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FILE DESIGNATION
300 [redacted]

SUBJECT OR TITLE
Fission Cross Sections

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SPECIAL RE-REVIEW
FINAL DETERMINATION
DECLASSIFICATION CONFIRMED
BY AEBarber DATE 2-19-82
JE Savely 1-9-03
PD Amah 2-3-03

Reviewed and Approved for Public Release by the Hanford Declassification Project
BJ Brown PNNL ADD
9/23-02 Date

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FISSION CROSS SECTIONS [redacted]

Element	Energy Range	Requirement	Accuracy Resolution
HIGH PRIORITY			
U-233	10 ev to 1 Mev.	ORNL	
U-233	0.1 to 10 Mev.	BNL (CVR)	
U-235	.025 ev to 1 Mev.	SR	1%
Pu-239	0.025 to 20 ev.	SR	5%; high resol.
Pu-240	0.1 to 5 Mev	CR&D (FBR)	50-100 kev
Pu-240	0.025 to 20 ev.	SR	5%
Pu-240	.05 to 5 Mev.	CR&D	
MEDIUM PRIORITY			
Th-232	0.1 to 5 Mev	CR&D (FBR)	50-100 kev
U-233	0.1 to 5 Mev	CR&D (FBR)	50-100 kev.
U-233	.025 to 20 ev	SR	5%
LOW PRIORITY			
U-238	Threshold to 8 Mev	SR	
Pu-240	10 kev to 3 Mev	ANL	
Pu-240	fast and 10 kev to 5 Mev	MIT and NDA	
Pu-241	10 kev to 3 Mev	ANL	

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SPECIAL NUCLEAR INFORMATION

Element	Energy Range	Requirement	Accuracy Resolution
HIGH PRIORITY			
U-233	Completion of info. for comparison to U-235	W. Kidde	
U-233 & 235	Fission and capture cross section in thermal range to determine variation of alpha and eta with temperature	BNL (LMFR)	
U-233 & 235	More info on variation of eta in resonance energy range	BNL (LMFR)	
U-233 & 235	Info. about fission and capture resonances in intermed. region	BNL (LMFR)	
U-235 & 238	as a function of energy from 0.1 to 10 Mev.	BNL (CVR)	
Pu-239	Eta as a function of energy through resonance region	W. Kidde	
Fe, Pb U, W, Ni	Gammas emitted in inelastic scattering for 2-4 Mev neutrons	Shield (NDA)	
D, B, O, C, N, Pb	Angular distribution of elastically scattered neutrons. Energies greater than 3 Mev.	Shield (NDA)	
D, B, O, C, N. Pb	Gamma ray spectrum for prompt, delayed, fission product, neutron capture and inelastic scattering.	Shield (NDA)	
Nitrogen*	up to 2.42 Mev.	Convair	
Oxygen*	up to 8 Mev.	Convair	
Silicon*	up to 8 Mev.	Convair	
Aluminum*	up to 8 Mev.	Convair	
Magnesium*	up to 8 Mev.	Convair	
Uranium*	up to 8 Mev.	Convair	

*Differential Angular Scattering Cross Sections (Particularly (1) General Shapes of curves and (2) if decided differences in angular distribution occur at resonance.)

SPECIAL NUCLEAR INFORMATION (Cont'd)

Element	Energy Range	Requirement	Accuracy Resolution
MEDIUM PRIORITY			
U-235 & 238	.05 to 5 Mev	CR&D	
Pu-239	0.5 to 5 Mev	CR&D	
Pu-239	0.5 to 5 Mev	CR&D	
Pu-240	0.5 to 5 Mev	CR&D	
Pu-240	0.5 to 5 Mev	CR&D	
Pu-241	0.5 to 5 Mev	CR&D	
Np-239	0.5 to 5 Mev	CR&D	
LOW PRIORITY			
U-233	Fission product distribution as a function of energy	NAA	
U-233		ORNL (Shield)	
U-235 & 238	as a function of energy	ORNL (Shield)	

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TOTAL CROSS SECTION

Element	Energe Range	Requirement	Accuracy Resolution
HIGH PRIORITY			
Thorium	5 kev to 150 kev	BNL (LMFR)	
Thorium	3 Mev to 15	BNL (LMFR)	
Fluorine	200 ev to 10 kev	BNL (LMFR)	
Fluorine	2.5 Mev to 15 Mev	BNL (LMFR)	
Bismuth	200 ev to 10 kev.	BNL (LMFR)	
Beryllium	1 kev to 20 kev	BNL (LMFR)	
Titanium	.025 to 10^4 ev	GE-ANP Lockland	
Zirconium	.025 to 10 ev	GE-ANP Lockland	
Zirconium	3 to 10 Mev.	GE-ANP Lockland	
Water	.025 to 10 ev	GE-ANP Lockland	
Silicon	2 to 10 Mev	GE-ANP Lockland	
Aluminum	3 to 10 Mev	GE-ANP Lockland	
Xenon	below .04 ev and above 0.2 ev	NAA	
LOW PRIORITY			
Aluminum	up to 12 Mev.	Shield (ORNL)	
Chromium	above .01 Mev.	ANP Pratt Whit.	
Nickel	above 3 Mev.	ANP Pratt Whit.	
Lead	up to 12 mev.	Shield (ORNL)	
Iron	up to 12 Mev	Shield (ORNL)	
Boron	up to 12 Mev	Shield (ORNL)	
Carbon	up to 12 Mev	Shield (ORNL)	
Nitrogen	up to 12 Mev.	Shield (ORNL)	
Oxygen	up to 12 Mev.	Shield (ORNL)	
Tungsten	up to 12 Mev.	Shield (ORNL)	

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CAPTURE CROSS SECTIONS

Element	Energe Range	Requirement	Accuracy Resolution
HIGH PRIORITY			
U-233	0.025 to 20 ev	SR	
U-233	0.1 to 10 Mev	BNL	
U-233	0.1 to 10 Mev	Convair	
U-235	0.1 to 10 Mev	BNL	
U-235	0.1 to 10 Mev	Convair	
U-235	0.1 to 5 Mev	SR	
U-235	0.025 to 20 ev	SR	
U-236	Thermal and intermediate	SAR	
U-236	10 kev to 5 Mev	NAA	
U-236	Fast	MIT	
U-238	0.1 to 10 Mev	BNL	
U-238	0.1 to 10 Mev	Convair	
U-238	0.05 to 5 Mev	CR&D	
Pu-239	0.025 to 20 ev	SR	
Pu-239	0.05 to 5 Mev	(CR&D)(BNL)	
Pu-240	0.025 to 20 ev	(SR)	
Pu-240	0.01 to 5 Mev	(CR&D)(BNL)(ANL)	
Pu-241	0.025 to 20 ev	SR	
Pu-241	0.01 to 5 Mev	(BNL)(ANL)	
Lead	0.05 to 5 Mev	CR&D	
Bismuth	0.05 to 5 Mev	CR&D	
Maj. Fission Prods.	0.01 to 3 Mev	ANL	
Maj. Fission Prods.	0.05 to 5 Mev	CR&D	
Maj. Fission Prods.	Therman & intermediate	SAR	
Vanadium	0.05 to 5 Mev	CR&D	
Iron	0.05 to 5 Mev	CR&D	
Nickel	0.05 to 5 Mev	CR&D	
Sodium	0.05 to 5 Mev	CR&D	
Potassium	0.05 to 5 Mev	CR&D	
Mercury, natural	0.01 to 2 Mev	P&W, Kidde	
Mercury 200	Thermal, 0.01 to 1 Mev	P&W, Kidde	
Mercury 201	thermal, 0.01 to 1 Mev	P&W, Kidde	
Mercury 202	thermal, 0.01 to 1 Mev	P&W, Kidde	
Mercury 204	thermal, 0.01 to 1 Mev	P&W, Kidde	
H-1	0.025 to 20 ev	SR	High res.
H-2	0.025 to 20 ev	SR	High res.
Magnesium	0.025 to 20 ev	SR	5%
Zirconium	0.025 to 20 ev	SR	5% high resol.
Zirconium	0.05 to 5 Mev	CR&D	

CAPTURE CROSS SECTIONS (Cont'd)

Element	Energy Range	Requirement	Accuracy Resolution
MEDIUM PRIORITY			
Thorium 232	0.1 to 5 Mev	BNL	50-100 kev
Thorium 232	0.025 to 20 ev	SR	Improved
Pa-233	0.025 to 20 ev	SR	Improved
Silicon	0.05 to 5 Mev	(CR&D)(Convair)	
Chlorine	10 kev to 5 mev	(NAA)(MIT)	
Cobalt	10 kev to 5 mev	(NAA)(MIT)(CR&D)	
Lead	10 kev to 5 Mev	(NAA)(MIT)	
Bismuth	10 Kev to 5 Mev	(NAA)(MIT)	
Hydrogen	thermal to 20 Mev	P&W	
Oxygen	thermal to 20 Mev	(P&W)(CR&D)(Convair)	
Boron	0.05 to 5 Mev	CR&D	
Iron	thermal to 20 Mev	(P&W)(MIT(NAA)	
Chromium	thermal to 20 Mev	(P&W)(CR&D)	
Nickel	thermal to 20 Mev	(P&W)(MIT)(NAA)	
Sodium	thermal to 20 Mev	P&W	
Potassium	thermal to 20 Mev	P&W	
Water	thermal to 20 Mev	P&W	
Plexiglass	thermal to 20 Mev	P&W	
Fluorine	thermal to 20 Mev	P&W	
Lithium 6 and 7	thermal to 20 Mev	P&W	
Molybdenum	0.05 to 5 Mev	CR&D	
LOW PRIORITY			
Np-239	0.025 to 20 ev	SR	
Columbium	0.05 to 5 Mev	CR&D	
Nitrogen	fast	Convair	
Aluminum	fast	Convair	
Magnesium	0.05 to 5 Mev	(CR&D)(Convair)	
Carbon	0.05 to 5 Mev	CR&D	
Iodine	0.05 to 5 Mev	CR&D	
Calcium	0.05 to 5 Mev	CR&D	
Manganese	0.05 to 5 Mev	CR&D	
Beryllium	0.05 to 5 Mev	CR&D	

ABSORPTION CROSS SECTION

Element	Energy Range	Requirement	Accuracy Resolution
HIGH PRIORITY			
Hafnium	intermediate	SIR	
Xenon	entire range	Nav. Reac. Br.	
Titanium	above thermal	ANP-Lockland	
Zirconium	above thermal	ANP-Lockland	
Gadolinium	0.1 to 10^7 ev	ANP-Lockland	
Gadolinium	intermediate	SIR	
Sodium	intermediate	SIR (KAPL)	
Sodium	thermal to 1 Mev	HTB (ORNL)	
Stainless Steel (by constituents)	intermediate	SIR (KAPL)	
Iron	"	"	
Chromium	"	"	
Nickel	"	"	
Manganese	intermediate	SIR (KAPL)	
Lithium	intermediate	SIR (KAPL)	
Cobalt	intermediate	SIR (KAPL)	
Samarium	intermediate	SIR (KAPL)	
MEDIUM PRIORITY			
Boron	intermediate	NAA	
Pu-240	entire range	NAA	
Pu-241	entire range	NAA	
Pu-242	entire range	NAA	
Europium-151	thermal	NAA	
Europium-153	thermal	NAA	
Beryllium	(resonances) epithermal and intermediate	BNL (LMFR)	
Bismuth	(resonances) epithermal and intermediate	BNL (LMFR)	
Protoactinium	at 0.025 ev	BNL (LMFR)	
Lead 206 & 208	0.025	BNL (LMFR)	
Lead fr. U ores	0.025 ev. and resonances in epithermal & intermed.	BNL (LMFR)	
Gold	intermediate	BNL	
Gold	intermediate	SIR	
Iridium	intermediate	NAA	
Xenon	intermediate	SIR	
Samarium 149	intermediate	SIR	

ABSORPTION CROSS SECTION (Cont'd)

Element	Energy Range	Requirement	Accuracy Resolution
MEDIUM PRIORITY (Cont'd)			
Fission Product Poisons (SAR)	thermal & intermediate	SAR	
U-235	All energies (resonance integrals)	HTB (ORNL) & NAA	
		SAR	
Thorium 232	Resonance integral	HTB (ORNL) & NAA	
Thorium oxide	Resonance integral	HTB (ORNL) & NAA	
Thorium	0.025 ev to 15 kev	BNL (LMFR)	
Aluminum	intermediate	SIR (KAPL)	
Magnesium	intermediate	SIR (KAPL)	
Cadmium	intermediate	SIR (KAPL)	
Cadmium	above 1 ev.	SIR	
Cadmium	epithermal	NAA	
Mercury	intermediate	SIR (KAPL)	
Copper	intermediate	SIR	
Silicon	intermediate	SIR	
Tantalum	intermediate	SIR	
Molybdenum	intermediate	SIR	
Potassium	intermediate	SIR	
Chlorine	intermediate	SIR	
LOW PRIORITY			
Fluorine	thermal to 1 Mev	ANP (ORNL)	
Fluorine	absorption resonance		
	epithermal & intermed.	BNL (LMFR)	
Potassium	thermal to 1 Mev.	ANP (ORNL)	
Rubidium	thermal to 1 Mev.	ANP (ORNL)	
Iron	thermal to 1 Mev	ANP (ORNL)	
Nickel	thermal to 1 Mev	ANP (ORNL)	
Chromium	thermal to 1 Mev	ANP (ORNL)	
Barium	intermediate	SIR	
Cesium	thermal to 1 Mev	SIR, HTB (ORNL)	
Lead	intermediate	SIR	
Rare earths	intermediate	SIR	
Indium	above 10 ev.	SIR	
Fission Products Poisons	intermediate (SIR spectrum)	SIR	
Lithium 6 & 7	thermal to 1 Mev	ANP (ORNL)	
Cobalt	thermal to 1 Mev	HTB (ORNL)	

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ABSORPTION CROSS SECTION (Cont'd)

Element	Energy Range	Requirement	Accuracy Resolution
LOW PRIORITY (Cont'd)			
Calcium	intermediate	SIR	
Vanadium	intermediate	SIR	
Titanium	intermediate	SIR	
Phosphorus	intermediate	SIR	
Sulphur	intermediate	SIR	
Niobium	intermediate	SIR	
Tin	intermediate	SIR	
Antimony	intermediate	SIR	

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REACTION CROSS SECTIONS

Element	Energy Range	Requirement	Accuracy Resolution
HIGH PRIORITY			
Lithium 6	(n, 2n)	UCRL-Whitney	
Lead	10 kev to 3 Mev (,n) and (,2n) 5 to 14 Mev	ANL, CR&D	
Bismuth	10 kev to 3 mev (,n) and (,2n) 5 to 14 Mev	ANL, CR&D	
Sodium	10 kev to 3 mev	ANL	
Iron	10 kev to 3 mev	ANL	
Potassium	10 kev to 3 mev	ANL	
Nickel	10 kev to 3 mev	ANL	
Chromium	10 kev to 3 mev	ANL	
Columbium	10 kev to 3 mev	ANL	
Thorium	(fast effect)	NAA	
MEDIUM PRIORITY			
Beryllium	(n, 2n) vs. energy	SAR, CR&D	
Fe 56	(n, p)	NDA	
Thorium 232	(n, 2n)	NAA	
Oxygen 17	(n, p)	NAA	
Sulfur	S^{32} (n, p)	NDA (reactor)	
Tellurium	Te^{48} (n, p)	NDA (reactor)	
Tin	Sn^{116} (n, p)	NDA (reactor)	
Barium	Ba^{138} (n, p)	NDA (reactor)	
Rubidium	Rb^{87} (n, p)	NDA (reactor)	
Magnesium	Mg^{24} (n, p)	NDA (reactor)	
Tantalum	Ta^{181} (n, p)	NDA (reactor)	
LOW PRIORITY			
Lithium 7	(n, 2n)	UCRL-Whitney	
Deuterium	(n, 2n)	UCRL-Whitney	
Uranium 235	thermal to 8 mev	SR	
Uranium 238	thermal to 8 mev	SR	
Copper	10 kev to 3 Mev	ANL	
Nickel	10 kev to 3 mev	ANL	
Zirconium	10 kev to 3 mev	ANL	
Vanadium	10 kev to 3 mev	ANL	
Silver	10 kev to 3 mev	ANL	
Cobalt	10 kev to 3 mev	ANL, NDA (Shield)	
Boron 10	10 kev to 3 Mev	ANL	

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ACTIVATION CROSS SECTION

Element	Energy Range	Requirement	Accuracy Resolution
MEDIUM PRIORITY			
Hydrogen	thermal to 20 mev	(P&W)	
Oxygen	thermal to 20 mev	(P&W)	
Iron	thermal to 20 Mev	(P&W)	
Iron	fast	Convair	
Chromium	thermal to 20 Mev	(P&W)	
Chromium	fast	Convair	
Nickel	thermal to 20 mev	(P&W)	
Nickel	fast	Convair	
Sodium	thermal to 20 mev	(P&W)	
Potassium	thermal to 20 mev	(P&W)	
Water	thermal to 20 mev	(P&W)	
Plexiglass	thermal to 20 mev	(P&W)	
Fluorine	thermal to 20 mev	(P&W)	
Lithium (Li 6 & 7)	thermal to 20 mev	(P&W)	
Aluminum	Al (n,) Na^{24} fast to 8 Mev	Convair	
Magnesium	Mg (n,p) Na^{24}; fast to 8 mev	Convair	
Chlorine	Cl (n,) P^{32}; fast to 8 mev	Convair	
Silver	fast	Convair	
Cobalt	fast	Convair	
Copper	fast	Convair	
Zinc	fast	Convair	
Sulfur	fast	Convair	
Molybdenum	fast	Convair	
Manganese	fast	Convair	

TRANSPORT CROSS SECTIONS

Element	Energy Range	Requirement	Accuracy Resolution
HIGH PRIORITY			
Uranium 235	10 kev to 3 mev	ANL	
Uranium 238	10 kev to 3 mev	ANL	
Uranium 238	(entire range)	Nav. React. Brn.	
Uranium 238	0.1 to 10 mev	BNL	
Uranium 238	.05 to 5 mev	CR&D	
Pu-239	10 kev to 3 mev	ANL	
Pu-239	fast	MIT	
Pu-239	10 kev to 5 mev	NAA	
Pu-239	.05 to 5 mev	CR&D	
Lead	10 kev to 3 Mev	ANL	
Lead	.05 to 5 Mev	CR&D	
Bismuth	10 kev to 5 mev	ANL, MIT, NAA, CR&D	
Sodium	10 kev to 5 mev	ANL, CR&D	
Iron	10 kev to 5 Mev	ANL, CR&D	
Potassium	10 kev to 5 mev	ANL, CR&D	
Nickel	10 kev to 5 mev	ANL, CR&D	
Chromium	10 kev to 5 mev	ANL, CR&D	
Columbium	10 kev to 3 mev	ANL, CR&D	
Columbium	.05 to 5 mev	ANL, CR&D	
Zirconium	10 kev to 5 mev	ANL	
	entire range	Nav. Rea. Brn.	
		CR&D	
Vanadium	10 kev to 5 Mev	ANL, CR&D	
Hafnium	entire range	Nav. Rea. Brn.	
Oxygen	entire range	Nav. Rea. Brn.	
		CR&D	
MEDIUM PRIORITY			
Chlorine	10 kev to 5 mev	MIT, NAA	
Boron	.05 to 5 mev	CR&D	
Molybdenum	.05 to 5 mev	CR&D	
Silicon	.05 to 5 mev	CR&D	
LOW PRIORITY			
Beryllium vs. crystal size		SIR (KAPL)	
Copper	10 kev to 3 mev	ANL	
Carbon	above 2 mev	(NAA)Shield	
Carbon	.05 to 5 mev	CR&D	
Iodine	.05 to 5 mev	CR&D	

TRANSPORT CROSS SECTIONS (Cont'd)

Element	Energy Range	Requirement	Accuracy Resolution
LOW PRIORITY (Cont'd)			
Calcium	.05 to 5 mev	CR&D	
Magnesium	.05 to 5 mev	CR&D	
Cobalt	.05 to 5 mev	CR&D	
Manganese	.05 to 5 mev	CR&D	
Beryllium	.05 to 5 mev	CR&D	

ELASTIC SCATTERING CROSS SECTION

Element	Energy Range	Requirement	Accuracy Resolution
HIGH PRIORITY			
Hydrogen	0.025 to 20 ev	SIR	
Oxygen	0.025 to 20 ev	SIR	
Beryllium	0.025 to 20 ev	SIR	
Magnesium	0.025 to 20 ev	SIR	
MEDIUM PRIORITY			
Zirconium	0.025 to 20 ev	SIR	
LOW PRIORITY			
Hafnium	intermediate	SIR	
Cadmium	intermediate	SIR	
Gadolinium	intermediate	SIR	
Samarium	intermediate	SIR	
Gold	intermediate	SIR	
Silver	intermediate	SIR	
Iridium	intermediate	SIR	
Indium	intermediate	SIR	
Xenon	intermediate	SIR	
Fission Products	Intermediate (SIR spectrum)	SIR	

INELASTIC SCATTERING CROSS SECTION

Element	Energy Range	Requirement	Accuracy Resolution
HIGH PRIORITY			
Thorium 232	fission energies	Kidde	
Thorium 232	0.1 to 15 mev	BNL (LMFR)	
Uranium 235	10 kev to 3 mev	ANL, NDA	
Uranium 235	0.1 to 5 mev	FBR	
Uranium 238	.05 to 5 mev	CR&D	
Pu-239	0.1 to 5 mev	FBR, ANL	50-100 kev
Pu-239	fast	MIT	
Pu-239	.05 to 5 mev	CR&D	
Pu-239	10 kev to 5 mev	NAA	
Pu-240	0.1 to 5 mev	FBR, ANL	50-100 kev
Pu-240	.05 to 5 mev	CR&D	
Pu-241	0.1 to 5 mev	FBR, ANL	50-100 kev
Zirconium	.05 to 5 mev	CR&D	
Vanadium	.05 to 5 mev	CR&D	
Bismuth	10 kev to 3 mev	ANL, CR&D	
Bismuth	.05 to 5 mev	CR&D, ANL	
Columbium	10 kev to 3 mev	ANL	
Tungsten		NDA (Shield	
Copper	10 kev to 3 mev	NDA	
Iron	10 kev to 5 mev	ANL, NAA	
Iron		NDA (Shield	
Iron		CR&D	
Chromium	10 kev to 5 mev	ANL, CR&D	
Nickel	10 kev to 5 mev	ANL	
Nickel		NDA (Shield)	
Nickel		CR&D	
Sodium	10 kev to 5 mev	ANL, CR&D	
Potassium	10 kev to 5 mev	ANL, CR&D	
Mercury	thermal to high	MCR-P&W	
Lead	10 kev to 5 mev	ANL, NDA, CR&D	
Maj. Fission Prods.	.05 to 5 mev	CR&D	
MEDIUM PRIORITY			
Uranium 233	Th to 8 mev	SR	
Uranium 235	10 kev to 5 mev	MIT, NAA	
Stainless Steel	intermediate to fast	SAR	
Zirconium	intermediate to fast	SAR	
Molybdenum	.01 to 5 mev	SAR, CR&D	
Vanadium	10 kev to 3 mev	SAR, ANL	
Bismuth	intermediate to fast	SAR	
Mercury	(cross section & spectrum)	Kidde	

INELASTIC SCATTERING CROSS SECTION (Cont'd)

Element	Energy Range	Requirement	Accuracy Resolution
MEDIUM PRIORITY (Cont'd)			
Iron	intermediate to fast	SAR	
Chromium	intermediate to fast	SAR	
Nickel	intermediate to fast	SAR	
Potassium	intermediate to fast	SAR	
Nitrogen	intermediate	NDA (Shield)	
Oxygen	.05 to 5 Mev	NDA (Shield), CR&D	
Silicon	.05 to 5 mev	Convair, CR&D	
Aluminum	intermediate to fast	NDA (Shield), Convair	
Lead	intermediate to fast	SAR	
Thorium 232	0.1 to 5 mev	FBR (CR&D, NAA 50-100 kev	
Xenon	intermediate	SIR	
Samarium	intermediate	SIR	
Boron	.05 to 5 mev	CR&D	
LOW PRIORITY			
Uranium 235	0.1 to 10 mev	Convair, BNL (CVR)	
Columbium	0.5 to 5 mev	CR&D	
Carbon	.05 to 5 mev	NDA (Shield), CR&D	
Chlorine	10 kev to 5 mev	MIT, NAA	
Copper	10 kev to 3 mev	Convair, ANL	
Zinc	fast	Convair	
Iron	threshold to 20 mev	ANP-P&W	
Chromium	threshold to 20 mev	ANP-P&W, Convair	
Nickel	threshold to 20 mev	ANP-P&W	
Sodium	threshold to 20 mev	ANP-P&W	
Potassium	threshold to 20 mev	ANP-P&W	
Nitrogen	fast	Convair	
Oxygen	fast	Convair	
Magnesium	.05 to 5 mev	Convair, CR&D	
Lead	fast	Convair	
Cadmium	intermediate to fast	Convair, SIR	
Fission Products	intermediate (SIR spectrum)	SIR	
Hafnium	intermediate	SIR	
Gadolinium	intermediate	SIR	
Gold	intermediate	SIR	
Silver	intermediate	SIR	
Iridium	intermediate	SIR	
Indium	above 10 ev	SIR	
Iodine	.05 to 5 mev	CR&D	
Calcium	.05 to 5 mev	CR&D	

INELASTIC SCATTERING CROSS SECTION (Cont'd)

Element	Energy Range	Requirement	Accuracy Resolution
LOW PRIORITY (Cont'd)			
Cobalt	.05 to 5 mev	CR&D	
Manganese	.05 to 5 mev	CR&D	
Beryllium	.05 to 5 mev	CR&D	