

Run12 Availability...

RHIC Retreat July 26, 2012

P. Ingrassia

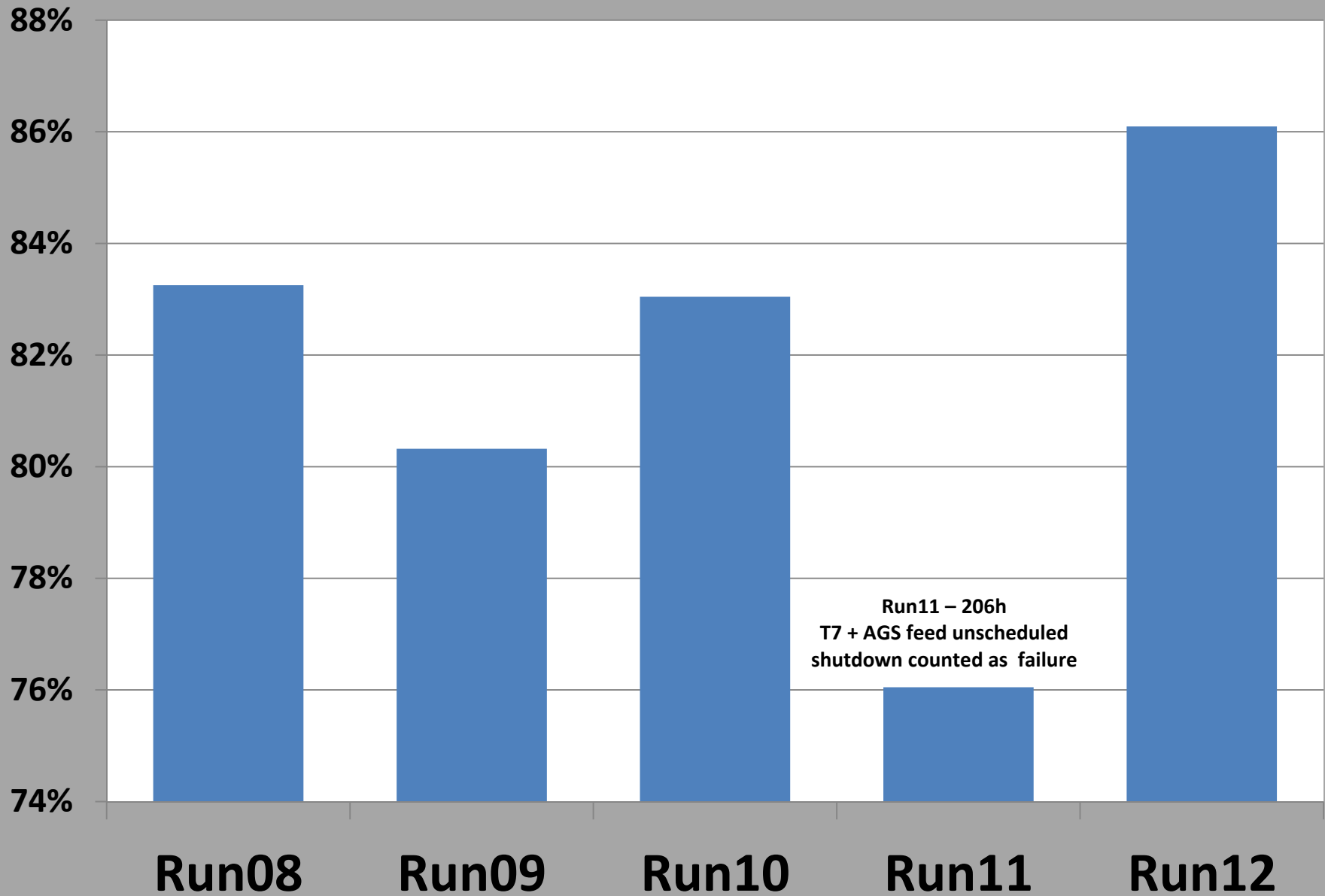
THIS TALK

- **QUICK** review of availability
- “SETUP” next 3 speakers
 - RHIC PS
 - RHIC Rf
 - Maintenance

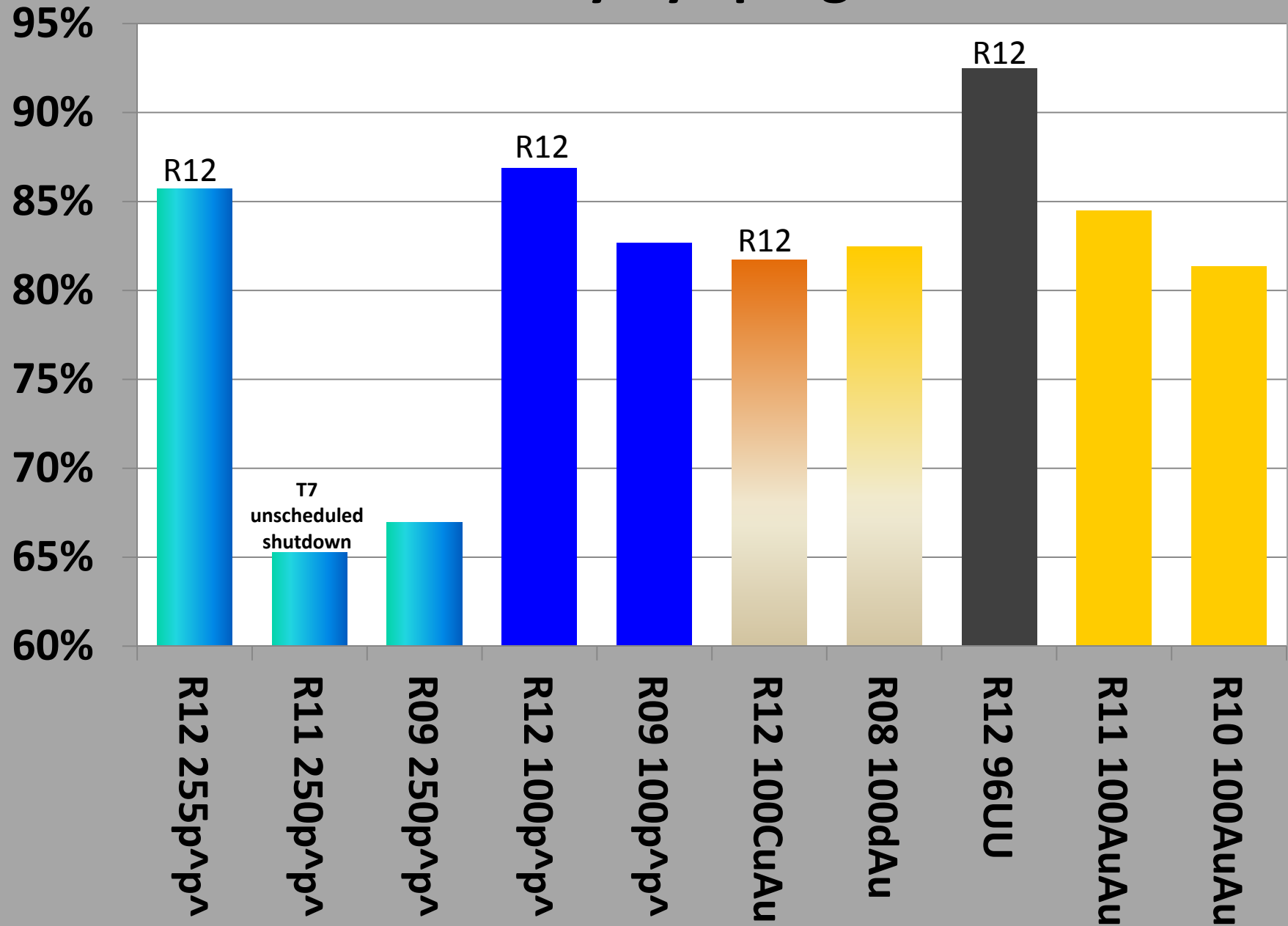
Notes

- “Scheduled Hours” = sum of [**physics + development + apex + machine setup + experimenter setup + failure**] hours
 - maintenance and shutdown are not “scheduled (running) hours”
- Failures normalized by Scheduled Hours for the run in question.
- Failure Hour charts by system e.g. RHIC_Rf NOT group {RHIC_Rf, AGS_Rf, Booster_Rf}
- Top 10 list is by group

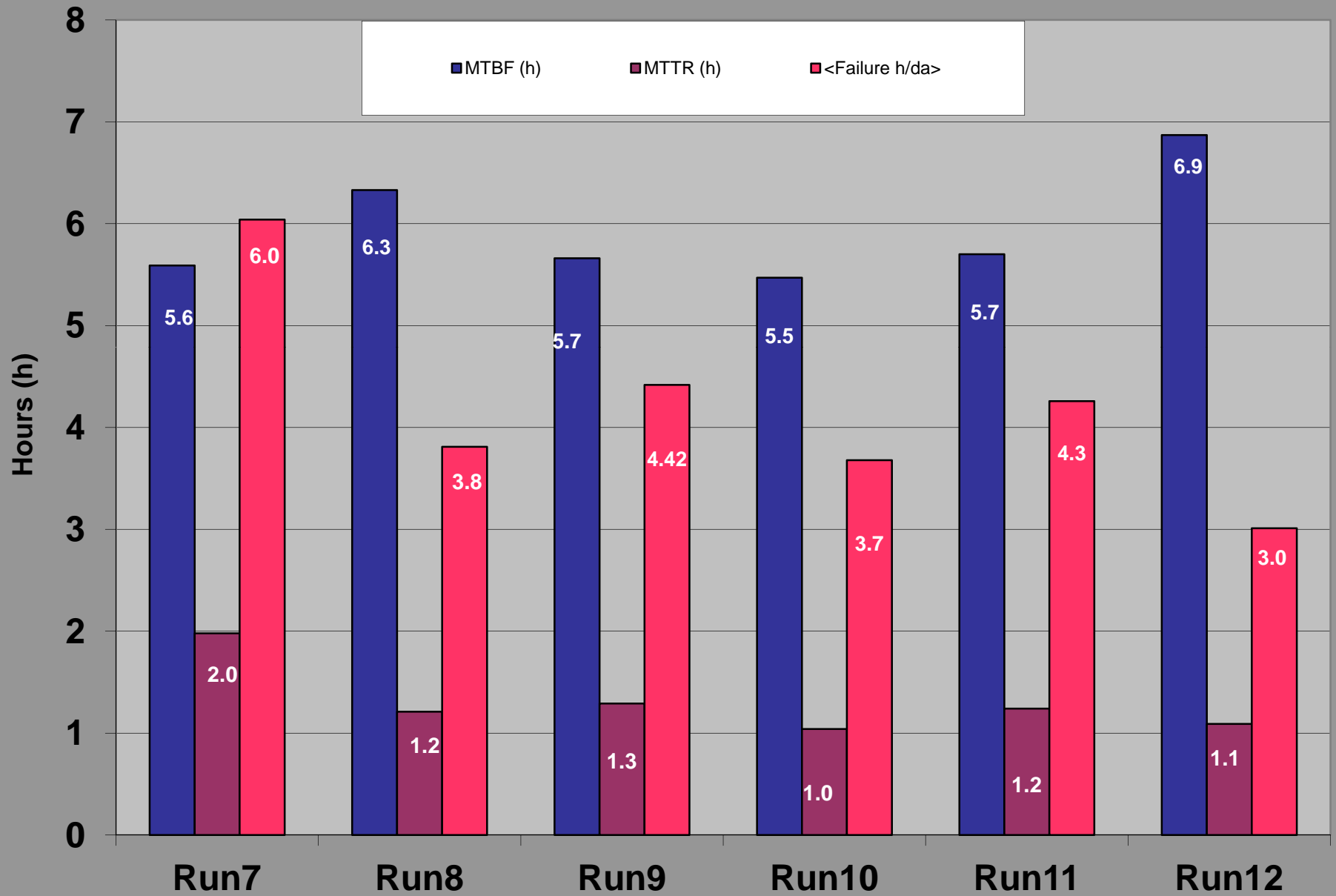
Availability Runs 08 thru 12



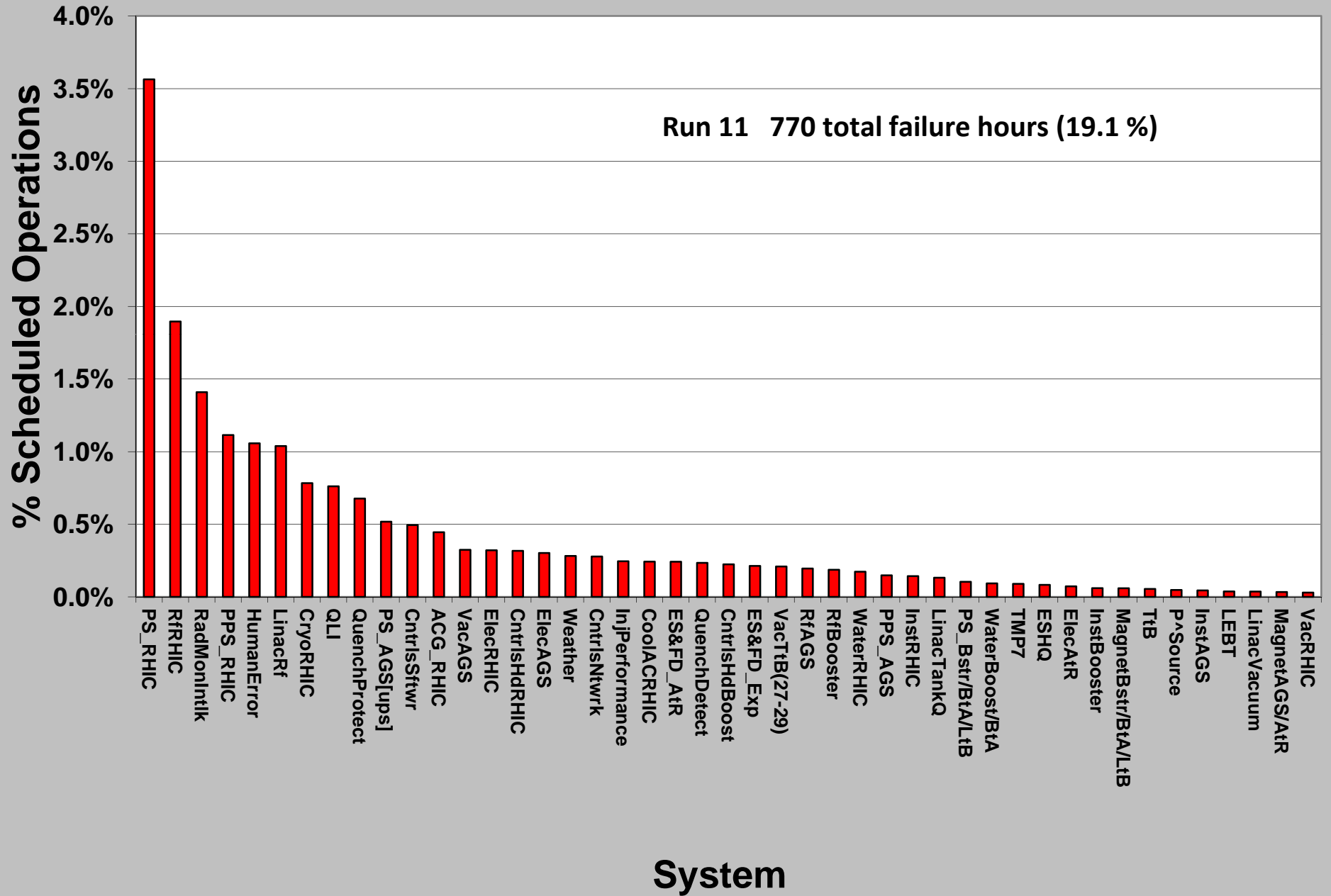
Availability by "program"



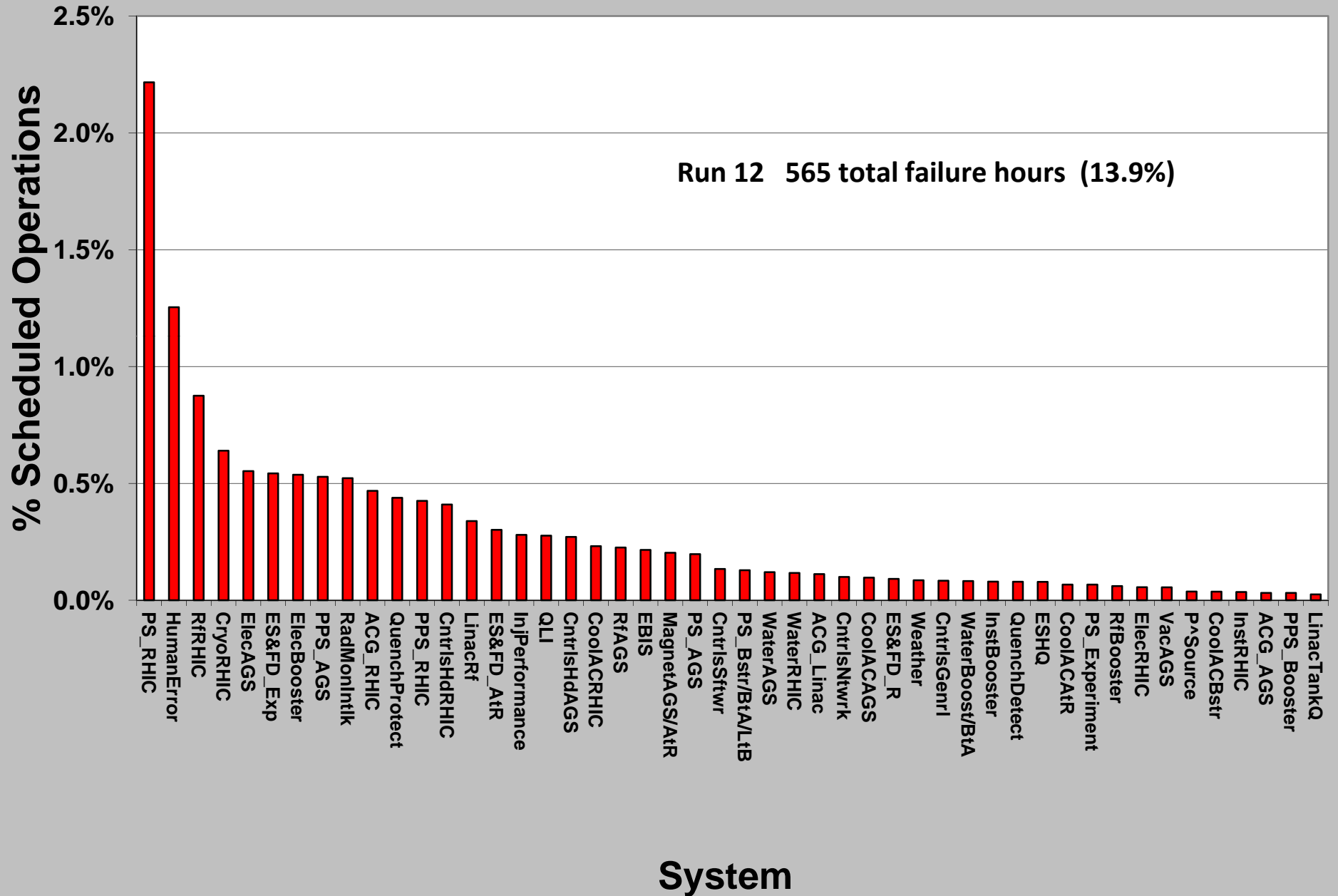
Mean Time Between Failure, Mean Time To Repair, Average Failure hours/day [start to end date]



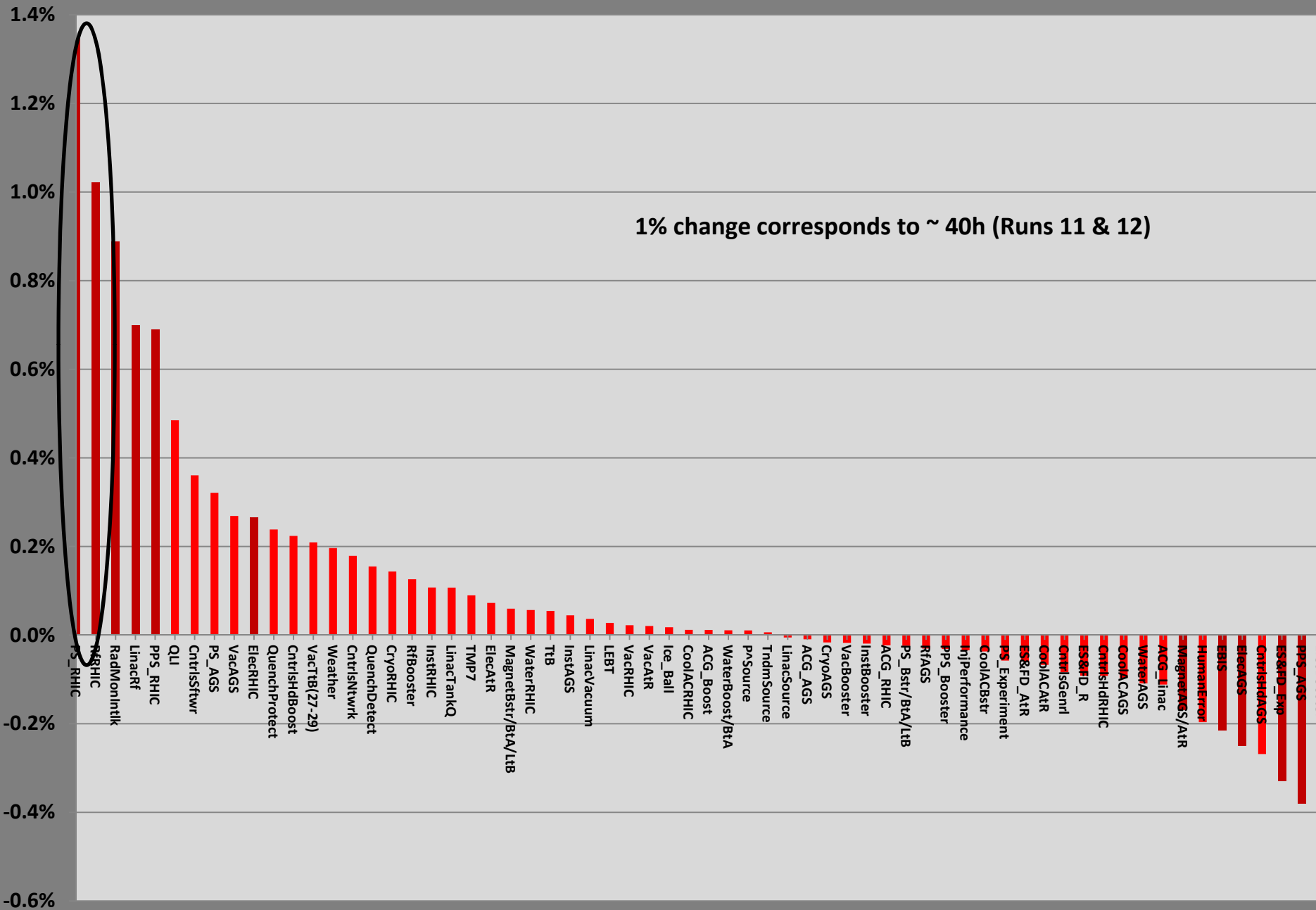
RHIC Run11 Failure Hours (> 1 hr.) by System/Group



RHIC Run12 Failure Hours (> 1 hr.) by System/Group



% Improvement by System Run12 vs Run11



PS_RHIC

R11vR12

(1/2)

- Problems Identified & fixed Shutdown 11
 - PS voltage drop out (redundant wire mod)
 - tq supplies
 - “OFF” problem (ps trips to OFF state)
 - tq supplies
 - DCCT card on q89 supplies

PS_RHIC

RUN11 v RUN12

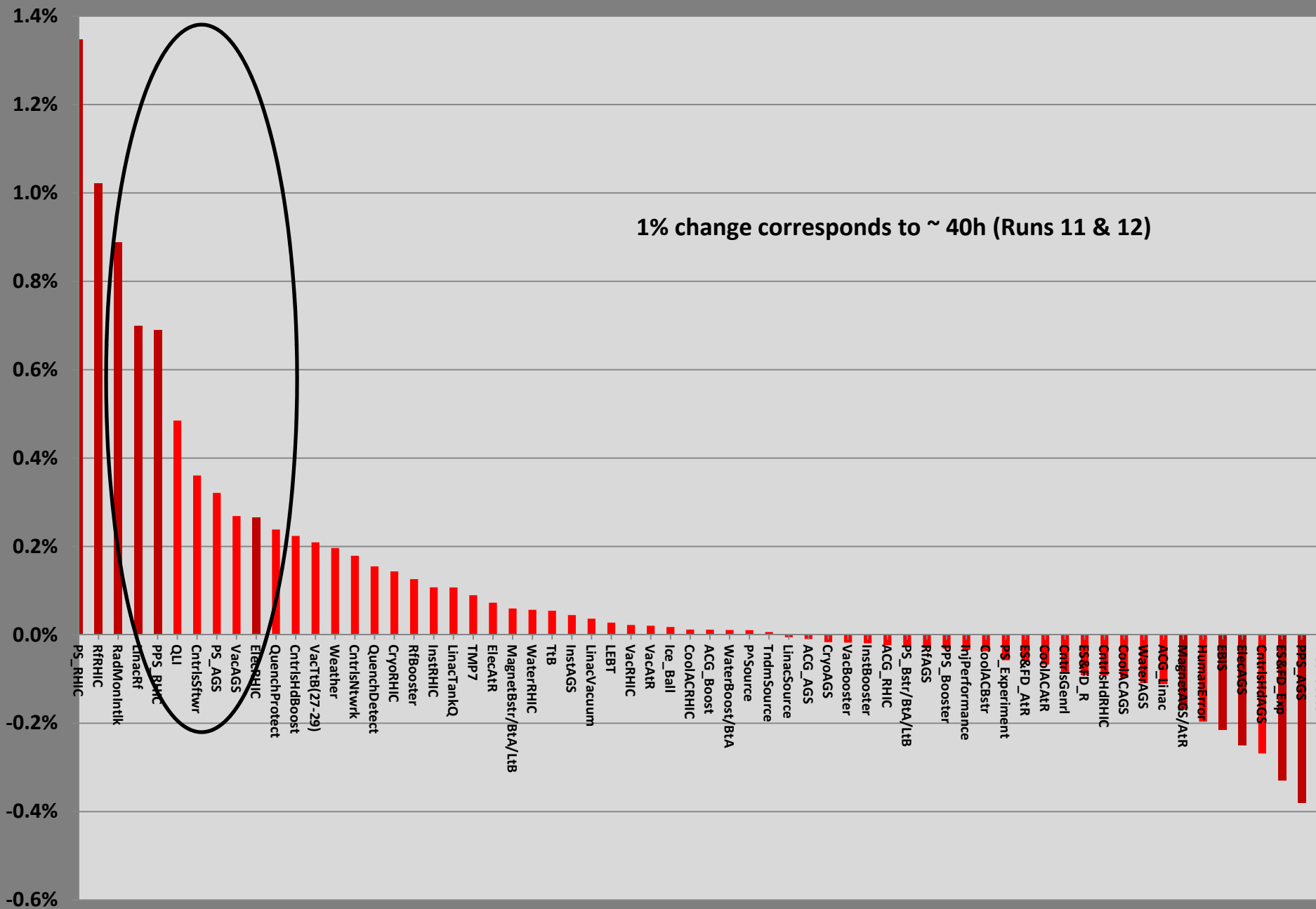
(2/2)

	tq (% scheduled hours)	q89 (% scheduled hours)
RUN 11	0.92%	1.06%
RUN 12	0.34%	0.53%

Rf_RHIC RUN11 v RUN12

HLrf	197 MHz (% scheduled hours)	28 MHz (% scheduled hours)	9 MHz (% scheduled hours)
RUN11	0.27%	0.29%	0.92%
RUN12	0.10%	0.15%	0.41%
LLrf	197 MHz (% scheduled hours)	28 MHz (% scheduled hours)	9 MHz (% scheduled hours)
RUN11	0.02%	0.59%	0.09%
RUN12	0.08%	0.01%	0.12%

% Improvement by System Run12 vs Run11



Improved Performance

in addition to RHIC PS and RHIC Rf

- BLM disables beam permit
 - FEEDBACKS – less tuning -- fewer interlocks
- LINAC Rf
 - Return of experienced help
- RHIC Pulsed Power Supplies
 - Clean living?
- RHIC Electrical
 - events “shift” to injectors

Contributing cause for Improvement

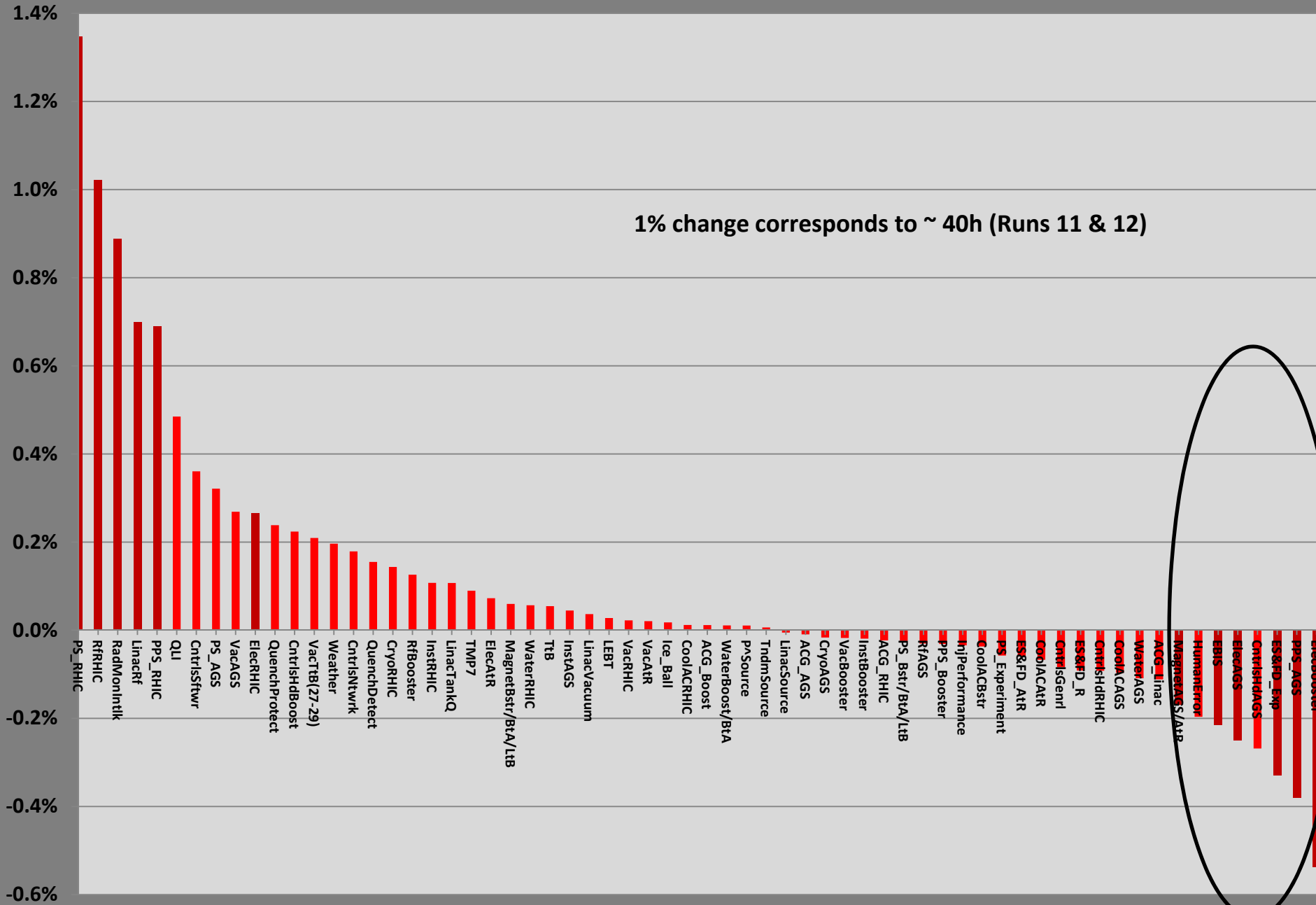
thanks Wolfram

● LONG STORES

- Fewer opportunities to get into trouble between stores
- Failures fixed behind long stores (e.g. EBIS 5/12, 5/19, 5/22,
- Maintenance behind long stores

% Improvement by System Run12 vs Run11

1% change corresponds to ~ 40h (Runs 11 & 12)



Poorer performance

- Electrical Booster & AGS
 - Eagle, Substations Q & R feed
- AGS Pulsed power
 - Direct result of lost power feed
- Experiments
 - Aggressive fault logging?
- EBIS
 - New on the radar
- AGS Magnet
 - mouse in the house
- Human Error
 - The saga continues

ELECTRICAL EVENTS R11vR12

Power Dips & Power Interruptions

RUN11

01/21 Pdip – COMPLEX	(0.10%)
02/05 Tower 6 Breaker - AtR	(0.07%)
02/14 Tower 7 Breaker - RHIC	(0.37%)
03/07 Tower 7 Breaker – RHIC	(4.60%)
03/17 Pdip – COMPLEX	(0.09%)
03/17 911-17 feed –AGS	(1.49%)
03/23 Pdip – COMPLEX	(0.10%)
04/28 Pdip – WEATHER	(0.12%)
05/13 1004B breaker – PASS	(0.06%)
05/19 Pdip – COMPLEX	(0.07%)
06/09 Pdip – WEATHER	(0.07%)
06/17 Pdip – WEATHER	(0.16%)
06/21 Pdip - COMPLEX	(0.05%)
06/ 27 1011C breaker – PASS	(0.03%)
06/29 Pdip – COMPLEX	(0.04%)
Total	(7.32%)*

*7.32% not reflected in 19.1% Run 11 downtime
(5.12% counted as Unscheduled Downtime)

RUN12

01/12 Pdip – Injectors	(0.01%)
03/06 Pdip -- COMPLEX	(0.05%)
03/14 Pdip – COMPLEX	(0.12%)
04/07 Pdip – COMPLEX	(0.06%)
04/21 928 MCC – AGS	(0.22%)
05/27 Pdip -- COMPLEX	(0.08%)
06/01 Booster Feed (eagle)	(0.59%)
06/22 911 Feed – Injectors	(0.64%)
06/25 Pdip WEATHER – BLIP & NSRL	(0.07%)
Total	(1.84%)

Top 10 “Failure List” by group

	FY12 RANK	FY12 HOURS	FY11 RANK	FY11 HOURS	FY10 RANK	FY10 HOURS	FY09 RANK	FY09 HOURS	FY08 RANK
PS_RHIC	1	90.12	1	143.5	1	112.91	1	163.3	1
HumanError	2	50.99	5	42.58	3	61.73	4	40	4
Rf	3	47.21	2	91.7	2	73.08	3	48.8	2
ElectricalService	4	46.56	9	28	14	11.91	8	27.5	13
Controls	5	40.54	6	41.8	5	41.88	10	22.5	5
PulsedPower	6	40.04	4	50.8	4	53.8	6	31.8	7
ES&FD_AtR&Experiment	7	38.03	12	18.3	7	33.6	12	20.3	6
CryogenicSystems	8	26.68	8	31.53	8	32.01	11	21.2	15
Linac	9	25.69	3	52.1	16	0	7	31.1	14
AccessControls	10	25.13	11	19.5	13	19.15	9	23.3	3
QuenchProtect Detect	11	21.05	7	36.7	12	23.75	2	84.3	12
Services A/C	12	17.56		9.9		14.7		7.02	
PS_AGS Booster	13	15.95	10	25.1	10	26.12	5	34.6	10
Services Water	14	12.95	14	11.1	15	3.39	13	19.8	11
Instrumentation	15	4.67	16	5.8	6	35.51	14	15	9
Vacuum	16	3.29	13	14.3	11	25.14	15	3.6	8
Tandem	17	0	15	6.1	9	30.94	16	0	16

Maintenance FY13

RUN IT TILL IT BREAKS? a la(FNAL)

- NEGATIVES

- RUN12 – Major outages 4/12 Saturday (MCC); 6/01 Friday (eagle); 6/22 Friday (AGS Feed).
- Initial conditions – Maintenance starts with non working machine(s)
- Work planning -- more difficult
- Project Slippage – same technician labor force is used for maintenance, repair, and new system fabrication. Delivery schedule of new systems will slip due to “uncertain labor schedules”
- Technician Morale -
- Not addressing real motivation for change!

Maintenance FY13

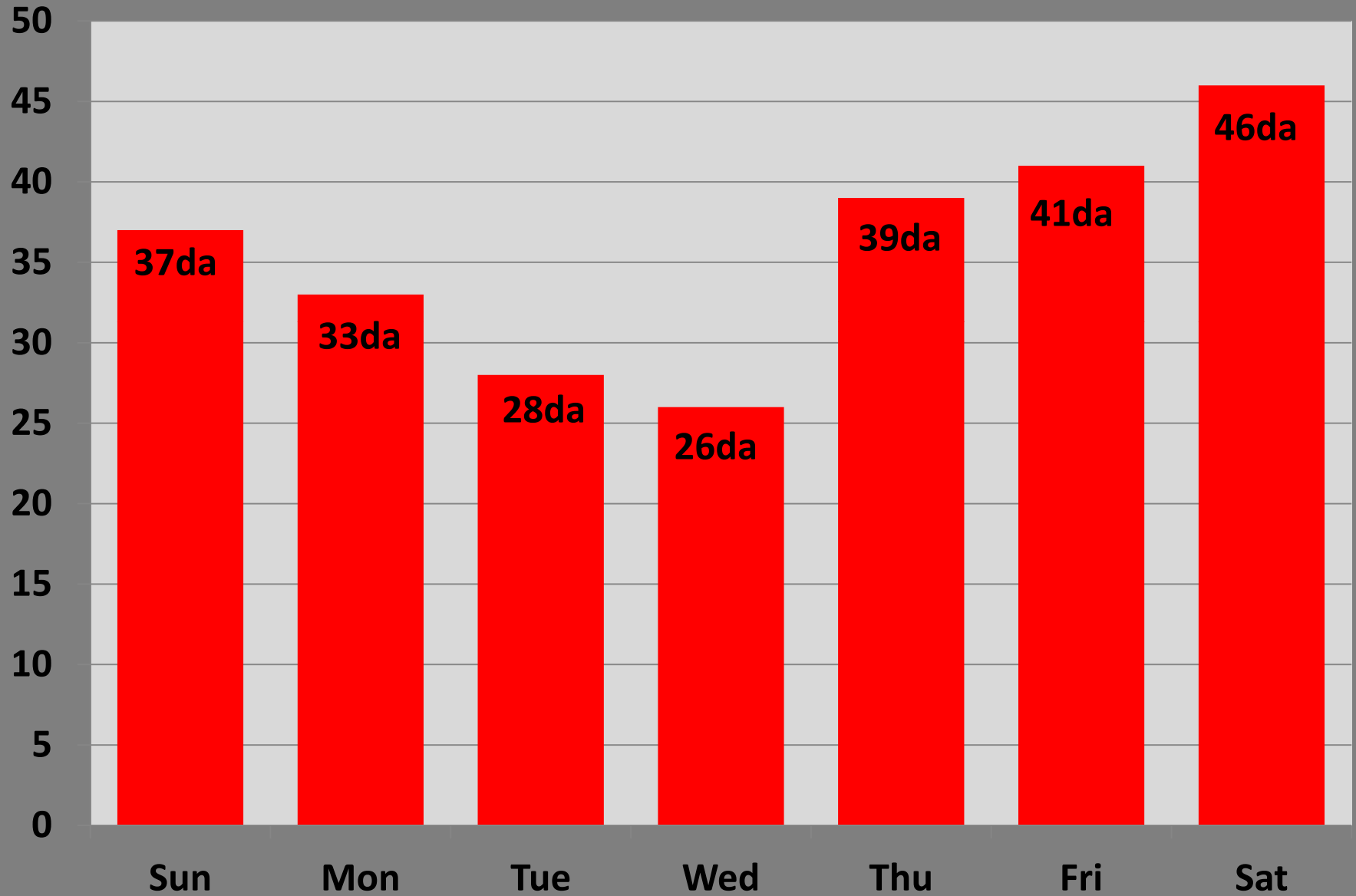
RUN IT TILL IT BREAKS? a la(FNAL)

- POSITIVES

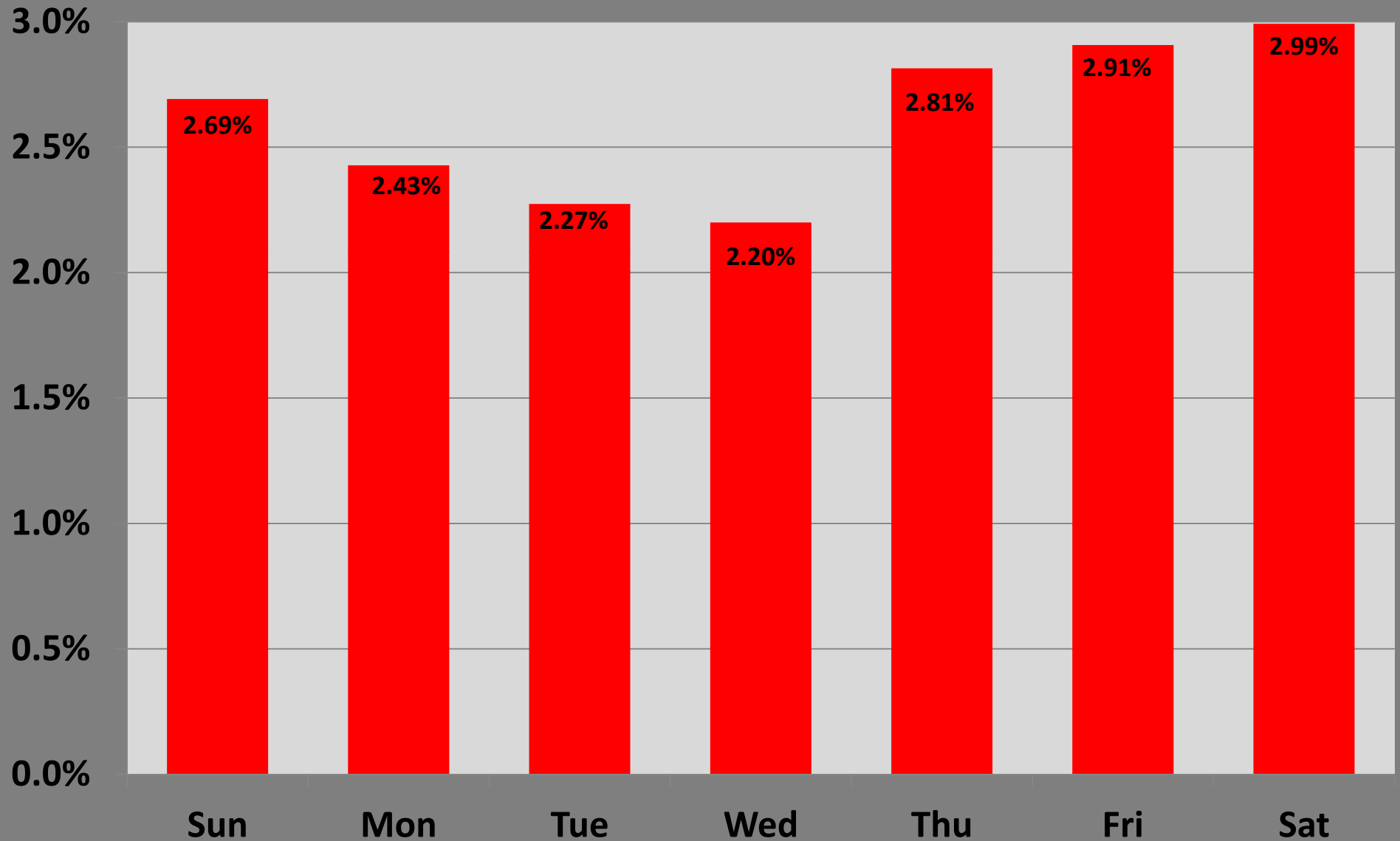
- PHENIX is happy

- Apologies to PHENIX for the apparent SNARKEY remark

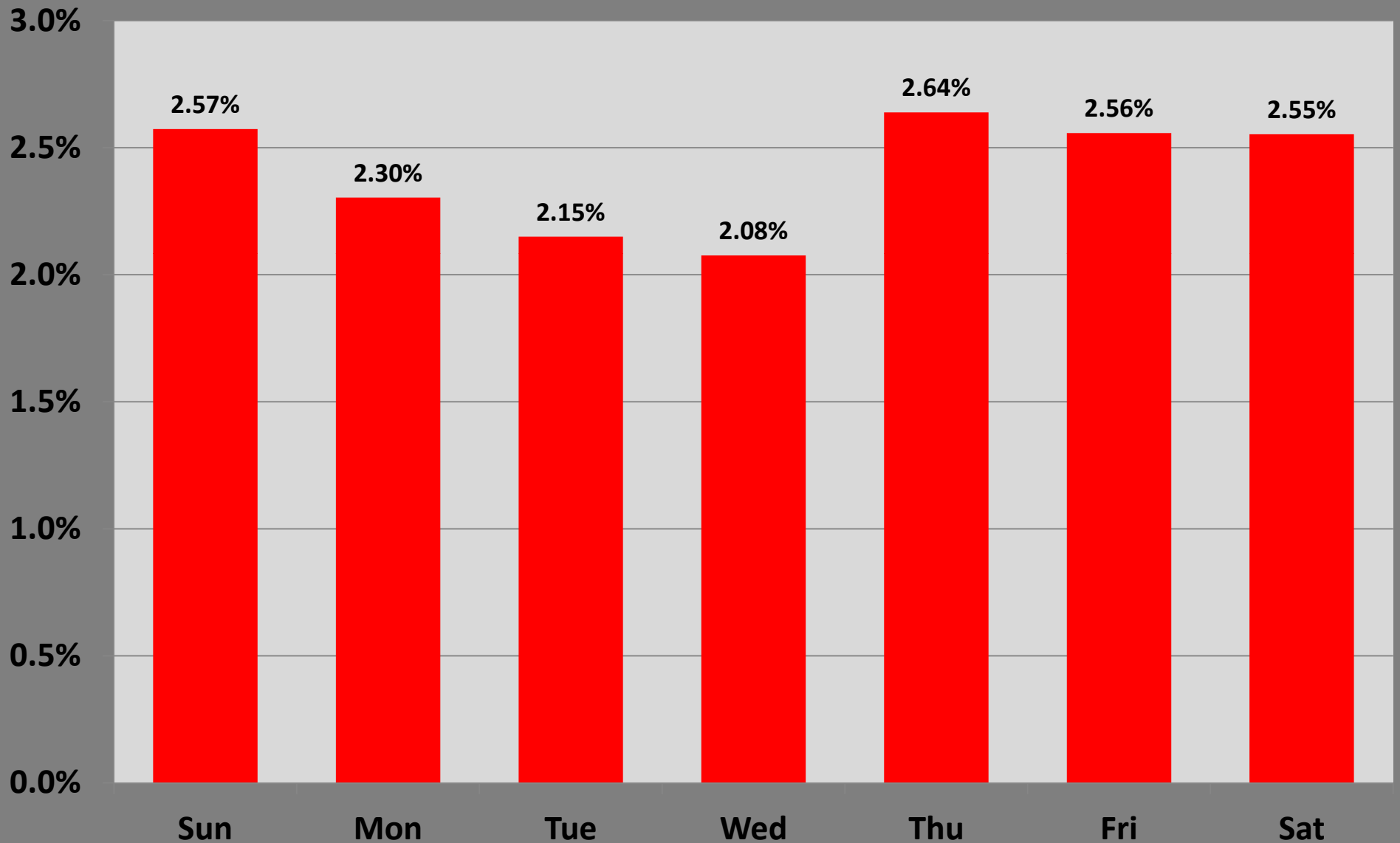
**Number of times a weekday had cumulative failure > 5hr
{sample size 760 days Run8->Run12}**



Sum of failure hours "by day" (R8-R12) normalized to scheduled operating hours



Sum of failure hours "by day"(R8-R12)minus major R11 & R12 electrical failures -- normalized to scheduled operating hours



fin