RHIC Machine/Detector Planning Meeting

4 May 05

Agenda

- **Schedule Issues – (Montag)**
- **Report from experiments (STAR,PHENIX,BRAHMS)**
- **Polarized Proton Status (Bai)**
- **RCF Issues (Throwe)**
- **Other business**

Planning Meeting Web Site: http://www.c-ad.bnl.gov/esfd/RMEM/rhic_planning.htm

Corrected after meeting

Experiment Goals RHIC Run 5, 100x100 GeV pp

- **BRAHMS**
  - Began physics 17 April
  - Goal 5 pb^{-1} transverse polarized (>45%) delivered
- **PHENIX**
  - Began min-bias physics 17 April, main physics 19 April
  - Goal 5.5 pb^{-1}recorded Luminosity with 45% polarization, 20 pb^{-1} delivered
  - Translates to: $P_B^2P_Y^2\boldsymbol{L}$ goal 226 nb^{-1} recorded
  - Translates to: $P_B^2P_Y^2\boldsymbol{L}$ goal 226 $nb^{-1}/(0.45*0.6)$ = 837 nb^{-1} delivered
- **STAR**
  - Began physics 17 April
  - Goal ~ 20 Mevts min-bias (~70 hrs)
  - Goal ~ 7 pb^{-1} longitudal polarized (>40%) collisions, 14 pb^{-1} delivered (useable)
  - Goal ~ 4 pb^{-1} transverse polarized (>40%) collisions, 8 pb^{-1} delivered (useable)

400 GeV pp Run Issue

20 Apr 05

Summary of discussion to date (Y. Makdisi)

- **Machine issues**
  - **3 days to setup ramps**
  - **3+ days to establish adequate polarization**
  - **Can start mid-May, before PAC meeting (3rd week of May) or after the PAC meeting**
  - **Prefer 1.5 day PHOBOS physics at end of 200 GeV pp run**

- **Experiments issues**
  - **PHOBOS – strong advocate for short physics run, above schedule OK**
  - **STAR – decide after pp physics is established, priority is to integrate 4-6 pb^{-1} of delivered luminosity (P>35%) at expense of 400 GeV development run if necessary**
  - **PHENIX – priority is to integrate 1.5 pb^{-1} of recorded luminosity (P>45%) before development run and push 1 day PHOBOS physics run to end of 200 GeV pp run**
  - **BRAHMS – does not plan to run**

- **Status:**
  - **Decision will be made at a later date**

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- ***RHIC Run5 Plan (estimate based on present understanding of budget)***

  - **18 Nov 04 – Cool down begins**
  - **23 Nov 04 – Blue Ring Cold**
  - **28 Nov 04 – Yellow Cold**
  - **29 Nov 04 – Short in D6-D8 dipoles Yellow Ring, schedule delay**
  - **3 Dec 04 – quad bus-bus short in sector 12, shutdown to repair**
  - **27 Dec 04 – short problem resolved, rings at 4 degrees again**
  - **27 Dec 04 - "2 week" RHIC setup with beam began**
  - **28-29 Dec 04 – found & fixed aperture problem in Yellow Ring (Al foil)**
  - ***5 Jan 05 – "2 week" ramp-up with colliding beams began***

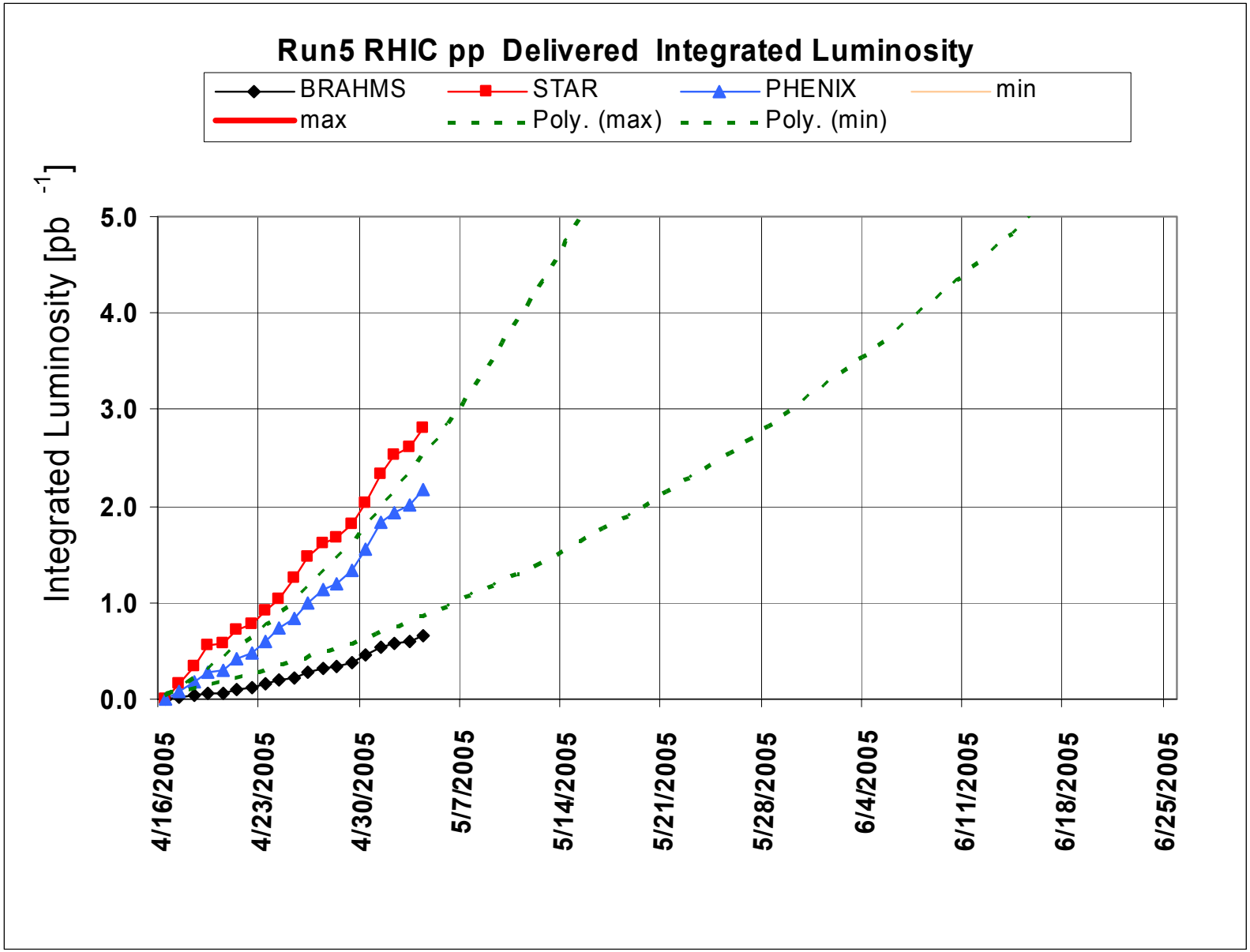
As of 4 May 05

RHIC Machine/Detector Planning Meeting

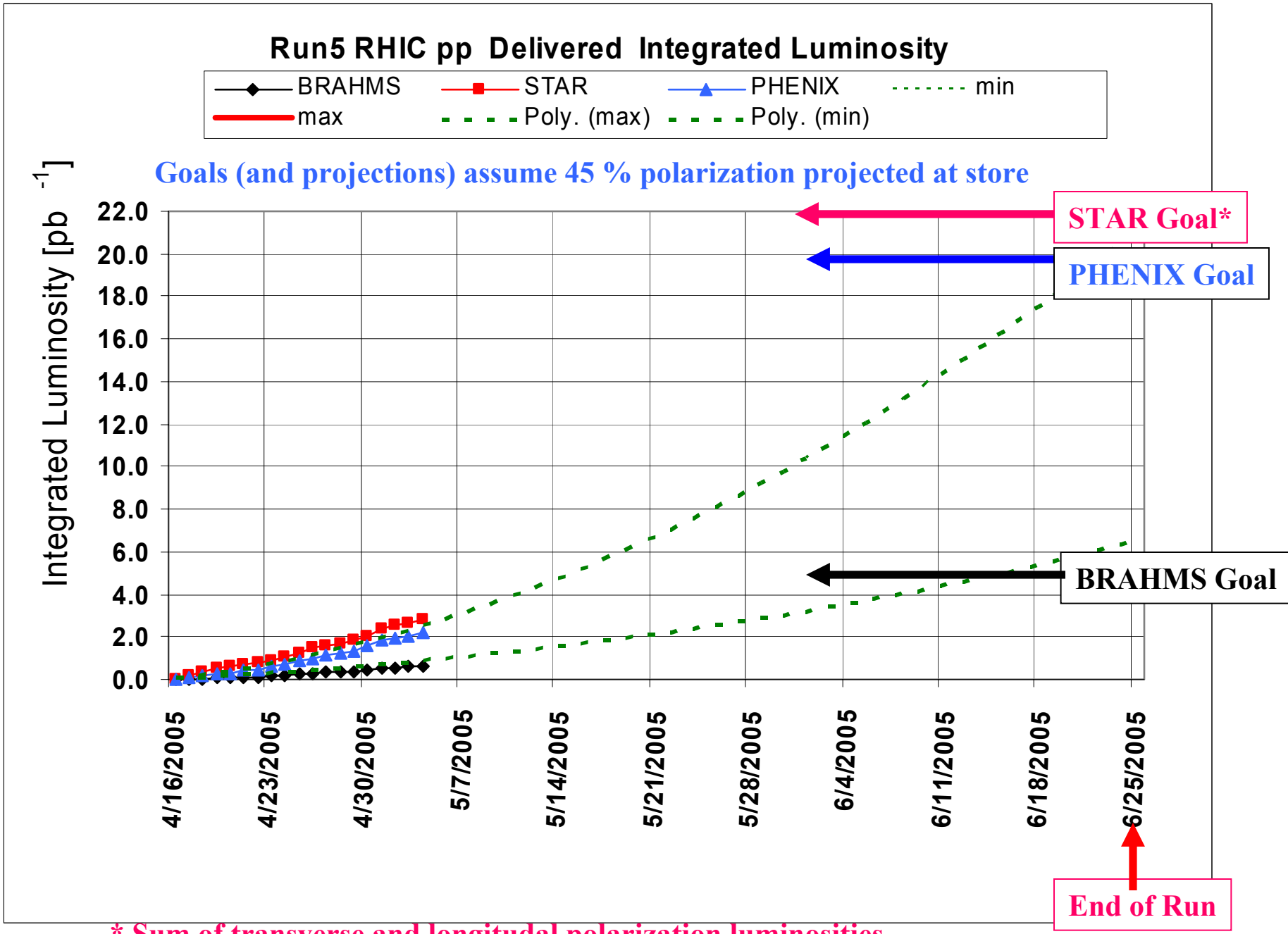
- **Details – as run/planned**

  - ***11 Jan – Physics with Cu-Cu began***
  - ***7 Mar (0800) – end 200 GeV/n Cu-Cu***
  - ***7-9 Mar – Setup 62.4 GeV/n Cu-Cu***
  - ***9-15 Mar - 62.4 GeV/n Cu-Cu Physics***
  - ***10 March – Physics begins***
  - ***15 Mar – 8 hours at injection energy 10 March – Physics begins***
  - ***15-22 (1400) Mar - 62.4 GeV/n Cu-Cu Physics***
  - ***22 (1400)-24 (0800) March Cu-Cu Physics at RHIC Injection***
  - **24 Mar (0800) – End of 10.3 week Cu-Cu run, 8 hr maintenance**
  - ***24-30 Mar – begin 3 week pp setup***
  - **30 Mar - 1 Apr 05 Cold Snake/Jet Installation/CNI etc**
  - ***1-16 Apr – complete 3 week pp setup*** *(7 April, overnight stores for experiments started)*
  - ***17 Apr – Begin 10.0 week pp Physics run***
  - **25 Jun – end pp run, RHIC Run 5 ends**
  - **30 Jun – Cryo switch to LN_2 complete, *32.0* weeks of RHIC cryo operation ends**

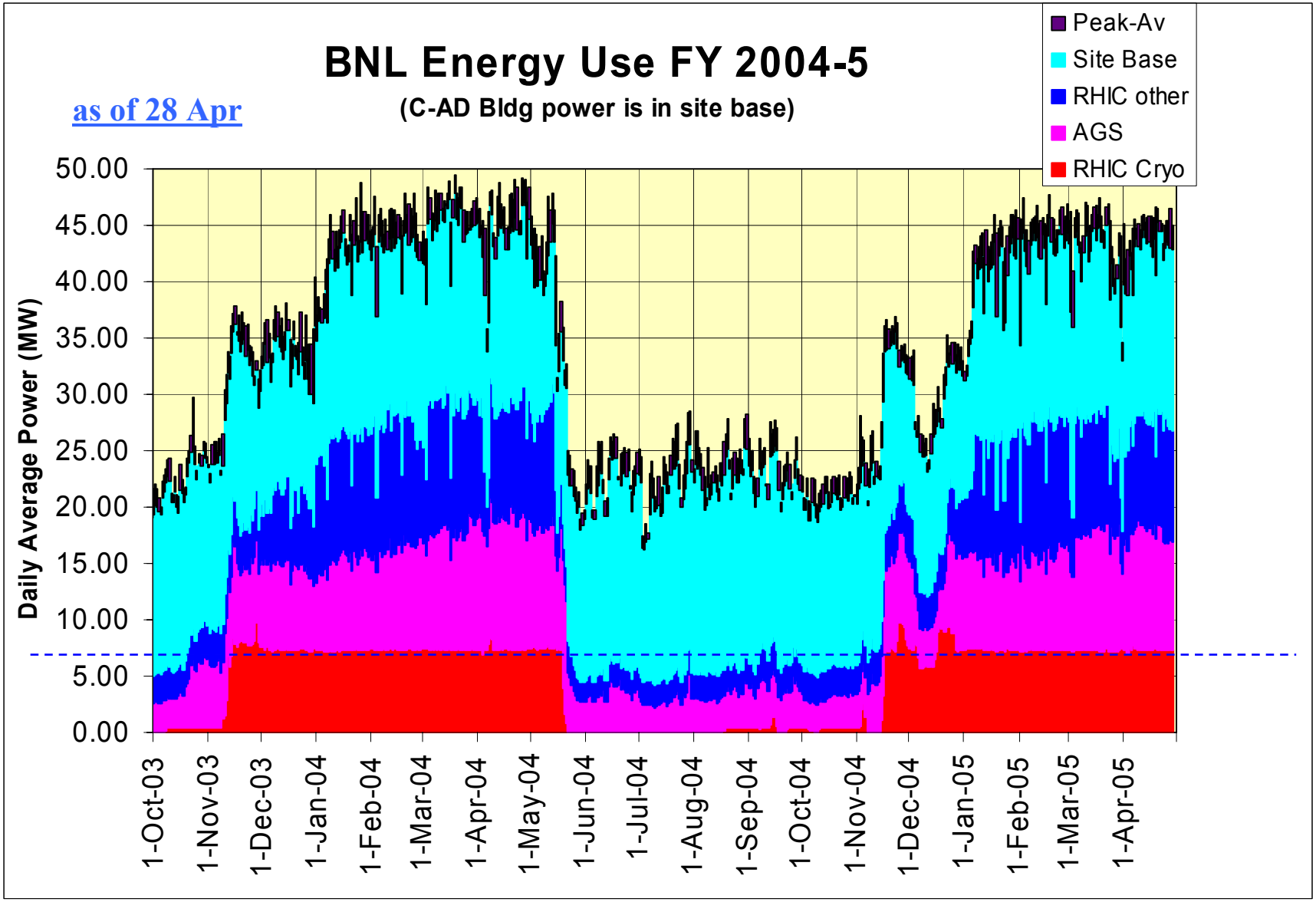
Corrected after meeting



Corrected after meeting



* Sum of transverse and longitudal polarization luminosities


BNL Energy Use FY 2004-5
(C-AD Bldg power is in site base)
as of 28 Apr
Peak-Av
Site Base
RHIC other
AGS
RHIC Cryo
Daily Average Power (MW)
50.00
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1-Oct-03
1-Nov-03
1-Dec-03
1-Jan-04
1-Feb-04
1-Mar-04
1-Apr-04
1-May-04
1-Jun-04
1-Jul-04
1-Aug-04
1-Sep-04
1-Oct-04
1-Nov-04
1-Dec-04
1-Jan-05
1-Feb-05
1-Mar-05
1-Apr-05

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PHENIX 400+ GeV Running

- It is the position of PHENIX that 400+ GeV development is ***extremely important*** to the future of the polarized proton program at RHIC.
  - Equally important as our Run-5 physics goals.

- We would prefer the 400+ GeV energy ramp development to commence after we have integrated $\mathbf{P^4\mathcal{L} \sim 62\ nb^{-1}}$ (this is 1.5 pb^{-1} at 45% polarization).

  - This gives PHENIX sufficient running time to be able to establish reasonable projections for the rest of the run, and enables us to better understand the impact of shifts taken for machine development instead of physics.

  - The polarization development with the 400+ GeV ramp should come in the week immediately following the energy ramp development.

  - The overall development time should be discussed with a **very clear understanding of the potential loss of physics**, based on our experience and machine performance.

- One day of physics running at 400+ GeV should come at the end of the 200 GeV physics program.

STAR - On the issue of the High Energy Beam Development

- STAR places an extremely high priority on getting a sufficient data set to make a measurement of the gluon polarization out of the current run.
- STAR recognizes and appreciates the importance of doing collider development for the future.
- STAR would like to have 2 to 3 pb^{-1} recorded luminosity (this means 4 to 6 pb^{-1} delivered), with "good" polarization (> 35% in each beam), before RHIC efforts are diverted to this development effort.
- If this can't be achieved prior to the Collider Physicists leaving for their Conference, perhaps early June, after their return, would be possible.

Experiment Goals RHIC Run 5, 100x100 GeV/n CuCu, Summary of Results (3/23/05 update)

- **BRAHMS**
  - Soft physics goal 0.8 nb^{-1} recorded, achieved 0.8 nb^{-1} → 100% of goal
  - High-Pt goal 2.4 nb^{-1} recorded, achieved 1.75 nb^{-1} → 73% of goal
- **PHENIX**
  - Integrated recorded luminosity goal (live BBCLL1) 2.9 nb^{-1}, achieved 3.06 nb^{-1} → 105% of goal
- **PHOBOS**
  - Goal 1000M events to tape, achieved 500M → 50% of minimum goal
  - Minimum Goal 400M events to tape, achieved 500M → 125% of minimum goal
- **STAR**
  - Min bias, Goal 80M events, recorded 64.5M events → 80% of goal
  - High Pt Trigger (BEMC HT18), Goal to sample 1-2 nb^{-1}, recorded >1 nb^{-1} → 100% of goal

Experiment Goals RHIC Run 5, 31.2 x31.2 GeV/n and 11.2x11.2 GeV/n CuCu and Final Results (3/30/05)

- **BRAHMS**
  - 62 GeV, Integrated Recorded Luminosity Goal 90 μb^{-1}
    Actual recorded luminosity 120 μb^{-1} (133% of goal)
  - 22 GeV, Goal 1.5M FFS triggers recorded
    Actual recorded 1.9M triggers (126% of goal)

- **PHENIX**
  - 62 GeV, Integrated Delivered Luminosity Goal = 250 μb^{-1}
    Integrated Recorded Luminosity Goal 92 μb^{-1}
    Actual recorded luminosity 190 μb^{-1} (206% of goal)
  - 22 GeV, ~20M recorded events
    Actual recorded 23.8M events (119% of goal)

- **PHOBOS**
  - 62 GeV, Goal 250M events to tape, minimum Goal 100M events
    Actual recorded 115M events (115% of minimum goal)
  - 22 GeV, Goal 8M events to tape
    Actual recorded 20M events (250% of goal)

- **STAR**
  - 62 GeV, Min bias, Goal >20M events to tape
    Actual recorded 27.3M events (136% of goal)
  - 22 GeV, Min bias, Goal >1M events to tape
    Actual recorded 3.85M events (385% of goal)

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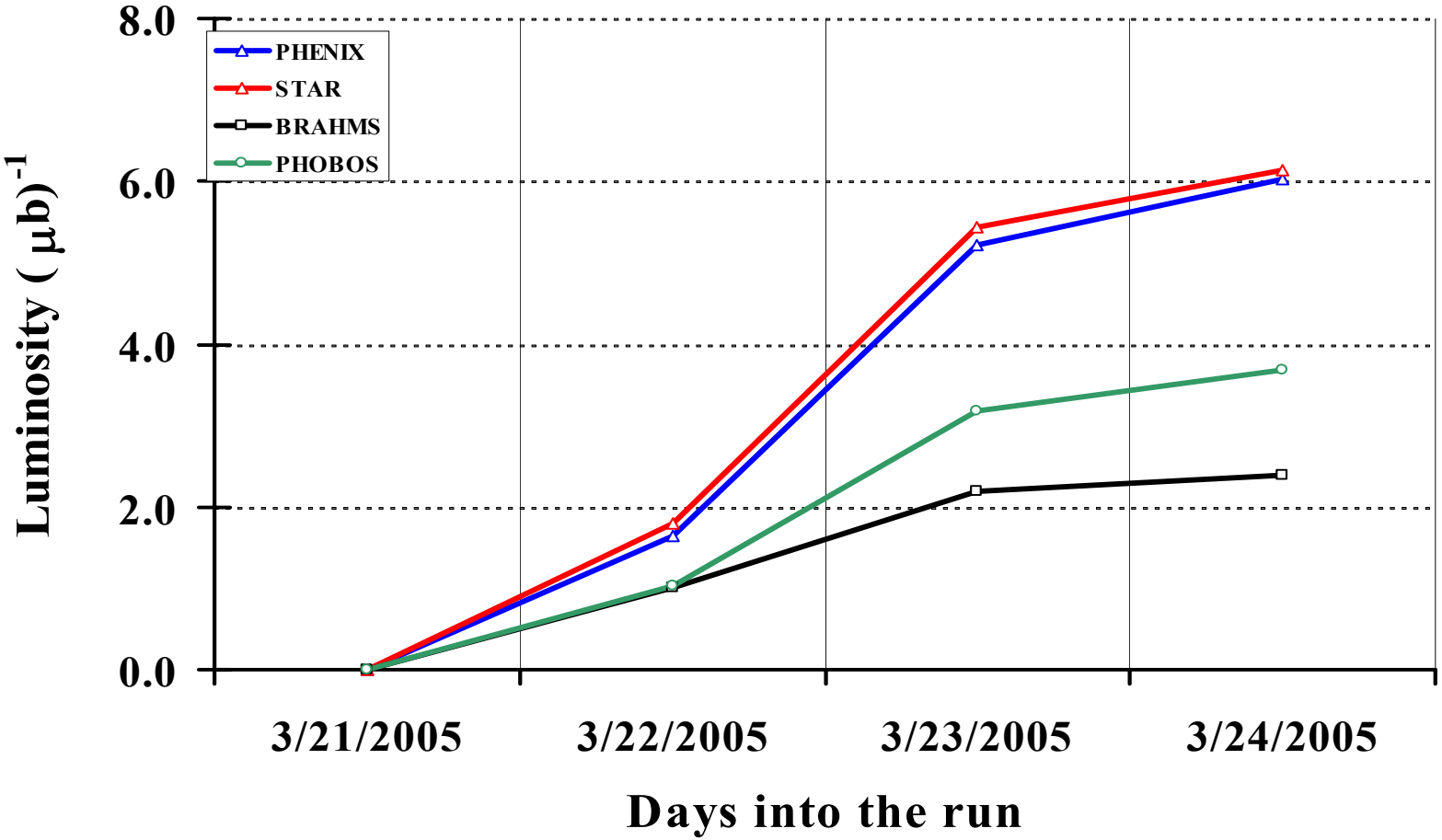
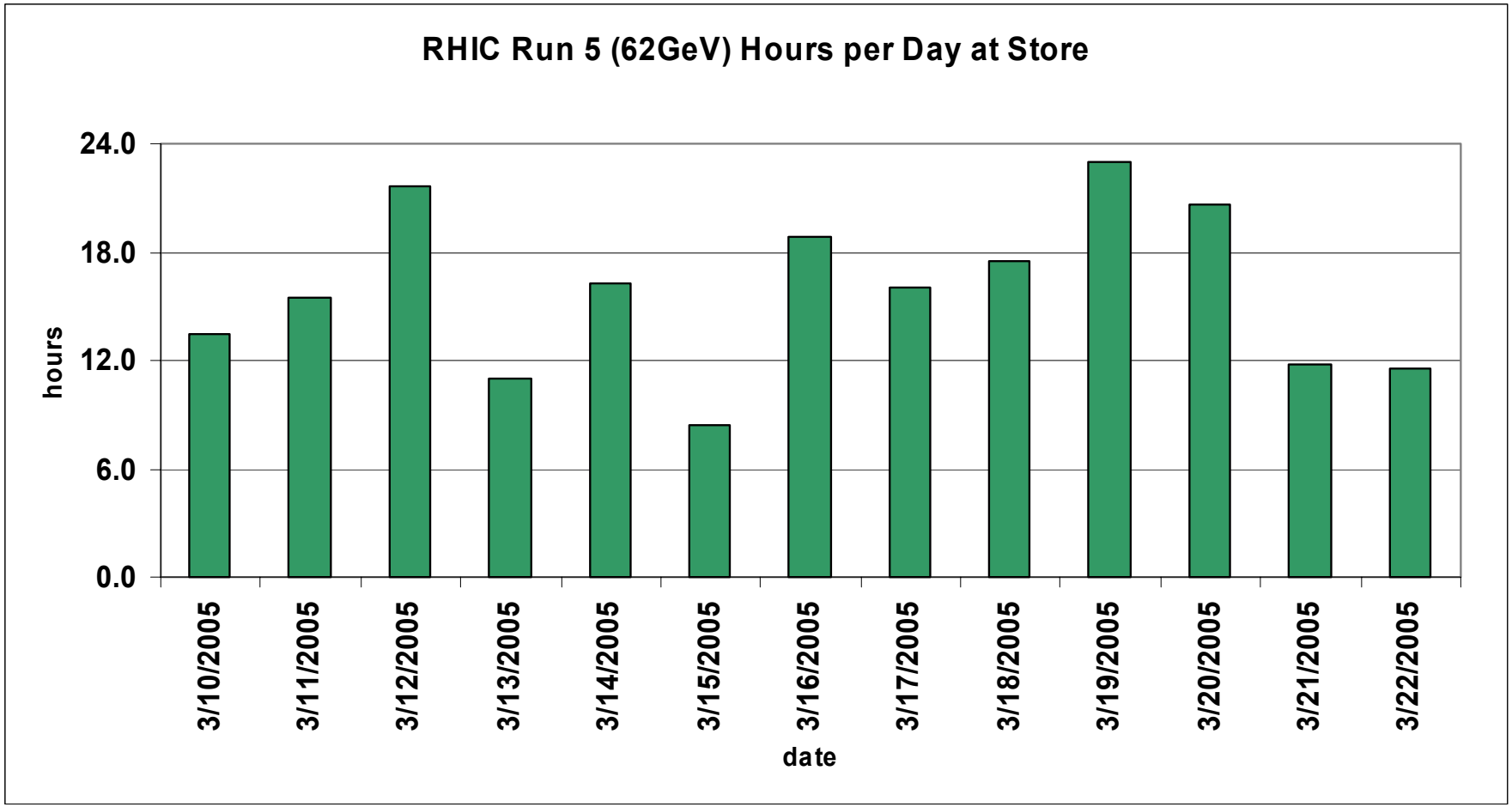
PAC Recommendations (very short summary):

- 8-10 week pp run should have highest priority
- Cu-Cu run should accumulate an integrated delivered luminosity of at least 7 nb^{-1} at $\sqrt{s}$ = 200 GeV
- Cu-Cu at $\sqrt{s}$ = 62.4 GeV and 1 day at injection is advisable if above goals are met
- 1-2 day pp (unpolarized) run at $\sqrt{s}$ = 400-500 GeV desirable

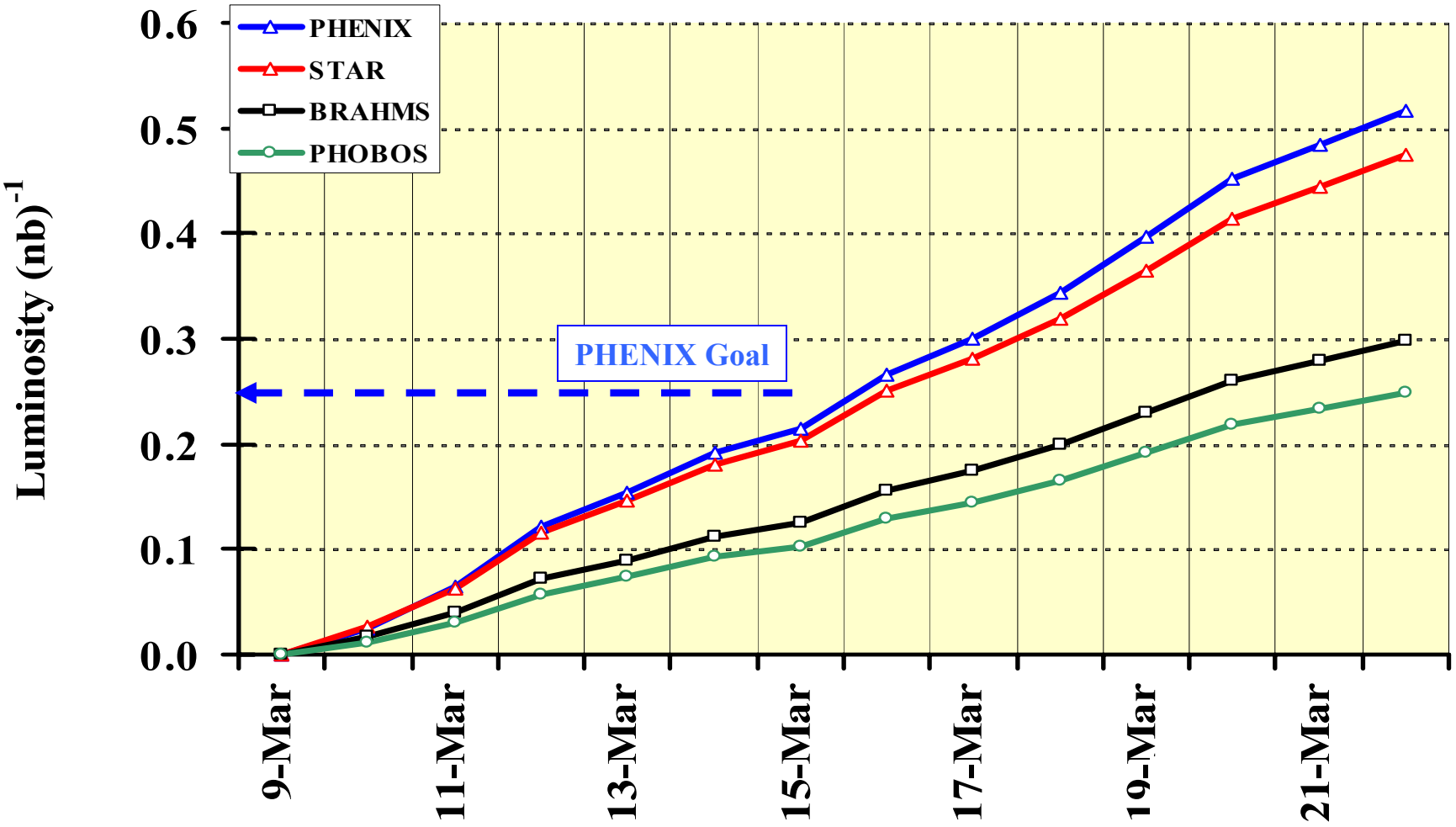
RHIC Run 5 (22 GeV) Final Delivered Cu-Cu Luminosity



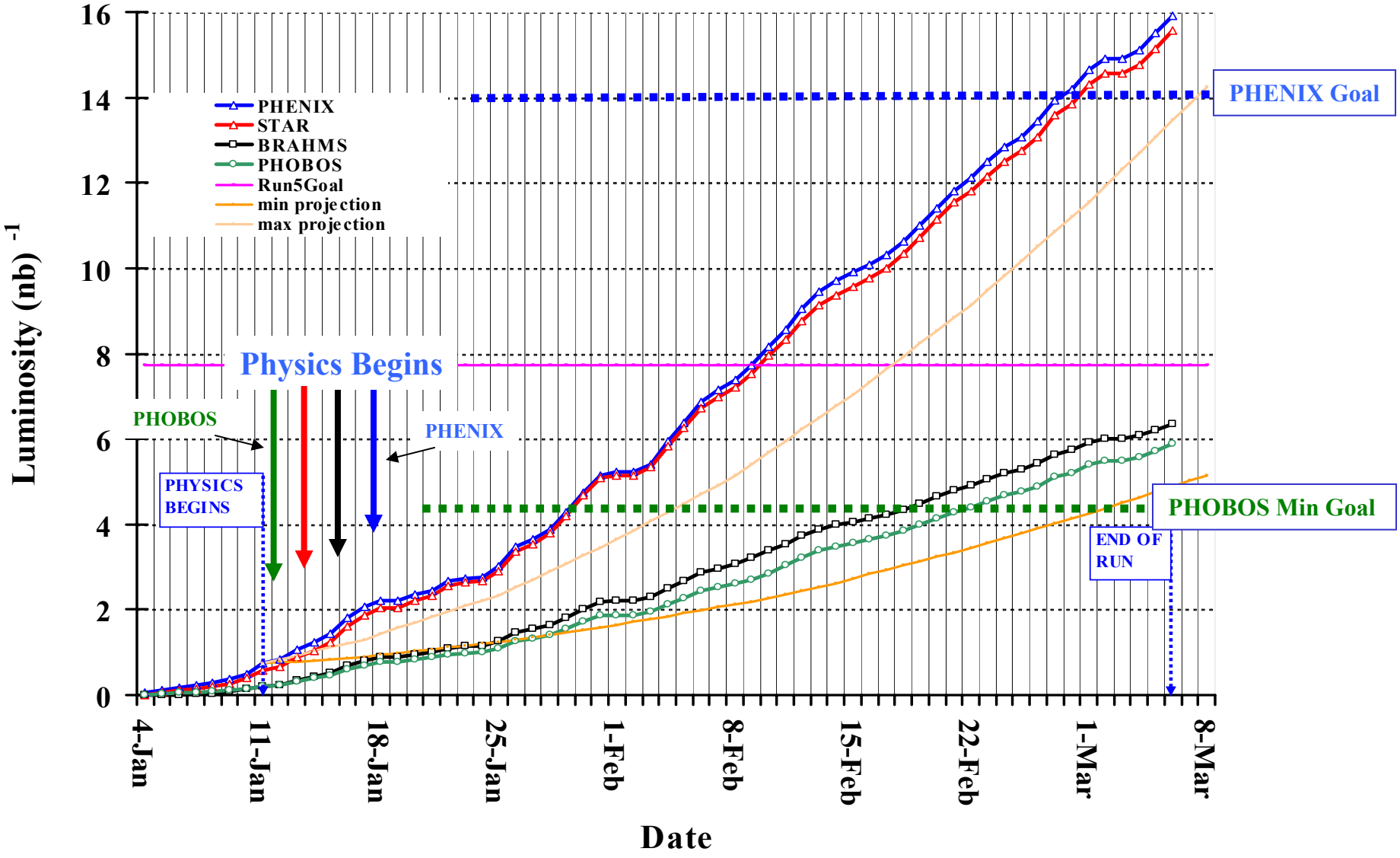


Total = 205.5 hours
0130 10 Mar – 1330 22 Mar = 300 clock hours
68.5% or 115 hrs/week average

RHIC Run 5 (62 GeV) Final Delivered Cu-Cu Luminosity



RHIC Run 5 Final Delivered 100x100 GeV/n Cu-Cu Luminosity



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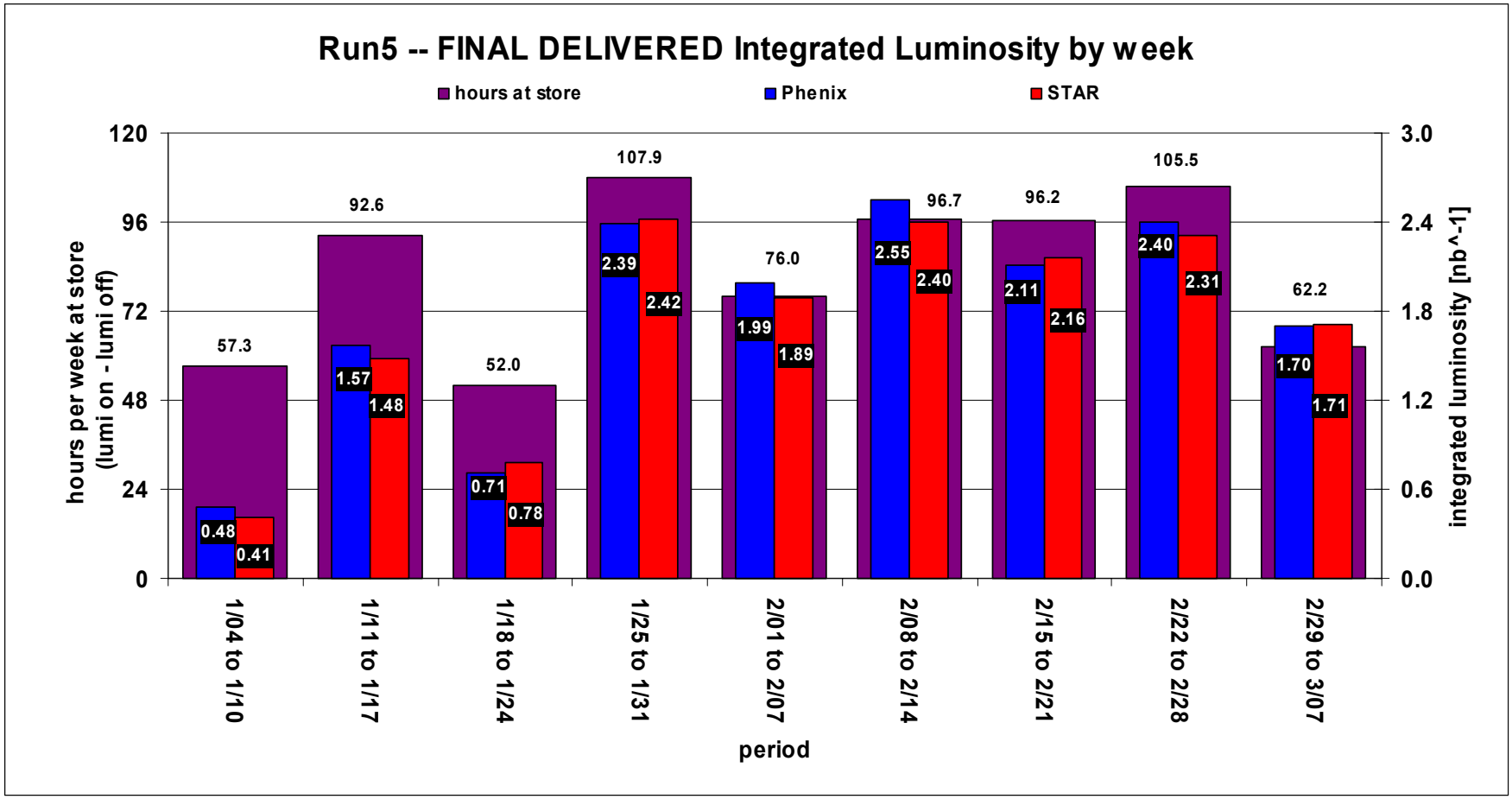


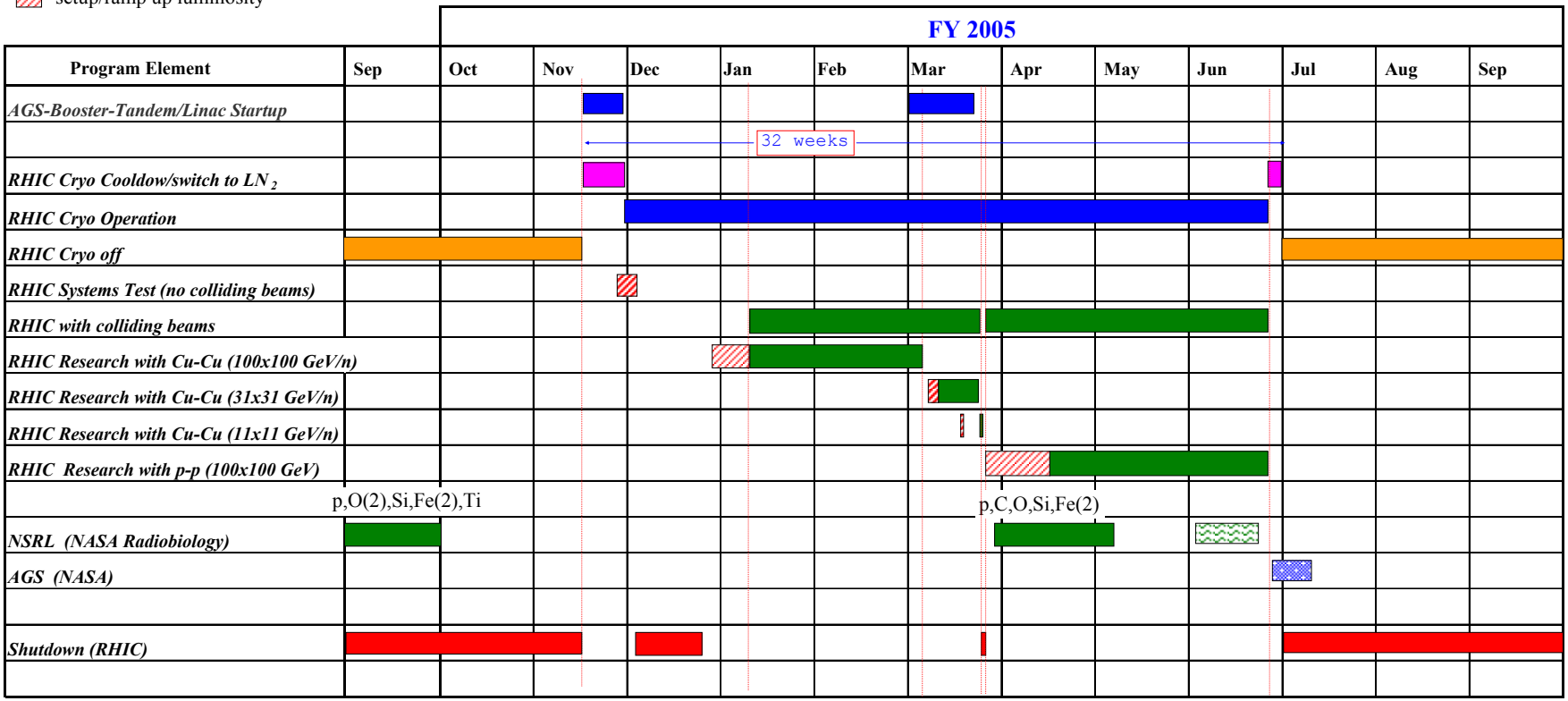
http://www.c-ad.bnl.gov/esfd

C-A Operations-FY05

22 Feb 05

Schedule - subject to change

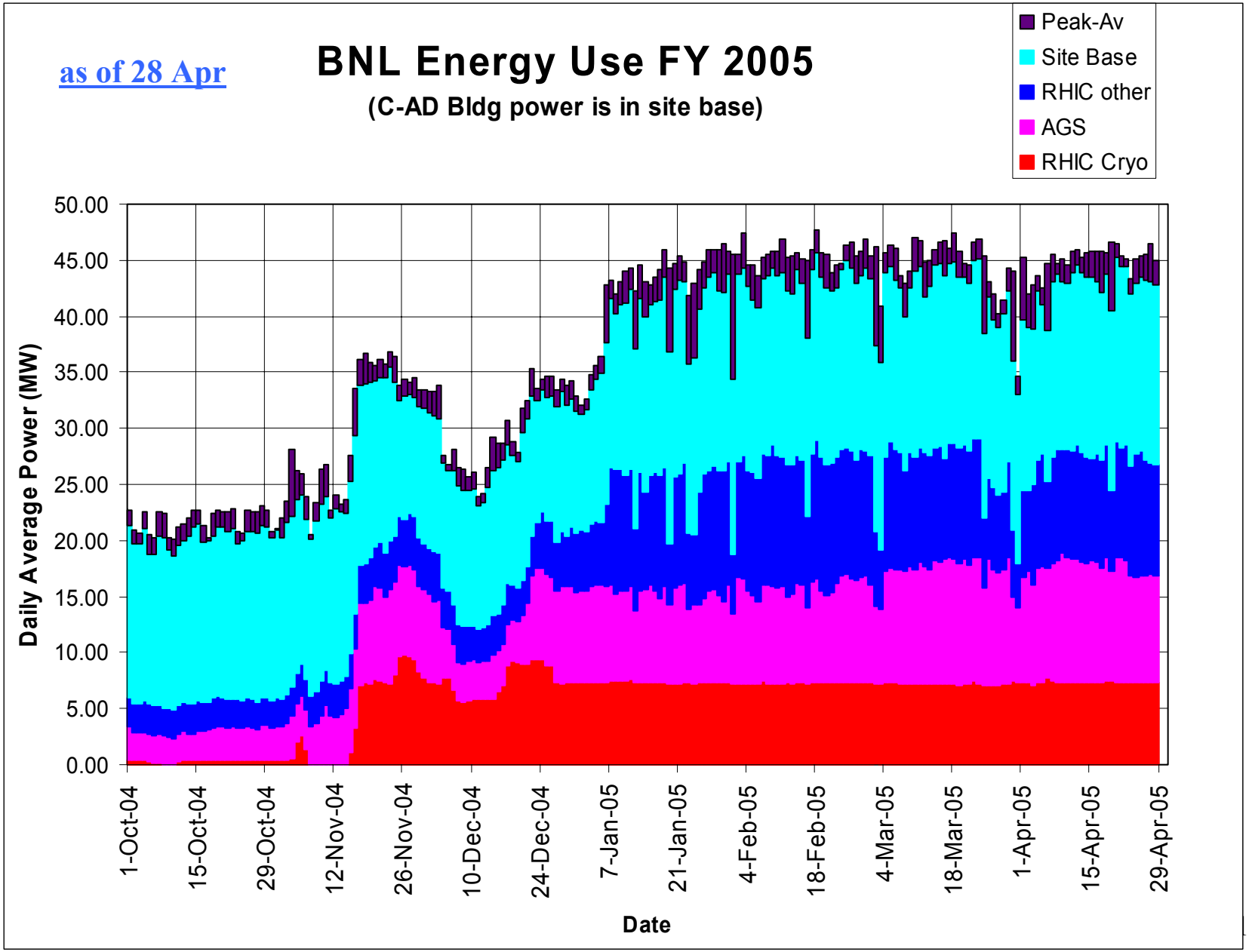
pending approval/funding
schedule to be determined
setup/ramp up luminosity



as of 28 Apr

BNL Energy Use FY 2005

(C-AD Bldg power is in site base)



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Purpose of this meeting:

- To address issues and priorities relating to the optimization of physics output from RHIC experiments.

- To discuss and promulgate policy (when needed).