Run 12 RHIC Machine/Experiments Meeting

7 Dec 2011 (3rd meeting)

Agenda: Run 12 Priorities

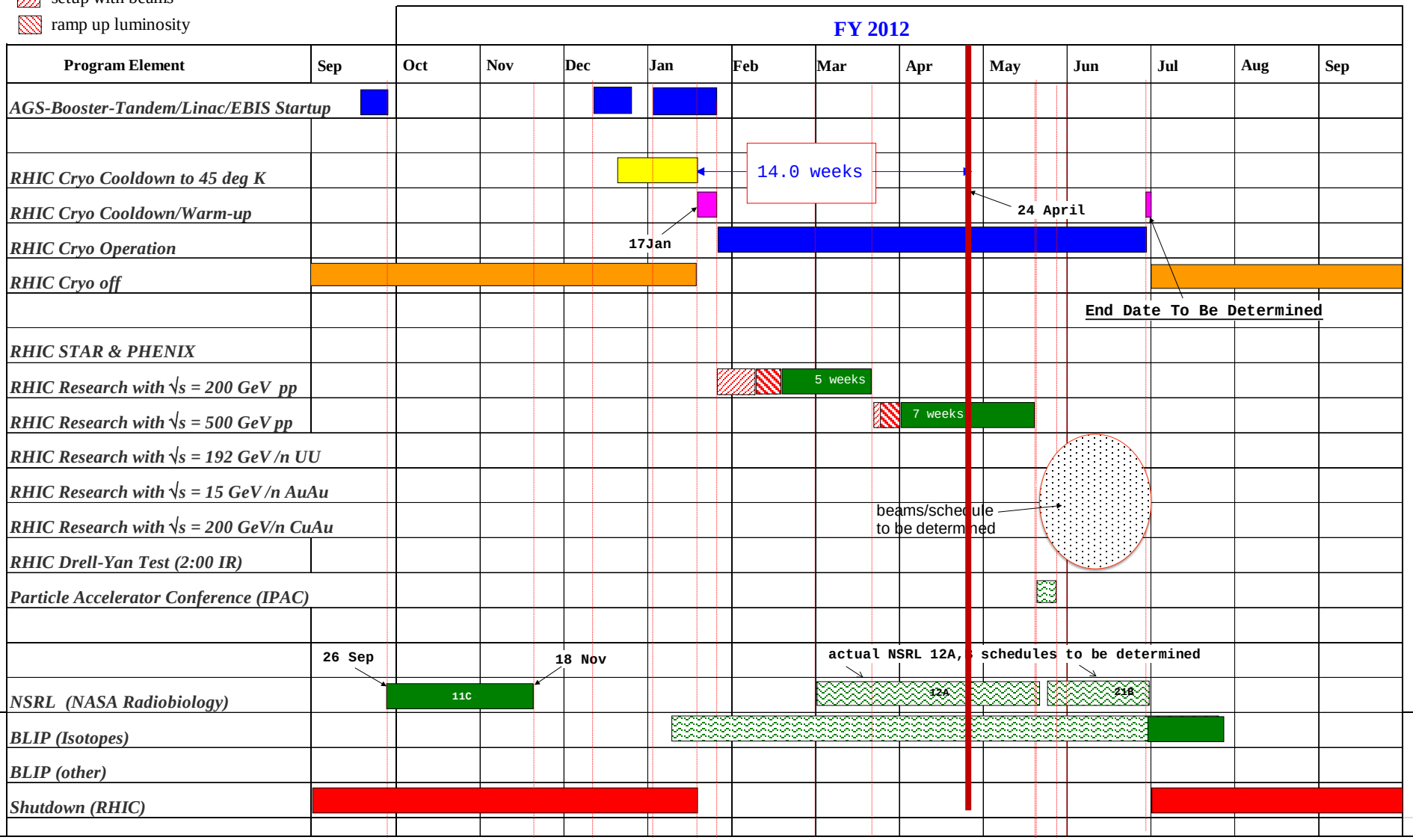
http://www.bnl.gov/cad/esfd

C-A Operations-FY12

7 Dec 11

planned (budget permitting)

concurrent with RHIC
setup with beams
ramp up luminosity



Run 12 Plan based on PAC recommendation/ALD Guidance and 14 weeks cryo operation
5 Dec 11 DRAFT – an example 14 week schedule

- 17 Jan, Begin cool-down to 4.5K
- 20 Jan, Cool-down to 4.5K in Blue Ring complete, begin magnet setup
- 24 Jan, Cool-down to 4.5K complete in both rings begin √s = ?00 GeV pp setup
- 31 Jan, begin 2 week ramp-up with 8 hrs/night for experiments
- 14 Feb, begin 5 weeks physics with further ramp-up
- 20 March, end 5 week √s = ?00 GeV pp run, begin 1 week setup for √s = ?? GeV/n HI-HI
- 27 March, begin 3 week √s = ?? GeV/n Hi-HI physics run
- 17 Apr, end 3 week √s = ?? GeV/n Hi-HI physics run
- 4 days contingency
- 21 April, End RHIC Physics
- 24 April, Cryo Warm-up complete (**14.0 cryo-weeks**)

- 22 May (18 cryo-weeks)
- 19 Jun (22 cryo-weeks)
- 30 Jun (22.6 cryo-weeks)

- 20-25 May: IPAC

D.L. November 23, 2011 update

Cryo Issue

Our helium supplier no longer able to meet our peek demand of 4 trailers in a one week period. They can give us one trailer a week starting on December 31st, so we expect to have all the helium we need, on time, but we will have to store most of it in the dewars outside 1006B. This will result in our 4K cooldown being a little less stable and predictable than it has been for the past few years when we received all of the helium at 1005R over a short period of time. Because of this, I expect the 4K cooldown will take a least one additional day.

Cryogenic System Cooldown Projection based on Full Compressor Power Starting on January 17, 2012

.5 to 1 MW – Nov 23, 2011 through Dec 18, 2011 (temporary peaks up to 2 MW)

Scrub of RHIC rings and cryo plant, 14 atm pressure test of blue sextants 2/3 and 8/9 M-lines. Main compressor testing and scrub.

2.8 MW – Dec 19, 2011 through Jan 16, 2012

12/19/11	Start 45K cooldown of cryo plant
12/20/11	Start 45K wave in both RHIC rings
12/31/11	First liquid helium delivery, 1006B
01/07/12	Second liquid helium delivery, 1006B
01/14/12	Third liquid helium delivery, 1005R

6 to 8 MW – Jan 17, 2012 through Jan 22, 2012

01/17/12	Start 4K wave in Blue ring, Hi potting (3 days)
01/20/12	Estimate blue ring cold and stable, soak complete, ready for magnet powering.
01/20/12	Start 4K wave in Yellow ring, Hi potting (3 days)
01/21/12	Fourth liquid helium delivery
01/23/12	Estimate yellow ring cold and stable, soak complete, ready for magnet powering.

5 MW starting on Jan 23, 2012

01/23/12	Start T7 turbine

Other Slides

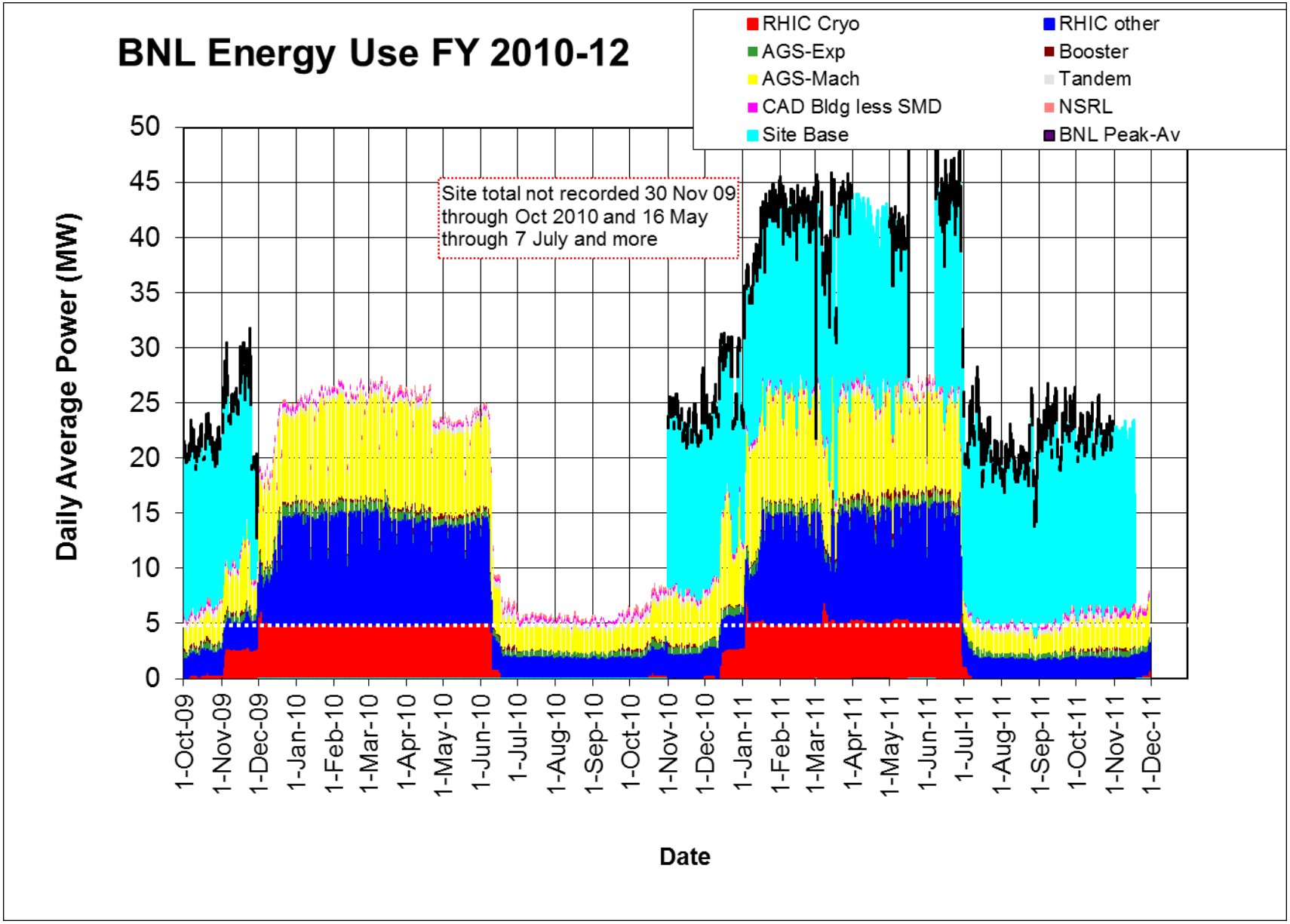
Recommendations following the June 6-8, 2011 PAC

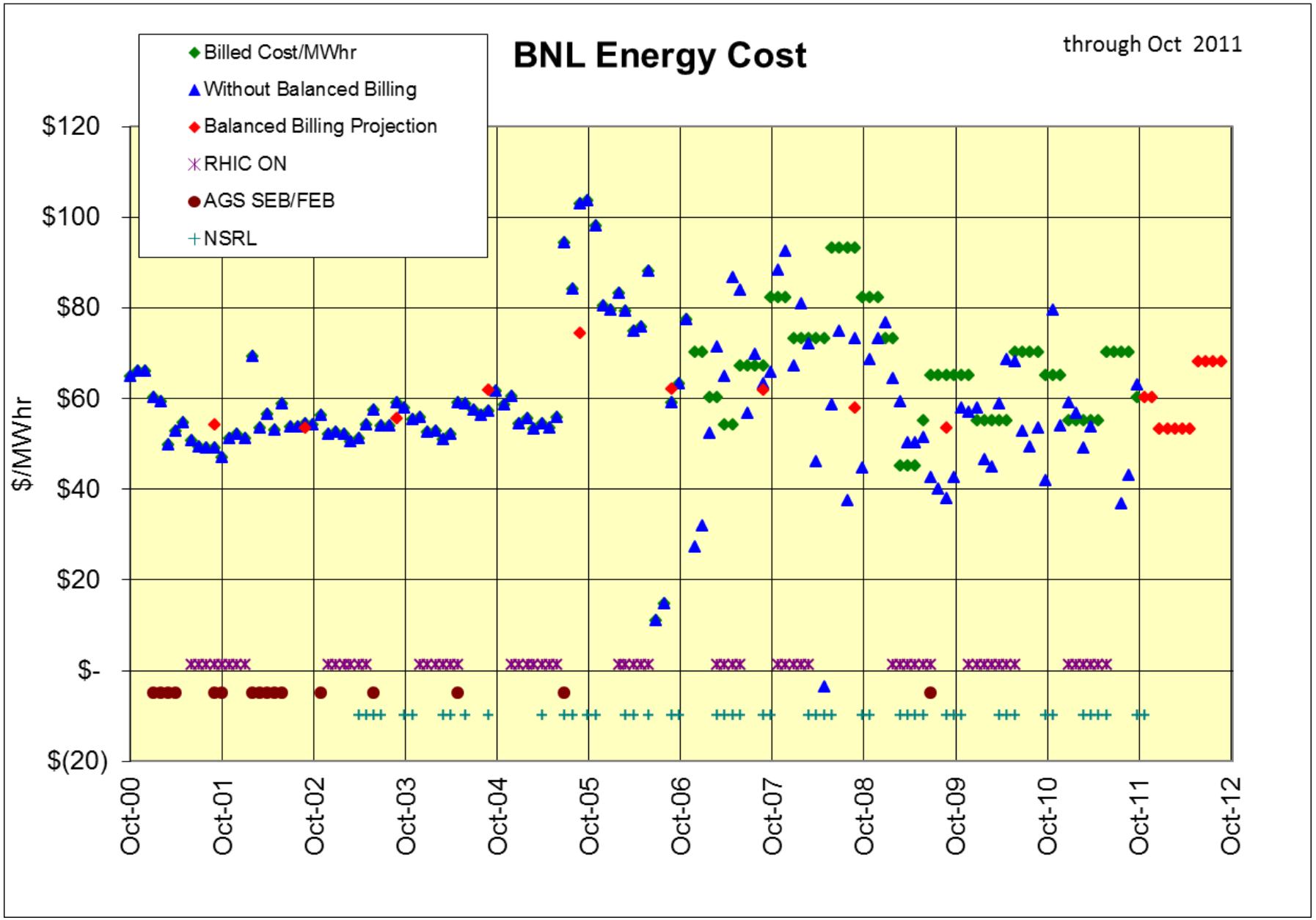
For Run 12 the PAC recommends the following (*in order of priority*):

- 5 weeks of running with polarized proton collisions at 200 GeV.
- 7 weeks of running with polarized proton collisions at 500 GeV.
- 5 weeks of running with Cu+Au collisions at 200 GeV.
- 3 weeks of running with U+U collisions at 193 GeV.

For Run13 the PAC recommends the following (*not* in order of priority):

- 12 weeks of running with polarized proton collisions at 500 GeV.
- 5 week of running with polarized proton collisions at 200 GeV.
- 7 weeks of running with Au+Au collisions at full energy.


BNL Energy Use FY 2010-12
RHIC Cryo
RHIC other
AGS-Exp
Booster
AGS-Mach
Tandem
CAD Bldg less SMD
NSRL
Site Base
BNL Peak-Av
Site total not recorded 30 Nov 09 through Oct 2010 and 16 May through 7 July and more
Daily Average Power (MW)
0
5
10
15
20
25
30
35
40
45
50
1-Oct-09
1-Nov-09
1-Dec-09
1-Jan-10
1-Feb-10
1-Mar-10
1-Apr-10
1-May-10
1-Jun-10
1-Jul-10
1-Aug-10
1-Sep-10
1-Oct-10
1-Nov-10
1-Dec-10
1-Jan-11
1-Feb-11
1-Mar-11
1-Apr-11
1-May-11
1-Jun-11
1-Jul-11
1-Aug-11
1-Sep-11
1-Oct-11
1-Nov-11
1-Dec-11
Date


BNL Energy Cost
through Oct 2011
Billed Cost/MWhr
Without Balanced Billing
Balanced Billing Projection
RHIC ON
AGS SEB/FEB
NSRL
$/MWhr
$120
$100
$80
$60
$40
$20
$-
$(20)
Oct-00
Oct-01
Oct-02
Oct-03
Oct-04
Oct-05
Oct-06
Oct-07
Oct-08
Oct-09
Oct-10
Oct-11
Oct-12

FY2012

Sept billed at $70/MWhr actual cost $42.86 -- $438K added to bank

Oct billed at $60/MWhr actual cost $62.80 -- $45.5K withdrawn from bank

FY2012 Bank Total = $392,563

FY2012 Electric Rates			FY11 Rates
Month	Original $/kWh	Revised $/kWh	As Billed $/kWh
Oct-11	0.060		0.065
Nov-11	0.060		0.065
Dec-11	0.060		0.065
Jan-12	0.053		0.055
Feb-12	0.053		0.055
Mar-12	0.053		0.055
Apr-12	0.053		0.055
May-12	0.053		0.055
Jun-12	0.068		0.070
Jul-12	0.068		0.070
Aug-12	0.068		0.070
Sep-12	0.068		0.070

Run 12 Plan based on PAC recommendation/ALD Guidance and 22 weeks cryo operation
22 Nov 11 DRAFT

- 17 Jan, Begin cool-down to 4.5K
- 20 Jan, Cool-down to 4.5K in Blue Ring complete, begin magnet setup
- 24 Jan, Cool-down to 4.5K complete in both rings begin √s = 200 GeV pp setup
- 31 Jan, begin 2 week ramp-up with 8 hrs/night for experiments
- 14 Feb, begin 5 weeks physics with further ramp-up
- 20 March, end 5 week √s = 200 GeV pp run, begin ½ week setup for √s = 500 GeV pp
- 24 March, begin 1 week ramp-up to √s = 500 GeV with 8 hrs/night for experiments
- 31 March, begin 7 week pp physics run at √s = 500 GeV
- 19 May, end 7 week pp physics run at √s = 500 GeV

- **17.4 cryo-weeks to this point, schedule beyond this point to be determined**

If Uranium…

- 19 May, begin 1 week setup for √s = 193 GeV/n UU (no overnight stores for experiments)
- 26 May, begin 3 week √s = 193 GeV/n UU physics run
- 16 Jun, end 3 week √s = 193 GeV/n UU physics run
- 19 June, cryo warm-up complete (22.0 cryo-weeks)

Consistent with Fischer et. al. "RHIC Collider Projections (FY 2012 – FY 2016)"
14 October 2011

From Fischer et. al. "RHIC Collider Projections (FY 2012 – FY 2016)"
14 October 2011

Cool-down from 50 K to 4 K	1 week	
Set-up mode 1 (p↑-p↑ at 100 GeV)	1 week	(no dedicated time for experiments)
Ramp-up mode 1	2 week	(8 h/night for experiments)
Data taking mode 1 with further ramp-up	5 weeks	
Set-up mode 2 (p↑-p↑ at 250 GeV)	½ week	(no dedicated time for experiments)
Ramp-up mode 2	1 week	(8 h/night for experiments)
Data taking mode 2 with further ramp-up	7 weeks	
Set-up mode 3 (U-U at 100 GeV/nucleon)	1 week	(no dedicated time for experiments)
Data taking mode 3 with further ramp-up	3 weeks	
Warm-up	½ week	

Run 12 projection for √s = 200 GeV pp

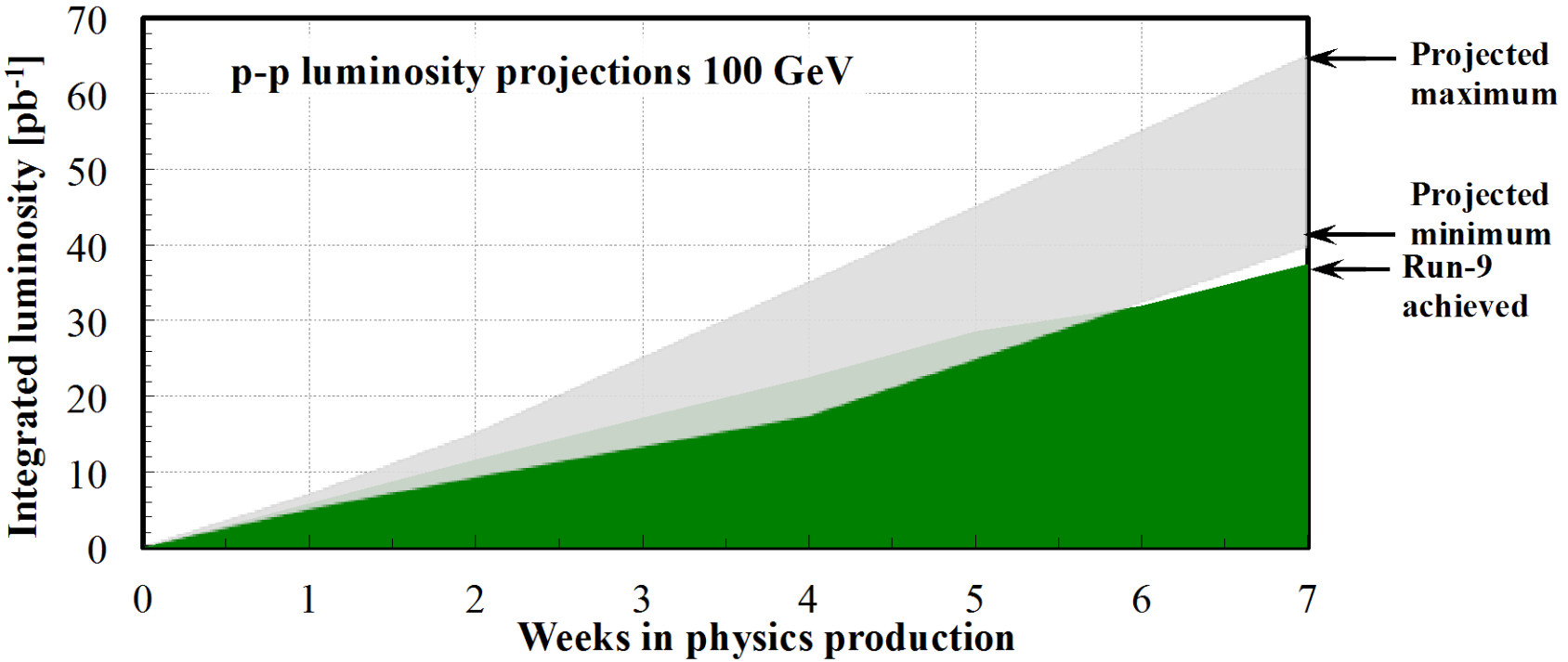


Figure 3: Projected minimum and maximum integrated luminosities for polarized proton collisions at 100 GeV beam energy, assuming a linear weekly luminosity ramp-up in 4 weeks. An average store polarization between 50 and 60% is expected.

From Fischer et. Al. "RHIC Collider Projections (FY 2012 – FY 2016)"
14 October 2011

Run 12 projection for √s = 500 GeV pp

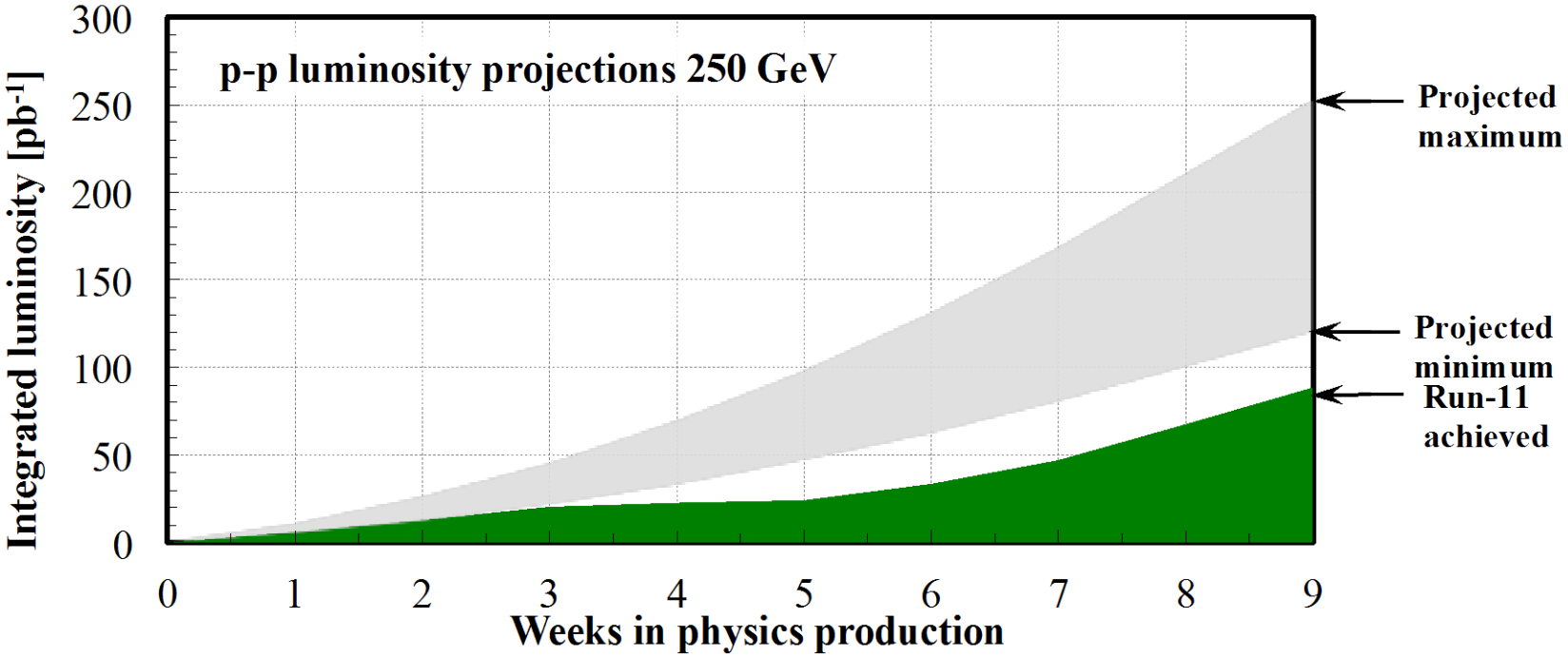


Figure 4: Projected minimum and maximum integrated luminosities for polarized proton collisions at 250 GeV beam energy, assuming linear weekly luminosity ramp-up in 8 weeks. An average store polarization between 45 and 50% is expected.

From Fischer et. Al. "RHIC Collider Projections (FY 2012 – FY 2016)"
14 October 2011

Run 12 projection for √s = 193 GeV/n UU

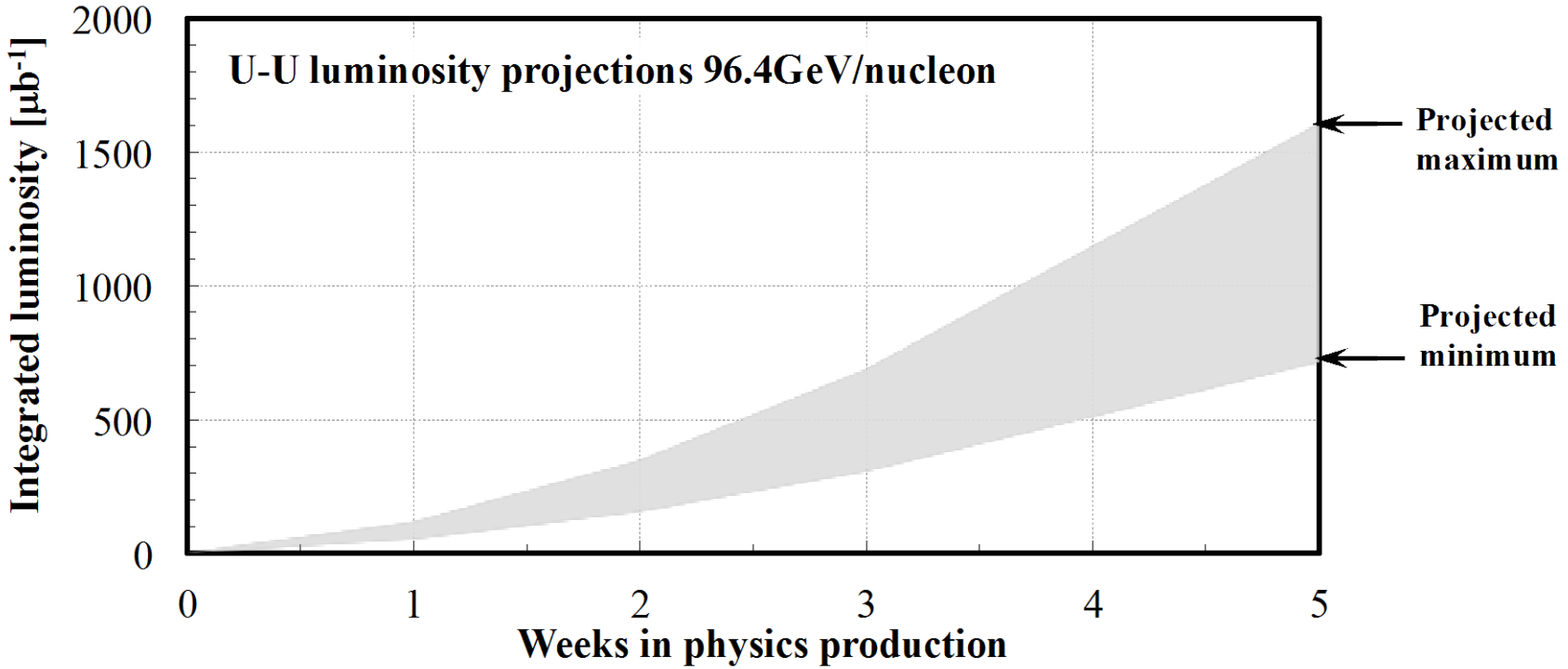


Figure 5: Projected minimum and maximum integrated luminosities for uranium-uranium at 96.4 GeV/nucleon, assuming linear weekly luminosity ramp-up in 48 weeks.

From Fischer et. Al. "RHIC Collider Projections (FY 2012 – FY 2016)"
14 October 2011

Run 12 projection for √s = 200 GeV/n CuAu

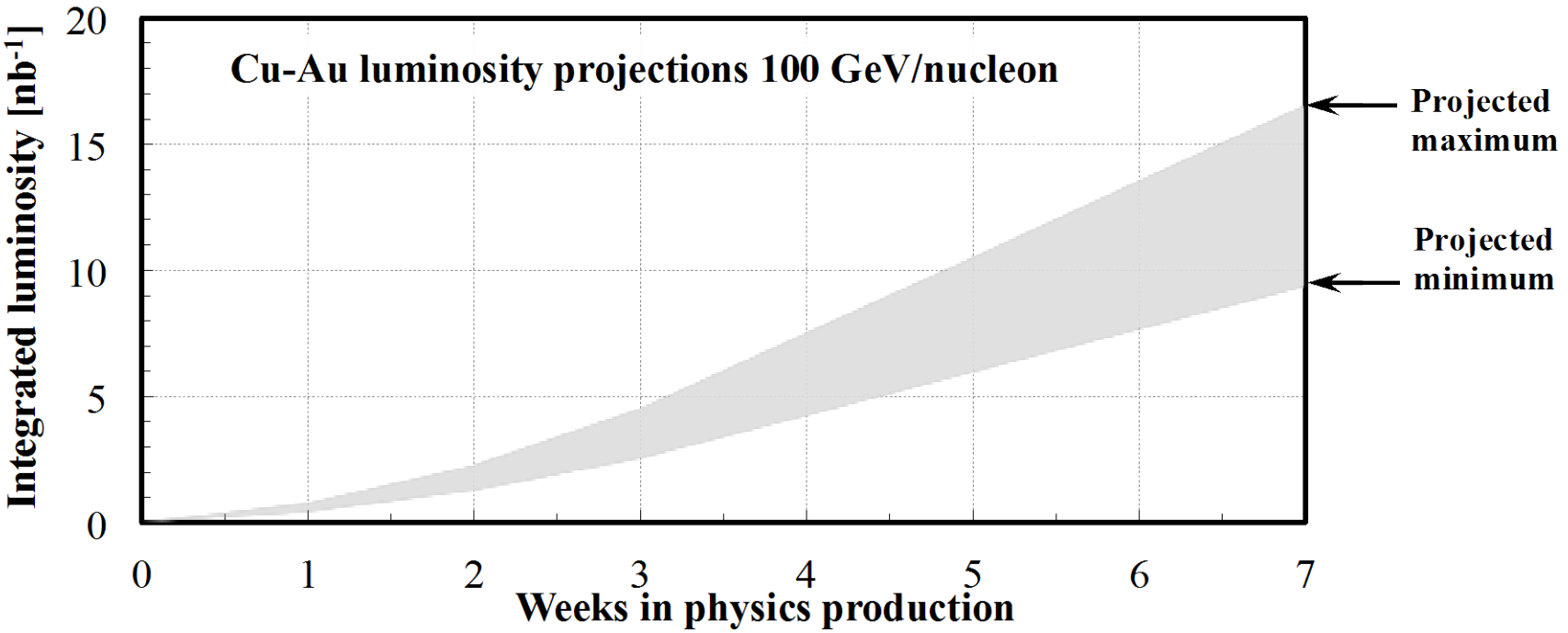


Figure 6: Projected minimum and maximum integrated luminosities for copper-gold collisions at 100 GeV/nucleon beam energy, assuming linear weekly luminosity ramp-up in 4 weeks.

From Fischer et. Al. "RHIC Collider Projections (FY 2012 – FY 2016)"
14 October 2011