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WRENDA INPUT GUIDE

Abstract

This document describes the preparation of a new nuclear data request for input to the WRENDA (the World Request List for Nuclear Data) System.

N. DayDay, D.W. Muir

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WRENDA INPUT GUIDE

I. Introduction

WRENDA, the World Request List for Nuclear Data, is intended to provide guidance to experimentalists, evaluators and programme administrators when planning nuclear data programmes. WRENDA, published approximately every two years, lists all current data requests stored on a computer file maintained by the Nuclear Data Section of the Internatioal Atomic Energy Agency. The most recent edition is WRENDA 81/82 published as the report INDC(SEC)-78/URSF which can be obtained costfree from the Nuclear Data Section.

A WRENDA "data request" consists of a concise statement of what data are needed, the desired accuracy, the priority assignment, the intended application, and the name and affiliation of the requestor - all coded into a particular format for computerized storage, retrieval and report production. In addition, most requests also include free-text comments in which the requestor further defines his requirements.

In the present report we describe in detail the coding procedures to be used when adding new data requests to the file, or modifying or withdrawing earlier requests contained in the file. Further information which will be of assistance in the correct formulation of requests, can be found in parts II and III of WRENDA 81/82.

In describing the computer formats for WRENDA requests, we must distinguish between (a) the "input" format, which is the format used to codify a request for entry into the WRENDA system, (b) the "internal" format, which is the format in which a request appears on the WRENDA request master file, and (c) the "report" format, which is the format used in the actual WRENDA report. Fig. 1 shows a typical data request, as it appears in these three different formats.

The Nuclear Data Section maintains a system of computer programmes designed to perform update and retrieval operations on the WRENDA master file. The WRENDA request-update programme translates an input-formatted request into the internal format before writing the request onto the request master file. As can be seen in the illustration, the main difference between the input and internal formats is that certain key information is repeated on each record in the internal format (as an aid to later sorting of the requests). A second system programme reads requests in the internal format (either from the request master file or from some pre-selected portion of it) and prints the requests in the report format.

Fig. 1: Formats for WRENDA

a) Input Format

```
B 011 N,GEM,DA/DE                 9.00+6 1.40+7 FB 2 10.0                    +781157A01
          DOE C.R.HEAD                                                        781157B01
             DATA NEEDED FOR BLANKET, SHIELD AND MAGNET HEAT                  781157E01
               DEPOSITION CALCULATIONS.                                       781157E02
```

b) Internal Format

```
FB  501100219602+781157A011USAB 011 N,GEM,DA/DE                9.00+6 1.40+7 10.0
FB  501100219602+781157B011USADOE C.R.HEAD
FB  501100219602+781157E011USADATA NEEDED FOR BLANKET, SHIELD AND MAGNET HEAT
FB  501100219602+781157E021USA  DEPOSITION CALCULATIONS.
```

c) Report Format

```
==============================================================================================
5 BORON 11                    NEUTRON              ENERGY-ANGLE DIFF. PHOTON-PRODUCTION CROSS SECTION
==============================================================================================

  142    9.00  MEV     14.0  MEV    10.0%     2    USA   C.R.HEAD        DOE                781157F
                                                    O: DATA NEEDED FOR BLANKET, SHIELD AND MAGNET HEAT
                                                          DEPOSITION CALCULATIONS.
                                                    M: NEW REQUEST.
```

WRENDA REQUEST FORM A
IAEA NUCLEAR DATA SECTION

Numbers	Letters
0, Ø zero	Ø
1 one	I
2, Z two	Z
5 five	S
7 seven	J

Coded . . . . . Checked . . . . .

Punched . . . . . Verified . . . . .

Fig. 2

Repeat on each card → Request Year (71–72) | Request Number (73–76)

S (1)	A (3–5)	Projectile, Reaction-modifier (7–26)	Energy (ev) Min. ± (31–36)	Energy (ev) Max. ± (38–43)	Appl. Code (45–46)	Prior. Code (48)	Accuracy % (50–53)	Status Flag (70)	(77)	Card No. (78–79)	UPD Code (80)
									A		

Institute (16–18)	Requester's Name (20–55)	(77)	Card No. (78–79)	UPD Code (80)
		B		
		B		
		B		
		B		

Requester's Comments on reaction (C), accuracy (C) and reason etc. (E). (20–69)

Card-type* (C, D or E) (77)

A-53/Rev 1 (Jan 75)

II. Input Format for New Requests

To prepare a new nuclear data request for input to the WRENDA system, a set of input cards (or card-images) must be prepared to specify precisely what nuclear data are requested. As an aid to the preparation of this input, printed coding forms are available from the IAEA Nuclear Data Section. A sample form, showing the input layout, is shown in Fig. 2. Instructions concerning the material to be entered are given below.

Request Card (A-card)

The first card of each request is the request card, or A-card. There is only one A-card per request. The format of the information on this card is as follows:

Columns 1 - 2 S. 2-character, left adjusted, element symbol of the target nuclide. Table I contains a list of the standard element symbols.

3 - 5 A. 3-digit number, with leading zeroes, to specify the atomic weight of the target nuclide.
Enter 000 for the natural elemental mixture of isotopes. (Do not use 000 for strictly monoisotopic elements; see also Section VI, recommendation 5). Alternatively, columns 3-5 may contain a 3-character compound designation, selected from the first column of Table II. In this case, columns 1-2 must still contain an element symbol. This element should be the compound element of greatest interest to the requestor. For example, if the target is "steel", then columns 1-5 should contain FESTX.

Note: FP000 is entered in columns 1-5 if the target is mixed fission products.

7 - 26 Projectile, Reaction-modifier. Up to 20 characters, left adjusted in the field, with a comma separating the projectile code from the reaction-modifier code. See Table III for the projectile codes and Table IV for the reaction-modifier codes.

31 - 36 Energy-min. (ev). n.nn±m (m is the exponent) or blank. See discussion of blank energy fields in Part II of WRENDA 81/82, also recommendation 4 in Section VI of this report.

38 - 43 Energy-max. (ev). n.nn±m or blank.

45 - 46 Application code. Up to 2 characters, left adjusted in field.
See Table V for definitions.

48 Priority code. 1 character. See Part III of WRENDA 81/82.

50 - 53 Accuracy (in %) nn.n, n.n or blank. If blank, an explanation must be given on D-cards. Unless specified otherwise, requested accuracies should be one standard deviation.

70 Status code. 1 character. See Table VI. (For new requests the status code is "+").

71 - 72 Year of request. 2 digits.

73 Region code. Geographic region where the request originates. 1 = U.S.A. and Canada, 2 = Western Europe and Japan, 4 = U.S.S.R. and 3 = all other countries.

74 - 76 Request number. Assigned by the regional data center responsible for compiling the request.

Note: Columns 71-76 form a 6-digit number called the "identification number", which uniquely and permanently identifies a given request.

77 Card-type. "A"

Name card (B-Card)

Second card type of a request, one such card for each requestor.

16 - 18 Institute. 3-character code, left adjusted. All institutes must be from the same

country in one request. The presently defined WRENDA institute codes are listed in Table VII. More codes can be added as required by the Nuclear Data Section.

20 - 55 Requestor's name. Up to 36 characters, left adjusted in field, without spaces between initials and surname. (example: W.H.WALKER).

71 - 76 Identification number. As on A-card.

77 Card-type. "B"

Comment Cards (C-, D- and E-Cards)

These cards give free-text comments to further define the reaction and accuracy requirements, and to give the purpose and justification of the request.

Columns 20 - 69 Free text comments.

71 - 76 Identification number. As on A-card.

77 Card-type: "C" for comments which further specify the reaction.

"D" for comments which further specify the required accuracy and/or resolution.

"E" for comments concerning the purpose and justification of the request and any further information the requestor may wish to include.

On each input card of a new request, columns 78-79 can be used to sequentially number the cards of each type, or this field can be left blank. In either case, card sequence numbers are supplied by the request-update programme. Column 80 can contain the character "I" or be left blank.

III. Input Format and Procedures for Modifying or Withdrawing an Existing Request

The WRENDA request-update programme, which writes new requests onto the master file, is also used to modify or withdraw existing requests. In fact, all of these operations can be performed in a single computer run. The format of the input required to modify or withdraw an existing request is very similar to the new-request input format just described. The following description of the input required for modifying a request may be clarified by reference to the sample input provided in Section V below (see also Fig. 3).

To make a change in a request, one first prepares an A-card on which the S, A, projectile, reaction-modifier and identification number all exactly match the corresponding parameters on the existing request to be changed; column 80 must contain the character "C". The remaining fields of this A-card can be used to specify changes in the following parameters:

a) Energy-min (cols. 31 - 36)

b) Energy-max (cols. 38 - 43)

c) Application code (cols. 45 - 46)

d) Priority code (col. 48)

e) Accuracy (cols. 50 - 53)

The corresponding parameter will be changed on the master file if, and only if, the input field is non-blank. If an input field is completely filled with the character "*", the corresponding master file field will be blanked.

Also on the A-card, one should indicate the nature and extent of the changes by setting the status code, column 70, equal to A, B, C, D, S, or W. Explanations of these various code-values are given in Table VI. A status code of + (new request), A, B, C or D remains valid only until the publication of the next edition of the WRENDA report. After publication, these status codes are automatically re-set to blanks. Thus the comment printed in the request under the key "M" (for modification status) appears in only a single edition.

The last two status codes, S and W, are used to remove a request from the list. If newly available data meet the requestor's needs, the value "S" is used to declare the request "satisfied". If the request is to be removed for any other reason, "W" is used to declare the request simply "withdrawn". Satisfied and withdrawn requests are completely removed from the master file after the publication of the next WRENDA edition.

For changes which involve card-types B, C, D and/or E of the request, one first has to prepare an A-card with a "C" in column 80, as above. This is then followed by cards describing the changes. In particular:

i) To delete a line within a request, enter the card type in col. 77, the card sequence number in cols. 78-79 and "D" in col. 80.

ii) To insert a line, enter the sequence number of the card the new line is to follow in cols. 78-79, the card type in col. 77 and "I" or blank in col. 80. If there is no card present for a given type, or if the line is to be the first line for a given card type, enter "00" (zeroes) in cols. 78-79. To insert in cards consecutively in the same card type, the same procedure applies; hence, all n cards will have the same number in cols. 78-79.

iii) To replace a line in its entirety, enter the card type in col. 77, the line number in cols. 78-79 and "R" in col. 80.

As with a new request, all card sequence numbering for the modified request is applied by the request-update programme.

IV. Changing the Element Symbol, Atomic Weight or Reaction Modifier

On a few occasions, it becomes necessary to change one of the key parameters (S, A or reaction-modifier) of a request. This cannot be done with the request-change procedure described in the previous section, because the request-update programme requires, as a safety measure, that these key parameters be identical on the A-card of the change-input and the A-card of the existing request. To accomplish such a change, the existing request must be deleted from the master file and then immediately re-inserted with the key parameter changed (see Example 7 in Fig. 3). To summarize this procedure, one prepares an A-card on which the S, A, projectile, reaction-modifier and identification number all exactly match the corresponding parameters on the existing request; column 80 must contain character "D" for deletion. Immediately following this card, the request is re-entered explicitly on input cards, starting with the corrected A-card. As described in Section II, card sequence numbers are optional and column 80 of all cards should either be blank or contain the character "I". With a request change of this kind, the status code on the re-entered request should normally be "D", indicating "substantial modifications".

V. Sample Input

Several representative examples of input to the request-update programme are shown in Fig. 3. In Example 1, a new request is entered, as described in Section II. Then in succeeding examples, various hypothetical changes to this request are shown, illustrating the procedures described in Sections III and IV.

Fig. 3: Sample Input

```
******* EXAMPLE 1.  INSERT A NEW REQUEST.

ZR000 N,G                    1.00-3 5.00+4 R  2 10.0                  *761057A01
                BET N.STEEN                                            761057B01
                   LOW RESOLUTION MEASUREMENT ABOVE THERMAL DESIRED.   761057D01
                   WANT 2 PERCENT ACCURACY IN THERMAL VALUE.           761057D02
                   FOR VERIFICATION OF RECENT MEASUREMENTS.            761057E01


******* EXAMPLE 2.  MODIFY AN EXISTING REQUEST (CHANGING E-MAX ONLY).

ZR000 N,G                         2.00+4                              A761057A01C


******* EXAMPLE 3.  MODIFY AN EXISTING REQUEST (CHANGING ACCURACY AND D-CARD).

ZR000 N,G                                          2.0                D761057A01C
                   WANT 10 PERCENT ACCURACY ABOVE THERMAL REGION.      761057D02R


******* EXAMPLE 4.  MODIFY AN EXISTING REQUEST (ADDING 2 C-CARDS).

ZR000 N,G                                                             C761057A01C
                   MEASUREMENTS ON THE INDIVIDUAL ISOTOPES USEFUL      761057C00
                   BUT NOT ESSENTIAL.                                  761057C00


******* EXAMPLE 5.  WITHDRAW A REQUEST.

ZR000 N,G                                                             W761057A01C


******* EXAMPLE 6.  DECLARE A REQUEST SATISFIED.

ZR000 N,G                                                             S761057A01C


******* EXAMPLE 7.  CHANGE A KEY PARAMETER (REACTION-MODIFIER).

ZR000 N,G                                                              761057A01D
ZR000 N,ABS                  1.00-3 5.00+4 R  2 10.0                  D761057A01
                BET N.STEEN                                            761057B01
                   LOW RESOLUTION MEASUREMENT ABOVE THERMAL DESIRED.   761057D01
                   WANT 2 PERCENT ACCURACY IN THERMAL VALUE.           761057D02
                   FOR VERIFICATION OF RECENT MEASUREMENTS.            761057E01
```

VI. Recommended Practices

While it is important that a request be prepared in the proper format, it is even more important that the request be clearly understandable to the reader of the WRENDA report. To help requestors in attaining this goal, we have prepared a list of recommended uniform practices. Several of the recommendations are intended to draw attention to recent improvements to and extensions of the list of reaction-modifiers, Table IV. For this reason, these recommendations are not directed solely toward new requests; many existing requests could also benefit from review and revision along these lines.

Recommendations

1. If the neutron-induced total hydrogen-production (H+D+T) cross section is wanted, one should ask for N,Z1 not N,P and not N,PEM. Similarly for total helim production ($^{3}He+^{4}He$), one should request N,Z2, not N,A and not N,AEM.

2. If the neutron-induced gamma-ray-production cross section, differential in gamma-ray energy, is needed, one should ask for N,GEM,DE instead of requesting N,GEM and then using a C-card to state "energy spectrum wanted". Similarly, energy-differential and energy-angle-differential reaction-modifiers are also now available for proton and alpha-particle emission, and should be used where appropriate instead of using C-cards for this purpose.

3. If the total spectrum of emitted neutrons is wanted, one should ask for the differential neutron emission cross section, N,NEM,DE or N,NEM,DA/DE, instead of the inelastic cross section, N,INL,DE or N,INL,DA/DE. This is especially important above the (n,2n) reaction threshold.

4. The lower energy E-min may be omitted from a request only for threshold reactions. For all other reactions, such as elastic scattering, capture, $^{235}U(n,f)$, etc. one should always state explicitly the lowest energy of interest.

5. With nearly-monoisotopic elements, such as C, N, O and V, difficulties arise because some requestors have requested data for ^{12}C, for example, while others have requested the same measurement, except for natural C. Unless there is a good reason for requesting data on separated isotopes, data should be requested for a natural-element target for these elements (see Table VIII), A = 000. (However, one should not specify A = 000 for strictly monoisotopic elements, which are also listed in Table VIII).

6. To remove a request from the next WRENDA edition, the requestor may "withdraw" the request or declare it "satisfied". (See discussion in Section III above.) The use of other words, such delete, suppress, purge, cancel, etc., should be avoided.

Table 1. List of Elements

ACTINIUM	AC	89	HAFNIUM	HF	72	POTASSIUM	K	19
ALUMINUM	AL	13	HAHNIUM	HA	105	PRASEODYMIUM	PR	59
AMERICIUM	AM	95	HELIUM	HE	2	PROMETHIUM	PM	61
ANTIMONY	SB	51	HOLMIUM	HO	67	PROTACTINIUM	PA	91
ARGON	AR	18	HYDROGEN	H	1	RADIUM	RA	88
ARSENIC	AS	33	INDIUM	IN	49	RADON	RN	86
ASTATINE	AT	85	IODINE	I	53	RHENIUM	RE	75
BARIUM	BA	56	IRIDIUM	IR	77	RHODIUM	RH	45
BERKELIUM	BK	97	IRON	FE	26	RUBIDIUM	RB	37
BERYLLIUM	BE	4	KRYPTON	KR	36	RUTHENIUM	RU	44
BISMUTH	BI	83	KURCHATOVIUM	KU	104	SAMARIUM	SM	62
BORON	B	5	LANTHANUM	LA	57	SCANDIUM	SC	21
BROMINE	BR	35	LAWRENCIUM	LR	103	SELENIUM	SE	34
CADMIUM	CD	48	LEAD	PB	82	SILICON	SI	14
CALCIUM	CA	20	LITHIUM	LI	3	SILVER	AG	47
CALIFORNIUM	CF	98	LUTETIUM	LU	71	SODIUM	NA	11
CARBON	C	6	MAGNESIUM	MG	12	STRONTIUM	SR	38
CERIUM	CE	58	MANGANESE	MN	25	SULFUR	S	16
CESIUM	CS	55	MENDELEVIUM	MD	101	TANTALUM	TA	73
CHLORINE	CL	17	MERCURY	HG	80	TECHNETIUM	TC	43
CHROMIUM	CR	24	MOLYBDENUM	MO	42	TELLURIUM	TE	52
COBALT	CO	27	NEODYMIUM	ND	60	TERBIUM	TB	65
COPPER	CU	29	NEON	NE	10	THALLIUM	TL	81
CURIUM	CM	96	NEPTUNIUM	NP	93	THORIUM	TH	90
DYSPROSIUM	DY	66	NICKEL	NI	28	THULIUM	TM	69
EINSTEINIUM	ES	99	NIOBIUM	NB	41	TIN	SN	50
ERBIUM	ER	68	NITROGEN	N	7	TITANIUM	TI	22
EUROPIUM	EU	63	NOBELIUM	NO	102	TUNGSTEN	W	74
FERMIUM	FM	100	OSMIUM	OS	76	URANIUM	U	92
FLUORINE	F	9	OXYGEN	O	8	VANADIUM	V	23
FRANCIUM	FR	87	PALLADIUM	PD	46	XENON	XE	54
GADOLINIUM	GD	64	PHOSPHORUS	P	15	YTTERBIUM	YB	70
GALLIUM	GA	31	PLATINUM	PT	78	YTTRIUM	Y	39
GERMANIUM	GE	32	PLUTONIUM	PU	94	ZINC	ZN	30
GOLD	AU	79	POLONIUM	PO	84	ZIRCONIUM	ZR	40

Table II. Compound Codes

HYD	HYRIDE
WTR	WATER
D20	HEAVY WATER
CXX	ORGANIC
OXI	OXIDE
STX	STEEL
CMP	COMPOUND

Table III. Projectile Codes

0	SPONTANEOUS (zero, not letter "O")
G	GAMMA
N	NEUTRON
P	PROTON
D	DEUTERON
T	TRITON
3	HELIUM-3
A	ALPHA
LI6	LITHIUM-6
MISC	

Table IV. Reaction-modifier Codes

(In the expansions "X,N" ect. X stands for the projectile)

LDP	LEVEL DENSITY PARAMETERS
LQN	DISCRETE LEVEL STRUCTURE (ENERGY, SPIN, PARITY)
HL	HALF LIFE
HL,A	ALPHA HALF LIFE
HL,F	FISSION HALF LIFE
DH	DECAY HEAT PER GRAM
TOT	TOTAL CROSS SECTION
EL	ELASTIC CROSS SECTION
EL,DA	DIFFERENTIAL ELASTIC CROSS SECTION
EL,POL	VECTOR POLARIZATION PRODUCED IN ELASTIC SCATTERING
INL	INELASTIC CROSS SECTION
INL,DA	ANGULAR DIFFERENTIAL INELASTIC CROSS SECTION
INL,DE	ENERGY DIFFERENTIAL INELASTIC CROSS SECTION
INL,DA/DE	ENERGY-ANGLE DIFFERENTIAL INELASTIC CROSS SECTION
THS	THERMAL SCATTERING LAW
SCT	TOTAL SCATTERING CROSS SECTION
SCT,DA	DIFFERENTIAL TOTAL SCATTERING CROSS SECTION
NON	NON-ELASTIC CROSS SECTION
ABS	ABSORPTION CROSS SECTION
G	CAPTURE CROSS SECTION
G,DE	ENERGY DIFFERENTIAL CAPTURE CROSS SECTION
G,SPC	CAPTURE GAMMA RAY SPECTRUM
G,SPC,DL	DELAYED CAPTURE GAMMA RAY SPECTRUM
ING	PHOTON PRODUCTION CROSS SECTION IN INELASTIC SCAT.
ING/DA	ANGULAR DISTRIBUTION OF PHOTON FROM INELASTIC SCAT
ING/DE	ENERGY DISTRIBUTION OF PHOTON FROM INELASTIC SCAT
GEM	TOTAL PHOTON PRODUCTION CROSS SECTION
GEM,YLD	GAMMA RAY YIELD
GEM,DE	ENERGY DIFF. PHOTON-PRODUCTION CROSS SECTION
GEM,DA/DE	ENERGY-ANGLE DIFF. PHOTON-PRODUCTION CROSS SECTION
N	*** ,N
N,DE	*** ,N NEUTRON SPECTRA
2N	*** ,2N
2N,DA	*** ,2N ANGULAR DISTRIBUTION
2N,DE	*** ,2N NEUTRON SPECTRA
2N,DA/DE	ENERGY-ANGLE DIFF.2 NEUTRON-PRODUCTION CROSS SECT.
3N	*** ,3N
4N	*** ,4N
5N	*** ,5N
NEM	NEUTRON EMISSION CROSS SECTION
NEM,YLD	TOTAL NEUTRON YIELD
NEM,YLD,DL	DELAYED NEUTRON YIELD
NEM,DE	ENERGY DIFFERENTIAL NEUTRON-EMISSION CROSS SECTION
NEM,DA	ANGULAR DIFF. NEUTRON-EMISSION CROSS SECTION
NEM,DA/DE	ENERGY-ANGLE DIFF. NEUTRON-EMISSION CROSS SECTION
P	*** ,P
P,YLD,DL,N	*** ,P DELAYED NEUTRON YIELD
NP	*** ,NP
N2P	NEUTRON AND 2-PROTON PRODUCTION CROSS SECTION
2P	*** ,2P
PEM	TOTAL PROTON PRODUCTION CROSS SECTION

Table IV. (continued)

PEM,DE	ENERGY DIFF. PROTON-PRODUCTION CROSS SECTION
PEM,DA/DE	ENERGY-ANGLE DIFF. PROTON-PRODUCTION CROSS SECTION
D	*** ,D
D,DE	ENERGY DISTRIBUTION OF DEUTERONS
ND	*** ,ND
T	*** ,T
T,DA	ANGULAR DISTRIBUTION OF TRITONS
T,DE	ENERGY DISTRIBUTION OF TRITONS
NT	*** ,NT
NT,DA,,N	ANG.DIST.OF NEUT.FROM N AND T PRODUCING CORSS SEC.
TEM	TOTAL TRITON PRODUCTION
3	*** ,HELIUM-3
3,DE	ENERGY DISTRIBUTION OF HE-3 PARTICLES
3EM	TOTAL HE-3 PRODUCTION CROSS SECTION
A	*** ,ALPHA
A,DA	ANGULAR DISTRIBUTION OF ALPHA PARTICLES
NA	*** ,NALPHA
N3A	*** ,N3ALPHA
N4A	*** ,N4ALPHA
3A	THREE ALPHA PARTICLES PRODUCTION CROSS SECTION
AEM	TOTAL ALPHA PRODUCTION CROSS SECTION
AEM,DE	ENERGY DIFFERENTIAL ALPHA-PRODUCTION CROSS SECTION
AEM,DA/DE	ENERGY-ANGLE DIFF. ALPHA-PRODUCTION CROSS SECTION
Z1	TOTAL HYDROGEN-PRODUCTION CROSS SECTION
Z2	TOTAL HELIUM-PRODUCTION CROSS SECTION
X	SPECIAL QUANTITY (DESCRIPTION BELOW)
F	FISSION CROSS SECTION
NF	SECOND CHANCE FISSION CROSS SECTION
ALF	CAPTURE TO FISSION RATIO (ALPHA)
ETA	NEUTRONS EMITTED PER NEUTRON ABSORPTION (ETA)
NON/ETA	NEUTRONS EMITTED PER NON-ELASTIC PROCESS
NU	NEUTRONS EMITTED PER FISSION (NU BAR)
NU,,DL	DELAYED NEUTRONS EMITTED PER FISSION
NU,,PR	PROMPT NEUTRONS EMITTED PER FISSION
NU,,FF	INFORMATION ON NEUTRONS FROM A FISSION FRAGMENT
NU,DE	ENERGY SPECTRUM OF FISSION NEUTRONS
NU,DE,DL	ENERGY SPECTRUM OF DELAYED FISSION NEUTRONS
F,DE,,G	SPECTRUM OF PROMPT GAMMA RAYS EMITTED IN FISSION
F,SPC,,G	SPECTRUM OF GAMMA RAYS EMITTED IN FISSION
F,SPC,DL,G	DELAYED GAMMA SPECTRUM FROM FISSION PRODUCTS
F,YLD	FISSION PRODUCT MASS YIELD SPECTRUM
F,,,FF	INFORMATION ON KINETICS OF FISSION FRAGMENTS
RES	RESONANCE PARAMETERS
ABS,RI	ABSORPTION RESONANCE INTEGRAL
G,RI	CAPTURE RESONANCE INTEGRAL
F,RI	FISSION RESONANCE INTEGRAL
MISC	MISC

*) Explanation must be given on C-cards

Table V. Application Codes

F	FUSION
FA	FUSION, REACTOR PHYSICS
FB	FUSION, SHIELDING
FC	FUSION, RADIATION DAMAGE
FD	FUSION, DOSIMETRY
G	GENERAL
M	MEDICINE
MI	RADIOISOTOPE PRODUCTION
MT	CANCER RADIOTHERAPY
N	SAFEGUARDS
NA	SAFEGUARDS, ACTIVE ASSAY
NB	SAFEGUARDS, PASSIVE ASSAY
NC	BURN-UP DETERMINATION
R	FISSION REACTORS

Table VI. Status Codes

+	New request
A	Modified due to partial satisfaction
B	Modified due to partial withdrawal
C	Altered - minor changes which do not affect the meaning of the request
D	Substantial modifications
S	Satisfied
W	Withdrawn

Table VII. Presently Valid Institute Codes
(codes from EXFOR-dictionary 3)

1CAN ALA	UNIVERSITY OF ALBERTA,EDMONTON,ALBERTA
1CAN BUQ	BISHOP'S UNIVERSITY, QUEBEC
1CAN CAN	CANADA
1CAN CPO	AECL COMMERCIAL PRODUCTS, OTTAWA
1CAN CRC	A.E.C.L.,CHALK RIVER, ONTARIO
1CAN CRL	CARLETON UNIVERSITY, OTTAWA, ONTARIO
1CAN KQU	KINGSTON, QUEEN'S UNIVERSITY
1CAN LUQ	LAVAL UNIVERSITY, QUEBEC
1CAN MCG	MCGILL UNIVERSITY, MONTREAL,QUEBEC
1CAN MCM	MCMASTER UNIVERSITY, HAMILTON,ONTARIO
1CAN MGW	MONTREAL, SIR GEORGE WILLIAMS UNIV.
1CAN MNA	UNIV.OF MANITOBA, CYCLOTRON LAB.,WINNIPEG,MANITOBA
1CAN MON	UNIV.OF MONTREAL, QUEBEC
1CAN MRC	NATIONAL RESEARCH COUNCIL, MONTRAL LAB
1CAN OTC	NAT.RESEARCH COUNCIL, OTTAWA,ONTARIO
1CAN OTU	UNIV.OF OTTAWA, ONTARIO
1CAN PIN	A.E.C.L.,WHITESHELL NUCL.RES.ESTABL.,PINAWA,MANITOBA
1CAN SAS	UNIV.OF SASKATCHEWAN,SASKATOON,SASK.
1CAN SFU	SIMON FRAZER UNIVERSITY, BURNABY, B.C.
1CAN TOR	UNIV.OF TORONTO, ONTARIO
1CAN UBC	UNIV.OF BRITISH COLUMBIA, VANCOUVER,B.C.
1USA ABD	US ARMY ABERDEEN RES.+DEVEL.CENTER,ABERDEEN,MARYLAND
1USA ACC	EXXON NUCL.IDAHO CO.,FORMERLY ALLIED CHEMICAL CORP., IDAHO FALLS
1USA AEC	US ATOMIC ENERGY COMMISSION, WASHINGTON D.C.
1USA AFT	AIR FORCE INST.OF TECHNOLOGY
1USA AFW	AIR FORCE WEAPONS LAB.,KIRTLAND,NEW MEXICO
1USA AGN	AEROJET-GENERAL NUCLEONICS,SAN RAMON,CALIF.
1USA AI	ATOMICS INTERNATIONAL,CANOGA PARK, CALIF.
1USA AIF	ARGONNE NATIONAL LABORATORY, IDAHO FACILITY, IDAHO
1USA AIP	AMERICAN INSTITUTE OF PHYSICS,NEW YORK
1USA ALB	STATE UNIVERSITY OF NEW YORK, ALBANY, N.Y.
1USA ALS	ALABAMA STATE UNIVERSITY, MONTGOMERY, ALABAMA
1USA AMH	AMHERST COLLEGE, AMHERST, MASS
1USA ANA	U.S. NAVAL ACADEMY, ANNAPOLIS, MD.
1USA AND	ANDREWS UNIV.,BERRIEN SPRINGS,MICH.
1USA ANL	ARGONNE NATIONAL LAB, ARGONNE, ILLINOIS
1USA APD	ATOMIC POWER DEVELOPM. ASSOCIATES, DETROIT, MICH.
1USA ARK	U.OF ARKANSAS,FAYETTEVILLE,ARK.
1USA ARL	AEROSPACE RES.LABS,WRIGHT-PATTERSON AIRFORCE BSE,OHIO
1USA AST	ASTRA INC.,RALEIGH,N.C.
1USA ASU	ARIZONA STATE UNIV., TEMPE, ARIZ.
1USA AUB	AUBURN UNIVERSITY, ALABAMA
1USA B+W	BABCOCK AND WILLCOX,LYNCHBURGH,VA.
1USA BAR	BARTOL RESEARCH FOUNDATION,SWARTHMORE,PA.
1USA BAT	BATTELLE MEMORIAL INSTITUTE,COLUMBUS,OHIO
1USA BCC	J.T.BAKER CHEMICAL COMPANY,PHILLIPSBURG, N.J.
1USA BCM	BOSTON COLLEGE, CHESTNUT HILL,MASS.
1USA BEL	BELL TELEPHONE LABORATORIES,MURRAY HILL,N.J.
1USA BET	WESTINGHOUSE, BETTIS ATOM.POWER LAB,PITTSBURGH,PA.
1USA BLN	BROOKLYN COLLEGE, THE CITY U. OF N.Y., BROOKLYN, N.Y.
1USA BNL	BROOKHAVEN NATIONAL LABORATORY,UPTON, N.Y.
1USA BNW	BATTELLE NORTHWEST,RICHLAND,WASH.

Table VII (cont'd)

1USA BOE	BOEING SCI.RES.LABS, SEATTLE, WASH
1USA BRK	UNIV.OF CALIF.,LAWRENCE BERKELEY LAB.BERKELEY,CALIF.
1USA BRL	BALLISTIC RES.LABS, ABERDEEN, PROVING GROUNDS, MD
1USA BRN	BROWN UNIVERSITY, PROVIDENCE,R.I.
1USA BYU	BRIGHAM YOUNG UNIV., PROVO, UTAH
1USA CAL	CALIF. INSTITUTE OF TECHNOLOGY,PASADENA,CALIF.
1USA CAR	CARNEGIE INSTIT. OF TECHNOLOGY,PITTSBURGH,PA.
1USA CAW	CARNEGIE INSTITUTE, WASHINGTON D.C.
1USA CBE	COMBUSTION ENGINEERING, WINDSOR, CONNECTICUT
1USA CHI	UNIV.OF CHICAGO,ILLINOIS
1USA CLA	UNIV.OF CALIFORNIA,LOS ANGELES,CALIF.
1USA CLI	CLINTON LABS, KNOXVILLE, TENN
1USA CLK	CLARK UNIVERSITY, WORCESTER, MASS.
1USA CLS	CLEVELAND STATE UNIV., CLEVELAND, OHIO
1USA CLU	COLORADO UNIV., BOULDER, COLORADO
1USA COL	COLUMBIA UNIV.,NEW YORK,N.Y.
1USA CON	CONVAIR,SAN DIEGO,CALIF.
1USA COR	CORNELL UNIV.,ITHACA,N.Y.
1USA COU	COURANT INST.OF MATH.SCIENCES,NEW YORK,N.Y.
1USA CRD	CALIFORNIA RES.AND DEVEL.COMP.,LIVERMORE
1USA CSD	UNIV.OF CALIFORNIA,SAN DIEGO,CALIF.
1USA CSE	CASE WESTERN RESERVE UNIV.,CLEVELAND,OHIO
1USA CSI	COLUMBIA SCIENTIFIC INDUSTRIES CORP., LAFAYETTE, LA.
1USA CSM	COLORADO SCHOOL OF MINES, GOLDEN, COLORADO
1USA CSU	COLORADO STATE UNIV., FORT COLLINS, COLORADO
1USA CUA	CATHOLIC UNIV.OF AMERICA, WASHINGTON,D.C.
1USA CUW	CURTISS-WRIGHT CORP.,QUEHANNA,PA.
1USA DAV	UNIV.OF CALIFORNIA,DAVIS,CALIF.
1USA DKE	DUKE UNIV.,DURHAM,NORTH CAROLINA
1USA DOD	DEPT.OF DEFENSE,DASA,WASHINGTON, D.C.
1USA DOE	DEPARTMENT OF ENERGY, WASHINGTON, D.C.
1USA DOF	DIAMOND ORDNANCE FUSE LAB.
1USA DRF	DOW CHEMICAL COMP., ROCKY FLATS, COLORADO
1USA EGG	EG+G, INC., SANTA BARBARA DIVISION, GOLETA, CALIF.
1USA EMY	EMORY UNIVERSITY, ATLANTA, GEORGIA
1USA ETS	EAST TEXAS STATE UNIVERSITY
1USA FLA	UNIV.OF FLORIDA,GAINESVILLE,FLA.
1USA FSU	FLORIDA STATE UNIV.,TALLAHASSEE,FLA.
1USA GA	GULF ENERGY AND ENVIRONMENTAL SYSTEMS, SAN DIEGO, CAL
1USA GDT	GENERAL DYNAMICS, FORT WORTH, TEXAS
1USA GEA	GENERAL ELECTRIC, AIRCRAFT NUCL.PROP.DEPT., OHIO
1USA GEB	GEN.EL. BREEDER REACT. DEVELOP.OPER.,SUNNYVALE,CALIF.
1USA GEC	GENERAL ELECTRIC COMPANY, SAN JOSE, CALIF.
1USA GEF	GENERAL ELECTRIC, SPACE SCIENCE LAB, PA.
1USA GEN	GENERAL ELECTRIC, NUCLEAR MATERIALS,PA.
1USA GEO	UNIV.OF GEORGIA,ATHENS,GEORGIA
1USA GEP	GENERAL ELECTRIC, NUCLEONICS LAB., PLEASANTON,CALIF.
1USA GES	GENERAL ELECTRIC, SCHENECTADY, N.Y.
1USA GEV	GENERAL ELECTRIC, VALLECITOS ATOM.LAB., CALIF.
1USA GGA	GULF GENERAL ATOMIC, SAN DIEGO, CALIF.
1USA GIT	GEORGIA INST.OF TECH.,ATLANTA,GA.
1USA GRT	GULF RADIATION TECHNOLOGY, SAN DIEGO, CALIF.
1USA GSF	GODDARD SPACE FLIGHT CENTER
1USA GSU	GEORGIA STATE UNIVERSITY, ATLANTA, GA.
1USA GWU	GEORGE WASHINGTON UNIV.,WASHINGTON,D.C.
1USA HED	HANFORD ENGINEERING DEVELOPMENT LAB.,RICHLAND,WASH.
1USA HNS	HAZELTON NUCL. SCIENCE CORP., PALO ALTO, CALIF.
1USA HRV	HARVARD UNIV.,CAMBRIDGE,MASS.
1USA HSL	USAEC HEALTH AND SAFETY LAB.,NEW YORK
1USA IAP	INSTITUTE FOR ADVANCED STUDIES, PRINCETON, N.J.
1USA IBM	IBM RES.LAB, SAN JOSE, CALIF.

Table VII (cont'd)

1USA IIT	ILLINOIS INST.OF TECH.,CHICAGO
1USA INL	IDAHO NUCLEAR ENGINEERING LAB., IDAHO FALLS
1USA INU	INDIANA U.,INDIANA
1USA IOW	IOWA STATE UNIV., AMES, IOWA
1USA IRT	INTELCOM RADIATION TECHNOLOGY, SAN DIEGO, CALIF.
1USA IRV	UNIV.OF CALIFORNIA, IRVINE
1USA ISU	IDAHO STATE UNIV., POCATELLO, IDAHO
1USA JHU	JOHNS HOPKINS UNIV., BALTIMORE, MARYLAND
1USA KAN	U.OF KANSAS,LAWRENCE,KANSAS
1USA KAP	KNOLLS ATOM.POWER LAB.,N.Y.
1USA KSU	KANSAS STATE UNIV.,MANHATTAN,KANSAS
1USA KTY	UNIV.OF KENTUCKY,LEXINGTON,KY.
1USA LAN	LANGLEY RESEARCH CENTER, NASA LANGLEY STATION, VA.
1USA LAS	LOS ALAMOS SC.LAB.,NEW MEXICO
1USA LMS	LOCKHEED MISSILES AND SPACE DIV., PALO ALTO, CALIF.
1USA LOK	LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
1USA LRC	NASA-LEWIS RESEARCH CENTER, CLEVELAND, OHIO
1USA LRL	UNIV.OF CALIF.,LAWRENCE LIVERMORE LAB.LIVERMORE,CAL.
1USA LSU	LOUISIANA STATE UNIV.,LOUISIANA
1USA LTI	UNIV.OF LOWELL, LOWELL, MASS.
1USA MAG	MAGI,ELMSFORD,NEW YORK
1USA MAR	MARQUETTE UNIV.,MILWAUKEE,WIS.
1USA MGT	MICHIGAN TECHNOLOGICAL UNIVERSITY
1USA MHG	UNIV.OF MICHIGAN,MICH.
1USA MIN	UNIV.OF MINNESOTA,MINNEAPOLIS,MINN.
1USA MIS	UNIV.OF MISSOURI, COLUMBIA, MISSOURI
1USA MIT	MASSACHUSETTS INST. OF TECH.,CAMBRIDGE,MASS.
1USA MND	MOUND LAB.,MIAMISBURG,OHIO
1USA MRY	MARYLAND UNIV.,COLLEGE PARK,MD.
1USA MSU	MICHIGAN STATE UNIV.,E.LANSING,MICH.
1USA MTR	IDAHO NUCL.CORP.,IDAHO FALLS
1USA MTS	MIDDLE TENNESSEE STATE UNIV.,MURFREESBORO,TENN.
1USA MTU	MONTANA STATE UNIV., MISSOULA, MONT.
1USA MUR	MURRAY STATE UNIVERSITY
1USA NAA	NORTH AMERICAN AVIATION
1USA NAL	FERMI NATIONAL LAB., BATAVIA, ILLINOIS
1USA NAS	NASA,WASHINGTON,D.C.
1USA NBS	NATL.BUREAU OF STANDARDS,WASHINGTON,D.C.
1USA NCA	UNIV.OF NORTH CAROLINA,RALEIGH,N.C.
1USA NCS	N.CAROLINA STATE COLL.,RALEIGH,N.C.
1USA NDA	NUCLEAR DEVELOPMENT ASSOCIATES INC.
1USA NEB	BOSTON, NORTH EASTERN UNIVERSITY
1USA NEL	US NUCLEAR EFFECTS LAB.,EDGEWOOD ARSENAL,MARYLAND
1USA NIH	NATIONAL INST. OF HEALTH, BETHESDA, MD.
1USA NIU	NORTHERN ILLINOIS UNIV.,DEKALB,ILLINOIS
1USA NMX	UNIV.OF NEW MEXICO,ALBUQUERQUE,N.M.
1USA NOL	U.S.NAVY ORDN.LAB.,SILVER SPRINGS,MD.
1USA NOT	UNIV.OF NOTRE DAME,S.BEND,INDIANA
1USA NRD	US NAVAL RADIOL. DEFENSE LAB., SAN FRANCISCO, CALIF.
1USA NRL	US NAVAL RES.LAB.,WASHINGTON,D.C.
1USA NTS	NORTH TEXAS STATE UNIV.
1USA NWU	NORTHWESTERN UNIV.,EVANSTON,ILL.
1USA NYB	N.Y.STATE UNIV.,BUFFALO,N.Y.
1USA NYU	NEW YORK UNIVERSITY,NEW YORK,N.Y.
1USA OAU	OAK RIDGE ASSOCIATED UNIVERSITIES, OAK RIDGE, TENN.
1USA OBR	OBERLIN COLLEGE, OBERLIN, OHIO
1USA OHO	OHIO UNIVERSITY,ATHENS,OHIO
1USA OKL	UNIV.OF OKLAHOMA
1USA ORD	NUCLEAR DATA PROJECT, OAK RIDGE, TENN.
1USA ORE	UNIV.OF OREGON,EUGENE,OREGON
1USA ORL	OAK RIDGE NATIONAL LAB.,TENN

Table VII (cont'd)

1USA ORS	RADIAT.SHIELD.INFORM.CENTER, OAK RIDGE, TENN.
1USA ORU	OREGON STATE UNIV., CORVALLIS, ORE.
1USA OSU	OHIO STATE UNIVERSITY,COLUMBUS,OHIO
1USA PCT	PICATINNY ARSENAL, DOVER, NEW JERSEY
1USA PEN	UNIV.OF PENNSYLVANIA,PHILADELPHIA,PA.
1USA PPO	PHILLIPS PETROLEUM CO.,BARTLETSVILLE,OKLA.
1USA PR	PUERTO RICO
1USA PRW	PRATT+WHITNEY,MIDDLETOWN,CONN.
1USA PSU	PENN.STATE UNIV.,U.PARK,PA.
1USA PTN	PRINCETON UNIVERSITY, PRINCETON, N.J.
1USA PUP	UNIV.OF PITTSBURGH,PENNSYLVANIA
1USA PUR	PURDUE UNIV.,LAFAYETTE,INDIANA
1USA RAN	THE RAND CORPORATION, SANTA MONICA, CALIF.
1USA RDI	RADIATION DYNAMICS, INC. WESTBURY, NEW YORK
1USA RED	REDSTONE ARSENAL,ALABAMA
1USA REN	RENO METALLURGICAL RESEARCH CENTER, NEVADA
1USA RES	DIVISION OF RESEARCH, USAEC, WASHINGTON, D.C.
1USA RHI	RHODE ISLAND UNIVERSITY, KINGSTON
1USA RIC	RICE INST.,HOUSTON,TEXAS
1USA RL	RICHLAND OPERATION OFFICE,RICHLAND,WASHINGTON
1USA ROC	UNIV.OF ROCHESTER,N.Y.
1USA RPI	RENSSELAER POLYTECH.INST.TROY,N.Y
1USA RUT	RUTGERS - THE STATE UNIV., NEW BRUNSWICK, N.J.
1USA SAI	SCIENCE APPLICATION INC., LAJOLLA, CALIF.
1USA SC	SANDIA CORP.,ALBUQUERQUE, NEW MEXICO
1USA SCA	UNIV.OF SOUTH CAROLINA, COLUMBIA, S.C.
1USA SDC	SAN DIEGO STATE COLLEGE, SAN DIEGO, CALIF.
1USA SIG	NAT. NEUTRON CROSS-SECT.CENTER, BROOKHAVEN LAB, N.Y
1USA SLU	ST.LOUIS UNIV.,ST.LOUIS,MISSOURI
1USA SMU	SOUTHERN METHODIST UNIV., DALLAS, TEXAS
1USA SNI	SOUTHERN UNIV. NUCLEAR INST., BATON ROUGE, LA.
1USA SNP	SPACE NUCLEAR PROPULSION OFFICE,CLEVELAND,OHIO
1USA SOC	SOCONY MOBIL OIL CO.,DALLAS,TEXAS
1USA SRE	SPACE RADIATION EFFECTS LAB.,NEWPORT NEWS,VIRGINIA
1USA SRI	STANFORD RES.INST.MENLO PARK,CALIF.
1USA SRL	DUPONT SAVANN.RIV.LAB.,AIKEN,S.C.
1USA STB	STATE UNIVERSITY OF NEW YORK, STONY BROOK, N.Y.
1USA STF	STANFORD UNIV.,STANFORD,CALIF.
1USA STM	ST.MARY'S COLLEGE, ST.MARY'S CITY, MARYLAND
1USA SUB	STATE UNIV. OF NEW YORK, BINGHAMPTON
1USA SUI	STATE UNIVERSITY OF IOWA, IOWA CITY, IOWA
1USA SWL	UNIV.OF SOUTHWESTERN LOUISIANA, LAFAYETTE, LA.
1USA SYR	SYRACUSE UNIV.,SYRACUSE,N.Y.
1USA TAM	TEXAS A.AND M. COLLEGE, TEXAS
1USA TEN	UNIVERSITY OF TENNESSEE
1USA TEX	UNIV.OF TEXAS,AUSTIN,TEXAS
1USA TID	DIV.OF TECH.INFO.,USAEC,OAK RIDGE,TENN.
1USA TNC	TEXAS NUCL.CORP.,AUSTIN,TEXAS
1USA TNL	TRIANGLE UNIVERSITIES NUCL.LAB.,DURHAM,NORTH CAROLINA
1USA TUL	TULANE U., NEW ORLEANS, LOUISIANA
1USA UAL	UNIVERSITY OF ALABAMA
1USA UCB	UNITED NUCLEAR CORP., TUXEDO, N.Y.
1USA UCN	UNIV.OF CINCINNATI,CINCINNATI,OHIO
1USA UCS	UNION CARBIDE,STERLING FOREST RES.CENTER,TUXEDO,N.Y.
1USA UI	UNIV.OF ILLINOIS
1USA UID	UNIVERSITY OF IDAHO, MOSCOW, IDAHO
1USA UMT	UNIV.OF MONTANA,HELENA,MONTANA
1USA UNB	UNIV. OF NEBRASKA, LINCOLN, NEB.
1USA UNC	UNITED NUCL.CORP.,ELMSFORD,NY
1USA UNH	UNIV. OF NEW HAMPSHIRE, DURHAM, N.H.
1USA USA	UNITED STATES OF AMERICA

Table VII (cont'd)

1USA	USC	UNIV. OF SOUTHERN CALIF., LOS ANGELES, CALIF.
1USA	USU	UTAH STATE UNIVERSITY
1USA	VBT	VANDERBILT UNIV.
1USA	VIP	VIRGINIA POLYTECHNIC
1USA	VIR	UNIV. OF VIRGINIA, CHARLOTTESVILLE, VA.
1USA	WAL	WESTINGHOUSE ASTRONUCLEAR LAB., PITTSBURGH, PA.
1USA	WAP	WESTINGHOUSE ATOMIC POWER DIV., PITTSBURGH, PA.
1USA	WAS	WASHINGTON UNIV., ST. LOUIS, MISSOURI
1USA	WAT	WATERTOWN ARSENAL, WATERTOWN, MASS
1USA	WAU	UNIV. OF WASHINGTON, SEATTLE, WASH.
1USA	WAY	WAYNE STATE UNIVERSITY, DETROIT, MICHIGAN
1USA	WES	WESTINGHOUSE RESEARCH LAB., PITTSBURGH, PA.
1USA	WEW	WESTINGHOUSE ADVANCED REACTOR DIVISION, PITTSBURGH, PA.
1USA	WIS	UNIV. OF WISCONSIN, MADISON, WIS.
1USA	WKU	WESTERN KENTUCKY UNIV., BOWLING GREEN, KENTUCKY
1USA	WLY	WESLEYAN UNIV., MIDDLETOWN, CONN
1USA	WMC	PHYSICS DEPT. COLLEGE OF WILLIAM AND MARY, WILLIAMSBURG, VIRGINIA
1USA	WMU	WEST MICHIGAN UNIVERSITY
1USA	WPI	WORCESTER POLYTECH. INSTITUTE
1USA	WSU	WASHINGTON STATE UNIVERSITY, PULLMAN, WASH.
1USA	WVU	UNIV. OF WEST VIRGINIA, MORGANTOWN, W. VA.
1USA	WWS	WESTERN WASHINGTON STATE COLLEGE, BELLINGHAM, WASH.
1USA	YAL	YALE UNIV., NEW HAVEN, CONNECTICUT
2AUS	ATI	ATOMINST. DER OESTERREICHISCHEN HOCHSCHULEN, VIENNA
2AUS	AUS	AUSTRIA
2AUS	GFK	GESELLSCHAFT ZUR FORDERUNG DER KERNENERGIE, GRAZ
2AUS	IRK	INST. FUER RADIUMFORSCHUNG UND KERNPHYSIK, VIENNA
2AUS	PVI	INST. FUER EXPERIMENTALPHYSIK, UNIVERSITAET WIEN
2AUS	SGA	OEST. STUDIENGES. F. ATOMENERGIE, WIEN+SEIBERSDORF
2AUS	THV	INST. F. EXPERIMENTELLE KERNPHYSIK, TECHN. UNIV., VIENNA
2AUS	TPG	INST. FUER THEORETISCHE PHYSIK DER UNIV. GRAZ, GRAZ
2BLG	BLG	BELGIUM
2BLG	BN	BELGONUCLEAIRE
2BLG	BRU	UNIV. OF BRUXELLES, BRUXELLES
2BLG	GHT	UNIV. OF GHENT, GHENT
2BLG	LIE	UNIV. OF LIEGE, LIEGE
2BLG	LVN	U. OF LOUVAIN, LOUVAIN
2BLG	MOL	C. E. N., MOL
2BLG	UIA	UNIV. INSTELLING, ANVERS
2BLG	UMK	UNION MINIERE DU HAUT KATANGA, BRUXELLES
2DEN	AAU	AARHUS UNIVERSITY, AARHUS
2DEN	COP	U. OF COPENHAGEN, COPENHAGEN
2DEN	DEN	DENMARK
2DEN	NBI	NIELS BOHR INST., COPENHAGEN
2DEN	NTA	NORDITA, DENMARK
2DEN	RIS	RISO, ROSKILDE
2EIR	EIR	IRELAND
2EIR	UCD	UNIVERSITY COLLEGE, DUBLIN
2FR	AAA	GROUPE ATOMIQUE ALSACIEN ATLANT., H/SEINE
2FR	BIP	BUREAU INTERN. DES POIDS ET MES., SEVRES
2FR	BOR	BORDEAUX, UNIV. + C. E. A.
2FR	BRC	CEN BRUYERE LE CHATEL
2FR	CAD	CADARACHE, BOUCHES-DU-RHONE
2FR	CLE	UNIVERSITE DE CLERMONT, CLERMONT-FERRAND
2FR	CSN	CENTRE DE SPECTROMETRIE NUCLEAIRE ET DE SPECTROMETRIE DE MASSE, ORSAY
2FR	EDF	ELECTRICITE DE FRANCE, PARIS
2FR	ENS	ECOLE NORMALE SUPERIEURE, PARIS
2FR	FAR	CEA FONTENAY-AUX-ROSES, SEINE
2FR	FR	FRANCE

Table VII (cont'd)

2FR	GRA	CENTRE D'ETUDES NUCLEAIRES DE BORDEAUX-GRADIGNAN, GRADIGNAN
2FR	GRE	CEA AND UNIV., GRENOBLE, ISERE
2FR	ILL	INSTITUT LAUE-LANGEVIN, GRENOBLE
2FR	ITL	COMMISSARIAT A L'ENERGIE ATOMIQUE, CENTRE D'ETUDES DE VALDUC, IS-SUR-TILLE
2FR	LYO	U. OF LYON, VILLEURBANNE, RHONE
2FR	PAR	U. OF PARIS, (INCL. ORSAY), PARIS
2FR	PCF	COLLEGE DE FRANCE, PARIS
2FR	SAC	C.E.N. SACLAY, ESSONNE
2FR	STR	NUCL. RES. CENTRE, STRASBOURG
2FR	TOU	UNIV. OF TOULOUSE, HAUTE-GARONNE
2FR	VNV	CENTRE D'ETUDES DE LIMEIL, VILLENEUVE-SAINT-GEORGES
2GER	ALK	ALKEM GMBH, LEOPOLDSHAFEN
2GER	BBC	BROWN-BOVERI/KRUPP, MANNHEIM
2GER	BER	HAHN-MEITNER-INST., BERLIN
2GER	BOC	BOCHUM, UNIV.
2GER	BON	U. OF BONN
2GER	DOR	DORTMUND UNIV., F.R. GERMANY
2GER	FRB	FREIBURG IM BREISGAU, UNIVERSITAET
2GER	FRK	J.W. GOETHE UNIV., FRANKFURT
2GER	GER	GERMANY, FED. REP.
2GER	GOE	U. OF GOETTINGEN
2GER	GSI	GESELLSCHAFT FUER SCHWERIONENFORSCHUNG, DARMSTADT
2GER	HAM	HAMBURG, UNIVERSITAET
2GER	HEI	HEIDELBERG, UNIVERSITAET
2GER	IFS	INST. FUER STRAHLENPHYSIK, STUTTGART
2GER	IKA	INFORMATIONSSYSTEM KARLSRUHE
2GER	INA	INTERATOM, BENSBERG
2GER	JLU	JUSTUS LIEBIG-UNIV., GIESSEN
2GER	JUL	KERNFORSCHUNGSANLAGE JUELICH
2GER	KFK	KERNFORSCHUNGSZENTRUM, KARLSRUHE
2GER	KIG	GKSS, GEESTHACHT
2GER	KIL	U. OF KIEL, KIEL
2GER	KLN	UNIVERSITAET KOELN
2GER	KRU	KARLSRUHE, UNIV.
2GER	MBG	U. OF MARBURG
2GER	MNZ	U. OF MAINZ
2GER	MPH	MAX-PLANCK-INSTITUT FUER KERNPHYSIK, HEIDELBERG
2GER	MST	U. OF MUENSTER
2GER	MUN	TECHNISCHE UNIVERSITAET MUENCHEN
2GER	MUU	U. OF MUNICH, MUNICH
2GER	PTB	PHYS. TECHN. BUNDESANST., BRAUNSCHWEIG
2GER	SBU	UNIV. OF SAARLAND, SAARBRUECKEN
2GER	SIE	SIEMENS REAKTORENTWICKLUNG, ERLANGEN
2GER	THA	TECH. HOCHSCHULE, AACHEN
2GER	THB	TECH. HOCHSCHULE, BRAUNSCHWEIG
2GER	THD	TECH. HOCHSCHULE, DARMSTADT
2GER	THS	UNIVERSITAET STUTTGART
2GER	TUB	TECH. UNIV., BERLIN
2GER	TUE	UNIVERSITAET TUEBINGEN
2GER	TUH	TECHN. UNIV. HANNOVER
2GER	UEN	U. OF ERLANGEN-NUERNBERG
2GER	WUU	WUERZBURG, UNIVERSITAET
2GRC	ATH	NRC DEMOKRITOS, ATHENS
2GRC	GRC	GREECE
2ITY	BAU	BARI, UNIVERSITY
2ITY	BOL	BOLOGNA, CNEN
2ITY	CAG	U. OF CAGLIARI
2ITY	CAS	CENTRO DI STUDI NUCLEARI DELLA CASACCIA, ROME
2ITY	CAT	U. OF CATANIA

Table VII (cont'd)

2ITY CIS	C.I.S.E.,MILAN
2ITY ENI	ENI,SAN DONATO,MILAN
2ITY FIR	UNIV.OF FLORENCE
2ITY GVA	U.+INFN.,GENOVA
2ITY ITY	ITALY
2ITY MES	UNIV.OF MESSINA
2ITY MIL	U.OF MILAN
2ITY MIP	POLITECNICO DI MILANO
2ITY NAP	U.OF NAPLES
2ITY PAD	PADUA, UNIVERSITY AND LAB.NAT.LEGNARO
2ITY PAV	U.OF PAVIA
2ITY ROM	U.OF ROME
2ITY SAL	SORIN NUC.RES.CENTRE SALUGGIA
2ITY TRI	U.OF TRIESTE
2ITY TUP	POLITECNICO DI TORINO
2ITY TUR	UNIV.OF TURIN
2ITY UBO	BOLOGNA, UNIV.+IST.NAZ.DI FIS.NUCL.
2JAP FE	FUJI ELECTRIC
2JAP HIR	HIROSHIMA, UNIVERSITY OF HIROSHIMA
2JAP HOS	HOSEI UNIVERSITY,TOKYO
2JAP HYO	HYOGO AGRICULT.UNIV.,SASAYAMA
2JAP ISS	INST.OF SOLID STATE PHYSICS, UNIV. OF TOKYO
2JAP JAE	JAERI, TOKAI
2JAP JAP	JAPAN
2JAP JCL	CYCLOTRON LAB.,INST.OF PHYSICAL AND CHEMICAL RESEARCH, WAKO-SHI, SAITAMA
2JAP JEL	ELECT.POW.DEV.CORP.,AED,TOKYO
2JAP KON	KONAN UNIV.,KOBE
2JAP KTO	KYOTO UNIV.
2JAP KYU	KYUSHU UNIV.,DEPT.OF NUCL.ENG.,FUKUOKA
2JAP NAG	UNIV.OF NAGOYA
2JAP NIG	NIPPON ATOMIC INDUSTRY GROUP
2JAP NII	NIIGATA UNIV., NIIGATA
2JAP OSA	OSAKA UNIV.,OSAKA
2JAP OSP	RADIATION CENTRE OF OSAKA PREFECTURE, SAKAI, OSAKA
2JAP PNC	PLUTONIUM FUEL DIV.,TOKAI WORKS, POWER REACTOR+NUCLEAR FUEL DEVELOPMENT CORP., MURAMATSU, TOKAI-MURA
2JAP SAE	SUMITOMO ATOMIC ENERGY INDUSTRIES
2JAP SHR	SHIP RESEARCH INST., MINISTRY OF TRANSPORT, JAPAN
2JAP TIT	TOKYO INST.OF TECHNOLOGY,TOKYO
2JAP TOH	TOHOKU UNIV.,SENDAI
2JAP TOK	TOKYO UNIV.,TOKYO
2JAP TSU	UNIV. OF TSUKUBA, IBARAKI, JAPAN
2JAP YAM	YAMANASHI UNIV.,KOFU
2JAP YOK	RIKKYO(ST.PAUL)UNIV., YOKOSUKA AND TOKYO
2LUX LUX	LUXEMBOURG
2NED AMS	U.OF AMSTERDAM,AMSTERDAM
2NED DEL	TECHNICAL UNIV.,DELFT
2NED ENT	EINDHOVEN U.OF TECHNOLOGY
2NED FUL	VRIJE UNIVERSITEIT TE AMSTERDAM, DE BOELELAAN
2NED GRN	GRONINGEN
2NED IKO	INST. VOOR KERNPHYSISCH ONDERZOEK, AMSTERDAM
2NED LEI	U.OF LEIDEN
2NED NED	NETHERLANDS
2NED RCN	NETHERLAND'S ENERGY RESEARCH FOUNDATION, PETTEN
2NED UTR	U.OF UTRECHT
2NED VDN	CENTRAL BUREAU DER V.D.E.N., ARNHEM
2NOR BGN	U.OF BERGEN
2NOR HAL	HALDEN, INST.FOR ATOMENERGI
2NOR KJL	INST.FOR ATOMENERGI,KJELLER
2NOR NOR	NORWAY

Table VII (cont'd)

2NOR	OSL	U.OF OSLO,OSLO
2PRT	JES	JUNTA DE ENERGIA NUCLEAR, SACAVEM
2PRT	LFE	LABOR. DE FISICA E ENGENERIA NUCLEARES, SACAVEM
2PRT	PRT	PORTUGAL
2SF	ABA	PHYSICS DEPT. ABO AKADEMI, ABO
2SF	HLS	U.OF HELSINKI, HELSINKI
2SF	HLT	HELSINKI TECH.UNIV.,OTANIEMI
2SF	JYV	JYVAESKYLAE, UNIVERSITY
2SF	OUL	UNIVERSITY OF OULU, OULU
2SF	SF	FINLAND
2SF	TKU	TURKU UNIVERSITY
2SPN	JNE	JUNTA ENERGIA NUCLEAR,MADRID
2SPN	SPN	SPAIN
2SPN	VAL	VALENCIA, UNIVERSITY
2SPN	VLD	U.DE VALLADOLID
2SWD	AE	STUDSVIK ENERGITEKNIK AB
2SWD	CTH	CHALMERS U.OF TECH.,GOTHENBURG
2SWD	FOA	RESEARCH INST. FOR NATIONAL DEFENCE, STOCKHOLM
2SWD	IPS	RES.INST.OF PHYSICS (FORM.NOBEL INST.), STOCKHOLM
2SWD	KTH	ROYAL INST.OF TECH.,STOCKHOLM
2SWD	LND	LUND UNIV.+ TECH.UNIV.
2SWD	SWD	SWEDEN
2SWD	SWR	STUDSVIK SCIENCE RESEARCH LABORATORY
2SWD	TLU	TANDEM LABORATORY, UPPSALA
2SWD	UPP	U.OF UPPSALA
2SWD	UST	STOCKHOLM UNIVERSITY
2SWT	BAS	BASEL U.
2SWT	ETH	EIDGENOSSISCHE TECHNISCHE HOCHSCHULE, ZURICH
2SWT	FRS	U.OF FRIBOURG
2SWT	GVE	U.OF GENEVA
2SWT	LAU	U.OF LAUSANNE
2SWT	NEU	U.OF NEUCHATEL
2SWT	SWT	SWITZERLAND
2SWT	UBE	BERN, UNIV.
2SWT	WUR	EIDGENOSSISCHES INST.FUER REAKT.FORSCH.,WUERENLINGEN
2SWT	ZUR	ZURICH
2TUK	ANK	ANKARA U. + MIDDLE EAST TECHNICAL U., ANKARA
2TUK	CNA	CEKMECE NUCL.RES.CEN.,ISTANBUL
2TUK	TUK	TURKEY
2UK	ALD	AWRE,ALDERMASTON,ENGLAND
2UK	BCT	BATTERSEA COLLEGE OF TECHNOLOGY, LONDON
2UK	BIA	UNIV.OF ASTON, BIRMINGHAM
2UK	BIR	U.OF BIRMINGHAM,ENGLAND
2UK	BLF	U.OF BELFAST,N.IRELAND
2UK	BRD	U.OF BRADFORD,ENGLAND
2UK	BRI	U.OF BRISTOL,ENGLAND
2UK	CAV	CAVENDISH LAB.,CAMBRIDGE,ENGL.
2UK	CCH	UKAEA REACTOR MATERIALS LAB., WARRINGTON
2UK	CEG	CENTRAL ELECTRICITY GENERATING BOARD, BERKELEY LABS
2UK	DOU	DOUNREAY EXPERIMENTAL REACTOR ESTABLISHMENT, THURSO
2UK	DUR	U.OF DURHAM,ENGLAND
2UK	EDG	U.OF EDINBURGH,SCOTLAND
2UK	EE	ENGL.ELEC.CO.,WHEATSTONE,LEICS
2UK	GLS	U.OF GLASGOW,GLASGOW,SCOTLAND
2UK	HAR	AERE,HARWELL,BERKS,ENGLAND
2UK	IST	IMP.COLL.OF SCI.+TECHN.,LONDON
2UK	KEN	U.OF KENT,CANTERBURY,ENGLAND
2UK	LEE	U.OF LEEDS,LEEDS,ENGLAND
2UK	LON	U.OF LONDON,LONDON,ENGLAND
2UK	LVP	U.OF LIVERPOOL,ENGLAND
2UK	MAN	U.OF MANCHESTER,ENGLAND

Table VII (cont'd)

2UK	MVE	METROPOLITAN-VICKERS ELECTRICAL H.V. LAB.
2UK	NEW	U.OF NEWCASTLE-ON-TYNE
2UK	NIN	RUTHERFORD LAB.,CHILTON,BERKS
2UK	NPL	NATIONAL PHYS.LAB.,TEDDINGTON
2UK	NRP	NATIONAL RADIOLOGICAL PROTECTION BOARD, HARWELL
2UK	OXF	U.OF OXFORD,OXFORD,ENGLAND
2UK	QML	QUEEN MARY COLLEGE, LONDON
2UK	REA	U.OF READING
2UK	RLY	UKAEA, RISLEY
2UK	RR	ROLLS-ROYCE
2UK	SBL	DEPT.OF PHYSICS, POLYTECHNIC OF SOUTH BANK, LONDON
2UK	SHE	U.OF SHEFFIELD,ENGLAND
2UK	SRC	SCOTTISH REACTOR CENTRE, E.KILBRIDE, SCOTLAND
2UK	SSX	U.OF SUSSEX,BRIGHTON,ENGLAND
2UK	SUR	U.OF SURREY, GUILFORD
2UK	UK	UNITED KINGDOM
2UK	UKW	WINDSCALE REACTOR DEVELOPMENT LABS., UKAEA
2UK	WIN	AEE,WINFRITH,DORSET,ENGLAND
2ZZZ	CER	CERN,GENEVA,SWITZERLAND
2ZZZ	DGE	CEC DOSIMETRY GROUP, GEEL
2ZZZ	GEL	BCMN GEEL
2ZZZ	HOE	OECD HALDEN REACT.PROJ.,NORWAY
2ZZZ	ISP	CEC ISPRA, ITALY
2ZZZ	ITU	CEC INSTITUTE FOR TRANSURANIUM ELEMENTS, KARLSRUHE
2ZZZ	NDC	NEA DATA BANK,SACLAY,FRANCE
2ZZZ	NEA	OECD NUCLEAR ENERGY AGENCY, PARIS
3AFG	AFG	AFGHANISTAN
3ALG	ALG	ALGERIA
3ALG	UAG	UNIVERSITE D'ALGER
3ARG	ARG	ARGENTINA
3ARG	CAB	CENTRO ATOMICO BARILOCHE, SAN CARLOS DE BARILOCHE
3ARG	CDO	CENTRO DE DOCUMENTACION CIENTIFICA,BUENOS AIRES
3ARG	CIN	CENTRO NACIONAL DE INVESTIGACION, BUENOS AIRES
3ARG	CNE	COMISION NACIONAL DE ENERGIA ATOMICA, BUENOS AIRES
3ARG	CRB	CENTR.NACIONAL DE RAD. COSMICA, BUENOS AIRES
3ARG	IIA	INST.DE INVESTIG.AERONAUT.Y ESPACIAL, BUENOS AIRES
3ARG	UBA	UNIVERSIDAD DE BUENOS AIRES
3ARG	UPA	UNIVERSIDAD DE LA PLATA,BUENOS AIRES
3AUL	AIN	A.I.N.S.E.,LUCAS HEIGHTS,NSW
3AUL	AML	U.OF MELBOURNE,MELBOURNE
3AUL	ASY	U.OF SYDNEY,SYDNEY
3AUL	AUA	AAEC RES.EST.,LUCAS HEIGHTS,NSW
3AUL	AUF	FLINDERS UNIV.,BEDFORD PARK,ADELAIDE
3AUL	AUL	AUSTRALIA
3AUL	CBR	AUSTRALIAN NATL.UNIV.,CANBERRA
3AUL	MOU	MONASH UNIVERSITY
3AUL	NSW	UNIV.OF NEW SOUTH WALES
3AUL	QUC	UNIV.COLL.,TOWNSVILLE,QUEENSL.
3AUL	QUE	UNIV.OF QUEENSLAND
3AUL	TAS	UNIV.OF TASMANIA
3AUL	UNE	UNIV.OF NEW ENGLAND
3AUL	WAI	WESTERN AUSTRALIAN INST. OF TECH.,WEST BENTLEY
3AUL	WUC	WOLLONGONG UNIVERSITY COLLEGE, WOLLONGONG
3BAN	BAN	BANGLA DESH
3BAN	DAC	DACCA, UNIVERSITY
3BAN	RAM	DACCA, ATOMIC ENERGY CENTRE, RAMNA
3BLV	BLV	BOLIVIA
3BLV	LFC	LABORATORIO DE FISICA COSMICA, CHACALTAYA
3BUL	BLA	SOFIA, INST.OF NUCL.RES.AND NUCL.EN.
3BUL	BUL	BULGARIA
3BUR	BUR	BURMA

Table VII (cont'd)

3BZL ABC	ACADEMIA BRASILEIRA DE CIENCIAS, RIO DE JANEIRO
3BZL BZL	BRAZIL
3BZL CAF	CENTRO LATIN.AMERIC.DE FISICA, RIO DE JANEIRO
3BZL IDF	INST.DE FISICA,UNIV.DO RIO GRANDE DO SUL,PORTO ALEGRE
3BZL IEN	INSTIT. DE ENGENHARIA NUCLEAR, RIO DE JANEIRO
3BZL IPE	INST.DE PESQUISAS ENERGETICAS E NUCLEARES, SAO PAULO
3BZL IPR	INSTIT. DE PESQUISAS RADIOATIVAS, BELO HORIZONTE
3BZL ITA	INSTIT. TECHNIC. DE AERONAUTICA, SAO PAULO
3BZL LDD	LAB.DE DOSIMETRIA,RIO DE JANEIRO
3BZL PUJ	PONTIF. UNIVERSIDAD CATOLICA, RIO DE JANEIRO
3BZL RIO	CENTRO BRAZIL.DE PESQUISAS FISICAS, RIO DE JANEIRO
3BZL UEC	UNIV.ESTADUAL DE CAMPINAS,INST.DE FISICA, CAMPINAS
3BZL UFP	UNIV.FEDERAL DE PERNAMBUCO, RECIFE
3BZL USP	UNIV.DE SAO PAULO,SAO PAULO
3CHF CHF	CHINA,TAIWAN
3CHF NTU	NAT.TAIWAN UNIV.,TAIPEI
3CHF SHI	INSTIT. OF NUCLEAR ENERGY RESEARCH, LUNG TAN
3CHF THU	NATIONAL TSING HUA UNIV., HSIN-CHU
3CHL CEC	COMISION DE ENERGIA NUCLEAR, SANTIAGO
3CHL CHL	CHILE
3CHL SAN	UNIVERSIDAD DE CHILE, SANTIAGO
3CHP AEP	INST.OF ATOMIC ENERGY, ACAD. SINICA, PEKING
3CHP CHP	CHINA, PEOPLE'S REP.
3CHP IMP	INST.OF MODERN PHYSICS, PEOPLE'S REP.OF CHINA
3CLM CLM	COLUMBIA, REP.
3CLM IAN	INST.DE ASUNTOS NUCL.,BOGOTA
3CMR CMR	CAMEROON
3COS COS	COSTA RICA
3CSR CHE	INST.OF HIGH EN.PHYS.,PRAGUE
3CSR CHU	CHARLES UNIV.,FACULT.OF MATHEM.AND PHYSICS, PRAGUE
3CSR CSR	CZECHOSLOVAKIA
3CSR CTI	CZECH.TECHNICAL UNIV.,PRAGUE
3CSR CZA	CZECH.ACAD.OF SCIENCES,PRAGUE
3CSR PFU	PF UNIV., NUCLEAR PHYSICS DEPT., BRATISLAVA
3CSR SLO	SLOVAK ACADEMY OF SCIENCES, PHYSICS INST., BRATISLAVA
3CSR UJF	INST.OF NUCL.PHYS.OF CZECH.ACAD.SCI.,REZ U PRAHY
3CSR UJV	INST.OF NUCL.RES., REZ U PRAHY
3CUB CUB	CUBA
3DDR BEH	HUMBOLDT UNIV. BERLIN + DAW ZEUTHEN
3DDR BEP	VEB ATOMKRAFT, BERLIN-PANKOW
3DDR BFR	BERGAKADEMIE FREIBERG
3DDR DDR	GERMAN DEMOCRATIC REPUBLIC
3DDR JNA	JENA, UNIV.
3DDR ROS	ZENTRALINST.F.KERNFORSCHUNG,ROSSENDORF
3DDR TUD	DRESDEN, TECHN.UNIV.
3DDR ZFI	ZENTRALINST.F.ISOTOPEN- UND STRAHLENFORSCHUNG,LEIPZIG
3ECU ECU	ECUADOR
3ECU UEF	UNIV.CENTRAL DE ECUADOR, DEPT.DE FISICA, QUITO
3EGY CAI	AEE CAIRO
3EGY EGY	EGYPT
3ETP ETP	ETHIOPIA
3GHA GHA	GHANA
3GUA GUA	GUATEMALA
3HKG HKG	HONG-KONG
3HKG HKU	CHINESE UNIV.OF HONG-KONG
3HUN DEB	ATOMKI, DEBRECEN
3HUN ELU	EOTVOS LORAND UNIV., THEOR.PHYSICS INST., BUDAPEST
3HUN HUN	HUNGARY
3HUN II	MTA IZOTOP INTEZETE, BUDAPEST
3HUN KFI	KFKI, BUDAPEST
3HUN KOS	KOSSUTH UNIV. DEBRECEN

Table VII (cont'd)

3HUN	NBM	NATL.BUREAU OF MEAS.,BUDAPEST
3IND	ALU	ALLAHABAD UNIV.,ALLAHABAD
3IND	AUW	ANDHRA UNIV.,NUCL.RES.LAB., WALTAIR
3IND	BHU	BANARAS HINDU UNIV.,VARANASI
3IND	BOS	BOSE INSTITUTE,CALCUTTA
3IND	CAU	CALCUTTA, UNIVERSITY
3IND	DLH	DELHI UNIV.,DELHI
3IND	FRI	CENTRAL FUEL RESEARCH INST., FRI, BIHAR
3IND	GUL	GULMARG RES.OBSERVAT.,KASHMIR
3IND	IAC	IND.ASS.CULT.OF SC.,CALCUTTA
3IND	IIB	IND.INST.OF TECHNOLOGY,BOMBAY
3IND	IID	IND.INST.OF TECHNOLOGY,DELHI
3IND	IIK	IND.INST.OF TECHNOL.,KHARAGPUR
3IND	IND	INDIA
3IND	ISI	IND.STATISTICAL INST.,CALCUTTA
3IND	ITB	IND.INST.OF TECHNOL.,BANGLORE
3IND	ITK	IND.INST.OF TECHNOL.,KANPUR
3IND	KAL	KALPAKKAM REACTOR RESEARCH CENTRE,KALPAKKAM,TAMILNADU
3IND	KUD	KARNATAK UNIVERSITY,DHARWAR
3IND	KUK	KURUKSHETRA UNIV.,KURUKSHETRA
3IND	LUL	LUCKNOW UNIV.,LUCKNOW
3IND	MAD	IND.INST.OF TECHNOLOGY,MADRAS
3IND	MGA	MAHATMA GHANDI SCIENCE INST.OF TECHNOLOGY, AHMEDABAD
3IND	MUA	MUSLIM UNIV.,ALIGARH
3IND	OSM	OSMANIA UNIVERSITY, HYDERABAD
3IND	PAT	PANJABI UNIV., PATIALA
3IND	POO	POONA, UNIVERSITY
3IND	PRA	PHYS.RES.LABORATORY,AHMEDABAD
3IND	PUC	PANJAB UNIV., CHANDIGARM
3IND	SAH	SAHA INSTITUTE,CALCUTTA
3IND	SUK	SHIVAJI UNIV.,KOLHAPUR
3IND	TAT	TATA INSTITUTE,BOMBAY
3IND	TRM	BHABHA ATOM.RES.CENTRE,TROMBAY
3IND	URJ	UNIV.OF RAJESTAN,JAIPUR
3IND	URR	UNIV.OF ROORKEE,ROORKEE
3INS	BNG	BANDUNG REACTOR CENTER,BANDUNG
3INS	INS	INDONESIA
3IRN	AMU	A.M.U.T. TEHRAN
3IRN	IRN	IRAN
3IRN	PAH	PAHLAVI UNIV.,DANESHGAH,SHIRAZ
3IRN	TEH	TEHRAN UNIVERSITY NUCLEAR CENTRE, TEHRAN
3IRQ	IRQ	IRAQ
3IRQ	NRI	NUCL.RESEARCH INSTITUTE, TUWAITHA, BAGHDAD
3ISL	HEB	HEBREW UNIV.,JERUSALEM
3ISL	HFA	TECHNION HAIFA
3ISL	ISL	ISRAEL
3ISL	NEG	BEER-SHEBA NUCL.RES.CENTER NEGEV
3ISL	REH	REHOVOTH LAB.,ISRAEL AEC.
3ISL	SOR	SOREQ RESEARCH CENTRE,YAVNE
3ISL	TEL	TEL AVIV UNIVERSITY
3ISL	WZI	WEIZMANN INST., REHOVOTH
3JAM	JAM	JAMAICA
3JAM	UWI	WEST-INDIES UNIV., KINGSTON
3JOR	JOR	JORDAN
3KDR	KDR	KOREA, DEM.PEOPLE'S REP.OF
3KOR	KNU	KYUNGPOOK NATIONAL UNIVERSITY
3KOR	KOR	KOREA, REPUBLIC OF
3KOR	KUS	KOREA UNIV.,SEOUL
3KOR	NSU	NATL.SEOUL UNIV.,SEOUL
3KOR	SEO	ATOM.ENERGY RES.INST.,SEOUL
3KOR	YON	YONSEI UNIV.,SEOUL

Table VII (cont'd)

3KUW	KUW	KUWAIT
3KYA	KYA	KENYA
3KYA	NAI	UNIVERSITY COLLEGE, NAIROBI
3LE	LE	LEBANON
3LIB	LIB	LIBYA
3MA	MA	MADAGASCAR
3MAL	MAL	MALAYSIA
3MEX	CNM	CENT.NUCL.DE MEXICO, INST.NAC.DE ENERG.NUC.,MEXICO DF
3MEX	IFM	UNIV.DE MEXICO, INST.DE FISICA, MEXICO CITY
3MEX	IPN	INST.POLITEC.NAC.,MEXICO CITY
3MEX	ITM	INST.TECHNOL.DE MONTERREY
3MEX	MEX	MEXICO
3MEX	UGM	UNIV.DE GUANAJUTO,GUANAJUTO
3MEX	UMX	UNIV.NACL.AUTONOMA DE MEXICO
3MGL	MGL	MONGOLIA
3MLI	MLI	MALI
3MOR	MOR	MOROCCO
3NER	NER	NIGER
3NI	NI	NIGERIA
3NZL	NZA	U.OF AUCKLAND,AUCKLAND
3NZL	NZH	INST.OF NUCLEAR SCIENCES, LOWER HUTT
3NZL	NZL	NEW ZEALAND
3NZL	NZW	VICTORIA UNIVERSITY OF WELLINGTON, WELLINGTON
3PAK	GCL	NUC.RES.LAB.,GOV'T COLLEGE,LAHORE
3PAK	LAH	ATOMIC ENERGY CENTRE,LAHORE
3PAK	NIL	PINSTECH, NILORE, RAWALPINDI
3PAK	PAK	PAKISTAN
3PER	ISE	INSTITUTO SUPERIOR DE ENERGIA NUCLEAR, LIMA
3PER	PER	PERU
3PHI	PHI	PHILIPPINES
3POL	IBJ	SWIERK+WARSZAWA,INST.BADAN JADR
3POL	IFJ	KRAKOW,INST.FIZ.JADR.
3POL	ITJ	KRAKOW,INST.TECH.JADR.,AKAD.GORNICZO-HUTNICZA
3POL	KPI	KIELCE, WYZSZA SZKOLA PEDAGOGICZNA
3POL	KPS	HIGHER PEDAGOG.SCHOOL,KATOWICE
3POL	LOU	U.OF LODZ,LODZ
3POL	POL	POLAND
3POL	PWA	POLITECHNIKA WARSZAWSKA
3POL	SKU	CURIE-SKLODOWSKA UNIVERSITY, LUBLIN
3POL	UJK	KRAKOW,JAGELLONIAN UNIV
3POL	WRO	UNIV.OF WROCLAW,WROCLAW
3POL	WWA	WARSZAWA, UNIVERSITY
3PRG	PRG	PARAGUAY
3QAT	QAT	QATAR
3RUM	BBU	BABES-BOLYAI UNIVERSITY,CLUJ
3RUM	BUC	INSTITUTUL DE FIZICA SI INGINERIE NUCLEARA, BUCHAREST
3RUM	JAS	RESEARCH CENTRE OF PHYS.,JASSY
3RUM	PIC	PEDAGOGICAL INST.,CONSTANTZA
3RUM	PIT	INST. FOR NUCLEAR POWER REACTORS, PITESTI
3RUM	RUM	ROMANIA
3SAF	NLP	NATIONAL PHYSICAL RESEARCH LAB., PRETORIA
3SAF	PEL	A.E.BOARD,PELINDABA, PRETORIA
3SAF	POT	U.OF POTCHEFSTROM,POTCHEFSTROM
3SAF	SAF	SOUTH AFRICA, REP.
3SAF	SCT	U.OF CAPETOWN,CAPE TOWN
3SAF	SIR	COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RES., PRETORIA
3SAF	STL	U. OF STELLENBOSCH
3SAF	SUN	NUCLEAR INST., SOUTHERN UNIV., FAURE, CAPE PROV.
3SAF	UPR	UNIV.OF PRETORIA,HATFIELD,PRETORIA
3SAF	USF	U.OF SOUTH AFRICA,PRETORIA
3SAF	WIT	UNIV.OF WITWATERSRAND,JOHANNESBURG

Table VII (cont'd)

3SAR	RIY	UNIV.OF RIYADH, SAUDI ARABIA
3SAR	SAR	SAUDI ARABIA
3SIL	SIL	SIERRA LEONE
3SIN	SIN	SINGAPORE
3SR	SR	SRI LANKA
3SUD	SUD	SUDAN
3SY	SY	SYRIA
3TAI	BGK	OFFICE OF THE ATOMIC ENERGY FOR PEACE, BANGKOK
3TAI	TAI	THAILAND
3TUN	TUN	TUNISIA
3UAE	UAE	UNITED ARAB EMIRATES
3URU	URM	MONTEVIDEO, UNIVERSIDAD DE LA REPUBLICA
3URU	URU	URUGUAY
3VEN	IVI	INST.VENEZUAL. DE INVESTIGACION CIENTIFICA, CARACAS
3VEN	UCV	UNIV. CENTRAL DE VENEZUELA, CARACAS
3VEN	VEN	VENEZUELA
3VN	VN	VIETNAM
3YUG	BKB	INST.BORIS KIDRICH, VINCA
3YUG	NJS	INST. JOZEF STEFAN, LJUBLJANA
3YUG	RBZ	INST.RUDJER BOSKOVIC, ZAGREB
3YUG	YUG	YUGOSLAVIA
3YUG	ZAG	U.OF ZAGREB,ZAGREB
3ZAI	ZAI	ZAIRE
3ZAM	ZAM	ZAMBIA
3ZZZ	IAE	IAEA,VIENNA,AUSTRIA
3ZZZ	NDS	NUCLEAR DATA SECTION, IAEA
3ZZZ	UN	U.N.ORGANIZATIONS
4CCP	ARM	INST. FIZIKI A.N.ARMENIAN SSR, JEREVAN
4CCP	CCP	UNION OF SOV.SOCIAL.REPUBLICS
4CCP	CJD	CENTR PO JADERNYM DANNYM, OBNINSK
4CCP	FEI	FIZIKO-ENERGETICHESKIJ INST., OBNINSK
4CCP	FTI	FIZIKO-TEKHNICHESKIJ INST. IOFFE, LENINGRAD+GATCHINA
4CCP	GAC	INST.FOR GEO- AND ANALYTICAL CHEMISTRY, MOSCOW
4CCP	GKS	STATE COMMITTEE ON STANDARDS, MOSCOW
4CCP	GOR	UNIV.OF GORKIJ,GORKIJ
4CCP	ICP	INST.OF CHEMICAL PHYS.,MOSCOW
4CCP	IFB	INST.FIZ. AN BELORUS.SSR, MINSK
4CCP	IFL	INST. FIZIKI A.N.LATVIJSKOI SSR, RIGA
4CCP	IFP	INST. FIZICHESKIKH PROBLEM, MOSCOW
4CCP	IFU	INST. FIZIKI A.N.UKRAINSKOI SSR, KIEV
4CCP	IIU	INST.OF INFORMATION OF USSR STATE COMM.ON A.E.,MOSCOW
4CCP	IJE	INST.JAD.EN. A.N. BJELORUSS.SSR, MINSK
4CCP	IJI	INST.JADERNYKH ISSLEDOVANIJ A.N. UKRAINSKOI SSR, KIEV
4CCP	IRE	I.R.E. KHARKOV
4CCP	ITE	INST.TEORET.+ EXPERIMENT. FIZIKI, MOSCOW
4CCP	JIA	INST.JADERNYCH ISSLEDOVANIJ A.N. SSSR = NUCL.RES.INST. OF ACAD.OF SCIENCE, MOSCOW
4CCP	KAZ	INST.JADERNOI FIZIKI, ALMA-ATA, KAZAKHSTAN
4CCP	KFT	KHARKOVSKIJ FIZIKO-TEKHNICHESKIJ INST., KHARKOV
4CCP	KGU	GOSUDARSTVENNYJ UNIV.(STATE UNIV.), KIEV
4CCP	KUR	INST.AT.EN. I.V.KURCHATOVA, MOSKVA
4CCP	LEB	FIZ.INST. LEBEDEV (FIAN), MOSKVA
4CCP	LIN	LENINGRAD INST.NUCL.PHYS.,USSR ACAD.SCI., GATCHINA
4CCP	LPI	LENINGRADSKIJ POLITEKHNICHESKIJ INST.
4CCP	MFT	MOSKOVSKIJ FIZIKO-TEKHNICHESKIJ INST., MOSKVA
4CCP	MIF	MOSCOW INST.OF ENGINEERING PHYSICS, MOSCOW
4CCP	MIM	VSESOJUZNYJ NAUCHNO-ISSLEDOVATELSKIJ INST. METROLOGII IMENI D.I.MENDELEEVA = ALL-UNION D.I.MENDELEEV'S 3METROLOGICAL RES.INST., LENINGRAD
4CCP	MOS	MOSCOW STATE UNIV.,NUCLEAR PHYSICS INST., MOSCOW
4CCP	NIR	NIIAR DIMITROVGRAD

Table VII (cont'd)

4CCP RI	KHLOPIN RADIEV. INST.,LENINGRAD
4CCP SCU	USSR STATE COMM. ON THE USE OF ATOMIC ENERGY, MOSCOW
4CCP SIB	INST. JAD. FIZ., NOVOSIBIRSK
4CCP SUL	GOSUDARSTVENNYJ UNIV. (STATE UNIV.), LENINGRAD
4CCP TIL	LENINGRADSKIJ TEKHNOLOGICHESKIJ INST. IM. LENSOVETA
4CCP TMO	INST. TEPLO-MASSOOBMENA A.N. BJELORUSS. SSR, MINSK
4CCP TPI	TOMSKIJ POLITEKHNICHESKIJ INST., TOMSK
4CCP UZB	INST. JADERNOI FIZIKI A.N. UZBEKSKOI SSR, TASHKENT
4CCP VNI	SCIENT. AND TECHNICAL INFORM. INST. OF THE USSR, MOSCOW
4ZZZ DUB	JOINT INST. FOR NUCL. RES., DUBNA

Table VIII

nearly monoisotopic elements	strictly monoisotopic elements
1-H	4-Be-9
2-He	9-F-19
6-C	11-Na-23
7-N	13-Al-27
8-O	15-P-31
23-V	21-Sc-45
57-La	25-Mn-55
73-Ta	27-Co-59
	33-As-75
	39-Y-89
	41-Nb-93
	45-Rh-103
	53-I-127
	55-Cs-133
	59-Pr-141
	65-Tb-159
	67-Ho-165
	69-Tm-169
	79-Au-197
	83-Bi-209
	90-Th-232