

Minutes of Meeting of Working Group on Nuclear Structure and Decay Data of the

U. S. Nuclear Data Program
April 27, 1998, Brookhaven National Laboratory

Contents

The Working Group on Nuclear Structure and Decay Data of the newly reorganized U. S. Nuclear Data Program met on April 27, 1998 at Brookhaven National Laboratory. The meeting was chaired by Richard Helmer. The agenda, as amended at the meeting is Attachment 1, included oral and written reports by each Center doing structure or decay data evaluations and about twenty items which had been submitted by the various evaluators in the United States and Canada. The persons attending this meeting include those in Attachment 2. The written versions of the Center reports are in Attachment 3.

The agenda items that were discussed are given in Attachment 4 and are numbered 5-17, 19, 21-23. As circulated before the meeting, these items were made up of a Proposal, a Purpose, and a Discussion; these Discussions have been deleted to save space. A summary of the results of the discussions at the meeting are given below.

General comments

The meetings of the former U. S. Nuclear Data Network usually consisted of two parts. One was a small group called the Formats and Procedures Subcommittee that discussed detailed items related to the data as it is stored in the Evaluated Nuclear Structure Data File (ENSDF) and the second was a Network meeting of including all of the U. S. and Canadian evaluators as well as the ENSDF system management people, involving broader policy issues. This meeting of the Working Group included both functions. The meeting lasted about eight hours and this constraint meant that some broader issues were discussed only in a narrow context, rather than a context which would have required more time.

This meeting progressed quite well and all attendees were interested in having a cooperative and productive meeting.

The decreased level of manpower available for evaluations of A-cahins and nuclides was commented on at several points, but was not discussed as a specific item. The Chair indicated he would collect some data on this matter.

Specific agenda items

It was agreed that the National Nuclear Data Center, NNDC, will continue to prepare lists of priority A-chains and priority nuclides for the guidance of evaluators in deciding on the order of their evaluation efforts (item #5). There was discussion of how the priorities are set, especially as to the influence of subject areas (e.g., astrophysics and high-spin data) as against the number of new papers with experimental data. It is assumed that the criteria for setting priorities may develop over the next year.

In the past there were problems with the long times that it took to get reviews done for the A-chains. To determine whether this is still a problem, NNDC provided a tally, Attachment 5, of the review times taken by the reviewer (item #6). It was pointed out that these times do not count the delay caused in several cases by the retirement of the person who originally was going to do the review. It is clear from the tally that the review time is not a general problem now. With the retirement of Murray Martin, most reviews will be less extensive as described in Nndc policy statements on reviews; therefore, it is necessary that the evaluator take full responsibility for the accurate entry of all numbers from the literature.

Several details related to the ENSDF processing codes (item #9) were discussed. (a) For the code LOGFT (which computes $\log ft$ and related values), the Lawrence Berkeley National Laboratory, LBNL, group agreed to supply the coding they are using to compute the $\log ft$ values for unique 3rd and 4th forbidden transitions, NNDC will have it reviewed by John Millener, a theorist, and it will be added to LOGFT. (b) For RADLST (which computes atomic data quantities from the nuclear data), NNDC will supply to all evaluators a more modern set of atomic data, from Eckart Schönfeld of Physikalisch-Technische Bundesanstalt, PTB, in Germany. The RADLST code will remain the same; it is just run with the newer atomic data. (c) There are some PC codes that are not as up-to-date as the VAX versions; NNDC plans to supply new PC versions in the near future. They will be made available electronically rather than via disk, except where a disk is necessary. (d) Changes in ENSDF by NNDC to accommodate the year 2000 and beyond were authorized. (e) The need for improvements in the printing of complex level schemes, including those of high-spin data, was discussed and NNDC will explore several possible improvements.

Three items related to analysis methods were discussed, but not adopted; these were (1) use of code to provide interpolated internal-conversion coefficients from Hager and Seltzer tables, Rósel et al., tables, and Band tables (item #13); (2) use of a code to provide the weighted average of a group of values by the Limitation of Relative Statistical Weight (LRSW) method (item #15); and (3) estimation of the most probable β^- or $EC+\beta^+$ intensity for branches whose characteristics known but intensity is not otherwise determined from new $\log ft$ systematics by B. Singh (item #14). (1) In the next few years there may be one or two new sets of theoretical internal-conversion coefficients calculated, so any change in the current Network policy of using the Hager and Seltzer tables was deferred. New calculations may be done by S. Raman, Oak Ridge National Laboratory (ORNL) and by a Russian-French group. The need to verify the quality of any new set of internal-conversion coefficients and the associated interpolation scheme was discussed. LBNL is to contact S. Raman about his efforts and to indicate to him what is needed if

the results are to be useful to the Network. (2) An LRSW average code may be circulated later so that evaluators can become familiar with it. (3) Since $\log ft$ distributions are always skewed by the inability to observe very weak branches, there is a technical question about the proper use of such systematics as well as the possibility that the distributions are so wide that the results would not be useful.

Three items that would involve the changing of some ENSDF formats were discussed. The first involved a method to store data for ionized atoms when they differ from the data for neutral atoms (item #17). It was agreed that the needed additions would be made. These changes are the first step in accommodating structure data for the astrophysics community since they will deal with highly ionized atoms. The suggested format modifications were discussed and a revised format will be circulated for comments before the ENSDF file format is modified. The first data to be entered into the file may be for the decays of ^{188}Re and ^{163}Dy ; the later neutral atom is stable, but the fully stripped atom decays by β^- emission.

The two other proposals for changing the ENSDF formats involved storing additional quantities related to converting the stored γ -ray intensities to γ rays per 100 spontaneous fissions (items #10 and #22) and converting measured γ -ray emission rates to the number of atoms in a sample (item #23). It was suggested for item #22 and agreed for item #23 that these situations should be handled by having separate files available containing the spontaneous fission yields, the thermal-neutron-capture cross sections, the Westcott g -factors, the isotopic abundances, etc. These data are not of the type considered by the ENSDF evaluators and they would be much easier to update or modify for special situations (e.g., abundances which vary between geographic locations), if they are separate from ENSDF. The quality of the spontaneous fission yields was questioned and needs discussion.

The advisability of adding flags to the entries in ENSDF to indicate whether a reference has been used in ENSDF was discussed (item #11). The difficulties of implementing this and its usefulness were discussed. Rather than this, it was suggested that there be added character-strings on which searches can be made to look for new papers in a particular subject area and the NNDC will explore the ideas discussed. .

A presentation was made concerning the types of data that the astrophysics community needs that fit into the categories in ENSDF (item #7). Since ENSDF is a file for measured data, or at least for atoms that are observed, the new data in this field may be quite limited. The atoms of interest will often be ionized and, therefore, will be studied in stripped beams. The first modifications of ENSDF to handle these data have been agreed to (see item #17 discussed above). The Chair will continue this dialogue with the new astrophysics group.

The data needs of the high-spin community were also discussed (item #8) by the evaluators present. This need appears to be primarily for a web-site where the experimenter can post her/his level scheme results before publication. It was reported that ORNL is developing such a web site. The chair will ascertain the details of the plans for this web site in order to determine if there are

needs, in addition to the regular need to evaluate the published data and get it into ENSDF.

The complexity of the incorporation of horizontal evaluations into ENSDF and their value for ENSDF were discussed. The specific proposal suggested that all horizontal evaluation results be given to the responsible A-chain evaluator to approve before entry into ENSDF, if such an evaluator is available and willing (item #12). The lack of a definite A-chain evaluator, the need to submit the whole nuclide as minimum unit and resolving related data in related nuclides, the possibility of putting horizontal evaluations in separate files, and the difference in evaluation procedures were all discussed. It was suggested that all horizontal evaluations done by ENSDF evaluators be approved by the Network before they are initiated; this has been done in some cases and not in others. The question of whether horizontal evaluations reduce the effort invested in A-chain and nuclide evaluations was raised. A web bulletin board where evaluators post their current activities was suggested to reduce the cases where two evaluators are working on the same nuclide at the same time, especially in this time of a manpower shortage. These issues were not resolved, but the Chair indicated he would gather some information on present and future horizontal evaluations and the related manpower.

The existing horizontal evaluations that are being carried out by the people who are evaluators included:

- decay data for selected nuclides (coordinated by R. G. Helmer, and including six non-network evaluators).
- super-deformed band data (carried out by B. Singh and R. B. Firestone).
- new nuclides (carried out by R. B. Firestone and including one non-network person)
- α -decay data of even-even nuclei with no γ decay (carried out by Y. Akovali)

The minutes were prepared by R. G. Helmer, Working Group Chair, in part, from notes provided by C. Baglin and C. W. Reich.

Agenda for Working Group
on
Nuclear Structure and Decay Data Evaluations

Monday, 27 April 1998 at NNDC, BNL

Sessions

Morning	10:30 - 12:30
Afternoon	13:30 - 17:30
Evening	19:30 - 22:00

There may be a joint meeting on astrophysics data during part of this time.

Morning Session

Comments by Chair

Agenda revisions

Center reports (10 minutes each)

 NNDC activities of whole network

 TUNL

 ORNL

 NIST

 McMaster

 LBNL

 INEEL

 NNDC as evaluation group

Evaluation items

 priority list (item #5, NNDC)

 review times and procedures (item #6)

 enter spontaneous fission data as a priority (#10)

Afternoon session

Analysis codes

 changes to LOGFT & RADLST (#9a,b INEEL)

 PC versions of codes (#9d)

 ENSDF output of absolute γ intensities (#9c, INEEL)

 improved plots (#9f)

 internal-conversion coefficients (#13, INEEL)

ENSDF formats

year 2000 for ENSDF (#9e, NNDC)
ionized atoms data sets (#17, McMaster)
spontaneous fission format additions (#22, LBNL)
(n, γ) format additions (#23, LBNL)

Nuclear Structure References

added flags for indicating use in ENSDF (#11, LBNL)

Evaluation techniques

new $\log ft$ systematics (#14, McMaster)
averaging methods (#15, INEEL/LBNL)
do only adopted data sets (#16)

Evening session will begin during or before the next group of items

Horizontal evaluations & compilations

data needs of astrophysics community (#7)
data needs for high-spin community (#8)
incorporation of horizontal evaluations in ENSDF (#12, INEEL)
new nuclides (#21, LBNL)

General topics

advice on attendance at international NSDD meeting (#18, INEEL)
authorize Chair to work between meetings (#19, INEEL)
advertize for suggestions (#20, INEEL)
items to be taken to the international NSDD meeting (no #)

Other

as needed ---

Nuclear Structure and Decay Data Working Group

U. S. Nuclear Data Network, April 27, 1998

Item: #5

Proposal:

NNDC is asked to continue to provide lists of priority A-chains and priority nuclides.

Purpose:

To provide a continuing method of informing evaluators about the status of those A-chains and nuclides within their area of responsibility. And, to reduce the number of new papers that have to be evaluated after the review is done.

Discussion:

The evaluators should suggest improvements in the way the priority cases are identified.

Proposal from Richard Helmer.

Nuclear Structure and Decay Data Working Group

U. S. Nuclear Data Network, April 27, 1998

Item: #6

Proposal:

All evaluators in this Working Group should advise the Working Group Chair if they agree that they will attempt to carry out any A-chain or similar large review within two months of the date they receive the material, and carry out any nuclide review or similar small review within three weeks. The agreement on the part of the evaluator assumes that the NNDC would send the material to the evaluator only after she/he has agreed to do the review and to the schedule.

Purpose:

To obtain the acknowledgement that reviews should not inordinately delay the publication of evaluations.

Discussion:

None.

Proposal from Richard Helmer.

Nuclear Structure and Decay Data Working Group

U. S. Nuclear Data Network, April 27, 1998

Item: #7

Proposal:

Request that the Coordinating Committee attempt to determine if there are unmet needs of the Astrophysics Community that lie within the current domain of ENSDF, that is, measured data for the specified quantities.

If the Community needs lie outside this domain, would this Community be well served by a file of computed half-lives and Q values within the NNDC, or if such a file would be useful, should it continue to be developed elsewhere?

Purpose:

To ascertain the unmet needs.

Discussion:

None.

Proposal from Richard Helmer.

Nuclear Structure and Decay Data Working Group

U. S. Nuclear Data Network, April 27, 1998

Item: #8

Proposal:

Request that the Coordinating Committee attempt to determine if the "High-Spin Community" wants this Data Network to establish a file of compiled, unevaluated high-spin data in the ENSDF format.

Purpose:

To respond to user community needs if they are well-defined, generally agreed to, and compatible with subsequent data entry into ENSDF.

Discussion:

This Working Group needs to know if the High-Spin Community wants such a file, rather than using their existing files. Would this user Community need to rewrite their calculational codes to use ENSDF data sets, and is this acceptable? Does the desired data already exist in High-Spin Community files? If so, can the user Community provide computer codes to translate their current files into ENSDF data sets?

Proposal from Richard Helmer.

Nuclear Structure and Decay Data Working Group

U. S. Nuclear Data Network, April 27, 1998

Item: #9

Proposal:

Upgrade ENSDF processing and checking codes possibly including:

- ◆ Extend the code LOGFT to provide correct results for unique 3rd and 4th forbidden beta decays.
- ◆ Redistribute RADLST with up-to-date atomic data.
- ◆ Extend the output obtained when extracting decay data from ENSDF to give the absolute gamma-ray intensities and the associated uncertainties.
- ◆ Update any PC processing codes that are not as advanced as the VAX codes.
- ◆ Make changes in ENSDF that are needed for the year 2000. This involves converting to 8-character keynumbers on Q and ID records. On ID records, 'DATE' changes from YYMMDD to YYYYMM, eliminate 'PUB' field, and expand 'DSREF' to 35 characters. Also, reference data set and 'R' records will be eliminated.
- ◆ Improve the plotting of bands and complex level schemes. Goals might be to eliminate cases where the energy of the level at which a gamma terminates is not clear due to the complexity of the scheme and to show high-spin data primarily in the bands.

Purpose:

To improve the evaluation methodology and the usefulness of the data provided the user.

Discussion:

The unique beta decays mentioned do occur, so the correct values should be available.

Currently the extraction of decay data from the ENSDF file give the gamma-ray intensities as they are in ENSDF, which is often relative values that must be multiplied by a scaling factor. For decays with a large number of gamma rays, a lot of hand calculation must be done in order to get the absolute intensities.

Proposal from Richard Helmer in response to several suggestions.

Nuclear Structure and Decay Data Working Group

U. S. Nuclear Data Network, April 27, 1998

Item: #10

Proposal:

Data in neutron-rich nuclei from recent spontaneous fission measurements be treated as a special sub-topic of high-spin data and compiled or evaluated promptly.

Discussion:

The application of large detector arrays to the investigation of prompt gamma rays emitted in the spontaneous fission of ^{252}Cf and ^{248}Cm is yielding a rapidly growing body of nuclear structure data on neutron-rich nuclei in the 90-160 mass range. Over the last five years (1993-1997), the two main collaborations in the field published about 50 papers, identifying and assigning gamma transitions in and elucidating level schemes of, over 70 nuclei, ranging from strontium to samarium. The analysis of a more recent experiment done at Gammasphere with a thin ^{252}Cf source by University of Rochester and collaborators is beginning to generate additional data. Prompt gamma de-excitation of nascent fission fragments samples mainly the yrast level sequence up to spins of 20. The data can therefore be viewed as an extension of high spin data to the neutron excess region, which is not accessible by conventional high spin accelerator experiments.

Only a relatively small fraction of these data has so far been incorporated in ENSDF, and progress is quite slow, relative to the rate at which the data are being generated and published. In the normal course of events it will take many years till all the relevant mass chains come up for re-evaluation. Since this particular body of data represents a substantial extension of available nuclear structure data in the neutron-rich domain (and may be of practical significance to the nuclear power community), its inclusion in ENSDF should be expedited.

Proposal from Jacob Gilat, LBNL

Nuclear Structure and Decay Data Working Group
U. S. Nuclear Data Network, April 27, 1998

Item: #11

Proposal:

Add to NSR database, flags to indicate the "importance" of a paper and its status in relation to ENSDF.

Purpose:

To provide currency by means of NSR to compensate for the lack of manpower to keep ENSDF current.

Discussion:

A frequent criticism leveled against the nuclear data program is the long time lag between the publication of new data and their evaluation and inclusion in the evaluated data files. Given the large amount and increasing complexity of the data on the one hand, and the limited resources for evaluation on the other, the chance of a major improvement of the timeliness of the evaluation process in the foreseeable future is quite low. Different ways to alleviate this situation have been proposed: creating and disseminating an interim file of compiled (but not evaluated) data, selective priority evaluation of partial data sets of special interest to user communities, 'horizontal evaluation' and other variations on the theme. A major shortcoming of these proposed approaches is that their implementation entails a further dilution of available resources, leading to an even longer time lag and eventual impairment of the quality of the end product. The resulting status quo leaves the user in the unsatisfactory position of having to scan a rather large number of Recent References, to evaluate the validity of the data they contain and to assess their importance to his own project.

To partially alleviate the problem, I propose to make more efficient and effective use of the human resources devoted to the generation and maintenance of the NSR database. Instead of operating it as an essentially independent and separate effort, the idea is to integrate and share its resources with the rest of the program. Since highly qualified professional manpower is already being used to scan the literature and enter it in the NSR database, it shouldn't be difficult to generate for each paper a flag or a series of flags, indicating the importance and possible impact of the paper. Such flags, generated as an integral part of the process, would be based on agreed criteria developed by the network. One flag could indicate the "added value" figure of merit, i.e. the fraction of new data added or substantially modified by the paper relative to ENSDF. The network could also use the same figure of merit to assign evaluation priorities. A second useful flag (inserted into NSR in the final stages of the evaluation process) could indicate that the information on this nuclide in a given paper has already been included in ENSDF. (Yet another useful addition to NSR might be a link to an archived electronic copy of the actual paper, especially for less common literature sources.)

Proposal from Jacob Gilat, LBNL

Nuclear Structure and Decay Data Working Group

U. S. Nuclear Data Network, April 27, 1998

Item: # 12

Proposal:

A standard practice for incorporating horizontal evaluations into ENSDF shall be established. The data from the horizontal evaluation shall be provided to the evaluator of the corresponding mass-chain. This evaluator shall decide whether to incorporate these data into ENSDF as is, or after modifying it. If the mass-chain does not have a regular evaluator, or that evaluator is not available for this task, this authority shall be exercised by the NNDC.

Purpose:

To provide a mechanism for the orderly incorporation into ENSDF data from all horizontal evaluations.

Discussion:

A set of data from a horizontal evaluation will usually require changes in the corresponding Adopted Levels, Gammas data set. Sometimes, the person doing the horizontal evaluation will not be in a position to up-date the corresponding Adopted Data set. This would route the super-deformed band evaluations and decay-data evaluations through the A-chain evaluators rather than through a single reviewer. This would in principle, but probably not in practice, route some decay-data evaluations through the Utrecht group.

Proposal from Richard Helmer in response to issues raised by others.

Nuclear Structure and Decay Data Working Group

U. S. Nuclear Data Network, April 27, 1998

Item: # 13

Proposal:

The Network shall support the development of a code for simultaneously interpolating internal-conversion coefficients from the tables of Hager and Seltzer, Rösler et al., and Band for ENSDF format data sets. The evaluator will then use her/his preferred values and identify the table used. The difference between the values from the first two tables can be used as an additional indication of the uncertainty in the theoretical values.

Purpose:

To improve the evaluation methodology of the Network.

Discussion:

The French participants in the Decay Data Evaluation Project are supporting an effort by Russian theorists to produce an interpolation code that incorporates all three of these tables. By combining this code with a routine to read ENSDF data sets, it will be possible to interpolate ICC's for extended Z and energy ranges, and use the differences in the values as an indication of the uncertainty in the theoretical values. (There is a possibility that the French will also support the calculation of a new set of theoretical values.)

Proposal from Richard Helmer.

Nuclear Structure and Decay Data Working Group

U. S. Nuclear Data Network, April 27, 1998

Item: # 14

Proposal:

To make available a new set of measured distributions of log ft values for allowed and 1st forbidden beta transitions.

To use the most probable values from these distributions for estimating the intensity of beta transitions that can not be determined from direct measurements or intensity balances. The widths of these distributions can be used to estimate the uncertainty of the deduced beta intensities.

Purpose:

To improve the evaluation methodology.

Discussion:

These distribution are based on retrieval of about 8000 log ft values from the ENSDF database.

The current practice is to use the existing log ft systematics to determine a limit on the beta transition intensity when the intensity can not be determined otherwise. These new log ft distributions provide sufficient data to determine the most probably log ft value and the uncertainty thereof.

Proposal from Balraj Singh and Richard Helmer.

Nuclear Structure and Decay Data Working Group

U. S. Nuclear Data Network, April 27, 1998

Item: #15

Proposal:

The Network shall promote the use of the Limitation of Relative Statistical Weight, LRSW, method for averaging data and shall provide a computer program for this purpose. The Network shall also provide codes to average data by means of the Normalized Residual and RAJEVAL methods which provide aggressive treatments for the more discrepant values.

Purpose:

Promotion of more critical, and more uniform, evaluation of sets of measured values, especially where the values are discrepant.

Discussion:

The US NDN Subcommittee of Formats and Procedures endorse the recommendation of the Limitation of Relative Statistical Weights method in March 1996, and the international Decay Data Evaluation Project has adopted this method and is using it.

The IAEA Nuclear Data Section used this method in the "Co-ordinated Research Programme (CRP) on the Measurement and Evaluation of X- and Gamma-ray Standards for Detector Efficiency Calibration". It has been extensively used by the National Physical Laboratory (NPL), Teddington, for the evaluation of half-life results, and at the AEA Technology, Harwell, for the evaluation of half-life and gamma-ray emission probability data.

Proposal from Edgardo Browne, amended, by Richard Helmer

Nuclear Structure and Decay Data Working Group

U. S. Nuclear Data Network, April 27, 1998

Item: #16

Proposal:

Do evaluations only for Adopted Levels and Adopted Gammas. For all other data sets, only compilations will be done, or just provide directions to the appropriate references.

Purpose:

To reduce the work to be done to the available manpower.

Discussion:

None available.

Proposal from European evaluator

Nuclear Structure and Decay Data Working Group

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Item: #17

Proposal:

Create a new type of ENSDF data set called IONIZED ATOM.

Purpose:

To provide retrievable storage of data related to ionized atoms, especially fully stripped atoms.

Discussion:

An example of this case is ^{163}Dy .

A new dataset should exist of the ^{163}Ho with the following name: ^{163}Dy B- DECAY (47D): IONIZED ATOM. In the next record a comment should appear that it is the 66+ ionic (fully stripped of electrons) state of ^{163}Dy . The parent card should be ^{163}Dy with an energy level that of the ionized atom, in this case a few keV or so. The daughter level populated in this decay should be just ^{163}Ho gs. I do not know whether logft values can be calculated easily for such cases, since screening corrections will be different.

In ^{163}Dy adopted level dataset, a level should be added near gs, such as a few keV for ^{163}Dy with a %B=100, T1/2=47 D +4-5 and a comment that this is an atomic excited state of ^{163}Dy gs with all the 66 electrons stripped.

In ^{163}Ho adopted level dataset, ^{163}Dy B- decay (47 D) dataset should be listed under XREF and gs population from this decay should be indicated.

Proposal from Balraj Singh

Nuclear Structure and Decay Data Working Group

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Item: #18

Proposal:

This Working Group suggests that the attendance of evaluators at the international meeting in December be limited to approximately four, unless DOE requests that more attend.

It is recommended that all technical proposals to be offered at that meeting by U. S. evaluators be conveyed in advance to the NNDC and that they be organized by the NNDC into a coherent group.

Purpose:

To limit the financial expenditure related to this meeting and to coordinate the technical discussions.

Discussion:

None

Proposal from Richard Helmer.

Nuclear Structure and Decay Data Working Group

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Item: #19

Proposal:

This Working Group authorizes its Chair to pursue, during the period before the next Working Group meeting, with the appropriate members of this Group, any items from this agenda, and if necessary to accumulate information on these items to promote future decisions.

Purpose:

To promote action between meetings.

Discussion:

None.

Proposal from Richard Helmer.

Nuclear Structure and Decay Data Working Group

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Item: #20

Proposal:

Promote comments from the community that currently uses the Internet and WWW access to ENSDF by adding an option in the exit ritual that solicits comments on possible errors in the file and suggested improvements

Purpose:

To increase interaction with users.

Discussion:

None.

Proposal from Richard Helmer.

Nuclear Structure and Decay Data Working Group

U. S. Nuclear Data Network, April 27, 1998

Item #21:

Proposal:

To establish a joint effort with the NuBASE group to horizontally evaluate new nuclides as follows.

- 1) Audi et al. and the Isotopes Project would track new nuclides as they appear in the literature.
- 2) The Isotopes Project would prepare ENSDF datasets for these nuclides on a priority basis.
- 3) The NuBASE group would review these evaluations.
- 4) ENSDF datasets would be submitted to the NNDC.

Purpose:

To update ENSDF, on a priority basis, new nuclides as they appear in the literature.

Discussion:

The Isotopes Project has been compiling and evaluating new nuclides on a priority basis[1] for over a year. These nuclides are also continuously tracked by the NuBASE group (G. Audi et al)[2]. New nuclides are an important focus of interest in several research communities including nuclear structure, astrophysics, and radioactive beams. Coordination of the two parallel efforts will reduce potential duplication of effort.

[1] R.B. Firestone, Over 200 isotopes published in the ENSDF file in 1997.

[2] G. Audi, O. Bersillon, J. Blachot, and A.H. Wapstra, "The Nubase evaluation of nuclear and decay properties", Nucl. Phys. A6224, 1(1997).

Proposal presented by R.B. Firestone and G. Audi.

Nuclear Structure and Decay Data Working Group

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Item #22

Proposal:

To modify the ENSDF format for spontaneous fission data as follows.

- 1) The "NR" normalization field should be used to normalize transition intensities so that the total intensity feeding the ground state is 100.
- 2) The "BR" normalization field should contain the fission yield so that $I_g \cdot \text{NR} \cdot \text{BR}$ gives the gamma-ray yield per 100 fissions of the precursor.
- 3) A parent record should be provided for the fissioning nucleus.

Purpose:

To provide complete information with spontaneous fission decay datasets for normalizing the transition intensities to per 100 fissions.

Discussion:

Several recent experiments at the large Ge detector arrays have provided a large amount of new data for neutron-deficient isotopes. These data are being compiled by the Isotopes Project in ENSDF format. Minor modifications to ENSDF format and policy are proposed to normalize this data in a similar manner to other decay datasets. (Fission yields are available from the Spontaneous Fission home page at <http://ie.lbl.gov/fission.html>.)

Proposal presented by R.B. Firestone and J. Gilat on behalf of the GANDS collaboration.

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Item #23:

Proposal:

To make minor modifications to ENSDF format and policy as follows:

- 1) There should be a single (n,g) E=thermal dataset containing both primary and secondary gammas normalized per 100 neutron captures by the NR normalization. Separate datasets for primary and secondary transitions would be phased out.
- 2) The "BR" normalization field should contain the thermal neutron capture cross-section in barn units.
- 3) The Westcott g-factor should be included in a new field, possibly columns 65-76 on the normalization record.
- 4) The "NB" field should contain the isotopic abundance of the capture nucleus.
- 5) Multipolarities and mixing ratios should be taken from the Adopted Levels, Gammas dataset. Internal conversion coefficients should be included when appreciable.
- 6) Evaluators should typically normalize the gamma-ray data in such a way that the total intensity populating the ground state is 100. Gammas from Adopted Levels, Gammas dataset, missed in the measurements, should be added before this normalization. If either the total intensity deexciting the capture state is less than 100 or the energy-weighted sum of normalized intensities is lower than the Q-value it should be reported in a comment.
- 7) The capture state energy should be taken from the most recent mass evaluation.
- 8) New capture gamma-ray data measured with natural targets on thermal or cold neutron guides will be included whenever the isotope identification is unambiguous, as separate sets marked E=cold. These data will also be considered for the normalization of E=thermal datasets whenever the cross section is verified to obey the $1/v$ law.

Purpose:

To provide a uniform method of incorporating capture gamma data into ENSDF so that it will be complete and useful for applications.

Discussion:

An IAEA CRP has been funded for 1999-2001 to compile a database for Prompt Gamma-Ray Neutron Activation Analysis. Both the LBNL Isotopes Project and the Institute of Isotope and Surface Chemistry, Budapest plan to participate. The goal of the CRP is to create a new library of experimental data for thermal and cold neutron capture. LBNL will participate in the compilation and reevaluation, including a set of new data measured with natural targets for all stable elements at Budapest. The data will be compiled in ENSDF format and will be made available over the Internet at <http://ie.lbl.gov/ng.html> for those interested in the progress. The final dataset will be offered to the evaluators' network for inclusion in the ENSDF file after proper checks are made.

Proposal presented by R.B. Firestone and G. Molnar