

Appendix A. Cost Estimate

R. Alber, T. Anderson, M. Ball, M. Champion, W. Chou, J. Crisp, A. Drozhdin,
D. Harding, C. Jach, J. Lackey, J. Leibfritz, N. Mokhov, J. Reid, M. Shea, J. Steimel,
D. Wildman, D. Young

A.1. Introduction

A cost estimate for each technical system as well as for civil construction has been carried out. A WBS was not done at this stage of the project but will be produced when it is required.

The cost estimate is for Phase I only. It includes a 16 GeV synchrotron, a 400 MeV transport line, a 12/16 GeV transport line, improvements in the present H⁻ source and Linac, and civil construction. We present an "unloaded" cost estimate, a cost estimate in which G&A and contingency are not included. These items can be added later following guidelines to be provided by the Fermilab Director and the DOE.

All the figures are in FY 2000 U. S. dollars. No inflation is included.

A.2. Two-Stage Cost Estimate

The cost estimate for Stage 1 is given in Table A.1. Every technical system shown is capable of working in Stage 2 except the rf system and the power supplies.

In Stage 1, the rf is a 53 MHz system, which would reuse a large portion of the existing Booster rf components, thus reducing the cost. The power supplies would employ chokes and capacitors that are limited to 12 GeV operation. Because these chokes and capacitors are major cost items and their costs are proportional to the total stored energy, the savings in power supplies in Stage 1 compared to what will be required in Stage 2 are significant.

In Stage 2, a new 7.5 MHz rf system would replace the 53 MHz rf system, and the chokes and capacitors would be upgraded for 16 GeV operation. The cost estimate is **K\$ 44,694** for the rf system and **K\$ 21,057** for the power supplies, respectively. Therefore, the additional cost for Stage 2 would be **K\$ 65,751**.

Table A.1. Proton Driver Stage 1 Cost Estimate (in thousand US dollars K\$)

1	Technical Systems		184,893
1.1	16 GeV Synchrotron		173,551
1.1.1	Magnets	53,982	
1.1.2	Power supplies	52,095	
1.1.3	RF	11,051	
1.1.4	Vacuum	9,222	
1.1.5	Collimators	325	
1.1.6	Injection system	1,039	
1.1.7	Extraction system	3,542	
1.1.8	Instrumentation	2,553	
1.1.9	Controls	2,214	
1.1.10	Utilities	10,615	
1.1.11	Installation	1,696	
1.1.12	ED&I	25,217	
1.2	400 MeV Transport Line		2,110
1.2.1	Magnets	1,443	
1.2.2	Power supplies	361	
1.2.3	ED&I	307	
1.3	12/16 GeV Transport Line		3,718
1.3.1	Magnets	2,542	
1.3.2	Power supplies	636	
1.3.3	ED&I	540	
1.4	Ion Source and Linac Improvements		5,514
1.4.1	Negative ion source	480	
1.4.2	LEBT	225	
1.4.3	RFQ	1,850	
1.4.4	MEBT	255	
1.4.5	Chopper	100	
1.4.6	New drift tube Tank #1	1,500	
1.4.7	Instrumentation and controls	135	
1.4.8	Building modification	250	
1.4.9	ED&I	719	
2	Civil construction		54,184
2.1	16 GeV Synchrotron		25,600
2.1.1	Enclosure	8,600	
2.1.2	Service buildings	10,200	
2.1.3	Utility support building	6,800	
2.2	400 MeV Transport Line		1,800
2.3	12/16 GeV Transport Line		2,200
2.4	Site work		6,300
2.5	Subcontractors OH&P		7,180
2.6	ED&I		7,324
2.7	Environmental controls and permits		3,780
3	Project Management		3,000
TOTAL			242,077

Note: Items 1.1.4, 1.1.8, 1.1.9, 1.1.10 and 1.1.11 include the costs for the synchrotron as well as for the two transport lines.