MASTER

ORNL ALICE
A Statistical Model Computer Code
Including Fission Competition

F. Plasil

OAK RIDGE NATIONAL LABORATORY
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ABSTRACT

A listing of the computer code ORNL ALICE is given. This code is a modified version of computer codes ALICE and OVERLAID ALICE. It allows for higher excitation energies and for a greater number of evaporated particles than the earlier versions. The angular momentum removal option has been made more general and more internally consistent. Certain roundoff errors are avoided by keeping a strict accounting of partial probabilities. Several output options have been added.

During the last four years, the statistical model computer codes ALICE¹ and OVERLAID ALICE² have been used extensively for the analysis of heavy-ion-induced reactions. The codes are based on the original statistical model program of Blann,³ and include angular-momentum-dependent fission-competition by making use of fission barriers calculated in the rotating liquid drop model.⁴ The applications of these codes to nuclear reactions have been illustrated originally by the authors^{1,2} with reference to specific cases.^{5,6} As the use of the ALICE codes became more widespread, it became evident that certain options and extensions of the code would be desirable. This report incorporates several useful additions to the original versions of the codes and describes the version of ALICE currently in use at ORNL. The additions described here were made at a small sacrifice. In order to keep the computer memory core requirements reasonable (≤ 270 K bytes at ORNL), the pre-equilibrium option was deleted. This loss is, in practice, not too regrettable, since the pre-equilibrium model included in OVERLAID ALICE applies primarily to "light" heavy ions such as ^4He ions, while recent interest has centered on heavier ions. Also deleted was the line-printer-plot option for excitation energies. In exchange, the following additions were made:

1. The code was expanded to handle excitation energies up to 300 MeV. This permits the inclusion of higher bombarding energies. The user should, however, be aware of the possibility that such calculations may not be physically significant.⁷
2. Up to 22 neutrons and 15 protons can be evaporated (compared with 11 neutrons and 9 protons in Refs. 1 and 2). See NA and NZ parameters.

3. The option of angular momentum removal (JANG=1) has been made more internally consistent, so that calculated effective excitation energies used in the level density calculations reflect the fact that different rotational energies are involved when the various particles are emitted.⁸

4. The amount of angular momentum removed by evaporated particles is no longer restricted to 2 units per neutron and 3 units per proton. Any arbitrary and fractional amount of angular momentum removal is possible. (See parameters ANGN and ANGP.) The amount of angular momentum removed by a ^4He ion is, however, restricted to twice the sum of the angular momentum removed by a proton and by a neutron.

5. The internal logic of the program was changed. In the present version, a strict accounting of all partial probabilities is made. If particles are evaporated from a particular nuclide, the relevant partial cross sections are subtracted from it, and added to the appropriate residual nuclide. In the versions of the program of Refs. 1 and 2, this was not the case. Final residual cross sections were obtained by integrating residual partial probabilities up to a separately-calculated limit. This resulted in certain roundoff errors, that affected the calculated cross sections for particular residual nuclides to the extent of up to 10%. A consequence of this change is that the "MISSING CROSS SECTION" is now very nearly zero, provided that NA and NZ are large enough.

6. It is now possible to follow the specific deexcitation paths by printing out the intermediate cross sections at all stages of the deexcitation process. Thus it is possible, for example, to state if a

particular nuclide was formed as a result of ^4He -emission, or as a result of the sequential emission of two protons and two neutrons (see IKE parameter).

7. First-chance partial widths and first-chance effective excitation energies can be printed out (see IKE parameter).

8. Computer charges can be reduced by drastically reducing the amount of output. The parameter IKE allows for minimal output for each partial wave (with full output at the end of the calculation), as well as for output only at the end of the case under consideration.

The above description is not intended to "stand-alone". It must be combined with those of Refs. 1 and 2. A listing of the program, including a sample calculation, are included in this report. The new input requirements are essentially identical to those of Ref. 2, with certain minor additions. The input needed is given at the beginning of the listing of the MAIN program. It also remains necessary for the user to provide exponential overflow and underflow instructions, specific to the hardware and/or software of the computer used (largest number and continue, zero and continue). All updating reported for OVERLAID ALICE has been included in the program given here, with the exception, of course, of the updating of the HYBRID subroutine, which does the pre-equilibrium calculation, and which has not been included in this work.

Those who wish to obtain a copy of the URNL version of the ALICE program should send a blank tape to me. All users listed on the present mailing list will be advised of any changes and/or errors.

I would like to thank Drs. M. Blann and M. Beckerman for many very useful discussions.

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Appendix

PAGES 7 to 8
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C
C XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
C
C THIS IS CODE ORNL ALICE      DESCRIBED IN REPORT ORNL-TM-6054
C IT CAN HANDLE LARGER ARRAYS OF NUCLIDES AND EXCITATION ENERGIES UP TO 300 MEV
C THE PREEQUILIBRIUM OPTION AND LINEPRINTER PLOTS OF EXCITATION FUNCTIONS HAVE
C BEEN ELIMINATED TO SAVE CORE SPACE.  INPUT IS DESCRIBED BELOW
C
C XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
C
C 'D' MEANS DEFAULT OPTION.
C
C CARD1 FORMAT (7F5.1,7I5,F5.1,I5)
C
C AP    PROJECTILE MASS NUMBER
C AT    TARGET MASS NUMBER
C ZP    PROJECTILE CHARGE
C ZT    TARGET CHARGE
C QVAL  REACTION Q VALUE=AP+AT-ACN. D=CALCULATED FROM M&S MASS FORMULA.
C CLD   RATIO OF SINGLE PARTICLE LEVEL DENSITIES 'AP/AN. D=1.00
C BARFAC MULTIPLIES THE ROTATING DROP FISSION BARRIER BY THIS VALUE. D=1.0
C NA    NUMBER OF NUCLIDES OF EACH Z TO BE INCLUDED IN CALCULATION.
C NZ    NUMBER OF Z TO BE CALCULATED IN THE EMISSION PROCESS.
C MC    SHELL CORRECTION OPTION FOR MASSES SUBROUTINE.MC=1,SHELL CORR. CALC.
C       MC=0,NO SHELL CORR. MC=2,BE VALUES WILL BE SUPPLIED AS INPUT.
C MP    PAIRING CORRECTION TO MASSES.MP=0.NO CORRECTION;=1,PAIRING TERM INCL.
C INVER  INVERSE CROSS SECTION PARAM. =0,RESULTS SUPPLIED BY O.M. SUBROUTINE.=1,
C       USER WILL SUPPLY.
C IKE    IF=0,NO PARTICLE SPECTRA WILL BE PRINTED;IF=1,EQUILIBRIUM SPECTRA FOR
C       EACH NUCLIDE WILL BE PRINTED;IF=2,ONLY PRECOMPOUND SPECTRA PRINTED;IF
C       =4,PRECOMPOUND PLUS SUMMED EQUILIBRIUM SPECTRA WILL BE(SEPARATELY)
C       PRINTED. IF = 11 AND 12, NO PARTICLE SPECTRA, BUT REDUCED OUTPUT.
C       IF=11,ONLY TOTAL FISSION, SUM, AND MISSING CROSS SECTIONS ARE PRINTED
C       IF=12, FINAL OUTPUT ONLY. IF=13 GET FULL NORMAL OUTPUT FOR EACH J
C       PLUS FIRST-CHANCE BRANCHING RATIOS AND NON-RESIDUAL (INTERMEDIATE)
C       CROSS SECTIONS
C IPCH  D= INVERSE CROSS SECTIONS WILL BE PUNCHED FOR POSSIBLE FUTURE USE.
C       =1,SUPPRESSES PUNCHING.
C PLD   LEVEL DENSITY PARAMETER 'A',A=ACN/PLD. D=ACN/8.
C M3    NUMBER AND TYPE OF PARTICLES TO BE EMITTED FROM EACH NUCLIDE.IF=1,N
C       ONLY,=2,N&P,=3 OR 0,N,P,&ALPHA,=4,N,P,ALPHA&DEUTERON.
C
C CARD2 TITLE CARD-80 COLUMNS
C
C       IF MC =2 ON CARD 1,READ USER SUPPLIED N,P,ALPHA,DEUTERON BINDING
C       ENERGIES HERE,FORMAT(4F10.5)IA=1,NA,IZ=1,NZ
C       IF INVER=1 ON CARD1,READ N,P,ALPHA,DEUT INVERSE CROSS SECTIONS HERE.
C       FORMAT IS (6E10.5)IN ASCENDING CHANNEL ENERGY,FIRST VALUE=0.1MEV,
C       INCREMENTED BY 1 MEV,48 VALUES PER PARTICLE TYPE,IN SEQUENCE N,P,A,D.
C
C CARD3 ENERGY AND OPTIONS CARDS. THIS CARD IS REPEATED FOR EACH ENERGY WANTED

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C   FOR A GIVEN TARGET AND PROJECTILE. FORMAT(2F5.1,4I5,2F5.1)
C
C   EQ      PROJECTILE KINETIC ENERGY IN THE LABORATORY SYSTEM.
C           IF=0., A NEW PROBLEM WILL BEGIN AT CARD1.
C           IF EQ=0. ON TWO SUCCESSIVE CARDS, A NORMAL EXIT WILL OCCUR.
C   RCSS    REACTION CROSS SECTION IF USER WISHES TO SUPPLY .D= CALC FROM SUBROUTINE
C   JCAL    TYPE OF CALCULATION OPTION. 1=WEISSKOPF, 2=S WAVE WITH RIGID BODY, 3= S
C           WAVE WITH LIQUID DROP MOMENT OF INERTIA, -1=FISSION CALC IN 1 MEV WIDE
C           BINS OF ROTATION, 0=FISSION CALC FOR EACH PARTIAL WAVE.
C           IF FISSION IS TO BE CALCULATED USING ZERO BARRIER FOR ALL J.GT.JCRIT,
C           INCREASE JCAL BY 10
C   JFRAC   IF A FISSION CALC IS TO BE ONLY IN A SPECIFIED ANGULAR MOMENTUM RANGE,
C           THIS IS THE LOWER VALUE.
C   JUPPER  UPPER INDEX OF ANGULAR MOMENTUM, IF THE RANGE IS TO BE RESTRICTED.
C   JANG    OPTION OF EMITTED PARTICLES DECREASING ANG. MOM. IF=1, YES;=0, NO.
C           IF JANG IS GREATER THAN 100 (LESS THAN 200) LOOP OVER ANGULAR MOMENTA
C           WILL BE FOR INCREMENTS OF JANG-100 AND 'NO' OPTION ON ANGULAR REMOVAL
C           HOLDS. IF JANG IS GREATER THAN 200 LOOP OVER ANGULAR MOMENTA WILL
C           BE FOR INCREMENTS OF JANG-200 AND 'YES' OPTION ON ANG. MOM. REMOVAL
C           HOLDS
C   ANGN    IF ANG. MOM. REMOVAL OPTION HOLDS (AS DEFINED BY JANG), ANGN IS THE
C           NUMBER OF UNITS OF ANG. MOM. REMOVED BY NEUTRONS. RECOMMENDED VAL IS 1.
C           RECOMMENDED UPPER LIMIT IS 2.0. IF ANG MOM IS REMOVED BUT ANGN=0., THE
C           OLD ANGULAR MOMENTUM OPTION OF OVERLAID ALICE IS SELECTED ( SEE REP. 8
C           OF ORNL-TM-6054 )
C   ANGP    AS ABOVE, BUT ANG MOM REMOVED BY PROTONS. RECOMMEND ANGP=1.0,
C           RECOMMENDED UPPER LIMIT IS ANGP=3.0. DEUTERONS WILL CARRY OFF
C           ANGN+ANGP UNITS OF ANG. MOM., AND ALPHAS TWICE THE DEUTERON AMOUNT
C
CMAIN
      DIMENSION Q(300), SP(50), SIFIS(300), GAMPT(300), T(300)
      DIMENSION UCLAD(300), FCLAD(300), GAIN(4)
      DIMENSION LMND(4), CXYJ(17,22), LMXD(4), EXCZAD(4), NJAMMA(17,24)
      DIMENSION GAMPT(4,22,15), GAMFN(22,15), ENLOSS(4,22,15), CXY(15,22,4)
      1  , PSXY(15,22)
      COMMON/PAR3/EQ, SIGML(300), ACRS(300)
      COMMON/LAB10/POW(3000), GAM(3000)
      COMMON/SP6/AOZ, ZOZ, EN(4,50)
      COMMON/SHPT/QVAL, AP, AT, ZP, ZT, CLD, MC, MP, INVER, IKE, IPCH, BARFAC
      COMMON/UG/IZ, IA, IPRINT
      COMMON/NHY2/GDO
      COMMON/S1/JFRAC, JUPPER
      COMMON/3F/H3
      COMMON/SPT9/K5, PLD, JMAX, C(4), DELT, ALT
      COMMON/PAR2/CNCSS
      COMMON/HYB3/LMN, LMX
      COMMON/PL8/JAMMA(17,24), NULIM(17,24)
      COMMON/PL1/ECM(20)
      COMMON/NAME/K2
      COMMON/HJK/RCSS, JANG
      COMMON/SS/SOR, RR
      COMMON/PARPS/DELRR(300), K6
      COMMON/SHPT2/K3, FS(22), DSP(22), BRR(22), DER(22), ER(22), FISS, SUMIZ
      1  CX(22), BILSUM, JCAL, XMISS
      COMMON/PL4/CRS(22,15)
      COMMON/NHY/TD, EX1, EX2, TMX, AV, GAV, IJ, COST, JL, JI, JJ, B(2)
      COMMON/PARO/PQ, CROSS
      COMMON/HYB2/PP(3,22,300)

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MAIN	0
DIMENSION Q(300), SP(50), SIFIS(300), GAMPT(300), T(300)	MAIN 5
DIMENSION UCLAD(300), FCLAD(300), GAIN(4)	MAIN 10
DIMENSION LMND(4), CXYJ(17,22), LMXD(4), EXCZAD(4), NJAMMA(17,24)	MAIN 15
DIMENSION GAMPT(4,22,15), GAMFN(22,15), ENLOSS(4,22,15), CXY(15,22,4)	MAIN 20
1 , PSXY(15,22)	MAIN 25
COMMON/PAR3/EQ, SIGML(300), ACRS(300)	MAIN 30
COMMON/LAB10/POW(3000), GAM(3000)	MAIN 35
COMMON/SP6/AOZ, ZOZ, EN(4,50)	MAIN 40
COMMON/SHPT/QVAL, AP, AT, ZP, ZT, CLD, MC, MP, INVER, IKE, IPCH, BARFAC	MAIN 45
COMMON/UG/IZ, IA, IPRINT	MAIN 50
COMMON/NHY2/GDO	MAIN 55
COMMON/S1/JFRAC, JUPPER	MAIN 60
COMMON/3F/H3	MAIN 65
COMMON/SPT9/K5, PLD, JMAX, C(4), DELT, ALT	MAIN 70
COMMON/PAR2/CNCSS	MAIN 75
COMMON/HYB3/LMN, LMX	MAIN 80
COMMON/PL8/JAMMA(17,24), NULIM(17,24)	MAIN 85
COMMON/PL1/ECM(20)	MAIN 90
COMMON/NAME/K2	MAIN 95
COMMON/HJK/RCSS, JANG	MAIN 100
COMMON/SS/SOR, RR	MAIN 105
COMMON/PARPS/DELRR(300), K6	MAIN 110
COMMON/SHPT2/K3, FS(22), DSP(22), BRR(22), DER(22), ER(22), FISS, SUMIZ	MAIN 115
1 CX(22), BILSUM, JCAL, XMISS	MAIN 120
COMMON/PL4/CRS(22,15)	MAIN 125
COMMON/NHY/TD, EX1, EX2, TMX, AV, GAV, IJ, COST, JL, JI, JJ, B(2)	MAIN 130
COMMON/PARO/PQ, CROSS	MAIN 135
COMMON/HYB2/PP(3,22,300)	MAIN 140

COMMON/SPT5/EXC(17,24),XMAX	MAIN 145
COMMON/PL3/EB(20),RCSP(20),ZEE,AMASS,PLEX,NEPR	MAIN 150
COMMON/LYM1/BE(15,22,4)	MAIN 155
COMMON/PL7/MAS	MAIN 160
COMMON/LAB3/SIG(4,50)	MAIN 165
COMMON/PL5/TITLE(20),NA,NZ	MAIN 170
WRITE(6,11300)	MAIN 175
NEPR=1	MAIN 180
PQ=0.	MAIN 185
10 READ(INPUT,11200) AP,AT,ZP,ZT,QVAL,CLD,BARFAC,NA,NZ,MC,MP,INVER,	MAIN 190
1 IKE,IECH,PLD,M3	MAIN 195
KPLT = 0	MAIN 200
IPRINT = 0	MAIN 205
K5=0	MAIN 210
IPRINT = 0	MAIN 215
IF (IKE.GE.10) IPRINT=IKE	MAIN 220
IF (IKE.GE.10) IKE=0	MAIN 225
IF (AT) 20,20,30	MAIN 230
20 WRITE(6,11900)	MAIN 235
MX=0	MAIN 240
STOP	MAIN 245
30 PLEX=NZ	MAIN 250
CALL ERRSET(207,256,-1,-1)	MAIN 255
CALL ERRSET(208,256,-1,-1)	MAIN 260
K6=0	MAIN 265
GIM=0.	MAIN 270
K3=0	MAIN 275
IF (KPLT.GT.0) K2=1	MAIN 280
NEPR = 0	MAIN 285
CALL SHAFT	MAIN 290
40 CALL LYMASS(ZEE,AMASS,NZ,NA,MC,MP,AP,AT,ZP,ZT,QVAL)	MAIN 295
NIA=AMASS	MAIN 300
IIP=ZEE	MAIN 305
IF (INVER) 70,70,50	MAIN 310
50 WRITE(6,11700)	MAIN 315
JMAX=48	MAIN 320
DO 60 K = 1,M3	MAIN 325
60 READ(INPUT,10200) (SIG(K,JE),JE=1,JMAX)	MAIN 330
GO TO 80	MAIN 335
70 CALL OVER	MAIN 340
C	MAIN 345
80 K3=3	MAIN 350
CALL SHAFT	MAIN 355
DO 90 I=1,300	MAIN 360
90 T(I)=0.	MAIN 365
100 READ(INPUT,10300) EQ,RCSS,JCAL,JFRAC,JUPPER,JANG,ANGN,ANGP, TD,EX1,	MAIN 370
1 EX2,TMX,AV,GAV,COST,GDO,IJ	MAIN 375
JDELT = 1	MAIN 380
IF (JANG.GT.200) JDELT = JANG -200	MAIN 385
IF (JANG.GT.200) JANG = 1	MAIN 390
IF (JANG.GT.100) JDELT = JANG-100	MAIN 395
IF (JANG.GT.100) JANG = 0	MAIN 400
JSW = 0	MAIN 405
IF (JCAL.GE.9) JSW = 1	MAIN 410
IF (JCAL.GE.9) JCAL=JCAL-10	MAIN 415
ABC=0.	MAIN 420
IF (TMX.EQ.0.) ABC=1.	MAIN 425
DO 110 M=1,300	MAIN 430

DELRR(M)=0.	MAIN 435
110 SIGML(M)=0.	MAIN 440
DO 120 N=1,50	MAIN 445
DO 120 M=1,4	MAIN 450
120 EN(M,N)=0.	MAIN 455
IF (JCAL.NE.1) K6=1	MAIN 460
IF (JCAL.NE.1) CALL FISROT(A,Z,AN,AL,DELR,DELS,ERO,BARFAC)	MAIN 465
PQ=EQ*AT/AMASS	MAIN 470
IF (RCSS.EQ.0.) GO TO 140	MAIN 475
JKL=TMX	MAIN 480
IF (RCSS.NE.0..AND.JCAL.NE.1) READ(INPUT,10000) (T(L),L=1,JKL)	MAIN 485
CON=660./(PQ*AP)	MAIN 490
DO 130 L=1,300	MAIN 495
TL=L-1	MAIN 500
130 SIGML(L)=(TL+TL+1.)*T(L)*CON	MAIN 505
140 BAR=300.	MAIN 510
AFIS=0.	MAIN 515
IF (EQ) 1280,10,150	MAIN 520
150 NEPR=NEPR+1	MAIN 525
XMAX=PQ+QVAL	MAIN 530
K3=2	MAIN 535
CALL SHAFT	MAIN 540
ECH(NEPR) = XMAX	MAIN 545
EB(NEPR)=EQ	MAIN 550
DELR=0.	MAIN 555
DELS=0.	MAIN 560
IF (XMAX.GT.299.) GO TO 100	MAIN 565
I3=M3	MAIN 570
IF (RCSS.LE.0.) GO TO 160	MAIN 575
CNCSS = RCSS	MAIN 580
GO TO 220	MAIN 585
160 IF (ZP.LT.2.) GO TO 170	MAIN 590
CALL PARAP(MX,JCAL)	MAIN 595
GO TO 180	MAIN 600
170 IF (ZP.EQ.0.) M3=1	MAIN 605
IF (ZP.EQ.1..AND.AP.EQ.1.) M3=2	MAIN 610
IF (ZP.EQ.1..AND.AP.EQ.2.) M3=4	MAIN 615
CALL OVER	MAIN 620
M3=I3	MAIN 625
CNCSS=CROSS	MAIN 630
180 CONTINUE	MAIN 635
190 DO 200 I=1,300	MAIN 640
JJ=I-1	MAIN 645
IF (SIGML(I).LT..01) GO TO 210	MAIN 650
200 CONTINUE	MAIN 655
210 CONTINUE	MAIN 660
IF (JJ.LT.0) JJ=1	MAIN 665
TMX=JJ	MAIN 670
JJJ=TMX	MAIN 675
IF (RCSS.NE.0..AND.JCAL.NE.1) JJ=TMX	MAIN 680
IF (TMX.GT.1.) TMX=JJ	MAIN 685
RCSS=CNCSS	MAIN 690
220 IF (JFRAC) 230,230,240	MAIN 695
230 JI=1	MAIN 700
GO TO 250	MAIN 705
240 JI=JFRAC + 1	MAIN 710
250 IF (JUPPER.NE.0) JJ = JUPPER + 1	MAIN 715
RCSP(NEPR) = RCSS	MAIN 720

C	CALC MAXIMUM EXC OF EACH NUCLIDE OF ARRAY	MAIN 725
	BILSUM=0.0	MAIN 730
	TOTFIS=0.	MAIN 735
	FISS=0.	MAIN 740
	SUMIZ =0.	MAIN 745
C	BEGIN CALC ON PARTIAL CROSS SECTION ON J	MAIN 750
	IF (JCAL) 270,270,260	MAIN 755
260	JJ=1	MAIN 760
	JJ=1	MAIN 765
270	DO 1260 JL=JJ,JJ,JDELT	MAIN 770
	DO 280 MK=1,22	MAIN 775
	DO 280 ML=1,3	MAIN 780
	DO 280 MM=1,300	MAIN 785
280	PP(ML,MK,MM)=0.	MAIN 790
	DO 290 MK = 1,4	MAIN 795
	DO 290 ML = 1,22	MAIN 800
	DO 290 MM = 1,15	MAIN 805
	FSXY(MM,ML) = 0.	MAIN 810
290	CXY(MM,ML,MK) = 0.	MAIN 815
	DO 300 IA = 1,22	MAIN 820
	DO 300 IZ = 1,15	MAIN 825
	GAMFN(IA,IZ) = 0.	MAIN 830
	DO 300 KJ = 1,M3	MAIN 835
	ENLOSS(KJ,IA,IZ) = 0.	MAIN 840
300	GAMPT(KJ,IA,IZ) = 0.	MAIN 845
	DO 310 ML = 1,17	MAIN 850
	DO 310 MM = 1,22	MAIN 855
310	CXYJ(ML,MM) = 0.	MAIN 860
320	LMX=1	MAIN 865
	LMN=1	MAIN 870
	AL=JL-1	MAIN 875
	JLL=AL	MAIN 880
	IF (JCAL.LT.0.AND.TD.GT.0.) GO TO 350	MAIN 885
	IF (JCAL) 330,350,350	MAIN 890
330	IF (ACRS(JL)) 1260,1260,340	MAIN 895
340	PP(1,1,1)=ACRS(JL)	MAIN 900
	GO TO 360	MAIN 905
350	PP(1,1,1)=SIGML(JL)	MAIN 910
360	NIA=AMASS	MAIN 915
370	IIP=ZEE	MAIN 920
	IF (JCAL.EQ.1) PP(1,1,1)=RCSS	MAIN 925
	IF (JCAL.GT.1) PP(1,1,1)=0.	MAIN 930
	SWC = 0.	MAIN 935
	IF (IPRINT.EQ.12) GO TO 380	MAIN 940
	WRITE(6,10900)	MAIN 945
	WRITE(6,11000) IIP,NIA	MAIN 950
	WRITE(6,11100) PP(1,1,1)	MAIN 955
	WRITE(6,10400) XMAX,JLL	MAIN 960
	IF (JCAL.GT.1) PP(1,1,1)=0.	MAIN 965
	WRITE(6,11800) RCSP(NEPR)	MAIN 970
	SWC=0.	MAIN 975
380	MAX=40	MAIN 980
	CXYJ(1,1) = PP(1,1,1)	MAIN 985
	CRS(1,1) = CRS(1,1) + PP(1,1,1)	MAIN 990
	IF (TD.EQ.0.) GO TO 390	MAIN 995
	B(1)=BE(1,1,1)	MAIN1000
	B(2)=BE(1,1,2)	MAIN1005
	IF (JCAL.EQ.1.AND.ABC.EQ.1.) TMX=1.	MAIN1010

WRITE (6,11100)CNCSS	MAIN1015
390 IF (JCAL.LE.1) GO TO 430	MAIN1020
400 PP(1,1,1)=0.	MAIN1025
LMX=XMAX+1.	MAIN1030
LMN=1	MAIN1035
IF (TD.GT.0.) GO TO 430	MAIN1040
410 DO 420 IX=1,JJJ	MAIN1045
IU=XMAX+1.-DELRR(IX)	MAIN1050
IF (IU.LT.1) IU=1	MAIN1055
420 PP(1,1,IU)=PP(1,1,IU)+SIGML(IX)	MAIN1060
IF (MX.EQ.0) LMN=1	MAIN1065
430 CONTINUE	MAIN1070
C BEGIN CALC ON Z	MAIN1075
DO 1230 IZ=1,NZ	MAIN1080
DO 440 IA=1,22	MAIN1085
FS(IA)=0.	MAIN1090
DSP(IA)=0.	MAIN1095
BRR(IA)=0.	MAIN1100
DER(IA)=0.	MAIN1105
440 ER(IA)=0.	MAIN1110
450 IIZ=IIP-IZ+1	MAIN1115
C BEGIN CALC ON A	MAIN1120
JMAX=50	MAIN1125
460 DO 1150 IA=1,NA	MAIN1130
AOZ=NIA-IZ-IA+2	MAIN1135
ZOZ=IIP-IZ+1	MAIN1140
DO 470 IPJ=1,22	MAIN1145
470 CX(IPJ)=0.	MAIN1150
IF (IKE.EQ.4) GO TO 490	MAIN1155
DO 480 IM=1,4	MAIN1160
DO 480 IL=1,50	MAIN1165
480 EN(IM,IL)=0.	MAIN1170
490 DO 500 IND=1,50	MAIN1175
500 SP(IND)=0.	MAIN1180
IF (JCAL) 520,520,510	MAIN1185
510 NULIM(IZ,IA)=JAMMA(IZ,IA)	MAIN1190
GO TO 650	MAIN1195
520 IF (JANG) 560,560,530	MAIN1200
530 PIA = IA	MAIN1205
PIZ = IZ	MAIN1210
FJL = JL	MAIN1215
ANGCNT = ANCN + ANCP - 1.	MAIN1220
AL = FJL-PIA*ANGN-PIZ*ANGP+ANGCNT	MAIN1225
IF (ANGN.EQ.0.) AL = JL-IA*2-IZ*3+2	MAIN1230
IF (ANGN.EQ.0.) GO TO 540	MAIN1235
540 IF (AL) 550,550,560	MAIN1240
550 AL=0.	MAIN1245
560 AFIS=0.	MAIN1250
570 DO 580 JM=1,300	MAIN1255
SIPIS(JM)=0.	MAIN1260
580 GAMPT(JM)=0.	MAIN1265
C CALC CORR TO EXC SADDLE	MAIN1270
IAI=NIA-IA-IZ+2	MAIN1275
A=IAI	MAIN1280
NEUT=IAI-IIZ	MAIN1285
AN=NEUT	MAIN1290
Z-IIZ	MAIN1295
CALL FISROT (A,Z,AN,AL,DELR,DELS,ERO,BARFAC)	MAIN1300

NUL=DELS-DELR+1.	MAIN1305
DSP(IA)=DELS	MAIN1310
DER(IA)=DELR	MAIN1315
ER(IA)=ERO	MAIN1320
IF (NUL-JAMMA(IZ,IA)) 590,590,600	MAIN1325
590 NULIM(IZ,IA)=NUL	MAIN1330
GO TO 610	MAIN1335
600 NULIM(IZ,IA)=JAMMA(IZ,IA)	MAIN1340
610 CONTINUE	MAIN1345
JKL=EXC(IZ,IA)+1.	MAIN1350
PFIS=0.	MAIN1355
IF (DELS.LT.DELR.AND.JSW.GT.0) DELS=DELR	MAIN1360
BAR=DELS-DELR	MAIN1365
BRR(IA)=BAR	MAIN1370
IF (BAR.GT.0.0.OR.JSW.EQ.1) GO TO 650	MAIN1375
620 DO 630 I=1,JKL	MAIN1380
630 PFIS=PFIS+PP(1,IA,I)	MAIN1385
PS(IA)=PFIS	MAIN1390
640 PISS=PISS+PS(IA)	MAIN1395
CXYJ(IZ,IA) = CXYJ(IZ,IA) -PS(IA)	MAIN1400
GO TO 1150	MAIN1405
650 DO 660 IJJ=1,300	MAIN1410
660 Q(IJJ)=0.0	MAIN1415
C CALCULATE NEW EXC. ENGS. TO ACCOUNT FOR ENERGY GAINED	MAIN1420
DO 670 IT = 1,M3	MAIN1425
LMXD(IT) = LMX	MAIN1430
670 LMND(IT)=LMN	MAIN1435
DO 780 IT = 1,M3	MAIN1440
IF (JANG.LE.0.OR.ANGN.LE.0.) GO TO 730	MAIN1445
GO TO (680,690,700,710),IT	MAIN1450
680 AL2= AL-ANGN	MAIN1455
IF (AL2.LT.0.) AL2 = 0.	MAIN1460
A2 = A - 1.	MAIN1465
Z2 = Z	MAIN1470
AN2 = AN - 1.	MAIN1475
GO TO 720	MAIN1480
690 AL2= AL-ANGP	MAIN1485
IF (AL2.LT.0.) AL2 = 0.	MAIN1490
A2 = A - 1.	MAIN1495
Z2 = Z - 1.	MAIN1500
AN2 = AN	MAIN1505
GO TO 720	MAIN1510
700 AL2= AL-2*ANGN-2*ANGP	MAIN1515
IF (AL2.LT.0.) AL2 = 0.	MAIN1520
A2 = A - 4.	MAIN1525
Z2 = Z - 2.	MAIN1530
AN2 = AN - 2.	MAIN1535
GO TO 720	MAIN1540
710 AL2= AL-ANGN-ANGP	MAIN1545
IF (AL2.LT.0.) AL2 = 0.	MAIN1550
A2 = A - 2.	MAIN1555
Z2 = Z - 1.	MAIN1560
AN2 = AN - 1.	MAIN1565
720 CALL FISROT(A2,Z2,AN2,AL2,DELR2,XDUM1,XDUM2,BARFAC)	MAIN1570
GO TO 740	MAIN1575
730 DELR2 = DELR	MAIN1580
740 EXCZAD(IT) = EXC(IZ,IA)-DELR2	MAIN1585
IF (SWC) 780,780,750	MAIN1590

750	LMXD(IT) = EXCZAD(IT) + 1.	MAIN1595
	IF (LMXD(IT)-300) 770,770,760	MAIN1600
760	LMND(IT)=LMXD(IT)-300	MAIN1605
	GO TO 780	MAIN1610
770	LMND(IT) = 1	MAIN1615
780	CONTINUE	MAIN1620
C	CALC. OF EXC. ENGS. AND LIMITS FOR DIFF. PARTICLE TYPES IS FINISHED	MAIN1625
790	SWC = 1.	MAIN1630
C	BEGIN CALC ON PARTICLE TYPE	MAIN1635
C	SEPARATE NORMALISATION LOOPS	MAIN1640
	DO 800 I = 1,300	MAIN1645
	UCLAD(I) = 0.	MAIN1650
800	FCLAD(I) = 0.	MAIN1655
	DO 840 KJ = 1,M3	MAIN1660
	LMN = LMND(KJ)	MAIN1665
	LMX = LMXD(KJ)	MAIN1670
	IF (LMX.LE.0) GO TO 840	MAIN1675
	BB = 0.	MAIN1680
	DO 830 J = LMN,LMX	MAIN1685
	I = LMN+LMX-J	MAIN1690
	IF (PP(1,IA,I).LE.0.) GO TO 830	MAIN1695
	EMAX = EXCZAD(KJ)-BE(IZ,IA,KJ)-BB	MAIN1700
	M = EMAX + 1.	MAIN1705
	IF (M.GT.JMAX) M = JMAX	MAIN1710
	IF (M.LE.0) GO TO 820	MAIN1715
	IB = 10.*EMAX+1.	MAIN1720
	DO 810 L = 1,M	MAIN1725
	PT = POW(IB)*EIG(KJ,L)	MAIN1730
	UCLAD(I) = UCLAD(I) + PT	MAIN1735
810	IB = IB-10	MAIN1740
820	II = 1	MAIN1745
C	CALCULATE FISSION	MAIN1750
	IF (JCAL.GT.0) GO TO 830	MAIN1755
	IF (FCLAD(I).GT.0) GO TO 830	MAIN1760
	II = 10.*(EXC(IZ,IA)-DELSB-BB)	MAIN1765
	IF (II.LE.0) II = 1	MAIN1770
	FCLAD(I) = GAM(II)	MAIN1775
830	BB = BB + 1.	MAIN1780
840	CONTINUE	MAIN1785
	DO 850 I = 1,300	MAIN1790
	UCLA = UCLAD(I)+ FCLAD(I)	MAIN1795
	IF (PP(1,IA,I).LE.0.) GO TO 850	MAIN1800
	IF (UCLA.LE.0.) GO TO 850	MAIN1805
	Q(I) = PP(1,IA,I)/UCLA	MAIN1810
	IF (FCLAD(I).LE.0.) GO TO 850	MAIN1815
C	CALC. OF NORMALIZATION CONST. IS COMPLETE. NOW CALC. FISS CROSS S.	MAIN1820
	GAMFT(I) = FCLAD(I)/UCLA	MAIN1825
	SIFIS(I) = GAMFT(I)*PP(1,IA,I)	MAIN1830
	AFIS = AFIS + SIFIS(I)	MAIN1835
	FISS = FISS + SIFIS(I)	MAIN1840
850	CONTINUE	MAIN1845
C	LOOP FOR BRANCHING RATIOS	MAIN1850
	IF (IZ.NE.1.OR.IA.NE.1) GO TO 890	MAIN1855
	DO 880 KJ = 1,M3	MAIN1860
	LMN = LMND(KJ)	MAIN1865
	LMX = LMXD(KJ)	MAIN1870
	IF (LMX.LE.0) GO TO 880	MAIN1875
	I = LMX	MAIN1880

IF (PP(1,IA,I).LE.0.) GO TO 870	MAIN1885
EMAX = EXCZAD(KJ)-BE(IZ,IA,KJ)	MAIN1890
M = EMAX + 1.	MAIN1895
IF (M.GT.JMAX) M = JMAX	MAIN1900
IF (M.LE.0) GO TO 870	MAIN1905
IB = 10.*EMAX+1.	MAIN1910
PTSUM = 0.	MAIN1915
DO 860 L = 1,M	MAIN1920
PT = POW(IB)*SIG(KJ,L)	MAIN1925
PTSUM = PTSUM + PT	MAIN1930
860 IB = IB - 10	MAIN1935
GAMPT (KJ,IA,IZ) = PTSUM/(UCLAD(I)+FCLAD(I))	MAIN1940
ENLOSS(KJ,IA,IZ) = EMAX	MAIN1945
IF (KJ.NE.1) GO TO 870	MAIN1950
GAMFN(IA,IZ) = GAMPT(I)	MAIN1955
870 CONTINUE	MAIN1960
880 CONTINUE	MAIN1965
C MAIN PROBABILITY LOOP	MAIN1970
890 DO 1050 K=1,M3	MAIN1975
900 GO TO (910,920,930,940),K	MAIN1980
910 JZ=1	MAIN1985
KZ=IZ	MAIN1990
JA=IA+1	MAIN1995
GO TO 950	MAIN2000
920 JZ=2	MAIN2005
KZ=IZ+1	MAIN2010
JA=IA	MAIN2015
GO TO 950	MAIN2020
930 JZ=3	MAIN2025
KZ=IZ+2	MAIN2030
JA=IA+2	MAIN2035
GO TO 950	MAIN2040
940 JZ=2	MAIN2045
KZ=IZ+1	MAIN2050
JA=IA+1	MAIN2055
950 BB=0.	MAIN2060
IF (JA.GT.22) GO TO 1050	MAIN2065
LMN = LMND(K)	MAIN2070
LMX = LMXD(K)	MAIN2075
IF (LMX) 1050,1050,960	MAIN2080
960 EXCZA=EXCZAD(K)	MAIN2085
970 DO 1040 J=LMN,LMX	MAIN2090
I=LMN+LMX-J	MAIN2095
IF (U(1).LE.0.) GO TO 1040	MAIN2100
XAJ=EXCZA-BE(IZ,IA,K)-BB	MAIN2105
980 M=XAJ+1.	MAIN2110
IF (M-JMAX) 1000,1000,990	MAIN2115
990 M=JMAX	MAIN2120
1000 IF (M-1) 1040,1010,1010	MAIN2125
1010 IB=10.*XAJ+1.	MAIN2130
NDEX=XAJ+1.	MAIN2135
DO 1030 L=1,M	MAIN2140
1020 PPAT=Q(I)*POW(IB)*SIG(K,L)	MAIN2145
PP(JZ,JA,NDEX)=PP(JZ,JA,NDEX)+PPAT	MAIN2150
EN(K,L)=EN(K,L)+PPAT	MAIN2155
CXY(IZ,IA,K)=CXY(IZ,IA,K)+PPAT	MAIN2160
CXYJ(IZ,IA) = CXYJ(IZ,IA)-PPAT	MAIN2165
CXYJ(KZ,JA) = CXYJ(KZ,JA) + PPAT	MAIN2170

IB=IB-10	MAIN2175
1030 NDEX=NDEX-1	MAIN2180
1040 DD=DD:1.0	MAIN2185
1050 CONTINUE	MAIN2190
1060 IF (LMXD(3).LT.1) GO TO 1150	MAIN2195
EXCZA = EXCZAD(1)	MAIN2200
IF (IKE.NE.1) GO TO 1070	MAIN2205
K3=4	MAIN2210
CALL SHAFT	MAIN2215
1070 IF (IZ.NE.1.OR.IA.NE.1) GO TO 1090	MAIN2220
1080 JMIN=1	MAIN2225
GO TO 1120	MAIN2230
1090 JP=EXCZA	MAIN2235
1100 JMIN=BAR-1.	MAIN2240
IF (JP-JMIN) 1150,1150,1110	MAIN2245
1110 IF (JP) 1120,1120,1140	MAIN2250
1120 JP=1	MAIN2255
IF (IPRINT.EQ.12.AND.JL.GT.1) GO TO 1140	MAIN2260
1130 WRITE(6,11600) (GAMPT(I),I=JMIN,JP)	MAIN2265
WRITE(6,10100) BARFAC,CLD,ANGN,ANGP,PLD	MAIN2270
1140 PS(IA)=AFIS	MAIN2275
PSXY(IZ,IA)=AFIS	MAIN2280
1150 CONTINUE	MAIN2285
1160 DO 1210 IA=1,NA	MAIN2290
SA=0.0	MAIN2295
1170 NDMX=MAX	MAIN2300
1180 DO 1190 NDEX=1,NDMX	MAIN2305
SA=SA+PP(1,IA,NDEX)	MAIN2310
1190 SP(NDEX)=SA	MAIN2315
1200 CX(IA)=CXYJ(IZ,IA) -FSXY(IZ,IA)	MAIN2320
IF (CX(IA).LT.0..AND.CX(IA).GT.-0.05) CX(IA)=0.	MAIN2325
1210 CONTINUE	MAIN2330
SMALL = 0.01*PP(1,1,1)	MAIN2335
IF (IZ.EQ.1.AND.CX(2).LE.SMALL) CX(2)=0.	MAIN2340
MAS=NIA-IZ+1	MAIN2345
K3=1	MAIN2350
CALL SHAFT	MAIN2355
DO 1220 IA=1,NA	MAIN2360
DO 1220 NDEX=1,300	MAIN2365
PP(1,IA,NDEX)=PP(2,IA,NDEX)	MAIN2370
PP(2,IA,NDEX)=PP(3,IA,NDEX)	MAIN2375
1220 PP(3,IA,NDEX)=0.0	MAIN2380
1230 CONTINUE	MAIN2385
IF (IPRINT.NE.13) GO TO 1260	MAIN2390
WRITE(6,10900)	MAIN2395
WRITE(6,10500)	MAIN2400
IA = 1	MAIN2405
IZ = 1	MAIN2410
1240 WRITE(6,10600) IA,IZ,GAMFN(IA,IZ), (GAMPT(LXQ,IA,IZ),LXQ=1,4),	MAIN2415
1 (ENLOSS(LYQ,IA,IZ),LYQ=1,4)	MAIN2420
WRITE(6,10900)	MAIN2425
WRITE(6,10700)	MAIN2430
DO 1250 IZ = 1,NZ	MAIN2435
DO 1250 IA = 1,NA	MAIN2440
IF (CXY(IZ,IA,1).LT.0.1E-20.AND.CXY(IZ,IA,2).LT.0.1E-	MAIN2445
1 20.AND.CXY(IZ,IA,3).LT.0.1E-20.AND.CXY(IZ,IA,4).LT.0.1E-20) GO	MAIN2450
1 TO 1250	MAIN2455
WRITE(6,10800) IZ,IA,PSXY(IZ,IA), (CXY(IZ,IA,LXQ),LXQ=1,4)	MAIN2460

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1250 CONTINUE                                MAIN2465
1260 CONTINUE                                MAIN2470
      IZ = NZ                                MAIN2475
      IA = NA                                MAIN2480
      IF (IKE.EQ.4) K3=4                     MAIN2485
      IF (IKE.EQ.4) CALL SHAFT                MAIN2490
      WRITE(6,11500)FISS                     MAIN2495
1270 CONTINUE                                MAIN2500
      IF (KPLT.GT.0) K2=2                     MAIN2505
      WRITE(6,11400) BILSUM                   MAIN2510
      GO TO 100                               MAIN2515
1280 IF (KPLT.GT.0) K2=3                     MAIN2520
      GO TO 10                               MAIN2525
      INTEGER INPUT/5/                       MAIN2530
10000 FORMAT(10F5.3)                        MAIN2535
10100 FORMAT(13X,'BARFAC = ',F5.3,10X,'CLD = ',F6.4,10X,'ANGN = ',F5.3,10X,'ANGP = ',F5.3,10X,'PLD = ',F6.3) MAIN2540
10200 FORMAT(6E10.3)                        MAIN2550
10300 FORMAT(2F5.1,4I5,6F5.1,2F3.0,F5.1,F3.0,I3) MAIN2555
10400 FORMAT(31X,'EXCITATION ENERGY OF COMPOUND NUCLEUS =',F6.1,1X,'MEV J=',I4/) MAIN2560
10500 FORMAT(2X,'BRANCHING RATIOS AT C.N. EX. ENGY / EXCITN, ETC, ARE F11ST-CHANCE EFFECTIVE EXCITATION ENERGIES FOR N-EMISSION,ETC',/ 1X,8X,'IA IZ GAMF/GAMT GAMN/GAMT GAMPR/GAMT 1/GAMT GAMD/GAMT EXCITN EXCITP EXCITA EXCITD'1) MAIN2570
10600 FORMAT(2I10,9E12.3)                   MAIN2575
10700 FORMAT(20X,'NON-RESIDUAL (TOTAL) CROSS SECTIONS. (NON-CUMULATIVE, THIS J ONLY)',/ 8X,'IZ IA SIGMFISS SIGMNEUT SIGMPR10T SIGMALPH SIGMDEUT') MAIN2580
10800 FORMAT(2I10,5E12.3)                   MAIN2585
10900 FORMAT(2H )                           MAIN2590
11000 FORMAT(33X,'COMPOUND NUCLEUS ATOMIC NUMBER = ',I3,1X,' MASS NUMBER = ',I3/) MAIN2595
11100 FORMAT(39X,'COMPOUND NUCLEUS CROSS SECTION =',E10.3/) MAIN2600
11200 FORMAT(7F5.1,7I5,F5.1,I5)             MAIN2605
11300 FORMAT(50X,'EVAPORATION CODE ORNL ALICE ',//,' THIS CODE IS DESCHAINED IN REPORT ORNL-TM-6054 ',//,' USERS SENDING LETTER TO F.PLASIL WILL BE ADVISED OF FUTURE CORRECTIONS OR IMPROVEMENTS1 TO THIS CODE. MAILING ADDRESS IS:',//50X,' F.PLASIL',//50X,' OAK RIDGE NATIONAL LABORATORY',//50X,' BLDG 6003, P.O. BOX X',//51X,' OAK RIDGE, TENN, 37830, USA') MAIN2610
11400 FORMAT(22H0SUM CROSS SECTIONS = E10.3/2H1 ) MAIN2615
11500 FORMAT(31H TOTAL FISSION CROSS SECTION = E10.3) MAIN2620
11600 FORMAT(48X,'GAMF/GAMTOT = ',E10.3)    MAIN2625
11700 FORMAT(/33X,1X,'INVERSE REACTION CROSS SECTIONS WERE PROVIDED BY USER'/) MAIN2630
11800 FORMAT(44X,'REACTION CROSS SECTION = ',F8.1/) MAIN2635
11900 FORMAT(' DAS IST ALICE DAS IST ALICE DAS IST ALICE DAS IST ALICE') MAIN2640
      END                                    MAIN2645
CSHAFT                                       SHAP 0
      SUBROUTINE SHAFT                       SHAP 5
      DIMENSION MS(22)                     SHAP 10
      COMMON/PL7/MAS                        SHAP 15
      COMMON/S1/JFRAC,JUPPER               SHAP 20
      COMMON/PL8/JANNA(17,24),NULIM(17,24) SHAP 25
      COMMON/UG/IZ,IA,IPRINT               SHAP 30
      COMMON/SS/SOR,RR                     SHAP 35

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COMMON/SHFT/QVAL,AP,AT,ZP,ZT,CLD,MC,MP,INVER,IKE,IPCH,BARFAC	SHAP 40
COMMON/LYM1/BE(15,22,4)	SHAP 45
COMMON/PL3/EB(20),RCSP(20),ZEE,AMASS,PLEX,NEPR	SHAP 50
COMMON/PAR3/EQ,SIGML(300),ACRS(300)	SHAP 55
COMMON/SPT5/EXC(17,24),XMAX	SHAP 60
COMMON/PL5/TITLE(20),NA,NZ	SHAP 65
COMMON/SP6/AOZ,ZOZ,EN(4,50)	SHAP 70
COMMON/LAB3/SIG(4,50)	SHAP 75
COMMON/NHY/TD,EX1,EX2,TMX,AV,GAV,IJ,COST,JL,JI,JJ,B(2)	SHAP 80
COMMON/NHY2/GDO	SHAP 85
COMMON/SPT9/K5,PLD,JMAX,C(4),DELT,ALT	SHAP 90
COMMON/SP/M3	SHAP 95
COMMON/LAB10/POW(3000),GAM(3000)	SHAP 100
COMMON/PL4/CRS(22,15)	SHAP 105
COMMON/HJK/RCSS,JANG	SHAP 110
COMMON/SHFT2/K3,FS(22),DSP(22),BRR(22),DER(22),ER(22),FISS,SUMIZ	SHAP 115
1 CX(22),BILSUM,JCAL,XMISS	SHAP 120
IF (K3.EQ.1) GO TO 90	SHAP 125
IF (K3.EQ.2) GO TO 200	SHAP 130
IF (K3.EQ.3) GO TO 340	SHAP 135
IF (K3.EQ.4) GO TO 510	SHAP 140
READ(INPUT,10000) TITLE	SHAP 145
WRITE(6,12600)TITLE	SHAP 150
WRITE(6,12400)QVAL,AP,AT,ZP,ZT,CLD,NA,NZ,MC,MP,INVER,IKE,IPCH	SHAP 155
IF (BARFAC.EQ.0.) BARFAC=1.	SHAP 160
WRITE(6,12500)BARFAC	SHAP 165
IF (NZ.GT.15) WRITE(6,10100)	SHAP 170
IF (NA.GT.22) WRITE(6,10200)	SHAP 175
IF (NZ.GT.15) NZ=15	SHAP 180
IF (NA.GT.22) NA=22	SHAP 185
IF (M3.GT.4) M3=3	SHAP 190
IF (M3.EQ.0) M3=3	SHAP 195
IF (PLD.EQ.0.) PLD=8.	SHAP 200
AMASS=AP+AT	SHAP 205
ZEE=ZP+ZT	SHAP 210
RR=AMASS/PLD	SHAP 215
JMAX=(ZEE-10.)*0.5+15.	SHAP 220
IF (JMAX.GT.48) JMAX=48	SHAP 225
IF (INVER.GT.0) JMAX=48	SHAP 230
IF (JMAX.LT.20) JMAX=20	SHAP 235
IF (NA.GT.0.AND.NZ.GT.0) GO TO 20	SHAP 240
10 NZ=5	SHAP 245
PLEX=NZ	SHAP 250
NA=10	SHAP 255
20 IF (CLD) 30,30,40	SHAP 260
30 CLD=1.	SHAP 265
WRITE(6,13100)	SHAP 270
40 CONTINUE	SHAP 275
DO 50 KK=1,17	SHAP 280
DO 50 JJ=1,24	SHAP 285
50 EXC(KK,JJ)=0.	SHAP 290
IF (K5.EQ.0) GO TO 60	SHAP 295
RETURN	SHAP 300
60 SOR=SQRT(RR*150.)	SHAP 305
DO 70 IB=1,3000	SHAP 310
BJ=IB	SHAP 315
BJ=DJ/10.	SHAP 320
SQ=SQRT(RR*BJ)	SHAP 325

SQ=SQ+SQ-SOR	SHAP 330
70 POW(IB)=(1./(BJ*BJ+1.))*EXP(SQ)	SHAP 335
CONST=33.0	SHAP 340
RF=CLD*RR	SHAP 345
SPR=SOR	SHAP 350
GAM(1)=0.	SHAP 355
DO 80 IB=2,3000	SHAP 360
BJ=IB	SHAP 365
BJ=BJ/10.	SHAP 370
SR=SQRT(RF*BJ)	SHAP 375
SR=SR+SR-SPR	SHAP 380
80 GAM(IB)=CONST*(1./(BJ*BJ+1.))*EXP(SR)+GAM(IB-1)	SHAP 385
K5=1	SHAP 390
RETURN	SHAP 395
90 K3=0	SHAP 400
MS(1)=MAS	SHAP 405
DO 100 IN=2,22	SHAP 410
100 MS(IN)=MS(1)-IN+1	SHAP 415
DO 110 IM=1,NA	SHAP 420
SUMIZ = SUMIZ + CX(IM)	SHAP 425
IF (IZ.EQ.1.AND.IM.EQ.1) GO TO 110	SHAP 430
CRS(IM,IZ)=CRS(IM,IZ)+CX(IM)	SHAP 435
110 CONTINUE	SHAP 440
DO 120 M=1,NA	SHAP 445
120 BILSUM=BILSUM + CX(M)	SHAP 450
IIZ=Z0Z	SHAP 455
IF (IPRINT.EQ.11.AND.JL.NE.JJ) GO TO 190	SHAP 460
IF (IPRINT.EQ.12.AND.JL.NE.JJ) RETURN	SHAP 465
WRITE(6,12700) IIZ,IIZ,IIZ,IIZ,IIZ,IIZ,IIZ,IIZ,IIZ,IIZ,IIZ,IIZ	SHAP 470
NB=1	SHAP 475
NC=NA	SHAP 480
IF (NA.LE.11) GO TO 130	SHAP 485
NC=11	SHAP 490
130 WRITE(6,12800) (MS(IN),IN=NB,NC)	SHAP 495
140 WRITE(6,12900) (CX(N),N=NB,NC)	SHAP 500
150 IF (JCAL) 160,160,180	SHAP 505
160 WRITE(6,13000) (CRS(I,IZ),I=NB,NC)	SHAP 510
170 WRITE(6,13300) (PS(IA),IA=NB,NC)	SHAP 515
WRITE(6,13500) (DSP(IA),IA=NB,NC)	SHAP 520
WRITE(6,13400) (BRR(IA),IA=NB,NC)	SHAP 525
WRITE(6,13600) (DER(IA),IA=NB,NC)	SHAP 530
WRITE(6,13700) (ER(IA),IA=NB,NC)	SHAP 535
180 IF (NC.EQ.NA) GO TO 190	SHAP 540
NB = 12	SHAP 545
NC = NA	SHAP 550
GO TO 130	SHAP 555
190 XMISS=CRS(1,1)-FISS-SUMIZ	SHAP 560
WRITE(6,13800) FISS ,SUMIZ,XMISS	SHAP 565
RETURN	SHAP 570
200 NZ=NZ+1	SHAP 575
NA=NA+1	SHAP 580
DO 210 IZ=1,15	SHAP 585
DO 210 IA=1,22	SHAP 590
210 CRS(IA,IZ)=0.	SHAP 595
220 EXC(1,1)=XMAX	SHAP 600
230 DO 240 IZ=2,NZ	SHAP 605
240 EXC(IZ,1)=EXC(IZ-1,1)-BE(IZ-1,1,2)	SHAP 610
NZ=NZ-1	SHAP 615

250 NNA=NA-1	SHAP 620
260 DO 280 IZ=1,NZ	SHAP 625
270 DO 280 IA=1,NNA	SHAP 630
280 EXC (IZ,IA+1)=EXC (IZ,IA) -BE (IZ,IA, 1)	SHAP 635
290 NZ=NZ+1	SHAP 640
300 DO 310 IA=1,NNA	SHAP 645
310 EXC (NZ,IA)=EXC (NZ-1,IA) -BE (NZ-1,IA,2)	SHAP 650
DO 320 NDL = 3,15,2	SHAP 655
IF (NZ.LT.NDL.OR.NA.LT.NDL) GO TO 330	SHAP 660
DO 320 IZ = NDL,NZ	SHAP 665
DO 320 IA = NDL,NA	SHAP 670
320 EXC (IZ,IA) = EXC (IZ,IA) + 28.3	SHAP 675
330 NZ=NZ-1	SHAP 680
NA=NA-1	SHAP 685
WRITE (6,11200) EQ,AT,AMASS,QVAL	SHAP 690
WRITE (6,10400) JCAL,JPRAC,JUPPER,JANG	SHAP 695
IF (XMAX.GT.299.) WRITE (6,10300)	SHAP 700
IF (XMAX.GT.299.) RETURN	SHAP 705
IF (RCSS.NE.0.) WRITE (6,11300)	SHAP 710
IF (JCAL.NE.1) GDO=0.	SHAP 715
IF (JCAL.LE.0) WRITE (6,11600)	SHAP 720
IF (JCAL.EQ.1.AND.TD.EQ.0.) WRITE (6,11700)	SHAP 725
IF (JCAL.EQ.2) WRITE (6,11000)	SHAP 730
IF (JCAL.EQ.3) WRITE (6,11100)	SHAP 735
IF (JANG.GT.0) WRITE (6,11400)	SHAP 740
IF (TD.GT.0..AND.TMX.LE.1.) WRITE (6,11500)	SHAP 745
IF (TD.GT.0..AND.TMX.GT.1.) WRITE (6,11800)	SHAP 750
IF (TD.GT.0.) WRITE (6,10500)	SHAP 755
CCCC=COST+1.	SHAP 760
IF (TD.GT.0.) WRITE (6,10600) CCCC	SHAP 765
IF (TD.GT.0..AND.AV.EQ.0.) WRITE (6,10700)	SHAP 770
IF (AV.EQ.0..AND.TD.GT.0..AND.XMAX.GT.55) WRITE (6,10800)	SHAP 775
IF (TD.GT.0.) WRITE (6,10900) TD,EX1,EX2,TMX,AV,GAV,COST,GDO,IJ	SHAP 780
K3=0	SHAP 785
RETURN	SHAP 790
340 DO 350 IZ=1,17	SHAP 795
DO 350 IA=1,24	SHAP 800
NULIM (IZ,IA)=1	SHAP 805
350 JAMMA (IZ,IA)=1	SHAP 810
DELT = 0.0	SHAP 815
ALT = 0.0	SHAP 820
DO 380 L=1,JMAX	SHAP 825
DO 380 K = 1,3	SHAP 830
IF (K-2) 380,360,370	SHAP 835
360 IF (SIG (K,L).IE.0.0) DELT = DELT + 1.0	SHAP 840
GO TO 380	SHAP 845
370 IF (SIG (K,L).IE.0.0) ALT =ALT + 1.0	SHAP 850
380 CONTINUE	SHAP 855
390 DO 400 K=1,M3	SHAP 860
DO 400 JE=JMAX,50	SHAP 865
400 SIG (K,JE)=SIG (K,JMAX)	SHAP 870
IF (M3.LT.3) ALT=48.	SHAP 875
JMAX=50	SHAP 880
DELT=DELT+.1	SHAP 885
ALT=ALT+.1	SHAP 890
WRITE (6,13200) DELT,ALT,CLD	SHAP 895
DO 460 IZ=1,NZ	SHAP 900
DO 460 IA=1,NA	SHAP 905

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      IF (BE(IZ,IA,1)-(BE(IZ,IA,2)+DELT)) 410,420,420      SHAP 910
410 IF (BE(IZ,IA,1)-(BE(IZ,IA,3)+ALT)) 440,440,420      SHAP 915
420 IF (BE(IZ,IA,2)+DELT-(BE(IZ,IA,3)+ALT)) 450,450,430  SHAP 920
430 JAMMA(IZ,IA)=BE(IZ,IA,3)+ALT      SHAP 925
      GO TO 460      SHAP 930
440 JAMMA(IZ,IA)=BE(IZ,IA,1)+.1      SHAP 935
      GO TO 460      SHAP 940
450 JAMMA(IZ,IA)=BE(IZ,IA,2)+DELT      SHAP 945
460 JAMMA(IZ,IA)=JAMMA(IZ,IA)+1.      SHAP 950
      DO 480 IZ=1,NZ      SHAP 955
      DO 480 IA=1,NA      SHAP 960
      IF (JAMMA(IZ,IA)) 470,470,480      SHAP 965
470 WRITE(6,11900)IZ,IA      SHAP 970
      JAMMA(IZ,IA)=1      SHAP 975
480 CONTINUE      SHAP 980
490 C(1)=(AMASS-1.)/AMASS      SHAP 985
      C(2)=C(1)      SHAP 990
      C(3)=2.*(AMASS-4.)/AMASS      SHAP 995
      C(4)=3.*(AMASS-2.)/AMASS      SHAP1000
      DO 500L=1,50      SHAP1005
      BL=L      SHAP1010
      BL=BL-.9      SHAP1015
      DO 500 K=1,M3      SHAP1020
500 SIG(K,L)=C(K)*SIG(K,L)*BL      SHAP1025
      K3=0      SHAP1030
      RETURN      SHAP1035
510 IF (IKE.EQ.4.AND.IA.EQ.NA.AND.IZ.EQ.NZ) WRITE(6,12000) SHAP1040
      IF (IKE.EQ.4.AND.IA.NE.NA.OR.IZ.NE.NZ) RETURN      SHAP1045
      WRITE(6,12100)AOZ,ZOZ      SHAP1050
      WRITE(6,12200)      SHAP1055
      DO 520 KEE=1,40      SHAP1060
      CMS=EN(1,KEE)+EN(2,KEE)+EN(3,KEE)+EN(4,KEE)      SHAP1065
      IF (CMS.EQ.0.) GO TO 530      SHAP1070
520 WRITE(6,12300)KEE,EN(1,KEE),EN(2,KEE),EN(3,KEE),EN(4,KEE) SHAP1075
530 CONTINUE      SHAP1080
      K3=0      SHAP1085
      RETURN      SHAP1090
      INTEGER INPUT/5/      SHAP1095
10000 FORMAT(20A4)      SHAP1100
10100 FORMAT(' NZ EXCEEDS DIMENSIONED LIMIT. DEFAULT TO NZ=15') SHAP1105
10200 FORMAT(' NA EXCEEDS DIMENSIONED LIMIT. DEFAULT TO 22.INQUIRE INTO SHAP1110
      1CODE -BIG ALICE-FOR GREATER DIMENSION LIMITS')      SHAP1115
10300 FORMAT(25X,'EXCITATION ENERGY EXCEEDS DIMENSIONED LIMIT. CALCULAT SHAP1120
      1ION AT THIS ENERGY TERMINATED.')      SHAP1125
10400 FORMAT(//////32X,' JCAL=',I5,' START J=',I5,' STOP J =',I5, SHAP1130
      1 ' JANG =',I5/)      SHAP1135
10500 FORMAT(' THE FOLLOWING PARAMETER VALUES WERE SELECTED FOR THE P-ECSHAP1140
      1OMPOUND CALCULATION')      SHAP1145
10600 FORMAT(' MEAN FREE PATH MULTIPLIER IS = ',F10.3)      SHAP1150
10700 FORMAT(' INTRANUCLEAR TRANSITION RATES WERE CALCULATED USING THE ISHAP1155
      1MAGINARY OPTICAL POTENTIAL')      SHAP1160
10800 FORMAT(' WARNING:THE IMAGINARY OPTICAL POTENTIAL PARAMETER SET MAYSHAP1165
      1 BE INVALID ABOVE 55 MEV CHANNEL ENERGY.')      SHAP1170
10900 FORMAT(' TD= ',F5.2,' EX1= ',F5.2,' EX2= ',F5.2,' THX= ',F5.2, SHAP1175
      1 ' AV= ',F5.2,' GAV= ',F5.2,' COST= ',F5.2,' GDO= ',F5.2,' IJ= ', SHAP1180
      1 I5)      SHAP1185
11000 FORMAT(' S WAVE APPROXIMATION WITH ROTATING LIQUID DROP MOMENT OF SHAP1190
      1INERTIA AT EQUILIBRIUM DEFORMATION ')      SHAP1195

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11100 FORMAT(' S WAVE APPROXIMATION WITH RIGID ROTOR MOMENT OF INERTIA') SHAP1200
11200 FORMAT (28X,'LABORATORY BOMBARDMENT ENERGY = ',F6.1,'MEV',3X, SHAP1205
1 'TARGET MASS = ',F6.1, '//22X,'COMPOUND NUCLEUS MASS = ',F6.1,2X, SHAP1210
1 'COMPOUND NUCLEUS FORMATION Q VALUE = ',F6.1/) SHAP1215
11300 FORMAT (36X,'COMPOUND NUCLEUS CROSS SECTION PROVIDED BY USER') SHAP1220
11400 FORMAT(41H OPTION PARTICLES REMOVE ANGULAR MOMENTUM) SHAP1225
11500 FORMAT(' HYBRID CALCULATION HAS BEEN SELECTED ') SHAP1230
11600 FORMAT(' CALCULATION INCLUDES FISSION COMPETITION') SHAP1235
11700 FORMAT(' STANDARD WEISSKOPF-EWING OPTION SELECTED') SHAP1240
11800 FORMAT(' GEOMETRY DEPENDENT HYBRID MODEL SELECTED') SHAP1245
11900 FORMAT(' CROSS SECTION FOR NUCLIDE OF IZ = ',I2,' AND IA = ',I2, SHAP1250
1 ' WILL BE MEANINGLESS DUE TO NEGATIVE BINDING ENERGY') SHAP1255
12000 FORMAT(' PARTICLE SPECTRA ARE SUMMED OVER ALL EMITTING NUCLEI') SHAP1260
12100 FORMAT(' KINETIC ENERGY SPECTRA FROM A = ',F5.1,' Z = ',F5.1,' (NOSHAP1265
1TE THAT ACTUAL CHANNEL ENERGY EQUALS KE INDEX LESS 0.9 MEV)') SHAP1270
12200 FORMAT(' KE DS/DE (MB/MEV): NEUTRONS PROTONS ALPHAS SHAP1275
1DEUTERONS') SHAP1280
12300 FORMAT(' ',I3,' ',E10.3,' ',E10.3,' ',E10.3, SHAP1285
1 ' ',E10.3) SHAP1290
12400 FORMAT(/34X,'QVAL = ',F5.1,' AP = ',F5.1,' AT = ',F5.1,' ZP = ', SHAP1295
1 F5.1,2X,'ZT = ',F5.1/15X,' CLD = ',F5.1,' NA = ',I5,' NZ = ',I5, SHAP1300
1 ' MC = ',I5,' MP = ',I5,' INVER = ',I5,' IKE = ',I5,' IPCH = ', SHAP1305
1 I5) SHAP1310
12500 FORMAT(' BARRIER=LIQUID DROP BARRIER*',F5.3) SHAP1315
12600 FORMAT(///20A4///) SHAP1320
12700 FORMAT(15H0ATOMIC NUMBER I7,10(7X,I3)) SHAP1325
12800 FORMAT(' MASS NUMBER',11(7X,I3)) SHAP1330
12900 FORMAT(15H CROSS SECTION E10.3,10( E10.3)) SHAP1335
13000 FORMAT(' CUMLTV.CRSSEC ',11(E10.3)) SHAP1340
13100 FORMAT (20X,'RATIO OF FISSION TO NUCLEON SINGLE PARTICLE DENSITIES SHAP1345
1S WAS SET EQUAL TO 1 BY DEFAULT OPTION') SHAP1350
13200 FORMAT (34X,'DELT = ',F10.5,2X,'ALT = ',F10.5,2X,'CLD = ',F10.5/) SHAP1355
13300 FORMAT(15H FISSION X SECT 11E10.3) SHAP1360
13400 FORMAT(15H FISSION BARRIER 11E10.3) SHAP1365
13500 FORMAT(15H DEL SADDLE PT 11E10.3) SHAP1370
13600 FORMAT(15H DEL ROTATION 11E10.3) SHAP1375
13700 FORMAT(15H ROTATIONAL EN 11E10.3/) SHAP1380
13800 FORMAT(' FISSION CROSS SECTION TO HERE=',E10.3,2X, SHAP1385
1 ' SUM CROSS SECTION =',E10.3,2X,' MISSING CROSS SECTION =',E10.3) SHAP1390
END SHAP1395
COVER OVER 0
SUDROUTINE OVER OVER 5
C CALCULATES THE TRANSMISSION COEFFICIENTS OVER 10
COMMON/PL3/EB(20),RCSP(20),ZEE,AMASS,PLEX,NEPR OVER 15
COMMON/SP/M3 OVER 20
COMMON/SPT9/K5,PLD,JMAX,C(4),DELT,ALT OVER 25
COMMON/PARO/PQ,CROSS OVER 30
COMMON/LAB3/SIG(4,50) OVER 35
COMMON/PAR3/DQ,TL(300),ACRS(300) OVER 40
COMMON /LAB2/T(2,31),V(15),V1(3),BR(2,31),BI(2,31) OVER 45
EQ=PQ OVER 50
JMIN=1 OVER 55
M2=1 OVER 60
AM = AMASS*.333333 OVER 65
IF (EQ.GT.0.) M2=M3 OVER 70
IF (EQ.GT.0.) JMIN=JMAX OVER 75
IF (EQ.GT.0.) GO TO 10 OVER 80
DELT=0.0 OVER 85

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ALT=0.0	OVER 90
II=0.14*ZEE	OVER 95
IK=II/2	OVER 100
10 DO 240 K=M2,M3	OVER 105
TSUM=0.	OVER 110
GO TO (20,30,40,50),K	OVER 115
20 XJP=0.50	OVER 120
XMP=1.00	OVER 125
XMT=AMASS-1.0	OVER 130
ZP=0.0	OVER 135
ZT=ZEE	OVER 140
P=48.00	OVER 145
RV = 1.322 -0.00076*AMASS + 4.0* AMASS*AMASS*1.0E-06-8.0*(AMASS**	OVER 150
1 3)*1.0E-09	OVER 155
AV=.650	OVER 160
W=5.750	OVER 165
RW = 1.266- 0.00037*AMASS+2.*AMASS*AMASS*1.E-06-4.* (AMASS**3)*1.E-	OVER 170
1 09	OVER 175
AW=0.70	OVER 180
VSO=5.50	OVER 185
RSO=1.25	OVER 190
ASO=0.70	OVER 195
RCLMB=.001	OVER 200
S=1.00	OVER 205
XLH=20.0	OVER 210
GO TO 60	OVER 215
30 XJP=0.50	OVER 220
RSO=1.25	OVER 225
XMP=1.00	OVER 230
XMT=AMASS-1.0	OVER 235
ZP=1.0	OVER 240
ZT=ZEE-1.0	OVER 245
P=49.0	OVER 250
RV=1.285	OVER 255
AV=.650	OVER 260
W=10.80	OVER 265
RW=1.285	OVER 270
AW=.530	OVER 275
VSO=5.60	OVER 280
ASO=.530	OVER 285
RCLMB=1.285	OVER 290
S=1.00	OVER 295
XLH=20.0	OVER 300
DELPD=27.*(AMASS-2.*ZEE)/AMASS-4.*ZEE/AM	OVER 305
GO TO 60	OVER 310
40 XJP=0.0	OVER 315
XMP=4.0	OVER 320
XMT=AMASS-4.0	OVER 325
ZP=2.00	OVER 330
ZT=ZEE-2.0	OVER 335
P=45.0	OVER 340
RV=1.660	OVER 345
AV=.560	OVER 350
W=10.00	OVER 355
RW=1.660	OVER 360
AW=.560	OVER 365
RSO=1.	OVER 370
VSO=.001	OVER 375

ASO=1.0	OVER 380
RCLMB=1.30	OVER 385
S=0.0	OVER 390
XLH=30.0	OVER 395
GO TO 60	OVER 400
50 XJP=1.00	OVER 405
XMP=2.00	OVER 410
XMT=AMASS-2.	OVER 415
ZP=1.	OVER 420
ZT=ZEE-1.	OVER 425
P=45.	OVER 430
RV=1.66	OVER 435
AV=.56	OVER 440
W=10.	OVER 445
RW=1.66	OVER 450
AW=.56	OVER 455
RSO=1.25	OVER 460
VSO=5.6	OVER 465
ASO=.53	OVER 470
RCLMB=1.285	OVER 475
S=1.00	OVER 480
XLH=25.	OVER 485
60 XP=XMT**.3333	OVER 490
XN=XMT/(XMT + XMP)	OVER 495
XJT=0.0	OVER 500
DO 180 JE=JMIN,JMAX	OVER 505
ENGY=JE	OVER 510
ENGY=ENGY-.9	OVER 515
IF (EQ.GT.0.) ENGY=EQ	OVER 520
E=ENGY	OVER 525
IF (EQ.GT.0.) GO TO 70	OVER 530
IF (K.EQ.2.AND.JE.LE.IK) GO TO 130	OVER 535
IF (K.EQ.4.AND.JE.LE.IK) GO TO 130	OVER 540
IF (K.EQ.3.AND.JE.LE.II) GO TO 130	OVER 545
IF (K.EQ.1) P=47.-.267*E	OVER 550
IF (K.EQ.1) W = 9.52-.053*E	OVER 555
IF (K.EQ.2) P=53.3-.55*E+DELPD	OVER 560
70 V(1)=RV*XP	OVER 565
V(2)=AV	OVER 570
V(3)=RW*XP	OVER 575
V(4)=AW	OVER 580
V(5)=S	OVER 585
V(6)=VSO	OVER 590
V(9)=RCLMB*XP	OVER 595
V(10)=RSO*XP	OVER 600
V(11)=ASO	OVER 605
V1(1)=XJP	OVER 610
V1(2)=+0.0	OVER 615
W1=0.04783258*XMP*XN	OVER 620
STPLTH=0.1	OVER 625
V1(3)=XLH	OVER 630
V(7)=P	OVER 635
V(8)=W	OVER 640
H4=0.04783*XMP*(XM**2)*E	OVER 645
H1=SQRT(H4)	OVER 650
Z=(0.03478*ZP*ZT*XMP*XN)/H1	OVER 655
C6=31.42/H4	OVER 660
DO 80 J=1,2	OVER 665

DO 80 I=1,31	OVER 670
80 T(J,I)=0.0	OVER 675
CALL TLJ(H4,N1,J1,H1,Z,W1,STPLTH)	OVER 680
TSUM=0.0	OVER 685
INTRPO=2.*XJP	OVER 690
IF (INTRPO-1) 110,90,90	OVER 695
90 DO 100 I=1,30	OVER 700
TK=I-1	OVER 705
TL(I) = C6* (T(1,I)*TK +T(2,I)*(TK+1.))	OVER 710
100 TSUM=TSUM+TL(I)	OVER 715
GO TO 130	OVER 720
110 DO 120 I=1,30	OVER 725
120 TSUM = TSUM+T(1,I)*C6*(2*I-1)	OVER 730
130 CONTINUE	OVER 735
IF (TSUM.GT.1.0) GO TO 170	OVER 740
GO TO (170,140,150,160),K	OVER 745
140 DELT=DELT+1.0	OVER 750
TSUM =0.0	OVER 755
GO TO 170	OVER 760
150 ALT=ALT+1.0	OVER 765
TSUM =0.0	OVER 770
GO TO 170	OVER 775
160 TSUM=0.	OVER 780
170 IF (EQ.EQ.0.) SIG(K,JE)=TSUM	OVER 785
IF (EQ.GT.0.) CROSS=TSUM	OVER 790
IF (EQ.GT.0.) JJ=I	OVER 795
180 CONTINUE	OVER 800
IF (EQ.GT.0.) GO TO 260	OVER 805
GO TO (190,200,210,220),K	OVER 810
190 WRITE(6,10000)	OVER 815
GO TO 230	OVER 820
200 WRITE(6,10100)	OVER 825
GO TO 230	OVER 830
210 WRITE(6,10200)	OVER 835
GO TO 230	OVER 840
220 WRITE(6,10300)	OVER 845
230 WRITE(6,10400)JMAX	OVER 850
WRITE(6,10500) (SIG(K,JE),JE=1,JMAX)	OVER 855
240 CONTINUE	OVER 860
250 RETURN	OVER 865
260 WRITE(6,10600)CROSS	OVER 870
EQ=0.	OVER 875
WRITE(6,10700)	OVER 880
WRITE(6,10500) (TL(I),I=1,30)	OVER 885
GO TO 250	OVER 890
10000 FORMAT(/,45X,'NEUTRON INVERSE CROSS SECTIONS'/)	OVER 895
10100 FORMAT(/,45X,'PROTON INVERSE CROSS SECTIONS'/)	OVER 900
10200 FORMAT(/,46X,'ALPHA INVERSE CROSS SECTIONS'/)	OVER 905
10300 FORMAT(/,45X,'DEUTERON INVERSE CROSS SECTIONS'/)	OVER 910
10400 FORMAT(1H0'INVERSE REACTION CROSS SECT. FOR E=1 TO',I3,3HMEV)	OVER 915
10500 FORMAT(1H,10F7.0)	OVER 920
10600 FORMAT(' REACTION CROSS SECTION COMPUTED BY OPTICAL MODEL SUBROUTIO	OVER 925
1NE',F10.2,' MB')	OVER 930
10700 FORMAT(' PARTIAL REACTION CROSS SECTIONS,L=0 TO LMAX ')	OVER 935
END	OVER 940
CLYMASS	LYMA 0
SUBROUTINE LYMASS(ZEE,ANASS,NZ,NA,NC,MP,AP,AT,ZP,ZT,QVAL)	LYMA 5
DIMENSION EM(10),XK(10),Y(2),F(2),XMS(24,17),EMP(10)	LYMA 10

DIMENSION XQ(20)	LYMA 15
COMMON/LYM1/BE(15,22,4)	LYMA 20
COMMON/SF/M3	LYMA 25
EM(1)=0.0	LYMA 30
EM(2)=2.0	LYMA 35
EM(3)=8.0	LYMA 40
EM(4)=14.0	LYMA 45
EM(5)=28.0	LYMA 50
EM(6)=50.0	LYMA 55
EM(7)=82.0	LYMA 60
EM(8)=126.0	LYMA 65
EM(9)=184.0	LYMA 70
EM(10)=258.0	LYMA 75
CAY1=1.15303	LYMA 80
CAY2=0.0	LYMA 85
CAY3=200.0	LYMA 90
CAY4=11.0	LYMA 95
CAY5=8.07144	LYMA 100
CAY6=7.28899	LYMA 105
GAMMA=1.7826	LYMA 110
A1=15.4941	LYMA 115
A2=17.9439	LYMA 120
A3=0.7053	LYMA 125
D=0.444	LYMA 130
C=5.8	LYMA 135
SHALC=0.325	LYMA 140
IF (MP) 10,10,20	LYMA 145
10 CAY4=0.0	LYMA 150
20 CONTINUE	LYMA 155
DO 30 I=1,10	LYMA 160
EMP(I)=EM(I)**(5.0/3.0)	LYMA 165
30 CONTINUE	LYMA 170
DO 40 I=1,9	LYMA 175
XK(I)=0.6*(EMP(I+1)-EMP(I))/(EM(I+1)-EM(I))	LYMA 180
40 CONTINUE	LYMA 185
RZ=.863987/A3	LYMA 190
L=0	LYMA 195
Z=1.0	LYMA 200
50 KZ=ZEE	LYMA 205
KA=AMASS	LYMA 210
IF (MC.EQ.2.AND.QVAL.NE.0.) GO TO 440	LYMA 215
IF (QVAL) 70,60,70	LYMA 220
60 NNZ=3	LYMA 225
NNA=1	LYMA 230
GO TO 130	LYMA 235
70 NNZ=NNZ+2	LYMA 240
NNA=NNA+2	LYMA 245
WRITE(6,10400)	LYMA 250
IF (MC) 90,90,80	LYMA 255
80 WRITE(6,10000)	LYMA 260
GO TO 100	LYMA 265
90 WRITE(6,10100)	LYMA 270
100 IF (MP) 110,110,120	LYMA 275
110 WRITE(6,10200)	LYMA 280
GO TO 130	LYMA 285
120 WRITE(6,10300)	LYMA 290
130 DO 380 JZ=1,NNZ	LYMA 295
DO 380 JA=1,NNA	LYMA 300

IF (QVAL) 180,140,180	LYMA 305
140 IF (JZ-2) 150,160,170	LYMA 310
150 Z=ZEE	LYMA 315
A=AMASS	LYMA 320
IA=A	LYMA 325
IZ=Z	LYMA 330
N=IA-IZ	LYMA 335
UN=AMASS-ZEE	LYMA 340
GO TO 200	LYMA 345
160 Z=ZT	LYMA 350
A=AT	LYMA 355
IA=A	LYMA 360
IZ=Z	LYMA 365
N=IA-IZ	LYMA 370
UN=AT-ZT	LYMA 375
GO TO 200	LYMA 380
170 Z=ZP	LYMA 385
A=AP	LYMA 390
IZ=Z	LYMA 395
IA=A	LYMA 400
N=IA-IZ	LYMA 405
UN=AP-ZP	LYMA 410
GO TO 200	LYMA 415
180 IA=KA+2-JA-JZ	LYMA 420
IZ=KZ+1-JZ	LYMA 425
N=IA-IZ	LYMA 430
190 Z=IZ	LYMA 435
UN=N	LYMA 440
A=IA	LYMA 445
200 A3RT=A**(1.0/3.0)	LYMA 450
A2RT=SQRT(A)	LYMA 455
A3RT2=A3RT**2.0	LYMA 460
ZSQ=Z**2.0	LYMA 465
SYH=((UN-Z)/A)**2	LYMA 470
ACOR=1.0-GAMMA*SYH	LYMA 475
PARNAS=CAY5*UN+CAY6*Z	LYMA 480
VOLNUC=-1.0*A1*ACOR*A	LYMA 485
SUPNUC=A2*ACOR*A3RT2	LYMA 490
COULMB=A3*ZSQ/A3RT	LYMA 495
FUZSUR=-1.0*CAY1*ZSQ/A	LYMA 500
ODDEV=-1.0*(1.0+2.0*(N/2)-UN+2.0*(IZ/2)-Z)/SQRT(A)*CAY4	LYMA 505
IF (SYH.GT.0.4) WTERM=0.	LYMA 510
IF (SYH.GT.0.4) GO TO 210	LYMA 515
WTERM=-1.*CAY2*A3RT2*EXP(-1.*CAY3*SYH)	LYMA 520
210 CONTINUE	LYMA 525
WOTNUC=PARNAS+COULMB+FUZSUR+ODDEV+WTERM	LYMA 530
SHASS=WOTNUC+VOLNUC+SUPNUC	LYMA 535
XMS(JA,JZ)=SHASS	LYMA 540
XQ(JZ)=SHASS	LYMA 545
IF (MC) 220,220,380	LYMA 550
220 CONTINUE	LYMA 555
C2=(SUPNUC+WTERM)/(A**(2.0/3.0))	LYMA 560
X=COULMB/(2.0*(SUPNUC+WTERM))	LYMA 565
230 BARR=0.0	LYMA 570
240 Y(1)=UN	LYMA 575
Y(2)=Z	LYMA 580
DO 280 J=1,2	LYMA 585
DO 250 I=1,9	LYMA 590

IF (Y(J)-EM(I+1)) 270,270,250	LYMA 595
250 CONTINUE	LYMA 600
260 STOP	LYMA 605
270 F(J)=XK(I)*(Y(J)-EM(I))- .6*(Y(J)**(5./3.)-EMP(I))	LYMA 610
280 CONTINUE	LYMA 615
S=(2.0/A)**(2.0/3.0)*(F(1)+F(2))-SHALC*A**(1./3.)	LYMA 620
EE=2.*C2*D**2*(1.0-X)	LYMA 625
PF=.42591771*C2*D**3*(1.+2.*X)/A3RT	LYMA 630
SSHELL=C*S	LYMA 635
V=SSHELL/EE	LYMA 640
EPS=1.5*PF/EE	LYMA 645
IF (EE*(1.-3.*V).LE.0.0) GO TO 290	LYMA 650
QCALC=0.0	LYMA 655
THETA=0.0	LYMA 660
SHLL=SSHELL	LYMA 665
GO TO 370	LYMA 670
290 TO=1.0	LYMA 675
300 DO 310 IPQ=1,10	LYMA 680
T=TO-(1.-EPS*TO-V*(3.-2.*TO**2)*EXP(-TO**2))/(-EPS+V*(10.*TO-4.*	LYMA 685
1 TO**3)*EXP(-TO**2))	LYMA 690
IF (T.LE.0.0) GO TO 330	LYMA 695
IF (ABS(T-TO).LT.0.0001) GO TO 320	LYMA 700
TO=T	LYMA 705
310 CONTINUE	LYMA 710
GO TO 350	LYMA 715
320 IF (2.*EE*(1.-2.*EPS*T-V*(3.-12.*T**2+4.*T**4)*EXP(-T**2)).GT.0.0)	LYMA 720
1 GO TO 360	LYMA 725
330 DO 340 I=1,20	LYMA 730
TO=FLOAT(I)/10.	LYMA 735
GL=EE*(1.-EPS*TO-V*(3.-2.*TO**2)*EXP(-TO**2))	LYMA 740
IF (GL.GE.0.0) GO TO 300	LYMA 745
340 CONTINUE	LYMA 750
350 CONTINUE	LYMA 755
GO TO 380	LYMA 760
360 THETA=T	LYMA 765
ALPHA0=D*SQRT(5.)/A**(1./3.)	LYMA 770
ALPHA=ALPHA0*THETA	LYMA 775
SIGMA=ALPHA*(1.+ALPHA/14.)	LYMA 780
QCALC=.004*Z*(RZ*A3RT)**2*(EXP(2.*SIGMA)-EXP(-SIGMA))	LYMA 785
SHLL=EE*T**2-PF*T**3+SSHELL*(1.-2.*T**2)*EXP(-T**2)	LYMA 790
370 CMASS=SMASS+SHLL	LYMA 795
XMS(JA,JZ)=CMASS	LYMA 800
XQ(JZ)=CMASS	LYMA 805
380 CONTINUE	LYMA 810
IF (QVAL) 420,390,420	LYMA 815
390 IF (ZP-20.) 400,400,410	LYMA 820
400 IF (AP.EQ.01..AND.ZP.EQ.01.) XQ(3)=7.29	LYMA 825
IF (AP.EQ.01..AND.ZP.EQ.00.) XQ(3)=8.07	LYMA 830
IF (AP.EQ.02..AND.ZP.EQ.01.) XQ(3)=13.14	LYMA 835
IF (AP.EQ.03..AND.ZP.EQ.01.) XQ(3)=14.95	LYMA 840
IF (AP.EQ.03..AND.ZP.EQ.02.) XQ(3)=14.93	LYMA 845
IF (AP.EQ.04..AND.ZP.EQ.02.) XQ(3)=2.43	LYMA 850
IF (AP.EQ.06..AND.ZP.EQ.03.) XQ(3)=14.09	LYMA 855
IF (AP.EQ.07..AND.ZP.EQ.03.) XQ(3)=14.91	LYMA 860
IF (AP.EQ.09..AND.ZP.EQ.04.) XQ(3)=11.35	LYMA 865
IF (AP.EQ.10..AND.ZP.EQ.05.) XQ(3)=12.05	LYMA 870
IF (AP.EQ.11..AND.ZP.EQ.05.) XQ(3)=8.67	LYMA 875
IF (AP.EQ.12..AND.ZP.EQ.06.) XQ(3)=0.	LYMA 880

IF (AP.EQ.13..AND.ZP.EQ.06.)	XQ(3)=3.13	LYMA 885
IF (AP.EQ.14..AND.ZP.EQ.07.)	XQ(3)=2.86	LYMA 890
IF (AP.EQ.15..AND.ZP.EQ.07.)	XQ(3)=0.10	LYMA 895
IF (AP.EQ.16..AND.ZP.EQ.08.)	XQ(3)=-4.74	LYMA 900
IF (AP.EQ.17..AND.ZP.EQ.08.)	XQ(3)=-.81	LYMA 905
IF (AP.EQ.18..AND.ZP.EQ.08.)	XQ(3)=-.78	LYMA 910
IF (AP.EQ.19..AND.ZP.EQ.09.)	XQ(3)=-3.43	LYMA 915
IF (AP.EQ.20..AND.ZP.EQ.10.)	XQ(3)=-7.04	LYMA 920
IF (AP.EQ.21..AND.ZP.EQ.10.)	XQ(3)=-5.73	LYMA 925
IF (AP.EQ.22..AND.ZP.EQ.10.)	XQ(3)=-8.03	LYMA 930
IF (AP.EQ.23..AND.ZP.EQ.11.)	XQ(3)=-9.53	LYMA 935
IF (AP.EQ.24..AND.ZP.EQ.12.)	XQ(3)=-13.93	LYMA 940
IF (AP.EQ.25..AND.ZP.EQ.12.)	XQ(3)=-13.19	LYMA 945
IF (AP.EQ.26..AND.ZP.EQ.12.)	XQ(3)=-16.21	LYMA 950
IF (AP.EQ.27..AND.ZP.EQ.13.)	XQ(3)=-17.2	LYMA 955
IF (AP.EQ.28..AND.ZP.EQ.14.)	XQ(3)=-21.49	LYMA 960
IF (AP.EQ.29..AND.ZP.EQ.14.)	XQ(3)=-21.89	LYMA 965
IF (AP.EQ.30..AND.ZP.EQ.14.)	XQ(3)=-24.44	LYMA 970
IF (AP.EQ.31..AND.ZP.EQ.15.)	XQ(3)=-24.44	LYMA 975
IF (AP.EQ.32..AND.ZP.EQ.16.)	XQ(3)=-26.01	LYMA 980
IF (AP.EQ.33..AND.ZP.EQ.16.)	XQ(3)=-26.58	LYMA 985
IF (AP.EQ.34..AND.ZP.EQ.16.)	XQ(3)=-29.93	LYMA 990
IF (AP.EQ.36..AND.ZP.EQ.16.)	XQ(3)=-30.66	LYMA 995
IF (AP.EQ.35..AND.ZP.EQ.17.)	XQ(3)=-29.01	LYMA1000
IF (AP.EQ.37..AND.ZP.EQ.17.)	XQ(3)=-31.77	LYMA1005
IF (AP.EQ.36..AND.ZP.EQ.18.)	XQ(3)=-30.23	LYMA1010
IF (AP.EQ.38..AND.ZP.EQ.18.)	XQ(3)=-34.72	LYMA1015
IF (AP.EQ.40..AND.ZP.EQ.18.)	XQ(3)=-35.04	LYMA1020
IF (AP.EQ.39..AND.ZP.EQ.19.)	XQ(3)=-33.80	LYMA1025
IF (AP.EQ.40..AND.ZP.EQ.19.)	XQ(3)=-33.53	LYMA1030
IF (AP.EQ.41..AND.ZP.EQ.19.)	XQ(3)=-35.55	LYMA1035
IF (AP.EQ.40..AND.ZP.EQ.20.)	XQ(3)=-34.85	LYMA1040
IF (AP.EQ.42..AND.ZP.EQ.20.)	XQ(3)=-38.54	LYMA1045
IF (AP.EQ.43..AND.ZP.EQ.20.)	XQ(3)=-38.40	LYMA1050
IF (AP.EQ.44..AND.ZP.EQ.20.)	XQ(3)=-41.46	LYMA1055
IF (AP.EQ.46..AND.ZP.EQ.20.)	XQ(3)=-43.14	LYMA1060
IF (AP.EQ.48..AND.ZP.EQ.20.)	XQ(3)=-44.22	LYMA1065
410 QVAL=XQ(2)+XQ(3)-XQ(1)		LYMA1070
WRITE(6,10500)QVAL		LYMA1075
GO TO 50		LYMA1080
420 DO 430 JZ=1,NZ		LYMA1085
DO 430 JA=1,NA		LYMA1090
BE(JZ,JA,1)=8.07+XMS(JA+1,JZ)-XMS(JA,JZ)		LYMA1095
BE(JZ,JA,2)=7.29+XMS(JA,JZ+1)-XMS(JA,JZ)		LYMA1100
BE(JZ,JA,4)=13.3+XMS(JA+1,JZ+1)-XMS(JA,JZ)		LYMA1105
430 BE(JZ,JA,3)=2.42+XMS(JA+2,JZ+2)-XMS(JA,JZ)		LYMA1110
GO TO 460		LYMA1115
440 DO 450 IZ=1,NZ		LYMA1120
450 READ(INPUT,10600)((BE(IZ,IA,K),K=1,4),IA=1,NA)		LYMA1125
WRITE(6,10700)		LYMA1130
460 WRITE(6,10800)		LYMA1135
DO 470 IZ=1,NZ		LYMA1140
DO 470 IA=1,NA		LYMA1145
470 WRITE(6,10900)IZ,IA,(BE(IZ,IA,K),K=1,M3)		LYMA1150
RETURN		LYMA1155
10000 FORMAT(50X,'LIQUID DROP MASSES')		LYMA1160
10100 FORMAT(48X,'SHELL CORRECTED MASSES')		LYMA1165
10200 FORMAT(54X,'ZERO PAIRING')		LYMA1170

10300	FORMAT(54X,'WITH PAIRING')	LYMA1175
10400	FORMAT(45X,'MYERS SWIATECKI LYSEKIL MASSES')	LYMA1180
10500	FORMAT(41H QVAL FROM MYERS SWIATECKI MASS FORMULA =F5.1)	LYMA1185
10600	FORMAT(4F10.5)	LYMA1190
10700	FORMAT(41X,'BINDING ENERGIES WERE PROVIDED BY USER')	LYMA1195
10800	FORMAT(/50X,'BINDING ENERGIES USED'//24X,' IZ = Z-INDEX OF NUCLEOLYMA1200	
	1S, IA = A-INDEX OF NUCLEUS IN PROGRAM ISOTOPE TABLE'//39X,' IZ ILYMA1205	
	1A NEUTRON PROTON ALPHA DEUTERON '/')	LYMA1210
10900	FORMAT(39X,2I4,2X,4(F10.5,2X))	LYMA1215
	INTEGER INPUT/5/	LYMA1220
	END	LYMA1225
CPARAP		PARA 0
	SUBROUTINE PARAP(MX,JCAL)	PARA 5
C	QUICK CALCULATION OF NUCLEAR CROSS SECTIONS VIA OPTICAL MODEL	PARA 10
C	WITH PARABOLIC BARRIER - SEE THOMAS, PHYS REV 116,703 (1959) -	PARA 15
C	PROGRAM BELOW BY W. G. WINN	PARA 20
	DIMENSION CNCS(300)	PARA 25
	COMMON/PARFS/DELRR(300),K6	PARA 30
	COMMON/PAR2/CNCSS	PARA 35
	COMMON/PAR3/EQ,SIGHL(300),ACRS(300)	PARA 40
	COMMON/SHPT/QVAL,AP,AT,ZP,ZT,CLD,MC,MP,INVER,IKE,IPCH,BARFAC	PARA 45
	EN=EQ	PARA 50
	DO 20 I=1,300	PARA 55
10	CNCS(I)=0.	PARA 60
	ACRS(I)=0.	PARA 65
20	SIGHL(I)=0.	PARA 70
	CCS=0.	PARA 75
	LMAX=300	PARA 80
	LCM=0	PARA 85
30	WRITE(6,10000)	PARA 90
	LMAX=LMAX+1	PARA 95
	COUL=(1.4393)*ZT*ZP	PARA 100
	IF (AP-4.) 50,50,40	PARA 105
40	CONTINUE	PARA 110
	AR=AT**0.333333+AP**0.333333	PARA 115
	RA=1.22*AR	PARA 120
	F=67.0	PARA 125
	GO TO 60	PARA 130
50	AR=AT**0.333333	PARA 135
	AR=AT**0.333333	PARA 140
	RA=1.17*AR	PARA 145
	F=1100.0	PARA 150
60	CONTINUE	PARA 155
	D=0.574	PARA 160
	U=AT*AP/(AT+AP)	PARA 165
	H2=41.814	PARA 170
	ACN=AP+AT	PARA 175
	CROTL=H2/(1.16*ACN**1.666666)	PARA 180
	CR2=D*COUL/F	PARA 185
	CR3P=H2*D/(F*U)	PARA 190
	IF (LCM) 70,70,80	PARA 195
70	E=EN*AT/(AT+AP)	PARA 200
	EL=EN	PARA 205
	GO TO 90	PARA 210
80	E=EN	PARA 215
	EL=EN*(AT+AP)/AT	PARA 220
90	WRITE(6,10100)	PARA 225
	WRITE(6,10200)	PARA 230

WRITE (6,10300)	PARA 235
WRITE (6,10400)	PARA 240
WRITE (6,10500) AP,AT,ZP,ZT,EL,E	PARA 245
WRITE (6,10100)	PARA 250
WRITE (6,10600)	PARA 255
WRITE (6,10700)	PARA 260
WRITE (6,10400)	PARA 265
WRITE (6,10800)	PARA 270
WRITE (6,10400)	PARA 275
PWAVE=SQRT(2.*931.16*U*E)	PARA 280
WAVEL=19.732/PWAVE	PARA 285
ARWAVE=3141.59*(WAVEL**2)	PARA 290
SUMAL2=0.0	PARA 295
SUMTL=0.0	PARA 300
SUMDXL=0.0	PARA 305
EROTLI=0.0	PARA 310
DO 290 K=1,LMAX	PARA 315
L=K-1	PARA 320
R=RA	PARA 325
AL=FLOAT(L)	PARA 330
CR3=CR3P*AL*(AL+1)	PARA 335
100 RB=RA-D*ALOG(CR2/R**2+CR3/R**3)	PARA 340
DELTR=ABS(RB-R)	PARA 345
IF (DELTR-0.001) 120,110,110	PARA 350
110 R=RB	PARA 355
GO TO 100	PARA 360
120 CONTINUE	PARA 365
R0=RB/AR	PARA 370
VLB=COUL/RB+(H2/2./U)*(AL*(AL+1)/RB**2)-F*EXP(-(RB-RA)/D)	PARA 375
D2VLB=2.*COUL/RB**3+(H2/U)*3.*AL*(AL+1)/RB**4-(F/D**2)*EXP(-(RB-	PARA 380
1 RA)/D)	PARA 385
IF (D2VLB) 130,140,150	PARA 390
130 SD2VLB=-1.0	PARA 395
GO TO 160	PARA 400
140 SD2VLB=0.0	PARA 405
GO TO 160	PARA 410
150 SD2VLB=1.0	PARA 415
160 CONTINUE	PARA 420
WL2=ABS((H2/U)*D2VLB)	PARA 425
WL=SQRT(WL2)	PARA 430
TL=1./(1.+EXP(2.*3.14159*(VLB-E)/WL))	PARA 435
RSIGL=TL*(2.*AL+1.)	PARA 440
SIGL=ARWAVE*RSIGL	PARA 445
SIGML(K)=SIGL	PARA 450
IF (JCAL.LE.0.OR.JCAL.EQ.2) GO TO 170	PARA 455
GO TO 180	PARA 460
170 EROTL=DELRR(K)	PARA 465
GO TO 190	PARA 470
180 EROTL=CROTL*AL*(AL+1.)	PARA 475
DELRR(K)=EROTL	PARA 480
190 SIGXL2=AL*(AL+1.)*RSIGL	PARA 485
IF (EROTL-0.5-EROTLI) 200,200,220	PARA 490
200 SUMDXL=SUMDXL+SIGL	PARA 495
IF (TL-0.0001) 220,210,210	PARA 500
210 CONTINUE	PARA 505
GO TO 250	PARA 510
220 IF (L) 240,240,230	PARA 515
230 WRITE (6,10900) EROTLI,SUMDXL	PARA 520

LX=EROTL+.5	PARA 525
IF (TL.LT..0001) LX=LX+1	PARA 530
ACRS(K-1)=SUMDXL	PARA 535
MX=LX	PARA 540
240 CONTINUE	PARA 545
EROTLI=EROTLI+1.0	PARA 550
SUMDXL=SIGL	PARA 555
250 CONTINUE	PARA 560
WRITE(6,11000) L,TL,RR,RO,VLB,WL,RSIGL,SD2VLB,SIGXL2,SIGL,EROTL	PARA 565
IF (L) 260,260,280	PARA 570
260 IF (TL-.0001) 270,280,280	PARA 575
270 WRITE(6,10900) EROTLI,SUMDXL	PARA 580
280 CONTINUE	PARA 585
SUMTL=SUMTL+RSIGL	PARA 590
SUMAL2=SUMAL2+SIGXL2	PARA 595
IF (TL-.0001) 300,290,290	PARA 600
290 CONTINUE	PARA 605
300 SIGMA=3141.59*(WAVEL**2)*SUMTL	PARA 610
WRITE(6,11100) SIGMA	PARA 615
AVEL2=SUMAL2/SUMTL	PARA 620
AVROE=AVEL2*CROTL	PARA 625
RMSL2=SQRT(AVEL2)	PARA 630
WRITE(6,11200) RMSL2,AVEL2,AVROE	PARA 635
310 DO 330 I=1,300	PARA 640
CCS=CCS+SIGML(I)	PARA 645
CNCS(I)=CCS	PARA 650
IF (SIGML(I)) 320,320,330	PARA 655
320 JJ=I-1	PARA 660
GO TO 340	PARA 665
330 JJ=I	PARA 670
340 CONTINUE	PARA 675
WRITE(6,11300) CNCS(JJ)	PARA 680
WRITE(6,11400) (CNCS(I),I=1,JJ)	PARA 685
CNCS=CNCS(JJ)	PARA 690
350 RETURN	PARA 695
10000 FORMAT(' PARABOLIC BARRIER APPROXIMATION FOR REACTION CROSS SECTION')	PARA 700
1NS')	PARA 705
10100 FORMAT(3H0)	PARA 710
10200 FORMAT(61H0 PROJECTILE TARGET PROJECTILE TARGET ENERGY	PARA 715
1ENERGY)	PARA 720
10300 FORMAT(61H MASS MASS CHARGE CHARGE LAB	PARA 725
1 CH)	PARA 730
10400 FORMAT(3H)	PARA 735
10500 FORMAT(4X,F7.3,5(3X,F7.3))	PARA 740
10600 FORMAT(124H ANGULAR TRANSMISSION BARRIER BAR-RADIUS BARRIER	PARA 745
1RRIER RELATIVE CURVATURE PROBABLE SIGMA(L) ROTOR-E EFFROT EFFSI	PARA 750
1GMA)	PARA 755
10700 FORMAT(124H MOMENTA COEFFICIENTS RADII CONSTANT (MEV) CUR	PARA 760
1VATURE SIGMA(L) SIGN L-ENERGY (MB) (MEV) (MEV) (MB)	PARA 765
1)	PARA 770
10800 FORMAT(122H L TL RB RO VLB	PARA 775
1WL RSIGL SD2VLB SIGXL2 SIGL EROTL EROTLI SUMDX	PARA 780
1L)	PARA 785
10900 FORMAT(3H+ ,107X,F5.1,1X,F7.2)	PARA 790
11000 FORMAT(3X,I3,4X,F10.8,2X,F6.3,4X,F6.3,4X,F6.1,4X,F6.3,4X,F6.2,4X,	PARA 795
1 F6.3,1X,F10.2,2X,F7.3,3X,F7.3)	PARA 800
11100 FORMAT(25H0CROSS SECTION (MBARN) = ,F10.3)	PARA 805
11200 FORMAT(23H0ROOT MEAN SQUARE L = ,F6.2,10X,16H RMSL SQUARED = ,	PARA 810

1 F10.3,10X,33H AVERAGE ROTATION ENERGY (MEV) = ,F6.3)	PARA 815
11300 FORMAT (39X,'COMPOUND NUCLEUS CROSS SECTION =' ,E10.3/)	PARA 820
11400 FORMAT (9X,10E10.3)	PARA 825
END	PARA 830
CPNCH	PNCH 0
SUBROUTINE PNCH(JMAX)	PNCH 5
COMMON/LYN1/BE(15,22,4)	PNCH 10
COMMON/PL5/TITLE(20),NA,NZ	PNCH 15
COMMON/SHPT/QVAL,AP,AT,ZP,ZT,CLD,MC,MP,INVER,IKE,IPCH,BARFAC	PNCH 20
COMMON/LAB3/SIG(4,50)	PNCH 25
10 MC= 2	PNCH 30
INVER=1	PNCH 35
PUNCH 10100,AP,AT,ZP,ZT,QVAL,CLD,BARFAC,NA,NZ,MC,MP,INVER,IKE,IPCH	PNCH 40
PUNCH 10200, TITLE	PNCH 45
DO 20 K = 1,3	PNCH 50
20 PUNCH 10000, (SIG(K,JE),JE=1,JMAX)	PNCH 55
RETURN	PNCH 60
10000 FORMAT (6E10.3)	PNCH 65
10100 FORMAT (7F5.1,7I5)	PNCH 70
10200 FORMAT (20A4)	PNCH 75
END	PNCH 80
CTLJ	TLJ 0
SUBROUTINE TLJ(H4,N1,J1,H1,Z,W1,STPLTH)	TLJ 5
DIMENSION SG(2),S(16,4),F(101,2),G(101,3),R(2,3),H(502),A(502),	TLJ 10
1 B(502),Q(502),D(300),E(300),Y(300),U(300),Z1(5),U1(7),Y1(7)	TLJ 15
COMMON /LAB2/T(2,31),V(15),V1(3),BR(2,31),BI(2,31)	TLJ 20
REAL LOGF ,MAX1	TLJ 25
B1 = 0.	TLJ 30
10 I1=2.0*V1(1) + 2	TLJ 35
I3=I1+2	TLJ 40
I4=I1*(I1-2)	TLJ 45
J1=I1-1	TLJ 50
B7=V(1)	TLJ 55
V(1)=ABS(V(1))	TLJ 60
RB=V(1)+9.*V(2)	TLJ 65
RB=AMAX1(RB,V(10)+9.0*V(11))	TLJ 70
T1=V(3)+9.*V(4)	TLJ 75
IF (RB-T1) 20,30,30	TLJ 80
20 RB=T1	TLJ 85
30 IRB=10.*RB	TLJ 90
RB=IRB	TLJ 95
RB=RB/10.	TLJ 100
M4=RB/STPLTH	TLJ 105
IF (M4=299) 50,50,40	TLJ 110
40 M4=299	TLJ 115
50 D1=RB/FLOAT(M4)	TLJ 120
M4=M4+1	TLJ 125
M1=M4+1	TLJ 130
M3=M4+2	TLJ 135
N1=(V1(3)+1.0)	TLJ 140
V1(3)=FLOAT(N1-1)	TLJ 145
Z2=Z*Z	TLJ 150
DT=2.*D1	TLJ 155
DTT=D1*D1/12.	TLJ 160
W2=W1	TLJ 165
W1=W1*DTT	TLJ 170
DT3=-2.*DTT	TLJ 175
H2=1.+DTT*M4	TLJ 180

HY=DT3*H1*Z	TLJ 185
S(16,1)=1.	TLJ 190
S(16,2)=1.	TLJ 195
S(16,3)=0.	TLJ 200
S(16,4)=0.	TLJ 205
T1=1.	TLJ 210
T2=2.	TLJ 215
T3=0.	TLJ 220
DO 60 I=1, 15	TLJ 225
J=16-I	TLJ 230
T7=T1*Z/T2	TLJ 235
T6=-T3*(T3+1.)+Z2	TLJ 240
T4=T6/T2	TLJ 245
T5=(2.+T6)/T2	TLJ 250
S(J,1)=T7*S(J+1,1)-T4*S(J+1,3)	TLJ 255
S(J,2)=T7*S(J+1,2)-T5*S(J+1,4)	TLJ 260
S(J,3)=T7*S(J+1,3)+T4*S(J+1,1)	TLJ 265
S(J,4)=T7*S(J+1,4)+T5*S(J+1,2)	TLJ 270
T1=T1+2.	TLJ 275
T2=T2+2.	TLJ 280
60 T3=T3+1.	TLJ 285
TM=RB	TLJ 290
IF(Z) 70,100,70	TLJ 295
70 DO 90 I=1,4	TLJ 300
T1=(EXP((13.816+ALOG(ABS(S(1,I))))/15.0))/H1	TLJ 305
IF(T1-TM) 90,90,80	TLJ 310
80 TM=T1	TLJ 315
90 CONTINUE	TLJ 320
100 M2=(TM-RB)/D1 + 1	TLJ 325
TM=RB+D1*FLOAT(M2)	TLJ 330
T1=Z2+16.	TLJ 335
SG(1)=-Z+Z*(ALOG(T1))/2.0+3.5*ATAN(Z/4.0)-ATAN(Z)-ATAN(Z/2.0)-	TLJ 340
1 ATAN(Z/3.)-Z*(1.+(Z2-48.)/(30.*T1*T1)+(Z2*Z2-160.*Z2+1280.)/	TLJ 345
1 (105.*T1*T1*T1*T1))/(12.*T1)	TLJ 350
SG(2)=SG(1)-1.5707963*ATAN(Z)	TLJ 355
T1=TM+DT	TLJ 360
DO 130 I=1,2	TLJ 365
T1=T1-D1	TLJ 370
T2=T1*H1	TLJ 375
T3=T2-Z*ALOG(2.0*T2)	TLJ 380
DO 120 J=1,2	TLJ 385
T7=0.	TLJ 390
T8=0.	TLJ 395
DO 110 K=1,15	TLJ 400
T7=(T7+S(K,J))/T2	TLJ 405
110 T8=(T8+S(K,J+2))/T2	TLJ 410
T7=T7+1.	TLJ 415
T4=T3+SG(J)	TLJ 420
T5=COS(T4)	TLJ 425
T6=SIN(T4)	TLJ 430
120 G(J,I)=T7*T5-T8*T6	TLJ 435
R(1,I)=H2+HY/T1	TLJ 440
130 R(2,I)=R(1,I)+DT3/(T1*T1)	TLJ 445
DO 140 I=1,M2	TLJ 450
T1=T1-D1	TLJ 455
R(1,3)=H2+HY/T1	TLJ 460
R(2,3)=R(1,3)+DT3/(T1*T1)	TLJ 465
DO 140 J=1,2	TLJ 470

G(J,3)=((12.-10.*R(J,2))*G(J,2)-R(J,1)*G(J,1))/R(J,3)	TLJ	475
DO 140K=1,2	TLJ	480
R(J,K)=R(J,K+1)	TLJ	485
140 G(J,K)=G(J,K+1)	TLJ	490
T1=T1+D1	TLJ	495
DO 260I=1,2	TLJ	500
T2=T1*H1	TLJ	505
T3=1./T2	TLJ	510
T1=T1-D1	TLJ	515
T7=0.	TLJ	520
N4=0	TLJ	525
N2=(T2/1.4142)*SQRT(25.-2.*Z*T3+10.*SQRT((Z*T3-.5)**2+6.))	TLJ	530
IF (N2-N1-8) 150,160,160	TLJ	535
150 N2=N1+8	TLJ	540
160 IF (N2-500) 170,170,460	TLJ	545
170 T6=FLOAT(N2)	TLJ	550
N3=N2+1	TLJ	555
T5=T7	TLJ	560
H(N3+1)=0.	TLJ	565
H(N3)=1.0E-20	TLJ	570
A(N3)=SQRT(Z2+(T6+1.0)**2)/(T6+1.0)	TLJ	575
DO 210K=1,N2	TLJ	580
M=N3-K	TLJ	585
IF (N4-M) 180,190,190	TLJ	590
180 A(M)=SQRT(Z2+T6*T6)/T6	TLJ	595
B(M)=(2.*T6+1.)*(Z/(T6*(T6+1.))+T3)	TLJ	600
T6=T6-1.	TLJ	605
190 H(M)=(B(M)*H(M+1)-A(M+1)*H(M+2))/A(M)	TLJ	610
IF (ABS(H(M+2))-(10.0**30)) 210,210,200	TLJ	615
200 H(M)=H(M)/(10.0**25)	TLJ	620
H(M+1)=H(M+1)/(10.0**25)	TLJ	625
210 CONTINUE	TLJ	630
N4=N2	TLJ	635
N2=N2+10	TLJ	640
T7=H(2)/H(1)	TLJ	645
IF (ABS((T5-T7)/T7)-0.0001) 230,230,220	TLJ	650
220 IF (N2.LE.500) GO TO 160	TLJ	655
N2 = 500	TLJ	660
230 T5=1./(A(1)*(H(1)*G(2,I)-H(2)*G(1,I)))	TLJ	665
F(1,I)=T5*H(1)	TLJ	670
F(2,I)=T5*H(2)	TLJ	675
DO 260K=3,N1	TLJ	680
IF (ABS(H(K)/H(K-1))-10.0**15) 250,250,240	TLJ	685
240 T5=T5/(10.0**25)	TLJ	690
250 F(K,I)=T5*H(K)	TLJ	695
260 G(K,I)=(B(K-2)*G(K-1,I)-A(K-2)*G(K-2,I))/A(K-1)	TLJ	700
Q(1)=0.	TLJ	705
Q(2)=0.	TLJ	710
H(1)=0.	TLJ	715
H(2)=0.	TLJ	720
A(1)=0.	TLJ	725
A(2)=1.0E-20	TLJ	730
B(1)=0.	TLJ	735
B(2)=1.0E-20	TLJ	740
HZ3=H2+1.5*HY/V(9)	TLJ	745
HZ=-HY/(2.*(V(9)**3))	TLJ	750
T101=1.0/EXP(V(10)/V(11))	TLJ	755
T1=1.0/EXP(V(1)/V(2))	TLJ	760

T102=EXP(D1/V(11))	TLJ 765
T2=EXP(D1/V(2))	TLJ 770
IF (B7) 270,280,280	TLJ 775
270 A2=V(5)*V(5)/16.	TLJ 700
V(5)=1.	TLJ 785
A1=4.*W2*A2	TLJ 790
B1=EXP(4.0*A2*H4)	TLJ 795
280 V5=V(5)	TLJ 800
IF (V5) 290,300,300	TLJ 805
290 V(5)=-V5	TLJ 810
V4=V(4)	TLJ 815
V(4)=0.69*V(4)	TLJ 820
300 T9=V(8)*(1.-V(5))	TLJ 825
T3=1.0/EXP(V(3)/V(4))	TLJ 830
T4=EXP(D1/V(4))	TLJ 835
T6=0.	TLJ 840
DO 400K=1,H4	TLJ 845
T6=T6+D1	TLJ 850
Y(K)=T6*T6	TLJ 855
T1=T1*T2	TLJ 860
T101=T101*T102	TLJ 865
T3=T3*T4	TLJ 870
T5=V(7)/(1.+T1)	TLJ 875
T7=1./(1.+T3)	TLJ 880
IF (V5) 310,340,340	TLJ 885
310 T8=((T6-V(3))/V4)**2	TLJ 890
IF (T8-10.) 330,320,320	TLJ 895
320 T8=0.	TLJ 900
GO TO 370	TLJ 905
330 T8=V(8)*EXP(-T8)	TLJ 910
GO TO 370	TLJ 915
340 T8=4.*T3*T7*T7*V(8)	TLJ 920
IF (B7) 350,370,370	TLJ 925
350 P5=A2/(T5*T5+T8*T8)	TLJ 930
P8=T1/(1.+T1)	TLJ 935
P9=T3*T7	TLJ 940
P6=-T5*P8/V(2)	TLJ 945
P/=T8*(1.-2.*P9)/V(4)	TLJ 950
P8=P6*(1.-2.*P8)/V(2)	TLJ 955
P9=T8*(1.-6.*P9*(1.-P9))/(V(4)*V(4))	TLJ 960
U2=P5*((T5*P6+T8*P7)*2./T6+T5*P8+T8*P9)	TLJ 965
Y2=P5*((T5*P7-T8*P6)*2./T6+T5*P9-T8*P8)	TLJ 970
Y1(1)=T8/(B1*B1+2.*B1*A1*T5)	TLJ 975
U1(1)=(T5+T8*A1*Y1(1))/(D1+A1*T5)	TLJ 980
DO 360J=1,6	TLJ 985
P5=A1*Y1(J)-Y2	TLJ 990
P6=SIN(P5)	TLJ 995
P5=COS(P5)	TLJ 1000
P7=1.0/(B1*EXP(A1*U1(J)-U2))	TLJ 1005
U1(J+1)=(T5*P5+T8*P6)*P7	TLJ 1010
360 Y1(J+1)=(T8*P5-T5*P6)*P7	TLJ 1015
T5=U1(7)-((U1(7)-U1(6))**2)/(U1(7)-2.*U1(6)+U1(5))	TLJ 1020
T8=Y1(7)-((Y1(7)-Y1(6))**2)/(Y1(7)-2.*Y1(6)+Y1(5))	TLJ 1025
370 H(K+2)=W1*(T9*T7+V(5)*T8)	TLJ 1030
U(K)=2.*W1*V(6)*T101/(V(11)*T6*((1.+T101)**2))	TLJ 1035
IF (T6-V(1)) 380,390,390	TLJ 1040
380 E(K)=W1*T5+HZ3+HZ*Y(K)	TLJ 1045
GO TO 400	TLJ 1050

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390 E(K)=W1*T5+H2+HY/T6
400 CONTINUE
      T8=0.
      DO 450 I=1,N1
        I2=2*I
        T1=DTT*T8*(T8+1.)
        T8=T8+1.
        DO 410 K=1,M4
          D(K)=E(K)-T1/Y(K)
          DO 450 J=1,J1
            L=I2-I3+2*J
            IF (IABS(I2-I1)-L) 430,430,420
          420 T(J,I)=0.
          GO TO 450
        430 T9=(FLOAT(L*(I+2)-I2*(I2-2)-I4))/4.
          DO 440 K=1,M4
            Q(K+2)=D(K)+T9*U(K)
            T3=12.-10.*Q(K+1)
            T4=10.*H(K+1)
            T1=T3*A(K+1)-Q(K)*A(K)+T4*B(K+1)+H(K)*B(K)
            T2=T3*B(K+1)-Q(K)*B(K)-T4*A(K+1)-H(K)*A(K)
            T3=Q(K+2)**2+H(K+2)**2
            A(K+2)=(Q(K+2)*T1+H(K+2)*T2)/T3
          440 B(K+2)=(Q(K+2)*T2-H(K+2)*T1)/T3
            T3=A(M3)**2+B(M3)**2
            T1=(A(M1)*A(M3)+B(M1)*B(M3))/T3
            T2=(A(M3)*B(M1)-A(M1)*B(M3))/T3
            T5=F(I,2)-F(I,1)*T1
            T6=F(I,1)*T2
            T3=T5-G(I,1)*T2
            T4=G(I,2)-G(I,1)*T1+T6
            T7=(T3/T4)*T3+T4
            T1=(T3*T5+T4*T6)/T7
            T2=(T4*T5-T3*T6)/T7
            T7=T4
            T1=T1/T7
          C NEW CARDS *****
            IF (T1.LT..00000001) T1=0.
            T2=T2/T7
          C NEW CARDS *****
            IF (T2.LT..00000001) T2=0.
          C CP(I)=G(I,2)**2+F(I,2)**2 REMOVED OCT 73
            BR(J,I)=T1
            BI(J,I)=T2
            T(J,I)=4.*(T1-T1**2-T2**2)
          450 CONTINUE
          460 CONTINUE
            RETURN
            END
            SUBROUTINE FISROT(A,Z,AN,AL,DELR,DELS,ERO,BARFAC)
            DIMENSION X1B(6,11),X2B(6,11),X3B(10,20),X1H(6,11),X2H(6,11),X3H(10,20)
            COMMON/PL3/EB(20),RCSP(20),ZEE,AMASS,PLEX,NEPR
            COMMON/PARF/DELR(300),K6
            DATA X1B/.28,.243,.221,.208,.195,.18,.211,.186,.17,.1506,.136,.12,
            1.152,.131,.1155,.096,.0795,.0625,.09725,.0795,.065,.0506,.0375,.02,
            153,.05771,.0455,.03414,.0235,.014,.0065,.03325,.0235,.0153,.0081,.
            1001,.0,.01625,.009,.0032,.0,.0,.0,.0071,.0,.0,.0,.0,.0,.0,.0,FISR0001
            FISR0002
            FISR0003
            FISR0004
            FISR0005
            FISR0006
            FISR0007
            FISR0008
            FISR0009

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TLJ 1055
TLJ 1060
TLJ 1065
TLJ 1070
TLJ 1075
TLJ 1080
TLJ 1085
TLJ 1090
TLJ 1095
TLJ 1100
TLJ 1105
TLJ 1110
TLJ 1115
TLJ 1120
TLJ 1125
TLJ 1130
TLJ 1135
TLJ 1140
TLJ 1145
TLJ 1150
TLJ 1155
TLJ 1160
TLJ 1165
TLJ 1170
TLJ 1175
TLJ 1180
TLJ 1185
TLJ 1190
TLJ 1195
TLJ 1200
TLJ 1205
TLJ 1210
TLJ 1215
TLJ 1220
TLJ 1225
TLJ 1230
TLJ 1235
TLJ 1240
TLJ 1245
TLJ 1250
TLJ 1255
TLJ 1260
TLJ 1265
TLJ 1270
TLJ 1275
TLJ 1280
TLJ 1285
TLJ 1290
TLJ 1295
FISR0001
FISR0002
FISR0003
FISR0004
FISR0005
FISR0006
FISR0007
FISR0008
FISR0009

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JM=1	FISR 340
IF (K6.GT.0) JM=300	FISR 345
DO 200 J=1,JM	FISR 350
IF (K6.GT.0) AL=J-1	FISR 355
ERO=34.548*AL*AL/A**1.666666	FISR 360
Y=1.9254*AL*AL/(PAREN*A**2.3333333)	FISR 365
IX=20.*X+1.	FISR 370
CX=IX	FISR 375
BX=20.*X+1.	FISR 380
DX=BX-CX	FISR 385
IF (X-.25) 10,10,60	FISR 390
10 BY=10.*Y+1.	FISR 395
IF (BY-9.) 30,30,20	FISR 400
20 BY=9.	FISR 405
30 IF (BY-1.) 40,40,50	FISR 410
40 BY=1.	FISR 415
50 IY=BY	FISR 420
CY=IY	FISR 425
DY=BY-CY	FISR 430
H1=(X1H(IX+1,IY)-X1H(IX,IY))*DX+X1H(IX,IY)	FISR 435
H2=(X1H(IX+1,IY+1)-X1H(IX,IY+1))*DX+X1H(IX,IY+1)	FISR 440
HP=(H2-H1)*DY+H1	FISR 445
B2=(X1B(IX+1,IY+1)-X1B(IX,IY+1))*DX+X1B(IX,IY+1)	FISR 450
B1=(X1B(IX+1,IY)-X1B(IX,IY))*DX+X1B(IX,IY)	FISR 455
BP=(B2-B1)*DY+B1	FISR 460
GO TO 190	FISR 465
60 IF (X-.5) 70,70,120	FISR 470
70 BY=20.*Y+1.	FISR 475
IF (BY-11.) 90,90,80	FISR 480
80 BY=11.	FISR 485
90 IF (BY-1.) 100,100,110	FISR 490
100 BY=1.	FISR 495
110 IX=IX-5	FISR 500
IY=BY	FISR 505
CY=IY	FISR 510
DY=BY-CY	FISR 515
H1=(X2H(IX+1,IY)-X2H(IX,IY))*DX+X2H(IX,IY)	FISR 520
H2=(X2H(IX+1,IY+1)-X2H(IX,IY+1))*DX+X2H(IX,IY+1)	FISR 525
HP=(H2-H1)*DY+H1	FISR 530
B1=(X2B(IX+1,IY)-X2B(IX,IY))*DX+X2B(IX,IY)	FISR 535
B2=(X2B(IX+1,IY+1)-X2B(IX,IY+1))*DX+X2B(IX,IY+1)	FISR 540
BP=(B2-B1)*DY+B1	FISR 545
GO TO 190	FISR 550
120 IF (X-.95) 140,140,130	FISR 555
130 X=.95	FISR 560
140 IX=20.*X+1.	FISR 565
IX=IX-10	FISR 570
BY=100.*Y+1.	FISR 575
IF (BY-19.) 160,160,150	FISR 580
150 BY=19.	FISR 585
160 IF (BY-1.) 170,170,180	FISR 590
170 BY=1.	FISR 595
180 IY=BY	FISR 600
CY=IY	FISR 605
DY=BY-CY	FISR 610
H1=(X3H(IX+1,IY)-X3H(IX,IY))*DX+X3H(IX,IY)	FISR 615
H2=(X3H(IX+1,IY+1)-X3H(IX,IY+1))*DX+X3H(IX,IY+1)	FISR 620
HP=(H2-H1)*DY+H1	FISR 625

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      B1=(X3B(IX+1,IY)-X3B(IX,IY))*DX+X3B(IX,IY)
      B2=(X3B(IX+1,IY+1)-X3B(IX,IY+1))*DX+X3B(IX,IY+1)
      BF=(B2-B1)*DY+B1
190  DELR=ERO+HF*ESO
200  IF (K6.GT.0) DELRR(J)=DELR
      K6=0
      BF=BF*BARFAC
      DELSP=DELR+BF*ESO
      REAL LOGF ,MAX1
      RETURN
10000 FORMAT(6E10.4)
10100 FORMAT(1I1)
10200 FORMAT(1H ,8F10.3 )
10300 FORMAT(6F10.0)
      END

```

FISR 630
FISR 635
FISR 640
FISR 645
FISR 650
FISR 655
FISR 660
FISR 665
FISR 670
FISR 675
FISR 680
FISR 685
FISR 690
FISR 695
FISR 700

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C
C *****
C
C   LISTING OF INPUT CARDS FOR TEST OUTPUT GIVEN BELOW
C
      86.  65.  36.  29.                13  11                1      4
      KR + CN
500.                50  50
      86.  65.  36.  29.                6   4                11   1      4
      KR + CU ( INPUT IKE = 11 FOR FULL OUTPUT ONLY AT END OF CALCULATION )
400.                5
      86.  65.  36.  29.                10   6                13   1      4
      KR + CU ( INPUT IKE = 13 FOR OUTPUT OF INTERMEDIATE CROSS SECTIONS )
400.                50  60  210  1.0  1.0
C
C *****
C

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EVAPORATION CODE ORNL ALICE

THIS CODE IS DESCRIBED IN REPORT ORNL-TM-6054

USERS SENDING LETTER TO P.PLASIL WILL BE ADVISED OF FUTURE CORRECTIONS OR IMPROVEMENTS TO THIS CODE. MAILING ADDRESS IS:

P.PLASIL

OAK RIDGE NATIONAL LABORATORY

BLDG 6003, P.O. BOX X

OAK RIDGE, TENN, 37830, USA

KR + CU

QVAL = 0.0 AP = 86.0 AT = 65.0 ZP = 36.0 ZT = 29.0
 CLD = 0.0 HA = 13 NZ = 11 HC = 0 HP = 0 INVER = 0 IKE = 0 IPCH = 1
 BARRIER=LIQUID DROP BARRIER*1.000
 RATIO OF FISSION TO NUCLEON SINGLE PARTICLE DENSITIES WAS SET EQUAL TO 1 BY DEFAULT OPTION
 QVAL FROM MYERS SWIATECKI MASS FORMULA =-73.7

MYERS SWIATECKI LYSEKIL MASSES
 SHELL CORRECTED MASSES
 ZERO PAIRING

BINDING ENERGIES USED

IZ = Z-INDEX OF NUCLEUS, IA = A-INDEX OF NUCLEUS IN PROGRAM ISOTOPE TABLE

IZ	IA	NEUTRON	PROTON	ALPHA	DEUTERON
1	1	7.94572	4.71353	-3.57526	10.28439
1	2	8.11441	4.39868	-3.87627	10.13547
1	3	8.28769	4.08107	-4.17625	9.98718
1	4	8.46147	3.75951	-2.53859	9.83856
1	5	10.56094	3.43710	-0.87968	11.62144
1	6	10.76093	3.12051	-1.12209	11.50150
1	7	10.96428	2.80058	-1.36183	11.38258
1	8	11.17137	2.47832	-1.59848	11.26604
1	9	11.37578	2.15468	-2.12877	11.14697
1	10	11.21432	1.83121	-2.91376	10.67940
1	11	11.22052	1.52509	-3.38216	10.36412
1	12	11.39676	1.20361	-3.63123	10.21228
1	13	11.63445	0.87553	-3.80017	10.11723
2	1	7.63087	5.21974	-3.19658	10.47377
2	2	7.79680	4.90291	-3.50589	10.32034
2	3	7.96613	4.58356	-3.81422	10.16826
2	4	8.13907	4.26215	-2.17520	10.01656
2	5	10.24435	3.93750	-0.51645	11.80284
2	6	10.44099	3.61850	-0.76740	11.67886
2	7	10.64201	3.29788	-1.01402	11.55641
2	8	10.84773	2.97441	-1.26024	11.43558
2	9	11.05231	2.64786	-1.69962	11.31548
2	10	10.90820	2.32318	-2.45210	10.90425
2	11	10.89905	2.05606	-2.92882	10.58684
2	12	11.06868	1.74780	-3.18494	10.43372
2	13	11.30171	1.42505	-3.36046	10.33649

3	1	7.31404	5.73148	-2.80591	10.66713
3	2	7.47745	5.41310	-3.12358	10.50964
3	3	7.64471	5.09221	-3.44153	10.35376
3	4	7.81442	4.76906	-1.80153	10.19751
3	5	9.92535	4.44310	-0.14238	11.98824
3	6	10.12038	4.12289	-0.40048	11.86070
3	7	10.31854	3.80034	-0.65767	11.73373
3	8	10.52118	3.47520	-0.91203	11.60956
3	9	10.72763	3.14839	-1.24704	11.48418
3	10	10.64108	2.81656	-1.93735	11.16490
3	11	10.59079	2.58383	-2.45169	10.82364
3	12	10.74593	2.29286	-2.72160	10.66434
3	13	10.97145	1.97842	-2.90654	10.56134
4	1	6.99567	6.25076	-2.40529	10.86798
4	2	7.15656	5.93233	-2.73109	10.70695
4	3	7.32156	5.61041	-3.05672	10.54677
4	4	7.48846	5.28522	-1.41693	10.38470
4	5	9.60515	4.95625	0.24316	12.18095
4	6	9.79782	4.63582	-0.02402	12.04938
4	7	9.99341	4.31157	-0.28961	11.91881
4	8	10.19437	3.98541	-0.55266	11.78859
4	9	10.39580	3.65424	-0.81842	11.65840
4	10	10.40836	3.32262	-1.38324	11.44878
4	11	10.29982	3.10043	-1.95065	11.07774
4	12	10.43149	2.83794	-2.24199	10.90466
4	13	10.64293	2.53319	-2.44029	10.79405
5	1	6.67723	6.77676	-1.99222	11.07280
5	2	6.83464	6.45558	-2.32716	10.90672
5	3	6.99637	6.13210	-2.66174	10.74194
5	4	7.15950	5.80559	-1.02089	10.57651
5	5	9.28471	5.47702	0.64050	12.37836
5	6	9.47357	5.15366	0.36368	12.24220
5	7	9.66725	4.82864	0.09013	12.10660
5	8	9.86319	4.49936	-0.18306	11.97157
5	9	10.06418	4.16840	-0.45265	11.83875
5	10	10.18617	3.83458	-0.82770	11.70317
5	11	10.03732	3.57701	-1.42027	11.34798
5	12	10.12674	3.37067	-1.74750	11.15160
5	13	10.32088	3.08487	-1.96129	11.03334
6	1	6.35605	7.31186	-1.56798	11.28540
6	2	6.51115	6.98936	-1.91068	11.11497
6	3	6.66986	6.66383	-2.25375	10.94611
6	4	6.83093	6.33626	-0.61293	10.77631
6	5	8.96135	6.00539	1.04855	12.58260
6	6	9.14856	5.68126	0.76353	12.44214
6	7	9.33797	5.35359	0.48083	12.30147
6	8	9.53223	5.02351	0.19937	12.16353
6	9	9.73036	4.69131	-0.07948	12.02536
6	10	9.92860	4.35501	-0.35620	11.88860
6	11	9.83098	4.02000	-0.85185	11.64912
6	12	9.84094	3.87816	-1.23938	11.41174
6	13	10.00848	3.63081	-1.47203	11.28090
7	1	6.03355	7.85094	-1.13333	11.50066
7	2	6.18562	7.52711	-1.48405	11.32661
7	3	6.34229	7.20100	-1.83638	11.15434
7	4	6.50006	6.87207	-0.19484	10.98013
7	5	8.63722	6.54008	1.46709	12.79076
7	6	8.82089	6.21355	1.17386	12.64595
7	7	9.00789	5.88507	0.88214	12.50139
7	8	9.20003	5.55351	0.59215	12.35936
7	9	9.39406	5.21935	0.30304	12.21584
7	10	9.59360	4.88179	0.01822	12.07515
7	11	9.68913	4.54156	-0.28307	11.93520
7	12	9.59360	4.30608	-0.72250	11.67902
7	13	9.71010	4.14543	-0.98357	11.52887
8	1	5.70973	8.39812	-0.68361	11.72343

8	2	5.85951	8.07372	-1.04358	11.54601
8	3	6.01335	7.74651	-1.40501	11.36932
8	4	6.16808	7.41599	0.23686	11.18927
8	5	8.31068	7.08121	1.89980	13.00502
8	6	8.49242	6.75435	1.59804	12.85632
8	7	8.67633	6.42392	1.29707	12.70790
8	8	8.86586	6.09158	0.99852	12.56075
8	9	9.05650	5.75490	0.69980	12.41278
8	10	9.25337	5.41629	0.40491	12.26720
8	11	9.45364	5.07384	0.11067	12.12306
8	12	9.43295	4.72943	-0.20366	11.96173
8	13	9.44345	4.58879	-0.50471	11.77847
9	1	5.38533	8.95523	-0.22162	11.95454
9	2	5.53230	8.62923	-0.59117	11.77295
9	3	5.68283	8.30066	-0.96075	11.59041
9	4	5.83330	7.96759	0.68153	11.40565
9	5	7.98383	7.63237	2.34552	13.22758
9	6	8.16199	7.30377	2.03424	13.07477
9	7	8.34399	6.97279	1.72493	12.92171
9	8	8.52917	6.63773	1.41582	12.76917
9	9	8.71790	6.30000	1.10898	12.61777
9	10	8.91092	5.95988	0.80444	12.46701
9	11	9.10924	5.61610	0.50052	12.31770
9	12	9.29231	5.26848	0.19742	12.16760
9	13	9.24969	4.93530	-0.08968	12.01460
10	1	5.05933	9.51790	0.25229	12.19081
10	2	5.20374	9.19150	-0.12590	12.00383
10	3	5.34976	8.86011	-0.50491	11.81587
10	4	5.49808	8.52612	1.13853	11.62883
10	5	7.65523	8.19077	2.80370	13.45587
10	6	7.83101	7.86066	2.48335	13.29793
10	7	8.00893	7.52693	2.16396	13.13947
10	8	8.19145	7.19055	1.84619	12.98322
10	9	8.37778	6.85178	1.52992	12.82664
10	10	8.56714	6.50888	1.21497	12.67120
10	11	8.76161	6.16408	0.90158	12.51743
10	12	8.95914	5.81583	0.58870	12.36281
10	13	9.13931	5.46368	0.27866	12.20981
11	1	4.73293	10.08990	0.74123	12.43336
11	2	4.87234	9.76045	0.35387	12.24147
11	3	5.01578	9.42914	-0.03436	12.05026
11	4	5.16272	9.09450	1.61084	11.85921
11	5	7.32512	8.75650	3.27478	13.68970
11	6	7.49728	8.42459	2.94652	13.52782
11	7	7.67255	8.09055	2.61847	13.36542
11	8	7.85268	7.75288	2.29178	13.20448
11	9	8.03488	7.41182	1.96484	13.04297
11	10	8.22234	7.06810	1.64088	12.88327
11	11	8.41336	6.72095	1.31648	12.72375
11	12	8.60699	6.37041	0.99332	12.56415
11	13	8.80614	6.01717	0.67343	12.40588

NEUTRON INVERSE CROSS SECTIONS

INVERSE REACTION CROSS SECT. FOR E=1 TO 42MEV

4864.	3431.	3124.	3008.	3003.	2994.	2971.	2911.	2839.	2764.
2712.	2676.	2652.	2626.	2602.	2579.	2562.	2546.	2535.	2530.
2528.	2529.	2526.	2521.	2514.	2509.	2500.	2490.	2477.	2464.
2444.	2422.	2395.	2370.	2340.	2310.	2279.	2251.	2219.	2188.
2158.	2133.								

PROTON INVERSE CROSS SECTIONS

INVERSE REACTION CROSS SECT. FOR E=1 TO 42MEV

0.	0.	0.	0.	0.	0.	5.	22.	62.	131.
221.	325.	434.	535.	628.	712.	790.	857.	916.	968.
1015.	1059.	1096.	1128.	1156.	1184.	1206.	1226.	1244.	1262.
1276.	1289.	1301.	1312.	1322.	1330.	1338.	1346.	1352.	1358.
1363.	1368.								

ALPHA INVERSE CROSS SECTIONS

INVERSE REACTION CROSS SECT. FOR E=1 TO 42MEV

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	3.	13.	44.	121.	251.	407.	568.
718.	858.	954.	1099.	1205.	1300.	1389.	1469.	1545.	1612.
1675.	1736.	1750.	1843.	1890.	1935.	1977.	2017.	2054.	2088.
2122.	2152.								

DEUTERON INVERSE CROSS SECTIONS

INVERSE REACTION CROSS SECT. FOR E=1 TO 42MEV

0.	0.	0.	0.	0.	2.	21.	104.	298.	560.
824.	1062.	1276.	1463.	1627.	1773.	1893.	1989.	2080.	2163.
2236.	2301.	2355.	2402.	2441.	2478.	2517.	2553.	2589.	2620.
2647.	2671.	2691.	2709.	2728.	2743.	2759.	2773.	2786.	2800.
2811.	2822.								

DELF = 6.10000 ALT = 13.10000 CLD = 1.00000

LABORATORY BOMBARDMENT ENERGY = 500.0MEV TARGET MASS = 65.0

COMPOUND NUCLEUS MASS = 151.0 COMPOUND NUCLEUS FORMATION Q VALUE = -79.7

JCAL= 0 START J= 50 STOP J= 50 JANG = 0

CALCULATION INCLUDES FISSION COMPETITION
PARABOLIC BARRIER APPROXIMATION FOR REACTION CROSS SECTIONS

PROJECTILE MASS	TARGET MASS	PROJECTILE CHARGE	TARGET CHARGE	ENERGY LAB	ENERGY CM
86.000	65.000	36.000	29.000	500.000	215.232

ANGULAR TRANSMISSION MOMENTA COEFFICIENTS	BARRIER RADIUS	BARRIER CONSTANT	BARRIER (MEV)	BARRIER CURVATURE	RELATIVE CURVATURE SIGMA(L)	SIGN	PROBABLE L-ENERGY	SIGMA(L) (MB)	ROTOR-E (MEV)	EFFROT (MEV)	EFFSIGMA (MB)	
L	TL	RB	RO	VLB	WL	BSIGL	SD2VLB	SIGL2	SIGL	EROTL	EROTLI	SUMDKI
0	1.03000000	11.642	1.380	122.7	4.435	1.00	-1.000	0.0	0.082	0.0		
1	1.03000000	11.641	1.380	122.7	4.435	3.00	-1.000	6.00	0.247	0.008		
2	1.03000000	11.641	1.380	122.7	4.436	5.00	-1.000	30.00	0.412	0.032		
3	1.03000000	11.641	1.380	122.8	4.436	7.00	-1.000	84.00	0.577	0.072		
4	1.03000000	11.641	1.380	122.9	4.438	9.00	-1.000	180.00	0.742	0.127		
5	1.03000000	11.640	1.380	122.8	4.439	11.00	-1.000	330.00	0.907	0.199		
6	1.03000000	11.640	1.380	122.9	4.441	13.00	-1.000	546.00	1.072	0.286		
7	1.03000000	11.639	1.380	122.9	4.443	15.00	-1.000	840.00	1.236	0.390	0.0	5.28
8	1.03000000	11.639	1.380	123.0	4.446	17.00	-1.000	1224.00	1.401	0.509		

9	1.00000000	11.638	1.380	123.1	4.448	19.00	-1.000	1710.00	1.566	0.644		
10	1.00000000	11.637	1.380	123.2	4.451	21.00	-1.000	2310.00	1.731	0.795		
11	1.00000000	11.636	1.380	123.3	4.454	23.00	-1.000	3036.00	1.896	0.962		
12	1.00000000	11.635	1.379	123.4	4.458	25.00	-1.000	3900.00	2.061	1.145		
13	1.00000000	11.634	1.379	123.5	4.462	27.00	-1.000	4914.00	2.226	1.343	1.0	10.88
14	1.00000000	11.633	1.379	123.6	4.466	29.00	-1.000	6090.00	2.391	1.558		
15	1.00000000	11.632	1.379	123.7	4.471	31.00	-1.000	7440.00	2.555	1.789		
16	1.00000000	11.630	1.379	123.8	4.475	33.00	-1.000	8976.00	2.720	2.035		
17	1.00000000	11.629	1.379	124.0	4.481	35.00	-1.000	10710.00	2.885	2.297	2.0	10.55
18	1.00000000	11.628	1.379	124.1	4.486	37.00	-1.000	12654.00	3.050	2.576		
19	1.00000000	11.626	1.378	124.3	4.492	39.00	-1.000	14820.00	3.215	2.870		
20	1.00000000	11.624	1.378	124.5	4.497	41.00	-1.000	17220.00	3.380	3.180	3.0	9.64
21	1.00000000	11.623	1.378	124.6	4.504	43.00	-1.000	19866.00	3.545	3.506		
22	1.00000000	11.621	1.378	124.8	4.510	45.00	-1.000	22770.00	3.709	3.847		
23	1.00000000	11.619	1.378	125.0	4.517	47.00	-1.000	25944.00	3.874	4.205	4.0	11.13
24	1.00000000	11.617	1.377	125.2	4.524	49.00	-1.000	29400.00	4.039	4.579		
25	1.00000000	11.615	1.377	125.4	4.532	51.00	-1.000	33150.00	4.204	4.965		
26	1.00000000	11.613	1.377	125.6	4.539	53.00	-1.000	37206.00	4.369	5.361	5.0	12.61
27	1.00000000	11.611	1.377	125.9	4.547	55.00	-1.000	41580.00	4.534	5.772		
28	1.00000000	11.609	1.376	126.1	4.556	57.00	-1.000	46284.00	4.699	6.199	6.0	9.23
29	1.00000000	11.607	1.376	126.3	4.564	59.00	-1.000	51330.00	4.863	6.641		
30	1.00000000	11.604	1.376	126.6	4.573	61.00	-1.000	56730.00	5.028	7.099	7.0	9.89
31	1.00000000	11.602	1.375	126.9	4.582	63.00	-1.000	62496.00	5.193	7.572		
32	1.00000000	11.599	1.375	127.1	4.592	65.00	-1.000	68640.00	5.358	8.061	8.0	10.55
33	1.00000000	11.597	1.375	127.4	4.601	67.00	-1.000	75174.00	5.523	8.566		
34	1.00000000	11.594	1.375	127.7	4.611	69.00	-1.000	82110.00	5.688	9.085	9.0	11.21
35	1.00000000	11.592	1.374	128.0	4.622	71.00	-1.000	89460.00	5.853	9.620		
36	1.00000000	11.589	1.374	128.3	4.632	73.00	-1.000	97236.00	6.018	10.158	10.0	11.87
37	1.00000000	11.586	1.374	128.6	4.643	75.00	-1.000	105450.00	6.182	10.712		
38	1.00000000	11.583	1.373	128.9	4.654	77.00	-1.000	114114.00	6.347	11.282	11.0	12.53
39	1.00000000	11.580	1.373	129.2	4.665	79.00	-1.000	123240.00	6.512	11.866		
40	1.00000000	11.577	1.373	129.6	4.677	81.00	-1.000	132840.00	6.677	12.466	12.0	13.19
41	1.00000000	11.574	1.372	129.9	4.689	83.00	-1.000	142926.00	6.842	13.081	13.0	6.84
42	1.00000000	11.571	1.372	130.3	4.701	85.00	-1.000	153510.00	7.007	13.711		
43	1.00000000	11.568	1.371	130.6	4.714	87.00	-1.000	164604.00	7.172	14.351	14.0	14.18
44	1.00000000	11.564	1.371	131.0	4.726	89.00	-1.000	176220.00	7.336	14.993	15.0	7.34
45	1.00000000	11.561	1.371	131.4	4.739	91.00	-1.000	188370.00	7.501	15.649		
46	1.00000000	11.558	1.370	131.8	4.752	93.00	-1.000	201066.00	7.666	16.320	16.0	15.17
47	1.00000000	11.554	1.370	132.2	4.766	95.00	-1.000	214320.00	7.831	17.006	17.0	7.83
48	1.00000000	11.551	1.369	132.6	4.780	97.00	-1.000	228144.00	7.996	17.707		
49	1.00000000	11.547	1.369	133.0	4.794	99.00	-1.000	242550.00	8.161	18.423	18.0	16.16
50	1.00000000	11.544	1.369	133.4	4.808	101.00	-1.000	257550.00	8.326	19.138	19.0	8.33
51	1.00000000	11.540	1.368	133.9	4.823	103.00	-1.000	273156.00	8.490	19.861	20.0	8.49
52	1.00000000	11.536	1.368	134.3	4.838	105.00	-1.000	289380.00	8.655	20.597		
53	1.00000000	11.533	1.367	134.8	4.853	107.00	-1.000	306234.00	8.820	21.348	21.0	17.48
54	1.00000000	11.529	1.367	135.2	4.868	109.00	-1.000	323730.00	8.985	22.113	22.0	8.99
55	1.00000000	11.525	1.366	135.7	4.884	111.00	-1.000	341880.00	9.150	22.893	23.0	9.15
56	1.00000000	11.521	1.366	136.2	4.899	113.00	-1.000	360696.00	9.315	23.688		
57	1.00000000	11.517	1.365	136.6	4.915	115.00	-1.000	380190.00	9.480	24.499	24.0	18.79
58	1.00000000	11.513	1.365	137.1	4.932	117.00	-1.000	400374.00	9.645	25.323	25.0	9.64
59	1.00000000	11.509	1.364	137.6	4.948	119.00	-1.000	421260.00	9.809	26.162	26.0	9.81
60	1.00000000	11.505	1.364	138.1	4.965	121.00	-1.000	442860.00	9.974	27.015	27.0	9.97
61	1.00000000	11.501	1.364	138.7	4.982	123.00	-1.000	465186.00	10.139	27.867	28.0	10.14
62	1.00000000	11.497	1.363	139.2	5.000	125.00	-1.000	488250.00	10.304	28.720	29.0	10.30
63	1.00000000	11.492	1.363	139.7	5.017	127.00	-1.000	512064.00	10.469	29.587		
64	1.00000000	11.488	1.362	140.3	5.035	129.00	-1.000	536640.00	10.634	30.468	30.0	21.10
65	1.00000000	11.484	1.361	140.8	5.053	131.00	-1.000	561990.00	10.799	31.362	31.0	10.80
66	1.00000000	11.479	1.361	141.4	5.071	133.00	-1.000	588126.00	10.963	32.262	32.0	10.96
67	1.00000000	11.475	1.360	142.0	5.090	135.00	-1.000	615060.00	11.128	33.171	33.0	11.13
68	1.00000000	11.471	1.360	142.6	5.108	137.00	-1.000	642804.00	11.293	34.094	34.0	11.29
69	1.00000000	11.466	1.359	143.2	5.127	139.00	-1.000	671370.00	11.458	35.030	35.0	11.46
70	1.00000000	11.462	1.359	143.8	5.147	141.00	-1.000	700770.00	11.623	35.969	36.0	11.62
71	1.00000000	11.457	1.358	144.4	5.166	143.00	-1.000	731016.00	11.788	36.878	37.0	11.79
72	1.00000000	11.453	1.358	145.0	5.186	145.00	-1.000	762120.00	11.953	37.800	38.0	11.95
73	1.00000000	11.448	1.357	145.6	5.206	147.00	-1.000	794094.00	12.117	38.735	39.0	12.12
74	1.00000000	11.443	1.357	146.3	5.226	149.00	-1.000	826950.00	12.282	39.683	40.0	12.28

75	1.00000000	11.439	1.356	146.9	5.246	151.00	-1.000	860700.00	12.447	40.575		
76	1.00000000	11.434	1.356	147.6	5.267	153.00	-1.000	895356.00	12.612	41.477	41.0	25.06
77	1.00000000	11.429	1.355	148.2	5.287	155.00	-1.000	930930.00	12.777	42.392	42.0	12.78
78	1.00000000	11.425	1.354	148.9	5.308	157.00	-1.000	967434.00	12.942	43.318	43.0	12.94
79	1.00000000	11.420	1.354	149.6	5.330	159.00	-1.000	1004880.00	13.107	44.151	44.0	13.11
80	1.00000000	11.415	1.353	150.3	5.351	161.00	-1.000	1043280.00	13.272	44.991	45.0	13.27
81	1.00000000	11.410	1.353	151.0	5.373	163.00	-1.000	1082646.00	13.436	45.841	46.0	13.44
82	1.00000000	11.405	1.352	151.7	5.395	165.00	-1.000	1122990.00	13.601	46.681		
83	1.00000000	11.400	1.352	152.4	5.417	167.00	-1.000	1164324.00	13.766	47.418	47.0	27.37
84	1.00000000	11.395	1.351	153.1	5.439	169.00	-1.000	1206660.00	13.931	48.165	48.0	13.93
85	1.00000000	11.391	1.350	153.9	5.461	171.00	-1.000	1250010.00	14.096	48.920		
86	1.00000000	11.386	1.350	154.6	5.484	173.00	-1.000	1294386.00	14.261	49.341		
87	1.00000000	11.381	1.349	155.4	5.507	175.00	-1.000	1339800.00	14.426	49.452	49.0	42.73
88	1.00000000	11.376	1.349	156.2	5.530	177.00	-1.000	1386264.00	14.590	49.564		
89	1.00000000	11.371	1.348	156.9	5.553	179.00	-1.000	1433790.00	14.755	49.688		
90	1.00000000	11.366	1.347	157.7	5.577	181.00	-1.000	1482390.00	14.920	50.142	50.0	44.27
91	1.00000000	11.360	1.347	158.5	5.600	183.00	-1.000	1532076.00	15.085	50.601		
92	1.00000000	11.355	1.346	159.3	5.624	185.00	-1.000	1582860.00	15.250	51.066	51.0	30.33
93	1.00000000	11.350	1.346	160.1	5.648	187.00	-1.000	1634754.00	15.415	51.523		
94	1.00000000	11.345	1.345	161.0	5.673	189.00	-1.000	1687770.00	15.580	51.980		
95	1.00000000	11.340	1.344	161.8	5.697	191.00	-1.000	1741920.00	15.745	52.441	52.0	46.74
96	1.00000000	11.335	1.344	162.6	5.722	193.00	-1.000	1797216.00	15.909	53.013	53.0	15.91
97	1.00000000	11.330	1.343	163.5	5.747	195.00	-1.000	1853670.00	16.074	53.728		
98	1.00000000	11.324	1.343	164.4	5.772	197.00	-1.000	1911294.00	16.239	54.451	54.0	32.31
99	1.00000000	11.319	1.342	165.2	5.797	199.00	-1.000	1970100.00	16.404	55.069		
100	1.00000000	11.314	1.341	166.1	5.822	201.00	-1.000	2030100.00	16.569	55.429	55.0	32.97
101	1.00000000	11.309	1.341	167.0	5.848	203.00	-1.000	2091306.00	16.734	55.793		
102	1.00000000	11.304	1.340	167.9	5.874	205.00	-1.000	2153730.00	16.899	56.160	56.0	33.63
103	1.00000000	11.298	1.340	168.8	5.899	207.00	-1.000	2217384.00	17.063	56.531		
104	1.00000000	11.293	1.339	169.7	5.926	209.00	-1.000	2282280.00	17.228	56.906	57.0	34.29
105	1.00000000	11.288	1.338	170.7	5.952	211.00	-1.000	2348430.00	17.393	57.694	58.0	17.39
106	1.00000000	11.282	1.338	171.6	5.978	213.00	-1.000	2415846.00	17.558	59.396	59.0	17.56
107	1.00000000	11.277	1.337	172.6	6.005	215.00	-1.000	2484540.00	17.723	61.115	60.0	17.72
108	1.00000000	11.272	1.336	173.5	6.032	217.00	-1.000	2554524.00	17.888	62.850	61.0	17.89
109	1.00000000	11.267	1.336	174.5	6.059	219.00	-1.000	2625810.00	18.053	64.601	62.0	18.05
110	1.00000000	11.261	1.335	175.5	6.086	221.00	-1.000	2698410.00	18.217	66.368	63.0	18.22
111	1.00000000	11.256	1.334	176.5	6.113	223.00	-1.000	2772336.00	18.382	68.151	64.0	18.38
112	1.00000000	11.251	1.334	177.5	6.141	225.00	-1.000	2847600.00	18.547	69.950	65.0	18.55
113	1.00000000	11.245	1.333	178.5	6.168	227.00	-1.000	2924214.00	18.712	71.765	66.0	18.71
114	1.00000000	11.240	1.333	179.5	6.196	229.00	-1.000	3002190.00	18.877	73.597	67.0	18.88
115	1.00000000	11.234	1.332	180.5	6.224	231.00	-1.000	3081540.00	19.042	75.445	68.0	19.04
116	1.00000000	11.229	1.331	181.5	6.252	233.00	-1.000	3162276.00	19.207	77.309	69.0	19.21
117	1.00000000	11.224	1.331	182.6	6.281	235.00	-1.000	3244410.00	19.372	79.189	70.0	19.37
118	1.00000000	11.218	1.330	183.7	6.309	237.00	-1.000	3327954.00	19.536	81.085	71.0	19.54
119	1.00000000	11.213	1.329	184.7	6.338	239.00	-1.000	3412920.00	19.701	82.997	72.0	19.70
120	1.00000000	11.208	1.329	185.8	6.367	241.00	-1.000	3499320.00	19.866	84.925	73.0	19.87
121	1.00000000	11.202	1.328	186.9	6.395	243.00	-1.000	3587166.00	20.031	86.870	74.0	20.03
122	1.00000000	11.197	1.327	188.0	6.425	245.00	-1.000	3676470.00	20.196	88.830	75.0	20.20
123	1.00000000	11.191	1.327	189.1	6.454	247.00	-1.000	3767244.00	20.361	90.807	76.0	20.36
124	1.00000000	11.186	1.326	190.2	6.483	249.00	-1.000	3859500.00	20.526	92.800	77.0	20.53
125	1.00000000	11.181	1.326	191.3	6.513	251.00	-1.000	3953250.00	20.690	94.809	78.0	20.69
126	1.00000000	11.175	1.325	192.5	6.542	253.00	-1.000	4048506.00	20.855	96.834	79.0	20.86
127	1.00000000	11.170	1.324	193.6	6.572	255.00	-1.000	4145280.00	21.020	98.876	80.0	21.02
128	1.00000000	11.164	1.324	194.8	6.602	257.00	-1.000	4243584.00	21.185	100.933	81.0	21.19
129	1.00000000	11.159	1.323	196.0	6.632	259.00	-1.000	4343430.00	21.350	103.007	82.0	21.35
130	1.00000000	11.154	1.322	197.1	6.663	261.00	-1.000	4444830.00	21.515	105.097	83.0	21.51
131	1.00000000	11.148	1.322	198.3	6.693	263.00	-1.000	4547796.00	21.680	107.203	84.0	21.68
132	1.00000000	11.143	1.321	199.5	6.724	265.00	-1.000	4652340.00	21.844	109.325	85.0	21.84
133	0.99999905	11.137	1.320	200.7	6.754	267.00	-1.000	4758465.00	22.009	111.463	86.0	22.01
134	0.99999619	11.132	1.320	202.0	6.785	269.00	-1.000	4866187.00	22.174	113.617	87.0	22.17
135	0.99998569	11.127	1.319	203.2	6.816	271.00	-1.000	4975488.00	22.339	115.788	88.0	22.34
136	0.99995041	11.121	1.318	204.4	6.847	272.99	-1.000	5086281.00	22.503	117.974	89.0	22.50
137	0.99983692	11.116	1.318	205.7	6.879	274.96	-1.000	5198300.00	22.665	120.177	90.0	22.67
138	0.99946427	11.110	1.317	206.9	6.910	276.85	-1.000	5310566.00	22.821	122.396	91.0	22.82
139	0.99824828	11.105	1.317	208.2	6.942	278.51	-1.000	5419828.00	22.956	124.631	92.0	22.96
140	0.99429446	11.100	1.316	209.5	6.973	279.40	-1.000	5515291.00	23.031	126.882	93.0	23.03

141	0.98160404	11.094	1.315	210.8	7.005	277.79	-1.000	5561985.00	22.899	129.149	94.0	22.90
142	0.94240040	11.089	1.315	212.1	7.037	268.58	-1.000	5453866.00	22.140	131.433	95.0	22.14
143	0.83398759	11.083	1.314	213.4	7.069	239.35	-1.000	4928786.00	19.730	133.732	96.0	19.73
144	0.60701114	11.078	1.313	214.7	7.101	175.43	-1.000	3662899.00	14.461	136.048	97.0	14.46
145	0.32230580	11.073	1.313	216.1	7.134	93.79	-1.000	1985555.00	7.731	138.380	98.0	7.73
146	0.12789363	11.067	1.312	217.4	7.166	37.47	-1.000	804241.75	3.089	140.728	99.0	3.09
147	0.04332420	11.062	1.311	218.8	7.199	12.78	-1.000	278055.50	1.054	143.092	100.0	1.05
148	0.01381215	11.057	1.311	220.1	7.231	4.10	-1.000	90461.81	0.338	145.472	101.0	0.34
149	0.00431935	11.051	1.310	221.5	7.264	1.29	-1.000	28864.73	0.106	147.868	102.0	0.11
150	0.00134393	11.046	1.310	222.9	7.297	0.40	-1.000	9162.47	0.033	150.281	103.0	0.03
151	0.00041794	11.040	1.309	224.3	7.330	0.13	-1.000	2906.55	0.010	152.710	104.0	0.01
152	0.00013010	11.035	1.308	225.7	7.363	0.04	-1.000	922.80	0.003	155.154	105.0	0.00
153	0.00004055	11.030	1.308	227.1	7.397	0.01	-1.000	293.35	0.001	157.615		

CROSS SECTION (NBARN) = 1730.234

ROOT MEAN SQUARE L = 102.47

RMSI SQUARED = 10499.336 AVERAGE ROTATION ENERGY (MEV) = 88.390
COMPOUND NUCLEUS CROSS SECTION = 0.173E 04

0.824E-01	0.330E 00	0.742E 00	0.132E 01	0.206E 01	0.297E 01	0.404E 01	0.528E 01	0.668E 01	0.824E 01
0.997E 01	0.119E 02	0.139E 02	0.162E 02	0.185E 02	0.211E 02	0.238E 02	0.267E 02	0.298E 02	0.330E 02
0.364E 02	0.399E 02	0.436E 02	0.475E 02	0.515E 02	0.557E 02	0.601E 02	0.646E 02	0.693E 02	0.742E 02
0.792E 02	0.844E 02	0.898E 02	0.953E 02	0.101E 03	0.107E 03	0.113E 03	0.119E 03	0.125E 03	0.132E 03
0.139E 03	0.145E 03	0.152E 03	0.160E 03	0.167E 03	0.174E 03	0.182E 03	0.190E 03	0.198E 03	0.206E 03
0.214E 03	0.223E 03	0.232E 03	0.240E 03	0.249E 03	0.259E 03	0.268E 03	0.277E 03	0.287E 03	0.297E 03
0.307E 03	0.317E 03	0.327E 03	0.338E 03	0.348E 03	0.359E 03	0.370E 03	0.381E 03	0.392E 03	0.404E 03
0.416E 03	0.427E 03	0.439E 03	0.451E 03	0.464E 03	0.476E 03	0.489E 03	0.502E 03	0.514E 03	0.528E 03
0.541E 03	0.554E 03	0.568E 03	0.582E 03	0.596E 03	0.610E 03	0.624E 03	0.638E 03	0.653E 03	0.668E 03
0.683E 03	0.698E 03	0.713E 03	0.728E 03	0.744E 03	0.760E 03	0.776E 03	0.792E 03	0.808E 03	0.824E 03
0.841E 03	0.858E 03	0.875E 03	0.892E 03	0.909E 03	0.926E 03	0.944E 03	0.961E 03	0.979E 03	0.997E 03
0.102E 04	0.103E 04	0.105E 04	0.107E 04	0.109E 04	0.111E 04	0.113E 04	0.115E 04	0.117E 04	0.119E 04
0.121E 04	0.123E 04	0.125E 04	0.127E 04	0.129E 04	0.131E 04	0.133E 04	0.135E 04	0.137E 04	0.139E 04
0.141E 04	0.144E 04	0.146E 04	0.148E 04	0.150E 04	0.152E 04	0.155E 04	0.157E 04	0.159E 04	0.162E 04
0.164E 04	0.166E 04	0.168E 04	0.170E 04	0.172E 04	0.173E 04	0.173E 04	0.173E 04	0.173E 04	0.173E 04
0.173E 04	0.173E 04	0.173E 04	0.173E 04	0.173E 04	0.173E 04	0.173E 04	0.173E 04	0.173E 04	0.173E 04

COMPOUND NUCLEUS ATOMIC NUMBER = 65 MASS NUMBER = 151

COMPOUND NUCLEUS CROSS SECTION = 0.833E 01

EXCITATION ENERGY OF COMPOUND NUCLEUS = 135.6MEV J= 50

REACTION CROSS SECTION = 1730.2

BARFAC = 1.000 CLD = 1.0000 GAMP/GAMTOT = 0.265E-03 ANGN = 0.0 ANGP = 0.0 PLD = 8.000

ATOMIC NUMBER	65	65	65	65	65	65	65	65	65	65	65
MASS NUMBER	151	150	149	148	147	146	145	144	143	142	141
CROSS SECTION	0.0	0.0	0.850E-03	0.0	0.0	0.0	0.0	0.776E-03	0.121E-01	0.580E-02	0.802E-04
CUMULV. CRSSSEC	0.833E 01	0.0	0.850E-03	0.0	0.0	0.0	0.0	0.776E-03	0.121E-01	0.580E-02	0.802E-04
FISS X SECT	0.221E-02	0.148E-02	0.101E-02	0.820E-03	0.178E-02	0.130E-02	0.790E-03	0.354E-03	0.460E-04	0.302E-06	0.251E-12
DEL SADDLE PT	0.383E 02	0.379E 02	0.375E 02	0.371E 02	0.366E 02	0.362E 02	0.357E 02	0.352E 02	0.347E 02	0.341E 02	0.335E 02
FISS BARRIER	0.192E 02	0.186E 02	0.180E 02	0.173E 02	0.167E 02	0.160E 02	0.153E 02	0.146E 02	0.139E 02	0.131E 02	0.123E 02
DEL ROTATION	0.191E 02	0.193E 02	0.195E 02	0.197E 02	0.199E 02	0.201E 02	0.204E 02	0.206E 02	0.208E 02	0.210E 02	0.212E 02
ROTATIONAL EN	0.202E 02	0.204E 02	0.206E 02	0.209E 02	0.211E 02	0.213E 02	0.216E 02	0.218E 02	0.221E 02	0.223E 02	0.226E 02
MASS NUMBER	140	139									
CROSS SECTION	0.875E-10	0.0									
CUMULV. CRSSSEC	0.875E-10	0.0									
FISS X SECT	0.0	0.0									
DEL SADDLE PT	0.330E 02	0.324E 02									
FISS BARRIER	0.115E 02	0.107E 02									
DEL ROTATION	0.215E 02	0.217E 02									
ROTATIONAL EN	0.229E 02	0.232E 02									
FISSION CROSS SECTION TO HERE=	0.978E-02										
SUM CROSS SECTION =	0.196E-01										
MISSING CROSS SECTION =	0.830E 01										

ATOMIC NUMBER	64	64	64	64	64	64	64	64	64	64
MASS NUMBER	150	149	148	147	146	145	144	143	142	141
CROSS SECTION	0.0	0.0	0.0	0.0	0.0	0.0	0.663E-02	0.145E-00	0.293E-00	0.161E-01
CUMULV.CRSSEC	0.0	0.0	0.0	0.0	0.0	0.0	0.663E-02	0.145E-00	0.293E-00	0.161E-01
FISS X SECT	0.305E-04	0.764E-04	0.781E-04	0.868E-04	0.255E-03	0.214E-03	0.969E-04	0.150E-04	0.165E-06	0.485E-11
DEL SADDLE PT	0.402E-02	0.398E-02	0.394E-02	0.390E-02	0.336E-02	0.382E-02	0.377E-02	0.372E-02	0.367E-02	0.362E-02
FISS BARRIER	0.208E-02	0.203E-02	0.197E-02	0.191E-02	0.134E-02	0.178E-02	0.171E-02	0.164E-02	0.157E-02	0.150E-02
DEL ROTATION	0.193E-02	0.195E-02	0.197E-02	0.199E-02	0.232E-02	0.204E-02	0.206E-02	0.208E-02	0.210E-02	0.213E-02
ROTATIONAL EN	0.204E-02	0.206E-02	0.209E-02	0.211E-02	0.213E-02	0.216E-02	0.218E-02	0.221E-02	0.223E-02	0.226E-02

MASS NUMBER	139	138
CROSS SECTION	0.630E-15	0.0
CUMULV.CRSSEC	0.630E-15	0.0
FISS X SECT	0.0	0.0
DEL SADDLE PT	0.351E-02	0.345E-02
FISS BARRIER	0.134E-02	0.126E-02
DEL ROTATION	0.217E-02	0.220E-02
ROTATIONAL EN	0.232E-02	0.234E-02

FISSION CROSS SECTION TO HERE= 0.106E-01 SUM CROSS SECTION = 0.480E-00 MISSING CROSS SECTION = 0.784E-01

ATOMIC NUMBER	63	63	63	63	63	63	63	63	63	63
MASS NUMBER	149	148	147	146	145	144	143	142	141	140
CROSS SECTION	0.0	0.0	0.0	0.0	0.0	0.959E-03	0.989E-01	0.715E-00	0.244E-00	0.340E-00
CUMULV.CRSSEC	0.0	0.0	0.0	0.0	0.0	0.959E-03	0.989E-01	0.715E-00	0.244E-00	0.340E-00
FISS X SECT	0.192E-06	0.781E-06	0.147E-03	0.243E-03	0.584E-03	0.540E-03	0.401E-03	0.278E-03	0.561E-04	0.196E-05
DEL SADDLE PT	0.420E-02	0.416E-02	0.413E-02	0.405E-02	0.405E-02	0.401E-02	0.395E-02	0.392E-02	0.387E-02	0.382E-02
FISS BARRIER	0.224E-02	0.219E-02	0.213E-02	0.207E-02	0.201E-02	0.195E-02	0.188E-02	0.182E-02	0.175E-02	0.167E-02
DEL ROTATION	0.196E-02	0.198E-02	0.200E-02	0.202E-02	0.204E-02	0.206E-02	0.208E-02	0.210E-02	0.213E-02	0.215E-02
ROTATIONAL EN	0.206E-02	0.209E-02	0.211E-02	0.213E-02	0.216E-02	0.218E-02	0.221E-02	0.223E-02	0.226E-02	0.229E-02

MASS NUMBER	138	137
CROSS SECTION	0.247E-02	0.381E-07
CUMULV.CRSSEC	0.247E-02	0.381E-07
FISS X SECT	0.514E-15	0.0
DEL SADDLE PT	0.372E-02	0.367E-02
FISS BARRIER	0.152E-02	0.144E-02
DEL ROTATION	0.220E-02	0.222E-02
ROTATIONAL EN	0.234E-02	0.237E-02

FISSION CROSS SECTION TO HERE= 0.129E-01 SUM CROSS SECTION = 0.211E-01 MISSING CROSS SECTION = 0.621E-01

ATOMIC NUMBER	62	62	62	62	62	62	62	62	62	62
MASS NUMBER	148	147	146	145	144	143	142	141	140	139
CROSS SECTION	0.0	0.0	0.0	0.0	0.0	0.492E-02	0.112E-00	0.155E-00	0.822E-00	0.156E-01
CUMULV.CRSSEC	0.0	0.0	0.0	0.0	0.0	0.492E-02	0.112E-00	0.155E-00	0.822E-00	0.156E-01
FISS X SECT	0.367E-09	0.210E-08	0.205E-05	0.721E-05	0.351E-04	0.327E-04	0.234E-04	0.593E-05	0.309E-06	0.661E-09
DEL SADDLE PT	0.437E-02	0.434E-02	0.431E-02	0.427E-02	0.423E-02	0.419E-02	0.415E-02	0.411E-02	0.407E-02	0.402E-02
FISS BARRIER	0.240E-02	0.235E-02	0.229E-02	0.223E-02	0.217E-02	0.211E-02	0.205E-02	0.198E-02	0.191E-02	0.184E-02
DEL ROTATION	0.198E-02	0.200E-02	0.202E-02	0.204E-02	0.206E-02	0.208E-02	0.210E-02	0.213E-02	0.215E-02	0.217E-02
ROTATIONAL EN	0.209E-02	0.211E-02	0.213E-02	0.216E-02	0.218E-02	0.221E-02	0.223E-02	0.226E-02	0.229E-02	0.232E-02

MASS NUMBER	137	136
CROSS SECTION	0.138E-03	0.177E-11
CUMULV.CRSSEC	0.138E-03	0.177E-11
FISS X SECT	0.0	0.0
DEL SADDLE PT	0.392E-02	0.387E-02
FISS BARRIER	0.170E-02	0.162E-02
DEL ROTATION	0.222E-02	0.225E-02
ROTATIONAL EN	0.237E-02	0.240E-02

FISSION CROSS SECTION TO HERE= 0.130E-01 SUM CROSS SECTION = 0.489E-01 MISSING CROSS SECTION = 0.343E-01

ATOMIC NUMBER	61	61	61	51	61	61	61	51	61	61
MASS NUMBER	147	146	145	144	143	142	141	140	139	138
CROSS SECTION	0.0	0.0	0.0	0.0	0.0	0.629E-03	0.630E-02	0.155E-00	0.722E-00	0.307E-00
CUMULV.CRSSEC	0.0	0.0	0.0	0.0	0.0	0.629E-03	0.630E-02	0.155E-00	0.722E-00	0.307E-00
FISS X SECT	0.113E-12	0.666E-12	0.677E-08	0.340E-07	0.175E-04	0.220E-04	0.210E-04	0.133E-04	0.501E-05	0.559E-06

DEL SADDLE PT 0.454E 02 0.451E 02 0.448E 02 0.445E 02 0.441E 02 0.438E 02 0.434E 02 0.430E 02 0.425E 02 0.421E 02 0.417E 02
FISS BARRIER 0.255E 02 0.250E 02 0.244E 02 0.239E 02 0.233E 02 0.227E 02 0.221E 02 0.215E 02 0.208E 02 0.201E 02 0.194E 02
DEL ROTATION 0.200E 02 0.202E 02 0.204E 02 0.206E 02 0.208E 02 0.211E 02 0.213E 02 0.215E 02 0.218E 02 0.220E 02 0.223E 02
ROTATIONAL EN 0.211E 02 0.213E 02 0.216E 02 0.218E 02 0.221E 02 0.223E 02 0.226E 02 0.229E 02 0.232E 02 0.234E 02 0.237E 02

MASS NUMBER 136 135
CROSS SECTION 0.482E 00 0.105E-01
CUMLTV.CRSSEC 0.482E 00 0.105E-01
FISS X SECT 0.102E-11 0.123E-21
DEL SADDLE PT 0.412E 02 0.407E 02
FISS BARRIER 0.187E 02 0.179E 02
DEL ROTATION 0.225E 02 0.228E 02
ROTATIONAL EN 0.240E 02 0.243E 02
FISSION CROSS SECTION TO HERE= 0.131E-01 SUM CROSS SECTION = 0.710E 01 MISSING CROSS SECTION = 0.122E 01

ATOMIC NUMBER	60	60	60	60	60	60	60	60	60	60	60	60
MASS NUMBER	146	145	144	143	142	141	140	139	138	137	136	135
CROSS SECTION	0.0	0.0	0.0	0.0	0.0	0.0	0.329E-02	0.153E-01	0.283E-01	0.322E 00	0.484E 00	0.484E 00
CUMLTV.CRSSEC	0.0	0.0	0.0	0.0	0.0	0.0	0.329E-02	0.153E-01	0.283E-01	0.322E 00	0.484E 00	0.484E 00
FISS X SECT	0.117E-17	0.610E-17	0.326E-11	0.203E-10	0.217E-06	0.366E-06	0.304E-06	0.134E-06	0.168E-07	0.230E-09	0.103E-12	0.103E-12
DEL SADDLE PT	0.470E 02	0.468E 02	0.465E 02	0.462E 02	0.459E 02	0.455E 02	0.452E 02	0.448E 02	0.444E 02	0.440E 02	0.436E 02	0.436E 02
FISS BARRIER	0.269E 02	0.264E 02	0.259E 02	0.253E 02	0.248E 02	0.242E 02	0.236E 02	0.230E 02	0.224E 02	0.217E 02	0.210E 02	0.210E 02
DEL ROTATION	0.202E 02	0.204E 02	0.206E 02	0.208E 02	0.211E 02	0.213E 02	0.215E 02	0.218E 02	0.220E 02	0.223E 02	0.225E 02	0.225E 02
ROTATIONAL EN	0.213E 02	0.216E 02	0.218E 02	0.221E 02	0.223E 02	0.226E 02	0.229E 02	0.232E 02	0.234E 02	0.237E 02	0.240E 02	0.240E 02

MASS NUMBER 135 134
CROSS SECTION 0.553E-01 0.132E-03
CUMLTV.CRSSEC 0.553E-01 0.132E-03
FISS X SECT 0.715E-19 0.0
DEL SADDLE PT 0.431E 02 0.427E 02
FISS BARRIER 0.203E 02 0.196E 02
DEL ROTATION 0.228E 02 0.231E 02
ROTATIONAL EN 0.243E 02 0.246E 02
FISSION CROSS SECTION TO HERE= 0.131E-01 SUM CROSS SECTION = 0.800E 01 MISSING CROSS SECTION = 0.308E 00

ATOMIC NUMBER	59	59	59	59	59	59	59	59	59	59	59	59
MASS NUMBER	145	144	143	142	141	140	139	138	137	136	135	134
CROSS SECTION	0.424E-15	0.588E-13	0.0	0.0	0.0	0.656E-05	0.578E-04	0.781E-03	0.145E-01	0.288E-01	0.154E-01	0.154E-01
CUMLTV.CRSSEC	0.424E-15	0.588E-13	0.0	0.0	0.0	0.656E-05	0.578E-04	0.781E-03	0.145E-01	0.288E-01	0.154E-01	0.154E-01
FISS X SECT	0.159E-25	0.116E-24	0.801E-1E	0.377E-15	0.400E-09	0.562E-09	0.106E-06	0.131E-06	0.705E-07	0.167E-07	0.843E-09	0.843E-09
DEL SADDLE PT	0.486E 02	0.483E 02	0.481E 02	0.478E 02	0.475E 02	0.472E 02	0.469E 02	0.465E 02	0.462E 02	0.458E 02	0.454E 02	0.454E 02
FISS BARRIER	0.282E 02	0.277E 02	0.272E 02	0.267E 02	0.262E 02	0.257E 02	0.251E 02	0.245E 02	0.239E 02	0.233E 02	0.226E 02	0.226E 02
DEL ROTATION	0.204E 02	0.206E 02	0.208E 02	0.211E 02	0.213E 02	0.215E 02	0.218E 02	0.220E 02	0.223E 02	0.225E 02	0.228E 02	0.228E 02
ROTATIONAL EN	0.216E 02	0.218E 02	0.221E 02	0.223E 02	0.226E 02	0.229E 02	0.232E 02	0.234E 02	0.237E 02	0.240E 02	0.243E 02	0.243E 02

MASS NUMBER 134 133
CROSS SECTION 0.106E 00 0.933E-01
CUMLTV.CRSSEC 0.106E 00 0.933E-01
FISS X SECT 0.261E-11 0.183E-16
DEL SADDLE PT 0.450E 02 0.446E 02
FISS BARRIER 0.219E 02 0.212E 02
DEL ROTATION 0.231E 02 0.233E 02
ROTATIONAL EN 0.246E 02 0.249E 02
FISSION CROSS SECTION TO HERE= 0.131E-01 SUM CROSS SECTION = 0.826E 01 MISSING CROSS SECTION = 0.495E-01

ATOMIC NUMBER	58	58	58	58	58	58	58	58	58	58	58	58
MASS NUMBER	144	143	142	141	140	139	138	137	136	135	134	133
CROSS SECTION	0.487E-18	0.100E-16	0.191E-1E	0.654E-11	0.391E-08	0.122E-06	0.916E-05	0.110E-03	0.200E-03	0.176E-02	0.166E-01	0.166E-01
CUMLTV.CRSSEC	0.487E-18	0.100E-16	0.191E-1E	0.654E-11	0.391E-08	0.122E-06	0.916E-05	0.110E-03	0.200E-03	0.176E-02	0.166E-01	0.166E-01
FISS X SECT	0.0	0.0	0.396E-2E	0.101E-22	0.335E-13	0.243E-13	0.284E-09	0.260E-09	0.686E-10	0.296E-11	0.693E-14	0.693E-14
DEL SADDLE PT	0.502E 02	0.500E 02	0.497E 02	0.494E 02	0.491E 02	0.488E 02	0.485E 02	0.482E 02	0.479E 02	0.475E 02	0.472E 02	0.472E 02
FISS BARRIER	0.297E 02	0.292E 02	0.287E 02	0.281E 02	0.276E 02	0.270E 02	0.265E 02	0.259E 02	0.253E 02	0.247E 02	0.241E 02	0.241E 02
DEL ROTATION	0.206E 02	0.208E 02	0.210E 02	0.213E 02	0.215E 02	0.218E 02	0.220E 02	0.223E 02	0.225E 02	0.228E 02	0.231E 02	0.231E 02
ROTATIONAL EN	0.218E 02	0.221E 02	0.223E 02	0.226E 02	0.229E 02	0.232E 02	0.234E 02	0.237E 02	0.240E 02	0.243E 02	0.246E 02	0.246E 02

MASS NUMBER 133 132

CROSS SECTION 0.104E-01 0.276E-03
 CUMLTV.CRSSEC 0.104E-01 0.276E-03
 FISS X SECT 0.502E-19 0.0
 DEL SADDLE PT 0.468E 02 0.464E 02
 FISS BARRIER 0.234E 02 0.227E 02
 DEL ROTATION 0.234E 02 0.237E 02
 ROTATIONAL EF 0.249E 02 0.252E 02
 FISSION CROSS SECTION TO HERE= 0.131E-01 SJM CROSS SECTION = 0.829E 01 MISSING CROSS SECTION = 0.201E-01

ATOMIC NUMBER	57	57	57	57	57	57	57	57	57	57
MASS NUMBER	143	142	141	140	139	138	137	136	135	134
CROSS SECTION	0.308E-25	0.363E-24	0.707E-16	0.165E-14	0.107E-09	0.107E-07	0.679E-07	0.351E-06	0.236E-04	0.192E-03
CUMLTV.CRSSEC	0.308E-25	0.363E-24	0.707E-16	0.165E-14	0.107E-09	0.107E-07	0.679E-07	0.351E-06	0.236E-04	0.192E-03
FISS X SECT	0.0	0.0	0.132E-37	0.347E-38	0.661E-20	0.945E-21	0.212E-13	0.721E-14	0.773E-10	0.362E-10
DEL SADDLE PT	0.519E 02	0.517E 02	0.515E 02	0.512E 02	0.509E 02	0.506E 02	0.503E 02	0.500E 02	0.496E 02	0.493E 02
FISS BARRIER	0.311E 02	0.306E 02	0.302E 02	0.297E 02	0.291E 02	0.286E 02	0.281E 02	0.275E 02	0.269E 02	0.262E 02
DEL ROTATION	0.208E 02	0.211E 02	0.213E 02	0.216E 02	0.218E 02	0.220E 02	0.223E 02	0.225E 02	0.228E 02	0.230E 02
ROTATIONAL EF	0.221E 02	0.223E 02	0.226E 02	0.229E 02	0.232E 02	0.234E 02	0.237E 02	0.240E 02	0.243E 02	0.246E 02

MASS NUMBER 132 131
 CROSS SECTION 0.803E-03 0.460E-02
 CUMLTV.CRSSEC 0.803E-03 0.460E-02
 FISS X SECT 0.417E-13 0.510E-17
 DEL SADDLE PT 0.485E 02 0.482E 02
 FISS BARRIER 0.248E 02 0.242E 02
 DEL ROTATION 0.237E 02 0.240E 02
 ROTATIONAL EF 0.252E 02 0.256E 02
 FISSION CROSS SECTION TO HERE= 0.131E-01 SJM CROSS SECTION = 0.830E 01 MISSING CROSS SECTION = 0.143E-01

ATOMIC NUMBER	56	56	56	56	56	56	56	56	56	56
MASS NUMBER	142	141	140	139	138	137	136	135	134	133
CROSS SECTION	0.0	0.235E-39	0.180E-22	0.179E-21	0.171E-12	0.383E-11	0.365E-09	0.308E-07	0.136E-06	0.657E-06
CUMLTV.CRSSEC	0.0	0.235E-39	0.180E-22	0.179E-21	0.171E-12	0.383E-11	0.365E-09	0.308E-07	0.136E-06	0.657E-06
FISS X SECT	0.0	0.0	0.0	0.0	0.539E-32	0.605E-35	0.192E-20	0.224E-21	0.460E-14	0.735E-15
DEL SADDLE PT	0.536E 02	0.534E 02	0.532E 02	0.529E 02	0.527E 02	0.524E 02	0.521E 02	0.518E 02	0.515E 02	0.511E 02
FISS BARRIER	0.324E 02	0.320E 02	0.316E 02	0.311E 02	0.306E 02	0.301E 02	0.296E 02	0.290E 02	0.284E 02	0.278E 02
DEL ROTATION	0.211E 02	0.214E 02	0.216E 02	0.218E 02	0.221E 02	0.223E 02	0.225E 02	0.228E 02	0.231E 02	0.233E 02
ROTATIONAL EF	0.223E 02	0.226E 02	0.229E 02	0.232E 02	0.234E 02	0.237E 02	0.240E 02	0.243E 02	0.246E 02	0.249E 02

MASS NUMBER 131 130
 CROSS SECTION 0.108E-03 0.324E-04
 CUMLTV.CRSSEC 0.108E-03 0.324E-04
 FISS X SECT 0.105E-20 0.277E-28
 DEL SADDLE PT 0.504E 02 0.500E 02
 FISS BARRIER 0.265E 02 0.259E 02
 DEL ROTATION 0.238E 02 0.241E 02
 ROTATIONAL EF 0.256E 02 0.259E 02
 FISSION CROSS SECTION TO HERE= 0.131E-01 SJM CROSS SECTION = 0.830E 01 MISSING CROSS SECTION = 0.141E-01

ATOMIC NUMBER	55	55	55	55	55	55	55	55	55	55
MASS NUMBER	141	140	139	138	137	136	135	134	133	132
CROSS SECTION	0.0	0.0	0.280E-35	0.408E-35	0.166E-17	0.909E-18	0.211E-11	0.935E-11	0.953E-09	0.471E-07
CUMLTV.CRSSEC	0.0	0.0	0.280E-35	0.408E-35	0.166E-17	0.909E-18	0.211E-11	0.935E-11	0.953E-09	0.471E-07
FISS X SECT	0.0	0.0	0.0	0.0	0.0	0.0	0.506E-35	0.0	0.191E-21	0.451E-23
DEL SADDLE PT	0.551E 02	0.549E 02	0.547E 02	0.545E 02	0.543E 02	0.541E 02	0.539E 02	0.535E 02	0.532E 02	0.529E 02
FISS BARRIER	0.337E 02	0.333E 02	0.329E 02	0.324E 02	0.320E 02	0.315E 02	0.310E 02	0.304E 02	0.299E 02	0.293E 02
DEL ROTATION	0.214E 02	0.216E 02	0.219E 02	0.221E 02	0.223E 02	0.226E 02	0.228E 02	0.231E 02	0.234E 02	0.236E 02
ROTATIONAL EF	0.226E 02	0.229E 02	0.232E 02	0.234E 02	0.237E 02	0.240E 02	0.243E 02	0.246E 02	0.249E 02	0.252E 02

MASS NUMBER 130 129
 CROSS SECTION 0.311E-06 0.989E-05
 CUMLTV.CRSSEC 0.311E-06 0.989E-05
 FISS X SECT 0.189E-16 0.925E-20
 DEL SADDLE PT 0.522E 02 0.519E 02
 FISS BARRIER 0.281E 02 0.274E 02
 DEL ROTATION 0.242E 02 0.244E 02

ROTATIONAL EN 0.259E 02 0.262E 02
FISSION CROSS SECTION TO HERE= 0.131E-01 SUM CROSS SECTION = 0.830E 01 MISSING CROSS SECTION = 0.141E-01
TOTAL FISSION CROSS SECTION = 0.131E-01
SUM CROSS SECTIONS = 0.830E 01

KR + CU (INPUT IKE = 11 FOR FULL OUTPUT ONLY AT END OF CALCULATION)

QVAL = 0.0 AP = 86.0 AT = 65.0 ZP = 36.0 ZT = 29.0
 CLD = 0.0 NA = 6 NZ = 4 MC = 0 MP = 0 INVER = 0 IKE = 0 IFCH = 1
 BARRIER=LIQUID DROP BARRIER*1.000
 RATIO OF FISSION TO NUCLEON SINGLE PARTICLE DENSITIES WAS SET EQUAL TO 1 BY DEFAULT OPTION
 QVAL FROM MYERS SWIATECKI MASS FORMULA =-79.7
 MYERS SWIATECKI LYSEKIL MASSES
 SHELL CORRECTED MASSES
 ZERO PAIRING

BINDING ENERGIES USED

IZ = Z-INDEX OF NUCLEUS, IA = A-INDEX OF NUCLEUS IN PROGRAM ISOTOPE TABLE

IZ	IA	NEUTRON	PROTON	ALPHA	DEUTERON
1	1	7.94572	4.71353	-3.57526	10.28439
1	2	8.11441	4.39868	-3.87627	10.13547
1	3	8.28769	4.08107	-4.17625	9.98718
1	4	8.46147	3.75951	-2.53859	9.33856
1	5	10.56094	3.43710	-0.87968	11.52144
1	6	10.76093	3.12051	-1.12209	11.50150
2	1	7.63087	5.21974	-3.19658	10.47377
2	2	7.79680	4.90291	-3.50589	10.32034
2	3	7.96613	4.58356	-3.81422	10.16826
2	4	8.13907	4.26215	-2.17520	10.01656
2	5	10.24435	3.93750	-0.51645	11.30284
2	6	10.44099	3.61850	-0.76740	11.57886
3	1	7.31404	5.73148	-2.80591	10.56713
3	2	7.47745	5.41310	-3.12358	10.50964
3	3	7.64471	5.09221	-3.44153	10.35376
3	4	7.81442	4.76906	-1.80153	10.19751
3	5	9.92535	4.44310	-0.14238	11.98824
3	6	10.12038	4.12289	-0.40048	11.86070
4	1	6.99567	6.25076	-2.40529	10.86798
4	2	7.15656	5.93233	-2.73109	10.70695
4	3	7.32156	5.61041	-3.05672	10.54677
4	4	7.48846	5.28522	-1.41693	10.38470
4	5	9.60515	4.95625	0.24316	12.18095
4	6	9.79782	4.63582	-0.02402	12.04938

NEUTRON INVERSE CROSS SECTIONS

INVERSE REACTION CROSS SECT. FOR E=1 TO 42MEV
 4864. 3437. 3124. 3008. 3003. 2994. 2971. 2911. 2839. 2764.
 2712. 2676. 2652. 2626. 2602. 2579. 2562. 2546. 2535. 2530.
 2528. 2529. 2526. 2521. 2514. 2509. 2500. 2490. 2477. 2464.
 2444. 2422. 2395. 2370. 2340. 2310. 2279. 2251. 2219. 2188.
 2158. 2133.

PROTON INVERSE CROSS SECTIONS

INVERSE REACTION CROSS SECT. FOR E=1 TO 42MEV
 0. 0. 0. 0. 0. 0. 5. 22. 62. 131.
 221. 325. 434. 535. 628. 712. 790. 857. 916. 968.
 1015. 1059. 1096. 1128. 1156. 1184. 1206. 1226. 1244. 1262.
 1276. 1289. 1301. 1312. 1322. 1330. 1338. 1346. 1352. 1358.
 1363. 1368.

ALPHA INVERSE CROSS SECTIONS

INVERSE REACTION CROSS SECT. FOR E=1 TO 42MEV
 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.
 0. 0. 0. 3. 3. 44. 121. 251. 407. 568.
 718. 858. 984. 1099. 1205. 1300. 1389. 1469. 1545. 1612.
 1675. 1736. 1790. 1843. 1890. 1935. 1977. 2017. 2054. 2088.
 2122. 2152.

DEUTERON INVERSE CROSS SECTIONS

INVERSE REACTION CROSS SECT. FOR E=1 TO 42MEV
 0. 0. 0. 0. 0. 2. 21. 104. 298. 560.
 824. 1062. 1276. 1463. 1627. 1773. 1893. 1989. 2080. 2163.
 2236. 2301. 2355. 2402. 2441. 2478. 2517. 2553. 2589. 2620.
 2647. 2671. 2691. 2709. 2728. 2743. 2759. 2773. 2786. 2800.
 2811. 2822.

DELT = 6.10000 ALT = 13.10000 CLD = 1.00000

LABORATORY BOMBARDMENT ENERGY = 400.0MEV TARGET MASS = 65.0

COMPOUND NUCLEUS MASS = 151.0 COMPOUND NUCLEUS FORMATION Q VALUE = -79.7

JCAL= 0 START J= 0 STOP J = 5 JANG = 0

CALCULATION INCLUDES FISSION COMPETITION
 PARABOLIC BARRIER APPROXIMATION FOR REACTION CROSS SECTIONS

PROJECTILE MASS	TARGET MASS	PROJECTILE CHARGE	TARGET CHARGE	ENERGY LAB	ENERGY CM
86.000	65.000	36.000	29.000	400.000	172.185

ANGULAR MOMENTA	TRANSMISSION COEFFICIENTS	BARRIER RADIUS	BAR-RADIUS CONSTANT	BARRIER (MEV)	BARRIER CURVATURE	RELATIVE SIGMA (L)	CURVATURE SIGN	PROBABLE L-ENERGY	SIGMA (L) (MB)	ROTOR-E (MEV)	EPFROT (MEV)	EPFSIGMA (MB)
L	TL	RP	RO	VLB	WL	RSIGL	SD2VLB	SIGL2	SIGL	EROTL	EROTLI	SUMDIL
0	1.00000000	11.642	1.380	122.7	4.435	1.00	-1.000	0.0	0.103	0.0		
1	1.00000000	11.641	1.380	122.7	4.435	3.00	-1.000	6.00	0.309	0.008		
2	1.00000000	11.641	1.380	122.7	4.436	5.00	-1.000	30.00	0.515	0.032		
3	1.00000000	11.641	1.380	122.8	4.436	7.00	-1.000	84.00	0.721	0.072		
4	1.00000000	11.641	1.380	122.8	4.438	9.00	-1.000	180.00	0.927	0.127		
5	1.00000000	11.640	1.380	122.8	4.439	11.00	-1.000	330.00	1.133	0.199		
6	1.00000000	11.640	1.380	122.9	4.441	13.00	-1.000	546.00	1.340	0.286		
7	1.00000000	11.639	1.380	122.9	4.443	15.00	-1.000	840.00	1.545	0.390	0.0	6.59
8	1.00000000	11.639	1.380	123.0	4.446	17.00	-1.000	1224.00	1.752	0.509		

9	1.00000000	11.638	1.380	123.1	4.448	19.00	-1.000	1710.00	1.958	0.644		
10	1.00000000	11.637	1.380	123.2	4.451	21.00	-1.000	2310.00	2.164	0.795		
11	1.00000000	11.636	1.380	123.3	4.454	23.00	-1.000	3036.00	2.370	0.962		
12	1.00000000	11.635	1.379	123.4	4.458	25.00	-1.000	3900.00	2.576	1.145		
13	1.00000000	11.634	1.379	123.5	4.462	27.00	-1.000	4914.00	2.782	1.343	1.0	13.60
14	1.00000000	11.633	1.379	123.6	4.466	29.00	-1.000	6090.00	2.988	1.558		
15	1.00000000	11.632	1.379	123.7	4.471	31.00	-1.000	7440.00	3.194	1.789		
16	1.00000000	11.630	1.379	123.8	4.475	33.00	-1.000	8976.00	3.400	2.035		
17	1.00000000	11.629	1.379	124.0	4.481	35.00	-1.000	10710.00	3.606	2.297	2.0	13.19
18	1.00000000	11.628	1.379	124.1	4.486	37.00	-1.000	12654.00	3.812	2.576		
19	1.00000000	11.626	1.378	124.3	4.492	39.00	-1.000	14820.00	4.019	2.870		
20	1.00000000	11.624	1.378	124.5	4.497	41.00	-1.000	17220.00	4.225	3.180	3.0	12.06
21	1.00000000	11.623	1.378	124.6	4.504	43.00	-1.000	19866.00	4.431	3.506		
22	1.00000000	11.621	1.378	124.8	4.510	45.00	-1.000	22770.00	4.637	3.847		
23	1.00000000	11.619	1.378	125.0	4.517	47.00	-1.000	25944.00	4.843	4.205	4.0	13.91
24	1.00000000	11.617	1.377	125.2	4.524	49.00	-1.000	29400.00	5.049	4.579		
25	1.00000000	11.615	1.377	125.4	4.532	51.00	-1.000	33150.00	5.255	4.965		
26	1.00000000	11.613	1.377	125.6	4.539	53.00	-1.000	37206.00	5.461	5.361	5.0	15.77
27	1.00000000	11.611	1.377	125.9	4.547	55.00	-1.000	41580.00	5.667	5.772		
28	1.00000000	11.609	1.376	126.1	4.556	57.00	-1.000	46284.00	5.873	6.199	6.0	11.54
29	1.00000000	11.607	1.376	126.3	4.564	59.00	-1.000	51330.00	6.079	6.641		
30	1.00000000	11.604	1.376	126.6	4.573	61.00	-1.000	56730.00	6.285	7.099	7.0	12.36
31	1.00000000	11.602	1.375	126.9	4.582	63.00	-1.000	62496.00	6.492	7.572		
32	1.00000000	11.599	1.375	127.1	4.592	65.00	-1.000	68640.00	6.698	8.061	8.0	13.19
33	1.00000000	11.597	1.375	127.4	4.601	67.00	-1.000	75174.00	6.904	8.566		
34	1.00000000	11.594	1.375	127.7	4.611	69.00	-1.000	82110.00	7.110	9.085	9.0	14.01
35	1.00000000	11.592	1.374	128.0	4.622	71.00	-1.000	89460.00	7.316	9.620		
36	1.00000000	11.589	1.374	128.3	4.632	73.00	-1.000	97236.00	7.522	10.158	10.0	14.84
37	1.00000000	11.586	1.374	128.6	4.643	75.00	-1.000	105450.00	7.728	10.712		
38	1.00000000	11.583	1.373	128.9	4.654	77.00	-1.000	114114.00	7.934	11.282	11.0	15.66
39	1.00000000	11.580	1.373	129.2	4.665	79.00	-1.000	123240.00	8.140	11.866		
40	1.00000000	11.577	1.373	129.6	4.677	81.00	-1.000	132840.00	8.346	12.466	12.0	16.49
41	1.00000000	11.574	1.372	129.9	4.689	83.00	-1.000	142926.00	8.552	13.081	13.0	8.55
42	1.00000000	11.571	1.372	130.3	4.701	85.00	-1.000	153510.00	8.758	13.711		
43	1.00000000	11.568	1.371	130.6	4.714	87.00	-1.000	164604.00	8.964	14.351	14.0	17.72
44	1.00000000	11.564	1.371	131.0	4.726	89.00	-1.000	176220.00	9.171	14.993	15.0	9.17
45	1.00000000	11.561	1.371	131.4	4.739	91.00	-1.000	188370.00	9.377	15.649		
46	1.00000000	11.558	1.370	131.8	4.752	93.00	-1.000	201066.00	9.583	16.320	16.0	18.96
47	1.00000000	11.554	1.370	132.2	4.766	95.00	-1.000	214320.00	9.789	17.006	17.0	9.75
48	1.00000000	11.551	1.369	132.6	4.780	97.00	-1.000	228144.00	9.995	17.707		
49	1.00000000	11.547	1.369	133.0	4.794	99.00	-1.000	242550.00	10.201	18.423	18.0	20.20
50	1.00000000	11.544	1.369	133.4	4.808	101.00	-1.000	257550.00	10.407	19.138	19.0	10.41
51	1.00000000	11.540	1.368	133.9	4.823	103.00	-1.000	273156.00	10.613	19.861	20.0	10.61
52	1.00000000	11.536	1.368	134.3	4.838	105.00	-1.000	289380.00	10.819	20.597		
53	1.00000000	11.533	1.367	134.8	4.853	107.00	-1.000	306234.00	11.025	21.348	21.0	21.84
54	1.00000000	11.529	1.367	135.2	4.868	109.00	-1.000	323730.00	11.231	22.113	22.0	11.23
55	1.00000000	11.525	1.366	135.7	4.884	111.00	-1.000	341880.00	11.437	22.893	23.0	11.44
56	1.00000000	11.521	1.366	136.2	4.899	113.00	-1.000	360696.00	11.644	23.688		
57	1.00000000	11.517	1.365	136.6	4.915	115.00	-1.000	380190.00	11.850	24.499	24.0	23.49
58	1.00000000	11.513	1.365	137.1	4.932	117.00	-1.000	400374.00	12.056	25.323	25.0	12.06
59	1.00000000	11.509	1.364	137.6	4.948	119.00	-1.000	421260.00	12.262	26.162	26.0	12.26
60	1.00000000	11.505	1.364	138.1	4.965	121.00	-1.000	442860.00	12.468	27.015	27.0	12.47
61	1.00000000	11.501	1.364	138.7	4.982	123.00	-1.000	465186.00	12.674	27.867	28.0	12.67
62	1.00000000	11.497	1.363	139.2	5.000	125.00	-1.000	488250.00	12.880	28.720	29.0	12.88
63	1.00000000	11.492	1.363	139.7	5.017	127.00	-1.000	512064.00	13.086	29.587		
64	1.00000000	11.488	1.362	140.3	5.035	129.00	-1.000	536640.00	13.292	30.468	30.0	26.36
65	1.00000000	11.484	1.361	140.8	5.053	131.00	-1.000	561990.00	13.498	31.362	31.0	13.50
66	1.00000000	11.479	1.361	141.4	5.071	133.00	-1.000	588126.00	13.704	32.262	32.0	13.70
67	1.00000000	11.475	1.360	142.0	5.090	135.00	-1.000	615060.00	13.910	33.171	33.0	13.91
68	1.00000000	11.471	1.360	142.6	5.108	137.00	-1.000	642804.00	14.116	34.094	34.0	14.12
69	1.00000000	11.466	1.359	143.2	5.127	139.00	-1.000	671370.00	14.323	35.030	35.0	14.32
70	1.00000000	11.462	1.359	143.8	5.147	141.00	-1.000	700770.00	14.529	35.969	36.0	14.53
71	1.00000000	11.457	1.358	144.4	5.166	143.00	-1.000	731016.00	14.735	36.878	37.0	14.73
72	1.00000000	11.453	1.358	145.0	5.186	145.00	-1.000	762120.00	14.941	37.800	38.0	14.94
73	1.00000000	11.448	1.357	145.6	5.206	147.00	-1.000	794094.00	15.147	38.735	39.0	15.15
74	1.00000000	11.443	1.357	146.3	5.226	149.00	-1.000	826950.00	15.353	39.683	40.0	15.35

75	1.00000000	11.439	1.356	146.9	5.246	151.00	-1.000	860700.00	15.559	40.575		
76	1.00000000	11.434	1.356	147.6	5.267	153.00	-1.000	895356.00	15.765	41.477	41.0	31.32
77	1.00000000	11.429	1.355	148.2	5.287	155.00	-1.000	930930.00	15.971	42.392	42.0	15.97
78	1.00000000	11.425	1.354	148.9	5.308	157.00	-1.000	967434.00	16.177	43.318	43.0	16.18
79	1.00000000	11.420	1.354	149.6	5.330	159.00	-1.000	1004880.00	16.383	44.151	44.0	16.38
80	1.00000000	11.415	1.353	150.3	5.351	161.00	-1.000	1043280.00	16.589	44.991	45.0	16.59
81	1.00000000	11.410	1.353	151.0	5.373	163.00	-1.000	1082646.00	16.795	45.841	46.0	16.80
82	1.00000000	11.405	1.352	151.7	5.395	165.00	-1.000	1122990.00	17.002	46.681		
83	1.00000000	11.400	1.352	152.4	5.417	167.00	-1.000	1164324.00	17.208	47.418	47.0	34.21
84	1.00000000	11.395	1.351	153.1	5.439	169.00	-1.000	1206660.00	17.414	48.165	48.0	17.41
85	1.00000000	11.391	1.350	153.9	5.461	171.00	-1.000	1250010.00	17.620	48.920		
86	1.00000000	11.386	1.350	154.6	5.484	173.00	-1.000	1294386.00	17.826	49.341		
87	1.00000000	11.381	1.349	155.4	5.507	175.00	-1.000	1339800.00	18.032	49.452	49.0	53.48
88	1.00000000	11.376	1.349	156.2	5.530	177.00	-1.000	1386264.00	18.233	49.564		
89	1.00000000	11.371	1.348	156.9	5.553	179.00	-1.000	1433790.00	18.444	49.688		
90	1.00000000	11.366	1.347	157.7	5.577	181.00	-1.000	1482390.00	18.650	50.142	50.0	55.33
91	1.00000000	11.360	1.347	158.5	5.600	183.00	-1.000	1532076.00	18.856	50.601		
92	1.00000000	11.355	1.346	159.3	5.624	185.00	-1.000	1582860.00	19.062	51.066	51.0	37.92
93	0.99999905	11.350	1.346	160.1	5.648	187.00	-1.000	1634752.00	19.268	51.523		
94	0.999999619	11.345	1.345	161.0	5.673	189.00	-1.000	1687763.00	19.474	51.980		
95	0.99998951	11.340	1.344	161.8	5.697	191.00	-1.000	1741901.00	19.680	52.441	52.0	58.42
96	0.99997234	11.335	1.344	162.6	5.722	192.99	-1.000	1797166.00	19.886	53.013	53.0	19.89
97	0.99992561	11.330	1.343	163.5	5.747	194.99	-1.000	1853532.00	20.091	53.728		
98	0.99980164	11.324	1.343	164.4	5.772	196.96	-1.000	1910914.00	20.295	54.451	54.0	40.39
99	0.99946904	11.319	1.342	165.2	5.797	198.89	-1.000	1969053.00	20.494	55.069		
100	0.99858004	11.314	1.341	166.1	5.822	200.71	-1.000	2027217.00	20.682	55.429	55.0	41.18
101	0.99620074	11.309	1.341	167.0	5.848	202.23	-1.000	2083360.00	20.838	55.793		
102	0.98985386	11.304	1.340	167.9	5.874	202.92	-1.000	2131877.00	20.909	56.160	56.0	41.75
103	0.97314644	11.298	1.340	168.8	5.899	201.44	-1.000	2157839.00	20.756	56.531		
104	0.93073887	11.293	1.339	169.7	5.926	194.52	-1.000	2124206.00	20.044	56.906	57.0	40.80
105	0.83263928	11.288	1.338	170.7	5.952	175.69	-1.000	1955394.00	18.103	57.694	58.0	18.10
106	0.64777935	11.282	1.338	171.6	5.978	137.98	-1.000	1564935.00	14.217	59.396	59.0	14.22
107	0.40437186	11.277	1.337	172.6	6.005	86.94	-1.000	1004677.94	8.958	61.115	60.0	8.96
108	0.20017016	11.272	1.336	173.5	6.032	43.44	-1.000	511339.38	4.476	62.850	61.0	4.48
109	0.08437055	11.267	1.336	174.5	6.059	18.48	-1.000	221540.88	1.904	64.601	62.0	1.90
110	0.03277432	11.261	1.335	175.5	6.086	7.24	-1.000	88438.50	0.746	66.368	63.0	0.75
111	0.01229435	11.256	1.334	176.5	6.113	2.74	-1.000	34084.05	0.282	68.151	64.0	0.28
112	0.00454691	11.251	1.334	177.5	6.141	1.02	-1.000	12947.78	0.105	69.950	65.0	0.11
113	0.00167178	11.245	1.333	178.5	6.168	0.38	-1.000	4888.64	0.039	71.765	66.0	0.04
114	0.00061301	11.240	1.333	179.5	6.196	0.14	-1.000	1840.36	0.014	73.597	67.0	0.01
115	0.00022444	11.234	1.332	180.5	6.224	0.05	-1.000	691.62	0.005	75.445	68.0	0.01
116	0.00008210	11.229	1.331	181.5	6.252	0.02	-1.000	259.61	0.002	77.309		

CROSS SECTION (MBARN) = 1182.456

ROOT MEAN SQUARE L = 75.79

RMSL SQUARED = 5744.180

AVERAGE ROTATION ENERGY (MEV) = 48.358

COMPOUND NUCLEUS CROSS SECTION = 0.118E 04

0.103E 00	0.412E 00	0.927E 00	0.165E 01	0.258E 01	0.371E 01	0.505E 01	0.659E 01	0.835E 01	0.103E 02
0.125E 02	0.148E 02	0.174E 02	0.202E 02	0.232E 02	0.264E 02	0.298E 02	0.334E 02	0.372E 02	0.412E 02
0.454E 02	0.499E 02	0.545E 02	0.594E 02	0.644E 02	0.697E 02	0.751E 02	0.808E 02	0.867E 02	0.927E 02
0.990E 02	0.106E 03	0.112E 03	0.119E 03	0.126E 03	0.134E 03	0.141E 03	0.149E 03	0.157E 03	0.165E 03
0.173E 03	0.182E 03	0.191E 03	0.199E 03	0.209E 03	0.218E 03	0.228E 03	0.237E 03	0.247E 03	0.258E 03
0.268E 03	0.279E 03	0.289E 03	0.300E 03	0.312E 03	0.323E 03	0.335E 03	0.347E 03	0.359E 03	0.371E 03
0.383E 03	0.396E 03	0.409E 03	0.422E 03	0.435E 03	0.449E 03	0.463E 03	0.476E 03	0.491E 03	0.505E 03
0.519E 03	0.534E 03	0.549E 03	0.564E 03	0.580E 03	0.595E 03	0.611E 03	0.627E 03	0.643E 03	0.659E 03
0.676E 03	0.693E 03	0.710E 03	0.727E 03	0.744E 03	0.762E 03	0.780E 03	0.798E 03	0.816E 03	0.835E 03
0.853E 03	0.872E 03	0.891E 03	0.910E 03	0.930E 03	0.950E 03	0.969E 03	0.990E 03	0.101E 04	0.103E 04
0.105E 04	0.107E 04	0.109E 04	0.111E 04	0.113E 04	0.115E 04	0.117E 04	0.117E 04	0.118E 04	0.118E 04
0.118E 04	0.118E 04	0.118E 04	0.118E 04	0.118E 04	0.118E 04	0.118E 04	0.118E 04	0.118E 04	0.118E 04

COMPOUND NUCLEUS ATOMIC NUMBER = 65 MASS NUMBER = 151

COMPOUND NUCLEUS CROSS SECTION = 0.103E 00

EXCITATION ENERGY OF COMPOUND NUCLEUS = 92.5MEV J= 0

REACTION CROSS SECTION = 1182.5

GAMP/GANTOT = 0.113E-06
BARFAC = 1.000 CLD = 1.0000 ANGN = 0.0 ANGP = 0.0 PLD = 8.000
FISSION CROSS SECTION TO HERE= 0.170E-07 SUM CROSS SECTION = 0.0 MISSING CROSS SECTION = 0.103E 00
FISSION CROSS SECTION TO HERE= 0.171E-07 SUM CROSS SECTION = 0.553E-03 MISSING CROSS SECTION = 0.102E 00
FISSION CROSS SECTION TO HERE= 0.173E-07 SUM CROSS SECTION = 0.403E-02 MISSING CROSS SECTION = 0.990E-01
FISSION CROSS SECTION TO HERE= 0.173E-07 SUM CROSS SECTION = 0.425E-02 MISSING CROSS SECTION = 0.988E-01

COMPOUND NUCLEUS ATOMIC NUMBER = 65 MASS NUMBER = 151

COMPOUND NUCLEUS CROSS SECTION = 0.309E 00

EXCITATION ENERGY OF COMPOUND NUCLEUS = 92.5MEV J= 1

REACTION CROSS SECTION = 1182.5

GAMP/GANTOT = 0.113E-06
BARFAC = 1.000 CLD = 1.0000 ANGN = 0.0 ANGP = 0.0 PLD = 8.000
FISSION CROSS SECTION TO HERE= 0.685E-07 SUM CROSS SECTION = 0.426E-02 MISSING CROSS SECTION = 0.408E 00
FISSION CROSS SECTION TO HERE= 0.686E-07 SUM CROSS SECTION = 0.591E-02 MISSING CROSS SECTION = 0.406E 00
FISSION CROSS SECTION TO HERE= 0.692E-07 SUM CROSS SECTION = 0.155E-01 MISSING CROSS SECTION = 0.397E 00
FISSION CROSS SECTION TO HERE= 0.692E-07 SUM CROSS SECTION = 0.162E-01 MISSING CROSS SECTION = 0.396E 00

COMPOUND NUCLEUS ATOMIC NUMBER = 65 MASS NUMBER = 151

COMPOUND NUCLEUS CROSS SECTION = 0.515E 00

EXCITATION ENERGY OF COMPOUND NUCLEUS = 92.5MEV J= 2

REACTION CROSS SECTION = 1182.5

GAMP/GANTOT = 0.113E-06
BARFAC = 1.000 CLD = 1.0000 ANGN = 0.0 ANGP = 0.0 PLD = 8.000
FISSION CROSS SECTION TO HERE= 0.154E-06 SUM CROSS SECTION = 0.162E-01 MISSING CROSS SECTION = 0.911E 00
FISSION CROSS SECTION TO HERE= 0.154E-06 SUM CROSS SECTION = 0.189E-01 MISSING CROSS SECTION = 0.908E 00
FISSION CROSS SECTION TO HERE= 0.155E-06 SUM CROSS SECTION = 0.348E-01 MISSING CROSS SECTION = 0.893E 00
FISSION CROSS SECTION TO HERE= 0.155E-06 SUM CROSS SECTION = 0.360E-01 MISSING CROSS SECTION = 0.891E 00

COMPOUND NUCLEUS ATOMIC NUMBER = 65 MASS NUMBER = 151

COMPOUND NUCLEUS CROSS SECTION = 0.721E 00

EXCITATION ENERGY OF COMPOUND NUCLEUS = 92.5MEV J= 3

REACTION CROSS SECTION = 1182.5

GAMP/GANTOT = 0.117E-06
BARFAC = 1.000 CLD = 1.0000 ANGN = 0.0 ANGP = 0.0 PLD = 8.000
FISSION CROSS SECTION TO HERE= 0.277E-06 SUM CROSS SECTION = 0.360E-01 MISSING CROSS SECTION = 0.161E 01
FISSION CROSS SECTION TO HERE= 0.277E-06 SUM CROSS SECTION = 0.396E-01 MISSING CROSS SECTION = 0.161E 01
FISSION CROSS SECTION TO HERE= 0.278E-06 SUM CROSS SECTION = 0.615E-01 MISSING CROSS SECTION = 0.159E 01
FISSION CROSS SECTION TO HERE= 0.278E-06 SUM CROSS SECTION = 0.631E-01 MISSING CROSS SECTION = 0.159E 01

COMPOUND NUCLEUS ATOMIC NUMBER = 65 MASS NUMBER = 151

COMPOUND NUCLEUS CROSS SECTION = 0.927E 00

EXCITATION ENERGY OF COMPOUND NUCLEUS = 92.5MEV J= 4

REACTION CROSS SECTION = 1182.5

GAMP/GANTOT = 0.119E-06
BARFAC = 1.000 CLD = 1.0000 ANGN = 0.0 ANGP = 0.0 PLD = 8.000
FISSION CROSS SECTION TO HERE= 0.438E-06 SUM CROSS SECTION = 0.631E-01 MISSING CROSS SECTION = 0.251E 01

FISSION CROSS SECTION TO HERE= C.438E-06 SUM CROSS SECTION = 0.679E-01 MISSING CROSS SECTION = 0.251E 01
 FISSION CROSS SECTION TO HERE= C.440E-06 SUM CROSS SECTION = 0.965E-01 MISSING CROSS SECTION = 0.248E 01
 FISSION CROSS SECTION TO HERE= 0.440E-06 SUM CROSS SECTION = 0.986E-01 MISSING CROSS SECTION = 0.248E 01

COMPOUND NUCLEUS ATOMIC NUMBER = 65 MASS NUMBER = 151

COMPOUND NUCLEUS CROSS SECTION = 0.113E 01

EXCITATION ENERGY OF COMPOUND NUCLEUS = 92.5MEV J= 5

REACTION CROSS SECTION = 1182.5

BARFAC = 1.000 CLD = 1.0000 GANP/GANTOT = 0.124E-06 ANGP = 0.0 PLD = 8.000

ATOMIC NUMBER	65	65	65	65	65	65	65	65	65	65
MASS NUMBER	151	150	149	148	147	146				
CROSS SECTION	0.0	0.0	0.0	0.0	0.0	0.0				
CUMLTV.CRSSEC	0.371E 01	0.0	0.0	0.0	0.0	0.117E-05				
FISS X SECT	0.141E-06	0.470E-07	0.125E-07	0.274E-08	0.857E-09	0.107E-10				
DEL SADDLE PT	0.335E 02	0.330E 02	0.325E 02	0.321E 02	0.315E 02	0.310E 02				
FISS BARRIER	0.333E 02	0.328E 02	0.323E 02	0.318E 02	0.313E 02	0.308E 02				
DEL ROTATION	0.199E 00	0.201E 00	0.203E 00	0.205E 00	0.208E 00	0.210E 00				
ROTATIONAL EN	0.202E 00	0.204E 00	0.206E 00	0.209E 00	0.211E 00	0.213E 00				
FISSION CROSS SECTION TO HERE=	0.644E-06									
SUM CROSS SECTION =	0.986E-01									
MISSING CROSS SECTION =	0.361E 01									

ATOMIC NUMBER	64	64	64	64	64	64	64	64	64	64
MASS NUMBER	150	149	148	147	146	145				
CROSS SECTION	0.0	0.0	0.0	0.0	0.0	0.591E-02				
CUMLTV.CRSSEC	0.0	0.0	0.0	0.0	0.550E-06	0.192E-01				
FISS X SECT	0.301E-09	0.307E-09	0.827E-10	0.996E-11	0.114E-11	0.510E-15				
DEL SADDLE PT	0.353E 02	0.349E 02	0.345E 02	0.340E 02	0.335E 02	0.330E 02				
FISS BARRIER	0.351E 02	0.347E 02	0.342E 02	0.338E 02	0.333E 02	0.328E 02				
DEL ROTATION	0.201E 00	0.203E 00	0.206E 00	0.208E 00	0.210E 00	0.213E 00				
ROTATIONAL EN	0.204E 00	0.206E 00	0.209E 00	0.211E 00	0.213E 00	0.216E 00				
FISSION CROSS SECTION TO HERE=	0.644E-06									
SUM CROSS SECTION =	0.105E 00									
MISSING CROSS SECTION =	0.360E 01									

ATOMIC NUMBER	63	63	63	63	63	63	63	63	63	63
MASS NUMBER	149	148	147	146	145	144				
CROSS SECTION	0.0	0.0	0.0	0.0	0.593E-03	0.349E-01				
CUMLTV.CRSSEC	0.0	0.0	0.0	0.0	0.192E-02	0.113E 00				
FISS X SECT	0.978E-13	0.104E-12	0.119E-0E	0.570E-09	0.385E-09	0.121E-10				
DEL SADDLE PT	0.371E 02	0.367E 02	0.363E 02	0.358E 02	0.354E 02	0.349E 02				
FISS BARRIER	0.369E 02	0.365E 02	0.361E 02	0.356E 02	0.352E 02	0.347E 02				
DEL ROTATION	0.203E 00	0.206E 00	0.208E 00	0.210E 00	0.213E 00	0.215E 00				
ROTATIONAL EN	0.206E 00	0.209E 00	0.211E 00	0.213E 00	0.216E 00	0.218E 00				
FISSION CROSS SECTION TO HERE=	0.647E-06									
SUM CROSS SECTION =	0.140E 00									
MISSING CROSS SECTION =	0.357E 01									

ATOMIC NUMBER	62	62	62	62	62	62	62	62	62	62
MASS NUMBER	148	147	146	145	144	143				
CROSS SECTION	0.0	0.0	0.0	0.0	0.388E-03	0.215E-02				
CUMLTV.CRSSEC	0.0	0.0	0.0	0.0	0.135E-02	0.693E-02				
FISS X SECT	0.772E-18	0.401E-18	0.864E-12	0.620E-12	0.240E-12	0.839E-15				
DEL SADDLE PT	0.389E 02	0.385E 02	0.381E 02	0.377E 02	0.372E 02	0.368E 02				
FISS BARRIER	0.387E 02	0.383E 02	0.379E 02	0.374E 02	0.370E 02	0.366E 02				
DEL ROTATION	0.206E 00	0.208E 00	0.210E 00	0.213E 00	0.215E 00	0.218E 00				
ROTATIONAL EN	0.209E 00	0.211E 00	0.213E 00	0.216E 00	0.218E 00	0.221E 00				
FISSION CROSS SECTION TO HERE=	0.647E-06									
SUM CROSS SECTION =	0.143E 00									
MISSING CROSS SECTION =	0.357E 01									
TOTAL FISSION CROSS SECTION =	0.647E-06									

SUM CROSS SECTIONS = 0.143E 00

KE + CU (INPUT IKE = 13 FOR OUTPUT OF INTERMEDIATE CROSS SECTIONS)

CLD = 0.0 NA = 10 NZ = 6 MC = 0 MP = 0 INVER = 0 IKE = 0 IPCH = 1
 BARRIER=LIQUID DROP BARRIER*1.000
 QVAL = 0.0 AP = 86.0 AT = 65.0 ZP = 36.0 ZT = 29.0
 RATIO OF FISSION TO NUCLEON SINGLE PARTICLE DENSITIES WAS SET EQUAL TO 1 BY DEFAULT OPTION
 QVAL FROM MYERS SWIATECKI MASS FORMULA = -79.7

MYERS SWIATECKI LYSEKIL MASSES
 SHELL CORRECTED MASSES
 ZERO PAIRING

BINDING ENERGIES USED

IZ = Z-INDEX OF NUCLEUS, IA = A-INDEX OF NUCLEUS IN PROGRAM ISOTOPE TABLE

IZ	IA	NEUTRON	PROTON	ALPHA	LEUTERON
1	1	7.94572	4.71353	-3.57526	10.28439
1	2	8.11441	4.39868	-3.87527	10.13547
1	3	8.28765	4.08107	-4.17625	9.98718
1	4	8.46147	3.75951	-2.53359	9.83856
1	5	10.56094	3.43710	-0.87968	11.62144
1	6	10.76093	3.12051	-1.12209	11.50150
1	7	10.96428	2.80058	-1.36183	11.38258
1	8	11.17137	2.47832	-1.59848	11.26604
1	9	11.37578	2.15468	-2.12877	11.14697
1	10	11.21432	1.83121	-2.91376	10.67940
2	1	7.63087	5.21974	-3.19658	10.87377
2	2	7.79688	4.90291	-3.50689	10.22034
2	3	7.96613	4.58356	-3.81422	10.16826
2	4	8.13307	4.26215	-2.17520	10.01556
2	5	10.24435	3.93750	-0.51645	11.80284
2	6	10.44099	3.61850	-0.76740	11.67886
2	7	10.64207	3.29788	-1.01402	11.55641
2	8	10.84773	2.97441	-1.26024	11.43558
2	9	11.05231	2.64786	-1.69962	11.31548
2	10	10.90824	2.32318	-2.45210	10.90425
3	1	7.31404	5.73148	-2.80591	10.66713
3	2	7.47746	5.41310	-3.12358	10.50964
3	3	7.64471	5.09221	-3.44153	10.35376
3	4	7.81442	4.76906	-1.80153	10.19751
3	5	9.92535	4.44310	-0.14238	11.98824
3	6	10.12033	4.12289	-0.40048	11.86070
3	7	10.31852	3.80034	-0.65767	11.73373
3	8	10.52113	3.47520	-0.91203	11.60956
3	9	10.72761	3.14839	-1.24704	11.48418
3	10	10.64103	2.81656	-1.93735	11.16490
4	1	6.99567	6.25076	-2.40529	10.36798
4	2	7.15655	5.93233	-2.73109	10.20695
4	3	7.32155	5.61041	-3.05672	10.04677
4	4	7.48845	5.28522	-1.41693	10.88470
4	5	9.60515	4.95625	0.20316	12.18095
4	6	9.79782	4.63582	-0.00402	12.04938
4	7	9.99344	4.31157	-0.28961	11.91881
4	8	10.19437	3.98541	-0.55266	11.78859
4	9	10.39580	3.65424	-0.81842	11.65840

4	10	10.40836	3.32262	-1.38324	11.44878
5	1	6.67723	6.77676	-1.99222	11.07280
5	2	6.83464	5.45558	-2.32716	10.90672
5	3	6.99637	6.13210	-2.66174	10.74194
5	4	7.15950	5.80559	-1.02089	10.57651
5	5	9.28471	5.47702	0.64050	12.37836
5	6	9.47357	5.15366	0.36368	12.24220
5	7	9.66725	4.82864	0.09013	12.10660
5	8	9.86319	4.49936	-0.18306	11.97157
5	9	10.06418	4.16840	-0.45265	11.83875
5	10	10.18617	3.83458	-0.82770	11.70317
6	1	6.35605	7.31186	-1.56798	11.28540
6	2	6.51115	5.98936	-1.91068	11.11497
6	3	6.66986	5.66383	-2.25375	10.94611
6	4	6.83093	5.33626	-0.61293	10.77631
6	5	8.96135	6.00539	1.04855	12.58260
6	6	9.14856	5.68126	0.76353	12.44214
6	7	9.33797	5.35359	0.48083	12.30147
6	8	9.53223	5.02351	0.19937	12.16353
6	9	9.73036	4.69131	-0.07948	12.02536
6	10	9.92860	4.35501	-0.35620	11.88860

NEUTRON INVERSE CROSS SECTIONS

INVERSE REACTION CROSS SECT. FOR E=1 TO 42MEV

4854.	3431.	3124.	3008.	3003.	2994.	2971.	2911.	2839.	2764.
2712.	2676.	2652.	2626.	2602.	2579.	2562.	2546.	2535.	2530.
2528.	2529.	2526.	2521.	2514.	2509.	2500.	2490.	2477.	2464.
2444.	2422.	2395.	2370.	2340.	2310.	2279.	2251.	2219.	2188.
2158.	2133.								

PROTON INVERSE CROSS SECTIONS

INVERSE REACTION CROSS SECT. FOR E=1 TO 42MEV

0.	0.	0.	0.	0.	0.	5.	22.	62.	131.
221.	325.	434.	535.	628.	712.	790.	857.	916.	968.
1015.	1059.	1096.	1128.	1156.	1184.	1206.	1226.	1244.	1262.
1276.	1289.	1301.	1312.	1322.	1330.	1338.	1346.	1352.	1358.
1353.	1368.								

ALPHA INVERSE CROSS SECTIONS

INVERSE REACTION CROSS SECT. FOR E=1 TO 42MEV

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	3.	13.	44.	121.	251.	407.	568.
718.	858.	984.	1099.	1205.	1300.	1389.	1469.	1545.	1612.
1675.	1736.	1790.	1843.	1890.	1935.	1977.	2017.	2054.	2088.
2122.	2152.								

DEUTERON INVERSE CROSS SECTIONS

INVERSE REACTION CROSS SECT. FOR E=1 TO 42MEV

0.	0.	0.	0.	0.	2.	21.	104.	298.	560.
824.	1062.	1276.	1463.	1627.	1773.	1893.	1989.	2080.	2163.
2236.	2301.	2355.	2402.	2441.	2478.	2517.	2553.	2589.	2620.
2647.	2671.	2691.	2709.	2728.	2743.	2759.	2773.	2786.	2800.
2811.	2822.								

DELT = 5.10000 ALT = 13.10000 CLD = 1.00000

LABORATORY BOMBARDMENT ENERGY = 400.0MEV TARGET MASS = 65.0
 COMPOUND NUCLEUS MASS = 151.0 COMPOUND NUCLEUS FORMATION Q VALUE = -79.7

JCAL= 0 START J= 50 STOP J = 60 JANG = 1

CALCULATION INCLUDES FISSION COMPETITION
 OPTION PARTICLES REMOVE ANGULAR MOMENTUM
 PARABOLIC BARRIER APPROXIMATION FOR REACTION CROSS SECTIONS

PROJECTILE MASS	TARGET MASS	PROJECTILE CHARGE	TARGET CHARGE	ENERGY LAB	ENERGY CM										
86.000	65.000	36.000	29.000	400.000	172.185										
ANGULAR MOMENTA	TRANSMISSION COEFFICIENTS	BARRIER RADIUS	BAR-RADIUS CONSTANT	BARRIER (MEV)	BARRIER CURVATURE	RELATIVE SIGMA (L)	CURVATURE SIGN	PROBABLE L-ENERGY	SIGMA (L) (MB)	ROTOR-E (MEV)	EFFROT (MEV)	EFFSIGMA (MB)			
L	TL	RB	RO	VLB	WL	RSIGL	SD2VLB	SIGXL2	SIGL	EROTL	EROTLI	SUMDXI			
0	1.00000000	11.642	1.380	122.7	4.435	1.00	-1.000	0.0	0.103	0.0					
1	1.00000000	11.641	1.380	122.7	4.435	3.00	-1.000	6.00	0.309	0.008					
2	1.00000000	11.641	1.380	122.7	4.436	5.00	-1.000	30.00	0.515	0.032					
3	1.00000000	11.641	1.380	122.8	4.436	7.00	-1.000	84.00	0.727	0.072					
4	1.00000000	11.641	1.380	122.8	4.438	9.00	-1.000	180.00	0.927	0.127					
5	1.00000000	11.640	1.380	122.8	4.439	11.00	-1.000	330.00	1.133	0.199					
6	1.00000000	11.640	1.380	122.9	4.441	13.00	-1.000	546.00	1.340	0.286					
7	1.00000000	11.639	1.380	122.9	4.443	15.00	-1.000	840.00	1.544	0.390	0.0	6.59			
8	1.00000000	11.639	1.380	123.0	4.446	17.00	-1.000	1224.00	1.752	0.509					
9	1.00000000	11.638	1.380	123.1	4.448	19.00	-1.000	1710.00	1.958	0.644					
10	1.00000000	11.637	1.380	123.2	4.451	21.00	-1.000	2310.00	2.164	0.795					
11	1.00000000	11.636	1.380	123.3	4.454	23.00	-1.000	3036.00	2.370	0.962					
12	1.00000000	11.635	1.379	123.4	4.458	25.00	-1.000	3900.00	2.574	1.145					
13	1.00000000	11.634	1.379	123.5	4.462	27.00	-1.000	4914.00	2.782	1.343	1.0	13.60			
14	1.00000000	11.633	1.379	123.6	4.466	29.00	-1.000	6090.00	2.988	1.558					
15	1.00000000	11.632	1.379	123.7	4.471	31.00	-1.000	7440.00	3.192	1.789					
16	1.00000000	11.630	1.379	123.8	4.475	33.00	-1.000	8976.00	3.400	2.035					
17	1.00000000	11.629	1.379	124.0	4.481	35.00	-1.000	10710.00	3.606	2.297	2.0	13.19			
18	1.00000000	11.628	1.379	124.1	4.486	37.00	-1.000	12654.00	3.812	2.576					
19	1.00000000	11.626	1.378	124.3	4.492	39.00	-1.000	14820.00	4.019	2.870					
20	1.00000000	11.624	1.378	124.5	4.497	41.00	-1.000	17220.00	4.225	3.180	3.0	12.06			
21	1.00000000	11.623	1.378	124.6	4.504	43.00	-1.000	19866.00	4.431	3.506					
22	1.00000000	11.621	1.378	124.8	4.510	45.00	-1.000	22770.00	4.637	3.847					
23	1.00000000	11.619	1.378	125.0	4.517	47.00	-1.000	25944.00	4.843	4.205	4.0	13.91			
24	1.00000000	11.617	1.377	125.2	4.524	49.00	-1.000	29400.00	5.049	4.579					
25	1.00000000	11.615	1.377	125.4	4.532	51.00	-1.000	33150.00	5.255	4.965					
26	1.00000000	11.613	1.377	125.6	4.539	53.00	-1.000	37206.00	5.461	5.361	5.0	15.77			
27	1.00000000	11.611	1.377	125.9	4.547	55.00	-1.000	41580.00	5.667	5.772					
28	1.00000000	11.609	1.376	126.1	4.556	57.00	-1.000	46284.00	5.873	6.199	6.0	11.50			
29	1.00000000	11.607	1.376	126.3	4.564	59.00	-1.000	51330.00	6.079	6.641					
30	1.00000000	11.604	1.376	126.6	4.572	61.00	-1.000	56730.00	6.285	7.099	7.0	12.36			
31	1.00000000	11.602	1.375	126.9	4.582	63.00	-1.000	62496.00	6.492	7.572					
32	1.00000000	11.599	1.375	127.1	4.592	65.00	-1.000	68640.00	6.693	8.061	8.0	13.19			
33	1.00000000	11.597	1.375	127.4	4.601	67.00	-1.000	75174.00	6.904	8.566					
34	1.00000000	11.594	1.375	127.7	4.611	69.00	-1.000	82110.00	7.110	9.085	9.0	14.01			
35	1.00000000	11.592	1.374	128.0	4.622	71.00	-1.000	89460.00	7.315	9.620					
36	1.00000000	11.589	1.374	128.3	4.632	73.00	-1.000	97236.00	7.522	10.158	10.0	14.80			
37	1.00000000	11.586	1.374	128.6	4.642	75.00	-1.000	105450.00	7.723	10.712					

38	1.00000000	11.583	1.373	128.9	4.654	77.00	-1.000	114114.00	7.934	11.282	11.0	15.66
39	1.00000000	11.580	1.373	129.2	4.665	79.00	-1.000	123240.00	8.140	11.866		
40	1.00000000	11.577	1.373	129.6	4.677	81.00	-1.000	132840.00	8.346	12.466	12.0	16.49
41	1.00000000	11.574	1.372	129.9	4.689	83.00	-1.000	142926.00	8.552	13.081	13.0	8.55
42	1.00000000	11.571	1.372	130.3	4.701	85.00	-1.000	153510.00	8.758	13.711		
43	1.00000000	11.568	1.371	130.6	4.714	87.00	-1.000	164604.00	8.964	14.351	14.0	17.72
44	1.00000000	11.564	1.371	131.0	4.726	89.00	-1.000	176220.00	9.171	14.993	15.0	9.17
45	1.00000000	11.561	1.371	131.4	4.739	91.00	-1.000	188370.00	9.377	15.649		
46	1.00000000	11.558	1.370	131.8	4.752	93.00	-1.000	201066.00	9.583	16.320	16.0	18.96
47	1.00000000	11.554	1.370	132.2	4.766	95.00	-1.000	214320.00	9.789	17.006	17.0	9.79
48	1.00000000	11.551	1.369	132.6	4.780	97.00	-1.000	228144.00	9.995	17.707		
49	1.00000000	11.547	1.369	133.0	4.794	99.00	-1.000	242550.00	10.201	18.423	18.0	20.20
50	1.00000000	11.544	1.369	133.4	4.808	101.00	-1.000	257550.00	10.407	19.138	19.0	10.41
51	1.00000000	11.540	1.368	133.9	4.823	103.00	-1.000	273156.00	10.613	19.861	20.0	10.61
52	1.00000000	11.536	1.368	134.3	4.838	105.00	-1.000	289380.00	10.819	20.597		
53	1.00000000	11.533	1.367	134.8	4.853	107.00	-1.000	306234.00	11.025	21.348	21.0	21.84
54	1.00000000	11.529	1.367	135.2	4.868	109.00	-1.000	323730.00	11.231	22.113	22.0	11.23
55	1.00000000	11.525	1.366	135.7	4.884	111.00	-1.000	341880.00	11.437	22.893	23.0	11.44
56	1.00000000	11.521	1.366	136.2	4.899	113.00	-1.000	360696.00	11.644	23.688		
57	1.00000000	11.517	1.365	136.6	4.915	115.00	-1.000	380190.00	11.850	24.499	24.0	23.49
58	1.00000000	11.513	1.365	137.1	4.932	117.00	-1.000	400374.00	12.056	25.323	25.0	12.06
59	1.00000000	11.509	1.364	137.6	4.948	119.00	-1.000	421260.00	12.262	26.162	26.0	12.26
60	1.00000000	11.505	1.364	138.1	4.965	121.00	-1.000	442860.00	12.468	27.015	27.0	12.47
61	1.00000000	11.501	1.364	138.7	4.982	123.00	-1.000	465186.00	12.674	27.867	28.0	12.67
62	1.00000000	11.497	1.363	139.2	5.000	125.00	-1.000	488250.00	12.880	28.720	29.0	12.88
63	1.00000000	11.492	1.363	139.7	5.017	127.00	-1.000	512064.00	13.086	29.587		
64	1.00000000	11.488	1.362	140.3	5.035	129.00	-1.000	536640.00	13.292	30.468	30.0	26.38
65	1.00000000	11.484	1.361	140.8	5.053	131.00	-1.000	561990.00	13.498	31.362	31.0	13.50
66	1.00000000	11.479	1.361	141.4	5.071	133.00	-1.000	588126.00	13.704	32.262	32.0	13.70
67	1.00000000	11.475	1.360	142.0	5.090	135.00	-1.000	615060.00	13.910	33.171	33.0	13.91
68	1.00000000	11.471	1.360	142.6	5.108	137.00	-1.000	642804.00	14.116	34.094	34.0	14.12
69	1.00000000	11.466	1.359	143.2	5.127	139.00	-1.000	671370.00	14.323	35.030	35.0	14.32
70	1.00000000	11.462	1.359	143.8	5.147	141.00	-1.000	700770.00	14.529	35.969	36.0	14.53
71	1.00000000	11.457	1.358	144.4	5.166	143.00	-1.000	731016.00	14.735	36.878	37.0	14.73
72	1.00000000	11.453	1.358	145.0	5.186	145.00	-1.000	762120.00	14.941	37.800	38.0	14.94
73	1.00000000	11.448	1.357	145.6	5.206	147.00	-1.000	794094.00	15.147	38.735	39.0	15.15
74	1.00000000	11.443	1.357	146.3	5.226	149.00	-1.000	826950.00	15.353	39.683	40.0	15.35
75	1.00000000	11.439	1.356	146.9	5.246	151.00	-1.000	860700.00	15.559	40.575		
76	1.00000000	11.434	1.356	147.6	5.267	153.00	-1.000	895356.00	15.765	41.477	41.0	31.32
77	1.00000000	11.429	1.355	148.2	5.287	155.00	-1.000	930930.00	15.971	42.392	42.0	15.97
78	1.00000000	11.425	1.354	148.9	5.308	157.00	-1.000	967434.00	16.177	43.318	43.0	16.18
79	1.00000000	11.420	1.354	149.6	5.330	159.00	-1.000	1004880.00	16.383	44.151	44.0	16.38
80	1.00000000	11.415	1.353	150.3	5.351	161.00	-1.000	1043280.00	16.589	44.991	45.0	16.59
81	1.00000000	11.410	1.353	151.0	5.373	163.00	-1.000	1082646.00	16.795	45.841	46.0	16.80
82	1.00000000	11.405	1.352	151.7	5.395	165.00	-1.000	1122990.00	17.002	46.681		
83	1.00000000	11.400	1.352	152.4	5.417	167.00	-1.000	1164324.00	17.208	47.418	47.0	34.21
84	1.00000000	11.395	1.351	153.1	5.439	169.00	-1.000	1206660.00	17.414	48.165	48.0	17.41
85	1.00000000	11.391	1.350	153.9	5.461	171.00	-1.000	1250010.00	17.620	48.920		
86	1.00000000	11.386	1.350	154.6	5.484	173.00	-1.000	1294386.00	17.826	49.341		
87	1.00000000	11.381	1.349	155.4	5.507	175.00	-1.000	1339800.00	18.032	49.452	49.0	53.48
88	1.00000000	11.376	1.349	156.2	5.530	177.00	-1.000	1386264.00	18.238	49.564		
89	1.00000000	11.371	1.348	156.9	5.553	179.00	-1.000	1433790.00	18.444	49.688		
90	1.00000000	11.366	1.347	157.7	5.577	181.00	-1.000	1482390.00	18.650	50.142	50.0	55.33
91	1.00000000	11.360	1.347	158.5	5.600	183.00	-1.000	1532076.00	18.856	50.601		
92	1.00000000	11.355	1.346	159.3	5.624	185.00	-1.000	1582860.00	19.062	51.066	51.0	37.92
93	0.99999905	11.350	1.346	160.1	5.648	187.00	-1.000	1634752.00	19.268	51.523		
94	0.99999919	11.345	1.345	161.0	5.673	189.00	-1.000	1687763.00	19.474	51.980		
95	0.99998951	11.340	1.344	161.8	5.697	191.00	-1.000	1741901.00	19.680	52.441	52.0	58.42
96	0.99997234	11.335	1.344	162.6	5.722	192.99	-1.000	1797166.00	19.886	53.013	53.0	19.89
97	0.99992561	11.330	1.343	163.5	5.747	194.99	-1.000	1853532.00	20.091	53.728		
98	0.99980164	11.324	1.343	164.4	5.772	196.96	-1.000	1910914.00	20.295	54.451	54.0	40.39
99	0.99946904	11.319	1.342	165.2	5.797	198.89	-1.000	1969053.00	20.494	55.069		
100	0.99858004	11.314	1.341	166.1	5.822	200.71	-1.000	2027217.00	20.682	55.429	55.0	41.18
101	0.99620074	11.309	1.341	167.0	5.848	202.23	-1.000	2083360.00	20.838	55.793		
102	0.98985386	11.304	1.340	167.9	5.874	202.92	-1.000	2131877.00	20.909	56.160	56.0	41.75
103	0.97314644	11.298	1.340	168.8	5.899	201.44	-1.000	2157839.00	20.756	56.531		

104	0.93073887	11.293	1.339	169.7	5.926	194.52	-1.000	2124206.00	20.044	56.906	57.0	40.80
105	0.83263928	11.288	1.338	170.7	5.952	175.69	-1.000	1955394.00	18.103	57.694	58.0	18.10
106	0.64777935	11.282	1.338	171.6	5.978	137.98	-1.000	1564935.00	14.217	59.396	59.0	14.22
107	0.40437186	11.277	1.337	172.6	6.005	86.94	-1.000	1004677.94	8.958	61.115	60.0	8.96
108	0.20017016	11.272	1.336	173.5	6.032	43.44	-1.000	511339.38	4.476	62.850	61.0	4.48
109	0.08437055	11.267	1.336	174.5	6.059	18.48	-1.000	221540.88	1.904	64.601	62.0	1.90
110	0.03277432	11.261	1.335	175.5	6.086	7.24	-1.000	88438.50	0.746	66.368	63.0	0.75
111	0.01229435	11.256	1.334	176.5	6.113	2.74	-1.000	34084.05	0.282	68.151	64.0	0.28
112	0.00454691	11.251	1.334	177.5	6.141	1.02	-1.000	12947.78	0.105	69.950	65.0	0.11
113	0.00167178	11.245	1.333	178.5	6.168	0.38	-1.000	4888.64	0.039	71.765	66.0	0.04
114	0.00061301	11.240	1.333	179.5	6.196	0.14	-1.000	1840.36	0.014	73.597	67.0	0.01
115	0.00022444	11.234	1.332	180.5	6.224	0.05	-1.000	691.62	0.005	75.445	68.0	0.01
116	0.00008210	11.229	1.331	181.5	6.252	0.02	-1.000	259.61	0.002	77.309		

CROSS SECTION (MBARN) = 1182.456

ROOT MEAN SQUARE L = 75.79

RMSL SQUARED = 5714.180 AVERAGE ROTATION ENERGY (MEV) = 48.358
COMPOUND NUCLEUS CROSS SECTION = 0.118E 04

0.103E 00	0.412E 00	0.927E 00	0.165E 01	0.258E 01	0.371E 01	0.505E 01	0.659E 01	0.835E 01	0.103E 02
0.125E 02	0.148E 02	0.174E 02	0.202E 02	0.232E 02	0.264E 02	0.298E 02	0.334E 02	0.372E 02	0.412E 02
0.454E 02	0.499E 02	0.545E 02	0.594E 02	0.644E 02	0.697E 02	0.751E 02	0.808E 02	0.867E 02	0.927E 02
0.990E 02	0.106E 03	0.112E 03	0.119E 03	0.126E 03	0.134E 03	0.141E 03	0.149E 03	0.157E 03	0.165E 03
0.173E 03	0.182E 03	0.191E 03	0.199E 03	0.209E 03	0.218E 03	0.228E 03	0.237E 03	0.247E 03	0.258E 03
0.268E 03	0.279E 03	0.289E 03	0.300E 03	0.312E 03	0.323E 03	0.335E 03	0.347E 03	0.359E 03	0.371E 03
0.383E 03	0.396E 03	0.409E 03	0.422E 03	0.435E 03	0.449E 03	0.463E 03	0.476E 03	0.491E 03	0.505E 03
0.519E 03	0.534E 03	0.549E 03	0.564E 03	0.580E 03	0.595E 03	0.611E 03	0.627E 03	0.643E 03	0.659E 03
0.676E 03	0.693E 03	0.710E 03	0.727E 03	0.744E 03	0.762E 03	0.780E 03	0.798E 03	0.816E 03	0.835E 03
0.853E 03	0.872E 03	0.891E 03	0.910E 03	0.930E 03	0.950E 03	0.969E 03	0.990E 03	0.101E 04	0.103E 04
0.105E 04	0.107E 04	0.109E 04	0.111E 04	0.113E 04	0.115E 04	0.117E 04	0.117E 04	0.118E 04	0.118E 04
0.118E 04	0.118E 04	0.118E 04	0.118E 04	0.118E 04	0.118E 04	0.118E 04	0.118E 04	0.118E 04	0.118E 04

COMPOUND NUCLEUS ATOMIC NUMBER = 65 MASS NUMBER = 151

COMPOUND NUCLEUS CROSS SECTION = 0.104E 02

EXCITATION ENERGY OF COMPOUND NUCLEUS = 92.5MEV J= 50

REACTION CROSS SECTION = 1182.5

BARFAC = 1.000 GAMP/GAMTOT = 0.583E-04 ANGN = 1.000 ANGP = 1.000 PLD = 8.000

ATOMIC NUMBER	65	65	65	65	65	65	65	65	65	65
MASS NUMBER	151	150	149	148	147	146	145	144	143	142
CROSS SECTION	0.0	0.0	0.0	0.0	0.338E-03	0.165E 00	0.837E 00	0.280E-02	0.0	0.0
CUMULATIVE CROSS SECTION	0.104E 02	0.0	0.0	0.0	0.338E-03	0.165E 00	0.837E 00	0.280E-02	0.0	0.0
FISS X SECT	0.607E-03	0.287E-03	0.118E-03	0.350E-04	0.200E-04	0.660E-07	0.0	0.0	0.0	0.0
DEL SADDLE PT	0.383E 02	0.377E 02	0.371E 02	0.365E 02	0.359E 02	0.352E 02	0.345E 02	0.338E 02	0.331E 02	0.323E 02
FISS BARRIER	0.192E 02	0.191E 02	0.190E 02	0.190E 02	0.188E 02	0.187E 02	0.185E 02	0.184E 02	0.181E 02	0.179E 02
DEL ROTATION	0.191E 02	0.186E 02	0.181E 02	0.175E 02	0.170E 02	0.165E 02	0.160E 02	0.154E 02	0.149E 02	0.144E 02
ROTATIONAL EN	0.202E 02	0.196E 02	0.190E 02	0.184E 02	0.179E 02	0.173E 02	0.167E 02	0.161E 02	0.156E 02	0.150E 02
FISSION CROSS SECTION TO HERE	0.107E-02									
SUM CROSS SECTION										0.101E 01
MISSING CROSS SECTION										0.940E 01

ATOMIC NUMBER	64	64	64	64	64	64	64	64	64	64
MASS NUMBER	150	149	148	147	146	145	144	143	142	141
CROSS SECTION	0.0	0.0	0.0	0.205E-04	0.104E 00	0.194E 01	0.351E 00	0.582E-05	0.0	0.0
CUMULATIVE CROSS SECTION	0.0	0.0	0.0	0.205E-04	0.104E 00	0.194E 01	0.351E 00	0.582E-05	0.0	0.0
FISS X SECT	0.166E-05	0.177E-05	0.521E-06	0.676E-07	0.595E-08	0.132E-13	0.0	0.0	0.0	0.0
DEL SADDLE PT	0.400E 02	0.394E 02	0.389E 02	0.383E 02	0.377E 02	0.370E 02	0.364E 02	0.357E 02	0.350E 02	0.343E 02
FISS BARRIER	0.214E 02	0.213E 02	0.213E 02	0.212E 02	0.212E 02	0.211E 02	0.209E 02	0.208E 02	0.206E 02	0.204E 02
DEL ROTATION	0.185E 02	0.181E 02	0.176E 02	0.170E 02	0.165E 02	0.160E 02	0.155E 02	0.149E 02	0.144E 02	0.139E 02
ROTATIONAL EN	0.196E 02	0.190E 02	0.184E 02	0.179E 02	0.173E 02	0.167E 02	0.161E 02	0.156E 02	0.150E 02	0.145E 02
FISSION CROSS SECTION TO HERE	0.107E-02									
SUM CROSS SECTION										0.340E 01
MISSING CROSS SECTION										0.700E 01

ATOMIC NUMBER 63 63 63 63 63 63 63 63 63 63 63

MASS NUMBER	149	148	147	146	145	144	143	142	141	140
CROSS SECTION	0.0	0.0	0.0	0.509E-03	0.132E 00	0.162E 00	0.834E 00	0.303E 01	0.167E-01	0.0
CUMULV.CRSSEC	0.0	0.0	0.0	0.509E-03	0.132E 00	0.162E 00	0.834E 00	0.303E 01	0.167E-01	0.0
FISS X SECT	0.554E-09	0.287E-09	0.789E-05	0.265E-05	0.175E-05	0.459E-07	0.233E-11	0.0	0.0	0.0
DEL SADDLE PT	0.416E 02	0.411E 02	0.406E 02	0.400E 02	0.394E 02	0.388E 02	0.382E 02	0.375E 02	0.369E 02	0.362E 02
FISS BARRIER	0.235E 02	0.235E 02	0.235E 02	0.235E 02	0.234E 02	0.233E 02	0.232E 02	0.231E 02	0.229E 02	0.228E 02
DEL ROTATION	0.181E 02	0.176E 02	0.171E 02	0.165E 02	0.160E 02	0.155E 02	0.150E 02	0.144E 02	0.139E 02	0.134E 02
ROTATIONAL EN	0.190E 02	0.184E 02	0.179E 02	0.173E 02	0.167E 02	0.161E 02	0.156E 02	0.150E 02	0.145E 02	0.139E 02
FISSION CROSS SECTION TO HERE=	0.108E-02			SUM CROSS SECTION = 0.758E 01			MISSING CROSS SECTION = 0.283E 01			

ATOMIC NUMBER	62	62	62	62	62	62	62	62	62	62	62
MASS NUMBER	148	147	146	145	144	143	142	141	140	139	138
CROSS SECTION	0.0	0.478E-07	0.0	0.228E-04	0.114E-02	0.217E 00	0.151E 01	0.112E 00	0.351E-06	0.0	0.0
CUMULV.CRSSEC	0.0	0.478E-07	0.0	0.228E-04	0.114E-02	0.217E 00	0.151E 01	0.112E 00	0.351E-06	0.0	0.0
FISS X SECT	0.264E-14	0.692E-16	0.339E-08	0.853E-09	0.175E-09	0.138E-13	0.0	0.0	0.0	0.0	0.0
DEL SADDLE PT	0.432E 02	0.427E 02	0.422E 02	0.417E 02	0.411E 02	0.405E 02	0.399E 02	0.393E 02	0.387E 02	0.380E 02	0.374E 02
FISS BARRIER	0.256E 02	0.256E 02	0.257E 02	0.256E 02	0.256E 02	0.255E 02	0.255E 02	0.254E 02	0.252E 02	0.251E 02	0.250E 02
DEL ROTATION	0.176E 02	0.171E 02	0.165E 02	0.160E 02	0.155E 02	0.150E 02	0.145E 02	0.140E 02	0.134E 02	0.129E 02	0.124E 02
ROTATIONAL EN	0.184E 02	0.179E 02	0.173E 02	0.167E 02	0.161E 02	0.156E 02	0.150E 02	0.145E 02	0.139E 02	0.134E 02	0.128E 02
FISSION CROSS SECTION TO HERE=	0.108E-02			SUM CROSS SECTION = 0.942E 01			MISSING CROSS SECTION = 0.987E 00				

ATOMIC NUMBER	61	61	61	61	61	61	61	61	61	61	61
MASS NUMBER	147	146	145	144	143	142	141	140	139	138	137
CROSS SECTION	0.717E-10	0.450E-08	0.0	0.120E-05	0.296E-02	0.180E-01	0.789E-02	0.396E 00	0.477E 00	0.218E-02	0.0
CUMULV.CRSSEC	0.717E-10	0.450E-08	0.0	0.120E-05	0.296E-02	0.180E-01	0.789E-02	0.396E 00	0.477E 00	0.218E-02	0.0
FISS X SECT	0.702E-27	0.0	0.178E-13	0.299E-15	0.104E-07	0.394E-09	0.263E-12	0.0	0.0	0.0	0.0
DEL SADDLE PT	0.447E 02	0.442E 02	0.438E 02	0.432E 02	0.427E 02	0.422E 02	0.416E 02	0.410E 02	0.404E 02	0.398E 02	0.392E 02
FISS BARRIER	0.277E 02	0.277E 02	0.277E 02	0.277E 02	0.277E 02	0.277E 02	0.276E 02	0.276E 02	0.275E 02	0.273E 02	0.272E 02
DEL ROTATION	0.171E 02	0.165E 02	0.160E 02	0.155E 02	0.150E 02	0.145E 02	0.140E 02	0.134E 02	0.129E 02	0.124E 02	0.119E 02
ROTATIONAL EN	0.179E 02	0.173E 02	0.167E 02	0.161E 02	0.156E 02	0.150E 02	0.145E 02	0.139E 02	0.134E 02	0.128E 02	0.123E 02
FISSION CROSS SECTION TO HERE=	0.108E-02			SUM CROSS SECTION = 0.103E 02			MISSING CROSS SECTION = 0.829E-01				

ATOMIC NUMBER	60	60	60	60	60	60	60	60	60	60	60
MASS NUMBER	146	145	144	143	142	141	140	139	138	137	136
CROSS SECTION	0.520E-13	0.103E-12	0.264E-08	0.385E-06	0.119E-04	0.189E-03	0.232E-01	0.314E-01	0.356E-03	0.102E-10	0.0
CUMULV.CRSSEC	0.520E-13	0.103E-12	0.264E-08	0.385E-06	0.119E-04	0.189E-03	0.232E-01	0.314E-01	0.356E-03	0.102E-10	0.0
FISS X SECT	0.0	0.0	0.645E-25	0.0	0.853E-13	0.283E-15	0.0	0.0	0.0	0.0	0.0
DEL SADDLE PT	0.462E 02	0.457E 02	0.452E 02	0.448E 02	0.442E 02	0.437E 02	0.432E 02	0.426E 02	0.420E 02	0.414E 02	0.408E 02
FISS BARRIER	0.296E 02	0.297E 02	0.297E 02	0.298E 02	0.298E 02	0.298E 02	0.297E 02	0.297E 02	0.296E 02	0.295E 02	0.294E 02
DEL ROTATION	0.166E 02	0.160E 02	0.155E 02	0.150E 02	0.145E 02	0.140E 02	0.134E 02	0.129E 02	0.124E 02	0.119E 02	0.114E 02
ROTATIONAL EN	0.173E 02	0.167E 02	0.161E 02	0.155E 02	0.150E 02	0.145E 02	0.139E 02	0.134E 02	0.128E 02	0.123E 02	0.118E 02
FISSION CROSS SECTION TO HERE=	0.108E-02			SUM CROSS SECTION = 0.104E 02			MISSING CROSS SECTION = 0.277E-01				

BRANCHING RATIOS AT C.N. EX. ENGY / EXCITN, ETC, ARE FIRST-CHANCE EFFECTIVE EXCITATION ENERGIES FOR N-EMISSION, ETC

IA	IZ	GAHF/GAHT	GAHN/GAHT	GAMP/GAHT	GAMA/GAHT	GAND/GAHT	EXCITW	EXCITP	EXCITA	EXCITD
1	1	0.583E-04	0.595E 00	0.218E-01	0.368E 00	0.147E-01	0.660E 02	0.692E 02	0.790E 02	0.641E 02

		NON-RESIDUAL (TOTAL) CROSS SECTIONS. (NON-CUMULATIVE, THIS J ONLY)				
IZ	IA	SIGNFISS	SIGNNEUT	SIGNPROT	SIGNALPH	SIGNDEUT
1	1	0.607E-03	0.620E 01	0.226E 00	0.383E 01	0.153E 00
1	2	0.287E-03	0.483E 01	0.182E 00	0.110E 01	0.841E-01
1	3	0.118E-03	0.377E 01	0.150E 00	0.882E 00	0.212E-01
1	4	0.350E-04	0.323E 01	0.131E 00	0.398E 00	0.188E-01
1	5	0.200E-04	0.240E 01	0.605E 00	0.218E 00	0.275E-02
1	6	0.660E-07	0.104E 01	0.114E 01	0.597E-01	0.255E-04
1	7	0.0	0.280E-02	0.195E 00	0.153E-04	0.355E-12
2	1	0.166E-05	0.201E 00	0.319E-02	0.208E-01	0.937E-03
2	2	0.177E-05	0.480E 00	0.723E-02	0.489E-01	0.132E-02
2	3	0.521E-06	0.582E 00	0.832E-02	0.122E 00	0.154E-02
2	4	0.676E-07	0.715E 00	0.868E-02	0.101E-01	0.203E-03
2	5	0.505E-08	0.109E 01	0.131E 00	0.135E-01	0.278E-04
2	6	0.132E-13	0.156E 00	0.131E 00	0.760E-04	0.186E-08
2	7	0.0	0.582E-05	0.281E-03	0.213E-09	0.0
3	1	0.554E-09	0.306E-02	0.149E-04	0.113E-03	0.270E-05
3	2	0.287E-09	0.105E-01	0.379E-04	0.720E-03	0.875E-05
3	3	0.789E-05	0.336E 01	0.606E-01	0.415E 00	0.194E-01

3	4	0.265E-05	0.412E 01	0.687E-01	0.252E 00	0.249E-01
3	5	0.175E-05	0.450E 01	0.286E 00	0.210E 00	0.902E-02
3	6	0.459E-07	0.446E 01	0.357E 00	0.413E-01	0.437E-03
3	7	0.233E-11	0.304E 01	0.778E 00	0.295E-01	0.117E-04
3	8	0.0	0.166E-01	0.573E-01	0.557E-04	0.716E-11
4	1	0.264E-14	0.148E-04	0.108E-07	0.105E-06	0.767E-09
4	2	0.692E-16	0.547E-04	0.156E-07	0.592E-06	0.117E-08
4	3	0.339E-08	0.773E-01	0.450E-03	0.361E-02	0.920E-04
4	4	0.853E-09	0.209E 00	0.937E-03	0.387E-02	0.227E-03
4	5	0.175E-09	0.626E 00	0.107E-01	0.430E-02	0.730E-04
4	6	0.133E-13	0.775E 00	0.835E-02	0.101E-02	0.126E-05
4	7	0.0	0.548E-01	0.133E-02	0.112E-05	0.118E-10
4	8	0.0	0.350E-06	0.968E-07	0.174E-11	0.0
5	1	0.702E-27	0.107E-07	0.117E-12	0.894E-11	0.414E-14
5	2	0.0	0.226E-07	0.416E-13	0.110E-11	0.389E-16
5	3	0.178E-13	0.557E-03	0.547E-06	0.568E-05	0.481E-07
5	4	0.299E-15	0.230E-02	0.915E-06	0.414E-05	0.823E-07
5	5	0.104E-07	0.405E 00	0.971E-02	0.100E-01	0.907E-03
5	6	0.394E-09	0.624E 00	0.136E-01	0.922E-02	0.363E-03
5	7	0.263E-12	0.809E 00	0.133E-01	0.452E-02	0.344E-04
5	8	0.0	0.450E 00	0.467E-02	0.270E-03	0.540E-07
5	9	0.0	0.213E-02	0.949E-04	0.684E-08	0.270E-15
6	1	0.0	0.649E-13	0.257E-22	0.102E-19	0.122E-28
6	2	0.0	0.792E-14	0.143E-25	0.734E-22	0.0
6	3	0.645E-25	0.649E-06	0.146E-10	0.535E-09	0.932E-12
6	4	0.0	0.182E-05	0.523E-11	0.313E-10	0.557E-13
6	5	0.853E-13	0.132E-01	0.665E-04	0.472E-04	0.204E-05
6	6	0.283E-15	0.312E-01	0.987E-04	0.115E-04	0.112E-06
6	7	0.0	0.259E-01	0.217E-04	0.259E-05	0.206E-08
6	8	0.0	0.260E-03	0.873E-07	0.139E-08	0.370E-14
6	9	0.0	0.850E-11	0.0	0.0	0.0

COMPOUND NUCLEUS ATOMIC NUMBER = 65 MASS NUMBER = 151

COMPOUND NUCLEUS CROSS SECTION = 0.125E 02

EXCITATION ENERGY OF COMPOUND NUCLEUS = 92.5MEV J= 60

REACTION CROSS SECTION = 1182.5

BAEFAC = 1.000 GAMF/GAMTOT = 0.109E-02 ANGP = 1.000 PLD = 8.000
CLD = 1.0000 ANG = 1.000

ATOMIC NUMBER	65	65	65	65	65	65	65	65	65	65	65
MASS NUMBER	151	150	149	148	147	146	145	144	143	142	65
CROSS SECTION	0.0	0.0	0.0	0.0	0.620E-02	0.815E 00	0.605E 00	0.149E-06	0.0	0.0	
CUMULV.CRSSEC	0.229E 02	0.0	0.0	0.0	0.654E-02	0.980E 00	0.144E 01	0.280E-02	0.0	0.0	
FISS X SECT	0.136E-01	0.874E-02	0.454E-02	0.242E-02	0.536E-02	0.150E-03	0.0	0.0	0.0	0.0	
DEL SADDLE PT	0.405E 02	0.399E 02	0.393E 02	0.386E 02	0.380E 02	0.373E 02	0.366E 02	0.358E 02	0.351E 02	0.343E 02	
FISS BARRIER	0.135E 02	0.135E 02	0.134E 02	0.134E 02	0.133E 02	0.132E 02	0.130E 02	0.129E 02	0.127E 02	0.125E 02	
DEL ROTATION	0.270E 02	0.264E 02	0.258E 02	0.253E 02	0.247E 02	0.241E 02	0.235E 02	0.230E 02	0.224E 02	0.218E 02	
ROTATIONAL EN	0.290E 02	0.284E 02	0.278E 02	0.271E 02	0.265E 02	0.258E 02	0.252E 02	0.245E 02	0.239E 02	0.232E 02	
FISSION CROSS SECTION TO HERE=	0.359E-01				SUM CROSS SECTION = 0.118E 02			MISSING CROSS SECTION = 0.110E 02			
ATOMIC NUMBER	64	64	64	64	64	64	64	64	64	64	64
MASS NUMBER	150	149	148	147	146	145	144	143	142	141	64
CROSS SECTION	0.0	0.0	0.0	0.108E-02	0.529E 00	0.234E 01	0.353E-02	0.0	0.0	0.0	
CUMULV.CRSSEC	0.0	0.0	0.0	0.110E-02	0.633E 00	0.428E 01	0.354E 00	0.582E-05	0.0	0.0	
FISS X SECT	0.452E-04	0.659E-04	0.329E-04	0.517E-05	0.157E-05	0.215E-12	0.0	0.0	0.0	0.0	
DEL SADDLE PT	0.421E 02	0.415E 02	0.409E 02	0.403E 02	0.397E 02	0.390E 02	0.383E 02	0.377E 02	0.369E 02	0.362E 02	
FISS BARRIER	0.157E 02	0.157E 02	0.156E 02	0.156E 02	0.156E 02	0.155E 02	0.154E 02	0.152E 02	0.151E 02	0.150E 02	
DEL ROTATION	0.265E 02	0.259E 02	0.253E 02	0.247E 02	0.241E 02	0.236E 02	0.230E 02	0.224E 02	0.218E 02	0.213E 02	
ROTATIONAL EN	0.284E 02	0.278E 02	0.271E 02	0.265E 02	0.258E 02	0.252E 02	0.245E 02	0.239E 02	0.232E 02	0.226E 02	
FISSION CROSS SECTION TO HERE=	0.360E-01				SUM CROSS SECTION = 0.147E 02			MISSING CROSS SECTION = 0.816E 01			
ATOMIC NUMBER	63	63	63	63	63	63	63	63	63	63	63

MASS NUMBER	149	148	147	146	145	144	143	142	141	140
CROSS SECTION	0.0	0.0	0.0	0.242E-02	0.124E 00	0.671E-01	0.337E 01	0.216E 01	0.260E-03	0.0
CUMLTV.CRSSEC	0.0	0.0	0.0	0.293E-02	0.256E 00	0.229E 00	0.421E 01	0.519E 01	0.169E-01	0.0
FISS X SECT	0.150E-07	0.139E-07	0.239E-03	0.128E-03	0.213E-03	0.106E-04	0.371E-08	0.0	0.0	0.0
DEL SADDLE PT	0.437E 02	0.431E 02	0.425E 02	0.419E 02	0.413E 02	0.407E 02	0.401E 02	0.394E 02	0.387E 02	0.380E 02
FISS BARRIER	0.178E 02	0.178E 02	0.178E 02	0.178E 02	0.178E 02	0.177E 02	0.176E 02	0.176E 02	0.175E 02	0.173E 02
DEL ROTATION	0.259E 02	0.253E 02	0.247E 02	0.241E 02	0.236E 02	0.230E 02	0.224E 02	0.218E 02	0.213E 02	0.207E 02
ROTATIONAL EN	0.278E 02	0.271E 02	0.265E 02	0.258E 02	0.252E 02	0.245E 02	0.239E 02	0.232E 02	0.226E 02	0.220E 02
FISSION CROSS SECTION TO HERE=	0.366E-01			SUM CROSS SECTION = 0.204E 02			MISSING CROSS SECTION = 0.243E 01			

ATOMIC NUMBER	62	62	62	62	62	62	62	62	62	62	62
MASS NUMBER	148	147	146	145	144	143	142	141	140	139	62
CROSS SECTION	0.675E-09	0.549E-06	0.0	0.0	0.308E-02	0.545E 00	0.100E 01	0.459E-02	0.0	0.0	
CUMLTV.CRSSEC	0.675E-09	0.597E-06	0.0	0.228E-04	0.422E-02	0.763E 00	0.251E 01	0.117E 00	0.351E-06	0.0	
FISS X SECT	0.255E-13	0.445E-14	0.100E-06	0.519E-07	0.323E-07	0.877E-11	0.0	0.0	0.0	0.0	
DEL SADDLE PT	0.452E 02	0.447E 02	0.441E 02	0.436E 02	0.430E 02	0.423E 02	0.417E 02	0.411E 02	0.404E 02	0.398E 02	
FISS BARRIER	0.199E 02	0.199E 02	0.200E 02	0.200E 02	0.200E 02	0.199E 02	0.199E 02	0.198E 02	0.197E 02	0.196E 02	
DEL ROTATION	0.253E 02	0.248E 02	0.242E 02	0.236E 02	0.230E 02	0.224E 02	0.218E 02	0.213E 02	0.207E 02	0.201E 02	
ROTATIONAL EN	0.271E 02	0.265E 02	0.258E 02	0.252E 02	0.245E 02	0.239E 02	0.232E 02	0.226E 02	0.220E 02	0.213E 02	
FISSION CROSS SECTION TO HERE=	0.366E-01			SUM CROSS SECTION = 0.220E 02			MISSING CROSS SECTION = 0.877E 00				

ATOMIC NUMBER	61	61	61	61	61	61	61	61	61	61	61
MASS NUMBER	147	146	145	144	143	142	141	140	139	138	61
CROSS SECTION	0.262E-09	0.183E-08	0.0	0.175E-04	0.483E-02	0.816E-02	0.260E-01	0.561E 00	0.203E 00	0.886E-05	
CUMLTV.CRSSEC	0.334E-09	0.633E-08	0.0	0.187E-04	0.779E-02	0.262E-01	0.339E-01	0.957E 00	0.680E 00	0.219E-02	
FISS X SECT	0.0	0.0	0.209E-12	0.191E-13	0.539E-06	0.415E-07	0.398E-10	0.137E-18	0.0	0.0	
DEL SADDLE PT	0.467E 02	0.462E 02	0.457E 02	0.451E 02	0.445E 02	0.440E 02	0.434E 02	0.428E 02	0.422E 02	0.415E 02	
FISS BARRIER	0.219E 02	0.220E 02	0.221E 02	0.221E 02	0.221E 02	0.221E 02	0.221E 02	0.221E 02	0.220E 02	0.219E 02	
DEL ROTATION	0.248E 02	0.242E 02	0.236E 02	0.230E 02	0.224E 02	0.218E 02	0.213E 02	0.207E 02	0.202E 02	0.196E 02	
ROTATIONAL EN	0.265E 02	0.258E 02	0.252E 02	0.245E 02	0.239E 02	0.232E 02	0.226E 02	0.220E 02	0.213E 02	0.207E 02	
FISSION CROSS SECTION TO HERE=	0.366E-01			SUM CROSS SECTION = 0.228E 02			MISSING CROSS SECTION = 0.742E-01				

ATOMIC NUMBER	60	60	60	60	60	60	60	60	60	60	60
MASS NUMBER	146	145	144	143	142	141	140	139	138	137	60
CROSS SECTION	0.934E-16	0.197E-16	0.881E-08	0.206E-06	0.210E-05	0.163E-02	0.266E-01	0.710E-02	0.681E-06	0.0	
CUMLTV.CRSSEC	0.521E-13	0.103E-12	0.115E-07	0.591E-06	0.140E-04	0.182E-02	0.499E-01	0.385E-01	0.357E-03	0.102E-10	
FISS X SECT	0.0	0.0	0.0	0.0	0.931E-11	0.129E-14	0.0	0.0	0.0	0.0	
DEL SADDLE PT	0.481E 02	0.476E 02	0.471E 02	0.466E 02	0.460E 02	0.455E 02	0.450E 02	0.444E 02	0.438E 02	0.432E 02	
FISS BARRIER	0.239E 02	0.240E 02	0.241E 02	0.242E 02	0.242E 02	0.242E 02	0.242E 02	0.242E 02	0.242E 02	0.241E 02	
DEL ROTATION	0.242E 02	0.236E 02	0.230E 02	0.224E 02	0.218E 02	0.213E 02	0.207E 02	0.202E 02	0.196E 02	0.190E 02	
ROTATIONAL EN	0.258E 02	0.252E 02	0.245E 02	0.239E 02	0.232E 02	0.226E 02	0.220E 02	0.213E 02	0.207E 02	0.201E 02	
FISSION CROSS SECTION TO HERE=	0.366E-01			SUM CROSS SECTION = 0.228E 02			MISSING CROSS SECTION = 0.388E-01				

BRANCHING RATIOS AT C.N. EX. ENGY / EXCITN, ETC, ARE FIRST-CHANCE EFFECTIVE EXCITATION ENERGIES FOR N-EMISSION, ETC

IA	IZ	GAMP/GANT	GAMN/GANT	GAMP/GANT	GAMA/GANT	GAMD/GANT	EXCITN	EXCITP	EXCITA	EXCITD
1	1	0.109E-02	0.603E 00	0.188E-01	0.367E 00	0.107E-01	0.581E 02	0.613E 02	0.714E 02	0.563E 02

NON-RESIDUAL (TOTAL) CROSS SECTIONS. (NON-CUMULATIVE, THIS J ONLY)

IZ	IA	SIGMFISS	SIGNNEUT	SIGNPROT	SIGNALPH	SIGNDEUT
1	1	0.136E-01	0.751E 01	0.234E 00	0.457E 01	0.134E 00
1	2	0.874E-02	0.607E 01	0.184E 00	0.121E 01	0.379E-01
1	3	0.454E-02	0.404E 01	0.130E 00	0.186E 01	0.281E-01
1	4	0.242E-02	0.378E 01	0.108E 00	0.154E 00	0.326E-02
1	5	0.536E-02	0.290E 01	0.804E 00	0.578E-01	0.194E-03
1	6	0.150E-03	0.605E 00	0.148E 01	0.441E-02	0.629E-07
1	7	0.0	0.149E-06	0.637E-03	0.832E-10	0.0
2	1	0.452E-04	0.211E 00	0.256E-02	0.197E-01	0.597E-03
2	2	0.659E-04	0.479E 00	0.573E-02	0.434E-01	0.751E-03
2	3	0.329E-04	0.591E 00	0.601E-02	0.501E-01	0.291E-03
2	4	0.517E-05	0.707E 00	0.426E-02	0.153E-01	0.129E-03
2	5	0.157E-05	0.874E 00	0.110E 00	0.894E-03	0.199E-06
2	6	0.215E-12	0.290E-02	0.935E-02	0.689E-05	0.888E-13
3	1	0.150E-07	0.242E-02	0.670E-05	0.137E-03	0.169E-05
3	2	0.139E-07	0.855E-02	0.160E-04	0.175E-03	0.687E-06
3	3	0.239E-03	0.402E 01	0.611E-01	0.493E 00	0.149E-01
3	4	0.128E-03	0.503E 01	0.663E-01	0.131E 00	0.895E-02

3	5	0.213E-03	0.642E 01	0.359E 00	0.964E-01	0.258E-02
3	6	0.106E-04	0.599E 01	0.412E 00	0.107E 00	0.352E-03
3	7	0.371E-08	0.216E 01	0.517E 00	0.110E-02	0.288E-07
3	8	0.0	0.260E-03	0.357E-02	0.778E-08	0.0
4	1	0.255E-13	0.664E-05	0.113E-0E	0.574E-07	0.745E-10
4	2	0.445E-14	0.237E-04	0.177E-0E	0.339E-07	0.100E-10
4	3	0.100E-06	0.775E-01	0.274E-03	0.302E-02	0.870E-04
4	4	0.519E-07	0.200E 00	0.553E-03	0.105E-02	0.296E-04
4	5	0.323E-07	0.606E 00	0.816E-02	0.800E-03	0.397E-05
4	6	0.877E-11	0.487E 00	0.350E-02	0.416E-04	0.601E-08
4	7	0.0	0.101E-02	0.948E-05	0.901E-09	0.216E-17
5	1	0.0	0.865E-09	0.934E-16	0.632E-14	0.137E-18
5	2	0.0	0.881E-09	0.196E-16	0.258E-14	0.162E-20
5	3	0.209E-12	0.409E-03	0.118E-06	0.187E-05	0.126E-07
5	4	0.191E-13	0.121E-02	0.151E-06	0.204E-06	0.133E-08
5	5	0.539E-06	0.483E 00	0.101E-01	0.436E-02	0.253E-03
5	6	0.415E-07	0.596E 00	0.109E-01	0.234E-02	0.454E-04
5	7	0.398E-10	0.657E 00	0.766E-02	0.182E-02	0.339E-05
5	8	0.137E-18	0.202E 00	0.155E-02	0.384E-05	0.411E-10
5	9	0.0	0.885E-05	0.363E-06	0.287E-12	0.0
6	3	0.0	0.166E-06	0.189E-12	0.108E-10	0.188E-15
6	4	0.0	0.158E-06	0.461E-13	0.559E-13	0.803E-17
6	5	0.931E-11	0.131E-01	0.406E-04	0.815E-05	0.160E-06
6	6	0.129E-14	0.236E-01	0.209E-04	0.110E-05	0.988E-08
6	7	0.0	0.550E-02	0.105E-05	0.495E-08	0.127E-12
6	8	0.0	0.318E-06	0.749E-11	0.249E-13	0.0

TOTAL FISSION CROSS SECTION = 0.366E-01

SUM CROSS SECTIONS = 0.228E 02

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