

***** BIR-SECTION *****

* REFERENCE (C,68WASH,2,885,6803) PRO
 * CONTRIBUTION.
 * (P,EAND(CE)-89,37,6802) P
 * (J,NP/A,118,9,6805) FINAL
 * MEASUREMENTS.
 * AUTHOR CH,K,VONACH,K,G,VONACH,H
 * TITLE PRECISION MEASUREMENTS
 * OF (N,P),(N,A) AND (N,2N)
 * 13.5 - 14.7 MEV NEUTRON
 * INSTITUTE (2GERMUN)
 * N-SOURCE (D-T) BOMBARDMENT OF A
 * DEUTERONS. A RANGE OF I
 * WERE USED BY VARYING THE
 * FACILITY (VDG) 400KEV VAN DE GR
 * FUR STRAHLENFORSCHUNG.
 * METHOD (ACTIV) GAMMA PULSES EX
 * TA-180M WHERE RETAS WER
 * PART-DET (DG) DECAY GAMMAS.
 * SAMPLE NATURAL MATERIALS. ME
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 * ENERGY, AND SUBTENDED
 * DISTANCE OF 100MM
 * CORRECTION ANGULAR DEPENDENT NE
 * ELASTICALLY SCATTERED
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 * DECAY CORRECTIONS.
 * ERR-ANALYS SYSTEMATIC ERRORS, TA
 * ATTENUATION CORRECTION
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 * IN THE TOTAL ERROR.
 * DETECTOR (NATR) 5X5INCH WELL CRY
 * (PROPC) CH4 FLOW COUNTER
 * TA-180M.
 * STATUS FROM TABLES IN CONFERENCE
 * HISTORY (781017C) PDJ, RECOMPILE
 * (790219E)
 * (800115A) REACTION STRIN
 * 022 AND 023 CHANGED.
 * (800115E)
 * (800424A) DATA HEADINGS
 * (800603E)

** END BIR-SECTION *****

***** BIR-SECTION *****

* REACTION (23-V-51(N,A)21-SC-48,,S
 * RATIO TO THE 14.7 MEV C
 * PUBLISHED TABLE.
 * HISTORY (781018C) PDJ,
 * (790219E)
 * (800424A) DATA HEADINGS
 * (800603E)

** END BIR-SECTION *****

***** NO COMMON-SECTION *****

	EN MEV	EN-ERR MEV	DATA ARB-UNIT
1	13.6	0.075	0.820
2	13.7	0.075	0.836
3	13.8	0.075	0.852
4	13.9	0.075	0.867
5	14.0	0.075	0.885
6	14.1	0.075	0.902

** END DATA-SECTION *****

NNDEN/34

NEUTRON NUCLEAR DATA EVALUATION NEWSLETTER

NEA DATA BANK
BANQUES DE DONNÉES DE L'AEN

AUGUST 1983

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NEUTRON NUCLEAR DATA EVALUATION NEWSLETTER

NNDEN/34

This Newsletter summarises evaluation activity in Member countries and states of both OECD Nuclear Energy Agency and the International Atomic Energy Agency.

It should be noted that work in progress and future plans set out in this Newsletter may be changed without notice: the Newsletter is intended as an informal means of exchanging information between active evaluators, and should neither be quoted as a reference in publications nor be listed in any abstract journal.

The Newsletter reports:

1. Evaluation work on particular nuclides
2. Development of codes for nuclear model calculations, and other codes needed for nuclear data work
3. Publications relevant to the neutron data field.

Contributions on evaluation activities have been received from:

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FED. REP. OF GERMANY	KFK, Karlsruhe	1
FRANCE	CEN, Bruyères-le-Chatel	3
	CEN, Cadarache	5
GERMAN DEMOCRATIC REP.	Technische Universität, Dresden	7
HUNGARY	Kossuth University	8
INDIA	Reactor Research Centre, Kalpakkam	9
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IAEA	Nuclear Data Section, Vienna	21
OECD/NEA	Data Bank, Saclay	22

- August 1983 -

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1. NEW EVALUATIONS RECENTLY COMPLETED A), IN PROGRESS B), OR
 PLANNED IN THE NEAR FUTURE C)

NUCLIDE	DATA TYPE	ENERGY RANGE	PAGE			NUCLIDE	DATA TYPE	ENERGY RANGE	PAGE		
			A	B	C				A	B	C
H-2	many	10 ⁻⁵ eV-20MeV	14			Np	many		19		
H-3	many		19								
B-11	many	10 ⁻⁵ eV-20MeV			19	Pu-238	many		19		
						Pu-239	many		19		
						Pu-239	many			5	
C-12	many			14		Pu-239	(n,2n)	<16MeV		5	
Na	many			19		Pu-240	many		19		
						Pu-240	many				6
Cr	(n,n')			20		Pu-241	many		19		
						Pu-242	many		19		
Co	many			19		Pu-242	many			10	
Ni-nat	many				6	Am-241	many		19		
					Am-241	many		13			
Rb-85	many		19		Am-243	many		19			
Rb-87	many		19		Am-243	many		13			
Ag-107	many		19		Cm-244	many		19			
Ag-109	many		19		Cm-246	many			14		
					Cm-247	many			14		
Eu	many		19		Cm-248	many	<20MeV			14	
					Cm-249	many				14	
Tm-169	many	10 ⁻⁵ eV-20MeV		4							
Ta-181	many		19								
Ta-182	many		19								
Pb	many	<20MeV	19								
Pb	(n,n')		7								
Th-232	many		19								
Th-232	(n,2n)			8							
Th-232	many		16								
Pa-233	many		19								
Pa-233	many		16								
U-233	many	10 ⁻⁵ eV-20MeV	13								
U-233	many		19								
U-234	many		19								
U-235	(n,2n)	<16MeV		5							
U-235	many		19								
U-236	many		19								
U-238	(n,2n)	<16MeV		5							
U-238	(n,γ)(n,n')			2							
U-238	many		19								

THE HISTORY OF THE UNITED STATES

OF THE UNITED STATES OF AMERICA

FROM 1776 TO 1876

BY

W. H. CHAPMAN

NEW YORK

1876

THE HISTORY OF THE UNITED STATES

OF THE UNITED STATES OF AMERICA

FROM 1776 TO 1876

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Contribution to NNEN-34

KFK KARLSRUHE

GERMANY

Names: A. Anzaldo, F.H. Fröhner, B. Goel, H. Jahn, B. Krieg
Address: Institut für Neutronenphysik und Reaktortechnik
Kernforschungszentrum Karlsruhe
Postfach 3640
D-7500 Karlsruhe, West Germany

Work recently completed

- A review of the current status of precompound models has been completed. (Ref. 1). Merits and shortcomings of presently used formalisms for angle-integrated and double-differential emission cross sections are discussed and promising directions for further work indicated. (H. Jahn)
- Number theory was used to derive the antisymmetrisation term in Williams' expression for the density of particle-hole states. In contrast to the various prescriptions in the literature this new result is rigorous and general, showing the expected symmetry in the number of particles and of holes. A review on the number-theoretical method in level density studies was given at the Brookhaven level density meeting in April (Ref. 2).
- A fairly comprehensive review of level density estimation from resolved resonance parameters was presented at the level density meeting at BNL in April and issued as KfK report (Ref. 3). (F.H. Fröhner)
- A critical comparison was made between D. Cullen's SIGMA1 code for Doppler broadening of tabulated, linearly interpolable cross sections (Ref. 4) and the DOBRO code developed at KfK for calculation of Doppler broadened multi-level cross sections directly from resonance parameters (Ref. 5). The test problem involved calculation of 3-channel Reich-Moore cross sections for ^{241}Pu broadened to 900 K. The CPU time needed was shorter and the precision higher with DOBRO, where interpolation errors do not occur, than with SIGMA1. (F.H. Fröhner, E. Stein, B. Krieg, B. Wiegner)

Work in progress

- The documentation of KEDAK-4 is delayed by hospitalisation of B. Goel. (B. Goel, B. Krieg)
- Number-theoretical level density formulae. (A. Anzaldo, H. Jahn)
- Comparative study of precompound reaction theories

(H. Jahn)

- Reevaluation of capture and inelastic scattering of ^{238}U in the unresolved resonance region
(F.H. Fröhner, B. Goel)

References

1. H. Jahn, "Critical Review of Precompound Models", in print
2. A. Anzaldo, "Application of Number-theoretical Methods for the Calculation of Nuclear Level Densities", Proc. IAEA Advisory Group Meeting on Basic and Applied Problems of Nuclear Level Densities, BNL, 11-15 April 1983 (in print).
3. F.H. Fröhner, "Statistical Inference of Level Densities from Resolved Resonance Parameters", report KfK 3553, August 1983, in print also for Proc. IAEA Advisory Group Meeting on Basic and Applied Problems of Nuclear Level Densities, BNL, 11-15 April 1983
4. D.E. Cullen and C.R. Weisbin, Nucl. Sci. Eng. 60(1976)199
5. F.H. Fröhner, Proc. Conf. on Nucl. Data Eval. Meth. and Pcedures, BNL 1980, BNL-NCS-51363 (1981), vol. I, p. 375, also available as KfK 2388, Karlsruhe (1980)

Service de Physique Neutronique et Nucléaire
Centre d'Etudes de Bruyères-le-Châtel
France

Names : O. BERSILLON, M. COLLIN, J.P. DELAROCHE, Ch. LAGRANGE, R. PERRIER,
C. PHILIS, J. SALVY, N. VERGES.

Address : Service de Physique Neutronique et Nucléaire
Centre d'Etudes de Bruyères-le-Châtel
B.P. n° 561, 92542 Montrouge Cedex, France

- Work recently completed and publications

- "Semi-microscopic calculations of inelastic neutron scattering from heavy deformed nuclei" (Ch. LAGRANGE, M. GIROD), Journal of Physics "G" Nuclear Physics n° 9 (1983) L97.
- "On the transformation of angular scattering probabilities between reference systems : survey and numerical analysis" (O. BERSILLON, A. SCHETT⁽³⁾, B. CAPUT).
- "Optical potential analysis for ²⁰⁸Pb neutron scattering at 10 MeV" (J.P. DELAROCHE et al.).
- "Spin orbit potential analysis for neutron scattering from ⁵⁴Fe and ⁶⁵Cu" (J.P. DELAROCHE et al.).
- "Theoretical investigation of ^{76,78,80,82}Se spectroscopic properties deduced from nucleon scattering experiments" (J.P. DELAROCHE et al) .

- Work in progress

- Semi-microscopic calculations of inelastic neutron scattering from deformed nuclei. Studied nuclei : ^{150,152}Sm, ^{70,72,74,76}Ge, ²⁴Mg, ²⁸Si and ³²S (Ch. LAGRANGE, M. GIROD).
- Coherent optical and statistical model calculations of neutron cross sections for Gd isotopes (J.P. DELAROCHE, Ch. LAGRANGE).
- Calculation of neutron cross sections for some Pt isotopes (J.P. DELAROCHE).

.../...

- Complete reevaluation of ^{169}Tm from 10^{-5} eV to 20 MeV (E.D. ARTHUR⁽¹⁾, M. COLLIN, D. GARDNER⁽⁴⁾, M. GARDNER⁽⁴⁾, P. NAGEL⁽²⁾, C. PHILIS, P.G. YOUNG⁽¹⁾).
- Semi-microscopic optical potential analysis within the actinide region (Ch. LAGRANGE).
- Calcul précis de l'angle moyen de diffusion, du décroément logarithmique et de son carré moyen (O. BERSILLON, B. CAPUT).

-
- (1) LANL (USA)
 - (2) OECD (Paris)
 - (3) Collaborateur Temporaire Etranger
 - (4) LLNL (USA)

CONTRIBUTION TO NNDEN-34

Service de Physique de Contrôle et d'Instrumentation

Centre d'Etudes Nucléaires de CADARACHE

Names : H. DERRIEN, E. FORT, P. LONG

Address : DRNR/SPCI/LEPh

Centre d'Etudes Nucléaires de CADARACHE

Boîte Postale n°1

13115 SAINT PAUL LEZ DURANCE (FRANCE)

Work recently completed :

- Least square shape analysis of JAERI ^{238}U transmission data in the energy range 3.8 KeV to 4 KeV.
(H.DERRIEN for NEANDC task force for ^{238}U problems)

Work in progress :

- Evaluation of ^{239}Pu cross sections in the thermal resolved and unresolved regions (H. DERRIEN, P. LONG)
- Continuing action on reevaluation of ^{235}U , ^{238}U and ^{239}Pu from (n, 2n) threshold to 16 MeV (E. FORT)

Work planed for the near future :

- Reevaluation of natural nickel cross sections in the resonance region, taking into account the ORNL experimental results for ^{60}Ni (1) (H. DERRIEN).
- Evaluation of ^{240}Pu from unresolved resonance region (OM calculations) to 16 MeV (E. FORT)

(1) C.M. PEREY et al, ORNL - 5893

GERMAN DEMOCRATIC REPUBLIC

Name: D. Hermsdorf, H. Kalka, D. Seeliger

Address: Technische Universität Dresden
Sektion Physik
Mommsenstr. 13
DDR-8027 Dresden

Work recently completed:

FORTRAN Code AMAPRE for calculation of angular dependence of neutron inelastic scattering in the frame of the Generalized Exciton Model.

AMAPRE combines the computer codes AMALTHE and PREANG [1]

Recent publications (available on request):

[1] H. Kalka, diploma work; TU Dresden, 1983, unpublished.

Work in progress:

Evaluation of double differential cross sections for neutron inelastic scattering on Pb from threshold to 20 MeV.

Supporting measurements at 14 MeV.

Evaluation of neutron data for silicon: The data are presently checked with the code FIZCON.

Recent Reports available from the IAEA Nuclear Data Section:

INDC(GDR)-20: D. Hermsdorf, Description of the Evaluated Neutron Nuclear Data File 2015 for Silicon of the SOKRATOR Library..

INDC(GDR)-22: D. Hermsdorf, Consistent Interpretation of Neutron-Induced Charged Particle Emission in Silicon.

HUNGARY

INSTITUTE OF EXPERIMENTAL PHYSICS
KOSSUTH LAJOS UNIVERSITY, DEBRECEN

Name: S. Daroczy, P. Raics, J. Csikai

Address: Institute of Experimental Physics
Kossuth Lajos University
Bem Ter 18/c
H-4026 Debrecen, P.O. Box 105

Cooperation with:

N.V. Kornilov, O.A. Sainikov, FEI Obninsk, USSR

Work in progress:

Evaluation of the Th-232(n,2n) reaction based on experiments
at the tandem generator of the FEI Obninsk.

Evaluation of (n,t) cross-sections (see NNEN/33 p.25)
continuing.

REACTOR RESEARCH CENTRE KALPAKKAM, INDIA

Names: S. Ganesan, M.M. Ramanadhan, V. Gopalakrishnan

Address: Fast Reactor Group
Reactor Research Centre
Kalpakkam 603 102
Tamil Nadu, India

Work recently completed

(S. Ganesan, M.M. Ramanadhan and V. Gopalakrishnan)

- Generation and Testing of a non-adjusted RRC 1983 ENDF/B Based Multigroup Cross Section Set for Fast Reactor Applications.
- Analysis of ZPR-9-Assembly 31, an Advanced Carbide Fueled Fast Reactor Benchmark Assembly.
- A detailed comparison of reactionwise and groupwise multigroup cross sections of RRC ENDF/B-IV Based non-adjusted set with the 1969 Adjusted French set for ^{239}Pu , ^{240}Pu , ^{241}Pu , ^{242}Pu , ^{235}U , ^{238}U , Fe, Cr, Ni, C, O, Mo, Na, Mn, Al and Si.

Work in progress:

- Participation in IAEA code verification Project (S. Ganesan and M.M. Ramanadhan)
- Generation of broad group errors and their correlation matrix for total reaction cross section in ^{238}U starting from the fine group values provided by recent ANL(USA) evaluation (S. Ganesan and V. Gopalakrishnan)
- Further improvements in the nuclear data processing code system RAMBHA (V. Gopalakrishnan)

ISRAEL

Names: M. Caner, Y. Bartal, S. Yiftah

Address: Soreq Nuclear Research Center
Yavne 70600
Israel

Work recently completed:

Caner, M. and Yiftah S., "Curium-244 neutron data evaluation",
IA-1353 (1979)

Caner, M. Bartal, Y., and Yiftah S., "Curium-246 neutron data evaluation"
IA-1358 (1980).

Caner, M., "Area analysis of underdetermined neutron resonance data".
Ann. Nucl. Energy 7, 403 (1980).

Caner, M. and Yiftah S., "Curium-248 neutron data evaluation".
IA-1383 (1983).

Work in progress

Plutonium-242 neutron data evaluation.

Data files for Cm-244, 246, 248 in KEDAK format available as
INDL/A file 3.

E.N.E.A. - Centro Ricerche Energia "Ezio Clementel"

Laboratorio Dati Nucleari e Codici - TIB/FICS - Via Mazzini, 2 -
40138 Bologna, Italy
tel. 051-498111 - telex 511578 ENEABO I -

Names: V. Benzi, F. Fabbri, G. Maino, E. Menapace, G.C. Panini,
G. Reffo, M. Rosetti, M. Vaccari, A. Ventura.

Publications

- 1) G. Reffo, "Limits and validity of the phenomenological Gilbert-Cameron level density approach", presented to IAEA Adv. Meet., Brookhaven (USA), April 11-15, 1983.
- 2) G. Maino, E. Menapace, "Nilsson-BCS microscopic approach to the description of level density and related phenomenological parameters", presented to IAEA Adv. Meet., Brookhaven (USA), April 11-15, 1983.
- 3) F. Fabbri, G. Reffo et al., "The isomeric ratio in thermal and fast neutron capture of Am-241", NSE 80, 630 (1982).
- 4) M. Rosetti, "Calcoli di modello ottico nella regione degli Attinidi", internal report TIB/FICS/DACO(83)13.
- 5) M. Vaccari, "La preparazione di librerie di dati valutati mediante il sistema di codici SYSMF", internal report TIB/FICS/DACO(83)3.

Work in progress or recently completed

- *Fission product cross sections.* i) Model calculations of $\sigma_{n,\gamma}$ for the following isotopes: (76-78-79-80)Se, (79-81)Br, (78-79-80-81-82-83-84)Kr in the energy range 1 KeV-1 MeV, (128-129-130-131-132-134)Xe in the energy range 1 KeV-200 KeV and (147-148-149-150-151)Sm and (147-148)Pm in the range 1 KeV-100 KeV. Isomeric ratios calculations for ^{79}Se .
- ii) Model calculations of $\sigma_{n,\gamma}$, $\sigma_{n,n}$, $\sigma_{n,\text{el}}$ and σ_{tot} in the energy range 1 KeV-4 MeV for ^{93}Nb , ^{103}Rh , ^{181}Ta , ^{197}Au . Total γ ray spectra calculated, isomeric ratios for $\sigma_{n,\gamma}$ given for Nb, Rh and Ta, average γ ray multiplicity given.

- *Actinide cross sections.* Theoretical estimate was performed for isomeric ratio of ^{241}Am neutron capture in thermal and fast energy regions.

Optical model calculations in actinide region were performed for sake of comparison of different deformed optical potentials proposed in the recent literature.

- *Level density estimate for neutron data calculations.* Improved Nilsson-BCS calculation, with rigorous blocking approach for odd systems, were fitted by very simple phenomenological formula in Fission Product and Actinide mass regions.

Contribution to Neutron Nuclear Data Evaluation Newsletter-34

Japanese Nuclear Data Committee
(Nuclear Data Center, JAERI)

Work Recently Completed and Publications:

- (i) Calculation of Gamma-Ray Production Cross Sections at the Neutron Energies of 1-20 MeV

Hideo KITAZAWA, Yoshiko HARIMA, Masayoshi KAWAI, Hisao YAMAKOSHI,
Yuji SANO, and Tsuguyuki KOBAYASHI

J. Nucl. Sci. Technol., Vol. 20, No. 4, pp. 273-285 (1983)

Gamma-ray production cross sections and spectra of Al, Si, Ca, Fe, Ni, Cu, Nb, Ta, Au, and Pb have been obtained at the neutron energies of 1-20 MeV, using a spin-dependent multi-step evaporation model. Calculations include dipole and quadrupole transition without the distinction between electric and magnetic process, and take explicit account of the role of yrast levels. The effects of the yrast levels and gamma-ray strength function upon gamma-ray production are also investigated in relation to particle emission. At the incident neutron energies where $(n, n'\gamma)$ and/or $(n, 2n\gamma)$ reactions are dominant, the present model is shown to be able to predict the production of secondary gamma-rays (<9.0 MeV) from medium-heavy to heavy nuclei with reasonable accuracy.

- (ii) Evaluation of Neutron Nuclear Data for Uranium-233

Norio ASANO, Hiroyuki MATSUNOBU and Yasuyuki KIKUCHI

J. Nucl. Sci. Technol., Vol. 19, No. 12, pp. 1037-1053 (1982)

Evaluation has been made for the neutron nuclear data of ^{233}U in the energy range from 10^{-5} eV to 20 MeV. Evaluated quantities are the total, fission, capture, elastic and inelastic scattering, $(n, 2n)$ and $(n, 3n)$ reaction cross sections as well as the resonance parameters. The average numbers of prompt and delayed neutrons per fission have also been evaluated. The presently evaluated fission cross section is considerably lower than that of ENDF/B-IV between 10 and 50 keV.

- (iii) Evaluation of Neutron Nuclear Data for ^{241}Am and ^{243}Am

Yasuyuki KIKUCHI

(JAERI-M 82-096 (1982))

Neutron nuclear data of ^{241}Am and ^{243}Am were evaluated for JENDL-2. Evaluated quantities are the total, elastic and inelastic scattering, fission, capture, $(n, 2n)$, $(n, 3n)$ and $(n, 4n)$ reaction cross sections, the resolved and unresolved resonance parameters, the angular or energy distribution of the emitted neutrons, and the average number of neutrons emitted per fission. The fission cross section was evaluated on the basis of newly measured data, and lower values than JENDL-1 were given in the subthreshold energy region. The reliability of the calculation parameters are also much improved, because experimental data became available for the total and capture cross sections of ^{241}Am in the high energy region.

- (iv) Evaluation of Neutron Nuclear Data for Deuterium
Keiichi SHIBATA, Tsutomu NARITA and Sin-iti IGARASI

(JAERI-M 83-006 (1983))

Evaluation of neutron nuclear data for ^2H has been performed in the neutron energy region from 10^{-5} eV to 20 MeV. The evaluated quantities are the total, elastic scattering, capture and (n,2n) reaction cross sections, the angular distribution for the elastic scattering and the double-differential cross section for the (n,2n) reaction. Theoretical calculations were done of the elastic angular distribution and the neutron spectrum from the (n,2n) reaction on the basis of the Faddeev equation.

Work in Progress:

(i) Evaluation of neutron nuclear data for ^{12}C is in progress in the energy region from 10^{-5} eV to 20 MeV. The total cross section below the threshold energy of the inelastic scattering is calculated on the basis of the R-matrix theory. Three discrete levels are taken into consideration for the inelastic scattering.

(from K. Shibata, JAERI)

(ii) The inelastic scattering cross section of structural materials are calculated with the coupled channel optical model and DWBA.

(from Y. Kikuchi, JAERI)

(iii) Neutron nuclear data of ^{246}Cm and ^{247}Cm are evaluated. Evaluated quantities are the total, elastic and inelastic scattering, fission, capture, (n,2n), (n,3n) and (n,4n) reaction cross sections; the resolved and unresolved resonance parameters, the angular and energy distributions of the emitted neutrons, and the average number of neutrons emitted per fission.

(from Y. Kikuchi, JAERI)

Work Planned for the Near Future:

(i) Evaluation of ^{248}Cm and ^{249}Cm nuclear data is planned below 20 MeV.

(from Y. Kikuchi, JAERI)

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May 20, 1983

1. Names

H. Gruppelaar, H.A.J. van der Kamp, C. Costa, R.J. Heijboer and D. Nierop, Netherlands Energy Research Foundation (ECN), P.O. Box 1, 1755 ZG Petten, The Netherlands.
Telephone: 02246-6262, telex 57211 reacp nl.

2. Recent publications and preprints (available upon request)

- [1] H. Gruppelaar, Status of recent fast capture cross section evaluations for important fission product nuclides, Proc. of the NEANDC/NEACRP Specialists' Mtg. on Fast-neutron capture cross sections, Argonne, April 1982, NEANDC(US)-214/L(1983) p.473.
- [2] H. Gruppelaar and H.A.J. van der Kamp, Evaluation of activation cross sections of corrosion products, cover-gas nuclides and other nuclides in the primary cooling circuit of a fast power reactor, Proc. of the Int. Conf. on Nuclear Data for Science and Technology, Antwerp, Sept. 1982, Reidel Publ. Co (1983) p.643.
- [3] H. Gruppelaar, C. Costa, D. Nierop and J.M. Akkermans, Calculation and processing of continuum particle-emission spectra and angular distributions, *ibid.*, p.537.
- [4] C. Costa, H. Gruppelaar and J.M. Akkermans, Energy dependence of preequilibrium angular distributions, *Lett. al Nuovo Cim.* 36 (1983) 431.
- [5] C. Costa, H. Gruppelaar and J.M. Akkermans, Angle-energy correlated model of preequilibrium angular distributions, submitted for publication in *Phys. Rev. C*; ECN-82-172.
- [6] J.M. Akkermans, Random-walk model of precompound decay II: Stochastic uncertainties in the lifetimes and cross-sections, accepted for publication in *Z. Phys. A*; ECN-83-028.
- [7] H. Gruppelaar, Level density in unified preequilibrium and equilibrium models, IAEA Advisory Group Meeting on Basic and Applied Problems on Nuclear Level Densities, Brookhaven, April 1983; ECN-83-064.
- [8] H. Gruppelaar, H.A.J. van der Kamp (ECN) and P. Nagel (NEA), International Nuclear Model Code Comparison on Pre-Equilibrium Effects, NEANDC-177U, NEA Data Bank, Gif-sur-Yvette, France, April 1983.

3. Work recently completed

- . Revision of ^{40}Ar and ^{64}Zn neutron cross sections.
- . Group cross sections (26 group structure) for natural Argon.
- . Preequilibrium models: see Refs. [6-8].

4. Work in progress

- . Revision of neutron-emission cross sections for $^{204,206,207,208}\text{Pb}$.
- . Re-analysis of integral data for fission-product nuclei.

5. Work planned for the near future

- . Continuation of efforts in evaluation and adjustment of capture cross sections for about 15 fission-product nuclides (RCN-3 evaluation; JEF).
- . Evaluation of neutron cross sections for structural materials (JEF).
- . Evaluation of neutron cross sections for fusion-design studies (EC).

6. Computer codes

Improvements to the PRANG code system for the calculation of multi-particle precompound and compound continuum emission have been achieved, see Refs. [3-7].

ROMANIA

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Work recently completed:

The following evaluations have been significantly revised for several reactions:

Th-232: This work was previously published in report INDC(RUM)-10, May 1980, with data available as INDL/A-9990. The revised data will be available in ENDF/B-5 format as INDL-9090.

PA-233: This work was previously published in report INDC(ROM)-12, July 1980, with data available as INDL/A-9993. The revised data will be available in ENDF/B-5 format as INDL-9193.

NUCLEAR DATA EVALUATION NEWSLETTER NO 34

J.L. ROWLANDS
AEE WINFRITH, UNITED KINGDOM

WORK IN PROGRESS

(A) ACTIVATION PRODUCT DECAY DATA

Decay data for 60 nuclides have been evaluated, and are being converted for ENDF/B-V format for inclusion in the new UKPADD-2 library, which will eventually contain data for 410 nuclides. A note describing the work has been published (a L. Nichols INST J Applied Radiat. Isot. 34, 1249).

(B) FISSION YIELD EVALUATIONS

The last evaluation made by E.A.C. Crouch before his retirement is being documented, and his bibliographies and processing codes are being implemented at Winfrith. It is planned to carry out a programme of work to update these evaluations.

(C) RESONANCE PARAMETER PROCESSING CODE SIGAR 7

This code has been linked into the NJOY system. The automatic point selection scheme produces data on a mesh for which a cubic spline fit is used to interpolate. A routine to generate data suitable for Lin-Lin interpolation has been added.

4.8.83

U.S.A. CONTRIBUTION TO NNDEN-34
VIA THE NATIONAL NUCLEAR DATA CENTER

Recent Publications

ANL-83-4 1983

"Proceedings of the NEANDC/NEACRP Specialist's Meeting on Fast Neutron Capture Cross-Section," Argonne National Laboratory, April 20-23, 1982.
A. B. Smith, W.P. Poenitz.

ANL/NDM-62 November 1981

"Covariance Matrices and Applications to the Field of Nuclear Data."
D.L. Smith.

ANL/NDM-69 December 1982

"Fast Neutron Scattering Cross-Sections of Elemental Zirconium."
A.B. Smith and P.T. Guenther.

ANL/NDM-72 July 1982

"Fast Neutron Scattering from Elemental Cadmium." A.B. Smith and
P.T. Guenther.

AND/NDM-74 December 1982

"Evaluation of the ^{238}U Neutron Total Cross-Section." A. B. Smith,
W. P. Poenitz and R. Howerton.

ANL/NDM-75 September 1981

"Neutron Total and Scattering Cross-Sections of Elemental Antimony."
A.B. Smith, P.T. Guenther and J.F. Whalen.

ANL/NDM-76 November 1982

"Scattering of Fast Neutrons from Elemental Molybdenum." A.B. Smith and
P.T. Guenther.

ANL/NDM-77 November 1982

"A Least-Squares Method for Deriving Reaction Differential Cross-Section Information from Measurements Performed in Diverse Neutron Field."
D.L. Smith.

ANL/NDM-78 November 1982

"Fast Neutron Total and Elastic Scattering Cross-Sections of Elemental Indium." A.B. Smith, P.T. Guenther, and J.F. Whalen.

BNL/NCS-51619 October 1982

"ENDF/B-V Cross-Section Measurement Standards." A.D. Carlson and
M.R. Bhat.

ORNL/TM-8290 September 1982

"Evaluated Neutron-Induced Cross-Sections for ^{40}Ca from 20 to 40 MeV."
D.M. Hetrick, C.Y. Fu, and D.C. Larson.

EVALUATION RECENTLY COMPILED OR IN PROGRESS

<u>Material</u>	<u>Laboratory</u>	<u>Status</u>
^3H	LANL	Completed Revision 2 ENDF/B-V
^{11}B	LANL	Planned for ENDF/B-VI
Na	ORNL	Completed Revision 2 ENDF/B-V
Co	BNL	Completed Revision 2 ENDF/B-V
$^{85,87}\text{Rb}$	BNL	Completed Revision 2 ENDF/B-V
$^{107,109}\text{Ag}$	BNL	Completed Revision 2 ENDF/B-V
Eu	BNL	Completed Revision 2 ENDF/B-V
$^{181,182}\text{Ta}$	HEDL	Completed Revision 2 ENDF/B-V
Pb	ORNL	Completed Revision 2 ENDF/B-V
^{232}Th	ORNL	Completed Revision 2 ENDF/B-V
^{233}Pa	BNL	Completed Revision 2 ENDF/B-V
$^{233,234,236}\text{U}$	BNL	Completed Revision 2 ENDF/B-V
$^{235,238}\text{U}$	ORNL	Completed Revision 2 ENDF/B-V
Np	HEDL	Completed Revision 2 ENDF/B-V
^{238}Pu	HEDL	Completed Revision 2 ENDF/B-V
^{239}Pu	LANL	Completed Revision 2 ENDF/B-V
$^{240,241}\text{Pu}$	ORNL	Completed Revision 2 ENDF/B-V
^{242}Pu	BNL	Completed Revision 2 ENDF/B-V
^{241}Am	BNL	Completed Revision 2 ENDF/B-V
^{243}Am	HEDL	Completed Revision 2 ENDF/B-V
^{244}Cm	BNL	Completed Revision 2 ENDF/B-V

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U.S.S.R.

Names: V.V. Vozjakov, V.M. Bychkov, V.P. Lunev, V.I. Popov

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Recent publication:

Jadernye Konstanty 4 (48) 1982 p. 44-53 = INDC(CCP)-196, in Russian.

Evaluation of chromium neutron inelastic scattering cross-sections.

Abstract:

Re-evaluation was made for nuclear levels excitation function, non-elastic and inelastic cross-sections of natural chromium. Evaluation was based on last experimental data, theoretical calculations and previous evaluated cross-sections of reactions (n,p), (n,pn), (n,alfa), (n,2n). Evaluated cross-sections are compared with ENDF/B-V cross-sections. The data obtained are entered in the Soviet evaluated data library in ENDF/B format. (16 figures)

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Tel: 2360-1710 Telex: 1-12645

Names: D.E. Cullen, H.D. Lemmel, P.K. McLaughlin, K. Okamoto,
V.G. Pronyaev, O. Schwerer

Work in progress:

1. The 1983 version of the IAEA Evaluated Nuclear Data Library INDL is being prepared containing revisions to evaluations included in the 1982 version and some new evaluations. The library consists of:

INDL/V - various evaluations

INDL/A - actinides

IRDF - the International Reactor Dosimetry File

INDL/F - for INTOR fusion neutronics calculations

INDL/F-83 was released; it is documented in IAEA-NDS-57. The 1983 version is a collection of 23 materials required for INTOR as retrieved from ENDF/B-4 and -5 and from ENDF-78, converted to ENDF/B-5 format. In addition to the basic file, a RECENT output version ("INDL/F-83-R") is available.

2. A Consultants' Meeting was held in Smolenice, Czechoslovakia, 28 March - 1 April 1983 on
 - (1) the U-235 Fast Fission Cross-Section, and
 - (2) the Cf-252 Fission Neutron Spectrum.

The papers and conclusions will be published as an INDC report. The evaluation of the new experimental data will lead to improved accuracy for these standard data.

3. The verification of neutron cross-section processing codes will be continued. The project was outlined in a paper presented at the Sixth International Conference on Radiation Shielding, Tokyo, Japan, 16-20 May 1983, by D.E. Cullen (IAEA), N.M. Greene (ORNL), A. Hasegawa (JAERI), E. Sartori (OECD/NEA), G.C. Panini (ENEA Bologna).

NEA Data Bank

Joint Evaluated File project (JEF)

The file now (August 1983) contains data for about 290 isotopes and elements. Benchmark testing was held up for a time until the results of the first IAEA benchmark on nuclear data processing codes were known, but work now continues in parallel on the zero-dimensional KFK benchmark set and the one-dimensional tests proposed by the Scientific Coordinating Group at its meeting in May this year. It is too early to make a very clear statement about the quality of the data chosen; however, no serious errors in the data or in the format of the files have yet been discovered.

Seventy-one group cross-sections for ten materials were prepared during June 1983 at Harwell, for use in the one-dimensional benchmarks.

Nuclear Model Codes benchmarks

A detailed status report on the Spherical Optical Model and Statistical Model study was circulated to all participants in October 1982, and considerable feedback of comments and new calculations was received from users. Production of the final report on this study and codes (which will also include some new material received since the April 1981 preliminary report) has been delayed by pressure of other work. Effort has been allotted for urgent preparation of the final report on these studies in the autumn of this year.

The third exercise, on Pre-equilibrium Effects, is now well under way, and there were a very good number of requests for the specification document NEANDC-177U (April 1983). The deadline for receipt of solutions at the Data Bank is 1st November, 1983.



