

Week in Review: 12/2/02 -12/9/02

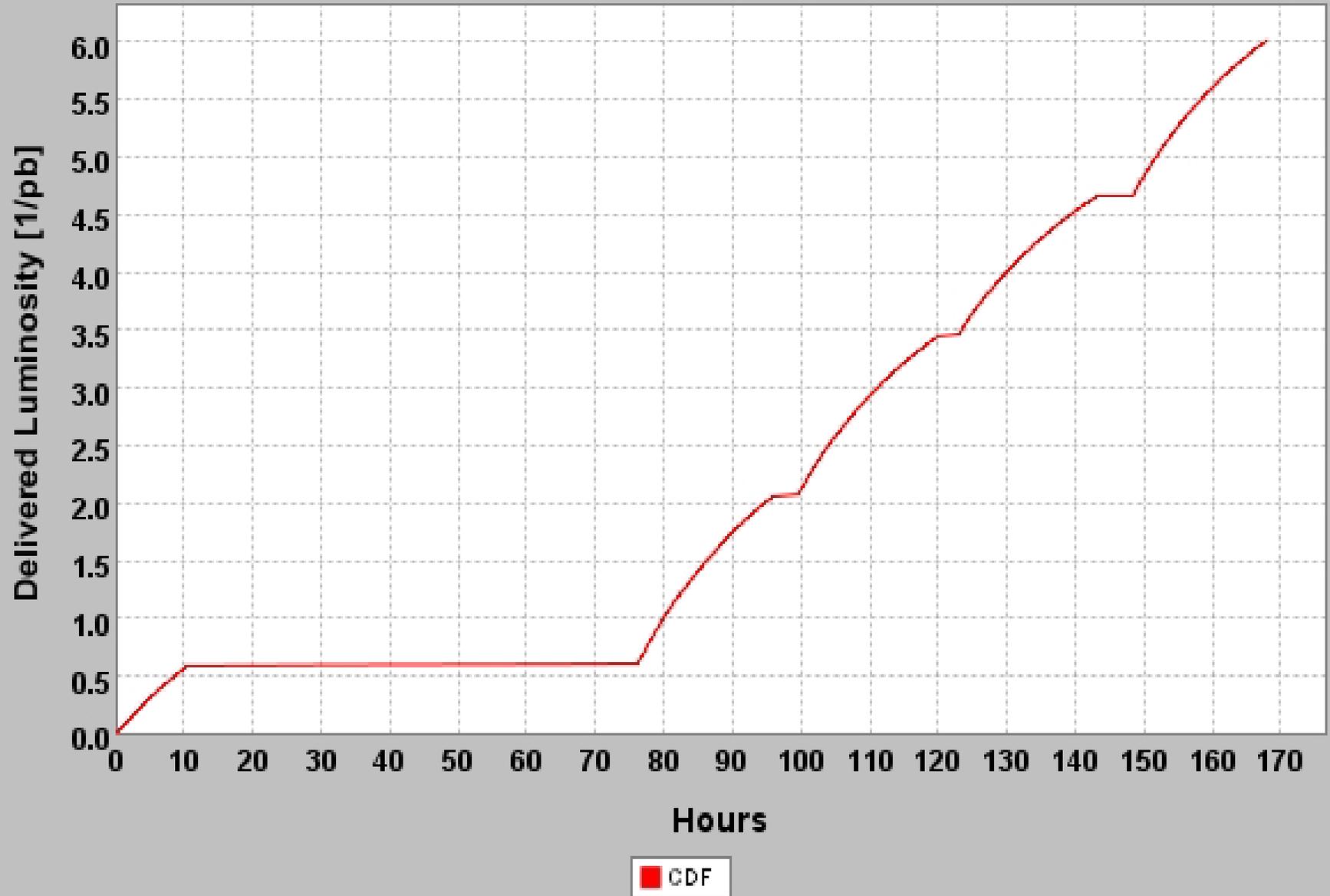
Ron Moore – FNAL

- Store Summary (Studies Week)
- Studies Review
- Schedule for Week

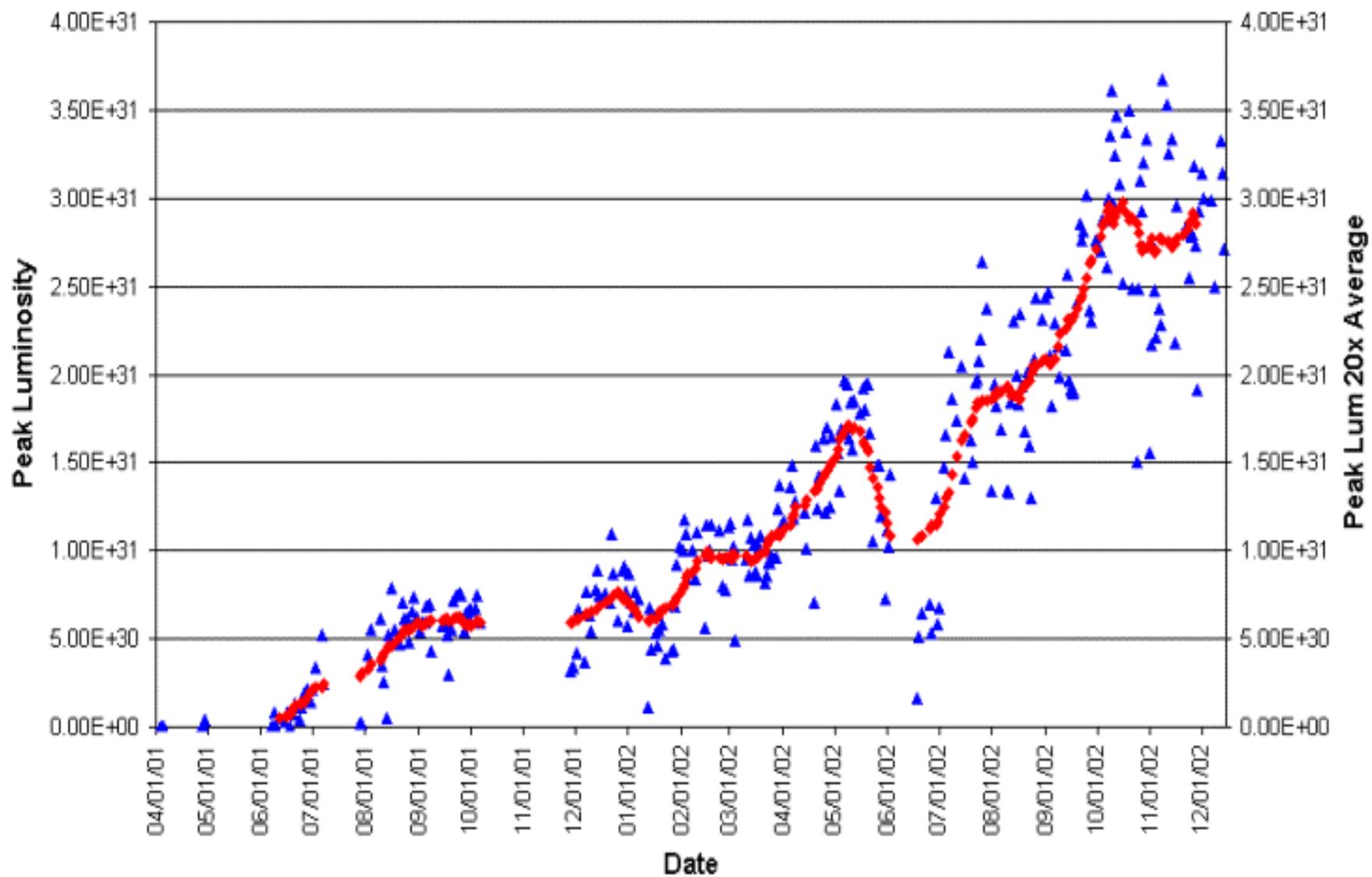
Store Summary

Store	Initial Lumi	Deliv'd Lumi	Termination	Comments
2049	24.8	888	Intentional	Tev dampers off ; pbar RF problem affects coalescing in MI
2070	33.2	1479	Intentional	Tev feeddown changes on ramp; pbar ARF1 problems again
2072	31.4	1383	Intentional	ARF1 problem again, but finally understood
2074	27.0	1215	Intentional	First shot with pbar ARF1 fixed
2076	31.2	1567	Intentional	Minor chromaticity decrease in Tev ramp
2078	28.4	> 500	<i>ongoing</i>	Proton bunch length blow-up at 980 GeV

Tevatron Delivered Luminosity: Dec-09-2002 to Dec-16-2002

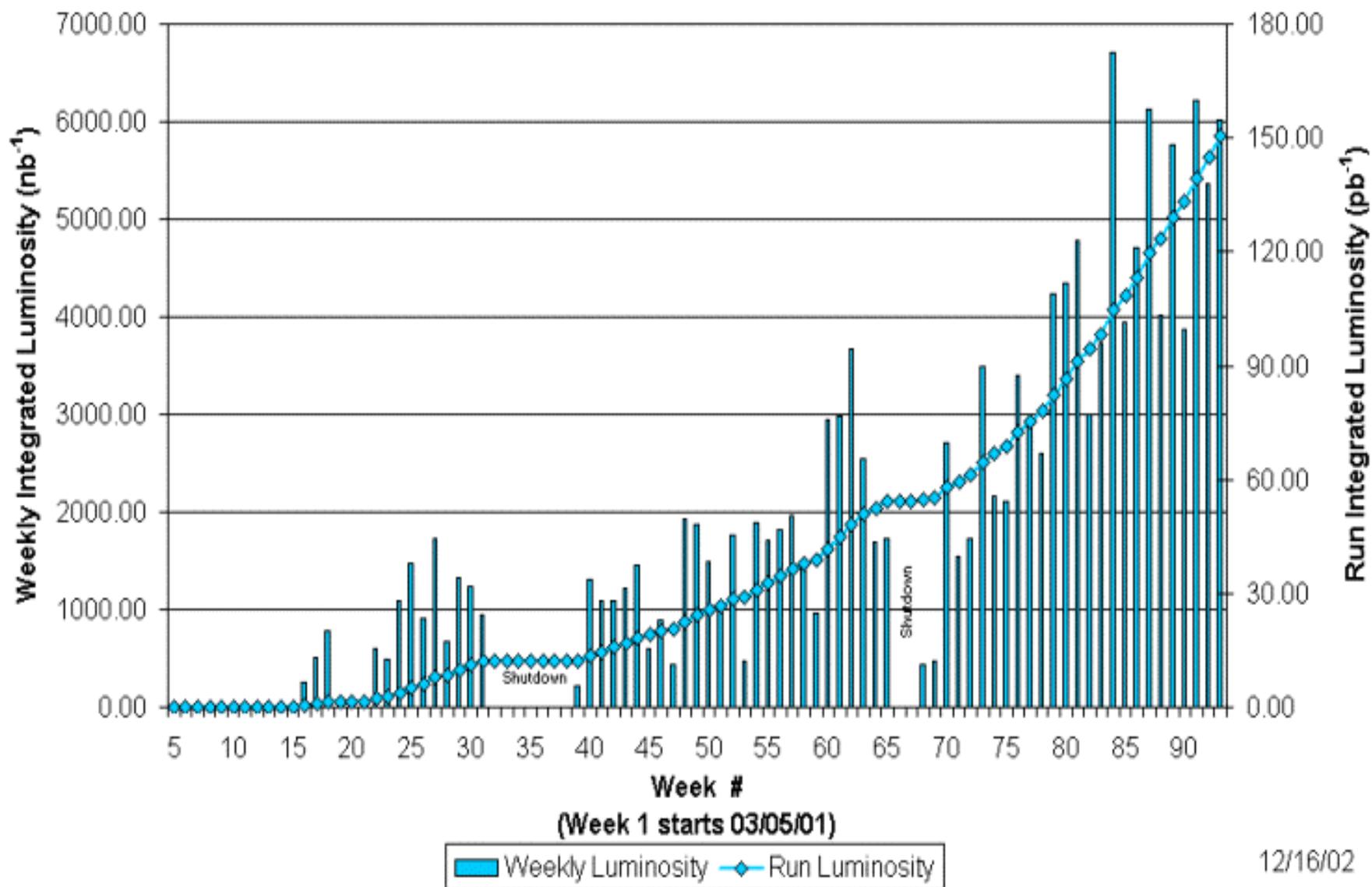


Collider Run IIA Peak Luminosity

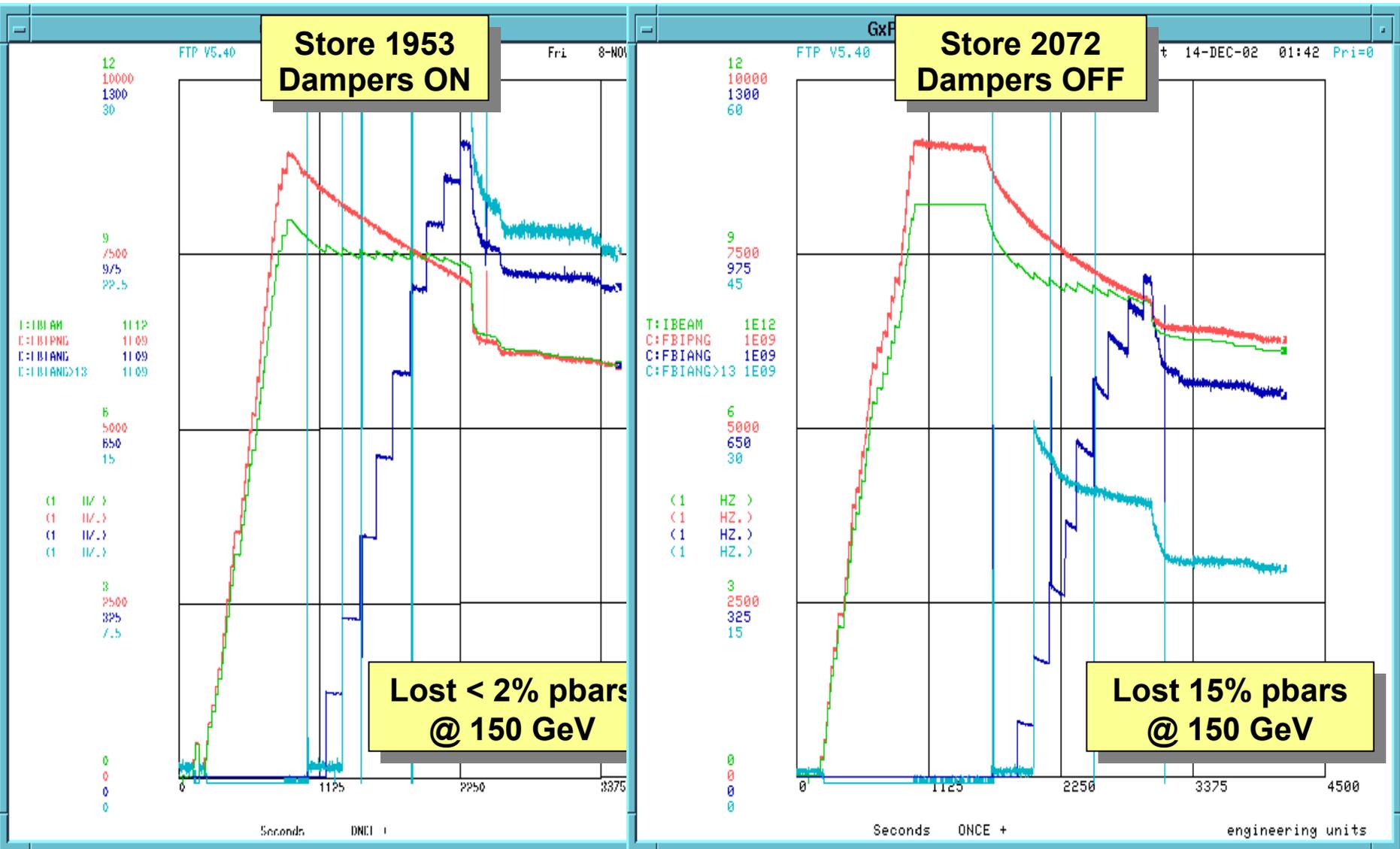


▲ Peak Luminosity ◆ Peak Lum 20X Average

Collider Run IIA Integrated Luminosity



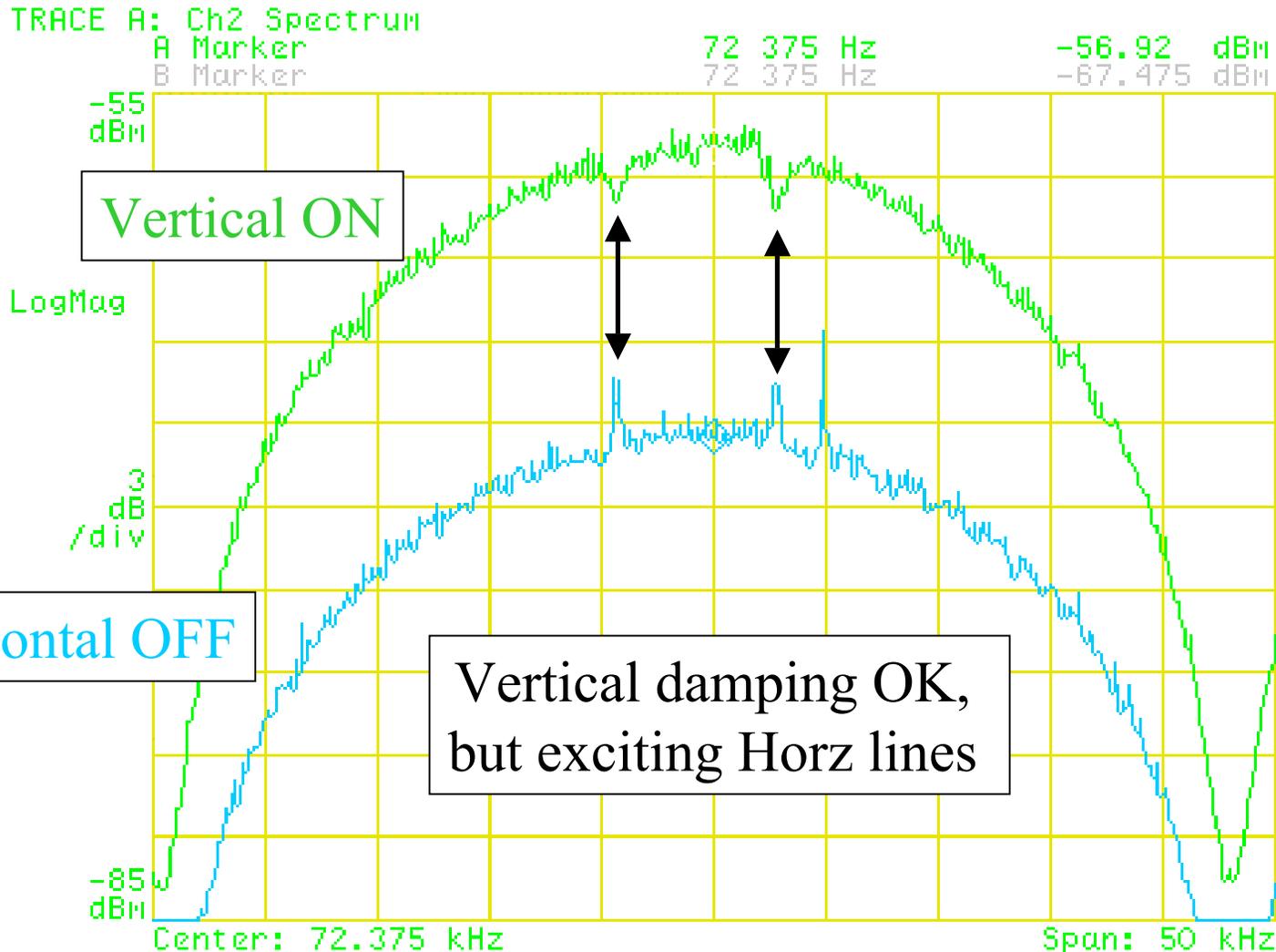
Lifetimes @ 150 GeV with/without dampers



Tevatron Studies

- Emittance Growth up ramp
 - See some growth with uncoalesced and coalesced
 - On central orbit and both helical orbits
 - Still not completely understood
- Adjusted feeddowns on ramp (tunes on helices)
- Transverse dampers
 - Vertical damper causing horizontal excitations
 - Dampers sensitive to Tev coupling
 - Keeping dampers off until noise measurements and coupling adjustments @ 150 GeV are made
- Octupole usage at 150 GeV
 - Can improve proton lifetime at 150 GeV
 - Coupling changes on helix troublesome
 - Needs more study time

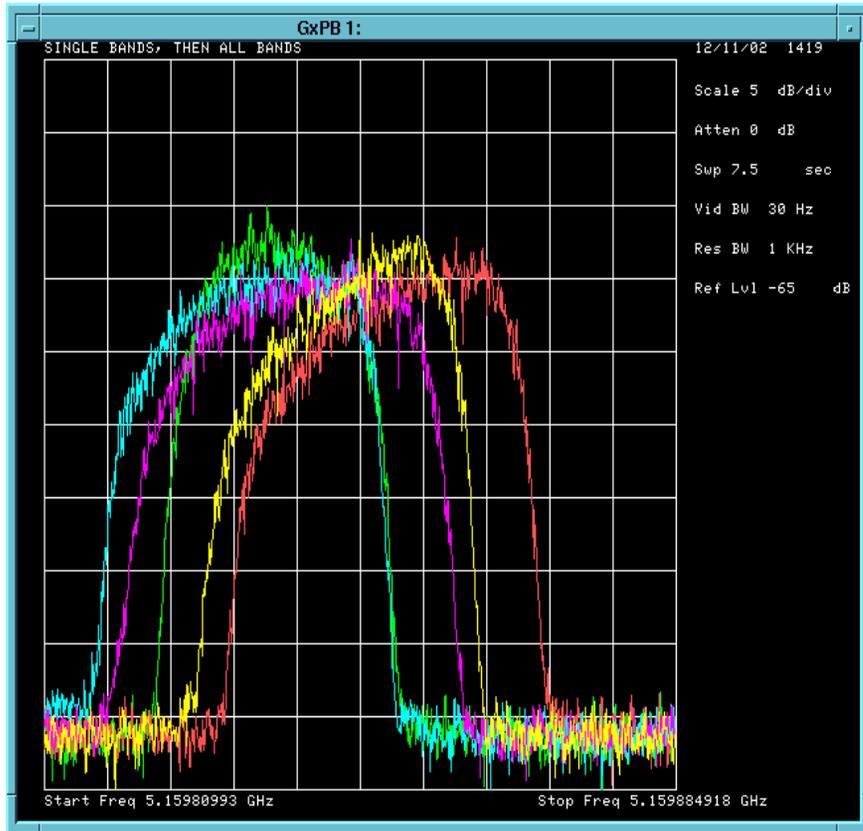
Tevatron Transverse Dampers



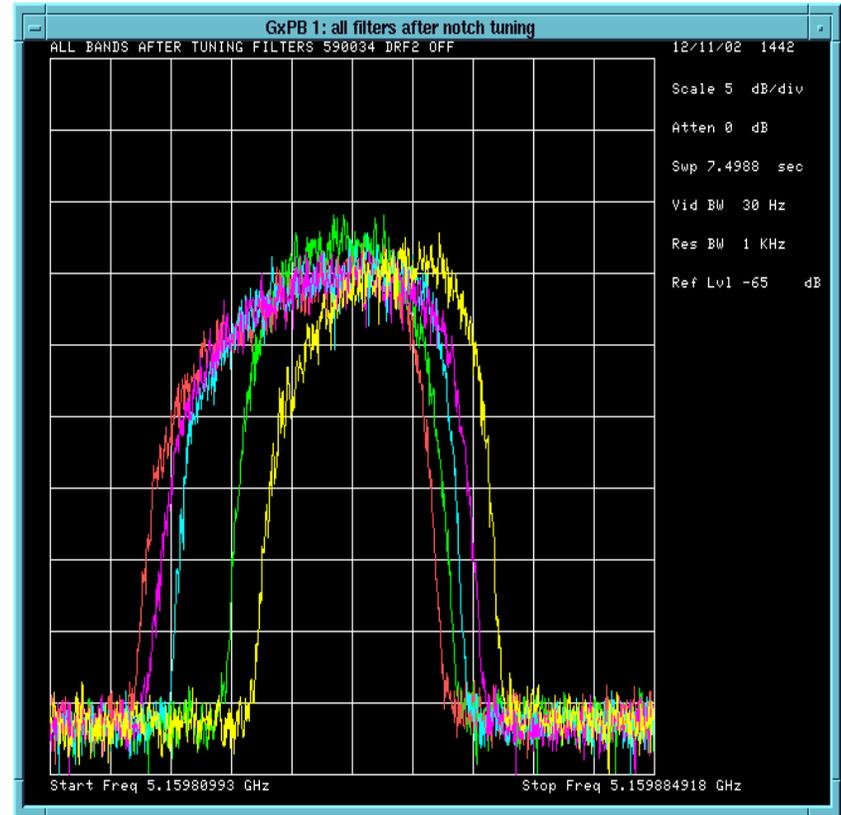
Pbar Studies/Maintenance

- Stacktail compensation with directional couplers
 - Tried with 200 mA stack
 - Suppressed signal from core, but stacking deteriorated
- Ni vs Inconel targeting study
 - 1-2% better yield with Ni for smallest spot sizes
 - Yield is less than models predict
- Aligned Debuncher Notch Filter band #2
- Creating DRF1 curves to bunch reverse protons in 53 MHz (to send up AP2 line)

Debuncher Notch Filters



as found



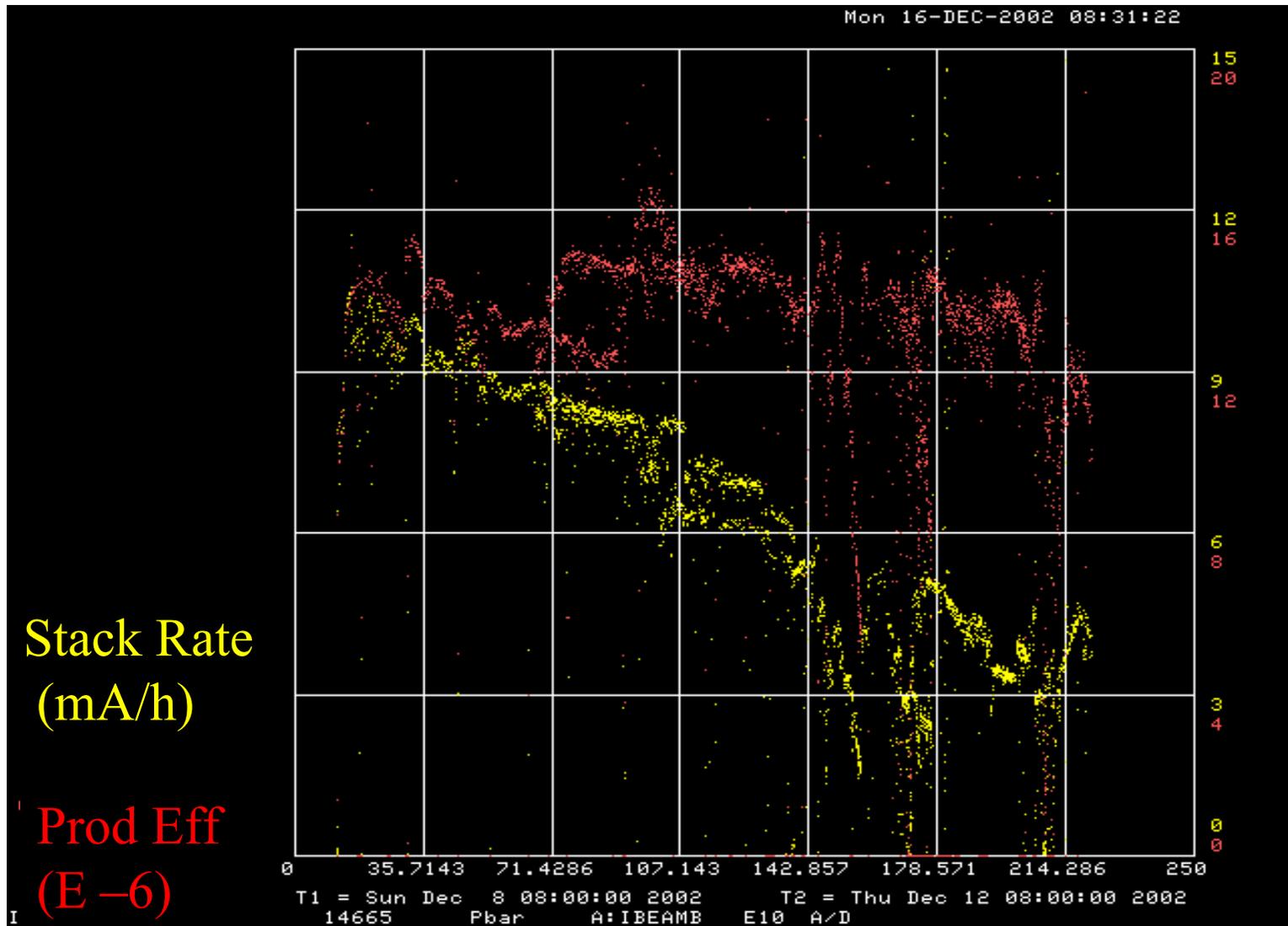
after alignment

Green - PB1 ; Red - PB2; Cyan - PB3; Magenta - PB4; Yellow - all systems

Record Pbar Stack

- Kept stack meant for HEP shot Monday night
- Continued stacking as part of studies
- Accumulated 225 mA stack (previous 221.25 mA)
- Took 2 hours to cool stack before changing lattice
 - Poor lifetime during that time, too.
- No beam lost going to shot lattice, lifetime recovered
- Emittances as expected from smaller stacks
- For shots, extracted 168 mA from 213 mA, took rest back to stacking lattice for next HEP shot

Pbar Production Versus Stack Size



Other studies

- Main Injector
 - Continued 27 GeV coalescing/2.5 MHz studies
 - Continued proton slip-stacking studies
- Recycler
 - Completed aperture scans
 - Measured admittance = 64π (H), 46π (V)
 - Measured momentum aperture = 1.5% full width

Maintenance

- Linac RF station 5 – PA replaced (again!)
 - Tube had only ~6000 hours
 - Tube in place had been rejected by manufacturer
 - Have only one spare
- A3 cryo vacuum
 - Dead turbo cart replaced
 - Vacuum spoiled in repair, took long time to recover
- ARF1-2 phase feedback
 - Preventing pbars from having nice 53 MHz structure
 - Adjusted feedback signal drifted out of stable region

Dedicated Pbar Shots to Recycler

- Elvin Harms is coordinator
- Charge from Steve Holmes
 - “The goal is to achieve in a reliable manner an 85% stacking efficiency in the Recycler and shot times (defined as the interruption in Pbar Source stacking) of under an hour.”
- After every HEP shot...
 - Take leftover pbars back to stacking lattice (~10 mA)
 - Stack to 30 mA, shoot to Recycler
 - Tune up transfer lines while stacking
 - Begin stacking for next HEP shot
- No more “shots off bottom” from shot lattice
- No shots to Recycler during studies periods
- Expect < 10% drop in delivered luminosity

Weekly Schedule

Update 12/16/02 11:32 AM	MONDAY 12/16/02	TUESDAY 12/17/02	WEDNESDAY 12/18/02	THURSDAY 12/19/02	FRIDAY 12/20/02	SATURDAY 12/21/02	SUNDAY 12/22/02
Owls 0000 to 0800	Stack and store	<u>TEV</u> - Store - EOS @ 0400 <u>Pbar</u> - Stacking - 0555 Beam Off 0600-0800 No access, Safety System Tests	<u>TEV</u> - All Line Emitt. Growth - Head/Tail Mon. <u>Pbar</u> - Stacking <u>ML/RR</u> - Parasitic Studies	Shot Setup Shots Store -		Stack and Store	
DAYS 0800 to 1600	<u>TEV</u> - Store <u>Pbar</u> - Shots to RR <u>ML/RR</u> - Shots to RR	<u>NIF - PT</u> 0800 C/A in Linac, Booster, Tev CDF/D0 - S/A (NOT F-Sector, MI, & MI 8) more SS Tests 1400 controlled access to MI	<u>TEV</u> - Feeddown Coupling 150 Gev <u>Pbar</u> - Rev Prot. Deb/AP2, Orbits <u>ML/RR</u> - Parasitic Studies		<u>NIF - PT</u>	Stack and Store	
EVES 1600 to 2400	<u>TEV</u> - Store <u>Pbar</u> - Shots to RR <u>ML/RR</u> - Shots to RR	1700-2000 Startup <u>TEV</u> - Chromaticity up the ramp - Tune Tracker <u>Pbar</u> - Stacking <u>ML/RR</u> - Parasitic Studies	<u>TEV</u> - Ramp Bunch loss - Main./36x0 <u>Pbar</u> - Stacking 120mA <u>ML/RR</u> - Parasitic Studies			Stack and Store	

Summary

- Best delivered luminosity with studies: $\approx 6 \text{ pb}^{-1}$
- Record pbar stack = 225 mA
- Elvin Harms coordinating stacking and pbar shots to Recycler after every HEP shot
- Shutdown 12/17 for safety system tests and accesses (06:00 – 17:00)
- 3-3.5 shifts of dedicated studies this week
 - Try to get Tev transverse damper(s) back on for HEP shots
- Resume “stack and store” following studies until week after Christmas