D0 Run Report

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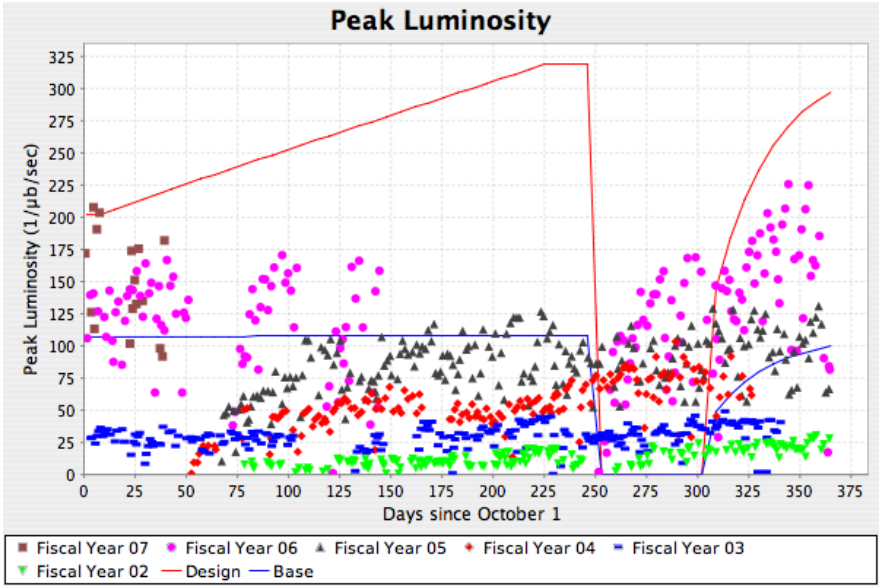
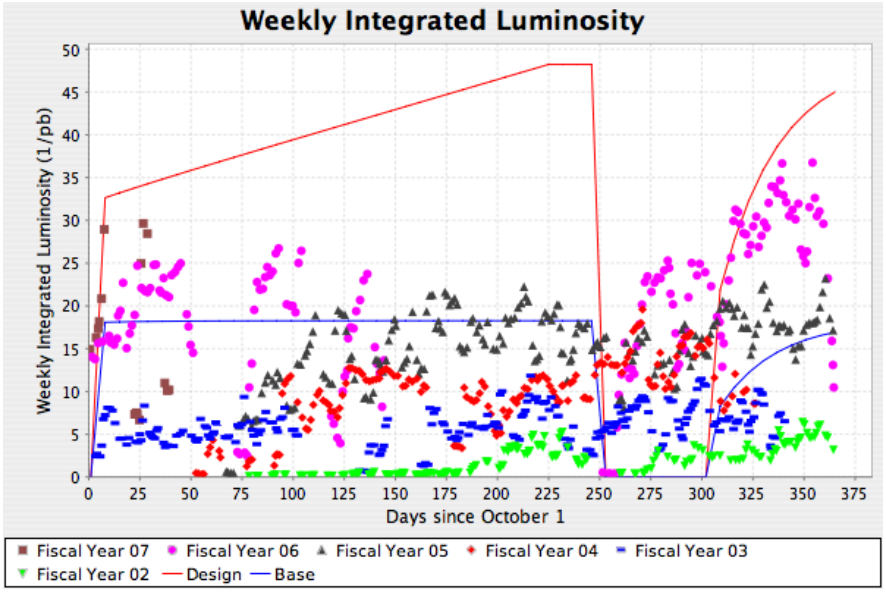
6 December 2006

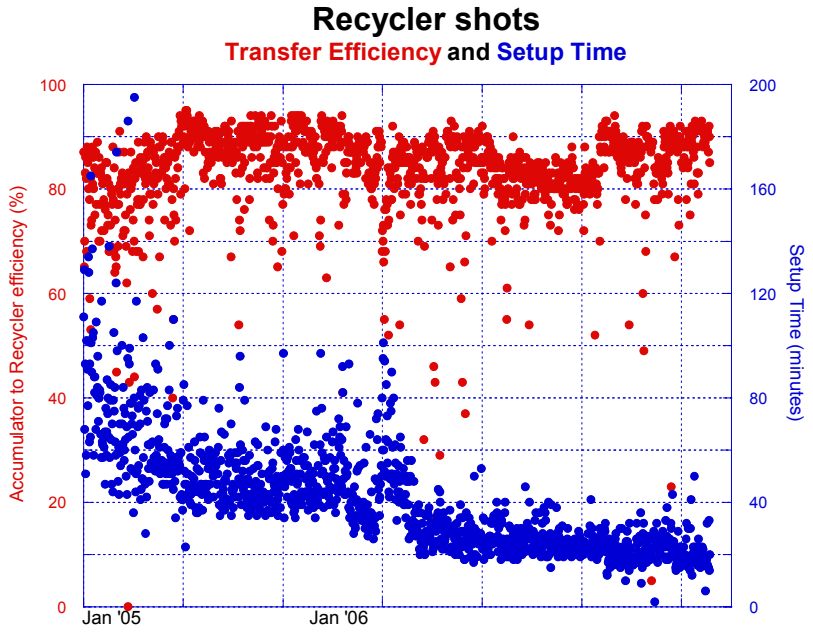
Accelerator complex status

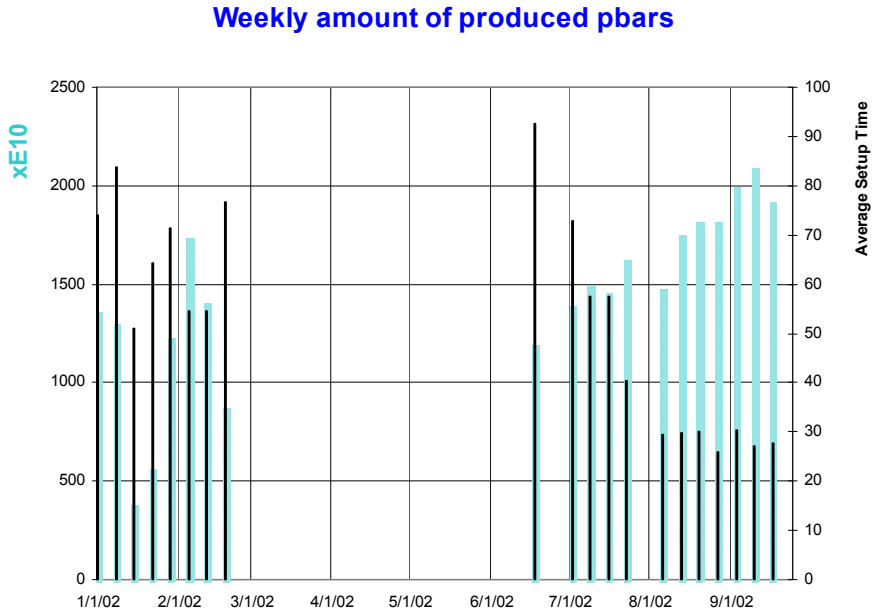
- New Lithium lens with higher gradient in pbar source
- Rapid transfer of pbars from Accumulator to Recycler
  - Also working on other pbar cooling/transfer improvements
- New helix with 2 new separators in Tevatron
  - Reduced beam-beam effects → Better store life time





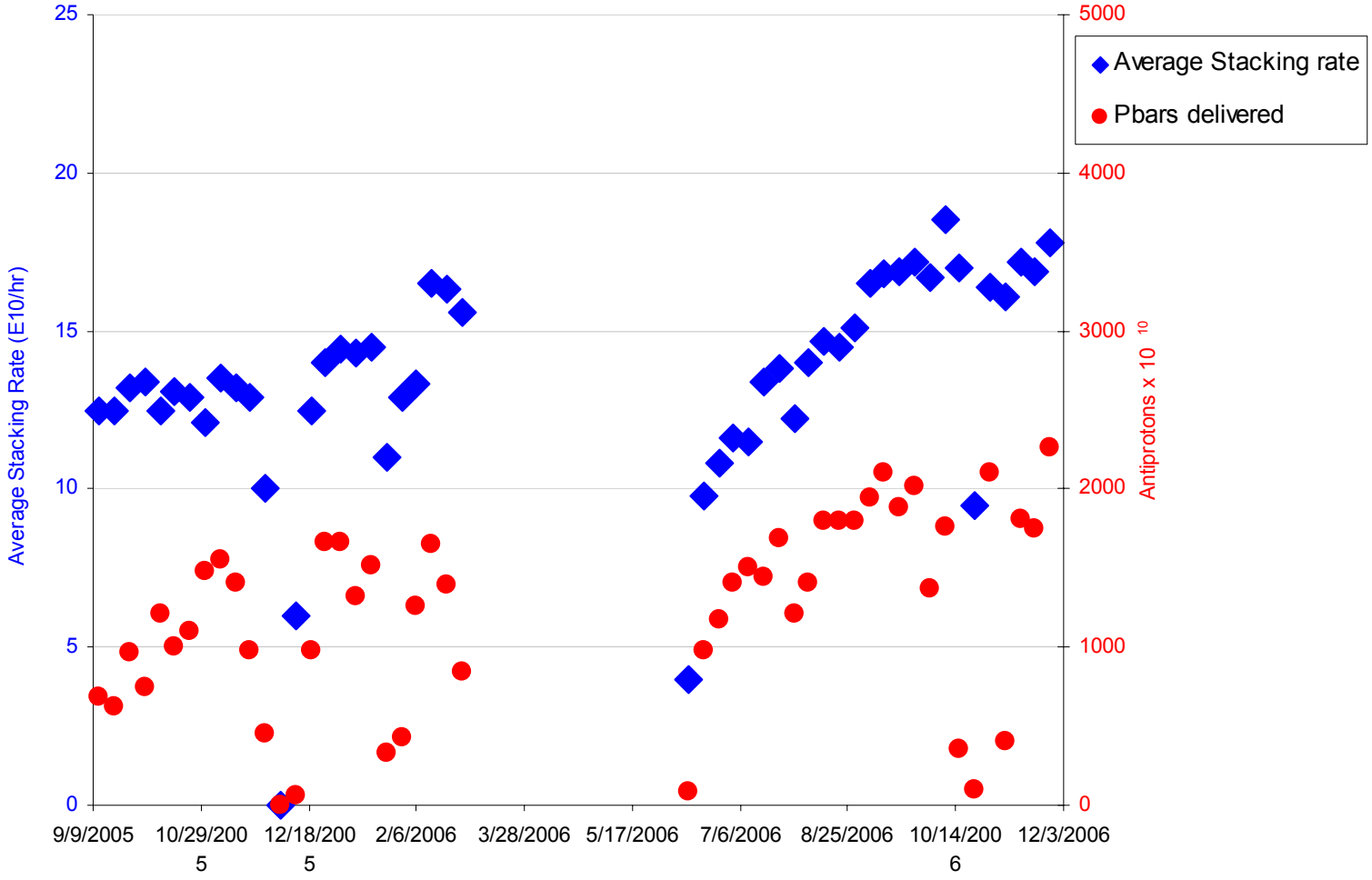
Rapid Pbar Transfer



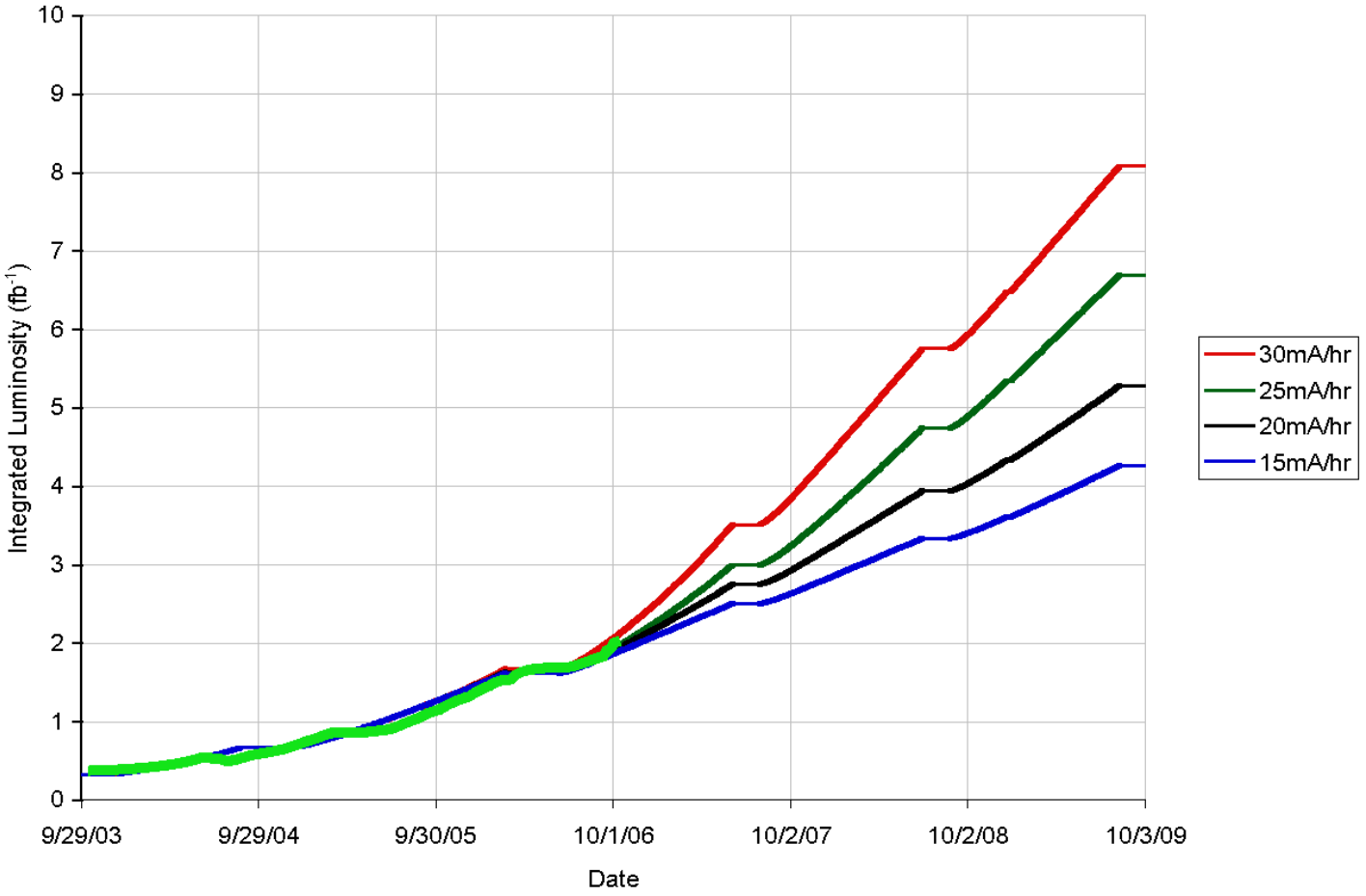


- Goal is to get transfer under 5 minutes
- At 5 minutes if we transfer once an hour
  - 2310 E10 pbars at 15 ma/hr
  - 3080 E10 pbars at 20 ma/hr
  - 3850 E10 pbars at 25 ma/hr

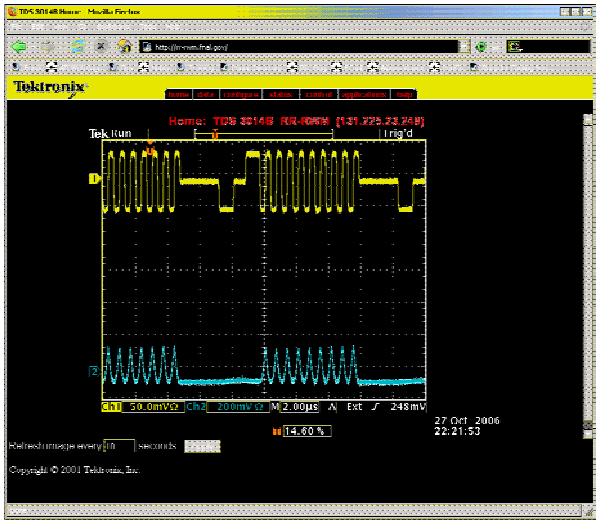
Average Stacking Rate

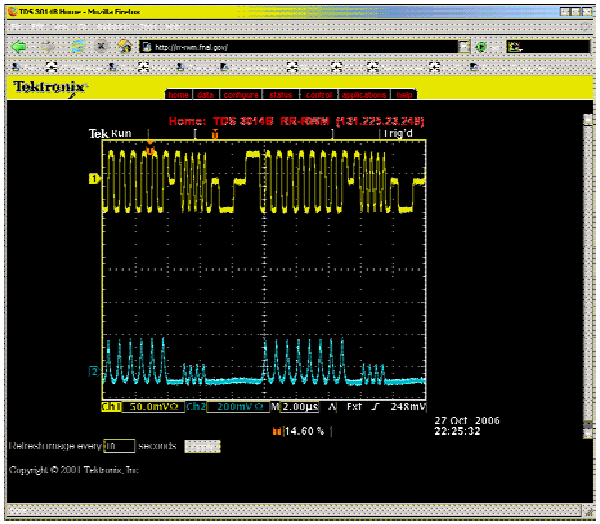


Current Luminosity vs Projections

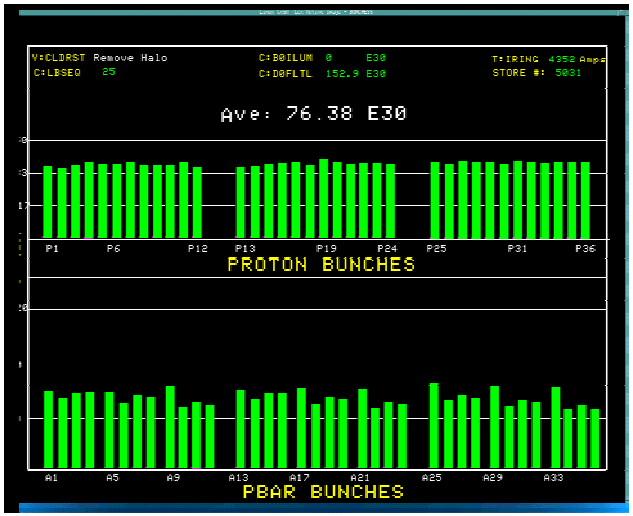


Pbar Bunch Leveling





- RF feed forward in mining pbars from Recycler
  - Bunch-to-bunch leveling of pbar bunch intensity.
  - Goal is to level within 5-10%.



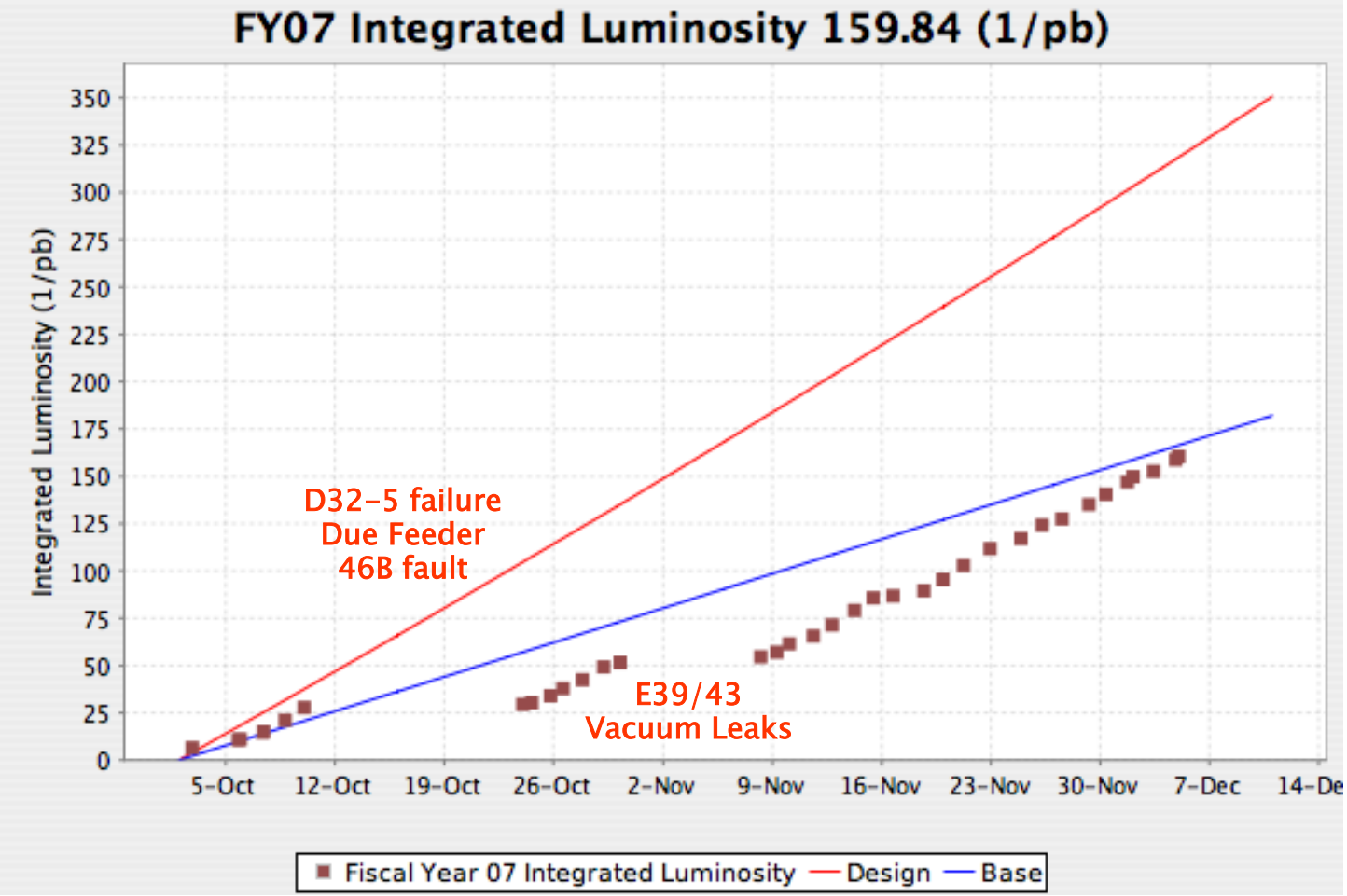
Tevatron Woes

- Feeder 46b glitch
  - Tevatron suffered a major blow on 10/10, when a mouse walked over a power supply, causing feeder 46b to glitch.
    - A D-sector dipole had to be replaced.
    - 12 days of shutdown.

Tevatron Woes

- Failed O-ring in E-sector on 10/30
  - 8 day shutdown due to a failed o-ring in E-sector.

FY07 Integrated Luminosity



Weekly Statistics

Week	Delivered Lum (pb^{-1})	Recorded Lum (pb^{-1})	Eff. (%)	Comments
8/21 – 8/27	30.3	26.5	87	Interface Board LV supply failure required 10 hour access. SMT firmware upgrade to deal with problems with the last 11 ticks.
8/28 – 9/3	35.4	29.1	82	Rack M123 trip cost 5 hour downtime.
9/3 – 9/10	32.2	28.6	89	
9/11 – 9/17	26.9	23.5	87	Lost a store due to quench.
9/18 – 9/24	32.1	28.4	89	
9/25 – 10/1	10.3	7.7	75	Data logger problem. 12 hour access to attempt to recover HDIs. TeV injection kicker problems. AP1 line vacuum repair. Luminosity constants updated.
10/2 – 10/8	20.6	19.0	87	Cal calibration trigger implemented. Lost a store due to lightning.
10/9 – 10/15	5.5	4.2	75	Delivered luminosity surpassed 2 fb-1 Feeder 46b glitch.

Weekly Statistics

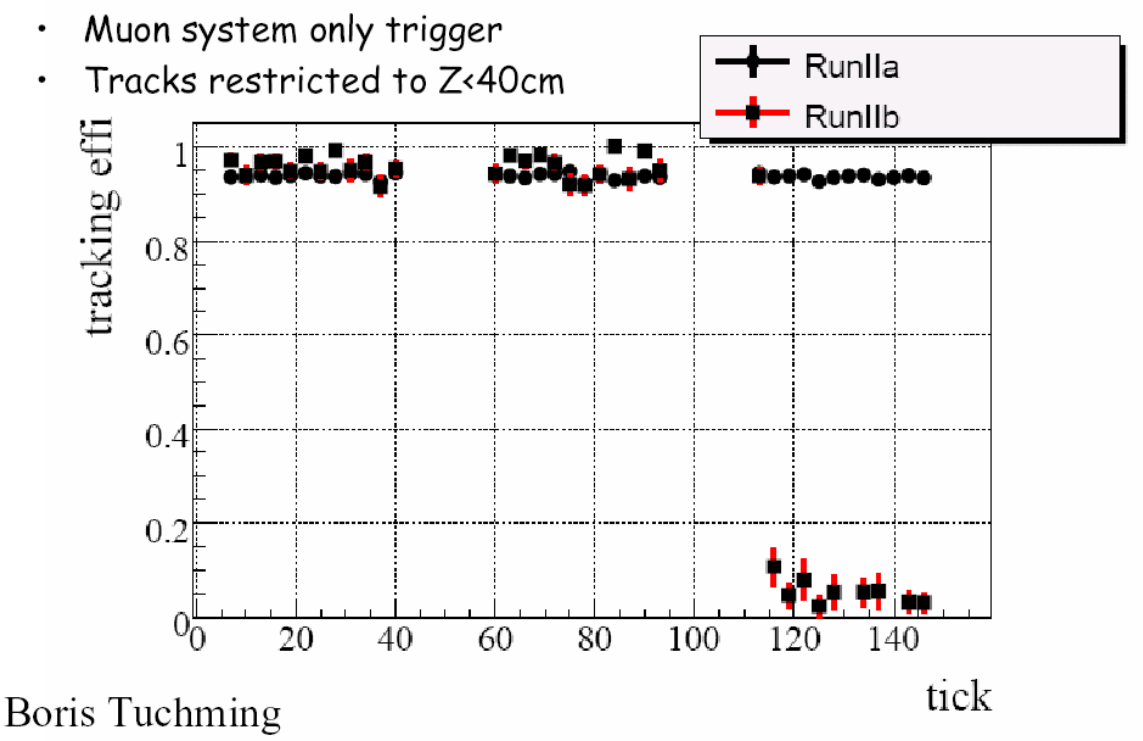
Week	Delivered Lum (pb^{-1})	Recorded Lum (pb^{-1})	Eff. (%)	Comments
10/16 – 10/22	0.0	0.0	n/a	AFEIIs in stereo.
10/23 – 10/29	21.0	17.1	78	Many SMT readout problems after download GUI upgrade. Data logger node crash.
10/30 – 11/5	2.3	2.0	88	E-39/43 vacuum leak problem The CHW conversion from the pure water to the water-glycol mix.
11/6 – 11/12	19.8	15.6	79	8 hour access to replace a blown fuse for Cal. 1.5 hour downtime due to two different data logger node crashes. 2.5 hour downtime due to Forward muon PS failure.
11/13 – 11/19	24.2	20.8	86	Feeder 47 glitch.
11/20 – 11/26	29.8	25.5	86	
11/27 – 12/3	29.2	25.3	87	

Monthly Statistics

Month	Delivered Lum (pb^{-1})	Recorded Lum (pb^{-1})	Eff. (%)	Comments
August	115.6	100.0	87	Record recorded luminosity
September	114.4	99.3	87	2nd best recorded luminosity
October	50.2	41.2	82	
November	92.7	78.4	85	3rd best recorded luminosity

SMT Readout Problem Solved

- Last 11 ticks of SVX2 readout were compromised since the beginning of Run IIb.
  - Due to complexity in reading out both SVX2 and SVX4 chips.
- Once the problem was identified, it was solved quickly.



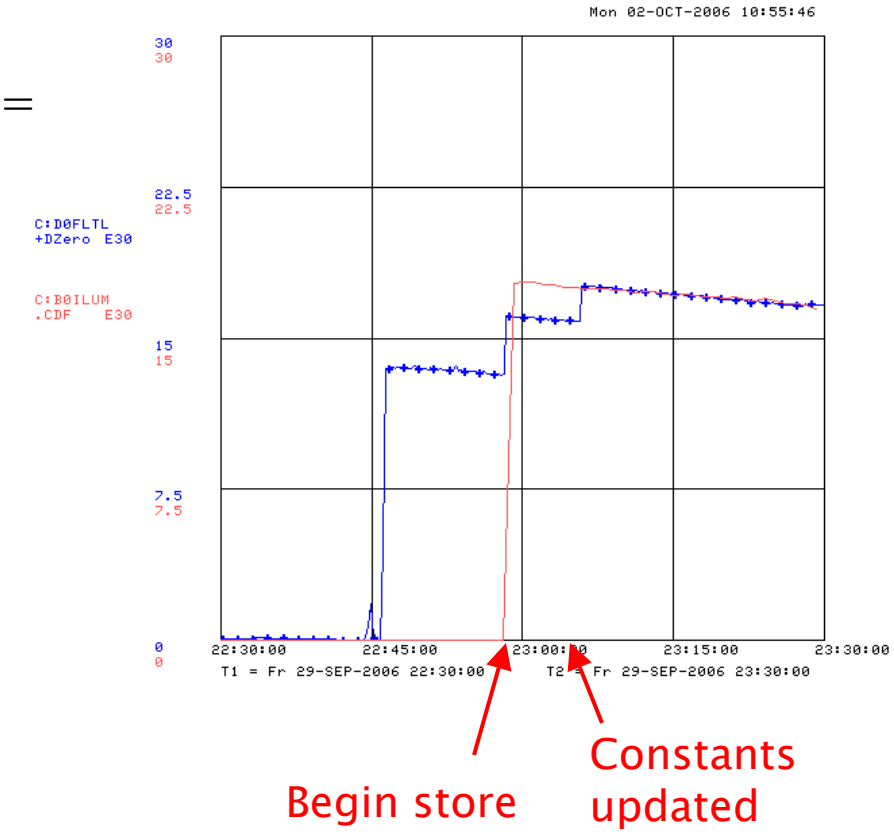
Failed SMT HDIs

- The trigger framework trip on 8/30 lead to high currents in SMT HDIs.
  - 40 HDIs with readout errors that can only be partially readout.
  - Have been studying the HDIs removed during the shutdown.
  - Tried an idea for resurrecting HDIs obtained from this study on the failed HDIs. But the result was negative.
  - Experts are working on different ideas to recover these HDIs.
- There are 432 HDIs in Barrel. Of them, 60 are disabled and 40 are partially readout.

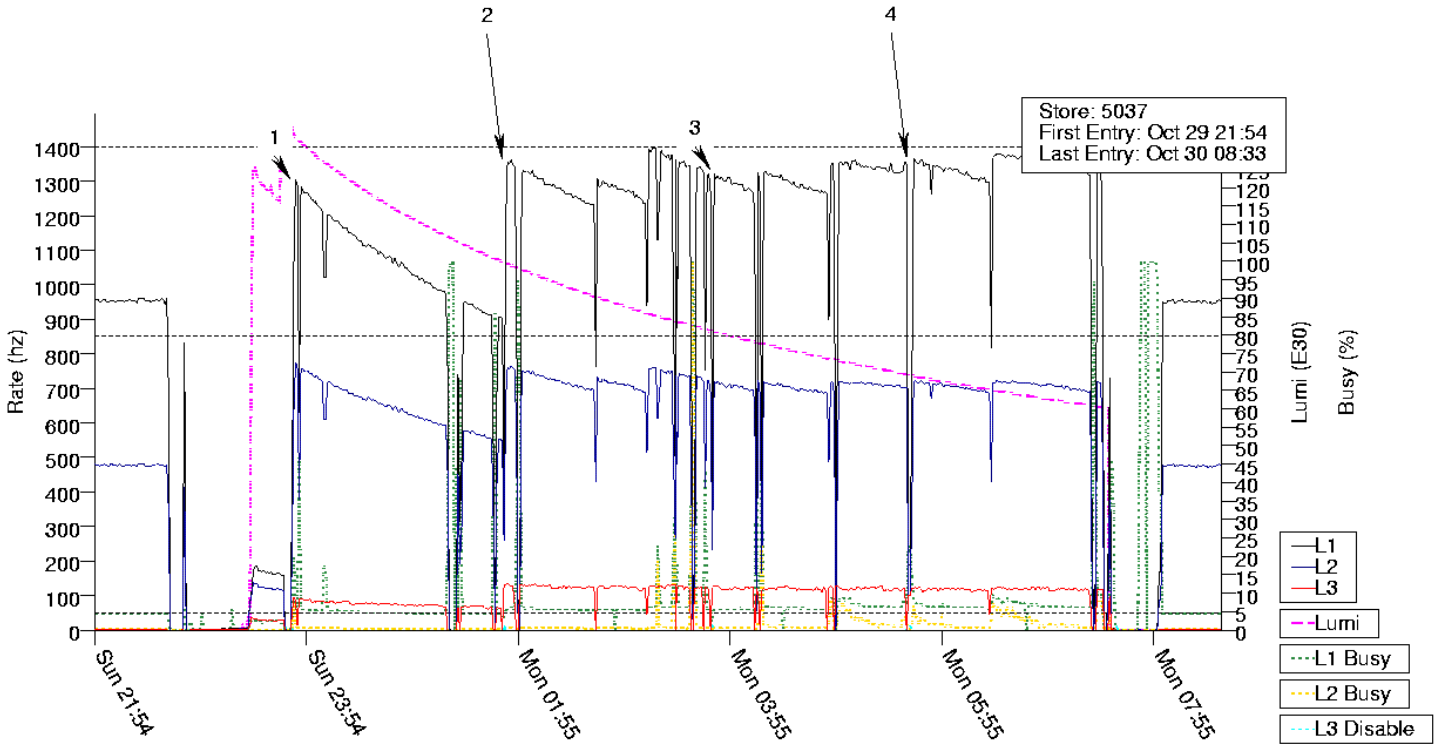
Luminosity constants updated

- Effective ND cross section = 48 mb (old value 54 mb).

Store 4989



50 M Cal Calibration Events Collected



Global_CMT-15.21, 15.22:

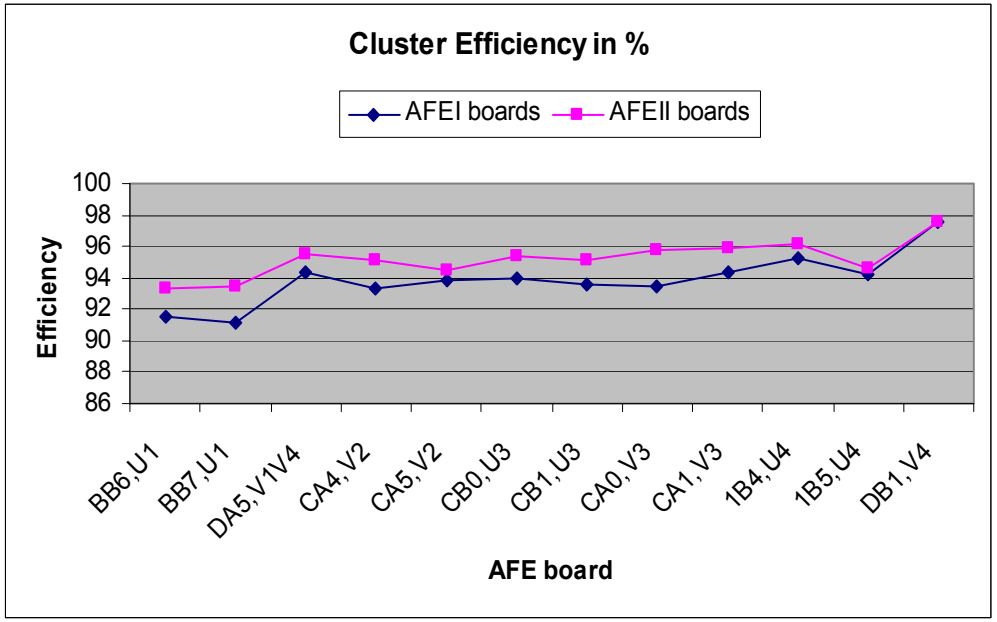
- New L1Cal firmware for Cal Calibration trigger
- New l1cal2b_towers_term0_ncu term

Work Done During the Mouse Shutdown

- Re-activated SNEG beam pipe.
  - To improve vacuum in the beam pipe.
    - Beam loss reduction.
- Opened the detector
  - Maintenance of A-layer muon PDTs
    - Replaced a few FEBs and a Control board for PDT033
    - Installed shorter standoffs.
  - Repaired Cal preamp supply
  - ICD phtotubes replaced
  - Installed AFEIIs in stereo layers
  - Upgraded the AC distribution for L3 farm upgrade

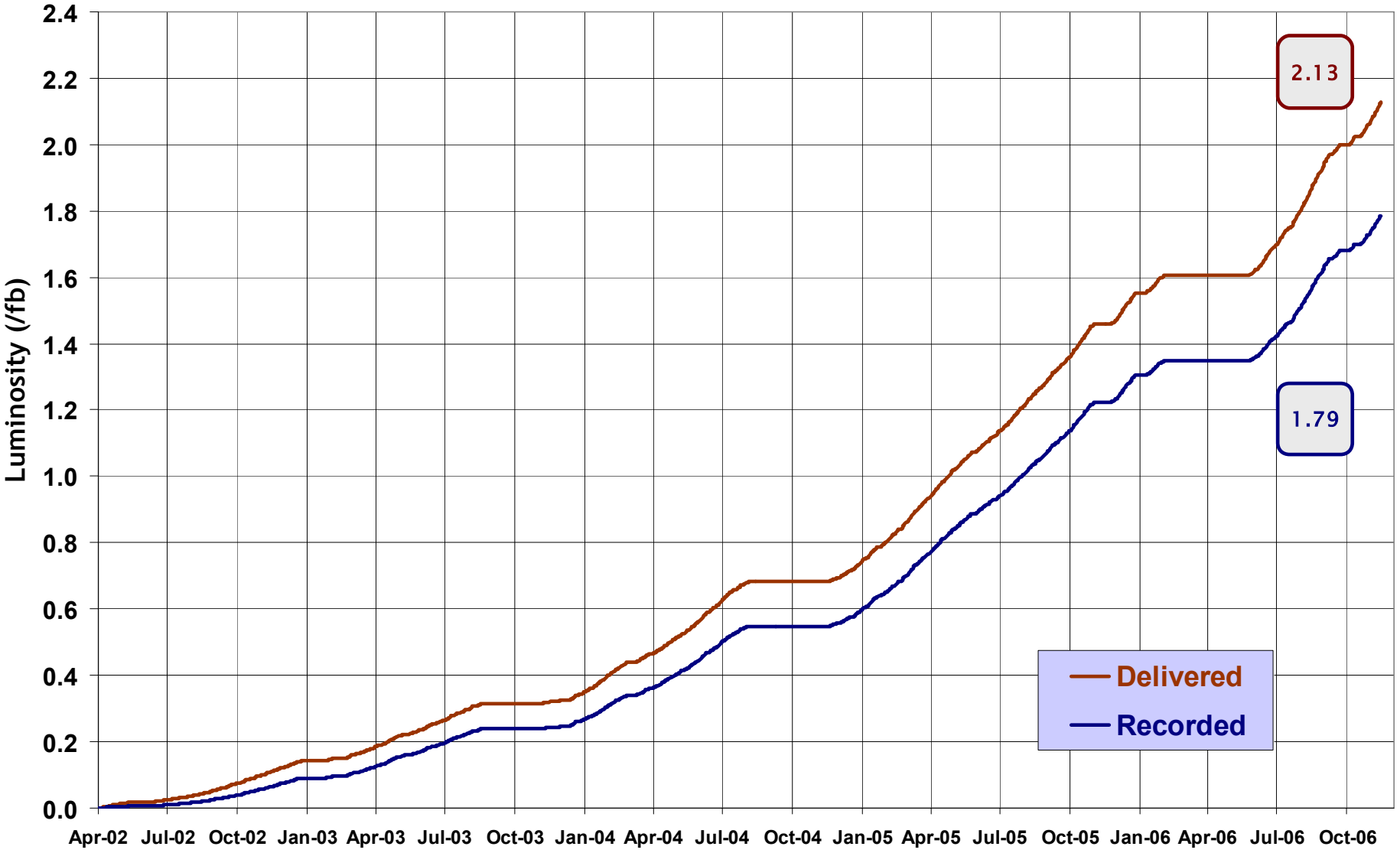
AFEII

- CFT axial layers are fully implemented with AFEII boards.
- CFT stereo layers are almost fully implemented with AFEII boards, except 10 boards that are shared with CPS.
  - 32 boards for CPS and FPS have not been installed yet.
- Installation of the rest of the boards is on-hold while data for CPS stereo are analyzed.



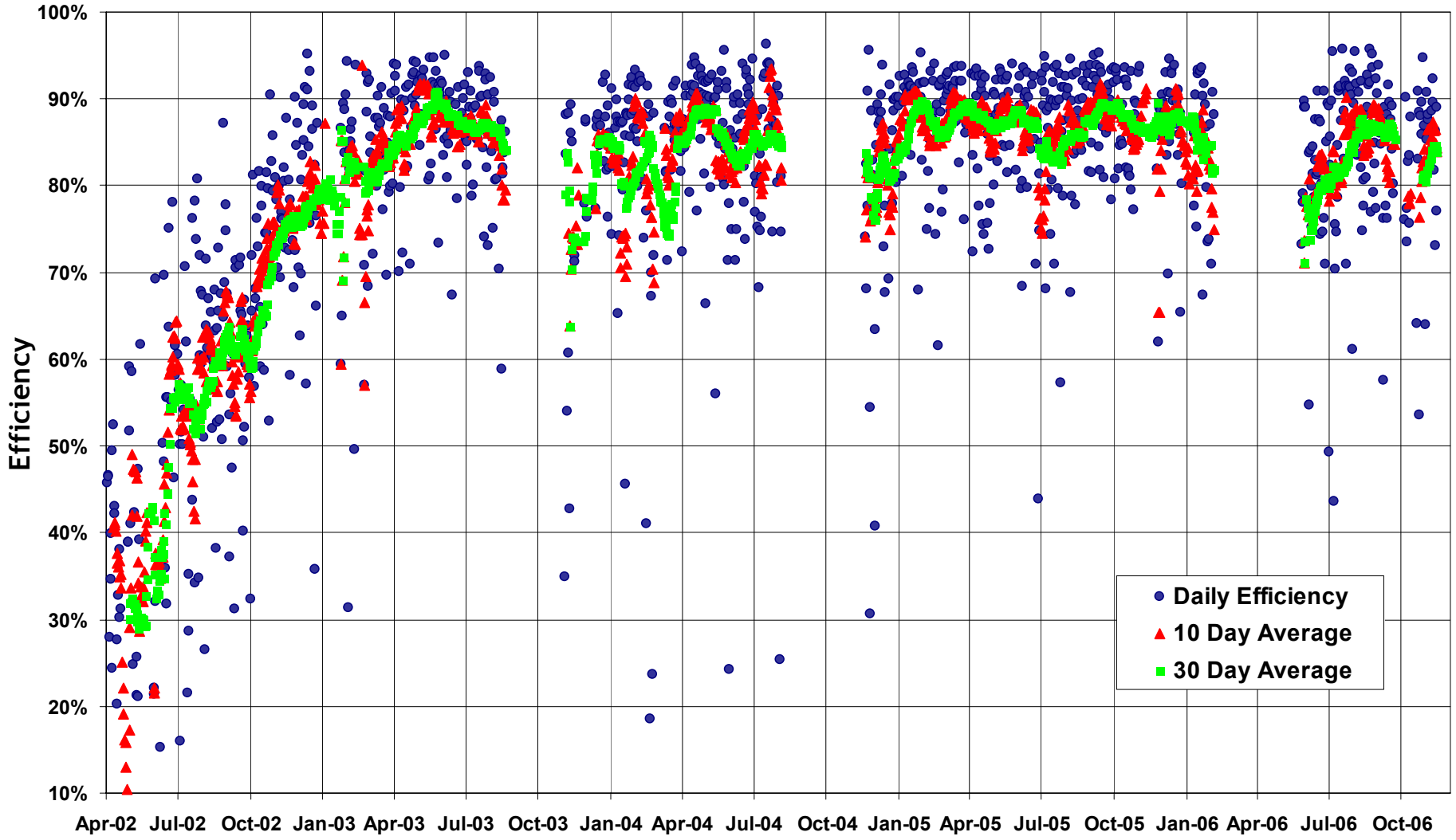
Run II Integrated Luminosity

19 April 2002 - 3 December 2006



Daily Data Taking Efficiency

19 April 2002 - 3 December 2006



Records

- Delivered luminosity surpassed 2 fb^{-1} on 10/9/06.
  - After the back propagation of luminosity constants.
- Recorded luminosity in August was the record in a month, 100.0 pb^{-1}
  - Recorded luminosity in September was the 2nd highest, 99.3pb^{-1}.
- Recorded luminosity on 9/19 was the record in a day, 6.6pb^{-1}
  - Recorded luminosity on 9/9 was the 2nd highest, 6.1pb^{-1}.
- Initial luminosity for store 5086 started on 11/21 is the record, 236E30.
  - 2nd highest is 224E30 for 5092 on 11/25.

Summary

- D0 detector
  - Accumulated 2.1 fb^{-1} of delivered luminosity; 1.8 pb^{-1} recoreded.
  - No major problems.
  - All elements of Run IIb upgrade are working.
    - Layer 0, CTT upgrade, STT upgrade, and L1Cal are a part of everyday running.
    - Most of AFEIIs installed and readout.
    - Getting ready for latency change to implement L1Cal track match (the last piece of Run IIb upgrade).
  - Calorimeter data for inter-phi calibration collected.
  - Calorimeter data for inter-eta calibration being collected.
- Accelerator complex
  - Tevatron suffered two setbacks in the last two months.
  - Pbar production improving.
  - Many small improvements being made to the complex to increase the delivered integrated luminosity.