NNDEN/25

NEUTRON NUCLEAR DATA EVALUATION NEWSLETTER

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GENERAL RECOMMENDATIONS TO CONTRIBUTORS

Contents and Presentation

These newsletters are meant to be informal : nevertheless, we think it useful to give some recommendations concerning the contents, presentation, distribution, etc.

The Newsletters are concerned with evaluation activities - with evaluation work itself and with computer programs useful for evaluation.

Experimenters should be careful to distinguish between "evaluating" all the good data and the more customary process of simply analysing their own measurements.

When compiling your contribution, the following headings may serve as a guide :

1. Names, address, telephone number, telex code.
2. Work recently completed and publications.
3. Work in progress - please give names of physicists doing each evaluation.
4. Work planned for near future, i e., work expected to start within six months (before publication of the next newsletter).
5. Computer programs for : nuclear data file operations - nuclear data analysis - nuclear model calculations.

Any note or report mentioned should be available on request to another evaluator for his own use but not necessarily for widespread copying and re-distribution. The distribution list of each newsletter will be attached to it.

Contributions should be forwarded typewritten in single spacing, as the newsletters will be produced directly from this typescript.

IMPORTANT NOTE

Future Neutron Nuclear Data Evaluation Newsletters will be distributed on 1st June and 1st December each year.

Evaluators are requested to send their contributions by :

15th May and 15th November

to :

NEA DATA BANK
Boîte Postale 9
91190 GIF SUR YVETTE
FRANCE

NEUTRON NUCLEAR DATA EVALUATION NEWSLETTER

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This newsletter summarizes evaluation activity in the OECD area. It should be noted that work in progress and future plans cited in this document may be changed without notice: consequently, the newsletter should neither be quoted as a reference in publications nor be listed in an abstract journal.

The information contained in this newsletter concerns :

1. Evaluation work on particular nuclides;
2. Development of codes for the manipulation of data and for the calculation of cross sections;
3. Publications relevant to the neutron data field.

Contributions on evaluation activities have been received from :

		Page
FRANCE	CEN, Bruyères-le-Châtel	1
	CEN, Cadarache	3
ITALY	CNEN, Bologna	5
JAPAN	Japanese Nuclear Data Committee	7
NETHERLANDS	ECN, Petten	9
UNITED KINGDOM	AERE, Harwell/AEE, Winfrith	11
UNITED STATES	Hanford Engineering Development Laboratory	14
	National Nuclear Data Centre	16

Other information included in this issue :

Partial CINDA index to national progress reports to NEANDC (Information for some countries was not yet available when the issue was prepared).	24
Nuclear Data files and multi-group cross sections sets available from the NEA Data Bank (a fuller description of these data files is in preparation, and will be available on request).	36

December, 1978

1 - NEW EVALUATIONS RECENTLY COMPLETED a), IN PROGRESS b) OR PLANNED IN THE NEAR FUTURE c)

For the USA contribution, see pages 14 to 16

Nuclide	Data Type	Energy Range	Pages			Nuclide	Data Type	Energy Range	Pages		
			a	b	c				a	b	c
C-13	(n,2n)				2	Ru-106				14	
Na-22	capt.				10	Rh-103	many				2
Ar-38	capt.				10	Rh-103				14	
Ar-40	capt.				10	Pd-105	all			6	
Sc-45	capt.	10μeV-20MeV		2		Pd-105				14	
Cr-isot.	He prod.				15	Pd-107				14	
Cr-50	capt.			9		Pd-nat.	many			9	
Fe-isot.	He prod.				15	Ag-nat	many			9	
Fe-54	capt.			9		Ag-109				14	
Co-58m	capt.				10	Sn-112	capt.				10
Ni-isot.	He prod.				15	Cs-133				14	
Ni-58	all			4		Cs-135				14	
Ni-60	all			4		Ce-138	capt.	10μeV-20MeV		14	
Ni-62	capt.				10	Ce-140	(n,2n)	to 20MeV		2	
Ni-64	capt.				10	Ce-144				14	
Cu-isot.	He prod.	to 40MeV		14		Nd-nat.	capt.		9		
Zn-64	capt.			9		Nd-nat.	many			9	
Se-76	scatt.		1			Nd-143	many			6	
Se-78	scatt.		1			Nd-143				14	
Rb-85	(n,2n)	to 20MeV		2		Nd-isot.	capt.		9		
Nb-93	el+inel scatt	5keV-5MeV	1			Nd-145				14	
Nb-93m	el+inel scatt	5keV-5MeV	1			Nd-147	capt.		9		
Nb-isot.	He prod.	to 40MeV			15	Pm-147	capt.		9		
Mo			9			Pm-147				14	
Mo	capt.			14		Sm-nat.	many			9	
Mo-92	many	10μeV-15MeV	7			Sm-149				6	
Mo-94		10μeV-15MeV	7			Sm-149				14	
Mo-95				14		Sm-151				6	
Mo-97				14		Sm-151				14	
Mo-98				14		Sm-154	capt.	10μeV-20MeV		2	
Tc-99				14		Gd-isot.				2	
Ru-101				14		Tb-159	capt.+scatt	10μeV-20MeV			2
Ru-102				14		Tm-169	many	10μeV-20Mev	1		
Ru-104				14		Tm-169	capt.	10μeV-20MeV	1		

Nuclide	Data Type	Energy Range	Pages			Nuclide	Data Type	Energy Range	Pages		
			a	b	c				a	b	c
Lu-isot.	many				2	Pu-240	many			7	
Lu-175	(n,2n)		1			Pu-241	fission		5		
Lu-175	(n,3n)		1			Pu-241		reson.region		6	
W-isot.	many	500keV-20MeV		2		Pu-241	many			7	
W-isot.	capt+inel scatt			2		Pu-242	scatt.	10keV-20MeV	1		
Ir-nat	many	10μeV-20MeV	1			Pu-242		reson. region		6	
Pt-196	scatt.		1			Am-241	reson.params. (2 papers)		3		
Au-197	(opt. model)	10keV-57MeV	1								
Au-isot.	n.2n,np,nx			2		Am-241	many	10μeV-15MeV		4	
Th-228					8	Am-241	many	0-15MeV		6	
Th-230					8	Am-241	many			12	
Th-230	many		14			Am-243		reson.region		6	
Th-232	many	0.3-2.4MeV	1			Cm-242		reson.region		6	
Th-232	many			8		Cm-242					8
Th-233					8	Cm-245	many	up to 20MeV	7		
Th-234					8	F.P.			3,5		
Pa-231	many		14			F.P.		25-group	5		
Pa-233	many		14			F.P. for breeder			9		
U-232	many		14			F.P.	capt.		9		
U-233	tot.+ fiss.	100eV-20MeV		7		F.P. mixt.	$\sigma_{n\alpha}+\sigma_{np}$		9		
U-235	(n,xn)			2		F.P. nuclides	capt.				10
U-235	fission		5			F.P.	decay heat	light masspk		12	
U-235	many			7		F.P.				14	
U-238	many			7		opt. model				2	
U-238	reson.params.			8		opt. model	(n,2n),(n,3n)		7		
U-238	(n,γ)&spectr	5-20MeV	7			actinides				2	
Np-237	reson.params.			4		actinides	decay data, spon.fiss.			12	
Pu-236	many			8							
Pu-238	many			8		actinides	many (for ENDF/B-VI)				14
Pu-239	(n,xn)			2							
Pu-239	fission		5								
Pu-239	many			7							
Pu-239	fission	thermal		12							
Pu-240	scatt.	10keV-20MeV	1								

Service de Physique nucléaire
Centre d'Etudes de Bruyères-le-Châtel
France

Names : O.BERSILLON, J.P.DELAROCHE, J.M.DUFOUR, L.FAUGERE, J.JARY, Ch.LAGRANGE, C.PHILIS, J.SALVY, G.SIMON, N.VERGES

Address : Service de Physique nucléaire
Centre d'Etudes de Bruyères-le-Châtel
BP n° 561
92542 MONTROUGE Cedex, France

Work recently completed and publications

- C.PHILIS, P.G.YOUNG* , E.D.ARTHUR* "An evaluation of the ^{175}Lu(n,2n) ^{174}Lu, ^{175}Lu(n,2n)^{174m}Lu and ^{175}Lu(n,3n)^{173}Lu cross sections from threshold to 20MeV " Report LA-7236 MS (1978)

- Ch.LAGRANGE, J.JARY "Coherent optical and statistical model calculations of neutron cross sections for ^{240}Pu and ^{242}Pu between 10keV and 20MeV" Report NEANDC(E)198"L", INDC(FR)30/L (1978)

- J.P.DELAROCHE "Potentiel optique nucleon-^{197}Au entre 10keV et 57MeV", Com.HARWELL Conf., Sept.1978

- J.P.DELAROCHE "Effets des déformations non axiales sur la diffusion des neutrons par ^{76,78}Se et ^{196}Pt", Com.HARWELL Conf.,Sept.1978

- O.BERSILLON, L.FAUGERE "Calcul des spectres d'émission et de sections efficaces par le modèle d'excitons de GRIFFIN", Com.HARWELL Conf., Sept.1978

- G.SIMON, E.D.ARTHUR* ,C.PHILIS, O.BERSILLON "Evaluation des sections efficaces neutroniques de ^{169}Tm de 10^{-5}eV à 20MeV", Com.HARWELL Conf. Sept.1978

- O.BERSILLON, G.SIMON, C.PHILIS, E.D.ARTHUR* "Evaluation des Sections efficaces neutroniques de Ir naturel de 10^{-5}eV à 20MeV", Com.HARWELL Conf., Sept.1978

- G.SIMON, E.D.ARTHUR* , C.PHILIS, O.BERSILLON "Evaluation of the capture cross section of ^{169}Tm from 10^{-5}eV to 20MeV", Int.Symp. on Neutron Capture, BROOKHAVEN, Sept.1978

- Theoretical calculations of neutron elastic and inelastic scattering cross sections for ^{93}Nb and ^{93m}Nb from 5keV to 5MeV (J.P.DELAROCHE, Ch.LAGRANGE)

- Relations between fission probabilities and thermal cross sections (J.JARY)

- Preliminary theoretical interpretation of neutron cross sections (total, fission, capture, elastic and inelastic scattering) and fission products angular distributions for ^{232}Th from 0.3MeV to 2.4MeV (J.JARY, with H.ABOU YEHIA and J.TROCHON)

.../...

Work in progress

- Evaluation of (n,2n) cross sections for ^{85}Rb and ^{140}Ce from threshold to 20MeV (N.VERGES, C.PHILIS)

- Evaluation of the capture cross section for ^{45}Sc and ^{154}Sm from 10^{-5}eV to 20MeV (G.SIMON)

- Carrying out of a Fortran code for generating multigroup γ-ray production cross sections (G.SIMON, R.PERRIER, C.PHILIS)

- Theoretical evaluations of (n,2n), (n,p) and (n,α) cross sections for a set of Au isotopes (J.JARY)

- Optical model code with deformed non local folding potentials treated by matrix methods (J.M.DUFOUR, J.SALVY)

- Carrying out of a Fortran code for calculating capture cross sections and associated γ spectra from direct and semi-direct mechanisms (J.M. DUFOUR, J.SALVY)

- Evaluation of neutron cross sections and γ-ray production data for W isotopes in the energy range 500keV - 20MeV (E.ARTHUR* , C.PHILIS, A.B.SMITH**)

- Coherent optical and statistical model calculations of neutron cross sections for Gd isotopes (Ch.LAGRANGE, J.P.DELAROCHE)

- Tests of the "JLM" optical model and its applications for calculating neutron cross-sections (Ch.LAGRANGE)

- Systematic study by nuclear models of characteristics of odd actinides (J.JARY)

- Calculation of neutron spectra from actinides (n,xn) reactions. Applications to ^{235}U and ^{239}Pu. (J.JARY)

- Theoretical analysis of neutron capture and inelastic scattering of W isotopes with consideration of a deformed optical potential (J.P.DELAROCHE)

Plans for the near future

- Evaluation of capture and scattering cross sections for ^{159}Tb and capture cross section for ^{138}Ce from 10^{-5}eV to 20MeV (G.SIMON)

- Evaluation of some cross sections for unstable Lu isotopes (O.BERSILLON, C.PHILIS)

- Calculations of ^{13}C(n,2n) cross section (J.JARY)

- Consistent calculations by SPRT method of total, scattering and capture cross sections for ^{103}Rh (Ch.LAGRANGE)

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*Los Alamos Scientific Laboratory
**Argonne National Laboratory

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CEA/CEN CADARACHE - FRANCE

Names : E. FORT, H.DERRIEN, D. LAFOND, J.P. DOAT, F. CASSANG, TRANG-QUOC THUONG.

Address : CEA/CEN CADARACHE
DRNR/SPNR
BP N° 1
13115 - SAINT PAUL LEZ DURANCE

-Work recently completed

. Contributed paper presented at HARWELL conference, September 1978 :

Fission Product library for SUPER-PHENIX project (DARROUZET, FORT, REFFO et al.)

. Contributed paper presented at the meeting on nuclear data for higher Pu and Am isotopes, BNL/NNDC, November 20 - 22 1978 :

Evaluation of Am 241 Resonance parameters and their consequences for the unresolved region (H.DERRIEN, E. FORT, D. LAFOND).

. To be published in a NEANDC report :

Evaluation of Am 241 resonance parameters (H. DERRIEN).

.../...

- Work in progress

  . Evaluation of a complete set of neutron cross sections for Am 241 from 10^{-5} ev to 15 MeV
  (E. FORT, H. DERRIEN)

  . Evaluation of a complete set of neutron cross sections for ^{58}Ni and ^{60}Ni
  (D. LAFOND, E. FORT)

  . Evaluation of the resonance paramters of Np 237 (H. DERRIEN)

- Work on code development

  - Improvement of the statistical code FISINGA : extension to include the double humped fission barrier
  (E. FORT, F. CASSANG)

  . Code for (n, x n) and (n, x nf) cross section calculation (E. FORT, J.P DOAT).

C.N.E.N. - DIVISIONE FISICA - LABORATORIO DATI NUCLEARI - Via Mazzini, 2
40138 BOLOGNA, ITALY - tel. 307562 - telex 610167 CNEN/BO.I

Names: F. Fabbri, T. Martinelli, E. Menapace, M. Motta, G.C. Panini, G. Reffo, M. Vaccari, A. Ventura.

Work recently completed and publications

- An Evaluated Fission Product Data Library for Super Phenix Project.
  CNEN-CEA paper presented at Harwell Int. Conf., 25-29 Sept. 1978.

- An Improved JWKB Approximation for Multiple-Lumped Fission Barriers.
  T. Martinelli, E. Menapace, A. Ventura.
  Lettere al Nuovo Cimento 20, 267 (1977).

- On the Penetrability of Multiple-Lumped Fission Barriers.
  T. Martinelli, E. Menapace, A. Ventura.
  CNEN Report RT/FI(78)7, 1978.

- On the Fission Probability for ^{235}U, ^{239}Pu and ^{241}Pu.
  V. Benzi, G. Maino, E. Menapace.
  Lettere al Nuovo Cimento 21, 231 (1978).

- Parameter Systematics for Statistical Theory Calculations of Neutron Reaction Cross Section.
  G. Reffo.
  CNEN Report RT/FI(78)11.
  Lectures held at ICTP Trieste during the "Winter Course on Nuclear Physics and Reactors", 17 Jan. - 10 March, 1978.

- The Rôle of Desk Calculators in Nuclear Data Evaluation.
  M. Motta.
  Lectures held at ICTP Trieste during the "Winter Course on Nuclear Physics and Reactors", 17 Jan. - 10 March, 1978.

- Graphs of 25-Group Cross Sections of 63 F.P. Nuclei from Different Data Files.
  A. Montaguti, G.C. Panini, M. Vaccari.
  (To be published as CNEN Report RT/FI 1978).

Work in progress

- A revision of the evaluation for the fission products Pd105, Nd143, Sm149 and 151 is in progress. The revision takes into account the information obtained by integral experiments (see the quoted paper of Harwell Conf.) (E. Menapace, M. Motta).

- Evaluation of the resonance region (resolved and unresolved) for Pu241, 242, Am243, Cm242 is in progress. In addition, the evaluation of Am241 in the total range 0-15 MeV is in progress for a comparison with the contemporary evaluation from CEA-France and KFK-Germany (E. Menapace, M. Motta, A. Ventura).

- Microscopic calculations of nuclear level densities are presently performed for spherical and statically deformed nuclei, starting from single particle levels and residual pairing interaction in the framework of the BCS approximation (G. Maino, E. Menapace, A. Ventura).

Computer programs

A complete set of codes in basic language for minicomputer (Olivetti P6060) has been prepared for the manipulation of data and evaluation of the resolved resonance region (partly presented at the IAEA Winter Courses 1978 - see quoted publications) (M. Motta).

Contribution to Neutron Nuclear Data Evaluation Newsletter-25

Japanese Nuclear Data Committee
(Nuclear Data Center, JAERI)

Work recently completed and publication:

(i) Direct and Collective Captures of Energetic Neutrons by Ellipsoidally Deformed Nuclei.
H. Kitazawa, T. Hayase and N. Yamamuro (TIT).
(to be published in Nucl. Phys.)

The direct and collective theories for nucleon radiative capture are applied to the ellipsoidally deformed nucleus within the framework of an adiabatic approximation. Numerical application is made for the $^{238}U(n,\gamma)^{239}U$ reaction with 5 to 20 MeV neutrons. Contributions of the capture cross section from the rotational bands for all Nilsson levels in ^{239}U are calculated to produce the excitation curve and capture γ-ray spectra for this reaction. Good agreement is obtained between the calculated cross sections and the observed data.

(ii) Evaluation of the Neutron Nuclear Data for ^{92}Mo and ^{94}Mo
T. Hojuyama (MAPI), JAERI-M 7276
(reported in Japanese)

Evaluation of the neutron nuclear data for ^{92}Mo and ^{94}Mo has been made for the total, elastic scattering, radiative capture and inelastic scattering cross sections in the energy range from 10^{-5} eV to 15 MeV. These data were compiled in Japanese Evaluated Nuclear Data Library, version one, JENDL-1 together with the data for the other molybdenum isotopes and element molybdenum.

(iii) Evaluation of Neutron Nuclear Data for ^{245}Cm
S. Igarasi and T. Nakagawa (JAERI), JAERI-M 7733
(reported in Japanese)

Evaluation of neutron nuclear data for ^{245}Cm was performed below 20 MeV. Calculations below 60 eV where the resonance parameters were given were carried out with the single-level formula, and the differences between multilevel and single-level calculations were taken as the background cross sections. Using semi-empirical formula, the fission cross section was obtained above 50 eV. Optical and statistical model calculations were made in order to obtain the total, capture, inelastic and elastic scattering, (n,2n) and (n,3n) reaction cross sections. The number of neutrons per fission was also estimated.

Work in progress:

(i) Study on mutual consistency of the evaluated data for ^{235}U, ^{238}U, ^{239}Pu, ^{240}Pu, and ^{241}Pu is in progress in Working Group on Heavy-Nuclide Nuclear Data of JNDC. The optical potential parameters were also studied for the above five nuclides (from H. Matsunobu, SAEI).

(ii) Evaluation work of the nuclear data for ^{233}U is performed. Evaluation of the total cross section and the fission cross section has been almost completed in the energy range from 100 eV to 20 MeV. The optical potential parameters obtained from the evaluation of the total cross section were consistent with those of the other heavy nuclides. (from H. Matsunobu, SAEI).

(iii) Evaluation of neutron nuclear data for ^{236}Pu and ^{238}Pu is now in progress. The results will be stored in the second version of Japanese Evaluated Nuclear Data Library, JENDL-2. (from T. Hojuyama, MAPI).

(iv) Reevaluation of ^{232}Th neutron nuclear data for JENDL-2 is made. (from T. Ohsawa, KYU).

(v) Evaluation work on resonance parameters of ^{238}U is making progress. The evaluated parameters will be compiled in JENDL-2. (from T. Nakagawa, JAERI).

Work planned for the near future :

(i) Evaluation of neutron nuclear data for ^{228}Th, ^{230}Th, ^{233}Th and ^{234}Th is going to be made. (from T. Ohsawa, KYU),

(ii) Evaluation on ^{242}Cm nuclear data will be started. (from T. Fuketa, JAERI)

S. Igarasi

Nuclear Data Center
Tokai Research Establishment
Japan Atomic Energy Research Institute
Tokai-mura, Naka-gun, Ibaraki-ken, Japan

November 10, 1978

NEUTRON NUCLEAR DATA EVALUATION NEWSLETTER-25

Petten - The Netherlands

1. Names

H. Gruppelaar, R.J. Heijboer, H.A.J. v.d. Kamp and H. Akkermans, Netherlands Energy Research Foundation (ECN), Petten, The Netherlands, Telephone: (02246) - 6262, telex: 57211 reacp nl.

2. Recent publications and preprints on evaluation and adjustment of cross sections for fission-product nuclides:

|1| H. Gruppelaar, Evaluated neutron cross sections of natural molybdenum, ECN-40 (1978).

|2| H. Gruppelaar, J.W.M. Dekker, A.J. Janssen and H.Ch. Rieffe, Adjustment of evaluated neutron capture cross sections of Neodymium isotopes to integral STEK and CFRMF data, Int. Conf. on Neutron Physics and Nuclear Data for Reactors and other Applied Purposes, Harwell, September 1978.

|3| R.J. Heijboer, Pseudo fission-product cross sections for a 1300 MWe fast breeder reactor (status July 1978), ECN-report (in print).

3. Work recently completed

- Evaluation and adjustment of capture cross sections for stable Nd isotopes, ^{147}Nd, natural Nd and ^{147}Pm.
- Adjustment of capture point cross sections for about 20 fission product nuclides in the statistical-model energy range.

4. Work in progress

- Evaluation of capture cross sections for nuclides in the primary cooling circuit of a LMFBR; e.g. ^{64}Zn, ^{50}Cr, ^{54}Fe.
- Contribution of $\sigma_{n\alpha}$ and σ_{np} to capture cross sections of fission products and lumped fission-product mixture.
- Evaluation of cross sections for natural Pd, Ag, Nd, Sm.
- Study of angular distributions in pre-equilibrium models.

5. Work planned for the near future

- Continuation of efforts in evaluation and adjustment of capture cross sections for about 20 fission-product nuclides.
- Further evaluation of capture cross sections for nuclides in the primary cooling circuit of a LMFBR, i.e. for ^{22}Na, $^{38,40}Ar$, ^{58m}Co, $^{62,64}Ni$, ^{112}Sn.

6. Work about codes

The KEDAK processing code MIGROS-3 has been adapted to the CDC-CYBER-175 computer.

WNDG/ 201

NUCLEAR DATA EVALUATION NEWSLETTER

NO 25

The United Kingdom

1 PERSONNEL

The following graduate personnel are currently working on nuclear data evaluation:-

UK Atomic Energy Authority

i) Winfrith, Nuclear Data Group J S Story - M F James - R W Smith

Address: Building B21, Atomic Energy Establishment, Winfrith, Dorchester, Dorset. Telephone Dorchester 3111; Telex No 41231

Winfrith Technology Branch - A L Nichols

Address: Building A50, Atomic Energy Research Establishment, Winfrith, Dorchester, Dorset. Telephone Dorchester 3111; Telex No 41231

ii) Harwell, Electron Eccelerator Group (Building 418)

J E Lynn - M C Moxon - M G Sowerby - C A Uttley

Address: Atomic Energy Research Establishment, Harwell, Oxfordshire, OX11 ORA. Telephone Abingdon 24141: Telex No 83135.

Harwell Chemistry Division (Building 220)

J G Cuninghame - E A C Crouch - Katherine M Glover - M King

Address: Atomic Energy Research Establishment, Harwell, Oxfordshire, OX11 ORA. Telephone Abingdon 24141: Telex No 83135

iii) Central Electricity Generating Board

Berkeley Nuclear Laboratory - B S J Davies - A Tobias

Address: Berkeley Nuclear Laboratories, CEGB Berkeley, Gloucestershire GL13 9PB Telephone Berkeley 451.

iv) British Nuclear Fuels Ltd

Windscale & Calder Works - J R Parkinson

Address: Windscale & Calder Works, Sellafield, Seascale, Cumbria Telephone Seascale 333.

2 WORK COMPLETED

Tobias (CEGB) has extended and improved the fission-product inventory code FISP-5, and has extended his code COGEND to output spontaneous fission decay data in ENDF/B-5 format; see references in Section 5 below.

Smith (AEEW) sent copies of the resonance cross-section code SIGAR-5 (two versions) to the NEA Data Bank in July. This programme includes the routine TEMPO which carries out Doppler broadening by numerical integrations.

3 WORK IN PROGRESS

Evaluation of the Am-241 neutron cross-section data at AERE is virtually complete, and a preliminary file is available as DFN-1009. However, following discussions with AEEW some small changes may be made in the low energy region. Documentation of the file is also nearly finished, and will be issued when the modifications referred to above have been done.

Work continues on provision of data for up-dating the files of the Chemical Nulcear Data Committee (CNDC):

(i) The fission-product decay data set UKFPDD-1. Davies (CEGB) has extracted fission-product decay data from the ENSDF for about 80 nuclides in the light mass peak, and Parkinson (BNFL) has completed evaluations for 10 nuclides in the heavy mass peak.

Testing of the UKFPDD-1 file in decay heat calculations (James - AEEW) shows disagreement between calculated and measured values for Pu-239 thermal neutron fission. Tobias has attempted to identify any deficiencies in the file which might account for this. For cooling times below 1000 secs an appreciable fraction of the calculated decay heat is from nuclides having semi-empirical values for half-lives and/or mean beta and gamma energies. For 48 of these nuclides half-life measurements have recently been reported, and for a further 48 nuclides the decay schemes have been studied experimentally for the first time. It is planned to include these measured data in the UKFPDD file by next Easter.

(ii) Fission-product yields. Crouch (AERE) is compiling further data for his fission-yield evaluations and is refining the methods used to produce self-consistent data sets.

(iii) Decay data for activation products of structural materials. No further work is planned since what was reported in the last Newsletter.

(iv) Heavy element and actinide decay data. The file being prepared by Nichols (AEEW) is about half done; when completed, for 119 nuclides, it will be added to the set of UKCNDC files. Recent work has drawn attention to many further measurement requirements, and a list of these will be produced. James (AEEW) is evaluating the spontaneous fission data for inclusion in this file.

4 COMPUTER PROGRAMMES - FURTHER WORK

The User's Guide for SIGAR-5 is now nearly complete.

A more advanced edition of the programme, SIGAR-6 is still under test. This includes a routine for calculating the cross-section contributions of distant unresolved resonances, a routine for calculating Lamb's effective temperature from the physical and Debye temperatures, and an improved Doppler broadening routine DOPCUB as an alternative to TEMPO.

Further improvements have been made to the programme MINIGAL, anda User's Guide is in draft.

5 PAPERS

TOBIAS A (May 1978) CEGB report RD/B/N-4303. 'FISP-5, an extended and improved version of the fission-product inventory code FISP'.

TOBIAS A (June 1978) CEGB report RD/B/N-4309. 'Extensions to COGEND for ENDF/B-V output of spontaneous fission decay data'.

I C McKean, (AERE)
M G Sowerby (AERE)
J S Story (AEEW)

14 November, 1978

HANFORD ENGINEERING DEVELOPMENT LABORATORY

U.S.A.

1. Names

D. L. Johnson, F. M. Mann, R. E. Schenter and F. Schmittroth, Hanford Engineering Development Laboratory (HEDL), P.O. Box 1970, Richland, WA 99352 U.S.A., Telephone: (509) 942-6598

2. Work recently completed

Evaluation of 4 thorium cycle isotopes for inclusion in ENDF/B-V: ^{230}Th, ^{231}Pa, ^{233}Pa, and ^{232}U.

Development of computer code to combine integral (STEK worth ratios and CFRMF reaction rate ratios) and microscopic (experimental data and evaluated curves) data.

Incorporation of pre-equilibrium (exciton model) and statistical direct reactions into computer code (HEDL-TME 78-83, to be published).

3. Work in progress

Evaluation of 182 fission product isotopes including 20 of the most important isotopes for FBR applications: ^{105}Pd, ^{99}Tc, ^{101}Ru, ^{107}Pd, ^{103}Rh, ^{133}Cs, ^{147}Pm, ^{149}Sm, ^{145}Nd, ^{102}Ru, ^{135}Cs, ^{97}Mo, ^{109}Ag, ^{106}Ru, ^{143}Nd, ^{151}Sm, ^{95}Mo, ^{104}Ru, ^{98}Mo, and ^{144}Ce.

Evaluation of capture cross section of Mo.

Calculation of helium production for Cu for neutron energies to 40 MeV.

4. Work planned for the near future

Evaluation of actinide, thorium cycle, and fission product isotopes for ENDF/B-VI

Evaluation of high energy (E_n > 20 MeV) cross sections for the construction and operation of the Fusion Material Irradiation Testing (FMIT) Facility.

Evaluation of helium production for stainless steel isotopes and for Nb for neutron energies up to 40 MeV.

U.S.A. CONTRIBUTION TO NNDEN-25
via the National Nuclear Data Center

RECENT PUBLICATIONS

ANL/NDM-40 February, 1978 44 pages
"Statistical Theory of Neutron Nuclear Reactions"
P.A. Moldauer

LA-7236 April, 1978 31 pages
"An Evaluation of the ^{175}Lu (n,2n) ^{174}Lu, ^{175}Lu (n,2n) ^{174m}Lu, and ^{175}Lu (n,3n) ^{173}Lu Cross Sections from Threshold to 20 MeV"
C. Philis, P.G. Young, E.D. Arthur

ORNL-5393 April, 1978 73 pages
"Sensitivity and Uncertainty Analysis for Functionals of the Time-Dependent Nuclide Density Field"
M.L. Williams, C.R. Weisbin

ORNL/TM-6245 May, 1978 15 pages
"Review and Combination of Experimental Results for Neutron Emission per Fission of ^{232}Th"
R. Gwin

ORNL/TM-6286 May, 1978 69 pages
"SIOB: A FORTRAN Code for Least Squares Shape Fitting Several Neutron Transmission Measurements Using the Breit-Wigner Multilevel Formula:
G. de Saussure, D.K. Olsen, R.B. Perez

USA - CONTRIBUTIONS TO NNDEN-25 (Cont'd.)

EVALUATIONS RECENTLY COMPLETED OR IN PROGRESS

ENDF/B-V GENERAL PURPOSE FILE

New Materials

Material	Evaluator	Lab	Reviewer	Lab
D	Stewart	LASL	Leonard	BNWL
Li-6	Hale	LASL	Leonard	BNWL
Be-9	Perkins	LLL	Grimesey	EG&E
B-10	Hale	LASL	Carlson	NBS
C	Fu	ORNL	Stewart	LASL
N-15	Arthur	LASL	Magurno	BNL
O-17	Magurno	BNL	Arthur	LASL
F-19	Larson	ORNL	Muir	LASL
Na-23	Larson	ORNL	Kujawski	GE
Mg	Larson	ORNL	Divadeenam	BNL
Si	Larson	ORNL	Bhat	BNL
P-31	Howerton	LLL	Larson	ORNL
S-32	Howerton	LLL	Larson	ORNL
Ca	Fu	ORNL	Maerker	ORNL
Ti	Smith	ANL	Perey	ORNL
V	Smith	ANL	Perey	ORNL
Cr	Prince	BNL	Larson	ORNL
Mn-55	Mughabghab	BNL	Smith	EG&G
Fe	Fu	ORNL	Bhat	BNL
			LaBauve	LASL
Co	Mughabghab	BNL	Mann	HEDL
Ni	Divadeenam	BNL	Foster	LASL
Cu	Fu	ORNL	Ottewitte	ORNL
Kr (6 isotopes)	Prince	BNL	Schenter	HEDL
Zr	Drake	SAI	Reynolds	KAPL
Zr (5 isotopes)	Drake/	SAI/	Reynolds	KAPL
	Pearlstein	BNL	---	---

New Materials (cont'd).

Material	Evaluator	Lab	Reviewer	Lab
Tc-99	Schenter	HEDL		
Rh-103	Schenter	HEDL		
Ag-107	Schenter	HEDL		
Ag-109	Schenter	HEDL		
Cd-113	Schenter	HEDL		
Xe (9 isotopes)	Bhat	BNL		
Cs-133	Schenter	HEDL		
Ba-138	Howerton	LLL	Ottewitte	EG&G
Sm-149	Schenter	HEDL		
Eu-151	Mughabghab	BNL	Leonard	BNWL
Eu-153	Mughabghab	BNL	Leonard	BNWL
Gd (7 isotopes)	Magurno	BNL	Lubitz	KAPL
			Wittkopf	B&W
Hf	Drake	SAI	Reynolds	KAPL
Hf (6 isotopes)	Drake/	SAI/	Reynolds	KAPL
	Pearlstein	BNL	---	---
Au-197	Mughabghab	BNL	Leonard	BNWL
Pb	Fu	ORNL	Arthur	LASL
Th-232	Bhat	BNL	Hardy	BAPL
			Peele	ORNL
Pa-233	Mann	HEDL	Benjamin	SRL
U-233	Stewart	LASL	Weston	ORNL
			Poenitz	ANL
U-234	Divadeenam	BNL/	Benjamin	SRL
	Mann	HEDL		
U-235	Bhat	BNL	Stewart	LASL
U-236	Divadeenam/	BNL/	Benjamin	SRL
	Mann	HEDL		
U-238	Pennington	ANL	Kujawski	GE
			Hardy	BET
			Grimesey	EG&G

New Materials (cont'd).

Material	Evaluator	Lab	Reviewer	Lab
Np-237	Mann/ Benjamin	HEDL/ SRL	Stewart	LASL
Pu-238	Mann	HEDL	Benjamin	SRL
Pu-239	Kujawski	GE	Pennington	ANL
Pu-240	Weston	ORNL	McKnight	ANL
Pu-241	Weston	ORNL	Smith	EG&G
Pu-242	Mann/ Benjamin	HEDL/ SRL	Howerton	LLL
Am-241	Mann/ Weston	HEDL/ ORNL	Benjamin Grimesey	SRL INEL
Am-242m	Mann/ Benjamin	HEDL/ SRL	Wittkopf	B&W
Am-243	Mann/ Benjamin	HEDL/ SRL	Ottewitte	EG&G
Cm-243	Mann/ Benjamin	HEDL/ SRL	Howerton	LLL
Cm-244	Mann/ Benjamin	HEDL/ SRL	Howerton	LLL
Cm-254	Benjamin	SRL	Mann	HEDL
Cm-246	Benjamin/ Howerton	SRL/ LLL	Mann	HEDL

MATERIALS FROM ENDF/B-IV WITH ERROR FILES

Material	Evaluator	Lab		
H	Stewart	LASL		
N-14	Young	LASL		
O-16	Young	LASL		
Al-27	Young	LASL	Fu	ORNL

MATERIALS FROM ENDF/B-IV CONVERTED TO ENDF/B-V

Material	Evaluator	Lab
T	Stewart	LASL
He-3	Stewart	LASL
He-4	Nisley	LASL
Li-7	LaBauve	LASL
B-11	Cowan	GE,BNL
Cl	Allen	GGA
K	Drake	GGA
Nb-93	Smith	ANL,LLL
Mo	Howerton	LLL
Cd	Pearlstein	UK, BNL
Dy-164	Leonard	BNW
Lu (2 isotopes)	Leonard	BNW
Ta-181	Howerton	LLL
Ta-182	Otter	AI
W (4 isotopes)	Alter	AI, LASL
Re (2 isotopes)	Henderson	GE

DOSIMETRY FILE

EXPECTED RELEASE: MARCH 1979

REACTIONS	EVALUATOR	LAB	REVIEWER	LAB
$_{3}Li^{6}$ (total helium production)	Hale	LASL	Leonard	BNWL
$_{5}B^{10}$ (total helium production)	Hale	LASL	Leonard	BNWL
$_{11}Na^{23}$ (n,γ)	Larson	ORNL	Kujawski	GE
$_{16}S^{32}$ (n,p)	Howerton	LLL	Smith, Jr.	EG&G
$_{21}Sc^{45}$ (n,γ)	Magurno	BNL	Lippincott	HEDL
$_{22}Ti^{46,47,48}$ (n,p) (n,np)	Smith	ANL	Leonard	BNWL
$_{25}Mn^{55}$ (n,2n)	Mughabghab	BNL	Smith, Jr.	EG&G
$_{26}Fe^{54\ 56}$ (n,p) and $_{26}Fe^{58}$ (n,γ)	Fu, Schmittroth	ORNL, HEDL	Smith, DL	ANL
$_{27}Co^{59}$ (n,γ), (n,α) and (n,2n)	Mughabghab, etal	BNL	Mann	HEDL
$_{28}Ni^{58}$ (n,p) and (n,2n) and $_{28}Ni^{60}$(n,p)	Divadeenam	BNL	Schenter, Smith	HEDL, ANL
$_{29}Cu^{63}$ (n,γ) and $_{29}Cu^{65}$ (n,2n)	Mann	HEDL	Schenter	HEDL
$_{49}In^{115}$ (n,n')	Smith	ANL	Sher	SU
$_{49}In^{115}$ (n,γ)	Schmittroth	HEDL		
$_{53}I^{127}$ (n,2n)	Sher	SU	Schmittroth, Lippincott	HEDL
$_{79}Au^{197}$ (n,γ)	Mughabghab, etal	BNL		
$_{90}Th^{232}$ (n,γ) and (n,f)	Bhat	BNL	Leonard	BNWL
$_{92}U^{235}$ (n,f)	Bhat, et al	BNL	Stewart	LASL
$_{92}U^{238}$ (n,γ) and (n,f)	Pennington	ANL	Kujawski	GE
$_{93}Np^{237}$ (n,f)	Mann, Stein	HEDL, LASL	Stewart	LASL
$_{94}Pu^{239}$ (n,f)	Kujawski, et al	GE	Pennington	ANL

ACTINIDE SPECIAL PURPOSE FILE

Material	Evaluator	Lab	Reviewer	Lab
Ti-208	Reich	INEL	Ewbank	ORNL
Pb-212	Reich	INEL	Ewbank	ORNL
Bi-212	Reich	INEL	Ewbank	ORNL
Po-216	Reich	INEL	Ewbank	ORNL
Rn-220	Reich	INEL	Ewbank	ORNL
Ra-224	Reich	INEL	Ewbank	ORNL
Th-228	Schenter	HEDL	Ewbank	ORNL
Th-230	Schenter	HEDL	Benjamin	SRL
Th-231	Reich	INEL	Ewbank	ORNL
Th-233	Reich	INEL	Ewbank	ONRL
Pa-231	Mann	HEDL	Benjamin	SRL
Pa-232	Reich	INEL	Ewbank	ORNL
U-232	Mann	HEDL	Benjamin	SRL
			Ewbank	ORNL
U-237	Benjamin/	SRL/	Wittkopf	B&W
	Howerton	LLL		
U-239	Reich	INEL	Ewbank	ORNL
Np-236	Reich	INEL	Ewbank	ORNL
Np-236m	Reich	INEL	Ewbank	ORNL
Np-238	Benjamin	SRL	Wittkopf	B&W
Np-239	Reich	INEL	Ewbank	ORNL
Pu-236	Mann/	HEDL/	Weston	ORNL
	Benjamin	SRL		
Pu-237	Mann	HEDL	Benjamin	SRL
Pu-243	Benjamin/	SRL/	Mann	HEDL
	Howerton	LLL		
Pu-244	Mann/	HEDL	Weston	ORNL
	Benjamin	SRL		
Am-240	Reich	INEL	Ewbank	ORNL
Am-242	Benjamin	SRL	Ewbank	ORNL

ACTINIDE SPECIAL PURPOSE FILE
(cont'd)

Material	Evaluator	Lab	Reviewer	Lab
Am-244	Reich	INEL	Ewbank	ORNL
Am-244m	Reich	INEL	Ewbank	ORNL
Cm-241	Mann	HEDL	Benjamin	SRL
Cm-242	Mann/	HEDL	Howerton	LLL
	Benjamin	SRL		
Cm-247	Benjamin/	SRL/	Mann	HEDL
	Howerton	LLL		
Cm-248	Mann/	HEDL/	Stewart	LASL
	Benjamin	SRL		
Cm-249	Reich	INEL	Ewbank	ORNL
Bk-249	Benjamin/	SRL/	Stewart	LASL
	Howerton	LLL		
Bk-250	Reich	INEL	Ewbank	ORNL
Cf-249	Benjamin/	SRL/	Kujawski	GE
	Howerton	LLL		
Cf-250	Benjamin/	SRL/	Kujawski	GE
	Howerton	LLL		
Cf-251	Benjamin/	SRL/	Kujawski	GE
	Howerton	LLL		
Cf-252	Benjamin/	SRL/	Stewart	LASL
	Howerton	LLL		
Cf-253	Benjamin	SRL	Harker	INEL
Es-253	Benjamin	SRL	Harker	INEL

PARTIAL CINDA INDEX TO NATIONAL NEANDC PROGRESS REPORTS

ELEMENT S	A	QUANTITY	TYPE	ENERGY MIN	MAX	DOCUMENTATION REF	VOL	PAGE	DATE	LAB	COMMENTS
D	002	DIFF ELASTIC	EXPT-PROG	25+6	34+6	NEANDC(OR)	151	678		NEU	CHATELAIN+ ABST. PHASE SHIFT ANAL.
D	002	DIFF ELASTIC	EXPT-PROG	80+6	10+7	KDK-23	37	478		UPP	AMTEN+
D	002	POLARIZATION	EXPT-PROG	26+6		NEANDC(OR)	151	678		NEU	BOVET+ DEPOLARIZATION
HE	004	DIFF ELASTIC	EXPT-PROG	NDG		DOE-NDC-12	128	478		LAS	DODDER+R-MATRX ANAL.NDG.TBP
HE	004	POLARIZATION	THEO-PROG	NDG		DOE-NDC-12	128	478		LAS	DODDER+R-MATRX ANAL.CALC.TBP
LI	006	EVALUATION	EVAL-PROG	10-5	20+7	DOE-NDC-12	130	478		LAS	HALE+EVAL FOR ENDF/B-V.NDG
LI	006	TOTAL	EXPT-PROG	10+5	70+5	INDC(EUR)	11	35	378	GEL	KNITTER+VDG TOF MEASM
LI	006	ELASTIC SCAT	EXPT-PROG	10+5	70+5	INDC(EUR)	11	35	378	GEL	KNITTER+OBTAINED BY INTEGER OF DEL
LI	006	DIFF ELASTIC	EXPT-PROG	10+5	70+5	INDC(EUR)	11	35	378	GEL	KNITTER+VDG TOF MEASM
LI	006	N,EMISSION	EXPT-PROG	60+6	10+7	DOE-NDC-12	118	478		LAS	DRAKE+N EMISSION SPEC.CFD ENDF.NDG.
LI	006	DIFF INELAST	THEO-PROG	50+6		DOE-NDC-12	129	478		LAS	HALE+90DEG.SIMULATED SPEC.GRPH.
LI	006	N,TRITON	COMP-PROG	10+2	20+7	INDC(EUR)	11	40	378	GEL	WATTECAMPS.RATIO TO B10(N,A)
LI	006	N,TRITON	EXPT-PROG	23+4		DOE-NDC-12	170	478		MHG	ENGDAHL+PRELIM CS=.94+-.03B.TBC.
LI	006	N,TRITON	EXPT-PROG	20+6	34+6	KDK-23	38	478		UPP	ANDERSSON+
LI	007	EVALUATION	EVAL-PROG	10-5	20+7	DOE-NDC-12	130	478		LAS	YOUNG+PSEUDO LVL REP.PRELIM EVAL.NDG
LI	007	N,EMISSION	EXPT-PROG	60+6	10+7	DOE-NDC-12	118	478		LAS	DRAKE+N EMISSION SPEC.CFD ENDF.NDG.
LI	007	INELASTIC G	EXPT-PROG	10+6	20+7	DOE-NDC-12	232	478		ORL	MORGAN.TOF.2ANGS.NDG.SEE ORNL-TM6247
LI	007	N,N TRITON	EXPT-PROG	27+6	14+7	NEANDC(E)	192	8	678	HAR	UTTLEY+ P60. ABST.TBC.
BE	009	EVALUATION	EVAL-PROG	NDG		DOE-NDC-12	131	478		LAS	YOUNG+PSEUDO LVL REP.NDG.
B	010	TOTAL	COMP-PROG	10+2	20+7	INDC(EUR)	11	40	378	GEL	WATTECAMPS.(N,A0)+(N,A1)+BRANCH RAT
B	010	N,ALPHA	EVAL-PROG	10+5	20+6	INDC(EUR)	11	42	378	GEL	LISKIEN+TBP
B	010	N,ALPHA	COMP-PROG	10+2	20+7	INDC(EUR)	11	40	378	GEL	WATTECAMPS.(N,A0)+(N,A1)+BRANCH RAT
B	010	N,ALPHA	EXPT-PROG	10+2	20+6	INDC(EUR)	11	46	378	GEL	VIESTI+VDG TOF REL CURV TBP
B	010	N,ALPHA	EXPT-PROG	14+7		NEANDC(E)	192	5	478	TUE	MOERIKE+P.79 DIFF+INT SIG,TBP
C	012	TOTAL	EXPT-PROG	45+6	80+6	NEANDC(E)	192	5	478	KFK	CIERJACKS+P.16 GRPHS,P1 TPF,TRANS
C	012	TOTAL	EXPT-PROG	50+5	25+7	DOE-NDC-12	110	478		LRL	PHILLIPS+LINAC.TOF.TRNS.NDG.CFD.
C	012	RESON PARAMS	EXPT-PROG	49+6	66+6	NEANDC(E)	192	5	478	KFK	CIERJACKS+P.3 2 RES,EN,WTOT
C	012	DIFF ELASTIC	EVAL-PROG		20+6	DOE-NDC-12	248	478		ORL	FU+R-MATRIX.NDG.TBP ND/A.
N	014	N,2N	EXPT-PROG	14+7	19+7	NEANDC(E)	192	8	678	NPL	RYVES+ P107.ABST.ACTIVATION.TBD
N	014	N,ALPHA	EXPT-PROG	14+7		NEANDC(E)	192	5	478	TUE	MOERIKE+P.79 DIFF+INT SIG,TBP
O	016	TOTAL	EXPT-PROG	NDG		NEANDC(E)	192	5	478	KFK	CIERJACKS+P.1 TOF.TR,TBC,P.16 GRPHS
O	016	RESON PARAMS	EXPT-PROG	32+6	11+7	NEANDC(E)	192	5	478	KFK	CIERJACKS+P.3 10 RES,EN,WTOT
O	016	RESON PARAMS	EXPT-PROG	74+6	11+7	NEANDC(E)	192	5	478	KFK	CIERJACKS+P.14 T=3/2RES,PRELIM
F	019	INELASTIC G	EXPT-PROG	16+7	23+7	KDK-23	35	478		AE	CORCALCIUC+
F	019	N,2N	EXPT-PROG	14+7	19+7	NEANDC(E)	192	8	678	NPL	RYVES+ P107.ABST.ACTIVATION.TBD
F	019	N,2N	EXPT-PROG	16+7	22+7	KDK-23	35	478		SWR	CORCALCIUC+
F	019	N,PROTON	EXPT-PROG	FISS		NEANDC(E)	192	8	678	HAR	HOOTON+ P71. CF-252 FISS SPECT AVG
F	019	N,DEUTERON	EXPT-PROG	16+7	22+7	KDK-23	35	478		SWR	CORCALCIUC+
F	019	N,ALPHA	EXPT-PROG	FISS		NEANDC(E)	192	8	678	HAR	HOOTON+ P71. CF-252 FISS SPECT AVG
F	019	N,N PROTON	EXPT-PROG	16+7	22+7	KDK-23	35	478		SWR	CORCALCIUC+
AL	027	DIFF INELAST	EXPT-PROG	70+6	80+6	KDK-23	33	478		SWR	RAMSTROM+ TOF 35 TO 150 DEGREES
AL	027	DIFF INELAST	EXPT-PROG	20+6	45+6	KDK-23	32	478		SWR	RAMSTROM+
AL	027	SPECT N,GAMT	EXPT-PROG	59+3		DOE-NDC-12	29	478		BNL	KENNY+5908 EV RES SPEC.G-WIDS.NDG
AL	027	N,PROTON	EXPT-PROG	FISS		NEANDC(E)	192	8	678	HAR	HOOTON+ P71. CF-252 FISS SPECT AVG

ELEMENT S	A	QUANTITY	TYPE	ENERGY MIN	MAX	DOCUMENTATION REF	VOL	PAGE	DATE	LAB	COMMENTS
AL	027	N,PROTON	EXPT-PROG	14+7		KDK-23	15	478		LND	LUNDBERG+ ABS MEASUREMENT
AL	027	N,PROTON	EXPT-PROG	15+7		DOE-NDC-12	105	478		LRL	HAIGHT+(N,XP).CS TBL.MAG QUAD SPEC.
AL	027	N,PROTON	EXPT-PROG	14+7	19+7	NEANDC(E)	192	8	678	NPL	RYVES+ P107.ABST.ACTIVATION.TBD
AL	027	N,DEUTERON	EXPT-PROG	15+7		DOE-NDC-12	105	478		LRL	HAIGHT+(N,XP).CS TBL.MAG QUAD SPEC.
AL	027	N,ALPHA	EXPT-PROG	14+7		KDK-23	15	478		LND	LUNDBERG+ ABS MEASUREMENT
AL	027	N,ALPHA	EXPT-PROG	15+7		DOE-NDC-12	105	478		LRL	HAIGHT+(N,XA) CS TBL.MAG QUAD SPEC
AL	027	N,ALPHA	EXPT-PROG	14+7	19+7	NEANDC(E)	192	8	678	NPL	RYVES+ P107.ABST.ACTIVATION.TBD
AL	027	N,ALPHA	EXPT-PROG	FISS		NEANDC(E)	192	5	478	PTB	MANNHART.P.84 AVG SIG CFD CALC
SI	028	RESON PARAMS	EXPT-PROG	12+6	13+6	NEANDC(E)	192	5	478	KFK	CIERJACKS+P.14 ABST
SI	028	DIFF INELAST	EXPT-PROG	20+6	42+6	DOE-NDC-12	156	478		LTI	EGAN+1780KEV STATE FROM DNG.CFD.NDG.
SI	028	INELASTIC G	EXPT-PROG	20+6	42+6	DOE-NDC-12	156	478		LTI	EGAN+125DEG CS.DIN FROM DNG.NDG.
SI	028	THERMAL SCAT	EXPT-PROG	51-6	52+0	NEANDC(E)	192	5	478	MUN	KOESTER+P.78 COH SCAT LENGTH
SI	028	N,PROTON	EXPT-PROG	FISS		NEANDC(E)	192	8	678	HAR	HOOTON+ P71. CF-252 FISS SPECT AVG
SI	029	THERMAL SCAT	EXPT-PROG	51-6	52+0	NEANDC(E)	192	5	478	MUN	KOESTER+P.78 COH SCAT LENGTH
SI	030	THERMAL SCAT	EXPT-PROG	51-6	52+0	NEANDC(E)	192	5	478	MUN	KOESTER+P.78 COH SCAT LENGTH
P	030	N,ALPHA	EXPT-PROG	NDG		DOE-NDC-12	95	478		KTY	FLYNN+INV.DETAILED BALANCE.NDG.
S	032	THERMAL SCAT	EXPT-PROG	51-6	52+0	NEANDC(E)	192	5	478	MUN	KOESTER+P.78 COH SCAT LENGTH
S	032	N,ALPHA	EXPT-PROG	NDG		DOE-NDC-12	95	478		KTY	FLYNN+INV.DETAILED BALANCE.NDG.
S	033	THERMAL SCAT	EXPT-PROG	51-6	52+0	NEANDC(E)	192	5	478	MUN	KOESTER+P.78 COH SCAT LENGTH
S	033	N,ALPHA	EXPT-PROG	10+4	80+5	DOE-NDC-12	95	478		KTY	FLYNN+INV.DETAILED BALANCE.GRPH
S	034	THERMAL SCAT	EXPT-PROG	51-6	52+0	NEANDC(E)	192	5	478	MUN	KOESTER+P.78 COH SCAT LENGTH
CA	040	N,GAMMA	EXPT-PROG	25+6	70+6	KDK-23	39	478		UPP	BERGQVIST+
CA	040	N,ALPHA	EXPT-PROG	FISS		NEANDC(E)	192	5	478	JUL	QAIM.P.41 NDG,ABST
SC	045	TOTAL	EXPT-PROG	NDG		DOE-NDC-12	30	478		BNL	LIOU+ANAL COMPLETED.NDG.TBP
TI		N,PROTON	EXPT-PROG	15+7		DOE-NDC-12	105	478		LRL	HAIGHT+(N,XP).CS TBL.FROM ISOTOPES.
TI		N,DEUTERON	EXPT-PROG	15+7		DOE-NDC-12	105	478		LRL	HAIGHT+(N,XP),CS TBL.FROM ISOTOPES.
TI		N,ALPHA	EXPT-PROG	15+7		DOE-NDC-12	105	478		LRL	HAIGHT+(N,XA) CS TBL.FROM ISOTOPES
TI	046	N,GAMMA	EXPT-PROG	10+3	10+5	NEANDC(E)	192	8	678	HAR	THOM+ P40. LARGE LIQ SCIN.YLD GRPH.
TI	046	N,PROTON	EXPT-PROG	15+7		DOE-NDC-12	105	478		LRL	HAIGHT+(N,XP).CS TBL.MAG QUAD SPEC.
TI	046	N,PROTON	EXPT-PROG	FISS		NEANDC(E)	192	5	478	PTB	MANNHART.P.84 AVG SIG CFD CALC
TI	046	N,DEUTERON	EXPT-PROG	15+7		DOE-NDC-12	105	478		LRL	HAIGHT+(N,XP).CS TBL.MAG QUAD SPEC.
TI	046	N,ALPHA	EXPT-PROG	15+7		DOE-NDC-12	105	478		LRL	HAIGHT+(N,XA) CS TBL.MAG QUAD SPEC
TI	047	N,GAMMA	EXPT-PROG	10+3	10+5	NEANDC(E)	192	8	678	HAR	THOM+ P40. LARGE LIQ SCIN.YLD GRPH.
TI	047	N,PROTON	EXPT-PROG	FISS		NEANDC(E)	192	5	478	PTB	MANNHART.P.84 AVG SIG CFD CALC
TI	048	N,GAMMA	EXPT-PROG	10+3	10+5	NEANDC(E)	192	8	678	HAR	THOM+ P40. LARGE LIQ SCIN.YLD GRPH
TI	048	N,PROTON	EXPT-PROG	15+7		DOE-NDC-12	105	478		LRL	HAIGHT+(N,XP).CS TBL.MAG QUAD SPEC.
TI	048	N,PROTON	EXPT-PROG	FISS		NEANDC(E)	192	5	478	PTB	MANNHART.P.84 AVG SIG CFD CALC
TI	048	N,DEUTERON	EXPT-PROG	15+7		DOE-NDC-12	105	478		LRL	HAIGHT+(N,XP).CS TBL.MAG QUAD SPEC.
TI	048	N,ALPHA	EXPT-PROG	15+7		DOE-NDC-12	105	478		LRL	HAIGHT+(N,XA) CS TBL.MAG QUAD SPEC
TI	049	N,GAMMA	EXPT-PROG	10+3	10+5	NEANDC(E)	192	8	678	HAR	THOM+ P40. LARGE LIQ SCIN.YLD GRPH.

ELEMENT S	A	QUANTITY	TYPE	ENERGY MIN	MAX	DOCUMENTATION REF	VOL	PAGE	DATE	LAB	COMMENTS
TI	050	N,GAMMA	EXPT-PROG	10+3	10+5	NEANDC(E)	192	8	678	HAR	THOM+ P40. LARGE LIQ SCIN.NDG
V	051	DIFF INELAST	EXPT-PROG	20+6	45+6	KDK-23	33	478		AE	RAMSTROM.
V	051	DIFF INELAST	EXPT-PROG	70+6	80+6	KDK-23	33	478		SWR	RAMSTROM+ TOF 35 TO 150 DEGREES
V	051	N,PROTON	EXPT-PROG	15+7		DOE-NDC-12	105	478		LRL	HAIGHT+(N,XP).CS TBL.TBP PR/C.
V	051	N,DEUTERON	EXPT-PROG	15+7		DOE-NDC-12	105	478		LRL	HAIGHT+(N,XP).CS TBL.TBP PR/C.
V	051	N,ALPHA	EXPT-PROG	15+7		DOE-NDC-12	105	478		LRL	HAIGHT+(N,XA) CS TBL.TBP PR/C.
CR		EVALUATION	EVAL-PROG	NDG		NEANDC(E)	192	5	478	KFK	FROEHNER.P.34 KEDAK EVL, NDG
CR		INELASTIC G	EXPT-PROG	84+5	40+6	DOE-NDC-12	157	478		LTI	COUCHELL+125DEG PROD CS.NDG.TBP NSE.
CR		THERMAL SCAT	EXPT-PROG	51-6	52+0	NEANDC(E)	192	5	478	MUN	KOESTER+P.77 COH SCAT LENGTH
CR		N,ALPHA	EXPT-PROG	14+7		NEANDC(E)	192	8	678	HAR	COOKSON+ P61. TBD.NDG.
CR	050	DIFF INELAST	EXPT-PROG	84+5	40+6	DOE-NDC-12	157	478		LTI	COUCHELL+DIN FROM DNG.NDG.TBP
CR	050	INELASTIC G	EXPT-PROG	80+5	14+7	NEANDC(E)	192	5	478	KFK	VOSS+P.6 781KEV GAM, NDG
CR	050	INELASTIC G	EXPT-PROG	84+5	40+6	DOE-NDC-12	157	478		LTI	COUCHELL+NAT CR.DIN FROM DNG.LVL SCH
CR	050	THERMAL SCAT	EXPT-PROG	51-6	52+0	NEANDC(E)	192	5	478	MUN	KOESTER+P.77 COH SCAT LENGTH
CR	050	N,PROTON	EXPT-PROG	15+7		DOE-NDC-12	105	478		LRL	HAIGHT+(N,XP).QUAD SPEC.ANAL TBD.NDG
CR	050	N,DEUTERON	EXPT-PROG	15+7		DOE-NDC-12	105	478		LRL	HAIGHT+(N,XD).QUAD SPEC.ANAL TBD.NDG
CR	050	N,ALPHA	EXPT-PROG	15+7		DOE-NDC-12	105	478		LRL	HAIGHT+(N,XA).QUAD SPEC.ANAL TBD.NDG
CR	052	DIFF INELAST	EXPT-PROG	84+5	40+6	DOE-NDC-12	157	478		LTI	COUCHELL+DIN FROM DNG.CURV.CFD.TBP
CR	052	INELASTIC G	EXPT-PROG	15+6	14+7	NEANDC(E)	192	5	478	KFK	VOSS+P.6 1434KEV GAM,SIG,GRPH
CR	052	INELASTIC G	EXPT-PROG	84+5	40+6	DOE-NDC-12	157	478		LTI	COUCHELL+NAT CR.DIN FROM DNG.LVL SCH
CR	052	THERMAL SCAT	EXPT-PROG	51-6	52+0	NEANDC(E)	192	5	478	MUN	KOESTER+P.77 COH SCAT LENGTH
CR	052	N,PROTON	EXPT-PROG	15+7		DOE-NDC-12	105	478		LRL	HAIGHT+(N,XP).QUAD SPEC.ANAL TBD.NDG
CR	052	N,DEUTERON	EXPT-PROG	15+7		DOE-NDC-12	105	478		LRL	HAIGHT+(N,XD).QUAD SPEC.ANAL TBD.NDG
CR	052	N,ALPHA	EXPT-PROG	15+7		DOE-NDC-12	105	478		LRL	HAIGHT+(N,XA).QUAD SPEC.ANAL TBD.NDG
CR	053	DIFF INELAST	EXPT-PROG	84+5	40+6	DOE-NDC-12	157	478		LTI	COUCHELL+DIN FROM DNG.NDG.TBP
CR	053	INELASTIC G	EXPT-PROG	84+5	40+6	DOE-NDC-12	157	478		LTI	COUCHELL+NAT CR.DIN FROM DNG.LVL SCH
CR	053	THERMAL SCAT	EXPT-PROG	51-6	52+0	NEANDC(E)	192	5	478	MUN	KOESTER+P.77 COH SCAT LENGTH
CR	054	DIFF INELAST	EXPT-PROG	84+5	40+6	DOE-NDC-12	157	478		LTI	COUCHELL+DIN FROM DNG.NDG.TBP
CR	054	INELASTIC G	EXPT-PROG	84+5	40+6	DOE-NDC-12	157	478		LTI	COUCHELL+NAT CR.DIN FROM DNG.LVL SCH
CR	054	THERMAL SCAT	EXPT-PROG	51-6	52+0	NEANDC(E)	192	5	478	MUN	KOESTER+P.77 COH SCAT LENGTH
MN	052	N,GAMMA	EXPT-PROG	PILE		NEANDC(E)	192	5	478	KLN	WOELFLE+P.67 T1/2 OF MN53
MN	055	DIFF INELAST	EXPT-PROG	20+6	45+6	KDK-23	33	478		AE	RAMSTROM.
MN	055	N,GAMMA	EXPT-PROG	15+7		KDK-23	13	478		LND	MAGNUSSON+ ACT.TECHNIQUE
MN	055	SPECT N,GAMT	EXPT-PROG	25-2		DOE-NDC-12	34	478		BNL	STELTS+LOW SPIN STATES.TBC.NDG
MN	055	SPECT N,GAMT	EXPT-PROG	20+3	24+4	DOE-NDC-12	34	478		BNL	STELTS+LOW SPIN STATES.TBC.NDG.2ES
FE		EVALUATION	EVAL-PROG	NDG		NEANDC(E)	192	5	478	KFK	FROEHNER.P.34 KEDAK EVL, NDG
FE		TOTAL	EXPT-PROG	10+4	10+7	NEANDC(E)	192	8	678	HAR	MOXON+ REFIT RESONANCE ANALYSIS.SYNC
FE		DIFF ELASTIC	EXPT-PROG	70+6		KDK-23	34	478		AE	RAMSTROM+ TOF 20 TO 174 DEGREES
FE		DIFF ELASTIC	EXPT-PROG	10+3	30+5	INDC(EUR)	11	15	378	GEL	BRUSEGAN+LINAC TOF MEASM
FE		DIFF ELASTIC	EXPT-PROG	49+5	31+6	NEANDC(E)	192	5	478	KFK	CIERJACKS+ P.9,SIG,CURVES.

ELEMENT S A	QUANTITY	TYPE	ENERGY MIN	MAX	DOCUMENTATION REF	VOL	PAGE	DATE	LAB	COMMENTS
FE	POLARIZATION	EXPT-PROG	16+7		NEANDC(E)	192	8	678	EDG	GALLOWAY+ P121.GRAPHS CFD OPTMDL.
FE	DIFF INELAST	EXPT-PROG	87+5	40+6	DOE-NDC-12	157		478	LTI	COUCHELL+DIN FROM DNG.CFD.NDG
FE	INELASTIC G	EXPT-PROG	87+5	40+6	DOE-NDC-12	157		478	LTI	COUCHELL+125 DEG CS.DIN FROM DNG.NDG
FE	N,GAMMA	EXPT-PROG	15+5	80+5	NEANDC(E)	192	8	678	HAR	GAYTHER+ P38. YLD AT 3 THICKNESSES.
FE	N,PROTON	EXPT-PROG	15+7		DOE-NDC-12	105		478	LRL	HAIGHT+(N,XP).CS TBL.TBP.
FE	N,DEUTERON	EXPT-PROG	15+7		DOE-NDC-12	105		478	LRL	HAIGHT+(N,XP),CS TBL.MAG QUAD SPEC.
FE	N,ALPHA	EXPT-PROG	14+7		NEANDC(E)	192	8	678	HAR	COOKSON+ P61. TBD.NDG.
FE	N,ALPHA	EXPT-PROG	15+7		DOE-NDC-12	105		478	LRL	HAIGHT+(N,XA) CS TBL.MAG QUAD SPEC.
FE 054	RESON PARAMS	EXPT-PROG	78+3	99+4	NEANDC(E)	192	8	678	HAR	MOXON+ P51.TBL L,J,WN.FROM SYNC TRAN
FE 054	N,2N	EXPT-PROG	14+7	19+7	NEANDC(E)	192	8	678	NPL	RYVES+ P107.ABST.TBP IN METROLOGIA
FE 054	N,GAMMA	EXPT-PROG	50+2	60+5	INDC(EUR)	11	15	378	GEL	BRUSEGAN+LINAC TOF MEASM
FE 054	N,PROTON	EXPT-PROG	15+7		DOE-NDC-12	105		478	LRL	HAIGHT+(N,XP).CS TBL.MAG QUAD SPEC.
FE 054	N,PROTON	EXPT-PROG	FISS		NEANDC(E)	192	5	478	PTB	MANNHART.P.84 AVG SIG CFD CALC
FE 054	N,DEUTERON	EXPT-PROG	15+7		DOE-NDC-12	105		478	LRL	HAIGHT+(N,XP).CS TBL.MAG QUAD SPEC
FE 054	N,ALPHA	EXPT-PROG	15+7		DOE-NDC-12	105		478	LRL	HAIGHT+(N,XA) CS TBL.MAG QUAD SPEC.
FE 056	TOTAL	EXPT-PROG	12+3		INDC(EUR)	11	15	378	GEL	BRUSEGAN+LINAC TOF MEASM
FE 056	RESON PARAMS	EXPT-PROG	12+3		INDC(EUR)	11	15	378	GEL	BRUSEGAN+LINAC TOF MEASM
FE 056	RESON PARAMS	EXPT-PROG	-3+4	22+5	NEANDC(E)	192	8	678	HAR	MOXON+ P51.TBL L,J,WN.FROM SYNC TRAN
FE 056	RESON PARAMS	EXPT-PROG	45+5	83+5	NEANDC(E)	192	5	478	KFK	CIERJACKS+P.959 RESON,TBL
FE 056	DIFF INELAST	EXPT-PROG	75+6	86+6	NEANDC(E)	192	5	478	KFK	BROEDERS+P.36 GRPH,TBC
FE 056	DIFF INELAST	EXPT-PROG	16+7	22+7	KDK-23		35	478	SWR	CORCALCIUC+
FE 056	N,2N	EXPT-PROG	16+7	22+7	KDK-23		35	478	SWR	CORCALCIUC+
FE 056	N,GAMMA	EXPT-PROG	50+2	60+5	INDC(EUR)	11	15	378	GEL	BRUSEGAN+LINAC TOF MEASM
FE 056	SPECT N,GAMT	EXPT-PROG	12+3		DOE-NDC-12		29	478	BNL	KENNY+1167 EV RES.G-WID.CFD.NDG.
FE 056	N,PROTON	EXPT-PROG	15+7		DOE-NDC-12	105		478	LRL	HAIGHT+(N,XP).CS TBL.MAG QUAD SPEC
FE 056	N,PROTON	EXPT-PROG	14+7	19+7	NEANDC(E)	192	8	678	NPL	RYVES+ P107.ABST.TBP IN METROLOGIA
FE 056	N,PROTON	EXPT-PROG	FISS		NEANDC(E)	192	5	478	PTB	MANNHART.P.84 AVG SIG CFD CALC
FE 056	N,DEUTERON	EXPT-PROG	15+7		DOE-NDC-12	105		478	LRL	HAIGHT+(N,XP).CS TBL.MAG QUAD SPEC
FE 056	N,DEUTERON	EXPT-PROG	16+7	22+7	KDK-23		35	478	SWR	CORCALCIUC+
FE 056	N,ALPHA	EXPT-PROG	15+7		DOE-NDC-12	105		478	LRL	HAIGHT+(N,XA) CS TBL.MAG QUAD SPEC.
FE 056	N,N PROTON	EXPT-PROG	16+7	22+7	KDK-23		35	478	SWR	CORCALCIUC+
FE 057	RESON PARAMS	EXPT-PROG	40+3	62+3	NEANDC(E)	192	8	678	HAR	MOXON+ P51.TBL L,J,WN.FROM SYNC TRAN
FE 057	N,N PROTON	EXPT-PROG	15+7		NEANDC(E)	192	5	478	JUL	QAIM+P.41 ACT SIG,NDG,ABST
FE 058	RESON PARAMS	EXPT-PROG	10+4	32+5	NEANDC(E)	192	5	478	KFK	LYDIHONG+P.18 WN,WG,TBL
FE 058	N,GAMMA	EXPT-PROG	30+4		NEANDC(E)	192	5	478	KFK	LYDIHONG+P.18 MAXW AVG SIG
CO 059	DIFF ELASTIC	EXPT-PROG	70+6	80+6	KDK-23		34	478	AE	RAMSTROM+ TOF 20 TO 174 DEGREES
CO 059	DIFF INELAST	EXPT-PROG	20+6	45+6	KDK-23		32	478	AE	RAMSTROM.
CO 059	DIFF INELAST	EXPT-PROG	11+6	33+6	DOE-NDC-12	160		478	LTI	EGAN+DIN FROM DNG.CURVS.CFD.TBP
CO 059	DIFF INELAST	EXPT-PROG	16+7	22+7	KDK-23		35	478	SWR	CORCALCIUC+
CO 059	INELASTIC G	EXPT-PROG	11+6	33+6	DOE-NDC-12	160		478	LTI	EGAN+DIN FROM DNG.CURVS.CFD.TBP
CO 059	N,2N	EXPT-PROG	16+7	22+7	KDK-23		35	478	SWR	CORCALCIUC+

ELEMENT S A	QUANTITY	TYPE	ENERGY MIN	ENERGY MAX	DOCUMENTATION REF	VOL	PAGE	DATE	LAB	COMMENTS
CO 059	N,DEUTERON	EXPT-PROG	16+7	22+7	KDK-23	35	478	SWR		CORCALCIUC+
CO 059	N,N PROTON	EXPT-PROG	15+7		NEANDC(E)	192 5	478	JUL		QAIM+P.41 ACT SIG,NDG,ABST
CO 059	N,N PROTON	EXPT-PROG	16+7	22+7	KDK-23	35	478	SWR		CORCALCIUC+
NI	EVALUATION	EVAL-PROG	NDG		NEANDC(E)	192 5	478	KFK		FROEHNER.P.34 KEDAK EVL, NDG
NI	INELASTIC G	EXPT-PROG	14+6	42+6	DOE-NDC-12	164	478	LTI		MITTLER+DIN FROM DNG.NDG.TBP.
NI	N,GAMMA	EXPT-PROG	15+5	80+5	NEANDC(E)	192 8	678	HAR		GAYTHER+ P38. YLD AT 3 THICKNESSES.
NI	N,PROTON	EXPT-PROG	12+6	40+6	INDC(EUR)	11 8	378	GEL		PAULSEN+NP+NA DIR PART DETECT PRELIM
NI	N,PROTON	EXPT-PROG	15+7		DOE-NDC-12	105	478	LRL		HAIGHT+(N,XP).CS TBL.TBP
NI	N,DEUTERON	EXPT-PROG	15+7		DOE-NDC-12	105	478	LRL		HAIGHT+(N,XP),CS TBL.TBP
NI	N,ALPHA	EXPT-PROG	14+7		NEANDC(E)	192 8	678	HAR		COOKSON+ P61. TBD.NDG.
NI	N,ALPHA	EXPT-PROG	15+7		DOE-NDC-12	105	478	LRL		HAIGHT+(N,XA) CS TBL.TBP
NI 058	RESON PARAMS	EXPT-PROG	20+4	30+5	NEANDC(E)	192 8	678	HAR		BOWEN+ P54. S-L AREA ANAL.P+D WAVES.
NI 058	RESON PARAMS	EXPT-PROG	20+4	10+6	NEANDC(E)	192 8	678	HAR		GADD+ P55. M-L R-MATRIX ANALYSIS.
NI 058	DIFF INELAST	EXPT-PROG	14+6	42+6	DOE-NDC-12	164	478	LTI		MITTLER+DIN FROM DNG.CURVS.CFD.TBP
NI 058	INELASTIC G	EXPT-PROG	15+6	14+7	NEANDC(E)	192 5	478	KFK		VOSS+P.6 2 GAM-LINES,NDG
NI 058	INELASTIC G	EXPT-PROG	TR	42+6	DOE-NDC-12	164	478	LTI		MITTLER+NAT NI,DIN FROM DNG.LVL SCH.
NI 058	N,GAMMA	EXPT-PROG	25+6	70+6	KDK-23	39	478	UPP		BERGQVIST+
NI 058	N,PROTON	EXPT-PROG	15+7		DOE-NDC-12	105	478	LRL		HAIGHT+(N,XP).CS TBL.MAG QUAD SPEC
NI 058	N,PROTON	EXPT-PROG	FISS		NEANDC(E)	192 5	478	PTB		MANNHART.P.84 AVG SIG CFD CALC
NI 058	N,DEUTERON	EXPT-PROG	15+7		DOE-NDC-12	105	478	LRL		HAIGHT+(N,XP).CS TBL.MAG QUAD SPEC
NI 058	N,ALPHA	EXPT-PROG	15+7		DOE-NDC-12	105	478	LRL		HAIGHT+(N,XA) CS TBL.MAG QUAD SPEC.
NI 058	N,N PROTON	EXPT-PROG	15+7		NEANDC(E)	192 5	478	JUL		QAIM+P.41 ACT SIG,NDG,ABST
NI 059	N,GAMMA	EXPT-PROG	25-2		DOE-NDC-12	231	478	ORL		HARVEY+MASS ANAL.CORRC.THR CS GVN.
NI 059	N,PROTON	EXPT-PROG	NDG		DOE-NDC-12	95	478	KTY		FLYNN+INV.DETAILED BALANCE.NDG.TBD
NI 059	N,ALPHA	EXPT-PROG	NDG		DOE-NDC-12	95	478	KTY		FLYNN+INV.DETAILED BALANCE.NDG.TBD
NI 060	RESON PARAMS	EXPT-PROG	20+4	10+6	NEANDC(E)	192 8	678	HAR		GADD+ P55. M-L R-MATRIX ANALYSIS.
NI 060	DIFF INELAST	EXPT-PROG	14+6	42+6	DOE-NDC-12	164	478	LTI		MITTLER+DIN FROM DNG.CURVS.CFD.TBP
NI 060	INELASTIC G	EXPT-PROG	14+6	14+7	NEANDC(E)	192 5	478	KFK		VOSS+P.6 4 GAM-LINES,NDG
NI 060	INELASTIC G	EXPT-PROG	TR	42+6	DOE-NDC-12	164	478	LTI		MITTLER+NAT NI,DIN FROM DNG.LVL SCH.
NI 060	N,PROTON	EXPT-PROG	15+7		DOE-NDC-12	105	478	LRL		HAIGHT+(N,XP).CS TBL.TBP
NI 060	N,DEUTERON	EXPT-PROG	15+7		DOE-NDC-12	105	478	LRL		HAIGHT+(N,XP).CS TBL.TBP
NI 060	N,ALPHA	EXPT-PROG	15+7		DOE-NDC-12	105	478	LRL		HAIGHT+(N,XA) CS TBL.MAG QUAD SPEC.
NI 061	N,N PROTON	EXPT-PROG	15+7		NEANDC(E)	192 5	478	JUL		QAIM+P.41 ACT SIG,NDG,ABST
NI 062	DIFF INELAST	EXPT-PROG	12+6	40+6	DOE-NDC-12	164	478	LTI		MITTLER+DIN FROM DNG.CURVS.CFD.TBP
NI 062	INELASTIC G	EXPT-PROG	TR	42+6	DOE-NDC-12	164	478	LTI		MITTLER+NAT NI,DIN FROM DNG.LVL SCH.
NI 062	N,N PROTON	EXPT-PROG	15+7		NEANDC(E)	192 5	478	JUL		QAIM+P.41 ACT SIG,NDG,ABST
NI 064	DIFF INELAST	EXPT-PROG	18+6	42+6	DOE-NDC-12	164	478	LTI		MITTLER+DIN FROM DNG.CURVS.CFD.TBP
NI 064	INELASTIC G	EXPT-PROG	TR	42+6	DOE-NDC-12	164	478	LTI		MITTLER+NAT NI,DIN FROM DNG.LVL SCH.
CU	POLARIZATION	EXPT-PROG	16+7		NEANDC(E)	192 8	678	EDG		GALLOWAY+ P121.GRAPHS CFD OPTMDL.
CU	N,PROTON	EXPT-PROG	15+7		DOE-NDC-12	105	478	LRL		HAIGHT+(N,XP).CS TBL.FROM ISOTOPES.
CU	N,ALPHA	EXPT-PROG	15+7		DOE-NDC-12	105	478	LRL		HAIGHT+(N,XA) CS TBL.FROM ISOTOPES.

ELEMENT S A	QUANTITY	TYPE	ENERGY MIN	MAX	DOCUMENTATION REF	VOL	PAGE	DATE	LAB	COMMENTS
CU 063	DIFF INELAST	EXPT-PROG	20+6	45+6	KDK-23	32	478		SWR	RAMSTROM.
CU 063	N,2N	EXPT-PROG	14+7	19+7	NEANDC(E)	192	8	678	NPL	RYVES+ P107.ABST.TBP IN METROLOGIA
CU 063	N,PROTON	EXPT-PROG	15+7		DOE-NDC-12	105	478		LRL	HAIGHT+(N,XP).CS TBL.MAG QUAD SPEC.
CU 063	N,DEUTERON	EXPT-PROG	15+7		DOE-NDC-12	105	478		LRL	HAIGHT+(N,XP).CS TBL.MAG QUAD SPEC.
CU 063	N,ALPHA	EXPT-PROG	15+7		DOE-NDC-12	105	478		LRL	HAIGHT+(N,XA) CS TBL.MAG QUAD SPEC.
CU 065	DIFF INELAST	EXPT-PROG	20+6	45+6	KDK-23	32	478		SWR	RAMSTROM.
CU 065	N,2N	EXPT-PROG	14+7	19+7	NEANDC(E)	192	8	678	NPL	RYVES+ P107.ABST.TBP IN METROLOGIA
CU 065	N,PROTON	EXPT-PROG	15+7		DOE-NDC-12	105	478		LRL	HAIGHT+(N,XP).CS TBL.MAG QUAD SPEC.
CU 065	N,PROTON	EXPT-PROG	14+7	19+7	NEANDC(E)	192	8	678	NPL	RYVES+ P107.ABST.TBP IN METROLOGIA
CU 065	N,DEUTERON	EXPT-PROG	15+7		DOE-NDC-12	105	478		LRL	HAIGHT+(N,XP).CS TBL.MAG QUAD SPEC.
CU 065	N,ALPHA	EXPT-PROG	15+7		DOE-NDC-12	105	478		LRL	HAIGHT+(N,XA) CS TBL.MAG QUAD SPEC.
CU 065	N,N ALPHA	EXPT-PROG	14+7	19+7	NEANDC(E)	192	8	678	NPL	RYVES+ P107.ABST.TBP IN METROLOGIA
ZN 064	N,PROTON	EXPT-PROG	FISS		NEANDC(E)	192	5	478	PTB	MANNHART.P.84 AVG SIG CFD CALC
KR	N,GAMMA	EXPT-PROG	10+3	+5	NEANDC(E)	192	5	478	KFK	HENSLEY+P.30 TOF SPEC,GRPH,TBC
KR 084	N,GAMMA	EXPT-PROG	10+3	+5	NEANDC(E)	192	5	478	KFK	HENSLEY+P.30 NDG,TBC
SR	N,GAMMA	EXPT-PROG	MAXW		KDK-23	40	478		UPP	BERGQVIST+ ANG.DISTR.OF GAMMAS
SR 088	DIFF ELASTIC	EXPT-PROG	11+7		DOE-NDC-12	221	478		OHO	FINLAY+ANGDIST.5PCT.OPTMDL.NDG.73P.
Y 089	DIFF INELAST	EXPT-PROG	20+6	45+6	KDK-23	32	478		AE	RAMSTROM.
Y 089	N,GAMMA	EXPT-PROG	14+7	+7	KDK-23	13	478		LND	MAGNUSSON+
Y 089	N,GAMMA	EXPT-PROG	MAXW		KDK-23	40	478		UPP	BERGQVIST+ ANG.DISTR.OF GAMMAS
Y 089	N,GAMMA	EXPT-PROG	60+6	16+7	KDK-23	39	478		UPP	BERGQVIST+
ZR 091	SPECT N,GAMT	EXPT-PROG	20+3	24+4	DOE-NDC-12	28	478		BNL	KENNY+SPEC.N BINDING ES CALC.NDG.
ZR 092	SPECT N,GAMT	EXPT-PROG	20+3	24+4	DOE-NDC-12	28	478		BNL	KENNY+SPEC.N BINDING ES CALC.NDG.
ZR 094	SPECT N,GAMT	EXPT-PROG	20+3	24+4	DOE-NDC-12	28	478		BNL	KENNY+SPEC.N BINDING ES CALC.NDG.
ZR 096	SPECT N,GAMT	EXPT-PROG	20+3	24+4	DOE-NDC-12	28	478		BNL	KENNY+SPEC.N BINDING ES CALC.NDG.
NB 093	N,2N	EXPT-PROG	90+6	15+7	DOE-NDC-12	107	478		LRL	NETHAWAY+REVISION NP/A 190 P.635.NDG
NB 093	N,2N	EXPT-PROG	14+7	19+7	DOE-NDC-12	107	478		LRL	NETHAWAY+REL AL27.NDG.TBP IN JIN.
NB 093	N,PROTON	EXPT-PROG	15+7		DOE-NDC-12	105	478		LRL	HAIGHT+(N,XP).CS TBL.MAG QUAD SPEC.
NB 093	N,DEUTERON	EXPT-PROG	15+7		DOE-NDC-12	105	478		LRL	HAIGHT+(N,XP),CS TBL.MAG QUAD SPEC.
NB 093	N,ALPHA	EXPT-PROG	15+7		DOE-NDC-12	105	478		LRL	HAIGHT+(N,XA) CS TBL.MAG QUAD SPEC.
TC 099	TOTAL	EXPT-PROG	45+0	24+1	NEANDC(E)	192	5	478	KIL	PRIESMEYER+P.57 TRANS,GRPH
RH 103	TOTAL	EXPT-PROG	10+5	40+6	INDC(EUR)	11	5	378	GEL	PAULSEN+RH103M ACTIV MEASM
PD 108	SPECT N,GAMT	EXPT-PROG	25-2	27+0	DOE-NDC-12	29	478		BNL	CASTEN+LVL SCHEME.STRUCT.TBC
CD 108	RESON PARAMS	EXPT-PROG	54+1	10+3	NEANDC(E)	192	5	478	KIL	PRIESMEYER+P.57 NDG,TBC
IN	DIFF ELASTIC	EXPT-PROG	70+6	80+6	KDK-23	34	478		AE	RAMSTROM+ TOF 20 TO 174 DEGREES
IN 113	TOTAL	EXPT-PROG	FISS		NEANDC(E)	192	5	478	PTB	MANNHART.P.84 AVG SIG CFD CALC
IN 115	TOTAL	EXPT-PROG	40+5	40+6	INDC(EUR)	11	5	378	GEL	LISKIEN+IN115M ACTIV MEASM
IN 115	TOTAL	EXPT-PROG	14+7		KDK-23	15	478		LND	LUNDBERG+ ABS.MEASUREMENT
IN 115	TOTAL	EXPT-PROG	FISS		NEANDC(E)	192	5	478	PTB	MANNHART.P.84 AVG SIG CFD CALC
IN 115	N,GAMMA	EXPT-PROG	15+7		KDK-23	13	478		LND	MAGNUSSON+ ACT TECHNIQUE

ELEMENT S	A	QUANTITY	TYPE	ENERGY MIN	MAX	DOCUMENTATION REF	VOL	PAGE	DATE	LAB	COMMENTS
IN	115	N,GAMMA	EXPT-PROG	23+4	96+5	DOE-NDC-12	172	478		MHG	GRADY+EXPT TBD.5ES.NDG.
IN	115	N,GAMMA	EXPT-PROG	FISS		NEANDC(E)	192	5	478	PTB	MANNHART.P.84 AVG SIG CFD CALC
SN	116	DIFF ELASTIC	EXPT-PROG	10+6		DOE-NDC-12		90	478	KTY	HARPER+TOF.14ANG.LEG FIT.CURV.TBC
SN	118	DIFF ELASTIC	EXPT-PROG	10+6		DOE-NDC-12		90	478	KTY	HARPER+TOF.14ANG.LEG FIT.CURV.TBC
SN	120	DIFF ELASTIC	EXPT-PROG	10+6		DOE-NDC-12		90	478	KTY	HARPER+TOF.14ANG.LEG FIT.CURV.TBC
SN	122	DIFF ELASTIC	EXPT-PROG	10+6		DOE-NDC-12		90	478	KTY	HARPER+TOF.14ANG.LEG FIT.CURV.TBC
SN	124	DIFF ELASTIC	EXPT-PROG	10+6		DOE-NDC-12		90	478	KTY	HARPER+TOF.14ANG.LEG FIT.CURV.TBC
I	127	TOTAL	EXPT-PROG	20+1	20+3	INDC(EUR)	11	19	378	GEL	ROHR+LINAC TOF MEASM
I	127	RESON PARAMS	EXPT-PROG	20+1	20+3	INDC(EUR)	11	19	378	GEL	ROHR+
I	127	STRNTH FNCTN	EXPT-PROG	20+1	20+3	INDC(EUR)	11	19	378	GEL	ROHR+
I	127	POLARIZATION	EXPT-PROG	16+7		NEANDC(E)	192	8	678	EDG	GALLOWAY+ P121.GRAPHS CFD OPTMDL.
I	127	N,GAMMA	EXPT-PROG	20+1	50+3	INDC(EUR)	11	19	378	GEL	ROHR+CAPT+SELF-INDICTN RATIO MEASM
I	127	N,GAMMA	EXPT-PROG	15+7		KDK-23		13	478	LND	MAGNUSSON+ ACT TECHNIQUE
I	127	LVL DENSITY	EXPT-PROG	20+1	20+3	INDC(EUR)	11	19	378	GEL	ROHR+
CE		N,ALPHA	EXPT-PROG	14+7		NEANDC(E)	192	5	478	JUL	QAIM+P.41 NDG,ABST
CE	140	TOTAL	EXPT-PROG	20+3	24+4	DOE-NDC-12		110	478	LRL	CAMARDA.HIGH RSLN TOF.RES ANAL.NDG
CE	140	RESON PARAMS	EXPT-PROG	20+3	24+4	DOE-NDC-12		110	478	LRL	CAMARDA.TRNS.RES ANAL.D GVN L=0,1.
CE	140	STRNTH FNCTN	EXPT-PROG	20+3	24+4	DOE-NDC-12		110	478	LRL	CAMARDA.S0,S1 GVN.
CE	140	N,GAMMA	EXPT-PROG	60+6	16+7	KDK-23		39	478	UPP	BERGQVIST+
PR	141	INELASTIC G	EXPT-PROG	12+6	20+6	KDK-23		33	478	SWR	TROSTELL+
ND		N,ALPHA	EXPT-PROG	14+7		NEANDC(E)	192	5	478	JUL	QAIM.P.41 NDG,ABST
ND	145	SPECT N,GAMT	EXPT-PROG	MAXW		DOE-NDC-12		28	478	BNL	KENNY+SPEC.+-.2KEV PRECISION.NDG
ND	145	SPECT N,GAMT	EXPT-PROG	20+3	24+4	DOE-NDC-12		28	478	BNL	KENNY+SPEC.+-.2KEV PRECISION.NDG.2ES
SM	148	DIFF ELASTIC	EXPT-PROG	25+6		DOE-NDC-12		93	478	KTY	COOPE+CFD SM152.CC CALC.CURV.
SM	152	DIFF ELASTIC	EXPT-PROG	25+6		DOE-NDC-12		93	478	KTY	COOPE+CFD SM148.CC CALC.CURV.
EU		N,ALPHA	EXPT-PROG	14+7		NEANDC(E)	192	5	478	JUL	QAIM.P.41 NDG,ABST
TB	159	RESON PARAMS	EXPT-PROG	+1	12+3	NEANDC(J)	51U	7	977	JAE	OHKUBO+.S0=1.5E-4,WG=0.105EV,D=4.3EV
TB	159	N,ALPHA	EXPT-PROG	14+7		NEANDC(E)	192	5	478	JUL	QAIM.P.41 NDG,ABST
TM	169	N,GAMMA	THEO-PROG	10+3	60+6	DOE-NDC-12		133	478	LAS	ARTHUR.GNASH CODE CALC.CFD.EXPT.GRPH
TM	169	N,ALPHA	EXPT-PROG	14+7		NEANDC(E)	192	5	478	JUL	QAIM.P.41 NDG,ABST
YB		N,ALPHA	EXPT-PROG	14+7		NEANDC(E)	192	5	478	JUL	QAIM.P.41 NDG,ABST
YB	171	SPECT N,GAMT	EXPT-PROG	NDG		DOE-NDC-12		30	478	BNL	CASTEN+172YB LVL STRUCT STUDY.NDG.
YB	173	SPECT N,GAMT	EXPT-PROG	NDG		DOE-NDC-12		30	478	BNL	CASTEN+174YB LVL STRUCT STUDY.NDG.
LU	175	N,ALPHA	EXPT-PROG	14+7		NEANDC(E)	192	5	478	JUL	QAIM.P.41 NDG,ABST
W		POLARIZATION	EXPT-PROG	16+7		NEANDC(E)	192	8	678	EDG	GALLOWAY+ P121.GRAPHS CFD OPTMDL.
W	182	SPECT N,GAMT	EXPT-PROG	20+3	24+4	DOE-NDC-12		28	478	BNL	STELTS+SPEC.NUCLEAR STRUC.NDG.TBC
W	182	SPECT N,GAMT	EXPT-PROG	MAXW		DOE-NDC-12		28	478	BNL	STELTS+SPEC.NUCLEAR STRUC.NDG.TBC
W	182	SPECT N,GAMT	EXPT-PROG	20+3	24+4	DOE-NDC-12		28	478	BNL	STELTS+SPEC.NUCLEAR STRUC.NDG.TBC
W	186	N,GAMMA	EXPT-PROG	15+7		KDK-23		13	478	LND	MAGNUSSON+ ACT TECHNIQUE
OS	192	N,GAMMA	EXPT-PROG	NDG		DOE-NDC-12		30	478	ILL	CASTEN+TWOFOLD CAPTURE.CS GVN.

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OS	192	SPECT N,GAMT	EXPT-PROG	NDG		DOE-NDC-12	30	478		ILL	CASTEN+TWOFOLD CAPTURE.LVL STUDY.NDG
OS	193	N,GAMMA	EXPT-PROG	NDG		DOE-NDC-12	30	478		ILL	CASTEN+TWOFOLD CAPTURE.CS GVN
IR	191	N,GAMMA	THEO-PROG	10+3	60+6	DOE-NDC-12	133	478		LAS	ARTHUR.GNASH CODE CALC.CFD.EXPT.GRPH
IR	191	SPECT N,GAMT	EXPT-PROG	66-1	10+1	DOE-NDC-12	31	478		BNL	KANE+PRIMARY G RAY MEAS.NDG.ANAL TBD
IR	193	N,GAMMA	THEO-PROG	10+3	60+6	DOE-NDC-12	133	478		LAS	ARTHUR.GNASH CODE CALC.CFD.EXPT.GRPH
IR	193	SPECT N,GAMT	EXPT-PROG	13+0	91+0	DOE-NDC-12	31	478		BNL	KANE+PRIMARY G RAY MEAS.NDG.ANAL TBD
PT	192	SPECT N,GAMT	EXPT-PROG	NDG		DOE-NDC-12	31	478		BNL	SMITH+LVL SCHEME STUDY PT193.NDG.
PT	194	SPECT N,GAMT	EXPT-PROG	NDG		DOE-NDC-12	31	478		BNL	SMITH+LVL SCHEME STUDY PT195.NDG.
PT	195	SPECT N,GAMT	EXPT-PROG	NDG		DOE-NDC-12	26	478		BNL	CASTEN+LVL SCH UP TO 2.5MEV.CFD.NDG.
AU	197	N,2N	EXPT-PROG	14+7		KDK-23	15	478		LND	LUNDBERG+ ABS. MEASUREMENT
AU	197	N,2N	EXPT-PROG	FISS		NEANDC(E)	192	5	478	PTB	MANNHART.P.84 AVG SIG CFD CALC
AU	197	N,GAMMA	THEO-PROG	10+4	10+6	INDC(EUR)	11	47	378	GEL	LISKIEN+CALC OF SIG FLUCTUATIONS
AU	197	N,GAMMA	EXPT-PROG	15+7		KDK-23	15	478		LND	MAGNUSSON+ ACT TECHNIQUE
AU	197	N,GAMMA	EXPT-PROG	FISS		NEANDC(E)	192	5	478	PTB	MANNHART.P.84 AVG SIG CFD CALC
HG		POLARIZATION	EXPT-PROG	16+7		NEANDC(E)	192	8	678	EDG	GALLOWAY+ P121.GRAPHS CFD OPTMDL.
HG	196	SPECT N,GAMT	EXPT-PROG	NDG		DOE-NDC-12	32	478		BNL	ZGANJAR+LVL SCHEME HG197.S P E.CFD.
PB		POLARIZATION	EXPT-PROG	16+7		NEANDC(E)	192	8	678	EDG	GALLOWAY+ P121.GRAPHS CFD OPTMDL.
PB	207	DIFF INELAST	EXPT-PROG	20+6	45+6	KDK-23	32	478		AE	RAMSTROM.
BI	209	DIFF ELASTIC	EXPT-PROG	70+6	80+6	KDK-23	34	478		AE	RAMSTROM+ TOF 20 TO 174 DEGREES
BI	209	DIFF INELAST	EXPT-PROG	20+6	45+6	KDK-23	32	478		AE	RAMSTROM.
TH	229	RESON PARAMS	EXPT-PROG	13+0	41+1	DOE-NDC-12	43	478		COL	LUERS+TBL WT,WF.D GVN.GRPHS.77RES E.
TH	229	N,FISSION	EXPT-PROG	10+0	43+1	DOE-NDC-12	43	478		COL	LUERS+TOF.REL U235.CURV.
TH	229	FISS YIELD	EXPT-PROG	NDG		DOE-NDC-12	42	478		COL	LUERS+MASS+TOT KE DISTR.GRPH.
TH	229	FRAG SPECTRA	EXPT-PROG	NDG		DOE-NDC-12	42	478		COL	LUERS+MASS+TOT KE DISTR.GRPH.
TH	229	RESON PARAMS	EXPT-PROG	11+0	38+1	DOE-NDC-12	43	478		COL	LUERS+NORM REL U235.TBL.
TH	230	SPECT N,GAMT	EXPT-PROG	14+0		DOE-NDC-12	32	478		BNL	JEUCH+EPITHERMAL.LVL.STUDY TH231.NDG
TH	232	DIFF ELASTIC	EXPT-PROG		30+5	DOE-NDC-12	151	478		LTI	KEGEL+EXPT TBD.NDG.
TH	232	DIFF ELASTIC	EXPT-PROG	10+6	31+6	DOE-NDC-12	152	478		LTI	KEGEL+EXCIT FN,ANGDIST.TBD.NDG.
TH	232	DIFF INELAST	EXPT-PROG	NDG		DOE-NDC-12	153	478		LTI	KEGEL+EXPT TBC.NDG
TH	232	DIFF INELAST	EXPT-PROG		30+5	DOE-NDC-12	151	478		LTI	KEGEL+50KEV,45KEV STATES.NDG.TBC.
TH	232	DIFF INELAST	EXPT-PROG	10+6	31+6	DOE-NDC-12	152	478		LTI	KEGEL+EXCIT FN,ANGDIST.TBD.NDG.
TH	232	INELASTIC G	EXPT-PROG	10+6	30+6	DOE-NDC-12	153	478		LTI	KEGEL+125DEG EXCIT FN.PRELIM.TBC.NDG
TH	232	N,FISSION	EXPT-PROG	50+6	90+6	KDK-23	26	478		FOA	CONDE+
TH	232	N,FISSION	EXPT-PROG	12+6	20+6	INDC(EUR)	11	22	378	GEL	BLONS+LINAC TOF 2KEV RESOL
TH	232	DELAYD NEUTS	EVAL-PROG	13+6	16+7	DOE-NDC-12	249	478		ORL	GWIN+NDG.SEEORNL-TM-6245.
TH	232	FISS YIELD	EVAL-PROG	10+5	14+7	DOE-NDC-12	135	478		LAS	ENGLAND+EVL YLDS FOR ENDF/B-V.2E.NDG
PA	231	N,FISSION	EXPT-PROG	NDG		DOE-NDC-12	108	478		LRL	BEHRENS+PA231/U235.NDG.TBD.
U		TOTAL	EXPT-PROG	10+1	20+5	NEANDC(E)	192	8	678	HAR	HASTE+ P28. DOPPLER EFF.AVG TRANSM.
U		RESON PARAMS	EXPT-PROG	21+1	89+1	NEANDC(E)	192	8	678	HAR	HASTE+ P28. DOPPLER EFF.
U	233	EVALUATION	EVAL-PROG	50+4	20+7	DOE-NDC-12	131	478		LAS	STEWART+ENDF/B-V.NDG.

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U	233	TOTAL	THEO-PROG	10+3	15+7	DOE-NDC-12	137	478		LAS	MADLAND+OPTMDL CALC.NDG.
U	233	N,FISSION	EXPT-PROG	13+5	82+6	DOE-NDC-12	10	478		ANL	POENITZ.IONZ CHMBR.GRPH.CFD ENDF
U	233	N,FISSION	EXPT-PROG	15+5	20+7	NEANDC(E)	192	8	678	HAR	JAMES+ P33. 50M TOF.SYNCH.REL U-235
U	233	N,FISSION	EXPT-PROG	23+4	96+5	DOE-NDC-12	168	478		MHG	BALDWIN+5ES.PHOTO N SOURCE.NDG.TBD.
U	233	SPECT FISS G	EXPT-PROG	MAXW		DOE-NDC-12	122	478		LAS	BENDT+G SPEC.TBL.CFD ENDF,OTH.
U	233	FISS YIELD	EVAL-PROG	25-2	14+7	DOE-NDC-12	135	478		LAS	ENGLAND+EVL YLDS FOR ENDF/B-V.3E.NDG
U	233	FISS YIELD	EXPT-PROG	MAXW		NEANDC(OR)	151	678		WUR	ZWICKY+ PM-148M,148G IND YLDS
U	233	FRAG SPECTRA	EXPT-PROG	27+5	96+5	DOE-NDC-12	169	478		ANL	ROBERTSON+3ES.ANGDIST.TBD.NDG
U	234	N,FISSION	EXPT-PROG	SPON		NEANDC(OR)	151	678		WUR	REIST+ SPON FISS HALF LIVE.
U	235	TOTAL	THEO-PROG	10+3	15+7	DOE-NDC-12	137	478		LAS	MADLAND+OPTMDL CALC.NDG.
U	235	N,FISSION	EXPT-PROG	10+0	43+1	DOE-NDC-12	42	478		COL	LUERS+REL B10.PRELIM ANAL.GRPH.
U	235	N,FISSION	THEO-PROG	10+4	10+6	INDC(EUR)	11	47	378	GEL	LISKIEN+CALC OF SIG FLUCTUATIONS
U	235	N,FISSION	EXPT-PROG	15-2	20+2	INDC(EUR)	11	23	378	GEL	BARTHELEMY+ REL TO LI-6 AND B-10.
U	235	N,FISSION	EXPT-PROG	10+6	20+7	NEANDC(E)	192	5	478	KFK	KARI+ P.6 ABSOL,NDG
U	235	N,FISSION	EXPT-PROG	10+5	30+7	DOE-NDC-12	108	478		LRL	BEHRENS+5 RATIOS.NDG.TBP.TBC.
U	235	N,FISSION	EXPT-PROG	23+4		DOE-NDC-12	168	478		MHG	BALDWIN+NDG.ANAL TBD
U	235	N,FISSION	EXPT-PROG	70+5	20+7	DOE-NDC-12	175	478		NBS	CARLSON+TOF.ANAL TBD.NDG.REL NP237
U	235	N,FISSION	EXPT-PROG	20+5	12+6	DOE-NDC-12	175	478		NBS	WASSON+ABSOL MEAS.CFD REL MEAS.NDG.
U	235	N,FISSION	EXPT-PROG	10+0	10+5	DOE-NDC-12	271	478		RPI	NAKAGOME+CFD ENDF.NDG
U	235	ALPHA	EXPT-PROG	FAST		NEANDC(E)	192	8	678	HAR	MCKEAN+ P89. IRRADIATION IN PFR.
U	235	ALPHA	EXPT-PROG	10+4	50+5	NEANDC(E)	192	5	478	KFK	BEER+P.19 GRPHS,CFD OTHERS
U	235	NUBAR (NU)	EXPT-PROG	50-3	10+7	DOE-NDC-12	239	478		OEL	GWIN+REL CF252.NDG.SEE ORNL-TM-6246
U	235	DELAYD NEUTS	EXPT-PROG	MAXW		DOE-NDC-12	22	478		BNW	REEDER+ES.NDG.TBC.SEE PR/C 16 P2098
U	235	DELAYD NEUTS	EXPT-PROG	MAXW		DOE-NDC-12	179	478		NBS	SCHRACK.U02,U308 CHEMICAL EFFECT.TBC
U	235	DELAYD NEUTS	EXPT-PROG	MAXW		KDK-23		28	478	SWR	ALEKLETT+ GA,BR,RB PRECURSERS
U	235	DELAYD NEUTS	EXPT-PROG	MAXW		KDK-23		28	478	SWR	ALEKLETT+ IN,TE,I,XE,CS PRECURSERS.
U	235	FRAG NEUTS	EXPT-PROG	MAXW		DOE-NDC-12		22	478	BNW	REEDER+ES.NDG.TBC.SEE PR/C 16 P2098
U	235	SPECT FISS N	EXPT-PROG	10+5		NEANDC(E)	192	8	678	AE	ADAMS+ (HAR) P.59.ABST.NDG.
U	235	SPECT FISS N	EXPT-PROG	10+5		KDK-23		24	478	AE	ADAMS+ LOW EN SPECT.
U	235	SPECT FISS G	EXPT-PROG	MAXW		DOE-NDC-12	122	478		LAS	BENDT+G SPEC.TBL.CFD ENDF,OTH.
U	235	FISS YIELD	EXPT-PROG	30-1	19+1	DOE-NDC-12		46	478	COL	LUERS+MASS+TOT KE DISTR.GRPH 5RES.
U	235	FISS YIELD	EXPT-PROG	MAXW		DOE-NDC-12		46	478	COL	LUERS+MASS+TOT KE DISTR.GRPH.
U	235	FISS YIELD	EXPT-PROG	NDG		DOE-NDC-12		42	478	COL	LUERS+THICK SAMPL.TERNARY ALFS.NDG
U	235	FISS YIELD	EXPT-PROG	MAXW		NEANDC(E)	192	8	678	HAR	MCKEAN+ P90. TRITIUM YLD IN DIDO
U	235	FISS YIELD	EVAL-PROG	25-2	14+7	DOE-NDC-12	135	478		LAS	ENGLAND+EVL YLDS FOR ENDF/B-V.3E.NDG
U	235	FISS YIELD	EXPT-PROG	PILE		NEANDC(E)	192	5	478	MNZ	DENSCHLAG+P.70 NB+BA NUCLIDES
U	235	FRAG SPECTRA	EXPT-PROG	27+5	96+5	DOE-NDC-12	169	478		ANL	ROBERTSON+3ES.ANGDIST.NDG
U	235	FRAG SPECTRA	EXPT-PROG	30-1	19+1	DOE-NDC-12		46	478	COL	LUERS+MASS+TOT KE DISTR.GRPH 5RES.
U	235	FRAG SPECTRA	EXPT-PROG	MAXW		DOE-NDC-12		46	478	COL	LUERS+MASS+TOT KE DISTR.GRPH.
U	235	FISS PROD G	EXPT-PROG	MAXW		KDK-23		32	478	AE	JOHANSSON+ DELAYED GAM.AFTER FISSION

ELEMENT S	A	QUANTITY	TYPE	ENERGY MIN	MAX	DOCUMENTATION REF	VOL	PAGE	DATE	LAB	COMMENTS
U	235	FISS PROD G	EXPT-PROG	PILE		KDK-23		4	478	CTH	BRODEN+ ZR,NB,TC ISOTOPES,CHEM SEP
U	235	FISS PROD G	EXPT-PROG	NDG		NEANDC(E)	192	5	478	PTB	SCHOETZIG+P.83 I131,EMISS-PROB
U	235	FISS PROD G	EXPT-PROG	MAXW		KDK-23		29	478	SWR	FOGELBERG+ IN GAMMAS.
U	235	FISS PROD G	EXPT-PROG	MAXW		KDK-23		29	478	SWR	FOGELBERG+ SN ISOTOPE GAMMAS
U	236	N,FISSION	EXPT-PROG	50+6	90+6	KDK-23		26	478	FOA	CONDE+ REL.TO U235 FISSION
U	236	N,FISSION	EXPT-PROG	SPON		NEANDC(OR)	151		678	WUR	REIST+ SPON FISS HALF LIVE.
U	236	FISS YIELD	EVAL-PROG	10+5		DOE-NDC-12	135		478	LAS	ENGLAND+EVL YLDS FOR ENDF/B-V.NDG
U	238	EVALUATION	EVAL-PROG	45+4	20+7	DOE-NDC-12		21	478	ANL	POENITZ+SEE ANL-NDM-32.NDG.
U	238	TOTAL	EXPT-PROG	10+0	43+3	INDC(EUR)	11	27	378	GEL	CORNELIS+LINAC TOF MEASM
U	238	TOTAL	THEO-PROG	10+3	15+7	DOE-NDC-12		137	478	LAS	MADLAND+OPTMDL CALC.NDG.
U	238	TOTAL	EXPT-PROG	66+0	68+0	DOE-NDC-12		179	478	NBS	BOWMAN+U238-U3C8 VS UFG.GRPH.
U	238	TOTAL	EXPT-PROG	10+2	17+5	DOE-NDC-12		238	478	ORL	OLSEN+TRNS.RES E.NDG.SEE ORNL-TM5915
U	238	RESON PARAMS	EXPT-PROG	10+0	43+3	INDC(EUR)	11	27	378	GEL	CORNELIS+LINAC TOF MEASM
U	238	RESON PARAMS	EXPT-PROG	67+0		INDC(EUR)	11	24	378	GEL	STAVELOZ+SCAT EXPERIMENT
U	238	RESON PARAMS	EXPT-PROG	67+0	19+2	NEANDC(E)	192	8	678	HAR	HASTE+ P24. S-WAVE PARAMS FROM TRANS
U	238	RESON PARAMS	EVAL-PROG	67+0	37+1	NEANDC(E)	192	5	478	KFK	GOEL.P.33 WN,WG,3 LEVELS
U	238	RESON PARAMS	EXPT-PROG	10+2	17+5	DOE-NDC-12		238	478	ORL	OLSEN+TRNS.ES FOR SHARP RES.NDG.TBP.
U	238	RESON PARAMS	EVAL-PROG		40+3	DOE-NDC-12		250	478	ORL	DESAUSSURE+ NDG, SEE ORNL-TM-6152
U	238	RESON PARAMS	EXPT-PROG	67+0	81+1	DOE-NDC-12		263	478	RPI	BLOCK+CAPT.TBL WN,WG.CFD ENDF,OTH.
U	238	STRNTH FNCTN	EXPT-PROG	10+0	43+3	INDC(EUR)	11	27	378	GEL	CORNELIS+LINAC TOF MEASM
U	238	ELASTIC SCAT	EXPT-PROG	10+0	43+3	INDC(EUR)	11	27	378	GEL	CORNELIS+LINAC TOF MEASM
U	238	DIFF ELASTIC	EXPT-PROG	90+5	31+6	DOE-NDC-12		152	478	LTI	KEGEL+TBP.EXCIT FN,ANGDIST.GRPHS.CFD
U	238	DIFF ELASTIC	EXPT-PROG		30+5	DOE-NDC-12		151	478	LTI	KEGEL+EXPT TBD.NDG.
U	238	DIFF INELAST	EXPT-PROG	90+5	31+6	DOE-NDC-12		152	478	LTI	KEGEL+TBP.EXCIT FN,ANGDIST.GRPHS.CFD
U	238	DIFF INELAST	EXPT-PROG	10+5	30+5	DOE-NDC-12		151	478	LTI	KEGEL+45KEV STATE.TBL CS 5 ES.TBC.
U	238	DIFF INELAST	EXPT-PROG	NDG		DOE-NDC-12		153	478	LTI	KEGEL+EXPT TBC.NDG
U	238	INELASTIC G	EXPT-PROG	10+6	30+6	DOE-NDC-12		153	478	LTI	KEGEL+125DEG EXCIT FN.PRELIM.TBC.NDG
U	238	N,FISSION	EXPT-PROG	50+6	90+6	KDK-23		26	478	FOA	CONDE+ REL.TO U235 FISSION
U	238	N,FISSION	EXPT-PROG	SPON		NEANDC(E)	192	5	478	KLN	THIEL+P.61 DECAY-CONST DET
U	238	FISS YIELD	THEO-PROG	FAST		DOE-NDC-12		17	478	ANL	GINDLER+MASS DISTR CALC.CURV.CFD EXP
U	238	FISS YIELD	EXPT-PROG	FAST		NEANDC(E)	192	8	678	HAR	CUNINGHAME+ P90. YLD OF MO-99.NDG
U	238	FISS YIELD	EVAL-PROG	10+5	14+7	DOE-NDC-12		135	478	LAS	ENGLAND+EVL YLDS FOR ENDF/B-V.2E.NDG
U	238	N,GAMMA	EXPT-PROG	10+0	43+3	INDC(EUR)	11	27	378	GEL	CORNELIS+LINAC TOF MEASM
U	238	N,GAMMA	EXPT-PROG	67+0	81+1	DOE-NDC-12		263	478	RPI	BLOCK+TOF.SELF INDIC.CAPT YLD.CURV.
U	238	SPECT N,GAMT	EXPT-PROG	20+3	24+4	DOE-NDC-12		32	478	BNL	CHRIEN+U239LVL STRUCT.INTS.CFD.NDG
U	239	FISS YIELD	EVAL-PROG	25-2	14+7	DOE-NDC-12		135	478	LAS	ENGLAND+EVL YLDS FOR ENDF/B-V.3E.NDG
NP	237	TOTAL	EXPT-PROG	80+0	21+2	INDC(EUR)	11	29	378	GEL	ANGELETTI+LINAC TOF MEASM
NP	237	TOTAL	THEO-PROG	10+1	10+3	DOE-NDC-12		114	478	LAS	AUCHAMPAUGH+TRNS.RES ANAL.TBC.NDG
NP	237	RESON PARAMS	EXPT-PROG	80+0	21+2	INDC(EUR)	11	29	378	GEL	ANGELETTI+LINAC TOF MEASM
NP	237	RESON PARAMS	THEO-PROG	10+1	10+3	DOE-NDC-12		114	478	LAS	AUCHAMPAUGH+TRNS.RES PAR ANAL.NDG

ELEMENT S A	QUANTITY	TYPE	ENERGY MIN	MAX	DOCUMENTATION REF	VOL	PAGE	DATE	LAB	COMMENTS
NP 237	STRNTH FNCTN	EXPT-PROG	80+0	21+2	INDC(EUR)	11	29	378	GEL	ANGELETTI+LINAC TOF MEASM
NP 237	ELASTIC SCAT	EXPT-PROG	80+0	21+2	INDC(EUR)	11	29	378	GEL	ANGELETTI+LINAC TOF MEASM
NP 237	N,FISSION	EXPT-PROG	10+5	30+7	DOE-NDC-12	108		478	LRL	BEHRENS+NP237/U235.NDG.TBP NSE.
NP 237	N,FISSION	EXPT-PROG	23+4	96+5	DOE-NDC-12	168		478	MHG	BALDWIN+5ES.PHOTO N SOURCE.NDG.TBD.
NP 237	FISS YIELD	EVAL-PROG	FAST		DOE-NDC-12	135		478	LAS	ENGLAND+EVL YLDS FOR ENDF/B-V.NDG
NP 237	FRAG SPECTRA	EXPT-PROG	27+5	96+5	DOE-NDC-12	169		478	ANL	ROBERTSON+3ES.ANGDIST.TBD.NDG
NP 237	N,GAMMA	EXPT-PROG	80+0	21+2	INDC(EUR)	11	29	378	GEL	ANGELETTI+LINAC TOF MEASM
NP 237	LVL DENSITY	EXPT-PROG	80+0	21+2	INDC(EUR)	11	29	378	GEL	ANGELETTI+LINAC TOF MEASM
PU 239	TOTAL	EXPT-PROG	10+2	50+5	DOE-NDC-12	239		478	ORL	GWIN+TRNS.NDG.
PU 239	N,FISSION	EXPT-PROG	10+0	43+1	DOE-NDC-12	42		478	COL	LUERS+REL B10.PRELIM ANAL.GRPH.
PU 239	N,FISSION	EXPT-PROG	50-1	17+0	DOE-NDC-12	42		478	COL	LUERS+REL B10.PRELIM ANAL.GRPH.
PU 239	N,FISSION	EXPT-PROG	15+5	20+7	NEANDC(E)	192	8	678	HAR	JAMES+ P33. 50M TOF.SYNCH.REL U-235
PU 239	N,FISSION	EXPT-PROG	10+6	20+7	NEANDC(E)	192	5	478	KFK	KARI+ P.6 ABSOL,CURV,CFD OTHERS
PU 239	N,FISSION	EXPT-PROG	23+4		DOE-NDC-12	168		478	MHG	BALDWIN+NDG.ANAL TBD
PU 239	NUBAR (NU)	EXPT-PROG	50-3	10+7	DOE-NDC-12	239		478	ORL	GWIN+REL CF252.NDG.SEE ORNL-TM-6246
PU 239	SPECT FISS G	EXPT-PROG	MAXW		DOE-NDC-12	122		478	LAS	BENDT+G SPEC.TBL.CFD ENDF,OTH.
PU 239	FISS YIELD	EXPT-PROG	90-1	10+2	DOE-NDC-12	48		478	COL	LUERS+MASS+TOT KE DISTR.GRPH.
PU 239	FISS YIELD	EXPT-PROG	20-3	20+0	DOE-NDC-12	48		478	COL	LUERS+MASS+TOT KE DISTR.GRPH.
PU 239	FISS YIELD	EXPT-PROG	25-2	10+2	INDC(EUR)	11	31	378	GEL	BARTHELEMY+MASS DISTRIB
PU 239	FISS YIELD	EXPT-PROG	FAST		NEANDC(E)	192	8	678	HAR	CUNINGHAME+ P90. YLD OF MO-99.NDG
PU 239	FISS YIELD	EXPT-PROG	MAXW		NEANDC(OR)	151		678	WUR	ZWICKY+ PM-148M,148G IND YLDS
PU 239	FRAG SPECTRA	EXPT-PROG	27+5	96+5	DOE-NDC-12	169		478	ANL	ROBERTSON+3ES.ANGDIST.ANAL TBD.NDG.
PU 239	FRAG SPECTRA	EXPT-PROG	20-3	20+0	DOE-NDC-12	48		478	COL	LUERS+MASS+TOT KE DISTR.GRPH.
PU 239	FRAG SPECTRA	EXPT-PROG	NDG		DOE-NDC-12	48		478	COL	LUERS+MASS+TOT KE DISTR.GRPH.
PU 239	FRAG SPECTRA	EXPT-PROG	25-2	10+2	INDC(EUR)	11	31	378	GEL	BARTHELEMY+KIN ENERGY SPECTRA
PU 240	RESON PARAMS	EXPT-PROG	11+0		NEANDC(E)	192	5	478	KIL	PRIESMEYER+P.59 TRANS,TBD
PU 240	N,FISSION	EXPT-PROG	10+4	25+5	NEANDC(E)	192	5	478	KFK	KAEPPELER+P.25 REL U235,GRPH
PU 240	N,FISSION	EXPT-PROG	10+6	20+7	NEANDC(E)	192	5	478	KFK	KARI+ P.6 ABSOL,CURV,CFD OTHERS
PU 240	FISS YIELD	EVAL-PROG	FAST		DOE-NDC-12	135		478	LAS	ENGLAND+EVL YLDS FOR ENDF/B-V.NDG.
PU 240	N,GAMMA	EXPT-PROG	50+4	25+5	NEANDC(E)	192	5	478	KFK	WISSHAK+P.23 GRPH,CFD OTHERS
PU 241	N,FISSION	EXPT-PROG	SPON		NEANDC(E)	192	8	678	HAR	CROUCH+ HALF-LIFE.OLD+NEW SAMPLES.
PU 241	N,FISSION	EXPT-PROG	25-2	80+0	DOE-NDC-12	109		478	LRL	CZIRR.CFD ENDF/B-V.NDG.TBP NSE
PU 241	FISS YIELD	EVAL-PROG	25-2	10+5	DOE-NDC-12	135		478	LAS	ENGLAND+EVL YLDS FOR ENDF/B-V.2E.NDG
PU 242	FISS YIELD	EVAL-PROG	FAST		DOE-NDC-12	135		478	LAS	ENGLAND+EVL YLDS FOR ENDF/B-V.NDG
PU 242	N,GAMMA	EXPT-PROG	50+4	25+5	NEANDC(E)	192	5	478	KFK	WISSHAK+P.23 NDG
AM 241	TOTAL	EXPT-PROG	50+5	25+7	DOE-NDC-12	110		478	LRL	PHILLIPS+LINAC.TOF.TRNS.PRELIM GRPH.
AM 241	RESON PARAMS	EVAL-PROG	10+0	60+1	INDC(EUR)	11	33	378	GEL	THEOBALD.AVERAGE WF CFD
AM 241	N,FISSION	EXPT-PROG	50+3	50+6	INDC(EUR)	11	31	378	GEL	BUDTZ-JOERGENSEN+VDG MEASM
AM 241	N,FISSION	EXPT-PROG	10+0	20+5	INDC(EUR)	11	32	378	GEL	BUDTZ-JOERGENSEN+VLINAC TOF MEASM
AM 241	N,FISSION	EXPT-PROG	50+1	10+4	NEANDC(E)	192	8	678	HAR	GAYTHER+ P35. GRAPH CFD OTHER DATA.
AM 241	N,FISSION	EXPT-PROG	13+4	90+5	NEANDC(E)	192	5	478	KFK	HAGE+P.26 GRPH,FISS-BARR CALC

ELEMENT S A	QUANTITY	TYPE	ENERGY MIN	MAX	DOCUMENTATION REF	VOL	PAGE	DATE	LAB	COMMENTS
AM 241	N,FISSION	EXPT-PROG	10+3	30+7	DOE-NDC-12	108	478		LRL	BEHRENS+AM241/U235.NDG.TBP NSE.
AM 241	ABSORPTION	EXPT-PROG	10+2	30+5	NEANDC(E)	192	8	678	HAR	GAYTHER+ P35. GRAPH CPD EVALUATION.
AM 241	N,GAMMA	EXPT-PROG	10+2	30+5	NEANDC(E)	192	8	678	HAR	GAYTHER+ P35. SEE ABSORPTION
AM 241	N,GAMMA	EXPT-PROG	FAST		NEANDC(E)	192	8	676	HAR	GLOVER+ INTEGRAL YLD METHOD.TBD
AM 241	N,GAMMA	EXPT-PROG	10+4	25+5	NEANDC(E)	192	5	478	KFK	WISSHAK+P.23 TBC,NDG
AM 242	N,FISSION	EXPT-PROG	10-2	20+7	DOE-NDC-12	109	478		LRL	BROWNE+LINAC.META.ANAL TBD.NDG
AM 242	NUBAR (NU)	EXPT-PROG	10-2	30+7	DOE-NDC-12	109	478		LRL	HOWE.LINAC.META.REL.U235.CPD.NDG.
AM 243	N,FISSION	EXPT-PROG	10+5	30+7	DOE-NDC-12	108	478		LRL	BEHRENS+AM243/U235.NDG.TBP NSE.
AM 243	N,GAMMA	EXPT-PROG	FAST		NEANDC(E)	192	8	678	HAR	GLOVER+ INTEGRAL YLD OF CM-242.
CM 244	N,FISSION	EXPT-PROG	NDG		NEANDC(E)	192	5	478	KFK	KAZEROUNI+P.28 DETECT TEST,TBC
CF 252	NUBAR (NU)	EXPT-PROG	SPON		DOE-NDC-12	78	478		INL	SMITH+NU DISCREPANCY DISCUSSED.
CF 252	NUBAR (NU)	EXPT-PROG	SPON		DOE-NDC-12	78	478		INL	SMITH.MN BATH METH.NDG.TBC
CF 252	NUBAR (NU)	EXPT-PROG	SPON		DOE-NDC-12	173	478		MHG	BOZORGMANESH+NU REVAL=3.744+-.023.
CF 252	FRAG NEUTS	EXPT-PROG	SPON		DOE-NDC-12	49	478		COL	SOMESHAKAR+EXPT TBD.NDG.
CF 252	FISS YIELD	EVAL-PROG	SPON		DOE-NDC-12	135	478		LAS	ENGLAND+EVL YLDS FOR ENDF/B-V.NDG
CF 252	FRAG SPECTRA	EXPT-PROG	SPON		DOE-NDC-12	49	478		COL	SOMESHAKAR+EXPT TBD.NDG.
MA NY	EVALUATION	EVAL-PROG	NDG		NEANDC(E)	192	5	478	KFK	GOEL.P.33 TRANS-U SIG,NDG,TBC
MA NY	RESON PARAMS	THEO-PROG	NDG		NEANDC(E)	192	5	478	KFK	PROEHNER.P.37 CONVERSION-CALC
MA NY	N,PROTON	EVAL-PROG	15+7		NEANDC(E)	192	5	478	JUL	QAIM.P.42 SYSTEMATICS INV,NDG
MA NY	N,TRITON	EXPT-PROG	12+7	44+7	NEANDC(E)	192	5	478	JUL	QAIM+P.39 NT+NND+NNP SIG,GRPHS
MA NY	N,ALPHA	EXPT-PROG	14+7		NEANDC(E)	192	5	478	TUE	MOERIKE+P.79 INTEGSIG A=6-40
MA NY	N,N PROTON	EVAL-PROG	15+7		NEANDC(E)	192	5	478	JUL	QAIM.P.42 SYSTEMATICS INV,NDG
MA NY	N,N ALPHA	EVAL-PROG	15+7		NEANDC(E)	192	5	478	JUL	QAIM.P.42 SYSTEMATICS INV,NDG
FE 415	N,PROTON	EXPT-PROG	15+7		DOE-NDC-12	105	478		LRL	HAIGHT+(N,XP).CS TBL.MAG QUAD SPEC.
FE 415	N,DEUTERON	EXPT-PROG	15+7		DOE-NDC-12	105	478		LRL	HAIGHT+(N,XP),CS TBL.MAG QUAD SPEC.
FE 415	N,ALPHA	EXPT-PROG	15+7		DOE-NDC-12	105	478		LRL	HAIGHT+(N,XA) CS TBL.MAG QUAD SPEC.
ZR 423	TOTAL	EXPT-PROG	80-2	40-1	NEANDC(E)	192	5	478	KIL	PRIESMEYER+P.59 GRAPH

NUCLEAR DATA COMPUTER FILES AVAILABLE FROM THE NEA DATA BANK.

1. NEUTRON DATA

1.1. Experimental

1.1.1. EXFOR: The main international library for experimental neutron nuclear data. It includes most of the data compiled earlier in NEUDATA (OECD/NEA DATA BANK) DASTAR (IAEA/NDS), or CSISRC (BNL/NNDC)

1.1.2. ECSIL: The Livermore Library of experimental neutron nuclear data.

1.1.3. CROUCH'S FILE: Experimental data on fission product yields in EXFOR Format.

1.1.4. MUSGROVE FILE: Compilation of experimental strength function data (Australia, 1973).

1.2. Evaluated

1.2.1. General Evaluations.

1.2.1.1. ENDF/B-IV (BNL, 1975)
1.2.1.2. UKNDL-73 (UK, 1973)
1.2.1.3. KEDAK-3 (KFK, 1975)
1.2.1.4. SOCRATOR (USSR, 1971-1978)
1.2.1.5. ENDL-78 (LLL, 1978)
1.2.1.6. DASTAR (Vienna, 1968): includes some earlier USSR evaluations.
1.2.1.7. BENZI - Evaluations (CNEN, Bologna), in ENDF/B and UK format.
1.2.1.8. JENDL-1 (JAERI, 1977). Japanese Library in ENDF/B format.
1.2.1.9. VIEN-VOOOl up to 7, some USSR and other evaluations compiled by IAEA/NDS in EXFOR
1.2.1.10 FRENCH - Evaluations in ENDF/B or UK Format (PHILIS, RIBON, KREBS, TROCHON, BLUET, SIMON etc.)
1.2.1.11 IAEA/NDS - Evaluations (LEMMEL, BAK, MANERO, KOSHIN etc.)
1.2.1.12 BNL-325 (1973), Data of Resonance Parameters
1.2.1.13 RESEND-OUTPUTS, pointwise cross sections calculated from the Resonance Parameters of ENDF/B-IV Library.

1.2.2. Dosimetry Reactions

1.2.2.1. ENDF/B-IV, dosimetry file
1.2.2.2. UKNDL-73, dosimetry file
1.2.2.3. KEDAK-3, dosimetry file
1.2.2.4. ENDL-78, dosimetry file
1.2.2.5. RIGA-USSR dosimetry file (included in VIEN-V0002 and 3)
1.2.2.6. SAND-II and DETAN-74 dosimetry file
1.2.2.7. ROMANIEN, dosimetry file (1974)
1.2.2.8. HUNGARIAN dosimetry file (1970)

1.2.3. Fission Product Data

1.2.3.1. ENDF/B-IV fission product cross sections and decay data.
1.2.3.2. KEDAK (RCN-2) fission product cross sections.
1.2.3.3. JENDL-library: Japanese fission product cross sections in ENDF/B format.
1.2.3.4. DEVILLERS fission product yields and decay data.
1.2.3.5. CNEN Bologna fission product cross sections in ENDF/B format.
1.2.3.6. COOK's library (or Australian library included in UKNDL-library) of fission product cross sections.
1.2.3.7. ORNL-1973 fission product cross sections.
1.2.3.8. BIBFP and BIBGRFP, Czechoslovakian fission products libraries of cross section, decay data and fission yields.
1.2.3.9. MEEK and RIDER, compilation of fission product yields (NEDO-1215M-1, 1974)

1.2.4. Group Cross Sections (see also pages 39 to 41).

1.2.4.1. LIB-IV, library of group constants for nuclear reactor calculations, 50 groups, 101 nuclides (LA-6260-MS, 1976, R.B. Kidmay and R.E. MacFarlane).
1.2.4.2. ARAMALO, USSR group constants, 26 group, 45 nuclides.
1.2.4.3. BENJAMIN file (SRL), 84 group cross sections for heavy actinides (^{242}Pu - ^{253}Es).
1.2.4.4. ENDF-Universal super group system

2. PHOTONUCLEAR DATA

2.1. NNCSC/LLL, Livermore Library of experimental photoneutron data.
2.2. ENDF/B-IV, photon interaction data.

3. CHARGED PARTICLE NUCLEAR DATA

3.1. KACHAPAG (KFK) library of experimental charged particle data in EXFOR format.
3.2. CAJAD (USSR) library of experimental charged particle data in EXFOR format
3.3. ENDF/B STARTER library of evaluated charged particle data.
3.4. VIEN-V1000, a file of VIEN-library for evaluated charged particle data in EXFOR format.

4. NUCLEAR STRUCTURE AND DECAY DATA.

4.1. ENSDF-Library, Evaluated Nuclear Structure Data File (Oak Ridge Nuclear Data Project), from which the Nuclear Data Sheets are edited.

4.2. ENDF/B-IV fission product cross sections and decay data.

4.3. DEVILLERS fission product yields and decay data.
4.4. TOBIAS (CEGB, UK, 1978) library of decay data in ENDF/B forma
4.5. JUELICH library for gamma-lines of radionuclides.
4.6. MEIXNER's gamma-energies library
4.7. Radioactive Decay Data for 192 nuclides (BNL, 1974)

5. NUCLEAR DATA REQUEST LISTS.

WRENDA, World request list for nuclear data measurements requested for the purpose of fission reactions, fusion reactor and safeguards.

6. NEUTRON BIBLIOGRAPHY AND DATA INDEX.

CINDA

GROUP CROSS-SECTION LIBRARIES

Library Name	Origin	Codes to be used with	Description	Restrictions
ZZ-DLC-2 100G	RSIC	ANISN, DOT, DTF-4, MORSE	100 group neutron cross sections generated by SUPERTOG from ENDF/B-3 (infinite dilution)	*
ZZ-DLC-6 GAMLIB	RSIC	GAM	99 group neutron cross sections for use in the GAM portion of GCC multi-group cross section code.	*
ZZ-DLC-10 AVKER	RSIC	AVKER	Neutron kerma response function data	*
ZZ-DLC-11 RITTS	RSIC	ANISN, DOT, DIF-4, MORSE	121 group coupled neutron-gamma cross section data for transport codes.	*
ZZ-DLC-12 POPLIB	RSIC	POPOP-4, ANISN, DOT, DIF-4 MORSE.	A compendium of neutron-induced secondary gamma ray yield and cross section data.	*
ZZ-DLC-13	RSIC	GARU, GARW	Multigroup resonance-region cross sections for Tungsten and depleted uranium for use in shielding calculations	*
ZZ-DLC-14 AIR	RSIC	ANISN, DOT, DIF-4, MORSE	Sample input to ANISN for calculation of neutron and secondary gamma-ray transport in air.	*
ZZ-DLC-16 COBB	RSIC	XSDRN	123 group neutron cross section data generated from ENDF/B-2 data for use in XSDRN discrete ordinates spectral averaging codes.	*
ZZ-DLC-17 NOX	RSIC	O6R, ANISN, DOT, DTF-4, MORSE	119 group P5 coupled neutron and secondary gamma ray cross section data for Nitrogen and Oxygen	*

Library Name	Origin	Codes to be used with	Description	Restrictions
ZZ-DLC-18 NAB	RSIC	ANISN, DOT, MORSE	100 group P3 neutron cross section data for sodium and aluminium	*
Z Z-DLC-21 KXRAY	RSIC	RDXRAY	Evaluated x-ray cross section library	*
ZZ-DLC-23 CASK	RSIC	ANISN, DOT, MORSE	40 group coupled neutron and gamma ray cross section data	*
ZZ-DLC-24 SINEX	RSIC	ANISN, DOT, MORSE	100 group neutron reaction cross sections data generated by SUPERTOG from ENDF/B	*
ZZ-DLC-27 AMPX01(104,22)	RSIC	ANISN, DOT, MORSE	126-group coupled neutron and gamma-ray transportation cross section data generated by AMPX	*
ZZ-DLC-28 CTR	RSIC	ANISN, DOT, MORSE	73-group P3 coupled neutron and gamma-ray cross sections for fusion reactor calculations.	*
ZZ-DLC-29 MACKLIB	RSIC	GAM	100 group neutron fluence to kerma factors and reaction cross sections generated by MACK computer program from data in ENDF format.	*
ZZ-DLC-38 ORYX-E	RSIC	ORYX-E	ORIGEN yields and cross sections nuclear transmutation and decoy data from ENDF/B-4	*
ZZ-JFS-25) ZZ-JFS-70)	JAERI		JAERI Fast Reactor Group Constant Systems	No
ZZ-JSD-100) ZZ-JSD-120)	JAERI	ANISN, DOT, MORSE	Multi-group cross section sets for shield materials - 100 neutron groups and 20 gamma ray groups in P5 approximation	?

Library Name	Origin	Codes to be used with	Description	Restrictions
ZZ-ACTINIDES	NBL	HAMMER	Actinides 84-group cross sections	*
ZZ-THERMOS	NESC	THERMOS	Thermal group-cross sections from ENDF/B for THERMOS	*
ZZ-EURLIB	EURATOM	ANISN, DOT, MORSE	120 group coupled neutron and gamma data library.	No
ZZ-LIB-IV	BNL	SPHINX, 1DX, VENTURE	LIB-IV a library of group constants for nuclear research calculations.	*
ZZ-ESIS-G19	EURATOM	ANISN, DOT, MORSE	19 group photon interaction cross sections	No

* These libraries are available to OECD countries without restriction; whenever a request from a non-OECD country is received, written authorization must be received in every case from the U.S. Authorities before it can be distributed. in some cases U.S. Centres prefer to contact the requestor directly.

? These two libraries might possibly be released for general distribution. The problem will be studied in the near future.

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