NATIONAL NUCLEAR DATA CENTER

Status Report to the Consultants' Meeting on Technical Aspects of Co-operation of the Nuclear Reaction Data Centers 21-23 May 2001

General

Since the last meeting of the Nuclear Reaction Data Centers in May 2000, we have hired a full-time staff member to assist in the nuclear reaction data area; one staff member and one support staff member will be retiring within the next year. There are currently 10 FTE scientific/professional and four support staff. See Table I for list of visitors for this period. Also, attached is a list of NNDC visits to other centers.

The NNDC and NPDC (Sarov) have submitted a joint grant proposal to the Civilian Research & Development Foundation (CRDF)[1].

NNDC initiated a workshop on nuclear reaction physics and codes, which was prepared jointly with LANL and LLNL, and was held in Santa Fe, April 10-11, 2001.

Nuclear Data Base Migration

In September the NNDC hosted a workshop for international collaborators to discuss issues related to database migration and use of the relational database concept. It is expected that full migration will take four to five years. The proceedings have been issued[2].

D. Winchell has begun development on the NSR database using Sybase Enterprise. The ADLIST database has been converted to an RDB and installed in a Linux PC. Web-based Java retrievals are being tested.

The preliminary design of the Nuclear Reaction Database has been completed by the Reaction Database Design Team (V. McLane, V. Zerkin, S. Dunaeva), and is being sent out for comment. The nuclear structure team at NNDC, led by T, Burrows, J. Tuli, and A. Sonzogni, has begun investigating options for the nuclear structure databases. A preliminary ENSDF database using Access is being tested.

Computer Facilities

[1] Compilation and Evaluation of Alpha-Induced Nuclear Reaction Cross Sections for Astrophysics, submitted to Civilian Research & Development Foundation, May 2001.

[2] *Workshop on Relational Database and Java Technologies for Nuclear Data*, jointly sponsored by BNL and NEA, report prepared by R. Arcilla, D. Winchell, Y. Sanborn (2001).

The NNDC has recently installed a new ODS-5 disk on the VAX Alpha, which allows upper and lower case long file names. An Apache server has also been installed and is being tested.

A Linux operating system has been installed on two of our PCs, and Apache Tom Cat and the Java servlet JSP are also installed. WINDOWS2000 is also being tested on one of our PCs.

Bibliographies

The NSR compilation activity has continued. About 4,500 references have been entered in the past year.

The CINDA compilation activity continues with respect to those references associated with the experimental data compiled at the Center. In the period from June 2000 to May 2001, 4 CINDA transmissions were sent (BNL163-166).

Experimental Nuclear Reaction Data

The NNDC continues to compile neutron and charged-particle reaction data produced in the U. S. and Canada. In the period from June 2000 through May 2001, 6 neutron data transmission tapes (TRANS 1289-1294) and 13 charged-particle transmission tapes (C041-C049, P003, T006-T008) were sent containing new and corrected entries.

The contract with Oak Ridge to compile neutron total cross section data measured by J. Harvey has been completed. All recoverable data has been received by NNDC and are being processed or have already been added to the CSISRS database.

The LEXFOR Manual has been updated; a preliminary copy has been distributed for proofreading.

Evaluated Nuclear Reaction Data

NNDC continues to coordinate the work of the Cross Section Evaluation Working Group. ENDF/B-VI, Release 7, was distributed in June 2000. Version 6.12 of the ENDF Utility codes was also distributed in April 2001. The ENDF-102 Data Formats and Procedures Manual[3] has been updated and is available on the NNDC Web site.

Pavel Oblozinsky has continued the cooperation with KAERI on fission product evaluations, focusing on the fast neutron energy range. Thirteen preliminary evaluations have been completed.

Collaboration with LANL and IAEA NDS on the development of a modular code for nuclear reaction data evaluations was initiated. The pre-equilibrium Monte Carlo code HMS was extended to account for angular momentum conservation, of importance for modeling isomer and discrete gamma-ray production. The modular code Empire was extended by adding a module based on the exciton model code DEGAS, motivated by the need to handle direct/semi-direct capture in the fast neutron energy region.

[3] V. McLane, Ed., ENDF-102 Data Formats and Procedures Manual, BNL report BNL-NCS-44945-01/04-Rev. (April 2001).

Nuclear Structure Data

NNDC continues to publish the ***Nuclear Data Sheets***. As of April 2001, issues through Volume 95, #4 have been sent to Academic Press.

The experimental nuclear structure and decay data database (XUNDL) now contains more than 635 data sets for 513 nuclides.

The ENSDF Manual[4] has been revised and is available on the NNDC Web site.

Customer Services

The number of online retrievals continues to increase, primarily due to the availability of most databases on the Web. There are now about 900 customer accounts for the Online Service with about 1,000 users. There are about 20,000 retrievals per month from the combined Online Service, Web site, and anonymous ftp. A chart of online retrievals is attached.

Links to Nuclear Physics Electronic Link Manager were added to CINDA, CSISRS, and NSR HTML retrievals; links to the APS Link Manager were extended back to 1970.

[4] J.K. Tuli, *Evaluated Nuclear Structure Data File – A Manual for Preparation of Data Sets*, BNL report BNL-NCS-51855-01/02-Rev. (February 2001).

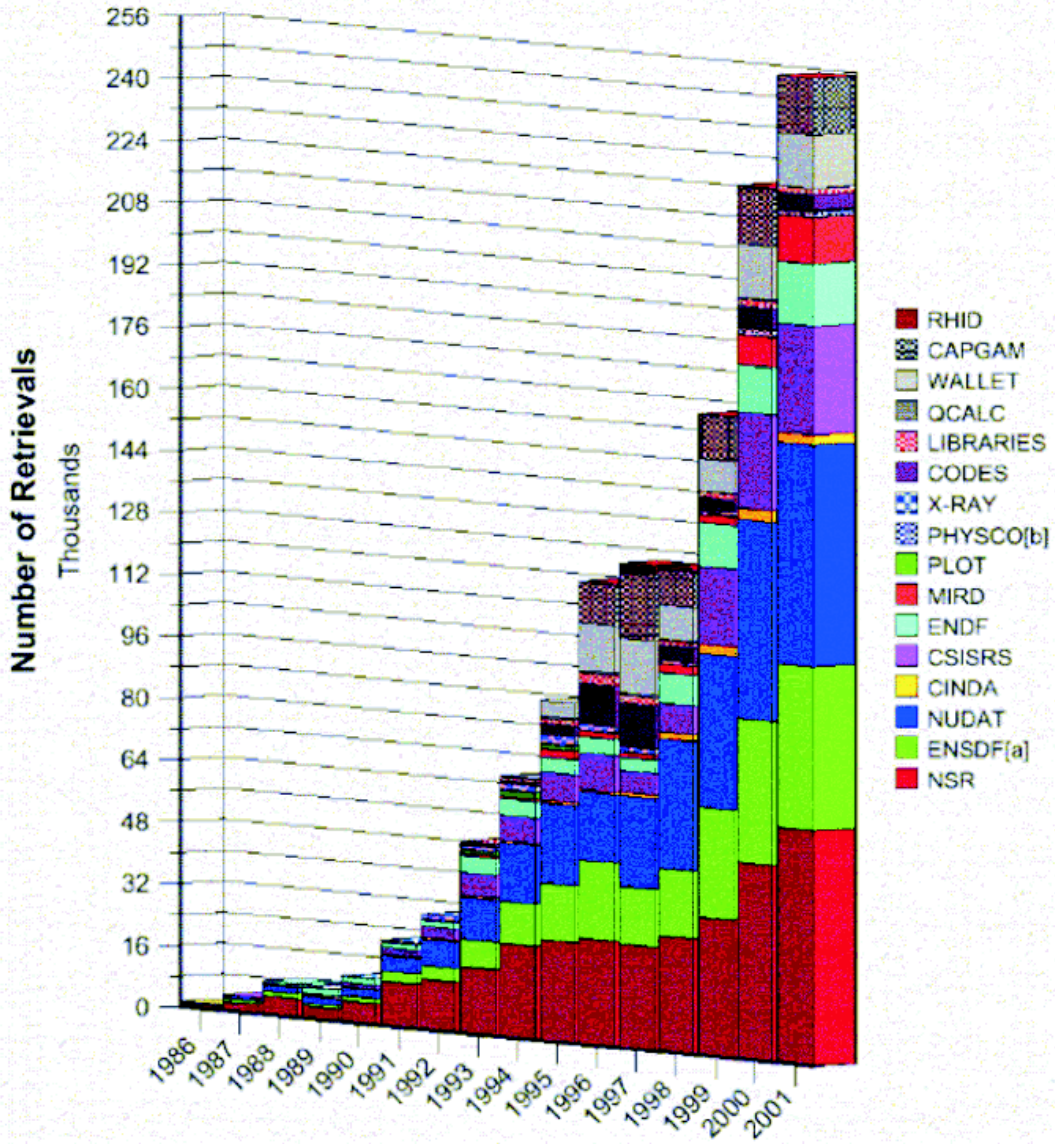
Table I.
Visitors to NNDC from June 1996 to May 1998

Visitor	Host	Duration	Topic
Viktor Zerkin	D. Winchell V. McLane	2 weeks	Nuclear reaction relational databases
Sophie Taova	D. Winchell	1 week	Evaluation programs
Andre Grebennikov	D. Winchell	1 week	Evaluation programs
Svetlana Dunaeva	V. McLane	10 weeks	Neutron reaction data compilation
Yong-Deok Lee	P. Oblozinsky	3 months	Fission product nuclei evaluation
Viktor Zerkin	V. McLane	2 weeks	Nuclear Reaction Database, ZVView
Mike Hermann	P. Oblozinsky	1 week	EMPIRE-2 improvements

Table II.
Visits by NNDC Personnel to Other Centers

Staff Member	Host	Duration	Topic
Victoria McLane	NPDC, Sarov	1 week	ICTP project
Thomas Burrows	IAEA/NDS	1 week	Web and EXFOR services
David Winchell	IAEA/NDS	2 weeks	Database migration strategies
Victoria McLane	IAEA/NDS	1 week	Nuclear reaction database design

*NNDC On-Line Data Service, World Wide Web (W^3), and FTP Retrievals 1986-2001**



* Extrapolated as of April 30, 2001.
[a] Includes XUNDL retrievals since January 1 (OnLine) and January 11 (Web), 1999.
[b] Added to Web August 18, 1999.