEP/IDZON(20),NID(20),KZON,MODE,KBPT,NEL,MAJT,MINT,MJTE	FARED	12194
	COMMON/MAC1/ SC(30,100),SA(30,100),IDZN(20,20)	FARED	12195
	COMMON/ACA/S2N(30,100)	FARED	12196
	COMMON/MAC2/SF(30,100)	FARED	12197
	COMMON/FLX/SP(30,100),NUID(100),LXPT(20),KZN(20),NLN(20),NNQ(39),	FARED	12198
	1NC,NND(40),ICHN(820),ICY(40),FP(400),APHI(20,30)	FARED	12199
C		FARED	12200
C	READ CROSS SECTIONS FOR BLOCK IB FROM NTAPE(19) DIRECTLY.	FARED	12201
C		FARED	12202
C		FARED	12203
C	MAXIMUM NUMBER OF CROSS-SECTION SETS - IF EXCEEDED,SET TAPE MODE	FARED	12204
	MSET=100	FARED	12205
C		FARED	12206
	NT19=NTAPE(19)	FARED	12207
	IF(MODE.EQ.1) GO TO 500	FARED	12208
	IF(IB.GT.1) GO TO 10	FARED	12209
	REWIND NT19	FARED	12210
	READ (NT19)	FARED	12211
10	CONTINUE	FARED	12212
	READ(NT19)	FARED	12213
	READ(NT19) IDB,NEL,KZON,(IDZON(I),I=1,KZON)	FARED	12214
15	DO 20 JL=1,NEL	FARED	12215
	READ(NT19) NID(JL),(SC(I,JL),I=1,MAG),(SF(J,JL),J=1,MAG),(SA(K,JL)	FARED	12216
	1,K=1,MAG),(S2N(L,JL),L=1,MAG),(SP(M,JL),M=1,MAG)	FARED	12217
20	CONTINUE	FARED	12218
	RETURN	FARED	12219
C		FARED	12220
C	READ CROSS SECTIONS FOR BLOCK IB AND SET UP STORAGE	FARED	12221
C	LOCATIONS.	FARED	12222
C		FARED	12223

500	CONTINUE	FARED	12224
	IF(IITIM.NE.1) GO TO 700	FARED	12225
	IF(IB.GT.1) GO TO 502	FARED	12226
	REWIND NT19	FARED	12227
	READ(NT19)	FARED	12228
	KBPT=1	FARED	12229
	NEL=0	FARED	12230
502	CONTINUE	FARED	12231
	READ(NT19) IDB,NL,KZ,(IDZN(IB,I),I=1,KZ)	FARED	12232
	KBPT=KBPT+NEL	FARED	12233
	LST=KBPT+NL-1	FARED	12234
	IF(LST.LE.MSET) GO TO 510	FARED	12235
	NPR=NTAPE(2)	FARED	12236
	WRITE(NPR,501)	FARED	12237
501	FORMAT(20X50HTAPE MODE IS USED FOR DEPLETION CROSS SECTION SETS//)	FARED	12238
	MODE=2	FARED	12239
	KBPT=1	FARED	12240
	NEL=NL	FARED	12241
	KZON=KZ	FARED	12242
	DO 504 I=1,KZ	FARED	12243
504	IDZON(I)=IDZN(IB,I)	FARED	12244
	GO TO 15	FARED	12245
510	CONTINUE	FARED	12246
	KZN(IB)=KZ	FARED	12247
	NLN(IB)=NL	FARED	12248
	DO 520 JL=KBPT,LST	FARED	12249
	READ(NT19) NUID(JL),(SC(I,JL),I=1,MAG),(SF(J,JL),J=1,MAG),(SA(K,JL	FARED	12250
	1),K=1,MAG),(S2N(L,JL),L=1,MAG),(SP(M,JL),M=1,MAG)	FARED	12251
520	CONTINUE	FARED	12252
	GO TO 702	FARED	12253
700	CONTINUE	FARED	12254
	IF(IB.EQ.1) GO TO 701	FARED	12255
	KBPT=KBPT+NEL	FARED	12256
	GO TO 702	FARED	12257
701	KBPT=1	FARED	12258
702	CONTINUE	FARED	12259
	LST=KBPT+NLN(IB)-1	FARED	12260
	KZON=KZN(IB)	FARED	12261
	NEL=NLN(IB)	FARED	12262
	DO 710 I=1,KZON	FARED	12263
710	IDZON(I)=IDZN(IB,I)	FARED	12264
	LZ=0	FARED	12265
	DO 715 J=KBPT,LST	FARED	12266
	LZ=LZ+1	FARED	12267
	NID(LZ)=NUID(J)	FARED	12268
715	CONTINUE	FARED	12269
	RETURN	FARED	12270
	END	FARED	12271

	OVERLAY(RIM,3,11)	FARED	12272
	PROGRAM TEST	FARED	12273
C		FARED	12274
C		FARED	12275
C	THIS SUBROUTINE CONTROLS THE TESTS WHICH ARE PERFORMED	FARED	12276
C	AFTER EACH MAJOR DEPLETION PERIOD.	FARED	12277
C		FARED	12278
		FARED	12279
	COMMON NTAPE(20)	FARED	12280
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RO,RIN,RUT,CIN,MI	FARED	12281
	ICT,THE,IODC,NIB,NOB,NCV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	12282
	COMMON NSPARES(42)	FARED	12283
	COMMON IFLAG,IV,N,W(18),IBLANK,IZER0,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	12284
	1D,BLANKS	FARED	12285
	COMMON NPOINT(20),ZONE(5000)	FARED	12286
	DIMENSION NZONE(2000)	FARED	12287
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	12288
	COMMON/PARS/NSR,ICT,IGO,ICT2,N100,IFLX,COUT,MICT2,EIGEN,EIGEN1,P,	FARED	12289
	1PIN,IST	FARED	12290
	COMMON/TEST/IDATA(2),FDATA(2),ITEST(4),IMID(20),FMIN(20),NZMT(20),	FARED	12291
	1IZM(20,20),IBZ(20),NTEST,EMIN,BMAX(20),NBZ,NTNL	FARED	12292
	NPR=NTAPE(2)	FARED	12293
	IF(NTEST.LT.0.OR.NTEST.GT.4) GO TO 1001	FARED	12294
	NTST=NTEST	FARED	12295
	DO 1000 IT=1,NTST	FARED	12296
	ITST=ITEST(IT)	FARED	12297
	IF(ITST.LT.0.OR.ITST.GT.4) GO TO 2000	FARED	12298
	IF(ITST.EQ.1) NSR=4	FARED	12299
	GO TO (1000,100,200,300),ITST	FARED	12300
100	CONTINUE	FARED	12301
	CALL IMIN(IT)	FARED	12302
	GO TO 1000	FARED	12303
200	CONTINUE	FARED	12304
	CALL TBMAX(IT)	FARED	12305
	GO TO 1000	FARED	12306
300	CONTINUE	FARED	12307
	CALL KMIN(IT)	FARED	12308
1000	CONTINUE	FARED	12309
	IF(NTEST.GT.0) RETURN	FARED	12310
	WRITE(NPR,400)	FARED	12311
400	FORMAT(1H0,/////,48X,41H ALL DEPLETION DIRECTIVES WITHIN THIS	FARED	12312
1	/,48X,41HRAIM SEQUENCE WILL BE IGNORED UNTIL A /	FARED	12313
2	48X,20HSEARCH IS PERFORMED. 5(/))	FARED	12314
	IF(NEDIT.EQ.0) WRITE(M6,10)	FARED	12315
10	FORMAT(64X9H* * * * *)	FARED	12316
1001	RETURN	FARED	12317
2000	CONTINUE	FARED	12318
	WRITE(NPR,2001)	FARED	12319
2001	FORMAT(20X,28H*** IMPROPER TEST NUMBER ***)	FARED	12320
	GO TO 1000	FARED	12321

C	SUBROUTINE TFALL	FARED	12323
C	THIS SUBROUTINE PRINT A TEST FAILURE MESSAGE	FARED	12324
C		FARED	12325
	COMMON NTAPE(20)	FARED	12326
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RO,RIN,RUT,CIN,MI	FARED	12327
	1CT,THE,IUDC,NIB,NOB,NCV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	12328
	NPR=NTAPE(2)	FARED	12329
	WRITE(NPR,3)	FARED	12330
3	FORMAT(1H1/66X5H* * *//52X34H* * * DEPLETION TEST FAILURE * * */)	FARED	12331
	WRITE(NPR,4) TIME	FARED	12332
4	FORMAT(60X,13HTIME (DAYS) :F7.2 //)	FARED	12333
	RETURN	FARED	12334
	END	FARED	12335
		FARED	12336

C	SUBROUTINE KMIN(IT)	FARED	12337
C		FARED	12338
C		FARED	12339
C	THIS SUBROUTINE PERFORMS THE MINIMUM K-EFFECTIVE TEST.	FARED	12340
C		FARED	12341
		FARED	12342
	COMMON NTAPE(20)	FARED	12343
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RO,RIN,RUT,CIN,MI	FARED	12344
	ICT,THE,IDDC,NIB,NOB,NCV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	12345
	COMMON NSPARES(42)	FARED	12346
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	12347
	10,BLANKS	FARED	12348
	COMMON NPOINT(20),ZONE(5000)	FARED	12349
	DIMENSION NZONE(2000)	FARED	12350
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	12351
	COMMON/PARS/NSR,ICT,IGO,ICT2,N103,IFLX,COUT,MICT2,EIGEN,EIGEN1,P,	FARED	12352
	1PIH,IST	FARED	12353
	COMMON/TEST/IDATA(2),FOATA(2),ITEST(4),IMID(20),FMIN(20),NZMT(20),	FARED	12354
	1IZH(20,20),IBZ(20),NTEST,EMIN,BMAX(20),NBZ,NTNL	FARED	12355
	IF(EIGEN.GT.EMIN) RETURN	FARED	12356
	IF(NTEST.GT.0) CALL TFAIL	FARED	12357
	NTEST=-IABS(NTEST)	FARED	12358
	NPR=NTAPE(2)	FARED	12359
	3 FORMAT(27X,63H*** THE SYSTEM EIGENVALUE HAS FAILED THE MINIMUM TES	FARED	12360
	11 VALUE OF ,E13.6, 6H * * * /)	FARED	12361
	WRITE(NPR,3) EMIN	FARED	12362
	RETURN	FARED	12363
	END	FARED	12364

C	SUBROUTINE IMIN(IT)	FARED	12365
C		FARED	12366
C	THIS SUBROUTINE PERFORMS THE MINIMUM ISOTOPE CONCENTRATION	FARED	12367
C	TESTS.	FARED	12368
C		FARED	12369
C		FARED	12370
	COMMON NTAPE(20)	FARED	12371
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RO,RIN,RUT,CIN,MI	FARED	12372
	1CT,THE,IUOC,NIB,NOB,NCV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	12373
	COMMON NSPARES(42)	FARED	12374
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	12375
	10,BLANKS	FARED	12376
	COMMON NPOINT(20),ZONE(5000)	FARED	12377
	DIMENSION NZONE(2000)	FARED	12378
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	12379
	COMMON/TEST/IDATA(2),FDATA(2),ITEST(4),IMID(20),FMIN(20),NZMT(20),	FARED	12380
	1IZM(20,20),IBZ(20),NTEST,EMIN,BMAX(20),NBZ,NTNL	FARED	12381
	NPR=NTAPE(2)	FARED	12382
	DO 100 IZ=1,NZ	FARED	12383
	IX=NPOINT(IZ)	FARED	12384
	NISO=NZONE(IX+5)	FARED	12385
	DO 100 NI=1,NISO	FARED	12386
	IY=IX+10+(NI-1)*10	FARED	12387
	DO 20 ITL=1,NTNL	FARED	12388
	IF(IMID(ITL).NE.NZONE(IY)) GO TO 20	FARED	12389
	LT=NZMT(ITL)	FARED	12390
	IF(LT.LE.0) GO TO 20	FARED	12391
	INID=NZONE(IY+1)	FARED	12392
	DO 18 J=1,LT	FARED	12393
	IF(IZM(ITL,J).NE.INID) GO TO 18	FARED	12394
	CON=ZONE(IY+6)	FARED	12395
	IF(CON.GE.FMIN(ITL)) GO TO 18	FARED	12396
	IF(NTEST.GT.0) CALL TFAIL	FARED	12397
	NTEST=-IABS(NTEST)	FARED	12398
	CALL CONVL(IMID(ITL),NAMA,NAMB)	FARED	12399
	WRITE(NPR,3) NAMA,NAMB,INID,NZONE(IX),FMIN(ITL)	FARED	12400
18	CONTINUE	FARED	12401
20	CONTINUE	FARED	12402
100	CONTINUE	FARED	12403
	3 FORMAT(14X12H*** NUCLEIDE A4A2,17H OF ZONE MATERIAL I3, 9H IN ZONE	FARED	12404
	1 ,I3,46H HAS FAILED ITS MINIMUM CONCENTRATION TEST OF ,E12.5,4H **	FARED	12405
	2* /)	FARED	12406
	RETURN	FARED	12407
	END	FARED	12408
		FARED	12409

C	SUBROUTINE TBMAX(IT)	FARED	12410
C		FARED	12411
C		FARED	12412
C	THIS SUBROUTINE PERFORMS THE MAXIMUM ZONE MATERIAL	FARED	12413
C	BURNUP TESTS.	FARED	12414
C		FARED	12415
C		FARED	12416
	COMMON NTAPE(20)	FARED	12417
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RO,RIN,RUT,CIN,MI	FARED	12418
	1CT,THE,IODC,NIB,NOB,NCV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	12419
	COMMON NSPARES(42)	FARED	12420
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICAR,NWO	FARED	12421
	10,BLANKS	FARED	12422
	COMMON NPOINT(20),ZONE(5000)	FARED	12423
	DIMENSION NZONE(2000)	FARED	12424
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	12425
	COMMON TEST/IDATA(2),FDATA(2),ITEST(4),IMID(20),FMIN(20),NZMT(20),	FARED	12426
	1IZM(20,20),IBZ(20),NTEST,EMIN,BMAX(20),NBZ,NTNL	FARED	12427
	NPR=NTAPE(2)	FARED	12428
	DATA CN/9.658075E-14/	FARED	12429
	DO 100 IBZM=1,NBZ	FARED	12430
	IDZM=IBZ(IBZM)	FARED	12431
	SUM=0.0	FARED	12432
	SUM1=0.0	FARED	12433
	SUM2=0.0	FARED	12434
	DO 20 IZ=1,NZ	FARED	12435
	IX=NPOINT(IZ)	FARED	12436
	NISO=NZONE(IX+5)	FARED	12437
	DO 10 ISO=1,NISO	FARED	12438
	IY=11+IX+(ISO-1)*10	FARED	12439
	ICK=NZONE(IY)	FARED	12440
	IF(ICK.NE.IDZM) GO TO 10	FARED	12441
	SUM1=SUM1+ZONE(IY+3)	FARED	12442
	SUM2=SUM2+ZONE(IY+4)	FARED	12443
10	CONTINUE	FARED	12444
20	CONTINUE	FARED	12445
	SUM=(SUM1*CN)/SUM2	FARED	12446
	IF(SUM.LE.BMAX(IBZM)) GO TO 100	FARED	12447
	IF(NTEST.GT.0) CALL TFAIL	FARED	12448
	WRITE(NPR,3) IDZM,BMAX(IBZM)	FARED	12449
	NTEST=-1ABS(NTEST)	FARED	12450
100	CONTINUE	FARED	12451
	RETURN	FARED	12452
	3 FORMAT(37X,18H*** ZONE MATERIAL ,I3,27H HAS EXCEEDED ITS BURNUP OF	FARED	12453
	1 ,E12.5,4H *** /)	FARED	12454
	1 ,E12.5,4H *** /)	FARED	12455
	END	FARED	12456

	OVERLAY(RIM,3,12)	FARED	12457
	PROGRAM DEPED	FARED	12458
C		FARED	12459
C		FARED	12460
C	THIS PROGRAM CONTROLS THE EDIT CALCULATIONS PERFORMED	FARED	12461
C	DURING DEPLETION.	FARED	12462
C		FARED	12463
C		FARED	12464
	COMMON NTAPE(20)	FARED	12465
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RO,RIN,RUT,CIN,MI	FARED	12466
	1CT,THE,IDOC,NIB,NOB,NCV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	12467
	COMMON NSPARES(42)	FARED	12468
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	12469
	1D,BLANKS	FARED	12470
	COMMON NPOINT(20),ZONE(5000)	FARED	12471
	DIMENSION NZONE(2000)	FARED	12472
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	12473
	COMMON/PARS/NSR,ICT,IGO,ICT2,N10J,IFLX,COUT,MICT2,EIGEN,EIGEN1,P,	FARED	12474
	1PIN,IST	FARED	12475
	COMMON/DPEDIT/NEDIT,ITED(10)	FARED	12476
	IF(NEDIT,LE.0) RETURN	FARED	12477
	DO 100 IT=1,NEDIT	FARED	12478
	ITY=ITED(IT)	FARED	12479
	GO TO(10,20,30,40,50,60,100),ITY	FARED	12480
10	CONTINUE	FARED	12481
	CALL ZOMED	FARED	12482
	GO TO 100	FARED	12483
20	CONTINUE	FARED	12484
	CALL MCPR	FARED	12485
	GO TO 100	FARED	12486
30	CONTINUE	FARED	12487
	CALL FXPR	FARED	12488
	GO TO 100	FARED	12489
40	CONTINUE	FARED	12490
	CALL RATES	FARED	12491
	GO TO 100	FARED	12492
50	CONTINUE	FARED	12493
	CALL BAL	FARED	12494
	GO TO 100	FARED	12495
60	CONTINUE	FARED	12496
	CALL REACT	FARED	12497
100	CONTINUE	FARED	12498
	NPR=NTAPE(2)	FARED	12499
	WRITE(NPR,2)	FARED	12500
2	FORMAT(5(1))	FARED	12501
	IF(IGO.EQ.1) WRITE(NPR,3)	FARED	12502
3	FORMAT(1H1)	FARED	12503
	RETURN	FARED	12504
	END	FARED	12505

C	SUBROUTINE ZOMED	FARED	12506
C		FARED	12507
C	THIS SUBROUTINE PERFORMS THE ZONE MATERIAL EDIT.	FARED	12508
C		FARED	12509
C		FARED	12510
	COMMON NTAPE(20)	FARED	12511
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RD,RIN,RUT,CIN,MI	FARED	12512
	1CT,THE,IDDC,NIB,NDB,NCV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	12513
	COMMON NSPARES(42)	FARED	12514
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	12515
	10,BLANKS	FARED	12516
	COMMON NPOINT(20),ZONE(5000)	FARED	12517
	DIMENSION NZONE(2000)	FARED	12518
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	12519
	COMMON/ACA/ APhi(20,30)	FARED	12520
	COMMON/FLX/IDZN(20),SP(30,30),BURN(3000),MID(300),INDC(300),KON(30	FARED	12521
	10),NID(30),LID(100),FMAS(100)	FARED	12522
	DIMENSION IBURN(2000)	FARED	12523
	EQUIVALENCE (IBURN,BURN)	FARED	12524
	DATA CN,CM,IFILE/1.603E-19,602.5,4HFILE/	FARED	12525
	DATA ZERO/10.E-100/	FARED	12526
	DATA IPLT/4HDPXS/	FARED	12527
	MXZM=3000	FARED	12528
	KP=0	FARED	12529
	NTM=0	FARED	12530
	NZMT=0	FARED	12531
	M6=NTAPE(2)	FARED	12532
	ISOR=NTAPE(10)	FARED	12533
	REWIND ISOR	FARED	12534
	READ(ISOR)	FARED	12535
	READ(ISOR)	FARED	12536
	READ(ISOR)	FARED	12537
	READ(ISOR)	FARED	12538
	READ(ISOR) ((APHI(I,J),J=1,MAG),I=1,NZ)	FARED	12539
	REWIND ISOR	FARED	12540
C		FARED	12541
C	READ DATA FROM RETAP FILE 7.	FARED	12542
C		FARED	12543
	NTM=0	FARED	12544
	ITAP=NTAPE(4)	FARED	12545
	REWIND ITAP	FARED	12546
50	READ(ITAP) FI,JF,ISO,NGP	FARED	12547
	IF(EOF,ITAP) 54,51	FARED	12548
51	CALL SCAN(6HFILE**,FI,IFIL)	FARED	12549
	GO TO(52,54),IFIL	FARED	12550
52	IF(JF-7) 53,60,55	FARED	12551
53	CALL REOF(ITAP)	FARED	12552
	GO TO 50	FARED	12553
54	IF(NTM.NE.0) GO TO 1055	FARED	12554
	NTM=1	FARED	12555

REWIND ITAP	FARED	12556
GO TO 5J	FARED	12557
55 IF (NTM.NE.0) GO TO 1060	FARED	12558
NTM=1	FARED	12559
REWIND ITAP	FARED	12560
GO TO 50	FARED	12561
60 CONTINUE	FARED	12562
READ(ITAP) ((LID(I),N1,N2,N3,N4,N5,N6,FMAS(I),N7,N8),I=1,ISO)	FARED	12563
NT19=NTAPE(19)	FARED	12564
REWIND NT19	FARED	12565
READ(NT19) IPKLT,NBK,MAGK,MT	FARED	12566
IF(IPKLT.EQ.IPLT) GO TO 2	FARED	12567
WRITE(NPR,1)	FARED	12568
1 FORMAT(20X,34H*** IMPROPER LABEL FOR TAPE 19 *** //)	FARED	12569
RETURN	FARED	12570
2 CONTINUE	FARED	12571
DO 1J00 IB=1,NB	FARED	12572
READ(NT19) IOB,NEL,KZO,(IDZN(I),I=1,KZO)	FARED	12573
DO 10 I=1,NEL	FARED	12574
READ(NT19) NID(I),((SP(I,J),J=1,MAG),K=1,5)	FARED	12575
10 CONTINUE	FARED	12576
C	FARED	12577
C CALCULATE ALL ZONE MATERIAL EDIT QUANTITIES FOR EACH ZONE.	FARED	12578
C	FARED	12579
DO 9J0 IZ=1,KZO	FARED	12580
IZN=IDZN(IZ)	FARED	12581
IX2=NPOINT(IZN)	FARED	12582
NUC=NZONE(IX2+5)	FARED	12583
LAST=0	FARED	12584
DO 890 NM=1,NUC	FARED	12585
NEXT=10J00000J0	FARED	12586
DO 100 IM=1,NUC	FARED	12587
IX3=10+IX2+(IM-1)*10	FARED	12588
IDM=NZONE(IX3+1)	FARED	12589
IF(IDM.GT.NEXT.OR.IDM.LE.LAST) GO TO 100	FARED	12590
NEXT=IDM	FARED	12591
100 CONTINUE	FARED	12592
IF(NEXT.GT.1000) GO TO 900	FARED	12593
NZMT=NZMT+1	FARED	12594
LAST=NEXT	FARED	12595
ISET=0	FARED	12596
DO 400 LM=1,NUC	FARED	12597
IX3=10+IX2+(LM-1)*10	FARED	12598
LMM=NZONE(IX3+1)	FARED	12599
IF(LMM.NE.NEXT) GO TO 400	FARED	12600
IF(ISET.EQ.1) GO TO 350	FARED	12601
ISET=1	FARED	12602
KP=KP+1	FARED	12603
IF(KP.GE.MXZM) GO TO 1061	FARED	12604
INDC(NZMT)=KP	FARED	12605

MID(NZMT)=1000*NEXT+NZONE(IX2)	FARED	12606
BURN(KP+1)=ZONE(IX3+8)*ZONE(IX3+9)*ZONE(IX2+6)*.001	FARED	12607
BURN(KP+2)=0.0	FARED	12608
BURN(KP+3)=0.0	FARED	12609
HM=0.0	FARED	12610
NNU=0	FARED	12611
350 NNU=NNU+1	FARED	12612
IY=KP+4+5*(NNU-1)	FARED	12613
CALL CONVL(NZONE(IX3),IDA,IDB)	FARED	12614
IBURN(IY)=IDA	FARED	12615
IBURN(IY+1)=IDB	FARED	12616
BURN(IY+2)=ZONE(IX3+6)	FARED	12617
DO 352 IM=1,NEL	FARED	12618
IF(NZONE(IX3).EQ.NID(IM)) GO TO 353	FARED	12619
352 CONTINUE	FARED	12620
GO TO 1050	FARED	12621
353 CONTINUE	FARED	12622
SUM1=0.0	FARED	12623
DO 355 J=1,MAG	FARED	12624
SUM1=SUM1+(SP(IM,J)*APHI(IZN,J))	FARED	12625
355 CONTINUE	FARED	12626
SUM1=SUM1*ZONE(IX2+6)*CN*ZONE(IX3+6)	FARED	12627
DO 360 IFM=1,ISO	FARED	12628
IF(NZONE(IX3).EQ.LID(IFM)) GO TO 361	FARED	12629
360 CONTINUE	FARED	12630
BURN(IY+3)=0.0	FARED	12631
GO TO 362	FARED	12632
361 CONTINUE	FARED	12633
BURN(IY+3)=(FMAS(IFM)*ZONE(IX2+6)*ZONE(IX3+6))/CM	FARED	12634
362 CONTINUE	FARED	12635
BURN(IY+4)=SUM1	FARED	12636
BURN(KP+2)=BURN(KP+2)+SUM1	FARED	12637
BURN(KP+3)=BURN(KP+3)+ZONE(IX3+4)	FARED	12638
HM=HM+ZONE(IX3+5)	FARED	12639
400 CONTINUE	FARED	12640
BURN(KP+3)=(BURN(KP+3)*CM*CN*1000.)/HM	FARED	12641
IF(HM.LE.ZERO) BURN(KP+3)=0.0	FARED	12642
IBURN(KP)=NNU	FARED	12643
KP=KP+3+5*NNU	FARED	12644
890 CONTINUE	FARED	12645
900 CONTINUE	FARED	12646
1000 CONTINUE	FARED	12647
C	FARED	12648
C PERFORM THE ZONE MATERIAL EDIT PRINT.	FARED	12649
C	FARED	12650
LAST=0	FARED	12651
DO 912 IOR=1,NZMT	FARED	12652
IRST=1000000	FARED	12653
DO 910 LOR=1,NZMT	FARED	12654
IF(MID(LOR).GT.IRST.OR.MID(LOR).LE.LAST) GO TO 910	FARED	12655

LR=LOR	FARED	12656
KON(IOR)=LOR	FARED	12657
IRST=MID(LR)	FARED	12658
910 CONTINUE	FARED	12659
LAST=MID(LR)	FARED	12660
912 CONTINUE	FARED	12661
LINE=4	FARED	12662
WRITE(M6,18)	FARED	12663
18 FORMAT(1H1//,54X,3UH* * * ZONE MATERIAL EDIT * * * /)	FARED	12664
IF(TIME.LE.0.) GO TO 20	FARED	12665
WRITE(M6,19) TIME	FARED	12666
LINE=5	FARED	12667
19 FORMAT(6X,13HTIME (DAYS) ,F7.2)	FARED	12668
20 WRITE(M6,22)	FARED	12669
22 FORMAT(1H)	FARED	12670
DO 950 IMT=1,NZMT	FARED	12671
IX=KON(IMT)	FARED	12672
IY2=INDC(IX)	FARED	12673
IY3=IY2+3+5*IIBURN(IY2)	FARED	12674
IF(IY3.GT.MXZM) GO TO 1061	FARED	12675
LKT=IIBURN(IY2)+10	FARED	12676
IY2=IY2+1	FARED	12677
MD=MID(IX)/1000	FARED	12678
IZD=MID(IX)-MD*1000	FARED	12679
IF((LINE+LKT).LE.50) GO TO 940	FARED	12680
LINE=0	FARED	12681
WRITE(M6,21)	FARED	12682
21 FORMAT(1H1)	FARED	12683
940 LINE=LINE+LKT	FARED	12684
WRITE(M6,25) MD,IZD, (IBURN(I),I=IY2,IY3)	FARED	12685
WRITE(M6,722)	FARED	12686
LINE=LINE+2	FARED	12687
722 FORMAT(//)	FARED	12688
950 CONTINUE	FARED	12689
25 FORMAT(21X14HZONE MATERIAL I2/26X5HZONE I2/26X18HVOLUME (LITERS) =	FARED	12690
1 E12.5/26X19HTOTAL POWER (MWT) = E12.5/26X32HCUMULATIVE BURNUP (M	FARED	12691
2WD/TONNE) = E12.5/26X7HELEMENT10X18HZONE CONCENTRATION15X4HMASS15	FARED	12692
3X5HPOWER/44X16H(NUCLE I/BARN-CM)16X4H(KG)15X5H(MWT)/(27XA4,A2,14XE	FARED	12693
412.5,14XE12.5,8XE12.5))	FARED	12694
RETURN	FARED	12695
1050 CONTINUE	FARED	12696
WRITE(M6,1150) IDA,IDB	FARED	12697
1150 FORMAT(20X26HTHE CROSS SECTION SET FOR ,A4A2,17HCOULD NOT BE FOUND	FARED	12698
1)	FARED	12699
GO TO 1065	FARED	12700
1055 CONTINUE	FARED	12701
WRITE(M6,1155)	FARED	12702
1155 FORMAT(20X37HPREATURE END OF FILE ON REGA LIBRARY)	FARED	12703
GO TO 1065	FARED	12704
1060 CONTINUE	FARED	12705

1061	CONTINUE	FARED	12706
	WRITE(M6,1161)	FARED	12707
1161	FORMAT(20X,65H)THE MAXIMUM STORAGE AVAILABLE FOR ZONE MATERIAL HAS	FARED	12708
	1BEEN EXCEEDED ///	FARED	12709
	WRITE(M6,1160)	FARED	12710
1160	FORMAT(20X38H)FILE SEVEN COULD NOT BE FOUND BY ZOMED)	FARED	12711
1065	CONTINUE	FARED	12712
	STOP 13	FARED	12713
	END	FARED	12714

C	SUBROUTINE MCPR	FARED	12715
C		FARED	12716
C		FARED	12717
C	THIS SUBROUTINE PERFORMS THE MACROSCOPIC CROSS SECTION	FARED	12718
C	PRINT EDIT.	FARED	12719
C		FARED	12720
C		FARED	12721
	COMMON NTAPE(20)	FARED	12722
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RO,RIN,RUT,CIN,MI	FARED	12723
	1CT,THE,IDDC,NIB,NOB,NCV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	12724
	COMMON NSPARES(42)	FARED	12725
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	12726
	1D,BLANKS	FARED	12727
	COMMON NPOINT(20),ZONE(5000)	FARED	12728
	DIMENSION NZONE(2000)	FARED	12729
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	12730
	COMMON/FLX/PHI(150,30),APHI(20,30)	FARED	12731
	COMMON/GE0/DELR(20),R(150),RI(150),LB(20)	FARED	12732
	COMMON/OM/OMEGA(30),OMEG1(30)	FARED	12733
	COMMON/SO/SOU(150),SOUP(150),SOM(20),SOP(20),SOPP(30)	FARED	12734
	COMMON/BK/BUCK2(20,30)	FARED	12735
	COMMON/MIS/CHI(20,30),DELTA(20),BETA(20)	FARED	12736
	COMMON/ACB/AC2(150)	FARED	12737
	COMMON/ACA/SAPR(20,30)	FARED	12738
	COMMON/MAC1/VUSIG(20,30),DIF(20,30),TRANS(4000),SIGT(20,30),SIGA(2	FARED	12739
	1L,30),S2N(20,30)	FARED	12740
	COMMON/PARS/NSR,ICT,IGO,ICT2,N100,IFLX,COUT,MICT2,EIGEN,EIGEN1,P,	FARED	12741
	1PIM,IST	FARED	12742
	COMMON/PDN/PDEN(150),PDENP(20)	FARED	12743
	DIMENSION JFM(6),MZN(7),MCD(50),MCF(13),MT1(16),MT2(6),MTA(16),	FARED	12744
	1 MTB(6),MX1(7),MX2(6)	FARED	12745
	DIMENSION MC1(12),MC2(13),MC3(12),MC4(13)	FARED	12746
	EQUIVALENCE (MC1(1),MCD(1)),(MC2(1),MCD(13)),(MC3(1),MCD(26)),(MC4	FARED	12747
	1(1),MCD(38))	FARED	12748
	EQUIVALENCE (APHI(1,1),ISPACE(1))	FARED	12749
	DATA (MX1=4H(10X,4H5HZ0,4HNE I,4H2,9X,4H6(E1,4H2.5,,4H2X)))	FARED	12750
	DATA (MX2=4H(/3,4H7X6(,4H6X5H,4HGROU,4HPI3),4H/))	FARED	12751
	DATA(MTB=4H(17X,4HI2,1,4H3X5(,4HE12.,4H5,5X,4H)))	FARED	12752
	DATA(MTA=4H(/65,4HX5HZ,4HONE ,4HI2/6,4H2X12,4HH DO,4HWN5C,4HATTE,	FARED	12753
	1 4HR/ /1,4H5X7H,4HGROU,4HP J1,4H5X5(,4H2HJ+,4HI2,1,4H3X)))	FARED	12754
	DATA(MCD=4H (6,4H(/)5,4H2X32,4HH***,4H NU-,4HFISS,4HION,4HCROS,	FARED	12755
	1 4HS-SE,4HCTIO,4HN **,4H* /),4H (1,4HH16(,4H/)52,4HX32H,	FARED	12756
	2 4H*** ,4HABSO,4HRPTI,4HON C,4HROSS,4H-SEC,4HTION,4H ***,	FARED	12757
	3 4H/) ,4H(1H1,4H6(/),4H54X3,4H0H**,4H* DI,4HFFUS,4HION ,	FARED	12758
	4 4HCOEF,4HFICI,4HENTS,4H *** ,4H/) ,4H(1H,4H16(/,4H)51X,	FARED	12759
	6 4H35H*,4H** T,4HOTAL,4H REM,4HOVAL,4H CRO,4HSS-S,4HECTI,	FARED	12760
	7 4HON *,4H**/))	FARED	12761
C		FARED	12762
C	SET UP FORMATS FOR THE MACROSCOPIC CROSS SECTION EDIT.	FARED	12763
C		FARED	12764

	M6=NTAPE(2)	FARED	12765
	MC=NTAPE(17)	FARED	12766
C		FARED	12767
C	READ IN MACROS IF NOT A FLUX CALCULATION	FARED	12768
		FARED	12769
	IF(IGO.LT.4) GO TO 200	FARED	12770
	REWIND MC	FARED	12771
	READ(MC) NTID,NTS,NZT,MAGT	FARED	12772
	IF(EOF,MC) 16,5	FARED	12773
5	READ(MC) SKAR	FARED	12774
	IF(EOF,MC) 16,6	FARED	12775
6	READ(MC) ((SIGA(I,J),I=1,NZ),J=1,MAG)	FARED	12776
	IF(EOF,MC) 16,7	FARED	12777
7	READ(MC) ((VUSIG(I,J),I=1,NZ),J=1,MAG)	FARED	12778
	IF(EOF,MC) 16,108	FARED	12779
108	READ(MC) ((DIF(I,J),I=1,NZ),J=1,MAG)	FARED	12780
	IF(EOF,MC) 16,109	FARED	12781
109	READ(MC) SKPR	FARED	12782
	READ(MC) ((S2N(I,J),I=1,NZ),J=1,MAG)	FARED	12783
	READ(MC) NMEL,(TRANS(I),I=1,NMEL)	FARED	12784
	IF(EOF,MC) 16,100	FARED	12785
100	DO 101 I=1,NZ	FARED	12786
	DO 101 J=1,MAG	FARED	12787
101	DIF(I,J)=1./(3.*DIF(I,J))	FARED	12788
	CALL CROCA	FARED	12789
	GO TO 200	FARED	12790
16	WRITE(M6,117)	FARED	12791
117	FORMAT(20X,27HPREATURE EOF ON MACRO TAPE///)	FARED	12792
	RETURN	FARED	12793
200	CONTINUE	FARED	12794
	DO 210 I=1,NZ	FARED	12795
	DO 210 J=1,MAG	FARED	12796
	SAPR(I,J)=SIGA(I,J)+2.*S2N(I,J)	FARED	12797
210	CONTINUE	FARED	12798
	NGPR=6	FARED	12799
	NGF=NGPR+IZERO	FARED	12800
	ICPP=136	FARED	12801
	NXSEC=4	FARED	12802
	NPP=MAG/NGPR	FARED	12803
	IK=MAG-(NPP*NGPR)	FARED	12804
	IF(IK.GT.0) NPP=NPP+1	FARED	12805
	ICEN1=(ICPP-14*NGPR)/2-14	FARED	12806
	ICEN2=ICEN1+13	FARED	12807
	CALL MASH(ICEN1,ICENA,ICENB)	FARED	12808
	CALL MASH(ICEN2,ICEND,ICENE)	FARED	12809
	WRITE(M6,2)	FARED	12810
2	FORMAT(1H1//,49X,39H* * * MACROSCOPIC CROSS-SECTIONS * * *)	FARED	12811
	CALL FORM(28,MX1,MZN)	FARED	12812
	CALL FORM(24,MX2,JFM)	FARED	12813
	CALL FORM(24,MTB,MT2)	FARED	12814

CALL FORM(64,MTA,MT1)	FARED	12815
ICNG=1	FARED	12816
DO 50 IX=1,NXSEC	FARED	12817
GO TO(31,32,33,34),IX	FARED	12818
31 CONTINUE	FARED	12819
CALL FORM(48,MC1,MCF)	FARED	12820
GO TO 35	FARED	12821
32 CONTINUE	FARED	12822
CALL FORM(50,MC2,MCF)	FARED	12823
GO TO 35	FARED	12824
33 CALL FORM(46,MC3,MCF)	FARED	12825
GO TO 35	FARED	12826
34 CALL FORM(52,MC4,MCF)	FARED	12827
35 CONTINUE	FARED	12828
WRITE(M6,MCF(1))	FARED	12829
MIN=1	FARED	12830
DO 70 IP=1,NPP	FARED	12831
IF(ICNG.EQ.0) GO TO 9	FARED	12832
CALL INTALP(MZN(1),2,ICENA)	FARED	12833
CALL INTALP(MZN(1),3,ICENB)	FARED	12834
CALL INTALP(JFM(1),4,ICEND)	FARED	12835
CALL INTALP(JFM(1),5,ICENE)	FARED	12836
CALL INTALP(JFM(1),7,NGF)	FARED	12837
CALL INTALP(MZN(1),17,NGF)	FARED	12838
ICNG=0	FARED	12839
9 CONTINUE	FARED	12840
MAX=MIN+(MAG,IP*NGPR)	FARED	12841
IF(IP.NE.NPP.OR.IK.EQ.0) GO TO 10	FARED	12842
ICNG=1	FARED	12843
IF(IX.GT.1) GO TO 8	FARED	12844
NWPR=MAX-MIN+1	FARED	12845
NGFF=NWPR+IZERO	FARED	12846
IK1=(ICPP-14*NWPR)/2-14	FARED	12847
IK2=IK1+13	FARED	12848
CALL MASH(IK1,IKA,IKB)	FARED	12849
CALL MASH(IK2,IKD,IKE)	FARED	12850
8 CONTINUE	FARED	12851
CALL INTALP(MZN(1),2,IKA)	FARED	12852
CALL INTALP(MZN(1),3,IKB)	FARED	12853
CALL INTALP(JFM(1),4,IKD)	FARED	12854
CALL INTALP(JFM(1),5,IKE)	FARED	12855
CALL INTALP(JFM(1),7,NGFF)	FARED	12856
CALL INTALP(MZN(1),17,NGFF)	FARED	12857
10 CONTINUE	FARED	12858
C PRINT MACROSCOPIC CROSS SECTIONS FOR EACH ZONE AND GROUP.	FARED	12859
C	FARED	12860
C	FARED	12861
WRITE(M6,JFM(1)) (J,J=MIN,MAX)	FARED	12862
GO TO (15,18,20,22),IX	FARED	12863
15 CONTINUE	FARED	12864

DO 17 IZ=1,NZ	FARED	12865
WRITE(M6,MZN(1)) IZ,(VUSIG(IZ,I),I=MIN,MAX)	FARED	12866
17 CONTINUE	FARED	12867
GO TO 24	FARED	12868
18 CONTINUE	FARED	12869
DO 19 IZ=1,NZ	FARED	12870
WRITE(M6,MZN(1)) IZ,(SAPR(IZ,I),I=MIN,MAX)	FARED	12871
19 CONTINUE	FARED	12872
GO TO 24	FARED	12873
20 CONTINUE	FARED	12874
DO 21 IZ=1,NZ	FARED	12875
WRITE(M6,MZN(1)) IZ,(DIF(IZ,I),I=MIN,MAX)	FARED	12876
21 CONTINUE	FARED	12877
GO TO 24	FARED	12878
22 CONTINUE	FARED	12879
DO 23 IZ=1,NZ	FARED	12880
WRITE(M6,MZN(1)) IZ,(SIGT(IZ,I),I=MIN,MAX)	FARED	12881
23 CONTINUE	FARED	12882
24 CONTINUE	FARED	12883
MIN=MAX+1	FARED	12884
70 CONTINUE	FARED	12885
72 FORMAT(//)	FARED	12886
50 CONTINUE	FARED	12887
WRITE(M6,71)	FARED	12888
71 FORMAT(1H155X26H*** DOWNSCATTER MATRIX ***)	FARED	12889
WRITE(M6,72)	FARED	12890
LINE=5	FARED	12891
NSEC=NDS/5	FARED	12892
IRES=NDS-5*NSEC	FARED	12893
IF(IRES.NE.0) NSEC=NSEC+1	FARED	12894
MNS=1	FARED	12895
MM=MAG-1	FARED	12896
DO 90 IP=1,NSEC	FARED	12897
MXS=MIN0(NDS,IP*5)	FARED	12898
MXT=MXS-MNS+1	FARED	12899
ICON=MXT+IZERO	FARED	12900
CALL INTALP(MT1(1),51,ICON)	FARED	12901
IF(IP.NE.1.AND.IP.NE.NSEC) GO TO 75	FARED	12902
ICEN1=(ICPP-17*MXT-21)/2	FARED	12903
ICEN2=ICEN1+2	FARED	12904
CALL MASH(ICEN1,ICENA,ICENB)	FARED	12905
CALL MASH(ICEN2,ICENC,ICEND)	FARED	12906
CALL INTALP(MT1(1),36,ICENA)	FARED	12907
CALL INTALP(MT1(1),37,ICENB)	FARED	12908
CALL INTALP(MT2(1),2,ICENC)	FARED	12909
CALL INTALP(MT2(1),3,ICEND)	FARED	12910
75 CONTINUE	FARED	12911
DO 82 LZ=1,NZ	FARED	12912
WRITE(M6,MT1(1)) LZ,(J,J=MNS,MXS)	FARED	12913
LINE=LINE+5	FARED	12914

DO 80 JG=1,MM	FARED 12915
IF(LINE.LT.45 .OR. (MM-JG).LT.5) GO TO 79	FARED 12916
LINE=5	FARED 12917
WRITE(M6,78)	FARED 12918
WRITE(M6,MT1(1)) LZ,(J,J=MNS,MXS)	FARED 12919
78 FORMAT(1H1)	FARED 12920
79 CONTINUE	FARED 12921
IX=IXTR(LZ,MNS,JG)	FARED 12922
NJ=MING(MXS,MAG-JG)-5*(IP-1)+IX-1	FARED 12923
WRITE(M6,MT2(1)) JG,(TRANS(L),L=IX,NJ)	FARED 12924
LINE=LINE+1	FARED 12925
IF(IX.EQ.NJ) GO TO 81	FARED 12926
80 CONTINUE	FARED 12927
81 CONTINUE	FARED 12928
IF(LINE.LT.40) GO TO 82	FARED 12929
LINE=0	FARED 12930
WRITE(M6,78)	FARED 12931
82 CONTINUE	FARED 12932
MNS=MXS+1	FARED 12933
90 CONTINUE	FARED 12934
RETURN	FARED 12935
END	FARED 12936

C	SUBROUTINE FXPR	FARED	12937
C		FARED	12938
C		FARED	12939
C	THIS SUBROUTINE PERFORMS THE POWER AND FLUX DISTRIBUTIONS	FARED	12940
C	PRINT EDIT	FARED	12941
C		FARED	12942
C		FARED	12943
	COMMON NTAPE(20)	FARED	12944
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RO,RIN,RUT,CIN,MI	FARED	12945
	ICT,THE,IDOC,NIB,NOB,NCV,NBUCK,NBWM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	12946
	COMMON NSPARES(42)	FARED	12947
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	12948
	10,BLANKS	FARED	12949
	COMMON NPOINT(20),ZONE(5000)	FARED	12950
	DIMENSION NZONE(2000)	FARED	12951
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	12952
	COMMON/FLX/PHI(150,30),APHI(20,30)	FARED	12953
	COMMON/GE0/DELTA(20),R(150),RI(150),LB(20)	FARED	12954
	COMMON/OM/OMEGA(30),OMEG1(30)	FARED	12955
	COMMON/SO/SOU(150),SOUP(150),SOM(20),SOP(20),SOPP(30)	FARED	12956
	COMMON/BK/BUCK2(20,30)	FARED	12957
	COMMON/MIS/CHI(20,30),DELTA(20),BETA(20)	FARED	12958
	COMMON/ACB/AC2(150)	FARED	12959
	COMMON/MAC1/VUSIG(20,30),DIF(20,30),TRANS(4000),SIGT(20,30)	FARED	12960
	COMMON/PARS/NSR,ICT,IGO,ICT2,N100,IFLX,COUT,MICT2,EIGEN,EIGEN1,P,	FARED	12961
	1PIM,IST	FARED	12962
	COMMON/PON/PDEN(150),PDENP(20)	FARED	12963
	DIMENSION JFM(6),HFM(8),MZN(7),LFM(21),FX1(8),FX2(21),FX3(21),	FARED	12964
	1MX1(7),MX2(6),FX4(22),FXA(22)	FARED	12965
	DATA (FX4=4H(45X,4H19HP,4HRESE,4HNT E,4HIGEN,4HVALU,4HE 15,4HX1H1,	FARED	12966
	1 4HE12.,4H5 /4,4H5X28,4HHEIG,4HENVA,4HLUE ,4HFOR ,4HN-1 ,	FARED	12967
	2 4HITER,4HATIO,4HN6X1,4HHIE1,4H2.5 ,4H))	FARED	12968
	DATA (MX1=4H(10X,4H5HZ0,4HNE I,4H2,9X,4H6 (E1,4H2.5,,4H2X)))	FARED	12969
	DATA (MX2=4H(//3,4H7X6(,4H6X5H,4HGROU,4HPI3),4H/))	FARED	12970
	DATA (FX1=4H(9XI,4H3,1X,4HF9.4,4H,2XE,4H12.5,4H,6(2,4HXE12,4H.5)))	FARED	12971
	DATA (FX2=4H(9X,,4H5HPO,4HINT2,4HX6HR,4HADIU,4HS6X5,4HHP0W,4HER35,	FARED	12972
	1 4HX17H,4HNORM,4HALIZ,4HED F,4HLUXE,4HS/27,4HX7HD,4HENSI,	FARED	12973
	2 4HTY6(,4H6X5H,4HGROU,4HPI3),4H))	FARED	12974
	DATA (FX3=4H(9X,,4H5HPO,4HINT2,4HX6HR,4HADIU,4HS5X7,4HHFIS,4HSION,	FARED	12975
	1 4H37X1,4H7HNO,4HRMAL,4HIZED,4H FLU,4HXES/,4H28X6,4HHSOU,	FARED	12976
	2 4HRCE6,4H(6X5,4HHGRO,4HUPI3,4H)))	FARED	12977
	M6=NTAPE(2)	FARED	12978
	ISOR=NTAPE(1J)	FARED	12979
	REWIND ISOR	FARED	12980
	IF(IGO.EQ.3.OR.IGO.EQ.5) GO TO 160	FARED	12981
		FARED	12982
	READ IN FLUX IF NOT A FLUX WAS NOT CALLED	FARED	12983
		FARED	12984
	READ(ISOR) SRID,NPTST,MAGT,NZT	FARED	12985
	IF(E0F,ISOR) 150,140	FARED	12986

140	READ(ISOR) SKPR	FARED	12987
	READ(ISOR) SKPR	FARED	12988
	READ(ISOR)((APHI(I,J),J=1,MAG),I=1,NZ)	FARED	12989
	IF(EOF,ISOR) 150,143	FARED	12990
143	READ(ISOR)((PHI(I,J),J=1,MAG),I=1,NPTS)	FARED	12991
	IF(EOF,ISOR) 150,160	FARED	12992
150	WRITE(M6,151)	FARED	12993
151	FORMAT(20X,26HPREATURE EOF ON FLUX TAPE ///)	FARED	12994
	RETURN	FARED	12995
160	CONTINUE	FARED	12996
	NGPR=6	FARED	12997
	NGF=NGPR+IZERO	FARED	12998
	ICPP=136	FARED	12999
	NXSEC=4	FARED	13000
	NPP=MAG/NGPR	FARED	13001
	IK=MAG-(NPP*NGPR)	FARED	13002
	IF(IK.GT.0) NPP=NPP+1	FARED	13003
	ICEN1=(ICPP-14*NGPR)/2-14	FARED	13004
	ICEN2=ICEN1+13	FARED	13005
	CALL MASH(ICEN1,ICENA,ICENB)	FARED	13006
	CALL MASH(ICEN2,ICEND,ICENE)	FARED	13007
	LINE=6	FARED	13008
	CALL FORM(32,FX1,MFM)	FARED	13009
	CALL FORM(28,MX1,MZN)	FARED	13010
	CALL FORM(24,MX2,JFM)	FARED	13011
	CALL INTALP(JFM(1),7,NGF)	FARED	13012
	CALL INTALP(MZN(1),17,NGF)	FARED	13013
	IF(IGO.NE.5) GO TO 220	FARED	13014
	DO 205 I=1,NPTS	FARED	13015
	SOU(I)=PDEN(I)	FARED	13016
205	PDEN(I)=SOUP(I)	FARED	13017
	DO 210 I=1,NZ	FARED	13018
	SOP(I)=PDENP(I)	FARED	13019
210	PDENP(I)=SOPP(I)	FARED	13020
220	CONTINUE	FARED	13021
	4 MIN=1	FARED	13022
	JCT=MAG	FARED	13023
55	IF(JCT.GT.6) GOTO 102	FARED	13024
101	NOUT=JCT	FARED	13025
	JCT=0	FARED	13026
	GOTO103	FARED	13027
102	NOUT=6	FARED	13028
	JCT=JCT-6	FARED	13029
103	MAX=MIN+NOUT-1	FARED	13030
	IPK=25	FARED	13031
	IIR=1	FARED	13032
	IF(MIN.GT.1) GO TO 11	FARED	13033
	IF(IGO.NE.5) GO TO 110	FARED	13034
	WRITE(M6,112)	FARED	13035
	CALL FORM(82,FX3,LFM)	FARED	13036

GO TO 111	FARED	13037
110 WRITE(M6,12)	FARED	13038
CALL FORM(82,FX2,LFM)	FARED	13039
111 CONTINUE	FARED	13040
1001 FORMAT(1H1)	FARED	13041
112 FORMAT(1H1//,55X,26H* * * ADJOINT FLUXES * * * //)	FARED	13042
12 FORMAT(1H1//,56X,23H* * * REAL FLUXES * * * //)	FARED	13043
IF (TIME.GT.0.) WRITE(M6,13) TIME	FARED	13044
13 FORMAT(45X,12H TIME (DAYS) ,22X,1H:,F7.2)	FARED	13045
C- DETERMINE SIZE OF CIN	FARED	13046
CHK=CIN	FARED	13047
DO 18 I=1,14	FARED	13048
ICLK=I	FARED	13049
IF (CHK.GE..99999) GO TO 16	FARED	13050
18 CHK=CHK*10.	FARED	13051
16 CONTINUE	FARED	13052
CALL FORM(88,FX4,FXA)	FARED	13053
ICHL=ICLK+7	FARED	13054
CALL MASH(ICLK,ISA,ISB)	FARED	13055
CALL INTALP(FXA(1),37,ISA)	FARED	13056
CALL INTALP(FXA(1),38,ISB)	FARED	13057
CALL INTALP(FXA(1),83,ISA)	FARED	13058
CALL INTALP(FXA(1),84,ISB)	FARED	13059
CALL MASH(ICHL,ISA,ISB)	FARED	13060
CALL INTALP(FXA(1),34,ISA)	FARED	13061
CALL INTALP(FXA(1),35,ISB)	FARED	13062
CALL INTALP(FXA(1),80,ISA)	FARED	13063
CALL INTALP(FXA(1),81,ISB)	FARED	13064
WRITE(M6,FXA(1)) EIGEN,EIGEN1	FARED	13065
WRITE(M6,14) ICT,CIN	FARED	13066
14 FORMAT(45X31HNUMBER OF INNER FLUX ITERATIONS3X1H:1XI2/45X27HINNER	FARED	13067
1CONVERGENCE CRITERION7X1H:E12.5)	FARED	13068
IPK=10	FARED	13069
IF (IGO.EQ.5) GO TO 11	FARED	13070
WRITE(M6,17) POW	FARED	13071
17 FORMAT(45X22HNORMALIZED TO POWER OF 12X1H:E12.5 ,3H MW /)	FARED	13072
IPK=11	FARED	13073
11 CONTINUE	FARED	13074
WRITE(M6,1000)	FARED	13075
IF (MAX.GT.5.AND.MAX.NE.MAG) GO TO 27	FARED	13076
MGA=MAX-MIN+1	FARED	13077
LXA=(ICPP-14*MGA-27)/2	FARED	13078
LXD=LXA+18	FARED	13079
LXC=7*MGA-4	FARED	13080
CALL MASH(LXA,LX3,LX4)	FARED	13081
CALL INTALP(LFM(1),1,LX3)	FARED	13082
CALL INTALP(LFM(1),2,LX4)	FARED	13083
IBS=J	FARED	13084
IF (IGO.EQ.5) IBS=2	FARED	13085
LLA=31+IBS	FARED	13086

LLB=32+IBS	FARED	13087
CALL MASH(LXC,LX1,LX2)	FARED	13088
CALL INTALP(LFM(1),LLA,LX1)	FARED	13089
CALL INTALP(LFM(1),LLB,LX2)	FARED	13090
IF(IGO,EQ.5) LX8=LX8+1	FARED	13091
LLA=55+IBS	FARED	13092
LLB=56+IBS	FARED	13093
CALL MASH(LXB,LX1,LX2)	FARED	13094
CALL INTALP(LFM(1),LLA,LX1)	FARED	13095
CALL INTALP(LFM(1),LLB,LX2)	FARED	13096
CALL INTALP(MFM(1),1,LX3)	FARED	13097
CALL INTALP(MFM(1),2,LX4)	FARED	13098
MGK=MAX-MIN+1+IZERO	FARED	13099
ICK=67	FARED	13100
IF(IGO,EQ.5) ICK=ICK+1	FARED	13101
CALL INTALP(LFM(1),ICK,MGK)	FARED	13102
27 CONTINUE	FARED	13103
WRITE(M6,LFM(1)) (J,J=MIN,MAX)	FARED	13104
WRITE(M6,1000)	FARED	13105
1000 FORMAT(1H)	FARED	13106
NI=1	FARED	13107
DO 15 I1=1,NZ	FARED	13108
NF=LB(I1)	FARED	13109
DO 69 I=NI,NF	FARED	13110
WRITE(M6,MFM(1)) I, R(I),PDEN(I),(PHI(I,NO),NO=MIN,MAX)	FARED	13111
LINE=LINE+1	FARED	13112
IF(LINE.LT.45) GO TO 69	FARED	13113
WRITE(M6,1001)	FARED	13114
WRITE(M6,LFM(1)) (J,J=MIN,MAX)	FARED	13115
LINE=2	FARED	13116
69 CONTINUE	FARED	13117
IF(I1.EQ.NZ) GO TO 15	FARED	13118
WRITE(M6,54)	FARED	13119
54 FORMAT(49X47H * * * * * INTERFACE * * * * *)	FARED	13120
LINE=LINE+1	FARED	13121
WRITE(M6,MFM(1)) NF, R(NF),PDENP(I1),(PHI(NF,NO),NO=MIN,MAX)	FARED	13122
61 NI=NF+1	FARED	13123
15 CONTINUE	FARED	13124
MIN=MAX+1	FARED	13125
WRITE(M6,1002)	FARED	13126
1002 FORMAT(//)	FARED	13127
IF(JCT.GT.0) GO TO 55	FARED	13128
CALL INTALP(MZN(1),2,ICENA)	FARED	13129
CALL INTALP(MZN(1),3,ICENB)	FARED	13130
CALL INTALP(JFM(1),4,ICEND)	FARED	13131
CALL INTALP(JFM(1),5,ICENE)	FARED	13132
WRITE(M6,202)	FARED	13133
202 FORMAT(1H1,5(//),58X22H*** AVERAGE FLUXES ***//)	FARED	13134
203 FORMAT(50X,23HNORMALIZED TO POWER OF E12.5,3H MW ///)	FARED	13135
IF(IGO.NE.5) WRITE(M6,203) POW	FARED	13136


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MIN=1
DO 270 IP=1,NPP
MAX=MIN+(MAG,IP*NGPR)
NWPR=MAX-MIN+1
IF(NWPR.GE.NGPR) GO TO 265
NGFF=NWPR+IZERO
IK1=(ICPP-14*NWPR)/2-14
IK2=IK1+13
CALL MASH(IK1,IKA,IKB)
CALL MASH(IK2,IKD,IKE)
CALL INTALP(JFM(1),7,NGFF)
CALL INTALP(MZN(1),17,NGFF)
CALL INTALP(MZN(1),2,IKA)
CALL INTALP(MZN(1),3,IKB)
CALL INTALP(JFM(1),4,IKD)
CALL INTALP(JFM(1),5,IKE)
265 CONTINUE
WRITE(M6,JFM(1)) (J,J=MIN,MAX)
DO 266 LZ=1,NZ
WRITE(M6,MZN(1)) LZ,(APHI(LZ,I),I=MIN,MAX)
266 CONTINUE
MIN=MAX+1
270 CONTINUE
IF(IGO.NE.5) GO TO 240
DO 230 I=1,NPTS
230 PDEN(I)=SOU(I)
DO 235 I=1,NZ
235 PDENP(I)=SOP(I)
240 CONTINUE
400 RETURN
END

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FARED 13137
FARED 13138
FARED 13139
FARED 13140
FARED 13141
FARED 13142
FARED 13143
FARED 13144
FARED 13145
FARED 13146
FARED 13147
FARED 13148
FARED 13149
FARED 13150
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FARED 13162
FARED 13163
FARED 13164
FARED 13165
FARED 13166
FARED 13167

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C	SUBROUTINE BAL	FARED	13168
C		FARED	13169
C		FARED	13170
C	THIS SUBROUTINE PERFORMS THE NEUTRON BALANCE EDIT.	FARED	13171
C		FARED	13172
	COMMON NTAPE(20)	FARED	13173
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RO,RIN,RUT,CIN,HI	FARED	13174
	ICT,THE,IODC,NIB,NOB,NCV,NBUCK,NBWM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	13175
	COMMON NSPARES(42)	FARED	13176
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	13177
	10,BLANKS	FARED	13178
	COMMON NPOINT(20),ZONE(5000)	FARED	13179
	DIMENSION NZONE(2000)	FARED	13180
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	13181
	COMMON/ACA/ APhi(20,30),DIV(20,30)	FARED	13182
	COMMON/BK/ BUCK2(20,30)	FARED	13183
	COMMON/OM/ OMEGA(30)	FARED	13184
	COMMON/MIS/ CHI(20,30)	FARED	13185
	COMMON/GE0/ DELR(20),R(150),RI(150),LB(20)	FARED	13186
	COMMON/MAC1/ VUSIG(20,30),DIF(20,30),TRANS(4000),SIGT(20,30),SIGA(	FARED	13187
	520,30)	FARED	13188
	COMMON/FLX/ PCORE(8,30),PBLNK(8,30),PREFL(8,30),SIGF(20,30),SIGC(2	FARED	13189
	10,30),SIGEP(20,30),SIG2N(20,30),ZTERM(8),DUMX(8,30),PTERM(8,30),PT	FARED	13190
	2BAL(8)	FARED	13191
	COMMON/PARS/ NSR,ICT,IGO,ICT2,N100,IFLX,COUT,MICT2,EIGEN,EIGEN1,P,	FARED	13192
	1PIM,IST	FARED	13193
	DIMENSION PHI(150,30)	FARED	13194
	EQUIVALENCE (PHI(1,1),PCORE(1,1))	FARED	13195
	M6=NTAPE(2)	FARED	13196
	ISUR=NTAPE(10)	FARED	13197
	MCORE=0	FARED	13198
	MBLNK=0	FARED	13199
	MREFL=0	FARED	13200
	MPRNT=1	FARED	13201
C		FARED	13202
C	READ POINT AND ZONE-AVERAGED FLUXES.	FARED	13203
C		FARED	13204
	REWIND ISOR	FARED	13205
	READ(ISOR) SRIO,NPTS,MAG,NZ	FARED	13206
	READ(ISOR)	FARED	13207
	READ(ISOR)	FARED	13208
	READ(ISOR) ((APHI(I,J),J=1,MAG),I=1,NZ)	FARED	13209
	READ(ISOR) ((PHI(I,J),J=1,MAG),I=1,NPTS)	FARED	13210
	REWIND ISOR	FARED	13211
C		FARED	13212
C	CALCULATE FLUX DERIVATIVES AT ZONE BOUNDARIES.	FARED	13213
C		FARED	13214
	MC=NTAPE(17)	FARED	13215
	REWIND MC	FARED	13216
		FARED	13217

READ(MC) DUMDUM	FARED	13218
READ(MC) DUMDUM	FARED	13219
READ(MC) ((SIGA(I,J),I=1,NZ),J=1,MAG)	FARED	13220
READ(MC) ((VUSIG(I,J),I=1,NZ),J=1,MAG)	FARED	13221
READ(MC) ((DIF(I,J),I=1,NZ),J=1,MAG)	FARED	13222
READ(MC) DUMDUM	FARED	13223
READ(MC) DUMDUM	FARED	13224
READ(MC) NMEL,(TRANS(I),I=1,NMEL)	FARED	13225
REWIND MC	FARED	13226
DO 2810 I=1,NZ	FARED	13227
DO 2810 J=1,MAG	FARED	13228
2810 DIF(I,J)=1.0/(3.0*DIF(I,J))	FARED	13229
CALL CROCA	FARED	13230
PGO=FLOAT(NGO-1)	FARED	13231
DO 2900 I=1,NZ	FARED	13232
DO 2900 J=1,MAG	FARED	13233
2900 DIV(I,J)=0.0	FARED	13234
IF(NIB.EQ.1.AND.NOB.EQ.1) GO TO 2908	FARED	13235
DO 2907 I=1,NZ	FARED	13236
DO 2907 J=1,MAG	FARED	13237
K=1	FARED	13238
IF(I.NE.1) K=LB(I-1)	FARED	13239
IF(K.NE.1) GO TO 2901	FARED	13240
GO TO (2905,2901,2904,2901,2904),NIB	FARED	13241
2901 DUM1=SIGT(I,J)*PHI(K,J)	FARED	13242
DUM3=DEL R(I)	FARED	13243
IF(R(K).EQ.0.0) GO TO 2902	FARED	13244
DUM3=DUM3-J.5*PGO*(DEL R(I)**2.0)/R(K)	FARED	13245
2902 DO 2903 L=1,MAG	FARED	13246
DUM1=DUM1-CHI(I,J)*VUSIG(I,L)*PHI(K,L)/EIGEN	FARED	13247
NMAX=MAX0(1,J-NDS)	FARED	13248
IF(L.GE.J.OR.L.LT.NMAX) GO TO 2903	FARED	13249
IX=IXTR(I,J-L,L)	FARED	13250
DUM1=DUM1-TRANS(IX)*PHI(K,L)	FARED	13251
2903 CONTINUE	FARED	13252
DIV(I,J)=(R(K)**PGO)*(PHI(K+1,J)-PHI(K,J)-J.5*(DEL R(I)**2.0)*DUM1/	FARED	13253
10DIF(I,J))/DUM3	FARED	13254
GO TO 2905	FARED	13255
2904 DIV(I,J)=(R(K)**PGO)*PHI(K,J)/OMEGA(J)	FARED	13256
2905 K=LB(I)	FARED	13257
DUM1=SIGT(I,J)*PHI(K,J)	FARED	13258
DUM3=DEL R(I)+J.5*PGO*(DEL R(I)**2.0)/R(K)	FARED	13259
DO 2906 L=1,MAG	FARED	13260
DUM1=DUM1-CHI(I,J)*VUSIG(I,L)*PHI(K,L)/EIGEN	FARED	13261
NMAX=MAX0(1,J-NDS)	FARED	13262
IF(L.GE.J.OR.L.LT.NMAX) GO TO 2906	FARED	13263
IX=IXTR(I,J-L,L)	FARED	13264
DUM1=DUM1-TRANS(IX)*PHI(K,L)	FARED	13265
2906 CONTINUE	FARED	13266
DIV(I,J)=DIV(I,J)-(R(K)**PGO)*(PHI(K,J)-PHI(K-1,J)+0.5*(DEL R(I)**2	FARED	13267

	1.0)*DUM1/DIF(I,J))/DUM3	FARED	13268
	DIV(I,J)=RD*(PGO+1.0)*DIV(I,J)	FARED	13269
2907	CONTINUE	FARED	13270
2908	CONTINUE	FARED	13271
C		FARED	13272
C	CALCULATE MACROSCOPIC CROSS SECTIONS USED IN BALANCE TERMS.	FARED	13273
C		FARED	13274
	DO 2601 K=1,8	FARED	13275
	DO 2601 J=1,MAG	FARED	13276
	PCORE(K,J)=0.0	FARED	13277
	PBLNK(K,J)=0.0	FARED	13278
2601	PREFL(K,J)=0.0	FARED	13279
	MC=NTAPE(17)	FARED	13280
	REWIND MC	FARED	13281
	READ(MC) NTID,NTS,NZ,MAG	FARED	13282
	READ(MC) ((SIGF(I,J),I=1,NZ),J=1,MAG)	FARED	13283
	READ(MC) ((SIGC(I,J),I=1,NZ),J=1,MAG)	FARED	13284
	READ(MC) ((VUSIG(I,J),I=1,NZ),J=1,MAG)	FARED	13285
	READ(MC)	FARED	13286
	READ(MC) ((SIGEP(I,J),I=1,NZ),J=1,MAG)	FARED	13287
	READ(MC) ((SIG2N(I,J),I=1,NZ),J=1,MAG)	FARED	13288
	REWIND MC	FARED	13289
	DO 3001 I=1,NZ	FARED	13290
	DO 3001 J=1,MAG	FARED	13291
3001	SIGC(I,J)=SIGC(I,J)-SIGF(I,J)-SIGEP(I,J)	FARED	13292
	DO 3002 I=1,NZ	FARED	13293
	DO 3002 J=1,MAG	FARED	13294
3002	SIGEP(I,J)=SIGEP(I,J)+SIG2N(I,J)	FARED	13295
	DO 3003 I=1,8	FARED	13296
	DO 3003 J=1,MAG	FARED	13297
3003	DUMX(I,J)=0.0	FARED	13298
	REWIND ISOR	FARED	13299
	READ(ISOR) SRID,NPTS,MAG,NZ	FARED	13300
	READ(ISOR)	FARED	13301
	READ(ISOR)	FARED	13302
	READ(ISOR) ((APHI(I,J),J=1,MAG),I=1,NZ)	FARED	13303
	REWIND ISOR	FARED	13304
	WRITE(M6,3200)	FARED	13305
3200	FORMAT(1H1,35X,53H* * * * ZONE - GROUP NEUTRON BALANCE EDIT * *	FARED	13306
	1 * * */)	FARED	13307
	LINE=57	FARED	13308
	IF(TIME.NE.0.) WRITE(M6,3342) TIME	FARED	13309
3342	FORMAT(1H ,51X,14H TIME (DAYS) = ,F7.2/)	FARED	13310
	LINE=55	FARED	13311
C		FARED	13312
C	CALCULATE ABSOLUTE REACTION RATES AND PRINT NEUTRON	FARED	13313
C	BALANCE TERMS FOR EACH ZONE.	FARED	13314
C		FARED	13315
	DO 3100 I=1,NZ	FARED	13316
	IX1=NPOINT(I)	FARED	13317

IDZ=NZONE(IX1)	FARED	13318
VOL=ZONE(IX1+6)	FARED	13319
DO 3050 J=1,MAG	FARED	13320
PTERM(1,J)=DIF(I,J)*DIV(I,J)	FARED	13321
PTERM(2,J)=DIF(I,J)*BUCK2(I,J)*APHI(I,J)*VOL	FARED	13322
PTERM(3,J)=SIGC(I,J)*APHI(I,J)*VOL	FARED	13323
PTERM(4,J)=SIGF(I,J)*APHI(I,J)*VOL	FARED	13324
PTERM(5,J)=SIGEP(I,J)*APHI(I,J)*VOL	FARED	13325
PTERM(6,J)=-SIG2N(I,J)*APHI(I,J)*VOL	FARED	13326
DO 3010 L=1,NDS	FARED	13327
IF((L+J).GT.MAG) GO TO 3011	FARED	13328
IX=IXTR(I,L,J)	FARED	13329
3010 PTERM(6,J)=PTERM(6,J)+TRANS(IX)*APHI(I,J)*VOL	FARED	13330
3011 PTERM(7,J)=0.0	FARED	13331
DO 3012 L=1,MAG	FARED	13332
3012 PTERM(7,J)=PTERM(7,J)+CHI(I,J)*VUSIG(I,L)*APHI(I,L)*VOL/EIGEN	FARED	13333
PTERM(8,J)=0.0	FARED	13334
DO 3013 L=1,MAG	FARED	13335
NMAX=MAX0(1,J-NDS)	FARED	13336
IF(L.GE.J.OR.L.LT.NMAX) GO TO 3013	FARED	13337
IX=IXTR(I,J-L,L)	FARED	13338
PTERM(8,J)=PTERM(8,J)+TRANS(IX)*APHI(I,L)*VOL	FARED	13339
3013 CONTINUE	FARED	13340
3050 CONTINUE	FARED	13341
LINE=LINE-11-MAG	FARED	13342
IF(LINE.GE.0) GO TO 3225	FARED	13343
LINE=48-MAG	FARED	13344
3210 WRITE (M6,3211)	FARED	13345
3211 FORMAT (1H1,1H /)	FARED	13346
3220 WRITE (M6,3221) IDZ	FARED	13347
3221 FORMAT (1H0,11H* * * ZONE ,I2,32X,35HREACTION RATES (REACTIONS PER	FARED	13348
1 SEC.))	FARED	13349
GO TO 3230	FARED	13350
3225 WRITE (M6,3226)	FARED	13351
3226 FORMAT (1H)	FARED	13352
GO TO 3220	FARED	13353
3230 WRITE (M6,3231)	FARED	13354
3231 FORMAT (1H0,5HGROUP,6X,6HRADIAL,7X,10HTRANSVERSE,6X,7HCAPTURE,8X,7	FARED	13355
1HFISSION,7X,9H(N,ALPHA),9X,3HOUT,10X,7HFISSION,10X,2HIN)	FARED	13356
WRITE (M6,3232)	FARED	13357
3232 FORMAT (1H ,10X,7HLEAKAGE,8X,7HLEAKAGE,37X,10H(N,PROTON),6X,7HSCAT	FARED	13358
1TER,9X,6HSOURCE,8X,7HSCATTER/)	FARED	13359
DO 3245 J=1,MAG	FARED	13360
WRITE (M6,3241) J,(PTERM(K,J),K=1,8)	FARED	13361
3241 FORMAT (1H ,1X,12,2X,8(3X,E12.5))	FARED	13362
3245 CONTINUE	FARED	13363
DO 3250 K=1,8	FARED	13364
ZTERM(K)=0.0	FARED	13365
DO 3250 J=1,MAG	FARED	13366
ZTERM(K)=ZTERM(K)+PTERM(K,J)	FARED	13367

3250	CONTINUE	FARED	13368
	WRITE (M6,3251) (ZTERM(K),K=1,8)	FARED	13369
3251	FORMAT (1H,5HTOTAL,8(3X,E12.5)//)	FARED	13370
	DO 3051 J=1,MAG	FARED	13371
	DO 3051 K=1,8	FARED	13372
3051	DUMX(K,J)=DUMX(K,J)+PTERM(K,J)	FARED	13373
	IPOINT=NPOINT(I)	FARED	13374
	IPNT=NZONE(IPOINT+3)	FARED	13375
	IF(IPNT.NE.1) GO TO 2610	FARED	13376
	DO 2605 K=1,8	FARED	13377
	DO 2605 J=1,MAG	FARED	13378
2605	PCORE(K,J)=PCORE(K,J)+PTERM(K,J)	FARED	13379
	MCORE=1	FARED	13380
	GO TO 2630	FARED	13381
2610	IF(IPNT.NE.2) GO TO 2620	FARED	13382
	DO 2615 K=1,8	FARED	13383
	DO 2615 J=1,MAG	FARED	13384
2615	PBLNK(K,J)=PBLNK(K,J)+PTERM(K,J)	FARED	13385
	MBLNK=1	FARED	13386
	GO TO 2630	FARED	13387
2620	IF(IPNT.NE.3) GO TO 2630	FARED	13388
	DO 2625 K=1,8	FARED	13389
	DO 2625 J=1,MAG	FARED	13390
2625	PREFL(K,J)=PREFL(K,J)+PTERM(K,J)	FARED	13391
	MREFL=1	FARED	13392
2630	CONTINUE	FARED	13393
3100	CONTINUE	FARED	13394
C		FARED	13395
C	CALCULATE AND PRINT NORMALIZED NEUTRON BALANCE TERMS FOR	FARED	13396
C	CORE, BLANKET, REFLECTOR AND REACTOR.	FARED	13397
C		FARED	13398
	DO 3105 K=1,8	FARED	13399
	ZTERM(K)=0.0	FARED	13400
	DO 3105 J=1,MAG	FARED	13401
	PTERM(K,J)=DUMX(K,J)	FARED	13402
	ZTERM(K)=ZTERM(K)+PTERM(K,J)	FARED	13403
3105	CONTINUE	FARED	13404
	DUM1=ZTERM(7)	FARED	13405
	DO 3110 K=1,8	FARED	13406
	ZTERM(K)=ZTERM(K)/DUM1	FARED	13407
	DO 3110 J=1,MAG	FARED	13408
	PTERM(K,J)=PTERM(K,J)/DUM1	FARED	13409
3110	CONTINUE	FARED	13410
	DO 2640 K=1,8	FARED	13411
	DO 2640 J=1,MAG	FARED	13412
	PCORE(K,J)=PCORE(K,J)/DUM1	FARED	13413
	PBLNK(K,J)=PBLNK(K,J)/DUM1	FARED	13414
2640	PREFL(K,J)=PREFL(K,J)/DUM1	FARED	13415
	IF(MCORE.NE.1) GO TO 2720	FARED	13416
	LINE=LINE-11-MAG	FARED	13417

	IF(LINE.GE.0) GO TO 3310	FARED	13418
	LINE=48-MAG	FARED	13419
	WRITE (M6,3211)	FARED	13420
	GO TO 3320	FARED	13421
3310	WRITE (M6,3226)	FARED	13422
3320	WRITE (M6,2711)	FARED	13423
2711	FORMAT (1H,62H* * CORE BALANCE NORMALIZED TO A TOTAL FISSION SO	FARED	13424
	URCE OF 1.0)	FARED	13425
	WRITE (M6,3231)	FARED	13426
	WRITE (M6,3232)	FARED	13427
	DO 2715 J=1,MAG	FARED	13428
	WRITE (M6,3241) J, (PCORE(K,J),K=1,8)	FARED	13429
2715	CONTINUE	FARED	13430
	DO 2716 K=1,8	FARED	13431
	PTBAL(K)=0.0	FARED	13432
	DO 2716 J=1,MAG	FARED	13433
2716	PTBAL(K)=PTBAL(K)+PCORE(K,J)	FARED	13434
	WRITE (M6,3251) (PTBAL(K),K=1,8)	FARED	13435
	MPRNT=MPRNT+1	FARED	13436
2720	IF(MBLNK.NE.1) GO TO 2740	FARED	13437
	LINE=LINE-11-MAG	FARED	13438
	IF(LINE.GE.0) GO TO 3410	FARED	13439
	LINE=48-MAG	FARED	13440
	WRITE (M6,3211)	FARED	13441
	GO TO 3420	FARED	13442
3410	WRITE (M6,3226)	FARED	13443
3420	WRITE (M6,2726)	FARED	13444
2726	FORMAT (1H,65H* * BLANKET BALANCE NORMALIZED TO A TOTAL FISSION	FARED	13445
	1 SOURCE OF 1.0)	FARED	13446
	WRITE (M6,3231)	FARED	13447
	WRITE (M6,3232)	FARED	13448
	DO 2727 J=1,MAG	FARED	13449
	WRITE (M6,3241) J, (PBLNK(K,J),K=1,8)	FARED	13450
2727	CONTINUE	FARED	13451
	DO 2729 K=1,8	FARED	13452
	PTBAL(K)=0.0	FARED	13453
	DO 2729 J=1,MAG	FARED	13454
2729	PTBAL(K)=PTBAL(K)+PBLNK(K,J)	FARED	13455
	WRITE (M6,3251) (PTBAL(K),K=1,8)	FARED	13456
	MPRNT=MPRNT+1	FARED	13457
2740	IF(MREFL.NE.1) GO TO 2770	FARED	13458
	LINE=LINE-11-MAG	FARED	13459
	IF(LINE.GE.0) GO TO 3510	FARED	13460
	LINE=48-MAG	FARED	13461
	WRITE (M6,3211)	FARED	13462
	GO TO 3520	FARED	13463
3510	WRITE (M6,3226)	FARED	13464
3520	WRITE (M6,2751)	FARED	13465
2751	FORMAT (1H,67H* * REFLECTOR BALANCE NORMALIZED TO A TOTAL FISSI	FARED	13466
	1ON SOURCE OF 1.0)	FARED	13467

	WRITE (M6,3231)		
	WRITE (M6,3232)		FARED 13468
	DO 2752 J=1,MAG		FARED 13469
	WRITE (M6,3241) J, (PREFL(K,J),K=1,8)		FARED 13470
2752	CONTINUE		FARED 13471
	DO 2753 K=1,8		FARED 13472
	PTBAL(K)=0.0		FARED 13473
	DO 2753 J=1,MAG		FARED 13474
2753	PTBAL(K)=PTBAL(K)+PREFL(K,J)		FARED 13475
	WRITE (M6,3251) (PTBAL(K),K=1,8)		FARED 13476
2770	CONTINUE		FARED 13477
	LINE=LINE-11-MAG		FARED 13478
	IF (LINE.GE.0) GO TO 3610		FARED 13479
	LINE=48-MAG		FARED 13480
	WRITE (M6,3211)		FARED 13481
	GO TO 3620		FARED 13482
3610	WRITE (M6,3226)		FARED 13483
3620	WRITE (M6,3115)		FARED 13484
3115	FORMAT (1H ,65H* * * REACTOR BALANCE NORMALIZED TO A TOTAL FISSION		FARED 13485
	1 SOURCE OF 1.0)		FARED 13486
	WRITE (M6,3231)		FARED 13487
	WRITE (M6,3232)		FARED 13488
	DO 3120 J=1,MAG		FARED 13489
	WRITE (M6,3241) J, (PTERM(K,J),K=1,8)		FARED 13490
3120	CONTINUE		FARED 13491
	WRITE (M6,3251) (ZTERM(K),K=1,8)		FARED 13492
	RETURN		FARED 13493
	END		FARED 13494
			FARED 13495

C	SUBROUTINE REACT	FARED	13496
C		FARED	13497
C		FARED	13498
C	THIS SUBROUTINE PERFORMS THE REACTOR EDIT.	FARED	13499
C		FARED	13500
C		FARED	13501
	COMMON NTAPE(20)	FARED	13502
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZH,NN,POW,RO,RIN,RUT,CIN,MI	FARED	13503
	1CT,THE,IUDC,NIB,NOB,NCV,NBUCK,NWBM,NWZH,NWB,NSOU,NSO,TIME,PT	FARED	13504
	COMMON NSPARES(42)	FARED	13505
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	13506
	1D,BLANKS	FARED	13507
	COMMON NPOINT(20),ZONE(5000)	FARED	13508
	DIMENSION NZONE(2000)	FARED	13509
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	13510
	COMMON /ACA/ APHI(20,30),CRI(20),BRI(20)	FARED	13511
	COMMON/PDN/ PDEN(150),PDENP(20)	FARED	13512
	COMMON/GEO/ DELR(20),R(150),RI(150),LB(20)	FARED	13513
	COMMON/IBR/NBR,BN(20),BD(20)	FARED	13514
	COMMON/PARS/NSR,ICT,IGO,ICT2,N100,IFLX,COUT,MICT2,EIGEN,EIGEN1,P,	FARED	13515
	1PIH,IST	FARED	13516
	COMMON/FLX/ PTERM(8,20),PCORE(8),PBLNK(8),PREFL(8),ZTERM(8),SIGC(2	FARED	13517
	10,30),SIGF(20,30),SIGEP(20,30),PSF(30),PSC(30),PSEPS(30),ZDUM(1,0,	FARED	13518
	212),NUC(100),NUB(100),NUR(100),NUT(100),IBDS(30),EGRP(101),EPG(31)	FARED	13519
	3,DARG(150),IZO(20),ICOMP(30),DUMX(5,30),LID(100),FMAS(100)	FARED	13520
	M6=NTAPE(2)	FARED	13521
	ISOR=NTAPE(10)	FARED	13522
4500	DO 4501 I=1,NZ	FARED	13523
	DO 4501 K=1,8	FARED	13524
4501	PTERM(K,I)=0.0	FARED	13525
	DO 4502 K=1,8	FARED	13526
	PCORE(K)=0.0	FARED	13527
	PBLNK(K)=0.0	FARED	13528
	PREFL(K)=0.0	FARED	13529
4502	ZTERM(K)=0.0	FARED	13530
C		FARED	13531
C	READ AVERAGE FLUXES, POLYGROUP ENERGY BOUNDS AND	FARED	13532
C	MICROGROUP ENERGIES.	FARED	13533
C		FARED	13534
	REWIND ISOR	FARED	13535
	READ (ISOR)	FARED	13536
	READ (ISOR)	FARED	13537
	READ (ISOR)	FARED	13538
	READ (ISOR) ((APHI(I,J),J=1,MAG),I=1,NZ)	FARED	13539
	REWIND ISOR	FARED	13540
	NUUS=NTAPE(9)	FARED	13541
	REWIND N8DS	FARED	13542
	READ (N8DS) PGID,NGROUP	FARED	13543
	READ (N8DS) (IBDS(I),I=1,NGROUP)	FARED	13544
	REWIND N8DS	FARED	13545

	NERG=NTAPE(4)	FARED	13546
	REWIND NERG	FARED	13547
	READ (NERG) NFILE,JF,NZERO,NGRP	FARED	13548
	READ (NERG)	FARED	13549
	NGRP1=NGRP+1	FARED	13550
	READ (NERG) (EGRP(I),I=1,NGRP1)	FARED	13551
	REWIND NERG	FARED	13552
	EPG(1)=EGRP(1)	FARED	13553
	DO 4503 J=1,MAG	FARED	13554
	JDUM=IBDS(J)	FARED	13555
4503	EPG(J+1)=EGRP(JDUM+1)	FARED	13556
	MCORE=0	FARED	13557
	MBLNK=0	FARED	13558
	MREFL=0	FARED	13559
	MPRNT=1	FARED	13560
C		FARED	13561
C	CALCULATE THE TOTAL POWER, AVERAGE POWER DENSITY AND RATIO	FARED	13562
C	OF MAXIMUM-TO-AVERAGE POWER DENSITY FOR EACH ZONE.	FARED	13563
C		FARED	13564
	IF (TIME.EQ.0.0) GO TO 7200	FARED	13565
	CRC=0.	FARED	13566
	CRB=0.	FARED	13567
	CRR=0.	FARED	13568
	CRT=0.	FARED	13569
	BRB=0.	FARED	13570
	BRB=0.	FARED	13571
	BRR=0.	FARED	13572
	BRT=0.	FARED	13573
	DO 7050 I=1,NZ	FARED	13574
	IX=NPOINT(I)	FARED	13575
	IY=NZONE (IX+3)	FARED	13576
	RNUM=ZONE (IX+7)	FARED	13577
	RDEN=ZONE (IX+8)	FARED	13578
	IF (RDEN.EQ.0.0) GO TO 7005	FARED	13579
	CRI(I)=RNUM/RDEN	FARED	13580
	GO TO 7010	FARED	13581
7005	CRI(I)=0.	FARED	13582
7010	BRI(I)=RNUM	FARED	13583
	CRT=CRT+RNUM	FARED	13584
	BRT=BRT+RDEN	FARED	13585
	IF (IY.NE.1) GO TO 7020	FARED	13586
	CRC=CRC+RNUM	FARED	13587
	BRB=BRB+RDEN	FARED	13588
	GO TO 7050	FARED	13589
7020	IF (IY.NE.2) GO TO 7030	FARED	13590
	CRB=CRB+RNUM	FARED	13591
	BRB=BRB+RDEN	FARED	13592
	GO TO 7050	FARED	13593
7030	IF (IY.NE.3) GO TO 7050	FARED	13594
	CRR=CRR+RNUM	FARED	13595

7950	BRR=BRR+RDEN	FARED	13596
	CONTINUE	FARED	13597
	DO 7070 I=1,NZ	FARED	13598
7070	BRI(I)=BRI(I)/BRT	FARED	13599
	DUM=CRC	FARED	13600
	IF(BRC.NE.0.0) CRC=CRC/BRC	FARED	13601
	BRC=DUM/BRT	FARED	13602
	DUM=CRB	FARED	13603
	IF(BRB.NE.0.0) CRB=CRB/BRB	FARED	13604
	BRB=DUM/BRT	FARED	13605
	DUM=CRR	FARED	13606
	IF(BRR.NE.0.0) CRR=CRR/BRR	FARED	13607
	BRR=DUM/BRT	FARED	13608
	DUM=CRT	FARED	13609
	CRT=CRT/BRT	FARED	13610
	BRT=DUM/BRT	FARED	13611
7200	CONTINUE	FARED	13612
	DO 4510 I=1,NZ	FARED	13613
	IIN=1	FARED	13614
	IF(I.NE.1) IIN=LB(I-1)	FARED	13615
	IOUT=LB(I)	FARED	13616
	IPTS=IOUT-IIN+1	FARED	13617
	DARG(1)=PDEN(1)	FARED	13618
	IF(I.NE.1) DARG(1)=PDENP(I-1)	FARED	13619
	DO 4505 K=2,IPTS	FARED	13620
4505	DARG(K)=PDEN(IIN+K-1)	FARED	13621
	PTERM(1,I)=RINTG(DARG,I)*.000001	FARED	13622
	IX=NPOINT(I)	FARED	13623
	IY=NZONE(IX+3)	FARED	13624
	VOL=ZONE(IX+6)	FARED	13625
	IF(IY.EQ.1) PCORE(1)=PCORE(1)+PTERM(1,I)	FARED	13626
	IF(IY.EQ.2) PBLNK(1)=PBLNK(1)+PTERM(1,I)	FARED	13627
	IF(IY.EQ.3) PREFL(1)=PREFL(1)+PTERM(1,I)	FARED	13628
	ZTERM(1)=ZTERM(1)+PTERM(1,I)	FARED	13629
	PTERM(2,I)=VOL	FARED	13630
	IF(IY.EQ.1) PCORE(2)=PCORE(2)+VOL	FARED	13631
	IF(IY.EQ.2) PBLNK(2)=PBLNK(2)+VOL	FARED	13632
	IF(IY.EQ.3) PREFL(2)=PREFL(2)+VOL	FARED	13633
	ZTERM(2)=ZTERM(2)+VOL	FARED	13634
	DO 4506 K=1,IPTS	FARED	13635
	IF(DARG(K).GT.PTERM(3,I)) PTERM(3,I)=DARG(K)	FARED	13636
4506	CONTINUE	FARED	13637
	IF(IY.EQ.1.AND.PTERM(3,I).GT.PCORE(3)) PCORE(3)=PTERM(3,I)	FARED	13638
	IF(IY.EQ.2.AND.PTERM(3,I).GT.PBLNK(3)) PBLNK(3)=PTERM(3,I)	FARED	13639
	IF(IY.EQ.3.AND.PTERM(3,I).GT.PREFL(3)) PREFL(3)=PTERM(3,I)	FARED	13640
	IF(PTERM(3,I).GT.ZTERM(3)) ZTERM(3)=PTERM(3,I)	FARED	13641
4510	CONTINUE	FARED	13642
	IF(PCORE(2).NE.0.0) MCORE=1	FARED	13643
	IF(PBLNK(2).NE.0.0) MBLNK=1	FARED	13644
	IF(PREFL(2).NE.0.0) MREFL=1	FARED	13645

DO 4511 I=1,NZ	FARED	13646
4511 PTERM(2,I)=1000000.0*PTERM(1,I)/PTERM(2,I)	FARED	13647
IF(MCORE.EQ.1) PCORE(2)=1000000.0*PCORE(1)/PCORE(2)	FARED	13648
IF(MBLNK.EQ.1) PBLNK(2)=1000000.0*PBLNK(1)/PBLNK(2)	FARED	13649
IF(MREFL.EQ.1) PREFL(2)=1000000.0*PREFL(1)/PREFL(2)	FARED	13650
ZTERM(2)=1000000.0*ZTERM(1)/ZTERM(2)	FARED	13651
DO 4512 I=1,NZ	FARED	13652
4512 PTERM(3,I)=PTERM(3,I)/ZTERM(2)	FARED	13653
ZTERM(3)=ZTERM(3)/ZTERM(2)	FARED	13654
IF(MCORE.EQ.1) PCORE(3)=PCORE(3)/ZTERM(2)	FARED	13655
IF(MBLNK.EQ.1) PBLNK(3)=PBLNK(3)/ZTERM(2)	FARED	13656
IF(MREFL.EQ.1) PREFL(3)=PREFL(3)/ZTERM(2)	FARED	13657
C	FARED	13658
C	FARED	13659
C	FARED	13660
IF(IODC.NE.0) GO TO 3600	FARED	13661
IOPLT=NIAPE(19)	FARED	13662
REWIND IOPLT	FARED	13663
READ (IOPLT) IPLT,NB,MAG,MT	FARED	13664
DO 4530 KK=1,NB	FARED	13665
READ (IOPLT) IOB,NEL,KZO,(IZO(I),I=1,KZO)	FARED	13666
DO 4528 NL=1,NEL	FARED	13667
READ (IOPLT) ICOMP(NL),((DUMX(K,J),J=1,MAG),K=1,5)	FARED	13668
JC=ICOMP(NL)	FARED	13669
IC=JC-(JC/100000)*100000	FARED	13670
IF(IC.NE.90232.AND.IC.NE.92238.AND.IC.NE.94240) GO TO 4520	FARED	13671
DO 4518 I1=1,KZO	FARED	13672
I=IZO(I1)	FARED	13673
IX=NPOINT(I)	FARED	13674
VOL=ZONE (IX+6)	FARED	13675
CONCM=CONCENT (JC,I)	FARED	13676
DO 4516 J=1,MAG	FARED	13677
4516 PTERM(4,I)=PTERM(4,I)+VOL*CONCM*APHI(I,J)*DUMX(1,J)	FARED	13678
4518 CONTINUE	FARED	13679
GO TO 4528	FARED	13680
4520 IF(IC.NE.92233.AND.IC.NE.92235.AND.IC.NE.94239.AND.IC.NE.94241) GO	FARED	13681
1 TO 4523	FARED	13682
DO 4526 I1=1,KZO	FARED	13683
I=IZO(I1)	FARED	13684
IX=NPOINT(I)	FARED	13685
VOL=ZONE (IX+6)	FARED	13686
CONCM=CONCENT (JC,I)	FARED	13687
DO 4524 J=1,MAG	FARED	13688
4524 PTERM(5,I)=PTERM(5,I)+VOL*CONCM*APHI(I,J)*DUMX(3,J)	FARED	13689
4526 CONTINUE	FARED	13690
4528 CONTINUE	FARED	13691
4530 CONTINUE	FARED	13692
REWIND IOPLT	FARED	13693
GO TO 3700	FARED	13694
3600 IF(NBR.EQ.0) GO TO 3650	FARED	13695

	DO 3610 I=1,NZ	FARED	13696
	PTERM(4,I)=8N(I)	FARED	13697
3610	PTERM(5,I)=8D(I)	FARED	13698
	GO TO 3700	FARED	13699
3650	WRITE (M6,3660)	FARED	13700
3660	FORMAT (1H0,49H*** INSTANTANEOUS BREEDING RATIO IS UNDEFINED ***)	FARED	13701
	STOP	FARED	13702
3700	CONTINUE	FARED	13703
	DO 4540 I=1,NZ	FARED	13704
	ZTERM(4)=ZTERM(4)+PTERM(4,I)	FARED	13705
	ZTERM(5)=ZTERM(5)+PTERM(5,I)	FARED	13706
	IX=NPOINT(I)	FARED	13707
	IY=NZONE (IX+3)	FARED	13708
	IF (IY.NE.1) GO TO 4532	FARED	13709
	PCORE(4)=PCORE(4)+PTERM(4,I)	FARED	13710
	PCORE(5)=PCORE(5)+PTERM(5,I)	FARED	13711
	GO TO 4540	FARED	13712
4532	IF (IY.NE.2) GO TO 4534	FARED	13713
	PBLNK(4)=PBLNK(4)+PTERM(4,I)	FARED	13714
	PBLNK(5)=PBLNK(5)+PTERM(5,I)	FARED	13715
	GO TO 4540	FARED	13716
4534	IF (IY.NE.3) GO TO 4540	FARED	13717
	PREFL(4)=PREFL(4)+PTERM(4,I)	FARED	13718
	PREFL(5)=PREFL(5)+PTERM(5,I)	FARED	13719
4540	CONTINUE	FARED	13720
	IF (ZTERM(5).EQ.0.0) GO TO 4599	FARED	13721
	DO 4550 I=1,NZ	FARED	13722
	DUM=PTERM(5,I)	FARED	13723
	IF (DUM.EQ.0.0) GO TO 4545	FARED	13724
	PTERM(5,I)=PTERM(4,I)/ZTERM(5)	FARED	13725
	PTERM(4,I)=PTERM(4,I)/DUM	FARED	13726
	GO TO 4550	FARED	13727
4545	IF (PTERM(4,I).EQ.0.0) GO TO 4546	FARED	13728
	PTERM(5,I)=PTERM(4,I)/ZTERM(5)	FARED	13729
	GO TO 4547	FARED	13730
4546	PTERM(5,I)=0.0	FARED	13731
4547	PTERM(4,I)=0.0	FARED	13732
4550	CONTINUE	FARED	13733
	IF (MPCORE.NE.1) GO TO 4560	FARED	13734
	DUM=PCORE(5)	FARED	13735
	IF (DUM.EQ.0.0) GO TO 4555	FARED	13736
	PCORE(5)=PCORE(4)/ZTERM(5)	FARED	13737
	PCORE(4)=PCORE(4)/DUM	FARED	13738
	GO TO 4560	FARED	13739
4555	IF (PCORE(4).EQ.0.0) GO TO 4556	FARED	13740
	PCORE(5)=PCORE(4)/ZTERM(5)	FARED	13741
	GO TO 4557	FARED	13742
4556	PCORE(5)=0.0	FARED	13743
4557	PCORE(4)=0.0	FARED	13744
4560	IF (MBLKN.NE.1) GO TO 4570	FARED	13745

	DUM=PBLNK(5)	FARED	13746
	IF(DUM.EQ.0.0) GO TO 4565	FARED	13747
	PBLNK(5)=PBLNK(4)/ZTERM(5)	FARED	13748
	PBLNK(4)=PBLNK(4)/DUM	FARED	13749
	GO TO 4570	FARED	13750
4565	IF(PBLNK(4).EQ.0.0) GO TO 4566	FARED	13751
	PBLNK(5)=PBLNK(4)/ZTERM(5)	FARED	13752
	GO TO 4567	FARED	13753
4566	PBLNK(5)=0.0	FARED	13754
4567	PBLNK(4)=0.0	FARED	13755
4570	IF(MREFL.NE.1) GO TO 4580	FARED	13756
	DUM=PREFL(5)	FARED	13757
	IF(DUM.EQ.0.0) GO TO 4575	FARED	13758
	PREFL(5)=PREFL(4)/ZTERM(5)	FARED	13759
	PREFL(4)=PREFL(4)/DUM	FARED	13760
	GO TO 4580	FARED	13761
4575	IF(PREFL(4).EQ.0.0) GO TO 4576	FARED	13762
	PREFL(5)=PREFL(4)/ZTERM(5)	FARED	13763
	GO TO 4577	FARED	13764
4576	PREFL(5)=0.0	FARED	13765
4577	PREFL(4)=0.0	FARED	13766
4580	DUM=ZTERM(5)	FARED	13767
	ZTERM(5)=ZTERM(4)/ZTERM(5)	FARED	13768
	ZTERM(4)=ZTERM(4)/DUM	FARED	13769
4599	CONTINUE	FARED	13770
C		FARED	13771
C	CALCULATE MEDIAN FISSION, ABSORPTION AND FLUX ENERGIES.	FARED	13772
C		FARED	13773
	MC=NTAPE(17)	FARED	13774
	REWIND MC	FARED	13775
	READ (MC) NTID,NTS,NZ,MAG	FARED	13776
	READ (MC) ((SIGF(I,J),I=1,NZ),J=1,MAG)	FARED	13777
	READ (MC) ((SIGC(I,J),I=1,NZ),J=1,MAG)	FARED	13778
	REWIND MC	FARED	13779
	DO 4610 I=1,NZ	FARED	13780
	IX=NPOINT(I)	FARED	13781
	VOL=ZONE(IX+6)	FARED	13782
	DO 4610 J=1,MAG	FARED	13783
	SIGF(I,J)=VOL*APHI(I,J)*SIGF(I,J)	FARED	13784
	SIGC(I,J)=VOL*APHI(I,J)*SIGC(I,J)	FARED	13785
4610	SIGEP(I,J)=VOL*APHI(I,J)	FARED	13786
	DO 4620 I=1,NZ	FARED	13787
	DO 4612 J=1,MAG	FARED	13788
	PSF(J)=SIGF(I,J)	FARED	13789
	PSC(J)=SIGC(I,J)	FARED	13790
4612	PSEPS(J)=SIGEP(I,J)	FARED	13791
	PTERM(6,I)=AVRAT(PSF,EPG)	FARED	13792
	PTERM(7,I)=AVRAT(PSC,EPG)	FARED	13793
4620	PTERM(8,I)=AVRAT(PSEPS,EPG)	FARED	13794
	DO 4625 J=1,MAG	FARED	13795

	PSF(J)=0.0	FARED	13796
	PSC(J)=0.0	FARED	13797
4625	PSEPS(J)=0.0	FARED	13798
	DO 4630 I=1,NZ	FARED	13799
	DO 4630 J=1,MAG	FARED	13800
	PSF(J)=PSF(J)+SIGF(I,J)	FARED	13801
	PSC(J)=PSC(J)+SIGC(I,J)	FARED	13802
4630	PSEPS(J)=PSEPS(J)+SIGEP(I,J)	FARED	13803
	ZTERM(6)=AVRAT(PSF,EPG)	FARED	13804
	ZTERM(7)=AVRAT(PSC,EPG)	FARED	13805
	ZTERM(8)=AVRAT(PSEPS,EPG)	FARED	13806
	DO 4635 J=1,MAG	FARED	13807
	PSF(J)=0.0	FARED	13808
	PSC(J)=0.0	FARED	13809
4635	PSEPS(J)=0.0	FARED	13810
	IF(MCORE.NE.1) GO TO 4650	FARED	13811
	DO 4640 I=1,NZ	FARED	13812
	IX=NPOINT(I)	FARED	13813
	IY=NZONE(IX+3)	FARED	13814
	IF(IY.NE.1) GO TO 4640	FARED	13815
	DO 4637 J=1,MAG	FARED	13816
	PSF(J)=PSF(J)+SIGF(I,J)	FARED	13817
	PSC(J)=PSC(J)+SIGC(I,J)	FARED	13818
4637	PSEPS(J)=PSEPS(J)+SIGEP(I,J)	FARED	13819
4640	CONTINUE	FARED	13820
	PCORE(6)=AVRAT(PSF,EPG)	FARED	13821
	PCORE(7)=AVRAT(PSC,EPG)	FARED	13822
	PCORE(8)=AVRAT(PSEPS,EPG)	FARED	13823
4650	DO 4655 J=1,MAG	FARED	13824
	PSF(J)=0.0	FARED	13825
	PSC(J)=0.0	FARED	13826
4655	PSEPS(J)=0.0	FARED	13827
	IF(MBLNK.NE.1) GO TO 4670	FARED	13828
	DO 4660 I=1,NZ	FARED	13829
	IX=NPOINT(I)	FARED	13830
	IY=NZONE(IX+3)	FARED	13831
	IF(IY.NE.2) GO TO 4660	FARED	13832
	DO 4657 J=1,MAG	FARED	13833
	PSF(J)=PSF(J)+SIGF(I,J)	FARED	13834
	PSC(J)=PSC(J)+SIGC(I,J)	FARED	13835
4657	PSEPS(J)=PSEPS(J)+SIGEP(I,J)	FARED	13836
4660	CONTINUE	FARED	13837
	PBLNK(6)=AVRAT(PSF,EPG)	FARED	13838
	PBLNK(7)=AVRAT(PSC,EPG)	FARED	13839
	PBLNK(8)=AVRAT(PSEPS,EPG)	FARED	13840
4670	DO 4675 J=1,MAG	FARED	13841
	PSF(J)=0.0	FARED	13842
	PSC(J)=0.0	FARED	13843
4675	PSEPS(J)=0.0	FARED	13844
	IF(MREFL.NE.1) GO TO 4690	FARED	13845

DO 4680 I=1,NZ	FARED	13846
IX=NPOINT(I)	FARED	13847
IY=NZONE (IX+3)	FARED	13848
IF(IY.NE.3) GO TO 4680	FARED	13849
DO 4677 J=1,MAG	FARED	13850
PSF(J)=PSF(J)+SIGF(I,J)	FARED	13851
PSC(J)=PSC(J)+SIGC(I,J)	FARED	13852
4677 PSEPS(J)=PSEPS(J)+SIGEP(I,J)	FARED	13853
4680 CONTINUE	FARED	13854
PREFL(6)=AVRAT(PSF,EPG)	FARED	13855
PREFL(7)=AVRAT(PSC,EPG)	FARED	13856
PREFL(8)=AVRAT(PSEPS,EPG)	FARED	13857
4690 CONTINUE	FARED	13858
4700 FORMAT (1H1,1H)	FARED	13859
4701 FORMAT (1H0,1H)	FARED	13860
4702 FORMAT (1H1,40X,32H* * * * REACTOR EDIT * * * * //)	FARED	13861
4703 FORMAT (1H ,10X,5HZONE ,12//)	FARED	13862
4704 FORMAT (1H ,20X,15HVOLUME (LITERS),44X,2H= ,E12.5)	FARED	13863
4705 FORMAT (1H ,20X,10HPOWER (MW),49X,2H= ,E12.5)	FARED	13864
4706 FORMAT (1H ,20X,36HAVERAGE POWER DENSITY (WATTS PER CC),23X,2H= ,E12.5)	FARED	13865
4707 FORMAT (1H ,20X,49HRATIO OF MAXIMUM-TO-REACTOR AVERAGE POWER DENSITY,10X,2H= ,E12.5)	FARED	13866
4708 FORMAT (1H ,20X,30HINSTANTANEOUS CONVERSION RATIO,29X,2H= ,E12.5)	FARED	13867
4709 FORMAT (1H ,20X,28HINSTANTANEOUS BREEDING RATIO,31X,2H= ,E12.5)	FARED	13868
4710 FORMAT (1H ,20X,27HMEDIAN FISSION ENERGY (KEV),32X,2H= ,E12.5)	FARED	13869
4711 FORMAT (1H ,20X,30HMEDIAN ABSORPTION ENERGY (KEV),29X,2H= ,E12.5)	FARED	13870
4712 FORMAT (1H ,20X,24HMEDIAN FLUX ENERGY (KEV),35X,2H= ,E12.5/)	FARED	13871
4713 FORMAT (1H0,20X,7HNUCLIDE,10X,13HCONCENTRATION,13X,4HMASS,18X,5HPOWER)	FARED	13872
4714 FORMAT (1H ,33X,20H(NUCLEI PER BARN-CM),10X,4H(KG),18X,4H(MW)/)	FARED	13873
4715 FORMAT (1H ,21X,A4,A2,3 (10X,E12.5))	FARED	13874
C	FARED	13875
READ NUCLIDE ATOMIC MASSES FROM RETAP FILE 7.	FARED	13876
C	FARED	13877
4776 FORMAT (1H ,20X,27HINTEGRATED CONVERSION RATIO,32X,2H= ,E12.5)	FARED	13878
4777 FORMAT (1H ,20X,25HINTEGRATED BREEDING RATIO,34X,2H= ,E12.5/)	FARED	13879
NTM=0	FARED	13880
ITAP=NTAPE(4)	FARED	13881
4950 READ (ITAP) FI,JF,ISO,NGP	FARED	13882
IF(EUF,ITAP) 4954,4951	FARED	13883
4951 CALL SCAN(6HFILE**,FI,IFIL)	FARED	13884
GO TO (4952,4954),IFIL	FARED	13885
4952 IF(JF-7) 4953,4960,4955	FARED	13886
4953 CALL REUF(ITAP)	FARED	13887
GO TO 4950	FARED	13888
4954 IF(NTM.NE.0) GO TO 5000	FARED	13889
NTM=1	FARED	13890
REWIND ITAP	FARED	13891
GO TO 4950	FARED	13892
	FARED	13893
	FARED	13894
	FARED	13895

4955	IF(NTH.NE.0) GO TO 5000	FARED	13896
	NTM=1	FARED	13897
	REWIND ITAP	FARED	13898
4960	CONTINUE	FARED	13899
	READ(ITAP) ((LID(I),N1,N2,N3,N4,N5,N6,FMAS(I),N7,N8),I=1,ISO)	FARED	13900
	GO TO 5010	FARED	13901
5000	WRITE (M6,5001)	FARED	13902
5001	FORMAT (1H0,20HFILE 7 NOT FOUND ***)	FARED	13903
	STOP	FARED	13904
5010	DO 4716 L=1,100	FARED	13905
	DO 4716 J=1,12	FARED	13906
4716	ZDUM(L,J)=0.0	FARED	13907
	VOLC=0.0	FARED	13908
	VOLB=0.0	FARED	13909
	VOLR=0.0	FARED	13910
	VOLT=0.0	FARED	13911
	NELB=J	FARED	13912
	NELC=0	FARED	13913
	NELR=J	FARED	13914
	NELT=0	FARED	13915
	WRITE (M6,4702)	FARED	13916
	IF(TIME.NE.0.) WRITE (M6,3362) TIME	FARED	13917
3362	FORMAT (1H ,45X,14HTIME (DAYS) = ,F7.2/)	FARED	13918
C		FARED	13919
C	CALCULATE THE MASS AND POWER FOR EACH NUCLIDE IN A ZONE	FARED	13920
C	AND PRINT THE REACTOR EDIT PARAMETERS FOR EACH ZONE.	FARED	13921
C		FARED	13922
	DO 4800 I=1,NZ	FARED	13923
	IX=NPOINT(I)	FARED	13924
	IY=NZONE (IX+3)	FARED	13925
	VOL=ZONE (IX+6)	FARED	13926
	VOL1=0.001*VOL	FARED	13927
	IF(IY.EQ.1) VOLC=VOLC+VOL1	FARED	13928
	IF(IY.EQ.2) VOLB=VOLB+VOL1	FARED	13929
	IF(IY.EQ.3) VOLR=VOLR+VOL1	FARED	13930
	VOLT=VOLT+VOL1	FARED	13931
	IF(I.GT.1) WRITE (M6,4700)	FARED	13932
	WRITE (M6,4703) I	FARED	13933
	WRITE (M6,4704) VOL1	FARED	13934
	WRITE (M6,4705) PTERM(1,I)	FARED	13935
	WRITE (M6,4706) PTERM(2,I)	FARED	13936
	WRITE (M6,4707) PTERM(3,I)	FARED	13937
	WRITE (M6,4708) PTERM(4,I)	FARED	13938
	WRITE (M6,4709) PTERM(5,I)	FARED	13939
	WRITE (M6,4710) PTERM(6,I)	FARED	13940
	WRITE (M6,4711) PTERM(7,I)	FARED	13941
	WRITE (M6,4712) PTERM(8,I)	FARED	13942
	IF(TIME.EQ.0.0) GO TO 7300	FARED	13943
	WRITE (M6,4776) CRI(I)	FARED	13944
	WRITE (M6,4777) BRI(I)	FARED	13945

7300	CONTINUE	FARED	13946
	WRITE (M6,4713)	FARED	13947
	WRITE (M6,4714)	FARED	13948
	IDPLT=NTAPE(19)	FARED	13949
	REWIND IDPLT	FARED	13950
	READ (IDPLT) IPLT,NB,MAG,MT	FARED	13951
	DO 4720 KK=1,NB	FARED	13952
	READ (IDPLT) IDB,NEL,KZO,(IZO(K),K=1,KZO)	FARED	13953
	DO 4718 K=1,KZO	FARED	13954
	IF (IZO(K).EQ.I) GO TO 4721	FARED	13955
4718	CONTINUE	FARED	13956
	DO 4719 L=1,NEL	FARED	13957
	READ (IDPLT) ICOMP(L),((PSF(J),J=1,MAG),JJ=1,5)	FARED	13958
4719	CONTINUE	FARED	13959
4720	CONTINUE	FARED	13960
4721	DO 4750 L=1,NEL	FARED	13961
	READ (IDPLT) ICOMP(L),((PSF(J),J=1,MAG),JJ=1,5)	FARED	13962
	IC=ICOMP(L)	FARED	13963
	DO 4722 LL=1,ISO	FARED	13964
	LD=LL	FARED	13965
	IF (LD(LL).EQ.IC) GO TO 4723	FARED	13966
4722	CONTINUE	FARED	13967
4723	CONCM=CONCENT(IC,I)	FARED	13968
	ZMAS=CONCM*VOL*FMAS(LD)/602.5	FARED	13969
	ZPOW=0.0	FARED	13970
	DO 4724 J=1,MAG	FARED	13971
4724	ZPOW=ZPOW+CONCM*VOL*APHI(I,J)*PSF(J)*(1.603 E-19)	FARED	13972
	CALL CONVL(IC,ZNAME1,ZNAME2)	FARED	13973
	WRITE (M6,4715) ZNAME1,ZNAME2,CONCM,ZMAS,ZPOW	FARED	13974
	IF (IY.NE.1) GO TO 4725	FARED	13975
	ZDUM(LD,1)=ZDUM(LD,1)+CONCM	FARED	13976
	ZDUM(LD,2)=ZDUM(LD,2)+ZMAS	FARED	13977
	ZDUM(LD,3)=ZDUM(LD,3)+ZPOW	FARED	13978
	NELC=NELC+1	FARED	13979
	NUC(NELC)=IC	FARED	13980
	GO TO 4730	FARED	13981
4725	IF (IY.NE.2) GO TO 4726	FARED	13982
	ZDUM(LD,4)=ZDUM(LD,4)+CONCM	FARED	13983
	ZDUM(LD,5)=ZDUM(LD,5)+ZMAS	FARED	13984
	ZDUM(LD,6)=ZDUM(LD,6)+ZPOW	FARED	13985
	NELB=NELB+1	FARED	13986
	NUB(NELB)=IC	FARED	13987
	GO TO 4730	FARED	13988
4726	IF (IY.NE.3) GO TO 4730	FARED	13989
	ZDUM(LD,7)=ZDUM(LD,7)+CONCM	FARED	13990
	ZDUM(LD,8)=ZDUM(LD,8)+ZMAS	FARED	13991
	ZDUM(LD,9)=ZDUM(LD,9)+ZPOW	FARED	13992
	NELR=NELR+1	FARED	13993
	NUR(NELR)=IC	FARED	13994
4730	CONTINUE	FARED	13995

	ZDUM(LD,10)=ZDUM(LD,10)+CONCM	FARED	13996
	ZDUM(LD,11)=ZDUM(LD,11)+ZMAS	FARED	13997
	ZDUM(LD,12)=ZDUM(LD,12)+ZPOW	FARED	13998
	NELT=NELT+1	FARED	13999
	NUT(NELT)=IC	FARED	14000
4750	CONTINUE	FARED	14001
4800	CONTINUE	FARED	14002
C		FARED	14003
C	PRINT THE EDIT QUANTITIES FOR CORE, BLANKET, REFLECTOR	FARED	14004
C	AND REACTOR.	FARED	14005
C		FARED	14006
	IF(MCORE.NE.1) GO TO 4820	FARED	14007
	WRITE (M6,4801)	FARED	14008
4801	FORMAT (1H1,10X,4HCORE/)	FARED	14009
	WRITE (M6,4704) VOLC	FARED	14010
	WRITE (M6,4705) PCORE(1)	FARED	14011
	WRITE (M6,4706) PCORE(2)	FARED	14012
	WRITE (M6,4707) PCORE(3)	FARED	14013
	WRITE (M6,4708) PCORE(4)	FARED	14014
	WRITE (M6,4709) PCORE(5)	FARED	14015
	WRITE (M6,4710) PCORE(6)	FARED	14016
	WRITE (M6,4711) PCORE(7)	FARED	14017
	WRITE (M6,4712) PCORE(8)	FARED	14018
	IF(TIME.EQ.0.0) GO TO 7400	FARED	14019
	WRITE (M6,4776) CRC	FARED	14020
	WRITE (M6,4777) BRC	FARED	14021
7400	CONTINUE	FARED	14022
	WRITE (M6,4713)	FARED	14023
	WRITE (M6,4714)	FARED	14024
	DO 4810 L=1,ISO	FARED	14025
	DO 6610 I=1,NELC	FARED	14026
	IF(LID(L).EQ.NUC(I)) GO TO 6620	FARED	14027
6610	CONTINUE	FARED	14028
	GO TO 4810	FARED	14029
6620	CONTINUE	FARED	14030
	CALL CONVL(LID(L),ZNAME1,ZNAME2)	FARED	14031
	WRITE (M6,4715) ZNAME1,ZNAME2,(ZDUM(L,K),K=1,3)	FARED	14032
4810	CONTINUE	FARED	14033
4820	IF(MBLNK.NE.1) GO TO 4840	FARED	14034
	WRITE (M6,4821)	FARED	14035
4821	FORMAT (1H1,10X,7HBLANKET/)	FARED	14036
	WRITE (M6,4704) VOLB	FARED	14037
	WRITE (M6,4705) PBLNK(1)	FARED	14038
	WRITE (M6,4706) PBLNK(2)	FARED	14039
	WRITE (M6,4707) PBLNK(3)	FARED	14040
	WRITE (M6,4708) PBLNK(4)	FARED	14041
	WRITE (M6,4709) PBLNK(5)	FARED	14042
	WRITE (M6,4710) PBLNK(6)	FARED	14043
	WRITE (M6,4711) PBLNK(7)	FARED	14044
	WRITE (M6,4712) PBLNK(8)	FARED	14045

	IF (TIME.EQ.0.0) GO TO 7500	FARED	14046
	WRITE (M6,4776) CRB	FARED	14047
	WRITE (M6,4777) BRB	FARED	14048
7500	CONTINUE	FARED	14049
	WRITE (M6,4713)	FARED	14050
	WRITE (M6,4714)	FAREU	14051
	DO 4830 L=1,ISO	FARED	14052
	DO 6630 I=1,NELB	FARED	14053
	IF (LID(L).EQ.NUB(I)) GO TO 6640	FARED	14054
6630	CONTINUE	FARED	14055
	GO TO 4830	FARED	14056
6640	CONTINUE	FARED	14057
	CALL CONVL (LID(L),ZNAME1,ZNAME2)	FARED	14058
	WRITE (M6,4715) ZNAME1,ZNAME2,(ZDUM(L,K),K=4,6)	FARED	14059
4830	CONTINUE	FARED	14060
4840	IF (MREFL.NE.1) GO TO 4860	FARED	14061
	WRITE (M6,4841)	FAREU	14062
4841	FORMAT (1H1,10X,9HREFLECTOR/)	FARED	14063
	WRITE (M6,4704) VOLR	FARED	14064
	WRITE (M6,4705) PREFL(1)	FARED	14065
	WRITE (M6,4706) PREFL(2)	FARED	14066
	WRITE (M6,4707) PREFL(3)	FARED	14067
	WRITE (M6,4708) PREFL(4)	FARED	14068
	WRITE (M6,4709) PREFL(5)	FARED	14069
	WRITE (M6,4710) PREFL(6)	FARED	14070
	WRITE (M6,4711) PREFL(7)	FARED	14071
	WRITE (M6,4712) PREFL(8)	FARED	14072
	IF (TIME.EQ.0.0) GO TO 7600	FARED	14073
	WRITE (M6,4776) CRR	FAREU	14074
	WRITE (M6,4777) BRR	FARED	14075
7600	CONTINUE	FARED	14076
	WRITE (M6,4713)	FARED	14077
	WRITE (M6,4714)	FARED	14078
	DO 4850 L=1,ISO	FARED	14079
	DO 6650 I=1,NELR	FARED	14080
	IF (LID(L).EQ.NUR(I)) GO TO 6660	FARED	14081
6650	CONTINUE	FARED	14082
	GO TO 4850	FARED	14083
6660	CONTINUE	FARED	14084
	CALL CONVL (LID(L),ZNAME1,ZNAME2)	FARED	14085
	WRITE (M6,4715) ZNAME1,ZNAME2,(ZDUM(L,K),K=7,9)	FARED	14086
4850	CONTINUE	FARED	14087
4860	WRITE (M6,4861)	FARED	14088
4861	FORMAT (1H1,10X,7HREACTOR/)	FARED	14089
	WRITE (M6,4704) VOLT	FARED	14090
	WRITE (M6,4705) ZTERM(1)	FARED	14091
	WRITE (M6,4706) ZTERM(2)	FARED	14092
	WRITE (M6,4707) ZTERM(3)	FARED	14093
	WRITE (M6,4708) ZTERM(4)	FARED	14094
	WRITE (M6,4709) ZTERM(5)	FARED	14095

	WRITE (M6,4710) ZTERM(6)	FARED	14096
	WRITE (M6,4711) ZTERM(7)	FARED	14097
	WRITE (M6,4712) ZTERM(8)	FARED	14098
	IF (TIME.EQ.0.0) GO TO 7700	FARED	14099
	WRITE (M6,4776) CRT	FARED	14100
	WRITE (M6,4777) BRT	FARED	14101
7700	CONTINUE	FARED	14102
	WRITE (M6,4713)	FARED	14103
	WRITE (M6,4714)	FARED	14104
	DO 4870 L=1,ISO	FARED	14105
	DO 6670 I=1,NELT	FARED	14106
	IF (LID(L).EQ.NUT(I)) GO TO 6680	FARED	14107
6670	CONTINUE	FARED	14108
	GO TO 4870	FARED	14109
6680	CONTINUE	FARED	14110
	CALL CONVL (LID(L),ZNAME1,ZNAME2)	FARED	14111
	WRITE (M6,4715) ZNAME1,ZNAME2,(ZDUM(L,K),K=10,12)	FARED	14112
4870	CONTINUE	FARED	14113
	RETURN	FARED	14114
	END	FARED	14115

	FUNCTION AVRAT(RAT,ENG)	FARED	14116
C		FARED	14117
C		FARED	14118
C	THIS FUNCTION COMPUTES A SPECIFIED MEDIAN REACTION	FARED	14119
C	RATE ENERGY. ARRAYS RAT AND ENG CONTAIN THE REACTION	FARED	14120
C	RATES AND ENERGIES FOR EACH GROUP, RESPECTIVELY.	FARED	14121
C		FARED	14122
C		FARED	14123
	COMMON NTAPE(20)	FARED	14124
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBH,NZM,NN,POW,RO,RIN,RUT,CIN,MI	FARED	14125
	1CT,THE,IDDC,NIB,NOB,NCV,NBUCK,NWBM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	14126
	COMMON NSPARES(42)	FARED	14127
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	14128
	10,BLANKS	FARED	14129
	COMMON NPOINT(20),ZONE(500J)	FARED	14130
	DIMENSION NZONE(2000)	FARED	14131
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	14132
	DIMENSION RAT(30),ENG(31)	FARED	14133
	SUM=0.0	FARED	14134
	TOTAL=0.0	FARED	14135
	DO 1 J=1,MAG	FARED	14136
1	TOTAL=TOTAL+RAT(J)	FARED	14137
	IF(TOTAL.EQ.0.0) GO TO 4	FARED	14138
	DO 2 J=1,MAG	FARED	14139
	SUM=SUM+RAT(J)	FARED	14140
	JPLUS=J	FARED	14141
	IF(SUM.GT.0.5*TOTAL) GO TO 3	FARED	14142
2	CONTINUE	FARED	14143
3	DUM1=ALOG(ENG(1)/ENG(JPLUS+1))	FARED	14144
	DUM2=ALOG(ENG(1)/ENG(JPLUS))	FARED	14145
	DUM3=DUM1-(DUM1-DUM2)*(SUM-J.5*TOTAL)/RAT(JPLUS)	FARED	14146
	AVRAT=0.001*ENG(1)*EXP(-DUM3)	FARED	14147
	GO TO 1J	FARED	14148
4	AVRAT=0.0	FARED	14149
10	CONTINUE	FARED	14150
	RETURN	FARED	14151
	END	FARED	14152

C	SUBROUTINE RATES	FARED	14153
C		FARED	14154
C		FARED	14155
C	THIS SUBROUTINE PERFORMS THE REACTION RATES EDIT.	FARED	14156
C		FARED	14157
	COMMON NTAPE(20)	FARED	14158
	COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RO,RIN,RUT,CIN,MI	FARED	14159
	ICT,THE,IDDC,NIB,NOB,NCV,NBUCK,NWBH,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	14160
	COMMON NSPARES(42)	FARED	14161
	COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	14162
	10,BLANKS	FARED	14163
	COMMON NPOINT(20),ZONE(5000)	FARED	14164
	DIMENSION NZONE(2000)	FARED	14165
	EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	14166
	COMMON/ACA/ APhi(20,30)	FARED	14167
	COMMON /MIS/ CHI(20,30)	FARED	14168
	COMMON/FLX/ NZIO(20),IDN(20,30),RC(20,30),RF(20,30),RNF(20,30),RN(	FARED	14169
	120,30),RP(20,30),ICOMP(30),NCAP(30),NFIS(30),N2N(30),NDEL(30),NTR(	FARED	14170
	230),DUMX(5,30),IDZON(20),CRC(30),BRC(30),RRC(30),TRC(30),CRF(30),B	FARED	14171
	JRF(30),RRF(30),TRF(30),CRNF(30),BRNF(30),RRNF(30),TRNF(30),CRN(30)	FARED	14172
	4,BRN(30),RRN(30),TRN(30),CRP(30),BRP(30),RRP(30),TRP(30),IDNC(30),	FARED	14173
	5IDNB(30),IDNR(30),IDNT(30),TOT(5,20),TOTC(5),TOTB(5),TOTR(5),TOTT(	FARED	14174
	65)	FARED	14175
		FARED	14176
		FARED	14177
C	READ THE ZONE-AVERAGED FLUXES.	FARED	14178
C		FARED	14179
C	COMMON /PARS/NSR,ICT,IGO,ICT2,N100,IFLX,COUT,MICT2,EIGEN,EIGEN1,P,	FARED	14180
	1PIM,IST	FARED	14181
	M6=NTAPE(2)	FARED	14182
	ISOR=NTAPE(10)	FARED	14183
	REWIND ISOR	FARED	14184
	READ(ISOR) DUMDUM	FARED	14185
	READ(ISOR) DUMDUM	FARED	14186
	READ(ISOR) DUMDUM	FARED	14187
	READ(ISOR) ((APHI(I,J),J=1,MAG),I=1,NZ)	FARED	14188
	REWIND ISOR	FARED	14189
	DO 7010 I=1,NZ	FARED	14190
	NZIO(I)=0	FARED	14191
	DO 7010 J=1,30	FARED	14192
	IDN(I,J)=0	FARED	14193
	RC(I,J)=0.0	FARED	14194
	RF(I,J)=0.0	FARED	14195
	RNF(I,J)=0.0	FARED	14196
	RN(I,J)=0.0	FARED	14197
7010	RP(I,J)=0.0	FARED	14198
	DO 7020 I=1,5	FARED	14199
	TOTC(I)=0.0	FARED	14200
	TOTB(I)=0.0	FARED	14201
	TOTR(I)=0.0	FARED	14202

	TOTT(I)=0.0	FARED	14203
	DO 7020 J=1,NZ	FARED	14204
7020	TOT(I,J)=0.0	FARED	14205
C		FARED	14206
C	READ MICROSCOPIC CROSS SECTIONS FOR EACH NUCLIDE AND	FARED	14207
C	CALCULATE THE CORRESPONDING REACTION RATES.	FARED	14208
C		FARED	14209
	MAC=NTAPE(14)	FARED	14210
	REWIND MAC	FARED	14211
	READ(MAC) MTP,NBK,MAGK,NDSK	FARED	14212
	DO 7200 MMK=1,NBK	FARED	14213
	READ(MAC) IDB,NEL,(ICOMP(I),NCAP(I),NFIS(I),NZN(I),NDEL(I),NTR(I),	FARED	14214
	1I=1,NEL)	FARED	14215
	MAG1=MAG-1	FARED	14216
	DO 7100 KK=1,MAG1	FARED	14217
	DO 7100 II=1,NEL	FARED	14218
	IF(NTR(II).LE.J) GO TO 7100	FARED	14219
	LR=MIND(NDS,MAG-KK)	FARED	14220
	READ(MAC) DUMDUM	FARED	14221
7100	CONTINUE	FARED	14222
	READ(MAC) DUMDUM	FARED	14223
	DO 7200 NL=1,NEL	FARED	14224
	DO 7101 LSET=1,MAG	FARED	14225
	DO 7101 NSET=1,5	FARED	14226
7101	DUMX(NSET,LSET)=0.0	FARED	14227
	READ(MAC) DUMDUM	FARED	14228
	IF(NCAP(NL).NE.J) READ(MAC) (DUMX(1,J),J=1,MAG)	FARED	14229
	IF(NFIS(NL).NE.0) READ(MAC) ((DUMX(2,I),I=1,MAG),(DUMX(3,J),J=1,MA	FARED	14230
	1G))	FARED	14231
	IF(NZN(NL).NE.J) READ(MAC) (DUMX(4,J),J=1,MAG)	FARED	14232
	IF(NDEL(NL).NE.J) READ(MAC) (DUMX(5,J),J=1,MAG)	FARED	14233
	DO 7102 J=1,MAG	FARED	14234
7102	DUMX(5,J)=DUMX(5,J)+DUMX(4,J)	FARED	14235
	IC=ICOMP(NL)	FARED	14236
	CALL ZOLIST(IC,IDB,KZON,IDZON)	FARED	14237
	DO 7120 K=1,KZON	FARED	14238
	DO 7103 KZ=1,NZ	FARED	14239
	IP=NPOINT(KZ)	FARED	14240
	IDZ=KZ	FARED	14241
	IZ=NZONE(IP)	FARED	14242
	IF(IZ.EQ.IDZON(K)) GO TO 7105	FARED	14243
7103	CONTINUE	FARED	14244
	GO TO 7120	FARED	14245
7105	VOL=ZONE(IP+6)	FARED	14246
	IDUM=NZID(IDZ)+1	FARED	14247
	NZID(IDZ)=IDUM	FARED	14248
	IDN(IDZ,IDUM)=IC	FARED	14249
	CON=CONCENT(IC,IDZ)	FARED	14250
	DO 7110 J=1,MAG	FARED	14251
	RC(IDZ,IDUM)=RC(IDZ,IDUM)+DUMX(1,J)*APHI(IDZ,J)	FARED	14252

	RF(IDZ, IDUM)=RF(IDZ, IDUM)+DUMX(2, J)*APHI(IDZ, J)	FARED	14253
	RNF(IDZ, IDUM)=RNF(IDZ, IDUM)+DUMX(2, J)*DUMX(3, J)*APHI(IDZ, J)	FARED	14254
	RN(IDZ, IDUM)=RN(IDZ, IDUM)+DUMX(4, J)*APHI(IDZ, J)	FARED	14255
	RP(IDZ, IDUM)=RP(IDZ, IDUM)+DUMX(5, J)*APHI(IDZ, J)	FARED	14256
7110	CONTINUE	FARED	14257
	RC(IDZ, IDUM)=RC(IDZ, IDUM)*VOL*CON	FARED	14258
	RF(IDZ, IDUM)=RF(IDZ, IDUM)*VOL*CON	FARED	14259
	RNF(IDZ, IDUM)=RNF(IDZ, IDUM)*VOL*CON/EIGEN	FARED	14260
	RN(IDZ, IDUM)=RN(IDZ, IDUM)*VOL*CON	FARED	14261
	RP(IDZ, IDUM)=RP(IDZ, IDUM)*VOL*CON	FARED	14262
	TOT(1, IDZ)=TOT(1, IDZ)+RC(IDZ, IDUM)	FARED	14263
	TOT(2, IDZ)=TOT(2, IDZ)+RF(IDZ, IDUM)	FARED	14264
	TOT(3, IDZ)=TOT(3, IDZ)+RNF(IDZ, IDUM)	FARED	14265
	TOT(4, IDZ)=TOT(4, IDZ)+RN(IDZ, IDUM)	FARED	14266
	TOT(5, IDZ)=TOT(5, IDZ)+RP(IDZ, IDUM)	FARED	14267
7120	CONTINUE	FARED	14268
7200	CONTINUE	FARED	14269
C		FARED	14270
C	CALCULATE THE REACTION RATES FOR CORE, BLANKET, REFLECTOR	FARED	14271
C	AND REACTOR.	FARED	14272
C		FARED	14273
	DO 7210 I=1,30	FARED	14274
	CRF(I)=0.0	FARED	14275
	BRF(I)=0.0	FARED	14276
	RRC(I)=0.0	FARED	14277
	TRC(I)=0.0	FARED	14278
	CRF(I)=0.0	FARED	14279
	BRF(I)=0.0	FARED	14280
	RRF(I)=0.0	FARED	14281
	TRF(I)=0.0	FARED	14282
	CRNF(I)=0.0	FARED	14283
	BRNF(I)=0.0	FARED	14284
	RRNF(I)=0.0	FARED	14285
	TRNF(I)=0.0	FARED	14286
	CRN(I)=0.0	FARED	14287
	BRN(I)=0.0	FARED	14288
	RRN(I)=0.0	FARED	14289
	TRN(I)=0.0	FARED	14290
	CRP(I)=0.0	FARED	14291
	BRP(I)=0.0	FARED	14292
	RRP(I)=0.0	FARED	14293
	TRP(I)=0.0	FARED	14294
	IDNC(I)=0.0	FARED	14295
	IDNB(I)=0.0	FARED	14296
	IDNR(I)=0.0	FARED	14297
7210	IUNT(I)=0.0	FARED	14298
	NCID=0	FARED	14299
	NBID=0	FARED	14300
	NRID=0	FARED	14301
	NTID=0	FARED	14302

	00 7400 I=1,NZ	FARED	14303
	NID=NZIO(I)	FARED	14304
	IX=NPOINT(I)	FARED	14305
	IY=NZONE(IX+3)	FARED	14306
	DO 7230 K=1,NID	FARED	14307
	L=K	FARED	14308
	IF(NTIO.EQ.0) GO TO 7220	FARED	14309
	DO 7215 KK=1,NTIO	FARED	14310
	L=KK	FARED	14311
	IF(IDNT(KK).EQ.IDN(I,K)) GO TO 7225	FARED	14312
7215	CONTINUE	FARED	14313
	L=NTIO+1	FARED	14314
	NTIO=L	FARED	14315
	GO TO 7225	FARED	14316
7220	NTIO=1	FARED	14317
7225	IDNT(L)=IDN(I,K)	FARED	14318
	TRC(L)=TRC(L)+RC(I,K)	FARED	14319
	TRF(L)=TRF(L)+RF(I,K)	FARED	14320
	TRNF(L)=TRNF(L)+RNF(I,K)	FARED	14321
	TRN(L)=TRN(L)+RN(I,K)	FARED	14322
	TRP(L)=TRP(L)+RP(I,K)	FARED	14323
	TOTT(1)=TOTT(1)+RC(I,K)	FARED	14324
	TOTT(2)=TOTT(2)+RF(I,K)	FARED	14325
	TOTT(3)=TOTT(3)+RNF(I,K)	FARED	14326
	TOTT(4)=TOTT(4)+RN(I,K)	FARED	14327
	TOTT(5)=TOTT(5)+RP(I,K)	FARED	14328
7230	CONTINUE	FARED	14329
	IF(IY.NE.1) GO TO 7260	FARED	14330
	DO 7250 K=1,NID	FARED	14331
	L=K	FARED	14332
	IF(NCID.EQ.0) GO TO 7240	FARED	14333
	DO 7235 KK=1,NCID	FARED	14334
	L=KK	FARED	14335
	IF(IDNC(KK).EQ.IDN(I,K)) GO TO 7245	FARED	14336
7235	CONTINUE	FARED	14337
	L=NCID+1	FARED	14338
	NCID=L	FARED	14339
	GO TO 7245	FARED	14340
7240	NCID=1	FARED	14341
7245	IDNC(L)=IDN(I,K)	FARED	14342
	CRC(L)=CRC(L)+RC(I,K)	FARED	14343
	CRF(L)=CRF(L)+RF(I,K)	FARED	14344
	CRNF(L)=CRNF(L)+RNF(I,K)	FARED	14345
	CRN(L)=CRN(L)+RN(I,K)	FARED	14346
	CRP(L)=CRP(L)+RP(I,K)	FARED	14347
	TOTC(1)=TOTC(1)+RC(I,K)	FARED	14348
	TOTC(2)=TOTC(2)+RF(I,K)	FARED	14349
	TOTC(3)=TOTC(3)+RNF(I,K)	FARED	14350
	TOTC(4)=TOTC(4)+RN(I,K)	FARED	14351
	TOTC(5)=TOTC(5)+RP(I,K)	FARED	14352

7250	CONTINUE	FARED	14353
	GO TO 7400	FARED	14354
7260	IF(IY.NE.2) GO TO 7290	FARED	14355
	DO 7280 K=1,NID	FARED	14356
	L=K	FARED	14357
	IF(NBID.EQ.0) GO TO 7270	FARED	14358
	DO 7265 KK=1,NBID	FARED	14359
	L=KK	FARED	14360
	IF(IDNB(KK).EQ.IDN(I,K)) GO TO 7275	FARED	14361
7265	CONTINUE	FARED	14362
	L=NBID+1	FARED	14363
	NBID=L	FARED	14364
	GO TO 7275	FARED	14365
7270	NBID=1	FARED	14366
7275	IDNB(L)=IDN(I,K)	FARED	14367
	BRC(L)=BRC(L)+RC(I,K)	FARED	14368
	BRF(L)=BRF(L)+RF(I,K)	FARED	14369
	BRNF(L)=BRNF(L)+RNF(I,K)	FARED	14370
	BRN(L)=BRN(L)+RN(I,K)	FARED	14371
	BRP(L)=BRP(L)+RP(I,K)	FARED	14372
	TOTB(1)=TOTB(1)+RC(I,K)	FARED	14373
	TOTB(2)=TOTB(2)+RF(I,K)	FARED	14374
	TOTB(3)=TOTB(3)+RNF(I,K)	FARED	14375
	TOTB(4)=TOTB(4)+RN(I,K)	FARED	14376
	TOTB(5)=TOTB(5)+RP(I,K)	FARED	14377
7280	CONTINUE	FARED	14378
	GO TO 7400	FARED	14379
7290	IF(IY.NE.3) GO TO 7400	FARED	14380
	DO 7310 K=1,NID	FARED	14381
	L=K	FARED	14382
	IF(NRID.EQ.0) GO TO 7300	FARED	14383
	DO 7295 KK=1,NRID	FARED	14384
	L=KK	FARED	14385
	IF(IDNR(KK).EQ.IDN(I,K)) GO TO 7305	FARED	14386
7295	CONTINUE	FARED	14387
	L=NRID+1	FARED	14388
	NRID=L	FARED	14389
	GO TO 7305	FARED	14390
7300	NRID=1	FARED	14391
7305	IDNR(L)=IDN(I,K)	FARED	14392
	RRC(L)=RRC(L)+RC(I,K)	FARED	14393
	RRF(L)=RRF(L)+RF(I,K)	FARED	14394
	RRNF(L)=RRNF(L)+RNF(I,K)	FARED	14395
	RRN(L)=RRN(L)+RN(I,K)	FARED	14396
	RRP(L)=RRP(L)+RP(I,K)	FARED	14397
	TOTR(1)=TOTR(1)+RC(I,K)	FARED	14398
	TOTR(2)=TOTR(2)+RF(I,K)	FARED	14399
	TOTR(3)=TOTR(3)+RNF(I,K)	FARED	14400
	TOTR(4)=TOTR(4)+RN(I,K)	FARED	14401
	TOTR(5)=TOTR(5)+RP(I,K)	FARED	14402

7310	CONTINUE	FARED	14403
7400	CONTINUE	FARED	14404
C		FARED	14405
C	PRINT REACTION RATES FOR EACH NUCLIDE IN EACH ZONE.	FARED	14406
C		FARED	14407
7401	FORMAT (1H,47X,31H* * * REACTION RATES EDIT * * *//)	FARED	14408
7402	FORMAT (1H,1H)	FARED	14409
7403	FORMAT (1H0,1H //)	FARED	14410
7404	FORMAT (1H ,52X,14H TIME (DAYS) = ,F7.2//)	FARED	14411
7405	FORMAT (1H ,4X,7HNUCLIDE,12X,7HCAPTURE,15X,7HFISSION,12X,14HFISSION	FARED	14412
	1N SOURCE,12X,6H(N,2N),9X,2JH(N,ALPHA)+(N,PROTON)/)	FARED	14413
7406	FORMAT (1H ,5X,A4,A2,5(10X,E12.5))	FARED	14414
1416	FORMAT (1H ,5X,5HTOTAL,1X,5(10X,E12.5))	FARED	14415
7407	FORMAT (1H ,5HZONE ,I2,42X,34HREACTION RATES (REACTIONS PER SEC)/)	FARED	14416
7408	FORMAT (1H ,4HCORE,45X,34HREACTION RATES (REACTIONS PER SEC)/)	FARED	14417
7409	FORMAT (1H ,7HBLANKET,42X,34HREACTION RATES (REACTIONS PER SEC)/)	FARED	14418
7410	FORMAT (1H ,9HREFLECTOR,40X,34HREACTION RATES (REACTIONS PER SEC)/	FARED	14419
	1)	FARED	14420
7411	FORMAT (1H ,7HREACTOR,42X,34HREACTION RATES (REACTIONS PER SEC)/)	FARED	14421
	LINE=57	FARED	14422
	WRITE (M6,7401)	FARED	14423
	LINE=LINE-3	FARED	14424
	IF (TIME.EQ.0.0) GO TO 7420	FARED	14425
	WRITE (M6,7404) TIME	FARED	14426
	LINE=LINE-3	FARED	14427
7420	DO 7500 I=1,NZ	FARED	14428
	IP=NPOINT(I)	FARED	14429
	IZN=NZONE(IP)	FARED	14430
	INUM=NZID(I)+7	FARED	14431
	IF (INUM.GT.LINE) GO TO 7425	FARED	14432
	IF (I.NE.1) WRITE (M6,7403)	FARED	14433
	LINE=LINE-INUM	FARED	14434
	GO TO 7430	FARED	14435
7425	WRITE (M6,7402)	FARED	14436
	LINE=59-INUM	FARED	14437
7430	WRITE (M6,7407) IZN	FARED	14438
	WRITE (M6,7405)	FARED	14439
	IDNUM=NZID(I)	FARED	14440
	DO 7450 J=1,IDNUM	FARED	14441
	ID=IDN(I,J)	FARED	14442
	CALL CONVL(ID,LET1,LET2)	FARED	14443
	WRITE (M6,7406) LET1,LET2,RC(I,J),RF(I,J),RNF(I,J),RN(I,J),RP(I,J)	FARED	14444
7450	CONTINUE	FARED	14445
	WRITE (M6,1416) (TOT(J,I),J=1,5)	FARED	14446
7500	CONTINUE	FARED	14447
C		FARED	14448
C	PRINT THE REACTION RATES FOR EACH NUCLIDE IN THE CORE,	FARED	14449
C	BLANKET, REFLECTOR AND REACTOR.	FARED	14450
C		FARED	14451
	IF (NCID.EQ.0) GO TO 7550	FARED	14452

	INUM=NCID+7		
	IF(INUM.GT.LINE) GO TO 7510		FARED 14453
	WRITE (M6,7403)		FARED 14454
	LINE=LINE-INUM		FARED 14455
	GO TO 7520		FARED 14456
7510	WRITE (M6,7402)		FARED 14457
	LINE=59-INUM		FARED 14458
7520	WRITE (M6,7408)		FARED 14459
	WRITE (M6,7405)		FARED 14460
	DO 7530 J=1,NCID		FARED 14461
	ID=IDNC(J)		FARED 14462
	CALL CONVL(ID,LET1,LET2)		FARED 14463
	WRITE (M6,7406) LET1,LET2,CRC(J),CRF(J),CRNF(J),CRN(J),CRP(J)		FARED 14464
7530	CONTINUE		FARED 14465
	WRITE (M6,1416) (TOTC(J),J=1,5)		FARED 14466
7550	IF(NBID.EQ.0) GO TO 7600		FARED 14467
	INUM=NBID+7		FARED 14468
	IF(INUM.GT.LINE) GO TO 7560		FARED 14469
	WRITE (M6,7403)		FARED 14470
	LINE=LINE-INUM		FARED 14471
	GO TO 7570		FARED 14472
7560	WRITE (M6,7402)		FARED 14473
	LINE=59-INUM		FARED 14474
7570	WRITE (M6,7409)		FARED 14475
	WRITE (M6,7405)		FARED 14476
	DO 7580 J=1,NBID		FARED 14477
	ID=IDNB(J)		FARED 14478
	CALL CONVL(ID,LET1,LET2)		FARED 14479
	WRITE (M6,7406) LET1,LET2,BRC(J),BRF(J),BRNF(J),BRN(J),BRP(J)		FARED 14480
7580	CONTINUE		FARED 14481
	WRITE (M6,1416) (TOTB(J),J=1,5)		FARED 14482
7600	IF(NRID.EQ.0) GO TO 7650		FARED 14483
	INUM=NRID+7		FARED 14484
	IF(INUM.GT.LINE) GO TO 7610		FARED 14485
	WRITE (M6,7403)		FARED 14486
	LINE=LINE-INUM		FARED 14487
	GO TO 7620		FARED 14488
7610	WRITE (M6,7402)		FARED 14489
	LINE=59-INUM		FARED 14490
7620	WRITE (M6,7410)		FARED 14491
	WRITE (M6,7405)		FARED 14492
	DO 7630 J=1,NRID		FARED 14493
	ID=IDNR(J)		FARED 14494
	CALL CONVL(ID,LET1,LET2)		FARED 14495
	WRITE (M6,7406) LET1,LET2,RRC(J),RRF(J),RRNF(J),RRN(J),RRP(J)		FARED 14496
7630	CONTINUE		FARED 14497
	WRITE (M6,1416) (TOTR(J),J=1,5)		FARED 14498
7650	INUM=NTID+7		FARED 14499
	IF(INUM.GT.LINE) GO TO 7660		FARED 14500
	WRITE (M6,7403)		FARED 14501
			FARED 14502

	LINE=LINE-INUM	FARED	14503
	GO TO 7670	FARED	14504
7660	WRITE (M6,7402)	FARED	14505
	LINE=59-INUM	FARED	14506
7670	WRITE (M6,7411)	FARED	14507
	WRITE (M6,7405)	FARED	14508
	DO 7680 J=1,NTID	FARED	14509
	ID=IDNT(J)	FARED	14510
	CALL CONVL(ID,LET1,LET2)	FARED	14511
	WRITE (M6,7406) LET1,LET2,TRC(J),TRF(J),TRNF(J),TRN(J),TRP(J)	FARED	14512
7680	CONTINUE	FARED	14513
	WRITE (M6,1416) (TOTT(J),J=1,5)	FARED	14514
	RETURN	FARED	14515
	END	FARED	14516

OVERLAY (RIM,3,13)	FARED	14517
PROGRAM EDIT	FARED	14518
COMMON NTAPE(20)	FARED	14519
COMMON NGO,MIG,MAG,NDS,NPTS,NB,NZ,NBM,NZM,NN,POW,RO,RIN,RUT,CIN,MI	FARED	14520
1CT,THE,IODO,NIB,NOB,NCV,NBUCK,NBWM,NWZM,NWB,NSOU,NSO,TIME,PT	FARED	14521
COMMON NSPARES(42)	FARED	14522
COMMON IFLAG,IV,N,W(18),IBLANK,IZERO,IPLUS,IMINUS,IASTER,ICHAR,NWO	FARED	14523
10,BLANKS	FARED	14524
COMMON NPOINT(20),ZONE(5000)	FARED	14525
DIMENSION NZONE(2000)	FARED	14526
EQUIVALENCE (NZONE,ZONE),(V,IV),(IW,W(1))	FARED	14527
COMMON/GEO/DELR(20),R(150),RI(150),LB(20)	FARED	14528
COMMON/OM/OMEGA(30)	FARED	14529
COMMON/SO/SOU(150),SOUP(150),SOM(20),SOP(20),SOPP(20)	FARED	14530
COMMON/MIS/CHI(20,30)	FARED	14531
COMMON/FLX/ PHI(150,30),PSF(30),PSC(30),PSNUF(30),PDIF(30),PSEPS(3	FARED	14532
10),PS2N(30),PBUCK(30),ICOMP(40),NCAP(40),NFIS(40),N2N(40),NDEL(40)	FARED	14533
2,NTR(40),DARG(150)	FARED	14534
COMMON/MAC1/ PHIA(150,30),DUMX(20,30),ZDIF(30),ZTRANS(660),IZO(20)	FARED	14535
1,ZSIGT(30),ZVUSIG(30),PTERM(8,51),ZTERM(8),AVE(30)	FARED	14536
COMMON /ACA/ APhi(20,30),NUCID(20),DNSP(20,30),VELOC(30),BETA(20),	FARED	14537
1PWOR(20,20),DWOR(20,20),NUP(20,20),NUD(20,20),NP(20),ND(20),FINT(2	FARED	14538
20),BN,BD,PLN,PLD,NBDS(30)	FARED	14539
COMMON/BK/BUCK2(20,30)	FARED	14540
COMMON/PARS/ NSR,ICT,ICT1,ICT2,N100,NTRY,COUT,MICT2,EIGEN,EIGEN1,P	FARED	14541
1,PIM,IMAG	FARED	14542
DIMENSION ENG(100),PTRANS(330)	FARED	14543
DATA EVC / 7.1865 E-07 /	FARED	14544
ISOR=NTAPE(10)	FARED	14545
IASOR=NTAPE(16)	FARED	14546
NPZON=0	FARED	14547
NPZON1=0	FARED	14548
M6=NTAPE(2)	FARED	14549
NPBLK=0	FARED	14550
NPX=0	FARED	14551
NPFAC=0	FARED	14552
MPRNT=1	FARED	14553
99 IF(N.NE.0) GO TO 999	FARED	14554
CALL SCAN(48HPERT*VPERT*ZPERT*ZVPERT*RPERT*XPERT*BPERT*LIFE**,IW,N	FARED	14555
1EDIT)	FARED	14556
IF(NEDIT.EQ.9) GO TO 1001	FARED	14557
IF(NEDIT.EQ.8) GO TO 6000	FARED	14558
IF(NEDIT.NE.6) GO TO 101	FARED	14559
CALL GRAMIN(V,N,W)	FARED	14560
IF(N.NE.-2) GO TO 997	FARED	14561
CALL SCAN(7MB**,IW,IER)	FARED	14562
IF(IER.NE.1) GO TO 997	FARED	14563
NPBLK=IV	FARED	14564
101 CALL GRAMIN(V,N,W)	FARED	14565
IF(N.NE.-2) GO TO 995	FARED	14566

	CALL SCAN(3HZ**,IH,IER)	FARED	14567
	IF(IER.NE.1) GO TO 995	FARED	14568
	NPZON=IV	FARED	14569
135	GO TO (135,135,130,130,130,135,130),NEDIT	FARED	14570
	N=2	FARED	14571
	CALL IDNUM(NPISO,LET1,LFT2,V,N,W)	FARED	14572
	IF(NEDIT.EQ.6) GO TO 103	FARED	14573
	GO TO 102	FARED	14574
135	CALL CRAMIN (V,N,W)	FARED	14575
132	IF(N.NE.2) GO TO 993	FARED	14576
	CALL SCAN(5HM*A**,IH,NPFAC)	FARED	14577
	IF(NPFAC.GT.2) GO TO 993	FARED	14578
	IF(NPFAC.EQ.2.AND.NEDIT.GT.2) GO TO 993	FARED	14579
	PFACT=V	FARED	14580
	IF(NEDIT.EQ.7) GO TO 105	FARED	14581
	IF(NEDIT.NE.5) GO TO 110	FARED	14582
	CALL CRAMIN(V,N,W)	FARED	14583
	IF(N.NE.-2) GO TO 995	FARED	14584
	CALL SCAN(3HZ**,IH,IER)	FARED	14585
	IF(IER.NE.1) GO TO 995	FARED	14586
	NPZONI=IV	FARED	14587
	GO TO 110	FARED	14588
133	IF(N.NE.2) GO TO 993	FARED	14589
	CALL SCAN(9HCAP*FIS**,IH,NPX)	FARED	14590
	IF(NPX.GT.2) GO TO 993	FARED	14591
	NPFAC=1	FARED	14592
	PFACT=V	FARED	14593
135	CALL CRAMIN (V,N,W)	FARED	14594
	IF(N.NE.-1) GO TO 993	FARED	14595
	NGP1=IV	FARED	14596
	CALL CRAMIN(V,N,W)	FARED	14597
	IF(N.NE.-1) GO TO 993	FARED	14598
	NGP2=IV	FARED	14599
110	CONTINUE	FARED	14600
	WRITE (M6,787)	FARED	14601
787	FORMAT (1H1,1H)	FARED	14602
	WRITE (M6,703)	FARED	14603
700	FORMAT (1H0,55X,37H* * * * * PERTURBATION EDIT * * * * *//)	FARED	14604
	IF(TIME.NE.0.) WRITE (M6,3352) TIME	FARED	14605
3352	FORMAT (1H ,63X,14H TIME (DAYS) = ,E12.5)	FARED	14606
	GO TO (701,701,703,703,705,709,707),NEDIT	FARED	14607
701	WRITE (M6,702)	FARED	14608
702	FORMAT (1H0,20X,30H TYPE OF PERTURBATION - ISOTOPE)	FARED	14609
	GO TO 711	FARED	14610
703	WRITE (M6,704)	FARED	14611
704	FORMAT (1H0,20X,27H TYPE OF PERTURBATION - ZONE)	FARED	14612
	GO TO 711	FARED	14613
705	WRITE (M6,706)	FARED	14614
706	FORMAT (1H0,20X,39H TYPE OF PERTURBATION - ZONE REPLACEMENT)	FARED	14615
	GO TO 711	FARED	14616

707	WRITE (M6,708)	FARED	14617
708	FORMAT (1H0,20X,31HTYPE OF PERTURBATION - BUCKLING)	FARED	14618
	GO TO 711	FARED	14619
709	WRITE (M6,710)	FARED	14620
710	FORMAT (1H0,20X,36HTYPE OF PERTURBATION - CROSS SECTION)	FARED	14621
711	IF(NEDIT.NE.6) GO TO 713	FARED	14622
	WRITE (M6,712) NPBLK	FARED	14623
712	FORMAT (1H0,20X,32HPERTURBED CROSS SECTION BLOCK = ,I2)	FARED	14624
713	WRITE (M6,714) NPZON	FARED	14625
714	FORMAT (1H0,20X,17HPERTURBED ZONE = ,I2)	FARED	14626
	IF(NEDIT.NE.5) GO TO 716	FARED	14627
	WRITE (M6,715) NPZON1	FARED	14628
715	FORMAT (1H0,20X,19HREPLACEMENT ZONE = ,I2)	FARED	14629
716	GO TO (717,717,725,725,719,723),NEDIT	FARED	14630
717	WRITE (M6,718) LET1,LET2	FARED	14631
718	FORMAT (1H0,20X,20HPERTURBED ISOTOPE = ,A4,A2)	FARED	14632
	GO TO 725	FARED	14633
719	WRITE (M6,718) LET1,LET2	FARED	14634
	IF(NPX.EQ.2) GO TO 721	FARED	14635
	WRITE (M6,720)	FARED	14636
720	FORMAT (1H0,20X,33HPERTURBED CROSS SECTION = CAPTURE)	FARED	14637
	GO TO 723	FARED	14638
721	WRITE (M6,722)	FARED	14639
722	FORMAT (1H0,20X,33HPERTURBED CROSS SECTION = FISSION)	FARED	14640
723	WRITE (M6,724) NGP1,NGP2	FARED	14641
724	FORMAT (1H0,20X,19HPERTURBED GROUPS = ,I2,3H , ,I2)	FARED	14642
725	GO TO (726,728,726,728,730,730),NEDIT	FARED	14643
726	WRITE (M6,727)	FARED	14644
727	FORMAT (1H0,20X,47HDIFFUSION COEFFICIENT PERTURBATION = SELF WORTH	FARED	14645
	1)	FARED	14646
	GO TO 730	FARED	14647
728	WRITE (M6,729)	FARED	14648
729	FORMAT (1H0,20X,47HDIFFUSION COEFFICIENT PERTURBATION = VOID WORTH	FARED	14649
	1)	FARED	14650
730	IF(NPFAC.EQ.2) GO TO 732	FARED	14651
	WRITE (M6,731) PFACT	FARED	14652
731	FORMAT (1H0,20X,27HPERTURBATION FACTOR M = ,E12.5)	FARED	14653
	GO TO 734	FARED	14654
732	WRITE (M6,733) PFACT	FARED	14655
733	FORMAT (1H0,20X,27HPERTURBATION FACTOR A = ,E12.5)	FARED	14656
734	CONTINUE	FARED	14657
	NPIN=1	FARED	14658
	IF(NPZON.NE.1) NPIN=LB(NPZON-1)	FARED	14659
	NPQUT=LB(NPZON)	FARED	14660
	NPPTS=NPQUT-NPIN+1	FARED	14661
	PGO=FLOAT(NGO-1)	FARED	14662
	MC=NTAPE(17)	FARED	14663
	REWIND MC	FARED	14664
	READ(MC) DUMDUM	FARED	14665
	READ(MC) DUMDUM	FARED	14666

	READ(MC) ((DUMX(I,J),I=1,NZ),J=1,MAG)	FARED	14667
	READ(MC) ((PHI(I,J),I=1,NZ),J=1,MAG)	FARED	14668
	DO 910 J=1,MAG	FARED	14669
910	ZVUSIG(J)=PHI(NPZON,J)	FARED	14670
	READ(MC) ((PHI(I,J),I=1,NZ),J=1,MAG)	FARED	14671
	DO 920 J=1,MAG	FARED	14672
920	ZDIF(J)=1.0/(3.0*PHI(NPZON,J))	FARED	14673
	READ(MC) DUMDUM	FARED	14674
	READ(MC) DUMDUM	FARED	14675
	READ(MC) NMEL,(PHI(I),I=1,NMEL)	FARED	14676
	NMEL1=NMEL/NZ	FARED	14677
	NMEL2=NMEL1*(NPZON-1)	FARED	14678
	NMEL3=NMEL1	FARED	14679
	DO 930 J=1,NMEL3	FARED	14680
930	ZTRANS(J)=PHI(NMEL2+J)	FARED	14681
	IF(NPZON1.EQ.0) GO TO 950	FARED	14682
	NMEL2=NMEL1*(NPZON1-1)	FARED	14683
	DO 940 J=1,NMEL3	FARED	14684
940	ZTRANS(NMEL1+J)=PHI(NMEL2+J)	FARED	14685
950	CONTINUE	FARED	14686
	REWIND MC	FARED	14687
	DO 975 J=1,MAG	FARED	14688
	SUM=0.0	FARED	14689
	IF(J.EQ.MAG) GO TO 965	FARED	14690
	LB3=MIN0(NDS,MAG-J)	FARED	14691
	DO 955 K=1,LB3	FARED	14692
	IX=IXTR(1,K,J)	FARED	14693
	SUM=SUM+ZTRANS(IX)	FARED	14694
955	CONTINUE	FARED	14695
965	CON1=0.0	FARED	14696
	IF(NGO.GT.2) GO TO 970	FARED	14697
	CON1=ZDIF(J)*BUCK2(NPZON,J)	FARED	14698
970	ZSIGT(J)=CON1+SUM+DUMX(NPZON,J)	FARED	14699
975	CONTINUE	FARED	14700
	REWIND ISOR	FARED	14701
	READ(ISOR) SRID,NPTS,MAG,NZ	FARED	14702
	READ(ISOR) (SOUP(I),I=1,NPTS)	FARED	14703
	READ(ISOR) (SOPP(I),I=1,NZ)	FARED	14704
	READ(ISOR) DUMDUM	FARED	14705
	READ(ISOR) ((PHI(I,J),J=1,MAG),I=1,NPTS)	FARED	14706
	REWIND ISOR	FARED	14707
	REWIND IASOR	FARED	14708
	READ(IASOR) SRID,NPTS,MAG,NZ	FARED	14709
	READ(IASOR) (SOUP(I),I=1,NPTS)	FARED	14710
	READ(IASOR) (SOPP(I),I=1,NZ)	FARED	14711
	READ(IASOR) DUMDUM	FARED	14712
	READ(IASOR) ((PHIA(I,J),J=1,MAG),I=1,NPTS)	FARED	14713
	REWIND IASOR	FARED	14714
	QTERM=0.0	FARED	14715
	DO 410 I=1,NZ	FARED	14716

IIN=1	FARED	14717
IF (I.NE.1) IIN=LB(I-1)	FARED	14718
IOUT=LB(I)	FARED	14719
IPTS=IOUT-IIN+1	FARED	14720
DARG(1)=SOUP(1)*SOU(1)	FARED	14721
IF (I.NE.1) DARG(1)=SOPP(I-1)*SOP(I-1)	FARED	14722
DO 435 K=2,IPTS	FARED	14723
DARG(K)=SOUP(IIN+K-1)*SOU(IIN+K-1)	FARED	14724
435 CONTINUE	FARED	14725
QTERM=QTERM+RINTG(DARG,I)	FARED	14726
410 CONTINUE	FARED	14727
IF(NEDIT.EQ.1.OR.NEDIT.EQ.2.OR.NEDIT.EQ.6) GO TO 300	FARED	14728
IF(NEDIT.EQ.7) GO TO 300	FARED	14729
MT=NTAPE(17)	FARED	14730
REWIND MT	FARED	14731
READ(MT) NTID,NTS,NZ,MAG	FARED	14732
READ(MT) ((DUMX(I,J),I=1,NZ),J=1,MAG)	FARED	14733
IF(NEDIT.EQ.5) GO TO 202	FARED	14734
DO 201 J=1,MAG	FARED	14735
201 PSF(J)=(PFACT-1.)*DUMX(NPZON,J)	FARED	14736
GO TO 204	FARED	14737
DO 203 J=1,MAG	FARED	14738
203 PSF(J)=PFACT*(DUMX(NPZON1,J)-DUMX(NPZON,J))	FARED	14739
204 READ(MT) ((DUMX(I,J),I=1,NZ),J=1,MAG)	FARED	14740
IF(NEDIT.EQ.5) GO TO 206	FARED	14741
DO 205 J=1,MAG	FARED	14742
205 PSC(J)=(PFACT-1.)*DUMX(NPZON,J)	FARED	14743
GO TO 208	FARED	14744
DO 207 J=1,MAG	FARED	14745
207 PSC(J)=PFACT*(DUMX(NPZON1,J)-DUMX(NPZON,J))	FARED	14746
208 READ(MT) ((DUMX(I,J),I=1,NZ),J=1,MAG)	FARED	14747
IF(NEDIT.EQ.5) GO TO 210	FARED	14748
DO 209 J=1,MAG	FARED	14749
209 PSNUF(J)=(PFACT-1.)*DUMX(NPZON,J)	FARED	14750
GO TO 212	FARED	14751
DO 211 J=1,MAG	FARED	14752
211 PSNUF(J)=PFACT*(DUMX(NPZON1,J)-DUMX(NPZON,J))	FARED	14753
212 READ(MT) ((DUMX(I,J),I=1,NZ),J=1,MAG)	FARED	14754
IF(NEDIT.EQ.5) GO TO 214	FARED	14755
DO 213 J=1,MAG	FARED	14756
213 PDIF(J)=(PFACT-1.)*DUMX(NPZON,J)	FARED	14757
GO TO 216	FARED	14758
DO 215 J=1,MAG	FARED	14759
215 PDIF(J)=PFACT*(DUMX(NPZON1,J)-DUMX(NPZON,J))	FARED	14760
216 READ(MT) ((DUMX(I,J),I=1,NZ),J=1,MAG)	FARED	14761
IF(NEDIT.EQ.5) GO TO 218	FARED	14762
DO 217 J=1,MAG	FARED	14763
217 PSEPS(J)=(PFACT-1.)*DUMX(NPZON,J)	FARED	14764
GO TO 220	FARED	14765
218 DO 219 J=1,MAG	FARED	14766

219	PSEPS(J)=PFACT*(DUMX(NPZON1,J)-DUMX(NPZON,J))	FARED	14767
220	READ(MT)((DUMX(I,J),I=1,NZ),J=1,MAG)	FARED	14768
	IF(NEDIT.EQ.5) GO TO 222	FARED	14769
	DO 221 J=1,MAG	FARED	14770
221	PS2N(J)=(PFACT-1.)*DUMX(NPZON,J)	FARED	14771
	GO TO 224	FARED	14772
222	DO 223 J=1,MAG	FARED	14773
223	PS2N(J)=PFACT*(DUMX(NPZON1,J)-DUMX(NPZON,J))	FARED	14774
224	REWIND MT	FARED	14775
	DO 225 J=1,MAG	FARED	14776
	PBUCK(J)=0.0	FARED	14777
	PSEPS(J)=PSEPS(J)+PS2N(J)	FARED	14778
225	PSC(J)=PSC(J)-PSF(J)-PSEPS(J)	FARED	14779
	IF(NEDIT.EQ.4) GO TO 227	FARED	14780
	DO 226 J=1,MAG	FARED	14781
226	PDIF(J)=-PDIF(J)*ZDIF(J)/(1.+(3.0*ZDIF(J)+PDIF(J))	FARED	14782
	GO TO 229	FARED	14783
227	DO 228 J=1,MAG	FARED	14784
228	PDIF(J)=-3.0*PDIF(J)*(ZDIF(J)**2.0)	FARED	14785
229	IF(NEDIT.EQ.5) GO TO 232	FARED	14786
	DO 231 J=1,MAG	FARED	14787
	DO 230 K=1,NDS	FARED	14788
	IF((J*K).GT.MAG) GO TO 231	FARED	14789
	IXD=IXTR(1,K,J)	FARED	14790
230	PTRANS(IXD)=(PFACT-1.)*ZTRANS(IXD)	FARED	14791
231	CONTINUE	FARED	14792
	GO TO 400	FARED	14793
232	DO 234 J=1,MAG	FARED	14794
	DO 233 K=1,NDS	FARED	14795
	IF((J*K).GT.MAG) GO TO 234	FARED	14796
	IX1=IXTR(2,K,J)	FARED	14797
	IXD=IXTR(1,K,J)	FARED	14798
233	PTRANS(IXD)=PFACT*(ZTRANS(IX1)-ZTRANS(IXD))	FARED	14799
234	CONTINUE	FARED	14800
	GO TO 400	FARED	14801
300	DO 302 J=1,MAG	FARED	14802
	PSF(J)=0.0	FARED	14803
	PSC(J)=0.0	FARED	14804
	PSNUF(J)=0.0	FARED	14805
	PDIF(J)=0.0	FARED	14806
	PSEPS(J)=0.0	FARED	14807
	PS2N(J)=0.0	FARED	14808
	PBUCK(J)=0.0	FARED	14809
	DO 301 K=1,NDS	FARED	14810
	IXD=IXTR(1,K,J)	FARED	14811
	IF((J*K).GT.MAG) GO TO 302	FARED	14812
301	PTRANS(IXD)=0.0	FARED	14813
302	CONTINUE	FARED	14814
	NJ1=1	FARED	14815
	NJ2=MAG	FARED	14816

	IF(NEDIT.NE.6) GO TO 475		
	NJ1=NGP1		FARED 14817
	NJ2=NGP2		FARED 14818
475	CONTINUE		FARED 14819
	IF(NEDIT.NE.7) GO TO 304		FARED 14820
	DO 303 J=NGP1,NGP2		FARED 14821
303	PBUCK(J)=(PFACT-1.)*BUCK2(NPZON,J)		FARED 14822
	GO TO 400		FARED 14823
304	MAC=NTAPE(14)		FARED 14824
	REWIND MAC		FARED 14825
	READ(MAC) MTP,NBK,MAGK,NDSK		FARED 14826
	DO 325 MMK=1,NB		FARED 14827
	READ(MAC) IOB,NEL,(ICOMP(I),NCAP(I),NFIS(I),N2M(I),NOEL(I),NTR(I),		FARED 14828
	1I=1,NEL)		FARED 14829
	NPOP=0		FARED 14830
	IF(NEDIT.EQ.6.AND.NPBLK.NE.IOB) GO TO 306		FARED 14831
	CALL ZOLO(IOB,KZO,IZO)		FARED 14832
	DO 305 I=1,KZO		FARED 14833
	IF(NPZON.NE.IZO(I)) GO TO 305		FARED 14834
	NPOP=1		FARED 14835
	PCON=CONCENT(NPISO,NPZON)		FARED 14836
	GO TO 306		FARED 14837
305	CONTINUE		FARED 14838
306	MAGM1=MAG-1		FARED 14839
	DO 308 KK=1,MAGM1		FARED 14840
	DO 308 II=1,NEL		FARED 14841
	IF(NTR(II).LE.J) GO TO 308		FARED 14842
	LR=MINI(NDS,MAG-KK)		FARED 14843
	READ(MAC) ICOM,IT,MINJ,KT,(DUMX(JP),JP=1,LR)		FARED 14844
	IF(NPOP.NE.1.OR.ICOM.NE.NPISO) GO TO 308		FARED 14845
	IF(NEDIT.EQ.6) GO TO 308		FARED 14846
	DO 307 IJ=1,LR		FARED 14847
	IXD=IXTR(1,IJ,KK)		FARED 14848
	IF(NPFAC.EQ.1) PTRANS(IXD)=(PFACT-1.)*DUMX(IJ)*PCON		FARED 14849
	IF(NPFAC.EQ.2) PTRANS(IXD)=PFACT*DUMX(IJ)		FARED 14850
307	CONTINUE		FARED 14851
308	CONTINUE		FARED 14852
	READ(MAC) (DUMX(I),I=1,MAG)		FARED 14853
	DO 320 II=1,NEL		FARED 14854
	READ(MAC) (DUMX(J),J=1,MAG)		FARED 14855
	IF(NPOP.NE.1.OR.NPISO.NE.ICOMP(II)) GO TO 310		FARED 14856
	IF(NEDIT.EQ.6) GO TO 310		FARED 14857
	DO 309 J=1,MAG		FARED 14858
	IF(NPFAC.EQ.1) PDIF(J)=(PFACT-1.)*DUMX(J)*PCON		FARED 14859
	IF(NPFAC.EQ.2) PDIF(J)=PFACT*DUMX(J)		FARED 14860
309	CONTINUE		FARED 14861
310	IF(NCAP(II).NE.J) READ(MAC) (DUMX(J),J=1,MAG)		FARED 14862
	IF(NCAP(II).EQ.J) GO TO 312		FARED 14863
	IF(NPOP.NE.1.OR.NPISO.NE.ICOMP(II)) GO TO 312		FARED 14864
	IF(NEDIT.EQ.6.AND.NPX.NE.1) GO TO 312		FARED 14865
			FARED 14866

	DO 311 J=NJ1,NJ2	FARED	14867
	IF(NPFAC.EQ.1) PSC(J)=(PFACT-1.)*DUMX(J)*PCON	FARED	14868
	IF(NPFAC.EQ.2) PSC(J)=PFACT*DUMX(J)	FARED	14869
311	CONTINUE	FARED	14870
	IF(NEDIT.EQ.6.AND.NPX.EQ.1) GO TO 390	FARED	14871
312	IF(NFIS(II).NE.0) READ(MAC) ((DUMX(1,J),J=1,MAG),(DUMX(2,J),J=1,MAG))	FARED	14872
	IF(NFIS(II).EQ.0) GO TO 314	FARED	14873
	IF(NPOP.NE.1.OR.NPISO.NE.ICOMP(II)) GO TO 314	FARED	14874
	IF(NEDIT.EQ.6.AND.NPX.NE.2) GO TO 314	FARED	14875
	DO 313 J=NJ1,NJ2	FARED	14876
	IF(NPFAC.EQ.1) PSF(J)=(PFACT-1.)*DUMX(1,J)*PCON	FARED	14877
	IF(NPFAC.EQ.2) PSF(J)=PFACT*DUMX(1,J)	FARED	14878
	IF(NPFAC.EQ.1) PSNUF(J)=(PFACT-1.)*DUMX(1,J)*DUMX(2,J)*PCON	FARED	14879
	IF(NPFAC.EQ.2) PSNUF(J)=PFACT*DUMX(1,J)*DUMX(2,J)	FARED	14880
313	CONTINUE	FARED	14881
	IF(NEDIT.EQ.6.AND.NPX.EQ.2) GO TO 390	FARED	14882
314	IF(N2N(II).NE.0) READ(MAC) (DUMX(J),J=1,MAG)	FARED	14883
	IF(N2N(II).EQ.0) GO TO 316	FARED	14884
	IF(NPOP.NE.1.OR.NPISO.NE.ICOMP(II)) GO TO 316	FARED	14885
	IF(NEDIT.EQ.6) GO TO 316	FARED	14886
	DO 315 J=1,MAG	FARED	14887
	IF(NPFAC.EQ.1) PS2N(J)=(PFACT-1.)*DUMX(J)*PCON	FARED	14888
	IF(NPFAC.EQ.2) PS2N(J)=PFACT*DUMX(J)	FARED	14889
315	CONTINUE	FARED	14890
316	CONTINUE	FARED	14891
	IF(NDEL(II).NE.0) READ(MAC) (DUMX(J),J=1,MAG)	FARED	14892
	IF(NDEL(II).EQ.0) GO TO 318	FARED	14893
	IF(NPOP.NE.1.OR.NPISO.NE.ICOMP(II)) GO TO 318	FARED	14894
	IF(NEDIT.EQ.6) GO TO 318	FARED	14895
	DO 317 J=1,MAG	FARED	14896
	IF(NPFAC.EQ.1) PSEPS(J)=(PFACT-1.)*DUMX(J)*PCON+PS2N(J)	FARED	14897
	IF(NPFAC.EQ.2) PSEPS(J)=PFACT*DUMX(J)+PS2N(J)	FARED	14898
317	CONTINUE	FARED	14899
318	CONTINUE	FARED	14900
	IF(NPOP.EQ.1.AND.NPISO.EQ.ICOMP(II)) GO TO 390	FARED	14901
320	CONTINUE	FARED	14902
	IF(NPOP.EQ.0) GO TO 325	FARED	14903
	WRITE (M6,321)	FARED	14904
321	FORMAT (1H0,43H*** ISOTOPE NOT FOUND IN SPECIFIED ZONE ***)	FARED	14905
	GO TO 1000	FARED	14906
325	CONTINUE	FARED	14907
	WRITE (M6,326)	FARED	14908
326	FORMAT (1H0,32H*** ILLEGAL ZONE DESIGNATION ***)	FARED	14909
	GO TO 1000	FARED	14910
390	REWIND MAC	FARED	14911
	IF(NEDIT.GE.6) GO TO 392	FARED	14912
	DO 391 J=1,MAG	FARED	14913
	IF(NEDIT.EQ.1) PDIF(J)=-PDIF(J)*ZDIF(J)/(1./(3.0*ZDIF(J))+PDIF(J))	FARED	14914
	IF(NEDIT.EQ.2) PDIF(J)=-3.0*PDIF(J)*(ZDIF(J)**2.0)	FARED	14915

391	CONTINUE	FARED	14917
392	CONTINUE	FARED	14918
400	CONTINUE	FARED	14919
500	CONTINUE	FARED	14920
	DO 519 K=1,NPPTS	FARED	14921
	DUM1=0.0	FARED	14922
	DUM2=0.0	FARED	14923
	DO 501 I=1,MAG	FARED	14924
	DUM1=DUM1+PSNUF(I)*PHI(K+NPIN-1,I)	FARED	14925
501	DUM2=DUM2+CHI(NPZON,I)*PHIA(K+NPIN-1,I)	FARED	14926
	PTERM(1,K)=DUM1*DUM2/QTERM	FARED	14927
	PTERM(2,K)=0.0	FARED	14928
	IF(NIB.EQ.1.AND.NOB.EQ.1) GO TO 513	FARED	14929
	IF(K.NE.1) GO TO 509	FARED	14930
	IF(NPZON.NE.1) GO TO 502	FARED	14931
	IF(NGO.NE.1) GO TO 513	FARED	14932
	GO TO (513,502,507,502,507),NIB	FARED	14933
502	DO 506 I=1,MAG	FARED	14934
	DUM1=ZSIGT(I)*PHI(NPIN,I)	FARED	14935
	DUM2=ZSIGT(I)*PHIA(NPIN,I)	FARED	14936
	DUM3=DELNR(NPZON)	FARED	14937
	IF(R(NPIN).EQ.0.0) GO TO 503	FARED	14938
	DUM3=DUM3-0.5*PGO*(DELNR(NPZON)**2.0)/R(NPIN)	FARED	14939
503	DO 505 J=1,MAG	FARED	14940
	DUM1=DUM1-CHI(NPZON,I)*ZVUSIG(J)*PHI(NPIN,J)/EIGEN	FARED	14941
	NMAX=MAX0(1,I-NDS)	FARED	14942
	IF(J.GE.1.OR.J.LT.NMAX) GO TO 504	FARED	14943
	IX=IXTR(1,I-J,J)	FARED	14944
	DUM1=DUM1-ZTRANS(IX)*PHI(NPIN,J)	FARED	14945
504	DUM2=DUM2-ZVUSIG(I)*CHI(NPZON,J)*PHIA(NPIN,J)/EIGEN	FARED	14946
	NMAX=MIN0(MAG,I+NDS)	FARED	14947
	IF(J.GT.NMAX.OR.J.LE.1) GO TO 505	FARED	14948
	IX=IXTR(1,J-I,I)	FARED	14949
	DUM2=DUM2-ZTRANS(IX)*PHIA(NPIN,J)	FARED	14950
505	CONTINUE	FARED	14951
506	PTERM(2,1)=PTERM(2,1)-PDIF(I)*(PHI(NPIN+1,I)-PHI(NPIN,I)-0.5*(DELNR(NPZON)**2.0)*DUM1/ZDIF(I))*(PHIA(NPIN+1,I)-PHIA(NPIN,I)-0.5*(DELNR(NPZON)**2.0)*DUM2/ZDIF(I))/(DUM3**2.0)	FARED	14952
	GO TO 513	FARED	14953
507	DO 508 I=1,MAG	FARED	14954
508	PTERM(2,1)=PTERM(2,1)-PDIF(I)*PHI(NPIN,I)*PHIA(NPIN,I)/OMEGA(I)**2	FARED	14955
	GO TO 513	FARED	14956
509	DO 512 I=1,MAG	FARED	14957
	DUM1=ZSIGT(I)*PHI(K+NPIN-1,I)	FARED	14958
	DUM2=ZSIGT(I)*PHIA(K+NPIN-1,I)	FARED	14959
	DUM3=DELNR(NPZON)+0.5*PGO*(DELNR(NPZON)**2.0)/R(NPIN+K-1)	FARED	14960
	DO 511 J=1,MAG	FARED	14961
	DUM1=DUM1-CHI(NPZON,I)*ZVUSIG(J)*PHI(K+NPIN-1,J)/EIGEN	FARED	14962
	NMAX=MAX0(1,I-NDS)	FARED	14963
		FARED	14964
		FARED	14965
		FARED	14966

	IF (J.GE.I.OR.J.LT.NMAX) GO TO 510	FARED	14967
	IX=IXTR(1,I-J,J)	FARED	14968
	DUM1=DUM1-ZTRANS(IX)*PHI(K+NPIN-1,J)	FARED	14969
510	DUM2=DUM2-ZVUSIG(I)*CHI(NPZON,J)*PHIA(K+NPIN-1,J)/EIGEN	FARED	14970
	NMAX=MINU(MAG,I+NDS)	FARED	14971
	IF (J.GT.NMAX.OR.J.LE.I) GO TO 511	FARED	14972
	IX=IXTR(1,J-1,I)	FARED	14973
	DUM2=DUM2-ZTRANS(IX)*PHIA(K+NPIN-1,J)	FARED	14974
511	CONTINUE	FARED	14975
512	PTERM(2,K)=PTERM(2,K)-POIF(I)*(PHI(K+NPIN-1,I)-PHI(K+NPIN-2,I)+0.5	FARED	14976
	1*(DEL(NPZON)**2.0)*DUM1/ZOIF(I))*(PHIA(K+NPIN-1,I)-PHIA(K+NPIN-2,	FARED	14977
	2I)+J.5*(DEL(NPZON)**2.0)*DUM2/ZOIF(I))/(DUM3**2.J)	FARED	14978
513	CONTINUE	FARED	14979
	DO 514 J=3,7	FARED	14980
514	PTERM(J,K)=J.J	FARED	14981
	DO 517 I=1,MAG	FARED	14982
	PTERM(3,K)=PTERM(3,K)-(BUCK2(NPZON,I)*POIF(I)+ZOIF(I)*PBUCK(I))*PH	FARED	14983
	IA(K+NPIN-1,I)*PHIA(K+NPIN-1,I)	FARED	14984
	PTERM(4,K)=PTERM(4,K)-PSC(I)*PHI(K+NPIN-1,I)*PHIA(K+NPIN-1,I)	FARED	14985
	PTERM(5,K)=PTERM(5,K)-PSF(I)*PHI(K+NPIN-1,I)*PHIA(K+NPIN-1,I)	FARED	14986
	PTERM(6,K)=PTERM(6,K)-PSEPS(I)*PHI(K+NPIN-1,I)*PHIA(K+NPIN-1,I)	FARED	14987
	IF (I.EQ.MAG) GO TO 517	FARED	14988
	DUM1=0.0	FARED	14989
	DO 515 J=1,NDS	FARED	14990
	IF ((I+J).GT.MAG) GO TO 516	FARED	14991
	IX=IXTR(1,J,I)	FARED	14992
515	DUM1=DUM1+PIRANS(IX)*(PHIA(K+NPIN-1,I)-PHIA(K+NPIN-1,I+J))	FARED	14993
516	PTERM(7,K)=PTERM(7,K)-PHI(K+NPIN-1,I)*(DUM1-PS2N(I)*PHIA(K+NPIN-1,	FARED	14994
	1I))	FARED	14995
517	CONTINUE	FARED	14996
	DO 518 J=2,7	FARED	14997
518	PTERM(J,K)=PTERM(J,K)*(EIGEN/QTERM)	FARED	14998
519	CONTINUE	FARED	14999
	DO 121 J=1,7	FARED	15000
	DO 120 K=1,NPPTS	FARED	15001
120	DARG(K)=PTERM(J,K)	FARED	15002
121	ZTERM(J)=RINTG(DARG,NPZON)	FARED	15003
	DO 122 K=1,NPPTS	FARED	15004
	PTERM(8,K)=0.0	FARED	15005
	DO 122 J=1,7	FARED	15006
122	PTERM(8,K)=PTERM(8,K)+PTERM(J,K)	FARED	15007
	ZTERM(8)=0.0	FARED	15008
	DO 123 J=1,7	FARED	15009
123	ZTERM(8)=ZTERM(8)+ZTERM(J)	FARED	15010
	WRITE (M6,761) QTERM	FARED	15011
761	FORMAT (1H0,20X,27HPERTURBATION DENOMINATOR = ,E12.5/////)	FARED	15012
	WRITE (M6,751)	FARED	15013
751	FORMAT (1H0,51X,45H* * * PERTURBATION RESULTS - ZONE WORTH * * *)	FARED	15014
	WRITE (M6,752)	FARED	15015
752	FORMAT (1H0,20X,17HPERTURBATION TERM,33X,11H(DELTA K)/K/)	FARED	15016

	WRITE (M6,753) ZTERM(1)	FARED	15017
753	FORMAT (1H0,25X,6HSOURCE,39X,E12.5)	FARED	15018
	WRITE (M6,754) ZTERM(2)	FARED	15019
754	FORMAT (1H0,25X,14HRADIAL LEAKAGE,31X,E12.5)	FARED	15020
	WRITE (M6,755) ZTERM(3)	FARED	15021
755	FORMAT (1H0,25X,18HTRANSVERSE LEAKAGE,27X,E12.5)	FARED	15022
	WRITE (M6,756) ZTERM(4)	FARED	15023
756	FORMAT (1H0,25X,7HCAPTURE,38X,E12.5)	FARED	15024
	WRITE (M6,757) ZTERM(5)	FARED	15025
757	FORMAT (1H0,25X,7HFISSION,38X,E12.5)	FARED	15026
	WRITE (M6,758) ZTERM(6)	FARED	15027
758	FORMAT (1H0,25X,22H(N,ALPHA) + (N,PROTON),23X,E12.5)	FARED	15028
	WRITE (M6,759) ZTERM(7)	FARED	15029
759	FORMAT (1H0,25X,10HSCATTERING,35X,E12.5)	FARED	15030
	WRITE (M6,760) ZTERM(8)	FARED	15031
760	FORMAT (1H0,23X,23HTOTAL ZONE PERTURBATION,27X,E12.5)	FARED	15032
	WRITE (M6,767)	FARED	15033
	WRITE (M6,770)	FARED	15034
770	FORMAT (1H0,48X,47H* * * PERTURBATION RESULTS - POINT WORTHS * * *	FARED	15035
	1/)	FARED	15036
	WRITE (M6,771)	FARED	15037
771	FORMAT (1H0,13X,6HRADIUS,43X,19H(DELTA K)/K PER CC.)	FARED	15038
	WRITE (M6,772)	FARED	15039
772	FORMAT (1H0,35X,6HSOURCE,16X,6HRADIAL,14X,10HTRANSVERSE,13X,7HCAPT	FARED	15040
	1URE)	FARED	15041
	WRITE (M6,773)	FARED	15042
773	FORMAT (1H ,56X,7HLEAKAGE,15X,7HLEAKAGE/)	FARED	15043
	DO 775 K=1,NPPTS	FARED	15044
	WRITE (M6,774) R(NPIN+K-1),(PTERM(J,K),J=1,4)	FARED	15045
774	FORMAT (1H ,10X,5(E12.5,10X))	FARED	15046
775	CONTINUE	FARED	15047
	WRITE (M6,787)	FARED	15048
	WRITE (M6,770)	FARED	15049
	WRITE (M6,771)	FARED	15050
	WRITE (M6,776)	FARED	15051
776	FORMAT (1H0,34X,7HFISSION,15X,9H(N,ALPHA),12X,10HSCATTERING,14X,5H	FARED	15052
	1TOTAL)	FARED	15053
	WRITE (M6,777)	FARED	15054
777	FORMAT (1H ,55X,10H(N,PROTON),33X,12HPERTURBATION/)	FARED	15055
	DO 779 K=1,NPPTS	FARED	15056
	WRITE (M6,774) R(NPIN+K-1),(PTERM(J,K),J=5,8)	FARED	15057
779	CONTINUE	FARED	15058
	GO TO 1000	FARED	15059
6000	CONTINUE	FARED	15060
	ISOR=NTAPE(10)	FARED	15061
	REWIND ISOR	FARED	15062
	READ(ISOR) SRID,NPTS,MAG,NZ	FARED	15063
	READ(ISOR) (SOUP(I),I=1,NPTS)	FARED	15064
	READ(ISOR) (SOPP(I),I=1,NZ)	FARED	15065
	READ(ISOR) ((APHI(I,J),J=1,MAG),I=1,NZ)	FARED	15066

READ(IASOR) ((PHI(I,J),J=1,MAG),I=1,NPTS)	FARED	15067
REWIND IASOR	FARED	15068
IASOR=NTAPE(16)	FARED	15069
REWIND IASOR	FARED	15070
READ(IASOR) SRID,NPTS,MAG,NZ	FARED	15071
READ(IASOR) DUMDUM	FARED	15072
READ(IASOR) DUMDUM	FARED	15073
READ(IASOR) ((DUMX(I,J),J=1,MAG),I=1,NZ)	FARED	15074
READ(IASOR) ((PHIA(I,J),J=1,MAG),I=1,NPTS)	FARED	15075
REWIND IASOR	FARED	15076
IBUS=NTAPE(9)	FARED	15077
REWIND IBUS	FARED	15078
READ(IBUS) PGID,NGROUP	FARED	15079
READ(IBUS) (NBUS(I),I=1,NGROUP)	FARED	15080
REWIND IBUS	FARED	15081
ITAP=NTAPE(4)	FARED	15082
REWIND ITAP	FARED	15083
READ(ITAP) NFILE,JF,NZERO,NGRP	FARED	15084
READ(ITAP) DUMDUM	FARED	15085
NGRP1=NGRP+1	FARED	15086
READ(ITAP) (ENG(I),I=1,NGRP1)	FARED	15087
REWIND ITAP	FARED	15088
DO 6005 J=1,MAG	FARED	15089
6005 AVE(J)=0.0	FARED	15090
VOLT=0.0	FARED	15091
DO 6010 I=1,NZ	FARED	15092
IX=NPOINT(I)	FARED	15093
VOL=ZONE(IX+6)	FARED	15094
VOLT=VOLT+VOL	FARED	15095
DO 6010 J=1,MAG	FARED	15096
AVE(J)=AVE(J)+VOL*APHI(I,J)*DUMX(I,J)	FARED	15097
6010 CONTINUE	FARED	15098
DO 6015 J=1,MAG	FARED	15099
6015 AVE(J)=AVE(J)/VOLT	FARED	15100
E1=ENG(1)	FARED	15101
DO 6050 J=1,MAG	FARED	15102
JX=NBUS(J)	FARED	15103
E2=ENG(JX+1)	FARED	15104
IF(J.EQ.1) GO TO 6020	FARED	15105
JX1=NBUS(J-1)	FARED	15106
E1=ENG(JX1+1)	FARED	15107
6020 IF(J.NE.1) GO TO 6030	FARED	15108
B1=AVE(2)/(E2-E1)	FARED	15109
A1=-B1*E1	FARED	15110
GO TO 6040	FARED	15111
6030 IF(J.NE.MAG) GO TO 6035	FARED	15112
B1=-AVE(MAG-1)/(E2-E1)	FARED	15113
A1=-B1*E2	FARED	15114
GO TO 6040	FARED	15115
6035 B1=(AVE(J+1)-AVE(J-1))/(E2-E1)	FARED	15116

	A1=AVE(J-1)-B1*E1	FARED	15117
6040	VELOC(J)=EVC*(2.0*A1*(E2**0.5-E1**0.5)+2.0*B1*(E2**1.5-E1**1.5)/3.10)/((E2-E1)*(A1+0.5*B1*(E1+E2)))	FARED	15118
6050	CONTINUE	FARED	15119
	NTM=0	FARED	15120
	NONUC=0	FARED	15121
6060	READ(ITAP) FI,JF,ISO,NGP	FARED	15122
	IF(EOF,ITAP) 6080,6065	FARED	15123
6065	CALL SCAN(6HFILE**,FI,IFIL)	FARED	15124
	GO TO (6070,6080),IFIL	FARED	15125
6070	IF(JF-7) 6075,6100,6090	FARED	15126
6075	CALL REOF(ITAP)	FARED	15127
	GO TO 6060	FARED	15128
6080	IF(NTM.NE.0) GO TO 6090	FARED	15129
	NTM=1	FARED	15130
	REWIND ITAP	FARED	15131
	GO TO 6060	FARED	15132
6090	WRITE (M6,6095)	FARED	15133
6095	FORMAT (1H0,2JHFILE 7 NOT FOUND ***)	FARED	15134
	STOP	FARED	15135
6100	CONTINUE	FARED	15136
	READ(ITAP) ((ICOMP(I),N1,N2,N3,NFIS(I),NCAP(I),N4,N5,N6,N7),I=1,IS10)	FARED	15137
	DO 6200 K=1,ISO	FARED	15138
	IF(NFIS(K).EQ.0) GO TO 6120	FARED	15139
	READ(ITAP) DUMDUM	FARED	15140
6120	IF(NCAP(K).EQ.0) GO TO 6200	FARED	15141
	NONUC=NONUC+1	FARED	15142
	NF=NCAP(K)	FARED	15143
	READ(ITAP) NUCID(NONUC),((01,PSF(I)),I=1,NF),(PTERM(J),J=1,MIG)	FARED	15144
	BETA(NONUC)=0.0	FARED	15145
	DO 6130 J=1,NF	FARED	15146
6130	BETA(NONUC)=BETA(NONUC)+PSF(J)	FARED	15147
	DO 6140 J=1,MAG	FARED	15148
6140	ONSP(NONUC,J)=0.0	FARED	15149
	N1=1	FARED	15150
	DO 6160 J=1,MAG	FARED	15151
	N2=NBDS(J)	FARED	15152
	IF(J.NE.1) N1=NBDS(J-1)+1	FARED	15153
	DO 6150 L=N1,N2	FARED	15154
6150	ONSP(NONUC,J)=ONSP(NONUC,J)+PTERM(L)	FARED	15155
6160	CONTINUE	FARED	15156
6200	CONTINUE	FARED	15157
	IIN=1	FARED	15158
	VINT=0.0	FARED	15159
	DO 6250 I=1,N2	FARED	15160
	IF(I.NE.1) IIN=LB(I-1)	FARED	15161
	IOUT=LB(I)	FARED	15162
	IPTS=IOUT-IIN+1	FARED	15163
	DO 6240 K=1,IPTS	FARED	15164
		FARED	15165
		FARED	15166

	PTERM(K)=0.0	FARED	15167
	DO 6240 J=1,MAG	FARED	15168
6240	PTERM(K)=PTERM(K)+PHI(IIN+K-1,J)*PHIA(IIN+K-1,J)*VELOC(J)	FARED	15169
	VINT=VINT+RINTG(PTERM,I)	FARED	15170
6250	CONTINUE	FARED	15171
	VINT=VINT+EIGEN	FARED	15172
	DO 6400 K=1,20	FARED	15173
	NP(K)=0	FARED	15174
	ND(K)=0	FARED	15175
	DO 6400 L=1,20	FARED	15176
	NUD(K,L)=0	FARED	15177
	NUP(K,L)=0	FARED	15178
	APHI(K,L)=0.0	FARED	15179
	PHOR(K,L)=0.0	FARED	15180
6400	UWOR(K,L)=0.0	FARED	15181
	BN=0.0	FARED	15182
	BO=0.0	FARED	15183
	PLU=J.0	FARED	15184
	MAC=NTAPE(14)	FARED	15185
	REWIND MAC	FARED	15186
	READ(MAC) MTP,NBK,MAGK,NDSK	FARED	15187
	DO 6600 MMK=1,NB	FARED	15188
	READ(MAC) IDB,NEL,(ICOMP(I),NCAP(I),NFIS(I),N2N(I),NDEL(I),NTR(I),	FARED	15189
	1I=1,NEL)	FARED	15190
	MAGM1=MAG-1	FARED	15191
	DO 6405 KK=1,MAGM1	FARED	15192
	DO 6405 II=1,NEL	FARED	15193
	IF(NTR(II).LE.J) GO TO 6405	FARED	15194
	READ(MAC) DUMDUM	FARED	15195
6405	CONTINUE	FARED	15196
	READ(MAC) DUMDUM	FARED	15197
	DO 6595 II=1,NEL	FARED	15198
	READ(MAC) DUMDUM	FARED	15199
	IF(NCAP(II).NE.0) READ(MAC) DUMDUM	FARED	15200
	IF(NFIS(II).EQ.J) GO TO 6490	FARED	15201
	READ(MAC) (PSF(J),J=1,MAG),(PSC(JJ),JJ=1,MAG)	FARED	15202
	DO 6410 J=1,MAG	FARED	15203
6410	PSF(J)=PSF(J)*PSC(J)	FARED	15204
	CALL ZOLIST(ICOMP(II),IUB,KZO,IZO)	FARED	15205
	DO 6480 K=1,KZO	FARED	15206
	I=IZO(K)	FARED	15207
6420	DO 6425 L=1,51	FARED	15208
	DO 6425 LL=1,3	FARED	15209
6425	PTERM(LL,L)=0.0	FARED	15210
	IIN=1	FARED	15211
	IF(I.NE.1) IIN=LB(I-1)	FARED	15212
	IOUT=LB(I)	FARED	15213
	IPTS=IOUT-IIN+1	FARED	15214
	NP(I)=NP(I)+1	FARED	15215
	NN=NP(I)	FARED	15216

NUP(I,NN)=ICOMP(II)	FARED	15217
DO 6435 L=1,IPTS	FARED	15218
DO 6430 J=1,MAG	FARED	15219
COMP=CONCENT(ICOMP(II),I)	FARED	15220
PTERM(1,L)=PTERM(1,L)+COMP*PSF(J)*PHI(IIN+L-1,J)	FARED	15221
6430 PTERM(2,L)=PTERM(2,L)+CHI(I,J)*PHIA(IIN+L-1,J)	FARED	15222
6435 CONTINUE	FARED	15223
DO 6440 L=1,IPTS	FARED	15224
6440 DUMX(L)=PTERM(1,L)*PTERM(2,L)	FARED	15225
PHOR(I,NN)=RINTG(DUMX,I)	FARED	15226
DO 6445 L=1,IPTS	FARED	15227
6445 DUMX(L)=PTERM(1,L)	FARED	15228
APHI(I,NN)=RINTG(DUMX,I)	FARED	15229
DO 6450 L=1,NDNUC	FARED	15230
IDN=L	FARED	15231
IF(NUCID(L).EQ.ICOMP(II)) GO TO 6455	FARED	15232
6450 CONTINUE	FARED	15233
GO TO 6480	FARED	15234
6455 ND(I)=ND(I)+1	FARED	15235
NN=ND(I)	FARED	15236
NUD(I,NN)=ICOMP(II)	FARED	15237
DO 6465 L=1,IPTS	FARED	15238
DO 6460 J=1,MAG	FARED	15239
6460 PTERM(3,L)=PTERM(3,L)+DNPS(IDN,J)*PHIA(IIN+L-1,J)	FARED	15240
6465 CONTINUE	FARED	15241
DO 6470 L=1,IPTS	FARED	15242
6470 DUMX(L)=PTERM(1,L)*PTERM(3,L)	FARED	15243
DWOR(I,NN)=RINTG(DUMX,I)	FARED	15244
6480 CONTINUE	FARED	15245
6490 CONTINUE	FARED	15246
IF(N2N(II).NE.0) READ(MAC) DUMDUM	FARED	15247
IF(NUEL(II).NE.0) READ(MAC) DUMDUM	FARED	15248
6595 CONTINUE	FARED	15249
6600 CONTINUE	FARED	15250
DO 6700 I=1,NZ	FARED	15251
KNUC=NP(I)	FARED	15252
DO 6695 K=1,KNUC	FARED	15253
PLD=PLD+PHOR(I,K)	FARED	15254
KD=ND(I)	FARED	15255
DO 6620 L=1,KD	FARED	15256
IF(NUD(I,L).NE.NUP(I,K)) GO TO 6620	FARED	15257
DO 6605 LL=1,NDNUC	FARED	15258
IF(NUD(I,LL).NE.NUCID(LL)) GO TO 6605	FARED	15259
BET=BETA(LL)	FARED	15260
GO TO 6625	FARED	15261
6605 CONTINUE	FARED	15262
6620 CONTINUE	FARED	15263
BET=0.0	FARED	15264
6625 BN=BN+BET*DWOR(I,K)	FARED	15265
BD=BU+BET*DWOR(I,K)+(1.0-BET)*PHOR(I,K)	FARED	15266

6695	CONTINUE	FARED	15267
6700	CONTINUE	FARED	15268
	BEFF=BN/80	FARED	15269
	PLIFE=VINT/PLD	FARED	15270
	PMMAX=U.U	FARED	15271
	DO 6750 I=1,NZ	FARED	15272
	KP=NP(I)	FARED	15273
	DO 6750 K=1,KP	FARED	15274
	IF (APHI(I,K).EQ.0.0) GO TO 6710	FARED	15275
	PWOR(I,K)=PWOR(I,K)/APHI(I,K)	FARED	15276
	IF (PWOR(I,K).LE.PMMAX) GO TO 6710	FARED	15277
	PMMAX=PWOR(I,K)	FARED	15278
	IMAX=I	FARED	15279
	KMAX=K	FARED	15280
6710	KD=ND(I)	FARED	15281
	DO 6725 L=1,KD	FARED	15282
	IF (NUD(I,L).NE.NUP(I,K)) GO TO 6725	FARED	15283
	IF (APHI(I,K).EQ.0.0) GO TO 6725	FARED	15284
	DWOR(I,L)=DWOR(I,L)/APHI(I,K)	FARED	15285
6725	CONTINUE	FARED	15286
6750	CONTINUE	FARED	15287
	DO 6800 I=1,NZ	FARED	15288
	KP=NP(I)	FARED	15289
	DO 6770 K=1,KP	FARED	15290
6770	PWOR(I,K)=PWOR(I,K)/PMMAX	FARED	15291
	KD=ND(I)	FARED	15292
	DO 6780 K=1,KD	FARED	15293
6780	DWOR(I,K)=DWOR(I,K)/PMMAX	FARED	15294
6800	CONTINUE	FARED	15295
	WRITE (M6,6810)	FARED	15296
6810	FORMAT (1H1,40X,46H* * SAFETY AND KINETIC PARAMETERS EDIT * * /	FARED	15297
	1//)	FARED	15298
	WRITE (M6,6820) BEFF	FARED	15299
6820	FORMAT (1H0,36X,14HBETA-EFFECTIVE,26X,2H= ,E12.5)	FARED	15300
	WRITE (M6,6830) PLIFE	FARED	15301
6830	FORMAT (1H0,36X,30HPROMPT NEUTRON LIFETIME (SEC.),10X,2H= ,E12.5//	FARED	15302
	1////)	FARED	15303
	WRITE (M6,6840)	FARED	15304
6840	FORMAT (1H0,43X,41H* * PROMPT AND DELAYED NEUTRON WORTHS * *)	FARED	15305
	ISOM=NUP(IMAX,KMAX)	FARED	15306
	CALL CONVL(ISOM,LET1,LET2)	FARED	15307
	IX=NPOINT(IMAX)	FARED	15308
	IZONE=NZONE(IX)	FARED	15309
	WRITE (M6,6850) LET1,LET2,IZONE	FARED	15310
6850	FORMAT (1H0,42X,24H(NORMALIZED TO 1.0 FOR ,A4,A2,9H IN ZONE ,I2,2	FARED	15311
	1H))	FARED	15312
6860	FORMAT (1H1,1H)	FARED	15313
6870	FORMAT (1H0,1H ///)	FARED	15314
6880	FORMAT (1H0,20X,5HZONE ,I2,10X,7HNUCLIDE,10X,14HPROMPT NEUTRON,10X	FARED	15315
	1,15HDELAYED NEUTRON)	FARED	15316

6890	FORMAT (1H ,58X,5HWORTH,20X,5HWORTH/)	FARED	15317
6900	FORMAT (1H ,38X,A4,A2,11X,E12.5,12X,E12.5)	FARED	15318
6910	FORMAT (1H ,38X,A4,A2,11X,E12.5)	FARED	15319
	LINE=38	FARED	15320
	DO 7100 I=1,NZ	FARED	15321
	LTG=LINE-NP(I)-8	FARED	15322
	IF (LTG.GT.0) GO TO 7010	FARED	15323
	LINE=55	FARED	15324
	WRITE (M6,6860)	FARED	15325
	GO TO 7020	FARED	15326
7010	WRITE (M6,6870)	FARED	15327
7020	NN=NP(I)	FARED	15328
	LINE=LINE-NN-8	FARED	15329
	WRITE (M6,6880) I	FARED	15330
	WRITE (M6,6890)	FARED	15331
	IF (NN.EQ.0) GO TO 7095	FARED	15332
	DO 7090 K=1,NN	FARED	15333
	ISOM=NUP (I, K)	FARED	15334
	CALL CONVL (ISOM,LET1,LET2)	FARED	15335
	KU=NO(I)	FARED	15336
	DO 7040 L=1,KD	FARED	15337
	LK=L	FARED	15338
	IF (NUD(I,L).EQ.NUP (I, K)) GO TO 7060	FARED	15339
7040	CONTINUE	FARED	15340
	WRITE (M6,6910) LET1,LET2,PWOR(I,K)	FARED	15341
	GO TO 7090	FARED	15342
7060	WRITE (M6,6900) LET1,LET2,PWOR(I,K),DWOR(I,LK)	FARED	15343
7090	CONTINUE	FARED	15344
	GO TO 7100	FARED	15345
7095	WRITE (M6,7096)	FARED	15346
7096	FORMAT (1H0,45X,42HTHIS ZONE CONTAINS NO FISSIONABLE NUCLIDES)	FARED	15347
7100	CONTINUE	FARED	15348
	GO TO 1000	FARED	15349
999	WRITE (M6,998)	FARED	15350
998	FORMAT (1H0,31H*** EDIT DIRECTIVE EXPECTED ***)	FARED	15351
	GO TO 1000	FARED	15352
997	WRITE (M6,996)	FARED	15353
996	FORMAT (1H0,34H*** BLOCK DESIGNATION EXPECTED ***)	FARED	15354
	GO TO 1000	FARED	15355
995	WRITE (M6,994)	FARED	15356
994	FORMAT (1H0,33H*** ZONE DESIGNATION EXPECTED ***)	FARED	15357
	GO TO 1000	FARED	15358
993	WRITE (M6,992)	FARED	15359
992	FORMAT (1H0,40H*** INCORRECT PERTURBATION PARAMETER ***)	FARED	15360
	GO TO 1000	FARED	15361
991	WRITE (M6,990)	FARED	15362
990	FORMAT (1H0,36H*** NUCLIDE DESIGNATION EXPECTED ***)	FARED	15363
1000	CONTINUE	FARED	15364
	WRITE (M6,1005)	FARED	15365
1005	FORMAT (1H0,//////)	FARED	15366

	CALL CRAMIN(V,N,M)	FARED	15367
	GO TO 99	FARED	15368
1001	CONTINUE	FARED	15369
	MC=NTAPE(17)	FARED	15370
	REWIND MC	FARED	15371
	NLEN=NZ*MAG	FARED	15372
	READ(MC) DUMDUM	FARED	15373
	READ(MC) DUMDUM	FARED	15374
	READ(MC) DUMDUM	FARED	15375
	READ(MC) ((PHIA(I,J),I=1,NZ),J=1,MAG)	FARED	15376
	READ(MC) ((PHIA(I+20,J+30),I=1,NZ),J=1,MAG)	FARED	15377
	DO 1020 I=1,NZ	FARED	15378
	DO 1020 J=1,MAG	FARED	15379
1020	PHIA(I+20,J+30)=1.0/(3.0*PHIA(I+20,J+30))	FARED	15380
	READ(MC) DUMDUM	FARED	15381
	READ(MC) DUMDUM	FARED	15382
	READ(MC) NMEL,(PHIA(I+1200),I=1,NMEL)	FARED	15383
	CALL GROCA	FARED	15384
	REWIND MC	FARED	15385
	RETURN	FARED	15386
	END	FARED	15387

OVERLAY(RETAP,G,G)	RETAP	00002
PROGRAM RETAP(INPUT,OUTPUT,TAPE6=OUTPUT,TAPE11=INPUT,TAPE12,TAPE1	RETAP	00003
1,TAPE2,TAPE3)	RETAP	00004
*** PROGRAM RETAP ***	RETAP	00005
RETAP IS A PROGRAM FOR THE GENERATION AND UPDATING OF THE	RETAP	00006
REGA LIBRARY TAPE. THE INPUT IS IN FREE FORMAT WITH THE USE OF	RETAP	00007
DIRECTIVES TO LABEL DATA FOR USE IN SPECIFIED FILES. THE REGA	RETAP	00008
TAPE IS ORDERED BY FILES AND ANY GENERATION OR UPDATING SHOULD	RETAP	00009
BE DONE IN THIS SAME ORDER. IN GENERATING A TAPE, ALL FILES	RETAP	00010
MUST BE PRESENT (I.E., CONTAINING DATA FOR AT LEAST ONE NUCLIDE).	RETAP	00011
IN UPDATING A TAPE, ONLY INFORMATION NECESSARY FOR THE UPDATING	RETAP	00012
OF EACH FILE MUST BE INCLUDED AND ONLY THOSE FILES UPDATED NEED	RETAP	00013
BE INCLUDED IN THE DIRECTIVES. THE CODE HAS ONE MACHINE DEPENDENT	RETAP	00014
PARAMETER - ICHAR (THE NUMBER OF CHARACTERS PER MACHINE WORD), AND	RETAP	00015
TWO SUBROUTINES WHICH MUST BE REPLACED FOR EACH MACHINE - LPINT	RETAP	00016
AND INTALP. THE CODE USES THE FOLLOWING TAPES :	RETAP	00017
TAPE6 : PRINTER	RETAP	00018
TAPE11 : CARD READER	RETAP	00019
TAPE12 : USED AS A SCRATCH TAPE	RETAP	00020
TAPE1 : INPUT FOR UPDATE OR EDIT	RETAP	00021
TAPE2 : OUTPUT FOR REGA	RETAP	00022
TAPE3 : OPTIONAL DATA TAPE BCD MODE	RETAP	00023
USED IF A TAPE WORD IS SEEN BEFORE	RETAP	00024
TEXT STREAM	RETAP	00025
PROGRAMING NOTE: EDIT READS FROM TAPE 1 IF THE RUN IS	RETAP	00026
AN EDIT ONLY	RETAP	00027
THE NOCARD AND CARD DIRECTIVES CONTROL WHETHER THE INPUT DATA	RETAP	00028
CARDS ARE PRINTED OR NOT PRINTED. THE DEFAULT IS THAT THEY WILL	RETAP	00029
BE PRINTED.	RETAP	00030
NOCARD TURNS THEM OFF AND THE CARD OPTION TURNS THEM BACK ON.	RETAP	00031
THIS CAN BE DONE AS MANY TIMES AS DESIRED.	RETAP	00032
THE WORD NOCARD CAN APPEAR BEFORE THE WORDS UPDATE, FILE,	RETAP	00033
TAPE, OR EDIT. THE WORD CARD CAN APPEAR BEFORE THE WORDS FILE OR	RETAP	00034
EDIT.	RETAP	00035
COMMON/MIS/ NPAR, ICHAR, IWOD, MU1, K1, K2, K3, NOWD, NOKD	RETAP	00036
COMMON/TAPES/ NIN, NOUT, KROF, INP, NPR, NPRO	RETAP	00037
COMMON/KARD/ IALPH(80)	RETAP	00038
COMMON/FILES/TYPE, FNO, FI, JF, NGRP, NHED, NGRPT	RETAP	00039
COMMON/RED/ V, N, W	RETAP	00040
COMMON/JEMS/ IBL, IZO, IS, IASTER, MINUS, IPLUS, LPARN	RETAP	00041
COMMON DUMMY (16003)	RETAP	00042
DIMENSION W(18)	RETAP	00043
EQUIVALENCE (V, IV), (IW, W(1))	RETAP	00044
DATA FL/44FILE/	RETAP	00045
DATA IIBL, IZZO, ISS, IASTER, MINUS, IPLUS, LPARN/1H , 1H0, 1HS, 1H*,	RETAP	00046
1 1H-, 1H+, 1H) /	RETAP	00047
CALL LPINT (IIBL, 1, IBL)	RETAP	00048
	RETAP	00049
	RETAP	00050
	RETAP	00051

CALL LPINT (IZZD,1,IZO)	RETAP	00052
CALL LPINT (ISS,1,IS)	RETAP	00053
CALL LPINT (IASTER,1,IASTER)	RETAP	00054
CALL LPINT (MINUS,1,MINUS)	RETAP	00055
CALL LPINT (IPLUS,1,IPLUS)	RETAP	00056
CALL LPINT (LPARN,1,LPARN)	RETAP	00057
MUM=1	RETAP	00058
C	RETAP	00059
C TAPES ASSIGNMENT	RETAP	00060
C	RETAP	00061
NPR=6	RETAP	00062
NPRO=NPR	RETAP	00063
IED=1	RETAP	00064
INP=11	RETAP	00065
KRDT=12	RETAP	00066
NOUT=2	RETAP	00067
NIN=0	RETAP	00068
C MACHINE DEPENDENTS	RETAP	00069
C	RETAP	00070
RET=5LRETAP	RETAP	00071
C	RETAP	00072
FI=FL	RETAP	00073
ICHAR=10	RETAP	00074
IWOD=72/ICHAR	RETAP	00075
C	RETAP	00076
WRITE(NPR,2)	RETAP	00077
CALL CRAMIN(V,N,W)	RETAP	00078
TYPE=W(1)	RETAP	00079
5 CALL SCAN1(30HFILE*UPDATE*EDIT*TAPE*NOCARD**,TYPE,M)	RETAP	00080
GO TO (10,20,8,15,17,40),M	RETAP	00081
C	RETAP	00082
C NOCARD OPTION	RETAP	00083
C	RETAP	00084
17 NPRO=0	RETAP	00085
CALL CRAMIN(V,N,W)	RETAP	00086
TYPE=W(1)	RETAP	00087
GO TO 5	RETAP	00088
C	RETAP	00089
C OPTIONAL INPUT FROM TAPE	RETAP	00090
C	RETAP	00091
15 INP=3	RETAP	00092
CALL CRAMIN(V,N,W)	RETAP	00093
TYPE=W(1)	RETAP	00094
GO TO 5	RETAP	00095
C	RETAP	00096
C ILLEGAL DIRECTIVE	RETAP	00097
C	RETAP	00098
40 CALL ERR(2)	RETAP	00099
C	RETAP	00100
C READ IN UPDATE PARAMETERS	RETAP	00101

C	20 NIN=1	RETAP	00102
	CALL CRAMIN(V,N,W)	RETAP	00103
	K1=IV	RETAP	00104
	CALL CRAMIN(V,N,W)	RETAP	00105
	K2=IV	RETAP	00106
	CALL CRAMIN(V,N,W)	RETAP	00107
	K3=IV	RETAP	00108
	CALL CRAMIN(V,N,W)	RETAP	00109
	TYPE=W(1)	RETAP	00110
	GO TO 5	RETAP	00111
C		RETAP	00112
C	READ IN FILE NUMBER	RETAP	00113
C		RETAP	00114
	10 CALL CRAMIN(V,N,W)	RETAP	00115
	FNO=W(1)	RETAP	00116
	2 FORMAT(1H1,20(/),67X,4H****,7(/),44X,47H**** RES A L I B R A	RETAP	00117
	X R Y T A P E ****,7(/),67X,4H****,/,1H1)	RETAP	00118
	IF(NIN.NE.0) REWIND NIN	RETAP	00119
	DO 30 IVR=1,7	RETAP	00120
	CALL OVERLAY(RET,IVR,0,6HRECALL)	RETAP	00121
	30 CONTINUE	RETAP	00122
	IED=NOUT	RETAP	00123
	IF(NOUT.LE.0) CALL ERR(9)	RETAP	00124
	IF(NIN.EQ.0) GO TO 5	RETAP	00125
	WRITE(NPR,3)	RETAP	00126
	3 FORMAT(1H1,10(/),57X,23H*** UPDATE COMPLETE ***,5(/))	RETAP	00127
	GO TO 11	RETAP	00128
	6 CONTINUE	RETAP	00129
	WRITE(NPR,4)	RETAP	00130
	4 FORMAT(1H1,10(/),55X,27H*** GENERATION COMPLETE ***,5(/))	RETAP	00131
	11 CONTINUE	RETAP	00132
	ENDFILE NOUT	RETAP	00133
	CALL CHNCK	RETAP	00134
	CALL COED	RETAP	00135
	75 CALL SCAN1(24HEDIT*FINIS*NOCARD*CARD**,TYPE,M)	RETAP	00136
	IF(M.GT.4) CALL ERR(2)	RETAP	00137
	GO TO (8,9,80,90),M	RETAP	00138
	80 NPRO=0	RETAP	00139
	GO TO 91	RETAP	00140
	90 NPRO=NPR	RETAP	00141
	91 CALL CRAMIN(V,N,W)	RETAP	00142
	TYPE=W(1)	RETAP	00143
	GO TO 75	RETAP	00144
	8 CONTINUE	RETAP	00145
	NOUT=IED	RETAP	00146
	IVR=8	RETAP	00147
	CALL OVERLAY(RET,IVR,0,6HRECALL)	RETAP	00148
	9 STOP	RETAP	00149
	END	RETAP	00150
		RETAP	00151

00000	SUBROUTINE WEOF(NTAP)	000000000	RETAP	00202
00001		000000000	RETAP	00203
00002	WRITE AN END OF FILE MARK ON NTAP	000000000	RETAP	00204
00003		000000000	RETAP	00205
00004	ENDFILE NTAP	000000000	RETAP	00206
00005	RETURN	000000000	RETAP	00207
00006	END	000000000	RETAP	00208
00007				

C SUBROUTINE REOF(NTAP)
C SEARCH FOR AN END OF FILE ON NTAP
C
2 READ(NTAP)
 IF(EOF,NTAP) 3,2
3 RETURN
 END

RETAP 00209
RETAP 00210
RETAP 00211
RETAP 00212
RETAP 00213
RETAP 00214
RETAP 00215
RETAP 00216

	SUBROUTINE FORM(NCR,LDATA,LFORM)	RETAP	00217
	COMMON/MIS/ NPAR,ICHAR,IWOD,MUM,K1,K2,K3	RETAP	00218
	DIMENSION LDATA(1),LFORM(1)	RETAP	00219
C		RETAP	00220
C	TRANSFER THE INFORMATION FROM LDATA TO LFORM TO BUILD A FORMAT	RETAP	00221
C	STATEMENT. ICHAR CONTROLS THE CHARACTER PER WORD COUNT.	RETAP	00222
	ICR=4	RETAP	00223
	MCR=0	RETAP	00224
	NWP=1	RETAP	00225
	DO 100 IC=1,NCR	RETAP	00226
	MCR=MCR+1	RETAP	00227
	IF(MCR.LE.ICR) GO TO 50	RETAP	00228
	MCR=1	RETAP	00229
	NWP=NWP+1	RETAP	00230
50	CONTINUE	RETAP	00231
	CALL LPINT(LDATA(NWP),MCR,ITEM)	RETAP	00232
	CALL INTALP(LFORM(1),IC,ITEM)	RETAP	00233
100	CONTINUE	RETAP	00234
	RETURN	RETAP	00235
	END	RETAP	00236
		RETAP	00237

	SUBROUTINE MASH(NUM, IONE, ITWO)	RETAP	00238
	COMMON/JEMS/ IBL, IZO, IS, IASTER, MINUS, IPLUS, LPARN	RETAP	00239
C		RETAP	00240
C	THIS SUBROUTINE TAKES THE NUMBER(NUM) AND RETURNS IN IONE THE	RETAP	00241
C	CHARACTER REPRESENTATION OF THR FIRST DIGIT OF NUM. THE SECOND	RETAP	00242
C	DIGIT REPRESENTATION IS RETURNED IN ITWO. IT IS ASSUMED THAT	RETAP	00243
C	NUM IS LESS THAN 100. IZO IS ADDED TO INSURE MACHINE INDEPENDENCE.	RETAP	00244
C		RETAP	00245
	IONE = NUM/ 10	RETAP	00246
	ITWO = NUM - (10*IONE)	RETAP	00247
	IONE= IONE+IZO	RETAP	00248
	ITWO= ITWO+IZO	RETAP	00249
	RETURN	RETAP	00250
	END	RETAP	00251

C	SUBROUTINE SCAN1(HOLL,W,I)	RETAP	00252
C		RETAP	00253
C	HOLL IS A HOLLERITH ARRAY OF WORDS SEPARATED BY ASTERISKS(*).	RETAP	00254
C	**INDICATES END OF ARRAY. I IS SET SO THAT W IS IDENTICAL TO	RETAP	00255
C	THE I,TH MEMBER OF THE ARRAY. IF NO IDENTITY FOUND I IS SET	RETAP	00256
C	TO 1 MORE THAN THE NUMBERS OF MEMBERS IN THE ARRAY.	RETAP	00257
C		RETAP	00258
	DIMENSION HOLL(1),WORD(1)	RETAP	00259
C	IC-IC-IC IS NUMBER OF CHARACTERS/WORD FOR MACHINE INDEPENDENCE	RETAP	00260
	COMMON/MIS/ NPAR,IC-IC,IWOD,MUM	RETAP	00261
	COMMON/JEMS/ IBL,IZO,IS,I-IC-IC,MINUS,IPLUS,LPARN	RETAP	00262
	JLAST=-1	RETAP	00263
	J=1	RETAP	00264
	I=0	RETAP	00265
8	I=I+1	RETAP	00266
	DO 10 K = 1,IC-IC	RETAP	00267
	CALL INTALP(WORD(1),K,IBL)	RETAP	00268
10	CONTINUE	RETAP	00269
	K=0	RETAP	00270
6	CALL LPINT (HOLL(1),J,NCH)	RETAP	00271
	J=J+1	RETAP	00272
	IF (NCH - I-IC-IC) 1,2,1	RETAP	00273
1	IF(NCH-IBL) 9,6,9	RETAP	00274
9	K=K+1	RETAP	00275
	IF (K - IC-IC) 5,5,5	RETAP	00276
5	CALL INTALP (WORD(1),K,NCH)	RETAP	00277
	GO TO 6	RETAP	00278
2	IF(J-JLAST-1) 7,7,3	RETAP	00279
7	RETURN	RETAP	00280
3	JLAST=J	RETAP	00281
	CALL RECOG1(WORD,W,L)	RETAP	00282
	IF(L) 8,8,7	RETAP	00283
	END	RETAP	00284

C	SUBROUTINE RECOG1(A,W,I)	RETAP	00285
C	A AND W ARE COMPARED AND IF THEY ARE THE SAME, I IS SET TO 0;	RETAP	00286
C	OTHERWISE, I IS SET TO 1.	RETAP	00287
C		RETAP	00288
	DIMENSION A(1)	RETAP	00289
C-IC	CHAR IS NUMBER OF CHARACTERS/WORD FOR MACHINE INDEPENDENCE	RETAP	00290
	COMMON/MIS/ NPAR,ICCHAR,IWOD,MUM	RETAP	00291
	I=0	RETAP	00292
	DO 1 J = 1,ICCHAR	RETAP	00293
	CALL LPINT (A(1),J,NCH1)	RETAP	00294
	CALL LPINT (W,J,NCH2)	RETAP	00295
	IF(NCH1-NCH2) 2,1,2	RETAP	00296
1	CONTINUE	RETAP	00297
	I=1	RETAP	00298
2	RETURN	RETAP	00299
	END	RETAP	00300
		RETAP	00301

C	SUBROUTINE CRAMIN (V,N,W)	RETAP	00302
C	GENERALISED FORMAT FREE INPUT ROUTINE. READS A CARD INTO	RETAP	00303
C	BUFFER AND PRINTS CARD.----- SEARCHES BUFFER FOR ALPHA-NUMERIC	RETAP	00304
C	INFORMATION. PUTS ALPHABETIC INFORMATION IN W, NUMBER IN V (OR	RETAP	00305
C	IN IV IF INTEGER), AND	RETAP	00306
C	SETS N=0 IF WORD ONLY READ	RETAP	00307
C	N=1 IF FLOATING POINT NO. READ	RETAP	00308
C	N=2 IF WORD AND FLOATING POINT NO. READ	RETAP	00309
C	N=-1 IF INTEGER ONLY READ	RETAP	00310
C	N=-2 IF WORD AND INTEGER READ	RETAP	00311
C	N=-3 IF HOLLERITH ARRAY READ.	RETAP	00312
C	THIS SUBROUTINE WAS TAKEN FROM SCRAMBLE AND MODIFIED TO READ IN A	RETAP	00313
C	WHOLE CARD AS A ;W; ARRAY WHEN A \$ IS IN COLUMN 1 OF THAT CARD	RETAP	00314
C	COMMON /TAPES/ NIN,NOUT,KROT,INP,NPR,NPRO	RETAP	00315
	COMMON /KARD/ IALPH	RETAP	00316
	COMMON /MIS/ NPAR,ICHAR,IWDD,MUM,K1,K2,K3,NOWD,NOKD	RETAP	00317
	COMMON /JEMS/ IBL,IZO,IS,IASTER,MINUS,IPLUS,LPARN	RETAP	00318
	DIMENSION IALPH(80), I(80), W(13)	RETAP	00319
	EQUIVALENCE (IA,A)	RETAP	00320
	DATA ISTART,JCOL/1,0/	RETAP	00321
C	C-ICHAR IS NUMBER OF CHARACTERS/WORD FOR MACHINE INDEPENDENCE	RETAP	00322
C		RETAP	00323
	IF (ISTART.NE.1) GO TO 11	RETAP	00324
	ISTART=0	RETAP	00325
	NOKD=0	RETAP	00326
	NOWD=0	RETAP	00327
11	CONTINUE	RETAP	00328
	NOWD=NOWD+1	RETAP	00329
	IF (NOWD.GT.36) CALL ERR (10)	RETAP	00330
	IF (JCOL) 13,12,13	RETAP	00331
12	CALL CARD (IALPH,I)	RETAP	00332
	NOWD=1	RETAP	00333
	NOKD=NOKD+1	RETAP	00334
	IF (NPRO.NE.0) WRITE (NPRO,73) IALPH,NOKD	RETAP	00335
	JCOL=0	RETAP	00336
13	A=0.0	RETAP	00337
	NR=0	RETAP	00338
	NNN=1	RETAP	00339
	IAA=0	RETAP	00340
	N=0	RETAP	00341
	NT=0	RETAP	00342
	MU=0	RETAP	00343
	NK=0	RETAP	00344
	NS=0	RETAP	00345
	NU=0	RETAP	00346
	MODE=1	RETAP	00347
	NP=1	RETAP	00348
		RETAP	00349
		RETAP	00350
		RETAP	00351

31	IF (NR) 15,15,32	RETAP	00402
32	IF (NT) 33,33,34	RETAP	00403
33	IF (NW) 15,15,42	RETAP	00404
34	IF (NP) 35,37,37	RETAP	00405
35	NPP=IABS(NP)	RETAP	00406
	AAA=1.0	RETAP	00407
	DO 36 KK=1,NPP	RETAP	00408
36	AAA=10.0*AAA	RETAP	00409
	A=A/AAA	RETAP	00410
	NP=0	RETAP	00411
	GO TO 34	RETAP	00412
C		RETAP	00413
37	IF (NS) 38,39,39	RETAP	00414
38	A=-A	RETAP	00415
39	IF (NE) 66,40,67	RETAP	00416
40	IF (NP) 42,42,41	RETAP	00417
41	IA=A+SIGN(0.001,A)	RETAP	00418
	N=-1	RETAP	00419
42	V=A	RETAP	00420
	IF (MU.EQ.0.AND.N.GT.0) V=V/10.**NKK	RETAP	00421
	IF (NW) 44,44,43	RETAP	00422
43	N=N+N	RETAP	00423
44	RETURN	RETAP	00424
C		RETAP	00425
45	IF (NS) 15,46,15	RETAP	00426
46	NS=1	RETAP	00427
	GO TO 15	RETAP	00428
C		RETAP	00429
47	IF (NS) 15,48,15	RETAP	00430
48	NS=-1	RETAP	00431
	GO TO 15	RETAP	00432
C		RETAP	00433
49	IF (NP) 15,15,50	RETAP	00434
50	IF (IAA) 51,51,62	RETAP	00435
51	NP=0	RETAP	00436
	N=1	RETAP	00437
	MU=1	RETAP	00438
	GO TO 15	RETAP	00439
C		RETAP	00440
52	IF (IAA) 53,53,60	RETAP	00441
53	IF (NNN) 54,54,55	RETAP	00442
54	JCOL=JCOL-1	RETAP	00443
	GO TO 40	RETAP	00444
C		RETAP	00445
55	IF (NW.GE.ICHR) GO TO 15	RETAP	00446
C		RETAP	00447
C	STORE LETTER IN W	RETAP	00448
C		RETAP	00449
	NW=NW+1	RETAP	00450
	CALL INTALP (W,NW,K)	RETAP	00451

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      GO TO 15
C      THIS SEGMENT STORES THE W ARRAY.
C
56     N=-3
57     NT=1
      JCOL=0
      DO 58 J=1,IWON
      DO 58 K=1,ICHAR
        NT=NT+1
        CALL INTALP (W(J),K,I(NT))
        IF (NT.EQ.71) RETURN
58     CONTINUE
      RETURN
59     IF (IAA) 63,63,60
60     IF (NR) 62,62,61
61     JCOL=JCOL-1
      GO TO 32
C
62     JCOL=NNNN-1
      A=FRAC
      NE=0
      NP=MODE
      GO TO 40
C
63     IF (NT) 52,52,64
64     NU=1
      NKK=NK
      IF (NE) 15,65,15
65     NE=-1
      NNNN=JCOL
      IAA=1
      GO TO 32
C
66     FRAC=A
      NE=1
      A=0.0
      NT=0
      NS=0
      MODE=NP
      NP=1
      GO TO 15
C
67     FACTOR=1.0
      NEXP=A*SIGN(0.001,A)
      IF (NEXP) 69,68,69
68     A=FRAC
      GO TO 42
C
69     NEXPP=IABS(NEXP)

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RETAP 00452
RETAP 00453
RETAP 00454
RETAP 00455
RETAP 00456
RETAP 00457
RETAP 00458
RETAP 00459
RETAP 00460
RETAP 00461
RETAP 00462
RETAP 00463
RETAP 00464
RETAP 00465
RETAP 00466
RETAP 00467
RETAP 00468
RETAP 00469
RETAP 00470
RETAP 00471
RETAP 00472
RETAP 00473
RETAP 00474
RETAP 00475
RETAP 00476
RETAP 00477
RETAP 00478
RETAP 00479
RETAP 00480
RETAP 00481
RETAP 00482
RETAP 00483
RETAP 00484
RETAP 00485
RETAP 00486
RETAP 00487
RETAP 00488
RETAP 00489
RETAP 00490
RETAP 00491
RETAP 00492
RETAP 00493
RETAP 00494
RETAP 00495
RETAP 00496
RETAP 00497
RETAP 00498
RETAP 00499
RETAP 00500
RETAP 00501

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	DO 70 L=1,NEXPP	RETAP	00502
	FACTOR=FACTOR*10.0	RETAP	00503
70	CONTINUE	RETAP	00504
	N=1	RETAP	00505
	IF (NEXP) 71,72,72	RETAP	00506
71	A=FRAC/FACTOR	RETAP	00507
	GO TO 42	RETAP	00508
C		RETAP	00509
72	A=FRAC*FACTOR	RETAP	00510
	GO TO 42	RETAP	00511
C		RETAP	00512
73	FORMAT(1X,2H>>,72A1,2H<<,2X,8A1,3X,17H*** DATA CARD NO.,I6,4H ***)	RETAP	00513
	END	RETAP	00514

	SUBROUTINE CARD (IALPH,IINT)	RETAP	00515
C		RETAP	00516
C	CALLLED BY CRAMIN - READS ONE CARD OF INFORMATION AND PLACES THE	RETAP	00517
C	INTEGER EQUIVALENT TO EACH CHARACTER INTO IINT	RETAP	00518
C		RETAP	00519
	COMMON/TAPES/NIN,NOUT,KROT,INP,NPR	RETAP	00520
	DIMENSION LIN(80)	RETAP	00521
	DATA ITEST /0/	RETAP	00522
	DATA (LIN(I),I=1,80)/1HF,1HI,1HN,1HI,1HS,75*1H /	RETAP	00523
	DIMENSION IALPH(1),IINT(1)	RETAP	00524
	READ(INP,990) (IALPH(IC),IC=1,80)	RETAP	00525
	IF(EOF,INP) 10,12	RETAP	00526
12	CONTINUE	RETAP	00527
990	FORMAT(80A1)	RETAP	00528
	DO 2 I=1,80	RETAP	00529
C	TRANSFER CHARACTER FROM A1 TO INTEGER FORM	RETAP	00530
	CALL LPINT (IALPH(I),1,IINT(I))	RETAP	00531
2	CONTINUE	RETAP	00532
	RETURN	RETAP	00533
10	CONTINUE	RETAP	00534
	IF (ITEST .NE. 0) GO TO 20	RETAP	00535
	ITEST =1	RETAP	00536
	DO 13 J=1,80	RETAP	00537
13	IALPH(J)=LIN(J)	RETAP	00538
	WRITE(NPR,11)	RETAP	00539
11	FORMAT(20X,18HFINIS CARD ASSUMED)	RETAP	00540
	GO TO 12	RETAP	00541
20	CALL ERR (11)	RETAP	00542
	END	RETAP	00543

C	SUBROUTINE IDNUM(NUM,LET1,LET2,V,N,W)	RETAP	00544
C		RETAP	00545
C	THIS SUBROUTINE CONVERTS A NUCLIDE ID INTO AN INTEGER AND STORES	RETAP	00546
C	THE ALPHANUMERIC EQUIVALENT INTO TWO WORDS-LET1 AND LET2.	RETAP	00547
C	IF THE SUBROUTINE IS UNABLE TO PERFORM SUCH A CONVERSION, THE	RETAP	00548
C	FLAG, NUMBER, AND WORD COMBINATION ARE LEFT IN V,N,W SO THAT THE	RETAP	00549
C	EFFECT IS A CRAMIN CALL.	RETAP	00550
C	CAUTION---A SUCCESSION OF NON-NUCLIDE WORD-NUMBER PAIRS CAN CAUSE	RETAP	00551
C	A LOOP IF THIS SUBROUTINE IS CONTINUOUSLY CALLED WITHOUT	RETAP	00552
C	EXTERNALLY CALLING CRAMIN OR RESETTING THE N-FLAG.	RETAP	00553
C		RETAP	00554
	COMMON/MIS/ NPAR,ICHAR,IWOD,MUM	RETAP	00555
	COMMON/JEMS/ IBL,IZO,IS,IASTER,MINUS,IPLUS,LPARN	RETAP	00556
	DIMENSION W(18), I(3), LT(2)	RETAP	00557
	EQUIVALENCE(U,IW),(X,IV)	RETAP	00558
	DO 5 J=1,ICHAR	RETAP	00559
	CALL INTALP (LT(1), J, IBL)	RETAP	00560
	CALL INTALP (LT(2), J, IBL)	RETAP	00561
5	CONTINUE	RETAP	00562
	IF(N.NE.-2) CALL CRAMIN(V,N,W)	RETAP	00563
	LN=1	RETAP	00564
	LL=0	RETAP	00565
	NUM=0	RETAP	00566
	IF(N.NE.-2) GO TO 100	RETAP	00567
	U=W(1)	RETAP	00568
	CALL SCAN1(283HH*HE*LI*BE*3*C*N*O*F*NE*NA*MG*AL*SI*P*S*CL*A*K*CA*S	RETAP	00569
	1C*TI*V*CR*MN*FE*CO*NI*CU*ZN*GA*GE*AS*SE*BR*KR*RB*SR*Y*ZR*CB*MO*TC*	RETAP	00570
	2RU*RH*PD*AG*CD*IN*SN*SB*TE*I*XE*CS*BA*LA*CE*PR*ND*PM*SH*EU*GD*TB*D	RETAP	00571
	3Y*HO*ER*TM*YB*LU*HF*TA*W*RE*OS*IR*PT*AU*HG*TL*PB*BI*PU*AT*RN*SS*RA	RETAP	00572
	4*AC*TH*PA*U*NP*PU*AM*CM*BK*CF*FP**,U,L)	RETAP	00573
	IF(L.GT.99) RETURN	RETAP	00574
	LT(1) = IW	RETAP	00575
	X=V	RETAP	00576
	NUM=L*1000+IV	RETAP	00577
	NU=NUM	RETAP	00578
	CALL LPINT(U,2,ICH)	RETAP	00579
	NSTR=2	RETAP	00580
	IF(ICH.NE.IBL) NSTR=3	RETAP	00581
	I(1)=IV/100	RETAP	00582
	I(2)=(IV/10)-I(1)*10	RETAP	00583
	I(3)=IV-(I(1)*100)-(I(2)*10)	RETAP	00584
	I(1)=I(1)+IZO	RETAP	00585
	I(2)=I(2)+IZO	RETAP	00586
	I(3)=I(3)+IZO	RETAP	00587
	LL=NSTR	RETAP	00588
	IF(IV.GE.0) LLL=3	RETAP	00589
	IF(IV.GE.10) LLL=2	RETAP	00590
	IF(IV.GE.100) LLL=1	RETAP	00591
	IT=1	RETAP	00592
	INDEX=1	RETAP	00593

DO 10 JL=LLL,3	RETAP	00594
NL=JL	RETAP	00595
CALL INTALP(LT(INDEX),LL,I(JL))	RETAP	00596
LL=LL+1	RETAP	00597
IF(LL-5) 10,9,9	RETAP	00598
9 LL=1	RETAP	00599
INDEX=2	RETAP	00600
10 CONTINUE	RETAP	00601
CALL GRAMIN(V,N,W)	RETAP	00602
X=V	RETAP	00603
U=W	RETAP	00604
IF(N.NE.0) GO TO 100	RETAP	00605
CALL SCAN1(53HA*B*C*D*E*F*G*H*I*J*K*L*M*N*O*P*Q*R*S*T*U*V*W*X*Y*Z*	RETAP	00606
1*,U,L)	RETAP	00607
IF(L.GT.26) GO TO 100	RETAP	00608
CALL LPINT(U,1,IWO)	RETAP	00609
NUM=NUM + L*100000	RETAP	00610
NU=NUM	RETAP	00611
CALL INTALP(LT(INDEX),LL,IWO)	RETAP	00612
CALL GRAMIN(V,N,W)	RETAP	00613
100 LET1=LT(1)	RETAP	00614
LET2=LT(2)	RETAP	00615
RETURN	RETAP	00616
END	RETAP	00617

C	SUBROUTINE DEL	RETAP	00618
C	THIS SUBROUTINE DELETES NUCLIDES FROM COMMON-LTAP BY COMPARISON	RETAP	00619
C	WITH COMMON-LCD AND STORES THE NEW LIST INTO LIST.	RETAP	00620
C		RETAP	00621
	COMMON LAST(100),NPD(100,13),LB,LIST(100),NPD(100,13),LTAP(100),	RETAP	00622
	INPT(100,12),LA,LCD(100),ND	RETAP	00623
	COMMON/TAPES/NIN,NOUT,KROT,INP,NPR	RETAP	00624
	COMMON/MIS/ NPAR,ICHAR,IWDD,MUM	RETAP	00625
	EQUIVALENCE(LI,LB)	RETAP	00626
	IF(NIN.EQ.0) RETURN	RETAP	00627
	NTA=LI	RETAP	00628
	DO 10 J=1,LA	RETAP	00629
	DO 20 K=1,NTA	RETAP	00630
	IF(LTAP(J).EQ.LIST(K))GO TO 10	RETAP	00631
20	CONTINUE	RETAP	00632
	IF(ND.EQ.0) GO TO 30	RETAP	00633
	DO 40 K=1,ND	RETAP	00634
	IF(LTAP(J).EQ.LCD(K)) GO TO 10	RETAP	00635
40	CONTINUE	RETAP	00636
30	LI=LI+1	RETAP	00637
	LIST(LI)=LTAP(J)	RETAP	00638
	DO 50 I=4,NPAR	RETAP	00639
50	NPD(LI,I)=NPT(J,I-1)	RETAP	00640
	NPD(LI,1)=NPT(J,1)	RETAP	00641
	NPD(LI,2)=NPT(J,2)	RETAP	00642
	NPD(LI,3)=0	RETAP	00643
10	CONTINUE	RETAP	00644
	RETURN	RETAP	00645
	END	RETAP	00646
		RETAP	00647

```

C      SUBROUTINE ORDR
C      THIS SUBROUTINE ORDERS COMMON-LIST INTO COMMON-LAST
C
COMMON/MIS/ NPAR, ICHAR, IWOD, MUM
COMMON LAST(100), NPO(100,13), LB, LIST(100), NP(100,13)
IF(LB.EQ.0) RETURN
DO 40 I=1, LB
  LRG=0
  DO 30 J=1, LB
    IF(LIST(J).LT.LRG) GO TO 30
    LRG=LIST(J)
    LR=J
30  CONTINUE
    K=LB+1-I
    LAST(K)=LRG
    LIST(LR)=0
    DO 40 L=1, NPAR
      NPO(K,L)=NP(LR,L)
40  CONTINUE
  RETURN
  END

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RETAP 00648
RETAP 00649
RETAP 00650
RETAP 00651
RETAP 00652
RETAP 00653
RETAP 00654
RETAP 00655
RETAP 00656
RETAP 00657
RETAP 00658
RETAP 00659
RETAP 00660
RETAP 00661
RETAP 00662
RETAP 00663
RETAP 00664
RETAP 00665
RETAP 00666
RETAP 00667
RETAP 00668
RETAP 00669

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C	SUBROUTINE POST(NW,NXT,NFILE)	RETAP	00670
C	THIS SUBROUTINE POSITIONS THE SCRATCH TAPE TO THE NEXT NUCLIDE SET	RETAP	00671
C	TO BE COPIED ONTO NOUT.	RETAP	00672
C		RETAP	00673
	COMMON /TAPES/NIN,NOUT,KRDT,INP,NPR	RETAP	00674
	COMMON LAST(100),NPO(100,13),LT,LIST(100),NP(100,13)	RETAP	00675
1	CONTINUE	RETAP	00676
	NFAC=NXT-NW-1	RETAP	00677
	IF(NFAC.EQ.0) RETURN	RETAP	00678
	IF(NFILE.EQ.2) NFAC=2*NFAC	RETAP	00679
	IF(NFAC.LT.0) GO TO 20	RETAP	00680
	DO 6 J=1,NFAC	RETAP	00681
	JJ=J+NW	RETAP	00682
	IF(NFILE.NE.5) GO TO 8	RETAP	00683
	NFL=NP(JJ,13)	RETAP	00684
	IF(NFL.EQ.0) GO TO 6	RETAP	00685
	DO 2 K=1,NFL	RETAP	00686
2	READ(KRDT)	RETAP	00687
	GO TO 6	RETAP	00688
8	CONTINUE	RETAP	00689
	IF(NFILE.EQ.3.AND.NP(JJ,4).EQ.0) GO TO 6	RETAP	00690
	IF(NFILE.NE.4) GO TO 5	RETAP	00691
	NJ=NP(JJ,4)+NP(JJ,5)	RETAP	00692
	IF(NJ.EQ.0) GO TO 6	RETAP	00693
	DO 4 K=1,NJ	RETAP	00694
4	READ(KRDT)	RETAP	00695
5	IF(NFILE.EQ.7 .AND. NP(JJ,4) .EQ.0) GO TO 7	RETAP	00696
	READ(KRDT)	RETAP	00697
7	IF(NFILE.NE.7 .OR. NP(JJ,5).EQ.0) GO TO 6	RETAP	00698
	READ(KRDT)	RETAP	00699
6	CONTINUE	RETAP	00700
	RETURN	RETAP	00701
20	CONTINUE	RETAP	00702
	REWIND KRDT	RETAP	00703
	NW=0	RETAP	00704
	GO TO 1	RETAP	00705
	END	RETAP	00706
		RETAP	00707

C	SUBROUTINE ERR (M)	RETAP	00708
C	THIS SUBROUTINE CONTAINS ALL MAIN ERROR MESSAGES	RETAP	00709
C	COMMON/TAPES/NIN,NOUT,KRDT,INP,NPR,NPRO	RETAP	00710
	COMMON/KARD/ IALPH(80)	RETAP	00711
	COMMON/FILES/TYPE,FNO,FI,JF,NGRP,NHED,NGRPT	RETAP	00712
	COMMON/RED/ V,N,W	RETAP	00713
	COMMON/MIS/ NPAR,ICHAR,IWOD,MUM,K1,K2,K3,NOWD,NOKD	RETAP	00714
	DIMENSION W(18)	RETAP	00715
	IF(NPRO.EQ.0) WRITE(NPR,1) IALPH, NOKD	RETAP	00716
	1 FORMAT(1X,2H>>,72A1,2H<<,2X,8A1,3X,17H*** DATA CARD NO.,I6,4H ***)	RETAP	00717
	IF(M.EQ.3) GO TO 300	RETAP	00718
	WRITE(NPR,2)	RETAP	00719
	2 FORMAT(//42X,33H*** FATAL ERROR MESSAGE ***//)	RETAP	00720
	GO TO(100,200,300,400,500,600,700,800,900,999,1110),M	RETAP	00721
100	WRITE(NPR,3) JF	RETAP	00722
	3 FORMAT(29X,62HTHE REGA LIBRARY TAPE MUST CONTAIN A COMPLETE SET OF	RETAP	00723
	1FILES WITH//,29X,63HNO FILES BEING OMITTED. THIS ERROR STOP OCCUR	RETAP	00724
	2S IF A GENERATION//,29X,61HHAS BEEN ATTEMPTED WITH A FILE MISSING	RETAP	00725
	3OR OUT OF ORDER. IN //,29X,15HTHIS CASE, FILE,I1,40HHAS BEEN OM	RETAP	00726
	4TTED OR PLACED OUT OF ORDER.////)	RETAP	00727
	GO TO 1000	RETAP	00728
200	IF(N.NE.0) GO TO 250	RETAP	00729
20	WRITE(NPR,4) TYPE	RETAP	00730
	4 FORMAT(29X,62HTHIS ERROR STOP OCCURS WHEN A DIRECTIVE OR WORD IS E	RETAP	00731
	1NCOUNTERED//,29X,62HWHICH IS EITHER OUT OF ORDER OR ILLEGAL. THE	RETAP	00732
	2WORD ENCOUNTERED//, 29X, 54WAS 3,A4,4H...3////)	RETAP	00733
	GO TO 1000	RETAP	00734
250	CONTINUE	RETAP	00735
	WRITE(NPR,5)	RETAP	00736
	5 FORMAT(29X,66HA NUMBER AND/OR A WORD HAS BEEN ENCOUNTERED WHICH IS	RETAP	00737
	1EITHER OUT OF,/,29X,68HORDER, ILLEGAL, OR IN THE WRONG FORMAT. I	RETAP	00738
	2N THIS CASE, THE ERROR WAS//,29X,13HCAUSED BY THE/)	RETAP	00739
	IF(N.LT.2) GO TO 101	RETAP	00740
	WRITE(NPR,7) W(1),V	RETAP	00741
	7 FORMAT(1H+,42X,5HWORD ,A4, 16H AND THE NUMBER ,E12.5,10(/))	RETAP	00742
	GO TO 105	RETAP	00743
101	IF(N.LT.1) GO TO 102	RETAP	00744
	WRITE(NPR,8) V	RETAP	00745
	8 FORMAT(1H+,42X,7HNUMBER ,E12.5,10(/))	RETAP	00746
	GO TO 105	RETAP	00747
102	IF(N.LT.0) GO TO 103	RETAP	00748
	WRITE(NPR,9) W(1)	RETAP	00749
	9 FORMAT(1H+, 42X,5HWORD , A4,10(/))	RETAP	00750
	GO TO 105	RETAP	00751
103	IF(N.LT.-1) GO TO 104	RETAP	00752
	WRITE(NPR,6) IV	RETAP	00753
	6 FORMAT(1H+,42X,7HNUMBER ,I6,10(/))	RETAP	00754
	GO TO 105	RETAP	00755
		RETAP	00756
		RETAP	00757

104	WRITE (NPR,11) W(1), IV	RETAP	00758
11	FORMAT (1H+,42X,5HWORD ,A4,16H AND THE NUMBER ,I6,10(/))	RETAP	00759
105	CONTINUE	RETAP	00760
	GO TO 1000	RETAP	00761
300	WRITE(NPR,301) NOKD,NOWD	RETAP	00762
301	FORMAT(90X,22H*** DATA ERROR - CARD ,I6,6H WORD ,I2,4H ***)	RETAP	00763
	NOUT=-IABS(NOUT)	RETAP	00764
	RETURN	RETAP	00765
400	WRITE(NPR,401)	RETAP	00766
401	FORMAT(20X,72HIF AN UPDATE IS ATTEMPTED, FILE ONE MUST BE MODIFIED	RETAP	00767
	1 WITH NEW PARAMETERS//,1H1)	RETAP	00768
	GO TO 1000	RETAP	00769
500	WRITE(NPR,501)	RETAP	00770
501	FORMAT(20X,85HAN UPDATE COMMAND MUST BE FOLLOWED BY A TAPE NUMBER,	RETAP	00771
	1A DATE, AND THE NUMBER OF GROUPS /,1H1)	RETAP	00772
	GO TO 1000	RETAP	00773
600	WRITE(NPR,601)	RETAP	00774
601	FORMAT(20X,81HTHE GIVEN UPDATE PARAMETERS DO NOT MATCH THE PARAMET	RETAP	00775
	1ERS ON THE TAPE TO BE UPDATED /,1H1)	RETAP	00776
	GO TO 1000	RETAP	00777
700	WRITE(NPR,701)	RETAP	00778
701	FORMAT(38X,41HTHE REAGA TAPE MAY NOT CONTAIN A VOID FILE /,1H1)	RETAP	00779
	GO TO 1000	RETAP	00780
800	WRITE(NPR,801)	RETAP	00781
801	FORMAT(44X,29HUNRECOGNIZABLE EDIT DIRECTIVE /,1H1)	RETAP	00782
	STOP 77	RETAP	00783
900	CONTINUE	RETAP	00784
	WRITE(NPR,2000)	RETAP	00785
2000	FORMAT(///39X,3H***,34X,3H***/39X,40H*** A SYSTEM ERROR WILL BE GE	RETAP	00786
	1NERATED ***/39X,3H***,34X,3H***////)	RETAP	00787
	GO TO 106	RETAP	00788
1110	WRITE (NPR,1111)	RETAP	00789
1111	FORMAT(34X,49H*** ATTEMPTED TO READ PAST END OF FILE MARK ***/)	RETAP	00790
	GO TO 106	RETAP	00791
999	WRITE(NPR,2001)	RETAP	00792
2001	FORMAT(43X,31H*** INFINITE LOOP ASSUMED ***/)	RETAP	00793
1000	CONTINUE	RETAP	00794
106	CONTINUE	RETAP	00795
C	AT THIS POINT A SYSTEM ERROR IS GENERATED SO THAT THE PROGRAM WILL	RETAP	00796
C	TERMINATE ABNORMALLY. ON THE CONTROL DATA MACHINE, THIS IS EASILY	RETAP	00797
C	ACCOMPLISHED BY CALLING A SUBROUTINE WHICH IS AN UNSATISFIED	RETAP	00798
C	EXTERNAL, THUS CAUSING A FATAL ADDRESSING ERROR.	RETAP	00799
C		RETAP	00800
C	PROGRAMMING NOTE: SOME TYPE OF CONVENIENT SYSTEM ERROR MAY HAVE TO	RETAP	00801
C	BE SUBSTITUTED HERE ON ANOTHER MANUFACTURERS MACHINE.	RETAP	00802
C		RETAP	00803
	CALL 90MB	RETAP	00804
	STOP	RETAP	00805
	END	RETAP	00806

C	SUBROUTINE COVRT(NCID,AD)	RETAP	00807
C	THIS SUBROUTINE CONVERTS THE NUCLIDE NUMBER NUID, INTO AN ALPHA	RETAP	00808
C	WORD ARRAY AD	RETAP	00809
C		RETAP	00810
	COMMON/JEMS/ IBL,IZO,IS,IASTER,MINUS,IPLUS,LPARN	RETAP	00811
	INTEGER AD(12),LET(27),ICH(99)	RETAP	00812
	DATA (ICH(I),I=1,99)/2HH,2HHE,2HLI,2HBE,2HB,2HC,2HN,2HO,2HF,	RETAP	00813
	12HNE,2HNA,2HMG,2HAL,2HSI,2HP,2HS,2HCL,2HA,2HK,2HCA,2HSC,2HTI,2	RETAP	00814
	2HV,2HCR,2HMN,2HFE,2HCO,2HNI,2HCU,2HZN,2HGA,2HGE,2HAS,2HSE,2HBR,2H	RETAP	00815
	3KR,2HRB,2HSR,2HY,2HZR,2HCB,2HMO,2HTC,2HRU,2HRH,2HPD,2HAG,2HCU,2HI	RETAP	00816
	4N,2HSN,2HSB,2HTE,2HI,2HXE,2HCS,2HBA,2HLA,2HCE,2HPR,2HND,2HPM,2HSA	RETAP	00817
	5,2HEU,2HGO,2HTB,2HDY,2HHO,2HER,2HTM,2HYB,2HLU,2HHF,2HTA,2HW,2HRE,	RETAP	00818
	62HOS,2HIR,2HPT,2HHU,2HHG,2HTL,2HPB,2HBI,2HPO,2HAT,2HRN,2HSS,2HRA,2	RETAP	00819
	7HAC,2HTH,2HPA,2HU,2HNP,2HPU,2HAM,2HCM,2HBK,2HCF,2HFP/	RETAP	00820
	DATA (LET(I),I=1,27)/1HA,1HB,1HC,1HD,1HE,1HF,1HG,1HH,1HI,1HJ,1HK,1H	RETAP	00821
	1L,1HM,1HN,1HO,1HP,1HQ,1HR,1HS,1HT,1HU,1HV,1HW,1HX,1HY,1HZ,1H /	RETAP	00822
	DO 1 KP=1,12	RETAP	00823
	1 AD(KP) = I9L	RETAP	00824
	IE=(NCID/100000)	RETAP	00825
	IA=(NCID-(IE*100000))/1000	RETAP	00826
	IB=(NCID-(IE*100000)-(IA*1000))/100	RETAP	00827
	IC=(NCID-(IE*100000)-(IA*1000)-IB*100)/10	RETAP	00828
	ID=(NCID-(IE*100000)-(IA*1000)-(IB*100)-(IC*10))	RETAP	00829
	IB=IB+IZO	RETAP	00830
	IC=IC+IZO	RETAP	00831
	ID=ID+IZO	RETAP	00832
	IP=2	RETAP	00833
	AD(1)=ICH(IA)	RETAP	00834
	CALL LPINT(AD(1),2,IAR)	RETAP	00835
	IF(IAR.EQ.I9L) GO TO 9	RETAP	00836
	IP=3	RETAP	00837
	CALL INTALP(AD(2),1,IAR)	RETAP	00838
	9 IF(IB.EQ.IZO.AND.IC.EQ.IZO) GO TO 11	RETAP	00839
	IF(IB.EQ.IZO) GO TO 10	RETAP	00840
	CALL INTALP(AD(IP),1,IB)	RETAP	00841
	IP=IP+1	RETAP	00842
	10 CALL INTALP(AD(IP),1,IC)	RETAP	00843
	IP=IP+1	RETAP	00844
	11 CALL INTALP(AD(IP),1,ID)	RETAP	00845
	IF(IE.EQ.0) GO TO 20	RETAP	00846
	IP=IP+1	RETAP	00847
	CALL LPINT(LET(IE),1,IF)	RETAP	00848
	CALL INTALP(AD(IP),1,IF)	RETAP	00849
	20 RETURN	RETAP	00850
	END	RETAP	00851
		RETAP	00852

SUBROUTINE CHNCK	RETAP	00853
COMMON/TAPES/ NIN,NOUT,KROT,INP,NPR	RETAP	00854
CC THIS SUBROUTINE CHECKS ALL CHAINS ON THE GENERATED TAPE TO INSURE	RETAP	00855
CC COMPATABILITY WITH FILE SEVEN. THE CHAINS ARE CHECKED ONE BY ONE	RETAP	00856
CC WITH ERROR MESSAGES PRINTED WHERE FOUND.	RETAP	00857
CC	RETAP	00858
COMMON NUID(100),NFP(100),LFP(100,10),LCHN(100),NCN(100),ICN(40),	RETAP	00859
1MDC(40,40),NDN(100),AID(100),BID(100),IPT(40)	RETAP	00860
DIMENSION DUM3(3),DUM4(4),DUM5(5),AD(6)	RETAP	00861
C FIND FILE SEVEN	RETAP	00862
REWIND NOUT	RETAP	00863
WRITE(NPR,2)	RETAP	00864
2 FORMAT(////)	RETAP	00865
DO 1 I=1,6	RETAP	00866
1 CALL REOF(NOUT)	RETAP	00867
READ(NOUT) FIT,JFT,NNU,NGR	RETAP	00868
IF(JFT.NE.7) GO TO 2000	RETAP	00869
C READ IN FILE SEVEN DATA	RETAP	00870
READ(NOUT) (NUID(I),AID(I),BID(I),DUM,NFP(I),NDN(I),DUM4,I=1,NNU)	RETAP	00871
DO 3 I=1,NNU	RETAP	00872
NP=NFP(I)	RETAP	00873
IF(NP.NE.0) READ(NOUT) LD,(LFP(I,J),DUM,J=1,NP)	RETAP	00874
NDNX=NDN(I)	RETAP	00875
IF(NDNX.NE.0) READ(NOUT) LD	RETAP	00876
3 CONTINUE	RETAP	00877
C READ IN FILE TWO	RETAP	00878
REWIND NOUT	RETAP	00879
CALL REOF(NOUT)	RETAP	00880
READ(NOUT) FIT,JFT,NCHN,MUM	RETAP	00881
IF(JFT.NE.2) GO TO 2005	RETAP	00882
C FILE TWO HAS BEEN FOUND	RETAP	00883
C START THE CHAIN LOOP	RETAP	00884
C	RETAP	00885
READ(NOUT) (LCHN(I),NCN(I),NUM,I=1,NCHN)	RETAP	00886
DO 10J JC=1,NCHN	RETAP	00887
NC=NCN(JC)	RETAP	00888
READ(NOUT) LCID,(ICN(J),J=1,NC)	RETAP	00889
READ(NOUT) ((MDC(I,J),J=1,I),I=1,NC)	RETAP	00890
C CHECK LIST IN CHAIN	RETAP	00891
IER=0	RETAP	00892
DO 10 LS=1,NC	RETAP	00893
DO 5 LT=1,NNU	RETAP	00894
IF(NUID(LT).EQ.ICN(LS)) GO TO 9	RETAP	00895
5 CONTINUE	RETAP	00896
CALL COVRT(ICN(LS),AD)	RETAP	00897
WRITE(NPR,6) AD,LCID	RETAP	00898
6 FORMAT(/32X4H*** 6A1 ,55H IS OMITTED FROM FILE SEVEN: IT IS REFERENCE	RETAP	00899
1NCED BY CHAIN I3)	RETAP	00900
IER=1	RETAP	00901
	RETAP	00902

GO TO 10	RETAP	00903
9 IPT(LS)=LT	RETAP	00904
10 CONTINUE	RETAP	00905
IF(IER.EQ.0) GO TO 20	RETAP	00906
C ERROR IN FIRST CHECK-GO TO NEXT CHAIN	RETAP	00907
WRITE(NPR,11)	RETAP	00908
11 FORMAT(/38X2H**54X2H**/38X58H** NO FISSION PRODUCT CHECK WILL BE	RETAP	00909
100NE FOR THIS CHAIN **/38X2H**54X2H**/)	RETAP	00910
GO TO 100	RETAP	00911
CC	RETAP	00912
CC FISSION PRODUCT CHECK	RETAP	00913
CC	RETAP	00914
20 CONTINUE	RETAP	00915
IST=1	RETAP	00916
DO 50 IC=2,NC	RETAP	00917
IRO=IC-1	RETAP	00918
DO 40 IR=1,IRO	RETAP	00919
IRT=MDC(IC,IR)	RETAP	00920
IF(IRT.NE.1) GO TO 40	RETAP	00921
C CHECK FOR FISSION PRODUCTS	RETAP	00922
IP=IPT(IR)	RETAP	00923
NSR=NFP(IP)	RETAP	00924
DO 30 LS=1,NSR	RETAP	00925
IF(LFP(IP,LS).EQ.ICN(IC)) GO TO 40	RETAP	00926
30 CONTINUE	RETAP	00927
C FISSION PRODUCT FAILURE	RETAP	00928
IF(IST.EQ.0) GO TO 33	RETAP	00929
IST=0	RETAP	00930
WRITE(NPR,32) LCID	RETAP	00931
32 FORMAT(/63X,6HCHAIN ,I3/)	RETAP	00932
33 CONTINUE	RETAP	00933
CALL COVRT (ICN(IC),AD)	RETAP	00934
WRITE(NPR,31) AD,AID(IP),BID(IP)	RETAP	00935
31 FORMAT(/39X4H*** 6A1,39H IS NOT LISTED AS A FISSION PRODUCT OF A4A	RETAP	00936
12,4H ***)	RETAP	00937
40 CONTINUE	RETAP	00938
50 CONTINUE	RETAP	00939
100 CONTINUE	RETAP	00940
RETURN	RETAP	00941
2000 CONTINUE	RETAP	00942
2005 CONTINUE	RETAP	00943
STOP 33	RETAP	00944
END	RETAP	00945

	SUBROUTINE DOUBLE(JF)	RETAP	00946
	COMMON LIST(100),ALIST(100,2),SKIP(1100),NUM	RETAP	00947
	COMMON/TAPES/ NIN,NOUT,KROT,INP,NPR	RETAP	00948
C		RETAP	00949
C	THIS SUBROUTINE CHECKS FOR REPEATED ISOTOPES IN LIST FOR FILE JF,	RETAP	00950
C	AND PRINTS EITHER FROM LIST OR ALIST DEPENDING ON THE FILE.	RETAP	00951
C		RETAP	00952
	NM=NUM-1	RETAP	00953
	DO 100 I=1,NM	RETAP	00954
	II=I+1	RETAP	00955
	DO 99 K=II,NUM	RETAP	00956
	IF(LIST(I).NE.LIST(K)) GO TO 99	RETAP	00957
	IF(JF.EQ.2.OR.JF.EQ.6) GO TO 50	RETAP	00958
	WRITE(NPR,10) ALIST(I,1),ALIST(I,2)	RETAP	00959
	10 FORMAT(///56X2H**20X2H**/56X3H** A4A2,15H IS REPEATED **/56X2H**2)	RETAP	00960
	1X2H**)	RETAP	00961
	GO TO 99	RETAP	00962
	50 WRITE(NPR,51) LIST(I)	RETAP	00963
	51 FORMAT(///56X2H**17X2H**/56X3H** I3,15H IS REPEATED **/56X2H**17X2	RETAP	00964
	1H**)	RETAP	00965
	99 CONTINUE	RETAP	00966
	100 CONTINUE	RETAP	00967
	RETURN	RETAP	00968
	END	RETAP	00969

C	SUBROUTINE COED	RETAP	00970
C	THIS SUBROUTINE COMPILES A LIST OF ALL ISOTOPES IN FILES 3,4,5, AND	RETAP	00971
C	7. IF ANY ARE MISSING FROM A FILE, THE SUBROUTINE PRINTS OUT AN	RETAP	00972
C	ERROR MESSAGE TO THE USER.	RETAP	00973
C		RETAP	00974
	COMMON/RED/ V,N,W	RETAP	00975
	COMMON /TAPES/NIN,NOUT,KRDT,INP,NPR	RETAP	00976
	COMMON/FILES/TYPE,FNJ,FI,TF,NGRP,NHED,NGRPT	RETAP	00977
	COMMON IDS(100),LT(100,2),IDT(100),IPR(100,12),KON(100,4),	RETAP	00978
	1 NPNT(100),IDUM(100,2)	RETAP	00979
	DIMENSION W(18),IFORM(2,4)	RETAP	00980
	DATA IFORM/4HTHRE,4HE ,4HFOUR,4H ,4HFIVE,4H ,4HSEVE,	RETAP	00981
	1 4HN /	RETAP	00982
	NIN=NOUT	RETAP	00983
	IF(NIN.EQ.0) CALL ERR(4)	RETAP	00984
	KFILE=0	RETAP	00985
	KT=0	RETAP	00986
	MT=0	RETAP	00987
	DO 6 I=1,100	RETAP	00988
	DO 6 J=1,4	RETAP	00989
	6 KON(I,J)=0	RETAP	00990
110	CALL REOF(NIN)	RETAP	00991
CC	READ IN RECORD ONE OF THIS FILE(JF).	RETAP	00992
	READ(NIN)FJ,JF,LPAR,MUM	RETAP	00993
	GO TO (110,110,203,204,205,110,206),JF	RETAP	00994
203	JK=7	RETAP	00995
	GO TO 300	RETAP	00996
204	JK=10	RETAP	00997
	GO TO 300	RETAP	00998
205	JK=12	RETAP	00999
	GO TO 300	RETAP	01000
206	JK=9	RETAP	01001
C	READ IN RECORD TWO OF THIS FILE.	RETAP	01002
300	READ(NIN) (IDT(I),(IPR(I,J),J=1,JK), I=1,LPAR)	RETAP	01003
	IF(KT.NE.0) GO TO 330	RETAP	01004
C	BUILD THE STARTING LIST FROM FILE THREE.	RETAP	01005
	KT=LPAR	RETAP	01006
	IF(KT.EQ.0) CALL ERR(1)	RETAP	01007
	DO 310 K=1,KT	RETAP	01008
	IDS(K)=IDT(K)	RETAP	01009
	LT(K,1)=IPR(K,1)	RETAP	01010
	LT(K,2)=IPR(K,2)	RETAP	01011
	NPNT(K)=K	RETAP	01012
	KFILE=1	RETAP	01013
310	KON(K,KFILE)=1	RETAP	01014
	GO TO 110	RETAP	01015
330	KFILE =KFILE+1	RETAP	01016
C	THIS SECTION SEARCHES AND ALSO MAKES ANY ADDITIONS	RETAP	01017
C	TO THE STARTING LIST.	RETAP	01018
		RETAP	01019

DO 350 KK=1,LPAR	RETAP	01020
DO 340 K=1,KT	RETAP	01021
IF(IDT(KK).NE. IDS(K)) GO TO 346	RETAP	01022
KON(K,KFILE)=1	RETAP	01023
GO TO 350	RETAP	01024
340 CONTINUE	RETAP	01025
MC=KT	RETAP	01026
KT=KT+1	RETAP	01027
IDS(KT)=IDT(KK)	RETAP	01028
LT(KT,1)=IPR(KK,1)	RETAP	01029
LT(KT,2)=IPR(KK,2)	RETAP	01030
KON(KT,KFILE)=1	RETAP	01031
NPNT(KT)=KT	RETAP	01032
DO 345 I=1,MC	RETAP	01033
J=NPNT(I)	RETAP	01034
345 IF(IDT(KK).LT.IDS(J)) GO TO 348	RETAP	01035
GO TO 350	RETAP	01036
348 IX=KT	RETAP	01037
DO 349 J=I,KT	RETAP	01038
ISAVE=NPNT(J)	RETAP	01039
NPNT(J)=IX	RETAP	01040
349 IX=ISAVE	RETAP	01041
350 CONTINUE	RETAP	01042
IF(JF.LT.7) GO TO 110	RETAP	01043
C PRINT OUT THE RESULTS.	RETAP	01044
WRITE(NPR,2)	RETAP	01045
2 FORMAT(1H1,///,43X,39H*** N U C L I D E L I S T ***,	RETAP	01046
1///,20X,81HTHE FOLLOWING LIST OF NUCLIDES IS A SUMMARY OF THOSE AP	RETAP	01047
2PEARING ON THE RETAP TAPE./20X,82HBECAUSE FILES, ONE, TWO, AND SIX	RETAP	01048
3 ARE NOT NUCLIDE DEPENDENT, ONLY FILES THREE, FOUR,/20X,	RETAP	01049
4 55HFIVE, AND SEVEN WERE CONSIDERED IN COMPOSING THIS LIST. //)	RETAP	01050
DO 400 II=1,KT	RETAP	01051
I=NPNT(II)	RETAP	01052
IDUM(II,1)=LT(I,1)	RETAP	01053
400 IDUM(II,2)=LT(I,2)	RETAP	01054
WRITE(NPR,3) (IDUM(I,1),IDUM(I,2), I=1,KT)	RETAP	01055
3 FORMAT(20X,7(A4,A2,7X))	RETAP	01056
DO 401 I=1,KT	RETAP	01057
III =NPNT(I)	RETAP	01058
DO 401 II=1,4	RETAP	01059
401 IF(KON(III,II).EQ.0) WRITE(NPR,4) LT(III,1),LT(III,2),IFORM(1,II),	RETAP	01060
1 IFORM(2,II)	RETAP	01061
4 FORMAT(//36X,13H*** NUCLIDE ,A4,A2,23H IS MISSING FROM FILE ,	RETAP	01062
1 A4,A1,4H ***)	RETAP	01063
RETURN	RETAP	01064
END	RETAP	01065

	OVERLAY(RETAP,1,0)	RETAP	01066
	PROGRAM FILONE	RETAP	01067
C		RETAP	01068
C	THIS SUBROUTINE CONTROLS THE GENERATING OR UPDATING OF FILE ONE	RETAP	01069
C		RETAP	01070
	COMMON /TAPES/NIN,NOUT,KRDT,INP,NPR	RETAP	01071
	COMMON/FILES/TYPE,FNO,FI,JF,NGRP,NHED,NGRPT	RETAP	01072
	COMMON/MIS/ NPAR,ICHAR,IWOD,MUM	RETAP	01073
	COMMON/RED/ V,N,W	RETAP	01074
	COMMON LCAO(100),LAO(100,2),LWO(100),NPO(100,10),LB,LCAO(100),	RETAP	01075
	1LAO(100,2),LW(100),NPK(100,10),LCBD(100),LBD(100,2),NPT(100,10),	RETAP	01076
	2LA, LCO(100),	RETAP	01077
	3ND,	RETAP	01078
	4IDT(10),IHED(18,615),EGRP(100),IF1,IF2,IF3,IF4	RETAP	01079
	EQUIVALENCE (NOA(1),NPO(1,1)),(NOB(1),NPO(1,2)),(NOC(1),NPO(1,3)),	RETAP	01080
	1(NOD(1),NPO(1,4)),(NOE(1),NPO(1,5)),(NAK(1),NPK(1,1)),(NOK(1),NPK(	RETAP	01081
	21,2)),(NCK(1),NPK(1,3)),(NDK(1),NPK(1,4)),(NEK(1),NPK(1,5)),(NOAT(	RETAP	01082
	31),NPT(1,1)),(NOBT(1),NPT(1,2)),(NOCT(1),NPT(1,3)),(NODT(1),NPT(1,	RETAP	01083
	44)),(NOET(1),NPT(1,5))	RETAP	01084
	DIMENSION NOA(100),NOB(100),NOC(100),NOD(100),NOE(100),NAK(100),N	RETAP	01085
	1OK(100),NCK(100),NDK(100),NEK(100),NOAT(100),NOBT(100),NOCT(100),N	RETAP	01086
	2ODT(100),NOET(100)	RETAP	01087
	JF=1	RETAP	01088
	IF(NIN.EQ.0) GO TO 5	RETAP	01089
	CALL RTF1	RETAP	01090
	NGRPT=NGRP	RETAP	01091
5	CALL RDF1	RETAP	01092
	IF(NOUT.LE.0) RETURN	RETAP	01093
C	SET PARAMETERS	RETAP	01094
	IF(IF3.NE.0) NHED=IF3	RETAP	01095
	IF(IF4.NE.0) NGRP=IF4	RETAP	01096
	IF(IF4.EQ.0.AND.NIN.EQ.0.AND.IF3.EQ.0.AND.IF2.EQ.0) CALL ERR(3)	RETAP	01097
	IF (IF1.EQ.0 .AND. NIN.EQ.0) CALL ERR(7)	RETAP	01098
	CALL PRF1	RETAP	01099
	CALL WTF1	RETAP	01100
	RETURN	RETAP	01101
	END	RETAP	01102

	SUBROUTINE R0F1	RETAP	01103
C		RETAP	01104
C	READ FROM CARDS ANY INFORMATION CONCERNING FILE ONE	RETAP	01105
C		RETAP	01106
	COMMON/TAPES/NIN,NOUT,KROT,INP,NPR,NPRO	RETAP	01107
	COMMON/FILES/TYPE,FNO,FI,JF,NGRP,NHED,NGRPT	RETAP	01108
	COMMON/MIS/ NPAR,ICHAR,IWOD,HUM	RETAP	01109
	COMMON LCAO(100),LAO(100,2),LWO(100),NPO(100,10),LB,LCAO(100),	RETAP	01110
	1LAO(100,2),LW(100),NPK(100,10),LCBO(100),LBO(100,2),NPT(100,10),	RETAP	01111
	2LA, LCD(100),	RETAP	01112
	3NO,	RETAP	01113
	4IDT(10),IHED(18,615),EGRP(100),IF1,IF2,IF3,IF4	RETAP	01114
	DIMENSION NOA(100),NOB(100),NOC(100),NOD(100),NOE(100),NAK(100),N	RETAP	01115
	1BK(100),NCK(100),NOK(100),NEK(100),NOAT(100),NOBT(100),NOCT(100),N	RETAP	01116
	2ODT(100),NOET(100)	RETAP	01117
	DIMENSION W(18), HED(18,615)	RETAP	01118
	EQUIVALENCE (NOA(1),NPO(1,1)),(NOB(1),NPO(1,2)),(NOC(1),NPO(1,3)),	RETAP	01119
	1(NOD(1),NPO(1,4)),(NOE(1),NPO(1,5)),(NAK(1),NPK(1,1)),(NBK(1),NPK(	RETAP	01120
	21,2)),(NCK(1),NPK(1,3)),(NOK(1),NPK(1,4)),(NEK(1),NPK(1,5)),(NOAT(	RETAP	01121
	31),NPT(1,1)),(NOBT(1),NPT(1,2)),(NOCT(1),NPT(1,3)),(NOOT(1),NPT(1,	RETAP	01122
	44)),(NOET(1),NPT(1,5))	RETAP	01123
	EQUIVALENCE (V,IV),(IW,W(1)),(IHED,HED)	RETAP	01124
C	THIS SHOULD AGREE WITH THE DIMENSION OF IHED	RETAP	01125
	MAX = 615	RETAP	01126
	1 CALL SCAN1(5HONE**,FNO,M)	RETAP	01127
	IF1=0	RETAP	01128
	IF(M.NE.1) CALL ERR(4)	RETAP	01129
	IF3=0	RETAP	01130
	IF4=0	RETAP	01131
	IF1=1	RETAP	01132
	IF2=1	RETAP	01133
C	READ IN PARAMETERS	RETAP	01134
	CALL GRAMIN(V,N,W)	RETAP	01135
	IF(N.NE.-1) CALL ERR(5)	RETAP	01136
	IDT(1)=IV	RETAP	01137
	CALL GRAMIN(V,N,W)	RETAP	01138
	IF(N.NE.-1) CALL ERR(5)	RETAP	01139
	IDT(2)=IV	RETAP	01140
	CALL GRAMIN(V,N,W)	RETAP	01141
	IF(N.NE.-1) CALL ERR(5)	RETAP	01142
	IDT(3)=IV	RETAP	01143
	LNUM=3	RETAP	01144
	DO 6 J=4,10	RETAP	01145
6	IDT(J)=0	RETAP	01146
7	CALL GRAMIN(V,N,W)	RETAP	01147
	IF(N.NE.-1)GO TO 10	RETAP	01148
	LNUM=LNUM+1	RETAP	01149
	IDT(LNUM)=IV	RETAP	01150
	IF(LNUM.GT.10) CALL ERR(3)	RETAP	01151
	GO TO 7	RETAP	01152


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C   READ INFORMATION CARDS
    9 CALL CRAMIN(V,N,W)
    10 IF(N.NE.-3) GO TO 20
        IF(IF3.EQ.MAX) GO TO 9
        IF3=IF3+1
        DO 11 L=1,12
            HED(L,IF3)=W(L)
    11 CONTINUE
        GO TO 9
    20 IF(N.EQ.0) GO TO 30
        READ ENERGY BOUNDS
        IF4=1
        EGRP(1)=V
    21 IF4=IF4+1
        CALL CRAMIN(EGRP(IF4),N,W)
        IF(N.EQ.1) GO TO 21
        IF4=IF4-2
    30 TYPE=W(1)
        CALL SCAN1(29HFILE*EDIT*FINIS*NOCARD*CARD**,TYPE,M)
        GO TO (31,33,33,40,50,34),M
    40 NPRO=0
        GO TO 51
    50 NPRO=NPR
    51 CALL CRAMIN(V,N,W)
        GO TO 30
    34 CALL ERR(2)
    32 RETURN
    31 CALL CRAMIN(V,N,W)
        FNO=W(1)
    33 RETURN
        END

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RETAP 01153
RETAP 01154
RETAP 01155
RETAP 01156
RETAP 01157
RETAP 01158
RETAP 01159
RETAP 01160
RETAP 01161
RETAP 01162
RETAP 01163
RETAP 01164
RETAP 01165
RETAP 01166
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RETAP 01169
RETAP 01170
RETAP 01171
RETAP 01172
RETAP 01173
RETAP 01174
RETAP 01175
RETAP 01176
RETAP 01177
RETAP 01178
RETAP 01179
RETAP 01180
RETAP 01181
RETAP 01182
RETAP 01183

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	SUBROUTINE RTF1	RETAP	01184
C		RETAP	01185
C	READ FILE ONE FROM TAPE	RETAP	01186
C		RETAP	01187
	COMMON /TAPES/NIN,NOUT,KROD,INP,NPR	RETAP	01188
	COMMON/FILES/TYPE,FNO,FI,JF,NGRP,NHED,NGRPT	RETAP	01189
	COMMON/HIS/ NPAR,ICHAR,IWOD,MUM,K1,K2,K3	RETAP	01190
	COMMON LCAO(100),LAO(100,2),LWO(100),NPO(100,10),LB,LCAD(100),	RETAP	01191
	1LAD(100,2),LW(100),NPK(100,10),LCBD(100),LBD(100,2),NPT(100,10),	RETAP	01192
	2LA, LCD(100),	RETAP	01193
	3ND,	RETAP	01194
	4IDT(10),IHED(18,615),EGRP(100),IF1,IF2,IF3,IF4	RETAP	01195
	DIMENSION NOA(100),NOB(100),NOC(100),NOD(100),NOE(100),NAK(100),N	RETAP	01196
	1BK(100),NCK(100),NDK(100),NEK(100),NOAT(100),NOBT(100),NOCT(100),N	RETAP	01197
	2ODT(100),NOET(100)	RETAP	01198
	EQUIVALENCE (NOA(1),NPO(1,1)),(NOB(1),NPO(1,2)),(NOC(1),NPO(1,3)),	RETAP	01199
	1(NOD(1),NPO(1,4)),(NOE(1),NPO(1,5)),(NAK(1),NPK(1,1)),(NBK(1),NPK(	RETAP	01200
	21,2)),(NCK(1),NPK(1,3)),(NDK(1),NPK(1,4)),(NEK(1),NPK(1,5)),(NOAT(	RETAP	01201
	31),NPT(1,1)),(NOBT(1),NPT(1,2)),(NOCT(1),NPT(1,3)),(NODT(1),NPT(1,	RETAP	01202
	44)),(NOET(1),NPT(1,5))	RETAP	01203
	EQUIVALENCE (V,IV),(IW,W(1))	RETAP	01204
	READ(NIN) IDF,IDN,NHED,NGRP	RETAP	01205
	READ(NIN) (IDT(I),I=1,10), ((IHED(I,J),I=1,IWOD),J=1,NHED)	RETAP	01206
	IF(NIN.EQ.NOUT) GO TO 10	RETAP	01207
	IF(IDT(1).NE.K1.OR.IDT(2).NE.K2.OR.IDT(3).NE.K3) CALL ERR(6)	RETAP	01208
10	CONTINUE	RETAP	01209
	NGR=NGRP+1	RETAP	01210
	READ(NIN) (EGRP(I),I=1,NGR)	RETAP	01211
	RETURN	RETAP	01212
	END	RETAP	01213

C	SUBROUTINE WTF1	RETAP	01214
C	WRITE FILE ONE ON NOUT	RETAP	01215
C		RETAP	01216
	COMMON /TAPES/NIN,NOUT,KRDT,INP,NPR	RETAP	01217
	COMMON/FILES/TYPE,FNO,FI,JF,NGRP,NHED,NGRPT	RETAP	01218
	COMMON/MIS/ NPAR,ICHAR,IWOD,MUM,K1,K2,K3	RETAP	01219
	COMMON LCAJ(100),LAO(100,2),LWO(100),NPO(100,10),LB,LCAD(100),	RETAP	01220
	1LAD(100,2),LW(100),NPK(100,10),LCBD(100),LBD(100,2),NPT(100,10),	RETAP	01221
	2LA, LCD(100),	RETAP	01222
	3ND,	RETAP	01223
	4IDT(10),IHED(18,615),EGRP(100),IF1,IF2,IF3,IF4	RETAP	01224
	DIMENSION NOA(100),NOB(100),NOC(100),NOD(100),NOE(100),NAK(100),N	RETAP	01225
	1BK(100),NCK(100),NOK(100),NEK(100),NOAT(100),NOBT(100),NOCT(100),N	RETAP	01226
	2ODT(100),NOET(100)	RETAP	01227
	EQUIVALENCE (NOA(1),NPO(1,1)),(NOB(1),NPO(1,2)),(NOC(1),NPO(1,3)),	RETAP	01228
	1(NOD(1),NPO(1,4)),(NOE(1),NPO(1,5)),(NAK(1),NPK(1,1)),(NBK(1),NPK(	RETAP	01229
	21,2)),(NCK(1),NPK(1,3)),(NOK(1),NPK(1,4)),(NEK(1),NPK(1,5)),(NOAT(	RETAP	01230
	31),NPT(1,1)),(NOBT(1),NPT(1,2)),(NOCT(1),NPT(1,3)),(NODT(1),NPT(1,	RETAP	01231
	44)),(NOET(1),NPT(1,5))	RETAP	01232
	IF(NOUT.LE.0) RETURN	RETAP	01233
	WRITE(NOUT) FI,JF,NHED,NGRP	RETAP	01234
	WRITE (NOUT) (IDT(I),I=1,10),((IHED(I,J),I=1,IWOD),J=1,NHED)	RETAP	01235
	NGR=NGRP+1	RETAP	01236
	WRITE(NOUT) (EGRP(I),I=1,NGR)	RETAP	01237
	CALL WEOF (NOUT)	RETAP	01238
	RETURN	RETAP	01239
	END	RETAP	01240
		RETAP	01241

C	SUBROUTINE PRF1	RETAP	01242
C	PRINT OUT FILE ONE INFORMATION	RETAP	01243
C	COMMON LCAO(100), LAO(100,2), LWO(100), NPO(100,10), LB, LCAD(100),	RETAP	01244
	1LAD(100,2), LW(100), NPK(100,10), LCBD(100), LBD(100,2), NPT(100,10),	RETAP	01245
	2LA, LCD(100),	RETAP	01246
	3ND,	RETAP	01247
	4IDT(10), IHED(18,615), EGRP(100), IF1, IF2, IF3, IF4	RETAP	01248
	DIMENSION IFA(4), IFB(4)	RETAP	01249
	DIMENSION IDTJR(3)	RETAP	01250
	COMMON /TAPES/ NIN, NOUT, KROT, INP, NPR	RETAP	01251
	COMMON/FILES/TYPE, FNO, FI, JF, NGRP, NHED, NGRPT	RETAP	01252
	COMMON/MIS/ NPAR, ICHAR, IWOD, HUM, K1, K2, K3	RETAP	01253
	DATA IFA /4H(1H, 4H, 23X, 4H, 07A, 4H10) /	RETAP	01254
	CALL FORM(16, IFA, IFB)	RETAP	01255
	CALL MASH(IWOD, NN1, NN2)	RETAP	01256
	CALL INTALP(IFB(1), 10, NN1)	RETAP	01257
	CALL INTALP(IFB(1), 11, NN2)	RETAP	01258
	CALL MASH(ICHAR, ICH1, ICH2)	RETAP	01259
	CALL INTALP(IFB(1), 13, ICH1)	RETAP	01260
	CALL INTALP(IFB(1), 14, ICH2)	RETAP	01261
	WRITE(NPR, 2)	RETAP	01262
	2 FORMAT(1H1///46X, 27H*** F I L E O N E ***//50X, 19HGENERAL I	RETAP	01263
	INFORMATION, ///, 45X, 30HTAPE IDENTIFICATION PARAMETERS)	RETAP	01264
	WRITE(NPR, 20) IDT(1)	RETAP	01265
	20 FORMAT(1H0, 23X, 14HTAPE NUMBER IS, I4)	RETAP	01266
	IDTJR(1)=IDT(2)/10000	RETAP	01267
	IDTJR(2)=(IDT(2)-(IDTJR(1)*10000))/100	RETAP	01268
	IDTJR(3)=IDT(2)-(IDTJR(1)*10000+IDTJR(2)*100)	RETAP	01269
	WRITE(NPR, 21) (IDTJR(I), I=1, 3), IDT(2)	RETAP	01270
	21 FORMAT (1H0, 23X, 22HCREATION DATE OF TAPE , 2(I2, 1H/), I2, 5X, 1H(,	RETAP	01271
	1 I6, 1H))	RETAP	01272
	WRITE(NPR, 22) IDT(3)	RETAP	01273
	22 FORMAT(1H0, 23X, 16HNUMBER OF GROUPS, I4)	RETAP	01274
	WRITE(NPR, 4)	RETAP	01275
	4 FORMAT(///, 52X, 16HTAPE DESCRIPTION/)	RETAP	01276
	DO 12 J=1, NHED	RETAP	01277
	WRITE(NPR, IFB) (IHED(I, J), I=1, IWOD)	RETAP	01278
	JME = 33 + J/45 * 45	RETAP	01279
	IF (J.NE.33 .AND. J.NE.JME) GO TO 12	RETAP	01280
	IF (J.EQ.NHED) GO TO 12	RETAP	01281
	WRITE(NPR, 5)	RETAP	01282
	12 CONTINUE	RETAP	01283
	6 FORMAT(1H1, ///, 48X, 24HTAPE DESCRIPTION (COND.), ///)	RETAP	01284
	WRITE(NPR, 23)	RETAP	01285
	23 FORMAT(1H1, ///, 47X, 28HMICROGROUP LOW ENERGY BOUNDS)	RETAP	01286
	EMAX=EGRP(1)/1.E+6	RETAP	01287
	WRITE(NPR, 24) EMAX	RETAP	01288
	24 FORMAT (1H0, 43X, 24HMAXIMUM NEUTRON ENERGY =, F7.2, 4H MEV)	RETAP	01289
		RETAP	01290
		RETAP	01291

```

      WRITE(NPR,26)
26  FORMAT(1H0,6X,6(13HGROUP ENERGY,8X))
      KON = (NGRP+5)/5
      DO 111 IK=1,KON
      MAX = IK + 5*KON
      IF (MAX.GT.NGRP) MAX=MIN0(NGRP,IK+ 4*KON)
      WRITE(NPR,25) (K,EGRP(K+1), K=IK,MAX,KON)
111 CONTINUE
25  FORMAT(1H0,6(6X,I3,2X,E10.4))
      WRITE(NPR,8)
8   FORMAT(1H1)
      RETURN
      END

```

```

RETAP 01292
RETAP 01293
RETAP 01294
RETAP 01295
RETAP 01296
RETAP 01297
RETAP 01298
RETAP 01299
RETAP 01300
RETAP 01301
RETAP 01302
RETAP 01303
RETAP 01304

```

	OVERLAY (RETAP,2,0)	RETAP	01305
	PROGRAM FILTWO	RETAP	01306
C		RETAP	01307
C	THIS PROGRAM CONTROLS THE GENERATING,UPDATING OR COPYING OF FILE	RETAP	01308
C	TWO	RETAP	01309
C		RETAP	01310
	COMMON/TAPES/NIN,NOUT,KRODT,INP,NPR,NPRO	RETAP	01311
	COMMON/FILES/TYPE,FNO,FI,JF,NGRP,NHED,NGRPT	RETAP	01312
	COMMON/MIS/ NPAR,ICHAR,IWOD,MUM	RETAP	01313
	COMMON/RED/ V,N,W	RETAP	01314
	COMMON/JEMS/ IBL,IZO,IS,IASTER,MINUS,IPLUS,LPARN	RETAP	01315
	COMMON: LCAO(100),LAO(100,2),LWO(100),NPO(100,10),LB,LCAD(100),	RETAP	01316
	1LAD(100,2),LW(100),NPK(100,10),LCBD(100),LBD(100,2),NPT(100,10),	RETAP	01317
	2LA, LCO(100),	RETAP	01318
	3ND,	RETAP	01319
	4NCID(41),NSOR(41),IOS(41,41),MSR(41,41),MDC(40,40),LFG(41),IDT(41)	RETAP	01320
	5,MST(41)	RETAP	01321
	DIMENSION NOA(100),NOB(100),NOC(100),NOD(100),NOE(100),NAK(100),N	RETAP	01322
	1BK(100),NCK(100),NDK(100),NEK(100),NOAT(100),NOBT(100),NOCT(100),N	RETAP	01323
	2ODT(100),NOET(100)	RETAP	01324
	DIMENSION W(12)	RETAP	01325
	EQUIVALENCE (NOA(1),NPO(1,1)),(NOB(1),NPO(1,2)),(NOC(1),NPO(1,3)),	RETAP	01326
	1(NOD(1),NPO(1,4)),(NOE(1),NPO(1,5)),(NAK(1),NPK(1,1)),(NBK(1),NPK(	RETAP	01327
	21,2)),(NCK(1),NPK(1,3)),(NDK(1),NPK(1,4)),(NEK(1),NPK(1,5)),(NOAT(	RETAP	01328
	31),NPT(1,1)),(NOBT(1),NPT(1,2)),(NOCT(1),NPT(1,3)),(NOOT(1),NPT(1,	RETAP	01329
	44)),(NOET(1),NPT(1,5))	RETAP	01330
	EQUIVALENCE (V,IV),(IW,W(1))	RETAP	01331
	JF=2	RETAP	01332
	MUM=0	RETAP	01333
	NPAR=6	RETAP	01334
	REWIND KRODT	RETAP	01335
	LB=0	RETAP	01336
	ND=0	RETAP	01337
	IF(NIN.NE.0) CALL REOF(NIN)	RETAP	01338
	CALL SCAN1(12HFINIS*EDIT**,TYPE,M)	RETAP	01339
	GO TO (3,3,1),M	RETAP	01340
	1 CALL SCAN1(5HTWO**,FNO,M)	RETAP	01341
	IF(M.EQ.1) GO TO 10	RETAP	01342
	3 IF (NIN.EQ.0) CALL ERR(1)	RETAP	01343
	CALL CPY2	RETAP	01344
	2 CALL WEOF(NOUT)	RETAP	01345
	RETURN	RETAP	01346
	10 CALL GRAMIN(V,N,W)	RETAP	01347
	12 TYPE=W(1)	RETAP	01348
	11 CALL SCAN1(43HOC DATA*DELETE*FILE*EDIT*FINIS*NOCARD*CARD**,TYPE,M)	RETAP	01349
	IF(M.GT.7) CALL ERR(2)	RETAP	01350
	GO TO (16,50,99,100,100,13,14),M	RETAP	01351
	13 NPRO=0	RETAP	01352
	GO TO 10	RETAP	01353
	14 NPRO=NPR	RETAP	01354

```

      GO TO 10
16  CALL GRAMIN(V,N,W)
C   CARD INFORMATION
15  LB=LB+1
      LW(LB)=LB
      IF(N.NE.-1)CALL ERR(3)
      LCAD(LB)=IV
      NAK(LB)=1
30  CALL IDNUM(NUM,LT1,LT2,V,N,W)
      IF(NUM.EQ.0.OR.N.EQ.0) GO TO 20
      NAK(LB)=NAK(LB)+1
      L=NAK(LB)
      NCID(L)=NUM
      IF(N.NE.-1)CALL ERR(3)
      LFG(L)=IV
      CALL GRAMIN(V,N,W)
      IF(N.NE.-1)CALL ERR(3)
      NSOR(L)=IV
      IF(NSOR(L).EQ.0) GO TO 30
      NS=NSOR(L)
      DO 19 I=1,NS
      CALL IDNUM(IDS(L,I),LUM1,LUM2,V,N,W)
      IF(N.NE.-1)CALL ERR(3)
19  MSR(L,I)=IV
      GO TO 30
20  CONTINUE
      NAK(LB)=NAK(LB)-1
      NBK(LB)=NAK(LB)
C   CARDS TO SCRATCH SEGMENT
      CALL MATOR
      CALL MATX
      NK=NAK(LB)
      WRITE(KRDT) LCAD(LB), (NCID(J),J=1,NK)
      WRITE(KRDT) (((MOC(I,J)),J=1,I),I=1,NK)
      IF(N) 15,12,15
C   DELETE SEGMENT READ IN
50  CALL GRAMIN(V,N,W)
      IF(N.EQ.0) GO TO 12
      ND=ND+1
      IF(N.NE.-1)CALL ERR(3)
      LCD(ND)=IV
      GO TO 50
99  CALL GRAMIN(V,N,W)
      FNO=W(1)
100 IF(NIN.EQ.0) GO TO 200
C   READ FROM TAPE
      READ(NIN) IDTAPE, INUM, LA, MUM
      READ(NIN) (LCBD(I), NOAT(I), NOBT(I), I=1, LB)
200 CALL DEL
      CALL ORDR

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RETAP 01355
RETAP 01356
RETAP 01357
RETAP 01358
RETAP 01359
RETAP 01360
RETAP 01361
RETAP 01362
RETAP 01363
RETAP 01364
RETAP 01365
RETAP 01366
RETAP 01367
RETAP 01368
RETAP 01369
RETAP 01370
RETAP 01371
RETAP 01372
RETAP 01373
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RETAP 01397
RETAP 01398
RETAP 01399
RETAP 01400
RETAP 01401
RETAP 01402
RETAP 01403
RETAP 01404

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      CALL DOUBLE(JF)
      IF (LB.EQ.0) CALL ERR(7)
300  CONTINUE
C    WRITE ON NOUT
      IF(NOUT.LE.0) RETURN
      REWIND KRDT
      WRITE(NOUT) FI,JF,LB,MUM
      CALL PRF2
      WRITE(NOUT) (LCAO(I),NOA(I),NOB(I),I=1,LB)
      KOUNT=0
      NJW=0
      DO 399 KU=1,LB
      IF(LWO(KU).EQ.0) GO TO 350
C    COPY FROM SCRATCH
      NXT=LWO(KU)
      CALL POST(NJW,NXT,2)
      NJW=NXT
      NK=NOA(KU)
      READ(KRDT) LCAD(KU), (NCID(J),J=1,NK)
      WRITE(NOUT) LCAD(KU), (NCID(J),J=1,NK)
      READ(KRDT) ((MDC(I,J),J=1,I),I=1,NK)
      WRITE(NOUT) ((MDC(I,J),J=1,I),I=1,NK)
      GO TO 399
C    COPY FROM NIN
350  KOUNT=KOUNT+1
      NLT=NOAT(KOUNT)
      READ(NIN) LCAD(KU), (NCID(J),J=1,NLT)
      READ(NIN) ((MDC(I,J),J=1,I),I=1,NLT)
      IF(LCAD(KU).NE.LCAO(KU)) GO TO 350
      WRITE(NOUT) LCAD(KU), (NCID(J),J=1,NLT)
      WRITE(NOUT) ((MDC(I,J),J=1,I),I=1,NLT)
399  CONTINUE
      GO TO 2
      END

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RETAP  01405
RETAP  01406
RETAP  01407
RETAP  01408
RETAP  01409
RETAP  01410
RETAP  01411
RETAP  01412
RETAP  01413
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RETAP  01431
RETAP  01432
RETAP  01433
RETAP  01434
RETAP  01435
RETAP  01436
RETAP  01437
RETAP  01438

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C	SUBROUTINE MATOR	RETAP	01439
C	ORDER THE LIST NCID TO CONFORM TO THE RULE THAT A PARENT	RETAP	01440
C	MUST PRECEDE ITS DAUGHTER.	RETAP	01441
C		RETAP	01442
	COMMON LCAO(100), LAO(100,2), LWO(100), NPO(100,10), LB, LCAO(100),	RETAP	01443
	1LAO(100,2), LW(100), NPK(100,10), LCBO(100), LBO(100,2), NPT(100,10),	RETAP	01444
	2LA, LCD(100),	RETAP	01445
	3NO,	RETAP	01446
	4NCID(41), NSOR(41), IDS(41,41), MSR(41,41), MDC(40,40), LFG(41), IOT(41)	RETAP	01447
	5,MST(41)	RETAP	01448
	COMMON/TAPES/ NIN,NOUT,KRDT,INP,NPR	RETAP	01449
	DIMENSION NOA(100),NOB(100),NOC(100),NOD(100),NOE(100),NAK(100),N	RETAP	01450
	1BK(100),NCK(100),NDK(100),NEK(100),NOAT(100),NOBT(100),NOCT(100),N	RETAP	01451
	2OOT(100),NOET(100)	RETAP	01452
	EQUIVALENCE (NOA(1),NPO(1,1)),(NOB(1),NPO(1,2)),(NOC(1),NPO(1,3)),	RETAP	01453
	1(NOD(1),NPO(1,4)),(NOE(1),NPO(1,5)),(NAK(1),NPK(1,1)),(NBK(1),NPK(	RETAP	01454
	21,2)),(NCK(1),NPK(1,3)),(NDK(1),NPK(1,4)),(NEK(1),NPK(1,5)),(NOAT(	RETAP	01455
	31),NPT(1,1)),(NOBT(1),NPT(1,2)),(NOCT(1),NPT(1,3)),(NODT(1),NPT(1,	RETAP	01456
	44)),(NOET(1),NPT(1,5))	RETAP	01457
	NAT=NAK(LB)+1	RETAP	01458
	IF(NAT.LT.2) RETURN	RETAP	01459
	DO 5 I=2,NAT	RETAP	01460
	IF(NSOR(I).NE.0) GO TO 5	RETAP	01461
	IRST=I	RETAP	01462
	GO TO 5	RETAP	01463
5	CONTINUE	RETAP	01464
6	NCID(1)=NCID(IRST)	RETAP	01465
	LFG(1)=LFG(IRST)	RETAP	01466
	NSOR(1)=0	RETAP	01467
	II=IRST+1	RETAP	01468
	IF(IRST.EQ.NAT) GO TO 11	RETAP	01469
	DO 10 J=II,NAT	RETAP	01470
	NSOR(J-1)=NSOR(J)	RETAP	01471
	LFG(J-1)=LFG(J)	RETAP	01472
	ISR=NSOR(J)	RETAP	01473
	IF(ISR.LE.0) GO TO 10	RETAP	01474
	DO 12 K=1,ISR	RETAP	01475
	IDS(J-1,K)=IDS(J,K)	RETAP	01476
12	MSR(J-1,K)=MSR(J,K)	RETAP	01477
10	NCID(J-1)=NCID(J)	RETAP	01478
11	CONTINUE	RETAP	01479
	NC =NAK(LB)	RETAP	01480
	DO 101 LRO=1,NC	RETAP	01481
	DO 100 K =2,NC	RETAP	01482
	IXC=0	RETAP	01483
	IF(NSOR(K).EQ.0) GO TO 20	RETAP	01484
	NSR=NSOR(K)	RETAP	01485
	DO 30 L=1,NSR	RETAP	01486
	KK=K-1	RETAP	01487
		RETAP	01488

DO 25 M=1, KK	RETAP	01489
ML=K-M	RETAP	01490
IF(NCID(ML).EQ.IDS(K,L).OR.MSR(K,L).EQ.4) GO TO 30	RETAP	01491
25 CONTINUE	RETAP	01492
GO TO 50	RETAP	01493
30 CONTINUE	RETAP	01494
GO TO 20	RETAP	01495
50 IDTT=NCID(K)	RETAP	01496
LFT=LFG(K)	RETAP	01497
NST=NSOR(K)	RETAP	01498
IF(NST.EQ.0) GO TO 52	RETAP	01499
DO 2 KL=1, NST	RETAP	01500
IDT(KL)=IDS(K, KL)	RETAP	01501
2 MST(KL)=MSR(K, KL)	RETAP	01502
52 CONTINUE	RETAP	01503
NCID(K)=NCID(K+1)	RETAP	01504
LFG(K)=LFG(K+1)	RETAP	01505
NSOR(K)=NSOR(K+1)	RETAP	01506
NN=NSOR(K+1)	RETAP	01507
IF(NN.EQ.0) GO TO 53	RETAP	01508
DO 3 KL=1, NN	RETAP	01509
IDS(K, KL)=IDS(K+1, KL)	RETAP	01510
3 MSR(K, KL)=MSR(K+1, KL)	RETAP	01511
53 CONTINUE	RETAP	01512
NCID(K+1)=IDTT	RETAP	01513
LFG(K+1)=LFT	RETAP	01514
NSOR(K+1)=NST	RETAP	01515
IF(NST.EQ.0) GO TO 54	RETAP	01516
DO 4 KL=1, NST	RETAP	01517
IDS(K+1, KL)=IDT(KL)	RETAP	01518
4 MSR(K+1, KL)=MST(KL)	RETAP	01519
54 CONTINUE	RETAP	01520
IXC=1	RETAP	01521
20 CONTINUE	RETAP	01522
IF(IXC.EQ.0) GO TO 101	RETAP	01523
100 CONTINUE	RETAP	01524
101 CONTINUE	RETAP	01525
C CHECK FOR N2N REPEAT	RETAP	01526
NAT=NC	RETAP	01527
NX=1	RETAP	01528
110 NX=NX+1	RETAP	01529
IF(NX.GT.41) GO TO 300	RETAP	01530
IF(NX.GT.NAT) GO TO 200	RETAP	01531
NSR=NSOR(NX)	RETAP	01532
IF(NSR.LE.0) GO TO 110	RETAP	01533
II=1	RETAP	01534
120 NK =NX-1	RETAP	01535
DO 150 IR=II, NSR	RETAP	01536
DO 140 IK=1, NK	RETAP	01537
IF(NCID(IK).EQ.IDS(NX, IR)) GO TO 150	RETAP	01538

140	CONTINUE	RETAP	01539
	GO TO 160	RETAP	01540
150	CONTINUE	RETAP	01541
	GO TO 110	RETAP	01542
C	N2N CHECK FAILURE	RETAP	01543
160	CONTINUE	RETAP	01544
	II=IR	RETAP	01545
	NAT=NAT+1	RETAP	01546
	NM=NAT-NX	RETAP	01547
	DO 170 IM=1,NM	RETAP	01548
	JA=NAT-IM	RETAP	01549
	JB=JA+1	RETAP	01550
	NCID(JB)=NCID(JA)	RETAP	01551
	NSOR(JB)=NSOR(JA)	RETAP	01552
	LFG(JB)=LFG(JA)	RETAP	01553
	IF(NSOR(JA).EQ.0) GO TO 170	RETAP	01554
	NSB=NSOR(JA)	RETAP	01555
	DO 175 ISR=1,NSB	RETAP	01556
	IDS(JB,ISR)=IDS(JA,ISR)	RETAP	01557
	MSR(JB,ISR)=MSR(JA,ISR)	RETAP	01558
175	CONTINUE	RETAP	01559
170	CONTINUE	RETAP	01560
C	INSERT NUCLIDE	RETAP	01561
	DO 178 IL=1,NAT	RETAP	01562
	IF(NCID(IL).EQ.IDS(NX,IR))GO TO 179	RETAP	01563
178	CONTINUE	RETAP	01564
	GO TO 310	RETAP	01565
179	LFG(NX)=LFG(IL)	RETAP	01566
	NCID(NX)=NCID(IL)	RETAP	01567
	NSOR(NX)=0	RETAP	01568
	NX=NX+1	RETAP	01569
	IF(II.EQ.NSR) GO TO 110	RETAP	01570
	GO TO 120	RETAP	01571
200	NAK(LB)=NAT	RETAP	01572
9000	CONTINUE	RETAP	01573
	RETURN	RETAP	01574
300	CONTINUE	RETAP	01575
	WRITE(NPR,301)	RETAP	01576
301	FORMAT(///20X23HORDER FAILURE BY MATOR //)	RETAP	01577
	GO TO 200	RETAP	01578
310	WRITE(NPR,311) IDS(NX,IR)	RETAP	01579
311	FORMAT(///20XI7,14H HAS NO SOURCE //)	RETAP	01580
	RETURN	RETAP	01581
	END	RETAP	01582

C	SUBROUTINE MATX	RETAP	01583
C	GENERATE THE DEPLETION CHAIN MATRIX	RETAP	01584
C	COMMON LCAO(100), LAO(100,2), LWO(100), NPO(100,10), LB, LCAD(100),	RETAP	01585
	1LAD(100,2), LW(100), NPK(100,10), LCBD(100), LBD(100,2), NPT(100,10),	RETAP	01586
	2LA, LCD(100),	RETAP	01587
	3ND,	RETAP	01588
	4NCID(41), NSOR(41), IDS(41,41), MSR(41,41), MDC(40,40), LFG(41), IDT(41)	RETAP	01589
	5, MST(41)	RETAP	01590
	DIMENSION NOA(100), NOB(100), NOC(100), NOD(100), NOE(100), NAK(100), N	RETAP	01591
	1BK(100), NCK(100), NDK(100), NEK(100), NOAT(100), NOBT(100), NOCT(100), N	RETAP	01592
	2ODT(100), NOET(100)	RETAP	01593
	EQUIVALENCE (NOA(1), NPO(1,1)), (NOB(1), NPO(1,2)), (NOC(1), NPO(1,3)),	RETAP	01594
	1 (NOD(1), NPO(1,4)), (NOE(1), NPO(1,5)), (NAK(1), NPK(1,1)), (NBK(1), NPK(	RETAP	01595
	21,2)), (NCK(1), NPK(1,3)), (NDK(1), NPK(1,4)), (NEK(1), NPK(1,5)), (NOAT(	RETAP	01596
	31), NPT(1,1)), (NOBT(1), NPT(1,2)), (NOCT(1), NPT(1,3)), (NOET(1), NPT(1,	RETAP	01597
	44)), (NOET(1), NPT(1,5))	RETAP	01598
	NA=NAK(LB)	RETAP	01599
	IF (NA.EQ.0) STOP	RETAP	01600
	DO 10 I=1, NA	RETAP	01601
	MDC(I,I)=LFG(I)	RETAP	01602
10	CONTINUE	RETAP	01603
	IF (NA.LT.2) RETURN	RETAP	01604
	DO 20 I=2, NA	RETAP	01605
	II=I-1	RETAP	01606
	DO 11 KK=1, II	RETAP	01607
	MDC(I, KK)=0	RETAP	01608
11	CONTINUE	RETAP	01609
	IF (NSOR(I).EQ.0) GO TO 20	RETAP	01610
	NOR=NSOR(I)	RETAP	01611
	DO 19 J=1, NOR	RETAP	01612
	DO 18 K=1, II	RETAP	01613
	KJ=II-K+1	RETAP	01614
	IF (NCID(KJ).EQ. IDS(I,J)) GO TO 15	RETAP	01615
18	CONTINUE	RETAP	01616
	GO TO 19	RETAP	01617
15	MDC(I, KJ)= MSR(I, J)	RETAP	01618
19	CONTINUE	RETAP	01619
20	CONTINUE	RETAP	01620
	RETURN	RETAP	01621
	END	RETAP	01622
		RETAP	01623
		RETAP	01624

C	SUBROUTINE CPY2	RETAP	01625
C	COPY FILE TWO FROM NIN TO NOUT	RETAP	01626
C	COMMON /TAPES/NIN,NOUT,KROT,INP,NPR	RETAP	01627
	COMMON/FILES/TYPE,FNO,FI,JF,NGRP,NHED,NGRPT	RETAP	01628
	COMMON LCAO(100),LAO(100,2),LWO(100),NPO(100,10),LB,LCAD(100),	RETAP	01629
	1LAD(100,2),LW(100),NPK(100,10),LCBO(100),LBO(100,2),NPT(100,10),	RETAP	01630
	2LA, LCD(100),	RETAP	01631
	3NO,	RETAP	01632
	4MDC(40,40),NCID(40)	RETAP	01633
	DIMENSION NOA(100),NOB(100)	RETAP	01634
	EQUIVALENCE (NOA(1),NPO(1,1)),(NOB(1),NPO(1,2)),(LB,NSC)	RETAP	01635
	READ (NIN) FJ,JF,NSC,MUM	RETAP	01636
	READ(NIN) (LCAO(I),NOA(I),NOB(I),I=1,NSC)	RETAP	01637
	WRITE(NOUT) FJ,JF,NSC,MUM	RETAP	01638
	WRITE(NOUT) (LCAO(I),NOA(I),NOB(I),I=1,NSC)	RETAP	01639
	DO 10 I=1,NSC	RETAP	01640
	NC=NOA(I)	RETAP	01641
	READ(NIN) IDC,(NCID(J),J=1,NC)	RETAP	01642
	WRITE(NOUT) IDC,(NCID(J),J=1,NC)	RETAP	01643
	READ(NIN) ((MDC(J,K),K=1,J),J=1,NC)	RETAP	01644
	WRITE(NOUT) ((MDC(J,K),K=1,J),J=1,NC)	RETAP	01645
10	CONTINUE	RETAP	01646
	CALL PRF2	RETAP	01647
	RETURN	RETAP	01648
	END	RETAP	01649
		RETAP	01650
		RETAP	01651

C	SUBROUTINE PRF2	RETAP	01652
C	PRINT OUT A DISCRIPTION OF FILE TWO	RETAP	01653
C	COMMON/FILES/TYPE,FNO,FI,JF,NGRP,NHED,NGRPT	RETAP	01654
	COMMON /TAPES/NIN,NOUT,KROD,INP,NPR	RETAP	01655
	COMMON LCAO(100),LAO(100,2),LWO(100),NPO(100,10),LB,LCAD(100),	RETAP	01656
	1LAO(100,2),LW(100),NPK(100,10),LCBD(100),LBD(100,2),NPT(100,10),	RETAP	01657
	2LA, LCO(100),	RETAP	01658
	3NO,	RETAP	01659
	4MDC(40,40),NCID(40)	RETAP	01660
	DIMENSION LCHAIN(100),NOC(100)	RETAP	01661
	EQUIVALENCE (LCHAIN(1),LCAO(1)),(NOC(1),NPO(1,2)),(LB,NSC)	RETAP	01662
	WRITE(NPR,2)	RETAP	01663
	2 FORMAT(1H1,///,48X,27H*** FILE TWO ****/,50X,22H(DEPLET	RETAP	01664
	1ION CHAIN DATA) ///)	RETAP	01665
	WRITE(NPR,3)	RETAP	01666
	3 FORMAT(20X,23HCHAIN ID NO. NUCLIDES,6X,23HCHAIN ID NO. NUCLIDE	RETAP	01667
	1S,6X,23HCHAIN ID NO. NUCLIDES/)	RETAP	01668
	NT=MIND(45,NSC)	RETAP	01669
	WRITE(NPR,5) (LCHAIN(I),NOC(I),I=1,NT)	RETAP	01670
	IF(NSC.LE.45) GO TO 10	RETAP	01671
	WRITE(NPR,6)	RETAP	01672
	WRITE(NPR,3)	RETAP	01673
	6 FORMAT(1H1,///)	RETAP	01674
	WRITE(NPR,5) (LCHAIN(I),NOC(I),I=46,NSC)	RETAP	01675
	5 FORMAT(21X,I6,9X,I2,12X,I6,9X,I2,12X,I6,9X,I2)	RETAP	01676
	10 WRITE(NPR,6)	RETAP	01677
	RETURN	RETAP	01678
	END	RETAP	01679
		RETAP	01680
		RETAP	01681

	OVERLAY(RETAP,3,0)	RETAP	01682
	PROGRAM FILTHE	RETAP	01683
C		RETAP	01684
C	THIS PROGRAM CONTROLS THE GENERATING, UPDATING OR COPYING OF	RETAP	01685
C	FILE THREE	RETAP	01686
		RETAP	01687
	COMMON/TAPES/NIN,NOUT,KROD,INP,NPR,NPRO	RETAP	01688
	COMMON/FILES/TYPE,FNO,FI,JF,NGRP	RETAP	01689
	COMMON/MIS/ NPAR,ICAR,IMOD,MUM	RETAP	01690
	COMMON/REO/ V,N,W	RETAP	01691
	COMMON LCAO(100),LAO(100,2),LWO(100),NPO(100,10),LB,LCAD(100),	RETAP	01692
	1LAO(100,2),LW(100),NPK(100,10),LCBO(100),LBO(100,2),NPT(100,10),	RETAP	01693
	2LA, LCD(100),	RETAP	01694
	3ND,	RETAP	01695
	4AM(2),EA(200),BM(6000)	RETAP	01696
	DIMENSION NOA(100),NOB(100),NOC(100),OD(100),NAK(100),NBK(100),NCK	RETAP	01697
	1(100),OK(100),NOAT(100),NOBT(100),NOCT(100),ODT(100)	RETAP	01698
	EQUIVALENCE (NOA(1),NPO(1,1)),(NOB(1),NPO(1,2)),(NOC(1),NPO(1,3)),	RETAP	01699
	1(OD(1),NPO(1,4)),(NAK(1),NPK(1,1)),(NBK(1),NPK(1,2)),(NCK(1),NPK(1	RETAP	01700
	2,3)),(OK(1),NPK(1,4)),(NOAT(1),NPT(1,1)),(NOBT(1),NPT(1,2)),(NOCT(	RETAP	01701
	3),NPT(1,3)),(ODT(1),NPT(1,4))	RETAP	01702
	DIMENSION W(18)	RETAP	01703
	EQUIVALENCE (V,IV),(IW,W(1))	RETAP	01704
	DIMENSION OE(100),EK(100),OET(100)	RETAP	01705
	EQUIVALENCE (OE(1),NPO(1,5)),(EK(1),NPK(1,5)),(OET(1),NPT(1,5))	RETAP	01706
	JF=3	RETAP	01707
	REWIND KROD	RETAP	01708
	MUM=0	RETAP	01709
	NPAR=9	RETAP	01710
	LB=0	RETAP	01711
	NO=0	RETAP	01712
	IF(NIN.NE.0) CALL REOF(NIN)	RETAP	01713
	CALL SCAN1(17HFINIS*EDIT*FILE**,TYPE,M)	RETAP	01714
	IF(M.GT.3) CALL ERR(2)	RETAP	01715
	IF(M.NE.3) GO TO 3	RETAP	01716
	CALL SCAN1(7HTHREE**,FNO,M)	RETAP	01717
	IF(M.EQ.1) GO TO 10	RETAP	01718
	3 IF(NIN.EQ.0) CALL ERR(1)	RETAP	01719
	CALL CPY3	RETAP	01720
	2 CALL WEOF(NOUT)	RETAP	01721
	RETURN	RETAP	01722
	10 CALL CRAMIN(V,N,W)	RETAP	01723
	12 TYPE=W(1)	RETAP	01724
	11 CALL SCAN1(43HRRDATA*DELETE*FILE*EDIT*FINIS*NOCARD*CARD**,TYPE,M)	RETAP	01725
	IF(M.GT.7) CALL ERR(2)	RETAP	01726
	GO TO (100,200,299,300,300,13,14),M	RETAP	01727
	13 NPRO=0	RETAP	01728
	GO TO 10	RETAP	01729
	14 NPRO=NPR	RETAP	01730
	GO TO 10	RETAP	01731

C	CARD INFORMATION	RETAP	01732
100	LB=LB+1	RETAP	01733
	LN(LB)=LB	RETAP	01734
	CALL IDNUM(LCAD(LB),LAD(LB,1),LAD(LB,2),V,N,W)	RETAP	01735
	IF(N.NE.-1) CALL ERR(3)	RETAP	01736
	NAK(LB)=IV	RETAP	01737
	CALL CRAMIN(OK(LB),N,W)	RETAP	01738
	IF(N.NE.+1) CALL ERR(3)	RETAP	01739
	CALL CRAMIN(EK(LB),N,W)	RETAP	01740
	IF(N.NE.+1) CALL ERR(3)	RETAP	01741
	IF(EK(LB).LT.0.0) EK(LB)=SQRT((ABS(EK(LB))/12.5664))	RETAP	01742
	AM(1)=0.	RETAP	01743
	AM(2)=0.	RETAP	01744
	NBK(LB)=0	RETAP	01745
	NCK(LB)=0	RETAP	01746
	IF(NAK(LB).EQ.0) GO TO 115	RETAP	01747
	CALL CRAMIN(V,N,W)	RETAP	01748
	IF(N.NE.-1) CALL ERR(3)	RETAP	01749
	NBK(LB)=IV	RETAP	01750
	CALL CRAMIN(V,N,W)	RETAP	01751
	IF(N.NE.-1) CALL ERR(3)	RETAP	01752
	NCK(LB)=IV	RETAP	01753
	DO 111 J=1,2	RETAP	01754
	CALL CRAMIN(AM(J),N,W)	RETAP	01755
	IF(N.NE.1) CALL ERR(3)	RETAP	01756
111	CONTINUE	RETAP	01757
	NKO=NAK(LB)*6	RETAP	01758
	DO 112 J=1,NKO	RETAP	01759
	CALL CRAMIN(BM(J),N,W)	RETAP	01760
	IF(N.NE.1) CALL ERR(3)	RETAP	01761
112	CONTINUE	RETAP	01762
	NA=(NBK(LB)+NCK(LB))*2	RETAP	01763
	IF(NA.EQ.0) GO TO 114	RETAP	01764
	DO 113 K=1,NA	RETAP	01765
	CALL CRAMIN(EA(K),N,W)	RETAP	01766
	IF(N.NE.1) CALL ERR(3)	RETAP	01767
113	CONTINUE	RETAP	01768
	WRITE(KRDT) LCAD(LB),(AM(J),J=1,2),(BM(I),I=1,NKO),(EA(K),K=1,NA)	RETAP	01769
	GO TO 115	RETAP	01770
114	CONTINUE	RETAP	01771
	WRITE(KRDT) LCAD(LB),(AM(J),J=1,2),(BM(I),I=1,NKO)	RETAP	01772
115	CALL CRAMIN(V,N,W)	RETAP	01773
	IF(N.EQ.0) GO TO 12	RETAP	01774
	IF(N.NE.-2) CALL ERR(3)	RETAP	01775
	GO TO 100	RETAP	01776
200	ND=ND+1	RETAP	01777
	CALL IDNUM(LCD(ND),LDUM1,LDUM2,V,N,W)	RETAP	01778
	IF(N.EQ.0) GO TO 12	RETAP	01779
	IF(N.NE.-2) CALL ERR(3)	RETAP	01780
	GO TO 200	RETAP	01781

299	CALL CRAMIN(V,N,W)	RETAP	01782
	FNO=W(1)	RETAP	01783
300	IF(NIN.EQ.0) GO TO 310	RETAP	01784
C	READ FROM TAPE	RETAP	01785
	READ(NIN) FI,JF,LA,MUM	RETAP	01786
	READ(NIN) (LCBD(J),LBD(J,1),LBD(J,2),NOAT(J),NOBT(J),NOCT(J),	RETAP	01787
	1 OBT(J),OET(J), J=1,LA)	RETAP	01788
310	CALL DEL	RETAP	01789
	CALL ORDR	RETAP	01790
	CALL DOUBLE(JF)	RETAP	01791
	IF (LB.EQ.0) CALL ERR(7)	RETAP	01792
C	WRITE ON NOUT	RETAP	01793
	IF(NOUT.LE.0) RETURN	RETAP	01794
	REWIND KROT	RETAP	01795
	WRITE(NOUT) FI,JF,LB,MUM	RETAP	01796
	WRITE(NOUT) (LCAO(K),LAO(K,1),LAO(K,2),NOA(K),NOB(K),NOC(K),	RETAP	01797
	1 OD(K),OE(K), K=1,LR)	RETAP	01798
	NW=0	RETAP	01799
	NWT=0	RETAP	01800
	DO 400 KU=1,LB	RETAP	01801
	IF(NOA(KU).EQ.0) GO TO 400	RETAP	01802
C	COPY FROM SCRATCH	RETAP	01803
	IF(LWO(KU).EQ.0) GO TO 450	RETAP	01804
	NXT=LWO(KU)	RETAP	01805
	CALL POST(NW,NXT,3)	RETAP	01806
	NW=NXT	RETAP	01807
	MO=NOA(KU)*6+(NOB(KU)+NOC(KU))*2	RETAP	01808
	READ(KROT) IDR,(AM(I),I=1,2),(EA(J),J=1,MO)	RETAP	01809
	WRITE(NOUT) IDR,(AM(I),I=1,2),(EA(J),J=1,MO)	RETAP	01810
	GO TO 400	RETAP	01811
C	COPY FROM NIN	RETAP	01812
450	NWT=NWT+1	RETAP	01813
	IF(NOAT(NWT).EQ.0) GO TO 450	RETAP	01814
	MOT=6*NOAT(NWT)+2*(NOBT(NWT)+NOCT(NWT))	RETAP	01815
	READ(NIN) IDR,(AM(J),J=1,2),(EA(I),I=1,MOT)	RETAP	01816
	IF(IDR.NE.LCAO(KU)) GO TO 450	RETAP	01817
	WRITE(NOUT) IDR,(AM(J),J=1,2),(EA(I),I=1,MOT)	RETAP	01818
400	CONTINUE	RETAP	01819
	CALL PRF3	RETAP	01820
	GO TO 2	RETAP	01821
	END	RETAP	01822

	SUBROUTINE CPY3	RETAP	01823
C		RETAP	01824
C	COPY FILE THREE FROM NIN ONTO NOUT	RETAP	01825
C		RETAP	01826
	COMMON/TAPES/NIN,NOUT,KROD,INP,NPR	RETAP	01827
	COMMON/FILES/TYPE,FNO,FI,JF,NGRP,NHED,NGRPT	RETAP	01828
	COMMON LCAO(100),LAO(100,2),LWO(100),NPO(100,10),LB,LCAO(100),	RETAP	01829
	1LAD(100,2),LW(100),NPK(100,10),LCBD(100),LBD(100,2),NPT(100,10),	RETAP	01830
	2LA, LCD(100),	RETAP	01831
	3ND,	RETAP	01832
	4AM(2),BM(6,1000),CM(2,100),DM(2,100)	RETAP	01833
	EQUIVALENCE (LB,NRRN)	RETAP	01834
	READ(NIN) FJ,JF,NRRN,MUM	RETAP	01835
	WRITE(NOUT) FI,JF,NRRN,MUM	RETAP	01836
	READ(NIN) (LCAO(I),LAO(I,1),LAO(I,2),(NPO(I,J),J=1,5),I=1,NRRN)	RETAP	01837
	WRITE(NOUT) (LCAO(I),LAO(I,1),LAO(I,2),(NPO(I,J),J=1,5),I=1,NRRN)	RETAP	01838
	DO 10 J=1,NRRN	RETAP	01839
	IF (NPO(J,1) .EQ. 0) GO TO 10	RETAP	01840
	NP=2+6* NPO(J,1)+ 2* (NPO(J,2)+NPO(J,3))	RETAP	01841
	READ(NIN) LCAO(J),(AM(I), I=1,NP)	RETAP	01842
	WRITE(NOUT) LCAO(J),(AM(I), I=1,NP)	RETAP	01843
10	CONTINUE	RETAP	01844
	CALL PRF3	RETAP	01845
	RETURN	RETAP	01846
	END	RETAP	01847

C	SUBROUTINE PRF3	RETAP	01848
C	PRINT OUT INFORMATION FOR FILE THREE	RETAP	01849
C	COMMON/FILES/TYPE,FNO,FI,JF,NGRP,NHED,NGRPT	RETAP	01850
	COMMON /TAPES/NIN,NOUT,KROD,INP,NPR	RETAP	01851
	COMMON LCAO(100),LAO(100,2),LWO(100),NPO(100,10),LB,LCAD(100),	RETAP	01852
	1LAD(100,2),LW(100),NPK(100,10),LCBO(100),LBD(100,2),NPT(100,10),	RETAP	01853
	2LA, LCD(100), NO	RETAP	01854
	WRITE(NPR,2)	RETAP	01855
	2 FORMAT (1H1,5(/),47X,31H*** FILE THREE *** ///,16X,	RETAP	01856
	17HNUCLIDE,3X,15HRESONANCE PEAKS,3X,17HCORRECTION POINTS,3X,17HCORR	RETAP	01857
	2ECTION POINTS,5X,6HATOMIC,5X,10HSCATTERING/,44X,17HFOR CAPTURE X-S	RETAP	01858
	3EC,3X,17HFOR FISSION X-SEC,6X,4HMASS,7X,6HLENGTH //)	RETAP	01859
	DO 10 I=1,LB	RETAP	01860
	WRITE(NPR,3) LAO(I,1),LAO(I,2),(NPO(I,J), J=1,5)	RETAP	01861
	3 FORMAT (17X,A4,A2,6X,I4,17X,I4,15X,I4, 9X,2(E12.5,2X)/)	RETAP	01862
	IF (I.NE.25.AND.I.NE.50.AND.I.NE.75) GO TO 10	RETAP	01863
	IF (I.EQ.LB) GO TO 10	RETAP	01864
	WRITE(NPR,2)	RETAP	01865
10	CONTINUE	RETAP	01866
	WRITE(NPR,8)	RETAP	01867
8	FORMAT(1H1)	RETAP	01868
	RETURN	RETAP	01869
	END	RETAP	01870
		RETAP	01871
		RETAP	01872

	OVERLAY (RETAP,4,0)	RETAP	01873
	PROGRAM FILFOR	RETAP	01874
C		RETAP	01875
C	THIS PROGRAM CONTROLS THE COPY,UPDATE OR GENERATION OF FILE FOUR	RETAP	01876
C		RETAP	01877
	COMMON/TAPES/NIN,NOUT,KRDT,INP,NPR,NPRO	RETAP	01878
	COMMON/FILES/ TYPE,FNO,FI,JF,NGRP	RETAP	01879
	COMMON/MIS/ NPAR,ICHAR,IWOD,MUM	RETAP	01880
	COMMON/RED/ V,N,W	RETAP	01881
	DIMENSION OH(100),HK(100),OHT(100)	RETAP	01882
	COMMON LCAO(100),LAO(100,2),LWO(100),NPO(100,10),LB,LCAO(100),	RETAP	01883
	1LAO(100,2),LW(100),NPK(100,10),LCBO(100),LBO(100,2),NPT(100,10),	RETAP	01884
	2LA, LCO(100),	RETAP	01885
	3NO,	RETAP	01886
	4NU(3,100),BJ(3,100),EFN(50,50),GNZ(50,50),EFF(50,50),GF(50,50)	RETAP	01887
	DIMENSION NOA(100),NOB(100),OC(100),OD(100),NOE(100),NOF(100),OG(1	RETAP	01888
	100),NAK(100),NBK(100),CK(100),DK(100),NEK(100),NFK(100),GK(100),NO	RETAP	01889
	2AT(100),NOBT(100), OCT(100),ODT(100),NOET(100),NOFT(100),OGT(100)	RETAP	01890
	DIMENSION W(18)	RETAP	01891
	EQUIVALENCE (NPO(1,8),OH(1)),(NPK(1,8),HK(1)),(NPT(1,8),OHT(1))	RETAP	01892
	EQUIVALENCE (NPO(1,1),NOA(1)),(NPO(1,2),NOB(1)),(NPO(1,3),OC(1)),(	RETAP	01893
	1NPO(1,4),OD(1)),(NPO(1,5),NOE(1)),(NPO(1,6),NOF(1)),(NPO(1,7),OG(1	RETAP	01894
	2)),(NPK(1,1),NAK(1)),(NPK(1,2),NBK(1)),(NPK(1,3),CK(1)),(NPK(1,4),	RETAP	01895
	3DK(1)),(NPK(1,5),NEK(1)),(NPK(1,6),NFK(1)),(NPK(1,7),GK(1)),(NPT(1	RETAP	01896
	4,1),NOAT(1)),(NPT(1,2),NOBT(1)),(NPT(1,3),OCT(1)),(NPT(1,4),ODT(1)	RETAP	01897
	5),(NPT(1,5),NOET(1)),(NPT(1,6),NOFT(1)),(NPT(1,7),OGT(1))	RETAP	01898
	EQUIVALENCE (V,IV),(IW,W(1))	RETAP	01899
	REWIND KRDT	RETAP	01900
	JF=4	RETAP	01901
	NPAR=11	RETAP	01902
	MUM=0	RETAP	01903
	LB=0	RETAP	01904
	NO=0	RETAP	01905
	IF(NIN.NE.0) CALL REOF(NIN)	RETAP	01906
	CALL SCAN1(17HFINIS*EDIT*FILE**,TYPE,LL)	RETAP	01907
	IF(LL.GT.3) CALL ERR(2)	RETAP	01908
	IF(LL.NE.3) GO TO 3	RETAP	01909
	CALL SCAN1(6HFOUR**,FNO,LL)	RETAP	01910
	IF(LL.EQ.1) GO TO 10	RETAP	01911
	3 IF(NIN.EQ.0) CALL ERR(1)	RETAP	01912
	CALL CPY4	RETAP	01913
	2 CALL WEOF(NOUT)	RETAP	01914
	RETURN	RETAP	01915
	10 CALL CRAIN(V,N,W)	RETAP	01916
	12 TYPE=W(1)	RETAP	01917
	11 CALL SCAN1(43HURDATA*DELETE*FILE*EDIT*FINIS*NOCARD*CARD**,TYPE,LL)	RETAP	01918
	IF(LL.GT.7) CALL ERR(2)	RETAP	01919
	GO TO (100,200,299,300,300,13,14),LL	RETAP	01920
	13 NPRO=0	RETAP	01921
	GO TO 10	RETAP	01922

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14 NPR0=NPR
GO TO 10
C CARD INFORMATION
100 LB=LB+1
LW(LB)=LB
CALL IDNUM(LCAD(LB),LAD(LB,1),LAD(LB,2),V,N,W)
IF(N.NE.-1)CALL ERR(3)
NAK(LB)=IV
CALL CRAMIN(V,N,W)
IF(N.NE.-1)CALL ERR(3)
NBK(LB)=IV
CALL CRAMIN(GK(LB),N,W)
IF(N.NE.+1)CALL ERR(3)
IF(GK(LB).LT.0.0) GK(LB)=SQRT((ABS(GK(LB))/12.5664))
CK(LB)=DK(LB)=0.
HK(LB)=0.
NEK(LB)=NFK(LB)=0
IF(NAK(LB).EQ.0.AND.NBK(LB).EQ.0) GO TO 116
CALL CRAMIN(CK(LB),N,W)
IF(N.NE.+1)CALL ERR(3)
CALL CRAMIN(DK(LB),N,W)
IF(N.NE.+1)CALL ERR(3)
CALL CRAMIN(V,N,W)
IF(N.NE.-1)CALL ERR(3)
NEK(LB)=IV
CALL CRAMIN(V,N,W)
IF(N.NE.-1)CALL ERR(3)
NFK(LB)=IV
CALL CRAMIN(HK(LB),N,W)
IF(N.NE.+1)CALL ERR(3)
MJ=NAK(LB)+NBK(LB)
IF(MJ.EQ.0) GO TO 116
DO 110 J=1,MJ
DO 103 K=1,3
CALL CRAMIN(V,N,W)
IF(N.NE.-1)CALL ERR(3)
103 NU(K,J)=IV
DO 105 K=1,3
CALL CRAMIN(BJ(K,J),N,W)
IF(N.NE.+1)CALL ERR(3)
105 CONTINUE
NR=NU(1,J)
DO 107 MM=1,NR
CALL CRAMIN(EFN(MM,J),N,W)
IF(N.NE.+1)CALL ERR(3)
CALL CRAMIN(GNZ(MM,J),N,W)
IF(N.NE.+1)CALL ERR(3)
107 CONTINUE
NE=NU(2,J)
IF(NE.EQ.0) GO TO 110

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RETAP 01923
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DO 109 MM=1,NE	RETAP	01973
CALL CRAMIN(EFF(MM,J),N,W)	RETAP	01974
IF(N.NE.+1)CALL ERR(3)	RETAP	01975
CALL CRAMIN(GF(MM,J),N,W)	RETAP	01976
IF(N.NE.+1)CALL ERR(3)	RETAP	01977
109 CONTINUE	RETAP	01978
110 CONTINUE	RETAP	01979
WRITE(KRDT) LCAD(LB),((NU(K,J),K=1,3),(BJ(I,J),I=1,3),J=1,MJ)	RETAP	01980
DO 115 MM=1,MJ	RETAP	01981
NR=NU(1,MM)	RETAP	01982
NE=NU(2,MM)	RETAP	01983
IF(NE.EQ.0) GO TO 111	RETAP	01984
WRITE(KRDT) (EFN(I,MM),GNZ(I,MM),I=1,NR),(EFF(J,MM),GF(J,MM),J=1,	RETAP	01985
1NE)	RETAP	01986
GO TO 115	RETAP	01987
111 WRITE(KRDT) (EFN(I,MM),GNZ(I,MM),I=1,NR)	RETAP	01988
115 CONTINUE	RETAP	01989
116 CONTINUE	RETAP	01990
CALL CRAMIN(V,N,W)	RETAP	01991
IF(N) 100,12,100	RETAP	01992
200 ND=ND+1	RETAP	01993
CALL IDNUM(LCD(ND),IDNU1,IDNU2,V,N,W)	RETAP	01994
IF(N) 200,12,200	RETAP	01995
299 CALL CRAMIN(V,N,W)	RETAP	01996
FNO=W(1)	RETAP	01997
300 IF(NIN.EQ.0) GO TO 310	RETAP	01998
C READ FROM TAPE	RETAP	01999
READ(NIN) FI,JF,LA,MUM	RETAP	02000
READ(NIN) (LCBD(J),LBD(J,1),LBD(J,2),NOAT(J),NOBT(J),OGT(J),	RETAP	02001
1ODT(J),NOET(J),NOFT(J),OGT(J),OHT(J),J=1,LA)	RETAP	02002
310 CALL DEL	RETAP	02003
CALL ORDR	RETAP	02004
CALL DOUBLE(JF)	RETAP	02005
IF(LB.EQ.0) CALL ERR(7)	RETAP	02006
C WRITE ON NOUT	RETAP	02007
IF(NOUT.LE.0) RETURN	RETAP	02008
REWIND KRDT	RETAP	02009
WRITE(NOUT) FI,JF,LB,MUM	RETAP	02010
WRITE(NOUT) (LCAO(I),LAO(I,1),LAO(I,2),NOA(I),NOB(I),OC(I),OD(I),	RETAP	02011
1NOE(I),NOF(I),OG(I),OH(I), I=1,LB)	RETAP	02012
NW=0	RETAP	02013
NWT=0	RETAP	02014
DO 400 KU=1,LB	RETAP	02015
C COPY FROM SCRATCH	RETAP	02016
IF(NOA(KU).EQ.0.AND.NOB(KU).EQ.0) GO TO 400	RETAP	02017
IF(LWO(KU).EQ.0) GO TO 450	RETAP	02018
NXT=LWO(KU)	RETAP	02019
CALL POST(NW,NXT,4)	RETAP	02020
NW=NXT	RETAP	02021
NJ=NOA(KU)+NOB(KU)	RETAP	02022

READ(KROT) ID, ((NU(J,I),J=1,3), (BJ(L,I),L=1,3), I=1,NJ)	RETAP	02023
WRITE(NOUT) ID, ((NU(J,I),J=1,3), (BJ(L,I),L=1,3), I=1,NJ)	RETAP	02024
DO 311 K=1,NJ	RETAP	02025
NR=NU(1,K)	RETAP	02026
NE=NU(2,K)	RETAP	02027
IF(NE.EQ.0) GO TO 401	RETAP	02028
READ(KROT) ((EFN(I,K),GNZ(I,K)), I=1,NR), ((EFF(J,K),GF(J,K)), J=1,NE)	RETAP	02029
WRITE(NOUT) ((EFN(I,K),GNZ(I,K)), I=1,NR), ((EFF(J,K),GF(J,K)), J=1,N	RETAP	02030
1E)	RETAP	02031
GO TO 311	RETAP	02032
401 READ(KROT) ((EFN(I,K),GNZ(I,K)), I=1,NR)	RETAP	02033
WRITE(NOUT) ((EFN(I,K),GNZ(I,K)), I=1,NR)	RETAP	02034
311 CONTINUE	RETAP	02035
GO TO 400	RETAP	02036
C COPY FROM NIN	RETAP	02037
450 NWT=NWT+1	RETAP	02038
NJT=NOAT(NWT)+NOBT(NWT)	RETAP	02039
IF(NJT.EQ.0) GO TO 450	RETAP	02040
READ(NIN) IDT, ((NU(J,I),J=1,3), (BJ(K,I),K=1,3), I=1,NJT)	RETAP	02041
DO 411 L=1,NJT	RETAP	02042
NRIT=NU(1,L)	RETAP	02043
NETT=NU(2,L)	RETAP	02044
IF(NETT.EQ.0) GO TO 412	RETAP	02045
READ(NIN) ((EFN(I,L),GNZ(I,L)), I=1,NRIT), ((EFF(J,L),GF(J,L)), J=1,NE	RETAP	02046
1TT)	RETAP	02047
GO TO 411	RETAP	02048
412 READ(NIN) ((EFN(I,L),GNZ(I,L)), I=1,NRIT)	RETAP	02049
411 CONTINUE	RETAP	02050
IF(IDT.NE.LCAO(KU)) GO TO 450	RETAP	02051
WRITE(NOUT) IDT, ((NU(J,I),J=1,3), (BJ(K,I),K=1,3), I=1,NJT)	RETAP	02052
DO 415 K=1,NJT	RETAP	02053
NRIT=NU(1,K)	RETAP	02054
NETT=NU(2,K)	RETAP	02055
IF(NETT.EQ.0) GO TO 414	RETAP	02056
WRITE(NOUT) (EFN(I,K),GNZ(I,K), I=1,NRIT), (EFF(J,K),GF(J,K), J=1,NE	RETAP	02057
1TT)	RETAP	02058
GO TO 415	RETAP	02059
414 WRITE(NOUT) (EFN(I,K),GNZ(I,K), I=1,NRIT)	RETAP	02060
415 CONTINUE	RETAP	02061
400 CONTINUE	RETAP	02062
CALL PRF4	RETAP	02063
GO TO 2	RETAP	02064
END	RETAP	02065

C	SUBROUTINE CPY4	RETAP	02066
C	COPY FILE FOUR FROM TAPE NIN TO TAPE NOUT	RETAP	02067
C	COMMON/FILES/TYPE,FNO,FI,JF,NGRP,NHED,NGRPT	RETAP	02068
	COMMON /TAPES/NIN,NOUT,KROT,INP,NPR	RETAP	02069
	COMMON LCAO(100),LAO(100,2),LWO(100),NPO(100,10),LB,LCAO(100),	RETAP	02070
	1LAD(100,2),LW(100),NPK(100,10),LCBD(100),LBD(100,2),NPT(100,10),	RETAP	02071
	2LA, LCD(100),	RETAP	02072
	3NO,	RETAP	02073
	4NRN(25),NEF(25),MU(25),BJ(25),GG(25),D(25),EFN(10),GNZ(10),EFF(10)	RETAP	02074
	5, GF(10)	RETAP	02075
	EQUIVALENCE (NURN,LB)	RETAP	02076
	READ (NIN) FJ,JF,NURN,MUM	RETAP	02077
	WRITE(NOUT) FJ,JF,NURN,MUM	RETAP	02078
	READ(NIN) (LCAO(I),LAO(I,1),LAO(I,2),(NPO(I,J),J=1,8),I=1,NURN)	RETAP	02079
	WRITE(NOUT) (LCAO(I),LAO(I,1),LAO(I,2),(NPO(I,J),J=1,8),I=1,NURN)	RETAP	02080
	DO 10 J=1,NURN	RETAP	02081
	IF (NPO(J,1) .EQ.0 .AND. NPO(J,2) .EQ. 0) GO TO 10	RETAP	02082
	NJ=NPO(J,1) + NPO(J,2)	RETAP	02083
	READ(NIN) LCAO(J),(NRN(I),NEF(I),MU(I),BJ(I),GG(I),D(I),I=1,NJ)	RETAP	02084
	WRITE(NOUT) LCAO(J),(NRN(I),NEF(I),MU(I),BJ(I),GG(I),D(I),I=1,NJ)	RETAP	02085
	DO 9 K=1,NJ	RETAP	02086
	NR=2*(NRN(K)+NEF(K))	RETAP	02087
	READ(NIN) (EFN(I),I=1,NR)	RETAP	02088
	WRITE(NOUT) (EFN(I),I=1,NR)	RETAP	02089
9	CONTINUE	RETAP	02090
10	CONTINJE	RETAP	02091
	CALL PRF4	RETAP	02092
	RETURN	RETAP	02093
	END	RETAP	02094
		RETAP	02095
		RETAP	02096

	SUBROUTINE PRF4	RETAP	02097
C		RETAP	02098
C	PRINT OUT THE INFORMATION FOR FILE FOUR	RETAP	02099
C		RETAP	02100
	COMMON/FILES/TYPE,FNO,FI,JF,NGRP,NHED,NGRPT	RETAP	02101
	COMMON /TAPES/NIN,NOUT,KROT,INP,NPR	RETAP	02102
	COMMON LCAD(100),LAO(100,2),LWO(100),NPO(100,10),LB,LCAD(100),	RETAP	02103
	1LAD(100,2),LW(100),NPK(100,10),LCBD(100),LBD(100,2),NPT(100,10),	RETAP	02104
	2LA, LCD(100),	RETAP	02105
	3ND,	RETAP	02106
	4NRN(25),NEF(25),MU(25),BJ(25),GG(25),D(25),EFN(10),GNZ(10),EFF(10)	RETAP	02107
	5,GF(10)	RETAP	02108
	EQUIVALENCE (NURN,LB)	RETAP	02109
	WRITE(NPR,2)	RETAP	02110
	2 FORMAT (1H1,////,48X,29H*** FILE FOUR *** //54X,	RETAP	02111
	1 17H(UNRESOLVED DATA) ///,29X,	RETAP	02112
	1 6HSYMBOL, 9X,11HDESCRIPTION,///,30X,35HNJS0 NUMBER OF J-STATES	RETAP	02113
	2 OF S-WAVE /,30X,35HNJS1 NUMBER OF J-STATES OF P-WAVE/,30X,	RETAP	02114
	339HECUR UPPER BOUND OF UNRESOLVED REGION/,30X,39HECLR LOWER BO	RETAP	02115
	4UND OF UNRESOLVED REGION/,30X,56HM NUMBER OF POINTS EVALUATED	RETAP	02116
	5 FOR J-STATES -- S-WAVE/,30X,56HN NUMBER OF POINTS EVALUATED	RETAP	02117
	6FOR J-STATES -- P-WAVE/,30X,24HR SCATTERING LENGTH/,30X,	RETAP	02118
	742HAK CONSTANT FOR THE PENETRATION FACTOR ///	RETAP	02119
	WRITE(NPR,3)	RETAP	02120
	3 FORMAT(15X,73HNUCLIDE NJS0 NJS1 ECUR ECLR	RETAP	02121
	1 M N ,3X,1HR,12X,2HAK/)	RETAP	02122
	DO 10 I=1,LB	RETAP	02123
	WRITE(NPR,4) LAO(I,1),LAO(I,2),(NPO(I,J),J=1,8)	RETAP	02124
	4 FORMAT (16X,A4,A2, 2(7X,I2),5X,E12.5,1X, E12.5, 3X, 2(I3,3X),	RETAP	02125
	1E12.5, 2X, E12.5/)	RETAP	02126
	IF(I.NE.15.AND.I.NE.40.AND.I.NE.65.AND.I.NE.90) GO TO 10	RETAP	02127
	IF (I.EQ.LB) GO TO 10	RETAP	02128
	WRITE(NPR,5)	RETAP	02129
	5 FORMAT(1H1,///)	RETAP	02130
	WRITE(NPR,3)	RETAP	02131
10	CONTINUE	RETAP	02132
	WRITE(NPR,5)	RETAP	02133
	RETURN	RETAP	02134
	END	RETAP	02135

OVERLAY (RETAP,5,0)	RETAP	J2136
PROGRAM FILFIV	RETAP	02137
C THIS PROGRAM CONTROLS THE GENERATION,COPY OR UPDATE OF FILE FIVE	RETAP	02138
C	RETAP	02139
C	RETAP	02140
COMMON/TAPES/NIN,NOUT,KRDT,INP,NPR,NPRO	RETAP	02141
COMMON/FILES/TYPE,FNO,FI,JF,NGRP,NHED,NGRPT	RETAP	02142
COMMON/MIS/ NPAR,ICHAR,IWOD,MUM	RETAP	02143
COMMON/RED/ V,N,W	RETAP	02144
COMMON LCAO(100),LAO(100,2),LWO(100),NPO(100,10),LB,LCAD(100),	RETAP	02145
1LAD(100,2),LW(100),NPK(100,10),LCRD(100),LBD(100,2),NPT(100,10),	RETAP	02146
2LA, LCD(100),	RETAP	02147
3NO,	RETAP	02148
4X(5200)	RETAP	02149
DIMENSION NOA(100),NOB(100),NOC(100),NOD(100),NOE(100),NAK(100),N	RETAP	02150
1BK(100),NCK(100),NDK(100),NEK(100),NOAT(100),NOBT(100),NOCT(100),N	RETAP	02151
2OOT(100),NOET(100),NOFT(100),NOGT(100),NOHT(100),NOI(100),NOF(100)	RETAP	02152
3,NOG(100),NOH(100),NFK(100),NGK(100),NHK(100),NOIT(100),NOJ(100)	RETAP	02153
DIMENSION Y(100,5)	RETAP	02154
EQUIVALENCE (Y(2,2),X(1000)),(NJK(1),NPK(1,10))	RETAP	02155
DIMENSION NIK(100),NJK(100)	RETAP	02156
DIMENSION W(18)	RETAP	02157
EQUIVALENCE (NOA(1),NPO(1,1)),(NOB(1),NPO(1,2)),(NOC(1),NPO(1,3)),	RETAP	02158
1(NOD(1),NPO(1,4)),(NOE(1),NPO(1,5)),(NAK(1),NPK(1,1)),(NBK(1),NPK(	RETAP	02159
21,2)),(NCK(1),NPK(1,3)),(NDK(1),NPK(1,4)),(NEK(1),NPK(1,5)),(NOAT(	RETAP	02160
31),NPT(1,1)),(NOBT(1),NPT(1,2)),(NOCT(1),NPT(1,3)),(NODT(1),NPT(1,	RETAP	02161
44)),(NOET(1),NPT(1,5)),(NOFT(1),NPT(1,6)),(NOGT(1),NPT(1,7)),(NOHT	RETAP	02162
5(1),NPT(1,8)),(NOIT(1),NPT(1,9)),(NFK(1),NPK(1,6)),(NGK(1),NPK(1,7	RETAP	02163
6)),(NHK(1),NPK(1,8)),(NIK(1),NPK(1,9)),(NOF(1),NPO(1,6)),(NOG(1),N	RETAP	02164
7PO(1,7)),(NOH(1),NPO(1,8)),(NOI(1),NPO(1,9)),(NOJ(1),NPO(1,10))	RETAP	02165
EQUIVALENCE (V,IV),(IW,W(1))	RETAP	02166
REWIND KRDT	RETAP	02167
NPAR=13	RETAP	02168
JF=5	RETAP	02169
MUM=0	RETAP	02170
LB=0	RETAP	02171
ND=0	RETAP	02172
IF(NIN.NE.0) CALL REOF(NIN)	RETAP	02173
CALL SCAN1(17HFINIS*EDIT*FILE**,TYPE,M)	RETAP	02174
IF(M.GT.3) CALL ERR(2)	RETAP	02175
IF(M.NE.3) GO TO 3	RETAP	02176
CALL SCAN1(6HFIVE**,FNO,M)	RETAP	02177
IF(M.EQ.1) GO TO 10	RETAP	02178
3 IF(NIN.EQ.0) CALL ERR(1)	RETAP	02179
CALL CPY5	RETAP	02180
2 CALL WEOF(NOUT)	RETAP	02181
RETURN	RETAP	02182
10 CALL CRAMIN(V,N,W)	RETAP	02183
12 TYPE=W(1)	RETAP	02184
11 CALL SCAN1(43HXSDATA*DELETE*FILE*EDIT*FINIS*NOCARD*CARD**,TYPE,M)	RETAP	02185

IF(M.GT.7) CALL ERR(2)	RETAP	02186
GO TO(100,200,299,300,300,13,14),M	RETAP	02187
13 NPRO=0	RETAP	02188
GO TO 10	RETAP	02189
14 NPRO=NPR	RETAP	02190
GO TO 10	RETAP	02191
C CARD INFORMATION	RETAP	02192
100 LB=LB+1	RETAP	02193
LW(LB)=LB	RETAP	02194
CALL IDNUM(LCAD(LB),LAD(LB,1),LAD(LB,2),V,N,W)	RETAP	02195
NAK(LB)=0	RETAP	02196
NBK(LB)=0	RETAP	02197
NCK(LB)=0	RETAP	02198
NOK(LB)=0	RETAP	02199
101 IF(N.NE.0) GO TO 108	RETAP	02200
FLG=W(1)	RETAP	02201
CALL SCAN1(18HFIS*NTN*EXAB*CAP**,FLG,M)	RETAP	02202
IF(M.GT.4) CALL ERR(3)	RETAP	02203
GO TO (103,104,105,106, 12),M	RETAP	02204
103 NBK(LB)=1	RETAP	02205
DO 131 J=1,NGRP	RETAP	02206
CALL CRAMIN(Y(J,2),N,W)	RETAP	02207
IF(N.NE.+1)CALL ERR(3)	RETAP	02208
131 CONTINUE	RETAP	02209
DO 132 J=1,NGRP	RETAP	02210
CALL CRAMIN(Y(J,3),N,W)	RETAP	02211
IF(N.NE.+1)CALL ERR(3)	RETAP	02212
132 CONTINUE	RETAP	02213
CALL CRAMIN(V,N,W)	RETAP	02214
GO TO 101	RETAP	02215
104 NCK(LB)=1	RETAP	02216
DO 133 J=1,NGRP	RETAP	02217
CALL CRAMIN(Y(J,4),N,W)	RETAP	02218
133 CONTINUE	RETAP	02219
CALL CRAMIN(V,N,W)	RETAP	02220
GO TO 101	RETAP	02221
105 NOK(LB)=1	RETAP	02222
DO 134 J=1,NGRP	RETAP	02223
CALL CRAMIN(Y(J,5),N,W)	RETAP	02224
IF(N.NE.+1)CALL ERR(3)	RETAP	02225
134 CONTINUE	RETAP	02226
CALL CRAMIN(V,N,W)	RETAP	02227
GO TO 101	RETAP	02228
106 NAK(LB)=1	RETAP	02229
DO 130 J=1,NGRP	RETAP	02230
CALL CRAMIN(Y(J,1),N,W)	RETAP	02231
IF(N.NE.1) CALL ERR(3)	RETAP	02232
130 CONTINUE	RETAP	02233
CALL CRAMIN(V,N,W)	RETAP	02234
GO TO 101	RETAP	02235

108 IF (N.NE. -1) GO TO 500	RETAP	02236
NFK(LB)=IV	RETAP	02237
NHK(LB)=-1	RETAP	02238
IF(NFK(LB).EQ.-1) GO TO 109	RETAP	02239
CALL CRAMIN(V,N,W)	RETAP	02240
IF(N.NE.-1)CALL ERR(3)	RETAP	02241
NHK(LB)=IV	RETAP	02242
109 NEK(LB)=NAK(LB)+2*NBK(LB)+NCK(LB)+NDK(LB)	RETAP	02243
NU=NEK(LB)*NGRP	RETAP	02244
IF(NU.EQ.0) GO TO 110	RETAP	02245
MXT=0	RETAP	02246
DO 120 K=1,4	RETAP	02247
IF(NPK(LB,K).EQ.0) GO TO 120	RETAP	02248
IF(K.NE.2) GO TO 119	RETAP	02249
DO 118 KL=2,3	RETAP	02250
DO 118 J=1,NGRP	RETAP	02251
LT=MXT+J+(NGRP*(KL-2))	RETAP	02252
118 X(LT)=Y(J,KL)	RETAP	02253
MXT=MXT+2*NGRP	RETAP	02254
GO TO 120	RETAP	02255
119 KL=K+1	RETAP	02256
IF(K.EQ.1) KL=1	RETAP	02257
DO 117 J=1,NGRP	RETAP	02258
LT=MXT+J	RETAP	02259
117 X(LT)=Y(J,KL)	RETAP	02260
MXT=MXT+NGRP	RETAP	02261
120 CONTINUE	RETAP	02262
WRITE(KRDT) LCAD(LB),(X(I),I=1,NU)	RETAP	02263
110 CONTINUE	RETAP	02264
NGK(LB)=((NFK(LB)+1)*(NGRP-NFK(LB)+1))+((NFK(LB)+1)*(NFK(LB))/2)-1	RETAP	02265
NIK(LB)=((NHK(LB)+1)*(NGRP-NHK(LB)+1))+((NHK(LB)+1)*(NHK(LB))/2)-1	RETAP	02266
IF(NIK(LB).LT.0) NIK(LB)=0	RETAP	02267
IF(NGK(LB).LT.0) NGK(LB)=0	RETAP	02268
DO 320 J=1,LB	RETAP	02269
NJ=0	RETAP	02270
IF(NEK(J).NE.0) NJ=NJ+1	RETAP	02271
IF(NGK(J).NE.0) NJ=NJ+1	RETAP	02272
IF(NIK(J).NE.0) NJ=NJ+1	RETAP	02273
320 NJK(J)=NJ	RETAP	02274
IF(NFK(LB).EQ.-1) GO TO 113	RETAP	02275
112 NGM=NGK(LB)	RETAP	02276
NIM=NIK(LB)	RETAP	02277
107 CONTINUE	RETAP	02278
DO 114 J=1,NGM	RETAP	02279
CALL CRAMIN(X(J),N,W)	RETAP	02280
IF(N.NE.1.AND.J.EQ.1) GO TO 107	RETAP	02281
IF (N.NE.1) CALL ERR(3)	RETAP	02282
114 CONTINUE	RETAP	02283
WRITE(KRDT) (LCAD(LB),(X(J),J=1,NGM))	RETAP	02284
IF(NIM.EQ.0) GO TO 113	RETAP	02285

DO 115 J=1,NIM	RETAP	02286
CALL CRAMIN(X(J),N,W)	RETAP	02287
IF(N.NE.+1)CALL ERR(3)	RETAP	02288
115 CONTINUE	RETAP	02289
WRITE(KRDT) (X(J),J=1,NIM)	RETAP	02290
113 CALL CRAMIN(V,N,W)	RETAP	02291
IF(N.EQ.0) GO TO 12	RETAP	02292
IF(N.NE.-2) CALL ERR(3)	RETAP	02293
GO TO 100	RETAP	02294
200 ND=ND+1	RETAP	02295
CALL IDNUM(LCD(ND),LDUM1,LDUM2,V,N,W)	RETAP	02296
IF(N.EQ.0) GO TO 12	RETAP	02297
IF(N.NE.-2) CALL ERR(3)	RETAP	02298
GO TO 200	RETAP	02299
299 CALL CRAMIN(V,N,W)	RETAP	02300
FNO=W(1)	RETAP	02301
300 IF(NIN.EQ.0) GO TO 310	RETAP	02302
C READ FROM TAPE	RETAP	02303
READ(NIN) FI,JF,LA,MUM	RETAP	02304
NR=NPAP-3	RETAP	02305
READ(NIN) (LCBD(J),LBD(J,1),LBD(J,2),(NPT(J,I),I=1,NR),J=1,LA)	RETAP	02306
310 CALL DEL	RETAP	02307
CALL ORDR	RETAP	02308
CALL DOUBLE(JF)	RETAP	02309
IF (LB.EQ.0) CALL ERR(7)	RETAP	02310
C WRITE ON NOUT	RETAP	02311
IF(NOUT.LE.0) RETURN	RETAP	02312
REWIND KRDT	RETAP	02313
WRITE(NOUT) FI,JF,LB,NGRP	RETAP	02314
NR=NPAP-3	RETAP	02315
WRITE(NOUT) (LCAO(K),LAO(K,1),LAO(K,2),(NPO(K,I),I=1,NR),K=1,LB)	RETAP	02316
NW=0	RETAP	02317
NWT=0	RETAP	02318
DO 400 KU=1,LB	RETAP	02319
IF(LWO(KU).EQ.0) GO TO 450	RETAP	02320
C COPY FROM SCRATCH	RETAP	02321
NXT=LWO(KU)	RETAP	02322
CALL POST(NW,NXT,5)	RETAP	02323
NW=NXT	RETAP	02324
NG=NGRP*NOE(KU)	RETAP	02325
IF(NG.EQ.0) GO TO 430	RETAP	02326
READ(KRDT) ID,(X(I),I=1,NG)	RETAP	02327
WRITE(NOUT) (LCAO(KU),(X(I),I=1,NG))	RETAP	02328
430 IF(NOF(KU).EQ.-1) GO TO 400	RETAP	02329
NG=NOG(KU)	RETAP	02330
READ(KRDT) ID,(X(I),I=1,NG)	RETAP	02331
WRITE(NOUT) ID,(X(I),I=1,NG)	RETAP	02332
IF(NOI(KU).EQ.0) GO TO 400	RETAP	02333
NI=NOI(KU)	RETAP	02334
READ(KRDT) (X(I),I=1,NI)	RETAP	02335

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      WRITE(NOUT) (X(I), I=1, NI)
      GO TO 400
C     COPY FROM NIN
450  NWT=NWT+1
      NFM=NOET(NWT)*NGRPT
      IF(NFM.EQ.0) GO TO 460
      READ(NIN) ID, (X(I), I=1, NFM)
      IF(ID.EQ.LCAO(KU)) GO TO 455
      IF(NOGT(NWT).NE.0) READ(NIN)
      IF(NOIT(NWT).NE.0) READ(NIN)
      GO TO 450
455  WRITE(NOUT) ID, (X(I), I=1, NFM)
460  CONTINUE
      IF(NOG(KU).EQ.0) GO TO 400
      NFM=NOG(KU)
      READ(NIN) ID, (X(I), I=1, NFM)
      WRITE(NOUT) ID, (X(I), I=1, NFM)
      IF(NOH(KU).EQ.-1) GO TO 400
      NFM=NOI(KU)
      READ(NIN) (X(I), I=1, NFM)
      WRITE(NOUT) (X(I), I=1, NFM)
400  CONTINUE
      CALL PRF5
      GO TO 2
500  CALL ERR(3)
      WRITE (NPR, 501)
501  FORMAT (20X, 38H*** PREVIOUS MATRIX DATA IGNORED ***,//)
502  CALL CRAMIN (V,N,W)
      IF (N.EQ.0) GO TO 12
      IF (N.EQ.-2) GO TO 100
      GO TO 502
END

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RETAP 02336
RETAP 02337
RETAP 02338
RETAP 02339
RETAP 02340
RETAP 02341
RETAP 02342
RETAP 02343
RETAP 02344
RETAP 02345
RETAP 02346
RETAP 02347
RETAP 02348
RETAP 02349
RETAP 02350
RETAP 02351
RETAP 02352
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RETAP 02363
RETAP 02364
RETAP 02365
RETAP 02366
RETAP 02367

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C	SUBROUTINE CPY5	RETAP	02368
C	COPY FILE FIVE FROM TAPE NIN TO NOUT	RETAP	02369
C	COMMON/FILES/TYPE,FNO,FI,JF,NGRP,NHED	RETAP	02370
	COMMON/TAPES/NIN,NOUT,KRDT,INP,NPR	RETAP	02371
	COMMON LCAO(100),LAO(100,2),LWO(100),NPO(100,10),LB,X(5000)	RETAP	02372
	EQUIVALENCE (LB,LA)	RETAP	02373
	READ(NIN) FJ,JF,LB,NGRP	RETAP	02374
	WRITE(NOUT) FJ,JF,LB,NGRP	RETAP	02375
	READ(NIN) (LCAO(J),LAO(J,1),LAO(J,2),(NPO(J,I),I=1,10),J=1,LA)	RETAP	02376
	WRITE(NOUT) (LCAO(J),LAO(J,1),LAO(J,2),(NPO(J,I),I=1,10),J=1,LA)	RETAP	02377
	DO 100 K=1,LB	RETAP	02378
	NF=NPO(K,5)*NGRP	RETAP	02379
	IF(NF.EQ.0) GO TO 40	RETAP	02380
	READ(NIN) ID,(X(I),I=1,NF)	RETAP	02381
	WRITE(NOUT) ID,(X(I),I=1,NF)	RETAP	02382
40	IF(NPO(K,7).EQ.0) GO TO 100	RETAP	02383
	NF=NPO(K,7)	RETAP	02384
	READ(NIN) ID,(X(I),I=1,NF)	RETAP	02385
	WRITE(NOUT) ID,(X(I),I=1,NF)	RETAP	02386
	NF=NPO(K,9)	RETAP	02387
	IF(NF.EQ.0) GO TO 100	RETAP	02388
	READ(NIN) (X(I),I=1,NF)	RETAP	02389
	WRITE(NOUT) (X(I),I=1,NF)	RETAP	02390
100	CONTINUE	RETAP	02391
	CALL PRF5	RETAP	02392
	RETURN	RETAP	02393
	END	RETAP	02394
		RETAP	02395
		RETAP	02396

C	SUBROUTINE PRF5	RETAP	02397
C	PRINT OUT DISCRIPTION OF FILE FIVE	RETAP	02398
C	COMMON/FILES/TYPE,FNO,FI,JF,NGRP,NHED,NGRPT	RETAP	02399
	COMMON/TAPES/NIN,NOUT,KROD,INP,NPR	RETAP	02400
	COMMON LCO (100),NUID(100,2),LW(100),MA(100),MB(100),MC(100),	RETAP	02401
	MD(100), KP(100),MF(100),KU(100),MH(100),KV(200),NX	RETAP	02402
	DATA NO,IES/3HNO ,3HYES/	RETAP	02403
	DIMENSION LFG(4)	RETAP	02404
	WRITE(NPR,2)	RETAP	02405
	2 FORMAT (1H1,////,48X,29H*** FILE FIVE *** //,52X,	RETAP	02406
	1 20H(CROSS SECTION DATA) ///)	RETAP	02407
	WRITE(NPR,3)	RETAP	02408
	3 FORMAT(9X,7HNUCLIDE,9X,7HCAPTURE,9X,7HFISSION,9X,3HN2N,9X,4HEXAB,9	RETAP	02409
	1X,9HISOTROPIC,9X,11HANISOTROPIC/,26X,4HDATA,12X,4HDATA,11X,4HDATA,	RETAP	02410
	18X,4HDATA,9X,9HD-SCATTER,10X,9HD-SCATTER/)	RETAP	02411
	4 FORMAT(1H1,///)	RETAP	02412
	DO 100 J=1,NX	RETAP	02413
	DO 10 K=1,4	RETAP	02414
10	LFG(K)=NO	RETAP	02415
	IF(MA(J).NE.0) LFG(1)=IES	RETAP	02416
	IF(MB(J).NE.0) LFG(2)=IES	RETAP	02417
	IF(MC(J).NE.0) LFG(3)=IES	RETAP	02418
	IF(MD(J).NE.0) LFG(4)=IES	RETAP	02419
	WRITE(NPR,5)NUID(J,1),NUID(J,2),(LFG(I),I=1,4),MF(J),MH(J)	RETAP	02420
5	FORMAT (9X,A4,A2,11X,A3,13X,A3,12X,A3,9X,A3,13X,I3,16X,I3/)	RETAP	02421
	IF(J.NE.22.AND.J.NE.48.AND.J.NE.74) GO TO 100	RETAP	02422
	IF (J.EQ. NX) GO TO 100	RETAP	02423
	WRITE(NPR,4)	RETAP	02424
	WRITE(NPR,3)	RETAP	02425
100	CONTINUE	RETAP	02426
	WRITE(NPR,4)	RETAP	02427
	RETURN	RETAP	02428
	END	RETAP	02429
		RETAP	02430
		RETAP	02431

	OVERLAY (RETAP,6,0)	RETAP	02432
	PROGRAM FILSIX	RETAP	02433
C		RETAP	02434
C	THIS PROGRAM CONTROLS THE COPY,GENERATION OR UPDATE OF FILE SIX	RETAP	02435
C		RETAP	02436
	COMMON LCAO(100),LAO(100,2),LWO(100),NPO(100,10),LB,LCAD(100),	RETAP	02437
	1LAD(100,2),LW(100),NPK(100,10),LCBD(100),LBD(100,2),NPT(100,10),	RETAP	02438
	2LA, LCD(100),	RETAP	02439
	3ND,	RETAP	02440
	4IOIS(18,100), SSP(100,100)	RETAP	02441
	COMMON/TAPES/NIN,NOUT,KRDT,INP,NPR,NPRO	RETAP	02442
	COMMON/FILES/TYPE,FNO,FI,JF,NGRP,NHED,NGRPT	RETAP	02443
	COMMON/MIS/ NPAR,ICHAR,IWOD,MUM	RETAP	02444
	COMMON/REO/V,N,W	RETAP	02445
	DIMENSION W(18) ,KW(18)	RETAP	02446
	EQUIVALENCE (V,IV),(IW,W(1),KW(1))	RETAP	02447
	JF=6	RETAP	02448
	NPAR=3	RETAP	02449
	MUM=0	RETAP	02450
	LB=0	RETAP	02451
	NO=0	RETAP	02452
	IF(NIN.NE.0) CALL REOF(NIN)	RETAP	02453
	CALL SCAN1(17HFINIS*EDIT*FILE**,TYPE,M)	RETAP	02454
	IF(M.GT.3) CALL ERR(1)	RETAP	02455
	IF(M.NE.3) GO TO 3	RETAP	02456
	CALL SCAN1(5HSIX**,FNO,M)	RETAP	02457
	IF(M.EQ.1) GO TO 10	RETAP	02458
	3 IF(NIN.EQ.0) CALL ERR(1)	RETAP	02459
	CALL CPY6	RETAP	02460
	2 CALL WEOF(NOUT)	RETAP	02461
	RETURN	RETAP	02462
	10 CALL CRAMIN(V,N,W)	RETAP	02463
	12 TYPE=W(1)	RETAP	02464
	11 CALL SCAN1(43HSOURCE*DELETE*FILE*EDIT*FINIS*NOCARD*CARD**,TYPE,M)	RETAP	02465
	IF(M.GT.7) CALL ERR(2)	RETAP	02466
	GO TO (100,200,299,300,300,13,14),M	RETAP	02467
	13 NPRO=0	RETAP	02468
	GO TO 10	RETAP	02469
	14 NPRO=NPR	RETAP	02470
	GO TO 10	RETAP	02471
C	CARD INFORMATION	RETAP	02472
	100 CALL CRAMIN(V,N,W)	RETAP	02473
	IF(N.NE.-1)CALL ERR(3)	RETAP	02474
	101 LB=LB+1	RETAP	02475
	LW(LB)=LB	RETAP	02476
	LCAD(LB)=IV	RETAP	02477
	CALL CRAMIN(V,N,W)	RETAP	02478
	IF(N.NE.-3) CALL ERR(3)	RETAP	02479
	DO 110 J=1,IWOD	RETAP	02480
	110 IOIS(J,LB)=KW(J)	RETAP	02481

DO 112 K=1,NGRP	RETAP	02482
CALL GRAMIN(SSP(K,LB),N,W)	RETAP	02483
IF(N.NE.1) CALL ERR(3)	RETAP	02484
112 CONTINUE	RETAP	02485
CALL GRAMIN(V,N,W)	RETAP	02486
IF(N.EQ.0) GO TO 12	RETAP	02487
IF(N.NE.-1) CALL ERR(3)	RETAP	02488
GO TO 101	RETAP	02489
200 CALL GRAMIN(V,N,W)	RETAP	02490
IF(N.EQ.0) GO TO 12	RETAP	02491
IF(N.NE.-1) CALL ERR(3)	RETAP	02492
NO=NO+1	RETAP	02493
LCD(NO)=IV	RETAP	02494
GO TO 200	RETAP	02495
299 CALL GRAMIN(V,N,W)	RETAP	02496
FNO=W(1)	RETAP	02497
300 IF(NIN.EQ.0) GO TO 310	RETAP	02498
READ FROM TAPE	RETAP	02499
READ(NIN) FI,JF,LA,MUM	RETAP	02500
READ(NIN) (LCBD(J),J=1,LA)	RETAP	02501
310 CALL DEL	RETAP	02502
CALL ORDR	RETAP	02503
CALL DOUBLE(JF)	RETAP	02504
IF(NOUT.LE.0) RETURN	RETAP	02505
WRITE(NOUT) FI,JF,LB,NGRP	RETAP	02506
IFL=MAX0(LB,4)	RETAP	02507
WRITE(NOUT) (LCAO(J),J=1,IFL)	RETAP	02508
NTP=LB	RETAP	02509
UD 400 KU=1,LB	RETAP	02510
IF(LWO(KU) .EQ. 0) GO TO 455	RETAP	02511
NXT=LWO(KU)	RETAP	02512
WRITE(NOUT) (LCAO(KU),((IDIS(J,NXT),J=1,IWOD),(SSP(K,NXT),K=1,NGRP	RETAP	02513
1)))	RETAP	02514
GO TO 400	RETAP	02515
455 NTP=NTP+1	RETAP	02516
LWO(KU)=NTP	RETAP	02517
450 READ(NIN) ID,(IDIS(J,NTP),J=1,IWOD),(SSP(K,NTP),K=1,NGRP)	RETAP	02518
IF(ID.NE.LCAO(KU)) GO TO 450	RETAP	02519
WRITE(NOUT) (LCAO(KU),(IDIS(J,NTP),J=1,IWOD),(SSP(K,NTP),K=1,NGRP))	RETAP	02520
400 CONTINUE	RETAP	02521
CALL PRF6	RETAP	02522
GO TO 2	RETAP	02523
END	RETAP	02524

C	SUBROUTINE PRF6	RETAP	02525
C	PRINT OUT THE DISCRPTION OF FILE SIX	RETAP	02526
C	COMMON/TAPES/NIN,NOUT,KRDT,INP,NPR	RETAP	02527
	COMMON/FILES/TYPE,FNO,FI,JF,NGRP,NHED,NGRPT	RETAP	02528
	COMMON/MIS/ NPAR,ICHAR,IWOD,MUM	RETAP	02529
	COMMON LCAO(100),LAO(100,2),LWO(100),NPO(100,10),LB,DUM(2802),	RETAP	02530
	1 IDIS(18,100)	RETAP	02531
	DIMENSION IFA(5), IFB(5)	RETAP	02532
	DATA IFA/4H(19X,4H,I3,,4H5X,1,4H2A06,4H/) /	RETAP	02533
	CALL FORM(20,IFA, IFB)	RETAP	02534
	WRITE(NPR,2)	RETAP	02535
	2 FORMAT (1H1,////48X,27H*** F I L E S I X *** ///,20X,	RETAP	02536
	172HTHIS FILE CONTAINS SOURCE INFORMATION. THE FOLLOWING SOURCE ID	RETAP	02537
	2ENTIFIERS ///,20X,65HWHERE WRITTEN ON THE REGA TAPE WITH THE CORRESP	RETAP	02538
	3ONDING INFORMATION. ////,20X,2HID,6X,18HSOURCE DESCRIPTION ///	RETAP	02539
	CALL MASH(IWOD,NN1,NN2)	RETAP	02540
	CALL INTALP (IFB(1), 12, NN1)	RETAP	02541
	CALL INTALP (IFB(1), 13, NN2)	RETAP	02542
	CALL MASH(ICHAR,ICH1,ICH2)	RETAP	02543
	CALL INTALP (IFB(1), 15, ICH1)	RETAP	02544
	CALL INTALP (IFB(1), 16, ICH2)	RETAP	02545
	DO 3 J=1,LB	RETAP	02546
	JT=LWO(J)	RETAP	02547
	3 WRITE(NPR,IFB) (LCAO(J),(IDIS(I,JT),I=1,IWOD))	RETAP	02548
	WRITE(NPR,4)	RETAP	02549
	4 FORMAT(1H1)	RETAP	02550
	RETURN	RETAP	02551
	END	RETAP	02552
		RETAP	02553
		RETAP	02554

	SUBROUTINE CPY6	RETAP	02555
C		RETAP	02556
C	COPY FILE SIX FROM TAPE NIN TO TAPE NOUT	RETAP	02557
C		RETAP	02558
	COMMON LCAO(100),LAD(100,2),LWO(100),NPO(100,10),LR,LCAD(100),	RETAP	02559
	1LAD(100,2),LW(100),NPK(100,10),LCBD(100),LBD(100,2),NPT(100,10),	RETAP	02560
	2LA, LCD(100),	RETAP	02561
	3ND,	RETAP	02562
	4IDIS(18,100), SSP(100,100)	RETAP	02563
	COMMON/TAPES/NIN,NOUT,KRDT,INP,NPR	RETAP	02564
	COMMON/FILES/TYPE,FNO,FI,JF,NGRP,NHED,NGRPT	RETAP	02565
	COMMON/MIS/ NPAR,ICHAR,IWOD,MUM	RETAP	02566
	COMMON/RED/V,N,W	RETAP	02567
	DIMENSION W(18) ,KW(18)	RETAP	02568
	EQUIVALENCE (V,IV),(IW,W(1),KW(1))	RETAP	02569
	READ(NIN) FJ,JF,NSU,MUM	RETAP	02570
	JF=6	RETAP	02571
	WRITE(NOUT) FJ,JF,NSU,MUM	RETAP	02572
	NSSU=MAX0(NSU,4)	RETAP	02573
	READ(NIN) (LCAO(I),I=1,NSSU)	RETAP	02574
	WRITE(NOUT) (LCAO(I),I=1,NSSU)	RETAP	02575
	LB=NSU	RETAP	02576
	DO 100 KU=1,LB	RETAP	02577
	LWO(KU)=KU	RETAP	02578
	READ(NIN) LCAO(KU),((IDIS(J,KU),J=1,IWOD),(SSP(K,KU),K=1,NGRP))	RETAP	02579
	WRITE(NOUT)LCAO(KU),((IDIS(J,KU),J=1,IWOD),(SSP(K,KU),K=1,NGRP))	RETAP	02580
100	CONTINUE	RETAP	02581
	CALL PRF6	RETAP	02582
	RETURN	RETAP	02583
	END	RETAP	02584

	OVERLAY (RETAP,7,0)	RETAP	J2585
	PROGRAM FILSVN	RETAP	02586
C		RETAP	02587
C	THIS PROGRAM CONTROLS THE COPY,UPDATE OR GENERATION OF FILE SEVEN	RETAP	02588
C		RETAP	J2589
	COMMON/RED/V,N,W	RETAP	02590
	COMMON/MIS/ NPAR,ICHAR,IWOD,MUM	RETAP	02591
	COMMON/FILES/TYPE,FNO,FI,JF,NGRP,NHED,NGRPT	RETAP	02592
	COMMON/TAPES/NIN,NOUT,KRDT,INP,NPR,NPRO	RETAP	02593
	COMMON LCAO(100),LAO(100,2),LWO(100),NPO(100,10),LB,LCAO(100),	RETAP	02594
	1LAO(100,2),LW(100),NPK(100,10),LCBD(100),LBD(100,2),NPT(100,10),	RETAP	02595
	2LA, LCD(100),	RETAP	02596
	3NO,FPID(50),FPY(50),FPD(140)	RETAP	02597
	INTEGER FPID	RETAP	02598
	DIMENSION NOA(100),NOB(100),OC(100),OD(100),OE(100),OF(100),	RETAP	02599
	1NOG(100), NAK(100),NBK(100),CK(100),OK(100),EK(100),FK(100),	RETAP	02600
	2NGK(100), NOAT(100),NOBT(100),OCT(100),ODT(100),OET(100),OFT(100),	RETAP	02601
	3NOGT(100)	RETAP	02602
	EQUIVALENCE (NOA(1),NPO(1,1)),(NOB(1),NPO(1,2)),(OC(1),NPO(1,3)),	RETAP	02603
	1(OD(1),NPO(1,4)),(OE(1),NPO(1,5)),(OF(1),NPO(1,6)),(NOG(1),NPO(1,7	RETAP	02604
	2)), (NAK(1),NPK(1,1)),(NBK(1),NPK(1,2)),(CK(1),NPK(1,3)),(OK(1),	RETAP	02605
	3NPK(1,4)),(EK(1),NPK(1,5)),(FK(1),NPK(1,6)),(NGK(1),NPK(1,7)),	RETAP	02606
	4(NOAT(1),NPT(1,1)),(NOBT(1),NPT(1,2)),(OCT(1),NPT(1,3)),(ODT(1),	RETAP	02607
	5NPT(1,4)),(OET(1),NPT(1,5)),(OFT(1),NPT(1,6)),(NOGT(1),NPT(1,7))	RETAP	02608
	DIMENSION W(18)	RETAP	02609
	EQUIVALENCE (V,IV), (IW,W(1))	RETAP	02610
	MUM=0	RETAP	02611
	NPAR=10	RETAP	02612
	REWIND KRDT	RETAP	02613
	LB=0	RETAP	02614
	NO=0	RETAP	02615
	JF=7	RETAP	02616
	IF(NIN.NE.0) CALL REOF(NIN)	RETAP	02617
	CALL SCAN1(17HFINIS*EDIT*FILE**,TYPE,M)	RETAP	02618
	IF(M.GT.3) CALL ERR(2)	RETAP	02619
	IF(M.NE.3) GO TO 3	RETAP	02620
	CALL SCAN1(7HSEVEN**,FNO,M)	RETAP	02621
	IF(M.EQ.1) GO TO 10	RETAP	02622
	3 IF(NIN.EQ.0) CALL ERR(1)	RETAP	02623
	CALL CPY7	RETAP	02624
	2 CALL WEOF(NOUT)	RETAP	02625
	RETURN	RETAP	02626
	10 CALL GRAMIN(V,N,W)	RETAP	02627
	12 TYPE=W(1)	RETAP	02628
	11 CALL SCAN1(43HOPDATA*DELETE*FILE*EDIT*FINIS*NOCARD*CARD**,TYPE,M)	RETAP	02629
	IF(M.GT.7) CALL ERR(2)	RETAP	02630
	GO TO (100,200,299,300,300,13,14),M	RETAP	02631
	13 NPRO=0	RETAP	02632
	GO TO 10	RETAP	02633
	14 NPRO=NPR	RETAP	02634

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      GO TO 10
C CARD INFORMATION
100 LB=LB+1
   LW(LB)=LB
   CALL IDNUM(LCAD(LB),LAD(LB,1),LAD(LB,2),V,N,W)
   IF (LCAD(LB).EQ.0) CALL ERR(3)
   IF(N.NE.-1) CALL ERR(3)
   NGK(LB)=IV
   CALL CRAMIN(NAK(LB),N,W)
   IF(N.NE.-1) CALL ERR(3)
   NK=NAK(LB)
   CALL CRAMIN(NBK(LB),N,W)
   IF(N.NE.-1) CALL ERR(3)
   CALL CRAMIN(CK(LB),N,W)
   IF(N.NE.+1) CALL ERR(3)
   CALL CRAMIN(DK(LB),N,W)
   IF(N.NE.+1) CALL ERR(3)
   IF(CK(LB).LT.0) CK(LB)= -2.1974885E-08 / CK(LB)
   FPI0(2)=0
   FPY(2)=0.
   CALL CRAMIN(EK(LB),N,W)
   IF(N.NE.1) CALL ERR(3)
   CALL CRAMIN(FK(LB),N,W)
   IF(N.NE.1) CALL ERR(3)
   IF(NAK(LB).EQ.0) GO TO 115
   DO 111 J=1,NK
   CALL IDNUM(FPI0(J),LNUM1,LNUM2,FPY(J),N,W)
111 CONTINUE
   IF(NK.LT.2) NK=2
   WRITE(KROT) LCAD(LB), (FPI0(J),FPY(J),J=1,NK)
115 IF(NBK(LB).EQ.0) GO TO 118
   NG=2*NBK(LB)
   NGP=NGRP+ NG
   DO 116 J=1,NGP
   CALL CRAMIN(FPD(J),N,W)
116 IF(N.NE.1) CALL ERR(3)
   DO 117 J=1,NG,2
117 IF(FPD(J).LT.0) FPD(J)=-.593/ FPD(J)
   WRITE(KROT) LCAD(LB), (FPD(J),J=1,NGP)
118 CALL CRAMIN(V,N,W)
   IF(N.EQ.0) GO TO 12
   IF(N.NE.-2) CALL ERR(3)
   GO TO 100
200 ND=ND+1
   CALL IDNUM(LCD(ND),LDUM1,LDUM2,V,N,W)
   IF(N.EQ.0) GO TO 12
   IF(N.NE.-2) CALL ERR(3)
   GO TO 200
299 CALL CRAMIN(V,N,W)
   FNO=W(1)

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RETAP 02635
RETAP 02636
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RETAP 02682
RETAP 02683
RETAP 02684

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300 IF(NIN.EQ.0) GO TO 310	RETAP	02685
C READ FROM TAPE	RETAP	02686
READ(NIN) FI,JF,LA,MUM	RETAP	02687
READ(NIN) (LCBD(J),LBD(J,1),LBD(J,2),NOGT(J),NOAT(J),NOBT(J),	RETAP	02688
10CT(J),OOT(J),OET(J),OFT(J), J=1,LA)	RETAP	02689
310 CALL DEL	RETAP	02690
CALL ORDR	RETAP	02691
CALL DOUBLE(JF)	RETAP	02692
IF(NOUT.LE.0) RETURN	RETAP	02693
C WRITE ON NOUT	RETAP	02694
REWIND KRDT	RETAP	02695
WRITE(NOUT) FI,JF,LB,NGRP	RETAP	02696
WRITE(NOUT) (LCAO(K),LAO(K,1),LAO(K,2),NOG(K),NOA(K),NOB(K),OC(K),	RETAP	02697
100(K),OE(K),OF(K), K=1,LB)	RETAP	02698
NW=0	RETAP	02699
NWT=0	RETAP	02700
DO 400 KU=1,LB	RETAP	02701
IF(NOA(KU).EQ.0.AND. NOB(KU).EQ.0) GO TO 400	RETAP	02702
NGP=NGRP+ 2*NOB(KU)	RETAP	02703
C COPY FROM SCRATCH	RETAP	02704
IF(LWO(KU).EQ.0) GO TO 450	RETAP	02705
NXT=LWO(KU)	RETAP	02706
CALL POST(NW,NXT,7)	RETAP	02707
NW=NXT	RETAP	02708
NPX=MAX0(2,NOA(KU))	RETAP	02709
IF(NOA(KU).EQ.0) GO TO 430	RETAP	02710
READ(KRDT) ID,(FPID(J),FPY(J),J=1,NPX)	RETAP	02711
WRITE(NOUT) ID,(FPID(J),FPY(J),J=1,NPX)	RETAP	02712
IF(NOB(KU).EQ.0) GO TO 400	RETAP	02713
430 READ(KRDT) ID,(FPD(J),J=1,NGP)	RETAP	02714
WRITE(NOUT) ID,(FPD(J),J=1,NGP)	RETAP	02715
GO TO 400	RETAP	02716
C COPY FROM NIN	RETAP	02717
450 NWT=NWT+1	RETAP	02718
IF(NOAT(NWT).EQ.0.AND. NOBT(NWT).EQ.0) GO TO 450	RETAP	02719
NPX=MAX0(2,NOAT(NWT))	RETAP	02720
IF(NOAT(NWT).NE.0) READ(NIN) ID,(FPID(J),FPY(J),J=1,NPX)	RETAP	02721
IF(NOBT(NWT).NE.0) READ(NIN) IDD,(FPD(J),J=1,NGP)	RETAP	02722
IF(ID.NE.LCAO(KU)) GO TO 450	RETAP	02723
IF(NOAT(NWT).NE.0) WRITE(NOUT) ID,(FPID(J),FPY(J),J=1,NPX)	RETAP	02724
IF(NOBT(NWT).NE.0) WRITE(NOUT) IDD,(FPD(J),J=1,NGP)	RETAP	02725
400 CONTINUE	RETAP	02726
CALL PRF7	RETAP	02727
GO TO 2	RETAP	02728
END	RETAP	02729

C	SUBROUTINE CPY7	RETAP	02730
C	COPY FILE SEVEN FROM TAPE NIN TO TAPE NOUT	RETAP	02731
C	COMMON/RED/V,N,W	RETAP	02732
	COMMON/MIS/ NPAR, ICHAR, IWOD, MUM	RETAP	02733
	COMMON/FILES/TYPE, FNO, FI, JF, NGRP, NHED, NGRPT	RETAP	02734
	COMMON/TAPES/NIN, NOUT, KROT, INP, NPR	RETAP	02735
	COMMON LCAO(100), LAO(100,2), LWO(100), NPO(100,10), LB, LCAO(100),	RETAP	02736
	1LAO(100,2), LW(100), NPK(100,10), LCB(100), LBD(100,2), NPT(100,10),	RETAP	02737
	2LA, LCD(100),	RETAP	02738
	3ND, FPID(50), FPY(50), FPD(140)	RETAP	02739
	INTEGER FPID	RETAP	02740
	DIMENSION NOA(100), NOB(100), OC(100), OD(100), OE(100), OF(100),	RETAP	02741
	1NOG(100), NAK(100), NBK(100), CK(100), DK(100), EK(100), FK(100),	RETAP	02742
	2NGK(100), NOAT(100), NOBT(100), OCT(100), ODT(100), OET(100), OFT(100),	RETAP	02743
	3NOGT(100)	RETAP	02744
	EQUIVALENCE (NOA(1), NPO(1,1)), (NOB(1), NPO(1,2)), (OC(1), NPO(1,3)),	RETAP	02745
	1(OD(1), NPO(1,4)), (OE(1), NPO(1,5)), (OF(1), NPO(1,6)), (NOG(1), NPO(1,7	RETAP	02746
	2)), (NAK(1), NPK(1,1)), (NBK(1), NPK(1,2)), (CK(1), NPK(1,3)), (DK(1),	RETAP	02747
	3NPK(1,4)), (EK(1), NPK(1,5)), (FK(1), NPK(1,6)), (NGK(1), NPK(1,7)),	RETAP	02748
	4(NOAT(1), NPT(1,1)), (NOBT(1), NPT(1,2)), (OCT(1), NPT(1,3)), (ODT(1),	RETAP	02749
	5NPT(1,4)), (OET(1), NPT(1,5)), (OFT(1), NPT(1,6)), (NOGT(1), NPT(1,7))	RETAP	02750
	DIMENSION W(18)	RETAP	02751
	EQUIVALENCE (V, IV), (IW, W(1))	RETAP	02752
	MUM=0	RETAP	02753
	READ(NIN) FJ, JF, NNU, MUM	RETAP	02754
	WRITE(NOUT) FJ, JF, NNU, MUM	RETAP	02755
	READ(NIN) (LCAO(I), LAO(I,1), LAO(I,2), NOG(I), NOA(I), NOB(I), OC(I),	RETAP	02756
	100(I), OE(I), OF(I), I=1, NNU)	RETAP	02757
	WRITE(NOUT) (LCAO(I), LAO(I,1), LAO(I,2), NOG(I), NOA(I), NOB(I), OC(I),	RETAP	02758
	100(I), OE(I), OF(I), I=1, NNU)	RETAP	02759
	LB=NNU	RETAP	02760
	DO 100 KK=1, NNU	RETAP	02761
	IF(NOAK(KK).EQ.0.) GO TO 99	RETAP	02762
	NFP=MAXD(NOAK(KK), 2)	RETAP	02763
	READ(NIN) LCAO(KK), (FPID(I), FPY(I), I=1, NFP)	RETAP	02764
	WRITE(NOUT) LCAO(KK), (FPID(I), FPY(I), I=1, NFP)	RETAP	02765
99	IF(NOB(KK).EQ.0) GO TO 100	RETAP	02766
	NGP=NGRP+ 2*NOB(KK)	RETAP	02767
	READ(NIN) LCAO(KK), (FPD(I), I=1, NGP)	RETAP	02768
	WRITE(NOUT) LCAO(KK), (FPD(I), I=1, NGP)	RETAP	02769
100	CONTINUE	RETAP	02770
	CALL PRF7	RETAP	02771
	RETURN	RETAP	02772
	END	RETAP	02773
		RETAP	02774
		RETAP	02775

C	SUBROUTINE PRF7	RETAP	02776
C	PRINT FILE SEVEN INFORMATION	RETAP	02777
C	COMMON/RED/V,N,W	RETAP	02778
	COMMON/MIS/ NPAR, ICHAR, IWOD, MUM	RETAP	02779
	COMMON/FILES/TYPE,FNO,FI,JF,NGRP,NHED,NGRPT	RETAP	02780
	COMMON/TAPES/NIN,NOU,KROT,INP,NPR	RETAP	02781
	COMMON LCAO(100),LAO(100,2),LWO(100),NPO(100,10),LB,LCAD(100),	RETAP	02782
	1LAD(100,2),LW(100),NPK(100,10),LCBD(100),LBD(100,2),NPT(100,10),	RETAP	02783
	2LA, LCD(100),	RETAP	02784
	3ND,FPID(50),FPY(50),FPD(140)	RETAP	02785
	INTEGER FPID	RETAP	02786
	DIMENSION NOA(100),NOB(100),OC(100),OD(100),OE(100),OF(100),	RETAP	02787
	1NOG(100), NAK(100),NBK(100),CK(100),OK(100),EK(100),FK(100),	RETAP	02788
	2NGK(100), NOAT(100),NOBT(100),OCT(100),OOT(100),OET(100),OFT(100),	RETAP	02789
	3NOGT(100)	RETAP	02790
	EQUIVALENCE (NOA(1),NPO(1,1)),(NOB(1),NPO(1,2)),(OC(1),NPO(1,3)),	RETAP	02791
	1(OD(1),NPO(1,4)),(OE(1),NPO(1,5)),(OF(1),NPO(1,6)),(NOG(1),NPO(1,7	RETAP	02792
	2)), (NAK(1),NPK(1,1)),(NBK(1),NPK(1,2)),(CK(1),NPK(1,3)),(OK(1),	RETAP	02793
	3NPK(1,4)),(EK(1),NPK(1,5)),(FK(1),NPK(1,6)),(NGK(1),NPK(1,7)),	RETAP	02794
	4(NOAT(1),NPT(1,1)),(NOBT(1),NPT(1,2)),(OCT(1),NPT(1,3)),(OOT(1),	RETAP	02795
	5NPT(1,4)),(OET(1),NPT(1,5)),(OFT(1),NPT(1,6)),(NOGT(1),NPT(1,7))	RETAP	02796
	DIMENSION W(18),NOYES(2),IFORM(11),IFF(11)	RETAP	02797
	EQUIVALENCE (V,IV), (IW,W(1))	RETAP	02798
	DATA NOYES/4HNO ,4HYES /,NONE/4HNONE/,IA/4HA /,II/4HI /	RETAP	02799
	DATA IFORM/4H(12X,4HA4,A,4H2,7X,4H,A4,,4H7X,I,4H4,11,4HX,I4,	RETAP	02800
	1 4H,6X,,4H4(E1,4H2.5,,4H5X)) /	RETAP	02801
	CALL FORM (44,IFORM,IFF)	RETAP	02802
	CALL LPINT(IA,1,IAA)	RETAP	02803
	CALL LPINT(II,1,III)	RETAP	02804
	WRITE(NPR,2)	RETAP	02805
	2 FORMAT(1H1,/))	RETAP	02806
	WRITE(NPR,3)	RETAP	02807
	3 FORMAT(44X,35H*** FILE SEVEN ***///,53X,19H(DEPL	RETAP	02808
	1ETION DATA)////)	RETAP	02809
	NSTR=1	RETAP	02810
	NRND=(LB/25)	RETAP	02811
	ICK=NRND*25-LB	RETAP	02812
	IF(ICK.NE.0) NRND=NRND+1	RETAP	02813
	DO 100 K=1,NRND	RETAP	02814
	WRITE(NPR,4)	RETAP	02815
	4 FORMAT(11X,7HNUCLIDE,5X,7HFISSILE,4X,7HFISSION,4X,15HDELAYED NEUTR	RETAP	02816
	1ON,5X,5HDECAY,13X,4HMASS, 9X,11HMEV/CAPTURE, 6X,11HMEV/FISSION,/	RETAP	02817
	2 34X,8HPRODUCTS,6X,10HPERCURSORS,6X,8HCONSTANT /)	RETAP	02818
	NSP=NSTR+24	RETAP	02819
	NSTP=MIN0(NSP,LB)	RETAP	02820
	DO 50 I=NSTR,NSTP	RETAP	02821
	IF(NOAI(I).NE.0) GO TO 20	RETAP	02822
	NOA(I)=NONE	RETAP	02823
		RETAP	02824
		RETAP	02825

CALL INTALP(IFF(1),20,IAA)	RETAP	02826
GO TO 21	RETAP	02827
20 CALL INTALP(IFF(1),20,III)	RETAP	02828
21 IF(NO9(I).NE.0) GO TO 30	RETAP	02829
NOB(I)=NONE	RFTAP	02830
CALL INTALP(IFF(1),27,IAA)	RETAP	02831
GO TO 31	RETAP	02832
30 CALL INTALP(IFF(1),27,III)	RETAP	02833
31 NO=NOG(I)+1	RETAP	02834
IF (NOA(I).EQ.NONE .AND.OF(I).EQ.0) GO TO 40	RETAP	02835
WRITE(NPR,IFF) (LAO(I,1),LAO(I,2),NOYES(NO),NOA(I),NOB(I),OC(I),	RETAP	02836
100(I),OE(I),OF(I))	RETAP	02837
GO TO 50	RETAP	02838
40 WRITE(NPR,IFF) (LAO(I,1),LAO(I,2),NOYES(NO),NOA(I),NOB(I),OC(I),	RETAP	02839
100(I),OE(I))	RETAP	02840
50 CONTINUE	RETAP	02841
WRITE(NPR,2)	RETAP	02842
NSTR=NSTR+25	RETAP	02843
100 CONTINUE	RETAP	02844
RETURN	RETAP	02845
END	RFTAP	02846

OVERLAY (RETAP,10,0)	RETAP	02847
PROGRAM EDIT	RETAP	02848
COMMON/FILES/TYPE,FNO,FI,JF,NGRP,NHED,NALL	RETAP	02849
COMMON/TAPES/NIN,NOUT,KROT,INP,NPR,NPRO	RETAP	02850
EQUIVALENCE (V,IV),(IW,W(1))	RETAP	02851
DIMENSION W(18)	RETAP	02852
REWIND NOUT	RETAP	02853
NIN=NOUT	RETAP	02854
NALL=0	RETAP	02855
C THIS SUBROUTINE EDITS(NTAPE) IN THREE WAYS. ONE, IT CAN EDIT THE	RETAP	02856
C ENTIRE TAPE; OR, TWO, IT CAN EDIT THE FILES FOR SPECIFIED	RETAP	02857
C NUCLIDES; OR, THREE, IT CAN GIVE A CONTENTS BY NUCLIDES FOR EACH	RETAP	02858
C FILE.	RETAP	02859
C THE EDIT PROGRAM WILL EDIT TAPE ONE IF AN EDIT ONLY IS BEING DONE	RETAP	02860
C OR WILL EDIT TAPE TWO IF EITHER AN UPDATE OR CREATION HAS BEEN	RETAP	02861
C DONE.	RETAP	02862
C CONTENTS WILL GIVE A TABLE OF CONTENTS FOR FILES THREE THRU FIVE	RETAP	02863
C AND SEVEN.	RETAP	02864
C	RETAP	02865
50 CONTINUE	RETAP	02866
IF(NOUT.LE.0) RETURN	RETAP	02867
10 CALL CRAMIN(V,N,W)	RETAP	02868
TYPE=W(1)	RETAP	02869
CALL SCAN1(38HFINIS*FILE*CONTENTS*EDIT*NOCARD*CARD**,TYPE,M)	RETAP	02870
GO TO (100,200,300,100,13,14,201),M	RETAP	02871
13 NPRO=0	RETAP	02872
GO TO 10	RETAP	02873
14 NPRO=NPR	RETAP	02874
GO TO 10	RETAP	02875
400 CALL ERR(2)	RETAP	02876
C EDIT ALL THE FILES FOR ALL THE NUCLIDES	RETAP	02877
100 NALL=1	RETAP	02878
CALL EDONE	RETAP	02879
CALL EDTWO	RETAP	02880
CALL EDTHE	RETAP	02881
CALL EDFOR	RETAP	02882
CALL EDFIV	RETAP	02883
CALL EDSIX	RETAP	02884
CALL EDSVN	RETAP	02885
IF(M.EQ.4) GO TO 50	RETAP	02886
GO TO 700	RETAP	02887
C EDIT EACH FILE FOR THE NUCLIDES GIVEN	RETAP	02888
200 CALL CRAMIN(V,N,W)	RETAP	02889
201 FNO=W(1)	RETAP	02890
CALL SCAN1(38HONE*TWO*THREE*FOUR*FIVE*SIX*SEVEN**,FNO,M)	RETAP	02891
GO TO(210,220,230,240,250,260,280,400),M	RETAP	02892
210 CALL EDONE	RETAP	02893
GO TO 270	RETAP	02894
220 CALL EDTWO	RETAP	02895
	RETAP	02896

GO TO 270	RETAP	02897
230 CALL EDTHE	RETAP	02898
GO TO 270	RETAP	02899
240 CALL EDFOR	RETAP	02900
GO TO 270	RETAP	02901
250 CALL EDFIV	RETAP	02902
GO TO 270	RETAP	02903
260 CALL EDSIX	RETAP	02904
GO TO 270	RETAP	02905
280 CALL EDSVN	RETAP	02906
270 CALL SCAN1(60HFILE*CONTENTS*FINIS*EDIT*ONE*TWO*THREE*FOUR*FIVE*SIX	RETAP	02907
1*SEVEN**,TYPE,M)	RETAP	02908
GO TO(200,300,700,50,210,220,230,240,250,260,280,400),M	RETAP	02909
C EDIT ALL FILES FOR INFORMATION CONCERNING LISTED NUCLIDES	RETAP	02910
300 REWIND NOUT	RETAP	02911
CALL COED	RETAP	02912
CALL CRAMIN(V,N,W)	RETAP	02913
TYPE=W(1)	RETAP	02914
CALL SCAN1(17HFILE*FINIS*EDIT**,TYPE,M)	RETAP	02915
GO TO(200,700,50,400),M	RETAP	02916
C A FINIS WORD HAS BEEN ENCOUNTERED - STOP	RETAP	02917
700 WRITE(NPR,3)	RETAP	02918
3 FORMAT(1H1,5(/),58X,21H*** EDIT COMPLETE ***)	RETAP	02919
STOP	RETAP	02920
END	RETAP	02921

```

      SUBROUTINE EDLIST(LL,LIST,LAD)
      COMMON/RFO/V,N,W
      DIMENSION W(18)
C READ IN THE EDIT LIST
      DIMENSION LIST(100), LAD(100,2)
      COMMON/FILES/TYPE,FNO,FI,JF,NGRP,NHED,NALL
      LL=0
10    LL=LL+1
      CALL IONUM (LIST(LL),LAD(LL,1),LAD(LL,2),V,N,W)
      IF(LIST(LL).EQ.0) LL=LL-1
      NN=N+4
      GO TO (15,10,15,20,15,15),NN
15    CALL GRAMIN(V,N,W)
      IF(N.NE.0) GO TO 15
20    CONTINUE
      TYPE=W(1)
      RETURN
      FNO

```

```

RETAP 02922
RETAP 02923
RETAP 02924
RETAP 02925
RETAP 02926
RETAP 02927
RETAP 02928
RETAP 02929
RETAP 02930
RETAP 02931
RETAP 02932
RETAP 02933
RETAP 02934
RETAP 02935
RETAP 02936
RETAP 02937
RETAP 02938
RETAP 02939

```

```

SUBROUTINE CKLIST(LL,LAD,NFO,LFD,NNFD,LNF)
C PREPARE THE NOT FOUND LIST
  DIMENSION LAD(100,2), LFD(100), LNF(100,2)
  NNFD=0
  DO 110 K=1,LL
    IF(NFO.EQ.0) GO TO 106
    DO 105 J=1,NFO
      IF(K.EQ.LFD(J))GO TO 110
105  CONTINUE
106  CONTINUE
      NNFD=NNFD+1
      LNF(NNFD,1)=LAD(K,1)
      LNF(NNFD,2)=LAD(K,2)
110  CONTINUE
      RETURN
      END

```

```

RETAP 02940
RETAP 02941
RETAP 02942
RETAP 02943
RETAP 02944
RETAP 02945
RETAP 02946
RETAP 02947
RETAP 02948
RETAP 02949
RETAP 02950
RETAP 02951
RETAP 02952
RETAP 02953
RETAP 02954
RETAP 02955

```

SUBROUTINE EDONE	RETAP	02956
COMMON /TAPES/NIN,NOUT,KROT,INP,NPR	RETAP	02957
COMMON/FILES/TYPE,FNO,FI,JF,NGRP,NHED,NALL	RETAP	02958
COMMON/MIS/ NPAR,ICHAR,IWOD,MUM	RETAP	02959
COMMON LCAO(100),LAO(100,2),LWO(100),NPO(100,10),LB,LCAD(100),	RETAP	02960
1LAO(100,2),LW(100),NPK(100,10),LCBD(100),LBD(100,2),NPT(100,10),	RETAP	02961
2LA, LCD(100),	RETAP	02962
3ND,	RETAP	02963
4IOT(10),IHED(18,615),EGRP(100),IF1,IF2,IF3,IF4	RETAP	02964
DIMENSION W(18)	RETAP	02965
EQUIVALENCE (V,IV),(IW,W(1))	RETAP	02966
JF=1	RETAP	02967
REWIND NOUT	RETAP	02968
CALL RTF1	RETAP	02969
CALL PRF1	RETAP	02970
MUM=0	RETAP	02971
CALL REOF(NIN)	RETAP	02972
IF(NALL.NE.0) RETURN	RETAP	02973
CALL GRAMIN(V,N,W)	RETAP	02974
TYPE=W(1)	RETAP	02975
RETURN	RETAP	02976
END	RETAP	02977

SUBROUTINE PRF1	RETAP	02978
COMMON LCAO(100), LAO(100,2), LWO(100), NPO(100,10), LB, LCAD(100),	RETAP	02979
1LAD(100,2), LW(100), NPK(100,10), LCBD(100), LBD(100,2), NPT(100,10),	RETAP	02980
2LA, LCD(100),	RETAP	02981
3ND,	RETAP	02982
4 IOT(10), IHED(18,615), EGRP(100), IF1, IF2, IF3, IF4	RETAP	02983
DIMENSION IFA(4), IFB(4)	RETAP	02984
DIMENSION IDTJR(3)	RETAP	02985
COMMON /TAPES/NIN, NOUT, KRDT, INP, NPR	RETAP	02986
COMMON/FILES/TYPE, FNO, FI, JF, NGRP, NHED, NGRPT	RETAP	02987
COMMON/MIS/ NPAR, ICHAR, IWOD, MUM, K1, K2, K3	RETAP	02988
DATA IFA /4H(1H, 4H, 23X, 4H, 07A, 4H10) /	RETAP	02989
CALL FORM(16, IFA, IFB)	RETAP	02990
CALL MASH(IWOD, NN1, NN2)	RETAP	02991
CALL INTALP(IFB(1), 10, NN1)	RETAP	02992
CALL INTALP(IFB(1), 11, NN2)	RETAP	02993
CALL MASH(ICHAR, ICH1, ICH2)	RETAP	02994
CALL INTALP(IFB(1), 13, ICH1)	RETAP	02995
CALL INTALP(IFB(1), 14, ICH2)	RETAP	02996
WRITE(NPR,2)	RETAP	02997
2 FORMAT(1H1,////,46X,26H*** F 1 L E O N E ****/,50X,19HGENERAL I	RETAP	02998
1NFORMATION,////,45X,30HTAPE IDENTIFICATION PARAMETERS)	RETAP	02999
WRITE(NPR,20) IDT(1)	RETAP	03000
20 FORMAT(1H0,23X,14HTAPE NUMBER IS,I4)	RETAP	03001
IDTJR(1)=IDT(2)/10000	RETAP	03002
IDTJR(2)=(IDT(2)-(IDTJR(1)*10000))/100	RETAP	03003
IDTJR(3)=IDT(2)-(IDTJR(1)*10000+IDTJR(2)*100)	RETAP	03004
WRITE(NPR,21) (IDTJR(I), I=1,3), IDT(2)	RETAP	03005
21 FORMAT(1H0,23X,22HCREATION DATE OF TAPE ,2(I2,1H/),I2,5X,1H(,	RETAP	03006
1 I6,1H)	RETAP	03007
WRITE(NPR,22) IDT(3)	RETAP	03008
22 FORMAT(1H0,23X,16HNUMBER OF GROUPS,I4)	RETAP	03009
WRITE(NPR,4)	RETAP	03010
4 FORMAT(///,52X,16HTAPE DESCRIPTION/)	RETAP	03011
DO 12 J=1,NHED	RETAP	03012
WRITE (NPR,IFB) (IHED(I,J), I=1,IWOD)	RETAP	03013
JME = 33 + J/45 * 45	RETAP	03014
IF (J.NE.33 .AND. J.NE.JME) GO TO 12	RETAP	03015
IF (J.EQ.NHED) GO TO 12	RETAP	03016
WRITE(NPR,6)	RETAP	03017
12 CONTINUE	RETAP	03018
6 FORMAT(1H1,////,48X,24HTAPE DESCRIPTION (COND.),////)	RETAP	03019
WRITE(NPR,23)	RETAP	03020
23 FORMAT(1H1,////,47X,28HMICROGROUP LOW ENERGY BOUNDS)	RETAP	03021
EMAX=EGRP(1)/1.E+6	RETAP	03022
WRITE(NPR,24) EMAX	RETAP	03023
24 FORMAT (1H0,43X,24HMAXIMUM NEUTRON ENERGY =,F7.2,4H MEV)	RETAP	03024
WRITE(NPR,26)	RETAP	03025
26 FORMAT(1H0,6X,6(13HGROUP ENERGY,8X))	RETAP	03026
KON = (NGRP+5)/6	RETAP	03027


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DO 111 IK=1,KON
MAX = IK + 5*KON
IF (MAX.GT.NGRP) MAX=MIN0(NGRP,IK+4*KON)
WRITE(NPR,25) (K,EGRP(K+1), K=IK,MAX,KON)
111 CONTINUE
25 FORMAT(1H0,6(6X,I3,2X,E10.4))
WRITE(NPR,8)
8 FORMAT(1H1)
RETURN
END

```

```

RETAP 03028
RETAP 03029
RETAP 03030
RETAP 03031
RETAP 03032
RETAP 03033
RETAP 03034
RETAP 03035
RETAP 03036
RETAP 03037

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C	SUBROUTINE RTF1	RETAP	03038
	READ FILE ONE FROM TAPE	RETAP	03039
	COMMON /TAPES/NIN,NOUT,KROT,INP,NPR	RETAP	03040
	COMMON/FILES/TYPE,FNO,FI,JF,NGRP,NHED,NGRPT	RETAP	03041
	COMMON/MIS/ NPAR,ICHAR,IWOD,MUM,K1,K2,K3	RETAP	03042
	COMMON LCAO(100),LAO(100,2),LWO(100),NPO(100,10),LB,LCAO(100),	RETAP	03043
	1LAD(100,2),LW(100),NPK(100,10),LCBD(100),LBD(100,2),NPT(100,10),	RETAP	03044
	2LA, LCD(100),	RETAP	03045
	3NO,	RETAP	03046
	4IDT(10),IHED(18,615),ESRP(100),IF1,IF2,IF3,IF4	RETAP	03047
	READ(NIN) IDF,IDN,NHED,NGRP	RETAP	03048
	READ(NIN) (IDT(I),I=1,10), ((IHED(I,J),I=1,IWOD),J=1,NHED)	RETAP	03049
	NGR=NGRP+1	RETAP	03050
	READ(NIN) (ESRP(I),I=1,NGR)	RETAP	03051
	RETURN	RETAP	03052
	END	RETAP	03053

SUBROUTINE EDTWO	RETAP	03054
COMMON/RED/ V,N,W	RETAP	03055
COMMON /TAPES/NIN,NOUT,KROD,INP,NPR	RETAP	03056
COMMON/FILES/TYPE,FNO,FI,JF,NGRP,NHED,NALL	RETAP	03057
COMMON LID(100,2),LCHAIN(100),NOC(100),NCID(40),MDC(40,40),	RETAP	03058
1AID(40,6),AD(6)	RETAP	03059
DIMENSION W(18)	RETAP	03060
DIMENSION LFD(100),LNF(100,2)	RETAP	03061
EQUIVALENCE (IV,V)	RETAP	03062
DIMENSION IFORM(4,3),IFRM(5,4),IFOR(12),IFR(20),IPT(40)	RETAP	03063
EQUIVALENCE (IFORM(1,1),IFOR(1)), (IFORM(1,1),IFR(1))	RETAP	03064
DATA IFOR /4HFISS,4HILE ,4H ,4H ,	RETAP	03065
1 4HNON-,4HFISS,4HIONA,4HBLE ,	RETAP	03066
2 4HFISS,4HIONA,4HBLE ,4H /	RETAP	03067
DATA IFR/ 4HFISS,4HION ,4H ,4H ,4H ,	RETAP	03068
1 4HCAPT,4HURE ,4H ,4H ,4H ,	RETAP	03069
2 4HRADI,4HOACT,4HIVE ,4HDECA,4HY ,	RETAP	03070
3 4HN,2N,4H ,4H ,4H ,4H /	RETAP	03071
JF=2	RETAP	03072
NFO=0	RETAP	03073
LL=0	RETAP	03074
NTIME=0	RETAP	03075
IF(NALL.EQ.1) GO TO 21	RETAP	03076
C READ IN THE CHAIN IDIS TO BE EDITED IF NOT ALL OF FILE TWO	RETAP	03077
C IS WANTED.	RETAP	03078
10 CALL CRAMIN(V,N,W)	RETAP	03079
IF(N.EQ.0) GO TO 20	RETAP	03080
IF(N.NE.-1) CALL ERR(8)	RETAP	03081
LL=LL+1	RETAP	03082
LID(LL,1)=IV	RETAP	03083
GO TO 10	RETAP	03084
C SET TYPE EQUAL TO NEXT DIRECTIVE	RETAP	03085
20 TYPE=W(1)	RETAP	03086
21 CONTINUE	RETAP	03087
C READ IN TAPE UNTIL FILE TWO IS ENCOUNTERED	RETAP	03088
30 READ(NIN) FI,IF,NSC	RETAP	03089
IF(EOF,NIN) 60,35	RETAP	03090
35 IF(IF-JF) 40,50,60	RETAP	03091
40 CALL REOF(NIN)	RETAP	03092
GO TO 30	RETAP	03093
60 REWIND NIN	RETAP	03094
CALL REOF(NIN)	RETAP	03095
IF(NTIME.NE.0) GO TO 61	RETAP	03096
NTIME=1	RETAP	03097
GO TO 30	RETAP	03098
G1 WRITE (NPR,62)	RETAP	03099
62 FORMAT(1H1,20X,41H***FILE TWO COULD NOT BE FOUND ON TAPE***)	RETAP	03100
RETURN	RETAP	03101
C READ IN RECORD TWO	RETAP	03102
50 READ(NIN) (LCHAIN(I),NOC(I),DUM,I=1,NSC)	RETAP	03103

C	PRINT THE FIRST PAGE CONTAINING DESCRIPTION	RETAP	03104
	WRITE(NPR,1)	RETAP	03105
1	FORMAT(1H1,////,49X,26H*** FILE TWO ***//,48X,28HNUCLEAR	RETAP	03106
	1 DEPLETION CHAIN DATA)	RETAP	03107
	DO 100 K=1,NSC	RETAP	03108
	NC=NOC(K)	RETAP	03109
C	READ IN NEXT CHAIN OR FIRST CHAIN	RETAP	03110
	READ(NIN) LCHAIN(K),(NCID(I),I=1,NC)	RETAP	03111
	READ(NIN) ((MDC(I,J),J=1,I),I=1,NC)	RETAP	03112
C	CHECK TO SEE IF THIS CHAIN IS TO BE EDITED	RETAP	03113
	IF(LL.EQ.0) GO TO 72	RETAP	03114
	DO 55 I=1,LL	RETAP	03115
	IF (LCHAIN(K) .EQ. LID(I,1)) GO TO 70	RETAP	03116
55	CONTINUE	RETAP	03117
	GO TO 100	RETAP	03118
C	CHANGE NCID TO AN ALPHA ARRAY FOR PRINTING PURPOSES	RETAP	03119
70	CONTINUE	RETAP	03120
	NFD=NFD+1	RETAP	03121
	LFD(NFD)=I	RETAP	03122
72	NUMB=0	RETAP	03123
	IPT(NC)=1	RETAP	03124
	NCC=NC-1	RETAP	03125
	DO 75 J=1,NCC	RETAP	03126
	II=J+1	RETAP	03127
	IPT(J)=1	RETAP	03128
	DO 75 I=II,NC	RETAP	03129
	IF(NCID(J).NE.NCID(I)) GO TO 75	RETAP	03130
	NUMB=NUMB+1	RETAP	03131
	IPT(J)=0	RETAP	03132
75	CONTINUE	RETAP	03133
	NUMB= NC-NUMB	RETAP	03134
	WRITE(NPR,3) LCHAIN(K),NUMB	RETAP	03135
3	FORMAT(////,50X,5H*** ,10HCHAIN ID =,I4,5H ***//,52X,8HCONTAINS,	RETAP	03136
1	I3,9H ISOTOPES ///	RETAP	03137
	IPG=11	RETAP	03138
	DO 80 J=1,NC	RETAP	03139
	IF(IPT(J).EQ.0) GO TO 80	RETAP	03140
	CALL COVRT(NCID(J),AD)	RETAP	03141
	NUMB=MDC(J,J) +2	RETAP	03142
	WRITE(NPR,6) AD, (IFORM(I,NUMB),I=1,4)	RETAP	03143
6	FORMAT (/32X,1H*,6A1,1H*,12X,4A4)	RETAP	03144
	IPG=IPG+2	RETAP	03145
	IF(IPG.LT.55) GO TO 71	RETAP	03146
	IPG=0	RETAP	03147
	WRITE(NPR,5)	RETAP	03148
71	CONTINUE	RETAP	03149
	IF(J.EQ.1) GO TO 79	RETAP	03150
	JJ=J-1	RETAP	03151
	IFLAG=0	RETAP	03152
	DO 75 I=1,JJ	RETAP	03153

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      IF(MDC(J,I).EQ.0) GO TO 76
      IF(IFLAG.EQ.0) WRITE(NPR,7)
7   FORMAT(1H+,77X,6HPARENT,5X,13HREACTION TYPE)
      IFLAG=1
      CALL COVRT(NCID(I),AD)
      NN=MDC(J,I)
      WRITE(NPR,8)  AD, (IFRM(II,NN),II=1,5)
      IPG=IPG+1
      IF(IPG.LT.55) GO TO 78
      IPG=0
      WRITE(NPR,5)
78  CONTINUE
      8  FORMAT( 78X,6A1,5X, 5A4)
76  CONTINUE
      IF(IFLAG.NE.0) GO TO 80
79  WRITE(NPR,9)
      9  FORMAT(1H+,77X,10HNO PARENTS)
80  CONTINUE
      WRITE(NPR,5)
      5  FORMAT(1H1)
100 CONTINUE
      IF(NFD.GE.LL) GO TO 200
      CALL CKLIST(LL,LID,NFD,LFD,NNFD,LNF)
      WRITE(NPR,105) (LNF(I,1), I=1,NNFD)
105  FORMAT (//20X6HCHAIN ,I2,20H  COULD NOT BE FOUND)
200 CONTINUE
      NFD=0
      CALL REOF(NOUT)
      RETURN
      END

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RETAP 03154
RETAP 03155
RETAP 03156
RETAP 03157
RETAP 03158
RETAP 03159
RETAP 03160
RETAP 03161
RETAP 03162
RETAP 03163
RETAP 03164
RETAP 03165
RETAP 03166
RETAP 03167
RETAP 03168
RETAP 03169
RETAP 03170
RETAP 03171
RETAP 03172
RETAP 03173
RETAP 03174
RETAP 03175
RETAP 03176
RETAP 03177
RETAP 03178
RETAP 03179
RETAP 03180
RETAP 03181
RETAP 03182
RETAP 03183

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SUBROUTINE EDTHE	RETAP	03184
COMMON LID(100),LAD(100,2),IDR(100),LDR(100,2),NPKS(100),	RETAP	03185
1NECOR(100),NECORF(100),AMAS(100),SL(100),EZERO(300),AJ(300),	RETAP	03186
2GAMN(300),GAMG(300),GAMF(300),ABN(300),ECORA(10),ECORB(10),	RETAP	03187
3RCAP(10),RFIF(10),LNF(100,2),LFD(100)	RETAP	03188
COMMON /TAPES/NIN,NOUT,KROT,INP,NPR	RETAP	03189
COMMON/FILES/TYPE,FNO,FI,JF,NGRP,NHED,NALL	RETAP	03190
EQUIVALENCE (NECORF(1),NECOF(1)),(RFIS(1),RFIF(1))	RETAP	03191
DIMENSION RFIS(10),NECOF(100)	RETAP	03192
DIMENSION W(18)	RETAP	03193
JF=3	RETAP	03194
NFO=0	RETAP	03195
NTIME=0	RETAP	03196
LL=0	RETAP	03197
IF(NALL.EQ.0) CALL EDLIST(LL,LID,LAD)	RETAP	03198
READ IN FILE THREE	RETAP	03199
30 WRITE(NPR,1)	RETAP	03200
ICKT=14	RETAP	03201
31 READ(NOUT) FI,IF,NRRN	RETAP	03202
IF (EOF,NOUT) 60,35	RETAP	03203
35 IF (IF-JF) 40,50,60	RETAP	03204
40 CALL REOF(NOUT)	RETAP	03205
GO TO 31	RETAP	03206
60 REWIND NOUT	RETAP	03207
CALL REOF(NOUT)	RETAP	03208
CALL REOF(NOUT)	RETAP	03209
IF(NTIME.NE.0) GO TO 61	RETAP	03210
NTIME=2	RETAP	03211
GO TO 31	RETAP	03212
61 WRITE (NPR,62)	RETAP	03213
62 FORMAT(1H1,20X,43H***FILE THREE COULD NOT BE FOUND ON TAPE***)	RETAP	03214
RETURN	RETAP	03215
C READ IN RECORD TWO	RETAP	03216
50 READ(NOUT) (IDR(I),LDR(I,1),LDR(I,2),NPKS(I),NECOR(I),NECORF(I),	RETAP	03217
1AMAS(I),SL(I), I=1,NRRN)	RETAP	03218
C READ IN RECORD THREE AND CHECK FOR EDIT	RETAP	03219
DO 100 K=1,NRRN	RETAP	03220
IF(LL.EQ.0) GO TO 70	RETAP	03221
DO 55 I=1,LL	RETAP	03222
IF(IDR(K).EQ.LID(I))GO TO 70	RETAP	03223
55 CONTINUE	RETAP	03224
IF(NPKS(K).NE.0) READ(NOUT)	RETAP	03225
GO TO 100	RETAP	03226
70 NFO=NFO+1	RETAP	03227
LFO(NFO)=I	RETAP	03228
IF(NPKS(K).NE.0) GO TO 71	RETAP	03229
WRITE(NPR,2) LDR(K,1),LDR(K,2),AMAS(K),SL(K)	RETAP	03230
ICKT= ICKT+2	RETAP	03231
IF(ICKT,GE.50) 300,100	RETAP	03232
300 WRITE(NPR,400)	RETAP	03233

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      ICKT=0
      GO TO 100
71  CONTINUE
      N1=2+6*NPKS(K)+2*(NECOR(K)+NECORF(K))
      N2=2+6*NPKS(K)
      READ(NOUT) ID, (EZERO(I), I=1, N1)
      ICKT=ICKT+6
      IF(ICKT.GE.50) 301,302
301  WRITE(NPR,400)
      ICKT=6
302  CONTINUE
      WRITE(NPR,3) LDR(K,1),LDR(K,2),AMAS(K), SL(K),EZERO(1)
      WRITE(NPR,201)EZERO(2),NECOR(K),NECORF(K)
      WRITE(NPR,202)NPKS(K)
      NPKSE=NPKS(K)
      JJJ=2
      DO 205 J=1,NPKSE
      ICKT=ICKT+1
      IF(ICKT.GE.51)303,304
303  WRITE(NPR,401)
      ICKT=0
304  CONTINUE
      JJ=JJJ+1
      JJJ=JJ+5
205  WRITE(NPR,203)J, (EZERO(I), I=JJ, JJJ)
      N3=N2+2*NECOR(K)
      IFA=0
      IF(NECOR(K).EQ.0) GO TO 72
      N2=N2+1
      ICK=ICKT+9+NECOR(K)/2
      IF(ICK.LT.51) GO TO 206
      WRITE(NPR,400)
      ICK=0
206  ICKT=ICK
      IFA=1
      WRITE(NPR,8)
      WRITE(NPR,6) (EZERO(I), I=N2, N3)
72  CONTINUE
      IF(NECORF(K).EQ.0) GO TO 100
      N3=N3+1
      ICK=ICKT+8+NECORF(K)/2
      IF(ICK.LT.51) GO TO 207
      WRITE(NPR,400)
      ICK=0
207  ICKT=ICK
      IF(IFA.NE.0) WRITE(NPR,0)
      WRITE(NPR,7) (EZERO(I), I=N3, N1)
100  CONTINUE
      WRITE(NPR,400)
C    CHECK NUCLIDES NOT FOUND

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RETAP 03234
RETAP 03235
RETAP 03236
RETAP 03237
RETAP 03238
RETAP 03239
RETAP 03240
RETAP 03241
RETAP 03242
RETAP 03243
RETAP 03244
RETAP 03245
RETAP 03246
RETAP 03247
RETAP 03248
RETAP 03249
RETAP 03250
RETAP 03251
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RETAP 03279
RETAP 03280
RETAP 03281
RETAP 03282
RETAP 03283

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IF(NFD,GE,LL) GO TO 200	RETAP	03284
CALL CKLIST(LL,LAD,NFD,LFD,NNFD,LNF)	RETAP	03285
IF(NNFD,GT,1) GO TO 120	RETAP	03286
WRITE(NPR,4) LNF(1,1), LNF(1,2)	RETAP	03287
GO TO 200	RETAP	03288
120 WRITE (NPR,5) (LNF(I,1),LNF(I,2), I=1,NNFD)	RETAP	03289
1 FORMAT(1H1,5(/),48X,30H*** F I L E T H R E E ***//51X,	RETAP	03290
123HRESOLVED RESONANCE DATA ///)	RETAP	03291
2 FORMAT(1H0,5X,3H** ,A4,A2,3H **,5X,14HATOMIC MASS = ,E12.5,5X,20HS	RETAP	03292
1CATTERING LENGTH = ,E12.5,5X,17HNO RESOLVED PEAKS)	RETAP	03293
3 FORMAT (1H0,5X,3H** ,A4,A2,3H **,5X,14HATOMIC MASS = ,E12.5,5X,20H	RETAP	03294
1SCATTERING LENGTH = ,E12.5,5X,15HNUCLEAR SPIN = ,E12.5)	RETAP	03295
201 FORMAT(1H0,22X,23HMEAN LEVEL SPACING D = ,E12.5,3X,32HCORRECTION P	RETAP	03296
XOINTS FOR CAPTURE = ,I3,3X,14HFOR FISSION = ,I3)	RETAP	03297
202 FORMAT(1H0,6X,I4,16H RESOLVED PEAKS: ,/,1H ,7X,4HPEAK,11X,6HENERGY,	RETAP	03298
X12X,1HJ,11X,7HGAMMA-N,11X,7HGAMMA-G,12X,7HGAMMA-F,11X,9HABUNDANCE)	RETAP	03299
203 FORMAT(1H ,7X,I3,8X,E12.5,7X,F5.2,4(7X,E12.5))	RETAP	03300
400 FORMAT(1H1)	RETAP	03301
401 FORMAT(1H1,7X,4HPEAK,11X,6HENERGY,12X,1HJ,11X,7HGAMMA-N,11X,7HGAMM	RETAP	03302
XA-G,12X,7HGAMMA-F,11X,9HABUNDANCE)	RETAP	03303
6 FORMAT(//25X,2(1HE,16X,7HCAPTURE,26X),/41X,9HX-SECTION, 40X,	RETAP	03304
1 9HX-SECTION/ (18X,E12.5,8X,E12.5,20X,E12.5,8X,E12.5))	RETAP	03305
7 FORMAT(//25X,2(1HE,16X,7HFISSION,26X),/41X,9HX-SECTION, 40X,	RETAP	03306
1 9HX-SECTION/ (18X,E12.5,8X,E12.5,20X,E12.5,8X,E12.5))	RETAP	03307
8 FORMAT(1H0,22X,38HBREIT-WIGNER POINT CORRECTIONS (STRIP) ,/)	RETAP	03308
4 FORMAT(20X,A4,A2,19H COULD NOT BE FOUND)	RETAP	03309
5 FORMAT(40X,47HTHESE NUCLIDES COULD NOT BE FOUND IN FILE THREE/10X,	RETAP	03310
110(4X,A4,A2))	RETAP	03311
200 CALL REOF(NOUT)	RETAP	03312
RETURN	RETAP	03313
END	RETAP	03314

SUBROUTINE EDFOR	RETAP	03315
DIMENSION W(18)	RETAP	03316
COMMON/FILES/TYPE,FNO,FI,JF,NGRP,NHED,NALL	RETAP	03317
COMMON /TAPES/NIN,NOUT,KRDT,INP,NPR	RETAP	03318
COMMON IDU(100),LID(100,2),NJS0(100),NJS1(100),ECUR(100), ECLR(100	RETAP	03319
1),M(100),N(100),R(100),AK(100),NRN(100),NEF(100),MU(100),BJ(100),G	RETAP	03320
1G(100),O(100),EFN(100),GNZ(100),EFF(100),GF(100)	RETAP	03321
DIMENSION IDL(100),IDA(100,2),LFD(100),LNF(100,2)	RETAP	03322
LINE=9	RETAP	03323
NFD=0	RETAP	03324
NLIST=0	RETAP	03325
IF(NALL.EQ.0) CALL EDLIST(NLIST,IDL,IDA)	RETAP	03326
NTIME=0	RETAP	03327
1 READ(NOUT) FJ,JF,NURN,MUM	RETAP	03328
IF (EOF,NOUT) 4,2	RETAP	03329
2 IF(JF-4) 3,10,4	RETAP	03330
3 CALL REOF(NOUT)	RETAP	03331
GO TO 1	RETAP	03332
4 REWIND NOUT	RETAP	03333
DO 9 J=1,3	RETAP	03334
9 CALL REOF(NOUT)	RETAP	03335
IF(NTIME.NE.0) GO TO 900	RETAP	03336
NTIME=1	RETAP	03337
GO TO 1	RETAP	03338
900 WRITE(NPR,101)	RETAP	03339
101 FORMAT (1H1,20X,42H***FILE FOUR COULD NOT BE FOUND ON TAPE***)	RETAP	03340
RETURN	RETAP	03341
10 CONTINUE	RETAP	03342
WRITE(NPR,110)	RETAP	03343
110 FORMAT(1H1///54X29H*** F I L E F O U R ***//56X25HUNRESOLVE	RETAP	03344
10 RESONANCE DATA ///)	RETAP	03345
READ(NOUT) (IDU(I),LID(I,1),LID(I,2),NJS0(I),NJS1(I),ECUR(I),	RETAP	03346
1ECLR(I),M(I), N(I),R(I), AK(I), I=1,NURN)	RETAP	03347
DO 500 KN=1,NURN	RETAP	03348
NR1=0	RETAP	03349
NR2=0	RETAP	03350
MJ=NJS0(KN)+NJS1(KN)	RETAP	03351
IF(MJ.EQ.0) GO TO 150	RETAP	03352
READ(NOUT) ID,(NRN(I),NEF(I),MU(I),BJ(I),GG(I),O(I),I=1,MJ)	RETAP	03353
150 CONTINUE	RETAP	03354
C CHECK PRINT LIST IF NALL=0	RETAP	03355
IF(NLIST.EQ.0) GO TO 170	RETAP	03356
DO 152 I=1,NLIST	RETAP	03357
IF(IDU(KN).EQ.IDL(I)) GO TO 170	RETAP	03358
152 CONTINUE	RETAP	03359
IF(MJ.EQ.0) GO TO 500	RETAP	03360
DO 155 I=1,MJ	RETAP	03361
READ(NOUT)	RETAP	03362
155 CONTINUE	RETAP	03363
GO TO 500	RETAP	03364

C PRINT FOR ONE NUCLIDE	RETAP	03365
170 CONTINUE	RETAP	03366
NFD=NFD+1	RETAP	03367
LFD(NFD)=I	RETAP	03368
IF(MJ.NE.0) GO TO 175	RETAP	03369
IF(LINE .LE. 55) GO TO 173	RETAP	03370
LINE=0	RETAP	03371
WRITE(NPR,172)	RETAP	03372
172 FORMAT(1H1)	RETAP	03373
173 CONTINUE	RETAP	03374
WRITE(NPR,171) LID(KN,1),LID(KN,2),R(KN)	RETAP	03375
171 FORMAT(10X,3H** ,A4,A2,3H **,19X,19HSCATTERING LENGTH =,E12.5,	RETAP	03376
114H, NO J-STATES //)	RETAP	03377
LINE = LINE+3	RETAP	03378
GO TO 500	RETAP	03379
175 CONTINUE	RETAP	03380
IF(LINE .LE. 55) GO TO 179	RETAP	03381
LINE=0	RETAP	03382
WRITE(NPR,172)	RETAP	03383
179 CONTINUE	RETAP	03384
WRITE(NPR,176) LID(KN,1),LID(KN,2),R(KN),AK(KN),ECUR(KN),ECLR(KN)	RETAP	03385
LINE=LINE+3	RETAP	03386
LL=0	RETAP	03387
NP=M(KN)	RETAP	03388
DO 201 JJ=1,MJ	RETAP	03389
NCG=NJS0(KN)+1	RETAP	03390
IF(JJ.NE.NCG) GO TO 177	RETAP	03391
LL=1	RETAP	03392
NP=N(KN)	RETAP	03393
177 CONTINUE	RETAP	03394
NR1=NRN(JJ)	RETAP	03395
NR2=NEF(JJ)	RETAP	03396
IF(NR2.EQ.0) GO TO 178	RETAP	03397
READ(NOUT) (EFN(I),GNZ(I),I=1,NR1),(EFF(J),GF(J),J=1,NR2)	RETAP	03398
GO TO 180	RETAP	03399
178 READ(NOUT) (EFN(I),GNZ(I),I=1,NR1)	RETAP	03400
180 CONTINUE	RETAP	03401
C PRINT FOR THIS STATE	RETAP	03402
ICKK =0	RETAP	03403
IF (JJ.EQ.MJ) ICKK=3	RETAP	03404
ICK =9+((NR1+1)/2) +ICKK	RETAP	03405
IF((LINE+ICK).LE.55) GO TO 181	RETAP	03406
WRITE(NPR,172)	RETAP	03407
LINE=0	RETAP	03408
181 CONTINUE	RETAP	03409
LINE=LINE+ICK	RETAP	03410
WRITE(NPR,195) JJ,LL,BJ(JJ),MU(JJ),NP,GG(JJ),D(JJ)	RETAP	03411
195 FORMAT(13X12,6H) STATE3X2HL=I1,3X2HJ=F4.2,5X19HENTRY CHANNELS MU =,	RETAP	03412
1I2,19X15HCALCULATION AT I2,7H POINTS/41X19HMEAN CAPTURE WIDTH=,	RETAP	03413
2E12.5,9X,20HMEAN LEVEL SPACING =,E12.5//)	RETAP	03414

WRITE(NPR,196) (EFN(I),GNZ(I),I=1,NR1)	RETAP	03415
IF(NR2.EQ.0) GO TO 200	RETAP	03416
ICK=(NR2+1)/2 +6	RETAP	03417
IF((LINE+ICK).LE.55) GO TO 185	RETAP	03418
WRITE(NPR,172)	RETAP	03419
LINE=0	RETAP	03420
185 CONTINUE	RETAP	03421
LINE=LINE+ICK	RETAP	03422
WRITE(NPR,197) (EFF(I),GF(I),I=1,NR2)	RETAP	03423
200 CONTINUE	RETAP	03424
WRITE(NPR,199)	RETAP	03425
199 FORMAT(//)	RETAP	03426
201 CONTINUE	RETAP	03427
WRITE(NPR,198)	RETAP	03428
198 FORMAT(///)	RETAP	03429
196 FORMAT(41X21HREDUCED NEUTRON WIDTH//27X2(17X6HENERGY12X5HWIDTH)/	RETAP	03430
1(41XE12.5,6XE12.5,10XE12.5,6XE12.5))	RETAP	03431
197 FORMAT(//41X18HMEAN FISSION WIDTH//27X2(17X6HENERGY12X5HWIDTH)/(41	RETAP	03432
1XE12.5,6XE12.5,10XE12.5,6XE12.5))	RETAP	03433
176 FORMAT(10X,3H** ,A4,A2,3H **,19X,20HSCATTERING LENGTH =,E12.5,8X,	RETAP	03434
120HPENETRATION CONST. =,E12.5,/41X,20HUPPER ENERGY BOUND =,E12.5,	RETAP	03435
28X,20HLOWER ENERGY BOUND =, E12.5/)	RETAP	03436
500 CONTINUE	RETAP	03437
WRITE(NPR,172)	RETAP	03438
IF(NFO .GE. NLIST) GO TO 600	RETAP	03439
CALL CKLIST(NLIST,IDA,NFO,LFO,NNFO,LNF)	RETAP	03440
IF(NNFO.LT.1) STOP 77	RETAP	03441
IF(NNFO.GT.1) GO TO 520	RETAP	03442
WRITE(NPR,504) LNF(1,1),LNF(1,2)	RETAP	03443
GO TO 600	RETAP	03444
520 WRITE(NPR,505) (LNF(I,1), LNF(I,2), I=1,NNFO)	RETAP	03445
504 FORMAT(5(/)20XA4,A2,43H COULD NOT BE FOUND IN AN EDIT OF FILE FOUR	RETAP	03446
1)	RETAP	03447
505 FORMAT(5(/)40X46HTHESE NUCLIDES COULD NOT BE FOUND IN FILE FOUR/10	RETAP	03448
1X10(4XA4,A2))	RETAP	03449
600 CALL REOF(NOUT)	RETAP	03450
RETURN	RETAP	03451
END	RETAP	03452

SUBROUTINE EDFIV	RETAP	03453
COMMON /TAPES/NIN,NOUT,KROT,INP,NPR	RETAP	03454
COMMON/FILES/TYPE,FNO,FI,JF,NGRP,NHED,NALL	RETAP	03455
COMMON/JEMS/ IBL,IZO,IS,IASTER,MINUS,IPLUS,LPARN	RETAP	03456
DIMENSION IXF(11,5),IMF(16,2),IXMF(16)	RETAP	03457
DATA IXF/4H(///,4H5XA4,4H,A2,,4H4X, ,4H 22H,4HCAPT,4HURE ,4HCROS,	RETAP	03458
1 4HS-SE,4HCTIO,4HN /),4H(///,4H5XA4,4H,A2,,4H4X21,4HMFIS,4HSION,	RETAP	03459
2 4H CRO,4HSS-S,4HECTI,4HON /,4H) ,4H(///,4H5XA4,4H,A2,,4H4X,1,	RETAP	03460
3 4H9HNO,4H.NEU,4HTRON,4HS/FI,4HSSIO,4HN /),4H ,4H(///,4H5X,A,	RETAP	03461
4 4H4,A2,4H,4X,,4H 1,4H7HN2,4HN CR,4HOSS-,4HSECT,4HION/,4H) ,	RETAP	03462
5 4H(///,4H5XA4,4H,A2,,4H4X25,4HH(N,,4HP + ,4HN,A),4H CRO,4HSS-S,	RETAP	03463
6 4HECTI,4HON//	RETAP	03464
DATA IMF/4H(///,4H5XA4,4H,A2,,4H4X16,4HHISO,4HTROP,4HIC M,4HATRI,	RETAP	03465
1 4HX/15,4HXI2,,4H13H ,4HDOON,4HSCAT,4HTERS,4H /),4H ,4H(///,	RETAP	03466
2 4H5XA4,4H,A2,,4H4X18,4HHANI,4HSOTR,4HOPIC,4H MAT,4HRIX/,4H15X,;	RETAP	03467
3 4HI2,1,4H3H D,4HOWN,4HCATT,4HERS/,4H) /	RETAP	03468
INTEGER DSF(16), DSXF(16)	RETAP	03469
DATA DSF /4H(25X,4H5HGR,4HOUP3,4H8X11,4HHDOW,4HNSCA,4HTTER,4H/25X,	RETAP	03470
1 4H5HI ,4H J1,4H0X1H,4HJ 1X,4H,4(1,4H3X,2,4HHJ+,4HI1)) /	RETAP	03471
COMMON LCAO(100),LAO(100,2),LWO(100),NPO(100,10),LB,LCAD(100),	RETAP	03472
1LAO(100,2),LW(100),NPK(100,10),LCBD(100),LBD(100,2),NPT(100,10),	RETAP	03473
2LA, LCD(100),	RETAP	03474
3ND,	RETAP	03475
4X(5200)	RETAP	03476
DIMENSION NOA(100),NOB(100),NOC(100),NOD(100),NOE(100),NAK(100),N	RETAP	03477
1BK(100),NCK(100),NOK(100),NEK(100),NOAT(100),NOBT(100),NOCT(100),N	RETAP	03478
2ODT(100),NOET(100),NOFT(100),NOGT(100),NOHT(100),NOI(100),NOF(100)	RETAP	03479
3,NOG(100),NOH(100),NFK(100),NGK(100),NHK(100),NOIT(100),NOJ(100)	RETAP	03480
DIMENSION Y(100,5)	RETAP	03481
EQUIVALENCE (Y(1,1),X(1000)),(NJK(1),NPK(1,10))	RETAP	03482
DIMENSION NIK(100),NJK(100)	RETAP	03483
DIMENSION W(18)	RETAP	03484
EQUIVALENCE (NOA(1),NPO(1,1)),(NOB(1),NPO(1,2)),(NOC(1),NPO(1,3)),	RETAP	03485
1(NOD(1),NPO(1,4)),(NOE(1),NPO(1,5)),(NAK(1),NPK(1,1)),(NBK(1),NPK(	RETAP	03486
21;2)),(NCK(1),NPK(1,3)),(NOK(1),NPK(1,4)),(NEK(1),NPK(1,5)),(NOAT(	RETAP	03487
31),NPT(1,1)),(NOBT(1),NPT(1,2)),(NOCT(1),NPT(1,3)),(NODT(1),NPT(1,	RETAP	03488
44)),(NOET(1),NPT(1,5)),(NOFT(1),NPT(1,6)),(NOGT(1),NPT(1,7)),(NOHT	RETAP	03489
5(1),NPT(1,8)),(NOIT(1),NPT(1,9)),(NFK(1),NPK(1,6)),(NGK(1),NPK(1,7	RETAP	03490
6)),(NHK(1),NPK(1,8)),(NIK(1),NPK(1,9)),(NOF(1),NPO(1,6)),(NOG(1),N	RETAP	03491
7PO(1,7)),(NOH(1),NPO(1,8)),(NOI(1),NPO(1,9)),(NOJ(1),NPO(1,10))	RETAP	03492
EQUIVALENCE (V,IV),(IW,W(1))	RETAP	03493
DIMENSION IOL(100),IDA(100,2),LFD(100),LNF(100,2)	RETAP	03494
DATA FND/10E-100/	RETAP	03495
CALL FORM (64,DSF,DSXF)	RETAP	03496
LINE=7	RETAP	03497
NLIST=0	RETAP	03498
NFO =0	RETAP	03499
IF(NALL.EQ.0) CALL EDLIST(NLIST,IOL,IDA)	RETAP	03500
NTIME=0	RETAP	03501
1 READ(NOUT) FJ,JF,NID,NGRP	RETAP	03502

IF(EOF,NOUT)4,2	RETAP	03503
2 IF(JF-5) 3,10,4	RETAP	03504
3 CALL REOF(NOUT)	RETAP	03505
GO TO 1	RETAP	03506
4 REWIND NOUT	RETAP	03507
IF(NTIME.NE.0) GO TO 900	RETAP	03508
NTIME=1	RETAP	03509
DO 9 J=1,4	RETAP	03510
9 CALL REOF(NOUT)	RETAP	03511
GO TO 1	RETAP	03512
900 WRITE(NPR,101)	RETAP	03513
101 FORMAT (1H1,20X,42H***FILE FIVE COULD NOT BE FOUND ON TAPE***)	RETAP	03514
RETURN	RETAP	03515
10 CONTINUE	RETAP	03516
KON=(NGRP+4)/5	RETAP	03517
C EDIT BY NUCLIDES	RETAP	03518
WRITE(NPR,110)	RETAP	03519
110 FORMAT(1H1///53X29H*** F I L E F I V E ***//51X33HSMOOTH DAT	RETAP	03520
1A AND TRANSFER MATRICES/)	RETAP	03521
READ(NOUT) (LCAO(I),LAO(I,1),LAO(I,2),(NPO(I,J),J=1,10),I=1,NID)	RETAP	03522
DO 500 K=1,NID	RETAP	03523
NX1=NOE(K)	RETAP	03524
NX2=NOG(K)	RETAP	03525
NX3=NOI(K)	RETAP	03526
IF(NLIST.EQ.0) GO TO 105	RETAP	03527
DO 102 I=1,NLIST	RETAP	03528
IF(LCAO(K).EQ.IDL(I)) GO TO 105	RETAP	03529
102 CONTINUE	RETAP	03530
IF(NX1.NE.0) READ(NOUT)	RETAP	03531
IF(NX2.NE.0) READ(NOUT)	RETAP	03532
IF(NX3.NE.0) READ(NOUT)	RETAP	03533
GO TO 500	RETAP	03534
105 CONTINUE	RETAP	03535
NFO=NFO+1	RETAP	03536
LFO(NFO)=I	RETAP	03537
C EDIT FOR THIS NUCLIDE	RETAP	03538
IF(NX1.EQ.0) GO TO 200	RETAP	03539
READ(NOUT) (LID,((Y(I,J),I=1,NGRP),J=1,NX1))	RETAP	03540
LX=0	RETAP	03541
DO 120 IX=1,5	RETAP	03542
KX=IX	RETAP	03543
IF(IX.GT.2) KX=KX-1	RETAP	03544
IF(NPO(K,KX).EQ.0) GO TO 130	RETAP	03545
LX=LX+1	RETAP	03546
IF((LTIME+KON).LE.F0) GO TO 125	RETAP	03547
WRITE(NPR,124)	RETAP	03548
124 FORMAT(1H1)	RETAP	03549
LINE=0	RETAP	03550
125 CONTINUE	RETAP	03551
LINE=LINE+KON+6	RETAP	03552

CALL FORM(44,IXF(1,IX),IXMF)	RETAP	03553
WRITE(NPR,IXMF) LAO(K,1),LAO(K,2)	RETAP	03554
WRITE(NPR,122)	RETAP	03555
DO 120 L=1,KON	RETAP	03556
MAX=L+4*KON	RETAP	03557
IF(MAX.GT.NGRP) MAX=L+3*KON	RETAP	03558
WRITE(NPR,121) (J,Y(J,LX),J=L,MAX,KON)	RETAP	03559
122 FORMAT(5(8X5HGROUP2X10HX-SECTION))	RETAP	03560
121 FORMAT(5(9XI2,2XE12.5))	RETAP	03561
120 CONTINUE	RETAP	03562
130 CONTINUE	RETAP	03563
200 CONTINUE	RETAP	03564
C EDIT OF TRANSFER MATRICES	RETAP	03565
IF(NX2.EQ.0) GO TO 500	RETAP	03566
DO 250 IM=1,2	RETAP	03567
IX2=5+2*IM	RETAP	03568
MX=NPO(K,IX2)	RETAP	03569
IF(MX.EQ.0) GO TO 250	RETAP	03570
K2=NPO(K,IX2)+1	RETAP	03571
READ(NOUT) (X(I),I=IM,K2)	RETAP	03572
NDS=NPO(K,IX2-1)	RETAP	03573
IF(NDS.EQ.0) GO TO 599	RETAP	03574
IF (NDS.GT.4) GO TO 498	RETAP	03575
KOUNT=6+NDS*8	RETAP	03576
NNDS =NDS	RETAP	03577
CALL MASH(KOUNT,ICH1,ICH2)	RETAP	03578
ICH=NDS+IZO	RETAP	03579
GO TO 499	RETAP	03580
498 ICH1=3+IZO	RETAP	03581
ICH2=8+IZO	RETAP	03582
ICH=4+IZO	RETAP	03583
NNDS =4	RETAP	03584
499 CONTINUE	RETAP	03585
CALL INTALP(OSXF,12,ICH1)	RETAP	03586
CALL INTALP(OSXF,13,ICH2)	RETAP	03587
CALL INTALP(OSXF,50,ICH)	RETAP	03588
599 IF(LINE.LE.40) GO TO 505	RETAP	03589
LINE=0	RETAP	03590
WRITE(NPR,124)	RETAP	03591
505 CONTINUE	RETAP	03592
LINE=LINE+8	RETAP	03593
CALL FORM(64,IMF(1,IM),IXMF)	RETAP	03594
IMM=53+3*IM	RETAP	03595
IF(NDS.NE.1) GO TO 553	RETAP	03596
CALL INTALP(IXMF,IMM,IBL)	RETAP	03597
GO TO 554	RETAP	03598
553 CALL INTALP(IXMF,IMM,IS)	RETAP	03599
554 WRITE(NPR,IXMF) LAO(K,1), LAO(K,2), NDS	RETAP	03600
IF(NDS.EQ.0) GO TO 555	RETAP	03601
WRITE(NPR,OSXF) (II,II=1,NNDS)	RETAP	03602

GO TO 556	RETAP	03603
555 WRITE (NPR,502)	RETAP	03604
502 FORMAT(25X5HGROUP6X11HDOWNSCATTER,/25X5HI * J,10X1HJ)	RETAP	03605
556 CONTINUE	RETAP	03606
KOL=MIN0(5,NDS+1)	RETAP	03607
K1=2	RETAP	03608
DO 245 NG=1,NGRP	RETAP	03609
ICK=MIN0(NG+NDS,NGRP+1)	RETAP	03610
KPA=NG	RETAP	03611
K2=MIN0(NDS,NGRP+1-NG)+K1	RETAP	03612
C PRINT FIRST LINE	RETAP	03613
MAX=MIN0(K1+KOL-1,K2)	RETAP	03614
LINE=LINE+1	RETAP	03615
IF(LINE.LE.50) GO TO 503	RETAP	03616
WRITE(NPR,124)	RETAP	03617
IF(NDS.EQ.0) GO TO 557	RETAP	03618
WRITE(NPR,DSXF) (II,II=1,NNDS)	RETAP	03619
GO TO 558	RETAP	03620
557 WRITE (NPR,502)	RETAP	03621
558 LINE=1	RETAP	03622
503 CONTINUE	RETAP	03623
WRITE(NPR,501) NG,KPA,(X(I),I=K1,MAX)	RETAP	03624
501 FORMAT(25XI2,1HI2,1X5(4XE12.5))	RETAP	03625
IF(MAX.EQ.K2) GO TO 244	RETAP	03626
KPA=KPA+4	RETAP	03627
230 CONTINUE	RETAP	03628
KPA=KPA+1	RETAP	03629
243 CONTINUE	RETAP	03630
L1=K1+KPA-NG	RETAP	03631
IF(X(L1).GT.FND) GO TO 233	RETAP	03632
IF(KPA.LT.ICK) GO TO 230	RETAP	03633
233 CONTINUE	RETAP	03634
KPB=MIN0(KPA+4,ICK)	RETAP	03635
LINE=LINE+1	RETAP	03636
IF(LINE.LE.50) GO TO 504	RETAP	03637
WRITE(NPR,124)	RETAP	03638
IF(NDS.EQ.0) GO TO 559	RETAP	03639
WRITE(NPR,DSXF) (II,II=1,NNDS)	RETAP	03640
GO TO 560	RETAP	03641
559 WRITE (NPR,502)	RETAP	03642
560 LINE=1	RETAP	03643
504 CONTINUE	RETAP	03644
KRA=K1+KPA-NG	RETAP	03645
KRB=K1+KPB-NG	RETAP	03646
WRITE(NPR,501) NG,KPA,(X(I),I=KRA,KRB)	RETAP	03647
KPA=KPB+1	RETAP	03648
IF(KPA.LE.ICK) GO TO 243	RETAP	03649
244 K1=K2+1	RETAP	03650
245 CONTINUE	RETAP	03651
250 CONTINUE	RETAP	03652

500 CONTINUE	RETAP	03653
WRITE(NPR,124)	RETAP	03654
IF(NFD .GE. NLIST) GO TO 600	RETAP	03655
CALL CKLIST(NLIST,IOA,NFD,LFD,NNFD,LNF)	RETAP	03656
IF(NNFD.LT.1) STOP 77	RETAP	03657
IF(NNFD.GT.1) GO TO 520	RETAP	03658
WRITE(NPR,506) LNF(1,1),LNF(1,2)	RETAP	03659
GO TO 600	RETAP	03660
520 WRITE(NPR,507) (LNF(I,1),LNF(I,2), I=1,NNFD)	RETAP	03661
506 FORMAT(5(/)20XA4,A2,43H COULD NOT BE FOUND IN AN EDIT OF FILE FIVE	RETAP	03662
1)	RETAP	03663
507 FORMAT(5(/)40X46HTHESE NUCLIDES COULD NOT BE FOUND IN FILE FIVE/10	RETAP	03664
1X10(4XA4,A2))	RETAP	03665
600 CALL REOF(NOUT)	RETAP	03666
RETURN	RETAP	03667
END	RETAP	03668

SUBROUTINE EDSIX	RETAP	03669
COMMON /TAPES/NIN,NOUT,KROD,INP,NPR	RETAP	03670
COMMON LCAO(100),LAO(100,2),LWO(100),NPO(100,10),LB,LCAO(100),	RETAP	03671
1 LAO(100,2),LW(100),NPK(100,10),LCBD(100),LBD(100,2),NPT(100,10),	RETAP	03672
2 LA, LCD(100),	RETAP	03673
3 ND,	RETAP	03674
4 IDIS(12,100),SSP(100)	RETAP	03675
DIMENSION IDS(18)	RETAP	03676
COMMON/FILES/TYPE,FNO,FI,JF,NGRP,NHED,NALL	RETAP	03677
COMMON/MIS/ NPAR,ICHAR,IWOD,MUM	RETAP	03678
COMMON/RED/V,N,W	RETAP	03679
DIMENSION W(18),KW(18),LID(100,2),IFZ(8),IFZZ(8)	RETAP	03680
DIMENSION IDA(100,2), LFD(100),LNF(100,2)	RETAP	03681
EQUIVALENCE (V,IV),(IW,W(1),KW(1))	RETAP	03682
DATA IFZ/4H(//5,4H9X9H,4HSPEC,4HTRUM,4H I3/,4H/25X,4H12A0,4H6//)/	RETAP	03683
CALL FORM(32,IFZ,IFZZ)	RETAP	03684
CALL MASH(IWOD,NN1,NN2)	RETAP	03685
CALL INTALP(IFZZ(1),25,NN1)	RETAP	03686
CALL INTALP(IFZZ(1),26,NN2)	RETAP	03687
CALL MASH(ICHAR,ICH1,ICH2)	RETAP	03688
CALL INTALP(IFZZ(1),28,ICH1)	RETAP	03689
CALL INTALP(IFZZ(1),29,ICH2)	RETAP	03690
NFO=0	RETAP	03691
LINE=7	RETAP	03692
NTIME=0	RETAP	03693
C READ IN SPECTRUM IDS	RETAP	03694
LL=0	RETAP	03695
IF(NALL.EQ.1) GO TO 30	RETAP	03696
20 CALL CRAMIN(V,N,W)	RETAP	03697
IF(N.EQ.0) GO TO 29	RETAP	03698
IF(N.NE.-1) CALL ERR(8)	RETAP	03699
LL=LL+1	RETAP	03700
LID(LL,1)=IV	RETAP	03701
GO TO 20	RETAP	03702
29 TYPE=W(1)	RETAP	03703
30 CONTINUE	RETAP	03704
1 READ(NOUT) FJ,JF,NSU,NGRP	RETAP	03705
IF(EQF,NOUT) 4,2	RETAP	03706
2 IF(JF-6) 3,10,4	RETAP	03707
3 CALL REOF(NOUT)	RETAP	03708
GO TO 1	RETAP	03709
4 REWIND NOUT	RETAP	03710
IF(NTIME.NE.0) GO TO 900	RETAP	03711
NTIME=1	RETAP	03712
DO 9 J=1,5	RETAP	03713
9 CALL REOF(NOUT)	RETAP	03714
GO TO 1	RETAP	03715
900 WRITE(NPR,101)	RETAP	03716
101 FORMAT (1H1,20X,41H***FILE SIX COULD NOT BE FOUND ON TAPE***)	RETAP	03717
RETURN	RETAP	03718

10 WRITE(NPR,110)	RETAP	03719
110 FORMAT(1H1//52X27H*** F I L E S I X ***//59X13HSPECTRUM DATA	RETAP	03720
1//)	RETAP	03721
KON=(NGRP+4)/5	RETAP	03722
READ(NOUT)	RETAP	03723
DO 500 KU=1,NSU	RETAP	03724
READ(NOUT) IDSU, ((IDS(J),J=1,IWOD), (SSP(K),K=1,NGRP))	RETAP	03725
IF(LL.EQ.0) GO TO 131	RETAP	03726
DO 130 I=1,LL	RETAP	03727
IF(IDSU.EQ.LID(I,1)) GO TO 131	RETAP	03728
NFD=NFD+1	RETAP	03729
LFD(NFD)=I	RETAP	03730
130 CONTINUE	RETAP	03731
GOTO500	RETAP	03732
131 CONTINUE	RETAP	03733
ICK=KON+5	RETAP	03734
IF((LINE+ICK).LE.55) GO TO 133	RETAP	03735
WRITE(NPR,132)	RETAP	03736
132 FORMAT(1H1)	RETAP	03737
LINE=0	RETAP	03738
133 LINE=LINE+ICK	RETAP	03739
WRITE(NPR,IFZZ) IDSU, (IDS(J),J=1,IWOD)	RETAP	03740
WRITE(NPR,104)	RETAP	03741
DO 120 IK=1,KON	RETAP	03742
MAX=IK+4*KON	RETAP	03743
IF(MAX.GT.NGRP) MAX=IK+3*KON	RETAP	03744
WRITE(NPR,103) (K,SSP(K),K=IK,MAX,KON)	RETAP	03745
120 CONTINUE	RETAP	03746
500 CONTINUE	RETAP	03747
WRITE(NPR,132)	RETAP	03748
IF(NFD.GE.LL) GO TO 600	RETAP	03749
CALL CKLIST(LL,LID,NFD,LFD,NNFD,LNF)	RETAP	03750
IF(NNFD.LE.0) STOP 77	RETAP	03751
IF(NNFD.GT.1) GO TO 510	RETAP	03752
WRITE(NPR,502) LNF(1,1)	RETAP	03753
502 FORMAT(5(/)20X9HSPECTRUM I3,20H COULD NOT BE FOUND 5(/))	RETAP	03754
GO TO 600	RETAP	03755
510 WRITE(NPR,512) (LNF(I,1), I=1,NNFD)	RETAP	03756
512 FORMAT(5(/)40X38H THE FOLLOWING SPECTRUMS WERE NOT FOUND//20X10(7XI	RETAP	03757
13))	RETAP	03758
NFD=0	RETAP	03759
103 FORMAT(5(9XI2,2XE12.5))	RETAP	03760
104 FORMAT(5(8X5HGROUP3X6HSOURCE3X))	RETAP	03761
600 CALL REOF(NOUT)	RETAP	03762
RETURN	RETAP	03763
END	RETAP	03764

SUBROUTINE EDSVN	RETAP	03765
COMMON/RED/V,N,W	RETAP	03766
COMMON/MIS/ NPAR,ICHAR,IWOD,MUM	RETAP	03767
COMMON/FILES/TYPE,FNO,F1,JF,NGRP,NHED,NALL	RETAP	03768
COMMON/TAPES/NIN,NOUT,KROT,INP,NPR	RETAP	03769
COMMON LCAO(100),LAO(100,2),LWO(100),NPO(100,10),LB,LCAD(100),	RETAP	03770
1LAD(100,2),LW(100),NPK(100,10),LCBD(100),LBD(100,2),NPT(100,10),	RETAP	03771
2LA, LCD(100),	RETAP	03772
3ND,FPID(50),FPY(50),FPD(140)	RETAP	03773
INTEGER FPID	RETAP	03774
DIMENSION NOA(100),NOB(100),OC(100),OD(100),OE(100),OF(100),	RETAP	03775
1NOG(100), NAK(100),NBK(100),CK(100),OK(100),EK(100),FK(100),	RETAP	03776
2NGK(100), NOAT(100),NOBT(100),OCT(100),ODT(100),OET(100),OFT(100),	RETAP	03777
3NOGT(100)	RETAP	03778
EQUIVALENCE (NOA(1),NPO(1,1)),(NOB(1),NPO(1,2)),(OC(1),NPO(1,3)),	RETAP	03779
1(OD(1),NPO(1,4)),(OE(1),NPO(1,5)),(OF(1),NPO(1,6)),(NOG(1),NPO(1,7	RETAP	03780
2)), (NAK(1),NPK(1,1)),(NBK(1),NPK(1,2)),(CK(1),NPK(1,3)),(OK(1),	RETAP	03781
3NPK(1,4)),(EK(1),NPK(1,5)),(FK(1),NPK(1,6)),(NGK(1),NPK(1,7)),	RETAP	03782
4(NOAT(1),NPT(1,1)),(NOBT(1),NPT(1,2)),(OCT(1),NPT(1,3)),(ODT(1),	RETAP	03783
5NPT(1,4)),(OET(1),NPT(1,5)),(OFT(1),NPT(1,6)),(NOGT(1),NPT(1,7))	RETAP	03784
DIMENSION W(18)	RETAP	03785
EQUIVALENCE (V,IV), (IW,W(1))	RETAP	03786
DIMENSION IDL(100),IDA(100,2),IDB(6),IDC(6)	RETAP	03787
DIMENSION LFD(100),LNF(100,2)	RETAP	03788
NFD=0	RETAP	03789
NLIST=0	RETAP	03790
IF(NALL.EQ.0) CALL EOLIST(NLIST,IDL,IDA)	RETAP	03791
NTM=0	RETAP	03792
100 READ(NOUT) FI,JF,NNU,NGRP	RETAP	03793
IF(EOF,NOUT) 104, 101	RETAP	03794
101 IF(JF-7) 102,200,104	RETAP	03795
102 CALL REOF(NOUT)	RETAP	03796
GO TO 100	RETAP	03797
104 IF(NTM.NE.0) GO TO 900	RETAP	03798
NTM=1	RETAP	03799
REWIND NOUT	RETAP	03800
DO 9 J=1,6	RETAP	03801
9 CALL REOF(NOUT)	RETAP	03802
GO TO 100	RETAP	03803
900 WRITE(NPR,2)	RETAP	03804
2 FORMAT (1H1,20X,43H***FILE SEVEN COULD NOT BE FOUND ON TAPE***)	RETAP	03805
RETURN	RETAP	03806
200 CONTINUE	RETAP	03807
C READ IN RECORD TWO	RETAP	03808
READ(NOUT) (LCAO(I),LAO(I,1),LAO(I,2),NUG(I),NOA(I),NOB(I),OC(I),	RETAP	03809
1OD(I),OE(I),OF(I), T=1,NNH)	RETAP	03810
WRITE(NPR,50)	RETAP	03811
LINE =7	RETAP	03812
50 FORMAT(1H1,53X,31H*** F I L E S E V E N ***//62X,	RETAP	03813
1 14HDEPLETION DATA /)	RETAP	03814

C EDIT BY NUCLIDE	RETAP	03815
DO 300 IN=1, NNU	RETAP	03816
NP=NOA(IN)	RETAP	03817
IF(NP.NE.0) READ(NOUT) LO, (FPID(I), FPY(I), I=1, NP)	RETAP	03818
NG=2*NOB(IN)	RETAP	03819
NGP=NGRP+NG	RETAP	03820
IF(NOBI(IN).NE.0) READ(NOUT) ID, (FPD(I), I=1, NGP)	RETAP	03821
IF(NLIST.EQ.0) GO TO 204	RETAP	03822
C CHECK EDIT LIST	RETAP	03823
DO 203 IC=1, NLIST	RETAP	03824
IF(IDL(IC) .EQ. LCAO(IN)) GO TO 205	RETAP	03825
203 CONTINUE	RETAP	03826
GO TO 300	RETAP	03827
205 CONTINUE	RETAP	03828
NFD=NFD+1	RETAP	03829
LFD(NFD)=IC	RETAP	03830
C EDIT THIS NUCLIDE	RETAP	03831
204 LTST=0	RETAP	03832
IF(NOBI(IN).NE.0) LTST=9+NOB(IN)+NGRP/4	RETAP	03833
LTEST =LINE+8+ (NOA(IN)+1)/2 +LTST	RETAP	03834
IF(LTEST.LT.61) GO TO 206	RETAP	03835
LINE=0	RETAP	03836
WRITE(NPR,51)	RETAP	03837
51 FORMAT(1H1)	RETAP	03838
206 CONTINUE	RETAP	03839
WRITE(NPR,52) LAO(IN,1), LAO(IN,2), OC(IN), OE(IN), OD(IN), OF(IN)	RETAP	03840
52 FORMAT(///22X1H*A4A2,1H*12X16HDECAY CONSTANT =E12.5,12X,17HCAPTURE	RETAP	03841
1 3-VALUE =E12.5/42X13HATOMIC MASS =E12.5,15X17HFISSION Q-VALUE =E1	RETAP	03842
22.5)	RETAP	03843
IF(NOBI(IN).EQ.1) GO TO 207	RETAP	03844
WRITE(NPR,48)	RETAP	03845
48 FORMAT(42X,11HNON-FISSILE)	RETAP	03846
GO TO 208	RETAP	03847
207 WRITE(NPR,49)	RETAP	03848
49 FORMAT(42X,7HFISSION)	RETAP	03849
208 IF(NOBI(IN).NE.0) GO TO 210	RETAP	03850
WRITE(NPR,53)	RETAP	03851
53 FORMAT(1H+,81X,19HNO FISSION PRODUCTS)	RETAP	03852
LINE=LINE+6	RETAP	03853
IF(NOBI(IN).NE.0) GO TO 223	RETAP	03854
GO TO 300	RETAP	03855
210 CONTINUE	RETAP	03856
C FISSION PRODUCT PRINT	RETAP	03857
IF(NOBI(IN).GT.1) GO TO 215	RETAP	03858
CALL COVRT(FPID(1), IDB)	RETAP	03859
WRITE(NPR,54) (IDB(I), I=1,6), FPY(1)	RETAP	03860
54 FORMAT(/60X17H1 FISSION PRODUCT/54X7HPRODUCT16X5HYIELD/54X6A1,12XE	RETAP	03861
112.5//)	RETAP	03862
LINE=LINE+9	RETAP	03863
GO TO 217	RETAP	03864

215 CONTINUE	RETAP 03865
LINE =LINE+8 + (NOA(IN)+1)/2	RETAP 03866
WRITE(NPR,55) NOA(IN)	RETAP 03867
WRITE(NPR,56)	RETAP 03868
NA=NOA(IN)	RETAP 03869
NB=(NA+1)/2	RETAP 03870
IK=NB	RETAP 03871
DO 216 I=1,NB	RETAP 03872
CALL COVRT(FPID(I),IDB)	RETAP 03873
IK=IK+1	RETAP 03874
IF(IK.GT.NA) GO TO 218	RETAP 03875
CALL COVRT(FPID(IK),IDC)	RETAP 03876
WRITE(NPR,57) (IDB(J),J=1,5),FPY(I), (IDC(K),K=1,6),FPY(IK)	RETAP 03877
GO TO 216	RETAP 03878
218 CONTINUE	RETAP 03879
WRITE(NPR,57) (IDB(J),J=1,6),FPY(I)	RETAP 03880
GO TO 217	RETAP 03881
216 CONTINUE	RETAP 03882
217 IF(NOB(IN).EQ.0) GO TO 300	RETAP 03883
220 LINE=LINE+9+ NOB(IN)+ NGRP/4	RETAP 03884
WRITE(NPR,58) NOB(IN)	RETAP 03885
WRITE(NPR,59) (FPD(K),K=1,NG)	RETAP 03886
WRITE(NPR,60) NGRP	RETAP 03887
KON= (NGRP+2)/3	RETAP 03888
DO 219 K=1,KON	RETAP 03889
MAX=K+2*KON	RETAP 03890
IF(MAX.GT.NGRP) MAX=K+KON	RETAP 03891
219 WRITE(NPR,61) (IKK,FPD(IKK+NG),IKK=K,MAX,KON)	RETAP 03892
300 CONTINUE	RETAP 03893
55 FORMAT (/64X,I2,17H FISSION PRODUCTS)	RETAP 03894
56 FORMAT(42X,7HPRODUCT,13X,5HYIELD,15X,7HPRODUCT,14X,5HYIELD)	RETAP 03895
57 FORMAT(43X,6A1,9X,E12.5,13X,6A1,10X,E12.5)	RETAP 03896
58 FORMAT(/53X,39HNUMBER OF DELAYED NEUTRON PERCURSORS = ,I2,/46X,	RETAP 03897
1 14HDECAY CONSTANT,22X,24HDELAYED NEUTRON FRACTION)	RETAP 03898
59 FORMAT(46X,E12.5,30X,E12.5)	RETAP 03899
60 FORMAT (/55X,27HDELAYED NEUTRON SPECTRUM - ,I3,8H GROUPS,/37X,	RETAP 03900
1 3(5X,5HGROUP,3X,6HSOURCE,6X))	RETAP 03901
61 FORMAT(34X,3(8X,I3,2X,E12.5))	RETAP 03902
IF(NFD .GE. NLIST) GO TO 600	RETAP 03903
CALL CKLIST(NLIST,IDA,NFD,LFD,NNFD,LNF)	RETAP 03904
IF(NNFD.LT.1) STOP 77	RETAP 03905
IF(NNFD.GT.1) GO TO 520	RETAP 03906
WRITE(NPR,504) LNF(1,1),LNF(1,2)	RETAP 03907
GO TO 600	RETAP 03908
520 WRITE(NPR,505) (LNF(I,1), LNF(I,2), I=1,NNFD)	RETAP 03909
504 FORMAT(5(/)20XA4,A2,43HCOULD NOT BE FOUND IN AN EDIT OF FILE SEVEN	RETAP 03910
1)	RETAP 03911
505 FORMAT(5(/)40X47HTHESE NUCLIDES COULD NOT BE FOUND IN FILE SEVEN /	RETAP 03912
1 10X,10(4X,A4,A2))	RETAP 03913
600 CONTINUE	RETAP 03914

CALL REOF(NOUT)
RETURN
END

RETAP 03915
RETAP 03916
RETAP 03917

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