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CO-OPERATION AND DEVELOPMENT

NUCLEAR ENERGY AGENCY

STEERING COMMITTEE  
FOR NUCLEAR ENERGY

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NUCLEAR SCIENCE COMMITTEE

WORKING PARTY ON INTERNATIONAL EVALUATION COOPERATION

Summary Record of the Sixth Meeting  
Oak Ridge, USA, 5th and 6th May 1994

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NUCLEAR SCIENCE COMMITTEENEANSC Working Party on International Evaluation Cooperation

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PARTICIPANTS**Working Group Members:**

A.J. Deruytter	(NEANSC Interlaboratory Collaboration)	
T. Fukahori	(JENDL)	
H. Gruppelaar	(EFF)	
A. Ignatyuk	(BROND)	
Y. Kikuchi	(JENDL)	
D. Larson	(ENDF)	
T. Liu	(CENDL)	
R. McKnight	(ENDF)	
E. Menapace	(JEF)	
C. Nordborg	(NEA)	(Secretary)
P. Oblozinsky	(IAEA)	
R. Roussin	(ENDF)	
M. Salvatores	(JEF)	(Chairman)
P. Young	(ENDF)	

**Subgroup Coordinators:**

C.Y. Fu	(Subgroup 1 and 16)
F. Froehner	(Subgroup 15)
R. MacFarlane	(Subgroup 14)
G. Reffo	(Subgroup 12)
H. Weigmann	(Subgroup 3 and A)

**Observer:**

Yu. Shubin	(BROND)
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The chairman, M. Salvatores, opened the meeting and welcomed the participants. The summary record from the fifth meeting of the Working Party was approved without corrections.

ADOPTION OF THE AGENDA

The proposed agenda was adopted with the modification that point 9 (Status of the NEA Interlaboratory Collaboration on Experimental Activities) would be taken directly after point 5 (Status report from the evaluation projects).

MEMBERSHIP

The delegate from the the IAEA Nuclear Data Section, P. Oblozinsky, was welcomed together with the representatives for the BROND (A. Ignatyuk) and CENDL (T. Liu) evaluation projects. The importance to integrate the non-OECD scientists in the work of the subgroups was stressed. The representative from the IAEA agreed to assist in facilitating the communication with non-OECD research groups, but pointed out that there were no funds available to support the work of the different subgroups.

PROPOSALS FROM THE NSC AND THE NEA REVIEW ON NUCLEAR DATA NEEDS**Merging of NSC projects on experimental activities**

It was agreed to review this proposal during the discussion of Subgroup A on Experimental activities.

**Arrangement of a nuclear data user-producer forum**

One of the recommendations in the recently published NEA report on "A Strategic Report on Nuclear Data Needs", was to arrange a forum between users and producers of nuclear data in an attempt to improve the dialogue and possibly establish closer cooperation between the two groups. The Working Party discussed different approaches to the organisation of such a forum, but felt that it must be carefully prepared in order to be effective. A small group (A. Deruytter, Y. Kikuchi, R. MacFarlane, G. Reffo, M. Salvatores and C. Nordborg) was formed to give indications by the end of June 1994 on the format, timing and users to contact. Most of the work will be done by mail. The NEA Secretariat would provide the group with a proposed outline as a starting point for the discussions.

STATUS REPORTS FROM THE EVALUATION PROJECTS

The different evaluation projects presented the present status of and near-term future plans for their data libraries. The most important developments were:

In USA, the Cross Section Evaluation Working Group (CSEWG) was planning release 3 of the ENDF/B-VI library, and was considering to revise the CSEWG structure in the light of current conditions and resources.

The second version of the Chinese Evaluated Nuclear Data Library, CENDL-2, was released in 1992. Following benchmark testing results and feedback from users, it is planned to release and updated version, CENDL-2.1, at the end of 1994.

The main efforts in Japan had during the last year been devoted to the updating and validation of a second version of the JENDL-3 general purpose library, called JENDL-3.2. In parallel, evaluation is going on for a large number of special purpose files, such as high energy, fusion, minor actinide and other files.

The latest version of the Russian general purpose file, BROND-2.2, was issued at the end of 1992. Special purpose libraries, such as photo-neutron (BOFOD), dosimetry (RDF-94), activation (ADL-3) and intermediate energy data (MENDL), were recently developed.

The current versions of the European Fusion File (EFF) and European Activation File (EAF) are EFF-2 and EAF-3.1 respectively. The EFF programme has been reoriented to meet, as far as possible, the needs of the ITER project. The close cooperation with the JEF community will continue.

The first version of the IAEA Nuclear Data Section coordinated Fusion Evaluated Nuclear Data File, FENDL-1, had been completed and was being processed for validation calculations. An activation and a dosimetry library (IRDF-90) for the FENDL project had also been compiled.

The JEF-2.2, general purpose library was released in the beginning of 1992, followed by the special purpose libraries in mid-1993. A extensive validation programme of the data is being pursued, and the documentation of the library is being prepared. Long-term plans for updating of the library are being discussed.

#### STATUS OF THE NEA INTERLABORATORY COLLABORATION (ILC) ON EXPERIMENTAL ACTIVITIES

A. Deruytter reported on two ongoing and one planned ILC experimental activities.

The first, coordinated by A. Carlson, USA, concerned the  $^{10}\text{B}(n,\alpha)$  standard cross section. As a number of measurements had recently been performed or were underway, it had been agreed to hold a meeting of this group during the International Nuclear Data Conference at Gatlinburg, 9th to 13th May 1994, to discuss discrepancies found at high energy in the preliminary results of these measurements as compared to older data.

The ILC on activation cross sections, coordinated by D. Smith, USA, had completed two tasks: an intercomparison of calculated cross section for  $^{60}\text{Co}(n,p)$  and an intercomparison of measurement methods. The collaboration is actively continuing. An extensive series of activation cross section measurements were, for example, recently performed in a collaboration between Argonne, USA, and JAERI, Japan. The close cooperation with the IAEA Coordinated Research Project on activation cross sections for long-lived nuclides will be maintained.

It has been pointed out that there are still important discrepancies in the data base for the inelastic cross section of  $^{238}\text{U}$ . Considering this and the indications from subgroup 4, the NEANSC proposed to set up an ILC on this subject. A first meeting of the group will be held during the Gatlinburg conference in mid-May 1994, to examine the possibility of coordinated measurements up to 2 to 3 MeV.

## REPORTS FROM LONG-TERM SUBGROUPS

Three long-term subgroups had been created at the last Working Party meeting in 1993: Subgroup A on Experimental Activities, Subgroup B on Evaluated Data Formats and Processing for Application Libraries, Subgroup C on High Priority Request List.

Two of these subgroups (subgroups A and B) met on 4th May 1994 to agree on their scope and objectives and to prepare a programme of work for at least one year.

### **Subgroup A**

At the time of its creation, the objective of this subgroup was defined to coordinate differential measurement activities in support of specific goals and of the high priority request list of the Working Party. Following the publication of the NEA report on "A Strategic View on Nuclear Data Needs" in the autumn of 1993 and discussions during a meeting in December 1993 of the NSC bureau, the chairman of the NSC proposed to the chairman of the NEA Interlaboratory Collaboration and the chairman of this Working Party to consider creating a separate Working Party on Experimental Activities, incorporating the activities of subgroup A, the ILCs and related proposals in the report on nuclear data needs. The purpose of this proposal was to highlight the importance of these activities by giving them more visibility in a separate Working Party.

The Working Party and the members of Subgroup A welcomed this proposal and had a thorough discussion on the most efficient way to transfer the present subgroup into a Working Party. It was strongly felt that a close contact with the present Working Party on International Evaluation Cooperation must be maintained, preferably with adjoining yearly meetings, and with proper liaison between the two groups. The membership of the proposed Working Party should be nominated among scientists representing active measurement facilities or with unique expertise in experimental nuclear data work and the present proposed membership of Subgroup A was recommended for consideration. The Working Party agreed on a proposed organisational document for the new Working Party.

Draft organisational documents for Subgroup A and for the proposed Working Party on International Measurement Activities are given in Annex 1 and 2 respectively.

A transition from the present Subgroup A to a separate Working Party should be carefully prepared and should cover a period of approximately six months.

### **Subgroup B**

An outline of the scope and objective of this subgroup was discussed on 4th May 1994. The Working Party approved the final version after a small amendment to the objective. It was considered worthwhile to include explicitly the processing of data for Monte Carlo applications. The draft organisational document stating scope and objective, membership, and work programme is given in Annex 3.

**Subgroup C**

The coordinator of the subgroup was not able to participate due to lack of funding. It was agreed that the monitor would contact the coordinator to establish his future involvement in this activity, and if necessary appoint a new coordinator. The membership list as a whole was reviewed and updated and extended, as far as possible, to scientists performing nuclear data validation with close connections to the users of these data. The following membership was decided: H. Gruppelaar, A. Ignatyuk, Y. Kikuchi, T. Liu, R. McKnight, E. Menapace, A. Tsiboolia, N. Yamano. A proposal of having E. Cheng as co-coordinator would be explored.

A number of documents, such as the former NEANDC high priority request list, a fusion request list by E. Cheng and request lists from Russia and China would be collected and compiled for the next meeting. Indications for additional measurements from subgroups 1, 4, 6, 8 and 10 would also be included in the list.

SUBGROUP ACTIVITIES**Subgroup 1 (Intercomparison of evaluated files for 52Cr, 56Fe and 58Ni)**

A final report was presented by the coordinator C.Y. Fu. The aim of the subgroup was to graphically compare cross sections and energy and angular distributions in different evaluated libraries for the major structural material isotopes, to understand the reasons for the observed discrepancies and to come up with recommendations for improvements. This work has been done and the conclusions have led to the creation of a new subgroup (number 16) on level densities for structural materials.

**Subgroup 2 (Covariances of 56Fe and natFe)**

Written apologies for absence had been received from the coordinator, who informed the Working Party that the work of the subgroup had been completed and the final report would be issued soon. The Working Party expressed a strong wish to have this final report issued by 1 September 1994, and the monitor was asked to contact the coordinator on this matter.

**Subgroup 3 (Thermal actinide data)**

One of the coordinators, H. Weigmann, presented the final report on the analysis of ETA measurements for 235U in the thermal neutron energy region. Results from a large experimental effort involving Geel, Grenoble, Harwell and Oak Ridge have been analysed and a recommendation for a slope of 235U ETA at energies below 0.2 eV has been issued. This report together with the report on Thermal Neutron Actinide Data by the other coordinator, H. Tellier, would constitute the complete final report of this subgroup and would be properly edited and published by the NEA Secretariat.

**Subgroup 4 (238U capture and inelastic cross sections)**

The monitor, Y. Kikuchi, presented recent theoretical work on the inelastic cross section of 238U performed by the coordinator, Y. Kanda. This work had been included in the JENDL-3.2 library. A strong recommendation for

further experimental work up to 2 to 3 MeV on this cross section had been issued and would be communicated to the proposed ILC on the same subject and to Subgroup C on the high priority request list. It was agreed that Y. Kanda would produce, as soon as possible, a final report, based on the presented paper. This would then, together with the earlier report on the capture cross section, constitute the final report of this subgroup.

#### **Subgroup 5 (239Pu fission cross section between 1 and 100 keV)**

The monitor, M. Salvatores, presented a short status report from the coordinator, E. Ford, confirming that the work of the subgroup was completed and that the final report was almost ready. The necessity to re-normalise the 1984 Weston experimental data by 4% was later confirmed by other measurements at Oak Ridge and Geel. A new set of resonance parameters by H. Derrien are consistent with the findings of the subgroup. A final report is expected by 1 July 1994.

#### **Subgroup 6 (Delayed neutron data)**

A status report by the coordinator, A. Filip, was presented by R. McKnight. The programme of work comprises a large experimental effort, both in the differential and the integral area. Three laboratories, Birmingham, UK, Dubna, Russia, and Studsvik, Sweden, are involved in the differential programme covering yields and delayed neutron measurements on 233U, 235U, 238U and 239Pu. Beta effective measurements on different core compositions are being performed at the MASURCA facility, Cadarache, France. A preliminary set of experimental results obtained from a U and a Pu-fueled core, were reported. The experimental uncertainties were as low as expected, namely about 5 %, which is sufficient for validating delayed neutron data. The complete results from all these measurements will not be available before the end of 1995.

#### **Subgroup 7**

Subgroup terminated. See Subgroup B.

#### **Subgroup 8 (Minor actinide data)**

Y. Kikuchi presented an activity report on behalf of the coordinator, H. Takano. Following the completion of the graphical comparison of 237Np and 241Am from different evaluated libraries, a limited benchmark activity had been started. The FCA-IX assemblies had been calculated using the JENDL-3.2 data. The possibility to start a wider collaboration, including JAERI, Japan, CEA, France, and Argonne, USA, to exploit separate sample irradiation experiments in PFR, EBR-II, and PHENIX would be explored. The group from Obninsk, Russia, would also participate actively through a contribution by V. Dulin.

#### **Subgroup 9**

Subgroup terminated. See Subgroup C.

**Subgroup 10 (Inelastic scattering cross section of fission products)**

The aim of the subgroup is to review the existing data base, recommend methods and model parameters for calculating inelastic cross sections and to explain observed discrepancies between differential and integral data. The monitor, H. Gruppelaar, presented a paper submitted to the Gatlinburg conference, concluding that the objectives set out from the start had, to a very large extent, been achieved. The coordinator, M. Kawai, would be asked to write a final report based on the presented paper.

Considering the conclusions of the subgroup and the discussions during the 1992 NEANSC specialists' meeting on fission product data, it was agreed to create a new subgroup (see subgroup 17 below) with a goal to investigate the possibility of recommending a unique evaluated fission product data library. To this end the lumped fission product cross sections for each evaluated library would be compared and the uncertainties assessed. In parallel, it was recommended to continue the experimental effort on Pd and to verify the integral results for Mo-98 and -100 in a differential experiment. The selection of meaningful benchmark experiments would also be addressed by the new subgroup.

**Subgroup 11 (Intercomparison of the resonance region of 52Cr, 56Fe and 58Ni)**

When reviewing different graphical intercomparisons, it became clear that more accurate specifications were in many cases needed concerning the origin of the data plotted. The situation in the field of experiments and analysis of experimental data was: 52Cr New resonance data from Oak Ridge existed but were not being analysed due to lack of manpower. Large discrepancies with previous data were expected. 56Fe Resonance parameters based on new data from Geel combined with data from Oak Ridge had been introduced in JEF/EFF. This needed to be documented. (See also subgroup 15 below) 58Ni New capture data from Geel would be compared with data from Oak Ridge for creation of a new set of resonance parameters. 60Ni F. Frohner was analysing the existing data base for a final recommendation.

The goal of the subgroup would be to recommend a unique set of resonance parameters for each of the above mentioned isotopes. Most of the work was well advanced, but the analysis of the recent Oak Ridge 52Cr data remained a problem. Working Party members were asked to investigate possibilities to assist in this analysis of these data. The situation will be reviewed before the end of 1994.

**Subgroup 12 (Nuclear Model Validation)**

G. Reffo presented a detailed proposal for organising the work of the subgroup. The need for a strong link to the user community and different applications areas was stressed in the discussion that followed. It was agreed to pursue a two step procedure where in the first step the developers of nuclear model codes would document the applicability and limitations of different codes, and then to involve the users of these codes to verify and comment upon the document produced. The subgroup would meet during the Gatlinburg conference to agree upon a more specific programme of work.



**Subgroup 13 (Intermediate energy data)**

The monitor, Y. Kikuchi, presented a status report. The major tasks, such as defining data needs, formats and methodologies, had been defined and agreed upon. A part of the background work had already been performed by one of the coordinators, A. Koning, and a questionnaire had also been sent out to identified subgroup members.

Future orientations of this subgroup depend also on a few meetings that would be held in the near future: a subgroup meeting during the Gatlinburg conference and the NEANSC specialists' meeting on intermediate energy data at the end of May 1994, where the results of the two benchmarks launched by the NSC on thin and thick target proton spallation will be discussed.

A draft summary and conclusions of a recently held NEANSC specialists' meeting on shielding aspects of accelerators, targets and radiation facilities was distributed for information.

**Subgroup 14 (Kerma and radiation damage evaluation)**

The coordinator, R. MacFarlane, presented proposed objectives of the subgroup, which would include reviewing and publicizing the best methods for preparing evaluations to be used to compute kerma and radiation damage. It would also comprise the development of methods and tools for the upgrading of existing evaluations in order to produce more reliable results. It would mainly be restricted to isotopes with  $A < 90$ . The energies considered should extend up to about 100 MeV, and should include material damage mechanisms at energies above 20 MeV.

The proposed scope and objective was approved and the members of the subgroup were identified.

**Subgroup 15 (Self-shielding in the unresolved resonance region for structural materials)**

The objectives as presented by the coordinator, F. Frohner, would be to understand the effects due to a high resolution structure of the Fe total cross section (and the related self-shielding effect) above 800 keV on shielding and transport benchmark calculations, to determine the importance of a correct treatment of the effects, and to recommend procedures for representing in the evaluated files the physics in this energy region in a manner consistent with processing code capabilities.

It was agreed to perform an initial benchmark calculation of neutron transport through iron, using two evaluated files, one with fluctuating and one without fluctuating cross sections in the energy region above the resolved resonances. The benchmark should be kept as simple as possible (spherical or slab geometry and two energy sources: fission spectrum and 14 MeV). The work would be shared between KfK Karlsruhe, ECN Petten, ENEA Bologna and LANL Los Alamos. The results would be reviewed at the next meeting of the Working Party.

**Subgroup 16 (Nuclear level densities for model calculations of neutron induced reactions with  $^{52}\text{Cr}$ ,  $^{56}\text{Fe}$ , and  $^{58}\text{Ni}$ )**

The objective of the subgroup is to understand the effects of different level density formalisms in model calculations for the above mentioned isotopes and recommend which formalism and parameters are to be used in these isotopes. The subgroup is a follow-up to subgroup 1 and the work has recently started.

NEW PROPOSALS FOR COOPERATIVE ACTIONS

A proposal for the creation of a new subgroup based on the results of subgroup 10 was discussed and approved. The proposed scope and objective of this new subgroup 17, entitled "Fission Product Cross Sections", are given in Annex 4.

Another proposal concerning the " $^{235}\text{U}$  epithermal capture cross section" was discussed. A recent paper, by S. Cathalau, on the JEF-2 data validation had pointed out a possible underestimation of the  $^{235}\text{U}$  capture data in the resonance region of about 10 %. An action by the JEF group to re-analyse Oak Ridge data would be undertaken and P. Young would investigate the possibility of forming a subgroup on the subject, involving other interested scientists, such as C. Lubitz, and would communicate to the Working Party chairman the outcome of these investigations.

Other possible subjects for cooperative actions to be brought up for discussion at the next meeting were: Minor Plutonium isotopes (status and need for improvements), Standard data (how to assure the follow-up of the NEANDC activities and the collaboration with IAEA), and Covariances of  $^7\text{Li}$  and  $^9\text{Be}$ .

CONFERENCE AND MEETINGS OF INTEREST TO THE NUCLEAR DATA COMMUNITY

The next large nuclear data conference would normally be held in three years time, and further discussions would be held during the Gatlinburg conference.

The following topical or specialists meetings, to be held within the next year, were mentioned:

- NEANSC specialists meeting on intermediate energy data, May 1994, Paris, France
- FENDL meeting, September 1994, Garching, Germany
- IAEA meeting on the establishment of an international reference data library of nuclear activation cross sections, October 1994, Debrecen, Hungary
- IAEA meeting on compilation and evaluation of fission yield nuclear data, October 1994, Vienna, Austria
- NEANSC specialists meeting on photon production data, November 1994, Bologna, Italy
- IAEA CRP on Measurement, Calculation and Evaluation of photon production data, November 1994, Bologna, Italy (Coordinated with the NEA specialists meeting)

NEXT MEETING

It was agreed to hold the next meeting of the Working Party at the NEA Headquarters, Paris, France, in April or May 1995. The exact dates would be communicated at a later stage.

Annex 1

March 15, 1994

## DRAFT OF ORGANISATIONAL DOCUMENT FOR SUBGROUP A

**Subgroup A. Experimental Activities****Monitor:** A.J. Deruytter; Coordinators: H. Weigmann and D. Larson**Objective:** The objective of this Subgroup is to coordinate differential measurement activities in support of specific goals of the Working Party. The goals are defined by the tasks of the short-term subgroups and Subgroup C, which is responsible for development of the high priority request list. To meet this objective, this Subgroup uses its collective experience in nuclear data measurements

- to correlate needed measurements with laboratory capabilities,
- to encourage appropriate laboratories to make needed measurements, and
- to coordinate experimental work in order to insure efficient use of remaining resources.

**Scope:** The scope of this subgroup includes coordination of differential measurements to meet all types of data needs identified by the Working Party. Facilities in all member states of the NEA are candidates for measurement recommendations, consistent with experimental capabilities. In addition, in cooperation with the IAEA collaboration with non-OECD countries will be encouraged, and facilities in these countries may also be recommended for certain types of measurement work.**Membership:** Membership includes representatives of active measurement facilities and others with unique expertise in experimental nuclear data work, and includes experts knowledgeable in traditional areas of nuclear data needs.**Proposed Subgroup Members:**

A. Carlson, NIST, USA  
R. Haight, LANL, USA  
G. Kegel, University of Massachusetts at Lowell, USA  
S. Grimes, Ohio University, USA  
D. Smith, ANL, USA  
W. Mannhart, PTB, Germany  
S. Qaim, Julich, Germany  
A. Lepretre, CEA Saclay, France  
H. Conde, Uppsala University, Sweden  
Yu. Popov, JINR, Dubna  
B. Fursov, IPPE, Obninsk  
S. Chiba, JAERI, Japan  
M. Baba, Tohoku University, Japan  
Y. Ikeda, JAERI, Japan  
Tang Hong Qing, CIAE, China

**Work Programme:** The work programme will be under continuous development according to the measurement needs identified by the short-term subgroups and especially by subgroup C on high priority requests. However, we accept responsibility for some legacy measurement coordination, including the Interlaboratory Comparisons (ILC's) on 10B Standards Measurements (A. Carlson) and on Activation Measurements (D. Smith). In addition, we expect to be involved with organization of measurements for Subgroup 4,  $^{238}\text{U}(n,n')$ , possibly Subgroup 8, Minor Actinide Data, Subgroup 10, Fission Product Inelastic Scattering, and possibly other new subgroups 12-16 as their work plans become available.

**Milestones:**

- Meeting to discuss candidate facilities for  $^{238}\text{U}(n,n')$  measurement work (11/5/94)
- Complete Subgroup organization and membership (1/6/94)
- Organise list of measurement facilities which can contribute to Subgroup work (1/8/94)
- Organise "newsletter" on experimental activities (1/10/94)
- Locate candidate facilities to meet top five measurement needs identified by Subgroup C, and encourage work on priority needs (1/11/94)
- Develop method for collaborative work among member laboratories (31/1/95)
- Locate candidate facilities to meet new top five measurement needs identified by Subgroup C, and encourage work on needs (1/6/95)
- Maintain contact with laboratories doing priority work, informal status check of progress (ongoing)

Annex 2DRAFT OF ORGANISATIONAL DOCUMENT FOR  
A WORKING PARTY ON INTERNATIONAL MEASUREMENT ACTIVITIES

**Objective:** The objective of this Working Party is to coordinate measurement activities in support of specific needs of the Working Party on International Evaluation Cooperation (WPEC). The goals are guided by the work of the subgroups of the WPEC, especially of Subgroup C, which is responsible for development of the high priority request list. To meet this objective, the Working Party will use its collective experience in nuclear data measurements

- to correlate needed measurements with laboratory capabilities,
- to encourage appropriate laboratories to make needed measurements,
- and to coordinate experimental work in order to insure efficient use of remaining resources.

**Scope:** The scope of this Working Party includes coordination of measurements to meet data needs identified by the WPEC. This includes differential nuclear data measurements as well as specific integral data measurements (e.g., average cross sections, resonance integrals) of direct relevance to evaluations. Meetings of the Working Party should be held in common with those of the WPEC. Facilities in all member countries of the NEA are candidates for measurement recommendations, consistent with experimental capabilities. In addition, in cooperation with the IAEA collaboration with non-OECD countries will be encouraged, and facilities in these countries may also be recommended for certain types of measurement work.

The Working Party is expected to evolve from the existing WPEC subgroup on Experimental Activities ("Subgroup A") and, under inclusion of the existing Interlaboratory Collaborations (ILC's) to continue their work in a broader scope and a long term perspective. Specific tasks of the type of the former ILC's will be pursued in short-term subgroups composed of experts in their respective fields.

**Membership:** Membership should include representatives of the major active measurement facilities. The Chairman of the Working Party should participate in the meetings of the WPEC, whereas monitor and coordinator of WPEC Subgroup C should participate in the meetings of this Working Party. It is expected that the members of the existing WPEC subgroup A will continue to collaborate either as members of the Working Party or as experts in specific subgroups.

**Work Program:** The work program will be under continuous development according to the measurement needs identified by the WPEC, especially its subgroup C on high priority requests. The Working Party will accept responsibility for the continuation of the work of the existing WPEC subgroup A, including the ILC's on 10B Standards Measurements (A. Carlson) and on Activation Measurements (D. Smith), and will be involved with organization of measurements for WPEC Subgroup 4, 238-U(n,n'), possibly WPEC Subgroup 8, Minor Actinide Data, WPEC Subgroup 10, Fission Product Inelastic Scattering, and possibly other new WPEC Subgroups 12-16 as their work plans become available.

The Working Party will develop methods for the collaborative work among member laboratories, and organize the edition of a regular newsletter on experimental activities. In addition, it will establish cooperation with the "Coordinated Research Programs" (CRP's) of the IAEA on long lived activation, reference activation cross sections, He-production and photon production.

Annex 3

## DRAFT OF ORGANISATIONAL DOCUMENT FOR SUBGROUP B

**Subgroup B:** Evaluated Data Formats and Processing Methods for Application Libraries

**Monitor:** E. Menapace; Coordinator: R. Roussin

**Objective:** Subgroup B will promote and coordinate activities that help facilitate the accurate processing of evaluated nuclear data into forms needed for applications in radiation transport calculations, including deterministic and Monte Carlo Methods.

**Scope:** Areas of interest include formats and procedures used for evaluated nuclear data files, processing codes for producing cross-section libraries for applications, methods for intercomparison and checking of processed data, and other related topics that can help achieve our objective.

**Membership:** Membership includes active participants in processing and/or data formats for the major evaluated nuclear data files or others with unique expertise that would be beneficial to the work of the Subgroup.

**Proposed Subgroup Members:**

A. Blokhin, IPPE Obninsk, Russia  
 S. Ganesan, IAEA NDS, Austria  
 Y. Kikuchi, JAERI, Japan  
 A. Hogenbirk, ECN, The Netherlands  
 R. MacFarlane, LANL, USA  
 V. Manokhin, IPPE Obninsk, Russia  
 M. Mattes, IKE Stuttgart, Germany  
 E. Menapace, ENEA Bologna, Italy  
 D. Muir, LANL, USA  
 T. Nakagawa, JAERI, Japan  
 G. C. Panini, ENEA, Bologna, Italy  
 S. Pelloni, PSI, Switzerland  
 O. C. Liang, CNDC, China  
 O. S. Liu, CNDC, China  
 R. Roussin, ORNL/RSIC, USA  
 E. Sartori, NEA DB, France  
 H. Takano, JAERI, Japan  
 J. White, ORNL/RSIC, USA  
 ---- CEA, France (TBD)



**Work Program:** Subgroup B (SGB) will complete and update the work started under Subgroup 7 involving processing of various regional evaluated libraries into the VITAMIN-J (175n,42g) group structure, including non-OECD country files (e.g., BROND, CENDL and FENDL).

A forum will be provided for discussing evaluation format improvements, extensions and procedures for using the formats effectively.

Coordination will be provided for processing intercomparisons, including consistency checks for processed data (e.g., SMILER->AMPX->RADE). SGB will coordinate the dissemination of processed libraries to participants for intercomparison and feedback to evaluators and processors. Efforts will be made to extend the work of SGB to other processing systems (e.g., PROF-GROUCH, GRUCON, AMPX) for improved reciprocal validation.

Since many rely on the NJOY system, SGB endorses the methods and work of the JEF NJOY User's Group. SGB members representing the various evaluated files will be welcome to participate in the JEF NJOY User's Group, with E. Sartori acting as liaison. Some time for discussion among NJOY User's will be allocated in conjunction with future SGB meetings, taking advantage of the active participation by the members to the User's Group itself.

A forum will be provided for discussing the extension of processing methodology, e.g., intermediate energy range (coordinated with SG13) and thermal upscatter.

Act as a forum for discussing and solving processing and format problems for Monte Carlo cross-section libraries. e.g., MCNP and related the NJOY module ACER.

**Milestones:**

- [30-06-94] Coordinator write letter to SGB members asking for examples of format-related processing problems encountered producing multigroup and Monte Carlo libraries, with the purpose of sharing the information with processors and evaluators.
- [30-06-94] Complete (update) processing of regional libraries and document methodology used.
- [31-07-94] Transmit processed libraries to NEA DB and RSIC in (175n,42q) structure (collapse as needed).
- [01-09-94] Centers announce availability of contributed processed data and disseminate to interested participants for benchmarking, intercomparison, and feedback to evaluators.
- [01-10-94] CSEWG chair examine the feasibility of maintaining the ENDF Format manual for on-line access.

Annex 4

## SUBGROUP 17 ON FISSION PRODUCT CROSS SECTIONS

**Background:**

Fission-product cross sections have been reviewed by Subgroup 10, resulting in a much better understanding of the low-energy part of the inelastic scattering cross sections of even-mass nuclides. It was concluded that some additional work was required, i.e. a few more inelastic measurements, further analysis of experimental data from Geel, systematic inclusion of results in nuclear data libraries and further analysis of detected discrepancies in integral data (reactivity worths). Meanwhile, JENDL-3.2 has been improved considerably by inserting new evaluations for inelastic and capture cross sections for many fission products. It therefore seems to be relevant to assess the effect of lumped fission products by calculating one-group fast reactor cross section for <capture> and <inelastic> and compare the results of different evaluations. The differences might give indications on the current uncertainties in lumped fission-product cross sections and also on the possibility to converge to a unique fission product file. To this end, the new subgroup 17 has been defined with the following objectives and programme of work.

**Objectives:**

- Confirm conclusions from subgroup 10 by performing a few more measurements and analysis of inelastic data.
- Assess status and uncertainties of fission product cross section data files for fast reactor calculations.
- Pursue the analysis of relevant integral experiments and take into account indications from these experiments.
- Examine the possibility to recommend a unique evaluated fission-product data file.

**Programme of Work:**

- Analyse Pd inelastic data measured at Geel and insert results in evaluated data sets. Consider also BROND evaluations (Action on ECN-Petten and IRMM-Geel)
- Request new experimental inelastic data of  $^{98}\text{Mo}$  and  $^{100}\text{Mo}$  (Action on IRMM-Geel)
- Define concentrations,  $C(i)$  for the 70 most important fission product nuclei with the requirement that  $\sum C(i) = 2.0$  (Action on CEA-Cadarache)

- Define fast reactor flux weighting spectrum in point-wise form by extracting it from a data statement in an NJOY module (Action on CEA-Cadarache)
- Calculate lumped (pseudo) inelastic, absorption, and elastic fission product cross sections from ENDF/B-VI, JEF-2.2, BROND-2, JENDL-3.1, and JENDL-3.2 (Action on LANL-Los Alamos, ECN-Petten, CJD-Obninsk, JAERI-Tokai-Mura)
- Intercompare lumped cross sections, draw conclusions and make recommendations.

**Participants:**

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Annex 5

## DOCUMENTS PRESENTED AT THE WORKING GROUP MEETING

- IEC-81 CSEWG Report to the NEANSC Working Group on International Evaluation Cooperation; R. Roussin
- IEC-82 The Current Status of CENDL-2; Liu Tingjin et.al.
- IEC-83 Present Status of JENDL Project; Y. Kikuchi
- IEC-84 Status Report of JAERI/NDC and JNDC; Y. Kikuchi
- IEC-85 JENDL-3 Revision-2 - JENDL-3.2 -; Y. Kikuchi
- IEC-86 Benchmark tests of JENDL-3.2 for thermal and Fast Reactors; H. Takano et.al.
- IEC-87 JENDL Special Purpose Files; T. Nakagawa et.al.
- IEC-88 Current Status of Russian Evaluated Neutron Data Libraries; A.I. Blokhin et.al.
- IEC-89 Overview of EFF/EAF Projects 1994; H. Gruppelaar et.al.
- IEC-90 Status of the JEF Evaluated Data Library; C. Nordborg et.al.
- IEC-91 Progress Report on the NEANSC International Inter-laboratory Collaboration on the  $^{10}\text{B}(n,\alpha)$  Standard Cross Section; A.D. Carlson
- IEC-92 Status Report on the NEANSC Interlaboratory Collaboration on Activation Cross Sections; D. Smith
- IEC-93 Status Report on the Planned ILC on Inelastic Scattering Cross Sections of  $^{238}\text{U}$ ; H. Weigmann
- IEC-94 Report of Subgroup 1 of the NEANSC Working Party on International Evaluation Cooperation; C.Y. Fu et.al.
- IEC-95 Analysis of Eta Measurements for  $^{235}\text{U}$  in the Thermal Neutron Energy Region; M.C. Moxon et.al.
- IEC-96 Re-evaluation of  $^{238}\text{U}$  Inelastic Scattering Cross Section for JENDL-3.2; Y. Kanda
- IEC-97 Subgroup 5:  $^{239}\text{Pu}$  Fission Cross Section between 1 and 100 keV; E. Fort

- IEC-98 Subgroup 6: Delayed Neutrons, Data Evaluation and Benchmarking, Status Report; A. Filip
- IEC-99 Integral Data Test for Minor Actinide Data; H. Takano
- IEC-100 NEANSC International Evaluation Cooperation SG10 Activities on Inelastic Scattering Cross Sections for Weakly Absorbing Fission Product Nuclides; M. Kawai et.al.
- IEC-101 Report to the NEANSC Working Party on International Evaluation Cooperation for the May, 1994 Meeting in Oak Ridge, Subgroup 11: Inter-comparison of the Resonance Region of  $^{52}\text{Cr}$ ,  $^{56}\text{Fe}$  and  $^{58}\text{Ni}$ ; D. Larson
- IEC-102 Objectives and Organisation of Subgroup 12 on Nuclear Model Validation; G. Reffo
- IEC-103 Status Report, NEANSC Working Party in International Evaluation Cooperation Subgroup 13 (Intermediate Energy Data); Y. Kikuchi
- IEC-104 Subgroup 14 on Kerma and Radiation Damage Evaluation; R. MacFarlane
- IEC-105 Report to the NEANSC Working Party on International Evaluation Cooperation for the May, 1994 Meeting in Oak Ridge, Subgroup 15: Self-shielding in the Unresolved Resonance Region for Structural Materials; F. Frohner et.al.
- IEC-106 Proposal to Subgroup 15: Self-shielding treatment in the unresolved resonance region; V.V. Sinitza
- IEC-107 Report to the NEANSC Working Party on International Evaluation Cooperation for the May, 1994 Meeting in Oak Ridge, Subgroup 16: Nuclear Level Densities for Model Calculations of Neutron Induced Reactions with  $^{52}\text{Cr}$ ,  $^{56}\text{Fe}$  and  $^{58}\text{Ni}$ ; D. Larson et.al.