

WBS Level 2 Components

RIA Driver Accelerator (WBS Level 2)						
Index	Description	System	Purchases	FTE (150k\$)	Cost	
3		(M\$)	(M\$)	(M\$)	Basis	Person
1.0	Front End (source, RFQ, IH)	9.3				
1.1	ECR		3.1		Eng. Est.	ANL/P.O.
1.2	High Voltage Platform		0.3		Eng. Est.	ANL/P.O.
1.3	LEBT		1.0		Eng. Est.	ANL/P.O.
1.4	RFQ		4.1		Eng. Est.	ANL/P.O.
1.5	MEBT		0.9		Eng. Est.	ANL/P.O.
2.0	Injector and Low Beta Linac (31 CM)	34.7				
2.1	Beta = 0.021 and 0.030 (1 CM, 7 CAV)		1.2		Eng. Est.	ANL/K.S.
2.2	Beta = 0.062 (4 CM, 32 CAV)		3.9		Eng. Est.	ANL/K.S.
2.3	Beta= 0.128 (5 CM, 40 CAV)		5.2		Eng. Est.	ANL/K.S.
2.4	Beta =0.19 (9 CM, 72 CAV)		9.4		Eng. Est.	ANL/K.S.
2.5	Beta = 0.38 (12 CM, 96 CAV)		12.7		Eng. Est.	ANL/K.S.
2.6	Magnets, Power Supplies, Other.		1.0		Allowance	NSCL
2.7	Design/Eng			1.0	Eng. Est.	ANL/K.S.
2.8	Installation and Checkout			0.4	Eng. Est.	ANL/K.S.
3.0	High Beta Accelerator (47 CM)	58.8				
3.1	Beta = 0.49 (19 CM, 76 CAV)		22.8		Eng. Est.	Jlab
3.2	Beta = 0.61 (21 CM, 84 CAV)		25.6		Eng. Est.	Jlab
3.3	Beta = 0.81 (7 CM, 28 CAV)		9.4		Eng. Est.	Jlab
3.4	Magnets, Power Supplies, Other.		1.0		Allowance	NSCL
4.0	RF (RIA DRIVER)	39.8				
4.1	_Signal Source		0.2		Eng. Est.	ANL/APS
4.2	_(RFQ(One System)		0.9		Eng. Est.	ANL/P.O.
4.3	_(Buncher (2 Systems)		0.4		Eng. Est.	ANL/APS
4.4	SC Linac Injection Section (79 Systems)		4.7		Eng. Est.	ANL/APS
4.5	SC Linac Mid Section (168 Systems)		9.4		Eng. Est.	ANL/APS
4.6	SC Linac Final Section (188 Systems)		24.3		Eng. Est.	ANL/APS
5.0	Linac Control Interface	7.9				
5.1	Linac IOC's and Software Setup		3.4		Eng. Est.	NSCL
5.2	Diagnostic Systems		4.5		Allowance	ANL/Atlas
6.0	Stripping Systems	3.0				
6.1	First		1.0		Eng. Est.	ANL/P.O.
6.2	Second		2.0		Eng. Est.	ANL/P.O.
7.0	Linac BSY	4.6				
7.1	RF Switch		0.2	0.3	Allowance	NSCL
7.2	Magnetic Elements		1.6	2.5	Eng. Est.	NSCL
	Sub-Total	158.1	154.0	4.2		
	Contingency (35%)	55.3	53.9	1.5		
	Total	213.5	207.9	5.6		
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RIA Experimental Facilities (WBS Level 2)						
Index	Description	System	Purchases	FTE (150k\$)	Cost Basis	Lab
4		(M\$)	(M\$)	(M\$)		
1.0	Safety Systems	\$3.6	\$1.3	\$2.4	Allowance	NSCL
2.0	Control Systems	\$3.5	\$1.0	\$2.5	Allowance	NSCL
3.0	Target Systems	\$33.9				
3.1	High Energy Target		\$2.9	\$4.3	Eng. Est.	NSCL
3.2	Gas Stopping Target		\$2.5	\$4.1	Eng. Est.	NSCL
3.3	2 ISOL Targets		\$4.0	\$4.4	Eng. Est.	NSCL/ISAC/SNS
3.4	Shared Target Services		\$3.0	\$8.8	Eng. Est.	NSCL/ISAC/SNS
4.0	ISOL Systems	\$57.2				
4.1	Gas Cell TGT Area Transport		\$3.0	\$1.6	Eng. Est.	NSCL
4.2	Gas Cell Fragment Separator		\$2.8	\$4.2	Eng. Est.	NSCL
4.3	Gas Cell System		\$0.6		Eng. Est.	ANL/Atlas
4.4	Low Energy Static Switchyards		\$2.0	\$4.0	Allowance	ANL/Atlas
4.4.1	Isobar Entrance Switchyards					
4.4.2	Isobar Exit Switchyards					
4.4.3	Stopped Beam Vaults Switchyard					
4.4.4	Astrophysics 1 MeV/u Switchyard		\$1.3		Eng. Est.	ANL/Ostromov
4.4.5	7 MeV/u Switchyard		\$0.9		Eng. Est.	ANL/Ostromov
4.5	100 keV Isobar Separators					
4.5.1	Two High Res		\$0.6	\$1.4	Allowance	ANL/Atlas
4.6	Post Accelerators					
4.6.1	RFQ's, HV platforms, bunchers		\$2.6		Eng. Est.	ANL/Atlas
4.6.2	Helium and carbon strippers		\$0.7		Eng. Est.	ANL/Atlas
4.6.3	SC to 2 MeV/u Linac		\$11.8		(64 cav, 8 CM)	ANL/Atlas
4.6.4	SC to 7 MeV/u Linac (ATLAS)		\$9.0		(42 cav, 4 rebunchers, 7 CM)	ANL/Atlas
4.6.5	RF Electronics/Amplifiers		\$4.8		Eng. Est.	ANL/Atlas
4.6.6	Cryodistribution		\$2.0		Eng. Est.	ANL/Atlas
4.6.7	Design			3.0	Eng. Est.	ANL/Atlas
4.6.8	Magnets, Power Supplies, Controls		\$1.0		Allowance	NSCL
5.0	High Energy Systems	\$27.5				
5.1	High Energy TGT Area Transport		\$3.1	\$1.6	Eng. Est.	NSCL
5.2	High Energy Fragment Separator		\$7.4	\$11.6	Eng. Est.	NSCL
5.3	Beam Transport to Vaults		\$1.4	\$2.4	Eng. Est.	NSCL
6.0	Detectors	\$93.8				
6.1	Fragmentation Facilities		\$29.3			
6.1.1	High Res. Spectrograph		\$14.3		SOFFBRIA, NSCL, 3/2000, pp 80	
6.1.2	Sweeper Magnet		\$5.0		SOFFBRIA, NSCL, 3/2000, pp 80	
6.1.3	Large Area Neutron Detector		\$2.0		SOFFBRIA, NSCL, 3/2000, pp 80	
6.1.4	Large Area Si-array		\$3.0		SOFFBRIA, NSCL, 3/2000, pp 80	
6.1.5	Implantation Station		\$1.0		SOFFBRIA, NSCL, 3/2000, pp 80	
6.1.6	Time Projection Chamber		\$4.0		SOFFBRIA, NSCL, 3/2000, pp 80	
6.2	ISOL Facilities Detectors		\$29.7		LBNL-43460, 3/99, pp4	
6.2.1	Recoil Separators		\$9.8			
6.2.2	Magnetic Spectrographs		\$3.6			
6.2.3	Particle Detectors		\$1.9			
6.2.4	Non Accelerated Beams		\$12.7			
6.2.5	Special Targets		\$1.8			
6.3	Common Shared Detectors		\$34.8			
6.3.1	Position Sensitive Ge-array		\$10.0		SOFFBRIA, NSCL, 3/2000, pp 80	
6.3.2	Gamma Ray Detectors		\$24.8		LBNL-43460, 3/99, pp4	
	Sub-Total	\$125.7	\$69.5	\$56.2		
	Contingency (35%)	\$44.0	\$24.3	\$19.7		
	Detector Allowance	\$93.8	\$93.8	\$0.0		
	Total	\$263.5	\$187.6	\$75.9		

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