

**Nuclear Data Section  
International Atomic Energy Agency  
P.O.Box 100, A-1400 Vienna, Austria**

**Memo CP-D/442**

**Date:** 7 October 2005  
**To:** Distribution  
**From:** V. Zerkin  
**Subject:** **Procedure of loading the new CINDA database in IAEA-NDS  
(Working paper to NRDC meeting, and reply to CP-N/35)**

Attached is a working paper "**Procedure of populating (initial loading) of new CINDA database in IAEA-NDS**" for the forthcoming technical NRDC meeting.

This is the implementation of decisions of the CINDA meeting (May 2005, see CP-D/433).

Distribution:

oblozinsky@bnl.gov  
vml@bnl.gov  
drochman@bnl.gov  
nordborg@nea.fr  
manokhin@ippe.obninsk.ru  
samaev@obninsk.ru  
Mmarina@ippe.obninsk.ru  
blokhin@ippe.obninsk.ru  
feliks@polyn.kiae.su  
chukreev@polyn.kiae.su  
S.Dunaeva@iaea.org  
taova@expd.vniief.ru  
varlamov@depni.sinp.msu.ru  
chiba@earth.sgu.ac.jp  
[kato@nucl.sci.hokudai.ac.jp](mailto:kato@nucl.sci.hokudai.ac.jp)  
[ohnishi@nucl.sci.hokudai.ac.jp](mailto:ohnishi@nucl.sci.hokudai.ac.jp)  
[ohbayasi@meme.hokudai.ac.jp](mailto:ohbayasi@meme.hokudai.ac.jp)

[yxzhuang@iris.ciae.ac.cn](mailto:yxzhuang@iris.ciae.ac.cn)  
gezg@iris.ciae.ac.cn  
hongwei@iris.ciae.ac.cn  
tarkanyi@atomki.hu  
[stakacs@atomki.hu](mailto:stakacs@atomki.hu)  
katakura.junichi@jaea.go.jp  
vlasov@kinr.kiev.ua  
kaltchenko@kinr.kiev.ua  
ogritzay@kinr.kiev.ua  
yolee@kaeri.re.kr  
jhchang@kaeri.re.kr  
ohtsuka@nucl.sci.hokudai.ac.jp  
A.Mengoni@iaea.org  
m.wirtz@iaea.org  
schwerer@iaeand.iaea.org  
[v.zerkin@iaea.org](mailto:v.zerkin@iaea.org)  
henriksson@nea.fr  
[exfor@nea.fr](mailto:exfor@nea.fr)

## Procedure of populating (initial loading) of new CINDA database in IAEA-NDS

*V.Zerkin, IAEA-NDS, 26.09.2005*

This work was done according to Conclusion C3 of the NRDC-2004 meeting and decision of the meeting "EXFOR-CINDA: revision of contents, compilation and plans", Vienna, IAEA, 26-28 April 2005 (see Memo CP-D/433).

### Data sources:

1. Old CINDA database on NDS Alpha-VMS/DBMS with last updates:

Area	Last Exchange	Date	Lines	Total Blocks	Total Lines
1	BNL182	2005.02.02	635	40,429	91,311
2	NEA068	2005.02.21	2,283	43,793	83,259
3	NDS044	2004.12.17	48	26,838	43,563
4	CJD050	2004.04.14	17	28,671	60,130
Sum				139,731	278,263

2. EXFOR database, created on Common (NDS-NNDC) Master file (2005-09-14).
3. EXFOR-CINDA Dictionaries: 9089 (2005-09).

### Algorithm\*

#### 1. Convert old CINDA backup file (from VMS) to CINDA2001 format.

Old CINDA quantity are remained in output file in order to provide identification of Blocks equivalent to Blocks in old CINDA.

#### 2. Create CINDA relational database and load CINDA2001 backup file into it.

For those Blocks, which have no unique correspondence between new and old quantity and have EXFOR Line, new quantity is taken from EXFOR database.

#### 3. Import Charged Particle and Photonuclear data from EXFOR.

- Read EXFOR database in CINDA format with criteria:

WHERE (zIncident>0) OR (Reaction Like 'G,\*') OR (Reaction='0,F') OR (Reaction='0,0')

- For every Line:

Write CINDA2001/Exchange file for database update with action="A" (Add).

#### 4. Import missing Neutron data from EXFOR.

- Read EXFOR database in CINDA format: WHERE (Reaction Like 'N,\*')

- Write CINDA2001/Exchange file for CINDA database update with action="A"  
(Add) only for Lines and/or Blocks which do not exist in CINDA database:

a. Find Block by: (Z, A, State, Reaction, Quantity, SAN)

b. Block found:

{	<ol style="list-style-type: none"> <li>i. Find Line by Reference-code</li> <li>ii. Line not found:               <ol style="list-style-type: none"> <li>1. write Line with Ref.=Reference-code</li> </ol> </li> </ol>	}
---	---	---

c. Block not found:

{	<ol style="list-style-type: none"> <li>i. Find Block by: (Z, A, State, Reaction, Quantity, Reference-code)</li> <li>ii. Block found:               <ol style="list-style-type: none"> <li>1. write Line with Ref.=EXFOR</li> </ol> </li> <li>iii. Block not found:               <ol style="list-style-type: none"> <li>1. write Line with Ref.=Reference-code</li> <li>2. write Line with Ref.=EXFOR</li> </ol> </li> </ol>	}
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Diff. from  
NRDC'2005-C3

#### 5. Send output files, separated by Area-code to responsible Centers for a checking.

#### 6. Update CINDA database by the files produced on steps 3 and 4.

\*Note. The algorithm is based on the Conclusion C3 of the NRDC-2004 meeting;  
it is implemented in IAEA-NDS with some improvements (see grey box above).

## General Remark:

The following possibilities foreseen by CINDA2001 format are not implemented, because considered as natural functions of EXFOR (and criteria for an EXFOR search) and may lead to unnecessary complications of CINDA compilation (can be discussed):

- Ranges of Subentries (H=5, 6) are not used;
- Multiple Labs (H=8) are not used;
- Product: presented in Comment field, but not in separate lines (H=9).

## Output files:

1. Program generates Exchange and Reader files for each Area (8 files).
2. Besides CINDA-2001 formatted lines, output file contains also log-lines.  
Log-lines contain an additional information helping to understand and check why program did so and so, and also to find out what was the problem.

```
#I Information: like, Block exists,...
#W Warning: another Institute/Area (compare to EXFOR)
#R Reader: goes also to Reader file (another Area)
#E Errors: more than 1 block found
## Numbering: Block number,...
#S Summary: Total...
```

3. Blocks are sorted by (Z, A, Q, Reaction, Lab) codes and separated by blank lines for convenience of eye checking\*;
4. Line contains Old-Quantity code at the end (serves the purpose of block identification for the cases when new Quantity and Reaction codes do not identify Block uniquely);
5. End of Comment field contains EXFOR-Import flag: "X4A";
6. Length of Quantity field is 4.

*\*Note. Blank lines and lines starting with # can be ignored by programs performing load/update of CINDA database. (This can also be allowed by CINDA format.)*

## Example:

```
##---Block#1 EXFOR=31515 Z=13 A=27 S= R=N,A Q=CS: Institute=3ARGCAB
#I---Block exists: BlockID=87230 BlockNo=34990 lastSeqNo=4
#I---Line exists: Publication=[J,NSE:,127,245:199711] BlockID=87230 LineID=179365
#I---Line exists: Publication=[J,RCA:,78,11:1997] BlockID=87230 LineID=179366
A 13 27 N,A CS 3ARGCAB34990 0Ex 1.5+06 1.5+062J,JRN,244,(2),417 200011Arribere+ X4A 20011205NA

##---Block#6 EXFOR=30395 Z=20 A=40 S= R=N,0 Q=RP:STF Institute=1USAORL
#I---Block exists: BlockID=89222 BlockNo=34730 lastSeqNo=13
#W---Warning: Cinda.Institute=[3AULAU]
#I---Line exists: Publication=[C,75KIEV:,3,233:197505] BlockID=89222 LineID=183103
#I---Line exists: Publication=[J,NP/A:,259,365:197603] BlockID=89222 LineID=183102
#RA 20 40 N,0 RP 3AULAU34730 0Ex 2.9+03 3.0+053C,75WASH,,(EB16) 197504Del+ X4A 19850101RES
#RA 20 40 N,0 RP 3AULAU34730 0Ex 2.9+03 3.0+053J,AUG,24,671 197110Del+ X4A 19850101RES
#RA 20 40 N,0 RP 3AULAU34730 0Ex 2.9+03 3.0+053J,NSE,82,(2),230 198201Del+ X4A 19850101RES
#RA 20 40 N,0 RP 3AULAU34730 0Ex 2.9+03 3.0+053R,AAEC/E-200 196910Del+ X4A 19850101RES

##---Block#11 EXFOR=10498 Z=20 A=40 S= R=N,0 Q=RP:STF Institute=1USACOL
#E---Error? Many-Blocks/SAN: Entry=10498 SubentID=10498002 Search:(Sub=false, Qua=true) →
Z=20 A=40 S= R=N,0 Q=RP:STF N.Blocks=2 IDs= 8076(RP:STF) 8070(RP:RES)
#I---Block exists: BlockID=8076 BlockNo=11500 lastSeqNo=7
#I---Line exists: Publication=[J,PR/C:,10,2143:197412] BlockID=8076 LineID=18932
A 20 40 N,0 RP 1USACOL11500 0Ex 1.1+04 5.4+053W,SINGH 197504Singh+ X4A 20040402STF

#S---Total: Blocks=93 Lines=140 Warnings=3 Errors=1
```

**Table. CINDA Loading Statistics (26.09.2005)**

Area	Old CINDA		Import from EXFOR				New CINDA		
			Charged-part. + photo-nuclear + neutron data						
	Blocks	Lines	Blocks	Lines:Exchange,Reader	Warnings	Errors	Blocks	Lines	
1	40,429	91,311	21,813	46,265	360	392	145	55,763	137,593
2	43,793	83,259	21,363	60,049	23	420	192	58,746	143,348
3	26,838	43,463	6,538	15,815	14	367	19	30,761	59,732
4	28,671	60,130	11,898	30,048	14	1,607	178	36,304	90,178
Sum	139,731	278,263		152,177	411	2,786	534	181,574	430,851
Add			<61,612	152,588				+41,843	+152,588