INTERNATIONAL ATOMIC ENERGY AGENCY

NUCLEAR DATA SERVICES

DOCUMENTATION SERIES OF THE IAEA NUCLEAR DATA SECTION

IAEA-NDS-80
Rev. 1

PROGRAM X4TOC4

(Version 2001-3)

Translation of experimental data from the EXFOR format
to a computation format

by

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Abstract: Experimental nuclear reaction data are world-wide compiled in EXFOR format (see document IAEA-NDS-1). The computer program X4TOC4 described in the present document translates data from the rather flexible EXFOR format to the more rigid "computation format" which is suitable for input to further computer processing of the data including graphical plotting (see document IAEA-NDS-79).

The program is available upon request cost free from the IAEA Nuclear Data Section.

March 2001

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PROGRAM X4TOC4

(Version 2001-3)

Translation of experimental data from the EXFOR format
to a computation format

Introduction

Enclosed is the documentation for program X4TOC4. The program is designed to translate experimental data from the EXFOR format (which allows variable units and column order for data) to a computation format (which uses a fixed set of units and column order for data).

The enclosed documentation includes,

1) A listing of the comment cards from the beginning of the program.

2) A listing of the three translation dictionaries used by the program

3) A listing of an example output report.

4) A listing of example EXFOR data.

5) A listing of the corresponding data in the computation format.

6) Plots of the data, obtained using program PLOTC4 (see document IAEA-NDS-79).

The enclosed documentation is up to date as of March 2001. The program documentation on the comment cards at the beginning of the program and the translation dictionaries are continuously updated. Before using this program the user is advised to consult the comment cards at the beginning of the program and the translation dictionaries for the latest documentation.

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The comments can be extracted using system search routines by copying to "x4toc4.man" all records beginning with "C-". For example:

Unix:	`grep C-M x4toc4.f >x4toc4.man`
VMS	`search x4toc4.f C-M /out=x4toc4.man`
Dos	`find C-M x4toc4.for >x4toc4.man`

Program X4TOC4

Comment cards

USERS' GUIDE FOR PROGRAM X4TOC4
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PURPOSE

This program is designed to translate experimental data from the EXFOR format to a computation format.

WHAT COMPUTERS WILL THE PROGRAM RUN ON

The program has been implemented on a variety of computers from Cray and IBM mainframe to Sun workstations to a PC. The program is small enough to run on virtually any computer.

EXFOR FORMAT

The EXFOR format is designed to allow experimentally measured data to be coded in a computer readable format in a very flexible form. In particular the data can be entered in essentially any set of units (e.g., eV vs. barns or KeV vs. milli-barns) and in any table format; essentially the table may be entered exactly as published by an author (e.g., energy followed by columns of cross sections in any order).

The EXFOR format is table oriented in the sense that data from a given measurement are collected together and can be presented in a single, or as a series of tables.

The advantage of the EXFOR format is that since data can be coded essentially as published by an author problems of unit conversion and re-formatting tables prior to coding are avoided and the author can easily check the coded data. The result is a greatly improved reliability of the coded data.

The disadvantage of the EXFOR format is that since physically comparable data from different measurements (e.g. Fe-56 total cross sections) may be given in a variety of different units and formats it is very difficult to use in applications. In addition the table oriented EXFOR system makes it difficult to collect together physically comparable data from different measurements.

COMPUTATION FORMAT

The computation format used by this program is designed to present experimental data in a fixed set of units and column order. By starting from data in the EXFOR format and translating data to the computation format it is possible to combine the advantages of the improved reliability of the data coded in the EXFOR format with the advantages of a fixed unit and column order format for use in subsequent applications.

In addition the computation format is point oriented (as opposed the table oriented EXFOR format). Each line of the computation format represents a single data point. This makes it possible to sort data in the computation format into any desired order for use in application, e.g., sort 26-Fe-26 (n,2n) data from a number of measurements together into energy order to simplify comparisons.

EXFOR VS. COMPUTATION FORMAT

The computation format is not intended as a substitute for the EXFOR format, rather the two are complementary. The EXFOR format contains much more information than can be included in computation formats and this information should be consulted and used during evaluation. The computation format is only intended to simplify use of the data during evaluation, or other applications.

RELATIONSHIP TO ENDF

It is assumed that one of the major uses of this program will be to prepare data for subsequent use in evaluation and/or to compare available evaluated and experimental data. As such the computation format has been designed to allow data to be reduced to a form in which data are classified in a manner similar to ENDF data.

In particular the EXFOR classification of data by the EXFOR keyword reaction (or ISO-QUANT, etc.) is replaced by classifying the data by (1) projectile, (2) target - ZA, (3) type of data (ENDF MF number), (4) reaction (ENDF MT number). In addition the standard units used by the translation program were selected to be the same as the units used by ENDF (e.g., eV, barns, etc.).

The result of putting data into the computation format is that it is easy to decide if the data is comparable to evaluated data (e.g. same ZA, MF, MT) and once it is decided that data is comparable, evaluation and/or comparison is simplified because the data is in the same units as ENDF (e.g., eV vs. barns).

EXTENSIONS OF ENDF CONVENTIONS

For all types of data which are physically comparable to data, which can be included in the ENDF data, this program uses the ENDF definitions of (1) type of data (ENDF MF number), (2) reaction (ENDF MT number). For example all cross sections are represented by MF=3, angular distributions by MF=4, energy distributions by MF=5 and double differential distributions by MF=6. Similarly for simple reactions such as total, elastic etc., the data are translated into corresponding MT=1,2, etc., respectively.

Since many types of data which appear in EXFOR do not have a one to one correspondence to data which appears in ENDF the ENDF classification of type of data (MF) and reaction (MT) have been extended to allow additional types of data and reactions to be translated (e.g., define MF numbers for ratios, define MT numbers for (n,np)+(n,na) reactions).

The ENDF MF is a 2 digit number and the MT is a 3 digit number. In the computation format MF has been extended to 3 digits and the MT has been expanded to 4 digits. These extensions allow the user the flexibility to translate virtually any EXFOR data to a fixed set of units and column order for subsequent use in applications.

Some extensions of MF and MT have already been established (for, details see the input dictionaries described below) and if at all possible these conventions should be followed by the user. The user has the flexibility of establishing any conventions that may be required to meet his or her needs, but in this case it is the responsibility of the user to properly interpret and use the translated data.

DIRECT COMPARISON TO ENDF DATA

Although the ENDF classification system of MF and MT is used for translation, generally very little of the EXFOR data is directly

comparable to ENDF data. Generally cross sections (MF=3) are directly comparable. However, it must be realized that angular (MF=4) and energy (MF=5) and double differential (MF=6) data are given in ENDF in a normalized (i.e., normalized to unity when integrated) form, whereas data in EXFOR are generally given in an un-normalized form (e.g.,angular distributions in barns/steradian).

After this program has been used to translate EXFOR data to the computation format the user may make additional data directly comparable to the corresponding ENDF data by either,
(1) Normalizing the data in the computation format, or,
(2) Converting ENDF data to un-normalized form.
This involves selecting an integrated cross section as a standard to use for the comparison (e.g., for a 14.2 MeV elastic angular distribution use the 14.2 MeV ENDF elastic cross section).

Since the selection of a standard to use for comparison in highly application dependent it has been decided that it is better to use this program to translate data exactly as given in EXFOR (except for conversion to a standard set of units) and to allow the user to subsequently select a standard for re-normalization.

CONTROL OF TRANSLATION

The user has complete control over what data is translated, where given types of data appear in the computation format and the units of the data in the computation format.

This is accomplished by using three dictionaries which control the translation. All three of these dictionaries are distributed with this program. Each dictionary is a simple card image file which may be modified by the user at any time to meet specific needs. The three dictionaries are:

(1) EXFOR REACTION - PROJECTILE, MF, MT EQUIVALENCE
This dictionary tells the program for each EXFOR reaction what projectile, MF and MT to output in the computation format (e.g.,(n,tot) = neutron, MF =3 (cross section),MT =1 (total)). If a reaction read from the EXFOR format is not found in this dictionary, or the assigned MF or MT is not positive the EXFOR data will simply be skipped and not translated. Using this dictionary the user has control over which data is translated and what MF and MT are assigned to each EXFOR reaction.

(2) EXFOR COLUMN TITLE - COMPUTATION FORMAT OUTPUT FIELD
Once the EXFOR reaction has been translated and assigned an equivalent MF and MT this dictionary tells the program where to place each EXFOR column in the computation format. The assigned MF number can be used to output an EXFOR column with the same title into different columns of the computation format based on different MF numbers. For example, for cross sections (MF=3) the user may use EN-MIN and EN-MAX to define an average incident energy to be output in the first field of the computation format and an equivalent energy uncertainty in the second field of the computation format. Alternatively, for resonance integrals (MF=213) the user may decide to output EN-MIN and EN-MAX in the first two fields of the computation format to define the energy range of the resonance integral.

There are 8 output fields in the computation format and for any given MF number the user may output any EXFOR column into any of these fields. Any EXFOR title which is not assigned to an output field 1 to 8 will be ignored and not output. This allows the user to selectively translate portions of EXFOR data tables to meet any given need. For example, by simply modifying this dictionary the user has control over whether an EXFOR column DATA-ERR3 is translated or ignored, and if translated the user has control over which of the 8

computation format data fields DATA-ERR3 will appear in.

(3) EXFOR COLUMN UNITS - COMPUTATION FORMAT UNITS
This dictionary tells the program how to convert each EXFOR unit into standard units. As distributed this dictionary will convert all EXFOR units to ENDF compatible units. However, the user has the option to change this dictionary at any time to obtain any output units to meet his or her needs. For example if the user would like output in MeV vs. milli-barns instead of eV vs. barns it is merely necessary to modify this dictionary.

OPERATIONS ON DATA

In addition to the information described above each of the three dictionaries allows the user to select from a menu of operations which may be performed on the data (for a complete and up-to-date list of available operations see the dictionaries). For example, the reaction dictionary allows the user to specify that legendre coefficients may be re-normalized, the title dictionary allows the user to specify that EN-MIN and EN-MAX are to be converted to an average energy and associated energy uncertainty and the units dictionary allows the user to specify that angles should be converted to cosines.

These operations are completely under the control of the user and by simply modifying the dictionaries the user can control whether or not each operation is performed (e.g., if you want to output angles instead of cosines modify the units dictionary by removing the option to convert from angle to cosine from the EXFOR units ASEC, AMIN and ADEG).

COMPUTATION FORMAT UNITS

As distributed the Units dictionary will convert all EXFOR units to ENDF units:

```
eV         = energy
barns      = cross section
steradians = solid angle
seconds    = time
kelvin     = temperature
```

If the user would like to obtain any other output units it is merely necessary to modify the units dictionary (see units dictionary for details).

A LEARNING PROGRAM

As distributed the three translation dictionaries do not contain definitions of how to translate all EXFOR reactions, titles and units. At the present time this program has only been used to translate a small portion of the data included in the EXFOR system and the dictionaries only contain sufficient information to translate the EXFOR data which has been encountered to date.

It is difficult and dangerous to try to define translation rules for all types of EXFOR data without examining actual EXFOR data. therefore only when a new reaction, title or unit is encountered during translation will the actual EXFOR data be examined, a decision made as to how to best translate the data and the dictionaries updated.

Generally once a given type of EXFOR data has been encountered and the dictionaries updated to define how to translate the data the same rules can be used to translate all similar data. Therefore over a period of time user experience will be accumulated in the translation dictionaries and the program will learn to properly

translate more and more types of EXFOR data.

UNDEFINED EXFOR REACTIONS, TITLES AND UNITS

In order to assist the user to define new types of EXFOR data as they are encountered during translation the output report from this program will indicate the number of EXFOR reactions, titles and units which have been encountered during translation which are not defined in the translation dictionaries. In additional all undefined reactions, titles and units will be written to output Unit 4 (NEWX4).

Based on comparison to the reaction, title and units dictionaries if an EXFOR reaction, title or units is encountered during translation that is not defined in the dictionaries it will be written to Unit 4 (NEWX4). This information is written in a form that can be easily edited and added to a translation dictionary. After updating the dictionaries if this program is then run a second time using the same EXFOR data all of the EXFOR data can be translated.

COMPUTATION FORMAT

The computation format uses a classification system and units which are compatible with ENDF. Data is classified by (1) ZA of projectile, (2) ZA of target, (3) metastable state of target, (4) MF - type of data, (5) MT - reaction, (6) metastable state of residual nucleus. To identify the source of the data the first author and year and the EXFOR accession and sub-accession number are included in the format. In addition, fields are assigned to define the status of the EXFOR data (e.g., S = superceded), whether data is in the laboratory or center-of-mass frame of reference and the physical significance of the last 2 output fields (LVL = level energy, HL = half-life). Finally the format includes 8 fields in which the output data are contained (e.g., incident energy, data, cosine, uncertainties, etc.)

Columns	Description
1- 5	Projectile ZA (e.g. neutron =1, proton =1001) (defined by reaction dictionary).
6- 11	Target ZA (e.g. 26-Fe-56 = 26056) (defined by EXFOR reaction).
12	Target metastable state (e.g. 26-FE-56m = M) (defined by EXFOR reaction).
13- 15	MF (ENDF conventions, plus additions) (defined by reaction dictionary).
16- 19	MT (ENDF conventions, plus additions) (defined by reaction dictionary).
20	Product metastable state (e.g. 26-FE-56M = M) (defined by EXFOR reaction).
21	EXFOR status (defined by EXFOR keyword status).
22	Center-of-mass flag (C=center-of-mass, blank=lab) (defined by EXFOR title dictionary).
23- 94	8 data fields (each in E9.3 format defined below) (defined by MF and title dictionary).
95- 97	Identification of data fields 7 and 8 (e.g., LVL=level, HL=half-life, etc.). For a complete list of codes see title dictionary (defined by MF and title dictionary).
98-122	Reference (first author and year) (defined by EXFOR keywords title and reference).
123-127	EXFOR accession number (defined by EXFOR format).
128-130	EXFOR sub-accession number (defined by EXFOR format).
131	Multi-dimension table flag

(defined by EXFOR keyword reaction or common fields).

PRECISION OF THE 8 DATA FIELDS

If written in normal format E9.2 format the output from this this program would give data to only 2 or 3 digits of accuracy, depending on the computer used (e.g., 0.23E+02 or 2.34E+01), which is not sufficient for many applications (e.g., energy of cross section points in the resonance region).

In order to avoid this problem this program will output data in a special compatible format to allow up to 7 digits of accuracy (i.e. more than the full word accuracy of IBM computers).

Numbers between 0.01 and less than 10 million will be output in F (rather than E format). For example, the energy 12.3456 KeV will be output as 123456.0. Numbers less than 0.01 or greater than 10 million will be output in E format, but without as E and an exponent of 1 or 2 digits. For example 14.123 MeV will be output as "1.4123+7".

These output conventions have been used for many years with ENDF related programs and have been proven to be FORTRAN compatible for use on virtually any computer. For example, any fortran program which is written to read this data using an E9.2 format will read the data properly whether the data is actually in E or F format.

Generally maintaining high precision in the data is most important for the independent variable, particularly incident energy. Since we do not expect very narrow resonance structure below 0.01 eV or above 10 MeV generally these output conventions will maintain the accuracy of the EXFOR data to meet requirements.

DEFINITION OF 8 COMPUTATION FORMAT DATA FIELDS

The user may use the title dictionary to output any EXFOR column into any computation format data field. As distributed the title dictionary contains a number of conventions which if at all possible should be followed by the users. The general definitions of the 8 computation format data fields are:

Data field	Definition
1	Projectile incident energy
2	Projectile incident energy uncertainty
3	Data, e.g., cross section, angular distribution, etc.
4	Data uncertainty
5	Cosine or legendre order
6	Cosine uncertainty
7	Identified by columns 95-97 (e.g.,level E, half-life)
8	Identified by columns 95-97 (e.g.,level E, uncertainty)

The physical significance of each field is defined by the assigned MF number. For example, for MF =3 (cross sections), columns 1 and 2 contain the incident projectile energy and its uncertainty in eV, respectively and columns 3 - 4 contain the cross section and its uncertainty in barns, respectively and columns 7 and 8 may contain a level energy and its uncertainty in eV or a half-life and its uncertainty in seconds.

SPECIAL CONVENTIONS

The above conventions are appropriate for most types of data in the ENDF system. In order to allow this program to plot additional types of data the following special conventions have been adopted,

Cross section ratios (MF = 203) - Field 5 = MT of denominator.
Field 6 = ZA of denominator.

Resonance integrals - Field 1 = lower energy limit.
(MF = 213) Field 2 = upper energy limit.
Spectrum averages - Field 1 = lower energy limit.
(MF = 223) Field 2 = upper energy limit.
Fission yield data - Field 5 = ZA of fission fragment.
(MF = 801) Field 6 = mass of fission fragment.
Production - Field 6 = ZA of product.
(MT = 9000-9999)

See, remarks below on metastable state flags.

REQUIRED DATA FIELDS

For various types of data the program will check if all required fields are defined and non-blank. If they are not warning messages will be printed. If the data field (Field 3) is not defined or blank the data point will not be output. If the data field is not defined this usually indicates an error in the EXFOR data. Blank data fields are quite common in multi-dimensional tables and a warning may or may not indicate an error (check the EXFOR data to see if it is correct).

The program considers that the following fields are required:

MF (Data type)	Data field (X = Required)							
	1	2	3	4	5	6	7	8
3 (Cross sections)	X		X					
4 (Angular dist.)	X		X		X			
5 (Energy dist.)	X		X				X	
6 (Double diff.)	X		X		X		X	
154 (Legendre coeff.)	X		X		X			
203 (Ratios)	X		X		X	X		
801 (Yield data).	X		X		X	X		

(See the above definition of the 8 data fields).

MULTI-DIMENSIONAL TABLES

The program can translate multi-dimensional EXFOR tables for:
(1) Multiple reactions following the EXFOR keyword reaction (ISO-QUANT, etc.) with each reaction identified by a character in column 11.
(2) Single reactions with multiple common fields each identified by a character in the eleventh column of each field.
(3) The old ISO-QUANT, etc. convention of reactions separated by commas, e.g., ((90-TH-232,NG)/(29-CU-0,NG)),(29-CU-0,NG)).

TRANSLATION OF EXFOR REACTIONS

Not all EXFOR reactions (ISO-QUANT, etc.) can be translated by this program. In order to translate each reaction the program will first break each reaction into a series of simple reactions and remove and save the target and residual ZA, E.G.:

((26-FE-56(N,G)26-FE-57-M1,,SIG)/(26-FE-56(N,G)26-FE-57-G,,SIG))

is broken down to define

ZA-target = 26056 , ZA-residual = 260571, reaction = (N,G),SIG

Note residual metastable state flags. See explanation below.

The program will then define an equivalent MF, MT for each reaction.

The program will next translate the following types of

reactions:
(1) Simple reactions
    (N,G),SIG
(2) Equivalent reactions
    ((N,G),SIG)=...anything else....
    After decoding the first simple reaction the program assumes that the first simple reaction is truly equivalent to the remainder of the reaction and defines ZA, MF and MT based on the first simple reaction.
(3) Simple ratios
    ((N,G)M1/G,,SIG/RAT) or ((N,G)M1,SIG)/((N,G)G,SIG)
(4) Complex reactions - all with the same equivalent ZA
    ((N,EL),WID,,G)*((N,G),WID)/((N,TOT),WID)
(5) Other reactions
    (((N,G),SIG)/((N,G),SIG),(N,G),SIG))

    If the reaction is not one of the above types the program will try to use the entire EXFOR reaction, including target and residual ZA and see if it is defined in reaction equivalent dictionary. If an MF, MT is defined for the entire reaction the program will use the target and residual ZA from the first simple reaction to translate the data. This last form may be used to insure that almost all EXFOR reaction can be translated, regardless of how complicated it is (for examples see reaction dictionary) however the user should carefully check the output to insure that the data has been translated as intended.

The only reactions that have so far been found that cannot be correctly translated are ratios of production cross sections, e.g., (29-CU-0(P,X)26-FE-56)/(28-NI-0(P,X)26-FE-58) because ratio data requires fields 5 and 6 for the denominator MT and ZA and ratio data requires field 5 for the product ZA. When this case is encountered the program will print an error message and output the denominator MT and ZA in fields 5 and 6. In this case the output will identify the numerator as ZA=29000, MT=9001 and the denominator as ZA=28000, MT=9001. One solution is to modify the output of this program by defining two reactions, e.g., MT = 8001 = (p,x) 26-Fe-56 and MT = 8002 = (p,x) 26-Fe-58, modify the numerator MT to 8001 and denominator MT to 8002 and then properly interpreting the data using these definition in all applications (for examples, see program PLOTC4 input directions for proton induced reactions).

OUTPUT REPORT

This program will write a report on Unit 6 (OUTP) to allow the user to monitor the translation of the EXFOR data. It is extremely important that the user read this report and not simply assume that all of the data has been properly translated.

After identifying each EXFOR accession, sub-accession number, ZA, MF, MT and reaction the program can print two types of messages:

WARNING = Something unusual has occurred. The user should carefully check to insure that the output data has been properly translated.
OPERATION = One of the defined reaction, title or unit operations has been performed on the data. The user should carefully check to insure that the proper operation has been performed.

If the user does not agree with how the data has been translated the three dictionaries may to be modified and the program re-run. For example, if the program prints a warning that the title dictionary tells it to output E-ERR1, E-ERR2, E-ERR3 all in the same computation format field, followed by an operation that says

the program will only output E-ERR1 and ignore the other 2 EXFOR fields, if the user would rather output E-ERR2 and ignore E-ERR1 and E-ERR3 it is merely necessary to modify the title dictionary to ignore E-ERR1 and E-ERR3 and select E-ERR2 and then re-run the program.

METASTABLE STATE

The computation format allows the metastable state of the target and residual nucleus to be identified. For ratio data metastable state of both numerator and denominator of the ratio may be defined.

The metastable state of the target is identified in column 12 and the metastable state of the residual nuclues in column 20. For ratio data the metastable state of the denominator target and residual nucleus are identified by output the denominator ZA and MT in the form ZA.M and MT.M (e.g., 26056.9 and 102.1). Columns 12 and 20 could contain characters such as M, but to maintain the eight output fields in strictly numerical form the denominator ZA.M and MT.M will be output in numerical form. The possible characters that may appear in columns 12 or 20 and their numerical equivalents used with ratio denominator ZA and MT include:

Definition	Column 12 or 20	Equivalent
ground	G	0
m1	1	1
m2	2	2
m3	3	3
m4	4	4
m5	5	5
unknown	?	6
m	M	7
more than 1	+	8
all or total	T	9
all or total	blank	9

By convention if an EXFOR reaction does not specify a metastable state the state is defined in the computation format to be..ALL.. (i.e., blank in column 12 or 20, 9 in ratio ZA or MT).

For example, for a ratio if the ZA.m and MT.m are output as 26056.9 and 102.1, respectively the ratio denominator target is 26-Fe-56 (all) and the reaction is capture (MT=102) leaving the residual nucleus in the m1 state.

NOTE: Since most data will not contain a metastable state flag the above convention to output the ZA and MT of the denominator of ratios allows the user to read and use the denominator ZA and MT as integers (effectively ignoring any metastable state flag) or if necessary to determine the metastable state.

EXFOR STATUS

Column 21 of each computation format record may contain blank (status not specified) or one to the following characters:

Column 21	Definition
U	Un-normalized (indicated by unit translation dictionary) This condition has priority over the EXFOR status and is used to indicate that the data is not in standard output units).
A	Approved by author
C	Correlated
D	Dependent
O	Outdated

```
   P        Preliminary
   R        Re-normalized
   S        Superceded

 If data has any other EXFOR status (e.g., translated from SCISRS)
 it will be ignored and the status field will be output as blank.

 INPUT FILES
 -----------
 Unit  Description
 ----  -----------
  10   EXFOR data (to be translated) (BCD - 80 characters/record)
  12   EXFOR reaction dictionary     (BCD - 80 characters/record)
  14   EXFOR title dictionary        (BCD - 80 characters/record)
  15   EXFOR units dictionary        (BCD - 80 characters/record)

 OUTPUT FILES
 ------------
 Unit  Description
 ----  -----------
   4   List of all undefined EXFOR reactions, titles and units
       found during the translation (if any).(BCD -  80 characters)
   6   Output report                          (BCD - 132 characters)
  11   Computation format experimental data   (BCD - 131 characters)

 SCRATCH FILES
 -------------
 NONE

 INPUT PARAMETERS
 ----------------
 None

 REPORTING ERRORS
 ----------------
 In order to improve this code and make future versions more
 compatible for use on as many different types of computers as
 possible please report all compiler diagnostics and/or operating
 problems to the author at the above address.

 Please remember if you simply report "I'VE GOT A PROBLEM" and do
 not adequately describe exactly how you were using the program
 it will be impossible for the author to help you. When a problem
 arises please write to the author, describe the problem in as much
 detail as possible, identify the version of the program that you
 are using (e.g. Version 2001-3) and send the following information
 in computer-readable form (e-mail, floppy disc, etc.) to the author:

 (1) A copy of the program you are using
 (2) A copy of compiler diagnostics (if any)
 (3) A copy of the JCL deck you used to execute the program
 (4) A copy of the 3 translation dictionaries you are using
 (5) A copy of the EXFOR format data you using
 (6) A copy of the computation format data you produce
 (7) A copy of the output report from the program.

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

***** COMPUTER DEPENDENT CODING ******

COMPUTER DEPENDENT CODING
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* This program is designed to be used with a Fortran-77 or
  Fortran-90 compiler.
```

```
* The only compiler dependent format statements involve,
 (1) CHARACTER*1 and CHARACTER*4
 (2) Testing for errors and end of file during reads.

* It is assumed that characters are stored in successive storage
  locations and that characters may be treated as continuous strings
  of characters in either CHARACTER*4 or CHARACTER*1 format.

* For example, if one subroutine contains,

  CHARACTER*4 BCD
  DIMENSION BCD(10)

 the array BCD is assumed to be an array of 40 characters in
 successive byte locations.

 It is assumed that this array can be passed as an argument to
 another subroutine and used as CHARACTER*1, e.g.,

  CALL DUMMY(BCD)

  SUBROUTINE DUMMY(BCD)
  CHARACTER*1 BCD
  DIMENSION BCD(40)

* This convention will work on all 32 bit per word computers (e.g.,
  IBM or IBM compatible computers).

* For longer word length computers (e.g., CDC or CRAY) it is
  suggested that before implementing and using this program the
  user first verify that character strings can be treated as
  described above, e.g., write a simple program to read a character
  string of 40 characters in CHARACTER*4 format, pass it to a
  subroutine which uses the character string in CHARACTER*1 format
  and print the character string in the subroutine. If the character
  string is printed as a continuous string you will be able to use
  this program. If the character string is not printed as a
  continuous string it is not recommended that you use this rogram.

* This program using the Fortran-77 convention for testing for
  reading errors and end of file during reads, e.g.,

  READ(10,1000,END=100,ERR=200) A,B,C,D
```

Reaction Dictionary

```
EXFOR REACTION - MF/MT EQUIVALENCE TABLE                                    1
=======================================                                     1
COMMENT CARDS ARE DEFINED BY A 1 IN COLUMN 80                               1
REACTION DEFINITIONS MUST HAVE A BLANK COLUMN 80                            1
WARNING...FAILURE TO FOLLOW THIS CONVENTION WILL RESULT IN ERRORS            1
                                                                            1
FORMAT                                                                      1
======                                                                      1
COLUMNS   DEFINITION                                                        1
=======   ==========                                                        1
  1- 48   EXFOR REACTION (WARNING...DO NOT GO BEYOND COLUMN 48).            1
 49- 53   PROJECTILE ZA (E.G. NEUTRON = 1, PROTON = 1001)                   1
 54- 56   MF NUMBER (USE ENDF/B CONVENTION FOR MF =1 TO 99, MF=100 TO 999    1
          TO TRANSLATE DATA NOT EQUIVALENT TO ENDF/B)                       1
 57- 60   MT NUMBER (USE ENDF/B CONVENTION FOR MT =1 TO 999, MT=1000 TO 9999 1
          TO TRANSLATE DATA NOT EQUIVALENT TO ENDF/B)                       1
 61- 63   OPERATION NUMBER (SEE, LIST BELOW FOR DEFINITIONS).               1
                                                                            1
FOR COMPLICATED REACTIONS OF OVER 48 CHARACTERS IT IS ONLY NECESSARY TO      1
LIST THE FIRST 48 CHARACTERS, AS OPPOSED TO THE ENTIRE REACTION, AS LONG     1
AS THE FIRST 48 CHARACTERS UNIQUELY DEFINE THE REACTION, E.G., SEE           1
REACTION DEFINITIONS UNDER YIELD DATA.                                       1
                                                                            1
TRANSLATION CONVENTIONS                                                     1
=======================                                                     1
NOTE, THE PROGRAM TO CONVERT DATA FROM THE EXFOR TO COMPUTATION FORMAT       1
HAS BEEN DESIGNED TO ALLOW THE USER TO CONVERT VIRTUALLY ANY EXFOR DATA      1
TO THE COMPUTATION FORMAT. THE USER SHOULD USE THE ENDF/B DEFINITION OF      1
MF AND MT IF POSSIBLE. IN ADDITION THE SPECIAL EXTENSIONS OF MF AND MT       1
DEFINED BELOW SHOULD BE FOLLOWED, IF POSSIBLE. IF THE USER TRANSLATES        1
OTHER DATA YOU SHOULD BE AWARE THAT THE TRANSLATION PROGRAM MAY BE USED      1
TO CONVERT EXFOR DATA TO STANDARD UNITS AND COLUMN ORDER, BUT THE USER       1
MUST WRITE PROGRAMS TO SUBSEQUENTLY OPERATE ON THE TRANSLATED DATA.          1
                                                                            1
THE AUTHOR OF THE TRANSLATION CODE ACCEPTS NO RESPONSIBILITY TO PROVIDE      1
SPECIAL PROGRAMS TO TREAT SPECIAL TYPES OF DATA TRANSLATED BY THE USER       1
THE USER.                                                                   1
                                                                            1
DEFINED MF NUMBERS                                                          1
==================                                                          1
FOR CONVENIENCE IN LISTING AND/OR PLOTTING DATA THE FOLLOWING MF NUMBERS     1
HAVE BEEN DEFINED,                                                          1
                                                                            1
DATA TYPE                                MF SPECIAL CONVENTIONS             1
=========                              ==== ==================             1
SAME AS ENDF/B                        3-  6 (PARTICLE/ISOTOPE MT=9000       1
                                            PRODUCT DEFINED BY              1
                                            FIELD 6 =ZA)                    1
LEGENDRE COEFFICIENTS                   154                                 1
RATIOS                                  203 (DENOMINATOR DEFINED BY         1
                                            FIELD 5 =MT.MF                  1
                                            FIELD 6 =ZA.MI                  1
                                            MF - FINAL METASTABLE STATE     1
                                            MI - INITIAL METASTABLE STATE   1
RESONANCE INTEGRALS                     213                                 1
SPECTRUM AVERAGES                       223                                 1
TRIPLE DIFFERENTIAL                     306                                 1
NUCLEAR AND RESONANCE PARAMETERS     400-499                                1
FISSION YIELD DATA                   800-899 (FISSION PRODUCT DEFINED BY    1
                                            FIELD 5 =ELEMENT                1
                                            FIELD 6 =MASS)                  1
```

LEVEL DENSITY PARAMETER 900

DEFINED MT NUMBERS

FOR CONVENIENCE IN LISTING AND/OR PLOTTING DATA THE FOLLOWING MT NUMBERS HAVE BEEN DEFINED,

REACTION	MT	
SAME AS ENDF/B	1- 999	
(N,N+P)	1001	* MT EXTENSIONS
(N,N+P)+(N,P)	1002	MT =1000 + ASSIGNED MT
(N,N+P)+(N,D)	1003	NUMBER
(N,N+A)+(N,A)	1004	
(N,3-LI-7)PAR,SIG	1200	
(N,P)DI	2103	* DIRECT MT = MT + 2000
(N,P)CN	3103	* COMPOUND MT = MT + 3000
(P,N)	8001	* LIGHT PARTICLE INDUCED
(D,N)	8002	NEUTRON PRODUCTION MT =
(T,N)	8003	8000 + ASSIGNED MT
(A,N)	8004	
(N,X)	9000	PARTICLE/ISOTOPE PRODUCTION
(P,X)	9001	(PRODUCT DEFINED BY
(D,X)	9002	FIELD 6 =ZA)
(T,X)	9003	
(HE-3,X)	9004	
(A,X)	9005	

DEFINITION OF 8 COMPUTATION FORMAT DATA FIELDS

IN ORDER TO ESTABLISH STANDARDS IF AT ALL POSSIBLE THE USER SHOULD FOLLOW THE BELOW CONVENTIONS,

DATA FIELD	DEFINITION
1	PROJECTILE INCIDENT ENERGY
2	PROJECTILE INCIDENT ENERGY UNCERTAINTY
3	DATA (E.G., CROSS SECTION, ANGLE OR ENERGY DISTRIBUTION)
4	DATA UNCERTAINTY
5	COSINE OR LEGENDRE ORDER
6	COSINE UNCERTAINTY
7	SECONDARY ENERGY
8	SECONDARY ENERGY UNCERTAINTY

SPECIAL CONVENTIONS

CROSS SECTION RATIOS	- FIELDS 5 WILL CONTAIN MT AND FIELD 6 WILL CONTAIN ZA OF THE DENOMINATOR OF THE RATIO
RESONANCE INTEGRALS	- FIELDS 1 AND 2 WILL CONTAIN LOWER AND UPPER ENERGY LIMITS
SPECTRUM AVERAGES	- FIELDS 1 AND 2 WILL CONTAIN LOWER AND UPPER ENERGY LIMITS
FISSION YIELD DATA	- FIELD 5 WILL CONTAIN THE ELEMENT ZA AND FIELD FIELD 6 WILL CONTAIN THE MASS
PRODUCTION	- FIELD 6 WILL CONTAIN THE ZA OF THE PARTICLE OR ISOTOPE PRODUCED

DEFINED OPERATIONS

TO PERFORM ANY OF THE FOLLOWING OPERATIONS ON THE EXFOR DATA ENTER ONE OF THE FOLLOWING NUMBERS IN COLUMN 63 (E.G., FOR SPECTRUM AVERAGED DATA IF NO ENERGY IS GIVEN TO CREATE AN ENERGY = 0.0253 EV INSERT A 1 IN COLUMN 63 OPPOSITE (N,G),SIG,,MXW)).

ALL OPERATIONS ON DATA (COLUMN 3) WILL ALSO BE PERFORMED ON THE DATA

ERROR (COLUMN 4).

(1) IF NO EN DEFINE EN = 0.0253 EV (THERMAL SPECTRUM AVERAGE).
(2) IF NO EN DEFINE EN =2.0 MEV (FISSION SPECTRUM AVERAGE).
(3) DATA = DATA/2.0 (CONVERT (N,EL),,WID,,2G TO (N,EL),,WID,,G)).
(4) DATA = DATA/(2*L+1) (LEGENDRE COEFFICIENTS).
(5) DATA = DATA/F(0) (F(0) = ZEROTH ORDER LEGENDRE COEFFICIENT)
(6) DATA = DATA/(F(0)*(2*L+1)) (F(0) = ZEROTH ORDER LEGENDRE COEFFICIENT)

NOTE, THESE CONVENTIONS ARE CODED INTO THE TRANSLATION PROGRAM.
THE USER SHOULD NOT ADD ANY OPERATIONS TO THIS LIST UNLESS THEY ARE
ALSO INCLUDED IN THE TRANSLATION PROGRA.

REACTION	PROJECTILE	MF	MT	OPERATION
CROSS SECTIONS				
(N,TOT),SIG	1	3	1	0
TOT	1	3	1	0
(N,EL),SIG	1	3	2	0
NF	1	3	18	0
NG	1	3	102	0
(N,P),SIG	1	3	103	0
(N,P),SIG,,A	1	3	103	0
(N,D),SIG	1	3	104	0
NT	1	3	105	0
NA	1	3	107	0
(N,A),SIG	1	3	107	0
(N,2A),SIG	1	3	108	0
(N,2A)PAR,SIG	1	31	108	0
(N,T+2A),SIG	1	3	113	0
(N,T+2A)PAR,SIG	1	31	113	0
(N,N+P),SIG	1	31	001	0
((N,P),SIG)+((N,N+P),SIG)	1	31	002	0
((N,N+P),SIG)+((N,D),SIG)	1	31	003	0
(N,3-LI-7)PAR,SIG	1	31	200	0
(N,P)DI,SIG	1	32	103	0
(D,N)PAR,TTY,G,,EXP	1002	0	0	0
(D,N)PAR,SIG,G,,EXP	1002	38	002	0
ANGULAR DISTRIBUTIONS				
(N,EL),DA	1	4	2	0
(N,INL),DA	1	4	4	0
(N,INL)PAR,DA	1	4	51	0
(N,INL)PAR,DA,G,A	1	4	51	0
(N,P),DA	1	4	103	0
(N,P)PAR,DA	1	41	103	0
(N,N+P),DA,P	1	41	001	0
((N,P),DA)+((N,N+P),DA,P)	1	41	002	0
(N,P)DI,DA	1	42	103	0
DOUBLE DIFFERENTIAL DATA				
(N,2N),DA/DE	1	6	16	0
(N,N+A),DA/DE,A,REL	1	6	22	0
(N,N+P),DA/DE,P	1	6	28	0
(N,P),DA/DE	1	6	103	0
(N,A),DA/DE,,REL	1	6	107	0
((N,P),DA/DE)+((N,N+P),DA/DE,P)	1	61	002	0
((N,A),DA/DE,,REL)+((N,N+A),DA/DE,A,REL)	1	61	004	0
PARTICLE/ISOTOPE PRODUCTION				

```
THE PRODUCED PARTICLE OR ISOTOPE WILL BE DEFINED BY OUTPUTTING ZA IN          1
FIELD 6.                                                                      1
                                                                              1
(N,X),SIG                                          1  39000  0
(N,X)CN,SIG                                        1  39000  0
(P,X),SIG                                          1  39001  0
(D,X),SIG                                          1  39002  0
(T,X),SIG                                          1  39003  0
(HE-3,X),SIG                                       1  39004  0
(A,X),SIG                                          1  39005  0
(N,X),DA                                           1  49000  0
(N,X)PAR,DA                                        1  49000  0
                                                                              1
LEGENDRE COEFFICIENTS                                                         1
OPERATION FLAGS ARE SET TO REDUCE ALL LEGENDRE COEFFICIENTS TO THE FORM,       1
D(SIGMA)/D(MU)=1.0 +SUM(L=1 TO N) (2*L+1)*F(L)*P(L,MU)                         1
(I.E., ENDF/B CONVENTION - COEFFICENTS NORMALIZED TO F(0) WITH 2*L+1)          1
                                                                              1
(N,EL),DA,,LEG/RSL                                 1154   2  0
(N,EL),DA,,LEG/RS                                  1154   2  4
(N,EL),DA,,LEG/RSD                                 1154   2  4
(N,EL),DA,,LEG/2L2                                 1154   2  5
(N,EL),DA,,LEG/L4P                                 1154   2  5
(N,EL),DA,,LEG                                     1154   2  6
(N,EL),DA,,LEG/1K2                                 1154   2  6
(N,EL),DA,,LEG/RS0                                 1154   2  6
(D,N),DA,,LEG/1K2                               10021548002  6
(A,N)PAR,DA,,LEG/RS0,EVAL                       20041548004  6
                                                                              1
RATIOS                                                                        1
                                                                              1
SIMPLE CROSS SECTION (MF=3) RATIOS, E.G. (90-TH-232,MF)/(94-PU-238,NF)        1
WILL BE AUTOMATICALLY TRANSLATED AND NEED NOT BE INCLUDED IN THE BELOW        1
LIST. WHEN SIMPLE RATIOS ARE TRANSLATED THE DENOMINATOR WILL BE DEFINED       1
BY OUTPUTTING MT IN FIELD 5 AND ZA IN FIELD 6. THE FOLLOWING LIST SHOULD      1
ONLY BE USED TO DEFINE COMPLEX RATIOS.                                        1
                                                                              1
(N,P),SIG/RAT                                      1203 103  0
                                                                              1
RESONANCE INTEGRALS                                                           1
                                                                              1
(N,G),RI                                           1213 102  0
(N,G),RI,,RAW                                      1213 102  0
                                                                              1
SPECTRUM AVERAGES                                                             1
                                                                              1
(N,G),SIG,,MXW                                     1223 102  1
(N,G),SIG,,FIS                                     1223 102  2
                                                                              1
TRIPLE DIFFERENTIAL DATA                                                      1
                                                                              1
(N,2N+P),DA/DE/DE,N/N/P                            1306 103  0
                                                                              1
NUCLEAR AND RESONANCE PARAMETERS                                              1
                                                                              1
(0,0),TEM                                          04016001  0
(N,0),L                                            14026002  0
(N,0),J                                            14026003  0
(N,0),D                                            14026004  0
(N,TOT),WID                                        14026010  0
(N,EL),WID                                         14026021  0
(N,EL),WID,,G                                      14026022  0
(N,EL),WID/RED                                     14026023  0
(N,EL),WID/RED,,G                                  14026024  0
(N,EL),WID/RED,,2G                                 14026024  3
```

```
(N,G),WID                                              14026031  0
(N,G),WID,,G                                           14026032  0
(N,G),WID,,2G                                          14026032  3
((N,EL),WID,,G)*((N,G),WID)/((N,TOT),WID)              14026051  0
(N,EL),STF                                             14036001  0
(N,G),ARE                                              14046001  0
(N,G),WID,,AV                                          14056001  0
                                                                    1
YIELD DATA (USUALLY FISSION)                                        1
                                                                    1
(N,F)ELEM/MASS,CUM,FY,,SPA                             1801  18  0
(N,F)ELEM/MASS,CUM,FY                                  1801  18  0
(N,F)ELEM/MASS,IND,FY,,MXW                             1801  18  0
(N,F)MASS,CHN,FY,,MXW                                  1801  18  0
((N,F)ELEM/MASS,IND,FY,,MXW)/((N,F)MASS,CHN,FY,,       1802  18  0
(N,F),DA,FF,COS/RSD                                    1  41016  0
(G,F),DA,FF,REL,EXP                                    0  41019  0
(N,F),DA,FF,LEG/RSD                                    11541016  4
                                                                    1
LEVEL DENSITY PARAMETER                                             1
                                                                    1
LDP                                                    19001800  0
```

Titles Dictionary

```
EXFOR COLUMN TITLE TO COMPUTATION FORMAT OUTPUT COLUMN TABLE                    1
=========================================================                      1
COMMENT CARDS ARE DEFINED BY A 1 IN COLUMN 80                                  1
REACTION DEFINITIONS MUST HAVE A BLANK COLUMN 80                               1
WARNING...FAILURE TO FOLLOW THIS CONVENTION WILL RESULT IN ERRORS               1
                                                                               1
FORMAT                                                                         1
======                                                                         1
COLUMNS   DEFINITION                                                           1
=======   ==========                                                           1
  1- 10   EXFOR TITLE                                                          1
 11- 15   LOWEST MF NUMBER                                                     1
 16- 20   HIGHEST MF NUMBER                                                    1
 21- 25   COMPUTATION FORMAT OUTPUT FIELD (1 TO 8)                             1
 26- 30   OPERATION NUMBER (SEE, LIST BELOW FOR DEFINITIONS)                   1
 33- 35   DEFINITION OF FIELDS 7 AND 8...SEE BELOW LIST                        1
          (DEFINITION MUST BE RIGHT ADJUSTED TO END IN COLUMN 35).             1
          ONLY ONE OF THE FOLLOWING SHOULD BE USED,                            1
          LVL=LEVEL         HL=HALF-LIFE    E2=SECONDARY ENERGY                1
          DLV=LEVEL RANGE  EXC=EXCITATION  DE2=SECONDARY ENERGY RANGE          1
          MIN=E-MIN        MAX=E-MAX                                           1
                                                                               1
REACTION DEFINED MF                                                            1
===================                                                            1
NOTE, THE REACTION DEFINED MF NUMBER CAN BE USED TO OPERATE ON AND             1
OUTPUT THE SAME TITLE IN DIFFERENT WAYS FOR DIFFERENT TYPES OF DATA            1
(E.G., SEE EN-MIN AND EN-MAX BELOW).                                           1
                                                                               1
DEFINED OPERATIONS                                                             1
==================                                                             1
TO PERFORM ANY OF THE FOLLOWING OPERATIONS ON AN EXFOR TITLE ENTER ONE         1
OF THE FOLLOWING NUMBERS IN COLUMN 30 (E.G., TO SET THE CENTER-OF-MASS         1
SYSTEM FLAG THE EXFOR TITLE DATA-CM HAS A 6 IN COLUMN 30).                     1
                                                                               1
(1) MULTIPLE FIELDS...ALWAYS CHOOSE THIS FIELD.                                1
(2) MULTIPLE FIELDS...CHOOSE THE FIRST FIELD.                                  1
(3) MULTIPLE FIELDS...NEVER CHOOSE THIS FIELD.                                 1
(4) MULTIPLE FIELDS...CHOOSE THE LARGEST FIELD, E.G. ERRORS.                   1
(5) MULTIPLE FIELDS...COMBINE FIELDS QUADRATICALLY, E.G. ERRORS,               1
                      (EN-ERR = SQRT(EN-ERR1**2 + EN-ERR2**2)).                1
(6) SET CENTER-OF-MASS SYSTEM FLAG IN OUTPUT                                   1
(7) MULTIPLE FIELDS...COMBINE FIELDS TO DEFINE AVERAGE, BUT NOT ERROR,         1
                      (EN-MIN AND EN-MAX TO DEFINE EN).                        1
(8) MULTIPLE FIELDS...COMBINE FIELDS TO DEFINE AVERAGE AND ERROR,              1
                      (EN-MIN AND EN-MAX TO DEFINE EN AND EN-ERR).             1
(9) -MIN/-MAX MUST APPEAR TOGETHER, E.G. EN-MIN/EN-MAX - RESONANCE INTEGRAL,   1
                     (IF MISSING DEFINE -MIN= 0 OR -MAX= 15 MEV).              1
(10) MULTIPLE FIELDS..CHOOSE LARGEST AND SMALLEST IN 2 SUCCESSIVE FIELDS,      1
                      (MULTIPLE E-LVL).                                        1
                                                                               1
            MF  MF   OUTPUT                                                    1
            LOW HIGH FIELD  OPERATION                                          1
                                                                               1
INITIAL ENERGY                                                                 1
                                                                               1
EN            1  999    1    1
EN-RES        1  999    1    1
EN-DUMMY      1  999    1    0
EN-MIN      121  399    1    9
```

```
EN-MAX      121  399    2    9
EN-MIN        1  999    1    8
EN-MAX        1  999    1    8
EN-RSL        1  999    2    4
EN-ERR        1  999    2    4
EN-RES-ERR    1  999    2    4
EN-NRM        1  999    0    0                                                  1

DATA                                                                           1
                                                                               1
DATA          1  199    3    1
DATA        200  209    3    0
DATA        210  999    3    1
DATA-APRX     1  999    3    0
DATA-CM       1  999    3    6
DATA-MIN      1  999    3    8
DATA-MAX      1  999    3    8
DATA-ERR      1  999    4    4
DATA-ERR1     1  999    4    4
DATA-ERR2     1  999    4    4
+DATA-ERR     1  999    4    4
-DATA-ERR     1  999    4    4
ERR-T         1  999    4    1
ERR-S         1  999    4    3
RATIO       200  209    3    1
RATIO-APRX  200  209    3    0
RATIO-ERR   200  209    4    0
RATIO       802  802    3    0
RATIO-APRX  802  802    3    0
RATIO-ERR   802  802    4    0
RATIO         1  999    0    0
RATIO-APRX    1  999    0    0
RATIO-ERR     1  999    0    0                                                  1

ANGULAR VARIABLES                                                              1
                                                                               1
COS           4  999    5    0
COS-CM        4  999    5    6
ANG           4  999    5    0
ANG-CM        4  999    5    6
ANG-RSL       4  999    6    4                                                  1

SECONDARY ENERGY                                                               1
                                                                               1
E             1  999    7   10   E2
E-CM          1  999    7   10   E2
E-LVL         1  999    7   10  LVL
E-EXC         1  999    7   10  EXC
E-EXC1        1  999    7   10  EXC
E-EXC2        1  999    7   10  EXC
E-EXC3        1  999    7   10  EXC
E1            1  999    7    0  DE2
E2            1  999    8    0
E-MIN         1  999    7    0  DE2
E-MAX         1  999    8    0  DE2
E1-MAX        1  999    7    0  DE2
E1-MIN        1  999    8    0  DE2
E-CM-MIN      1  999    7    0  DE2
E-CM-MAX      1  999    8    0  DE2
E-LVL-MIN     1  999    7    0  DE2
E-LVL-MAX     1  999    8    0  DE2                                            1

YIELD (USUALLY FISSION). OUTPUT ELEMENT IN FIELD 5, MASS IN FIELD 6.           1
                                                                               1
ELEMENT       3    3    5    1
```

```
ELEMENT       4    4    0    0
ELEMENT     801  802    5    1
ELEMENT     804  804    0    0
MASS          3    4    6    1
MASS        801  804    6    1
                                                                      1
MISCELLANEOUS (USED)                                                  1
                                                                      1
MOMENTUM L    1  999    5    0
NUMBER        1  999    5    0
NUMBER-CM     1  999    5    6
HL1           1  999    7    0   HL
HL1-ERR       1  999    8    0
                                                                      1
MISCELLANEOUS (IGNORED)                                               1
                                                                      1
MONIT1        1  999    0    0
MONIT2        1  999    0    0
MONIT3        1  999    0    0
MONIT-ERR     1  999    0    0
ASSUM         1  999    0    0
ASSUM1        1  999    0    0
ASSUM2        1  999    0    0
MISC          1  999    0    0
MISC1         1  999    0    0
MISC2         1  999    0    0
MISC3         1  999    0    0
MISC4         1  999    0    0
MISC-ERR      1  999    0    0
MISC1-ERR     1  999    0    0
MONIT         1  999    0    0
MONIT1-ERR    1  999    0    0
MONIT2-ERR    1  999    0    0
ISOMER        1  999    0    0
DECAY-FLAG    1  999    0    0
FLAG          1  999    0    0
N-OUT         1  999    0    0
```

Units Dictionary

```
EXFOR UNITS TO STANDARD UNIT CONVERSION TABLE                                  1
==========================================                                     1
COMMENT CARDS ARE DEFINED BY A 1 IN COLUMN 80                                  1
REACTION DEFINITIONS MUST HAVE A BLANK COLUMN 80                               1
WARNING...FAILURE TO FOLLOW THIS CONVENTION WILL RESULT IN ERRORS              1
                                                                               1
FORMAT                                                                         1
======                                                                         1
COLUMNS   DEFINITION                                                           1
=======   ==========                                                           1
  1- 11   EXFOR UNITS                                                         1
 12- 22   STANDARD UNITS                                                      1
 23- 33   MULTIPLIER                                                          1
 34- 44   ADDER                                                               1
 45- 55   OPERATION NUMBER (SEE, LIST BELOW FOR DEFINITIONS).                 1
                                                                               1
NOTE, EXFOR UNITS WILL BE CONVERTED TO STANDARD UNITS BY MULTIPLYING            1
BY THE MULTIPLIER, ADDING THE ADDER AND THEN PERFORMING AN OPERATION            1
(IF ANY OPERATION), E.G., TO CONVERT DEG-C TO DEG-K MULTIPLY BY 1.0 AND         1
ADD 273.16, E.G., TO CONVERT ADEG TO COSINE MULTIPLY BY 1.0 AND PERFORM        1
OPERATION 2 (ANGLE TO COSINE CONVERSION).                                      1
                                                                               1
STANDARD UNITS                                                                 1
==============                                                                 1
THE USER MAY SPECIFY ANY SET OF DESIRED STANDARD OUTPUT UNITS. THE             1
FOLLOWING TABLE HAS CONVERSION FACTORS FOR EXFOR UNITS TO THE STANDARD         1
UNITS,                                                                         1
                                                                               1
EV          - ENERGY                                                           1
BARNS       - CROSS SECTION                                                    1
STERADIANS  - SOLID ANGLE                                                      1
SECONDS     - TIME                                                             1
KELVIN      - TEMPERATURE                                                      1
                                                                               1
DEFINED OPERATIONS                                                             1
==================                                                             1
TO PERFORM ANY OF THE FOLLOWING OPERATIONS ON AN EXFOR UNIT ENTER ONE           1
OF THE FOLLOWING NUMBERS IN COLUMN 55 (E.G., TO PERFORM PER-CENT TO             1
ABSOLUTE CONVERSION THE EXFOR UNIT PER-CENT HAS A 1 IN COLUMN 55).             1
                                                                               1
(1) CONVERT PER-CENT TO ABSOLUTE                                               1
(2) CONVERT ANGLE TO COSINE (ANGLE OR ANGULAR ERROR).                          1
(3) CONVERT RESOLUTION (E.G. NSEC/M TO ENERGY ERROR EV).                       1
    WARNING...THIS CONVERSION ASSUMES MASS =1 PROJECTILES, E.G. N OR P.        1
(4) CONVERT ANGSTROM TO EV.                                                    1
(5) CONVERT LENGTH TO BARNS (E.G., FERMI TO BARNS).                            1
(6) BARNS*SQRT(E) TO BARNS (E.G., SOME RESONANCE PARAMETERS).                  1
(7) PRINT WARNING FOLLOWED BY UNITS (E.G., WARNING...UNITS=ABR-UNITS).         1
(8) PRINT WARNING FOLLOWED BY UNITS (E.G., WARNING...UNITS=ABR-UNITS),         1
    AND CHANGE STATUS TO UNNORMALIZED (U).                                     1
                                                                               1
EXFOR      STANDARD                                                            1
UNITS      UNITS       MULTIPLIER ADDER          OPERATION                    1
                                                                               1
ENERGY                                                                         1
                                                                               1
MICRO-EV   EV          1.00000- 6 0.0               0
MILLI-EV   EV          1.00000- 3 0.0               0
EV         EV          1.0        0.0               0
```

KEV	EV	1.00000+ 3	0.0	0
MEV	EV	1.00000+ 6	0.0	0
GEV	EV	1.00000+ 9	0.0	0
TEV	EV	1.00000+12	0.0	0
1/MICRO-EV	1/EV	1.00000+ 6	0.0	0
1/MILLI-EV	1/EV	1.00000+ 3	0.0	0
1/EV	1/EV	1.0	0.0	0
1/KEV	1/EV	1.00000- 3	0.0	0
1/MEV	1/EV	1.00000- 6	0.0	0
1/GEV	1/EV	1.00000- 9	0.0	0
1/TEV	1/EV	1.00000-12	0.0	0

1

RESOLUTION 1

1

NSEC/M	EV	1.0	0.0	3
MICROSEC/M	EV	1.00000+ 3	0.0	3
MSEC/M	EV	1.00000+ 6	0.0	3
ANGSTROM	EV	1.0	0.0	4

1

CROSS SECTIONS 1

1

MICRO-B	B	1.00000- 6	0.0	0
MB	B	1.00000- 3	0.0	0
B	B	1.0	0.0	0
KB	B	1.00000+ 6	0.0	0
MB*RT-EV	B	1.00000- 3	0.0	6
B*RT-EV	B	1.0	0.0	6
MB*MILLIEV	B*EV	1.00000- 6	0.0	0
MB*EV	B*EV	1.00000- 3	0.0	0
B*MILLI-EV	B*EV	1.00000- 3	0.0	0
B*EV	B*EV	1.0	0.0	0
MB*EV-SQ	B*EV-SQ	1.00000- 3	0.0	0
B*EV-SQ	B*EV-SQ	1.0	0.0	0
B*EV*RT-EV	B*EV*RT-EV	1.0	0.0	0

1

LENGTH 1

1

FERMI	B	1.00000- 1	0.0	5
MM	B	1.00000+11	0.0	5
CM	B	1.00000+12	0.0	5
M	B	1.00000+14	0.0	5

1

ANGLES 1

1

ASEC	NO-DIM	2.77777- 4	0.0	2
AMIN	NO-DIM	1.66666- 2	0.0	2
ADEG	NO-DIM	1.0	0.0	2

1

ANGULAR DISTRIBUTIONS 1

1

MU-B/SR	B/SR	1.00000- 6	0.0	0
MB/SR	B/SR	1.00000- 3	0.0	0
B/SR	B/SR	1.0	0.0	0
1/SR	1/SR	1.0	0.0	0

1

ENERGY DISTRIBUTIONS 1

1

MU-B/MEV	B/EV	1.0	0.0	0
MB/EV	B/EV	1.00000- 3	0.0	0
MB/KEV	B/EV	1.00000- 6	0.0	0
MB/MEV	B/EV	1.00000- 9	0.0	0
B/MILLI-EV	B/EV	1.00000+ 3	0.0	0
B/EV	B/EV	1.0	0.0	0
B/KEV	B/EV	1.00000- 3	0.0	0
B/MEV	B/EV	1.00000- 6	0.0	0

1

DOUBLE DIFFERENTIAL DISTRIBUTIONS 1

1

MUB/SR/MEV	B/SR/EV	1.00000-12	0.0	0
MB/SR/EV	B/SR/EV	1.00000- 3	0.0	0
MB/SR/KEV	B/SR/EV	1.00000- 6	0.0	0
MB/SR/MEV	B/SR/EV	1.00000- 9	0.0	0
MB/SR/GEV	B/SR/EV	1.00000-12	0.0	0
B/SR/MI-EV	B/SR/EV	1.00000+ 3	0.0	0
B/SR/EV	B/SR/EV	1.0	0.0	0
B/SR/KEV	B/SR/EV	1.00000- 3	0.0	0
B/SR/MEV	B/SR/EV	1.00000- 6	0.0	0
B/SR/GEV	B/SR/EV	1.00000- 9	0.0	0

1

TRIPLE DIFFERENTIAL DISTRIBUTIONS 1

1

MB/SR/MEV2	B/SR/EV2	1.00000-15	0.0	0

1

TEMPERATURE 1

1

DEG-K	DEG-K	1.0	0.0	0
DEG-C	DEG-K	1.0	273.16	0
DEG-F	DEG-K	0.555556	255.382	0

1

TIME 1

1

PSEC	SEC	1.00000-12	0.0	0
NSEC	SEC	1.00000- 9	0.0	0
MICROSEC	SEC	1.00000- 6	0.0	0
MSEC	SEC	1.00000- 3	0.0	0
SEC	SEC	1.0	0.0	0
MIN	SEC	6.00000+ 1	0.0	0
HR	SEC	3.60000+ 2	0.0	0
D	SEC	8.64000+ 3	0.0	0
Y	SEC	3.15576+ 6	0.0	0
YR	SEC	3.15576+ 6	0.0	0
1/PSEC	1/SEC	1.00000+12	0.0	0
1/NSEC	1/SEC	1.00000+ 9	0.0	0
1/MICROSEC	1/SEC	1.00000+ 6	0.0	0
1/MSEC	1/SEC	1.00000+ 3	0.0	0
1/SEC	1/SEC	1.0	0.0	0
1/MIN	1/SEC	1.66666- 2	0.0	0
1/HR	1/SEC	2.77777- 3	0.0	0
1/D	1/SEC	1.15741- 4	0.0	0
1/Y	1/SEC	3.16881- 7	0.0	0
1/YR	1/SEC	3.16881- 7	0.0	0

1

MISCELLANEOUS 1

1

PER-CENT	(VARIOUS)	1.0	0.0	1
NO-DIM	NO-DIM	1.0	0.0	0
GAM/100N	GAM/100N	1.00000- 2	0.0	7
GAM/PART	GAM/PART	1.0	0.0	7
PC/FIS	PC/FIS	1.00000- 2	0.0	7
ARB-UNITS	ARB-UNITS	1.0	0.0	8
SEE TEXT	SEE TEXT	1.0	0.0	7
MUCI/MUA	MUCI/MUA	1.0	0.0	7
MUCI/MUAHR	MUCI/MUAHR	1.0	0.0	7

Example Output Report

```
TRANSLATE DATA FROM EXFOR TO COMPUTATION FORMAT (X4TOC4 VERSION 86-1)
=====================================================================
READING TRANSLATION TABLES
=====================================================================
REACTIONS------------  100 (  400 ALLOWED)
TITLES---------------   90 (  400 ALLOWED)
UNITS----------------   93 (  400 ALLOWED)
=====================================================================
   AN SAN PROJECT  TARGET RESIDUAL  MF   MT REACTION
=====================================================================
10529   3       1  14028    14028    3    4   (N,INL),SIG
11274  11       1  14028    13028    3  103   (N,P),SIG
         OPERATION...CONVERTED PER-CENT TO ABSOLUTE
11464   4       1  14028    13028    3  103   (N,P),SIG
20498   2       1  14028    14028    4    2   (N,EL),DA
         OPERATION...CENTER-OF-MASS SYSTEM FLAG SET
         OPERATION...CONVERTED ANGULAR ERROR TO COSINE ERROR
21984 119       1  14028    14028    4    2   (N,EL),DA
         OPERATION...CENTER-OF-MASS SYSTEM FLAG SET
         OPERATION...CENTER-OF-MASS SYSTEM FLAG SET
         OPERATION...CONVERTED ANGLES TO COSINES
31097   3       1  14028    13028    3  103   (N,P),SIG
=====================================================================
TRANSLATION SUMMARY
=====================================================================
SUBENTRIES TRANSLATED--------      6
SUBENTRIES SKIPPED-----------      0 (NO OUTPUT)
POINTS READ------------------    318
POINTS TRANSLATED------------    318
DATA FIELDS NOT DEFINED------      0 (NO OUTPUT)
DATA FIELDS BLANK------------      0 (NO OUTPUT)
UNDEFINED REACTIONS----------      0
UNDEFINED TITLES-------------      0
UNDEFINED UNITS--------------      0
=====================================================================
```

Example EXFOR format data

```
REQUEST           1001   20010326          3     095246              0  0    0
ENTRY            10529     830901                                 10529000    1
SUBENT         10529001     830901                                 10529001    1
BIB                  13         21                                 10529001    2
INSTITUTE   (1USAORL)                                              10529001    3
REFERENCE   (C,71KNOX,1,191,7103)                                  10529001    4
AUTHOR      (F.G.PEREY,W.E.KINNEY,R.L.MACKLIN)                     10529001    5
TITLE       HIGH RESOLUTION INELASTIC CROSS SECTION MEASUREMENTS   10529001    6
            FOR NA,SI,AND FE.                                      10529001    7
FACILITY    (LINAC) OAK RIDGE ELECTRON LINEAR ACCELERATOR          10529001    8
N-SOURCE    (PHOTO) PHOTONEUTRONS                                  10529001    9
METHOD      (TOF) TIME-OF-FLIGHT                                   10529001   10
DETECTOR    (SCIN) CARBON-FLUORIDE LIQUID SCINTILLATOR             10529001   11
CORRECTION  DATA CORRECTED FOR BACKGROUND COUNTS.                  10529001   12
MONITOR     (3-LI-7(N,INL)3-LI-7,PAR,SIG)                          10529001   13
             KNOWN LITHIUM-7 CROSS SECTION AT                      10529001   14
            THE 478 KEV LEVEL IN BNL-325,1964,2ND ED.,USED TO      10529001   15
            DETERMINE NEUTRON FLUX SHAPE.                          10529001   16
ERR-ANALYS  CROSS SECTION NORMALIZED TO PREVIOUS ABSOLUTE          10529001   17
            MEASUREMENT. ESTIMATED UNCERTAINTY IS APPROX.          10529001   18
            15. PER-CENT                                           10529001   19
STATUS      (APRVD) APPROVED BY AUTHOR 751017                      10529001   20
             DATA TAKEN FROM PRIVATE COMM., PEREY, 75/8.           10529001   21
HISTORY     (750804C)                                              10529001   22
            (830901A) CONVERTED TO REACTION FORMALISM              10529001   23
ENDBIB             21                                              10529001   24
NOCOMMON            0          0                                   10529001   25
ENDSUBENT          24                                              1052900199999
SUBENT         10529003     830901                                 10529003    1
BIB                 1          1                                  10529003    2
REACTION    (14-SI-28(N,INL)14-SI-28,,SIG)                         10529003    3
ENDBIB              1                                             10529003    4
NOCOMMON            0          0                                  10529003    5
DATA                3        258                                  10529003    6
EN          DATA       DATA-ERR                                    10529003    7
KEV         MB         MB                                          10529003    8
1772.2       -9.6      10.5                                        10529003    9
1781.1        1.4      10.9                                        10529003   10
1785.0       -2.8      10.8                                        10529003   11
1788.9       -2.2      10.9                                        10529003   12
1792.9       -4.1      10.9                                        10529003   13
1796.8       -6.6      10.9                                        10529003   14
1800.7       11.7      11.5                                        10529003   15
1804.6       22.0      11.8                                        10529003   16
1808.5       14.0      11.6                                        10529003   17
1812.5        7.8      11.5                                        10529003   18
1816.4       31.7      12.3                                        10529003   19
1820.3       24.9      12.1                                        10529003   20
1824.2       37.6      12.6                                        10529003   21
1828.1       31.5      12.5                                        10529003   22
1832.0       60.5      13.3                                        10529003   23
1836.0       74.8      13.8                                        10529003   24
1839.9      102.1      14.6                                        10529003   25
1843.8      148.4      15.8                                        10529003   26
1847.7      219.3      17.5                                        10529003   27
1851.6      384.8      20.8                                        10529003   28
1855.5      455.7      22.2                                        10529003   29
1859.5      436.9      22.0                                        10529003   30
1863.4      397.3      21.5                                        10529003   31
1867.3      287.9      19.5                                        10529003   32
```

1871.2	218.8	18.2	10529003	33
1875.1	190.6	17.8	10529003	34
1879.0	168.7	17.4	10529003	35
1883.0	149.1	17.0	10529003	36
1886.9	151.1	17.2	10529003	37
1890.8	99.1	16.0	10529003	38
1894.7	103.5	16.2	10529003	39
1898.6	78.3	15.7	10529003	40
1902.5	92.7	16.2	10529003	41
1906.5	155.6	17.9	10529003	42
1910.4	203.3	19.2	10529003	43
1914.3	259.5	20.6	10529003	44
1918.2	329.8	22.2	10529003	45
1922.1	366.6	23.1	10529003	46
1926.0	331.4	22.5	10529003	47
1930.0	309.7	22.2	10529003	48
1933.9	279.3	21.6	10529003	49
1937.8	242.0	20.9	10529003	50
1941.7	200.3	20.0	10529003	51
1945.6	200.5	20.1	10529003	52
1949.5	158.8	19.2	10529003	53
1953.5	210.0	20.6	10529003	54
1957.4	203.7	20.5	10529003	55
1961.3	193.3	20.4	10529003	56
1965.2	183.1	20.2	10529003	57
1969.1	188.7	20.5	10529003	58
1973.0	192.6	20.7	10529003	59
1974.0	175.1	16.5	10529003	60
1979.9	142.0	15.8	10529003	61
1985.7	123.4	15.5	10529003	62
1991.6	105.6	15.1	10529003	63
1997.5	91.7	14.8	10529003	64
2003.4	117.0	15.4	10529003	65
2009.2	96.1	14.9	10529003	66
2015.1	106.8	15.2	10529003	67
2021.0	77.8	14.5	10529003	68
2026.8	83.5	14.7	10529003	69
2032.7	96.3	15.0	10529003	70
2038.6	137.5	16.0	10529003	71
2044.5	138.4	16.0	10529003	72
2050.3	173.9	16.8	10529003	73
2056.2	247.5	18.3	10529003	74
2062.1	341.0	20.1	10529003	75
2067.9	329.8	19.9	10529003	76
2073.8	293.1	19.2	10529003	77
2079.7	317.0	19.6	10529003	78
2085.5	403.3	21.1	10529003	79
2091.4	408.0	21.2	10529003	80
2097.3	377.9	20.7	10529003	81
2103.1	232.9	18.0	10529003	82
2109.0	168.7	16.8	10529003	83
2114.9	215.8	17.7	10529003	84
2120.7	348.2	20.1	10529003	85
2126.6	266.8	18.6	10529003	86
2132.5	158.8	16.5	10529003	87
2138.3	104.2	15.3	10529003	88
2144.2	103.3	15.2	10529003	89
2150.1	110.9	15.4	10529003	90
2155.9	116.9	15.5	10529003	91
2161.8	124.0	15.6	10529003	92
2167.7	151.2	16.2	10529003	93
2173.5	167.2	16.5	10529003	94
2179.4	207.8	17.3	10529003	95
2185.3	234.9	17.8	10529003	96
2191.1	193.4	17.1	10529003	97
2197.0	216.6	17.5	10529003	98
2202.9	212.8	17.4	10529003	99
2208.7	214.5	17.5	10529003	100

2214.6	257.0	18.3	10529003	101
2220.5	357.8	20.1	10529003	102
2226.3	517.3	22.6	10529003	103
2232.2	518.0	22.7	10529003	104
2238.1	415.6	21.2	10529003	105
2243.9	243.2	18.3	10529003	106
2249.8	193.2	17.5	10529003	107
2255.6	204.3	17.7	10529003	108
2261.5	280.2	19.2	10529003	109
2267.4	354.8	20.5	10529003	110
2273.2	551.6	23.6	10529003	111
2279.1	708.0	25.7	10529003	112
2285.0	768.6	26.5	10529003	113
2290.8	604.1	24.2	10529003	114
2296.7	436.2	21.7	10529003	115
2302.5	294.0	19.4	10529003	116
2308.4	251.5	18.6	10529003	117
2314.3	226.1	18.1	10529003	118
2320.1	224.4	18.1	10529003	119
2326.0	206.2	17.8	10529003	120
2331.8	226.0	18.2	10529003	121
2337.7	213.0	18.0	10529003	122
2343.6	279.5	19.2	10529003	123
2349.4	309.2	19.8	10529003	124
2355.3	337.4	20.3	10529003	125
2361.1	395.2	21.3	10529003	126
2367.0	443.3	22.1	10529003	127
2372.9	492.7	22.9	10529003	128
2378.7	499.8	23.0	10529003	129
2384.6	390.1	21.4	10529003	130
2390.4	331.6	20.5	10529003	131
2396.3	295.5	19.9	10529003	132
2402.2	305.6	20.1	10529003	133
2408.0	315.0	20.3	10529003	134
2413.9	330.4	20.7	10529003	135
2419.7	336.4	20.8	10529003	136
2425.6	338.5	20.9	10529003	137
2431.5	386.5	21.8	10529003	138
2437.3	438.5	22.7	10529003	139
2443.2	497.0	23.6	10529003	140
2449.0	544.2	24.4	10529003	141
2454.9	523.3	24.1	10529003	142
2460.7	481.9	23.6	10529003	143
2463.7	408.5	19.4	10529003	144
2471.5	340.3	18.5	10529003	145
2479.3	369.6	19.1	10529003	146
2487.1	471.1	20.6	10529003	147
2494.9	489.1	20.9	10529003	148
2502.7	497.1	21.2	10529003	149
2510.5	410.9	20.1	10529003	150
2518.3	272.9	18.1	10529003	151
2526.1	238.2	17.7	10529003	152
2533.9	207.3	17.3	10529003	153
2541.7	239.1	18.0	10529003	154
2549.5	260.6	18.5	10529003	155
2557.4	268.7	18.8	10529003	156
2565.2	279.3	19.1	10529003	157
2573.0	282.5	19.3	10529003	158
2580.8	253.1	18.9	10529003	159
2588.6	252.0	19.0	10529003	160
2596.4	266.4	19.4	10529003	161
2604.2	279.9	19.8	10529003	162
2612.0	228.1	19.1	10529003	163
2619.8	166.5	18.1	10529003	164
2627.6	210.1	19.1	10529003	165
2635.4	171.0	18.6	10529003	166
2643.2	214.9	19.6	10529003	167
2651.0	216.4	19.8	10529003	168

2658.8	286.2	21.2	10529003	169
2666.6	262.8	21.1	10529003	170
2674.4	218.1	20.5	10529003	171
2682.2	278.2	21.9	10529003	172
2690.0	264.6	21.9	10529003	173
2697.8	331.5	23.4	10529003	174
2705.6	283.4	22.8	10529003	175
2713.4	283.0	23.1	10529003	176
2721.2	254.2	22.9	10529003	177
2729.0	280.5	23.6	10529003	178
2736.8	326.5	24.7	10529003	179
2744.6	272.1	24.1	10529003	180
2752.4	283.2	24.6	10529003	181
2760.2	266.7	24.7	10529003	182
2768.0	298.8	25.7	10529003	183
2775.8	335.8	26.8	10529003	184
2783.6	376.3	27.9	10529003	185
2791.4	352.2	28.0	10529003	186
2799.2	367.6	28.7	10529003	187
2807.0	343.4	28.7	10529003	188
2814.8	392.0	29.8	10529003	189
2822.6	409.4	30.4	10529003	190
2830.4	523.7	32.7	10529003	191
2838.2	639.4	34.9	10529003	192
2846.0	843.9	38.3	10529003	193
2853.7	824.3	38.3	10529003	194
2861.5	951.8	40.4	10529003	195
2869.3	896.2	39.8	10529003	196
2877.1	752.0	37.9	10529003	197
2884.9	538.1	34.6	10529003	198
2892.7	359.1	31.5	10529003	199
2900.5	335.9	31.3	10529003	200
2908.3	242.0	29.5	10529003	201
2916.1	331.7	31.3	10529003	202
2923.9	308.4	31.0	10529003	203
2931.7	411.8	33.0	10529003	204
2939.5	494.9	34.6	10529003	205
2947.3	381.7	32.6	10529003	206
2952.1	274.2	27.3	10529003	207
2961.9	220.0	26.3	10529003	208
2971.6	199.1	25.9	10529003	209
2981.3	189.2	25.7	10529003	210
2991.1	254.2	26.9	10529003	211
3000.8	283.4	27.3	10529003	212
3010.6	324.9	27.8	10529003	213
3020.3	350.4	28.0	10529003	214
3030.0	286.5	26.6	10529003	215
3039.8	349.7	27.4	10529003	216
3049.5	433.6	28.7	10529003	217
3059.2	548.4	30.4	10529003	218
3069.0	545.6	30.3	10529003	219
3078.7	416.4	28.2	10529003	220
3088.4	367.3	27.4	10529003	221
3098.2	539.1	30.1	10529003	222
3107.9	751.5	33.1	10529003	223
3117.6	762.3	33.3	10529003	224
3127.4	683.9	32.3	10529003	225
3137.1	634.8	31.6	10529003	226
3146.8	675.1	32.3	10529003	227
3156.5	581.9	31.1	10529003	228
3166.3	433.8	29.1	10529003	229
3176.0	483.9	30.0	10529003	230
3185.7	394.3	28.8	10529003	231
3195.5	442.8	29.8	10529003	232
3205.2	417.0	29.8	10529003	233
3214.9	486.3	31.1	10529003	234
3224.6	685.3	34.3	10529003	235
3234.4	882.0	37.2	10529003	236

```
3244.1     866.3      37.4                                                  10529003  237
3253.8     771.2      36.4                                                  10529003  238
3263.5     615.9      34.5                                                  10529003  239
3273.3     567.2      34.1                                                  10529003  240
3283.0     627.9      35.2                                                  10529003  241
3292.7     640.4      35.6                                                  10529003  242
3302.4     602.6      35.3                                                  10529003  243
3312.2     543.4      34.7                                                  10529003  244
3321.9     486.5      34.1                                                  10529003  245
3331.6     521.6      34.9                                                  10529003  246
3341.3     557.0      35.7                                                  10529003  247
3351.1     569.6      36.0                                                  10529003  248
3360.8     577.1      36.3                                                  10529003  249
3370.5     542.5      36.0                                                  10529003  250
3380.2     558.8      36.5                                                  10529003  251
3389.9     472.5      35.3                                                  10529003  252
3399.7     495.8      35.8                                                  10529003  253
3409.4     449.8      35.3                                                  10529003  254
3419.1     526.8      36.7                                                  10529003  255
3428.8     561.8      37.4                                                  10529003  256
3438.5     473.5      36.1                                                  10529003  257
3448.2     363.8      34.3                                                  10529003  258
3458.0     284.3      32.9                                                  10529003  259
3467.7     303.4      33.2                                                  10529003  260
3477.4     281.3      32.9                                                  10529003  261
3487.1     234.1      32.1                                                  10529003  262
3496.8     219.3      31.9                                                  10529003  263
3506.5     260.2      32.9                                                  10529003  264
3516.3     407.6      35.7                                                  10529003  265
3526.0     433.7      36.3                                                  10529003  266
ENDDATA           260                                                       10529003  267
ENDSUBENT         266                                                       1052900399999
ENDENTRY            2                                                       1052999999999
ENTRY           11274     860318                                            11274000    1
SUBENT       11274001     860318                                            11274001    1
BIB                10         15                                            11274001    2
INSTITUTE  (1CANCRC)                                                       11274001    3
REFERENCE  (J,CJP,31,267,53)                                               11274001    4
AUTHOR     (E.B.PAUL,R.L.CLARKE)                                           11274001    5
TITLE      CROSS SECTION MEASUREMENTS OF REACTIONS INDUCED BY              11274001    6
           NEUTRONS OF THE 14.5 MEV ENERGY.                                11274001    7
INC-SOURCE (D-T)                                                           11274001    8
MONITOR    NEUTRON FLUX MONITORED BY A LONG BORON COUNTER.                 11274001    9
           BETA COUNTERS CALIBRATED WITH STANDARD SOURCES.                 11274001   10
METHOD     (ACTIV).                                                        11274001   11
HALF-LIFE  HALF LIVES TAKEN FROM N.B.C. CIRCULAR 499(1952)                 11274001   12
STATUS     (SCSRS)                                                         11274001   13
HISTORY    (761001T) TRANSLATED FROM SCISRS                                11274001   14
           (810428A) CONVERTED TO REACTION FORMALISM                       11274001   15
           (820108U) BIB CORRECTIONS                                       11274001   16
           (860318A) BIB CORRECTION.                                       11274001   17
ENDBIB             15                                                      11274001   18
NOCOMMON            0          0                                           11274001   19
ENDSUBENT          18                                                      1127400199999
SUBENT       11274011     810428                                            11274011    1
BIB                 2          2                                           11274011    2
REACTION   (14-SI-28(N,P)13-AL-28,,SIG)                                    11274011    3
DECAY-DATA (13-AL-28,2.4MIN,B)                                             11274011    4
ENDBIB              2                                                      11274011    5
NOCOMMON            0          0                                           11274011    6
DATA                3          1                                           11274011    7
EN         DATA       DATA-ERR                                             11274011    8
MEV        B          PER-CENT                                             11274011    9
 1.45   +01 2.20   -01   23.                                                11274011   10
ENDDATA             3                                                      11274011   11
ENDSUBENT          10                                                      1127401199999
ENDENTRY            2                                                      1127499999999
ENTRY           11464     820813                                            11464000    1
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SUBENT        11464001     820813                                    11464001    1
BIB                  9         11                                    11464001    2
INSTITUTE  (1USANRD)                                                 11464001    3
REFERENCE  (J,NP,10,226,5905)                                        11464001    4
           (R,USNRDL-TR-269,5810) TABULATED DATA                     11464001    5
AUTHOR     (B.D.KERN,W.E.THOMPSON,J.M.FERGUSON)                      11464001    6
TITLE      CROSS SECTIONS FOR SOME (N,P) AND (N,ALPHA) REACTIONS.    11464001    7
N-SOURCE   (D-T) D(T,N) SOURCE                                       11464001    8
METHOD     (ACTIV)                                                   11464001    9
MONITOR    (3-LI-6(N,T)2-HE-4,,SIG)                                  11464001   10
STATUS     (SCSRS)                                                   11464001   11
HISTORY    (761016T) TRANSLATED FROM SCISRS                          11464001   12
           (820813A) CONVERTED TO REACTION FORMALISM                 11464001   13
ENDBIB               11                                              11464001   14
NOCOMMON              0          0                                    11464001   15
ENDSUBENT            14                                              1146400199999
SUBENT        11464004     820813                                    11464004    1
BIB                  1          1                                    11464004    2
REACTION   (14-SI-28(N,P)13-AL-28,,SIG)                              11464004    3
ENDBIB               1                                               11464004    4
NOCOMMON             0          0                                    11464004    5
DATA                 3         33                                    11464004    6
EN         DATA       DATA-ERR                                       11464004    7
MEV        B          B                                              11464004    8
 1.233  +01 3.77   -01 4.52   -02                                    11464004    9
 1.299  +01 3.577  -01 4.3    -02                                    11464004   10
 1.30   +01 3.401  -01 4.08   -02                                    11464004   11
 1.31   +01 4.480  -01 6.3    -02                                    11464004   12
 1.338  +01 3.896  -01 4.3    -02                                    11464004   13
 1.35   +01 3.816  -01 4.5    -02                                    11464004   14
 1.359  +01 3.888  -01 4.67   -02                                    11464004   15
 1.373  +01 3.485  -01 3.5    -02                                    11464004   16
 1.373  +01 3.264  -01 3.3    -02                                    11464004   17
 1.384  +01 4.150  -01 4.6    -02                                    11464004   18
 1.401  +01 4.413  -01 5.3    -02                                    11464004   19
 1.428  +01 3.505  -01 3.9    -02                                    11464004   20
 1.428  +01 3.766  -01 4.7    -02                                    11464004   21
 1.474  +01 3.403  -01 3.7    -02                                    11464004   22
 1.499  +01 3.062  -01 4.00   -02                                    11464004   23
 1.499  +01 3.446  -01 4.50   -02                                    11464004   24
 1.499  +01 2.601  -01 3.1    -02                                    11464004   25
 1.506  +01 3.010  -01 3.3    -02                                    11464004   26
 1.544  +01 2.985  -01 3.3    -02                                    11464004   27
 1.566  +01 3.160  -01 3.5    -02                                    11464004   28
 1.599  +01 2.332  -01 2.8    -02                                    11464004   29
 1.599  +01 2.606  -01 3.1    -02                                    11464004   30
 1.621  +01 2.312  -01 2.5    -02                                    11464004   31
 1.632  +01 2.926  -01 4.1    -02                                    11464004   32
 1.668  +01 2.684  -01 3.2    -02                                    11464004   33
 1.698  +01 2.111  -01 2.5    -02                                    11464004   34
 1.698  +01 2.148  -01 2.6    -02                                    11464004   35
 1.704  +01 2.542  -01 3.6    -02                                    11464004   36
 1.712  +01 2.824  -01 3.6    -02                                    11464004   37
 1.75   +01 2.330  -01 3.5    -02                                    11464004   38
 1.75   +01 1.887  -01 2.6    -02                                    11464004   39
 1.752  +01 2.098  -01 2.4    -02                                    11464004   40
 1.824  +01 1.584  -01 2.5    -02                                    11464004   41
ENDDATA              35                                              11464004   42
ENDSUBENT            41                                              1146400499999
ENDENTRY              2                                              1146499999999
ENTRY            20498     840120                                    20498000    1
SUBENT        20498001     840120                                    20498001    1
BIB                 16         42                                    20498001    2
INSTITUTE  (2ITYTUR)                                                 20498001    3
REFERENCE  (J,NCL,8,249,7309)                                        20498001    4
           (C,72BUD,,134,7208) ALSO C-12 AND O-16.                   20498001    5
           (J,NIM,87,291,7010) WITH DETAILS ON EXPERIMENTAL          20498001    6
                               TECHNIQUES.                           20498001    7
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AUTHOR     (B.MINETTI, A.PASQARELLI, G.C.BONAZZOLA, T.BRESSANI,   20498001    8
            E.CHIAVASSA)                                          20498001    9
TITLE      -ELASTIC AND INELASTIC BACKSCATTERING OF 14.2 MEV      20498001   10
            NEUTRONS FROM SI-28.-                                 20498001   11
FACILITY   (CCW  )    14 MEV ELECTRO-STATIC GENERATOR AT ISTITUTO 20498001   12
            DI FISICA SPERIMENTALE DEL POLITECNICO, TURIN.        20498001   13
INC-SOURCE (D-T  )    DEUTERON-TRITIUM.                           20498001   14
SAMPLE      NATURAL POWDERED SI (92.2 PERC. SI-28, 4.7 PERC. SI-29 20498001   15
            AND 3.1 PERC. SI-30).                                 20498001   16
            SAMPLE WAS CONTAINED IN A PARALLELEPIPED, 70 * 70 * 4 20498001   17
            CM3, COMPOSED OF AN ALUMINUM FRAME WITH 2 POLYETYLENE 20498001   18
            WINDOWS STRENGTHENED BY A THIN ALUMINUM MESH.         20498001   19
METHOD     (TOF  )    TIME OF FLIGHT, PATH = 220 CM. SEE          20498001   20
            NUCL.INSTR.METH.,87(1970)291.                         20498001   21
DETECTOR   (SCIN )    NE 213 LIQUID SCINTILLATOR, CONTAINED IN A  20498001   22
            CYLINDRICAL BOX OF 9 CM DIAM. AND 10 CM LENGTH, WITH  20498001   23
            A XP 1021 PHOTOMULTIPLIER.                            20498001   24
ANALYSIS   - THE WHOLE ANGULAR DISTRIBUTION FOR ELASTIC SCATT.    20498001   25
             WAS FIRST ANALYSED WITH A SPHERICAL OPTICAL          20498001   26
             POTENTIAL.                                           20498001   27
           - THE ANGULAR DISTRIBUTIONS BOTH FOR ELASTIC AND       20498001   28
             INELASTIC SCATT. TO 1.77 MEV LEVEL WAS AFTERWARDS    20498001   29
             ANALYSED WITH THE COUPLED-CHANNEL METHOD, IN THE     20498001   30
             ADIABATIC APPROXIMATION.                             20498001   31
MONITOR     ABSOLUTE MEASUREMENT. THE NEUTRON FLUX DISTRIBUTION   20498001   32
            ON THE SCATTERER PLANE WAS MEASURED BY SCANNING ITS   20498001   33
            SURFACE IN STEPS OF 5 CM WITH A PLASTIC SCINTILLATOR  20498001   34
            WHOSE EFFICIENCY WAS MEASURED WITH 1 PERCENT ERROR    20498001   35
PART-DET   (N    )    NEUTRONS.                                   20498001   36
STATUS      DATA FROM TABLE I OF LETT.NUOVO CIMENTO,8(1973)249.   20498001   37
HISTORY    (731031C)                                             20498001   38
           (760315E)                                             20498001   39
CORRECTION  DOUBLE SCATTERING CORRECTIONS, 12 PERC. FOR ELASTIC   20498001   40
            SCATTERING AND 17 PERC. FOR INELASTIC ONE, WERE       20498001   41
            CALCULATED WITH MONTE-CARLO METHOD.                   20498001   42
ERR-ANALYS  ERRORS ARE STATISTICAL.                               20498001   43
            ANGULAR RESOLUTION IS +-1.5 DEG. FWHM.                20498001   44
ENDBIB              42                                            20498001   45
COMMON               1          3                                 20498001   46
EN                                                                20498001   47
MEV                                                               20498001   48
 1.4200E+01                                                       20498001   49
ENDCOMMON            3                                            20498001   50
ENDSUBENT           49                                            2049800199999
SUBENT        20498002     840120                                 20498002    1
BIB                  2          3                                 20498002    2
REACTION   (14-SI-28(N,EL)14-SI-28,,DA)                           20498002    3
HISTORY    (731031C)                                             20498002    4
           (760315E)                                             20498002    5
ENDBIB               3                                            20498002    6
NOCOMMON             0          0                                 20498002    7
DATA                 4          8                                 20498002    8
COS-CM     ANG-RSL    DATA       DATA-ERR                         20498002    9
NO-DIM     ADEG       MB/SR      MB/SR                            20498002   10
-9.9945E-01 7.5000E-01 1.3000E+01 1.0000E+00                      20498002   11
-9.9415E-01 7.5000E-01 1.1000E+01 9.0000E-01                      20498002   12
-9.9189E-01 7.5000E-01 1.1000E+01 8.0000E-01                      20498002   13
-9.6901E-01 7.5000E-01 1.1100E+01 9.0000E-01                      20498002   14
-9.4551E-01 7.5000E-01 9.7000E+00 8.0000E-01                      20498002   15
-9.0850E-01 7.5000E-01 8.4000E+00 8.0000E-01                      20498002   16
-8.7964E-01 7.5000E-01 6.8000E+00 6.0000E-01                      20498002   17
-8.3771E-01 7.5000E-01 6.7000E+00 6.0000E-01                      20498002   18
ENDDATA             10                                            20498002   19
ENDSUBENT           18                                            2049800299999
ENDENTRY             2                                            2049899999999
ENTRY            21984     970922                                 21984000    1
SUBENT        21984001     970922                                 21984001    1
BIB                 15         43                                 21984001    2
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INSTITUTE  (2JPNTOH)                                                    21984001    3
REFERENCE  (C,85SANTA,1,223,8505)                                       21984001    4
           (W,CHIBA,851001) DATA RECEIVED ON TAPE.                      21984001    5
AUTHOR     (M.BABA,M.ONO,N.YABUTA,T.KIKUTI,N.HIRAKAWA)                  21984001    6
TITLE      -SCATTERING OF 14.1MEV NEUTRONS FROM B-10,B-11,C,N,O,F       21984001    7
            AND SI-.                                                    21984001    8
FACILITY   (DYNAM) DYNAMITRON                                           21984001    9
INC-SOURCE (D-T  ) THE T(D,N) REACTION USING A SOLID TI-T TARGET        21984001   10
            90 AND 0 DEGREES FOR 14.2  AND 18.2 MEV MEASUREMENT         21984001   11
            RESPECTIVELY. A SMALL NE213 SCINTILLATOR MONITORED THE      21984001   12
            SOURCE NEUTRONS FOR FLUX NORMALISATION.                     21984001   13
SAMPLE     .THE SCATTERING SAMPLES WERE CYLINDERS OF 10-B(4)C (90       21984001   14
            PERCENT 10-B), BORON, CARBON, SI(3)N(4), SIO(2), CF(2)      21984001   15
            AND SI, 2.5 OR 3.5 CM IN DIAMETER AND 4 CM LONG. THE        21984001   16
            SAMPLES OTHER THAN CARBON AND CF(2) WERE INCASED IN         21984001   17
            THIN-WALLED ALUMINUM CANS.                                  21984001   18
METHOD     (TOF  ) TIME OF FLIGHT TECHNIQUES.                           21984001   19
DETECTOR   (SCIN ) A WELL SHIELDED NE213 LIQUID SCINTILLATOR OF         21984001   20
            5 INCH DIAMETER AND 2 INCH THICK, INCORPORATING TWO         21984001   21
            SEPARATE NEUTRON-GAMMA DISCRIMINATORS WITH 0.3 AND          21984001   22
            2 MEV BAIS RESPECTIVELY. THE EFFICIENCY WAS DETERMINED      21984001   23
            TO +- 4 PERCENT BY COMBINING THE CALCULATION AND THE        21984001   24
            MEASUREMENT OF FISSION SPECTRUM FROM CF-252 AND OF          21984001   25
            N-P SCATTERING.                                             21984001   26
PART-DET   (N    ) NEUTRONS                                             21984001   27
MONITOR    (1-H-1(N,EL)1-H-1,,SIG) NO VALUES GIVEN IN CONFERENCE        21984001   28
            PAPER.                                                      21984001   29
CORRECTION .FOR SAMPLE-OUT BACKGROUND, SAMPLE-SIZE EFFECT ( MONTE-      21984001   30
            CARLO SIMULATION TAKING THE FINITE TARGET-SAMPLE            21984001   31
            GEOMETRY INTO ACCOUNT), AND FOR BACKGROUND DUE TO           21984001   32
            PARASITIC D-D NEUTRONS.                                     21984001   33
ERR-ANALYS (DATA-ERR)  STANDARD DEVIATION                               21984001   34
STATUS     .DATA TAKEN FROM PRIVATE COMMUNICATION.                      21984001   35
HISTORY    (860128C)                                                    21984001   36
           (860210E)                                                    21984001   37
           (880802A) SUBENTRIES 32-41 DELETED                           21984001   38
           (880810E)                                                    21984001   39
           (910103A) S.W. MAIN REFERENCE IMPROVED. 14 MEV DATA FOR      21984001   40
                     C-12 AND O-16 DELETED.                             21984001   41
           (910103E)                                                    21984001   42
           (970922A)  * * CORRECTED BY S.MAEV                           21984001   43
                    PART OF SUPERSEDED DATA FOR C-12 AND O-16           21984001   44
                    HAVE BEEN RESTORED  * *                             21984001   45
ENDBIB              43                                                  21984001   46
NOCOMMON             0          0                                       21984001   47
ENDSUBENT           46                                                  2198400199999
SUBENT        21984119     970922                                       21984119    1
BIB                  3          5                                       21984119    2
REACTION   (14-SI-28(N,EL)14-SI-28,,DA)                                 21984119    3
STATUS     .DATA TAKEN FROM PRIVATE COMMUNICATION.                      21984119    4
HISTORY    (860128C)                                                    21984119    5
           (860210E)                                                    21984119    6
           (970922U)  CHECKED                                           21984119    7
ENDBIB               5                                                  21984119    8
COMMON               1          3                                       21984119    9
EN                                                                      21984119   10
MEV                                                                     21984119   11
 1.4200E+01                                                             21984119   12
ENDCOMMON            3                                                  21984119   13
DATA                 3         10                                       21984119   14
ANG-CM     DATA-CM    DATA-ERR                                          21984119   15
ADEG       B/SR       B/SR                                              21984119   16
 2.5900E+01 2.4720E-01 3.9800E-02                                       21984119   17
 3.1000E+01 1.1800E-01 1.3500E-02                                       21984119   18
 4.6400E+01 1.8700E-02 2.1000E-03                                       21984119   19
 6.1800E+01 3.9300E-02 3.6000E-03                                       21984119   20
 7.7000E+01 2.1000E-02 4.1000E-03                                       21984119   21
 8.2000E+01 1.3100E-02 2.0000E-03                                       21984119   22
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 1.0700E+02 1.0500E-02 1.7000E-03                                        21984119   23
 1.2180E+02 9.5700E-03 1.0300E-03                                        21984119   24
 1.3640E+02 6.7700E-03 7.6000E-04                                        21984119   25
 1.5100E+02 5.3100E-03 6.0000E-04                                        21984119   26
ENDDATA             12                                                   21984119   27
ENDSUBENT           26                                                   2198411999999
ENDENTRY             2                                                   2198499999999
ENTRY            31097     851217                                        31097000    1
SUBENT        31097001     851217                                        31097001    1
BIB                  5          5                                       31097001    2
INSTITUTE  (3ISLISL)                                                     31097001    3
REFERENCE  (J,NIM,21,197,63)                                             31097001    4
AUTHOR     (M.BIRK,G.GOLDRING,P.HILLMAN)                                 31097001    5
TITLE      FAST NEUTRON SPECTROSCOPY WITH SOLID STATE DETECTORS.         31097001    6
HISTORY    (771115T) CONVERTED FROM EXFOR 70097                          31097001    7
ENDBIB               5                                                   31097001    8
NOCOMMON             0          0                                        31097001    9
ENDSUBENT            8                                                   3109700199999
SUBENT        31097003     851217                                        31097003    1
BIB                  3          3                                       31097003    2
REACTION   (14-SI-28(N,P)13-AL-28,,SIG)                                  31097003    3
DETECTOR   (SOLST)    SOLID STATE DETECTOR                               31097003    4
STATUS     (SCSRS)                                                       31097003    5
ENDBIB               3                                                   31097003    6
NOCOMMON             0          0                                        31097003    7
DATA                 2          8                                       31097003    8
EN         DATA                                                          31097003    9
MEV        B                                                             31097003   10
 5.3500E+00 1.5000E-02                                                   31097003   11
 5.5500E+00 6.0000E-02                                                   31097003   12
 5.7000E+00 1.0900E-01                                                   31097003   13
 5.7500E+00 8.5000E-02                                                   31097003   14
 5.8500E+00 5.5000E-02                                                   31097003   15
 6.0000E+00 1.2000E-01                                                   31097003   16
 6.1500E+00 1.2000E-01                                                   31097003   17
 6.4000E+00 1.5000E-01                                                   31097003   18
ENDDATA             10                                                   31097003   19
ENDSUBENT           18                                                   3109700399999
ENDENTRY             2                                                   3109799999999
ENDREQUEST           6                                                   Z999999999999
```

Example computation format data

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 1 14028   3   4 A  1781100.          1.4000-3 0.010900                    F.G.PEREY,ET.AL. (71)    10529  3
 1 14028   3   4 A  1800700.          0.011700 0.011500                    F.G.PEREY,ET.AL. (71)    10529  3
 1 14028   3   4 A  1804600.          0.022000 0.011800                    F.G.PEREY,ET.AL. (71)    10529  3
 1 14028   3   4 A  1808500.          0.014000 0.011600                    F.G.PEREY,ET.AL. (71)    10529  3
 1 14028   3   4 A  1812500.          7.8000-3 0.011500                    F.G.PEREY,ET.AL. (71)    10529  3
 1 14028   3   4 A  1816400.          0.031700 0.012300                    F.G.PEREY,ET.AL. (71)    10529  3
 1 14028   3   4 A  1820300.          0.024900 0.012100                    F.G.PEREY,ET.AL. (71)    10529  3
 1 14028   3   4 A  1824200.          0.037600 0.012600                    F.G.PEREY,ET.AL. (71)    10529  3
 1 14028   3   4 A  1828100.          0.031500 0.012500                    F.G.PEREY,ET.AL. (71)    10529  3
 1 14028   3   4 A  1832000.          0.060500 0.013300                    F.G.PEREY,ET.AL. (71)    10529  3
 1 14028   3   4 A  1836000.          0.074800 0.013800                    F.G.PEREY,ET.AL. (71)    10529  3
 1 14028   3   4 A  1839900.          0.102100 0.014600                    F.G.PEREY,ET.AL. (71)    10529  3
 1 14028   3   4 A  1843800.          0.148400 0.015800                    F.G.PEREY,ET.AL. (71)    10529  3
 1 14028   3   4 A  1847700.          0.219300 0.017500                    F.G.PEREY,ET.AL. (71)    10529  3
 1 14028   3   4 A  1851600.          0.384800 0.020800                    F.G.PEREY,ET.AL. (71)    10529  3
 1 14028   3   4 A  1855500.          0.455700 0.022200                    F.G.PEREY,ET.AL. (71)    10529  3
 1 14028   3   4 A  1859500.          0.436900 0.022000                    F.G.PEREY,ET.AL. (71)    10529  3
 1 14028   3   4 A  1863400.          0.397300 0.021500                    F.G.PEREY,ET.AL. (71)    10529  3
 1 14028   3   4 A  1867300.          0.287900 0.019500                    F.G.PEREY,ET.AL. (71)    10529  3
 1 14028   3   4 A  1871200.          0.218800 0.018200                    F.G.PEREY,ET.AL. (71)    10529  3
 1 14028   3   4 A  1875100.          0.190600 0.017800                    F.G.PEREY,ET.AL. (71)    10529  3
 1 14028   3   4 A  1879000.          0.168700 0.017400                    F.G.PEREY,ET.AL. (71)    10529  3
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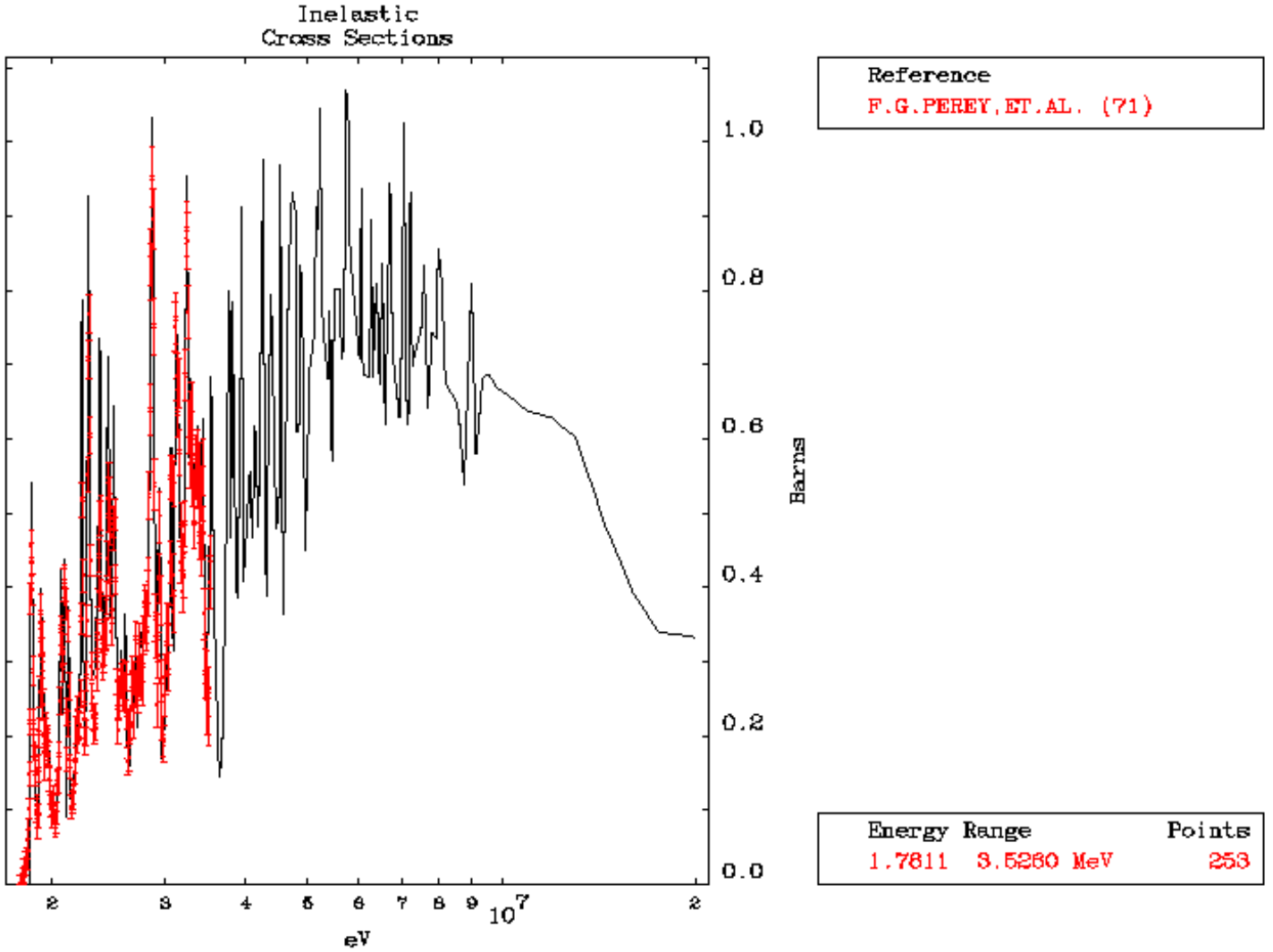
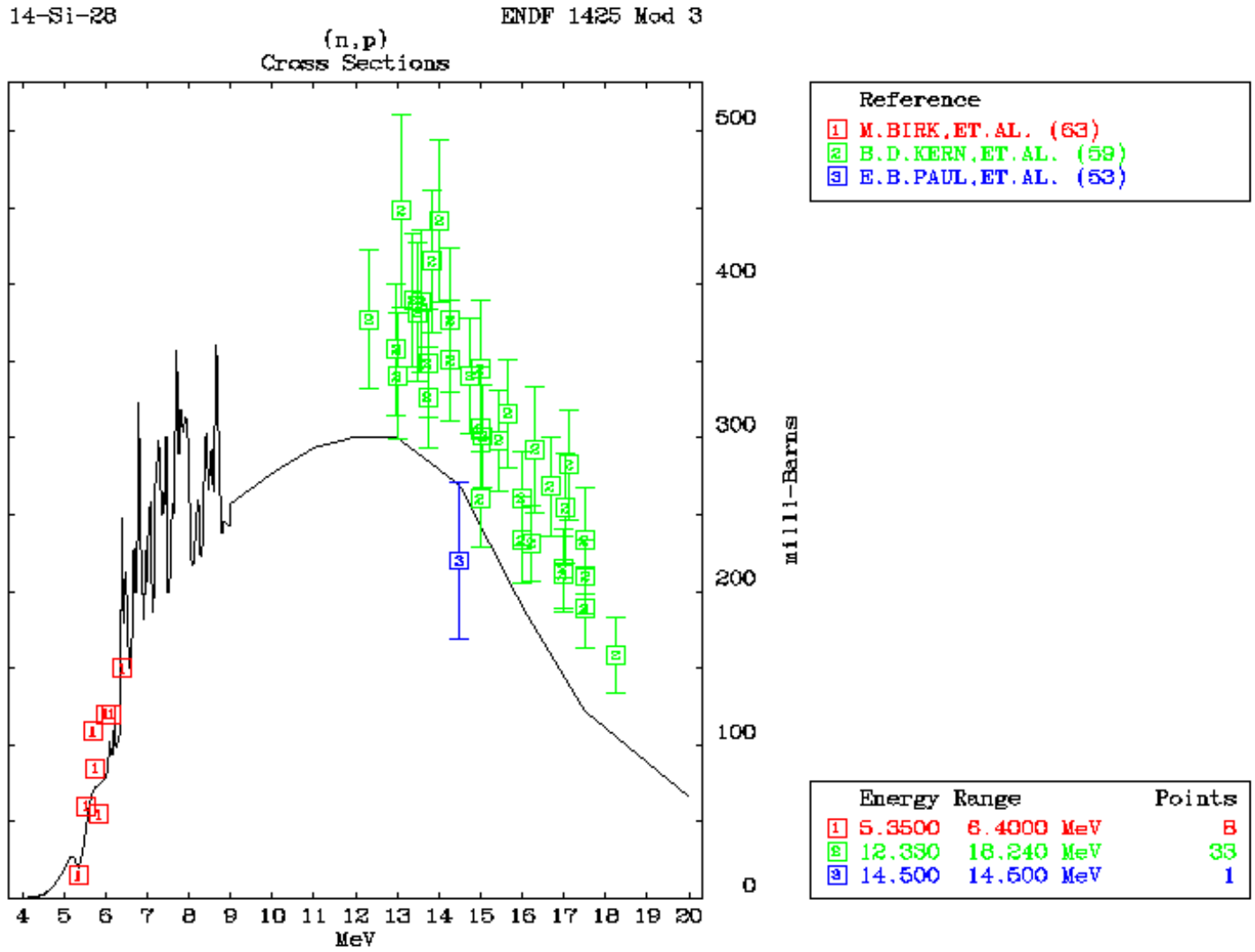
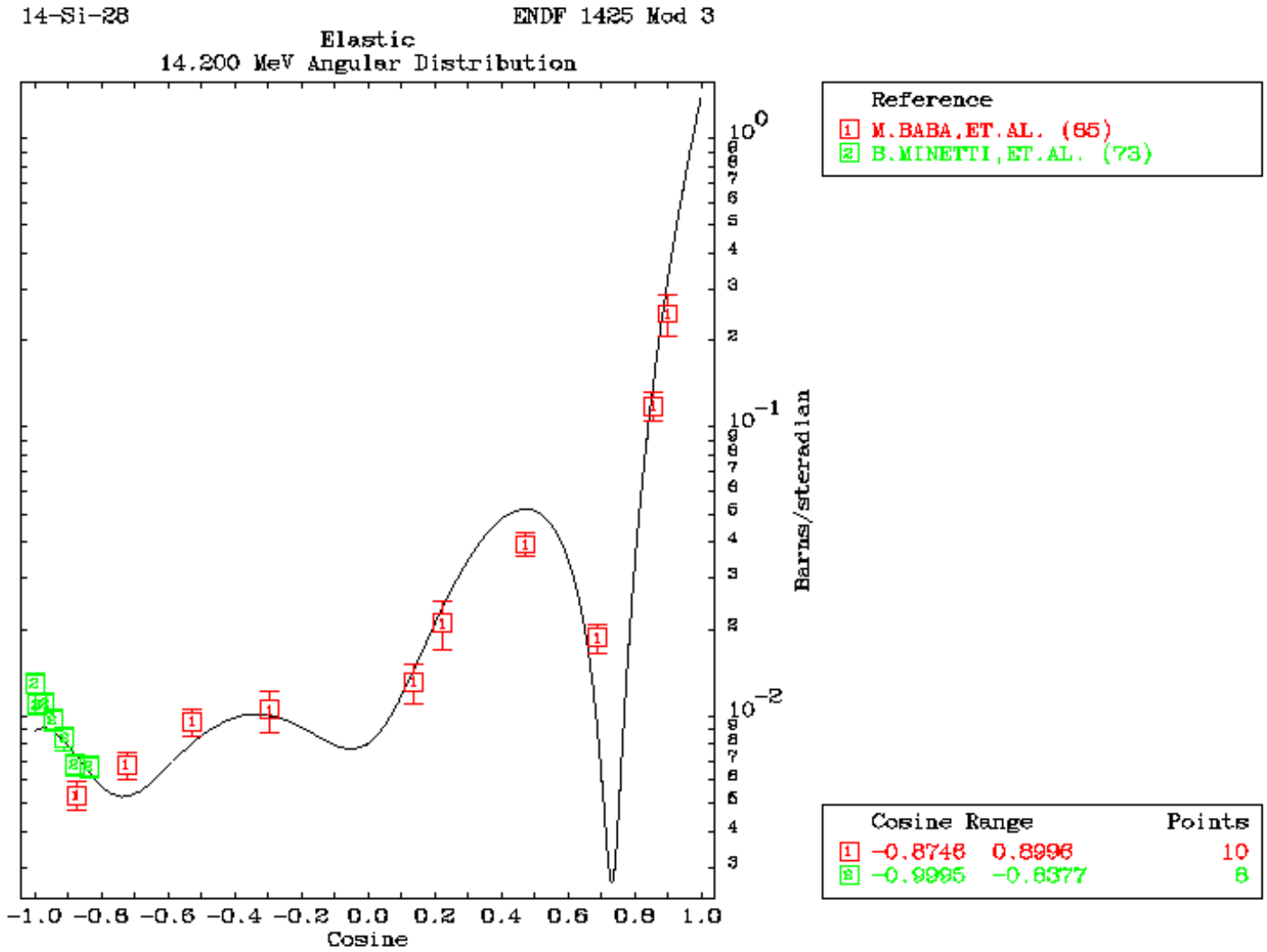
PLOTS of the Data using program PLOTC4

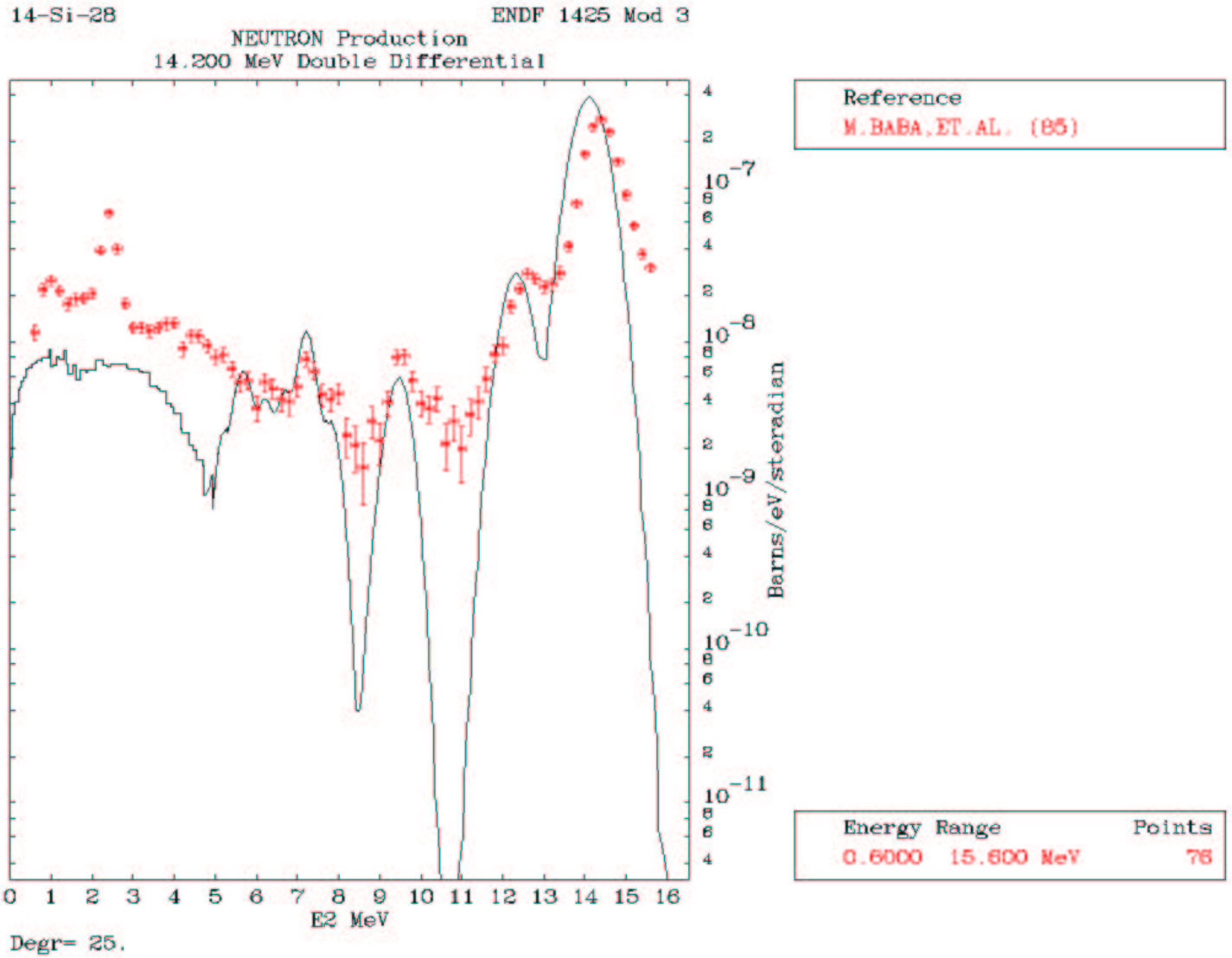
(see document IAEA-NDS-79)

14-Si-28 ENDF 1425 Mod 3




14-Si-28
ENDF 1425 Mod 3
(n,p)
Cross Sections
500
400
300
200
100
0
milli-Barns
4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
MeV
Reference
1 M.BIRK,ET.AL. (63)
2 B.D.KERN,ET.AL. (59)
3 E.B.PAUL,ET.AL. (53)
Energy Range Points
1 5.3500 6.4000 MeV 8
2 12.330 18.240 MeV 33
3 14.500 14.500 MeV 1


14-Si-28
ENDF 1425 Mod 3
Elastic
14.200 MeV Angular Distribution
Barns/steradian
Cosine
-1.0 -0.8 -0.6 -0.4 -0.2 0.0 0.2 0.4 0.6 0.8 1.0
Reference
1 M.BABA,ET.AL. (85)
2 B.MINETTI,ET.AL. (73)
Cosine Range
Points
1 -0.8746 0.8996 10
2 -0.9995 -0.8377 8


14-Si-28
ENDF 1425 Mod 3
NEUTRON Production
14.200 MeV Double Differential
Barns/eV/steradian
E2 MeV
Degr= 25.
Reference
M.BABA,ET.AL. (85)
Energy Range
Points
0.6000 15.600 MeV
76