IAEA-NDS-80
(Rev.0)

INTERNATIONAL ATOMIC ENERGY AGENCY

NUCLEAR DATA SERVICES

DOCUMENTATION SERIES OF THE IAEA NUCLEAR DATA SECTION

PROGRAM X4TOC4

(Version 86-1)

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

by

Dermott E. Cullen

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 costfree from the IAEA Nuclear Data Section, upon request.

September 1986

IAEA-NDS [illegible] IAEA SECTION, P.O. BOX 100, A-1400 [illegible]

PAGE 0001

```
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
```

PROGRAM X4TOC4

(Version B6-1)

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

Introduction

Enclosed is the documentation for Program X4TOC4. This 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 Job Control Language (JCL) deck, used to submit the program for execution.

4) A listing of an example output report

5) A listing of example EXFOR data

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

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

The enclosed documentation is up to date as of September 1986. 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.

SAME AS ENDF/B
(N,N+P)
(N,N+P)+(N,P)
(N,N+P)+(N,D)
(N,N+A)+(N,A)

1- 999 1
1001 * MT EXTENSIONS 1
1002 MT =1000 + ASSIGNED MT 1
1003 NUMBER 1
1004 1

Availability of X4TOC4

At Nuclear Data Section - Mainframe

A batch deck and the translation dictionaries are available in XNDC.EXFOR.CNTL,

GOX4TOC4 - batch deck
EXFOR14A - reaction dictionary
EXFOR24A - title dictionary
EXFOR25A - units dictionary

At Nuclear Data Section - IBM Personal Computer

A batch deck and the translation dictionaries are available in GOEXFOR.GOX4TOC4

GOX4TOC4 - batch deck
EXFOR14A - reaction dictionary
EXFOR24A - title dictionary
EXFOR25A - units dictionary

Distribution outside Nuclear Data Section

The program can be obtained costfree on magnetic tape. The magnetic tape will contain,

file 1 - Fortran program
file 2 - reaction dictionary
file 3 - title dictionary
file 4 - units dictionary
file 5 - JCL deck
file 6 - example output report
file 7 - example EXFOR input data
file 8 - example computation format output data

PAGE 0003

```
NOTE, THESE CONVENTIONS ARE CODED INTO THE TRANSLATION PROGRAM.                1
THE USER SHOULD NOT ADD ANY OPERATIONS TO THIS LIST UNLESS THEY ARE            1
ALSO INCLUDED IN THE TRANSLATION PROGRA.                                       1
                                                                               1
REACTION                                  PROJECTILE MF  MT OPERATION          1
================================================================================1
```

Program X4TOC4

Comment cards

(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

```
C     PROGRAM X4TOC4(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT,                X4T00010
C    1 TAPE10,TAPE11,TAPE12,TAPE14,TAPE15)                                 X4T00020
C                                                                          X4T00030
C                                                                          X4T00040
C     PROGRAM X4TOC4                                                       X4T00050
C     VERSION 86-1 (AUGUST 1986)                                           X4T00060
C                                                                          X4T00070
C     WRITTEN BY DERMOTT E. CULLEN                                         X4T00080
C                NUCLEAR DATA SECTION                                      X4T00090
C                INTERNATIONAL ATOMIC ENERGY AGENCY                        X4T00100
C                P.O. BOX 200                                              X4T00110
C                VIENNA, AUSTRIA                                           X4T00120
C     TELEPHONE  23-60-1718                                                X4T00130
C                                                                          X4T00140
C     PURPOSE                                                              X4T00150
C     =======                                                              X4T00160
C     THIS PROGRAM IS DESIGNED TO TRANSLATE EXPERIMENTAL DATA FROM THE     X4T00170
C     EXFOR FORMAT TO A COMPUTATION FORMAT.                                X4T00180
C                                                                          X4T00190
C     EXFOR FORMAT                                                         X4T00200
C     ============                                                         X4T00210
C     THE EXFOR FORMAT IS DESIGNED TO ALLOW EXPERIMENTALLY MEASURED DATAX4T00220
C     TO BE CODED IN A COMPUTER READABLE FORMAT IN A VERY FLEXIBLE FORM.X4T00230
C     IN PARTICULAR THE DATA CAN BE ENTERED IN ESSENTIALLY ANY SET OF   X4T00240
C     UNITS (E.G., EV VS. BARNS OR KEV VS. MILLI-BARNS) AND IN ANY TABLEX4T00250
C     FORMAT; ESSENTIALLY THE TABLE MAY BE ENTERED EXACTLY AS PUBLISHED X4T00260
C     BY AN AUTHOR (E.G., ENERGY FOLLOWED BY COLUMNS OF CROSS SECTIONS  X4T00270
C     IN ANY ORDER).                                                       X4T00280
C                                                                          X4T00290
C     THE ADVANTAGE OF THE EXFOR FORMAT IS THAT SINCE DATA CAN BE CODED X4T00300
C     ESSENTIALLY AS PUBLISHED BY AN AUTHOR PROBLEMS OF UNIT CONVERSION X4T00310
C     AND RE-FORMATTING TABLES PRIOR TO CODING ARE AVOIDED AND THE      X4T00320
C     AUTHOR CAN EASILY CHECK THE CODED DATA. THE RESULT IS A GREATLY   X4T00330
C     IMPROVED RELIABILITY OF THE CODED DATA.                              X4T00340
C                                                                          X4T00350
C     THE DISADVANTAGE OF THE EXFOR FORMAT IS THAT SINCE PHYSICALLY        X4T00360
C     COMPARABLE DATA FROM DIFFERENT MEASUREMENTS (E.G. FE-56 TOTAL        X4T00370
C     CROSS SECTIONS) MAY BE GIVEN IN A VARIETY OF DIFFERENT UNITS AND     X4T00380
C     FORMATS IT IS VERY DIFFICULT TO USE IN APPLICATIONS.                 X4T00390
C                                                                          X4T00400
C     COMPUTATION FORMAT                                                   X4T00410
C     ==================                                                   X4T00420
C     THE COMPUTATION FORMAT USED BY THIS PROGRAM IS DESIGNED TO PRESENTX4T00430
C     EXPERIMENTAL DATA IN A FIXED SET OF UNITS AND COLUMN ORDER. BY     X4T00440
C     STARTING FROM DATA IN THE EXFOR FORMAT AND TRANSLATING DATA TO     X4T00450
C     THE COMPUTATION FORMAT IT IS POSSIBLE TO COMBINE THE ADVANTAGES    X4T00460
C     OF THE IMPROVED RELIABILITY OF THE DATA CODED IN THE EXFOR FORMAT X4T00470
C     WITH THE ADVANTAGES OF A FIXED UNIT AND COLUMN ORDER FORMAT FOR    X4T00480
C     USE IN SUBSEQUENT APPLICATIONS.                                      X4T00490
C                                                                          X4T00500
C     RELATIONSHIP TO ENDF/B                                               X4T00510
C     ======================                                               X4T00520
C     IT IS ASSUMED THAT ONE OF THE MAJOR USES OF THIS PROGRAM WILL BE   X4T00530
C     TO PREPARE DATA FOR SUBSEQUENT USE IN EVALUATION AND/OR TO COMPAREX4T00540
C     AVAILABLE EVALUATED AND EXPERIMENTAL DATA. AS SUCH THE COMPUTATIONX4T00550
C     FORMAT HAS BEEN DESIGNED TO ALLOW DATA TO BE REDUCED TO A FORM IN X4T00560
C     WHICH DATA ARE CLASSIFIED IN A MANNER SIMILAR TO ENDF/B DATA.      X4T00570
C                                                                          X4T00580
C     IN PARTICULAR THE EXFOR CLASSIFICATION OF DATA BY      EXFOR       X4T00590
C     KEYWORD REACTION (OR ISO-QUANT, ETC.) IS REPLACED      CLASSIFYING X4T00600
C     THE DATA BY (1) PROJECTILE, (2) TARGET - ZA, (3)       OF DATA -   X4T00610
C     ENDF/B - MF, (4) REACTION - ENDF/B MT. IN ADDITION     STANDARD    X4T00620
C     UNITS USED BY THE TRANSLATION PROGRAM WERE SELECTED    BE THE      X4T00630
C     SAME AS THE UNITS USED BY ENDF/B (E.G., EV, BARNS      ).          X4T00640
C                                                                          X4T00650
```


FISSION YIELD DATA

(N,F)CUM,FY,,SPA

1801 18 0

1
1
1

```
C     THE RESULT OF PUTTING DATA INTO THE COMPUTATION FORMAT IS THAT IT X4T00660
C     IS EASY TO DECIDE IF THE DATA IS COMPARABLE TO EVALUATED DATA     X4T00670
C     (E.G. SAME ZA, MF, MT) AND ONCE IT IS DECIDED THAT DATA IS        X4T00680
C     COMPARABLE, EVALUATION AND/OR COMPARISON IS SIMPLIFIED BECAUSE THEX4T00690
C     DATA IS IN THE SAME UNITS AS ENDF/B (E.G., EV VS. BARNS).         X4T00700
C                                                                       X4T00710
C     EXTENSIONS OF ENDF/B CONVENTIONS                                  X4T00720
C     ================================                                  X4T00730
C     FOR ALL TYPES OF DATA WHICH ARE PHYSICALLY COMPARABLE TO DATA     X4T00740
C     WHICH CAN BE INCLUDED IN THE ENDF/B DATA THIS PROGRAM USING THE   X4T00750
C     ENDF/B DEFINITIONS OF (1) TYPE OF DATA - ENDF/B MF, (2) REACTION -X4T00760
C     ENDF/B MT. FOR EXAMPLE ALL CROSS SECTIONS (MF=3), ANGULAR (MF=4)  X4T00770
C     AND ENERGY (MF=5) AND DOUBLE DIFFERENTIAL (MF=6) DISTRIBUTIONS    X4T00780
C     DATA ARE TRANSLATED TO MF =3 TO 6. SIMILARLY FOR SIMPLE REACTIONS X4T00790
C     SUCH AS TOTAL (MT=1), ELASTIC (MT=2), ETC. THE DATA ARE TRANSLATEDX4T00800
C     TO THE CORRESPONDING ENDF/B MT.                                   X4T00810
C                                                                       X4T00820
C     SINCE MANY TYPES OF DATA WHICH APPEAR IN EXFOR DO NOT HAVE A ONE  X4T00830
C     TO ONE CORRESPONDENCE TO DATA WHICH APPEARS IN ENDF/B THE ENDF/B  X4T00840
C     CLASSIFICATION OF TYPE OF DATA (MF) AND REACTION (MT) HAVE BEEN   X4T00850
C     EXTENDED TO ALLOW ADDITIONAL TYPES OF DATA AND REACTIONS TO BE    X4T00860
C     TRANSLATED (E.G., DEFINE MF NUMBERS FOR RATIOS, DEFINE MT NUMBERS X4T00870
C     FOR (N,NP)+(N,NA)).                                               X4T00880
C                                                                       X4T00890
C     THE ENDF/B MF IS A 2 DIGIT NUMBER AND THE MT IS A 3 DIGIT NUMBER. X4T00900
C     IN THE COMPUTATION FORMAT MF HAS BEEN EXTENDED TO 3 DIGITS AND THEX4T00910
C     MT HAS BEEN EXPANDED TO 4 DIGITS. THESE EXTENSIONS ALLOW THE USER X4T00920
C     THE FLEXIBILITY TO TRANSLATE VIRTUALLY ANY EXFOR DATA TO A FIXED  X4T00930
C     SET OF UNITS AND COLUMN ORDER FOR SUBSEQUENT USE IN APPLICATIONS. X4T00940
C                                                                       X4T00950
C     SOME EXTENSIONS OF MF AND MT HAVE ALREADY BEEN ESTABLISHED (FOR,  X4T00960
C     DETAILS SEE THE INPUT DICTIONARIES DESCRIBED BELOW) AND IF AT ALL X4T00970
C     POSSIBLE THESE CONVENTIONS SHOULD BE FOLLOWED BY THE USER. THE    X4T00980
C     USER HAS THE FLEXIBILITY OF ESTABLISHING ANY CONVENTIONS THAT MAY X4T00990
C     BE REQUIRED TO MEET HIS OR HER NEEDS, BUT IN THIS CASE IT IS THE  X4T01000
C     RESPONSIBILITY OF THE USER TO PROPERLY INTERPRET AND USE THE      X4T01010
C     TRANSLATED DATA.                                                  X4T01020
C                                                                       X4T01030
C     CONTROL OF TRANSLATION                                            X4T01040
C     ======================                                            X4T01050
C     THE USER HAS COMPLETE CONTROL OVER WHAT DATA IS TRANSLATED, WHERE X4T01060
C     GIVEN TYPES OF DATA APPEAR IN THE COMPUTATION FORMAT AND THE UNITSX4T01070
C     OF THE DATA IN THE COMPUTATION FORMAT.                            X4T01080
C                                                                       X4T01090
C     THIS IS ACCOMPLISHED BY USING THREE DICTIONARIES WHICH CONTROL    X4T01100
C     THE TRANSLATION. ALL THREE OF THESE DICTIONARIES ARE DISTRIBUTED  X4T01110
C     WITH THIS PROGRAM. EACH DICTIONARY IS A SIMPLE CARD IMAGE FILE    X4T01120
C     WHICH MAY BE MODIFIED BY THE USER AT ANY TIME TO MEET SPECIFIC    X4T01130
C     NEEDS. THE THREE DICTIONARIES ARE,                                X4T01140
C                                                                       X4T01150
C     (1) EXFOR REACTION - PROJECTILE, MF, MT EQUIVALENCE               X4T01160
C         ---------------------------------------------                 X4T01170
C         THIS DICTIONARY TELLS THE PROGRAM FOR EACH EXFOR REACTION     X4T01180
C         WHAT PROJECTILE, MF AND MT TO OUTPUT IN THE COMPUTATION FORMATX4T01190
C         (E.G.,(N,TOT) = NEUTRON, MF =3 (CROSS SECTION),MT =1 (TOTAL)).X4T01200
C         IF A REACTION READ FROM THE EXFOR FORMAT IS NOT FOUND IN THIS X4T01210
C         DICTIONARY, OR THE ASSIGNED MF OR MT IS NOT POSITIVE THE EXFORX4T01220
C         DATA WILL SIMPLY BE SKIPPED AND NOT TRANSLATED. USING THIS    X4T01230
C         DICTIONARY THE USER HAS CONTROL OVER WHICH DATA IS TRANSLATED X4T01240
C         AND WHAT MF AND MT ARE ASSIGNED TO EACH EXFOR REACTION.       X4T01250
C                                                                       X4T01260
C     (2) EXFOR COLUMN TITLE - COMPUTATION FORMAT OUTPUT FIELD          X4T01270
C         ---------------------------------------------------           X4T01280
C         ONCE THE EXFOR REACTION HAS BEEN TRANSLATED AND ASSIGNED AN   X4T01290
C         EQUIVALENT MF AND MT THIS DICTIONARY TELLS THE PROGRAM WHERE  X4T01300
```

```
C        TO PLACE EACH EXFOR COLUMN IN THE COMPUTATION FORMAT. THE      X4T01310
C        ASSIGNED MF NUMBER CAN BE USED TO OUTPUT AN EXFOR COLUMN       X4T01320
C        WITH THE SAME TITLE INTO DIFFERENT COLUMNS OF THE COMPUTATION  X4T01330
C        FORMAT BASED ON DIFFERENT MF NUMBERS. FOR EXAMPLE, FOR CROSS   X4T01340
C        SECTIONS (MF=3) THE USER MAY USE EN-MIN AND EN-MAX TO DEFINE   X4T01350
C        AN AVERAGE INCIDENT ENERGY TO BE OUTPUT IN THE FIRST FIELD     X4T01360
C        OF THE COMPUTATION FORMAT AND AN EQUIVALENT ENERGY UNCERTAINTYX4T01370
C        IN THE SECOND FIELD OF THE COMPUTATION FORMAT. ALTERNATIVELY   X4T01380
C        FOR RESONANCE INTEGRALS (MF=213) THE USER MAY DECIDE TO OUTPUTX4T01390
C        EN-MIN AND EN-MAX IN THE FIRST TWO FIELDS OF THE COMPUTATION   X4T01400
C        FORMAT TO DEFINE THE ENERGY RANGE OF THE RESONANCE INTEGRAL.   X4T01410
C                                                                       X4T01420
C        THERE ARE 8 OUTPUT FIELDS IN THE COMPUTATION FORMAT AND FOR    X4T01430
C        ANY GIVEN MF NUMBER THE USER MAY OUTPUT ANY EXFOR COLUMN       X4T01440
C        INTO ANY OF THESE FIELDS. ANY EXFOR TITLE WHICH IS NOT         X4T01450
C        ASSIGNED TO AN OUTPUT FIELD 1 TO 8 WILL BE IGNORED AND NOT     X4T01460
C        OUTPUT. THIS ALLOWS THE USER TO SELECTIVELY TRANSLATE PORTIONSX4T01470
C        OF EXFOR DATA TABLES TO MEET ANY GIVEN NEED. FOR EXAMPLE, BY   X4T01480
C        SIMPLY MODIFYING THIS DICTIONARY THE USER HAS CONTROL OVER     X4T01490
C        WHETHER AN EXFOR COLUMN DATA-ERR3 IS TRANSLATED OR IGNORED.    X4T01500
C                                                                       X4T01510
C    (3) EXFOR COLUMN UNITS - COMPUTATION FORMAT UNITS                  X4T01520
C        ------------------------------------------                     X4T01530
C        THIS DICTIONARY TELLS THE PROGRAM HOW TO CONVERT EACH EXFOR    X4T01540
C        UNIT INTO STANDARD UNITS. AS DISTRIBUTED THIS DICTIONARY WILL  X4T01550
C        CONVERT ALL EXFOR UNITS TO ENDF/B COMPATIBLE UNITS. HOWEVER,   X4T01560
C        THE USER HAS THE OPTION TO CHANGE THIS DICTIONARY AT ANY TIME  X4T01570
C        TO OBTAIN ANY OUTPUT UNITS TO MEET HIS OR HER NEEDS. FOR       X4T01580
C        EXAMPLE IF THE USER WOULD LIKE OUTPUT IN MEV VS. MILLI-BARNS   X4T01590
C        INSTEAD OF EV VS. BARNS IT IS MERELY NECESSARY TO MODIFY THIS  X4T01600
C        DICTIONARY.                                                    X4T01610
C                                                                       X4T01620
C    OPERATIONS ON DATA                                                 X4T01630
C    ==================                                                 X4T01640
C    IN ADDITION TO THE INFORMATION DESCRIBED ABOVE EACH OF THE THREE   X4T01650
C    DICTIONARIES ALLOWS THE USER TO SELECT FROM A MENU OF OPERATIONS   X4T01660
C    WHICH MAY BE PERFORMED ON THE DATA (FOR A COMPLETE AND UP-TO-DATE  X4T01670
C    LIST OF AVAILABLE OPERATIONS SEE THE DICTIONARIES). FOR EXAMPLE,   X4T01680
C    THE REACTION DICTIONARY ALLOWS THE USER TO SPECIFY THAT LEGENDRE   X4T01690
C    COEFFICENTS MAY BE RE-NORMALIZED, THE TITLE DICTIONARY ALLOWS THE  X4T01700
C    USER TO SPECIFY THAT EN-MIN AND EN-MAX ARE TO BE CONVERTED TO AN   X4T01710
C    AVERAGE ENERGY AND ASSOCIATED ENERGY UNCERTAINTY AND THE UNITS     X4T01720
C    DICTIONARY ALLOWS THE USER TO SPECIFY THAT ANGLES SHOULD BE        X4T01730
C    CONVERTED TO COSINES.                                              X4T01740
C                                                                       X4T01750
C    THESE OPERATIONS ARE COMPLETELY UNDER THE CONTROL OF THE USER AND  X4T01760
C    BY SIMPLY MODIFYING THE DICTIONARIES THE USER CAN CONTROL WHETHER   X4T01770
C    OR NOT EACH OPERATION IS PERFORMED (E.G., IF YOU WANT TO OUTPUT    X4T01780
C    ANGLES INSTEAD OF COSINES MODIFY THE UNITS DICTIONARY BY REMOVING  X4T01790
C    THE OPTION FROM THE EXFOR UNITS ASEC, AMIN AND ADEG).              X4T01800
C                                                                       X4T01810
C    COMPUTATION FORMAT UNITS                                           X4T01820
C    ========================                                           X4T01830
C    AS DISTRIBUTED THE UNITS DICTIONARY WILL CONVERT ALL EXFOR UNITS   X4T01840
C    TO ENDF/B UNITS,                                                   X4T01850
C                                                                       X4T01860
C    EV         = ENERGY                                                X4T01870
C    BARNS      = CROSS SECTION                                         X4T01880
C    STERADIANS = SOLID ANGLE                                           X4T01890
C    SECONDS    = TIME                                                  X4T01900
C    KELVIN     = TEMPERATURE                                           X4T01910
C                                                                       X4T01920
C    IF THE USER WOULD LIKE TO OBTAIN ANY OTHER OUTPUT UNITS IT IS      X4T01930
C    MERELY NECESSARY TO MODIFY THE UNITS DICTIONARY (SEE UNITS         X4T01940
C    DICTIONARY FOR DETAILS).                                           X4T01950
```



```
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 PROBLY
```

```
C                                                                       X4T01960
C     A LEARNING PROGRAM                                                X4T01970
C     ==================                                                X4T01980
C     AS DISTRIBUTED THE THREE TRANSLATION DICTIONARIES DO NOT CONTAIN  X4T01990
C     DEFINITIONS OF HOW TO TRANSLATE ALL EXFOR REACTIONS, TITLES AND   X4T02000
C     UNITS. AT THE PRESENT TIME THIS PROGRAM HAS ONLY BEEN USED TO     X4T02010
C     TRANSLATE A SMALL PORTION OF THE DATA INCLUDED IN THE EXFOR SYSTEMX4T02020
C     AND THE DICTIONARIES ONLY CONTAIN SUFFICIENT INFORMATION TO       X4T02030
C     TRANSLATE THE EXFOR DATA WHICH HAS BEEN ENCOUNTERED TO DATE.      X4T02040
C                                                                       X4T02050
C     IT IS DIFFICULT AND DANGEROUS TO TRY TO DEFINE TRANSLATION RULES  X4T02060
C     FOR ALL TYPES OF EXFOR DATA WITHOUT EXAMINING ACTUAL EXFOR DATA.  X4T02070
C     THEREFORE ONLY WHEN A NEW REACTION, TITLE OR UNIT IS ENCOUNTERED  X4T02080
C     DURING TRANSLATION WILL THE ACTUAL EXFOR DATA BE EXAMINED, A      X4T02090
C     DECISION MADE AS TO HOW TO BEST TRANSLATE THE DATA AND THE        X4T02100
C     DICTIONARIES UPDATED.                                             X4T02110
C                                                                       X4T02120
C     GENERALLY ONCE A GIVEN TYPE OF EXFOR DATA HAS BEEN ENCOUNTERED ANDX4T02130
C     THE DICTIONARIES UPDATED TO DEFINE HOW TO TRANSLATE THE DATA THE  X4T02140
C     SAME RULES CAN BE USED TO TRANSLATE ALL SIMILAR DATA. THEREFORE   X4T02150
C     OVER A PERIOD OF TIME USER EXPERIENCE WILL BE ACCUMULATED IN THE  X4T02160
C     TRANSLATION DICTIONARIES AND THE PROGRAM WILL LEARN TO PROPERLY   X4T02170
C     TRANSLATE MORE AND MORE TYPES OF EXFOR DATA.                      X4T02180
C                                                                       X4T02190
C     COMPUTATION FORMAT                                                X4T02200
C     ==================                                                X4T02210
C     THE COMPUTATION FORMAT USES A CLASSIFICATION SYSTEM AND UNITS     X4T02220
C     WHICH ARE COMPATIBLE WITH ENDF/B. DATA IS CLASSIFIED BY (1) ZA    X4T02230
C     OF PROJECTILE, (2) ZA OF TARGET, (3) METASTABLE STATE OF TARGET,  X4T02240
C     (4) MF - TYPE OF DATA, (5) MT - REACTION, (6) METASTABLE STATE    X4T02250
C     OF RESIDUAL NUCLEUS. TO IDENTIFY THE SOURCE OF THE DATA THE FIRST X4T02260
C     AUTHOR AND YEAR AND THE EXFOR ACCESSION AND SUB-ACCESSION NUMBER  X4T02270
C     ARE INCLUDED IN THE FORMAT. IN ADDITION FIELDS ARE ASSIGNED TO    X4T02280
C     DEFINE THE STATUS OF THE EXFOR DATA (E.G., S = SUPERCEDED),       X4T02290
C     WHETHER DATA IS IN THE LABORATORY OR CENTER-OF-MASS FRAME OF      X4T02300
C     REFERENCE AND THE PHYSICAL SIGNIFICANCE OF THE LAST 2 OUTPUT      X4T02310
C     FIELDS (LVL = LEVEL ENERGY, HL = HALF-LIFE). FINALLY THE FORMAT   X4T02320
C     INCLUDES 8 FIELDS INTO WHICH THE USER MAY OUTPUT DATA (E.G., DATA,X4T02330
C     INCIDENT ENERGY, COSINE, UNCERTAINTIES, ETC.).                    X4T02340
C                                                                       X4T02350
C     COLUMNS   DESCRIPTION                                             X4T02360
C     -------   -----------                                             X4T02370
C       1- 5    PROJECTILE ZA (E.G. NEUTRON =1, PROTON =1001)           X4T02380
C               (DEFINED BY REACTION DICTIONARY)                        X4T02390
C       6- 11   TARGET ZA (E.G. 26-FE-56 =  26056)                      X4T02400
C               (DEFINED BY EXFOR REACTION)                             X4T02410
C          12   TARGET METASTABLE STATE (E.G. 26-FE-56-M = M)           X4T02420
C               (DEFINED BY EXFOR REACTION)                             X4T02430
C       13- 15  MF (ENDF/B CONVENTIONS, PLUS ADDITIONS).                X4T02440
C               (DEFINED BY REACTION DICTIONARY)                        X4T02450
C       16- 19  MT (ENDF/B CONVENTIONS, PLUS ADDITIONS).                X4T02460
C               (DEFINED BY REACTION DICTIONARY)                        X4T02470
C          20   PRODUCT METASTABLE STATE (E.G. 26-FE-56-M = M)          X4T02480
C               (DEFINED BY EXFOR REACTION)                             X4T02490
C          21   EXFOR STATUS                                            X4T02500
C               (DEFINED BY EXFOR KEYWORD STATUS)                       X4T02510
C          22   CENTER-OF-MASS FLAG (C=CENTER-OF-MASS, BLANK=LAB)       X4T02520
C               (DEFINED BY EXFOR TITLE DICTIONARY)                     X4T02530
C       23- 94  8 DATA FIELDS (EACH IN E9.3 FORMAT). DEFINED BELOW.     X4T02540
C               (DEFINED BY MF AND TITLE DICTIONARY)                    X4T02550
C       95- 97  IDENTIFICATION OF DATA FIELDS 7 AND 8                   X4T02560
C               (E.G., LVL=LEVEL, HL=HALF-LIFE.ETC.)                    X4T02570
C               FOR A COMPLETE LIST OF CODES SEE TITLE DICTIONARY.      X4T02580
C               (DEFINED BY MF AND TITLE DICTIONARY)                    X4T02590
C      98-122   REFERENCE (FIRST AUTHOR AND YEAR)                       X4T02600
```



```
EN-NRM        1  999    0    0

                                                                      1
DATA                                                                  1
                                                                      1
DATA          1  999    3    1
DATA-APRX     1  999    3    0
```

```
C                (DEFINED BY EXFOR KEYWORDS TITLE AND REFERENCE)          X4T02610
C     123-127    EXFOR ACCESSION NUMBER                                   X4T02620
C                (DEFINED BY EXFOR FORMAT)                                X4T02630
C     128-130    EXFOR SUB-ACCESSION NUMBER                               X4T02640
C                (DEFINED BY EXFOR FORMAT)                                X4T02650
C         131    MULTI-DIMENSION TABLE FLAG                               X4T02660
C                (DEFINED BY EXFOR KEYWORD REACTION OR COMMON FIELDS)     X4T02670
C                                                                         X4T02680
C                                                                         X4T02690
C     DEFINITION OF 8 COMPUTATION FORMAT DATA FIELDS                      X4T02700
C     ==============================================                      X4T02710
C     THE USER MAY USE THE TITLE DICTIONARY TO OUTPUT ANY EXFOR COLUMN    X4T02720
C     INTO ANY COMPUTATION FORMAT DATA FIELD. AS DISTRIBUTED THE TITLE    X4T02730
C     DICTIONARY CONTAINS A NUMBER OF CONVENTIONS WHICH IF AT ALL         X4T02740
C     POSSIBLE SHOULD BE FOLLOWED BY THE USERS. THE GENERAL DEFINITIONS   X4T02750
C     OF THE 8 COMPUTATION FORMAT DATA FIELDS ARE,                        X4T02760
C                                                                         X4T02770
C     DATA FIELD   DEFINITION                                             X4T02780
C     ----------   ----------                                             X4T02790
C       1          PROJECTILE INCIDENT ENERGY                             X4T02800
C       2          PROJECTILE INCIDENT ENERGY UNCERTAINTY                 X4T02810
C       3          DATA (E.G., CROSS SECTION)                             X4T02820
C       4          DATA UNCERTAINTY                                       X4T02830
C       5          COSINE OR LEGENDRE ORDER                               X4T02840
C       6          COSINE UNCERTAINTY                                     X4T02850
C       7          IDENTIFIED BY COLUMNS 95-97 (E.G.,LEVEL E, HALF-LIFE)X4T02860
C       8          IDENTIFIED BY COLUMNS 95-97 (E.G.,LEVEL E UNCERTANTY)X4T02870
C                                                                         X4T02880
C                                                                         X4T02890
C     THE PHYSICAL SIGNIFICANCE OF EACH FIELD IS DEFINED BY THE ASSIGNEDX4T02900
C     MF NUMBER. FOR EXAMPLE, FOR MF =3 (CROSS SECTIONS), COLUMNS 1 AND X4T02910
C     2 CONTAIN THE INCIDENT PROJECTILE ENERGY AND ITS UNCERTAINTY IN   X4T02920
C     EV, RESPECTIVELY AND COLUMNS 3 - 4 CONTAIN THE CROSS SECTION AND  X4T02930
C     ITS UNCERTAINTY IN BARNS, RESPECTIVELY AND COLUMNS 7 AND 8 MAY    X4T02940
C     CONTAIN A LEVEL ENERGY AND ITS UNCERTAINTY IN EV OR A HALF-LIFE   X4T02950
C     AND ITS UNCERTAINTY IN SECONDS.                                   X4T02960
C                                                                       X4T02970
C     SPECIAL CONVENTIONS                                               X4T02980
C     ===================                                               X4T02990
C     THE ABOVE CONVENTIONS ARE APPROPRIATE FOR MOST TYPES OF DATA      X4T03000
C     IN THE ENDF/B SYSTEM. IN ORDER TO ALLOW THIS PROGRAM TO TRANSLATE X4T03010
C     ADDITIONAL TYPES OF DATA THE FOLLOWING SPECIAL CONVENTIONS HAVE   X4T03020
C     BEEN ADOPTED,                                                     X4T03030
C                                                                       X4T03040
C     CROSS SECTION RATIOS  - FIELD 5 = MT OF DENOMINATOR.              X4T03050
C     (MF = 203)              FIELD 6 = ZA OF DENOMINATOR.              X4T03060
C     RESONANCE INTEGRALS   - FIELD 1 = LOWER ENERGY LIMIT.             X4T03070
C     (MF = 213)              FIELD 2 = UPPER ENERGY LIMIT.             X4T03080
C     SPECTRUM AVERAGES     - FIELD 1 = LOWER ENERGY LIMIT.             X4T03090
C     (MF = 223)              FIELD 2 = UPPER ENERGY LIMIT.             X4T03100
C     FISSION YIELD DATA    - FIELD 5 = ZA OF FISSION FRAGMENT          X4T03110
C     (MF = 801)              FIELD 6 = MASS OF FISSION FRAGMENT        X4T03120
C     PRODUCTION            - FIELD 6 = ZA OF PRODUCT                   X4T03130
C     (MT = 9000)                                                       X4T03140
C                                                                       X4T03150
C     MULTI-DIMENSIONAL TABLES                                          X4T03160
C     ========================                                          X4T03170
C     THE PROGRAM CAN TRANSLATE MULTI-DIMENSIONAL EXFOR TABLES FOR,     X4T03180
C     (1) MULTIPLE REACTIONS FOLLOWING THE EXFOR KEYWORD REACTION       X4T03190
C         (ISO-QUANT, ETC.) WITH EACH REACTION IDENTIFIED BY A CHARACTERX4T03200
C         IN COLUMN 11.                                                 X4T03210
C     (2) SINGLE REACTIONS WITH MULTIPLE COMMON FIELDS WHICH IDENTIFIED X4T03220
C         BY A CHARACTER IN THE ELEVENTH COLUMN OF EACH FIELD.          X4T03230
C                                                                       X4T03240
C     TRANSLATION OF EXFOR REACTIONS                                    X4T03250
```



```
ASSUM1        1  999    0    0
ASSUM2        1  999    0    0
MISC          1  999    0    0
MISC1         1  999    0    0
```

```
C     ============================                                  X4T03260
C     NOT ALL EXFOR REACTIONS (ISO-QUANT, ETC.) CAN BE TRANSLATED BY    X4T03270
C     THIS PROGRAM. IN ORDER TO TRANSLATE EACH REACTION THE PROGRAM WILLX4T03280
C     FIRST BREAK EACH REACTION INTO A SERIES OF SIMPLE REACTIONS AND   X4T03290
C     REMOVE AND SAVE THE TARGET AND RESIDUAL ZA, E.G.,                 X4T03300
C                                                                       X4T03310
C     ((26-FE-56(N,G)26-FE-57-M1,,SIG)/(26-FE-56(N,G)26-FE-57-G,,SIG))  X4T03320
C                                                                       X4T03330
C     IS BROKEN DOWN TO DEFINE                                          X4T03340
C                                                                       X4T03350
C     ZA-TARGET = 26056 , ZA-RESIDUAL = 260571, REACTION = (N,G),SIG    X4T03360
C     ZA-TARGET = 26056 , ZA-RESIDUAL = 260570, REACTION = (N,G),SIG    X4T03370
C                                                                       X4T03380
C     (NOTE, RESIDUAL METASTABLE STATE FLAGS. SEE EXPLANATION BELOW).   X4T03390
C                                                                       X4T03400
C     THE PROGRAM WILL THEN DEFINE AN EQUIVALENT MF, MT FOR EACH        X4T03410
C     REACTION.                                                         X4T03420
C                                                                       X4T03430
C     THE PROGRAM WILL NEXT TRANSLATE THE FOLLOWING TYPES OF            X4T03440
C     REACTIONS,                                                        X4T03450
C     (1) SIMPLE REACTIONS                                              X4T03460
C         (N,G),SIG                                                     X4T03470
C     (2) EQUIVALENT REACTIONS                                          X4T03480
C         ((N,G),SIG)=...ANYTHING ELSE....                              X4T03490
C         AFTER DECODING THE FIRST SIMPLE REACTION THE PROGRAM ASSUMES   X4T03500
C         THAT THE FIRST SIMPLE REACTION IS TRUELY EQUIVALENT TO THE    X4T03510
C         REMAINDER OF THE REACTION AND DEFINES ZA, MF AND MT BASED ON  X4T03520
C         THE FIRST SIMPLE REACTION.                                    X4T03530
C     (3) SIMPLE RATIOS                                                 X4T03540
C         ((N,G)M1/G,,SIG/RAT) OR ((N,G),SIG)/((N,G),SIG)               X4T03550
C     (4) COMPLEX REACTIONS - ALL WITH THE SAME EQUIVALENT ZA           X4T03560
C         ((N,EL),WID,,G)*((N,G),WID)/((N,TOT),WID)                     X4T03570
C     (5) OTHER REACTIONS                                               X4T03580
C         (((N,G),SIG)/((N,G),SIG),(N,G),SIG))                          X4T03590
C         IF THE REACTION IS NOT ONE OF THE ABOVE TYPES THE PROGRAM WILLX4T03600
C         TRY TO USE THE ENTIRE EXFOR REACTION, INCLUDING TARGET AND    X4T03610
C         RESIDUAL ZA AND SEE IF IT IS DEFINED IN REACTION EQUIVALENT   X4T03620
C         DICTIONARY. IF AN MF, MT IS DEFINED FOR THE ENTIRE REACTION   X4T03630
C         THE PROGRAM WILL USE THE TARGET AND RESIDUAL ZA FROM THE FIRSTX4T03640
C         SIMPLE REACTION TO TRANSLATE THE DATA. THIS LAST FORM MAY BE  X4T03650
C         USED TO INSURE THAT VIRTUALLY ANY EXFOR REACTION CAN BE       X4T03660
C         TRANSLATED, REGARDLESS OF HOW COMPLICATED IT IS (FOR EXAMPLES X4T03670
C         SEE REACTION DICTIONARY) HOWEVER THE USER SHOULD CAREFULLY    X4T03680
C         CHECK THE OUTPUT TO INSURE THAT THE DATA HAS BEEN TRANSLATED  X4T03690
C         AS INTENDED.                                                  X4T03700
C                                                                       X4T03710
C     UNDEFINED EXFOR REACTIONS, TITLES AND UNITS                       X4T03720
C     ===========================================                       X4T03730
C     BASED ON COMPARISON TO THE REACTION, TITLE AND UNITS DICTIONARIES X4T03740
C     IF AN EXFOR REACTION, TITLE OR UNITS IS ENCOUNTERED DURING        X4T03750
C     TRANSLATION THAT IS NOT DEFINED IN THE DICTIONARIES IT WILL BE    X4T03760
C     WRITTEN TO UNIT 4 (NEWX4). THIS INFORMATION IS WRITTEN IN A FORM  X4T03770
C     THAT CAN BE EASILY EDITED AND ADDED TO A TRANSLATION DICTIONARY.  X4T03780
C     AFTER UPDATING THE DICTIONARIES IF THIS PROGRAM IS THEN RUN A     X4T03790
C     SECOND TIME USING THE SAME EXFOR DATA ALL OF THE EXFOR DATA CAN   X4T03800
C     BE TRANSLATED.                                                    X4T03810
C                                                                       X4T03820
C     OUTPUT REPORT                                                     X4T03830
C     =============                                                     X4T03840
C     THIS PROGRAM WILL WRITE A REPORT ON UNIT 6 (OUTP) TO ALLOW THE    X4T03850
C     USER TO MONITOR THE TRANSLATION OF THE EXFOR DATA. IT IS EXTREMELYX4T03860
C     IMPORTANT THAT THE USER READ THIS REPORT AND NOT SIMPLY ASSUME    X4T03870
C     THAT ALL OF THE DATA HAS BEEN PROPERLY TRANSLATED.                X4T03880
C                                                                       X4T03890
C     AFTER IDENTIFYING EACH EXFOR ACCESSION, SUB-ACCESSION NUMBER,     X4T03900
```

```
C     ZA, MF, MT AND REACTION THE PROGRAM CAN PRINT TWO TYPES OF        X4T03910
C     MESSAGES,                                                         X4T03920
C                                                                       X4T03930
C     WARNING    = SOMETHING UNUSUAL HAS OCCURRED. THE USER SHOULD      X4T03940
C                  CAREFULLY CHECK TO INSURE THAT THE OUTPUT DATA HAS   X4T03950
C                  BEEN PROPERLY TRANSLATED.                           X4T03960
C     OPERATION  = ONE OF THE DEFINED REACTION, TITLE OR UNIT OPERATIONSX4T03970
C                  HAS BEEN PERFORMED ON THE DATA. THE USER SHOULD      X4T03980
C                  CAREFULLY CHECK TO INSURE THAT THE PROPER OPERATION  X4T03990
C                  HAS BEEN PERFORMED.                                 X4T04000
C                                                                       X4T04010
C     IF THE USER DOES NOT AGREE WITH HOW THE DATA HAS BEEN TRANSLATED  X4T04020
C     THE THREE DICTIONARIES MAY TO BE MODIFIED AND THE PROGRAM RE-RUN. X4T04030
C     FOR EXAMPLE, IF THE PROGRAM PRINTS A WARNING THAT THE TITLE       X4T04040
C     DICTIONARY TELLS IT TO OUTPUT E-ERR1, E-ERR2, E-ERR3 ALL IN THE   X4T04050
C     SAME COMPUTATION FORMAT FIELD, FOLLOWED BY AN OPERATION THAT SAYS X4T04060
C     THE PROGRAM WILL ONLY OUTPUT E-ERR1 AND IGNOR THE OTHER 2 EXFOR   X4T04070
C     FIELDS, IF THE USER WOULD RATHER OUTPUT E-ERR2 AND IGNOR E-ERR1   X4T04080
C     AND E-ERR3 IT IS MERELY NECESSARY TO MODIFY THE TITLE DICTIONARY  X4T04090
C     TO IGNOR E-ERR1 AND E-ERR3 AND SELECT E-ERR2 AND THEN RE-RUN THE  X4T04100
C     PROGRAM.                                                          X4T04110
C                                                                       X4T04120
C     METASTABLE STATE                                                  X4T04130
C     ================                                                  X4T04140
C     THE COMPUTATION FORMAT ALLOWS THE METASTABLE STATE OF THE TARGET  X4T04150
C     AND RESIDUAL NUCLEUS TO BE IDENTIFIED. FOR RATIO DATA METASTABLE  X4T04160
C     STATE OF BOTH NUMERATOR AND DENOMINATOR OF THE RATIO MAY BE       X4T04170
C     DEFINED.                                                          X4T04180
C                                                                       X4T04190
C     THE METASTABLE STATE OF THE TARGET IS IDENTIFIED IN COLUMN 12 AND X4T04200
C     THE METASTABLE STATE OF THE RESIDUAL NUCLUES IN COLUMN 20. FOR    X4T04210
C     RATIO DATA THE METASTABLE STATE OF THE DENOMINATOR TARGET AND     X4T04220
C     RESIDUAL NUCLEUS ARE IDENTIFIED BY OUTPUT THE DENOMINATOR ZA AND  X4T04230
C     MT IN THE FORM ZA.M AND MT.M (E.G., 26056.9 AND 102.1). COLUMNS   X4T04240
C     12 AND 20 MAY CONTAIN CHARACTERS SUCH AS M, BUT TO MAINTAIN THE   X4T04250
C     EIGHT OUTPUT FIELDS IN STRICTLY NUMERICAL FORM THE DENOMINATOR    X4T04260
C     ZA.M AND MT.M WILL BE OUTPUT IN NUMERICAL FORM. THE POSSIBLE      X4T04270
C     CHARACTERS THAT MAY APPEAR IN COLUMNS 12 OR 20 AND THEIR NUMERICALX4T04280
C     EQUIVALENTS USED WITH RATIO DENOMINATOR ZA AND MT INCLUDE,        X4T04290
C                                                                       X4T04300
C     DEFINITION     COLUMN 12 OR 20     EQUIVALENT                     X4T04310
C     ==========     ===============     ==========                     X4T04320
C     GROUND               G                 0                        X4T04330
C     M1                   1                 1                        X4T04340
C     M2                   2                 2                        X4T04350
C     M3                   3                 3                        X4T04360
C     M4                   4                 4                        X4T04370
C     M5                   5                 5                        X4T04380
C     UNKNOWN              ?                 6                        X4T04390
C     M                    M                 7                        X4T04400
C     MORE THAN 1          +                 8                        X4T04410
C     ALL OR TOTAL         T                 9                        X4T04420
C     ALL OR TOTAL       BLANK               9                        X4T04430
C                                                                       X4T04440
C     BY CONVENTION IF AN EXFOR REACTION DOES NOT SPECIFY A METASTABLE  X4T04450
C     STATE THE STATE IS DEFINED IN THE COMPUTATION FORMAT TO BE..ALL.. X4T04460
C     (I.E., BLANK IN COLUMN 12 OR 20, 9 IN RATIO ZA OR MT).            X4T04470
C                                                                       X4T04480
C     FOR EXAMPLE, FOR A RATIO IF THE ZA.M AND MT.M ARE OUTPUT AS       X4T04490
C     26056.9 AND 102.1, RESPECTIVELY THE RATIO DENOMINATOR TARGET WAS  X4T04500
C     26-FE-56 (ALL) AND THE REACTION WAS CAPTURE (MT=102) LEAVING THE  X4T04510
C     RESIDUAL NUCLEUS IN THE M1 STATE.                                 X4T04520
C                                                                       X4T04530
C     EXFOR STATUS                                                      X4T04540
C     ============                                                      X4T04550
```



```
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
```

```
C     COLUMN 21 OF EACH COMPUTATION FORMAT RECORD MAY CONTAIN BLANK     X4T04560
C     (STATUS NOT SPECIFIED) OR ONE TO THE FOLLOWING CHARACTERS,       X4T04570
C                                                                      X4T04580
C     COLUMN 21   DEFINITION                                           X4T04590
C     ---------   ----------                                           X4T04600
C        A        APPROVED BY AUTHOR                                  X4T04610
C        C        CORRELATED                                          X4T04620
C        D        DEPENDENT                                           X4T04630
C        O        OUTDATED                                            X4T04640
C        P        PRELIMINARY                                         X4T04650
C        R        RENORMALIZED                                        X4T04660
C        S        SUPERCEDED                                          X4T04670
C                                                                      X4T04680
C     IF DATA HAS ANY OTHER EXFOR STATUS (E.G., TRANSLATED FROM SCISRS) X4T04690
C     IT WILL BE IGNORED AND THE STATUS FIELD WILL BE OUTPUT AS BLANK.  X4T04700
C                                                                      X4T04710
C     INPUT FILES                                                      X4T04720
C     ===========                                                      X4T04730
C     UNIT  DESCRIPTION                                                X4T04740
C     ====  ===========                                                X4T04750
C      10   EXFOR DATA (TO BE TRANSLATED) (BCD - 80 CHARACTERS/RECORD)  X4T04760
C      12   EXFOR REACTION DICTIONARY     (BCD - 80 CHARACTERS/RECORD)  X4T04770
C      14   EXFOR TITLE DICTIONARY        (BCD - 80 CHARACTERS/RECORD)  X4T047 0
C      15   EXFOR UNITS DICTIONARY        (BCD - 80 CHARACTERS/RECORD)  X4T04790
C                                                                      X4T04800
C     OUTPUT FILES                                                     X4T04810
C     ============                                                     X4T04820
C     UNIT  DESCRIPTION                                                X4T04830
C     ====  ===========                                                X4T04840
C       4   LIST OF ALL UNDEFINED EXFOR REACTIONS, TITLES AND UNITS    X4T04850
C           FOUND DURING THE TRANSLATION (IF ANY). (BCD - 80 CHARACTERS)X4T04860
C       6   OUTPUT REPORT                          (BCD - 132 CHARACTERS)X4T04870
C      11   COMPUTATION FORMAT EXPERIMENTAL DATA  (BCD - 131 CHARACTERS)X4T04880
C                                                                      X4T04890
C     SCRATCH FILES                                                    X4T04900
C     =============                                                    X4T04910
C     NONE                                                             X4T04920
C                                                                      X4T04930
C     INPUT PARAMETERS                                                 X4T04940
C     ================                                                 X4T04950
C     NONE                                                             X4T04960
C                                                                      X4T04970
C***** COMPUTER DEPENDENT CODING ******                               X4T04980
C                                                                      X4T04990
C    * THIS PROGRAM IS DESIGNED TO BE USED WITH A FORTRAN-77 COMPILER.  X4T05000
C                                                                      X4T05010
C    * THE ONLY COMPILER DEPENDENT FORMAT STATEMENTS INVOLVE,           X4T05020
C      (1) CHARACTER*1 AND CHARACTER*4                                 X4T05030
C      (2) TESTING FOR ERRORS AND END OF FILE DURING READS.            X4T05040
C                                                                      X4T05050
C    * IT IS ASSUMED THAT CHARACTERS ARE STORED IN SUCCESSIVE STORAGE   X4T05060
C      LOCATIONS AND THAT CHARACTERS MAY BE TREATED AS CONTINUOUS STRINGSX4T05070
C      OF CHARACTERS IN EITHER CHARACTER*4 OR CHARACTER*1 FORMAT.       X4T05080
C                                                                      X4T05090
C    * FOR EXAMPLE, IF ONE SUBROUTINE CONTAINS,                        X4T05100
C                                                                      X4T05110
C      CHARACTER*4 BCD                                                 X4T05120
C      DIMENSION BCD(10)                                               X4T05130
C                                                                      X4T05140
C      THE ARRAY BCD IS ASSUMED TO BE AN ARRAY OF 40 CHARACTERS IN     X4T05150
C      SUCCESSIVE BYTE LOCATIONS.                                      X4T05160
C                                                                      X4T05170
C      IT IS ASSUMED THAT THIS ARRAY CAN BE PASSED AS AN ARGUMENT TO   X4T05180
C      ANOTHER SUBROUTINE AND USED AS CHARACTER*1,                     X4T05190
C                                                                      X4T05200
```



```
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

RESOLUTION                                                          1
                                                                    1
```

```
C     CALL DUMMY(BCD)                                                    X4T05210
C                                                                        X4T05220
C     SUBROUTINE DUMMY(BCD)                                              X4T05230
C     CHARACTER*1 BCD                                                    X4T05240
C     DIMENSION BCD(40)                                                  X4T05250
C                                                                        X4T05260
C    * THIS CONVENTION WILL WORK ON ALL 32-BIT PER WORD COMPUTERS (E.G., X4T05270
C      IBM OR IBM COMPATIBLE COMPUTERS).                                 X4T05280
C                                                                        X4T05290
C    * FOR LONGER WORD LENGTH COMPUTERS (E.G., CDC OR CRAY) IT IS        X4T05300
C      SUGGESTED THAT BEFORE IMPLEMENTING AND USING THIS PROGRAM THE     X4T05310
C      USER FIRST VERIFY THAT CHARACTER STRINGS CAN BE TREATED AS        X4T05320
C      DESCRIBED ABOVE, E.G., WRITE A SIMPLE PROGRAM TO READ A CHARACTER X4T05330
C      STRING OF 40 CHARACTERS IN CHARACTER*4 FORMAT, PASS IT TO A       X4T05340
C      SUBROUTINE WHICH USES THE CHARACTER STRING IN CHARACTER*1 FORMAT  X4T05350
C      AND PRINT THE CHARACTER STRING IN THE SUBROUTINE. IF THE CHARACTERX4T05360
C      STRING IS PRINTED AS A CONTINUOUS STRING YOU WILL BE ABLE TO USE  X4T05370
C      THIS PROGRAM. IF THE CHARACTER STRING IS NOT PRINTED AS A         X4T05380
C      CONTINUOUS STRING IT IS NOT RECOMMENDED THAT YOU USE THIS PROGRAM.X4T05390
C                                                                        X4T05400
C    * THIS PROGRAM USING THE FORTRAN-77 CONVENTION FOR TESTING FOR      X4T05410
C      ERRORS AND END OF FILE DURING READS, E.G.,                        X4T05420
C                                                                        X4T05430
C     READ(10,1000,END=100,ERR=200) A,B,C,D                              X4T05440
C                                                                        X4T05450
C***** COMPUTER DEPENDENT CODING ******                                 X4T05460
```



```
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
```

Reaction Dictionary

EXFOR REACTION - MF/MT EQUIVALENCE TABLE

COMMENT CARDS ARE DEFINED BY A 1 IN COLUMN 80
REACTION DEFINITIONS MUST HAVE A BLANK COLUMN 80
WARNING...FAILURE TO FOLLOW THIS CONVENTION WILL RESULT IN ERRORS

FORMAT

COLUMNS	DEFINITION
1- 48	EXFOR REACTION (WARNING...DO NOT GO BEYOND COLUMN 48).
49- 53	PROJECTILE ZA (E.G. NEUTRON = 1, PROTON = 1001)
54- 56	MF NUMBER (USE ENDF/B CONVENTION FOR MF =1 TO 99, MF=100 TO 999 TO TRANSLATE DATA NOT EQUIVALENT TO ENDF/B)
57- 60	MT NUMBER (USE ENDF/B CONVENTION FOR MT =1 TO 999, MT=1000 TO 9999 TO TRANSLATE DATA NOT EQUIVALENT TO ENDF/B)
61- 63	OPERATION NUMBER (SEE, LIST BELOW FOR DEFINITIONS).

TRANSLATION CONVENTIONS

NOTE, THE PROGRAM TO CONVERT DATA FROM THE EXFOR TO COMPUTATION FORMAT HAS BEEN DESIGNED TO ALLOW THE USER TO CONVERT VIRTUALLY ANY EXFOR DATA TO THE COMPUTATION FORMAT. THE USER SHOULD USE THE ENDF/B DEFINITION OF MF AND MT IF POSSIBLE. IN ADDITION THE SPECIAL EXTENSIONS OF MF AND MT DEFINED BELOW SHOULD BE FOLLOWED, IF POSSIBLE. IF THE USER TRANSLATES OTHER DATA YOU SHOULD BE AWARE THAT THE TRANSLATION PROGRAM MAY BE USED TO CONVERT EXFOR DATA TO STANDARD UNITS AND COLUMN ORDER, BUT THE USER MUST WRITE PROGRAMS TO SUBSEQUENTLY OPERATE ON THE TRANSLATED DATA.

THE AUTHOR OF THE TRANSLATION CODE ACCEPTS NO RESPONSIBILITY TO PROVIDE SPECIAL PROGRAMS TO TREAT SPECIAL TYPES OF DATA TRANSLATED BY THE USER THE USER.

DEFINED MF NUMBERS

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

DATA TYPE	MF	SPECIAL CONVENTIONS
SAME AS ENDF/B	3- 6	(PARTICLE/ISOTOPE MT=9000 PRODUCT DEFINED BY FIELD 6 =ZA)
LEGENDRE COEFFICIENTS	154	
RATIOS	203	(DENOMINATOR DEFINED BY FIELD 5 =MT.MF FIELD 6 =ZA.MI MF - FINAL METASTABLE STATE MI - INITIAL METASTABLE STATE
RESONANCE INTEGRALS	213	
SPECTRUM AVERAGES	223	
TRIPLE DIFFERENTIAL	306	
NUCLEAR AND RESONANCE PARAMETERS	400-499	
FISSION YIELD DATA	800-899	(FISSION PRODUCT DEFINED BY FIELD 5 =ELEMENT FIELD 6 =MASS)
LEVEL DENSITY PARAMETER	900	

DEFINED MT NUMBERS

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

REACTION	MT


```
//RNC1 JOB (NO,P),P14-CULLEN,CLASS=I,MSGCLASS=X,NOTIFY=RNC,
//  TIME=(1,00)                                          00010015
```

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

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
((NG)/(NG)),(NG)	1	3	102	0
((90-TH-232,NG)/(29-CU-0,NG)),(90-TH-232,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	3	108	0
(N,T+2A),SIG	1	3	113	0
(N,T+2A)PAR,SIG	1	3	113	0
(N,N+P),SIG	1	31001		0
((N,P),SIG)+((N,N+P),SIG)	1	31002		0
((N,N+P),SIG)+((N,D),SIG)	1	31003		0
(N,3-LI-7)PAR,SIG	1	31200		0
(N,P)DI,SIG	1	32103		0
(D,N)PAR,TTY,G,,EXP	1002	0	0	0
(D,N)PAR,SIG,G,,EXP	1002	38002		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	4	103	0
(N,N+P),DA,P	1	41001		0
((N,P),DA)+((N,N+P),DA,P)	1	41002		0
(N,P)DI,DA	1	42103		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	61002		0
((N,A),DA/DE,,REL)+((N,N+A),DA/DE,A,REL)	1	61004		0
PARTICLE/ISOTOPE PRODUCTION				
THE PRODUCED PARTICLE OR ISOTOPE WILL BE DEFINED BY OUTPUTTING ZA IN FIELD 6.				
(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	0401	1	0	
(N,0),L	1402	2	0	
(N,0),J	1402	3	0	
(N,0),D	1402	4	0	
(N,TOT),WID	1402	20	0	
(N,EL),WID	1402	21	0	
(N,EL),WID,,G	1402	22	0	
(N,EL),WID/RED	1402	23	0	
(N,EL),WID/RED,,G	1402	24	0	
(N,EL),WID/RED,,2G	1402	24	3	
(N,G),WID	1402	31	0	
(N,G),WID,,G	1402	32	0	
(N,G),WID,,2G	1402	32	3	
((N,EL),WID,,G)*((N,G),WID)/((N,TOT),WID)	1402	501	0	
(N,EL),STF	1403	21	0	
(N,G),ARE	1404	31	0	
(N,G),WID,,AV	1405	31	0	

				1
FISSION YIELD DATA				1
				1
(N,F)CUM,FY,,SPA	1801	18	0	
(N,F)CUM,FY	1801	18	0	
(N,F)IND,FY,,MXW	1801	18	0	
(N,F)CHN,FY,,MXW	1801	18	0	
((N,F)IND,FY,,MXW)/((N,F)CHN,FY,,MXW)	1802	18	0	
(G,F),DA,FF,REL,EXP	0804	18	0	
(N,F),DA,FF,COS/RSD	1804	18	0	
(N,F),DA,FF,LEG/RSD	1814	18	4	
				1
LEVEL DENSITY PARAMETER				1
				1
LDP	1900	1	0	

Titles Dictionary

TRANS	3000	860625		0000000000000
ENTRY	12734	830426	2	1273400000001
SUBENT	12734001	830426		1273400100001

EXFOR COLUMN TITLE TO COMPUTATION FORMAT OUTPUT COLUMN TABLE

COMMENT CARDS ARE DEFINED BY A 1 IN COLUMN 80
REACTION DEFINITIONS MUST HAVE A BLANK COLUMN 80
WARNING...FAILURE TO FOLLOW THIS CONVENTION WILL RESULT IN ERRORS

FORMAT

COLUMNS	DEFINITION
1- 10	EXFOR TITLE
11- 15	LOWEST MF NUMBER
16- 20	HIGHEST MF NUMBER
21- 25	COMPUTATION FORMAT OUTPUT FIELD (1 TO 8)
26- 30	OPERATION NUMBER (SEE, LIST BELOW FOR DEFINITIONS)
33- 35	DEFINITION OF FIELDS 7 AND 8...SEE BELOW LIST
	(DEFINITION MUST BE RIGHT ADJUSTED TO END IN COLUMN 35).
	ONLY ONE OF THE FOLLOWING SHOULD BE USED,
	LVL=LEVEL HL=HALF-LIFE E2=SECONDARY ENERGY
	DLV=LEVEL RANGE EXC=EXCITATION DE2=SECONDARY ENERGY RANGE
	MIN=E-MIN MAX=E-MAX

REACTION DEFINED MF

NOTE, THE REACTION DEFINED MF NUMBER CAN BE USED TO OPERATE ON AND OUTPUT THE SAME TITLE IN DIFFERENT WAYS FOR DIFFERENT TYPES OF DATA (E.G., SEE EN-MIN AND EN-MAX BELOW).

DEFINED OPERATIONS

TO PERFORM ANY OF THE FOLLOWING OPERATIONS ON AN EXFOR TITLE ENTER ONE OF THE FOLLOWING NUMBERS IN COLUMN 30 (E.G., TO SET THE CENTER-OF-MASS SYSTEM FLAG THE EXFOR TITLE DATA-CM HAS A 6 IN COLUMN 30).

(1) MULTIPLE FIELDS...ALWAYS CHOOSE THIS FIELD.
(2) MULTIPLE FIELDS...CHOOSE THE FIRST FIELD.
(3) MULTIPLE FIELDS...NEVER CHOOSE THIS FIELD.
(4) MULTIPLE FIELDS...CHOOSE THE LARGEST FIELD, E.G. ERRORS.
(5) MULTIPLE FIELDS...COMBINE FIELDS QUADRATICALLY, E.G. ERRORS,
(EN-ERR = SQRT(EN-ERR1**2 + EN-ERR2**2)).
(6) SET CENTER-OF-MASS SYSTEM FLAG IN OUTPUT
(7) MULTIPLE FIELDS...COMBINE FIELDS TO DEFINE AVERAGE, BUT NOT ERROR,
(EN-MIN AND EN-MAX TO DEFINE EN).
(8) MULTIPLE FIELDS...COMBINE FIELDS TO DEFINE AVERAGE AND ERROR,
(EN-MIN AND EN-MAX TO DEFINE EN AND EN-ERR).
(9) -MIN/-MAX MUST APPEAR TOGETHER, E.G. EN-MIN/EN-MAX - RESONANCE INTEGRAL,
(IF MISSING DEFINE -MIN= 0 OR -MAX= 15 MEV).
(10) MULTIPLE FIELDS..CHOOSE LARGEST AND SMALLEST IN 2 SUCCESSIVE FIELDS,
(MULTIPLE E-LVL).

INITIAL ENERGY

	MF LOW	MF HIGH	OUTPUT FIELD	OPERATION
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

((25.)55-CS-140,65.5SEC,DG,602.35,0.557) 1273400200036
((26.)33-AS-80,15.2SEC,DG,665.8,0.42) 1273400200037

EN-NRM	1	999	0	0		1
DATA						1
						1
DATA	1	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		
ERR-T	1	999	4	1		
ERR-S	1	999	4	3		
RATIO	200	209	3	0		
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-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	MIN	
E-MAX	1	999	8	0	MAX	
E-CM-MIN	1	999	7	0	MIN	
E-CM-MAX	1	999	8	0	MAX	
E-LVL-MIN	1	999	7	0	MIN	
E-LVL-MAX	1	999	8	0	MAX	
						1
FISSION YIELD. MASS MUST BE OUTPUT IN FIELD 6.						1
						1
ELEMENT	801	802	5	1		
MASS	801	804	6	1		
						1
MISCELLANEOUS						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		
MONIT1	1	999	0	0		
MONIT2	1	999	0	0		
MONIT3	1	999	0	0		
MONIT-ERR	1	999	0	0		

58.	148.				
59.	146.	0.88	0.35	10.	1273400200101
		3.56	0.27	22	1273400200102

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
MISC-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

ENDBIB	15	0

Units Dictionary

EXFOR UNITS TO STANDARD UNIT CONVERSION TABLE

COMMENT CARDS ARE DEFINED BY A 1 IN COLUMN 80
REACTION DEFINITIONS MUST HAVE A BLANK COLUMN 80
WARNING...FAILURE TO FOLLOW THIS CONVENTION WILL RESULT IN ERRORS

FORMAT

COLUMNS	DEFINITION
1- 11	EXFOR UNITS
12- 22	STANDARD UNITS
23- 33	MULTIPLIER
34- 44	ADDER
45- 55	OPERATION NUMBER (SEE, LIST BELOW FOR DEFINITIONS).

NOTE, EXFOR UNITS WILL BE CONVERTED TO STANDARD UNITS BY MULTIPLYING BY THE MULTIPLIER, ADDING THE ADDER AND THEN PERFORMING AN OPERATION (IF ANY OPERATION), E.G., TO CONVERT DEG-C TO DEG-K MULTIPLY BY 1.0 AND ADD 273.16, E.G., TO CONVERT ADEG TO COSINE MULTIPLY BY 1.0 AND PERFORM OPERATION 2 (ANGLE TO COSINE CONVERSION).

STANDARD UNITS

THE USER MAY SPECIFY ANY SET OF DESIRED STANDARD OUTPUT UNITS. THE FOLLOWING TABLE HAS CONVERSION FACTORS FOR EXFOR UNITS TO THE STANDARD UNITS,

EV - ENERGY
BARNS - CROSS SECTION
STERADIANS - SOLID ANGLE
SECONDS - TIME
KELVIN - TEMPERATURE

DEFINED OPERATIONS

TO PERFORM ANY OF THE FOLLOWING OPERATIONS ON AN EXFOR UNIT ENTER ONE OF THE FOLLOWING NUMBERS IN COLUMN 55 (E.G., TO PERFORM PER-CENT TO ABSOLUTE CONVERSION THE EXFOR UNIT PER-CENT HAS A 1 IN COLUMN 55).

(1) CONVERT PER-CENT TO ABSOLUTE
(2) CONVERT ANGLE TO COSINE (ANGLE OR ANGULAR ERROR).
(3) CONVERT RESOLUTION (E.G. NSEC/M TO ENERGY ERROR EV).
    WARNING...THIS CONVERSION ASSUMES MASS =1 PROJECTILES, E.G. N OR P.
(4) CONVERT ANGSTROM TO EV.
(5) CONVERT LENGTH TO BARNS (E.G., FERMI TO BARNS).
(6) BARNS*SQRT(E) TO BARNS (E.G., SOME RESONANCE PARAMETERS).
(7) PRINT WARNING FOLLOWED BY UNITS (E.G., WARNING...UNITS=ABR-UNITS).

EXFOR UNITS	STANDARD UNITS	MULTIPLIER	ADDER	OPERATION
ENERGY				
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	1.0	0.0	7	
GAM/PART	GAM/PART	1.0	0.0	7	
PC/FIS	PC/FIS	1.0	0.0	7	
ARB-UNITS	ARB-UNITS	1.0	0.0	7	
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 JCL deck

```
                                                                        PAGE 0001
//RNC1 JOB (NO,P),P14-CULLEN,CLASS=I,MSGCLASS=X,NOTIFY=RNC,              00010015
//  TIME=(1,00)                                                         00020011
//*                                                                     00030099
//* TRANSLATE EXPERIMENTAL DATA FROM EXFOR TO COMPUTATION FORMAT.       00040099
//*                                                                     00050099
//JOBLIB  DD  DSN=XNDC.EXFORLIB,DISP=SHR                              00060099
//  EXEC  PGM=X4TOC4                                                  00070099
//*FT06F001  DD  SYSOUT=*                                             00080099
//FT04F001  DD  DSN=XNDC.NEWX4,DISP=SHR                               00090099
//FT06F001  DD  DSN=XNDC.EXFOR.REPORT1,DISP=SHR                       00100099
//FT10F001  DD  DSN=XNDC.EXFOR.DATA(EXFOR1),DISP=SHR                  00110099
//FT11F001  DD  DSN=XNDC.EXFOR.C1,DISP=SHR                            00120099
//FT12F001  DD  DSN=XNDC.EXFOR.CNTL(EXFOR14A),DISP=SHR                00130099
//FT14F001  DD  DSN=XNDC.EXFOR.CNTL(EXFOR24A),DISP=SHR                00140099
//FT15F001  DD  DSN=XNDC.EXFOR.CNTL(EXFOR25A),DISP=SHR                00150099
//FT05F001  DD  *                                                     00160099
                                                                      00170099
                                                                      00180099
//                                                                    00190099
//FT06F001  DD  DISP=(NEW,CATLG),UNIT=SYSDA,                          00200099
//  SPACE=(9440,(500,10),RLSE),                                       00210099
//  DCB=(LRECL=120,BLKSIZE=9600,RECFM=FB),DSN=XNDC.EXFOR.REPORT7      00220099
//FT11F001  DD  DISP=(NEW,CATLG),UNIT=SYSDA,                          00230099
//  SPACE=(9440,(500,10),RLSE),                                       00240099
//  DCB=(LRECL=136,BLKSIZE=9520,RECFM=FB),DSN=XNDC.EXFOR.C7           00250099
//*                                                                   00260099
//*    THE FOLLOWING THREE CARDS WILL CREATE A NEW OUTPUT DISK FILE   00270099
//*                                                                   00280099
//GO.FT11F001  DD  DISP=(NEW,CATLG),UNIT=SYSDA,                       00290099
//  SPACE=(9440,(500,10),RLSE),                                       00300099
//  DCB=(LRECL=80,BLKSIZE=9440,RECFM=FB),DSN=XNXV.EX242B.GROUP        00310099
//*                                                                   00320099
//*    THE FOLLOWING THREE CARDS WILL CREATE A BINARY SCRATCH FILE.   00330099
//*                                                                   00340099
//GO.FT12F001  DD  UNIT=SYSDA,DISP=(NEW,DELETE),DSN=&&TRASA,          00350099
//  SPACE=(6020,(10,5),RLSE),                                         00360099
//  DCB=(LRECL=6020,BLKSIZE=6020,RECFM=VS)                            00370099
```

Example Output Report

```
TRANSLATE DATA FROM EXFOR TO COMPUTATION FORMAT (X4TOC4 VERSION 86-1)
=====================================================================
READING TRANSLATION TABLES
=====================================================================
REACTIONS-----------    91 (  400 ALLOWED)
TITLES--------------    72 (  400 ALLOWED)
UNITS---------------    93 (  400 ALLOWED)
=====================================================================
   AN SAN PROJECT  TARGET RESIDUAL  MF   MT REACTION
=====================================================================
12734   2       1  90229            801   18  (N,F)CUM,FY,,SPA
         WARNING.....UNITS=PC/FIS
         WARNING.....UNITS=PC/FIS
20836   2       1  20040    18037    6 1004  ((N,A),DA/DE,,REL)+((N,N+A),DA/DE,A,REL)
         OPERATION...CENTER-OF-MASS SYSTEM FLAG SET
         WARNING.....UNITS=ARB-UNITS
         OPERATION...SET FIELD 7-8 DEFINITION= E2
21102   2       1  15031    14031    6 1002  ((N,P),DA/DE)+((N,N+P),DA/DE,P)
         OPERATION...CONVERTED ANGLES TO COSINES
         OPERATION...CONVERTED ANGULAR ERROR TO COSINE ERROR
         OPERATION...SET FIELD 7-8 DEFINITION= E2
21102   3       1  15031    14031    4 1002  ((N,P),DA)+((N,N+P),DA,P)
         OPERATION...CONVERTED PER-CENT TO ABSOLUTE
         OPERATION...CONVERTED ANGLES TO COSINES
         OPERATION...CONVERTED ANGULAR ERROR TO COSINE ERROR
21102   4       1  15031    14031    4  103  (N,P)PAR,DA
         OPERATION...CONVERTED ANGLES TO COSINES
         OPERATION...CONVERTED ANGULAR ERROR TO COSINE ERROR
         OPERATION...SET FIELD 7-8 DEFINITION=MIN
21102   5       1  15031    14031    4 2103  (N,P)DI,DA
         OPERATION...CONVERTED ANGLES TO COSINES
         OPERATION...CONVERTED ANGULAR ERROR TO COSINE ERROR
21102   6       0  14031             401   1  (0,0),TEM
21102   7       1  20040    19040    6 1002  ((N,P),DA/DE)+((N,N+P),DA/DE,P)
         OPERATION...CONVERTED ANGLES TO COSINES
         OPERATION...CONVERTED ANGULAR ERROR TO COSINE ERROR
         OPERATION...SET FIELD 7-8 DEFINITION= E2
21102   8       1  20040    19040    4 1002  ((N,P),DA)+((N,N+P),DA,P)
         OPERATION...CONVERTED PER-CENT TO ABSOLUTE
         OPERATION...CONVERTED ANGLES TO COSINES
         OPERATION...CONVERTED ANGULAR ERROR TO COSINE ERROR
21102   9       1  20040    19040    4  103  (N,P)PAR,DA
         OPERATION...CONVERTED ANGLES TO COSINES
         OPERATION...CONVERTED ANGULAR ERROR TO COSINE ERROR
         OPERATION...SET FIELD 7-8 DEFINITION=MIN
21102  10       1  20040    19040    4 2103  (N,P)DI,DA
         OPERATION...CONVERTED ANGLES TO COSINES
         OPERATION...CONVERTED ANGULAR ERROR TO COSINE ERROR
21102  11       0  19040             401   1  (0,0),TEM
21102  12       1  21045    20045    6 1002  ((N,P),DA/DE)+((N,N+P),DA/DE,P)
         OPERATION...CONVERTED ANGLES TO COSINES
         OPERATION...CONVERTED ANGULAR ERROR TO COSINE ERROR
         OPERATION...SET FIELD 7-8 DEFINITION= E2
30293   2       1  56135             402  501 1 ((N,EL),WID,,G)*((N,G),WID)/((N,TOT),WID)
30293   2       1  56135             404   31 2 (N,G),ARE
30293   2       1  56135             402    2 3 (N,0),L
30293   2       1  56135             402    3 4 (N,0),J
30293   2       1  56135             402   22 5 (N,EL),WID,,G
30293   2       1  56135             402   21 6 (N,EL),WID
30293   2       1  56135             402   31 7 (N,G),WID
30293   2       1  56135             402   24 8 (N,EL),WID/RED,,G
         OPERATION...CONVERTED PER-CENT TO ABSOLUTE
         WARNING.....CHECK MULTIPLE FIELD DEFINITION
         DATA-MIN  7
         DATA      7
```

```
          OPERATION...SELECTED DATA       7
30293     3         1   56135              405    31 1 (N,G),WID.,AV
30293     3         1   56135              402     4 2 (N,Q),D
30293     3         1   56135              403    21 3 (N,EL),STF
          WARNING.....CHECK MULTIPLE FIELD DEFINITION
          EN-MIN
          EN-MAX
          OPERATION...DEFINED AVERAGE VALUE AND ERROR
          WARNING.....CHECK MULTIPLE FIELD DEFINITION
          EN-MIN
          EN-MAX
          OPERATION...DEFINED AVERAGE VALUE AND ERROR
          WARNING.....CHECK MULTIPLE FIELD DEFINITION
          EN-MIN
          EN-MAX
          OPERATION...DEFINED AVERAGE VALUE AND ERROR
40699     2         1   13027    12027     6 1002   ((N,P),DA/DE)+((N,N+P),DA/DE,P)
40699     3         1   24050    23050     6 1002   ((N,P),DA/DE)+((N,N+P),DA/DE,P)
40699     4         1   26054    25054     6 1002   ((N,P),DA/DE)+((N,N+P),DA/DE,P)
40699     5         1   13027    12027     4  103   (N,P),DA
          OPERATION...CONVERTED ANGLES TO COSINES
40699     6         1   24050    23050     4  103   (N,P),DA
          OPERATION...CONVERTED ANGLES TO COSINES
40699     7         1   26054    25054     4  103   (N,P),DA
          OPERATION...CONVERTED ANGLES TO COSINES
40699     8         1   13027    12027     3  103 1 (N,P),SIG
40699     8         1   13027    12026     3 1001 2 (N,N+P),SIG
40699     8         1   13027    12027     3 1002 3 ((N,P),SIG)+((N,N+P),SIG)
40699     9         1   24050    23050     3  103 1 (N,P),SIG
40699     9         1   24050    23049     3 1001 2 (N,N+P),SIG
40699     9         1   24050    23050     3 1002 3 ((N,P),SIG)+((N,N+P),SIG)
40699    10         1   26054    25054     3  103 1 (N,P),SIG
40699    10         1   26054    25053     3 1001 2 (N,N+P),SIG
40699    10         1   26054    25054     3 1002 3 ((N,P),SIG)+((N,N+P),SIG)
=============================================================
TRANSLATION SUMMARY
=============================================================
SUBENTRIES TRANSLATED--------      21
SUBENTRIES SKIPPED-----------       0 (NO OUTPUT)
POINTS READ------------------     933
POINTS TRANSLATED------------     611
DATA FIELDS NOT DEFINED------       0 (NO OUTPUT)
DATA FIELDS BLANK------------     322 (NO OUTPUT)
UNDEFINED REACTIONS----------       0
UNDEFINED TITLES-------------       0
UNDEFINED UNITS--------------       0
=============================================================
```

Example EXFOR data

```
TRANS            3000     860625                                        0000000000000
ENTRY           12734     830426          2                             1273400000001
SUBENT       12734001     830426                                        1273400100001
BIB                13         19                                        1273400100002
INSTITUTE  (1USAORL)                                                   1273400100003
REFERENCE  (J,NSE,80,455,8203)                                         1273400100004
AUTHOR     (J.K.DICKENS,J.W.MC CONNELL,K.J.NORTHCUTT)                  1273400100005
TITLE      YIELDS OF SHORT-LIVED FISSION PRODUCTS OF THERMAL-           1273400100006
            NEUTRON FISSION OF THORIUM-229.                            1273400100007
INC-SPECT  REACTOR SPECTRUM                                            1273400100008
FACILITY   (REAC)                                                      1273400100009
SAMPLE     15-MICROG. OF THORIUM NITRATE, MORE THAN 99 PERCENT         1273400100010
            TH-229, ABOUT 0.0007 PERCENT TH-228.                       1273400100011
MONITOR    (90-TH-229(N,F),,SIG)                                       1273400100012
           (90-TH-229(N,F),,RI)                                        1273400100013
DETECTOR   (GELI)                                                      1273400100014
METHOD     MEASURED SPECTRA OF GAMMA RAYS EMITTED AFTER A 15-SEC.      1273400100015
            IRRADIATION.                                               1273400100016
CORRECTION CORRECTIONS MADE FOR RANDOM SUMMING (DETERMINED             1273400100017
            EMPIRICALLY).                                              1273400100018
STATUS     (APRVD) APPROVED BY J.K.DICKENS, 82/5/28.                   1273400100019
HISTORY    (820514C)                                                   1273400100020
           (830426A) BIB UPDATED.                                      1273400100021
ENDBIB           19          0                                         1273400100022
COMMON            5          3                                         1273400100023
EN-DUMMY   MONIT1     MONIT1-ERR MONIT2     MONIT2-ERR                1273400100024
EV         B          B          B          B                         1273400100025
 0.0253     30.5       3.0        464.       70.                       1273400100026
ENDCOMMON         3          0                                         1273400100027
ENDSUBENT        26          0                                         1273400199999
SUBENT       12734002     820527                                        1273400200001
BIB                3         53                                        1273400200002
REACTION   (90-TH-229(N,F)ELEM/MASS,CUM,FY,,SPA)                       1273400200003
ERR-ANALYS (DATA-ERR) UNCERTAINTY GIVEN INCLUDES -                     1273400200004
            - UNCERTAINTY IN FISSION CROSS SECTION (13 PERCENT)        1273400200005
            - UNCERTAINTY IN YIELD-TO-EFFICIENCY RATIO                 1273400200006
            - UNCERTAINTY IN DECAY CONSTANTS AND BRANCHING RATIO       1273400200007
            - UNCERTAINTY IN DEAD-TIME CORRECTIONS                     1273400200008
            NORMALIZATION UNCERTAINTY (13 PERCENT) IS NOT              1273400200009
            INCLUDED.                                                  1273400200010
DECAY-DATA ((1.)37-RB-91,58.7SEC,DG,93.1,0.32)                         1273400200011
           ((2.)53-I-136-M,44.8SEC,DG,197.3,0.783)                     1273400200012
           ((3.)58-CE-146,834.SEC,DG,218.25,0.205)                     1273400200013
           ((4.)54-XE-139,39.7SEC,DG,218.75,0.50)                      1273400200014
           ((5.)36-KR-89,184.SEC,DG,220.6,0.201)                       1273400200015
           ((6.)32-GE-79,42.SEC,DG,230.9,0.765)                        1273400200016
           ((7.)56-BA-142,636.SEC,DG,255.30,0.212)                     1273400200017
           ((8.)54-XE-138,850.SEC,DG,258.41,0.315)                     1273400200018
           ((9.)53-I-134-M,230.SEC,DG,271.9,0.79)                      1273400200019
           ((10.)58-CE-148,48.SEC,DG,291.8,0.68)                       1273400200020
           ((11.)59-PR-148-G,136.SEC,DG,301.7,0.60)                    1273400200021
           ((11.)59-PR-148-M,120.SEC,DG,301.7,0.95)                    1273400200022
           ((12.)56-BA-141,1080.SEC,DG,304.19,0.252)                   1273400200023
           ((13.)52-TE-133-G,744.SEC,DG,312.07,0.726)                  1273400200024
           ((14.)58-CE-146,834.SEC,DG,316.76,0.525)                    1273400200025
           ((15.)51-SB-130-G,2400.SEC,DG,330.92,0.78)                  1273400200026
           ((16.)34-SE-85,31.SEC,DG,345.1,0.46)                        1273400200027
           ((17.)34-SE-83-G,1344.SEC,DG,356.6,0.686)                   1273400200028
           ((18.)53-I-136-M,44.8SEC,DG,381.35,0.998)                   1273400200029
           ((19.)57-LA-144,42.SEC,DG,397.44,0.90)                      1273400200030
           ((20.)36-KR-87,4579.SEC,DG,402.7,0.495)                     1273400200031
           ((21.)34-SE-84,209.SEC,DG,408.8,1.0)                        1273400200032
           ((22.)59-PR-146,1440.SEC,DG,453.89,0.48)                    1273400200033
           ((23.)54-XE-137,229.SEC,DG,455.51,0.31)                     1273400200034
           ((24.)38-SR-93,466.SEC,DG,590.24,0.73)                      1273400200035
```

((25.)55-CS-140,65.5SEC,DG,602.35,0.557) 1273400200036
((26.)33-AS-80,15.2SEC,DG,665.8,0.42) 1273400200037
((27.)58-CE-145,167.SEC,DG,724.3,0.59) 1273400200038
((28.)52-TE-134,2508.SEC,DG,767.2,0.30) 1273400200039
((29.)35-BR-88,16.6SEC,DG,775.5,0.595) 1273400200040
((30.)54-XE-140,13.6SEC,DG,805.5,0.205) 1273400200041
((31.)37-RB-90-M,258.SEC,DG,831.69,0.966) 1273400200042
((32.)51-SB-130-M,390.SEC,DG,839.52,0.998) 1273400200043
((33.)38-SR-93,446.SEC,DG,875.9,0.252) 1273400200044
((34.)51-SB-131,1382.SEC,DG,943.4,0.440) 1273400200045
((35.)39-Y-95,620.SEC,DG,956.4,0.188) 1273400200046
((36.)51-SB-132-G,168.SEC,DG,973.9,0.999) 1273400200047
((36.)51-SB-132-M,252.SEC,DG,973.9,0.99) 1273400200048
((37.)36-KR-90,32.3SEC,DG,1118.7,0.38) 1273400200049
((38.)37-RB-89,910.SEC,DG,1248.1,0.467) 1273400200050
((39.)55-CS-139,570.SEC,DG,1283.23,0.077) 1273400200051
((40.)53-I-136-G,83.SEC,DG,1313.0,0.68) 1273400200052
((41.)38-SR-94,75.SEC,DG,1428.3,0.954) 1273400200053
((42.)35-BR-86,55.7SEC,DG,1564.6,0.62) 1273400200054
((43.)54-XE-138,850.SEC,DG,1768.2,0.167) 1273400200055

ENDBIB		53	0			1273400200056
NOCOMMON		0	0			1273400200057
DATA		6	43			1273400200058
ELEMENT NO-DIM	MASS NO-DIM	ISOMER NO-DIM	DATA PC/FIS	DATA-ERR PC/FIS	DECAY-FLAG NO-DIM	1273400200059 1273400200060
32.	79.		0.43	0.08	6.	1273400200061
33.	80.		2.78	0.78	26.	1273400200062
34.	83.		3.29	0.15	17.	1273400200063
34.	84.		8.28	0.35	21.	1273400200064
34.	85.		7.5	1.2	16.	1273400200065
35.	86.		5.32	0.54	42.	1273400200066
35.	88.		3.13	0.49	29.	1273400200067
36.	87.		6.46	0.35	20.	1273400200068
36.	89.		8.47	0.65	5.	1273400200069
36.	90.		5.96	0.62	37.	1273400200070
37.	89.		7.66	0.55	38.	1273400200071
37.	90.	1.	2.07	0.14	31.	1273400200072
37.	91.		4.35	0.36	1.	1273400200073
38.	93.		3.65	0.43	24.	1273400200074
38.	93.		4.28	0.52	33.	1273400200075
38.	94.		3.18	0.18	41.	1273400200076
39.	95.		2.35	0.36	35.	1273400200077
51.	130.		0.15	0.06	15.	1273400200078
51.	130.	1.	0.42	0.06	32.	1273400200079
51.	131.		0.58	0.14	34.	1273400200080
51.	132.		0.74	0.05	36.	1273400200081
52.	133.		1.49	0.12	13.	1273400200082
52.	134.		5.72	0.46	28.	1273400200083
53.	134.	1.	0.97	0.19	9.	1273400200084
53.	136.		2.10	0.87	40.	1273400200085
53.	136.	1.	1.14	0.13	2.	1273400200086
53.	136.	1.	1.04	0.17	18.	1273400200087
54.	137.		5.28	0.58	23.	1273400200088
54.	138.		8.09	0.49	8.	1273400200089
54.	138.		6.81	0.44	43.	1273400200090
54.	139.		7.7	1.1	4.	1273400200091
54.	140.		3.8	2.4	30.	1273400200092
55.	139.		7.2	2.9	39.	1273400200093
55.	140.		6.12	0.69	25.	1273400200094
56.	141.		7.29	0.72	12.	1273400200095
56.	142.		7.25	0.52	7.	1273400200096
57.	144.		9.58	0.71	19.	1273400200097
58.	145.		5.40	0.79	27.	1273400200098
58.	146.		4.05	0.84	3.	1273400200099
58.	146.		3.94	0.46	14.	1273400200100

58.	148.		0.88	0.35	10.	1273400200101
59.	146.		3.56	0.27	22.	1273400200102
59.	148.		1.36	0.24	11.	1273400200103
ENDDATA	45	0				1273400200104
ENDSUBENT	103	0				1273400299999
ENDENTRY	2					1273499999999
ENTRY	20836	790425				2083600000001
SUBENT	20836001	790425				2083600100001
BIB	10	36				2083600100002
REFERENCE	(J,ZN/A,21,988,6609) TABLES.					2083600100003
	(J,NP,68,387,6506) MAIN REFERENCE FOR AL-27 AND NI-58					2083600100004
	RESULTS.					2083600100005
	(J,ZP,194,75,6606) MAIN REFERENCE FOR NA-23 RESULTS.					2083600100006
	(P,EANDC(E)-57,18,6502) PROGRESS REPORT ON AL-27 AND					2083600100007
	NI-58 MEASUREMENTS.					2083600100008
	(P,EANDC(E)-66,42,6602) TABLES.					2083600100009
	(C,65ANTWERP,541,6507) ABSTRACT.PPR110.					2083600100010
	(R,EANDC-50,110,66) FULL PAPER OF 65ANTWERP.					2083600100011
TITLE	-LEVEL DENSITIES OF SOME MEDIUM WEIGHT NUCLEI FROM					2083600100012
	EVAPORATION SPECTRA OF THE ALPHA PARTICLES FROM					2083600100013
	(N,ALPHA) REACTIONS-.					2083600100014
AUTHOR	(M.BORMANN,U.SEEBECK,W.VOIGHTS,G.WOELFER)					2083600100015
INSTITUTE	(2GERHAM) INSTITUT FUR EXPERIMENTALPHYSIK.					2083600100016
FACILITY	(CCW) COCKROFT-WALTON (170KV).					2083600100017
	(VDG) TWO VAN DER GRAAFF ACCELAERATORS WITH					2083600100018
	MAXIMUM ENERGY OF 1 MEV AND 3 MEV.					2083600100019
INC-SOURCE	(D-T) 150 KEV DEUTERIUM BEAM ON TITANIUM TRITIDE					2083600100020
	TARGET. FLUX 10**5 N/SEC.					2083600100021
COMMENT	.THE SPECTRA SHOW TYPICAL EVAPORATION FORM, AND WHERE					2083600100022
	MEASURED THE ANGULAR DISTRIBUTIONS ARE SYMMETRIC					2083600100023
	ABOUT 90 DEGREES, WITH A MINIMUM AT THIS ANGLE.					2083600100024
	.DATA FOR NA-23 ARE COMPILED UNDER REFERENCE ZP,194,75					2083600100025
	AND DATA FOR AL-27 AND NI-58 UNDER REFERENCE					2083600100026
	NP,68,387,1965.					2083600100027
ANALYSIS	.THE SPECTRA ARE ANALYSED WITH THE STATISTICAL MODEL					2083600100028
	USING OPTICAL MODEL COMPOUND CROSS SECTIONS. A LEVEL					2083600100029
	DENSITY EXPRESSION OF THE FORM					2083600100030
	W(E).ALPHA(E-DELTA)**-2.EXP(2.SQRT(A).(E-DELTA))					2083600100031
	WITH E THE EXCITATION ENERGY, AND DELTA THE PAIRING					2083600100032
	ENERGY WAS USED, THE PARAMETER A WAS DEDUCED FROM THE					2083600100033
	SPECTRA.					2083600100034
STATUS	.NUMERICAL DATA RECOMPILED FROM NEUDADA, WITH					2083600100035
	SUPPLEMENTARY INFORMATION FROM 65ANTWERP.					2083600100036
HISTORY	(790302C)					2083600100037
	(790425E)					2083600100038
ENDBIB	36	0				2083600100039
NOCOMMON	0	0				2083600100040
ENDSUBENT	39	0				2083600199999
SUBENT	20836002	790425				2083600200001
BIB	9	15				2083600200002
REACTION	((20-CA-40(N,A)18-AR-37,,DA/DE,,REL)+					2083600200003
	(20-CA-40(N,N+A)18-AR-36,,DA/DE,A,REL)) ALPHA EMISSION					2083600200004
	SPECTRUM.					2083600200005
PART-DET	(A) ALPHAS.					2083600200006
DETECTOR	(SCIN) CSI SCINTILLATOR COUNTER WITH PULSE					2083600200007
	RISETIME DISCRIMINATION OF ALPHAS AND BACKGROUND.					2083600200008
METHOD	(ASSOP) ALPHA COUNTING.					2083600200009
MONITOR	(1-H-1(N,EL)1-H-1,,SIG) STILBENE PROTON RECOIL					2083600200010
	NEUTRON FLUX MONITOR, ACCURACY 4.5 PERCENT.					2083600200011
SAMPLE	.CA METAL.					2083600200012
EN-SEC	(E,A) EMITTED ALPHA ENERGY.					2083600200013
	ENERGY RESOLUTION 15 PERCENT.					2083600200014
STATUS	.NEUDADA.					2083600200015
HISTORY	(790302C)					2083600200016
	(790425E)					2083600200017

ENDBIB		15	0	2083600200018
COMMON		3	3	2083600200019
EN	EN-RSL	COS-CM		2083600200020
MEV	MEV	NO-DIM		2083600200021
14.1	0.1	0.8572		2083600200022
ENDCOMMON		3	0	2083600200023
DATA		2	15	2083600200024
E	DATA			2083600200025
MEV	ARB-UNITS			2083600200026
4.6	23.			2083600200027
5.2	50.			2083600200028
5.9	80.			2083600200029
6.5	77.			2083600200030
7.4	74.			2083600200031
8.1	58.			2083600200032
8.8	48.			2083600200033
9.4	36.			2083600200034
10.1	32.			2083600200035
10.9	20.			2083600200036
11.7	25.			2083600200037
12.5	24.			2083600200038
13.2	4.			2083600200039
14.1	1.			2083600200040
14.9	1.			2083600200041
ENDDATA		17	0	2083600200042
ENDSUBENT		41	0	2083600299999
ENDENTRY		2		2083699999999

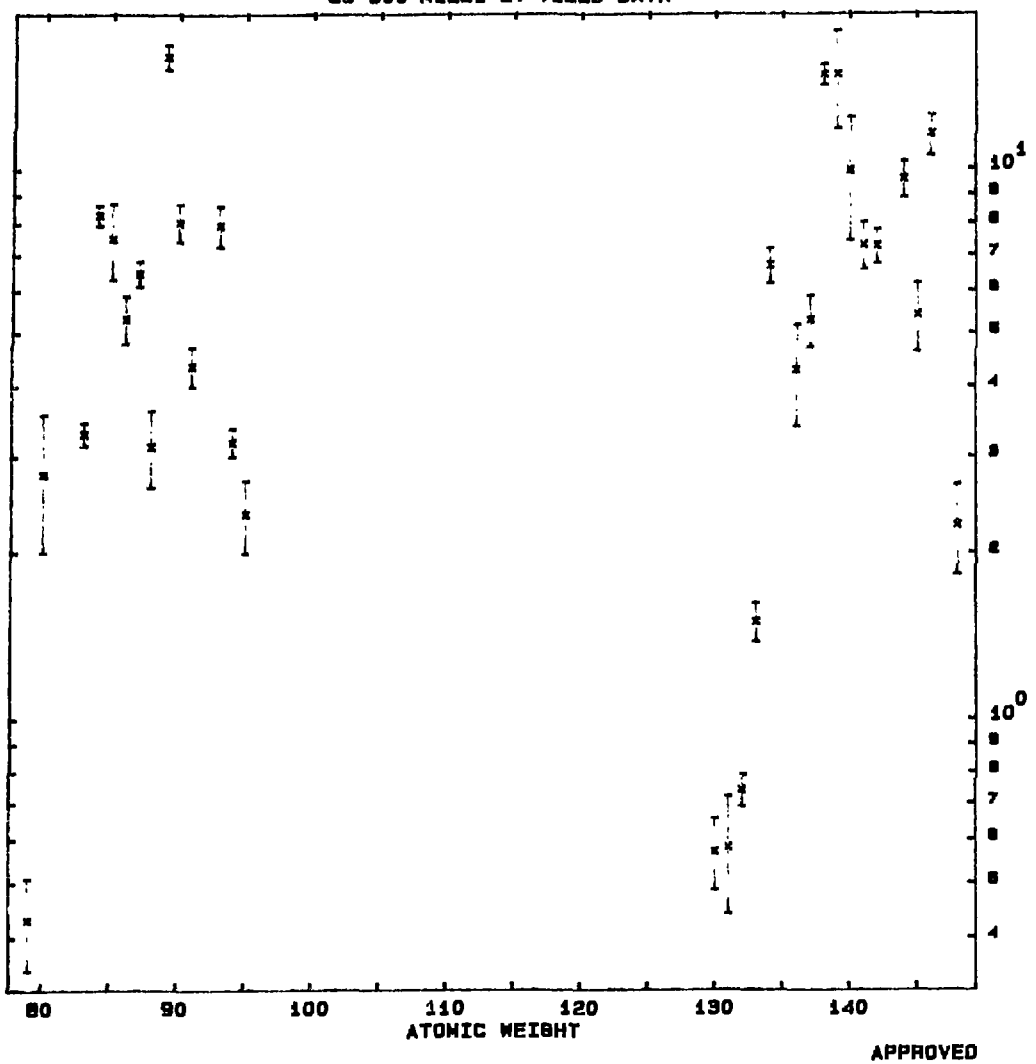
Example computation format data

1	90229	801	18	A	2.5300-2			4.3000-1	8.0000-2	3.2000+1	7.9000+1					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			2.7800+0	7.8000-1	3.3000+1	8.0000+1					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			3.2900+0	1.5000-1	3.4000+1	8.3000+1					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			8.2800+0	3.5000-1	3.4000+1	8.4000+1					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			7.5000+0	1.2000+0	3.4000+1	8.5000+1					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			5.3200+0	5.4000-1	3.5000+1	8.6000+1					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			3.1300+0	4.9000-1	3.5000+1	8.8000+1					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			6.4600+0	3.5000-1	3.6000+1	8.7000+1					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			8.4700+0	6.5000-1	3.6000+1	8.9000+1					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			5.9600+0	6.2000-1	3.6000+1	9.0000+1					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			7.6600+0	5.5000-1	3.7000+1	8.9000+1					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			2.0700+0	1.4000-1	3.7000+1	9.0000+1					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			4.3500+0	3.6000-1	3.7000+1	9.1000+1					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			3.6500+0	4.3000-1	3.8000+1	9.3000+1					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			4.2800+0	5.2000-1	3.8000+1	9.3000+1					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			3.1800+0	1.8000-1	3.8000+1	9.4000+1					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			2.3500+0	3.6000-1	3.9000+1	9.5000+1					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			1.5000-1	6.0000-2	5.1000+1	1.3000+2					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			4.2000-1	6.0000-2	5.1000+1	1.3000+2					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			5.8000-1	1.4000-1	5.1000+1	1.3100+2					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			7.4000-1	5.0000-2	5.1000+1	1.3200+2					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			1.4900+0	1.2000-1	5.2000+1	1.3300+2					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			5.7200+0	4.6000-1	5.2000+1	1.3400+2					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			9.7000-1	1.9000-1	5.3000+1	1.3400+2					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			2.1000+0	8.7000-1	5.3000+1	1.3600+2					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			1.1400+0	1.3000-1	5.3000+1	1.3600+2					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			1.0400+0	1.7000-1	5.3000+1	1.3600+2					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			5.2800+0	5.8000-1	5.4000+1	1.3700+2					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			8.0900+0	4.9000-1	5.4000+1	1.3800+2					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			6.8100+0	4.4000-1	5.4000+1	1.3800+2					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			7.7000+0	1.1000+0	5.4000+1	1.3900+2					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			3.8000+0	2.4000+0	5.4000+1	1.4000+2					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			7.2000+0	2.9000+0	5.5000+1	1.3900+2					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			6.1200+0	6.9000-1	5.5000+1	1.4000+2					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			7.2900+0	7.2000-1	5.6000+1	1.4100+2					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			7.2500+0	5.2000-1	5.6000+1	1.4200+2					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			9.5800+0	7.1000-1	5.7000+1	1.4400+2					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			5.4000+0	7.9000-1	5.8000+1	1.4500+2					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			4.0500+0	8.4000-1	5.8000+1	1.4600+2					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			3.9400+0	4.6000-1	5.8000+1	1.4600+2					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			8.8000-1	3.5000-1	5.8000+1	1.4800+2					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			3.5600+0	2.7000-1	5.9000+1	1.4600+2					J.K.DICKENS,ET.AL.	(82)	12734	2
1	90229	801	18	A	2.5300-2			1.3600+0	2.4000-1	5.9000+1	1.4800+2					J.K.DICKENS,ET.AL.	(82)	12734	2
1	20040	61004	C	1.4100+7	1.0000+5	2.3000+1				0.85720		4.6000+6				E2M.BORMANN,ET.AL.	(66)	20836	2
1	20040	61004	C	1.4100+7	1.0000+5	5.0000+1				0.85720		5.2000+6				E2M.BORMANN,ET.AL.	(66)	20836	2
1	20040	61004	C	1.4100+7	1.0000+5	8.0000+1				0.85720		5.9000+6				E2M.BORMANN,ET.AL.	(66)	20836	2
1	20040	61004	C	1.4100+7	1.0000+5	7.7000+1				0.85720		6.5000+6				E2M.BORMANN,ET.AL.	(66)	20836	2
1	20040	61004	C	1.4100+7	1.0000+5	7.4000+1				0.85720		7.4000+6				E2M.BORMANN,ET.AL.	(66)	20836	2
1	20040	61004	C	1.4100+7	1.0000+5	5.8000+1				0.85720		8.1000+6				E2M.BORMANN,ET.AL.	(66)	20836	2
1	20040	61004	C	1.4100+7	1.0000+5	4.8000+1				0.85720		8.8000+6				E2M.BORMANN,ET.AL.	(66)	20836	2
1	20040	61004	C	1.4100+7	1.0000+5	3.6000+1				0.85720		9.4000+6				E2M.BORMANN,ET.AL.	(66)	20836	2
1	20040	61004	C	1.4100+7	1.0000+5	3.2000+1				0.85720		1.0100+7				E2M.BORMANN,ET.AL.	(66)	20836	2
1	20040	61004	C	1.4100+7	1.0000+5	2.0000+1				0.85720		1.0900+7				E2M.BORMANN,ET.AL.	(66)	20836	2
1	20040	61004	C	1.4100+7	1.0000+5	2.5000+1				0.85720		1.1700+7				E2M.BORMANN,ET.AL.	(66)	20836	2
1	20040	61004	C	1.4100+7	1.0000+5	2.4000+1				0.85720		1.2500+7				E2M.BORMANN,ET.AL.	(66)	20836	2
1	20040	61004	C	1.4100+7	1.0000+5	4.0000+0				0.85720		1.3200+7				E2M.BORMANN,ET.AL.	(66)	20836	2
1	20040	61004	C	1.4100+7	1.0000+5	1.0000+0				0.85720		1.4100+7				E2M.BORMANN,ET.AL.	(66)	20836	2
1	20040	61004	C	1.4100+7	1.0000+5	1.0000+0				0.85720		1.4900+7				E2M.BORMANN,ET.AL.	(66)	20836	2

Example Plots

90-TH-229 EXFOR 12734 2

FISSION
25.300 MILLI-EV YIELD DATA



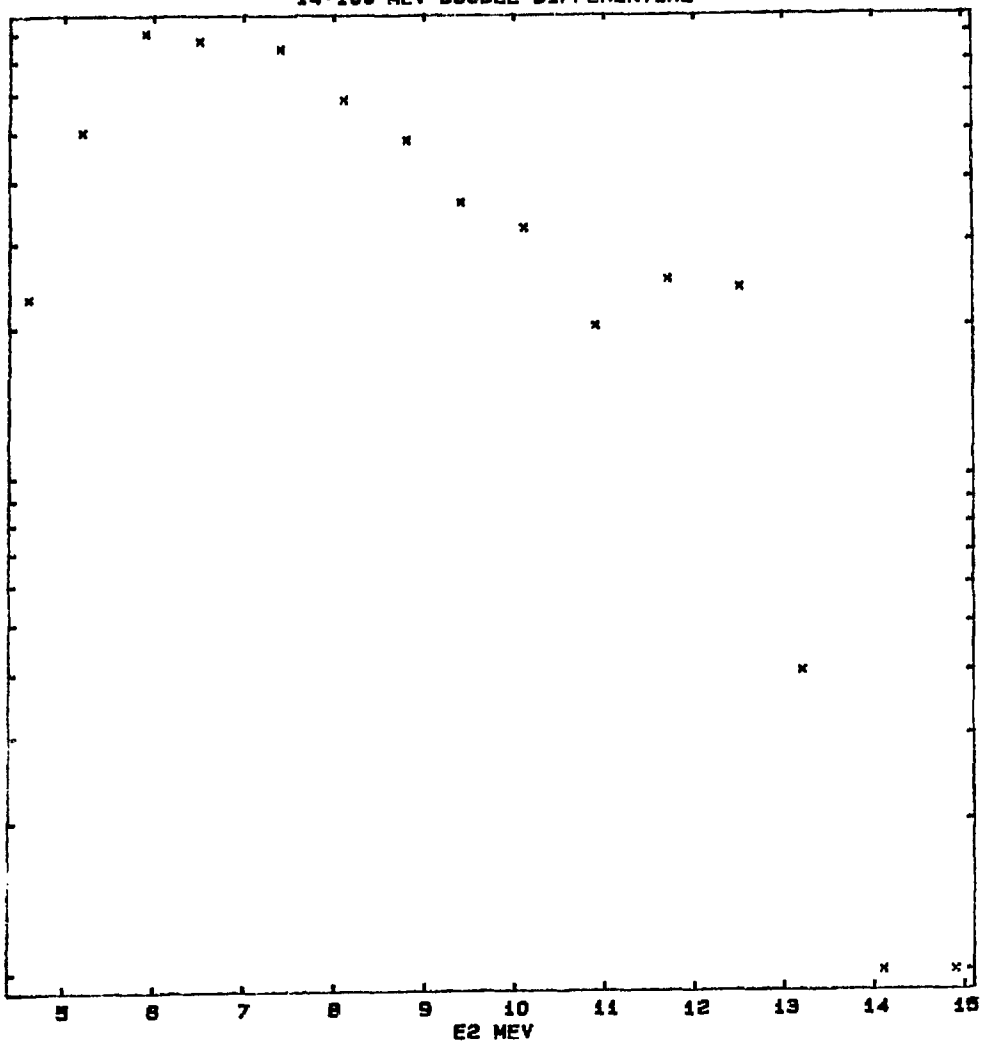
Reference
J.K.DICKENS.ET.AL. (82)

Range	Points
79 148	30

APPROVED

20-CA-40 EXFOR 20838 2

(N,N+A)+(N,A)
14.100 MEV DOUBLE DIFFERENTIAL



COS = 0.8572

Reference
H.BORMANN.ET.AL. (66)

Energy Range	Points
4.6000 14.900 MEV	15