# EXFOR compilation
# An overview

O. Schwerer, Nuclear Data Section

IAEA
International Atomic Energy Agency

## Database contents

| | Aug. 2004 | Aug. 2006 | Increase |
|---|---|---|---|
| Works (entries) | 14470 | 16608 | 15% |
| Tables (subentries) | 100127 | 109907 | 10% |

IAEA

## Entries

| | Aug. 2004 | Aug. 2006 | Increase |
|---|---|---|---|
| Neutron | 9038 | 9566 | 6% |
| CPND | 4706 | 6205 | 32% |
| Photonuclear | 726 | 837 | 15% |

IAEA

## Contents (no. of entries) by category

| | Aug. 2004 | Aug. 2006 |
|---|---|---|
| Neutron | 62% | 58% |
| CPND | 33% | 37% |
| Photonuclear | 5% | 5% |

IAEA

## Recent progress

- Common master file
- Overall no. of new compilations high
- Good progress in adding important old data (in particular CPND, for IBA etc.)
- Added value for users (plotting)
- Some data compiled *before* publication (negative delay)

IAEA

## New developments in compilation

- Extension of JCPRG scope (J-series, photonuclear data)
- New compilers (ATOMKI, India)
- More input from CNDC
- Data uploading facility

IAEA

## Problems (actual or perceived)

- Missing compilations
- Delayed compilations
- Complicated rules and procedures
- Mistakes in compilations
  (cf. Koning's paper to this meeting)

IAEA

## Reasons for "missing" compilations

- **All these cases really do occur:**
  - Article (after thorough checking) turns out to be not relevant to EXFOR
  - Though reactions were measured, no data are given
  - Not-obligatory data (high energy, heavy-ion, complex polarization data)
  - Graphs which cannot be digitized (very small logarithmic, double-diff.), no reply from authors
  - Exotic or new data types, questionable whether they should be compiled
  - Simply overlooked or forgotten

IAEA

## The story of digitizing data

- For ~30 years, no digitizing was done at the "core centres" => "NODATA" entries
- NNDC and NDS did not do any digitizing before the advent of S. Dunaeva
- Digitizing was introduced into NRDC through other centres (Russia, Japan)
- => Many more articles "to be compiled"

IAEA

## Additional data types

- In the past years, the compilation scope was extended in several directions:
  - Exotic data types (e.g. complex differential and polarization data, partly only interesting for basic research which was not original EXFOR goal)
  - Higher energies (up to 1 GeV obligatory)
  - Heavier projectiles (up to A=12 obligatory)
- =>Suddenly many more articles "to be compiled"

IAEA

## How bad are the delays in compilation of new literature?

- Example: Phys.Rev.C, 2004-2006
- Reviewed on next slides
- Red = possible delay

IAEA

## Phys.Rev. C 73 (Jan – June 2006)

- Relevant articles: 48
- Compiled: 14
- Booked: 22 (on the way)
- Open: 12
  - NNDC: 9
  - NEA/CAJAD: 2 (curves)
  - NDS: 1 (small gr.,double-diff.)

IAEA

## Phys.Rev. C 72 (July – Dec. 2005)

- Relevant articles: 30
- Compiled: 16
- Booked: 7
  (6 small graphs, 1 partly graphs (CJD))
- Open: 7
  - 4 small graphs
  - 1 graph (NNDC)
  - 1 graph/rel.exc.fct.,mostly NSDD)
  - 1 photonuclear, complex

IAEA

## Phys.Rev. C 71 (Jan. – June 2005)

- Relevant articles: 44
- Compiled: 33
- Booked: 3
  (2 small graphs, 1 high en. > 1 GeV)
- Open: 7
  - 3 NDS (1 India, 2 waiting for data)
  - 3 NEA/CAJAD (1 small gr., 1 gr.triple-diff., 1 table)
  - 1 NNDC (possibly only NSDD)

IAEA

## Phys.Rev. C 70 (July – Dec. 2004)

- Relevant articles: 56
- Compiled: 35
- Booked: 6
  (5 small graphs, 1 heavy-ion)
- Open: 15
  - 6 heavy-ion (1 without compilable data)
  - 3 photonuclear (not oblig.)
  - 5 small graphs (mainly NNDC)
  - 1 of questionable relevance

IAEA

## Phys.Rev. C 69 (Jan. – June 2004)

- Relevant articles: 69
- Compiled: 40
- Booked: 4
  (1 heavy-ion, 1 tensor-polar.,1 exotic nucl., 1 graph)
- Open: 25
  All heavy-ion and/or high-energy, partly exotic,
  no obligatory compilation

IAEA

## Summary Phys.Rev.C 2004-2006

- 2006:
  - 14 compiled
  - 22 on the way (booked)
  - 12 open (9 NNDC, perhaps on the way)
- 2004 – 2005:
  - 199 potentially relevant articles
  - 124 compiled
  - 8 possibly delayed
  - All others are undigitizable graphs, high-energy or heavy-ion data, or exotic or possibly non-relevant articles

IAEA

## Conclusion

- Looking at compilation statistics from a bookkeeper's point of view is not sufficient.

IAEA

## What to do in case of a real delay?

- Complain globally at annual meeting
  *or*
- Immediately request urgent compilation of the concrete article
  *(This is the constructive alternative)*

IAEA

## What we do to speed it up

- Keeping track by a new "current compilations" web page (to be presented at this meeting)

IAEA

## Compilation “by journal” ?

➢Question:

If the compilation responsibilities would be organised strictly by journal (like in old CINDA), would it eliminate the need for coordination between centres?

IAEA

## How many “multi-journal” entries are there?

- Remember: EXFOR is **not** a bibliography. It is ***work-oriented***, not primarily publication-oriented.
- The following slides are examples of entries with ***more than 1*** journal reference which happen to be transmitted or re-transmitted in the past several months (no special selection)
- Other “second references” (reports, conference proceedings, translation journals) are not considered in this list

IAEA

## Examples from area 1

| Accession number | Journals |
|---|---|
| 12784, 12786, 12846 | NP/A, JP/G |
| 12845 | PRL, JP/G |
| 12899 | PL/B, CJP |
| 12911 | PR/C, CJP, JP/G |
| 13633 | PR/C, CJP |
| 13648 | PR/C, IZV |

IAEA

etc.

## Examples from area C

| Accession number | Journals |
|---|---|
| C0258 | PL/B, PR/C, PRL |
| C0502 | PR/C, PRL |
| C0761 | PL/B, NP/A |
| C0803 | PRL, NP/A |
| C1004 | PR/C, PRL, NP/A |
| C1120 | PL/B, PR/C |
| etc. | |

IAEA

## Examples from area 3

| Accession number | Journals |
|---|---|
| 30466 | AKE, NIM |
| 30523 | PHE, PA, NIM/A, CST |
| 30942 | IPA, ANE |
| 30433, 30471 | NC/A, JP/G |

IAEA

etc.

## Examples from area 4

| Accession number | Journals |
|---|---|
| 40885 | AE, YK |
| 40913 | AE, YF |
| 40856 | YK, AE, YF |
| 41023 | AE, IZV |

IAEA

etc.

## Examples from area A

| Accession number | Journals |
|---|---|
| A0554 | PL/B, PR/C |
| A0714 | NP/A, EUL |
| A0428 | PRL, AJ |
| A0640 | ZP/A, NP/A |

IAEA etc.

## Examples from area D

| Accession number | Journals |
|---|---|
| D0005, D0006, D0007 | NSE, NIM |
| D0030 | NP/A, SCF |
| D0032 | BAP, AND |
| D0033 | AF, AND |
| D0034 | NIM, AND |
| D0039 | NP/A, AND |
| D4006 | ARI, RCA |

IAEA etc.

## Examples from areas E, F, O

| Accession number | Journals |
|---|---|
| E1594 | NP/A, PR/C |
| E1670 | PL/B, NP/A |
| F0017 | NP/A, NIM |
| F0770 | YF, NP/A |
| O1241 | PR/C, NP/A |
| O1390 | ZP/A, NP/B |
| O0849 | PR/C, NP/A |

IAEA

etc.

## Coordination?

- Multi-journal entries are a minority in the database.
- BUT duplications caused by “compilation by journal” are much harder to spot than accidental duplications of the same journal article.
- Coordination would be even more needed
- Anyway coordination needed also for non-journal references (reports, proceedings)

IAEA

## What are our real problems?

- Compilation delays ??
- Distribution of responsibilities (by country and data type vs. by journal) ??
- Too complicated rules ??

IAEA

## The problems I see (1)

- Quality of some compilations
  - Misrepresenting data
  - Missing some of the data
- Compilers must
  - read all relevant parts of the article
  - use the manual, LEXFOR, and the dictionaries
  - check the database (duplications, similar entries)

IAEA

## (Non)-solutions

- Simplify coding rules?
  The data we are compiling are getting ever more complicated. Compilation cannot be made a routine, secretarial-type job
- What can be done: make tools more convenient = > EXFOR editor
- No excuse for not using manual, LEXFOR, dictionaries!

IAEA

## Consequences of “compilation by journal”

- Easier bookkeeping
- New needs for coordination
- New duplications may appear which are hard to detect
- Loss of contacts to authors and familiarity with facilities etc.

IAEA

## The future?

- Compilation by journal, without coordination
- Copying tables or digitizing graphs, without going into details

- This is misunderstanding EXFOR as a bibliography. This concept can be called

  "Re-inventing CINDA"

IAEA

## "Re-inventing CINDA"

- Consequences would be:
  - Many data will be misrepresented (therefore unusable) or missing.
    - Entries cannot be made by reading only the abstract or only the title.
    - Even for bibliographies this is sometimes not sufficient and leads to mistakes!
  - Possible loss of a major strength: combining data and information from several papers describing the same experiment

IAEA

## The problems I see (2)

- Many of them are related to staff changes in the centres
  - Retirement of experienced compilers
  - Loss of "leading figures" who, beyond compilation, were experts in certain specialized areas (e.g., *V.McLane*, general EXFOR development; *M.Lammer*, fission data)
  - Must attract good compilers who bring useful expertise and are willing to put it to use for EXFOR

IAEA

## The problems I see (3)

- It's not enough to hire good people.
  They must be motivated to do a good job as a compiler.

- Compilation work is usually considered less important and less qualified than other nuclear data work – network-wide problem
  - Compilers have other, "more scientific" tasks and are led to believe that these are worth more
    -> Influence on quality of compilation work
  - Positions / salaries

IAEA

## Example: Data from n_TOF

- NDS had contacts to obtain numerical data directly but so far nothing was received
- Now some cross sections were digitized from small graphs published in a journal – very inadequate for these high quality data
- Compilation simply by journal ??

IAEA

## My conclusions

- Let's be open to change (if we can see an advantage)
- Let's concentrate on real problems
- Let's not blame "procedures" or "coding rules" as excuses for other shortcomings
- If we think that compilation is important, we (compilers and managers) must take it seriously

IAEA