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 acquiring, developing, improving and validating these tools and making them available upon request.

Highlights

➢ Some 1 800 computer codes and 2 000 sets of integral data were distributed to 620 authorised establishments.

➢ A complete CINDA archive was published in seven volumes, comprising 55 000 references from 1935 to 2006.

➢ A new version of the data display program JANIS-3 was released in June with reinforced plotting capabilities.

➢ A revised decay data library, JEFF-3.1.1/RDD, was released in November.

➢ A new phase of the Thermochemical Database (TDB) Project was approved towards the end of the year and will begin its activities in February 2008.

Computer program services

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

During 2007, a total of 94 new or revised versions of computer codes were acquired and 54 were verified, tested and master-filed. The special co-operative agreement in place between the NEA Data Bank and the International Atomic Energy Agency (IAEA) has enabled the NEA Data Bank to receive 25 computer codes from non-OECD countries. Nineteen new or revised sets of integral experiment compilations (such as SINBAD, IFPE and IRPhE) were acquired and integrated during the same period.

The Data Bank answered requests for 1 843 programs in 2007, of which 103 were sent to non-OECD countries. With regard to integral data experiments in support of computer code validation, 1 958 sets were distributed, of which 257 were sent to authorised users in the non-OECD area.

Knowledge transfer and preservation

As part of the Data Bank services, training courses on the utilisation of the most popular computer programs were organised. The areas covered were: computational radiation physics, radiation transport using Monte Carlo codes and data visualisation, radioisotope build-up and depletion during irradiation and cooling, uncertainty analysis in dosimetry and in coupled neutronics/thermal-hydraulics, and evaluated nuclear data processing. Approximately 250 participants attended in all.

In June, the NEA participated in the International Conference on Knowledge Management in Nuclear Facilities organised by the IAEA. Senior staff presented an overview of the work contributed by the NEA and its Data Bank to this field.

The Data Bank's knowledge preservation activities include the development of the IFPE (fuel performance experiments), SINBAD (shielding and dosimetry experiments) and the IRPhE (International Handbook of Evaluated Reactor Physics Benchmark Experiments) databases. Numerous copies of these databases were distributed upon request.

In the field of radiation transport and reactor physics, important "legacy" books were released to the Data Bank after publishers reverted the copyrights to the authors. The following have been released so far by professors MMR. Williams and J. Lewins: *The Slowing Down and Thermalisation of Neutrons; Mathematical Methods in Particle Transport Theory; Random Processes in Nuclear Reactors; Nuclear Reactor Kinetics and Control;* and *Importance: The Adjoint Function.* The OECD/NEA Data Bank is now authorised to distribute them in PDF format at no cost to requesters, and in particular to students.

Nuclear data services

The Data Bank maintains large databases containing bibliographic (CINDA), experimental (EXFOR) and evaluated (EVA) nuclear data and makes these databases available online to scientists and engineers in member countries. In 2007, the evaluated nuclear data libraries ENDF/B-VII.0, IRDF-2002, PADF-2007 and JEFF-3.11/RDD were added to the EVA database. The NEA contributed over 80 experiments on neutron-induced data and over 110 experiments on charged-particle reactions to the EXFOR database.

These databases are maintained in close co-operation with other nuclear data centres and cover most types of data needed in nuclear energy applications. In 2007, the Data Bank published a complete version of the CINDA

database that includes over 55 000 references to neutron- and charged-particle data including references to EXFOR. The publication was printed in seven volumes and distributed to approximately 300 libraries and research facilities around the world.
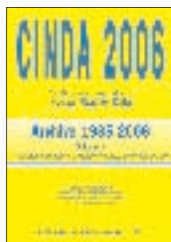
A new version of the nuclear data display software, JANIS-3, was released in June to respond to users' feedback and needs. The main improvements include coverage of the EXFOR database, the EXFOR and CINDA search panels and the plotting features. The popularity of the program has increased steadily and is now also being used in many university courses around the world as an easy introduction to nuclear data manipulation. JANIS users access the NEA online databases more than 40 000 times per month. Users request the new program mainly for fission applications, but also for basic research and educational purposes. The program is free of charge and can be downloaded or launched from the JANIS web page at www.nea.fr/janis.
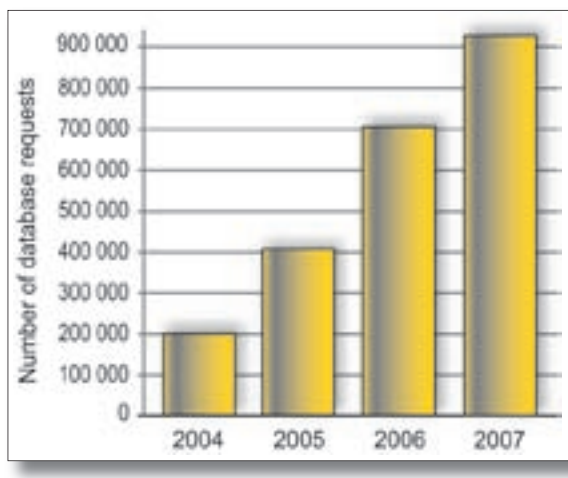
JANIS usage. The latest version (JANIS-3.0) was released in June 2007.

In April, the NEA co-sponsored the International Conference on Nuclear Data for Science and Technology, ND2007, in Nice, France. Senior staff gave welcoming addresses and several presentations were made on NEA work. The next conference on nuclear data is planned to be held in the Republic of Korea in 2010.

The JEFF project

The Joint Evaluated Fission and Fusion (JEFF) project has revised its decay data library. The new version, JEFF-3.1.1/RDD, was released in November and is available on the NEA website. A full report on the decay data library is planned to be published in 2008.

The outline of a JEFF-3.1 validation report has been established. The report will contain sections on: 1) Thermal systems, 2) Fast systems, 3) Fuel cycle, storage and reprocessing, 4) Fusion systems, and 5) Other applications.

International nuclear data evaluation co-operation

The NEA Working Party on International Nuclear Data Evaluation Co-operation (WPEC) provides a framework for co-operative activities between the participating projects in Japan (JENDL), the United States (ENDF), Western Europe (JEFF) and non-OECD countries (Russia, BROND; China, CENDL; and the IAEA-based FENDL). In 2007, a publication (Vol. 25) was issued on the *Assessment of Fission Product Decay Data for Decay Heat Calculations*. Two new activities have also been launched, one on ^{235}U Capture Cross-section in the keV to MeV Energy Region, and the other on Improvement of Accessibility and Quality of the EXFOR Database.

The High Priority Request List (HPRL) is based on requests from data users and provides a guide for scientists planning measurements and developing nuclear theory and data evaluation programs. The content is reviewed on a regular basis by external referees. New requests are expected from different WPEC subgroups during 2008, for example on cross-section uncertainties for advanced reactors.

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. Details are provided in the section on Joint Projects and Other Co-operative Projects (see page 34).

In-house computer services

The Data Bank's in-house computer services provide a highly available network, data storage and servers. The web cluster connected by two internet links has served one million visitors in 2007, who browsed 2.5 million web pages and downloaded 2.7 million documents amounting to a total of two terabytes (2 000 gigabytes).

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