

Milestones

A representation of the schedule at WBS Level 3, with these milestones is shown in Figure 1. A breakout at the lower WBS levels would show over 550 individual tasks, each with resources assigned.

Three types of milestone are identified (Table 3):

1. Project Management – evaluation of scope or integration plans
2. Subproject and Stage Completion
3. Tracking milestones added to facility tracking progress in the subprojects

Since these milestones are intended for project planning and tracking, no specific schedule contingency is included.

| WBS | Milestone | Date |
|---|--|-------------|
| Project Management Milestones | | |
| 1.6.2.1 | Evaluation: Tevatron Upgrade Plan | Sep-03 |
| 1.6.2.2 | Evaluation: RR & e-cool commissioning plan | Nov-03 |
| 1.6.2.3 | Evaluation: Phase 2-3 Transition Plan | Apr-04 |
| Subproject Completion Milestones | | |
| 1.1.1 | Slip Stacking Operational | Nov-04 |
| 1.1.2 | Target Station | Dec-03 |
| 1.2.1 | High Gradient Lithium Lens | Jan-05 |
| 1.2.2 | AP2&DB Aperture Improvements-1 | Oct-04 |
| 1.2.2 | AP2&DB Aperture Improvements-2 | Oct-05 |
| 1.2.2 | AP2&DB Aperture Improvements-3 | Feb-07 |
| 1.3.3 | Stacktail Cooling System | Dec-05 |
| 1.3.4 | RR Stochastic Commissioned | Apr-04 |
| 1.3.5 | Electron Cooling Operational | Jan-05 |
| 1.3.6 | Rapid Transfers Automated | Nov-04 |
| 1.4.2 | Active BBC: TEL | Jan-06 |
| 1.4.3 | Increased Helix Separation | Mar-07 |
| Stage Completion Milestones | | |
| 1.6.2.4 | Start Phase 2 | Nov-04 |
| 1.6.2.5 | Start Phase 3 | Feb-05 |
| 1.6.2.6 | Start Phase 4 | Nov-05 |
| 1.6.2.7 | Start Phase 5 | Apr-07 |

Table 3: Milestone Dates

Cost and Labor Estimates and Contingency

Table 4 itemizes the M&S costs at WBS Level 3, and Figure 2 shows the distribution by fiscal year. The contingency applied at the task level rolls up to a total contingency of 45% for the program.

| | M&S Base | M&S Contingency | M&S Total |
|--------------------------------------|----------------|-----------------|-----------------|
| 1 Run II Upgrades | 9416500 | 4263300 | 13679800 |
| 1.1 Protons on Pbar Target | 746500 | 266500 | 1013000 |
| 1.1.1 Slip Stacking | 650000 | 230000 | 880000 |
| 1.1.2 Pbar Target and Sweeping | 96500 | 36500 | 133000 |
| 1.2 Pbar Acceptance | 2281000 | 1215000 | 3496000 |
| 1.2.1 Lithium Lens Upgrades | 918000 | 268200 | 1186200 |
| 1.2.2 AP2 and Debuncher Acceptance | 1363000 | 946800 | 2309800 |
| 1.3 Pbar Stacking and Cooling | 2734000 | 1218800 | 3952800 |
| 1.3.3 Stacktail Cooling | 1656000 | 662400 | 2318400 |
| 1.3.5 Electron Cooling | 566000 | 251600 | 817600 |
| 1.3.6 Rapid Transfers | 512000 | 304800 | 816800 |
| 1.4 Tevatron High Luminosity | 3655000 | 1563000 | 5218000 |
| 1.4.3 Active Beam-Beam Compensation | 1385000 | 741000 | 2126000 |
| 1.4.4 Increased Helix Separation | 1670000 | 462000 | 2132000 |
| 1.4.6 Improved Diagnostics | 600000 | 360000 | 960000 |
| 1.6 Management Oversight | 0 | 0 | 0 |

Table 4: Estimated M&S at WBS Level 3. (Subprojects with no M&S costs are omitted)

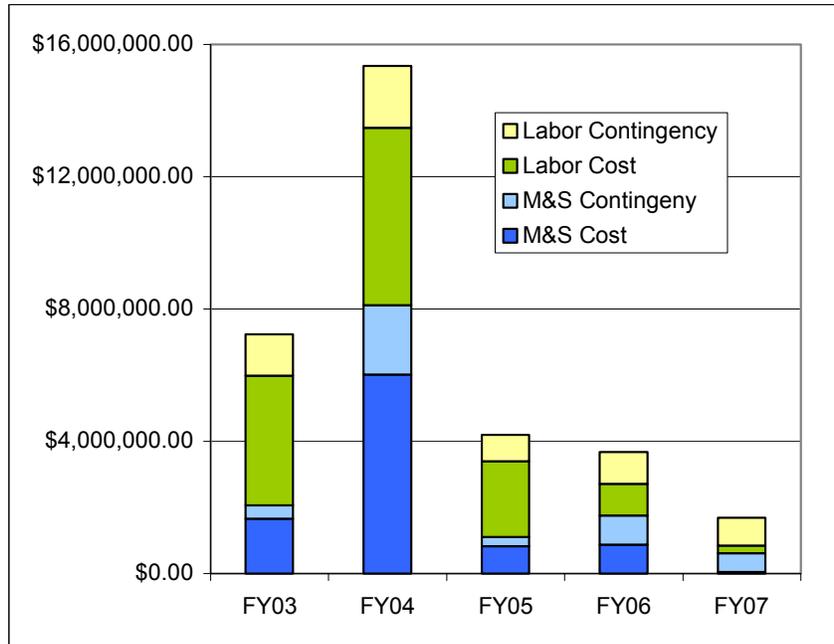


Figure 2: M&S Cost (with contingency) by fiscal year

The labor profile, with a breakdown by category is shown in Figure 3, and the labor cost is itemized by subproject and fiscal year in table 5.

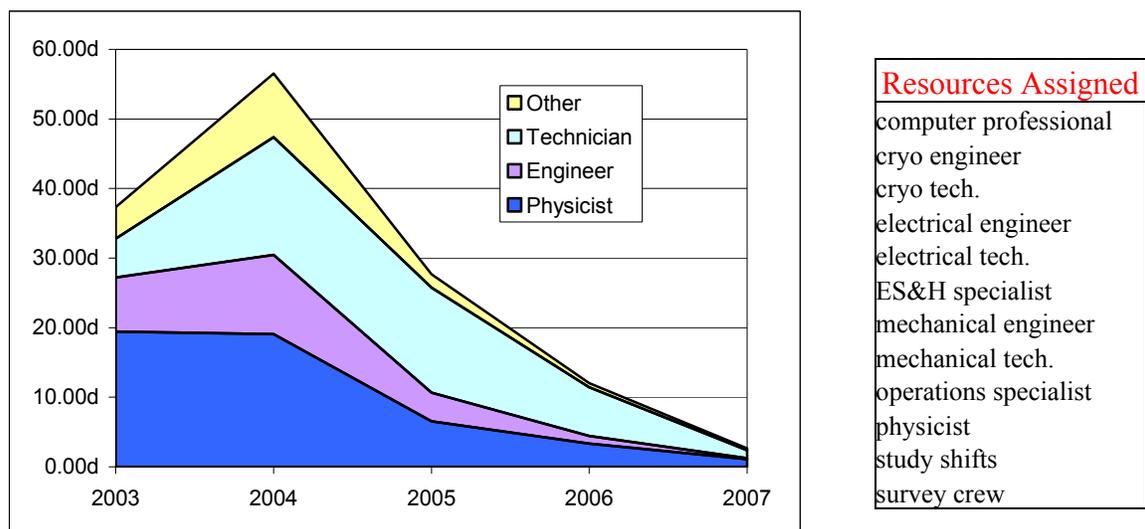


Figure 3: Labor Profile (without contingency) by Labor Category
(needs cleaning up – y axis is in FTE)

| | Labor Base | Labor Contingency | Labor Total |
|--|-----------------|-------------------|-----------------|
| 1 Run II Upgrades | 12755434 | 6082744 | 18838178 |
| 1.1 Protons on Pbar Target | 431312 | 161957 | 593268 |
| 1.1.1 Slip Stacking | 318213 | 112049 | 430262 |
| 1.1.2 Pbar Target and Sweeping | 113098 | 49908 | 163006 |
| 1.2 Pbar Acceptance | 2586079 | 1399738 | 3985817 |
| 1.2.1 Lithium Lens Upgrades | 595642 | 259896 | 855539 |
| 1.2.2 AP2 and Debuncher Acceptance | 1990437 | 1139842 | 3130279 |
| 1.3 Pbar Stacking and Cooling | 3244376 | 1542979 | 4787355 |
| 1.3.1 Stacking and Cooling Integration | 128077 | 0 | 128077 |
| 1.3.2 Debuncher Cooling | 22542 | 13525 | 36066 |
| 1.3.3 Stacktail Cooling | 774225 | 313356 | 1087581 |
| 1.3.5 Electron Cooling | 1009402 | 490815 | 1500217 |
| 1.3.6 Rapid Transfers | 1310131 | 725283 | 2035413 |
| 1.4 Tevatron High Luminosity | 4762143 | 2285460 | 7047603 |
| 1.4.1 Tevatron Task Force | 815850 | 326340 | 1142190 |
| 1.4.2 Beam-beam Limitations | 510600 | 228660 | 739260 |
| 1.4.3 Active Beam-Beam Compensation | 1439773 | 797225 | 2236998 |
| 1.4.4 Increased Helix Separation | 926048 | 292064 | 1218111 |
| 1.4.5 Luminosity Leveling | 13149 | 7138 | 20287 |
| 1.4.6 Improved Diagnostics | 1056723 | 634034 | 1690757 |
| 1.6 Management Oversight | 1731525 | 692610 | 2424135 |

Table 5: Labor Costs at WBS Level 3