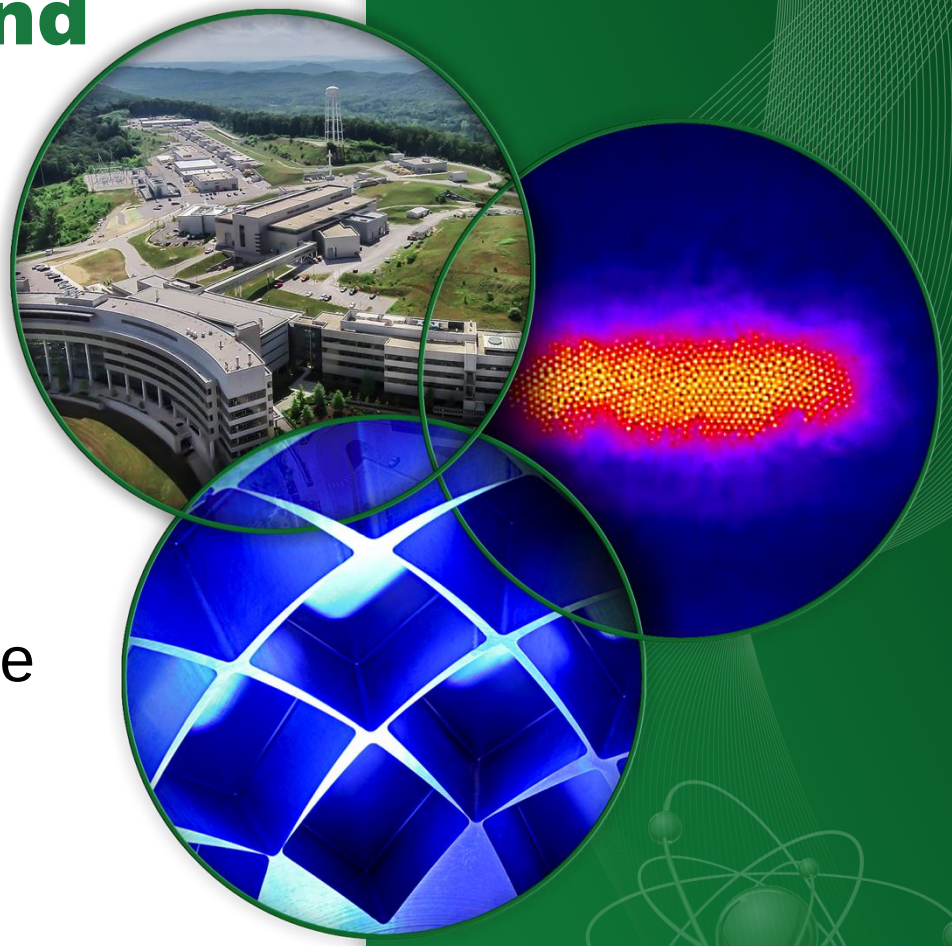
Operations Report for FY13-Q3/4, FY14, and FY15-Q1



Glen D. Johns

Accelerator Advisory Committee

March 24-26, 2015

ORNL is managed by UT-Battelle
for the US Department of Energy

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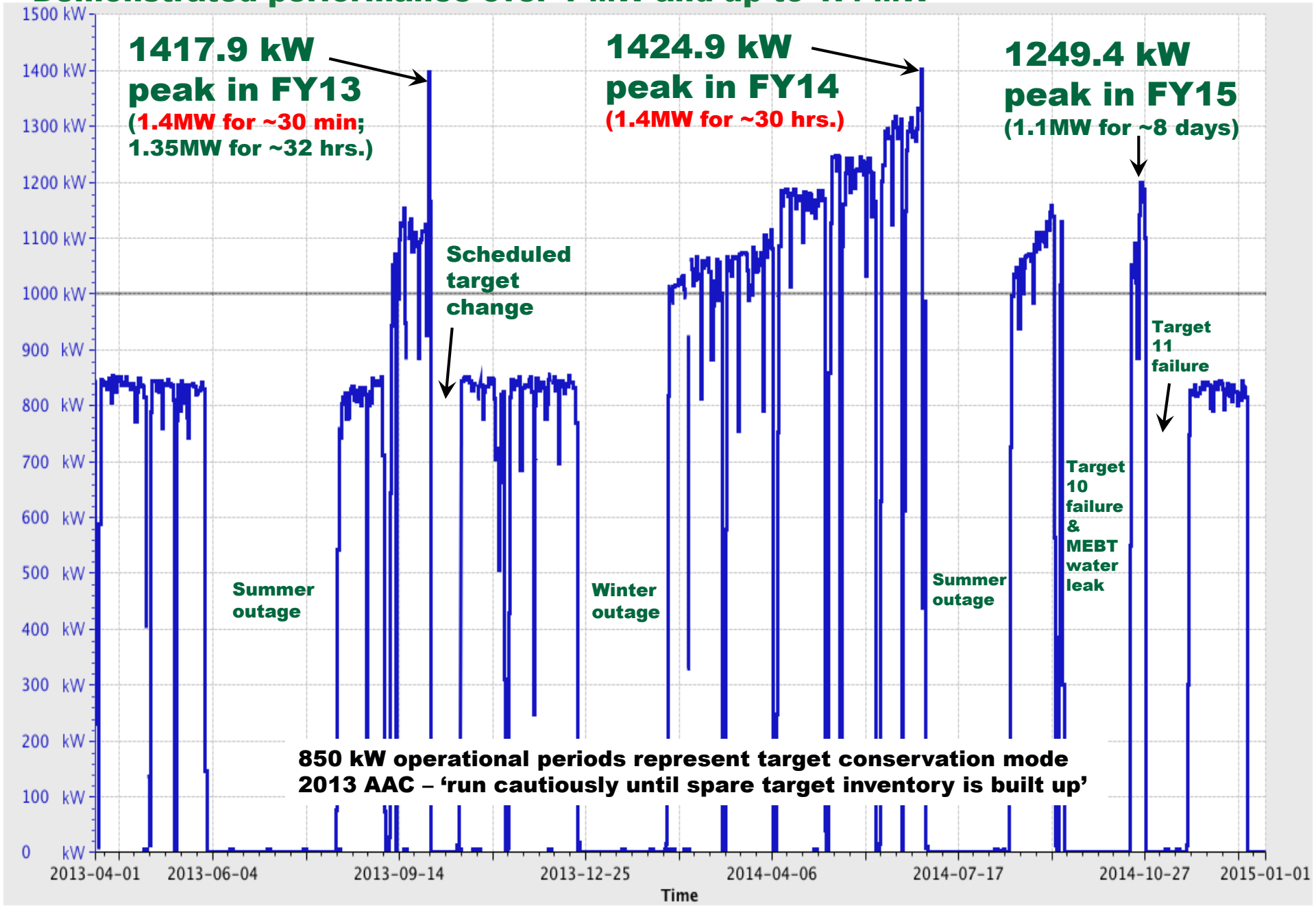
Outline

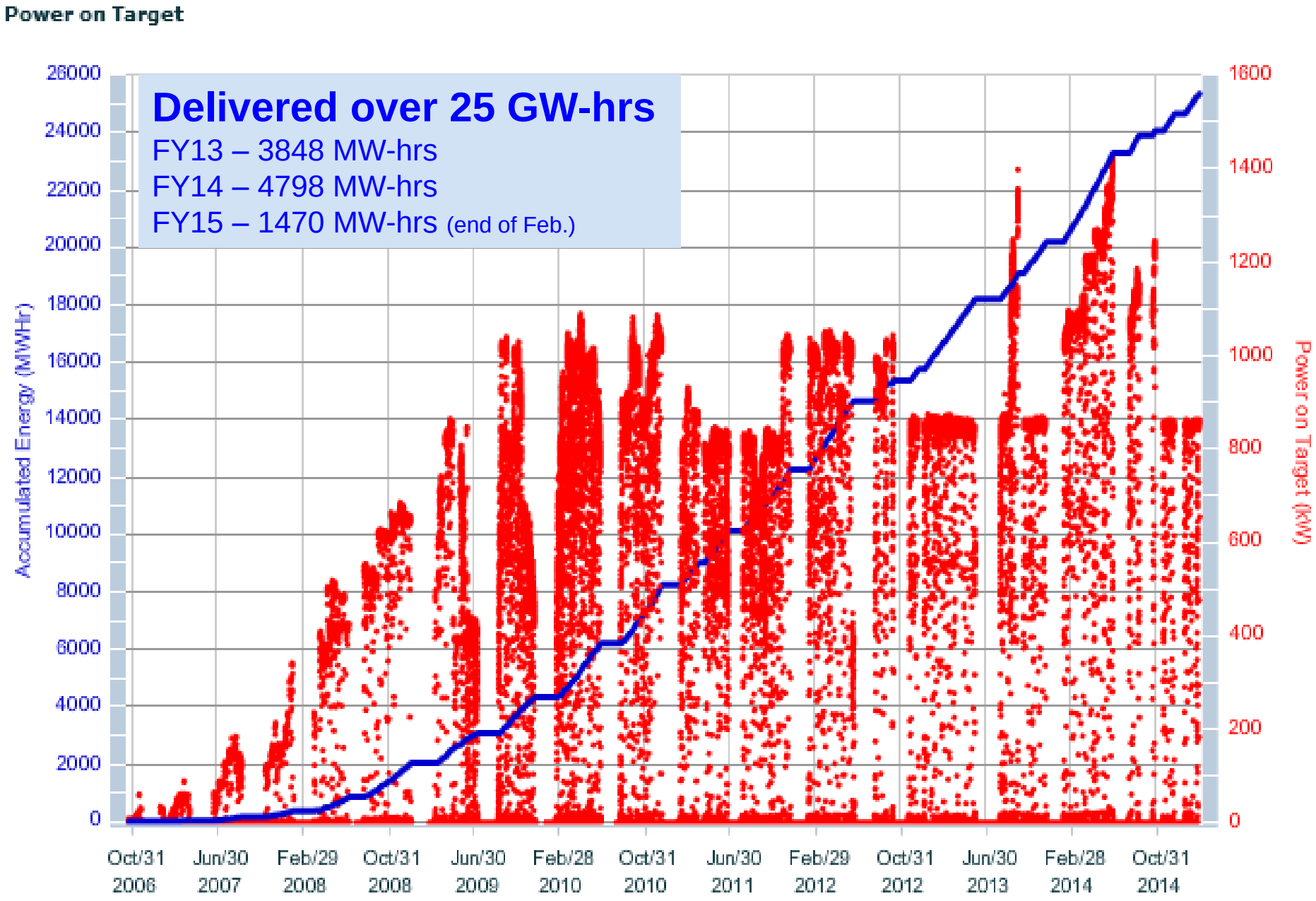
- Beam Power
- FY13/14/15 Run Schedules
- Review of SNS Commitments
- Performance
- Downtime Overview
- Summary

Beam power on target (60 sec average)

Demonstrated performance over 1 MW and up to 1.4 MW

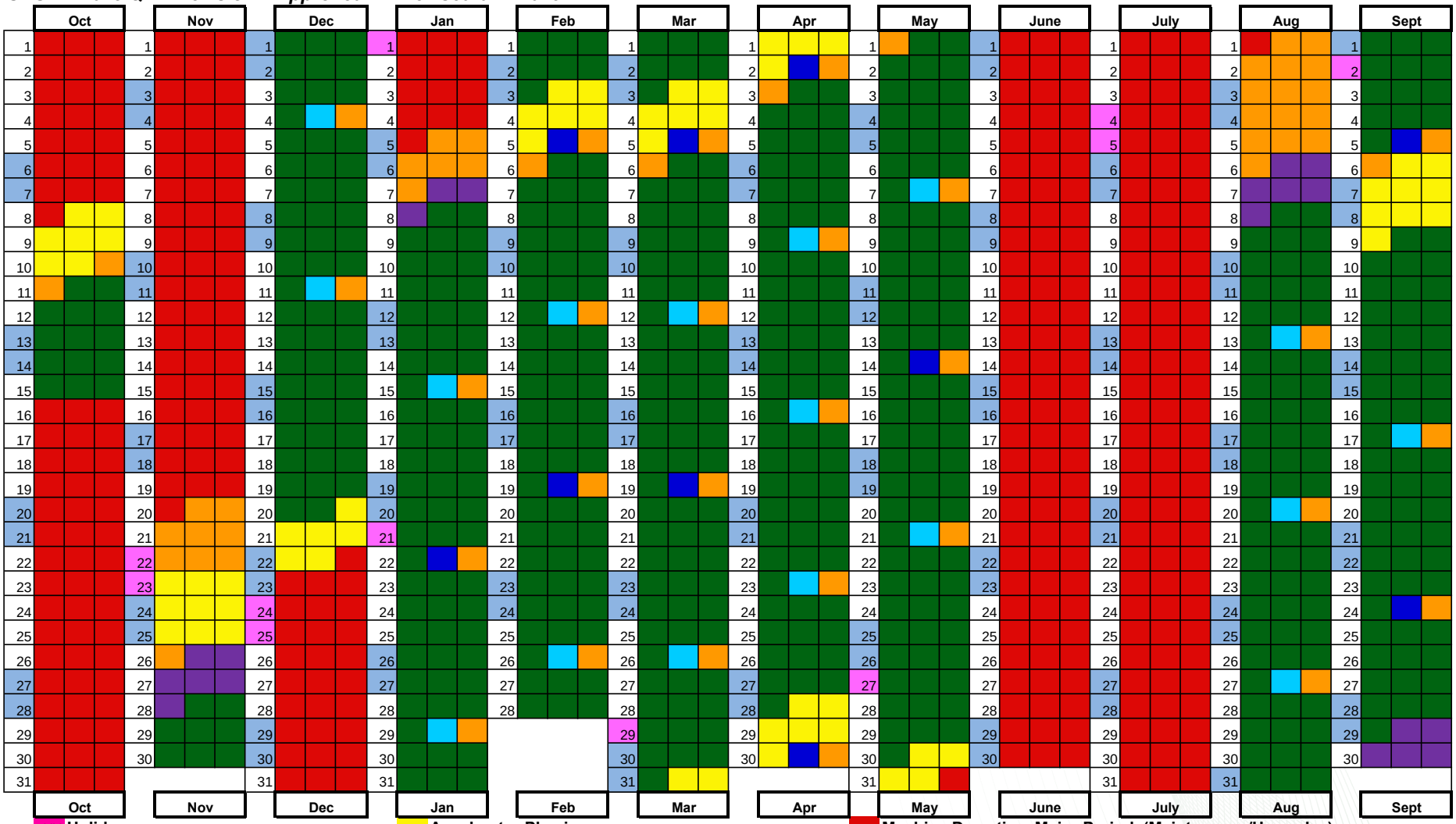


Energy and power on target from October 2006



FY13 Operating Schedule

SNS FY 2013 Q1-4 Revision 2 Approved *Revised 6/11/2013*



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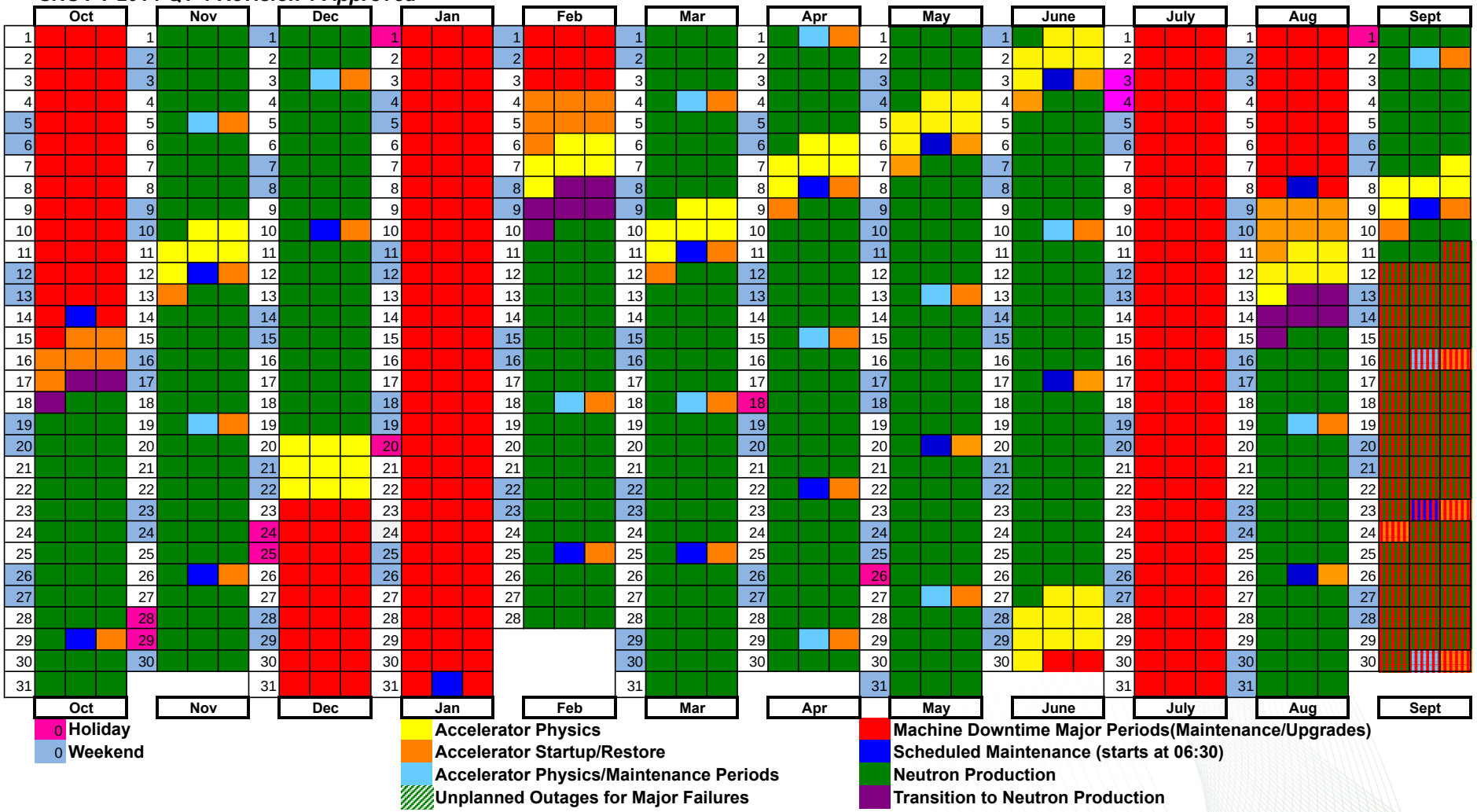
FY14 Operating Schedule

Implemented SNS Scheduling Committee

2013 AAC – involve user community in schedule development

SNS FY 2014 Q1-4 Revision 1 Approved



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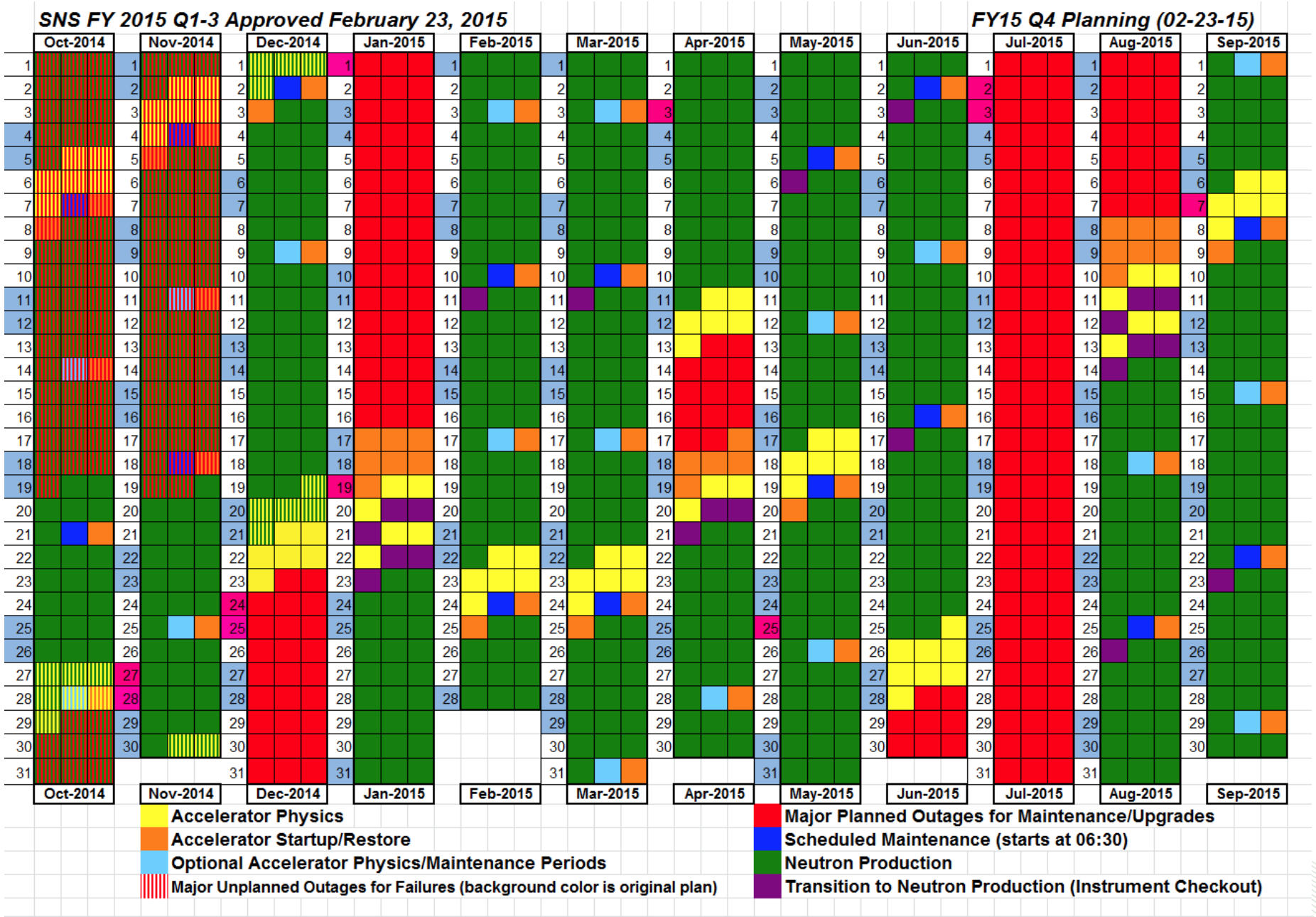
FY15 Q1-3 Operating Schedule



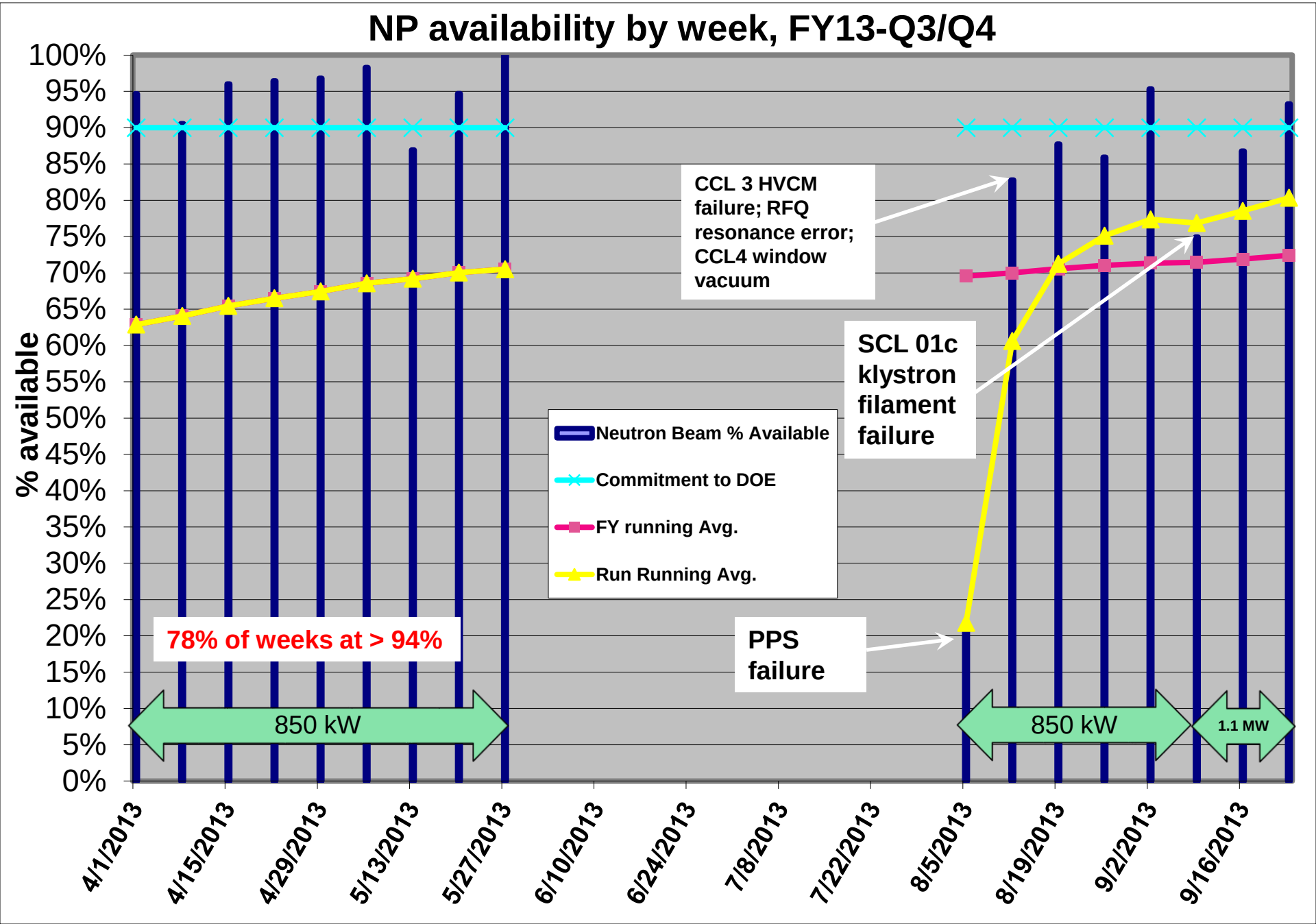
SNS Commitments

We remain committed to delivering 4500 hours of NP

Year	Neutron Production Availability		Integrated Beam Power (MW-hrs)	
	Commitment	Actual	Commitment	Actual
FY2007	68.0%	65.7%	117	159
FY2008	74.0%	72.0%	877	945
FY2009	80.0%	80.7%	2031	2166
FY2010	85.0%	85.6%	3253	3455
FY2011	88.0%	92.0%	NA	4132
FY2012	90.0%	90.0%	NA	4368
FY2013	90.0%	72.4%	NA	3848
FY2014	90.0%	83.7%	NA	4798
FY2015 (Q1)	90.0%	46.8%	NA	757

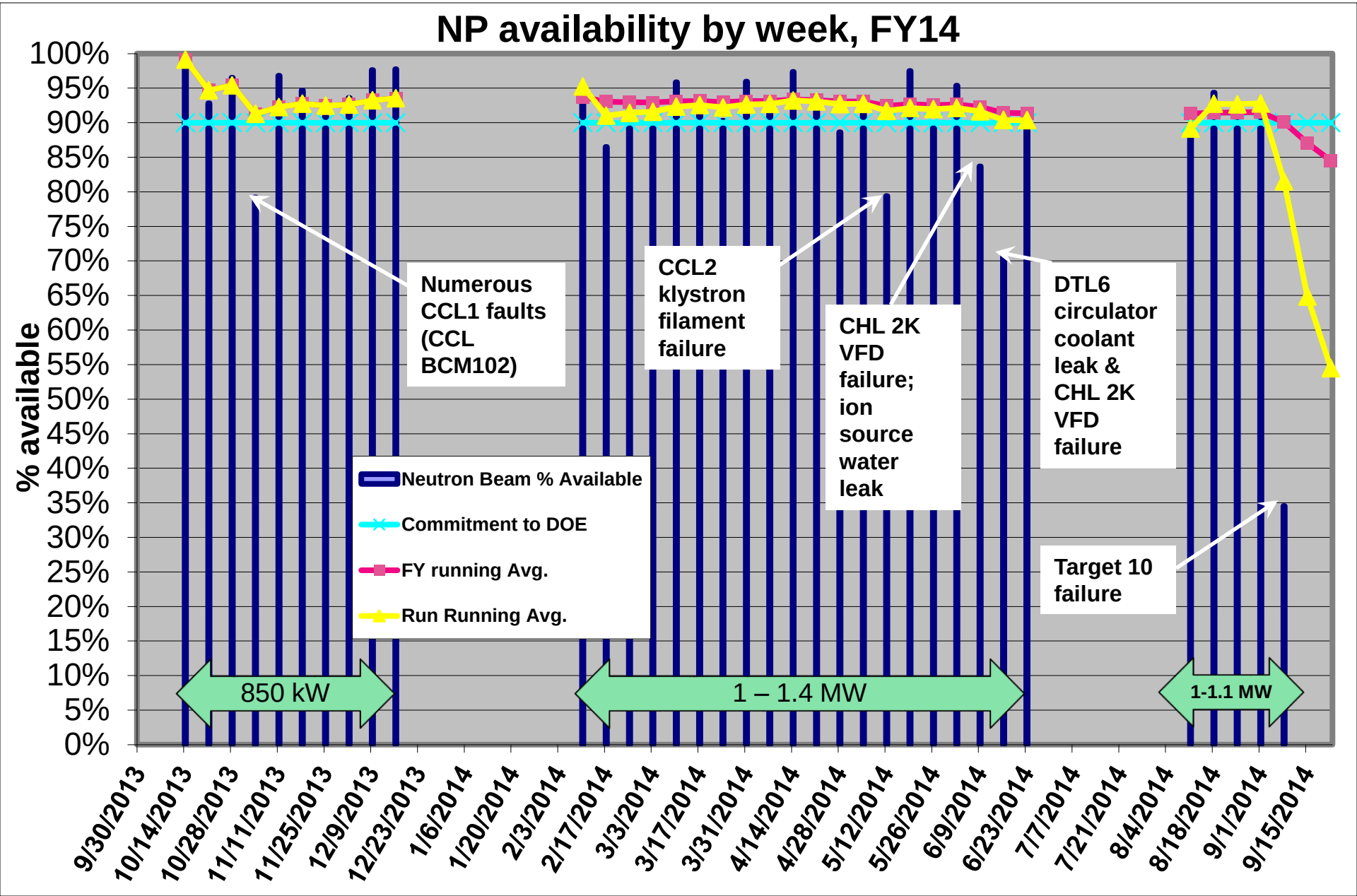
Year	Neutron Production Hours Delivered		Total Operating Hours Delivered	
	Commitment	Actual	Commitment	Actual
FY2007	1500	2078	3500	3779
FY2008	2700	2807	4000	4032
FY2009	3500	3553	4500	4916
FY2010	3900	4250	4800	5310
FY2011	4300	5002	5000	5941
FY2012	4500	4725	5000	5746
FY2013	4000	4202	5000	5120
FY2014	4230	4424	5000	5294
FY2015 (Q1)	4230	845	5000	875

Continued excellent Q3 performance but problems at start of Q4

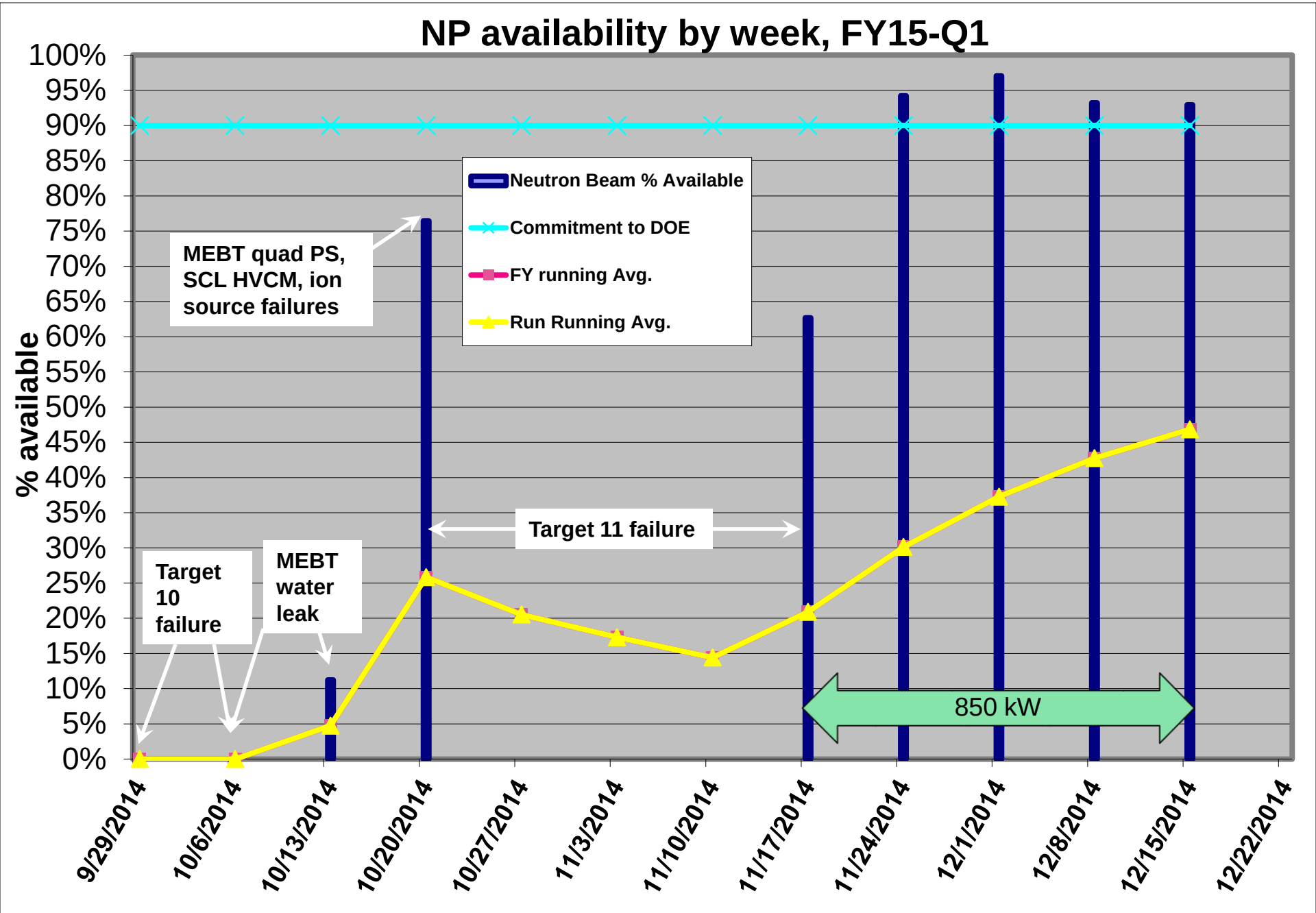


Excellent performance prior to target failure (91.5%)

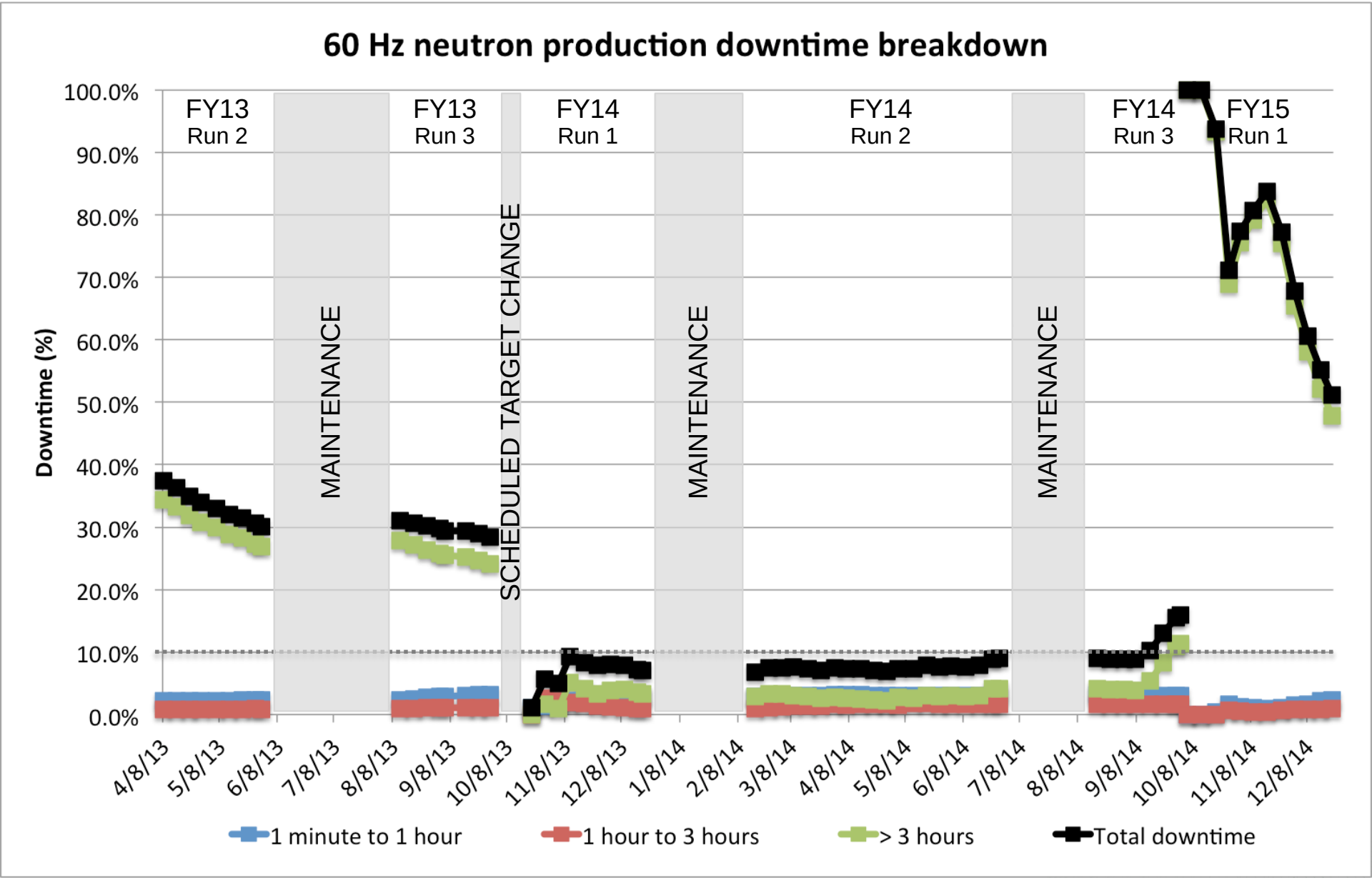
No decrease in availability during high power operations



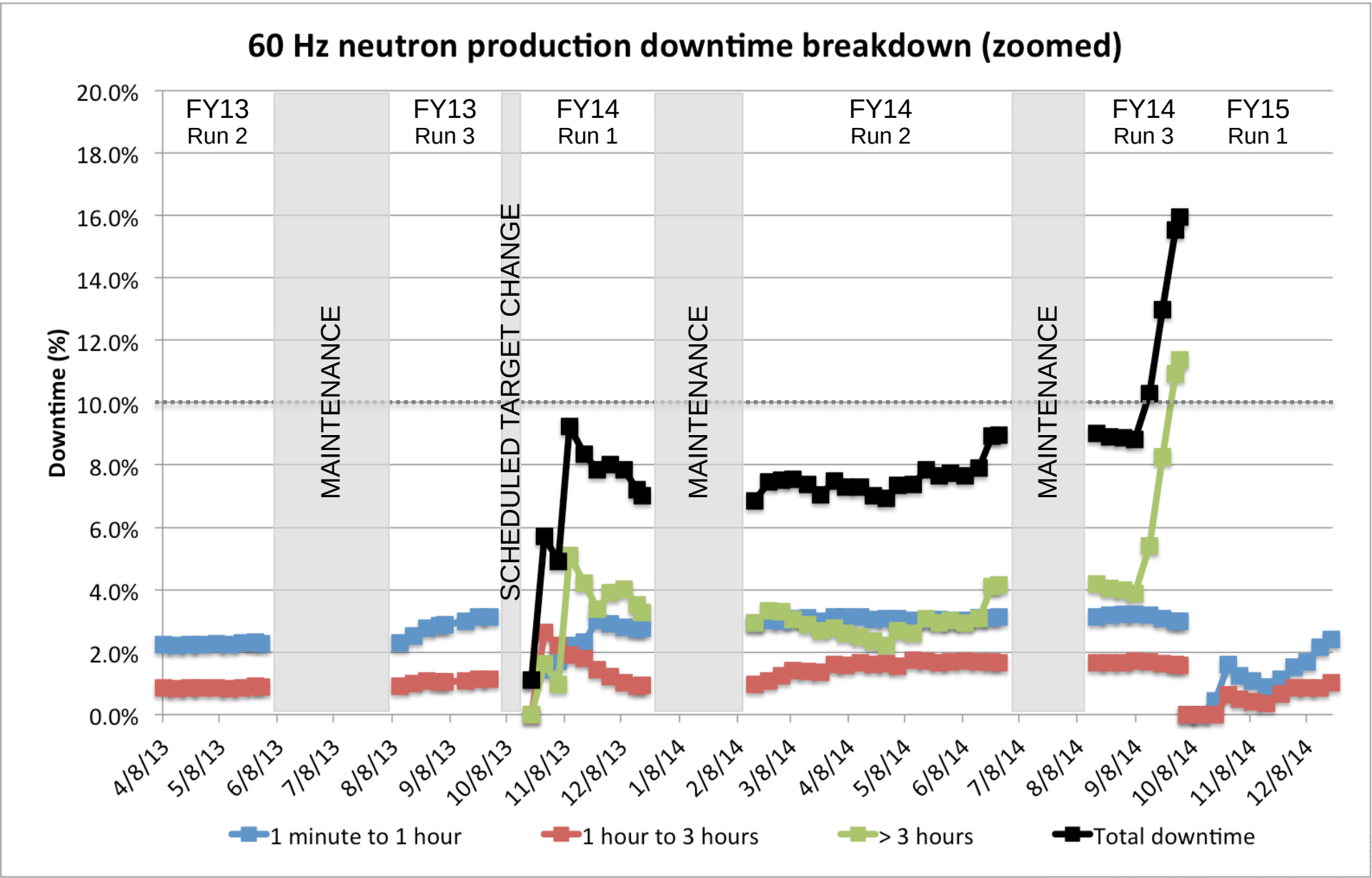
Excellent performance after initial issues in FY15



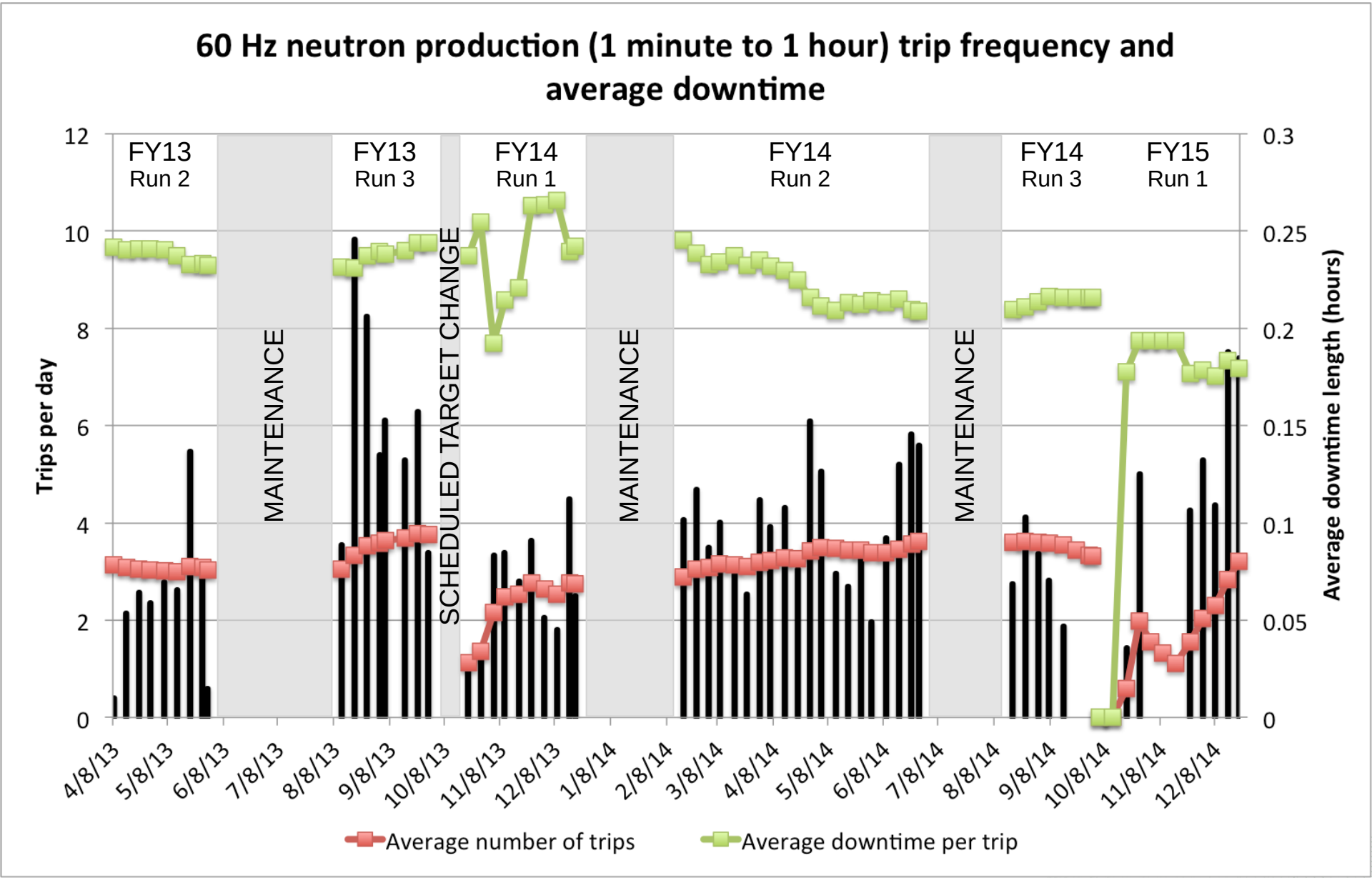
Long duration events dominate our overall downtime numbers



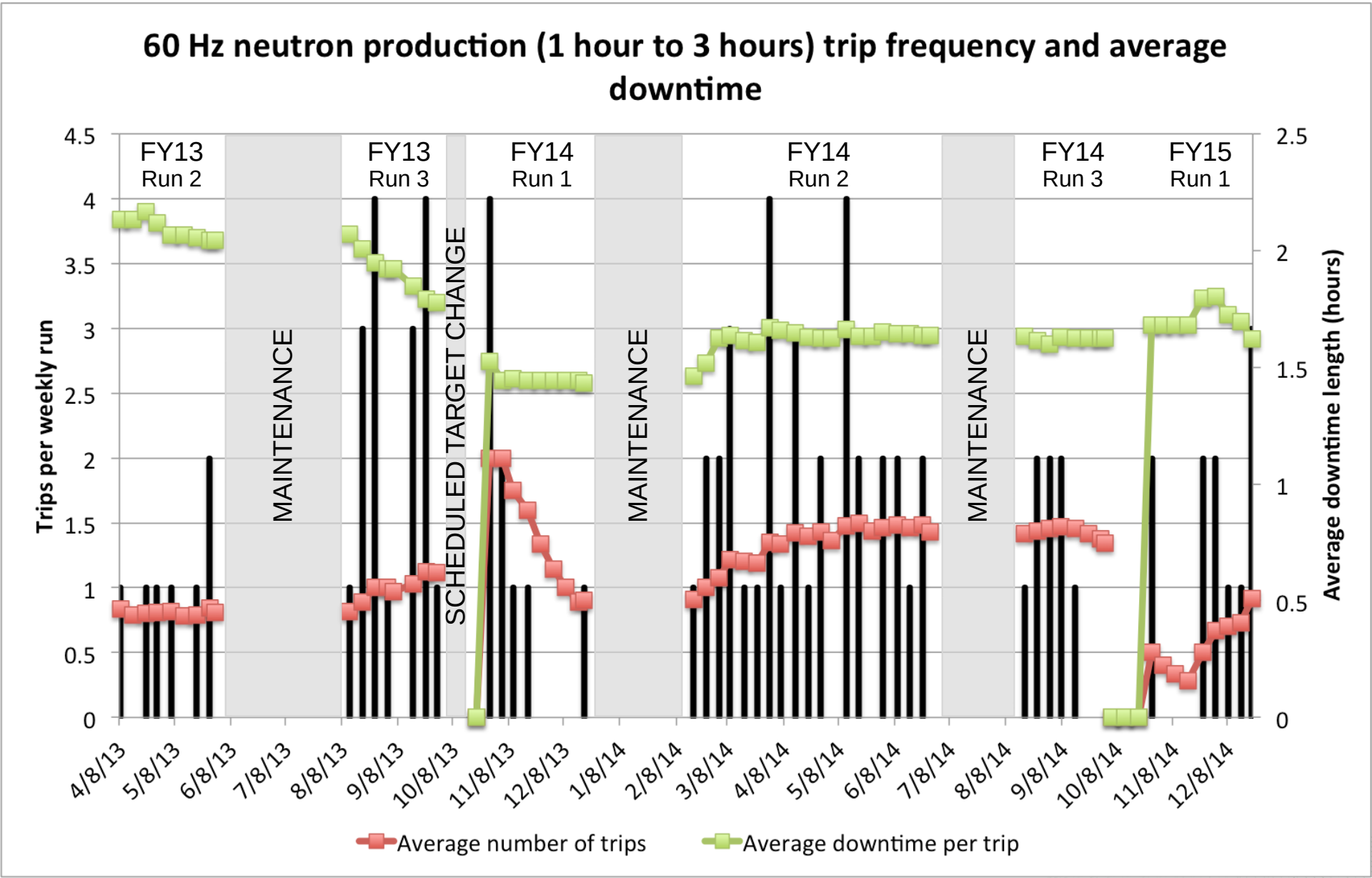
Less than 3 hours trips consistently account for ~4-5% of downtime



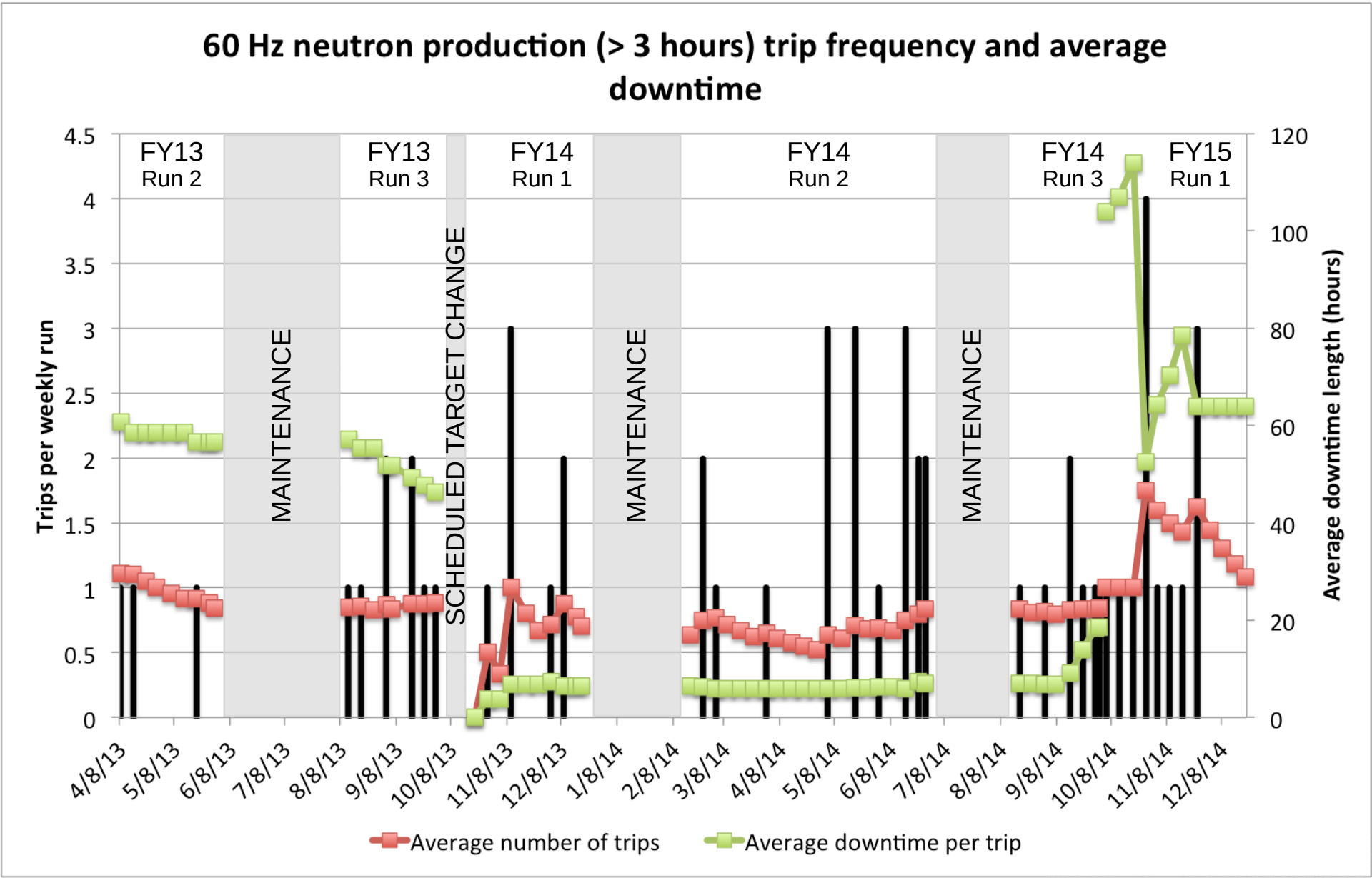
Continue to use frequency plots to look for trends
Short duration trip lengths are decreasing



Medium duration events are fairly constant



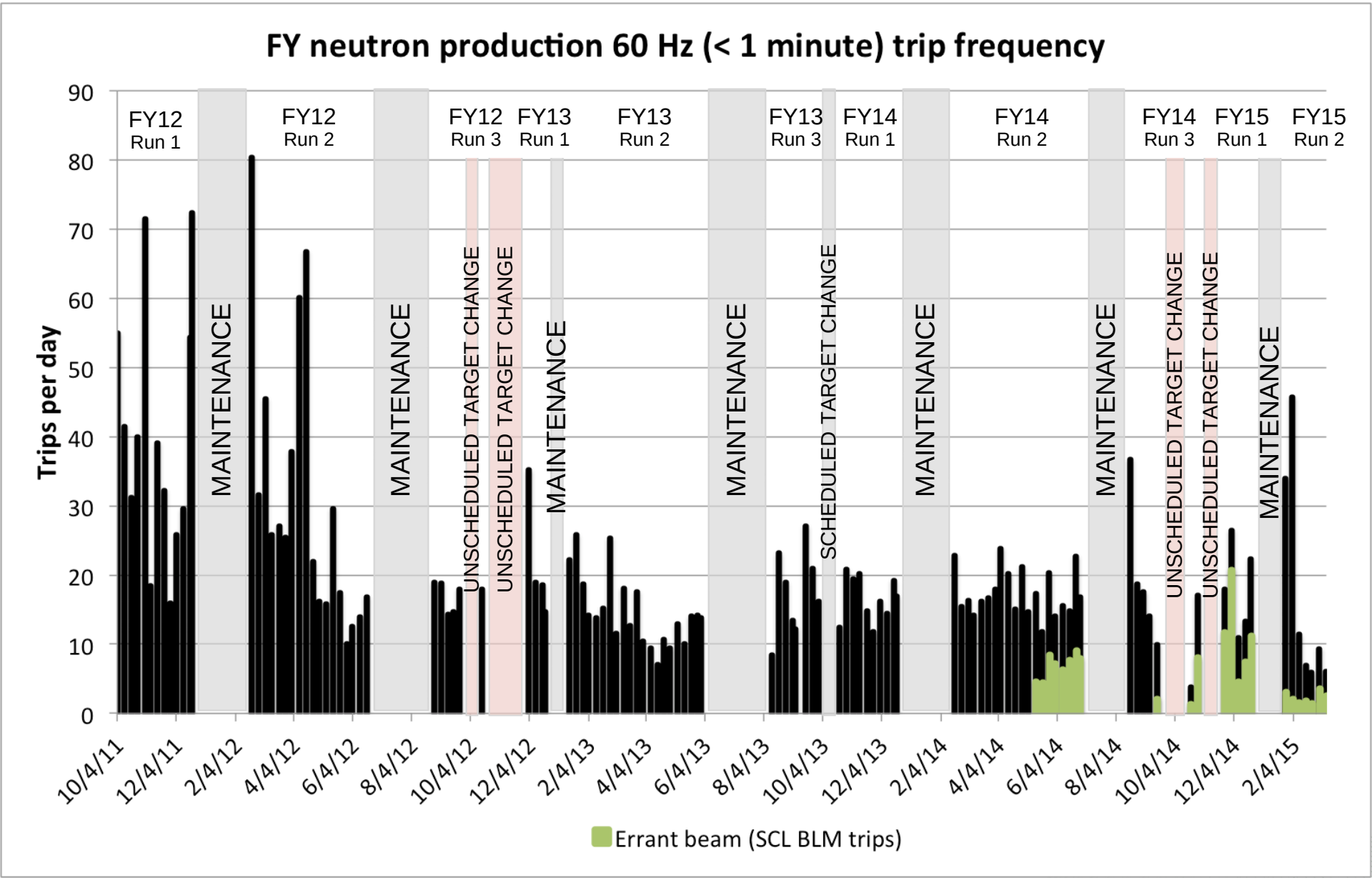
Strive for no more than 1 long duration trip every 2 weeks



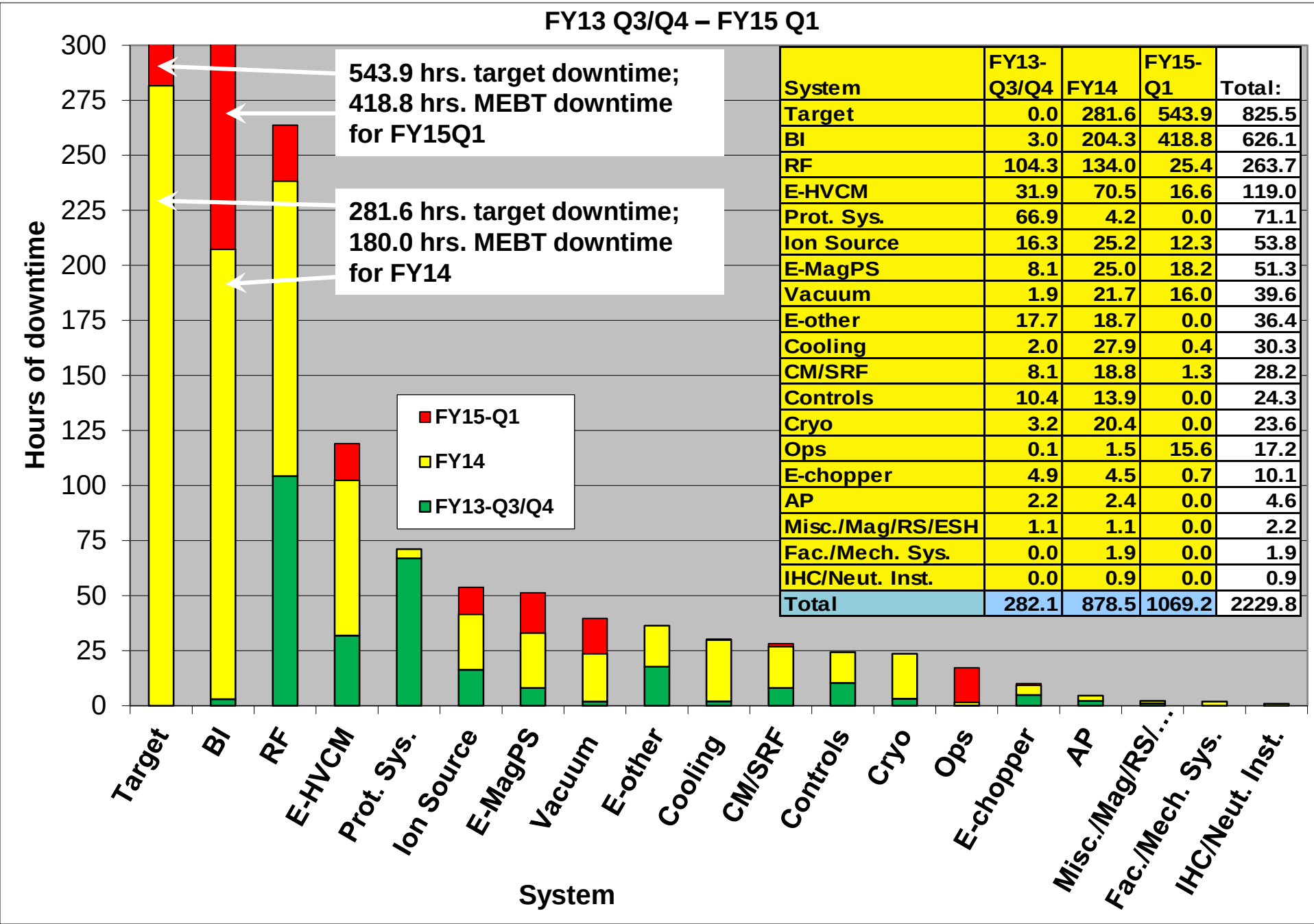
Continue to investigate errant beam

Very short duration trip frequency is improving

2013 AAC – 'reduce errant beam trips from warm linac'



Target our efforts towards highest downtime systems



System	FY13-Q3/Q4	FY14	FY15-Q1	Total:
Target	0.0	281.6	543.9	825.5
BI	3.0	204.3	418.8	626.1
RF	104.3	134.0	25.4	263.7
E-HVCM	31.9	70.5	16.6	119.0
Prot. Sys.	66.9	4.2	0.0	71.1
Ion Source	16.3	25.2	12.3	53.8
E-MagPS	8.1	25.0	18.2	51.3
Vacuum	1.9	21.7	16.0	39.6
E-other	17.7	18.7	0.0	36.4
Cooling	2.0	27.9	0.4	30.3
CM/SRF	8.1	18.8	1.3	28.2
Controls	10.4	13.9	0.0	24.3
Cryo	3.2	20.4	0.0	23.6
Ops	0.1	1.5	15.6	17.2
E-chopper	4.9	4.5	0.7	10.1
AP	2.2	2.4	0.0	4.6
Misc./Mag/RS/ESH	1.1	1.1	0.0	2.2
Fac./Mech. Sys.	0.0	1.9	0.0	1.9
IHC/Neut. Inst.	0.0	0.9	0.0	0.9
Total	282.1	878.5	1069.2	2229.8

Weekly Machine Health Report allows us to apply resources as emergent issues arise

- AP
  - Software issues with open xal (launcher, ldmp wizard, RTBT wizard, ~~orbit correction~~)
- Controls
  - Faulting MPS Edmp chassis Ring_MPS2A sublink signals.
- RF
  - ~~MEBT3 tuner is not working properly~~
  - ~~Possible CCL2 HPRF issue (SSA, FCM, or klystron)~~
  - RFQ B coupler instability (coupler heating noted on Monday August 4th)
  - SCL BLM19b faulting due to possible changes in x-ray background
  - ~~MEBT1 trips on vacuum interlock (seen last run as well)~~, now MEBT4
  - DTL3 vacuum bursts near IP302
  - DTL6 chatter faulting (vacuum faults indicated on the HPM)
- Vacuum
  - CCL4 to LEDP vacuum burst (tried replacing IP410, but vacuum personnel report IP410 is like new)

Trends can tell us something about future issues

MPS overall			First Hits		
System	Subsys.	Sub-sub	Last week	2 wks. ago	3 wks. ago
FPAR	LLRF	HPM	1552	1251	1472
FPAR	MPS	FPAR	898	877	912
FPAR	Mag	PS(Ekick)	218	339	487
FPAR	Diag	BLM	203	172	440
FPL	HPRF	Xmtr	38	5	11
FPL	MPS	FPL	36	29	35
FPL	Chop	MPS	13	27	16
FPL	Mag	PS	9	10	4
FPAR	Diag	ND	6	5	1
FPL	HPRF	Mod	5	1	2
FPAR	Diag	Scrp	0	113	12
FPL	MPS	Dump	0	2	2
FPL	Vac	VSIL	0	0	2
FPAR	Diag	DBCM	0	0	0
FPL	Mag	EKick	0	0	0

FPAR 3 wk. trends			First Hits		
System	Subsys.	Device	Last week	2 wks. ago	3 wks. ago
LLRF	HPM	RFQ	1324	1147	1217
LLRF	HPM	MEBT_4	42	38	20
LLRF	HPM	DTL_3	32	18	4
Diag	BLM	SCL_10c	25	14	118
Diag	BLM	HEBT_03	23	14	54
Diag	BLM	RTBT_13	17	9	5
Mag	PS	Ekick_WF04	95	112	97
Mag	PS	Ekick_WF02	56	122	289
Mag	PS	Ekick_WF03	39	51	40
FPL 3 wk. trends			**First Hits**		
Mag	PS	CCL_DCH408	3	0	0
Mag	PS	RTBT_DCV13	3	0	0
Mag	PS	RTBT_DCV07	2	0	0

Summary

- Demonstrated 1.4 MW operations and sustained operations well above1 MW!!!
- Availability was excellent at the end of FY13 through FY14 until the 2 target failures and MEBT water leak
- Long downtime events have had an impact on scheduling, performance, and beam power levels
- We continue to measure our performance and make system improvements as you will hear over the next 2 days