BNL-NCS--51665

DE83 016767

BNL-NCS-51665
UC-34c
(Physics-Nuclear — TIC-4500)

MINUTES OF THE SIXTH ANNUAL MEETING OF THE PANEL ON REFERENCE NUCLEAR DATA*

BROOKHAVEN NATIONAL LABORATORY
October 15–16, 1981

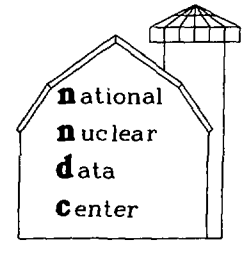
Edited by:

T.W. BURROWS
NATIONAL NUCLEAR DATA CENTER
BROOKHAVEN NATIONAL LABORATORY
UPTON, NY 11973

AND

D.S. BRENNER
PHYSICS DEPARTMENT
BROOKHAVEN NATIONAL LABORATORY
UPTON, NY 11973
AND
CHEMISTRY DEPARTMENT†
CLARK UNIVERSITY
WORCHESTER, MA 01610

*Subject to Panel approval at the next meeting.
†Current address.



BROOKHAVEN NATIONAL LABORATORY

UNDER CONTRACT NO. DE-AC02-76CH00016 WITH THE
UNITED STATES DEPARTMENT OF ENERGY

DISCLAIMER

TABLE OF CONTENTS

TABLE OF CONTENTS cont'd

APPENDICES

The minutes follow the general order of discussion. In some cases, the discussions have been rearranged to provide a more logical grouping.

1.0 WELCOME

The attendees and observers to the Sixth Annual Meeting of the Panel on Reference Nuclear Data were welcomed by S. Pearlstein, Director of the National Nuclear Data Center, Brookhaven National Laboratory. The membership for the Panel is given in Appendix A and Appendix B lists the attendees and observers of the Sixth Meeting.

2.0 APPROVAL OF AGENDA AND MINUTES OF THE FIFTH MEETING

2.1 Agenda

The agenda was approved as modified (Appendix C).

2.2. Minutes of the Fifth Meeting.

The Minutes of the Fifth Annual Meeting of the Panel on Reference Nuclear Data[1] were approved without corrections.

3.0 ELECTIONS

D.S. Brenner succeeded J.J. Coyne as Chairman. J. MacDonald was unanimously elected as Vice-Chairman, while T.W. Burrows remained as Secretary.

4.0 BIOMEDICAL DATA NEEDS

4.1 Radiopharmaceutical Council Survey

The summary of the Radiopharmaceutical Council Survey prepared by F.P. Castronovo was distributed. Since F.P. Castronovo was not present, discussion was limited. The Panel did

---

[1] T.W. Burrows, J.J. Coyne, and D.S. Brenner, editors, Brookhaven National Laboratory Report BNL-NCS-51364, 1981.

[2] D.J. Silvester and S.L. Waters, "Radionuclide Production," in the Proceedings of the 2nd International Symposium on Radiopharmaceuticals, March 19-22, 1979, Seattle Washington, p. 727.

wish additional details, including the number of questionnaires sent out.

4.2 Medical Cyclotrons in Use

A survey of medical cyclotrons in use for medical radioisotope production[2] was distributed. K. Lathrop noted that this list was a little out of date, but very comprehensive. There are, in general, two classes of facilities: 1) the commercial facilities, such as New England Nuclear, which produce relatively long-lived isotopes (e.g. ^{201}Tl and ^{67}Ga) and 2) clinical facilities which produce short-lived isotopes and generator systems. She also mentioned a new installation at Brookhaven and noted that an important part of the clinical installation is the imaging facilities.

J.J. Coyne was surprised at the large number of radioisotopes in use and asked if this was new. K. Lathrop stated that this had been going on for some time and listed uses for some of the radioisotopes. J. MacDonald asked if there was any way of predicting what would be needed. K. Lathrop felt that everything was needed. E. Kamykowski suggested that a survey of medical cyclotron users would be useful. K. Lathrop noted that a recent workshop on medical radioisotope production[3] included, among others, a recommendation that the International Atomic Energy Agency conduct such a survey and that there be no special large meeting on this subject at the present time. An action was placed upon the NNDC to make the results of the survey when completed, available to the Panel. K. Lathrop also cited a recent Orsay report[4] which summarizes radioisotope uses.

J.J. Coyne mentioned that the usefulness of most radiopharmaceuticals depends upon the biochemical specificity of the available chemical compounds. K. O'Brien mentioned the area of implant therapy (e.g. ^{125}I for melanoma) where the chemistry is not important. K. Lathrop felt that the use of implant therapy

---

[3] K. Okamoto, editor, International Nuclear Data Committee Report INDC(NDS)- 123, 1981 (unpublished).

[4] Medical Cyclotron 1980 Progress Report, Service Hospitalier Frederic, Joliet Department de Biologie, Orsay (unpublished).

[5] D. Brenner, "Improved Calculations of Energy Deposition from Fast Neutrons." Los Alamos National Laboratory Report LA-UR-. (Note: Editors were unable to find the report number).

has lessened. Many of the cyclotrons used for isotope production are also used for neutron therapy. According to K. Lathrop, the greatest nuclear data need in this area is production cross sections and the precision requirements and energy ranges needed have grown. D.S. Brenner noted that the Q-values for most of these reactions are well known; therefore, it should be possible to calculate production cross sections using a standard code. K. Lathrop, felt that what is really needed is a source for non-physicists.

4.3 Charged-Particle Nuclear Data Needs

J. MacDonald was not successful in finding private libraries among the groups involved in charged-particle therapy. These groups, including Lawrence Berkeley, Harvard, and Los Alamos, rely upon published data and ENDF-like data files. D. Brenner[5] and others are working on theoretical calculations, including Monte-Carlo calculations.

J. MacDonald briefly reviewed the work of existing facilities. This work includes tumor treatment by heavy ions (C, He, O) at Berkeley and by 160 MeV protons at Harvard. He also reviewed new facilities for neutron therapy. These facilities rely heavily on ENDF/B and derivatives for their neutron data needs. The facilities at Mallinckrodt and NIH Bethesda are also used for radioisotope production.

J.J. Coyne mentioned a group in the NRH Board in England who are using the GNASH code. Calculations at Los Alamos do predict multiparticle production. These calculations must, however, be tied to good nuclear data. He again mentioned the possible problem with the ENDF/B-V evaluation for the $^{12}C(n,n'3\alpha)$ cross section above 10 MeV. The measurements by R. Haight, et al. are lower than ENDF/B-V. J. MacDonald and H.H. Barschall are planning a carbon calorimeter experiment at Lawrence Livermore which will, hopefully, extend from below 14 MeV to above 15 MeV. Previously tissue-equivalent calorimeters have been used, but hydrogen dominates in these.

A question was raised by J.J. Coyne on the status of the ENDF/B carbon evaluation. D. Muir noted that it was a collaborative effort between Bruyes-le-Chatel and Oak Ridge and that version V had been modified to take into account new neutron-emission data. J.J. Coyne mentioned the tissue-equivalent proportional counter data which indicate that the evaluation is a little high in predicting α and heavy-ion production, but the total energy deposition is in agreement. M. Bhat stated that the next Fast Neutron Symposium will be held in about 2 years and that carbon will be re-evaluated for the next version of ENDF. J.J. Coyne mentioned the work at U.C. Davis which has been published

and J. MacDonald mentioned the 20-MeV work at Ohio using a new Q3D spectrometer.

J.J. Coyne is sure that there are equivalent questions in oxygen (e.g. $^{16}O(n,n'\alpha)^{12}C^*$). The NBS water calorimeter might be useful even with the scattering from hydrogen dominating. D. Muir suggested SiO_2 and J. MacDonald, Al_2O_3 as better alternatives.

4.4 Other

D. Muir asked about the data needs for neutron radiation therapy. J. MacDonald stated that neutron cross sections are needed from about 5 MeV to 50 MeV.

S. Pearlstein raised the question of the biological effectiveness of neutrons. The recent reassessment of the bomb results indicate that the effectiveness of neutrons is much worse than previously thought. This would require a greater accuracy in the neutron cross sections. K. O'Brien noted that the analysis by Rossi and Mays led to this, but their assumption of more neutrons delivered is probably wrong. New results indicate that the neutron doses were so low that this assumption cannot be supported. J.J. Coyne felt that the biological data were difficult to obtain and records were not well kept so there is doubt across the whole spectrum.

J.J. Coyne brought up the whole question of RBE's. Gammas and electrons have RBE's that can differ by a factor of three. Neutrons are more effective than 60Co electrons by a factor of ≈10. The neutron RBE is important from the viewpoints of exposure, therapy, and economics. K. O'Brien suggested the use of the ANSI standard dose to flux conversions, which are very conservative. J.J. Coyne mentioned the sustained very low dose problem. In response to a question by K. O'Brien, J.J. Coyne felt that there was not enough of a statistical data base to study the problem at the AGS.

K. Lathrop mentioned that the University of Chicago's CS-15 cyclotron is also used for neutron therapy. The chemistry laboratories above the cyclotron cannot be used when the machine is in use for therapy. They have also noticed in low-level work that there is a low-energy radiation whose source is unknown. J.J. Coyne pointed out that neutrons are also a problem at high-energy electron accelerators. In response to D. Muir's mention of room activation problems, J. MacDonald said that there are problems, but that there are various tricks to reduce these. J.J. Coyne noted that neutron cross sections are important right from the beginning. Data from tissue-equivalent proportional counters

must be corrected to reflect real tissue. He also noted that the margin of error is smaller for neutrons; a 5% change in neutron dose produces an observable reaction in patients.

5.0 FUSION DATA NEEDS

5.1 Cross Section Evaluation Working Group Charged-Particle Nuclear Data Subcommittee

T.W. Burrows briefly reviewed the activities of the CPND subcommittee of CSEWG. At the Spring 1980 meeting, an interim format for the exchange of evaluated charged-particle nuclear data was adopted.

J.J. Coyne mentioned the work by George Harrison, et al. at the University of Maryland Medical School, Baltimore. They are measuring proton-induced cross sections to 100 MeV as a means of predicting neutron-induced cross sections.

L. Gevantman noted that M. Berger, National Bureau of Standards, wishes to get into charged-particle nuclear data and is starting with an evaluation of stopping powers. According to J.J. Coyne, M. Berger has been working on this evaluation for two years and the results are very good, especially above the Bragg peak. In response to a question by K. O'Brien on the quality of the Bethe-Hiedler formalism above a few MeV, J.J. Coyne noted that the present work is taking into account shell corrections, etc. L. Gevantman noted that M. Berger was going for 1% accuracy.

According to J.J. Coyne, the big advantage of the present evaluation is a consistent treatment. Some of this work will appear in an ICRU report.

5.2 Neutron Data Needs

D. Muir said that there is a nice review[6] by O.M. Jarvis, Harwell, on neutron data needs related to fusion. This review should satisfy the action placed on H. Makowitz at the last Panel meeting. The review by O.M. Jarvis, covers approximately the same grounds as an earlier conference. He also mentioned that M. Abdou was the other representative from his division.

---

[6] O.N. Jarvis, in Nuclear Data for Fusion Reactor Technology, ed. by A. Lorenz and D.W. Muir. IAEA-TECDOC-223, 1979 (unpublished), p. 47.

6.0 REACTOR PHYSICS

T.W. Burrows summarized a letter by J. Rogers listing the data needs and subcommittees of the ASTM E-10 Committee.

D. Brenner mentioned the need for data on alternative fuels. Once you are far away from ^{235}U the data are very sparse. He is surprised that such data are not emphasized. S. Pearlstein noted that there is a strong emphasis on all the actinides and that this will develop. ENDF/B-V has a more complete library than earlier versions of ENDF. D. Brenner noted that there are some discrepancies in ^{239}Pu and problems with the antineutrino spectrum.

D. Muir noted that there is a formalized method of adding data requests to the DOE Request List.[7] This method is included as Appendix D. M. Bhat noted that the Request List is published every two years and the new list will appear in 1982. S. Pearlstein also called the Panel's attention to the DOE Status Reports[8] and WRENDA[9] and went over some examples of actinide data needs in the current request list. D. Muir noted that there are many peripheral problems with no specific funding. The DOE Request List and WRENDA are used by many foreign groups, including many small groups with 14-MeV generators to guide research activities. In response to J.J. Coyne's note that these publications cost money, S. Pearlstein stated that DOE contractors receive them free.

7.0 RESUME OF PANEL SURVEYS

T.W. Burrows summarized the results of surveys presented to the Panel and the results of earlier studies and surveys.[10] He

---

[7] National Nuclear Data Center, Brookhaven National Laboratory, ed. for DOE Nuclear Data Committee, Brookhaven National Laboratory Report BNL-NCS-51354, 1981 (unpublished).

[8] National Nuclear Data Center, ed. for U.S. Dept. of Energy Nuclear Data Committee, Brookhaven National Laboratory Report BNL-NCS-26133, 1979, (unpublished).

[9] N. DayDay, ed., IAEA Nuclear Data Section Report INDC(SEC)-78, 1981 (unpublished).

[10] T. W. Burrows, as a Brookhaven National Laboratory Report BNL-NCS-51635 (unpublished).

emphasized that the general areas of needs have been consistent over the years. An action was placed upon T.W. Burrows to expand and complete this summary and for the Panel to iterate on this expanded version to express definite needs.

D. Muir asked if there is an attempt to restrict the definition of reference data. S. Pearlstein felt that the primary restriction is the uniqueness of values (Ed. Note: See the Minutes of the Third Annual Meeting of the Panel on Reference Nuclear Data[11] for a more complete definition of reference nuclear data).

S. Pearlstein felt that the Panel should consider the possibilities. Are additional publications needed? Are more specialized publications (e.g. for fusion) required? Fiche production is cheap and relatively easy to update. The heavy computerization of reference nuclear data would make restricted publications in hard copy, etc., possible.

K. Lathrop noted that Mallinckrodt Nuclear has distributed a trilinear chart and wondered on the source of their data and its reliability.

S. Pearlstein brought up the problem of compactness versus depth. The Table of Isotopes has been very useful, but the last edition took ten years to produce. The U.S. Nuclear Data Network and the IAEA-sponsored Nuclear Structure and Decay Data Network have a goal of a four-year cycle time on evaluations. In accord with this goal, it is planned that the Radioactivity Handbook be published every four to five years. The Handbook is expensive; what will happen if it is on a four-year cycle?

D. Muir mentioned the possibility of distributing data on tapes. S. Pearlstein noted that the next edition of BNL-325[12] would be available through Academic Press, but the data would be available on tapes and might be more useful in this form.

---

[11] T. W. Burrows, L. Stewart, and J.J. Coyne, Brookhaven National Laboratory Report BNL-NCS-51023, 1979 (unpublished).

[12] S. F. Mughabghab, M. Divadeenam, and N. E. Holden, Neutron Cross Sections, Vol. I, Neutron Resonance Parameters and Thermal Cross Sections, Part A: Z=1 to 60 (Academic Press, New York, 1981): ibid, Neutron Resonance Parameters and Thermal Cross Sections, Part B: Z=61-100 (to be published, Academic Press, New York): R.R. Kinsey and V. McLane, ibid., Vol. II, Neutron Cross Section Curves (in preparation).

S. Pearlstein stated that the suggestions and ideas presented at the Panel meetings would help shape the activities of the data centers.

J.J. Coyne mentioned the increased activity in neutron dosimetry for personnel and asked if these needs were being fed into the NNDC. According to S. Pearlstein, CSEWG is funded to do work satisfying the central body of data needs. Other related needs should be made known and funded representatives sent to CSEWG; CSEWG is not an organization of users. If a list of contacts could be obtained, a possible relationship could be developed, perhaps with the Shielding Subcommittee (Ed. Note: C. Weisbin, chairman of the Subcommittee has taken the initiative by contacting T. W. Burrows for a list of interested Panel members).

J.J. Coyne opened a discussion on Radiation Research by describing some current European efforts in the area. The Europeans are developing, as an area monitor, a tissue-equivalent proportional counter with a minicomputer to give a measure of quality. A Swedish group is considering redefining quality relative to a tissue-equivalent proportional counter since linear energy transfer is not a measureable quantity. An action was placed upon J.J. Coyne to provide the NNDC with the necessary information on people interested in the above.

J. MacDonald noted that groups at Batelle Northwest and EG&G, San Diego are actively involved in this area and according to J.J. Coyne, NASA is involved through the Batelle group. According to K. Lathrop, this also touches upon the problem of calculating absorbed doses in humans using Monte-Carlo technique or mathematical models. Some experimental work on absorbed doses has started. J.J. Coyne raised the question of conversion from absolute dose to effective dose. A detailed discussion of methods followed.

S. Pearlstein asked if there are benchmark measurements to check the calculations. K. O'Brien stated that there have been sphere measurements of external ionizing radiation and comparisons have been made with calculations. K. Lathrop emphasized that the current benchmarks are for external dose, not internal, and noted that there is a legitimate concern about the accuracy of phantom calculations. Some attempts are currently being made on internal dose benchmarks.

L. Gevantman described the current reorganization at the Bureau. The Photonuclear and X-ray Ionization Data Centers have been combined into the Photon and Charged-Particle Data Center, with M. Berger as head. The current interests of the Center are photon attenuation, charged-particle stopping powers, where there is a current evaluation effort, and photonuclear. Although

E. Fuller has retired, he is still actively involved in producing one more photonuclear index and completing three photonuclear evaluations. The Center is currently heavily involved in automating the data files and developing appropriate formats. Responding to a question from T.W. Burrows, J.J. Coyne noted that the current stopping power evaluation has built upon the earlier work of Ziegler,[13] but should be better since a more universal approach is used.

K. O'Brien described an idea to convert a Bonner spectrometer into a single device. The device would have a cubical geometry and Monte-Carlo technique with combinatorial geometry would be used for unfolding. This device would measure the scaler flux not angular flux. He also noted that, in high-energy applications, there is great interest in differential, "inclusive" cross sections which are difficult to calculate. There is also a need for low- and high-energy activation cross sections.

8.0 DEFINITION OF STANDARD DATA

Since D. Harris was unable to attend, the discussion was limited. T.W. Burrows attempted to briefly described the problem D. Harris hoped to raise. D. Harris is on two standards subcommittees of ANS. In adopting standards covering basically the same data, these two committee have taken different approaches. One group, emphasizing that standards should be well documented, adopted a data set based upon ENDF. The other group, because of better agreement with experimental data, adopted a proprietory data set where documentation is not widely available. He had hoped that the Panel could discuss the advantages and disadvantages of each approach, including the interesting idea that by adopting a proprietory data set leverage may be gained in releasing the documentation.

9.0 NATIONAL AND INTERNATIONAL COOPERATION

S. Pearlstein briefly reviewed the status of national and international cooperation with the major emphasis on the effort by the U.S. Nuclear Data and IAEA-Sponsored Nuclear Structure and Decay Data Networks to reduce the cycle time of nuclear structure evaluations to a nominal four years. J.J. Coyne asked about the availability of ENDF/B-V to the Europeans. S. Pearlstein replied

---

[13] J.F. Ziegler, ed., The Stopping and Ranges of Ions in Matter (Pergamon Press, New York, 1977).

that this is unchanged. While most of the file is available, e.g. standards, dosimetry, fission products, etc., the General Purpose File is not available. He also encouraged Europeans with specific interests to make requests since some exceptions are made.

10.0 DESCRIPTION OF DATA FILES AND SERVICES

V. McLane briefly described the products and services of the NNDC, the computation format, and contents of data files resident at the Center. J.J. Coyne asked if the NNDC received photonuclear data from the Bureau. The photonuclear data currently in the Center's file are from Berman and the Moscow Photonuclear Data Center.

S. Pearlstein asked about the photonuclear scanning effort at the Bureau. L. Gevantman said that there would be one more photonuclear Data Index, but further additions are an open question. The automation of the photonuclear data files at the Bureau is progressing. S. Pearlstein urged talks between the Bureau and the Center. C. Dunford mentioned that monthly updates from the Nuclear Structure References File are sent to E. Fuller and wondered how complete these were in regard to photonuclear data. S. Pearlstein thought that the overlap should be explored.

11.0 TRANSFER OF RESPONSIBILITIES AND STATUS OF ENSDF

J.K. Tuli summarized the transfer of maintenance and publication responsibilities of NSR and ENSDF from the Nuclear Data Project to the NNDC and current retrieval capabilities from ENSDF. Responding to a question from L. Gevantman, it was noted that "Recent References" and Nuclear Data Sheets are still published by Academic Press. In answer to a question from J.J Coyne, the regular mechanism of requesting nuclear structure data is to contact F.M. Scheffel or J. K. Tuli at the NNDC.

E. Kamykowski asked about the present level of requests (are these approaching the manpower limit) and the demographic breakdown. Manpower limits have not been approached yet in handling requests and no demographic breakdown has been made.

D. Brenner, relating to some of the specialized retrievals shown, asked if there was the capability of doing some computational work on the retrievals, e.g. 4+/2+ energy ratios. J.K. Tuli responded that this is possible but requires additional effort. S. Pearlstein emphasized that the NNDC considers these data as a national and international resource and is working in improving the documentation of, adding additional checking of, and improving the consistency of ENSDF. C. Dunford reiterated that

specialized retrievals are limited, not standard. D. Brenner stated that just the retrieval of data is useful.

The Panel, in general, expressed great interest in a capture-γ retrieval by J.K. Tuli. Although C. Dunford noted that this retrieval could be made available on microfiche from the Center, there appeared to be a consensus that this retrieval should be more widely available through publication. A comprehensive capture gamma data set has just been published by M.A. Lone et. al in At. and Nucl. Data 26, 511 (1981), and the retrieval by J.K. Tuli will be published as BNL-NCS-51647 (1983).

D. Brenner raised the question of the number of pages of Nuclear Data Sheets versus the cycle time of evaluations. Currently, 2100 pages are published annually, including "Recent References", and evaluations are on 7-year cycle time. Reducing the cycle time to four years would raise the annual publication size to roughly 3300 pages. C. Dunford noted that various choices could be made in addition to increasing the number of pages. S. Pearlstein agreed that economics would be a big factor.

In response to a question by D. Muir, J. K. Tuli noted that the publication program does use DISPLA, but involved a significant effort by C. Dunford and R. R. Kinsey. Responding to a question by L. Gevantman, C. Dunford noted that the concepts used turned out to be very similar to those by C.M. Lederer for the Table of Isotopes, but were developed independently at the NNDC.

J.J. Coyne felt that medical people are overwhelmed by the amount of data available. J.K. Tuli cited the Radioactivity Handbook as an attempt to address this problem. Other horizontal compilations would be useful. S. Pearlstein reiterated that the Panel would be useful in defining new publications.

12.0 STATUS REPORT OF THE RADIOACTIVITY HANDBOOK

T.W. Burrows presented the status report by J. Dairiki on the Radioactivity Handbook.[14] There was no discussion.

---

[14] J.M. Dairiki. "Radioactivity Handbook" in Proceedings of the First Conference on Nuclear Structure Evaluation ed. R. B. Firestone, U.S. Shirley, and J. M. Dairiki (Lawrence Berkeley Laboratory Report LBL-14070, 1982 p. 23, (unpublished)).

13.0 STANDARDS FOR GE(LI) CALIBRATION

J.J. Coyne presented the draft introduction of a report being prepared by D.D. Hoppes and F.J. Schima on Standards for Ge(Li) Calibration. D. Brenner noted that the calibration sources based on NBS standards are very good; however, commercial sources are often extremely unreliable. According to L. Gevantman, there was similar experience with radiopharmaceuticals and the Bureau had to step back in.

14.0 ON-LINE DATA BASE SYSTEMS

W. Kropp briefly outlined the capabilities of the NNDC system and the Center's experiences relative to on-line retrievals. The standard operational mode at the Center is interactive and the programs currently used are almost "user friendly." Some effort would be required, but on-line retrievals are well within the capabilities of the system.

S. Pearlstein suggested a possible hierarchy on the implementation of an on-line system:

1. Bibliographic, with emphasis on Recent References and defaults on checking the size of the retrieval for transmission or mailing.

2. Retrievals of a subset of evaluated data ($T_{1/2}$), thermal neutron cross sections, etc.).

3. More general data retrievals, but limits on size of files for transmission.

He emphasized that the NNDC does have the capability, but is conservative on implementation and would require good justification to do this. C. Dunford noted that this would require seed money and money is tight. There is a question of priorities. W. Kropp noted that terminals and remote access are very common now and felt that now is the time to open the door.

This introduction generated a general discussion which centered on on-line access to files resident at the NNDC, providing data to on-line systems already in existence, and providing programs and data files to users. There were also some more general comments. The new generation of users is very heavily computer-oriented and acquainted with interactive systems; while a user might be reticent about disturbing a person for information, there is no reticence about bothering a machine.

Among the suggestions for on-line access to files resident at the Center, L. Gevantman suggested, as a start, allowing access to the US Nuclear Data Network and hospitals involved in neutron therapy. K. Lathrop suggested a booth at the Society of Nuclear Medicine meetings. A central terminal at Brookhaven for NSR retrievals was suggested by D. Brenner. E. Kamykowski suggested contacting technical libraries and industrial laboratories. D. Muir suggested the possibility of providing the necessary programs to users so that, in addition to having a retrieval, the data could be manipulated on-line. The beauty of on-line access is that the same data are being accessed by all users. C. Dunford pointed out that ensuring transferability of programs is not easy; data base management systems are not standardized.

Although NSR has been included in RECON system, the NNDC is not currently sending data to RECON. According to C. Dunford, there appeared to be little access of NSR within the system. L. Gevantman suggested that the Center send tapes for inclusion in the on-line chemical information system. The use of this system is leased to recover costs and there is a management system to evaluate use. S. Pearlstein said that the NNDC will look into providing such a tape.

D. Muir suggested, as a compromise, that tapes of selected data and programs be distributed. S. Pearlstein felt that computation formats are very useful and said that the Center would provide K. Lathrop with a list of relevant computer-independent codes.

D. Brenner attempted to summarize by asking whether funders should support personal contact, computer contact, or everybody developing their own systems.

15.0 OTHER ACTION ITEMS

With the exception of actions on D. Muir and H. Makowitz all actions placed on people at the Fifth Annual Meeting[1] have been satisfied. D. Muir felt that the actions on him to see that Brookhaven has the latest version of NJOY is almost satisfied. He also felt that the review by Jarvis satisfies the action on Makowitz to provide a list of activation data required for fusion design.

16.0 SUMMARY OF ACTIONS

T.W. Burrows complete survey of surveys.

J.J. Coyne provided the NNDC with information on people interested in neutron dosimetry (e.g. with respect to tissue equivalent proportional counters and quality factor).

J. MacDonald provide more information to the Panel on the new neutron therapy machines he discussed during the meeting.

NNDC make the results of the radioisotope survey being performed by the IAEA available to the Panel.

Panel review survey of surveys and needs for new publications and services, and respond.

17.0 ADJOURNMENT

The meeting was adjourned with the suggestion that the next meeting be held in about one year.

18.0 ACKNOWLEDGEMENTS

The Panel on Reference Nuclear Data, consisting of professional users' groups of nuclear data, was initiated by S. Pearlstein in 1975.

T.W. Burrows and J.J. Coyne were gratefully thanked for their services to the Panel.

APPENDIX A

PANEL ON REFERENCE NUCLEAR DATA

Membership - October 15, 1981

American Association of Physics in Medicine:

Dr. Joseph C. McDonald
Memorial Sloan-Kettering Cancer Center
Biophysics Laboratory
1275 York Avenue
New York, New York 10021

American Chemical Society:

Division of Nuclear Chemistry and Technology

Dr. Daeg S. Brenner*
Bldg. 510
Physics Department
Brookhaven National Laboratory
Upton, New York 11973
(Vice-Chairman, Panel on Reference Nuclear Data)

Dr. Nabil Morcos
Bldg. 830
Department of Nuclear Energy
Brookhaven National Laboratory
Upton, New York 11973

*Permanent Address:
Chemistry Department
Clark University
Worcester, Massachusetts 01610

American Nuclear Society:

Division of Controlled Nuclear Fusion

Dr. M. Abdou
Applied Physics Division
Bldg. 208
Argonne National Laboratory
9700 South Cass Avenue
Argonne IL 60439

Dr. Douglas Muir
T-2 Nuclear Data
T-2 Nuclear Data
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

Division of Isotopes and Radiation

Dr. Michael D. D'Agostino
Grumman Aerospace Corporation
Research Department, Plant 26
Bethpage, New York 11714
(ex-officio)

Dr. Edward Kamykowski
Grumman Aerospace Corporation
Research Department, Plant 26
Bethpage, New York 11714

Dr. Jack Trombka
NASA - Goddard Space Flight Center
Laboratory for Theoretical Studies
Greenbelt, Maryland 20910

Division of Radiation Protection and Shielding

Dr. R. Roussin
Oak Ridge National Laboratory
Post Office Box X
Oak Ridge, Tennessee 37830

Dr. Leona Stewart*
Oak Ridge National Laboratory
Post Office Box X
Oak Ridge, TN 37830

Division of Reactor Physics

Prof. Donald R. Harris
Department of Nuclear Engineering
Rensselaer Polytechnic Institute
Troy, New York 12181

ASTM, E-10 Committee

Dr. J.W. Rogers
TRA Area
EG&G Idaho Inc.
TRA652, P. O. Box 1625
Idaho Falls, Idaho 83415

Dr. W.N. Bishop
Babcock and Wilcox Company
Post Office Box 1260
Lynchburg, Virginia 24505

Health Physics Society:

The Thomas J. Bauer
University of Florida
4735 N.W. 28th Terrace
Gainesville, Florida 32605

Institute of Electrical and Electronic Engineers:

Nuclear Science and Plasma Society

---

*Permanent address:
Los Alamos National Laboratory
Post Office Boc 1663
M.S. 243
Los Alamos, New Mexico 87545

Dr. James E. Cline
Science Applications, Inc.
#3 Choke Cherry Road
Rockville, Maryland 20850

Dr. George H. Miley
University of Illinois
214 Nulcear Engineering Laboratory
Urbana, Illinois 61801

Radiation Research Society:

Dr. Randall S. Caswell
Center for Radiation Research
National Bureau of Standards
Washington, DC 20234

Dr. J.J. Coyne
Center for Radiation Research
National Bureau of Standards
Washington, DC 20234
(Chairman, Panel on Reference Nuclear Data)

Society of Nuclear Medicine:

Dr. Robert H. Rohrer
Department of Physics
Emory University
Atlanta, Georgia 30322

Medical Internal Radiation Dose Committee

Dr. Katherine A. Lathrop
Franlkin McLean Memorial
University of Chicago
950 East 59th Street
Post Office Box 420
Chicago, Illinois 60637

The Radiopharmaceutical Council

Dr. Frank P. Castronovo
The Massachusetts General Hospital
Radiology Department
Boston, Massachusetts 02114

APPENDIX B

ATTENDEES AND OBSERVERS TO THE SIXTH MEETING

NAME	INSTITUTE*	SOCIETY REPRESENTATION*
Bhat, M.R.	Brookhaven National Laboratory	
Brenner, D.S.	BNL/Clark Univers'	Div. of Nuclear Chemistry and Technology, ACS
Burrows, T.W.	Brookhaven National Laboratory	
Coyne, J.J.	National Bureau of Standards	Radiation Research Society
Dunford, C.L.	Brookhaven National Laboratory	
Gevantman, L.	National Bureau of Standards	
Kamykowski, E.	Grumman Aerospace	Div. of Isotopes and Radiation, ANS
Kropp, W.	Brookhaven National Laboratory	
Lathrop, K.	University of Chicago	Society of Nuclear Medicine
McDonald, J.	University of California (UCLA)	AAPM
McLane, V.	Brookhaven National Laboratory	
Muir, D.	Los Alamos National Laboratoty	Controlled Fusion, ANS
O'Brien, K	Department of Energy (DOE)	
Pearlstein, S.	Brookhaven National Laboratory	
Tuli, J.K.	Brookhaven National Laboratory	

SOCIETIES:
ACS = American Chemical Society
ANS = American Nuclear Society
AAPM = American Association of Physicists in Medicine

APPENDIX C

Preliminary Agenda

Sixth Annual Meeting of the Panel

on Reference Nuclear Data

Brookhaven National Laboratory

1:00 PM October 15
to
Noon October 16, 1981

Conference Room
The National Nuclear Data Center Bldg. 197D

THURSDAY, OCTOBER 15

I.	Welcome	S. Pearlstein (1:00-1:10)
II.	Approval of Agenda and the Minutes of the Fifth Meeting	J. J. Coyne (1:10-1:20)
III.	Election of Officers	J. J. Coyne (1:20-1:50)
IV.	Biomedical Data Needs	(1:50--3:00)
	A. Radiopharmaceutical Council Survey*	F. P. Castranovo
	B. Medical Cyclotrons in Use*	K. Lathrop
	C. Charged-Particle Data Needs and Private Libraries which may satisfy such needs	J. MacDonald
	D. Other	
Coffee Break		(3:00-3:10)

*Handout included

V. Fusion Data Needs (3:10-4:00)

A. Charged-Particle

1. CSEWG Charged-Particle Nuclear Data Sub-committee — T. W. Burrows

B. Neutron

VI. Reactor Physics Data Needs (4:00-4:50)

A. Neutron
B. Charged-Particle
C. Photonuclear
D. Other

VII. Resume of Surveys — T.W. Burrows (4:50-5:00)

FRIDAY, OCTOBER 16

VIII. Standard Reference Nuclear Data — D. Harris (9:00-9:30)

IX. Status of International and National Cooperation — S. Pearlstein (9:30-9:45)

X. Status and Availability of Data Files (9:45-10:00)

A. Reaction Data - Experimental and Evaluated — V. McLane
B. Nuclear Structure and Decay Data - Evaluated — J.K. Tuli
C. Bibliographic-Neutron, Charged Particle and Nuclear Structure — V. McLane

XI. Status of Publications (10:00-10:40)

A. "Radioactivity Handbook" — J.M. Dairiki
B. Transfer of the Nuclear Data Sheets — J.K. Tuli

	C. Nuclear Data for the Efficiency Calibration of Germanium Spectrometer Systems	J.J. Coyne
	D. Other	
Coffee Break		(10:40-10:45)
XII.	On-Line Data Base Systems	(10:50-11:15)
XIII.	Miscellaneous Action Items from the fifth meeting	(11:15-11:30)
XIV.	Summary of Recommendations and Actions	D. S. Brenner (11:30-11:45)
XV.	Adjournment	D. S. Brenner (11:45-12:00)

APPENDIX D

DOE-NDC COMPILATION OF REQUESTS FOR NUCLEAR DATA

Request for measurements of nuclear data should be transmitted by the requesting laboratories to the National Nuclear Data Center (NNDC) at Brookhaven National Laboratory. Requesters' comments should include statements as to the importance and application of the request. Data requests should be submitted to the designated representative who will coordinate the requests originating from each laboratory and do an initial screening. If your institution does not have a designated representative, requests may be submitted directly to the NNDC.

In accepting a request for nuclear data, the DOE/NDC assumes that the originator or the sponsoring agency has established that the existing data base has been reviewed and determined to be inadequate. In this regard, comments on evaluations that may be necessary, or the need for results from further theoretical work, should be included in the request. Originators of data requests must be realistic and exercise good sense and moderation, as well as a sense of proportion, in assembling their list. Requests should be ordered in terms of priority, in consultation with the program sponsors, to judge the importance of requests from the viewpoint of the whole program. From this list, a few of the most important requests should be chosen and submitted for the Data Request Compilation. This will prevent the Compilation from becoming an exercise in wishful thinking in which most of the requests do not stand an appreciable chance of ever being fulfilled.