REPORT FROM THE NEA DATA BANK

to the NRDC meeting in Paris, France

27 – 30 May 2002

Organisation

Total number of full time staff in the NEA Data Bank is 19. This is divided into 9 professional staff and 10 support staff. However, only 7 professional and 7 support staff members work within the Data Bank computer program and nuclear data services. The rest of the staff is allocated to work with other parts of the NEA.

An organisation chart of the Data Bank can be found in the annex. This chart shows the general allocation of professional staff in the four different activity areas. The post as head of the Data Bank is presently vacant. Two names (Byung-Chan Na and Federico Mompean) are indicated in *italic*, as they work mainly on nuclear science and radioactive waste management issues, respectively.

Total annual budget of the Data Bank is about 3,4 million Euros. The two persons, working for other parts of the NEA, mentioned above are paid by the NEA main budget, leaving an annual budget for the Data Bank scientific services of about 2,6 million Euros.

Nuclear Data Services

EXFOR compilations

The compilation of measured neutron and charged particle induced reaction data continues with the help of outside consultants. The statistics below show the number of neutron and charged particle induced data sets loaded into the EXFOR database. However these figures do not necessarily reflect the compilation effort. This is due to the rather long and complicated checking procedures that have been adopted by the Nuclear Reaction Data Centres (NRDC) network, which tend to delay the loading of entries, particularly for charged particle data where the precise coding of data becomes more difficult. It is hoped that the procedures will be simplified to minimise the time needed between the compilation and the loading of the data into the database.

Neutron induced data

The compilation of neutron induced data continues reasonably smoothly, with data being taken mainly from recently published work. Some revision of earlier compilation has also taken place, where the original data have now become available, or better scanning techniques for data extraction from figures. In total forty (40) new works and thirty (30) revised works were loaded and distributed during 2001. Currently there are forty-six (46) new and twenty-seven (27) revised works being processed.

Charged particle induced data

Noting the problems of loading charged particle data mentioned above a significant number of entries were nonetheless loaded during 2001, namely fifty-seven (57) new entries. Recently a further sixty-five (65) revised entries have been processed and distributed, but just over two hundred (205) new entries are awaiting agreement within the NRDC network prior to their

loading and distribution. It is foreseen that at least half of these will be loaded in the next two months following the May 2002 meeting of the NRDC, where final agreement on the coding of some of these will be achieved.

Bibliographic (CINDA) data

The CINDA compilation work has been enhanced during 2001 by the use of a consultant, as well as the continued support of the Japanese Nuclear Data Centre. This has allowed the preparation of over one thousand two hundred (1200) entries, of which two hundred and forty-four (244) were loaded in 2001 and the remainder are being currently being loaded prior to the closure of the database for the preparation of the CINDA book by the IAEA and the CD-ROM by the NEA.

Services to Nuclear Data Users

The nuclear data services are mainly provided through direct on-line access to the CINDA, EXFOR, EVA databases containing bibliographic, experimental and evaluated nuclear data respectively. The access to the CINDA database is open, whereas only accredited users, having obtained personal passwords, can access the EXFOR and EVA databases. In addition to these on-line services, the Data Bank also answers specific requests from customers. This concerns normally requests for very large datasets, which are too large for direct Internet download. The very large datasets are normally distributed on CD-ROM. Providing advice to nuclear data users is another important part of the nuclear data services.

The last two year's statistics concerning the on-line access to the databases show that the number of EXOR retrievals is roughly constant (8 075 in 2001 compared to 8 572 in 2000).

The number of EVA retrievals has gone down from about 3 200 in 2000 to about 1 600 in 2001. This can partly be explained by the release of the JANIS software, which contains a number of evaluated data libraries, and also by the fact that there were no new releases of evaluated data libraries in 2001.

The CINDA statistics was harder to analyse, as this database is open to the public. A number of filters had to be applied in order to eliminate occasional users, such as Internet search engines and "tourists", and to obtain a reliable value of the real use of the database. The total number of accesses to the CINDA Internet pages in 2001 was over 15 000. However, the number of real retrievals from the CINDA database was only about 2 600. The trend for CINDA on-line retrievals is increasing (there were only about 1 300 retrievals in 2000). This is somewhat surprising as the CINDA database is now distributed on CD-ROM once a year, together with the printed version.

Other Nuclear Data Activities

The Joint Evaluated Fission and Fusion Project (JEFF)

The JEFF project established a new working group on nuclear data measurement activities in May 2001. The objective of this group is to help analysing the expressed needs for nuclear data measurements and to co-ordinate the experiments for addressing these needs.

The JEFF-3.0 General Purpose Library, intended for use in Fission and Fusion neutronic applications, was released in April 2002. This library contains recommended nuclear data for

use in neutron transport calculations. Evaluated nuclear data are given for 340 isotopes or elements and for five molecular/lattice structures in the case of thermal scattering data.

JEFF-3.0 contains many new evaluations produced in the framework of JEFF and EFF compared to previous versions of the data library. Evaluations from other projects were also included when their quality was proven to be superior to those contained in JEF-2.2. Integral measurements provided the main guidance in the choice of data among the existing evaluated files. Compared to JEF-2.2 and EFF-2.4, JEFF-3.0 contains new evaluations for many materials including:

- Major actinides (e.g. U-233, U-235, U-238, Pu-239, Pu-240, Pu-241 and Pu-242)
- Minor actinides (e.g. Np-237, U-236, Pu-238 and Cm isotopes)
- Structural materials (e.g. Cr-52, Mn-55, Fe-56, Ni-58, Ni-60, Pb)
- Major fission products (e.g. Rh-103, Eu-152 to Eu-155, Nd-143 and Sm-149)
- Absorbers (e.g. Hf, Cd, V)

Besides the basic evaluated files, the JEFF Project has decided to produce JEFF-3.0-based processed libraries (in point-wise and group-wise formats). A documentation of the JEFF-3.0 general-purpose file will be published in June 2002.

The JEFF-3.0 activation file will be released in Autumn 2002. The Decay Data and Fission Yields libraries will be released in Autumn 2003. A revised version of the General Purpose file including an extension to intermediate energies (up to 200 MeV) will also be produced in Autumn 2003.

JANIS Software

The first version of the JANIS (Java Nuclear Information System) software was released in October 2001. A presentation of the software was made at the International Nuclear Data conference at Tsukuba, Japan. This first version has proven to be very useful to a variety of users. More than 530 copies have been distributed since October 2001.

Extensions of the software to include other capabilities are underway. A new version is foreseen in 2003 and will provide access to other categories of data such as activation files and Monte-Carlo application libraries (ACE format). (see http://www.nea.fr/janis/).

Data from Integral Experiments

The Data Bank and the NEA Nuclear Science section work closely together on the preservation of data from integral experiments to increase their uses and benefits and to favour innovation, especially in the context of the development of future nuclear energy systems. The Nuclear Science committee is responsible for overall guidance of the project, whereas the Data Bank provides the infrastructure for the safeguarding of information in databases and for services to member countries.

The following databases were all updated with new material in 2001:

- Radiation Shielding (SINBAD)
- Reactor Fuel Performance (IFPE)
- Criticality Safety Benchmark Experiments (ICSBEP)
- Code Validation Matrix of Thermal-Hydraulic Codes for LWR LOCA and Transients (CCVM)
- Reactor Physics Experiments (IRPhE) - pilot project

The demand for the integral nuclear data services was in line with the average distribution during the last 3 years. More than 1 800 data sets were distributed, of which about 290 went to non-OECD countries according to the cooperative agreement with the IAEA

Computer Program Services

The Data Bank maintains a database containing more than 2 000 documented program packages and group cross-section data sets, covering all civil application areas in nuclear energy. The program packages (the program itself, the user manual and suitable test cases) are distributed on CD-ROM or sent via Internet on request. New acquired computer codes are stored in a full computer readable form and other programs are being restructured to include full computer readable documentation.

The demand for the Data Bank computer program services remained very high in 2001. More than 2 200 programs were dispatched following requests. About 150 of these programs were sent to non-OECD countries according to a special cooperative agreement with the IAEA.

The most requested programs in 2001 were in the field of radiation transport and shielding, in particular the two Monte Carlo codes MCNP and PENELOPE. About 50 percent of the requests for computer programs originated from national laboratories, whereas about 25 percent came from universities and the remaining 25 percent from industry and consulting firms.

The Thermochemical Data Base (TDB)

The Thermochemical Data Base (TDB) project is a co-operative effort between the NEA Data Bank and the NEA Radioactive Waste Management Committee to produce internationally recommended chemical thermodynamic data needed for the safety assessment of radioactive waste disposal systems.

The review of Neptunium and Plutonium data was published in June 2001 by Elsevier North Holland.

The present activities of the TDB project (phase II) is organised as a separate funding semi-autonomous project, supervised by a Management Board with representatives from all the participating organisations. This phase of the project comprises the following five data review teams:

- Update of Uranium, Americium, Technetium, Neptunium and Plutonium data
- Review of Nickel data
- Review of Selenium data
- Complexation of simple organic ligands with radionuclides and competing cat-ions
- Review of Zirconium data

Among these five review efforts, it is expected that the updating of U, Am, Tc, Np and Pu data will be completed and sent to publication late in 2002 or in early 2003. The reviews of the inorganic compounds of Zr and the simple organic compounds will be sent for peer-review in 2002 and published in early 2003. The two remaining reviews will be published later in 2003.

In-house computer configuration

See separate document entitled "NEA Computer Network".

Annex

NEA Data Bank organisation chart
May 2002