Outline

- Technical Highlights/ Progress
- Status Report for November
  - Milestones
  - % Complete
  - Effort Report
  - M&S Costs
- Other
  - Contingency

Technical Highlights /Progress

- Many upgrade installations completed during shutdown

- Main Injector
  - Slip-stacking/ Beam-loading Compensation
    - All 18 MI RF stations have been upgraded.
    - Slip-stacking being commissioned.
    - On track; close to being operational
- Recycler/e-cool
  - e-cool installation work in the RR completed
  - Recycler now operating with the e-cool section powered !
  - Now back to Pelletron preparation
    - Currently a week behind schedule for Feb. 1 , '05 turn-on of Pelletron.

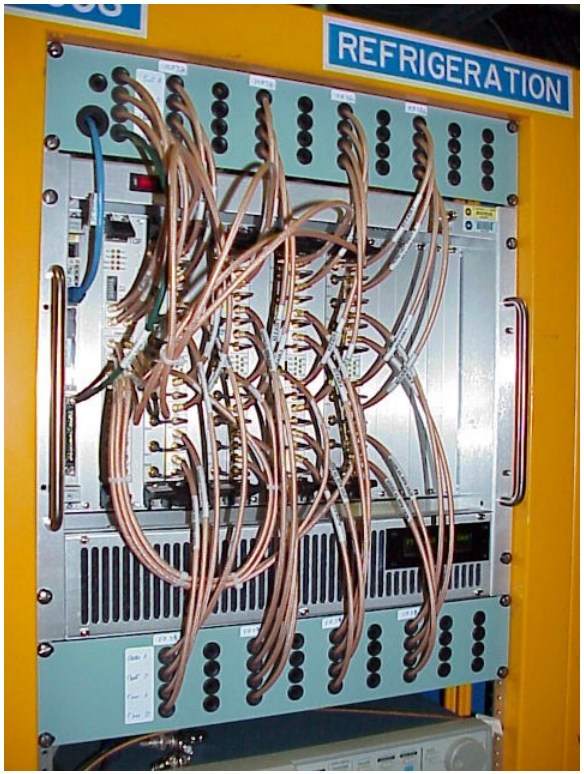
Technical Highlights / Progress (contd.)

- AP2/DB Acceptance (Shutdown activities/installation)
  - New beam-stop in AP2; Improves on the aperture. Have seen 10% increase in yield downstream in the ion chamber
  - Using the 20 motorized quads to study bumps
  - 3π improvement seen vertically in the DB ($18\pi \rightarrow 21\pi$)
    - Introduced bump with new motorized quads
  - Still working to return to prior horizontal improvements
    - (AP2+DB: $23\pi \rightarrow 29\pi$ from bump in the DB extraction region)
- AP2 BPM upgrade
  - AP2 Signals seen with prototype board
- Transfer-line BPM upgrade for Rapid transfers project
  - 88 BPMs in P1, P2, AP1, AP3 and A1 lines
  - Uses EchoTek boards; software based on RR BPM software
  - Test crate commissioning in F23 and data expected by the end of Jan. '05

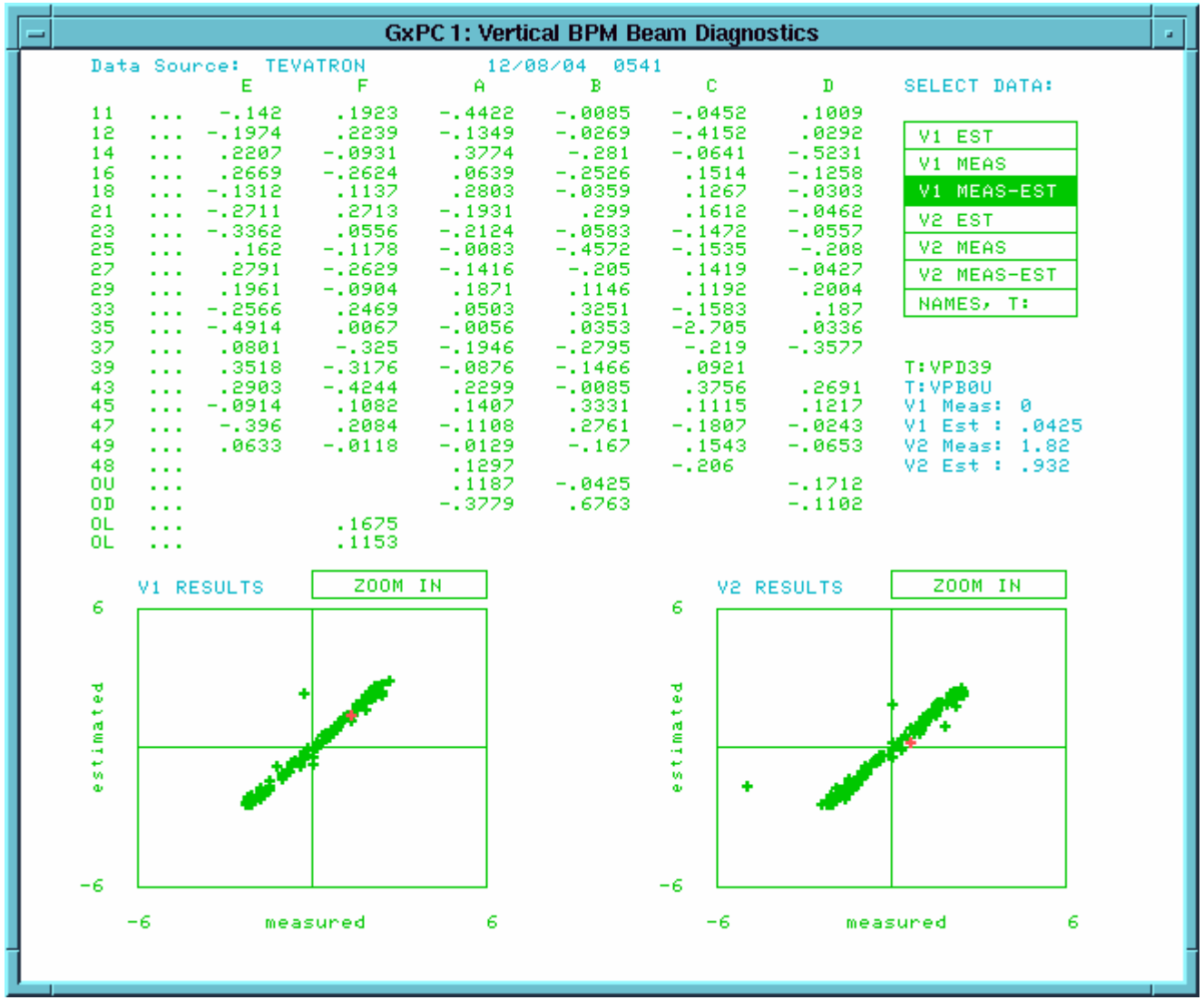
Tevatron
P1 Line
8.9 GeV/c
120 GeV/c
150 GeV/c
P2 Line
8.9 GeV/c
120 GeV/c
150 GeV/c
120 GeV
protons
Main Injector
AP1 Line
8.9 GeV/c
120 GeV/c
p̄ Target
Station
AP2 Line
8.9 GeV/c
π, μ, & p̄
Debuncher &
Accumulator Rings
8.9 GeV/c p̄
p̄ Source
AP3 Line
8.9
GeV/c

Technical Highlights / Progress (contd.)

- Tevatron
  - Separators
    - Problems encountered with "unconditioning" of separators when polarity is switched. Needs reconditioning in the polarity operated. We can study this further on the test stand.
  - BPMs
    - All EchoTek boards delivered (Tev, Beamline and MI)!
    - Installed the first crate in A3 with 8 BPMs.
      - Reliable position measurements for closed orbits for protons and pbars
    - Move to B3, C3, .. in coordination with Tev Dept. and operations

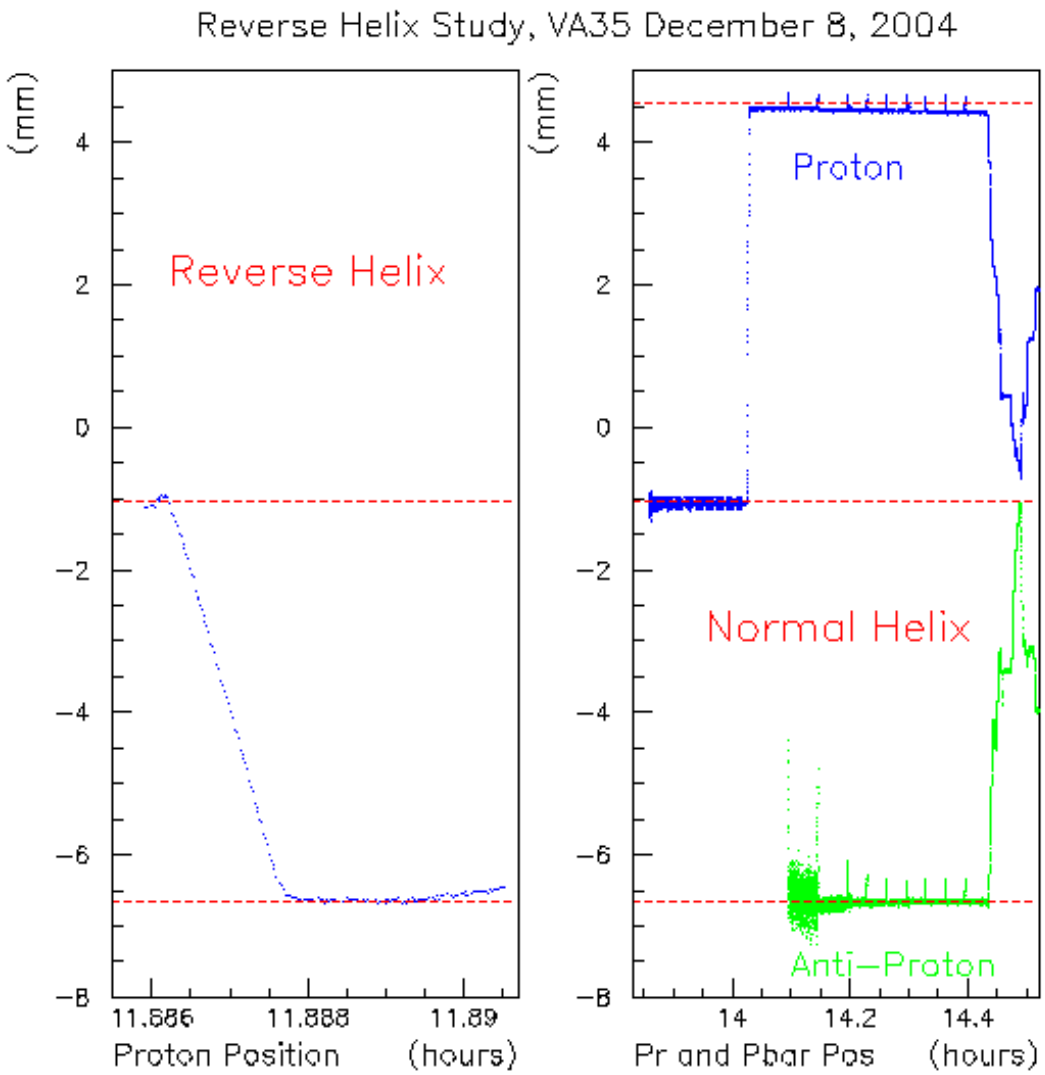


New Tev BPM System



		E	F	A	B	C	D
11	...	-.142	.1923	-.4422	-.0085	-.0452	.1009
12	...	-.1974	.2239	-.1349	-.0269	-.4152	.0292
14	...	.2207	-.0931	.3774	-.281	-.0641	-.5231
16	...	.2669	-.2624	.0639	-.2526	.1514	-.1258
18	...	-.1312	.1137	.2803	-.0359	.1267	-.0303
21	...	-.2711	.2713	-.1931	.299	.1612	-.0462
23	...	-.3362	.0556	-.2124	-.0583	-.1472	-.0557
25	...	.162	-.1178	-.0083	-.4572	-.1535	-.208
27	...	.2791	-.2629	-.1416	-.205	.1419	-.0427
29	...	.1961	-.0904	.1871	.1146	.1192	.2004
33	...	-.2566	.2469	.0503	.3251	-.1583	.187
35	...	-.4914	.0067	-.0056	.0353	-2.705	.0336
37	...	.0801	-.325	-.1946	-.2795	-.219	-.3577
39	...	.3518	-.3176	-.0876	-.1466	.0921	
43	...	.2903	-.4244	.2299	-.0085	.3756	.2691
45	...	-.0914	.1082	.1407	.3331	.1115	.1217
47	...	-.396	.2084	-.1108	.2761	-.1807	-.0243
49	...	.0633	-.0118	-.0129	-.167	.1543	-.0653
48	...			.1297		-.206	
OU	...			.1187	-.0425		-.1712
OD	...			-.3779	.6763		-.1102
OL	...		.1675				
OL	...		.1153				

New Tev BPM System



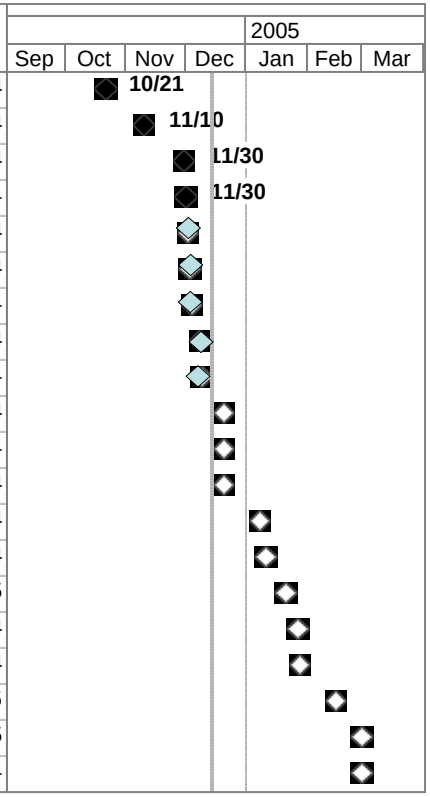
Stacktail Upgrade Prototype

- Currently designing prototype loops for testing in the Debuncher using reverse and forward protons
  - Use the shorter (170 cm) pick-up tank planned for the full upgrade
  - Test 3 different designs for the pick-up loops
  - Measure the signal to noise vs frequency
- Try the test with reverse protons in May-June '05
- Discussing a proposal for the test DURING the Tevatron 05 shutdown (e.g. 8 wks for Tevatron, 6 for the rest of the complex)
- Also high flux proton stacking studies (with forward protons) being discussed

Status Report

All Milestones (Oct. '04 – Feb. '05)

WBS	Name	MS Class	Finish	Base Fin
1.1.2.2.4.2	Beam Sweeping Ready (redefined)	A	10/21/04	10/21/04
1.4.2.1.1.3	Review TEL R&D	C	11/10/04	10/18/04
1.5.4	Finish Summer 04 Shutdown	C	11/30/04	11/19/04
1.1.1.2.1.24	HLRF Upgrade complete	C	11/30/04	11/1/04
1.4.3.2.6	Polarity switches operational	C	12/1/04	12/30/04
1.4.3.4.3	New standard separators operational	A	12/2/04	12/16/04
1.3.3.1.3.1.2.3	Kicker tank design finalized	C	12/3/04	12/3/04
1.2.2.10	Initial AP2&DB Improvements Complete (Milestone)	A	12/7/04	11/19/04
1.4.5.4.5.1.1	Begin system commissioning (Tev BPM)	C	12/8/04	12/9/04
1.1.1.4	Slip Stacking Operational	A	12/20/04	12/23/04
1.1.4.4	Booster-MI Cogging Operational	C	12/20/04	8/20/04
1.6.5.4	Start Phase 2 (Milestone)	A	12/20/04	12/23/04
1.4.5.4.3.2.1.3	Frontend DAQ SW code complete	C	1/7/05	11/29/04
1.1.1.2.2.6	MLRF upgrade complete	C	1/10/05	10/22/04
1.3.3.1.3.1.1.7	Pickup tank design finalized	C	1/20/05	1/21/05
1.4.5.4.3.2.3.2	Offline SW code complete	C	1/27/05	12/23/04
1.4.5.4.3.2.2.2	Online SW code complete	C	1/27/05	10/21/04
1.3.5.6.1	Pelletron Installed at MI-31 (Milestone)	C	2/15/05	2/1/05
1.1.3.3.5	MI 2.5 MHz Acceleration complete	B	2/28/05	1/31/05
1.2.2.7.4	Decision to proceed with development of chromatic compensatior	C	2/28/05	9/20/04



Progress as of November 30, '04

WBS	Name	Actual %	Planned %	A/P %
0	**Run II**	**55%**	**57%**	**96%**
1	**Luminosity Upgrades**	**57%**	**59%**	**96%**
1.1	Protons on Pbar Target	56%	60%	94%
1.2	Pbar Acceptance	39%	47%	83%
1.3	Pbar Stacking & Cooling	68%	67%	101%
1.4	Tevatron High Luminosity	55%	58%	94%
1.5	Shutdowns	32%	32%	100%
1.6	Project Management	54%	54%	100%
2	**Maintenance & Reliability**	**42%**	**42%**	**101%**

Effort for November '04

Adjusted FTE November 2004		Actual	Plan
			3 Mo. ave.
Run II Upgrades		**153.0**	**133.0**
1	**Luminosity Upgrades**	**145.3**	**119.7**
1.1	**Protons on Target**	**18.7**	6.6
1.2	**pbar Acceptance**	**13.4**	8.3
1.3	**pbar Stacking and Cooling**	**42.6**	34.9
1.4	**Tevatron High Luminosity**	**67.8**	65.2
1.6	**Management**	**2.8**	4.7
2	**Reliability Upgrades**	**7.7**	**13.3**

M&S Spending

M&S Spending through Nov 2004		OBL Planned from MSP file 12/14/04					Prior Year		Current Year Costs			FY04 To date Costs		
		RLS Estimate (then yr$)					FY04	FY04	FY05	FY05	FY05			
		FY04	FY05	FY06	FY07	Total	Actual	Obligatio	Actual	Obligatio	Obl+RIP	Actual	Obligatio	Obl+RIP
Run II Upgrades		**8,514**	**6,915**	**1,698**	**149**	**17,275**	**7,472**	**10,163**	**3,272**	**750**	**927**	**10,744**	**10,913**	**11,090**
1	**Luminosity Upgrades**	**7,019**	**5,253**	**609**	**111**	**12,992**	**6,155**	**8,316**	**2,879**	**632**	**809**	**9,034**	**8,948**	**9,125**
1.1	**Protons on Target**	**564**	**1,046**	**1**	**0**	**1,612**	**1,044**	**1,030**	**430**	**55**	**55**	**1,474**	**1,085**	**1,085**
1.1.1	Slip Stacking	400	9	0	0	409	893	374	16	7	7	909	381	381
1.1.2	Pbar Target and Sweeping	42	11	1	0	54	24	15	0	0	0	24	15	15
1.1.3	MI Upgrades	18	957	0	0	976	0	504	358	0	0	358	504	504
1.1.4	Booster-MI Cogging	0	0	0	0	0	0	0	0	0	0	0	0	0
1.1.5	OTR	104	68	0	0	172	128	137	56	48	48	183	186	186
1.2	**pbar Acceptance**	**449**	**519**	**390**	**111**	**1,469**	**435**	**445**	**85**	**85**	**105**	**521**	**530**	**550**
1.2.1	LiLens	128	106	169	111	513	125	122	24	41	61	149	163	183
1.2.2	AP2 and DB Acceptance	321	413	222	0	956	310	323	61	44	44	372	367	367
1.3	**pbar Stacking and Cooling**	**2,888**	**1,726**	**0**	**0**	**4,614**	**2,209**	**3,092**	**1,123**	**284**	**338**	**3,332**	**3,376**	**3,430**
1.3.1	S&C Task Force	0	0	0	0	0	0	0	0	0	0	0	0	0
1.3.2	Debuncher Cooling	0	0	0	0	0	0	0	0	0	0	0	0	0
1.3.3	Stacktail Upgrade	848	582	0	0	1,430	314	692	407	1	20	721	693	712
1.3.4	Recycler Commissioning	242	227	0	0	469	129	206	102	2	37	231	208	243
1.3.5	Electron Cooling	1,546	623	0	0	2,169	1,714	1,881	388	230	230	2,102	2,111	2,111
1.3.6	Rapid Transfers	252	294	0	0	546	52	312	226	51	51	278	363	363
1.4	**Tevatron High Luminosity**	**3,025**	**1,963**	**217**	**0**	**5,205**	**2,364**	**3,646**	**1,241**	**208**	**312**	**3,605**	**3,854**	**3,958**
1.4.1	Beam Studies and Simulation	38	0	0	0	38	42	41	0	0	0	42	41	41
1.4.2	Active BBC	286	992	108	0	1,386	365	478	105	48	48	470	526	526
1.4.3	Increased Helix Separation	559	540	92	0	1,191	645	805	12	10	104	657	815	909
1.4.4	Luminosity Leveling	0	0	0	0	0	0	0	0	0	0	0	0	0
1.4.5	Improved Controls and Diagnostics	1,880	248	0	0	2,129	911	1,918	1,087	134	144	1,998	2,052	2,061
1.4.6	Tevatron Vacuum Improvements	154	0	0	0	154	191	193	6	4	4	196	197	197
1.4.7	Tevatron Alignment	108	182	17	0	307	211	211	31	13	13	242	224	224
1.6	**Management**	**93**	**0**	**0**	**0**	**93**	**102**	**102**	**0**	**0**	**0**	**102**	**102**	**102**
2	**Reliability Upgrades**	**1,495**	**1,662**	**1,089**	**38**	**4,283**	**1,317**	**1,847**	**393**	**118**	**118**	**1,710**	**1,965**	**1,965**
2.1	Vulnerability White Paper	799	783	1,087	38	2,707	621	826	250	23	23	871	849	849
2.2	Reliability Upgrades	696	879	2	0	1,577	696	1,021	142	94	94	839	1,116	1,116

- (OBL+RIP)/Total Est = 64%

M&S Contingency

- Budget Guidance

($K)	FY04	FY05	FY06	Total
Original Budget Guidance				
Total	14,188	4,894	3,005	22,087
Base	10,488	3,694	1,805	15,987
Contingency	3,700	1,200	1,200	6,100
Contingency Use				
AIP	546	(450 used so far, assume all used		
non-AIP	800			
Current Guidance				
Total	14,188	4,894	3,005	22,087
Base	11,834	3,694	1,805	17,333
Contingency	2,354	1,200	1,200	4,754

- Current Estimate

($K)	FY04	FY05	FY06	Total
Current Estimate	**8513**	**6915**	**1847**	**17275**
Includes (since v3)				**90**
LiLens				90
Does not yet include				**630**
TEL (overrun due to 03/4)				100
e-cool Comm				350
Stacktail Proto				50
Further Tev vacuum improvements (SD05)				80
Add for Rec damper (over 210 added)				50
Upcoming Estimate				**17905**

Pending candidates for contingency

- Leaving 22,087-17,905 = 4,182 contingency = 2,982 (FY05) + 1,200 (FY06)
- OBL to Complete will be 17,905-10,913 = 6,992

Contingency …cont

Contingency need

- General contingency
  - ~ 30% on OBL to Complete = $1,5M (FY05) + $0.6M (FY06)
- Specific high technical risk:
  - D-A/Core Cooling (FY05) (not in scope)
  - E-cooling (FY05) (~spent)
  - Stacktail Upgrade (FY06) (~2/3 spent)
  - Li Lens (starting on proto2, new production)
  - TEL (modulator) (FY06) (to spend)

→ available contingency should not fall below $2.0-2.5M (FY05) and $1.5M (FY06)

Scope additions (in preparation)

- Vacuum systems reliability upgrade
  - Replace aging and problem equipment in Tevatron, MI and Recycler
  - Defining highest priority items – looks like (initial) scope change request will be ~$600K M&S
- Tevatron cryo systems reliability
  - Under discussion

3.0-0.6= $2.4M contingency available through FY05