International Atomic Energy Agency

INDC(NDS)-46/U+W

INDC INTERNATIONAL NUCLEAR DATA COMMITTEE

CONCLUSIONS AND RECOMMENDATIONS

FIRST MEETING OF THE INTERNATIONAL WORKING GROUP ON NUCLEAR STRUCTURE AND REACTION DATA (IWGNSRD)

VIENNA, 13 - 17 MARCH 1972

Edited
by

L. Hjärne

Vienna, August 1972

IAEA NUCLEAR DATA SECTION, KÄRNTNER RING 11, A-1010 VIENNA

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CONTENTS

I. SUMMARY OF RECOMMENDATIONS

1. International cooperation

(see paragraphs II.3.C, beginning of III, IV.2., Appendices A and B).

The Working Group agreed that the extensive compilations which are performed by the Oak Ridge Nuclear Data Project and other compilation groups in the field of nuclear structure and reaction data are a necessary and very useful basis, not only for fundamental research, but also for all important fields in the application of nuclear data. They are used on a world-wide basis as an essential source of information for many purposes including compilations on special topics and evaluations.

The Working Group recommends that this work be continued with all possible effort and that the IAEA ask member states to actively participate in supporting the nuclear data activities of international interest at major compiling centres. The Working Group wishes to encourage all actions that can contribute to keeping the compilations up-to-date. These objectives may be accomplished in two ways:

a) By international cooperation, such as support in the form of temporary secondment of qualified scientists to existing compilation groups, where this is acceptable. In general a secondment of less than one year is unlikely to be effective.

b) Through agreements between compilation groups to share out responsibilities.

Among centres for which such support would seem particularly advantageous at the present time there are:

a) The Nuclear Data Project, Oak Ridge National Laboratory, USA; to participate in A chain evaluations and further expand the broad international usage of their keywording and reference systems.

b) The groups preparing compilations of charged particle data, (1) the Institute of Radiochemistry, Gesellschaft f. Kernforschung, Karlsruhe, Germany and (2) the Charged-Particle Cross-Section Data Center, Oak Ridge National Laboratory, USA.

c) One or more regional data centres could be set up in the Soviet Union to facilitate the data flow from and between laboratories in the USSR.

d) The EURATOM group engaged in evaluation of data on the decay of radioisotopes could also be expanded to include more external participation.

2. Survey of nuclear data needs

In the mass chain compilations certain parameters are omitted and only a limited amount of attention is given to the evaluation of some specialized data. Also, the requirements for some groups of users can be answered better by another format in presenting certain categories of data. There is therefore a need for other and more specialized compilations and evaluations, such as cross-section compilation for radioisotope production as performed by the Karlsruhe Nuclear Chemistry Group, decay schemes for the biomedical field, etc. A survey of needs should be made where considered necessary in the fields of both pure and applied sciences. The Working Group recommends that the IAEA coordinate such inquiries. The members of the Working Group, however, will help conducting the inquiries and the processing of answers for their own country, region or speciality.

3. Request list for non-neutron nuclear data for fission reactors

(see paragraph III, 1)

Recognizing the experience of INDC with the request list RENDA for neutron data measurements for fission reactors it is recommended that INDC assist the Working Group and develop an international request list for non-neutron nuclear data for fission reactors. This list should include requests for measurements as well as for evaluations.

4. Nuclear data for activation analysis

(see paragraph III, 5)

It was pointed out that errors in nuclear data may have considerable influence on the errors in activation analysis (see, e.g. Quittner Pál, Magyar Fizikai Folyoirat XVI, 5 (1968), 421). The Working Group recommended that previous studies of this error propagation should be continued.

5. Nuclear data for application of radioisotopes

7. Reference system of the Oak Ridge Nuclear Data Project

The complexity of the problem of extending CINDA to encompass all nuclear data under discussion is considered to outweigh the gain that can be expected. For most purposes, a sufficiently complete bibliography can be obtained by a relatively small extension of the Nuclear Data Project's reference system. The Working Group is pleased to note that the Nuclear Data Project is considering an extension of the scope of its system as well as the depth of the indexing of these references in its keyword system. It is recommended that experts in the field make their views known to the Nuclear Data Project on this matter.

8. Computer storage and retrieval of experimental nuclear data

(See paragraph IV,5)

In principle, a system for computer storage and retrieval of experimental numerical data would be very desirable. It is recognized, however, that such a general system would be very complex and its attainment certainly some way in the future. It is noted, though, that some such systems for limited subject areas are in the development stage. It is recommended that these developments be encouraged, and that the Working Group be kept informed of their progress.

9. Recommendation to editor of nuclear physics journals

(See paragraphs IV and Appendix D)

The Working Group approved a recommendation to editors of nuclear physics journals prepared by a small subcommittee. It recommends that this document be sent by the Chairman of the Working Group to publishers of nuclear physics journals.

10. Newsletter on non-neutron nuclear data

(See paragraph II,3 A)

The Working Group recommends that ways be examined of publishing a newsletter on compilation and evaluation of non-neutron nuclear data.

II. REPORT OF SUBGROUP S ON STATUS

(Chairman: B.J. Allen)

1. On the basis of reports presented by meeting participants, a summary of compilation, evaluation and dissemination activities was made in a standard format. (Appendix A).

2. A list of compilations including several not reported during the meeting, was drawn up in an attempt to achieve a more extensive status report on the world situation (Appendix B). In establishing this list, the Cumulative Subject Index of the Journal Nuclear Data, Part A, and the CODATA Compendium on Numerical Data Projects, Springer Verlag, Berlin'69 were very helpful.

3. Recommendations

A) We recommend that ways be examined of publishing a newsletter on compilation and evaluation of non-neutron nuclear data. This newsletter would contain brief (roughly one page) contributions giving the status and future plans from active compiling groups. It would be issued twice a year.

The first issue would contain the group status reports (Appendix A). As a first step towards this goal the Nuclear Data Section was asked to investigate the possibility of issuing the newsletter with an initial distribution list based partly on Appendix B. It is noted that the CODATA Newsletter contains recently published compilations in nuclear physics. Some combined document incorporating our current status reports with the CODATA list of recent compilations in nuclear physics and distributed as per Appendix B would appear ideal for our purposes.

B) The working group took note of inconsistencies in compiled data on intensities of neutron capture γ-rays and of the usefulness of these data in shielding and other applications. It is recommended that current efforts be encouraged to rectify these deficiencies by evaluation or if necessary extra measurements.

C) We recommend that the IAEA ask member states to actively participate in supporting the nuclear data activities of international interest at major compiling centres. This may be achieved in particular by sending to and supporting physicists for extended periods at centres engaged in international data compilations. Among centres for which such or other support would seem particularly advantageous at the present time are:

1. The Nuclear Data Project, Oak Ridge National Laboratory, USA; to participate in A chain evaluations and further expand the broad international usage of their keywording and reference systems.

2. The groups preparing compilations of charged particle data (1) the Institute of Radiochemistry, Gesellschaft für Kernforschung, Karlsruhe, Germany and (2) the Charged-Particle Cross-Section Data Center, Oak Ridge National Laboratory, USA.

3. One or more regional data centres could be set up in the Soviet Union to facilitate the data flow from and between laboratories in the USSR.

4. The EURATOM group engaged in evaluation of data on the decay of radioisotopes could also be expanded to include more external participation.

III. REPORT OF SUBGROUP A ON APPLICATIONS

(Chairman: W. Michaelis)

General observations

The Working Group agreed that the extensive compilations which are performed by the Oak Ridge Nuclear Data Project and other compilation groups in the field of nuclear structure and reaction data are a necessary and very useful basis, not only for fundamental research, but also for all important fields in the application of nuclear data. They are used on a world-wide basis as an essential source of information for many purposes including compilations on special topics and evaluations. It is therefore recommended to continue this work with all possible effort and to have it up to date as soon as possible.

The Working Group agreed that it should try to make the presently existing efforts in compilation and evaluation more effective with respect to the application of nuclear data and to find out or initiate, if necessary, steps for improving the fulfillment of data needs in special fields. When considering the application of data it has to be kept in mind that along with routine applications where very often data needs are limited, for instance because of reliance upon standards, there is a necessity for innovation processes which may require special actions.

The Working Group considered the following application fields:

1. Fission reactors
2. Shielding
3. Safeguards
4. Fusion
5. Activation analysis and radioisotope production
6. Application of radioisotopes
7. Astrophysics and space research
8. Special topics.

As an immediate action the Working Group decided to try to identify the most important data fields for these applications and to provide in each case references to presently existing compilations and evaluations, making use of the list developed by Subgroup S with respect to nuclear structure and reaction data (Appendix B).

The question as to the effects of existing standards on the requests for new data was raised. However, the Working Group did not feel, it could and should consider this question during its present deliberations, but felt that at future meetings this topic should be seriously considered.

1. Fission reactors

The discussion was mainly based on the Working Papers nos. 9 and 19.

Data fields	Ref.
a) Nuclear level properties	4-10, 20, 22, 23
energies of the levels	4-10
spins and parities of the levels	4-10, 22
deformation parameters	23
b) Nuclear masses, Q-values and neutron binding energies	14,15
c) Level density parameters	no generally accepted reference compilation is available
d) Decay modes of levels and branching ratios	4-10, 20
multipolarity of photons and mixing parameters	4-10, 20
level widths and half-lives	4-10, 20
internal conversion coefficients	26
e) Secondary gamma-ray spectra from neutron-induced reactions	16-19, 25
f) Specific charged particle cross sections	11-13
g) Specific (γ,n) cross sections	21

The most important isotopes are:

- isotopes of structural materials for a,b,c,d and e (about 16 elements)
- heavy isotopes for a,d and e (about 15 isotopes)
- some light elements for d,e, f and g
- specific light and medium mass isotopes for f and g
- some fission products for b and d
- product nuclei from activation of some elements used as neutron detectors for d.

The Working Group concluded that the presently existing requests are not yet enough concrete and are too general to determine whether or not they might already be satisfied by existing data and/or compilations. In particular a much better specification of the isotopes is needed. Priorities and required accuracies have not yet been developed. It is agreed that this should not be done by the working group.

Recognizing the experience of INDC with the request list RENDA for neutron data measurements for fission reactors it is recommended that INDC assist the Working Group and develop an international request list for non-neutron nuclear data for fission reactors. This list should include requests for measurements as well as for evaluations.

However, it is felt that much of the requested data are available and that the requests will preferably concern compilation and evaluation. The references given above are supposed to be of considerable help for the users in this field.

2. Shielding

It was agreed that both reactors and accelerators should be discussed under this topic with the exclusion of very high energy machines ($> \sim 1$ GeV).

Data fields:	Ref.
a. Secondary gamma-ray spectra from neutron reactions	16-19, 25, 27
b. Secondary gamma-ray spectra from charged particle reactions	?
c. Gamma-ray production cross sections in neutron reactions	?
d. Gamma-ray production cross sections in charged particle reactions	-
e. Neutron production cross sections in charged particle reactions	-
f. Energies and intensities of gamma rays emitted in radioactive decay	4-10, 20

It was felt that many of these data needs are already well covered. Furthermore it was pointed out that the Radiation Shielding Information Centre (RSIC) at Oak Ridge offers an extensive service including codes and programmes.

Mr. Horen was asked to contact RSIC and to find out to what degree new or better nuclear data information is needed and what codes and files are available for Non-US users. If RSIC needs further data, the discussion should be continued at the next meeting of the working group. (Note added by NDS: After the meeting was announced the establishment of ESIS, the European Shielding Information Service at ISPRA; see Appendix A)

3. Safeguards

The discussion was based on Working Paper no. 20. Mr. Byer from the Nuclear Data Section of the IAEA who pointed out that within the safeguards community as a whole, there is still no generally accepted view as to the role which new neutron or non-neutron nuclear data may play in the development of new, or the refinement of existing, safeguarding techniques.

The present status may be summarized as follows: IAEA has received from three of its Member States officially sanctioned lists of data needed by the safeguards development groups in these states. It is planned that when these lists of data needs have been completely finalized, particularly regarding the status, priorities and justification of requests, the lists will be widely distributed under the auspices of the INDC.

The Working Group stated that most of the data needs specified in the official lists are requests on measurements and not on compilation or evaluation. It was agreed that no immediate action of the working group is required. The unofficial request lists seem to contain many data which are readily available. The report of this meeting should therefore be distributed to these requestors.

On the basis of the existing official request lists the following categories of non-neutron nuclear data are relevant:

Data fields:	Ref.:
a. Photoinduced reaction data, total and delayed neutron yields, delayed gamma-ray yields from fission products	21
b. Decay scheme and half-life data	4-10, 20
delayed neutron yields	-
gamma-ray intensities	16-19
c. (γ,n) reactions neutron yields	11-13
d. Neutron-induced reactions fission product gamma-ray spectra neutron capture gamma-ray spectra	16-17
e. Macroscopic quantities specific decay heats	

4. Fusion

The discussion started from Working Papers nos.9 and 21.

Data fields	Ref.
a. Neutron activation cross sections for structural materials	4 neutron data centres
b. Charged particle activation cross sections for structural materials	11 - 13
c. Decay schemes gamma-ray spectra half-lives	4 - 10, 20
d. Charged particle cross sections	11 - 13

Data for light-element charged-particle reactions related to potential fuel cycles are only poorly known. These data are of interest to plasma physicists but will receive high-priority only if they show potential utility in a reactor context.

Charged particle reactions with heavier elements (e.g. structural materials, plasma contaminants) will be required when reactor designs are sufficiently advanced to show where and with what materials these reactions are likely to occur.

At present the data of highest priority appear to be in general either neutron or non-nuclear.

At present the Nuclear Data Section of the IAEA is preparing a report on existing requests for INDC. The Fusion Council of the IAEA acts as a screening committee for these requests. The responsibilities are therefore well defined. It is felt that no immediate action of the working group is required. If it turns out that there are needs for better compilation or evaluation, INDC should forward this to the working group.

5. Activation analysis and isotope production

Examples for important fields of application are chemistry, geology, mining, forensic applications, biology, environmental research, impurity analysis and industrial applications.

Data fields	Ref.
a. Cross sections for reactions induced by γ, n, p, d, ^{3}He, ^{4}He Energy range up to 100 MeV	11 - 13, 21
b. Decay data half-lives	4 - 10, 20, 28
energies and intensities of gamma rays, beta- and alpha-particles branching ratios	4 - 10, 20
c. Prompt gamma-ray spectra from neutron-induced reactions capture reactions inelastic scattering	16, 17

d. Neutron production cross sections for charged particles and neutron spectra — 30, 31

As to topics a and b the Working Group stated that compilations and evaluations should cover all product nuclei with half-lives > 1 sec.

It was pointed out that there will be two conferences on activation analysis in the near future. The first one will be held at Karlsruhe in the Federal Republic of Germany on a national basis at the end of May 1972. The second one will be the International Conference on Modern Trends in Activation Analysis to take place at Saclay, France, 2-6 October 1972.

In order to initiate an inquiry on data needs, the representatives from Karlsruhe were asked by the Working Group to prepare a survey which should be presented at the next meeting of the working group. The Working Group decided to draft a circular with a questionnaire (see Appendix C). This circular should be widely distributed by Mr. Münzel, so that the result of the inquiry can be discussed at the Paris Conference in autumn.

It was pointed out that errors in nuclear data may have considerable influence on the errors in activation analysis (see, e.g. Quittner Pál, Magyar Fizikai Folyoirat XVI, 5 (1968), 421). The Working Group recommended that previous studies of this error propagation should be continued. This could perhaps be stimulated during the afore-mentioned conference.

It was also stated by the Working Group that very often, in basic nuclear physics research, information that is of great value in the application field is worked out, but is not published in the literature. This problem should be further discussed in subsequent meetings of the Working Group.

There was agreement among the members of the Working Group that at the present time atomic methods, such as x-ray fluorescence or electron emission spectroscopy, should not be included into topic 5. This might perhaps be considered at a later meeting.

6. Application of radioisotopes

Data field:	ref.
Radioactive decay data	1 - 10, 20

The Working Group strongly recommends that the thorough evaluation work of the C.E.C. group (Grinberg, Spernol et al.) should be continued, if possible, with a higher rate than about 10 nuclei per year.

It was pointed out that in some applications of radioisotopes, for instance in x-ray fluorescence, disturbances may occur due to low-energy, low-intensity radiation and especially some atomic data (e.g. mass absorption coefficients of gamma rays). A critical analysis of this problem was suggested. Mr. Berenyi suggested that C.G.Clayton or J.R. Rhodes be asked to carry out this critical analysis as invited speaker at the forthcoming Paris symposium (12-16 March, 1973). This survey can be the basis for further discussions in subsequent meetings of the Working Group.

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* "Radioisotope x-Ray Fluorescence Spectrometry" Report of a Panel held in Vienna 13 - 17 May 1968; IAEA Technical Report Series no.115 (115-STI/DOC/10/115).

7. Astrophysics and space research

Requests were received by the Working Group for data in the field of astrophysics. Most of them appear to be mainly for measurement of new data, and the Working Group concluded they should not devote time to this topic during this meeting. However, they wish to suggest that this field should definitely be considered appropriate for the Working Group at future meetings. With the approval of the Working Group, Wapstra will contact the International Astronomical Union about their possible wishes for compilations in the nuclear data field.

8. Special topics

The Working Group briefly considered pion beam therapy applications. It was stated that requested compilations on double differential cross sections for the production of pions are at least partially covered by the bibliography and data compilations which were recently provided by CERN, Berkeley and Dubna.

A suggestion of Dr. Mihul, at the Joint Institute for Nuclear Research, Dubna, USSR, was briefly discussed in the Working Group. Dr. Mihul had proposed that the Working Group include certain classes of elementary particle data in its scope. Although no objections to this inclusion, in principle, were made, it was felt that the scope was already very wide. Furthermore, the three high-energy physics centres cover at present quite well, in collaboration, data at nucleon energies above 1 GeV.

IV. REPORT OF SUBGROUP E ON EVALUATION

(Chairman: A. H. Wapstra)

1. The Working Group notes with satisfaction the concerted efforts to bring the mass chain compilations up-to-date within a three-year period.

2. The Working Group wishes to encourage all actions that can contribute to keeping the compilations up-to-date. It must be recognized that the value of a compilation decreases rapidly in the absence of continuing surveillance. This objective might be accomplished in two ways:

2.1. By international collaboration, such as support in the form of temporary secondment of qualified scientists to existing compilation groups, where this is acceptable. In general a secondment of less than one year is unlikely to be effective.

2.2. Through agreements between compilation groups to share out responsibilities. As far as sharing mass chain compilation is concerned it was encouraging to learn that the Nuclear Data Project has shown a willingness to make the content of its bibliographic system available to facilitate such work.

3. In the mass chain compilations certain parameters are omitted and only a limited amount of attention is given to the evaluation of some specialized data. Also, the requirements for some groups of users can be answered better by another format in presenting certain categories of data. There is therefore a need for other and more specialized compilations and evaluations, such as cross-section compilation for radioisotope production as performed by the Karlsruhe Nuclear Chemistry Group, decay schemes for the biomedical field, etc. A survey of needs should be made where considered necessary in the fields of both pure and applied sciences. The Working Group recommends that the IAEA coordinate such inquiries. The members of the Working Group, however, will help conducting the inquiries and the processing of answers for their own country, region or speciality.

4. The complexity of the problem of extending CINDA to encompass all nuclear data under discussion is considered to outweigh the gain that can be expected. For most purposes, a sufficiently complete bibliography can be obtained by a relatively small extension of the Nuclear Data Project's reference system. The Working Group is pleased to note that the Nuclear Data Project is considering an extension of the scope of its system as well as the depth of the indexing of these references in its keyword system. It is recommended that experts in the field make their views known to the Nuclear Data Project on this matter.

5. In principle, a system for computer storage and retrieval of experimental numerical data would be very desirable. It is recognized, however, that such a general system would be very complex and its attainment certainly some way in the future. It is noted, though, that some such systems for limited subject areas are in the development stage. It is recommended that these developments be encouraged, and that the Working Group be kept informed of their progress.

6. The Working Group approved a recommendation to editors of nuclear physics journals prepared by a small subcommittee. It recommends that this document be sent by Bartholomew as chairman of the Working Group, to publishers of nuclear physics journals. Wapstra was asked to provide Bartholomew with a list of publishers. The recommendation as well as the draft of the accompanying letter are contained in Appendix D.

V. TERMS OF REFERENCE OF THE WORKING GROUP

1. The Working Group has made a careful study of the draft terms of reference proposed for it by INDC. The changes which the Working Group has proposed were prompted exclusively by the desire to operate efficiently. The changes in question concern paragraph 1 and paragraph 2b. The Working Group is in agreement with all the other paragraphs of the draft.

2. The Working Group decided not to make a detailed study of its "Methods of Work" until after its Terms of Reference have been finally adopted. Dr. Bartholomew and Dr. Allen agreed to act as Chairman and Secretary, respectively, until the next meeting.

3. The name that has been proposed for the Working Group is: International Working Group on Nuclear Structure and Reaction Data (IWGNSRD).

PROPOSED CHANGES

Paragraph 1

It is proposed that the sentence "It will report to the INDC, which shall be the sole channel by which the Working Group may issue documents or otherwise report to the IAEA" should be replaced by "It will keep INDC informed of any recommendation made. Recommendations which would imply financial commitment to the Agency should have prior approval of INDC."

The first part of paragraph 1 would remain unchanged. It did seem, however, that the obligation laid down in the INDC draft, namely to channel all documents and recommendations exclusively through INDC, would seriously hamper the operations of the Group.

Paragraph 2b

It seemed desirable to let Governments decide on the number of their representatives. Accordingly it is proposed that the second sentence of paragraph 2b, which reads "No more than one member will be appointed from any one country", should be omitted.

The really important thing in fact, which comes up under "Methods of Work", is that participating countries should not have more than one corresponding member. Provided that rule is observed, the presence of additional representatives at meetings may stimulate the work of the group.

Appendix A

Compilation, Evaluation and Dissemination Activities in the Field of Nuclear Structure and Reaction Data

Contents

Title:	AAEC Research Establishment
Address:	Lucas Heights, N.S.W. 2232, Australia
Rapporteur:	B.J. Allen (Working Paper no. 14)
Staff:	4 physicists part-time
Subject Matter:	Capture Gamma Ray Spectra for 10 keV < En < 150 keV incident neutron energies
Recent Publications:	AAEC-E 200 (1969)
Plans:	Compilation of all available data on neutron capture γ-rays for 10 keV < En < 150 keV, including γ-ray tables, spectra, and level diagrams. publication expected within one year.
Services:	
Comments:	Compilation in resonance range below 10 keV is desirable but would double the magnitude of the task and is outside the energy region in which this group has experience.

Title:	Chalk River Nuclear Laboratories Atomic Energy of Canada Ltd.
Address:	Chalk River, Ontario, Canada
Rapporteur:	G.A. Bartholomew, Chalk River, Canada (Working Paper no. 15)
Staff:	3 physicists part-time
Subject Matter:	Thermal neutron capture γ-rays
Recent Publications:	Compendium of Thermal Neutron Capture - γ-Ray Measurements by Bartholomew, Doveika, Eastwood, Monaro, Groshev, Demidov, Pelekhov and Sokolovskii, Part I ($Z \leq 46$) Nuclear Data A 3 (1967) 367, and Groshev, Demidov, Pelekhov, Sokolovskii, Bartholomew, Doveika, Eastwood and Monaro, Parts II and III ($Z > 46$). Nuclear Data A 5 (1968) 1, 5 (1969) 243.
Plans:	Update is under discussion but no plans formulated.
Services:	Neutron Capture Gamma Ray Newsletter edited by E.D. Earle and M.A. Lone issued twice per year.
Comments:	Future updates may include greater attention to evaluation and may be cast in a form more useful to applied users.

Title:	Laboratorium für Isotopentechnik
Address:	Laboratorium für Isotopentechnik (LIT) Gesellschaft für Kernforschung 75 Karlsruhe, Postfach 3640 Fed. Rep. of Germany
Rapporteur:	W. Michaelis, Gesellschaft f. Kernforschung, Karlsruhe
Staff:	1 scientist
Subject Matter:	Gamma-ray spectra in activation analysis
Recent Publication:	See annual report of the Kernforschungszentrum Karlsruhe
Plans:	Catalogue of γ -ray spectra from neutron activation analysis with 14-MeV neutrons;
Services:	LIT accepts orders from external laboratories and industry (about 30 coworkers) in various fields of activation analysis.
Comments:	

Title:	Nuclear Chemistry Group (I)
Address:	Institut f. Radiochemie, Gesellschaft f. Kernforschung, 75 Karlsruhe, Postfach 3640
Staff:	1
Rapporteur:	H. Münzel
Subject Matter:	Chart of nuclides $T_{\frac{1}{2}}$, E of more prominent radiations emitted in radioactive decay, some intensity data, thermal capture cross sections, fission yields and natural abundances.
Recent Publications:	Chart of Nuclides, third edition 1968
Plans:	Next edition in 1973
Services:	Data supplied upon request
Comments:	-

Title:	Nuclear Chemistry Group (II)
Address:	Institut f. Radiochemie, Gesellschaft f. Kernforschung, 75Karlsruhe, Postfach 3640
Rapporteur:	H. Münzel
Staff:	
Subject Matter:	- Compilation of experimental excitation functions (cross sections) for charged particle reactions; 1 - 100 MeV p, d, α -particles; - Compilation of excitation functions estimated from systematics; - Compilation of thick target yields.
Recent Publications:	KFK 767 (1968)
Plans:	Publication of charged particle cross sections for projectiles with $A \geq 1$, cross section estimates from systematics and thick target yields for n,p, d, ^{3}He, ^{4}He. 1972 - Landolt + Börnstein.
Services:	Latest data available on request.
Comments:	Work to be extended to improve systematics of excitation functions.

Title:	Institute for Nuclear Study, University of Tokyo
Address:	Institute for Nuclear Study, University of Tokyo Midori-Cho, Tanashi-City, Tokyo, Japan
Rapporteur:	M. Sakai
Staff:	2 physicists part-time
Subject Matter:	level energies in even-even nuclei
Recent Publications:	Table of Bands in Even-Even Nuclei by M. Sakai, Nuclear Data A, 8 (1970) 323.
Plans:	To maintain compilation up-to-date
Services:	Published as INS-J reports and information available on request
Comments:	

Title:	Fysisch Laboratorium
Address:	Fysisch Laboratorium R.U. Sorbonnelaan 4, Utrecht, Netherlands
Rapporteur:	C. van der Leun
Staff:	2 physicists (part-time)
Subject Matter:	Nuclear Structure evaluation and compilation, A = 21 - 44
Recent Publications:	Nuclear Physics A 105 (1967) 1 Energy Levels of Z = 11 - 21 Nuclei
Plans:	5th edition within one year in "Nuclear Physics"
Services:	Informal information through private communications only.
Comments:	Emphasis on nuclear structure data, but reaction data and nuclear theory are also included.

Title:	IKO, Institute for Nuclear Research
Address:	IKO, Institute for Nuclear Research 18, Oosterringdijk, Amsterdam, Netherlands
Rapporteur:	A.H. Wapstra
Staff:	2 scientists
Subject Matter:	Nuclear mass evaluations Ground-state Q-value evaluation
Recent Publications:	Nuclear Data A, 9 (1971)
Plans:	Will update mass and Q value evaluations periodically (few year cycle)
Services:	Maintain evaluated file of reaction energies and masses. Evaluation is updated on short time scale, but not published. File is available to requesters.
Comments:	Values obtained by extrapolation using mass formulas and interpolation procedures are added to fill in experimental gaps.

Title:	Nuclear Physics Division
Address:	UKAEA, AERE Harwell Didcot, Berkshire , United Kingdom
Rapporteur:	A. Ferguson, AERE Harwell, U.K.
Staff:	Five physicists half-time.
Subject Matter:	Till now mainly evaluations for fission and fusion reactors (neutron data). Some work on charged particle reactions for fusion plasma studies.
Plans:	To continue on the above lines.
Services:	Primarily an internal group working to UK priorities for U.K. Nuclear Data Library.
Recent Publications:	
Comments:	none

Title:	Aerojet Nuclear Company
Address:	National Reactor Testing Station, P.O.Box 1845, Idaho Falls, Idaho 83401, USA
Rapporteur:	-
Staff:	3 part time
Subject Matter:	Evaluation of half-lives, gamma-ray energies and gamma-ray branching ratios for radionuclides produced in nuclear fission and for those radionuclides which are of use in fast-neutron dosimetry.
Recent Publication:	HEDL-TME 72-45
Plans:	Complete an evaluation of the nuclear data for all fission product nuclides with half-lives greater than 10 days in the near future and publish this information; commence the evaluation of those fission product nuclides with half-lives between 1 day and 10 days.
Services:	Copies of unpublished evaluated data may be provided upon request.
Comments:	none

Title:	Charged-Particle Cross-Section Data Centre
Address:	Oak Ridge National Laboratory Oak Ridge, Tennessee 37830, USA
Rapporteur:	D. J. Horen, Oak Ridge National Laboratory, USA
Staff:	2 physicists (half-time)
Subject Matter:	complete reference list for charged-particle-induced nuclear reactions of the type A(a,b)B maintain a file of selected cross section data (3×10^5 cross sections)
Plans:	Supplements to the Reaction List will be issued on a yearly basis to provide coverage of the current journal literature.
Services:	Issue supplements of the Reaction List in Section A of the journal Nuclear Data Tables published by Academic Press, Inc. Maintain cross-section data file and answer inquiries within its scope.
Recent Publications:	Reaction List for Charged-Particle-Induced Nuclear Reactions: Z = 3 to 27, 1948 - April 1969, Nucl. Data Tables A6, 353 (1969); Z = 28 to 99, 1948 - April 1969, Nucl.Data Tables A7, 1 (1969); Z = 1 to 98, May 1969 - June 1970, Nucl. Data Tables A8, 199 (1970); Z = 1 to 98, July 1970 - June 1971, Nucl. Data Tables A9, 469 (1971) Coulomb Excitation, 1956 - June 1971, Nucl. Data Tables A9, 572 (1971).
Comment:	Beginning with July 1970, theoretical papers dealing directly with the analysis of nuclear reaction data and results are included in the Reaction List.

Title:	Chart of the Nuclides (Norman E. Holden)
Address:	Dr. Norman E. Holden General Electric Company Knolls Atomic Power Laboratory P.O.B. 1072, D2-114, Schenectady, N.Y.12301
Rapporteur:	D.J.Horen, Oak Ridge National Laboratory, USA
Staff:	2 scientists - 1 physicist (part-time), 1 nuclear chemist (part-time)
Subject Matter:	Compilation and evaluation of data for Chart of Nuclides
Recent Publications:	The present tenth edition was published in July 1969.
Plans:	The new eleventh edition will be published this summer approximately July 1972. In addition to the data usually presented on the chart the new edition will include resonance integrals, cumulative fission chain yields, and a distinction will be made between 2200 m/s thermal neutron cross sections and reactor spectrum average values. The new edition will include the use of color.
Services:	As in the past, information pertaining to the evaluation of data listed on the chart will be provided upon request.
Comments:	Requests for copies of the new chart and/or questions concerning the chart should be addressed to Dr. N.E. Holden at the address given above.

Title:	Energy Levels of Light Nuclei
Address:	F. Ajzenberg-Selove, Department of Physics, University of Pennsylvania, Philadelphia, Pa.19104, USA
	T. Lauritsen, California Institute of Technology, Pasadena, Calif. 91109, USA
Rapporteur:	D.J. Horen, Oak Ridge National Laboratory, USA
Staff:	C. Busch, Department of Physics, University of Pennsylvania, Philadelphia, Pa. 19104, USA
Subject Matter:	Compilation and evaluation of nuclear structure data for light nuclei ($A \leq 20$)
Plans:	The revision of A = 5-12 is under way.
Services:	
Recent Publications:	"Energy Levels of Light Nuclei, A= 1-10," Nuclear Physics 78 (1966) 1
	"Energy Levels of Light Nuclei, A = 11-12," Nuclear Physics A114 (1968) 1
	"Energy Levels of Light Nuclei, A = 13-15," Nuclear Physics A152 (1970) 1
	"Energy Levels of Light Nuclei, A = 16-17," Nuclear Physics A166 (1971) 1
	"Energy Levels of Light Nuclei, A = 18 - 20," Nuclear Physics (to be published in 1972)
Comments:	-

Title:	Nuclear Data Project (D.J. Horen)
Address:	Oak Ridge National Laboratory, P.O.Box X, Oak Ridge, Tennessee 37830, USA
Rapporteur:	D.J. Horen, ORNL, USA (Working pages no. 6, 10, 10a, 23)
Staff:	9 part-time, nuclear structure physicists, support staff - 6; external contributors ~10
Subject Matter:	Preparation of Nuclear Data Sheets for all nuclei in mass region A>44; Maintenance of complete bibliography of papers in nuclear physics, with over 35 000 references on computer file. Evaluation of A chains. Scans and keywords nuclear physics articles in over 65 journals; unpublished literature included since 1971.
Recent Publications:	Nuclear Data Sheets (Academic Press) Recent References (nuclear structure papers only); also in Nuclear Data Sheets ORNL Reports ("Quickies") e.g. ORNL-4730, 1971 "Radioactive Atoms" - 135 Isotopes for medical application.
Plans:	Computerized data file - for both compiled and evaluated data. Continued updating of A-chain compilations. Continued publication of Recent References: to be expanded to include theoretical and reaction mechanism papers.
Services:	Provide selective topic reference lists to various external compiling groups. Publication of the journal Nuclear Data Sheets; Respond to requests for evaluated nuclear data in area of coverage.
Comments:	More effort needed to determine user needs; Keyword acceptance by journals

Title:	Photonuclear Data Center
Address:	National Bureau of Standards Washington, D.C. 20234 USA
Rapporteur:	D.J. Horen, Oak Ridge National Laboratory, USA
Staff:	E.G. Fuller H.M. Gerstenberg T.M. Collins
Subject Matter:	Experimental data from the published literature relating to the interaction of electromagnetic radiation with nuclei. Data on photonuclear reactions, elastic and inelastic scattering of photons, electron-induced reactions, inelastic electron scattering, inverse particle capture reactions, etc. are included. Data from Coulomb excitation and slow neutron capture experiments are not entered into the Center's collection.
Recent Publication:	NBS Special Publication 322: Photonuclear Data Index - January 1965 through 1970. An annotated index and bibliography of the data entered into the Center's files in the five-year period indicated. This index is periodically updated.
Plans:	To continue maintenance and development of Center's data abstract files and the library of selected cross section data in digitized form. The library now (March 1972) contains data for over 350 curves measured for more than 70 different covering 43 elements. Publication of the third updated cumulative supplement to the original Photonuclear Data Index. To develop and publish a comprehensive annotated compilation ("Atlas") of evaluated photonuclear cross section data.
Services:	Publication of a biennally updated, completely annotated, cumulative index to the data in its files.

Photonuclear Data Center
page 2

Services:(continued) Selected annotated indices and bibliographies covering specific types of data or reactions (on request).
Information in form of data abstract sheets for specific nuclides or classes of data (on request).

Within limited resources and on a case by case basis what it considers to be the best available data for specific cross sections for specified nuclei. Data are primarily furnished as data abstract sheets. As the digitized cross section library is developed, information will also be furnished in tabular or large scale graphical form (on request).

Title:	Radiation Shielding Information Centre
Address:	Oak Ridge National Laboratory. P.O.Box X, Oak Ridge, Tennessee 37830, USA
Rapporteur:	D.J. Horen
Staff:	
Subject Matter:	Reactor, space and accelerator shielding. Literature analysis, analysis and exchange of computer codes and of nuclear data for shielding applications.
Recent Publications:	Monthly newsletter. Report series ORNL-RSIC-.
Plans:	
Services:	Clearinghouse functions in connexion with the evaluation of cross section data of interest to the shielding community. Special bibliographies in response to requests. Selective dissemination of information according to customer profile.
Comments:	Cooperates with the ENEA computer library in Ispra, through which there is a liaison with IAEA for the benefit of non-OECD countries. Cooperation with the new European Shielding Information Service (ESIS) at Ispra is being established.

Title:	Table of Isotopes (J.M. Hollander)
Address:	University of California, Lawrence Berkeley Laboratory, Berkeley, California 94720, USA
Rapporteur:	D.J. Horen, Oak Ridge National Laboratory, USA
Staff:	6 physicists, 1 support
Subject Matter:	Compilation of experimental data on radioactive decay and nuclear level properties.
Recent Publication:	6 editions published to data
Plans:	7th edition will be expanded to include more data from nuclear reactions (commenced late 1970). Text and figures for 7th edition will be produced by computer from stored data files.
Services:	Inquiries answered on a limited basis
Comments:	Keyworded reference file is updated with "Recent References" obtained from the Nuclear Data Project.

Title:	Academy of Sciences, USSR (I.P. Selinov)
Address:	Moscow V-71 Leninsky Prospect 14, USSR
Rapporteur:	V.M. Kulakov, V.P. Rudakov, Kurchatov Institute of Atomic Energy, Moscow
Staff:	
Subject Matter:	Compilation of isotope decay schemes: Decay data, half lives, principal radiation, level properties, modes of production.
Recent Publications:	"Izotopy" Part I: Spravochnye Tablici (Tables) Z = 1 - 62 Part II: " " Z = 63 - 105 Part III: Bibliografija (References) Izdatelstvo "Nauka", Moscow 1970
Plans:	
Services:	
Comments:	

Title:	**Atomic Reactor Institute, Melekess**
Address:	**Atomic Reactor Institute, Melekess, Ulyanovsk Region, USSR**
Rapporteur:	V.M. Kulakov and V.P. Rudakov, Kurchatov Institute, Moscow (Working Paper no. 9)
Staff:	
Subject Matter:	**Compilation of level schemes for heavy nuclei**
Recent Publications:	**"Radioactive decay and heavy nuclei ($Z \geq 90$) level schemes", 1969 · Exact reference not known.**
Plans:	
Services:	
Comments:	

Title:	Khlopin Radium Institute (B.S. Dzhelepov)
Address:	Leningrad P-22, Roentgen Street 1, USSR
Rapporteur:	V.M. Kulakov, V.P. Rudakov, Kurchatov Institute of Atomic Energy, Moscow (Working paper no. 9).
Staff:	not less than five physicists
Subject Matter:	Compilation of isotopic nuclear decay schemes (nuclear levels from radioactive decay and nuclear reactions. Also tables of spins, magnetic dipole and electric quadrupole moments, electron binding energies, thermal neutron activation cross sections and nomograms for calculation of log ft, fn, β^- and β^+ decays and electron capture)
Recent Publication:	"Decay schemes of radioactive nuclei (A< 100)", by B.S. Dzhelepov and L.K. Peker, Isdatelstvo "Nauka", Moscow, 1966
Plans:	Third edition of "Decay schemes of radioactive nuclei" is under preparation.
Services:	
Comments:	

Title:	Kurchatov Institute of Atomic Energy (S.A. Baranov)
Address:	Kurchatov Institute of Atomic Energy, Moscow, USSR
Rapporteur:	V.M. Kulakov and V.P. Rudakov, Kurchatov Institute of Atomic Energy, Moscow (working paper no. 9)
Staff:	2 - 4 physicists
Subject Matter:	Alpha spectra of heavy nuclei.
Recent Publications:	
Plans:	Survey of results obtained hitherto (50 isotopes of 16 elements from Bi to Fm) is to be published.
Services:	
Comments:	

Title:	Kurchatov Institute of Atomic Energy (L.V.Groshev)
Address:	Kurchatov Institute of Atomic Energy, Moscow, USSR
Rapporteur:	V. M.Kulakov, V.P. Rudakov, Kurchatov Institute of Atomic Energy, Moscow (Working Paper no. 9).
Staff:	4 - 6 physicists
Subject Matter:	Compilation of thermal neutron capture gamma spectra (gamma energies and intensities, internal conversion coefficients and gamma transition schemes)
Recent Publications:	Compendium of Thermal Neutron Capture - γ-ray Measurements by Bartholomow, Doveika, Eastwood, Monaro, Groshev, Demidov, Pelekhov and Sokolovskii, Part I (Z 46) Nuclear Data A 3 (1967) 367, and Grcshev, Demidov, Pelekhov, Sokolovskii, Bartholomew, Doveika, Eastwood and Monaro, Parts II and III (Z 46). Nuclear Data A 5 (1968) 1, 5 (1969) 243.
Plans:	
Services:	
Comments:	

Title:	Mendelejev Metrological Institute (L.K. Peker)
Address:	Leningrad, Moskovskij Prospect 19, USSR
Rapporteur:	J.J.Schmidt
Staff:	5 physicists
Subject Matter:	Collection, interpretation and evaluation of nuclear structure data, in particular of radioactive decay schemes, nuclear levels and their properties.
Recent Publication:	"Decay schemes of radioactive nuclei (A< 100)", by B.S. Dzhelepov and L.K. Peker, Isdatelstvo "Nauka", Moscow, 1966.
Plans:	Third edition of "Decay schemes of radioactive nuclei" is under preparation
Services:	
Comments:	

Title:	European Shielding Information Service
Address:	CCR Euratom I-21020 Ispra (Varese), Italy
Rapporteur:	(Included by NDS after the meeting)
Staff:	
Subject Matter:	Reactor, Space and Accelerator Shielding. Literature analysis, analysis and exchange of computer codes and of nuclear data for shielding applications.
Recent Publication:	Quarterly newsletter.
Plans:	See comment.
Services:	Special bibliographies on shielding topics. Selective dissemination of information.
Comments:	This centre has just been established. It is to be expected that close collaboration with RSIC at ORNL will emerge.

Title:	Four laboratories working group on the evaluation of decay properties of radionuclides
Address:	BCMN, IKC (PTB), L.M.R.I. Saclay Secretary W. Bambynek, Bureau Central de Mesures Nucléaires C.C.E., Steenweg op Retie, Geel, Belgium
Rapporteur:	B. Grinberg (Working Document no. 12 by A.Spernol and J. Legrand)
Staff:	10 physicists
Subject Matter:	Thorough systematic and standardized evaluation of decay properties of the 100 most important radionuclides, with the aim of supplying "best" values, with their uncertainties, for "all" decay parameters. Five isotopes completed (^{58}Co, ^{65}Zn, ^{51}Cr, ^{60}Co, ^{90}Sr). In preparation: ^{241}Am, ^{37}Ax, ^{57}Co, ^{113}In, ^{137}Cs.
Recent Publications:	
Plans:	The evaluated data for these nuclides will be published together with the compiled data on which the evaluations are based, probably in the IAEA Atomic Energy Review. For each evaluation a report, detailing reasons for accepting or rejecting certain experimental data and describing the criteria used for judging and weighting the data will be written. The evaluation work will continue in essentially the same way; the output foreseen, supposing present level of effort to be maintained, is about 10 nuclides per year.
Services:	Copies of unpublished evaluated data may be provided by the secretary upon request.
Comments:	The hope is expressed that other scientists, who agree with the general evaluation rules discussed in Working Paper no. 12 would join the Group.

Title:	International collaboration on fluorescence yields. Chairman: R.W. Fink (Atlanta, USA) BCMN representative: W. Bambynek
Address:	Bureau Central de Mesures Nucléaires C.C.E., Steenweg op Retie, Geel, Belgium
Rapporteur:	A. Spernol, BCMN Geel, Belgium
Staff:	≈ 10
Subject Matter:	Compilation and evaluation of fluorescence yields.
Recent Publication	W. Bambynek R.W. Fink submitted to Rev. Mod. Phys.
Plans:	
Services:	none
Comments:	BCMN is planning to compile and evaluate EC-data. (Requested by a BIPM-working group on measurements of ionizing radiations.)

Title:	INIS Section of the IAEA
Address:	IAEA, Kärntnerring 11 - 13, 1010 Vienna, Austria
Rapporteur:	Zh. Turkov
Staff:	9 scientists of various specialties 3 administrators 18 supporting staff
Subject Matter:	International documentation system in the field of nuclear science and application. Documents (books, journal articles, reports, conference papers, patents) are abstracted and indexed by key-words.
Recent Publications:	A monthly bibliography, INIS Atomindex. Abstracts and "non-conventional" literature on microfiches.
Plans:	
Services:	Monthly magnetic tapes containing all records submitted to the system are available to INIS Liaison Officers of Participating IAEA Member States.
Comments:	

Title:	Nuclear Data Section of the IAEA (Non-neutron nuclear data activities only)
Address:	IAEA Kärntnerring 11-13, 1010 Vienna, Austria P.O.B. 590
Rapporteur:	J.J. Schmidt
Staff:	about 1 physicist manyear
Subject Matter:	Organisation of meetings in the field of non-neutron nuclear data; Secretariat to the International Nuclear Data Committee (INDC) and to the International Working Group for Nuclear Structure and Reaction Data (IWGNSRD); Compilation of requests for non-neutron nuclear data measurements and evaluation for various applied purposes.
Recent Publications:	-
Plans:	Coordination of international inquiry of IWGNSRD into improvements of nuclear data knowledge for activation analysis and isotope production; Symposium on Applications of Nuclear Data in Science and Technology, Paris, France. 12-16 March 1973 Issue of semi-annual Newsletter on compilation, evaluation and dissemination activities in the field of nuclear structure and reaction data.
Services:	-
Comments:	Main emphasis of the IAEA Nuclear Data Section still on neutron nuclear data (9 physicists, 3 programmers, 6 supporting staff). At present only small non-neutron nuclear data activity due to lack of funds and manpower.

Title:	ICSU-CODATA
Address:	ICSO-CODATA Central Office Westendstrasse 19, 6 Frankfurt/Main Federal Republic of Germany
Rapporteur:	T.V. Golashvili (Working Paper no. 13)
Staff:	
Subject Matter:	Encourage and co-ordinate world-wide activities on the generation, compilation, evaluation and dissemination of data for science and technology. Task groups have been established on - Computer use - Fundamental constants - Presentation of data - Primary Literature - Accessibility of evaluated data - Key values for thermodynamics - Chemical kinetics data
Recent Publications:	International Compendium on Numerical Data Projects. Springer-Verlag, Berlin, 1969. CODATA Newsletter CODATA Bulletin
Plans:	II nd. ed. of the Compendium to be published in 1973. The 3rd of the biennial CODATA Conferences on the Generation, Collection, Evaluation, and Dissemination of Data for Science and Technology will be arranged in Le Creusot, France, 26-30 June, 1972.
Services:	
Comments:	Central Office: ICSU-CODATA, Westendstr. 19 6, Frankfurt/Main, Germany, Fed.Rep. of. Tel. (0611) 748044. Cable: ICSUCODATA

Appendix B

REFERENCES TO NUCLEAR DATA COMPILATIONS

Title	Main Author(s), Reference(s)	Contents
1. Chart of Nuclides	N.E.Holden, GE-KAPL	Basic nuclear and decay properties
2. Nuklidkarte	W. Seelmann-Eggebert, G.Pfennig, H. Münzel KFK	Basic nuclear and decay properties
3. Izotopy parts I-III	I.P.Selinov.Izdatel'stvo "Nauka", Moscow 1970	Decay chains, nuclear properties
4. Energy Levels of Light Nuclei (A=5-20)	F.Ajzenberg-Selove, T.Lauritsen. Nucl.Phys. A 166, 1, 1971; A 152, 1,1970; A 114, 1,1968; 78, 1,1966	Nuclear structure data ("A-chains")
5. Energy Levels of Nuclei (A=21-44)	P.M.Endt; C.van der Leun Nucl.Phys. A 105, 1,1967 (for Z=11-21)	Nuclear structure data ("A-chains"; previously by Z)
6. Energy Levels of Nuclei ($A \geq 45$)	D.J.Horen et al. Evaluations of the Nuclear Data Group, published in Nuclear Data, B and in Nuclear Data Sheets. (Continuing).	Nuclear structure data ("A-chains")
7. Recent References	Nuclear Data Group. Nucl. Data,B and Sheets. (Continuing)	Bibliographic information on nuclear reactions, radioactivity, nuclear moments
8. Table of Isotopes	C.M. Lederer, J.M.Hollander, I. Perlman. Wiley, N.Y. 1967	Decay chains, nuclear properties
9. Decay schemes of radioactive nuclei $A \leq 100$.	B.S.Dzhelepov,L.K.Peker, Izdatel'stvo "Nauka", Moscow 1966	Decay chains, nuclear properties.
10. Nuclear Tables	W.Kunz, J.Schintlmeister, Pergamon Press 1963	Decay chains, nuclear properties.

Title	Main Author(s), Reference(s)	Contents
11. Charged-Particle--Induced Reaction Lists and cross sections	F.K.McGowan et al. Compilations of the Charged--Particle Cross Section Data Centre, Nuclear Data A 6, I,1969; A7,1,1969; A8, 199,1970, A9,477,1971 (Reaction lists) A1,203, 1966; A2, 1, 1966; A3, 123, 1967.	Reaction lists, some cross sections, polarization data for charged-particle induced reactions.
12. Charged particle data	N.N.Krasnov (Obninsk) See e.g.Chem.Zvesti 21, 611, 1967.	Reaction data: p,d, ^{3}He, α ; for activation analysis work.
13. Cross Sections for Charged-Particle Induced Reactions	H.Münzel,I.Lange KFK-767,1968; (Planned: Landdt-Börnstein 1972)	Cross sections 2-100 MeV p,d,α. Estimates for non-measured cross sections
14. The 1971 Atomic Mass Evaluation	A.H.Wapstra,N.B.Gove. Nuclear Data.A9, 265, 1971	Evaluated nuclear masses, Q-values, separation energies.
15. Nuclear Reaction Q-Values	C.Maples,G.W.Goth, J.Cerny . Nuclear Data A2, 429, 1967	Q-values
16. Compendium of Thermal-Neutron-Capture γ-Ray Measurements	G.A.Bartholomew et al.(AECL) and L.V.Groshev et al. (Kurchatov),Nuclear Data A3, 367, 1967; A5, 1,1968; A5, 243, 1969	γ-spectroscopic data, cascade schemes,graphs of γ-spectra
17. Compilation of KeV Neutron Capture Gamma Rays(A=40-70)	B.J.Allen,J.R.Bird,M.J.Kenny AAEC/E200,1969.To be extended.	Limited compilation of experimental data, 10-150 keV.
18. Catalogue of γ-Rays Emitted by Radionuclides.	M.A.Wakat.Nuclear Data A8, 445, 1971.	Photon energies.
19. Catalogue of γ-Ray Spectra from Neutron Activation Analysis with 14MeV Neutrons	Vogg, KFK,to be published	Experimental data, mainly from KFK.
20. Radioactive Atoms, Auger-Electron, α-, β-, γ-, and X-Ray Data.	M.J.Martin,P.H.Blichert-Toft, Nuclear Data A8, 1, 1970	Auger-electron, α-, β-, γ-, and X-ray data.

	Title	Main Author(s), Reference(s)	Contents
21.	Photonuclear Data Index	E.G.Fuller et al. Photonuclear Data Center, NBS. NBS Special Publication 322, 1971	Index to cross section data for photon interaction, 5-150MeV.
22.	Nuclear Spins and Moments	G.H.Fuller, V.W.Cohen, Nuclear Data A5, 433, 1969.	
23.	Nuclear Intrinsic Quadripole Moments and Deformation Parameters	K.E.G.Löbner, M.Vetter, V.Hönig, Nuclear Data, A7, 495, 1970.	
24.	Nuclear Radii	H.R.Collard, L.R.B.Elton, R.Hofstadter. Landolt-Börnstein, I. Vol.2, Springer Verlag, Berlin 1967.	Distribution of charge and magnetic moment in nuclei.
25.	Gamma-Ray Spectra and Sensitivities for 14MeV-Neutron Activation Analysis	M.Cuypers, I.Cuypers. J.Radionucl.Chem.1,243, 1968	Gamma-ray spectra, etc. for 14 MeV neutrons.
26.	Experimental Values of Internal-Conversion Coefficients of Nuclear Transitions	J.H. Hamilton et al. Nuclear Data A 1, 521, 1966	Internal conversion coefficients.
27.	Scintillation Spectrometry Gamma Ray Catalog	R.L. Heath. IDO-16880	γ-ray spectra from radionuclides
28.	Table of life-time measurements of excited nuclear states	J.Lindskog et al. in app.3 (Vol.2,p.1599) of Siegbahn: Alpha-Beta- and Gamma-Ray Spectroscopy. North-Holland Amsterdam (1965)	Life-times of excited states
29.	Photon Cross Sections from 1keV to 100MeV for Elements Z=1 to Z=100	E.Storm, H.I.Israel Nuclear Data A7, 565, 1970	See title
30.	See ref.and content:	Several articles in J.B.Marion, J.L.Fowler: Fast Neutron Physics, part.II (1963)	Neutron source reactions

Title	Main Author(s), Reference(s)	Contents
31. See ref. and content:	I. Slaus, G. Paić. Several tables in their contr. in: Solid State Physics, Nuclear Physics and Particle Physics. Benjamin, N.Y. 1968. Page 471.	Neutron production by charged particles.
32. Properties of Nuclei with A=174	Balalaye et al. Inst. of Nucl. Phys., Acad. of Sciences, Moscow, USSR. (Reference not known) 1969	See title
33. Neutron Activation Analysis Handbook	I.A. Moslov, V.A. Luknitskii, Izdatel'stvo Nauka Leningradskoe Otdelenie, 1971	Comprehensive tables of cross sections and γ-spectra
34. Handbook of Nuclear Data for Neutron Activation Analysis	A.I. Aliev et al. Russian original: Spravochnik 1969, Engl. transl.: Israel Progr. for Scient. Transl. Ltd. Jerusalem 1970	Cross sections and decay properties
35. Table of Gamma Rays for Activation Analysis	C. Meixner, Jülich, Germany, Thiemig, München 1970	See title
36. Delayed-Neutron precursors	P. del Marmol. Nuclear Data A6, 141, 1969	See title

supplemented after meeting

37. Table of Nuclear Spins and Moments	I. Lindgren in app. 4 (Vol. 2, p. 1621) of Siegbahn: Alpha- Beta- and Gamma-Ray Spectroscopy. North-Holland Amsterdam (1965)	See title
38. Table of Internal Conversion Coefficients	L.A. Sliv, I.M. Banol in app. 5 (Vol. 2p. 1639) of Siegbahn: Alpha- Beta- and Gamma-Ray Spectroscopy. North-Holland Amsterdam (1965)	See title
39. Internal Conversion Tables	R.S. Hager, E.C. Seltzer. Nuclear Data A4, 1, 1968; A6, 1, 1969	See title

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4 centres: files of the four cooperating neutron cross section centres -
National Neutron Cross Section Center, Brookhaven, USA;
Centre de Compilation des Données Neutroniques, Saclay, France;
Centr po Jadernym Dannym, Obninsk, USSR;
Nuclear Data Section, Vienna, Austria.

Appendix C

Inquiry of the IWGNSRD about necessary improvements of nuclear data knowledge for activation analysis and isotope production

a. Draft circular letter

Dear Sir,

In March 1972 an international working group was invited by the International Atomic Energy Agency (IAEA) to discuss the present status and needs for improvement in the compilation, evaluation and dissemination of nuclear structure and reaction data with particular emphasis on applications. In order to find out in which way the knowledge and dissemination of nuclear data and the quality of presently available compilations can or should be improved the working group decided to make an inquiry in this respect among nuclear data users in different fields of application. At its next meeting in March 1973 the working group will use the results of this survey as a basis for further discussions about necessary actions which should be initiated.

Enclosed with this letter you will find a questionnaire which was prepared at the meeting to find out the specific needs for improvement of nuclear data knowledge of people working in the field of activation analysis and isotope productions. We would very much appreciate if you would take the time to carefully fill in the questionnaire. The results of this survey will be distributed among the members of the working group, to the members of the International Nuclear Data Committee of the IAEA and will also be presented at the International Conference on Modern Trends in Activation Analysis which is to take place at Saclay in France, 2-6 October 1972.

We hope that this survey will help to improve the situation regarding the availability of nuclear structure and reaction data in the form of, as much as possible user-tailored, compilations. In addition, your requests may initiate new evaluations which may lead to improvements of the accuracy of available nuclear data or, which may form the basis for more reliable estimations of the values for unknown data like nuclear reaction cross sections. These improvements may be directly relevant to your work and may be a reward to the burden you now have in filling in the questionnaire.

We would appreciate if you fill in and return the questionnaire at your earliest convenience so as to reach us not later than

We would like to take this opportunity to inform you that the IAEA is going to organise an International Symposium on the Intercommunication of Users, Compilers and Evaluators of Nuclear Data for Applications in Science and Technology. This Symposium which is scheduled to take place in Paris or Saclay, France, between 12 and 16 March 1973, should bring together users, compilers and evaluators of nuclear data with the main objective to critically survey the existing compilations and evaluations regarding their usefulness in various fields of applications and to discuss necessary measures for their improvement. Aside from fission and fusion reactors, nuclear material safeguards, shielding, and use of radioisotopes, the field of application analysis will rank among the prominent areas of nuclear data applications to be discussed at this Symposium. The Symposium will thus present an excellent forum to discuss also your specific requirements.

Thanking you for your cooperation,

Yours sincerely,

DRAFT QUESTIONNAIRE

1. NAME:
2. Institution and Address
3. Which type of nuclear data do you need in your work?

   a) General survey (please state, if possible, the accuracy of the data required instead of only crossing the entries)

Type		Nuclides → Light	medium	heavy
Cross sections for projectiles:	γ			
	n			
	p			
Charged particles with A > 1				
(state also energy range)				
Half Lives				
Energy of Radiation:	α			
	β_{max}			
	γ			
	ϵ(conv)			
Intensity of Radiation (r.:relative; a: absolute)	α			
	β			
	γ			
Branching ratios				
Enter additional data				

b) detailed information:

Would you please specify the nuclear data you use at the moment or which you will need in the near future in more detail.

	Nuclide	Type of data	Accuracy requested	used for
Example	^{89}Y	$\sigma(\alpha,n)$; $5 \leq E_\alpha \leq 30$MeV	20%	Estimation of limits of detection of γ in semiconductors.
	^{92}Nb	$T_{\frac{1}{2}}$	10%	
		E_γ	0.1%	
		I_γ (absolute)	10%	

Did you have difficulties in obtaining the above-mentioned data?

4. Is your work strongly affected by an inadequate knowledge of the specified nuclear data? If yes, please state in which way.

5. In which field do you mainly apply the needed nuclear data? (for instance: Determination of isotopes in biological samples by activation analysis.)

6. Which of the existing compilations do you use to obtain the data? Please indicate the compilations and comment in detail on their usefulness for your purpose. You may refer to a list of compilations, which, together with a short description of their content, is given in an annex* to this questionnaire. Please, indicate any other compilation or source of information, which you use and which is not contained in this list.

7. Do you have some general comments to make about the available compilations, for instance in respect ot their usefulness in your case?

8. Is there a lack of special compilations? If yes, please state your opinion about the type of data that should be compiled and how these data are best presented.

9. What has, in your opinion, the highest priority, if more manpower could be made available for the compilation and evaluation of nuclear data? Please state, if other nuclear data should be compiled or if more effort should be made with respect to accuracy of the data in the evaluations etc.

*This annex is identical with Appendix B to this report.

Appendix D

Recommendation to Editors of nuclear physics journals

1. While brevity is a cardinal virtue, the description of the experiment should be in sufficient detail to enable the reader to judge the reliability of the data presented and of the precision claimed. Naturally a reference to such a description in an earlier publication would be equally acceptable.

2. A clear statement of the errors (systematic or statistical) of the result and how they are derived is essential.

3. If the results are relative to or depend on some other measured or calculated quantity this should be clearly indicated, its value(s) and its error given and its origin stated .

4. a) Data should clearly stand out from the text, e.g. in tables.
   b) Within tables, the authors' new measurements should be kept separate from values derived from other sources.
   c) Experimental data should be distinguished from results derived using theoretical Nuclear Models.

5. If an extensive tabular presentation of the data does not form part of the published paper but is available in a laboratory report or from a data centre this should be explicitly brought out.

6. Previously published material, e.g. abstracts, laboratory reports, conference reports etc., which are superseded by the paper presented should be explicitly indicated.

7. It would be desirable if the abstract would be supplemented by the use of the keyword system following the practice of "Nuclear Physics".

Draft Letter to Editors of nuclear physics journals

Dear .....

In March 1972, the IAEA organized the First Meeting of the International Working Group on Nuclear Structure and Reaction Data (IWGNSRD).

The attendees of this meeting have to read more papers than most other physicists. Their common experience is that papers in experimental nuclear physics in some respects fall short of certain long accepted standards. As well as this, there are a number of ways in which authors could ease the task of compilers without adding significantly to the length of their papers.

The Working Group hopes that, if the journal editors would underline the recommendation listed below in their instructions to authors/ referees, a substantial improvement would result.

For the Working Group

G.A. Bartholomew
Chairman

Appendix E

List of Working Papers

Submitted to the First Meeting of IWGNSRD

1. Proposed programme for the First Meeting of IWGNSRD
2. Provisional Agenda of First Meeting of IWGNSRD
3. Report of a consultants meeting on non-neutron nuclear data (23-25 November 1970). INDC(NDS)-30.
4. Proposed Terms of Reference for the Working Group, including the revisions suggested by INDC.
5. International cooperation in the field of nuclear data. Report by L. Hjärne and J.J. Schmidt, IAEA Nuclear Data Section, presented at the XXII National Conference on Nuclear Spectroscopy of the Atomic Nucleus, Kiev, 25-28 January 1972. INDC(NDS)-40/U.
6. Some thoughts on nuclear data compilations, by D. Horen, Oak Ridge National Laboratory, USA.
7. Suggested subgroups' agendas, second draft.
8. Nuclear Data Compilations; The Lifeblood of the Nuclear Sciences and their Applications. The report of an ad hoc panel, under chairman G.Scharff-Goldhaber, on nuclear data compilations, Committee on Nuclear Science, National Research Council.National Academy of Sciences, Washington, D.C. 1971.
9. On the compilation, evaluation and dissemination of non-neutron nuclear data, by V.M. Kulakov and V.P. Rudakov, Kurchatov Institute on Atomic Energy, Moscow, USSR.
10. Description of keyword system, by W.B. Ewbank, Oak Ridge National Laboratory, USA.
11. Two "Non-Neutron CINDAS", by K. Way, Duke University, Durham, USA.
12. Rules for evaluations of decay properties of radionuclides, by J. Legrand, CEN Saclay, France, and A.Spernol, BCMN Geel, Euratom. (Preliminary, not for publication!).
13. Problems of compilation and evaluation of nuclear data, by T.V.Golashvili, CODATA Central Office, Frankfurt, Germany.
14. Report for IWGNSRD by J.R. Bird, Lucas Heights, Australia.
15. Non-neutron nuclear data, status report, CRNL, by G.A. Bartholomew, Chalk River, Canada.
16. Neutron nuclear data compilation and evaluation - past, present and future, by J.J.Schmidt in Codata Newsletter no. 3 (1969)
17. An International Neutron Data System, Report from a Panel Meeting. IAEA Technical Report Series no. 100, Vienna, 1969.

18. Worldwide network for exchange of neutron physics numerical data, by M.D. Goldberg, National Neutron Cross Section Centre, Brookhaven National Laboratory, USA. From the proc. of the 33rd meeting of ASIS, 1970, pp. 19 - 21.

19. CSEWG Recommendations on Compilation of Nuclear Structure Data, by M.K. Drake, National Neutron Cross Section Centre, Brookhaven National Laboratory, USA.

20. Non-Neutron Nuclear Data Needs for Safeguards Development Purposes, by T.A. Byer, IAEA Nuclear Data Section.

21. Nuclear Data Needs for Controlled Thermonuclear Fusion Research, by J.R. Lemley, IAEA Nuclear Data Section.

22. The need for nuclear data in chemistry, by A. Palmer, IAEA Chemistry Section.

23. Statement by D. Horen.

24. Excerpts from a letter from D. Pancholi.

APPENDIX F

LIST OF PARTICIPANTS IN THE FIRST MEETING OF IWGNSRD

	Name of participant	Address
*	Mr.B.J. Allen	Physics Division Australian Atomic Energy Commission Lucas Heights, N.S.W., Australia
	Mr. Angeli	Institute of Experimental Physics Kossuth University Bem Ter, Debrecen Hungary
*	Mr.G.A. Bartholomew	Atomic Energy of Canada Ltd. Chalk River, Ontario Canada
*	Mr. Denes Berenyi	Institute of Nuclear Research 18-C Bem Ter Debrecen, Hungary
	Mr. G. Ebel	Zentralstelle für Atomkernenergie-Dokumentation Kernforschungszentrum D-07501 Leopoldshafen
*	Mr. A.T.G. Ferguson	U.K. Atomic Energy Authority Atomic Energy Research Establishment Harwell, Didcot, Berkshire, U.K.
**	Mr. F. Fröhner	ENEA Neutron Data Compilation Centre B.P.no. 9 91 Gif-sur-Yvette, France
*	Mr.A. Gerbasi da Silva	Instituto de Engenharia Nuclear Cidade Universitaria Ilha do Fundao Rio de Janeiro-GB-ZC-32 Brazil
**	Mr. T. Golashvili	ICSU CODATA Central Office Westendstrasse 19 D-06 Frankfurt
*	Mr. B.Grinberg	Centre d'Etudes Nucléaires de Saclay B.P. no. 2 91 Gif-sur-Yvette, France
*	Mr. D. Horen	Oak Ridge National Laboratory P.O.Box X Oak Ridge, Tenn. 37831, USA

* Corresponding member from Member State
** Corresponding representative from organisation

	Name of participant	Address
*	Mr. V. Kulakov	I.V. Kurchatov Institute of Atomic Energy Moscow, USSR
	Mr. J. Legrand	Centre d'Etudes Nucléaires de Saclay. Laboratoire de Météorologie B.P.no.2, Gif-sur-Yvette, France
*	Mr. W. Michaelis	Geschäftsführung Kernforschungszentrum Karlsruhe Postfach 3640 D-075 Karlsruhe
	Mr. H. Münzel	Inst. f. Radiochemie Kernforschungszentrum Karlsruhe Postfach 3640 D-075 Karlsruhe
	Mr. S. Rapeanu	Institute de Physique Atomique de Bucarest B.P. no. 35, Bucarest, Romania
	Mr. P. Riehs	Reaktorenzentrum Seibersdorf 2444 Austria
	Mr. V.P. Rudakov	I.V. Kurchatov Institute of Atomic Energy Moscow, USSR
*	Mr. M. Sakai	Institute for Nuclear Study Tokyo University Midori-Cho, Tanashi-City Tokyo, Japan
**	Mr. A. Spernol	Bureau Central de Mesures Nucléaires C.C.E. Steenweg op Retie Geel, Belgique
	Mr. H.L. Stefan	Institute de Physique Atomique de Bucarest B.P. no. 35, Bucarest, Romania
	Mr. C. Van der Leun	Fysisch Laboratorium R.U. 4 Sorbonnelaan Utrecht, The Netherlands
*	Mr. A.H. Wapstra	IKO, Inst.for Nuclear Research 18 Oosterringdijk Amsterdam, The Netherlands
*	Mr. L. Wallin	Research Institute of National Defence Avdelning 4 S-104 50 Stockholm 80 Sweden

Name of participant	Address	
Mr. T. Byer	I.A.E.A.	
Mr. L. Hjärne	"	
Mr. J. Lemley	"	
Mr. J. Schmidt	"	
Mr. A. Palmer	"	part-time

Appendix G

LIST OF ACTIONS

Action no.	Paragraph	Page	Action on	Action
1.	II 3 A		NDS	Investigate possibility of issuing the newsletter on compilation and evaluation of non-neutron nuclear data twice per year.
2.	III 2		Horen	Contest RSIC to find out to what degree new or better nuclear data information is needed and, what codes and files are available for Non-US users.
3.	III 5		Münzel, Michaelis	Perform inquiry and prepare survey about necessary improvements of nuclear data knowledge for activation analysis and isotope protection.
4.	III 6		Berenyi	Contact experts of IAEA Panel on Radio-isotope X-Ray Fluorescence Spectrometry regarding disturbances by low-energy, low-intensity radiation in some applications of radioisotopes, for instance in X-ray fluorescence.
5.	III 7		Wapstra	Contact International Astronomical Union about their possible wishes for compilation in the nuclear data field.
6.	IV 6		Bartholomew	Send recommendation document to editors of nuclear physics journals
7.	IV 6		Wapstra	Provide Bartholomew with list of publishers of nuclear physics journals.