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WinMerger

Visual Merging and Retrieval of Information from ENDF-6 Format Libraries

Summary Documentation

by

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Abstract: WinMerger is a PC code that will process any library in ENDF-6 format. The system has a display function which allows the user to visualize the reaction data of a specific nuclide and to produce a printed copy of these data. The system allows the user to retrieve and/or combine evaluated data to create a single file of data in the ENDF-6 format, from a number of different files, each of which is in the ENDF-6 format. The user can also create a mini-library from an ENDF-6 format library. The database was developed under a research contract with the IAEA (N° 302F4BRA88840) and is available on diskette from the IAEA Nuclear Data Section.

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VISUAL MERGING AND RETRIEVING OF INFORMATION FROM ENDF-6 FORMAT LIBRARIES

WinMerger - Version I, 1996

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ABSTRACT

This report presents a data information retrieval and merger system for ENDF-6 (Evaluated Nuclear Data File) format libraries, which can be run on personal computers under the Windows™ environment. The input is the name of an ENDF-6/B library, which can be chosen in a proper window. The system has a display function which allows the user to visualize the reaction data of a specific nuclide and to produce a printed copy of these data.

The system allows the user to retrieve and/or combine evaluated data to create a single file of data in ENDF-6 format, from a number of different files, each of which is in the ENDF-6 format. The user can also create a mini-library from an ENDF-6/B library.

This interactive and easy-to-handle system is a useful tool for Nuclear Data Centers and it is also of interest to nuclear and reactor physics researchers.

INTRODUCTION

One of the main activities of a Nuclear Data Center is to provide the scientific community with reliable nuclear data. Among the most requested data there are the evaluated nuclear data libraries in ENDF-6 format (Evaluated Nuclear Data File) Rose(1992). Therefore this type of library deserves a special treatment, e.g. the development of a special, user friendly, easy-to-handle information retrieval database management system.

It was for this reason that we begin to think about an adequate data management tool and a data index system for libraries in ENDF-6 format was created. This system, an "index generator", gets information from the database and writes a report, Silva(1992,1994). A VAX version of the same system using the VAX-C language was also created, Ferreira(1994). The necessity of this version became clear from contacts with other nuclear data centers, who solicited a mainframe version (IBM and VAX) of the existing system.

The successful and widespread use of the Windows™ environment made us think about the possibility to develop a new indexing system, for data in ENDF-6 format, similar to the previous one, but this time integrated in the Windows™ environment. A user friendly and easy-to-handle system was developed, Ferreira(1996).

Soon after the development of the system above, we felt it was necessary to improve it with the capabilities to visualize and merge data of ENDF-6 format libraries. In the following sections this system will be described.

DESCRIPTION OF THE DEVELOPED SYSTEM

The system includes functions to retrieve and merge ENDF-6 format data, it can be run on a PC computer under the Windows™ environment. The system allows the user to retrieve and/or combine evaluated data to create a single file of data in ENDF-6 format, from a number of different files, each of which must be in ENDF-6 format. The user can also create a mini-library from an ENDF-6/B library.

The input is the filename of an ENDF-6 data library, chosen through windows where the drive and/or directory of the desired file can be changed by the user. The system allows the user to visualize, on the screen, the reaction data of a specified nuclide, and to make a printed copy of these data.

The system was created following Windows architecture, where the options and available functions are displayed in a menu bar, at the top of the window.

The system is easily handled either using the mouse or the keyboard, through shortcut keys (ALT key + underlined letter). The user does not need to input data, and all the options are clearly shown to the user, so human errors are minimized.

In order to execute the system, it is necessary that the files "DEFNTION.MF" and "DEFNTION.MT", which contain the definitions of the MF and MT numbers, respectively, be in the same directory of the application (the executable program WINMERGER.EXE). The files VBRUN300.DLL and CMDIALOG.VBX and the software Windows™ are needed to run the system.

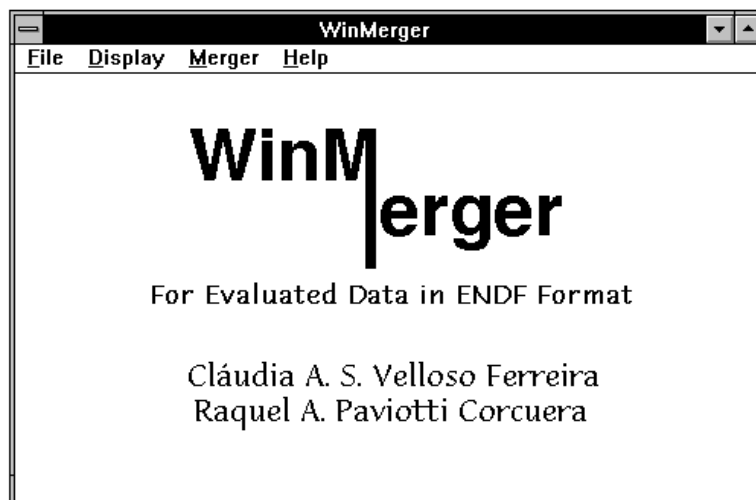


Figure 1. Principal window, system introduction

The principal window of the system, as may be seen in Fig. 1, provides all options available in the system, and they can be accessed through the keyboard using shortcut keys, or the mouse.

The options are:

- File (Alt+F), includes the options to process the print and font setup, and to exit the system (return to Windows).
- Display (Alt+D), option to exhibit reaction data of a specified nuclide.
- Merger (Alt+M), includes the function Merger : execute, visualize the file created and print.
- Help (Alt+H), gives general instructions and informations about the system.

PRINTER SETUP

The option "File" contains the configuration functions to print the reports (Fig. 2). The function "Print Setup" allows the user to select the printer where the reports will be printed (Fig. 3). The printer definition controls which fonts will be available to create the report. The font size can be changed using the option "Font Setup" (Fig. 4). The user can select one value among the values suggested or type a new one. Windows will adjust the font size in case that the typed value is not a valid one.

The system uses "Courier" font as a default, with size 8, because this is a non-proportional font which generates correct reports (a non-proportional font has all the characters with the same size). Before printing, a test is done, to verify whether this font is installed and available to the selected printer. A window to select a new font will appear in case there is no available Courier font (Fig. 5). The user must take care to select a non-proportional font, otherwise, the reports will be printed incorrectly.

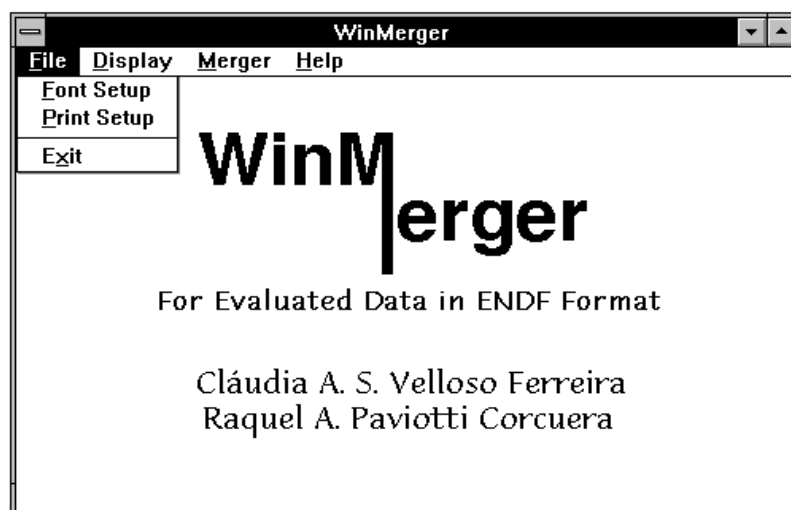


Figure 2. Setup functions

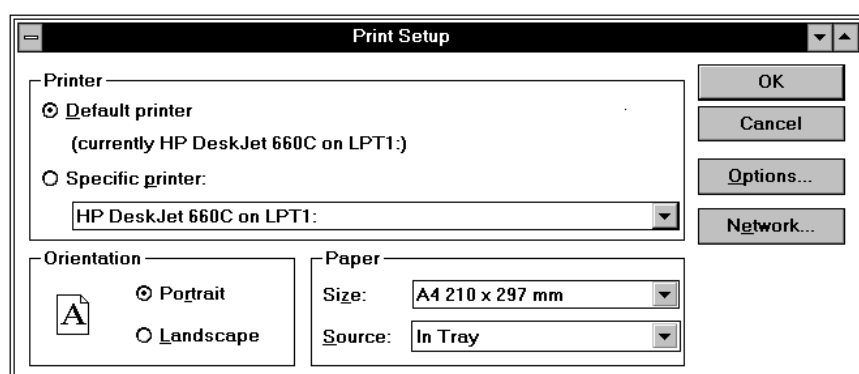


Figure 3. Printer Setup

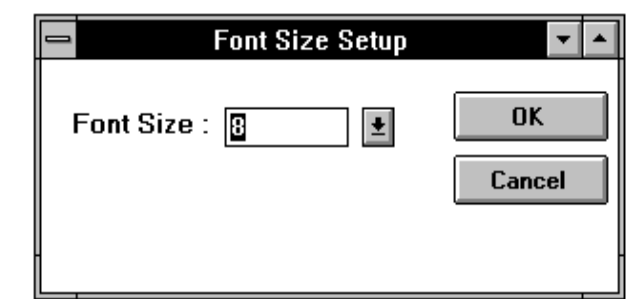


Figure 4. Font Setup

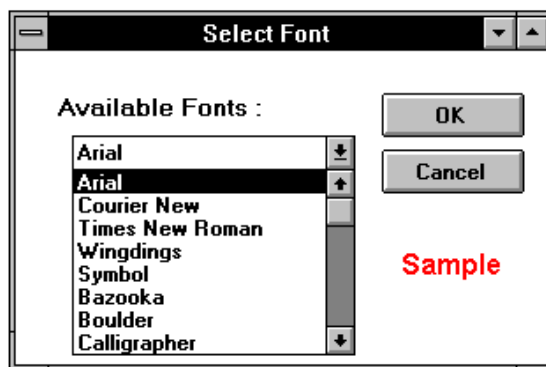


Figure 5. Font selection

VISUALIZATION OF ENDF-6 LIBRARY DATA

The option "Display" of the principal menu allows the user to open and then to process an ENDF-6 format database file (Fig. 1). There is no restriction on the name of the file, except that the extension should be ".NDF", and the filename must be a valid one to the operating system.

Once selected the option "Display", it will permit the user to search for "*.NDF" type files, through drivers and/or directories, or even to go to another point in a network (Fig. 6). The system will only open files with extension "NDF", and it is supposed that they are in the correct ENDF-6 format. If for some reason the format is not correct, errors will occur during the execution of the system.

At this stage, the user can cancel the job (Cancel button), this will take him to the previous window, the principal menu, or can select the OK button and process the database selected.

At the end of the job execution, information about the processed database will be displayed on the screen in a proper window, as may be seen in Fig. 7.

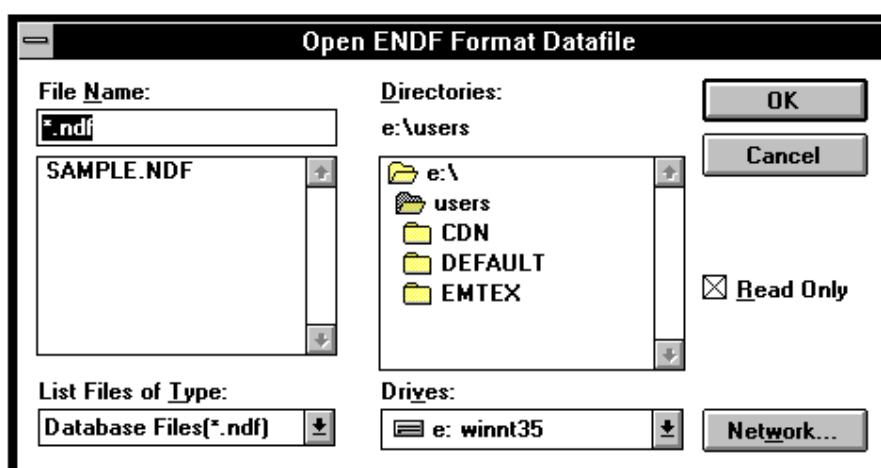


Figure 6. Opening of an ENDF-6 database

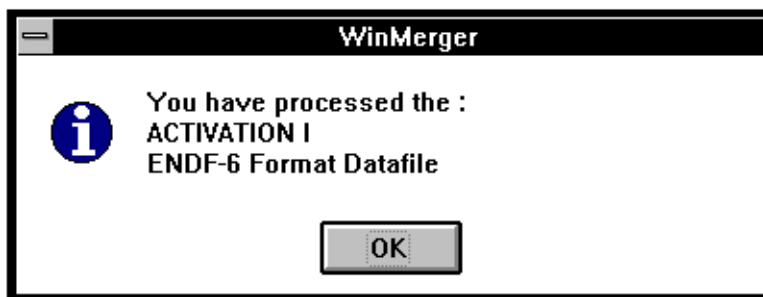


Figure 7. Information about the processed database

After the database is processed, the system presents to the user, in a proper window, the available nuclides in the chosen database (Fig. 8). Then, using the mouse or the cursor keys, the user can select one nuclide, or cancel the job.

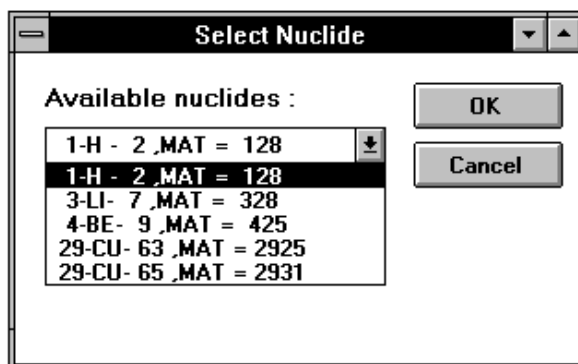


Figure 8. Available nuclides in the processed database

Once selected one nuclide and the OK button, the system leads to another window showing the available files for the selected nuclide (MF number and the corresponding description, Fig. 9). Again, the user can make his selection or cancel the job.

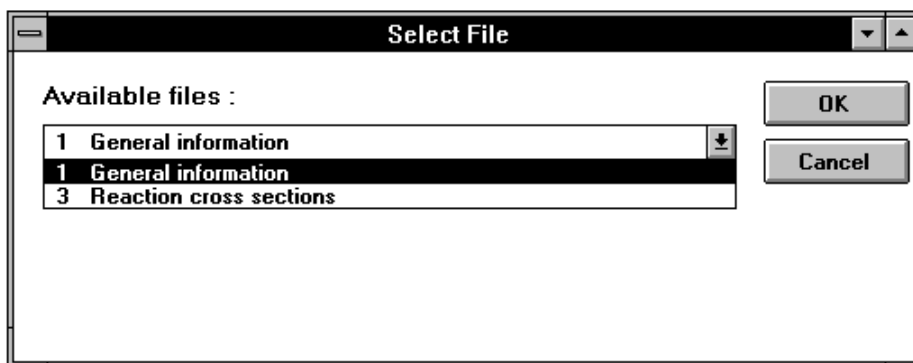


Figure 9. Available files for the selected nuclide

The following window (Fig. 10) presents the available reactions for the file selected in the previous window. Differently from the previous one, this window allows the user to choose more than one reaction, and also to cancel the job.

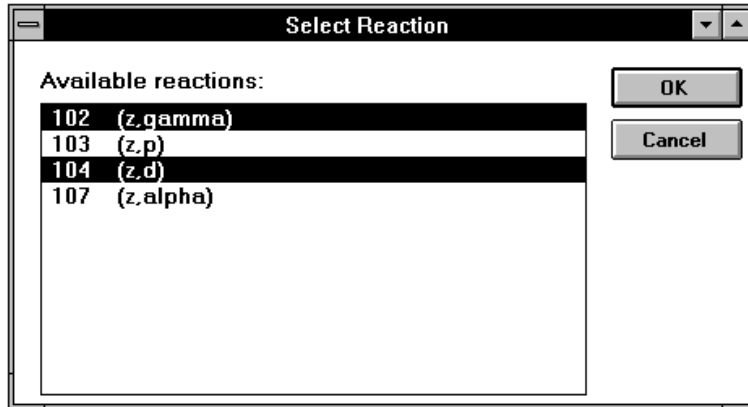


Figure 10. Available reactions for the selected file

The set of the selected MAT, MF and MT's numbers determine the portion of the database that will be displayed.

The system creates a file named SELECAO.DAT which stores the portion of data selected by the user through the MAT, MF and MT numbers. These file will be displayed in a proper window as shown in Fig. 11. Using the horizontal and vertical scroll bars, the user can visualize the whole file. The option "Print" (Print button) creates a printed report of the current file.

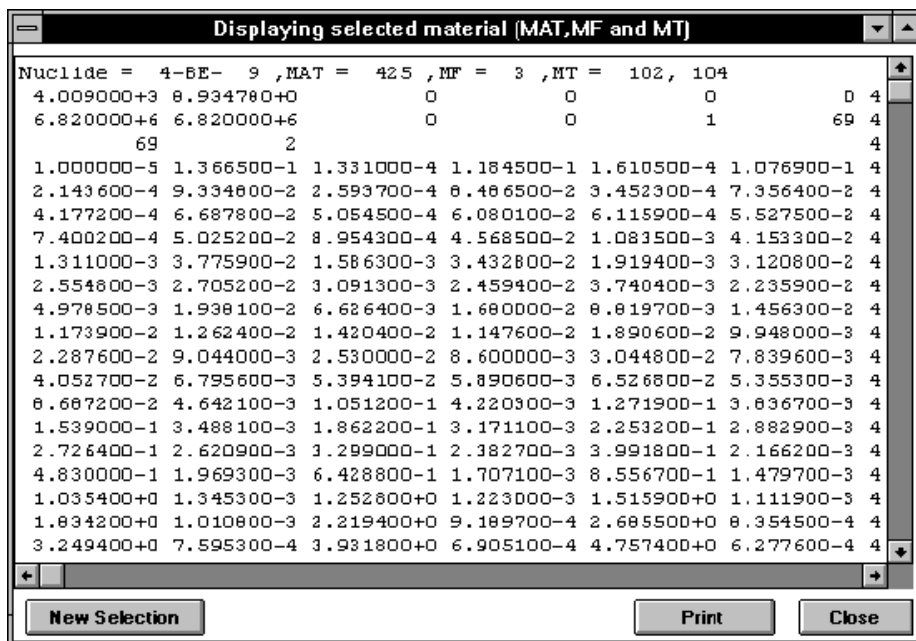


Figure 11. Display file window

The display procedure will not manipulate files with size greater than 32Kb. In this case, the file will be divided into blocks of 30Kb, called pages, and exhibited page by page. In this case an alert message will be displayed in the proper window as shown in Fig. 12. The time needed to execute this procedure depends on the size of the file.



Figure 12. Alert to long file

The proper window to exhibit the file is presented. At the bottom of the window, a message showing which page is being displayed, is presented as shown in Fig. 13. Using the command buttons, the user can go to the previous page (<<) or to the next page (>>), and with the Print button, the current page may be printed (Fig. 13).

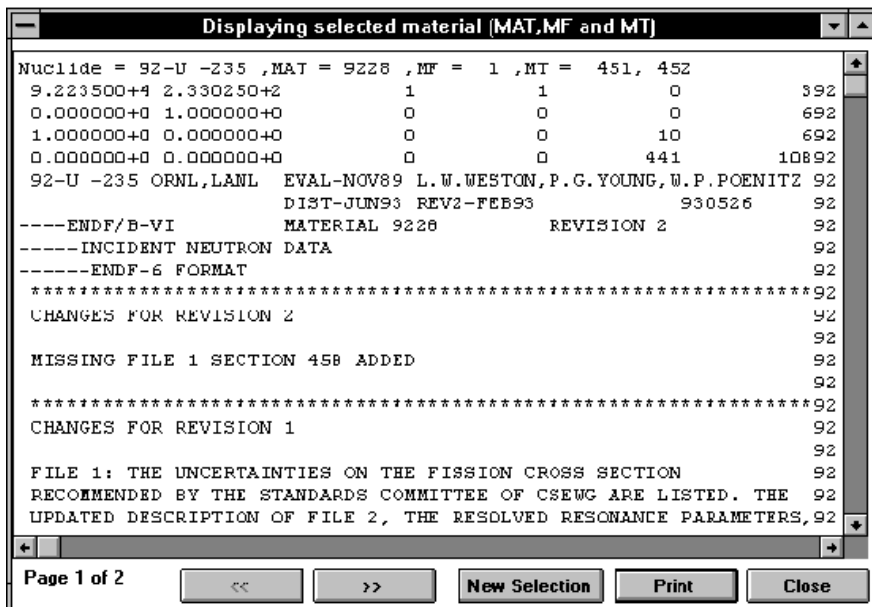


Figure 13. Window to exhibit the file page by page

The New Selection button at the bottom of the window, allows the user to make a new selection of nuclide, to visualize another portion of the same database, returning to the window of Fig. 8.

MERGING AND CREATING A NEW ENDF-6 FORMAT LIBRARY

The option "Merger" in the main window has the functions "Open", "View" and "Print", as may be seen in Fig. 14.

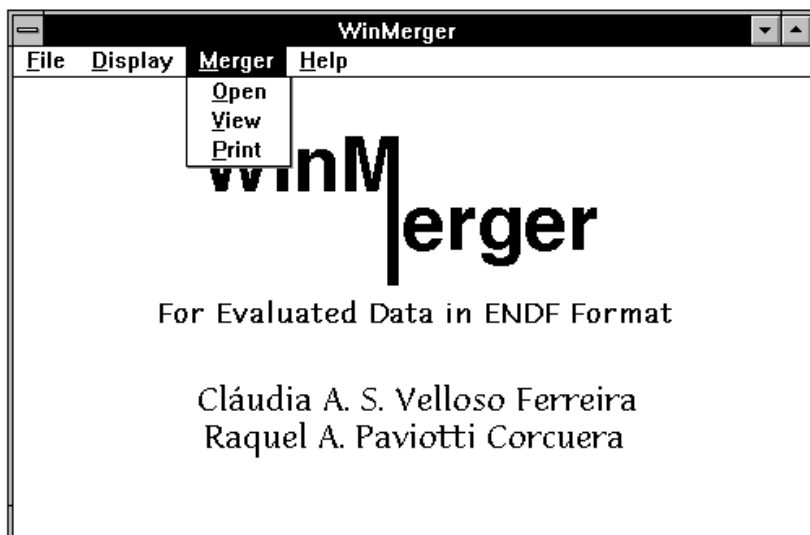


Figure 14. Merger function

The function "Open" allows the user to open and then process an ENDF-6 format database. A proper window, as may be seen in Fig. 6, is presented and it permits the user to search for "*.NDF" type files, through drivers and/or directories selection, or even to go to another point in a network.

The processing consists in verifying the available nuclides in the database and to show a list of them, in a proper window (Fig. 15). The user can then select one or more nuclides, using the mouse or cursor keys.

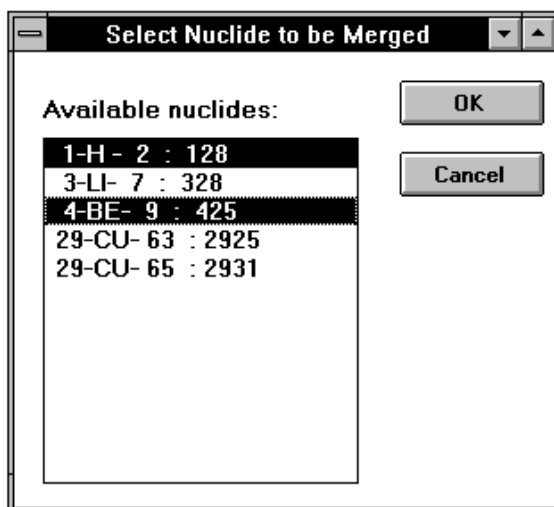


Figure 15. Available nuclides in the processed database

After the selection is done, the system presents a window similar to the one of Fig. 6, that permits the user to open the file where the data of the chosen nuclide will be kept. The user can select an existing file, among the available files with extension .NDF, and in this case the data will be appended at the end of the file. The user can also type the name of a new file, with extension .NDF, to create a new database. In the case of a new file, the window of Fig. 16 will be presented in order to allow the user to type the heading of his file. This will keep the file in the ENDF-6 format.

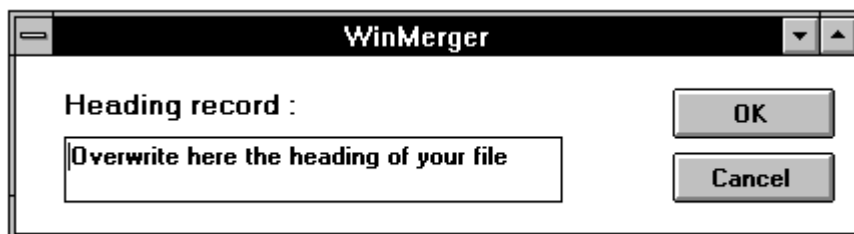


Figure 16. Heading of the new database

The option "View" allows the user to visualize in the screen a file with extension .NDF. The objective is to allow the user to check the file created with the option "Open". A window to open the file, similar to the one of Fig. 6, is presented and then the file is exhibited in a proper window, similar to the windows that may be seen in Fig. 12 or Fig. 14, depending on the size of the file.

The option "Print" permits to get a printer copy of an *.NDF type file. The objective is to allow the user to print the file created with the option "Open". A window to open the file, also similar to the one of Fig. 6, is presented and then the file is sent to the printer spool. All the system printing is done according to the user configuration, using the option "File" at the principal menu. In case that the user did not use the setup functions, the system uses the Windows default printer and the system default font size.

INFORMATIONS AND USER HELP

The option "Help", in the main menu (Fig. 17), provides the user with information about the system. This information include the system capabilities and objectives (Fig. 18), and also some instructions about system execution.

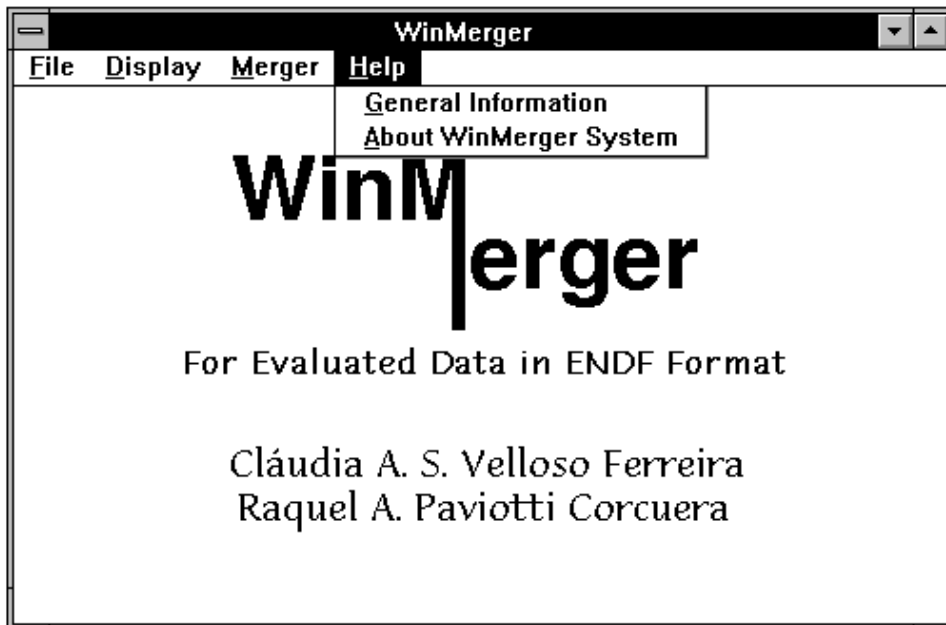


Figure 17. User help

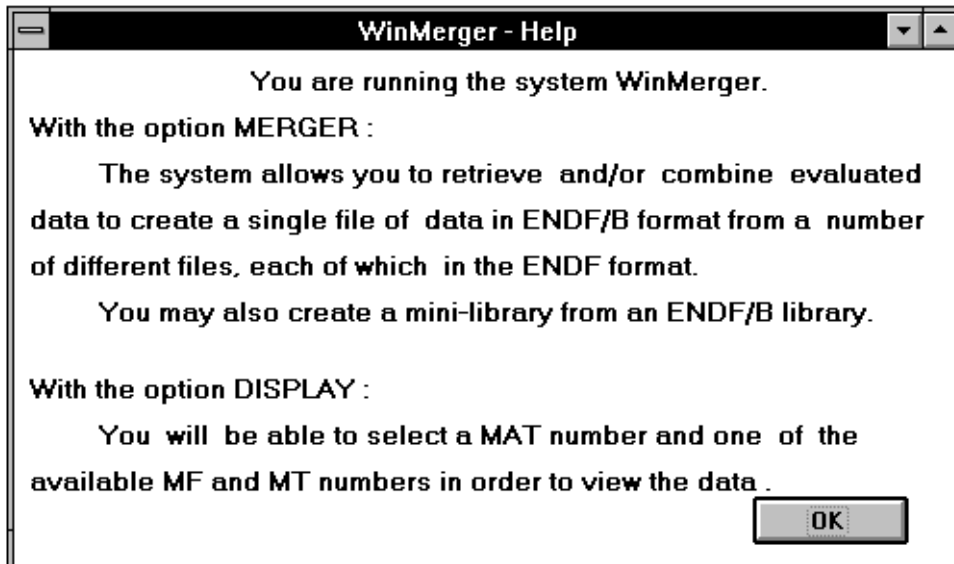


Figure 18. Help window

The function "About" gives information about the system authors and the institutions.

ABOUT THE SYSTEM

The system was developed and tested in a IBM-PC compatible microcomputer, with DOS 6.2 as operating system and Windows 3.11. To create the application, the Visual Basic programming system was used, Microsoft(1993). The minimum platform tested was a PC-486, 40 MHz with 16 Mb RAM.

Due to the fact that the system should work with large databases (30Mb to 60Mb), the computer performance is very important to gain speed to obtain the results. Large differences were verified when the system was tested in a Pentium 90MHz.

During its execution, the system creates some files for temporary use, which can be deleted later. These files, named Tabelama.dat, Tabelamf.dat and Tabelamt.dat, are created at the same directory of the processed database and keep informations about the selection made by the user. Another file that is also created is Selecao.dat, cited in the last section, which keeps the data of the last selection.

CONCLUSIONS

The system is a useful tool to obtain information about data in ENDF-6 format, specially when the user wants to know which nuclides are in the library and then create a new library merging data with another library, or create a mini-library from an ENDF-6 library.

This interactive and easy-to-handle system is a useful tool for Nuclear Data Centers and it is also of interest to nuclear and reactor physics researchers.

This system can be obtained free of charge from the Nuclear Data Section, International Atomic Energy Agency, P.O. Box 100, A-1400 Vienna, Austria.

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