All Experimenter's Meeting

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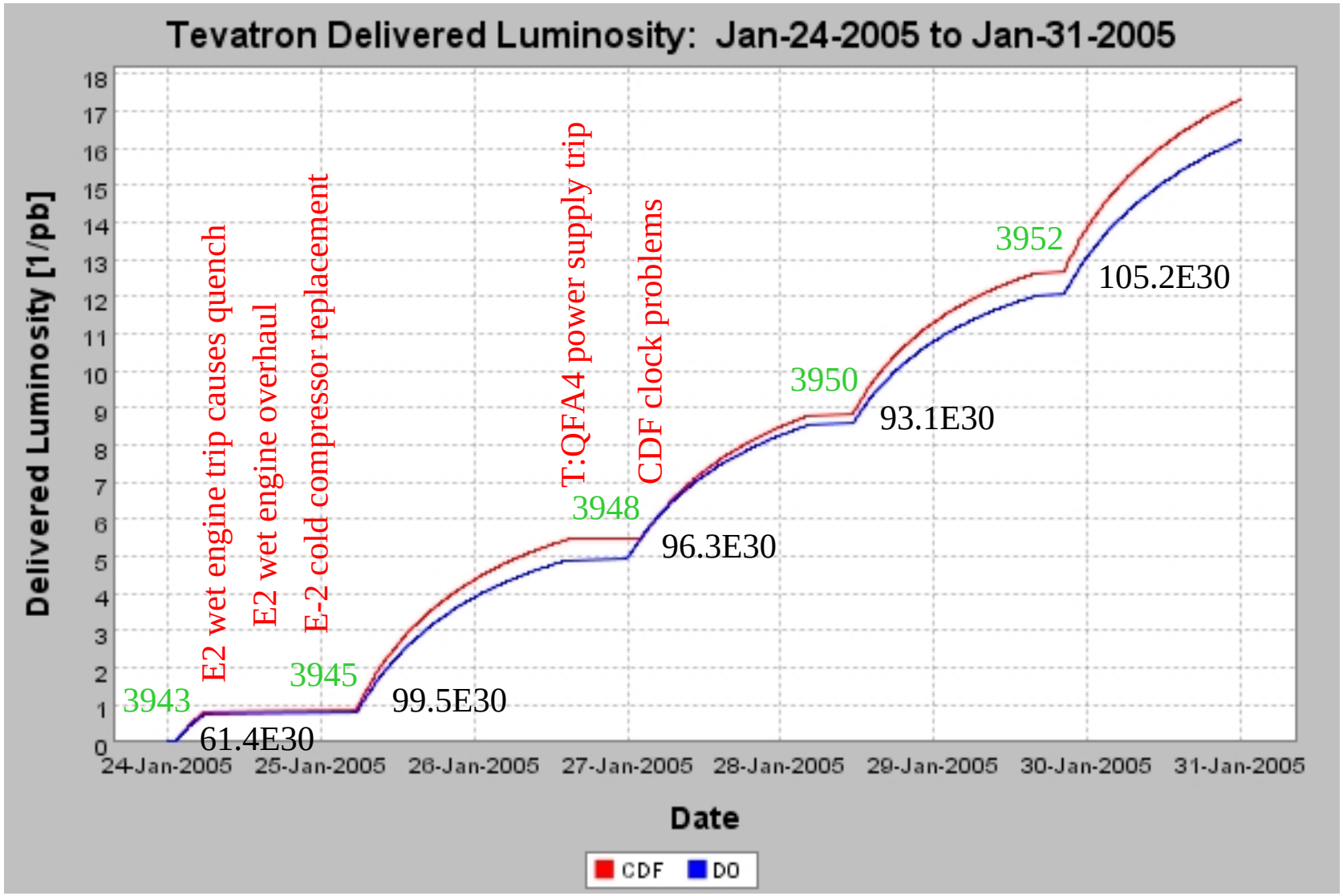
January 31, 2005

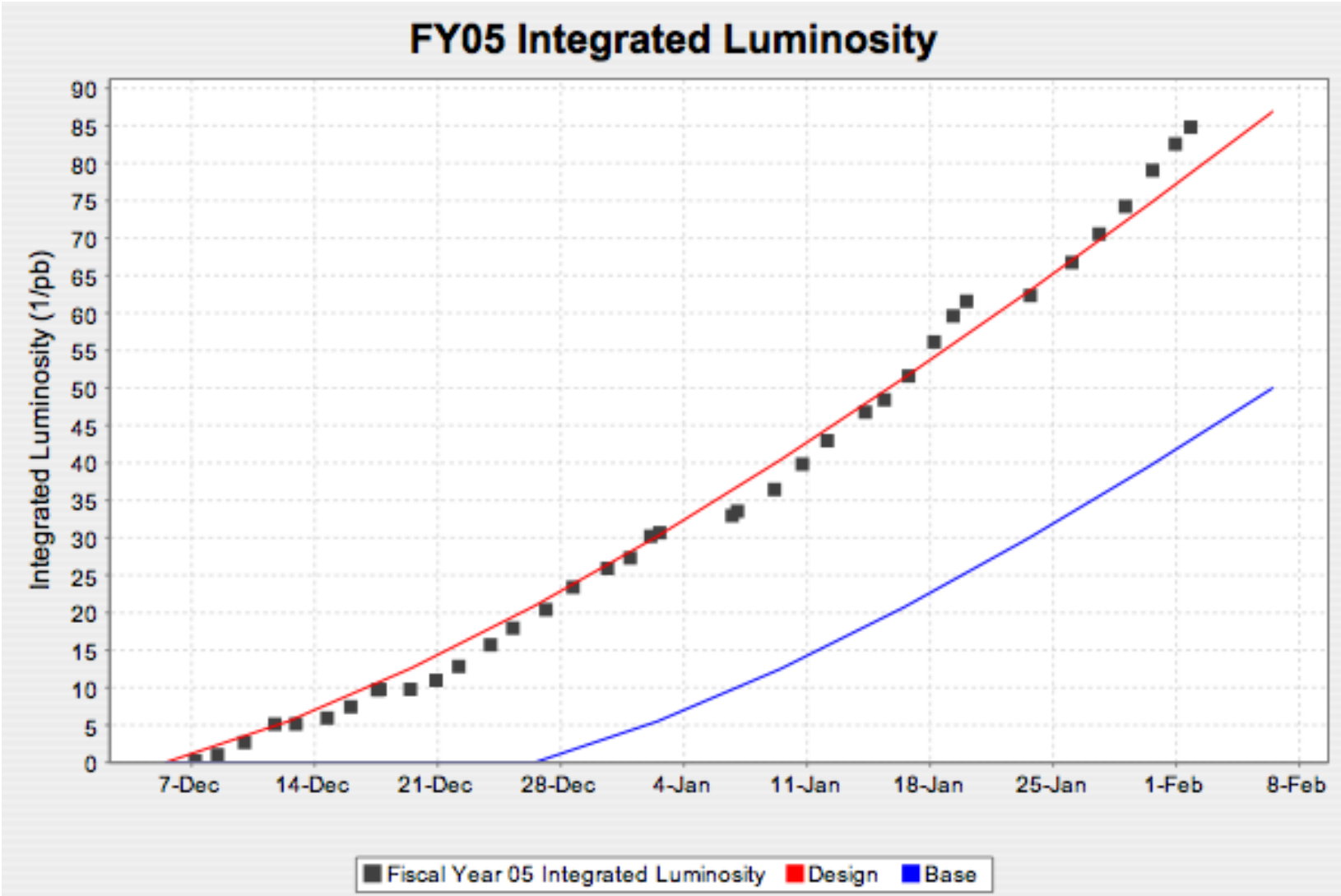
Store Summary

Store	Initial Lum. (E30)	Deliv'd Lum. (nb^{-1})	Termination	Time (hr)	Total Pbars (E10)	Comments (Stack/Stash)
3943	61.4	806	Loss of store	3.6	132.3	E2 quench after wet engine dies
3945	99.5	4,650	Loss of store	33.3	246.2	Combination shot (192.2/54.0E10), T:QFA4 trip
3948	96.3	4,050	Planned	28.2	208.6	Combination shot (168.2/40.4E10)
3950	93.1	3,868	Planned	29.3	233.3	Combination shot (177.2/56.1E10)
3952	105.2	5,055	Planned	33.0	261.4	Combination shot (183.5/77.9E10), record initial and integrated lum.

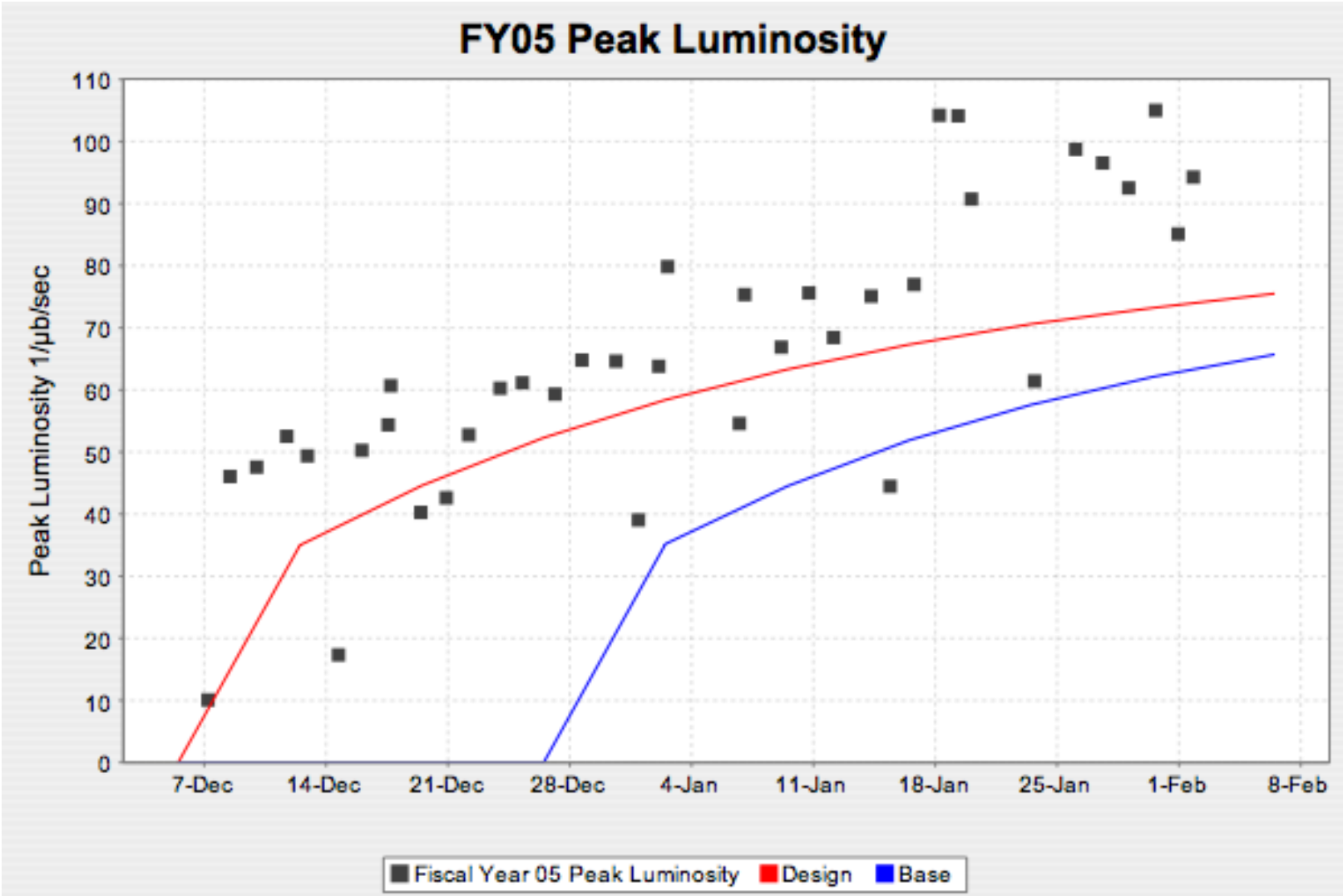
Store Summary



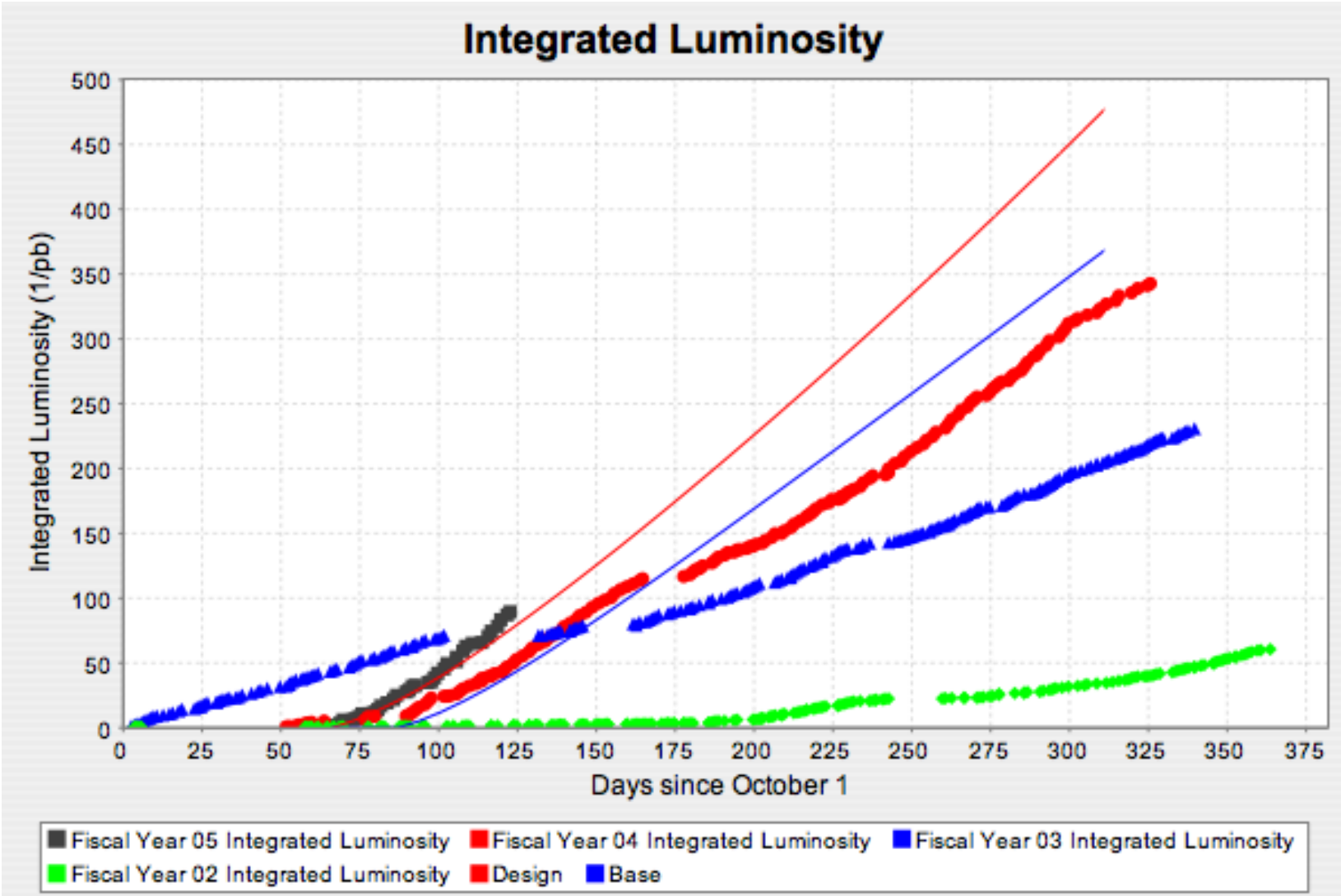
FY05 Integrated Luminosity



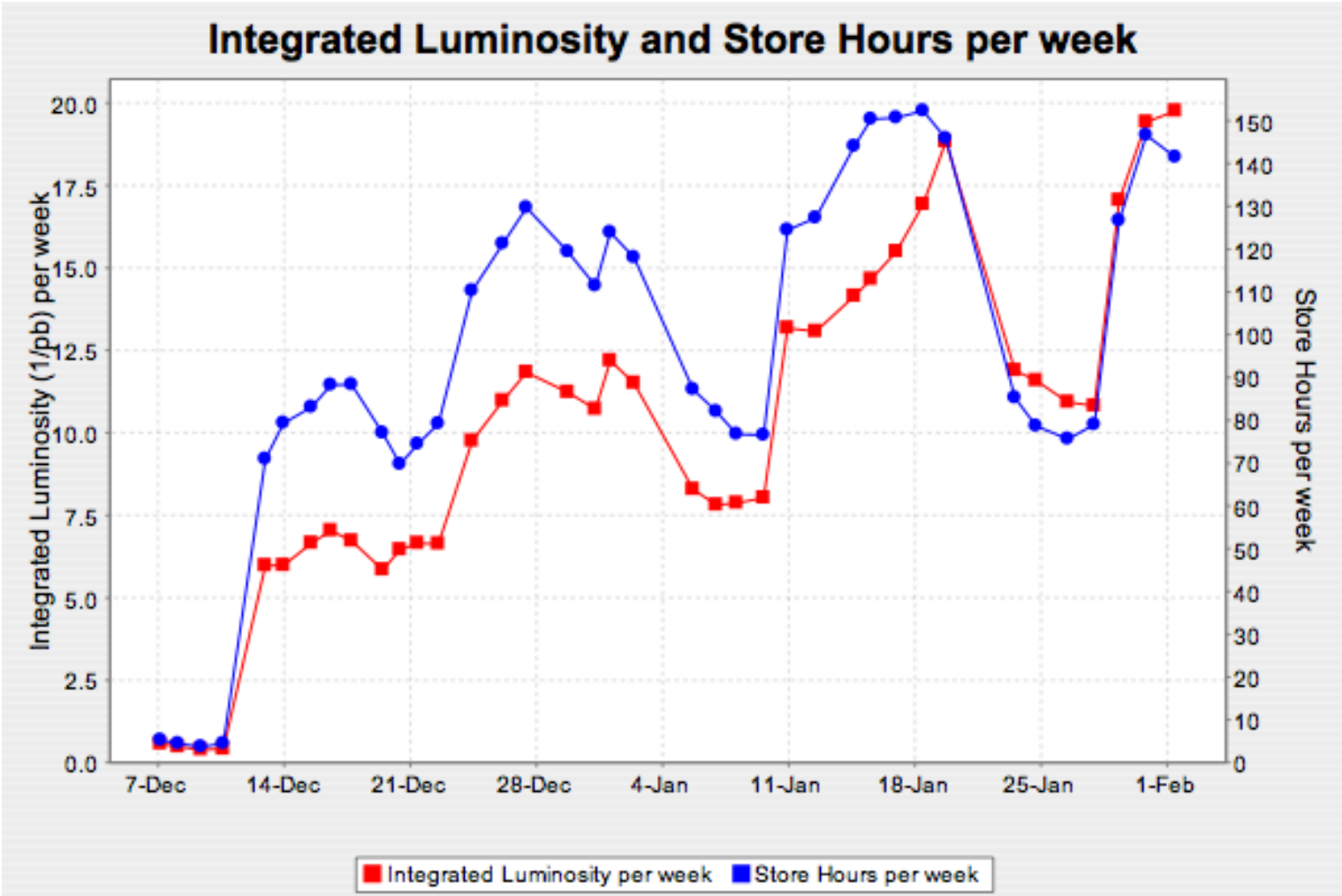
FY05 Peak Luminosity



Integrated Luminosity

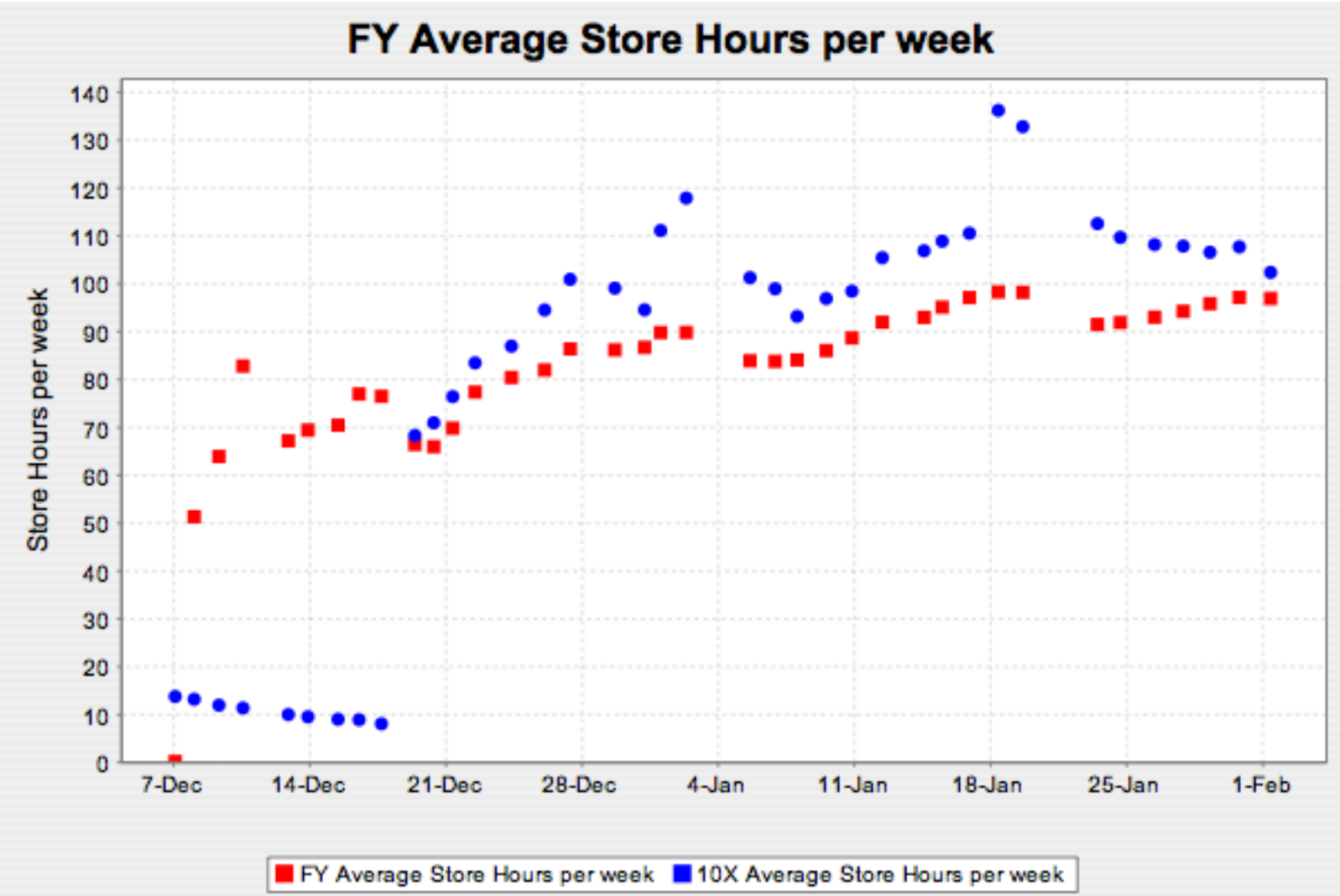


Integrated Luminosity and Store Hours per Week

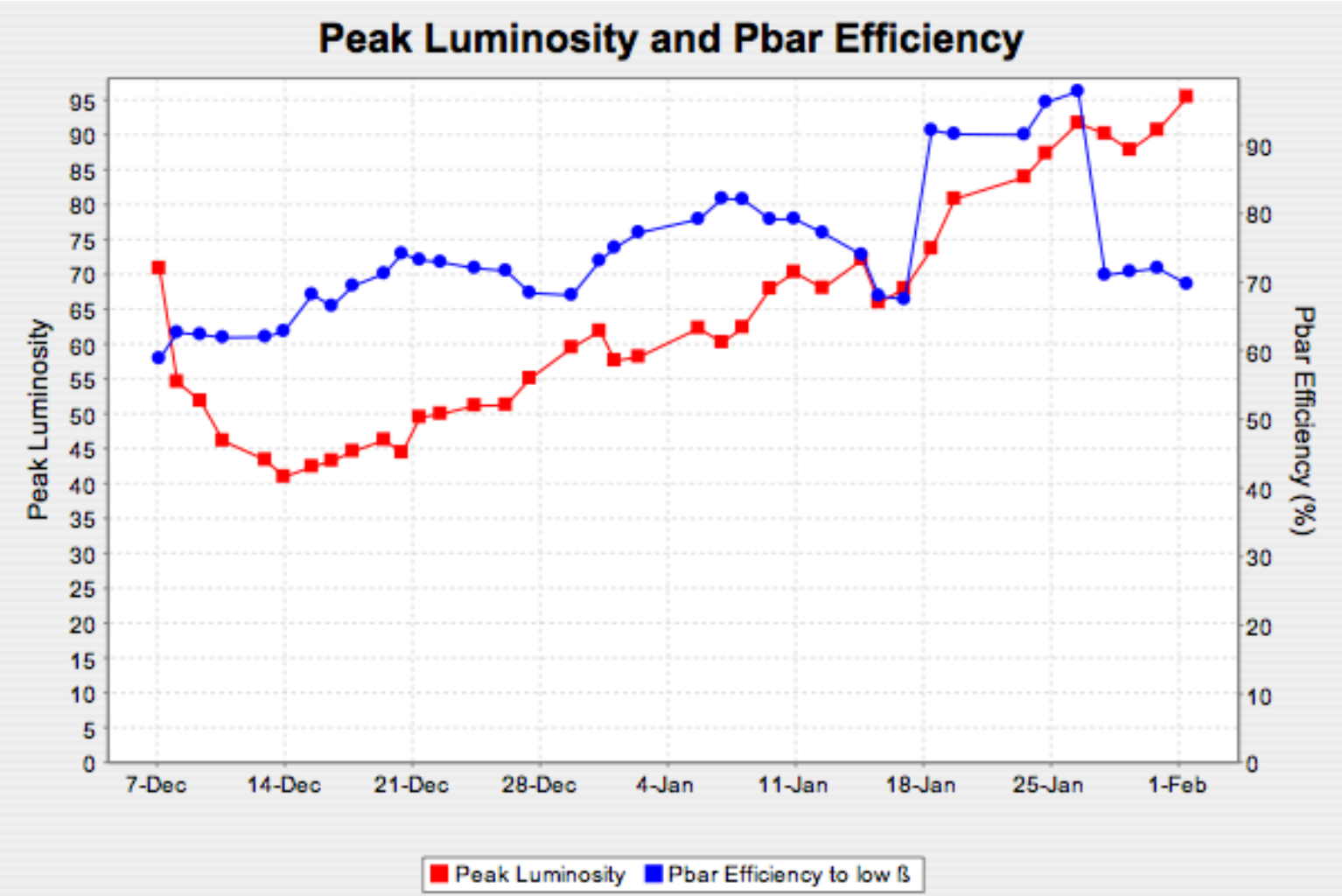


5 Store Running Average

FY05 Average Store Hours per Week



Peak Luminosity and Pbar Efficiency

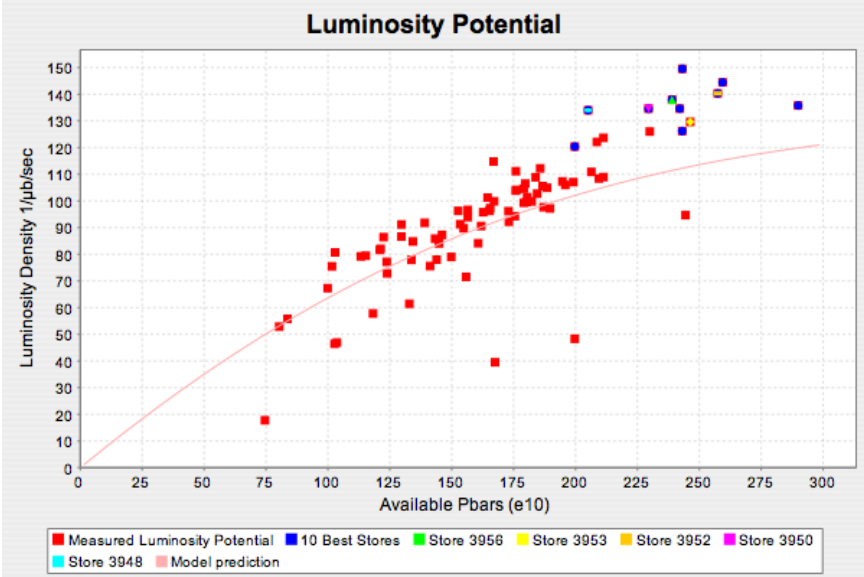


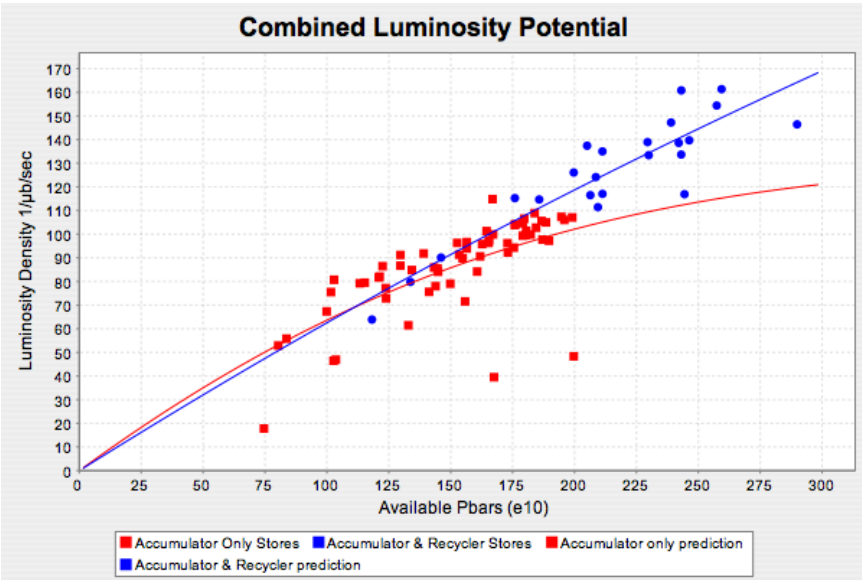
5 Store Running Average

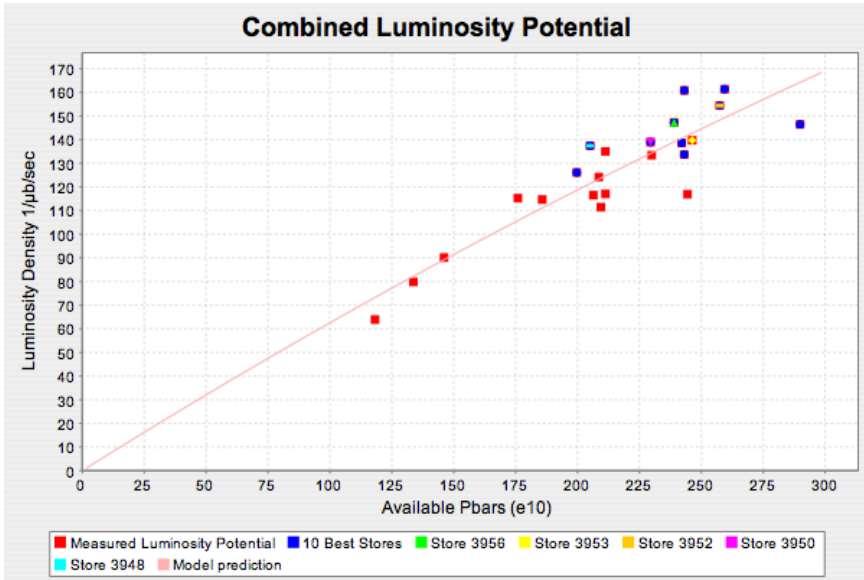
Data Summary Table

		Luminosity Parameters							
Parameter	Last Store	Best Store	Last 10 Stores (Ave)	Best 10 Stores (Ave)	FY Average	Previous FY	FY End Goal (Design)	FY End Goal (Base)	
Initial Luminosity (Average)	84.9	104.8	84.3	97.6	62.7	71.1	96.1	80.7	$x10^{30}cm^{-2}sec^{-1}$
Integrated Luminosity per Store (Avera	808.5	4811.8	3193.6	3740.8	2241.8	2660	3369	3190	nb^{-1}
Luminosity per week (Averaged)	-	-	13.9	-	10.2	11.8	16.8	12.7	pb^{-1}
Store Length	3.2	33.2	24.4	28.1	21.3	24.5	20	25	Hours
Store Hours per week	-	-	106.4	-	97.4	108.3	100	100	Hours
Shot Setup Time	2.9	2.5	2.8	2.9	3	2.6	2.6	2.6	Hours
		TEVATRON Parameters							
Parameter	Last Store	Best Store	Last 10 Stores (Ave)	Best 10 Stores (Ave)	FY Average	Previous FY	FY End Goal (Design)	FY End Goal (Base)	
Protons per bunch	225.6	237.1	227.1	238.1	213.2	247.3	260	260	$x10^{9}$
Antiprotons per bunch	36.2	42.8	33.5	39.1	27.9	30.1	42	34	$x10^{9}$
Proton Efficiency to Low Beta	64.6	67	65.8	69.2	60.6	72.7	-	-	%
Pbar Transfer efficiency to Low Beta	63	69.5	81.5	162.5	74.9	88.6	76	74	%
HourGlass Factor	0.67	0.67	0.67	0.67	0.67	0.68	0.65	0.65	
Initial Luminosity Lifetime	0	0	0	0	0	0	0	0	hours
Asymptotic Luminosity Lifetime	0	0	0	0	0	0	0	0	hours
Effective Emittance	15.9	16	14.9	15.5	16.1	18.1	18.5	17	π-mm-mrad
		Antiproton Parameters							
Parameter	Last Store	Best Store	Last 10 Stores (Ave)	Best 10 Stores (Ave)	FY Average	Previous FY	FY End Goal (Design)	FY End Goal (Base)	
Zero Stack Stack Rate	12.4	12.5	13.2	12.8	11.6	20.2	24.5	14	$x10^{10}$/hour
Normalized Zero Stack Stack Rate	2.2	2.2	2.3	2.3	2.1	2.3	3.1	2.3	$x10^{-2}$/hour
Average Stacking Rate	7.4	5.5	6.8	6.5	6.3	6.2	10.1	6.6	$x10^{10}$/hour
Stacking Time Line Factor	77.7	61.4	73.9	76.3	76	77.9	75	75	%
Stack Size at Zero Stack Rate	384.7	377.9	381.6	319	376.2	325.8	300	300	$x10^{10}$
Protons on Target	5.7	5.6	5.7	5.4	5.4	5.3	8	6.2	$x10^{12}$
Start Stack	246.6	257.7	217.4	240.2	163.9	170.7	216	181	$x10^{10}$
End Stack	36.2	34.7	25.3	30	14.6	15.8	15	15	$x10^{10}$
Unstacked Pbars	210.4	223	192.1	210.2	149.3	154.9	201	166	$x10^{10}$

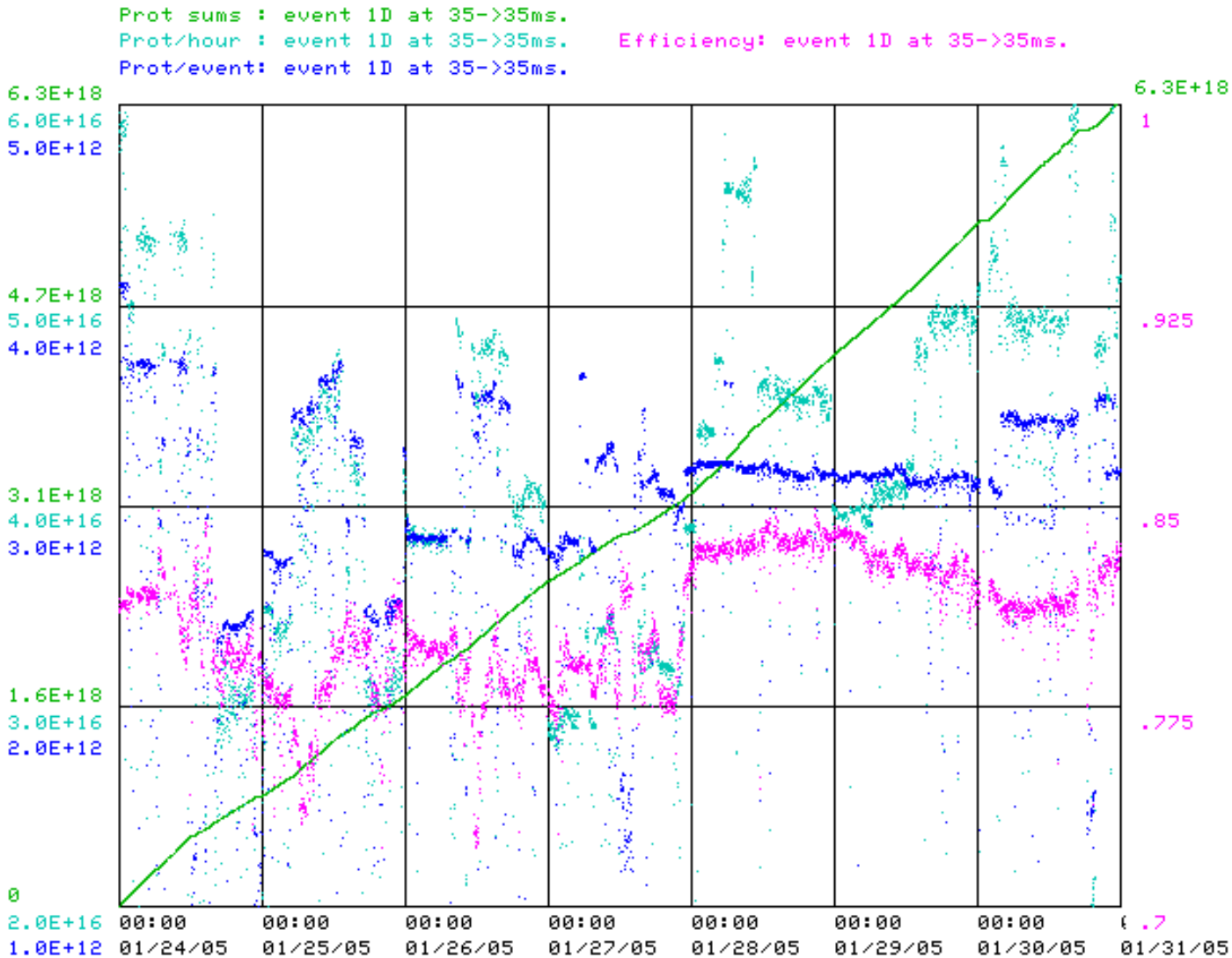
Stack Size Potential







MiniBoone


Prot sums : event 1D at 35->35ms.
Prot/hour : event 1D at 35->35ms.
Efficiency: event 1D at 35->35ms.
Prot/event: event 1D at 35->35ms.
6.3E+18
6.0E+16
5.0E+12
4.7E+18
5.0E+16
4.0E+12
3.1E+18
4.0E+16
3.0E+12
1.6E+18
3.0E+16
2.0E+12
0
2.0E+16
1.0E+12
6.3E+18
1
.925
.85
.775
.7
00:00 01/24/05
00:00 01/25/05
00:00 01/26/05
00:00 01/27/05
00:00 01/28/05
00:00 01/29/05
00:00 01/30/05
01/31/05

Plan for the Week

- Proton Source
  - Continue to tune-up/recover high field orbits
  - Work on slip-stacking beam loss
- Main Injector
  - Find and fix source of intermittent large TBT oscillation for pbar transfers
  - Work on slip-stacking beam loss
  - NUMI multi-batch studies
- Pbar
  - Find and fix source of intermittent large TBT oscillation for pbar transfers
  - Develop time-lines that push the cycle time at intermediate stack sizes
  - Beam Based Alignment
    - Forward Pbar AP2
    - Forward Pbar 3-bump Debuncher Aperture scans
    - Forward Pbar D/A line
  - Optimize Accumulator/Recycler pbar transfers
- Recycler
  - Optimize Accumulator/Recycler pbar transfers
  - Investigate stochastic cooling limitations
- Tevatron
  - Finish octupole studies and implement changes
  - Store-to-store orbit corrections

Commissioning NUMI

- Phase 1 - Beam line commissioning
  - Starting around February 9
  - One study cycle per time line (~ once per minute)
  - Might request short periods of attaching to pbar production cycles
  - Duration 2-3 weeks
- Phase 2 – Multi-batch Commissioning
  - Starting around March 1
  - NUMI cycles attached to every pbar production cycle
    - 1-2 SY120 mixed mode cycles per minute
    - Cycle time varies with pbar stack size
    - Low intensity batches at short cycle times, high intensity batches at long cycle times
  - Phase ends when the Main Injector can support 2.5×10^{13} protons per pulse at 2 sec. cycle time
    - Need definition of acceptable losses and radiation levels in the Main Injector
- Phase 3 – Operation at a fixed cycle time
  - Pbar cycle time limitations accommodated by reducing the amount of pbars brought into the stack as the stack size grows.
    - Unproven technique
    - Extra pulses will place a large burden on pulsed devices
      - Lithium lens production needs to be ramped up by 50%