VI.F.3. Using ENDF File 2 as input to SAMMY

Instead of manually creating a SAMMY-type PARameter file and an entire SAMMY-type INPut file, a user may retrieve resonance parameters (File 2) from the Evaluated Nuclear Data Files (ENDF) Library at the National Nuclear Data Center [NNDC] and use that file directly as input to SAMMY. The first portion of a SAMMY-type INPut file is still required; this file contains card sets 1–8 but no others (see Table VI A.1). Included in card set 3 of the INPut file must be the line

```
INPUT IS ENDF/B FILE  MAT=abcd  ,
```

in which "`abcd`" is to be replaced by the ENDF MAT (material) number. The name of the ENDF/B file is included in the input stream where the name of the PARameter file is called for.

Prior to Release M6 of the SAMMY code, it was necessary for the user to edit the ENDF file and extract File 2 for the material of interest. This is no longer needed; SAMMY will now search through a long ENDF file and use the relevant portion. However, if the command line reads only

```
INPUT IS ENDF/B FILE
```

without the MAT number, then SAMMY will assume (as in the past) that the ENDF file contains only File 2 for the material of interest.

With either of the commands given above, only resonance parameters and spin-group quantum numbers are retrieved from the ENDF File 2. If the energy range from the ENDF file is to be used for the SAMMY run, then the command

```
USE ENERGY RANGE FROm endf/b file 2
```

is given in the INPut file.

(Note that additional commands may be required for the experimental data and associated energy grid. In general, the user must provide a separate file for the experimental data in the customary fashion as described in Section VI C.1.)

Output from a run using an ENDF file for input includes several additional files not usually found in SAMMY output. The first is SAMNDF.INP which is a SAMMY-type INPut file containing the spin group information in card set 10.1 format. The second, SAMNDF.PAR, is a SAMMY-type PARameter file containing the resonance parameter information from the ENDF file, translated into SAMMY formats. These two files can then be modified as needed and used for subsequent SAMMY runs.

A third member of this list of additional output files is SAMQUA.PAR, a PARameter file that contains quantum number information as well as resonance parameters. See Table VI B.3 for a detailed explanation of this file.

Caveat # 1: Only isotopic ENDF files can be used as input for SAMMY runs. For example, one could use the file for ^{28}Si but not the file for natural silicon.

Caveat # 2: The file SAMNDF.INP contains a command (card set 3) specifying which type of R-matrix approximation was used for the ENDF file. For example, if the ENDF File 2 indicates LRF=1, then the resonance parameters were determined by a procedure that used the single-level Breit-Wigner approximation; SAMNDF.INP therefore will contain the command line "`SLBW FORMALISM IS WANTED`". Similarly LRF = 2 indicates multilevel Breit Wigner, and LRF = 3 indicates the ENDF Reich-Moore approximation.

If the intent of the user is simply to use SAMMY to create a plot of the evaluated cross sections, then the SAMMY runs should indeed use the same approximation as was used to define the ENDF file.

However, if the intent is to use the ENDF File 2 parameters as starting values for analysis of new data, or for a new evaluation, then the user is encouraged to modify (or remove) the command in the INPut file for subsequent runs. New analyses should use the Reich-Moore approximation, which is the default option for SAMMY.