
Run II Upgrades Status June Report

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Outline

- Management Update
- Technical Highlights
- Status Report for June (v3)
 - Milestones
 - % Complete
 - M&S Costs
 - Effort Report
- v3 vs v2 Comparisons
 - Change Requests
 - Cost and Schedule Comparison
- Reviews

Management Update

- v3 of the Plan is in place
 - Updated resource loaded schedule 3.0
 - Expect to use 3.1 for the DOE mini-review in September
 - Minor logic changes, WBS hierarchy changes for 26.4
- WBS Hierarchy changes in progress
 - More granularity in cost accounting
 - Across divisions, cost types, lower wbs levels in some cases
 - Will help use Cobra interface to the accounting system
 - Extraction of cost information to become transparent (Dixon Bogert, Ann Nestander)
- New cost codes
 - Expected to go into effect either in August or at the beginning of FY05.
 - Jeff Sims to work on mapping old→new codes

Technical Highlights

- Protons on Target
 - Slip-stacking
 - 6 RF stations in the MI now upgraded for BLC; expect to complete ~12 stations before start of shutdown
 - Delivery of Solid state amplifiers for BLC complete
 - Slip stacking being commissioned
- Recycler
 - met milestone: ready for e-cool commissioning on June 1
 - Mixed-source operation for HEP (record store on 7/6/04)
- e-cooling Installation
 - Currently disassembling and moving to MI31; on track
- Tevatron:
 - BPMs
 - Received modified EchoTek board; looking good
 - separators
 - Three successfully conditioned
 - 2 ready for installation in shutdown, 1 spare
 - Running separators in the Tevatron 15% higher (goal: 20%)

Status

Class A Milestones "+/- 3 month window"

WBS	Name	Baseline Date	Actual or Forecast
26.3.4.9.16	Recycler commissioned for electron cooling	6/1/04	6/1/04 complete
26.1.1.10	Slip Stacking Operational	12/23/04	12/23/04 on track

Planned & Actual % Complete

WBS	WBS Name	Planned % Complete (P%C)	Actual % Complete	A%C/P%C
1	Run II	37%	35%	95%
26	Luminosity Upgrades	38%	35%	94%
26.1	Protons on Pbar Target	45%	44%	98%
26.2	Pbar Acceptance	33%	30%	91%
26.3	Pbar Stacking & Cooling	46%	45%	98%
26.4	Tevatron High Luminosity	33%	29%	89%
26.6	Project Management	41%	41%	100%
27	Maintenance & Reliability	34%	34%	102%

M&S Costs and Labor for June '04

M&S Costs through June 2004 (\$K)						
Roll up	Task Description	v3 04 ObiBud	YTD OBL	YTD Act	RIP	(YTD OBL + RIP)/ObiBud
Total		10,711	6,358	3,654	395	63%
26	Luminosity Upgrades	9,040	5,205	3,243	395	62%
26.1	Protons on Target	650	373	899	0	57%
26.2	pbar Acceptance	411	326	240	5	81%
26.3	pbar Stacking and Cooling	3,709	1,632	826	100	47%
26.4	Tevatron High Luminosity	4,120	2,776	1,180	291	74%
26.6	Management	150	98	98	0	65%
27	Maintenance and Reliability	1,431	1,153	411	0	81%
27.1	"White Paper"	1,027	777	104	0	76%
27.2	Reliability Improvements	404	376	307	0	93%
New	BLM Systems	240				0%

Effort reporting from AD and CD (still need to integrate TD and PPD)

Effort Report for June (FTE)								
WBS		AD Effort	CD Effort	TD Effort (Est)	PPD Effort (Est)	Total	FTE Corrected	v2 Proj Need
26.1	Protons on Target	14.1				14.1	17	7
26.2	Pbar Acceptance	7.4		4	1	12.4	15	14
26.3	Pbar Stacking and Cooling	26.7		1	4	31.7	37	50
26.4	Tevatron	23.7	8.7	9	2	43.4	51	50
26.6	Management	2.0	0.8			2.8	3	5
27	Maintenance Upgrades	3.5		2		5.5	6	4
	Total	77.4	9.5	16	7	109.9	129	129



v3 vs v2 Comparisons

v2→v3: Change Requests

- Beam-sweeping on pbar production target
 - Revised scope
 - Do not install downstream system, test and prepare upstairs, use as back-up plan. Replace target assembly every 2-3 months with $8E12$ ppp on target. Increase beam spot size on target if needed.
- Additional separators for increased helix separation and smoothing
 - Cost increase (\$408K M&S, \$276K labor)
 - Conditioning and preparing previously fabricated separators (some 12 years old) required significant repairs, upgrades to cleaning facility and additional resources (2 temp techs)
- Optical Transition Radiation Detectors
 - New Scope (\$170K M&S, \$126K labor)
 - Change request approved last month for 3 OTRs in A1 line and one at IPM in Tev. Expected to be much superior to present wire chambers for optics matching.

v2→v3: Change Requests (Contd.)

- Start of Phase -3
 - Schedule change → Delayed
 - Due to 2-3 months delay in electron cooling installation and commissioning and the '05 shutdown schedule
- Accumulator Stacktail cooling system upgrade
 - Revised scope, schedule change and cost increase
 - 2-step upgrade:
 - tank move as soon as e-cooling is in operation; quick, revertible
 - bandwidth increase ready at start of 06 (assume installation in summer 06), not easily revertible - need established, reliable operation of the Recycler with e-cooling
 - Implement tank move in phase 3
 - Move phase 4 (bandwidth upgrade) from 05 → 06 shutdown
 - Cost increase : \$380K M&S for new pick-up and kicker tanks; \$37K labor

v2→v3: Change Requests (Contd.)

- Upgrades to the Beam Loss Monitors in the Tevatron, Main Injector and Booster
 - Tevatron (cost increase), MI (new), Booster (new)
 - Total cost increase: M&S \$291K, Labor \$402K
- AP2 and Debuncher Acceptance Tasks
 - Reduced scope and cost decrease (\$390K M&S)
 - **Redesign/modify/rebuild/relocate elements**

The following tasks are de-scoped:

- **Rebuild Debuncher Injection Septum**
 - Rebuild common vacuum for septum and DB beam pipe
- **Rebuild Debuncher Extraction Kicker**
 - New larger beam pipe and encasing rebuild
- **Design and build large aperture momentum scraper**
 - Dropped; not needed

v2→v3: Change Requests (Contd.)

- Recycler R22/R32 transferline Kicker and RF upgrades
 - Reduced scope, cost decrease
 - (\$525K M&S, \$33K labor)
 - No modifications needed in the transferline; Spare kicker available
 - RF upgrades not needed
- Alignment -
 - New Laser Tracker, Cost Increase: \$130K M&S
 - Contract services, Cost Increase \$200K M&S

Cost change from CRs

CR Description	M&S	Labor
Stacktail	\$380K	\$37K
OTR	\$170K	\$126K
Separators	\$408K	\$276K
De-scope AP2/DB Acceptance tasks	- \$390K	-
BLMs	\$291K	\$402K
De-scope Recycler kicker + RF upgrade	-\$525K	-\$33K
Alignment	\$330K	-
Total	\$664K	\$808K

■ At this time, requesting \$664K release from \$3.7M M&S contingency

■ We are considering moving up MI BPM purchase (~900K) FY05 → FY04

v2→v3: Cost

WBS	WBS Name	M&S Base		Labor Base		Difference		Comments
		v2.5	v3	v2.5	v3	M&S Base	Labor Base	
1	Run II	16,811,426	17,109,325	17,963,547	19,144,313	297,899	1,180,766	
26	Luminosity Upgrades	13,508,426	13,806,325	16,958,441	18,139,207	297,899	1,180,766	
26.1	Protons on Pbar Target	1,911,500	2,281,500	1,191,790	1,432,327	370,000	240,537	
26.1.1	Slip Stacking	895,000	895,000	436,394	437,018	0	624	
26.1.2	Pbar Target and Sweeping	91,500	91,500	102,346	97,644	0	-4,702	
26.1.3	MI Upgrades	925,000	1,125,000	596,899	715,284	200,000	118,385	MI BLM
26.1.4	Booster-MI Cogging	0	0	56,151	56,151	0	0	
26.1.5	OTR Detectors	0	170,000	0	126,231	170,000	126,231	New task
26.2	Pbar Acceptance	1,846,960	1,416,960	2,157,041	2,064,381	-430,000	-92,660	
26.2.1	Lithium Lens Upgrades	521,000	481,000	583,740	544,123	-40,000	-39,617	
26.2.2	AP2 and Debuncher Acceptance	1,325,960	935,960	1,573,301	1,520,258	-390,000	-53,043	
26.3	Pbar Stacking and Cooling	3,871,998	3,745,998	4,016,616	4,288,477	-126,000	271,861	
26.3.1	Stacking and Cooling Integration	0	0	443,001	443,001	0	0	
26.3.2	Debuncher Cooling	0	0	24,857	22,858	0	-1,999	
26.3.3	Stacktail Cooling	1,004,000	1,384,000	368,918	405,939	380,000	37,021	New pick-up and kicker tanks
26.3.4	Recycler Stacking and Cooling	774,998	249,998	1,190,458	1,157,639	-525,000	-32,819	Drop kicker, less RF upgrade
26.3.5	Electron Cooling	1,556,000	1,575,000	1,579,875	1,854,500	19,000	274,625	Added labor, AIP
26.3.6	Rapid Transfers	537,000	537,000	409,507	404,540	0	-4,967	
26.4	TeVatron High Luminosity	5,877,968	6,361,867	8,154,963	8,827,715	483,899	672,752	
26.4.1	TeVatron Task Force	0	0	1,856,039	1,856,039	0	0	
26.4.2	Beam-beam Limitations	5,000	5,000	452,692	452,692	0	0	
26.4.3	Active Beam-Beam Compensation	1,250,000	1,270,000	1,184,048	1,222,229	20,000	38,181	
26.4.4	Increased Helix Separation	1,788,500	2,092,498	1,037,523	1,313,371	303,998	275,848	Infrastructure, repairs
26.4.5	Luminosity Leveling	0	0	9,054	9,054	0	0	
26.4.6	Improved Control and Diagnostics	2,463,468	2,464,369	2,704,761	3,098,757	901	393,996	\$137K BPM, \$222K Tev BLM
26.4.7	TeVatron Vacuum Improvements	90,000	90,000	12,354	12,354	0	0	
26.4.8	TeVatron Alignment	281,000	440,000	898,492	863,219	159,000	-35,273	
26.6	Project Management	0	0	1,438,032	1,526,307	0	88,275	
27	Maintenance and Reliability	3,303,000	3,303,000	1,005,106	1,005,106	0	0	

The difference between v2.0 (used for Lehman in Feb '04) and v2.5:

1. Added \$50K in v2.5 for two Li lens spares (26.2.1)
2. Fixed a \$300K bug in 26.4.4

In v3, need to add \$104K for Techs in 26.4.4, \$200K for alignment contract services in 27.2.4, Booster BLMs \$40K → M&S diff. = \$642K

Class A Milestones: Comparison

WBS:V2	WBS:V3	WBS Name	Milestone Date		Slip (days)	Comments
			V2	V3		
26.1.2.1.4.3	26.1.2.1.4.3	New Target in Operation	1/2/04	1/2/04	0.00	
26.6.2.2	26.6.2.2	Review Recycler Commissioning Plan	2/9/04	3/1/04	21.00	
26.3.4.9.16	26.3.4.3.16	Recycler commissioned for Electron cooling	6/1/04	6/1/04	0.00	
26.1.2.2.4.2	26.1.2.2.4.2	Beam Sweeping Operational	8/25/04	9/21/04	27.00	
26.2.2.10	26.2.2.10	Initial AP2&DB Improvements Complete	11/19/04	11/19/04	0.00	
26.4.4.3.1.5	26.4.4.3.1.5	New standard separators operational	10/25/04	12/16/04	52.00	
26.1.1.10	26.1.1.4	Slip Stacking Operational	12/23/04	12/23/04	0.00	
26.6.2.4	26.6.2.4	Start Phase 2	12/23/04	12/23/04	0.00	
26.3.5.12	26.3.5.12	Electron Cooling Operational	6/1/05	8/25/05	85.00	
26.2.1.4	26.2.1.4	New Lens Operational	6/10/05	8/25/05	76.00	
	26.3.3.1.2.4	Stacktail Upgrade: Tank Move	12/6/05	9/1/05	-96.00	Phased Upgrade
26.2.2.11	26.2.2.11	Intermediate AP2&DB Improvements Complete	10/3/05	10/3/05	0.00	
26.3.6.8	26.3.6.8	Rapid Transfers Operational	6/14/05	10/31/05	139.00	
26.6.2.5	26.6.2.5	Start Phase 3	6/1/05	12/20/05	202.00	Phase Redefined
26.2.2.12	26.2.2.12	Final AP2&DB Improvements Complete	10/2/06	10/2/06	0.00	
26.3.3.1.10	26.3.3.1.3.8	Stacktail Upgrade: Bandwidth, Operational		12/5/06		
26.6.2.6	26.6.2.6	Start Phase 4	12/6/05	12/5/06	364.00	Phase Redefined
26.4.4.4.14	26.4.4.4.14	New helix operational	12/5/06	12/14/06	9.00	
26.4.3.1.11	26.4.3.1.11	TEL System Operational	2/12/07	2/12/07	0.00	
26.6.2.7	26.6.2.7	Start Phase 5	2/12/07	2/12/07	0.00	
26.6.2.8	26.6.2.8	End Project	8/17/07	8/17/07	0.00	

Reviews

- Transferline (P1, P2, AP1, AP3, A1) BPM requirements
 - Committee: Webber, Kourbanis, Lebedev, Rivetta, Werkema
 - Report : June 10, 2004
 - Updates requested by July 15th
- Electron cooling Commissioning in the Recycler
 - August 9, 10
 - Committee: H. Edwards (Chair), Peoples, Marriner, M. Steck (GSI/Darmstadt), M. Chanel (CERN) (TBC)
 - Charge: Review commissioning plan and procedures for demonstrating and establishing electron cooling of pbars in the Recycler
- Tev Alignment (July 14th)
- E-cool installation during shutdown (July 27th)