

REPORT FROM THE NEA DATA BANK

to the NRDC meeting in Vienna, Austria

25 - 26 May 2009

Introduction

1. The Data Bank continues, with the help of consultants, to compile experimental data into the international EXFOR database at a slightly higher rate than before. This increased rate is mainly due to the large number of corrected EXFOR entries (retransmissions) in response to the feedback from the NEA WPEC subgroup 30 on “Improvement of Accessibility and Quality of the EXFOR Database”. The Data Bank has also prepared 784 bibliographic CINDA entries, which were loaded into the database in 2009.

2. The year 2009 will be especially challenging for the NEA Data Bank due to a large number of staff movements. Five out of nine professional staff will be replaced. Hans Henriksson left the Data Bank in January 2009 to go back to Sweden and he will be replaced in the beginning of September 2009. Two persons have retired or will retire: Pierre Nagel in the beginning of March and Enrico Sartori at the end of May and two persons will come to the end of their contracts: Akira Hasegawa in July and Yolanda Rugama in October. In addition, the contract for the current IAEA staff member (Ivo Kodeli) in NEA for computer program services expired in December 2008 and he has not yet been replaced.

Nuclear Data Services

3. The Data Bank maintains large databases containing bibliographic (CINDA), experimental (EXFOR) and evaluated nuclear data and makes these databases available online to scientists and engineers in member countries. Other important nuclear data related activities of the Data Bank are the coordination of the Joint Evaluated Fission and Fusion (JEFF) file project and the development of the JANIS software, designed to facilitate the visualisation and manipulation of nuclear data.

Experimental data compilation

4. The compilation of measured neutron and charged particle induced reaction data into the EXFOR database is performed in close co-operation with a number of other nuclear data centres worldwide, all under the auspices of the Nuclear Data Section (NDS) of the IAEA. The EXFOR data verification procedures, introduced a few years ago, have appreciably helped diminish the time between the compilation and the loading of the data into the database. In addition, the IAEA NDS has, using a web interface, significantly facilitated and improved the administration and bookkeeping of the common EXFOR compilation effort, providing an easy overview of articles and data that need to be compiled.

5. The Data Bank compilation of measured neutron and charged particle induced reaction data continues with the help of outside consultants. There is a slight backlog in the compilation of neutron-induced data, with about 80 articles waiting to be compiled and entered into the database. Statistics below show the number of experimental data sets entered recently by the Data Bank into the EXFOR database.

Neutron induced data

6. In total, 50 new works and 147 revised experiments were entered by the Data Bank into the EXFOR database in 2008. For the first 4 months of 2009, the corresponding figures are 28 new works and 137 revised experiments transmitted.

7. The comparatively large number of revised EXFOR entries is explained by the fact that a subgroup of the NEA Nuclear Science Committee (NSC) Working Party on international nuclear data Evaluation Co-operation (WPEC) recently reviewed the quality of the EXFOR database and revealed a number of errors in the database. This feedback has triggered a special effort among the data centres to correct these errors, with a subsequent high number of revised entries.

Charged particle induced data

8. In 2008, the Data Bank compiled 145 new and 59 revised experiments in EXFOR. During the first 4 months of 2009, the Data Bank has compiled 56 new and 17 corrected charged-particle induced experiments.

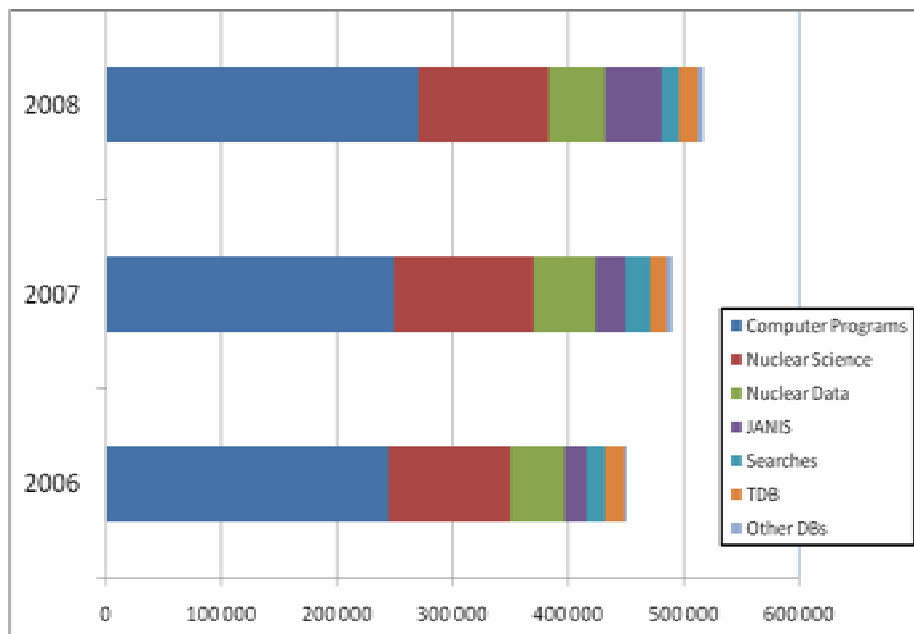
Bibliographic data compilation

9. The CINDA compilation work has continued in 2008 with the help of a consultant, as well as the continued support of the Japanese Nuclear Data Centre. This has allowed the preparation of 784 entries, which were loaded into the database in early 2009.

Services to nuclear data users

10. The nuclear data services are to a very large extent provided through direct on-line access to the CINDA, EXFOR, EVA databases containing bibliographic, experimental and evaluated nuclear data respectively. The statistics for these services are given in a table and a graph below.

	Number of Visits		
	2006	2007	2008
Computer Programs	244562	249813	270826
Abstracts	189290	190604	202077
Web Pages	54567	58281	67648
Program Retrievals	705	928	1101
Nuclear Science	105259	119993	112604
Nuclear Data	46872	53819	48653
Janis	18892	25268	48815
Searches	16290	22216	14786
Eva Search	9215	16755	9085
EXFOR Search	4507	3586	3550
CINDA Search	2568	1875	2151
TDB	16562	14087	15927
Other Databases	2438	4465	4962
HPRL	2249	1942	1750
SFCOMPO	64	1739	2102
RTFDB	13	378	991
Total	450802	489255	516454

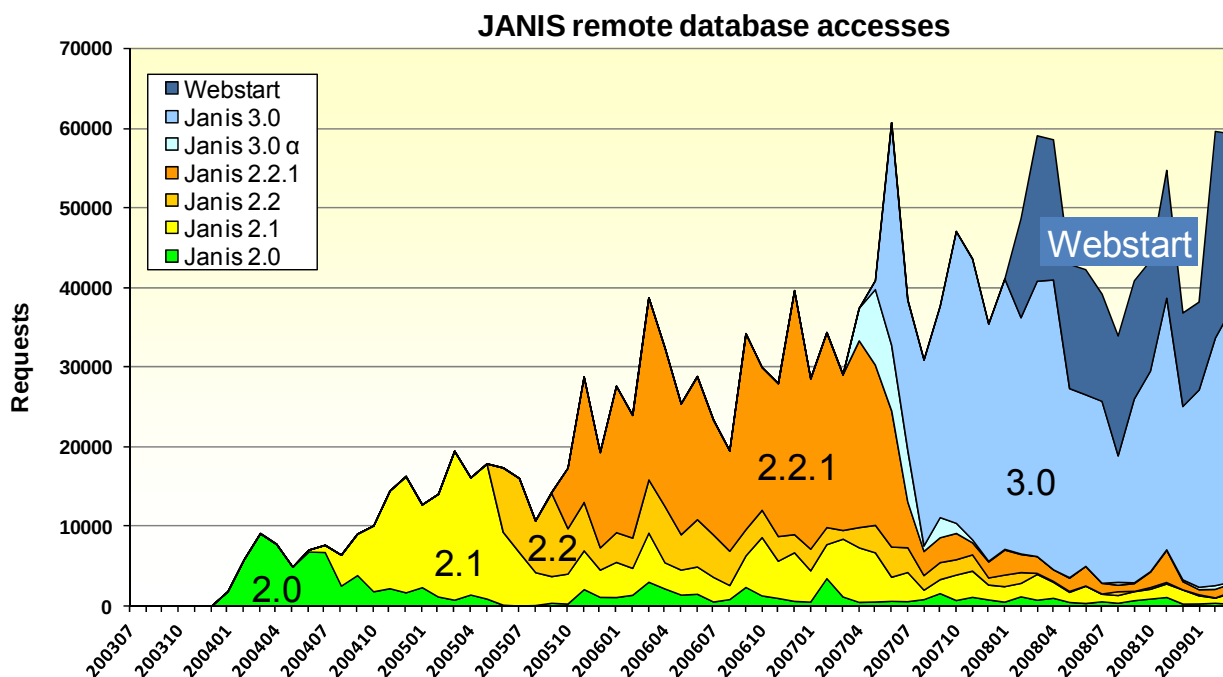


The JANIS Software

11. JANIS has been made accessible through Java Web Start technology in 2008. This allows users to always launch the most up to date version. This new way of launching JANIS has quickly represented one third of users accessing the NEA remote database.
12. ENDF support has been enhanced:
 - Implementation of ENDF Files 12, 13, 14 and 15 (photon data)
 - Plotting of “Beta decay ray shapes” was added, this is based on a FORTRAN code BTSPEC developed by A. Tobias, UK.
 - Display of all the 17 average decay energies from ENDF files, when they are given (only 3 were displayed previously)
 - Weighting: added Maxwellian and Fission analytical spectrum
 - GENDF: possibility to open files containing multiple temperatures
13. EXFOR support has been enhanced:
 - Improved EXFOR parsing : some format checks have been added, coverage of specific cases have been extended
 - EXFOR format change: alteration flag was moved to column 11 of ENTRY and SUBENTRY keywords.
 - Cleanup of dictionary 24 (Data headings) plotting flags, in cooperation with IAEA NDS.
 - EXFOR/EXFOR and EXFOR/ENDF comparison tools have been developed and are available either as standalone batch tools or embedded in end-user application. The EXFOR/ENDF tool convert the most used EXFOR REACTION codes into corresponding ENDF MF/MT entries, thus allowing automatic selection of the right data for comparison between evaluated and experimental data.

14. EXFOR Trans checker: this tool (www.nea.fr/janis/trans-checker/) periodically checks if new EXFOR TRANS files are uploaded to the NDS TRANS area web folder. Each new TRANS file is then automatically downloaded and read in by JANIS, the resulting XML log file containing error(s) and warning(s) is put on NEA website and can then be displayed in a regular web browser. This allows EXFOR compilers to correct EXFOR format errors at an early stage.

15. JANIS Web: a web interface to JANIS EXFOR Search is currently being developed



International nuclear data evaluation co-operation

16. The Data Bank co-operates closely with the NEA Nuclear Science Committee Working Party on international nuclear data Evaluation Co-operation (WPEC) and especially with two of the WPEC subgroups, namely subgroup 30 on “Improvement of Accessibility and Quality of the EXFOR Database” and subgroup C on the High Priority Request List (HPRL) for nuclear data.

17. WPEC subgroup 30 has completed its work and provided very useful feedback to the nuclear data compilation centres. The final report from the subgroup will be issued in the middle of 2009. The WPEC effort on establishing a High Priority Request List (HPRL) for nuclear data is a longer-term activity, where the Data Bank is assisting in maintaining the list’s website (www.nea.fr/html/dbdata/hprl/) currently containing 10 general and 25 high priority requests.

Status of the JEFF project

18. A complete validation report of JEFF-3.1 is being prepared at the moment. The report covers: thermal systems, fast systems, the fuel cycle, storage and reprocessing, fusion systems and other applications.

19. The Data Bank also offers a set of processed libraries, such as group cross-section and Monte Carlo libraries, based on JEFF-3.1/JEFF-3.1.1 to assist scientists wanting to use the latest JEFF file in application calculations. Experts from the JEFF project are developing new processing tools; the first phase is already underway and progress made thus far is promising. In November 2008, a Workshop on processing and evaluation tools was organised in conjunction with the JEFF meeting. NJOY user meetings are regularly held in conjunction with the JEFF meetings; the last one was held in November 2008.

20. The JEFF-3.1.1 library, an updated version of the incident neutron and fission yields libraries was released in February 2009. Improvements to this latest version of the JEFF General Purpose library are particularly noteworthy as they concern light water reactor applications and the associated fuel cycle. The documentation associated with this library was published in May 2009 as the JEFF report 22.

Other database projects maintained by the Data Bank

21. About 25 per-cent of the Data Bank resources are “leased” to the NEA main secretariat partly to assist in setting up databases, developing retrieval tools and web interfaces. The NEA work areas concerned are nuclear science, radioactive waste management, radiological protection and nuclear safety. Examples of databases and tools developed in these areas are:

- Nuclear Science
 - **DICE:** Database for the International Handbook of Evaluated Criticality Safety Benchmark Experiments
 - **SFCOMPO:** Database of Spent Fuel Composition
- Radioactive Waste Management:
 - **TDB:** Thermochemical Database Project
- Radiological protection:
 - **ISOE:** Information System on Occupational Exposure
- Nuclear Safety:
 - **OPDE:** OECD/NEA Piping Failure Data Exchange Project
 - **FIRE:** OECD/NEA Fire Incidents Records Exchange Project
 - **SCAP-SCC:** OECD/NEA Stress Corrosion Cracking and Cable Ageing Project
 - **CONEX:** Construction Experience Database