Run 14 RHIC Machine/Experiments Meeting

4 Mar 2014

<u>Agenda:</u>

- **Run 14 Schedule** (Pile)
- **Machine Status** (Montag)
- **STAR and PHENIX Status** (Experiments)
- **Other**

Call in bridge line is 631-344-8383

Run 14 plan based on 22 weeks cryo operation

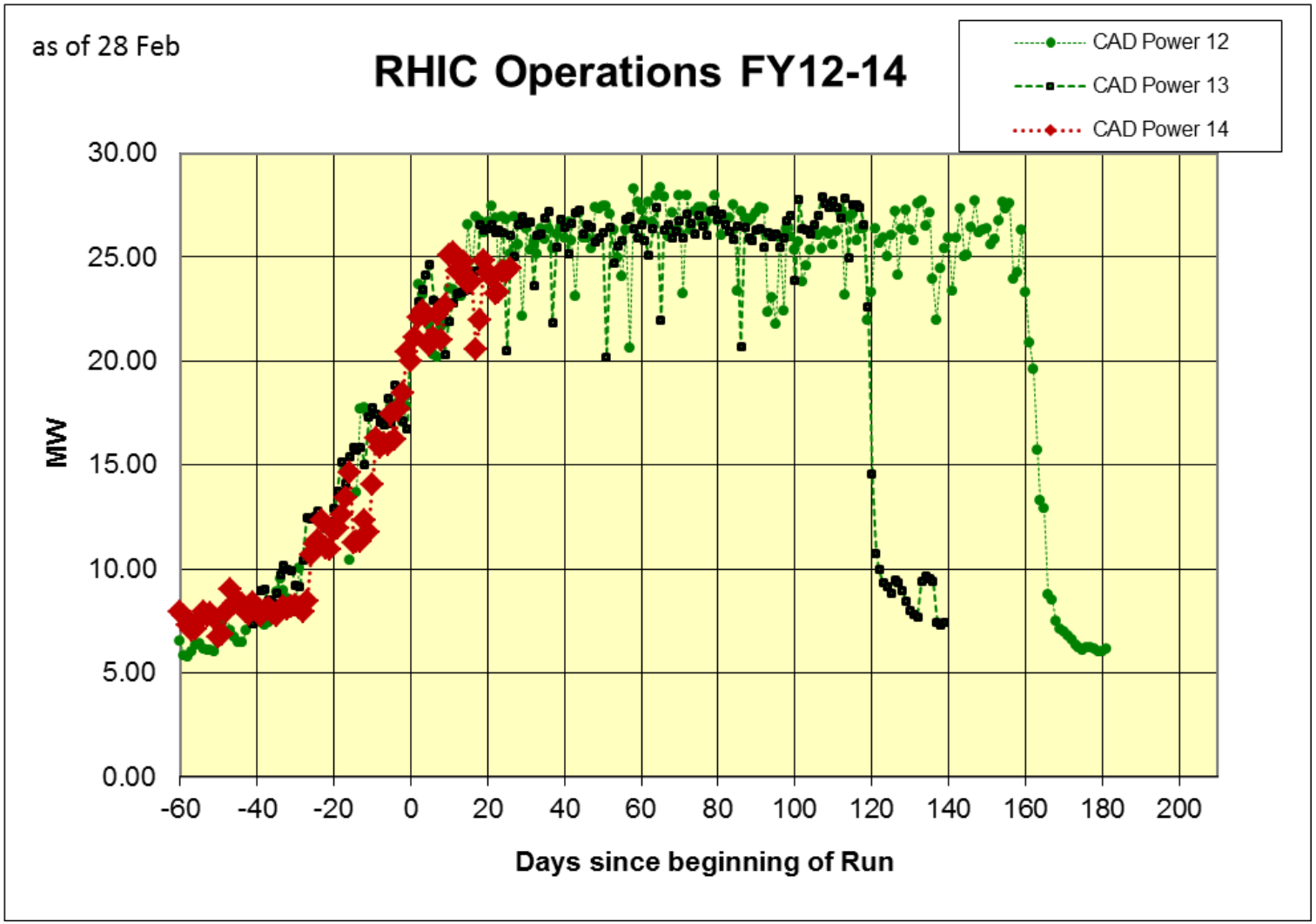
and Fischer et.al. RHIC Collider Projections (FY 2013 – FY 2017), 4 Jun 2013

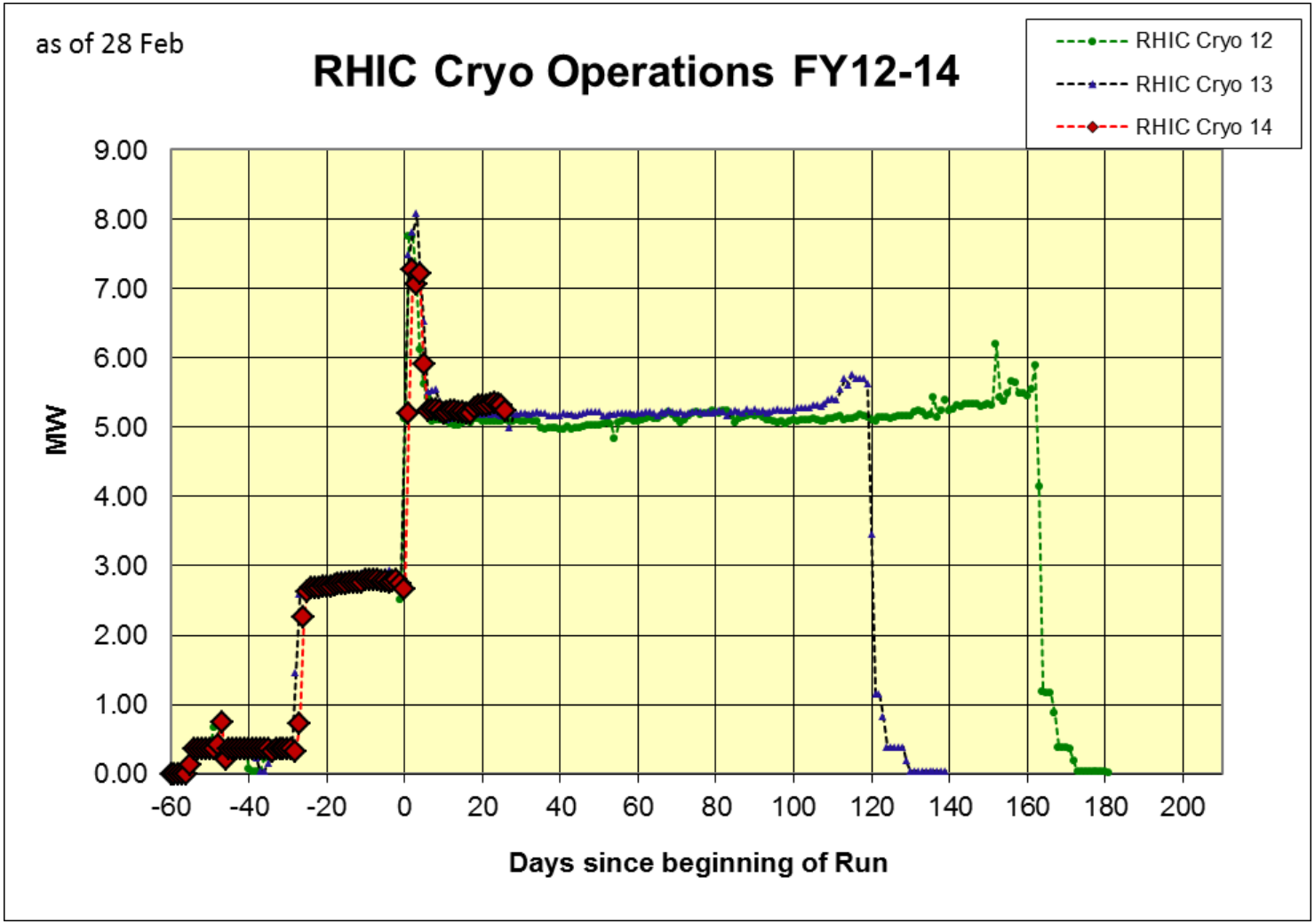
- ✓ 3 Feb, Begin cool-down to 4.5K
- ✓ 4 Feb, Cool-down to 6K in Blue
- ✓ 7 Feb, Blue and Yellow at 4.5 deg K
- ✓ 10-Feb, Beam in Blue and Yellow at injection
- ✓ 15-Feb, Begin √s = 14.6 GeV/n AuAu physics

today, 4 Mar…

- ~~8~~-10 Mar (Monday, 0800-1200?), End √s = 14.6 GeV/n AuAu physics run begin setup for √s = 200 GeV/n AuAu
- 14-Mar, Begin √s = 200 GeV/n AuAu run
- 27-Jun, End 15 week √s = 200 GeV/n AuAu run
- 27-June through 4 July , 7 days contingency/TBD
- 4-July, begin cryo warm-up
- 7- July, warm-up complete, 22.0 cryo weeks of operation

See http://www.rhichome.bnl.gov/AP/RHIC2014/ for the Run Coordinator's detailed plan


as of 28 Feb
RHIC Operations FY12-14
CAD Power 12
CAD Power 13
CAD Power 14
MW
30.00
25.00
20.00
15.00
10.00
5.00
0.00
-60
-40
-20
0
20
40
60
80
100
120
140
160
180
200
Days since beginning of Run


as of 28 Feb
RHIC Cryo Operations FY12-14
RHIC Cryo 12
RHIC Cryo 13
RHIC Cryo 14
MW
9.00
8.00
7.00
6.00
5.00
4.00
3.00
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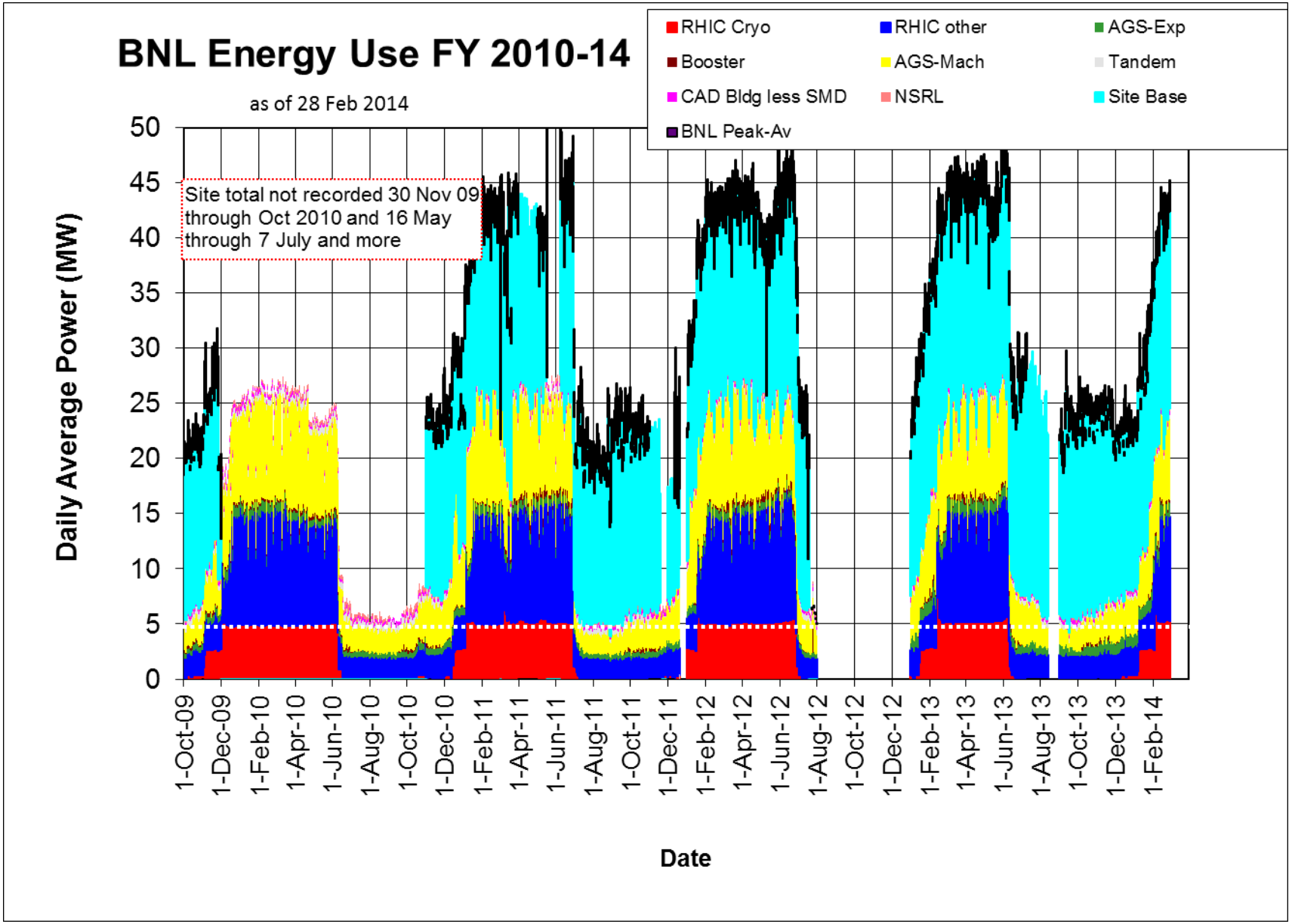
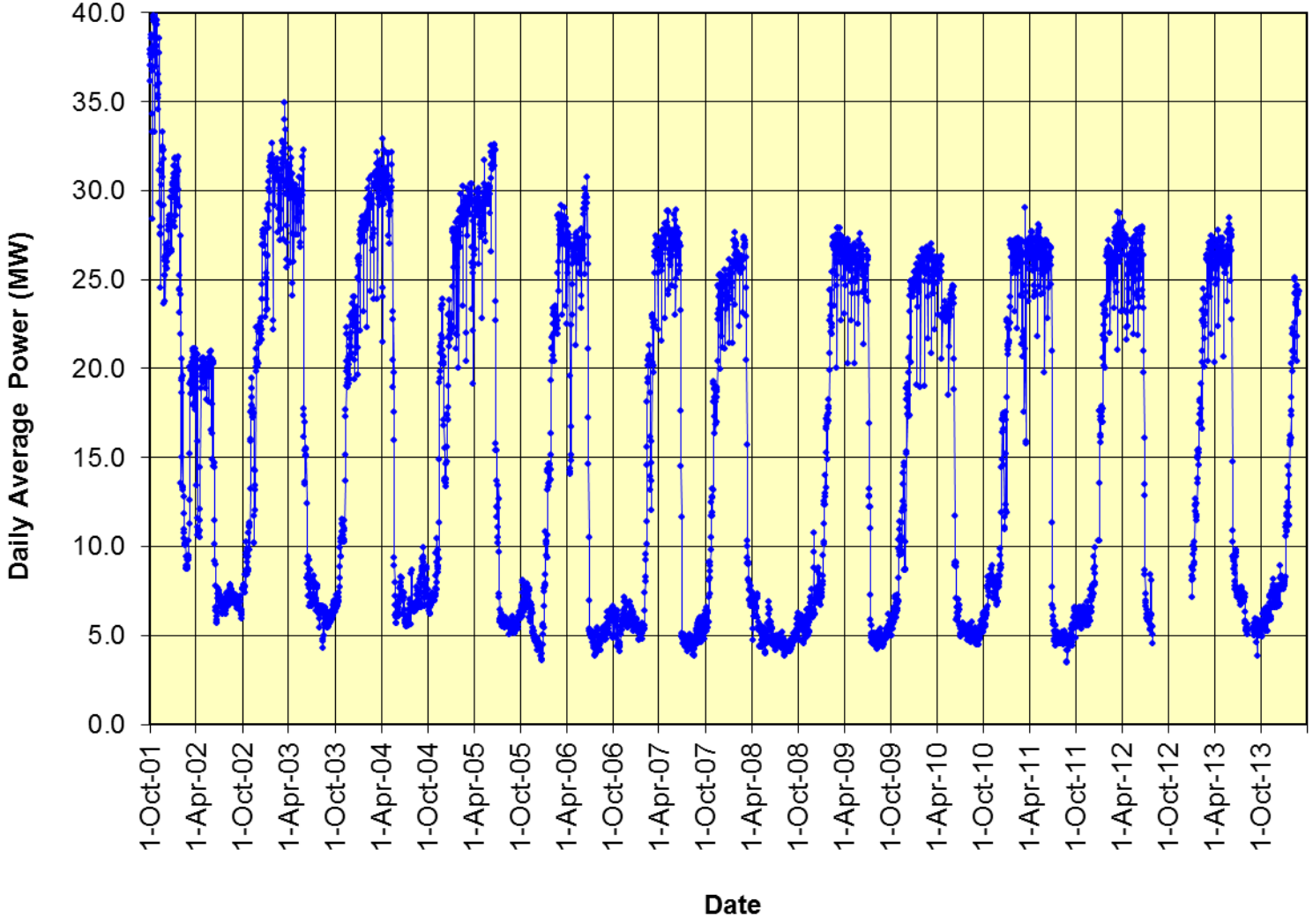
Days since beginning of Run


BNL Energy Use FY 2010-14
as of 28 Feb 2014
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-Dec-09
1-Feb-10
1-Apr-10
1-Jun-10
1-Aug-10
1-Oct-10
1-Dec-10
1-Feb-11
1-Apr-11
1-Jun-11
1-Aug-11
1-Oct-11
1-Dec-11
1-Feb-12
1-Apr-12
1-Jun-12
1-Aug-12
1-Oct-12
1-Dec-12
1-Feb-13
1-Apr-13
1-Jun-13
1-Aug-13
1-Oct-13
1-Dec-13
1-Feb-14
Date

as of 28 Feb 2013

C-AD Energy Use FY 2002-14



Archive

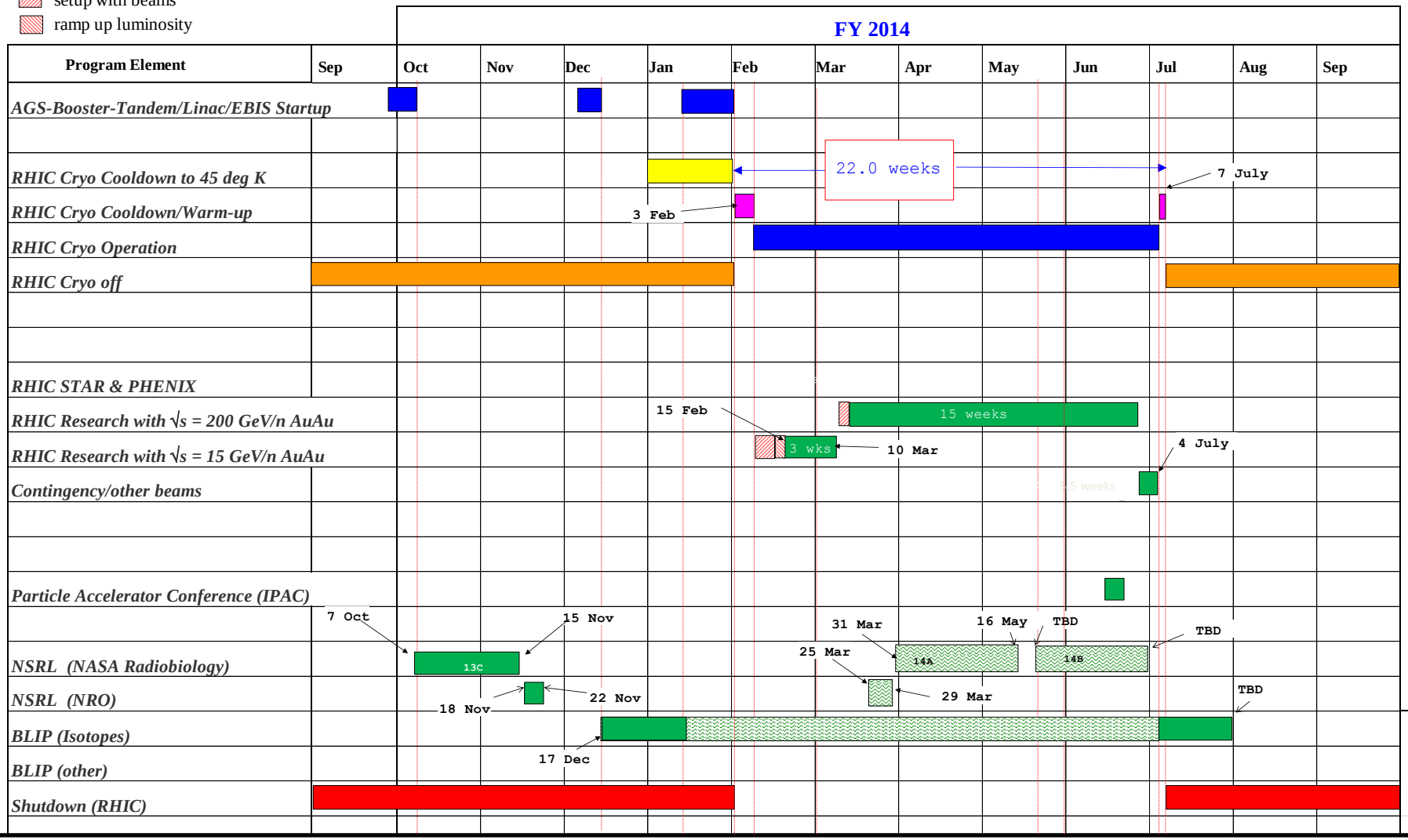
http://www.bnl.gov/cad/esfd

Scheduling Physicist: Chuyu Liu

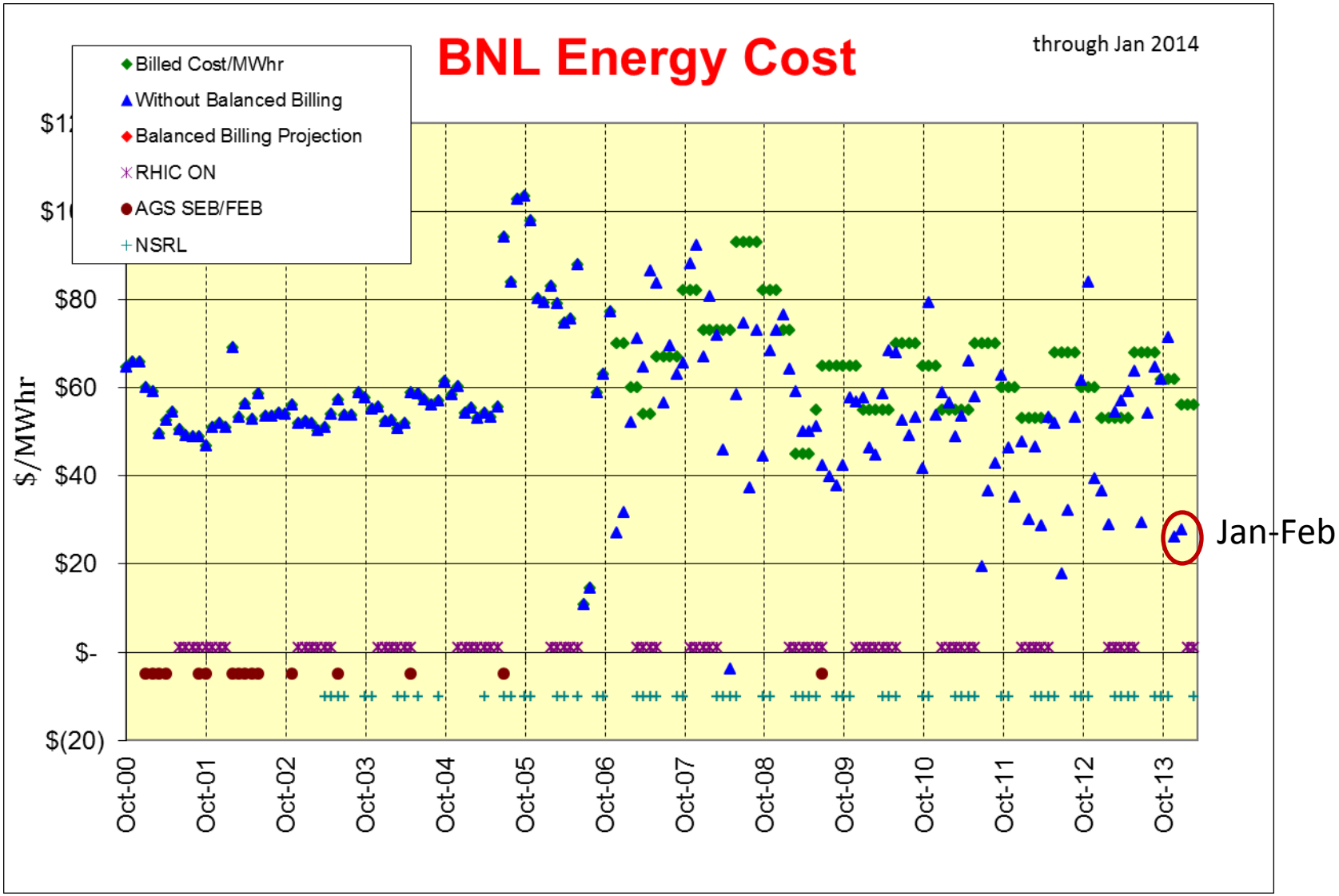
C-A Operations-FY14

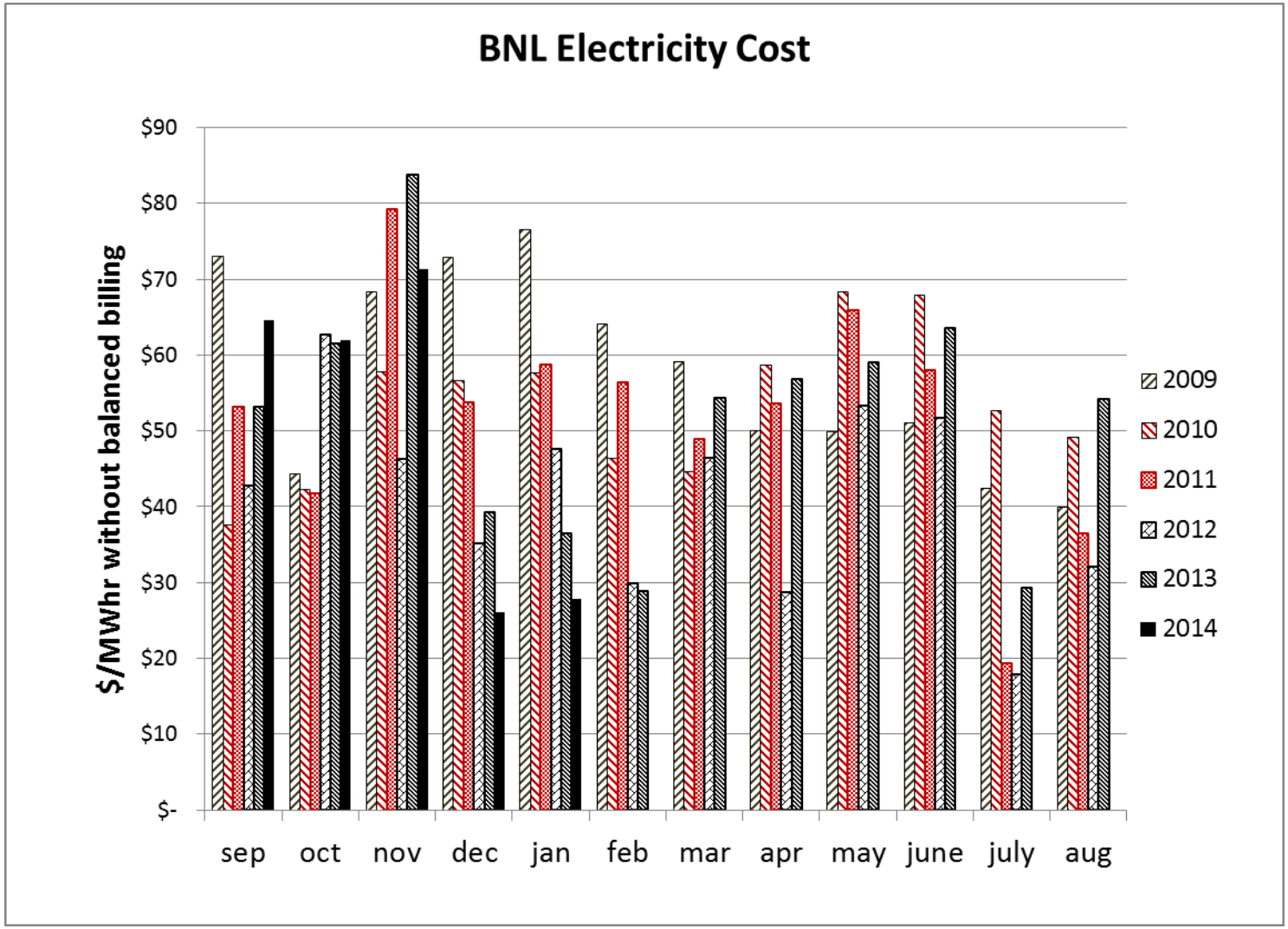
4 Mar 14

planned, budget permitting



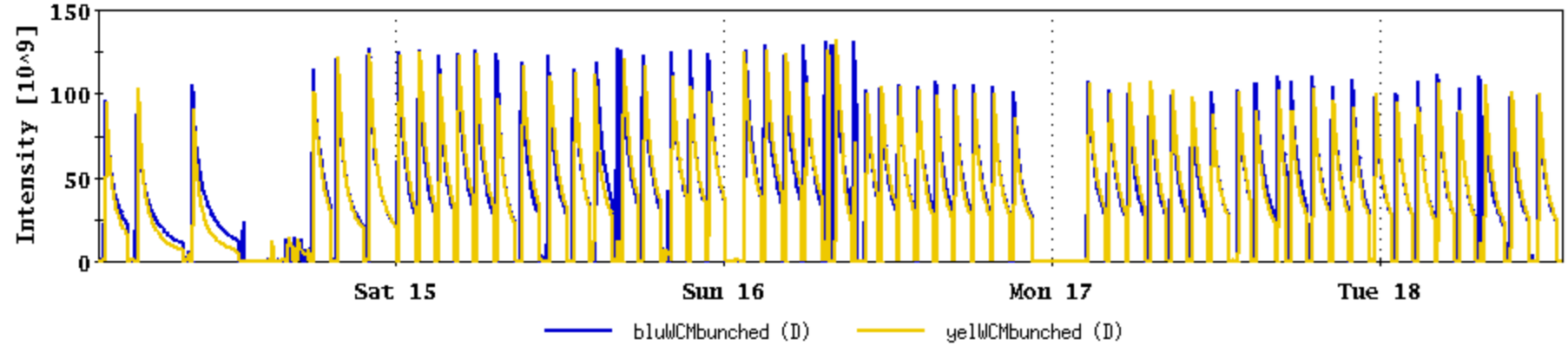
FY 2014 power rebate $ in BNL bank = $1.07M, through Jan

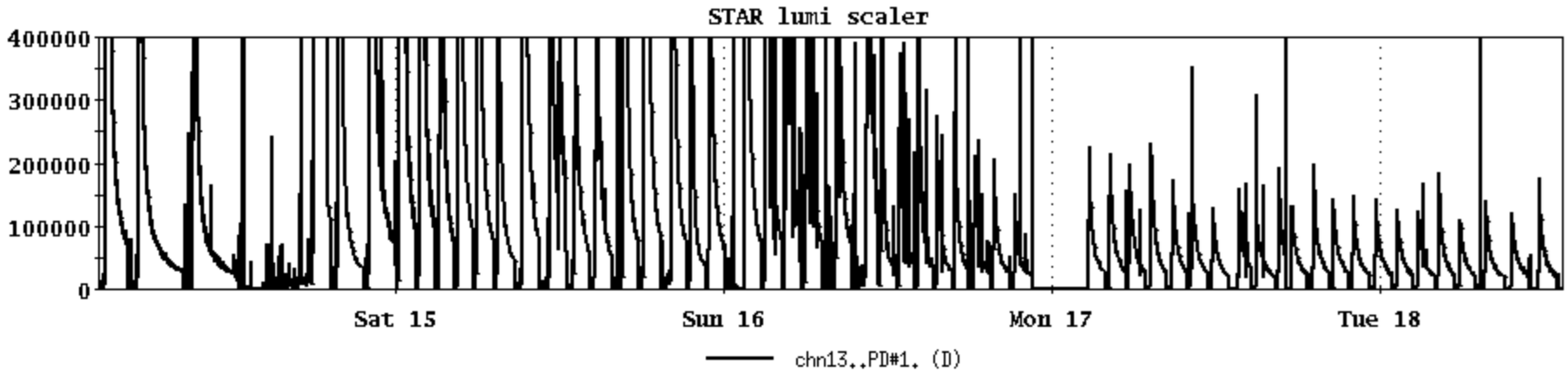


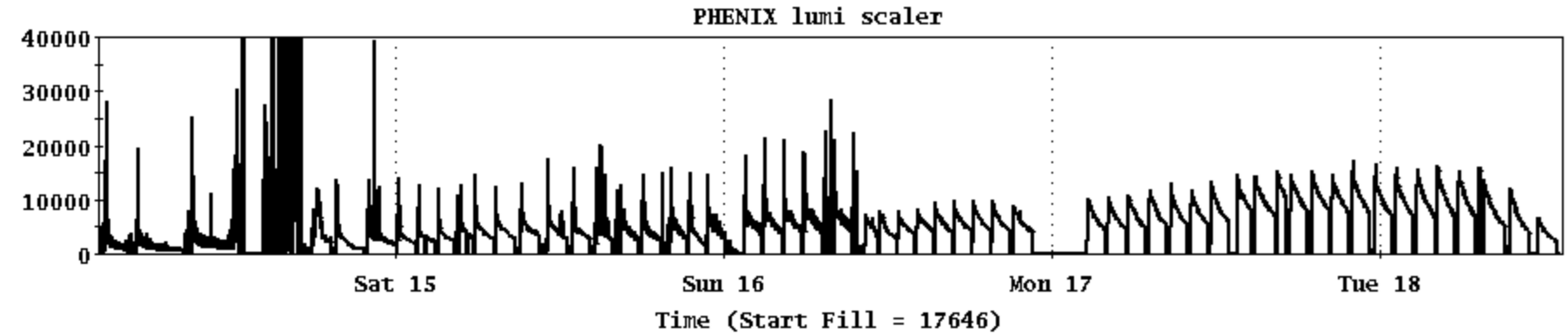

BNL Electricity Cost
$/MWhr without balanced billing
$90
$80
$70
$60
$50
$40
$30
$20
$10
$-
sep
oct
nov
dec
jan
feb
mar
apr
may
june
july
aug
2009
2010
2011
2012
2013
2014

RHIC/Experiments/Phenix/PhenixLumiScaler.logreq 02/14/2014 02:20 - 02/18 13:20

File Window Markers Analysis







Goals for Run 14 (based on Beam Use Requests)

(11 Feb, DRAFT, to be updated by experiments)

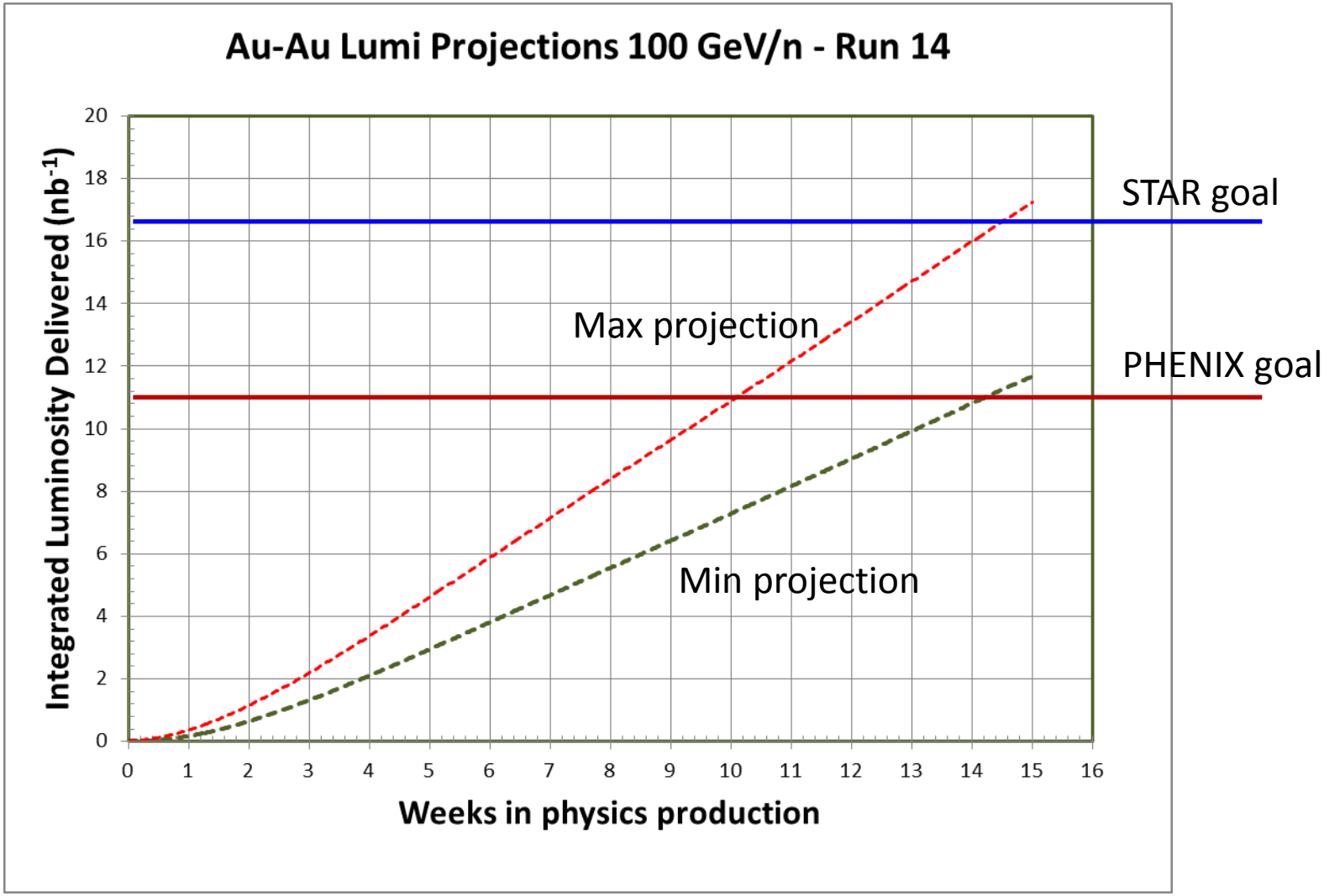
PHENIX

- Au+Au @ 200 GeV for 12 weeks, L = 1.5 nb^{-1} sampled luminosity within |z| < 10 cm]
  - ~30% within |z| < 10 cm]
  - ~90% DAQ efficiency
  - ~50% bandwidth, DAQ saturation factor (?)
  - → 11 nb^{-1} delivered

STAR

- Au+Au @ 200 GeV for 14 weeks, L= 10 nb^{-1} recorded, 10^9 min bias triggers within |z| < 5 cm] → ($2x10^9$ triggers required)
  - ~ 60% sampling efficiency
  - → 16.7 nb^{-1} delivered

- Au+Au @ 15 GeV for 3 weeks, $1.5x10^8$ min bias triggers



Fischer et. al. “RHIC Collider Projections (FY 2014 – FY 2018)”, 4 June 2013

Table 2: Maximum luminosities that can be reached after a sufficiently long running period. The beam energy is stated. Other ion combinations can be estimated on demand. For species combinations not yet run the minimum luminosities are approximately 50% of the maximum.

Mode	Beam energy [GeV/n]	No of colliding bunches	Ions/bunch [10^9]	β^* [m]	Emittance [mm]	L_{peak} [$cm^{-2}s^{-1}$]	$L_{store\ avg}$ [$cm^{-2}s^{-1}$]	L_{week}
Pb-Pb	98.3	111	1.1	0.7	23→8	20×10^{26}	17×10^{26}	0.6 nb^{-1}
Au-Au	100	111	1.4	0.7	23→8	40×10^{26}	35×10^{26}	1.2 nb^{-1}
h-Au ★	100	111	20 / 1.3	0.8	20→23	8×10^{28}	5×10^{28}	16 nb^{-1}
d-Au ★	100	111	110 / 1.4	0.8	17→25	47×10^{28}	28×10^{28}	95 nb^{-1}
p↑-C	100	111	180 / 20	0.8	18→23	10×10^{32}	7×10^{32}	2.3 pb^{-1}
p↑-Cu	100	111	180 / 4.0	0.8	18→23	200×10^{28}	150×10^{28}	475 nb^{-1}
p↑-Au	100	111	180 / 1.4	0.8	18→23	70×10^{28}	50×10^{28}	165 nb^{-1}
p↑-p↑*	100	107	160	0.85	17→25	65×10^{30}	38×10^{30}	14 pb^{-1}
p↑-p↑*	255	107	200	0.65	20→25	280×10^{30}	170×10^{30}	56 pb^{-1}

★ h (helion) – nucleus of the ^{3}He atom; d (deuteron) – nucleus of the ^{2}H atom; p (proton) – nucleus of the ^{1}H atom.
* We expect that an intensity- and time-averaged store polarization *P* of up to 65%, as measured by the H jet, can be reached at 100 GeV. At 255 GeV we expect the polarization *P* to reach up to 57%. In Run-11 PHENIX had 107 and STAR 102 colliding bunches.

Fischer et. al. “RHIC Collider Projections (FY 2014 – FY 2018)”, 4 June 2013

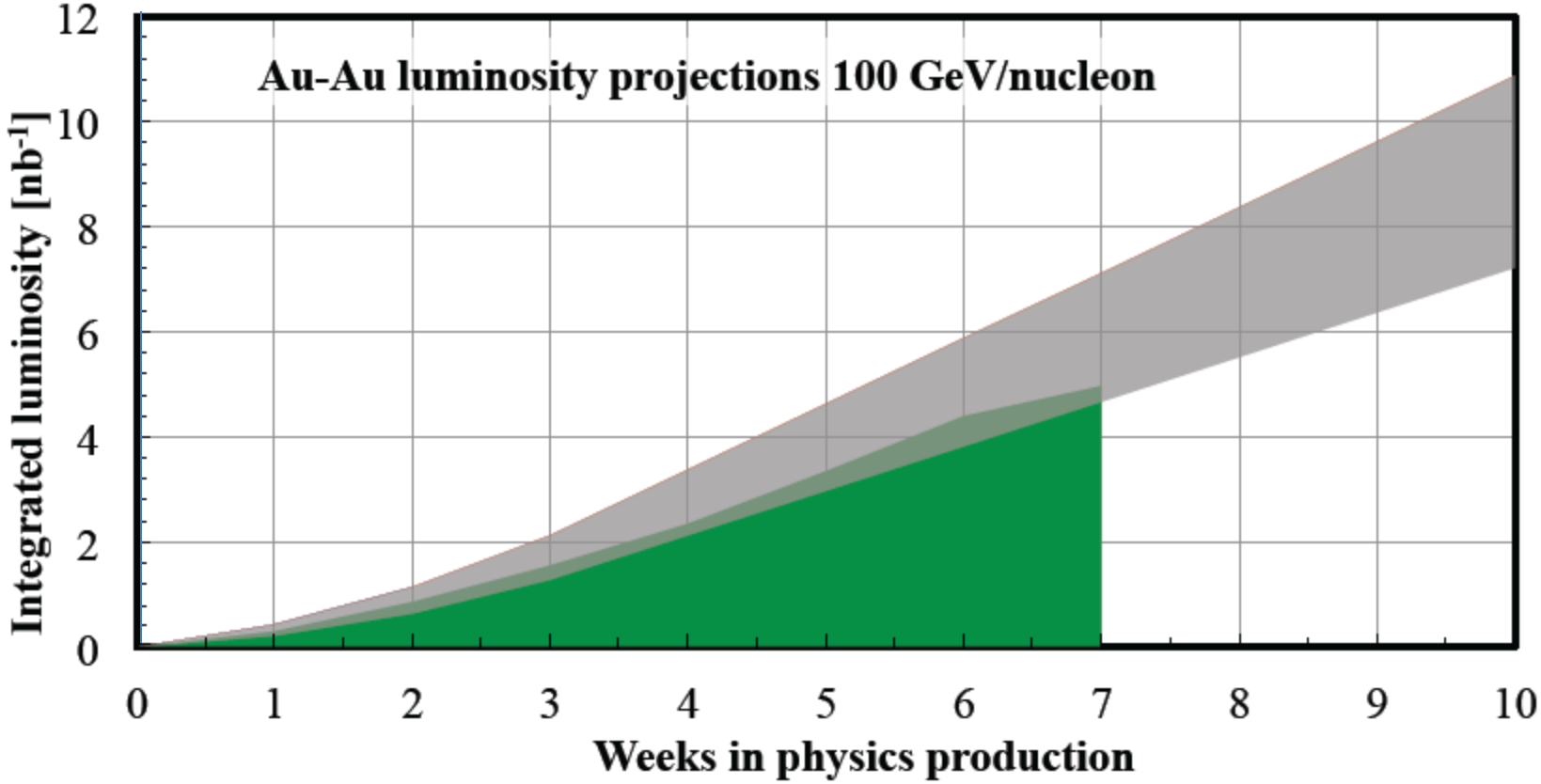


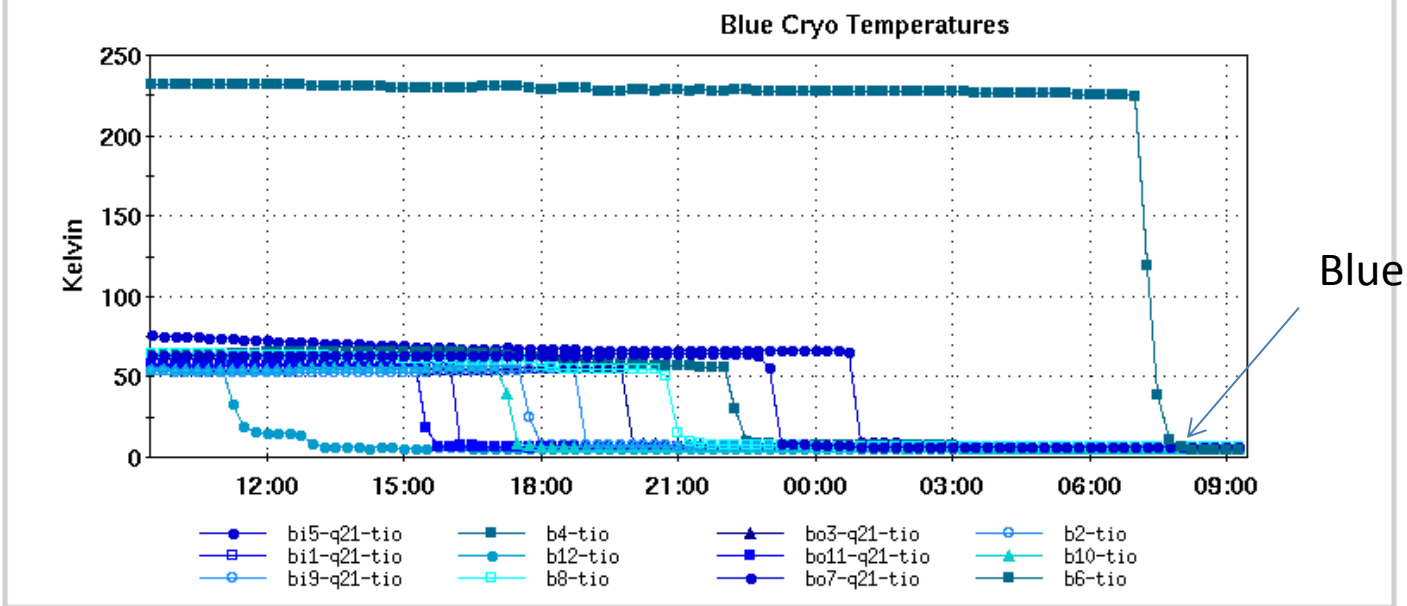
Figure 4: Projected minimum and maximum integrated luminosities for Au-Au at 100 GeV/nucleon.

Fischer et. Al. “RHIC Collider Projections (FY 2014 – FY 2018)”, 4 June 2013

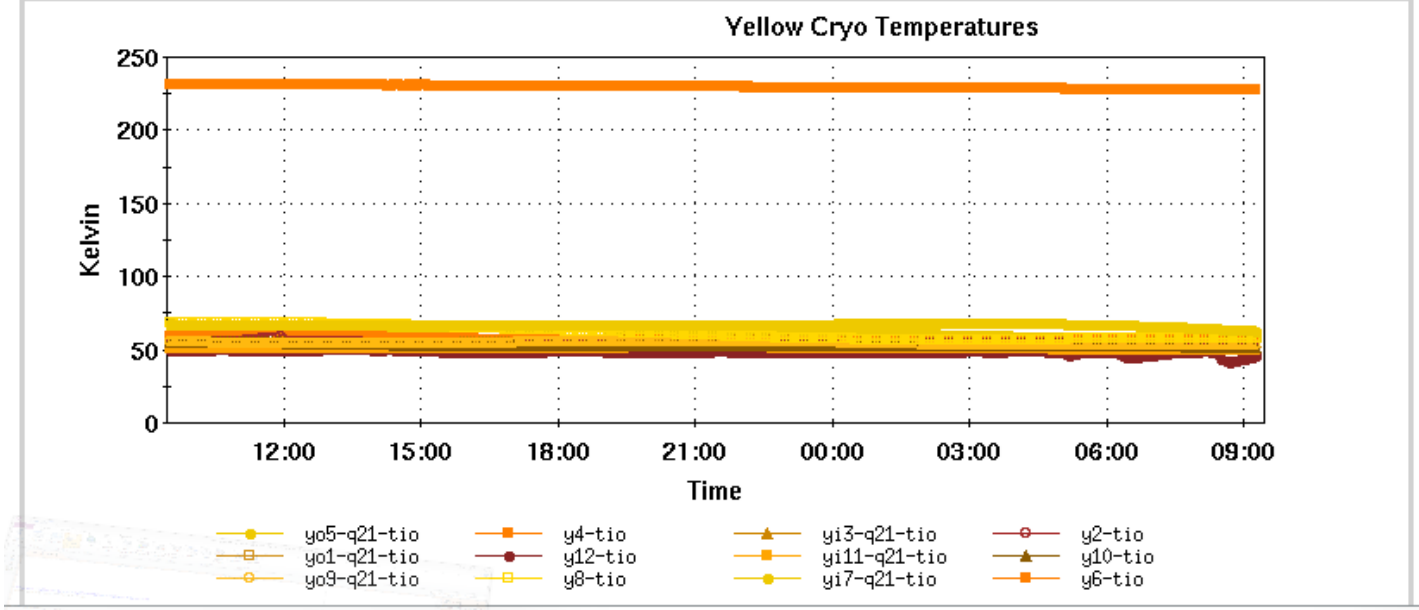
Ring Summary (14 days) Sector Plots (1 day) Sector Plots (14 days)

4 Feb 2014

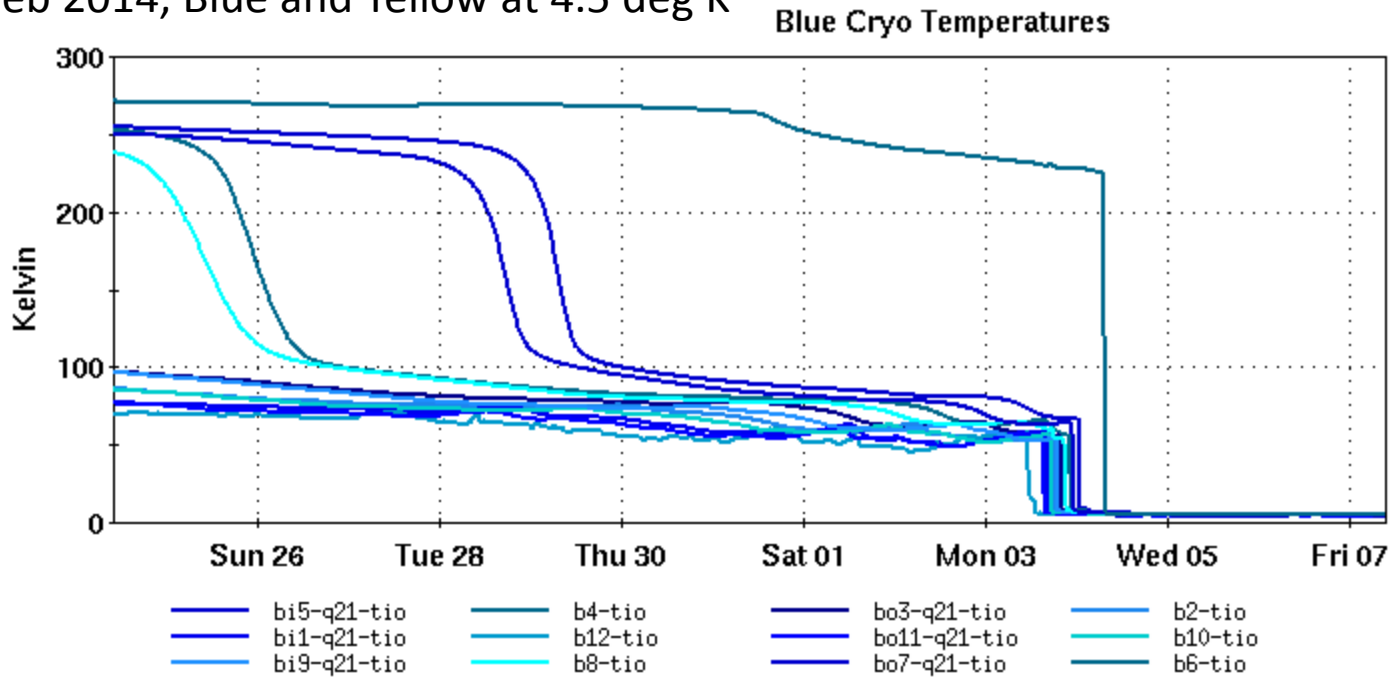
File Window Markers Analysis

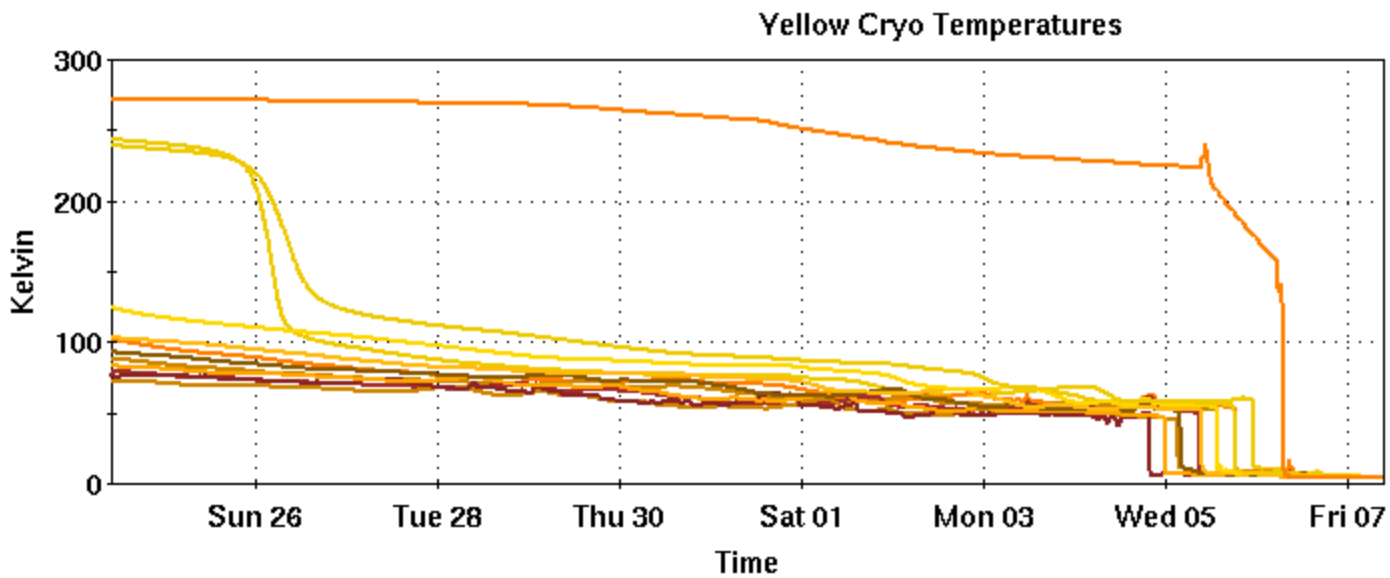


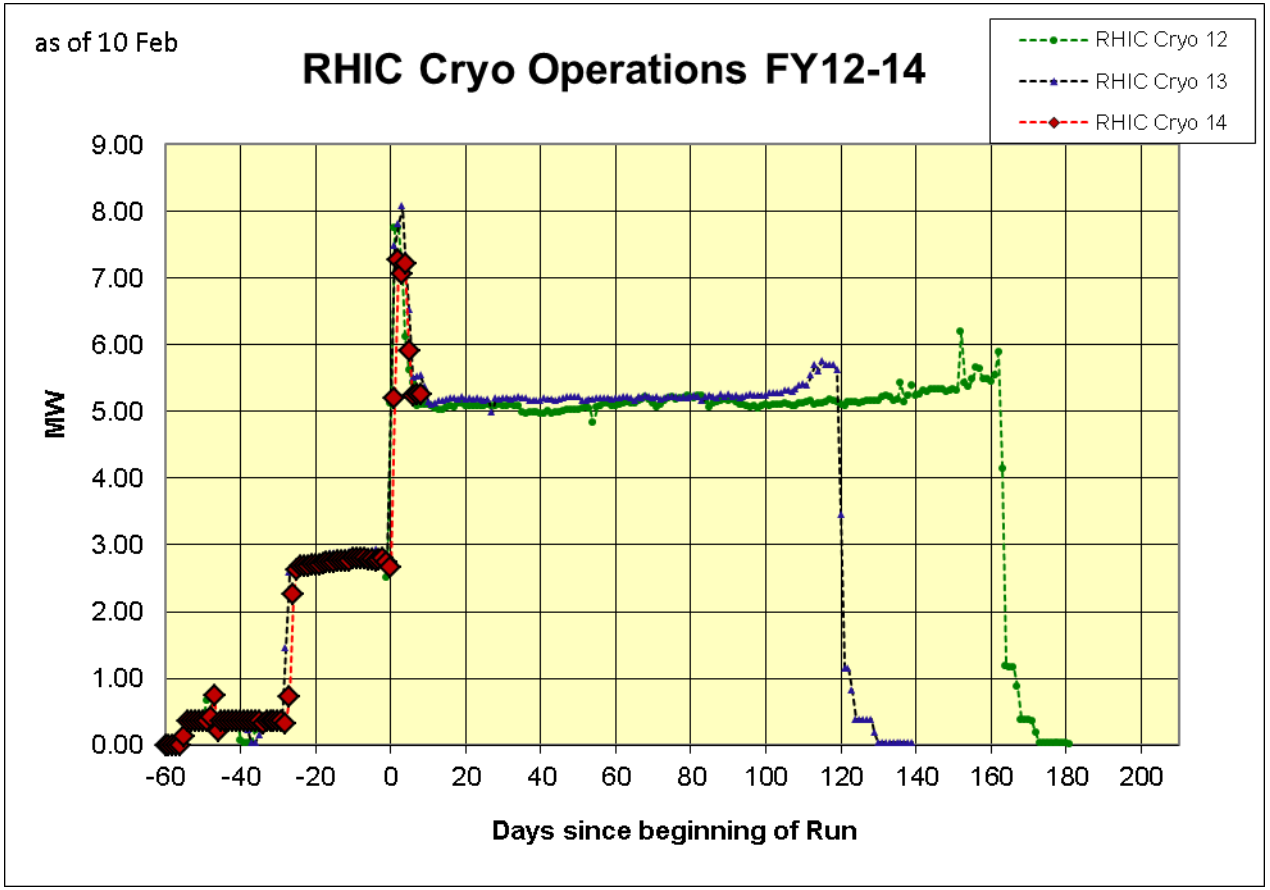
Blue at 4.5 deg



7 Feb 2014, Blue and Yellow at 4.5 deg K






as of 10 Feb
RHIC Cryo Operations FY12-14
RHIC Cryo 12
RHIC Cryo 13
RHIC Cryo 14
MW
9.00
8.00
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-60
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-20
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100
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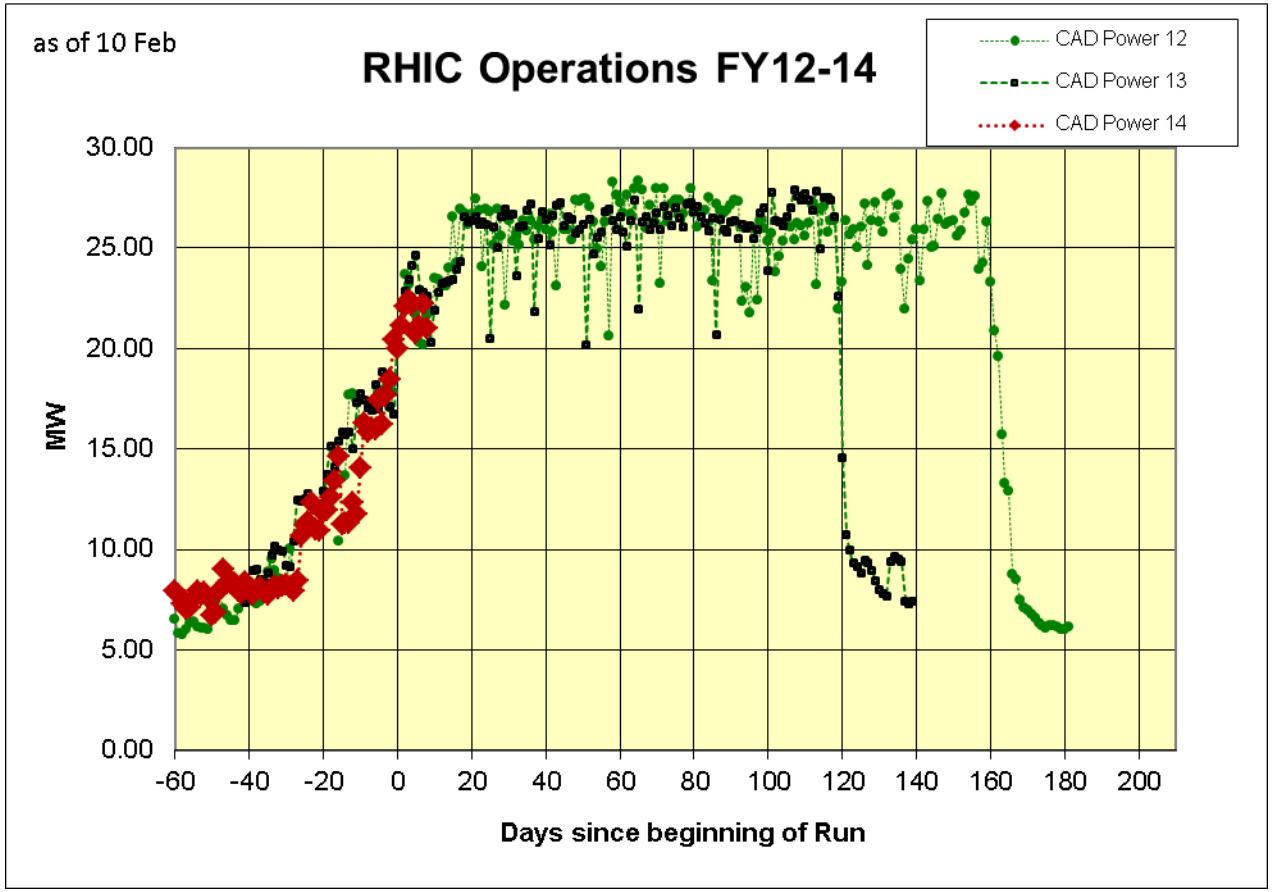
200
Days since beginning of Run


as of 10 Feb
RHIC Operations FY12-14
CAD Power 12
CAD Power 13
CAD Power 14
MW
30.00
25.00
20.00
15.00
10.00
5.00
0.00
-60
-40
-20
0
20
40
60
80
100
120
140
160
180
200
Days since beginning of Run

CAD POWER

	Building	Cubicle	Feeder	Transformer	Equipment	Demand (kW)
Machine Power:						
	603	23	911-13	3	B2500, W	115
	603	24	911-14	3	A2500, 911N, C(1,2), D2(914)	1382
	603	25	911-15	3	AMMPS (SIEMENS)	2160
	603	26	911-16	3	R, MG, ARF, AMMPS(LP)	2016
	603	27	911-17	3	3J, B925, 913R(HITL), Q	144
	631	6	930-1	4	SUB643, B926, 936, 924, 930-5(ALT)	2419
	631	8	930-5	5	1-2-3L, D2, 930-1(ALT)	173
	631	18		6	RHIC 4B.4C MMPS	173
	631	14	I-5F	6	He Compressor	1382
	631	19	I-5F	6	He Compressor	5530
	631	20		6	1-6A, 8A, 8B, 10A , 1101	1382
	631	21		6	I-5D, 5H, 6B	691
	631	22		6	I-2A, 4A, 12A	0
	638	B4		8	RHIC Overhead Line, RF4D.6C.STAR, MMPS T1 T2	1320
	638	A4		8	Future Overhead Line	0
					MACHINE TOTAL:	**18715**
Experimental Power:						
	631	3	912-3	4	1-2-3K, 1-2P	0
	631	4	919-1	4	E, 1-2-3F	518
	631	5	919-2	4	MPS, G, H1-2-3, B919, 975	346
	631	9	H10-6	5	5, 6M	0
	631	10	912-4	5	1, 2, 3M, 1SB, 2SB	173
	631	11	H10-11	5	5N, 4N, 1000P, 1MW1-2	346
					EXPERIMENTAL TOTAL:	**1382**
Booster MMPS Power:						
	631	1B		7	Booster Out	0
					BOOSTER TOTAL:	**0**
					CAD DEPARTMENT TOTAL:	**20098**

	Trnx -3	Trnx -4	Trnx -5	Trnx -6	Trnx -7	Trnx -8	Site
AGS Demand:	**5818**	**4493**	**691**	**7776**	**0**	**1320**	**20098**
Equipment Total:	**7862**	**5530**	**1037**	**7603**	**0**	**1728**	**39060**
AGS %:	**75**	**81**	**67**	**102**	**0**	**76**	**51**

Who's Who for 2014

RHIC Au-Au Run Coordinator Operations:	Gregory Marr	gmarr@bnl.gov	631-344-7810 (office)
	Vincent Schoefer	schoefer@bnl.gov	631-344-8453 (office)
	Travis Shrey	shrey@bnl.gov	631-344-7451 (office)
RHIC 7.3 GeV Au-Au Run Coordinator planning:	Christoph Montag	montagc@bnl.gov	631-344-4820 (office)
RHIC 100 GeV Au-Au Run Coordinator planning:	Guillaume Robert-Demolaize	grd@bnl.gov	631-344-8215 (office)
Scheduling Physicist:	Chuyu Liu	cliu1@bnl.gov	631-344-4431 (office)
AGS liaison:	Haixin Huang	huanghai@bnl.gov	631-344-5446 (office)

For example, 20 weeks of RHIC refrigerator operation in FY 2014 could be scheduled in the following way:

Cool-down from 50 K to 4 K	1 week	
Set-up mode 1 (Au-Au at 7.5 GeV/nucleon)	1 week	(no dedicated time for experiments)
Ramp-up mode 1	½ weeks	(8 h/night for experiments)
Data taking mode 1	2 ½ weeks	
Set-up mode 2 (Au-Au at 100 GeV/nucleon)	½ week	(no dedicated time for experiments)
Data taking mode 2 with further ramp-up	10 weeks	
Set-up mode 3 (p↑-p↑ at 100 GeV)	1 week	(no dedicated time for experiments)
Ramp-up mode 3	½ weeks	(8 h/night for experiments)
Data taking mode 3+1 with further ramp-up	2 ½ weeks	
Warm-up	½ week	

From Fischer et. al., RHIC Collider Projections (FY 2014 – FY 2018), 4 June 2013