Data Bank

The Data Bank operates as an international centre of reference for its member countries with respect to basic nuclear tools, such as computer codes and nuclear data, used for the analysis and prediction of phenomena in the nuclear field. It provides a direct service to its users by developing, improving and validating these tools and making them available as requested.

Highlights

- A new version of the Joint Evaluated Fission and Fusion data library (JEFF-3.1) was released in June 2005.
- Four new reviews of chemical thermodynamic data were published in 2005. The new reviews contain inorganic data of nickel, selenium and zirconium, as well as compounds of uranium, americium, technetium, neptunium, plutonium, nickel, selenium and zirconium with simple organic ligands.
- New state-of-the-art computer codes for radiation transport using Monte Carlo methods were acquired from Japan and Spain.
- New editions of databases with evaluated experimental data for radiation shielding and dosimetry (SINBAD) and for fuel behaviour (IFPE) applications were released.

Computer program services

The NEA Data Bank plays a central role in the collection, validation and dissemination of computer codes used by scientists in member countries. The collection of codes covers many different areas, from reactor design, kinetics, safety and shielding to material behaviour and nuclear waste applications.

In 2005, the Data Bank acquired 52 new or new versions of computer codes. Of these 52 programs, 15 were received from non-OECD countries through the special co-operative agreement in place between the NEA Data Bank and the International Atomic Energy Agency (IAEA).

The Data Bank answered requests for 1 836 programs in 2005, of which 158 were sent to non-OECD countries. This is slightly less than in recent years, mainly due to the fact that the renewal of the Data Bank exchange agreement with the US Department of Energy (DOE) was delayed and temporarily reduced the number of US codes available for distribution. The agreement should be in place in 2006. Requests for data from integral experiments in support of computer code validation were in high demand: 2 212 sets of experiments were distributed.

Special efforts have been devoted to sensitivity and uncertainty analysis studies, and a number of papers describing advances made have been presented at conferences and workshops. A covariance data library is being finalised containing cross-section uncertainties for different application areas. The data library will be made available in 2006.

Computer program training courses

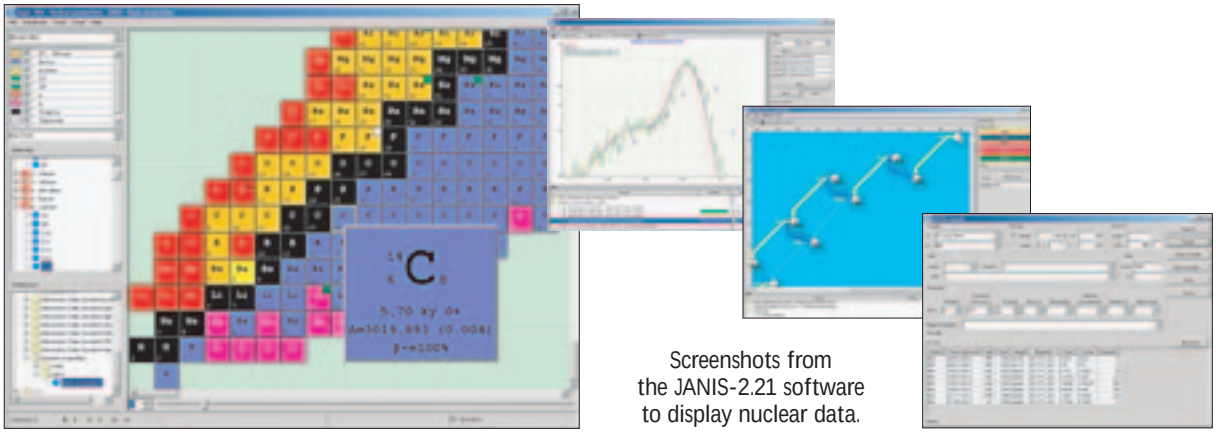
As part of the computer program services, the Data Bank also organises training courses on the utilisation of the most popular computer programs. The following courses were organised or co-sponsored in 2005:

- NJOY Workshop and User Group Meeting, NEA headquarters, 2 May;
- Sixth PENELOPE Electron-Photon Transport Modelling training course, Barcelona, Spain, 4-7 July;
- Seminar and Training on Scaling, Uncertainty and 3D Coupled Code Calculations in Nuclear Technology, held in co-operation with the University of Zagreb and the University of Pisa, 20 June-8 July;
- Workshop on Advances in Monte Carlo Criticality Calculations and on the Monte Carlo Code TRIPOLI-4, Avignon, France, 11 September.

Preservation of information from integral experiments

The Data Bank continues to compile integral experimental data under the supervision of the Nuclear Science Committee. Well-documented information and data from reactor physics, fuel behaviour, radiation shielding and criticality safety integral experiments are collected, verified and made available to scientists.

Two editions of the IFPE (fuel performance experiments) database were issued in March and June 2005. One revision of SINBAD (shielding and dosimetry experiments) and one revision of ICSBEP (criticality safety experiments) were issued in July and September 2005 respectively. A new edition of the IRPhE (international reactor physics experiments) is scheduled for March 2006.



Screenshots from the JANIS-2.21 software to display nuclear data.

Nuclear data services

The Data Bank maintains large databases containing bibliographic (CINDA), experimental (EXFOR) and evaluated (EVA) nuclear data and makes these databases available to scientists in member countries. The databases are maintained in close co-operation with other nuclear data centres and cover most types of data needed in nuclear energy applications. In 2005, the Data Bank updated more than 2 200 entries in the CINDA database, and prepared roughly 1 200 new entries covering bibliographic neutron and charged-particle data for inclusion in the new CINDA database. Information and data from 55 neutron-induced and over 100 new charged-particle-induced experiments were added to the EXFOR database.

The Data Bank provides direct online web access to its databases containing nuclear data. The number of retrievals from the NEA website averages about 1 200 per month for bibliographic and experimental data, and about the same number for evaluated data libraries.

A new version of nuclear data display software, JANIS-2.21, was released in October 2005. The program is free of charge and can be downloaded or launched using "JAVA Web Start" from the JANIS home page at http://www.nea.fr/janis, where the complete manual can also be found. JANIS is now integrated as the plotting tool for experimental and evaluated data on the NEA website. JANIS users access the NEA online databases over 15 000 times per month.

The JEFF project

A new version of the Joint Evaluated Fission and Fusion data library (JEFF-3.1) was released in June 2005. The release covers a general purpose file, containing incident neutron data for 381 materials and thermal scattering data for 9 materials, as well as special purpose files, such as radioactive decay data files, a fission yield file, an activation file and a file containing incident proton data.

The Data Bank has started to develop processed libraries based on JEFF-3.1 to assist scientists wishing to use the JEFF-3.1 general purpose library in application calculations. Both group cross-section and Monte Carlo libraries will be available in 2006.

International nuclear data evaluation co-operation

The NEA Working Party on International Nuclear Data Evaluation Co-operation (WPEC) was established to provide a framework for co-operative activities between the participating projects in Japan (JENDL), the United States (ENDF), Western Europe (JEFF) and non-OECD member countries (Russia, BROND; China, CENDL; and the international FENDL compendium). In 2005, the Working Party issued reports on measurement and validation of activation cross-sections and on an assessment of fission product evaluations. A number of new activities were also started, including a review of covariance data in the fast neutron region, improvement of data for decay heat calculations and studies on nuclear data needs for advanced reactor systems.

A High Priority Request List (HPRL) for nuclear data is also maintained. The purpose of the list is to provide a guide for those planning measurements and developing nuclear theory and data evaluation programmes. An entirely new list is under development and will be reviewed on a regular basis by external referees.

The Thermochemical Database (TDB) Project

The Data Bank continues to develop its database of recommended chemical thermodynamic data for the safety assessment of radioactive waste repositories. This work is performed under the scientific guidance of the NEA Radioactive Waste Management Committee. The details of this programme can be found in the section "Joint Projects and Other Co-operative Projects" (page 30).

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