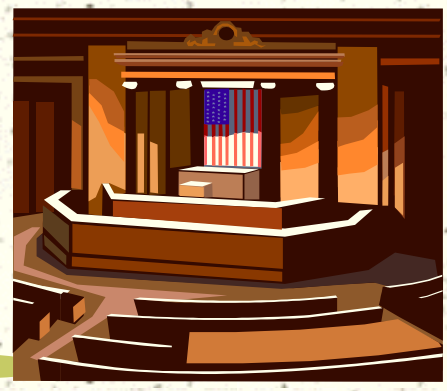
Proton Source Department Meeting

February 20, 2003

Agenda

- New People
- Budgets and performance overview
  - McCrory
- Progress reports (informal)
  - McCrory: 7835 spares
  - Prebys: Recent Studies
  - Kasper: Collimator Shielding
  - Lackey: MP02 & other new stuff in the tunnel
  - Pellico: Dampers, etc.
  - Martin: Vacuum, power supplies, etc.
  - Butler: Linac LEL water system
  - Wahl/Rimsa: Linac Spares Database
  - Did I miss anyone?

Budget Stuff

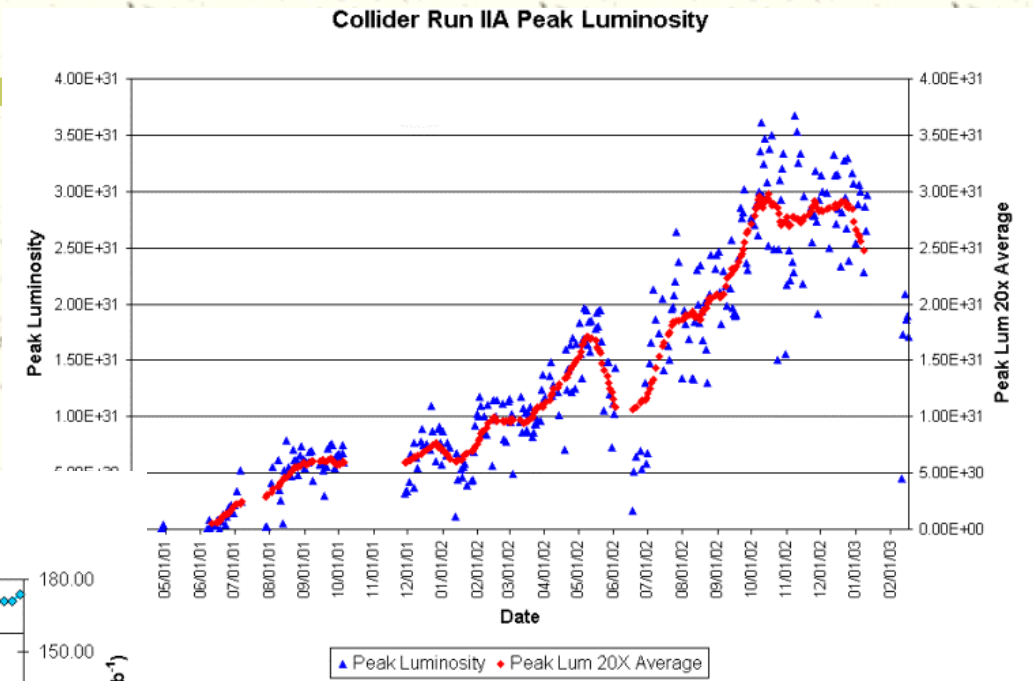


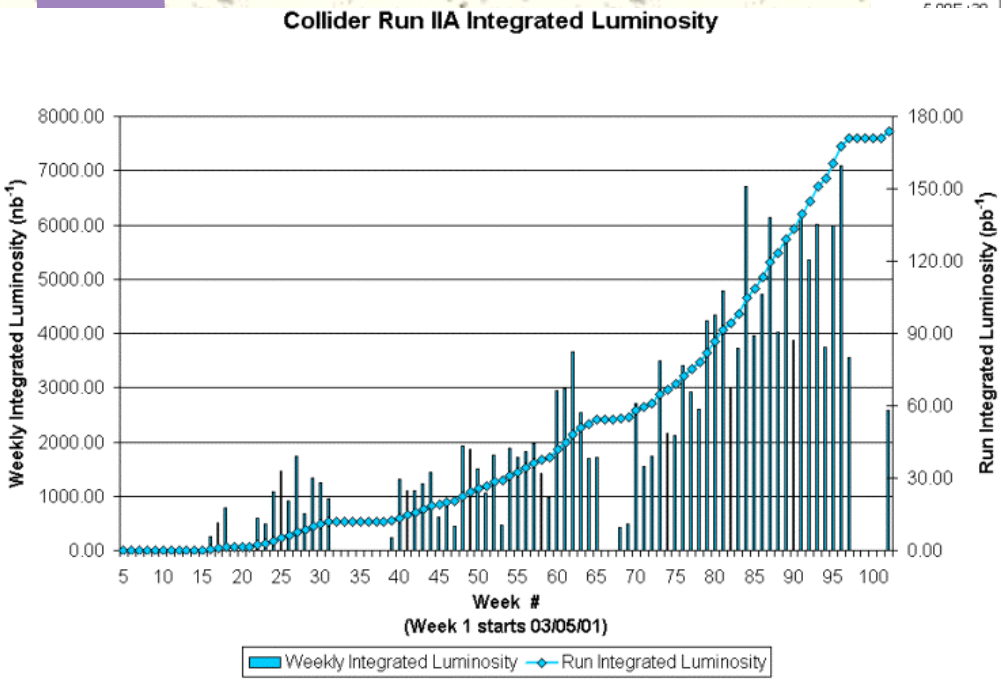
- Has Congress passed a budget for FY03?
  - 12 continuing resolutions so far!
  - No guidance, yet, on how much money we'll actually be getting
  - Harlan's prediction: - 151k$ to -721k$ for the year for BD
- Outlook for coming years?
- WBS is coming, April 1, 2003
  - Budget codes→WBS numbers
  - FBO→some number, like 1.4.3.2.1.1

New People in Proton Source!

- You all know:
  - Chuck Ankenbrandt
  - Craig Drennan
- As of today, we also have:
  - Yang Xi
- Where are they going to sit????

Run II Progress so far

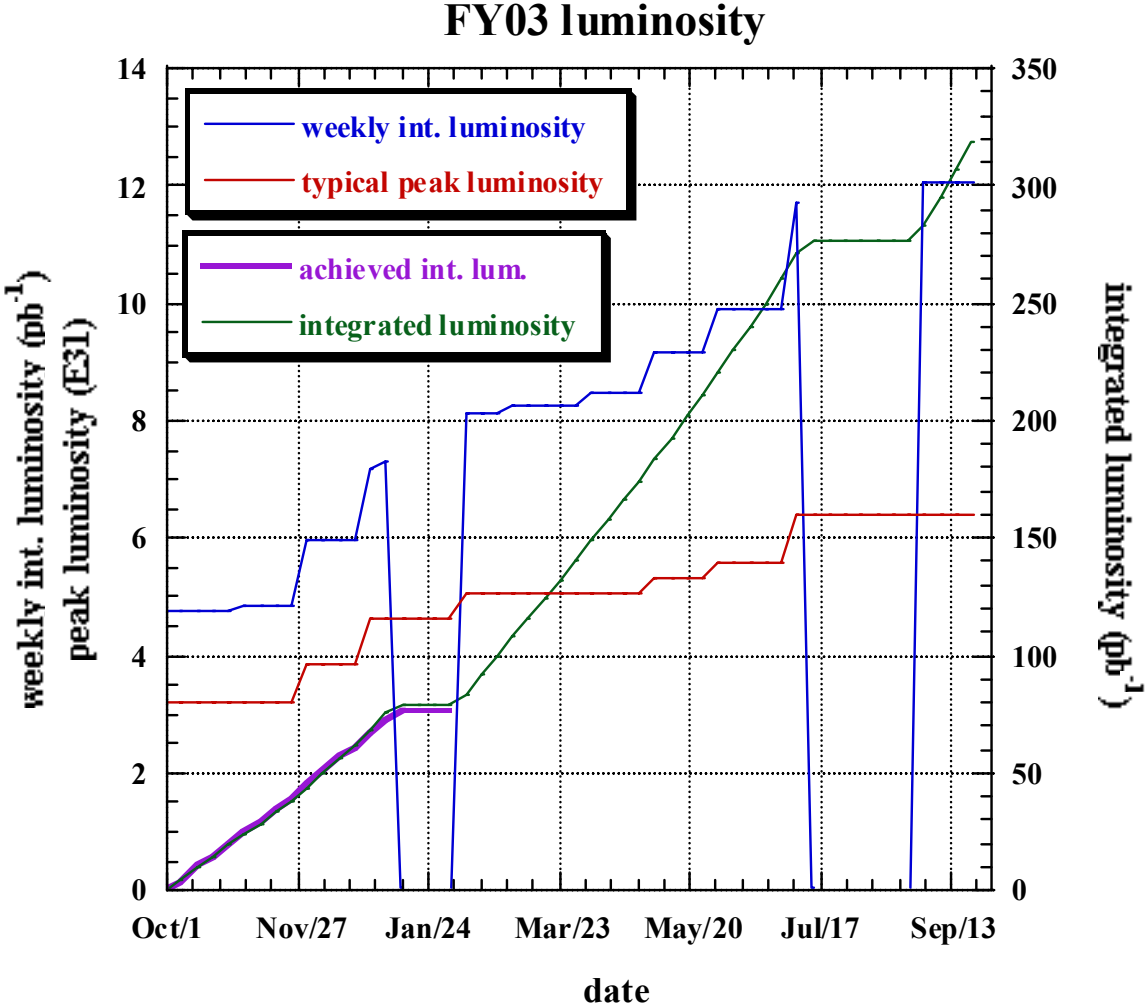




Status on Luminosity Parameters

	best parameters to date	highest luminosity to date	FY03 goals
max. antiproton stackrate (E10/hr)	13.1		18
max. antiproton stacksize (E10/hr)	213	167	200
pbar xfer eff.	.76	.60	.80
pbars/bunch at low beta (E9)	26.4	25.0	31.0
protons/bunch at low beta (E9)	211	163	240
emit. at low beta (π-mm-mrad) (average of p, pbar)	12.1	16.5	17.5
peak luminosity (E31 $cm^{-2}sec^{-1}$)		3.7	6.6

Integrated Luminosity Performance and "Stretch" Goal for FY03



Summary

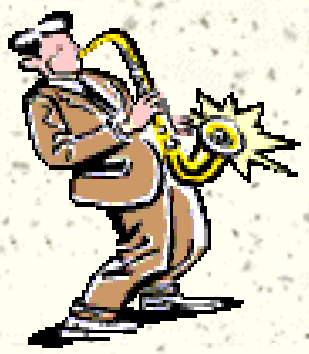
- **Factor of 3.7 increase in peak luminosity in CY02**
- **Increased stacking rate and Accumulator stack size**
- **Significant improvement in Recycler operations**
- **Reduced downtime**
- **Progress on instrumentation**
- **Improvements in theoretical understanding of issues**

- **Plan of action for continuing improvements in luminosity**

Run II planning

- "Run II" project (WBS) coming
  - We no longer are calling it "Run IIb"
  - Jeff Spalding and Dave McGinnis
  - How do we get 15 fb^{-1} in 2008?
    - Beam/beam interactions in the Tevatron.
    - Pbar flux, with Recycler.
    - 132 nsec bunch spacing? Probably not.
    - Electron Cooling priority and backup.

Proton Source Performance



- Linac: Many more beam pulses than ever before
- Stacking: 4.6E12 ppp at 2 seconds
- MiniBooNE: 3.1E12 ppp at 4.5 Hz!
  - Recently saw 4.2E16 protons per hour
    - Experimental goal: 8E16 pph

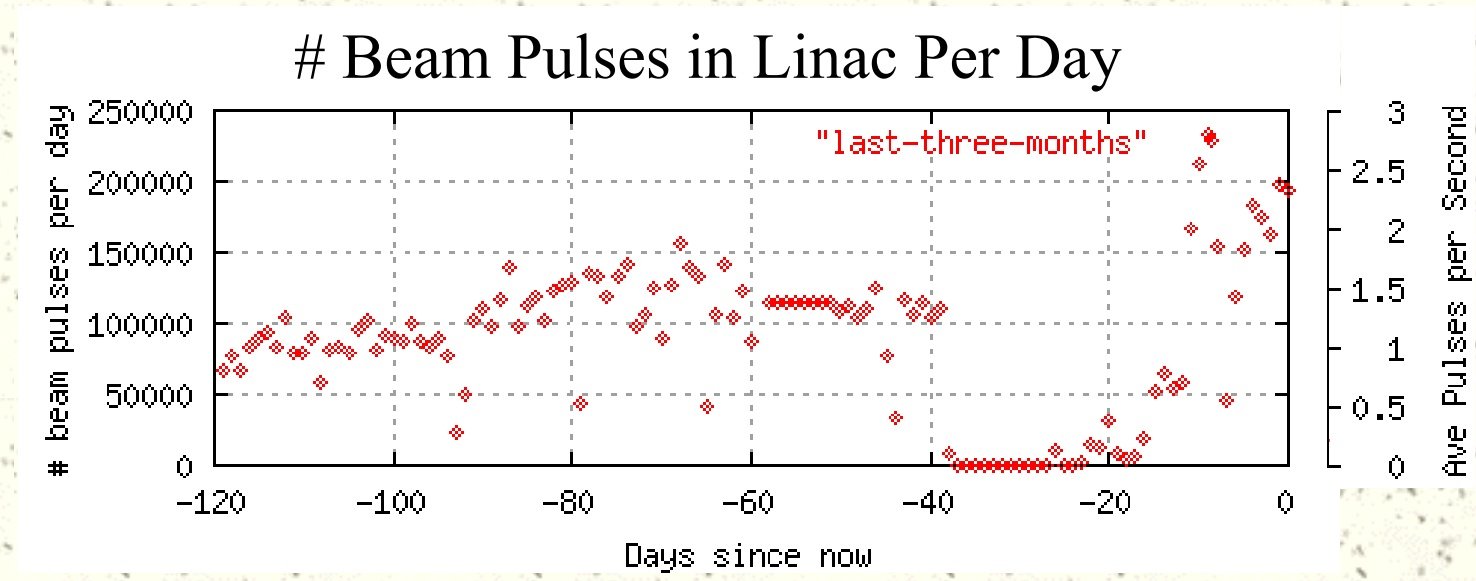
Note From Roger Dixon

Eric,

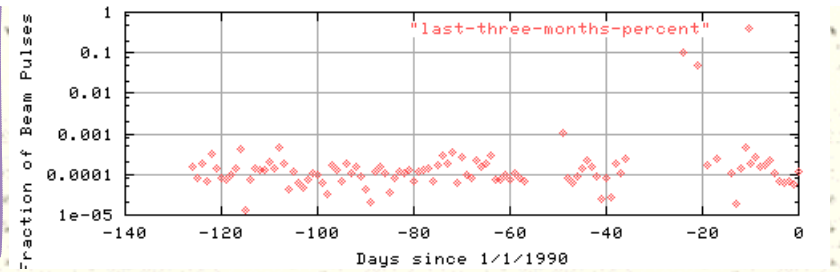
Great job! Thanks for the note. Please pass my congratulations on to all the people who have worked hard to make this breakthrough possible. It is quite impressive, and it catches me by surprise. That's the kind of surprise I like!

Roger

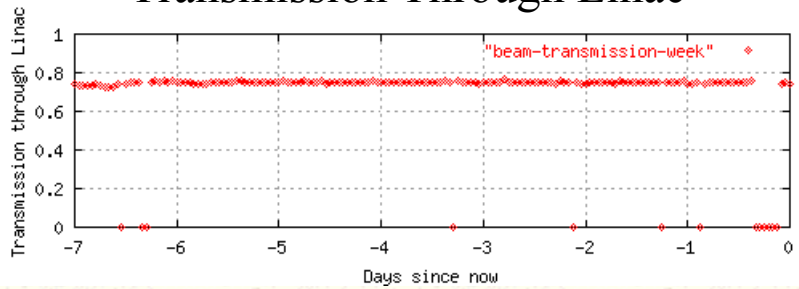
Linac Beam Pulses per Day



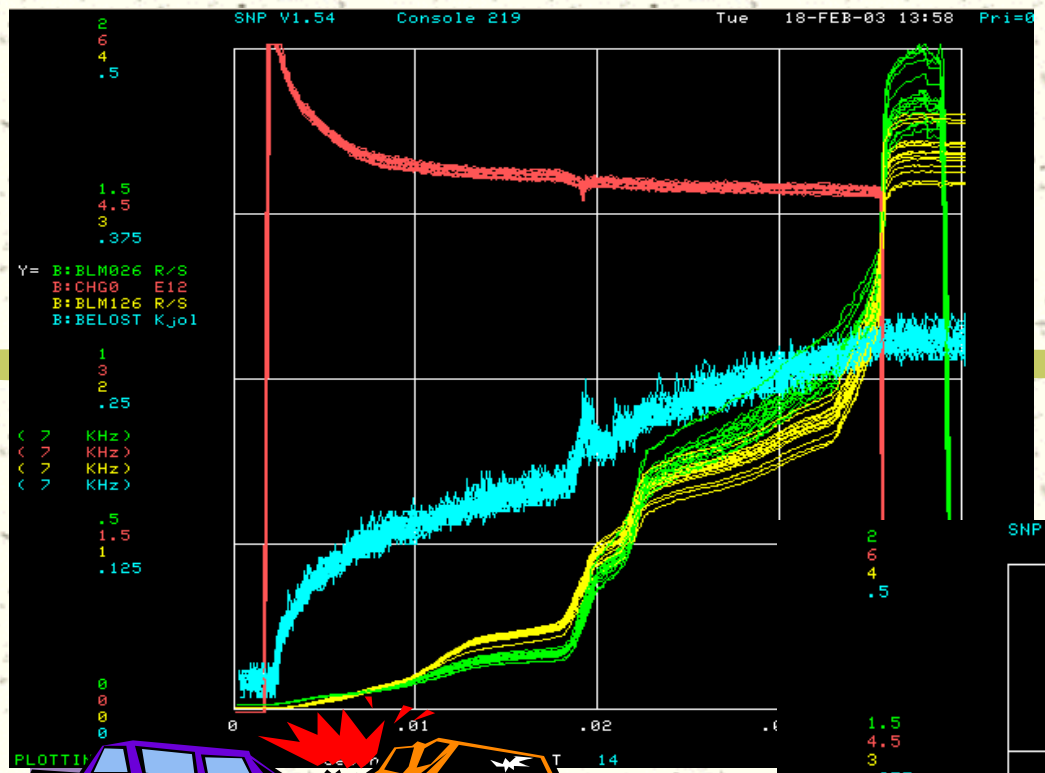
Fraction Beam Pulses Lost in Linac Per Day

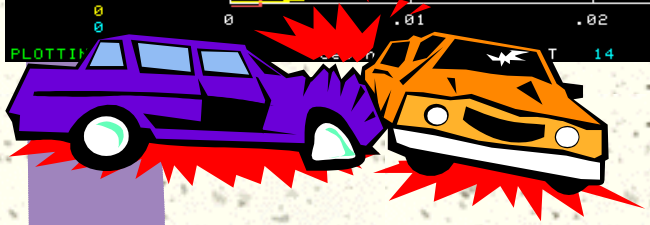


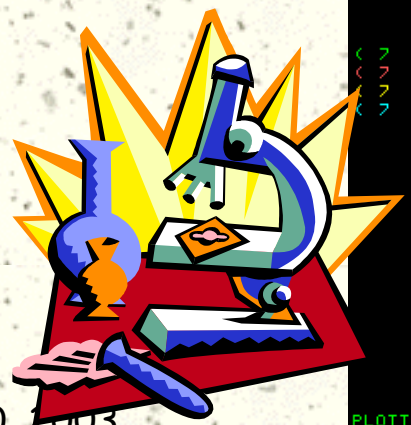
Transmission Through Linac

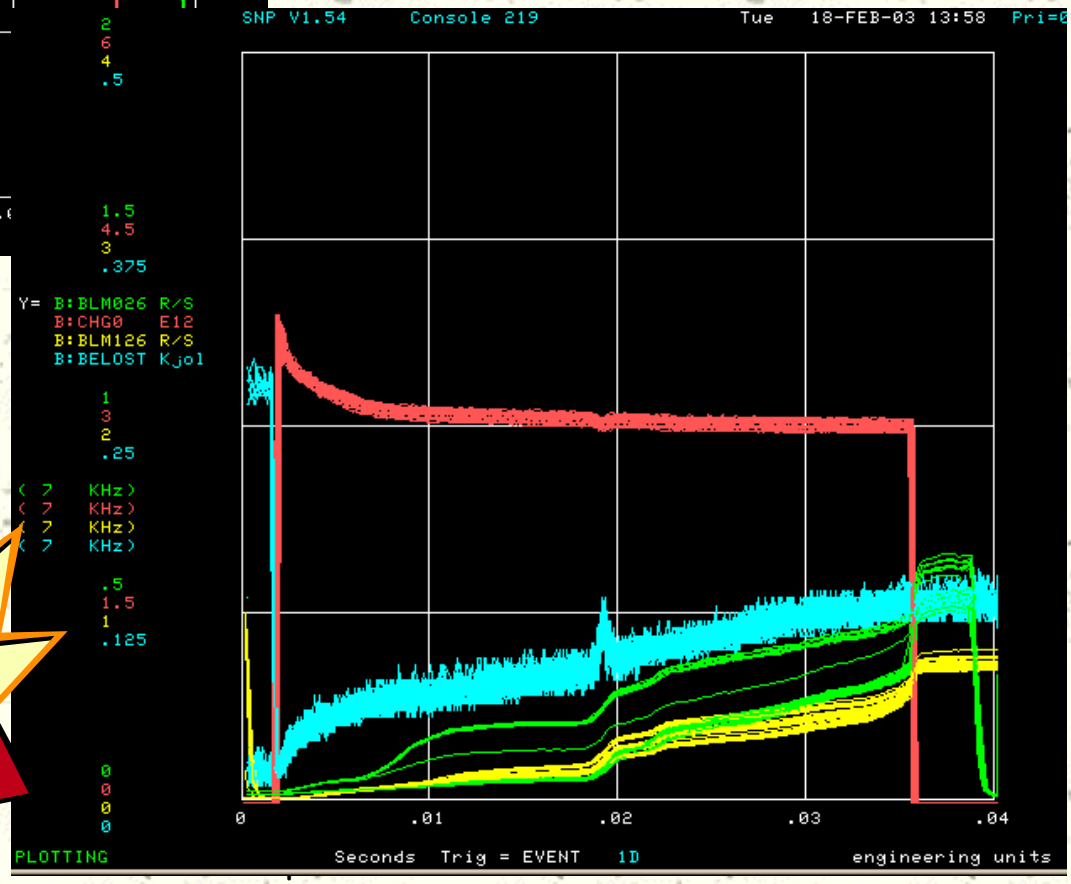


Stacking & MiniBooNE

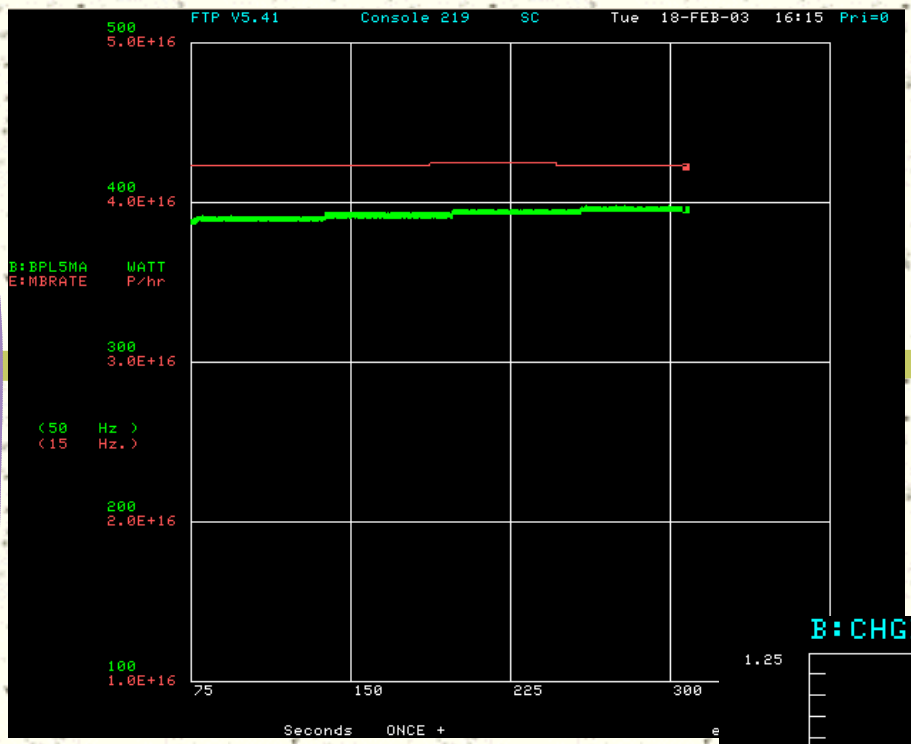


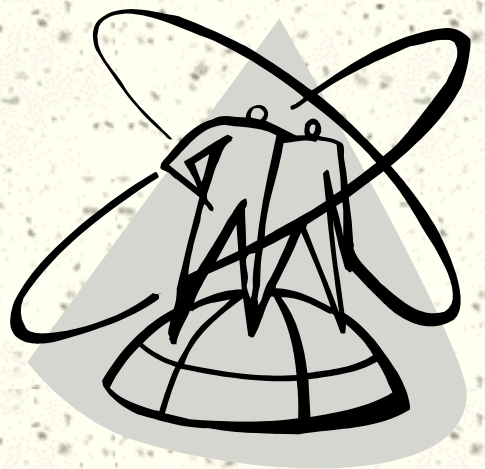


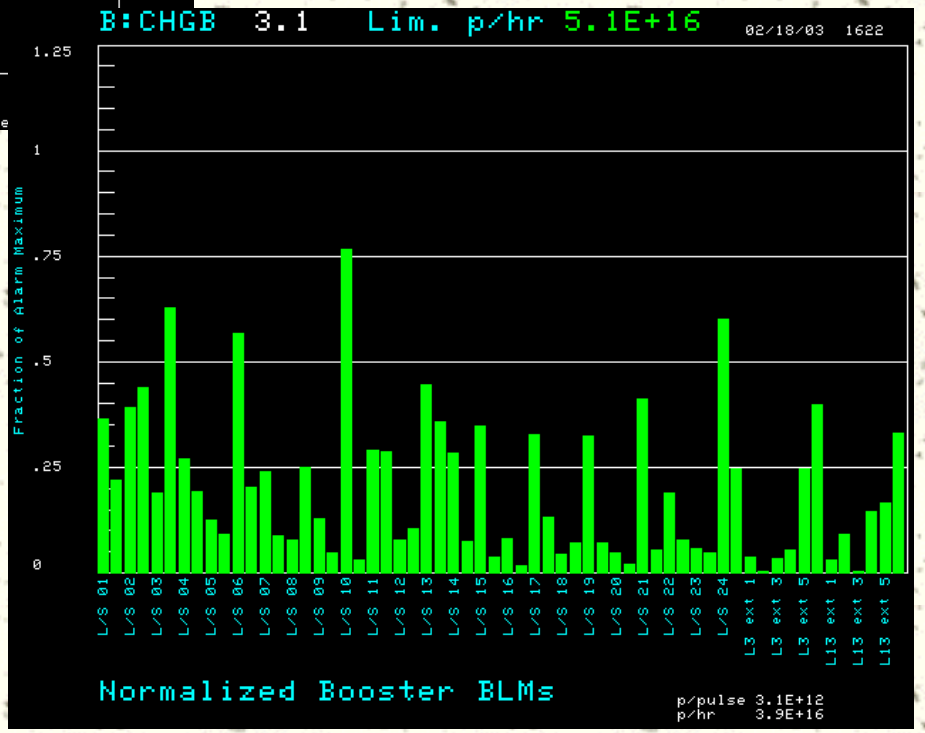




Booster Losses







MiniBooNE-only Time Line

Tuesday afternoon

D69 TLG(VME) Released 07-AUG-2001 10:40:00 18-FEB-03 16:18:39 ♦Pgm_Tools♦

TIMELINES | modules | module states | misc

TLG F/E STATUS WINDOW

Current : 15) General Purpose TLG (EDIT AS NEEDED FOR SHIFT) 60 REPEAT RUNNING

Next : NONE

TLG F/E : Responding SuperCycle Time : 57.4 Sec(s)

♦Status♦

TIMELINE EDIT WINDOW

BOO: 4.7 5.0 Hz ♦Plot♦ ♦Save♦ ♦Activate♦ ♦Delete♦ ♦Cycle Length♦ 60

NTF: %

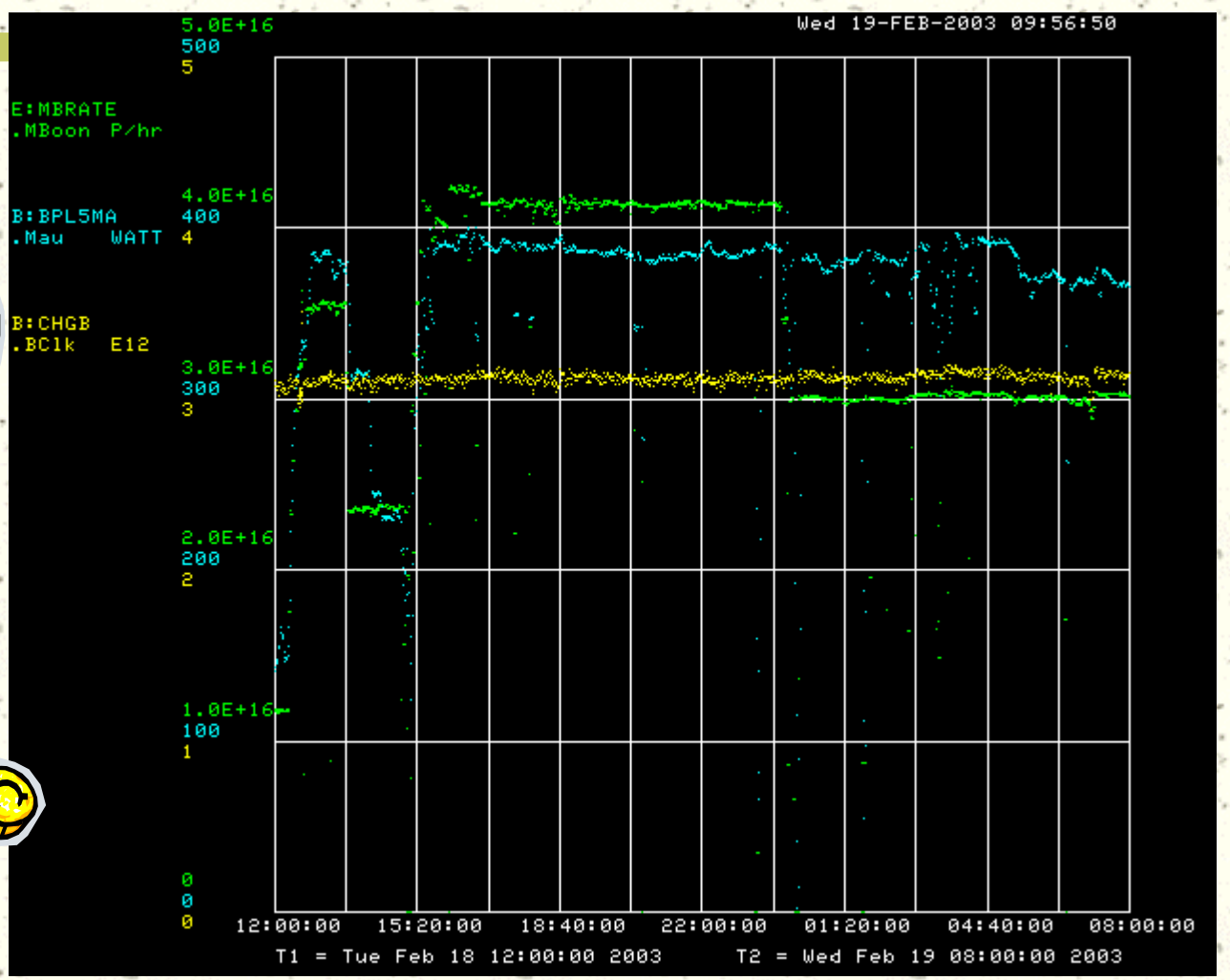
♦ TIMELINE NAME ♦ <General Purpose TLG (EDIT AS NEEDED FOR SHIFT)> ID = -<15>+

Click On Module To Select

	#	Modules ♦Expand♦ ♦Devices♦	♦Computed Values♦ Repeat Rate	Start Time	# Times		♦Diagnostics♦ End Time	Total Time
	1	Tevatron Ramp reset (Collider)	219	0	0	♦fixd♦	0	xxx.xxxx
*	2	Collider Protons to Tevatron	43	0	1	♦fixd♦	43	3.53333
	3	149.6GeV:slow accel. using 2.5 MH	13	20	1	♦fixd♦	33	32.8667
	4	$80 only for PS testing	10	6	3	♦fixd♦	36	26.0667
	5	Reverse Protons from MI to Pbar	40	8	2	♦fixd♦	88	53
*	6	RR study: 2.5Mhz state 4 batch I	30	45	0	♦fixd♦	45	xxx.xxxx
*	7	120 GeV Protons MI to MI Abort Fo	10	43	1	♦fixd♦	53	44.5333
*	8	Stacking	3	0	0	♦fixd♦	0	xxx.xxxx
	9	Reverse Protons from Tevatron to	30	11	0	♦fixd♦	11	xxx.xxxx
	10	MiniBoone Test - single 1D	2	.2	30	♦fixd♦	60.4	58.6
	11	Booster study	10	.4		♦fixd♦	.4	xxx.xxxx
	12	MINIBOONE (0X1D) GENERATED BY F/E	.06667	.4	174	♦pack♦	60	60

1:13 of 13

Averaged 4E16 pph Tues Eve



Linac 7835 Spares

- We have one spare
- Brookhaven can, in principle, help us.

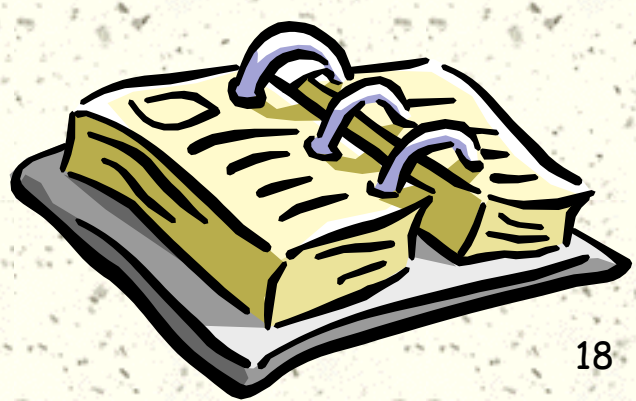
Station	Tube S/N	Gradient	Filament A	Hours	*Days*	Fraction of median* life	Prob of failure this week
1	A20R7	1	6756	17888	*745*	1.13	0.056
2	A1R8	1.02	6644	976	*40*	0.09	0
3	Y3R9	0.89	6787	2547	*106*	0.23	0
4	K7R2	0.98	6810	6711	*279*	0.62	0.007
5	Y2R7	1	6761	1527	*63*	0.14	0
7	N14R6	-0.02	186	11723	*488*	1.09	-

*Median lifetime for tubes is about 10750 hours (15750 for tank 1). This is 447 days (656 for tank 1).

Total probability of a 7835 failure this week: 0.063

Schedule for getting more spares

- Feb 20: AZ4R1 ships (we hope)
- March 31: A27R7
- April 30: Brand New Tube (#1)
- May 31: N16R9
- June 30: Brand New Tube (#2)
- July 31: P2R5
- August 31: A30R7



Linac Klystrons

- No problems here!

Module	Manuf	S/N	Hours	Days	Years
0	V	L122	78191	3257	8.9
V	V	L113	82536	3439	9.4
1	L	0002	23571	982	2.6
2	L	0004	92776	3865	10.5
3	L	0006	83137	3464	9.4
4	L	0009	77978	3249	8.8
5	L	0007	83767	3490	9.5
6	L	0013	22514	938	2.5
7	L	0015	65921	2746	7.5
D	V	A21	64965	2706	7.4