XUNDL Status Report (April 1, 2002- September 30, 2003)

B. Singh (McMaster)
D.F. Winchell (BNL) and T.W. Burrows (BNL)
October 24, 2003 (for US-NDP 2003)

Since the start of this project in January 1999, a total of about 1100 datasets have been added to XUNDL, covering mainly high-spin level-scheme structures for about 800 nuclides ranging from ^{21}Ne to ^{254}No and spread over 204 A-chains. The data were extracted from about 980 primary references published primarily during 1995-2003. About 90% contribution is from McMaster, while the remaining 10% datasets received from other data centers were reviewed/edited at McMaster prior to inclusion in XUNDL. The inclusion of datasets in XUNDL and other aspects of database management are handled at NNDC.

The total number given above includes about 255 datasets which have been added since April 2002. In addition 30 datasets already in XUNDL were revised and updated based on newer publications. All datasets, except one, were prepared at McMaster. During 2002-03 we also compiled several current low-spin papers, that were not in ENSDF. Between April 2002 and September 2003, the following undergraduate students at McMaster participated in XUNDL compilation work: Roy Zywina (since June 2001) and Michelle Lee (since February 2002).

The students are trained in basic nuclear physics, ENSDF formats, semi-automatic translation codes, the use of consistency checking codes such as FMTCHK, and GTOL and calculation codes such as HSICC and LOGFT. A commercial code FINEREADER is extensively used to create tabular text files from PDF-formatted tables in journal web pages A new TABULAR-TEXT to ENSDF conversion code has been developed at McMaster which is routinely used to translate tabular text files to ENSDF format. (This code includes several additional features that were not present in the code of David Radford (ORNL) used earlier.) Each dataset is run through codes such as FMTCHK and GTOL. For decay datasets, HSICC and LOGFT codes are also used. Data-related problems or inconsistencies are resolved through e-mail communication with the original authors.

In the current literature on experimental nuclear structure, the high-spin publications continue to dominate with about 75% publications in this field, as judged from our regular scanning of web pages of primary nuclear physics journals (PRL, PR-C, NP-A, PL-B, EPJ-A, JP-G) for new data. As of October 24, 2003, we are current on the compilation of current high-spin and low-spin publications, except for about 10 papers published during the last few weeks, which are presently being compiled. In summer 2002 and 2003, we also compiled main high-spin papers for some of the outdated (>10 years or so) A-chains in ENSDF.

We frequently communicate with the authors of original papers to resolve data-related errors and inconsistencies, and to request additional details of data, which are often lacking in publications due to space limitations or other reasons. The response from the original authors is generally prompt. A compilation of about 100 e-mail communications containing additional information or clarification and data received from the original authors (between 1999-2003) has been sent to BNL as a composite computer file as well as in print version. These private communications have not been assigned NSR keynumbers. The A-chain evaluators or other users can request copies of these communications and request BNL to assign keynumbers, if deemed necessary.

According to the monitoring of data retrievals from NNDC website, there have been on the average about 400/month retrievals from XUNDL database during the last ten months or so. The datasets in XUNDL are also being used by the ENSDF evaluators in their A-chain/nuclide evaluations. This should potentially speed up the data-evaluation process, and turn around time of the A-chain updates.

We think that amongst the two databases: ENSDF and XUNDL, the experimentally known/published high-spin level structures are now adequately covered and are conveniently available to the research/user community through NNDC's on-line retrieval system, LBNL's Isotope explorer, and ORNL's Radware software. There may only be a few significant primary papers (perhaps no more than 100 or so) published during 1990-1997, the contents of

which may still not have been included in any of the two databases mentioned above.

Semi-automated Procedures to Translate Tabular data in journals into ENSDF format:

- **Step 1: Create tabular text file of data from tables in journal web pages using a commercial software FINEREADER . Communicate with original authors if data tables or details are not given in the published papers**.

- **Step 2: Edit the tabular text file created in step 1, using a text editor**.

  Use **TXT2ENS** (PC) code written at McMaster to convert tabular text files in step 2 to ENSDF format.

- **Step 3: Check the ENSDF formatted dataset for level-scheme consistency and possible data-related problems in publications. This involves use of FMTCHK and GTOL codes. For decay datasets use HSICC and LOGFT codes, as needed. Commercial software TEXTPAD is used to edit ENSDF-formatted files.**

  Communicate with original authors if there are data related-problems or inconsistencies in a paper.

- **Step 4: Check the final ENSDF formatted dataset with the original paper for any transcription errors. LBNL's viewer 'Isotope Explorer' is used to verify that the level scheme and the band assignments correctly match the publication.**