

2.2 2005 Shutdown 1/4/2005 10/10/2005 196d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------------|-----------|-----------|-----------|----------------------|-------------------|------------|----------------|-----------|
| Subproject | \$268,579 | \$397,173 | \$665,752 | 25 | 20 | \$809,923 | | |

WBS Dictionary Warm up B4 and C1 houses. Replace half-dipoles with full-dipoles in these houses. Remove MI dipoles and C-magnets from C0. Install beam pipe in C0. Install LCW piping for collision hall and assembly hall. Cool down B4 and C1 houses. Warm up D3 house. Install modified QD37 for synch light monitor. Install Synch light monitor in D48 warm straight. Cool down D3 house.

Ground Rules There will be a 2 month shutdown starting ~Aug. 1, 2005 [MDC]

2.2.1 Preliminary LCW design: FY05/06 R&D 1/4/2005 4/1/2005 63d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------------|----------|---------|-----------|----------------------|-------------------|------------|----------------|-----------|
| Subproject | \$0 | \$9,459 | \$9,459 | 0 | 10 | \$10,405 | RD | |

WBS Dictionary Complete the design work for the 2005 shutdown low modifications.

2.2.1.1 Final LCW design 1/4/2005 4/1/2005 63d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|---------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$0 | \$9,459 | \$9,459 | 0 | 10 | \$10,405 | RD | |

WBS Dictionary Remaining system design for 2005 LCW modifications and extensions.

BOE Labor Based on engineering judgement for reviewing cooling requirements and existing system and working with a drafter to complete a layout drawing. [JR]

Labor Resources (hours)

| | |
|---------------------|-----|
| BTEV.FNAL.BD.DSGRDR | 20 |
| BTEV.FNAL.BD.ME | 100 |

2.2.2 Planning coordination fabrication 4/4/2005 8/5/2005 88d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------------|-----------|----------|-----------|----------------------|-------------------|------------|----------------|-----------|
| Subproject | \$139,901 | \$65,070 | \$204,970 | 26 | 16 | \$251,774 | | |

WBS Dictionary These activities are what need to be accomplished before the shutdown begins.

2.2.2.1 Preshutdown planning 4/4/2005 8/5/2005 88d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|----------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$0 | \$39,696 | \$39,696 | 0 | 10 | \$43,666 | CB | |

WBS Dictionary Shutdown planning starts ~6months before shutdown. Encompasses coordination meetings run by the level 3 manager. Encompasses a readiness review.

BOE Labor Project manager for wbs2.2 @50%; EE from ESD @10%; Engphys from Tev @50%; ME from MSD @50%; SE from Controls @10%; PHY from alignment group @10%. These estimates are based on previous shutdown experience. Encompasses a readiness review. [PG]

Labor Resources (hours)

| | |
|---------------------|-----|
| BTEV.FNAL.BD.EE | 72 |
| BTEV.FNAL.BD.ENGPHY | 144 |
| BTEV.FNAL.BD.ME | 144 |
| BTEV.FNAL.BD.OPSPEC | 72 |
| BTEV.FNAL.BD.PHY | 144 |
| BTEV.FNAL.BD.SE | 72 |
| BTEV.FNAL.PPD.PHY | 72 |

2.2.2.2 Beampipe procurement 4/13/2005 6/8/2005 40d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|---------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$13,920 | \$3,241 | \$17,161 | 25 | 30 | \$21,614 | CB | * |

WBS Dictionary Procurement and remaining design work of beampipe to be installed in the C0 straight section.

BOE Materials PO's 548761,548897, 507984, 507883, 548900 [PG]

Base Quantity: 1 **Additional Quantity:** 0 **Unit Cost:** 12000

Labor Resources (hours)

| | |
|-----------------|----|
| BTEV.FNAL.BD.ME | 40 |
|-----------------|----|

2.2.2.3 Stand and cable tray procurement 4/13/2005 7/7/2005 60d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|---------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$6,960 | \$3,241 | \$10,201 | 40 | 30 | \$13,958 | CB | |

WBS Dictionary Procurement and remaining design work of beampipe stands in C0 straight section. Also includes price of cable trays.

BOE Materials Based on R Reilly estimate of 12/16/03. [RR]

Base Quantity: 1 **Additional Quantity:** 0 **Unit Cost:** 6000

Labor Resources (hours)

| | |
|-----------------|----|
| BTEV.FNAL.BD.ME | 40 |
|-----------------|----|

2.2.2.5 Procurement for 2005 LCW components 4/4/2005 5/27/2005 40d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|---------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$58,000 | \$1,621 | \$59,621 | 25 | 25 | \$74,526 | CB | * |

WBS Dictionary Procurement of valves, instrumentation, pipe,etc for LCW modifications.
BOE Materials Parts list based on conceptual design. Based on past experience procuring similar materials and quotations on some major components. [JR]
Base Quantity: 1 **Additional Quantity:** 0 **Unit Cost:** 50000
Labor Resources (hours)
 BTEV.FNAL.BD.ME 20

2.2.2.6 Procurement of Kautzky relief line segments 4/13/2005 6/8/2005 40d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|-------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$580 | \$205 | \$785 | 30 | 30 | \$1,020 | CB | * |

WBS Dictionary Procurement of metal flex hose for Kautzky relief valves for 7 magnets. Lengths are 2" to 5" each.
BOE Materials Best guess for consumables. [JT]
Base Quantity: 10 **Additional Quantity:** 0 **Unit Cost:** 50
Labor Resources (hours)
 BTEV.FNAL.BD.TECH 4

2.2.2.7 Procurement for ODH walls 4/13/2005 6/8/2005 40d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|---------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$4,640 | \$1,621 | \$6,261 | 30 | 30 | \$8,139 | CB | |

WBS Dictionary ODH walls are Lexan, cut to size, bolted to concrete wall on either side of collision hall. This element includes some minor design work.
BOE Materials Best engineering estimate from conceptual design [PG]
Base Quantity: 1 **Additional Quantity:** 0 **Unit Cost:** 4000
Labor Resources (hours)
 BTEV.FNAL.BD.ME 20

2.2.2.8 Procurement of vacuum seals and supplies 4/13/2005 6/8/2005 40d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|-------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$1,856 | \$648 | \$2,504 | 30 | 30 | \$3,256 | CB | |

WBS Dictionary Miscellaneous vacuum seals and flanges for B4 and C1 modifications.
BOE Materials Based on number of vacuum interfaces to make up and known cost of vacuum seals. [RR]
Base Quantity: 1 **Additional Quantity:** 0 **Unit Cost:** 1600
Labor Resources (hours)
 BTEV.FNAL.BD.ME 8

2.2.2.9 Fabricate 2 warm BPM pairs for C0 4/4/2005 8/5/2005 88d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|---------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$8,816 | \$1,759 | \$10,575 | 30 | 30 | \$13,748 | CB | * |

WBS Dictionary 2 new BPM pairs will be required in the C0 straight section. Cabling cost is in 2.4.5. Cold BPM's for spools and quads are in wbs 6.3.1.1 and 6.3.1.2.
BOE Materials Based on 3/4/04 note from J Crisp via S Pordes. Based on recent experience building these type of bpm's for F0. [MDC]
BOE Labor Based on 3/4/04 note from J Crisp via S Pordes [MDC]
Base Quantity: 2 **Additional Quantity:** 0 **Unit Cost:** 3800
Labor Resources (hours)
 BTEV.FNAL.BD.DSGRDR 16
 BTEV.FNAL.BD.EE 8

2.2.2.10 Procure signal processing hardware for C0 BPMs 4/4/2005 8/5/2005 88d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|-------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$20,490 | \$674 | \$21,164 | 30 | 20 | \$27,446 | CB | |

WBS Dictionary Electronics room signal processing hardware for 2 C0 bpm's, including purchase of tunnel to service building cables. These BPM's will be cabled to the B4 and C1 BPM houses.
BOE Materials Based on recent purchases and stockroom cable prices. 16 RG8 cables @300' + connectors. No new BPM house but 2 new filter cards and digital receivers. See costbook entry for wbs 11.1.5 for details. [R.T-K]
Base Quantity: 4 **Additional Quantity:** 0 **Unit Cost:** 4416
Labor Resources (hours)
 BTEV.FNAL.BD.EE 8

2.2.2.11 Installation of LCW in assembly hall 6/23/2005 7/6/2005 9d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|--------------------------------|--|-----------------------------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$24,638 | \$12,363 | \$37,002 | 20 | 20 | \$44,402 | CB | * |
| WBS Dictionary | LCW piping and hose can be installed in the assembly hall before the shutdown begins. Piping between collision hall and assembly hall must wait until shutdown. C0 IR project provides headers and valves. wbs1.10 provides hose and piping to PS's and magnets. | | | | | | | |
| BOE Materials | T&M contract with 2 pipefitting crews for 9 days. 1 crew-day = \$1180K\$. [JR] | | | | | | | |
| BOE Labor | Senior tech as task manager, supervising @100%. ME @20%. [JR] | | | | | | | |
| Base Quantity: | 18 | Additional Quantity: | 0 | Unit Cost: | 1180 | | | |
| Labor Resources (hours) | | | | | | | | |
| BTEV.FNAL.BD.ME | | | 32 | | | | | |
| BTEV.FNAL.BD.SRTECH | | | 144 | | | | | |

2.2.3 Device removal and installation @ B4C0C1 8/8/2005 9/29/2005 38d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------------------|--|-----------|-----------|----------------------|-------------------|------------|----------------|-----------|
| Subproject | \$69,368 | \$196,306 | \$265,674 | 25 | 16 | \$313,867 | | * |
| BOE Labor | Labor estimates for tunnel work are taken from D Augustine's detailed MS Project schedule for the 2005 shutdown. This schedule has 280 individual activities linked together in an executable fashion. [MDC] | | | | | | | |

2.2.3.1 Move shield wall 8/8/2005 8/9/2005 2d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|--------------------------------|--|-----------------------------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$7,540 | \$1,357 | \$8,897 | 25 | 20 | \$11,053 | CB | |
| WBS Dictionary | This is the large shield wall between the Assembly Hall and Collision Hall. It is moved out of the way to allow the movement of large equipment into and out of the Collision Hall. | | | | | | | |
| BOE Materials | Ironworker T&M contract for 2.5 days @2600\$/day (4-man crew). Based on experience moving shield wall in 2003 shutdown. [D.Aug.] PO 533194 for previous ironworker work. PO encompasses wbs 2.2.1, 2.2.3, 2.2.4, 2.2.6. [PG] | | | | | | | |
| BOE Labor | FNAL senior tech as task manager for 2.5 days [D. Aug] | | | | | | | |
| Base Quantity: | 1 | Additional Quantity: | 0 | Unit Cost: | 6500 | | | |
| Labor Resources (hours) | | | | | | | | |
| BTEV.FNAL.BD.SRTECH | | | 20 | | | | | |

2.2.3.2 Prep for magnet removal in collision hall 8/8/2005 8/9/2005 2d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|---------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$0 | \$3,686 | \$3,686 | 0 | 20 | \$4,423 | CB | |

WBS Dictionary Disconnect buswork, QPM cables, safety leads, etc. LCW prep is in wbs 2.3.1. Vacuum cable and interface prep is in wbs 2.7.1

BOE Labor FNAL vacuum technicians. Based on previous experience of 2003 installation of MI dipoles. [D. Aug.]

Labor Resources (hours)

BTEV.FNAL.BD.TECH 72

2.2.3.3 Remove MI dipoles stands 8/15/2005 8/30/2005 12d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|---------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$36,192 | \$6,514 | \$42,706 | 25 | 20 | \$53,056 | CB | |

WBS Dictionary 4 MI dipoles and 2 C-magnets will be removed and put into storage. These were installed in 2003.

BOE Materials Ironworker T&M contract for 12 days @2600\$/day (4-man crew). Based on experience moving shield wall in 2003 shutdown. [D.Aug.] PO 533194 for previous ironworker work. PO encompasses wbs 2.2.1, 2.2.3, 2.2.4, 2.2.6. [PG]

BOE Labor 100% task manager by FNAL senior tech [D. Aug.]

Base Quantity: 12 **Additional Quantity:** 0 **Unit Cost:** 2600

Labor Resources (hours)

BTEV.FNAL.BD.SRTECH 96

2.2.3.4 Install beampipe stands bpms in C0 straight 8/31/2005 9/2/2005 3d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|---------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$18,096 | \$9,726 | \$27,822 | 25 | 20 | \$34,291 | CB | |

WBS Dictionary Beampipe is ~8' off the collision hall floor. Installation includes vacuum devices, bpm's and vacuum spool pieces. Also includes cable trays for cabling.

BOE Materials Ironworker T&M contract for 6 days @2600\$/day (4-man crew). Based on experience moving shield wall in 2003 shutdown. [D.Aug.] PO 533194 for previous ironworker work. PO encompasses wbs 2.2.1, 2.2.3, 2.2.4, 2.2.6. [PG]

BOE Labor T&M work supervised by senior tech @100%. Vacuum tech labor estimate based on experience gained from installation in 2003 shutdown. [D. Aug.]

Base Quantity: 6 **Additional Quantity:** 0 **Unit Cost:** 2600

Labor Resources (hours)

BTEV.FNAL.BD.SRTECH 78

BTEV.FNAL.BD.TECH 60

BTEV.FNAL.PPD.SRTECH 8

BTEV.FNAL.PPD.TECH 16

2.2.3.5 Bakeout C0 straight section 9/6/2005 9/9/2005 4d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|---------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$0 | \$5,447 | \$5,447 | 0 | 20 | \$6,537 | CB | |

WBS Dictionary Heat vacuum pipe to >100degC to condition vacuum.

BOE Labor Based on previous experience baking Tevatron warm vacuum sections. [D. Aug.]

Labor Resources (hours)

| | |
|---------------------|----|
| BTEV.FNAL.BD.SRTECH | 32 |
| BTEV.FNAL.BD.TECH | 64 |

2.2.3.6 Replace shield wall 9/6/2005 9/7/2005 2d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|---------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$7,540 | \$1,357 | \$8,897 | 25 | 20 | \$11,053 | CB | |

WBS Dictionary This is the large shield wall between the Assembly Hall and Collision Hall. It is moved back into position after the heavy equipment is moved out of the Collision Hall.

BOE Materials Ironworker T&M contract for 2.5 days @2600\$/day (4-man crew). Based on experience moving shield wall in 2003 shutdown. [D.Aug.] PO 533194 for previous ironworker work. PO encompasses wbs 2.2.1, 2.2.3, 2.2.4, 2.2.6. [PG]

BOE Labor FNAL senior tech as task manager for 2.5 days [D. Aug.]

Base Quantity: 1 **Additional Quantity:** 0 **Unit Cost:** 6500

Labor Resources (hours)

| | |
|---------------------|----|
| BTEV.FNAL.BD.SRTECH | 20 |
|---------------------|----|

2.2.3.7 Prep for device move/replacement in Tev tunnel 8/12/2005 8/16/2005 3d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|----------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$0 | \$23,171 | \$23,171 | 0 | 15 | \$26,646 | CB | |

WBS Dictionary Open vacuum interfaces in B4 and C1 cold sections

BOE Labor Based on previous experience in Tevatron device installation/replacement, following standard procedures. Trained cryogenic vacuum crew. [D.Aug.]

Labor Resources (hours)

| | |
|----------------------|-----|
| BTEV.FNAL.BD.VTECH | 320 |
| BTEV.FNAL.BD.VTECHLD | 80 |
| BTEV.FNAL.PPD.SRTECH | 8 |
| BTEV.FNAL.PPD.TECH | 16 |

2.2.3.8 Remove 26 MR dipoles from tunnel 8/12/2005 8/23/2005 8d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|----------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$0 | \$15,058 | \$15,058 | 0 | 15 | \$17,316 | CB | |

WBS Dictionary These MR dipoles interfere with work at B4 and C1 and must be removed from the tunnel before the 09 shutdown. Can be stored on site, according to note from J Anderson.

BOE Labor Based on previous experience in Tevatron device removal. [D.Aug.]

Labor Resources (hours)

| | |
|---------------------|-----|
| BTEV.FNAL.BD.SRTECH | 65 |
| BTEV.FNAL.BD.TECH | 208 |

2.2.3.9 Move/replace Tev tunnel devices 8/17/2005 9/6/2005 14d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|----------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$0 | \$76,457 | \$76,457 | 0 | 15 | \$87,925 | CB | |

WBS Dictionary 2 half-length Tevatron dipoles will be replaced with full length dipoles. 9 other cryogenic devices will be moved. Synch light monitor will be removed. Warm bypass will be replaced. This item includes alignment.

BOE Labor Based on previous experience in Tevatron device installation/replacement, following standard procedures. Trained cryogenic vacuum crew. [D. Aug.]

Labor Resources (hours)

| | |
|----------------------|-----|
| BTEV.FNAL.BD.VTECH | 952 |
| BTEV.FNAL.BD.VTECHLD | 238 |
| BTEV.FNAL.PPD.SRTECH | 68 |
| BTEV.FNAL.PPD.TECH | 136 |

2.2.3.10 Reconnect and leak check B4/C1 9/7/2005 9/15/2005 7d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|----------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$0 | \$34,349 | \$34,349 | 0 | 15 | \$39,501 | CB | |

WBS Dictionary Makeup all vacuum interfaces disconnected in B4 and C1 and leak check.

BOE Labor Based on previous experience in Tevatron device installation/replacement, following standard procedures. Trained cryogenic vacuum crew. [D.Aug.]

Labor Resources (hours)

| | |
|----------------------|-----|
| BTEV.FNAL.BD.VTECH | 504 |
| BTEV.FNAL.BD.VTECHLD | 126 |

2.2.3.11 Install u.s. and d.s. ODH walls 9/16/2005 9/16/2005 1d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|---------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$0 | \$1,638 | \$1,638 | 0 | 15 | \$1,884 | CB | |

WBS Dictionary Lexan wall on u.s and d.s. end of collision hall to provide odh barrier.

BOE Labor Labor estimate based on conceptual design. [D.Aug.]

Labor Resources (hours)

BTEV.FNAL.BD.TECH 32

2.2.3.12 Shutdown planning and coordination 8/8/2005 9/29/2005 38d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|----------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$0 | \$17,548 | \$17,548 | 0 | 15 | \$20,180 | CB | |

WBS Dictionary Day-to-day planning and coordination during shutdown.

BOE Labor Level 3 project manager @50%; Tev representative @25%; ME supervision @25%; EE and SE @10%; alignment supervision @25%. These estimates are based on previous shutdown experience. [PG]

Labor Resources (hours)

BTEV.FNAL.BD.EE 32
 BTEV.FNAL.BD.ENGPY 112
 BTEV.FNAL.BD.ME 80
 BTEV.FNAL.BD.PHY 160
 BTEV.FNAL.PPD.PHY 80

2.2.4 LCW modifications 8/12/2005 9/7/2005 18d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------------|----------|----------|-----------|----------------------|-------------------|------------|----------------|-----------|
| Subproject | \$54,752 | \$25,098 | \$79,850 | 20 | 20 | \$95,820 | | |

BOE Labor D Augustine labor estimates are from '05 shutdown detailed MSP file [MDC]

2.2.4.1 Prep LCW system 8/12/2005 8/12/2005 1d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|---------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$0 | \$1,601 | \$1,601 | 0 | 20 | \$1,921 | CB | |

WBS Dictionary Valve off LCW, disconnect hoses, disconnect from magnets in B4/C1 sides of Collision Hall. LCW must be drained from tunnel headers prior to piping modifications.

BOE Labor Best estimate for fnal technician time. [JR]

Labor Resources (hours)

BTEV.FNAL.BD.ME 8

BTEV.FNAL.BD.SRTECH 8
 BTEV.FNAL.BD.TECH 8

2.2.4.2 Remove C0 abort RAW system 8/15/2005 8/18/2005 4d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|---------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$0 | \$3,809 | \$3,809 | 0 | 20 | \$4,571 | CB | |

WBS Dictionary The old C0 abort RAW system is not used anymore. Remove from tunnel to avoid interference with future work. (Note: may be done in 04 shutdown)

BOE Labor Best estimate for removing old C0 RAW system. [JR]

Ground Rules Assumes this can be done without T&M rigging. [MDC]

Labor Resources (hours)
 BTEV.FNAL.BD.SRTECH 32
 BTEV.FNAL.BD.TECH 32

2.2.4.3 Modify LCW in Tevatron tunnel 8/15/2005 8/26/2005 10d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|---------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$13,688 | \$7,049 | \$20,737 | 20 | 20 | \$24,884 | CB | * |

WBS Dictionary Tunnel LCW modifications to accomodate removal of MI dipoles and C-magnets, to route LCW to collision hall, and to add new taps and valves for bus and leads.

BOE Materials 10 days of 2 T&M pipefitting crews @1180\$/day/crew. [JR]

BOE Labor 100% of senior tech as task manager + 25% of ME time. [JR]

Base Quantity: 10 **Additional Quantity:** 0 **Unit Cost:** 1180

Labor Resources (hours)
 BTEV.FNAL.BD.ME 20
 BTEV.FNAL.BD.SRTECH 80

2.2.4.4 Install LCW in collision hall 8/15/2005 9/2/2005 15d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|----------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$41,064 | \$10,087 | \$51,151 | 20 | 20 | \$61,381 | CB | * |

WBS Dictionary Header along bypass wall with 3 tee's and valves. Header also goes to assembly hall via penetrations between collision hall and assembly hall. LCW enters collision hall from beampipe opening on C side.

BOE Materials 15 days of 2 T&M pipefitting crews @1180\$/day/crew. [JR]

BOE Labor 100% of senior tech as task manager + 25% of ME time. [JR]

Base Quantity: 30 **Additional Quantity:** 0 **Unit Cost:** 1180

Labor Resources (hours)
 BTEV.FNAL.BD.ME 24
 BTEV.FNAL.BD.SRTECH 120

2.2.4.5 Re-establish LCW in B4/C1 9/6/2005 9/7/2005 2d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|---------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$0 | \$2,553 | \$2,553 | 0 | 20 | \$3,063 | CB | |

WBS Dictionary Fill and flush modified system; perform hydrostatic leak test; turn on low pumps, troubleshoot, and balance flows.

BOE Labor Previous operational experience. [JR]

Labor Resources (hours)

| | |
|---------------------|----|
| BTEV.FNAL.BD.ME | 8 |
| BTEV.FNAL.BD.SRTECH | 16 |
| BTEV.FNAL.BD.TECH | 16 |

2.2.5 Controls and instrumentation modifications 8/8/2005 9/21/2005 32d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------------|----------|----------|-----------|----------------------|-------------------|------------|----------------|-----------|
| Subproject | \$4,559 | \$10,378 | \$14,937 | 30 | 20 | \$18,380 | | |

BOE Labor D Augustine labor estimates are from '05 shutdown detailed MSP file [MDC]

2.2.5.1 Uncable old BPMs and BLMs 8/8/2005 8/8/2005 1d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|-------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$0 | \$952 | \$952 | 0 | 20 | \$1,143 | CB | |

WBS Dictionary Move cables out of the way for B4 and C1 modifications. Recable and test after installation is complete.

BOE Labor Best estimate for minor cabling job. [D.Aug.]

Labor Resources (hours)

| | |
|---------------------|---|
| BTEV.FNAL.BD.SRTECH | 8 |
| BTEV.FNAL.BD.TECH | 8 |

2.2.5.2 Disconnect HLS system in B4 sector 8/8/2005 8/8/2005 1d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|-------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$0 | \$819 | \$819 | 0 | 20 | \$983 | CB | |

WBS Dictionary HLS is the water leveling system which runs from B45 to B49. Must be moved out of the way before magnet move/replacement begins.

BOE Labor Best estimate for minor cabling job. [MDC]

Labor Resources (hours)

| | |
|-------------------|----|
| BTEV.FNAL.BD.PHY | 16 |
| BTEV.FNAL.BD.TECH | 16 |

2.2.5.3 Reconnect HLS system in B4 sector 9/16/2005 9/21/2005 4d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|---------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$0 | \$1,638 | \$1,638 | 0 | 20 | \$1,966 | CB | |

WBS Dictionary HLS is the water leveling system which runs from B45 to B49.

BOE Labor Best estimate for minor cabling job. [MDC]

Labor Resources (hours)

| | |
|-------------------|----|
| BTEV.FNAL.BD.PHY | 32 |
| BTEV.FNAL.BD.TECH | 32 |

2.2.5.4 Remove MI dipole shunt circuitry @ B4 S.B. 8/8/2005 8/11/2005 4d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|---------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$0 | \$2,073 | \$2,073 | 0 | 20 | \$2,488 | CB | |

WBS Dictionary When MI dipoles are removed, this circuitry will become obsolete. We will remove to make room in the B4 electronics room, and reuse racks and some parts for the new Q1/3 shunts to be installed in 2009.

BOE Labor Best estimate for removing 2 racks from B4 service building. Includes some disassembly. [MDC]

Labor Resources (hours)

| | |
|---------------------|----|
| BTEV.FNAL.BD.EE | 2 |
| BTEV.FNAL.BD.SRTECH | 16 |
| BTEV.FNAL.BD.TECH | 16 |

2.2.5.5 Recable and test BPMs/BLMs @ B4/C0/C1 9/16/2005 9/19/2005 2d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|---------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$3,039 | \$1,151 | \$4,191 | 30 | 20 | \$5,333 | CB | |

WBS Dictionary Recabling and testing old BPMs and BLMs @ B4/C0/C1. Cable and test 4 new BPM's in C0 straight section. These are cabled to the B4 and C1 BPM houses.

BOE Materials Assumes electrician T&M contract for 2 days @ 1310\$/day [MDC]

BOE Labor Estimate FNAL SRtech supervises electrician crew @ 1/2 time. EE assists SRtech with testing. Waiting for estimate from R T-K. [MDC]

Base Quantity: 2 **Additional Quantity:** 0 **Unit Cost:** 1310

Labor Resources (hours)

| | |
|---------------------|----|
| BTEV.FNAL.BD.EE | 4 |
| BTEV.FNAL.BD.SRTECH | 12 |

2.2.5.6 Move synch light hardware from C0 to D sector and recable 8/12/2005 8/17/2005 4d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|---------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$1,520 | \$3,744 | \$5,264 | 30 | 20 | \$6,468 | CB | * |

WBS Dictionary Synch light hardware in C0 service building must be moved to D4 service building. Cabling is included here.

BOE Materials Assumes electrician T&M contract for 1 day @1310\$/day [MDC]

BOE Labor Work breakdown list [R. T-K]

Base Quantity: 1 **Additional Quantity:** 0 **Unit Cost:** 1310

Labor Resources (hours)

| | |
|---------------------|----|
| BTEV.FNAL.BD.EA | 8 |
| BTEV.FNAL.BD.PHY | 8 |
| BTEV.FNAL.BD.SE | 16 |
| BTEV.FNAL.BD.SRTECH | 16 |
| BTEV.FNAL.BD.TECH | 16 |

2.2.6 Cryogenic modifications @B4 and C1 8/8/2005 9/29/2005 38d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------------|----------|----------|-----------|----------------------|-------------------|------------|----------------|-----------|
| Subproject | \$0 | \$32,290 | \$32,290 | 0 | 23 | \$39,819 | | |

BOE Materials No M&S required for these tasks. [JT]

2.2.6.1 Warm up B4 and C1 houses 8/8/2005 8/11/2005 4d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|----------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$0 | \$10,860 | \$10,860 | 0 | 20 | \$13,032 | CB | * |

WBS Dictionary Standard cryogenic warmup procedure for B4 and C1 houses.

BOE Labor Standard Tevatron warmup procedures. [JT]

Labor Resources (hours)

| | |
|---------------------|----|
| BTEV.FNAL.BD.ME | 40 |
| BTEV.FNAL.BD.SRTECH | 64 |
| BTEV.FNAL.BD.TECH | 64 |

2.2.7 SPS magnet purchase 10/3/2005 10/3/2005 1d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------------|----------|-------|-----------|----------------------|-------------------|------------|----------------|-----------|
| Subproject | \$0 | \$0 | \$0 | 0 | 0 | \$0 | | |

2.2.7.1 SPS magnet purchase administration 10/3/2005 10/3/2005 1d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|-------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$0 | \$0 | \$0 | 0 | 0 | \$0 | CB | * |

WBS Dictionary This is to pay for the 2 TB dipoles which will be taken from the AD Special Process Spares pool and installed in the Tevatron to replace the MI dipoles, C-magnets, and TA dipoles.

BOE Materials Cost taken from AD Special Process Spares spreadsheet. G&A must be added, per H Dick's instructions on 7/20/04. No inflation should be included as these are fixed price items. [MDC]

Base Quantity: 0 **Additional Quantity:** 0 **Unit Cost:** 45554

Labor Resources (hours)
BTEV.FNAL.BD.PHY 8

2.2.8 Vacuum modifications 8/12/2005 9/19/2005 26d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------------|----------|---------|-----------|----------------------|-------------------|------------|----------------|-----------|
| Subproject | \$0 | \$7,688 | \$7,688 | 0 | 38 | \$10,590 | | |

BOE Labor D Augustine labor estimates are from '05 shutdown detailed MSP file [MDC]

2.2.8.1 Uncabbling 8/12/2005 8/12/2005 1d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|---------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$0 | \$1,732 | \$1,732 | 0 | 30 | \$2,252 | CB | |

WBS Dictionary Vacuum devices must be uncabled downstairs before magnet moves.

BOE Labor Best estimate for minor cabling job. [D.Aug.]

Labor Resources (hours)
BTEV.FNAL.BD.EE 8
BTEV.FNAL.BD.ME 8
BTEV.FNAL.BD.TECH 8

2.2.8.2 Recabling and checkout 9/16/2005 9/19/2005 2d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|---------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$0 | \$5,956 | \$5,956 | 0 | 40 | \$8,338 | CB | |

WBS Dictionary No new cables anticipated. All vacuum devices will simply be moved. Device name changes will be required in B4, C0, C1 vacuum houses.

BOE Labor Best estimate for minor cabling job. [D.Aug.]

Labor Resources (hours)

| | |
|---------------------|----|
| BTEV.FNAL.BD.EE | 16 |
| BTEV.FNAL.BD.ENGPHY | 16 |
| BTEV.FNAL.BD.ME | 16 |
| BTEV.FNAL.BD.SE | 16 |
| BTEV.FNAL.BD.TECH | 16 |

2.2.9 Install synch light monitors @ D3 D48 8/8/2005 9/14/2005 27d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------------|----------|----------|-----------|----------------------|-------------------|------------|----------------|-----------|
| Subproject | \$0 | \$43,248 | \$43,248 | 0 | 29 | \$55,778 | | |

BOE Labor D Augustine labor estimates are from '05 shutdown detailed MSP file [MDC]

2.2.9.1 Warm up D3 house 8/8/2005 8/11/2005 4d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|---------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$0 | \$6,402 | \$6,402 | 0 | 20 | \$7,683 | CB | * |

WBS Dictionary Standard cryogenic warm up procedure for D3 house.

BOE Labor Standard Tevatron warmup procedures. [JT]

Labor Resources (hours)

| | |
|---------------------|----|
| BTEV.FNAL.BD.ME | 32 |
| BTEV.FNAL.BD.SRTECH | 32 |
| BTEV.FNAL.BD.TECH | 32 |

2.2.9.2 Replace QD37 8/12/2005 8/16/2005 3d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|---------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$0 | \$7,224 | \$7,224 | 0 | 30 | \$9,391 | CB | |

WBS Dictionary Single quad replacement. New quad has synch light pickoff mirror next to bpm.

BOE Labor Based on previous experience. [D. Aug.]

Labor Resources (hours)

| | |
|--------------------|----|
| BTEV.FNAL.BD.VTECH | 96 |
|--------------------|----|

| | |
|----------------------|----|
| BTEV.FNAL.BD.VTECHLD | 24 |
| BTEV.FNAL.PPD.SRTECH | 4 |
| BTEV.FNAL.PPD.TECH | 8 |

2.2.9.3 Install synch light monitors on QD37 and in D48 8/17/2005 8/24/2005 6d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|---------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$0 | \$6,276 | \$6,276 | 0 | 40 | \$8,787 | CB | |

WBS Dictionary Install 2 separate synch light monitors: one in D48 warm straight section and one on QD37. Synch light cabling is included in 2.4.6. QD37 modification is in 6.1.2 and 6.2.1.

BOE Labor Based on previous experience. [D. Aug.]

Labor Resources (hours)

| | |
|----------------------|----|
| BTEV.FNAL.BD.TECH | 96 |
| BTEV.FNAL.PPD.SRTECH | 8 |
| BTEV.FNAL.PPD.TECH | 16 |

2.2.9.4 Leak check D3 D48 8/25/2005 8/31/2005 5d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|----------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$0 | \$10,904 | \$10,904 | 0 | 30 | \$14,176 | CB | |

WBS Dictionary Standard procedures. Includes cold and warm sections.

BOE Labor Based on previous experience. [D. Aug.]

Labor Resources (hours)

| | |
|----------------------|-----|
| BTEV.FNAL.BD.VTECH | 160 |
| BTEV.FNAL.BD.VTECHLD | 40 |

2.2.9.5 Bakeout D48 straight section 9/1/2005 9/7/2005 4d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|---------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$0 | \$3,809 | \$3,809 | 0 | 30 | \$4,952 | CB | |

WBS Dictionary Bakeout warm straight section to >100degC to condition vacuum.

BOE Labor Based on previous bakeout experience [D.Aug.]

Labor Resources (hours)

| | |
|---------------------|----|
| BTEV.FNAL.BD.SRTECH | 32 |
| BTEV.FNAL.BD.TECH | 32 |

2.2.9.6 D3 startup review and signoffs 9/8/2005 9/8/2005 1d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|---------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$0 | \$2,230 | \$2,230 | 0 | 25 | \$2,788 | CB | * |

WBS Dictionary Electrical and mechanical inspection. Hipot. QPM and PS checks. Review and signoff.

BOE Labor Standard procedures for inspection, verification, review, and signoff after warming up and working on a Tevatron cryogenic house. [MDC]

Labor Resources (hours)

| | |
|---------------------|---|
| BTEV.FNAL.BD.EE | 4 |
| BTEV.FNAL.BD.ENGPHY | 8 |
| BTEV.FNAL.BD.ME | 4 |
| BTEV.FNAL.BD.OPSPEC | 3 |
| BTEV.FNAL.BD.PHY | 2 |
| BTEV.FNAL.BD.SRTECH | 8 |
| BTEV.FNAL.BD.TECH | 4 |

2.2.9.7 Cryogenic startup 9/9/2005 9/14/2005 4d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|---------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$0 | \$6,402 | \$6,402 | 0 | 25 | \$8,003 | CB | * |

WBS Dictionary Standard cryogenic cooldown procedures for D3 house. Includes cryogenic safety walkthrough.

BOE Labor Standard Tevatron cooldown procedures [JT]

Labor Resources (hours)

| | |
|---------------------|----|
| BTEV.FNAL.BD.ME | 32 |
| BTEV.FNAL.BD.SRTECH | 32 |
| BTEV.FNAL.BD.TECH | 32 |

2.2.10 Commissioning 10/3/2005 10/10/2005 6d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------------|----------|---------|-----------|----------------------|-------------------|------------|----------------|-----------|
| Subproject | \$0 | \$7,636 | \$7,636 | 0 | 77 | \$13,491 | | |

WBS Dictionary Commissioning items included here are only those which are directly related to the C0 modification.

2.2.10.1 Recommission B4 and C1 QPM systems 10/3/2005 10/3/2005 1d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|---------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$0 | \$1,194 | \$1,194 | 0 | 80 | \$2,149 | CB | |

WBS Dictionary Inductance and resistance of the magnet strings changes, requiring new database constants and testing.

BOE Labor Previous operational experience. [MDC]

Labor Resources (hours)

BTEV.FNAL.BD.ENGPHY 8

BTEV.FNAL.BD.OPSPEC 8

2.2.10.2 Train B4 and C1 houses to 1010 GeV 10/4/2005 10/4/2005 1d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|-------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$0 | \$596 | \$596 | 0 | 80 | \$1,073 | CB | |

WBS Dictionary Ramp Tevatron magnets progressively to higher energy, stopping at 1010 GeV, prior to commencing operation at 980 GeV

BOE Labor Previous operational experience in retraining magnets. [MDC]

Labor Resources (hours)

BTEV.FNAL.BD.OPSPEC 8

2.2.10.3 Change Tevatron injection frequency 10/5/2005 10/5/2005 1d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|-------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$0 | \$635 | \$635 | 0 | 40 | \$889 | CB | |

WBS Dictionary Code or database change in LLRF front-end. Change one number, then test.

BOE Labor Previous operational experience. [MDC]

Labor Resources (hours)

BTEV.FNAL.BD.EE 4

BTEV.FNAL.BD.OPSPEC 4

2.2.10.4 Commission B4/C1 BPMs and BLMs 10/6/2005 10/6/2005 1d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|---------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$0 | \$1,747 | \$1,747 | 0 | 80 | \$3,144 | CB | |

WBS Dictionary Four new BPM's installed in C0 warm straight section. Test with local bumps. BLM's repositioned slightly in C0. Test with local bumps. This item includes software and database changes to accommodate 4 new BPM's in C0.

BOE Labor Previous operational experience. [MDC]

Labor Resources (hours)

BTEV.FNAL.BD.EE 8

| | |
|---------------------|---|
| BTEV.FNAL.BD.OPSPEC | 8 |
| BTEV.FNAL.BD.SRTECH | 4 |
| BTEV.FNAL.BD.TECH | 4 |

2.2.10.5 Commission synch light tunnel hardware 10/7/2005 10/10/2005 2d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------|----------|---------|-----------|----------------------|-------------------|------------|----------------|-----------|
| ASAP | \$0 | \$3,464 | \$3,464 | 0 | 80 | \$6,235 | CB | |

WBS Dictionary Check that motion control works. Check light output.

BOE Labor WAG [MDC]

Labor Resources (hours)

| | |
|-------------------|----|
| BTEV.FNAL.BD.EE | 16 |
| BTEV.FNAL.BD.ME | 16 |
| BTEV.FNAL.BD.PHY | 32 |
| BTEV.FNAL.BD.TECH | 16 |

2.3 Power supplies 10/2/2006 10/2/2009 757d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------------|-------------|-----------|-------------|----------------------|-------------------|-------------|----------------|-----------|
| Subproject | \$1,933,453 | \$713,219 | \$2,646,672 | 30 | 31 | \$3,453,311 | | |

2.3.1 10 KA supplies @ C0 10/2/2006 8/19/2009 726d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------------|-----------|-----------|-----------|----------------------|-------------------|-------------|----------------|-----------|
| Subproject | \$694,759 | \$131,696 | \$826,454 | 30 | 32 | \$1,077,753 | | |

WBS Dictionary These supplies are located in the C0 service building and drive the new LHC-style low beta quads. A total of 4 will be built (3 + 1 spare). They are each 10KA /30V 12 phase SCR supplies. The project will be managed similar to the MI beamlines quadrupole supplies. A very detailed specification will be written for the magnetics and SCR bridge and the company that receives the bid will be given an FNAL-designed voltage and current regulator to be incorporated into the supply.

2.3.1.1 EDIA 10/2/2006 7/29/2008 460d

| Type | Material | Labor | Base Cost | Material Contingency | Labor Contingency | Total Cost | Funding Source | Cost Book |
|------------|----------|----------|-----------|----------------------|-------------------|------------|----------------|-----------|
| Subproject | \$0 | \$80,909 | \$80,909 | 0 | 30 | \$105,181 | | |