DKDATA: SUBROUTINE FOR RETRIEVING
RADIONUCLIDE GAMMA-RAY DECAY DATA
FROM RSIC DATA SET DLC-19/DECAYGAM

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OAK RIDGE NATIONAL LABORATORY

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Neutron Physics Division

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ABSTRACT

DKDATA is a subroutine written in Fortran IV which returns to the calling program information concerning the gamma-ray decay characteristics of a nuclide of specified atomic number and mass. This data is initially read from the Radiation Shielding Information Center Data Set DLC-19/DECAYGAM on first entry to the subroutine, and the pertinent data for all nuclides of interest are stored for use in subsequent calls.

INTRODUCTION

The DECAVGAM data set of the Radiation Shielding Information Center contains a large amount of information on the characteristics of radionuclides. This report describes one subroutine useful for retrieving this information for use in the calling program. The specific routine described here reads from the data tape all information concerning each nuclide, and selects for retention and subsequent return to the calling program only two quantities. These are the halflife of the nuclide (if gamma-active) and a weighting factor which is a measure of the average total energy emitted by the nuclide as photons. For other applications, the choice of what information read from the data tape is to be retained and what is to be discarded can be changed with little programming effort.

Use of the subroutine requires three steps: First, the subroutine call must be inserted into the main program with arguments Z and A set. Second, the namelist statements described below must be inserted into the standard input data set (assumed to be 5) such that it can be read by DKDATA on first entry. Third, data set DECAVGAM must be accessed with appropriate JCL cards, or in card form immediately following the namelist.

USEAGE OF SUBROUTINE

The following subroutine call must be inserted into the calling program:

```
CALL DKDATA (Z,A,WEIGHT,HALFLF)
```

where the calling arguments are the following:

- Z - atomic number of the nuclide for which the decay gamma-ray information is sought. Z must be the floating point representation of an integer.
- A - atomic mass of the nuclide. A must be the floating point representation of an integer.
- WEIGHT - a measure of the importance of the nuclide as a gamma-ray emitter found by summing the product of the gamma-ray energy and the branching ratio for each possible decay gamma ray.
- HALFLF - halflife of the nuclide in minutes.

The first execution of this subroutine call causes the namelist &DKGAM to be read from the standard input to determine the parameters to be considered in calculating the

weight. In addition, the amount of printed output to be listed during the reading of the data tape and the logical numbers of the input and output data set are specified. The arguments of the namelist &DKGAM are the following:

NTIN - Data set number for the RSIC Data Set DECAYGAM.

Default: NTIN=5.

NTOU - Output data set number for the listing of information during the reading of the DECAYGAM data. In addition, a listing of the data retained by the subroutine is made after the end of the tape has been reached. If NTOU is less than or equal to 0, all printed output is suppressed.

Default: NTOU=6

MAXZ - Maximum value of Z required by the calling program. Since the DECAYGAM tape has the radionuclides ordered in Z, scanning of the data is halted when a radionuclide having $Z = \text{MAXZ} + 1$ is encountered.

Default: MAXZ=400.

HALFLO - Lowest value of halflife (in minutes) to be considered in calculating the weight. If

HALFLO is assigned a value in the namelist input data, nuclides of lower halflife will be assigned a WEIGHT of zero. The correct halflife will still be returned in the argument HALFLF.

Default: HALFLO=0.

HALFHI - Highest value of the halflife (in minutes) to be considered in calculating the weight. If HALFHI is assigned a value in the namelist input data, nuclides of higher halflife will be tagged by a WEIGHT of zero and the correct value of HALFLF.

Default: HALFHI=33.3F33 mins.

ELOW - Lowest gamma-ray energy (in MeV) that is to be considered in computing the weight. If a value for ELOW appears in the namelist input data, gamma rays of energy less than ELOW will not be included in the computation of WEIGHT. If the printed output is enabled, each gamma-ray omitted from the calculation will be flagged.

Default: ELOW=0.

EHIGH - Highest gamma-ray energy (in MeV) that is to be considered in calculating the weight. If EHIGH

is assigned a value in the namelist input data, gamma rays of energy higher than EHIGH will not be included in the computation of WEIGHT. If the printed output is enabled, each gamma-ray so ignored by the computation will be flagged.
Default: EHIGH=33.3E33 MeV.

LIST - Logical variable to control the output of subroutine DKDATA only during the actual reading of the DECAYGAM data. In the namelist data, set LIST=.FALSE. or LIST=F to suppress listing. The final summary of stored information is not affected, and the limits of output controlled by LIST is printed in the full output listing, whenever listing is enabled.
Default: LIST=.TRUE.

The namelist data is inserted into the data cards of the standard input data set so as to be in position to be read on first entry to DKDATA. The customary rules regarding namelist data entry apply (column 1 not used, columns 73-80 may be used, commas separate data entries, blanks are ignored, etc.). An example of these cards is:

```

&DKGAM
NTIN=12, NTOU=6, MAXZ=54, HALFLO=.5, HALFHI=60,
ELOW=.6,
LIST=.FALSE.,
&END

```

in which the values of all the variables is explicitly specified, with the exception of EHIGH, which is taken to be infinite, by default. The data set:

```

&DKGAM ELOW=2 &END

```

results in the rejection of gamma-ray energies below 2 MeV and, by default, specifies NTIN=5, NTOU=6, LIST=.TRUE., HALFLO=0, and HALFHI infinite.

Because the namelist input statement causes all input cards of the standard data set to be skipped through until the &DKGAM card is encountered, it must be inserted at the correct place. Even if standard options are desired, the following card must appear:

```

&DKGAM &END

```

with at least one space preceding the &END.

After reading the namelist, the subroutine reads the DECAYGAM input from data set NTIN. All the data entries on the tape for a single radionuclide are read into the common

region /DKCOM/, which is not used after the original reading of the tape. Upon return to the calling program, /DKCOM/ contains all the information concerning the last radionuclide read from the DECAYGAM tape. The data on the tape are identified within the subroutine as follows:

KILL	- flag to indicate end of DECAYGAM data tape.
SYM	- chemical symbol of element in Hollerith.
TA	- atomic mass of nuclide.
STATE	- state of radionuclide:
	0 - ground state
	M - metastable
IZ	- atomic number of nuclide.
HALF	- halflife of radionuclide in units given in
	IUNIT.
COEFU	- prefix of units of halflife:
	M - milli
	6 - 10^{**6}
	9 - 10^{**9}
IUNIT	- units of halflife:
	S - seconds
	M - minutes
	H - hours
	D - days
	Y - years
MODE	- mode of decay:

B- - negative beta (negatron) emission.

B+ - positive beta (positron) emission.

EC - orbital electron capture.

K - orbital electron capture from K-shell.

PRECUR - chemical symbol of radionuclide precursor.

MASSP - atomic mass of radionuclide precursor.

ABUND - natural abundance of radionuclide precursor.

CRSSEC - thermal (2200 m/s) thermal cross section for (n,gamma) reaction.

MADE - method by which radionuclide can be made:

- 0 - (n,gamma) product
- 1 - fission product
- 2 - both (n,gamma) and fission product
- 3 - charged particle or cyclotron-produced
- 4 - natural radionuclide
- 5 - other

FYIELD - fission yield.

IMAX - number of gamma-ray energies tabulated.

STATUS - status of gamma-ray branching ratio data:

- A - absolute
- R - relative
- D - based on referenced decay scheme.

RESINT - resonance integral of radionuclide precursor.

REF1 - first reference from which data are taken.

REF2 - second reference.

E, PCT - the gamma-ray energies and the corresponding

branching ratios, a total of IMAX pairs.

After reading these data for a radionuclide, the energies are converted to MeV and the halflives to minutes. The variables Z, A, and HALF are then transferred into ZVEC, AVEC and HAFVEC to be saved for subsequent calls. The weight is calculated from the formula:

$$\text{WEIGHT} = \sum_{I=1}^{\text{IMAX}} (E(I) * 0.01 * \text{PCT}(I))$$

ignoring gamma-ray energies having E less than ELOW or greater than EHIGH. If the halflife falls outside the limits defined by HALFLO and HALFHI, the weight is cleared to zero. The resulting WEIGHT is entered into the WTVEC array and data for a new nuclide is read from the DECAYGAM tape.

When the data set has been completely read up to the end of the tape or to MAXZ+1, the stored data vectors ZVEC, AVEC and WTVEC are listed and the information sought by the calling routine looked up in the data arrays.

Since some radionuclides have metastable states, the arrays are always searched fully on first and subsequent entries and the value of halflife and weight returned is that for the entry of highest weight.

FORTRAN LISTINGS

SUBROUTINE DKDATA(Z,A,WEIGHT,HALPLF)

SUBROUTINE DKDATA

PURPOSE

TO RETURN TO THE CALLING PROGRAM DATA THAT HAS BEEN RETRIEVED FROM THE GAMMA DECAY DATA TAPE DESIGNATED RSIC NUMBER DLC-19. THE DATA IS READ FROM THE TAPE ON THE FIRST ENTRY TO THE SUBROUTINE AND STORED FOR USE IN SUBSEQUENT ENTRIES.

USAGE

- (1) INSERT INTO THE MAIN PROGRAM THE STATEMENT:
CALL DKDATA(Z,A,WEIGHT,HALPLF)
WHOSE ARGUMENTS ARE DESCRIBED BELOW.
- (2) ENTER DATA INTO THE STANDARD INPUT DATA SET IN THE FORM OF A NAMELIST, DESCRIBED BELOW, WHICH IS READ BY SUBROUTINE DKDATA ON FIRST ENTRY.
- (3) MOUNT THE DATA TAPE RSIC DLC-19 WITH A DATA SET LOGICAL NUMBER GIVEN TO SUBROUTINE DKDATA VIA THE NAMELIST.

DESCRIPTION OF CALLING ARGUMENTS

Z - ATOMIC NUMBER OF ELEMENT, SET BY CALLING PROGRAM
A - NUCLEAR MASS OF NUCLIDE, SET BY CALLING PROGRAM
WEIGHT - A MEASURE OF THE IMPORTANCE OF THE NUCLIDE FOUND BY SUMMING THE PRODUCT OF THE GAMMA ENERGY AND THE BRANCHING RATIO FOR EACH POSSIBLE DECAY GAMMA
HALPLF - HALFLIFE OF THE NUCLIDE IN MINUTES.

DESCRIPTION OF THE NAMELIST VARIABLES IN NAMELIST \$DKGAM

NTIN - DATA SET NUMBER OF THE DATA TAPE RSIC DLC-19
NTOU - OUTPUT DATA SET FOR LIST OF INFORMATION AS TAKEN FROM THE DATA TAPE AND AS SUMMARIZED AFTER THE ENTIRE TAPE HAS BEEN READ. IF NTOU IS NOT SPECIFIED IN THE NAMELIST, IT IS SET TO NTOU=6. IF NTOU IS LESS THAN OR EQUAL 0, ALL OUTPUT IS SUPPRESSED.
MAXZ - MAXIMUM VALUE OF Z REQUIRED. SCANNING OF THE TAPE IS TERMINATED WHEN AN ENTRY HAVING Z=MAXZ+1 IS ENCOUNTERED. AS DEFAULT, Z=400
HALPLO - LOWEST VALUE OF HALFLIFE TO BE CONSIDERED IN COMPUTING THE WEIGHT. NUCLIDES OF SMALLER HALFLIFE WILL BE ASSIGNED A WEIGHT OF 0.0, BUT THE HALFLIFE WILL BE RETURNED TO THE CALLING PROGRAM.
HALPHI - HIGHEST VALUE OF HALFLIFE TO BE CONSIDERED IN COMPUTING THE WEIGHT. (CF. HALPLO).
ELOW - LOWEST ENERGY OF GAMMA TO BE CONSIDERED IN COMPUTING THE WEIGHT. GAMMAS OF LOWER ENERGY ARE IGNORED.
EHIGH - HIGHEST ENERGY OF GAMMA TO BE CONSIDERED IN COMPUTING THE WEIGHT.
LIST - LOGICAL VARIABLE TO CONTROL THE OUTPUT OF SUBROUTINE DKDATA DURING READING OF THE DATA TAPE. SET LIST=.FALSE. OR LIST=F TO SUPPRESS LIST OF TAPE DATA EXCEPT AS FINAL STORED DATA.

DKDATA01
DKDATA02
DKDATA03
DKDATA04
DKDATA05
DKDATA06
DKDATA07
DKDATA08
DKDATA09
DKDATA10
DKDATA11
DKDATA12
DKDATA13
DKDATA14
DKDATA15
DKDATA16
DKDATA17
DKDATA18
DKDATA19
DKDATA20
DKDATA21
DKDATA22
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DKDATA41
DKDATA42
DKDATA43
DKDATA44
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DKDATA46
DKDATA47
DKDATA48
DKDATA49
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DKDATA52
DKDATA53
DKDATA54
DKDATA55
DKDATA56
DKDATA57
DKDATA58
DKDATA59
DKDATA60

```

C
C      SUBROUTINES AND FUNCTION PROGRAMS REQUIRED
C      ICOMP - FUNCTION TO COMPARE ALPHAMERIC STRINGS. RETURNS
C              THE VALUE ZERO IF THE STRINGS ARE ALIKE.
C
C      METHOD
C      ON FIRST ENTRY, THE NAMELIST &DKGAM IS READ FROM
C      THE STANDARD INPUT TO DETERMINE THE PARAMETERS TO
C      BE CONSIDERED IN CALCULATING THE WEIGHT, TO CONTROL THE OUT-
C      PUT, AND FIND THE DATA SET HAVING THE GAMMA DATA. THE TAPE
C      IS SCANNED AND THE VALUE OF WEIGHT COMPUTED. THE
C      RESULTANT WEIGHT AND THE HALFLIFE ARE STORED IN COMBINATION
C      WITH THE Z AND A OF THE NUCLIDE IN A 600 X 4 ARRAY.
C      WHEN THE END OF THE TAPE IS ENCOUNTERED, OR WHEN
C      Z EXCEEDS MAXZ, THE WEIGHT AND HALFLIFE FOR THE INITIAL
C      CALL ARE SOUGHT IN THE STORAGE ARRAY. BECAUSE THE ARRAY MAY
C      INCLUDE MULTIPLE ENTRIES FOR THE SAME Z AND A, BECAUSE
C      OF ISOMERIC STATES, THE ENTIRE ARRAY IS SCANNED AND
C      THE GREATEST WEIGHT DETERMINES WHICH DATA IS RETURNED.
C
C-----
C
C      LOGICAL ENTERD / .FALSE. /
C      LOGICAL LIST / .TRUE. /
C      INTEGER UNITS(5) / 'SECS', 'MINS', 'HOUR', 'DAYS', 'YEAR' /
C      REAL CONV(5) / 1.667E-2, 1., 60., 1.44E3, 5.256E5 /
C      REAL*8 MODE
C
C      DIMENSION ZVEC(600),AVEC(600),HAFVEC(600),WTVEC(600)
C      DIMENSION E(200),PCT(200)
C      DIMENSION REP1(20),REP2(20)
C      COMMON /DKCCM/ SYN,IA,STATE,IZ,HALF,COEFU,IUNIT,
C      *              MODE,PRECUR,MASSP,ABUND,CRSSEC,
C      *              MADE,FYIELD,IMAX,STATUS,RESINT,
C      *              REP1,REP2,E,PCT
C
C      NAMELIST /DKGAM/ HALFLO,HALPHI,NTIN,NTOU,MAXZ,
C      1              LIST,ELOW,EHIGH
C
C      IF(ENTERD) GO TO 140
C
C-----
C
C      INITIAL ENTRY
C
C      SET PARAMETERS TO THEIR DEFAULT VALUES, READ
C      THE VARIABLES OF THE NAMELIST FROM STANDARD INPUT
C      AND LIST THE CURRENT VALUES (UNLESS NTOU=0).
C
C-----
C
C      ENTERD=.TRUE.
C      NTIN=5
C      NTOU=6
C      HALFLO=0.0
C      HALPHI=33.3E33
C      ELOW=0.0
C      EHIGH=33.3E33
C      MAXZ=400
C
C-----
C
C      READ NAMELIST &DKGAM FROM TAPE 5
C
C-----
C
C      READ(5,DKGAM)
C      IF(NTOU.LE.0) LIST=.FALSE.

```

```

DKDATA61
DKDATA62
DKDATA63
DKDATA64
DKDATA65
DKDATA66
DKDATA67
DKDATA68
DKDATA69
DKDATA70
DKDATA71
DKDATA72
DKDATA73
DKDATA74
DKDATA75
DKDATA76
DKDATA77
DKDATA78
DKDATA79
DKDATA80
DKDATA81
DKDATA82
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DKDAT120
DKDAT121
DKDAT122
DKDAT123
DKDAT124
DKDAT125
DKDAT126
DKDAT127
DKDAT128
DKDAT129

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```

WRITE(NTOU,9000)
9000 FORMAT('1 ***** INITIALIZATION OF DKDATA *****')
WRITE(NTOU,9001)HALPLO
9001 FORMAT('0 REJECTING NUCLIDES OF HALF-LIFE (IN MINS) .LT. ',G14.7)
WRITE(NTOU,9002)HALPHI
9002 FORMAT('0 REJECTING NUCLIDES OF HALF-LIFE (IN MINS) .GT. ',
1 G14.7)
WRITE(NTOU,9003)ELOW
9003 FORMAT('0 WEIGHT IGNORES GAMMAS OF ENERGY .LT.',G14.7)
WRITE(NTOU,9004)EHIGH
9004 FORMAT('0 WEIGHT IGNORES GAMMAS OF ENERGY .GT.',G14.7)
WRITE(NTOU,9005)MAXZ
9005 FORMAT('0 REJECTING NUCLIDES OF ATOMIC NUMBER .GT. ',I14)
WRITE(NTOU,9006)NTIN
9006 FORMAT('0 READING GAMMA DECAY DATA FROM TAPE NR ',I14)
WRITE(NTOU,9007)NTOU
9007 FORMAT ('0 WRITING INITIALIZATION DATA ON TAPE ',I4)
IF(.NOT.LIST) WRITE(NTOU,9008)
9008 FORMAT('0 LIST = .FALSE., ALL PRINT-OUT EXCEPT SUMMARY WILL BE
1 SUPPRESSED. ')
WRITE(NTOU,9009)
9009 PCRMAT('1 **** BEGIN OUTPUT INVOKED BY SETTING LIST=.TRUE. '/1X)
C
C .....
C
C NOW READ THE GAMMA DECAY DATA TAPE FROM NTIN
C
C .....
C
10 CONTINUE
C
C .....
C
C IGNORE THE FIRST 100 RECORDS CONTAINING NORMAL DENSITIES
C
C .....
C
DO 20 I=1,100
20 READ(NTIN,9010)SYM,HALF
9010 FORMAT(A2,F8.4)
K=0
C
C .....
C
C BEGINNING OF LOOP HANDLING THE RECORDS PERTAINING TO
C A SINGLE RADIO-NUCLIDE. THE NUMBER OF RECORDS IS DEFINED
C BY THE NUMBER OF GAMMAS, GIVEN BY IMAX IN THE FIRST RECORD.
C
C .....
C
30 CONTINUE
READ(NTIN,9011) KILL,SYM,IA,STATE,IZ,HALF,COEPU,IUNIT,
*MODE,PRECUR,MASSP,ABUND,CRSSEC,MADE,FYIELD,IMAX,
*STATUS,RESINT
9011 FORMAT(I2,A2,I3,1X,A1,2X,I2,1X,E10.3,A1,A1,1X,
*A6,A2,I3,F7.3,F9.3,I1,1X,E10.3,1X,I3,1X,A1,F8.0)
IF(KILL.NE.0) GO TO 130
IF(IZ.GT.MAXZ) GO TO 120
C
C .....
C
C COEPU IS THE PREFIX ON THE HALPLIFE.
C
C M - MILLI
C 6 - 10**6
C 9 - 10**9
C
C .....
C

```

DKDAT 130
 DKDAT 131
 DKDAT 132
 DKDAT 133
 DKDAT 134
 DKDAT 135
 DKDAT 136
 DKDAT 137
 DKDAT 138
 DKDAT 139
 DKDAT 140
 DKDAT 141
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 DKDAT 197
 DKDAT 198

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      IF (ICOMPA(COEFU,'9',1).EQ.0) HALF=HALF*1.0E9
      IF (ICOMPA(COEFU,'6',1).EQ.0) HALF=HALF*1.0E6
      IF (ICOMPA(COEFU,'M',1).EQ.0) HALF=HALF*1.0E-3
C
C.....
C
C   THE UNITS FOR HALPLIFE ARE GIVEN BY IUNIT.  CONVERT TO MINUTES.
C
C       M DENOTES MINUTES
C       S       SECONDS
C       Y       YEAR
C       D       DAYS
C
C.....
C
      IF (ICOMPA(IUNIT,'S',1).EQ.0) J=1
      IF (ICOMPA(IUNIT,'M',1).EQ.0) J=2
      IF (ICOMPA(IUNIT,'H',1).EQ.0) J=3
      IF (ICOMPA(IUNIT,'D',1).EQ.0) J=4
      IF (ICOMPA(IUNIT,'Y',1).EQ.0) J=5
      IUNIT=UNITS(J)
      HPLIFE=HALF*CONV(J)
      IF (.NOT.LIST) GO TO 40
      WRITE(NTOU,9012) IZ,SYM,IA,STATE,HALF,IUNIT,HPLIFE
9012  FORMAT(1H,I3,1H-,A2,1H-,I3,A1,' ***** ',
1' HALF-LIFE = ',G10.3,1XA4,' = ',G14.7,' MINS')
40  CONTINUE
C
C.....
C
C   LOAD Z, A, AND HALPLIFE INTO THE STORAGE VECTORS
C
C.....
C
      K=K+1
      ZVEC(K)=IZ
      AVEC(K)=IA
      HAPVEC(K)=HPLIFE
C
C.....
C
C   NOW READ THE REFERENCES AND THE GAMMA ENERGIES AND PCTS.
C   CONVERT ENERGIES TO MEV AND ASSIGN 100 PCT TO MISSING BRANCHING RATIOS
C
C.....
C
      READ(NTIN,9013) REF1,REF2
9013  FORMAT(20A4)
      REAL(NTIN,9014) (E(I),PCT(I),I=1,IMAX)
9014  FORMAT(8F10.4)
      DO 50 I=1,IMAX
      E(I)=E(I)*0.001
      IF (PCT(I).EQ.0.0) PCT(I)=100.0
50  CONTINUE
      IF (IMAX.LE.0) GO TO 110
      IF (.NOT.LIST) GO TO 60
      WRITE(NTOU,9015)
9015  FORMAT(1H0,13X,'GAMMA ENERGY, MEV',5X,
1' PCT INTENSITY'/1H)
      WRITE(NTOU,9016) (E(I),PCT(I),I=1,IMAX)
9016  FORMAT(12X,3X,2G17.7)
      WRITE(NTOU,9017) REF1
9017  FORMAT(1H0,15X,'REFERENCE: ',20A4)
      IF (ICOMPA(REF2,' ',20).NE.0)
1  WRITE(NTOU,9017) REF2
9018  FORMAT(16X,'REFERENCE: ',20A4)
      WRITE(NTOU,9019)
9019  FORMAT(1X)
60  CONTINUE

```

DKDAT 199
 DKDAT 200
 DKDAT 201
 DKDAT 202
 DKDAT 203
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 DKDAT 205
 DKDAT 206
 DKDAT 207
 DKDAT 208
 DKDAT 209
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 DKDAT 264
 DKDAT 265
 DKDAT 266
 DKDAT 267

C		DKDAT 268
C		DKDAT 269
C		DKDAT 270
C	COMPUTE THE WEIGHT, IGNORING GAMMAS OUTSIDE THE ENERGY LIMITS	DKDAT 271
C		DKDAT 272
C		DKDAT 273
C		DKDAT 274
	WEIGHT=0.0	DKDAT 275
	DO 80 I=1,IMAX	DKDAT 276
	IF(E(I).LT.ELOW) GO TO 70	DKDAT 277
	IF(E(I).GT.EHIGH) GO TO 70	DKDAT 278
	WEIGHT=WEIGHT+E(I)*0.01*PCT(I)	DKDAT 279
	GO TO 80	DKDAT 280
70	CONTINUE	DKDAT 281
	IF(.NOT.LIST) GO TO 80	DKDAT 282
	WRITE(NTOU,9020)E(I)	DKDAT 283
9020	FORMAT(12X,'WEIGHTING OMITS GAMMA OF ENERGY = ',G14.7)	DKDAT 284
80	CONTINUE	DKDAT 285
	WTVEC(K)=WEIGHT	DKDAT 286
	IF(.NOT.LIST) GO TO 90	DKDAT 287
C		DKDAT 288
C		DKDAT 289
C		DKDAT 290
C	PRINT OUT THE WEIGHT BEFORE ANY REJECTION TEST	DKDAT 291
C		DKDAT 292
C	IF HALFLIFE TOO HIGH OR TOO LOW, REVISE WEIGHT TO 0.0.	DKDAT 293
C		DKDAT 294
C		DKDAT 295
C		DKDAT 296
	WRITE(NTOU,9021)WEIGHT	DKDAT 297
9021	FORMAT(1H0,15X,'WEIGHT = ',P10.3)	DKDAT 298
90	CONTINUE	DKDAT 299
	IF(HPLIFE.GE.HALFLO) GO TO 100	DKDAT 300
	WTVEC(K)=0.0	DKDAT 301
	IF(.NOT.LIST) GO TO 30	DKDAT 302
	WRITE(NTOU,9022)	DKDAT 303
9022	FORMAT('0 ***** REJECTED *****')	DKDAT 304
	WRITE(NTOU,9023)WTVEC(K)	DKDAT 305
9023	FORMAT(' HALF-LIFE TOO LOW. NEW WEIGHT=',G14.7)	DKDAT 306
	GO TO 110	DKDAT 307
100	CONTINUE	DKDAT 308
	IF(HPLIFE.LE.HALPHI) GO TO 110	DKDAT 309
	WTVEC(K)=0.0	DKDAT 310
	IF(.NOT.LIST) GO TO 30	DKDAT 311
	WRITE(NTOU,9022)	DKDAT 312
	WRITE(NTOU,9024)WTVEC(K)	DKDAT 313
9024	FORMAT(' HALF-LIFE TOO HIGH. NEW WEIGHT =',G14.7)	DKDAT 314
110	CONTINUE	DKDAT 315
	IF(.NOT.LIST) GO TO 30	DKDAT 316
	WRITE(NTOU,9025)	DKDAT 317
9025	FORMAT(1H /11X,50(1H-)/1H)	DKDAT 318
C		DKDAT 319
C		DKDAT 320
C		DKDAT 321
C	END OF LOOP TO HANDLE ONE NUCLIDE, GO BACK TO READ TAPE	DKDAT 322
C		DKDAT 323
C		DKDAT 324
C		DKDAT 325
	GO TO 30	DKDAT 326
120	CONTINUE	DKDAT 327
C		DKDAT 328
C		DKDAT 329
C		DKDAT 330
C	STOP READING TAPE AND PUBLISH STORED INFORMATION (IF NTOU.GT.0)	DKDAT 331
C		DKDAT 332
C		DKDAT 333
C		DKDAT 334
	IF(NTOU.LE.0) GO TO 140	DKDAT 335
	WRITE(NTOU,9031)	DKDAT 336

WRITE(NTOU,9026)MAXZ	DKDAT 337
9026 FORMAT('0 *** READING TERMINATED -- Z .GT. ',I14)	DKDAT 338
130 CONTINUE	DKDAT 339
WRITE(NTOU,9027)	DKDAT 340
9027 FORMAT('1 SUMMARY OF STORED INFORMATION'/1X)	DKDAT 341
WRITE(NTOU,9028)	DKDAT 342
9028 FORMAT(5X,1HI,7X,1HZ,13X,1HA,8X,'HALF-LIFE',9X,'WEIGHT'/1X)	DKDAT 343
WRITE(NTOU,9029) (I,ZVEC(I),AVEC(I),HAFVEC(I),WTVEC(I),	DKDAT 344
1 I=1,K)	DKDAT 345
9029 FORMAT(1X,I6,4G14.7)	DKDAT 346
WRITE(NTOU,9030)	DKDAT 347
9030 FORMAT('1 ***** END INITIALIZATION OF DKEATA *****')	DKDAT 348
9031 FORMAT('0 **** END OUTPUT CONTROLLED BY LOGICAL VARIABLE LIST')	DKDAT 349
C	DKDAT 350
C-----	DKDAT 351
C	DKDAT 352
C BEGINNING OF NON-INITIAL ENTRIES	DKDAT 353
C	DKDAT 354
C SEARCH THE STORED Z AND A VALUES FOR THE Z AND A	DKDAT 355
C PASSED IN THE CALLING ARGUMENTS. CHOOSE THE WEIGHT AND	DKDAT 356
C HALFLIFE CORRESPONDING TO THE NUCLIDE OF GREATEST WEIGHT.	DKDAT 357
C	DKDAT 358
C-----	DKDAT 359
C	DKDAT 360
140 CONTINUE	DKDAT 361
WEIGHT=0.0	DKDAT 362
HALFLF=0.0	DKDAT 363
DO 150 I=1,K	DKDAT 364
IF(ZVEC(I).NE.Z) GO TO 150	DKDAT 365
IF(AVEC(I).NE.A) GO TO 150	DKDAT 366
IF(WEIGHT.GT.WTVEC(I)) GO TO 150	DKDAT 367
WEIGHT=WTVEC(I)	DKDAT 368
HALFLF=HAFVEC(I)	DKDAT 369
150 CONTINUE	DKDAT 370
RETURN	DKDAT 371
END	DKDAT 372

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