Suggestions/proposals for the USNDP Meeting, April, 1999:

A. Nuclear Data Sheets Presentation:

1. Some years ago, there was a policy decision about drawings: if/when there are so many observed gamma transitions that it would take more than three pages of drawings to show their decay scheme, AND if such drawings could easily and clearly be demonstrated in a table, then the editors could decide not to show that particular decay scheme. This policy was intended to be particularly for primary-capture gamma-ray decay schemes where showing all primary gammas de-exciting one capturing state to various levels can be replaced by a table. For other decay schemes, such as beta decays, alpha decays and reaction gammas, presentations of connecting gammas, log ft's and HF's are crucial. We all know (or hope) that the information we are providing for our readers is valuable and useful (even though it may not be appreciated), if the information is complete and clear, in addition to being correct. The evaluators' wishes on the way their evaluations are to be presented in the publication of Nuclear Data Sheets are sometimes ignored. If and when part of a data set or drawing is not given in the Data Sheets, even if there is a reference to where the missing part can be found, this practice frustrates the users, making these evaluations less useful. We are aware of the manpower shortage. However, the evaluators take pride in their work and spend a long time preparing their manuscripts. If they feel that their evaluation is lacking its usefulness to users because of the way it is presented, then the evaluators have wasted some of their precious time. During the production of the Data Sheets, when an evaluator has some requests, they need to be taken seriously by considering that the evaluators might have better feelings about the presentation of their evaluations than our automatic programs. Occasionally, human interference is necessary. **I suggest that, at the production stage, evaluators' requests on presentation of their manuscript should be taken seriously. If an evaluator's request is refused, a written explanation for this refusal must be given to the evaluator. The *Nuclear Data Sheets must be treated as regular papers,* because they are.**

2. In the drawings for the "Adopted Levels, Gammas", levels that have not been assigned to a rotational band and the gammas de-exciting these levels are often not included. These levels and gammas are not necessarily less important. I suggest that ***all adopted levels be shown in the drawing, unless the evaluator asks otherwise.***

3. In the early 90's, the Network decided that all decay data be placed in the Nuclear Data Sheets following the adopted levels for the daughter nuclei. For the particle decays which involve nuclei with two different masses, such as alpha and proton decays, pertinent information about the parent nuclei, such as its half-life, Q value, spin, etc., is not given in the Nuclear Data Sheets with the decay data sets unless the evaluator makes a special effort and provides this information with comment records. When this information is not supplied, the reviewers and the readers have to search to find out what values were used in calculated quantities, such as alpha-hindrance factors. ***It would be a great service to***

have the parent information be retrieved from "P" records and included in the Nuclear Data Sheets automatically.

4. For the alpha-decay data, the Nuclear Data Sheets have three separate tables: (1) Levels in daughter populated in this decay, (2) Alpha radiations, (3) Gamma radiations. The "alpha radiations" have E(alpha), E(level), I(alpha) and HF columns, where E(level) is the level in daughter nucleus fed by direct alpha transition with energy E(alpha). In this "Alpha Radiations" table, if a column for JPI(level)'s, next to the column for E(level)'s, can be added, it would be very useful and time saving, therefore, a very desirable service to our customers, as well as to the reviewer, who would spend less time checking whether or not the alpha hindrance factors are consistent with the levels' spins and structures. The tables for the "Levels in Daughter" would not be needed. The very same procedure can be applied to beta and electron-capture decays: we can have one table, listing beta energies (if measured), intensities, log ft's, E(level)'s that these betas feed, and JPI's of the levels. This way we can improve the data presentation by adding one column in the "radiations" table for JPI's, and eliminate the table for levels.

   An example of the presentation at present:

253Fm A Decay

249Cf Levels

E(level)	JPI	T1/2	Comments
0.0	9/2-		
61	11/2-		
142	5/2+	45 us	T1/2: by AG(t) (67Ah02)
:	:	:	
:	:		
606	:		

Alpha radiations

E(alpha)	E(level)	I(alpha)	HF	Comments
6487	606	0.3	31	
:	:	:	:	
:	:	:	:	
6943	142	42.7	25	
7023	61	6.7	350	
7083	0.0	1.3	3200	

Note that in the "249Cf Levels"table, levels are listed in the order of increasing energy; in the "Alpha Radiations" table, the alpha's are listed in increasing energy and levels are listed in decreasing energy.

The suggested versions: *add two columns (for JPI and for T1/2) following E(level) column, and delete the "Daughter Levels" table* (in this example, "249Cf Levels")

Version (1):

253Fm A Decay

Alpha radiations

E(alpha)	E(level)	JPI	T1/2	I(alpha)	HF	Comments
6487	606			0.3	31	
:	:	:		:		
:	:	:		:		
6943	142	5/2+	45 us	42.7	25	T1/2: by AG(t) (67Ah02)
7023	61	11/2-		6.7	350	
7083	0.0	9/2-		1.3	3200	

Version (2):

253Fm A Decay

Alpha radiations

E(level)	JPI	T1/2	E(alpha)	I(alpha)	HF	Comments
606			6487	0.3	31	
:	:		:	:	:	
:	:		:	:	:	
142	5/2+	45 us	6943	42.7	25	T1/2: by AG(t) (67Ah02)
61	11/2-		7023	6.7	350	
0.0	9/2-		7083	1.3	3200	

Version (3): energies are reversed from version (2), where alphas would be listed in decreasing order and levels in increasing order (I prefer this version).

253Fm A Decay

Alpha radiations

E(level)	JPI	T1/2	E(alpha)	I(alpha)	HF	Comments
0.0	9/2-		7083	1.3	3200	
61	11/2-		7023	6.7	350	
142	5/2+	45 us	6943	42.7	25	T1/2: by AG(t) (67Ah02)
:	:		:	:	:	
:	:		:	:	:	
606			6487	0.3	31	

5. Our plot program needs to be upgraded, particularly for level schemes involving intra- and inter-band transitions. *The Radware-plot program satisfies this need beautifully*. I proposed that **the Radware-plot programs be adopted by the Network for level schemes with band structures.**

6. In the Nuclear Data Sheets, the tables for primary gamma rays from neutron capture, include a column for the levels that the primary gammas de-excite. However, since all of these primary gammas de-excite the same capturing level, this capturing level energy is repeated needlessly for every primary gamma. I suggest that **when there are separate primary and secondary gamma data sets, and two separate tables are generated for them in the Data Sheets, the E(level) column for the table for primary gammas be always suppressed.**

B. ENSDF checking codes:

7. In order to ease some of the ever-increasing imposed load that is being proposed for the Brookhaven Nuclear Data Center at the production stage, I suggest that **the programs to produce the tables and the drawings in the Nuclear Data Sheets be distributed to the evaluators, and the evaluators who have special demands for the presentation of their work, send the control files for them at the same time they send their evaluations to the BNL Nuclear Data Center.**

8. Almost all of the evaluators know that the strongest (which is also most energetic) alpha group from the ground state of an even-even nucleus always decays to the ground state of its daughter. However, occasionally this fact has been missed by some evaluators, and by the reviewer and the editors, unfortunately. In order to prevent this mistake being published in the NDS and entered in the ENSDF files, **the creation of a check program would be very valuable.**

9. There have been cases where Q(alpha) of an odd nucleus has been calculated by the evaluator by assuming that the highest energy alpha populates the ground state of the daughter nucleus, although its calculated hindrance factor might not be consistent with the parent and daughter configurations. For example, a favored alpha transition might be the highest energy alpha for a decay set; the Q(alpha) value from Audi and Wapstra might based on systematics. Calculation of Q(alpha) from the energy of this alpha, without any additional information, would be wrong, since favored alpha transitions from odd and odd-odd parents in the deformed region usually populate the excited states of daughter nuclei. **A check program which could give an <u>extra</u> warning whenever the Q(alpha) is different from those recommended by Audi would be very useful to the reviewer and the editors, as well as the evaluator.**