Beam		Halflife	Driver beam	Energy	Target	Thickn's	Volume	σ	Prod'n rate	Current	Total Power	Power Density	Total Prod'n
Z	A	s		(GeV)		(g/cm2)	cm3		/μA	pμA	KW	kW	
Li	5												
Li	6		p	1.0	C	80	1000	S-T	1.50E+11	100	7.8	7.8E-03	1.50E+13
Li	7		p	1.0	C	80	1000	S-T	1.34E+11	100	7.8	7.8E-03	1.34E+13
Li	8	0.842	p	1.0	C	80	1000	S-T	1.03E+10	100	7.8	7.8E-03	1.03E+12
Li	9	0.178	p	1.0	C	80	1000	S-T	3.53E+09	100	7.8	7.8E-03	3.53E+11
Li	11	0.0085	p	1.0	UC (ThC)	170	1000	S-T**	1.25E+07	100	18.1	1.8E-02	1.25E+09
Be	6		p	1.0	C	80	440	S-T	4.42E+10	100	8	1.8E-02	4.42E+12
Be	7	4604256	p	1.0	C	80	440	S-T	1.18E+11	100	7.8	1.8E-02	1.18E+13
Be	8	1.00E-16	p	1.0	C	80	440	S-T	2.88E+11	100	7.8	1.8E-02	2.88E+13
Be	9		p	1.0	C	80	440	S-T	5.37E+10	100	7.8	1.8E-02	5.37E+12
Be	10	5.049E+13	p	1.0	C	80	440	S-T	3.43E+10	100	7.8	1.8E-02	3.43E+12
Be	11	13.8	p	1.0	UC (ThC)	170	1000	S-T**	4.09E+08	100	18.0	1.8E-02	4.09E+10
Be	12	0.024	p	1.0	UC (ThC)	170	1000	S-T**	5.89E+07	100	18.0	1.8E-02	5.89E+09
Be	13												
Be	14	0.0042	p	1.0	UC (ThC)	170	1000	S-T**	1.72E+05	100	18.0	1.8E-02	1.72E+07
Blue highlight -> stable													
**There is reason to believe that the cross sections used for n-rich Be & Li are too small.													
	This question is under investigation. These yields may be modified.												

Beam		Halflife	Driver beam	Energy	Target	Thickn's	Volume	σ	Prod'n rate	Current	Total Power	Power Density	Total Prod'n
Z	A	s		(GeV)		(g/cm2)	cm3		/μA	pμA	KW	kW	
Ar	29		p	1.0	TiC/RVCF	80	1000	S-T	3.03E+00	100	13.3	1.3E-02	3.03E+02
Ar	30	0.0167	p	1.0	TiC/RVCF	80	1000	S-T	7.43E+01	100	13.3	1.3E-02	7.43E+03
Ar	31	0.015	p	1.0	CaO	100	1000	S-T	7.97E+04	20	18.4	1.8E-02	1.59E+06
Ar	32	0.098	p	1.0	CaO	100	1000	S-T	6.62E+06	20	18.4	1.8E-02	1.32E+08
Ar	33	0.173	p	1.0	CaO	100	1000	S-T	1.53E+08	20	18.4	1.8E-02	3.06E+09
Ar	34	0.844	p	1.0	CaO	100	1000	S-T	3.37E+09	20	18.4	1.8E-02	6.74E+10
Ar	35	1.78	p	1.0	CaO	100	1000	S-T	2.12E+10	20	18.4	1.8E-02	4.24E+11
Ar	36		p	1.0	CaO	100	1000	S-T	1.21E+11	20	18.4	1.8E-02	2.42E+12
Ar	37	3.03E+06	p	1.0	TiC/RVCF	80	1000	S-T	5.81E+10	100	13.3	1.3E-02	5.81E+12
Ar	38		p	1.0	TiC/RVCF	80	1000	S-T	1.89E+11	100	13.3	1.3E-02	1.89E+13
Ar	39	8.49E+09	p	1.0	TiC/RVCF	80	1000	S-T	1.00E+11	100	13.3	1.3E-02	1.00E+13
Ar	40		p	1.0	TiC/RVCF	80	1000	S-T	4.85E+10	100	13.3	1.3E-02	4.85E+12
Ar	41	6.59E+03	p	1.0	UC (ThC)	170	1000	S-T	1.71E+10	100	18.0	1.8E-02	1.71E+12
Ar	42	1.04E+09	p	1.0	UC (ThC)	170	1000	S-T	1.67E+10	100	18.0	1.8E-02	1.67E+12
Ar	43	322.2	p	1.0	UC (ThC)	170	1000	S-T	8.03E+09	100	18.0	1.8E-02	8.03E+11
Ar	44	714	p	1.0	UC (ThC)	170	1000	S-T	7.14E+09	100	18.0	1.8E-02	7.14E+11
Ar	45	21	p	1.0	UC (ThC)	170	1000	S-T	3.19E+09	100	18.0	1.8E-02	3.19E+11
Ar	46	8.9	p	1.0	UC (ThC)	170	1000	S-T	2.19E+09	100	18.0	1.8E-02	2.19E+11
Ar	47	1.06	p	1.0	UC (ThC)	170	820	S-T	5.33E+08	100	18.0	2.2E-02	5.33E+10
Ar	48	0.194	p	1.0	UC (ThC)	170	820	S-T	2.58E+08	100	18.0	2.2E-02	2.58E+10
Ar	49	0.093	p	1.0	UC (ThC)	170	820	S-T	6.37E+07	100	18.0	2.2E-02	6.37E+09
Ar	50	0.036	p	1.0	UC (ThC)	170	820	S-T	3.00E+07	100	18.0	2.2E-02	3.00E+09
Ar	51	0.025	p	1.0	UC (ThC)	170	820	S-T	7.26E+06	100	18.0	2.2E-02	7.26E+08
Ar	52	0.017	p	1.0	UC (ThC)	170	820	S-T	3.36E+06	100	18.0	2.2E-02	3.36E+08
Ar	53	0.001	p	1.0	UC (ThC)	170	820	S-T	8.01E+05	100	18.0	2.2E-02	8.01E+07
Ar	54	0.0087	p	1.0	UC (ThC)	170	820	S-T	3.66E+05	100	18.0	2.2E-02	3.66E+07
Ar	55												
Ar	56	0.0056	p	1.0	UC (ThC)	170	820	S-T	2.24E+04	100	18.0	2.2E-02	2.24E+06
Ar	57	Bound?	p	1.0	UC (ThC)	170	820	S-T	8.48E+03	100	18.0	2.2E-02	8.48E+05
Ar	58	Bound?	p	1.0	UC (ThC)	170	820	S-T	1.88E+03	100	18.0	2.2E-02	1.88E+05
Ar	59	Bound?	p	1.0	UC (ThC)	170	820	S-T	2.48E+02	100	18.0	2.2E-02	2.48E+04
Ar	60	Bound?	p	1.0	UC (ThC)	170	820	S-T	6.40E+01	100	18.0	2.2E-02	6.40E+03
		Blue highlight -> stable											
		Yellow highlight -> T1/2 based on calculation or systematics (not experiment)											

Beam		Halflife	Driver beam	Energy	Target	Thickn's	Volume	σ	Prod'n rate	Current	Total Power	Power Density	Total Prod'n
Z	A	s		(GeV)		(g/cm2)	cm3		/μA	pμA	KW	kW	
K	31		p	1.0	TiC/RVCF	80	1000	S-T	1.6E+00	100	13.3	1.3E-02	1.6E+02
K	32		p	1.0	TiC/RVCF	80	1000	S-T	6.2E+01	100	13.3	1.3E-02	6.2E+03
K	33	0.0372	p	1.0	TiC/RVCF	80	1000	S-T	2.4E+03	100	13.3	1.3E-02	2.4E+05
K	34	0.0869	p	1.0	TiC/RVCF	80	1000	S-T	1.3E+05	100	13.3	1.3E-02	1.3E+07
K	35	0.19	p	1.0	CaO	100	1000	S-T	1.4E+08	20	18.4	1.8E-02	2.8E+09
K	36	0.342	p	1.0	CaO	100	1000	S-T	2.2E+09	20	18.4	1.8E-02	4.4E+10
K	37	1.23	p	1.0	CaO	100	1000	S-T	1.6E+11	20	18.4	1.8E-02	3.3E+12
K	38	458.4	p	1.0	CaO	100	1000	S-T	1.9E+11	20	18.4	1.8E-02	3.9E+12
K	39		p	1.0	CaO	100	1000	S-T	3.3E+11	20	18.4	1.8E-02	6.7E+12
K	40		p	1.0	TiC/RVCF	80	1000	S-T	2.1E+11	100	13.3	1.3E-02	2.1E+13
K	41		p	1.0	TiC/RVCF	80	1000	S-T	2.3E+11	100	13.3	1.3E-02	2.3E+13
K	42	44496	p	1.0	TiC/RVCF	80	1000	S-T	7.1E+10	100	13.3	1.3E-02	7.1E+12
K	43	80280	p	1.0	TiC/RVCF	80	1000	S-T	2.4E+10	100	13.3	1.3E-02	2.4E+12
K	44	1326	p	1.0	UC (ThC)	170	820	S-T	9.7E+09	100	18.0	2.2E-02	9.7E+11
K	45	1038	p	1.0	UC (ThC)	170	820	S-T	7.6E+09	100	18.0	2.2E-02	7.6E+11
K	46	106.8	p	1.0	UC (ThC)	170	820	S-T	4.2E+09	100	18.0	2.2E-02	4.2E+11
K	47	17.5	p	1.0	UC (ThC)	170	820	S-T	3.0E+09	100	18.0	2.2E-02	3.0E+11
K	48	6.9	p	1.0	UC (ThC)	170	820	S-T	1.4E+09	100	18.0	2.2E-02	1.4E+11
K	49	1.1	p	1.0	UC (ThC)	170	820	S-T	8.2E+08	100	18.0	2.2E-02	8.2E+10
K	50	0.472	p	1.0	UC (ThC)	170	820	S-T	2.6E+08	100	18.0	2.2E-02	2.6E+10
K	51	0.365	p	1.0	UC (ThC)	170	820	S-T	1.1E+08	100	18.0	2.2E-02	1.1E+10
K	52	0.105	p	1.0	UC (ThC)	170	820	S-T	3.2E+07	100	18.0	2.2E-02	3.2E+09
K	53	0.03	p	1.0	UC (ThC)	170	820	S-T	1.3E+07	100	18.0	2.2E-02	1.3E+09
K	54	0.01	p	1.0	UC (ThC)	170	820	S-T	3.7E+06	100	18.0	2.2E-02	3.7E+08
K	55	0.014	p	1.0	UC (ThC)	170	820	S-T	1.5E+06	100	18.0	2.2E-02	1.5E+08
K	56	0.0085	p	1.0	UC (ThC)	170	820	S-T	4.2E+05	100	18.0	2.2E-02	4.2E+07
K	57	0.0083	p	1.0	UC (ThC)	170	820	S-T	1.1E+04	100	18.0	2.2E-02	1.1E+06
K	58	0.0053	p	1.0	UC (ThC)	170	820	S-T	3.1E+03	100	18.0	2.2E-02	3.1E+05
K	59	0.0038	p	1.0	UC (ThC)	170	820	S-T	2.5E+02	100	18.0	2.2E-02	2.5E+04
K	60		p	1.0	UC (ThC)	170	820	S-T	2.0E+01	100	18.0	2.2E-02	2.0E+03
K	61	0.0024	p	1.0	UC (ThC)	170	820	S-T	1.6E+00	100	18.0	2.2E-02	1.6E+02
K	62		p	1.0	UC (ThC)	170	820	S-T	1.3E-01	100	18.0	2.2E-02	1.3E+01
K	63	0.0017	p	1.0	UC (ThC)	170	820	S-T	1.0E-02	100	18.0	2.2E-02	1.0E+00
		Blue highlight -> stable											
		Yellow highlight -> T1/2 based on calculation or systematics (not experiment)											

Beam		Halflife	Driver beam	Energy	Target	Thickn's	Volume	σ	Prod'n rate	Current	Total Power	Power Density	Total Prod'n
Z	A	s		(GeV)		(g/cm2)	cm3		/μA	pμA	KW	kW	
Ni	47	0.00459	p	1.0	ZrO2	100	1000	S-T					
Ni	48	0.00871	p	1.0	ZrO2	100	1000	S-T					
Ni	49	0.0107	p	1.0	ZrO2	100	1000	S-T	3.4E-02	100	24	2.4E-02	3.4E+00
Ni	50	0.0186	p	1.0	ZrO2	100	1000	S-T	1.7E+00	100	24	2.4E-02	1.7E+02
Ni	51	0.0222	p	1.0	ZrO2	100	1000	S-T	8.5E+01	100	24	2.4E-02	8.5E+03
Ni	52	0.0375	p	1.0	ZrO2	100	1000	S-T	4.4E+02	100	15.4	1.5E-02	4.4E+04
Ni	53	0.045	p	1.0	ZrO2	100	1000	S-T	1.7E+04	100	15.4	1.5E-02	1.7E+06
Ni	54	0.103	p	1.0	ZrO2	100	1000	S-T	8.8E+05	100	15.4	1.5E-02	8.8E+07
Ni	55	0.212	p	1.0	ZrO2	100	1000	S-T	1.4E+07	100	15.4	1.5E-02	1.4E+09
Ni	56	5.27E+05	p	1.0	ZrO2	100	1000	S-T	2.7E+08	100	15.4	1.5E-02	2.7E+10
Ni	57	1.30E+05	p	1.0	ZrO2	100	1000	S-T	1.7E+09	100	15.4	1.5E-02	1.7E+11
Ni	58		p	1.0	ZrO2	100	1000	S-T	1.1E+10	100	15.4	1.5E-02	1.1E+12
Ni	59	2.37E+12	p	1.0	ZrO2	100	1000	S-T	2.3E+10	100	15.4	1.5E-02	2.3E+12
Ni	60		p	1.0	ZrO2	100	1000	S-T	4.9E+10	100	15.4	1.5E-02	4.9E+12
Ni	61		p	1.0	ZrO2	100	1000	S-T	2.3E+10	100	15.4	1.5E-02	2.3E+12
Ni	62		p	1.0	ZrO2	100	1000	S-T	1.3E+10	100	15.4	1.5E-02	1.3E+12
Ni	63	3.16E+09	p	1.0	ZrO2	100	1000	S-T	3.4E+09	100	15.4	1.5E-02	3.4E+11
Ni	64		p	1.0	ZrO2	100	1000	S-T	1.6E+09	100	15.4	1.5E-02	1.6E+11
Ni	65	9072	p	1.0	ZrO2	100	1000	S-T	2.9E+09	100	15.4	1.5E-02	2.9E+11
Ni	66	1.97E+05	p	1.0	UC (ThC)	170	820	S-T	1.7E+09	100	18.0	2.2E-02	1.7E+11
Ni	67	18	p	1.0	UC (ThC)	170	820	S-T	6.2E+08	100	18.0	2.2E-02	6.2E+10
Ni	68	555	p	1.0	UC (ThC)	170	820	S-T	4.3E+08	100	18.0	2.2E-02	4.3E+10
Ni	69	11.4	p	1.0	UC (ThC)	170	820	S-T	1.5E+08	100	18.0	2.2E-02	1.5E+10
Ni	70	30.3	p	1.0	UC (ThC)	170	820	S-T	9.9E+07	100	18.0	2.2E-02	9.9E+09
Ni	71	4.72	p	1.0	UC (ThC)	170	820	S-T	2.9E+07	100	18.0	2.2E-02	2.9E+09
Ni	72	2.1	p	1.0	UC (ThC)	170	820	S-T	1.7E+07	100	18.0	2.2E-02	1.7E+09
Ni	73	0.9	p	1.0	UC (ThC)	170	820	S-T	4.8E+06	100	18.0	2.2E-02	4.8E+08
Ni	74	1.1	p	1.0	UC (ThC)	170	820	S-T	2.7E+06	100	18.0	2.2E-02	2.7E+08
Ni	75	0.432	p	1.0	UC (ThC)	170	820	S-T	7.6E+05	100	18.0	2.2E-02	7.6E+07
Ni	76	0.311	p	1.0	UC (ThC)	170	820	S-T	4.1E+05	100	18.0	2.2E-02	4.1E+07
Ni	77	0.192	p	1.0	UC (ThC)	170	820	S-T	1.2E+05	100	18.0	2.2E-02	1.2E+07
Ni	78	0.14	p	1.0	UC (ThC)	170	820	S-T	6.2E+04	100	18.0	2.2E-02	6.2E+06
Ni	79	0.055	p	1.0	UC (ThC)	170	820	S-T	1.7E+04	100	18.0	2.2E-02	1.7E+06
Ni	80	0.017	p	1.0	UC (ThC)	170	820	S-T	9.1E+03	100	18.0	2.2E-02	9.1E+05
Ni	81	0.02	p	1.0	UC (ThC)	170	820	S-T	2.5E+03	100	18.0	2.2E-02	2.5E+05

Beam		Halflife	Driver beam	Energy	Target	Thickn's	Volume	σ	Prod'n rate	Current	Total Power	Power Density	Total Prod'n
Z	A	s		(GeV)		(g/cm2)	cm3		/μA	pμA	KW	kW	
Ni	82	0.011	p	1.0	UC (ThC)	170	820	S-T	1.3E+03	100	18.0	2.2E-02	1.3E+05
Ni	83		p	1.0	UC (ThC)	170	820	S-T	3.7E+02	100	18.0	2.2E-02	3.7E+04
		For certain long-lived species of particular interest, it may be appropriate											
		to consider batch mode production. A possible example is 56Ni.											
Ni	56	5.27E+05	p	1.0	58Ni	1.75	0.2	S-T	3.2E+08	100	2.9	1.4E+01	3.2E+10
		Blue highlight -> stable											
		Yellow highlight -> T1/2 based on calculation or systematics (not experiment)											

Beam		Halflife	Driver beam	Energy	Target	Thickn's	Volume	σ	Prod'n rate	Current	Total Power	Power Density	Total Prod'n
Z	A	s		(GeV)		(g/cm2)	cm3		/μA	pμA	KW	kW	
Kr	65		p	1.0	ZrO2	100	1000	S-T	1.0E+00	100	15.4	1.5E-02	1.0E+02
Kr	66	0.0105	p	1.0	ZrO2	100	1000	S-T	9.6E+00	100	15.4	1.5E-02	9.6E+02
Kr	67	0.0127	p	1.0	ZrO2	100	1000	S-T	2.2E+01	100	15.4	1.5E-02	2.2E+03
Kr	68	0.0253	p	1.0	ZrO2	100	1000	S-T	1.1E+02	100	15.4	1.5E-02	1.1E+04
Kr	69	0.0277	p	1.0	ZrO2	100	1000	S-T	6.3E+02	100	15.4	1.5E-02	6.3E+04
Kr	70	0.0885	p	1.0	ZrO2	100	1000	S-T	3.5E+04	100	15.4	1.5E-02	3.5E+06
Kr	71	0.097	p	1.0	ZrO2	100	1000	S-T	7.1E+05	100	15.4	1.5E-02	7.1E+07
Kr	72	17.4	p	1.0	ZrO2	100	1000	S-T	1.9E+07	100	15.4	1.5E-02	1.9E+09
Kr	73	27	p	1.0	ZrO2	100	1000	S-T	1.7E+08	100	15.4	1.5E-02	1.7E+10
Kr	74	690	p	1.0	ZrO2	100	1000	S-T	2.1E+09	100	15.4	1.5E-02	2.1E+11
Kr	75	270	p	1.0	ZrO2	100	1000	S-T	8.7E+09	100	15.4	1.5E-02	8.7E+11
Kr	76	53280	p	1.0	ZrO2	100	1000	S-T	4.3E+10	100	15.4	1.5E-02	4.3E+12
Kr	77	4500	p	1.0	ZrO2	100	1000	S-T	7.3E+10	100	15.4	1.5E-02	7.3E+12
Kr	78		p	1.0	ZrO2	100	1000	S-T	1.4E+11	100	15.4	1.5E-02	1.4E+13
Kr	79	126144	p	1.0	ZrO2	100	1000	S-T	7.4E+10	100	15.4	1.5E-02	7.4E+12
Kr	80		p	1.0	ZrO2	100	1000	S-T	4.9E+10	100	15.4	1.5E-02	4.9E+12
Kr	81	6.63E+12	p	1.0	ZrO2	100	1000	S-T	1.4E+10	100	15.4	1.5E-02	1.4E+12
Kr	82		p	1.0	UC (ThC)	170	820	S-T	9.4E+09	100	18.0	2.2E-02	9.4E+11
Kr	83		p	1.0	UC (ThC)	170	820	S-T	1.9E+10	100	18.0	2.2E-02	1.9E+12
Kr	84		p	1.0	UC (ThC)	170	820	S-T	3.0E+10	100	18.0	2.2E-02	3.0E+12
Kr	85	3.4E+08	p	1.0	UC (ThC)	170	820	S-T	2.0E+10	100	18.0	2.2E-02	2.0E+12
Kr	86		p	1.0	UC (ThC)	170	820	S-T	2.5E+10	100	18.0	2.2E-02	2.5E+12
Kr	87	4536	p	1.0	UC (ThC)	170	820	S-T	1.5E+10	100	18.0	2.2E-02	1.5E+12
Kr	88	10224	p	1.0	UC (ThC)	170	820	S-T + exptl(n)	1.9E+10	100	18.0	2.2E-02	1.9E+12
Kr	89	190.2	p	1.0	UC (ThC)	170	820	S-T + exptl(n)	1.6E+10	100	18.0	2.2E-02	1.6E+12
Kr	90	32.32	p	1.0	UC (ThC)	170	820	S-T + exptl(n)	2.4E+10	100	18.0	2.2E-02	2.4E+12
Kr	91	8.57	p	1.0	UC (ThC)	170	820	S-T + exptl(n)	2.5E+10	100	18.0	2.2E-02	2.5E+12
Kr	92	1.84	p	1.0	UC (ThC)	170	820	S-T + exptl(n)	2.1E+10	100	18.0	2.2E-02	2.1E+12
Kr	93	1.29	p	1.0	UC (ThC)	170	820	S-T + exptl(n)	1.1E+10	100	18.0	2.2E-02	1.1E+12
Kr	94	0.2	p	1.0	UC (ThC)	170	820	S-T + exptl(n)	5.5E+09	100	18.0	2.2E-02	5.5E+11
Kr	95	0.78	p	1.0	UC (ThC)	170	820	S-T + exptl(n)	1.1E+09	100	18.0	2.2E-02	1.1E+11
Kr	96	0.32	p	1.0	UC (ThC)	170	820	S-T + exptl(n)	2.9E+08	100	18.0	2.2E-02	2.9E+10
Kr	97	0.317	p	1.0	UC (ThC)	170	820	S-T + exptl(n)	2.5E+07	100	18.0	2.2E-02	2.5E+09
Kr	98	0.199	p	1.0	UC (ThC)	170	820	S-T	8.1E+06	100	18.0	2.2E-02	8.1E+08
Kr	99	0.224	p	1.0	UC (ThC)	170	820	S-T	1.6E+06	100	18.0	2.2E-02	1.6E+08
Kr	100	0.083	p	1.0	UC (ThC)	170	820	S-T	4.9E+05	100	18.0	2.2E-02	4.9E+07

Beam		Halflife	Driver beam	Energy	Target	Thickn's	Volume	σ	Prod'n rate	Current	Total Power	Power Density	Total Prod'n
Z	A	s		(GeV)		(g/cm2)	cm3		/μA	pμA	KW	kW	
Kr	101	0.066	p	1.0	UC (ThC)	170	820	S-T	2.6E+05	100	18.0	2.2E-02	2.6E+07
Kr	102	0.044	p	1.0	UC (ThC)	170	820	S-T	8.5E+04	100	18.0	2.2E-02	8.5E+06
		Blue highlight -> stable											
		Yellow highlight -> T1/2 based on calculation or systematics (not experiment)											

Beam		Halflife	Driver beam	Energy	Target	Thickn's	Volume	σ	Prod'n rate	Current	Total Power	Power Density	Total Prod'n
Z	A	s		(GeV)		(g/cm2)	cm3		/μA	pμA	KW	kW	
Zr	74	0.00819	p	1.0	Nb**	100	1000	S-T	1.2E-02	100	15	1.5E-02	1.2E+00
Zr	75	0.00896	p	1.0	Nb**	100	1000	S-T	7.2E-02	100	15	1.5E-02	7.2E+00
Zr	76	0.016	p	1.0	Nb**	100	1000	S-T	7.7E-01	100	15	1.5E-02	7.7E+01
Zr	77	0.0221	p	1.0	Nb**	100	1000	S-T	4.0E+00	100	15	1.5E-02	4.0E+02
Zr	78	0.0403	p	1.0	Nb**	100	1000	S-T	7.5E+00	100	15	1.5E-02	7.5E+02
Zr	79	0.143	p	1.0	Nb**	100	1000	S-T	9.4E+00	100	15	1.5E-02	9.4E+02
Zr	80	1.7	p	1.0	Nb**	100	1000	S-T	9.0E+02	100	15	1.5E-02	9.0E+04
Zr	81	15	p	1.0	Nb**	100	1000	S-T	4.2E+04	100	15	1.5E-02	4.2E+06
Zr	82	32	p	1.0	Nb**	100	1000	S-T	2.2E+06	100	15	1.5E-02	2.2E+08
Zr	83	39.6	p	1.0	Nb**	100	1000	S-T	3.0E+07	100	15	1.5E-02	3.0E+09
Zr	84	1440	p	1.0	Nb**	100	1000	S-T	4.3E+08	100	15	1.5E-02	4.3E+10
Zr	85	474	p	1.0	Nb**	100	1000	S-T	2.3E+09	100	15	1.5E-02	2.3E+11
Zr	86	5.94E+04	p	1.0	Nb**	100	1000	S-T	1.2E+11	100	15	1.5E-02	1.2E+13
Zr	87	5760	p	1.0	Nb**	100	1000	S-T	1.1E+11	100	15	1.5E-02	1.1E+13
Zr	88	7.21E+06	p	1.0	Nb**	100	1000	S-T	1.1E+11	100	15	1.5E-02	1.1E+13
Zr	89	2.83E+05	p	1.0	Nb**	100	1000	S-T	1.1E+11	100	15	1.5E-02	1.1E+13
Zr	90		p	1.0	Nb**	100	1000	S-T	1.2E+11	100	15	1.5E-02	1.2E+13
Zr	91		p	1.0	Nb**	100	1000	S-T	1.2E+11	100	15	1.5E-02	1.2E+13
Zr	92		p	1.0	Nb**	100	1000	S-T	9.0E+10	100	15	1.5E-02	9.0E+12
Zr	93	4.734E+13	p	1.0	Th**	140	1000	S-T	2.4E+10	100	17	1.7E-02	2.4E+12
Zr	94		p	1.0	Th**	140	1000	S-T	3.3E+10	100	17	1.7E-02	3.3E+12
Zr	95	5532192	p	1.0	Th**	140	1000	S-T	2.2E+10	100	17	1.7E-02	2.2E+12
Zr	96		p	1.0	Th**	140	1000	S-T	2.6E+10	100	17	1.7E-02	2.6E+12
Zr	97	60840	p	1.0	Th**	140	1000	S-T	1.5E+10	100	17	1.7E-02	1.5E+12
Zr	98	30.7	p	1.0	Th**	140	1000	S-T + exptl(n)	1.5E+10	100	17	1.7E-02	1.5E+12
Zr	99	2.1	p	1.0	Th**	140	1000	S-T + exptl(n)	7.6E+09	100	17	1.7E-02	7.6E+11
Zr	100	7.1	p	1.0	Th**	140	1000	S-T + exptl(n)	6.8E+09	100	17	1.7E-02	6.8E+11
Zr	101	2.1	p	1.0	Th**	140	1000	S-T + exptl(n)	3.0E+09	100	17	1.7E-02	3.0E+11
Zr	102	2.9	p	1.0	Th**	140	1000	S-T + exptl(n)	2.3E+09	100	17	1.7E-02	2.3E+11
Zr	103	1.3	p	1.0	Th**	140	1000	S-T + exptl(n)	8.9E+08	100	17	1.7E-02	8.9E+10
Zr	104	1.2	p	1.0	Th**	140	1000	S-T + exptl(n)	6.1E+08	100	17	1.7E-02	6.1E+10
Zr	105	1	p	1.0	Th**	140	1000	S-T + exptl(n)	2.0E+08	100	17	1.7E-02	2.0E+10
Zr	106	0.331	p	1.0	Th**	140	1000	S-T + exptl(n)	1.2E+08	100	17	1.7E-02	1.2E+10
Zr	107	0.199	p	1.0	Th**	140	1000	S-T	3.5E+07	100	17	1.7E-02	3.5E+09
Zr	108	0.147	p	1.0	Th**	140	1000	S-T	1.8E+07	100	17	1.7E-02	1.8E+09

Beam		Halflife	Driver beam	Energy	Target	Thickn's	Volume	σ	Prod'n rate	Current	Total Power	Power Density	Total Prod'n
Z	A	s		(GeV)		(g/cm2)	cm3		/μA	pμA	KW	kW	
Zr	109	0.111	p	1.0	Th**	140	1000	S-T	4.5E+06	100	17	1.7E-02	4.5E+08
Zr	110	0.085	p	1.0	Th**	140	1000	S-T	2.1E+06	100	17	1.7E-02	2.1E+08
Zr	111	0.056	p	1.0	Th**	140	1000	S-T	9.6E+05	100	17	1.7E-02	9.6E+07
Zr	112	0.053	p	1.0	Th**	140	1000	S-T	2.2E+05	100	17	1.7E-02	2.2E+07
Zr	113		p	1.0	Th**	140	1000	S-T	9.0E+04	100	17	1.7E-02	9.0E+06
Zr	114		p	1.0	Th**	140	1000	S-T	3.0E+04	100	17	1.7E-02	3.0E+06
Zr	115		p	1.0	Th**	140	1000	S-T	8.9E+03	100	17	1.7E-02	8.9E+05
Zr	116		p	1.0	Th**	140	1000	S-T	2.1E+03	100	17	1.7E-02	2.1E+05
		** CF4 introduced to target to facilitate "chemical evaporation" of Zr											

Beam		Halflife	Driver beam	Energy	Target	Thickn's	Volume	σ	Prod'n rate	Current	Total Power	Power Density	Total Prod'n
Z	A	s		(GeV)		(g/cm2)	cm3		/μA	pμA	KW	kW	
Sn	100	1.19	p	1.0	CeC2	100	1000	S-T	1.8E+01	100	13.5	1.4E-02	1.8E+03
Sn	101	7.17	p	1.0	CeC2	100	1000	S-T	7.3E+01	100	13.5	1.4E-02	7.3E+03
Sn	102	6.5	p	1.0	CeC2	100	1000	S-T	1.3E+02	100	13.5	1.4E-02	1.3E+04
Sn	103	7	p	1.0	CeC2	100	1000	S-T	1.3E+03	100	13.5	1.4E-02	1.3E+05
Sn	104	20.8	p	1.0	CeC2	100	1000	S-T	3.5E+04	100	13.5	1.4E-02	3.5E+06
Sn	105	31	p	1.0	CeC2	100	1000	S-T	3.8E+05	100	13.5	1.4E-02	3.8E+07
Sn	106	115	p	1.0	CeC2	100	1000	S-T	5.9E+06	100	13.5	1.4E-02	5.9E+08
Sn	107	174	p	1.0	CeC2	100	1000	S-T	3.7E+07	100	13.5	1.4E-02	3.7E+09
Sn	108	618	p	1.0	CeC2	100	1000	S-T	3.4E+08	100	13.5	1.4E-02	3.4E+10
Sn	109	1080	p	1.0	CeC2	100	1000	S-T	1.2E+09	100	13.5	1.4E-02	1.2E+11
Sn	110	14400	p	1.0	CeC2	100	1000	S-T	6.2E+09	100	13.5	1.4E-02	6.2E+11
Sn	111	2118	p	1.0	CeC2	100	1000	S-T	1.1E+10	100	13.5	1.4E-02	1.1E+12
Sn	112		p	1.0	CeC2	100	1000	S-T	3.1E+10	100	13.5	1.4E-02	3.1E+12
Sn	113	1284	p	1.0	CeC2	100	1000	S-T	3.0E+10	100	13.5	1.4E-02	3.0E+12
Sn	114		p	1.0	CeC2	100	1000	S-T	2.9E+10	100	13.5	1.4E-02	2.9E+12
Sn	115		p	1.0	CeC2	100	1000	S-T	1.1E+10	100	13.5	1.4E-02	1.1E+12
Sn	116		p	1.0	UC	170	820	S-T	2.7E+10	100	18.0	2.2E-02	2.7E+12
Sn	117		p	1.0	UC	170	820	S-T	2.1E+10	100	18.0	2.2E-02	2.1E+12
Sn	118		p	1.0	UC	170	820	S-T	3.0E+10	100	18.0	2.2E-02	3.0E+12
Sn	119		p	1.0	UC	170	820	S-T	2.1E+10	100	18.0	2.2E-02	2.1E+12
Sn	120		p	1.0	UC	170	820	S-T	2.7E+10	100	18.0	2.2E-02	2.7E+12
Sn	121	9.74E+04	p	1.0	UC	170	820	S-T	1.7E+10	100	18.0	2.2E-02	1.7E+12
Sn	122		p	1.0	UC	170	820	S-T	1.9E+10	100	18.0	2.2E-02	1.9E+12
Sn	123	1.12E+07	p	1.0	UC	170	820	S-T	1.1E+10	100	18.0	2.2E-02	1.1E+12
Sn	124		p	1.0	UC	170	820	S-T	1.1E+10	100	18.0	2.2E-02	1.1E+12
Sn	125	8.33E+05	p	1.0	UC	170	820	S-T	5.9E+09	100	18.0	2.2E-02	5.9E+11
Sn	126	7.88E+12	p	1.0	UC	170	820	S-T	6.6E+09	100	18.0	2.2E-02	6.6E+11
Sn	127	7.56E+03	p	1.0	UC	170	820	S-T	2.9E+09	100	18.0	2.2E-02	2.9E+11
Sn	128	3.54E+03	p	1.0	UC	170	820	S-T + exptl(n)	5.0E+09	100	18.0	2.2E-02	5.0E+11
Sn	129	133.8	p	1.0	UC	170	820	S-T + exptl(n)	2.8E+09	100	18.0	2.2E-02	2.8E+11
Sn	130	223.2	p	1.0	UC	170	820	S-T + exptl(n)	8.2E+09	100	18.0	2.2E-02	8.2E+11
Sn	131	56	p	1.0	UC	170	820	S-T + exptl(n)	8.5E+09	100	18.0	2.2E-02	8.5E+11
Sn	132	39.7	p	1.0	UC	170	820	S-T + exptl(n)	1.2E+10	100	18.0	2.2E-02	1.2E+12
Sn	133	1.44	p	1.0	UC	170	820	S-T + exptl(n)	4.1E+09	100	18.0	2.2E-02	4.1E+11
Sn	134	1.04	p	1.0	UC	170	820	S-T + exptl(n)	1.0E+09	100	18.0	2.2E-02	1.0E+11
Sn	135	0.25	p	1.0	UC	170	820	S-T + exptl(n)	1.1E+08	100	18.0	2.2E-02	1.1E+10
Sn	136	0.092	p	1.0	UC	170	820	S-T + exptl(n)	1.1E+07	100	18.0	2.2E-02	1.1E+09
Sn	137	0.11	p	1.0	UC	170	820	S-T	1.2E+06	100	18.0	2.2E-02	1.2E+08

Beam		Halflife	Driver beam	Energy	Target	Thickn's	Volume	σ	Prod'n rate	Current	Total Power	Power Density	Total Prod'n
Z	A	s		(GeV)		(g/cm2)	cm3		/μA	pμA	KW	kW	
Sn	138	0.087	p	1.0	UC	170	820	S-T	2.2E+05	100	18.0	2.2E-02	2.2E+07
Sn	139		p	1.0	UC	170	820	S-T	3.1E+04	100	18.0	2.2E-02	3.1E+06
Sn	140		p	1.0	UC	170	820	S-T	6.1E+03	100	18.0	2.2E-02	6.1E+05
Sn	141		p	1.0	UC	170	820	S-T	1.1E+03	100	18.0	2.2E-02	1.1E+05
		Sample Two-step Target Yields									Two-step Target Yields		
		(Factor of 2 higher yield than similar 1 GeV p calculations at ANL)											
Sn	129	133.8	p,n	1.0	W/UC	230/5	9.4/1800	Lahet + exptl(n)	2.9E+09	100	25.3	2.7	2.9E+11
Sn	130	223.2	p,n	1.0	W/UC	230/5	9.4/1800	Lahet + exptl(n)	6.5E+09	100	25.3	2.7	6.5E+11
Sn	131	56	p,n	1.0	W/UC	230/5	9.4/1800	Lahet + exptl(n)	7.4E+09	100	25.3	2.7	7.4E+11
Sn	132	39.7	p,n	1.0	W/UC	230/5	9.4/1800	Lahet + exptl(n)	1.1E+10	100	25.3	2.7	1.1E+12
Sn	133	1.2	p,n	1.0	W/UC	230/5	9.4/1800	Lahet + exptl(n)	4.1E+09	100	25.3	2.7	4.1E+11
Sn	134	1.12	p,n	1.0	W/UC	230/5	9.4/1800	Lahet + exptl(n)	1.1E+09	100	25.3	2.7	1.1E+11

Beam		Halflife	Driver beam	Energy	Target	Thickn's	Volume	σ	Prod'n rate	Current	Total Power	Power Density	Total Prod'n
Z	A	s		(GeV)		(g/cm2)	cm3		/µA	pµA	KW	kW	
Fr	189		p	1.0	ThC	170	820	S-T(Lahet)	2.9E+00	100	18.00	2.2E-02	2.9E+02
Fr	190		p	1.0	ThC	170	820	S-T(Lahet)	1.5E+01	100	18.00	2.2E-02	1.5E+03
Fr	191		p	1.0	ThC	170	820	S-T(Lahet)	1.1E+02	100	18.00	2.2E-02	1.1E+04
Fr	192		p	1.0	ThC	170	820	S-T(Lahet)	5.0E+02	100	18.00	2.2E-02	5.0E+04
Fr	193		p	1.0	ThC	170	820	S-T(Lahet)	3.0E+03	100	18.00	2.2E-02	3.0E+05
Fr	194		p	1.0	ThC	170	820	S-T(Lahet)	1.2E+04	100	18.00	2.2E-02	1.2E+06
Fr	195		p	1.0	ThC	170	820	S-T(Lahet)	6.1E+04	100	18.00	2.2E-02	6.1E+06
Fr	196		p	1.0	ThC	170	820	S-T(Lahet)	2.1E+05	100	18.00	2.2E-02	2.1E+07
Fr	197	2.19	p	1.0	ThC	170	820	S-T(Lahet)	9.3E+05	100	18.00	2.2E-02	9.3E+07
Fr	198	2.7	p	1.0	ThC	170	820	Lahet	1.6E+08	100	18.00	2.2E-02	1.6E+10
Fr	199	2.58	p	1.0	ThC	170	820	Lahet	1.1E+09	100	18.00	2.2E-02	1.1E+11
Fr	200	2.54	p	1.0	ThC	170	820	Lahet	5.2E+09	100	18.00	2.2E-02	5.2E+11
Fr	201	0.048	p	1.0	ThC	170	820	Lahet	1.3E+10	100	18.00	2.2E-02	1.3E+12
Fr	202	0.34	p	1.0	ThC	170	820	Lahet	1.7E+10	100	18.00	2.2E-02	1.7E+12
Fr	203	0.55	p	1.0	ThC	170	820	Lahet	2.0E+10	100	18.00	2.2E-02	2.0E+12
Fr	204	1.7	p	1.0	ThC	170	820	Lahet	2.0E+10	100	18.00	2.2E-02	2.0E+12
Fr	205	3.85	p	1.0	ThC	170	820	Lahet	2.3E+10	100	18.00	2.2E-02	2.3E+12
Fr	206	16	p	1.0	ThC	170	820	Lahet	2.2E+10	100	18.00	2.2E-02	2.2E+12
Fr	207	14.8	p	1.0	ThC	170	820	Lahet	2.6E+10	100	18.00	2.2E-02	2.6E+12
Fr	208	59.1	p	1.0	ThC	170	820	Lahet	2.4E+10	100	18.00	2.2E-02	2.4E+12
Fr	209	50	p	1.0	ThC	170	820	Lahet	2.5E+10	100	18.00	2.2E-02	2.5E+12
Fr	210	190.8	p	1.0	ThC	170	820	Lahet	2.0E+10	100	18.00	2.2E-02	2.0E+12
Fr	211	186	p	1.0	ThC	170	820	Lahet	1.8E+10	100	18.00	2.2E-02	1.8E+12
Fr	212	1200	p	1.0	ThC	170	820	Lahet	1.4E+10	100	18.00	2.2E-02	1.4E+12
Fr	213	34.7	p	1.0	ThC	170	820	Lahet	1.4E+10	100	18.00	2.2E-02	1.4E+12
Fr	214	0.005	p	1.0	ThC	35	168	Lahet	2.0E+09	100	7.20	4.3E-02	2.0E+11
Fr	215	8.60E-08	p	1.0	ThC	35	168	Lahet	2.2E+09	100	7.20	4.3E-02	2.2E+11
Fr	216	7.00E-07	p	1.0	ThC	35	168	Lahet	1.5E+09	100	7.20	4.3E-02	1.5E+11
Fr	217	1.60E-05	p	1.0	ThC	35	168	Lahet	1.6E+09	100	7.20	4.3E-02	1.6E+11
Fr	218	0.0007	p	1.0	ThC	35	168	Lahet	1.2E+09	100	7.20	4.3E-02	1.2E+11
Fr	219	0.02	p	1.0	ThC	35	168	Lahet	1.2E+09	100	7.20	4.3E-02	1.2E+11
Fr	220	27.4	p	1.0	ThC	170	820	Lahet	3.7E+09	100	18.00	2.2E-02	3.7E+11
Fr	221	288	p	1.0	ThC	170	820	Lahet	3.3E+09	100	18.00	2.2E-02	3.3E+11
Fr	222	888	p	1.0	ThC	170	820	Lahet	2.0E+09	100	18.00	2.2E-02	2.0E+11
Fr	223	1308	p	1.0	ThC	170	820	Lahet	2.3E+09	100	18.00	2.2E-02	2.3E+11
Fr	224	160.2	p	1.0	ThC	170	820	Lahet	1.4E+09	100	18.00	2.2E-02	1.4E+11
Fr	225	240	p	1.0	ThC	170	820	Lahet	1.8E+09	100	18.00	2.2E-02	1.8E+11
Fr	226	48	p	1.0	ThC	170	820	Lahet	8.4E+08	100	18.00	2.2E-02	8.4E+10

Beam		Halflife	Driver beam	Energy	Target	Thickn's	Volume	σ	Prod'n rate	Current	Total Power	Power Density	Total Prod'n
Z	A	s		(GeV)		(g/cm2)	cm3		/μA	pμA	KW	kW	
Fr	227	148.2	p	1.0	ThC	170	820	Lahet	8.1E+08	100	18.00	2.2E-02	8.1E+10
Fr	228	39	p	1.0	ThC	170	820	Lahet	4.3E+08	100	18.00	2.2E-02	4.3E+10
Fr	229	50.2	p	1.0	ThC	170	820	Lahet	2.1E+08	100	18.00	2.2E-02	2.1E+10
Fr	230	19.1	p	1.0	ThC	170	820	Lahet	1.1E+07	100	18.00	2.2E-02	1.1E+09
Fr	231	17.5	p	1.0	ThC	170	820	Lahet	7.1E+06	100	18.00	2.2E-02	7.1E+08
Fr	232	5	p	1.0	ThC	170	820	Lahet	5.5E+06	100	18.00	2.2E-02	5.5E+08
Fr	233	30.9	p	1.0	ThC	170	820	Lahet	3.2E+06	100	18.00	2.2E-02	3.2E+08