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BEVALAC UPGRADE

Conceptual Design Report

Supplement: Cost Estimate Details

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Work Breakdown Structure

Section II

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Section I

Supplement Overview

Bevalac Upgrade

CDR Supplement - Cost Estimate Details

I. Supplement Overview

1. Introduction

The purpose of this supplement is to provide additional backup materials concerning the cost estimate, contained in Chapter 8 of the main volume of this Conceptual Design Report. Chapter 8 includes the craft code and rate table, together with summaries of the project costs, obligations, and schedules. For the most part, the contents of Chapter 8 are not repeated here.

The results of the cost estimate are summarized in Table 1 in FY87 k$. The base cost for construction is $19,664 M. The total construction cost (construction base plus associated contingency) represents 74% of the $34,130 M project total. The cost for ED&I ($5,839 M) represents approximately 30% of the construction base cost. Adding $1.71 M estimated for project management and administration costs brings the project subtotal (project base cost) to $27.213 M. The contingency of $6.917 M thus represents approximately 25% of the project base cost. This figure includes all contingencies for construction, ED&I, and project management and administration. The full cost estimate roll-up is given in Section III of this supplement.

Table 1: Bevalac Upgrade Project (Costs in 1987 k$).

1.0	**Project Total**		**34,130**
1.1	Construction	19,664	
1.2	ED&I	5,839	(29.7% of construction)
1.3	Project management	1,710	
	Subtotal	27,213	
1.4	Contingency	6,917	(25.4% of subtotal)

In the remainder of Section I, a brief discussion is given of the methods and procedures used in developing the full cost estimate, of the cost schedules, and of the contingency analysis for the Bevalac Upgrade project. Information resulting from this process concerning cost summaries, cost and obligations schedules, as well as distributions of construction, ED&I, and contingencies are also given in this Supplement Overview.

Sections II through V of this Supplement provide more detailed information of the cost estimating process. Section II contains the *work breakdown structure*; Section III contains the *total estimated cost roll-up* in FY87 dollars; Section IV contains the *cost estimate summaries*; and finally, Section V contains the *cost estimate detail listing*.

2. Cost Estimating Procedures for Construction & ED&I

A carefully organized procedure was developed and followed in order to produce an accurate bottom-up cost estimate. This estimate was based on the Work Breakdown Structure (WBS) given in Section II of this Supplement. The appropriate Bevalac staff group leaders had the primary responsibility for developing an accurate estimate at the lowest WBS level, typically Level 6 or Level 7, including an estimate for ED&I and contingency. Material and labor costs were separately estimated and entered on Standard Data Sheets (See Figure 1). These costs were then entered into a computer spreadsheet facsimile of Figure 1. Using Lotus 1-2-3, these detailed cost data were then collected on Standard Summary Spreadsheets.

The estimating team used past history, recent experience, catalogue prices, and vendor quotes to develop the cost estimate. The experience from working on Bevalac Accelerator Improvement Projects and previous upgrades, such as the U-Beams vacuum liner, and on PEP, proved to be highly valuable. In cases where the relevant comparable costs occurred before FY 1987, a set of uniform escalation rates was used to convert these data to FY 1987 costs. These escalation rates are given in Table 2. The yearly inflation factors come from DOE-HEP 1981 "Analysis of Cost and Price Changes", HEP-81402 and subsequent updates. These factors as stated (Fig. III, HEP-81402) represent a typical major construction project at HEP laboratories.

Figure 1: Cost Estimate Detail Data Sheet

COST ESTIMATE DETAILS

		BEVALAC UPGRADE											
Major Component/Sub-component		WBS		Date	Version	Name	File Name	Notes					
Item No.	Item Title	Unit Meas	Material No. Units	Material Unit Cost	Cost Basis	**Total Material K$**	Labor No. Units	Labor Unit Hours	Labor Total Hours	Craft Code	Labor Rate $/Hr.	**Total Labor K$**	**Total Labor + Material**

Using the ED&I effort estimates at the lowest WBS level as guidance, the estimating group leaders summarized this information at Level 4 for the final cost roll-ups. These roll-ups also include supplies and expenses which typically constitute about 15% of the ED&I effort. In general, the relative amount of ED&I effort for each major subsystem is a reflection of its design complexity.

In the case of the synchrotron rf system, an unusually high rate of ED&I effort is provided because of the EE participation needed throughout a protracted testing period. Similarly, ED&I for the computer control system is high because it includes a significant amout of software development effort. In the case of systems requiring a lot of replication of identical units (such as the ring dipoles), the ED&I rates are comparatively lower.

Table 2: Cost Estimate Escalation Factors for Construction.

Ref. Yr. FY "XX"	Ref. Yr. Cost Inflation (%)	Cumulative Scaling Factor to convert FY "XX"$ to FY87$
70	9.0	3.592
71	10.9	3.295
72	7.0	2.971
73	6.8	2.777
74	12.8	2.600
75	9.0	2.305
76	6.8	2.115
77	9.2	1.980
78	8.7	1.813
79	10.2	1.668
80	10.5	1.514
81	9.1	1.370
82	6.2	1.256
83	3.7	1.183
84	4.0	1.141
85	4.2	1.097
86	5.3	1.053
87	—	1.000

The highest-cost, Level-3 item in the WBS for both construction and ED&I, is the new synchrotron ring. Figure 2 depicts the distribution of these costs among the six Level 4 WBS categories. A breakdown of labor costs by crafts for the total Bevalac Upgrade project is given in Table 3. This table includes labor costs for all project elements: construction; ED&I; and project management and administration.

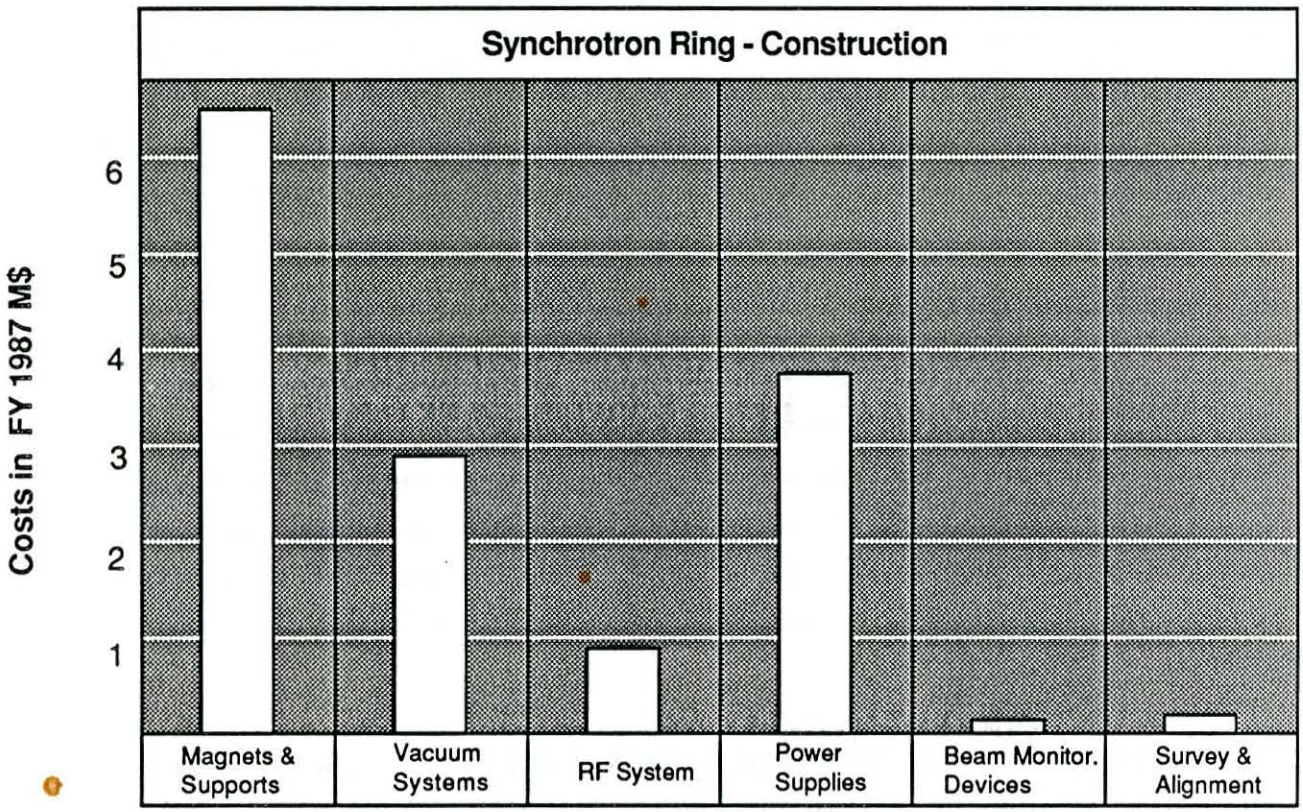
3. Cost Schedules

The schedule for Construction was developed by projecting from the data base, the Level 4 costs associated with *procurement*, *fabrication*, and *installation*. For this analysis, assembly and test activities were classified either as fabrication (as in the case of magnets and rf system) or as installation (as in the case of power systems that are tested *in situ* at the final installation site). Bevatron systems removal and disposal were classified as installation activities for the purpose of schedule development.

A schedule was then developed at WBS Level 4 for each of these three construction activities as well as for ED&I. The most significant items requiring funding in a fiscal year prior to actual costing were identified, permitting the development of a parallel schedule for obligations. These schedules were conceptualized on a quarterly basis, and subsequently summarized by fiscal year.

Table 4 shows the obligations and cost schedules in millions of then-year dollars, together with the escalation costs and escalation rates for each year. (These data are graphically presented as Figure 8-4 in the main volume of this Conceptual Design Report). Table 5 gives the cost schedule for major project elements, also in millions of then-year dollars.

Figure 2: Distribution of Synchrotron Ring Costs at Level 4



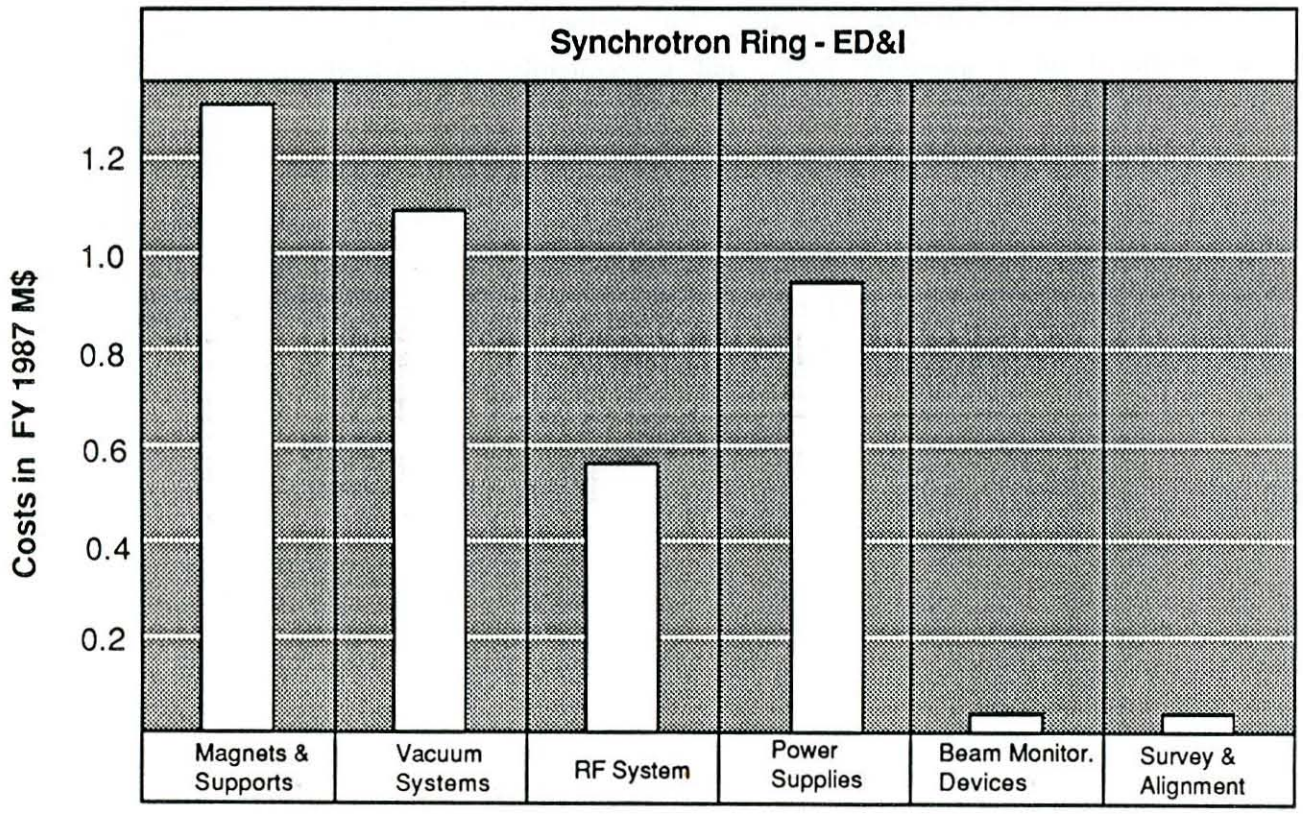


Table 3: Cost Breakdown by Craft

Craft Code	Craft Description	Craft Rate $/hr.	Total Labor Hrs	Person Years	Total Cost: k$	Percent
AA	Administrative Assistant	28.42	10,000	5.00	284	1.72%
CP	Computer Programming	46.40	8,900	4.45	413	2.49%
EC	Electronic Coordination	33.55	20,450	10.23	686	4.15%
ED	Electronic Drafting	25.45	8,230	4.12	209	1.27%
EE	Electronic Engineering	46.40	24,870	12.44	1,154	6.97%
EI	Electronic Installation	25.45	32,882	16.44	837	5.06%
EM	Electronic Maintenance	25.45	11,866	5.93	302	1.82%
ES	Electronic Shops	25.45	1,570	0.78	40	0.24%
MD	Mechanical Designer	36.00	37,340	18.67	1,344	8.12%
ME	Mechanical Engineering	49.00	31,180	15.59	1,528	9.23%
MES	Mechanical Engineering Support	23.00	7,715	3.86	177	1.07%
MS	Mechanical Shops	33.50	221,906	110.95	7,434	44.91%
MT	Mechanical Technician	22.50	38,363	19.18	863	5.21%
MU	Mechanical Technology	31.60	154	0.08	5	0.03%
NC	Mechanical Shops NC Tool	49.80	46	0.02	2	0.01%
PC	Plant Carpenter	34.25	288	0.14	10	0.06%
PE	Plant Electrician	34.25	6,259	3.13	214	1.30%
PH	Physicist	28.42	12,000	6.00	341	2.06%
PP	Plant Painter	34.25	30	0.01	1	0.01%
PPL	Plant Plumber	34.25	88	0.04	3	0.02%
PT	Plant Maintenance Technician	31.70	532	0.27	17	0.10%
RG	Rigger	31.20	22,022	11.01	687	4.15%
		Totals	**496,691**	**248.35**	**16,552**	**100%**

Table 4 : Obligations and Costs Schedule (millions of then-year dollars).

	Fiscal Year			
	1989	**1990**	**1991**	**Total**
Obligations	14.54	16.66	8.03	39.23
Costs	8.57	21.56	9.10	39.23
Escalation costs (included above)	0.72	2.80	1.58	5.10
Escalation rate (percent)	4.8	5.3	5.6	
Cumulative Escalation factor *	1.09	1.15	1.21	

* Includes 4.0% escalation in FY88.

Figures 3a, 3b, and 3c show cost schedules for various project elements in graphical form in both FY 1987 dollars and in then-year dollars. Figure 3a shows the cost schedule for the total project in the top panel, together with the cost schedules for the four Level 2 WBS elements in the four lower panels.

Figures 3b and 3c show the cost schedules for Construction and ED&I totals, respectively, at the top of each figure, together with the cost schedules of each of the four Level 3 WBS items in the four bottom panels. It is readily seen that most of the costs are associated with the synchrotron ring - i.e. the elements physically in the ring and the associated power supplies. This reflects the successful integration of project elements with existing Bevalac systems and utilities.

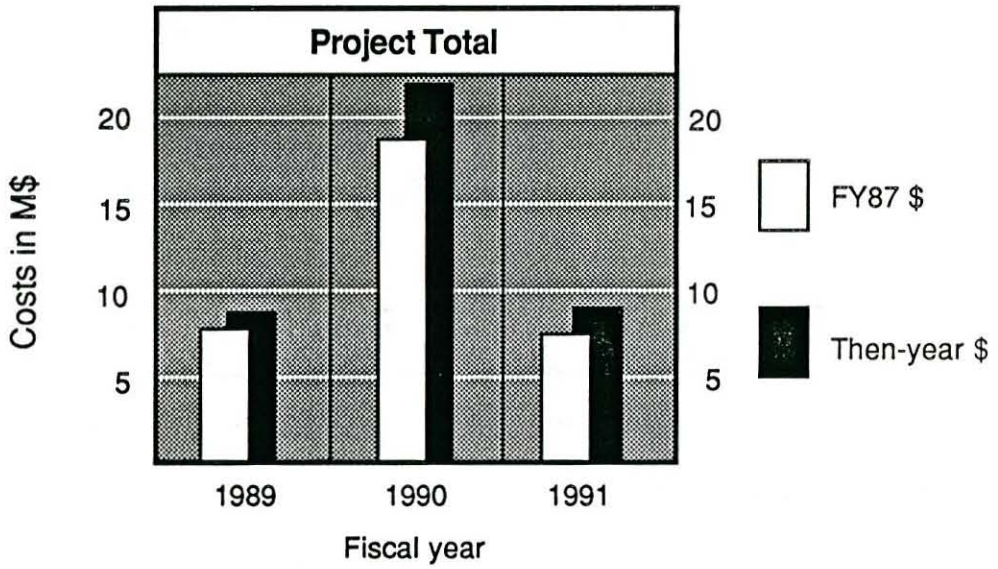
4. Contingency Analysis

A contingency analysis was carried out to assess the technical and cost uncertainties associated with major systems at WBS Level 4. Contingency estimates provided by the estimating team for each lowest - level WBS element provided input for this process. The results of this evaluation, after review and

Table 5: Cost Schedule for Major Project Elements in Millions of Then-Year Dollars.

	Fiscal year 1989	1990	1991	Totals
Synchrotron Ring				
• ED&I	2.08	1.43	0.95	4.46
• Construction	2.74	11.40	2.37	16.51
Subtotals	**4.82**	**12.83**	**3.32**	**20.97**
Beamline Modifications				
• ED&I	0.19	0.21	0.10	0.50
• Construction	0.13	1.45	0.25	1.83
Subtotals	**0.32**	**1.66**	**0.35**	**2.33**
Instrumentation & Controls				
• ED&I	0.36	0.40	0.54	1.30
• Construction	0.57	1.26	0.61	2.44
Subtotals	**0.93**	**1.66**	**1.15**	**3.74**
Conventional Facilities				
• ED&I	0.14	0.17	0.07	0.38
• Construction	0.21	0.50	1.15	1.86
Subtotals	**0.35**	**0.67**	**1.22**	**2.24**
Project Management & Admin.	**0.60**	**0.67**	**0.70**	**1.97**
Contingencies	**1.55**	**4.07**	**2.36**	**7.98**
Totals by fiscal year	**8.57**	**21.56**	**9.10**	**39.23**

Figure 3a: Cost Schedules and Distributions for Project Total



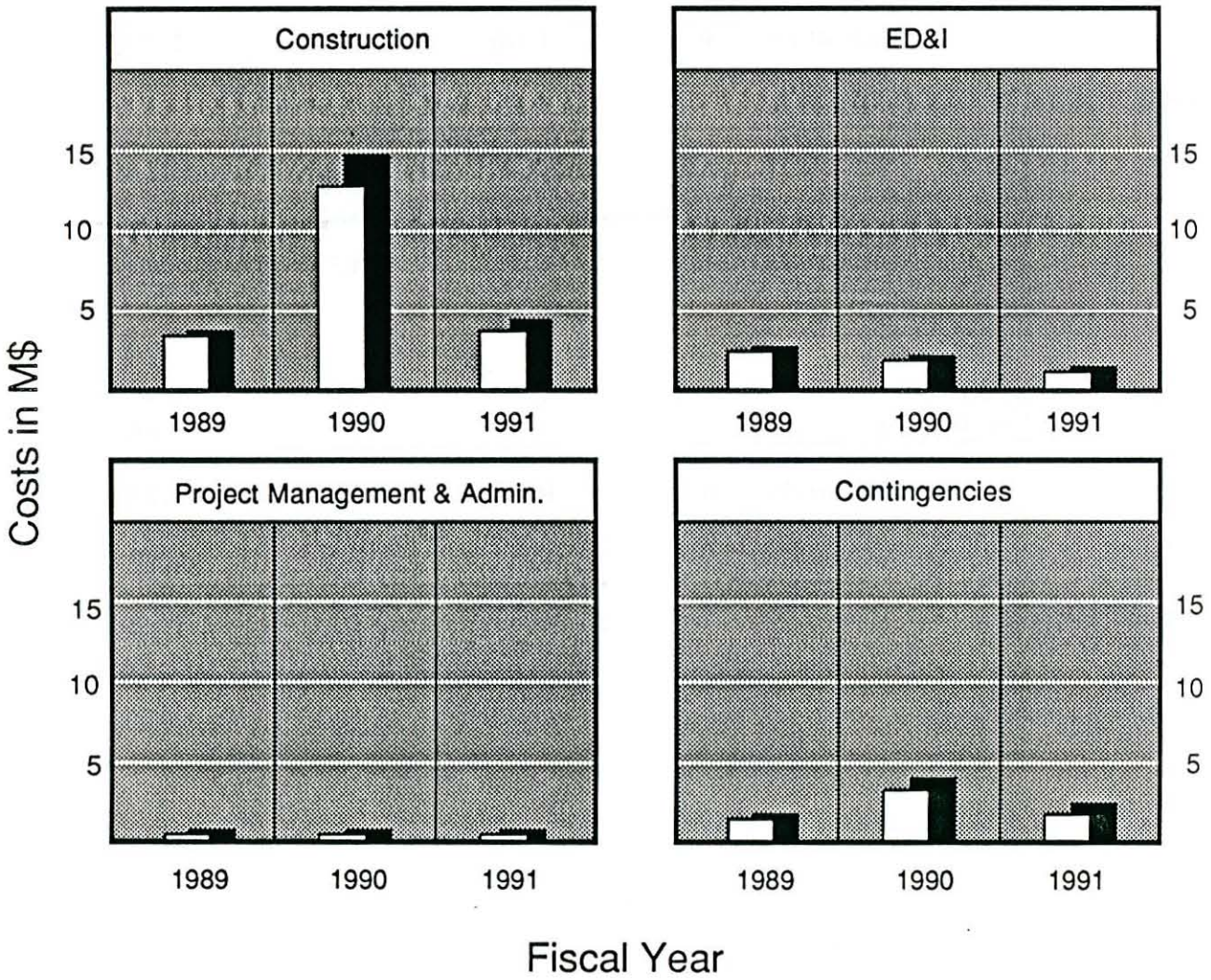
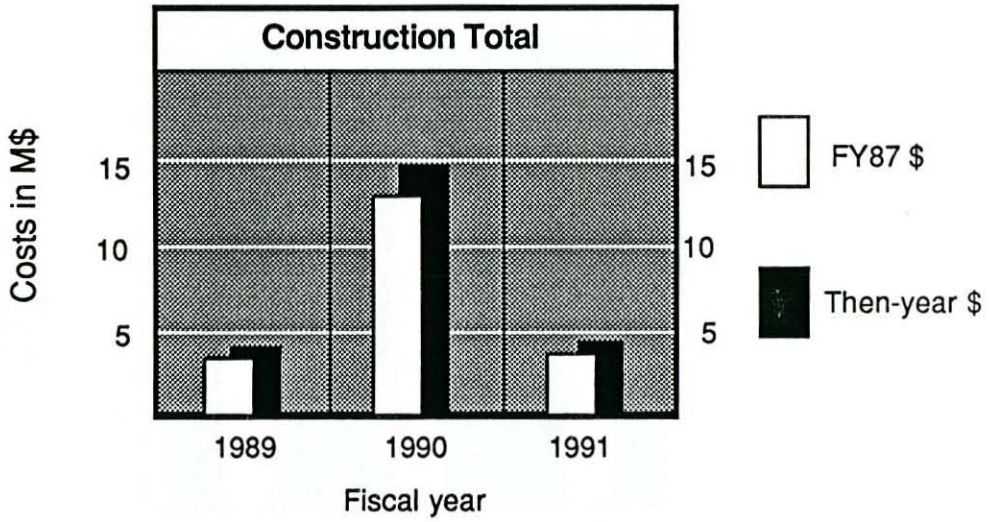


Figure 3b: Cost Schedules and Distributions for Project Construction



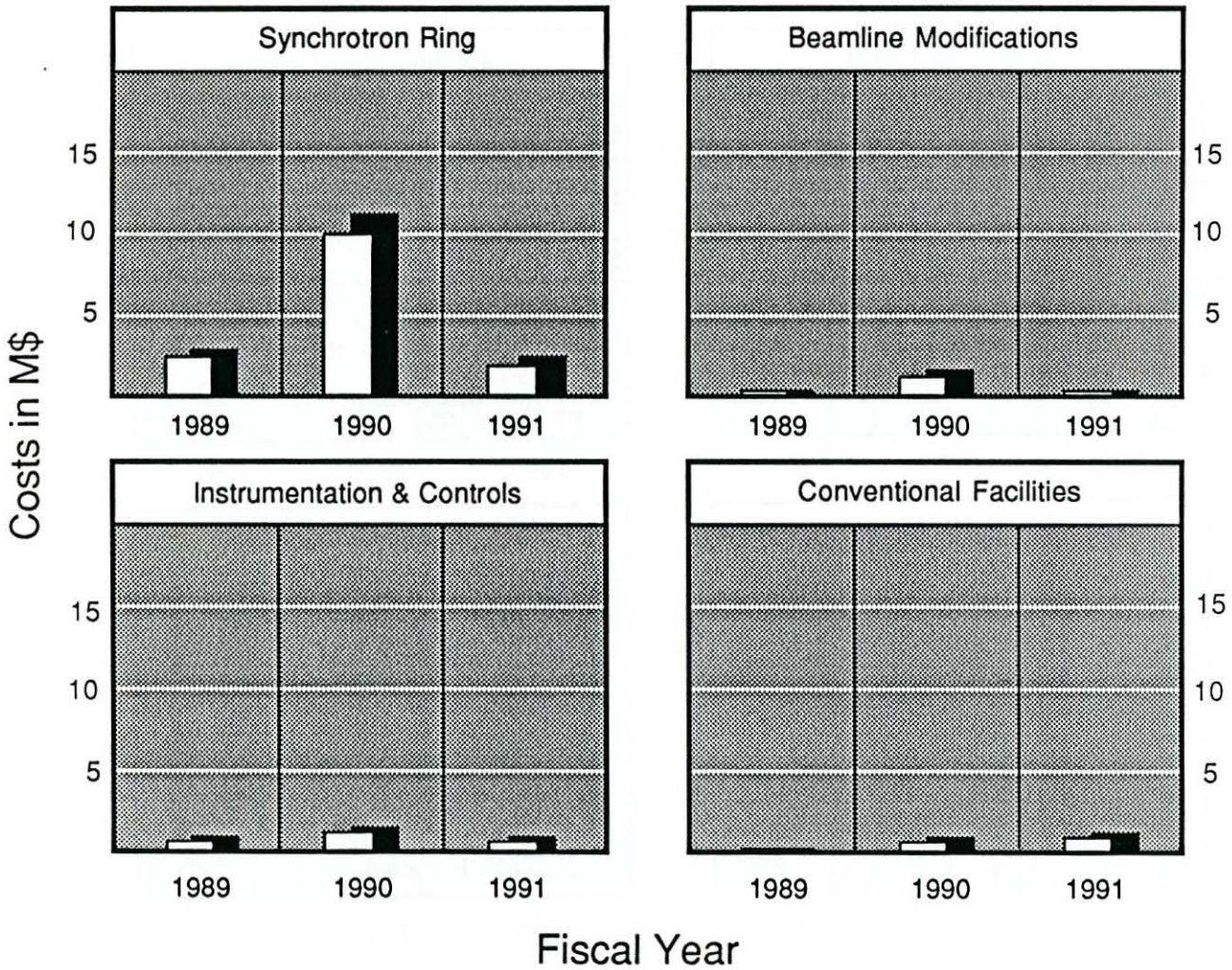
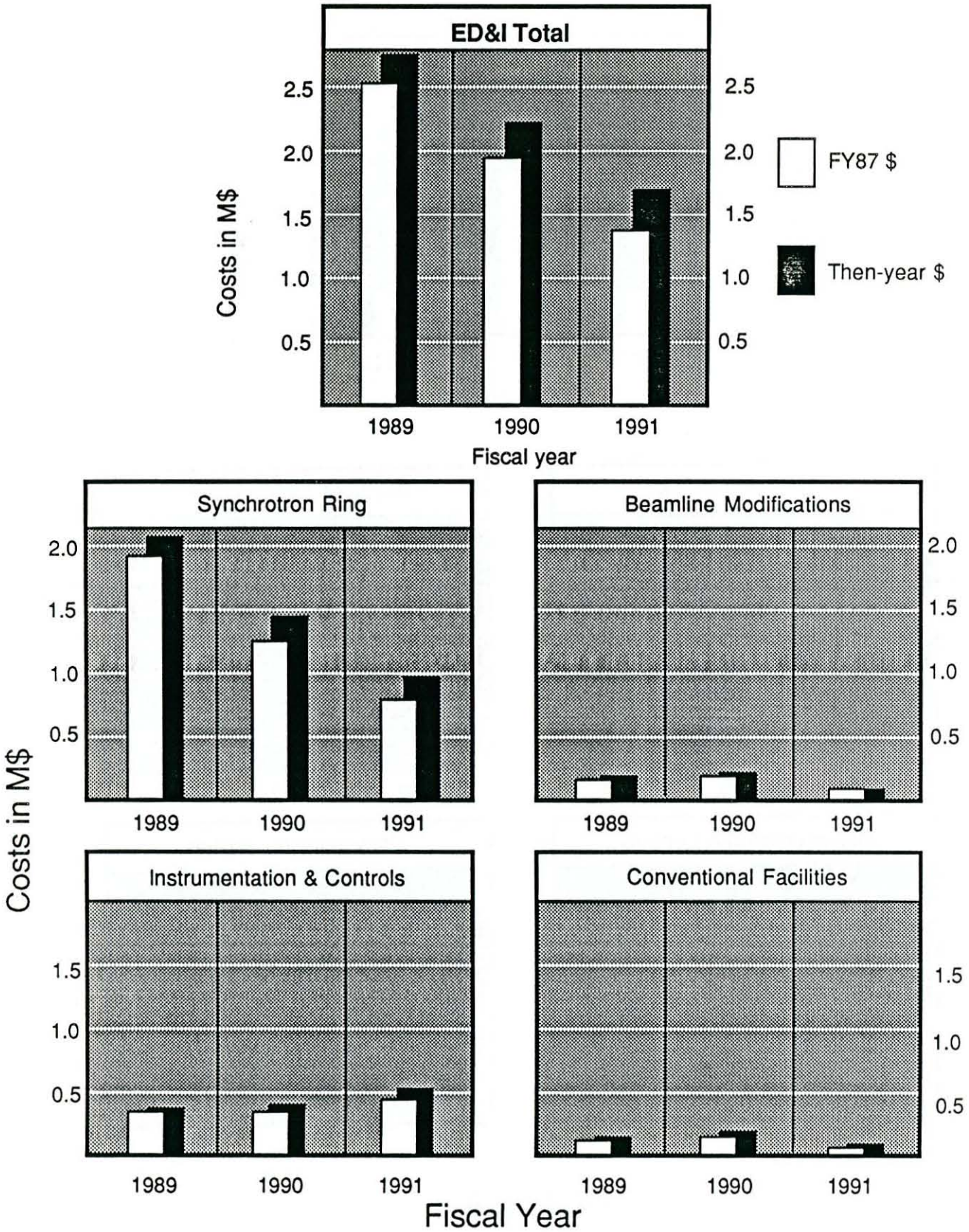


Figure 3c: Cost Schedules and Distributions for ED&I



some adjustments by the estimating group leaders, were incorporated into the cost roll-ups at Level 4 under WBS item 1.4 Contingencies. Table 6 summarizes the contingency rates assigned. Note that the contingency rates (percentages) shown apply to the construction base plus the ED&I total for each element.

Contingencies assigned to construction items in general reflect past experience on similar systems. Here, the highest contingency rates are assigned to vacuum systems. The vacuum system for the synchrotron ring, although based on the cryo-liner concept of the existing Bevatron, is highly innovative, requiring careful interfacing to the magnet systems. This, taken together with the limited space between magnets, was judged to be the area with the highest budgetary risk, and was therefore assigned the highest contingency. (The beamline vacuum systems also were assigned a higher contingency to reflect a somewhat less-detailed design study of these components. These vacuum systems do <u>not</u> represent a high degree of technical risk).

A final analysis was carried out to determine the proper distribution of contingency funds among the three construction activities (*procurement*, *fabrication*, and *installation*) that were specified in connection with schedule development. This process was also used to establish the contingency funding profiles required in each construction year. The goal for this study was to associate a contingency rate with each activity as shown in Table 7, normalized to keep the total contingency funding (in FY 87 dollars) consistent with the more detailed contingency analysis explained above.

TABLE 6: Level 4 Summary of ED&I and Contingency Rates

	Base (1987k$)	ED&I	Contingency
1.1 CONSTRUCTION	**19,664**	**30%**	**27%**
1.1.1 Synchrotron ring systems	**14,377**	**27%**	**27%**
1.1.1.1 Magnets & supports	6,537	20%	22%
1.1.1.2 Ring vacuum system	2,853	38%	36%
1.1.1.3 RF system	892	63%	28%
1.1.1.4 Ring power supplies	3,762	25%	28%
1.1.1.5 Beam monitoring devices	135	28%	16%
1.1.1.6 Survey & alignment	197	17%	24%
1.1.2 Modifications to beamlines	**1,596**	**28%**	**27%**
1.1.2.1 Magnets & supports	942	23%	26%
1.1.2.2 Vacuum systems	275	41%	35%
1.1.2.3 Mech. Beam instrumentation	235	31%	24%
1.1.2.4 Power supplies	144	29%	26%
1.1.3 Instrumentation and controls	**2,120**	**53%**	**21%**
1.1.3.1 Low level electronics	570	34%	26%
1.1.3.2 Computer control system mods	557	70%	22%
1.1.3.3 Control room consolidation	993	54%	19%
1.1.4 Conventional facilities	**1,570**	**21%**	**26%**
1.1.4.1 Site clearance & preparation	1,058	20%	28%
1.1.4.2 Shielding modifications	242	21%	21%
1.1.4.3 Utilities - mechanical	215	26%	24%
1.1.4.4 Utilities - electrical	55	20%	27%
1.3 PROJECT MANAGEMENT & ADMIN.	**1710**		**13%**

Table 7 : Approximate Distribution of Contingency Costs (using FY 87 dollars).

Construction and ED&I		27%
Construction	28%	
• procurement	20%	
• fabrication	25%	
• installation	55%	
ED&I	25%	
Project Management and Administration		13%
Overall Project Average		25%

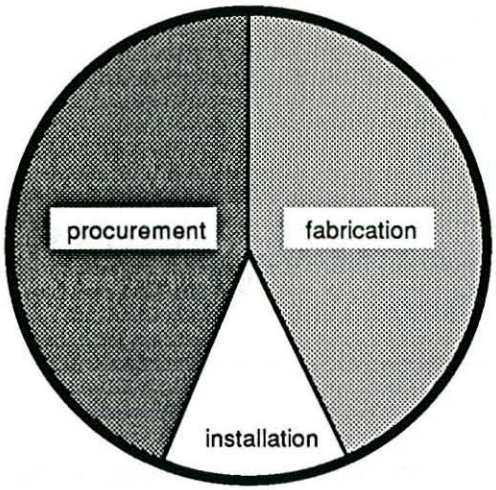
The high contingency set for installation is based on past experience, which indicates that this activity is significantly more difficult to estimate with confidence. Much of the procurement estimate, on the other hand, is based on vendor quotes, and accordingly a lower contingency rate of 20% was assigned.

Figure 4 illustrates the results of this analysis. The pie chart shows that procurement and fabrication costs are about equal, and together require approximately 85% of the total construction funding. Installation activities constitute the remaining 15%. This representation is based on FY 87 dollars.

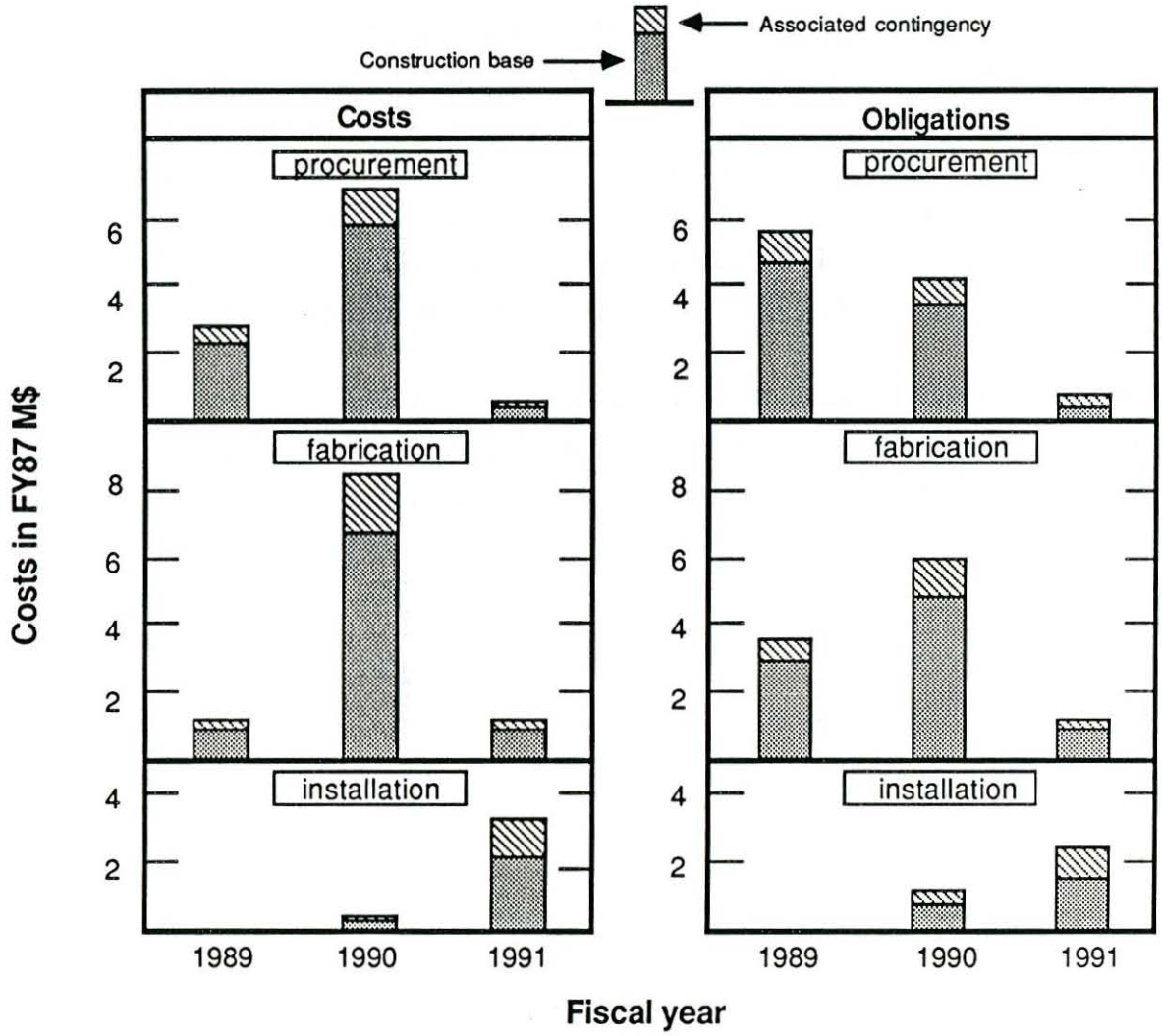
The two lower panels in Figure 4 show the schedules for costs and obligations for the three construction activities. The cross-hatched portion at the top of each histogram bar represents the assigned contingency.

Figure 4: Distribution of Project Construction Costs

(base cost + associated contingency)



Data for pie in FY 87 $



Section III

Total Estimated Cost; Roll-up in FY 87 Dollars

Section III Total Estimated Cost; Roll-up in FY 87 Dollars

Section III: Total Estimated Cost (TEC); Roll-up in FY 87 Dollars.

1.0 Bevalac Upgrade							34,130
1.1 Construction						19,664	
1.1.1 Synchrotron ring systems					14,377		
1.1.1.1 Magnets & supports (& elec. septa)				6,537			
1.1.1.1.1 Dipoles			4,215				
1.1.1.1.1.1 Long dipole (12)		2,748.1					
1.1.1.1.1.1.1 Coils(+ steering coil	920.9						
1.1.1.1.1.1.2 Yokes	1,476.8						
1.1.1.1.1.1.3 Fixtures	177.8						
1.1.1.1.1.1.4 Assembly and test	172.6						
1.1.1.1.1.2 Short dipole (13)		1,466.5					
1.1.1.1.1.2.1 Coils(+steering coil)	602.9						
1.1.1.1.1.2.2 Yokes	609.4						
1.1.1.1.1.2.3 Fixtures	84.8						
1.1.1.1.1.2.4 Assembly and test	169.4						
1.1.1.1.2 Quadrupoles			1,014				
1.1.1.1.2.1 Long (F) quadrupoles (11)		460.0					
1.1.1.1.2.1.1 Coils	209.7						
1.1.1.1.2.1.2 Yokes	125.7						
1.1.1.1.2.1.3 Fixtures	33.1						
1.1.1.1.2.1.4 Assembly and test	91.5						
1.1.1.1.2.2 Short (D) quadrupoles (12)		447.3					
1.1.1.1.2.2.1 Coils	212.5						
1.1.1.1.2.2.2 Yokes	117.0						
1.1.1.1.2.2.3 Fixtures	18.1						
1.1.1.1.2.2.4 Assembly and test	99.7						
1.1.1.1.2.3 Special quadrupole (1)		64.8					
1.1.1.1.2.3.1 Coils	19.2						
1.1.1.1.2.3.2 Yokes	11.5						
1.1.1.1.2.3.3 Fixtures	25.7						
1.1.1.1.2.3.4 Assembly and test	8.3						
1.1.1.1.2.4 Skew quadrupoles (2)		42.3					

1.1.1.1.2.4.1	Coils	10.8			
1.1.1.1.2.4.2	Yokes	6.7			
1.1.1.1.2.4.3	Fixtures	22.1			
1.1.1.1.2.4.4	Assembly and test	2.8			
1.1.1.1.3	Sextupoles			222	
1.1.1.1.3.1	X-sextupoles (6)		122.2		
1.1.1.1.3.1.1	Coils	56.0			
1.1.1.1.3.1.2	Yokes	26.2			
1.1.1.1.3.1.3	Fixtures	22.6			
1.1.1.1.3.1.4	Assembly and test	17.4			
1.1.1.1.3.2	Y-sextupoles (6)		99.6		
1.1.1.1.3.2.1	Coils	56.0			
1.1.1.1.3.2.2	Yokes	26.2			
1.1.1.1.3.2.3	Fixtures (NONE)				
1.1.1.1.3.2.4	Assembly and test	17.4			
1.1.1.1.4	Steering magnets (NONE)				
1.1.1.1.5	Injection elements			129	
1.1.1.1.5.1	Septum magnet		54.6		
1.1.1.1.5.2	Electrostatic inflector		38.8		
1.1.1.1.5.3	Slow bump magnets (3)		35.3		
1.1.1.1.6	Extraction elements			307	
1.1.1.1.6.1	Thin-septum magnet		74.9		
1.1.1.1.6.2	Thick-septum magnet		132.5		
1.1.1.1.6.3	Electrostatic septum		32.2		
1.1.1.1.6.4	Fast kicker (NONE)				
1.1.1.1.6.5	Bump magnets (NONE)				
1.1.1.1.6.6	Perturbation quads (2)		31.3		
1.1.1.1.6.7	Extraction sextupoles (2)		35.9		
1.1.1.1.7	Stands and supports			455	
1.1.1.1.8	Installation			196	
1.1.1.2	Ring vacuum system				2,853
1.1.1.2.1	Vacuum chambers			1,985	
1.1.1.2.1.1	Dipole chambers		1,281.9		
1.1.1.2.1.2	Straight section chambers		574.7		
1.1.1.2.1.3	Injection area chambers		64.3		
1.1.1.2.1.4	Extraction area chambers		64.3		
1.1.1.2.2	Pumping systems			508	
1.1.1.2.2.1	Roughing system		85.4		
1.1.1.2.2.2	Guard vac. external sys.		156.4		

1.1.1.2.2.3	Main cryopump system		266.5		
1.1.1.2.3	Instrumentation			114	
1.1.1.2.3.1	Vacuum monitoring		37.1		
1.1.1.2.3.2	Beam monitoring		76.7		
1.1.1.2.3.2.1	BIE	7.2			
1.1.1.2.3.2.2	Closed-orbit monit.	69.5			
1.1.1.2.4	Installation			246	
1.1.1.3	RF system				892
1.1.1.3.1	Cavity			313	
1.1.1.3.2	Ferrite bias system			62	
1.1.1.3.3	Final amplifier			100	
1.1.1.3.4	High voltage power supply			166	
1.1.1.3.5	Low level RF			82	
1.1.1.3.6	Instr. & control sys. interface			53	
1.1.1.3.7	Cooling system			21	
1.1.1.3.8	Assembly and test			77	
1.1.1.3.9	Installation			18	
1.1.1.4	Ring power supplies				3,762
1.1.1.4.1	Dipoles (MG mods)			1,465	
1.1.1.4.1.1	Power supplies		1,300.0		
1.1.1.4.1.2	Controls		36.0		
1.1.1.4.1.3	System installation		105.3		
1.1.1.4.1.4	System tests		23.2		
1.1.1.4.2	Quadrupole P/S			853	
1.1.1.4.2.1	Power supplies		700.0		
1.1.1.4.2.2	Controls		36.0		
1.1.1.4.2.3	System installation		101.0		
1.1.1.4.2.4	System tests		16.4		
1.1.1.4.3	Special ring power supplies			855	
1.1.1.4.3.1	Back-leg winding P/S		529.2		
1.1.1.4.3.2	Sqew-quad P/S		45.2		
1.1.1.4.3.3	Sextupole P/S		190.8		
1.1.1.4.3.4	Steering mag P/S (NONE)				
1.1.1.4.3.5	System installation		81.4		
1.1.1.4.3.6	System tests		8.1		
1.1.1.4.4	Injection elements - P/S			233	
1.1.1.4.4.1	Septum magnet P/S		28.7		
1.1.1.4.4.2	Electrostatic inflector P/S		9.7		
1.1.1.4.4.3	Slow bump magnets P/S		148.7		
1.1.1.4.4.4	System installation		41.0		

1.1.1.4.4.5 System tests		4.9			
1.1.1.4.5 Extraction elements - P/S			356		
1.1.1.4.5.1 Thin-septum magnet P/S		28.7			
1.1.1.4.5.2 Thick-septum magnet P/S		89.7			
1.1.1.4.5.3 Electrostatic septum P/S		22.6			
1.1.1.4.5.4 Fast kicker P/S (NONE)					
1.1.1.4.5.5 Perturb. quads P/S		120.0			
1.1.1.4.5.6 Extraction sextupoles P/S		48.3			
1.1.1.4.5.7 System installation		40.5			
1.1.1.4.5.8 System tests		6.4			
1.1.1.5 Beam monitoring devices				135	
1.1.1.5.1 First turn inj. diagnostics			123		
1.1.1.5.2 Installation			12		
1.1.1.6 Survey and alignment				197	
1.1.1.6.1 Monuments			5		
1.1.1.6.2 Liquid level			34		
1.1.1.6.3 Survey instruments			10		
1.1.1.6.4 Alignment fixtures			24		
1.1.1.6.5 Ring survey and alignment			124		
1.1.2 Modifications to beamlines					1,596
1.1.2.1 Magnets and supports				942	
1.1.2.1.1 Injection beamline			512		
1.1.2.1.1.1 Magnets		472.0			
1.1.2.1.1.1.1 Dipoles	378.1				
1.1.2.1.1.1.2 Quadrupoles	93.9				
1.1.2.1.1.2 Supports		40.0			
1.1.2.1.2 Extraction beamline			331		
1.1.2.1.2.1 Dipole		318.7			
1.1.2.1.2.1.1 Coils	77.1				
1.1.2.1.2.1.2 Yokes	123.1				
1.1.2.1.2.1.3 Fixtures	104.0				
1.1.2.1.2.1.4 Assembly and test	14.5				
1.1.2.1.2.2 Supports		12.0			
1.1.2.1.3 EPB area (NONE)					
1.1.2.1.4 Local injector (NONE)					
1.1.2.1.5 Transfer line (NONE)					
1.1.2.1.6 Emittance matcher			72		

1.1.2.1.6.1 Magnets	65.8		
1.1.2.1.6.2 Supports	6.0		
1.1.2.1.7 Installation and alignment		28	
1.1.2.2 Vacuum systems			275
1.1.2.2.1 Injection beamline		116	
1.1.2.2.2 Extraction beamline		70	
1.1.2.2.3 EPB area (NONE)			
1.1.2.2.4 Local injector (NONE)			
1.1.2.2.5 Transfer line (NONE)			
1.1.2.2.6 Emittance matcher		75	
1.1.2.2.7 Installation		14	
1.1.2.3 Mech. instr. for beam monitoring			235
1.1.2.3.1 Injection beamline		109	
1.1.2.3.1.1 Beam profile monitors	103.9		
1.1.2.3.1.2 Optical monit. (NONE)			
1.1.2.3.1.3 Intensity monit. (NONE)			
1.1.2.3.1.4 X-Y collimators (NONE)			
1.1.2.3.1.5 Attenuators (NONE)			
1.1.2.3.1.6 Assembly and test	5.4		
1.1.2.3.2 Extraction beamline (NONE)			
1.1.2.3.3 EPB area (NONE)			
1.1.2.3.4 Local injector (NONE)			
1.1.2.3.5 Transfer line (NONE)			
1.1.2.3.6 Emittance matcher		119	
1.1.2.3.6.1 Beam profile monitors	69.3		
1.1.2.3.6.2 Optical monit. (NONE)			
1.1.2.3.6.3 Beam intensity monitors	50.0		
1.1.2.3.6.4 X-Y collimators (NONE)			
1.1.2.3.6.5 Emittance diag. (NONE)			
1.1.2.3.6.6 Assembly and test (NONE)			
1.1.2.3.7 Installation and alignment		7	
1.1.2.4 Power supplies			144
1.1.2.4.1 Injection beamline P/S		118	
1.1.2.4.1.1 Dipoles	35.3		
1.1.2.4.1.2 Quadrupoles	50.0		
1.1.2.4.1.3 Steering magnets (NONE)			
1.1.2.4.1.4 Control systems interface	6.8		
1.1.2.4.1.5 System installation	21.1		
1.1.2.4.1.6 System tests	4.4		
1.1.2.4.2 Extraction beamline P/S		21	
1.1.2.4.2.1 Dipoles	18.8		

1.1.2.4.2.2	Quadrupoles (NONE)				
1.1.2.4.2.3	Steering magnets (NONE)				
1.1.2.4.2.4	Control sys. int'face (NONE)				
1.1.2.4.2.5	System installation	1.0			
1.1.2.4.2.6	System tests	1.1			
1.1.2.4.3	EPB area (NONE)				
1.1.2.4.4	Local injector (NONE)				
1.1.2.4.5	Transfer line (NONE)				
1.1.2.4.6	Emittance matcher P/S		5		
1.1.2.4.6.1	Septum magnets	2.6			
1.1.2.4.6.2	Control sys. int'face (NONE)				
1.1.2.4.6.3	System installation	2.2			
1.1.2.4.6.4	System tests	0.4			
1.1.3	Instrumentation and controls				2,120
1.1.3.1	Low level electronics			570	
1.1.3.1.1	Interlock safety systems		79		
1.1.3.1.1.1	Ring lattice magnets	4.3			
1.1.3.1.1.2	Ring injection magnets	0.5			
1.1.3.1.1.3	Ring extraction magnets	0.6			
1.1.3.1.1.4	Ring vacuum system	2.9			
1.1.3.1.1.5	Ring rf system (NONE)				
1.1.3.1.1.6	Injection beamlines	1.0			
1.1.3.1.1.7	Extraction beamlines	0.4			
1.1.3.1.1.8	Local injector (NONE)				
1.1.3.1.1.9	Transfer line (NONE)				
1.1.3.1.1.10	EPB area (NONE)				
1.1.3.1.1.11	Emittance matcher	0.8			
1.1.3.1.1.12	Control system interface	49.2			
1.1.3.1.1.13	System installation	9.7			
1.1.3.1.1.14	System tests	9.9			
1.1.3.1.2	Timing system		70		
1.1.3.1.2.1	Timing generator	56.4			
1.1.3.1.2.2	Timing-pulse distribution	4.1			
1.1.3.1.2.3	SHILAC synchronization	2.9			
1.1.3.1.2.4	Control sys. int'face (NONE)				
1.1.3.1.2.5	System installation	4.4			
1.1.3.1.2.6	System tests	2.7			
1.1.3.1.3	Vacuum monitoring & control		67		
1.1.3.1.4	Radiation monitoring		71		
1.1.3.1.4.1	Synchrotron area	25.8			
1.1.3.1.4.2	Inj. beamlines (NONE)				
1.1.3.1.4.3	Extr. beamlines (NONE)				
1.1.3.1.4.4	Local injector	2.0			
1.1.3.1.4.5	Transfer line	1.8			
1.1.3.1.4.6	EPB area	5.7			

1.1.3.1.4.7	Emittance matcher (NONE)				
1.1.3.1.4.8	Control systems interface		30.6		
1.1.3.1.4.9	System installation		2.1		
1.1.3.1.4.10	System tests		2.9		
1.1.3.1.5	Beam monitoring			282	
1.1.3.1.5.1	Synchrotron area		171.1		
1.1.3.1.5.1.1	BIE (1)	4.3			
1.1.3.1.5.1.2	Orb. corr. sensors	72.7			
1.1.3.1.5.1.3	Phase feedback sys.	9.1			
1.1.3.1.5.1.4	First turn inj. diag.	61.1			
1.1.3.1.5.1.5	System installation	16.4			
1.1.3.1.5.1.6	System tests	7.6			
1.1.3.1.5.2	Injection beamlines		67.1		
1.1.3.1.5.2.1	Beam profile monit.	57.0			
1.1.3.1.5.2.2	Optical mon. (NONE)				
1.1.3.1.5.2.3	Intens. mon. (NONE)				
1.1.3.1.5.2.4	X-Y collimat. (NONE)				
1.1.3.1.5.2.5	Attenuators (NONE)				
1.1.3.1.5.2.6	System installation	3.7			
1.1.3.1.5.2.7	System tests	6.4			
1.1.3.1.5.3	Extr. beamlines (NONE)				
1.1.3.1.5.4	Local injector (NONE)				
1.1.3.1.5.5	Transfer line (NONE)				
1.1.3.1.5.6	EPB area (NONE)				
1.1.3.1.5.7	Emittance matcher		44.2		
1.1.3.1.5.7.1	Beam profile monit.	37.4			
1.1.3.1.5.7.2	Optical mon. (NONE)				
1.1.3.1.5.7.3	Intens. mon. (NONE)				
1.1.3.1.5.7.4	X-Y collimat. (NONE)				
1.1.3.1.5.7.5	Emitt. diag. (NONE)				
1.1.3.1.5.7.6	System installation	2.5			
1.1.3.1.5.7.7	System tests	4.3			
1.1.3.1.6	Communications (NONE)				
1.1.3.2	Computer control sys. mods				557
1.1.3.2.1	Computers and networks			210	
1.1.3.2.1.1	System hardware		172.3		
1.1.3.2.1.2	Network hardware		37.5		
1.1.3.2.1.3	Documentation (NONE)				
1.1.3.2.2	Operator stations			116	
1.1.3.2.3	Data acq. & control hardware			132	
1.1.3.2.3.1	RF systems		15.0		
1.1.3.2.3.2	Vacuum systems		15.2		

1.1.3.2.3.3	Power supplies	38.2		
1.1.3.2.3.4	Beam monitoring	39.0		
1.1.3.2.3.5	Interlock monitor. sys.	24.6		
1.1.3.2.4	Commercial software		50	
1.1.3.2.5	Installation		49	
1.1.3.3	Control room consolidation			993
1.1.3.3.1	Hilac instrumentation		817	
1.1.3.3.1.1	RF system	13.4		
1.1.3.3.1.2	Adam injector	49.1		
1.1.3.3.1.3	Eve injector	41.6		
1.1.3.3.1.4	TV distribution	22.5		
1.1.3.3.1.5	Analog distribution	177.7		
1.1.3.3.1.6	Mod-Comp replacement	350.6		
1.1.3.3.1.7	A - area (misc. monitor.)	46.7		
1.1.3.3.1.8	Stripper control	8.1		
1.1.3.3.1.9	Existing control rm. mods.	107.7		
1.1.3.3.2	Synchrotron instrumentation		175	
1.1.3.3.2.1	Transfer line	14.3		
1.1.3.3.2.2	Main ring (NONE)			
1.1.3.3.2.3	Injector	26.0		
1.1.3.3.2.4	EPB	35.0		
1.1.3.3.2.5	MG	51.1		
1.1.3.3.2.6	Existing control rm. mods.	49.1		
1.1.4	Conventional facilities			1,570
1.1.4.1	Site clearance & preparation		1,058	
1.1.4.1.1	Access - shield. manipulation		41	
1.1.4.1.2	Bev. magnet yokes removal		371	
1.1.4.1.3	Bev. magnet leg-slabs removal		18	
1.1.4.1.4	Bev. magnet coils removal		92	
1.1.4.1.5	Bev. vacuum systems removal		74	
1.1.4.1.6	Beamline removals		57	
1.1.4.1.6.1	Beam 39 (NONE)			
1.1.4.1.6.2	Injection channel	34.7		
1.1.4.1.6.3	EPB 0 channel	22.0		
1.1.4.1.7	Bevatron electrical systems		35	
1.1.4.1.8	Misc. Bev. systems removal		16	
1.1.4.1.9	Disposal		354	
1.1.4.2	Shielding modifications			242
1.1.4.2.1	Synchrotron		10	
1.1.4.2.2	Injection area		141	
1.1.4.2.3	Extraction area		8	
1.1.4.2.4	EPB area		78	

1.1.4.2.5	Local injector (NONE)			
1.1.4.2.6	Transfer line (NONE)			
1.1.4.2.7	Emittance matcher	5		
1.1.4.3	Utilities - mechanical		215	
1.1.4.3.1	HVAC	13		
1.1.4.3.2	Cooling	172		
1.1.4.3.3	Fire hazard control	10		
1.1.4.3.4	Utilities	20		
1.1.4.4	Utilities - electrical		55	
1.1.4.4.1	AC power distribution	43		
1.1.4.4.2	Cable trays	13		
1.2 ED&I				5,839
1.2.1	Synchrotron ring systems		3,941	
1.2.1.1	Magnets & supports		1,279	
1.2.1.2	Ring vacuum system		1,090	
1.2.1.3	RF system		563	
1.2.1.4	Ring power supplies		938	
1.2.1.5	Beam monitoring devices		38	
1.2.1.6	Survey and alignment		33	
1.2.2	Modifications to beamlines		445	
1.2.2.1	Magnets and supports		218	
1.2.2.2	Vacuum systems		113	
1.2.2.3	Mech. instr. for beam monitoring		72	
1.2.2.4	Power supplies		42	
1.2.3	Instrumentation and controls		1,122	
1.2.3.1	Low level electronics		192	
1.2.3.2	Computer control sys. mods.		391	
1.2.3.3	Control room consolidation		539	
1.2.4	Conventional facilities		331	
1.2.4.1	Site clearance & preparation		212	
1.2.4.2	Shielding modifications		52	
1.2.4.3	Utilities - mechanical		56	
1.2.4.4	Utilities - electrical		11	
1.3 Project management and administration				1,710
1.3.1	Project direction / management		1,043	
1.3.2	Project office services		131	
1.3.3	Project financial tracking		196	
1.3.4	Incremental indirects		340	
..4 Contingency				6,917

1.4.1	Synchrotron ring systems		4,953
1.4.1.1	Magnets & supports	1,746	
1.4.1.2	Ring vacuum system	1,424	
1.4.1.3	RF system	401	
1.4.1.4	Ring power supplies	1,300	
1.4.1.5	Beam monitoring devices	27	
1.4.1.6	Survey and alignment	55	
1.4.2	Modifications to beamlines		559
1.4.2.1	Magnets and supports	303	
1.4.2.2	Vacuum systems	135	
1.4.2.3	Mech. instr. for beam monit.	73	
1.4.2.4	Power supplies	48	
1.4.3	Instrumentation and controls		693
1.4.3.1	Low level electronics	192	
1.4.3.2	Computer control sys. mods	207	
1.4.3.3	Control room consolidation	294	
1.4.4	Conventional facilities		497
1.4.4.1	Site clearance & preparation	354	
1.4.4.2	Shielding modifications	61	
1.4.4.3	Utilities - mechanical	64	
1.4.4.4	Utilities - electrical	18	
1.4.5	Proj. management & admin. contingency		215

Section IV

Cost Estimate Summaries

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
BEVALAC UPGRADE	1.0	2/12/87	1	KRUP	SS	PROJECT SUMMARY

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	CONSTRUCTION	1.1	S	1.0	9386.40	10277.50	19663.90	9386.40	10277.50	19663.90
2	ED&I	1.2	S12	1.0	761.00	5077.26	5838.26	761.00	5077.26	5838.26
3	PROJECT MANAGEMENT	1.3	SA13	1.0	512.62	1197.64	1710.26	512.62	1197.64	1710.26
4	CONTINGENCY	1.4	S14	1.0	6917.00	0.00	6917.00	6917.00	0.00	6917.00
								17577.02	16552.40	34129.42

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ES	1569.5	39.94
EI	32882.3	836.86
EM	11866.0	301.99
EE	24870.0	1153.97
EC	20450.0	686.10
ED	8230.0	209.45
CP	8900.0	412.96
MS	221905.8	7433.84
NC	46.0	2.29
MT	38363.2	863.17
ME	31180.0	1527.82
MD	37340.0	1344.24
MES	7715.0	177.45
MU	154.0	4.87
PT	532.0	16.86
PC	288.0	9.86
PE	6259.0	214.37
PPL	88.0	3.01
PP	29.5	1.01
RG	22022.2	687.09
PH	12000.0	341.04
AA	10000.0	284.20
SUM	496690.5	16552.40

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
CONSTRUCTION	1.1	2/11/87	3	KRUP	S	CONSTRUCTION SUMMARY SHEET

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	SYNCHROTRON RING SYSTEMS	1.1.1	S1	1.0	6658.01	7718.74	14376.74	6658.01	7718.74	14376.74
2	MODIFICATIONS TO BEAMLINES	1.1.2	S2	1.0	450.24	1146.11	1596.35	450.24	1146.11	1596.35
3	INSTRUMENTATION AND CONTROLS	1.1.3	S3	1.0	1546.24	574.09	2120.34	1546.24	574.09	2120.34
4	CONVENTIONAL FACILITIES	1.1.4	S4	1.0	731.91	838.56	1570.47	731.91	838.56	1570.47
								9386.40	10277.50	19663.90

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ES	1569.5	39.94
EI	32882.3	836.86
EM	11866.0	301.99
ED	160.0	4.07
MS	221905.8	7433.84
NC	46.0	2.29
MT	32063.2	721.42
MU	154.0	4.87
PT	532.0	16.86
PC	288.0	9.86
PE	6259.0	214.37
PPL	88.0	3.01
PP	29.5	1.01
RG	22022.2	687.09
SUM	329865.5	10277.50

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
SYNCHROTRON RING SYSTEMS	1.1.1	2/11/87	3	KRUP	S1	SYNCHROTRON RING SYSTEMS SUMMARY SHEET

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	MAGNETS AND SUPPORTS	1.1.1.1	S11	1.0	1890.49	4646.66	6537.15	1890.49	4646.66	6537.15
2	RING VACUUM SYSTEM	1.1.1.2	S12	1.0	834.42	2018.65	2853.07	834.42	2018.65	2853.07
3	SYNCHROTRON RF SYSTEM	1.1.1.3	013	1.0	517.69	374.66	892.35	517.69	374.66	892.35
4	RING POWER SUPPLIES	1.1.1.4	S14	1.0	3214.42	547.54	3761.95	3214.42	547.54	3761.95
5	BEAM MONITORING DEVICES	1.1.1.5	S15	1.0	12.00	122.95	134.95	12.00	122.95	134.95
6	SURVEY AND ALIGNMENT	1.1.1.6	X16	1.0	189.00	8.28	197.28	189.00	8.28	197.28
								6658.01	7718.74	14376.74

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ES	1496.0	38.07
EI	14862.0	378.24
EM	5396.0	137.33
ED	160.0	4.07
MS	190890.0	6394.82
MT	20900.2	470.25
MU	154.0	4.87
PT	500.0	15.85
PE	4320.0	147.96
PPL	76.0	2.60
RG	3996.0	124.68
SUM	242750.2	7718.74

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
MAGNETS AND SUPPORTS	1.1.1.1	2/12/87	4	KRUP	S11	SYNCHROTRON RING MAGNETS & SUPPORTS

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	DIPOLES	1.1.1.1.1	Y111	1.0	976.52	3238.11	4214.63	976.52	3238.11	4214.63
2	QUADRUPOLES	1.1.1.1.2	Y112	1.0	262.61	751.74	1014.35	262.61	751.74	1014.35
3	SEXTUPOLES	1.1.1.1.3	Y113	1.0	40.16	181.70	221.87	40.16	181.70	221.87
4	INJECTION ELEMENTS	1.1.1.1.5	Y115	1.0	22.05	106.60	128.65	22.05	106.60	128.65
5	EXTRACTION ELEMENTS	1.1.1.1.6	Y116	1.0	50.12	256.61	306.73	50.12	256.61	306.73
6	STANDS & SUPPORTS	1.1.1.1.7	X117	1.0	455.40	0.00	455.40	455.40	0.00	455.40
7	INSTALLATION	1.1.1.1.8	X118	1.0	83.62	111.90	195.53	83.62	111.90	195.53
								1890.49	4646.66	6537.15

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	135366.0	4534.76
MT	547.2	12.31
RG	3192.0	99.59
SUM	139105.2	4646.66

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
DIPOLES	1.1.1.1.1	2/12/87	1	TANABE	Y111	RING DIPOLE SUMMARY

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	LONG DIPOLES	1.1.1.1.1.1	Y1111	1.0	668.72	2079.41	2748.13	668.72	2079.41	2748.13
2	SHORT DIPOLES	1.1.1.1.1.2	Y1112	1.0	307.80	1158.70	1466.50	307.80	1158.70	1466.50
								976.52	3238.11	4214.63

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	96660.0	3238.11
SUM	96660.0	3238.11

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
LONG DIPOLES	1.1.1.1.1.1	1/8/87	2	TANABE	Y1111	DIPOLES

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	COILS	1.1.1.1.1.1.1	Y11111	1.0	216.64	704.30	920.94	216.64	704.30	920.94
2	YOKES	1.1.1.1.1.1.2	Y11112	1.0	388.20	1088.62	1476.82	388.20	1088.62	1476.82
3	FIXTURES	1.1.1.1.1.1.3	Y11113	1.0	54.53	123.28	177.81	54.53	123.28	177.81
4	ASSEMBLY & TEST	1.1.1.1.1.1.4	Y11114	1.0	9.35	163.21	172.56	9.35	163.21	172.56
								668.72	2079.41	2748.13

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	62072.0	2079.41
SUM	62072.0	2079.41

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
SHORT DIPOLES	1.1.1.1.1.2	1/8/87	2	TANABE	Y1112	SHORT DIPOLE SUMMARY

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	COILS	1.1.1.1.1.2.1	Y11121	1.0	132.59	470.34	602.93	132.59	470.34	602.93
2	YOKES	1.1.1.1.1.2.2	Y11122	1.0	160.81	448.57	609.38	160.81	448.57	609.38
3	FIXTURES	1.1.1.1.1.2.3	Y11123	1.0	4.35	80.40	84.75	4.35	80.40	84.75
4	ASSEMBLY & TEST	1.1.1.1.1.2.4	Y11124	1.0	10.05	159.39	169.44	10.05	159.39	169.44
								307.80	1158.70	1466.50

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	34588.0	1158.70
SUM	34588.0	1158.70

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
QUADRUPOLES	1.1.1.1.2	2/12/87	1	TANABE	Y112	RING QUADRUPOLE SUMMARY

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	LONG (F) QUADRUPOLES	1.1.1.1.2.1	Y1121	1.0	124.77	335.20	459.97	124.77	335.20	459.97
2	SHORT (D) QUADRUPOLES	1.1.1.1.2.2	Y1122	1.0	89.50	357.78	447.28	89.50	357.78	447.28
3	SPECIAL QUADRUPOLE	1.1.1.1.2.3	Y1123	1.0	26.37	38.39	64.76	26.37	38.39	64.76
4	SKEW QUADRUPOLES	1.1.1.1.2.4	Y1124	1.0	21.96	20.37	42.33	21.96	20.37	42.33
								262.61	751.74	1014.35

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	22440.0	751.74
SUM	22440.0	751.74

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
LONG (F) QUADRUPOLES	1.1.1.1.2.1	1/12/87	3	TANABE	Y1121	LONG (F) QUADRUPOLES SUMMARY

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	COILS	1.1.1.1.2.1.1	Y11211	1.0	50.50	159.19	209.69	50.50	159.19	209.69
2	YOKES	1.1.1.1.2.1.2	Y11212	1.0	47.56	78.12	125.68	47.56	78.12	125.68
3	FIXTURES	1.1.1.1.2.1.3	Y11213	1.0	17.00	16.08	33.08	17.00	16.08	33.08
4	ASSEMBLY & TEST	1.1.1.1.2.1.4	Y11214	1.0	9.71	81.81	91.52	9.71	81.81	91.52
								124.77	335.20	459.97

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	10006.0	335.20
SUM	10006.0	335.20

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
SHORT (D) QUADRUPOLES	1.1.1.1.2.2	1/12/87	2	TANABE	Y1122	SHORT (D) QUADRUPOLE SUMMARY

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	COILS	1.1.1.1.2.2.1	Y11221	1.0	38.80	173.66	212.46	38.80	173.66	212.46
2	YOKES	1.1.1.1.2.2.2	Y11222	1.0	38.20	78.79	116.99	38.20	78.79	116.99
3	FIXTURES	1.1.1.1.2.2.3	Y11223	1.0	2.00	16.08	18.08	2.00	16.08	18.08
4	ASSEMBLY & TEST	1.1.1.1.2.2.4	Y11224	1.0	10.50	89.24	99.75	10.50	89.24	99.75
								89.50	357.78	447.28

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	10680.0	357.78
SUM	10680.0	357.78

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
SPECIAL QUADRUPOLE	1.1.1.1.2.3	1/12/87	2	TANABE	Y1123	SPECIAL QUADRUPOLE SUMMARY

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	COILS	1.1.1.1.2.3.1	Y11231	1.0	4.75	14.47	19.22	4.75	14.47	19.22
2	YOKES	1.1.1.1.2.3.2	Y11232	1.0	4.41	7.10	11.51	4.41	7.10	11.51
3	FIXTURES	1.1.1.1.2.3.3	Y11233	1.0	16.30	9.38	25.68	16.30	9.38	25.68
4	ASSEMBLY AND TEST	1.1.1.1.2.3.4	Y11234	1.0	0.91	7.44	8.35	0.91	7.44	8.35
								26.37	38.39	64.76

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	1146.0	38.39
SUM	1146.0	38.39

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
SKEW QUADRUPOLES	1.1.1.1.2.4	12/1/86	1	TANABE	Y1124	SKEW QUADRUPOLES SUMMARY

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	COILS	1.1.1.1.2.4.1	Y11241	1.0	2.20	8.58	10.78	2.20	8.58	10.78
2	YOKES	1.1.1.1.2.4.2	Y11242	1.0	2.85	3.89	6.73	2.85	3.89	6.73
3	FIXTURES	1.1.1.1.2.4.3	Y11243	1.0	16.70	5.36	22.06	16.70	5.36	22.06
4	ASSEMBLY AND TEST	1.1.1.1.2.4.4	Y11244	1.0	0.22	2.55	2.76	0.22	2.55	2.76
								21.96	20.37	42.33

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	608.0	20.37
SUM	608.0	20.37

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
SEXTUPOLES	1.1.1.1.3	2/12/87	1	TANABE	Y113	RING SEXTUPOLE SUMMARY

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	X-SEXTUPOLES	1.1.1.1.3.1	Y1131	1.0	29.38	92.86	122.24	29.38	92.86	122.24
2	Y-SEXTUPOLES	1.1.1.1.3.2	Y1132	1.0	10.78	88.84	99.62	10.78	88.84	99.62
								40.16	181.70	221.87

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	5424.0	181.70
SUM	5424.0	181.70

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
X-SEXTUPOLES	1.1.1.1.3.1	1/12/87	2	TANABE	Y1131	X-SEXTUPOLES SUMMARY

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	COILS	1.1.1.1.3.1.1	Y11311	1.0	2.95	53.06	56.01	2.95	53.06	56.01
2	YOKES	1.1.1.1.3.1.2	Y11312	1.0	6.90	19.30	26.20	6.90	19.30	26.20
3	FIXTURES	1.1.1.1.3.1.3	Y11313	1.0	18.60	4.02	22.62	18.60	4.02	22.62
4	ASSEMBLY AND TEST	1.1.1.1.3.1.4	Y11314	1.0	0.93	16.48	17.41	0.93	16.48	17.41
								29.38	92.86	122.24

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	2772.0	92.86
SUM	2772.0	92.86

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
Y-SEXTUPOLES	1.1.1.1.3.2	1/12/87	2	TANABE	Y1132	Y-SEXTUPOLE SUMMARY

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	COILS	1.1.1.1.3.2.1	Y11321	1.0	2.95	53.06	56.01	2.95	53.06	56.01
2	YOKES	1.1.1.1.3.2.2	Y11322	1.0	6.90	19.30	26.20	6.90	19.30	26.20
3	FIXTURES	1.1.1.1.3.2.3	Y11323	1.0	0.00	0.00	0.00	0.00	0.00	0.00
4	ASSEMBLY AND TEST	1.1.1.1.3.2.4	Y11324	1.0	0.93	16.48	17.41	0.93	16.48	17.41
								10.78	88.84	99.62

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	2652.0	88.84
SUM	2652.0	88.84

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
INJECTION ELEMENTS	1.1.1.1.5	12/22/86	1	TANABE	Y115	SUMMARY INJECTION ELEMENT MAGNETS

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	SEPTUM MAGNET	1.1.1.1.5.1	Y1151	1.0	0.99	53.60	54.59	0.99	53.60	54.59
2	ELECTROSTATIC INFLECTOR	1.1.1.1.5.2	Y1152	1.0	1.68	37.12	38.80	1.68	37.12	38.80
3	SLOW BUMP MAGNETS	1.1.1.1.5.3	Y1153	1.0	19.37	15.88	35.25	19.37	15.88	35.25
								22.05	106.60	128.65

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	3182.0	106.60
SUM	3182.0	106.60

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
EXTRACTION ELEMENTS	1.1.1.1.6	1/24/87	2	TANABE	Y116	MAGNETS AND SUPPORTS

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	THIN-SEPTUM MAGNET	1.1.1.1.6.1	Y1161	1.0	1.15	73.70	74.85	1.15	73.70	74.85
2	THICK-SEPTUM MAGNET	1.1.1.1.6.2	Y1162	1.0	2.55	129.98	132.53	2.55	129.98	132.53
3	ELECTROSTATIC SEPTUM	1.1.1.1.6.3	Y1163	1.0	1.80	30.42	32.22	1.80	30.42	32.22
4	FAST PERTURBATION QUAD	1.1.1.1.6.6	Y1166	1.0	20.95	10.32	31.26	20.95	10.32	31.26
5	FAST EXTRACTION SEXTUPOLES	1.1.1.1.6.7	Y1167	1.0	23.67	12.19	35.87	23.67	12.19	35.87
								50.12	256.61	306.73

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	7660.0	256.61
SUM	7660.0	256.61

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
RING VACUUM SYSTEM	1.1.1.2	1/27/87	2	KRUP	S12	RING VACUUM SUMMARY SHEET

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	VACUUM CHAMBERS	1.1.1.2.1	Z121	1.0	256.00	1729.20	1985.20	256.00	1729.20	1985.20
2	PUMPING SYSTEM	1.1.1.2.2	Z122	1.0	508.30	0.00	508.30	508.30	0.00	508.30
3	INSTRUMENTATION	1.1.1.2.3	S123	1.0	50.12	63.75	113.87	50.12	63.75	113.87
4	INSTALLATION	1.1.1.2.4	Z124	1.0	20.00	225.70	245.70	20.00	225.70	245.70
								834.42	2018.65	2853.07

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	540.0	13.74
MS	47061.0	1576.54
MT	18295.0	411.64
MU	154.0	4.87
RG	380.0	11.86
SUM	66430.0	2018.65

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
VACUUM CHAMBERS	1.1.1.2.1	1/15/87	3	HUNT	Z121	RING VACUUM SYSTEM

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	DIPOLE CHAMBERS	1.1.1.2.1.1	Z1211	1.0	231.00	1050.94	1281.94	231.00	1050.94	1281.94
2	STRAIGHT SECTION CHAMBERS	1.1.1.2.1.2	Z1212	1.0	17.00	557.66	574.66	17.00	557.66	574.66
3	INJECTION AREA CHAMBERS	1.1.1.2.1.3	Z1213	1.0	4.00	60.30	64.30	4.00	60.30	64.30
4	EXTRACTION AREA CHAMBERS	1.1.1.2.1.4	Z1214	1.0	4.00	60.30	64.30	4.00	60.30	64.30
								256.00	1729.20	1985.20

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	45458.0	1522.84
MT	9104.0	204.84
MU	48.0	1.52
SUM	54610.0	1729.20

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
PUMPING SYSTEM	1.1.1.2.2	2/12/87	3	HUNT	Z122	RING VACUUM SYSTEM

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	ROUGHING SYSTEM	1.1.1.2.2.1	Z1221	1.0	85.40	0.00	85.40	85.40	0.00	85.40
2	GUARD VACUUM EXT PUMP SYS	1.1.1.2.2.2	Z1222	1.0	156.40	0.00	156.40	156.40	0.00	156.40
3	MAIN CRYOPUMP SYSTEM	1.1.1.2.2.3	Z1223	1.0	266.50	0.00	266.50	266.50	0.00	266.50
								508.30	0.00	508.30

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.00

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
INSTRUMENTATION	1.1.1.2.3	1/27/87	1	KRUP	S123	RING VACUUM SYSTEM

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	VACUUM MONITORING	1.1.1.2.3.1	Z1231	1.0	37.12	0.00	37.12	37.12	0.00	37.12
2	BEAM MONITORING	1.1.1.2.3.2	Z1232	1.0	13.00	63.75	76.75	13.00	63.75	76.75
								50.12	63.75	113.87

LABOR SUMMARY		
Craft Code	Total Hours	Total Labor K$
EI	52.0	1.32
MS	1267.0	42.44
MT	739.0	16.63
MU	106.0	3.35
SUM	2164.0	63.75

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
BEAM MONITORING	1.1.1.2.3.2	12/12/86	1	HUNT	Z1232	INSTRUMENTATION

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	BIE	1.1.1.2.3.2.1	Z12321	1.0	1.00	6.22	7.22	1.00	6.22	7.22
2	CLOSED ORBIT MONITOR	1.1.1.2.3.2.2	Z12322	1.0	12.00	57.52	69.52	12.00	57.52	69.52
								13.00	63.75	76.75

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	52.0	1.32
MS	1267.0	42.44
MT	739.0	16.63
MU	106.0	3.35
SUM	2164.0	63.75

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
SYNCHROTRON RF SYSTEM	1.1.1.3	1/24/87	2	DH	013	

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	CAVITY	1.1.1.3.1	0131	1.0	160.40	152.76	313.16	160.40	152.76	313.16
2	FERRITE BIAS SYSTEM	1.1.1.3.2	I132	1.0	36.30	25.93	62.23	36.30	25.93	62.23
3	FINAL AMPLIFIER	1.1.1.3.3	J133	1.0	66.08	34.36	100.44	66.08	34.36	100.44
4	HIGH VOLTAGE POWER SUPPLY	1.1.1.3.4	I134	1.0	134.89	30.89	165.78	134.89	30.89	165.78
5	LOW LEVEL R.F.	1.1.1.3.5	J135	1.0	57.32	24.23	81.55	57.32	24.23	81.55
6	INSTRUM & CONTROL SYS IFCE	1.1.1.3.6	I136	1.0	40.56	12.45	53.01	40.56	12.45	53.01
7	COOLING SYSTEM	1.1.1.3.7	0137	1.0	15.10	5.89	20.99	15.10	5.89	20.99
8	ASSEMBLY AND TEST	1.1.1.3.8	I138	1.0	3.79	72.91	76.70	3.79	72.91	76.70
9	INSTALLATION	1.1.1.3.9	I139	1.0	3.25	15.25	18.50	3.25	15.25	18.50
								517.69	374.66	892.35

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ES	440.0	11.20
EI	4022.0	102.36
EM	2308.0	58.74
ED	160.0	4.07
MS	4912.0	164.55
MT	256.0	5.76
PT	400.0	12.68
PE	288.0	9.86
PPL	64.0	2.19
RG	104.0	3.24
SUM	12954.0	374.66

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
RING POWER SUPPLIES	1.1.1.4	1/25/87	2	KRUP	S14	RING POWER SUPPLY SUMMARY

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	DIPOLE MAGNET POWER SUPPLIES	1.1.1.4.1	S141	1.0	1385.36	79.16	1464.52	1385.36	79.16	1464.52
2	QUADRUPOLE MAGNET POWER SUPPLIES	1.1.1.4.2	S142	1.0	786.56	66.81	853.37	786.56	66.81	853.37
3	SPECIAL RING POWER SUPPLIES	1.1.1.4.3	S143	1.0	612.44	242.38	854.82	612.44	242.38	854.82
4	INJECTION ELEMENT POWER SUPPLIES	1.1.1.4.4	S144	1.0	156.66	76.35	233.00	156.66	76.35	233.00
5	EXTRACTION ELEMENT POWER SUPPLIE	1.1.1.4.5	S145	1.0	273.40	82.84	356.24	273.40	82.84	356.24
								3214.42	547.54	3761.95

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ES	1056.0	26.88
EI	10300.0	262.14
EM	3088.0	78.59
MS	746.0	24.99
MT	146.0	3.29
PT	100.0	3.17
PE	4032.0	138.10
PPL	12.0	0.41
RG	320.0	9.98
SUM	19800.0	547.54

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
DIPOLE MAGNET POWER SUPPLIES	1.1.1.4.1	1/25/87	1	KRUP	S141	DIPOLE POWER SUPPLY SUMMARY

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	DIPOLE MAGNET POWER SUPPLY	1.1.1.4.1.1	M1411	1.0	1300.00	0.00	1300.00	1300.00	0.00	1300.00
2	DIPOLE CONTROL	1.1.1.4.1.2	M1412	1.0	36.00	0.00	36.00	36.00	0.00	36.00
3	INSTALL DIPOLE P.S'S.	1.1.1.4.1.3	M1413	1.0	49.36	55.99	105.35	49.36	55.99	105.35
4	DIPOLE P.S. TESTING	1.1.1.4.1.4	M1414	1.0	0.00	23.18	23.18	0.00	23.18	23.18
								1385.36	79.16	1464.52

LABOR SUMMARY		
Craft Code	Total Hours	Total Labor K$
EM	480.0	12.22
MS	192.0	6.43
PE	1592.0	54.53
RG	192.0	5.99
SUM	2456.0	79.16

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
QUADRUPOLE MAGNET POWER SUPPLIES	1.1.1.4.2	1/25/87	1	KRUP	S142	QUADRUPOLE MAGNET POWER SUPPLY SUMMARY

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	QUADRUPOLE MAGNETS/P.S.	1.1.1.4.2.1	M1421	1.0	700.00	0.00	700.00	700.00	0.00	700.00
2	QUADRUPOLE CONTROL	1.1.1.4.2.2	M1422	1.0	36.00	0.00	36.00	36.00	0.00	36.00
3	INSTALL QUAD P.S'S.	1.1.1.4.2.3	M1423	1.0	50.56	50.44	101.00	50.56	50.44	101.00
4	QUAD P.S. TESTING	1.1.1.4.2.4	M1424	1.0	0.00	16.36	16.36	0.00	16.36	16.36
								786.56	66.81	853.37

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EM	320.0	8.14
MS	176.0	5.90
PE	1424.0	48.77
RG	128.0	3.99
SUM	2048.0	66.81

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
SPECIAL RING POWER SUPPLIES	1.1.1.4.3	1/25/87	1	KRUP	S143	SPECIAL RING POWER SUPPLY SUMMARY

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	BACK LEG WINDING P.S.'S	1.1.1.4.3.1	K1431	1.0	392.40	136.80	529.20	392.40	136.80	529.20
2	SKEW QUADS P.S.	1.1.1.4.3.2	K1432	1.0	30.05	15.20	45.25	30.05	15.20	45.25
3	SEXTUPOLE PS	1.1.1.4.3.3	K1433	1.0	161.80	29.02	190.82	161.80	29.02	190.82
4	SPEC RING PS-SYST INSTALL	1.1.1.4.3.5	K1435	1.0	28.19	53.23	81.42	28.19	53.23	81.42
5	SPECIAL RING PS'S-SYST TESTS	1.1.1.4.3.6	K1436	1.0	0.00	8.14	8.14	0.00	8.14	8.14
								612.44	242.38	854.82

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ES	668.0	17.00
EI	6796.0	172.96
EM	1152.0	29.32
MS	216.0	7.24
MT	56.0	1.26
PT	46.0	1.46
PE	384.0	13.15
SUM	9318.0	242.38

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
INJECTION ELEMENT POWER SUPPLIES	1.1.1.4.4	1/25/87	1	KRUP	S144	INJECTION ELEMENT POWER SUPPLY SUMMARY

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	SEPTUM MAG PS 20V-2750A	1.1.1.4.4.1	K1441	1.0	26.00	2.72	28.72	26.00	2.72	28.72
2	ELECTROSTATIC INFLECTOR PS	1.1.1.4.4.2	K1442	1.0	4.12	5.56	9.67	4.12	5.56	9.67
3	SLOW BUMP PS	1.1.1.4.4.3	K1443	1.0	104.70	43.98	148.68	104.70	43.98	148.68
4	INJ ELEM PS-SYST INSTALL	1.1.1.4.4.4	K1444	1.0	21.84	19.20	41.04	21.84	19.20	41.04
5	INJ ELEMENTS PS'S-SYST TESTS	1.1.1.4.4.5	K1445	1.0	0.00	4.89	4.89	0.00	4.89	4.89
								156.66	76.35	233.00

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ES	190.0	4.84
EI	1696.0	43.16
EM	504.0	12.83
MS	82.0	2.75
MT	44.0	0.99
PT	26.0	0.82
PE	316.0	10.82
PPL	4.0	0.14
SUM	2862.0	76.35

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
EXTRACTION ELEMENT POWER SUPPLIES	1.1.1.4.5	1/25/87	1	KRUP	S145	EXTRACTION ELEMENT POWER SUPPLY SUMMARY

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	THIN SEPTUM MAG PS 20V-2750A	1.1.1.4.5.1	K1451	1.0	26.00	2.72	28.72	26.00	2.72	28.72
2	THICK SEPT.MAG PS 125V-2500A	1.1.1.4.5.2	K1452	1.0	87.00	2.72	89.72	87.00	2.72	89.72
3	ELECTROSTATIC SEPTUM PS	1.1.1.4.5.3	K1453	1.0	15.50	7.09	22.59	15.50	7.09	22.59
4	FAST PERTURBATION PS'S	1.1.1.4.5.5	K1455	1.0	92.40	27.62	120.02	92.40	27.62	120.02
5	EXTRACTION SEXTUPOLES PS	1.1.1.4.5.6	K1456	1.0	33.40	14.86	48.26	33.40	14.86	48.26
6	EXTR ELEM PS-SYST INSTALL	1.1.1.4.5.7	K1457	1.0	19.10	21.41	40.51	19.10	21.41	40.51
7	EXT ELEMENTS PS'S-SYST TESTS	1.1.1.4.5.8	K1458	1.0	0.00	6.41	6.41	0.00	6.41	6.41
								273.40	82.84	356.24

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ES	198.0	5.04
EI	1808.0	46.01
EM	632.0	16.08
MS	80.0	2.68
MT	46.0	1.04
PT	28.0	0.89
PE	316.0	10.82
PPL	8.0	0.27
SUM	3116.0	82.84

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
BEAM MONITORING DEVICES	1.1.1.5	12/22/86	1	KRUP	S15	BEAM MONITORING DEVICES SUMMARY SHEET

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	FIRST TURN INJ DIAGNOSTICS	1.1.1.5.1	X151	1.0	12.00	110.93	122.93	12.00	110.93	122.93
2	INSTALLATION	1.1.1.5.2	X152	1.0	0.00	12.02	12.02	0.00	12.02	12.02
								12.00	122.95	134.95

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	2805.0	93.97
MT	1288.0	28.98
SUM	4093.0	122.95

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
SURVEY AND ALIGNMENT	1.1.1.6	1/24/87	4	REIMERS	X16	SYNCHROTRON RING SYSTEMS

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	MONUMENTS	1.1.1.6.1	X161	1.0	1.00	4.05	5.05	1.00	4.05	5.05
2	LIQUID LEVEL SYSTEM	1.1.1.6.2	X162	1.0	30.00	4.05	34.05	30.00	4.05	34.05
3	SURVEY INSTRUMENTS	1.1.1.6.3	X163	1.0	10.00	0.18	10.18	10.00	0.18	10.18
4	ALIGNMENT FIXTURES	1.1.1.6.4	X164	1.0	24.00	0.00	24.00	24.00	0.00	24.00
5	RING SURVEY & ALIGNMENT	1.1.1.6.5	X165	1.0	124.00	0.00	124.00	124.00	0.00	124.00
								189.00	8.28	197.28

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MT	368.0	8.28
SUM	368.0	8.28

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
MODIFICATIONS TO BEAMLINES	1.1.2	2/11/87	3	KRUP	S2	MODIFICATIONS TO BEAMLINES SUMMARY SHEET

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	MAGNETS AND SUPPORTS	1.1.2.1	S21	1.0	204.79	737.34	942.13	204.79	737.34	942.13
2	VACUUM SYSTEMS	1.1.2.2	Z22	1.0	126.30	148.77	275.07	126.30	148.77	275.07
3	MECH INSTRUMENTS FOR BEAM MON	1.1.2.3	S23	1.0	24.46	210.89	235.35	24.46	210.89	235.35
4	POWER SUPPLIES	1.1.2.4	S24	1.0	94.69	49.11	143.80	94.69	49.11	143.80
								450.24	1146.11	1596.35

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ES	8.0	0.20
EI	1130.0	28.76
EM	326.0	8.30
MS	29807.0	998.53
MT	3156.0	71.01
PT	32.0	1.01
PE	289.0	9.90
PP	2.0	0.07
RG	908.0	28.33
SUM	35658.0	1146.11

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
MAGNETS AND SUPPORTS	1.1.2.1	2/13/87	4	KRUP	S21	MAGNETS AND SUPPORTS SUMMARY SHEET

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	INJECTION BEAMLINE	1.1.2.1.1	S211	1.0	88.97	423.04	512.01	88.97	423.04	512.01
2	EXTRACTION BEAMLINE	1.1.2.1.2	S212	1.0	106.05	224.65	330.70	106.05	224.65	330.70
3	EMITTANCE MATCHER	1.1.2.1.6	S216	1.0	8.47	63.29	71.76	8.47	63.29	71.76
4	INSTALLATION AND ALIGNMENT	1.1.2.1.7	X217	1.0	1.30	26.36	27.66	1.30	26.36	27.66
								204.79	737.34	942.13

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	21062.0	705.58
MT	240.0	5.40
RG	845.0	26.36
SUM	22147.0	737.34

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
INJECTION BEAMLINE	1.1.2.1.1	2/12/87	2	KRUP	S211	MAGNETS & SUPPORTS

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	MAGNETS	1.1.2.1.1.1	Y2111	1.0	48.97	423.04	472.01	48.97	423.04	472.01
2	SUPPORTS	1.1.2.1.1.2	X2112	1.0	40.00	0.00	40.00	40.00	0.00	40.00
								88.97	423.04	512.01

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	12628.0	423.04
SUM	12628.0	423.04

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
MAGNETS	1.1.2.1.1.1	2/12/87	1	TANABE	Y2111	INJECTION BEAMLINE MAGNETS

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	DIPOLES	1.1.2.1.1.1.1	Y21111	1.0	25.02	353.09	378.11	25.02	353.09	378.11
2	QUADRUPOLES	1.1.2.1.1.1.2	Y21112	1.0	23.95	69.95	93.89	23.95	69.95	93.89
								48.97	423.04	472.01

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	12628.0	423.04
SUM	12628.0	423.04

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
EXTRACTION BEAMLINE	1.1.2.1.2	2/11/87	1	KRUP	S212	MAGNETS & SUPPORTS

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	DIPOLE	1.1.2.1.2.1	Y2121	1.0	94.05	224.65	318.70	94.05	224.65	318.70
2	SUPPORTS	1.1.2.1.2.2	X2122	1.0	12.00	0.00	12.00	12.00	0.00	12.00
								106.05	224.65	330.70

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	6706.0	224.65
SUM	6706.0	224.65

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
DIPOLE	1.1.2.1.2.1	1/12/87	2	TANABE	Y2121	EXTRACTION BEAMLINE DIPOLE SUMMARY

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	COILS	1.1.2.1.2.1.1	Y21211	1.0	18.42	58.69	77.11	18.42	58.69	77.11
2	YOKES	1.1.2.1.2.1.2	Y21212	1.0	32.35	90.72	123.07	32.35	90.72	123.07
3	FIXTURES	1.1.2.1.2.1.3	Y21213	1.0	42.39	61.64	104.03	42.39	61.64	104.03
4	ASSEMBLY & TEST	1.1.2.1.2.1.4	Y21214	1.0	0.90	13.60	14.50	0.90	13.60	14.50
								94.05	224.65	318.70

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	6706.0	224.65
SUM	6706.0	224.65

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
EMITTANCE MATCHER	1.1.2.1.6	2/12/87	1	KRUP	S216	MODIFICATIONS TO BEAMLINES

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	MAGNETS	1.1.2.1.6.1	Y2161	1.0	2.47	63.29	65.76	2.47	63.29	65.76
2	SUPPORTS	1.1.2.1.6.2	X2162	1.0	6.00	0.00	6.00	6.00	0.00	6.00
								8.47	63.29	71.76

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	1728.0	57.89
MT	240.0	5.40
SUM	1968.0	63.29

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
VACUUM SYSTEMS	1.1.2.2	1/26/87	2	HUNT	Z22	MOD TO BEAMLINES & LOCAL INJECTOR

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	INJECTION BEAMLINE	1.1.2.2.1	Z221	1.0	75.00	40.87	115.87	75.00	40.87	115.87
2	EXTRACTION BEAMLINE	1.1.2.2.2	Z222	1.0	13.00	57.26	70.26	13.00	57.26	70.26
3	EMITTANCE MATCHER	1.1.2.2.6	Z226	1.0	36.30	38.62	74.92	36.30	38.62	74.92
4	INSTALLATION	1.1.2.2.7	Z227	1.0	2.00	12.02	14.02	2.00	12.02	14.02
								126.30	148.77	275.07

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	3699.0	123.92
MT	1038.0	23.36
RG	48.0	1.50
SUM	4785.0	148.77

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
MECH INSTRUMENTS FOR BEAM MON	1.1.2.3	2/13/87	3	KRUP	S23	MECH INSTRUMENTATION FOR BEAM MONITOR SUMMAR

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	INJECTION BEAMLINE	1.1.2.3.1	S231	1.0	12.00	97.31	109.31	12.00	97.31	109.31
2	EMITTANCE MATCHER	1.1.2.3.6	S236	1.0	10.00	109.27	119.27	10.00	109.27	119.27
3	INSTALLATION & ALIGNMENT	1.1.2.3.7	X237	1.0	2.46	4.32	6.78	2.46	4.32	6.78
								24.46	210.89	235.35

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	5034.0	168.64
MT	1878.0	42.26
SUM	6912.0	210.89

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
INJECTION BEAMLINE	1.1.2.3.1	2/12/87	1	KRUP	S231	MECH INSTRUMENTATION FOR BEAM MONITOR

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	BEAM PROFILE MONITORS	1.1.2.3.1.1	X2311	1.0	12.00	91.91	103.91	12.00	91.91	103.91
2	ASSEMBLY AND TEST	1.1.2.3.1.6	X2316	1.0	0.00	5.40	5.40	0.00	5.40	5.40
								12.00	97.31	109.31

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	2268.0	75.98
MT	948.0	21.33
SUM	3216.0	97.31

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
EMITTANCE MATCHER	1.1.2.3.6	2/12/87	1	KRUP	S236	MECH INSTRUMENTATION FOR BEAM MONITOR

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	BEAM PROFILE MONITORS	1.1.2.3.6.1	X2361	1.0	8.00	61.27	69.27	8.00	61.27	69.27
2	BEAM INTENSITY MONITORS	1.1.2.3.6.3	X2363	1.0	2.00	47.99	49.99	2.00	47.99	49.99
								10.00	109.27	119.27

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	2766.0	92.66
MT	738.0	16.61
SUM	3504.0	109.27

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
POWER SUPPLIES	1.1.2.4	2/13/87	3	KRUP	S24	POWER SUPPLIES SUMMARY SHEET

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	INJECTION BEAMLINE P/S	1.1.2.4.1	S241	1.0	83.97	33.68	117.65	83.97	33.68	117.65
2	EXTRACTION BEAMLINE P/S	1.1.2.4.2	S242	1.0	7.24	13.66	20.90	7.24	13.66	20.90
3	EMITTANCE MATCHER P/S	1.1.2.4.6	S246	1.0	3.49	1.77	5.25	3.49	1.77	5.25
								94.69	49.11	143.80

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ES	8.0	0.20
EI	1130.0	28.76
EM	326.0	8.30
MS	12.0	0.40
PT	32.0	1.01
PE	289.0	9.90
PP	2.0	0.07
RG	15.0	0.47
SUM	1814.0	49.11

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
INJECTION BEAMLINE P/S	1.1.2.4.1	2/13/87	1	KRUP	S241	POWER SUPPLIES

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	DIPOLES	1.1.2.4.1.1	S2411	1.0	18.00	17.30	35.30	18.00	17.30	35.30
2	QUADRUPOLES	1.1.2.4.1.2	S2412	1.0	46.64	3.41	50.05	46.64	3.41	50.05
3	INST. & CNTRL SYS INTFC	1.1.2.4.1.4	S2414	1.0	2.90	3.94	6.84	2.90	3.94	6.84
4	SYSTEM INSTALLATION	1.1.2.4.1.5	S2415	1.0	16.43	4.66	21.09	16.43	4.66	21.09
5	ASSEMBLY AND TEST	1.1.2.4.1.6	S2416	1.0	0.00	4.38	4.38	0.00	4.38	4.38
								83.97	33.68	117.65

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ES	8.0	0.20
EI	866.0	22.04
EM	172.0	4.38
PE	204.0	6.99
PP	2.0	0.07
SUM	1252.0	33.68

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
EXTRACTION BEAMLINE P/S	1.1.2.4.2	2/13/87	1	KRUP	S242	POWER SUPPLIES

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	DIPOLES	1.1.2.4.2.1	L2421	1.0	7.24	11.60	18.83	7.24	11.60	18.83
2	SYSTEM INSTALLATION	1.1.2.4.2.5	L2425	1.0	0.00	1.00	1.00	0.00	1.00	1.00
3	SYSTEM TESTS	1.1.2.4.2.6	L2426	1.0	0.00	1.07	1.07	0.00	1.07	1.07
								7.24	13.66	20.90

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	240.0	6.11
EM	130.0	3.31
MS	12.0	0.40
PT	32.0	1.01
PE	69.0	2.36
RG	15.0	0.47
SUM	498.0	13.66

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
EMITTANCE MATCHER P/S	1.1.2.4.6	2/13/87	1	KRUP	S246	POWER SUPPLIES

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	EMITT MATCHER P.S/SEPTUM MAG	1.1.2.4.6.1	C2461	1.0	2.42	0.20	2.62	2.42	0.20	2.62
2	EMITT MATCHER P.S/SYS INSTAL	1.1.2.4.6.3	C2463	1.0	1.04	1.16	2.19	1.04	1.16	2.19
3	EMITT MATCHER P.S/SYS TESTS	1.1.2.4.6.4	C2464	1.0	0.03	0.41	0.44	0.03	0.41	0.44
								3.49	1.77	5.25

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	24.0	0.61
EM	24.0	0.61
PE	16.0	0.55
SUM	64.0	1.77

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
INSTRUMENTATION AND CONTROLS	1.1.3	1/26/87	2	KRUP	S3	INSTRUMENTATION AND CONTROLS SUMMARY SHEET

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	LOW LEVEL ELECTRONICS	1.1.3.1	S31	1.0	320.15	250.04	570.20	320.15	250.04	570.20
2	COMPUTER CONTROL SYSTEM MODS	1.1.3.2	S32	1.0	455.80	101.40	557.20	455.80	101.40	557.20
3	CONTROL ROOM CONSOLIDATION	1.1.3.3	S33	1.0	770.29	222.65	992.94	770.29	222.65	992.94
								1546.24	574.09	2120.34

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ES	65.5	1.67
EI	16284.3	414.44
EM	5148.0	131.02
MS	344.4	11.54
NC	46.0	2.29
MT	45.0	1.01
PE	314.0	10.75
PP	27.5	0.94
RG	14.0	0.44
SUM	22298.7	574.09

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
LOW LEVEL ELECTRONICS	1.1.3.1	1/26/87	2	KRUP	S31	LOW LEVEL ELECTRONICS SUMMARY SHEET

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	INTERLOCK SAFETY SYSTEMS	1.1.3.1.1	D311	1.0	50.33	28.75	79.08	50.33	28.75	79.08
2	TIMING SYSTEM	1.1.3.1.2	L312	1.0	49.95	20.40	70.35	49.95	20.40	70.35
3	VACUUM MONITORING	1.1.3.1.3	E313	1.0	58.76	8.70	67.46	58.76	8.70	67.46
4	RAD MON	1.1.3.1.4	D314	1.0	53.94	16.97	70.91	53.94	16.97	70.91
5	BEAM MONITORING	1.1.3.1.5	S315	1.0	107.18	175.21	282.39	107.18	175.21	282.39
								320.15	250.04	570.20

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ES	65.5	1.67
EI	6268.3	159.53
EM	2492.0	63.42
MS	344.4	11.54
NC	46.0	2.29
MT	37.0	0.83
PE	274.0	9.38
PP	27.5	0.94
RG	14.0	0.44
SUM	9568.7	250.04

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
INTERLOCK SAFETY SYSTEMS	1.1.3.1.1	1/26/87	5	PATTE	D311	

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	INTLK/RING LAT MAG	1.1.3.1.1.1	D3111	1.0	3.12	1.15	4.26	3.12	1.15	4.26
2	INTLK/RING INJ MAG	1.1.3.1.1.2	D3112	1.0	0.35	0.13	0.47	0.35	0.13	0.47
3	INTLK/RING EXTR MAG	1.1.3.1.1.3	D3113	1.0	0.42	0.15	0.57	0.42	0.15	0.57
4	INTLK/RING VAC SYS	1.1.3.1.1.4	D3114	1.0	2.11	0.78	2.89	2.11	0.78	2.89
5	INTLK/INJ BEAM LINES	1.1.3.1.1.6	D3116	1.0	0.76	0.28	1.04	0.76	0.28	1.04
6	INTLK/EXTRACT BMLN	1.1.3.1.1.7	D3117	1.0	0.28	0.10	0.38	0.28	0.10	0.38
7	INTLK/EMITT MATCHER	1.1.3.1.1.11	D31111	1.0	0.55	0.20	0.76	0.55	0.20	0.76
8	INTLK/CNTL SYS INTERFACE	1.1.3.1.1.12	D31112	1.0	42.74	6.45	49.19	42.74	6.45	49.19
9	SYSTEM INSTALLATION	1.1.3.1.1.13	D31113	1.0	0.00	9.67	9.67	0.00	9.67	9.67
10	SYSTEM TESTS	1.1.3.1.1.14	D31114	1.0	0.00	9.85	9.85	0.00	9.85	9.85
								50.33	28.75	79.08

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	609.3	15.51
EM	387.0	9.85
MS	84.0	2.81
PP	6.0	0.21
RG	12.0	0.37
SUM	1098.3	28.75

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
TIMING SYSTEM	1.1.3.1.2	1/26/87	6	JBH/ALL	L312	Separates Installation, Design & Sys Check

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	Timing Generator	1.1.3.1.2.1	L3121	1.0	46.96	9.43	56.39	46.96	9.43	56.39
2	Timing-Pulse Distribution	1.1.3.1.2.2	L3122	1.0	0.00	4.07	4.07	0.00	4.07	4.07
3	SHILAC Synchronization	1.1.3.1.2.3	L3123	1.0	2.02	0.83	2.85	2.02	0.83	2.85
4	System Installation	1.1.3.1.2.5	L3125	1.0	0.97	3.43	4.40	0.97	3.43	4.40
5	System Check and Test	1.1.3.1.2.6	L3126	1.0	0.00	2.65	2.65	0.00	2.65	2.65
								49.95	20.40	70.35

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ES	35.5	0.90
EI	354.0	9.01
EM	264.0	6.72
MS	16.4	0.55
MT	37.0	0.83
PE	64.0	2.19
PP	4.0	0.14
RG	2.0	0.06
SUM	776.9	20.40

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
RAD MON	1.1.3.1.4	1/8/87	3	PATTE	D314	

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	RAD MON/SYNCHROTRON AREA	1.1.3.1.4.1	D3141	1.0	14.13	11.69	25.82	14.13	11.69	25.82
2	RAD MON/LOC INJ MODS	1.1.3.1.4.4	D3144	1.0	2.00	0.00	2.00	2.00	0.00	2.00
3	RAD MON/TRANSFER LINE	1.1.3.1.4.5	D3145	1.0	1.76	0.00	1.76	1.76	0.00	1.76
4	RAD MON/EPB AREA	1.1.3.1.4.6	D3146	1.0	5.43	0.31	5.74	5.43	0.31	5.74
5	RAD MON/CNTL SYS INTFCE	1.1.3.1.4.8	D3148	1.0	30.62	0.00	30.62	30.62	0.00	30.62
6	SYSTEM INSTALLATION	1.1.3.1.4.9	D3149	1.0	0.00	2.12	2.12	0.00	2.12	2.12
7	SYSTEM TESTS	1.1.3.1.4.10	D31410	1.0	0.00	2.85	2.85	0.00	2.85	2.85
								53.94	16.97	70.91

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ES	4.0	0.10
EI	413.0	10.51
EM	112.0	2.95
MS	20.0	0.67
NC	46.0	2.29
PE	10.0	0.34
PP	6.0	0.21
SUM	611.0	16.97

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
BEAM MONITORING	1.1.3.1.5	2/13/87	4	KRUP	S315	BEAM MONITORING SUMMARY SHEET

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	SYNCHROTRON AREA	1.1.3.1.5.1	S3151	1.0	71.62	99.53	171.14	71.62	99.53	171.14
2	INJECTION BEAMLINES	1.1.3.1.5.2	S3152	1.0	21.39	45.71	67.10	21.39	45.71	67.10
3	EMITTANCE MATCHER	1.1.3.1.5.7	S3157	1.0	14.18	29.97	44.15	14.18	29.97	44.15
								107.18	175.21	282.39

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ES	26.0	0.66
EI	4626.0	117.73
EM	1653.0	42.07
MS	224.0	7.50
PE	200.0	6.85
PP	11.5	0.39
SUM	6740.5	175.21

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
SYNCHROTRON AREA	1.1.3.1.5.1	2/13/87	1	KRUP	S3151	BEAM MONITORING

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	SYNCHROTRON AREA/BIE	1.1.3.1.5.1.1	C31511	1.0	1.36	2.95	4.31	1.36	2.95	4.31
2	SYNCHROTRON AREA/ORBIT	1.1.3.1.5.1.2	C31512	1.0	41.75	30.95	72.70	41.75	30.95	72.70
3	SYNCHROTRON AREA/PHASE	1.1.3.1.5.1.3	C31513	1.0	4.20	4.89	9.09	4.20	4.89	9.09
4	SYNCHROTRON AREA/1 TURN	1.1.3.1.5.1.4	C31514	1.0	20.30	40.76	61.05	20.30	40.76	61.05
5	SYNCH AREA/SYSTEM INSTALL	1.1.3.1.5.1.5	C31515	1.0	3.90	12.45	16.35	3.90	12.45	16.35
6	SYNCH AREA/SYSTEM TEST	1.1.3.1.5.1.6	C31516	1.0	0.11	7.53	7.64	0.11	7.53	7.64
								71.62	99.53	171.14

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	3090.0	78.64
EM	441.0	11.22
MS	84.0	2.81
PE	200.0	6.85
SUM	3815.0	99.53

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
INJECTION BEAMLINES	1.1.3.1.5.2	2/13/87	1	KRUP	S3152	BEAM MONITORING

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	BEAM PROFILE MONITORS	1.1.3.1.5.2.1	S31521	1.0	20.13	36.85	56.98	20.13	36.85	56.98
2	SYSTEM INSTALLATION	1.1.3.1.5.2.6	S31526	1.0	1.26	2.44	3.70	1.26	2.44	3.70
3	SYSTEM TESTS	1.1.3.1.5.2.7	S31527	1.0	0.00	6.41	6.41	0.00	6.41	6.41
								21.39	45.71	67.10

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ES	16.0	0.41
EI	928.0	23.62
EM	732.0	18.63
MS	94.0	2.81
PP	7.0	0.24
SUM	1767.0	45.71

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
EMITTANCE MATCHER	1.1.3.1.5.7	2/13/87	1	KRUP	S3157	BEAM MONITORING

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	BEAM PROFILE MONITORS	1.1.3.1.5.7.1	S31571	1.0	13.34	24.07	37.40	13.34	24.07	37.40
2	SYSTEM INSTALLATION	1.1.3.1.5.7.6	S31576	1.0	0.84	1.63	2.47	0.84	1.63	2.47
3	SYSTEM TESTS	1.1.3.1.5.7.7	S31577	1.0	0.00	4.28	4.28	0.00	4.28	4.28
								14.18	29.97	44.15

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ES	10.0	0.25
EI	608.0	15.47
EM	480.0	12.22
MS	56.0	1.88
PP	4.5	0.15
SUM	1158.5	29.97

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
COMPUTER CONTROL SYSTEM MODS	1.1.3.2	2/13/87	3	DWINELL	S32	COMPUTER CONTROL SYSTEM MODS SUMMARY SHEET

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	COMPUTERS AND NETWORKS	1.1.3.2.1	S321	1.0	192.35	17.46	209.81	192.35	17.46	209.81
2	OPERATOR STATIONS	1.1.3.2.2	R322	1.0	98.00	18.32	116.32	98.00	18.32	116.32
3	DATA ACQUISITION/CONTROL HARDWR	1.1.3.2.3	S323	1.0	90.60	41.38	131.98	90.60	41.38	131.98
4	COMMERCIAL SOFTWARE	1.1.3.2.4	R324	1.0	50.00	0.00	50.00	50.00	0.00	50.00
5	CONTROL SYSTEM INSTALLATION	1.1.3.2.5	R325	1.0	24.85	24.24	49.09	24.85	24.24	49.09
								455.80	101.40	557.20

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	2952.0	75.13
EM	1000.0	25.45
PE	24.0	0.82
SUM	3976.0	101.40

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
COMPUTERS AND NETWORKS	1.1.3.2.1	2/13/87	1	KRUP	S321	COMPUTER CONTROL SYSTEM MODS

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	COMPUTER SYSTEM HARDWARE	1.1.3.2.1.1	R3211	1.0	157.00	15.27	172.27	157.00	15.27	172.27
2	COMPUTER NETWORK HARDWARE	1.1.3.2.1.2	R3212	1.0	35.35	2.19	37.54	35.35	2.19	37.54
								192.35	17.46	209.81

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	566.0	14.40
EM	120.0	3.05
SUM	686.0	17.46

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
DATA ACQUISITION/CONTROL HARDWR	1.1.3.2.3	1/26/87	2	KRUP	S323	DATA ACQUISITION & CONTROL HARDWARE SUMMARY

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	RF SYSTEM DATA ACQ.	1.1.3.2.3.1	R3231	1.0	9.70	5.29	14.99	9.70	5.29	14.99
2	VACUUM SYSTEM DATA ACQ.	1.1.3.2.3.2	R3232	1.0	10.70	4.48	15.18	10.70	4.48	15.18
3	RING P.S. DATA ACQ.	1.1.3.2.3.3	R3233	1.0	26.60	11.55	38.15	26.60	11.55	38.15
4	RING BEAM MONIT. (BIE,ORBIT)	1.1.3.2.3.4	R3234	1.0	26.40	12.62	39.02	26.40	12.62	39.02
5	INTERLOCKS DATA ACQ.	1.1.3.2.3.5	R3235	1.0	17.20	7.43	24.63	17.20	7.43	24.63
								90.60	41.38	131.98

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	866.0	22.04
EM	760.0	19.34
SUM	1626.0	41.38

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
CONTROL ROOM CONSOLIDATION	1.1.3.3	1/26/87	2	DWINELL	S33	CONTROL ROOM CONSOLIDATION SUMMARY SHEET

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	HILAC INSTRUMENTATION	1.1.3.3.1	Q331	1.0	674.54	142.94	817.48	674.54	142.94	817.48
2	SYNCHROTRON INSTRUMENTATION	1.1.3.3.2	S332	1.0	95.75	79.71	175.46	95.75	79.71	175.46
								770.29	222.65	992.94

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	7064.0	179.78
EM	1656.0	42.15
MT	8.0	0.18
PE	16.0	0.55
SUM	8744.0	222.65

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
HILAC INSTRUMENTATION	1.1.3.3.1	1/26/87	2	CAT	Q331	

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	HILAC RF SYSTEM	1.1.3.3.1.1	Q3311	1.0	4.05	9.37	13.42	4.05	9.37	13.42
2	ADAM INJECTOR	1.1.3.3.1.2	Q3312	1.0	38.25	10.87	49.12	38.25	10.87	49.12
3	EVE INJECTOR	1.1.3.3.1.3	Q3313	1.0	36.50	5.09	41.59	36.50	5.09	41.59
4	TV DISTRIBUTION	1.1.3.3.1.4	Q3314	1.0	16.20	6.31	22.51	16.20	6.31	22.51
5	ANALOG SIG. DISTRIBUTION	1.1.3.3.1.5	Q3315	1.0	151.88	25.86	177.74	151.88	25.86	177.74
6	REPLACE MODCOMP	1.1.3.3.1.6	Q3316	1.0	284.42	66.17	350.59	284.42	66.17	350.59
7	A AREA	1.1.3.3.1.7	Q3317	1.0	38.74	7.98	46.72	38.74	7.98	46.72
8	STRIPPER FOIL CONTROL	1.1.3.3.1.8	Q3318	1.0	2.50	5.60	8.10	2.50	5.60	8.10
9	CONTROL ROOM MODIFICATIONS	1.1.3.3.1.9	Q3319	1.0	102.00	5.70	107.70	102.00	5.70	107.70
								674.54	142.94	817.48

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	5312.0	135.19
EM	276.0	7.02
MT	8.0	0.18
PE	16.0	0.55
SUM	5612.0	142.94

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
SYNCHROTRON INSTRUMENTATION	1.1.3.3.2	12/23/86	1	DWINELL	S332	BEVATRON INSTRUMENTATION SUMMARY SHEET

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	TRANSFER LINE INSTRUMENTATION	1.1.3.3.2.1	R3321	1.0	10.10	4.22	14.32	10.10	4.22	14.32
2	BEV INJ. INSTRUMENTATION	1.1.3.3.2.3	R3323	1.0	20.30	5.70	26.00	20.30	5.70	26.00
3	EPB INSTRUMENTATION	1.1.3.3.2.4	R3324	1.0	23.45	11.55	35.00	23.45	11.55	35.00
4	MG ROOM INSTRUMENTATION	1.1.3.3.2.5	R3325	1.0	36.50	14.56	51.06	36.50	14.56	51.06
5	CONTROL ROOM INSTR. MODS.	1.1.3.3.2.6	R3326	1.0	5.40	43.67	49.07	5.40	43.67	49.07
								95.75	79.71	175.46

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	1752.0	44.59
EM	1380.0	35.12
SUM	3132.0	79.71

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
CONVENTIONAL FACILITIES	1.1.4	1/26/87	2	KRUP	S4	CONVENTIONAL FACILITIES SUMMARY SHEET

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	SITE CLEARANCE & PREPARATION	1.1.4.1	S41	1.0	359.10	698.72	1057.82	359.10	698.72	1057.82
2	SHIELDING MODIFICATIONS	1.1.4.2	S42	1.0	148.97	93.29	242.26	148.97	93.29	242.26
3	UTILITIES - MECHANICAL	1.1.4.3	S43	1.0	204.00	11.06	215.06	204.00	11.06	215.06
4	UTILITIES - ELECTRICAL	1.1.4.4	S44	1.0	19.84	35.48	55.32	19.84	35.48	55.32
								731.91	838.56	1570.47

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	606.0	15.42
EM	996.0	25.35
MS	864.4	28.96
MT	7962.0	179.15
PC	288.0	9.86
PE	1336.0	45.76
PPL	12.0	0.41
RG	17104.2	533.65
SUM	29168.6	838.56

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
SITE CLEARANCE & PREPARATION	1.1.4.1	2/13/87	3	KRUP	S41	SITE CLEARANCE & PREPARATION SUMMARY SHEET

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	SITE PREP & SHLDNG MANIPULTN	1.1.4.1.1	X411	1.0	8.80	31.82	40.62	8.80	31.82	40.62
2	BEVATRON MAGNET YOKES	1.1.4.1.2	X412	1.0	122.99	248.10	371.09	122.99	248.10	371.09
3	BEVATRON MAGNET LEG SLABS	1.1.4.1.3	X413	1.0	0.00	17.97	17.97	0.00	17.97	17.97
4	BEVATRON MAGNET COILS & TIPS	1.1.4.1.4	X414	1.0	0.00	91.86	91.86	0.00	91.86	91.86
5	BEVATRON VACUUM SYSTEMS	1.1.4.1.5	X415	1.0	2.00	72.00	74.00	2.00	72.00	74.00
6	BEAM LINE REMOVALS	1.1.4.1.6	S416	1.0	0.00	56.70	56.70	0.00	56.70	56.70
7	BEVATRON ELECTRICAL SYSTEMS	1.1.4.1.7	S417	1.0	0.00	35.05	35.05	0.00	35.05	35.05
8	MISC. BEVATRON SYSTEMS	1.1.4.1.8	X418	1.0	0.00	16.11	16.11	0.00	16.11	16.11
9	DISPOSAL	1.1.4.1.9	X419	1.0	225.31	129.11	354.41	225.31	129.11	354.41
								359.10	698.72	1057.82

LABOR SUMMARY		
Craft Code	Total Hours	Total Labor K$
EI	606.0	15.42
EM	996.0	25.35
MS	302.4	10.13
MT	7962.0	179.15
PC	288.0	9.86
PE	300.0	10.28
PPL	12.0	0.41
RG	14363.0	448.13
SUM	24829.4	698.72

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
BEAM LINE REMOVALS	1.1.4.1.6	2/13/87	1	KRUP	S416	SITE CLEARANCE AND PREPARATION

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	INJECTION CHANNEL REMOVAL	1.1.4.1.6.2	X4162	1.0	0.00	34.67	34.67	0.00	34.67	34.67
2	REMOVE EPB 0 CHANNEL	1.1.4.1.6.3	X4163	1.0	0.00	22.03	22.03	0.00	22.03	22.03
								0.00	56.70	56.70

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	440.0	11.20
MT	350.0	7.88
PE	140.0	4.80
PPL	12.0	0.41
RG	1039.0	32.42
SUM	1981.0	56.70

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
SHIELDING MODIFICATIONS	1.1.4.2	1/26/87	2	KRUP	S42	SHIELDING MODIFICATIONS SUMMARY SHEET

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	SYNCHROTRON SHIELDING MODS	1.1.4.2.1	X421	1.0	4.00	5.99	9.99	4.00	5.99	9.99
2	INJECTION AREA SHIELDING	1.1.4.2.2	X422	1.0	85.57	55.64	141.21	85.57	55.64	141.21
3	EXTRCTION AREA SHLDING MODS	1.1.4.2.3	X423	1.0	2.70	5.30	8.00	2.70	5.30	8.00
4	EPB SHIELDING MODS	1.1.4.2.4	X424	1.0	56.70	21.37	78.07	56.70	21.37	78.07
5	EMITTANCE MATCHER	1.1.4.2.7	X427	1.0	0.00	4.99	4.99	0.00	4.99	4.99
								148.97	93.29	242.26

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	269.0	9.01
RG	2701.2	84.28
SUM	2970.2	93.29

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
UTILITIES - MECHANICAL	1.1.4.3	1/26/87	2	KRUP	S43	UTILITIES - MECHANICAL SUMMARY SHEET

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	HVAC	1.1.4.3.1	X431	1.0	2.00	11.06	13.06	2.00	11.06	13.06
2	COOLING	1.1.4.3.2	X432	1.0	172.00	0.00	172.00	172.00	0.00	172.00
3	FIRE HAZARD CONTROL	1.1.4.3.3	X433	1.0	10.00	0.00	10.00	10.00	0.00	10.00
4	UTILITIES	1.1.4.3.4	X434	1.0	20.00	0.00	20.00	20.00	0.00	20.00
								204.00	11.06	215.06

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	293.0	9.82
RG	40.0	1.25
SUM	333.0	11.06

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
UTILITIES - ELECTRICAL	1.1.4.4	1/26/87	2	KRUP	S44	UTILITIES - ELECTRICAL SUMMARY SHEET

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	AC POWER DISTRIBUTION	1.1.4.4.1	E441	1.0	13.78	28.91	42.69	13.78	28.91	42.69
2	CABLE TRAYS	1.1.4.4.2	E442	1.0	6.06	6.58	12.64	6.06	6.58	12.64
								19.84	35.48	55.32

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
PE	1036.0	35.48
SUM	1036.0	35.48

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
ED&I	1.2	2/2/87	1	KRUP	S12	ED&I SUMMARY

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	SYNCHROTRON RING SYSTEMS	1.2.1	S121	1.0	513.00	3427.11	3940.11	513.00	3427.11	3940.11
2	BEAM LINE MODIFICATIONS	1.2.2	S122	1.0	57.00	387.13	444.13	57.00	387.13	444.13
3	INSTRUMENTATION AND CONTROLS	1.2.3	S123	1.0	147.00	975.48	1122.48	147.00	975.48	1122.48
4	CONVENTIONAL FACILITIES	1.2.4	S124	1.0	44.00	287.55	331.55	44.00	287.55	331.55
								761.00	5077.26	5838.26

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EE	18870.0	875.57
EC	20450.0	686.10
ED	8070.0	205.38
CP	8900.0	412.96
MT	6300.0	141.75
ME	25180.0	1233.82
MD	37340.0	1344.24
MES	7715.0	177.45
SUM	132825.0	5077.26

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
SYNCHROTRON RING SYSTEMS	1.2.1	2/2/97	1	KRUP	S121	ED&I SUMMARY

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	MAGNETS & SUPPORTS	1.2.1.1	S1211	1.0	166.00	1112.55	1278.55	166.00	1112.55	1278.55
2	RING VACUUM SYSTEM	1.1.1.2	S1212	1.0	142.00	948.10	1090.10	142.00	948.10	1090.10
3	RF SYSTEM	1.2.1.3	S1213	1.0	74.00	489.21	563.21	74.00	489.21	563.21
4	RING POWER SUPPLIES	1.2.1.4	S1214	1.0	122.00	815.54	937.54	122.00	815.54	937.54
5	BEAM MONITORING DEVICES	1.2.1.5	S1215	1.0	5.00	32.81	37.81	5.00	32.81	37.81
6	SURVEY AND ALIGNMENT	1.2.1.6	S1216	1.0	4.00	28.90	32.90	4.00	28.90	32.90
								513.00	3427.11	3940.11

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EE	14200.0	658.88
EC	10800.0	362.34
ED	5400.0	137.43
MT	5700.0	128.25
ME	20180.0	988.82
MD	28680.0	1032.48
MES	5170.0	118.91
SUM	90130.0	3427.11

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
BEAM LINE MODIFICATIONS	1.2.2	2/2/87	1	KRUP	S122	ED&I SUMMARY

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	MAGNETS & SUPPORTS	1.2.2.1	S1221	1.0	28.00	189.80	217.80	28.00	189.80	217.80
2	VACUUM SYSTEMS	1.2.2.2	S1222	1.0	15.00	97.92	112.92	15.00	97.92	112.92
3	BEAM INSTRUMENTATION	1.2.2.3	S1223	1.0	9.00	62.73	71.73	9.00	62.73	71.73
4	POWER SUPPLIES	1.2.2.4	S1224	1.0	5.00	36.68	41.68	5.00	36.68	41.68
								57.00	387.13	444.13

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EE	240.0	11.14
EC	640.0	21.47
ED	160.0	4.07
MT	600.0	13.50
ME	2430.0	119.07
MD	5410.0	194.76
MES	1005.0	23.12
SUM	10485.0	387.13

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
INSTRUMENTATION AND CONTROLS	1.2.3	2/2/87	1	DWINELL	S123	ED&I SUMMARY

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	LOW LEVEL ELECTRONICS	1.2.3.1	S1231	1.0	25.00	166.74	191.74	25.00	166.74	191.74
2	COMPUTER CONTROL SYSTEM MODS	1.2.3.2	S1232	1.0	51.00	340.26	391.26	51.00	340.26	391.26
3	CONTROL ROOM CONSOLIDATION	1.2.3.3	S1233	1.0	71.00	468.47	539.47	71.00	468.47	539.47
								147.00	975.48	1122.48

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EE	4400.0	204.16
EC	8800.0	295.24
ED	2480.0	63.12
CP	8900.0	412.96
SUM	24580.0	975.48

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
CONVENTIONAL FACILITIES	1.2.4	2/2/87	1	KRUP	S124	ED&I SUMMARY

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	SITE CLEARANCE & PREP	1.2.4.1	S1241	1.0	27.00	184.50	211.50	27.00	184.50	211.50
2	SHIELDING MODIFICATIONS	1.2.4.2	S1242	1.0	7.00	45.36	52.36	7.00	45.36	52.36
3	UTILITIES - MECHANICAL	1.2.4.3	S1243	1.0	8.00	48.49	56.49	8.00	48.49	56.49
4	UTILITIES - ELECTRICAL	1.2.4.4	S1244	1.0	2.00	9.20	11.20	2.00	9.20	11.20
								44.00	287.55	331.55

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EE	30.0	1.39
EC	210.0	7.05
ED	30.0	0.76
ME	2570.0	125.93
MD	3250.0	117.00
MES	1540.0	35.42
SUM	7630.0	287.55

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
PROJECT MANAGEMENT	1.3	1/21/87	3	ALONSO	SA13	PROJECT MANAGEMENT SUMMARY

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	PROJECT DIRECTION/MANAGEMENT	1.3.1	SA131	1.0	130.00	913.44	1043.44	130.00	913.44	1043.44
2	PROJECT OFFICE SERVICES	1.3.2	SA132	1.0	17.05	113.68	130.73	17.05	113.68	130.73
3	PROJECT FINANCIAL TRACKING	1.3.3	SA133	1.0	25.57	170.52	196.09	25.57	170.52	196.09
4	INCREMENTAL INDIRECTS	1.3.4	SA134	1.0	340.00	0.00	340.00	340.00	0.00	340.00
								512.62	1197.64	1710.26

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EE	6000.0	278.40
ME	6000.0	294.00
PH	12000.0	341.04
AA	10000.0	284.20
SUM	34000.0	1197.64

BEVATRON UPGRADE

C O S T S U M M A R Y

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	N O T E S
CONTINGENCY	1.4	2/2/87	1	KRUP	S14	CONTINGENCY SUMMARY

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	SYNCHROTRON RING SYSTEMS	1.4.1	S141	1.0	4953.00	0.00	4953.00	4953.00	0.00	4953.00
2	MODIFICATIONS TO BEAM LINES	1.4.2	S142	1.0	559.00	0.00	559.00	559.00	0.00	559.00
3	INSTRUMENTATION AND CONTROLS	1.4.3	S143	1.0	693.00	0.00	693.00	693.00	0.00	693.00
4	CONVENTIONAL FACILITIES	1.4.4	S144	1.0	497.00	0.00	497.00	497.00	0.00	497.00
5	PROJECT MANAGEMENT	1.4.5	S145	1.0	215.00	0.00	215.00	215.00	0.00	215.00
								6917.00	0.00	6917.00

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.00

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
SYNCHROTRON RING SYSTEMS	1.4.1	2/2/87	1	KRUP	S141	CONTINGENCY SUMMARY

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	MAGNETS & SUPPORTS	1.4.1.1	S1411	1.0	1746.00	0.00	1746.00	1746.00	0.00	1746.00
2	RING VACUUM SYSTEM	1.4.1.2	S1412	1.0	1424.00	0.00	1424.00	1424.00	0.00	1424.00
3	RF SYSTEM	1.4.1.3	S1413	1.0	401.00	0.00	401.00	401.00	0.00	401.00
4	RING POWER SUPPLIES	1.4.1.4	S1414	1.0	1300.00	0.00	1300.00	1300.00	0.00	1300.00
5	BEAM MONITORING DEVICES	1.4.1.5	S1415	1.0	27.00	0.00	27.00	27.00	0.00	27.00
6	SURVEY & ALIGNMENT	1.4.1.6	S1416	1.0	55.00	0.00	55.00	55.00	0.00	55.00
								4953.00	0.00	4953.00

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.00

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
MODIFICATIONS TO BEAM LINES	1.4.2	2/2/87	1	KRUP	S142	CONTINGENCY SUMMARY

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	MAGNETS AND SUPPORTS	1.4.2.1	S1421	1.0	303.00	0.00	303.00	303.00	0.00	303.00
2	VACUUM SYSTEMS	1.4.2.2	S1422	1.0	135.00	0.00	135.00	135.00	0.00	135.00
3	MECH. BEAM INSTRUMENTATION	1.4.2.3	S1423	1.0	73.00	0.00	73.00	73.00	0.00	73.00
4	POWER SUPPLIES	1.4.2.4	S1424	1.0	48.00	0.00	48.00	48.00	0.00	48.00
								559.00	0.00	559.00

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.00

BEVATRON UPGRADE

COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
INSTRUMENTATION AND CONTROLS	1.4.3	2/2/87	1	DWINELL	S143	CONTINGENCY SUMMARY

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	LOW LEVEL ELECTRONICS	1.4.3.1	S1431	1.0	192.00	0.00	192.00	192.00	0.00	192.00
2	COMPUTER CONTROL SYSTEM MODS	1.4.3.2	S1432	1.0	207.00	0.00	207.00	207.00	0.00	207.00
3	CONTROL ROOM CONSOLIDATION	1.4.3.3	S1433	1.0	294.00	0.00	294.00	294.00	0.00	294.00
								693.00	0.00	693.00

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.00

BEVATRON UPGRADE

.COST SUMMARY

Major Component/Subcomponent	WBS	Date	Version	Name	FILENAME	NOTES
CONVENTIONAL FACILITIES	1.4.4	2/2/87	1	KRUP	S144	CONTINGENCY SUMMARY

Item No.	ITEM TITLE	WBS NUMBER	FILE NAME	QTY. REQD.	MAT'L K$	LABOR K$	TOTAL K$	TOTAL MAT'L K$	TOTAL LABOR K$	GRAND TOTAL K$
1	SITE CLEARANCE & PREP	1.4.4.1	S1441	1.0	354.00	0.00	354.00	354.00	0.00	354.00
2	SHIELDING MODIFICATIONS	1.4.4.2	S1442	1.0	61.00	0.00	61.00	61.00	0.00	61.00
3	UTILITIES - MECHANICAL	1.4.4.3	S1443	1.0	64.00	0.00	64.00	64.00	0.00	64.00
4	UTILITIES - ELECTRICAL	1.4.4.4	S1444	1.0	18.00	0.00	18.00	18.00	0.00	18.00
								497.00	0.00	497.00

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.00

Section V

Cost Estimate Detail Listing

Section V Cost Estimate Detail Listing

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
COILS	1.1.1.1.1.1.1	1/8/87	2	TANABE	Y11111	LONG DIPOLE

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	CU CONDUCTOR	LB	100800	2.05	VQ	206.640			0.0			0.000	206.640
2	MISC. MATERIAL		1	10000.00	EU	10.000			0.0			0.000	10.000
3	LABOR					0.000	12	1752	21024.0	MS	33.50	704.304	704.304
						216.640			21024.0			704.304	920.944

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	21024.0	704.304
SUM	21024.0	704.304

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
YOKES	1.1.1.1.1.1.2	1/8/87	2	TANABE	Y11112	LONG DIPOLE

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	LAMINATE STEEL	SHEET	60000	6.40	VQ	384.000			0.0			0.000	384.000
2	MISC. MATERIAL	LB	12000	0.35	CP	4.200			0.0			0.000	4.200
3	LABOR					0.000	12	2708	32496.0	MS	33.50	1088.616	1088.616
						388.200			32496.0			1088.616	1476.816

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	32496.0	1088.616
SUM	32496.0	1088.616

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
FIXTURES	1.1.1.1.1.1.3	1/8/87	2	TANABE	Y11113	LONG DIPOLE

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	JACKS	EA	16	250.00	VQ	4.000			0.0			0.000	4.000
2	MISC. MATERIAL	LB	1500	0.35	CP	0.525			0.0			0.000	0.525
3	STAMPING DIE	EA	1	50000.00	VQ	50.000			0.0			0.000	50.000
4	LABOR					0.000	1	3680	3680.0	MS	33.50	123.280	123.280
						54.525			3680.0			123.280	177.805

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	3680.0	123.280
SUM	3680.0	123.280

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
ASSEMBLY & TEST	1.1.1.1.1.1.4	1/8/87	2	TANABE	Y11114	LONG DIPOLE

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	THERMAL INTLK	EA	96	12.00	CP	1.152			0.0			0.000	1.152
2	FLOW INTLK	EA	24	300.00	CP	7.200			0.0			0.000	7.200
3	MISC. MATERIAL		1	1000.00	EU	1.000			0.0			0.000	1.000
4	LABOR					0.000	12	406	4872.0	MS	33.50	163.212	163.212
						9.352			4872.0			163.212	172.564

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	4872.0	163.212
SUM	4872.0	163.212

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
COILS	1.1.1.1.1.2.1	1/8/87	2	TANABE	Y11121	SHORT DIPOLE

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	CU CONDUCTOR	LB	59800	2.05	VQ	122.590			0.0			0.000	122.590
2	MISC MATERIAL		1	10000.00	EU	10.000			0.0			0.000	10.000
3	LABOR					0.000	13	1080	14040.0	MS	33.50	470.340	470.340
						132.590			14040.0			470.340	602.930

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	14040.0	470.340
SUM	14040.0	470.340

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
YOKES	1.1.1.1.1.2.2	1/8/87	2	TANABE	Y11122	SHORT DIPOLE

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	LAMINATED STEEL	SHEET	24700	6.40	VQ	158.080			0.0			0.000	158.080
2	MISC MATERIAL	LB	7800	0.35	CP	2.730			0.0			0.000	2.730
3	LABOR					0.000	13	1030	13390.0	MS	33.50	448.565	448.565
						160.810			13390.0			448.565	609.375

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	13390.0	448.565
SUM	13390.0	448.565

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
FIXTURES	1.1.1.1.1.2.3	1/8/87	2	TANABE	Y11123	SHORT DIPOLE

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	JACKS	EA	16	250.00	VQ	4.000			0.0			0.000	4.000
2	MISC MATERIAL	LB	1000	0.35	CP	0.350			0.0			0.000	0.350
3	LABOR					0.000	2	1200	2400.0	MS	33.50	80.400	80.400
						4.350			2400.0			80.400	84.750

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	2400.0	80.400
SUM	2400.0	80.400

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
ASSEMBLY & TEST	1.1.1.1.1.2.4	1/8/87	2	TANABE	Y11124	SHORT DIPOLE

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	THERMAL INTERLOCK	EA	104	12.00	CP	1.248			0.0			0.000	1.248
2	FLOW INTERLOCK	EA	26	300.00	CP	7.800			0.0			0.000	7.800
3	MISC MATERIAL	EA	1	1000.00	EU	1.000			0.0			0.000	1.000
4	LABOR					0.000	13	366	4758.0	MS	33.50	159.393	159.393
						10.048			4758.0			159.393	169.441

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	4758.0	159.393
SUM	4758.0	159.393

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
COILS	1.1.1.1.2.1.1	1/12/87	3	TANABE	Y11211	LONG (F) QUADRUPOLES

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	CU CONDUCTOR	LB	8800	5.00	EU	44.000			0.0			0.000	44.000
2	MISC MATERIAL		1	6500.00	EU	6.500			0.0			0.000	6.500
3	LABOR					0.000	11	432	4752.0	MS	33.50	159.192	159.192
						50.500			4752.0			159.192	209.692

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	4752.0	159.192
SUM	4752.0	159.192

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
YOKES	1.1.1.1.2.1.2	1/12/87	3	TANABE	Y11212	LONG (F) QUADRUPOLES

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	LAMINATED STEEL	SHEET	11440	4.00	EU	45.760			0.0			0.000	45.760
2	MISC MATERIAL		1	1800.00	CP	1.800			0.0			0.000	1.800
3	LABOR					0.000	11	212	2332.0	MS	33.50	78.122	78.122
						47.560			2332.0			78.122	125.682

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	2332.0	78.122
SUM	2332.0	78.122

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
FIXTURES	1.1.1.1.2.1.3	1/12/87	2	TANABE	Y11213	LDNG (F) QUADRUPOLES

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	JACKS	EA	2	250.00	VQ	0.500			0.0			0.000	0.500
2	MISC MATERIAL		1	1500.00	CP	1.500			0.0			0.000	1.500
3	STAMPING DIE	EA	1	15000.00	EU	15.000			0.0			0.000	15.000
4	LABOR					0.000	2	240	480.0	MS	33.50	16.080	16.080
						17.000			480.0			16.080	33.080

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	480.0	16.080
SUM	480.0	16.080

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
ASSEMBLY & TEST	1.1.1.1.2.1.4	1/12/87	3	TANABE	Y11214	LONG (F) QUADRUPOLES

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	THERMAL INTERLOCKS	EA	176	12.00	CP	2.112			0.0			0.000	2.112
2	FLOW INTERLOCKS	EA	22	300.00	CP	6.600			0.0			0.000	6.600
3	MISC MATERIAL		1	1000.00	EU	1.000			0.0			0.000	1.000
4	LABOR					0.000	11	222	2442.0	MS	33.50	81.807	81.807
						9.712			2442.0			81.807	91.519

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	2442.0	81.807
SUM	2442.0	81.807

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
COILS	1.1.1.1.2.2.1	1/12/87	2	TANABE	Y11221	SHORT (D) QUADRUPOLES

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	CU CONDUCTOR	LB	6840	5.00	EU	34.200			0.0			0.000	34.200
2	MISC MATERIAL		1	4600.00	EU	4.600			0.0			0.000	4.600
3	LABOR					0.000	12	432	5184.0	MS	33.50	173.664	173.664
						38.800			5184.0			173.664	212.464

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	5184.0	173.664
SUM	5184.0	173.664

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
YOKES	1.1.1.1.2.2.2	1/12/87	2	TANABE	Y11222	SHORT (D) QUADRUPOLES

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	LAMINATED STEEL	SHEET	8400	4.00	EU	33.600			0.0			0.000	33.600
2	MISC MATERIAL		1	4600.00	EU	4.600			0.0			0.000	4.600
3	LABOR					0.000	12	196	2352.0	MS	33.50	78.792	78.792
						38.200			2352.0			78.792	116.992

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	2352.0	78.792
SUM	2352.0	78.792

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
FIXTURES	1.1.1.1.2.2.3	1/12/87	2	TANABE	Y11223	SHORT (D) QUADRUPOLES

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	JACKS	EA	2	250.00	VQ	0.500			0.0			0.000	0.500
2	MISC MATERIALS		1	1500.00	CP	1.500			0.0			0.000	1.500
3	LABOR					0.000	2	240	480.0	MS	33.50	16.080	16.080
						2.000			480.0			16.080	18.080

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	480.0	16.080
SUM	480.0	16.080

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
ASSEMBLY & TEST	1.1.1.1.2.2.4	1/12/87	2	TANABE	Y11224	SHORT (D) QUADRUPOLES

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	THERMAL INTERLOCKS	EA	192	12.00	CP	2.304			0.0			0.000	2.304
2	FLOW INTERLOCK	EA	24	300.00	CP	7.200			0.0			0.000	7.200
3	MISC MATERIAL		1	1000.00	EU	1.000			0.0			0.000	1.000
4	LABOR					0.000	12	222	2664.0	MS	33.50	89.244	89.244
						10.504			2664.0			89.244	99.748

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	2664.0	89.244
SUM	2664.0	89.244

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
COILS	1.1.1.1.2.3.1	1/12/87	2	TANABE	Y11231	SPECIAL QUADRUPOLE

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	CU CONDUCTOR	LB	800	5.00	EU	4.000			0.0			0.000	4.000
2	MISC MATERIAL		1	750.00	EU	0.750			0.0			0.000	0.750
3	LABOR					0.000	1	432	432.0	MS	33.50	14.472	14.472
						4.750			432.0			14.472	19.222

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	432.0	14.472
SUM	432.0	14.472

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
YOKES	1.1.1.1.2.3.2	1/12/87	2	TANABE	Y11232	SPECIAL QUADRUPOLE

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	LAMINATED STEEL	SHEET	1040	4.00	EU	4.160			0.0			0.000	4.160
2	MISC MATERIAL		1	250.00	CP	0.250			0.0			0.000	0.250
3	LABOR					0.000	1	212	212.0	MS	33.50	7.102	7.102
						4.410			212.0			7.102	11.512

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	212.0	7.102
SUM	212.0	7.102

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
FIXTURES	1.1.1.1.2.3.3	1/12/87	2	TANABE	Y11233	SPECIAL QUADRUPOLE

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	JACKS	EA	2	250.00	VQ	0.500			0.0			0.000	0.500
2	MISC MATERIAL		1	800.00	CP	0.800			0.0			0.000	0.800
3	STAMPING DIE	EA	1	15000.00	EU	15.000			0.0			0.000	15.000
4	LABOR					0.000	1	280	280.0	MS	33.50	9.380	9.380
						16.300			280.0			9.380	25.680

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	280.0	9.380
SUM	280.0	9.380

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
ASSEMBLY AND TEST	1.1.1.1.2.3.4	1/12/87	2	TANABE	Y11234	SPECIAL QUADRUPOLE

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	THERMAL INTERLOCKS	EA	16	12.00	CP	0.192			0.0			0.000	0.192
2	FLOW INTERLOCK	EA	2	300.00	CP	0.600			0.0			0.000	0.600
3	MISC MATERIAL		1	120.00	EU	0.120			0.0			0.000	0.120
4	LABOR					0.000	1	222	222.0	MS	33.50	7.437	7.437
						0.912			222.0			7.437	8.349

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	222.0	7.437
SUM	222.0	7.437

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
COILS	1.1.1.1.2.4.1	12/1/86	1	TANABE	Y11241	SKEW QUADRUPOLES

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	CU CONDUCTOR	LB	360	5.00	EU	1.800			0.0			0.000	1.800
2	MISC MATERIAL		1	400.00	EU	0.400			0.0			0.000	0.400
3	LABOR					0.000	2	128	256.0	MS	33.50	8.576	8.576
						2.200			256.0			8.576	10.776

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	256.0	8.576
SUM	256.0	8.576

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
YOKES	1.1.1.1.2.4.2	12/1/86	1	TANABE	Y11242	SKEW QUADRUPOLES

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	LAMINATED STEEL	SHEET	566	4.75	EU	2.689			0.0			0.000	2.689
2	MISC MATERIAL		1	160.00	CP	0.160			0.0			0.000	0.160
3	LABOR					0.000	2	58	116.0	MS	33.50	3.886	3.886
						2.849			116.0			3.886	6.735

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	116.0	3.886
SUM	116.0	3.886

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
FIXTURES	1.1.1.1.2.4.3	12/1/86	1	TANABE	Y11243	SKEW QUADRUPOLES

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	JACKS	EA	2	250.00	VQ	0.500			0.0			0.000	0.500
2	MISC MATERIAL		1	1200.00	CP	1.200			0.0			0.000	1.200
3	STAMPING DIE	EA	1	15000.00	EU	15.000			0.0			0.000	15.000
4	LABOR					0.000	2	80	160.0	MS	33.50	5.360	5.360
						16.700			160.0			5.360	22.060

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	160.0	5.360
SUM	160.0	5.360

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
ASSEMBLY AND TEST	1.1.1.1.2.4.4	12/1/86	1	TANABE	Y11244	SKEW QUADRUPOLES

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	THERMAL INTERLOCKS	EA	8	12.00	CP	0.096			0.0			0.000	0.096
2	MISC MATERIAL		1	120.00	EU	0.120			0.0			0.000	0.120
3	LABOR					0.000	2	38	76.0	MS	33.50	2.546	2.546
						0.216			76.0			2.546	2.762

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	76.0	2.546
SUM	76.0	2.546

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
COILS	1.1.1.1.3.1.1	1/12/87	2	TANABE	Y11311	X-SEXTUPOLES

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	CU CONDUCTOR	LB	390	5.00	EU	1.950			0.0			0.000	1.950
2	MISC MATERIAL		1	1000.00	EU	1.000			0.0			0.000	1.000
3	LABOR					0.000	6	264	1584.0	MS	33.50	53.064	53.064
						2.950			1584.0			53.064	56.014

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	1584.0	53.064
SUM	1584.0	53.064

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
YOKES	1.1.1.1.3.1.2	1/12/87	2	TANABE	Y11312	X-SEXTUPOLES

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	LAMINATED STEEL	SHEET	2520	2.50	EU	6.300			0.0			0.000	6.300
2	MISC MATERIAL		1	600.00	EU	0.600			0.0			0.000	0.600
3	LABOR					0.000	6	96	576.0	MS	33.50	19.296	19.296
						6.900			576.0			19.296	26.196

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	576.0	19.296
SUM	576.0	19.296

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
FIXTURES	1.1.1.1.3.1.3	1/12/87	2	TANABE	Y11313	X-SEXTUPOLES

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	JACKS	EA	4	250.00	VQ	1.000			0.0			0.000	1.000
2	MISC MATERIAL		1	600.00	CP	0.600			0.0			0.000	0.600
3	STAMPING DIE	EA	1	17000.00	EU	17.000			0.0			0.000	17.000
4	LABOR					0.000	1	120	120.0	MS	33.50	4.020	4.020
						18.600			120.0			4.020	22.620

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	120.0	4.020
SUM	120.0	4.020

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
ASSEMBLY AND TEST	1.1.1.1.3.1.4	1/12/87	2	TANABE	Y11314	X-SEXTUPOLES

Item No.	ITEM TITLE	Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	THERMAL INTERLOCKS	EA	36	12.00	CP	0.432			0.0			0.000	0.432
2	MISC MATERIAL		1	500.00	EU	0.500			0.0			0.000	0.500
3	LABOR					0.000	6	82	492.0	MS	33.50	16.482	16.482
						0.932			492.0			16.482	17.414

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	492.0	16.482
SUM	492.0	16.482

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
COILS	1.1.1.1.3.2.1	1/12/87	2	TANABE	Y11321	Y-SEXTUPOLES

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	CU CONDUCTOR	LB	390	5.00	EU	1.950			0.0			0.000	1.950
2	MISC MATERIAL		1	1000.00	EU	1.000			0.0			0.000	1.000
3	LABOR					0.000	6	264	1584.0	MS	33.50	53.064	53.064
						2.950			1584.0			53.064	56.014

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	1584.0	53.064
SUM	1584.0	53.064

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
YOKES	1.1.1.1.3.2.2	1/12/87	2	TANABE	Y11322	Y-SEXTUPOLES

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	LAMINATED STEEL	SHEETS	2520	2.50	EU	6.300			0.0			0.000	6.300
2	MISC MATERIAL		1	600.00	EU	0.600			0.0			0.000	0.600
3	LABOR					0.000	6	96	576.0	MS	33.50	19.296	19.296
						6.900			576.0			19.296	26.196

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	576.0	19.296
SUM	576.0	19.296

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
ASSEMBLY AND TEST	1.1.1.1.3.2.4	1/12/87	2	TANABE	Y11324	Y-SEXTUPOLES

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	THERMAL INTERLOCK	EA	36	12.00	CP	0.432			0.0			0.000	0.432
2	MISC MATERIAL		1	500.00	EU	0.500			0.0			0.000	0.500
3	LABOR					0.000	6	82	492.0	MS	33.50	16.482	16.482
						0.932			492.0			16.482	17.414

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	492.0	16.482
SUM	492.0	16.482

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
SEPTUM MAGNET	1.1.1.1.5.1	12/11/86	1	TANABE	Y1151	INJECTION ELEMENTS

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	COIL		1	20.00	EU	0.020	1	600	600.0	MS	33.50	20.100	20.120
2	CORE	LB	450	0.33	EU	0.149	1	440	440.0	MS	33.50	14.740	14.889
3	TOOLING		1	300.00	EU	0.300	1	160	160.0	MS	33.50	5.360	5.660
4	ASSEMBLY AND TEST		1	524.00	EU	0.524	1	400	400.0	MS	33.50	13.400	13.924
						0.993			1600.0			53.600	54.593

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	1600.0	53.600
SUM	1600.0	53.600

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
ELECTROSTATIC INFLECTOR	1.1.1.1.5.2	12/11/86	1	TANABE	Y1152	INJECTION ELEMENTS

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	CATHODE	LB	96	4.00	CP	0.384	1	440	440.0	MS	33.50	14.740	15.124
2	ANODE		1	100.00	EU	0.100	1	360	360.0	MS	33.50	12.060	12.160
3	INSULATOR		1	1200.00	EU	1.200	1	48	48.0	MS	33.50	1.608	2.808
4	ASSEMBLY AND TEST					0.000	1	260	260.0	MS	33.50	8.710	8.710
						1.684			1108.0			37.118	38.802

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	1108.0	37.118
SUM	1108.0	37.118

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
SLOW BUMP MAGNETS	1.1.1.1.5.3	12/12/86	1	TANABE	Y1153	INJECTION ELEMENTS

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	COIL	LB	60	5.00	EU	0.300	3	40	120.0	MS	33.50	4.020	4.320
2	CORE	CM(CUBED)	72000	0.25	EU	18.000	3	40	120.0	MS	33.50	4.020	22.020
3	TOOLING		1	200.00	EU	0.200	1	24	24.0	MS	33.50	0.804	1.004
4	ASSEMBLY AND TEST		1	672.00	EU	0.672	3	70	210.0	MS	33.50	7.035	7.707
5	MISC MATERIAL		1	200.00	EU	0.200			0.0			0.000	0.200
						19.372			474.0			15.879	35.251

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	474.0	15.879
SUM	474.0	15.879

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
THIN-SEPTUM MAGNET	1.1.1.1.6.1	12/11/86	1	TANABE	Y1161	EXTRACTION ELEMENTS

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	SEPTUM FAB		1	10.00	EU	0.010	1	440	440.0	MS	33.50	14.740	14.750
2	COIL		1	20.00	EU	0.020	1	680	680.0	MS	33.50	22.780	22.800
3	CORE	LB	450	0.33	CP	0.149	1	440	440.0	MS	33.50	14.740	14.889
4	TOOLING		1	500.00	CP	0.500	1	240	240.0	MS	33.50	8.040	8.540
5	ASSEMBLY AND TEST		1	474.00	EU	0.474	1	400	400.0	MS	33.50	13.400	13.874
						1.153			2200.0			73.700	74.853

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	2200.0	73.700
SUM	2200.0	73.700

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
THICK-SEPTUM MAGNET	1.1.1.1.6.2	12/11/86	1	TANABE	Y1162	EXTRACTION ELEMENTS

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	SEPTUM FAB		1	50.00	EU	0.050	1	720	720.0	MS	33.50	24.120	24.170
2	COIL		1	100.00	EU	0.100	1	1360	1360.0	MS	33.50	45.560	45.660
3	CORE	LB	3264	0.33	EU	1.077	1	640	640.0	MS	33.50	21.440	22.517
4	TOOLING		1	500.00	EU	0.500	1	520	520.0	MS	33.50	17.420	17.920
5	ASSEMBLY AND TEST		1	824.00	EU	0.824	1	640	640.0	MS	33.50	21.440	22.264
						2.551			3880.0			129.980	132.531

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	3880.0	129.980
SUM	3880.0	129.980

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
ELECTROSTATIC SEPTUM	1.1.1.1.6.3	12/11/86	1	TANABE	Y1163	EXTRACTION ELEMENTS

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	CATHODE	EA	100	4.00	EU	0.400	1	360	360.0	MS	33.50	12.060	12.460
2	ANODE		1	100.00	EU	0.100	1	280	280.0	MS	33.50	9.380	9.480
3	INSULATOR		1	1200.00	EU	1.200	1	48	48.0	MS	33.50	1.608	2.808
4	ASSEMBLY AND TEST		1	100.00	EU	0.100	1	220	220.0	MS	33.50	7.370	7.470
						1.800			908.0			30.418	32.218

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	908.0	30.418
SUM	908.0	30.418

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
FAST PERTURBATION QUAD	1.1.1.1.6.6	1/24/87	2	TANABE	Y1166	EXTRACTION ELEMENT

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	COIL	LB	74	5.00	EU	0.370	2	48	96.0	MS	33.50	3.216	3.586
2	YOKE	SHEET	1890	2.00	EU	3.780	2	68	136.0	MS	33.50	4.556	8.336
3	FIXTURES	EA	1	16200.00	EU	16.200	1	16	16.0	MS	33.50	0.536	16.736
4	ASSEMBLY AND TEST		2	298.00	EU	0.596	2	30	60.0	MS	33.50	2.010	2.606
						20.946			308.0			10.318	31.264

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	308.0	10.318
SUM	308.0	10.318

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
FAST EXTRACTION SEXTUPOLES	1.1.1.1.6.7	12/11/86	1	TANABE	Y1167	EXTRACTION ELEMENTS

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	COIL	LB	28.8	5.00	EU	0.144	2	60	120.0	MS	33.50	4.020	4.164
2	YOKE	SHEET	940	2.75	EU	2.585	2	52	104.0	MS	33.50	3.484	6.069
3	FIXTURE		1	18500.00	EU	18.500	1	16	16.0	MS	33.50	0.536	19.036
4	ASSEMBLY AND TEST		1	1844.00	EU	1.844	2	62	124.0	MS	33.50	4.154	5.998
5	MISC MATERIAL		1	600.00	EU	0.600			0.0			0.000	0.600
						23.673			364.0			12.194	35.867

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	364.0	12.194
SUM	364.0	12.194

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
STANDS & SUPPORTS	1.1.1.1.7	1/10/87	3	REIMERS	X117	MAGNETS AND SUPPORTS

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	DIPOLE SUPPORTS	EA	26	8000.00		208.000			0.0			0.000	208.000
2	QUAD SUPPORTS	EA	25	4000.00		100.000			0.0			0.000	100.000
3	SKEW QUAD SUPPORTS	EA	2	2000.00		4.000			0.0			0.000	4.000
4	SEXTUPOLE SUPPORTS	EA	12	2000.00		24.000			0.0			0.000	24.000
5	INJ SEPTUM SUPPORTS	EA	1	2000.00		2.000			0.0			0.000	2.000
6	E.S. INFL SUPPORTS	EA	1	2000.00		2.000			0.0			0.000	2.000
7	SLOW BUMP SUPPORTS	EA	3	2000.00		6.000			0.0			0.000	6.000
8	EXTR THIN SEPT SUPPORT	EA	1	2000.00		2.000			0.0			0.000	2.000
9	EXTR THK SEPT SUPPORT					0.000			0.0			0.000	0.000
10	EXTR E.S. SEPT SUPPORT					0.000			0.0			0.000	0.000
11	FAST PERT QUAD SUPPORT	EA	1	2000.00		2.000			0.0			0.000	2.000
12	FAST EXTR SEXT SUPPORT	EA	2	2000.00		4.000			0.0			0.000	4.000
C	MAGNET SUPPORT BASES					0.000			0.0			0.000	0.000
13	DIPOLES	EA	52	1200.00	EU	62.400			0.0			0.000	62.400
14	QUADS	EA	25	1000.00	EU	25.000			0.0			0.000	25.000
15	SKEW QUADS	EA	2	1000.00	EU	2.000			0.0			0.000	2.000
16	SEXTUPOLES	EA	12	1000.00	EU	12.000			0.0			0.000	12.000
						455.400			0.0			0.000	455.400

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
INSTALLATION	1.1.1.1.9	1/24/87	4	REIMERS	X118	COST OF BASE BRACKETS IN 111412/121412

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	FIND & MOVE					0.000	76	1	76.0	RG	31.20	2.371	2.371
C	SUPPORTS TO BLDG 51					0.000			0.0			0.000	0.000
2	LIFT SUPPORTS INTO PLACE					0.000	76	2	152.0	RG	31.20	4.742	4.742
3	SURVEY & MARK FLOOR		1	24624.00	EU	24.624			0.0			0.000	24.624
4	DRILL & TAP HOLES					0.000	1368	0.4	547.2	MT	22.50	12.312	12.312
5	INSTALL SUPPORTS	EA	456	24.12	EU	10.999	456	1	456.0	RG	31.20	14.227	25.226
6	MOVE MAGS TO BLDG 51					0.000	76	3	228.0	RG	31.20	7.114	7.114
7	UNLOAD & STORE MAGS					0.000	76	4	304.0	RG	31.20	9.485	9.485
8	FAB LIFTING FIXTURE	EA	8	6000.00	EU	48.000			0.0			0.000	48.000
9	INSTALL LOWER HALVES					0.000	76	10	760.0	RG	31.20	23.712	23.712
C	VACUUM INSTALLATION COSTED ELSEWHERE					0.000			0.0			0.000	0.000
10	INSTALL UPPER HALVES					0.000	76	10	760.0	RG	31.20	23.712	23.712
11	RIGGING FOREMAN					0.000	76	6	456.0	RG	31.20	14.227	14.227
C	SURVEY & ALIGNMENT COSTED ELSEWHERE					0.000			0.0			0.000	0.000
						83.623			3739.2			111.902	195.525

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MT	547.2	12.312
RG	3192.0	99.590
SUM	3739.2	111.902

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
DIPOLE CHAMBERS	1.1.1.2.1.1	12/10/86	1	HUNT	Z1211	VACUUM CHAMBERS

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	GUARD VACUUM		1	72000.00	EU	72.000	1	14940	14940.0	MS	33.50	500.490	572.490
C						0.000	1	1320	1320.0	MT	22.50	29.700	29.700
2	CRYOLINER		1	99000.00	EU	99.000	1	10758	10758.0	MS	33.50	360.393	459.393
C			1	60000.00	EU	60.000	1	7127	7127.0	MT	22.50	160.358	220.358
						231.000			34145.0			1050.941	1281.941

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	25698.0	860.883
MT	8447.0	190.058
SUM	34145.0	1050.941

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
STRAIGHT SECTION CHAMBERS	1.1.1.2.1.2	1/15/87	4	HUNT	Z1212	VACUUM CHAMBERS

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	MATERIAL / LABOR		1	17000.00	EU	17.000	1	48	48.0	MU	31.60	1.517	18.517
C						0.000	1	16160	16160.0	MS	33.50	541.360	541.360
C						0.000	1	657	657.0	MT	22.50	14.783	14.783
						17.000			16865.0			557.659	574.659

LABOR SUMMARY		
Craft Code	Total Hours	Total Labor K$
MS	16160.0	541.360
MT	657.0	14.783
MU	48.0	1.517
SUM	16865.0	557.659

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
INJECTION AREA CHAMBERS	1.1.1.2.1.3	12/10/86	1	HUNT	Z1213	VACUUM CHAMBERS

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	$/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	MATERIAL / LABOR		1	4000.00	EU	4.000	1	1800	1800.0	MS	33.50	60.300	64.300
						4.000			1800.0			60.300	64.300

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	1800.0	60.300
SUM	1800.0	60.300

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
EXTRACTION AREA CHAMBERS	1.1.1.2.1.4	12/10/86	1	HUNT	Z1214	VACUUM CHAMBERS

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	MATERIAL / LABOR		1	4000.00	EU	4.000	1	1800	1800.0	MS	33.50	60.300	64.300
						4.000			1800.0			60.300	64.300

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	1800.0	60.300
SUM	1800.0	60.300

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
ROUGHING SYSTEM	1.1.1.2.2.1	1/26/87	1	HUNT	Z1221	RING PUMPING SYSTEM

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	ROUGHING SYSTEM		1	85400.00	EU	85.400			0.0			0.000	85.400
						85.400			0.0			0.000	85.400

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
GUARD VACUUM EXT PUMP SYS	1.1.1.2.2.2	1/26/87	2	HUNT	Z1222	RING PUMPING SYSTEM

Item No.	ITEM TITLE	Material Unit Meas.	No. Units	Unit Cost	Cost Basis	Total Mt K$	Labor No. Units	Unit Hrs.	Total Hours	Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	GUARD VACUUM		1	99000.00	EU	99.000			0.0			0.000	99.000
C	EXTERNAL PUMPING SYSTEM		1	57400.00	EU	57.400			0.0			0.000	57.400
						156.400			0.0			0.000	156.400

LABOR SUMMARY		
Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
MAIN CRYOPUMP SYSTEM	1.1.1.2.2.3	1/26/87	2	HUNT	Z1223	RING PUMPING SYSTEM

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	MAIN CRYOPUMP SYSTEM		1	99000.00	EU	99.000			0.0			0.000	99.000
C			1	99000.00	EU	99.000			0.0			0.000	99.000
C			1	68500.00	EU	68.500			0.0			0.000	68.500
						---			---			---	
						266.500			0.0			0.000	266.500

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
VACUUM MONITORING	1.1.1.2.3.1	12/16/86	1	HUNT	Z1231	INSTRUMENTATION

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	RGA HEADS	EA	4	4000.00	CP	16.000			0.0			0.000	16.000
2	UHV NUDE GAUGES	EA	6	400.00	CP	2.400			0.0			0.000	2.400
3	INSULATING NUDE I.G.	EA	8	275.00	CP	2.200			0.0			0.000	2.200
4	HASTINGS GAUGE P.S.	EA	28	550.00	CP	15.400			0.0			0.000	15.400
5	DV3M GAUGES	EA	28	40.00	CP	1.120			0.0			0.000	1.120
						37.120			0.0			0.000	37.120

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
BIE	1.1.1.2.3.2.1	12/12/86	1	HUNT	Z12321	BEAM MONITORING (ONLY ITEMS WITHIN VAC)

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	MATERIAL / LABOR		1	1000.00	EU	1.000	1	24	24.0	MU	31.60	0.758	1.758
C						0.000	1	67	67.0	MT	22.50	1.508	1.508
C						0.000	1	115	115.0	MS	33.50	3.853	3.853
C						0.000	1	4	4.0	EI	25.45	0.102	0.102
						1.000			210.0			6.220	7.220

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	4.0	0.102
MS	115.0	3.853
MT	67.0	1.508
MU	24.0	0.758
SUM	210.0	6.220

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
CLOSED ORBIT MONITOR	1.1.1.2.3.2.2	12/12/86	1	HUNT	Z12322	BEAM MONITORING

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	MATERIAL / LABOR		1	12000.00	EU	12.000	1	82	82.0	MU	31.60	2.591	14.591
C						0.000	1	48	48.0	EI	25.45	1.222	1.222
C						0.000	1	1152	1152.0	MS	33.50	38.592	38.592
C						0.000	1	672	672.0	MT	22.50	15.120	15.120
						12.000			1954.0			57.525	69.525

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	48.0	1.222
MS	1152.0	38.592
MT	672.0	15.120
MU	82.0	2.591
SUM	1954.0	57.525

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
INSTALLATION	1.1.1.2.4	12/4/86	1	HUNT	Z124	RING VACUUM SYSTEM

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	MATERIAL / LABOR		1	20000.00	EU	20.000	1	336	336.0	MS	33.50	11.256	31.256
C						0.000	1	8452	8452.0	MT	22.50	190.170	190.170
C						0.000	1	380	380.0	RG	31.20	11.856	11.856
C						0.000	1	488	488.0	EI	25.45	12.420	12.420
						20.000			9656.0			225.702	245.702

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	488.0	12.420
MS	336.0	11.256
MT	8452.0	190.170
RG	380.0	11.856
SUM	9656.0	225.702

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
CAVITY	1.1.1.3.1	11/25/86	1	DH	0131	DETAILED ESTIMATE IN EARLY DEC.

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	FERRITE	EA	90	1560.00	VQ	140.400			0.0			0.000	140.400
2	CAVITY & STAND	EA	2	10000.00	EU	20.000	2	2280	4560.0	MS	33.50	152.760	172.760
						160.400			4560.0			152.760	313.160

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	4560.0	152.760
SUM	4560.0	152.760

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
FERRITE BIAS SYSTEM	1.1.1.3.2	11/21/86	1	ART	I132	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	DOUBLE RACKS	EA	2	900.00	A85	1.800			0.0			0.000	1.800
2	PAINT RACKS					0.000	2	8	16.0	MS	33.50	0.536	0.536
3	ASSEMBLE RACKS					0.000	2	16	32.0	EI	25.45	0.814	0.814
4	CKT BKRS & PLUG STRIPS	EA	1	750.00	CP	0.750			0.0			0.000	0.750
5	PAINT CB PANELS					0.000	2	4	8.0	MS	33.50	0.268	0.268
6	AC PWR IN RKS INSTALL					0.000	2	16	32.0	EI	25.45	0.814	0.814
7	WIRE CK & TEST AC PWR					0.000	1	4	4.0	EM	25.45	0.102	0.102
8	P.S. 7.5V 600A	EA	10	2850.00	VQ	28.500			0.0			0.000	28.500
9	QA TEST P.S.					0.000	10	4	40.0	EM	25.45	1.018	1.018
10	INSTALL P.S.					0.000	8	16	128.0	EI	25.45	3.258	3.258
11	BUSS BAR ASSEMBLY	EA	1	1000.00	CP	1.000			0.0			0.000	1.000
12	FAB BUSS BAR ASSEMB					0.000	1	40	40.0	EI	25.45	1.018	1.018
13	INSTALL BUSS BAR ASSEMB					0.000	1	32	32.0	EI	25.45	0.814	0.814
14	CONTROL CHASSIS PARTS	EA	1	1500.00	EU	1.500			0.0			0.000	1.500
15	P.C. BD ARTWORK					0.000	4	40	160.0	ED	25.45	4.072	4.072
16	FAB PC BOARDS					0.000	8	8	64.0	ES	25.45	1.629	1.629
17	FAB CONTROL CHASSIS					0.000	1	120	120.0	EI	25.45	3.054	3.054
18	WIRE CHECK CONT CHASSIS					0.000	1	16	16.0	EM	25.45	0.407	0.407
19	INSTALL CONTROL CHASSIS					0.000	1	40	40.0	EI	25.45	1.018	1.018
20	RACK INTERLOCKS	EA	3	50.00	EU	0.150			0.0			0.000	0.150
21	TEMP & FLOW SWITCHES	EA	6	60.00	EU	0.360			0.0			0.000	0.360
22	INTLK CHASSIS PARTS		1	200.00	EU	0.200			0.0			0.000	0.200
23	FAB INTLK CHASSIS					0.000	1	72	72.0	EI	25.45	1.832	1.832
24	WIRE CK INTLK CHASSIS					0.000	1	8	8.0	EM	25.45	0.204	0.204
25	INSTALL INTLK CHASSIS					0.000	1	32	32.0	EI	25.45	0.814	0.814
26	FAST ACTING FUSES	EA	24	85.00	VQ	2.040			0.0			0.000	2.040
27	PAINT CHASS & ASSEMB					0.000	1	48	48.0	MS	33.50	1.608	1.608
28	SILKSCRN CHASS & ASSEM					0.000	1	64	64.0	ES	25.45	1.629	1.629
29	SYSTEM WIRE CHECK					0.000	1	40	40.0	EM	25.45	1.018	1.018
						36.300			996.0			25.928	62.228

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ES	128.0	3.258
EI	528.0	13.438
EM	108.0	2.749
ED	160.0	4.072
MS	72.0	2.412
SUM	996.0	25.928

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
FINAL AMPLIFIER	1.1.1.3.3	11/24/86	1	YUEN	J133	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	4CX40000 TUBE	EA	3	8750.00	VQ	26.250			0.0			0.000	26.250
2	TUBE SOCKET W/CAP	EA	3	800.00	VQ	2.400			0.0			0.000	2.400
3	AIR BLOWER	EA	3	500.00	CP	1.500			0.0			0.000	1.500
4	P.S.20V@250A[FIL]	EA	3	2800.00	VQ	8.400	3	4	12.0	EM	25.45	0.305	8.705
5	P.S.1KV@1.5A[SCG]	EA	3	4300.00	VQ	12.900	3	4	12.0	EM	25.45	0.305	13.205
6	P.S.300V@1A[CG]	EA	2	2500.00	VQ	5.000	2	4	8.0	EM	25.45	0.204	5.204
7	GRID MATCH XFMR	EA	2	300.00	EU	0.600	2	24	48.0	ES	25.45	1.222	1.822
8	GRID INPUT XFMR	EA	1	300.00	EU	0.300	1	24	24.0	ES	25.45	0.611	0.911
9	NEUTRALIZER NETWORK	EA	2	175.00	EU	0.350			0.0			0.000	0.350
10	EQUIPT. RACK	EA	1	1500.00	EU	1.500			0.0			0.000	1.500
11	ASSEMB. RACK					0.000	1	40	40.0	EI	25.45	1.018	1.018
12	AC PWR DISTRIB.	EA	1	500.00	EU	0.500	1	20	20.0	EI	25.45	0.509	1.009
13	ASSEMB. ITEM1-9	EA	1	1000.00	EU	1.000	1	280	280.0	EI	25.45	7.126	8.126
14	INTERLOCKS	EA	1	500.00	EU	0.500	1	50	50.0	EI	25.45	1.273	1.773
15	SCG FTO CONTROL	EA	1	500.00	EU	0.500	1	84	84.0	EI	25.45	2.138	2.638
16	CAVITY COUPL'G CAP.	EA	20	35.00	CP	0.700			0.0			0.000	0.700
17	GRAD.&PHASE DET.	EA	4	200.00	EU	0.800	4	52	208.0	EI	25.45	5.294	6.094
18	RACK RFI FILTERS	EA	1	1000.00	EU	1.000			0.0			0.000	1.000
19	RACK INTERFACE	EA	1	500.00	EU	0.500	1	120	120.0	EI	25.45	3.054	3.554
20	CATH. CURR. MON.	EA	3	200.00	EU	0.600			0.0			0.000	0.600
21	ANODE CURR. MON.	EA	3	260.00	EU	0.780	3	148	444.0	EI	25.45	11.300	12.080
22						0.000			0.0			0.000	0.000
						66.080			1350.0			34.358	100.438

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ES	72.0	1.832
EI	1246.0	31.711
EM	32.0	0.814
SUM	1350.0	34.358

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
HIGH VOLTAGE POWER SUPPLY	1.1.1.3.4	11/25/86	1	ART	I134	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	$/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	DOUBLE RACKS	EA	4	900.00	A85	3.600			0.0			0.000	3.600
2	PAINT RACKS					0.000	4	8	32.0	MS	33.50	1.072	1.072
3	ASSEMBLE RACKS					0.000	4	16	64.0	EI	25.45	1.629	1.629
4	PAINT CKT BKR PNLS					0.000	1	4	4.0	MS	33.50	0.134	0.134
5	CKT BKRS & PLUG STRIPS	EA	4	325.00	CP	1.300	4	16	64.0	EI	25.45	1.629	2.929
6	WIRE CK & TEST AC PWR					0.000	4	4	16.0	EM	25.45	0.407	0.407
7	P.S. 5 KVDC 600MA	EA	25	4950.00	VQ	123.750			0.0			0.000	123.750
8	QA TEST HV P.S.					0.000	20	4	80.0	EM	25.45	2.036	2.036
9	GROUND RELAY	EA	1	1500.00	VQ	1.500			0.0			0.000	1.500
10	RESISTORS	EA	25	25.00	VQ	0.625			0.0			0.000	0.625
11	MECH GND SYSTEM	EA	1	250.00	EU	0.250	1	40	40.0	MS	33.50	1.340	1.590
12	P.S. CONTROL CHASSIS	EA	1	300.00	EU	0.300	1	40	40.0	EI	25.45	1.018	1.318
13	WIRE CK P.S. CTL CHASSIS					0.000	1	32	32.0	EM	25.45	0.814	0.814
14	INSTALL P.S. CTL CHASSIS					0.000	1	32	32.0	EI	25.45	0.814	0.814
15	INTERLOCK CHASSIS	EA	1	500.00	EU	0.500	1	40	40.0	EI	25.45	1.018	1.518
16	WIRE CK INTLK CHASSIS					0.000	1	16	16.0	EM	25.45	0.407	0.407
17	INSTALL INTLK CHASSIS					0.000	1	32	32.0	EI	25.45	0.814	0.814
18	COOLING FANS & FLOW SW	EA	8	45.00	CP	0.360	8	4	32.0	EI	25.45	0.814	1.174
19	HV FTO CTL CHASSIS	EA	1	1000.00	EU	1.000	1	40	40.0	EI	25.45	1.018	2.018
20	WIRE CK FTO CHASSIS					0.000	1	8	8.0	EM	25.45	0.204	0.204
21	INSTALL FTO CHASSIS					0.000	1	32	32.0	EI	25.45	0.814	0.814
22	HV INSULATOR	EA	1	1000.00	EU	1.000	1	8	8.0	EI	25.45	0.204	1.204
23	PAINT CHASSIS AND ASSEM					0.000	1	56	56.0	MS	33.50	1.876	1.876
24	SILKSCRN CHASS & ASSEM					0.000	1	64	64.0	ES	25.45	1.629	1.629
25	DIODE ASSEMBLIES	EA	20	35.00	VQ	0.700	20	4	80.0	EI	25.45	2.036	2.736
26	INSTALL HV P.S.					0.000	20	16	320.0	EI	25.45	8.144	8.144
27	SYSTEM WIRE CHECK					0.000	1	40	40.0	EM	25.45	1.018	1.018
						134.885			1172.0			30.890	165.775

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ES	64.0	1.629
EI	784.0	19.953
EM	192.0	4.886
MS	132.0	4.422
SUM	1172.0	30.890

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
LOW LEVEL R.F.	1.1.1.3.5	11/24/86	1	YUEN	J135	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	P.S. 15V @ 3A	EA	3	50.00	CP	0.150			0.0			0.000	0.150
2	P.S. 5V @ 9A	EA	2	75.00	CP	0.150			0.0			0.000	0.150
3	DC P.S. DISTRIBUTION	EA	1	300.00	EU	0.300			0.0			0.000	0.300
4	FAB ITEM 3					0.000	1	52	52.0	EI	25.45	1.323	1.323
5	1KW RF AMP.	EA	2	18400.00	VQ	36.800	2	8	16.0	EM	25.45	0.407	37.207
6	LOW LEVEL CHASSIS	EA	1	3200.00	EU	3.200	1	280	280.0	EI	25.45	7.126	10.326
7	CONTROL CARD	EA	4	1680.00	EU	6.720	4	40	160.0	ES	25.45	4.072	10.792
8	INTERFACE	EA	1	500.00	EU	0.500	1	72	72.0	EI	25.45	1.832	2.332
9	WIDE BAND OSC.	EA	2	3500.00	EU	7.000	2	80	160.0	EM	25.45	4.072	11.072
10	RACK WIRING	EA	1	500.00	EU	0.500	1	72	72.0	EI	25.45	1.832	2.332
11	EQUIPT. RACK	EA	1	1500.00	EU	1.500			0.0			0.000	1.500
12	ASSEMB. RACK					0.000	1	40	40.0	EI	25.45	1.018	1.018
13	A.C. DISTRIB.	EA	1	500.00	EU	0.500	1	20	20.0	EI	25.45	0.509	1.009
14	SYSTEM CHECK					0.000	1	80	80.0	EM	25.45	2.036	2.036
15						0.000			0.0			0.000	0.000
						57.320			952.0			24.228	81.548

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ES	160.0	4.072
EI	536.0	13.641
EM	256.0	6.515
SUM	952.0	24.228

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
INSTRUM & CONTROL SYS IFCE	1.1.1.3.6	11/21/86	1	ART	I136	

Item No.	ITEM TITLE	Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	SCOPE 100MHZ 4CH RK MT	EA	2	1920.00	A85	3.840			0.0			0.000	3.840
2	8 CH WAVEFORM RECORDER	EA	1	22900.00	A85	22.900			0.0			0.000	22.900
3	10 PEN PLOTTER	EA	1	2786.00	A85	2.786			0.0			0.000	2.786
4	CHART PAPER AND PENS	EA	1	169.00	A85	0.169			0.0			0.000	0.169
5	SIG DISTRIBUTION CHAS	EA	1	1000.00	EU	1.000	1	160	160.0	EI	25.45	4.072	5.072
6	WIRE CK SIG DIST CHASS					0.000	1	16	16.0	EM	25.45	0.407	0.407
7	INSTALL SIG DIST CHASS					0.000	1	32	32.0	EI	25.45	0.814	0.814
8	INSTALL WAVEFORM REC					0.000	1	24	24.0	EI	25.45	0.611	0.611
9	PGMBLE CONTROLLER .	EA	1	9365.00	VQ	9.365			0.0			0.000	9.365
10	INSTALL PGMBLE CTLER					0.000	1	120	120.0	EI	25.45	3.054	3.054
11	WIRE CK PGMBLE CTLR					0.000	1	32	32.0	EM	25.45	0.814	0.814
12	PAINT SIG DIST CHASS					0.000	1	4	4.0	MS	33.50	0.134	0.134
13	SILKSCRN SIG DIST CHASS					0.000	1	16	16.0	ES	25.45	0.407	0.407
14	SYSTEM-WIRE CHECK					0.000	1	80	80.0	EM	25.45	2.036	2.036
15	FREQ. METER	EA	1	500.00	EU	0.500	1	4	4.0	EM	25.45	0.102	0.602
16						0.000			0.0			0.000	0.000
						40.560			488.0			12.452	53.012

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ES	16.0	0.407
EI	336.0	8.551
EM	132.0	3.359
MS	4.0	0.134
SUM	488.0	12.452

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
COOLING SYSTEM	1.1.1.3.7	11/25/86	1 DH	D137		FREON SYSTEM

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	F-113 PUMP, 50 GPM	EA	2	990.00	A77	1.980			0.0			0.000	1.980
2	SURGE TANK	EA	1	1127.00	A82	1.127			0.0			0.000	1.127
3	LEVEL GUAGE	EA	1	135.00	A82	0.135			0.0			0.000	0.135
4	CATCH FILTER DRYER	EA	1	226.00	A82	0.226			0.0			0.000	0.226
5	HEAT EXCHANGER	EA	1	3423.00	EU	3.423			0.0			0.000	3.423
6	KUNO FILTER	EA	1	480.00	A77	0.480			0.0			0.000	0.480
7	TEMP GUAGES	EA	4	275.00	CP	1.100			0.0			0.000	1.100
8	TEMP SWITCH	EA	2	112.00	A82	0.224			0.0			0.000	0.224
9	PRESSURE GUAGES	EA	4	11.00	CP	0.044			0.0			0.000	0.044
10	FLOW SWITCHES	EA	2	270.00	A84	0.540			0.0			0.000	0.540
11	FLOW BLOCK	EA	2	34.00	EU	0.068			0.0			0.000	0.068
12	SUPPORT STAND MTL	EA	1	1100.00	EU	1.100			0.0			0.000	1.100
13	UNIT ASSEMBLY	EA	1	2200.00	EU	2.200	1	160	160.0	PT	31.70	5.072	7.272
14	WIRING	EA	1	250.00	EU	0.250	1	24	24.0	PE	34.25	0.822	1.072
15	CHILLER	EA	1	2200.00	EU	2.200			0.0			0.000	2.200
						15.097			184.0			5.894	20.991

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
PT	160.0	5.072
PE	24.0	0.822
SUM	184.0	5.894

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
ASSEMBLY AND TEST	1.1.1.3.8	11/25/86	1	ART	I138	

	Item No.	ITEM TITLE	Material Unit Meas.	No. Units	Unit Cost	Cost Basis	Total Mt K$	Labor No. Units	Unit Hrs.	Total Hours	Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
	1	POSITION EQUIP RACKS					0.000	1	16	16.0	MT	22.50	0.360	0.360
	2	CONN BLDG POWER	EA	4	88.20	CP	0.353	1	40	40.0	PE	34.25	1.370	1.723
	3	WIRE CHECK PWR					0.000	1	4	4.0	EM	25.45	0.102	0.102
	4	INTRA CHASSIS CABLES	EA	1	250.00	EU	0.250	1	64	64.0	EI	25.45	1.629	1.879
	5	CONNECT COOLING PT	EA	1	300.00	EU	0.300	1	240	240.0	PT	31.70	7.608	7.908
C		EI	EA	1	250.00	EU	0.250	1	80	80.0	EI	25.45	2.036	2.286
C		PE	EA	1	100.00	EU	0.100	1	24	24.0	PE	34.25	0.822	0.922
	6	COPPER BUSS 5"SQ X 20'	EA	2	920.15	CP	1.840	2	12	24.0	MS	33.50	0.804	2.644
C							0.000	1	8	8.0	MT	22.50	0.180	0.180
C							0.000	1	8	8.0	EI	25.45	0.204	0.204
	7	WIRE CHECK CABLING					0.000	1	24	24.0	EM	25.45	0.611	0.611
	8	TEST & DEBUG SYSTEM					0.000	1	480	480.0	EM	25.45	12.216	12.216
C		MODIFICATIONS					0.000	1	120	120.0	EI	25.45	3.054	3.054
	9	DISASSEMBLE FOR SHIPMT					0.000	1	80	80.0	EI	25.45	2.036	2.036
C							0.000	1	160	160.0	MT	22.50	3.600	3.600
C							0.000	1	40	40.0	EM	25.45	1.018	1.018
	10	TEST FERRITES	EA	1	100.00	EU	0.100	1	1040	1040.0	EM	25.45	26.468	26.568
C			EA	1	300.00	EU	0.300	1	240	240.0	EI	25.45	6.108	6.408
C			EA	1	300.00	EU	0.300	1	80	80.0	MS	33.50	2.680	2.980
							3.793			2772.0			72.905	76.698

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	592.0	15.066
EM	1588.0	40.415
MS	104.0	3.484
MT	184.0	4.140
PT	240.0	7.608
PE	64.0	2.192
SUM	2772.0	72.905

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
INSTALLATION	1.1.1.3.9	1/24/87	2	ART	I139	

	Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
	1	POSITION CAVITY	EA	1	150.00	EU	0.150	1	16	16.0	RG	31.20	0.499	0.649
	2	POSITION BIAS SYSTEM	EA	1	100.00	EU	0.100	1	16	16.0	RG	31.20	0.499	0.599
C		CONNECT BUSS BARS					0.000	2	4	8.0	PE	34.25	0.274	0.274
C		CONNECT BLDG PWR	EA	1	75.00	EU	0.075	1	8	8.0	PE	34.25	0.274	0.349
C		CONN CONTROL CABLING	EA	1	75.00	EU	0.075	1	32	32.0	PE	34.25	1.096	1.171
C		FAB CABLE TRAYS	EA	2	600.00	EU	1.200	2	20	40.0	MS	33.50	1.340	2.540
C		INSTALL CABLE TRAYS	EA	2	75.00	EU	0.150	1	32	32.0	PE	34.25	1.096	1.246
	3	POSTITION FINAL AMP	EA	1	100.00	EU	0.100	1	16	16.0	RG	31.20	0.499	0.599
C		CONNECT BLDG POWER	EA	1	75.00	EU	0.075	1	8	8.0	PE	34.25	0.274	0.349
C		CONN CTL & RF CABLE	EA	1	150.00	EU	0.150	1	24	24.0	PE	34.25	0.822	0.972
	4	POSITION HV P.S.	EA	1	100.00	EU	0.100	1	16	16.0	RG	31.20	0.499	0.599
C		CONNECT BLDG POWER	EA	1	75.00	EU	0.075	1	8	8.0	PE	34.25	0.274	0.349
C		CONN CTL & H.V. CABLE	EA	1	150.00	EU	0.150	1	16	16.0	PE	34.25	0.548	0.698
	5	POSITION LL RF & INSTR	EA	1	100.00	EU	0.100	1	16	16.0	RG	31.20	0.499	0.599
C		CONN CONTROL CABLE	EA	1	100.00	EU	0.100	1	32	32.0	PE	34.25	1.096	1.196
	6	COOLING SYS PPL	EA	1	350.00	EU	0.350	1	64	64.0	PPL	34.25	2.192	2.542
C		MT	EA	1	150.00	EU	0.150	1	72	72.0	MT	22.50	1.620	1.770
C		PE	EA	1	150.00	EU	0.150	1	32	32.0	PE	34.25	1.096	1.246
C		RG	EA	1			0.000	1	24	24.0	RG	31.20	0.749	0.749
							3.250			480.0			15.247	18.497

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	40.0	1.340
MT	72.0	1.620
PE	200.0	6.850
PPL	64.0	2.192
RG	104.0	3.245
SUM	480.0	15.247

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
DIPOLE MAGNET POWER SUPPLY	1.1.1.4.1.1	1/5/87		6 FRIAS	M1411	DIPOLE MAGNET POWER SUPPLIES - COST ESTIMATE.

Item No.	ITEM TITLE	Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	$/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
DPS1-8	SCR P.S.-1600V/1200A	EA	8	75000.00	VQ	600.000			0.0			0.000	600.000
DPSCOM	SCR P.S.-COMBINATION	EA	4	99000.00	VQ	396.000			0.0			0.000	396.000
DPSCOM	1100V/500V @ 1200A	EA	4	76000.00	VQ	304.000			0.0			0.000	304.000
						1300.000			0.0			0.000	1300.000

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
DIPOLE CONTROL	1.1.1.4.1.2	1/16/87	2	FRIAS	M1412	CONTROL OF DIPOLE P.S. + (MG MODS)

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
						0.000			0.0			0.000	0.000
1	TRANSDUCTORS	EA	3	5000.00	VQ	15.000			0.0			0.000	15.000
2	FEEDBACK CHASSIS	EA	1	5000.00	EU	5.000			0.0			0.000	5.000
3	GEN VOLT REG CHASSIS	EA	1	5000.00	EU	5.000			0.0			0.000	5.000
4	TORSION MON CHASSIS	EA	1	5000.00	EU	5.000			0.0			0.000	5.000
5	NEW VAC FLD BKR	EA	1	6000.00	VQ	6.000			0.0			0.000	6.000
						36.000			0.0			0.000	36.000

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
INSTALL DIPOLE P.S'S.	1.1.1.4.1.3	1/24/87	4	FRIAS	M1413	INSTALL/CONNECT DIPOLE POWER SUPPLIES.

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	SEPARATE LEAD CABLES					0.000	12	8	96.0	PE	34.25	3.288	3.288
2	CUT BUSSES/REM COMP					0.000	12	16	192.0	PE	34.25	6.576	6.576
3	INSTALL UNISTRUT	FT	400	2.50	EU	1.000	40	2	80.0	PE	34.25	2.740	3.740
4	INSTALL VACUUM BKR	EA	4	6000.00	VQ	24.000	4	32	128.0	PE	34.25	4.384	28.384
5	INSTALL 350 MCM	FT	2000	2.80	VQ	5.600	24	4	96.0	PE	34.25	3.288	8.888
6	LUG & CONNECT 350 MCM					0.000	48	1	48.0	PE	34.25	1.644	1.644
7	INSTALL DIPOLE P.S'S.					0.000	12	16	192.0	RG	31.20	5.990	5.990
8	FAB DIPOLE LUGS	EA	96	60.00	EU	5.760	96	2	192.0	MS	33.50	6.432	12.192
9	MODIFY POT HD. HSE.	EA	4	2000.00	EU	8.000	4	80	320.0	PE	34.25	10.960	18.960
10	CUT 1750 MCM TO FIT					0.000	12	4	48.0	PE	34.25	1.644	1.644
11	INSTALL UNISTRUT	FT	1400	2.50	EU	3.500	12	2	24.0	PE	34.25	0.822	4.322
12	LUG & CONNECT 1750 MCM					0.000	12	2	24.0	PE	34.25	0.822	0.822
13	INSTALL UNISTRUT (DC)	FT	600	2.50	EU	1.500	12	4	48.0	PE	34.25	1.644	3.144
14	CUT 1750 TO FIT (DC)					0.000	12	2	24.0	PE	34.25	0.822	0.822
15	LUG & CONNECT 1750 (DC)					0.000	36	4	144.0	PE	34.25	4.932	4.932
						49.360			1656.0			55.988	105.348

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	192.0	6.432
PE	1272.0	43.566
RG	192.0	5.990
SUM	1656.0	55.988

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
DIPOLE P.S. TESTING	1.1.1.4.1.4	1/13/87	1	FRIAS	M1414	DIPOLE P.S. TESTS.

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	CONSTRUCT TEST UNIT					0.000	1	80	80.0	PE	34.25	2.740	2.740
2	CONNECT TEST UNITS					0.000	12	16	192.0	PE	34.25	6.576	6.576
3	WIRE CHECK & TEST					0.000	12	40	480.0	EM	25.45	12.216	12.216
4	DISCONNECT TEST UNITS					0.000	12	4	48.0	PE	34.25	1.644	1.644
						0.000			800.0			23.176	23.176

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EM	480.0	12.216
PE	320.0	10.960
SUM	800.0	23.176

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
QUADRUPOLE MAGNETS/P.S.	1.1.1.4.2.1	1/5/86	4	FRIAS	M1421	QUAD MAGNETS POWER SUPPLIES - COST ESTIMATE.

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	$/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
QPS1-4	SCR P.S. - 1250V/500A	EA	4	55000.00	VQ	220.000			0.0			0.000	220.000
QPSCOM	SCR P.S.-COMBINATION	EA	4	99000.00	VQ	396.000			0.0			0.000	396.000
QPSCOM	750/500 @ 500A	EA	4	21000.00	VQ	84.000			0.0			0.000	84.000
						700.000			0.0			0.000	700.000

LABOR SUMMARY		
Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
QUADRUPOLE CONTROL	1.1.1.4.2.2	1/16/86	3	FRIAS	M1422	CONTROL OF QUAD P.S. + (MG MODS)

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
						0.000			0.0			0.000	0.000
1	TRANSDUCTORS	EA	3	5000.00	VQ	15.000			0.0			0.000	15.000
2	FEEDBACK CHASSIS	EA	1	5000.00	EU	5.000			0.0			0.000	5.000
3	GEN VOLT REG CHASSIS	EA	1	5000.00	EU	5.000			0.0			0.000	5.000
4	TORSION MON CHASSIS	EA	1	5000.00	EU	5.000			0.0			0.000	5.000
5	NEW FIELD BREAKER.	EA	1	6000.00	VQ	6.000			0.0			0.000	6.000
						36.000			0.0			0.000	36.000

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
INSTALL QUAD P.S'S.	1.1.1.4.2.3	1/24/87	4	FRIAS	M1423	INSTALL/CONNECT QUAD POWER SUPPLIES.

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	SEPARATE LEAD CABLES					0.000	12	8	96.0	PE	34.25	3.288	3.288
2	CUT BUSSES/REM COMP					0.000	12	16	192.0	PE	34.25	6.576	6.576
3	INSTALL UNISTRUT	FT	400	2.50	EU	1.000	40	2	80.0	PE	34.25	2.740	3.740
4	INSTALL VACUUM BKR	EA	4	6000.00	VQ	24.000	4	32	128.0	PE	34.25	4.384	28.384
5	INSTALL 350 MCM	FT	2000	2.80	VQ	5.600	24	4	96.0	PE	34.25	3.288	8.888
6	LUG & CONNECT 350 MCM					0.000	48	1	48.0	PE	34.25	1.644	1.644
7	INSTALL QUAD P.S'S.					0.000	8	16	128.0	RG	31.20	3.994	3.994
8	FAB QUAD LUGS	EA	88	60.00	EU	5.280	88	2	176.0	MS	33.50	5.896	11.176
9	MODIFY POT HD. HSE.	EA	4	2000.00	EU	8.000	4	80	320.0	PE	34.25	10.960	18.960
10	CUT 1750 MCM TO FIT					0.000	8	4	32.0	PE	34.25	1.096	1.096
11	INSTALL UNISTRUT	FT	1400	2.50	EU	3.500	8	2	16.0	PE	34.25	0.548	4.048
12	LUG & CONNECT 1750 MCM					0.000	8	2	16.0	PE	34.25	0.548	0.548
13	INSTALL UNISTRUT (DC)	FT	600	2.50	EU	1.500	8	4	32.0	PE	34.25	1.096	2.596
14	CUT 350 MCM FIT	FT	600	2.80	EU	1.680	32	2	64.0	PE	34.25	2.192	3.872
15	LUG & CONNECT 350 MCM					0.000	64	1	64.0	PE	34.25	2.192	2.192
						50.560			1488.0			50.442	101.002

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	176.0	5.896
PE	1184.0	40.552
RG	128.0	3.994
SUM	1488.0	50.442

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
QUAD P.S. TESTING	1.1.1.4.2.4	1/13/87	1	FRIAS	M1424	QUADRUPOLE P.S. TESTS.

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	CONSTRUCT TEST UNIT					0.000	1	80	80.0	PE	34.25	2.740	2.740
2	CONNECT TEST UNITS					0.000	8	16	128.0	PE	34.25	4.384	4.384
3	WIRE CHECK & TEST					0.000	8	40	320.0	EM	25.45	8.144	8.144
4	DISCONNECT TEST UNITS					0.000	8	4	32.0	PE	34.25	1.096	1.096
						0.000			560.0			16.364	16.364

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EM	320.0	8.144
PE	240.0	8.220
SUM	560.0	16.364

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
BACK LEG WINDING P.S.'S	1.1.1.4.3.1	1/8/87	1	DRE	K1431	1 DUAL PS & 12 ACTUATORS

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	DUAL 50V-1000A PS	EA	1	30000.00	EU	30.000			0.0			0.000	30.000
2	P.S. TEST SET UP					0.000	4	8	32.0	EM	25.45	0.814	0.814
3	P.S. TEST SET UP					0.000	4	8	32.0	EI	25.45	0.814	0.814
4	P.S. TEST SET UP					0.000	4	2	8.0	PT	31.70	0.254	0.254
5	TEST					0.000	4	24	96.0	EM	25.45	2.443	2.443
6	BI-POLAR ACTUATOR	EA	12	26000.00	EU	312.000			0.0			0.000	312.000
7	BI-POLAR XDUCTOR 200A	EA	12	1200.00	EU	14.400			0.0			0.000	14.400
8	INSPECT ABOVE ITEMS					0.000	28	4	112.0	EM	25.45	2.850	2.850
9	INTLK CHASSIS	EA	12	800.00	EU	9.600	12	60	720.0	EI	25.45	18.324	27.924
10	INTLK CHASSIS-PAINT					0.000	12	2	24.0	MS	33.50	0.804	0.804
11	INTLK CHASSIS-SCREEN					0.000	12	2	24.0	ES	25.45	0.611	0.611
12	XISTOR DRIVER CHASSIS	EA	12	400.00	EU	4.800	12	80	960.0	EI	25.45	24.432	29.232
13	XISTOR DRVR CHASS-PAINT					0.000	12	2	24.0	MS	33.50	0.804	0.804
14	XISTOR DRVR CHASS-SCREEN					0.000	12	2	24.0	ES	25.45	0.611	0.611
15	XISTOR DRVR CHASS-P.C. BDS					0.000	48	6	288.0	ES	25.45	7.330	7.330
16	XISTOR BUFFER CHASS	EA	12	400.00	EU	4.800	12	80	960.0	EI	25.45	24.432	29.232
17	XISTOR BFFR CHASS-PAINT					0.000	12	2	24.0	MS	33.50	0.804	0.804
18	XISTOR BFFR CHASS-SCREEN					0.000	12	2	24.0	ES	25.45	0.611	0.611
19	XISTOR BFFR CHASS-P.C. BDS					0.000	24	6	144.0	ES	25.45	3.665	3.665
20	ASSEMBLE SINGLE RACK	EA	12	900.00	EU	10.800	12	16	192.0	EI	25.45	4.886	15.686
21	PAINT RACK					0.000	12	8	96.0	MS	33.50	3.216	3.216
22	ASSEMBLE & WIRE	EA	12	500.00	EU	6.000	12	100	1200.0	EI	25.45	30.540	36.540
23	WIRE CHECK CHASSIS					0.000	36	4	144.0	EM	25.45	3.665	3.665
24	WIRE CHECK ASSEMBLY					0.000	12	16	192.0	EM	25.45	4.886	4.886
						392.400			5320.0			136.796	529.196

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ES	504.0	12.827
EI	4064.0	103.429
EM	576.0	14.659
MS	168.0	5.628
PT	8.0	0.254
SUM	5320.0	136.796

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
SKEW QUADS P.S.	1.1.1.4.3.2	12/23/86	1 DRE	K1432		ONE SYSTEM

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	P.S., 5 KW	EA	2	3000.00	EU	6.000			0.0			0.000	6.000
2	TEST P.S.					0.000	2	4	8.0	EM	25.45	0.204	0.204
3	MODIFY P.S.	EA	2	100.00	EU	0.200	2	40	80.0	EI	25.45	2.036	2.236
4	CHECK & RE-TEST P.S.					0.000	2	6	12.0	EM	25.45	0.305	0.305
5	BI-POLAR ACTUATOR	EA	1	19000.00	EU	19.000			0.0			0.000	19.000
6	BI-POLAR XDUCTOR	EA	1	1200.00	EU	1.200			0.0			0.000	1.200
7	CB & CONTACTOR PNL	EA	1	250.00	EU	0.250	1	40	40.0	EI	25.45	1.018	1.268
8	CB & CONT. PNL-PAINT					0.000	1	2	2.0	MS	33.50	0.067	0.067
9	CB & CONT. PNL-SCREEN					0.000	1	4	4.0	ES	25.45	0.102	0.102
10	CONTROL & INTLK CHASS	EA	1	1000.00	EU	1.000	1	80	80.0	EI	25.45	2.036	3.036
11	CTL & INTLK CHASS-PAINT					0.000	1	2	2.0	MS	33.50	0.067	0.067
12	CTL & INTLK CHASS-SCREEN					0.000	1	4	4.0	ES	25.45	0.102	0.102
13	XISTOR DRIVER CHASSIS	EA	1	400.00	EU	0.400	1	80	80.0	EI	25.45	2.036	2.436
14	XISTOR DRVR CHASS-PAINT					0.000	1	2	2.0	MS	33.50	0.067	0.067
15	XISTOR DRVR CHASS-SCREEN					0.000	1	4	4.0	ES	25.45	0.102	0.102
16	XISTOR DRVR CHASS-P.C. BDS					0.000	4	6	24.0	ES	25.45	0.611	0.611
17	XISTR BUFFER CHASS	EA	1	400.00	EU	0.400	1	80	80.0	EI	25.45	2.036	2.436
18	XISTR BUFF CHASS-PAINT					0.000	1	2	2.0	MS	33.50	0.067	0.067
19	XISTR BUFF CHASS-SCREEN					0.000	1	4	4.0	ES	25.45	0.102	0.102
20	XISTR BUFF CHASS-PC BDS					0.000	2	6	12.0	ES	25.45	0.305	0.305
21	ASSEMBLE DOUBLE RACK	EA	1	1100.00	EU	1.100	1	16	16.0	EI	25.45	0.407	1.507
22	PAINT RACK					0.000	1	8	8.0	MS	33.50	0.268	0.268
23	ASSEMBLE & WIRE	EA	1	500.00	EU	0.500	1	100	100.0	EI	25.45	2.545	3.045
24	WIRE CHECK CHASSIS					0.000	3	4	12.0	EM	25.45	0.305	0.305
25	WIRE CHECK ASSEMBLY					0.000	1	16	16.0	EM	25.45	0.407	0.407
						30.050			592.0			15.195	45.245

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ES	52.0	1.323
EI	476.0	12.114
EM	48.0	1.222
MS	16.0	0.536
SUM	592.0	15.195

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
SEXTUPOLE PS	1.1.1.4.3.3	1/20/87	2 DRE	K1433		SX & SY SEXTUPOLES

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	PS 250V-600A	EA	2	37500.00	EU	75.000			0.0			0.000	75.000
2	PS TEST SET-UP					0.000	2	8	16.0	EM	25.45	0.407	0.407
3	PS TEST SET-UP					0.000	2	8	16.0	EI	25.45	0.407	0.407
4	PS TEST SET-UP					0.000	2	4	8.0	PT	31.70	0.254	0.254
5	PS TEST					0.000	2	24	48.0	EM	25.45	1.222	1.222
6	ACTUATOR	EA	2	38500.00	EU	77.000			0.0			0.000	77.000
7	XDUCTOR	EA	2	1500.00	EU	3.000			0.0			0.000	3.000
8	CTL & INTLK CHASSIS	EA	2	800.00	EU	1.600	2	80	160.0	EI	25.45	4.072	5.672
9	CTL & INTLK CH-PAINT					0.000	2	2	4.0	MS	33.50	0.134	0.134
10	CTL & INTLK CH-SCREEN					0.000	2	2	4.0	ES	25.45	0.102	0.102
11	SCR CONTROL	EA	2	400.00	EU	0.800	2	60	120.0	EI	25.45	3.054	3.854
12	SCR CONTROL-PAINT					0.000	2	2	4.0	MS	33.50	0.134	0.134
13	SCR CONTROL-SCREEN					0.000	2	2	4.0	ES	25.45	0.102	0.102
14	SCR CONTROL-PC BDS					0.000	6	6	36.0	ES	25.45	0.916	0.916
15	XISTOR DRIVER CHASSIS	EA	2	400.00	EU	0.800	2	80	160.0	EI	25.45	4.072	4.872
16	XISTR DRVR CHASS-PAINT					0.000	2	2	4.0	MS	33.50	0.134	0.134
17	XISTR DRVR CHASS-SCREEN					0.000	2	2	4.0	ES	25.45	0.102	0.102
18	XISTR DRVR CHASS-PC BDS					0.000	6	6	36.0	ES	25.45	0.916	0.916
19	XISTR BUFF CHASSIS	EA	2	400.00	EU	0.800	2	80	160.0	EI	25.45	4.072	4.872
20	XISTR BUFF CHASS-PAINT					0.000	2	2	4.0	MS	33.50	0.134	0.134
21	XISTR BUFF CHASS-SCREEN					0.000	2	2	4.0	ES	25.45	0.102	0.102
22	XISTR BUFF CHASS-PC BDS					0.000	4	6	24.0	ES	25.45	0.611	0.611
23	ASSEMBLE SINGLE RACK	EA	2	900.00	EU	1.800	2	16	32.0	EI	25.45	0.814	2.614
24	PAINT SINGLE RACK					0.000	2	8	16.0	MS	33.50	0.536	0.536
25	ASSEMBLE & WIRE	EA	2	500.00	EU	1.000	2	100	200.0	EI	25.45	5.090	6.090
26	WIRE CHECK CHASSIS					0.000	8	4	32.0	EM	25.45	0.814	0.814
27	WIRE CHECK ASSEMBLY					0.000	2	16	32.0	EM	25.45	0.814	0.814
						161.800			1128.0			29.015	190.815

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ES	112.0	2.850
EI	848.0	21.582
EM	128.0	3.258
MS	32.0	1.072
PT	8.0	0.254
SUM	1128.0	29.015

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
SPEC RING PS-SYST INSTALL	1.1.1.4.3.5	1/20/87	2 DRE	K1435		

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1 (431)	INSTALL PS					0.000	1	8	8.0	EI	25.45	0.204	0.204
2 (431)	INSTALL RACKS					0.000	12	8	96.0	EI	25.45	2.443	2.443
3 (431)	INSTALL ACTUATOR CAB					0.000	12	8	96.0	EI	25.45	2.443	2.443
4 (431)	RIGGING					0.000	25	2	50.0	MT	22.50	1.125	1.125
5 (431)	WIRE MAG INTLKS	EA	18	100.00	EU	1.800	18	24	432.0	EI	25.45	10.994	12.794
6 (431)	CNTL-INTLK CBLS	EA	12	300.00	EU	3.600	12	16	192.0	EI	25.45	4.886	8.486
7 (431)	DC CABLING	LOT	1	11320.00	CP	11.320	1	164	164.0	PE	34.25	5.617	16.937
8 (431)	H2O COOLING	EA	13	20.00	EU	0.260	13	2	26.0	PT	31.70	0.824	1.084
9 (431)	SYST WIRE CHECK					0.000	1	48	48.0	EM	25.45	1.222	1.222
10 (432)	INSTALL RACK					0.000	1	8	8.0	EI	25.45	0.204	0.204
11 (432)	RIGGING					0.000	1	2	2.0	MT	22.50	0.045	0.045
12 (432)	WIRE MAG INTLKS	EA	2	100.00	EU	0.200	2	24	48.0	EI	25.45	1.222	1.422
13 (432)	CNTL-INTLK CBLS	EA	2	300.00	EU	0.600	2	16	32.0	EI	25.45	0.814	1.414
14 (432)	DC CABLING	LOT	1	1200.00	CP	1.200	1	20	20.0	PE	34.25	0.685	1.885
15 (432)	H2O COOLING	EA	1	20.00	EU	0.020	1	2	2.0	PT	31.70	0.063	0.083
16 (432)	SYST WIRE CHECK					0.000	1	16	16.0	EM	25.45	0.407	0.407
17 (433)	INSTALL RACKS					0.000	2	8	16.0	EI	25.45	0.407	0.407
18 (433)	RIGGING					0.000	2	2	4.0	MT	22.50	0.090	0.090
19 (433)	WIRE MAG INTLKS	EA	12	100.00	EU	1.200	12	24	288.0	EI	25.45	7.330	8.530
20 (433)	CNTL-INTLK CBLS	EA	12	300.00	EU	3.600	12	16	192.0	EI	25.45	4.886	8.486
21 (433)	DC CABLING	LOT	1	4350.00	CP	4.350	1	200	200.0	PE	34.25	6.850	11.200
22 (433)	H2O COOLING	EA	2	20.00	EU	0.040	1	2	2.0	PT	31.70	0.063	0.103
23 (433)	SYST WIRE CHECK					0.000	1	16	16.0	EM	25.45	0.407	0.407
						28.190			1958.0			53.233	81.423

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	1408.0	35.834
EM	80.0	2.036
MT	56.0	1.260
PT	30.0	0.951
PE	384.0	13.152
SUM	1958.0	53.233

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
SPECIAL RING PS'S-SYST TESTS	1.1.1.4.3.6	1/7/87	1	DRE	K1436	

Item No.	ITEM TITLE	Unit Meas.	No. Units	Material Unit Cost	Cost Basis	Total Mt K$	No. Units	Labor Unit Hrs.	Total Hours	Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	(431) SYSTEM TESTS					0.000	1	180	180.0	EM	25.45	4.581	4.581
2	(432) SYSTEM TESTS					0.000	1	60	60.0	EM	25.45	1.527	1.527
3	(433) SYSTEM TESTS					0.000	1	80	80.0	EM	25.45	2.036	2.036
						0.000			0.0			0.000	0.000
						0.000			320.0			8.144	8.144

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EM	320.0	8.144
SUM	320.0	8.144

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
SEPTUM MAG PS 20V-2750A	1.1.1.4.4.1	12/22/86	1 DRE	K1441		SAME AS '1.1.1.4.5.1

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	SCR PS 20V-2750A	EA	1	26000.00	EU	26.000			0.0			0.000	26.000
2	INSPECTION					0.000	1	16	16.0	EM	25.45	0.407	0.407
3	TEST SET-UP					0.000	1	16	16.0	EI	25.45	0.407	0.407
4	"					0.000	1	16	16.0	PE	34.25	0.548	0.548
5	"					0.000	1	4	4.0	PPL	34.25	0.137	0.137
6	TEST PS					0.000	1	48	48.0	EM	25.45	1.222	1.222
						26.000			100.0			2.721	28.721

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	16.0	0.407
EM	64.0	1.629
PE	16.0	0.548
PPL	4.0	0.137
SUM	100.0	2.721

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
ELECTROSTATIC INFLECTOR PS	1.1.1.4.4.2	1/5/87	1	DRE	K1442	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	HV PS 100KV-4ma	EA	1	0.00		0.000			0.0			0.000	0.000
2	HV GND RELAY-120KV	EA	1	1865.00	VQ	1.865			0.0			0.000	1.865
3	HV CABLE	FT	75	4.00	VQ	0.300			0.0			0.000	0.300
4	HV FEED-THRU	EA	1	500.00	EU	0.500			0.0			0.000	0.500
5	INTLK CHASSIS-FAB	EA	1	300.00	EU	0.300	1	80	80.0	EI	25.45	2.036	2.336
6	INTLK CHASSIS-PAINT					0.000	1	2	2.0	MS	33.50	0.067	0.067
7	INTLK CHASSIS-SCREEN					0.000	1	4	4.0	ES	25.45	0.102	0.102
8	HV CAGE	EA	1	100.00	EU	0.100	1	24	24.0	MS	33.50	0.804	0.904
9	ASSEMBLE SINGLE RACK	EA	1	900.00	EU	0.900	1	16	16.0	EI	25.45	0.407	1.307
10	PAINT RACK					0.000	1	8	8.0	MS	33.50	0.268	0.268
11	ASSEMBLE & WIRE	EA	1	150.00	EU	0.150	1	40	40.0	EI	25.45	1.018	1.168
12	ASSEMBLE					0.000	1	20	20.0	MT	22.50	0.450	0.450
13	WIRE CHECK ABOVE					0.000	1	16	16.0	EM	25.45	0.407	0.407
						4.115			210.0			5.559	9.674

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ES	4.0	0.102
EI	136.0	3.461
EM	16.0	0.407
MS	34.0	1.139
MT	20.0	0.450
SUM	210.0	5.559

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
SLOW BUMP PS	1.1.1.4.4.3	1/20/87	2 DRE	K1443	3 SYSTEMS	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	PS 15V-800A	EA	3	10000.00	EU	30.000			0.0			0.000	30.000
2	PS TEST SET-UP					0.000	3	8	24.0	EM	25.45	0.611	0.611
3	PS TEST SET-UP					0.000	3	8	24.0	EI	25.45	0.611	0.611
4	PS TEST SET-UP					0.000	3	4	12.0	PT	31.70	0.380	0.380
5	PS TEST					0.000	3	24	72.0	EM	25.45	1.832	1.832
6	ACTUATOR	EA	3	19000.00	EU	57.000			0.0			0.000	57.000
7	XDUCTOR	EA	3	2500.00	EU	7.500			0.0			0.000	7.500
8	CNTL-INTLK CHASSIS	EA	3	800.00	EU	2.400	3	80	240.0	EI	25.45	6.108	8.508
9	CNTL-INTLK CHASS-PAINT					0.000	3	2	6.0	MS	33.50	0.201	0.201
10	CNTL-INTLK CH-SCREEN					0.000	3	2	6.0	ES	25.45	0.153	0.153
11	DUAL COMMAND CHASSIS	EA	3	400.00	EU	1.200	3	60	180.0	EI	25.45	4.581	5.781
12	DL COMMAND CH-PAINT					0.000	3	2	6.0	MS	33.50	0.201	0.201
13	DL COMMAND CH-SCREEN					0.000	3	2	6.0	ES	25.45	0.153	0.153
14	DL COMMAND CH-PC BDS					0.000	9	6	54.0	ES	25.45	1.374	1.374
15	XISTOR DRIVE CHASSIS	EA	3	400.00	EU	1.200	3	80	240.0	EI	25.45	6.108	7.308
16	XISTOR DRIVE CH-PAINT					0.000	3	2	6.0	MS	33.50	0.201	0.201
17	XISTOR DRIVE CH-SCREEN					0.000	3	2	6.0	ES	25.45	0.153	0.153
18	XISTOR DRIVE CH-PC BDS					0.000	12	6	72.0	ES	25.45	1.832	1.832
19	XISTOR BUFF CHASSIS	EA	3	400.00	EU	1.200	3	80	240.0	EI	25.45	6.108	7.308
20	XISTOR BUFF CH-PAINT					0.000	3	2	6.0	MS	33.50	0.201	0.201
21	XISTOR BUFF CH-SCREEN					0.000	3	2	6.0	ES	25.45	0.153	0.153
22	XISTOR BUFF CH-PC BDS					0.000	6	6	36.0	ES	25.45	0.916	0.916
23	ASSEMBLE SINGLE RACK	EA	3	900.00	EU	2.700	3	16	48.0	EI	25.45	1.222	3.922
24	PAINT RACK					0.000	3	8	24.0	MS	33.50	0.804	0.804
25	ASSEMBLE & WIRE	EA	3	500.00	EU	1.500	3	100	300.0	EI	25.45	7.635	9.135
26	WIRE CHECK CHASSIS					0.000	12	4	48.0	EM	25.45	1.222	1.222
27	WIRE CHECK ASSEMBLY					0.000	3	16	48.0	EM	25.45	1.222	1.222
						104.700			1710.0			43.981	148.681

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ES	186.0	4.734
EI	1272.0	32.372
EM	192.0	4.886
MS	48.0	1.608
PT	12.0	0.380
SUM	1710.0	43.981

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
INJ ELEM PS-SYST INSTALL	1.1.1.4.4.4	1/20/87	2 DRE	K1444		

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	$/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1 (441)	INSTALL PS					0.000	1	8	8.0	EI	25.45	0.204	0.204
2 (441)	RIGGING					0.000	1	2	2.0	MT	22.50	0.045	0.045
3 (441)	WIRE MAG INTLKS	EA	1	100.00	EU	0.100	1	24	24.0	EI	25.45	0.611	0.711
4 (441)	CNTL-INTLK CBLS	EA	1	300.00	EU	0.300	1	16	16.0	EI	25.45	0.407	0.707
5 (441)	DC CABLING	LOT	1	10000.00	CP	10.000	1	160	160.0	PE	34.25	5.480	15.480
6 (441)	H2O COOLING	EA	1	20.00	EU	0.020	1	2	2.0	PT	31.70	0.063	0.083
7 (441)	SYST WIRE CHECK					0.000	1	8	8.0	EM	25.45	0.204	0.204
8 (442)	INSTALL RACK					0.000	1	8	8.0	EI	25.45	0.204	0.204
9 (442)	INSTALL HV CAGE					0.000	1	8	8.0	EI	25.45	0.204	0.204
10 (442)	RIGGING					0.000	2	2	4.0	MT	22.50	0.090	0.090
11 (442)	CNTL-INTLK CBLS	EA	1	300.00	EU	0.300	1	16	16.0	EI	25.45	0.407	0.707
12 (442)	INSTALL HV CABLE	EA	1	100.00	EU	0.100			0.0			0.000	0.100
13 (442)	SYST WIRE CHECK					0.000	1	8	8.0	EM	25.45	0.204	0.204
14 (443)	INSTALL PS'S					0.000	3	8	24.0	EI	25.45	0.611	0.611
15 (443)	INSTALL RACKS					0.000	3	8	24.0	EI	25.45	0.611	0.611
16 (443)	INSTALL ACTUATOR CAB					0.000	3	8	24.0	EI	25.45	0.611	0.611
17 (443)	RIGGING					0.000	9	2	18.0	MT	22.50	0.405	0.405
18 (443)	WIRE MAG INTLKS	EA	3	100.00	EU	0.300	3	24	72.0	EI	25.45	1.832	2.132
19 (443)	CNTL-INTLK CBLS	EA	3	300.00	EU	0.900	3	16	48.0	EI	25.45	1.222	2.122
20 (443)	DC CABLING	LOT	1	9700.00	CP	9.700	1	140	140.0	PE	34.25	4.795	14.495
21 (443)	H2O COOLING	EA	6	20.00	EU	0.120	6	2	12.0	PT	31.70	0.380	0.500
22 (443)	SYST WIRE CHECK					0.000	1	24	24.0	EM	25.45	0.611	0.611
						21.840			650.0			19.199	41.039

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	272.0	6.922
EM	40.0	1.018
MT	24.0	0.540
PT	14.0	0.444
PE	300.0	10.275
SUM	650.0	19.199

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
INJ ELEMENTS PS'S-SYST TESTS	1.1.1.4.4.5	1/7/87	1	DRE	K1445	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	(441) SYSTEM TESTS					0.000	1	32	32.0	EM	25.45	0.814	0.814
2	(442) SYSTEM TESTS					0.000	1	40	40.0	EM	25.45	1.018	1.018
3	(443) SYSTEM TESTS					0.000	1	120	120.0	EM	25.45	3.054	3.054
						0.000			192.0			4.886	4.886

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EM	192.0	4.886
SUM	192.0	4.886

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
THIN SEPTUM MAG PS 20V-2750A	1.1.1.4.5.1	12/22/86	1 DRE	K1451		SAME AS 1.1.1.4.4.1

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	SCR P.S. 20V-2750A	EA	1	26000.00	EU	26.000			0.0			0.000	26.000
2	INSPECTION					0.000	1	16	16.0	EM	25.45	0.407	0.407
3	TEST SET-UP					0.000	1	16	16.0	EI	25.45	0.407	0.407
4	"					0.000	1	16	16.0	PE	34.25	0.548	0.548
5	"					0.000	1	4	4.0	PPL	34.25	0.137	0.137
6	TEST PS					0.000	1	48	48.0	EM	25.45	1.222	1.222
						26.000			100.0			2.721	28.721

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	16.0	0.407
EM	64.0	1.629
PE	16.0	0.548
PPL	4.0	0.137
SUM	100.0	2.721

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
THICK SEPT.MAG PS 125V-2500A	1.1.1.4.5.2	12/31/86	1	DRE	K1452	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	SCR PS 125V-2500A	EA	1	87000.00	EU	87.000			0.0			0.000	87.000
2	INSPECTION					0.000	1	16	16.0	EM	25.45	0.407	0.407
3	TEST SET-UP					0.000	1	16	16.0	EI	25.45	0.407	0.407
4	"					0.000	1	16	16.0	PE	34.25	0.548	0.548
5	"					0.000	1	4	4.0	PPL	34.25	0.137	0.137
6	TEST					0.000	1	48	48.0	EM	25.45	1.222	1.222
						87.000			100.0			2.721	89.721

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	16.0	0.407
EM	64.0	1.629
PE	16.0	0.548
PPL	4.0	0.137
SUM	100.0	2.721

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
ELECTROSTATIC SEPTUM PS	1.1.1.4.5.3	12/22/86	1	DRE	K1453	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	HV PS 150KV-3ma	EA	1	7190.00	CP	7.190			0.0			0.000	7.190
2	HV GND RELAY-200KV	EA	1	6360.00	VQ	6.360			0.0			0.000	6.360
3	HV FEED-THRU	EA	1	500.00	EU	0.500			0.0			0.000	0.500
4	INTLK CHASSIS-FAB	EA	1	300.00	EU	0.300	1	100	100.0	EI	25.45	2.545	2.845
5	INTLK CHASSIS-PAINT					0.000	1	2	2.0	MS	33.50	0.067	0.067
6	INTLK CHASSIS-SCREEN					0.000	1	4	4.0	ES	25.45	0.102	0.102
7	HV CAGE	EA	1	100.00	EU	0.100	1	24	24.0	MS	33.50	0.804	0.904
8	ASSEMBLE SINGLE RACK	EA	1	900.00	EU	0.900	1	16	16.0	EI	25.45	0.407	1.307
9	PAINT RACK					0.000	1	8	8.0	MS	33.50	0.268	0.268
10	ASSEMBLE & WIRE	EA	1	150.00	EU	0.150	1	80	80.0	EI	25.45	2.036	2.186
11	ASSEMBLE					0.000	1	20	20.0	MT	22.50	0.450	0.450
12	WIRE CHECK ABOVE					0.000	1	16	16.0	EM	25.45	0.407	0.407
						15.500			270.0			7.086	22.586

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ES	4.0	0.102
EI	196.0	4.988
EM	16.0	0.407
MS	34.0	1.139
MT	20.0	0.450
SUM	270.0	7.086

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
FAST PERTURBATION PS'S	1.1.1.4.5.5	1/20/87	2	DRE	K1455	1 UNI-POLAR & 1 BI-POLAR PS

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	PS 30V-800A	EA	1	15000.00	EU	15.000			0.0			0.000	15.000
2	PS BI-POLAR 75V-100A	EA	1	8000.00	EU	8.000			0.0			0.000	8.000
3	PS TEST SET-UP					0.000	2	8	16.0	EM	25.45	0.407	0.407
4	PS TEST SET-UP					0.000	2	8	16.0	EI	25.45	0.407	0.407
5	PS TEST SET-UP					0.000	2	4	8.0	PT	31.70	0.254	0.254
6	PS TEST					0.000	2	24	48.0	EM	25.45	1.222	1.222
7	ACTUATOR 800A	EA	1	30500.00	EU	30.500			0.0			0.000	30.500
8	ACTUATOR BI-POLAR 180A	EA	1	28800.00	EU	28.800			0.0			0.000	28.800
9	XDUCTOR 800A	EA	1	2500.00	EU	2.500			0.0			0.000	2.500
10	XDUCTOR BI-POLAR 100A	EA	1	1200.00	EU	1.200			0.0			0.000	1.200
11	CTL & INTLK CHASSIS	EA	2	800.00	EU	1.600	2	80	160.0	EI	25.45	4.072	5.672
12	CTL & INTLK CH-PAINT					0.000	2	2	4.0	MS	33.50	0.134	0.134
13	CTL & INTLK CH-SCREEN					0.000	2	2	4.0	ES	25.45	0.102	0.102
14	DUAL COMMAND CHASSIS	EA	1	400.00	EU	0.400	1	60	60.0	EI	25.45	1.527	1.927
15	DL COMMAND CH-PAINT					0.000	1	2	2.0	MS	33.50	0.067	0.067
16	DL COMMAND CH-SCREEN					0.000	1	4	4.0	ES	25.45	0.102	0.102
17	DL COMMAND CH-PC BDS					0.000	6	6	36.0	ES	25.45	0.916	0.916
18	XISTOR DRIVE CHASSIS	EA	2	400.00	EU	0.800	2	80	160.0	EI	25.45	4.072	4.872
19	XISTOR DRIVE CH-PAINT					0.000	2	2	4.0	MS	33.50	0.134	0.134
20	XISTOR DRIVE CH-SCREEN					0.000	2	2	4.0	ES	25.45	0.102	0.102
21	XISTOR DRIVE CH-PC BDS					0.000	8	6	48.0	ES	25.45	1.222	1.222
22	XISTOR BUFFER CHASSIS	EA	2	400.00	EU	0.800	2	80	160.0	EI	25.45	4.072	4.872
23	XISTOR BUFF CH-PAINT					0.000	2	2	4.0	MS	33.50	0.134	0.134
24	XISTOR BUFF CH-SCREEN					0.000	2	2	4.0	ES	25.45	0.102	0.102
25	XISTOR BUFF CH-PC BDS					0.000	4	6	24.0	ES	25.45	0.611	0.611
26	ASSEMBLE SINGLE RACK	EA	2	900.00	EU	1.800	2	16	32.0	EI	25.45	0.814	2.614
27	PAINT RACK					0.000	2	8	16.0	MS	33.50	0.536	0.536
28	ASSEMBLE & WIRE	EA	2	500.00	EU	1.000	2	100	200.0	EI	25.45	5.090	6.090
29	WIRE CHECK CHASSIS					0.000	7	4	28.0	EM	25.45	0.713	0.713
30	WIRE CHECK ASSEMBLY					0.000	2	16	32.0	EM	25.45	0.814	0.814
						92.400			1074.0			27.625	120.025

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ES	124.0	3.156
EI	788.0	20.055
EM	124.0	3.156
MS	30.0	1.005
PT	8.0	0.254
SUM	1074.0	27.625

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
EXTRACTION SEXTUPOLES PS	1.1.1.4.5.6	12/31/86	1 DRE	K1456	1 SYSTEM-ES	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	PS 20V-500A	EA	1	10000.00	EU	10.000			0.0			0.000	10.000
2	PS TEST SET-UP					0.000	1	8	8.0	EM	25.45	0.204	0.204
3	PS TEST SET-UP					0.000	1	8	8.0	EI	25.45	0.204	0.204
4	PS TEST SET-UP					0.000	1	4	4.0	PT	31.70	0.127	0.127
5	PS TEST					0.000	1	24	24.0	EM	25.45	0.611	0.611
6	ACTUATOR	EA	1	18500.00	EU	18.500			0.0			0.000	18.500
7	XDUCTOR	EA	1	1500.00	EU	1.500			0.0			0.000	1.500
8	CTL & INTLK CHASSIS	EA	1	800.00	EU	0.800	1	80	80.0	EI	25.45	2.036	2.836
9	CTL & INTLK CH-PAINT					0.000	1	2	2.0	MS	33.50	0.067	0.067
10	CTL & INTLK CH-SCREEN					0.000	1	4	4.0	ES	25.45	0.102	0.102
11	SCR CONTROL	EA	1	400.00	EU	0.400	1	60	60.0	EI	25.45	1.527	1.927
12	SCR CONTROL-PAINT					0.000	1	2	2.0	MS	33.50	0.067	0.067
13	SCR CONTROL-SCREEN					0.000	1	4	4.0	ES	25.45	0.102	0.102
14	SCR CONTROL-PC BDS					0.000	3	6	18.0	ES	25.45	0.458	0.458
15	XISTOR DRIVE CHASSIS	EA	1	400.00	EU	0.400	1	80	80.0	EI	25.45	2.036	2.436
16	XISTOR DRIVE CH-PAINT					0.000	1	2	2.0	MS	33.50	0.067	0.067
17	XISTOR DRIVE CH-SCREEN					0.000	1	4	4.0	ES	25.45	0.102	0.102
18	XISTOR DRIVE CH-PC BDS					0.000	4	6	24.0	ES	25.45	0.611	0.611
19	XISTOR DRIVE CHASSIS	EA	1	400.00	EU	0.400	1	80	80.0	EI	25.45	2.036	2.436
20	XISTOR DRIVE CH-PAINT					0.000	1	2	2.0	MS	33.50	0.067	0.067
21	XISTOR DRIVE CH-SCREEN					0.000	1	4	4.0	ES	25.45	0.102	0.102
22	XISTOR DRIVE CH-PC BDS					0.000	2	6	12.0	ES	25.45	0.305	0.305
23	ASSEMBLE SINGLE RACK	EA	1	900.00	EU	0.900	1	16	16.0	EI	25.45	0.407	1.307
24	PAINT RACK					0.000	1	8	8.0	MS	33.50	0.268	0.268
25	ASSEMBLE & WIRE	EA	1	500.00	EU	0.500	1	100	100.0	EI	25.45	2.545	3.045
26	WIRE CHECK CHASSIS					0.000	4	4	16.0	EM	25.45	0.407	0.407
27	WIRE CHECK ASSEMBLY					0.000	1	16	16.0	EM	25.45	0.407	0.407
						33.400			578.0			14.864	48.264

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ES	70.0	1.782
EI	424.0	10.791
EM	64.0	1.629
MS	16.0	0.536
PT	4.0	0.127
SUM	578.0	14.864

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
EXTR ELEM PS-SYST INSTALL	1.1.1.4.5.7	1/20/87	2	DRE	K1457	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	(451) INSTALL PS					0.000	1	8	8.0	EI	25.45	0.204	0.204
2	(451) RIGGING					0.000	1	2	2.0	MT	22.50	0.045	0.045
3	(451) WIRE MAG INTLKS	EA	1	100.00	EU	0.100	1	24	24.0	EI	25.45	0.611	0.711
4	(451) CNTL-INTLK CBLS	EA	1	300.00	EU	0.300	1	16	16.0	EI	25.45	0.407	0.707
5	(451) DC CABLING	LOT	1	6800.00	CP	6.800	1	104	104.0	PE	34.25	3.562	10.362
6	(451) H2O COOLING	EA	1	20.00	EU	0.020	1	2	2.0	PT	31.70	0.063	0.083
7	(451) SYST WIRE CHECK					0.000	1	8	8.0	EM	25.45	0.204	0.204
8	(452) INSTALL PS					0.000	1	8	8.0	EI	25.45	0.204	0.204
9	(452) RIGGING					0.000	1	2	2.0	MT	22.50	0.045	0.045
10	(452) WIRE MAG INTLKS	EA	1	100.00	EU	0.100	1	24	24.0	EI	25.45	0.611	0.711
11	(452) CNTL-INTLK CBLS	EA	1	300.00	EU	0.300	1	16	16.0	EI	25.45	0.407	0.707
12	(452) DC CABLING	LOT	1	6300.00	CP	6.300	1	100	100.0	PE	34.25	3.425	9.725
13	(452) H2O COOLING	EA	1	20.00	EU	0.020	1	2	2.0	PT	31.70	0.063	0.083
14	(452) SYST WIRE CHECK					0.000	1	8	8.0	EM	25.45	0.204	0.204
15	(453) INSTALL RACK					0.000	1	8	8.0	EI	25.45	0.204	0.204
16	(453) INSTALL HV CAGE					0.000	1	8	8.0	EI	25.45	0.204	0.204
17	(453) RIGGING					0.000	2	2	4.0	MT	22.50	0.090	0.090
18	(453) CNTL-INTLK CBLS	EA	1	300.00	EU	0.300	1	16	16.0	EI	25.45	0.407	0.707
19	(453) SYST WIRE CHECK					0.000	1	8	8.0	EM	25.45	0.204	0.204
20	(455) INSTALL PS'S					0.000	2	8	16.0	EI	25.45	0.407	0.407
21	(455) INSTALL RACKS					0.000	2	8	16.0	EI	25.45	0.407	0.407
22	(455) INSTALL ACTUATOR CAB					0.000	2	8	16.0	EI	25.45	0.407	0.407
23	(455) RIGGING					0.000	6	2	12.0	MT	22.50	0.270	0.270
24	(455) WIRE MAG INTLKS	EA	2	100.00	EU	0.200	2	24	48.0	EI	25.45	1.222	1.422
25	(455) CNTL-INTLK CBLS	EA	2	300.00	EU	0.600	2	16	32.0	EI	25.45	0.814	1.414
26	(455) DC CABLING	LOT	1	2440.00	CP	2.440	1	56	56.0	PE	34.25	1.918	4.358
27	(455) H2O COOLING	EA	4	20.00	EU	0.080	4	2	8.0	PT	31.70	0.254	0.334
28	(455) SYST WIRE CHECK					0.000	1	16	16.0	EM	25.45	0.407	0.407
29	(456) INSTALL PS					0.000	1	8	8.0	EI	25.45	0.204	0.204
30	(456) INSTALL RACK					0.000	1	8	8.0	EI	25.45	0.204	0.204
31	(456) INSTALL ACTUATOR CAB					0.000	1	8	8.0	EI	25.45	0.204	0.204
32	(456) RIGGING					0.000	3	2	6.0	MT	22.50	0.135	0.135
33	(456) WIRE MAG INTLKS	EA	2	100.00	EU	0.200	3	24	72.0	EI	25.45	1.832	2.032
34	(456) CNTL-INTLK CBLS	EA	1	300.00	EU	0.300	1	16	16.0	EI	25.45	0.407	0.707
35	(456) DC CABLING	LOT	1	1000.00	CP	1.000	1	24	24.0	PE	34.25	0.822	1.822
36	(456) H2O COOLING	EA	2	20.00	EU	0.040	2	2	4.0	PT	31.70	0.127	0.167
37	(456) SYST WIRE CHECK					0.000	1	8	8.0	EM	25.45	0.204	0.204
						19.100			742.0			21.406	40.506

LABOR SUMMARY		
Craft Code	Total Hours	Total Labor K$

EI	368.0	9.366
EM	48.0	1.222
MT	26.0	0.585
PT	16.0	0.507
PE	284.0	9.727
SUM	742.0	21.406

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
EXT ELEMENTS PS'S-SYST TESTS	1.1.1.4.5.8	1/7/87	1	DRE	K1458	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	(451) SYSTEM TESTS					0.000	1	32	32.0	EM	25.45	0.814	0.814
2	(452) SYSTEM TESTS					0.000	1	32	32.0	EM	25.45	0.814	0.814
3	(453) SYSTEM TESTS					0.000	1	40	40.0	EM	25.45	1.018	1.018
4	(455) SYSTEM TESTS					0.000	1	100	100.0	EM	25.45	2.545	2.545
5	(456) SYSTEM TESTS					0.000	1	48	48.0	EM	25.45	1.222	1.222
						0.000			252.0			6.413	6.413

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EM	252.0	6.413
SUM	252.0	6.413

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
FIRST TURN INJ DIAGNOSTICS	1.1.1.5.1	12/4/86	1	REIMERS	X151	BEAM MONITORING DEVICES

Item No.	ITEM TITLE	Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	$/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	SLOW PLUNGE	EA	3	2000.00	EU	6.000	3	557	1671.0	MS	33.50	55.979	61.979
C	FARADAY CUP					0.000	1	400	400.0	MT	22.50	9.000	9.000
2	SLOW PLUNGE	EA	3	2000.00	EU	6.000	3	378	1134.0	MS	33.50	37.989	43.989
C	BARE WIRE GRID B.P.M.					0.000	3	118	354.0	MT	22.50	7.965	7.965
						12.000			3559.0			110.932	122.932

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	2805.0	93.968
MT	754.0	16.965
SUM	3559.0	110.933

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
INSTALLATION	1.1.1.5.2	12/12/86	1	REIMERS	X152	BEAM MONITORING DEVICES

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	SLOW PLUNGE F.C.					0.000	3	89	267.0	MT	22.50	6.008	6.008
2	SLOW PLUNGE PROFILE MON					0.000	3	89	267.0	MT	22.50	6.008	6.008
						0.000			534.0			12.015	12.015

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MT	534.0	12.015
SUM	534.0	12.015

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
MONUMENTS	1.1.1.6.1	1/24/87	3	REIMERS	X161	RING SURVEY & ALIGNMENT

Item No.	ITEM TITLE	Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	MONUMENTS	EA	1	1000.00	EU	1.000	5	36	180.0	MT	22.50	4.050	5.050
						1.000			180.0			4.050	5.050

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MT	180.0	4.050
SUM	180.0	4.050

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
LIQUID LEVEL SYSTEM	1.1.1.6.2	1/24/87	3	REIMERS	X162	RING SURVEY & ALIGNMENT

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	LIQUID LEVEL SYSTEM	EA	20	1500.00	EU	30.000	20	9	180.0	MT	22.50	4.050	34.050
						30.000			180.0			4.050	34.050

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MT	180.0	4.050
SUM	180.0	4.050

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
SURVEY INSTRUMENTS	1.1.1.6.3	1/24/87	3	REIMERS	X163	RING SURVEY & ALIGNMENT

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	TRANSIT	EA	1	10000.00	EU	10.000	1	8	8.0	MT	22.50	0.180	10.180
						10.000			8.0			0.180	10.180

LABOR SUMMARY		
Craft Code	Total Hours	Total Labor K$
MT	8.0	0.180
SUM	8.0	0.180

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
ALIGNMENT FIXTURES	1.1.1.6.4	1/24/87	3	REIMERS	X164	RING SURVEY & ALIGNMENT

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	ALIGNMENT FIXTURES	EA	1	24000.00	EU	24.000			0.0			0.000	24.000
						24.000			0.0			0.000	24.000

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
RING SURVEY & ALIGNMENT	1.1.1.6.5	1/24/87	3	REIMERS	X165	RING SURVEY & ALIGNMENT

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	$/Hr	Labor Total Labor K$	NATL. & LABOR TOTAL $
1	SURVEY & ALIGNMENT		1	99000.00	EU	99.000			0.0			0.000	99.000
C			1	25000.00	EU	25.000			0.0			0.000	25.000
						124.000			0.0			0.000	124.000

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
DIPOLES	1.1.2.1.1.1.1	1/23/87	2	TANABE	Y21111	INJECTION BEAM LINE MAGNETS

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	ID1		1	21764.00	EU	21.764	5	1771.6	8858.0	MS	33.50	296.743	318.507
2	ID3		1	3257.00	EU	3.257	1	1682	1682.0	MS	33.50	56.347	59.604
						25.021			10540.0			353.090	378.111

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	10540.0	353.090
SUM	10540.0	353.090

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
QUADRUPOLES	1.1.2.1.1.1.2	1/23/87	2	TANABE	Y21112	INJECTION BEAMLINE MAGNETS

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	SHORT QUADRUPOLE	EA	1	23946.00	EU	23.946	8	261	2088.0	MS	33.50	69.948	93.894
						23.946			2088.0			69.948	93.894

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	2088.0	69.948
SUM	2088.0	69.948

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
SUPPORTS	1.1.2.1.1.2	12/12/86	1	REIMERS	X2112	INJECTION BEAMLINE

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	MATERIAL	EA	10	4000.00	EU	40.000			0.0			0.000	40.000
						40.000			0.0			0.000	40.000

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
COILS	1.1.2.1.2.1.1	1/12/87	2	TANABE	Y21211	EXTRACTION BEAMLINE DIPOLE

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	CU CONDUCTOR	LB	8400	2.05	VQ	17.220			0.0			0.000	17.220
2	MISC. MATERIAL		1	1200.00	CP	1.200			0.0			0.000	1.200
3	LABOR					0.000	1	1752	1752.0	MS	33.50	58.692	58.692
						18.420			1752.0			58.692	77.112

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	1752.0	58.692
SUM	1752.0	58.692

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
YOKES	1.1.2.1.2.1.2	1/12/87	2	TANABE	Y21212	EXTRACTION BEAMLINE DIPOLE

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	LAMINATED STEEL	SHEET	5000	6.40	VQ	32.000			0.0			0.000	32.000
2	MISC. MATERIAL	LB	1000	0.35	CP	0.350			0.0			0.000	0.350
3	LABOR					0.000	1	2708	2708.0	MS	33.50	90.718	90.718
						32.350			2708.0			90.718	123.068

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	2708.0	90.718
SUM	2708.0	90.718

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
FIXTURES	1.1.2.1.2.1.3	1/12/87	2	TANABE	Y21213	EXTRACTION BEAMLINE DIPOLE

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	JACKS	EA	8	250.00	VQ	2.000			0.0			0.000	2.000
2	MISC. MATERIAL	LB	1100	0.35	CP	0.385			0.0			0.000	0.385
3	STAMPING DIE	EA	1	40000.00	VQ	40.000			0.0			0.000	40.000
4	LABOR					0.000	1	1840	1840.0	MS	33.50	61.640	61.640
						42.385			1840.0			61.640	104.025

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	1840.0	61.640
SUM	1840.0	61.640

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
ASSEMBLY & TEST	1.1.2.1.2.1.4	1/12/87	2	TANABE	Y21214	EXTRACTION BEAMLINE DIPOLE

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	THERMAL INTERLOCK	EA	8	12.00	CP	0.096			0.0			0.000	0.096
2	FLOW INTERLOCK	EA	2	300.00	CP	0.600			0.0			0.000	0.600
3	MISC MATERIAL		1	200.00	EU	0.200			0.0			0.000	0.200
4	LABOR					0.000	1	406	406.0	MS	33.50	13.601	13.601
						0.896			406.0			13.601	14.497

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	406.0	13.601
SUM	406.0	13.601

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
SUPPORTS	1.1.2.1.2.2	12/12/86	1	REIMERS	X2122	EXTRACTION BEAMLINE

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	MATERIAL	EA	3	4000.00	EU	12.000			0.0			0.000	12.000
						12.000			0.0			0.000	12.000

LABOR SUMMARY		
Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
MAGNETS	1.1.2.1.6.1	1/12/87	1	TANABE	Y2161	EMITTANCE MATCHER DIPOLES EM1 / EM2

Item No.	ITEM TITLE	Material Unit Meas.	No. Units	Unit Cost	Cost Basis	Total Mt K$	Labor No. Units	Unit Hrs.	Total Hours	Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	EM1	EA	2	625.00	EU	1.250	2	382	764.0	MS	33.50	25.594	26.844
C						0.000	2	60	120.0	MT	22.50	2.700	2.700
2	EM2	EA	2	611.00	EU	1.222	2	482	964.0	MS	33.50	32.294	33.516
C						0.000	2	60	120.0	MT	22.50	2.700	2.700
						2.472			1968.0			63.288	65.760

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	1728.0	57.888
MT	240.0	5.400
SUM	1968.0	63.288

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
SUPPORTS	1.1.2.1.6.2	1/5/87	1	REIMERS	X2162	EMITTANCE MATCHER MAGNETS SUPPORTS

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	SUPPORTS	EA	4	1500.00	EU	6.000			0.0			0.000	6.000
						6.000			0.0			0.000	6.000

LABOR SUMMARY		
Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
INSTALLATION AND ALIGNMENT	1.1.2.1.7	1/12/87	2	REIMERS	X217	MAGNETS AND SUPPORTS

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	MATERIAL / LABOR	EA	13	100.00	EU	1.300	13	65	845.0	RG	31.20	26.364	27.664
						1.300			845.0			26.364	27.664

LABOR SUMMARY		
Craft Code	Total Hours	Total Labor K$
RG	845.0	26.364
SUM	845.0	26.364

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
INJECTION BEAMLINE	1.1.2.2.1	12/4/86	1	HUNT	Z221	VACUUM SYSTEMS

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	MATERIAL / LABOR		1	75000.00	EU	75.000	1	1220	1220.0	MS	33.50	40.870	115.870
						75.000			1220.0			40.870	115.870

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	1220.0	40.870
SUM	1220.0	40.870

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
EXTRACTION BEAMLINE	1.1.2.2.2	12/4/86	1	HUNT	Z222	VACUUM SYSTEMS

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	MATERIAL / LABOR		1	13000.00	EU	13.000	1	1407	1407.0	MS	33.50	47.135	60.135
C						0.000	1	450	450.0	MT	22.50	10.125	10.125
						13.000			1857.0			57.260	70.260

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	1407.0	47.135
MT	450.0	10.125
SUM	1857.0	57.260

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
EMITTANCE MATCHER	1.1.2.2.6	1/8/87	1	HUNT	Z226	VACUUM SYSTEMS

Item No.	ITEM TITLE	Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	MATERIAL/LABOR		1	36300.00	EU	36.300	1	1056	1056.0	MS	33.50	35.376	71.676
C						0.000	1	144	144.0	MT	22.50	3.240	3.240
						36.300			1200.0			38.616	74.916

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	1056.0	35.376
MT	144.0	3.240
SUM	1200.0	38.616

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
INSTALLATION	1.1.2.2.7	12/4/86	1	HUNT	Z227	VACUUM SYSTEMS

Item No.	ITEM TITLE	Material Unit Meas.	No. Units	Unit Cost	Cost Basis	Total Mt K$	Labor No. Units	Unit Hrs.	Total Hours	Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	MATERIAL / LABOR		1	2000.00	EU	2.000	1	16	16.0	MS	33.50	0.536	2.536
C						0.000	1	444	444.0	MT	22.50	9.990	9.990
C						0.000	1	48	48.0	RG	31.20	1.498	1.498
						2.000			508.0			12.024	14.024

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	16.0	0.536
MT	444.0	9.990
RG	48.0	1.498
SUM	508.0	12.024

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
BEAM PROFILE MONITORS	1.1.2.3.1.1	12/4/86	1	REIMERS	X2311	INJECTION BEAMLINE

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	SLOW PLUNGE					0.000			0.0			0.000	0.000
C	BARE WIRE GRID					0.000			0.0			0.000	0.000
C	PROFILE MONITOR	EA	6	2000.00	EU	12.000	6	378	2268.0	MS	33.50	75.978	87.978
C						0.000	6	118	708.0	MT	22.50	15.930	15.930
						12.000			2976.0			91.908	103.908

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	2268.0	75.978
MT	708.0	15.930
SUM	2976.0	91.908

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
ASSEMBLY AND TEST	1.1.2.3.1.6	1/5/87	1	REIMERS	X2316	INJECTION BEAMLINE MECH INSTRUMENTATION

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	BEAM PROFILE MONITOR					0.000	6	40	240.0	MT	22.50	5.400	5.400
						0.000			240.0			5.400	5.400

LABOR SUMMARY		
Craft Code	Total Hours	Total Labor K$
MT	240.0	5.400
SUM	240.0	5.400

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
BEAM PROFILE MONITORS	1.1.2.3.6.1	12/4/86	1	REIMERS	X2361	EMITTANCE MATCHER

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	SLOW PLUNGE	EA	4	2000.00	EU	8.000	4	378	1512.0	MS	33.50	50.652	58.652
C	BARE WIRE GRID					0.000	4	118	472.0	MT	22.50	10.620	10.620
C	BEAM PROFILE MON					0.000			0.0			0.000	0.000
						8.000			1984.0			61.272	69.272

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	1512.0	50.652
MT	472.0	10.620
SUM	1984.0	61.272

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
BEAM INTENSITY MONITORS	1.1.2.3.6.3	12/4/86	1	REIMERS	X2363	EMITTANCE MATCHER

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	$/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	NINE SEGMENT F.C.	EA	2	1000.00	EU	2.000	2	627	1254.0	MS	33.50	42.009	44.009
C						0.000	2	133	266.0	MT	22.50	5.985	5.985
						2.000			1520.0			47.994	49.994

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	1254.0	42.009
MT	266.0	5.985
SUM	1520.0	47.994

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
INSTALLATION & ALIGNMENT	1.1.2.3.7	1/5/87	1	REIMERS	X237	MECH INSTRUMENTATION FOR BEAMLINES

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	INJECTION BEAMLINE	EA	6	160.00	EU	0.960	6	16	96.0	MT	22.50	2.160	3.120
C	BEAM PROFILE MONITORS					0.000			0.0			0.000	0.000
2	EMITTANCE MATCHER					0.000			0.0			0.000	0.000
C	BEAM PROFILE MONITORS	EA	4	250.00	EU	1.000	4	16	64.0	MT	22.50	1.440	2.440
3	EMITTANCE MATCHER					0.000			0.0			0.000	0.000
C	BEAM INT MONITORS	EA	2	250.00	EU	0.500	2	16	32.0	MT	22.50	0.720	1.220
						2.460			192.0			4.320	6.780

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MT	192.0	4.320
SUM	192.0	4.320

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
DIPOLES	1.1.2.4.1.1	1/15/87	3	HALLIWELLS2411		INJECTION BEAM LINE POWER SUPPLIES

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	MODIFY 196KW PS	EA	6	2600.00	EU	15.600	6	100	600.0	EI	25.45	15.270	30.870
2	CONTROL WIRING		1	1200.00	EU	1.200	6	3	18.0	EI	25.45	0.458	1.658
C						0.000	6	2	12.0	PE	34.25	0.411	0.411
3	INTERLOCK WIRING		1	600.00	EU	0.600	1	24	24.0	EI	25.45	0.611	1.211
C			1	600.00	EU	0.600	1	16	16.0	PE	34.25	0.548	1.148
						18.000			670.0			17.298	35.298

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	642.0	16.339
PE	28.0	0.959
SUM	670.0	17.298

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
QUADRUPOLES	1.1.2.4.1.2	1/24/87	6	HALLIWELLS2412		INJECTION BEAMLINE

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	6V/600A	EA	16	2800.00	VQ	44.800	16	2	32.0	EI	25.45	0.814	45.614
2	INTERLOCK WIRING	EA	8	30.00	EU	0.240	8	3	24.0	EI	25.45	0.611	0.851
C						0.000	8	2	16.0	PE	34.25	0.548	0.548
3	CONTROL WIRING	EA	8	200.00	EU	1.600	8	3	24.0	EI	25.45	0.611	2.211
C						0.000	8	3	24.0	PE	34.25	0.822	0.822
						46.640			120.0			3.406	50.046

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	80.0	2.036
PE	40.0	1.370
SUM	120.0	3.406

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
CONTROL SYSTEMS INTERFACE	1.1.2.4.1.4	12/24/86	2	HALLIWELLS	2414	INJECTION BEAMLINE

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	16 CH ADC CHASSIS	EA	1	1500.00	EU	1.500	1	60	60.0	EI	25.45	1.527	3.027
C						0.000	1	4	4.0	ES	25.45	0.102	0.102
C						0.000	1	1	1.0	PP	34.25	0.034	0.034
2	16 CH DAC CHASSIS	EA	1	1200.00	EU	1.200	1	80	80.0	EI	25.45	2.036	3.236
C						0.000	1	4	4.0	ES	25.45	0.102	0.102
C						0.000	1	1	1.0	PP	34.25	0.034	0.034
3	WIRING TO COMPUTER	EA	2	100.00	EU	0.200	2	2	4.0	EI	25.45	0.102	0.302
						2.900			154.0			3.937	6.837

LABOR SUMMARY		
Craft Code	Total Hours	Total Labor K$
ES	8.0	0.204
EI	144.0	3.665
PP	2.0	0.069
SUM	154.0	3.937

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
SYSTEM INSTALLATION	1.1.2.4.1.5	1/24/87	5	KRUP	S2415	INJECTION BEAMLINE

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	$/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	DIPOLES					0.000			0.0			0.000	0.000
C	4/0 TO MAGNETS	FT	4500	1.56	CP	7.020	60	0.5	30.0	PE	34.25	1.028	8.048
C	LUGS	EA	120	1.90	CP	0.228	120	0.25	30.0	PE	34.25	1.028	1.256
2	QUADRUPOLES					0.000			0.0			0.000	0.000
C	4/0 TO MAGNETS	FT	5700	1.56	CP	8.892	76	0.5	38.0	PE	34.25	1.302	10.194
C	LUGS	EA	152	1.90	CP	0.289	152	0.25	38.0	PE	34.25	1.302	1.590
						16.429			136.0			4.658	21.087

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
PE	136.0	4.658
SUM	136.0	4.658

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
SYSTEM TESTS	1.1.2.4.1.6	12/24/86	2	KRUP	S2416	INJECTION BEAMLINE

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	DIPOLES					0.000	1	100	100.0	EM	25.45	2.545	2.545
2	QUADRUPOLES					0.000	1	24	24.0	EM	25.45	0.611	0.611
3	INST & CNTRL SYS INTFC					0.000	1	48	48.0	EM	25.45	1.222	1.222
						0.000			172.0			4.377	4.377

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EM	172.0	4.377
SUM	172.0	4.377

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
DIPOLES	1.1.2.4.2.1	1/22/87	3	ALL/JBH	L2421	EXTRACTION BEAMLINE - 196KW/2 BATTERY PS

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	$/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	BLOCK,PDW7TS01075	EA	3	277.84	VQ	0.834	1	8	8.0	EI	25.45	0.204	1.037
2	CU BUSS	EA	2	100.00	EU	0.200	2	4	8.0	EI	25.45	0.204	0.404
3	REGULATOR,VRCL3P-1	EA	1	227.00	VQ	0.227	1	4	4.0	EI	25.45	0.102	0.329
4	WIRING	EA	1	50.00	EU	0.050	1	4	4.0	EI	25.45	0.102	0.152
C						0.000			0.0			0.000	0.000
6	INSTALLATION, CABLES	LOT	1	10.00	EU	0.010	1	16	16.0	PE	34.25	0.548	0.558
7	FIRING BRD,FC0G6100	EA	1	454.00	VQ	0.454	1	8	8.0	EI	25.45	0.204	0.658
8	RMV 12 SCR+6 BAL RCTRS	EA	1	10.00	EU	0.010	1	30	0.0	EI	25.45	0.000	0.010
9	CHANGE WATER CKTS	EA	2	20.00	EU	0.040	2	8	16.0	PT	31.70	0.507	0.547
10	MOVE/INSTALL 196 KW	EA	1	0.00	EU	0.000	1	6	6.0	RG	31.20	0.187	0.187
C						0.000			0.0			0.000	0.000
12	DEBUG INSTALL-196 KW	EA	1	50.00	EU	0.050	1	32	32.0	EM	25.45	0.814	0.864
13	DRAWER CHASSIS FOR 3,7	EA	2	450.00	EU	0.900	2	32	64.0	EI	25.45	1.629	2.529
14	PANELS PREPARE & PAINT					0.000	1	12	12.0	MS	33.50	0.402	0.402
15	BLOCK, PDW7TS01075	EA	6	277.84	VQ	1.667	2	8	16.0	EI	25.45	0.407	2.074
16	COPPER BUS BAR	EA	4	100.00	EU	0.400	4	4	16.0	EI	25.45	0.407	0.807
17	CABLE/WIRE	EA	2	200.00	EU	0.400	2	4	8.0	EI	25.45	0.204	0.604
18	INSTALLATION CABLES	LOT	2	10.00	EU	0.020	2	16	32.0	PE	34.25	1.096	1.116
19	REMOVE RECTIFIERS	EA	2	10.00	EU	0.020	1	16	16.0	EI	25.45	0.407	0.427
20	CHANGE WATER CIRCUITS	EA	2	20.00	EU	0.040	2	8	16.0	PT	31.70	0.507	0.547
21	DEBUG INSTALL BATTS	EA	2	50.00	EU	0.100	2	28	56.0	EM	25.45	1.425	1.525
22	FIRING BRD FC0AUX60	EA	2	230.00	VQ	0.460	2	8	16.0	EI	25.45	0.407	0.867
23	REGULATOR, VRCL3P-1	EA	2	227.00	VQ	0.454	2	4	8.0	EI	25.45	0.204	0.658
25	DRWR CHASSIS FOR 22,23	EA	2	450.00	EU	0.900	2	32	64.0	EI	25.45	1.629	2.529
						7.236			426.0			11.595	18.831

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	240.0	6.108
EM	88.0	2.240
MS	12.0	0.402
PT	32.0	1.014
PE	48.0	1.644
RG	6.0	0.187
SUM	426.0	11.595

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
SYSTEM INSTALLATION	1.1.2.4.2.5	1/22/87	1	ALL/JBH	L2425	EXTRACTION BEAMLINE

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	P.S. POSITIONING	1 EA		50.00	EU	0.000	3	3	9.0	RG	31.20	0.281	0.281
2	P.S. TO MAG CONNECT	1 EA		30.00	EU	0.000	3	7	21.0	PE	34.25	0.719	0.719
						0.000			30.0			1.000	1.000

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
PE	21.0	0.719
RG	9.0	0.281
SUM	30.0	1.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
SYSTEM TESTS	1.1.2.4.2.6	1/22/87	3	ALL/JBH	L2426	EXTRACTION BEAMLINE

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	DIPOLES-SYS CHKS & TSTS					0.000	1	30	30.0	EM	25.45	0.764	0.764
2	INSTLTN-SYS CHKS & TSTS					0.000	1	12	12.0	EM	25.45	0.305	0.305
						0.000			42.0			1.069	1.069

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EM	42.0	1.069
SUM	42.0	1.069

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
EMITT MATCHER P.S/SEPTUM MAG	1.1.2.4.6.1	1/7/87	2	BRUSSE	C2461	SEPTUM MAGNETS PWR SUP

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	PWR SUP, 20V/40A	EA	2	1200.00	CP	2.400	2	2	4.0	EI	25.45	0.102	2.502
2	CHECKOUT	EA	2	10.00	EU	0.020	2	2	4.0	EM	25.45	0.102	0.122
						2.420			8.0			0.204	2.624

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	4.0	0.102
EM	4.0	0.102
SUM	8.0	0.204

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
EMITT MATCHER P.S/SYS INSTAL	1.1.2.4.6.3	1/24/87	4	BRUSSE	C2463	SYSTEM INSTALLATION

Item No.	ITEM TITLE	Unit Meas.	Material No. Units	Material Unit Cost	Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1			1	0.00	CP	0.000	1	0	0.0	EI	25.45	0.000	0.000
2	CABLE/INSTALLATION	EA	2	150.00	EU	0.300	2	8	16.0	PE	34.25	0.548	0.848
3	RACK/INSTALLATION	EA	1	475.00	EU	0.475	1	4	4.0	EI	25.45	0.102	0.577
4	RACK WIRING,FANS	EA	1	250.00	EU	0.250	1	16	16.0	EI	25.45	0.407	0.657
5	CHECKOUT	EA	1	10.00	EU	0.010	1	4	4.0	EM	25.45	0.102	0.112
						1.035			40.0			1.159	2.194

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	20.0	0.509
EM	4.0	0.102
PE	16.0	0.548
SUM	40.0	1.159

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
EMITT MATCHER P.S/SYS TESTS	1.1.2.4.6.4	1/7/87	2	BRUSSE	C2464	SYSTEM TESTS

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	POWER SUPPLY	EA	2	10.00	EU	0.020	2	6	12.0	EM	25.45	0.305	0.325
2	RACK/WIRING	EA	1	10.00	EU	0.010	1	4	4.0	EM	25.45	0.102	0.112
						0.030			16.0			0.407	0.437

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EM	16.0	0.407
SUM	16.0	0.407

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
INTLK/RING LAT MAG	1.1.3.1.1.1	1/7/87	4	PATTE	D3111	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	INTLK CABLES	EA	90	34.65	CP	3.119	90	0.5	45.0	EI	25.45	1.145	4.264
						0.000			0.0			0.000	0.000
						3.119			45.0			1.145	4.264

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	45.0	1.145
SUM	45.0	1.145

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
INTLK/RING INJ MAG	1.1.3.1.1.2	1/7/87	4	PATTE	D3112	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	INTLK CABLES	EA	10	34.65	CP	0.347	10	0.5	5.0	EI	25.45	0.127	0.474
						0.347			5.0			0.127	0.474

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	5.0	0.127
SUM	5.0	0.127

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
INTLK/RING EXTR MAG	1.1.3.1.1.3	1/7/87	4	PATTE	D3113	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	INTLK CABLES	EA	12	34.65	CP	0.416	12	0.5	6.0	EI	25.45	0.153	0.569
						0.416			6.0			0.153	0.569

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	6.0	0.153
SUM	6.0	0.153

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
INTLK/RING VAC SYS	1.1.3.1.1.4	1/7/87	4	PATTE	D3114	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	INTLK/ANNUN. CABLES	EA	61	34.65	CP	2.114	61	0.5	30.5	EI	25.45	0.776	2.890
						2.114			30.5			0.776	2.890

LABOR SUMMARY		
Craft Code	Total Hours	Total Labor K$
EI	30.5	0.776
SUM	30.5	0.776

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
INTLK/INJ BEAM LINES	1.1.3.1.1.6	1/7/87	4	PATTE	D3116	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	INTLK CABLES	EA	22	34.65	CP	0.762	22	0.5	11.0	EI	25.45	0.280	1.042
						0.762			11.0			0.280	1.042

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	11.0	0.280
SUM	11.0	0.280

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
INTLK/EXTRACT BMLN	1.1.3.1.1.7	1/7/87	4	PATTE	D3117	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	INTLK CABLES	EA	8	34.65	CP	0.277	8	0.5	4.0	EI	25.45	0.102	0.379
						0.277			4.0			0.102	0.379

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	4.0	0.102
SUM	4.0	0.102

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
INTLK/EMITT MATCHER	1.1.3.1.1.11	1/7/87	4	PATTE	D31111	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	INTLK CABLES	EA	16	34.65	CP	0.554	16	0.5	8.0	EI	25.45	0.204	0.758
						0.554			8.0			0.204	0.758

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	8.0	0.204
SUM	8.0	0.204

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
INTLK/CNTL SYS INTERFACE	1.1.3.1.1.12	1/24/87	4	PATTE	D31112	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	RING X CONN RACK	DBL HALF	2	984.56	CP	1.969	2	12	24.0	EI	25.45	0.611	2.580
C						0.000	2	9	18.0	MS	33.50	0.603	0.603
2	RING RELAY RACK	DBLE HALF	2	6075.56	CP	12.151	2	12	24.0	EI	25.45	0.611	12.762
C						0.000	2	9	18.0	MS	33.50	0.603	0.603
3	OPTO 22 RACK	DBLE	3	520.83	CP	1.562	3	8	24.0	EI	25.45	0.611	2.173
C						0.000	3	4	12.0	RG	31.20	0.374	0.374
C						0.000	3	2	6.0	PP	34.25	0.206	0.206
4	OPTO PC FRAME	EA	3	60.00	CP	0.180	3	16	48.0	MS	33.50	1.608	1.788
C						0.000	3	16	48.0	EI	25.45	1.222	1.222
5	OPTO 22 PC BOARD	EA	84	200.00	VQ	16.800	84	0	0.0	EI	25.45	0.000	16.800
6	OPTO 22 MODULE	EA	1344	7.50	VQ	10.080			0.0			0.000	10.080
						42.743			222.0			6.448	49.191

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	120.0	3.054
MS	84.0	2.814
PP	6.0	0.206
RG	12.0	0.374
SUM	222.0	6.448

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
SYSTEM INSTALLATION	1.1.3.1.1.13	1/7/87	1	PATTE	D31113	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	D3111					0.000	90	1	90.0	EI	25.45	2.290	2.290
2	D3112					0.000	10	1	10.0	EI	25.45	0.255	0.255
3	D3113					0.000	12	1	12.0	EI	25.45	0.305	0.305
4	D3114					0.000	61	1	61.0	EI	25.45	1.552	1.552
5	D3116					0.000	22	1	22.0	EI	25.45	0.560	0.560
6	D3117					0.000	8	1	8.0	EI	25.45	0.204	0.204
7	D31111					0.000	16	1	16.0	EI	25.45	0.407	0.407
8	D31112					0.000			0.0			0.000	0.000
C	ITEM #1					0.000	2	3	6.0	EI	25.45	0.153	0.153
C	ITEM #2					0.000	2	3	6.0	EI	25.45	0.153	0.153
C	ITEM #3					0.000	3	6	18.0	EI	25.45	0.458	0.458
C	ITEM #4					0.000	3	8	24.0	EI	25.45	0.611	0.611
C	ITEM #5					0.000	84	1	84.0	EI	25.45	2.138	2.138
C	ITEM #6					0.000	1344	0.017	22.8	EI	25.45	0.581	0.581
						0.000			379.8			9.667	9.667

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	379.8	9.667
SUM	379.8	9.667

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
SYSTEM TESTS	1.1.3.1.1.14	1/8/87	1	PATTE	D31114	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	D3111					0.000	90	1	90.0	EM	25.45	2.290	2.290
2	D3112					0.000	10	1	10.0	EM	25.45	0.255	0.255
3	D3113					0.000	12	1	12.0	EM	25.45	0.305	0.305
4	D3114					0.000	61	1	61.0	EM	25.45	1.552	1.552
5	D3116					0.000	22	1	22.0	EM	25.45	0.560	0.560
6	D3117					0.000	8	1	8.0	EM	25.45	0.204	0.204
7	D31111					0.000	16	1	16.0	EM	25.45	0.407	0.407
8	D31112					0.000			0.0			0.000	0.000
C	ITEM #5					0.000	84	2	168.0	EM	25.45	4.276	4.276
						0.000			387.0			9.849	9.849

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EM	387.0	9.849
SUM	387.0	9.849

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
Timing Generator	1.1.3.1.2.1	1/13/87	Sixth	JBH/ALL	L3121	Uses W/S items 1-9;Install & Sys Test; Design

	Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
	1	B dot Loop	ea	1	700.00	EU	0.700			0.0			0.000	0.700
C							0.000			0.0			0.000	0.000
	19	Painting; All Bins					0.000	6	2.4	14.4	MS	33.50	0.482	0.482
	20	Silkscreen; All Bins					0.000	6	4	24.0	ES	25.45	0.611	0.611
	2	Hall Probe System	ea	1	0.00		0.000			0.0			0.000	0.000
C		Bell 810 HR2	ea	1	3680.00	CP	3.680			0.0			0.000	3.680
C		Probes-HTJ 0618	ea	2	395.00	CP	0.790			0.0			0.000	0.790
C		Calibrated 25' Cables	ea	2	115.00		0.230			0.0			0.000	0.230
C							0.000			0.0			0.000	0.000
C							0.000			0.0			0.000	0.000
C							0.000			0.0			0.000	0.000
C							0.000			0.0			0.000	0.000
	3	NMR Probe	ea	1	19500.00	CP	19.500			0.0			0.000	19.500
	4	Cons & Sig Bufr Sys	ea	1	800.00	EU	0.800	1	4	4.0	PP	34.25	0.137	0.937
C							0.000			0.0			0.000	0.000
	6	Event Scheduler	ea	1	0.00	EU	0.000			0.0			0.000	0.000
	7	Isolatn Amp & Distbtr	ea	1			0.000			0.0			0.000	0.000
	8	B dot Drv'd Plse Gen	ea	1	1250.00	EU	1.250			0.0			0.000	1.250
	9	Volt/Freq Convertrs	ea	2	4000.00	EU	8.000	2	1.5	3.0	EI	25.45	0.076	8.076
C							0.000			0.0			0.000	0.000
C							0.000			0.0			0.000	0.000
	17	(1) B dot Loop	ea	0			0.000			0.0			0.000	0.000
C		(5) Fab Mount Hdwe	ea	1	100.00	EU	0.100	1	8	8.0	MT	22.50	0.180	0.280
	18	(3) NMR Probe System					0.000			0.0			0.000	0.000
C		(3) Fabricate Mounting					0.000	1	4	4.0	MT	22.50	0.090	0.090
	10	Simulator	EA	1			0.000			0.0			0.000	0.000
C		(1) Bin	EA	1	120.00	CP	0.120	1	8	8.0	EI	25.45	0.204	0.324
C		(2a) Analog Boards	EA	8	80.00	EU	0.640			0.0			0.000	0.640
C		(2b) Digital Boards	EA	7	50.00	EU	0.350			0.0			0.000	0.350
C		(3) Power Supply	EA	1	250.00	CP	0.250			0.0			0.000	0.250
C		(4) Back Plane Wiring					0.000	1	18	18.0	EI	25.45	0.458	0.458
C		(5) Plgs, Cnctrs, Sws	EA	5	20.00	CP	0.100			0.0			0.000	0.100
	13	(4) Consold & Sig Buff					0.000			0.0			0.000	0.000
C		(2) Mnt Misc Elect Chas					0.000	1	4	4.0	EI	25.45	0.102	0.102
C		(3) Fab Buffer Amp	EA	1	2390.00	EU	2.390	1	60	60.0	EI	25.45	1.527	3.917
	14	(6) Event Scheduler					0.000			0.0			0.000	0.000
C		(1) Single Ht Bin	EA	1	120.00	CP	0.120	1	8	8.0	EI	25.45	0.204	0.324
C		(2a) Digital Cards	EA	15	50.00	EU	0.750	15	1.5	22.5	EI	25.45	0.573	1.323
C		(2b) Analog Cards	EA	5	75.00	EU	0.375	5	1.5	7.5	EI	25.45	0.191	0.566
C		(3) Power Supply	EA	1	250.00	CP	0.250			0.0			0.000	0.250
C		(4) Connectors	EA	15	15.00	CP	0.225			0.0			0.000	0.225
C		(5) Back Plane Wirng					0.000	1	16	16.0	EI	25.45	0.407	0.407
C							0.000			0.0			0.000	0.000
C							0.000			0.0			0.000	0.000

C					0.000			0.0		0.000	0.000
C					0.000			0.0		0.000	0.000
	15 (7) Isltn Amp & Dist				0.000			0.0		0.000	0.000
C	(1) 13Y 7693 Cards	EA	9	156.00 EU	1.404	9	1.5	13.5 EI	25.45	0.344	1.748
C	(2) Dual Buffer Cards	EA	9	50.00 EU	0.450	9	1.5	13.5 EI	25.45	0.344	0.794
C	(3) IA&D Bin	EA	1	120.00 EU	0.120	1	32	32.0 EI	25.45	0.814	0.934
C	(4) Power Supply	EA	1	250.00 CP	0.250			0.0		0.000	0.250
C	(5) Plugs	EA	18	8.00 CP	0.144			0.0		0.000	0.144
C	(6) Coax Fittings	EA	18	2.00 CP	0.036			0.0		0.000	0.036
C					0.000			0.0		0.000	0.000
C					0.000			0.0		0.000	0.000
	16 (8) B dot Pulse Gen.				0.000			0.0		0.000	0.000
C	(1) Bin Assembly	EA	1	120.00 CP	0.120	1	8	8.0 EI	25.45	0.204	0.324
C	(2a) 5 Analog Boards	EA	5	75.00 EU	0.375	5	1.5	7.5 ES	25.45	0.191	0.566
C	(2b) 20 Digital Boards	EA	20	50.00 EU	1.000	20	1	20.0 EI	25.45	0.509	1.509
C					0.000			0.0		0.000	0.000
C					0.000			0.0		0.000	0.000
C	(3) Power Supply	EA	1	250.00 CP	0.250			0.0		0.000	0.250
C	(4) Back Plane Wire				0.000	1	10	10.0 EI	25.45	0.255	0.255
C	(5) Conectrs; Switches	EA	5	20.00 CP	0.100			0.0		0.000	0.100
C					0.000			0.0		0.000	0.000
C					0.000			0.0		0.000	0.000
C	(8) Back Plane Wiring				0.000	1	8	8.0 EI	25.45	0.204	0.204
C					0.000			0.0		0.000	0.000
C					0.000			0.0		0.000	0.000
C					0.000			0.0		0.000	0.000
C					0.000			0.0		0.000	0.000
C					0.000			0.0		0.000	0.000
C					0.000			0.0		0.000	0.000
	11 Event Decoder				0.000			0.0		0.000	0.000
C	(1) Bin	EA	1	120.00 CP	0.120	1	8	8.0 EI	25.45	0.204	0.324
C	(2) Digital Boards	EA	10	50.00 EU	0.500			0.0		0.000	0.500
C	(3) Power Supply	EA	1	250.00 CP	0.250			0.0		0.000	0.250
C	(4) Back Plane Wiring				0.000	1	18	18.0 EI	25.45	0.458	0.458
C	(5) Plugs, Cnctrs, Sws	EA	5	10.00 CP	0.050			0.0		0.000	0.050
	18 (1) Comp Mon Itrfc Bin	EA	1	120.00 CP	0.120	1	8	8.0 EI	25.45	0.204	0.324
C	(2a) Digital Boards	EA	5	90.00 EU	0.450			0.0		0.000	0.450
C	(2b) Analog Boards	EA	5	50.00 EU	0.250			0.0		0.000	0.250
C	(3) Power Supply	EA	1	250.00 CP	0.250			0.0		0.000	0.250
C	(4) Back Plane Wiring				0.000	1	18	18.0 EI	25.45	0.458	0.458
C	(5) Plgs, Cntrs, Sws	EA	5	20.00 CP	0.100			0.0		0.000	0.100
					46.959			365.9		9.428	56.387

LABOR SUMMARY		
Craft Code	Total Hours	Total Labor K$
ES	31.5	0.802
EI	304.0	7.737
MS	14.4	0.482
MT	12.0	0.270
PP	4.0	0.137
SUM	365.9	9.428

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
Timing-Pulse Distribution	1.1.3.1.2.2	12/5/86	First	JBH/ALL	L3122	Consists of work-sheet Item NO. 10

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1.	Clen-up, Remv Old Systm					0.000	1	160	160.0	EM	25.45	4.072	4.072
						0.000			160.0			4.072	4.072

LABOR SUMMARY		
Craft Code	Total Hours	Total Labor K$
EM	160.0	4.072
SUM	160.0	4.072

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
SHILAC Synchronization	1.1.3.1.2.3	1/13/87	Third	JBH/ALL	L3123	Deleted Elect Design & Moved Sys Check

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1.	Bin	EA	1	120.00	CP	0.120	1	8	8.0	EI	25.45	0.204	0.324
2.	Digital PC Cards	EA	30	50.00	EU	1.500			0.0			0.000	1.500
3.	Power Supply	EA	1	250.00	CP	0.250			0.0			0.000	0.250
4.	Connectors	EA	10	15.00	CP	0.150			0.0			0.000	0.150
5.	Back Plane Wiring					0.000	1	10	10.0	EI	25.45	0.255	0.255
6.	Painting					0.000	1	2	2.0	MS	33.50	0.067	0.067
7.	Silkscreen					0.000	1	4	4.0	ES	25.45	0.102	0.102
8.	Back Plane Wiring					0.000	1	8	8.0	EI	25.45	0.204	0.204
						2.020			32.0			0.831	2.851

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ES	4.0	0.102
EI	26.0	0.662
MS	2.0	0.067
SUM	32.0	0.831

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
System Installation	1.1.3.1.2.5	1/24/87	2	JBH/ALL	L3125	B/O of instln from L3121

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	B dot Loop	ea	1			0.000			0.0			0.000	0.000
a	Installation	ea				0.000	1	8	8.0	MT	22.50	0.180	0.180
2	Hall Probe System	ea	1			0.000			0.0			0.000	0.000
a	Fabricate Mounting	ea	2	100.00	EU	0.200	2	6	12.0	MT	22.50	0.270	0.470
b	Install Probes					0.000	2	2	4.0	MT	22.50	0.090	0.090
c	Instl chasis-Conn Cbls					0.000	2	2	4.0	EI	25.45	0.102	0.102
3	NMR Probe System					0.000			0.0			0.000	0.000
a	Probe Install					0.000	1	1	1.0	MT	22.50	0.023	0.023
b	Instl Connect Cabls					0.000	1	4	4.0	EI	25.45	0.102	0.102
4	Consold & Sig Buff					0.000			0.0			0.000	0.000
a	Rak Loc (Assmbl)					0.000	1	6	6.0	EI	25.45	0.153	0.153
b	Rak Loc (Mount)					0.000	1	2	2.0	RG	31.20	0.062	0.062
c	Rak Loc (Mount)					0.000	1	10	10.0	EI	25.45	0.255	0.255
d	Rak Loc (Rak Pwr)	ft	480	0.04	CP	0.018	1	4	4.0	PE	34.25	0.137	0.155
5	Conduit Run to MCR	ft	150	5.00	CP	0.750	1	60	60.0	PE	34.25	2.055	2.805
						0.968			115.0			3.428	4.396

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	24.0	0.611
MT	25.0	0.563
PE	64.0	2.192
RG	2.0	0.062
SUM	115.0	3.428

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
System Check and Test	1.1.3.1.2.6	1/13/87	Second	JBH/ALL	L3126	B/O of System Check from all Timing Sys jobs

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1.	Hall Probe System					0.000	1	8	8.0	EM	25.45	0.204	0.204
2.	NMR Probe					0.000	1	6	6.0	EM	25.45	0.153	0.153
3.	Consold & Sig Buffr					0.000	1	6	6.0	EM	25.45	0.153	0.153
4.	Conduit Run to MCR					0.000	1	4	4.0	EM	25.45	0.102	0.102
5.	Function Control					0.000	1	16	16.0	EM	25.45	0.407	0.407
6.	Isoltn Amp & Dist					0.000	1	16	16.0	EM	25.45	0.407	0.407
7.	B dot Pulse Gen					0.000	1	16	16.0	EM	25.45	0.407	0.407
8.	Volt/Freq Convtrs					0.000	2	4	8.0	EM	25.45	0.204	0.204
9.	SHILAC Sync Bin					0.000	1	24	24.0	EM	25.45	0.611	0.611
						0.000			104.0			2.647	2.647

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EM	104.0	2.647
SUM	104.0	2.647

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
VACUUM MONITORING	1.1.3.1.3	1/26/87	3	HENDERSONE	313	Vacuum monitoring equipment

Item No.	ITEM TITLE	Material: Unit Meas.	Material: No. Units	Material: Unit Cost	Material: Cost Basis	Material: Total Mt K$	Labor: No. Units	Labor: Unit Hrs.	Labor: Total Hours	Labor: Craft Code	Labor: $/Hr	Labor: Total Labor K$	MATL. & LABOR TOTAL $
1	RGA P/S	EA	1	18000.00	EU	18.000			0.0			0.000	18.000
						0.000			0.0			0.000	0.000
						0.000			0.0			0.000	0.000
2	P/S ION UHV TUBE	EA	6	2500.00	EU	15.000			0.0			0.000	15.000
						0.000			0.0			0.000	0.000
3	STD ION GAUGE P/S	EA	8	2000.00	EU	16.000			0.0			0.000	16.000
						0.000			0.0			0.000	0.000
4	HASTINGS GAUGE P/S	EA	16	550.00	EU	8.800			0.0			0.000	8.800
5	INSTALL CHASSIS					0.000	31	2	62.0	EI	25.45	1.578	1.578
6	FAB CABLES					0.000	100	0.5	50.0	EI	25.45	1.273	1.273
7	INSTALL CABLES					0.000	100	0.2	20.0	EI	25.45	0.509	0.509
8	EQUIPMENT CHECKOUT					0.000	1	60	60.0	EM	25.45	1.527	1.527
9	FAB PUSHBUTTON PANEL	EA	1	350.00	EU	0.350	1	40	40.0	EI	25.45	1.018	1.368
10	FAB LITE PANEL	EA	1	200.00	EU	0.200	1	16	16.0	EI	25.45	0.407	0.607
11	FAB WIRES	EA	8	20.00	EU	0.160	8	2	16.0	EI	25.45	0.407	0.567
12	FAB CROSSCONNECT SET	SET	1	250.00	EU	0.250			0.0			0.000	0.250
13	INSTALL PB PANEL					0.000	1	2	2.0	EI	25.45	0.051	0.051
14	INSTALL LITE PANEL					0.000	1	2	2.0	EI	25.45	0.051	0.051
15	INSTALL CROSSCONNECTS					0.000	1	4	4.0	EI	25.45	0.102	0.102
16	PULL IN WIRES					0.000	8	6	48.0	EI	25.45	1.222	1.222
17	MAKE CROSSCONNECTS					0.000	1	6	6.0	EI	25.45	0.153	0.153
18	TEST CONTROL SET					0.000	1	16	16.0	EM	25.45	0.407	0.407
						58.760			342.0			8.704	67.464

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	266.0	6.770
EM	76.0	1.934
SUM	342.0	8.704

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
RAD MON/SYNCHROTRON AREA	1.1.3.1.4.1	1/8/87	3	PATTE	D3141	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	NEUTRON DETECTORS	EA	4	511.66	A84	2.047	4	16	64.0	EI	25.45	1.629	3.675
C						0.000	4	1	4.0	ES	25.45	0.102	0.102
C						0.000			0.0			0.000	0.000
C						0.000	4	11.5	46.0	NC	49.80	2.291	2.291
C						0.000	4	5	20.0	MS	33.50	0.670	0.670
2	N. D. TUBES (SPARES)	EA	6	250.00	VQ	1.500			0.0			0.000	1.500
3	N.D. P.S. 11Y9463	EA	2	400.00	CP	0.800	2	26	52.0	EI	25.45	1.323	2.123
4	N.D.DIST.PNL.11Y6454	EA	1	620.00	CP	0.620	1	35	35.0	EI	25.45	0.891	1.511
5	SCALER 12Y4885	EA	3	2613.00	VQ	7.839	3	60	180.0	EI	25.45	4.581	12.420
C						0.000	3	2	6.0	PP	34.25	0.206	0.206
6	NEUTRON SOURCE	EA	6	220.00	VQ	1.320			0.0			0.000	1.320
						14.126			407.0			11.692	25.818

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ES	4.0	0.102
EI	331.0	8.424
MS	20.0	0.670
NC	46.0	2.291
PP	6.0	0.206
SUM	407.0	11.692

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
RAD MON/LOC INJ MODS	1.1.3.1.4.4	12/4/86	1	PATTE	D3144	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	XRAY DETS	EA	2	1000.00	VQ	2.000			0.0			0.000	2.000
						2.000			0.0			0.000	2.000

LABOR SUMMARY		
Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
RAD MON/TRANSFER LINE	1.1.3.1.4.5	12/17/86	1	PATTE	D3145	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	NEUTRON SOURCE	EA	8	220.00	VQ	1.760			0.0			0.000	1.760
						1.760			0.0			0.000	1.760

LABOR SUMMARY		
Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
RAD MON/EPB AREA	1.1.3.1.4.6	1/8/87	3	PATTE	D3146	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	COAX-HISS TO C200	RUN	10	81.00	CP	0.810			0.0			0.000	0.810
C						0.000	1	12	12.0	EI	25.45	0.305	0.305
C						0.000			0.0			0.000	0.000
2	NEUTRON SOURCE	EA	21	220.00	VQ	4.620			0.0			0.000	4.620
						5.430			12.0			0.305	5.735

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	12.0	0.305
SUM	12.0	0.305

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
RAD MON/CNTL SYS INTFCE	1.1.3.1.4.8	12/4/86	1	PATTE	D3148	

Item No.	ITEM TITLE	Material Unit Meas.	No. Units	Unit Cost	Cost Basis	Total Mt K$	Labor No. Units	Unit Hrs.	Total Hours	Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	INTERFACE 14X3921	EA	1	1000.00	EU	1.000			0.0			0.000	1.000
2	SDK-86 CHASSIS	EA	2	2000.00	EU	4.000			0.0			0.000	4.000
3	TEK CNTR/TMR DC-503A	EA	16	1420.00	CP	22.720			0.0			0.000	22.720
4	TEK RTM-506 MAIN FRM	EA	4	725.00	CP	2.900			0.0			0.000	2.900
						30.620			0.0			0.000	30.620

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
SYSTEM INSTALLATION	1.1.3.1.4.9	1/8/87	1	PATTE	D3149	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	D3141					0.000			0.0			0.000	0.000
C	ITEM #3					0.000	2	2	4.0	EI	25.45	0.102	0.102
C	ITEM #4					0.000	1	2	2.0	EI	25.45	0.051	0.051
C	ITEM #5					0.000	3	8	24.0	EI	25.45	0.611	0.611
2	D3144					0.000	2	8	16.0	EI	25.45	0.407	0.407
3	D3146					0.000	10	1	10.0	PE	34.25	0.343	0.343
4	D3148					0.000			0.0			0.000	0.000
C	ITEM #2					0.000	2	4	8.0	EI	25.45	0.204	0.204
C	ITEM #4					0.000	4	4	16.0	EI	25.45	0.407	0.407
						0.000			80.0			2.124	2.124

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	70.0	1.782
PE	10.0	0.343
SUM	80.0	2.124

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
SYSTEM TESTS	1.1.3.1.4.10	1/8/87	1	PATTE	D31410	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	D3141					0.000			0.0			0.000	0.000
C	ITEM #1					0.000	4	2	8.0	EM	25.45	0.204	0.204
C	ITEM #3					0.000	2	3	6.0	EM	25.45	0.153	0.153
C	ITEM #4					0.000	1	3	3.0	EM	25.45	0.076	0.076
C	ITEM #5					0.000	3	12	36.0	EM	25.45	0.916	0.916
2	D3144					0.000	2	4	8.0	EM	25.45	0.204	0.204
3	D3146					0.000			0.0			0.000	0.000
C	ITEM #1					0.000	10	0.5	5.0	EM	25.45	0.127	0.127
4	D3148					0.000			0.0			0.000	0.000
C	ITEM #1					0.000	1	2	2.0	EM	25.45	0.051	0.051
C	ITEM #2					0.000	2	10	20.0	EM	25.45	0.509	0.509
C	ITEM #3					0.000	16	1	16.0	EM	25.45	0.407	0.407
C	ITEM #4					0.000	4	2	8.0	EM	25.45	0.204	0.204
						0.000			112.0			2.850	2.850

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EM	112.0	2.850
SUM	112.0	2.850

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
SYNCHROTRON AREA/BIE	1.1.3.1.5.1.1	1/12/87	6	BRUSSE	C31511	STD CHASSIS MOVED

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	PREAMP CHASSIS	EA	1	400.00	EU	0.400	1	40	40.0	EI	25.45	1.018	1.418
2	DETECTOR CHASSIS	EA	1	800.00	EU	0.800	1	60	60.0	EI	25.45	1.527	2.327
3	5 PIECE CARD P.S.	EA	1	150.00	CP	0.150	1	8	8.0	EM	25.45	0.204	0.354
4	WIRE CHECK	EA	1	10.00	EU	0.010	2	4	8.0	EM	25.45	0.204	0.214
						1.360			116.0			2.952	4.312

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	100.0	2.545
EM	16.0	0.407
SUM	116.0	2.952

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
SYNCHROTRON AREA/ORBIT	1.1.3.1.5.1.2	1/24/87	6	BRUSSE	C31512	STD LOGIC CHAS MOVED

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	$/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	PREAMP CIRCUITS	EA	24	600.00	EU	14.400	24	16	384.0	EI	25.45	9.773	24.173
2	DETECTOR LOGIC	EA	24	800.00	EU	19.200	24	24	576.0	EI	25.45	14.659	33.859
3		EA	1	0.00	EU	0.000	1	0	0.0	EI	25.45	0.000	0.000
4	NIM BIN	EA	4	150.00	CP	0.600	2	2	4.0	EI	25.45	0.102	0.702
5	NIM BIN POWER SUPPLY	EA	4	950.00	CP	3.800	2	2	4.0	EI	25.45	0.102	3.902
6	POWER SUPPLY	EA	24	150.00	EU	3.600	24	6	144.0	EI	25.45	3.665	7.265
7		EA	0	0.00	CP	0.000	1	0	0.0	EI	25.45	0.000	0.000
8	WIRE CHECK	EA	1	150.00	CP	0.150	52	2	104.0	EM	25.45	2.647	2.797
						41.750			1216.0			30.947	72.697

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	1112.0	28.300
EM	104.0	2.647
SUM	1216.0	30.947

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
SYNCHROTRON AREA/PHASE	1.1.3.1.5.1.3	1/12/87	3	BRUSSE	C31513	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	PHASE FEEDBACK SYS	EA	1	4000.00	EU	4.000	1	160	160.0	EI	25.45	4.072	8.072
2	WIRE CHECK	EA	1	100.00	EU	0.100	1	16	16.0	EM	25.45	0.407	0.507
3	CABLES	EA	1	100.00	EU	0.100	1	16	16.0	EI	25.45	0.407	0.507
						4.200			192.0			4.886	9.086

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	176.0	4.479
EM	16.0	0.407
SUM	192.0	4.886

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
SYNCHROTRON AREA/1 TURN	1.1.3.1.5.1.4	1/6/87	2	BRUSSE	C31514	REF PRINTS;12Y1815 (MUX/ADC), 12Y3505 (CUP SY

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	9 SEGMENT CUPS	EA	3	3200.00	EU	9.600	3	224	672.0	EI	25.45	17.102	26.702
2	WIRE GRIDS	EA	3	3500.00	EU	10.500	3	270	810.0	EI	25.45	20.615	31.115
3	WIRE GRIDS	EA	3	50.00	EU	0.150	3	28	84.0	MS	33.50	2.814	2.964
4	CHECKOUT	EA	9	5.00	EU	0.045	9	1	9.0	EM	25.45	0.229	0.274
						20.295			1575.0			40.760	61.055

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	1482.0	37.717
EM	9.0	0.229
MS	84.0	2.814
SUM	1575.0	40.760

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
SYNCH AREA/SYSTEM INSTALL	1.1.3.1.5.1.5	1/24/87	3	BRUSSE	C31515	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	$/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	BIE	EA	1	100.00	EU	0.100	1	8	8.0	EI	25.45	0.204	0.304
2	ORBIT CORRECT SENSORS	EA	24	10.00	EU	0.240	24	2	48.0	EI	25.45	1.222	1.462
3	PHASE FEEDBACK SYS	EA	1	50.00	EU	0.050	1	16	16.0	EI	25.45	0.407	0.457
4	1 TURN INJ DIAG	EA	6	15.00	EU	0.090	6	8	48.0	EI	25.45	1.222	1.312
5	COAX, RG58C/U	FT	10000	0.09	CP	0.900	1	0	0.0	EI	25.45	0.000	0.900
6	COAX CONNECTORS	EA	200	2.16	CP	0.432	100	0.25	25.0	EI	25.45	0.636	1.068
7	12C/SH CABLE	FT	2500	0.56	CP	1.400	1	0	0.0	EI	25.45	0.000	1.400
8	12C/SH CONNECTORS	EA	50	13.82	CP	0.691	25	3	75.0	EI	25.45	1.909	2.600
9	INSTALL CABLE SET	EA	25	0.00	EU	0.000	25	8	200.0	PE	34.25	6.850	6.850
						3.903			420.0			12.449	16.352

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	220.0	5.599
PE	200.0	6.850
SUM	420.0	12.449

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
SYNCH AREA/SYSTEM TEST	1.1.3.1.5.1.6	1/6/87	1	BRUSSE	C31516	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	BIE	EA	1	10.00	EU	0.010	1	16	16.0	EM	25.45	0.407	0.417
2	ORBIT CORRECT SENSORS	EA	24	2.00	EU	0.048	24	8	192.0	EM	25.45	4.886	4.934
3	PHASE FEEDBACK SYS	EA	1	25.00	EU	0.025	1	16	16.0	EM	25.45	0.407	0.432
4	1 TURN INJ DIAG	EA	6	4.00	EU	0.024	6	12	72.0	EM	25.45	1.832	1.856
						0.107			296.0			7.533	7.640

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EM	296.0	7.533
SUM	296.0	7.533

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
BEAM PROFILE MONITORS	1.1.3.1.5.2.1	1/5/87	2	KRUP	S31521	INJECTION LINES

Item No.	ITEM TITLE	Material: Unit Meas.	Material: No. Units	Material: Unit Cost	Material: Cost Basis	Material: Total Mt K$	Labor: No. Units	Labor: Unit Hrs.	Labor: Total Hours	Labor: Craft Code	$/Hr	Labor: Total Labor K$	MATL. & LABOR TOTAL $
1	PROCESSOR CHASSIS	EA	6	1595.00	EU	9.570	6	40	240.0	EI	25.45	6.108	15.678
2						0.000	6	0.5	3.0	PP	34.25	0.103	0.103
3						0.000	6	1	6.0	ES	25.45	0.153	0.153
4	I/V POWER SUPPLY	EA	6	175.00	EU	1.050	6	24	144.0	EI	25.45	3.665	4.715
5						0.000	6	0.5	3.0	PP	34.25	0.103	0.103
6						0.000	6	1	6.0	ES	25.45	0.153	0.153
7	I/V CONVERTER CH	EA	6	1500.00	EU	9.000	6	64	384.0	EI	25.45	9.773	18.773
8						0.000	6	14	84.0	MS	33.50	2.814	2.814
9	4CH PLNGE CNTRL CH	EA	2	255.00	EU	0.510	2	32	64.0	EI	25.45	1.629	2.139
10						0.000	2	0.5	1.0	PP	34.25	0.034	0.034
11						0.000	2	2	4.0	ES	25.45	0.102	0.102
12	CHASSIS WIRE & HOT CHECKS					0.000	20	24	480.0	EM	25.45	12.216	12.216
						20.130			1419.0			36.851	56.981

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ES	16.0	0.407
EI	832.0	21.174
EM	480.0	12.216
MS	84.0	2.814
PP	7.0	0.240
SUM	1419.0	36.851

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
SYSTEM INSTALLATION	1.1.3.1.5.2.6	1/5/87	2	KRUP	S31526	INJ BEAMLINES

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	BPM CABLES	EA	6	210.00	EU	1.260	6	16	96.0	EI	25.45	2.443	3.703
C	FAB & INSTALL					0.000			0.0			0.000	0.000
						1.260			96.0			2.443	3.703

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	96.0	2.443
SUM	96.0	2.443

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
SYSTEM TESTS	1.1.3.1.5.2.7	1/5/87	1	KRUP	S31527	INJECTION BEAMLINES BEAM MONITORING

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	BEAM PROFILE MONITORS					0.000	6	42	252.0	EM	25.45	6.413	6.413
						0.000			252.0			6.413	6.413

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EM	252.0	6.413
SUM	252.0	6.413

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
BEAM PROFILE MONITORS	1.1.3.1.5.7.1	1/5/87	3	KRUP	S31571	EMITTANCE MATCHER

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	$/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	PROCESSOR CHASSIS	EA	4	1595.00	EU	6.380	4	40	160.0	EI	25.45	4.072	10.452
2						0.000	4	0.5	2.0	PP	34.25	0.069	0.069
3						0.000	4	1	4.0	ES	25.45	0.102	0.102
4	I/V POWER SUPPLY	EA	4	175.00	EU	0.700	4	24	96.0	EI	25.45	2.443	3.143
5						0.000	4	0.5	2.0	PP	34.25	0.069	0.069
6						0.000	4	1	4.0	ES	25.45	0.102	0.102
7	I/V CONVERTER CH	EA	4	1500.00	EU	6.000	4	64	256.0	EI	25.45	6.515	12.515
8						0.000	4	14	56.0	MS	33.50	1.876	1.876
9	4CH PLNGE CNTRL CH	EA	1	255.00	EU	0.255	1	32	32.0	EI	25.45	0.814	1.069
10						0.000	1	0.5	0.5	PP	34.25	0.017	0.017
11						0.000	1	2	2.0	ES	25.45	0.051	0.051
12	CHASSIS WIRE & HOT CHEC					0.000	13	24	312.0	EM	25.45	7.940	7.940
						13.335			926.5			24.070	37.405

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ES	10.0	0.255
EI	544.0	13.845
EM	312.0	7.940
MS	56.0	1.876
PP	4.5	0.154
SUM	926.5	24.070

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
SYSTEM INSTALLATION	1.1.3.1.5.7.6	1/5/87	2	KRUP	S31576	EMITTANCE MATCHER BEAM MONITORING

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	BPM CABLES	EA	4	210.00	EU	0.840	4	16	64.0	EI	25.45	1.629	2.469
C	FAB & INSTALL					0.000			0.0			0.000	0.000
						0.840			64.0			1.629	2.469

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	64.0	1.629
SUM	64.0	1.629

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
SYSTEM TESTS	1.1.3.1.5.7.7	1/5/87	1	KRUP	S31577	EMITTANCE MATCHER BEAM MONITORING

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	BEAM PROFILE MONITORS					0.000	4	42	168.0	EM	25.45	4.276	4.276
						0.000			168.0			4.276	4.276

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EM	168.0	4.276
SUM	168.0	4.276

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
COMPUTER SYSTEM HARDWARE	1.1.3.2.1.1	1/25/87	2	DWINELL	R3211	AIP88 PROVIDES MOST OF SYSTEM

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	sun 3/110 c	EA	1	47000.00	CP	47.000	1	40	40.0	EI	25.45	1.018	48.018
2	DATA POOL CNTRL	EA	1	9000.00	CP	9.000			0.0			0.000	9.000
3	VME CONTROLLER	EA	5	8400.00	CP	42.000	5	40	200.0	EI	25.45	5.090	47.090
4	PRINTER	EA	1	5000.00	EU	5.000			0.0			0.000	5.000
5	WAVEFORM DIGITIZER	EA	6	6000.00	EU	36.000			0.0			0.000	36.000
6	VIDEO CONTROLLERS	EA	6	3000.00	CP	18.000			0.0			0.000	18.000
7	TESTING					0.000	1	120	120.0	EM	25.45	3.054	3.054
8	INSTALLATION					0.000	2	120	240.0	EI	25.45	6.108	6.108
						157.000			600.0			15.270	172.270

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	480.0	12.216
EM	120.0	3.054
SUM	600.0	15.270

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
COMPUTER NETWORK HARDWARE	1.1.3.2.1.2	12/13/86	1	DWINELL	R3212	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	NETWORK TEST EQUIP	EA	1	20000.00	CP	20.000			0.0			0.000	20.000
2	ETHERNET BRIDGE	EA	2	4900.00	CP	9.800	2	4	8.0	EI	25.45	0.204	10.004
3	REPEATERS	EA	3	1200.00	CP	3.600	3	8	24.0	EI	25.45	0.611	4.211
4	CABLING	FT	1000	1.20	EU	1.200	1	24	24.0	EI	25.45	0.611	1.811
5	CONNECTORS	EA	30	25.00	EU	0.750	30	1	30.0	EI	25.45	0.764	1.514
						35.350			86.0			2.189	37.539

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	86.0	2.189
SUM	86.0	2.189

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
OPERATOR STATIONS	1.1.3.2.2	1/25/87	2	DWINELL	R322	ONE NEW CONSOLE AND MISC DISPLAY ITEMS

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	CONSOLE -LESS SUN	EA	1	12000.00	EU	12.000	1	80	80.0	EI	25.45	2.036	14.036
2	ANALOG MULTIPLEXOR	EA	6	10000.00	EU	60.000	6	20	120.0	EI	25.45	3.054	63.054
3	CONTROL ROOM SCOPES	EA	8	2500.00	CP	20.000			0.0			0.000	20.000
4	CABLING	EA	20	300.00	EU	6.000	1	80	80.0	EI	25.45	2.036	8.036
5	TESTING					0.000	1	120	120.0	EM	25.45	3.054	3.054
6	INSTALLATION					0.000	2	160	320.0	EI	25.45	8.144	8.144
						98.000			720.0			18.324	116.324

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	600.0	15.270
EM	120.0	3.054
SUM	720.0	18.324

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
RF SYSTEM DATA ACQ.	1.1.3.2.3.1	12/13/86	1	DWINELL	R3231	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	ANALOG INPUT MODULE	EA	1	900.00	CP	0.900	1	8	8.0	EI	25.45	0.204	1.104
2	16 BIT DAC	EA	1	1200.00	CP	1.200			0.0			0.000	1.200
3	DIGITAL I/O	EA	2	800.00	CP	1.600	2	12	24.0	EI	25.45	0.611	2.211
4	WAVEFORM SELECTOR	EA	1	4000.00	CP	4.000	1	16	16.0	EI	25.45	0.407	4.407
5	ISOLATION INTERFACE ??	EA	1	2000.00	EU	2.000	1	80	80.0	EI	25.45	2.036	4.036
6	TESTING					0.000	1	80	80.0	EM	25.45	2.036	2.036
						9.700			208.0			5.294	14.994

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	128.0	3.258
EM	80.0	2.036
SUM	208.0	5.294

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
VACUUM SYSTEM DATA ACQ.	1.1.3.2.3.2	12/13/86	1	DWINELL	R3232	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	IEEE-488 CONT.	EA	2	1000.00	CP	2.000			0.0			0.000	2.000
2	DIGITAL I/O	EA	2	800.00	CP	1.600	2	8	16.0	EI	25.45	0.407	2.007
3	4 CH. RTD UNIT	EA	2	1100.00	CP	2.200	2	12	24.0	EI	25.45	0.611	2.811
4	16 CH. ANALOG INPUT	EA	1	900.00	CP	0.900	1	16	16.0	EI	25.45	0.407	1.307
5	LN CONT. INTERFACE	EA	1	2200.00	EU	2.200			0.0			0.000	2.200
6	CABLING	EA	1	1800.00	EU	1.800	1	120	120.0	EM	25.45	3.054	4.854
						10.700			176.0			4.479	15.179

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	56.0	1.425
EM	120.0	3.054
SUM	176.0	4.479

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
RING P.S. DATA ACQ.	1.1.3.2.3.3	12/13/86	1	DWINELL	R3233	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	16 CH. ANALOG IN	EA	5	1800.00	CP	9.000	8	8	64.0	EI	25.45	1.629	10.629
2	8 CH. ANALOG OUT	EA	7	1200.00	CP	8.400	5	8	40.0	EI	25.45	1.018	9.418
3	WAVEFORM SELECTOR	EA	1	4000.00	CP	4.000	2	16	32.0	EI	25.45	0.814	4.814
4	CABLE DIST.	EA	13	400.00	EU	5.200	13	6	78.0	EI	25.45	1.985	7.185
5	TESTING					0.000	1	240	240.0	EM	25.45	6.108	6.108
						26.600			454.0			11.554	38.154

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	214.0	5.446
EM	240.0	6.108
SUM	454.0	11.554

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
RING BEAM NONIT. (BIE,ORBIT)	1.1.3.2.3.4	12/13/86	1	DWINELL	R3234	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	ANALOG IN -BIE	EA	1	1200.00	CP	1.200			0.0			0.000	1.200
2	ANALOG IN -ORB	EA	6	1200.00	CP	7.200			0.0			0.000	7.200
3	32 CH DIGITAL IN	EA	1	900.00	CP	0.900			0.0			0.000	0.900
4	CABLE DIST.	EA	8	400.00	EU	3.200	8	12	96.0	EI	25.45	2.443	5.643
5	CABLING	EA	120	25.00	EU	3.000	120	2	240.0	EI	25.45	6.108	9.108
6	WAVEFORM SELECTOR	EA	2	4000.00	EU	8.000			0.0			0.000	8.000
7	FLOATING P. PROC	EA	1	2900.00		2.900			0.0			0.000	2.900
8	TESTING					0.000	1	160	160.0	EM	25.45	4.072	4.072
						26.400			496.0			12.623	39.023

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	336.0	8.551
EM	160.0	4.072
SUM	496.0	12.623

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
INTERLOCKS DATA ACQ.	1.1.3.2.3.5	12/13/86	1	DWINELL	R3235	ADDS 3 SITES AT BEV,2 AT HILAC

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	8 CH. SERIAL CONT	EA	2	2100.00	CP	4.200	2	16	32.0	EI	25.45	0.814	5.014
2	STD BUS CONT.	EA	5	2100.00	EU	10.500	5	16	80.0	EI	25.45	2.036	12.536
3	CABLING	EA	5	500.00	EU	2.500	5	4	20.0	EI	25.45	0.509	3.009
4	TESTING					0.000	1	160	160.0	EM	25.45	4.072	4.072
						17.200			292.0			7.431	24.631

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	132.0	3.359
EM	160.0	4.072
SUM	292.0	7.431

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
COMMERCIAL SOFTWARE	1.1.3.2.4	1/26/87	1	DWINELL	R324	COMPUTER CONTROL SYSTEM MODIFICATIONS

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	COMMERCIAL SOFTWARE		1	50000.00	EU	50.000			0.0			0.000	50.000
						50.000			0.0			0.000	50.000

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
CONTROL SYSTEM INSTALLATION	1.1.3.2.5	1/25/87	2	DWINELL	R325	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	$/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	RACKS	EA	6	1100.00	EU	6.600	1	120	120.0	EI	25.45	3.054	9.654
2	CABLING	EA	75	26.00	EU	1.950	1	80	80.0	EI	25.45	2.036	3.986
3	DIST.AMPS	EA	4	2700.00	CP	10.800			0.0			0.000	10.800
4	AIR COND	EA	1	5500.00	EU	5.500	1	24	24.0	PE	34.25	0.822	6.322
5	SYSTEM INSTALLATION					0.000	3	240	720.0	EI	25.45	18.324	18.324
						24.850			944.0			24.236	49.086

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	920.0	23.414
PE	24.0	0.822
SUM	944.0	24.236

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
HILAC RF SYSTEM	1.1.3.3.1.1	11/21/86	1 CAT	Q3311		REPLACE MUX PANEL & AFC CONTROL

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	AFC BOX MOD.		8	100.00	EU	0.800	8	8	64.0	EI	25.45	1.629	2.429
2	ANODE COUPLE CNRL		1	500.00	EU	0.500	1	40	40.0	EI	25.45	1.018	1.518
3	FIL. VOLT. CNTRL		1	1000.00	EU	1.000	1	80	80.0	EI	25.45	2.036	3.036
4	FREQ. REF. CNTRL		1	500.00	EU	0.500	1	40	40.0	EI	25.45	1.018	1.518
5	TUNER CNTRL		1	500.00	EU	0.500	1	40	40.0	EI	25.45	1.018	1.518
6	RAD. GATE INTRLK		1	500.00	EU	0.500	1	40	40.0	EI	25.45	1.018	1.518
7	TERM. & INSTALL CABLE	50 M	5	50.00	CP	0.250	5	8	40.0	EI	25.45	1.018	1.268
8	WIRE CHECK					0.000	6	4	24.0	EM	25.45	0.611	0.611
						4.050			368.0			9.366	13.416

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	344.0	8.755
EM	24.0	0.611
SUM	368.0	9.366

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
ADAM INJECTOR	1.1.3.3.1.2	11/26/86	1	FAHMIE	Q3312	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	ADAM IOMM	EA	1	34200.00	CP	34.200			0.0			0.000	34.200
2	ADAM MODS		1	2000.00	EU	2.000	1	120	120.0	EI	25.45	3.054	5.054
3	ADAM MODS					0.000	1	60	60.0	EM	25.45	1.527	1.527
4	ADAM TELEMETRY	EA	1	2000.00	EU	2.000	1	200	200.0	EI	25.45	5.090	7.090
5	ADAM TELEMETRY					0.000	1	40	40.0	EM	25.45	1.018	1.018
6	HI-PRESSURE FEEDTHRU	EA	1	50.00	EU	0.050	1	8	8.0	MT	22.50	0.180	0.230
						38.250			428.0			10.869	49.119

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	320.0	8.144
EM	100.0	2.545
MT	8.0	0.180
SUM	428.0	10.869

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
EVE INJECTOR	1.1.3.3.1.3	11/26/86	1	FAHMIE	Q3313	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	EVE IOMM		1	34200.00	CP	34.200			0.0			0.000	34.200
2	EVE MODS	EA	1	2000.00	EU	2.000	1	120	120.0	EI	25.45	3.054	5.054
3	EVE MODS					0.000	1	40	40.0	EM	25.45	1.018	1.018
4	SPECIAL IOMM MOUNTING	EA	1	300.00	EU	0.300	1	40	40.0	EI	25.45	1.018	1.318
						36.500			200.0			5.090	41.590

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	160.0	4.072
EM	40.0	1.018
SUM	200.0	5.090

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
TV DISTRIBUTION	1.1.3.3.1.4	11/21/86	1	CAT	Q3314	

Item No.	ITEM TITLE	Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	24x12 CROSSBAR SWITCH	1	1	12000.00	CP	12.000	1	40	40.0	EI	25.45	1.018	13.018
2	CONTROL INTERFACE		2	2000.00	EU	4.000	2	80	160.0	EI	25.45	4.072	8.072
3	INSTALLATION		1	200.00	EU	0.200	1	40	40.0	EI	25.45	1.018	1.218
4	WIRE CHECK INTERFACE					0.000	2	4	8.0	EM	25.45	0.204	0.204
						16.200			248.0			6.312	22.512

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	240.0	6.108
EM	8.0	0.204
SUM	248.0	6.312

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
ANALOG SIG. DISTRIBUTION	1.1.3.3.1.5	11/21/86	1 CAT	Q3315		

Item No.	ITEM TITLE	Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	MUX CARD		12	250.00	EU	3.000	12	14	168.0	EI	25.45	4.276	7.276
2	BIM: FAB. & INSTALL		4	1000.00	EU	4.000	4	148	592.0	EI	25.45	15.066	19.066
3	INSTALL & TERM CABLE	100 FT	32	1600.00	EU	51.200	32	2	64.0	EI	25.45	1.629	52.829
4	PULL CABLES					0.000	1	8	8.0	EI	25.45	0.204	0.204
5	WIRE CHECK					0.000	12	2	24.0	EM	25.45	0.611	0.611
6	CAMAC CRATE & PS		1	2000.00	CP	2.000			0.0			0.000	2.000
7	LE CROY DIGITIZER		20	1100.00	EU	22.000			0.0			0.000	22.000
8	SAMPLE TIMER		3	300.00	EU	0.900	3	40	120.0	EI	25.45	3.054	3.954
9	TRIGGER SELECT		1	300.00	EU	0.300	1	40	40.0	EI	25.45	1.018	1.318
10	F 1 & F2 IOMMS		2	34240.00	CP	68.480			0.0			0.000	68.480
						151.880			1016.0			25.857	177.737

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	992.0	25.246
EM	24.0	0.611
SUM	1016.0	25.857

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
REPLACE MODCOMP	1.1.3.3.1.6	11/25/86	1	CAT	Q3316	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	$/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	IOMMS		8	34240.00	CP	273.920			0.0			0.000	273.920
2	REMOVE CLUSTER					0.000	9	40	360.0	EI	25.45	9.162	9.162
3	INSTALL IOMM & CROSS CON		7	1500.00	EU	10.500	7	320	2240.0	EI	25.45	57.008	67.508
						284.420			2600.0			66.170	350.590

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	2600.0	66.170
SUM	2600.0	66.170

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
A AREA	1.1.3.3.1.7	1/24/87	2 CAT	Q3317		NEUTRON MONIT, TANK VACUUM, RAD. GATES, ANNUC

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	MOD. NEUT MONIT CH.		6			0.000	6	10	60.0	EI	25.45	1.527	1.527
2	FAB. & LOAD BDS		6	500.00	EU	3.000	6	12	72.0	EI	25.45	1.832	4.832
3	WIRE CHECK					0.000	6	0	0.0	EM	25.45	0.000	0.000
4	RUN NEUT MONIT CABLES					0.000	1	8	8.0	PE	34.25	0.274	0.274
5	CON. RAD. GATES TO IOMM		1	500.00	EU	0.500	1	40	40.0	EI	25.45	1.018	1.518
6	RUN CABLING		0	0.00		0.000	0	0	0.0			0.000	0.000
7	CON. ANNUC ALARMS TO IOMM		1	500.00	EU	0.500	1	40	40.0	EI	25.45	1.018	1.518
8	RUN CABLING		0	0.00		0.000	0	0	0.0			0.000	0.000
7	POST & PRE STRIP VACUUM		1	500.00	EU	0.500	1	40	40.0	EI	25.45	1.018	1.518
9	CONNECTIONS TO IOMM		0	0.00		0.000	0		0.0			0.000	0.000
10	RUN CABLES					0.000	1	8	8.0	PE	34.25	0.274	0.274
11	WIRE CHECK					0.000	1	40	40.0	EM	25.45	1.018	1.018
12	A AREA IOMM		1	34240.00	CP	34.240	0	0	0.0			0.000	34.240
						38.740			308.0			7.979	46.719

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	252.0	6.413
EM	40.0	1.018
PE	16.0	0.548
SUM	308.0	7.979

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
STRIPPER FOIL CONTROL	1.1.3.3.1.8	11/26/86	1	CAT	Q3318	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	$/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	INTERFACE CHASSIS		1	2500.00	EU	2.500	1	120	120.0	EI	25.45	3.054	5.554
2	INSTALL					0.000	1	60	60.0	EI	25.45	1.527	1.527
3	WIRE CHECK					0.000	1	40	40.0	EM	25.45	1.018	1.018
						2.500			220.0			5.599	8.099

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	180.0	4.581
EM	40.0	1.018
SUM	220.0	5.599

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
CONTROL ROOM MODIFICATIONS	1.1.3.3.1.9	11/25/86	1 CAT	Q3319		INCLUDES OPERATOR CONSOLE & CMM UPGRADE

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	CMM BOARDS		4	2500.00	CP	10.000			0.0			0.000	10.000
2	SBX MODULES		8	500.00	CP	4.000	8	8	64.0	EI	25.45	1.629	5.629
3	DMM CHASSIS		3	20000.00	CP	60.000			0.0			0.000	60.000
4	CPU BOARDS		2	3000.00	CP	6.000			0.0			0.000	6.000
5	NETWORK BOARDS		4	2000.00	CP	8.000			0.0			0.000	8.000
6	DMM TO CMM BOARD		4	1500.00	CP	6.000			0.0			0.000	6.000
7	VIDEO BOARDS		4	2000.00	CP	8.000			0.0			0.000	8.000
8	INSTALLATION					0.000	2	40	80.0	EI	25.45	2.036	2.036
9	REMOVE ABEL & ADAM CONTROL					0.000	1	80	80.0	EI	25.45	2.036	2.036
						102.000			224.0			5.701	107.701

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	224.0	5.701
SUM	224.0	5.701

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
TRANSFER LINE INSTRUMENTATION	1.1.3.3.2.1	12/13/86	1	DWINELL	R3321	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	CHAIN SCANNER	EA	1	4500.00	EU	4.500	1	30	30.0	EI	25.45	0.764	5.264
2	VACUUM MONIT	EA	1	2400.00	EU	2.400	1	16	16.0	EI	25.45	0.407	2.807
3	9 SEG CUPS	EA	1	3200.00		3.200			0.0			0.000	3.200
4	TESTING					0.000	1	120	120.0	EM	25.45	3.054	3.054
						10.100			166.0			4.225	14.325

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	46.0	1.171
EM	120.0	3.054
SUM	166.0	4.225

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
BEV INJ. INSTRUMENTATION	1.1.3.3.2.3	12/13/86	1	DWINELL	R3323	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	VACUUM MONIT	EA	5	1100.00	CP	5.500			0.0			0.000	5.500
2	B.P.M. INTERFACE	EA	1	2600.00	EU	2.600	1	60	60.0	EI	25.45	1.527	4.127
3	WAVEFORM SELECTOR	EA	1	4000.00	EU	4.000			0.0			0.000	4.000
4	CHAIN SCANNER	EA	1	2100.00	EU	2.100	1	60	60.0	EI	25.45	1.527	3.627
5	LINAC RF INST.	EA	1	4000.00		4.000			0.0			0.000	4.000
6	16 CH ANALOG IN	EA	1	900.00		0.900			0.0			0.000	0.900
7	CABLE DIST	EA	3	400.00		1.200	3	8	24.0	EI	25.45	0.611	1.811
8	TESTING					0.000	1	80	80.0	EM	25.45	2.036	2.036
						20.300			224.0			5.701	26.001

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	144.0	3.665
EM	80.0	2.036
SUM	224.0	5.701

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
EPB INSTRUMENTATION	1.1.3.3.2.4	12/13/86	1	DWINELL	R3324	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	SEM MONIT.	EA	2	3600.00	EU	7.200	2	50	100.0	EI	25.45	2.545	9.745
2	MAGNET CONT. PDM	EA	1	4500.00	EU	4.500	1	24	24.0	EI	25.45	0.611	5.111
3	WAVEFORM SELECTOR	EA	2	4000.00	EU	8.000	2	60	120.0	EI	25.45	3.054	11.054
4	TESTING					0.000	1	120	120.0	EM	25.45	3.054	3.054
5	PM TUBE MONITORS	EA	3	1100.00		3.300	3	30	90.0	EI	25.45	2.290	5.591
6	HV CONTROL	EA	3	150.00		0.450			0.0			0.000	0.450
						23.450			454.0			11.554	35.004

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	334.0	8.500
EM	120.0	3.054
SUM	454.0	11.554

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
MG ROOM INSTRUMENTATION	1.1.3.3.2.5	12/13/86	1	DWINELL	R3325	

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	CHAIN SCANNER	EA	1	2600.00	EU	2.600	1	60	60.0	EI	25.45	1.527	4.127
2	16 CH. ANALOG IN	EA	8	1200.00	CP	9.600			0.0			0.000	9.600
3	CABLE DIST.	EA	12	400.00	EU	4.800	12	16	192.0	EI	25.45	4.886	9.686
4	16.CH ANALOG OUT	EA	1	1000.00		1.000			0.0			0.000	1.000
5	WAVEFORM SELECTOR	EA	2	4000.00		8.000			0.0			0.000	8.000
6	DIGITAL OUT	EA	1	900.00		0.900			0.0			0.000	0.900
7	POWER MONIT.	EA	1	3600.00		3.600			0.0			0.000	3.600
8	TESTING					0.000	2	160	320.0	EM	25.45	8.144	8.144
9	WAVEFORM DIGITIZER	EA	1	6000.00		6.000			0.0			0.000	6.000
						36.500			572.0			14.557	51.057

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	252.0	6.413
EM	320.0	8.144
SUM	572.0	14.557

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
CONTROL ROOM INSTR. MODS.	1.1.3.3.2.6	12/13/86	1	DWINELL	R3326	MCR CHANGES,REMOVALSETC.

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	CABLE REMOVAL					0.000	2	170	340.0	EM	25.45	8.653	8.653
2	CHASSIS REMOVAL					0.000	2	120	240.0	EM	25.45	6.108	6.108
3	RELOCATE EQUIP.					0.000	2	160	320.0	EI	25.45	8.144	8.144
4	RE-WIRE ALARMS					0.000	2	140	280.0	EI	25.45	7.126	7.126
5	RE-WIRE CONTROLS					0.000	2	140	280.0	EI	25.45	7.126	7.126
6	VIDEO MONITORS	EA	6	900.00	CP	5.400	6	16	96.0	EI	25.45	2.443	7.843
7	TESTING					0.000	1	160	160.0	EM	25.45	4.072	4.072
						5.400			1716.0			43.672	49.072

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	976.0	24.839
EM	740.0	18.833
SUM	1716.0	43.672

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
ACCESS/SHLDNG MANIPULATION	1.1.4.1.1	12/1/86	1	REIMERS	X411	SITE CLEARANCE & PREPARATION

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	REMOVE & STORE					0.000			0.0			0.000	0.000
C	T.T. ROOF BLOCKS					0.000	1	100	100.0	RG	31.20	3.120	3.120
2	REMOVE & STORE					0.000			0.0			0.000	0.000
C	T.T. WALL BLOCKS					0.000	1	100	100.0	RG	31.20	3.120	3.120
3	OUTSIDE CREW FOR 1 & 3		1	4400.00	VQ	4.400			0.0			0.000	4.400
4	REMOVE & STORE					0.000			0.0			0.000	0.000
C	ROOF BLOCKS					0.000	1	20	20.0	RG	31.20	0.624	0.624
5	MOVE ROOF BLOCKS					0.000			0.0			0.000	0.000
C	QUAD TO QUAD					0.000	1	500	500.0	RG	31.20	15.600	15.600
6	LOAD, MOVE, INSTALL					0.000			0.0			0.000	0.000
C	T.T. WALL BLOCKS					0.000	1	150	150.0	RG	31.20	4.680	4.680
7	LOAD, MOVE, INSTALL					0.000			0.0			0.000	0.000
C	T.T. ROOF BLOCKS					0.000	1	150	150.0	RG	31.20	4.680	4.680
8	OUTSIDE CRANE/CREW					0.000			0.0			0.000	0.000
C	FOR ITEM 6		1	4400.00	VQ	4.400			0.0			0.000	4.400
						8.800			1020.0			31.824	40.624

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
RG	1020.0	31.824
SUM	1020.0	31.824

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
BEVATRON MAGNET YOKES	1.1.4.1.2	1/15/87	3	REIMERS	X412	SITE CLEARANCE & PREPARATION

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	REMOVE PLY AIR DUCT					0.000	1	1000	1000.0	MT	22.50	22.500	22.500
2	REMOVE 4608 NUTS					0.000	4608	0.25	1152.0	MT	22.50	25.920	25.920
3	REMOVE 1,152 RADIAL STAYBOLTS					0.000	1152	1	1152.0	RG	31.20	35.942	35.942
4	REMOVE 288 VERT CLAMP STUDS					0.000	288	3	864.0	RG	31.20	26.957	26.957
5	REMOVE 112 IN & OUTER DIAG STAYS					0.000	112	1	112.0	RG	31.20	3.494	3.494
6	REMOVE 114 LEG STOP PLATES					0.000	114	1	114.0	RG	31.20	3.557	3.557
7	REMOVE 1152 HORIZ STAYS & TIE RODS					0.000	1152	1.5	1728.0	RG	31.20	53.914	53.914
8	REMOVE 144 TOP YOKES					0.000	144	2.5	360.0	RG	31.20	11.232	11.232
9	FAB & INSTALL	EA	288	400.00	EU	115.200	288	2	576.0	RG	31.20	17.971	133.171
C	HOLD-DOWN BRACKETS					0.000			0.0			0.000	0.000
10	MOVE I-BEAMS TO SAW AREA					0.000	144	1	144.0	RG	31.20	4.493	4.493
11	SETUP SAW					0.000	1	8	8.0	MT	22.50	0.180	0.180
12	BUY HD SAWBLADES	EA	144	7.00	EU	1.008			0.0			0.000	1.008
13	CUT I-BEAMS TO LENGTH					0.000	144	1	144.0	MT	22.50	3.240	3.240
14	DRILL WEB BOLTHOLES	EA	10	20.00		0.200	576	0.5	288.0	MT	22.50	6.480	6.680
15	FLAMECUT HOLES IN WEBS					0.000	288	0.25	72.0	MS	33.50	2.412	2.412
16	MOVE SCRAP TO SALVAGE					0.000	144	1	144.0	RG	31.20	4.493	4.493
17	CUTOFF BOLT MATERIAL					0.000	576	0.2	115.2	MS	33.50	3.859	3.859
18	THREAD PIECES BOTH ENDS					0.000	576	0.1	57.6	MS	33.50	1.930	1.930
19	BOLT UP FRAMES					0.000	144	1	144.0	MT	22.50	3.240	3.240
20	BUY 1" DECKING	SF	5000	1.00		5.000			0.0			0.000	5.000
21	CUT/FIT PLYWOOD					0.000	144	1	144.0	PC	34.25	4.932	4.932
22	SHOOT NAILS	EA	1440	0.50	EU	0.720	1440	0.1	144.0	PC	34.25	4.932	5.652
23	INSTALL FLOOR PANELS					0.000	144	1	144.0	RG	31.20	4.493	4.493
24	WELD ANGLE STOPS	EA	288	3.00	EU	0.864	288	0.2	57.6	MS	33.50	1.930	2.794
						122.992			8664.4			248.100	371.092

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	302.4	10.130
MT	2736.0	61.560
PC	288.0	9.864
RG	5338.0	166.546
SUM	8664.4	248.100

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
BEVATRON MAGNET LEG SLABS	1.1.4.1.3	12/1/86	1	REIMERS	X413	SITE CLEARANCE & PREPARATION

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	REMOVE 144 OUTER LEGS					0.000	144	2	288.0	RG	31.20	8.986	8.986
2	REMOVE 144 INNER LEGS					0.000	144	2	288.0	RG	31.20	8.986	8.986
						0.000			576.0			17.971	17.971

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
RG	576.0	17.971
SUM	576.0	17.971

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
BEVATRON MAGNET COILS & TIPS	1.1.4.1.4	12/1/86	1	REIMERS	X414	SITE CLEARANCE & PREPARATION

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	REMOVE & CUT COILS					0.000	4	200	800.0	MT	22.50	18.000	18.000
C						0.000	4	200	800.0	RG	31.20	24.960	24.960
2	REMOVE POLE BASES					0.000	288	1	288.0	MT	22.50	6.480	6.480
C						0.000	288	2	576.0	RG	31.20	17.971	17.971
3	REMOVE POLE TIPS					0.000	288	1	288.0	MT	22.50	6.480	6.480
C						0.000	288	2	576.0	RG	31.20	17.971	17.971
						0.000			3328.0			91.862	91.862

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MT	1376.0	30.960
RG	1952.0	60.902
SUM	3328.0	91.862

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
BEVATRON VACUUM SYSTEMS	1.1.4.1.5	12/1/86	1	REIMERS	X415	SITE CLEARANCE & PREPARATION

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	REMOVE T.T. VAC					0.000	4	400	1600.0	MT	22.50	36.000	36.000
2	REMOVE QUADRANT VAC.					0.000	4	400	1600.0	MT	22.50	36.000	36.000
3	LIFTING FIXTURE	1	1	2000.00	EU	2.000			0.0			0.000	2.000
						2.000			3200.0			72.000	74.000

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MT	3200.0	72.000
SUM	3200.0	72.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
INJECTION CHANNEL REMOVAL	1.1.4.1.6.2	1/25/87	2	REIMERS	X4162	BEAM LINE REMOVALS

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	REMOVE MAGNETS					0.000			0.0			0.000	0.000
C						0.000	1	100	100.0	EI	25.45	2.545	2.545
C						0.000	1	100	100.0	MT	22.50	2.250	2.250
C						0.000	1	200	200.0	RG	31.20	6.240	6.240
2	REMOVE INSTRUMENTATION					0.000			0.0			0.000	0.000
C						0.000	1	200	200.0	EI	25.45	5.090	5.090
C						0.000	1	200	200.0	MT	22.50	4.500	4.500
C						0.000	1	200	200.0	RG	31.20	6.240	6.240
3	R/R SHIELDING					0.000	1	250	250.0	RG	31.20	7.800	7.800
						0.000			1250.0			34.665	34.665

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	300.0	7.635
MT	300.0	6.750
RG	650.0	20.280
SUM	1250.0	34.665

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
REMOVE EPB 0 CHANNEL	1.1.4.1.6.3	1/25/87	2	REIMERS	X4163	BEAM LINE REMOVALS

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	REMOVE ROOF & WALL BLOCKS					0.000	15	20	300.0	RG	31.20	9.360	9.360
2	REMOVE BEAM PIPES					0.000	1	50	50.0	MT	22.50	1.125	1.125
3	REMOVE (2) WTT QUADS					0.000	2	3	6.0	RG	31.20	0.187	0.187
4	REMOVE (1) WTT BEND MAGS					0.000	1	3	3.0	RG	31.20	0.094	0.094
5	REMOVE F1 BOX					0.000			0.0			0.000	0.000
C						0.000	1	10	10.0	RG	31.20	0.312	0.312
6	REMOVE BEAM PLUG					0.000	1	10	10.0	RG	31.20	0.312	0.312
7	REMOVE (2) QB'S					0.000	2	10	20.0	RG	31.20	0.624	0.624
8	REMOVE XM4					0.000	1	20	20.0	RG	31.20	0.624	0.624
9	REMOVE XM5					0.000	1	20	20.0	RG	31.20	0.624	0.624
10	REMOVE CABLES					0.000	14	10	140.0	PE	34.25	4.795	4.795
C						0.000	14	10	140.0	EI	25.45	3.563	3.563
11	REMOVE HOSES					0.000	1	12	12.0	PPL	34.25	0.411	0.411
						0.000			731.0			22.031	22.031

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	140.0	3.563
MT	50.0	1.125
PE	140.0	4.795
PPL	12.0	0.411
RG	389.0	12.137
SUM	731.0	22.031

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
BEVATRON ELECTRICAL SYSTEMS	1.1.4.1.7	1/24/87	2	KRUP	S417	SITE CLEARANCE & PREPARATION

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	MISC. REMOVALS					0.000	1	996	996.0	EM	25.45	25.348	25.348
C						0.000	1	166	166.0	EI	25.45	4.225	4.225
C						0.000	1	160	160.0	PE	34.25	5.480	5.480
						0.000			1322.0			35.053	35.053

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EI	166.0	4.225
EM	996.0	25.348
PE	160.0	5.480
SUM	1322.0	35.053

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
MISC. BEVATRON SYSTEMS	1.1.4.1.8	12/1/86	1	REIMERS	X418	SITE CLEARANCE & PREPARATION

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	REMOVE M1, M2 SYSTEMS					0.000	1	300	300.0	MT	22.50	6.750	6.750
C						0.000	1	300	300.0	RG	31.20	9.360	9.360
						0.000			600.0			16.110	16.110

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MT	300.0	6.750
RG	300.0	9.360
SUM	600.0	16.110

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
DISPOSAL	1.1.4.1.9	1/10/87	5	REIMERS	X419	SITE CLEARANCE & PREPARATION

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1						0.000			0.0			0.000	0.000
2	CRANE COSTS		1	67000.00	EU	67.000			0.0			0.000	67.000
3	LOCAL TRUCKING	TON	3576	28.00	A84	100.128			0.0			0.000	100.128
4	RENT 25T FORK	EA	1	10000.00		10.000			0.0			0.000	10.000
5	LOAD, MOVE 51 TO EPB					0.000	1394	2	2788.0	RG	31.20	86.986	86.986
6	LOAD TRUCKS, EPB					0.000	450	3	1350.0	RG	31.20	42.120	42.120
7	TRUCKING & BURIAL	TON	219	220.00	A84	48.180			0.0			0.000	48.180
						225.308			4138.0			129.106	354.414

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
RG	4138.0	129.106
SUM	4138.0	129.106

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
SYNCHROTRON SHIELDING MODS	1.1.4.2.1	1/12/87	2	REIMERS	X421	SHIELDING MODIFICATIONS

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	R/R 2 BLKS NORTH					0.000	1	86	86.0	RG	31.20	2.683	2.683
2	R/R 2 BLKS SOUTH					0.000	1	86	86.0	RG	31.20	2.683	2.683
3	NORTH STEELWORK		1	2000.00		2.000	1	10	10.0	RG	31.20	0.312	2.312
4	SOUTH STEELWORK		1	2000.00		2.000	1	10	10.0	RG	31.20	0.312	2.312
						4.000			192.0			5.990	9.990

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
RG	192.0	5.990
SUM	192.0	5.990

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
INJECTION AREA SHIELDING	1.1.4.2.2	1/18/87		4 REIMERS	X422	BASED ON LAYOUT OF 1/16

Item No.	ITEM TITLE	Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	STEEL PIPE & PLATE	LOT	1	8000.00	EU	8.000			0.0			0.000	8.000
2	ANCHORS,DRILLS & CLIPS	LOT	1	2000.00	EU	2.000			0.0			0.000	2.000
3	REMOVE 54 ROOF BLOCKS					0.000	54	1.8	97.2	RG	31.20	3.033	3.033
4	MOVE BLOCKS OUTSIDE	DAY	7	1255.00	A86	8.785	54	3	162.0	RG	31.20	5.054	13.839
5	REMOVE 20 WALL BLOCKS					0.000	20	4.6	92.0	RG	31.20	2.870	2.870
6	PREPARE BLOCKS	LOT	1	58000.00	EU	58.000	4	5	20.0	RG	31.20	0.624	58.624
7	UNSTACK BAFFLE SHIELDING					0.000	1	240	240.0	RG	31.20	7.488	7.488
8	RESTACK/CLIP BAFFLE SHIELDING					0.000	1	240	240.0	RG	31.20	7.488	7.488
9	REINSTALL 20 WALL BLOCKS					0.000	20	5	100.0	RG	31.20	3.120	3.120
10	RETURN ROOF BLOCKS	DAY	7	1255.00	A86	8.785	54	3	162.0	RG	31.20	5.054	13.839
11	REINSTALL ROOF BLOCKS					0.000	54	5	270.0	RG	31.20	8.424	8.424
12	RIGGING FOREMAN					0.000	1	400	400.0	RG	31.20	12.480	12.480
						85.570			1783.2			55.636	141.206

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
RG	1783.2	55.636
SUM	1783.2	55.636

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
EXTRCTION AREA SHLDING MODS	1.1.4.2.3	1/12/87	2	REIMERS	X423	SHIELDING MODIFICATIONS

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	R/R 1 BLK NEAR F1					0.000	1	150	150.0	RG	31.20	4.680	4.680
2	STEELWORK FOR #1		1	2700.00		2.700	1	20	20.0	RG	31.20	0.624	3.324
						2.700			170.0			5.304	8.004

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
RG	170.0	5.304
SUM	170.0	5.304

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
EPB SHIELDING MODS	1.1.4.2.4	12/15/86	2	REIMERS	X424	SHIELDING MODIFICATIONS

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	FAB,INSTLL ROOF BLK		1	9700.00	EU	9.700	1	16	16.0	RG	31.20	0.499	10.199
2	FAB,INSTLL ROOF BLK SPPRT		1	6000.00	EU	6.000	1	269	269.0	MS	33.50	9.012	15.012
3	ANCHORS, BOLTS		1	1000.00	EU	1.000			0.0			0.000	1.000
4	ADD TO B30 BKSTOP					0.000	1	60	60.0	RG	31.20	1.872	1.872
5	F2 STEEL		1	40000.00	EU	40.000	1	320	320.0	RG	31.20	9.984	49.984
						56.700			665.0			21.367	78.067

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	269.0	9.012
RG	396.0	12.355
SUM	665.0	21.367

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
EMITTANCE MATCHER	1.1.4.2.7	12/1/86	1	REIMERS	X427	SHIELDING MODIFICATIONS

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	SHIELDING MODS					0.000	1	160	160.0	RG	31.20	4.992	4.992
						0.000			160.0			4.992	4.992

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
RG	160.0	4.992
SUM	160.0	4.992

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
HVAC	1.1.4.3.1	1/26/87	3	REIMERS	X431	UTILITIES - MECHANICAL

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	CONTROL ROOM HVAC		1	2000.00		2.000	1	293	293.0	MS	33.50	9.816	11.816
C						0.000	1	40	40.0	RG	31.20	1.248	1.248
						2.000			333.0			11.064	13.064

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MS	293.0	9.816
RG	40.0	1.248
SUM	333.0	11.064

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
COOLING	1.1.4.3.2	1/24/87	3	REIMERS	X432	UTILITIES - MECHANICAL

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	COOLING		2	80000.00	EU	160.000			0.0			0.000	160.000
2	50 HP PUMP/MOTOR	EA	1	12000.00	EU	12.000			0.0			0.000	12.000
						172.000			0.0			0.000	172.000

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
FIRE HAZARD CONTROL	1.1.4.3.3	12/1/86	1	REIMERS	X433	UTILITIES - MECHANICAL

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	LIGHTS, SIGNS		1	10000.00		10.000			0.0			0.000	10.000
						10.000			0.0			0.000	10.000

LABOR SUMMARY		
Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
UTILITIES	1.1.4.3.4	12/1/86	1	REIMERS	X434	UTILITIES - MECHANICAL

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	AIR COMPRESSOR	EA	2	4000.00		8.000			0.0			0.000	8.000
2	PIPING	FT	500	6.00		3.000			0.0			0.000	3.000
3	FITTINGS	EA	200	15.00		3.000			0.0			0.000	3.000
4	VALVES	EA	20	100.00		2.000			0.0			0.000	2.000
5	HOSE	FT	2000	2.00		4.000			0.0			0.000	4.000
						20.000			0.0			0.000	20.000

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
AC POWER DISTRIBUTION	1.1.4.4.1	1/9/87	2	HENDERSONE441		POWER, 480, 120/208, 120/240

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	XFMR, 480-120/208	EA	1	3000.00	EU	3.000	1	20	20.0	PE	34.25	0.685	3.685
2	XFMR, SWITCHGEAR	SET	1	1500.00	EU	1.500	1	60	60.0	PE	34.25	2.055	3.555
3	CONDUIT, MISC.	FT	500	1.00	EU	0.500	1	100	100.0	PE	34.25	3.425	3.925
4	PULL CANS	EA	20	30.00	EU	0.600	20	1	20.0	PE	34.25	0.685	1.285
5	PWR DIST PNL, 480V	EA	1	450.00	EU	0.450	1	10	10.0	PE	34.25	0.343	0.793
6	PWR DIST PNL, 120/208	EA	4	350.00	EU	1.400	4	10	40.0	PE	34.25	1.370	2.770
7	PWR DIST PNL, 120/240	EA	4	350.00	EU	1.400	4	10	40.0	PE	34.25	1.370	2.770
8	OUTLET PNL, W/OUTLETS	EA	30	100.00	EU	3.000	30	5	150.0	PE	34.25	5.138	8.138
9	WIRE, HEAVY, MISC.	FT	1000	0.78	EU	0.780	120	2	240.0	PE	34.25	8.220	9.000
10	WIRE, LIGHT, MISC.	FT	3000	0.20	EU	0.600	1	80	80.0	PE	34.25	2.740	3.340
11	DROP FOR 1.1.1.4.3	EA	2	50.00	EU	0.100	2	6	12.0	PE	34.25	0.411	0.511
12	DROP FOR 1.1.1.4.4	EA	4	50.00	EU	0.200	4	8	32.0	PE	34.25	1.096	1.296
13	DROP FOR 1.1.1.4.5	EA	5	50.00	EU	0.250	5	8	40.0	PE	34.25	1.370	1.620
						13.780			844.0			28.907	42.687

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
PE	844.0	28.907
SUM	844.0	28.907

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
CABLE TRAYS	1.1.4.4.2	1/9/87	1	HENDERSONE	442	UTILITIES - ELECTRICAL

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	$/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	TRAY FOR MAIN ROUTES	FT	800	6.00	EU	4.800	1	120	120.0	PE	34.25	4.110	8.910
2	TRAY FOR 1.1.1.4.3	FT	70	6.00	EU	0.420	1	24	24.0	PE	34.25	0.822	1.242
3	TRAY FOR 1.1.1.4.4.	FT	70	6.00	EU	0.420	1	24	24.0	PE	34.25	0.822	1.242
4	TRAY FOR 1.1.1.4.5	FT	70	6.00	EU	0.420	1	24	24.0	PE	34.25	0.822	1.242
						6.060			192.0			6.576	12.636

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
PE	192.0	6.576
SUM	192.0	6.576

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
MAGNETS & SUPPORTS	1.2.1.1	2/2/87	1	TANABE	S1211	ED&I MAGNETS & SUPPORTS

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Craft Code	$/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	MECHANICAL ENGINEERS					0.000	1	8700	8700.0	ME	49.00	426.300	426.300
2	MECHANICAL DESIGNERS					0.000	1	15500	15500.0	MD	36.00	558.000	558.000
3	MECHANICAL TECHNICIAN (INSPECTION)					0.000	1	5700	5700.0	MT	22.50	128.250	128.250
4	SUPPLIES & EXPENSES		2	83000.00	EU	166.000			0.0			0.000	166.000
						166.000			29900.0			1112.550	1278.550

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MT	5700.0	128.250
ME	8700.0	426.300
MD	15500.0	558.000
SUM	29900.0	1112.550

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
RING VACUUM SYSTEM	1.2.1.2	2/2/87	1	HUNT	S1212	ED&I RING VACUUM SYSTEM

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	MECHANICAL ENGINEERS					0.000	1	8700	8700.0	ME	49.00	426.300	426.300
2	MECHANICAL DESIGNERS					0.000	1	11300	11300.0	MD	36.00	406.800	406.800
3	MECHANICAL DRAFTING					0.000	1	5000	5000.0	MES	23.00	115.000	115.000
4	SUPPLIES & EXPENSES		2	71000.00	EU	142.000			0.0			0.000	142.000
						---			---			---	
						142.000			25000.0			948.100	1090.100

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ME	8700.0	426.300
MD	11300.0	406.800
MES	5000.0	115.000
SUM	25000.0	948.100

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
RF SYSTEM	1.2.1.3	2/2/87	1	HOWARD	S1213	ED&I RF SYSTEM

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	ELECTRICAL ENGINEERS					0.000	1	5400	5400.0	EE	46.40	250.560	250.560
2	ELECTRONIC COORDINATORS					0.000	1	2000	2000.0	EC	33.55	67.100	67.100
3	ELECTRONIC DRAFTING					0.000	1	1000	1000.0	ED	25.45	25.450	25.450
4	MECHANICAL ENGINEERS					0.000	1	2100	2100.0	ME	49.00	102.900	102.900
5	MECHANICAL DESIGNERS					0.000	1	1200	1200.0	MD	36.00	43.200	43.200
6	SUPPLIES & EXPENSES		1	74000.00	EU	74.000			0.0			0.000	74.000
						74.000			11700.0			489.210	563.210

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EE	5400.0	250.560
EC	2000.0	67.100
ED	1000.0	25.450
ME	2100.0	102.900
MD	1200.0	43.200
SUM	11700.0	489.210

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
RING POWER SUPPLIES	1.2.1.4	2/2/87	1	FRIAS	S1214	ED&I RING POWER SUPPLIES

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	ELECTRICAL ENGINEERS					0.000	1	8800	8800.0	EE	46.40	408.320	408.320
2	ELECTRONIC COORDINATORS					0.000	1	8800	8800.0	EC	33.55	295.240	295.240
3	ELECTRONIC DRAFTING					0.000	1	4400	4400.0	ED	25.45	111.980	111.980
4	SUPPLIES & EXPENSES		2	61000.00	EU	122.000			0.0			0.000	122.000
						122.000			22000.0			815.540	937.540

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EE	8800.0	408.320
EC	8800.0	295.240
ED	4400.0	111.980
SUM	22000.0	815.540

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
BEAM MONITORING DEVICES	1.2.1.5	2/2/87	1	REIMERS	S1215	ED&I BEAM MONITORING DEVICES

Item No.	ITEM TITLE	Material: Unit Meas.	Material: No. Units	Material: Unit Cost	Material: Cost Basis	Material: Total Mt K$	Labor: No. Units	Labor: Unit Hrs.	Labor: Total Hours	Labor: Craft Code	Labor: $/Hr	Labor: Total Labor K$	MATL. & LABOR TOTAL $
1	MECHANICAL ENGINEERS					0.000	1	340	340.0	ME	49.00	16.660	16.660
2	MECHANICAL DESIGNERS					0.000	1	340	340.0	MD	36.00	12.240	12.240
3	MECHANICAL DRAFTING					0.000	1	170	170.0	MES	23.00	3.910	3.910
4	SUPPLIES & EXPENSES		1	5000.00	EU	5.000			0.0			0.000	5.000
						5.000			850.0			32.810	37.810

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ME	340.0	16.660
MD	340.0	12.240
MES	170.0	3.910
SUM	850.0	32.810

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
SURVEY AND ALIGNMENT	1.2.1.6	2/2/87	1	REIMERS	S1216	ED&I SURVEY AND ALIGNMENT

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Craft Code	$/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	MECHANICAL ENGINEERS					0.000	1	340	340.0	ME	49.00	16.660	16.660
2	MECHANICAL DESIGNERS					0.000	1	340	340.0	MD	36.00	12.240	12.240
3	SUPPLIES & EXPENSES		1	4000.00	EU	4.000			0.0			0.000	4.000
						4.000			680.0			28.900	32.900

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ME	340.0	16.660
MD	340.0	12.240
SUM	680.0	28.900

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
MAGNETS & SUPPORTS	1.2.2.1	2/2/87	1	TANABE	S1221	ED&I MAGNETS & SUPPORTS (BEAM LINE MODS)

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	MECHANICAL ENGINEERS					0.000	1	1100	1100.0	ME	49.00	53.900	53.900
2	MECHANICAL DESIGNERS					0.000	1	3400	3400.0	MD	36.00	122.400	122.400
3	MECHANICAL TECHNICIANS (INSPECTION)					0.000	1	600	600.0	MT	22.50	13.500	13.500
4	SUPPLIES & EXPENSES		1	28000.00	EU	28.000			0.0			0.000	28.000
						28.000			5100.0			189.800	217.800

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
MT	600.0	13.500
ME	1100.0	53.900
MD	3400.0	122.400
SUM	5100.0	189.800

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
VACUUM SYSTEMS	1.2.2.2	2/2/87	1	HUNT	S1222	ED&I VACUUM SYSTEMS (BEAM LINE MODS)

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	MECHANICAL ENGINEERS					0.000	1	680	680.0	ME	49.00	33.320	33.320
2	MECHANICAL DESIGNERS					0.000	1	1360	1360.0	MD	36.00	48.960	48.960
3	MECHANICAL DRAFTING					0.000	1	680	680.0	MES	23.00	15.640	15.640
4	SUPPLIES & EXPENSES		1	15000.00	EU	15.000			0.0			0.000	15.000
						15.000			2720.0			97.920	112.920

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ME	680.0	33.320
MD	1360.0	48.960
MES	680.0	15.640
SUM	2720.0	97.920

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
BEAM INSTRUMENTATION	1.2.2.3	2/2/87	1	REIMERS	S1223	ED&I BEAM INSTRUMENTATION

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	MECHANICAL ENGINEERS					0.000	1	650	650.0	ME	49.00	31.850	31.850
2	MECHANICAL DESIGNERS					0.000	1	650	650.0	MD	36.00	23.400	23.400
3	MECHANICAL DRAFTING					0.000	1	325	325.0	MES	23.00	7.475	7.475
4	SUPPLIES & EXPENSES		1	9000.00	EU	9.000			0.0			0.000	9.000
						9.000			1625.0			62.725	71.725

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ME	650.0	31.850
MD	650.0	23.400
MES	325.0	7.475
SUM	1625.0	62.725

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
POWER SUPPLIES	1.2.2.4	2/2/87	1	DWINELL	S1224	ED&I POWER SUPPLIES

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	ELECTRICAL ENGINEERS					0.000	1	240	240.0	EE	46.40	11.136	11.136
2	ELECTRONIC COORDINATORS					0.000	1	640	640.0	EC	33.55	21.472	21.472
3	ELECTRONIC DRAFTING					0.000	1	160	160.0	ED	25.45	4.072	4.072
4	SUPPLIES & EXPENSES		1	5000.00	EU	5.000			0.0			0.000	5.000
						5.000			1040.0			36.680	41.680

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EE	240.0	11.136
EC	640.0	21.472
ED	160.0	4.072
SUM	1040.0	36.680

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
LOW LEVEL ELECTRONICS	1.2.3.1	2/2/87	1	DWINELL	S1231	ED&I LOW LEVEL ELECTRONICS

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	ELECTRICAL ENGINEERS					0.000	1	1200	1200.0	EE	46.40	55.680	55.680
2	ELECTRONIC COORDINATORS					0.000	1	2400	2400.0	EC	33.55	80.520	80.520
3	ELECTRONIC DRAFTING					0.000	1	1200	1200.0	ED	25.45	30.540	30.540
4	SUPPLIES & EXPENSES		1	25000.00	EU	25.000			0.0			0.000	25.000
						25.000			4800.0			166.740	191.740

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EE	1200.0	55.680
EC	2400.0	80.520
ED	1200.0	30.540
SUM	4800.0	166.740

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
COMPUTER CONTROL SYSTEM MODS	1.2.3.2	2/2/87	1	DWINELL	S1232	ED&I COMPUTER CONTROL SYSTEM MODS

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	ELECTRICAL ENGINEERS					0.000	1	1200	1200.0	EE	46.40	55.680	55.680
2	COMPUTER PROGRAMMERS					0.000	1	4000	4000.0	CP	46.40	185.600	185.600
3	ELECTRONIC COORDINATORS					0.000	1	2700	2700.0	EC	33.55	90.585	90.585
4	ELECTRONIC DRAFTING					0.000	1	330	330.0	ED	25.45	8.399	8.399
5	SUPPLIES & EXPENSES		1	51000.00	EU	51.000			0.0			0.000	51.000
						51.000			8230.0			340.263	391.263

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EE	1200.0	55.680
EC	2700.0	90.585
ED	330.0	8.399
CP	4000.0	185.600
SUM	8230.0	340.263

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
CONTROL ROOM CONSOLIDATION	1.2.3.3	2/2/87	1	DWINELL	S1233	ED&I CONTROL ROOM CONSOLIDATION

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	ELECTRICAL ENGINEERS					0.000	1	2000	2000.0	EE	46.40	92.800	92.800
2	COMPUTER PROGRAMMERS					0.000	1	4900	4900.0	CP	46.40	227.360	227.360
3	ELECTRONIC COORDINATORS					0.000	1	3700	3700.0	EC	33.55	124.135	124.135
4	ELECTRONIC DRAFTING					0.000	1	950	950.0	ED	25.45	24.178	24.178
5	SUPPLIES & EXPENSES		1	71000.00	EU	71.000			0.0			0.000	71.000
						71.000			11550.0			468.472	539.473

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EE	2000.0	92.800
EC	3700.0	124.135
ED	950.0	24.178
CP	4900.0	227.360
SUM	11550.0	468.472

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
SITE CLEARANCE & PREP	1.2.4.1	2/2/87	1	REIMERS	S1241	ED&I SITE CLEARANCE & PREP

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	MECHANICAL ENGINEERS					0.000	1	1900	1900.0	ME	49.00	93.100	93.100
2	MECHANICAL DESIGNERS					0.000	1	1900	1900.0	MD	36.00	68.400	68.400
3	MECHANICAL DRAFTING					0.000	1	1000	1000.0	MES	23.00	23.000	23.000
4	SUPPLIES & EXPENSES		1	27000.00	EU	27.000			0.0			0.000	27.000
						27.000			4800.0			184.500	211.500

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ME	1900.0	93.100
MD	1900.0	68.400
MES	1000.0	23.000
SUM	4800.0	184.500

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
SHIELDING MODIFICATIONS	1.2.4.2	2/2/87	1	REIMERS	S1242	ED&I SHIELDING MODIFICATIONS

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	MECHANICAL ENGINEERS					0.000	1	280	280.0	ME	49.00	13.720	13.720
2	MECHANICAL DESIGNERS					0.000	1	700	700.0	MD	36.00	25.200	25.200
3	MECHANICAL DRAFTING					0.000	1	280	280.0	MES	23.00	6.440	6.440
4	SUPPLIES & EXPENSES		1	7000.00	EU	7.000			0.0			0.000	7.000
						7.000			1260.0			45.360	52.360

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ME	280.0	13.720
MD	700.0	25.200
MES	280.0	6.440
SUM	1260.0	45.360

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
UTILITIES - MECHANICAL	1.2.4.3	2/2/87	1	REIMERS	S1243	ED&I UTILITIES - MECHANICAL

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	$/Hr	Total Labor K$	NATL. & LABOR TOTAL $
1	MECHANICAL ENGINEERS					0.000	1	390	390.0	ME	49.00	19.110	19.110
2	MECHANICAL DESIGNERS					0.000	1	650	650.0	MD	36.00	23.400	23.400
3	MECHANICAL DRAFTING					0.000	1	260	260.0	MES	23.00	5.980	5.980
4	SUPPLIES & EXPENSES		1	8000.00	EU	8.000			0.0			0.000	8.000
						8.000			1300.0			48.490	56.490

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
ME	390.0	19.110
MD	650.0	23.400
MES	260.0	5.980
SUM	1300.0	48.490

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
UTILITIES - ELECTRICAL	1.2.4.4	2/2/87	1	DWINELL	S1244	ED&I UTILITIES - ELECTRICAL

Item No.	ITEM TITLE	Material: Unit Meas.	Material: No. Units	Material: Unit Cost	Material: Cost Basis	Material: Total Mt K$	Labor: No. Units	Labor: Unit Hrs.	Labor: Total Hours	Labor: Craft Code	Labor: $/Hr	Labor: Total Labor K$	MATL. & LABOR TOTAL $
1	ELECTRICAL ENGINEERS					0.000	1	30	30.0	EE	46.40	1.392	1.392
2	ELECTRONIC COORDINATORS					0.000	1	210	210.0	EC	33.55	7.046	7.046
3	ELECTRONIC DRAFTING					0.000	1	30	30.0	ED	25.45	0.764	0.764
4	SUPPLIES & EXPENSES		1	2000.00	EU	2.000			0.0			0.000	2.000
						2.000			270.0			9.201	11.201

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EE	30.0	1.392
EC	210.0	7.046
ED	30.0	0.764
SUM	270.0	9.201

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
PROJECT DIRECTION/MANAGEMENT	1.3.1	1/21/87	3	ALONSO	SA131	PROJECT MANAGEMENT

Item No.	ITEM TITLE	Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	MANAGER					0.000	1	6000	6000.0	PH	28.42	170.520	170.520
2	DEPUTY MANAGER					0.000	1	6000	6000.0	PH	28.42	170.520	170.520
3	MECHANICAL LEADER					0.000	1	6000	6000.0	ME	49.00	294.000	294.000
4	ELECTRICAL LEADER					0.000	1	6000	6000.0	EE	46.40	278.400	278.400
5	SUPPLIES & EXPENSES	LOT	2	65000.00	EU	130.000			0.0			0.000	130.000
						130.000			24000.0			913.440	1043.440

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
EE	6000.0	278.400
ME	6000.0	294.000
PH	12000.0	341.040
SUM	24000.0	913.440

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
PROJECT OFFICE SERVICES	1.3.2	1/20/87	2	ALONSO	SA132	PROJECT MANAGEMENT

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	SECRETARIAL ASSISTANCE					0.000	1	4000	4000.0	AA	28.42	113.680	113.680
2	SUPPLIES & EXPENSES	LOT	1	17050.00	EU	17.050			0.0			0.000	17.050
						17.050			4000.0			113.680	130.730

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
AA	4000.0	113.680
SUM	4000.0	113.680

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
PROJECT FINANCIAL TRACKING	1.3.3	1/20/87	2	ALONSO	SA133	PROJECT MANAGEMENT

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	PROJECT ADMINISTRATOR					0.000	1	6000	6000.0	AA	28.42	170.520	170.520
2	SUPPLIES & EXPENSES	LOT	1	25570.00	EU	25.570			0.0			0.000	25.570
						25.570			6000.0			170.520	196.090

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
AA	6000.0	170.520
SUM	6000.0	170.520

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
INCREMENTAL INDIRECTS	1.3.4	1/16/87	1	ALONSO	SA134	PROJECT MANAGEMENT

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	INCREMENTAL INDIRECTS		6	56667.00	EU	340.002			0.0			0.000	340.002
						340.002			0.0			0.000	340.002

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
MAGNETS & SUPPORTS	1.4.1.1	2/2/87	1	TANABE	S1411	CONTINGENCY MAGNETS & SUPPORTS

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	CONTINGENCY		1000	1746.00	EU	1746.000			0.0			0.000	1746.000
						1746.000			0.0			0.000	1746.000

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
RING VACUUM SYSTEM	1.4.1.2	2/2/87	1	HUNT	S1412	CONTINGENCY RING VACUUM SYSTEM

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	CONTINGENCY		1000	1424.00	EU	1424.000			0.0			0.000	1424.000
						1424.000			0.0			0.000	1424.000

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
RF SYSTEM	1.4.1.3	2/2/87	1	HOWARD	S1413	CONTINGENCY RF SYSTEM

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	CONTINGENCY		1000	401.00	EU	401.000			0.0			0.000	401.000
						401.000			0.0			0.000	401.000

LABOR SUMMARY		
Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
RING POWER SUPPLIES	1.4.1.4	2/2/87	1	FRIAS	S1414	CONTINGENCY: RING POWER SUPPLIES

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	CONTINGENCY		1000	1300.00	EU	1300.000			0.0			0.000	1300.000
						1300.000			0.0			0.000	1300.000

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
BEAM MONITORING DEVICES	1.4.1.5	2/2/87	1	REIMERS	S1415	CONTINGENCY: BEAM MONITORING DEVICES

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	CONTINGENCY		1000	27.00	EU	27.000			0.0			0.000	27.000
						27.000			0.0			0.000	27.000

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
SURVEY & ALIGNMENT	1.4.1.6	2/2/87	1	REIMERS	S1416	CONTINGENCY: SURVEY AND ALIGNMENT

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	CONTINGENCY		1000	55.00	EU	55.000			0.0			0.000	55.000
						55.000			0.0			0.000	55.000

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
MAGNETS AND SUPPORTS	1.4.2.1	2/2/87	1	TANABE	S1421	CONTINGENCY: MAGNETS & SUPPORTS (BEAM LINE MO

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	CONTINGENCY		1000	303.00	EU	303.000			0.0			0.000	303.000
						303.000			0.0			0.000	303.000

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
VACUUM SYSTEMS	1.4.2.2	2/2/87	1	HUNT	S1422	CONTINGENCY: VACUUM SYSTEMS (BEAM LINE MODS)

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	CONTINGENCY		1000	135.00	EU	135.000			0.0			0.000	135.000
						135.000			0.0			0.000	135.000

LABOR SUMMARY		
Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
MECH. BEAM INSTRUMENTATION	1.4.2.3	2/2/87	1	REIMERS	S1423	CONTINGENCY: MECH. BEAM INSTRUMENTATION

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	CONTINGENCY		1000	73.00	EU	73.000			0.0			0.000	73.000
						73.000			0.0			0.000	73.000

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
POWER SUPPLIES	1.4.2.4	2/2/87	1	DWINELL	S1424	CONTINGENCY: POWER SUPPLIES

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	$/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	CONTINGENCY		1000	48.00	EU	48.000			0.0			0.000	48.000
						48.000			0.0			0.000	48.000

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
LOW LEVEL ELECTRONICS	1.4.3.1	2/2/87	1	DWINELL	S1431	CONTINGENCY: LOW LEVEL ELECTRONICS

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	CONTINGENCY		1000	192.00	EU	192.000			0.0			0.000	192.000
						192.000			0.0			0.000	192.000

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
COMPUTER CONTROL SYSTEM MODS 1.4.3.2		2/2/87	1	DWINELL	S1432	CONTINGENCY: COMPUTER CONTROL SYSTEM MODS

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	CONTINGENCY		1000	207.00	EU	207.000			0.0			0.000	207.000
						207.000			0.0			0.000	207.000

LABOR SUMMARY		
Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
CONTROL ROOM CONSOLIDATION	1.4.3.3	2/2/87	1	DWINELL	S1433	CONTINGENCY: CONTROL ROOM CONSOLIDATION

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	CONTINGENCY		1000	294.00	EU	294.000			0.0			0.000	294.000
						294.000			0.0			0.000	294.000

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
SITE CLEARANCE & PREP	1.4.4.1	2/2/87	1	REIMERS	S1441	CONTINGENCY: SITE CLEARANCE & PREP

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Craft Code	$/Hr	Total Labor K$	MATL. & LABOR TOTAL $
1	CONTINGENCY		1000	354.00	EU	354.000			0.0			0.000	354.000
						354.000			0.0			0.000	354.000

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
SHIELDING MODIFICATIONS	1.4.4.2	2/2/87	1	REIMERS	S1442	CONTINGENCY: SHIELDING MODIFICATIONS

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	CONTINGENCY		1000	61.00	EU	61.000			0.0			0.000	61.000
						61.000			0.0			0.000	61.000

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
UTILITIES - MECHANICAL	1.4.4.3	2/2/87	1	REIMERS	S1443	CONTINGENCY: UTILITIES - MECHANICAL

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	CONTINGENCY		1000	64.00	EU	64.000			0.0			0.000	64.000
						64.000			0.0			0.000	64.000

LABOR SUMMARY		
Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	NOTES
UTILITIES - ELECTRICAL	1.4.4.4	2/2/87	1	DWINELL	S1444	CONTINGENCY: UTILITIES - ELECTRICAL

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
1	CONTINGENCY		1000	18.00	EU	18.000			0.0			0.000	18.000
						18.000			0.0			0.000	18.000

LABOR SUMMARY

Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

BEVATRON UPGRADE

Cost Estimate Details

Major Component/Subcomponent	WBS	Date	Version	NAME	FILENAME	N O T E S
PROJECT MANAGEMENT	1.4.5	2/2/87	1	ALONSO	S145	CONTINGENCY: PROJECT MANAGEMENT

Item No.	ITEM TITLE	Material Unit Meas.	Material No. Units	Material Unit Cost	Material Cost Basis	Material Total Mt K$	Labor No. Units	Labor Unit Hrs.	Labor Total Hours	Labor Craft Code	Labor $/Hr	Labor Total Labor K$	MATL. & LABOR TOTAL $
	CONTINGENCY		1000	215.00	EU	215.000			0.0			0.000	215.000
						215.000			0.0			0.000	215.000

LABOR SUMMARY		
Craft Code	Total Hours	Total Labor K$
SUM	0.0	0.000

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