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# Run II Upgrades Status

## April 2006

# Outline

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- Technical Progress –Mike Martens
  - Run II Upgrade Shutdown Work
- Status for March '06 – Jeff Sims

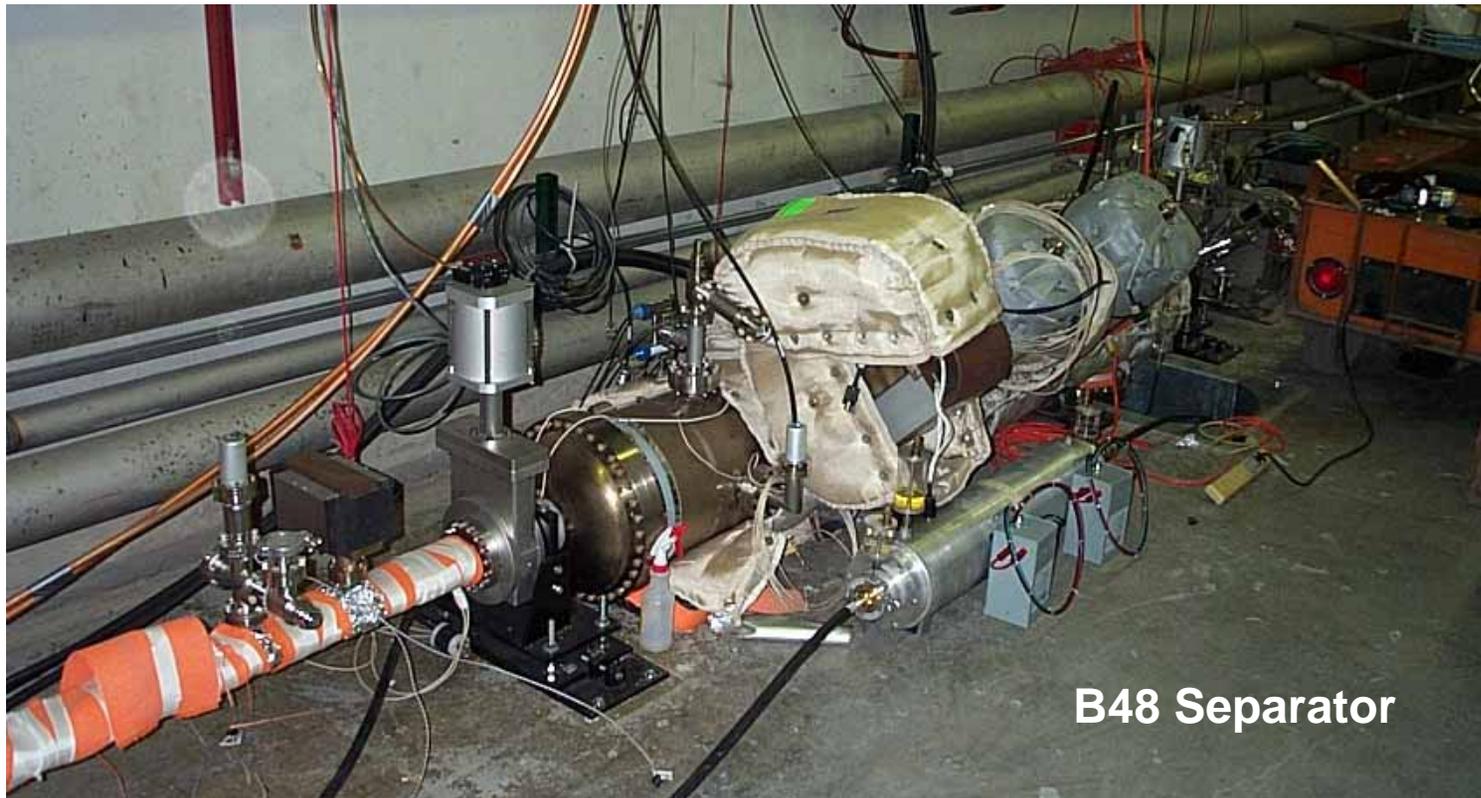
# Tevatron Separators

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Replace 3 separators at A49 -- Bakeout is complete.

B48 separator -- Bakeout is complete.

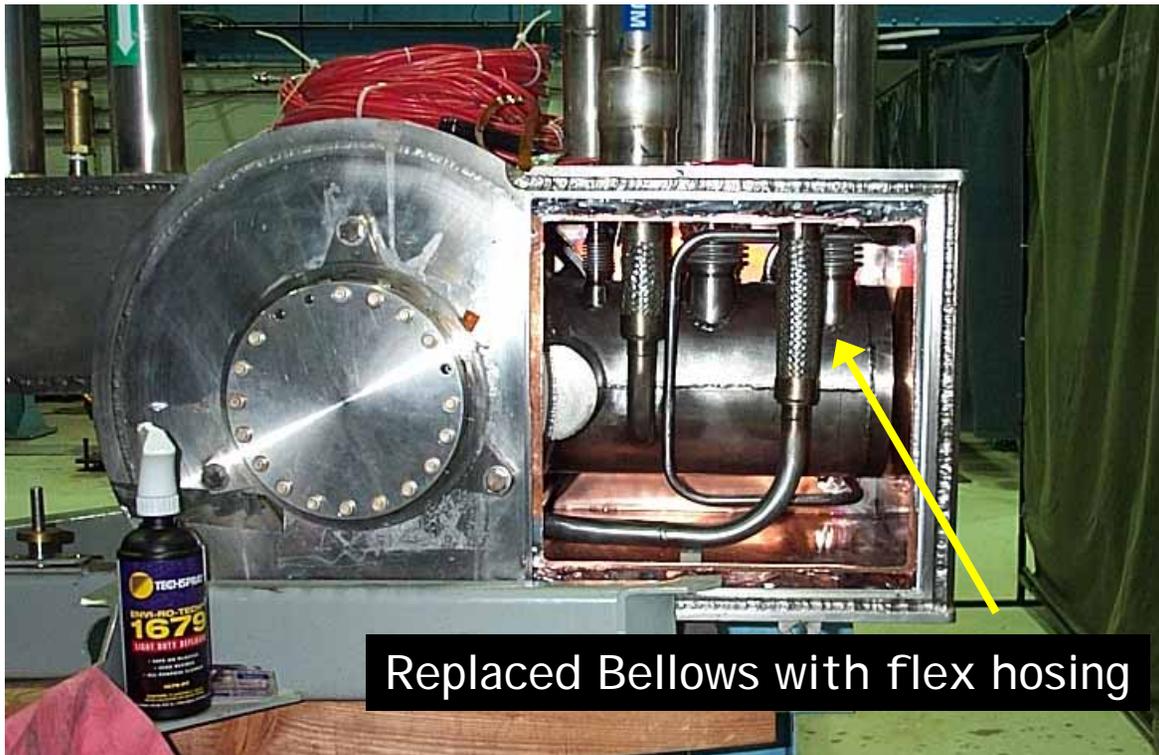
A17 separator – Scheduled.



**B48 Separator**

# TEL-1

TEL-1 leak repaired at IB-2  
Transporting to Tevatron  
Will be ready at startup.



Replaced Bellows with flex hosing

## TEL-2

TEL-2 installed in tunnel.

Bake is in progress.

Will be ready by startup (can be used for abort gap cleaning)

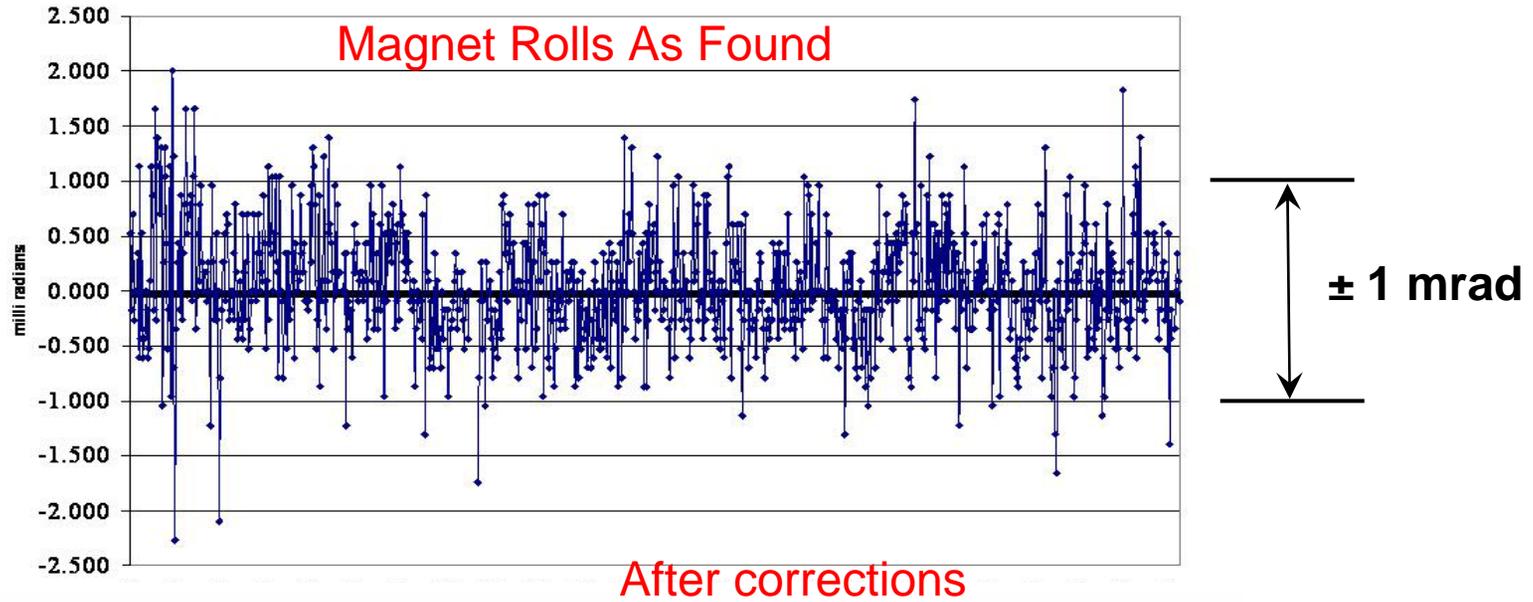


# Tevatron Alignment

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- Dipole shimming -- Only ~40 dipoles remaining to do
- D17 -- quad with incorrect fiducials rolled.
- A3 -- quad with uncertain fiducials replaced.
- Measured magnet rolls and corrected all rolls  $> 1$  mrad
- Surveyed CDF low beta quads

# Tevatron Alignment



# Instrumentation

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## ➤ MI BPMs

- Combiner boxes installed in tunnel
- Cable measurements completed
- All hardware has arrived or scheduled to arrive
- Software is completed.
- Will start commissioning and implementing after startup

## ➤ BLMs

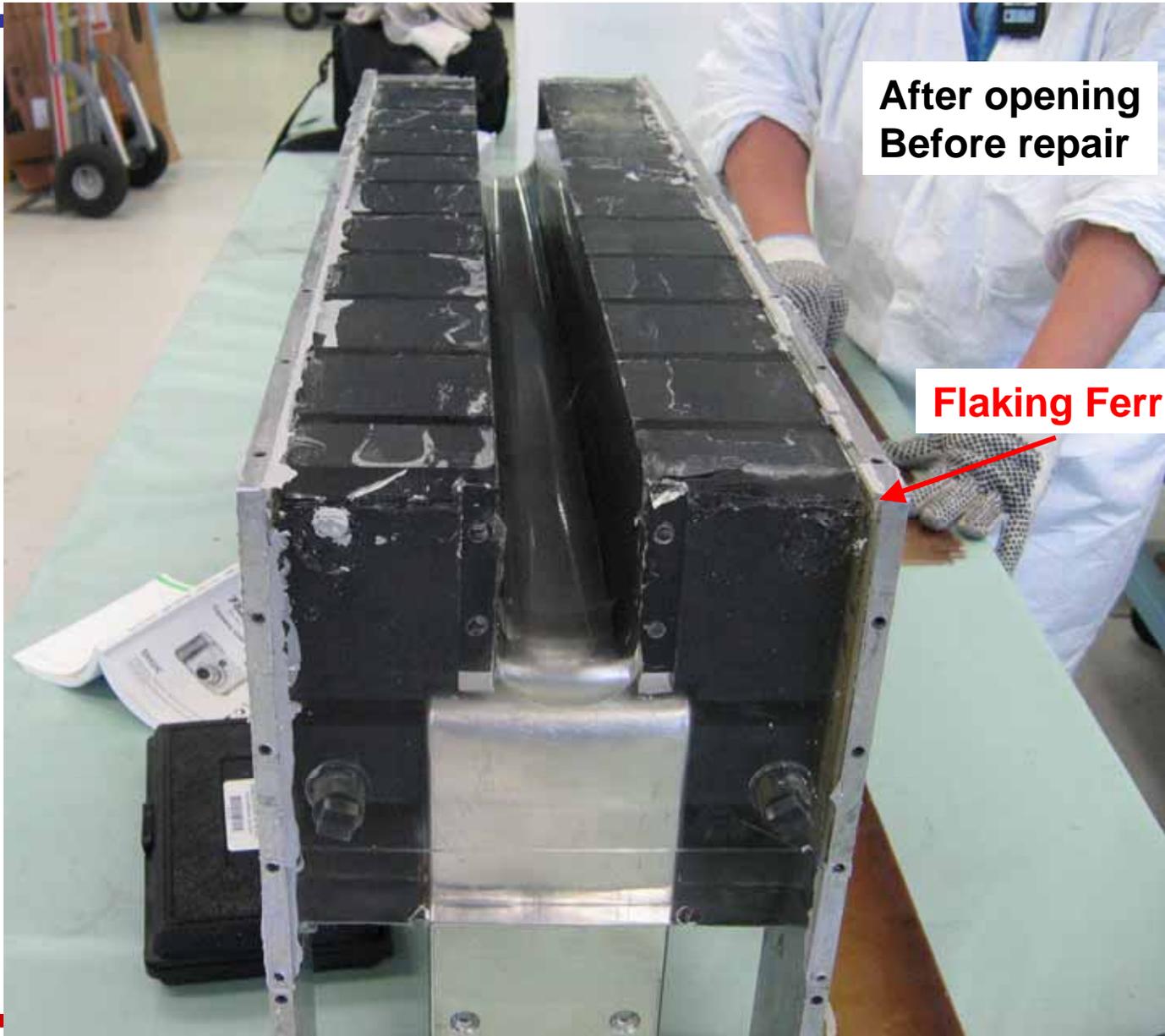
- Still on Schedule
- Expect to commission and implement by summer

## ➤ BPMs and BLMs implementation will be coordinated (due to rack space limitations) and coordinated with operations. Don't want to start up with a new system

## ➤ OTR (A1 line and NuMI)

- Some problems with OTRs. Some are binding during motion.
- Problem tracked to crooked bushings.
- May be able to get fixed in time for installation?

## Debuncher kicker



## Pbar Target, Debuncher kicker

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- Pbar target is ready.
  - Plan to install later in shutdown (to reduce radiation levels)
- Debuncher kicker motorized stands installed.
- Debuncher kickers being re-assembled.



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# Status

# Remaining Milestones

WBS	Name	Finish	Base Fin	%	MS Class	2006				2007				
						1	2	3	4	1	2	3	4	
1.5.6	Finish Summer 06 Shutdown	5/31/06	5/26/06	0%	C		▽							
1.3.3.1.2.4	Stacktail Reconfigured (option) (Milestone)	6/7/06	6/13/06	0%	C		▽							
1.6.5.6	Start Phase 4 (Milestone)	6/7/06	6/13/06	0%	(A)		▽							
1.4.2.1.4	TEL System Operational	8/25/06	8/25/06	0%	(A)			▽						
1.3.6.8	Rapid Transfers Operational (Milestone)	9/1/06	9/1/06	0%	(A)			▽						
2.2.4.4.4.1.6	Tevatron BLM System Operational	10/2/06	8/11/06	0%	B			▽						
2.2.4.4.4.2.4	MI BLM System Operational	10/2/06	8/11/06	0%	B			▽						
1.1.3.2.6	MI BPM system complete	10/9/06	8/18/06	0%	B			▽						
2.2.4.4.4.3.4	Booster BLM System Operational	10/9/06	8/18/06	0%	B			▽						
1.2.2.11	Intermediate AP2&DB Improvements Complete (Milestone)	12/28/06	6/6/06	0%	(A)		▽							
1.5.7	Start Summer 07 Shutdown	7/2/07	7/2/07	0%	C									▽
1.2.2.12	Final AP2&DB Improvements Complete (Milestone)	8/24/07	7/27/07	0%	(A)									▽
1.5.8	Finish Summer 07 Shutdown	8/24/07	8/24/07	0%	C									▽
1.6.5.7	Start Phase 5 (Milestone)	9/17/07	9/17/07	0%	(A)									▽
1.6.5.8	End Project	9/17/07	9/17/07	0%	(A)									▽

Redefine -  
Upcoming CR

Move-  
Upcoming CR

- ▽ Baseline Finish Date
- ▼ Actual Finish Date
- Forecast Date

# Progress

WBS	Name	Actual %	Planned %	A/P %
<b>0</b>	<b>Run II</b>	<b>88%</b>	<b>91%</b>	<b>97%</b>
<b>1</b>	<b>Luminosity Upgrades</b>	<b>87%</b>	<b>90%</b>	<b>97%</b>
1.1	Protons on Pbar Target	86%	90%	96%
1.2	Pbar Acceptance	72%	75%	96%
1.3	Pbar Stacking & Cooling	96%	98%	98%
1.4	Tevatron High Luminosity	86%	91%	95%
1.5	Shutdowns	50%	50%	100%
1.6	Project Management	78%	78%	100%
<b>2</b>	<b>Maintenance &amp; Reliability</b>	<b>91%</b>	<b>95%</b>	<b>96%</b>
2.1	2003 White Paper/Vulnerability Report	93%	93%	100%
2.2	Maintenance Improvements	88%	97%	91%

AP2 Inst & Deb Ext Kicker

RR and Ecool Upgrade

TEL 2

BLMs

# M&S Spending through Mar. '06

M&S Spending		v4 Plan Estimate			FY06	Inception To date Costs		% Plan used	% FY06 Budget Used
		(then yr\$)				Obl+RIP	Obligations	Obl+RIP	ITD Obl+RIP
		FY06	FY07	Total					
0	<b>Run II Upgrades</b>	4,148	239	18,160	1,504	15,848	15,870	87%	52%
1	<b>Luminosity Upgrades</b>	2,776	239	13,899	1,164	12,256	12,277	88%	50%
1.1	<b>Protons on Target</b>	398	0	1,859	447	1,673	1,673	90%	75%
1.1.1	Slip Stacking	0	0	416	0	406	406	98%	
1.1.2	Pbar Target and Sweeping	12	0	55	13	31	31	57%	75%
1.1.3	MI Upgrades	314	0	1,074	397	893	893	83%	87%
1.1.4	Booster-MI Cogging	0	0	0	0	0	0		
1.1.5	OTR	0	0	174	0	255	255	147%	100%
1.1.6	Operational Improvements for Protons	71	0	140	37	87	87	62%	32%
1.2	<b>pbar Acceptance</b>	454	239	1,415	97	977	981	69%	43%
1.2.1	LiLens	271	0	513	46	367	367	72%	43%
1.2.2	AP2 and DB Acceptance	184	239	901	50	610	614	68%	44%
1.3	<b>pbar Stacking and Cooling</b>	623	0	5,083	356	4,539	4,542	89%	55%
1.3.1	S&C Task Force	0	0	0	0	0	0		
1.3.2	Debuncher Cooling	0	0	0	0	0	0		
1.3.3	Stacktail Upgrade	1	0	916	46	922	922	101%	100%
1.3.4	Recycler Commissioning	0	0	376	2	297	297	79%	100%
1.3.5	Electron Cooling	0	0	2,536	47	2,555	2,555	101%	101%
1.3.6	Rapid Transfers	26	0	582	22	504	504	87%	21%
1.3.7	Additional Recycler Upgrades	233	0	311	83	94	97	31%	45%
1.3.8	Additional E-Cool Upgrades	146	0	146	156	167	167	115%	60%
1.3.9	Pbar Stack Rate Task Force	217	0	217	0	0	0	0%	0%
1.4	<b>Tevatron High Luminosity</b>	1,192	0	5,341	265	4,965	4,980	93%	34%
1.4.1	Beam Studies and Simulation	81	0	119	46	87	87	73%	100%
1.4.2	Active BBC	498	0	1,125	81	1,003	1,018	90%	20%
1.4.3	Increased Helix Separation	395	0	1,268	31	1,050	1,050	83%	12%
1.4.4	Luminosity Leveling	110	0	110	0	87	88	80%	86%
1.4.5	Improved Controls and Diagnostics	0	0	2,174	8	2,181	2,181	100%	60%
1.4.6	Tevatron Vacuum Improvements	41	0	235	26	254	254	108%	100%
1.4.7	Tevatron Alignment	66	0	309	27	302	302	98%	115%
1.6	<b>Management</b>	108	0	201	0	0	0	0%	0%
2	<b>Reliability Upgrades</b>	1,372	0	4,261	340	3,592	3,593	84%	60%

## Effort for Feb, and Mar 2006

### February

Adjusted FTE		Division				Totals	Plan
		AD	TD	PPD	CD		3 MO rolling ave.
<b>Run II Upgrades</b>		<b>26.5</b>	<b>8.3</b>	<b>10.9</b>	<b>6.9</b>	<b>52.6</b>	<b>56.7</b>
<b>1</b>	<b>Luminosity Upgrades</b>	<b>26.2</b>	<b>2.9</b>	<b>5.2</b>	<b>6.9</b>	<b>41.2</b>	<b>45.6</b>
<b>1.1</b>	<b>Protons on Target</b>	<b>6.2</b>	<b>0.0</b>	<b>0.9</b>	<b>6.9</b>	<b>14.0</b>	<b>11.6</b>
<b>1.2</b>	<b>pbar Acceptance</b>	<b>7.0</b>	<b>2.7</b>	<b>0.0</b>	<b>0.0</b>	<b>9.7</b>	<b>5.9</b>
<b>1.3</b>	<b>pbar Stacking and Cooling</b>	<b>2.7</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>2.7</b>	<b>10.6</b>
<b>1.4</b>	<b>Tevatron High Luminosity</b>	<b>8.2</b>	<b>0.2</b>	<b>4.3</b>	<b>0.0</b>	<b>12.7</b>	<b>14.4</b>
<b>1.6</b>	<b>Management</b>	<b>2.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>2.1</b>	<b>3.1</b>
<b>2</b>	<b>Reliability Upgrades</b>	<b>0.3</b>	<b>5.4</b>	<b>5.7</b>	<b>0.0</b>	<b>11.4</b>	<b>11.1</b>

### March

Adjusted FTE		Division				Totals	Plan
		AD	TD	PPD	CD		3 MO rolling ave.
<b>Run II Upgrades</b>		<b>15.5</b>	<b>14.0</b>	<b>9.5</b>	<b>5.3</b>	<b>44.3</b>	<b>50.9</b>
<b>1</b>	<b>Luminosity Upgrades</b>	<b>15.4</b>	<b>10.4</b>	<b>2.8</b>	<b>5.3</b>	<b>33.9</b>	<b>36.7</b>
<b>1.1</b>	<b>Protons on Target</b>	<b>3.9</b>	<b>0.0</b>	<b>0.9</b>	<b>5.3</b>	<b>10.1</b>	<b>9.6</b>
<b>1.2</b>	<b>pbar Acceptance</b>	<b>3.1</b>	<b>3.2</b>	<b>0.0</b>	<b>0.0</b>	<b>6.3</b>	<b>3.4</b>
<b>1.3</b>	<b>pbar Stacking and Cooling</b>	<b>3.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>3.2</b>	<b>6.7</b>
<b>1.4</b>	<b>Tevatron High Luminosity</b>	<b>4.3</b>	<b>7.2</b>	<b>1.9</b>	<b>0.0</b>	<b>13.4</b>	<b>13.9</b>
<b>1.6</b>	<b>Management</b>	<b>0.9</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.9</b>	<b>3.1</b>
<b>2</b>	<b>Reliability Upgrades</b>	<b>0.1</b>	<b>3.6</b>	<b>6.7</b>	<b>0.0</b>	<b>10.4</b>	<b>14.2</b>

## Other PM Issues

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- Potential for Contingency Needs –
  - In February we talked about the potential need for \$1.1 Million of contingency to procure a spare 40 MVA transformer. AD EE Support has spent the last few months analyzing the planned responses to transformer failures. Dan Wolff will present the findings of their study at next months PMG.
  - Contract Surveying – PPD Alignment has supplemented their forces during the shutdown with subcontract labor. The RLS only planned on Fermilab SWF for Alignment services. We may need to process a CR in the next few months to cover ~\$100k of M&S for these services.
  - A review of costs in May will help us understand if we will need to process any CR's as a result of the shutdown work (T&M efforts).