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INTERNATIONAL ATOMIC ENERGY AGENCY

NUCLEAR DATA SERVICES

DOCUMENTATION SERIES OF THE IAEA NUCLEAR DATA SECTION

ENDF/B Pre-Processing Codes:

Implementing and Testing on a Personal Computer

This document describes the contents of the diskettes containing the ENDF/B Pre-Processing codes by D.E.Cullen, and example data for use in implementing and testing these codes on a Personal Computer of the type IBM-PC/AT. Upon request the codes are available from the IAEA Nuclear Data Section, free of charge, on a series of 7 diskettes.

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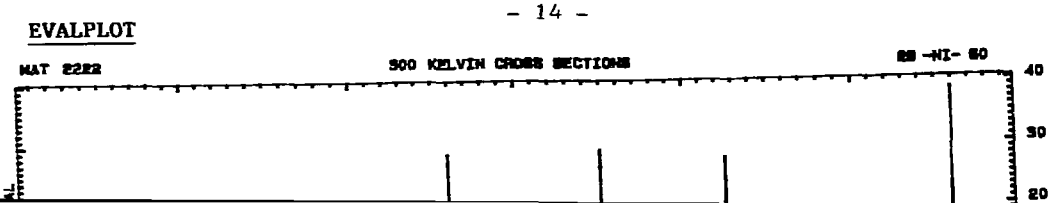


Introduction

The ENDF/B Pre-Processing codes by D.E.Cullen are described in the document IAEA-NDS-39(Rev.3) of Feb.1987. These codes are now available for a Personal Computer of the type IBM-PC/AT with a 1.2 Mbyte diskette drive. The present document describes the contents of the 7 diskettes containing the ENDF/B Pre-Processing codes, and gives instructions on how to implement and test the codes on your Personal Computer.

Upon request, the diskettes are available free of charge from the IAEA Nuclear Data Section, under the condition that all difficulties or defaults encountered are reported to the IAEA Nuclear Data Section. If results obtained from these codes are mentioned in a publication, a reprint is requested to be sent to the IAEA Nuclear Data Section.

The codes operate on all present versions of the ENDF/B format, specifically for the most frequently used versions ENDF/B-4 and ENDF/B-5, but also for the new version ENDF/B-6. The ENDF/B formatted data files can be obtained from the I.A.E.A. Nuclear Data Section upon request free of charge. See the document IAEA-NDS-7 for a list of data libraries available. Please note, that most of these data libraries are so large that they can be sent only on magnetic tape. When requesting data libraries, please make sure that your mainframe computer, on which the magnetic tapes will be read, has a link to a Personal Computer for writing selected data to diskettes. Only smaller data libraries of the order of 10000 records or selective retrievals from the larger libraries, are suitable for distribution on diskettes.

Output Report VIRGIN

UNCOLLIDED (I.E VIRGIN) FLUX AND REACTION CALCULATION (VIRGIN 86-1)

PROBLEM TITLE

VIRGIN TEST PROBLEM USING NATURAL IRON
OUTPUT FROM LINEAR/RECENT/SIGMA1 (293 KELVIN)

Contents of the diskettes

Diskette No.	Contents
IAEA/NDS-D69/1	MIXER.EXE VIRGIN.EXE RECENT.EXE COMPLOT.EXE EVALPLOT.EXE
IAEA/NDS-D69/2	SIGMA1.EXE GROUPIE.EXE CONVERT.EXE DICTION.EXE LEGEND.EXE MERGER.EXE RELABEL.EXE FIXUP.EXE
IAEA/NDS-D69/3	LINEAR.EXE n.BAT (14 batch files) n.INP (12 input parm.files) ENDFB.CIG
IAEA/NDS-D69/4	LEGEND.FOR MERGER.FOR VIRGIN.FOR COMPLOT.FOR FIXUP.FOR
IAEA/NDS-D69/5	LINEAR.FOR SIGMA1.FOR GROUPIE.FOR CONVERT.FOR DICTION.FOR RELABEL.FOR
IAEA/NDS-D69/6	MIXER.FOR RECENT.FOR EVALPLOT.FOR PLOTPACK.FOR EXIT.FOR
IAEA/NDS-D69/7	ENDFB.DIK NI60V5.DAT ENDFB.REC ENDFB.SIG

CM 0 0 + 0 1.0000+ 0 2.0000+ 0 3.0000+ 0 4.0000+ 0 5.0000+ 0 6.0000+ 0 7.0000+ 0 8.0000+ 0 9.0000+ 0 1.0000+ 1

ENERGY	AV(XC)	AV(XC)	AV(XC)	AV(XC)	AV(XC)	AV(XC)	AV(XC)	AV(XC)	AV(XC)	AV(XC)
2 5000- 2	1 4077+ 1	1 4077+ 1	1 4077+ 1	1 4077+ 1	1 4077+ 1	1 4077+ 1	1 4077+ 1	1 4077+ 1	1 4077+ 1	1 4077+ 1
2 5600- 2	1 2824+ 1	1 2791+ 1	1 2762+ 1	1 2735+ 1	1 2712+ 1	1 2691+ 1	1 2672+ 1	1 2655+ 1	1.2640+ 1	1 2626+ 1
2 1500- 1	1 2226+ 1	1 2225+ 1	1 2224+ 1	1 2222+ 1	1 2221+ 1	1.2220+ 1	1 2218+ 1	1.2217+ 1	1.2216+ 1	1 2215+ 1
4 6500- 1	1 1998+ 1	1 1997+ 1	1 1997+ 1	1 1996+ 1	1 1996+ 1	1 1995+ 1	1 1994+ 1	1 1994+ 1	1 1993+ 1	1.1993+ 1
1 0000+ 0	1 1842+ 1	1 1842- 1	1 1841+ 1	1 1841+ 1	1 1841+ 1	1 1841+ 1	1 1840+ 1	1 1840+ 1	1 1840+ 1	1 1839+ 1
2 1500+ 0	1 1733+ 1	1 1733+ 1	1 1733+ 1	1 1733+ 1	1 1733+ 1	1 1732+ 1	1 1732+ 1	1 1732+ 1	1 1732+ 1	1.1732+ 1
4 6500+ 0	1 1654+ 1	1 1654+ 1	1 1654+ 1	1 1654+ 1	1 1654+ 1	1 1654+ 1	1 1654+ 1	1 1654+ 1	1 1654+ 1	1 1654+ 1
1 0000+ 1	1 1591+ 1	1 1591+ 1	1 1591+ 1	1 1591+ 1	1 1591+ 1	1 1591+ 1	1 1591+ 1	1 1591+ 1	1 1591+ 1	1 1591+ 1
2 1500+ 1	1 1527+ 1	1 1527+ 1	1 1526+ 1	1 1526+ 1	1 1526+ 1	1 1526+ 1	1 1526+ 1	1 1526+ 1	1 1526+ 1	1 1526+ 1
4 6500+ 1	1 1437+ 1	1 1437+ 1	1 1437+ 1	1 1436+ 1	1 1436+ 1	1 1436+ 1	1 1436+ 1	1 1436+ 1	1 1435+ 1	1 1435+ 1

Contents of this document

Output Report: LEGEND

```
LINEARIZED ANGULAR DISTRIBUTIONS FROM LEGENDRE COEFFICIENTS OR TABULATIONS IN ENDF/B FORMAT (LEGEND 87-1)
-------------------------------------------------------------------------------------------------------
ALLOWABLE ACCURACY---------- 1 00000- 3 (   0 100 PERCENT)
MAXIMUM NUMBER OF COSINES--- 101 (LEGENDRE COEFFICIENT RECONSTRUCTION)
TABULATED DATA-------------LINEARIZE/THIN - OUTPUT TABLES
LEGENDRE DATA- -------------TABULATE      - OUTPUT COEFFICIENTS
NEGATIVE DATA CORRECTION----TABULATED DATA - NONE
                            LEGENDRE COEFFICIENTS - MODIFY COEFFICIENTS BY UP TO 1 PER-CENT
COEFFICIENT TESTS----------ON
-------------------------------------------------------------------------------------------------------
MINIMUM ALLOWABLE CROSS SECTION AND MAXIMUM ALLOWABLE COEFFICIENT CHANGE
-----------------------------------------------------------------------
```

Summary of ENDF/B Pre-Processing codes for use on a Personal Computer (PC)

The ENDF/B Pre-Processing codes are designed to be a modular set of computer codes each of which reads Evaluated Nuclear data in the ENDF/B format, processes the data and outputs it in the ENDF/B format. Each code performs one or more independent operations on the data, described below.

Codes in the order in which they are normally used

Code	Version	File size (Kbytes)	Purpose
MERGER	86-1	53	Retrieve and/or merge Evaluated data
LINEAR	87-1	223	Linearize Cross Sections
RECENT	87-1	300	Cross Sections from Resonance Parameters
SIGMA1	86-1	346	Doppler Broaden Cross Sections
LEGEND	87-1	121	Calculate/Correct Angular Distributions
FIXUP	86-2	171	Correct format and Cross Sections (MF=3)
GROUPIE	86-2	269	Group Averages and Multiband Parameters
DICTION	86-1	86	Create Reaction Dictionary (in MF=1, MT=451)
MIXER	86-1	200	Mixtures of Cross Sections
VIRGIN	86-1	132	Transmitted Uncollided Flux and Reaction Rates
COMPLOT	86-2	275	Plot comparisons of 2 Evaluated Data sets
EVALPLOT	86-1	248	Plot Evaluated data (MF=3, 4, 5)
RELABEL	86-1	100	Relabel and resequence computer codes
CONVERT	86-1	36	Convert for Computer/Precision/Compiler

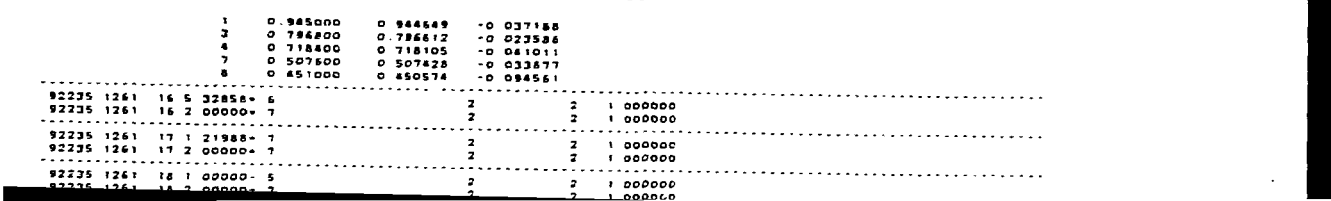
Additional subroutines to be included at Compile/Link stage.
See "Compiling and creating load modules on Personal Computers" below.

EXIT	Subroutine EXIT
PLOTPACK	Graphics Interface for Hewlett-Packard 7475A plotter

Personal Computers on which codes will operate

These codes on diskettes were developed for use on an IBM-PC-AT under the IBM Disk Operating System DOS-3.20 and require 512 Kilobytes of memory and a math co-processor. For practical use of these codes a hard disk drive is highly desirable. Compilation, linkage and execution is performed using the IBM Personal Computer Professional FORTRAN (PROFORT) by Ryan-McFarlane Corporation. The codes operate with Double Precision Arithmetic. The batch (BAT) files used for running the jobs may not conform with other PC operating systems and may need changes.

(WARNING...Codes on diskettes are only distributed on 1.2 Megabyte diskettes, which can only be used on a PC with 1.2 Megabyte disk drives, e.g. an IBM-PC-AT. Please do not request the codes on diskette if you have a normal IBM-PC or an IBM-PC-XT, since these PC's do not have 1.2 Megabyte disk drives).



Conversion for use on Computer/Compiler/Precision Combinations

As distributed for use on a personal Computer the codes are set up to use FORTRAN-77 conventions and DOUBLE PRECISION arithmetic.
Warning ... The codes must be run using DOUBLE PRECISION arithmetic.

Summary of contents of the ENDF/B Pre-Processing Diskettes

The ENDF/B Pre-Processing code package consists of 7 diskettes containing 61 files of information. Five different types of files are included on the diskettes.

Description	Type	Disk files
(1) FORTRAN codes (Source modules)	.FOR	16 files
(2) FORTRAN codes (Load modules)	.EXE	14 files
(3) Batch (BAT) files (Job control lanquage)	.BAT	14 files
(4) Input parameters	.INP	12 files
(5) Test data files	various	5 files

Warning ... Load modules are included with this package only to allow users to compare the compiler/loader output that they obtain, to our results.

Implementing and testing codes

The input parameters supplied for each code are designed to operate on the indicated Evaluated data and to produce the Output reports listed elsewhere in this report.

For details of the input parameters see the report IAEA-NDS-39 (Summary of ENDF/B Pre-Processing Codes)

In order to implement and test these codes it is suggested that the user,

(1) Compile (.FOR) and load each code,then execute (.BAT) using the Input (.INP) parameters and Evaluated data supplied with this code package. See "Compiling and creating load modules" below.

(2) Compare the Output reports with those included elsewhere in this report.


```
                WARNING...COEFFICIENT HAS DECREASED OR CHANGED SIGN
                L=  6 -7 07800- 5 AT E= 8 00000+ 6 EV TO  1.72050- 3 AT E= 1 00000+ 7 EV
                L=  7 -7 28220- 5 AT E= 8.00000+ 6 EV TO  2 94140- 4 AT E= 1.00000+ 7 EV
                L=  8 -5 90770- 5 AT E= 8 00000- 6 EV TO -5 49900- 5 AT E= 1 00000+ 7 EV
 92235 1261   63 1 40000+ 7    6                                        85    1 000670
                WARNING   COEFFICIENT HAS DECREASED OR CHANGED SIGN
                L=  8 -5 49900- 5 AT E= 1 00000+ 7 EV TO  1.43940- 4 AT E= 1 40000+ 7 EV
 92235 1261   63 2 00000+ 7    8                                        91    1 000922
 ----------------------------------------------------------------------------------------------------
 92235 1261   64 4 00000+ 6    8 (   1)                                 2    1 000000
 92235 1261   64 5 00000+ 6    8 (   1)                                 2    1 000000
 92235 1261   64 6 00000+ 6    8                                        6    1 000587
                WARNING   AT E= 6 00000+ 6 EV COEFFICIENTS DO NOT DECREASE WITH L
                L=  5  4.53540- 7 L=  6  5 1928C- 7
```

The codes were implemented on the PC in the following order, the ENDF/B output from the first code being the input to the next code, with the exceptions noted below.

Code	Batch file	ENDF/B input	ENDF/B output
MERGER	GOMERGER.BAT	ENDFB.CIG	ENDFB.MRG *
LINEAR	GOLINEAR.BAT	NI60V5.DAT	ENDFB.LIN *
RECENT	GORECENT.BAT	ENDFB.LIN	ENDFB.REC *
SIGMA1	GOSIGMA1.BAT	ENDFB.REC	ENDFB.SIG *
GROUPIE	GOGROUPY.BAT	ENDFB.SIG	ENDFB.GRO *
EVALPLOT	GOEVALPL.BAT	ENDFB.SIG	Graphics
COMPLOT	GOCOMPLO.BAT	ENDFB.REC ENDFB.SIG	Graphics
VIRGIN	GOVIRGIN.BAT	ENDFB.DIK	List
MIXER	GOMIXER.BAT	ENDFB.DIK	ENDFB.MIX
LEGEND	GOLEGEND.BAT	ENDFB.CIG	ENDFB.LEG *
FIXUP	GOFIXUP.BAT	ENDFB.LEG	ENDFB.FIX *
DICTION	GODICTN.BAT	ENDFB.FIX	ENDFB.DIC *
CONVERT	GOCONVRT.BAT	RECENT.FOR	CONVERT.FOR *
RELABEL	GORELABE.BAT	RECENT.FOR	RECENT.NEW *

* - created during execution and not included in this package.

The input parameters for each code are in the .INP file. The appropriate .INP file is preceded with the code name e.g. RECENT.INP.
DICTION & RELABEL require no input parameters and therefore have no .INP files.

Compiling and creating load modules on Personal Computers

Compilation and linking will vary from Operating Systems and Compilers depending on the configuration the user employs. As mentioned above this package was developed using IBM DOS-3.20 and the PROFORT Compiler of Ryan-McFarlane Corporation.

For all the codes except EVALPLOT & COMPLOT compile and include subroutine EXIT at the link stage, e.g.

```
PROFORT EXIT /L > EXIT.LST
PROFORT RECENT /L > RECENT.LST
LINK RECENT+EXIT;
```

This package includes a graphics interface for a Hewlett-Packard 7475A plotter. If you have this plotter you may use the interface routines in PLOTPACK. If you do not, you must provide your own interface.
For EVALPLOT & COMPLOT compile and include subroutines EXIT and PLOTPACK at the link stage, e.g.

```
PROFORT EXIT /L > EXIT.LST
PROFORT PLOTPACK /L > PLOTPACK.LST
PROFORT EVALPLOT /L > EVALPLOT.LST
LINK EVALPLOT+PLOTPACK+EXIT;
```


Output Report FIXUP

```
TEST AND CORRECT DATA IN THE ENDF/B FORMAT (FIXUP 86-2)
INTERPRETATION OF INPUT TEST/CORRECTION OPTIONS
CORRECT ZA/AWR IN ALL SECTIONS---------- YES
CORRECT THRESHOLDS---------- YES (USE BUILT-IN TABLE)
EXTEND CROSS SECTION TO 20 MEV---------- YES (AS CONSTANT)
ALLOW CROSS SECTION DELETION---------- YES (USE BUILT-IN TABLE)
ALLOW CROSS SECTION RECONSTRUCTION------ YES (USE BUILT-IN TABLE)
MAKE ALL CROSS SECTIONS NON-NEGATIVE---- YES
```

Executing codes on Personal Computers

Each code has a batch file which is used to define all input and output files, to execute the code and to delete all scratch files after execution. After a code has been compiled and loaded it may be executed by typing the name of the batch file (NOT execution module), e.g.

```
GOLINEAR.BAT
```

Below is an example of a BAT (Job control) file used for executing the code RECENT. (Might vary from PC to PC)

```
SET FORT10 = ENDFB.LIN     ..... Input file

SET FORT11 = ENDFB.REC     ..... Output file

SET FORT12 = RECENT.SC1    ..... Scratch file

SET FORT14 = RECENT.SC2    ..... Scratch file

RECENT  /R 41000 < RECENT.INP > RECENT.LST   ... Execute code, read
                                             ... input parameters from
                                             ... RECENT.INP and write
                                             ... the output report on
                                             ... RECENT.LST.

DEL RECENT.SC1             ..... Delete scratch file

DEL RECENT.SC2             ..... Delete scratch file
```

Below is an example of a BAT (Job control) file used for executing the code COMPLOT. (Might vary from PC to PC)

```
SET FORT4  = COMPLOT.INP     ..... Input parameters

SET FORT10 = ENDFB.REC     ..... Input file

SET FORT11 = ENDFB.SIG     ..... Input file

SET FORT12 = RECENT.SC1    ..... Scratch file

SET FORT13 = RECENT.SC2    ..... Scratch file

SET FORT14 = RECENT.SC3    ..... Scratch file

COMPLOT  /R 41000 > COMPLOT.LST              ... Execute code, and
                                             ... write the output re-
                                             ... port on COMPLOT.LST

DEL COMPLOT.SC1            ..... Delete scratch file

DEL COMPLOT.SC2            ..... Delete scratch file

DEL COMPLOT.SC3            ..... Delete scratch file
```

The graphics output from codes COMPLOT & EVALPLOT was produced via the software interface PLOTPACK tc a Hewlett Packard 7475A Plotter. (See examples of plots elsewhere in this report).


```
DELETED  7 41178- 1 EV
DELETED  8.24820- 1 EV
DELETED  8 80575- 1 EV
DELETED  9.67173- 1 EV
DELETED  9 78115- 1 EV
DELETED  9.86322- 1 EV
DELETED  9.94529- 1 EV
DELETED  1.00737+ 0 EV
DELETED  1.01290+ 0 EV
DELETED  1 01659+ 0 EV
DELETED  1 02028+ 0 EV
DELETED  1 02396+ 0 EV
DELETED  1 02765+ 0 EV
```

Reporting errors

We are attempting to make these codes as compatible as possible for use with as many different Personal Computers as possible. In order to help us and to insure that future versions of these codes are as compatible as possible for use at your installation please report any (repeat, any) Compiler, Loader or execution diagnostics or problems to the author, describing the problem in as much detail as possible. Identify the version of the code (e.g. Version 86-1) that you are using and send the following information on diskette.

(1) A copy of the code you are using

(2) A copy of compiler diagnostics (if any)

(3) A copy of the JCL deck (BAT file) that executes the code

(4) A copy of the output report from the code

(5) A copy of the ENDF/B input and output data

If you are using one of the plotting codes please also send a copy of any Graphic output that you obtained.

Without ALL of this information it is impossible to exactly simulate the problem that you ran and to determine the source of your problem.

Code Documentation

For details of the Code Documentation see the report IAEA-NDS-39 (Summary of ENDF/B Pre-Processing Codes)

Output Reports

The remainder of this Report contains the ouput reports and graphics output obtained by running the example problems described above under "Implementing and testing codes".


```
DELETED  4.13650+ 0 EV
DELETED  4 18200+ 0 EV
DELETED  4.27300+ 0 EV
DELETED  4 36400+ 0 EV
DELETED  4 45450+ 0 EV
DELETED  4 54500+ 0 EV
DELETED  4 59050+ 0 EV
DELETED  4 63600+ 0 EV
DELETED  4 64660+ 0 EV
DELETED  4.65720+ 0 EV
DELETED  4.68338+ 0 EV
DELETED  4 69646+ 0 EV
DELETED  4 70955+ 0 EV
```

Output Report: MERGER

```
GE ENDF/B DATA INTO MAT/MF/MT ORDER (MERGER 86-1)
*****************************************************************
ERPRETATION OF INPUT PARAMETERS
*****************************************************************
QCED TAPE UNIT NUMBER------          11
TRIEVAL CRITERIA-----------         MAT
TRIEVAL REPORT UNIT NUMBER-           0 (REPORT WILL NOT BE WRITTEN)
---------------------------------------------------------------
QCED TAPE LABEL
---------------------------------------------------------------
)-235 FROM ENDF/B-IV LIBRARY                                2000
---------------------------------------------------------------
MERGED TAPE UNIT NUMBERS---          10
---------------------------------------------------------------
ETRIEVAL CRITERIA
---------------------------------------------------------------
EQUEST  =    LOWER LIMIT  =    UPPER LIMIT
UMBER   =     MAT  MF  MT  =     MAT  MF  MT
---------------------------------------------------------------
     1  =    1261   1 451  =    1261   1 451
     2  =    1261   3   1  =    1261   3   2
     3  =    1261   3  18  =    1261   3  18
     4  =    1261   3 102  =    1261   3 102
---------------------------------------------------------------
```

```
*****************************************************************
RETRIEVED DATA
*****************************************************************
    ZA  MAT MF  MT  CARDS  UNIT REQUEST MESSAGE
                             NUMBER
---------------------------------------------------------------
92235 1261  1 451   356     10       1
92235 1261  3   1   601     10       2
92235 1261  3   2   259     10       2
92235 1261  3  18   700     10       3
92235 1261  3 102   799     10       4
---------------------------------------------------------------
        MAT CARDS   2715
---------------------------------------------------------------
       TAPE CARDS   2720
---------------------------------------------------------------
```



```
DELETED  B 78395+ 0 EV
DELETED  B 78672+ 0 EV
DELETED  B 78944+ 0 EV
DELETED  B 79225+ 0 EV
DELETED  B 79594+ 0 EV
DELETED  B 79963+ 0 EV
DELETED  B 80331+ 0 EV
DELETED  B 80700+ 0 EV
DELETED  B 81069+ 0 EV
DELETED  B 81437+ 0 EV
DELETED  B 81806+ 0 EV
DELETED  B 82175+ 0 EV
```

RETRIEVAL STATISTICS

MERGED MATERIALS---- 1
MERGED SECTIONS---- 5
MERGED CARDS------- 2720

RETRIEVED DATA FOR EACH REQUEST

REQUEST NUMBER	LOWER LIMIT MAT	MF	MT	UPPER LIMIT MAT	MF	MT	MATERIALS	RETRIEVED SECTIONS	CARDS
1	1261	1	451	1261	1	451	1	1	356
2	1261	3	1	1261	3	2	1	2	860
3	1261	3	18	1261	3	18	1	1	700
4	1261	3	102	1261	3	102	1	1	799
TOTALS							1	5	2720

NOTE THE CARD COUNT OF RETRIEVED DATA FOR EACH REQUEST DOES NOT INCLUDE FEND, MEND AND TEND CARDS. THEREFORE THE TOTAL NUMBER OF CARDS ACTUALLY RETRIEVED AND WRITTEN ON THE MERGED TAPE WILL BE MORE THAN THE SUM OF THE NUMBER OF CARDS FOR ALL REQUESTS

Output Report. LINEAR

LINEARIZE ENDF/B CROSS SECTIONS (LINEAR 87-1)

RETRIEVAL CRITERIA---------- MAT
MINIMUM ENERGY SPACING------- 5 DIGITS (NO LONGER AN INPUT OPTION)
ENERGY OUTPUT FORMAT--------- VARIABLE (NO LONGER AN INPUT OPTION)
MINIMUM CROSS SECTION-------- 1.00000-10
KEEP EVALUATED DATA POINTS--- NO

MAT RANGES

MINIMUM	MAXIMUM
0	9999

ALLOWABLE ERROR

ENERGY	ERROR	PER-CENT
0.00000+0	1.00000-3	0.100

TAPE LABEL

0 0 LARSON 81-60 TEST Evaluation WITH REICH-MOORE PARAMETERS 0

SA	MAT	MT	ENDF/B FORMAT	KELVIN	Q-VALUE EV	POINTS IN	POINTS OUT
28060	2222	1	V	0.00000+0	0.00000+0	2	2
28060	2222	2	V	0.00000+0	0.00000+0	2	2
28060	2222	102	V	0.00000+0	8.60000+6	2	2
					MAT TOTALS	6	6
					TAPE TOTALS	6	6

DELETED 1.18502+4 1 EV.
DELETED 1.16551+4 1 EV.
DELETED 1 16599+4 1 EV
DELETED 1 16647+4 1 EV
DELETED 1 16695+4 1 EV
DELETED 1.16743+4 1 EV
DELETED 1 16791+4 1 EV
DELETED 1 16827+4 1 EV.
DELETED 1.16863+4 1 EV
DELETED 1 16900+4 1 EV
DELETED 1 16936+4 1 EV
DELETED 1 16972+4 1 EV
DELETED 1 17008+4 1 EV

Output Report: RECENT

```
ROSS SECTIONS FROM RESONANCE PARAMETERS (RECENT 87-1)
RITERIA---------- MAT
NIMUM CROSS SECTION- 1.000000-10
WITH NO BACKGROUND- OUTPUT (RESONANCE CONTRIBUTION)
ERGY SPACING------ 9 DIGITS (NO LONGER AN INPUT OPTION)
PUT FORMAT-------- VARIABLE (NO LONGER AN INPUT OPTION)
EDIT MODE--------- CALCULATE (LIST RESONANCE PARAMETERS,
ESONANCE TREATMENT- EXACT (NO LONGER AN INPUT OPTION)
ODE--------------- OFF
 MAT RANGES
UM       MAXIMUM
 0        9999
RECONSTRUCTION ERROR
ERGY      ERROR    PER-CENT
          1.000
00+ 0 1.000000- 2
 TAPE LABEL
 LARSON NI-60 TEST EVALUATION WITH REICH-MOORE PARAMETERS
 LARSON NI-60 MAT= 2222
SSING  28-NI- 60 MAT= 1, MT=451
) ON THE FORMAT AND CONTENTS OF MF=1, MT=451
END/B- V FORMAT
MATERIAL IS NOT FISSILE (LFI=0)
RESONANCE PARAMETERS ARE GIVEN (LRP=1)
TING OF ALL RESONANCES PARAMETERS
MENT OR MATERIAL---------- 28-NI- 60
NIC WEIGHT RATIO---------- 5.94150+ 1
BER OF ISOTOPES----------- 1
OTOPE NUMBER-------------- 28-NI- 60
OTOPE------------------------ 1.000000+ 0
RACTIONAL ABUNDANCE------------ 0 (NO FISSION WIDTHS)
FR---------------------------- 1
UMBER OF ENERGY RANGES---------- 1.50000+ 5 EV
OWER LIMIT OF THE ENERGY RANGE--- 2.10000+ 5 EV
PPER LIMIT OF THE ENERGY RANGE--- 1 (RESOLVED REGION)
LRU--------------------------- 3 (REICH-MOORE)
LRF--------------------------- 0 (ENERGY INDEPENDENT SCATTERING RADIUS)
NRO--------------------------- 0.000000+ 0
NUCLEAR SPIN OF TARGET---------- 1
EFFECTIVE SCATTERING RADIUS (AP)- 6.00000- 1
NUMBER OF L VALUES-------------- 3
ATOMIC WEIGHT RATIO OF ISOTOPE--- 5.94150+ 1
EFFECTIVE SCATTERING RADIUS (A-)- 0.000000+ 0
ANGULAR MOMENTUM (L)------------ 0
NUMBER OF RESONANCES------------ 17
REICH-MOORE RESONANCE PARAMETERS
   ENERGY  J VALUE    NEUTRON     CAPTURE  FISSION-1  FISSION-2
    (EV)              (EV)        (EV)       (EV)
 1.24870+ 4    0.50  2.35600+ 3 4.30000+ 0 0.00000+ 0 0.00000+ 0
 8.55370+ 4    0.50  3.98000+ 2 8.00000- 1 0.00000+ 0 0.00000+ 0
 9.60850+ 4    0.50  1.00200+ 3 1.50000+ 0 0.00000+ 0 0.00000+ 0
 1.07850+ 5    0.50  6.49000+ 2 1.15000+ 1 0.00000+ 0 0.00000+ 0
 1.56360+ 5    0.50  1.32500+ 3 5.00000- 1 0.00000+ 0 0.00000+ 0
 1.61740+ 5    0.50  5.23700+ 3 4.00000+ 0 0.00000+ 0 0.00000+ 0
 1.85510+ 5    0.50  3.02500+ 3 1.80000+ 1 0.00000+ 0 0.00000+ 0
 1.97640+ 5    0.50  9.80000+ 0 6.00000- 1 0.00000+ 0 0.00000+ 0
 2.00590+ 5    0.50  5.36000+ 2 1.37000+ 0 0.00000+ 0 0.00000+ 0
 2.51990+ 5    0.50  8.70000+ 2 7.00000- 1 0.00000+ 0 0.00000+ 0
 2.56120+ 5    0.50  1.82500+ 3 6.80000- 1 0.00000+ 0 0.00000+ 0
 2.57630+ 5    0.50  2.25000+ 2 4.50000- 1 0.00000+ 0 0.00000+ 0
 2.78930+ 5    0.50  1.40000+ 3 7.10000- 1 0.00000+ 0 0.00000+ 0
 2.91920+ 5    0.50  2.78600+ 3 1.50000+ 0 0.00000+ 0 0.00000+ 0
 3.17020+ 5    0.50  7.08600+ 3 2.50000+ 0 0.00000+ 0 0.00000+ 0
 3.25520+ 5    0.50  3.56300+ 3 3.00000+ 0 0.00000+ 0 0.00000+ 0
 3.28480+ 5    0.50  3.56300+ 3
ATOMIC WEIGHT RATIO OF ISOTOPE------ 5.94150+ 1
EFFECTIVE SCATTERING RADIUS (A-)----- 0.000000+ 0
ANGULAR MOMENTUM (L)----------------- 1
NUMBER OF RESONANCES----------------- 5
REICH-MOORE RESONANCE PARAMETERS
   ENERGY  J VALUE    NEUTRON     CAPTURE  FISSION-1  FISSION-2
    (EV)              (EV)        (EV)       (EV)
 1.60220+ 5    0.50  2.04000+ 1 7.00000- 1 0.00000+ 0 0.00000+ 0
 1.74590+ 5    0.50  1.23000+ 1 4.80000- 1 0.00000+ 0 0.00000+ 0
 1.78900+ 5    0.50  1.60000+ 0 1.00000+ 0 0.00000+ 0 0.00000+ 0
 1.92590+ 5    1.50  4.15000+ 1 7.90000- 1 0.00000+ 0 0.00000+ 0
 1.94190+ 5    1.50  1.33000+ 1 1.80000+ 0 0.00000+ 0 0.00000+ 0
ATOMIC WEIGHT RATIO OF ISOTOPE------ 5.94150+ 1
EFFECTIVE SCATTERING RADIUS (A-)----- 0.000000+ 0
ANGULAR MOMENTUM (L)----------------- 2
NUMBER OF RESONANCES----------------- 3
REICH-MOORE RESONANCE PARAMETERS
   ENERGY  J VALUE    NEUTRON     CAPTURE  FISSION-1  FISSION-2
    (EV)              (EV)        (EV)       (EV)
 1.76000+ 5    1.50  7.07000+ 1 1.35000+ 0 0.00000+ 0 0.00000+ 0
 1.85000+ 5    1.50  6.53000+ 1 9.70000- 1 0.00000+ 0 0.00000+ 0
 2.05000+ 5    2.50  4.32000+ 1 5.80000- 1 0.00000+ 0 0.00000+ 0
RECONSTRUCTING CROSS SECTIONS FROM RESONANCE PARAMETERS
RESOLVED ENERGY REGION
   E-LOW     E-HIGH    POINTS
    (EV)      (EV)    GENERATED
 1.50000+ 5 2.10000+ 5    1070
ENTIRE RESONANCE REGION   1070 POINTS
COMBINING FILE 2 AND FILE 3 DATA
REACTION    FILE 2   FILE 3   COMBINED
            POINTS   POINTS   POINTS COMMENTS
```



```
DELETED  1.26429+ 1 EV
DELETED  1.26435+ 1 EV
DELETED  1.26440+ 1 EV
DELETED  1.26444+ 1 EV
DELETED  1.26448+ 1 EV
DELETED  1.26465+ 1 EV
DELETED  1.26482+ 1 EV
DELETED  1.37597+ 1 EV
DELETED  1.37732+ 1 EV
DELETED  1.37769+ 1 EV
DELETED  1.37786+ 1 EV
DELETED  1.37792+ 1 EV
DELETED  1.37794+ 1 EV
DELETED  1.37779+ 1 EV
```

```
  TOTAL        1070          2        1072 BACKGROUND IS ZERO AT ALL ENERGIES
 ELASTIC       1070          2        1072 BACKGROUND IS ZERO AT ALL ENERGIES.
 CAPTURE       1070          2        1072 BACKGROUND IS ZERO AT ALL ENERGIES
```

END OF ENDF/B INPUT DATA

CORE ALLOCATION AND REQUIREMENTS

	SECTIONS	NODES	PARAMETER STORAGE
ALLOCATED	200	1002	1002
REQUIRED	3	15	25

END OF RUN

Output Report. SIGMA1

DOPPLER BROADEN ENDF/B CROSS SECTIONS (SIGMA1 86-1) ITERATIVE SOLUTION

RETRIEVAL CRITERIA----------	MAT
MINIMUM ENERGY SPACING-------	8 DIGITS (NO LONGER AN INPUT OPTION)
ENERGY OUTPUT FORMAT---------	VARIABLE (NO LONGER AN INPUT OPTION)
TEMPERATURE-----------------	5 00000+ 2 KELVIN
MONITOR MODE----------------	ON

MAT RANGES

MINIMUM	MAXIMUM
0	9999

ACCURACY CRITERIA

CALCULATION ENERGY	CALCULATION ACCURACY	CALCULATION PER-CENT	THINNING ENERGY	THINNING ACCURACY	THINNING PER-CENT
0.0	+ 0 1.00000- 2	1.000	0.0	+ 0 1.00000- 2	1.000

TAPE LABEL

D C. LARSON NI-60 TEST EVALUATION WITH REICH-MOORE PARAMETERS 0

ZA	MAT	MT	ENDF/B FORMAT	KELVIN IN	Q-VALUE EV	POINTS IN	POINTS OUT	UNRESOLVED REGION E-LOW	E-HIGH
28060	2222	1	V	0.0	+ 0 0.0	+ 0	1072	567	
28060	2222	2	V	0.0	+ 0 0.0	+ 0	1072	565	
28060	2222	102	V	0.0	+ 0 8.60010+ 6		1072	804	
					MAT TOTALS	3216	1936		NONE
					TAPE TOTALS	3216	1936		

Output Report GROUPIE

MULTI-GROUP AND MULTI-BAND PARAMETERS FROM ENDF/B CROSS SECTIONS (GROUPIE 86-2)

RETRIEVAL CRITERIA----------	MAT
NUMBER OF ENERGY GROUPS------	4 (FROM INPUT)
MAXIMUM NUMBER OF BANDS/GROUP-	0
POINTS IN WEIGHTING SPECTRUM--	2 (FLAT WEIGHTED)
BAND SELECTION CRITERIA------	1.00000- 3 (0.100 PER-CENT)
SIGMA-0 DEFINITION----------	MULTIPLIER (MULTIPLE OF UNSHIELDED TOTAL IN EACH GROUP)
SELF-SHIELDED LISTING--------	NO
MULTI-BAND LISTING----------	NO
MULTI-BAND FILE-------------	NO
UNSHIELDED AVERAGES IN ENDF/B-	YES (HISTOGRAM)
UNSHIELDED AVERAGES LISTING---	NO

MULTI-BAND LIBRARY IDENTIFICATION

GROUPIE TEST PROBLEM

MAT RANGES

MINIMUM	MAXIMUM
0	9999

GROUP ENERGY BOUNDARIES

ENERGY-EV	ENERGY-EV	ENERGY-EV	ENERGY-EV	ENERGY-EV	ENERGY-EV
1.00000+ 5	1.70000+ 5	1.80000+ 5	1.90000+ 5	2.00000+ 5	

ENDF/B TAPE LABEL

D. C LARSON NI-60 TEST EVALUATION WITH REICH-MOORE PARAMETERS 0

ISOTOPE	MAT	ENDF/B FORMAT	KELVIN	TOTAL POINTS	ELASTIC POINTS	CAPTURE POINTS	FISSION POINTS	OTHER POINTS
28060	2222	V	3.00000+ 2	567	565	804	0	0
			TOTALS	567	565	804	0	0

WARNING... MINIMUM TOTAL CROSS SECTION IN ABOVE MATERIAL IS
0.00000+ 0 BARNS. ALL ENERGY INTERVALS IN WHICH TOTAL IS LESS THAN
1.00000- 3 BARNS WILL BE IGNORED IN CALCULATIONS.

NOTE..OTHER POINTS = NUMBER OF OTHER POINTS PROCESSED.
THIS WILL ALWAYS BE ZERO UNLESS UNSHIELDED OUTPUT IS REQUESTED.

[redacted]


```
DELETED  1.53640+ 1 EV.
DELETED  1.54550+ 1 EV
DELETED  1.55000+ 1 EV.
DELETED  1.55450+ 1 EV
DELETED  1.55905+ 1 EV
DELETED  1.56360+ 1 EV
DELETED  1.57270+ 1 EV.
DELETED  1.58180+ 1 EV
DELETED  1.58407+ 1 EV
DELETED  1.58635+ 1 EV
DELETED  1.58862+ 1 EV
DELETED  1.59090+ 1 EV
DELETED  1.59431+ 1 EV
```

Output Report: EVALPLOT

PLOT EVALUATED DATA FROM THE ENDF/B FORMAT (EVALPLOT 86-1)

INPUT PARAMETERS

GRID (SPEED) OPTION	FINE
PLOT CROSS SECTION, PARAMETERS AND NU BAR (FILES 1,3)	YES
PLOT ANGULAR DISTRIBUTIONS (FILE 4)	NO
PLOT ENERGY DISTRIBUTIONS (FILE 5)	NO
ENDF/B DATA SORTED ORDER	NONE
LOWER ZA LIMIT	0
UPPER ZA LIMIT	99999
CROSS SECTION TEMPERATURE ON PLOTS	YES
IGNOR CROSS SECTIONS IF MAXIMUM LESS THAN 1 MILLIBARN	NO
PLOT SIZE (X BY Y)	15.000 BY 10 500 INCHES
SMALL PLOT MODE	OFF
OPERATING MODE	BATCH (WITHOUT MASTER PLOTS)
LOWER ENERGY LIMIT OF MASTER PLOTS	1 00000- 2 EV (DEFAULT VALUE)

EXPANDED PLOT REQUESTS

MATERIALS ZA-LOW	ZA-HIGH	DATA TYPE	ENERGY RANGE LOWER-EV	UPPER-EV	CROSS SECTION RANGE LOWER-BARNS	UPPER-BARNS	PLOT MODE
0	99999	1	1 51000+ 5	2.09000+ 5	0.00000+ 0	0.00000+ 0	0

TAPE LABEL

D. C. LARSON NI-60 TEST EVALUATION WITH REICH-MOORE PARAMETERS 0

PLOT REPORT

MATERIAL	MAT	TABLES MF1	MF3	MF4	MF5	PLOTS MF1	MF3	MF4	MF5	STARTING PLOT
28-NI- 60	2222	0	3	0	0	0	1	0	0	1
TOTALS		0	3	0	0	0	1	0	0	1

Output Report: COMPLOT

COMPARISON OF EVALUATED DATA (COMPLOT 86-2)

RETRIEVAL CRITERIA	MAT
ALLOWABLE DIFFERENCE	0.0010 (0 10 PER-CENT)
PLOT SIZE (X BY Y)	15 00 BY 10 50 INCHES
SMALL PLOT MODE	OFF
GRID (SPEED) OPTION	FINE
PLOT MODE	CROSS SECTION OVER CROSS SECTION OVER RATIO

DATA IDENTIFICATIONS

DATA1=RECENT
DATA2=SIGMA1

REQUEST RANGES

MINIMUM MAT	MT	ENERGY-EV	MAXIMUM MAT	MT	ENERGY-EV	IDENTIFY DATA POINTS
0	2	1.51000+ 5	9999	2	2.09000+ 5	NO

NO EQUIVALENCES

ENDF/B TAPE LABELS

DATA1= D C LARSON NI-60 TEST EVALUATION WITH REICH-MOORE PARAMETERS 0
DATA2= D C LARSON NI-60 TEST EVALUATION WITH REICH-MOORE PARAMETERS 0

MATERIAL	MT	MAT1	MAT2	POINT1	POINT2	ENERGY RANGE (EV) MINIMUM	MAXIMUM	MAXIMUM PER-CENT DIFFERENCES NEGATIVE	POSITIVE	CROSS SECTION (BARNS) AT POINTS OF MAXIMUM PER-CENT DIFFERENCE DATA1	DATA2	DATA1	DATA2
28-NI- 60	2	2222	2222	1064	402	1.5100+ 5	2.0900+ 5	-82.214	*4209 417 *	6.02682+ 0	1.07193+ 0	2.06071- 1	8.88046+ 0

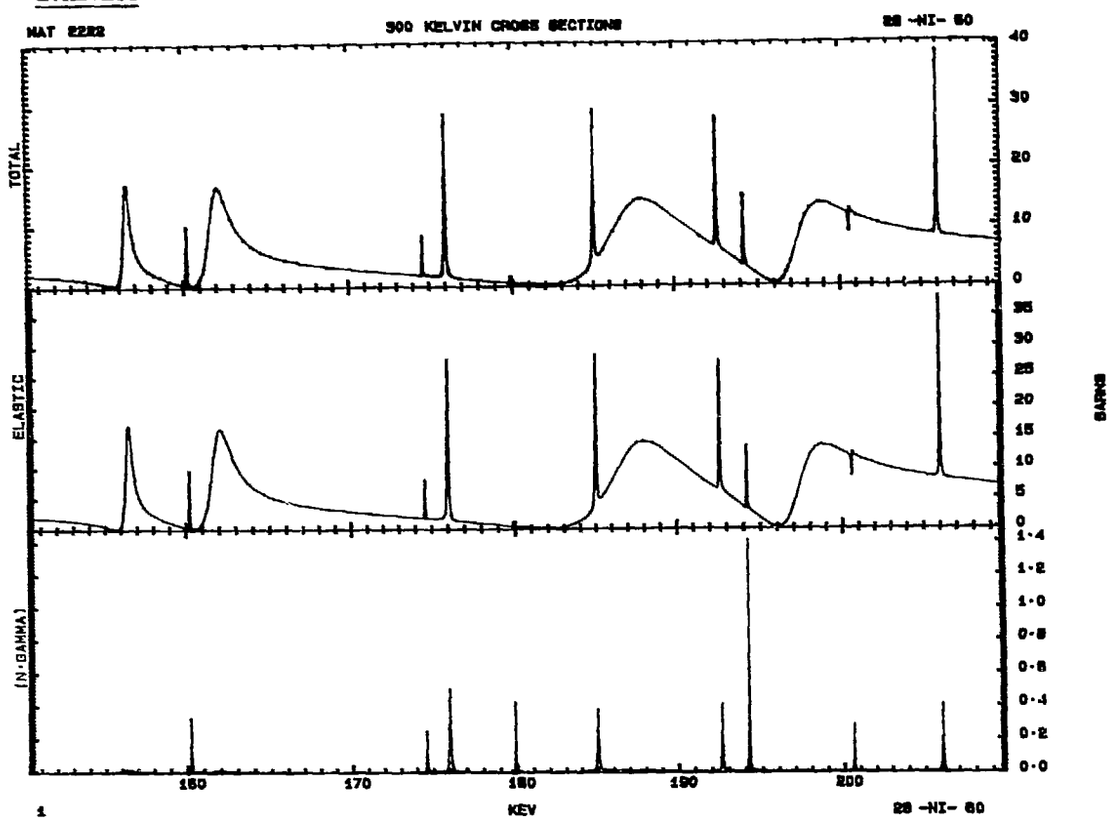
1 PLOTS GENERATED

* - INDICATES DIFFERENCE EXCEEDS 0.10 PER-CENT

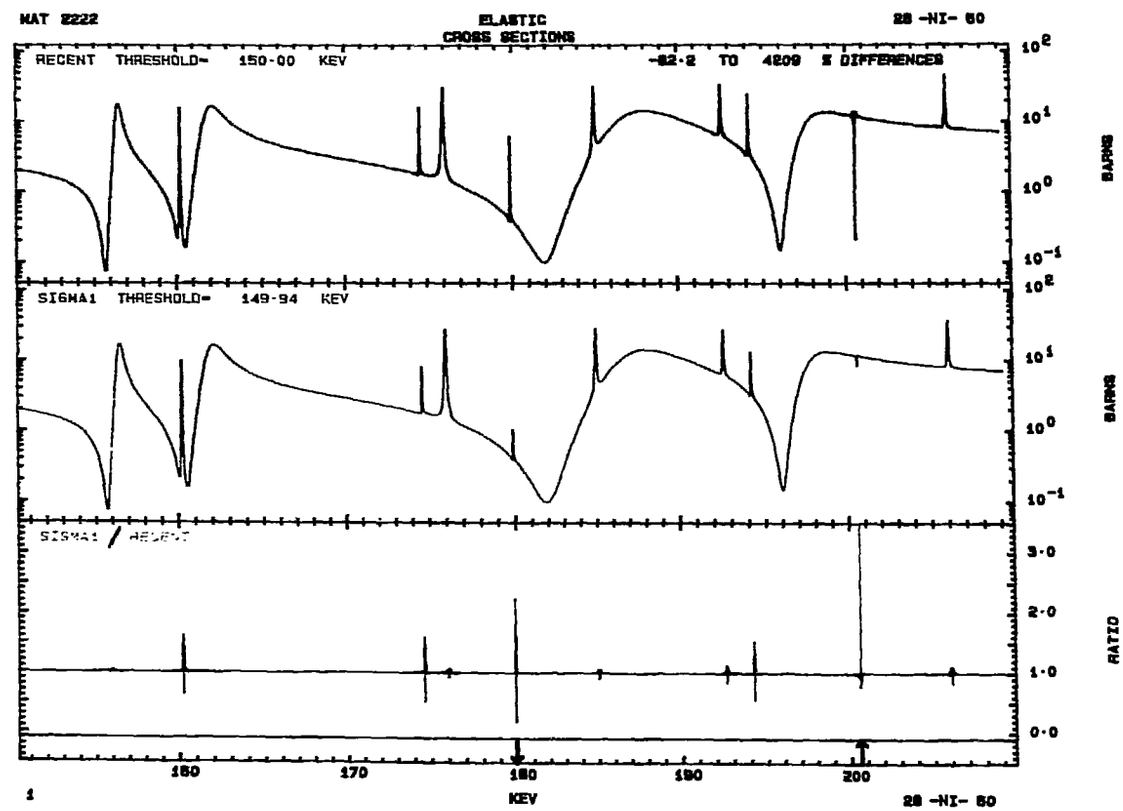
PER-CENT DIFFERENCE = 100 * ((DATA1-DATA2)/DATA1) AT EACH ENERGY POINT
MAXIMUM PER-CENT DIFFERENCE = LARGEST PER-CENT DIFFERENCE AT ANY ONE OR MORE ENERGY POINTS

DELETED 1.93691+ 1 EV
DELETED 1.93810+ 1 EV
DELETED 1.93949+ 1 EV
DELETED 1.94088+ 1 EV
DELETED 1.94365+ 1 EV
DELETED 1.94730+ 1 EV
DELETED 1.95000+ 1 EV
DELETED 1.95270+ 1 EV
DELETED 1.95520+ 1 EV
DELETED 1 95770+ 1 EV
DELETED 1.96145+ 1 EV
DELETED 1 97020+ 1 EV
DELETED 1.97497- - -

EVALPLOT



COMPLOT




```
                DELETED  2.61260+ 1 EV
E= 2.62870+ 1 EV  CROSS SECTION=-4.91311+ 0 (SET TO ZERO)
E= 1.30558+ 4 NEXT POINT E= 2.62870+ 1 DELETED
E= 2 64480+ 1 EV  CROSS SECTION=-1 62516+ 0 (SET TO ZERO)
E= 2 64940+ 1 EV  CROSS SECTION=-1 21224+ 0 (SET TO ZERO)
E= 2.65400+ 1 EV  CROSS SECTION=-1 01802+ 0 (SET TO ZERO)
E= 2.67700+ 1 EV  CROSS SECTION=-7 49527- 1 (SET TO ZERO)
E= 2 70000+ 1 EV  CROSS SECTION=-4.25261- 1 (SET TO ZERO)
E= 2 70690+ 1 EV  CROSS SECTION=-2.58006- 1 (SET TO ZERO)
E= 2 71380+ 1 EV  CROSS SECTION=-1 06737- 1 (SET TO ZERO)
E= 2 74598+ 1 EV  CROSS SECTION=-1 06820- 6 (SET TO ZERO)
E= 2 81033+ 1 EV  CROSS SECTION=-4 62809- 7 (SET TO ZERO)
```

Output Report: VIRGIN

COLLIDED (I.E. VIRGIN) FLUX AND REACTION CALCULATION (VIRGIN 86-1)

PROBLEM TITLE

VIRGIN TEST PROBLEM USING NATURAL IRON.
INPUT FROM LINEAR/RECENT/SIGMA1 (293 KELVIN)

INTERPRETATION OF INPUT PARAMETERS

TARGET ZA	26000	
REACTION MT	1	
ALLY GROUPS	28	(ABBN)
SPECTRUM POINTS	2	(CONSTANT)
THICKNESSES	10	
MAXIMUM THICKNESS	1.00000+ 1	CM
DENSITY	1.00000+ 1	GRAMS/CC
FLUX NORMALIZATION	1/GROUP	
REACTION NORMALIZATION	1/GROUP	
AVIDITY NORMALIZATION	NONE	
TOTAL POINTS	8373	
REACTION POINTS	8373	

CM 0.0 + 0 1.0000+ 0 2.0000+ 0 3.0000+ 0 4.0000+ 0 5.0000+ 0 6.0000+ 0 7.0000+ 0 8.0000+ 0 9.0000+ 0 1.0000+ 1

ENERGY	FLUX	FLUX	FLUX	FLUX	FLUX	FLUX	FLUX	FLUX	FLUX	FLUX	FLUX
2.5000- 2	1.0000+ 0	6.8023- 2	2.3063- 3	1.1076- 4	5.3192- 6	2.5545- 7	1.2268- 8	5.8918-10	2.8295-11	1.3589-12	6.5263-14
2.5600- 2	1.0000+ 0	6.2157- 2	2.9156- 3	1.6518- 4	1.0674- 5	6.9211- 8	4.5129- 9	2.9502-10	1.9346-11	1.2726-12	
2.1500- 1	1.0000+ 0	7.1596- 2	5.1276- 3	3.6732- 4	2.6322- 5	1.8867- 6	1.3528- 7	9.7016- 9	6.9600-10	4.9944-11	3.5849-12
4.6500- 1	1.0000+ 0	7.5204- 2	5.6563- 3	4.2550- 4	3.2011- 5	2.4086- 6	1.8126- 7	1.3642- 8	1.0269- 9	7.7307-11	5.8206-12
1.0000+ 0	1.0000+ 0	7.7776- 2	6.0495- 3	4.7057- 4	3.6606- 5	2.8477- 6	2.2156- 7	1.7238- 8	1.3413- 9	1.0437-10	8.1226-12
2.1500+ 0	1.0000+ 0	7.9624- 2	6.3400- 3	5.0484- 4	4.0200- 5	3.2012- 6	2.5493- 7	2.0302- 8	1.6168- 9	1.2877-10	1.0256-11
4.6500+ 0	1.0000+ 0	8.0985- 2	6.5585- 3	5.3116- 4	4.3019- 5	3.4841- 6	2.8219- 7	2.2854- 8	1.8511- 9	1.4993-10	1.2144-11
1.0000+ 1	1.0000+ 0	8.2097- 2	6.7398- 3	5.5333- 4	4.5429- 5	3.7297- 6	3.0622- 7	2.5141- 8	2.0642- 9	1.6948-10	1.3916-11
2.1500+ 1	1.0000+ 0	8.3245- 2	6.9304- 3	5.7696- 4	4.8032- 5	3.9989- 6	3.3293- 7	2.7719- 8	2.3078- 9	1.9215-10	1.5999-11
4.6500+ 1	1.0000+ 0	8.4873- 2	7.2038- 3	6.1148- 4	5.1905- 5	4.4062- 6	3.7405- 7	3.1755- 8	2.6961- 9	2.2892-10	1.9431-11
1.0000+ 2	1.0000+ 0	8.7843- 2	7.7173- 3	6.7812- 4	5.9597- 5	5.2385- 6	4.6055- 7	4.0498- 8	3.5613- 9	3.1325-10	2.7557-11
2.1500+ 2	1.0000+ 0	9.5166- 2	9.0700- 3	8.6572- 4	8.2756- 5	7.9224- 6	7.5960- 7	7.2936- 8	7.0140- 9	6.7548-10	6.5152-11
4.6500+ 2	1.0000+ 0	1.2133- 1	1.4861- 2	1.8273- 3	2.2925- 4	2.8862- 5	3.6645- 6	4.6812- 7	6.0518- 8	7.8641- 9	1.0288- 9
1.0000+ 3	1.0000+ 0	1.5817- 1	2.3311- 2	4.2388- 3	7.0419- 4	1.1625- 4	2.0055- 5	3.4321- 6	5.9222- 7	1.0296- 7	1.8020- 8
2.1500+ 3	1.0000+ 0	2.3448- 1	5.5200- 2	1.3720- 2	3.4021- 3	8.5520- 4	2.1782- 4	5.5992- 5	1.4586- 5	3.8162- 6	1.0094- 6
4.6500+ 3	1.0000+ 0	1.5923- 1	3.6477- 2	9.3778- 3	2.5456- 3	7.1194- 4	2.0271- 4	5.8389- 5	1.6951- 5	4.9497- 6	1.4516- 6
1.0000+ 4	1.0000+ 0	5.8948- 1	1.3615- 1	2.3368- 1	1.5504- 1	1.0544- 1	7.3210- 2	5.1683- 2	3.6985- 2	2.6766- 2	1.9552- 2
2.1500+ 4	1.0000+ 0	2.9594- 1	1.6571- 1	1.1907- 1	9.5612- 2	8.0328- 2	6.8760- 2	5.9372- 2	5.1516- 2	4.4844- 2	3.9134- 2
4.6500+ 4	1.0000+ 0	3.9342- 1	1.8629- 1	9.8488- 2	5.7293- 2	3.6247- 2	2.2 4634-	1.7767- 2	1.3442- 2	1.0562- 2	8.5465- 3
1.0000+ 5	1.0000+ 0	4.8086- 1	2.8360- 1	1.8442- 1	1.2806- 1	9.3504- 2	7.1038- 2	5.5714- 2	4.4821- 2	3.6738- 2	3.0706- 2
2.0000+ 5	1.0000+ 0	5.3180- 1	3.2575- 1	2.1463- 1	1.5644- 1	1.1688- 1	9.0200- 2	7.1340- 2	5.7505- 2	4.7050- 2	3.8957- 2
4.0000+ 5	1.0000+ 0	5.2432- 1	3.0535- 1	1.9206- 1	1.2812- 1	8.9435- 2	6.4673- 2	4.8078- 2	3.6532- 2	2.8255- 2	2.2169- 2
8.0000+ 5	1.0000+ 0	5.7882- 1	3.5318- 1	2.2495- 1	1.4837- 1	1.0071- 1	6.9988- 2	4.9603- 2	3.5740- 2	2.6113- 2	1.9308- 2
1.4000+ 6	1.0000+ 0	5.2197- 1	3.0033- 1	1.5469- 1	8.7567- 2	5.0810- 2	3.0151- 2	1.8271- 2	1.1287- 2	7.0969- 3	4.5336- 3
2.5000+ 6	1.0000+ 0	4.7558- 1	2.2731- 1	1.0919- 1	5.2705- 2	2.5569- 2	1.2465- 2	6.1076- 3	3.0075- 3	1.4886- 3	7.4033- 4
4.0000+ 6	1.0000+ 0	4.5228- 1	2.0476- 1	9.2796- 2	4.2096- 2	1.9118- 2	8.6912- 3	3.9555- 3	1.8022- 3	8.2208- 4	3.7543- 4
6.5000+ 6	1.0000+ 0	4.8602- 1	2.3662- 1	1.1539- 1	5.6373- 2	2.7585- 2	1.3521- 2	6.6382- 3	3.2642- 3	1.6078- 3	7.9313- 4
1.0500+ 7	1.0000+ 0	5.5636- 1	3.0989- 1	1.7280- 1	9.6464- 2	5.3907- 2	3.0156- 2	1.6888- 2	9.4669- 3	5.3122- 3	2.9838- 3
1.5000+ 7											
	1.0000+ 0	5.0763- 1	2.6323- 1	1.3934- 1	7.5457- 2	4.1937- 2	2.4018- 2	1.4237- 2	8.7709- 3	5.8322- 3	3.7761- 3

CM 0.0 + 0 1.0000+ 0 2.0000+ 0 3.0000+ 0 4.0000+ 0 5.0000+ 0 6.0000+ 0 7.0000+ 0 8.0000+ 0 9.0000+ 0 1.0000+ 1

ENERGY	REACTION	REACTION	REACTION	REACTION	REACTION	REACTION	REACTION	REACTION	REACTION	REACTION	REACTION
2.5000- 2	1.0000+ 0	4.8024- 2	2.3063- 3	1.1076- 4	5.3192- 6	2.5545- 7	1.2268- 8	5.8917-10	2.8295-11	1.3589-12	6.5263-14
2.5600- 2	1.0000+ 0	6.2998- 2	3.9963- 3	2.5509- 4	1.6374- 5	1.0563- 6	6.8464- 8	4.4536- 9	2.9079-10	1.9048-11	1.2513-12
2.1500- 1	1.0000+ 0	7.1589- 2	5.1263- 3	3.6721- 4	2.6310- 5	1.8857- 6	1.3519- 7	9.6944- 9	6.9538-10	4.9855-11	3.5811-12
4.6500- 1	1.0000+ 0	7.5200- 2	5.6557- 3	4.2542- 4	3.2005- 5	2.4080- 6	1.8120- 7	1.3637- 8	1.0265- 9	7.7271-11	5.8176-12
1.0000+ 0	1.0000+ 0	7.7772- 2	6.0493- 3	4.7054- 4	3.6603- 5	2.8475- 6	2.2152- 7	1.7236- 8	1.3411- 9	1.0435-10	8.1209-12
2.1500+ 0	1.0000+ 0	7.9620- 2	6.3396- 3	5.0482- 4	4.0197- 5	3.2010- 6	2.5491- 7	2.0300- 8	1.6167- 9	1.2875-10	1.0254-11
4.6500+ 0	1.0000+ 0	8.0983- 2	6.5585- 3	5.3115- 4	4.3016- 5	3.4840- 6	2.8216- 7	2.2853- 8	1.8510- 9	1.4992-10	1.2143-11
1.0000+ 1	1.0000+ 0	8.2093- 2	6.7398- 3	5.5332- 4	4.5427- 5	3.7296- 6	3.0620- 7	2.5140- 8	2.0641- 9	1.6947-10	1.3914-11
2.1500+ 1	1.0000+ 0	8.3246- 2	6.9299- 3	5.7692- 4	4.8031- 5	3.9987- 6	3.3291- 7	2.7717- 8	2.3077- 9	1.9214-10	1.5998-11
4.6500+ 1	1.0000+ 0	8.4871- 2	7.2035- 3	6.1144- 4	5.1901- 5	4.4058- 6	3.7401- 7	3.1751- 8	2.6956- 9	2.2867-10	1.9434-11
1.0000+ 2	1.0000+ 0	8.7833- 2	7.7163- 3	6.7796- 4	5.9579- 5	5.2366- 6	4.6034- 7	4.0475- 8	3.5593- 9	3.1305-10	2.7538-11
2.1500+ 2	1.0000+ 0	9.5109- 2	9.0586- 3	8.6408- 4	8.2547- 5	7.8976- 6	7.5669- 7	7.2611- 8	6.9784- 9	6.7167-10	6.4739-11
4.6500+ 2	1.0000+ 0	1.2078- 1	1.4728- 2	1.8128- 3	2.2521- 4	2.8232- 5	3.5703- 6	4.5529- 7	5.8521- 8	7.5782- 9	9.8827-10
1.0000+ 3	1.0000+ 0	1.5372- 1	2.4748- 2	4.0371- 3	6.6653- 4	1.1128- 4	1.8772- 5	3.1959- 6	5.4817- 7	9.5088- 8	1.6582- 8
2.1500+ 3	1.0000+ 0	2.3059- 1	5.6504- 2	1.3148- 2	3.2263- 3	8.0351- 4	2.0214- 4	5.1761- 5	1.3256- 5	3.4800- 6	9.1486- 7
4.6500+ 3	1.0000+ 0	1.1068- 1	2.2503- 2	5.4767- 3	1.4428- 3	3.9644- 4	1.1162- 4	3.1908- 5	9.2140- 6	2.6796- 6	7.8335- 7
1.0000+ 4	1.0000+ 0	5.3551- 1	3.0268- 1	1.7958- 1	1.1770- 1	7.1208- 2	4.6994- 2	3.1775- 2	2.1918- 2	1.5370- 2	1.0827- 2
2.1500+ 4	1.0000+ 0	8.0583- 2	2.4797- 2	1.0857- 2	6.4018- 3	4.5916- 3	3.6362- 3	3.0102- 3	2.5424- 3	2.1689- 3	1.8611- 3
4.6500+ 4	1.0000+ 0	2.6918- 1	1.0821- 1	4.8770- 2	2.4036- 2	1.2827- 2	7.3594- 3	4.5074- 3	2.9280- 3	2.0043- 3	1.4369- 3
1.0000+ 5	1.0000+ 0	3.0998- 1	1.4384- 1	7.8253- 2	4.6538- 2	2.9508- 2	1.9705- 2	1.3753- 2	9.9694- 3	7.4684- 3	5.7492- 3
2.0000+ 5	1.0000+ 0	4.0297- 1	1.9870- 1	1.0957- 1	6.7770- 2	4.4146- 2	3.0584- 2	2.2077- 2	1.6467- 2	1.2612- 2	9.6998- 3
4.0000+ 5	1.0000+ 0	4.3221- 1	2.1370- 1	1.1639- 1	6.8384- 2	4.2732- 2	2.8078- 2	1.9218- 2	1.3598- 2	9.8672- 3	7.3510- 3
8.0000+ 5	1.0000+ 0	5.2016- 1	2.8535- 1	1.6859- 1	1.0306- 1	6.5435- 2	4.2874- 2	2.8846- 2	1.9849- 2	1.3920- 2	9.9215- 3
1.4000+ 6	1.0000+ 0	4.9905- 1	2.5630- 1	1.3528- 1	7.3300- 2	4.0728- 2	2.3178- 2	1.3493- 2	8.0250- 3	4.8655- 3	3.0047- 3
2.5000+ 6	1.0000+ 0	4.7239- 1	2.2427- 1	1.0700- 1	5.1300- 2	2.4716- 2	1.1967- 2	5.8225- 3	2.8470- 3	1.3989- 3	6.9060- 4
4.0000+ 6	1.0000+ 0	4.5172- 1	2.0426- 1	9.2446- 2	4.1883- 2	1.8996- 2	8.6237- 3	3.9182- 3	1.7831- 3	8.1214- 4	3.7033- 4
6.5000+ 6	1.0000+ 0	4.8685- 1	2.3549- 1	1.1457- 1	5.5838- 2	2.7260- 2	1.3330- 2	6.5298- 3	3.2036- 3	1.5745- 3	7.7497- 4
1.0500+ 7	1.0000+ 0	5.5532- 1	3.0872- 1	1.7183- 1	9.5737- 2	5.3403- 2	2.9820- 2	1.6670- 2	9.3229- 3	5.2256- 3	2.9302- 3
1.5000+ 7											
	1.0000+ 0	5.8540- 1	2.8561- 1	1.2571- 1	6.5439- 2	3.4680- 2	1.8745- 2	1.0360- 2	5.8728- 3	3.4268- 3	2.0654- 3

E+ 5 88250+ 1 EV CROSS SECTION=-1 D4043+ 0 (SET TO ZERO)
E+ 5 88818+ 1 EV CROSS SECTION=-6 57006- 1 (SET TO ZERO)
E+ 5 89586+ 1 EV CROSS SECTION=-1 33883- 1 (SET TO ZERO)
E+ 5 89707+ 1 EV CROSS SECTION=-3 60158- 2 (SET TO ZERO)
E+ 7 02720+ 1 EV CROSS SECTION=-5.19566- 2 (SET TO ZERO)
E+ 7 03630+ 1 EV CROSS SECTION=-6 43769- 1 (SET TO ZERO)
E+ 7 04535+ 1 EV CROSS SECTION=-1 07222+ 0 (SET TO ZERO)
E+ 7 05440+ 1 EV CROSS SECTION=-1 45134+ 0 (SET TO ZERO)
E+ 7 06350+ 1 EV CROSS SECTION=-1 78690+ 0 (SET TO ZERO)
E+ 7 07260+ 1 EV CROSS SECTION=-2 00555+ 0 (SET TO ZERO)
E+ 7 09070+ 1 EV CROSS SECTION=-1 82760+ 0 (SET TO ZERO)
E+ 7 10880+ 1 EV CROSS SECTION=-9 84670- 1 (SET TO ZERO)

ENERGY	AV(XC)	AV(XC)	AV(XC)	AV(XC)	AV(XC)	AV(XC)	AV(XC)	AV(XC)	AV(XC)	AV(XC)
CM 0 0	+ 0 1 0000+ 0	2.0000+ 0	3 0000+ 0	4.0000+ 0	5 0000+ 0	6 0000+ 0	7.0000+ 0	8.0000+ 0	9.0000+ 0	1 0000+ 1
2 5000- 2	1.4077+ 1	1 4077+ 1	1 4077+ 1	1 4077+ 1	1 4077+ 1	1 4077+ 1	1 4077+ 1	1 4077+ 1	1 4077+ 1	1 4077+ 1
2 5000- 2	1 2824+ 1	1 2781+ 1	1 2762+ 1	1 2735+ 1	1 2712+ 1	1 2691+ 1	1 2672+ 1	1.2655+ 1	1.2640+ 1	1.2626+ 1
3 1500- 1	1.2226+ 1	1 2225+ 1	1.2224+ 1	1 2222+ 1	1 2221+ 1	1.2220+ 1	1.2218+ 1	1.2217+ 1	1.2216+ 1	1 2215+ 1
4 6500- 1	1 1998+ 1	1 1997+ 1	1 1997+ 1	1 1996+ 1	1.1996+ 1	1 1995+ 1	1.1994+ 1	1 1994+ 1	1 1993+ 1	1.1993+ 1
1 0000+ 0	1 1842+ 1	1 1842+ 1	1 1841+ 1	1 1841+ 1	1 1841+ 1	1 1841+ 1	1 1840+ 1	1 1840+ 1	1.1840+ 1	1.1839+ 1
2 1500+ 0	1 1733+ 1	1 1733+ 1	1 1733+ 1	1 1733+ 1	1 1733+ 1	1.1732+ 1	1.1732+ 1	1 1732+ 1	1 1732+ 1	1.1732+ 1
4.6500+ 0	1 1654+ 1	1 1654+ 1	1 1654+ 1	1 1654+ 1	1 1654+ 1	1 1654+ 1	1.1654+ 1	1 1654+ 1	1 1654+ 1	1 1654+ 1
1 0000+ 1	1 1591+ 1	1 1591+ 1	1 1591+ 1	1 1591+ 1	1 1591+ 1	1 1591+ 1	1 1591+ 1	1 1591+ 1	1 1591+ 1	1.1591+ 1
2.1500+ 1	1.1527+ 1	1 1527+ 1	1 1526+ 1	1 1526+ 1	1 1526+ 1	1 1526+ 1	1 1526+ 1	1 1526+ 1	1 1526+ 1	1.1526+ 1
4.6500+ 1	1 1437+ 1	1 1437+ 1	1 1437+ 1	1 1436+ 1	1.1436+ 1	1 1436+ 1	2.1436+ 1	1 1436+ 1	1 1435+ 1	1 1435+ 1
1 0000+ 2	1 1278+ 1	1 1277+ 1	1 1276+ 1	1 1275+ 1	1 1274+ 1	1 1273+ 1	1.1273+ 1	1 1272+ 1	1 1271+ 1	1 1270+ 1
2 1500+ 3	1 0910+ 1	1 0903+ 1	1 0898+ 1	1 0889+ 1	1 0882+ 1	1 0875+ 1	1.0868+ 1	1 0861+ 1	1.0854+ 1	1 0847+ 1
4 6500+ 2	9 8020+ 0	9 7580+ 0	9 7163+ 0	9 6712+ 0	9 6292+ 0	9 5887+ 0	9 5499+ 0	9 5131+ 0	9 4784+ 0	9 4458+ 0
1 0000+ 3	8 7661+ 0	8 4663+ 0	8 4068+ 0	8 3490+ 0	8.2973+ 0	8 2495+ 0	8 2056+ 0	8 1654+ 0	8 1290+ 0	8 0961+ 0
2 1500+ 3	6 7631+ 0	6 6708+ 0	6 5783+ 0	6 5003+ 0	6 4327+ 0	6 3730+ 0	6 3195+ 0	6 2708+ 0	6 2264+ 0	6 1855+ 0
4 6500+ 3	1 0523+ 1	7 3185+ 0	6 8918+ 0	6 1455+ 0	5 9645+ 0	5 8598+ 0	5 7944+ 0	5 7508+ 0	5 7199+ 0	5.6970+ 0
1 0000+ 4	2 5713+ 0	2 3358+ 0	2 1373+ 0	1 9743+ 0	1.8425+ 0	1 7363+ 0	1 6505+ 0	1 5809+ 0	1 5228+ 0	1 4745+ 0
2 1500+ 4	1.3168+ 1	1 3 5854+ 0	1.9705+ 0	1 2007+ 0	1 0 8162- 1	7 5267- 1	6 9634- 1	6.6782- 1	1 6 4887- 1	6.3687- 1
4 6500+ 4	5 5020+ 0	3 7645+ 0	3 1960+ 0	2 7246+ 0	2 3082+ 0	1.9672+ 0	1.6437+ 0	1.3959+ 0	1.1985+ 0	1.0441+ 0
1 0000+ 5	4 3077+ 0	2 7769+ 0	2.1849+ 0	1 8279+ 0	1 5653+ 0	1.3594+ 0	1.1949+ 0	1 0623+ 0	9 5815- 1	8 7408- 1
2.0000+ 5	3 3607+ 0	2 5830+ 0	2 0292+ 0	1 6878+ 0	1 4429+ 0	1.2584+ 0	1.1295+ 0	1 0400+ 0	9 6235- 1	9.0085- 1
4 0000+ 5	3 3030+ 0	2 7227+ 0	2.3117+ 0	2 0015+ 0	1 7630+ 0	1.5782+ 0	1.4340+ 0	1.3203+ 0	1 2295+ 0	1.1559+ 0
8 0000+ 5	2 6755+ 0	2 4044+ 0	2 1844+ 0	2.0052+ 0	1.8568+ 0	1 7385+ 0	1 6390+ 0	1.5559+ 0	1.4858+ 0	1 4262+ 0
1 4000+ 6	3 0427+ 0	2 9474+ 0	2.8185+ 0	2 6959+ 0	2 5799+ 0	2 4711+ 0	2 3698+ 0	2 2765+ 0	2 1911+ 0	2 1135+ 0
2 5000+ 6	3 4577+ 0	3 4345+ 0	3 4115+ 0	3 3885+ 0	3.3655+ 0	3.3425+ 0	3 3195+ 0	3 2964+ 0	3 2732+ 0	3 2499+ 0
4 0000+ 6	3 6813+ 0	3 6767+ 0	3.6721+ 0	3 6673+ 0	3 6625+ 0	3.6577+ 0	3.6527+ 0	3.6475+ 0	3 6423+ 0	3 6368+ 0
6 5000+ 6	3 3495+ 0	3 2815+ 0	3 2335+ 0	3.3256+ 0	3.3178+ 0	3.3100+ 0	3 3023+ 0	3.2948+ 0	3.2874+ 0	3 2801+ 0
1 0500+ 7	2 7212+ 0	2 7160+ 0	2 7108+ 0	2 7057+ 0	2 7007+ 0	2.8957+ 0	2 6908+ 0	2 6860+ 0	2 6813+ 0	2.6767+ 0
1 5000+ 7										
	3 2124+ 0	3 0917+ 0	2 9982+ 0	2 8989+ 0	2 7867+ 0	2 6573+ 0	2 5079+ 0	2 3383+ 0	2 1516+ 0	1 9551+ 0

Output Report MIXER

MIX ENERGY DEPENDENT ENDF/B CROSS SECTIONS (MIXER 66-1)

PROBLEM IDENTIFICATION

MIXER TEST PROBLEM
CONSISTUENTS ARE RANDOM, DESIGNED ONLY TO TEST PROGRAM MIXER

REQUESTED COMPOSITION (INPUT PARAMETERS)

ZA	MT	GRAMS/CC
1001	1	2 0000- 1
26000	1	1 0000+ 0
92235	1	1 0000+ 0
92800	1	2 2000+ 0

PROCESSING

ZA	MAT	MT	KELVIN	Q-VALUE Ev	POINTS	AMU-WEIGHT	ATOMS/B-CM *
26000	1192	1	2 9300+ 2	0 0000+ 0	4372	5 5845+ 1	1 0788- 2
92235	1261	1	2.9300+ 2	0 0000+ 0	4814	2 3504+ 2	2.5532- 3
1001	1269	1	2 9300+ 2	0 0000+ 0	185	1 0078+ 0	1 1856- 1
92800	8000	1	2.9300+ 2	0.0000+ 0	13127	9 9728+ 0	1.3291- 1

* - NOTE B-CM = 1 0E-24 CUBIC CENTIMETERS

ATOM FRACTIONS

ZA	MAT	MT	ATOM FRACTION
1001	1269	1	0 89854482
26000	1192	1	0.08117022
92235	1261	1	0 01928584
92800	8000	1	0 00000000

2

MT	POINTS ADDED	POINTS SUM	
18	2087	2087	
101	2284	4090	RECONSTRUCTED
27		4090	SUMMATION

3 DEFINED BY ADDING OR SUBTRACTING THE FOLLOWING MT NUMBERS

MT	POINTS	POINTS

Output Report: LEGEND

```
ARIZED ANGULAR DISTRIBUTIONS FROM LEGENDRE COEFFICIENTS OR TABULATIONS IN ENDF/B FORMAT (LEGEND 87-1)
-----------------------------------------------------------------------------------------------------
WABLE ACCURACY---------- 1.00000- 3 (   0 100 PERCENT)
IMUM NUMBER OF COSINES---          101 (LEGENDRE COEFFICIENT RECONSTRUCTION)
ULATED DATA------------LINEAR/2E/THIN - OUTPUT TABLES
ENDRE DATA-------------TABULATE     - OUTPUT COEFFICIENTS
ATIVE DATA CORRECTION--TABULATED DATA - NONE
                       LEGENDRE COEFFICIENTS - MODIFY COEFFICIENTS BY UP TO 1 PER-CENT
FFICIENT TESTS---------ON
-----------------------------------------------------------------------------------------------------
IMUM ALLOWABLE CROSS SECTION AND MAXIMUM ALLOWABLE COEFFICIENT CHANGE
-----------------------------------------------------------------------------------------------------
ATI  MT1  MAT2  MT2          E1          E2  SIGMA-LOW   DELTA-FL
                          (EV)        (EV)     (B/MU)
-----------------------------------------------------------------------------------------------------
  1     1  9999  999 0 00000+ 0 1.00000+ 9 1 00000- 3     0 01000
-----------------------------------------------------------------------------------------------------
PE LABEL
-----------------------------------------------------------------------------------------------------
ATA FROM THE ENDGEN LIBRARY                                                                      0
-----------------------------------------------------------------------------------------------------
   ZA  MAT  MT  ENERGY-EV   LEGENDRE      POINTS      POINTS
                    ORDER          IN         OUT   INTEGRAL MESSAGES
                 READ (USED)
-----------------------------------------------------------------------------------------------------
92235 1261    2 1.00000- 5     1                          2   1.000000
92235 1261    2 1 00000+ 6     1                          2   1.000000
92235 1261    2 2 00000+ 5     6                         31   1.000485
              WARNING...COEFFICIENTS DO NOT START EQUAL TO ZERO
              INTERPOLATION TO LOWER ENERGIES MAY CAUSE ERRORS
                L  COEFFICIENT
                2   6 07000- 3
                3   5.50000- 3
                4   2 37000- 3
                5   3 32000- 3
                6  -7.70000- 4
92235 1261    2 5.00000+ 5     6                         44   1 000479
92235 1261    2 8.00000+ 5    10                         66   1.000127
              WARNING  .COEFFICIENTS DO NOT START EQUAL TO ZERO
              INTERPOLATION TO LOWER ENERGIES MAY CAUSE ERRORS
                L  COEFFICIENT
                7  -5.11000- 3
                8   3 90000- 4
                9  -9.80000- 4
               10  -9 00000- 5
              WARNING  .AT E= 8.00000+ 5 EV COEFFICIENTS DO NOT DECREASE WITH L
              L= 5   6.10000- 3 L=  6 -1 12100- 2
              L= 8   3.90000- 4 L=  9 -9.80000- 4
92235 1261    2 1 00000+ 6    10                         64   1.000264
              WARNING  .AT E= 1 00000+ 6 EV COEFFICIENTS DO NOT DECREASE WITH L
              L= 5   1 12000- 2 L=  6 -1 36200- 2
              L= 8   2 21000- 3 L=  9 -4 16000- 3
92235 1261    2 1 50000+ 6    10                         78   1.001003
              WARNING  .COEFFICIENT HAS DECREASED OR CHANGED SIGN
              L= 6 -1.36200- 2 AT E= 1.00000+ 6 EV TO  2 03300- 2 AT E= 1.50000+ 6 EV
              L= 7 -9 00000- 3 AT E= 1 00000+ 6 EV TO  4 31000- 3 AT E= 1 50000+ 6 EV
              L= 9 -4 16000- 3 AT E= 1 00000+ 6 EV TO  7 40000- 4 AT E= 1 50000+ 6 EV
              WARNING  .AT E= 1 50000+ 6 EV COEFFICIENTS DO NOT DECREASE WITH L
              L=  7   4 31000- 3 L=  8  6.93000- 3
92235 1261    2 2 00000+ 6    10                         89   1.001705
92235 1261    2 3 00000+ 6    10                         91   1.002668
              WARNING  .COEFFICIENT HAS DECREASED OR CHANGED SIGN
              L= 10 -3.70000- 4 AT E= 2 00000+ 6 EV TO  1.40000- 4 AT E= 3.00000+ 6 EV
92235 1261    2 4.00000+ 6    10                         98   1.003852
92235 1261    2 4 50000+ 6    12                         96   1.005597
              WARNING.. COEFFICIENTS DO NOT START EQUAL TO ZERO
              INTERPOLATION TO LOWER ENERGIES MAY CAUSE ERRORS
                L  COEFFICIENT
               11   1 25000- 2
               12   2 70000- 3
92235 1261    2 5.00000+ 6    12                         96   1 006941
92235 1261    2 5 50000+ 6    14                         92   1.007988
              WARNING ..COEFFICIENTS DO NOT START EQUAL TO ZERO
              INTERPOLATION TO LOWER ENERGIES MAY CAUSE ERRORS
                L  COEFFICIENT
               13   5.30000- 6
               14   1.40000- 4
92235 1261    2 6.00000+ 6    16                         97   1 009212
              WARNING  .COEFFICIENTS DO NOT START EQUAL TO ZERO
              INTERPOLATION TO LOWER ENERGIES MAY CAUSE ERRORS
                L  COEFFICIENT
               15   6.00000- 5
               16   1.00000- 5
92235 1261    2 7 00000+ 6    16                        100   1.012326
              WARNING  .AT E= 7 00000+ 6 EV COEFFICIENTS DO NOT DECREASE WITH L
              L= 14   1 93000- 3 L= 15  2 13000- 3
92235 1261    2 8 00000+ 6    16                         98   1 014001
              WARNING. .COEFFICIENT HAS DECREASED OR CHANGED SIGN
              L= 14   1 93000- 3 AT E= 7 00000+ 6 EV TO -1 70000- 4 AT E= 8 00000+ 6 EV
              L= 15   2 13000- 3 AT E= 7 00000+ 6 EV TO -5 80000- 4 AT E= 8 00000+ 6 EV
              L= 16   8.80000- 4 AT E= 7 00000+ 6 EV TO  3.00000- 5 AT E= 8 00000+ 6 EV
              WARNING. .AT E= 8 00000+ 6 EV COEFFICIENTS DO NOT DECREASE WITH L
              L= 14  -1 70000- 4 L= 15 -4.80000- 4
92235 1261    2 1.00000+ 7    16                        100   1.020686
              WARNING...COEFFICIENT HAS DECREASED OR CHANGED SIGN
              L= 14  -1.70000- 4 AT E= 8.00000+ 6 EV TO  9.38000- 3 AT E= 1.00000+ 7 EV
              L= 15  -4 80000- 4 AT E= 8.00000+ 6 EV TO  1.84000- 3 AT E= 1 00000+ 7 EV
              L= 16   3.00000- 5 AT E= 8.00000+ 6 EV TO -2.70000- 4 AT E= 1.00000+ 7 EV
92235 1261    2 1.20000+ 7    18                         96   1.030389
              WARNING  .COEFFICIENTS DO NOT START EQUAL TO ZERO
              INTERPOLATION TO LOWER ENERGIES MAY CAUSE ERRORS
                L  COEFFICIENT
               17   1.26000- 3
               18   1.30000- 4
              WARNING  .COEFFICIENT HAS DECREASED OR CHANGED SIGN
              L= 16 -3.70000- 4 AT E= 1.00000+ 7 EV TO  8.37000- 3 AT E= 1.20000+ 7 EV
92235 1261    2 1 40000+ 7    18                         90   1.040455
92235 1261    2 1.70000+ 7    20                         95   1.057735
              WARNING ..COEFFICIENTS DO NOT START EQUAL TO ZERO
              INTERPOLATION TO LOWER ENERGIES MAY CAUSE ERRORS
                L  COEFFICIENT
               19   1.87000- 3
               20   6.10000- 4
              WARNING. .ANGULAR DISTRIBUTION IS NOT PROPERLY NORMALIZED
92235 1261    2 2.00000+ 7    20                        101   1.072435
              WARNING...ANGULAR DISTRIBUTION IS NOT PROPERLY NORMALIZED
              NEGATIVE ANGULAR DISTRIBUTION AT     1 POINTS. MINIMUM AT COSINE=  -0.900000 VALUE= -0 0004651
              REQUESTED MINIMUM VALUE=  0 001000
              NEGATIVE CONTRIBUTION OF EACH LEGENDRE ORDER AND PER-CENT
              CHANGE TO MAKE POSITIVE BY CHANGING ONE COEFFICIENT
              INDEX    COEFFICIENT   P-M(COSINE)   CONTRIBUTION   CHANGE  ALLOWED
                 2       0.451000     -0.402686     -1.570531   -0.0346   0.2500
                 3       0.796800     -0 472500     -1.317709   -0 1127   0.2500
                 7       0.885000     -0.900000     -1.275750    .1164    0.2500
                10       0.346700     -0.253146     -0.957985   -0.1650   0.2500
                 6       0.571300     -0.241184     -0.895550   -0.1658   0.2500
                13       0.190900     -0.177800     -0.458217   -0.3241   0.2500
                15       0.092660     -0.305198     -0 436334   -0.3368   0.2500
                17       0.033050     -0.199030     -0.115114   -1.2901   0.2500
                20       0.002540     -0.149307     -0.007774  -19.1024   0.2500
              COEFFICIENTS MODIFIED TO ELIMINATE NEGATIVE VALUE
              INDEX    OLD VALUE    NEW VALUE     PER-CENT CHANGE
```


Output Report DICTION

```
CREATE NEW SECTION INDEX (DICTION 86-1)
---------------------------------------
FIRST PASS  READING ENDF/B DATA
-------------------------------
 MAT    MESSAGES
        -------------------------
```

```
                1     0.845000     0.844649    -0.037182
                2     0.796800     0.796612    -0.023584
                3     0.718400     0.718105    -0.041011
                4     0.507600     0.507428    -0.033877
                5     0.451000     0.450574    -0.094561
-------------------------------------------------------------------------------
92235 1261   16 5 32858+ 6                          2          2    1.000000
92235 1261   16 2 00000+ 7                          2          2    1.000000
-------------------------------------------------------------------------------
92235 1261   17 1.21868+ 7                          2          2    1.000000
92235 1261   17 2.00000+ 7                          2          2    1.000000
-------------------------------------------------------------------------------
92235 1261   18 1 00000- 5                          2          2    1.000000
92235 1261   18 2 00000+ 7                          2          2    1.000000
-------------------------------------------------------------------------------
92235 1261   19 1 00000- 5                          2          2    1.000000
92235 1261   19 2.00000+ 7                          2          2    1.000000
-------------------------------------------------------------------------------
92235 1261   20 5 00000+ 6                          2          2    1.000000
92235 1261   20 2 00000+ 7                          2          2    1.000000
-------------------------------------------------------------------------------
92235 1261   21 1.18000+ 7                          2          2    1.000000
92235 1261   21 2.00000+ 7                          2          2    1.000000
-------------------------------------------------------------------------------
92235 1261   51 1 30553+ 4                          2          2    1.000000
92235 1261   51 2 00000+ 7                          2          2    1.000000
-------------------------------------------------------------------------------
92235 1261   52 5 00000+ 6                          2          2    1.000000
92235 1261   52 2 00000+ 7                          2          2    1.000000
-------------------------------------------------------------------------------
92235 1261   53 4 40000+ 6                          2          2    1.000000
92235 1261   53 2.00000+ 7                          2          2    1.000000
-------------------------------------------------------------------------------
92235 1261   54 1 03000+ 5                          2          2    1.000000
92235 1261   54 2 00000+ 7                          2          2    1.000000
-------------------------------------------------------------------------------
92235 1261   55 1 50000+ 5                          2          2    1.000000
92235 1261   55 2 00000+ 7                          2          2    1.000000
-------------------------------------------------------------------------------
92235 1261   56 1 73000+ 5                          2          2    1.000000
92235 1261   56 2 00000+ 7                          2          2    1.000000
-------------------------------------------------------------------------------
92235 1261   57 2 35000+ 5                          2          2    1.000000
92235 1261   57 2 00000+ 7                          2          2    1.000000
-------------------------------------------------------------------------------
92235 1261   58 5 70000+ 5                          2          2    1.000000
92235 1261   58 2.00000+ 7                          2          2    1.000000
-------------------------------------------------------------------------------
92235 1261   59 4 00000+ 5                          2          2    1.000000
92235 1261   59 2 00000+ 7                          2          2    1.000000
-------------------------------------------------------------------------------
92235 1261   60 6 00000+ 5                          2          2    1.000000
92235 1261   60 2 00000+ 7                          2          2    1.000000
-------------------------------------------------------------------------------
92235 1261   61 1 00000+ 6     8 (    1)                        2    1.000000
92235 1261   61 3.00000+ 6     8 (    1)                        2    1.000000
92235 1261   61 4.00000+ 6     8                                 6    1.000563
             WARNING   AT E= 4.00000+ 6 EV COEFFICIENTS DO NOT DECREASE WITH L
             L= 5  4.53540- 7 L=  6  5.19280- 7
92235 1261   61 5 00000+ 6     8                              13    1.000562
             WARNING  .COEFFICIENT HAS DECREASED OR CHANGED SIGN
             L=  6  5.19280- 7 AT E= 4.00000+ 6 EV TO  2.06340- 7 AT E= 5.00000+ 6 EV
             L=  7  3.79090- 7 AT E= 4.00000+ 6 EV TO -1.02800- 6 AT E= 5.00000+ 6 EV
             L=  8  2.64500- 7 AT E= 4.00000+ 6 EV TO -6.32820- 7 AT E= 5.00000+  6 EV
             WARNING  .AT E= 5.00000+ 6 EV COEFFICIENTS DO NOT DECREASE WITH L
             L=  6  2.06340- 7 L=  7 -1.02800- 6
92235 1261   61 6 00000+ 6     8                              32    1.000510
             WARNING  .COEFFICIENT HAS DECREASED OR CHANGED SIGN
             L=  6  2.06340- 7 AT E= 5.00000+ 6 EV TO -4.68880- 7 AT E= 6.00000+ 6 EV
             WARNING   AT E= 6.00000+ 6 EV COEFFICIENTS DO NOT DECREASE WITH L
             L=  6 -4.68880- 7 L=  7 -4.05530- 6
92235 1261   61 8 00000+ 6     8                              44    1.000451
             WARNING. .AT E= 8.00000+ 6 EV COEFFICIENTS DO NOT DECREASE WITH L
             L=  6 -7.07900- 5 L=  7 -7.28220- 5
92235 1261   61 1 00000+ 7     8                              67    1.000369
             WARNING. . COEFFICIENT HAS DECREASED OR CHANGED SIGN
             L=  6 -7.07900- 5 AT E= 8.00000+ 6 EV TO  1.72050- 3 AT E= 1.00000+ 7 EV
             L=  7 -7.28220- 5 AT E= 8.00000+ 6 EV TO  2.94140- 4 AT E= 1.00000+ 7 EV
             L=  8 -5.90770- 5 AT E= 8.00000+ 6 EV TO -5.49300- 5 AT E= 1.00000+ 7 EV
92235 1261   61 1.40000+ 7     8                              85    1.000670
             WARNING  . COEFFICIENT HAS DECREASED OR CHANGED SIGN
             L=  8 -5.49300- 5 AT E= 1.00000+ 7 EV TO  1.43940- 4 AT E= 1.40000+ 7 EV
92235 1261   61 2.00000+ 7     8                              91    1.000922
-------------------------------------------------------------------------------
92235 1261   62 2 00000+ 6     8 (    1)                        2    1.000000
92235 1261   62 3 00000+ 6     8 (    1)                        2    1.000000
92235 1261   62 4 00000+ 6     8                                 6    1.000563
             WARNING   AT E= 4.00000+ 6 EV COEFFICIENTS DO NOT DECREASE WITH L
             L=  5  4.53540- 7 L=  6  5.19280- 7
92235 1261   62 5 00000+ 6     8                              13    1.000562
             WARNING  .COEFFICIENT HAS DECREASED OR CHANGED SIGN
             L=  6  5.19280- 7 AT E= 4.00000+ 6 EV TO  2.06340- 7 AT E= 5.00000+ 6 EV
             L=  7  3.79090- 7 AT E= 4.00000+ 6 EV TO -1.02800- 6 AT E= 5.00000+ 6 EV
             L=  8  2.64500- 7 AT E= 4.00000+ 6 EV TO -6.32820- 7 AT E= 5.00000+ 6 EV
             WARNING...AT E= 5.00000+ 6 EV COEFFICIENTS DO NOT DECREASE WITH L
             L=  6  2.06340- 7 L=  7 -1.02800- 6
92235 1261   62 6.00000+ 6     8                              32    1.000510
             WARNING...COEFFICIENT HAS DECREASED OR CHANGED SIGN
             L=  6  2.06340- 7 AT E= 5.00000+ 6 EV TO -4.68880- 7 AT E= 6.00000+ 6 EV
             WARNING...AT E= 6.00000+ 6 EV COEFFICIENTS DO NOT DECREASE WITH L
             L=  6 -4.68880- 7 L=  7 -4.05530- 6
92235 1261   62 8.00000+ 6     8                              44    1.000451
             WARNING. . AT E= 8.00000+ 6 EV COEFFICIENTS DO NOT DECREASE WITH L
             L=  6 -7.07900- 5 L=  7 -7.28220- 5
92235 1261   62 1.00000+ 7     8                              67    1.000369
             WARNING...COEFFICIENT HAS DECREASED OR CHANGED SIGN
             L=  6 -7.07900- 5 AT E= 8.00000+ 6 EV TO  1.72050- 3 AT E= 1.00000+ 7 EV
             L=  7 -7.28220- 5 AT E= 8.00000+ 6 EV TO  2.94140- 4 AT E= 1.00000+ 7 EV
             L=  8 -5.90770- 5 AT E= 8.00000+ 6 EV TO -5.49300- 5 AT E= 1.00000+ 7 EV
92235 1261   62 1.40000+ 7     8                              85    1.000670
             WARNING  .COEFFICIENT HAS DECREASED OR CHANGED SIGN
             L=  8 -5.49300- 5 AT E= 1.00000+ 7 EV TO  1.43940- 4 AT E= 1.40000+ 7 EV
92235 1261   62 2.00000+ 7     8                              91    1.000922
-------------------------------------------------------------------------------
92235 1261   63 2 00000+ 6     8 (    1)                        2    1.000000
92235 1261   63 4.00000+ 6     8 (    1)                        2    1.000000
92235 1261   63 5.00000+ 6     8                                 6    1.000563
             WARNING. .AT E= 5.00000+ 6 EV COEFFICIENTS DO NOT DECREASE WITH L
             L=  5  4.53540- 7 L=  6  5.19280- 7
92235 1261   63 6.00000+ 6     8                              13    1.000562
             WARNING...COEFFICIENT HAS DECREASED OR CHANGED SIGN
             L=  6  5.19280- 7 AT E= 5.00000+ 6 EV TO  2.06340- 7 AT E= 6.00000+ 6 EV
             L=  7  3.79090- 7 AT E= 6.00000+ 6 EV TO -1.02800- 6 AT E= 6.00000+ 6 EV
             L=  8  2.64500- 7 AT E= 6.00000+ 6 EV TO -6.32820- 7 AT E= 6.00000+ 6 EV
             WARNING. .AT E= 6.00000+ 6 EV COEFFICIENTS DO NOT DECREASE WITH L
             L=  6  2.06340- 7 L=  7 -1.02800- 6
92235 1261   63 7.00000+ 6     8                              32    1.000510
             WARNING  . AT E= 7.00000+ 6 EV COEFFICIENTS DO NOT DECREASE WITH L
             L=  6  4.68880- 7 L=  7 -4.05530- 6
92235 1261   63 8.00000+ 6     8                              44    1.000451
             WARNING. . COEFFICIENT HAS DECREASED OR CHANGED SIGN
             L=  6  4.68880- 7 AT E= 7.00000+ 6 EV TO -7.07900- 5 AT E= 8.00000+ 6 EV
             WARNING  . AT E= 8.00000+ 6 EV COEFFICIENTS DO NOT DECREASE WITH L
             L=  6 -7.07900- 5 L=  7 -7.28220- 5
92235 1261   63 1.00000+ 7     8                              67    1.000369
```


Output Report - CONVERT

```
NVERT FORTRAN PROGRAMS (CONVERT 86-1)
UT KEYWORDS    COMMENTS
) IBM
) DOUBLE
) FORTRAN-77
ST CARD OF FORTRAN PROGRAM
```

```
                WARNING...COEFFICIENT HAS DECREASED OR CHANGED SIGN
                L=  8 -7.07900- 5 AT E= 8.00000+ 6 EV TO  1.72050- 3 AT E= 1 00000+ 7 EV
                L=  7 -7 28220- 5 AT E= 8.00000+ 6 EV TO  2.94140- 4 AT E= 1.00000+ 7 EV
                L=  8 -5.90770- 5 AT E= 8 00000+ 6 EV TO -5 49900- 5 AT E= 1 00000+ 7 EV
92235 1261  63 1 40000+ 7     8                                  85    1.000870
                WARNING ..COEFFICIENT HAS DECREASED OR CHANGED SIGN
                L=  8 -5 49900- 5 AT E= 1.00000+ 7 EV TO  1.43940- 4 AT E= 1.40000+ 7 EV
92235 1261  63 2.00000+ 7     8                                  91    1.000922
-------------------------------------------------------------------------------------------------------------------------------
92235 1261  64 4.00000+ 6     8 |    1|                           2    1.000000
92235 1261  64 5 00000+ 6     8 |    1|                           2    1.000000
92235 1261  64 6.00000+ 6     8                                   6    1.000583
                WARNING  AT E= 5 00000+ 6 EV COEFFICIENTS DO NOT DECREASE WITH L
                L=  5  4.53540- 7 L=  6  5 19280- 7
92235 1261  64 7 00000+ 6     8                                  13    1 000562
                WARNING  .COEFFICIENT HAS DECREASED OR CHANGED SIGN
                L=  6  5 19280- 7 AT E= 6 00000+ 6 EV TO  2 05340- 7 AT E= 7.00000+ 6 EV
                L=  7  3.78090- 7 AT E= 6.00000+ 6 EV TO -1.02800- 6 AT E= 7 00000+ 6 EV
                L=  8  2 64500- 7 AT E= 6 00000+ 6 EV TO -6.32820- 7 AT E= 7.00000+ 6 EV
                WARNING  AT E= 7 00000+ 6 EV COEFFICIENTS DO NOT DECREASE WITH L
                L=  6  2.06340- 7 L=  7 -1 02800- 6
92235 1261  64 8 00000+ 6     8                                  32    1.000510
                WARNING  AT E= 8 00000+ 6 EV COEFFICIENTS DO NOT DECREASE WITH L
                L=  6  4 68880- 7 L=  7 -4.05530- 6
92235 1261  64 9.00000+ 8     8                                  44    1.000451
                WARNING...COEFFICIENT HAS DECREASED OR CHANGED SIGN
                L=  6  4.68880- 7 AT E= 8.00000+ 6 EV TO -7.07900- 5 AT E= 9.00000+ 6 EV
                WARNING...AT E= 9.00000+ 6 EV COEFFICIENTS DO NOT DECREASE WITH L
                L=  6 -7.07900- 5 L=  7 -7.28220- 5
92235 1261  64 1 00000+ 7     8                                  67    1.000369
                WARNING  COEFFICIENT HAS DECREASED OR CHANGED SIGN
                L=  6 -7.07900- 5 AT E= 9.00000+ 6 EV TO  1.72050- 3 AT E= 1 00000+ 7 EV
                L=  7 -7.28220- 5 AT E= 9.00000+ 6 EV TO  2.94140- 4 AT E= 1.00000+ 7 EV
                L=  8 -5 90770- 5 AT E= 9.00000+ 6 EV TO -5.49900- 5 AT E= 1 00000+ 7 EV
92235 1261  64 1 40000+ 7     8                                  85    1 000887
                WARNING  COEFFICIENT HAS DECREASED OR CHANGED SIGN
                L=  6 -5 49900- 5 AT E= 1 00000+ 7 EV TO  2 85190- 4 AT E= 1 40000+ 7 EV
92235 1261  64 2 00000+ 7     8                                  91    1.000917
                WARNING  COEFFICIENT HAS DECREASED OR CHANGED SIGN
                L=  7  1.87560- 3 AT E= 1.40000+ 7 EV TO  7.73510- 4 AT E= 2.00000+ 7 EV
                L=  8  3.85190- 4 AT E= 1 40000+ 7 EV TO  1.43940- 4 AT E= 2.00000+ 7 EV
-------------------------------------------------------------------------------------------------------------------------------
92235 1261  65 5.00000+ 6     8 |    1|                           2    1.000000
92235 1261  65 6.00000+ 6     8 |    1|                           2    1.000000
92235 1261  65 7 00000+ 6     8                                   6    1.000583
                WARNING  AT E= 7 00000+ 6 EV COEFFICIENTS DO NOT DECREASE WITH L
                L=  5  4 53540- 7 L=  6  5.19280- 7
92235 1261  65 8 00000+ 6     8                                  13    1.000562
                WARNING  COEFFICIENT HAS DECREASED OR CHANGED SIGN
                L=  6  5 19280- 7 AT E= 7.00000+ 6 EV TO  2.05340- 7 AT E= 8 00000+ 6 EV
                L=  7  3 78090- 7 AT E= 7 00000+ 6 EV TO -1.02800- 6 AT E= 8.00000+ 6 EV
                L=  8  2 64500- 7 AT E= 7.00000+ 6 EV TO -6.32820- 7 AT E= 8.00000+ 6 EV
                WARNING  AT E= 8 00000+ 6 EV COEFFICIENTS DO NOT DECREASE WITH L
                L=  6  2 06340- 7 L=  7 -1.02800- 6
92235 1261  65 9 00000+ 6     8                                  32    1.000510
                WARNING  AT E= 9 00000+ 6 EV COEFFICIENTS DO NOT DECREASE WITH L
                L=  6  4 68880- 7 L=  7 -4 05530- 6
92235 1261  65 1 00000+ 7     8                                  44    1.000451
                WARNING  COEFFICIENT HAS DECREASED OR CHANGED SIGN
                L=  6  4 68880- 7 AT E= 9.00000+ 6 EV TO -7 07900- 5 AT E= 1 00000+ 7 EV
                WARNING  AT E= 1 00000+ 7 EV COEFFICIENTS DO NOT DECREASE WITH L
                L=  6 -7 07900- 5 L=  7 -7.28320- 5
92235 1261  65 1 20000+ 7     8                                  67    1 000359
                WARNING . COEFFICIENT HAS DECREASED OR CHANGED SIGN
                L=  6 -7 07900- 5 AT E= 1.00000+ 7 EV TO  1.72050- 3 AT E= 1 20000+ 7 EV
                L=  7 -7.28220- 5 AT E= 1 00000+ 7 EV TO  2 94140- 4 AT E= 1 20000+ 7 EV
                L=  8 -5.90770- 5 AT E= 1 00000+ 7 EV TO -5.49900- 5 AT E= 1 20000+ 7 EV
92235 1261  65 1 40000+ 7     8                                  85    1.000670
                WARNING  COEFFICIENT HAS DECREASED OR CHANGED SIGN
                L=  8 -5 49900- 5 AT E= 1 20000+ 7 EV TO  1 63940- 4 AT E= 1 40000+ 7 EV
92235 1261  65 2 00000+ 7     8                                  91    1.000922
-------------------------------------------------------------------------------------------------------------------------------
92235 1261  66 6 00000+ 6     8 |    1|                           2    1.000000
92235 1261  66 7 00000+ 6     8 |    1|                           2    1.000000
92235 1261  66 8.00000+ 6     8                                   6    1 000583
                WARNING  AT E= 8 00000+ 6 EV COEFFICIENTS DO NOT DECREASE WITH L
                L=  5  4 53540- 7 L=  6  5.19280- 7
92235 1261  66 9 00000+ 6     8                                  13    1.000562
                WARNING..COEFFICIENT HAS DECREASED OR CHANGED SIGN
                L=  6  5 19280- 7 AT E= 8.00000+ 6 EV TO  2 05340- 7 AT E= 9 00000+ 6 EV
                L=  7  3.78090- 7 AT E= 8.00000+ 6 EV TO -1.02800- 6 AT E= 9 00000+ 6 EV
                L=  8  2 64500- 7 AT E= 8.00000+ 6 EV TO -6.32820- 7 AT E= 9.00000+ 6 EV
                WARNING  AT E= 9 00000+ 6 EV COEFFICIENTS DO NOT DECREASE WITH L
                L=  6  2 06340- 7 L=  7 -1 02800- 6
92235 1261  66 1 00000+ 7     8                                  32    1 000510
                WARNING  AT E= 1 00000+ 7 EV COEFFICIENTS DO NOT DECREASE WITH L
                L=  6  4.68880- 7 L=  7 -4 05530- 6
92235 1261  66 1 10000+ 7     8                                  44    1 000451
                WARNING  COEFFICIENT HAS DECREASED OR CHANGED SIGN
                L=  6  4 68880- 7 AT E= 1 00000+ 7 EV TO -7.07900- 5 AT E= 1 10000+ 7 EV
                WARNING  AT E= 1 10000+ 7 EV COEFFICIENTS DO NOT DECREASE WITH L
                L=  6 -7.07900- 5 L=  7 -7.28220- 5
92235 1261  66 1 20000+ 7     8                                  67    1.000369
                WARNING  COEFFICIENT HAS DECREASED OR CHANGED SIGN
                L=  6 -7 07900- 5 AT E= 1 10000+ 7 EV TO  1 72050- 3 AT E= 1.20000+ 7 EV
                L=  7 -7 28220- 5 AT E= 1.10000+ 7 EV TO  2.94140- 4 AT E= 1.20000+ 7 EV
                L=  8 -5 90770- 5 AT E= 1 10000+ 7 EV TO -5 49900- 5 AT E= 1 20000+ 7 EV
92235 1261  66 1.40000+ 7     8                                  85    1.000670
                WARNING ..COEFFICIENT HAS DECREASED OR CHANGED SIGN
                L=  8 -5.49900- 5 AT E= 1.20000+ 7 EV TO  1.43940- 4 AT E= 1.40000+ 7 EV
92235 1261  66 2.00000+ 7     8                                  91    1.000922
-------------------------------------------------------------------------------------------------------------------------------
92235 1261  91 9 50000+ 5                        2          2    1.000000
92235 1261  91 2.00000+ 7                        2          2    1.000000
-------------------------------------------------------------------------------------------------------------------------------
SUMMARY OF DATA AS READ
-------------------------------------------------------------------------------------------------------------------------------
ISOTROPIC SECTIONS----------------------   0
ENERGIES WITH LEGENDRE COEFFICIENTS--   75
ENERGIES WITH TABULATIONS---------------  34
```

Output Report: FIXUP

```
TEST AND CORRECT DATA IN THE ENDF/B FORMAT (FIXUP 86-2)
-------------------------------------------------------------------------------------------------------------------------------
INTERPREATION OF INPUT TEST/CORRECTION OPTIONS
-------------------------------------------------------------------------------------------------------------------------------
CORRECT ZA/AWR IN ALL SECTIONS----------  YES
CORRECT THRESHOLDS----------------------  YES (USE BUILT-IN TABLE)
EXTEND CROSS SECTION TO 20 MEV----------  YES (AS CONSTANT)
ALLOW CROSS SECTION DELETION------------  YES (USE BUILT-IN TABLE)
ALLOW CROSS SECTION RECONSTRUCTION------  YES (USE BUILT-IN TABLE)
MAKE ALL CROSS SECTIONS NON-NEGATIVE----  YES
DELETE ENERGIES NOT IN ASCENDING ORDER--  YES
DELETE DUPLICATE POINTS-----------------  YES
CHECK FOR ASCENDING MAT/MF/MT ORDER-----  YES
CHECK FOR LEGAL MF/MT NUMBERS-----------  YES
ALLOW CREATION OF MISSING SECTIONS------  YES
-------------------------------------------------------------------------------------------------------------------------------
BUILT-IN SUMMATION/DELETION/THRESHOLD EXCLUSION RULES
-------------------------------------------------------------------------------------------------------------------------------
      MT = DELETED OR DEFINED AS THE SUM OF THE FOLLOWING MT RANGES
-------------------------------------------------------------------------------------------------------------------------------
      MT =    RANGE1     RANGE2     RANGE3     RANGE4     RANGE5     RANGE6     RANGE7     RANGE8     RANGE9     RANGE10
-------------------------------------------------------------------------------------------------------------------------------
       8 =+[ 51, 91)
     103 =+(700,718)
     104 =+(720,738)
     105 =+(740,758)
     106 =+(760,778)
     107 =+(780,782)
     101 =+((102,114)
      27 =+[ 18,  18)+(101,101)
       3 =+[  4,   4)+[  6,   9)+[ 16,  17)+[ 22,  37)
      19 =+[ 18,  18)-[ 20,  21)-[ 38,  38)
       1 =+[  2,   3)
NO CHANGE= (   1,   1) (   4,   4) ( 16,  16) ( 91,  91) (103 )114)
THRESHOLD
-------------------------------------------------------------------------------------------------------------------------------
NO SECTIONS WILL BE CREATED
-------------------------------------------------------------------------------------------------------------------------------
```

```
-------------------------------------------------------------------------------------------------------------------------------
READING ZA=  92235 MAT= 1261 AWR= 2.33025+ 2 ENDF/B-IV FORMAT
-------------------------------------------------------------------------------------------------------------------------------
MF  MT  POINTS       KELVIN      Q-VALUE MESSAGE
-------------------------------------------------------------------------------------------------------------------------------
 3   1    1791  3 00000+ 2  0 00000+ 0
 3   2     764  3 00000+ 2  0 00000+ 0
 3   3    2481  3 00000+ 2 -1.30000+ 4
                                          E= ( 30558+ 4 EV  INSERTED POINT AT THRESHOLD WITH ZERO CROSS SECTION
                                          E= ( 30558+ 4 EV  DELETED POINTS PRECEDING OR NEAR THRESHOLD
                                                            DELETED  1 00000- 5 EV.
                                                            DELETED  1.25961- 5 EV.
                                                            DELETED  1.58661- 5 EV.
                                                            DELETED  1 99851- 6 EV.
                                                            DELETED  2 51736- 5 EV
                                                            DELETED  3.17087- 5 EV
                                                            DELETED  3 99405- 5 EV
                                                            DELETED  5.03094- 5 EV
                                                            DELETED  6 33701- 5 EV
                                                            DELETED  7 98216- 5 EV.
                                                            DELETED  1.00588- 4 EV
                                                            DELETED  1 26646- 4 EV.
                                                            DELETED  1.59524- 4 EV
                                                            DELETED  2.00939- 4 EV
                                                            DELETED  2 53104- 4 EV.
                                                            DELETED  3.18811- 4 EV
                                                            DELETED  4.01578- 4 EV.
                                                            DELETED  5.05830- 4 EV.
                                                            DELETED  6.37148- 4 EV.
                                                            DELETED  8.02557- 4 EV.
                                                            DELETED  1.01091- 3 EV.
                                                            DELETED  1.27335- 3 EV.
                                                            DELETED  1.60392- 3 EV.
                                                            DELETED  2.02031- 3 EV.
                                                            DELETED  2 58480- 3 EV.
                                                            DELETED  3.20545- 3 EV.
                                                            DELETED  4.03782- 3 EV.
                                                            DELETED  5.08582- 3 EV.
                                                            DELETED  6.40614- 3 EV.
                                                            DELETED  8.06923- 3 EV.
                                                            DELETED  1.01641- 2 EV.
                                                            DELETED  1.28027- 2 EV.
                                                            DELETED  1.61265- 2 EV.
                                                            DELETED  2.03130- 2 EV.
                                                            DELETED  2.55868- 2 EV.
                                                            DELETED  3 22289- 2 EV
                                                            DELETED  4.05958- 2 EV.
                                                            DELETED  5.11348- 2 EV.
                                                            DELETED  6.44098- 2 EV.
                                                            DELETED  8.11312- 2 EV.
                                                            DELETED  1.02194- 1 EV.
                                                            DELETED  1.28724- 1 EV
                                                            DELETED  1.62787- 1 EV.
                                                            DELETED  1.82741- 1 EV.
                                                            DELETED  2 03340- 1 EV
                                                            DELETED  2.42932- 1 EV.
                                                            DELETED  2.83340- 1 EV.
                                                            DELETED  3.01729- 1 EV
                                                            DELETED  3.20119- 1 EV.
                                                            DELETED  3.56897- 1 EV.
                                                            DELETED  3.91643- 1 EV.
                                                            DELETED  4.26388- 1 EV.
                                                            DELETED  4.64180- 1 EV
                                                            DELETED  5.07905- 1 EV.
                                                            DELETED  5.66258- 1 EV.
                                                            DELETED  6.39761- 1 EV
```

DELETED 7.41178- 1 EV.
DELETED 8.24820- 1 EV.
DELETED 8.90575- 1 EV
DELETED 9.47172- 1 EV
DELETED 9.78115- 1 EV.
DELETED 9.86322- 1 EV
DELETED 9.94529- 1 EV
DELETED 1.00737+ 0 EV.
DELETED 1.01290+ 0 EV.
DELETED 1.01659+ 0 EV.
DELETED 1.02028+ 0 EV
DELETED 1.02396+ 0 EV.
DELETED 1.02765+ 0 EV
DELETED 1.03318+ 0 EV
DELETED 1.04058+ 0 EV
DELETED 1.06636+ 0 EV
DELETED 1.07742+ 0 EV
DELETED 1.08480+ 0 EV
DELETED 1.09217+ 0 EV
DELETED 1.09955+ 0 EV
DELETED 1.10784+ 0 EV.
DELETED 1.11498+ 0 EV.
DELETED 1.11706+ 0 EV.
DELETED 1.11752+ 0 EV.
DELETED 1.11798+ 0 EV
DELETED 1.14989+ 0 EV.
DELETED 1.18200+ 0 EV.
DELETED 1.19100+ 0 EV.
DELETED 1.20000+ 0 EV.
DELETED 1.20900+ 0 EV
DELETED 1.21800+ 0 EV.
DELETED 1.22700+ 0 EV.
DELETED 1.23600+ 0 EV.
DELETED 1.30000+ 0 EV.
DELETED 1.36400+ 0 EV.
DELETED 1.40950+ 0 EV.
DELETED 1.45500+ 0 EV
DELETED 1.50000+ 0 EV
DELETED 1.54500+ 0 EV
DELETED 1.59050+ 0 EV.
DELETED 1.63600+ 0 EV
DELETED 1.68150+ 0 EV
DELETED 1.72700+ 0 EV
DELETED 1.77250+ 0 EV.
DELETED 1.81800+ 0 EV.
DELETED 1.86350+ 0 EV.
DELETED 1.90900+ 0 EV.
DELETED 1.95450+ 0 EV
DELETED 2.00000+ 0 EV.
DELETED 2.09100+ 0 EV
DELETED 2.18200+ 0 EV
DELETED 2.27300+ 0 EV
DELETED 2.36400+ 0 EV.
DELETED 2.45450+ 0 EV.
DELETED 2.54500+ 0 EV
DELETED 2.59050+ 0 EV
DELETED 2.63600+ 0 EV
DELETED 2.69050+ 0 EV
DELETED 2.74500+ 0 EV
DELETED 2.78103+ 0 EV.
DELETED 2.77707+ 0 EV.
DELETED 2.77779+ 0 EV
DELETED 2.77850+ 0 EV
DELETED 2.78137+ 0 EV
DELETED 2.78567+ 0 EV
DELETED 2.79180+ 0 EV
DELETED 2.79713+ 0 EV
DELETED 2.80450+ 0 EV
DELETED 2.81125+ 0 EV
DELETED 2.81800+ 0 EV.
DELETED 2.82282+ 0 EV
DELETED 2.83188+ 0 EV.
DELETED 2.84113+ 0 EV.
DELETED 2.85500+ 0 EV
DELETED 2.86088+ 0 EV
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3   16      30  3 00000+ 2 -5.30600+ 6
3   17      15  3 00000+ 2 -1.21470+ 7
3   18   20857  3 00000+ 2  1 92500+ 8
3   19   20976  3 00000+ 2  1 92500+ 8
3   20      16  3 00000+ 2  1 92500+ 8
3   21      15  3 00000+ 2  1.92500+ 8
3   51      11  3 00000+ 2 -1.30000+ 6
3   52      20  3.00000+ 2 -8 96000+ 6
                                                E: 4 98129+ 4 EV  INSERTED POINT AT THRESHOLD WITH ZERO CROSS SECTION
                                                E: 4 98129+ 4 EV  DELETED POINTS PRECEDING OR NEAR THRESHOLD
                                                                  DELETED  5 00000+ 4 EV
3   53      17  3 00000+ 2 -8 36000+ 6
                                                E: 8 39588+ 4 EV  INSERTED POINT AT THRESHOLD WITH ZERO CROSS SECTION
                                                E: 8 39588+ 8 EV  DELETED POINTS PRECEDING OR NEAR THRESHOLD
                                                                  DELETED  8 40000+ 4 EV
3   54      13  3 00000+ 2 -1 02500+ 5
                                                E: 1 02940+ 5 EV  INSERTED POINT AT THRESHOLD WITH ZERO CROSS SECTION
                                                E: 1 02940+ 5 EV  DELETED POINTS PRECEDING OR NEAR THRESHOLD
                                                                  DELETED  1 03000+ 5 EV
3   55      12  3 00000+ 2 -1.49200+ 5
                                                E: 1 49840+ 5 EV. INSERTED POINT AT THRESHOLD WITH ZERO CROSS SECTION
                                                E: 1 49840+ 5 EV. DELETED POINTS PRECEDING OR NEAR THRESHOLD
                                                                  DELETED  1 50000+ 5 EV
3   56      20  3 00000+ 2 -1 72000+ 5
                                                E: 1 72736+ 5 EV. INSERTED POINT AT THRESHOLD WITH ZERO CROSS SECTION
                                                E: 1 72736+ 5 EV  DELETED POINTS PRECEDING OR NEAR THRESHOLD
                                                                  DELETED  1 73000+ 5 EV
3   57      15  3 00000+ 2 -2 34000+ 5
3   58      17  3 00000+ 2 -2 68000+ 5
                                                E: 2 69150+ 5 EV  INSERTED POINT AT THRESHOLD WITH ZERO CROSS SECTION
                                                E: 2.69150+ 5 EV  DELETED POINTS PRECEDING OR NEAR THRESHOLD
                                                                  DELETED  2 70000+ 5 EV
3   59      18  3 00000+ 2 -3 56000+ 5
                                                E: 3.99708+ 5 EV  INSERTED POINT AT THRESHOLD WITH ZERO CROSS SECTION
                                                E: 3 99708+ 5 EV  DELETED POINTS PRECEDING OR NEAR THRESHOLD
                                                                  DELETED  6 00000+ 5 EV
3   60      20  3 00000+ 2 -5 97000+ 5
                                                E: 5 98562+ 5 EV  INSERTED POINT AT THRESHOLD WITH ZERO CROSS SECTION
                                                E: 5 98562+ 5 EV  DELETED POINTS PRECEDING OR NEAR THRESHOLD
                                                                  DELETED  8 00000+ 5 EV
3   61      26  3 00000+ 2 -9 95763+ 5
3   62      18  3 00000+ 2 -1 99153+ 6
3   63      20  3 00000+ 2 -2 98729+ 6
3   64      19  3 00000+ 2 -3 98305+ 6
3   65      12  3 00000+ 2 -4.97881+ 6
3   66      13  3 00000+ 2 -6 97458+ 6
3   91      37  3.00000+ 2 -9.48946+ 5
3   102   2384  3 00000+ 2  6.54510+ 6
3   251     11  0 00000+ 0  0 00000+ 0
3   252     18  0.00000+ 0  0 00000+ 0
3   253     14  0 00000+ 0  0 00000+ 0
```

ALL CROSS SECTIONS READ

MT= 4 DEFINED BY ADDING OR SUBTRACTING THE FOLLOWING MT NUMBERS

MF	MT	POINTS ADDED	POINTS SUM
3	51	11	11
3	52	20	28
3	53	17	32
3	54	13	33
3	55	12	34
3	56	20	40
3	57	15	41
3	58	17	42
3	59	18	43
3	60	20	46
3	61	26	66
3	62	18	70
3	63	20	76
3	64	19	81
3	65	12	87
3	66	13	95
3	91	37	111
3	4		111 SUMMATION

MT= 101 DEFINED BY ADDING OR SUBTRACTING THE FOLLOWING MT NUMBERS

MF	MT	POINTS ADDED	POINTS SUM
3	102	2384	2384
3	101		2384 SUMMATION

MT= 27 DEFINED BY ADDING OR SUBTRACTING THE FOLLOWING MT NUMBERS

```
   MT  POINTS  POINTS
       ADDED     SUM
   ----------------------------------------------------------------------------
    16    2087     2087
   101    2384     4090 RECONSTRUCTED
   ----------------------------------------------------------------------------
    27             4090 SUMMATION
   ----------------------------------------------------------------------------
   ----------------------------------------------------------------------------
      3 DEFINED BY ADDING OR SUBTRACTING THE FOLLOWING MT NUMBERS
   ----------------------------------------------------------------------------
    MT  POINTS  POINTS
       ADDED     SUM
   ----------------------------------------------------------------------------
    16      30       30
    17      15       24
     4     111      126 RECONSTRUCTED
    27    4090     4187 RECONSTRUCTED
   ----------------------------------------------------------------------------
 3   3             4187 SUMMATION
   ----------------------------------------------------------------------------
   ----------------------------------------------------------------------------
TH   19 DEFINED BY ADDING OR SUBTRACTING THE FOLLOWING MT NUMBERS
   ----------------------------------------------------------------------------
MF  MT  POINTS  POINTS
       ADDED     SUM
   ----------------------------------------------------------------------------
 3   18    2087     2087
 3  -20      16     2101
 3  -21      12     2113
   ----------------------------------------------------------------------------
 3   19            2113 SUMMATION
   ----------------------------------------------------------------------------
   ----------------------------------------------------------------------------
MT=    1 DEFINED BY ADDING OR SUBTRACTING THE FOLLOWING MT NUMBERS
   ----------------------------------------------------------------------------
MF  MT  POINTS  POINTS
       ADDED     SUM
   ----------------------------------------------------------------------------
 3   2      764      764
 3   3     4187     4794 RECONSTRUCTED
   ----------------------------------------------------------------------------
 3   1             4794 SUMMATION
   ----------------------------------------------------------------------------
   ----------------------------------------------------------------------------
DESCRIPTION OF OUTPUT CROSS SECTIONS
   ----------------------------------------------------------------------------
MF  MT  POINTS       KELVIN      Q-VALUE MESSAGES
   ----------------------------------------------------------------------------
 3   1    4794  3.00000+ 2  0.00000+ 0 RECONSTRUCTED
 3   2     764  3.00000+ 2  0.00000+ 0
 3   3    4187  3.00000+ 2 -1.30000+ 6 RECONSTRUCTED
 3   4     111  3.00000+ 2 -1.30000+ 6 RECONSTRUCTED
 3  16      30  3.00000+ 2 -5.39590+ 6
 3  17      15  3.00000+ 2 -1.21470+ 7
 3  18    2087  3.00000+ 2  1.92500+ 6
 3  19    2113  3.00000+ 2  1.92500+ 6 RECONSTRUCTED
 3  20      16  3.00000+ 2  1.92500+ 6
 3  21      15  3.00000+ 2  1.92500+ 6
 3  51      11  3.00000+ 2 -1.30000+ 6
 3  52      20  3.00000+ 2 -4.96000+ 6
 3  53      17  3.00000+ 2 -8.36000+ 6
 3  54      13  3.00000+ 2 -1.02500+ 7
 3  55      12  3.00000+ 2 -1.49200+ 7
 3  56      20  3.00000+ 2 -1.72000+ 7
 3  57      15  3.00000+ 2 -2.34000+ 7
 3  58      17  3.00000+ 2 -3.68000+ 7
 3  59      18  3.00000+ 2 -3.98000+ 7
 3  60      20  3.00000+ 2 -5.97000+ 7
 3  61      26  3.00000+ 2 -9.95763+ 7
 3  62      18  3.00000+ 2 -1.99153+ 8
 3  63      20  3.00000+ 2 -2.98729+ 8
 3  64      19  3.00000+ 2 -3.98305+ 8
 3  65      12  3.00000+ 2 -4.97881+ 8
 3  66      13  3.00000+ 2 -5.97458+ 8
 3  91      37  3.00000+ 2 -8.45840+ 7
 3 102    2384  3.00000+ 2  6.54510+ 6
 3 251      11  0.00000+ 0  0.00000+ 0
 3 252      18  0.00000+ 0  0.00000+ 0
 3 253      14  0.00000+ 0  0.00000+ 0
   ----------------------------------------------------------------------------
ALL CROSS SECTIONS OUTPUT
   ----------------------------------------------------------------------------
   ----------------------------------------------------------------------------
END OF RUN
   ----------------------------------------------------------------------------
```

Output Report DICTION

CREATE NEW SECTION INDEX (DICTION 86-1)

FIRST PASS READING ENDF/B DATA

MAT	MESSAGES
1261	

SECOND PASS. CREATING NEW INDEX

ENDF/B FORMAT	MAT	MF	MT	CARDS	MOD
IV	1261	1	451	383	0
	1261	1	452	6	0
	1261	1	453	3	0
	1261	1	454	1698	0
	1261	1	455	8	0
	1261	1	456	6	0
	1261	1	457	60	0
	1261	2	151	871	0
	1261	3	1	1631	0
	1261	3	2	258	0
	1261	3	3	1399	0
	1261	3	4	40	0
	1261	3	16	13	0
	1261	3	17	8	0
	1261	3	18	699	0
	1261	3	19	708	0
	1261	3	20	9	0
	1261	3	21	8	0
	1261	3	51	7	0
	1261	3	52	10	0
	1261	3	53	9	0
	1261	3	54	8	0
	1261	3	55	7	0
	1261	3	56	10	0
	1261	3	57	8	0
	1261	3	58	9	0
	1261	3	59	8	0
	1261	3	60	10	0
	1261	3	61	12	0
	1261	3	62	9	0
	1261	3	63	10	0
	1261	3	64	10	0
	1261	3	65	7	0
	1261	3	66	8	0
	1261	3	91	16	0
	1261	3	102	798	0
	1261	3	251	7	0
	1261	3	252	8	0
	1261	3	253	8	0
	1261	4	2	135	0
	1261	4	16	10	0
	1261	4	17	10	0
	1261	4	18	10	0
	1261	4	19	10	0
	1261	4	20	10	0
	1261	4	21	10	0
	1261	4	51	10	0
	1261	4	52	10	0
	1261	4	53	10	0
	1261	4	54	10	0
	1261	4	55	10	0
	1261	4	56	10	0
	1261	4	57	10	0
	1261	4	58	10	0
	1261	4	59	10	0
	1261	4	60	10	0
	1261	4	61	31	0
	1261	4	62	31	0
	1261	4	63	31	0
	1261	4	64	31	0
	1261	4	65	31	0
	1261	4	66	31	0
	1261	4	91	10	0
	1261	5	16	15	0
	1261	5	17	11	0
	1261	5	18	7	0
	1261	5	19	7	0
	1261	5	20	28	0
	1261	5	21	22	0
	1261	5	91	7	0
	1261	5	455	107	0
	1261	12	4	253	0
	1261	12	18	5	0
	1261	12	102	5	0
	1261	13	3	7	0
	1261	14	3	1	0
	1261	14	4	1	0
	1261	14	18	1	0
	1261	14	102	1	0
	1261	15	3	136	0
	1261	15	18	54	0
	1261	15	102	58	0

ORIGINAL CARD COUNT	10077
FINAL CARD COUNT	10077

Output Report: CONVERT

```
CONVERT FORTRAN PROGRAMS (CONVERT 86-1)
INPUT KEYWORDS    COMMENTS
( 1) IBM
( 2) DOUBLE
( 3) FORTRAN-77
FIRST CARD OF FORTRAN PROGRAM                                    REC00001D
C     PROGRAM RECENT(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT,TAPE10,
C     PROGRAM AND COMMENTS
INDEX  LINE AND COMMENTS
SUMMARY OF CHANGES
          STATEMENTS TURNED
KEYWORD      ON      OFF   STATUS
DOUBLE        0        0     OFF
IBM           0        0     OFF
CDC-7600      0      113      ON
CRAY-1        0        0      ON
SINGLE      193        0     OFF
DOUBLE       28      113     OFF
FORTRAN-77    0        0     OFF
FORTRAN-H     0        0     OFF
MARNELL
JAERI
END OF RUN   7325 CARDS PROCESSED
```

Output Report: RELABEL

```
INCREMENTAL STATEMENT LABELS (RELABEL 86-1)                      REC00010
C     PROGRAM RECENT(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT,TAPE10,   REC09820
      SUBROUTINE READIN                                          REC11540
      SUBROUTINE NXTMAT                                          REC12300
      SUBROUTINE ZAHOLI(ZA,ZABCD)                                REC12880
      SUBROUTINE COMPND(ZA,ZABCD)                                REC14120
      SUBROUTINE FILE1(IMDONE)                                   REC16030
      SUBROUTINE FILE2                                           REC19750
      SUBROUTINE ERROR2(IE)                                      REC20240
      SUBROUTINE READ2                                           REC24580
      SUBROUTINE FILE3                                           REC30200
      SUBROUTINE RDBW                                            REC33370
      SUBROUTINE SPINER(SPI,LROW)                                REC33770
      SUBROUTINE RDAP                                            REC35250
      SUBROUTINE RDRMAS                                          REC37680
      SUBROUTINE RDAMS                                           REC40090
      SUBROUTINE RDAA                                            REC42810
      SUBROUTINE RDUA                                            REC45610
      SUBROUTINE LINIT(IPATH)                                    REC46280
      SUBROUTINE SIGMA(E,SIGNO)                                  REC46950
      SUBROUTINE SETRHO(E)
```