International Atomic Energy Agency

INDC(NDS)-143/GP

INDC

INTERNATIONAL NUCLEAR DATA COMMITTEE

PROGRESS
IN
FISSION PRODUCT NUCLEAR DATA

Information about activities
in the field of measurements and compilation/evaluations
of fission product nuclear data (FPND)

collected

by

M. Lammer

Nuclear Data Section
International Atomic Energy Agency
Vienna, Austria

No. 9
August 1983

IAEA NUCLEAR DATA SECTION, WAGRAMERSTRASSE 5, A-1400 VIENNA

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FOREWORD

This is the ninth issue of a report series on Fission Product Nuclear Data (FPND) which is published by the Nuclear Data Section (NDS) of the International Atomic Energy Agency (IAEA). The purpose of this series is to inform scientists working on FPND, or using such data, about all activities in this field which are planned, ongoing, or have recently been completed.

The main part of this report consists of unaltered original contributions which the authors have sent to IAEA/NDS. Therefore, the IAEA cannot be held responsible for the information contained nor for any consequences resulting from the use of this information. The present issue contains also a section with some recent references relative to fission product nuclear data, which were not covered by the contributions submitted.

The types of activities being included in this report are measurements, compilations and evaluations of:

Fission product yields (neutron induced and spontaneous fission);
Neutron reaction cross sections of fission products;
Data related to the radioactive decay of fission products;
Delayed neutron data of fission products; and
lumped fission product data (decay heat, absorption etc.).

The eighth issue of this series has been published in July 1982 as INDC(NDS)-130. The present issue includes contributions which were received by NDS between 1 August 1982 and 25 June 1983.

The next issue of this report series is envisaged to be published in June 1984.

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*) Page numbers in brackets refer to collaborations, which are not listed under "Laboratory and address"

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*) see page iii

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*) see page iii

SUBMITTING CONTRIBUTIONS

The next issue is expected to be published in July 1984. All scientists who are presently working - or have recently completed work - in the field of FPND and who want to contribute to the 9th issue of this series, are kindly asked to send contributions to me between now and 1 May 1984, so that they reach NDS before 15 May 1984.

Those scientists or groups who have already contributed to the present issue and who want to leave their contribution(s) unchanged or who wish to suggest only slight changes, should write an appropriate note to me before the above deadline.

Format:

The size of one contribution should preferably not exceed one page. Of course, the number of contributions per working group or laboratory is not restricted. Similar experiments (or calculations, evaluations, etc.) performed by one person or group should preferably be combined to one contribution, if this is possible without loss of clarity.

The headings suggested for the 3 types of contributions can be found on page viii. For the sake of consistency it is requested that the suggested headings be used as far as appropriate.

Compilation and evaluations: If applicable, the availability of numerical data from computer files could be indicated either under the headings "Computer files ..." or under a separate heading "Availability...".

Editing: Since contributions received are generally used directly for publication, it is important that typed originals are sent and not just carbon- or photocopies. It would be a great help for producing an edited report if a margin of 2 cm (or 1 inch for North American paper format) is left on each side of the text and a 5 cm space is left at the top of each page (or 3 cm, if the name of the country is included).

Comments or suggestions concerning the format, content and layout of this report series are most welcome and should be directed to me in time before the next issue.

I would like to thank the contributors for their cooperation.

M. Lammer

Measurements:	Compilations:	Evaluations:
Laboratory and address: Names: Facilities: <u>Experiment</u>: Method: Accuracy: Completion date: Descrepancies to other reported data: Publications:	Laboratory and address: Names: <u>Compilation</u>: Purpose: Major sources of information: Deadline of literature coverage: Cooperation: Other relevant details: Computer file: Completion date: Publications:	Laboratory and address: Names: <u>Evaluation</u>: Purpose: Method: Major sources of information: Deadline of literature coverage: Status: Cooperation: Other relevant details: Computer file of compiled data: Computer file of evaluated data: Discrepancies encountered: Completion date: Publications:

SUBJECT INDEX [a)]

1. MEASUREMENTS

1.1. Fission yields

a) with respect to the earlier issues, underlined page numbers refer to new work, page numbers in brackets refer to unchanged contributions, and others refer to revised contributions.

1.1. Fission yields (cont'd)

nuclide	neutron energy	further specifications	page
U-235	fast	element yields Br,Kr,Rb,Te,I,Xe,Cs	(25)
	fast	2 fast spectra, direct Ge(Li) + rad.chem.	(89)
	fast	tritium yield	(91)
	fast	PFR, chain yields, mass-spec.	92
	fast	FFTF, i.d. mass-spectrometry	107
	140-1000 keV	angular anisotropy of LCP	59
	0.1-8 MeV	rad.chem., Ge(Li), normalized to 200 %	(96)
	3 MeV	element yields Br,Kr,Rb,Te,I,Xe,Cs	(25)
	14-15 MeV	direct Ge(Li), yields rel. Zr-95 etc.	109
	14 MeV	Ag,Cd,In,Sn fract. yields, SISAK-2 system	117
U-236	spontaneous	angular momentum (indep. isomer ratio)	55
U-238	photofission	fragment charge + isotopic distribution	7
	epicadmium	cumul.= fract. yields, A=131-134	(17)
	fast	2 fast spectra, direct Ge(Li) + rad.chem.	(89)
	fast	PFR, chain yields, mass-spec.	92
	fission spec.	cumul. yields, rad. chem. + γ-spectr.	(16)
	0.1-8 MeV	rad.chem., Ge(Li), normalized to 200%	(96)
	1.6,3.1,5.2MeV	fragment mass distribution, kin. energy	(21)
	3 MeV	element yields Br,Kr,Rb,Te,I,Xe,Cs	(25)
	14-15 MeV	direct Ge(Li), yields rel. Zr-95 etc.	109
	14 MeV	Ag,Cd,In,Sn fract. yields, SISAK-2 system	117
Np-237	photofission	35 cumulative + 4 independent yields	119
	thermal	light charged particles, absol. yields	(9)
Pu-238	unspecified	element yields Br,Kr,Rb,Te,I,Xe,Cs	25
	spontaneous	mass yields, kin. energy	5
	spontaneous	fragment kinetic en. and mass distrib.	10
	thermal	mass yields, kin. energy	5
	fast	cumul. yields Ru-103,I-131 rel. Ba-140	66
Pu-239	spontaneous	mass yields, kin. energy	5
	thermal	mass resolution correction	5
	thermal	mass yields, kin. energy	5
	thermal	fragment mass distribution	(6)
	thermal	light charged particles, absol. yields	(9)
	thermal	fragment kinetic en. and mass distrib.	10
	thermal	indep. yields, light fragments	26
	thermal	cumul. + indep., rad. chem. + Ge(Li)	71
	thermal	indep.+ cumul. yields, rad.chem. + Ge(Li)	86
	thermal	tritium yield	(91)
	thermal	fragment mass yields, physical, all A	(115)
	thermal	Tc-104,105 fract. indep. yields	(117)
	thermal	cumul. yields (T1/2 = 7.1-48 s)	122
	fast	2 fast spectra, direct Ge(Li)+rad.chem.	(89)
	fast	tritium yield	(91)
	fast	PFR, chain yields, mass-spec.	92
	fast	FFTF, i.d. mass-spectrometry	107
	0.1-8 MeV	rad. chem., Ge(Li), normalised to 200%	96
	14-15 MeV	direct Ge(Li), yields rel. Zr-95 etc.	109

1.1. Fission yields (cont'd)

1.2. Neutron reaction cross sections

1.2 Neutron reaction cross sections (cont'd)

1.2 Neutron reaction cross sections (cont'd)

1.2 Neutron reaction cross sections (cont'd)

nuclide	neutron energy	reaction	page
In-115	fission spec.	Cf-252 source, (n,n')In-115m	75
	2-10 MeV	(n,γ)	85
Sn	47 keV-20 MeV	total	98
	0.8-4.5 MeV	total	97
	1.5-4.0 MeV	elastic	97
Sb	47 keV-20 MeV	total	98
	0.8-4.5 MeV	total	97
	0.5-4.0 MeV	(n,γ)	100
	1.5-4.0 MeV	elastic	97
Sb-123	unspecified	transmission and capture	70
Te-125	fast	RAPSODIE, mass-spec., absorption	49
Te-126	fast	RAPSODIE, mass-spec., absorption	49
Te-128	fast	RAPSODIE, mass-spec., absorption	49
I-127	2.6-2000 keV	(n,γ)	110
I-129	1 eV-1.5 keV	res. pars. (transmission)	(33)
	2.6-2000 keV	(n,γ)	110
Xe-124	30 keV	(n,γ)	36
Xe-132	30 keV	(n,γ)	36
Xe-134	30 keV	(n,γ)	36
Xe-136	2.6-2000 keV	(n,γ)	110
Cs-133	fast	RAPSODIE, mass-spec., absorption	49
	2.6-2000 keV	(n,γ)	110
Ba-134	3-200 keV	(n,γ), res. pars.	4
Ba-135	3-200 keV	(n,γ), res. pars.	4
Ba-136	3-200 keV	(n,γ), res. pars.	4
Ba-137	1.5 eV-100 keV	(n,γ)	69
	3-200 keV	(n,γ), res. pars.	4
Ba-138	3-200 keV	(n,γ), res. pars.	4
La-139	fast	capture γ spectrum	4
	fast	RAPSODIE, mass-spec., absorption	49
	below 2.5 keV	res. pars.	69
	0.5-4.0 keV	(n,γ)	100
	3-200 keV	(n,γ), res. pars.	4

1.2 Neutron reaction cross sections (cont'd)

1.2 Neutron reaction cross sections (cont'd)

nuclide	neutron energy	reaction	page
Sm-151	4-250 keV	(n,γ) deduced from Sm-148,149,150	38
Sm-152	30 keV	(n,γ)	36
Sm-154	30 keV	(n,γ)	36
Eu	0.5-4.0 keV	(n,γ)	100
Eu-151	fast 2.6-2000 keV 48.5 keV	CFRMF, EBR-II, integral (n,γ) (n,γ) (n,γ) to 9.3 h isomer	(106) 110 36
Eu-152	fast	CFRMF, EBR-II, integral (n,γ)	(106)
Eu-153	fast 2.6-2000 keV	CFRMF, EBR-II, integral (n,γ) (n,γ)	(106) 110
Eu-154	fast	CFRMF, EBR-II, integral (n,γ)	(106)
Gd	0.5-4.0 keV	(n,γ)	100
Gd-152	30 keV	(n,γ)	36
Gd-155	10 eV-200 keV	(n,γ)	69
Gd-157	10 eV-200 keV	(n,γ)	69
Gd-158	30 keV	(n,γ)	36
Tb-159	0.5-4.0 keV	(n,γ)	100
Dy	0.5-4.0 keV	(n,γ)	100
Dy-162	14 MeV	(n,p)	18
Er	0.5-4.0 keV	(n,γ)	100
FP *)	unspecified 1 eV-1.5keV	comparative measurements res. pars. (transmission)	33 33
Many +)	thermal	(n,α), systematic study	8

*) gross FP-mixtures

+) several reactions not specified in detail

1.3. Decay data

FP	data type	page
Zn-75	nucl. spectroscopy	83
Zn-77	nucl. spectroscopy	83
As-77	E_γ, I_γ, I_{KX} (absol.) E_γ, I_γ, I_{KX} (absol.)	(29) 30
As-78	E_γ, I_γ, decay-scheme	22
Br-82	$T_{1/2}$	19
Br-88	I_γ	124
Kr-85	I_γ (absolute)	19
Kr-90	I_γ	124
Rb-88	Q_β Q_β, β-spec.	42 102
Rb-89	Q_β	42
Rb-90	Q_β	42
Rb-91	Q_β	42
Rb-92	Q_β	42
Rb-93	Q_β	42
Rb-94	β-decay energy Q_β Q_β, β-spec	40 42 102
Rb-95	$T_{1/2}$, γ-, ce-spec. β-decay energy Q_β	43 40 42
Rb-96	β-decay energy Q_β Q_β, β-spec	40 42 102
Rb-97	$T_{1/2}$, γ-, ce-spec. β-decay energy Q_β	43 40 42
Rb-98	$T_{1/2}$, γ-, ce-spec. β-decay energy Q_β, β-spec	43 40 102

FP	data type	page
Rb-99	$T_{1/2}$,γ-singl+coinc	(102)
Sr-90	β-spectr. β-spectr., E_β	11 93
Sr-93	$T_{1/2}$	72
Sr-94	$T_{1/2}$ β-,γ- singles, coinc.	72 74
Sr-95	$T_{1/2}$,γ-, ce-spec.	43
Sr-97	$T_{1/2}$,γ-, ce-spec.	43
Sr-98	γ-angular correl.	102
Sr-99	$T_{1/2}$,γ-, ce-spec. $T_{1/2}$,γ-singl.+coinc	43 102
Sr-100	$T_{1/2}$,γ-, ce-spec.	43
Sr-101	$T_{1/2}$,γ-, ce-spec.	43
Y-90	β-spec. β-spec. E_β	11 93
Y-100	$T_{1/2}$,γ-, ce-spec.	43
Y-102	γ-singles, coinc.	34
Zr-95	E_γ, I_γ, I_{KX} (absol.)	29
Zr-97	γ-angular correl.	102
Zr-99	I_γ	124
Zr-100	I_γ	124
Nb-93m	$T_{1/2}$,ce,x-rays	14
Nb-95	$T_{1/2}$	19
Nb-99	I_γ	124
Nb-101	I_γ	124
Nb-102	I_γ	124

1.3. Decay data (cont'd)

1.3. Decay data (cont'd)

1.3. Decay data (cont'd)

1.4. Delayed neutron (del-n) data

1.4. Delayed neutron (del-n) data (cont'd)

1.5. Decay heat

2. COMPILATIONS AND EVALUATIONS

I. MEASUREMENTS

Unchanged contributions are marked as such.

Updates: revisions with respect to the last issue are marked by a vertical bar on the left margin of the text.

New contributions show no marks.

ARGENTINE

Laboratory: Departamento de Física
Comisión Nacional de Energía Atómica
Av. del Libertador 8250
1429 Buenos Aires, Argentina

Facilities: On-line electromagnetic isotope separator coupled with a neutron generator for $^{235}U(n_{+h},f)$ products studies (IALE facility).

Names: H.Huck, M.L.Pérez and J.J.Rossi

Experiment: Half lives and partial decay schemes for the ^{129}Sn (2.4 min) and ^{129}Sn (6.9 min) and ^{129}Sb isotopes were established.

Method: The ^{235}U thermal fission products were electromagnetically separated and mass 129 collected on a movable tape collector. Half lives determinations were performed by multi-scaling the gamma-spectra. Growing-decay curves were taken in order to assign a new half-life no previously reported. Gamma-ray energies and intensities as well as gamma-gamma coincidences were used to construct the decay schemes.

Accuracy: Varying

Completion date: Completed

Publications: **Phys. Rev. C26 (Aug. 1982) 621.**
CNEA NT 5/82 pag b.49, Progress Report 1980-1981, Department of Physics CNEA, Buenos Aires, Argentina.

AUSTRALIA

Laboratory and address: Australian Atomic Energy Commission, Research Establishment, Lucas Heights Research Laboratories, Lucas Heights, NSW 2234, Australia.

Names: J.W. Boldeman, B.J. Allen, D.W. Lang, R.L. Walsh

Facilities: 3 MeV Van de Graaff accelerator, HIFAR and Moata reactors.

1. Experiment: Collaborative measurements with ORNL of neutron capture cross sections in the fission product mass region.

   Publications: "Resonance Neutron Capture in $^{86,87}Sr$".
   G.C. Hicks[b], B.J. Allen, A.R. de L. Musgrove, R.L. Macklin[a].
   Aust.J.Phys. 35 (1982) 267.

   "Stable Isotope Capture Cross Sections from the Oak Ridge Linear Accelerator - Part II"
   B.J. Allen, J.W. Boldeman, R.L. Macklin, Nucl.Sci.Eng. 82 (1982) 230 (for list of nuclides see next page).

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2. Experiment: Collaborative Measurements with C.B.N.M. of High Resolution Neutron Capture Cross Sections.

   Method: C_6D_6,C_6F_6 detector at 30, 60 m flight path at GELINA.

   Publications: "Failure of Valence Neutron Capture in ^{96}Zr".
   A. Brusegan[c], F. Corvi[c], G. Rohr[c], B.J. Allen.
   Fourth Int. Symp. on Neutron Capture Gamma-Ray Spectroscopy and Related Topics (1981), Grenoble.Ed. T. Von Egidy and F. Gonnenwein - Adam Hilger, p. 406

   "Search for Valence Effects in p-Wave Capture in ^{88}Sr".
   B.J. Allen, R. Shelley[c], T. van der Veen[c], A. Brusegan[c], G. Vanpraet[d] - ibid. p. 404.

---

3. Experiment: Measurement of fast neutron capture γ-ray spectra.

   Method: NaF detector and pulsed Van de Graaff accelerator.

   Publications: "Fast Neutron Capture γ-Ray Spectra in ^{88}Sr.
   B.J. Allen and F.Z. Company[e].
   Fourth Int.Symp. on Neutron Capture Gamma-Ray Spectroscopy and Related Topics (1981), Grenoble.
   Ed. T. von Egidy and F. Gonnenwein - Adam Hilger, p. 398.

   "Average Neutron Capture γ-ray Spectra in ^{139}La and ^{141}Pr".
   B.J. Allen and F.Z. Company[e], ibid. p.401.

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4. Experiment: Relative yields of stable tellurium isotopes in neutron induced fission.

   Measurements of ^{233}U, ^{235}U.

   Method: Mass spectrometer; reactor HIFAR

   Accuracy: 1-5% (relative).

   Completion date: Completed

   Publication: J.R. de Laeter[f], K.J.R. Rosman[f] and J.W. Boldeman, Aust.J.Phys. 35 (1982) 385.

AUSTRALIA
(cont'd)

5. Experiment: Mass yields in neutron fission of ^{230}Th.
   Method: 3 MeV Van de Graaff accelerator: surface barrier detectors.
   Completion date: December 1983
   Publication: J.W. Boldeman and R.L. Walsh, 9th Aust.Inst.Nucl.Science and Eng.Conf., Melbourne, February 1982.

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6. Experiment: Mass resolution correction in double-energy fission measurements.
   Method: Calculation of and correction for mass resolution by operator and iterative methods. For $^{252}Cf(sf)$ and $^{239}Pu(n,f)$.
   Completion date: Completed
   Publication: D.W. Lang and R.L. Walsh, Nucl.Inst.Meth., 200 (1982) 389.

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7. Experiment: Mass yields and kinetic energies for spontaneous fission and thermal neutron fission of plutonium isotopes (in collaboration with J. Trochon *et al.*, Bruyères-le-Châtel). Measurements of: $^{238-244}Pu$.
   Method: Surface barrier detectors
   Completion date: June 1984
   Publication: H. Abou Yehia[g], J.W. Boldeman, Y. Pranal[g], and J. Trochon[g].
   4th Aust.Inst.Physics Congress, Melbourne, 1980.

(a) Oak Ridge National Laboratory, Oak Ridge, Tennessee, U.S.A.

(b) James Cook University, Queensland, Australia

(c) Central Bureau for Nuclear Measurements, Geel, Belgium

(d) Rijksuniversitair Centrum, Antwerp, Belgium

(e) University of Wollongong, NSW, Australia

(f) Western Australian Institute of Technology, South Bentley, W.A.

(g) Bruyères-le-Châtel, France.

List of nuclides for first experiment: correction factors for capture cross sections published earlier are giveb for:
$^{86-88}Sr$, ^{89}Y, $^{90-92,94}Zr$, $^{92,94-98,100}Mo$, $^{106,108,110-114,116}Cd$, $^{134-138}Ba$, ^{139}La, ^{140}Ce, ^{141}Pr, $^{142-146,148}Nd$.

BELGIUM

Laboratory and address : : - Nuclear Physics Laboratory
Proeftuinstraat 42
B-9000 Gent, Belgium

Names : H.Thierens, A.De Clercq, E.Jacobs, D.De Frenne, P.D'hondt, P.De Gelder and A.J.Deruytter.

Facilities : Linear Electron Accelerator, Gent
Reactor BR1, SCK/CEN Mol

Experiment : Kinetic energy and fragment mass distributions for $^{240,242,244}Pu$ sf, $^{239,241}Pu(n_{th},f)$ and $^{240,242,244}Pu(\gamma,f)$.

Method : Measured : photofission yields, fragment kinetic energies ; deduced : $\sigma(\gamma,f)$, kinetic energy- and provisional mass distributions with changing excitation energy of the compound system.

Completion date : $^{239,240}Pu$: November 1980
$^{241,244}Pu$: September 1982
^{242}Pu : February 1983

Publications :
- H.Thierens, A.De Clercq, E.Jacobs, D.De Frenne, P.D'hondt, P.De Gelder and A.J.Deruytter, Phys.Rev. C23, 2104 (1981)
- H.Thierens, A.De Clercq, E.Jacobs, M.Piessens, P.D'hondt and D.De Frenne, Phys.Rev. C27, 1117 (1983)
- H.Thierens et al, to be published in Phys.Rev.C.

BELGIUM

Laboratory and address : - Nuclear Physics Laboratory
Proeftuinstraat 42
B-9000 Gent, Belgium
- Physikalische Chemie, Philipps-Universität
D-3550 Marburg, W.Germany[a)]

Names : D.De Frenne, H.Thierens, B.Proot, E.Jacobs, P.De Gelder, A.De Clercq and W.Westmeier[a)].

Facilities : Linear Electron Accelerator, Gent.

Experiment : Charge and isotopic distribution, isomeric ratios and initial fragment spins for $^{235,238}U(\gamma,f)$.

Method : Measured : fission product γ-ray spectra ; deduced : fractional independent and cumulative yields.

Completion date : beginning 1983.

Publications :
- H.Thierens, B.Proot, D.De Frenne and E.Jacobs, Phys.Rev. C25, (1982) 1546
- D.De Frenne, H.Thierens, B.Proot, E.Jacobs, P.De Gelder, A.De Clercq, W.Westmeier, Phys.Rev. C26, 1356 (1982)
- D.De Frenne, H.Thierens, B.Proot, E.Jacobs, P.De Gelder and A.De Clercq, Proc. of the International Conference on Nuclear Data for Science and Technology, 1982 (D.Reidel Publ.Cie, Dordrecht 1982) p.748.

BELGIUM

Laboratory and adress	:	Nuclear Physics Laboratory, Proeftuinstraat 86, B-9000 GENT, Belgium SCK/CEN, B-2400 MOL, Belgium Institut de Physique Nucléaire, 69622 VILLEURBANNE, France Institut Laue-Langevin, BPN..156X, 38042 GRENOBLE, France
Names	:	C. Wagemans, E. Allaert, P. D'Hondt, A. Emsallem, R. Brissot
Facilities	:	High Flux Reactor, Institut Laue-Langevin, GRENOBLE
Experiments	:	Thermal neutron induced (n,α) reactions on fission products.
Method	:	Charged particle detection with surface barrier detectors
Completion date	:	Systematic study in progress
Publications	:	P. D'Hondt et al., Proc. Int. Conf. on Nuclear Data for Science and Technology, Antwerp 1982,p.147

BELGIUM

(same as INDC(NDS)-130)

Laboratory and adress	:	Nuclear Physics Laboratory, Proeftuinstraat 86, B-9000 GENT, Belgium SCK/CEN, B-2400 MOL, Belgium Institut Laue-Langevin, B.P. N. 156X GRENOBLE, France
Names	:	P. D'Hondt, C. Wagemans, A. De Clercq, E. Allaert, R. Brissot
Facilities	:	High Flux Reactor, Institut Laue Langevin, GRENOBLE
Experiments	:	Absolute yields and energy distributions of the charged light particles emitted during the thermal neutron induced fission of ^{233}U, ^{235}U, ^{237}Np, ^{239}Pu and ^{241}Am
Method	:	The charged particles are identified with surface barrier (ΔE-E) telescope detectors
Completion date	:	^{235}U completed; other isotopes in progress
Publications	:	1) C. Wagemans et al., Report BLG 539 (1980) 2) P. D'Hondt et al., Nucl. Phys. A 346 (1980) 461 3) C. Wagemans et al., Nucl. Phys. A 369 (1981) 1

E.E.C. BELGIUM

Laboratory and address	:	CEC - JRC, Central Bureau for Nuclear Measurements, B-2440 GEEL, Belgium SCK/CEN, B-2400 MOL, Belgium
Names	:	C. Wagemans, E. Allaert, G. Wegener-Penning, A.J. Deruytter
Facilities	:	Neutron time-of-flight spectrometer at the 150 MeV Linac Thermal neutron beam at the Reactor BR1
Experiments	:	Fission fragments kinetic energy and mass distribution for ^{238}Pu (s.f.), ^{239}Pu (n_{th},f), ^{240}Pu (s.f.), ^{241}Pu (n_{th},f), ^{242}Pu (s.f.) and ^{244}Pu (s.f.)
Method	:	Coïncident fission fragments detected with surface barrier detectors. Deduced fragment mass and energy distributions
Publications	:	E. Allaert et al., Nucl. Phys. A380 (1982) 61 E. Allaert et al., Verhandl. DPG VI 18, 1150 (1983)

E.E.C. BELGIUM

Laboratory and address	:	CEC-JRC, Central Bureau for Nuclear Measurements, Geel, Belgium .
1. Names	:	H.H. Hansen .
Facilities	:	Double focusing magnetic β-ray spectrometer.
Experiments	:	Determination of decay properties of $^{90}Sr/^{90}Y$: endpoint energies of the β-spectra, spectrum shapes and the ratio of the number of β-particles emitted in both decays .
Methods	:	Recording of the β-ray spectra by scanning with small equa current increments. Separate treatment of the spectra in the energy regions between 550 and 2200 keV (^{90}Y decay) and between 100 and 550 keV (^{90}Sr decay). Shape correction coefficients were deduced from calculations of the spectrum shapes. From the Kurie plots values of the endpoint energies were obtained. After extrapolation of the Kurie plots to energy E = 0, the complete spectra of emitted β-particles have been calculated.
Accuracies	:	Random and systematic uncertainties have been combined corresponding to a 68 % confidence level : 0.12 and 0.29 % on the endpoint energies of $^{90}Y/^{90}Sr$ β-spectra respectively; 30 and 22 % on the skope correction coefficients of the β-spectrum in the ^{90}Y decay and that in the ^{90}Sr decay, respectively; 1 % was found on the relative intensities of both β-spectra.
Publication	:	H.H. Hansen, Int. J. Appl. Radiat. Isot., in press.

E.E.C. BELGIUM
(cont'd)

2. Names : H.H. Hansen, D. Mouchel, A. Nylandsted Larsen .

Facilities : Various scintillation detectors in slow and/or fast coincidence arrangements.

Experiments : Determination of half lives of excited nuclear levels in the nanosecond and microsecond region in ^{119}Sn, ^{121}Sb, ^{133}Cs and ^{181}Ta.

Methods : Measurements were carried out using the method of delayed coincidences with a time-to-amplitude converter operated in the start-stop mode. In the nanosecond time range gitter, drift and walk phenomena are serious sources of errors. They have been minimized by a careful time pick-off with fast timing detectors and electronics. In the microsecond time range the ratio of true delayed to chance coincidences influences considerably the final accuracy. A series of measures have been applied to reduce the chance coincidence rate.

Accuracies : Random and systematic uncertainties have been combined corresponding to a 68 % confidence level. The following values were found : 2 % (6.05 μs level at 6.2 keV in ^{181}Ta), 0.4 % (18.03 ns level at 23.9 keV in ^{119}Sn), 0.9 % (3.46 ns level at 37.1 keV in ^{121}Sb), 0.5 % (6.23 ns level at 81.0 keV in ^{133}Cs), 0.5 % (10.67 ns level at 482.2 keV in ^{181}Ta) and 0.8 % (17.64 μs level at 615.3 keV in ^{181}Ta).

Publications : A. Nylandsted Larsen, D. Mouchel and H.H. Hansen, Z. Phys. A294, 191 (1980)
D. Mouchel, A. Nylandsted Larsen and H.H. Hansen, Z. Phys. A300, 85 (1981)
H.H. Hansen, D. Mouchel and A. Nylandsted Larsen, Z. Phys. A305, 347 (1982)
D. Mouchel and H.H. Hansen, Int. J. Appl. Radiat. Isot., in press.

E.E.C. BELGIUM
(cont'd)

3. Names : H.H. Hansen, D. Mouchel.

Facilities : Double focusing magnetic β-ray spectrometer.

Experiments : Determination of the internal conversion ratio K/LM+ for four pure E2 transitions in the decays of ^{152}Eu and ^{192}Ir.

Methods : Recording of electron spectra by scanning with small equal current increments. Background events and contributions of the continuous β-spectra have been subtracted. The intensities of the different conversion lines have been obtained by adding the counts registered for the various potentiometer readings.

Accuracies : Random and systematic uncertainties have been combined corresponding to a 68 % confidence level : they range between 1.4 and 3.8 %. The agreement between the experimental results and theoretical calculations is very good (within 1 %).

Publication : H.H. Hansen and D. Mouchel, Int. J. Appl. Radiat. Isot., in press.

E.E.C. BELGIUM

Laboratory and address	:	CEC-JRC, Central Bureau for Nuclear Measurements, Geel, Belgium .
Names	:	D. Reher, R. Vaninbroukx.
Facilities	:	Pressurized 4π proportional counter. Solid state photon and electron spectrometers.
Experiments	:	Determination of decay parameters of ^{93m}Nb : internal conversion data, half life, KX-ray emission probability.
Methods	:	Measurement of the conversion electrons with the pressurized 4π counter and with an open solid state detector. Remeasurement at regular intervals of the KX-ray emission rates from 5 different sources. Measurement of KX-ray emission probability using calibrated photon detectors.
Accuracies	:	Accuracies corresponding to the 68 % confidence level and taking into account random and systematic uncertainties : conversion data : 7 to 17 % half life : 0.9 % KX-ray emission probability : 2.6 %.
Publications	:	D. Reher, Int. J. Appl. Radiat. Isot. 33, 537 (1982) R. Vainbroukx, Int. J. Appl. Radiat. Isot., in press.

E.E.C. Belgium

Laboratory and address	:	JRC, CBNM, Geel, Belgium *Rijksuniversitair Centrum, Antwerpen, Belgium
Names	:	A. Brusegan, E. Cornelis*, F. Corvi, G. Rohr, R. Shelley, T. van der Veen, G. Vanpraet*
Facilities	:	Neutron time-of-flight spectrometer at the 150 MeV Linac (pulse width : 4 nsec)
Experiments	:	Neutron capture cross sections for $^{104, 105, 106, 108, 110}Pd$ and ^{149}Sm up to 500 keV
Methods	:	Capture detectors : C_6D_6-, C_6F_6- detectors using Maier Leibnitz method Neutron Flux detectors : ^{6}Li-glass and ^{10}B-slab
Accuracy	:	5-10% in the cross section
Completion date	:	Cross section for ^{149}Sm end of 1983
Publication	:	Average Capture Cross Section of the Fission Product Nuclei $^{104, 105, 106, 108, 110}Pd$ E. Cornelis, G.J. Vanpraet, C. Bastian, G. Rohr, R. Shelley, T. van der Veen Nuclear Data for Science and Technology, Antwerpen (1982) p. 222

BRASIL

Laboratory and address:	Instituto de Engenharia Nuclear Comissão Nacional de Energia Nuclear C.P. 2186 20001 Rio de Janeiro, Brasil.
Names:	A.V. Bellido
Facilities:	Argonaut Reactor
Experiment:	Measurement of fission product yields for ^{238}U fission induced by fission spectrum neutrons.
Method:	Separation of the irradiated samples in lanthanide and non-lanthanide fractions. Identification and activity measurements of the fission products by γ- ray spectrometry. Calculation of cumulative yields by substraction the ^{235}U fission contribution and relation of the saturation activities for each nuclide, in depleted and natural uranium, with the activities of reference nuclides. (Yields of reference nuclides: $^{142}La = 4.95$ and $^{92}Sr = 4.10$).
Accuracy:	Better than 10%
Completion date:	1983

BULGARIA

Laboratory and address :	University of Sofia, Faculty of Physics, Department of Atomic Physics, 1126 Sofia, Bulgaria
1. Names :	E. Dobreva, N. Nenoff M. Iovtshev (Institute for Nuclear Research and Nuclear Energy, Sofia)
Facility :	Experimental reactor of the Institute for Nuclear Research and Nuclear Energy
Experiment :	Measured yields of ^{131}I, ^{132}I, ^{133}I and ^{134}I for the epicadmium reactor neutron induced fission of ^{238}U. Deduced fractional independent yields for ^{132}I, ^{133}I and ^{134}I; most probable charge for the isobaric chains 132, 133 and 134; yields of precursor nuclides and chain yields for mass 131, 132, 133 and 134 relative to the cumulative yield of ^{135}I.
Method :	Radiochemical separation of I, Ge(Li) γ-ray counting. Five independent runs with equal irradiation and different separation time.
Accuracy :	Between 5 and 10 % ; 28 % for the lowest yield isotope (^{132}I).
Completion date :	November 1979

BULGARIA

(cont'd)

Publications :

1. E. Dobreva, V. Gadjokov, M. Iovtshev, N. Nenoff. Annu. Univ. Sofia 70-71 (1979/80) 1.
2. E. Dobreva, N. Nenoff. Radiochem. Radioanal. Letters (submitted).

2. Names: N. Nenoff et al

Experiment: Determination of 14 MeV neutron reaction cross sections for: $^{162}Dy(n,p)$ ^{162}Tb, $^{174}Yb(n,p)$ ^{174}Tm, $^{176}Yb(n,p)$ ^{176}Tm, $^{176}Yb(n,\alpha)$ ^{173}Er.

Method: Activation technique

Completion date: In progress, only preliminary data obtained.

Publication: Submitted to Bulg. J. Phys.

CANADA

Laboratory and address:	Chalk River Nuclear Laboratories Chalk River, Ontario Canada KOJ 1J0
Names:	A.R. Rutledge*, L.V. Smith and J.S. Merritt*
Facilities:	1) $4\pi\gamma$ ionization chamber 2) 4π gas flow proportional counter 3) $4\pi\beta$-γ coincidence system 4) scintillation spectrometer 5) Ge(Li) detector 6) Radioisotope standardization laboratory
Experiment:	Half-life values for ^{82}Br, ^{95}Nb, $^{99}Tc^m$, ^{109}Pd, $^{115}In^m$, ^{133}Xe, ^{134}Cs, $^{134}Cs^m$, $^{137}Ba^m$, ^{137}Cs, ^{141}Ce and ^{152}Eu. Gamma-ray emission probabilities for ^{85}Kr, $^{99}Tc^m$, $^{115}In^m$, ^{137}Cs and ^{141}Ce.
Method:	$4\pi\gamma$ ionization chamber and 4π gas flow proportional counter used for half-lives; $4\pi\gamma$ ionization chamber, $4\pi\beta$-γ coincidence system, and scintillation spectrometer used for γ-ray emission probabilities.
Accuracy:	$T_{\frac{1}{2}}$; ± 1.4% for ^{137}Cs, <± 0.22% for $^{115}In^m$ and ^{152}Eu, ± 0.02-0.09% for remainder. P_γ; ± 6.5% for ^{85}Kr; 0.2-0.9% for remainder.
Completion date:	Results published March 1980; part of the work is ongoing. Measurements on ^{137}Cs are preliminary and continuing.
Discrepancies to other data:	1) ^{137}Cs half-life 2.6% shorter. 2) ^{85}Kr P_γ 6-7% smaller.
Publication:	Decay Data for Radionuclides used for the Calibration of x- and γ-ray Spectrometers. A.R. Rutledge, L.V. Smith and J.S. Merritt, Atomic Energy of Canada Limited, Report AECL-6692, 1980. Also published in: NBS Special Publication No. 626 "Nuclear Data for the Efficiency Calibration of Germanium Spectrometer Systems", D. D. Hopper and F. J. Schima, Editors, National Bureau of Standards, Washington (Jan. 1982) pp. 5-31.

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CANADA

Laboratory and Address:	Atomic Energy of Canada Limited Research Company, Chalk River Nuclear Laboratories, Chalk River, Ontario, Canada, K0J 1J0
Names:	L.W. Green and W.J. Edwards
Facilities:	NRU Reactor
Experiment:	Effective Neutron Capture Cross Section of ^{147}Nd in a Thermal Reactor.
Method:	1. Gamma spectrometric determination of depletion of ^{147}Nd caused by neutron irradiation in NRU. Involves production of ^{147}Nd from fission of ^{235}U, and separation of Nd. 2. Irradiation of ^{146}Nd in the NRU reactor for 2 years followed by mass spectrometric determination of the ^{148}Nd to ^{146}Nd ratio.
Accuracy:	8%
Completion dates:	1. 1983 November 2. 1986

CANADA

Laboratory and address:	Nuclear Research Centre The University of Alberta Edmonton, Alberta Canada T6G 2N5
Names:	S.T. Lam, L.L. Yu, H.W. Fielding, W.K. Dawson G.C. Neilson and J.T. Sample
Facilities:	Subnano-second pulsed beam derived from 7 MV CN van de Graaff accelerator and Mobley magnet. Monoenergetic neutron beam obtained from $^{3}H(p,n)^{3}He$ and $^{3}H(d,n)^{4}He$ reactions using liquid nitrogen cooled tritium gas cell.
Experiment:	Determination of fission-fragment mass distribution and fission-fragment kinetic energy from fast neutron induced fission of ^{238}U and ^{232}Th. E_n = 2.0 - 5.2 MeV in steps of about 0.5 MeV for ^{238}U fission. E_n = 1.6, 3.1 and 5.2 MeV for ^{232}Th fission. Comparison of fission-fragment mass distribution with statistical model calculation. Fission barriers and shell energies deduced.
Method:	Fission fragment detected by Ortec surface barrier heavy-ion detector. Time-of-flight technique employed to measure fragment flight time. Fission-fragment mass distribution and correlation of fragment kinetic energy versus fragment mass derived from data.
Accuracy:	Fragment mass resolution about 5 u. Fragment energy resolution about 2 MeV. A total of about 5000 fission events collected for each neutron energy.
Completion date:	The measurement programme has been completed.
Publication:	"Fast Neutron Induced Fission of ^{238}U" S.T. Lam, L.L. Yu, H.W. Fielding, W.K. Dawson G.C. Neilson and J.T. Sample. Phys. Rev. C22, 2485 (1980). Results for ^{232}Th in Bull. Am. Phys. Soc. 26 (1981) 1118. also submitted to Phys. Rev. C

CANADA

Laboratory and address:	University of Toronto Erindale College 3359 Mississauga Road North Mississauga, Ontario Canada L5L 1C6
Names:	B. Singh†, D. Viggars†, H. W. Taylor († - University of Kuwait)
Facilities:	14 MeV neutron generator producing ∿ 2×10^{10} n/s through the d,T reaction.
Experiment:	Study of the decay of 91 m ^{78}As.
Method:	Gamma radiations studied with Ge spectrometers, γ-γ coincidence methods.
Accuracy:	γ-ray energy measurements to ≤0.6 keV energy levels in ^{78}Se to ≤0.22 keV.
Completion date:	January 1982.

Discrepancies to other reported data:

i) energy and intensity determinations have been improved

ii) new transitions with energies of 351.1, 497.0, 637.1, 756.9, 903.6, 988.2, 1018.7, 1169.5 and 2758.8 keV have been observed.

iii) coincidence measurements have produced some revisions of decay scheme.

Publications: B. Singh, D.A. Viggars and H.W. Taylor
Spectroscopy of gamma rays from ^{78}As decay
Phys. Rev. C 25 (April 1982) 2003.

CHILE

Laboratory and address:	Chilean Nuclear Energy Commission La Reina Nuclear Research Reactor Casilla 188-D, Santiago - Chile
Facilities:	Research Reactor, Activation Analysis Systems, Calorimetric Lab.
Experiment:	Precise measurement of the decay heat following irradiation of various uranium samples with slow neutrons.
Method:	Absolute adiabatic calorimetry. The aim of this work is to check the existing data on uranium decay heat after various irradiation periods. The results will be used to determine the absolute burn-up of the fuel discharged from the research reactors.
Completion date:	start of measurement delayed.

Czechoslovakia

Laboratory and Address:	Institute of Nuclear Physics, Czechoslovak Academy of Sciences, 250 68 Řež Czechoslovakia x) Nuclear Centre, Faculty of Mathematics and Physics, Charles University, Prague, Povltavská 1, 180 00 Praha 8-Pelc-Tyrolka, Czechoslovakia
Names:	R. Bayer, Z. Dlouhý, J. Švanda, x) I.Wilhelm,
Facilities:	1. 6 MW - research reactor 2. Self-fission source of 252 Cf
Experiment:	Light particles emission from heavy nuclei fission
Method:	A semiconductor ΔE-E detector telescope and ΔE- ΔE - E ionisation chamber are used for particle identification
Results:	The yields and their energy spectra of light particles from the self-fission of 252 Cf have been measured. The yields of ^{6}He, ^{8}He, Li, ^{6}Li, 7Li, ^{8}Li, ^{9}Li, Be relative to emission of 100 alpha particles and their most probable energies were determined.
Accuracy:	The accuracy of yield determination was about 5 - 25 %.
Completion date:	Work is in progress
Publications:	R. Bayer, Z. Dlouhý, J. Švanda, I.Wilhelm Investigation of light particle yields from ^{252}Cf source. All Union Conf. on Neutron Physics, Kiev 1980, Part 3, 20. R. Bayer, Z. Dlouhý, J. Svanda A Multiparameter System for Heavy Nuclei Fission Study, Czech. J. Phys. B 31 (1981) 1273

FRANCE

Laboratory and address :	Département de Recherche Fondamentale Laboratoire de Chimie Physique Nucléaire Centre d'Etudes Nucléaires de Grenoble 85 X - 38041 GRENOBLE CEDEX - France.
Names :	J. BLACHOT, J. CRANÇON, Ch. HAMELIN, G. LHOSPICE
Facilities :	Melusine reactor (thermal neutron and caramel system for fast neutrons) 3 MeV neutrons generator and high flux reactor of I.L.L.
Experiment :	The element yields of Bromine, Krypton, Rubidium, Tellurium, Iodine, Xenon, Caesium, have been measured for : $^{235}U(n_{th},f)$, $^{235}U(n_f,f)$, $^{235}(n_{3MeV},f)$, $^{232}Th(3MeV,f)$ $^{238}U(n_{3MeV},f)$, $*^{232}U(n_{th},f)$, $*^{229}Th(n_{th},f)$ Values for the odd even effects in Z for all these systems has been deduced.
Method :	Direct growth and decay activities are measured with a Ge/Li detector and recorder in a multispectrum mode by a 4K multichannel analyser.
Accuracy :	The average relative uncertainty of our measurements is between 5 and 10%.
Completion date:	^{235}U, ^{238}U, ^{232}Th during 1980 and 1981, ^{229}Th and ^{232}U in progress, ^{238}Pu will be started end of 1983.
Publication :	International Symposium on Physics and Chemistry of Fission - 14/18 May 1979 - Jülich (IAEA-SM/241 – F29) Nuclear Physics A361 (1981) 213 International Symposium on Nuclear Physics, Florence, Italy, 29 Aug. - 3 Sept. 1983. Ch. Hamelin, Ph-D Thesis , July 1983.

*Collaboration with CSTN, Alger

FRANCE

Laboratory and adress :

- DRF/CPN, CEN.G - 85 X, 38041 GRENOBLE CEDEX.
- Institut LAUE LANGEVIN - B.P. n° 156 X GRENOBLE.
- Institut für Kernphysik, Technische Hochschule - DARMSTADT (RFA)
- K.F.A. KARLSRUHE (RFA).

Names : A. GUESSOUS, J.P. BOCQUET, R. BRISSOT, H. NIFENECKER, Ch. RISTORI, K. SCHMIDT, H.G. CLERC, E. ENGELHARDT.

Facilities : High Flux Reactor - Lohengrin spectrometer.

Experiment : Independent yields and energy distributions of the light fission fragments produced by thermal neutron induced fission of ^{239}Pu.

Method : The fragments are separated according to their mass and their energy by the Lohengrin separator. Energy loss technique is used to separate the charge components of a given mass.

Completion date : Experiment completed. Data processing nearly achieved.

Publication : To be published in NUCLEAR PHYSICS.

FRANCE

(same as INDC(NDS)-130)

Laboratory and address: Laboratoire de Chimie-Physique et Radiochimie
Faculté des Sciences, 28, avenue Valrose
06034 Nice Cédex, France

Names: J. Dalmasso, H. Maria, G. Barci-Funel and G. Ardisson

Experiment: Search for low energy γ-quanta in ^{125}Sb-$^{125}Te^m$ equilibrium source decay.

Method: Recent works have been performed concerning β decay of ^{125}Sb (ref 1-4) in view to determinate missing low intensity γ-rays in ^{125}Te levels scheme. Walters and Meyer [3] reported a new 19.88 keV transition. In this study, we reinvestigated the low energy spectrum using a high resolution HPGe detector (145 eV at Fe K_α). Pulses were analysed with a 8192 channels ADC. Several runs were performed with one 6 years old ^{125}Sb-$^{125}Te^m$ source, before and after purification and precipitation as Sb_2S_3 [1].

Measurements: Energy and intensity of ^{125}Sb γ-rays and associated Te X-rays were calculated using standards I.A.E.A. sources of ^{137}Cs, ^{241}Am and ^{133}Ba. Careful examination of Te X-rays region was necessary, because a 20.020 keV photon was due to K_β escape of $K_{\beta'1}$ line. However we analysed a contribution of (0.023 $\pm$ 0.005)% for a 19.888 keV photon, in good agreement with result of Walters and Meyer[3]. Table summarizes results of energy and intensity in ^{125}Sb-$^{125}Te^m$ equilibrium mixture.

Accuracy: The accuracy (1σ) for energy is within 6 to 20 eV. Absolute intensities of γ- and X-rays range between 4 to 8% .

Discrepancies to other reported data: No evidence for reported 110.9 and 146.08 keV γ-rays[3]. Assuming the experimental value $\alpha_K = 151 \pm 11$ of 109.26 keV M4 transition[5] and 12.01 $\pm$ 0.36 for $\alpha_K(35.5)$ (ref6), a contribution of 1.55 e_K for all other transition and $\omega_K = 0.859$ (ref6), we found $I(K_\alpha + K_\beta) = 56.7 \pm 8.5$ % decays. This in good agreement with our experimental value i.e. 53.2 $\pm$6.4 K X-rays % decays.

Publications: See ref. 1, 4 and to be published

References:

(1) C. Marsol, G. Ardisson, Compt. Rend., 272B(1971)61.
(2) J.B. Gupta, N.C. Singhal and J.H. Hamilton, Z. Phys., 261(1973) 137.
(3) W.B. Walters, R.A. Meyer, Phys. Rev., 14C(1976)1925.
(4) G. Ardisson, K. Abdmeziem, Radiochem. Radioanal. Letters, 29, N°1(1977)1.
(5) S.B. Reddy, K. Sudhakar, K.L. Narasimhan, B.V. Thirumala Rao, V. Lakshminarayana, Indian J. Appl. Phys., 15, N°3 (1977)208.
(6) E. Karttunen, H.U. Freund and R.W. Fink, Nucl. Phys., A131(1969)343.

FRANCE
(cont'd)

Table: Absolute intensities of X-and low energy γ-rays in ^{125}Sb-$^{125}Te^{m}$ equilibrium source decay.

present work					Walters and Meyer[3]			
Energy		I (% decays)			Energy		I (% decays)	
19.888	15	0.023	5		19.88	15	0.02	1
27.213	8	14.5	9	Te $K\alpha_2$				
27.484	6	29.1	15	$K\alpha_1$				
30.985	6	7.82	31	$K\beta'_1$				
31.706	6	1.75	9	$K\beta'_2$				
35.505	6	4.46	18		35.504	15		
61.83		0.001						
109.263	12	0.072	6		109.276	15		
					110.89	15	0.0009	1
116.907	12	0.225	18		116.952	11	0.255	4
					146.08	10	0.00062	4
172.702	20	0.181	15		172.615	15	0.182	3
176.342	10	6.74*	26		176.334	11	6.79	2

*Intensity value of ref. 4 normalised to 29.44 photons of 427.9 keV which corresponds to 100 β decays[3].

FRANCE

Laboratories and Adresses :	Laboratoire de Chimie-Physique et Radiochimie(LCPR) Université de Nice, 06034 Nice Cédex, France Institut de Recherches sur les Energies Nouvelles(IREN) Faculté des Sciences, BP 322, Abidjan, Côte d'Ivoire
Names :	J. Dalmasso, G. Barci, H. Maria, C. Ardisson, B. Weiss, H. Forest, G. Ardisson (LCPR) A. Hachem (IREN)
Facilities :	Ge(Li) detectors, planar HPGe detectors, 4K analysers.
Experiments :	Measurements of Absolute K-X Transition Probabilities of Fission Products. These quantities are required for quantitative determination of FP activities in environmental samples by the X-Ray spectrometric method (1,2). Accurate determination of I_γ and E_γ in Fission Radionuclides. Decay Schemes.
Method :	Very thin sources of radiochemically separated FP nuclides are measured with calibrated coaxial Ge(Li) detectors and planar HPGe detectors (25 and 200 mm^2). The following nuclides are investigated: ^{77}As, ^{95}Zr, $^{108}Ag^{m+g}$, $^{110}Ag^{m+g}$, ^{106}Ru-^{106}Rh, ^{125}Sb, ^{131}I, ^{132}I, ^{137}Cs, ^{140}Ba, ^{140}La, ^{144}Ce-^{144}Pr.
Accuracy :	ΔE_γ between 5 to 100 eV, ΔI_γ between 5 to 15%. ΔI_{KX} between 5 to 15% (including error in branching ratios).
Completion date :	Expected mid 84
Discrepancies:	The new I_γ and E_γ values found for ^{77}As decay are given with better precision than ref(a). For ^{140}La, our $I_\gamma(487)$ =(45.10± 0.9)% (ref 3) disagree with earlier value of ref (b) i.e. $I_\gamma(487)$= (38.1 ± 0.5) %.
Publications :	1/G. Ardisson,G. Barci,J. Dalmasso,H. Maria."Determination of radionuclides in rain water by X-ray spectrometry", European Conference on Analytical Chemistry,Helsinki,(23-28 august 1981). 2/G. Ardisson"Determination of Fission Nuclides in rainwater by X-Ray spectrometry",Trends in Analytical Chemistry,1982, in press. 3/G. Ardisson"Intensités des γ associés à la décroissance de ^{140}La",Nucl. Instr. Methods,151(1978)505. 4/G. Mallet,J. Dalmasso,H. Maria,G. Ardisson,"Contribution à l'étude des états excités de ^{110}Cd peuplés lors de la désintégration de $^{110}Ag^{m}$",J. Phys.,G,7 (1981) 1259. 5/H. Maria,J. Dalmasso,G. Ardisson,"Sur l'énergie de la transition E1 de $^{108}Ag^{m}$",Nucl. Instr. Meth. 195 (1982) 621.
References :	a)G. Ardisson, C. Marsol,"Sur la mise en évidence de faibles branches β dans la désintégration de ^{77}As", Can. J. Phys., 49 (1971) 1731. b)J.T. Harvey,J.L. Meason,J.C. Hogan and H.L. Wright," Gamma-ray intensities for the radioactive decay of Baryum 140 and Lanthanum 140"Nucl. Sci. Eng.,58 (1975) 431.

FRANCE

Laboratories and Adresses:

- Laboratoire de Chimie Physique et Radiochimie,(LCPR) Université de Nice, 06034 Nice Cedex, France.
- Institut de Recherches sur les Energies Nouvelles(IREN) Faculté des Sciences 04 BP 322 ,Abidjan, Côte d'Ivoire.

Names: J. Dalmasso, H. Maria, G. Barci, C.Ardisson-Marsol and G. Ardisson (LCPR)
A. Hachem (IREN)

Facilities: HPGe Planar détector, Ge-Li coaxial detectors
4 K multichannel analysers.

Experiment 1 : Reinvestigation of ^{77}As decay.

Method : ^{77}As nuclide was radiochemically separated from ^{77}Ge. The low energy spectrum of ^{77}As was measured with high resolution HPGe planar detector. Precise energies and intensities of 14 γ lines were obtained by simultaneous calibration with ^{152}Eu and ^{182}Ta sources.
Two unreported photons at 51.34 and 125.84 keV were interpreted as desexciting a $J^{\pi}=9/2^{+}$ level at 175.33keV in ^{77}Se. ^{77}Se K_{α} and K_{β} X-ray intensities were also measured.

Accuracy : Within 5 to 15 eV for strong γ rays.

Table:

	E_{γ} (keV)	I_{γ} (rel)	E_{γ} (keV)	I_{γ} (rel)
K_{α}	11.22 (1)	8.95 (10)	161.932 (10)	9.22 (43)
K_{β}	12.50 (2)	1.16 (11)	200.47 (2)	0.067(7)
	13.4 (1)	0.01	239.011 (6)	100
	51.34 (2)	0.045	249.805 (8)	24.8 (10)
	62.2 (4)	0.005	270.850 (12)	0.52 (3)
	81.15 (2)	0.024	281.642 (8)	3.64 (18)
	87.854 (5)	12.7 (7)	439.493 (20)	0.064(7)
	125.84 (2)	0.075 (7)	520.654 (15)	35.1 (14)
	139.243 (15)	0.618 (43)		

Discrepancy: Good agreement with previous work of Ardisson and Marsol[1]. γ-rays at 167 and 177 keV reported by Cheng e.a.[2] were absent from our spectra. They could belong to ^{77}Ge as it has been reported elsewhere[3].

Publication: J. Dalmasso, H. Maria, G. Barci, G. Ardisson, Radiochimica Acta (1988) in press.

References:

(1) G. Ardisson, C. Marsol, C.J. Phys., 49(1971) 1731.
(2) V.C.K. Cheng , Y.C. Liu, T.S. Heng , Chin.J.Phys. 18 (1980) 83.
(3) B. Singh and D.A. Viggars, Nucl. Data Sheets,29 (1980)75.

FRANCE
(cont'd)

Experiment 2 : Precise measurements of the ^{144}Ce γ lines

Method : Radiochemically separated ^{144}Ce was measured with HPGe detector. The system resolution was better than 180 eV at FeK_{α} line.

Precise energy of main photon lines were obtained by simultaneous counting runs with ^{57}Co, ^{152}Eu and ^{182}Ta. A dispersion of 0.048 keV/channel was used in these experiments.

Accuracy : Within 5 to 50 eV for E_{γ} and 4 to 8 % for relative I_{γ}

Table :

E_{γ} (keV)	I_{γ}	Interpretation
5.012 (50)	5.44	$L\alpha_1 + L\alpha_2$
5.486 (50)	5.28	$L\beta_1 + L\beta_3 + L\beta_4$
5.851 (50)	1.6	$L\beta_{2,15}$
6.297 (50)	0.8	$L\gamma_1$
6.594 (50)	0.58	$L\gamma_2 + L\gamma_3$
33.568 (10)	1.77	
35.547 (20)	20.0	$K\alpha_2$
36.026	37.0	$K\alpha_1$
40.739 (20)	12.8	$K\beta_1$
40.98 (20)	1.38	
41.778 (10)	2.93	$K\beta_2$
53.402 (5)	0.90	
80.120 (5)	12.25	
99.961 (20)	0.36	
133.515 (5)	100	

Discrepancy: The 59 keV isomeric transition reported by other authors[1] is not found in this experiment .

Publication: J. Dalmasso et al , to be published

References :

1) A. Anttila, M. Piiparinen, Z. Physik, 237 (1970) 126.
B.V.N. Rao, G.N. Rao, J. Phys Soc. Japan, 40, (1976) 1.

FRANCE

Laboratory and address	:	Laboratoire de Biophysique, U.E.R.D.M., Université de Nice, 28, avenue Valrose - 06034 NICE CEDEX, F.
Name	:	G. MALLET
Facilities	:	This work was performed in the "Laboratoire de Chimie Physique Atomique et Structurale" of the Nice University, Parc Valrose.
Experiment	:	Application of $^{110}Ag^{m+g}$ to the determination of the absolute efficiency of Ge(Li) detectors.
Method	:	In γ spectra we can observe distributions due to the addition in the detector of pulses coming from γ emitted in coincidence by the sample studied. During our study of the $^{110}Ag^{m+g}$ decay we have demonstrated that it is possible to take advantage of this parasitic summing effect to determinate the full energy peak efficiency (F.E.P.E.) of two identical Ge(Li) detectors. This method can be also used to measure the F.E.P.E. of only one detector used in the single mode with the source near the detector.
Accuracy	:	Better than 3%.
Completion date	:	Completed.
Publications	:	G. MALLET - "Measurement of the Radioactive Decay of $^{110}Ag^{m+g}$" J. of the Phys. Soc. of Japan, 50, 384-392 (1981). G. MALLET and M.S. PRAVIKOFF - "Analyse du Fonctionnement du Spectromètre à Coïncidence et Addition ; Application à l'Etude de ^{207}Bi et ^{110m}Ag" Nucl. Inst. Meth. 184, 469-476 (1981). G. MALLET, J. DALMASSO, H. MARIA et G. ARDISSON - "Contribution à l'Etude des Etats Excités de ^{110}Cd Peuplés lors de la Désintégration de ^{110m}Ag" J. of Phys. G : Nucl. Phys. 7, 1259-1270 (1981). G. MALLET - "Application of the Sum-peak and Coincidence Spectrometer to the Determination of the Absolute Efficiency" J. de Physique - Lettres, 44, 147-150 (1983).

GERMANY Fed.Rep.

Laboratory and address:

Institut für Reine und Angewandte Kernphysik der Universität Kiel (IKK),
D-2o54 Geesthacht, Reaktorstation

Names: P. Fischer, U. Harz, H.G. Priesmeyer

Facility:
Fast Chopper Neutron Time-of-Flight spectrometer, 42 m flightpath in front of beam hole of 5MW FRG-1 reactor. 15 ns/m nominal resolution, special equipment for transmission investigations of highly radioactive samples, 11 Li-6 glass detectors, max. rotorspeed 12000 rpm, min. burst width 0.64 µsec, min. time channel width 100 nsec, 2560 time-of-flight channels.

Experiments:
Neutron resonance investigations by transmission measurements between 1 eV and 1.5 keV on separated stable or radioactive isotopes of special interest to reactor physics (especially fission products), gross fission products. Possibility of extending energy range to thermal region using crystal spectrometer or neutron guide tubes.

Completed: Final measurements on one of the five gross-fission product samples show time variations useful for isotopic identifications.

Ongoing: Gross-fission product mixtures, comparative measurements; measurements using 24 keV Fe-filter neutrons.

Planned: Transmission experiments on I 129, Krypton isotopes and gross-fission products.

Method:
Sample in beam, sample out-of-beam transmission measurement, black resonance background determination technique.

Accuracy:
For resonance parameters : about 5 % or better, depending on statistical accuracy of transmission points.

Recent publications:

P. Fischer, U. Harz, H.G. Priesmeyer ATKE 38(1), (1981) 63
Neutron Resonance Parameters of ^{99}Tc in the Energy Range 4.5 to 25 eV.

P. Fischer, U. Harz, H.G. Priesmeyer GKSS 81/E/17
Die Energieeichung des IKK Fast-Choppers mit U 238 Standards - Die Resonanzparameter des Iridiums im Energiebereich bis 1.5 eV.

H.G. Priesmeyer, U. Harz, P. Fischer
Neutron Physics Activities at the FRG-I RESEARCH REACTOR
IAEA-SR-77/67 Seminar on Research Reactor Operation and Use, Jülich 1981.

GERMANY, FED. REP.

Laboratory: Kernforschungsanlage Jülich, Institut für Kernphysik, Postfach 1913, D-5170 Jülich 1

1. Names: K. Shizuma (1980-82 on leave from Hiroshima University, Japan), H. Lawin, K. Sistemich

Facility: Fission product separator JOSEF at reactor DIDO, Jülich

Experiment: Study of the ß decay of ^{106}Nb and of the level scheme of ^{106}Mo

Method: Separation of the fission products according to their mass and nuclear charge. Measurement of γ singles and γ-γ coincidence spectra

Accuracy: Varying

Completion: Completed

Publication: Zeitschrift für Physik A - Atoms and Nuclei 311, 71 (1983)

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2. Names: K. Shizuma (1980-82 on leave from Hiroshima University, Japan), J.C. Hill (1980/81 on leave from Iowa State University, USA), H. Lawin, M. Shaanan (1980/81 on leave from Technion Haifa, Israel), H.A. Selič, K. Sistemich

Facility: Fission product separator JOSEF at reactor DIDO, Jülich

Experiment: Study of the ß decay of ^{102}Y and the level scheme of ^{102}Zr

Method: Separation of the fission products according to their mass and nuclear charge. Measurement of γ singles and γ-γ coincidence spectra

GERMANY, FED. REP.

(cont'd)

Accuracy: Varying

Completion: Completed

Publication: To be published in Physical Review C

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3. Laboratories: Universität Mainz, Institut für Kernchemie, Postfach 3980 D-6500 Mainz
Gesellschaft für Schwerionenforschung, Postfach 110541, D-6100 Darmstadt
Kernforschungsanlage Jülich, Institut für Kernphysik, Postfach 1913, D-5170 Jülich

Names: K. Shizuma (KFA, 1980-82 on leave of absence from Hiroshima University, Japan), H. Ahrens (GSI), J.P. Bocquet (Université de Grenoble, France), N. Kaffrell (Uni Mainz), B.D. Kern (KFA, 1978 on leave of absence University of Kentucky, USA), H. Lawin (KFA), R.A. Meyer (KFA, 1982/83 on leave of absence from University of California, USA), K. Sistemich (KFA), G. Tittel (Uni Mainz), N. Trautmann (Uni Mainz)

Facilities: Fission product separators LOHENGRIN (High flux reactor, ILL Grenoble, France) and JOSEF (Reactor DIDO, Jülich)

Experiments: Study of the β decays of $^{103,105}Nb$ and the level schemes of $^{103,105}Mo$

Method: Separation of the fission products according to their mass and nuclear charge. Measurement of γ singles and γ-γ coincidence spectra

Accuracy: Varying

Completion: Completed

Publication: In preparation

GERMANY, FED. REP.

LABORATORY: Kernforschungszentrum Karlsruhe
Institut für Angewandte Kernphysik

1. NAMES: H. Beer, F. Käppeler

FACILITIES:
1) pulsed 3 MV Van de Graaff, kinematically collimated neutron beam, 25 keV above the $^7Li(p,n)$ reaction threshold
2) Ge(Li) detector (rel. efficiency for ^{60}Co: 7 %, energy resolution at 1.33 MeV: 2 keV)

EXPERIMENT. 30 keV capture cross section of ^{124}Xe, ^{132}Xe, ^{134}Xe, $^{152,154}Sm$, $^{152,158}Gd$ and capture cross section of ^{151}Eu to the 9.3 h isomeric state in ^{152}Eu at 48.5 keV

METHOD: activation technique

ACCURACY: 5-10 %

COMPLETION DATE: Summer 1983

PUBLICATIONS: H. Beer, F. Fabbri, F. Käppeler, R.-D. Penzhorn, G. Reffo, R.A. Ward
Annual Report on Nuclear Physics Activities 1980-1982, KfK 3280 (Febr. 1982)

2. NAMES: G. Walter, F. Kaeppeler

FACILITIES: pulsed 3 MV Van de Graaff

EXPERIMENT: Capture Cross Section Measurements on ^{80}Kr and ^{86}Kr Between 4 and 300 keV Neutron Energy

GERMANY, FED. REP.
(cont'd)

METHOD: continuous neutron energy spectrum from $^{7}Li(p,n)$ reaction;
high pressure gas samples (300 bar in stainless steel spheres of 20 mm diameter and 0.5 mm wall thickness);
capture events detected by 2 C_6D_6-detectors of 1 l volume with pulse height weighting;
neutron energy determination by time-of-flight with a resolution of 1.5 ns/m;
^{197}Au-sample used as a standard.

ACCURACY: Statistical uncertainty typically 5-10% for energy intervals corresponding to the experimental resolution. Systematic uncertainties between 4 and 10 % dependent on the isotopic composition of the samples.

COMPLETION DATE: | summer 1983

DISCREPANCIES TO OTHER REPORTED DATA: No such data available

PUBLICATIONS: Preliminary data are summarized in internal reports.

Germany, Fed.Rep.

(cont'd)

3. Names : R.R.Winters, F. Käppeler, K.Wisshak, G.Reffo, A. Mengoni

Facility : 3.75 MV Van de Graaff

Experiment : Neutron capture cross sections
measured : $\sigma_{n\gamma}$ for $^{148,149,150}Sm$ for $4 < E_n < 250$ keV
calculated : $\sigma_{n\gamma}$ for the unstable isotopes ^{147}Nd, $^{147,148}Pm$, ^{151}Sm

Method : continuous neutron energy spectrum from $^7Li(p,n)$ reaction;
capture events detected by 2 C_6D_6-detectors of 1 l volume with off-line pulse height weighting;

neutron energy determination by time-of-flight with a resolution of 1.5 ns/m;
^{197}Au sample as a standard

Accuracy : statistical uncertainty typically 3 % for energy intervals corresponding to the experimental resolution.
Systematic uncertainties 4.5 %

Completion date : Autumn 1983

Discrepancies to other reported data : no discrepancies for ^{148}Sm, but severe discrepancies for ^{149}Sm (compared to Mizumoto et al., Proc.Int.Conf. on Nuclear Cross Sections for Technology, Knoxville, Tennessee, p. 328 (1979) and for ^{150}Sm (compared to Kononov et al., Sov.J.Nucl.Phys., 27 (1978) 5)

Germany, Fed.Rep.

(cont'd)

4. Names : G.J.Mathews, F.Käppeler

Facility : 3.75 MV Van de Graaff

Experiment : Measurement of the neutron capture cross sections of $^{142,143,144}Nd$ for $6 < E_n < 250$ keV

Method : continuous neutron energy spectrum from $^{7}Li(p,n)$ reaction;
capture events detected by 2 C_6D_6-detectors of 1 l volume with off-line pulse height weighting;
neutron energy determination by time-of-flight with a resolution of 1.5 ns/m;
^{197}Au sample as a standard

Accuracy : Statistical uncertainty typically 5 % for energy intervals corrsesponding to the experimental resolution,systematic uncertainties 6 %.

Completion date : Summer 1983

Discrepancies to other reported data : No discrepancies for $^{142,143}Nd$ but severe discrepancy for ^{144}Nd (compared to Musgrove et al., Proc.Int.Conf. on Neutreon Physics and Nuclear Data, Harwell, p. 438 (1979))

5. Names : G. Walter, H.Beer

Facility : 3.75 MV Van de Graaff

Experiment : Measurement of the Maxwellian average neutron capture cross sections of $^{79,81}Br$ and $^{85,87}Rb$ at kT = 25 keV

Method : activation technique

Accuracy : 5 - 18 %

Completion date : Summer 1983

GERMANY, FED. REP.

Laboratory and address: Kernspektroskopie, Institut für Metallphysik, Technische Universität, Mendelssohnstr. 3
D-3300 Braunschweig, Germany

Names: U. Keyser, F. Münnich, B. Pahlmann

Facilities: On-line mass separator LOHENGRIN and OSTIS, installed at the high-flux reactor of the ILL, Grenoble, France.

Experiments: 1.) Determination of beta-decay energies of very neutron-rich isotopes available from fission of ^{235}U and ^{239}Pu.

2.) Sum-beta-spectra of ^{235}U and ^{239}Pu from thermal neutron fission to deduce the antineutrinospectrum of a reactor core.

Method: $\beta\gamma$-coincidence measurements with a plastic-scintillator telescope, β-singles measurements with a high-purity Ge detector.

Accuracy: ΔE between 70 keV and 150 keV, depending upon the complexity of the decay scheme.

Completion date: 1.) Systematic investigation
2.) end of 1983

Publications: Yellow report CERN 81-09, p. 116
Zeitschrift für Physik A 308 (1982) 345

$^{94-98}Rb$, $^{142-146}Cs$

Germany, Fed. Rep.

Laboratory and address	Institut für Radiochemie Technische Universität München 8046 Garching
Names	D.C.Aumann*, I.Winkelmann
Facility	14.8-MeV neutron generator
Experiment	Determination of fission yields for fission of Pu-242 induced by 14.8-MeV neutrons
Method	Yields determined (1) by γ-counting of irradiated Pu-242 sample and (2) radiochemically with either γ- or ß-counting. Yields of 65 fission products, representing 43 mass chains, have been determined
Accuracy	Yields determined by γ-counting: 5-10% Yields determined radiochemically: 10-20%
Completion date	completed
Publication	I.Winkelmann, Dissertation, Technische Universität München, 1981 to be published in Radiochim. Acta

* Present address: Inst. f. Physikalische Chemie, Abt. Nuklearchemie Univ. Bonn

GERMANY, FED. REP.

Laboratory and adress: II. Physikalisches Institut
Universität Giessen
Heinrich-Buff-Ring 16
D-6300 Giessen, Germany

1. Names: C. Geisse, H. Wollnik (II.Physik Giessen)
F. Blönnigen (II.Physik Giessen/ILL Grenoble)
B. Pfeiffer (ILL Grenoble)

Facilities: On-line mass separator OSTIS installed at the high-flux reactor of ILL, Grenoble

Experiment: Q_{β}-values of neuton-rich fission products

Method: Alkaline fission products of ^{235}U are ionized on the 2000 K hot Rhenium surface of the ion source and separated according to mass. The beta-decay products are selected in energy by a magnetic sector device which is used for pile-up and background reduction. The energy determination is made in an $1000mm^2$x15mm Intrinsic Germanium detector. Taking into account the previously measured response function of the detector, the beta-spectra of $^{88-98}Rb$ and $^{138-146}Cs$ are analysed with an interactive graphics computer program.

Accuracy: 10-20 keV

Completion date: work is in progress

Publications: H. Wollnik et al.: Atomic Masses and Fundamental Constants 6 (1980)
F. Blönnigen et al.: Nucl. Instr. and Meth. 178 (1980) 357-361
R. Decker et al.: Nucl. Instr. and Meth. 192 (1982) 261-272
Annex to the Annual Report ILL 1979-1982

GERMANY, FED.REP.

(cont'd, same as INDC(NDS)-130)

2. Names: K. Becker, K. Kobras, E. Koglin, J. Münzel, U. Stöhlker, H. Wollnik (II.Physik Giessen) E. Monnand, B. Pfeiffer (ILL Grenoble)

Experiment: Half-lives and level schemes of neutron-rich fission products*)

Method: Alkaline and alkaline earth as well as several rare earth fission products of ^{235}U from the thermal ion source (2000 K) and a high temperature ion source (2700 K) are studied in different experiments:
Gamma-multispectra and multiscaling methods for the half-live determination of extremly neutron-rich fission fragments;
single gamma-ray and conversion electron spe tra, prompt and delayed gamma-gamma and beta-gamma coincidences and gamma-gamma angular correlation measurements with different Ge(Li)- and Si(Li)-detectors allowed to establish or extend level schemes of numerous isotopes.

Completion date: work is in progress

Publications: E. Koglin et al.: Z. Physik A288 (1978) 319-320
G. Jung et al.: Phys. Rev. C22 (1980) 252-263
J. Münzel et al.: Nucl. Instr. and Meth. 186 (1981) 343-347
B. Pfeiffer et al.: Proc. 4th Int. Conf. on Nuclei far from Stability (1981) CERN 81-09, p. 423

*) $^{95,97,98}Rb$, $^{95,97,99,100,101}Sr$, ^{100}Y, $^{147-149}Ba$, $^{147,148}La$, ^{152}Pr, ^{154}Nd.

GERMANY, FED. REP.

1. Laboratory: Institut für Kernchemie
Universität Mainz
D-6500 Mainz, Germany

Names: H.O. Denschlag, H. Braun, W. Ditz, B. Sohnius (Univ. Mainz), and H. Faust (ILL, Grenoble)

Facilities: LOHENGRIN Mass separator for unslowed fission products at ILL, Grenoble

Experiment: The charge distribution and isomeric yield ratios among heavy-mass peak fission products (A=130-147) from $^{235}U(n_{th},f)$ are being measured at various well defined kinetic energies (excitation energies) of the fission fragments

Method: Fission fragments separated according to mass (resolution $\frac{M}{\Delta M}$ = 400) and kinetic energy (resolution 2 MeV) are intercepted on a moving transport tape, transported continuously or discontinuously in front of a Ge(Li) γ-ray detector, and counted via the γ-rays emitted in their β-decay

Accuracy: Varying

Completion: nearly completed; experiment interrupted at present due to temporary reactor shut off

Publications: H.O. Denschlag, H. Braun, W. Faubel, G. Fischbach, H. Meixler, G. Paffrath, W. Pörsch, M. Weis, H. Schrader, G. Siegert, J. Blachot, Z.B. Alfassi, H.N. Erten, T. Izak-Biran, T. Tamai, A.C. Wahl, K. Wolfsberg, in Physics and Chemistry of Fission (Proc.Symp. Jülich, 1979), IAEA, Vienna (1980), Vol. II, p. 153-176, and progress reports in Jahresbericht, Institut für Kernchemie, Universität Mainz, and Annex to the Annual Report, Institut Laue-Langevin, Grenoble (1979-1981)

GERMANY, FED. REP.
(cont'd)

2. Names:	H. Braun, H.O. Denschlag
Facilities:	TRIGA Mark II Reactor
Experiment: (same as INDC(NDS)-130)	Yields and decay properties of the fission product chain with mass number A = 133 are being redetermined
Method:	Radiochemical and by mass-spectrometry
Completion date:	completed
Publications:	Jahresbericht 1977 and 1980 Institut für Kernchemie Universität Mainz H. Braun, Dissertation, Mainz 1983, publication in preparation
3. Names:	B. Sohnius, H.O. Denschlag
Facilities:	TRIGA Reactor (Mainz), HELIOS Mass-separator (Mainz), OSTIS Mass-separator (Grenoble)
Experiment:	Gamma-ray line intensities of short-lived nuclides in chains 142,143,144,146, and 147 are being redetermined relative to long-lived descendents
Method:	Fast radiochemical and mass separations
Accuracy:	Generally ±10%
Completion date:	Completed
Publications:	B. Sohnius, M. Brügger, H.O. Denschlag in Report NEANDC (E)-232 U Vol. V INDC (Ger.)-24/L (1982) p. 46, and B. Sohnius, B. Pfeiffer, H.O. Denschlag ibid (1983) in press

GERMANY, FED. REP.

Laboratory: Institut für Kernchemie
Universität Mainz
Postfach 3980
D-6500 Mainz, Germany

1. Names: **B. Steinmueller, H. Gabelmann, K.-L. Kratz**

Facilities: TRIGA Mark II Reactor

Experiment: Time-dependent neutron spectra from $^{235}U(n_{th},f)$ corresponding to Keepin's 6 half-life groups

Method: Spectroscopy using ^{3}He-ionization chambers and 100 µg ^{235}U samples

Accuracy: Spectrum range from about 10 keV to 3 MeV with 2 keV channel width; energy resolution about [illegible]-35 keV. Corrections for thermal neutrons, detector response and γ-ray pile-up.

Cooperation: J.G. Owen, D.R. Weaver (Univ. of Birmingham, U.K.)

Completion date: **End of 1983 for $^{235}U(n_{th},f)$. Further measurements with other fissioning nuclides are in progress.**

GERMANY, FED. REP.

(cont'd)

2. Names: H. Ohm, A. Schroeder, W. Ziegert and K.-L. Kratz

Experiment: From high-resolution delayed neutron energy spectra of ^{85}As, $^{87-92}Br$, $^{92-98}Rb$, ^{135}Sb, ^{136}Te, $^{137-141}I$, $^{141-147}Cs$ measured with ^{3}He – ionization chambers (SEFORAD-Applied Radiation Ltd.); deduced:

(I) average neutron energies ($\bar{E}_n$)

(II) time-dependent neutron spectra for $^{235}U(n_{th},f)$ by summation method

Accuracy: $\Delta\bar{E}_n \simeq 20$keV for 'soft' spectra

$\Delta\bar{E}_n \leq 75$keV for 'hard' spectra

Cooperation: T.R. England (LASL), F.M. Mann, R.E. Schenter (Hanford Engn. Development Lab.)

Publications: Proc. of the Consultants' Meeting on Delayed Neutron Properties, Vienna, March 1979, INDC (NDS)-107

GERMANY, FED. REP.

(cont'd)

3. Names: H. Gabelmann, K.-L. Kratz, B. Pfeiffer (ILL Grenoble) J. Muenzel, H. Wollnik (Univ. Giessen) G.I. Crawford (Univ. Glasgow)

Facilities: Alkali isotope separator OSTIS (ILL Grenoble)

Experiment: Measurement of half-lives and Pn-values of alkaline and earth-alkaline fission products

Method: Neutron-multiscaling, beta-multiscaling

Completion date: 1984. Results of Pn-values for $^{97-99}Sr$, $^{97-99}Y$, $^{147,148}Ba$, $^{147,148}La$ have already been published (see below).

Discrepancies to other data: Pn values obtained in this work are generally one or more orders of magnitude smaller than those given by G. Engler and E. Ne'eman, Nucl. Phys. A367 (1981)29.

Publication: H. Gabelmann et al., Z. Phys. A308 (1982)359.

Note: The experiment described in last years contribution on page 45 of INDC(NDS)-130 is completed, but 2 additional publications should be mentioned:

K.-L. Kratz et al., "Beta-Delayed Neutron Emission from $^{93-100}Rb$ to Exited States in the residual Sr Isotopes", Z. Phys. A 306 (July 1982) 239.

K.-L. Kratz et al. "The Beta-Decay of ^{95}Rb and ^{97}Rb", Z. Phys. A 312 (1983) 43.

C.E.C. GERMANY, FED. REP.

Commission of the European Communities
Joint Research Centre
Karlsruhe Establishment
European Institute for Transuranium Elements
Postfach 2266
7500 Karlsruhe
Federal Republic of Germany

Names: A. Cricchio, R. Ernstberger, L. Koch, R. Wellum

MEASUREMENT

Experiment: (Method)

The TACO experiment comprised the irradiation of well-characterized quantities of fissile and fission-product nuclides in the Rapsodie reactor. Each nuclide was prepared as an individual solution in nitric acid from which an aliquot was taken, dried on aluminium foil and sealed into stainless-steel containers under vacuum for irradiation.

The irradiation took place during 1971 and 1972 with the samples being exposed to a total fast neutron flux of 6×10^{22} n/cm^2. After cooling the capsules were dissolved and the contents analysed by massspectrometry. For those cases where neutron absorbtion was followed by β,γ decay and for the determination of fission yields, isotope dilution massspectrometry was employed. The following actinides were irradiated: ^{233}U, ^{235}U, ^{236}U, ^{237}Np, ^{238}U, $^{239-242}Pu$, ^{241}Am and ^{243}Am. After subsequent analysis their integral neutron absorbtion, capture and fission cross-sections were calculated. The method of calculation depended in all cases on specifying the concentration of each nuclide relative to the total nuclide content of the capsule. In this way potential losses of material were compensated for.

C.E.C. GERMANY, FED. REP.

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The fission-product nuclides irradiated included ^{95}Mo, ^{97}Mo, ^{98}Mo, $^{100-102}Ru$, ^{104}Ru, ^{106}Pd, ^{108}Pd, ^{110}Pd, ^{125}Te, ^{126}Te, ^{128}Te, ^{133}Cs, ^{141}Pr, ^{143}Nd, ^{144}Nd, ^{146}Nd, ^{148}Nd, ^{147}Sm, ^{149}Sm and ^{139}La.

Integral neutron absorbtion cross-sections have been calculated for the majority of these isotopes.

Publication: International Conference on Nuclear Data, 6-10 Sept. 1982, Antwerp, Belgium; proceedings p. 175.

INDIA

Laboratory and Address: Nuclear Physics Division, Bhabha Atomic Research Centre, Trombay, Bombay-400 085, India.

Names: Rekha Govil, S.S. Kapoor, D.M. Nadkarni, S.R.S. Murthy and P.N. Rama Rao.

Facilities: CIRUS Reactor, BARC

Measurements: Measurements of Fragment Mass, Charge and Kinetic Energy Distributions in Thermal Neutron Fission of ^{235}U.

Method: A simultaneous measurement of mass (M), charge (Z) and kinetic energy (E_k) distributions in ^{235}U (n_{th},f) has been carried out using a back-to-back ΔE-E detector system. A pair of gridded ionization chambers filled with P-5 gas measured the energy losses ΔE_1, ΔE_2 of the complementary fragments in the gas and the residual fragment energies were measured with a pair of semiconductor detectors. The four parameter data were analysed to obtain fragment charge distributions using the mass momentum relations to obtain M and then using the dependence of ΔE on E/M and Z. The charge resolution was determined at the gas pressures of 40-, 150- and 270- torr and an optimum resolution of FWHM = 2.1±0.1 charge units was obtained at 270 torr. The variances σ_M^2, σ_Z^2 of the fragment mass and charge distributions obtained as a function of E_k at 5 MeV intervals. The results of σ_M^2, σ_Z^2 versus E_k suggest a strong dependence of neutron-proton correlations on the E_k in the nucleon exchange processes which result in the fragment mass and

INDIA

(cont'd)

charge division.

Results: i) $\bar{M}_L$, $\bar{M}_H$, σ_M^2 versus E_k

ii) σ_z^2 versus E_k

Accuracy: Fragment mass distributions measured with an experimental resolution of FWHM ~ 4 amu. Fragment charge distribution with a resolution of FWHM = 2.1 ± 0.1.

Completion Date: April 1983

Discrepancies to other reported data: σ_M^2, σ_Z^2 versus E_k data reported for the first time. No similar data known to the authors.

Publications: i) Measurement of Specific Energy Losses of Individual Fission Fragments with a Back-to-Back ΔE-E Detector System" - Rekha Govil, S.S. Kapoor, D.M. Nadkarni, S.R.S. Murthy and P.N. Rama Rao - to be published.

ii) "Measurements of Fragment Mass, Charge and Kinetic Energy Distributions in Thermal Neutron Fission of ^{235}U with a Back-to-Back ΔE-E detector system" - Rekha Govil, S.S. Kapoor, D.M. Nadkarni, S.R.S. Murthy and P.N. Rama Rao (to be published).

INDIA

Laboratory and address	: Radiochemistry Division, Bhabha Atomic Research Centre, Trombay, Bombay-400 085
1. Names	: R.J. Singh, S.S. Rattan, A.V.R. Reddy, C.R. Venkatasubramani, A. Ramaswamy, Satya Prakash and M.V. Ramaniah
Facilities	: 1. Ge(Li) detector coupled with 4 K analyzer. 2. Beta proportional counter, Low background proportional counter. 3. Class A Radiochemical Laboratory
<u>Experiment</u>	: Mass yield from thermal neutron fission of ^{229}Th.
Method	: Fission yields in thermal neutron induced fission of ^{229}Th were determined using comparison method with respect to thermal neutron fission of ^{235}U and using ^{91}Sr as internal standard.
Accuracy	: 5 - 10% in the high yield region. 10 - 15% in the low yield region.
Completion date	: Completed.
Discrepancies to other reported data	: There are several reported data on mass yields of ^{229}Th in thermal neutron induced fission. Symmetric peak has been reported by some authors while others obtained only two asymmetric peaked mass yield distribution. In the present work, existence of small symmetric peak in addition to two prominent asymmetric peak has been established.
Publication	: Radiochimica Acta <u>31</u> (1982) 69-73

INDIA

(cont'd)

2. **Names:** K. Raghuraman, A. Ramaswami, C.K. Sivaramakrishnan and R.H. Iyer.

Facilities: 60 c.c Ge(Li), 4 K Analyser.

Experiment: Absolute Yields of ^{99}Mo and ^{140}Ba in the spontaneous fission of ^{244}Cm.

Method : Track etch-cum-radiochemistry, beta counting and gamm ray spectrometry.

Accuracy : 5-8%

Date : Completed.

Publication: Radiochimica Acta 31 (1982) 65-67.

3. **Names** : T. Datta, S.P. Dange, S.K. Das, Satya Prakash, and M.V. Ramaniah.

Facilities : 4K analyser and Ge detectors.

Experiment : Investigation on fragment angular momentum in ^{252}Cf (SF) system.

Method : Radiochemical separation followed by γ - ray spectrometry.

Completion date : Work in progress.

Publication : A part of work was presented at Solid State Nucl. Phys. Symp. at Varanasi, December 1982.

INDIA

(cont'd)

Laboratory and Address	:	Radiochemistry Division Bhabha Atomic Research Centre Trombay Bombay 400 085, India.
Names	:	T. Datta, S.M. Sahakundu, S.P. Dange, N. Chakravarty, R. Guin and Satya Prakash
Facilities	:	VEC, 4K analyser, 60 CC. Ge(Li)
Experiment	:	Dependence of fragment angular moments on entrance channel in ^{236}U Fission
Method	:	Radiochemical separation followed by γ - ray spectrometry
Accuracy	:	-
Completion date	:	Completed.
Publication	:	Phys. Rev. Vol.27, No. 5 May 1983.

INDIA

(cont'd)

Laboratory and Address	:	Radiochemistry Division Bhabha Atomic Research Centre Trombay Bombay- 400 085, India.
Names	:	Alok Srivastav, A.G.C, Nair, B.K. Srivastava, S.B. Manohar, Satya Prakash and M.V. Ramaniah.
Facilities	:	45 CC. Ge Detector 4K Channel Analyser
Experiment	:	Cumulative yields of short lived Ruthenium isotopes in the spontaneous fission of ^{252}Cf.
Method	:	Fast radiochemical separation followed by - ray spectrometry
Accuracy	:	± 5 - 6 %
Completion date	:	December, 1982.
Publication	:	Presented in DAE, Radio. Chem & Radiation Chem. Symposium, Poona, 1982.

INDIA

(cont'd)

Laboratory and Address	:	Radiochemistry Division Bhabha Atomic Research Centre Trombay Bombay 400 085, India
Names	:	Alok Srivastava, A.G.C. Nair, B.K. Srivastav, S.B. Manohar, Satya Prakash and M.V. Ramaniah
Facilities	:	45 CC. Intrinsic Ge detector 4K channel Analyser
Experiment	:	Isotopic yield distribution of Tc isotopes in the spontaneous fission of ^{252}Cf.
Method	:	Fast radiochemical separation followed by γ-ray spectrometry
Accuracy	:	± 10%
Completion date	:	December, 1982.
Publication	:	Presented in DAE, Nucl. Phy. Solid State Physics Symp. December, 1982. Varanasi.

INDIA

Laboratory : Indian Institute of Technology, KANPUR 208016, INDIA.

Names : M.M. Sharma, A.K. Sinha and G.K. Mehta, I.I.T. Kanpur
D.M. Nadkarni, B.A.R.C., Trombay, Bombay.

Facilities : 2 MeV Van de Graaff Accelerator.

Experiment : Angular Distribution of Polar Light Charged Particles in Thermal Neutron Induced Fission of ^{235}U.

Method : A semiconductor ΔE-E detector telescope is used for particle identification and an ionization chamber for fission fragment detection. The ionization chamber separates polar and equatorial light charged particles with the help of a collimator arrangement. Using different collimation for polar LCP region, yields of polar ^{1}H and ^{4}He particles were measured in thermal neutron induced fission of ^{235}U. Using Monte Carlo technique, $\sigma(\theta)$ of the angular distribution for polar proton and α's were determined. Angular distribution of polar protons was found to be very narrow in contrast with a wide distribution of polar α-particles.

Accuracy : Refer to the table.

Completion Date: Sept. 1981

Table : Yields of polar ^{1}H and ^{4}He per fission for two different collimator sizes viz 1 mm and 2 mm collimators.

LCP	1 mm Collimator	2 mm Collimator
^{1}H	$(2.0 \pm 0.6)x10^{-8}$	$(1.9 \pm 0.8)x10^{-8}$
^{4}He	$(1.1 \pm 0.4)x10^{-8}$	$(9.3 \pm 1.8)x10^{-8}$

Publications:

1. Polar and equatorial emission of light charged particles in ke, neutron induced fission, Journal of Physics G : Nuclear Physics, vol. 8 (1982) L85-L88.

2. Angular distribution of polar light charged particles in thermal neutron induced fission of ^{235}U. Silver Jubilee Physics Symposium (DAE, India), Nuclear Physics 24B (1981) 97.

INDIA

Laboratory : Indian Institute of Technology, KANPUR-208016, INDIA

Names : M.M. Sharma, S.C.L. Sharma, A.K. Sinha and G.K. Mehta, I.I.T. Kanpur

Facilities : 2 MeV Van de Graaff Accelerator

Experiment : Angular distribution of light charged particles with respect to neutron direction in fast neutron induced fission of ^{235}U.

Method : Particle identification was performed by using a semiconductor ΔE-E detector telescope. The angular information of the particles with respect to the detector axis was also obtained by telescope[1] using the technique developed in our laboratory. Experiments have been carried out at several neutron energies between thermal and 1 MeV and the anisotropies in the angular distributions of alpha particles are determined.

Accuracy : Refer to the table

Completion Date : April 1983

Table : Anisotropies $(Y^{(0^o)}/Y^{(90^o)})$ of the ternary alpha particle angular distribution

Neutron Energy	Anisotropy
(140 ± 30) KeV	(-85 ± 28)%
(170 ± 25) KeV	(-87 ± 32)%
(200 ± 25) KeV	(-94 ± 31)%
(400 ± 200) KeV	(-10 ± 28)%
(600 ± 180) KeV	(-25 ± 19)%
(1000 ± 170) KeV	(-50 ± 27) %

Publications:

1. Unpublished

INDIA

Laboratory: and address: Department of Physics, Faculty of Science, Punjabi University, Patiala-147002, India.

Names: K. Singh and H.S. Sahota.

Facility: Intrinsic Ge, Si(Li) and Ge(Li) spectrometers.

Experiment: Precision measurement of gamma-ray intensities and directional correlation measurements in the decay of ^{99}Mo.

Method: The intrinsic Ge and low energy Si(Li) detectors were calibrated with standard sources down to 5 keV energy region. The relative gamma ray intensities were precisely measured. For high energy region large size 64.1 cc Ge(Li) detector was used. From gamma-gamma directional correlation measurements on 740-181, 740-(40)-140, 961-181 and 822-(40)-140 keV cascades, the multipole admixtures in the 40, 140, 822 and 961 keV gamma rays have been respectively found as M1+ $\leq$ 6.25 x 10^{-2}% E2, M1+(8+1)% E2, E1+1% M2 and M2+E3. The spins of 921, 1004 and 1142 keV levels have been uniquely determined as $3/2^+$, $5/2^-$ and $1/2^-$.

Accuracy: Errors are quoted in the parenthesis.

Completion date: June 1981.

Discrepancies to other reported data: In good agreement with the recent literature data.

Publication: J. Phys. Soc. Japan, 51 (1982) 3766.

Table-1 Gamma-ray intensities for ^{99}Mo

Energy (keV)	Relative intensity	Energy (keV)	Relative intensity	Energy (keV)	Relative intensity
38.4	0.0035	352.9	0.0209	727.0	0.0585(3)
40.5	7.7(6)	366.4	9.8(8)	739.7	100
140.5	686(49)	380.7	0.07(2)	778.2	34.8(19)
159.7	0.11(4)	409.0	0.009	823.1	1.10(7)
163.4	0.078(13)	411.5	0.14(2)	861.0	0.005(3)
181.0	49.8(33)	458.0	0.04(2)	940.0	0.0008(3)
242.7	0.0118(44)	528.9	0.44(4)	961.0	0.79(6)
249.0	0.04(3)	537.9	0.009(3)	1001.7	0.045(12)
319.8	0.052(2)	580.1	0.021(8)	1057.2	0.007(3)
321.0	0.056(9)	599.6	0.017(8)	1071.9	0.010(4)
344.5	0.005(24)	620.7	0.026(2)	1082.0	0.005(2)

INDIA

Laboratory and Address:	Department of Physics, Faculty of Science, Punjabi University, Patiala-147002, India.
Names:	K.Singh and H.S.Sahota
Facility:	Intrinsic Ge, low energy Si(Li) and large size Ge(Li) detectors.
Experiment:	Precision measurement of gamma-ray intensitis and gamma-gamma directional correlations in the decay of ^{125}Sb.
Method:	The high resolution precisely calibrated semiconduct detectors were used to measure the intensities of several low energy lines below 200 keV. With the presence of 58, 693 and 729 keV gamma rays as 729→671, 729→36 and 729→0 transitions, the 729 keV level was confirmed. A 642 keV transition was found as $7/2^+ - 1/2^+$ M3 de-excitation. From directional correlation measurements on 204-176, 321-176, 208-428 and 208-463 keV cascades. The spin of 525 keV level was assigned as $7/2^-$ and some M3 content in 428 keV transition, in addition to M1+E2 was found.
Accuracy:	Errors are quoted in parentheses.
Completion date:	September 1981.
Discrepancies to other reported data	i) ii) iii) *
Publications:	Raj Mittal, K. Singh and H.S. Sahota, Curr. Sci. (India) 51 (1982) 746. K. Singh and H.S. Sahota Ind. J. Phys. (Calcutta) 56A (1982) 291. K. Singh and H.S. Sahota Ind. J. Pure and Appl. Phys. (New Delhi) (in press)

*

i) Intensity determinations for weak transitions have been improved

ii) New transitions with energies 20.14, 58.29, 111.36, 642.14, 693.23 and 729.62 keV have been observed.

iii) From coincidence measurements, the anomaly in the characters of 116.95 and 429.88 keV transitions have been removed.

Table-1 Relative gamma-ray intensities in the decay of ^{125}Sb

Energy (keV)	Relative intensity	Energy (keV)	Relative intensity	Energy (keV)	Relative intensity
20.1	0.068(2)	204.1	1.14(4)	463.4	35.50(7)
35.5	14.53(35)	208.0	0.82(2)	497.3	0.015(3)
58.2	0.91(4)	227.9	0.44(2)	600.5	60.50(10)
109.2	0.232(5)	315.1	0.013(2)	606.6	17.2(9)
111.3	0.0042(3)	321.0	1.30(5)	635.8	39.1(22)
116.9	1.060(10)	380.4	6.02(25)	642.1	0.160(9)
172.6	0.86(2)	408.0	0.61(3)	671.4	5.9(3)
176.3	24.5(8)	427.8	100	693.2	0.0015(6)
178.6	0.130(5)	443.4	1.12(5)	729.6	0.0025(7)
198.0	0.081(4)				

ISRAEL

Laboratory and Address:	Soreq Nuclear Research Centre 70600 Yavne, Israel
Names:	M.S. Rapaport, G. Engler, A. Gayer and I. Yoresh.
Facilities:	-4MW research reactor -SOLIS isotope separator
Experiment:	Experimental Study of ^{145}Cs Decay
Method:	SOLIS isotope separator operating on-line with the 4MW research reactor at Soreq Nuclear Research Centre. Integrated target-ion source system with ^{235}U targets enriched to 93% and exposed to a thermal neutron flux of $5x10^{8} n\text{-}cm^{-2}s^{-1}$. Selective separation of the A=145 mass chain starting with ^{145}Cs and ^{145}Ba with a Ta surface ionization surface used either as one integral piece or as a separate piece from the target container. The measurments consisted of simultaneous detection of γ-rays and conversion electrons.
Accuracy:	10% in intensities, 0.1 to 0.3 keV in energies.
Results:	Established level scheme of ^{145}Ba, γ-intensities, β-branching and log ft values.
Completion date:	Completed
Discrepancies to other reported data:	Reasonable agreement in γ-intensities with other reported data.
Publication:	Z. Phys. A 305 (1982) 359.

ISRAEL

Laboratory and Address:	Soreq Nuclear Research Centre 70600, Yavne, Israel.
Names:	G. Engler and M.S. Rapaport
Facilities:	- 4MW research reactor - SOLIS isotope separator
Experiment:	Independent Fission Yields of Short-Lived Br and I Isotopes in Thermal Neutron Fission of ^{235}U
Method:	SOLIS isotope separator operating on-line with 4MW research reactor at Soreq Nuclear Research Centre. Negative surface ionization integrated target-ion source system with ^{235}U targets enriched to 93% and exposed to thermal flux of $5x10^{8}$ $n\text{-}cm^{-2}s^{-1}$. Selective separation of Br and I isotopes. The measurments consisted of β-scans using a 300 mμ Si surface barrier detector.
Accuracy:	10-20% depending on isotope
Results:	Measured independ fission yields of $^{87-91}Br$ and $^{138-141}I$.
Completion date:	Completed.
Discrepancies to other reported data	Reosonable agreements with other reported data.
Publication:	Article in preparation.

ISRAEL

Laboratory and Address	:	Weizmann Institute of Science, Rehovot, Israel, in collaboration with Los Alamos Scientific Laboratory, U.S.A.
Names	:	G. Mamane, E. Cheifetz, E. Dafni and J. B. Wilhelmy.
Facility	:	^{252}Cf source
Experiment	:	Measurements of short half-lives ($t_{1/2}$<0.5 nsec) of excited states in prompt fission products
Method	:	Fission fragments emitted from a very flat thin foil of ^{252}Cf are stopped by a plunger whose distance to the foil is varied in steps from $4 \cdot 10^{-3}$-0.5 cm. Gamma ray spectra are measured with Ge-Li detector in coincidence with the complementary fragment. Lifetimes of known transitions, in particular $4^+ \rightarrow 2^+$ and $6^+ \rightarrow 4^+$ decays in even-even isotopes, are determined from the variation of the non-doppler shifted intensities with the distance
Accuracy	:	Dependent on transition intensities
Completion date	:	In progress

ITALY

Laboratory and Address : ENEL - Centro di Ricerca Termica e Nucleare
Via Rubattino, 54
20134 MILANO, ITALY

+Istituto di Ingegneria Nucleare
Politecnico di Milano
Via Ponzio, 34/3
20133 MILANO, ITALY

Names : A. Cesana+ , G. Sandrelli , M. Terrani+

Facilities : L54 reactor, high resolution Ge-Li detector .

Experiment : Determination of cumulative fission yields from fast neutron induced fission of Pu-238 and Pu-240, relative to Ba-140 . (Work performed under contract ENEL-CRTN/33-1975)

Method : Samples of a few milligrams of highly enriched isotopes (oxide powder), encapsulated in zircaloy vials, were irradiated in a B_4C filtered neutron flux at the edge of L54 reactor core (1). The samples had the following composition :

Target	Mass (mg)	Impurities
^{238}Pu	2.82 ± 0.01	^{234}U (5%), ^{237}Np (1.2%), ^{239}Pu (0.7%), ^{240}Pu(1%)
^{240}Pu	4.60 ± 0.02	^{239}Pu(1%), ^{241}Pu (0.5%), ^{242}Pu (0.3%), ^{241}Am(0.2%)

The absolute activities of the examined fission products were determined by Ge-Li spectrometric gamma-ray measurements performed directly on the fission product mixtures in the irradiated samples. Gamma-ray interferences and contributions from fissioning impurities were duly taken into account.
The results are listed below and compared, when possible, with experimental values reported in the literature .

Accurancy : The errors quoted in the table below are intended as standard errors (± 1σ) . They are obtained combining in the usual way the errors on the gamma-ray peaks, gamma-ray detection efficiency, gamma-ray selfabsorption in the sample and gamma-ray branchings (as reported in the literature) both for the condidered FP and for the Ba-140 taken as reference .

ITALY
(cont'd)

Completion date : 1984

Results : Relative Cumulative Yields

Fissioning Nuclide / Fission Product	^{238}Pu	^{240}Pu	
	present work	present work	ref.2[(a)]
^{91}Sr	-	0.41 ± 0.02	0.43 ± 0.05
^{103}Ru	1.25 ± 0.03	1.28 ± 0.03	1.29 ± 0.14
^{131}I	0.89 ± 0.03	0.70 ± 0.02	0.72 ± 0.08
^{132}Te	-	0.86 ± 0.02	0.93 ± 0.10
^{135}I	-	1.29 ± 0.04	1.31 ± 0.14
^{140}Ba	1.00 ±[(b)] 0.02	1.00 ±[(b)] 0.01	1.00 ± 0.08

(a) Experimental Cumulative Yields (Y_{Ba} = 5.28%) .

(b) Preliminary absolute determination : for ^{238}Pu, Y_{Ba} = 5.27%; for ^{240}Pu, Y_{Ba} = 5.56% .

References : 1) P. Barbucci et al. , Energia Nucleare, 26, 11, 542 (1979) .

2) B.F. Rider, NEDO-12154-3(A), (1979) .

JAPAN

Laboratory and Address : Department of Physics, Faculty of Science, Hiroshima University
1-1-89 Higashi-Sendamachi, Nakaku, Hiroshima 730, Japan

Names : Y. Yoshizawa and Y. Iwata

Facility : Ge(Li) spectrometer

Experiment : Precision measurement of gamma-ray intensities for ^{125}Sb

Method : The Ge(Li) detector was calibrated within uncertainties of 1 % with standard sources and cascade gamma rays in the energy range of 90 to 2750 keV. Relative intensities of gamma rays emitted from the ^{125}Sb nuclide were precisely measured. Gamma-ray intensities per decay were obtained from the relative gamma-ray intensities, theoretical internal conversion coefficients and beta branches. The intensity sum of all transitions feeding and crossing the isomer level at 145 keV of the daughter nucleus ^{125}Te.

Accuracy : For strong gamma rays, Accuracies of relative intensities and intensities per decay are within 1 % and 1.5 %, respectively.

Completion date : April 1982

Descrepancies to other reported data: Large descrepancies to other reported data are not recognized.

Table 1. Gamma-ray intensities for ^{125}Sb.

Gamma-ray energy (keV)	Relative intensity (%)	Intensity per decay (%)	Gamma-ray energy (keV)	Relative intensity (%)	Intensity per decay (%)
109.3	(0.241(24))	(0.071(7))	380.4	5.06(4)	1.500(19)
117.0	0.867(25)	0.257(8)	408.0	0.608(21)	0.180(6)
172.6	0.69(4)	0.205(12)	427.9	100.0(7)	29.6(3)
176.3	22.62(21)	6.70(9)	443.5	0.989(23)	0.293(7)
178.8	0.11(4)	0.032(13)	463.4	35.23(14)	10.44(12)
198.6	0.030(11)	0.009(3)	497.4	0.009(8)	0.0025(23)
204.1	1.08(3)	0.320(11)	600.6	59.54(22)	17.64(20)
208.1	0.788(21)	0.233(7)	606.6	16.94(7)	5.02(6)
227.9	0.433(12)	0.128(4)	635.9	37.87(14)	11.22(13)
321.0	1.391(24)	0.412(8)	671.4	6.039(24)	1.790(21)

Publication: Nucl. Instr. Meth. to be publ. 1983

JAPAN

Laboratory and address:	Nuclear Physics II Laboratory Japan Atomic Energy Research Institute Tokai-mura, Naka-gun, Ibaraki-ken, Japan
Names:	U. Furuta, Y. Kawarasaki, M. Mizumoto, Y. Nakajima, M. Ohkubo, M. Sugimoto, S. Tanaka (JAERI) Y. Kanda, I. Tsubone (Kyushu Univ.)
Facilities:	Neutron time-of-flight spectrometers at the 120 MeV electron linear accelerator.
1. Experiment:	Neutron capture cross section measurements in keV region.
Detectors:	3500 l and 500 l liquid scintillator tank for capture yield, ^{6}Li-glass and ^{10}B-NaI detectors for neutron flux and transmission measurements.
Flight paths:	52 m for capture measurements. 56 m for flux and transmission measurements.
Normalization:	Saturated resonance method.
(1) Samples:	^{107}Ag, ^{109}Ag (metallic powder enriched to 98.22 and 99.32 % respectively).
Energy region:	3.3 to 700 keV
Accuracy:	5 to 10 % (Experimental uncertainties are represented with a covariance matrix)
Completion data:	Measurements are completed
Publication:	M. Mizumoto et al. Int. Conf. on Nuclear Data for Science and Technology, p. 228. Antwerp, 1982.
(2) Sample:	La
Status:	Total radiation widths were obtained by the code TACASI for the s-wave resonances below 2.5 keV.
Publication:	Y. Nakajima et al. J. Nucl. Sci. Technol. 20(1983)183
(3) Sample:	^{137}Ba ($Ba(NO_3)_2$ powder enriched to 81.9 %)
Energy region:	1.5 eV to 100 keV
Completion date:	Measurements are completed.
(4) Samples:	^{155}Gd, ^{157}Gd enriched samples
Energy region:	10 eV to 200 keV
Completion date:	Measurements are completed.
2. Experiment:	Neutron resonance parameters.
Detectors:	^{6}Li-glass neutron detectors Moxon-Rae detector and 3500 l liquid scintillator tank
Flight paths:	47 m, 56 m and 190 m for transmission measurements 47 m and 52 m for capture measurements

JAPAN
(cont'd)

Analysis:	The Atta-Harvey area analysis code and the multi-level Breit-Wigner code SIOB Monte Carlo code CAFIT and TACASI
(1) Samples:	^{79}Br, ^{81}Br Resonance parameters, S_0, $\bar{D}$, $\bar{\Gamma}$ ^{79}Br 156 levels E_n < 10 keV ^{81}Br 100 levels E_n < 15 keV
Publications:	M. Ohkubo, Y. Kawarasaki and M. Mizumoto Resonance parameters of ^{79}Br and ^{81}Br up to 15keV. Int. Conf. on Nuclear Cross Sections for Technology, p173, NBS special publication 594, 1980 J. Nucl. Sci. Technol. 18 (1981) 745
(2) Samples:	^{85}Rb, ^{87}Rb Resonance parameters, S_0, $\bar{D}$, $\bar{\Gamma}_\gamma$ Rb 100 levels E_n < 17 keV Rb 42 levels E_n < 100 keV
(3) Samples:	^{107}Ag and ^{109}Ag (metallic powder enriched to 98.22 and 99.32 % respectively)
Energy region:	1.5 to 7000 eV both for ^{107}Ag and ^{109}Ag.
Completion date:	Dec. 1982
Publication:	M. Mizumoto et al. Int. Conf. on Nucl. Data for Science and Technology, p228, Antwerp, 1982 and submitted to J. Nucl. Sci. Technol.
(4) Sample:	^{123}Sb Transmission and capture measurements
Completion date:	Measurements are completed.

JAPAN

Laboratory and address: Institute of Atomic Energy, Kyoto University, Uji, Kyoto 611, Japan

Names: Ichiro Fujiwara and Nobutsugu Imanishi

Facilities: 5 MW research reactor [Research Reactor Institute, Kyoto University]

Experiment: Cumulative and independent fission-yields of some fission products in the thermal-neutron induced fission of ^{233}U, ^{235}U and ^{239}Pu.

Method: Radiochemical for fission yields; Instrumental with germanium detectors.

Accuracy: Errors range from 7 % to 20 % with different combinations of fission products and the fissile isotopes.

[Expected] completion date: see Table I

Publication: see Table I

Table I

Nuclide		Completion date	Publication
$^{128,130,132}Sn$, ^{133}Sb	[Cum.]		N. Imanishi, I. Fujiwara and
$^{128,130,132}Sb^{m,g}$,			T. Nishi, Nucl. Phys. A263,
^{131}Sb, $^{131,133}Te^{m,g}$	[Ind.]	Sep. 1975	141 (1976)
^{135}I	[cum.]		T. Nishi, I. Fujiwara and
$^{131,133}I$,			N. Imanishi, Int. Conf. on Nucl.
$^{132,134,136}I^{m,g}$	[Ind.]	Dec. 1976	Structure, Tokyo, Sep. 1977
$^{133,135}Xe^{m,g}$	[Ind.]	Dec. 1976	I. Fujiwara, N. Imanishi and
			T. Nishi, J. Phys. Soc. JAPAN
$^{138}Cs^{m,g}$	[Ind.]	May 1978	51,1713(1982)
$^{90}Rb^{m,g}$	[Ind.]	End of 1983	

JAPAN

Laboratory and address: Research Reactor Institute, Kyoto University
Kumatori-cho, Sennan-gun, Osaka, Japan

Names: K. Okano, Y. Kawase and Y. Funakoshi

Facilities: On-line mass separator(KUR-ISOL) installed at 5 MW Kyoto University Reactor.

Experiment: Half-life measurements of ^{93}Sr, ^{94}Sr and ^{143}Ba.

Method: Gamma-rays following the decay of ^{93}Sr, ^{94}Sr and ^{143}Ba were measured with a Ge(Li) detector.

Accuracy: Estimated errors are 0.3-0.6%.

Completion date: The measurements are completed.

Publications: Annu. Rep. Res. Reactor Inst., Kyoto Univ., 16(1983) in press.

JAPAN

Laboratory and address:	Research Reactor Institute, Kyoto University Kumatori-cho, Sennan-gun, Osaka, Japan
Names:	K. Okano, Y. Funakoshi and Y. Kawase
Facilities:	On-line mass separator(KUR-ISOL) installed at 5 MW Kyoto University Reactor.
Experiment:	Determination of delayed neutron emission probability by a β-γ spectroscopic method.
Method:	Gamma-rays in the decay chain of ^{94}Rb were measured with a Ge(Li) detector. The P_n value of ^{94}Rb was deduced from γ-ray intensity ratio of 1427.6 keV (^{94}Sr) and 590.2 keV(^{93}Sr).
Accuracy:	The associated error of P_n is about 7%.
Completion date:	The measurement for the ^{94}Rb precursor is completed. The experiment for ^{95}Rb is now in progress. The extension of the method to other Rb and Cs isotopes is planned.
Publications:	Annu. Rep. Res. Reactor Inst., Kyoto Univ., 16(1983) in press.

JAPAN

Laboratory and address:	Research Reactor Institute, Kyoto University Kumatori-cho, Sennan-gun, Osaka, Japan
Names:	Y. Funakoshi, K. Okano and Y. Kawase
Facilities:	On-line mass separator(KUR-ISOL) installed at 5 MW Kyoto University Reactor.
Experiment:	Determination of the decay scheme of ^{94}Sr.
Method:	Gamma-ray singles and coincidence spectra in the decay of ^{94}Sr were measured with Ge(Li) detectors. Beta-ray spectra were taken with a Ge(HP) detector.
Accuracy:	Gamma-ray energies to 0.1-0.2 keV, gamma-ray intensities to 5-10%.
Completion date:	February 1983
Publications:	Preliminary note;Annu. Rep. Res. Reactor Inst. Kyoto Univ., 15(1982)151. Full report will be published soon.

JAPAN

Laboratory and address : Research Reactor Institute, Kyoto University
Kumatori, Sennan-gun, Osaka-fu, 590-04

Names : Itsuro Kimura, Katsuhei Kobayashi

Facility : ^{252}Cf source of JAERI

Experiments : Average cross sections to ^{252}Cf fission neutrons, of ^{24}Mg (n,p)^{24}Na, ^{27}Al(n,p)^{27}Mg, ^{32}S(n,p)^{32}P, ^{51}V(n,p)^{51}Ti, ^{54}Fe(n,p)^{54}Mn, ^{56}Fe(n,p)^{56}Mn, ^{58}Ni(n,p)^{58}Co, ^{59}Co(n,α)^{56}Mn, ^{64}Zn(n,p)^{64}Cu, ^{113}In(n,n')^{113m}In, ^{115}In(n,n')^{115m}In, ^{197}Au(n,2n)^{196}Au, ^{46}Ti(n,p)^{46}Sc, ^{47}Ti(n,p)^{47}Sc, ^{48}Ti(n,p)^{48}Sc and ^{199}Hg(n,n')^{199m}Hg

Method : Gamma-rays (except ^{32}P) from the induced activities were measured with a Ge-Li counter. The average cross section for ^{27}Al(n,α)^{24}Na was taken to be 1.006 mb as a reference value and the other values were normalized to it. In evaluation of errors, covariance matrix was taken into account.

Accuracy : 3~5 %

Completion date : March 1982

Publication : K. Kobayashi et al., J. Nucl. Sci. Technol. vol. 19 (1982) p. 341.

JAPAN

Laboratory: 1. Department of Nuclear Engineering, Nagoya University
2. Institute for Atomic Energy Rikkyo University

Address: 1. Furo-cho, Chikusa, Nagoya, JAPAN
2. Nagasaka, Yokosuka, Kanagawa, JAPAN

Names: M.Totsuka[1)], S.Fujita[1)], K. Mio[1)], K. Kawade[1)], H.Yamamoto[1)], T. Katoh[1)] and T. Nagahara[2)]

Facilities: TRIGA-II reactor of Rikkyo University, pneumatic transport system, apparatus for electrophoresis, Ge(Li) detector, 4096 pulse height analyser

Experiment: Decay of ^{147}Ce to levels of ^{147}Pr

Method: By using a rapid paper electrophoretic method, sources of ^{147}Ce was separated from fission products of ^{235}U irradiated at the TRIGA-II Reactor. Energies and intensities of gamma rays and a half-life of ^{147}Ce were measured and a decay scheme is proposed.

Accuracy: Less than 0.7 keV for gamma ray energies, 57 $\pm$ 5 sec for the half-life

completion date: April 12, 1982

Discrepancy to other reported data:

Among 14 gamma rays assigned to the decay of ^{147}Ce, 4 gamma rays are newly observed ones, and 2 gamma rays reported previously are not detected. A new level of ^{147}Pr at 2.7 keV is proposed. Level energies of the 291.9 and the 802.4 keV levels are revised from old values.

Publication: J. Nuclear Science and Technology, vol 19 (1982) no 9, pp 765-767

JAPAN

Laboratory and address:	Nuclear Engineering Research Laboratory Faculty of Engineering University of Tokyo 2-22 Shirane Shirakata, Tokai-mura Ibaraki 319-11, Japan
Names:	M. Akiyama, Y. Oka, H. Hashikura and S. An
Facilities:	Fast Neutron Source Reactor "YAYOI" A 14 MeV neutron generator
Experiment:	Measurements of beta and gamma decay heat from fission products for fast neutron fissions of ^{233}U, ^{235}U, ^{238}U, natural U, ^{239}Pu and ^{232}Th for cooling times of 19 to 24000 seconds. Those measurements were already completed. Measurements of decay heat from fission products for 14 MeV neutron fissions were started.
Method:	Samples were irradiated for short periods with fast neutrons or 14 MeV neutrons, and returned immediately after irradiations to a counting area. Gamma-ray energy spectra emitted from the irradiated sample were measured using a NaI detector, and beta-ray spectra were obtained a plastic scintillation detector combined with $\Delta E/\Delta X$ type proportional counter to eliminate gamma-ray effects. Counting times were chosen to provide good statistics within the time range of interest. Energy release rates for beta- and gamma-rays were obtained to integrate beta and gamma energy spectra respectively and summed to obtain total decay heat from fission products.
Accuracy:	For fast neutron fissions gamma decay heat for ^{233}U, ^{235}U, ^{239}Pu — 5% gamma decay heat for ^{238}U, natural U, ^{232}Th — 6% beta decay heat — 4% For 14 MeV neutron fissions $\sim$ 8% for gamma decay heat for ^{238}U, ^{232}Th
Completion date:	Measurements of decay heat for fast neutron fissions were already completed. Measurements of decay heat for 14 MeV neutron fissions are preliminary and continuing.
Discrepancies to other reported data:	Present data of beta and gamma decay heat for fast neutron fissions are in reasonable agreement with results of current summation calculations.
Publications:	M. Akiyama, et al.; J. Atom. Energy Soc. Japan <u>24</u>, 709 (1982). M. Akiyama, et al.; ibid., <u>24</u>, 803 (1982). M. Akiyama, S. An ; Proc. Intern. Conf. Nucl. Data Sci. Technol. Sep. Antwerp 1982, (1983), page 237

J A P A N

Laboratory: 1.Department of Physics, Faculty of Science, Yamagata University
2.Division of Physics, Japan Atomic Energy Research Institute

Address: 1.Koshirakawa-cho, Yamagata, 990,Japan
2.Tokai-mura, Naka-gun, Ibaraki, 319-11, Japan

Names: H.Niizeki[1], S.Kageyama[1], T.Tamura[2] and Z.Matumoto[2]

Facilities: 50 Mev Electron liner accelerator (Japan Atomic Energy Research Institute)

Experiments: The level scheme of ^{103}Ru has been studied in the β-decay of ^{103}Tc

Method: Radioactivity ^{103}Tc (from ^{104}Ru (γ,p)); meassured E_γ, I_γ, γ-γ coinc, I_β, deduced log *ft*. ^{103}Ru deduced levels *J*,π. Enriched isotope, Ge(Li), anthracene scintillation detectors.

Accuracy: Details given in the publication.

Complation: Completed

Publication: Jour. Phys. Soc. Japan 47 (1979) 26

SWEDEN

Laboratories:	Department of Nuclear Chemistry Chalmers University of Technology S-412 96 Göteborg Sweden
	Institut für Kernchemie Johannes Gutenberg Universität Postfach 3980 D-6500 Mainz Germany
	Department of Nuclear Chemistry University of Oslo Blindern, Oslo 3 Norway
	Nuclear Chemistry Division Los Alamos National Laboratory Los Alamos, New Mexico 87545 U.S.A.
Names:	S. Höglund and G. Skarnemark (Göteborg) N. Kaffrell, H. Tetzlaff and N. Trautmann (Mainz) J. Alstad (Oslo) K. Wolfsberg and W. Daniels (Los Alamos)
Facilities:	SISAK system for studies of radionuclides with half-lives down to less than 1 s.
Experiments:	Half-life determinations, γ-singles, γ-γ coincidence and γ-γ angular correlation measurements. At present, our measurements are concentrated on very neutron-rich isotopes of technetium, ruthenium, rhodium and palladium formed in thermal-neutron induced fission of Cf-249.
Method:	Fast chemical on-line separations. The measurements are carried out on flow cells or ion exchange columns. The fission products are transported from the target cell via a gas jet system. Ge-detectors are used.
Completion date:	-

SWEDEN

Laboratory and address:	The Studsvik Science Research Laboratory, S-611 82 Nyköping, Sweden.
Facility:	The OSIRIS on-line mass separator is used to extract selected nuclei from thermally fissioned ^{235}U. The extraction method has been extended in the sense that Al or CF_4 is added to the ion source to facilitate separation of halogenes or lanthanides, respectively.
1. Names:	K. Aleklett, P. Hoff, E. Lund and G. Rudstam.
Experiment (same as INDC(NDS)-130)	Characterization of and P_n values for delayed neutron precursors of yttrium and lanthanides[1)]
Method:	Simultaneous measurement of neutron and beta activities in a multiscaling mode. Neutron counter consisting of 29 ^{3}He counters imbedded in paraffine beta counter being a 2 mm plastic scintillator. Separation of fluoride ions with CF_4 addition to the ion source.

1) ^{147}La, ^{147,149}Ce, ^{147,149}Pr

SWEDEN

(cont'd)

Completion date: Indefinite for the P_n studies as such.

2. Names: K. Aleklett, P. Hoff, E. Lund and G. Rudstam.

Experiment Total beta decay energies and atomic masses.

Method: Beta particles were recorded in coincidence with gamma rays depopulating known levels in the daughter nucleus. The end-point energies of the beta-spectra were determined, and by adding the level energy the total beta-decay energies were obtained.

The beta-particles were recorded in a Si(Li) detector system and the gamma rays in two Ge(Li) detectors.

Further experiments will probably be performed using other techniques, such as HPGe detector for registration of beta particles or well calibrated plastic scintillators.

Completion date: Indefinite for the experiment as such.

Publication: K. Aleklett, P. Hoff, E. Lund and G. Rudstam, Total beta decay energies and mass systematics for neutron rich silver and cadmium isotopes[2], Phys. Rev. C26(1982) 1157.

2) $^{116-121}Ag$ and $^{119,121}Cd$

SWEDEN
(cont'd)

3. Names: P. Aagaard, E. Lund, G. Rudstam and H-U Zwicky.

Experiment: Yields of products from thermal-neutron induced fission of ^{235}U.

Method: The activity of a fission product is determined by means of gamma spectroscopy and of neutron counting. After correction for delay, counting efficiency, branching ratio and reactor power the result will be a product of the fission yield and the overall separation efficiency. The latter factor is nearly the same for all isotopes of a given element. Thus relative yields are directly obtainable and have to be normalized against the yield of one of the isotopes determined absolutely by any other technique.

Completion date: 1983.

4. Names: P. Aagaard, E. Lund, G. Rudstam and J. Eriksen.

Experiment: Gamma branching ratios for fission products.

Method: Gamma branching ratios for products induced in thermal-neutron fission of ^{235}U have been

SWEDEN
(cont'd)

determined by simultaneous measurement of the gamma and beta activities. Well calibrated detectors have been used, a Ge(Li) detector for the determination of the intensities of certain gamma transitions and a plastic scintillator for determination of the beta activity.

Completion date: 1984.

5. Names: K. Aleklett, P. Hoff and E. Lund.

Experiment: Nuclear spectroscopic studies of the decays of $^{75,77}Zn$, and $^{139,140}I$. The studies aim at level scheme determinations to be combined with the Q_{β}-studies.

Completion date: 1983.

Publication: E. Lund, K.
and total de
published 19

6. Names: B. Fogelberg

Experiment: Nuclear spectroscopic studies of the decays of $^{113,114,115}Ag$. The studies aim at level scheme determinations to be combined with the Q_{β}-studies.

SWEDEN
(cont'd)

7. Names: B. Fogelberg, P. Hoff and G. Skarnemark.

Experiment: Nuclear spectroscopic studies of fission product nuclei. The energy levels and transition probabilities between these are studied. Recent studies include levels populated in the decays of ^{121}Ag, ^{131}In, ^{133}Sn and $^{149,150}Ce$.

Publications: B. Fogelberg and P. Hoff, Levels and transition probabilities in ^{121}Cd, Nucl. Phys.A391 (1982)445

S. Raman, B. Fogelberg, J.A.Harvey. R.L. Macklin. P.H. Stelson, A. Schroder and K.-L. Kratz, Overlapping beta-decay and resonance neutron spectroscopy of levels in ^{87}Kr, Phys. Rev. C (in press 1983).

SWEDEN

Laboratory:

Department of Nuclear Physics, University of Lund.

Names:

P. Andersson, R. Zorro and I. Bergqvist.

Activity:

Neutron capture cross section measurements with the activation technique. Experimental and theoretical determination of corrections due to background low energy neutrons produced in reactions like (n,n´) and (n,2n) and charged-particle reactions like (p,n) and (d,n) in target backing etc.

Facilities:

3 MV pelletron accelerator, Ge(Li) spectrometers, proton recoil telescope, long-counters.

Results:

Measurements in the neutron energy range 2-4.5 MeV for the nuclei ^{115}In and ^{197}Au.

Publications:

P. Andersson, R. Zorro and I. Bergqvist, Nuclear Physics Reports LUNFD6/(NFFR)/1-26/(1982).

Work in progress:

Most measurements for ^{115}In and ^{197}Au in the neutron energy range 4.5-7.5 MeV have been concluded.

Address:

Department of Nuclear Physics, University of Lund,
Sölvegatan 14, 223 62 Lund, Sweden.

Contact:

P. Andersson.

SWITZERLAND

Laboratory & address:	Eidg. Institut für Reaktorforschung, CH-5303 Würenlingen, Switzerland Institut für anorganische, analytische und physikalische Chemie, Universität Bern, CH-3012 Bern, Switzerland
Name:	H.R. von Gunten, H.N. Erten
Facility:	Swimming-pool type reactor (SAPHIR)
Experiments:	Determination of independent and cumulative yields in the fission of ^{232}Th, ^{233}U, ^{235}U, ^{239}Pu, and other nuclides Absolute yields in reactor neutron fission of ^{232}Th
Completion date:	**The measurement programme has been discontinued. The final publications are given below.**
Publications:	H.N. Erten, A. Grütter, E. Rössler, H.R. von Gunten Mass-Distribution in the Reactor-Neutron Induced Fission of ^{232}Th. Nucl. Sci. Eng. 79, 167 (1981) D.T. Jost and H.R. von Gunten Independent yields of ^{92m}Nb in the thermal neutron-induced fission of ^{233}U, ^{235}U and ^{239}Pu. J. inorg. nucl. Chem. 43, 2629 (1981) H.N. Erten, A. Grütter, E. Rössler and H.R. von Gunten Charge Distribution in the Reactor-Neutron-Induced Fission of ^{232}Th. Phys. Rev. C., 25, 2519 (1982)

CERN, Switzerland

Laboratory: and address: ISOLDE, CERN
CH-1211 Genève 23, Switzerland

Facilities: ISOLDE and Proton Synchrotron. Isotopically pure samples are obtained by on-line isotope separation of products formed in proton induced reactions in uranium carbide, thorium oxide or tantalum metal foil targets.

1. Experiment: Measurement of delayed neutron emission probability and neutron spectra for $^{89-92}$Br

Methods: Measurements by means of ^{3}He-spectrometers for neutron spectra and by a system of ^{3}He proportional counters imbedded in paraffin to obtain the neutron counting rate. Branching ratios are obtained by comparing the neutron rates to the beta rates obtained in a thin plastic scintillator, by means of multi-scaling or beta-neutron coincidences.

Descrepancies to earlier data: A P_n value of 27.8 $\pm$ 3.3 % is obtained for ^{91}Br, in disagreement with a value of 18.2 $\pm$ 1.3 % obtained by Aleklett et al. (Z.Phys. A295 (1980) 331)

Names: R.D. von Dincklage, H.Gabelmann, P.Hoff, B.Jonson, K.-L.Kratz, G.Nyman, H.L.Ravn, W.Ziegert.

2. Experiment: Measurement of the properties of states in ^{132}Sn populated in the beta-decay of ^{132}In

Methods: Delayed neutron spectra by means of ^{3}He-spectrometers. Gamma-ray spectroscopy and lifetime determinations by measuring delayed coincidences between electrons and gamma-rays.

Names: J.Blomqvist, R.D.von Dincklage, G.T.Ewan, P.Hoff, B.Jonson, K.Kawade, A.Kerek, G.Lövhöiden, G.Nyman, S.Mattsson, H.L.Ravn, K.Sistemich

Publication: Excited states in the doubly closed shell nucleus $^{132}_{50}Sn_{82}$.
Z.Phys. A306 (1982) 95

CERN, Switzerland

(cont'd)

3. Experiment: Investigation of the decay of ^{133}In and the properties of states in ^{133}Sn

Methods: Delayed neutron detection, gamma-ray spectroscopy

Result: Discovery of ^{133}In, $T_{\frac{1}{2}} = 180 \pm 20$ ms

Names: J.Blomqvist, R.D.von Dincklage, G.T.Ewan, P.Hoff, B.Jonson, A.Kerek, G.Lövhöiden, G.Nyman, H.L.Ravn

UNITED KINGDOM

(same as INDC(NDS)-130)

Laboratory and Address:	AERE Harwell	UKAEA AERE, Harwell, Oxfordshire OX11 ORA U.K.
Names:	J.G. Cuninghame, H.H. Willis	
Facilities:	ZEBRA - BIZET	
Experiment:	To measure the effect of change of reactor neutron spectrum on fission yields.	
Method:	Four irradiations, each of two ^{235}U, two ^{238}U and two ^{239}Pu metal beads of approx. 100mg. weight have been made; two were in the inner breeder island and two in the outer core. One of the samples of each of the fissile materials was counted directly on a calibrated Ge(Li) detector, while the other was dissolved and used to prepare purified samples of certain fission products of very low yield, viz. As, Ag, Cd, Sn, Sb and Rare Earths. Final results have now been obtained which give complete fission yield curves for fission of ^{235}U in both the inner and outer core positions of a "conventional" fast reactor core arrangement. They show that there is no significant change in fission yields between the two core positions, even though the neutron spectrum in the outer position is much softer than that in the inner. Final calculations of the other 10 fission yield curves are now in progress.	
Accuracy:	Expected $\pm$ 10%	
Completion date:	Expected 1983	

UNITED KINGDOM

Laboratory and Address:	AERE Harwell	UKAEA AERE, Harwell, Oxfordshire OX11 ORA U.K.
Names:	J. G. Cuninghame, H. E. Sims	
Facilities:	Variable Energy Cyclotron Helium jet recoil transport system.	
Experiment:	Decay scheme studies on short-lived fission products.	
Method:	Generate fission products by cyclotron irradiation, cluster with potassium chloride, and transport by helium jet to detection system for decay scheme study and analysis.	

UNITED KINGDOM

Laboratory and Address:	AERE Harwell	UKAEA AERE, Harwell, Oxfordshire, OX11 ORA

Names: I.C. McKean and **H.E. Sims**

Experiment: ^{3}H yield in thermal and fast fission spectra for U and Pu isotopes

Facilities: GLEEP and 'ZEBRA' Reactors

Method: The tritium produced in fission is converted to tritiated water, separated from other fission products and measured by liquid scintillation counting. A preliminary experiment has been completed in which solutions of ^{235}U were irradiated in a thermal flux. Samples have been irradiated in GLEEP (^{235}U + ^{239}Pu in solution) and in ZEBRA (^{235}U + ^{239}Pu metal) and await analysis. Samples of ^{240}Pu and ^{241}Pu have been obtained for further experiments.

Accuracy: $\pm$ 10%

Completion date: experiment interrupted, continuation pending.

UNITED KINGDOM

Laboratory and Address:	DNPDE	Dounreay Nuclear Power Development Establishment UKAEA, Northern Division Thurso, Caithness, Scotland KW14 7TZ

Names: T W Kyffin, C G Allan

Facilities: PFR

Experiment: The measurement of the absolute yields of ^{90}Sr, ^{137}Cs, ^{144}Ce, $^{143, 145, 146, 148, 150}Nd$ and perhaps other fission products, from the fission of ^{235}U, ^{238}U, ^{239}Pu, ^{240}Pu and ^{241}Pu.

In progress

Method: Twelve sealed stainless steel capsules are to be irradiated. Of these,

3 capsules contain ^{235}U and highly enriched uranium dioxide,
3 capsules contain ^{239}Pu as low ^{240}Pu content plutonium dioxide,
2 capsules contain ^{238}U as depleted uranium dioxide with an isotopic analysis of 99.7% ^{238}U,
1 capsule contains ^{240}Pu as a dried aqueous solution of plutonium with an isotopic analysis of 99% ^{240}Pu,
1 capsule contains ^{241}Pu as a dried aqueous solution of plutonium with an isotopic analysis of 93% ^{241}Pu, and
2 capsules contain no added fissile material.

The ^{235}U and ^{239}Pu capsules contain stainless-steel powder mixed with the fissile material dioxide for heat transfer reasons.

It is expected that the ^{235}U and ^{239}Pu capsules will receive irradiation corresponding to about 35% burn-up of the fissile material, the ^{238}U capsule to about 1.5% burn-up, the ^{240}Pu capsule to about 10% burn-up and the ^{241}Pu capsule to about 50% burn-up.

A set of capsules identical to the irradiated set except for irradiation in the reactor will be dissolved and analysed alongside the irradiated set, the objective being to improve the reliability of the analyses.

The aim is to correlate loss of fissile material during irradiation with the amounts of fission products formed, for each capsule, (except ^{238}U) to enable absolute measurements of fission yields to be obtained.

Accuracy:
$\pm$ 2% for ^{235}U and ^{239}Pu fission yields
$\pm$ 6% for ^{238}U, ^{240}Pu and ^{241}Pu fission yields

Expected completion date: 1986

UNITED KINGDOM

Laboratory and address:	National Physical Laboratory Queens Road Teddington Middlesex TW11 OLW, UK
Names:	P Christmas, P Cross
Facilities:	Iron-free, $\pi\sqrt{2}$ magnetic β-ray spectrometer.
Experiment:	Measurement of β-spectra of ^{90}Sr–^{90}Y to determine shape factors and endpoint energies. Similar measurements are being made by three other European Laboratories using sources prepared from NPL solution. This intercomparison has been organized by NPL on behalf of the International Committee for Radionuclide Metrology (ICRM).
Accuracy:	Endpoint energies will be determined with an expected uncertainty of ± 1 keV.
Completion date:	Measurements have been made. Target for completion of intercomparison is end 1983.

UNITED KINGDOM

Laboratory and address:	1) National Physical Laboratory	Queens Road Teddington Middlesex TW11 OLW, UK
	2) Fachinformationszentrum Energie, Physik, Mathematik	Karlsruhe D-7514 Eggenstein Leopoldshafen, FRG
Names:	H. Behrens [2], P. Christmas [1]	
Experiment:	Reanalysis of Cs-137 beta decay data	
Result:	Improved fits to previously measured beta spectra of Cs-137 (ref. 1) were obtained using a more realistic shape factor for the second-forbidden decay, with single-particle estimates of nuclear matrix element ratios. Revised decay scheme data were deduced, including the new value (85.21 ± 0.07) per cent for the gamma-ray intensity per disintegration. This work has been published (ref. 2).	
Publications:	1: Metrologia 14(1978) 157. 2: Nucl. Phys. A399(1983) 131.	

UNITED KINGDOM

Laboratory and address:	Birmingham Radiation Centre University of Birmingham P.O. Box 363 Birmingham B15 2TT United Kingdom
Names:	J.G. Owen, J. Walker, D.R. Weaver
Facilities:	3MV Dynamitron accelerator (Birmingham) and the Tandem Van de Graaff and IBIS (Harwell)
Experiments:	Delayed neutron spectrum measurements following monoenergetic fast neutron induced fission in ^{235}U and ^{239}Pu Spectrum measurements of Am/Li sources as recommended by the March 1979 Vienna Consultant's Meeting on Delayed Neutron Properties have been completed. An international round-robin of measurements of one of these Am/Li sources (a 5 Ci one belonging to NPL England) is in progress. Requests to join this round-robin should be sent to D.R. Weaver.
Method:	^{3}He spectrometers; for delayed neutron measurements cyclic irradiation and counting to give near-equilibrium contributions from all delayed neutron groups.
Accuracy:	A full covariance matrix is calculated.
Publication:	A paper on the measurement of the NPL's 5 Ci Am/Li source has been published.

Laboratory and Address:	Argonne National Laboratory 9700 South Cass Avenue Argonne, Illinois 60439
Names:	L. E. Glendenin, J. E. Gindler, J. W. Meadows
Facilities:	Fast-neutron generator facility (FNGF)
Experiment:	Determination of fission yields for monoenergetic neutron-induced fission as a function of incident neutron energy over the range 0.1 to 8 MeV.
Method:	Yields determined (1) radiochemically with either β- or γ-counting (RC) and (2) by γ-counting irradiated foils of fissionable material (γ). Neutrons produced by Li-p or D-d reaction. Flux monitored with fission chamber utilizing as the fission source the same material as that being irradiated. Absolute yields determined from flux measurements and/or 200% normalization of mass-yield distribution.
Accuracy:	Yields > 1% determined by γ-counting: 3-5% Yields < 1% determined by γ-counting: 5-20% Yields determined radiochemically with β-counting: 10-20%
Completion date:	Measurements completed and published or in press for $^{238}U(n,f)$, $^{232}Th(n,f)$, $^{235}U(n,f)$ and $^{239}Pu(n,f)$.
Publications:	"Mass distributions in monoenergetic-neutron-induced fission of ^{238}U", S. Nagy, K. F. Flynn, J. E. Gindler, J. W. Meadows, and L. E. Glendenin, Phys. Rev. C17, 163 (1978). "Mass distributions in monoenergetic-neutron-induced fission of ^{232}Th", L. E. Glendenin, J. E. Gindler, I. Ahmad, D. J. Henderson and J. W. Meadows, Phys. Rev. C22, 152 (1980). "Mass distributions for monoenergetic-neutron-induced fission of ^{235}U", L. E. Glendenin, J. E. Gindler, D. J. Henderson and J.W. Meadows, Phys. Rev. C24, 2600 (1981). "Mass distributions in monoenergetic-neutron-induced fission of ^{239}Pu", J. E. Gindler, L. E. Glendenin, D. J. Henderson, and J. W. Meadows, Phys. Rev. C27, 2058 (1983)

U. S. A.

(completely revised)

Laboratory and address:

Argonne National Laboratory
9700 South Cass Avenue
Argonne, Illinois 60439 U.S.A.

Research:

Fast neutron elastic scattering and total cross section studies for the Z=39 to 52 region and development of a regional optical model.

Authors:

A. B. Smith, P. T. Guenther, J. F. Whalen and C. Budtz-Jørgensen.

Facilities:

Argonne FNG (Fast-Neutron Generator), 10-angle Time-of-Flight Facility.

Status:

Total cross section measurements for Y, Nb, Rh, Pd, In, Sn and Sb from 0.8 - 4.5 MeV and elastic scattering cross section measurements for Y, Zr, Nb, Mo, Rh, Pd, Ag, Cd, In, Sn and Sb from 1.5 - 4.0 MeV have been completed. A series of reports on results for specific elements have been either issued (see below) or are in the final stages of completion. A regional optical model has been developed. Furthermore, a journal article summarizing all this work is in preparation.

Publications:

1. A. Smith, P. Guenther and J. Whalen, ANL/NDM-70 (1982).
2. A. Smith, P. Guenther and J. Whalen, ANL/NDM-76 (1982).
3. A. Smith, P. Guenther and J. Whalen, ANL/NDM-68 (1982).
4. A. Smith, P. Guenther and J. Whalen, ANL/NDM-71 (1982).
5. A. Smith and P. Guenther ANL/NDM-66 (1982).
6. A. Smith and P. Guenther ANL/NDM-72 (1982).
7. A. Smith, P. Guenther and J. Whalen, ANL/NDM-78 (1982).
8. C. Budtz-Jørgensen, P. Guenther and A. Smith, ANL/NDM-73 (1982).
9. A. Smith, P. Guenther and J. Whalen, ANL/NDM-75 (1982).

U. S. A.

(completely revised)

Laboratory and address:

Argonne National Laboratory
9700 South Cass Avenue
Argonne, Illinois 60439 U.S.A.

Research:

Neutron total cross section data have been measured for 11 fission-product elements (Y, Zr, Nb, Mo, Rh, Pd, Ag, Cd, In, Sn and Sb) in the energy range 47 keV to 20 MeV using both white and monoenergetic spectrum techniques.

Authors:

W. P. Poenitz and J. Whalen

Facilities:

Argonne FNG (Fast-Neutron Generator). Automated sample changer.

Status:

Measurements have been completed and a summary report is in the final stages of preparation.

U. S. A.

(completely revised)

Laboratory and address:

Argonne National Laboratory
9700 South Cass Avenue
Argonne, Illinois 60439 U.S.A.

Research:

Measurement of capture activation cross sections for $^{94,96}Zr$ and $^{98,100}Mo$ at Thermal and 30-keV energies and fast-neutron capture measurements and model calculations for $^{110}Cd(n,\gamma)^{111m}cD$ have been performed.

Authors:

W. P. Poenitz, D. Smith, J. Meadows, P. Moldauer and J. Wyrick

Facilities:

Argonne FNG (Fast-Neutron Generator)

Status:

Results from this work were reported at the NEANDC/NEACRP Specialist's Meeting on Fast-Neutron Capture Cross Sections which was hosted by Argonne National Laboratory.

Publications:

1. J. Wyrick and W. Poenitz, NEANDC(US)-214/L p. 196 (1983).

2. D. Smith, J. Meadows, P. Moldauer and W. Poenitz, NEANDC (US)-214/L, p. 186 (1983).

U. S. A.

(new)

Laboratory and address:

Argonne National Laboratory
9700 S. Cass Avenue
Argonne, Illinois 60439 USA

Research:

Fast-neutron capture cross sections have been measured, using a prompt detection technique, for Y, Zr, Mo, Ag, Cd, In, Sb, La, Eu, Gd, Tb, Dy, Er, Yb, Hf, W, Re and Pt in the 0.5-4.0 MeV neutron energy range. Included among these are several fission-product nuclei. Furthermore, the data on other nuclei are of interest for the development of nuclear models for the capture process in the fission-product mass region.

Authors:

W. P. Poenitz

Facilities:

Argonne FNG (Fast-Neutron Generator), Large-liquid-scintillator tank.

Status:

Work has been completed and reported at the NEANDC/NEACRP Specialist's Meeting on Fast-Neutron Capture Cross Sections (see below).

Publications:

1. W. P. Poenitz, NEANDC(US)-214/L, p. 239 (1983).

U.S.A.

Laboratory and Address:	Brookhaven National Laboratory Upton, New York, 11973
Names:	R. E. Chrien, R. L. Gill, Z. Berant, A. Piotrowski, R. Petry, D. D. Clark, Y. Y. Chu, R. F. Casten and D. D. Warner
Facilities:	On-Line Mass Separator "TRISTAN" Surface Ionization Source for Production of Alkaline Metals High-Temperature Thermal Ionization Source High-Temperature Plasma Source Febiad Source PDP-11-based Data Acquisition System
Experiments:	β and γ spectroscopy of fission product nuclei Nuclear masses far from stability Delayed neutron production and spectra Time-of-flight, recoil and He 3 spectrometer Angular correlations and perturbed angular correlations
Accuracy:	State-of-art precision for spectroscopic experiments ±10% in delayed neutron probabilities ±2% in half lives, typical Q_β ± (10 to 100 keV)
Comments:	TRISTAN is a multi-user facility with participants from the following institutions, in addition to the local group: Clark University Cornell University Idaho National Engineering Laboratory Iowa State University Los Alamos National Laboratory Lawrence Livermore National Laboratory Louisiana State University McGill University Pacific Northwest Laboratory Texas A&M Lafayette College University of Maryland University of Oklahoma For detailed publication list and participant list, please refer to individual contributions. A summary of the program is available in the DOE-NDC Progress Reports, available from the National Nuclear Data Center.

U.S.A.
(cont'd)

- Recoil spectrometer measurements of beta-delayed neutron spectra ($^{93-95}$Rb) (INEL/BNL)

- Delayed neutron spectra by time-of-flight (^{95}Rb) (Cornell/BNL)

- Precise Q-values for neutron-rich Rb and Cs isotopes and ^{146}La, ^{148}La (Clark/Lafayette/Ames/Oklahoma) [1]

- Angular correlation studies of the transitional nuclides $^{142-146}$Ce and the low lying 0^+ excited states

- Band structure in ^{148}Ce (Maryland/Clark/BNL/Ames) [2]

- Levels of ^{146}Ce from the decay of ^{146}La (Ames/Maryland/Oklahoma/BNL)

- The decay of mass-separated ^{144,146,148}Ba to levels in ^{144,146,148}La (Maryland/BNL/Clark)

- Low-lying levels in the N=85 isotone ^{141}Ba (Ames/Maryland/BNL) [3]

- ^{99}Rb and ^{99}Sr decay (Oklahoma/Maryland/BNL)

- Studies of the decay of ^{145,147}Cs and ^{145,147}Ba and a reinvestigation of the decay of ^{147}La (Oklahoma/BNL)

- Neutron emission probabilities - Cu, Ga, Br, Kr and Rb precursors (A=75-104); Ag, In, I, Xe, Cs (A=121-149) (PNW/BNL) (see also PNW)

- β-spectra and β-strength functions with a E-ΔE coincidence telescope (McGill)

- Perturbed angular correlation studies - g-factor measurements; ^{144,146}Ba, ^{98}Sr, ^{97}Zr, ^{124}Sn (BNL/Ames/Maryland)

- Decay of low spin ^{148,150,152}Pr (Ames/Maryland/BNL)

- Levels in ^{122}Ag from ^{122}Cd (BNL/Clark/Ames)

- ^{124}Ag level scheme (BNL/Clark/Ames)

- ^{142,144}Ce angular correlation studies (Maryland/BNL/Clark/Ames/Oklahoma)

[1] D.S. Brenner et al., "Q values for neutron-rich rubidium and lanthanum isotopes", Phys. Rev. C 26 (Nov. 1982) 2166 (incl. ^{88,94,96,98}Rb)

[2] R.L. Gill et al., "Levels in ^{148}Ce from the decay of mass separated ^{148}La" Phys. Rev. C27 (April 1983) 1732.

[3] H. Yamamoto et al. "Decay of mass-separated ^{141}Cs to ^{141}Ba and systematics of N=85 isotones" Phys. Rev. C 26 (Sept. 1982) 1215.

U.S.A.

Laboratory and address: Idaho National Engineering Laboratory
EG&G Idaho, Inc.
P.O. Box 1625
Idaho Falls, Idaho 83415 USA

1. Names: R.C. Greenwood, R.J. Gehrke, J.D. Baker, V. J. Novick

Experiment: Nuclear decay properties ($T_{1/2}$, γ-branching, β-branching) of short-lived fission products.

Facility: Two 600-μg ^{252}Cf fission-product sources coupled via He-gas jet transport to a chemical separation laboratory and an on-line mass separator.

Method: Fast on-line chemical or mass separations followed by γ- and β-ray measurements.

Measurements Completed: New isotopes ^{165}Tb and ^{168}Dy have been discovered and decay properties measured. ^{152}, ^{153}, ^{154}Pm measurements in progress.

Publications: R.J. Gehrke, R.C. Greenwood, J.D. Baker and D.H. Meikrantz, "Identification of a New Isotope, ^{168}Dy" Z. Phys. A 306, 363 (1982).

J. D. Baker, R. J. Gehrke, R. C. Greenwood and D. H. Meikrantz, "Advanced System for Rapid Separation of Rare Earth Fission Products," Journal of Radioanalytical Chemistry 74 (1982) 117.*

R.C. Greenwood, R.J. Gehrke, J.D. Baker, D. H. Meikrantz, and C.W. Reich, "Identification of a New Isotope, ^{165}Tb" Phys. Rev. C 23, 1266 (1983).

R.J. Gehrke, R.C. Greenwood. J.D. Baker and D.H. Meikrantz, "A New Iosotpe ^{163}Gd; Comments on the Decay of ^{162}Gd," Radiochimica Acta 31 1 (1982).

R.C. Greenwood, R.J. Gehrke, J.D. Baker and D.H. Meikrantz, "Identification of a New Isotope, ^{155}Pm, Produced in Spontaneous Fission of ^{252}Cf," Radiochimica Acta 30 57 (1982).

*Half-lives given for ^{155}Pm, ^{163}Gd and ^{160}Eu.

U.S.A.

(cont'd)

2. Names: R.J. Gehrke, R.G. Helmer

Facilities:
1) 4π β-γ coincidence counting system
2) Calibrated Ge(Li) spectrometers

Experiment: Determination of absolute γ-ray emission probabilities for important fission-product isotopes.

Method: The decay rates are determined by the 4π β-γ coincidence counting system, which has two separate pulse-processing systems. One system is based on fixed pulse widths and an overlap coincidence circuit. The γ-ray emission rates are determined by Ge(Li) spectrometers whose efficiencies have been measured to an accuracy of $\pm$1-1/2% (1σ) between 0.3 and 2 MeV.

Accuracy: $\pm$1% to $\pm$5% (1σ uncertainty).

Measurement Completed: Emission probabilities of the 316keV γ ray emitted in the decay of ^{146}Ce measured to an accuracy of ~3% (1σ level).

Publications:

R.J. Gehrke, "Emission Probability of the 316-keV γ-Ray Emitted in the Decay of ^{146}Ce," submitted for publication in Int. J. Appl. Radiat. and Isotopes (in press).

R.J. Gehrke, "Gamma-Ray Emission Probability for the Decay of ^{143}Ce," Int. J. Appl. Radiat. and Isotopes 33 355 (1982).

R.J. Gehrke and L.O. Johnson, "A 4π β-γ Coindicence System with Minimally Broadened Pulses for High Count Rates," Nucl. Istr, and Methods 204 191 (1982).

U.S.A.

(cont'd)

(same as INDC(NDS)-130)

3.	Names:	R.G. Helmer
	Experiment:	Precise γ-ray energy measurements for energy calibration standards.
	Facility:	γ-ray spectrometers using Ge detectors.
	Method:	Comparison of γ-ray energies by measurement of spectra including lines of known and unknown energies.
	Publications:	R.G. Helmer, A.J. Caffrey, R.J. Gehrke and R.C. Greenwood, " γ-Ray Energies from the Decay of ^{99}Mo, ^{133}Ba and ^{210}Pb," Nucl. Instr. and Methods 188, 671 (1981).

U.S.A

Laboratory and address: Idaho National Engineering Laboratory
EG&G Idaho, Inc.
P. O. Box 1625
Idaho Falls, Idaho 83415 USA

Names: R. A. Anderl, Y. D. Harker

Experiment: Integral cross-section measurements in fast-reactor-type environments.

Completion date: **This measurement programme has been terminated. The last publications are given again below.**

Publications:

Y. D. Harker, R. A. Anderl, "Integral Cross-Section Measurements on Fission-Products in Fast Neutron Fields," in the Proceedings of Specialists' Meeting on Neutron Cross Sections of Fission-Product Nuclei, Bologna, Italy, December 12-14, 1979, NEANDC(E)209"L" (June 1980).

J. M. Ryskamp, R. A. Anderl et al., "Sensitivity and Uncertainty Analysis of the CFRMF Central Flux Spectrum," Nucl. Tech. 57, 20 (1982).

R. A. Anderl, "Integral Data-Testing Report for ENDF/B-V Fission-Product and Actinide Cross Sections," U. S. DOE Report EGG-PHYS-5406, April, 1981.

R. A. Anderl, F. Schmittroth, Y. D. Harker, "Integral-Capture Measurements and Cross-Section Adjustments for Nd, Sm and Eu," U. S. DOE Report EGG-PHYS-5182, INEL, July, 1981. *)

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*) $^{143-146,148,150}Nd$, $^{147,149}Sm$, $^{151-154}Eu$

U. S. A.

Laboratory: Idaho National Engineering Laboratory

Address: Exxon Nuclear Idaho Company, Inc.
P.O. Box 2800
Idaho Falls, Idaho 83401
United States of America

Name: T.C. Chapman, R.L. Tromp

Experiment: Fast Reactor Fission Yield Measurement in FFTF

For many years, personnel at the Idaho Chemical Processing Plant (now operated by Exxon Nuclear Idaho Company, Inc.) at the Idaho National Engineering Laboratory, have been involved in the accurate measurement of absolute fission yields for use on the determination of burnup in fast reactor fuels. As a continuing effort of this program, an irradiation of heavy element nuclides (^{233}U, ^{235}U, ^{239}Pu, and ^{241}Pu) was conducted in the eight-day full-power run associated with the FFTF Reactor Characterization Experiment at Hanford, Washington.

The primary purpose is to generate a group of heavy element reference standards for which the number of fissions and burnup are well known. By combining this experiment with others of a similar nature, these samples will serve as reference and comparison standards. A secondary purpose is to verify the fast reactor fission yields measured in EBR-II and to assess the validity of using EBR-II values for irradiations conducted in FFTF.

For this experiment, ten samples each of highly-enriched ^{233}U, ^{235}U, ^{239}Pu, and ^{241}Pu (as oxides), sealed in high-purity nickel capsules were irradiated. Capsules were placed axially in one of the removable pins in Rows 1, 4, 5, and 6. Each pin was located immediately adjacent to an ILLR dosimetry package pin. The amount of material in each sample capsule was adjusted such that each individual sample will give about 10^{19} fissions.

Schedule: The irradiation was completed in November 1981. Analysis is planned to begin in Idaho when funding is available.

Method: The samples in Rows 1 and 6 will be dissolved and analyzed for the following fission product elements using isotope dilution mass spectrometry: Kr, Rb, Sr, Zr, Mo, Ru, Xe, Cs, Ba, La, Ce, Nd, and Sm. The absolute number of fissions will be established by summing the number of fission product atoms in the heavy mass peak. The samples in Rows 4 and 5 will only be partially analyzed principally for Nd, Cs, Kr, and Xe to establish relative fission yield values for the intermediate reactor positions.

Special Comment: Funding for this experiment was discontinued in 1982. Work will be resumed when funding is made available.

U. S. A.

LABORATORY	Lawrence Livermore Laboratory University of California P.O. Box 808 Livermore, CA 94550, U.S.A.	+ McClellan Central Laboratory 1155th Technical Operations Squadron McClellan AFB, CA 95652
NAMES	D. R. Nethaway A. L. Prindle D. H. Sisson	+ M. V. Kantelo[1] + R. A. Sigg[1]
FACILITY	FLATTOP Critical Assembly (Pu), Los Alamos Scientific Laboratory	
1. EXPERIMENT	Measure fission yields for fission of Am-241 induced by fission-spectrum neutrons.	
METHOD	Measurements were made by doing chemical separations on the irradiated Am-241 samples and by using the recoil catcher-foil technique. Absolute yields are based on a normalization of the mass-yield curve, and on the use of the $^{235}U(n,f)$ and $^{238}U(n,f)$ monitor reactions. The accuracy of the measurements is about ± 5%.	
COMPLETION DATE	The experiment is finished.	
PUBLICATION	R. A. Sigg et al., Phys. Rev. C 27 (1983) 245. (Preprint: UCRL-85195 (Dec. 1980))	

[1] Present address: E. I. duPont de Nemours and Co., Savannah River Laboratory, Aiken, SC 29808.

U.S.A.

(cont'd)

LABORATORY Lawrence Livermore National Laboratory
University of California
P. O. Box 808
Livermore, CA 94550, U.S.A.

NAMES D. R. Nethaway
F. F. Momyer
C. F. Smith
N. A. Bonner

FACILITY Livermore RTNS-2 Accelerator (D-T Neutrons)

2. **EXPERIMENT** Measure fission yields of rare gases, especially 10.7-y ^{85}Kr, for fission of ^{235}U, ^{238}U, and ^{239}Pu induced by 14-15 MeV neutrons. Several rare-earth yields will also be measured, such as ^{156}Eu and ^{161}Tb.

METHOD Measurements will be made by separating and counting the gaseous products from the dissolved target. Other products will be measured by direct Ge(Li) counting of an aliquot of the solution, and by chemically separating and counting various rare-earth products. Fission yields will be measured relative to known yields of products such as ^{95}Zr, ^{99}Mo, and ^{147}Nd. We plan to have about 10^{14} fissions in each target of 1 g of uranium or plutonium. The relative fission yields will be measured with an accuracy of about 2-5%.

COMPLETION DATE We have finished several irradiations so far: ^{235}U at 14.3 and 14.7 MeV, ^{238}U at 14.4 MeV, and ^{239}Pu at 14.8 MeV. We plan to have two more irradiations this year, ^{238}U at 14.8 MeV and ^{239}Pu at 14.4 MeV, and then prepare a report on the results.

U.S.A.

Measurements

Laboratory	Oak Ridge National Laboratory, P. O. Box X, Oak Ridge, Tennessee USA 37830
Name:	R. L. Macklin
Facility:	Oak Ridge Electron Linear Accelerator (ORELA)
Experiment:	Neutron Capture Cross Sections 2.6-2000 keV*
Method:	Neutron Time-of-Flight; prompt gamma cascade energy by liquid scintillator pulse height weighting
Accuracy:	Estimated 5% or less
Completion Date:	Experiment 1983; Analysis and Report 1984-5

Publications:

R.L. Macklin, "Cesium-133 Neutron Capture Cross Section", Nucl. Sci. Eng. 81, 418 (1982)

R.L. Macklin, "Technetium-99 Neutron Capture Cross Section", Nucl. Sci. Eng. 81, 520 (1982)

R.L. Macklin, "Neutron Capture Cross Sections of the Silver Isotopes ^{107}Ag and ^{109}Ag from 2.6 to 2000 keV", Nucl. Sci. Eng. 82, 400 (1982)

R.L. Macklin, "Fission Product ^{129}I and Natural ^{127}I Neutron Capture Cross Sections and Resonances", Nucl. Sci. Eng. (to be submitted) 1983

S. Raman, B. Fogelberg, J.A. Harvey, R.L. Macklin, P.H. Stelson, A. Schröder, and K.-L. Kratz, "Overlapping β Decay and Resonance Neutron Spectroscopy of Levels in ^{87}Kr", Phys. Rev. C (in press) 1983

A recent review paper including fission product nuclei and many capture results from this experimental apparatus is: F. Käppeler, H. Beer, K. Wisshak, D.D. Clayton, R.L. Macklin, and R.A. Ward, "s-process Studies in the Light of New Experimental Cross Sections: Distribution of Neutron Fluences and r-process Residuals", Astrophysical Journal 257, 821 (1982)

* ^{86}Kr, $^{127,129}I$, ^{136}Xe, $^{151,153}Eu$.

U.S.A.

Laboratory and Address: Oak Ridge National Laboratory
P. O. Box X, Building 6010
Oak Ridge, Tennessee 37830, USA

1. Names: J. K. Dickens and J. W. McConnell

Facilities: Fast Rabbit Transport Station at the ORR.

Experiment: Absolute yields of 37 fission products having half-lives between 7 min and 65 days, representing 25 mass chains created by thermal-neutron fission of ^{229}Th have been determined.

Method: A 15 μgram sample of ^{229}Th was irradiated three times, once for 150 sec, a second time for 1200 sec, and a third time for 120 sec, with thermal neutrons. Counting intervals were between 10 min and 0.4 yr following the end of the irradiation. Gamma-ray measurements following the first two irradiations were performed using a 90 cc Ge(Li) detector; measurements following the third irradiation were performed using a high-resolution intrinsic-Ge detector.

Accuracy: Relative 1σ uncertainties range between 2 and 15%; absolute uncertainties are dominated by an 8% uncertainty in absolute normalization, which is based on good agreement of the total mass yield for A between 76 and 152 with the expected 200% total yield.

Discrepancies: Deduced fission yields are in reasonably good agreement with previous measurements. Deduced mass yields agree with evaluation for $A \leqslant 100$ and $138 \leqslant A \leqslant 141$, and disagree for $129 \leqslant A \leqslant 137$ and $A \geqslant 141$.

Completion date: April 1982.

Publication: J. K. Dickens and J. W. McConnell, "Yields of Fission Products Produced by Thermal-Neutron Fission of ^{229}Th," Phys. Rev. 27, 253 (1983).

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2. Names: D. G. Breederland, J. K. Dickens, and J. W. McConnell

Facilities: Fast Rabbit Transport Station of the High Flux Isotope Reactor (HFIR)

Experiment: Absolute yields of 23 fission products having half-lives between 6 hr and 65 days, representing 16 mass chains created by thermal-neutron fission of a sample enriched in the isotope ^{243}Cm have been determined.

U.S.A. (cont'd)

Method:	A 0.077 μgram sample of ^{243}Cm (in the form of curium nitrate) was irradiated for 150 sec by thermal neutrons. Unseparated fission-product γ-ray spectra were obtained between 22 hrs and 79 days after the end of the irradiation.
Accuracy:	Relative 1σ uncertainties are between 1 and 25%. Absolute uncertainties have not yet been determined.
Completion date:	First part, December 1981. Completion of the total data reduction is anticipated by December 1983.
Discrepancies:	There are no prior measurements for $^{243}Cm(n,f)$ fission-product yields.
Publication:	David G. Breederland, "Fission Product Yields for Thermal-Neutron Fission of Curium-243," ORNL/TM-8168 (1982).

U. S. A.

(same as INDC(NDS)-130)

Laboratory and Address:

Pacific Northwest Laboratory
P. O. Box 999
Richland, WA 99352
USA

Names: P. L. Reeder and R. A. Warner

Facilities:

SOLAR - Spectrometer for On-Line Analysis of Radionuclides. This is an on-line mass spectrometer which incorporates a ^{235}U target in a surface ionization source located in the thermal column of a 1 MW TRIGA reactor at Washington State University, Pullman, WA.

Experiment:

Isomer yield ratios for $^{235}U + n_{th}$.

Method:

Ratios of independent yields of fission product isomers are being measured for thermal neutron fission of ^{235}U by use of an on-line mass spectrometric technique. A short burst of neutrons from the TRIGA reactor is used to produce various isomers of Br, Rb, In, I and Cs fission products within the surface ionization source. Selective ionization performs the rapid chemical separations and magnetic analysis performs the mass separation to give the desired nuclides as a beam of ions. Ions are collected on a moving tape collector system for a short time interval during and after the neutron pulse. The radioactive decay of the two isomers is followed by beta and gamma counting to determine the relative yield of each isomer.

Accuracy:

The final accuracy will probably depend more on how well the decay schemes are known for particular cases than on statistical uncertainties.

Completion Date:

Work is continuing.

U. S. A.

Laboratory and Address:

Pacific Northwest Laboratory
P. O. Box 999
Richland, WA 99352

Names: P. L. Reeder and R. A. Warner

Facilities:

TRISTAN - This is an on-line isotope separator located at the High Flux Beam Reactor at Brookhaven National Laboratory, Upton, NY

Experiment:

Half-lives, P_n values, average energies, and neutron gated gamma spectra are being measured for separated delayed-neutron precursors.

Method:

Delayed neutrons from separated precursors are counted in a polyethylene moderated counter containing 3 rings of counter tubes. Beta and neutron growth and decay curves are measured to determine half-lives and P_n values. Data have been obtained for Sr and Y precursors at masses 97-99, Ba and La precursors at masses 146-148, Ag precursors at masses 121-124, and In precursors at masses 127-130. Work is continuing on precursors at other elements. Gamma spectra in coincidence with delayed neutrons are being measured to provide partial neutron emission probabilities to excited states of the (A-1) daughter. The P_ni are being compared to predictions of a beta-decay model.

Accuracy:

The accuracy of the P_n measurements depends primarily on the accuracies of the neutron and beta counter efficiencies. The overall accuracy is expected to be about ±7%.

Discrepancies:

P_n values for Sr, Y, Ba, and La precursors at masses 97-99 and 146-148 are found to be very small (<1%).

Completion Date: Work is continuing.

Publications:

1. P. L. Reeder, R. A. Warner, and R. L. Gill, "Half-lives and Emission Probabilities of Delayed Neutron Precursors $^{121-124}Ag$", Phys. Rev. C (to be published).

2. P. L. Reeder and R. A. Warner, "Delayed Neutron Precursors at Masses 97-99 and 146-148", PNL-SA-11065, November 1982.

U. S. A.

Laboratory and address: University of Illinois
Nuclear Radiation Laboratory
214 Nuclear Engineering Lab.
103 South Goodwin Ave.
Urbana, Illinois 61801
U.S.A.

Names: Bernard W. Wehring

Facilities: Illinois Advanced TRIGA 1.5-MW Nuclear Reactor, HIAWATHA Fission-Fragment Mass Spectrometer.

Experiment: Direct Physical Measurement of the Primary Postneutron-Emission Nuclide Yields in Thermal-neutron Fission of U-235, Pu-239, U-233, and Th-229.

Method: The fission-fragment recoil mass spectrometer HIAWATHA, consisting of a cylindrical focusing electrostatic analyzer and time-of-flight system, is used to determine fragment masses while fragment energy loss is used to identify fragment atomic numbers in multiparameter experiment. All fragment velocities and charge states are measured.

Accuracy: <0.5-amu mass resolution, achieved,
about 1-Z atomic-number resolution, achieved,
1% standard error (relative error) in largest mass yield, achieved,
0.02-0.1% standard error (absolute error) in nuclide yields, achieved.

Completion date: Work is continuing

Publications:

Gino DiIorio and B. W. Wehring, "HIAWATHA, A Fission-Fragment Recoil Mass Spectrometer," Nucl. Instr. Methods 147, 487 (1977).

R.B. Strittmatter, "Nuclide Yields for Thermal Fission of Uranium 235," Ph.D. Thesis, University of Illinois at Urbana-Champaign, 1978.

R.B. Strittmatter and B.W. Wehring, "Direct Measurement of Nuclide Yields in Thermal-Neutron Fission Using HIAWATHA," Proceedings of the International Conference on Neutron Physics and Nuclear Data for Reactor and other Applied Purposes, Harwell, September 25-29, 1978.

R.B. Strittmatter and B.W. Wehring, "Fragment Atomic-Number Identification Using a Gas Ionization Chamber in Fission Yield Measurements," Nucl. Instr. Methods 166, 473 (1979).

B.W. Wehring, S. Lee, G. Swift, and R.B. Strittmatter, "Light-Fragment Independent Yields for Thermal-Neutron Fission of U-233," UILU-ENG-80-5312 (May 1980); Trans. Am. Nucl. Soc. 35, 551-552 (1980).

Shengdar Lee, "Yield, Kinetic Energy, Pairing Effect, and Shell Effect of Light Fission Products for Thermal-Neutron Fission of Uranium-233," Ph.D. Thesis, University of Illinois at Urbana-Champaign, 1983.

U. S. A.

Laboratory and address:	University of Lowell, Lowell, Mass. 01854
Names:	G. Couchell, W. Schier
Facilities:	5.5 - MV Van de Graff, 1 MW swimming pool reactor, helium gas jet and tape transport system
Experiment:	Delayed neutron energy spectra as a function of time following fission; initially for ^{235}U and ^{239}Pu.
Method:	Beta-neutron time-of-flight method using helium jet and tape transport system together with Pilot U plastic and ^{6}Li-glass scintillators. Initially accelerator, later reactor neutrons are used.
Completion date:	In progress; **composite spectra were measured with Pilot U plastic scintillators for six delay times (mean times range from 0.55 to 60.0 s) following fast fission of ^{235}U.**

U.S.A.

Laboratory and address: Washington University, Department of Chemistry, St. Louis, MO 63130 U.S.A.

Names: A.C. Wahl, T. Semkow, L. Robinson

Facilities: Cyclotron and 14-MeV neutron generator

Experiment: Determination of independent yields for near symmetric fission of ^{235}U by thermal and 14-MeV neutrons and of ^{238}U by 14-MeV neutrons.

Method: Fractional independent or cumulative yields of tin, indium, cadmium, and silver fission products are being determined to learn about nuclear-charge-distribution systematics for near symmetric modes of fission. Rapid (∿1 sec), continuous solvent-extraction separations of short-lived fission products from their beta-decaying precursors are being carried out using a SISAK-2 system containing H-10 centrifuges. Relatively long-lived descendents in each phase are purified and measured radiochemically for yield determinations.

Completion date: Measurement should be complete by the end of 1983, and publication is planned for 1984.

Publications:

1. T. Semkow and A.C. Wahl, "Extraction of Ag(I), Cd(II), In(III), Sn(II), Sn(IV), Sb(III), and U(VI) from Aqueous Solutions by Ketone Solutions Using Single-Step Batch and Continuous SISAK Mehtods," J. Radioanalyt. Chem. 79(1), (1983), in press.

2. E.N. Vine and A.C. Wahl, "Fractional Independent Yields of ^{104}Tc and ^{105}Tc from Thermal-Neutron-Induced Fission of ^{235}U and ^{239}Pu," J. inorg. nucl. Chem. 43, 877 (1981).

3. M.M. Fowler and A.C. Wahl, "Yields and Genetic Histories of ^{128}Sb, ^{129}Sb, and ^{130}Sb from Thermal-Neutron-Induced Fission of ^{235}U," J. inorg. nucl. Chem. 36, 1201 (1974).

4. B.R. Erdal, A.C. Wahl, and R.L. Ferguson, "Modes of Formation of Tin Fission Products," J. inorg. nucl. Chem. 33, 2763 (1971).

USSR

I.V. Kurchatov Atomic Energy Institute

A.A. Borovoj, Yu.V. Klimov, V.I. Kopejkin

Measurement of electron spectra of fission fragments resulting from thermal-neutron fission of ^{235}U and ^{239}Pu

A "disc" facility was used. Around the rim of the organic glass disc were placed targets consisting of ^{235}U and ^{239}Pu. The disc was rotated at 13 rpm. The neutron source (^{252}Cf) was placed on one side of the axis in a paraffin block, the electron spectrometer on the other side with a protective shield of lead and polyethylene positioned between them. The spectra of the fissioning isotopes and the background (the empty third of the disc) were measured simultaneously.

Ratios between the electron spectra from the fission fragments of ^{235}U and ^{239}Pu were obtained to an accuracy of ~ 5%. The following absolute spectra were established:

	^{235}U		^{239}Pu
E MeV	$N_e(E)$	$N_{\bar{\nu}}(E)$	$N_e(E)$
1.5	1.32 (0)	1.65 (0)	1.14
2	9.11(-1)	1.28 (0)	7.70(-1)
3	4.41(-1)	6.66(-1)	3.42(-1)
4	1.83(-1)	3.15(-1)	1.26(-1)
5	6.72(-2)	1.23(-1)	4.04(-2)
6	2.23(-2)	4.46(-2)	1.22(-2)
7	5.62(-3)	1.27(-2)	2.86(-3)

Note: The values of N are given per MeV interval; the order is given in brackets. E is the kinetic energy of the electron. The following accuracies were obtained: 2-4 MeV - ± 5%
6 MeV - ± 10%
7 MeV - ± 12%

The spectra obtained in the present experiment were harder than those obtained by Schrekenbacl et al., Phys. Lett. 99 B (1981) 251.

Reference: A.A. Borovoj, Yu.V. Klimov, V.I. Kopejkin, Preprint IAEh-3465/2 (1981).
A.A. Borovoj, V.I. Kopejkin, L.A. Mikaeljan, Pis'ma Zh. Eksp. Teor. Fiz. 33 (1981) 426 (Engl.: JETP Lett. 33 (1981) 408).

U.S.S.R.

Laboratory and address: Lensoviet Institute of Technology
Leningrad I980I3, USSR

Names: M.YA.Kondrat'ko, A.V.Mosesov,
K.A.Petrzhak, O.A.Teodorovich

Facilities: Ge(Li) γ-ray spectrometer, 4πβ-counters

Expertments: Measurements of product yields for the fission of Np-237 induced by 28 MeV bremsstrahlung

Method: Targets containing thin layers of Np-237 and Al catchers were irradiated with linac bremsstrahlung. Radioactive nuclides were determined by means of γ-ray spectrometry of unseparated products in catcherfoils and/or radiochemical separation with subsequent γ-ray spectrometry and 4πβ-counting. Absolute cumulative yields were determined by normalization of mass distribution to a total yield of 200%.

Accuracy: The accuracy achieved for absolute cumulative yields is within 3-9%, mean 4.4%(Iσ) for peak products and within 5-I5%, mean 8%(Iσ) for low yield products. The accuracy of fractional independent yields is within 9-25%.

Results:

Fission product	Cumulative yield, %	Fission product	Cumulative yield, %
Kr- 85m	I.I5±.II	Zr- 95	5.26±.I5
Kr- 88	2.20±.24	Zr- 97	5.54±.I6
Sr- 9I	4.02±.2I	Mo- 99	5.90±.23
Sr- 92	4.24±.20	Ru-I03	4.39±.I7
Y - 93	4.59±.2I	Rh-I05	2.66±.I2

(continued)

U.S.S.R.
(cont'd)

Results:
(continued)

Fission product	Cumulative yield, %	Fission product	Cumulative yield, %
Ru-I06	2.56 ±.23	Cs-I36	.538±.02I
Ag-III	.665±.040	La-I40	4.87 ±.I4
Ag-II2	.575±.033	Ce-I4I	4.59 ±.26
Cd-II5	.460±.028	Ce-I43	3.73 ±.I3
Cd-II7m	.I24±.007	Ce-I44	3.3I ±.I9
Cd-II7g	.27I±.02I	Pr-I45	2.87 ±.I7
Sb-I27	I.49 ±.06	Nd-I47	I.864±.059
Sb-I29	I.97 ±.I2	Pm-I49	I.496±.096
I -I3I	4.53 ±.I4	Pm-I5I	.722±.045
I-I32m	.20 ±.I3	Sm-I53	.380±.022
I -I32g	4.66 ±.I2	Sm-I56	.II5±.0I3
I -I33	5.49 ±.20	Eu-I57	.068±.0I0
Xe-I35	6.28 ±.I8		

Fission product	Fractional independent yield
I -I32(m+g)	.I83±.032
Xe-I35	.249±.025
Cs-I36	.085±.008
La-I40	.0I6±.004

Publications: Atomnaja Energija (USSR), 53, I64-I67 (I982).

USSR

Laboratory and address:	Moskovskij Inzhenerno-Fizicheskij Inst. (Moscow Institute of Engineering and Physics - MIFI), Moscow, 115409 USSR
Names:	A.N. Gudkov, V.V. Kazantsev, V.V. Kovalenko, A.B. Koldobskij, V.M. Kolobashkin, A.I. Slyusarenko
Facilities:	IRT research reactor: pneumatic transport system, calibrated coaxial Ge(Li)-detector.
Experiment:	Measurement of cumulative yields of the short-lived ($T_{\frac{1}{2}}$ = 7.1 - 54 s) products resulting from thermal-neutron-induced fission of ^{233}U.
Method:	Semiconductor gamma-spectrometry of the irradiated sample in a cyclical regime without prior chemical separation.
Sources of information:	A.N. Gudkov, V.V. Kazantsev, A.B. Koldobskij, V.M. Kolobashkin, "Cyclical pneumatic transport system in the IRT-2000 MIFI reactor", in Experimental Methods in Nuclear Physics 7, Atomizdat, Moscow (1980) 30-34. M.E. Meek, B.F. Rider, Compilation of fission product yields, Report NEDO-12154-2 (1977).
Other information:	Cumulative yield values were obtained for eight short-lived fission products.
Accuracy (mean):	~ 10%
Publications:	A.N. Gudkov, V.V. Kazantsev, V.V. Kovalenko, A.B. Koldobskij, V.M. Kolobashkin, A.I. Slyusarenko, "Fission product yields from thermal-neutron ^{233}U fission measured by a γ-spectrometric method in a cyclical regime". Voprosy Atomnoj Nauki i Tekhniki (Questions of Atomic Science and Technology) 42 3 (1981) 49.

USSR

Laboratory and address:	Moskovskij Inzhenerno-Fizičheskij Inst., Moscow, 115409 USSR
Names:	A.G. Golovanov, A.N. Gudkov, V.V. Kazantsev, V.V. Kovalenko, A.B. Koldobskij, V.M. Kolobashkin, S.I. Lifanov, A.I. Slyusarenko
Facilities:	IRT research reactor; pneumatic transport system; calibrated coaxial Ge(Li)-detector.
Experiment:	Measurement of cumulative yields of short-lived ($T_{\frac{1}{2}}$ = 7.1 - 48 s) fission products from plutonium-239 thermal-neutron fission.
Method:	Semiconductor gamma-spectrometry of the irradiated sample in a cyclical regime without prior chemical separation.
Sources of information:	M.E. Meek, B.F. Rider, Compilation of Fission Product Yields, Report NEDO - 12154-2 (1977).
Other information:	Cumulative yield values were obtained for eight short-lived fission products.
Accuracy (mean):	~ 18%
Discrepancies compared with published data:	The results agree with published theoretical data to within the error limits.
Publications:	A.G. Golovanov, A.N. Gudkov, V.V. Kazantsev, V.V. Kovalenko, A.B. Koldobskij, V.M. Kolobashkin, S.I. Lifanov, A.I. Slyusarenko, Determination of cumulative yields of short-lived fission products from thermal-neutron fission of ^{239}Pu by a gamma-spectrometric method in a cyclical regime. Atomnaja Ehnergija 53 2 (1982) 117 (English: Soviet Atomic Energy 53 (Feb. 1983) 576.)

USSR

Laboratory and address:	Moskovskij Inzhenerno-Fizicheskij Inst., Moscow, 115409 USSR.
Names:	A.N. Gudkov, V.M. Zhivun, V.V. Kovalenko, A.B. Koldobskij, V.M. Kolobashkin, V.N. Kosyakov, S.V. Krivasheev
Facilities:	MIFI IRT research reactor; calibrated coaxial Ge(Li)-detector.
Experiment:	Absolute measurements of independent and cumulative fission product yields from californium-249 in thermal-neutron-induced fission.
Method:	Semiconductor gamma-spectrometry of the irradiated sample without prior chemical separation; measurements at successive time intervals.
Other information:	Values were obtained for 32 cumulative and 7 independent yields.
Accuracy (mean):	~ 8% for the cumulative and ~ 12% for the independent yields.
Discrepancies compared with published data:	Within the experimental error range quoted the values obtained in the present study diverge from previously published results of radio-chemical measurements for the cumulative yields of ^{92}Sr, ^{97}Zr, ^{112}Pd, ^{127}Sb, ^{132}Te and ^{143}Ce.
Publications:	A.N. Gudkov, V.M. Zhivun, V.V. Kovalenko, A.B. Koldobskij, V.M. Kolobashkin, V.N. Kosyakov, S.V. Krivasheev, "Measurement of fission-product yields from thermal-neutron fission of californium-249 by semiconductor gamma-spectrometry", Atomnaja Ehnergija 50 5 (1981) 355 (English: Soviet Atomic Enegy 50 (Nov. 1981) 331.

USSR

Laboratory and address:	Moskovskij Inzhenerno-Fizicheskij Inst. Moscow, 115409 USSR.
Names:	A.N. Gudkov, V.V. Kazantsev, V.V. Kovalenko, A.B. Koldobskij, V.M. Kolobashkin, A.I. Slyusarenko.
System:	IRT research reactor; pneumatic transport system, calibrated coaxial Ge(Li)-detector.
Experiment:	Measurements of absolute quantum yields from the gamma-radiation of short-lived ($T_{\frac{1}{2}}$ < 1 min) fission products. *)
Method:	Semiconductor gamma-spectrometry of the irradiated sample in a cyclical regime without chemical separation.
Information sources:	1. A.N. Gudkov, V.V. Kazantsev, V.V. Kovalenko, et al., Measurement of short-lived fission products resulting from thermal-neutron fission of ^{233}U by a gamma-spectrometric method in a cyclical regime, Voprosy Atomnoj Nauki i Tekhniki, Ser. Yadernye Konstanty 42 3 (1981) 49. 2. M.E. Meek, B.F. Rider, "Compilation of Fission Product Yields", Report NEDO - 12154-2 (1977).
Other information:	Values were obtained for 13 absolute quantum yields, 5 of them for the first time.
Accuracy (mean):	~ 10%
Published data:	The results obtained in the present study do not agree, within the experimental error limits quoted, with those published earlier for the quantum yields of the following γ-lines: 775.2 keV ^{88}Br, 469.2 keV ^{99}Zr, 504.3 keV ^{100}Zr, 174.92 keV ^{139}Xe, 218.59 keV ^{139}Xe, 211.5 keV ^{143}Ba.
Publications:	A.N. Gudkov, V.V. Kazantsev, V.V. Kovalenko, A.B. Koldobskij, V.M. Kolobashkin, A.I. Slyusarenko, Determination of absolute quantum yields from the γ-radiation of short-lived fission products by a γ-spectrometric method in a cyclical regime, Voprosy Atomnoj Nauki i Tekhniki, Ser. Yadernye Konstanty, 42 3 (1981) 47

*) ^{88}Br, ^{90}Kr, $^{99,100}Zr$, $^{99,101,102}Nb$, ^{103}Tc, $^{139,140}Xe$, $^{143,144}Ba$, ^{144}La.

II. COMPILATIONS AND EVALUATIONS

Unchanged contributions are marked as such.

Updates: revisions with respect to the last issue are marked by a vertical bar on the left margin of the text.

New contributions show no marks.

BELGIUM

Laboratory and address : Nuclear Physics Laboratory
Proeftuinstraat 42
B-9000 Gent, Belgium

Names : P.De Gelder, D.De Frenne, E.Jacobs

Evaluation : Nuclear Data Sheets for A = 102, 110 and 105.

Purpose : to give a critical survey of all available information concerning A = 102, 110 and 105 nuclei, and derivation of consistent best or preferred values with their uncertainties.

Method : cfr. Nuclear Data Project

Major sources of information : Recent References of NDP

Deadline of literature coverage : 102 : March 1982
110 : October 1982

Computer file of evaluated data : ENSDF

Completion date : 102 : March 1982
110 : December 1982
105 : probably end of 1983

Publications : - P.De Gelder, D.De Frenne, E.Jacobs, Nucl.Data Sheets, 35, 443 (1982).

FRANCE

Laboratory and address : Département de Recherche Fondamentale
Laboratoire de Chimie Physique Nucléaire
Centre d'Etudes Nucléaires de Grenoble
85 X - 38041 GRENOBLE CEDEX - France.

Name : J. BLACHOT

Cooperation : C. FICHE** for developping the file and J.C. NIMAL*;
B. DUCHEMIN*; for the applications in summation calculation.

Compilation and Evaluation : Radionuclide decay data :
- to provide a comprehensive data bank of radioactive decay data with : half lives, Q-values, branching ratios, nuclear and spectra α, β, γ, energies and intensities with associated uncertainties.

Purpose :
- Decay data file for summation calculation of decay heat (Pepin code).
- Data bank for all people using decay data parameters.

Sources : ENSDF file mostly and new recent works on short lived F.P. not yet evaluated in ENSDF.

Computer file and programs :
- EDIBIB, TRIGAL, ISOTAB Programs
- Magnetic tape available on line for those using the French CISI Network.
- Off line from the NEA Data bank (Saclay).

Publication :
- AT. Data and Nucl. Dat. Tab. Vol. 20 (1977) p.241.
- Annales de Physique Vol 6S (1981)
- Int. Conf. on Nuclear Data for Science and Technology, Anwerp, Belgium, 6-10 Sept. 1982; proceedings page 249.

* CEN/CADARACHE -
C.E.A - BP.1 - 13115 St-PAUL LES DURANCE

** CEN/SACLAY-
C.E.A - BP.2 - 91190 GIF SUR YVETTE -

FRANCE

Laboratory and address:	Laboratoire de Mêtrologie des Rayonnements Ionisants C.E.N. de Saclay B.P. No. 2, F-91190 Gif sur Yvette
Names:	F. Lagoutine, N. Coursol, J. Legrand
Evaluation:	Radionuclide decay data
Purpose:	Preparation of a document providing recommended values of the principle decay scheme parameters; half-life, energies and intensities of various radiations emitted (e.g. β, γ, c.e., X-rays)
Method:	- critical analysis of published results - determination of mean values and associated uncertainties
Source of information:	Nuclear Data Sheets, INIS-Atomindex, other recent publications
Publications:	Table de radionucléides, edition CEA-LMRI, containing among other radionuclides, the following fission products:

- Vol. 1: Kr-85, Mo-99, Tc-99, Ru-103 + Rh-103m, Sb-125 + Te-125m, Xe-133, Xe-133m, Ce-144 + Pr-144 (revised publication 1982)

- Vol. 2 : Rb-86, Rb-88, Sr-89, Sr-90 + Y-90, Y-91
  Ru-106 + Rh-106, Te-127m + Te-127, I-129,
  Te-131m + Te-131, Xe-131m, Ba-140 + La-140, Pr-143.
  Zr-95 + Nb-95, 95m, I-131, Cs-137 + Ba-137m
  Ce-141 (revised publication by the end of 1983)

- Vol. 3 : first part : Sr-92, Y-92, Pm-147, Ra-266 +
  chain of daughters Pu-239, Pu-240, Pu-241, U-236,
  U-237. (publication second half-year 1983)
  second part : Kr-88, Te-129m, Nd-147, Sn-151, Pu-238,
  Cm-244 (publication by the end of 1983)
  in preparation : Th-228 + chain of daughters

GERMANY, DEM. REP.
(same as INDC(NDS)-130)

Laboratory and address:	Zentralinstitut für Kernforschung Rossendorf DDR 8051 Dresden Postfach 19
Names:	H.-C. Mehner, E. Franke
Evaluation:	Effective resonance integral of ^{133}Cs in reactor fuel elements
Purpose:	To clear differences between experimental and calculated fission product concentrations of ^{134}Cs observed in investigations of burnt fuel elements
1. Method:	Calculation of effective resonance integral of ^{133}Cs taking into account shielding by ^{238}U resonances and self-shielding using Breit-Wigner formalism with Doppler broadening
Major sources of information:	BNL-325, 3rd. ed. 1973
Status:	Completed
Publication:	Radiochem. Radioanal. Letters 43 (1980) 77
2. Method:	Calculation of the effective resonance integral of ^{133}Cs with the cell-code PEACO-II
Major sources of information:	- Y. Ishiguro, PEACO-II, JAERI-M 5527 (1974) - BNL-325, 3rd. ed., 1973 for ^{133}Cs data - JAERI-1255 (1978) for ^{238}U data
Status:	under work
Publication:	in plan

GERMANY, FED. REP.

Laboratory and adress: Inst. for Nuclear Chemistry
Philipps-University Marburg
Hans-Meerwein-Straße
D-3550 Marburg

Names: U. Reus and W. Westmeier

Compilation: Gamma-Ray Catalog§

Type of data: Compilation of energies and intensities of gamma-rays originating from the radioactive decay of nuclides, as well as other important decay properties of these nuclides.

Arrangement: Part I is a listing of ca. 32,000 gamma-rays ordered by increasing energy with the corresponding nuclei and other information needed for identification purposes.
Part II is ordered by nuclides (A,Z) and contains the complete data sets for 2526 nuclides and isomers (i.e. more than 47,000 gamma- and X-rays), decay data, references, comments etc.

Purpose: Identification of gamma-rays, data for cross-section calculations, activity determination, activation analysis etc.

Major sources of information: Nuclear Data Sheets and almost all important journals in nuclear physics and chemistry.

Deadline of literature coverage: All information received before June 30, 1982, has been included.

Other details: Intensities are given as gamma-rays (or X-rays) per 100 decays where possible to allow the determination of absolute quantities. K-X-ray intensities have been calculated where no experimental data were available.

Current status: Revision of the data has been completed. By changing the printing format, the size of the catalog has been reduced to 400 pages to meet publication requirements.

Publication: The catalog is scheduled to appear in *Atomic Data and Nuclear Data Tables, Volume 29,* which is to be issued in the second half of 1983.

§Work performed with the support of GSI (Gesellschaft für Schwerionenforschung mbH, D-6100 Darmstadt).

C.E.C. GERMANY, FED. REP.

Commission of the European Communities
Joint Research Centre
Karlsruhe Establishment
European Institute for Transuranium Elements
Postfach 2266
7500 Karlsruhe
Federal Republic of Germany

Names: I. Broeders, KfK Karlsruhe, FRG
L. Koch,
M. Robin, CEA Cadarache, France
R. Wellum

EVALUATION

Evaluation: (purpose and method)

In the TACO experiment described previously integral neutron cross-sections of selected actinides and fission product nuclides were determined. The total neutron flux was measured and the neutron spectrum as a function of axial position in the irradiation pins was known. Differential cross-sections for the isotopes concerned were taken from the KEDAK library From the flux and differential cross-sections the integral (n,γ), fission, and in some cases (n, 2n), cross-sections have been calculated. The experimentally determined and the calculated values are compared.

Publication: International Conference on Nuclear Data, 6-10 Sept 1982, Antwerp, Belgium; proceedings page 175.

INDIA

Laboratory and address	:	Department of Physics, Panjab University, Chandigarh -160014 (INDIA)
Names	:	D.R.Saroha, R.Aroumougame, R.K.Gupta
Evaluation	:	Charge distribution yields in the spontaneous fission of ^{236}U and ^{252}Cf nuclei.
Purpose	:	To predict the charge distribution of fission fragments of the naturally fissioning nuclei by using Fragmentation theory and two-centre shell model.
Method	:	(i) An analytical solution of the time-dependent Schrödinger equation leads to an explicit expression for charge distribution yields as a Gaussian function which gives the most probable charge and the width of distribution. The hypothesis of unchanged charge distribution and minimum potential energy are included as limiting cases. (ii) Charge distribution yields of light mass products (A = 97-104) in the spontaneous fission of ^{236}U are obtained by solving a stationary Schrödinger equation numerically.. The width of distribution and the most probable charge are also calculated.
Major sources of information	:	Journals and reports.
Deadline of literature coverage	:	1981.
Status	:	Comparison of theoretical results with the experimental data for the charge distribution yields in ^{236}U and ^{252}Cf nuclei is shown to be good and the most probable charge is comparable with that of potential energy hypothesis. Strong odd-even charge effects are obtained in the charge distribution yields of light mass products (A = 97-104) of ^{236}U which are in good agreement with experiments.
Publications	:	(i) D.R.Saroha, R.Aroumougame and Raj K.Gupta, Phys. Rev. C 27 (3) (1983). (ii) Results for light mass products charge distributions are submitted for publication.

ITALY

Laboratory and address:	ENEA, Laboratorio Dati Nucleari e Codici, Via Mazzini 2 - 40138 Bologna, Italy.
Names:	F. Fabbri, G. Maino, E. Menapace, G.C. Panini, G. Reffo, M. Vaccari, A. Ventura.
Work in Progress and Methods:	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. Works to be published. ii) Model calculations of $\sigma_{n,\gamma}$ $\sigma_{n,n'}$, $\sigma_{n\,el}$, 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. Work published on N.S.E. 80, 630(1982). iii) New evaluations of Pd-105 and -107, as maximum priority nuclei for fast reactors, were completed and group constants in CARNAVAL scheme were produced. Work published as ENEA report RTE/FIMA(82)4. iv) A critical intercomparison was performed on recent evaluations of Gd isotopes, with main care to the data for thermal reactor purposes. Work documented on ENEA report TIB/FICS(82)7.
Purpose:	Evaluation of reliable FP data, mainly capture cross sections, for estimating of long term reactivity effects in fast reactors.
Major sources of information:	EXFOR, CINDA up to 82 supplement, Nuclear Data Sheets.
Deadline of literature coverage:	December 1982.
Status:	see above text.
Cooperation:	CEA-Cadarache, KfK Karlsruhe and ECN-Petten.

JAPAN

Japanese Nuclear Data Committee, Decay Heat Evaluation Working Group

Secretariat address:
Japan Atomic Energy Research Institute
Tokai-mura, Naka-gun, Ibaraki-ken 319-11, Japan

Names:
R. Nakasima (Hosei University) M. Yamada (Waseda University)
T. Tamai (Kyoto University) M. Akiyama (University of Tokyo)
I. Otake (Fuji Electric Co., Ltd.) A. Zukeran (Hitachi Ltd.)
S. Iijima, T. Murata, T. Yoshida (Nippon Atomic Industry Group Co.)
T. Hojuyama (FBR Engineering Co.)
K. Umezawa, K. Tasaka, Z. Matumoto, T. Tamura, H. Ihara, J. Katakura (JAERI)

1. Compilation: Decay data and delayed neutron data
Purpose: Revision of a FP decay data library completed in 1981 for summation calculation of decay heat
Major Sources of Information: Journals, Nuclear Data Sheets, and ENSDF
Expected Completion Data: Continuous compilation

2. Evaluation: (1) Evaluation of raw decay data by comparing calculated decay heat curves with available measurements
(2) Deduction of analytical fitting equations

Purpose: (1) Update JNDC FP Decay and Yield Data Library
(2) Preparation of simple analytical function for the easy application of the present result of decay power calculation

Major Source of Information: Own compiled data

Status: (1) Satisfactory agreement was obtained between calculated decay heat and measured data of ^{235}U, ^{239}Pu and ^{241}Pu from ORNL, ^{235}U, ^{233}U and ^{239}Pu from LANL and ^{235}U from Univ. of Tokyo.
(2) Calculated results have been fitted to an analytical function with 31 exponential terms for thermal neutron fission of ^{235}U, ^{239}Pu, ^{241}Pu, ^{233}U, fast neutron fission of ^{235}U, ^{238}U, ^{239}Pu, ^{232}Th, and 14 MeV neutron fission of ^{235}U, ^{238}U.

Computer File of Evaluated Data: JNDC Nuclear Data Library of Fission Products

Discrepancies encountered: Some discrepancies still remain at cooling-times around 3000 second.

Availability of Nuclear Data: Contact Dr. Z. Matumoto,
Nuclear Data Center,
Japan Atomic Energy Research Institute,
Tokai-mura, Ibaraki-ken 319-11, Japan

Publication:
Y. Ando, M. Uno and M. Yamada, JAERI-M 83-025 (1983)
T. Yoshida, JAERI-M (in preparation)
K. Tasaka et al., JAERI report (in preparation)

JAPAN

Laboratory and address :	Japanese Nuclear Data Committee/FPND W.G., Japan Atomic Energy Research Institute, Tokai-mura, Naka-gun, Ibaraki, Japan
Name :	S. Iijima, M. Kawai (group leader) (i), S.Igarashi Y. Kikuchi, Y. Nakajima, H. Nishimura (ii) H. Matsunobu (iii), T. Aoki (iv), A. Zukeran (v), T. Watanabe (vi), M. Sasaki (vii), T. Nishigori (viii)
Evaluation :	(1) Neutron cross sections of about 80 FP nuclides (Z=35 to 64), forJENDL-2 FP Library. (2) Integtal test of JENDL FP library.
Purpose :	Fast breder reactor and thermal reactor calculation.
Method :	(1) Calculation with spherical optical model and statistical theory. Single and muti-level BW formula in thermal and resonance regions. Optical model paremeters are determined by SPRT method. Level density parameters are re-evaluated, deriving systematics of parameters. (2) Calculation using JAERI-FAST type 70-group cross sections with resonance self-shielding factors, and the neutron spectrum data from STEK and CFRMF data.
Major sources of information :	EXFOR Library, CINDA, BNL-325 and recent literature. Integral data from STEK, CFRMF and EBR-II.
Status :	(1) Re-evaluation for about 80 FP nuclides. Optical model parameters were re-determined in element-wise way for Rb-Gd. Level density parameters were determined for about 130 nuclides based on level spacing data, level scheme data, and the systematics. Compilation and evaluation of resonance parameters are in progress. (2) Analysis of STEK reactivity data for weak absorbers was completed. Revised calculation of CFRMF activation rates is planned using ENDF/B-5 spectrum field. (3) FP data library for thermal reaction application was prepared, and the fission product model was investigated for LWR calculation.
Other relvant details :	File preparation for storing the re-evaluated data are in progress. Cross section adjustment based on integral data will start soon.

(i) Nippon Atomic Industry Group Co., Ltd. (ii) JAERI (iii) Sumitomo Atomic Energy Industries, Ltd. (iv) Fuji Electric Co. (v) Hitachi Ltd.
(vi) Kawasaki Heavy Industries (vii) Mitsubishi Atomic Power Industries, Ltd.
(viii) Osaka University

JAPAN

(cont'd)

Computer file of evaluated data : JENDL (ENDF/B-IV Format).

Expected completion date : End of 1983

Publications :

(1) S. Iijima, M. Kawai : Systematics of neutron total cross sections of fission product nuclei, J. Nucl. sci. Technol. 20 (1983) 77 (short note)

(2) T. Yamamoto, T. Takeda, T. Yoshida, S. Iijima : Extension of fission product model for use in lattice calculation of thorum fueled BWR, J.Nucl. Sci. Technol. (to be published), 1983

(3) S. Iijima, T. Yoshida, T. Aoki, T. Watanabe, M. Sasaki : Study of systematics and the determination of level density parameters of fission product nuclei, submitted to J. Nucl. Sci. Technol.

NETHERLANDS

Laboratory and address	Netherlands Energy Research Foundation (ECN) P.O. Box 1, 1755 ZG Petten, The Netherlands. Telephone: (02246)-6262, telex: 57211 reacp nl.
Names	H. Gruppelaar, H.A.J. van der Kamp, R.J. Heijboer.
Evaluation	(1) RCN-2 and RCN-3 evaluations of neutron cross sections for fission-product nuclides and natural elements in the fission-product mass range |1-3|. The RCN-3 evaluation is a revised version of the published RCN-2 evaluation (see previous newsletters). The capture cross section has been adjusted to fit integral STEK and CFRMF data. The format of the library is that of KEDAK. (2) Pseudo fission-product group cross sections in 26-group ABBN format |4|.
Purpose	Fast breeder power-reactor data needs.
Method	Calculation with multilevel Breit-Wigner formula, optical model and statistical model, taking into account all available experimental information. Adjustment of point-wise given capture cross sections to integral data (STEK+CFRMF); see Refs. |1-3|.
Major sources of information	BNL-325, EXFOR, CINDA, Nuclear Data Sheets, recent literature, integral data from STEK and CFRMF.
Status	(1) RCN-3 evaluation completed for : Nb-93, natural Mo, Tc-99, Rh-103, Pd-102, Pd-104, Pd-105, Pd-106, Pd-107, Pd-108, Pd-110, Ag-107, Ag-109, natural Ag, I-127, I-129, Cs-133, La-139, Pr-141, Nd-142, Nd-143, Nd-144, Nd-145, Nd-146, Nd-147, Nd-148, Nd-150, natural Nd, Pm-147, Sm-148, Sm-149, Sm-150, Sm-151, Sm-152, Sm-154, natural Sm. Planned: Zr-isotopes, Xe-131, Cs-135, Ce-140, 142, Eu-153. (2) Completed: Pseudo fission-product cross sections |4|, based upon adjusted RCN-2A data, supplemented with ENDF/B-IV data and charged-particle emission cross sections |5|; comparison with ENDF/B-V data |3|.
Computer file	RCN-2 and RCN-3 libraries in KEDAK-format, available from NEA Data Bank.
Completion date	1985
Recent publications	|1| Plakman, J.C. (comp.), Fast reactor programme. Annual progress report 1980, ECN-115 (1982), other progress reports in press. |2| Gruppelaar, H. and J.B. Dragt, Cross section adjustments using integral data, Conf. on Nuclear Data Evaluation Methods and Procedures, Brookhaven, Sept. 22-25, 1980, BNL-NCS-51363, vol. 1, p. 133 (1981).

NETHERLANDS

(cont'd)

|3| H. Gruppelaar, Status of recent fast capture cross section evaluations for important fission product nuclides, NEANDC/NEACRP Specialists' Mtg. on Fast-neutron capture cross sections, Argonne, 20-23 April, 1982. NEANDC(US)-214 (1983) 473.

|4| Heijboer, R.J. and A.J. Janssen, Status of pseudo fission-product cross sections for fast reactors; sensitivity study for sodium void effect, Proc. of the NEANDC Specialists' Meeting on Neutron Cross Sections of Fission Product Nuclei, Bologna, Dec. 12-14, 1979, NEANDC(E)209"L" (1980), p. 375.

|5| Gruppelaar, H. and B.P.J. van den Bos, The contribution of (n,p) and (n,α) reactions to fission-product capture cross sections, ibid, p. 285; extended report: ECN-78 (1979).

NETHERLANDS

Laboratory	: Netherlands Energy Research Foundation ECN, Postbus 1, 1755 ZG Petten, The Netherlands.
Names	: Willem L. Zijp and J.H. Baard.
Compilation	: **Selected fission yields and fission product decay data for reactor neutron metrology application.**
purpose	: Creation of a common data set for all laboratories working in the field of reactor neutron metrology. The guide was prepared on behalf of the Euratom Working Group on Reactor Dosimetry.
Major sources of information	: . Cuninghame, J.G., Technical Report IAEA-213 (IAEA, Vienna, 1978); . Gilliam, D.M., et al., Report NUREG/CP-004 (NRC, Washington D.C., 1978); . Data supplied by the computer program MEDLIST from the Evaluated Nuclear Structure Data File (ENSDF); . Data supplied by the Physikalisch Technische Bundesanstalt, Braunschweig.
Deadline of literature coverage	: Spring 1979. A revision is planned.
Cooperation	: Members of Euratom Working Group on Reactor Dosimetry.
Other relevant details	: Fission yields and decay data and decay schemes are given for the following fission products: ^{95}Zr, ^{97}Zr, ^{103}Ru, ^{131}I, ^{132}Te, ^{137}Cs and ^{140}Ba. The fissionable isotopes considered are: ^{235}U, ^{238}U, ^{239}Pu, ^{237}Np.
Computer file	: Not present.
Completion date	: August 1979. For planned revision: fall 1983.
Publications	: Report ECN-71, also as EUR 7164, part II. Revision: planned for 1984.

UNITED KINGDOM

(same as INDC(NDS)-130)

Laboratory and Address:	AERE Harwell	UKAEA AERE, Harwell, Oxfordshire, Ox11 ORA

Name: E.A.C. Crouch (now retired)

Compilation: Chain, Cumulative and Independent fission product yields for all neutron induced fission reactions with neutrons of energy up to 14 MeV, including spontaneous fission. Ongoing compilation.

Purpose: Basic data for fission yield evaluation.

Sources: Journals, Proceedings of Learned Societies, or other open literature, Project reports if the work is complete but unlikely to be published.

Deadline: No results prior to 1950 are collected.

Cooperation: We are prepared to exchange files with other groups.

Computer File: Information held in standard forms on Computer Files.

Completion Date: Continuous compilation.

Publications: AERE R6642 'A library of neutron induced fission product yields maintained and interrogated by computer methods'.
'Part I: The establishment of the library'.
E.A.C. Crouch, December 1970.

AERE R7207 'A library of neutron induced fission product yields maintained and interrogated by computer methods'.
'Part II: The interrogation of the library'.
E.A.C. Crouch, August 1972.

Fission Product Yields from Neutron-Induced Fission -
E.A.C. Crouch.
Atomic Data and Nuclear Data Tables, Vol. 19, 5, May, 1977.
Contains experimental values and adjusted values after fitting to conservation laws .

UNITED KINGDOM

(same as INDC(NDS)-130)

Laboratory and Address:	AERE Harwell	UKAEA AERE Harwell Oxfordshire OX11 ORA

Name: E.A.C. Crouch (now retired)

1. Evaluation

(1) Neutron induced fission product yields for all fissile nuclides at neutron energies up to 15 MeV; chain yields and independent yields.

(2) Adjustments of the chain yields and the calculated independent yields to force agreement with the conservation laws i.e. to form a 'consistent set'.

Purpose: UKND File to be used in Reactor design and operation.

Method:

(1) The individual yields for a given reaction (both chain and independent), are examined, weighted and the means calculated together with the errors.

(2) The evaluated yields are augmented by interpolation to fill missing values or in the case of independent yields by calculation based on parameters estimated from known values. The results are fitted by least squares to the conservation conditions to give adjustments for chain yields and independent yields.

Complete - the fitting of conservation laws and the equality of yields of complementary elements. The set will be tested for its ability to produce an estimate of after heat from ^{239}Pu Fission nearer to experimental values than previous sets.

Sources: Compilation mentioned above.

Deadline: No results prior to 1950 are collected. Compilations believed to be complete up to end 1975, some 1976 results included.

Status: Evaluation and Consistent set complete at January 1977. Further development continuing.

Cooperation: We are prepared to exchange files with other groups.

UNITED KINGDOM

(cont'd, same as INDC(NDS)-130)

Computer Files of Compiled Data:	Compilation as above.
Computer File of Evaluated data:	Magnetic tape or punched cards of the consistent set in ENDF/BIV format.
Discrepancies found:	Files are compared with those of B.F. Rider and discrepancies found are resolved.
Publication:	Fission Product Yields from Neutron-Induced Fission. E.A.C. Crouch. Atomic Data and Nuclear Data Tables, vol. 19, 5, May 1977.

2. Evaluation:	Compilation and evaluation of the half lives of delayed neutron emitter precursors and emission probabilities of the delayed neutron emitters. Hence, using the fission product consistent sets, calculation of the delayed neutron yields ... Proceeding.
Purpose:	UK Nuclear Data File for use in Reactor design and operation calculations.
Sources:	The open literature
Deadline:	Continuous compilation.
Status:	Compilation of delayed neutron data proceeding.
Cooperation:	We are prepared to exchange information with other groups.
Computer files:	Not yet implemented.

UNITED KINGDOM

Laboratory and Address:	CEGB Berkeley Nuclear Laboratories	Berkeley Nuclear Laboratories, Berkeley, Gloucestershire GL13 9PB

Working Group:

A. Tobias	CEGB, BNL
A.L. Nichols	AEE, Winfrith
M.F. James,	AEE, Winfrith
H.E. Sims,	AERE, Harwell
K.M. Glover,	AERE, Harwell
V. Barnes,	BNFL, Windscale
D.G. Vallis,	AWRE, Aldermaston

Compilation and Evaluation: Radionuclide Decay Data

Purpose: To provide a comprehensive, up-to-date data library of radioactive decay data including half-lives, Q-values, branching ratios, α, β and γ energies and intensities and associated uncertainties.

Progress:

a) Activation Products

i) The activation product decay data library UKPADD-1, originally in ENDF/B-IV format, is also now available in ENDF/B-V format.

ii) Work has begun on a revised activation product decay data library UKPADD-2 which will eventually contain data for over 400 nuclides. Evaluations for 60 nuclides have been completed so far and will be processed via the code COGEND to ENDF/B-V format.

b) Fission Products

i) The spectral data given for 390 nuclides in UKFPDD-2 have been extracted to provide an additional data base for the inventory/decay heat code FISP6, enabling the calculation of detailed radiation spectra emitted by irradiated fuel.

ii) Data for ~ 300 fisson products, evaluated in 1979/1980 for UKFPDD-2, have been converted to ENDF/B-V format in preparation for UKFPDD-3.

UNITED KINGDOM

(cont'd)

c) Heavy Elements

The heavy element decay-data library UKHEDD-1 is now complete and includes spontaneous fission data where appropriate. Data are given for 125 nuclides in ENDF/B-V format.

d) Data Retrieval

A retrieval system for spectral data has been developed for use with any ENDF/B-IV or V format decay data libraries - in particular UKPADD-1, UKFPDD-2 and UKHEDD-1. Spectral data can be presented in increasing energy order or by nuclide and with a variety of editing options.

Publications:

i) "FISP6 - An Enhanced Code for the Evaluation of Fission Product Inventories and Decay Heat" by A. Tobias, CEGB Report TPRD/B/0097/N82.

ii) "Radioactive Heavy Element Decay Data for Reactor Calculations" by A.L. Nichols and M.F. James, UKAEA Report AEEW-R1407.

iii) "A Retrieval System for Spectral Data from ENDF/B Format Decay Data Files" by A. Tobias, CEGB Report RD/B/5170N81.

UNITED KINGDOM

(same as INDC(NDS)-130)

Laboratory and address:	Birmingham Radiation Centre	University of Birmingham P.O. Box 363 Birmingham B15 2TT United Kingdom
Name:	D.R. Weaver	
Evaluation:	Equilibrium and near-equilibrium delayed neutron spectra	
Purpose:	For reactor physics calculations and analysis of delayed neutron yield measurements. The evaluation was recommended by the March 1979 Vienna Consultants' Meeting on Delayed Neutron Properties	
Method:	Calculation of a full covariance matrix for the spectra	
Deadline of literature coverage:	None. Raw experimental data from laboratories who used either ^{3}He or proton recoil counters has been obtained. Further data would be welcomed	
Status:	A method of obtaining a full covariance matrix has been derived based upon the sensitivity of the spectra obtained from unfolding to changes in the calibration parameters of the detector and counting statistics. A paper describing the technique and measurement of an Am/Li spectrum using a ^{3}He counter has been published.	

U.S.A.

(same as INDC(NDS)-130)

Laboratory and address:

Hanford Engineering Development Laboratory
P.O.Box 1970
Richland, WA 99352

Names:

RE Schenter, FM Mann, DL Johnson, and F Schmittroth

Evaluation:

ENDF/B-V, Mods to ENDF/B-V, and ENDF/B-VI Fission Product Data File and Fission Yield Files

A. Coordinate generation and testing of complete ENDF/B-FP files which will contain cross sections, decay data and fission yields for approximately 900 fission product nuclei and 20 fissionable nuclei. Coordination is part of the responsibility as Chairman of CSEWG (Cross Section Evaluation Working Group) Fission Product and Actinide Data Subcommittee. Two subcommittees related and contributing to this subcommittee are chaired by TR England (LASL) and CW Reich (INEL) and cover the areas of fission yields and experimental decay data, respectively. Evaluations to these files will be contributed by essentially all CSEWG member laboratories.

B. Evaluate important FP cross sections for fast and thermal reactor application. These will mainly involve updating about 180 cross section evaluations from ENDF/B-V with emphasis on capture. Use will be made of combining recent integral and differential data results from CFRMF, STEK, RPI and ORNL.

C. Evaluate delayed neutron spectra using summation method from individual precursors in cooperation with TR England (LASL) and CW Reich (INEL). Precursors without experimental spectra will be predicted using the computer code BETA.

D. Evaluate decay data parameters $\bar{E}_\beta$, $\bar{E}_\gamma$ for "theoretical" ("no line data") FP nuclides using BETA code, extrapolated "fits" to known data, and integral results of recent decay heat measurements.

E. Analyze fission yield experimental results from FFTF.

Purpose:

Update ENDF/B Fission Product Data Files

Completion dates:

ENDF/B-V file was issued May 1980. ENDF/B-V Fission Yield Files issued April/May 1979. Mods to ENDF/B-V expected to be released Sep. 1982 and May 1983.

U. S. A.

(cont'd)

References:

Results for delayed neutron spectra will be reported at the Internat. Conf. on Nuclear Data for Science and Technol., Antwerp, 6-10 Sep. 1982.

Other references related to this work may be obtained from R. E. Schenter.

For further information see also LANL contribution.

U.S.A.

Laboratory and address:	Idaho National Engineering Laboratory EG&G Idaho, Inc. P.O. Box 1625 Idaho Falls, Idaho 83415 USA
Names:	C. W. Reich, R. L. Bunting
Compilation:	Decay data for fission products. Quantities treated include: $T_{1/2}$; Q_{β}; branching fractions for the various decay modes; energies and intensities of all emitted radiations (e.g., β, γ, c.e., x-ray); K-, L- and total ICC; delayed-neutron energy spectra for individual precursors; uncertainties in all measured values.
Purpose:	Decay data file for ENDF/B.
Major sources of information:	Nuclear Data Sheets, Table of Isotopes (7th Ed.), recently published papers, preprints of recent work.
Deadline of literature coverage:	Ongoing. For Version V of ENDF/B, cut-off date is approximately September, 1978.
Computer File:	Decay data are included in ENDF/B Fission Product File. Tapes available through normal ENDF/B procedures. Evaluated decay data sets for 318 fission-product nuclides (and isomeric states) have been prepared for inclusion in the ENDF/B-V Fission-Product File.
Publications:	R. L. Bunting and C. W. Reich, "Evaluation Procedures for Experimental Decay Data," in Proceedings of the Conference on Nuclear Data Evaluation Methods and Procedures, BNL-NCS-51363, Vol. I, pp. 163-183 (March, 1981). C. W. Reich and R. L. Bunting, "The Use of Data from Beta-Strength-Function Experiments to Obtain Average Decay-Energy Values for Short-Lived Fission-Product Nuclides," Nuclear Science and Engineering 82 (1982) 132.

U. S. A.

LABORATORY AND ADDRESS:

University of California
Los Alamos National Laboratory
PO Box 1663
Los Alamos, New Mexico 87545 (USA)

NAMES:

T. R. England (LANL)
B. F. Rider (Retired)
R. E. Schenter (HEDL)

COMPILATION:

Library of evaluated fission product yields for ENDF/B-VI files (preliminary).

DEADLINE OF LITERATURE COVERAGE

Mid-1983

COOPERATION

Subcommittee consisting of members from major USA commerical and government laboratories.

RELEVANT DETAILS

The new files are updated and extended to include 50 yield sets for 34 fissioning nuclides at one or more fission energies. Data are not yet in ENDF/B-V format and are now being updated at Los Alamos prior to further distribution and use in ENDF/B-VI.

PUBLICATIONS

1. B. F. Rider, et al., "Evaluation of Fission Product Yields for the U. S. National Nuclear Data Files," Proc. of Conf. on Nuclear Data Evaluation Methods and Procedures, BNL, September 22-25, 1980. Report BNL-NCS-51363 [DOE-NSX-23, NEANDC(US)-209, INDC(USA)-85], March 1981.

2. B. F. Rider, "Compilation of Fission Product Yields," General Electric Vallecitos Nuclear Center report (microfiche only) NEDO-12154-3(C), [ENDF-322] October 31, 1981 (modified at Los Alamos, 1983).

Editor's note: The contributions from LANL enclosed in the present issue do not reflect the full range of compilations and evaluations performed for the ENDF/B library, as several contributions on work already completed were not resubmitted (see also issue no. 8, INDC(NDS)-130, for completeness). A complete reorganized documentation of this work will appear in next year's issue.

U.S.A.

(cont'd, new)

LABORATORY AND ADDRESS:

University of California
Los Alamos National Laboratory
PO Box 1663
Los Alamos, New Mexico 87545 (USA)

NAMES:

T. R. England (LANL)
W. B. Wilson (LANL)
R. E. Schenter (HEDL)
F. M. Mann (HEDL)

COMPILATION

A summary of the fission-product and actinide data contained in ENDF/B-V data files is presented in Ref. 1. All fission products (877) and actinides (60) in Rev. "0" are included. Appendices contain some additional augmentation of these data along with a presentation of probable data changes, errors, or existing revisions to date. Schematics of all coupled fission products and augmented actinides (144 total actinides) are included. Mass chain yields, decay parameters (halflives, branchings, beta, gamma, and alpha energies), processed one-group cross sections for fast reactor spectra, four-group cross sections for thermal reactors, and the resonance integrals and 2200 m/s cross sections are included, as well as other information pertinent to the ENDF/B-V files. We have prepared this document to serve as a relatively concise source for the most frequently requested data and as a convenient reference for the fission-product and actinide data contained in ENDF/B-V.

REFERENCE:

1. T. R. England, W. B. Wilson, R. E. Schenter, and F. Mann, "ENDF/B-V Summary Data for Fission-Product and Actinides," Los Alamos National Laboratory informal document LA-UR-83-1285 [ENDF 332] (May 1983). [Final report to be published by EPRI.]

U.S.A.

(cont'd, new)

LABORATORY AND ADDRESS:

University of California
Los Alamos National Laboratory
PO Box 1663
Los Alamos, New Mexico 87545 (USA)

NAMES:

T. R. England (LANL)
W. B. Wilson (LANL)
R. E. Schenter (HEDL)
F. M. Mann (HEDL)

COOPERATION: G. Rudstam (Studsvik)

COMPILATION/EVALUATION:

Aggregate delayed neutrons and spectra have been computed and compared with evaluations in Ref. 1. One-hundred and five precursors were used. The intent of this and continued theoretical work for unmeasured spectra and re-evaluation of Pn values is to use summation calculations to improve and extend ENDF/B-VI delayed neutron evaluations. Results are given for each of the conventional six-time groups and for 11 fissionable nuclides at one or more neutron fission energies. [Pn values of Ref. 2 are being reevaluated (see the contribution prepared at HEDL).]

REFERENCES:

1. T. R. England, W. B. Wilson, R. E. Schenter, and F. M. Mann, "Aggregate Delayed Neutrons and Spectra Using Augmented ENDF/B-V Precursor Data," Los Alamos National Laboratory informal document LA-UR-83-1270 (May 1983) [to be published in Nucl. Sci. Eng.].

2. F. M. Mann, M. Schreiber, R. E. Schenter, and T. R. England, "Compilation of Neutron Precursor Data," K.H. Böckhoff, Ed., Proc. Int. Conf. Nucl. Data for Sci. Technol., Antwerp Belgium, Sept. 6-10, 1982 (D. Reidel Pub. Co., Boston), p. 272.

U.S.A.

Laboratory and Address: Oak Ridge National Laboratory
P. O. Box X, Building 6010
Oak Ridge, Tennessee 37830, USA

1. Name: J. K. Dickens

Compilation and Evaluation: Data file of fission-product radioactive β-decay information including energies, E_β, and absolute branching ratios, A_β, and degree of forbiddenness for 353 fission products, augmented by average β-ray energies for 183 additional fission products.

Purpose: To compute gross fission-product β-ray spectra obtained, e.g., following fission of ^{235}U so as to determine the associated "reactor antineutrino" spectrum to be used in experimental measurements of antineutrino-induced reactions.

Major sources of Information: Nuclear Data Sheets, Table of Isotopes (7th Edition), and recent published literature.

Deadline January 1982 for the current compilation.

Status: Data file is available from the ORNL Radiation Shielding Information Center.

Publications: J. K. Dickens, "Electron Spectra from Decay of Fission Products," ORNL/TM-8285 (September 1982); J. K. Dickens, "Electron Antineutrino Spectrum for $^{235}U(n,f)$," Phys. Rev. Lett. 46, 1061 (1981); J. K. Dickens, "Calculated Beta-Ray Spectra from Decay of Fission Products Produced by Thermal-Neutron Fission of ^{235}U," Phys. Lett. 113B, 201 (1982); J. K. Dickens, "Microscopic Beta and Gamma Data for Decay Heat Needs," (in preparation).

2. Name: J. K. Dickens and P. T. Perdue

Compilation: Data file of radioactive γ-decay information including energies and absolute intensities when available, or relative intensities when absolute values are not available.

Purpose: Identification of responsible radionuclides for data reduction of high-resolution Ge(Li) spectroscopy.

Major Sources: Nuclear Data Sheets and Table of Isotopes (7th Edition).

Deadline: Continuing.

U.S.A. (Cont'd)

Status: Three data files contain data for 774 radionuclides between ^{7}Be and ^{254}Es. About 65% of the 3200 entries are up to date (February 1983). The remainder are being upgraded on a continuous basis. The primary file is ordered by increasing Z and A; the file contains information useful for neutron activation analysis (NAA). There is a secondary file consisting of all γ rays ordered by increasing γ-ray energy; for each entry a second γ ray is included if available. There is an additional secondary file of the 774 radionuclides ordered by increasing half life; no γ-decay information is in this file. These data files are available from the ORNL Radiation Shielding Information Center.

Publication: Radiation Shielding Information Center Document No. DLC088/TPASGAM, "Informal Notes," J. K. Dickens and P. T. Perdue (April 1982); J. K. Dickens, "Microscopic Beta and Gamma Data for Decay Heat Needs " (in preparation).

U.S.A.

(same as INDC(NDS)-130)

Laboratory and address	Washington University, Dept. of Chemistry, St. Louis, MO., USA
Name	A. C. Wahl
Compilation and evaluation	Independent yields and other data related to nuclear-charge distribution in fission are compiled and evaluated for low-energy fission reactions (excitation energies up to ∿20 MeV). The current compilation includes data for thermal-nuetron-induced fission of ^{233}U, ^{235}U, and ^{239}Pu and for spontaneous fission of ^{252}Cf. Data for other fission reactions are to be added.
Purpose	Systematic trends in independent yields (IN) are derived from the data by use of models, which allow reasonable estimates to be made of independent yields for all fission products and increase knowledge of fission-reaction mechanisms.
Sources of information	Journals, reports, preprints, other compilations, and personal communications
Method	Original values of experimental data and uncertainties are maintained in a file, and average values are calculated and normalized for each A, when sufficient data exist, so that the sum of fractional independent yields (FI) is unity. The set of FI values for each fission reaction, or IN values derived from them, are treated by the method of least squares to derive systematic trends in the yields described by the Z_P and A'_P models. Experimental yield data are evaluated by comparison with other data, with average yield values, and with yields calculated from the models.
Cooperation	We are prepared to exchange files with other groups.
Computer file	Information is held in standard forms on computer files.
Completions	Compilation is continuous.
Publications	A.C. Wahl, "Systematics of Nuclear Charge Distribution in Fission - The Z_P Model," J. Radioanal. Chem. 55, 111 (1980). A.C. Wahl, "Nuclear-Charge distribution in Fission - Investigation of Systematics and Methods of Estimation of Independent Yields," Contribution to IAEA Petten Panel on Fission Product Nuclear Data - Sept., 1977. Published in: INDC(NDS)-87 (1978), 215. A.C. Wahl, A.E. Norris, R.A. Rouse, and J.C. Williams, "Products from Thermal-neutron-induced fission of ^{235}U: A correlation of Radiochemical Charge and Mass Distribution Data," in Proceedings of the Second International Atomic Energy Symposium on Physics and Chemistry of Fission, Vienna, Austria, 1969 (I.A.E.A.), p. 813.

U S S R

Laboratory and address	Fiziko-Energeticheskij Institut, Obninsk , and Institut Atomnoij Energii I.Y Kurchtova, Plochad I.V. Kurchatova, 46, Moscow, 123182 USSR
Names	Abagyan L.P., Zakharova S.M., Yudkevich M.S.
Evaluation	Capture cross sections for Pm isotopes.
Purpose	Production of the 21,80 and 26-group capture cross section fission product library for thermal, epithermal and fast reactor calculations.
Method	Re-evaluation of resonance parameters and average resonance parameters, thermal and epithermal neutron cross sections and capture resonance integrals. Calculation of capture cross sections using the recommended parameters in thermal and resonance region. Review of available σ_c evaluations in the unresolved resonance region to choose the best of them for Pm isotopes.
Major sources of information	Original papers on experimental data and available evaluations.
Publication	1. Zakharova S.M., Abagyan L.P., Kapustina V.F. The multi-group capture cross section library for fission products, P.2. Pm isotores. The evaluation of energy dependence of capture cross section for Pm-147. - Analytical review - 120, Obninsk, 1981, 82p. 2. Zakharova S.M., Abagyan L.P., Yudkevich M.S., Kapustina V.F. The multi-group capture cross section library for fission products, P.3. Pm isotopes. Analytical review - 142, Obninsk, 1981, 41p.

USSR

Laboratory and address:	Moskovskij Inzhenerno-Fizicheskij Inst. Moscow, 115409 USSR
Names:	A.N. Gudkov, A.B. Koldobskij, V.M. Kolobashkin, E.V. Semenova.
Evaluation:	Mass yields of fission products.
Purpose:	Prediction of the mass distributions of fission-fragment nuclides resulting from the fission (by neutrons of arbitrary energy) of heavy nuclei for which mass distributions are known experimentally for two or more fissioning neutron energies.
Method:	The "five Gaussian" method was used, the reference parameters being determined by the method of least squares.
Sources of Information:	M.E. Meek, B.F. Rider, NEDO - 12154-2 (1977). E.A.C. Crouch, At. Data Nucl. Data Tabl., 19 (1977) 417-432; original publications.
Results:	Recommended parameter values were obtained for calculating the mass distributions for ^{233}U, ^{235}U and ^{238}U resulting from fission by neutrons of arbitrary energy.
Discrepancies compared with published data:	The calculation formulae and values for most of the parameters differ widely from those recommended in the following: A.R. Musgrove et al., Proc. IAEA Panel of FPND, Vol. II Bologna (1973) 163, Vienna (1974); J.L. Cook et al., Austr. J. Phys. 29 (1976) 125.
Publications:	A.N. Gudkov, A.B. Koldobskij, V.M. Kolobashkin, E.V. Semenova, "Calculation of mass distributions for the fission products of heavy nuclei resulting from neutron-induced fission", Radiation Safety and the Protection of Nuclear Power Plants 5, Atomizdat, Moscow (1981) 59.

III. RECENT PUBLICATIONS RELATED TO FPND

The publications listed below refer to activities related to FPND which are not covered by the contributions contained in this issue. They are sorted according to

1. Fission yields and charge distribution
2. Neutron reaction cross sections
3. Decay data
4. Delayed neutron data
5. FP decay heat
6. Reviews and summaries

Completeness of this section has not been attempted. For papers presented at meetings see section IV.

III.1. Fission yields and charge distribution

(For fission yields of delayed neutron precursors see also "delayed neutrons")

Fission Yields of In Isotopes in the Thermal Neutron Fission of ^{235}U

M. Shmid, G. Engler
Z. Phys. A 311 (1983) 113

(including: T1/2 of $^{124-131}In$)

The absolute determination of cumulative yields of several nuclides from fission of ^{235}U induced by neutrons of spontaneous fission of ^{252}Cf

Institute of Atomic Energy
He Huaxue Yu Fangshe Huaxue (=J. Nucl. ə Radiochem., Beijing) Vol. 4 (Feb. 1982) 44

(in Chinese with English abstract)

Comparison of the Spontaneous Fission of ^{244}Cm and ^{252}Cf
(I). Fragment masses and kinetic energies

R. Schmidt, H. Henschel
Nucl. Phys. A395 (1983) 15

III.2. Neutron reaction cross sections

Measurement of the total neutron cross-section of selenium at neutron energies below 2 eV

M. Salama
Atomkernenergie - Kerntechnik 42 (1983) 187

Neutron-capture resonances for ^{82}Se

J.C. Browne, B.L. Berman
Phys. Rev. C 26 (1982) 969

In Situ Neutron Activation Analysis of and the Neutron Capture Cross-Section for ^{90}Sr

L.A. McVey, R.L. Brodzinski, T.M. Tanner
J. Radioanal. Chem. 76 (1983) 131

(discrepancy to old accepted value !)

Spectroscopy of ^{100}Ru and ^{102}Ru by resonance neutron capture

C. Coceva, P. Giacobbe
Nucl. Phys. A 385 (1982) 301

Mesurement of the neutron total cross sections of ^{109}Ag and ^{110m}Ag

V.A. Anufriev, S.I. Babich, V.N. Nefedov
At. Energ.(USSR) 53 (1982) 29
(Engl.: Soviet At. Energy 53 (1982) 478)

Interaction of neutrons with even-A tin isotopes.
I. total cross sections for E_n = 0.3-5.0 MeV

R.W. Harper, T.W. Godfrey, J.L. Weil
Phys. Rev. C 26 (Oct. 1982) 1432

III.3. Decay data

(for delayed neutron precursor decay data see also "delayed neutrons")

The Decay of ^{76}As

Weng Peikun, Liu Fengying, Yuan Guanjun, Li Shenggang, Lu Xiane, Cheng Shiping
Chinese J. Nucl. Phys. 4 (1982) 201

(in Chinese with English abstract)

Calorimetric Redetermination of the Half-life of ^{90}Sr

H. Ramthun
Nucl. Instr. Meth. 207 (1983) 445

Evidence for a Rotational Band in ^{99}Y

E. Monnand, J.A. Pinston, F. Schussler, B. Pfeiffer, H. Lawin, G. Battistuzzi, K. Shizuma, K. Sistemich,
Z. Phys. A 306 (1982) 183

Praezisionsbestimmung der Halbwertzeit des Nuklides ^{99m}Tc im Pertechnetat-Ion mittels eines Variationsverfahrens

K.P. Dostal
Isotopenpraxis 18 (1982) 201

(T1/2)

The Beta Decay of ^{104}Nb and the Level Scheme of ^{104}Mo

B.D. Kern, K. Sistemich, W.D. Lauppe, H. Lawin
Z. Phys. A 306 (1982) 161

Precision Measurement of gamma-ray Energies in the Range 450-600 keV

H. Kumahora, H. Inoue, Y. Yoshizawa
Nucl. Instr. Meth. 206 (1983) 489

(including: ^{106}Ru, ^{147}Nd)

Calibration of High-purity Germanium Detectors in the Energy Range from 25 to 122 keV

K. Debertin, W. Pessara
Int. J. Appl. Radiat. Isot. 34 (1983) 515

(I_γ; including low energy gammas or X-rays of: ^{108m}Ag, ^{131}I, ^{137}Cs, ^{152}Eu)

The gamma-gamma angular correlation studies in ^{132}Xe

S.S. Sooch, R. Kaur, N. Singh, P.N. Trehan
J. Phys. Soc. Jpn. 52 (Jan. 1983) 61

Population of ^{133}I from the beta decay of fission product $^{133}Te^g$ and the cluster-vibration model

H.G. Hicks, J.H. Landrum, E.A. Henry, R.A. Meyer
S. Brandt, V. Paar
Phys. Rev. C27 (1983) 2203

Shell model description of N = 81 five-exciton ^{135}Xe and the decay of ^{135}I

W.B. Walters, S.M. Lane, N.L. Smith, R.J. Nagle, R.A. Meyer
Phys. Rev. C 26 (Nov. 1982) 2273

(^{135}I: T1/2, E_γ, I_γ)

The radioactive decay of Isobars with A = 140

I. Adam et. al.
Izv. Akad. Nauk. SSSR, Ser. Fiz. 46 (1982) 2
(Engl.: Bull. Acad. Sci. USSR, Phys. Ser. 46 (1982) 1)

The decay of ^{144}Ce

Yu Banshui, Liu Fengying, Lu Xiane, Li Shenggang, Yang Chunxiang
Radiochem. Radianal. Lett. 53 (Oct. 1982) 351

Opposing properties of particle-hole and intruder-hole bands in N=87 nuclei and ^{149}Sm levels populated by $^{149}Pm(\beta^-)$and $^{149}Eu(EC)$

R.A. Meyer, J.W.T. Meadows, E.S. Macias
J. Phys. G. 8 (1982) 1413

(E_γ, I_γ)

The Radioactive Decay of ^{152}Eu

H.A. Ismail, H. Hanafi, M. Morsy, A. Nada, H. Abu-Leila
Acta Phys. Ada. Scient. Hung. 50 (1981) 391

The decay of ^{160}Tb

M.L. Hasiza, K. Singh, H.S. Sahota
Indian J. Phys. 56A (1982) 221

IV. MEETINGS

Internat. Conf. on Nuclear Data for Science and Technology

Antwerp, Belgium, 6-10 Sept. 1982

Proceedings published by D. Reidel Publishing Company (ISBN 90-277-1560-2)
Editor: K.H. Boeckhoff (CBNM Geel)

page selected papers:

9 ^{238}U, issues resolved and unresolved

G. DeSaussure, A.B. Smith

(review; including total delayed-neutron yields)

85 Convergence of integral and differential cross-section data for structural materials

J.L. Rowlands, R.W. Smith, J.M. Stevenson, W.H. Taylor

(including: Zr, Nb, Mo, Sn)

98 The integral check of neutron cross section data for reactor structural materials by measurement and analysis of neutron spectra

I. Kimura, S.A. Hayashi, K. Kobayashi, S. Yamamoto

(including: Nb, Mo)

143 Total cross section measurements of thermal and 24 keV neutrons for crystalline materials

O. Aizama, T. Matsumoto, H. Kadotani

(including: Zr, Nb)

147 Search for gas producing reactions in thermal reactors

P. D'hondt, C. Wagemans, E. Allaert, A. DeClercq, A. Emsallem, R. Brissot

(including:(n,α) cross sections for $^{95,97}Mo$, ^{101}Ru, ^{105}Pd, ^{113}Cd, ^{115}Sn; see also contribution on page 8)

152 Gamma-rays from capture of 400-keV neutrons

N. Yamamuro, H. Kitazawa, M. Igashira, T. Maruyama, K. Hashimoto

175 The TACO experiment for the determination of integral neutron cross-sections in a fast reactor

A. Cricchio, R. Ernstberger, L. Koch, R. Wellum

(see also contribution on page 49)

185 Reactor Irradiations of ^{242}Pu, comparison of measured and calculated yields of ^{244}Pu, ^{243}Am and ^{244}Cm, and study of the fission product yields

C. De Raedt, P. De Regge, T. Babeliowsky, E. Wattecamps

222 Average capture cross section of the fission product nuclei ^{104,105,106,108,110}Pd

E. Cornelis, C. Bastian, G. Rohr, R. Shelley,
T. van der Veen, G. Vanpraet

(see also contribution on page 15)

226 Neutron radiative capture and transmission measurements of ^{107}Ag and ^{109}Ag

M. Mizumoto, M. Sugimoto, Y. Nakajima, M. Ohkubo, Y. Furuta
Y. Kawarasaki

(see also contributions on pages 69,70)

230 Capture cross section, energy dependence of total cross section of ^{152}Eu isomer with T1/2=9.3 h for thermal neutrons

V.A. Pshenichniy, V.P. Vertebnyi, E.A. Gritzay

233 Mesures par activation d'isotopes separes de produits de fission dans des spectres de reacteurs a neutrons rapides

L. Martin Deidier, M. Darrouzet

(including: ^{98,100}Mo, ^{102,104}Ru, ^{108}Pd, ^{139}La, ^{141}Pr, ^{142}Ce, ^{146,148,150}Nd, ^{152}Sm)

237 Measurements of fission-product decay heat for fast reactors

Masatsugu Akiyama and Shigehiro An

(see also contribution on page 77)

245 A brief survey of experimental and theoretical data on fission product decay heat from U-235 and Pu-239

M.F. James

249 Calculs de puissance residuelle a l'aide de la bibliotheque CEA de donnees radioactives et du code PEPIN

B. Duchemin, J. Blachot, B. Nimal, J.C. Nimal, J.P. Veillaut

(see also contribution on page 128)

261 High resolution measurements of delayed neutron emission spectra from fission products

T.R. Yeh, D. CLark, G. Scharff-Goldhaber, R.E. Chrien, L.-J. Yuan, M. Shmid, R.L. Gill, A. Evans, H. Dautel, J. Lee

(see also contribution on page 101)

265 Delayed neutron spectral measurements and covariance error analysis for fast fission in ^{235}U and ^{239}Pu

J. Walker, D.R. Weaver, J.G. Owen

(see also contribution on page 95)

268 Integral measurements of delayed neutron average energies for ^{235}U

S. Synetos

272 Compilation of neutron precursor data

F.M. Mann, M. Schreiber, R.E. Schenter, T.R. England

(see also contributions on pages 147,152)

281 The UK Chemical Nuclear Data Libraries: evaluated nuclear decay data for reactor applications

B.S.J. Davies, A. Tobias, M.F. James, A.L. Nichols, E.A.C. Crouch

(see also contributions on pages 141-145)

284 Computer interpretation, analysis and evaluation of a nuclear decay schemes

G. Evangelides

(computer programs for use in decay heat or shielding calculations, sensitivity studies, etc.)

287 Decay scheme data for ^{239}U, ^{154}Eu and $^{140}Ba/^{140}La$

S.P. Holloway, J.B. Olomo, T.D. Mac Mahon, B.W. Hooton

360 Measurement of double differential neutron emission cross sections with 14 MeV source for D, Li, Be, C, O, Al, Cr, Fe, Ni, <u>Mo</u>, Cu, <u>Nb</u>, and Pb

A. Takahashi, J. Yammamoto, T. Murakami, K. Oshima, H. Oda, F. Fujimoto, K. Sumita

368 Measurement and evaluation of (n,t) cross sections

Z.T. Body, F. Cserpak, J. Csikai, S. Sudar, K. Mihaly

(including: ^{93}Nb)

(see also contribution on page 136)

781 Differential neutron scattering cross sections and average neutron parameters of tin isotopes

V.G. Nikolenko, A.B. Popov, G.S. Samosvat

818 IBA Description of collective states in neodymium isotopes

G. Maino, E. Menapace, A. Ventura

863 The measurement of short-lived radionuclides using a cyclic activation system

C.A. Adesanmi, N.M. Spyrou

(short lived fission products)

866 On neutron capture cross section measurements with the activation technique in the MeV region

P. Andersson, R. Zorro, I. Bergqvist,

($^{115}In(n,\gamma)^{116m}In$, see also contribution page 85)

873 Measurement of reaction cross-section radios of some neutron reactions using gamma and x-ray spectrometry

A. Reggoug, G. Paic, A. Chiadli

($^{113,115}In(n,2n)$ at 14.7 MeV)

987 Nuclear data activities in China

Zhou Delin

(including FPND; review)

991 The European-Japanese joint programme on neutron data evaluation

C.G. Campbell, C. Nordborg

(including many fission products)

1005 Evaluation et mesure de donnees nucleaires, programme et perspectives

N. Coursol, F. Lagoutine

Announcement of a

Specialists' Meeting on

"Yields and Decay Data of Fission Product Nuclides"

to be held at Berkner Hall, Brookhaven National Laboratory, Upton, N.Y.

24th - 27th October 1983

1. Organisation

This specialists' meeting will be held at Brookhaven National Laboratory (BNL), U.S., from Monday, 24th October to Thursday, 27th October, 1983. The meeting is sponsored by the NEA Nuclear Data Committee (NEANDC) and the U.S. Department of Energy (DOE), and its scientific programme has been established by a programme committee uder the chairmanship of Dr. R.E. Chrien of BNL. The scientific secretary will be Dr. T.W. Burrows of the National Nuclear Data Centre.

2. Programme of the meeting

The plan for the meeting is to have eighteen review talks scheduled over three and a half days. The last half day (Thursday afternoon) of the meeting will be devoted to a round table dicussion and a conference summary. The round table will be composed of four delegates from each of four separate workshops on the main areas of fission yields, delayed neutron applications, decay heat and microscopic data for modelling. These workshops, to which all registrants are expected to contribute, will meet in two evening sessions, Monday and Wednesday, to prepare overall assessments on the status of, and need for, nuclear data in the different areas. The conclusions are to be provided verbally in the round table discussion.

The detailed programme of review papers is given in Annex 1. Fifty minutes each have been allowed for these talks, plus ten minutes discussion. Participants are invited to submit titles and a very brief abstract for poster presentations: three one-hour periods have been set aside for discussion of posters, and the posters will be on display throughout the meeting. The posters, which replace individual presentation of shorter contributed papers, are an important feature of the meeting, and it is expected that new results of importance will be presented in this way.

3. Participation

Participation in the meeting is restricted to scientists nominated, in the case of OECD Member countries, by national representatives on NEANDC. The International Atomic Energy Agency (IAEA) was invited to submit nominations for a limited number of participants from non-OECD countries, and scientists from such countries wishing to attend the meeting should contact IAEA through their appropriate national channels.

A total attendance of between 70 and 100 persons is expected. The closing data for accepting nominations will be the 15th September 1983.

A registration fee of $80 U.S. will be charged, and should be paid on registration at the meeting. This fee will include the cost of the buffet and conference banquet, and conference proceedings.

5. Languages

The working language of the meeting will be English.

6. Papers and Posters for the Proceedings

Three copies of each review paper are needed for preparing the proceedings: one original typed on the composing sheets sent to authors from BNL (6 1/2 x 8 1/2 inches = 16.5 x 21.6 cms. page frame for reproduction full size in the proceedings), and at least two clear and legible copies. Two-page extended summaries of posters should be prepared in the same way for inclusion in the proceedings. Authors may bring their photo-ready text to the meeting, or send it sufficiently in advance to Dr. T. Burrows at the National Nuclear Data Center, BNL.

7. Registration and Lodging

After nomination of national representatives on NEANDC, or through IAEA, participants should return their completed Participant Registration Forms (two copies: one each to Dr. T. Burrows, BNL, and Dr. C. Nordborg, NEA Data Bank) and the Participants Lodging and Local Transport form to Dr. T. Burrows.

A package will be sent to authors and participants containing:

- Information about access to BNL and a map of the laboratory site,

- Instructions to authors, and

- Composing sheets (form 2303) where a paper or a poster has been submitted.

8. Detailed Provisional Programme

All review talks are 50 minutes plus 10 minutes discussion.

AM sessions: 09.00 - 12.30 PM sessions: 14.00 - 17.30

Sunday, 23 October

Preregistration and Buffet: Brookhaven Center 17.00 - 21.00

Monday, 24 October

AM	1.	Independent Fission Yield Measurements H.O. Denschlag (Mainz)
AM	2.	Status of Fission Yield Measurements T. England (Los Alamos)
	3.	Poster Discussion: "Yields"
PM	4.	Systematics of Neutron-induced Fission Yields J.P. Blachot (Grenoble)
PM	5.	Correlation of Fast Reactor Fission Yield with Neutron Energy W.J. Maeck (Idaho)
PM	6.	Fission Yield Data for Dosimetry A.J. Fudge (Harwell)
Evening:		Workshops

Tuesday, 25th October

AM	7.	Theories of Beta Strength Distribution in Nuclei K. Takahashi (Darmstadt)
AM	8.	Measuring Beta-ray Strength Functions K.L. Kratz (Mainz)
AM	9.	Poster Discussion: "Spectroscopy"
PM	10.	Problems in Decay Heat Measurement and Evaluation M.F. James (Winfrith)
PM	11.	Microscopic Beta and Gamma Data for Decay Heat Needs J.K. Dickens (ORNL)
PM	12.	Decay Heat Data Needs T. Yoshida (Japan)
Evening:		Buffet, Brookhaven Center Workshops

Wednesday, 26th October

AM	13.	Delayed Neutron Emission Probabilities P. Reeder (Pacific NW)
AM	14.	Measuring Delayed Neutron Spectra - A Comparison of Techniques R. Greenwood (Idaho)
AM	15.	Poster Discussion: "Delayed Neutrons"

AM	16.	Calculating Delayed Neutron Spectra F. Mann (Hanford)
PM	17.	Analytical Applications for Delayed Neutrons G. Eccleston (Los Alamos)
PM	18.	Prompt Fission Neutron Spectra and Averge Prompt Neutron Multiplicities D. Madland (Los Alamos)
19.00		Reception and Banquet, Berkner Hall

Thursday, 27th October

AM	19.	Nuclear Masses far from Stability D. Brenner (Clark University)
AM	20.	Applications for Fission Product Data to Problems in Stellar Nucleosynthesis G.J. Mathews (Livermore)
AM	21.	Spins and Moments of Fission Product Nuclei C. Ekstroem (CERN)
PM	22.	Workshop Round Table a. Fission Yields b. Decay Heat c. Delayed Neutron Applications d. Microscopic Data for Modelling
PM	23.	Meeting Summary G. Rudstam (Studsvik)