

Run 10 plan based on 25 Nov Revised Plan and $\sqrt{s}=200$ extended by 1 week

- Dec. 1, Begin cool down to 4.5K
- Dec. 4, Cooldown to 4.5K complete in both rings!
- Dec. 5, beam setup in RHIC begins.
- Dec 16, 20 hr unplanned Maintenance day
- Dec 20 (AM)-21(PM), blizzard 09 shut us down
- Dec. 27, RHIC Setup complete, begin Ramp Up for Physics (was 14 Dec, late)
- Dec 31 (midnight-store 11340), Machine, Physics declared (store 11340) $\sqrt{s}=200$ GeV/n Au-Au
- Jan 2 (midnight) STAR in Physics Mode
- Jan 8 (0600) PHENIX in Physics Mode
- Jan 12, Rebucketing not yet routine, stochastic cooling still to come.
- Jan 22, changed beta* from 0.6 to 0.7 meters, rebucketing ~established, yellow transverse stochastic cooling on
- Mar. 18 (0556), End 10 week $\sqrt{s} = 200$ GeV/n Run, begin $\sqrt{s} = 62.4$ GeV/n setup
- Mar. ~~20~~ **19**, Begin 4 week $\sqrt{s} = 62.4$ GeV/n run
 - Machine physics 19 March for stores ≥ 11954
 - PHENIX Physics 19 Mar for stores ≥ 11955
 - STAR Physics 22 March for stores ≥ 11976
- Apr. ~~17~~ **8**, End 4 week $\sqrt{s} = 62.4$ GeV/n Run, begin $\sqrt{s} = 39$ GeV/n setup
- Apr. ~~19~~ **9**, Begin 1.5 week $\sqrt{s} = 39$ GeV/n run
- Apr. ~~30~~ **20(?)**, End 1.5 week $\sqrt{s} = 39$ GeV/n Run, finish n= 0.67 studies sometime before polarity switches begin (i.e. this is a placeholder)
- May 1, complete n= 0.67 studies for pp and $\sqrt{s} = 7.7$ GeV/n setup (**12 hr pol. switches**)
- May. 3, Begin 4 week $\sqrt{s} = 7.7$ GeV/n run
- **May 23 – 28 IPAC (Kyoto)**
- **May 22 Jun 3, Satogata is away**
- May 31, End 4 week $\sqrt{s} = 7.7$ GeV/n Run, begin $\sqrt{s} = 11.5$ GeV/n setup (**4-6 hr polarity switch, if necessary**)
- Jun 2, begin $\sqrt{s} = 11.5$ GeV/n for STAR
- Jun 16, end 2 week $\sqrt{s} = 11.5$ GeV/n run, begin $\sqrt{s} = 5$ GeV/n setup (**4-6 hr polarity switch, if necessary**)
- Jun 18, begin $\sqrt{s} = 5$ GeV development
- Jun 21, end 3 days at $\sqrt{s} = 5$ GeV/n
- Jun 22 , Begin Cryo Warm-up
- Jun 23, Warm-up complete, Run 10 ends – **29.2 CRYO WEEKS**

Run 10 plan based on 25 Nov Revised Plan and $\sqrt{s}=200$ extended by 1 week

- Apr. ~~17~~ **8**, End 4- **2.9** week $\sqrt{s} = 62.4$ GeV/n Run, begin $\sqrt{s} = 39$ GeV/n setup
- Apr. ~~19~~ **9**, Begin 1.5 week $\sqrt{s} = 39$ GeV/n run
 - Machine physics 9 April for stores ≥ 12119
 - PHENIX and STAR Physics 9 April for stores ≥ 12122
- Apr. 14, 24 hours APEX for $n=0.67$ studies
- Apr. ~~30~~ **21(?)**, End 1.5 week $\sqrt{s} = 39$ GeV/n Run, If not completed on 14 April, finish $v=0.67$ studies for pp sometime before polarity switches begin

Below schedule TBD

- ~~May 1~~ **Apr 21(?)**, Begin $\sqrt{s} = 7.7$ GeV/n setup (**12 hr pol. switches**)
- May. 3, Begin 4 week $\sqrt{s} = 7.7$ GeV/n run
- May 23 – 28 IPAC (Kyoto)
- May 22 Jun 3, Satogata is away
- May 31, End 4 week $\sqrt{s} = 7.7$ GeV/n Run, begin $\sqrt{s} = 11.5$ GeV/n setup (**4-6 hr polarity switch, if necessary**)
- Jun 2, begin $\sqrt{s} = 11.5$ GeV/n for STAR
- Jun 16, end 2 week $\sqrt{s} = 11.5$ GeV/n run, begin $\sqrt{s} = 5$ GeV/n setup (**4-6 hr polarity switch, if necessary**)
- Jun 18, begin $\sqrt{s} = 5$ GeV development
- Jun 21, end 3 days at $\sqrt{s} = 5$ GeV/n
- Jun 22, Begin Cryo Warm-up
- Jun 23, Warm-up complete, Run 10 ends – **29.2 CRYO WEEKS**
- **Last Week of June – Commission EBIS with He beam to NSRL**

Run 10 Au-Au Goals, $\sqrt{s} = 39 \text{ GeV/n}$

4/13/10

- STAR

- $\sqrt{s} = 39 \text{ GeV/n}$

- Luminosity Sampled/Delivered = ?/? μb^{-1}

- 24M Min-bias events

- PHENIX

- $\sqrt{s} = 39 \text{ GeV/n}$

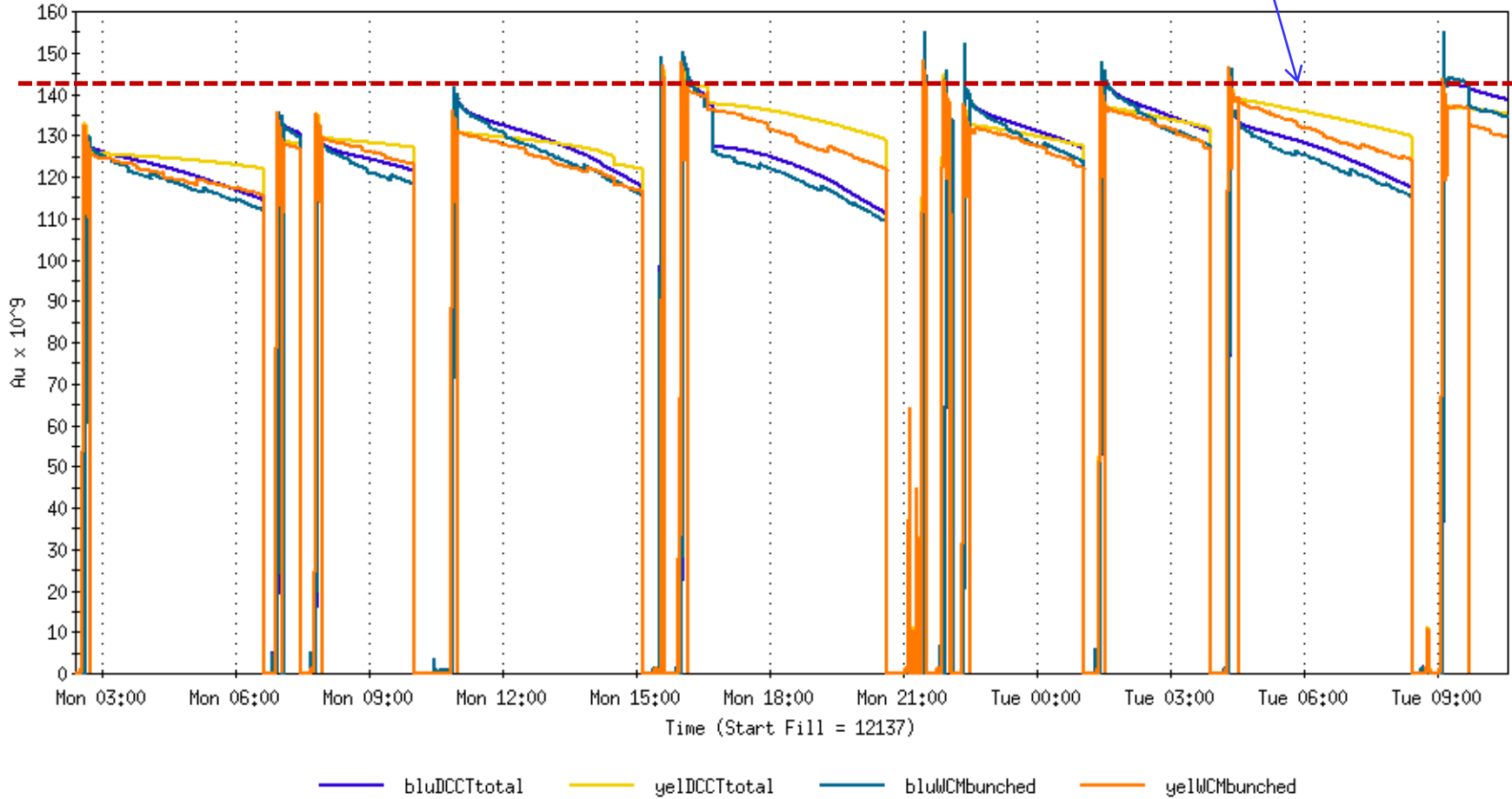
- Luminosity Recorded/Delivered = ?/? μb^{-1}

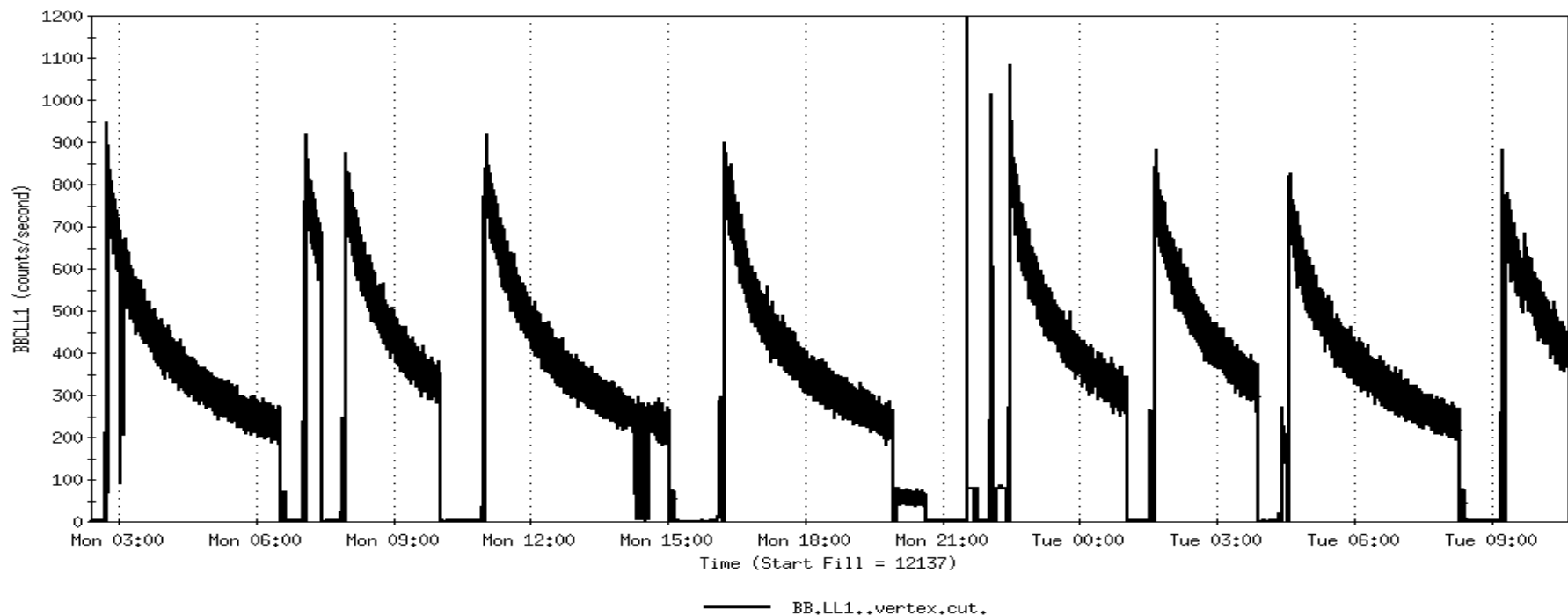
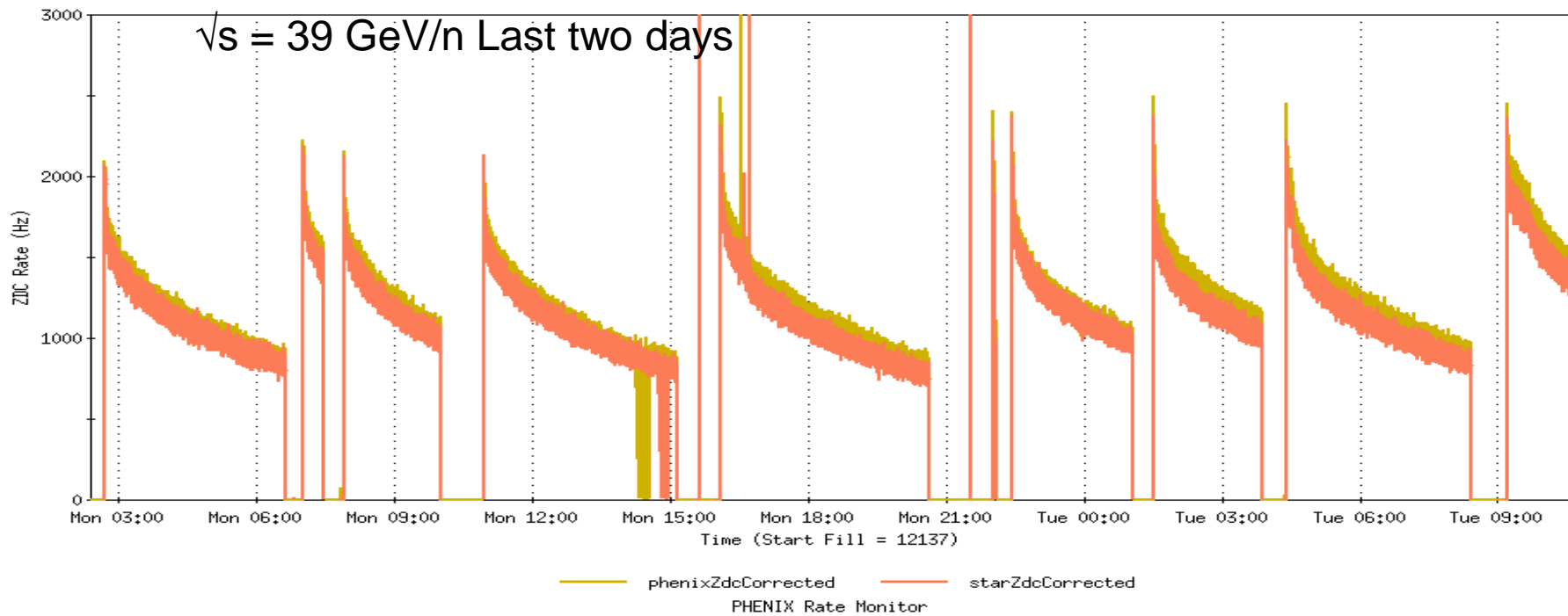
- 50M Min-bias events <30 cm vertex, (revised request 280M)

$\sqrt{s} = 39$ GeV/n Last two days

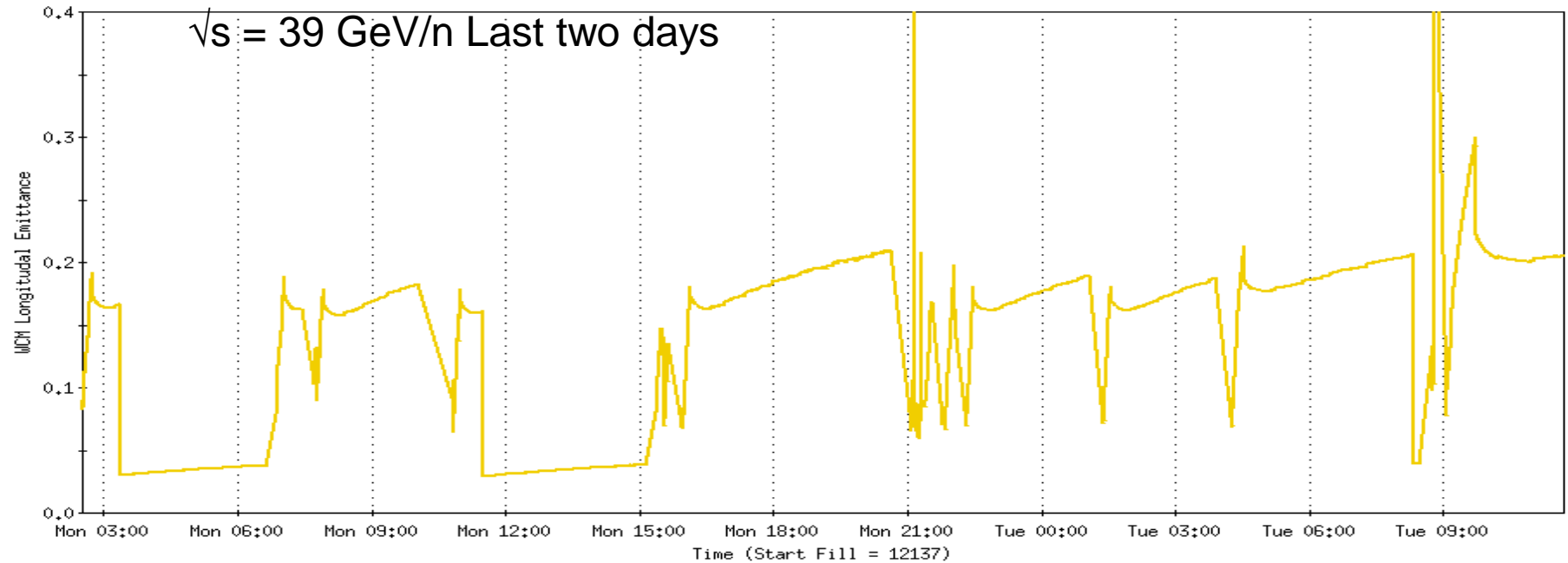
RHIC - DCCT total beam & WCM bunched beam

$1.3 \times 10^9/\text{bunch}$

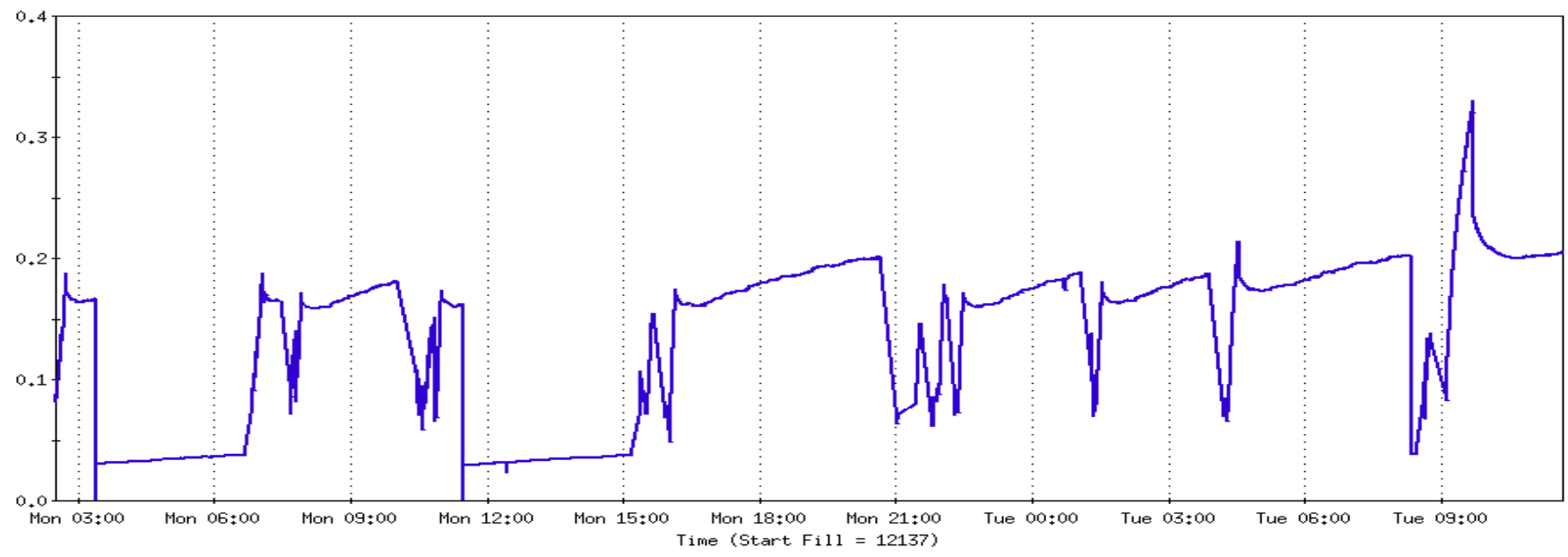




$\sqrt{s} = 39$ GeV/n Last two days

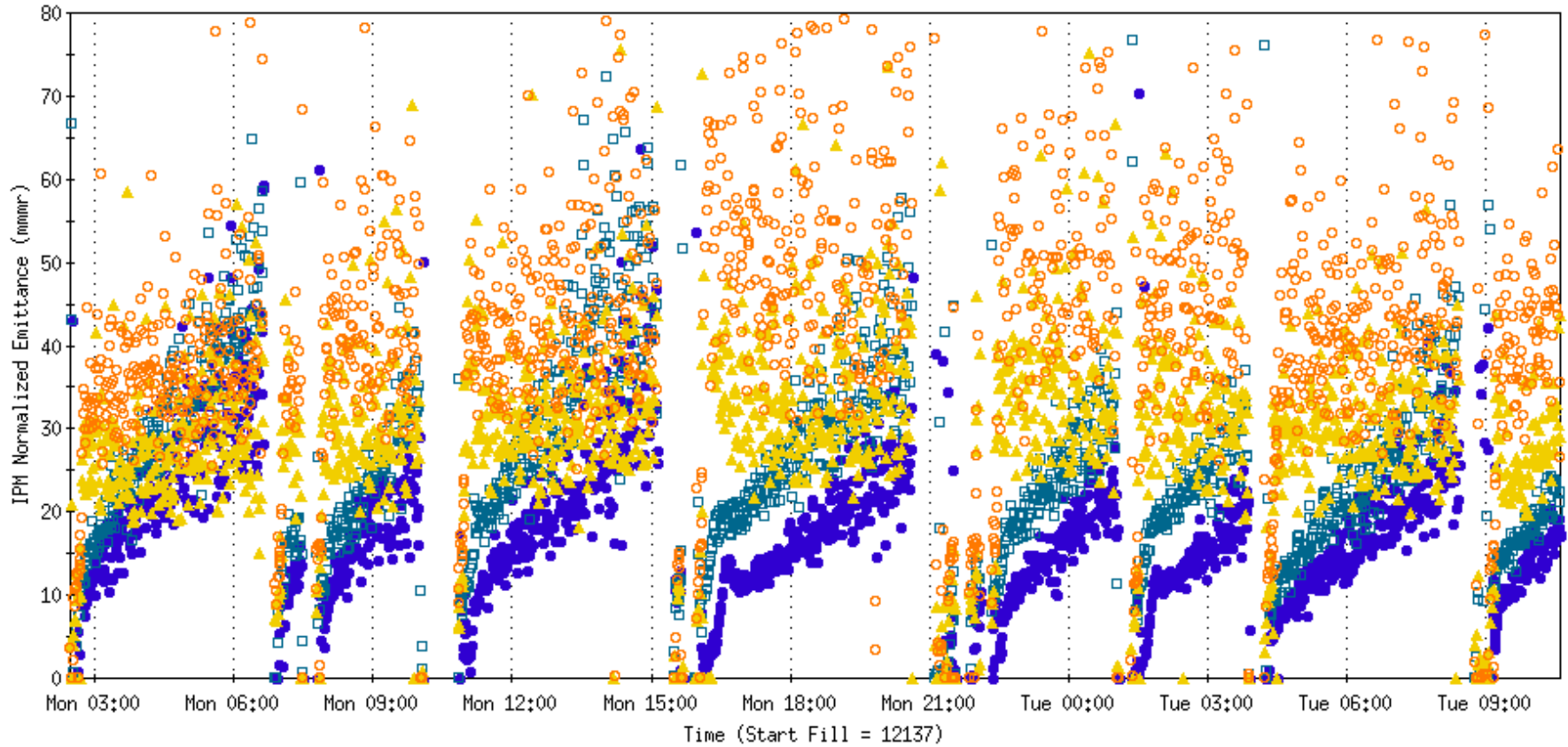


— gelEmittLong
Long Emitt from WCM



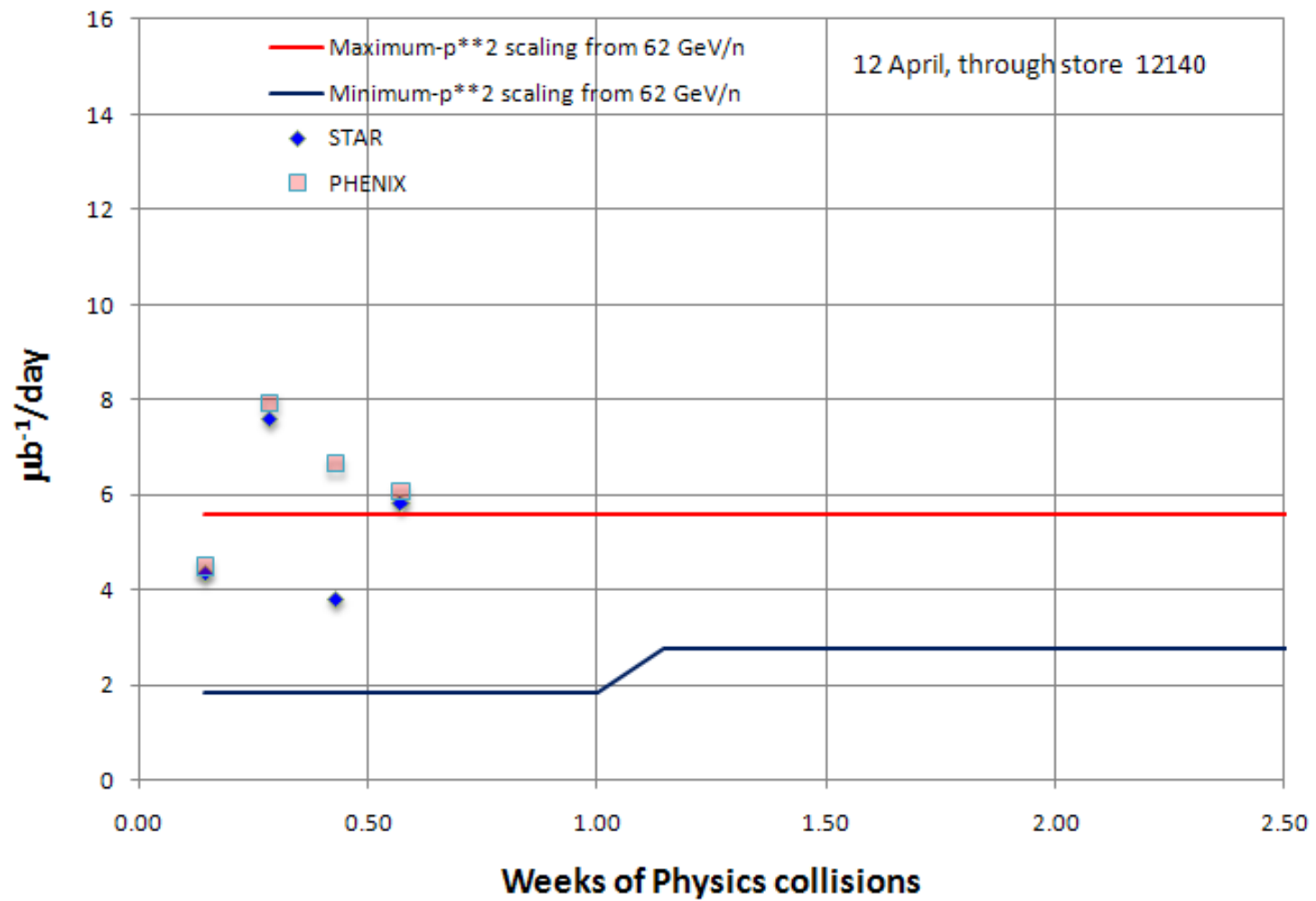
— bluEmittLong

$\sqrt{s} = 39$ GeV/n Last two days

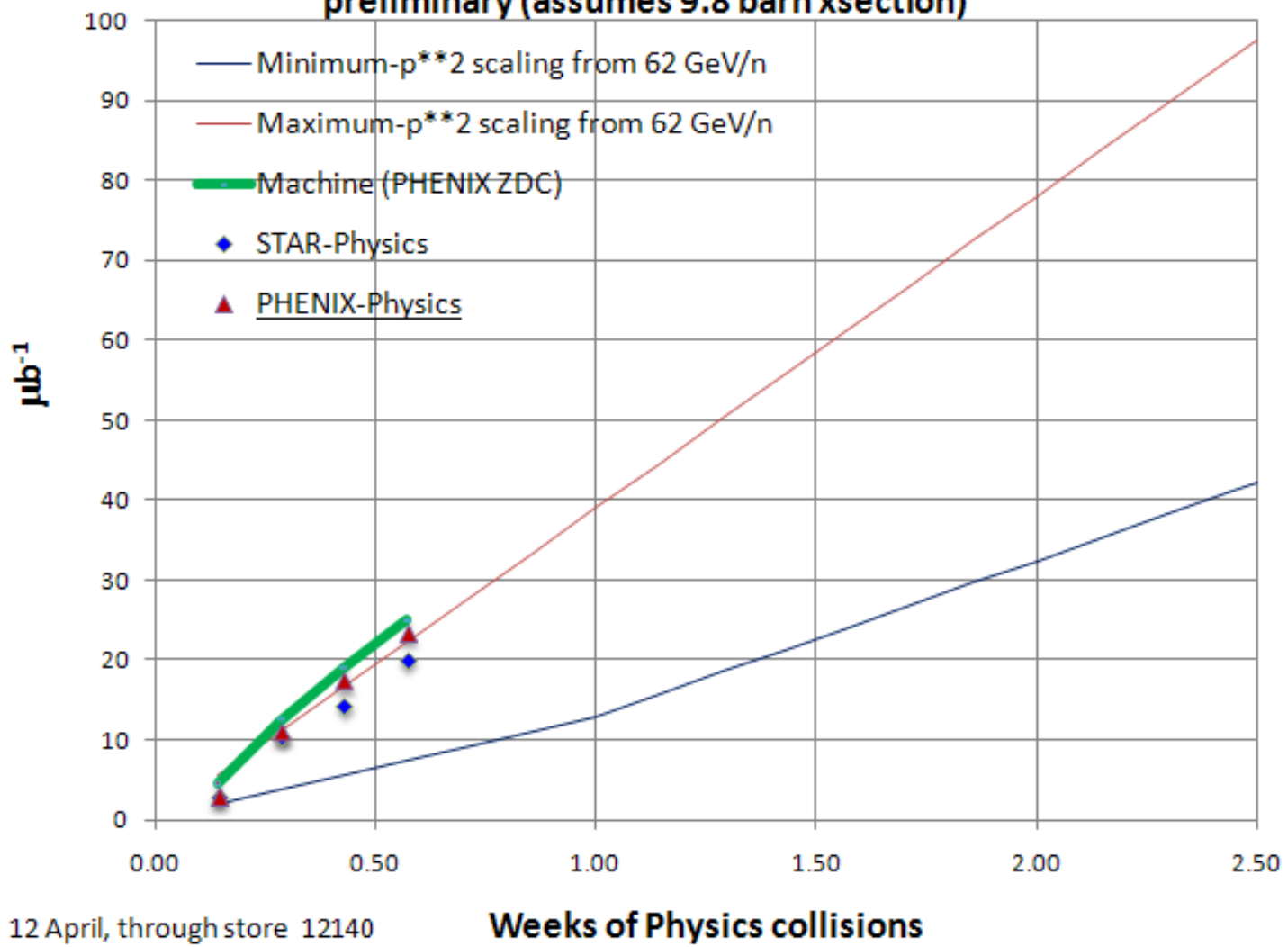


—●— RhicIpmManager,blue_horiz;normEmitM[.] —□— RhicIpmManager,blue_vert;normEmitM[.]
—▲— RhicIpmManager,yellow_horiz;normEmitM[.] —○— RhicIpmManager,yellow_vert;normEmitM[.]

Run 10, $\sqrt{s} = 39$ GeV/n Au Delivered Luminosity per day



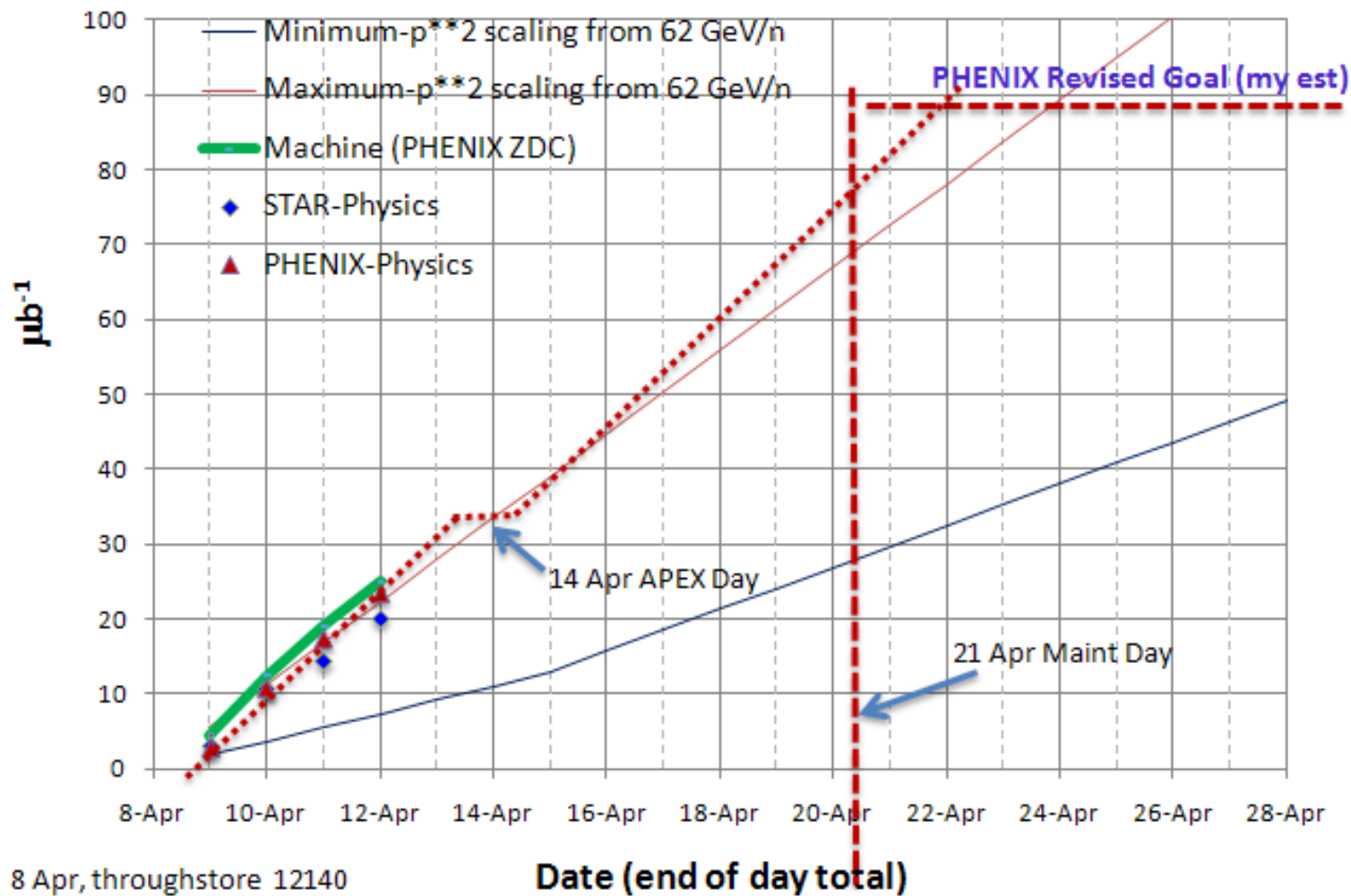
**Run 10, $\sqrt{s} = 39$ GeV/n Au Delivered Luminosity
preliminary (assumes 9.8 barn xsection)**



12 April, through store 12140

Weeks of Physics collisions

Run 10 $\sqrt{s} = 39$ GeV/n Au Delivered Luminosity (preliminary)



We should revisit Luminosity Projections

Table 6: Detailed plan for Run-10. PHENIX BUR

	$\sqrt{s_{NN}}$	weeks	events	comment
cooldown		2		
Au+Au start/rampup	200	3		
Au+Au physics	200	10		record 1.4nb ⁻¹
	62.4	3.5	350M	<i>(Actual 2.5 weeks, 660M)</i>
	≈ 39	1.6	50M	
	27	4.5	25M	
p+p development	500	4		PHENIX ops as needed
p+p physics	22.4	1	2.5B	
warm-up		0.5		
TOTAL		30		

Table II: Detailed breakdown of Critical Point search and Beam Energy Scan

STAR BUR

Beam Energy	Event Rate	8-hr Days/ 1M Events	Events proposed	8-hr days proposed
5	0.8	45	100 k	5
7.7	3	11	5 M	56
11.5	10	3.7	5M	19
17.3	33	1.1	15M	16
27	92	0.4	33M	12
39	190	0.2	24M	5

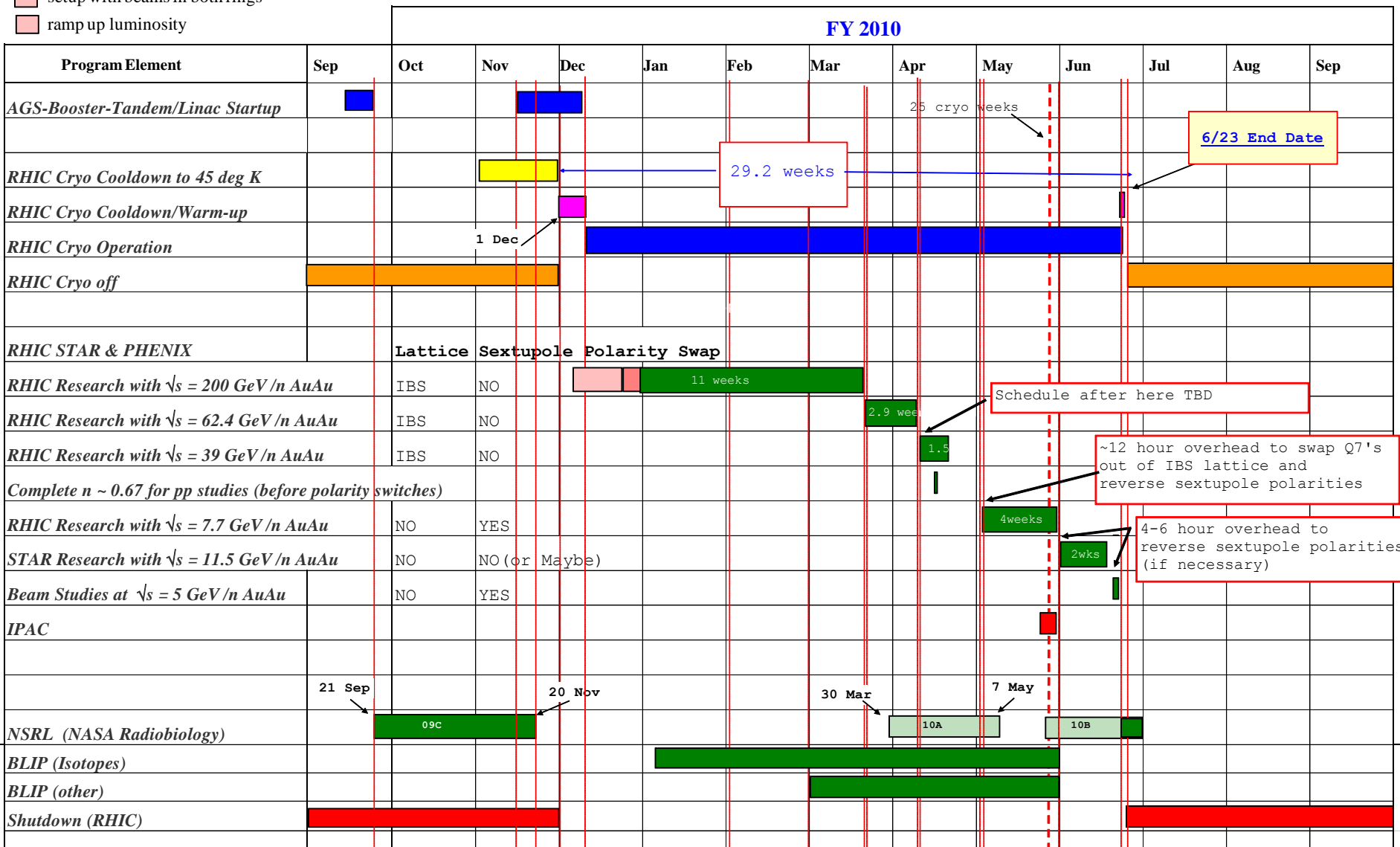
Actual Average ZDC Rate ~1200 Hz →



C-A Operations-FY10

as run/planned

- concurrent with RHIC
- setup with beams in both rings
- ramp up luminosity

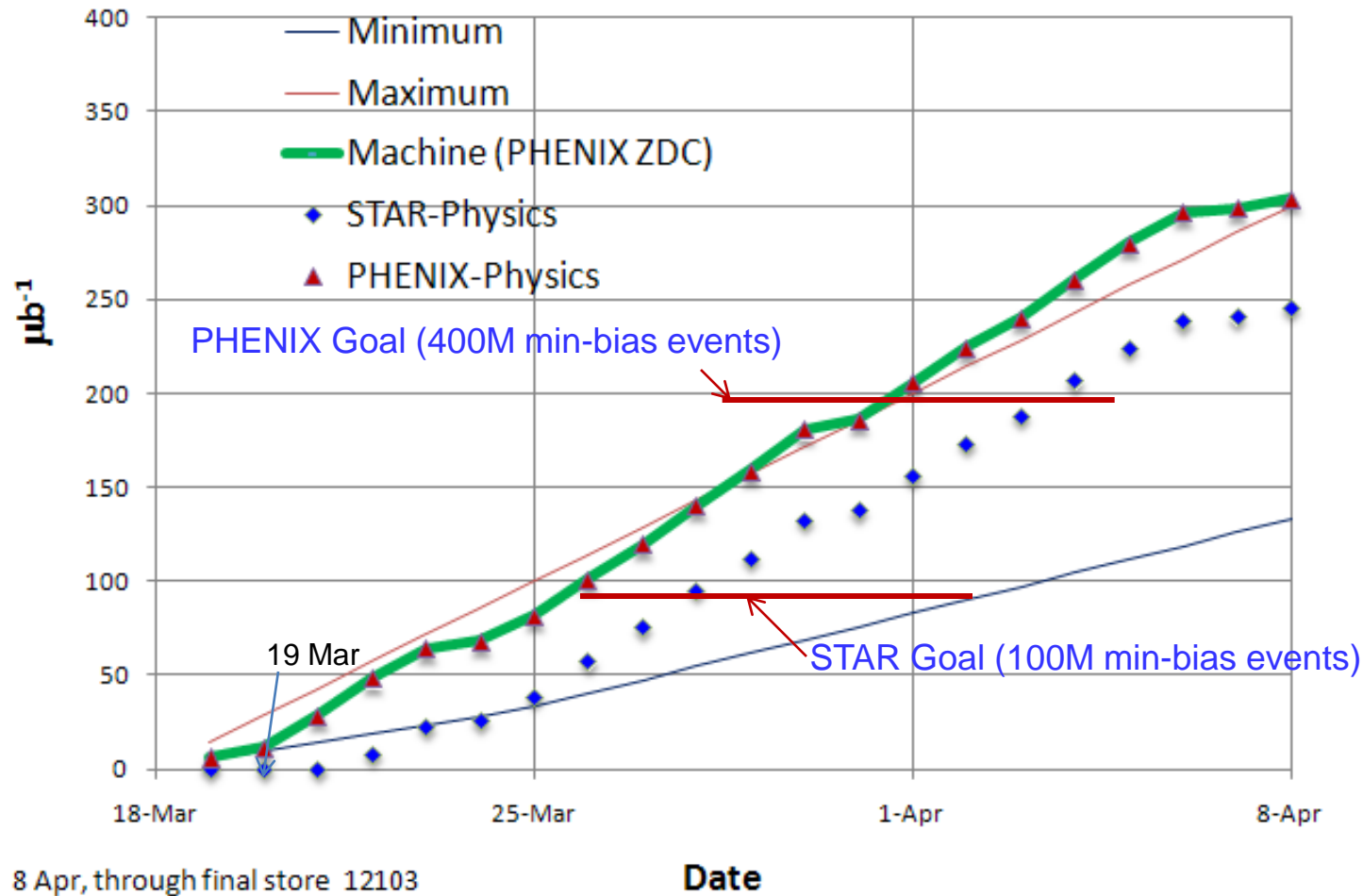


Archive

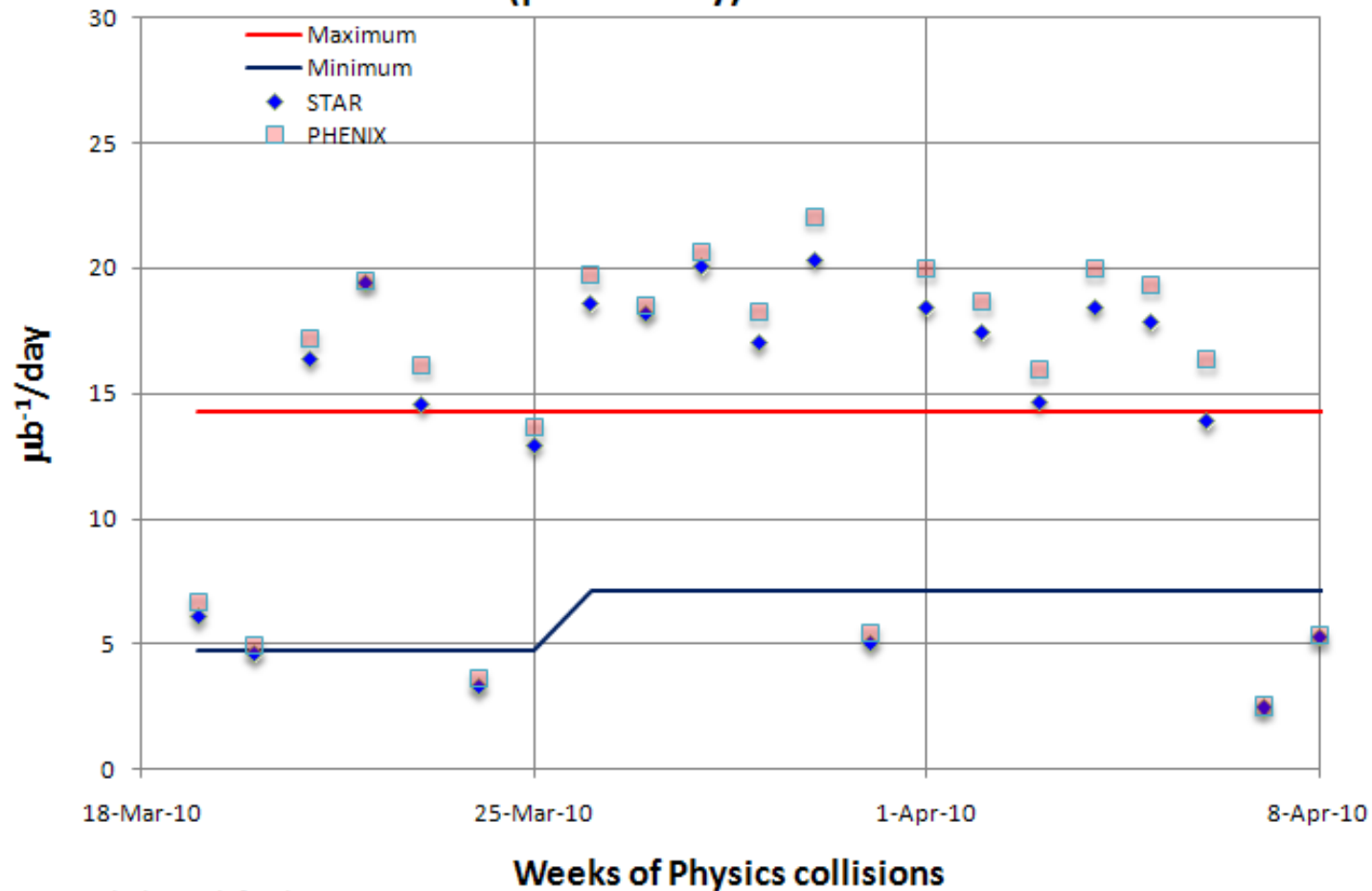
Future Topics

- Toward Smaller β^* - new quad triplets – D. Trbojevic

Run 10 31 x 31 GeV/n Au Delivered Luminosity (preliminary)



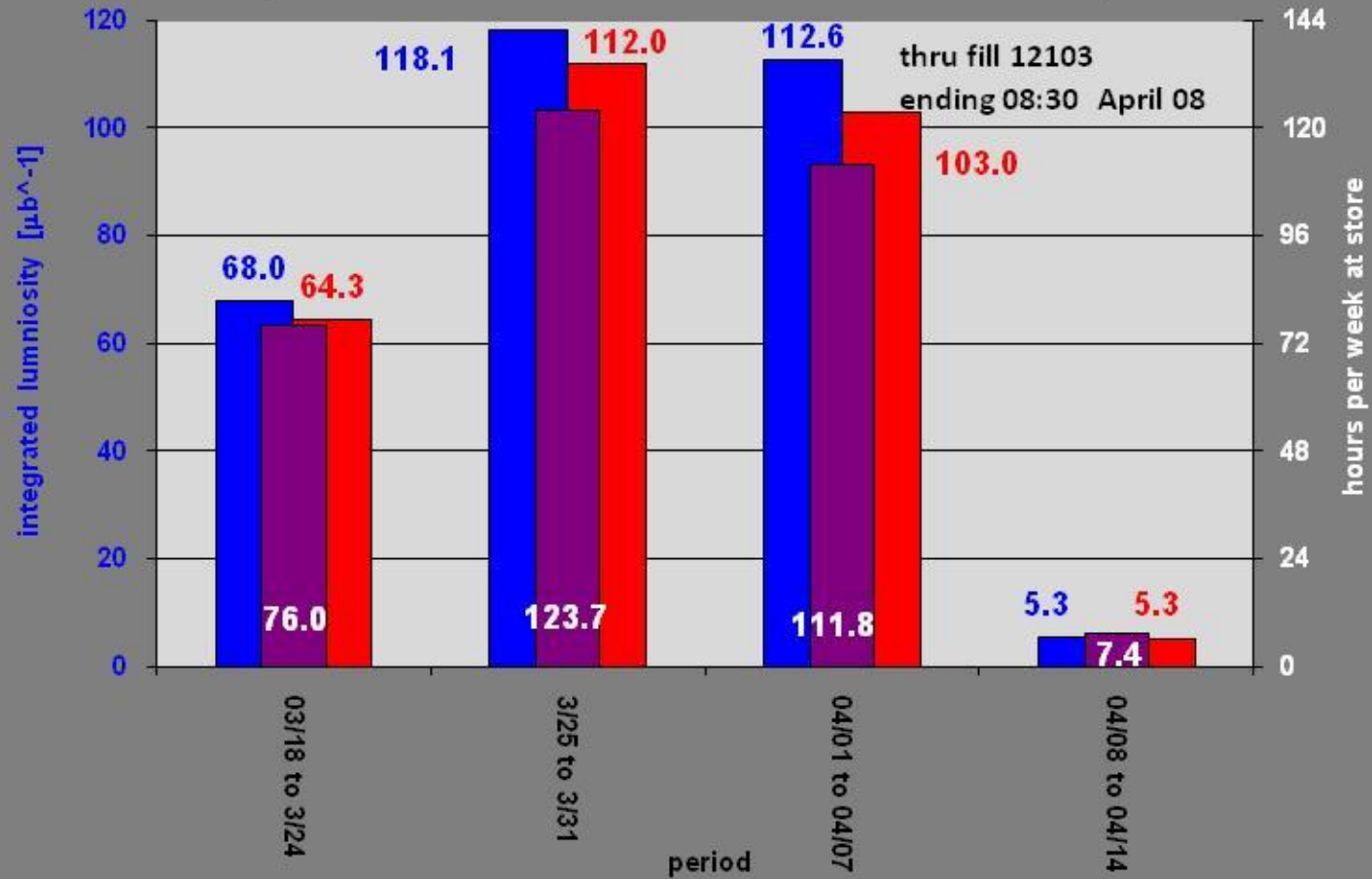
Run 10, 31 x 31 GeV/n Au Delivered Luminosity per day (preliminary)



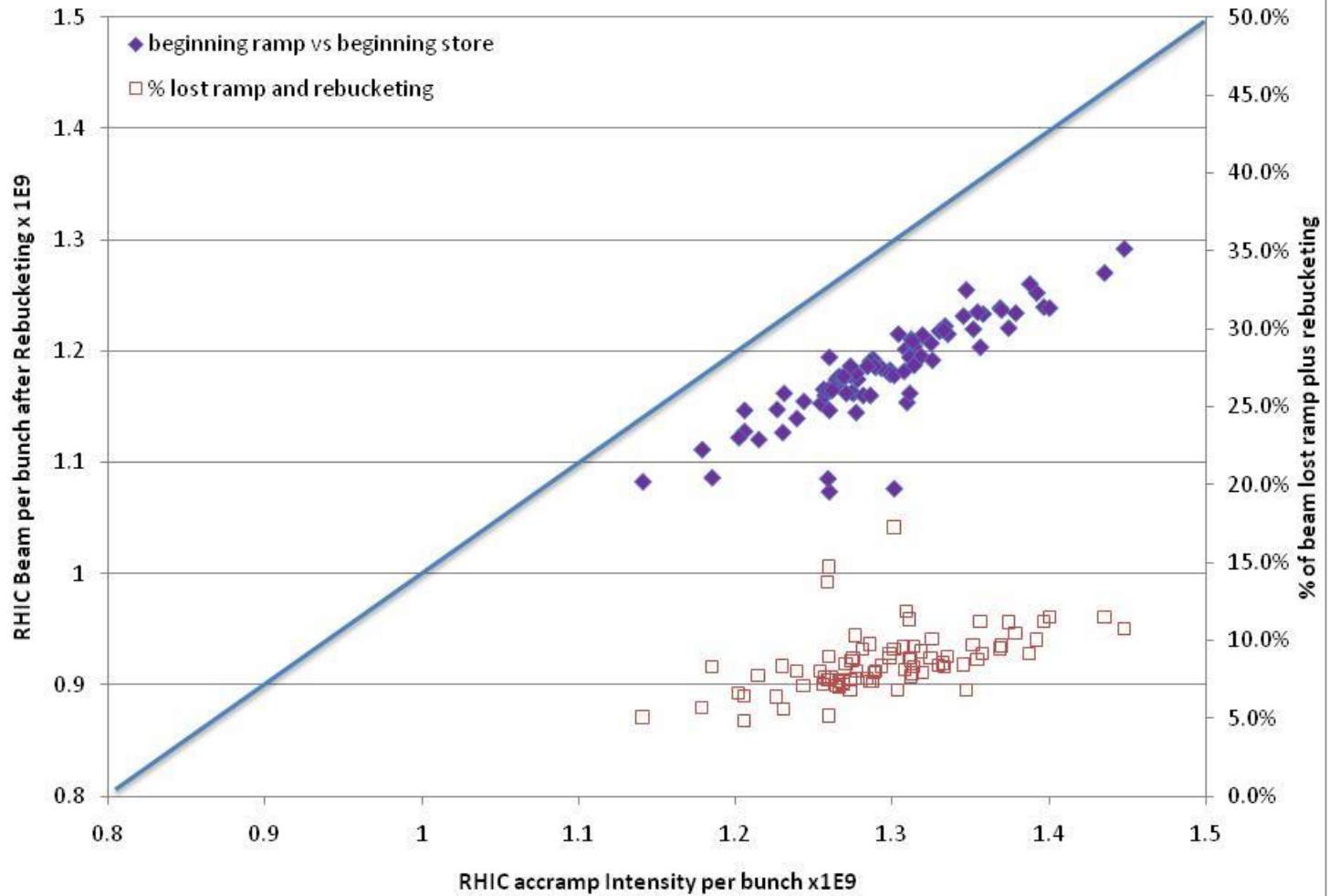
8 April, through final store 12103

Run 10 (AuAu) -- Integrated Luminosity by week

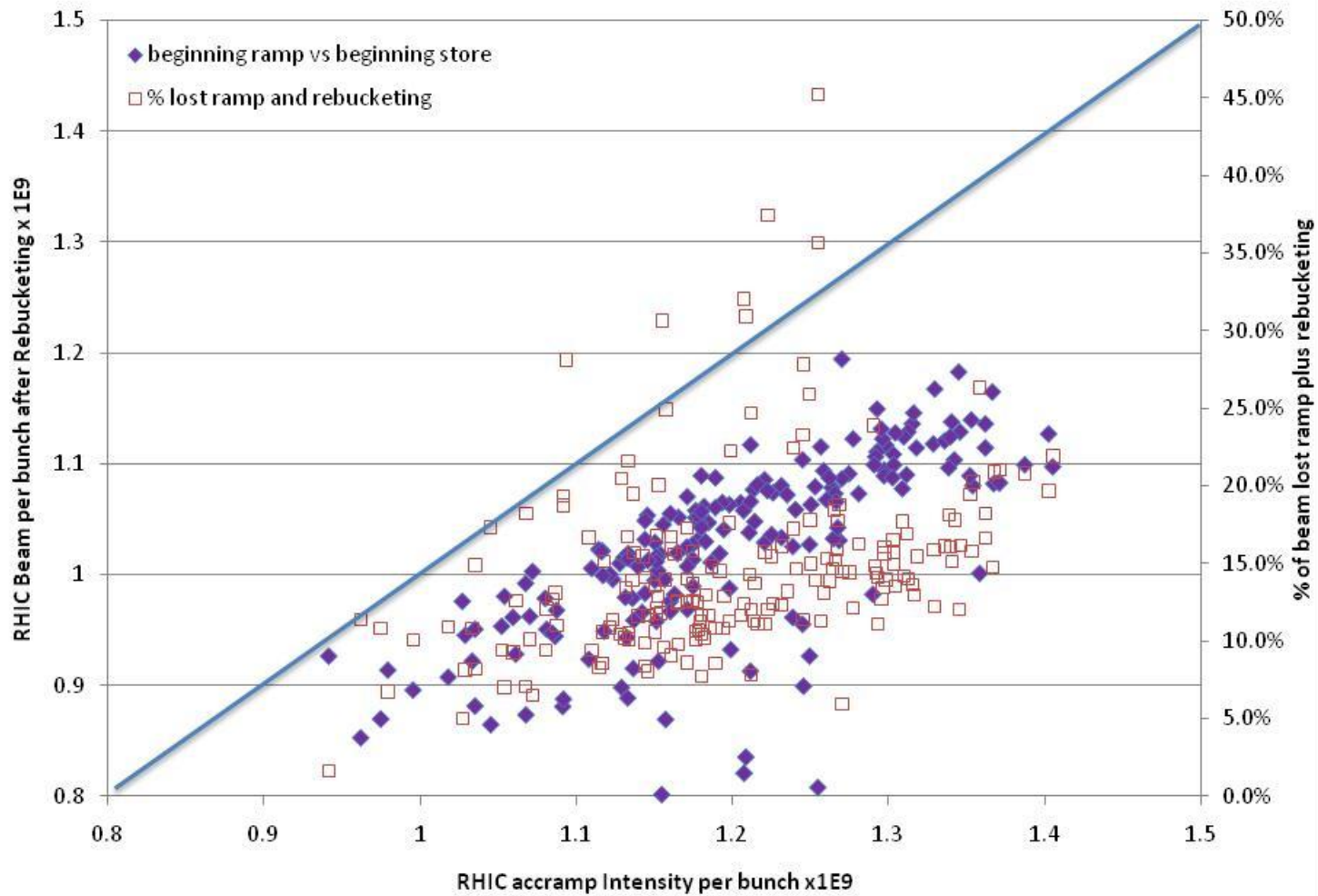
$\sqrt{s} = 62 \text{ GeV/n}$
final



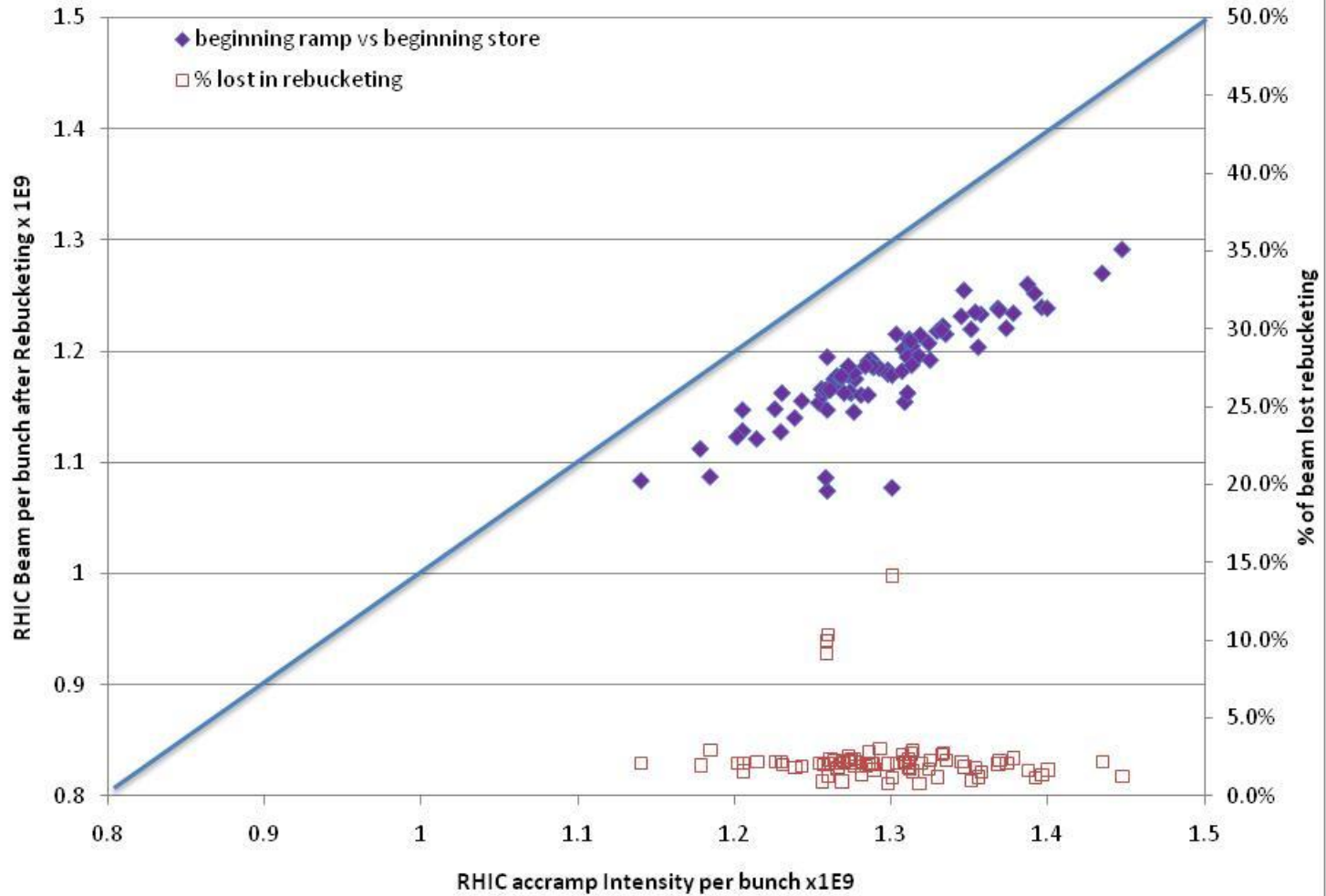
Run 10, 62 GeV AuAu



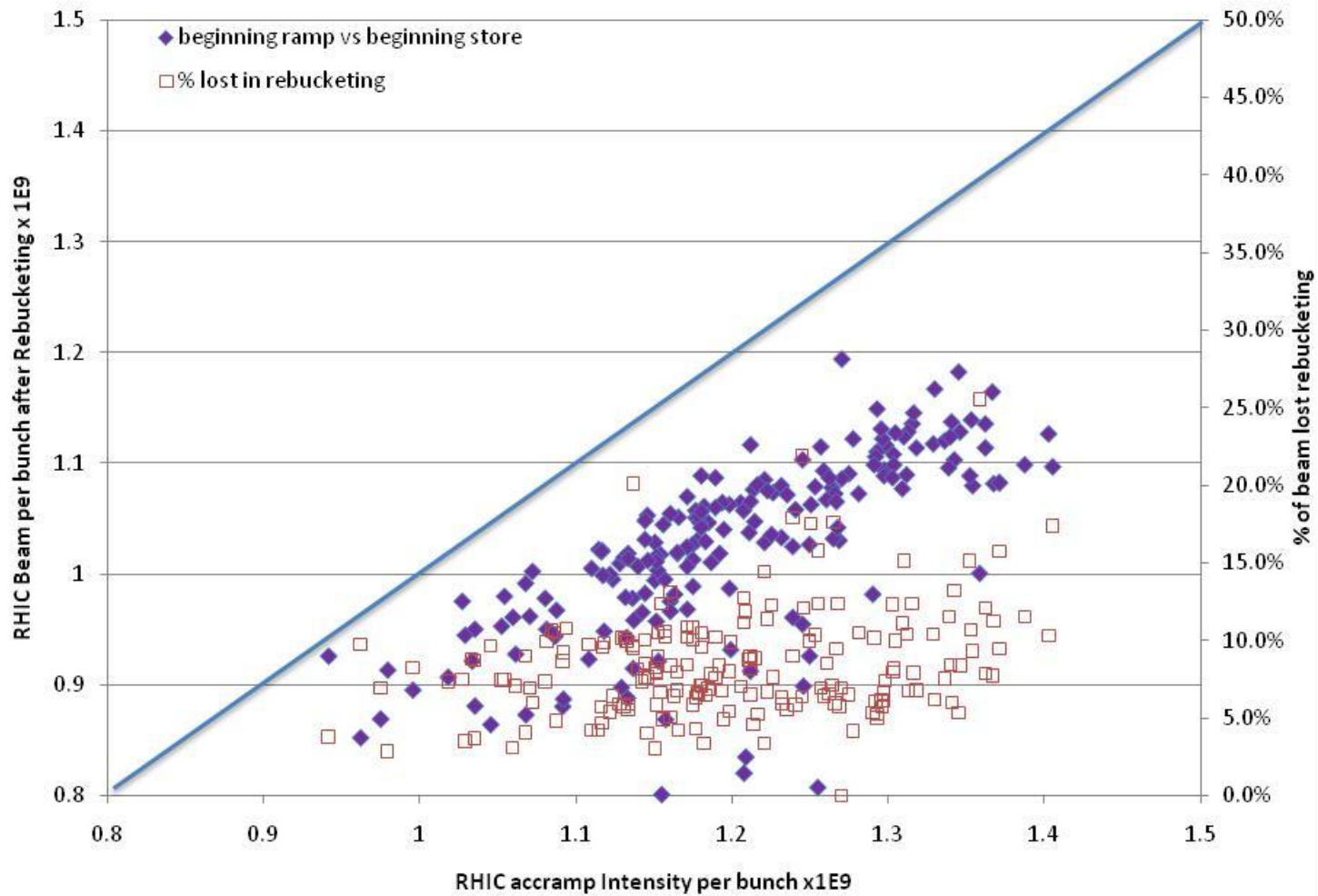
Run 10, $\sqrt{s} = 200$ GeV AuAu



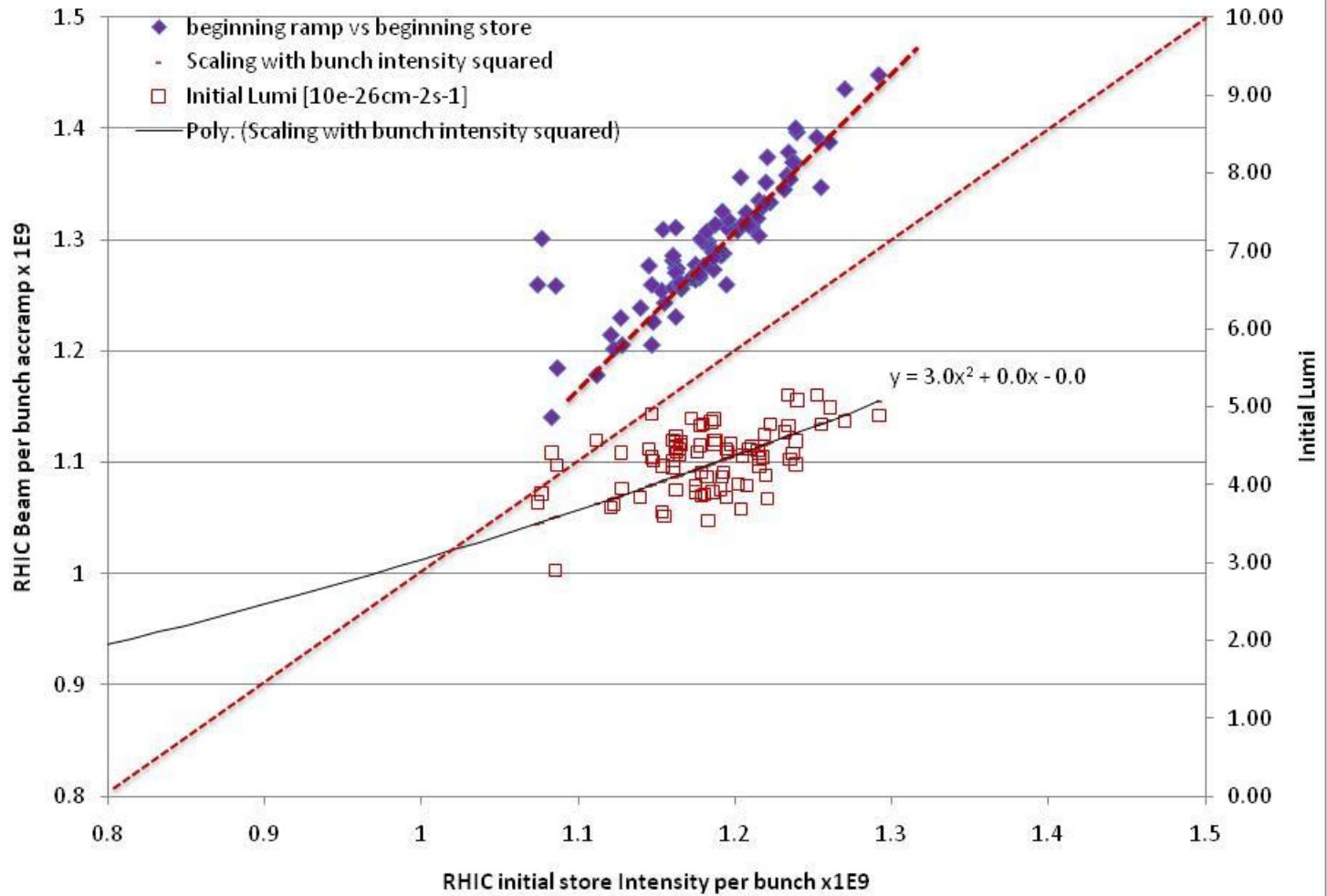
Run 10, 62 GeV AuAu



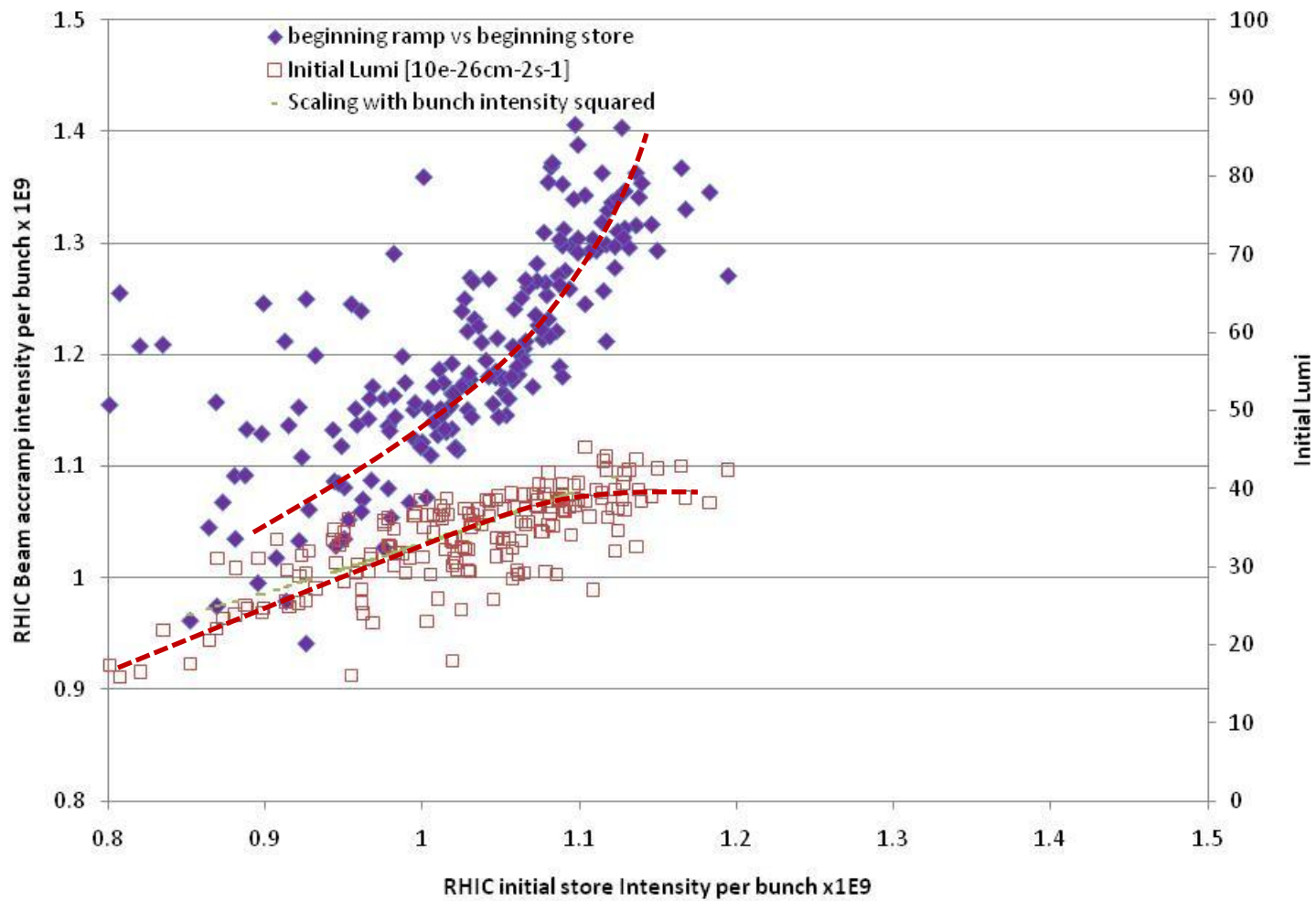
Run 10, $\sqrt{s} = 200$ GeV AuAu



Run 10, 62 GeV AuAu



Run 10, $\sqrt{s} = 200$ GeV AuAu



Run 10 Au-Au Goals

3/30/10

- STAR

- $\sqrt{s} = 62 \text{ GeV/n}$

- Luminosity Sampled/Delivered = ?/90 μb^{-1}

- 100M Min-bias events

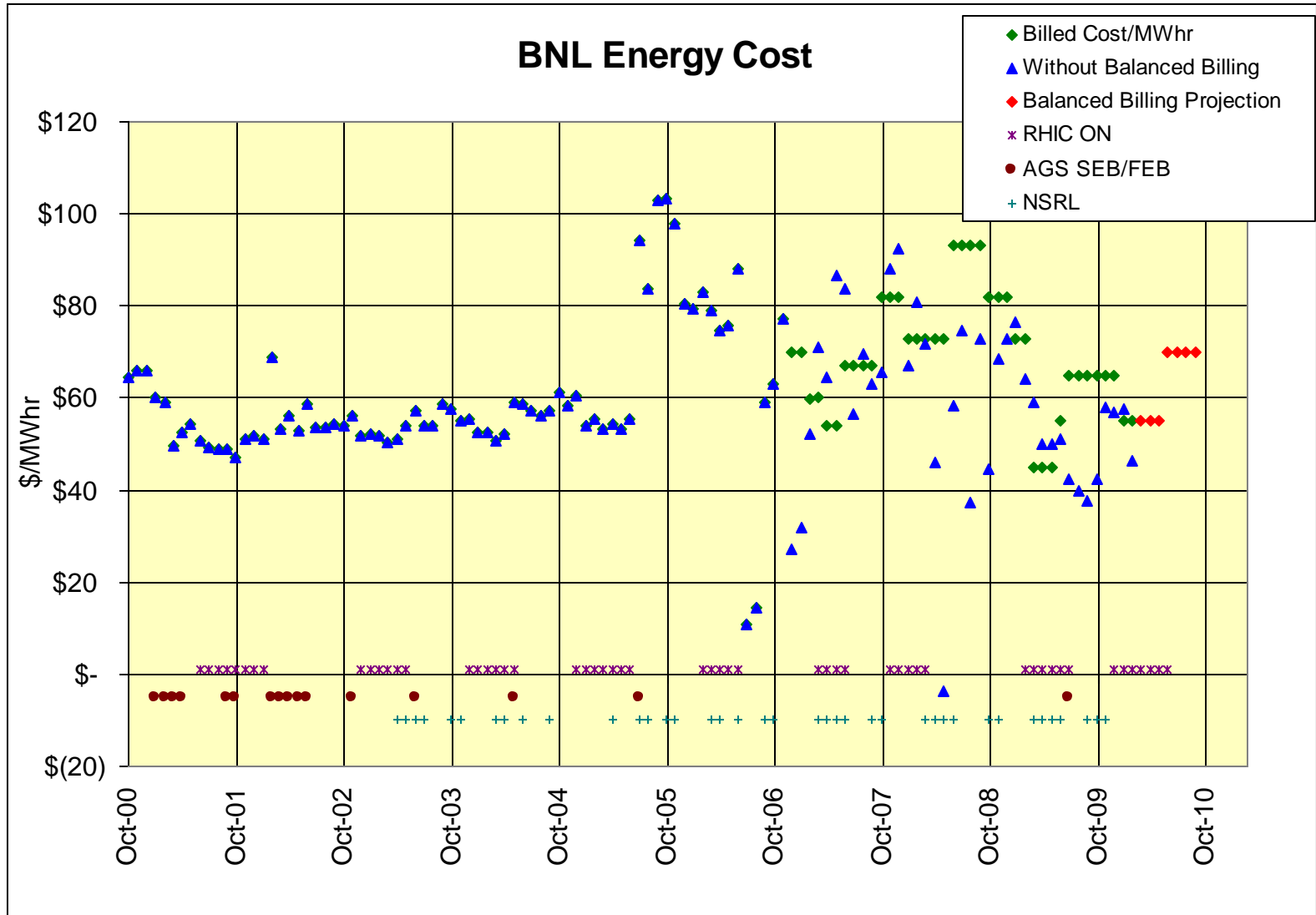
- PHENIX

- $\sqrt{s} = 62 \text{ GeV/n}$

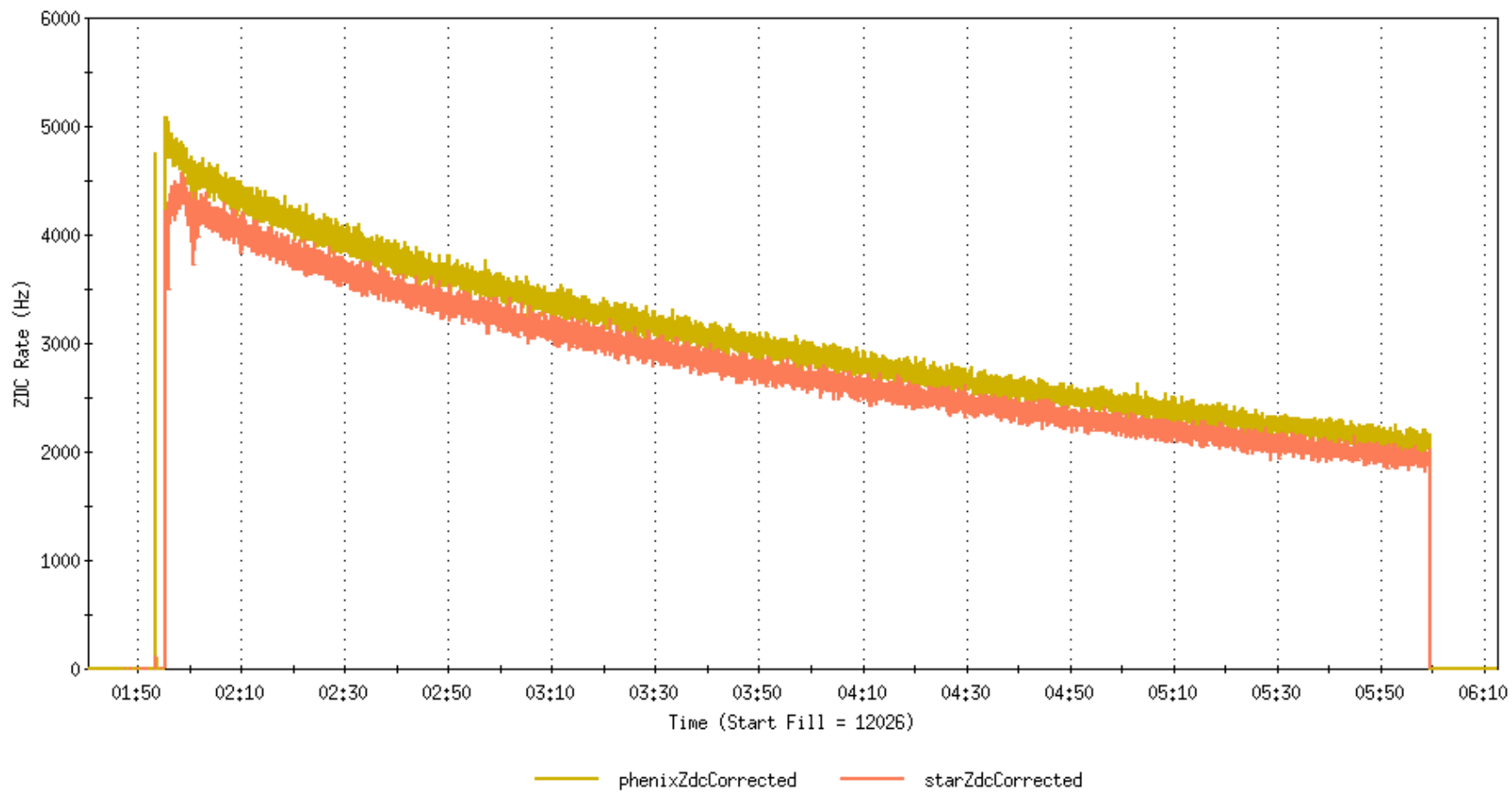
- Luminosity Recorded/Delivered = 64/193 μb^{-1}

- 400M Min-bias events

Through Feb 2010

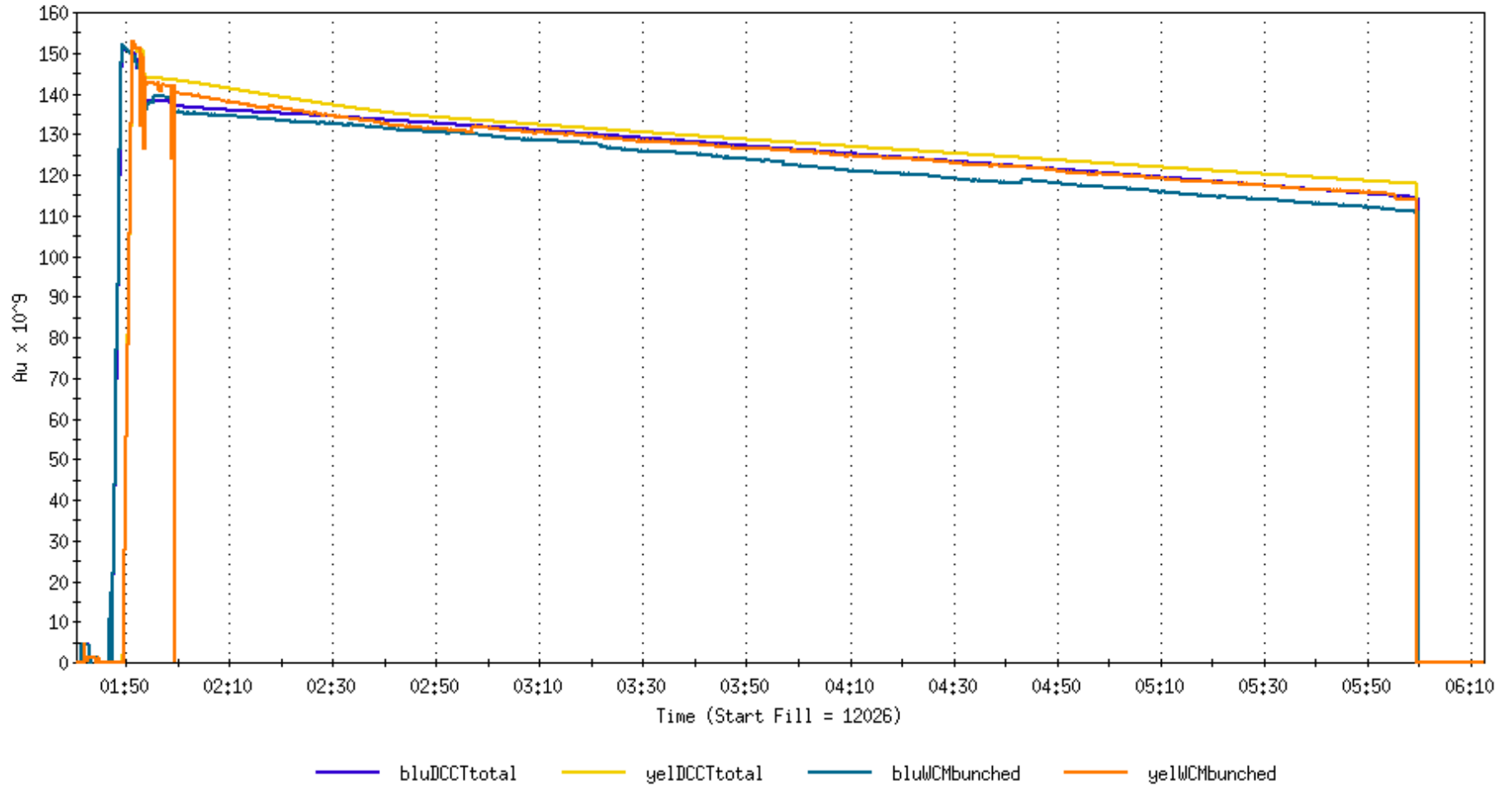


First Store Monday, 29 March, Store 12026

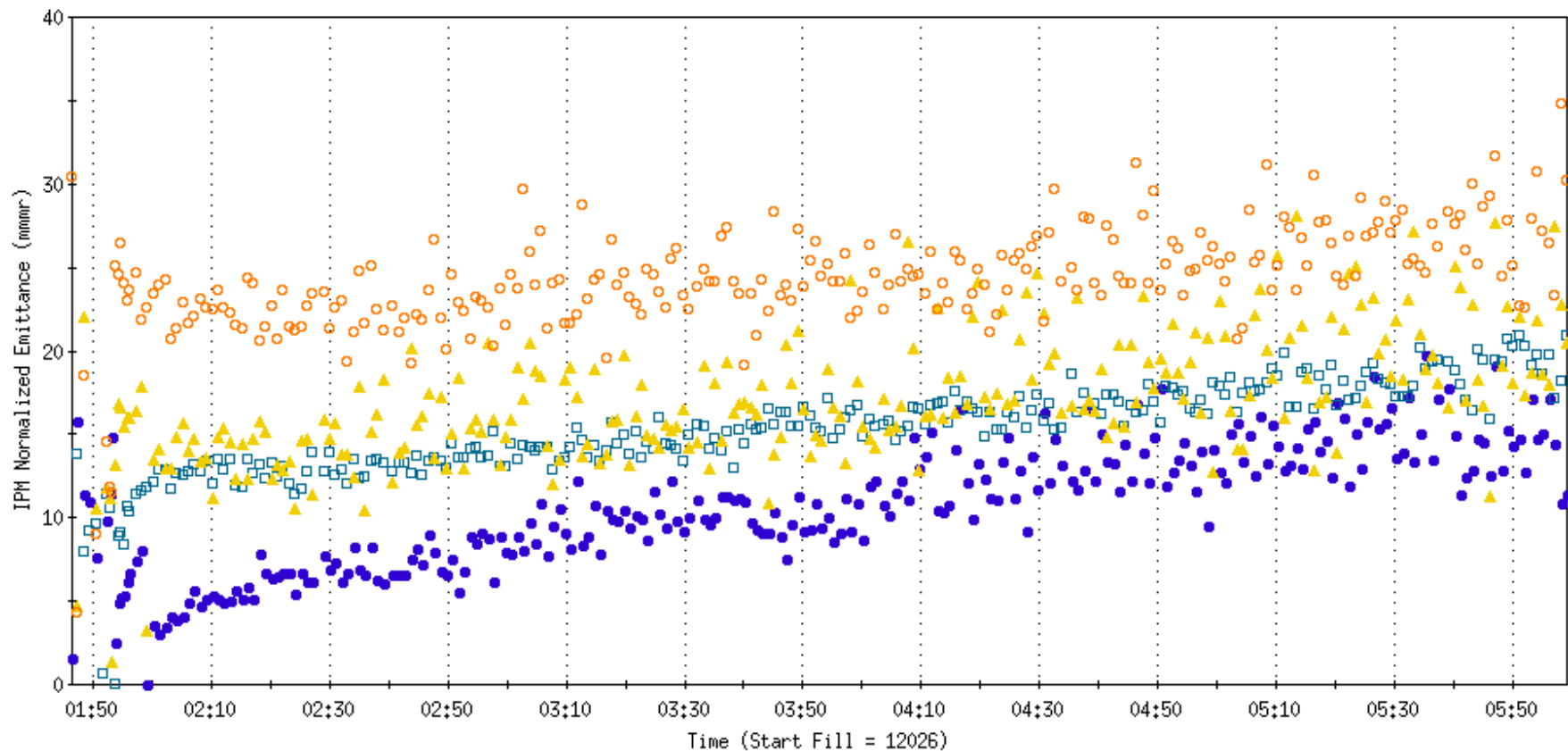


First Store Monday, 29 March, Store 12026

RHIC - DCCT total beam & WCM bunched beam

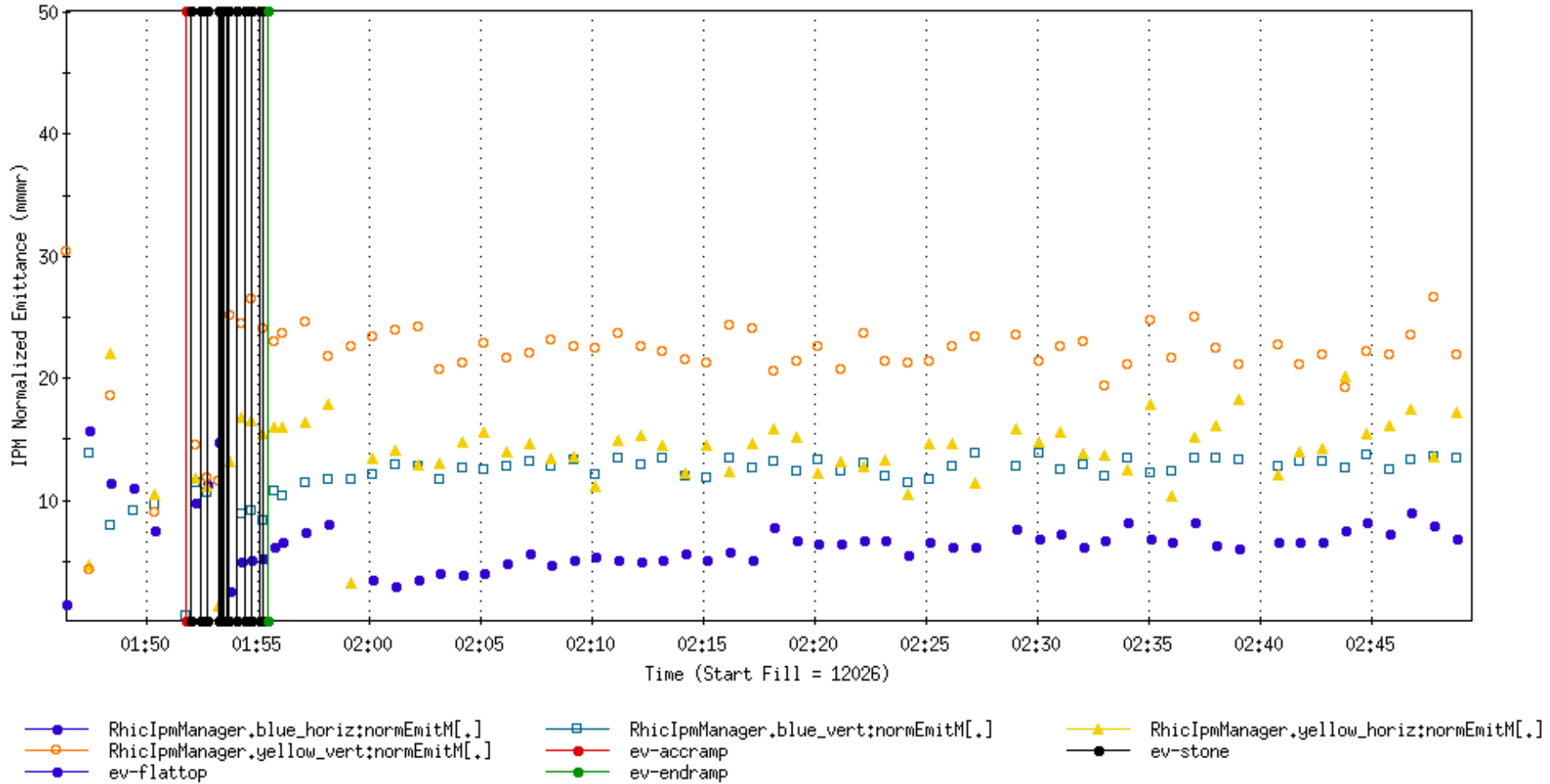


First Store Monday, 29 March, Store 12026

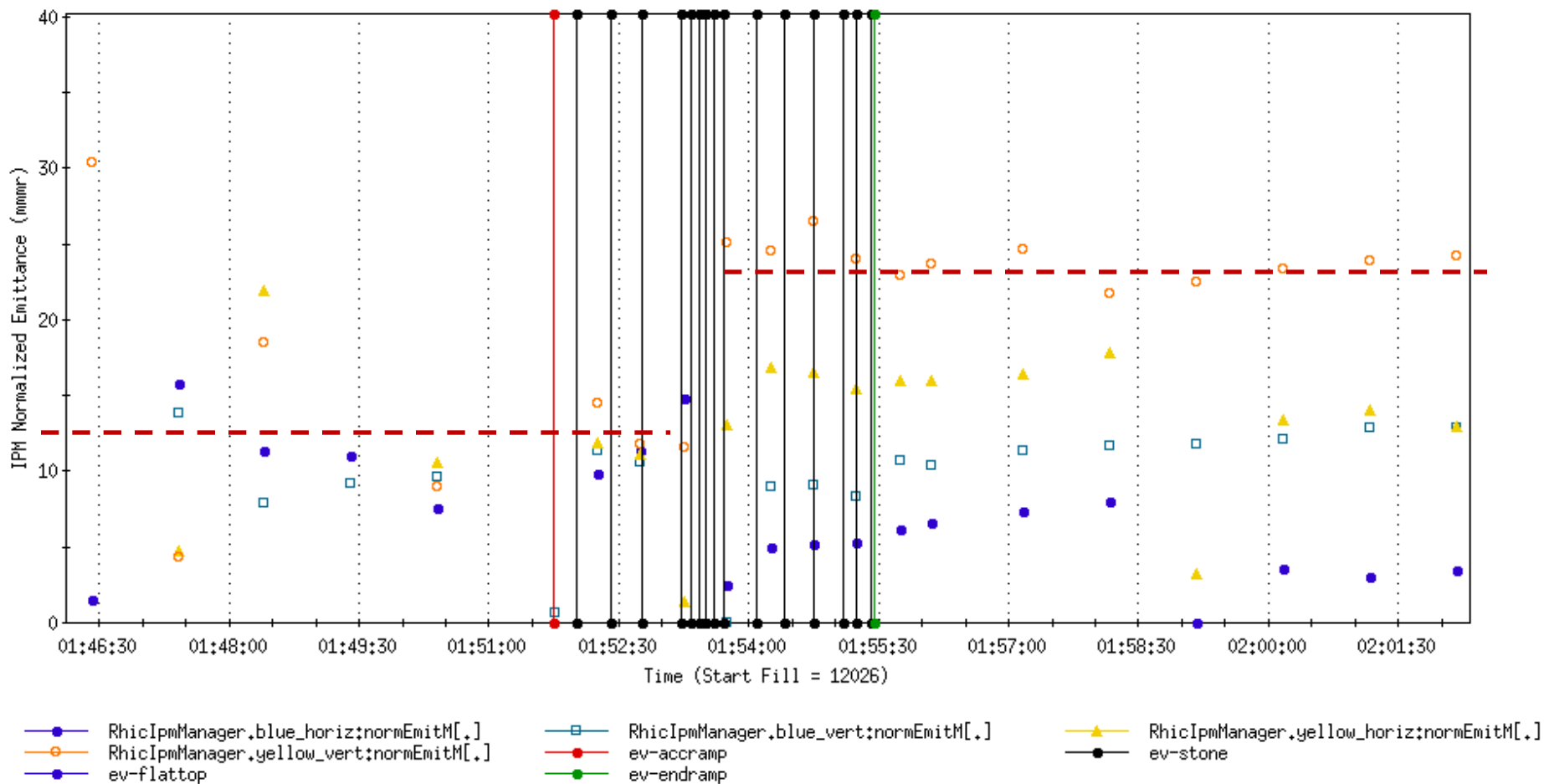


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First Store Monday, 29 March, Store 12026

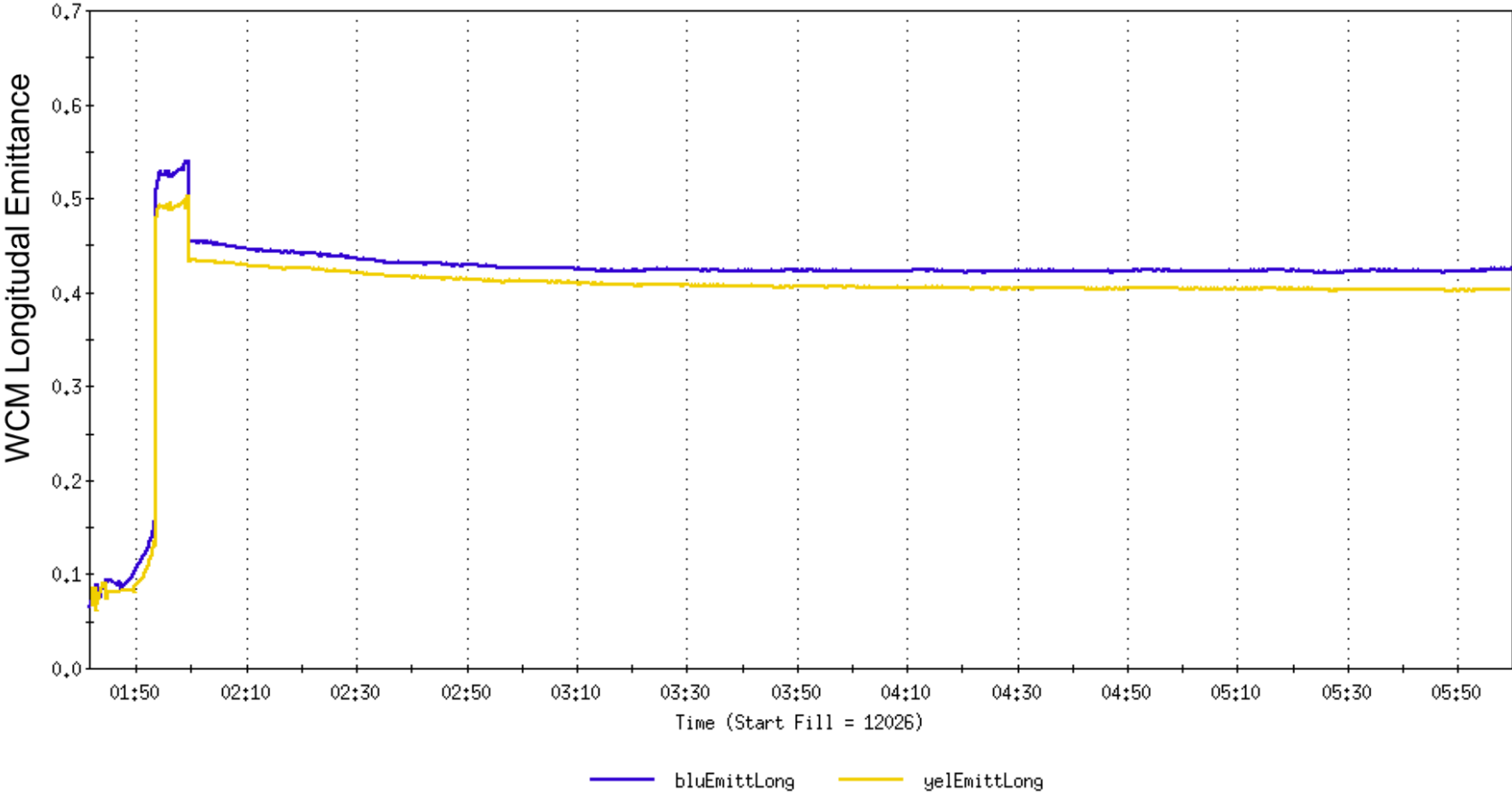


First Store Monday, 29 March, Store 12026

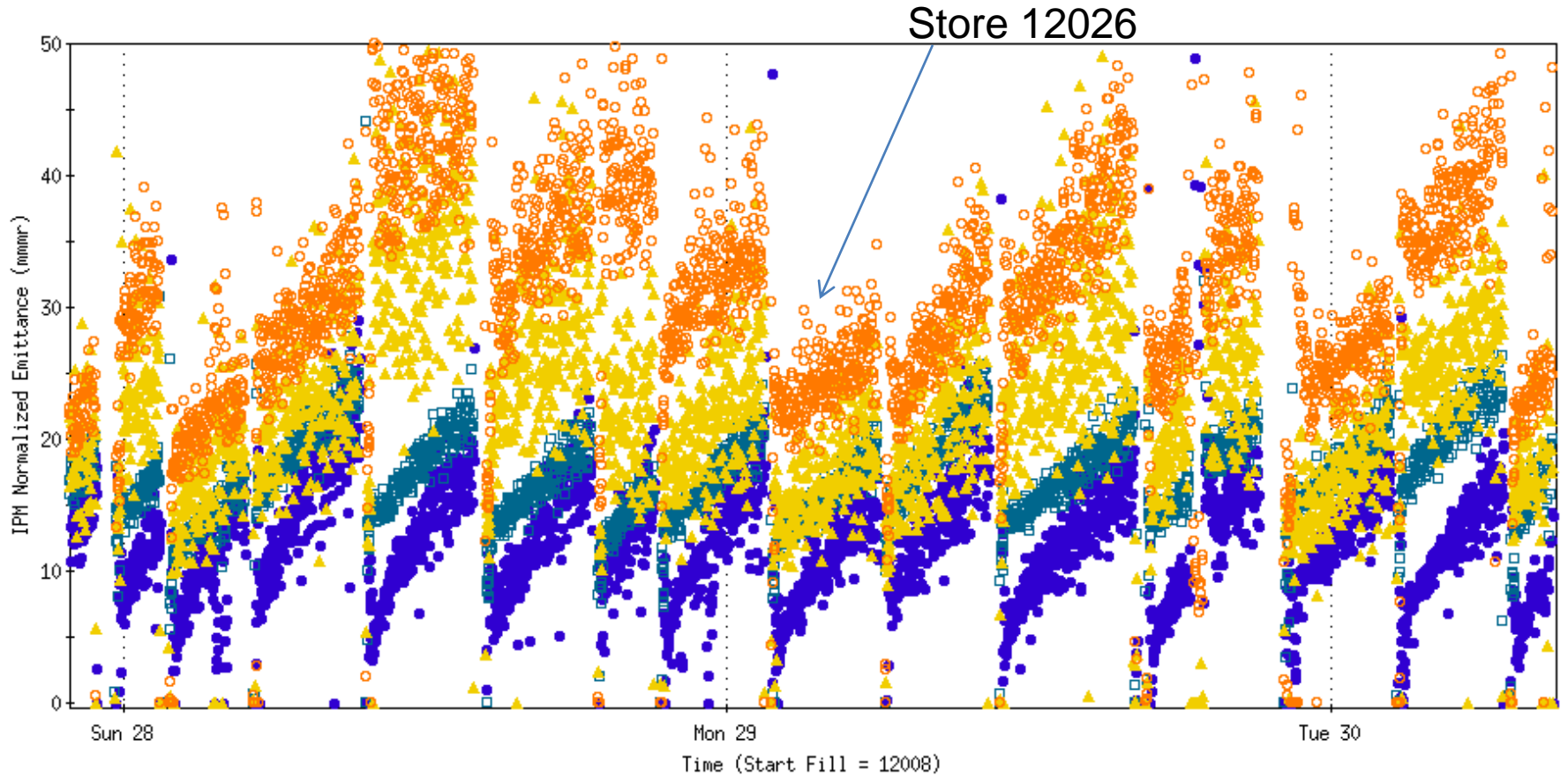


First Store Monday, 29 March, Store 12026

Long Emitt from WCM

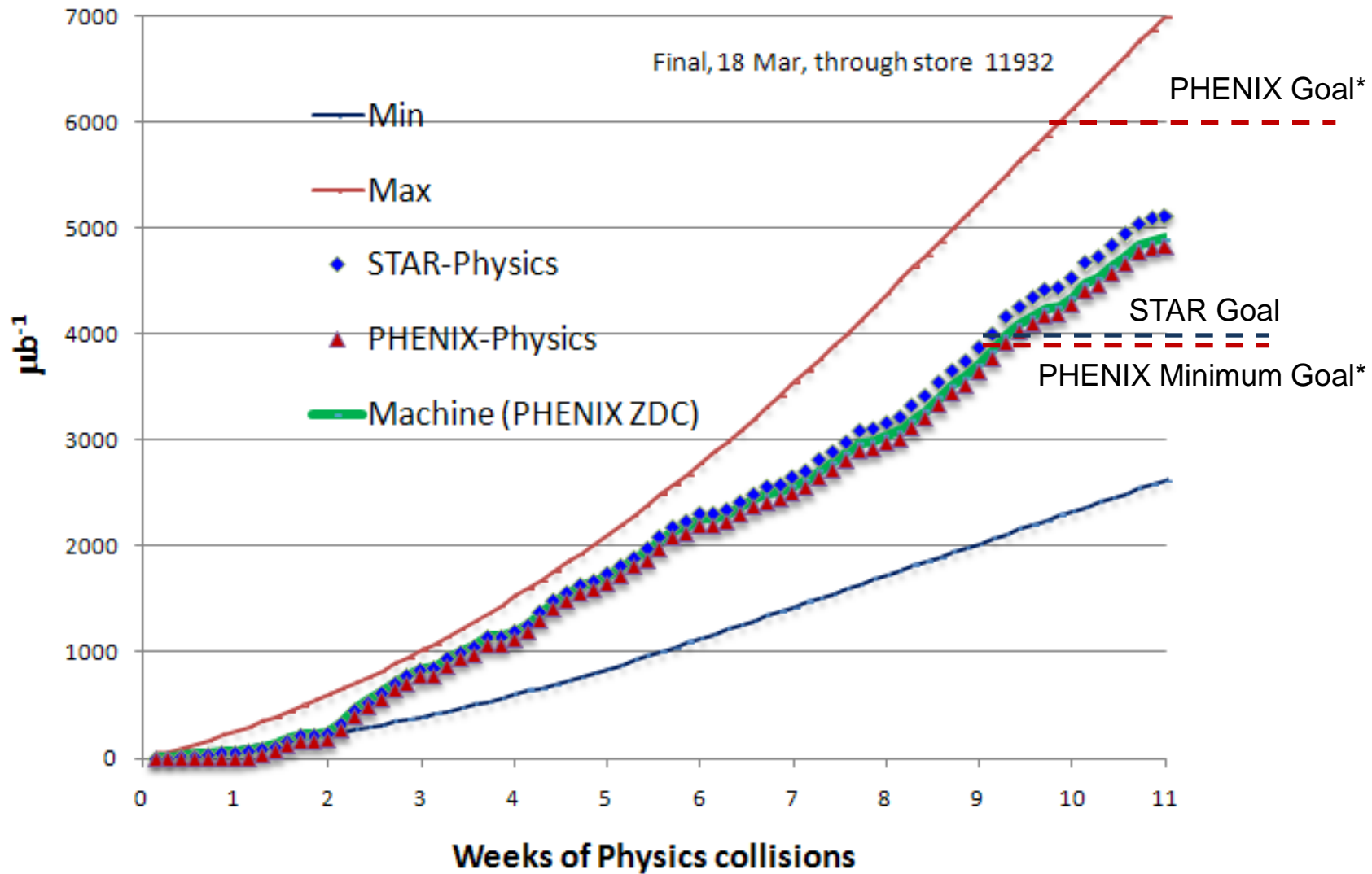


31 x 31 GeV/n Au horiz and vert emittances



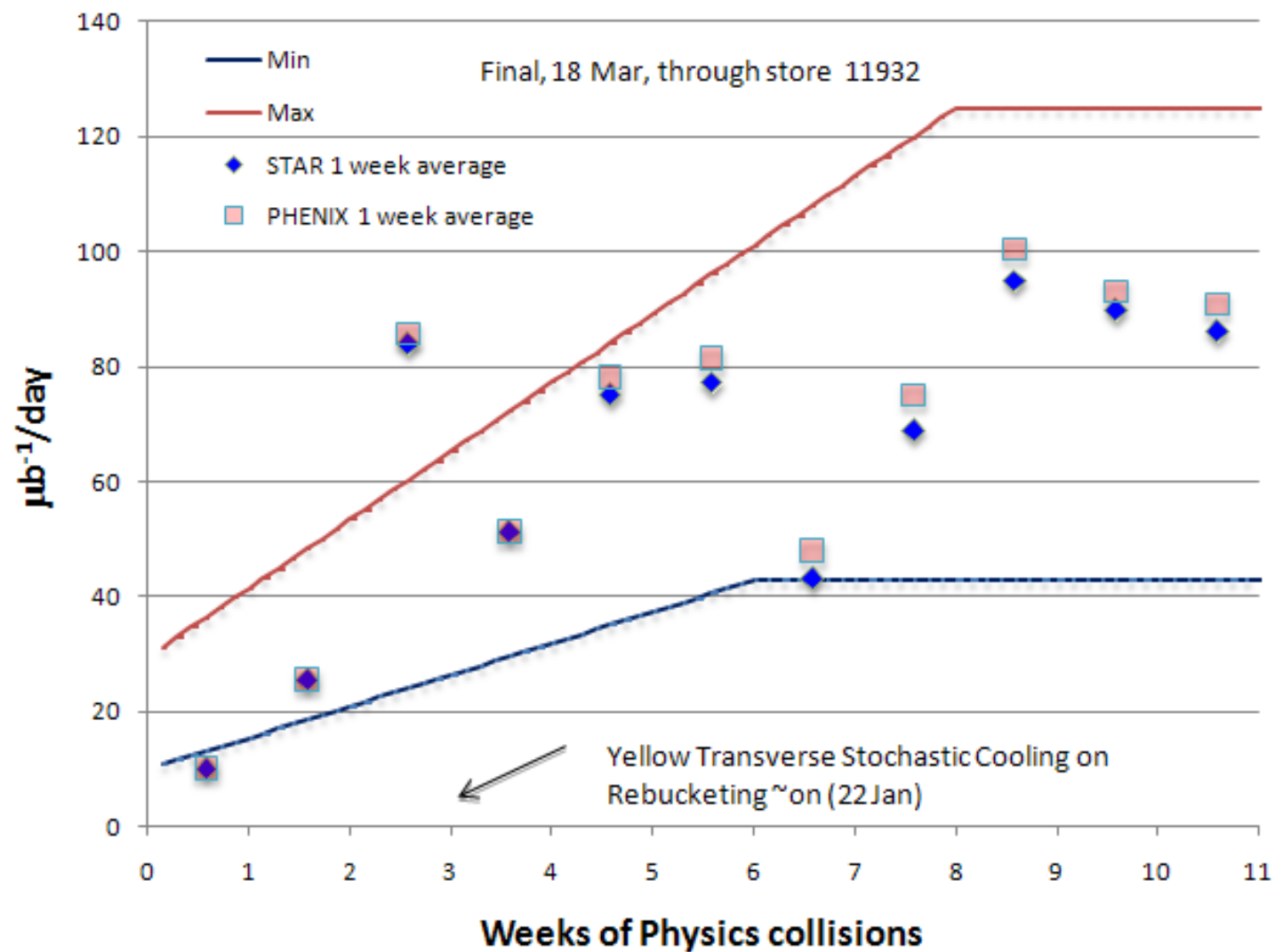
- RhicIpmManager.blue_horiz;normEmitM[.]
- RhicIpmManager.blue_vert;normEmitM[.]
- RhicIpmManager.yellow_horiz;normEmitM[.]
- RhicIpmManager.yellow_vert;normEmitM[.]

Run 10 100 x 100 GeV/n Au Delivered Luminosity



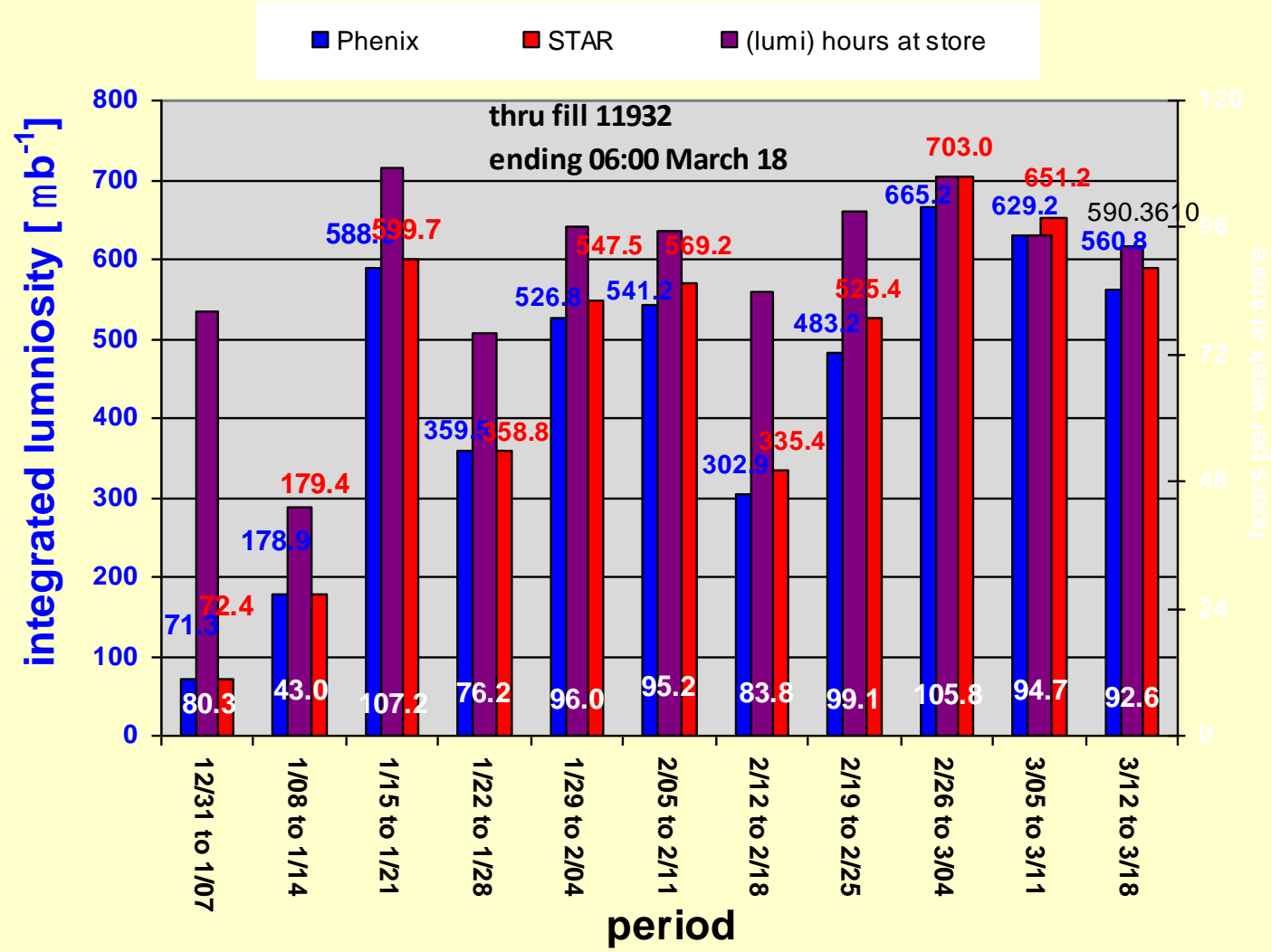
* With 20 cm sigma IR diamond

Run 10 100 x 100 GeV/n Au Delivered Luminosity per day

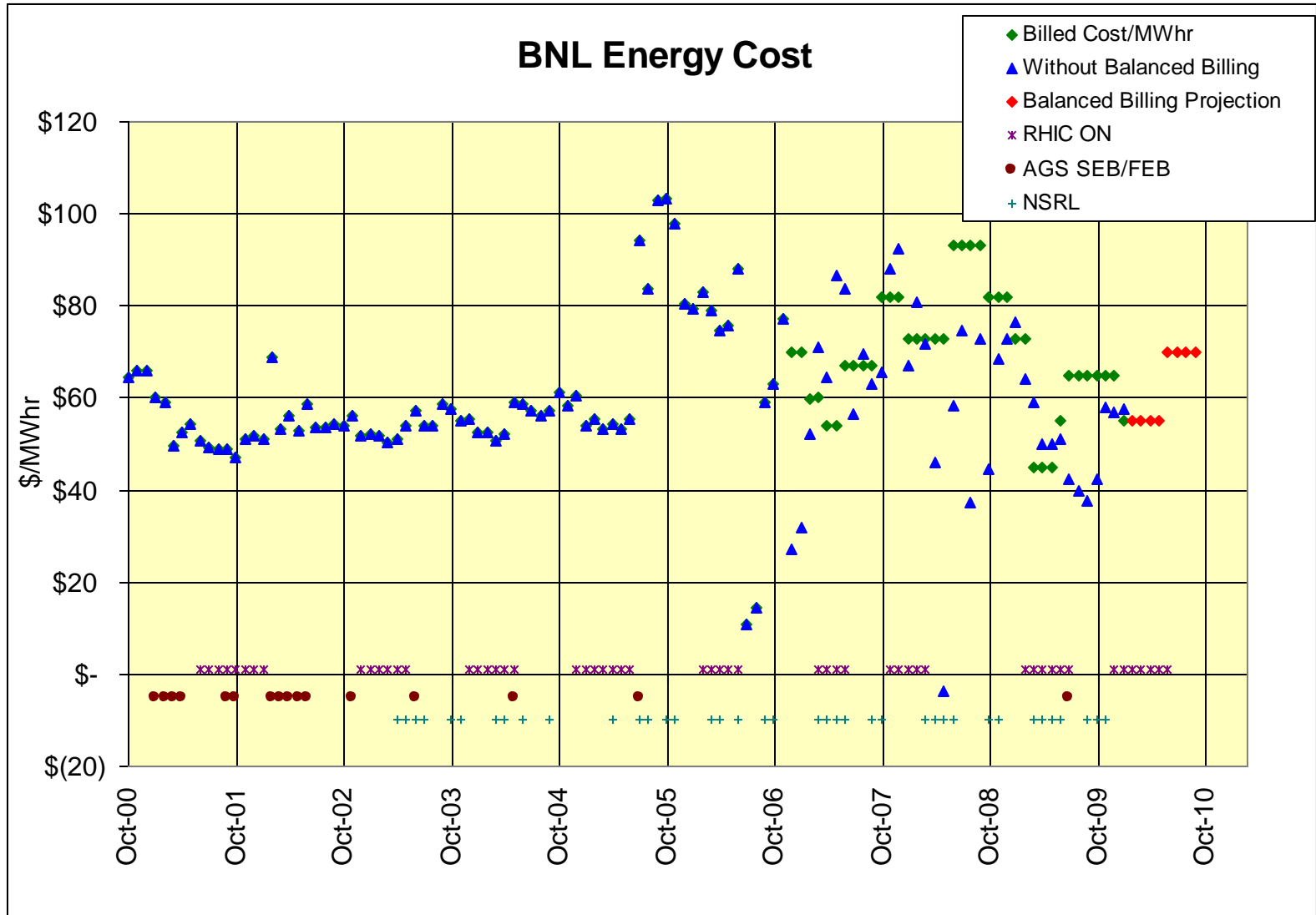


Average hours per week at store = 88.5

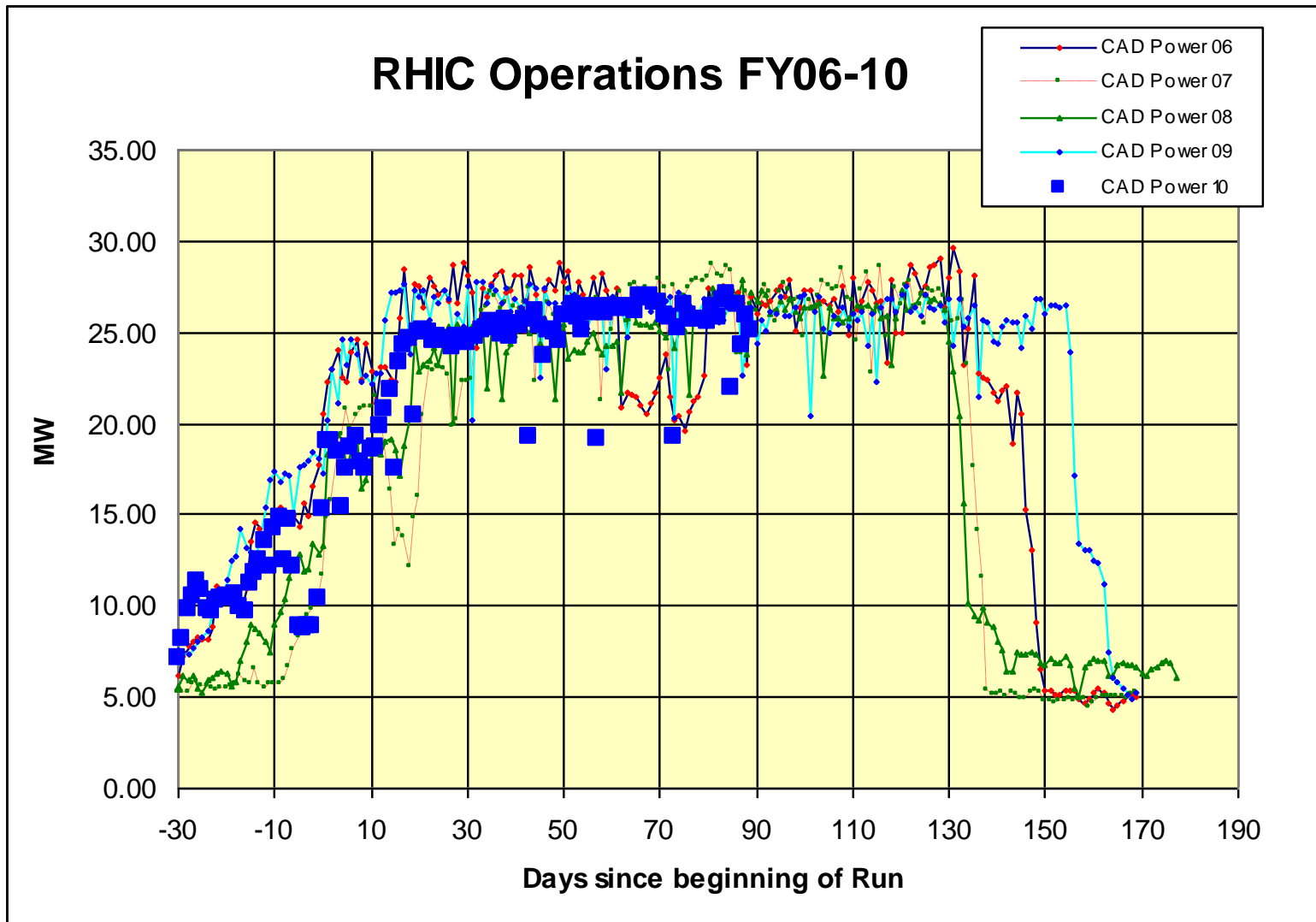
Run 10 (AuAu) -- Integrated Luminosity by week



Through Jan 2010



Through 2/28/10



31 Dec 1st Physics Store 11340, 0.6 m β^* No cooling or rebucketing, STAR 3.2 μb^{-1} , 2.6 hr store

Ring	Bunches/Cycles	Avg Bunch in RHIC (10 ⁶ ions)	Avg Efficiency XCBM to RHIC	XCBM to Uxf1	<i>Uxf1 to Wxf</i>	<i>Wxf to Arc</i>	<i>Arc to RHIC</i>
Blue	56/56	909	0.836	1.056	<i>0.963</i>	<i>0.992</i>	<i>0.828</i>
Yellow	56/56	990	0.971	1.085	<i>0.962</i>	<i>0.959</i>	<i>0.970</i>

18 Jan Physics Store 11489, 0.6 m β^* No cooling or rebucketing, STAR 22.6 μb^{-1} , 3.9 hr store

Ring	Bunches/Cycles	Avg Bunch in RHIC (10 ⁶ ions)	Avg Efficiency XCBM to RHIC	XCBM to Uxf1	<i>Uxf1 to Wxf</i>	<i>Wxf to Arc</i>	<i>Arc to RHIC</i>
Blue	111/28	1196	0.911	1.024	<i>0.961</i>	<i>0.999</i>	<i>0.927</i>
Yellow	111/29	1168	0.879	1.023	<i>0.961</i>	<i>0.989</i>	<i>0.905</i>

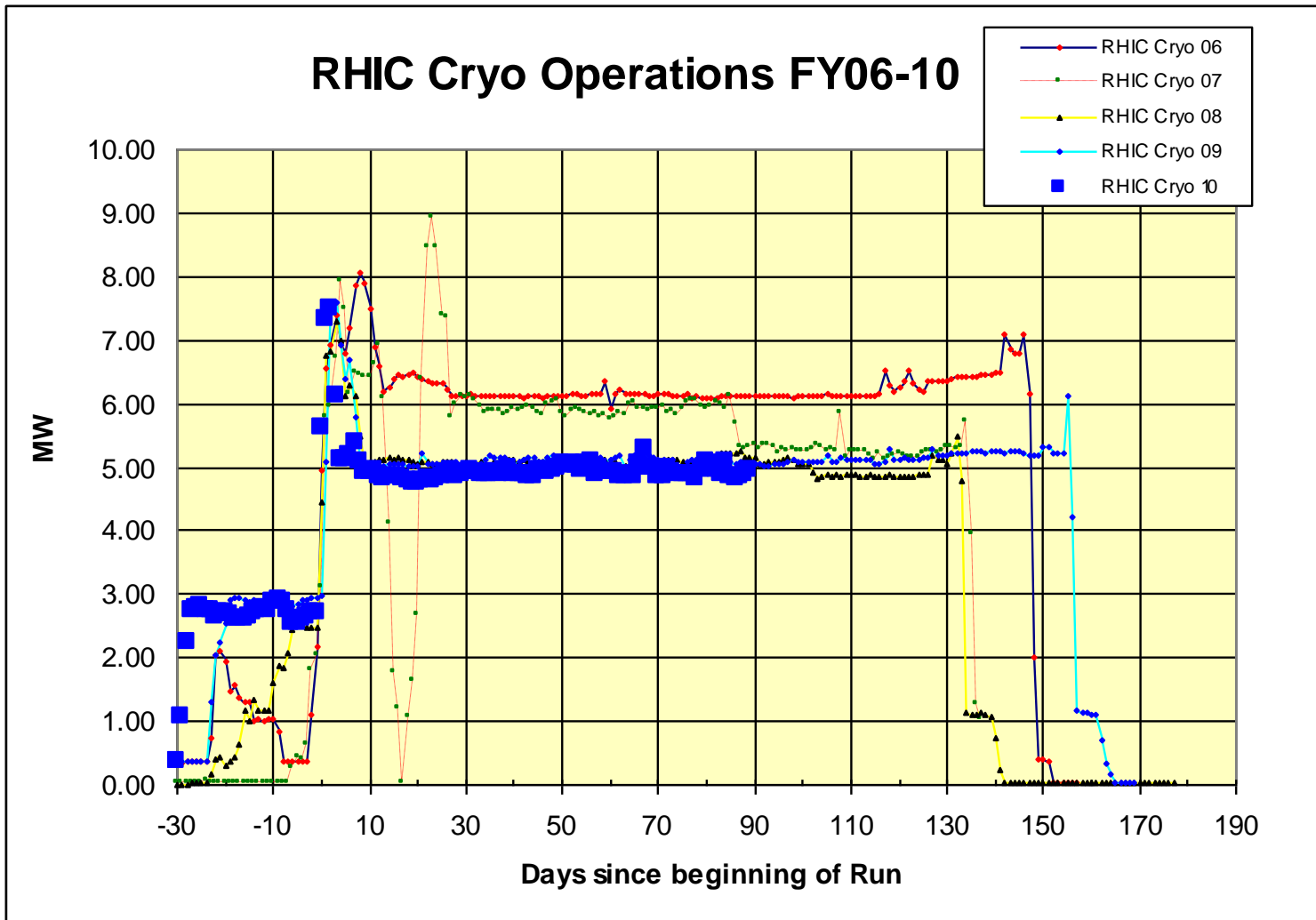
28 Feb Physics Store 11824, 0.7 m β^* with some cooling and with rebucketing, STAR 32.7 μb^{-1} , 3.9 hr store

Ring	Bunches/Cycles	Avg Bunch in RHIC (10 ⁶ ions)	Avg Efficiency XCBM to RHIC	XCBM to Uxf1	<i>Uxf1 to Wxf</i>	<i>Wxf to Arc</i>	<i>Arc to RHIC</i>
Blue	111/28	1262	0.917	0.975	<i>0.961</i>	<i>1.001</i>	<i>0.977</i>
Yellow	111/28	1246	0.910	0.961	<i>0.964</i>	<i>0.988</i>	<i>0.994</i>

2 Mar Physics Store 11834, 0.7 m β^* with some cooling and with rebucketing, STAR 29.4 μb^{-1} , 3.9 hr store)

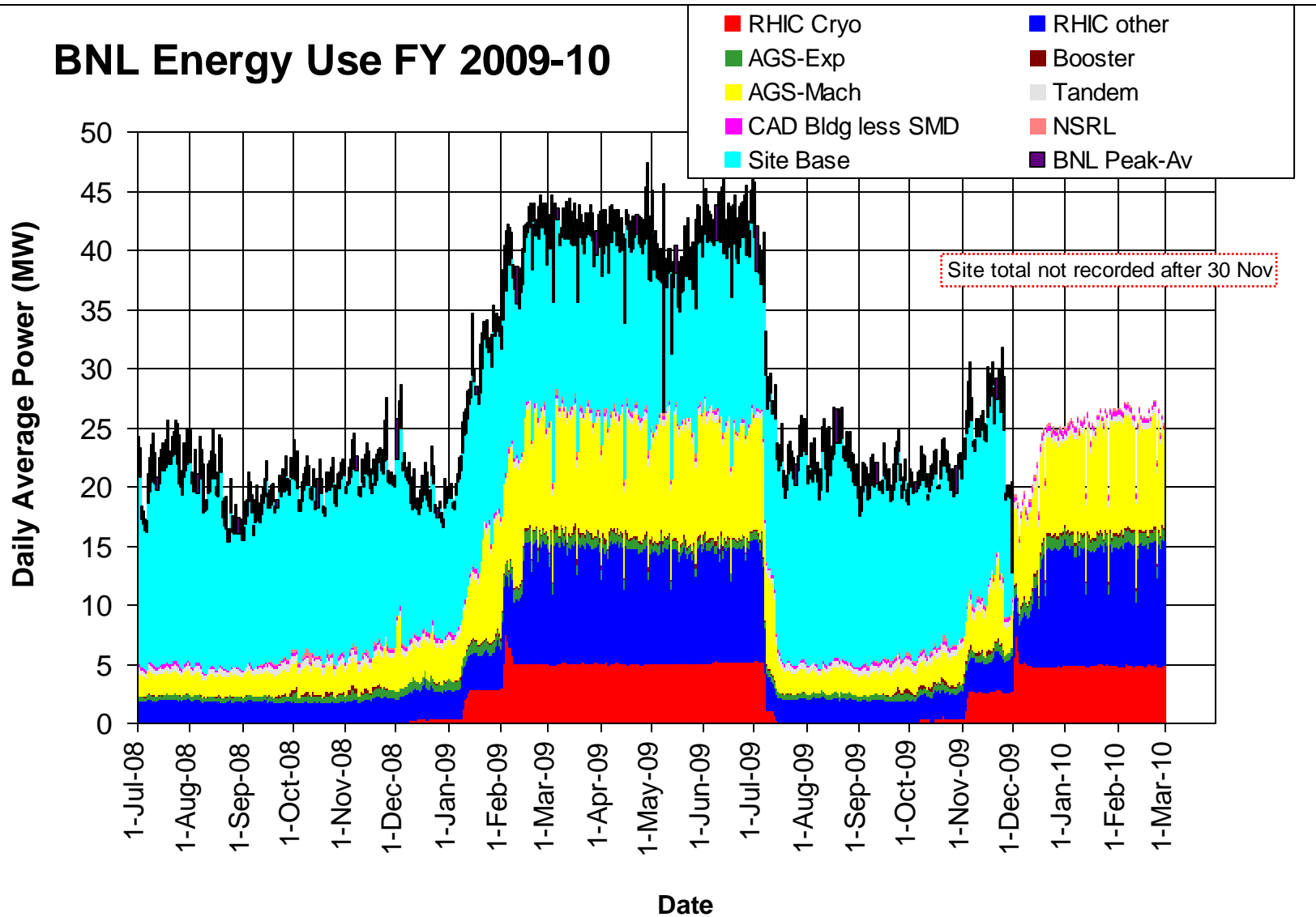
Ring	Bunches/Cycles	Avg Bunch in RHIC (10 ⁶ ions)	Avg Efficiency XCBM to RHIC	XCBM to Uxf1	<i>Uxf1 to Wxf</i>	<i>Wxf to Arc</i>	<i>Arc to RHIC</i>
Blue	111/28	1354	0.927	0.990	<i>0.965</i>	<i>1.003</i>	<i>0.968</i>
Yellow	111/28	1377	0.931	0.990	<i>0.964</i>	<i>0.989</i>	<i>0.987</i>

Through 2/28/10



Through 2/28/10

BNL Energy Use FY 2009-10



Revised Run 10 Plan, Nov 25, 2009

$\sqrt{s_{NN}}$ (GeV)	Physics production or beam studies weeks	
	25-cryoweek run	27-cryoweek run
200	10	10
62.4	4	4
39	1.5	1.5
27	0	0
18	0	0
11.5 @ STAR	0	2
7.7	4	4
Beam studies @ 5 GeV and @ $v \approx 0.67$	0.5	0.5

Run 10 Au-Au Goals

11/19/09

- STAR

- $\sqrt{s} = 200 \text{ GeV/n}$

- Luminosity Sampled/Delivered = 2/4 nb⁻¹
 - 250M Central Events
 - 300M Min-bias events

- PHENIX

- $\sqrt{s} = 200 \text{ GeV/n}$

- Luminosity Recorded/Delivered = 1.4/>6 nb⁻¹
 - Minimum Goal:
 - Luminosity Recorded/Delivered = 1.1/3.9 nb⁻¹

Time from start of 4.5 deg cooldown to Physics

