

# The Present Status of CENDL-3

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As I introduced before, we have had a fine year plan (from 1996 to 2000) to develop CENDL-3. Now, the planned evaluations were completed, and the data are being tested with benchmark and improved for the problems found in the test.

The evaluations have been done in this period at CNDC (Chinese Nuclear Data Center) and CNDN (Chinese Nuclear Data Network).

## 1. General Purpose File

The present stage of CENDL-3 is shown in Table 1.

Table 1. The present status of CENDL-3

Nuclides	Planned	Evaluated	Tested
Fissile nuclide	15	15	$^{233,235,238}\text{U}$ , $^{239,240}\text{Pu}$
Structure material	24	34	
Fission products	91	109	(n, $\gamma$ )
Light nuclide	3	3	
Total evaluated	133	161	
Total CENDL-3	178	206	

As shown by the table, the number of nuclides, for which the data were evaluated, is more than planned one. The data of total 161 nuclides are newly evaluated for CENDL-3. Considering that there are 45 nuclides, which are included in CENDL-2.1, but not included in the above list, the total 206 nuclides are included in CENDL-3.

The files 1,2,3,4,6,12-15 are included for important nuclides, such as major fissile nuclide, structure material and light nuclide, only files 1,2,3,4,5 are given for minor fissile and fission product nuclides.

For structure material, the data are given for both natural element and their all isotopes. The data were adjusted to make the data between natural element and their isotopes and, in general case, the consistence is within 1.0%. The double differential cross sections were calculated with code NUNF and the energy is in balance within about 1.0% error without any artificially adjusting.

For light nuclides, the double differential cross section (file 6) was calculated with code LUNF. As well known, it is difficult to give the differential cross section for light nuclides. We solved the problem in a frame of statistical theory.

The evaluated data of fissile nuclides for CENDL-3 have been tested to benchmark assemblies GODIVA, FLATTOP-25, BIG-10, JEZEBEL, JEZEBEL-Pu, FPATTOP-Pu, JEZEBEL-23, FLATTOP-23 and THOR. The  $K_{\text{eff}}$ ,  $F_{28}$ ,  $C_{28}$ ,  $F_{25}$ ,  $F_{25}$  etc. macroscopic parameters were calculated by using both neutron transport theory and Monte-Carlo method, and compared with the experimental data. 175 group cross sections were generated for transport calculation. Some problems in physics and format have been found, and are being improved now. For fission product nuclides, the reactor spectrum averaged (n, $\gamma$ ) cross sections were calculated and compared with the measured ones. The results are being analyzed now.

## 2. Special Purpose File

The evaluation was continuously done for special purpose file data. More progress

has been made for fission yield, ADS data and prompt  $\gamma$  ray data.

### **1). Fission Yield**

The work on fission yield evaluation has been done under the frame of IAEA's CRP on "Fission Product Yield Data Required for Transmutation of Minor Actinides Nuclear Waste".

The evaluations of reference fission yield data for  $^{235}\text{U}$ ,  $^{238}\text{U}$  were completed, and a reference fission yield data file was established. It contains altogether 79 product nuclides for  $^{235}\text{U}$  and 68 for  $^{238}\text{U}$ . The data were evaluated based on all available experimental data up to the date evaluated.

### **2) The Nuclear Data for ADS**

Accelerator Driven Sub-critical System (ADS), called Accelerator Driven Radioactive Clean Nuclear Power System, is being investigated in its prophase as national project now in China. To meet the requirement, the data of some nuclides are being evaluated, a code for calculating data in high energy region is being developed, and multi-group cross sections are being generated by using the microscopic data taken from CENDL.

### **3). Prompt $\gamma$ -ray data**

Under the supporting by the IAEA and as a part of the CRP, the evaluation of prompt  $\gamma$ -ray data of thermal neutron capture, including the energy, intensity and decay scheme, has been done. So far the data were evaluated for nuclides  $A=1\sim 35$ , reviewed and revised for 20 nuclides of  $A>190$ .

## **3. Five Year Plan for 2001 to 2005**

We are making a new five year plan for the year 2001 to 2005. It has not been defined concretely and determined finally, but it is certainly that CENDL-3, both general purpose data file and special purpose data file, will be developed further. The general purpose data file will include more nuclides and more files (for example covariance data files). More fission product nuclides will be included. The data of important nuclides will be improved further. The resonance parameters will be investigated and evaluated. The fission yield data and decay data will be continuously evaluated.

The nuclear data measurement and evaluation will still be as national project and more funding could be got.