

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

- Seven computer program training courses were organised with the aim of contributing to an effective utilisation of widely used codes and to obtain feedback from users.
- The fourth edition of the *International Handbook of Evaluated Reactor Physics Benchmark Experiments* was issued on DVD in March. This version contains experiments for 31 reactor configurations and 5 fundamental evaluations.
- Two JEFF reports, one on the neutron data library and the other on the radioactive decay data and fission yields sub-libraries were published.
- A report was issued on an *Evaluated Data Library for the Bulk of Fission Products*, describing the assembling and validation of a complete sub-library of evaluated data for fission product isotopes.
- A new version of the data display program JANIS (JANIS-3.1) was released at the end of 2009. It is available on the NEA website at www.nea.fr/janis.

Computer program services

The NEA Data Bank acts as a focal point for 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, safety and radiation shielding to material behaviour and radioactive waste applications.

The number of officially nominated establishments using the computer program services in NEA Data Bank member countries is close to 900. Through a co-operative agreement with the International Atomic Energy Agency (IAEA), 87 non-OECD establishments also have access to selected computer codes and data after screening by relevant authorities.

During 2009, a total of 27 new or revised versions of computer codes were acquired. The Data Bank answered requests for nearly 1 800 programs in 2009, of which about 130 were sent to non-OECD countries under the special

co-operative agreement in place with the IAEA. Of these 1 800 distributed programs, roughly 1 600 originated from OECD countries and 200 from non-OECD countries.

A new benchmark was started in 2009 to monitor the performance of detailed Monte Carlo calculations of power densities in a full-size reactor core. The key quantity to be estimated is the power density, and specifically its standard deviation in many small regions of the core in relation to the number of neutron histories and computer time. One of the aims is to enable calculations on readily available, personal computers rather than limiting them to the fastest computer systems available only to a few scientists.

Knowledge transfer and preservation

As an important complement to the computer program service, the Data Bank organises training courses on the utilisation of the most popular computer programs. Seven training courses were held in 2009, covering such topics as radiation transport using Monte Carlo (MCNP, FLUKA, PENELOPE) as well as deterministic (ERANOS) codes, lattice physics and depletion calculations (SCALE), and case studies in neutron transport theory.

Under the scientific guidance of the NEA Nuclear Science Committee, the Data Bank verifies, preserves and disseminates well-documented integral data in the following areas: fuel performance (IFPE), shielding and dosimetry (SINBAD) and reactor physics (IRPhE). Twenty-four new or revised sets of data from integral experiment were collected and close to 2 300 sets were distributed upon request.

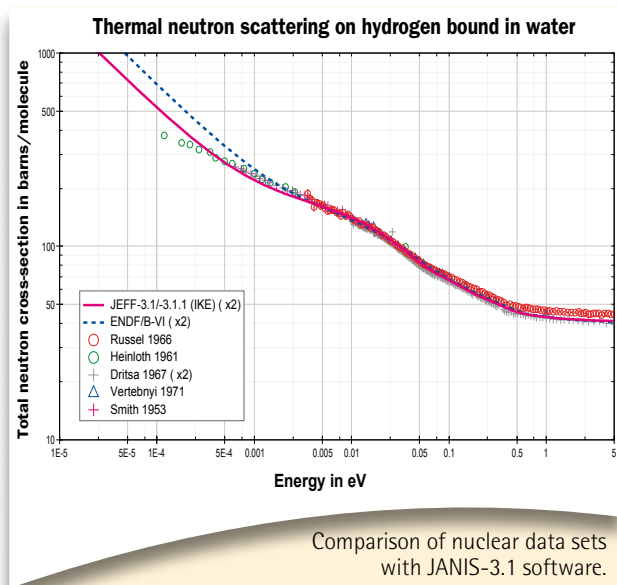
The Data Bank also assists other parts of the Agency, especially in the area of knowledge preservation. In co-operation with the NEA Nuclear Safety Division, experimental data from several international joint projects, such as those relevant for accident management, are maintained and distributed. The Data Bank is also providing support to the Information System on Occupational Exposure (ISOE) database, operated by the NEA Radiological Protection and Radioactive Waste Management Division.

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 2009, the Data Bank added data from 160 experiments on neutron- and charged-particle-induced data to the EXFOR database. It also supplemented the database with 270 experimental data sets which were revised following

feedback from users and from a subgroup of the NEA Nuclear Science Committee Working Party on International Nuclear Data Evaluation Co-operation (WPEC) specifically devoted to reviewing the quality of the EXFOR database.

An update of the nuclear data display software, JANIS-3.1, was released in December. The main improvements, apart from a number of corrections, include the possibility to display photon production data, thermal scattering cross-sections and isobaric fission yields, as well as a new tool to compare EXFOR data with evaluated libraries or to compare different evaluated libraries. The program can be downloaded or launched from the JANIS web page at www.nea.fr/janis.



The JEFF Project

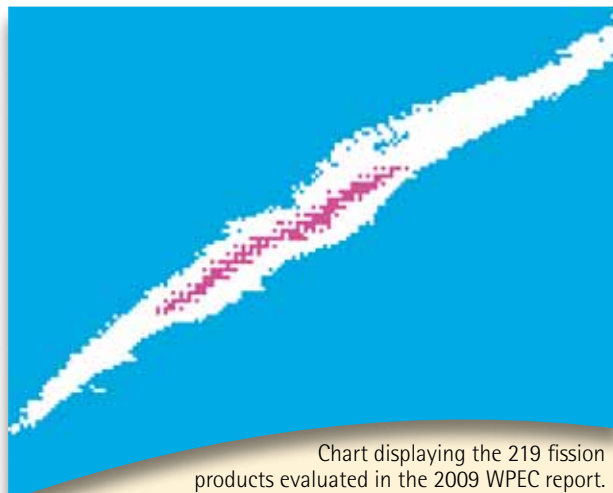
A new version of the Joint Evaluated Fission and Fusion (JEFF) data library, JEFF-3.1.1, was released in the beginning of 2009. Two JEFF reports were published: *The JEFF-3.1.1 Nuclear Data Library* (JEFF Report 22), disclosing the latest modifications to the library, and *The JEFF-3.1/-3.1.1 Radioactive Decay Data and Fission Yields Sub-libraries* (JEFF Report 20). Work on a report providing results from the validation of the JEFF-3.1/-3.1.1 data for fission and fusion applications is underway.

Plans for an improved version of the JEFF general purpose library (JEFF-3.2) have been made. A number of isotopic evaluations of the following elements have been identified for inclusion in the new library: manganese, hafnium, tantalum, tungsten, uranium, americium and plutonium.

International nuclear data evaluation co-operation

The NEA/NSC Working Party on International Nuclear Data Evaluation Co-operation (WPEC) provides a worldwide framework for improving the quality and completeness of evaluated nuclear data libraries and for promoting the efficient use of available resources through international collaboration. In 2009, a report was published entitled an *Evaluated Data Library for the Bulk of Fission Products*,

containing the description of the production and validation steps of a complete sub-library of evaluated data for fission product isotopes. This sub-library was included in the latest version of the ENDF/B-VII evaluated nuclear data library.



In addition to maintaining a high priority request list for nuclear data, the WPEC is also pursuing studies related to the production and processing of covariance data in different energy regions, a review of the quality of the experimental database EXFOR, a review of the uranium-235 capture cross-section in the keV to MeV energy region, and a study of methods and issues for the combined use of integral experiment and covariance data.

The Thermochemical Database (TDB) Project

Under the scientific guidance of the NEA Radioactive Waste Management Committee, the Data Bank evaluates recommended chemical thermodynamic data for the safety assessment of radioactive waste repositories. Details are provided in the section on Joint Projects and Other Co-operative Projects (see page 34).

In-house computer services

The Data Bank is responsible for the NEA in-house computer services comprising internet and data servers connected to a fast network. In 2009, the NEA internet server registered 1.1 million visits, during which 2.6 million web pages were browsed and some 3.3 terabytes were downloaded.



Contact:
Thierry Dujardin
 Deputy Director, Science and Development
 +33 (0)1 45 24 10 06
thierry.dujardin@oecd.org