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Reports to . . .

THE AEC NUCLEAR CROSS SECTIONS ADVISORY COMMITTEE

Meeting at

COLUMBIA UNIVERSITY
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Compiled by . . .

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PREFACE

The reports which follow were submitted to the AEC Nuclear Cross Sections Advisory Committee at the meeting held in New York, New York on October 21-23, 1968. The reporting laboratories are those which have a substantial effort devoted to the measurement of neutron and nuclear cross sections and other basic data of interest to the applied nuclear energy program of the United States. The reports which have been submitted contain informal statements of recent developments and preliminary data which reflect these interests. Material which may be considered appropriate includes the following:

1. Microscopic neutron cross sections in energy regions corresponding to reactor development or shielding interests, and inverse reactions.

2. Charged particle cross sections, especially as appropriate in the development and testing of nuclear models.

3. Gamma-ray production by nuclear reactions, or radioactive decay, and related theoretical developments concerning nuclear structure.

4. Proton and alpha-particle cross sections at higher energies (up to approximately 1 GeV), of interest to the space program.

In this sense, these reports are not intended to be complete; a number of laboratories, whose research is less programmatically oriented, do not submit reports; and those reports which have been submitted do not cover all the work in the reporting laboratories relating to nuclear cross-section measurements. For the sake of brevity, certain items of general interest appended to the submitted reports have been listed by title in this compilation.

Persons who might make use of these data for serious computations should contact the experimenter directly to ascertain that the data are considered appropriate for such use. The data which appear in these reports should be quoted only by permission of the contributor and should be referenced as such, i.e., a private communication and not by reference to this document.

This compilation has been made almost completely from master copies prepared by the laboratory representatives listed in the Table of Contents. It is a pleasure to acknowledge their contributions.

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Previously submitted Reports to the AEC Nuclear Cross Sections Advisory Committee include the following:

April 1968 Meeting at Los Alamos, New Mexico	WASH-1093 EANDC-US-105 U INDC-US-2 U
October 1967 Meeting at Idaho Falls, Idaho	WASH-1079 EANDC-US-104 U INDC-US-12 U
April 1967 Meeting at Brookhaven, New York	WASH-1074 EANDC-US-99 U INDC-US-9 U
November 1966 Meeting at Argonne, Illinois	WASH-1071 EANDC-US-91 U INDC-US-5 U
March 1966 Meeting at Washington, D. C.	WASH-1068 EANDC-US-85 U INDC-US-3 U
October 1965 Meeting at Duke University	WASH-1064 EANDC-US-79 U
March 1965 Meeting at National Bureau of Standards	WASH-1056 EANDC-US-72 U
October 1964 Meeting at Oak Ridge National Laboratory	WASH-1053 EANDC-US-70 U
June 1964 Meeting at Columbia University	WASH-1048 EANDC-US-57 U
January 1964 Meeting at Savannah River Laboratory	WASH-1046 EANDC-US-50 U

Summary of measurements described in WASH-1124 pertinent to requests compiled in WASH-1078. For a more nearly complete description of the experimental results which may be of interest to requesters, a CINDA index has been prepared through the efforts of L. T. Whitehead and H. Goldstein, and is found on p. ix.

REQ. NO.	MAT.	XSEC	ENERGY	WASH-1124 PAGE	LAB
1	D-2	DEL	5 MeV - 12 MeV	197	DKE
2	D-2	DEL	3 MeV - 16 MeV	197	DKE
8	He-3	NP	10 keV - 3 MeV	36	GGA
17	Li-7	TOT	TH - 100 keV	1	ANL
18	Li-7	TOT	5 keV - 3 MeV	1	ANL
32	C-NAT	DEL	7 MeV - 14 MeV	136	ORL
33	C-NAT	DEL	7 MeV - 14 MeV	136	ORL
34	C-NAT	DEL	2 MeV - 16 MeV	136	ORL
36	C-NAT	EM	7 MeV - 16 MeV	136	ORL
37	C-NAT	GPR	6 MeV - 16 MeV	45	GGA
39	N-NAT	SIN	8 MeV - 15 MeV	168	RIC
40	N-NAT	GPR	4 MeV - 16 MeV	45	GA
41	N-NAT	GPR	8 MeV - 15 MeV	45	GGA
42	N-NAT	GPR	3 MeV - 8 MeV	45	GGA
43	N-NAT	GPR	150 eV - 15 MeV	45	GGA
46	N-NAT	NA	8 MeV - 15 MeV	81	LRL
47	O-NAT	DEL	4 MeV - 16 MeV	168	RIC
48	O-NAT	DEL	10 MeV - 15 MeV	168	RIC
49	O-NAT	DEL	4 MeV - 16 MeV	168	RIC
51	O-NAT	SIN	10 MeV - 15 MeV	168	RIC
57	F-NAT	NG	1 keV - 1 MeV	152	RPI
58	NA-NAT	SIN	2 MeV - 14 MeV	136	ORL
60	NA-NAT	GPR	1 MeV - 14 MeV	176	TNC
61	AL-NAT	DEL	5 MeV - 16 MeV	136	ORL
62	AL-NAT	SIN	4 MeV - 14 MeV	136	ORL
63	AL-NAT	SIN	1 MeV - 16 MeV	136	ORL
67	SI-NAT	DEL	1 MeV - 16 MeV	136	ORL
68	SI-NAT	SIN	2 MeV - 14 MeV	136	ORL
69	SI-NAT	SIN	5 MeV - 16 MeV	136	ORL
70	SI-NAT	ABS	4 MeV - 16 MeV	105	LAS
71	SI-NAT	GPR	3 MeV - 16 MeV	105	LAS
74	CA-NAT	EM	3 MeV - 16 MeV	136	ORL
76	TI-NAT	SIN	1 MeV - 3 MeV	2	ANL
77	TI-NAT	EM	1 MeV - 16 MeV	2	ANL
78	TI-NAT	GPR	1 MeV - 16 MeV	2, 133	ANL, NRD
82	V-NAT	DEL	1 MeV - 14 MeV	2, 136	ANL, ORL
83	V-NAT	SIN	MeV - 14 MeV	2, 136	ANL, ORL

REQ. NO.	MAT.	XSEC	ENERGY	WASH-1124 PAGE	LAB
87	CR-NAT	NG	1 keV - 150 keV	152	RPI
88	CR-NAT	GPR	eV - 10 MeV.	133	NRD
91	MN-NAT	NG	TH - 1 keV	12, 32	BNL, COL
92	MN-NAT	NG	1 keV - 40 keV	12, 32, 66	BNL,COL,MTR
95	FE-NAT	SIN	3 MeV - 16 MeV	136	ORL
96	FE-NAT	SIN	4 MeV - 16 MeV	136	ORL
97	FE-NAT	SIN	MeV - 10 MeV	2, 133, 136	ANL,CSE,ORL
98	FE-NAT	EM	3 MeV - 16 MeV	136	ORL
99	FE-NAT	NG	1 keV - 175 keV	31, 152	COL, ORL
100	FE-NAT	GPR	eV - 10 MeV	45, 133, 157	GGA,NRD,RPI
101	FE-NAT	GPR	4 MeV - 16 MeV	157	RPI
102	FE-NAT	GPR	4 MeV - 16 MeV	157	RPI
103	FE-NAT	GPR	eV - 15 MeV	45, 133, 157	GGA,NRD,RPI
105	CO-NAT	DEL	1 MeV - 14 MeV	136	ORL
106	CO-NAT	EM	1 MeV - 14 MeV	136	ORL
110	NI-NAT	DEL	1 MeV - 3 MeV	22	CSE
115	NI-NAT	GPR	2 MeV - 14 MeV	105	LAS
116	NI-NAT	GPR	0 eV - 10 MeV	105	LAS
118	CU-63	NG	TH - 1 keV	31, 90	COL, LRL
121	KR-83	TOT	0 eV - 1 eV	17	BNL
122	Y-NAT	DEL	6 MeV - 16 MeV	136	ORL
132	ZR-90	TOT	eV - 10 keV	155	RPI
135	ZR-91	NG	eV - 10 keV	39, 155	GGA, RPI
136	ZR-91	TOT	eV - 10 keV	155	RPI
137	ZR-91	RPR	eV	155	RPI
139	ZR-92	NG	eV - 10 keV	155	RPI
140	ZR-92	TOT	eV - 10 keV	155	RPI
142	ZR-94	NG	eV - 10 keV	155	RPI
143	ZR-94	TOT	eV - 10 keV	155	RPI
154	NB-NAT	GPR	eV - 15 MeV	13	BNL
161	RH-103	NG	1 eV	13	BNL
177	ND-143	NG	0 eV - 1 eV	17	BNL
178	ND-143	NG	eV	17	BNL
181	ND-146	NG	TH - 10 keV	31	COL
195	EU-NAT	NG	100 eV - 200 keV	31, 94, 99	COL,LRL,LAS
196	EU-NAT	GPR	1 keV - 15 MeV	31, 94, 99	COL,LRL,LAS
203	GD-NAT	DEL	1 MeV - 10 MeV	3	ANL
204	GD-NAT	SIN	1 MeV - 10 MeV	3	ANL
205	GD-NAT	NG	100 eV - 200 keV	31, 39	COL, GGA
206	GD-NAT	GPR	1 keV - 15 MeV	7, 31, 39	ANL,COL,GGA
210	GD-158	NG	0 eV - 1 eV	31	COL
212	DY-NAT	NG	100 eV - 200 keV	7	ANL
213	ER-166	NG	TH - 10 keV	13, 31	BNL, COL
214	ER-167	NG	TH - 10 keV	31	COL
215	ER-170	NG	TH - 10 keV	31	COL
216	TM-169	NG	TH - 1 keV	8, 12	ANL, BNL

REQ. NO.	MAT.	XSEC	ENERGY	WASH-1124 PAGE	LAB
217	TM-170	NG	TH - 1 keV	53	MTR
219	HF-NAT	DEL	10 keV - 10 MeV	3	ANL
220	HF-NAT	SIN	10 keV - 10 MeV	3	ANL
222	HF-NAT	NG	200 eV - 50 keV	31, 159	COL, RPI
224	HF-176	NG	0 eV - 5 keV	159	RPI
225	HF-177	NG	0 eV - 5 keV	31, 159	COL, RPI
226	HF-178	NG	0 eV - 5 keV	159	RPI
227	HF-179	NG	0 eV - 5 eV	159	RPI
228	HF-180	NG	0 eV - 5 keV	159	RPI
231	W-NAT	GPR	TH - 2 MeV	7, 13, 45, 188	ANL, BNL, GGA, TNC
232	W-NAT	NG	1 keV - 50 keV	13, 31, 39, 155	BNL, COL, GGA, RPI
233	W-NAT	GPR	150 eV - 15 MeV	31, 105, 188	COL, LAS, TNC
234	W-NAT	GPR	2 MeV - 16 MeV	105	LAS
235	AU-NAT	NG	eV	13, 32, 39, 95	BNL, COL, GGA, LOK
239	PB-NAT	NG	1 keV - 50 keV	136	ORL
240	PB-NAT	GPR	1 eV - 10 MeV	182, 188	TNC
243	TH-NAT	NG	eV - 2 keV	13, 66	BNL, MTR
244	TH-NAT	NG	2 keV - 1 MeV	13, 66	BNL, MTR
245	TH-NAT	GPR	eV - 10 MeV	13	BNL
251	U-233	NG	0 eV - 30 eV	139	ORL
252	U-233	NG	30 eV - 1 keV	139	ORL
253	U-233	NG	1 keV - 30 keV	139	ORL
256	U-233	RPR	TH - 5 keV	35	COL
258	U-233	MIS	0 eV - 15 eV	35	COL
259	U-233	NF	0 eV - 1 keV	34, 99, 139	COL, LAS, ORL
260	U-233	NF	1 keV - 30 keV	99, 139	LAS, ORL
281	U-235	GPR	150 eV - 15 MeV	31	COL
282	U-235	NG	TH - 30 keV	31, 46	COL, GGA
285	U-235	RPR	TH - 5 keV	54	MTR
286	U-235	NF	10 keV - 8 MeV	110	LAS
287	U-235	NF	1 eV - 10 MeV	66, 110	MTR, LAS
288	U-235	NF	10 keV - 14 MeV	110	LAS
296	U-235	MIS	TH	33	COL
299	U-236	TOT	TH - 1 keV	42	GGA
300	U-236	NG	TH - 1 keV	42	GGA
301	U-236	NG	1 keV - 10 MeV	42	GGA
303	U-237	NF	eV - 16 MeV	110	LAS
308	U-238	NG	500 eV - 300 keV	13, 66, 99	BNL, MTR, LAS
310	U-238	GPR	150 eV - 15 MeV	7	ANL
311	U-238	GPR	0 eV - 10 MeV	7, 13	ANL, BNL
315	NP-237	NG	0 eV - 1 keV	72	MTR
317	NP-237	NF	MeV	99	LAS
323	PU-238	NG	TH - 1 keV	99	LAS
324	PU-238	NG	10 keV - 10 MeV	99	LAS
325	PU-238	NF	10 keV - 10 MeV	99	LAS

REQ. NO.	MAT.	XSEC	ENERGY	WASH-1124 PAGE	LAB
329	PU-238	MIS	100 keV - 1 MeV	99	LAS
330	PU-239	DEL	1 MeV - 5 MeV	3	ANL
331	PU-239	DEL	1 MeV - 7 MeV	3	ANL
332	PU-239	SIN	keV - 10 MeV	3	ANL
334	PU-239	NG	500 eV - 150 keV	46, 94, 141	GGA, LRL, ORL
337	PU-239	RPR	TH - 5 keV	5, 54, 159	ANL, MTR, RPI
338	PU-239	GPR	150 eV - 15 MeV	105	LAS
342	PU-239	NF	500 eV - 100 keV	4, 94	ANL, LRL
343	PU-239	FR	10 keV - 15 MeV	110	LAS
345	PU-239	NUN	TH - 10 MeV	160	RPI
346	PU-239	ETA	TH - 1 eV	46	GGA
347	PU-239	ETA	1 eV - 10 eV	46, 141, 160	GGA, ORL, RPI
363	PU-240	FR	100 keV - 15 MeV	110	LAS
368	PU-241	FR	10 keV - 15 MeV	110	LAS
380	AM-241	NG	TH - 1 keV	72	MTR
381	AM-242	TOT	TH - 10 keV	72	MTR
382	AM-243	TOT	TH - 10 keV	72, 99	MTR, LAS
383	AM-243	NG	TH - 10 keV	72	MTR
386	CM-243	TOT	TH - 10 keV	99	LAS
387	CM-243	NF	TH - 10 keV	99	LAS
391	CM-244	TOT	TH - 10 keV	72	MTR
393	CM-245	ALF	TH - 20 keV	72	MTR
394	CM-245	NF	TH - 10 keV	8	ANL
395	CM-246	TOT	TH - 10 keV	72	MTR
398	CM-247	NF	TH - 10 keV	8	ANL
404	CF-252	NG	TH - 10 keV	145	ORL
407	ES-254	ALF	TH - 20 keV	8	ANL
410	H20	TOT	eV - 10 eV	162	RPI
411	H20	EM	eV - 2 eV	162	RPI